Annual Pink Shrimp Review

Oregon Department of Fish and Wildlife
ODFW Marine Resources Program, 2040 S.E. Marine Science Dr.
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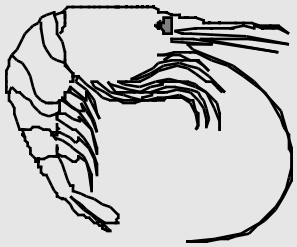

TO: **OREGON SHRIMP INDUSTRY**
FROM: **Bob Hannah and Steve Jones**
Subject: **Opening of 1998 Commercial Fishery**
Date: **March 1998**

The 1998 pink shrimp season begins on April 1 and extends through October. After the ups and downs of last season, we're all wondering what the 1998 fishery will provide for us. This newsletter includes a summary of the 1997 season for your review, including catch, effort and market sample information. Updates on some of our latest research, upcoming projects and important regulation changes for 1998 are included.

1997 Season Summary

Approximately 19.5 million pounds of pink shrimp were landed into Oregon ports during 1997, an increase of about 3.8 million pounds over the 1996 season total. It was the largest annual landing total since the 1993 season, which totaled approximately 26.9 million pounds (Figure 1). For perspective, the 15 year average landing total (1982-96) is about 25.8 million pounds.

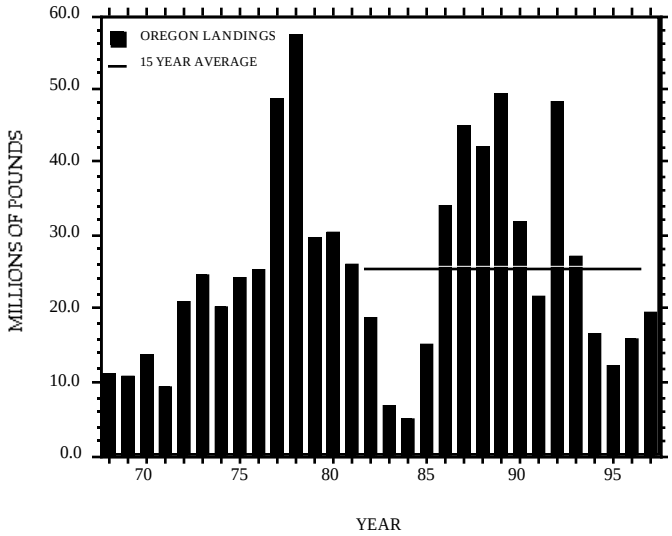

Figure 1. Oregon pink shrimp commercial catch (millions of pounds) 1967-1997. Includes all pink shrimp landed into Oregon ports.

Monthly landings peaked in May (about 6.5 million lbs), following a below average landing total in April (Figure 2). Although the May total was well above average, all other months were at or well below average. Below average monthly landings in 1997 were probably not the result of low shrimp abundance. Intra-industry price disputes slowed the April harvest. A large percentage of the fleet went albacore fishing from late June through mid-August, depressing landings during those months. Poor weather prevailed during October. All these factors combined to reduce landings from what could have been an average season. The "up side" of this is that there should be a decent hold-over of age-2 shrimp available in the 1998 season.

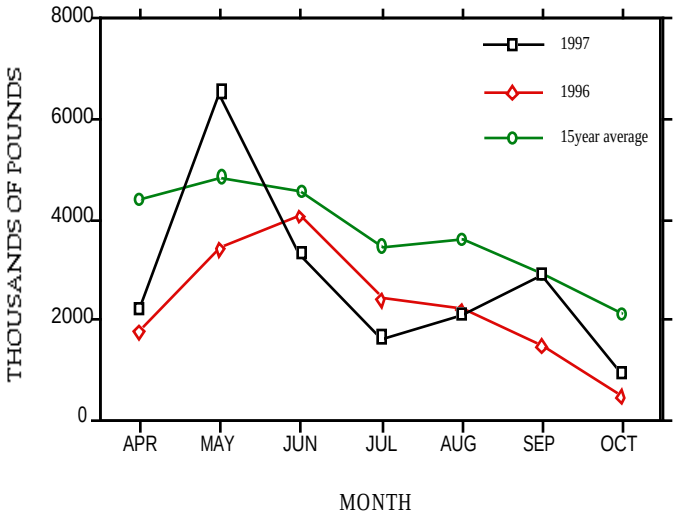

Figure 2. Monthly Oregon pink shrimp landings during 1996, 1997 and the 15 year average (1982-1996).

The coastal distribution of landings during 1997 was similar to the 1996 distribution, with most catches originating from the Mudhole and south. The Mudhole produced the most shrimp (about 5.1 million lbs), with the Rogue and Bandon Bed areas coming in at about 3.0-3.5 million pounds each. The dominant peak in landings occurred during May in the Mudhole and Bandon beds (Figure 3). Harvest off the Washington coast landed into Oregon remained low in 1997.

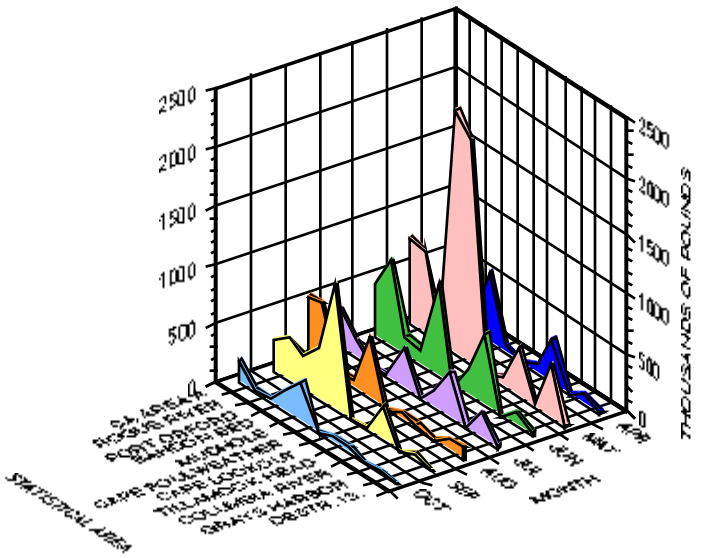

Figure 3. Total Oregon pink shrimp landings (1,000's of pounds) by month and area (preliminary), 1997.

Total fishing effort for the 1997 season was the lowest annual total since 1985, with approximately 55,000 single-rig equivalent (SRE) hours fished (Figure 4). Annual effort had been fairly stable since the 1993 season, until declining this year. Contributing factors to the low effort total in 1997 included fishing time lost due to price negotiations, stretches of poor weather and widespread participation of shrimpers in the albacore fishery.

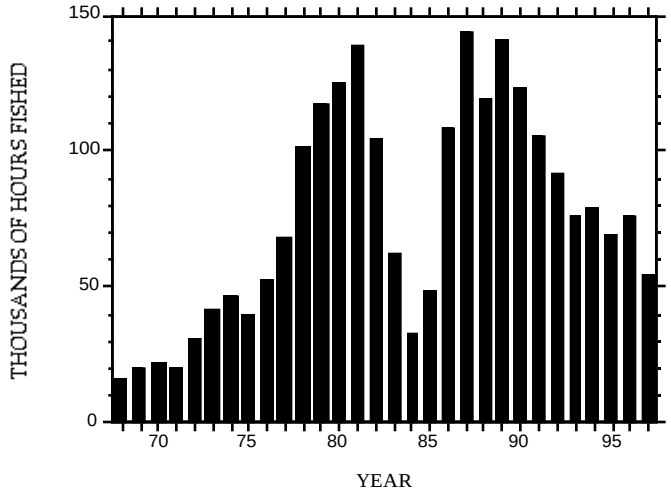

Figure 4. Fishing effort (1000's of single-rig equivalent hours) for pink shrimp landed into Oregon ports, 1968-1997.

The season average catch-per-unit-effort (CPUE) was about 356 lb/SRE, sharply above the 1996 value of 208 lb/SRE (Figure 5). Although overall effort was low, catch rates were higher than in recent years, probably due to greater shrimp abundance. CPUE was highest in the Port Orford Bed during April (Figure 6).

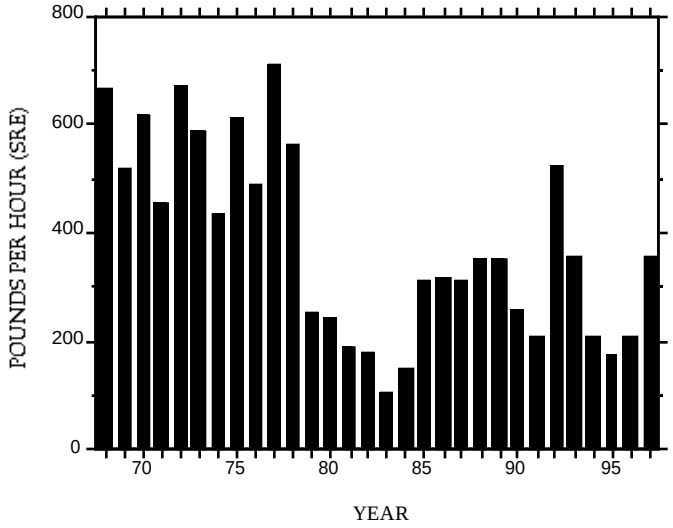

Figure 5. Catch per unit of effort (CPUE = lbs/SRE hour) for vessels landing pink shrimp into Oregon ports, 1968-1997.

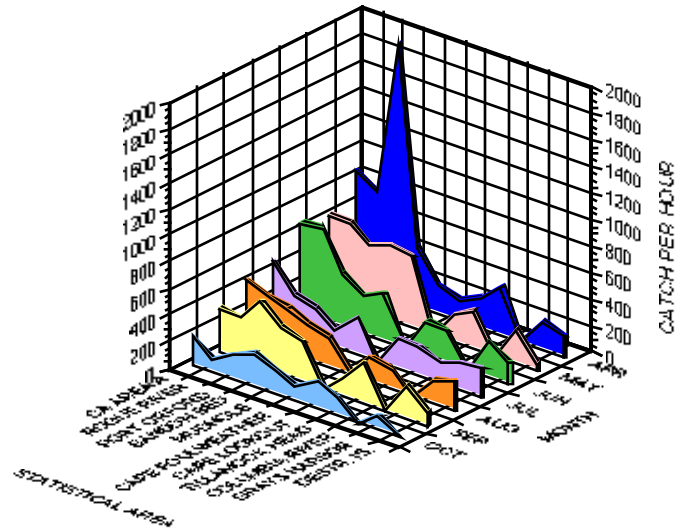

Figure 6. CPUE (preliminary) by area and month for the 1997 Oregon pink shrimp fishery.

The weighted average count-per-pound was about 120 shrimp/lb, similar to last years count and just above the long term average count of about 115 shrimp/lb (Figure 7). The fairly high average count, and its similarity to last years count, reflects the high percentage of age-1 shrimp in the catch. Age-1 shrimp comprised 83% of the catch (by number of shrimp) in both 1996 and 1997 (Figure 8). The high percentage of age-1 shrimp in the catch has been typical since about 1980.

Ex-vessel shrimp prices were variable during the 1997 season, ranging from .50¢ to .25¢ per pound. The average opening price was .50¢/lb. It had dropped quickly to .40¢/lb by the end of April, then to a split price structure of .25¢-.40¢/lb in May. The price stabilized at about .35¢/lb in June and increased gradually back to about .50¢/lb by the end of the season.

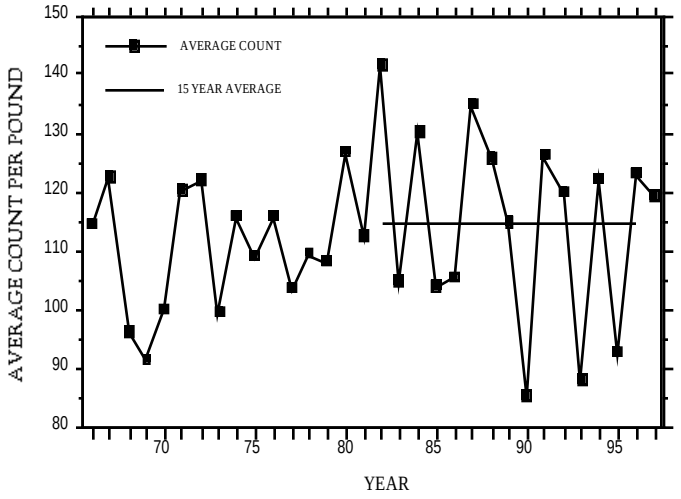

Figure 7. Average (catch weighted) count per pound of pink shrimp landed in Oregon, 1966-1997.

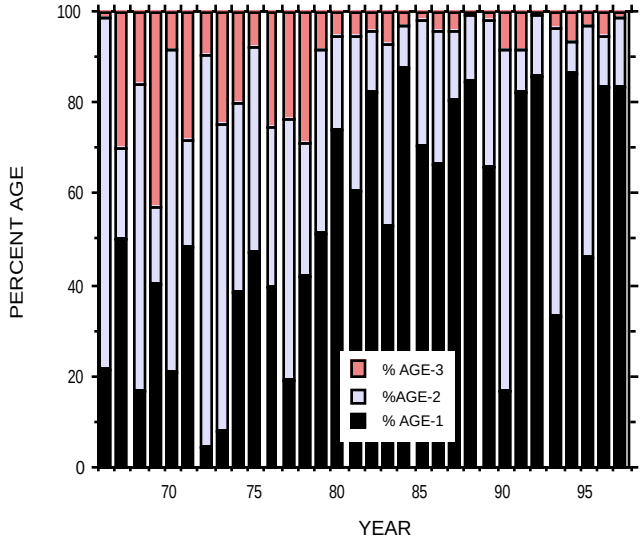

Figure 8. Annual percent age composition of pink shrimp (#'s of shrimp) landed in Oregon, 1966-1997.

Indicators For 1998

So, we're all wondering what the new season has in store. As is often the case preseason, we have conflicting information leading to uncertainty about shrimp abundance during the upcoming season. Shrimp were still fairly abundant at the end of the 1997 season, judging by season-end CPUE and reports from shrimpers. Hence, holdover of age-2 and age-3 shrimp from the 1997 season should be good, providing natural mortality isn't unusually high or aberrant ocean conditions don't cause unusual shrimp distribution. The holdover may provide significant volume of shrimp and help lower average counts early in the season.

The success of age-1 shrimp (spawned fall 1996; hatched spring 1997) is the big question mark. Our shrimp recruitment model, which is based on April sea level, indicates that recruitment could range from strong to slightly below average. The April 1997 sea level value was 6.9 feet (dashed vertical line in Figure 9), sharply lower than values seen since 1991. The ocean environment in April 1997 should have favored larval survival. In the past, recruitment events with similar April sea levels have produced from about 1.3 billion recruits to slightly over 4.0 billion recruits; a wide range. The strongest conclusion that can be made from the model is that recruitment from April 1997 shouldn't be a bust but could be very strong. However, the abundance of spawners during fall 1996 was relatively low, having come from a low overall population size. Recruitment in April 1997 may not extend into the highest range simply because of low parent stock during fall 1996.

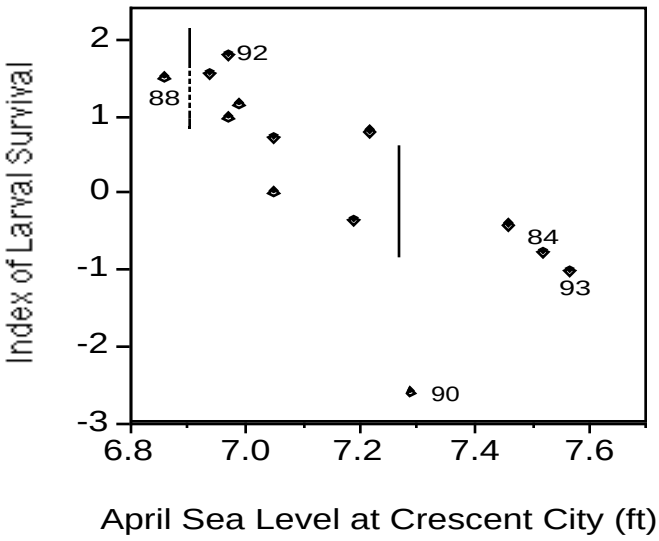

Figure 9. Index of shrimp larval survival vs. April sea level one year prior at Crescent City, CA. Year shown is the year of age-1 catch. For example, 1990 refers to shrimp that recruited to the fishery in 1990 at age-1, the same year class that was heavily impacted as eggs on females in April 1989. Dashed vertical line shows survival range expected for the 1998 1-year olds, based on sea level in April 1997. Solid vertical line shows the comparable range for last year.

The onset of the current ENSO (El Niño Southern Oscillation) event during summer 1997 and continuing this winter complicates the picture severely. Age-0 shrimp settlement probably occurred just about the time strong northerly flowing currents were developing from the ENSO. The last time this occurred was when the last large ENSO took place. The result appears to have been an extreme northerly shrimp distribution and loss of shrimp from the Oregon grounds. Our market samples from October 1997 had very low percentages of age-0 shrimp

coastwide; sharply lower than 1996, especially on the south coast. In 1998, probably more than in any recent year, we're very unsure what recruitment will look like.

Regulation Changes & Related Issues

Limits:
The National Marine Fisheries Service (NMFS) has changed the regulations governing groundfish retention in the pink shrimp fishery for 1998. The changes became effective on 1 January 1998, **AND MAY CHANGE DURING THE SEASON** as catches accrue for various species. Detailed regulations are available on the internet on the ODFW home page (http://www.hmsc.orst.edu/odfw/regs/gfopen.html), from the Pacific Fisheries Management Council (PMFC) page (http://www.pcouncil.org/release12-31.html), and from ODFW offices in Astoria, Coos Bay and Newport. Some highlights of these regulations are:

1. The trip limit for all groundfish is **500 POUNDS PER DAY** for a vessel engaged in fishing for pink shrimp, **MULTIPLIED by the NUMBER OF DAYS in the TRIP**. Species with **DAILY TRIP LIMITS** (such as sablefish) **MAY NOT BE ACCUMULATED DURING MULTIPLE DAY TRIPS**. The daily trip limit is also a total trip limit for those species.

2. No more than **300 POUNDS of SABLEFISH** may be landed **PER TRIP**.

3. **NO THORNYHEADS** may be retained or landed.

4. There is a **2 MONTH CUMULATIVE LIMIT of 1000 POUNDS for LINGCOD**. The limit may be taken at any time within the 2 month period. The **MINIMUM LENGTH for LINGCOD is 24 INCHES**, except up to 100 pounds of lingcod shorter than 24 inches may be landed per trip.

5. No more than **5,500 POUNDS of YELLOWTAIL ROCKFISH** may be landed **PER MONTH**.

Please note again that these limits may be changed by NMFS during the shrimp season depending on harvest rates within the open access fishery. The regulations can be confusing. If you're unsure about the limits, please consult the web pages listed above or give us a call at 541 867-4741. We encourage shrimpers to get involved in the groundfish management process, by attending Pacific Fisheries Management Council (PFMC) meetings, by writing to the Council or by writing to the appropriate Groundfish Management Team or Groundfish Advisory Panel member. Getting on the Council News mailing list may be a good way to keep up with the issues and hear of upcoming council meetings. The address and telephone number of the PFMC office is:

Pacific Fishery Management Council
2130 SW Fifth Avenue, Suite 224
Portland, Oregon 97201
(541) 326-6352

Logbooks:
We are anticipating increased effort in the shrimp fishery during 1998 due to the recent harvest restrictions imposed on the groundfish fishery. In all likelihood, the number of active permits will increase as some "groundfish" vessels return to the shrimp fishery. We'd like to remind everyone that logbooks are mandatory in the pink shrimp fishery. We'll be personally contacting as many skippers as possible to distribute logbooks. If we don't catch up with you though, please come by an ODFW office or give us a call.

We've been having some difficulty obtaining logs from some Washington vessels that landed shrimp into Oregon ports during 1997. These tended to be vessels landing only occasionally into Oregon, but they're still important for our catch analysis. Please remember that logs are required for all Oregon landings. If you still have Oregon logs, please drop them by any ODFW office or mail them to us here in Newport.

Research

1997 Finfish Excluder Tests:
We tested two excluders this year, the soft-panel "Willapa" and a stainless steel "fisheye". The tests were conducted under charter on the double-rig shrimper Calamari out of Warrenton, Oregon. The "Willapa" was supplied by Mr. Red Robeson of Raymond, WA, and the "Fisheye" by Mr. Bob Driscol of Warrenton, OR. Both of these devices are currently owned and used by Oregon shrimpers. Since their introduction, shrimpers have reported varying success with both devices, much like the varied reports we've heard about "WeJos".

We followed the same testing protocol that we used in 1995 with our tests of the "WeJo" excluders and the "Nordmore" grate. In addition, in 1997 we used our underwater video equipment extensively to facilitate interpretation of our test results, a tool we didn't have available in 1995. Testing results showed that both devices can exclude fish well, but that shrimp loss can be

variable and high. Our tests in 1995 showed similar results. The "fisheyes" performance was extremely sensitive to its fore-aft placement on the top of the codend.

The video assessments gave us some insight into the performance of the "Willapa", "fisheye", and "WeJos" performance. The footage clearly showed that the soft-panel mesh of the "Willapa" tended to pouch, causing fish to sometimes accumulate near the aperture, allowing more water flow out of the aperture and increasing shrimp loss. The soft-panel did not remain taut, with meshes fully expanded, as we had envisioned they should. We discussed our findings with net manufacturers Mr. Bob Driscol and Mr. George McMurrick. We now believe that the addition of a soft-panel excluder to many of the longer nets currently used by the fleet may cause collapse of the codend and intermediate to the point where the excluder section can't properly expand. They may perform better in shorter nets, but this remains to be tested. If true, this may explain the highly variable results that we've experienced between vessels.

We produced a short video last summer that summarizes the results of our 1997 excluder work and gives some advice about "fisheye" installation. It is currently available to borrow from our coastal offices. Many shrimpers have already viewed the VHS tape. If you're interested, please come by and borrow a copy.

Ovigerous Female Harvest - "Houston, we have a problem...":

If you read the shrimp newsletter each year, you know that one of our main jobs is to periodically assess the pink shrimp stock to try and determine if it's being overfished. This work has been ongoing for many years and along the way we've developed some new tools for estimating shrimp recruitment and uncovered an environmental model which has some modest predictive value (Figure 9). We now make extensive use of logbook data to estimate the geographical extent of shrimp recruitment events, to estimate mortality rates and to measure the size of the shrimp spawning stock each year.

Recently, we've revisited the question of overfishing, examining updated data sets on spawning stock, recruitment and April sea level. Another variable which we included in the analysis was an estimate of the fishery catch of ovigerous (egg-bearing) female shrimp in April. We felt this catch might have an important impact on recruitment, at times, because the environmental model suggests that the timing of larval release in relation to the timing of the spring transition, may be very important for larval survival. In other words, we suspected that in some years, these late egg-bearing females might contribute a lot of the larvae which survive to recruitment.

Our assessment of the new data suggests that pink shrimp are not overfished in the classical sense. However, fishing on very low year classes does slow the populations rebound somewhat when the environment improves. Most year class failures observed to date have been a result of El Niño events which strongly elevate April sea level (Figure 9). One exception seems to be the dismal recruitment we got from the 1989 year class (denoted 1990 in Figure 9 and 1989 in Figure 10). As you can see from Figure 10, this year class also had the highest ever fishery catch of ovigerous female shrimp in April. Is this a coincidence? Although it's only a single data point, we think the high egg-bearing catch caused the year-class failure.

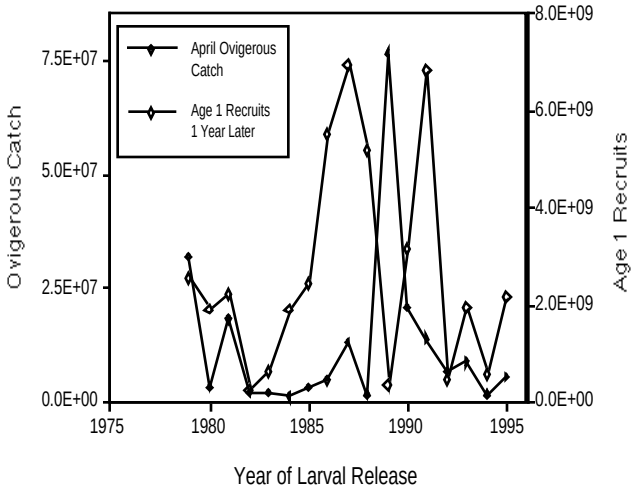

Figure 10. Time series of shrimp recruitment and the April catch of ovigerous shrimp, by year of larval release, 1979-1995.

The argument goes like this. Shrimp are dependent on a good spring transition for recruitment success. In years when the spring transition is early and strong, harvest of ovigerous shrimp in April may have little impact on later recruitment because so many larvae have already been released into a favorable ocean environment. When the transition is late, most of the larvae have been released into an unfavorable ocean environment, except for the ones that are still being carried by females. If the fishery catches even a modest proportion of these, preventing their eggs from hatching, the impact on recruitment could be much larger than the catch alone would indicate.

In most years, harvesting ovigerous female shrimp isn't a problem. In many years, either the spring transition is early or most shrimp have released their eggs before the fishery takes off, or the fishery itself is delayed by weather or price discussions and a large impact doesn't happen. Our

data suggest that high catches of egg-bearing shrimp occur less than one year in ten, although egg-bearing shrimp are present south of Cape Blanco nearly every year (Figure 11). So is this problem worth addressing? We think so, because the cost of a year-class failure is considerable. Our data suggest that the large catch of egg-bearing shrimp in April 1989 depressed the 1990 year class by about 50-90%. The economic impact was probably offset by increased prices during the following low-volume years, but an estimate that fishing ovigerous shrimp so heavily in April 1989 wiped out $4 million in ex-vessel value in 1990-91 is not unreasonable. April 1989 landings were valued at about $2.6 million, but if fishing had been halted in April 1989, most of the shrimp would just have been caught in May or June.

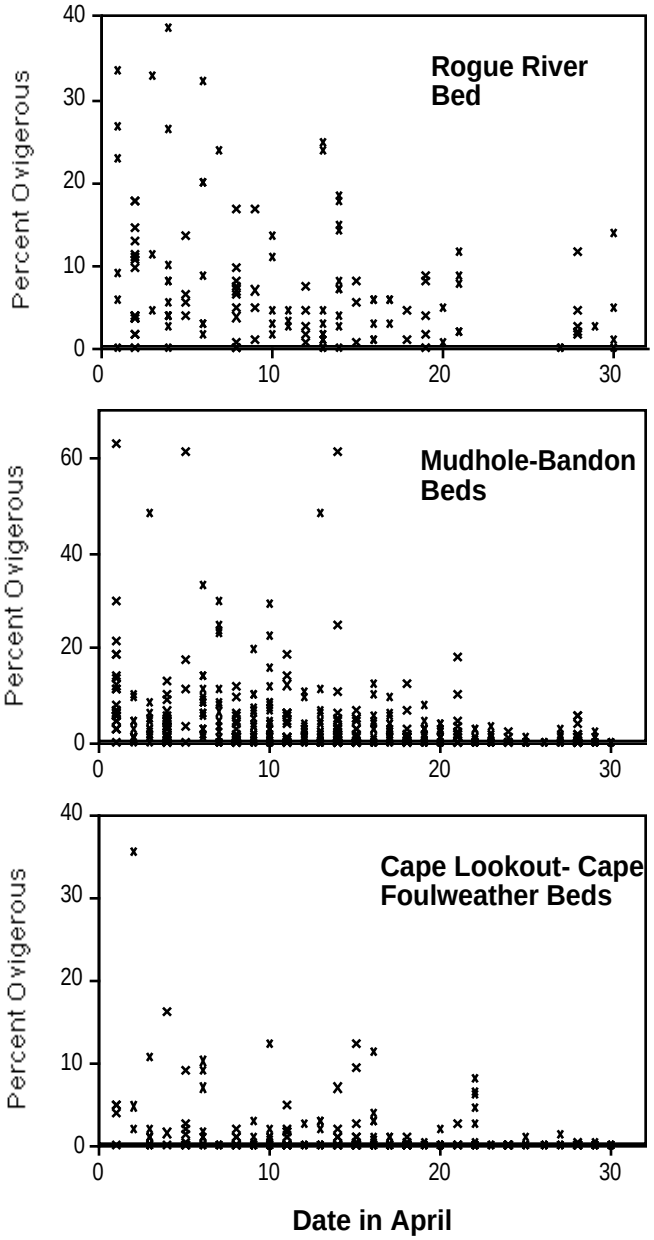

Figure 11. The percentage of egg-bearing shrimp in April samples of the ocean shrimp fishery, for central and southern Oregon shrimp beds, 1961-1997.

So, we think that fishing ovigerous shrimp in April can at times cost the industry a lot of money. Now that you've seen some of the data, we'd like to hear what you think on this issue, and any suggestions you have for addressing the problem. If you feel that status quo management is best and that this kind of revenue loss is tolerable, as long as it's infrequent, we'd like to hear that too. In the mean time, we are in the process of writing this work up for publication and plan to share the draft report with California and Washington fishery managers sometime later this spring. If you have any comments on this issue, please give us a call at Marine Program headquarters at 541 867-4741 and ask for Bob Hannah or Steve Jones (extension 231 or 239).

Upcoming Projects

Shrimp Fishery Economic Study:
We're beginning a new research project this year examining a number of economic aspects of the shrimp fishery. In cooperation with Gil Sylvia and Michael Morissey of Oregon State University (OSU), we have jointly secured Oregon Sea Grant funding to construct a bio-economic model of the Oregon shrimp fishery. This project has two major components and will fund two OSU graduate students. One part of the project will be to revisit the work done in the early 1980's to determine when is the best age to begin harvesting shrimp. The prior studies suggested that there was no benefit to delaying harvest because natural mortality of shrimp is so high. Since then, we have documented changes in shrimp growth rates, have experienced wide-ranging price changes and changing markets for various "grades" of shrimp. The new evaluation will incorporate these changes to see if the economic trade-offs have changed in todays market place. This will be the first time that this fishery has been examined in terms of maximizing economic yield rather than simple biomass yield.

The second component of the study will investigate the costs and benefits of fish bycatch in the shrimp fishery. Our prior research has shown that fish excluders need substantial additional development before they will be a reliable and frequently chosen tool for shrimpers. With excluders in use in the southeastern U.S. and in the Gulf of Maine shrimp fisheries, the problem of high and variable shrimp loss is of national significance. What hasn't been examined is just how good excluders need to be before they become a net economic benefit to fishermen rather than a net cost. Various types of data are needed to answer this question. First, we need to know how often high levels of non-marketable bycatch (e.g. hake) cause fishermen to alter fishing behavior and what kind of costs are associated

with these changes. For example, how frequently and how far will a vessel relocate to get away from high levels of hake bycatch? How often is a net repaired because of too much hake or other bycatch, and how much fishing time is lost? This is the type of data we need.

Volunteer Economic Logbook:
To try and get this type of information, we've developed a new "limited edition" logbook specifically for this purpose. It is strictly a volunteer program designed to obtain more detailed information than is currently required in our standard logbook. We're hoping to enlist the cooperation of 25-30 shrimp vessels coastwide. As a token for participating in the program, we will distribute a truly awesome looking "shrimp hat" to skippers, and for every trip for which the new log is completed, the skipper will get one "ticket" for our raffle. A lottery will be held after the end of the season with a substantial sized gift certificate from Cabela's catalog as the prize. The crew (up to 2) of vessels completing the entire season (at least 10 trips) using the new log will all receive the awesome hat. ODFW personnel will be approaching skippers soon, explaining the details and trying to get vessels on-board with the program. If you know you'd like to participate, or need more information, please give us a call.

Charter Opportunity:
Another part of figuring out the costs and benefits of bycatch is to examine how fish affect shrimp product quality and recovery. Under this part of the project we'll be chartering (the charter will actually be by OSU) a shrimp vessel and conducting some fishing experiments to answer this question. We'll be seeking out interested individuals in late March or early April. The charter will probably be for two 3 to 4 day cruises during May, June or July. It will require a double-rig shrimp vessel and will entail seeking out "fishy" shrimp areas and towing through the area with an excluder in use on one side only. A divided hopper is needed for this project. Shrimp from each side will need to be stored separately in the hold in several batches (some hold modifications may be needed). Our intent is to work with a processor and process the shrimp from clean and fishy nets separately and test for differences in recovery and product quality. If you are interested in working with us on this project please contact Bob Hannah or Steve Jones at ODFW or Gil Sylvia at OSU.

Count Per Pound Issues

No count per pound citations were issued in Oregon during the 1997 season. Processors wanted relatively large shrimp (<145 count) and shrimpers generally complied with their requirements. Also, most of the harvest occurred to the south where shrimp are generally larger at age.

As in the past few seasons, the potential exists for some higher than average counts in 1998. If a good recruitment event has occurred, it will probably be distributed north. Since shrimp grow at slower rates progressing north, the likelihood of encountering high count shrimp is increased. Modest standing crops of age-2 and age-3 shrimp to the north will make high counts even more likely. The Oregon State Police will be actively monitoring count per pound again in 1998. 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.

Reports Available

Hannah, R. W. 1997. Evaluation of methods used to estimate geographic stock area for ocean shrimp (*Pandalus jordani*) from logbook data. Oregon Dept. Fish Wildl., Information Rept. Ser., Fish. No. 97-6. 17 p.

Jones, S.A. and R.W. Hannah. 1998. The Oregon Ocean Shrimp Fishery: 1990-1995. Oregon Dept. Fish Wildf., Information Rept. Ser., Fish. No. 98-1. 25pp.

Acknowledgments

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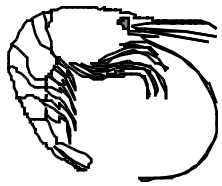
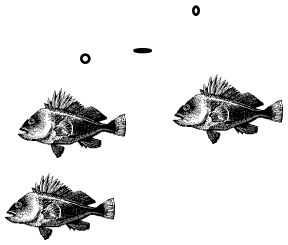


Good Luck Shrimping in 1998!



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