Management plans in general

What
Why
How

Dankert W. Skagen
Consultant in Fishery Science

Management plans - what and why

What - An agreed plan for how to manage a stock in the medium term:
Strategic decisions on how to make tactical (year-to -year) decisions

Why – promote a rational use of a self renewing resource.

- Predictability – you know what to expect and can adapt to that
- Long term perspective – trade-off between short term and long term
- Avoid unpredictable outcome of repeated negotiations
- Broad involvement in strategic decisions.
- Makes annual decisions just a technical issue.

Part of the development process is to evaluate the performance of the plan. You know the implications when you decide on a plan.

A management plan should include:

Objectives:

- What do we want to achieve
- What are the priorities when you cannot get everything

Information base: Ensure that the information needed is collected

- Catch statistics
- Surveys
- Assessment

Tactical decision rules

- Harvest control rules (For example: If the stock abundance is XX then the TAC shall be YY)
- How to handle unexpected situations
- Instruments: TACs, Effort regulations, Technical measures.
- Sharing of the resource.

Control and enforcement

Players:

- Managers: Ultimate decisions and responsibility
- Industry who shall make a living of this resource
- Other stakeholders – anyone whose interests may be influenced by the strategic decisions
- Science: Biological and technical expertise.

Essential key word: Dialogue.
To make a good plan, and to make it work, requires mutual understanding.

Role of science:

- Outline possibilities and limitations set by nature
- Evaluate the expected performance of a plan
- Evaluate in relation to standards: The precautionary approach, MSY
- Technical aspects of monitoring and tactical decisions (surveys, assessments, calculate the TAC according to rules in the plan)

The role of science in decision processes varies around the world.
In our areas **science gives advice, others make the decisions.**

Process:

Typically, there will be 3 phases:

Introduction:

- Outline the landscape (biology, fishery, identify interested parties, main objectives, limitations on trade-offs)
- Organize the practical work, find manpower, funding etc.

Development:

- Science: Develop tools for testing rules, clarify unresolved problems
- Science and stakeholders: Experiment with options and ideas, test performance, single out preferred options.
- Managers: Prepare infrastructure (Data collection, funding, enforcement instruments, legal framework)

Finalizing:

Fine tune one or a few alternatives, test performance in detail, get acceptance, make decisions.

Some possible harvest rules:

There are many variants, but these are some archetypes

F-based rules:

Keep the fishing mortality at some feasible level, reduce it if the stock declines below some trigger value, perhaps with additional rules to reduce fluctuations in the catches.

The standard way, but breaks down if there is no reliable analytic assessment.

Harvest rate rules:

The TAC is a fixed percentage of the measured stock abundance

Reduce the percentage if the stock declines below some trigger.

Rather similar to F-rules, but simpler and easier to adapt to other measures than SSB in an analytic assessment

TAC type rules:

Keep the TAC as it is, unless there are good reasons to change it.

Often useful when there is no assessment, but requires

- Good control of the catches vs. the TAC
- One or more measures to tell if the situation changes
- Ability to take strong enough action quickly enough.

Fixed effort rules:

Even if you don't know the F, keep it fixed.

Requires a strong link between effort and mortality

Technical measures.

Closed areas and seasons, gear restrictions etc.

Typically supplement rather than the only tool.

Useful if they are strong enough, but often difficult to tell the effect.

Rules in the pelagic world:

Mostly TAC regulations, effort regulation is generally considered less reliable

Fixed F or harvest rate, but reduction below some trigger SSB,
sometimes with a constraint on year to year variation of the TAC, and
sometimes with an upper limit to the TAC
The most common when there is a reliable assessment.

Escapement rules: Ensure that a sufficient biomass is left to spawn,
take the rest.
Typical for short lived species (capelin, anchovy)

TAC rules: Keep the TAC at a fixed level, but reduce it if the stock goes below some trigger, and perhaps increase it if the stock becomes very big.
Not common, but are discussed from time to time.
Can be dangerous if the TAC is maintained for too long if the stock goes down, so a reduction rule is necessary. Hard to accept if the stock goes up.
Stable prices may be one motive.

Essential elements to consider in the development process:

- Rule for the **normal situation**: Adapted to preferences, limited by nature
- **Exception handling:**
  - 'Watchdog' measure to give adequate warning
  - Rules to ensure sufficient action
- Ensure adequate **infrastructure**.

A rule that looks fine on paper but is not followed, is useless.

Testing of management rules – for design and evaluation

Test bench: Simulation program:

- Create a population with realistic properties
- Manage it according to the rules, with information derived from the model population
- See how it performs.

Realistic properties:

- In accordance with what we know
- Plausible range of future developments (recruitment, growth, etc.)
- Include uncertainty in the information used to take decisions.

To get a good simulation framework requires time and work.

- Careful conditioning – often scientifically challenging
- Programming and debugging – the amount of work is often underestimated
- Presentation and evaluation of results – requires good communication between science and stakeholders.

Management rules to look at:

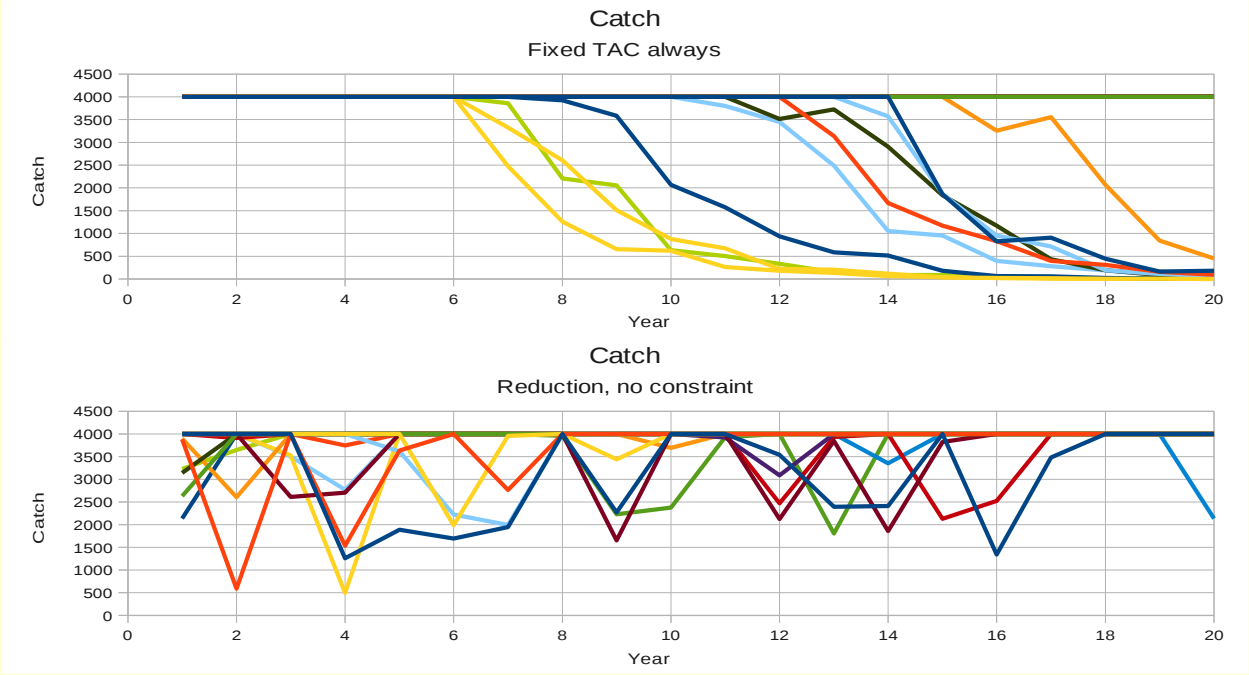
You cannot test everything – test sensible ideas:
Development through dialogue: Develop ideas that industry and managers find feasible.
We can test how they may work, reveal strong and weak spots,
perhaps have ideas for improvement

One example – exploring a fixed TAC regime:

Note: Quick and dirty conditioning

Requires knowledge about the state of the stock that we do not have

But gives some idea of how we can work:



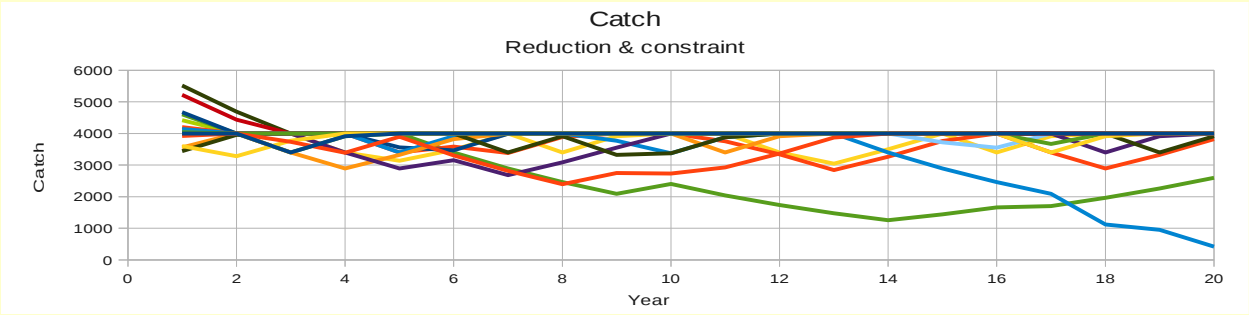
Shows 20 examples of how catches can develop over 20 years.

Maintain catch if you can, whatever happens.

Fine for a while, but then straight to disaster

Reduce TAC if SSB is below a trigger

Prevents disaster, but some draconian actions.



As above, but with a 15% constraint on yearly change.

Less sensitive to noisy data, but can be risky.

Thank you for your attention!

Time for discussion and questions