Pandalus stocks in Icelandic waters: Biology, exploitation and management

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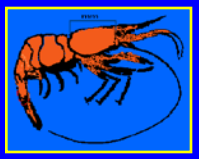
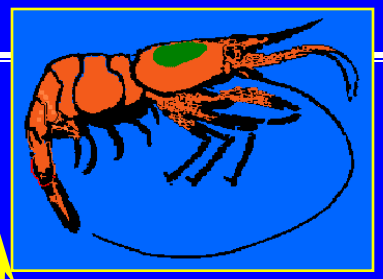
10th Norwegian-Russian Symposium on

Management strategies for commercial marine species in northern ecosystems,

Bergen, 27-29 August 2003

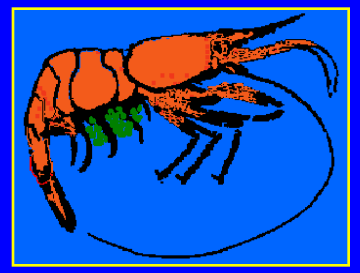
Pandalus borealis life history





EGG PRODUCTION

SPAWNING

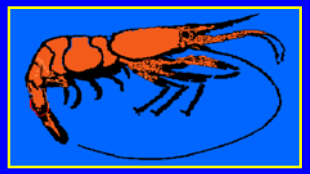


HATCHING

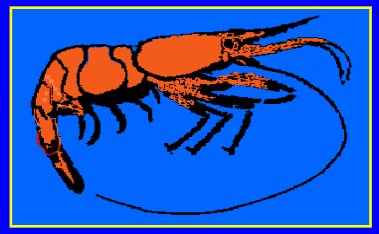
PELAGIC LARVAE

MALES

TRANSITIONAL

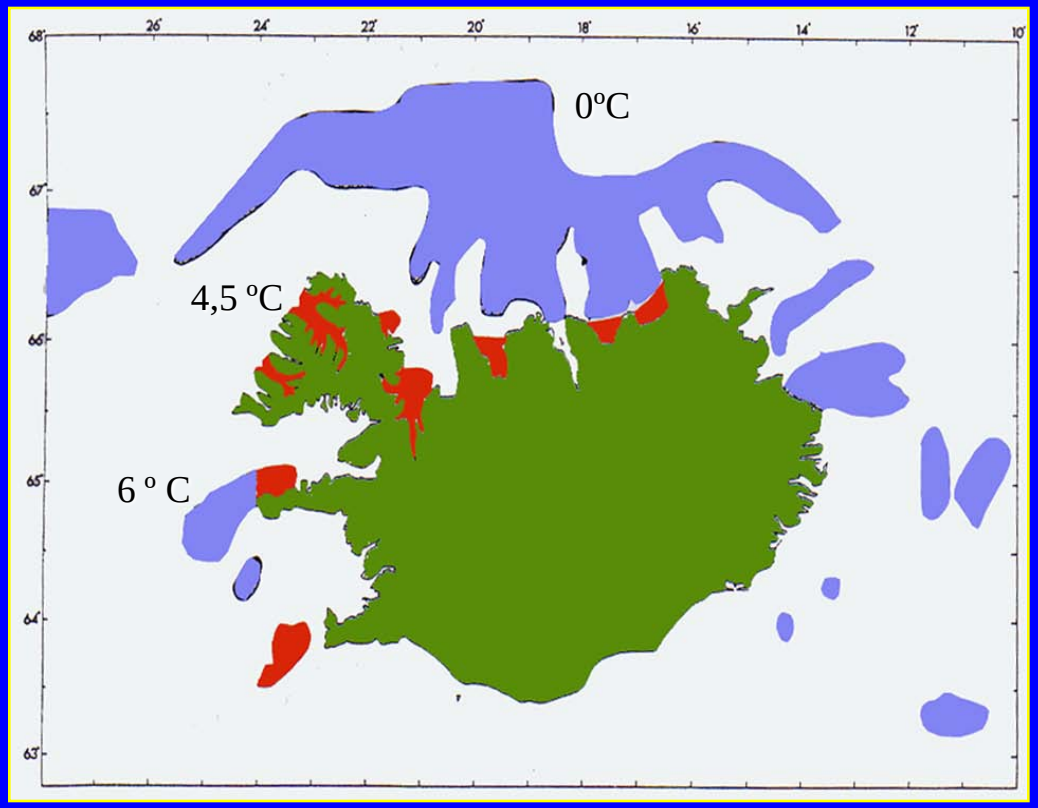


FEMALE



Fertilization

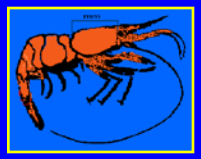
Pandalus stocks off Iceland

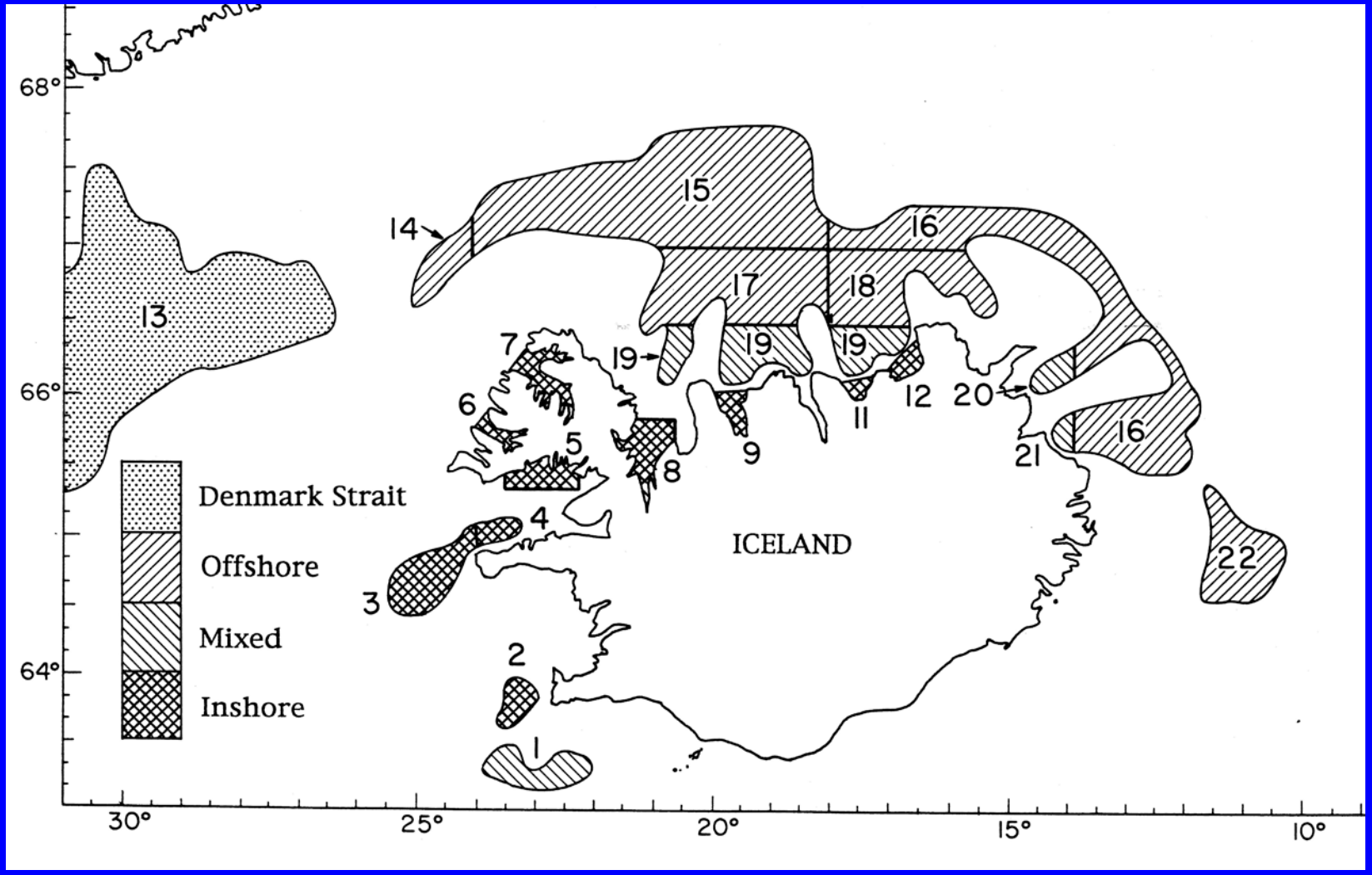


- Inshore: 50-150m depth, max age 5-7yrs
- Offshore: 200-600m depth, max age 7-8yrs
- Dohrnbank/Denmark Strait

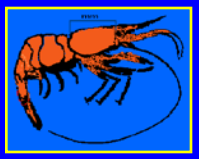
- Variations in max length inshore vs offshore
- Length at sexual change
- Genetically different

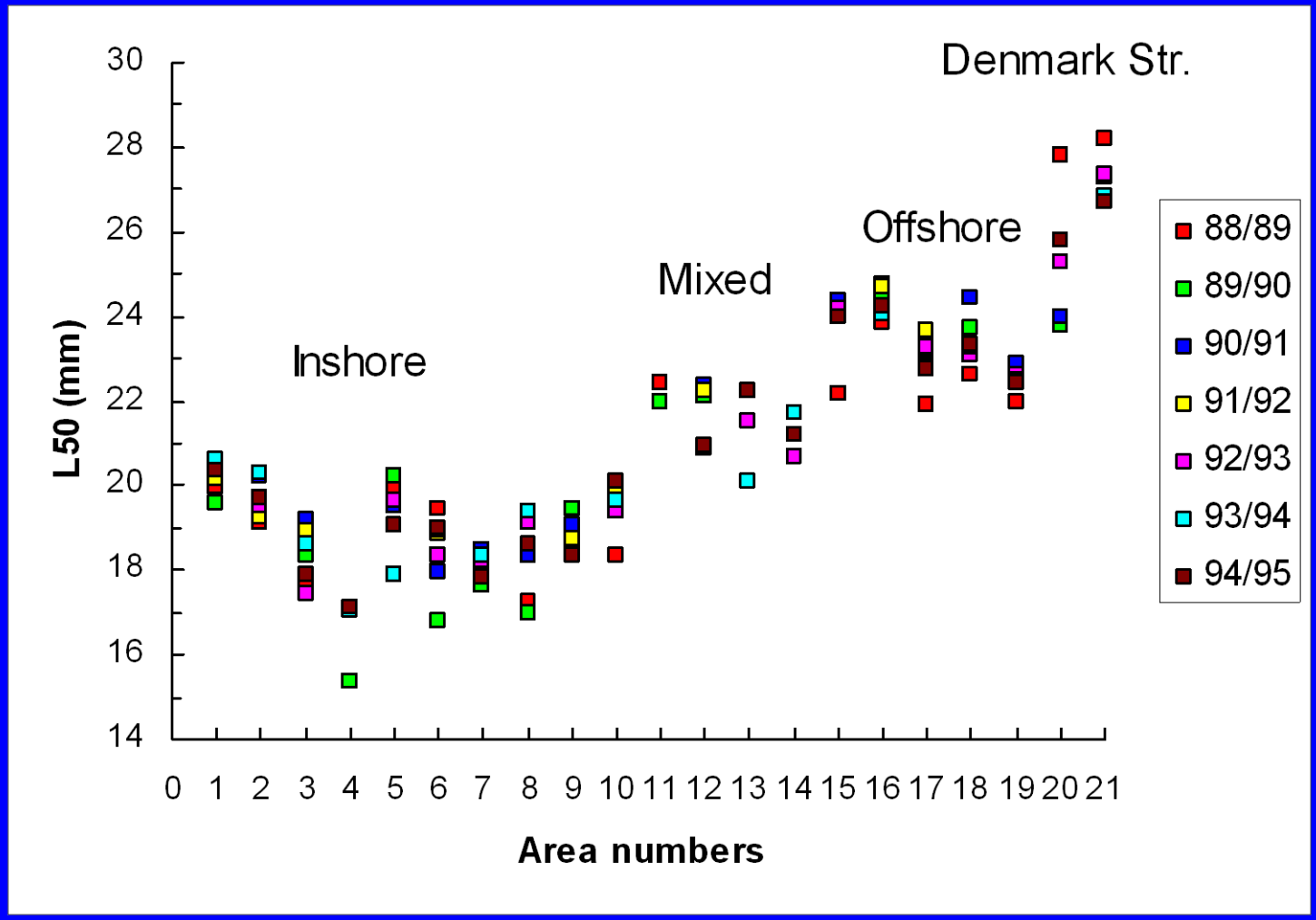
Shrimps stocks and stock units



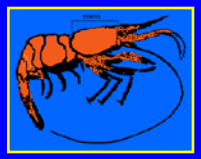


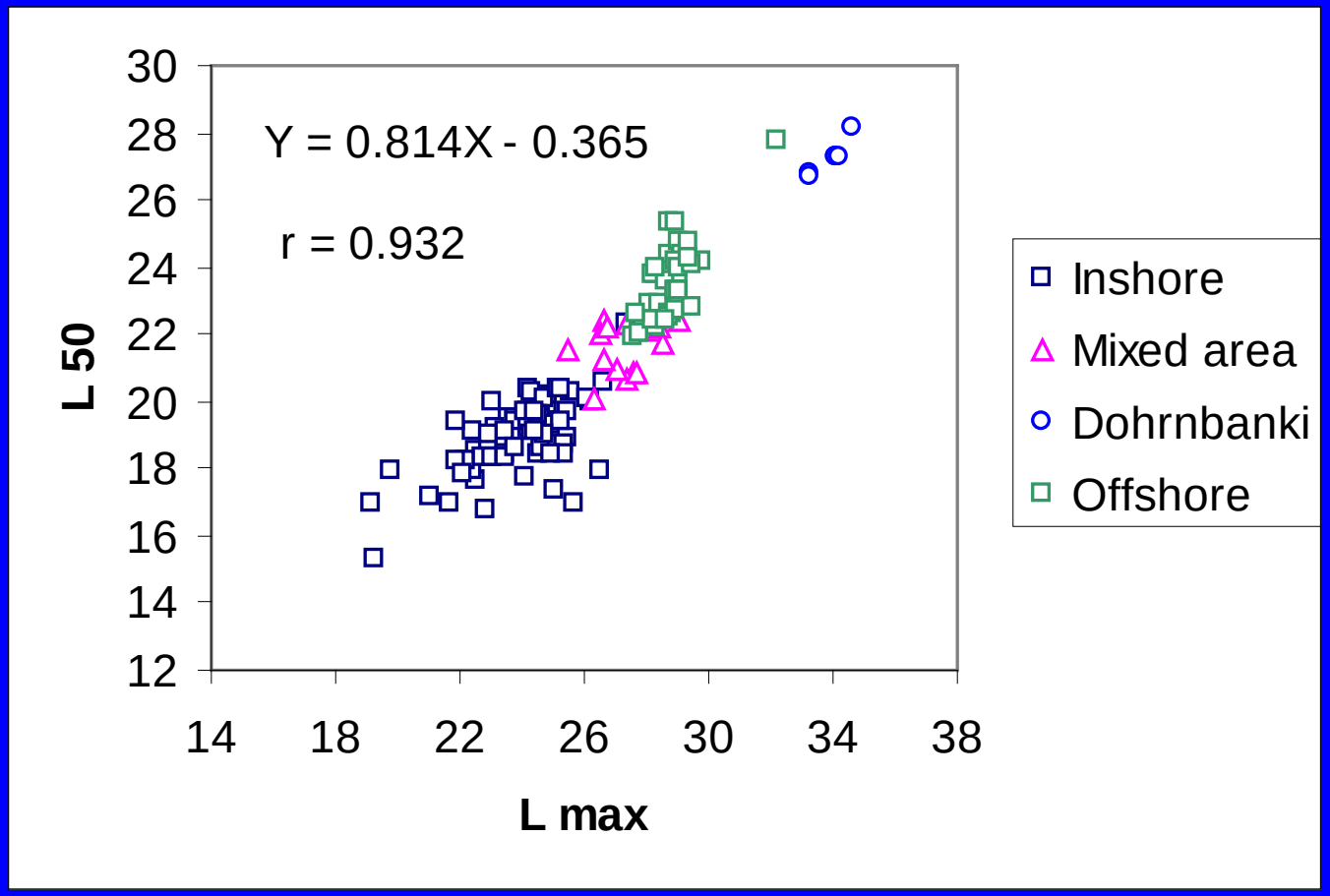
Shrimp off Iceland: Length at sexual change, L-50 by area



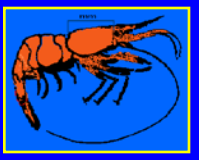


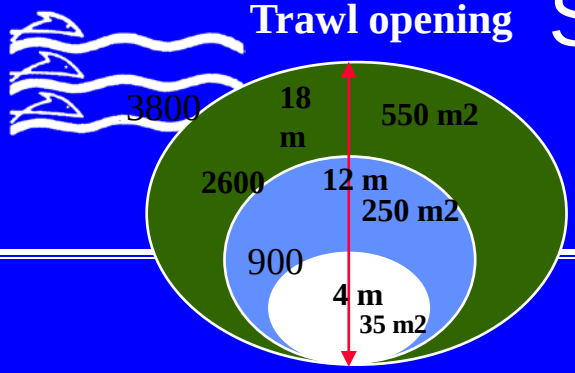
Shrimp off Iceland: Length at sexual change vs max. length by area





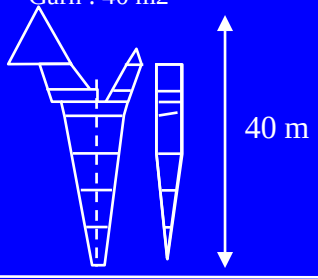
SHRIMP TRAWL





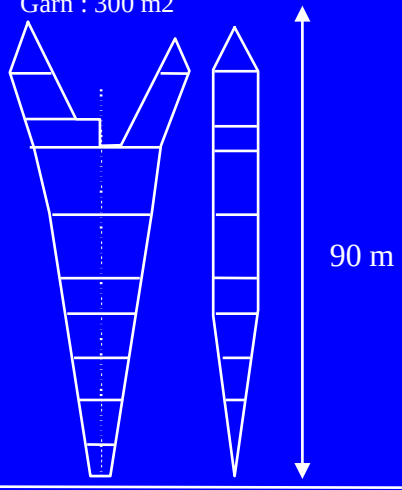
900 meshes

HL: 20 m
FL: 20 m
Garn : 40 m2



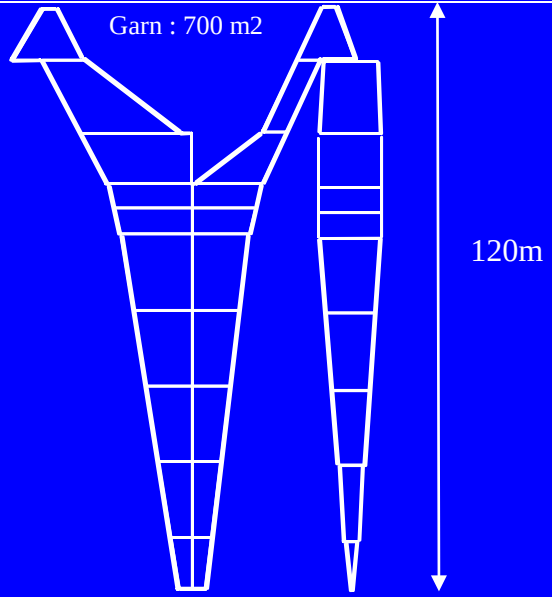
2600 meshes

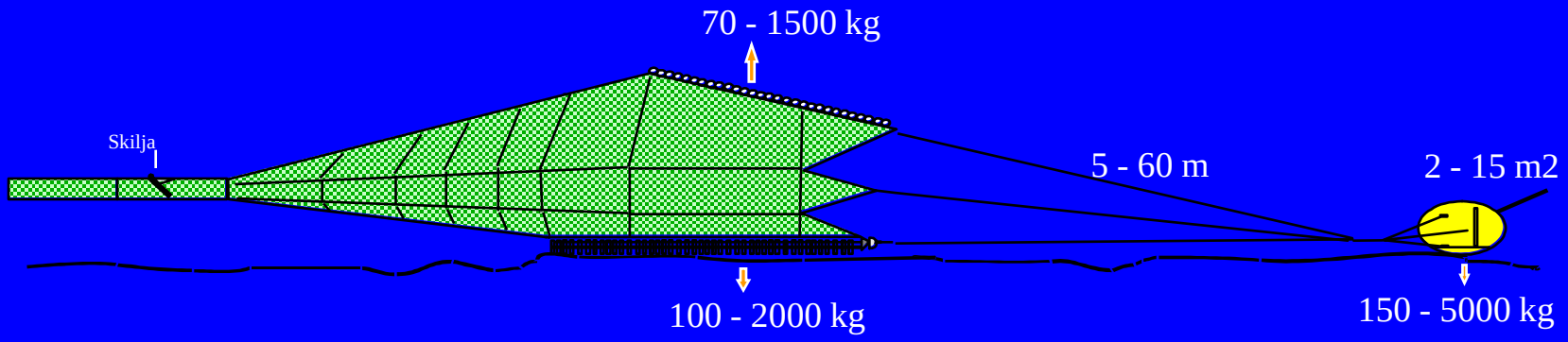
HL: 40 m
FL: 36 m
Garn : 300 m2



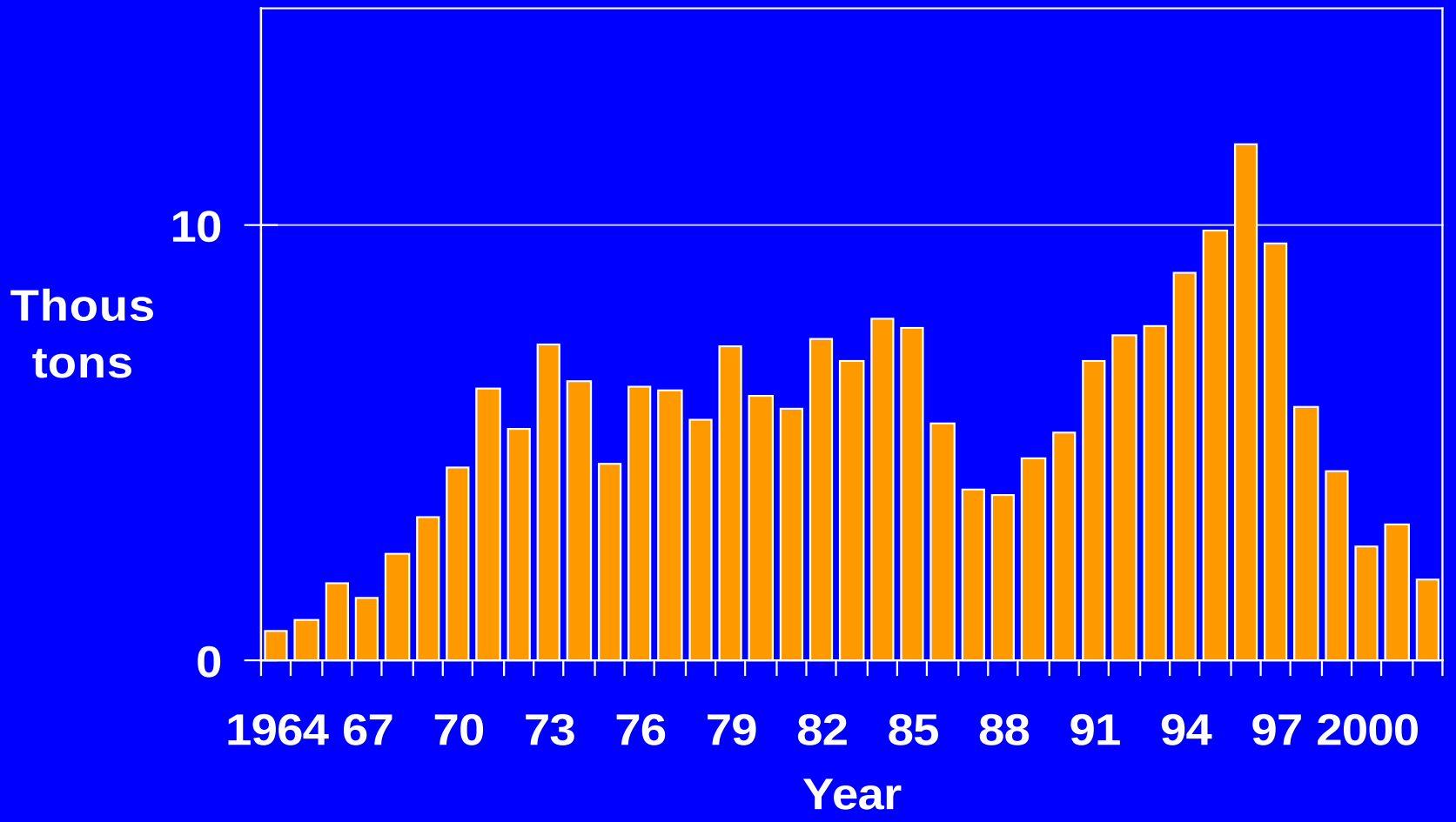
3800 meshes

HL: 72m
FL: 80 m
Garn : 700 m2





Shrimp Inshore fishery in Iceland: Total catch 1964-2002



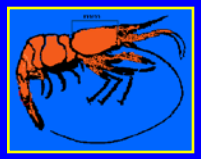
Management of shrimp fishery: Inshore

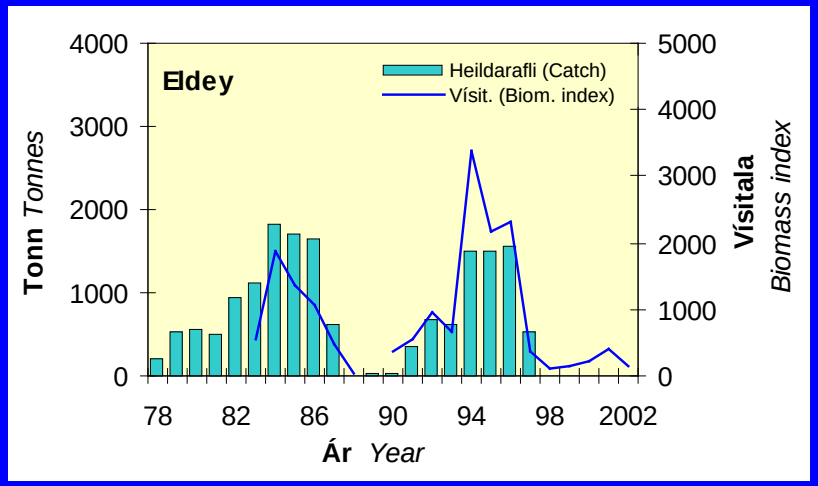
- 1962-1967 TAC, no allocation
- 1968-1973 Effort regulation by season
- 1974-present TAC, allocation by vessels and areas
- Mid 1990's ITQs, landing constraints lifted

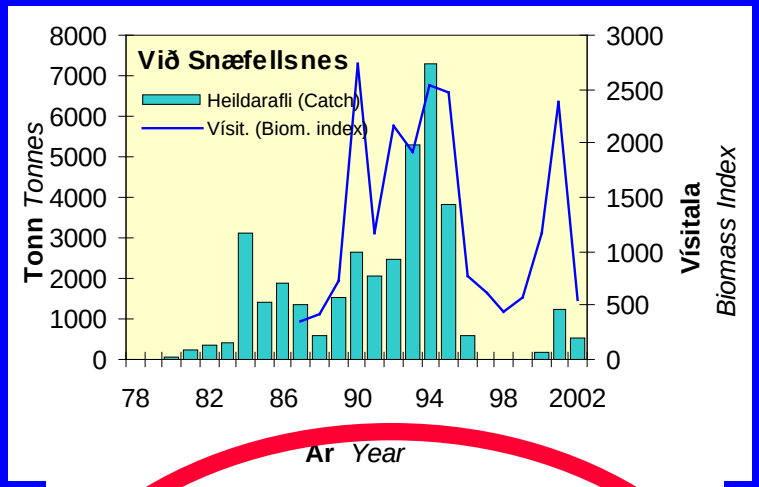
Basis for management advice

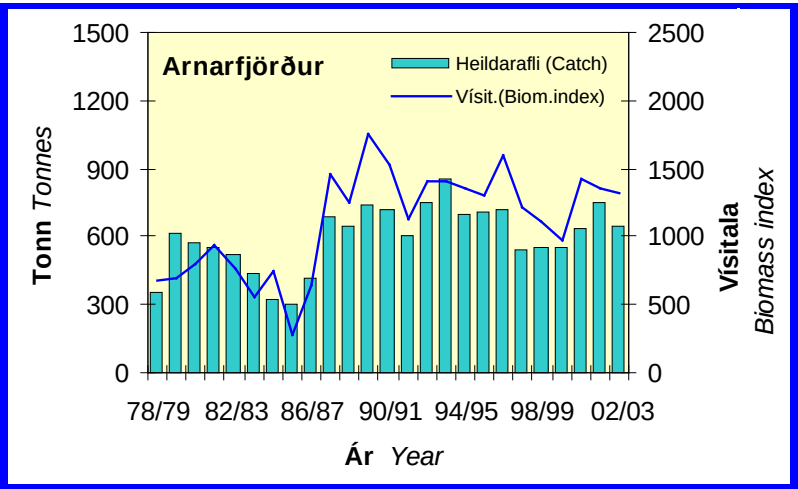
- Log-books
- Since 1973 trawl surveys; usually in September and February
- Standardised surveys since 1988
- Biomass estimates
- Preliminary TAC in June, final in October
- Harvesting strategy is based on relationship between biomass indices from surveys and historical catches
- Defined max. by-catch of juvenile fish permitted

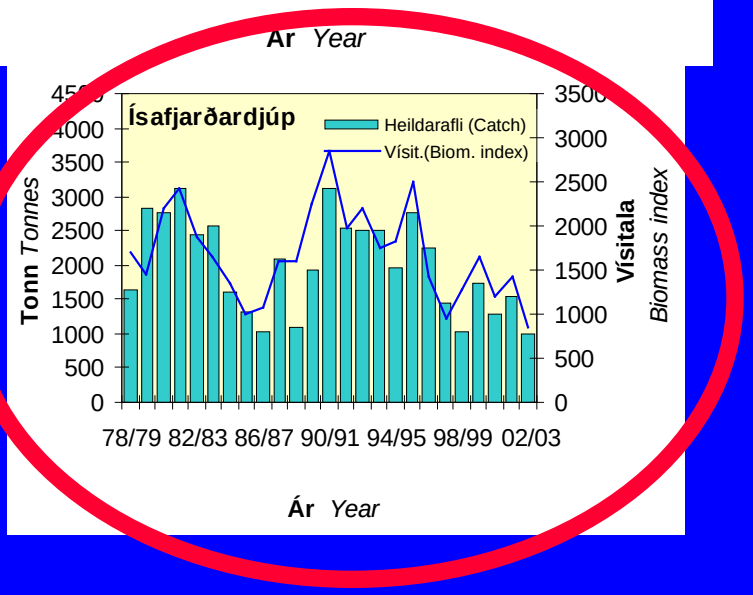
Shrimp fishery: Inshore western grounds



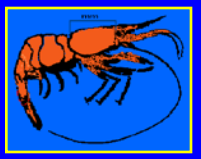


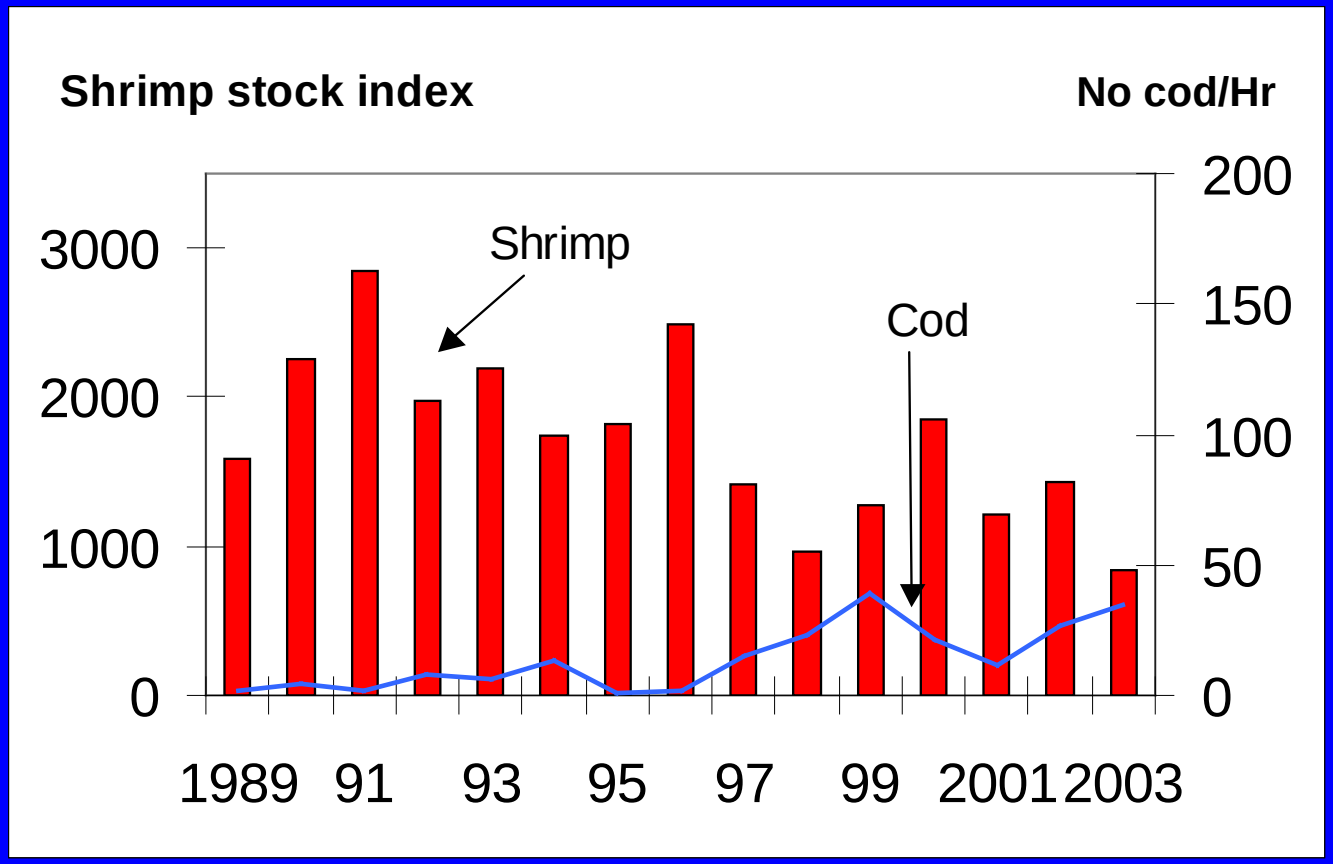




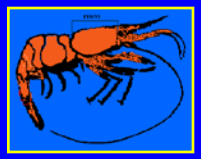


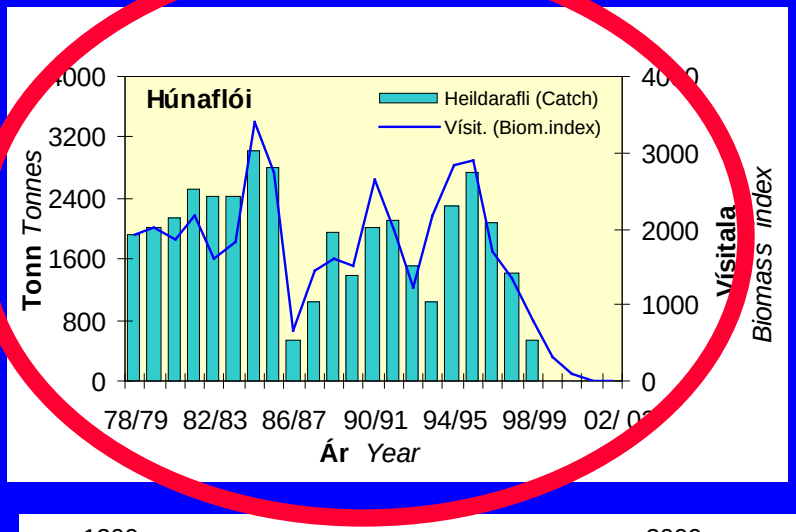
Ísafjord (W Iceland): Shrimp abundance in February vs cod>30cm

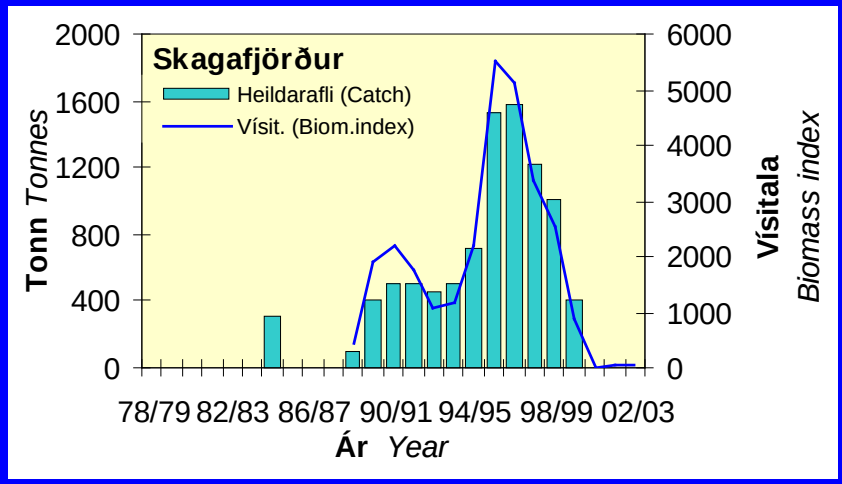


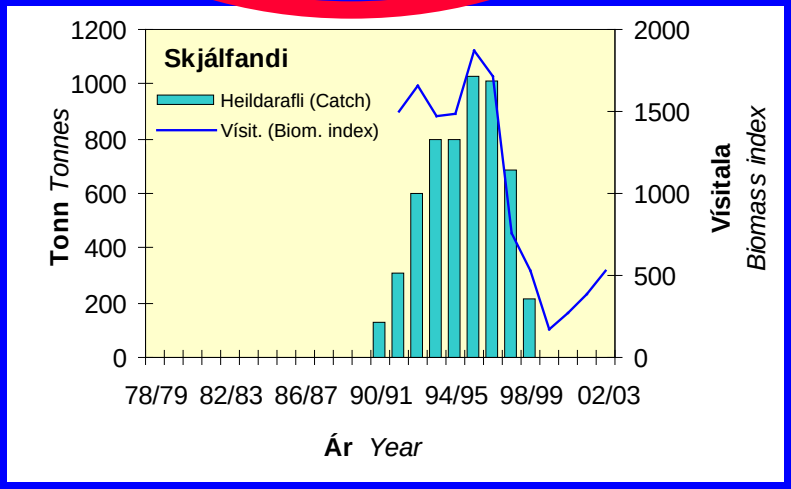


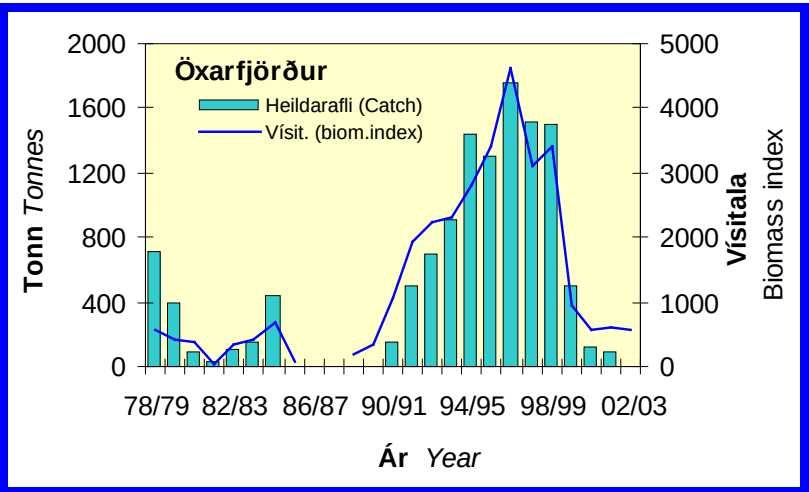
Shrimp fishery: Inshore northern grounds



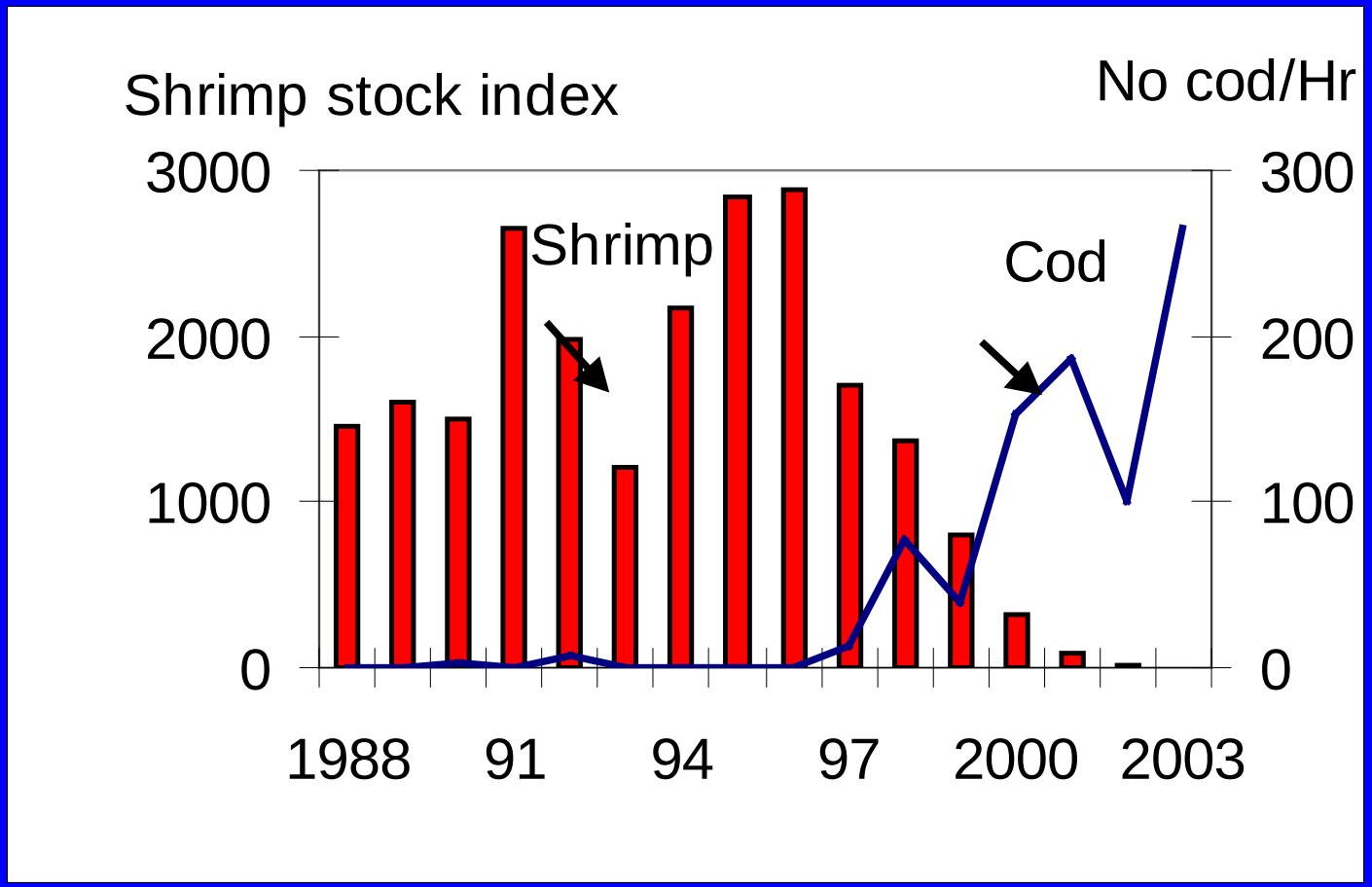




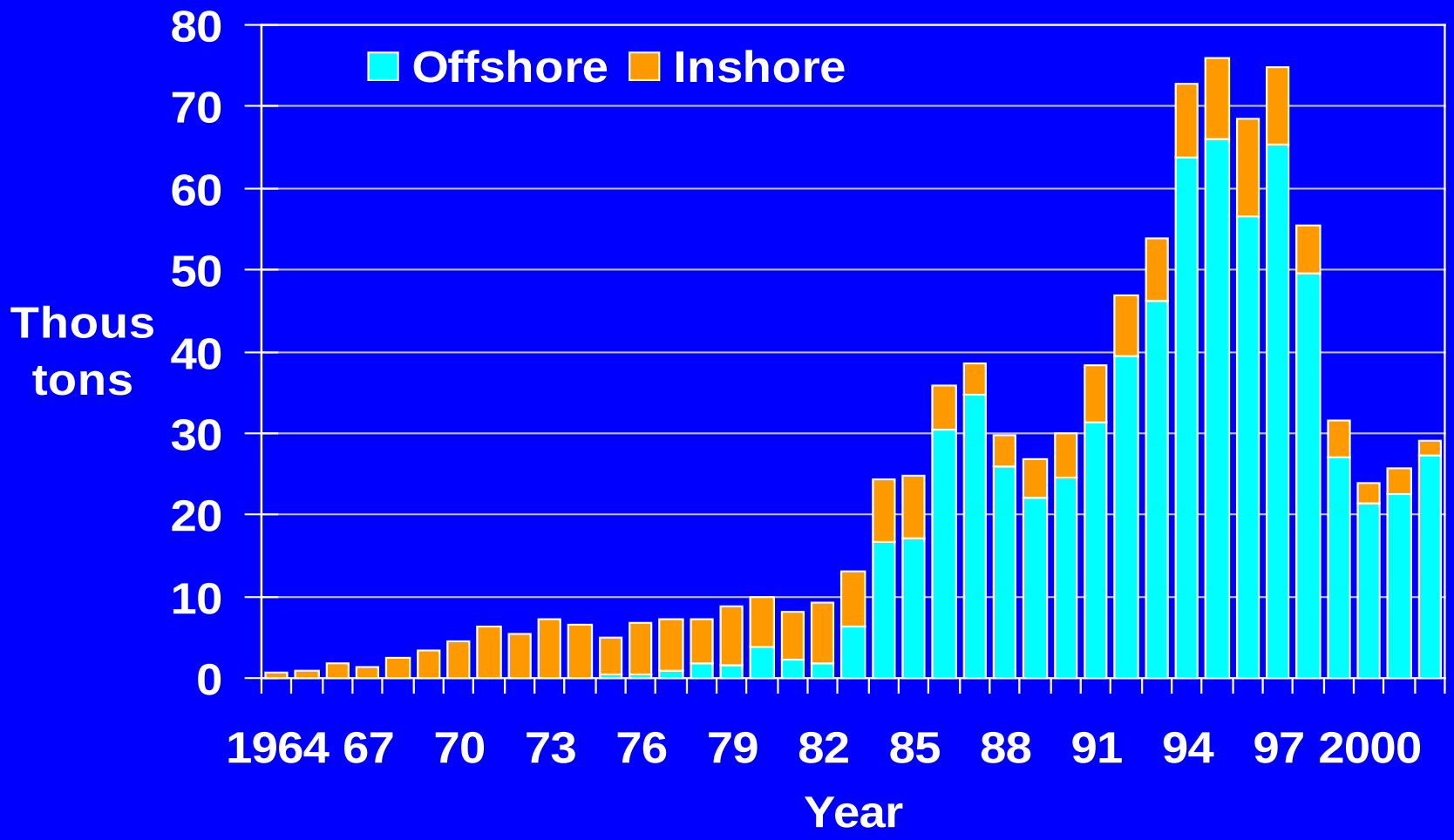




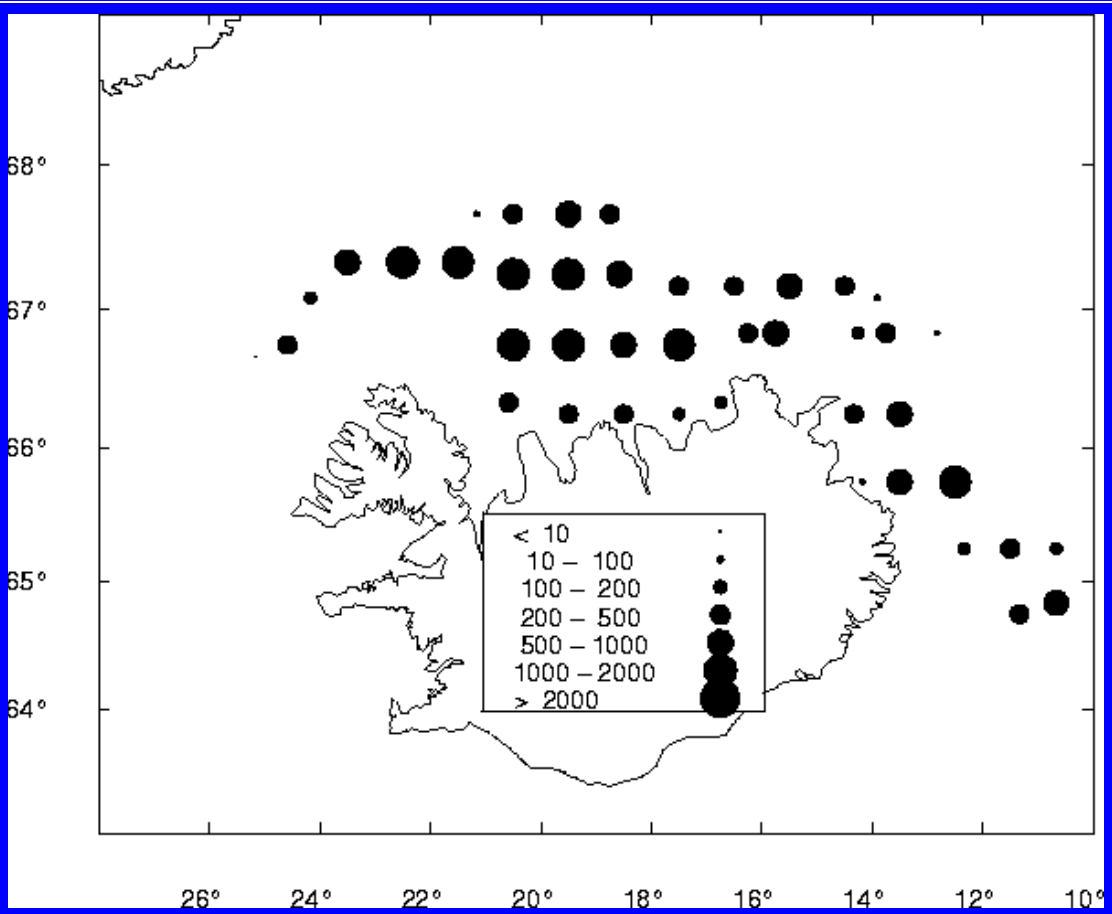
Húnaflói (N Iceland): Shrimp abundance in February vs cod>30cm



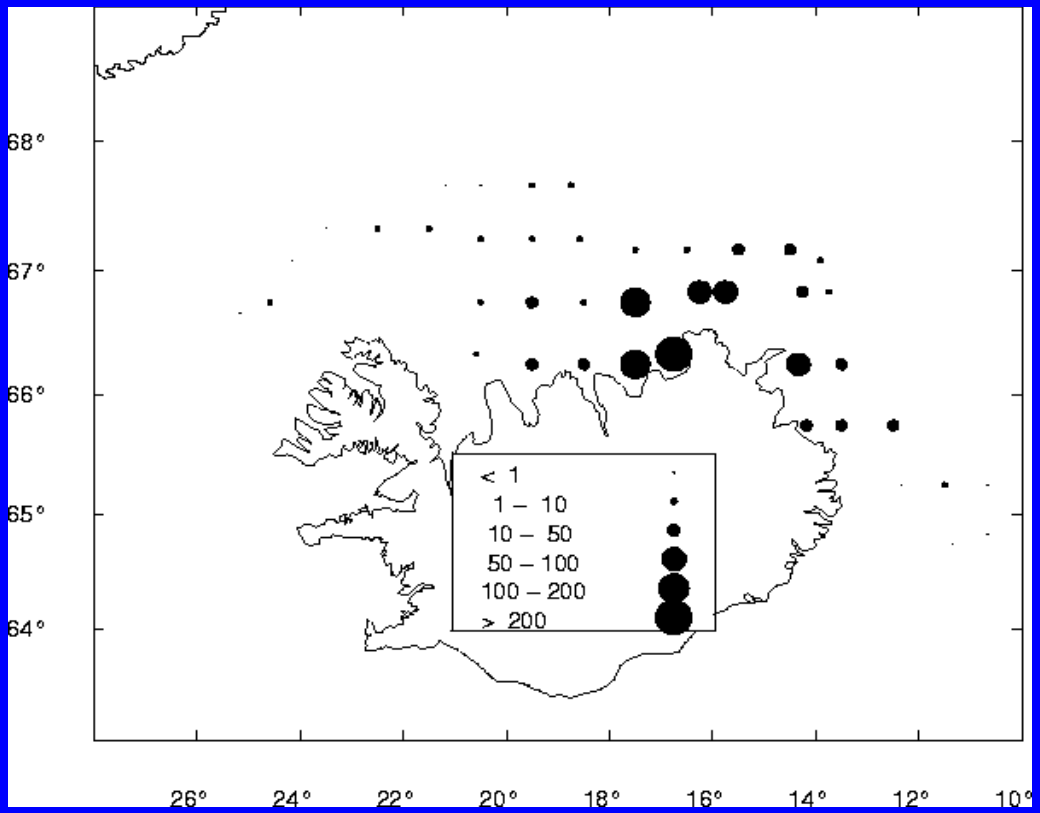
Shrimp fishery in Iceland: Total catch 1964-2002



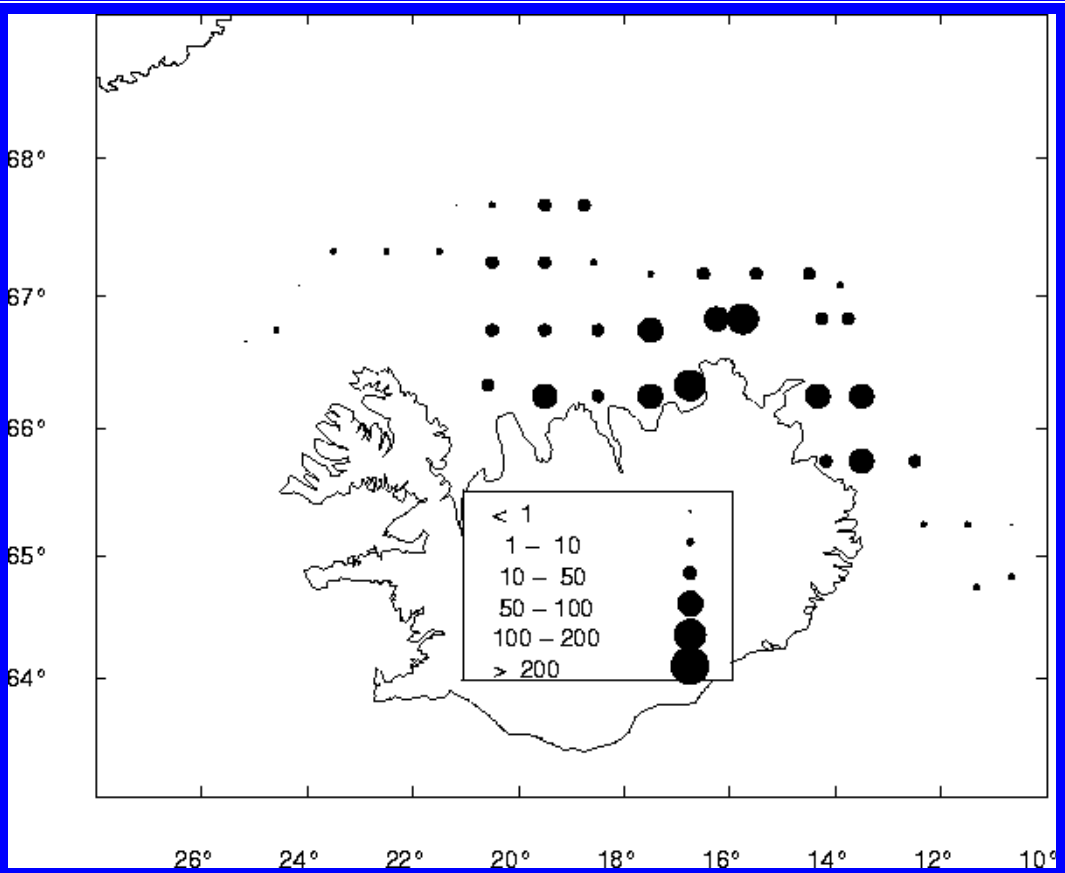
Offshore shrimp stock: Mean female stock index



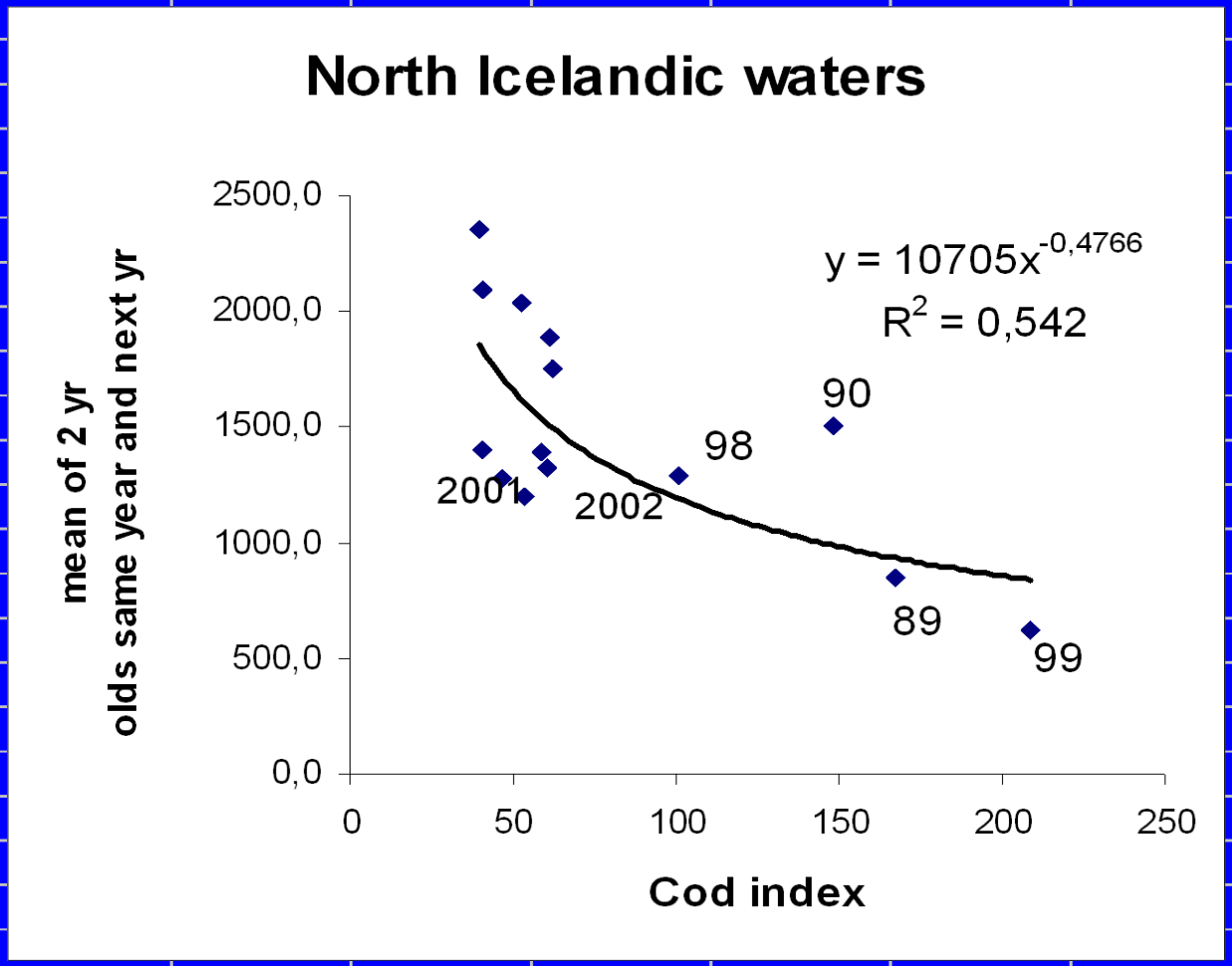
Offshore shrimp stock: Mean stock index 1-year



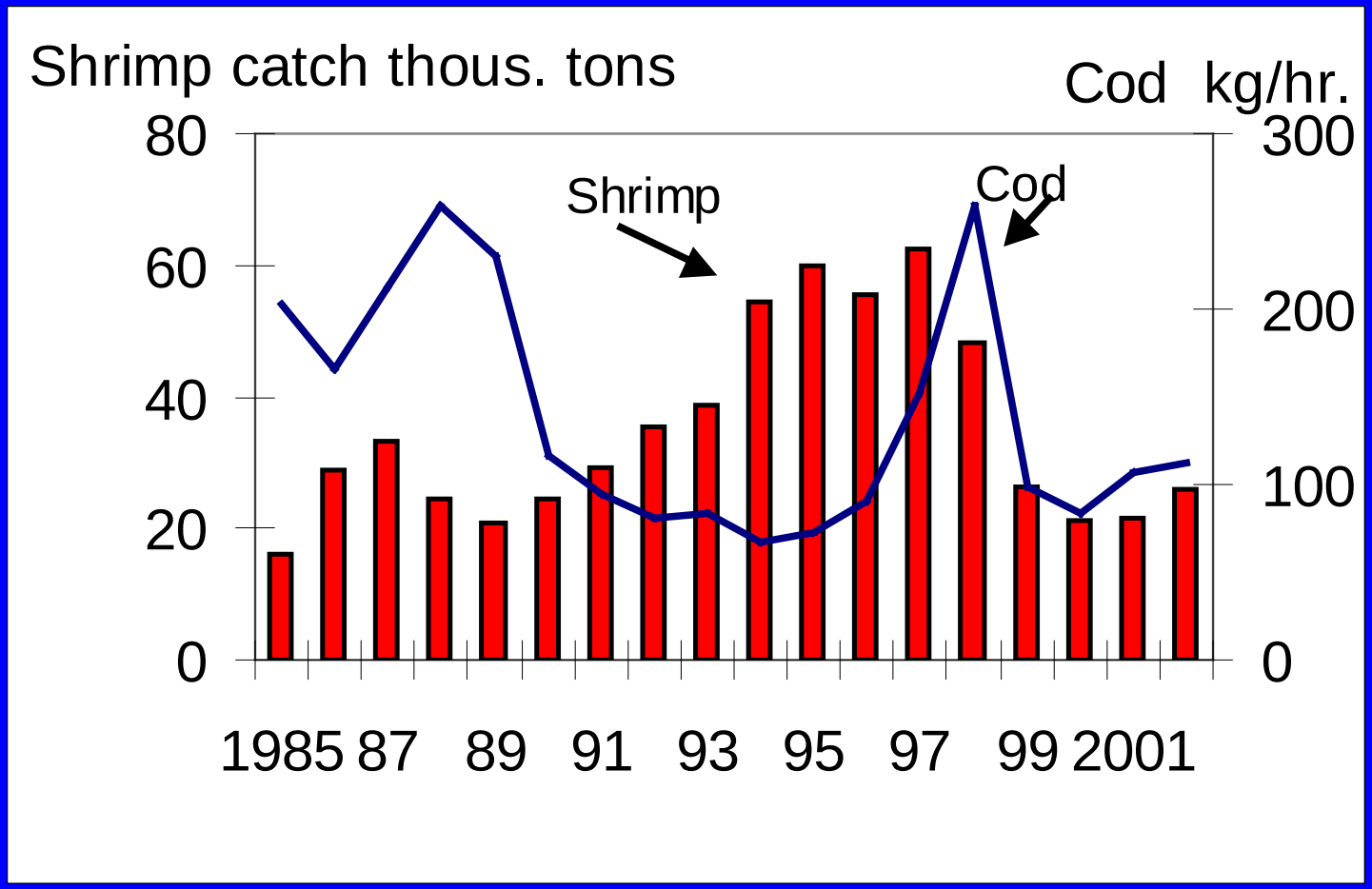
Offshore shrimp stock: Mean stock index 2-year



Shrimp recruitment (biomass of 2 year olds) and cod abundance index in N Icelandic waters



Offshore shrimp stock and cod abundance in groundfish surveys



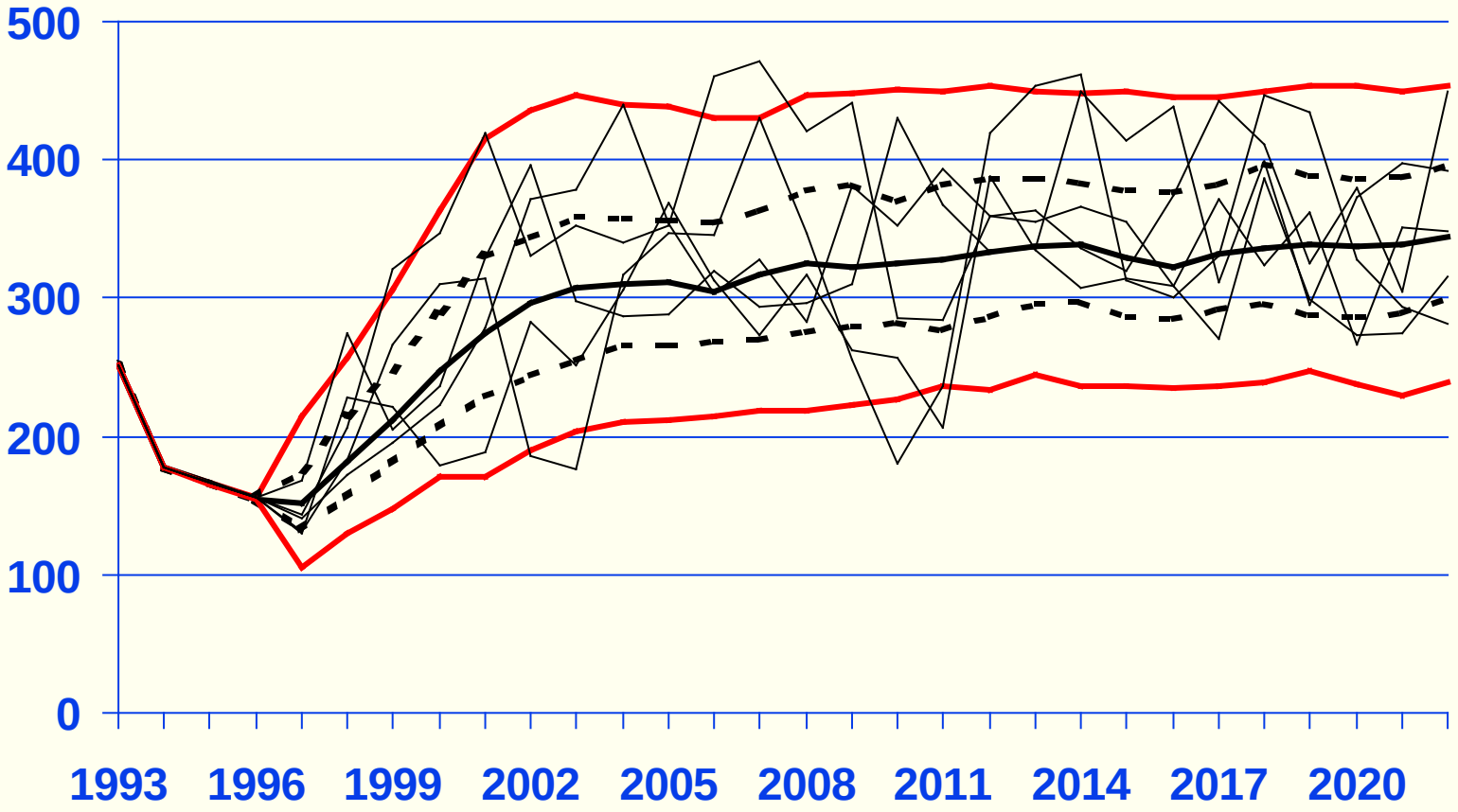
Regulation and basis for management

- Managed on basis of TAC by ITQ's
- Total TAC for offshore, separate for Dohrnbank and inshore
- Annual trawl surveys since 1988
- Standardised CPUE from logbooks
- Stock Production model: Recruits, shrimp catch, cod abundance
- Biomass calculated by least-spuare fit: CPUE-Average biomass 2 successive years
- Harvesting target 25-35% of fishable biomass

- Mid 1990's sorting grids (22mm) imposed to avoid bycatch of cod, Greenland halibut and redfish

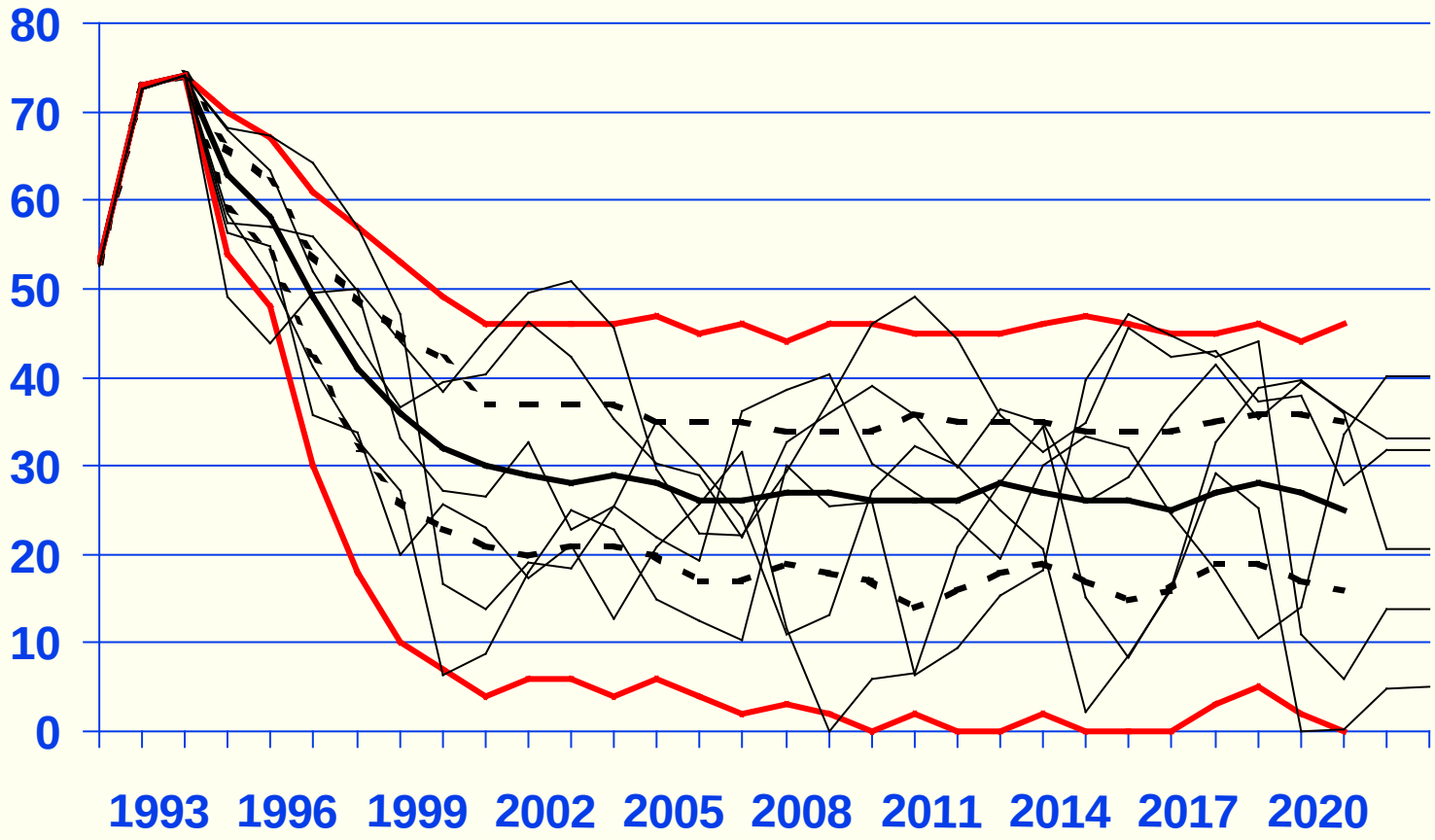
Development of cod catch under 25%HCL

Thous. tons

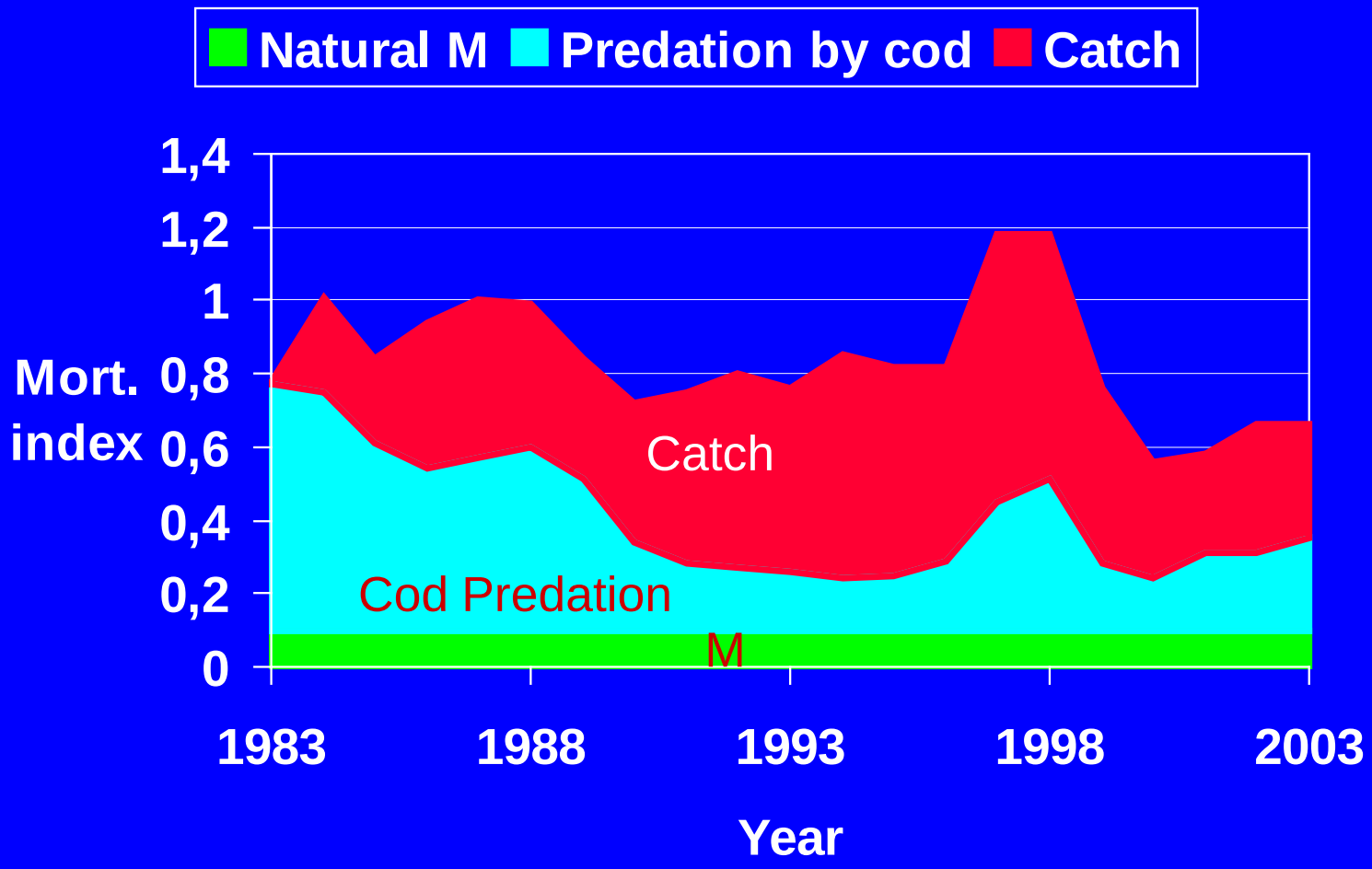


Development of offshore shrimp fishery under HCL for cod

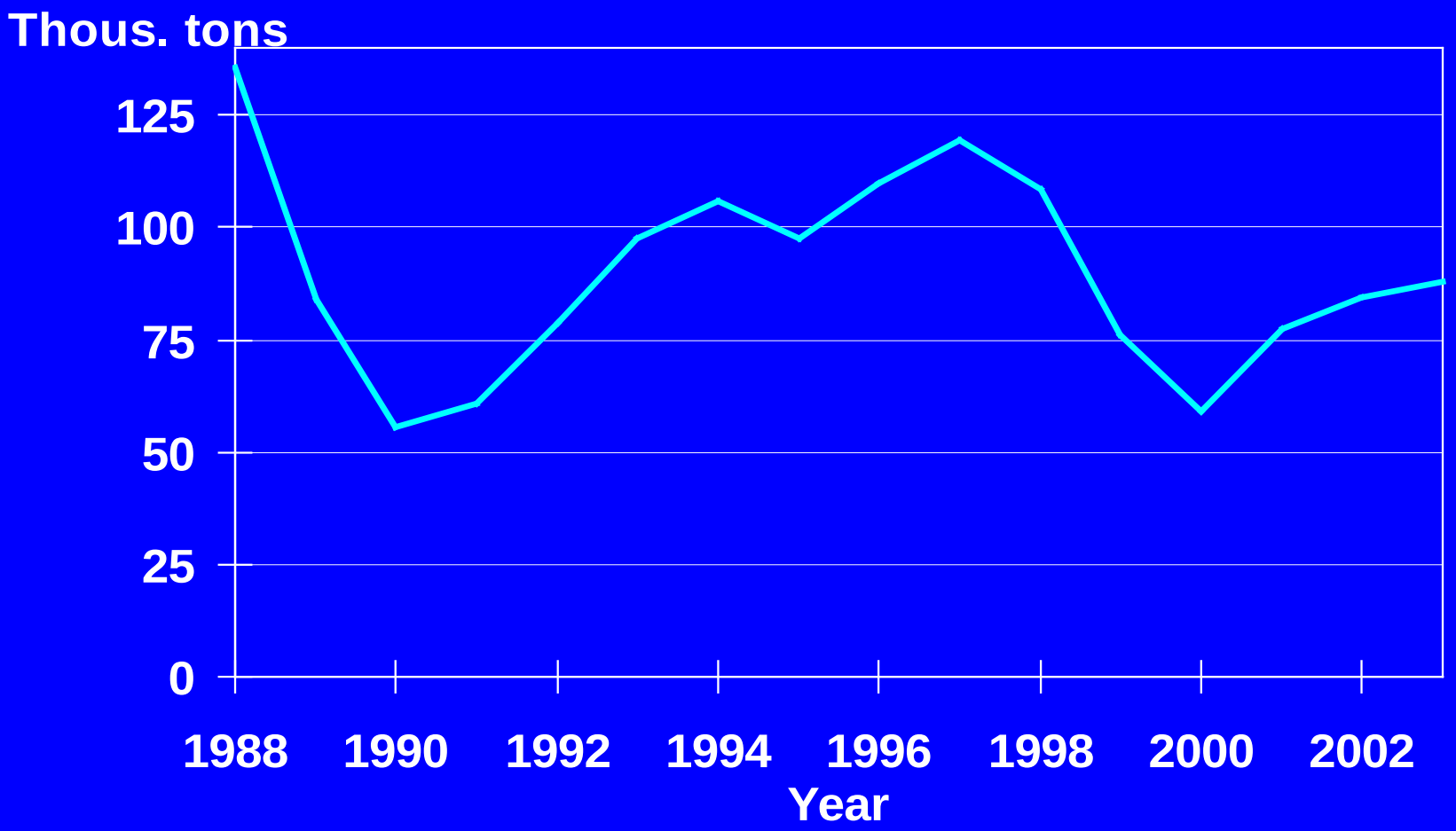
Thous. tons



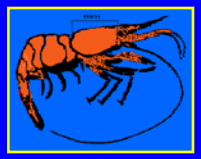
Offshore shrimp stock: Mortality estimated by multi-stock model



Offshore shrimp stock: Stock size estimated by production model



Conclusion



- Shrimp heavily predated by cod
- While the strategy is to let cod recover, shrimp will suffer !!
- Management strategy for shrimp under development
- Economic and operational (effort) aspects need to be explored and taken into account
- Effort regulation instead of TAC?