

Ms Lowri Evans  
European Commission  
Directorate General - Mare  
Office J-99; 0/07  
B-1049 BRUSSELS  
Belgium

Pelagic RAC  
Treubstraat 17  
PO Box 72  
2280 AB Rijswijk  
The Netherlands

Tel: +31 (0)70 336 9624  
Fax: +31 (0)70 399 3004  
E-mail: [info@pelagic-rac.org](mailto:info@pelagic-rac.org)  
<http://www.pelagic-rac.org>

Date: 14 August 2012  
Our reference: 1112PRAC127  
Subject: Long-term management plan for boarfish  
CC: Catherine Dale (by e-mail)

Dear Ms Evans,

The Pelagic RAC is pleased to present to you a long-term management plan for boarfish, developed together with scientists from the Marine Institute (Ireland) and DTU Aqua (Denmark) and unanimously approved by the Executive Committee of the Pelagic RAC.

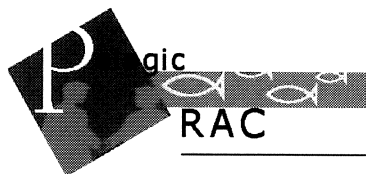
The boarfish fishery is a young and developing fishery with a rapid increase in landings, reaching almost 140,000 tons in 2010 compared to approximately 20,000 tons in 2007. Therefore a long-term management plan which guarantees the sustainable exploitation of this stock is urgently needed.

The management plan proposed hereunder provides for the sustainable management of the boarfish in accordance with precautionary principles and sets out a framework for setting the TAC for boarfish in all situations, irrespective of the amount or quality of data available. The Pelagic RAC requests that this plan will be forwarded to ICES for evaluation as soon as possible as the ICES Working Group on Widely Distributed Stocks meets at the end of August.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'V. Ohms', is written in a cursive style.

Ms Verena Ohms  
Pelagic RAC Secretariat



**Draft Management Plan for Boarfish, *Capros aper***  
**The Pelagic RAC**  
**August 2012**

This draft management plan for boarfish *Capros aper* has been agreed by the Pelagic RAC and was drafted with help and assistance of the Marine Institute (Ireland) and DTU Aqua (Denmark).

The plan provides for the sustainable management of the developing fishery for the small pelagic species boarfish, *Capros aper*, in EC waters of IV, V, VI, VII and VIII. 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 (FAO, 1996). These guidelines are given in the annex, with notes on the boarfish fishery.

This plan sets out a framework for setting the TAC for boarfish in all situations, irrespective of the amount or quality of data available. The plan contains a decision rule framework that is considered robust to any level of information availability and quality. The plan uses a "Reference TAC", defined as the average annual catch over the period 2008-2010. Boarfish were not considered to be overfished during this period (ICES, 2011). It is based on an Australian harvest strategy approach (Wayte, 2009), adapted to suit the current ICES advisory paradigm (ICES, 2011).

**Proposed Management Plan**

This plan aims to achieve sustainable harvesting of boarfish, maintaining the stock within safe biological limits.

1. The TAC setting rules 1.1-1.6 shall apply. Precedence is in decreasing order from Rule 1.1. These are shown in the table below. The decision year for TAC setting is the last year in the assessment, and not the TAC year.

Rule	Assessment	Uncertainty	Condition	Procedure
1.1.a 1.1.b	SSB and F	Low	SSB > B <sub>trigger</sub> SSB < B <sub>trigger</sub>	F <sub>target</sub> SSB * ( F <sub>target</sub> / B <sub>trigger</sub> )
1.2.a 1.2.b	SSB and F	Higher	SSB > B <sub>trigger</sub> SSB < B <sub>trigger</sub>	F <sub>target</sub> SSB * ( F <sub>target</sub> / B <sub>trigger</sub> ) * G
1.3.a 1.3.b	F	Any	F < F <sub>target</sub> F > F <sub>target</sub>	Reference TAC * G RTAC + (-RTAC / F <sub>lim</sub> -F <sub>pa</sub> )*(F-F <sub>pa</sub> ) * G
1.4.a 1.4.b	U	Any	U > U <sub>pa</sub> , TAC = U < U <sub>pa</sub> , TAC =	Reference TAC * G U * ( Reference TAC / U <sub>pa</sub> ) * G
1.5.	Survey biomass	Any	TAC <sub>y,q3,4</sub> = TAC <sub>y+1, q1</sub>	ASB * 1-exp <sup>-F<sub>0.1</sub></sup> * G * 0.62 ASB * 1-exp <sup>-F<sub>0.1</sub></sup> * G * 0.38
1.6	None		No information on stock status <i>and</i> no risk of recruitment impairment	TAC = 33,000 t (interim management plan TAC)

- 2 Notwithstanding Paragraph 1, if in the opinion of ICES, the stock is at risk of recruitment impairment, a TAC shall be based on advice given by ICES, and at a lower level than provided for in Paragraph 1, rules 1.1 to 1.6.
- 3 Closed seasons, closed areas and moving on procedures shall apply to all directed boarfish fisheries 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 the Irish 12 mile limit south of 52°30 from 12th February to 31st October, in order to prevent catches of Celtic Sea herring, known to form aggregations 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.

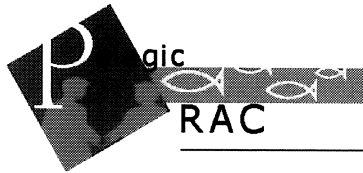
#### Abbreviations

SSB	Spawning Stock Biomass in tonnes
F	Fishing mortality in units per year
U	Fisheries independent abundance index, from IBTS survey, numbers per half hour
C	Commercial catch in tonnes
TSB	Total Stock Biomass in tonnes

#### Parameters of the management plan

The final values of these parameters should be set by means of simulation studies. However at the outset they are defined as follows:

MSY	SSB <sub>trigger</sub>	xx t	$B_{lim} < SSB < B_{msy}$
$B_{lim}$		xx t	SSB consistent with recruitment impairment
$B_{pa}$		xx t	$B_{lim} * \exp^{(1.645 * CV_{SSB})}$
$B_{msy}$		xx t	Based on simulation
$F_{target}$		year <sup>-1</sup>	$F_{msy}$ or a suitable proxy
$F_{0.1}$		0.13 y <sup>-1</sup>	Yield per recruit 2011 (preliminary)
$F_{max}$		0.28 y <sup>-1</sup>	Yield per recruit 2011, median (preliminary)
$F_{pa}$		0.135 y <sup>-1</sup>	0.9 * M (assuming limited forage status)
(preliminary)			
$F_{lim}$		0.22 y <sup>-1</sup>	$F_{pa} * \exp^{(1.645 * \sigma)}$ ; $\sigma_f$ assumed = 0.3 (preliminary)
Reference TAC		82,000 t	mean catch 2008-2010 (ICES, 2011)
$U_{max}$		xn h <sup>-1</sup>	Maximum observed IBTS abundance (2008)
$U_{lim}$		xn h <sup>-1</sup>	0.2 * $U_{max}$
$U_{pa}$		xn h <sup>-1</sup>	0.5 * $U_{max}$



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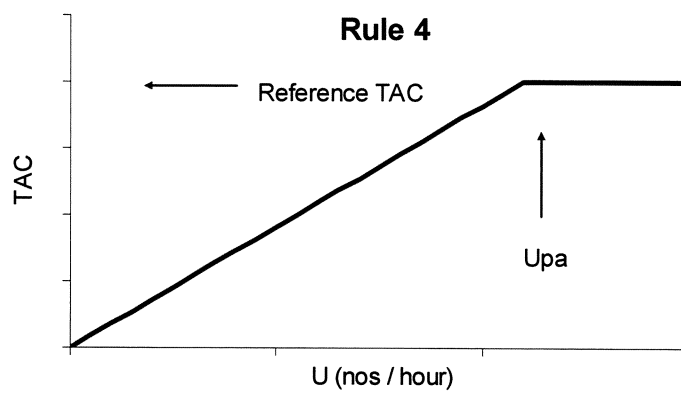
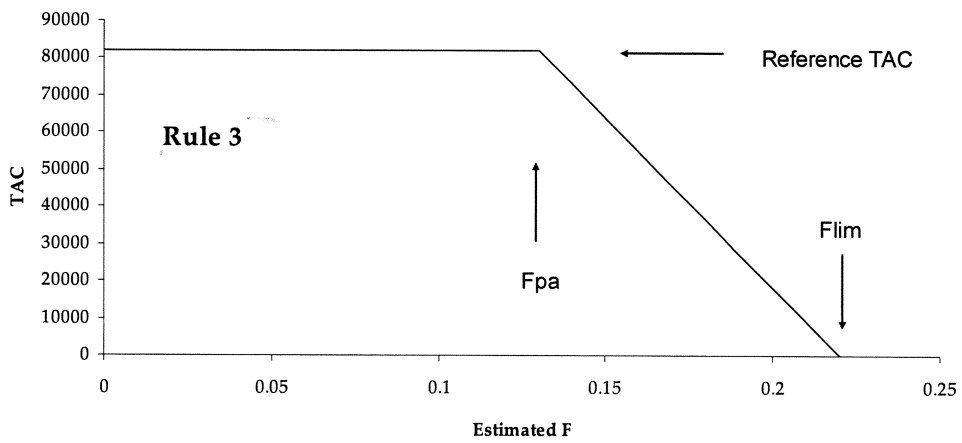
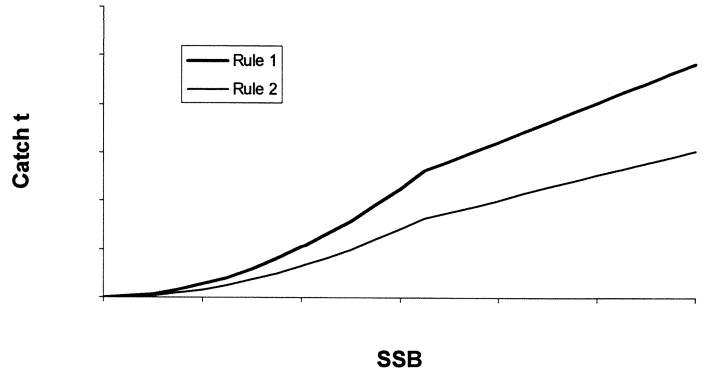
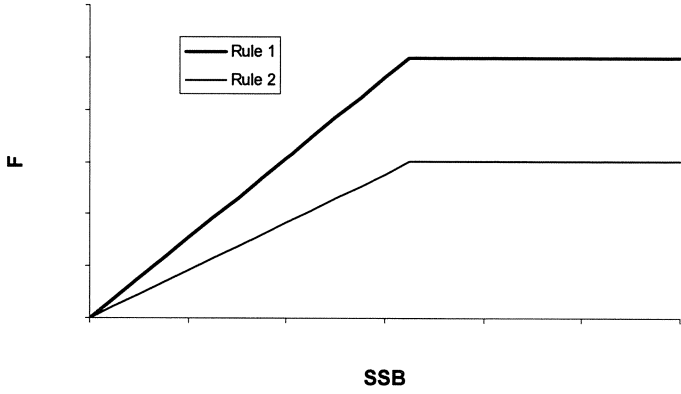
ASB	=	Acoustic survey biomass estimate (tonnes).
$G_1$	=	RTAC * $\exp^{-1.645 * \sigma_r}$
$\sigma_r$	=	CV (higher of process/observation error) where r refers to SSB, F, U or TSB, from rules 2, 3, 4 and 5 respectively.

### References

FAO. 1996. Precautionary approach to capture fisheries and species introductions. Elaborated by the Technical Consultation on the Precautionary Approach to Capture Fisheries (Including Species Introductions). Lysekil, Sweden, 6-13 June 1995. *FAO Technical Guidelines for Responsible Fisheries*. No. 2. Rome, FAO. 1996. 54p.

ICES. 2011. Boarfish in the Northeast Atlantic. In. ICES, 2011. Report of the ICES Advisory Committee, 2011. ICES Advice, 2011. Book 9, Section 9.4.22. 112-117.

Wayte, S.E. 2009. (ed.). Evaluation of new harvest strategies for southeast scalefish and shark species. CSIRO Marine and Atmosphere Research, Hobart and Australian Fisheries Management Authority, Canberra, 137 pp.



Rules 1-4 illustrated in terms of F and TAC. Rules 1 and 2 are diagrammatic only.

**Annex**  
**Application of the Precautionary Approach to a new and developing fishery:**  
**boarfish in the NE Atlantic.**

<b>UN FAO Guidelines</b>	<b>Comments in relation to boarfish</b>
Always control access to the fishery early, before problems appear. An open access fishery is not precautionary.	Conservative TAC in place 2011, based on interim management plan
Immediately put a conservative cap (or default level) on both fishing capacity and the total fishing mortality rate. This could be achieved by limiting effort or total allowable catch. As well, attention should be paid to preventing excessive investment in the processing sector. The conservative caps should remain in place until analyses of data justify an increase in fishing effort or fishing mortality. The objective is to prevent the development of the fleet's fishing power and capacity outpacing the ability of management to understand the effect of existing fishing effort.	TAC in place, ICES annually assesses the stock.  Need to balance development of processing capacity but avoiding overcapacity in either fish meal or human consumption.
Build in flexibility so that it is feasible to phase vessels out of the fleet, if this becomes necessary. To avoid new investments in fishing capacity, temporarily license vessels from another fishery.	No new vessels being built to target the fishery.
To limit risks to the resource and the environment, use area closures, which are relatively quick to implement and are easily enforceable. Closures provide refuges for fish stocks, protect habitat, and provide areas for comparison with fished areas;	Seasonal and area closures, in interim plan, adhered to by entire fleet.
Establish precautionary, preliminary biological limit reference points (e.g., spawning stock biomass less than 50% of the initial biomass) in the planning stage as described above.	Preliminary F based reference points available
Encourage fishing in a responsible manner to ensure long-term persistence of a productive stock or other parts of the ecosystem. For instance, encourage voluntary agreements on conduct in the fishery through co-management, community management, or some form of tenure of fishing rights.	Interim plan being followed on voluntary basis, although TACs set using different basis for 2012
Encourage development of fisheries that are economically viable without long-term subsidies.	In short term, subsidies may be a feature, but need to avoid dependence.
Establish a data collection and reporting system for new fisheries early in their development.	Programme established in 2007, detailed plan since 2009.
Immediately start a research programme on the stock and fisheries, including the response of individual vessels to regulations. When issuing a fishing license, require a vessel to report detailed information, including standard biological data and economic information.	Irish fishery has licensing requirement to collect samples. Industry funding survey, and biological sampling.
Take advantage of any opportunities for setting up experimental situations to generate information on the resources. This could be done by contrasting different harvesting strategies on subpopulations, for instance.	Underway as part of Management Strategy Evaluation, by Marine Institute.