Small Boat Commercial Bigeye and Yellowfin Tuna Operations and Regulatory Scenarios in the Main Hawaiian Islands

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Presentation

• Ika-Shibi and PFAD Projects Completed

• Brief Overview of Project Findings/Status of Report

• Relate Findings/Lingering Questions to Final Phase of Work with Core Group of Handline Operators

• Briefly Discuss in Light of Council Decision to Limit Entry into “Non-Longline Pelagic Fisheries”
Overview of Projects

• The Ika-Shibi and PFAD studies were human dimensions components of ongoing PFRP projects:
  
  ➢ Trophic Ecology and Structured-Associated Aggregation Behavior in Bigeye and Yellowfin Tuna in Hawaiian Waters

  ➢ Private FADS - Catch Composition and Aggregation Dynamics of Bigeye Tuna
Impetus/Research Questions

• Council staff/others related uncertainties and needs for information regarding the dramatic decline in the formerly lucrative ika-shibi fishery

    ~7,000 trips in 1995 to ~2,500 ten years later

    Biological? Economic? Socio-demographic?

Did diminished participation relate to apparent growth of the Private Fish Aggregating Device (PFAD) fishery?
Methods

• Identified/reviewed historical data and reports

• Conducted analysis of more recent trends in participation and production per various archival data

• Janna Shackeroff (Duke) & Courtney Carothers (UW) worked closely with a network of seasoned participants in the handline fishery to:
  
  Ø Conduct an ongoing series of in-depth interviews focused on the nature of handline operations, challenges, and explanation of trends

  Ø Participate in, observe, & document the workings of the fishery
Results

• Extensive description of: history of handline fishing in Hawaii, how the fleets operate, operational and economic challenges, spatial distribution of effort over time, social and cultural contexts within which the fleets operate and seafood is consumed

• Uses descriptive findings to explain trends in participation and production of ika-shibi and other handline fisheries

• Descriptive analysis was provided to Council in March 2007 in report titled Hawai‘i Pelagic Handline Fisheries: History, Trends, and Current Status
Trends in Landings, MHI Handline Fisheries

- Bigeye Tuna (1000 Pounds)
- Yellowfin Tuna (1000 Pounds)
CPUE MHI Commercial Handline Fisheries: 1990-2005

Graph showing the pounds landed of Bigeye Tuna and Yellowfin Tuna from 1990 to 2005.

- Bigeye Tuna (green diamonds)
- Yellowfin Tuna (gray squares)
Explanatory Factors/Findings

• Biological Factors
  - Abundance of tuna obviously critical; shifts in currents; ~fishing effects/regional populations of tuna?

• Economic Constraints
  - Fixed and trip costs ↑; market challenges, regional economy ↓

• Sociodemographic Factors:
  - “Aging out” of fishery w/out replacement, social problems

• Fleet Competition and Interaction Issues
  - FAD effects, effects of fishing by distant fleets

• Shift to PFADs limited to core group w/capital & knowledge
Lingering Uncertainties

• The relative importance of economic constraints given the overarching importance of abundant tuna resources

• Perspectives of seasoned participants on the existence of regional populations of ahi and bigeye and the effects of fishing by local and other fleets

• Degree of consensus among seasoned participants regarding various economic factors, the effects of FADs, fishing-specific pressures, and diminished participation in the ika-shibi fishery
Final Round of Interaction with Seasoned Handliners

• Content of instrument based on ethnographic work and designed to further clarify/quantify key findings to date: used rankings, true-false, and open-ended questions

• Target sample: core group of ~30 highliners, seasoned participants in handline, PFAD, and seamount fisheries

• Responding sample: 21 seasoned vets with analytical capabilities and with whom we have worked closely; we believe the sample offers valid insight into the nature of the commercial handline fleets
Ranking of Challenges

Most Challenging

- Fuel Prices: 3.25
- Abundance of Tuna: 3.3
- Market Prices: 3.45
- Fishing Pressure Elsewhere in Pacific: 4.24
- Vessel/Engine Maintenance Costs: 4.42
- Competition from Hawaii Longline Fleet: 5.05
- Competition from other Small Boat Operators: 6
- Problems with State FADs: 7

Least Challenging

- Non-fishing Employment Problems: 9
**Consensus Analysis** (see also Kaneko and Bartram’s *JIMAR Contribution 00-334*)

- True/false test based on interview data used to generate a 21 respondent X 23 question response matrix where “correct” responses represent cultural rather than empirical truth (the two may potentially be the same)

- Cultural Consensus Model used to evaluate agreement across respondents, identify culturally correct answers adjusted for guessing, & estimate relative “knowledge” for each respondent

- First factor eigenvalue ideally 3x the second, which indicates that a single cultural reality accounts for structure of the matrix apart from sampling variability; data marginally fit model in this case (not quite 3:1), with mean consensus score of .48, where full consensus = 1.0 (dealers, side of island, current level involvement)
Consensus on Fishing-Specific Factors and Issues

- Purse seine operations elsewhere in the Pacific are negatively affecting the level of success of local handline operators (.85)

- Fishing pressure from Hawaii longline vessels is not the principal factor affecting availability of large tuna around the Big Island (.8)

- Some Hawaii-based longline vessels have been seen fishing in the same area as small commercial handline boats (.7)

- It is not easy to find tuna when lots of people are participating in the commercial handline fishery (.7)

- The number of weekend fishermen around Hawaii Island has increased over the last five years (.5)
Consensus on Economic Factors/Processes

- Commercial fishermen almost always share part of their catch with family members (.9)
- Gassed tuna has a negative effect on market prices in Hawaii (.85)
- The average commercial fisherman now has to have a land job on the side in order to “pay the bills” (.75)
- A fishing co-op on the Big Island would help commercial fishermen increase overall profit margins (.7)
- The combined price of ice and bait is a central consideration when making decisions about whether or not to go fishing (.65)
- High fuel prices had a limiting effect on the number of trips taken by the typical full-time commercial fisherman during 2006 (.6)
- Commercial handline fishing activity does not increase when the local economy is in recession (.6)
- It has been more difficult to sell tuna following closure of Suisan public auction in 2001 (.5)
Consensus on Biophysical Factors/Processes

• The availability of large tuna around the Big Island relates to a combination of biological and human factors (.9)

• Abundance of tuna in the Main Hawaiian Islands relates both to natural cycles and fishing pressure (.7)

• There is a population of ahi that does not migrate much beyond the Hawaiian Islands (.7)

• There is no connection between what happens on the land and the presence of large tuna around Hawaii Island (.7)

• There is a relationship between nearshore currents and the abundance of tuna around the Big Island (.6)
Consensus on FAD-Specific Factors

- It is more difficult to make money fishing at PFADs today than it was five years ago (.8)

- The state FADs disrupted fishing at ahi koa around the Main Hawaiian Islands (.6)

- The state FADs have not been good for commercial tuna handline fishermen in Hawaii (.6)

- Use of PFADs should be regulated (.5)
Explaining the Downward Trend in the Ika-Shibi Fishery

- Highest frequency results of open-ended query:
  
  - 52 percent of sample discussed various problems associated with, or resulting from diminished availability of the resource
  
  - 43 percent discussed problems following establishment of the state’s FAD program, such as increased fishing pressure & deflection of migrating populations from traditional grounds
  
  - 19 percent discussed the effects of sudden wealth and drug use as having a prohibitive effect on participation
Regarding the Multiplicity of Techniques/Gear Use

- **Palu Ahi (or variation)**: 17
- **Trolling**: 15
- **Ika-Shibi**: 12
- **Danglers/other Poles for Surface Rush**: 6
- **Hydraulic Line Pullers**: 5
- **Deep Bottom Gear Configurations**: 4
- **Shallow Bottom Configurations**: 4
- **Gear for Jigging**: 3
Summary

• Recent work w/our key informants has helped verify the nature and extent of various economic challenges, the (perceived) pressures of fishing, and the pivotal and ongoing problem of (and biophysical uncertainties associated with) abundance of tuna in the region

• Clearly, cycles of participation and production in Hawaii’s commercial handline fisheries are related to interactive biophysical, economic, and social processes

• Participation in the handline fisheries (and commercial troll fisheries) is not currently flourishing, nor are those fisheries highly productive relative to other tuna fleets in and beyond the region
Diminishing Involvement in Handline Fishery

Percent of work hours devoted to commercial fishing in 2000: 87%
Percent of work hours devoted to commercial fishing in 2006: 67%

Mean Percent
Summary (continued)

- Yet because fishing is a desirable & culturally significant occupation in Hawaii, availability of ahi and BET, coupled with reasonably amenable market and regional economic conditions, would likely lead to another spike in participation.

- The biophysical effects of cycles in human involvement in this aspect of the region’s marine ecosystem are as yet uncertain.

- Further work designed to examine relationships between small boat commercial fishing activities and the dynamics of ahi and BET populations is warranted, with need for further understanding of the regional tuna population issue/small boat fleet effects a priority (that is; do small boat fleet operations have a significant effect on BET and ahi populations available to fleets in the region?)
Informing a New Regulatory Direction

• That question remains particularly relevant as these studies have demonstrated the importance of handline fishing and seafood in adjacent communities; limiting participation in the fishery could generate a range of social, economic, and political effects within and beyond the fleet.

• Current uncertainties about the stock effects of the handline fleet notwithstanding, the Council has decided to move toward regulating entry into some component of the MHI handline fishery.

• The focus and parameters of that action have not yet been determined and it is hoped that the description and explanation provided via these PFRP small boat projects will be used in the associated decision-making process.
Informing a New Regulatory Direction (continued)

• Our intent is to either submit the PFRP report now as a baseline useful for assessing aspects of the fishery including the likely human effects of limiting entry in some fashion, or

• Adjust the report in coming months based on discussions with Council staff, possible NEPA requirements, and the emerging descriptive and analytical needs of the Council as it moves forward . . .

• One likely recommendation would advance the potential utility of an experimental or temporary approach to limiting entry so as to enable assessment of human and biophysical effects of that action over time
Informing a New Regulatory Direction (continued)

• Other likely recommendations would address the need to:

  ➢ Clearly define the scope of regulation so that potential social and economic effects may be systematically examined at the appropriate levels of analysis (familial, community, fleet, etc.)

  ➢ Consider the effects of limiting entry in terms of prospective future generations of fishery participants

  ➢ Adequately examine the prospective regulatory action in the context of small island societies where residents tend to place great value on the production and consumption of seafood
Disposition of Catch

- Catch Sold: 79%
- Catch Kept: 9%
- Catch Shared: 12%
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