

What's going to happen with the Common Fishery Policy (CFP) Reform discard policy? - impacts of a discard ban

Peder Andersen , Jesper L. Andersen, Ayoe Hoff and Simon Mardle

Department of Food and Resource Economics
Faculty of SCIENCE
University of Copenhagen

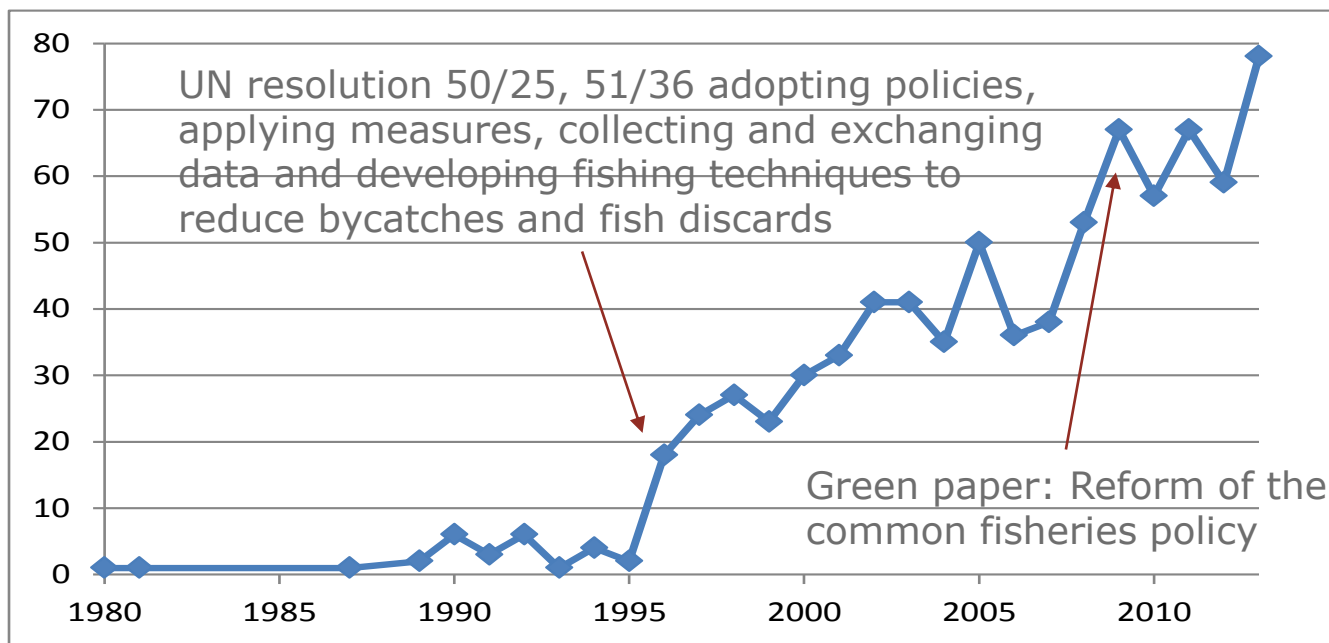


Introduction

- The European Common Fisheries Policy Reform includes a new landings obligation (i.e. discards regulations) that is likely to have the greatest impact on fisheries and fleets of any recent regulation
- This has the potential to result in a step change in fishing behaviour. However, there is a distinct lack of data or empirical knowledge available to inform the effects on fleets
- There is much research on the economics of discards (and operational impacts), e.g. the knowledge of what is rational behaviour regarding discarding Vs incentives driven by policy not to discard (and biological assessment also)
- In this paper:
 - we consider what fisheries economics theory tells us as well as exploring gaps in our knowledge regarding a discard ban
 - we use an empirical example of the North Sea demersal fisheries to consider implications further



"Discards" in peer reviewed papers



Annual number of ISI peer-reviewed records including the words "discards" and "fisheries" in either title, abstract or keywords. Scopus Database, accessed 04/02/2014.

Discards and regulation

The Common Fisheries Policy (CFP) reform is introducing a ban on discards. From 2015 to 2019 in a phased approach, it will become mandatory for fishermen to land all catch caught. Pelagic fisheries will start with a discard ban in 2015, demersal fisheries in 2016 and across all Total Allowable Catch (TAC) species by 2019.

There is little data or empirical knowledge available to inform the likely impacts, but some data exists from surveys and trials.

Will this regulation lead to “optimal” use of resources or more of the same?

- Management Plans are being devised to enable the policy
- There are additional tools in the ‘toolkit’ (e.g. Exemptions, quota uplift, quota transfer, better coordination etc)

Economics has the potential to help evaluate changing behaviour, changing profitability of fleets, improving management, and increasing transparency, maybe even increasing compliance(?).



Some questions...

What is the aim of regulation - ideology or sustainability or best economic outcome in using resources?

What's driving it - campaigning, convergence, science,...?

Why the sudden interest in socio-economic discards research from Govts and EU- why not 5 years ago with the green paper?

What about the ecosystem - is there an assumption that reducing fishing effort is always good? Maybe not for all:

- *"When the seagulls follow the trawler, it's because they think sardines will be thrown into the sea"* (Cantona, 1995)

Fishermen might ask: what's the cost to us vs the overall benefit?

How "brave" is it to introduce a policy based on little empirical evidence? What is the net cost and where is the benefit?

Is such a policy consistent with MSY (ensuring supply of food) in the long run?

Relative stability -> catch composition -> quota allocation?

Fishermen trapped in lack of quota (what happens to price of quota? What are the market incentives and innovative solutions...?)



Economic theory

There is much written on the economics of discards.

- The knowledge of what is rational behaviour regarding discarding versus incentives driven by policy not to discard.
- The fundamental idea of costs (incl penalty) outweighing benefits or as is typically considered whenever "*the (opportunity) cost of retaining and landing fish exceeds its market value*"

However, there are gaps in the literature and few (if any) discard bans have been implemented on such a scale.

One view might be to accept that the discards policy is a hard constraint but to acknowledge that in reality the achievement of this will not be done immediately but over time.

There's a trade-off between accepting that some discards could be acceptable (under certain conditions) and the impact on stocks.

Where's the 'fairness' in this and how is it enforced?



Fisherman's decision as to land or discard

In the EU (e.g. North Sea), quotas dominate although effort management through days at sea restrictions are in place (e.g. cod recovery plan).

Where effort management is restrictive then quotas are not binding (e.g. North Sea TR2 vessels targeting Nephrops).

However, simply reducing effort where stocks are in fair shape will not maintain the viability of fleets in the long-term.
(Subsidies are not discussed here!)

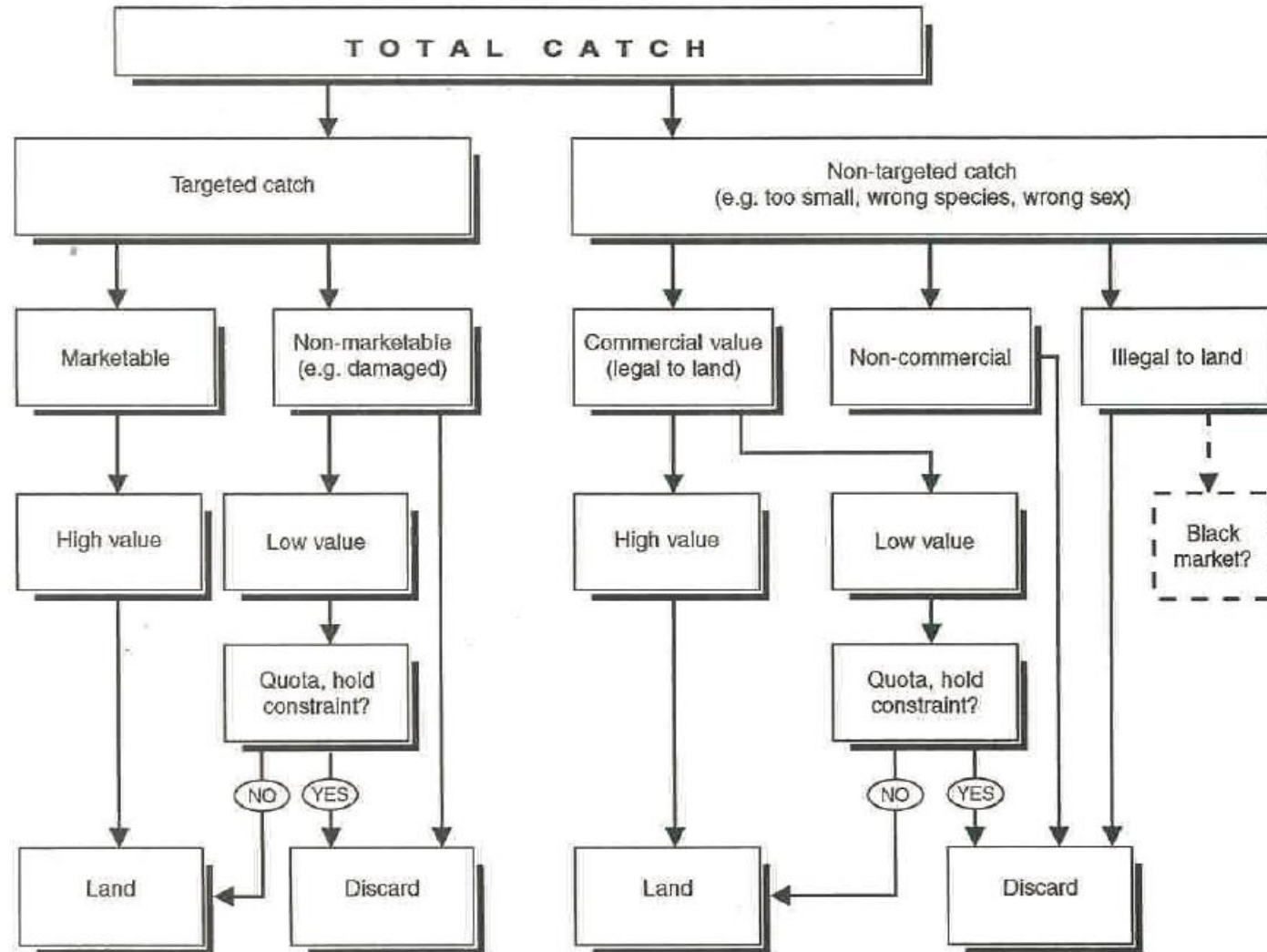
The fisher asks a pretty simple question,

"Am I allowed to land the fish and is the fish marketable?"

What solutions are available to minimise discards?



The decision making process (Pascoe, 1997)



The decision process

Discards result for a number of reasons and enable some sort of planning in the fisher's decision to discard (e.g. highgrading):

- Fish < legal minimum landing size
- Fish have no or low market value
- Lack of quota
- Catch composition rules limiting percentage

In all cases, better selectivity will reduce discards:

- Spatial aspect – area fished
- Technical aspect – gear used (incl changing gear, e.g. trawl to traps)
- Temporal aspect – time of year fished
- Market (quota) aspect – ensure catch composition matches quota

In addition, reducing fishing effort and therefore the amount of fishing gear in use overall will reduce total discards.

Will the management plan provide fishers with similar fishing opportunities?



Practical implementation

In the “new world”, the aim is that landings equal catch whereas in the “old world” landings equals catch minus discards. There is the potential to discard under defined exemptions but basically the premise is that unwanted catch is landed, it may be

- landed and sold (if quota allows),
- landed and surrendered (for fishmeal),
- discarded at sea (under exemption) or
- illegally discarded.

What are the likely rules? E.g. Scottish conservation credits:

- using more selective fishing nets and other gear
- observing temporary closures, or seasonal closures
- CCTV scheme and observer programmes to monitor vessels on agreed trials

and UK (with DK & DE) cod catch-quota program with up to 30% quota uplift and additional days:

- a) all caught fish are recorded and all cod caught count against quota
- b) all cod caught shall be retained on board and landed
- c) once a vessel's cod quota is reached it must stop all fishing practices that can catch cod.



Empirical analysis

Models and data are important for doing applied economic analyses of a discard ban.

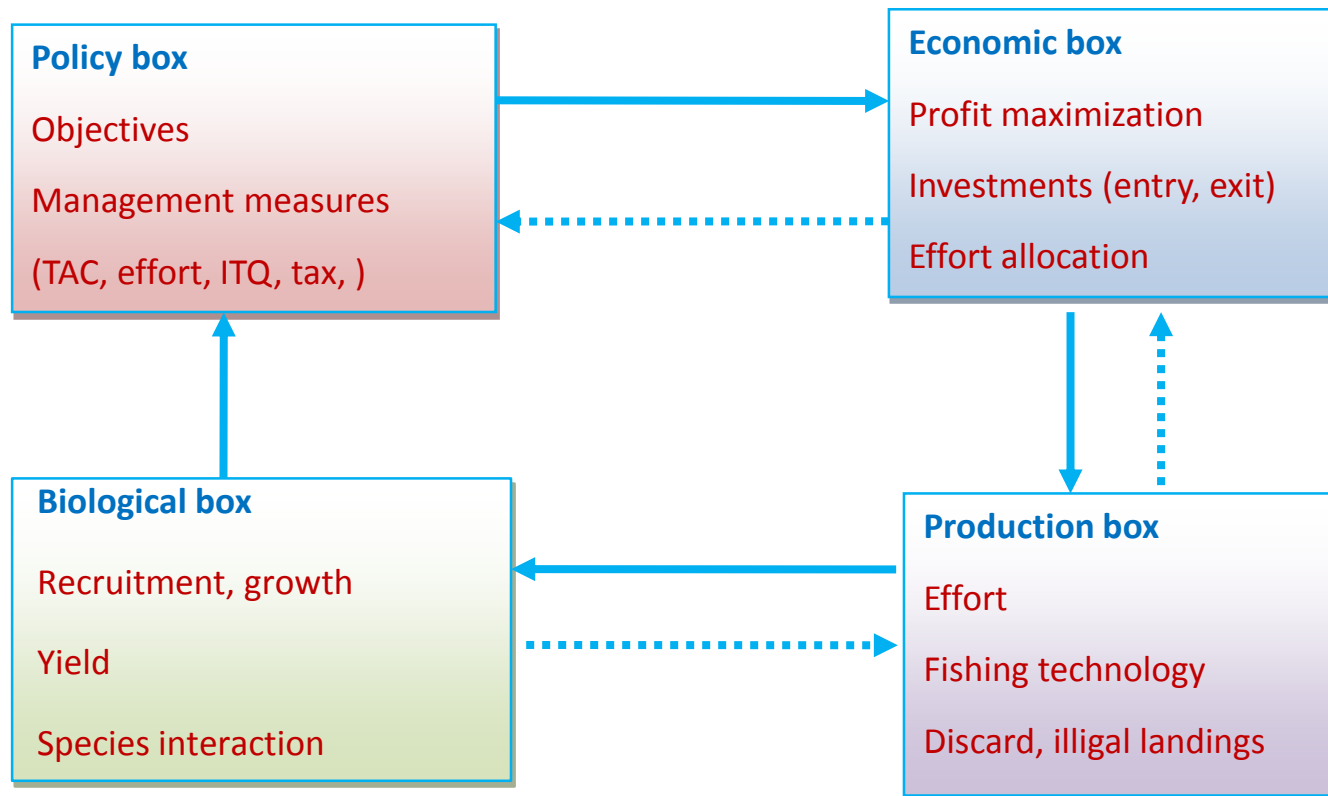
The FishRent model is an example of a model which can be used for analysing and evaluating what is useful and what might happen.

For example considering changing behaviour:

- Selectivity – what incentives can be promoted to improve selectivity (e.g. Scottish case of conservation credits)
- Substitution – given increasing regulation and constraints, how can vessels become more efficient? Is there any empirical evidence of this?
- Economic viability of fleets
- Learning across fleets and fisheries
- Investment decisions and disinvestment (management costs)



General structure of FISHRENT



Theoretical model of Clark (1980)

Towards a Predictive Model for the Economic Regulation of Commercial Fisheries. Can. J. of Fish. and Aq. Sci., 1980, 37(7): 1111-1129.

Harvest (h) for vessel (i) is the product of a constant catchability coefficient (q), standardised vessel effort (E) and fish biomass (x):

$$h_i = qE_i x$$

In a model without discards the model doesn't differentiate between landings and catch but in reality landings will almost always equal catch minus discards (or unwanted catch) as harvest contributes directly to revenue. Therefore, we assume that discards (d) are greater than zero.

In the simplest case for modelling discards explicitly, catchability can be defined differently for landings and discards:

$$l_i = q_l E_i x$$

$$d_i = q_d E_i x$$

The profitability of a vessel can be calculated as in Clark's model:

$$\pi_i = \pi_i(x, E_i) = p_l q_l E_i x - c_i(E_i) = (p_l q_l E_i x + p_d q_d E_i x) - c_i(E_i)$$

where price, p , is different for landed and discarded quantity.

Max profit: $MR_i = p_l q_l x + p_d q_d E_i = c'_i(E_i)$



Questions that result

Q: Is the stock level under open access $<$ or $=$ or $>$ the stock level under a discard ban?

If we assume that the cost of handling discards is proportional to the amount of discards then we can define a "discard" cost function

$$c_i^d(d_i) = c_d d_i$$

Therefore, marginal revenue (MR) can be defined as,

$$MR_i = p_l q_l x + (p_d - c_d) q_d E_i$$

Observations:

If $p_d < c_d$ then the cost of discarding outweighs catching unwanted fish thus resulting in reduced effort, also resulting in a higher equilibrium stock level

If $p_d > c_d$ then the cost of discarding incentivises catching unwanted fish thus resulting in increased effort, also resulting in a lower equilibrium stock level.



Questions cont.

Changing technology and discarding. The catch of unwanted fish can be controlled through the level of technology investment and effort applied. Therefore it can be approximated that it is a function of cost of effort,

$$q_d = q_d(c_i(E_i))$$

It can be assumed that catchability of discards will follow the same trend as catchability of landings.

$$\frac{\partial q_d}{\partial c_i} < 0$$

Taking an example of investing in a wider mesh size then less discarded fish are caught.

- If cost per vessel goes up then effort goes down
- Moreover, if cost of effort per vessel goes up then catchability of discards goes down



Optimal fishery (simple static case)

Consider the optimal case

$$\max \sum_i^N \pi_i(x, E_i)$$

$$F(x) = qx \sum_i^N E_i$$

Results in,

$$(p - \lambda)qx = c'_i(E_i) = (p_l - \lambda_l)q_lx + (p_d - \lambda_d)q_dx$$

where λ_s are shadow prices. The shadow prices for landable fish (λ_l) and discards (λ_d) differ. In an optimal regulated fishery this means that the tax on landable fish differs from the tax on discardable fish.

If $p_d < c_d + \lambda_d$ then

stock with a discard ban will be $>$ stock without a discard ban.

Moreover, if stock with discard ban is $<$ stock at MSY then

landings with discard ban will be $>$ landings without discard ban

Also, if stock with discard ban is $>$ stock at MSY then

landings with discard ban will $<$ than landings without discard ban



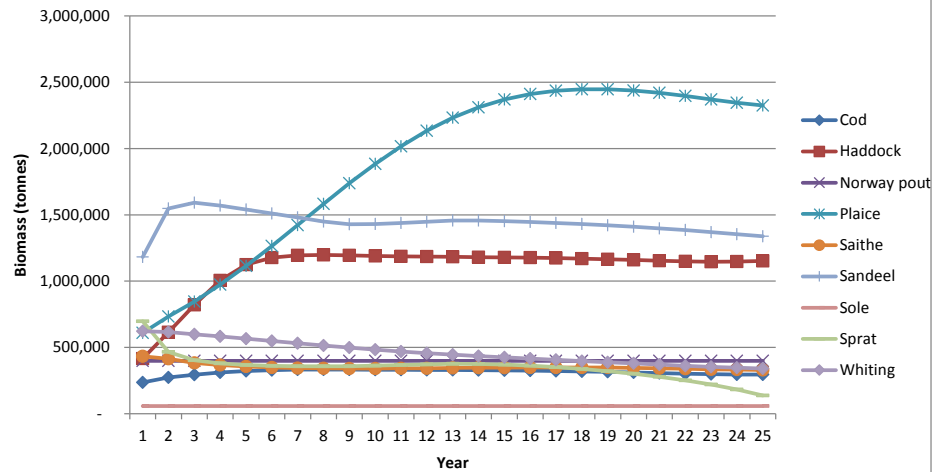
Some simulations: Fishrent runs

- Simulations
 - Baseline 2011
 - TAC MAX
 - Scenario to model discard ban explicitly:
 - TAC MIN
 - 0% discards
 - 30% TAC uplift
 - No quota trade
 - Species must contribute >2% share to fleet catch to impact effort
 - Scenario to model discard ban with 10% exemption:
 - TAC MIN
 - 10% discards
 - 30% TAC uplift
 - No quota trade
 - Species must contribute >2% share to fleet catch to impact effort

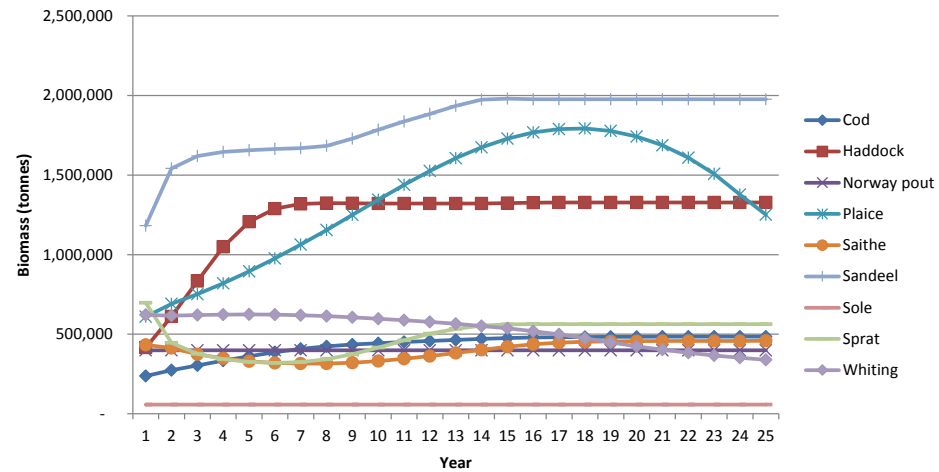


Fishrent results biology

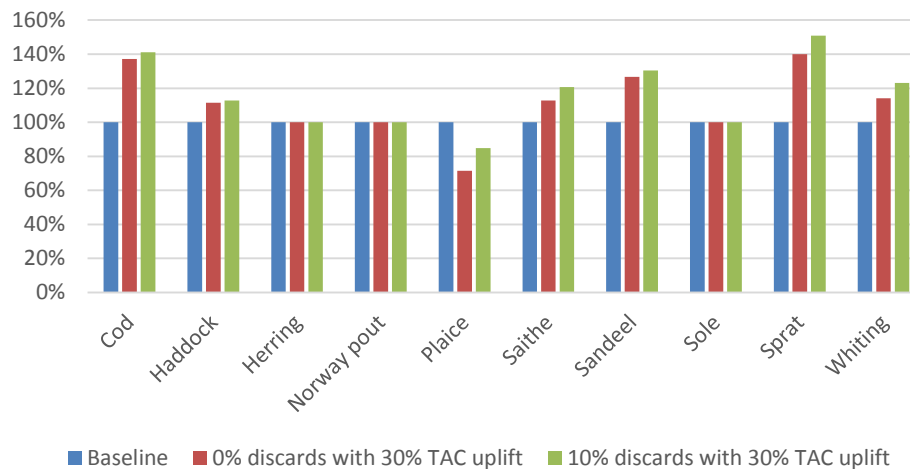
Biomass: Baseline



Biomass: Discards 0% with 30% TAC uplift

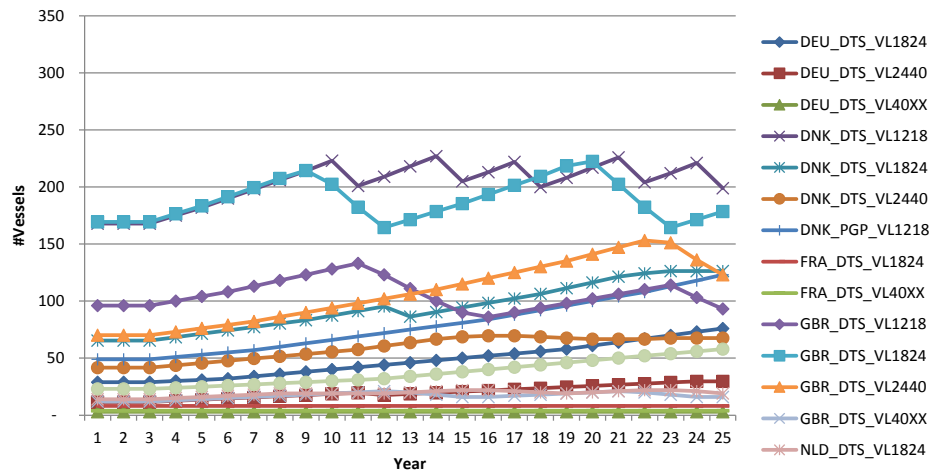


Average biomass difference across 25 years

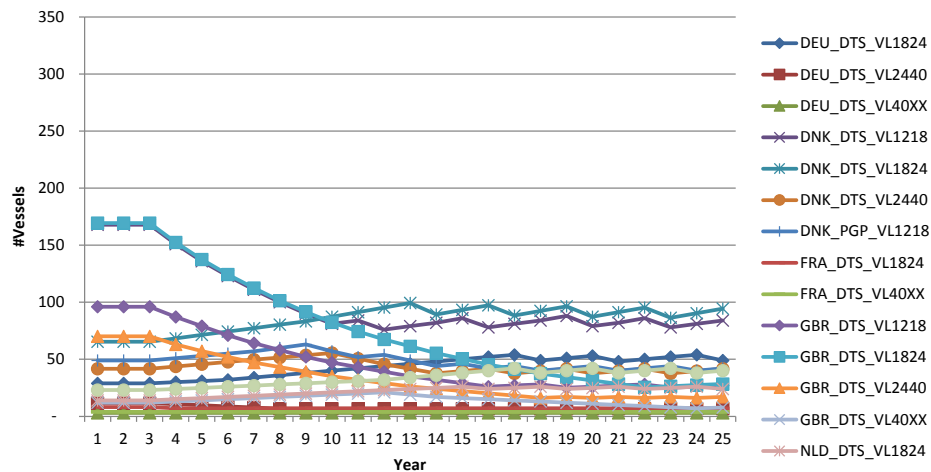


Fishrent fleet activity

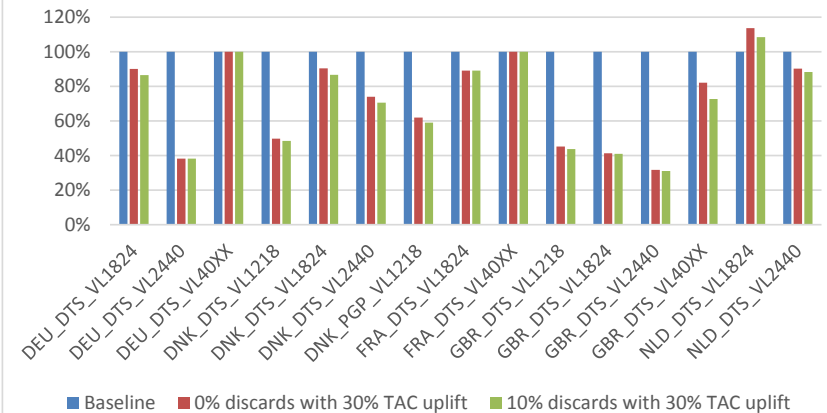
Vessels: Baseline



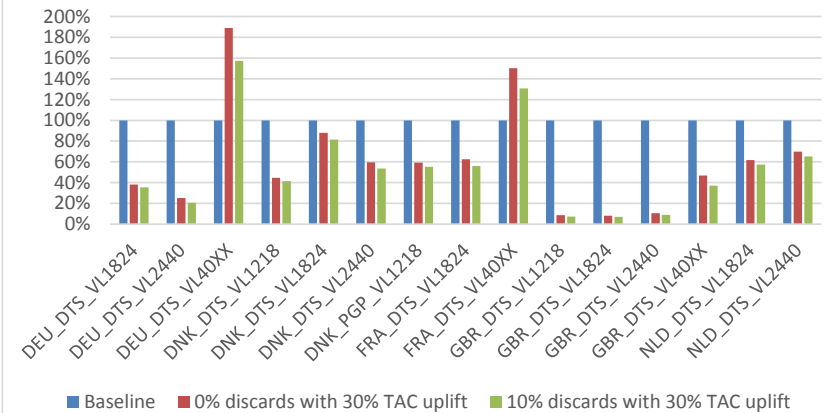
Vessels: 0% discards with 30% TAC uplift



Average vessels difference across 25 years

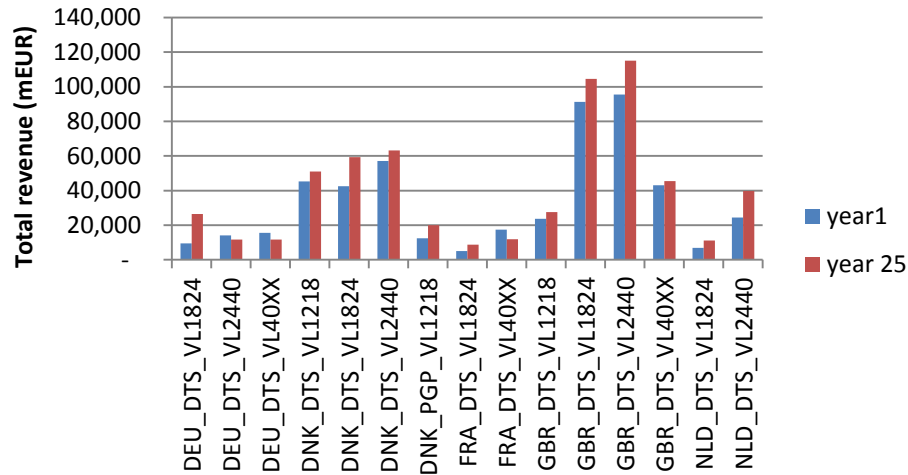


Average seadays difference across 25 years

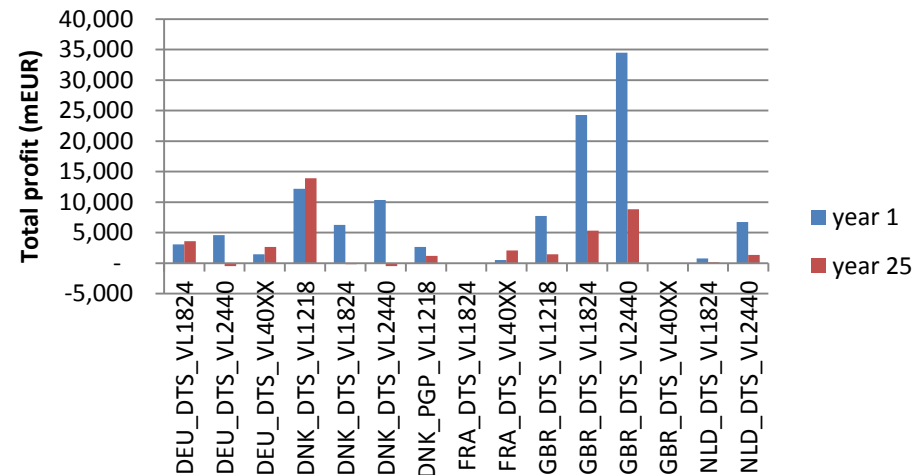


Fishrent results economics

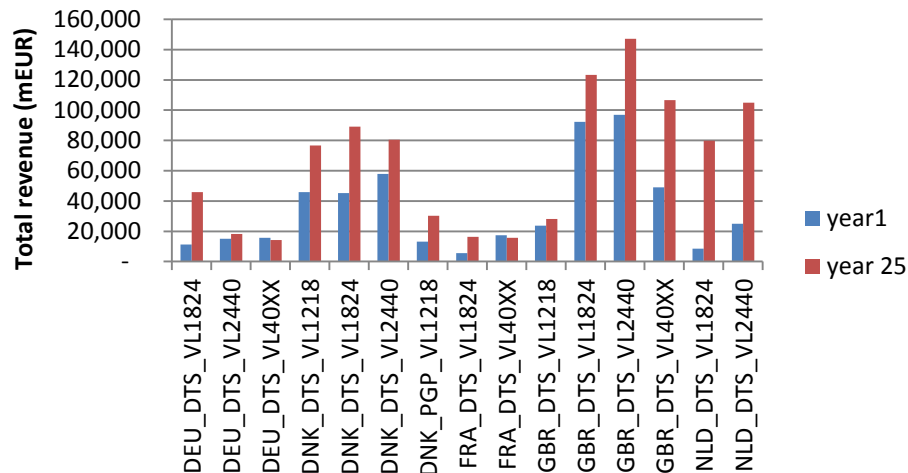
Scenario: Baseline



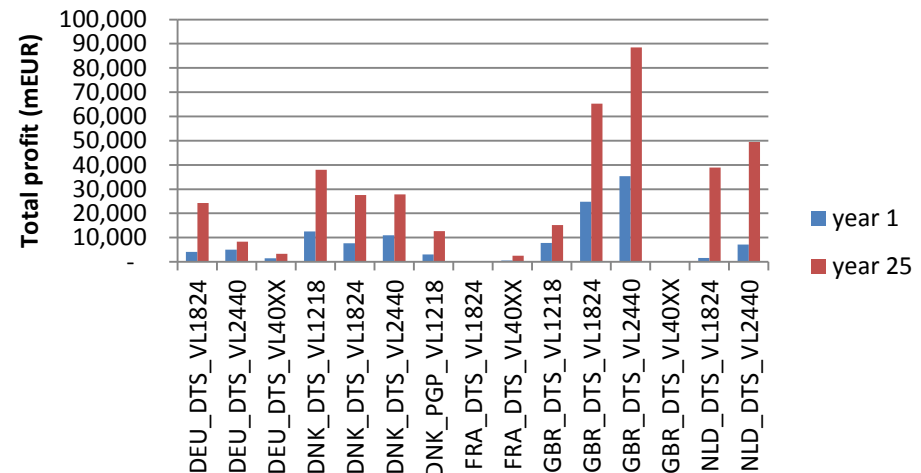
Scenario: Baseline



Scenario: Discards 0% with TAC uplift 30%

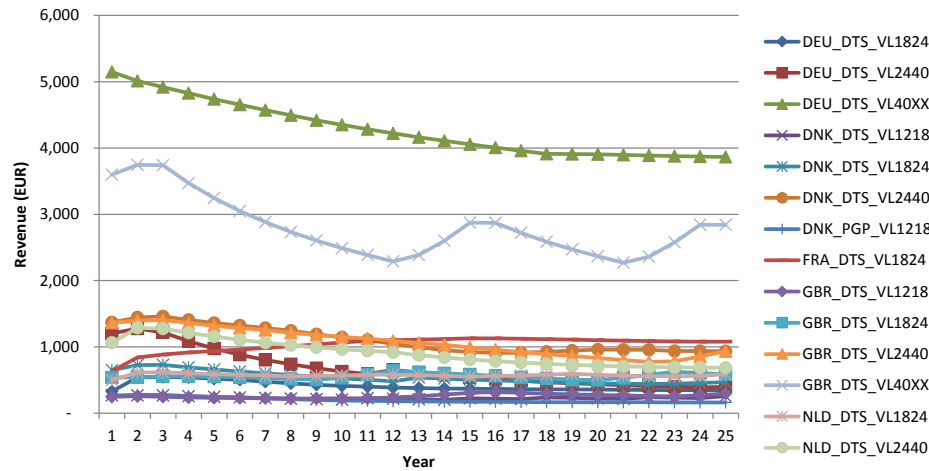


Scenario: Discards 0% with TAC uplift 30%

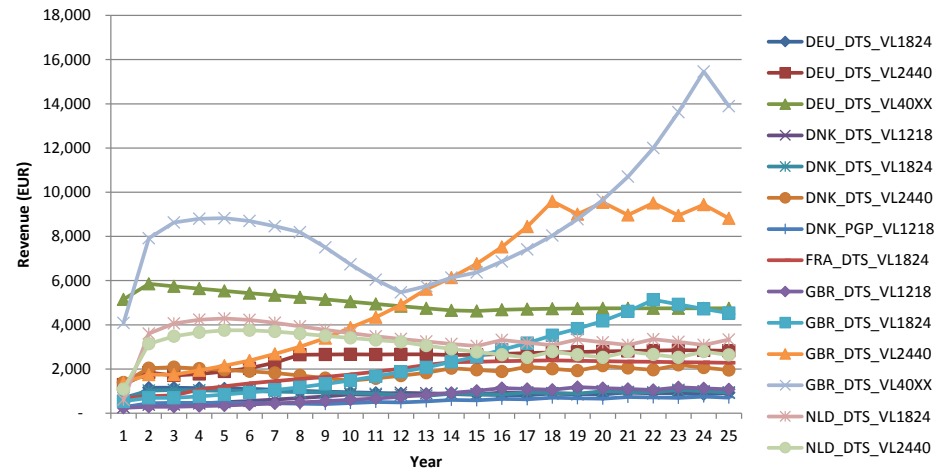


Fishrent average vessel viability

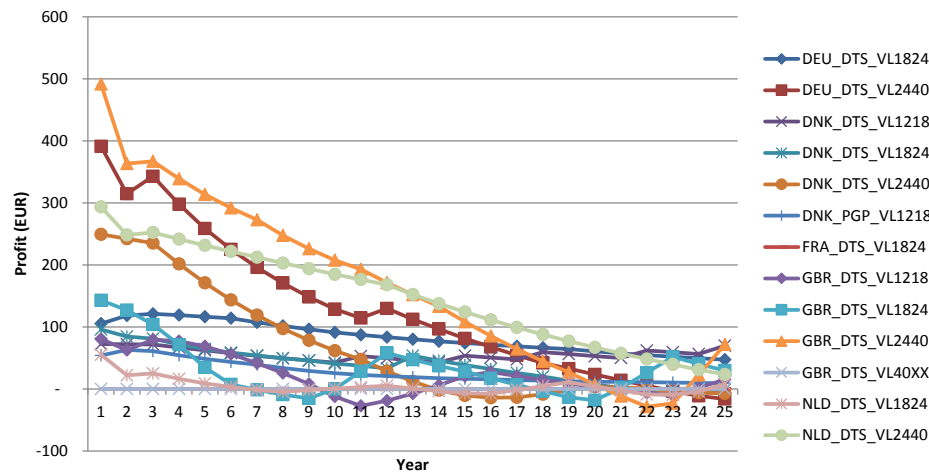
Revenue per vessel: Baseline



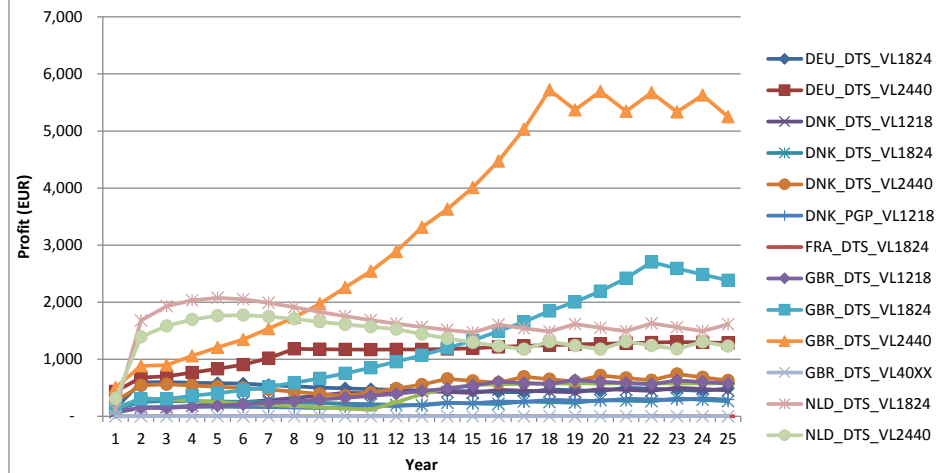
Revenue per vessel: 0% discards with 30% TAC uplift



Profit per vessel: Baseline

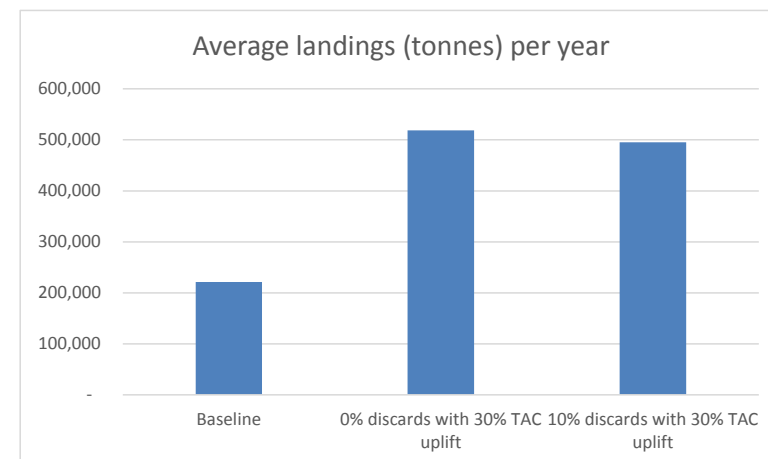


Profit per vessel: 0% discards with 30% TAC uplift



Observations

- Implementing a relatively strict discard approach of 0% discards with 30% TAC uplift
 - This takes account of estimated loss in single species discarding
 - This results in the likelihood of significantly less vessels and significantly less effort
 - This is due to choke species dominating whether a fleet can participate in the fishery
 - Catch composition is critical and will undoubtedly change to align better to catch opportunity
 - This may be through re-allocation of quota at source
 - Or perhaps through the market (buying and selling quota)
 - Estimated biomass of key species is better under the discard ban as predicted
 - There may be opportunity to trade-off the short term impact on fleets with slightly less improvement to stocks
 - This trade-off would slow both the reduction in fleets and the improvement in stock levels
 - Total landings (and revenue) is greater across 25 years, implying supply is relatively sure (see chart)



Discussion

- Warming – 2 area example: productive area now Vs productive area in the future – re-allocation of fleet effort
- Can economic indicators be used directly in management of discards?
 - Much has been written on economic indicators but stock assessment still drives policy.
 - With such a fleet focussed policy is economics set to play a more dominant role in management?
 - Will the economic data collected for fleets need to be improved
- Much is written about adding value to catch and changing markets – fleets will have to adapt
- Will total catch go down? This is likely given simulations however still not clear in the direction of policy
- Single species vs multi species – the biology must improve too – is it only discard data that's missing?
- There are likely to be penalties of not meeting regulation: currently when landings exceeds quota this is imposed on the vessel -> region -> nation, with reduced quota in the following year
- Enforcement and compliance have not been addressed
 - Technologies, methods, etc.



Conclusions

A discard ban matters:

- catches and economic consequences (can go both ways)
- environmental impacts (birds, seals, ecosystem services...)

The Management Plan is critical (still yet to be defined for North Sea demersal fisheries)

If the discard ban is rigorously introduced fleets will be bound by choke species – catch composition will be 'uncovered'

Empirical analyses using the FishRent Model will give the answers for a number of fisheries (part of a EU Horizon 2020 project).

Q. Will the discard ban provide an approach to reducing capacity and managing fisheries that ITQs cannot in Europe – mostly as relative stability must be maintained



Acknowledgements

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THANK YOU!

