Draft interim management plan for boarfish

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Summary

• Recap on ICES advice 2011
• Latest update on assessment of boarfish
• Need for a management plan
• Need for caution, and the FAO guidelines
• Harvest rule options
• Other measures
• Some things for the industry to consider
• ICES approach to data poor situations
<table>
<thead>
<tr>
<th>Region</th>
<th>Vla</th>
<th>VIIb</th>
<th>VIIc</th>
<th>VIIg</th>
<th>VIIh</th>
<th>VIIIa</th>
<th>VIIj</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4155</td>
<td>18</td>
<td>3624</td>
<td>7797</td>
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<td>Ireland</td>
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<td>274</td>
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<td>811</td>
<td>8540</td>
<td>11025</td>
<td></td>
<td>20685</td>
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<tr>
<td>Scotland</td>
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<td></td>
<td></td>
<td></td>
<td>2813</td>
<td></td>
<td></td>
<td>2813</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>274</td>
<td>9</td>
<td>811</td>
<td>15508</td>
<td>18</td>
<td>14648</td>
<td>31295</td>
</tr>
</tbody>
</table>
Advice

“This is the first time that ICES has provided advice for boarfish. Based on precautionary considerations, ICES advises that catches in 2012 should not be allowed to increase.”

Additional considerations

“During the period 2008–2010, boarfish do not appear to have been overfished. However, landings have increased rapidly during these years, reaching almost 140 000 tonnes in 2010. As information on the exploitation of boarfish is preliminary, it would be cautious for catches not to increase above the average of landings (82 000 t) recorded during that period.”
Latest information on stock status

Preliminary treatment of catches per unit effort from the International Bottom Trawl Survey

Combined index fits per survey and overall biomass index extracted from the Bayesian state space model assuming a lognormal random walk on the index and a log-normal measurement error (vertical bars). Fitted index is given in blue with 95% credible intervals represented by the dashed lines.
Latest information on stock status

Preliminary surplus production model as per megrim

The uncertainties are from the delta-lognormal survey index estimation.

The harvest ratio is landings divided by estimated biomass.
Need for a management plan

• Decision rule to set the TAC based on the information available.
• Proposed to agree draft at Pelagic RAC in July
• Advice will come out in September
• Management plan option would be included
Given the uncertainty about stock status and the recent nature of the fishery, a cautious development is warranted.

The United Nations Food and Agriculture Organisation (UN FAO) gives guidelines on how new and developing fisheries should be dealt with.
<table>
<thead>
<tr>
<th>UN FAO Guidelines</th>
<th>Comments in relation to boarfish</th>
</tr>
</thead>
<tbody>
<tr>
<td>control access to the fishery early</td>
<td>Conservative TAC in place 2011, based on interim management plan</td>
</tr>
<tr>
<td>conservative cap (or default level) on both fishing capacity and the total</td>
<td>TAC in place, ICES annually assesses the stock.</td>
</tr>
<tr>
<td>fishing mortality rate</td>
<td></td>
</tr>
<tr>
<td>prevent excessive investment in the processing sector.</td>
<td>Need to balance development of processing capacity whilst avoiding overcapacity</td>
</tr>
<tr>
<td>flexibility to phase vessels out of the fleet, if necessary</td>
<td>No new vessels being built to target the fishery.</td>
</tr>
<tr>
<td>area closures, are relatively quick to implement and are easily enforceable.</td>
<td>Seasonal and area closures, in interim plan, adhered to by entire fleet.</td>
</tr>
<tr>
<td>establish precautionary, preliminary reference points</td>
<td>Preliminary F based reference points available</td>
</tr>
<tr>
<td>encourage fishing in a responsible manner, encourage voluntary agreements etc.</td>
<td>Interim plan being followed on voluntary basis, although TACs set using different basis for 2012</td>
</tr>
<tr>
<td>encourage development of fisheries that are economically viable without</td>
<td>Need to avoid dependence.</td>
</tr>
<tr>
<td>long-term subsidies.</td>
<td></td>
</tr>
<tr>
<td>establish a data collection and reporting system for new fisheries early</td>
<td>Programme established in 2007, detailed plan since 2009.</td>
</tr>
<tr>
<td>in their development.</td>
<td></td>
</tr>
<tr>
<td>immediately start research programme detailed information, including standard</td>
<td>Irish fishery has licensing requirement to collect samples. Industry funding survey, and biological</td>
</tr>
<tr>
<td>biological data and economic information.</td>
<td>sampling.</td>
</tr>
<tr>
<td>consider different harvesting strategies</td>
<td>Underway</td>
</tr>
</tbody>
</table>
Towards an interim management plan

• To regulate the fishery, no matter what level of information is available

• The overall plan must be precautionary, and be judged so by ICES

• Should aim to achieve maximum sustainable yield

• Should contain a harvest control rule(s)

• A fuller HCR evaluation is not possible at the moment (not enough years of data from an exploited stock), so an interim plan is appropriate

• Must provide for all possible states of information… and none
• Based on SE Australian whitefish mixed fishery: options to suit all levels of information

• Decision rule to set the TAC based on the information available.

• 6 floors and a basement level

• Higher levels of information = more certainty = more generous TACs

• Lower levels of information = more uncertainty = more restrictive TACs

However there are at present:

• No assessment and,
• No reference points

Can agree a framework now, at least
Floors in the management plan

- Reliable estimates of SSB and F: Penthouse Luxury Apartment
- Less reliable estimates of SSB and F, Top Floor
- Middle floors in the plan deal with various lower information levels and deliver TACs between 33 000 t and 82 000 t
- If no information: ground floor, interim management plan of 22 000 to 33 000 t
- Basement (precautionary foundation) if stock is in danger of collapse, ICES advice override
Draft management plan

1. Reliable estimates of SSB and F: Set TAC as per recent advice for IV and VI megrim

2. Less reliable estimates of SSB and F: Set TAC as above, but down weight it by a precautionary factor

3. Only F estimates available:
   \[ F < F_{PA} \]: Reference TAC (66% of 2008-2010 catches);
   \[ F > F_{PA} \]: Linear reduction in F to 0 at \[ F_{LIM} \]
   Apply a precautionary factor

4. Only trends from trawl survey abundance available:
   Catch rate > target: reference TAC
   Catch rate < target: reduce reference TAC to zero at zero catch rate
   Apply a precautionary factor

5. If only acoustic survey available: biomass \times 13\% \times \text{precautionary factor}

6. If no information is available: 33,000 t (interim management plan).

7. If stock is in danger of collapse: ICES advice
Harvest Control Rules 1 and 2: when we have SSB and F

Rule 1
Set the TAC based on the rule
Do you want stability or the highest possible TAC in a given year?

Rule 2
Set the TAC based on the rule,
But
Down weight the final TAC
Harvest Control Rules 1 and 2: example of megrim

<table>
<thead>
<tr>
<th></th>
<th>Total catch option 2013 (tonnes)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catch (2013)</td>
<td>4000 5000 5500 6000</td>
</tr>
<tr>
<td>Landings (2013)</td>
<td>3400 4250 4700 5100</td>
</tr>
<tr>
<td>Discards (2013)</td>
<td>600 750 800 900</td>
</tr>
<tr>
<td>Probability of Biomass$<em>{2014}$ falling below MSY B$</em>{\text{trigger}}$</td>
<td>1% 3% 4% 6%</td>
</tr>
<tr>
<td>Probability of Biomass$<em>{2014}$ falling below B$</em>{\text{lim}}$</td>
<td>0% 1% 1% 2%</td>
</tr>
<tr>
<td>Stock size (B$<em>{2014}$/B$</em>{\text{MSY}}$)</td>
<td>1.41 1.25 1.21 1.16</td>
</tr>
<tr>
<td>Fishing mortality (F$<em>{2013}$/F$</em>{\text{MSY}}$)</td>
<td>0.60 0.89 1.00 1.19</td>
</tr>
</tbody>
</table>
Rule 3: Estimates of fishing mortality only

Reference TAC = 82,000 t mean catch 2008-2010

based on ICES Advice 2011, Additional Considerations

\[ F_{\text{lim}} = 0.22 \, \text{y}^{-1} = 0.13, \text{raised by a buffer} \]

PA factor applies too
Rule 4: Ground fish only

Reference TAC (82 000 t)

PA factor applies too

\[ U_{pa} = 0.5 \times U_{max} \]
Rule 5 Acoustic survey only

Harvest ratio is 12% = 0.13 (F₀.1)
Biomass estimate 2012 = 434 000 t

TAC 2013 (Q1) = 
biomass estimate 2012 * harvest rate * 0.38 * PA factor = 24 400
TAC 2013 (Q3 and 4) = 
biomass estimate 2012 * harvest rate * 0.62 * PA factor = 15 259

• Adjusted by number of months in each quarter
• Would require in year adjustment of TAC, pending next year’s survey results
• G would be based on CV from acoustic survey
  2011 CV was 0.18, G = 0.75
Rules 6 and 7

Rule 6: Basement level, if there was absolutely no information

22,000 – 33,000 t (interim management plan)

Would have to be adjusted if a first quarter catch had been advised from rule 5 (acoustic surveys)

Rule 7: If the stock is in danger of collapse ICES can give advice that overrules 1-6
Need this to make it precautionary
Precautionary buffers

- Approach here is to define a precautionary down weighting factor:
- For a CV of 30% (quite likely), $G = 0.61$, a 39% discount

$$G_1 = \exp(-1.645 \times \sigma_r)$$

$$\sigma_r = CV,$$ where $r$ refers to SSB, F, U or TSB, from rules 2,3,4 and 5 respectively.

CVs normally in the range 0.2 to 0.3

- ICES approach is to apply an arbitrary 20%,
- Fixed for three years
- Following exceptions
  - if substantial increases in abundance indices or other stock indices are consistently observed e.g. 50%
  - substantial effort decreases in the target fishery, for stocks that are caught mainly as by-catch
<table>
<thead>
<tr>
<th>Rule</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tbody>
<tr>
<td>F</td>
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<td>✓</td>
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<tr>
<td>SSB</td>
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<td>-</td>
<td>-</td>
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<td>-</td>
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<tr>
<td>U</td>
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<td>-</td>
<td>✓</td>
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<td>-</td>
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<tr>
<td>Ref. TAC</td>
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<td>Acoustic S.</td>
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<td>Optional</td>
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<tr>
<td>Assessment method</td>
<td>Biomass Dynamic Model</td>
<td>Catch curves</td>
<td>Abundance Trends</td>
<td>Harvest Ratio</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Likely catch range</td>
<td>Any</td>
<td>33 - 82 k t</td>
<td>33 - 82 k t</td>
<td>33 - 82 k t</td>
<td>33 - 82 k t</td>
<td>22 - 33 k t</td>
<td>0 - 22 k t</td>
</tr>
</tbody>
</table>
Closed areas, seasons and moving on

Closed seasons, closed areas and moving on procedures shall apply as follows:

i A closed season shall operate from 15th March to the 31st August. This is because it is known that herring and mackerel are present in these areas and may be caught with boarfish.

ii A closed area shall be implemented inside 12 miles south of 52°30' from 12th February to 31st October, in order to prevent catches of Celtic Sea herring, known to form aggregations in this region at these times.

iii If catches of other species covered by TAC, amount to more than 5% of the total catch by day by ICES statistical rectangle, then all fishing must cease in that rectangle for 5 consecutive days.
This is how ICES would deal with the situations in Rules 2-6.

If average of last 2 years of surveys (e.g. IBTS) is different to the previous 3 years, adjust last year’s TAC by that factor.

As an example in the case below it would imply a 30% increase on the TAC of 2011 = 43 000 t for 2013

Can further adjust the TAC if information on fishing mortality is available.
Options

• Type of HCRs to include: need to cover all possible information states
• Choice of PA buffer: arbitrary vs. proportional
• Incorporate ICES data poor approach?
• Closed seasons, areas, moving on procedures