Hawaii’s Small Boat Private FAD Fishery: Operational Dynamics and Considerations for Management

Edward Glazier
Impact Assessment, Inc.
ial@hawaii.rr.com
Project Overview

- This presentation derives from social research conducted for PFRP during 2005-2006

- The project extends research conducted with the MHI ika-shibi fleet during 2004-2006

- Human dimensions component of PFRP projects: "Trophic Ecology and Structured-Associated Aggregation Behavior in Bigeye and Yellowfin Tuna in Hawaiian Waters," and "Private FADS - Catch Composition and Aggregation Dynamics of Bigeye Tuna" (Holland et al.).

- Fieldwork for projects now completed; description and analysis of the small boat commercial handline fleets will be summarized in a PFRP report this winter
Rationale

- Responds to NMFS & WPFMC interest in changes in long-standing Hawaii’s ika-shibi fishery & Dept. Commerce determination that BET is undergoing overfishing in Pacific (12/2004)

- Why the dramatic decline in formerly lucrative ika-shibi (squid-tuna handline) fishery? Social? Biological?

- Does diminished participation relate to apparent growth of the Private Fish Aggregating Device (PFAD) fishery?
Approach

- Examine existing sources regarding participation & production in ika-shibi & other commercial handline fisheries
- Identify network of participants in PFAD fishery
- Interact with & interview key participants in handline fisheries, including PFAD fishery
- Describe PFAD fishery, explain changes in MHI handline fisheries, examine management options & implications
Total Pounds Landed by MHI Small-Boat Commercial Fishers by Year
Number of Small-Boat Commercial Pelagic Fishers

- No. of fishers

Years:
- 1985
- 1990
- 1995
- 2000
- 2005

Numbers:
- 0
- 100
- 200
- 300
- 400
- 500
- 600
- 700
Background: Declining Participation - Handline Fisheries
(Source: DAR)
Trends in Participation & Production:
Ika-Shibi Fishery
(Source: HDAR)

![Graph showing trends in pounds landed and number of fishers from 1986 to 2004.]

- **Pounds Landed**
  - Peaks and troughs over time
- **Number of Fishers**
  - Trends showing fluctuations over the years


Graphical representation indicates trends in participation and production over the specified period.
Ika-Shibi Trips 1995-2004
(Source: HDAR)

No. of Trips


6,983 4,689 2,559

(Source: HDAR)
Reported Ika-Shibi Trips by Residence of Participant: 1994
Reported Ika-Shibi Trips by Residence of Participant: 2004
Spatial Patterns of Reported Harvest & Participation: 1986

Year 1986
Reported Small Boat Harvest Areas for all Gear Types

Reported Landings in Pounds

- To 5,000
- 50,000
- 100,000
- 150,000
- 200,000
- 250,000
- 300,000

Each area is labeled with the number of reporting fishermen.

Source: Hawaii Division of Aquatic Resources

Scale 1:4,000,000
Spatial Patterns of Reported Harvest & Participation: 1995

Year 1995
Reported Small Boat Harvest Areas for all Gear Types

Reported Landings in Pounds
- White: To 5,000
- Light yellow: 50,000
- Yellow: 100,000
- Orange: 150,000
- Brown: 200,000
- Dark brown: 250,000
- Red: 545,000

Each area is labeled with the number of reporting fishermen.

Source: Hawaii Division of Aquatic Resources

Scale 1:4,000,000
Spatial Patterns of Reported Harvest & Participation: 2004

Year 2004
Reported Small Boat Harvest Areas for all Gear Types

 Reported Landings in Pounds

<table>
<thead>
<tr>
<th>Range</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>To 5,000</td>
<td>Lightest yellow</td>
</tr>
<tr>
<td>5,000-100,000</td>
<td>Yellow</td>
</tr>
<tr>
<td>100,000-150,000</td>
<td>Light orange</td>
</tr>
<tr>
<td>150,000-200,000</td>
<td>Orange</td>
</tr>
<tr>
<td>200,000-250,000</td>
<td>Dark orange</td>
</tr>
<tr>
<td>250,000+</td>
<td>Brown</td>
</tr>
</tbody>
</table>

Each area is labeled with the number of reporting fishermen.

Source: Hawaii Division of Aquatic Resources
Explanation of Change

- Socio-demographics – many aged out of ika-shibi fishery, little replacement

- Seasoned informants report quality of experience/chances for success have gradually diminished upon arrival of many haoles (outsiders)

- Closure of Suisan auction in 2001 was major challenge for many; established business relationships & arrangements enabled lost; many informants claim pricing is now less openly competitive
Many operators were only marginally prepared in economic terms to weather market and resource fluctuations; dynamic relationship between regional economy, accrual of capital & ability to participate and persevere on full-time basis.

Today, essentially all study participants report dramatic increases in trip costs vis-à-vis revenue. Cost of ice, bait, palu, gear, and especially fuel have risen significantly in the last few years.

Economic challenges are very commonly discussed in relation to diminished involvement in commercial small boat fishing in the MHI.
**Explanation of Change (continued)**

- Trends of diminished participation seen in ika-shibi reflective of full-time small boat commercial fleet as a whole.

- Combined effects of operational economics, market issues, economic depression in Islands, pushed many fishermen out of the industry.

- Significantly, many knowledgeable informants also report smaller and fewer ahi and bigeye over time & changes in spawning /migration patterns.
Some informants blame state FAD program for disrupting such patterns (PFADs are at times also blamed in this regard, even as some informants are deeply-involved in their use).

Problems ultimately led many to take land jobs.

But some have stayed and innovated, establishing & maintaining relationships with private buyers; prospecting at weather buoys and seamounts; developing PFADs.

PFADs appear to be an opportunity for staying in commercial fisheries in otherwise highly challenging context.
Derelict PFAD
(Photos courtesy of Dave Itano)
Evolution of PFADs in Hawaii

- **~1982** First rudimentary buoy 30 miles off Kona by 2 fishers w/1 trailered boat - Keauhou. Activities discovered w/in weeks by fishermen on shore; discovered by trollers w/in 2 months; 2:1

- **1985** FADs constructed by <5 handline highliners Kona and <5 Hilo. Trailered boats, anchored buoys fished w/in ~30 miles. Long and highly productive season (Sept-May); 3-5:3-5 X 2

- **1989** Small number of highliners craft/deploy more low-tech buoys/streamers; buoys often lost; lifespan ~ 6 mos.; ~8:8; 3:5

- **1995** Former ika-shibi & Cross Seamount highliner enters fishery w/much akamai; technology enhanced; 10:15 X 2
Evolution of PFADs in Hawaii (continued)

- **1995-2000** Increase in participation, more buoys than fishers; engineering advances; GPS; some interactions w/longline fleet; ~10:20 Hilo; 4:8 Kona

- **2000-2004** Reported involvement part-time commercial & charter operators; threats & limited violence associated w/use of others’ FADs; some sunk to depth; satellite beacons & drifters introduced; 15+:25 Hilo; 6:12 Kona

- **2003-2005** Coast Guard requires registration; Council designates PFADs as a form of fishing gear

- **2005-2006** Some key commercial operators dropping out of fishery; buoys offshore South Point and Hilo abandoned due to non-productivity; use by charter operators & part-timers reportedly continuing; 5:10 Hilo, ~12-15:25 Kona [?]
Reported Landings in Pounds

Reported Small Boat Harvest Areas for PFAD Landings

Each area is labeled with the number of reporting fishermen.

Source: Hawaii Division of Aquatic Resources

Scale 1:3,100,000
Species Composition of Reported Landings,
Known PFAD Operators: 1994-2004 (Source: HDAR)
PFAD Operational Factors

- Small group cooperation typical in purchase, engineering, deployment, use

- Buoys expensive (~$5-10,000) depending on quality of gear; short-lived; larger vessels typical

- Fishery characterized by trial and error in engineering, capital outlay & (formerly) solid return on investment

- Palu and handline gear often used at PFADs; but gear use is varied and opportunistic
Desired secrecy in location of buoys and fishing methods is typical of the fleet.

In reality, knowledge spreads quickly in island settings; people are watchful & close-knit; PFADs attract birds.

Operators are now akamai to how PFADs are developed and used in other parts of the world; knowledge of “building the house,” remote monitoring, etc.
Management Considerations

- Who are the PFAD operators?: (1) primarily former ika-shibi and/or Cross Seamount/weather buoy highliners, but, increasingly (2) charter boat captains & small huis of part-timers.

- Access to capital critical: (1) financial capital needed for multiple buoys/year, vessel & gear maintenance, trip costs; (2) intellectual capital – knowledge of pelagic species, oceanography, and expertise in use of multiple techniques; (3) social capital – good business relationships and practices.

- In presence of resources, PFAD operators may be relatively better equipped to persevere than were many ika-shibi operators.
Management Considerations

- Non-reporting and data problems undoubtedly extensive

- But observation validates recent reports of diminished participation and production since 2005

- 1982 - 70,000 lbs. landed in two months; in 2000, one highliner reportedly landed 250,000 lbs.

- But same highliner reported landings between 30,000 and 50,000 lbs. during early 2000s. His season has shrunk from 8 continuous months to one sporadic month

- Meanwhile, relationship with private buyers and extensive overhead have increased pressure on operators to produce
Opportunism in annual round & flexibility in gear use is typical; some highliners continue to innovate with deep-set short longline and other new gear.

Constraint on established operators is likely to incur further innovation and/or enhanced secrecy by some.

Increasingly efficient technology available & used by a select few:
- Satellite beacons communicate location to home computers
- Fish finders transmit images of resident biomass
- Buoys can now drift extensively & be monitored until occupied
Management Considerations (continued)

- PFADs insinuated in changing social interaction between small-boat commercial fishermen. Old networks of cooperation said to be breaking down as fishermen who invest in the new buoys attempt to keep location(s) and levels of production secret.

- Moreover, there is much sensitivity to inquiry and resistance to any perceived threat to investment and/or source of income.

- As such, a unified voice representing the interests of all operators may be muted or absent.
Management Considerations (continued)

- Better reporting is clearly needed; under-reporting and (some) intentional misreporting problems are enabled in part by large ocean areas & minimal oversight.

- Limited entry has been expressed as an attractive option insofar as active and/or historically active participants may be “grandfathered” in
Management Considerations (continued)

- Operators assert: (1) relatively minor impact on pelagic resources, (2) fishery highly directed w/minimal by-catch, and (3) catch is a critical component of local seafood market.

- Operators fear that any quota could be based on performance during the “wrong years”.

- Operators desire enforcement of labeling requirements and increased limitations on carbon monoxide-treated tuna.

- Operators tend to attribute blame current under-abundance to actions of distant fleets, and tension with Hawaii-based longline fleet continues.
Management Considerations (continued)

- Certain operators seek recognition that although they specialize in pelagics, conditions have forced them to generalize and that bottomfish regulations and the trend toward MPAs may have a profound effect on their well-being as fishermen.
Lingering Questions

- Macroeconomic effects on small boat fleets (e.g., ika-shibi fleet)

- Effects of local small boat fleets, including PFAD operations, on BET, ahi, and other pelagic fish populations

- Structure, distribution, behavioral characteristics of pelagic fish populations in this context
Conclusion

- While a temporary limited entry program and/or temporary limitation on the number of allowable PFADs in the EEZ could potentially serve to control effort until sufficient knowledge of fleet-biophysical interaction effects is attained. At this point, however, establishment of inflexible regulatory constraints on the PFAD fishery may be premature. Moreover, such action may be superfluous given limited BET abundance and attendant effort being observed during recent seasons.
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