BalticSea2020

The effect of following scientific advice

What does MSY management look like?

The concept of Maximum Sustainable Yield (MSY) is presently debated within EU for the reform of the Common Fisheries Policy (CFP) and is often framed as the road to the "promised land". But what does the promised land look like? Some say it will lead to bankrupt fishing industries or a sea overflowing with fish. Some say it can never be achieved in reality. Here we briefly present two cod stocks that have been rebuilt to MSY levels, how long it took and the effects on the industry.

Eastern Baltic Cod (see figure 1)

In 2002 this cod stock had declined to levels dangerously outside safe biological limits and the International Council for the Exploration of the Seas (ICES) recommended a moratorium with no cod fishery. The background was a long series of years where TACs had been set well above the levels advised by scientists. Improvements in the stock levels were always immediately followed by TAC increases and the stock never had a chance to recover. The Cod Recovery Plan was implemented in 2007. The target of the plan is that not more than approximately 30% of the stock should be fished each year (F = 0.3) which equals MSY (Fmsy)[1]. Also, the plan limits year to year changes of the quota to maximum ±15%. Since 2007, quotas set by member states have followed the harvest rules of the plan and the scientific advice, as is shown in the figure 1.

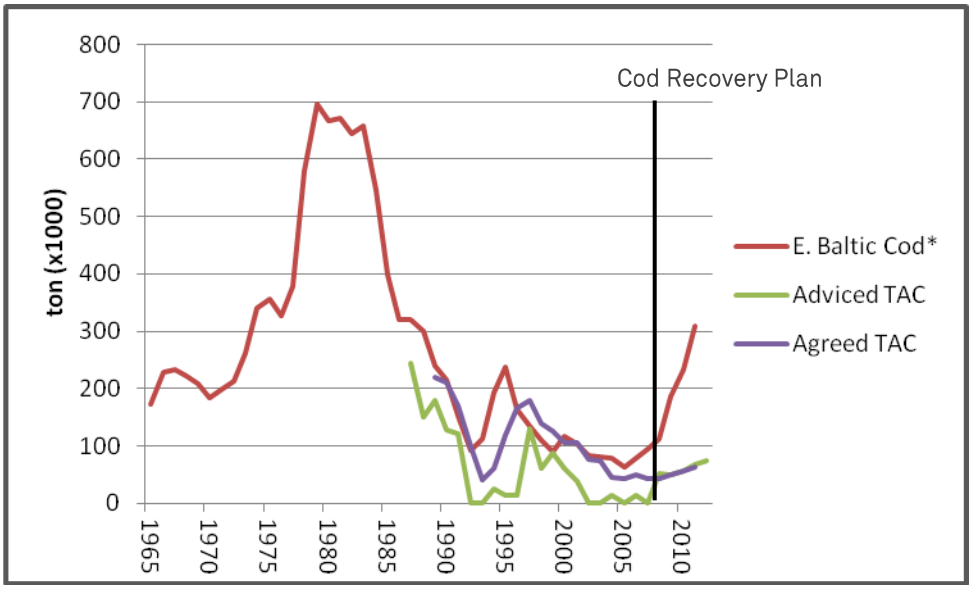

Figure 1. Stock size, advised TACs and agreed TACs for the eastern Baltic cod. Data source: ICES advice 2011. *Spawning stock biomass.

[1] Bmsy is the biomass (B - the weight of all fish) that a stock must have so that it can produce MSY. Fmsy is the fishing mortality (F – the amount of fish that die from fishing) that would let the fish grow to the stock size Bmsy.

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The figure underlines two very important results of following scientific advice.

Firstly, there was never a dramatic cut in quotas that forced the fishing fleet out of business. Instead the 15% rule ensured a careful increase of quotas when the stock naturally started to increase at the same time as it prevented market effects of increased production and secured a stable production, important for processors. The stock has been fished on or below Fmsy since 2008.

Secondly, the cod stock recovered to a biomass corresponding to MSY (Bmsy) in 4 years! Simulations indicate that if the plan is followed, quotas will be doubled between 2008 (42.000 tonnes) and 2015 (~100.000 tonnes) while still adhering to MSY management.

This Baltic example shows that MSY management can be done in reality, does not imply a closure of the industry and can lead to increased profits within a few years. However, agreed harvest rules with long term biological targets have to be implemented and the harvest rules HAS TO BE ADHERED TO (including minimizing IUU-fishing).

Northeast Arctic Cod (see figure 2)

Since the mid–1980's quotas have been set reasonably close to the ICES advice but until 2004 advice was targeted to maximize catches without risking a collapse. That is, there was no long-term biological target. So even though advice was sometimes adhered to, the stock size was highly variable and large quota changes were needed to keep the stock inside safe biological limits. In 2004, Norwegian and Russian authorities (a jointly managed stock) agreed a management plan with a long term target of not fishing more than approximately 40% of the stock each year and keep the stock size above 460 kton which is the limit over which the risk of collapse is small (Bpa). That is, the MSY target is not considered but the management plan follows a precautionary approach. This plan has a limit of a 10% change of quotas from year to year. Since 2004, set quotas have to an increasing degree followed those stipulated by the plan and scientific advice as is shown in figure 2.

A substantial cut in fishing has not been necessary and the fishing industry has profited from the plan within 5 years. Quotas are now likely to be much more stable, ensuring a stabile production and maximized use of capacity in the industry. Fishing pressure has been 40% (F=0.4) since 2006.

The cod stock has continually increased as agreed quotas have approached levels stipulated by the management plan. The stock is now at historical levels. Thus it only took 7 years to restore the stock from the verge of collapse (Blim) to historically high levels.

MSY is not defined for this stock although current levels are most likely well above Bmsy. This example still shows the strength of management plans based on scientific advice and agreed harvest rules on condition the rules are adhered to.

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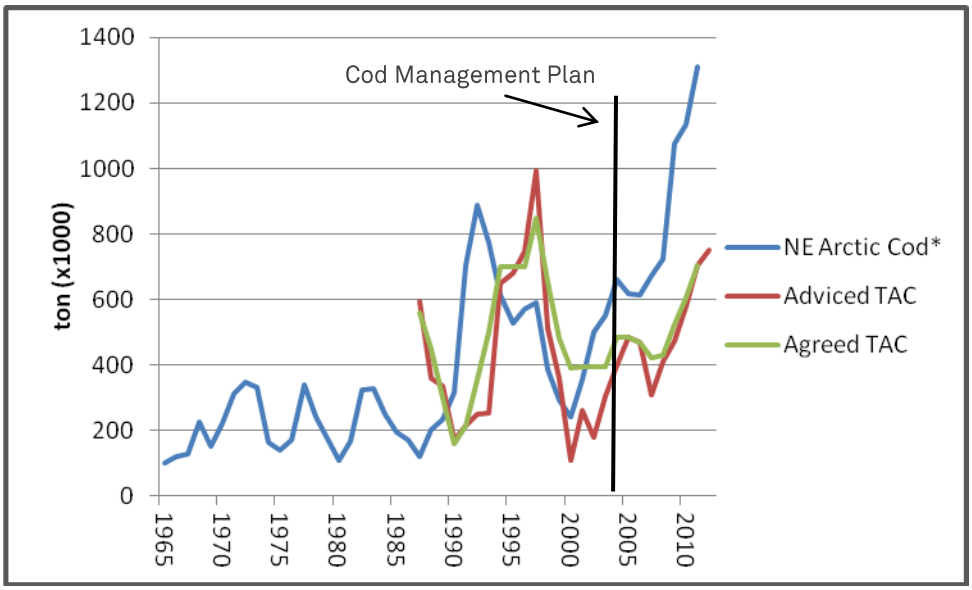

Figure 1. Stock size, advised TACs and agreed TACs for the northeast Arctic cod. Data source: ICES advice 2011.

*Spawning stock biomass.

Conclusions

MSY can be achieved in reality and the two examples show that it can take as little as 5-10 years. This has been done without serious implications for the fishing industry. Instead plans have resulted in improved profitability for the industry and catch increases of 100% in a few years. The two management plans are not perfectly designed but have still delivered healthy stocks and profitable fishery. This shows that even a rough plan with reasonable targets can deliver but it is paramount that all stakeholders adhere to the plan and the harvest rules.