

Science, Service, Stewardship



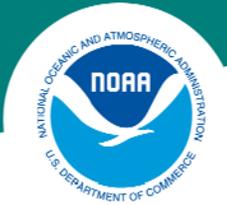
Productivity Issues in Fisheries

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**NOAA
FISHERIES
SERVICE**



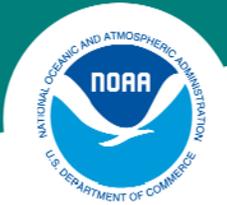
Why Productivity?

- Productivity studies have taken place sporadically over the years.
- Squires (1987, 2002), Jin et al. (2002), Fox et al. (2003), Felthoven and Morrison-Paul (2004), Hanneson (2007), Sharp and Batstone (2007), Squires, Reid and Yeon (2008), Oliveira et al. (2009), Felthoven, Morrison-Paul and Torres (2009), Eggert and Tvetarås (2013).
- National Performance reports for catch share fisheries has brought productivity forward as an important metric.
- Would like to standardize approach for measuring productivity among regions.



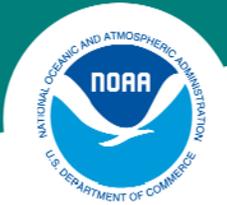
What makes fisheries different than other Industries??

- Vessels are harvesting a natural resource stock, and the harvest level is controlled by the Government.
- Regulations in some instances are designed to make vessels less efficient.
- Different technologies can be used to harvest the same resource.
- Stock conditions can limit productivity gains. Spatial and temporal aspects are important. This can occur in catch share fisheries as well as input regulated fisheries.



Issues to consider

- Malmquist Index has been identified as the preferred metric. Is there a better approach?
- Do we measure productivity at an aggregate level versus an individual vessel level??
- Do we account for stock conditions in our estimates?
- If so, how? Many fisheries have multiple stocks. For example, northeast multispecies has 15 species and 21 different stocks.
- Role of undesirable outputs (i.e. by-catch).
- Do binding Catch limits matter, and if so how?



Data issues

- Aggregating catch across species – If creating an index based on optimization, need to somehow aggregate species in multi-species settings.
- Lack of cost data.
- Biomass Index – How should this be created in multi-species setting.
- Minimum observations needed if using any index based on optimization techniques.
- Entry/Exit – How does this impact optimization based indexes such as Malmquist, Hicks-Moorsteen



Fisheries in the Northeast

Northeast Multispecies (*) Scallops (*?)
Monkfish Herring
Small Mesh Multispecies Dogfish
Red Crab (*) Skates
Squid, Mackerel and Butterfish
Surfclam and Ocean Quahog (*)
Summer Flounder, Scup & BSB
Tilefish (*)



What do we want at the end of this workshop? (a NMFS perspective)

- Learned about productivity and see examples from non-fishery industries.
- Discuss best choice of productivity indices (or indicators) to pursue for national reporting purposes.
- Discuss data needed to construct productivity measures.
- Decide role of stock biomass in productivity metrics.
- Discuss software needs to estimate metrics.