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Catch ID

from a Fisheries Research perspective



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The Institute of Marine Research

IMR is one of the largest research institutes of its kind in Europe.
Our main activities are monitoring, research and advisory work.



Employees: About 1100
Funding: 1.6 billion NOK



Advisory work

- We give catch advice on 80 fish stocks – directly and through ICES or other international organisations
- Annual report on risk assessment of Norwegian aquaculture
- About 13 000 farmed fish are examined yearly for undesirable substances



Our vessels



Kronprins Haakon



Dr. Fridtjof Nansen



G.O. Sars



Johan Hjort



Kristine Bonnevie



G.M. Dannevig



Today's sampling of the commercial fisheries

- Why?

- Age matrix for the most commercial important species
- Bycatch/discard of commercial important species
- Bycatch of rare or unwanted species
- Details about effort and catch in data poor stocks
- Collection of biological samples (genetics, food safety, ...)

- How?

- Reference fleet (37 vessels)
- Catch sampling lottery ("pelagic" >15 m , ~200 vessels)
- Sampling at landings from coastal fleet
- Data from coast guard and Directorate inspections



Overview of new data for fisheries research

- Change from landing notes to electronic logbooks (in “real” time)
- More detailed data from small vessels (15m – 0 m)
 - Effort in time and space (e.g. standardise by number of hooks in longlining)
 - Total catch composition, including non-commercial species
- Length/species distribution data (photo, machine learning,)
 - Maybe census for larger vessels
 - Based on sampling for smaller vessels?
- Better bycatch registration?
 - Commercial bycatch – accurate/precise registration of total catch of the commercial important species possible
 - Registration of rare species/unwanted bycatch (red-list, birds, mammals)



Control and research – different perspectives

Control	Research
Reduce undocumented catch	Quantify undocumented catch
Risk-based surveillance	Representative sampling
Regulation parameters (total-catch, length, by-catch)	Research parameters (age, maturity, genetics, fish-health, human-health)

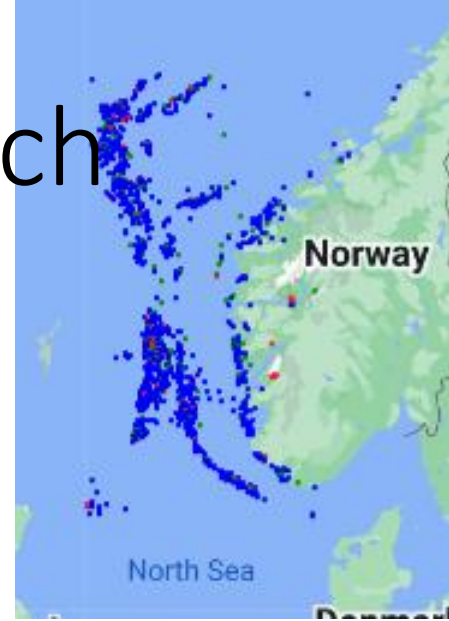


New/more data requires changes in workflow

- Data structure, storage, quality control, estimation procedures
 - Don't underestimate this!
 - HI-digital
- “Real time” decisions
 - Sampling (Extend catch sampling lottery to more species)
 - Cruise planning?
 - Technological developments will also influence fisheries independent sampling
 - Autonomic vessels (mainly acoustics) in combination with age/length data from commercial fisheries
 - Census length distribution may optimise (reduce?) biological sampling (age)



New possibilities: “Reference fleet” + catch sampling lottery



- From few vessels in a reference fleet to all vessels?
 - But much less reporting on each of them
 - (Some payment to compensate for extra work?)
- Random selection of samples to be taken based on real time ERS
 - Like today's catch sampling lottery for pelagic fishes
 - Small individuals, a sample of ~20 individuals can be frozen and stored onboard in larger vessels
 - For larger species like cod, saithe, etc., and in mixed fisheries
 - Take otoliths and length of a few individuals onboard, maybe genetics?
 - “Reference fleet light”
 - For small vessels with limited storage capacity and few crew members
 - Sample the total catch when landing – by specialised staff at landing site



From pragmatic towards probabilistic sampling

Pragmatic	Probabilistic
Estimate and its precision calculated with reservations	Unbiased calculation of estimate and its precision
Expert judgement	Objective
Supported by census-data (total reports)	Validates census data
Doable in the real world	Doable?



Internationalisation and transparency: effectivisation



Stock assessment and advice (ICES category 1):

Present and historic stock status (stock size as number of fish per year/age class)
Fishing pressure (fishing mortality by age and year)
Prediction (what will future stock status look like given a certain fishery)

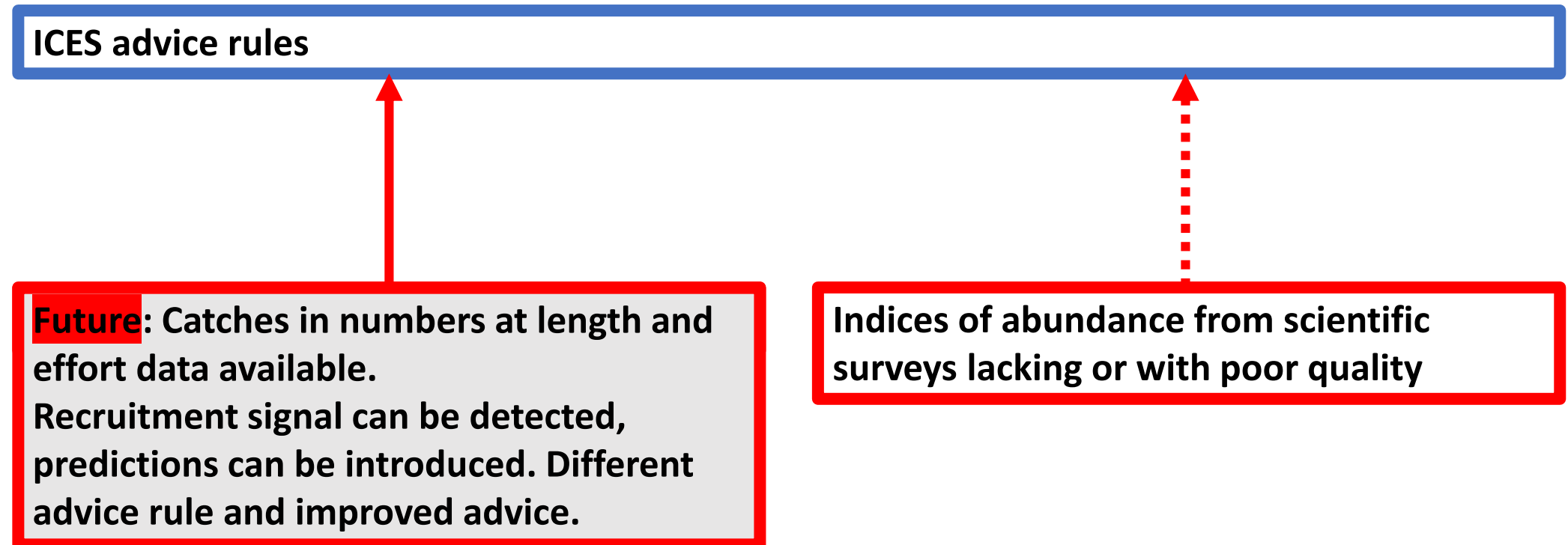
Catch at age (catch at age matrix, catch in numbers by year and age)

Indices of abundance from scientific surveys

Future: Size composition is “known” and the number of age samples needed is reduced. Sampling design easier to optimize.



Stock assessment and advice (lower categories):



Mixed fisheries aspects (ICES is currently giving a mixed fisheries advice to EU):

Detailed information on size and species composition in “time and space (in real-time)” becomes available?

Cost effective management measures aimed at reducing unwanted catch (size or species) can “easily” be implemented. Gear selectivity, closed or open areas.

Advice on real-time criteria to use when applying different management measures should be developed.





Thank you!

