Annual Pink Shrimp Review

Oregon Department of Fish and Wildlife

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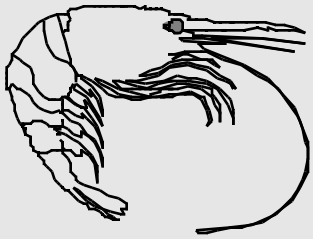

TO: **OREGON SHRIMP INDUSTRY**
FROM: **BOB HANNAH and STEVE JONES**
SUBJECT: **OPENING OF 1994 COMMERCIAL FISHERY FOR PINK SHRIMP**
DATE: **11 March 1994**

As you all know, the 1994 pink shrimp season begins April first and extends through October. After the last season, we're all wondering how the 1994 season will progress. We've put together a summary of catch and effort for the 1993 season for your review. We also describe some of our research efforts which occurred last year and an update on some shrimp regulation changes. Good luck this coming season!

1993 Commercial Fishery

Approximately 26.9 million pounds of pink shrimp were landed in Oregon during the 1993 season (Figure 1), about 21.1 million pounds less than in 1992. For perspective, the average landing total over the last fifteen years is about 30.5 million pounds. The primary reason for the below average catch in 1993 was a weak age-class of one-year-old shrimp (the 1992 year-class), which have been the mainstay of our fishery over the last decade. Catches would have been much lower if the remainder of the 1991 year-class of age-2 shrimp hadn't been abundant.

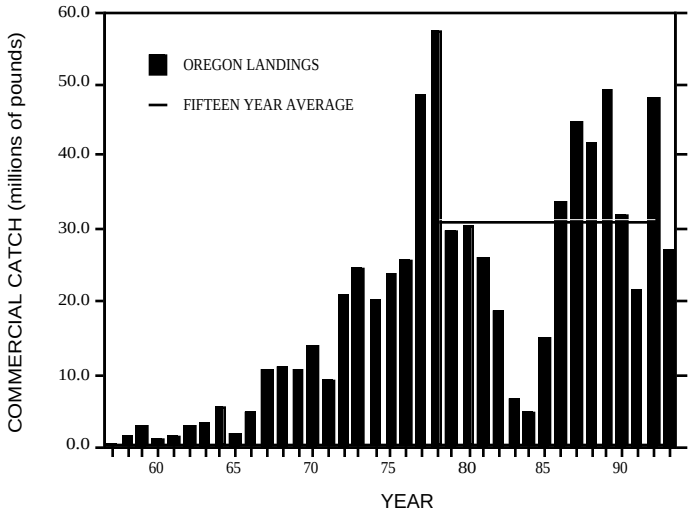

Figure 1. Oregon pink shrimp commercial catch (millions of pounds) 1975-1993. Includes all pink shrimp landed annually into Oregon ports.

Monthly catches were highest during April, May, and June, but declined precipitously coastwide during July and remained low through October. The largest catches occurred early in the season off northern Washington and generally were more modest to the south (Figure 2). Age-2 shrimp made up the bulk of these catches, with only a small component of age-1 shrimp (the 1992 year-class).

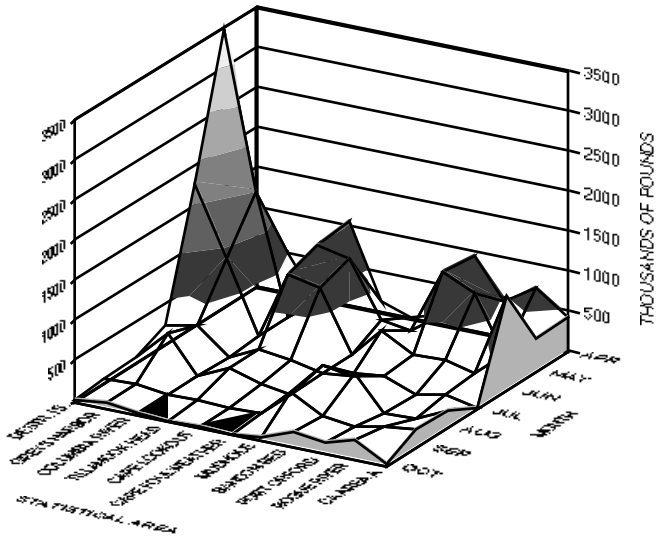

Figure 2. Total Oregon monthly catch (1000's of LB's) of pink shrimp (preliminary), 1993.

The scenario was reversed during 1992 when the largest catches occurred off southern Oregon in September. Again, this pattern probably resulted from a weak 1992 year-class. In 1992, age-1 shrimp (the 1991 year-class) were heavily harvested to the south, but much less so off Washington due to their small size.

Fishing effort was also highest from April through June, with especially high effort levels off Washington during this period. Catch per unit of effort (CPUE) was relatively high through June, except for the "Mudhole" where it was low (Figure 3). CPUE declined through October, except in areas south of Cape Blanco where CPUE remained in the 200-250 lb/hour range. Of course we measure effort and CPUE in terms of single-rig equivalent hours. To get the comparable double-rig figure, just multiply the figure by (1.6). Average CPUE for the entire season was 357 lb/hour, well below last years 520 lb/hour, but similar to others since the late 1980's.

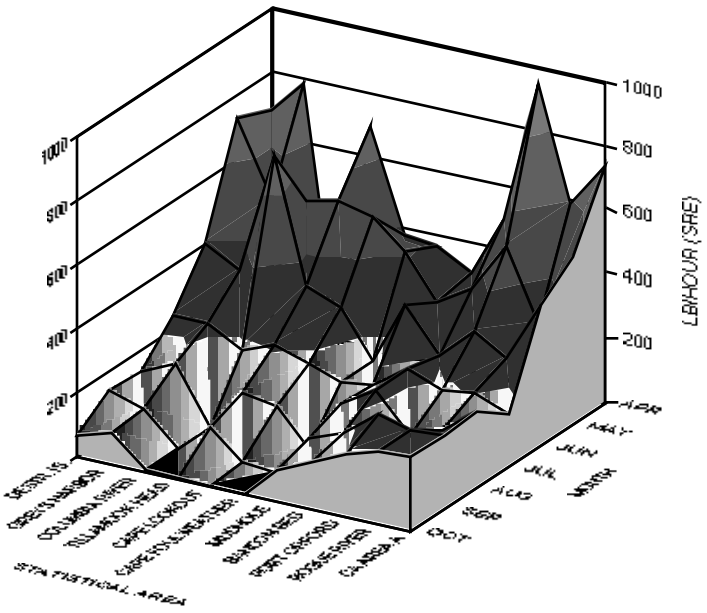

Figure 3. Catch per unit effort (preliminary) by area and month for the 1993 Oregon pink shrimp fishery.

The average count per pound of shrimp landed in Oregon was excellent during 1993; the second best on record (Figure 4). The low counts resulted from the high percentage of age-2 shrimp and correspondingly low percentage of smaller age-1 shrimp in the catch. Growth of both age-1 and age-2 shrimp appeared normal; consistent with the ranges seen since 1978.

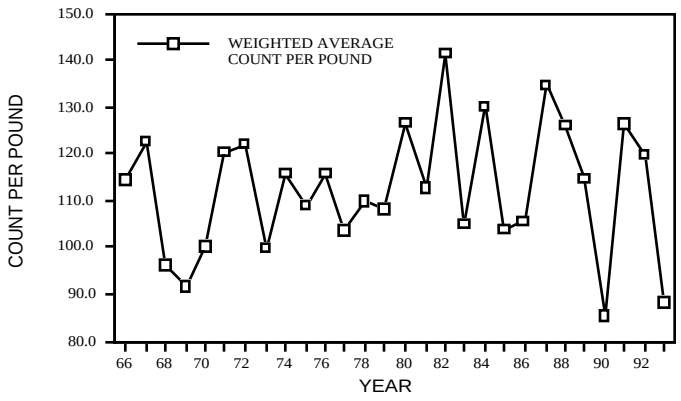

Figure 4. Average (catch weighted) count per pound of pink shrimp landed in Oregon, 1966-1993.

The age composition of the late season shrimp catch may provide some insight into what we might see this coming season. Age-2 shrimp comprised 35-60% of shrimp caught during October 1993. During October 1992 they comprised 3-14%. Many of these age-2 shrimp will die over the winter of natural causes, leaving a relatively small component of age-3 shrimp for the 1994 season. Low abundance of age-1 shrimp during 1993 means that there will be few of them available in 1994 at age-2. The result is that we'll be heavily dependent on the incoming crop of age-1 shrimp, whose recruitment success is unknown. Two scenarios seem most likely. Either we'll have a successful incoming year-class (meaning high counts and possible count-per-pound problems), or we'll have low numbers of all age-classes. Evidence supporting either scenario is conflicting. Our recruitment model (still being tested) suggests below average recruitment is expected due to poor ocean conditions. However, our October market samples showed that the percentage of new recruits (zero-age shrimp) was fairly high south of Cape Blanco. In the past, a good showing of zeros to the south has often been associated with strong recruitment events. We'll just have to wait and see.

Research - Finfish Bycatch

We're still interested in evaluating a variety of finfish excluder devices in the shrimp fishery. This type of research seems all the more urgent with the recent changes in how the groundfish trip limits effect shrimpers (see below), and with increased concern expressed by the International Pacific Halibut Commission over halibut bycatch. Although we don't expect major discard problems in the shrimp fishery in 1994, limited entry in groundfish has permanently changed the rules for the "open access" fishery. Discard problems in this fishery now seem more likely at some time in the future.

Our modest efforts to test the soft mesh excluder device in 1993 (thanks again to the F/V Prospector for making the work possible) reaffirmed our belief that this type of research work requires charter funds. Accordingly, we reapplied for Saltonstall-Kennedy funds in 1993 and will receive word on the results this coming April. If grant monies are provided, they will fund research over an 18 month period beginning around September 1994 for assessment of the Nordemore Grate and the "WeJo" soft mesh panel finfish excluder devices. A "fisheye" device, which has shown promise in one of our experimental trawl fisheries, may also be tested. One of our initial tasks will be to obtain underwater video footage of the bycatch reduction devices in action, on the shrimp grounds. Plans have been made with the National Marine Fisheries Service Conservation Engineering staff for training with the video equipment, and a joint field venture is likely if S-K funding goes through. The video work would require charter of a single-rig shrimp vessel capable of safely accommodating crew, biologists, and equipment. Hopefully, any initial "bugs" with the equipment can be worked out during the video assessment. Work on this aspect of the study would probably begin during fall 1994. Performance evaluation of each excluder device would be undertaken during the 1995 shrimp season. This phase would require the charter of double-rigged shrimp vessels with similar accommodation requirements.

Reports Available

Our study of factors influencing shrimp recruitment was published during 1993 in the Canadian Journal of

Fisheries and Aquatic Sciences. Much of the information presented in the paper was derived from the Oregon pink shrimp trawl fishery. Also, the results of our past study on the weight change of pink shrimp from harvest to landing has been published as a note in Fishery Bulletin. Several Oregon vessels and their crews were involved in this study and we thank the fleet again for their cooperation. Copies of each paper are available on request to interested individuals. We hope to submit the results of our shrimp fecundity study for publication later this year. The paper describes variability seen in the number of eggs produced annually by pink shrimp.

Gear Survey

The shrimp trawler gear survey that we've conducted during the last three shrimp seasons has been completed, with the final interviews finished by phone during January. Many thanks to all the participants in the fleet, which included over half of the shrimp vessels landing in Oregon. We extended the survey during 1993 to respond to recent comments from the fleet concerning the use of roller gear, and the introduction of the "WeJo" excluder device. Our goal was to document the extent to which these fishing gears were being used while they were still relatively uncommon in the fleet. As with the other data gathered in 1991 and 1992, the information may be helpful in the future when we need to assess effective fishing effort and changes in fishing strategies. We hope to have the final report produced by this summer.

Regulation Changes

We "tightened up" the wording of our count per pound regulation this year in response to advice from the court system. The language change clearly describes the working definition of the terms "whole" and "whole and unbroken", which will remove a major grey area when any future count per pound cases come to court. Oregon Administrative Rule 635-05-200 section (3) now reads: "For the purpose of determining count per pound "whole shrimp" and "whole and unbroken shrimp" are defined as shrimp in which the body is substantially intact, including an identifiable carapace, abdomen, and telson (tail). It is not intended to require shrimp to have an unbroken rostrum, complete set of legs, antennae, or other appendages". Figure 5 shows these parts in detail.

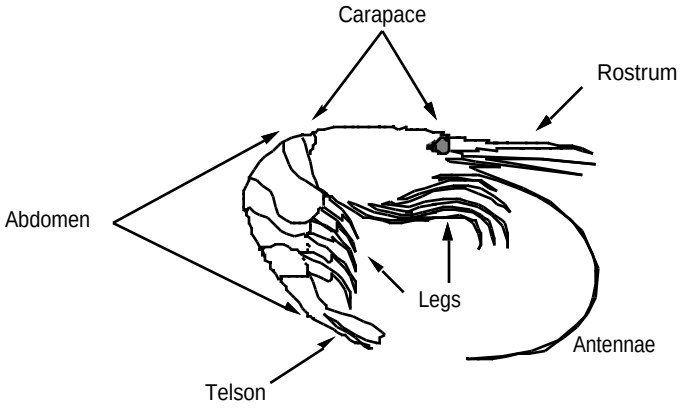

Figure 5. Gross pink shrimp anatomy with major body parts and appendages identified.

The trip limit for groundfish for a vessel engaged in fishing for pink shrimp remains at 1,500 pounds per fishing day of the trip (See OAR 635-05-185 through 635-05-200). However, **Groundfish Trip Limits Now Apply To Shrimpers** under the new groundfish regulations:

A. No more than 1000 pounds per trip of sablefish may be landed.

B. For any vessel landing yellowtail rockfish within a month, the monthly cumulative trip limits for north and south of Cape Lookout, as well as the declaration process, now apply. Details of the requirements and declaration process for shrimpers may change during the 1994 season. For more information, please contact ODFW's groundfish management staff or the Pacific Fishery Management Council. The PMFC may consider changing how the declaration process applies to shrimpers at its April meeting.

Shrimp Mortality Rates

Some recent research which we thought the fleet might find interesting involves some new estimation techniques for shrimp natural mortality rates. A new approach to analyzing logbook data has allowed us to estimate the geographical area inhabited by shrimp for the years 1980-89. These "stock area" estimates show that the area in which commercial quantities of shrimp are found expands roughly in proportion to the abundance of shrimp. In other words, when the shrimp stock is larger, it's range expands. This explains why CPUE has been such a poor overall index of abundance in the past; it reflected changes in shrimp density but not in "stock area".

However, the really interesting aspect of this work is that it has allowed us to extract estimates of shrimp natural mortality rates from catch and effort data (the actual method is pretty complicated and won't be included here (it's not the interesting part anyway). This has provided a long-awaited opportunity to look at the interannual variation in shrimp natural mortality rates and examine the role that Pacific hake may play in determining natural mortality rates of shrimp. The results are shown in Figure 6. Although this graph is based on a limited number of years of data, it very clearly shows that high shrimp natural mortality is associated with increases in the biomass of Pacific hake. This in turn suggests that natural mortality rates for shrimp are elevated when hake are present off the coast and probably decline somewhat after the hake leave. This information may eventually help explain why some shrimp year classes seem to last a while despite heavy fishing and why some seem to disappear quite quickly. For all of you who've been telling us for years that hake eat up a lot of shrimp, here's the scientific data to back you up.

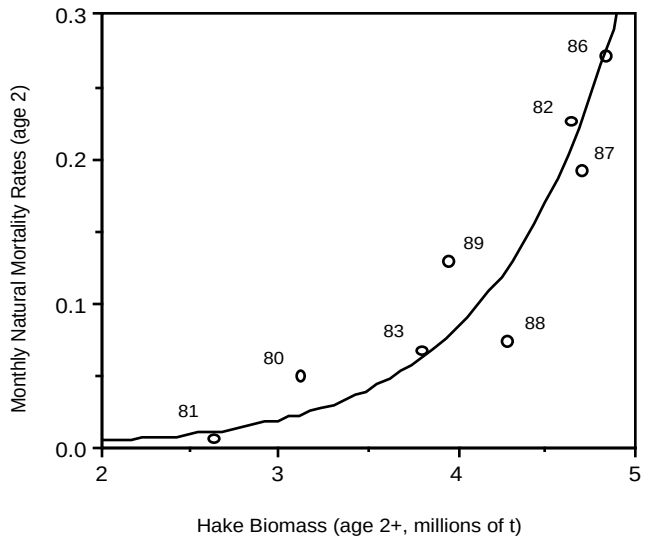

Figure 6. Shrimp mortality rates versus Hake biomass.

Future Direction of the Shrimp Project

The last several years of research has improved our understanding of pink shrimp biology, to the point where we're beginning to understand some of the mechanisms which influence the wide fluctuations in shrimp abundance. However, the regional effort being directed towards pink shrimp has gradually been reduced over the same time period. In 1992, the California Department of Fish and Game made a large cut in their monitoring of the shrimp fishery. They no longer collect or analyze shrimp market samples. In 1993, the Washington Department of Fisheries discontinued their shrimp project altogether. They no longer collect samples, or collect and analyze logbook data and have eliminated the logbook requirement. As things presently stand, ODF&W is the only U.S. agency on the west coast doing any significant monitoring or research work with pink shrimp, a multi-million dollar fishery resource.

This spring, budget planning will begin for the 1995-97 biennium. ODF&W Marine Region staff will be discussing which monitoring and research projects are of highest priority and which areas can be reduced to meet the expected reduction in our biennial budget. We're very interested in fleet input on this issue. We're specifically interested in feedback on our research and monitoring efforts towards the pink shrimp fishery. Is enough effort going towards monitoring pink shrimp? Too much? Are there specific areas in which more research is needed? If cuts must be made, is there an aspect of the Marine Region program which the fleet feels could be eliminated? We'd like to hear from you on these subjects as we move forward in planning our research and other activities for the next biennium.

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