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Annual Pink Shrimp Review

Oregon Department of Fish and Wildlife

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TO: OREGON SHRIMP INDUSTRY
FROM: Bob Hannah and Steve Jones
Subject: Opening of 2000 Commercial Fishery
Date: 16 February 2000

The 2000 pink shrimp season begins on April 1 and extends through October. After an encouraging 1999 season, we're all wondering what the upcoming season has in store for the shrimp industry. It looks like we may be entering a period of average to better shrimp production, after experiencing six fairly lean years. This newsletter includes a summary of the 1999 season for your review, including catch, effort, and market sample information. Updates on some of our latest research and **important groundfish regulation issues** are discussed.

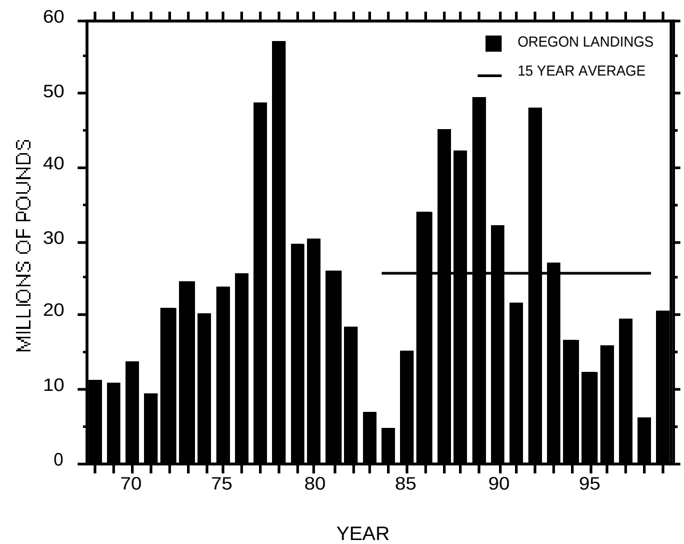


Figure 1. Oregon pink shrimp commercial catch (millions of pounds) 1968-1999. Includes all pink shrimp landed into Oregon

1999 Season Summary

Shrimp fishing began quickly in 1999, with fishermen and processors anxious to get an idea of what shrimp volume and grade was available. A few slowdowns occurred due to price disputes, but the season progressed fairly smoothly overall. Oregon shrimpers landed a total of 20.5 million pounds of pink shrimp during 1999, an increase of about 14.4 million pounds over the 1998 season (Figure 1). It was the largest landing total since 1993, although smaller than the 15 year (1984-'98) average landing total of about 25.8 million pounds.

Monthly landings were below the monthly average throughout the season, but the landings closely approached the average during June and July (Figure 2). Landings peaked during June at 4.5 million pounds. The peak, which typically occurs in May, was delayed due to a combination of small shrimp size, weather and price disputes.

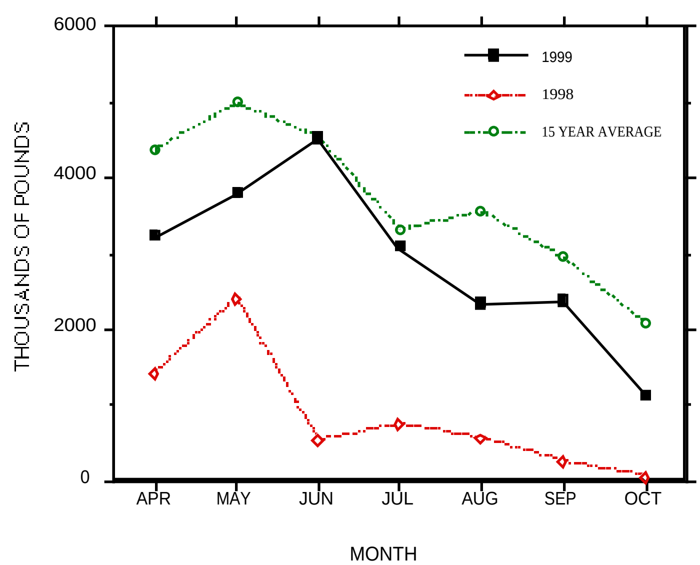


Figure 2. Monthly Oregon pink shrimp landings during 1998, 1999 and the 15 year average (1984-1998).

The bulk of the shrimp harvest occurred between Tillamook Head and the Bandon Bed (Figure 3). The Cape Lookout bed produced the largest portion at about 5.6 million pounds, with the Mudhole coming in second with about 4.1 million pounds. Production was lowest from areas north of Tillamook Head.

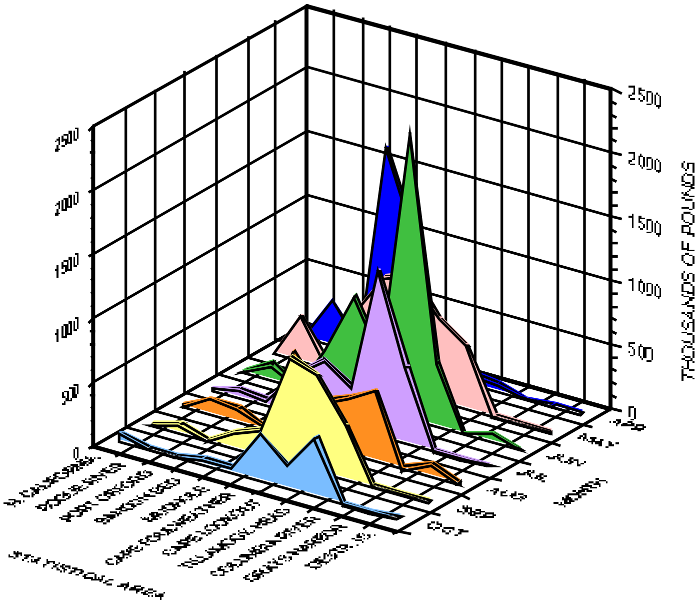


Figure 3. Total Oregon pink shrimp landings (1000's of pounds) by month and area, 1999.

Fishing effort during the 1999 pink shrimp fishery increased approximately 50% over the 1998 season (Figure 4). It was the largest percent increase in the fishery since 1986. The total number of hours fished for shrimp landed into Oregon during 1999 was 74,615 single-rig equivalent (SRE) hours. A total of 121 vessels landed shrimp into Oregon this year, up 12 vessels from 1998. A small part of this increase can be attributed to groundfish vessels (with either permits or single delivery licenses) entering the fishery due to groundfish harvest reductions. However, the number of vessels is still well below the numbers seen in 1990-1995, when the number of participating vessels fluctuated between 150-180.

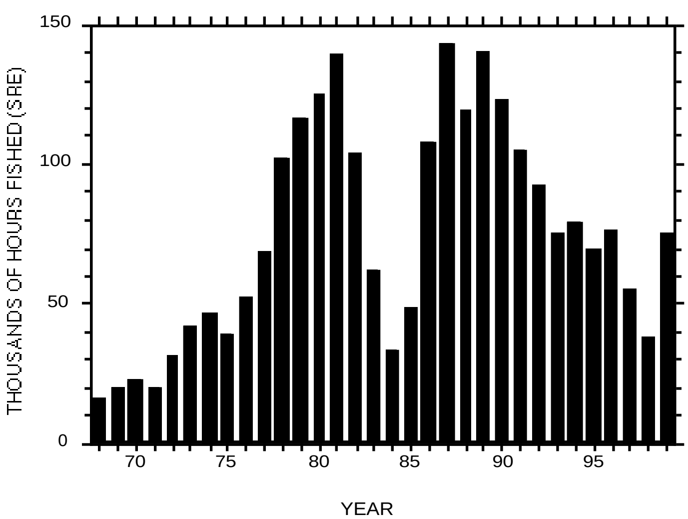


Figure 4. Fishing effort (1000's of single-rig equivalent hours) for pink shrimp landed into Oregon ports 1968-1999.

The season average catch per unit of effort (CPUE) increased sharply in 1999, but remained slightly below the 15 year average CPUE of 282 lb/SRE (Figure 5). CPUE was highest during May, peaking in the Cape Foulweather area at about 580 lb/SRE (Figure 6).

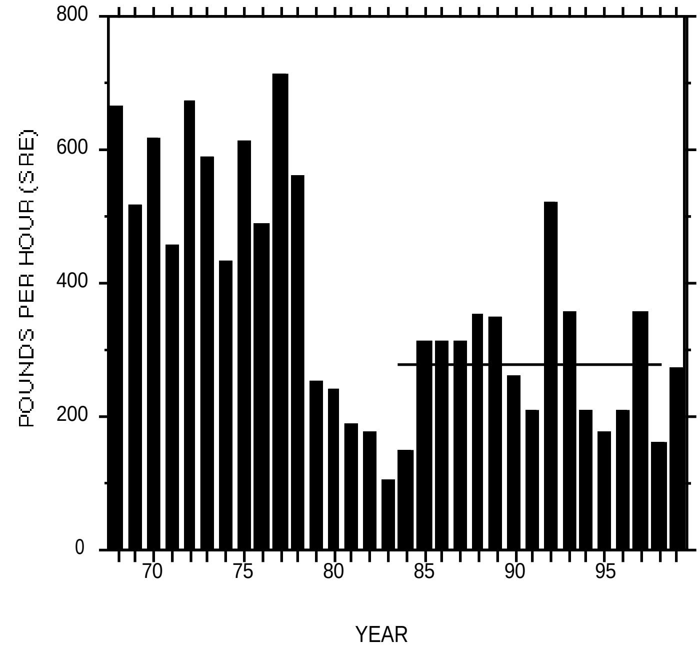


Figure 5. Catch per unit of effort (CPUE=lbs/SRE hour) for vessels landing shrimp into Oregon, 1968-1999.

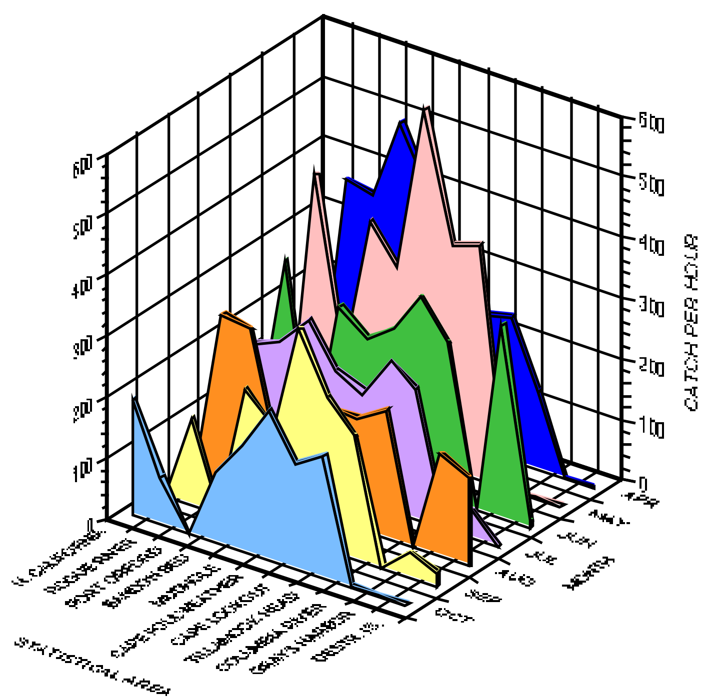


Figure 6. Catch per unit of effort by statistical area and month for the 1999 Oregon pink shrimp fishery.

The weighted average count per pound (count) was about 131 shrimp/lb in 1999, the highest it's been since 1987 (Figure 7). It was well above the 15 year average count of about 114 shrimp/lb. The relatively high count is attributed to the high proportion of age-1 shrimp in the catch. The age-1 component comprised 91% of the catch (by number of shrimp), the highest percentage ever seen in the fishery (Figure 8). We attribute this scenario to a near average recruitment of age-1 shrimp in 1999 coming on top of the very low shrimp stock left at the end of the 1998 season.

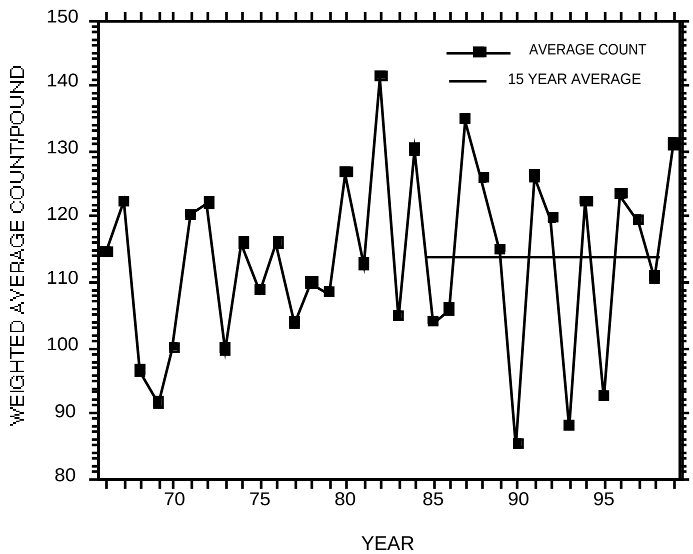


Figure 7. Average (catch weighted) count per pound of pink shrimp landed in Oregon, 1966-1999.

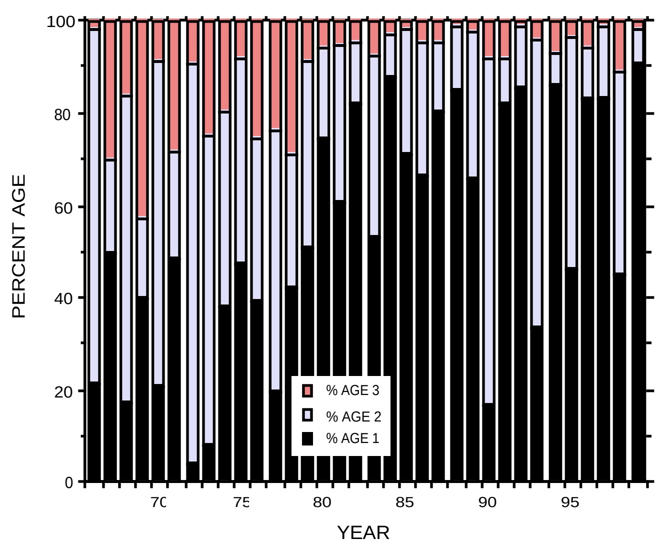


Figure 8. Annual percent age composition of pink shrimp (#'s of shrimp) landed in Oregon, 1966-1999.

The ex-vessel shrimp price varied between 40-60¢/lb in 1999, similar to the price structure in 1998. The opening price was about 50¢/lb, which held through April. The price dropped to 45¢ during May, then to 40¢/lb in June, correlating with increased volume of shrimp landed. The price had increased to 45¢ in early July which continued through August. A split price structure prevailed during September and October, with the lower count shrimp sold at 60¢/lb.

Indicators For 2000

Indicators of what the available shrimp stock might look like this coming season are mixed, but most factors suggest that shrimp abundance will be higher than it was during 1999. Our recruitment model, based on April sea level, indicates that recruitment should be in the high range (Figure 9). The sea level value of 6.900 is the lowest since April, 1987. Low levels have often been followed by large recruitment events in the past. Though the model is still being tested, it did indicate the apparently average year-class last year.

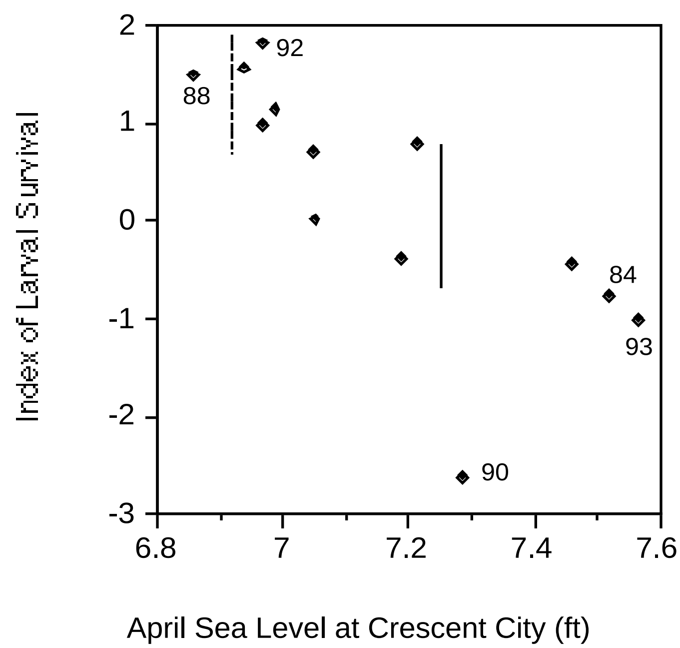


Figure 9. Index of shrimp survival vs. April sea level one year prior at Crescent City, CA. Points shown indicate year of age-1 catch. For example, 1990 refers to the shrimp that recruited to the fishery in 1990 at age-1. The dashed line shows the survival range expected for 2000 1-year olds. The solid vertical line shows the comparable range from last year.

On top of the new recruits coming in (spawned fall 1998, hatched spring 1999), there should be a fairly decent hold-over of 2 and 3 year old shrimp not harvested in 1999. The season end CPUE in 1999 was about 200 lb/SRE, as opposed to about 135 lb/SRE at the end of the 1998 season suggesting that shrimp were much more abundant at the end of the 1999 season. Another factor that may have bolstered holdover, and decreased loss from predation, is that hake were apparently less common on the shrimp grounds in 1999 than in recent years. Colder water which favors shrimp survival is not optimal for hake, suggesting that shrimp losses to hake predation may be relatively low this year.

Observations of zero-age shrimp in the fall are weak but interesting "indicators" of incoming year-class strength. The small size of zero's in the fall often means they're not represented well in the catch and hence market samples. Shrimpers may not get a good sense of their abundance and distribution if fishing effort is low or restricted to certain areas during September and October. Last fall, shrimpers reported that zero-age shrimp were present in the areas they fished during September and October, but no large concentrations were reported. Our market samples showed a lower percentage of zeros during October than we found in 1998, and the average size of the zero's was smaller than usual. Historically, large recruitment events have showed much larger percentages of zeros in fall samples. However, the small size of zero's in 1999 suggests that they may be abundant, since pink shrimp tend to grow slower when densities are high. So the bottom line is that we hoped to see more in the way of zeros than we did, given the condition of the stock and favorable environmental conditions. The outcome is uncertain; we'll see.

Many shrimpers have expressed concern about groundfish vessels "entering" the shrimp fishery in 2000. Indeed, many limited entry groundfish trawl vessels do also have valid shrimp permits. Many of these shrimp permit holders, feeling the pinch from reduced groundfish harvest limits, may exercise their option to shrimp. There were 173 shrimp permits renewed for the 1999 season, and less than 121 landed shrimp into Oregon. We anticipate a higher active permit rate in 2000, but just how high and what affects it will have on the market remains to be seen.

Regulation Changes & Related Issues

Groundfish Limits

The National Marine Fisheries Service **(NMFS) is likely to alter groundfish retention limits** in the pink shrimp fishery for 2000. The Groundfish Management Team (GMT) conducted a public meeting to review new information on groundfish harvest policies from February 8-11 at the PFMC office in Portland (PFMC, see address below). The meeting gave shrimpers an opportunity to see regional representatives and hear what each member will be proposing to the GMT and hence the PFMC in March. The next changes (if any) to the current regulations will occur at the March 2000 PFMC meeting in Sacramento, California. The **Council will meet March 6-10** at the Red Lion Hotel in Sacramento (see address below). We encourage shrimpers to attend the PFMC meeting and to express their views on current limits to the Council either in writing or in person at the public meeting. Meeting agendas are available from PFMC in Portland or ODFW offices in Astoria, Newport and Coos Bay.

PFMC
2130 SW Fifth Avenue, Suite 224
Portland, OR 97201
(503) 326-6352
web address: http://www.pcouncil.org/

Red Lion Hotel
1401 Arden Way
Sacramento, CA
(916) 922-8041

The groundfish limits proposed by the GMT in February are listed below: (**PLEASE NOTE!** these proposed groundfish limits may be changed before they are officially adopted in March! Be sure to check on the current regulations before fishing this year!)

- A total of **2000 pounds of groundfish per trip**, not to exceed **500 pounds per day**.

- For any delivery, the weight of groundfish must not exceed the weight of pink shrimp.

- **No Lingcod may be landed until May,** then no more than 400 pounds per month from May through October. No lingcod shorter than 24 inches may be landed.

- **No Thornyheads** may be landed.

- No more than 300 lb of Canary Rockfish per month

- No more than 2000 lb of Sablefish per month.

Dealing with the reduced bycatch limits in 2000 is going to be challenging for shrimpers. Skippers will be responsible for not exceeding the fish limit per trip and making sure the individual species monthly limits are not exceeded. Skippers should also keep in mind that limits on some species (i.e. Canary and Lingcod) will probably be reduced in the future as the PFMC more clearly defines the rebuilding schedules for these species. It's important for shrimpers to recognize that current limits on these species are meant to utilize limited unavoidable catches in the fishery. **It's in a shrimpers best long-term interest to avoid catching these species when they can. REMEMBER TO CHECK THE GROUNDFISH REGULATIONS PRIOR TO THE SEASON!**

Single Delivery and Landing Requirement Regulation Changes

The 1999 Oregon legislature passed two Bills affecting shrimpers. House Bill 2333 changed the number of single deliveries of pink shrimp allowed annually in Oregon, from six to **ONE**. House Bill 2334 **abolished the 5,000 pound minimum shrimp landing requirement** needed to renew an Oregon pink shrimp permit, and changed the language regarding Permit Review Board waivers. Both Bills are listed on the Oregon Legislature home page at www.leg.state.or.us/.

Research

Excluder Studies

Inspired by some comments from a local fisherman last year, we were interested in trying some square mesh panels in pink shrimp nets to help reduce bycatch. The technique has been used successfully in some Australian prawn fisheries, but using different style nets and with different bycatch species. We chartered the F.V. Miss Yvonne to go out and test an array of square mesh (2-2.5 inch square) panels installed in the codend. We'd hoped to show that small unmarketable fish like smelt, herring, juvenile rockfish and slender sole could escape through the square mesh while minimizing shrimp loss. The results were disappointing. Reductions for small fish and shrimp were about equal, regardless of where we placed the panel. In essence, it functioned about like a hole in the net. No sorting of shrimp from fish was apparent. We also believe that codend collapse, or at least weakly filled out codends, in the pink shrimp nets doesn't allow square meshes to expand well. The results indicate that this style of excluder may not be a good choice for the pink shrimp fishery, at least how we used it.

Update on the Economics Logbook Study, and Bycatch Effects on Shrimp Product Quality

Vicki Krutzikowsky's masters degree project is progressing well, with the shrimp product quality segment complete, and the Economic Log study well on its way. She presented some of her shrimp quality results last year at the International Pandalid Shrimp Symposium in Halifax, Nova Scotia. The product quality project was an effort to determine whether fish bycatch influences shrimp product quality. As we described in last years newsletter, we worked on a vessel chartered by Oregon State University, completing two trips in June 1998. We fished a Nordmore grate excluder on one side of the boat, with no excluder on the other side. Catches were kept in separate bins depending on which day they occurred and whether or not an excluder was used. Samples of shrimp were taken at a variety of stages, from capture all the way through final processing. The degree to which shrimp were intact or broken was measured along with a variety of laboratory and subjective quality measurements. We had the help of Fishhawk Fisheries on the processing end to get samples and measure recovery. The Astoria Seafood lab helped with the quality assessment.

Here are some of Vicki's findings concerning product quality:

- As found in our previous studies, the Nordmore excluder greatly reduced the percent bycatch.
- Samples taken on deck from the excluder side had a smaller average percent of broken shrimp than the control side samples.
- After offloading and ripening, the average percent of broken shrimp increased to 8.1% on the excluder side and 11.2% on the control side.
- At greater than 50% bycatch, there was a significantly higher percent breakage in the control net than in the excluder net through most of the processing.
- The average percent shrimp breakage increased from 2.9% before placement in the hold to 18.0% in the final product.
- Percent meat recovery was not significantly different between sides.
- Factors such as molt condition, count per pound, shrimp size, moisture content and bacterial counts were not found to increase breakage.

Based on these findings, Vicki concluded that finfish bycatch does contribute to breakage of pink shrimp. However, the impact is small relative to breakage caused by processing in general.

Vicki's logbook study won't be completed until next year, but here is a summary of her findings so far. During the 1998 season a special economic logbook was distributed to 20 volunteer vessels. The goal of the logbook was to collect information on the reasons and time involved for running to fishing grounds, running overnight, relocating between tows, dumping tows and modifying gear. Completed logbooks were collected for 263 trips and 4727 tows. Excluders were used on 15 trips and 157 tows.

Prospecting and expected good catch of shrimp were the main reasons given for the choosing of the initial area to fish. Catch was the main reason for relocating overnight and between tows. Bycatch was never cited as a reason for the choice of initial grounds or relocating overnight and rarely for relocating between tows by vessels that were using excluders. Bycatch was the main reason cited for dumping 430 (9%) tows. Excluders did reduce the frequency of dumped tows.

A total of 260,365 pounds of fish and 5,988 pounds of shrimp were estimated to have been dumped. Hake caused most of the dumping with 306 (81%) of the fishy tows dumped due to their presence. Flatfish were a distant second reason, 29 (8%) times, for dumping tows. Other species given for dumping tows were dogshark, anchovy, hagfish, heart urchins, ratfish, red rockfish and yellowtail rockfish.

Yield and Revenue Per Recruit Survey

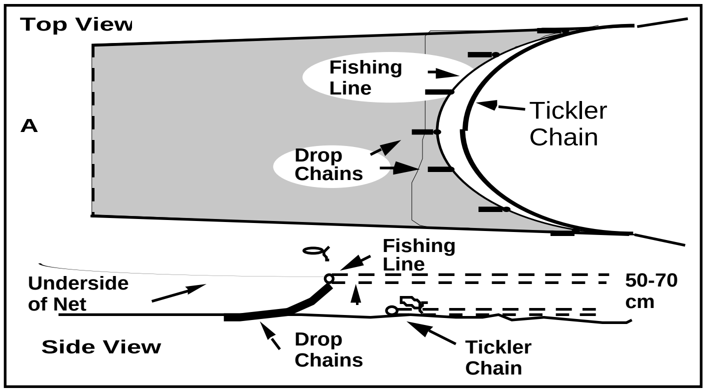
Charmaine Gallagher's research is also progressing. She presented a talk entitled "Yield Per Recruit and Revenue Per Recruit: Alternative Approaches to Management Strategies for *Pandalus jordani*" at the International Pandalid Shrimp Symposium. Charmaine's research has examined whether a delay in the season opening date for the shrimp fishery would increase net revenues. Her work indicates that the answer to this question is a tentative yes. The data shows some increase in net revenue from a season delay. However, this finding depends heavily on estimates of natural mortality and on how the ex-vessel value of shrimp varies with grade, factors which are both poorly known. Much more research needs to be done to clarify this issue, however her work clearly demonstrates the benefit of incorporating economic analysis into fishery assessment.

Trawl Efficiency

We chartered the F.V. Lady Kaye last summer to conduct an experiment to measure shrimp trawl efficiency. The project was challenging from an equipment standpoint, but the potential payoff was improved understanding of shrimp abundance. We're very interested in knowing what the efficiency is because many of the population parameters we've been trying to measure for shrimp, such as natural mortality rate, fishing mortality rate etc. depend on knowing how efficient the trawls are. The equipment deployment went well. We used a Tucker Trawl, a staged plankton sampling device that can be fitted with larger mesh to catch shrimp, which was fished on a third wire beside the shrimp trawl. We used a SIMRAD ITI trawl monitoring system to measure the opening of the shrimp net (providing area swept), and to monitor the height off bottom of the Tucker Trawl. The results were surprising; the Tucker Trawl didn't perform as we'd hoped, even though located in the right spot. Shrimp catch per area swept by the Tucker Trawl was far lower than the shrimp trawl, suggesting that its nets were creating a pressure wave that prevented shrimp from entering the Tucker. Back to the drawing board on how to get a better measure of shrimp trawl efficiency!

Footrope Experiment

On the same charter with the F.V. Lady Kaye (a double-rig shrimper), we also evaluated the performance of a new footrope configuration that's becoming popular in the shrimp fleet. We'd been told numerous times by fishermen that had used the arrangement, that it fished much cleaner than standard "tickler gear". The experiment involved fishing standard tickler gear on one side (the control) and a net with the new footrope configuration on the other. The control net footrope used a traditional tickler chain groundline, which is shorter than, and runs below and in front of the fishing line. The test net utilized a ladder chain groundline with a short roller section in the center, set to run under and slightly behind the fishing line (Figure 10). We measured the rise and spread of the nets on each side by using the SIMRAD ITI. The results confirmed what fishermen had told us (Figure 11). The ladder/roller groundline caught 84% fewer slender sole, 49% fewer greenstripe rockfish and 47% fewer juvenile rockfish than the tickler chain groundline. After allowing for a wider spread with the ladder/roller gear, catches of shrimp and other species were comparable for both gears. It's a good example of a relatively small gear change making a big difference, at least for the smaller, demersal fishes.



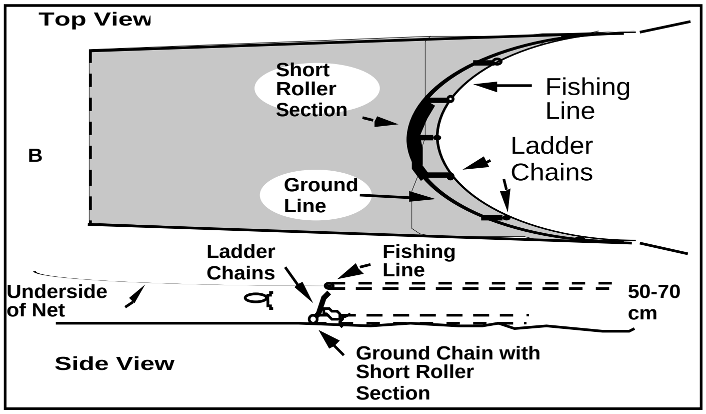


Figure 10. Schematic of trawl footrope with tickler and dropper chains (A) and with ladder/roller footrope (B).

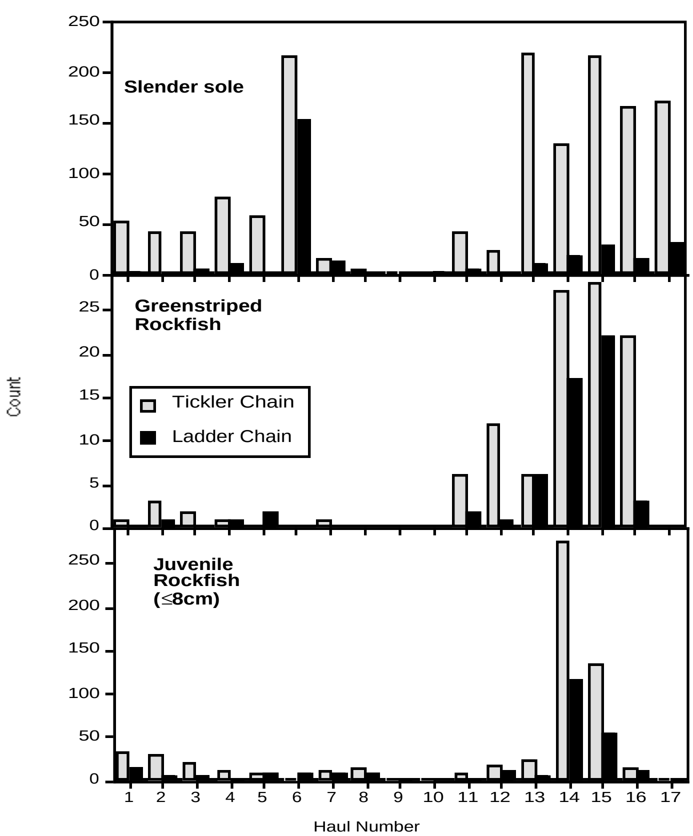


Figure 11. Catch of slender sole, greenstriped rockfish and juvenile rockfish, by haul, for the tickler chain and ladder/roller style footropes.

Upcoming Projects

The bulk of our pink shrimp research efforts will probably be office-based in 2000, barring unforeseen opportunities and events. One of these projects will involve analyzing historical data on primary females (age-1 shrimp that are female) from October market samples. The effort is to evaluate the effect of age-1 shrimp abundance on sex change in the population. There is a chance that the project would be enhanced by a short charter next October if shrimp recruitment is very strong and dense concentrations can be found in the fall. We would be sampling areas with a wide range of shrimp density and noting the levels of primary females found at different densities. However, shrimp staff may be spread thin this year. ODFW at-sea projects in the groundfish fishery will be consuming much of their time and effort. We've got more projects involving charters in mind, but the recent groundfish crisis has altered ODFW's field priorities at least for the time being.

Reports Available

Hannah, Robert W. 1999. A new method for indexing spawning stock and recruitment in ocean shrimp, *Pandalus jordani*, and preliminary evidence for a stock-recruitment relationship. Fish. Bull. 97:482-494.

Treat For The Fleet!

"Michelle's" Pinky Wraps (a recipe from the kitchen of one of our staff)

Ingredients;

- Approximately 1.5 lb **Oregon** shrimp meat
- ~ 1/3 cup real mayonnaise
- ~ 1/2 cup parmesan bread crumbs
- ~ 1/2 cup finely diced celery
- ~ Three finely chopped green onions
- ~ One dash hot sauce
- ~ One pinch oregano
- Choice of salsa (homemade really)
- Olive oil
- One package large flour tortillas
- ~ 1 1/2 cup grated cheddar cheese

Gently and lightly saute' celery and onion in about 2 tsp olive oil with a pinch of oregano. Mix all ingredients, except salsa, cheese and tortilla, thoroughly. Lay tortilla on a plate. Spread a large dollop of shrimp mixture on the tortilla in a strip across the centre. Top with grated cheddar and about 2 tablespoons of salsa. Roll those pinkies up tight! Place on cookie sheet. Brush each roll lightly with olive oil. Cover with foil. Bake for 20-30 minutes at 325°. Bon Appetite. Makes approximately 7-8.

Count Per Pound Issues

One count per pound citation was issued during the 1999 season, in Astoria. However, Oregon State Police (OSP) closely inspected several other loads that were close to the legal limit of 160 shrimp/lb. As in the past few seasons, the potential exists for some higher than average counts in 2000. If a good recruitment event has occurred, small age-1 shrimp will predominate. The OSP will be actively monitoring count per pound again in 2000. For anyone who is unsure about which type of scales work best at sea, or how much the average weight of retained shrimp is likely to change, we have two reports available which detail our research in these areas. Just call us for copies, or for any other questions about count per pound.

Acknowledgments

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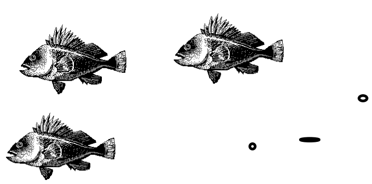

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