



Oregon

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Ernesto and Gabriela,

Below is our review of the Argentinian red shrimp fishery documents you provided us on March 20, 2024

The fishery for Argentinian red shrimp, *Pleoticus muelleri*, is valuable and has increased in scale substantially in recent years. Fishery sustainability is difficult to achieve in a growing fishery and we appreciate that Argentinian fishery managers are investigating how to improve that of Argentinian red shrimp. Actions taken to increase the sustainability of this fishery will likely improve the durability of the industry, increase the value of fishery products, and reduce negative effects of fishing and fishing gear.

The Oregon pink shrimp, *Pandalus jordani*, fishery has increased its sustainability over many years, culminating in becoming the first ever shrimp fishery certified as “sustainable” by the Marine Stewardship Council (MSC), in 2007. Oregon’s sustainability journey was challenging, requiring teamwork, compromise, and commitment. Managers, scientists, and industry worked together to 1) understand drivers of stocks to prevent overfishing, 2) reduce bycatch, and 3) understand effects to habitats by fishing gear. Fishery sustainability for *P. jordani* has been facilitated by the species short life history (maximum age 3-4 years), low impact and easily studied fishing gear, and occurrence primarily on soft, dynamic habitats (i.e., sand and mud). Lastly, Oregon’s *P. jordani* fishery stock is very well understood due in large part to a long, continuous datasets which allow back-calculated stock assessment, allowing stock drivers to be compared to environmental, biological, and anthropogenic stressors to be understood and mitigated.

A team of four fishery scientists from Oregon Department of Fish and Wildlife (Scott Groth, Leif Rasmuson, Kendall Smith, and Eric Anderson) reviewed three documents provided by Gabriela McLean (CeDe Pesca), which were primarily focused on stock sustainability. The documents reviewed may be coarsely described as 1) stock status, 2) CPUE standardization, and 3) biological reference point development. We provide the below review which includes Positive aspects, Improvements for Consideration, and some additional comments.

Positive aspects of Argentine fishery management strategy

Campaigns

Periodic “campaigns” (also known as “fishery independent surveys”), have taken place three times each year, before, during, and after each season. These campaigns are highly valuable for monitoring the stock and are likely to contribute to a long term understanding of the species. We appreciated that a random (stratified) sampling design within zones capable to understand much of the stock. We appreciate continuation of this work to refine this work to a biological indicator (survey CPUE, age/size distribution, etc.) and generally learn more about the species and fishing gear.

CPUE index

We appreciate that the fishery CPUE data is standardized to account for gear and temporal differences.

Observer coverage

Presence of observers during fishing activities are highly desirable for managers to understand the fishery. These scientists perform a vital role in developing relationships between management and industry, understanding fishing practices, non-target catch, and other discard issues. In the Argentinian red shrimp fishery, observers are may also provide roles in spatial and temporal management (i.e., closed areas and prospecting).

Management

We appreciated that the season is set to minimize effects to juvenile and reproductive (egged) shrimp. Protecting juvenile shrimp reduces chances of growth overfishing while protection of reproductive shrimp reduces the chances of recruitment overfishing. In addition, reduction of negative effects to other fisheries (hake) was considered heavily in season setting.

Argentinian red shrimp live short lives (~2 years) and their recruitment is likely environmentally forced. Management recognizes its life history and is positioned to make changes quickly. It was unclear how logbook data was processed, in particular the timing from tow to analysis. Continuation of monitoring via campaign, dockside sampling and/or observer coverage allows a greater temporal understanding of the effects of stressors relative to recruitment which could be valuable in management.

Lastly, we think it’s particularly positive that fishery managers are looking into improvements to the sustainability of this fishery.

Improvements for consideration

Campaigns

The valuable campaigns could consider some additional items: 1) depth stratification- it is unclear if studies are stratified by depth, this should be either described or considered, 2) duration of campaigns- the time provided (2017-2022) is a very short time series when considering the short lives and environmentally forced recruitment, this work should be

continued, reviewed, reanalyzed, and refined if greater understanding of the stock is desired to improve sustainability.

CPUE index

The CPUE index was developed and standardized in order to develop a Limit Reference Point (LRP). We provide the below considerations.

1. We suggest consideration of changes to gear efficiency (aka “fishing power”) over time. Gear efficiency constantly improved and may do so sharply at times when fishing is particularly lucrative and/or expanding (i.e., competition increases).
2. Cross/ auto correlation could be considered in CPUE methodology.
3. Data pooling among CPUE across such a great distance could be considered to assure it is appropriate in management and science (e.g., can openers/closures be made using zones? Are CPUE’s different by time|area, etc.)
4. The environmentally forced stock levels may dramatically change CPUE; however, lower stock levels may not affect reproductive potential, possibly making a closure during those times unnecessarily restrictive. A deeper understanding of stock drivers relative to stressors could aid in assuring this LRP is useful.
5. Oregon uses one month known to indicate contemporary abundance (June) in combination with an environmental factor known to relate to recruitment (sea level height). Critical here, is that we use June because that’s enough time for the fishery to be fully active, but not enough to see large “fishing down” effects that may complicate understanding of abundance.

Observer coverage

This key component of management could be described better to understand its uses and potential. We expect that this may be a great source of in season size distribution of shrimp, bycatch rates, and variety/specification/technology related to fishing gear.

Management

Fishery management strategies were not clear. We understand that your investigations are accelerating; however, strongly believe that a fishery management plan (FMP) should be presented. An FMP could fill in gaps we were unclear on such as: size, season, areas of campaign, survey methods, fishing gear, life history of red shrimp, description of fishing and natural mortality rates, bycatch concerns/rates, habitat effects of gear, threats to the fishery, etc.

Other items we suggest management consideration include:

1. Mesh size should be considered. While larger mesh catches larger shrimp, it may also apply an unaccounted mortality on smaller shrimp squeezed through net/codend.
2. Increased caution should be taken in management until recruitment drivers are understood. Not knowing the limits of reproduction potential for the stock (i.e., when fishing effects make population small enough to reduce the stocks reproductive potential) could severely impact the sustainability of the fishery.

Additional items:

1. A Virtual Population Estimate (VPE) could be back-calculated somewhat easily from such a short lived and heavily fished shrimp. This VPE could quickly identify causative factors of recruitment, to assure appropriate LRPs are employed through time.
2. Real time vessel tracking or dockside sampling may have high value in population assessment.
3. In Oregon, the use of double rigged gear (a vessel towing two nets) has been invaluable in research related to bycatch. We strongly recommend using similar methodology for ease and accuracy.
4. Conventions (e.g., 60% for CPUE) are notable round and unreferenced numbers, these could be justified.
5. Genetic sources of red shrimp could be identified. For example, is this one population? Makes a big difference in management.
6. Understanding of larval dynamics of the red shrimp could aid in determining future stressors (e.g., climate change) and allow the fishery to adapt prior to effects being severe.

Thank you,



Scott Groth



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