

# Ecological Impacts of Current Quota Systems

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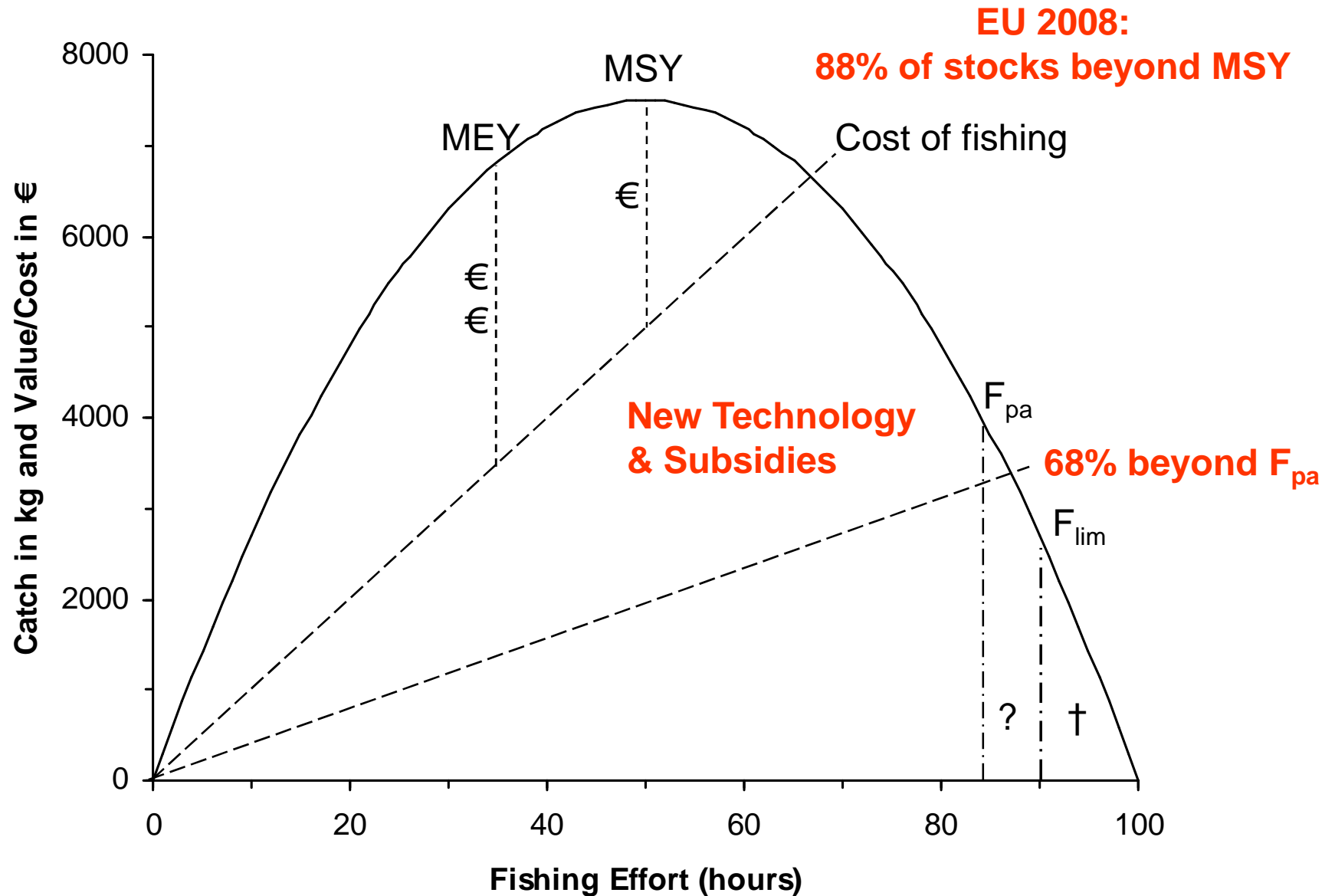
# TACs & Quotas

- TACs are the total allowable catch in a given year from a given stock
- Quotas are subsets of the TAC, given to countries, companies, boats or individuals
- ITQs are individual transferable quotas, long-term percentages of the TAC that can be fished, sold or leased

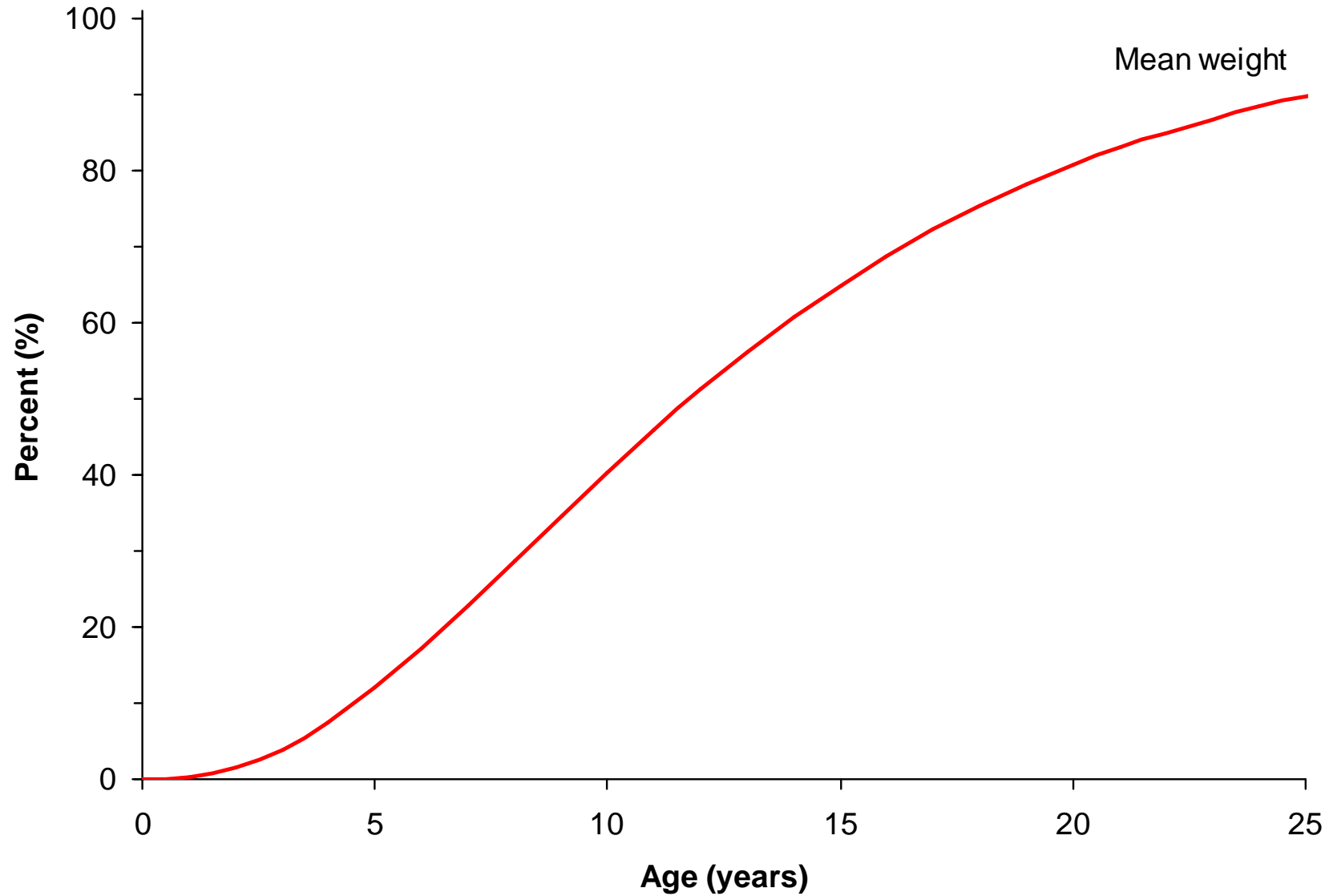
# If the TAC is Too High

- The stock and future catches decrease
- Mean size of fishes decreases
- Fishers compete in 'race to fish' their quota
- Fishers have incentives to cheat
- Fishers spend too much time to catch too few fish
- Excessive fishing causes damage to the environment

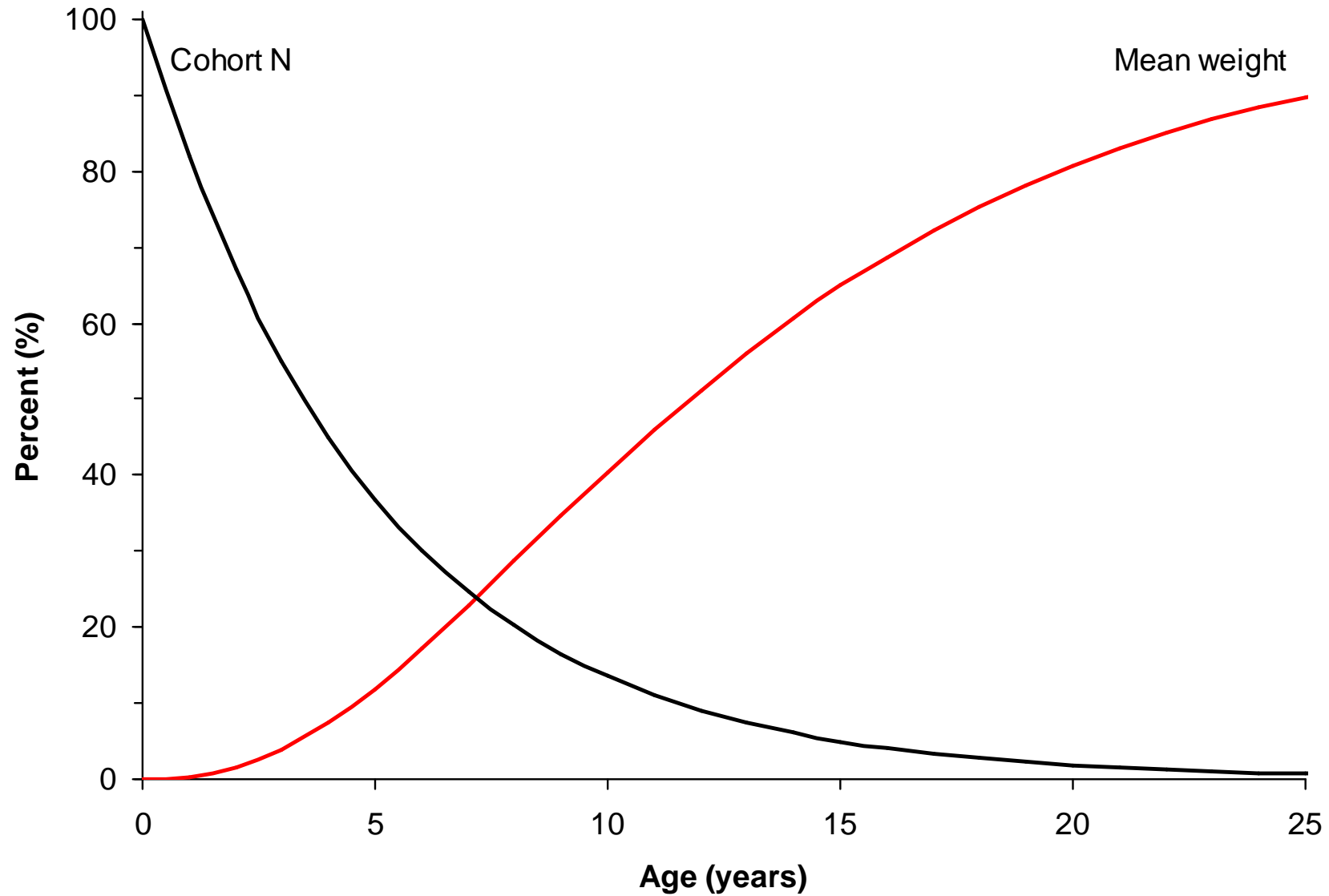
# Fisheries Management Basics



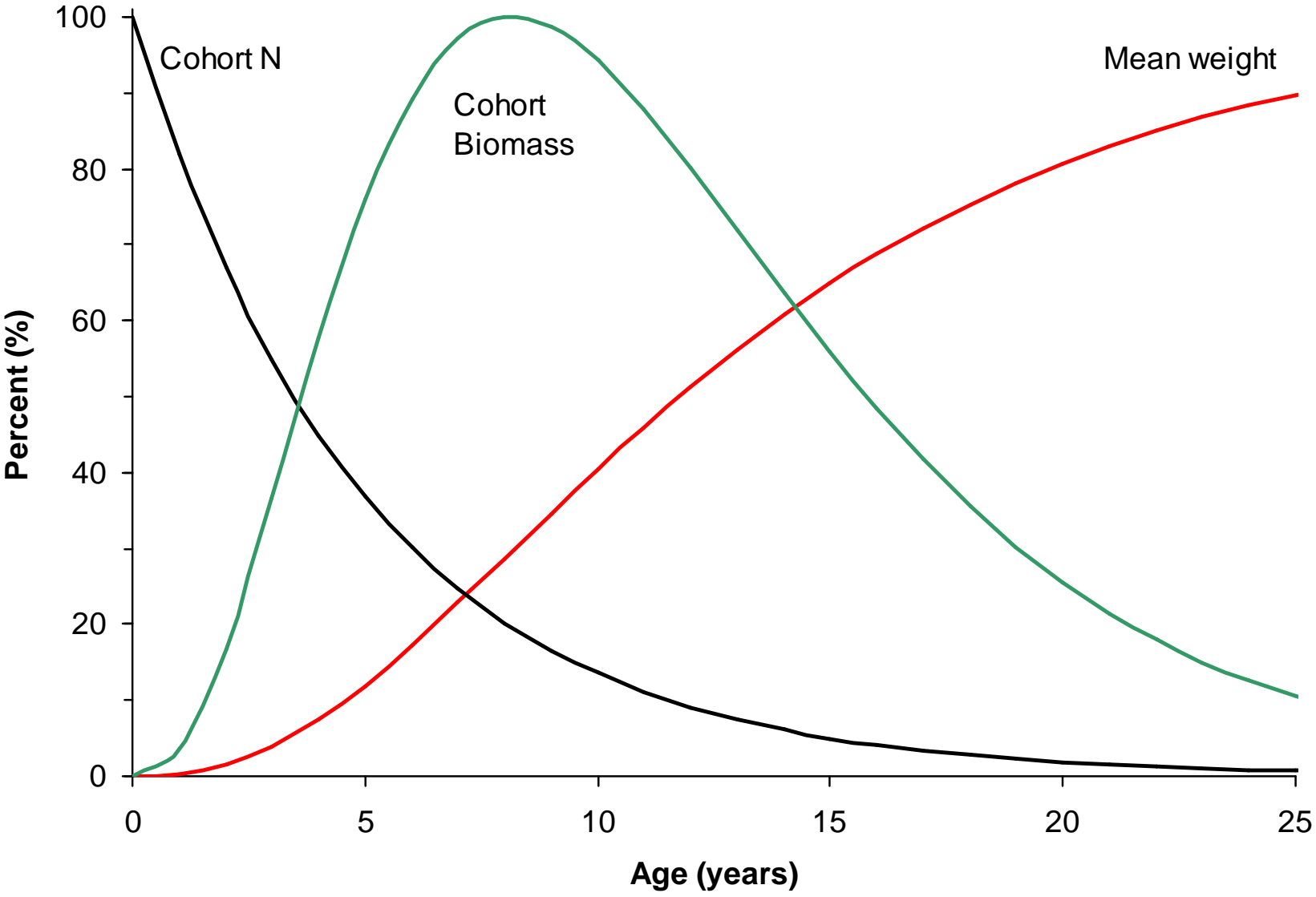
# Cohort Biomass



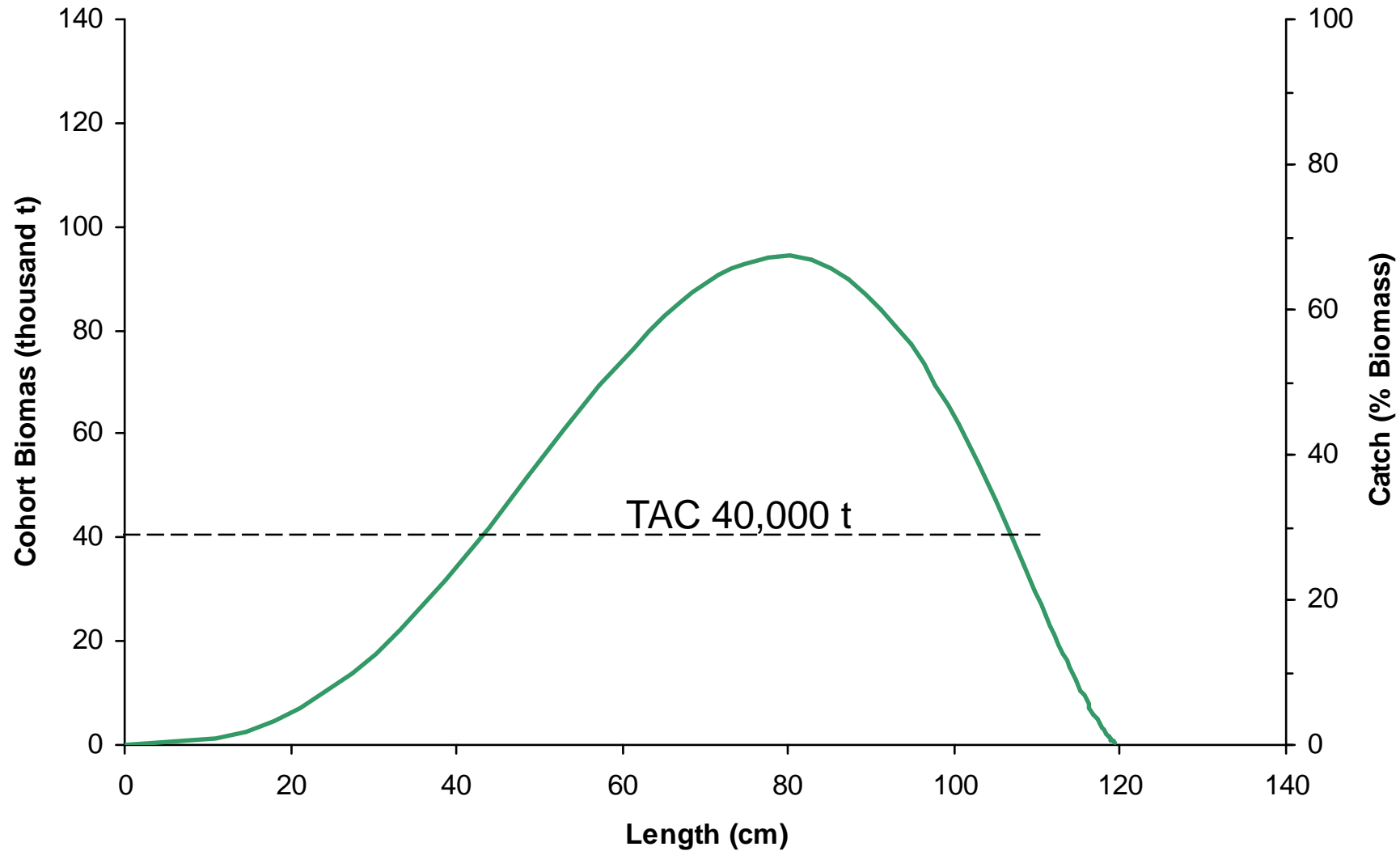
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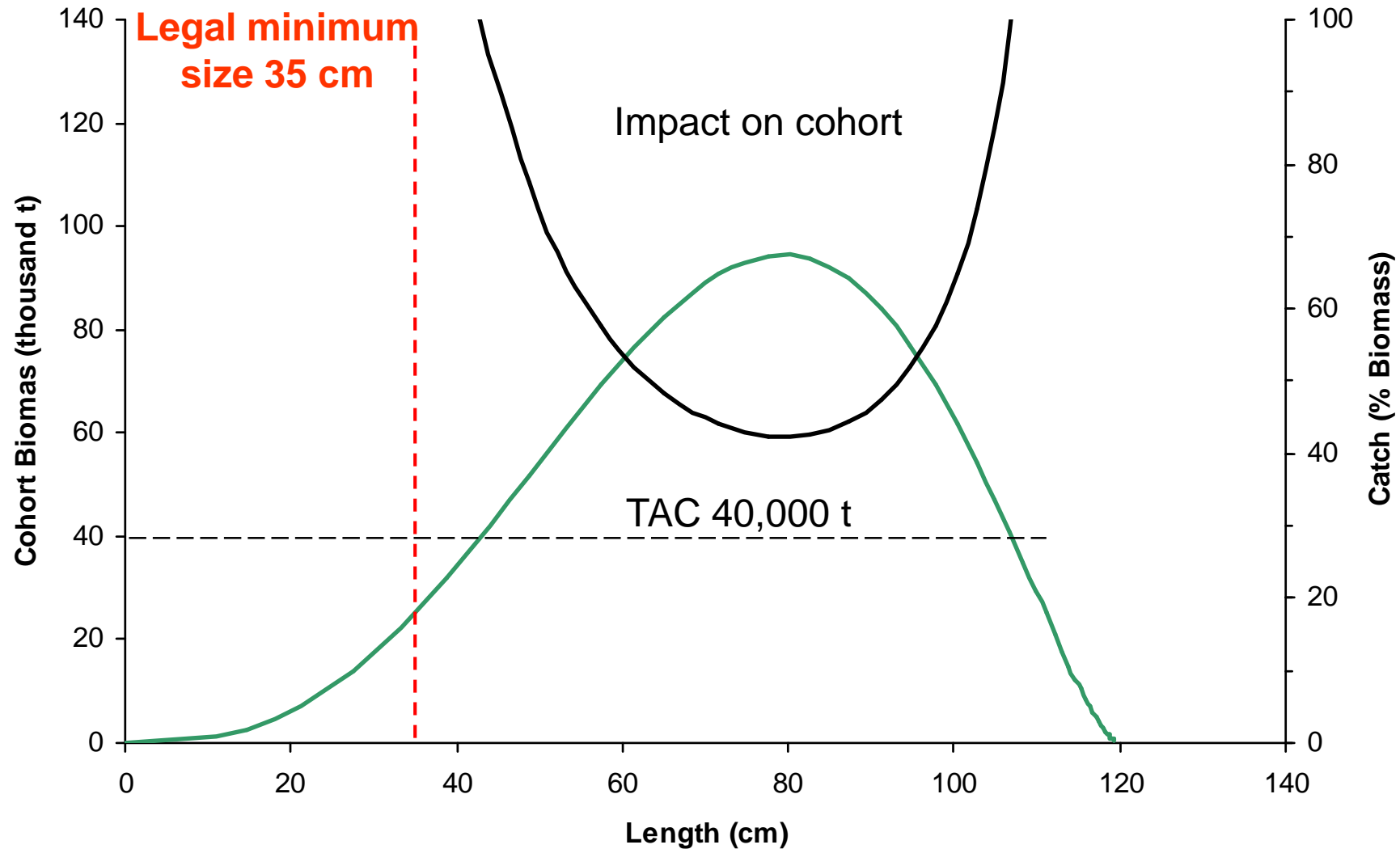


# Size at First Capture Matters





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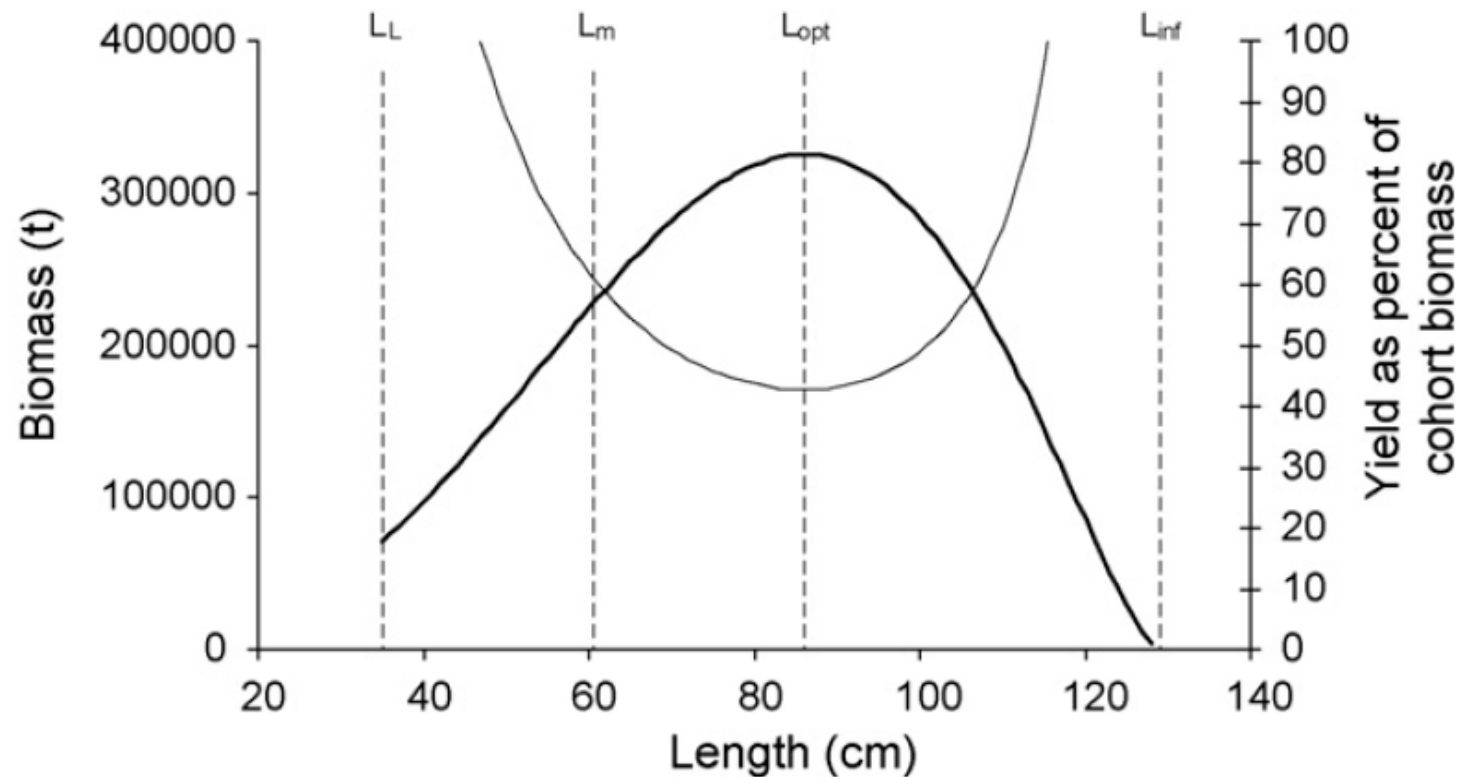
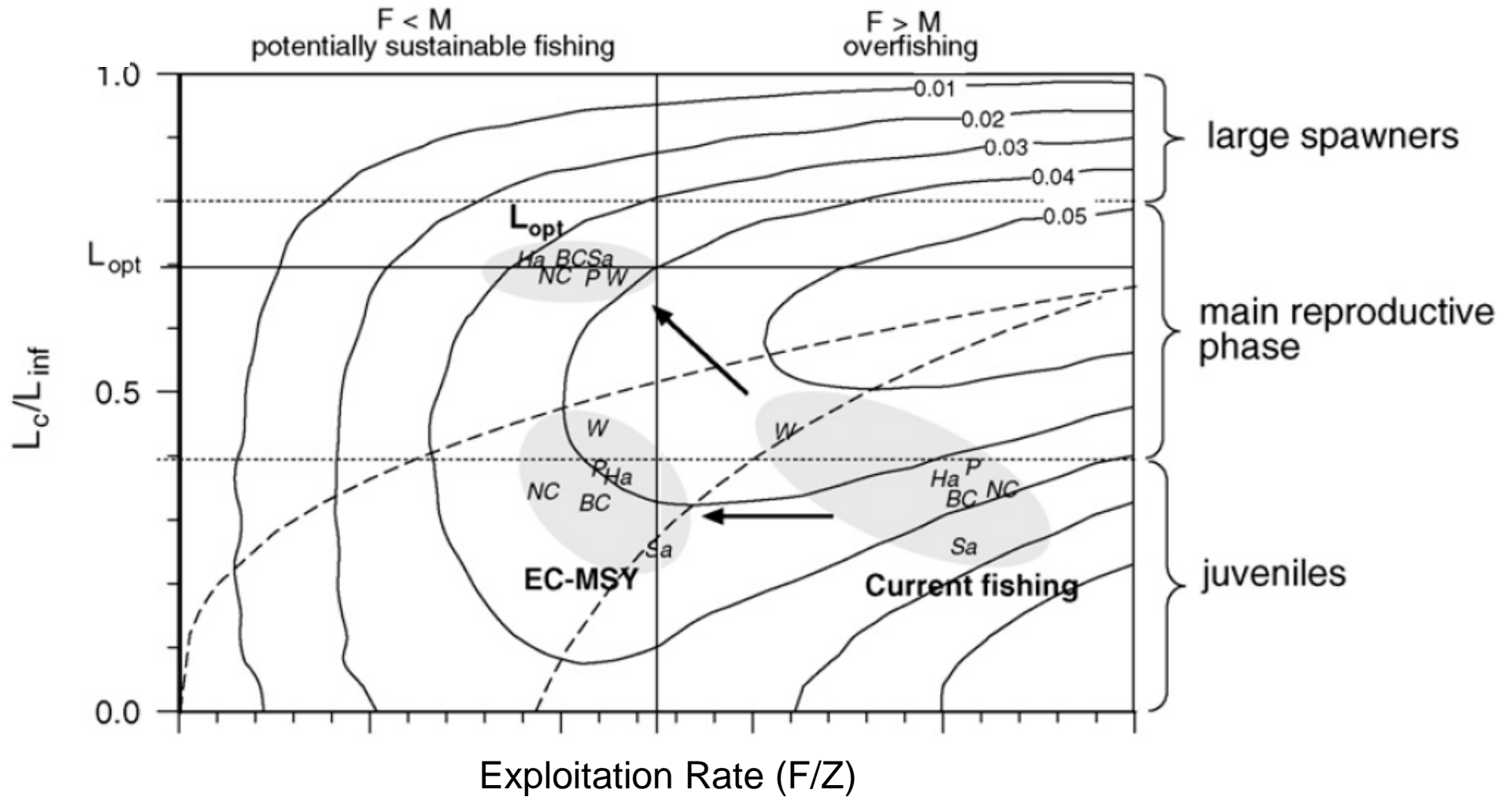


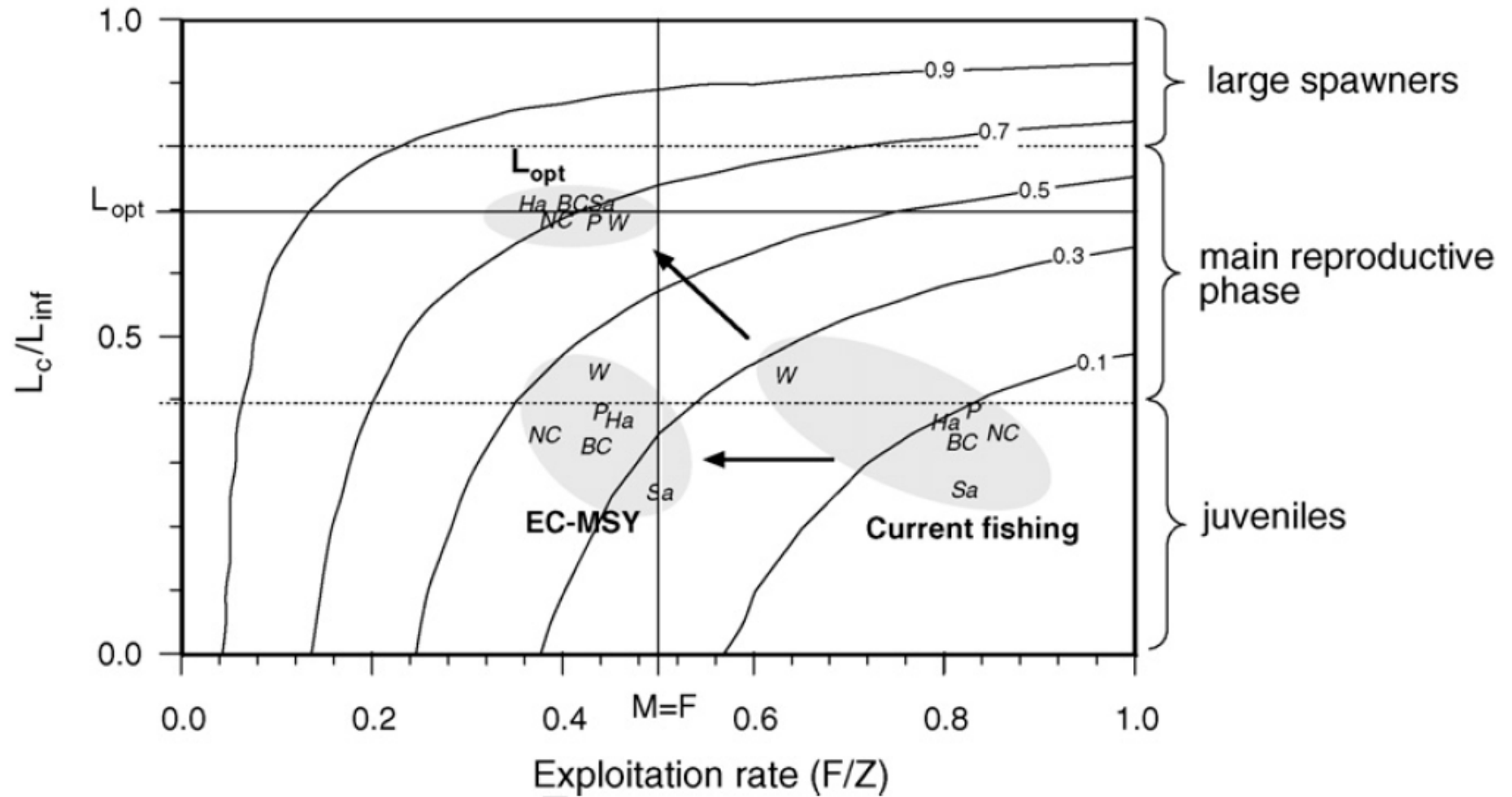
Fig. 1. *Gadus morhua*. Unfished cohort biomass (bold line) and respective percentage of the catch (thin line) of 139,026 t plotted over the mean length of the cohort, with indication of legal minimum length ( $L_L$ ), length at first maturity ( $L_m$ ), length at maximum biomass ( $L_{opt}$ ) and asymptotic length ( $L_{inf}$ ), for North Sea Cod.

# Yield per Recruit, EC Goal: Less Effort, Same Catch



# Less Effort, Same Catch, 7-times Higher Biomass

B.B'/R



# Yield per Recruit Tool

# Ecological Impacts of ITQs

## Sources:

Costello, C., S.D. Gaines and J. Lynham. 2008.  
Can catch shares prevent fisheries collapse?  
Science 321:1678-1681

Branch, T.A. 2008. How do individual transferable  
quotas affect marine ecosystems? Fish and  
Fisheries 9:1-19

# Demonstrated Benefits of ITQs

Precondition: TACs and Size-Structure are OK and fishers trust enforcement in the long term. Under such conditions, the value of ITQs increases with better status of the stock, providing incentives for fishers to push for better management.

Then

- In 'Derby-fisheries' where fishing is allowed until a fishery-wide TAC is caught, ITQs end the 'race for fish'
- ITQs are an economic improvement over 'input-controls', which deliberately use economic inefficiency to control fishing effort (e.g. limited days at Sea, limitations on boats and gear, etc)
- If catches (and not landings) are counted against the ITQ, high-grading and other discarding decrease
- Fishers often assist in data collection and better stock assessment (may even pay for related research)
- Fishers participate in enforcement

# Ecological Effects of ITQs

Precondition: TACs and Size-Structure are OK and fishers trust enforcement in the long term. Under such conditions, the value of ITQs increases with better ecological and 'public' status of the stock, such as MSC certification, positive listing in Seafood Guides, etc.

Most important indirect effects:

- Correct TAC and target size lead to stock size and structure being closer to 'natural', un-fished status
- Reduced effort leads to less by-catch and less habitat damage

Additional effects:

- Fishers have incentives to push for sustainable, ecosystem-based fisheries management



# Negative Effects of ITQs

- Free trading of ITQs may result in socially undesired distribution of fishing rights
- Fishing pressure on non-ITQ species may increase
- If ITQ-allocation is based on catch history, fishers have an incentive to overfish
- If TACs are too high or enforcement is lacking, High-grading and discarding may increase

# Conclusions

- TACs and legal sizes determine status of stocks; if these are unsustainable the stock will collapse, also with ITQs
- If TAC and size structure are sustainable, ITQs reduce discarding and illegal fishing, improve stewardship and economic efficiency, provide incentives for ecosystem-based management

Thank You