

Reducing By-catch in the World's Fisheries

Prof. Steve Kennelly
Chief Scientist

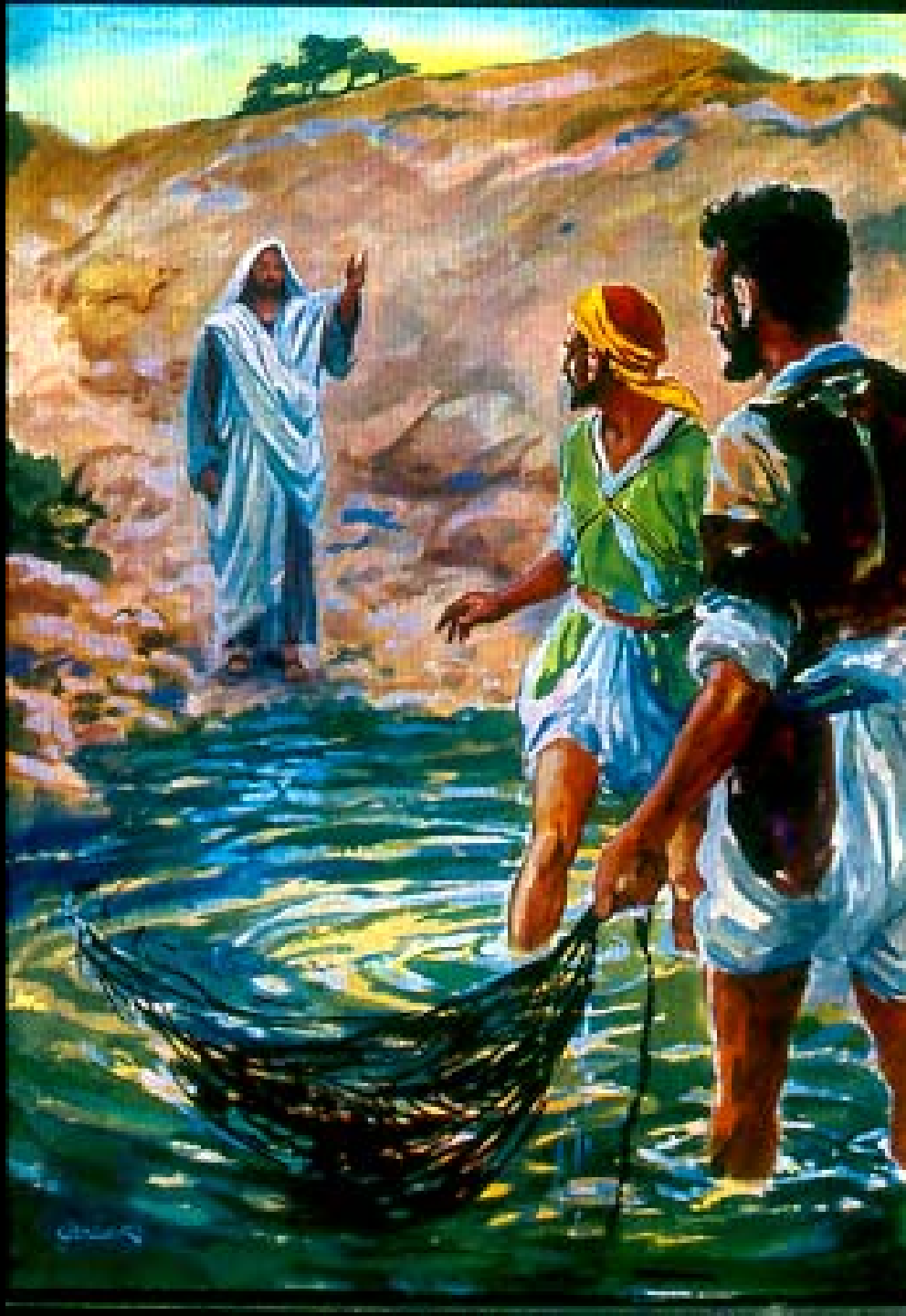
NSW Dept. of Primary Industries
Australia

90,000 years ago



Beginnings

fishing technology developed to exploit
an “inexhaustible supply”



2,000 years ago

“....the Kingdom of heaven is like a net thrown out in the lake, which catches all kinds of fish. When it is full, the fishermen pull it to shore and sit down to divide the fish: the good ones go into their buckets, the worthless ones are thrown away.”

Jesus Christ, Matt. 13.47

The 14th to 19th Centuries

beginning to see a problem

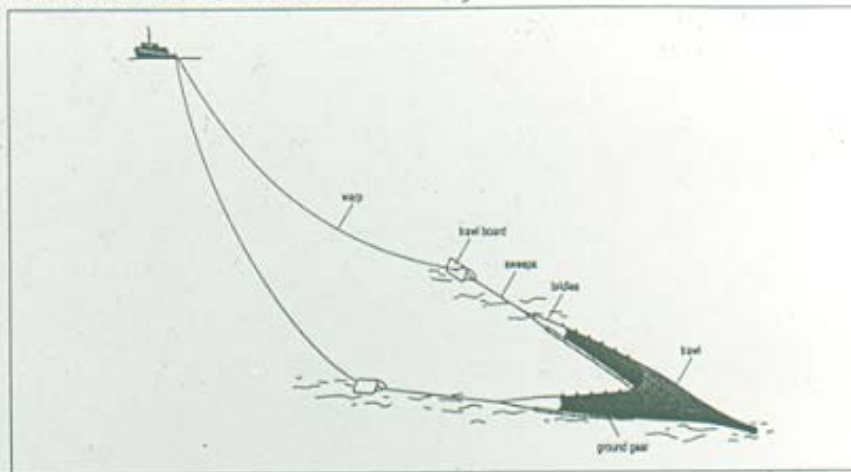
“The great and long iron of the wondyrchoun runs so heavily and hardly over the ground when fishing that it destroys the flowers of the land below the water, and also the spat of the oysters, mussels and other fish upon which the great fish are accustomed to be fed and nourished. By which instrument in many places the fishermen take such quantity of small fish that they know not what to do with them; and they feed and fat their pigs with them, to the great damage of the Commons of the Realm and the destruction of the fisheries.”

Petition to Edward III, 1376

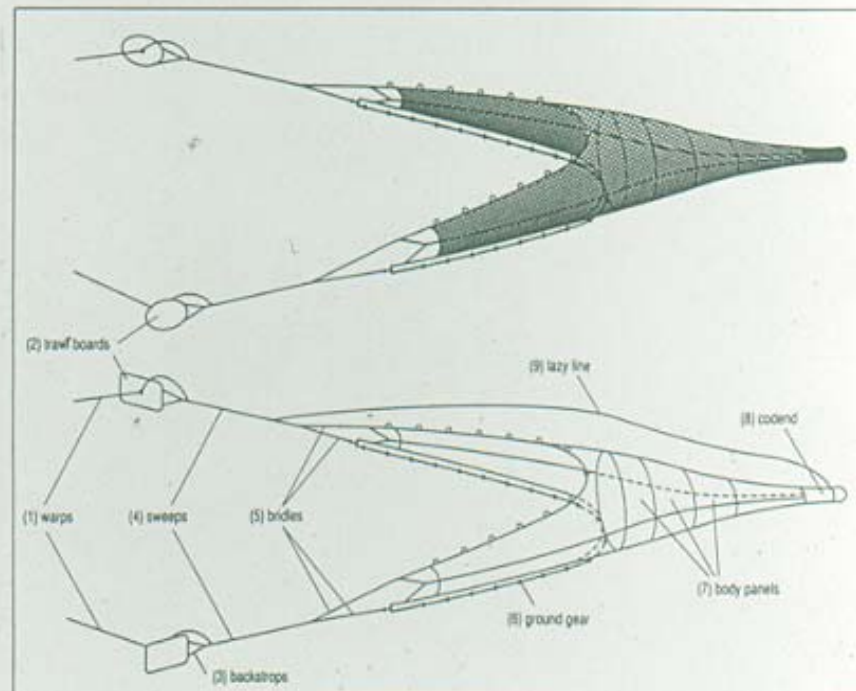




A demersal trawl arrangement used for fish.



Two trawl configurations showing the main components.

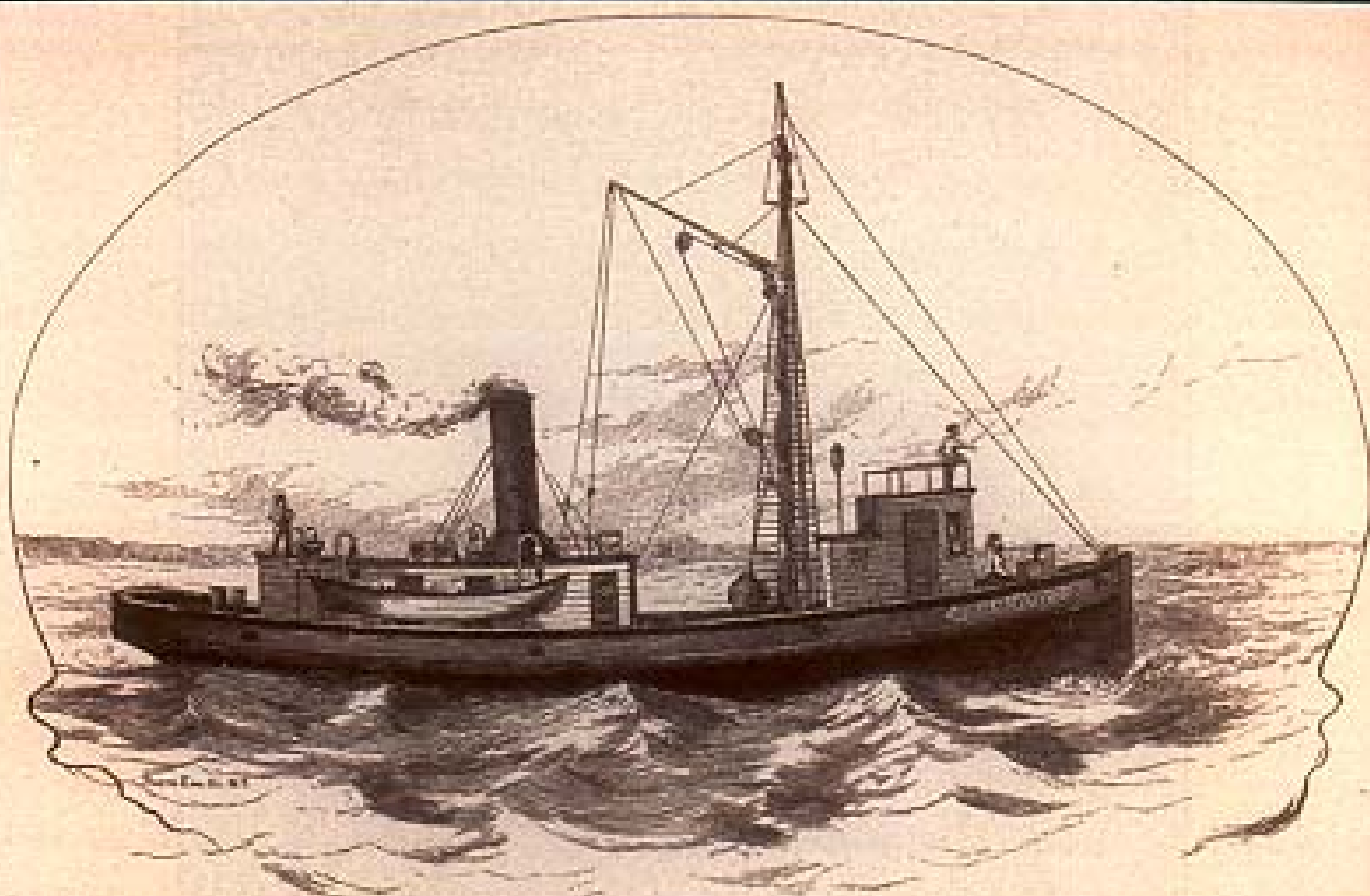


Into the 20th Century

unchecked technology, overfishing and
environmental impacts







“It is only in the last few years when the fishing fleet has suffered from a marked scarcity of haddock that the folly of (the) belief in the inexhaustibility of nature has become potent.”

William Herrington, 1932





The Last Few Decades

a change in philosophy

BY-CATCH

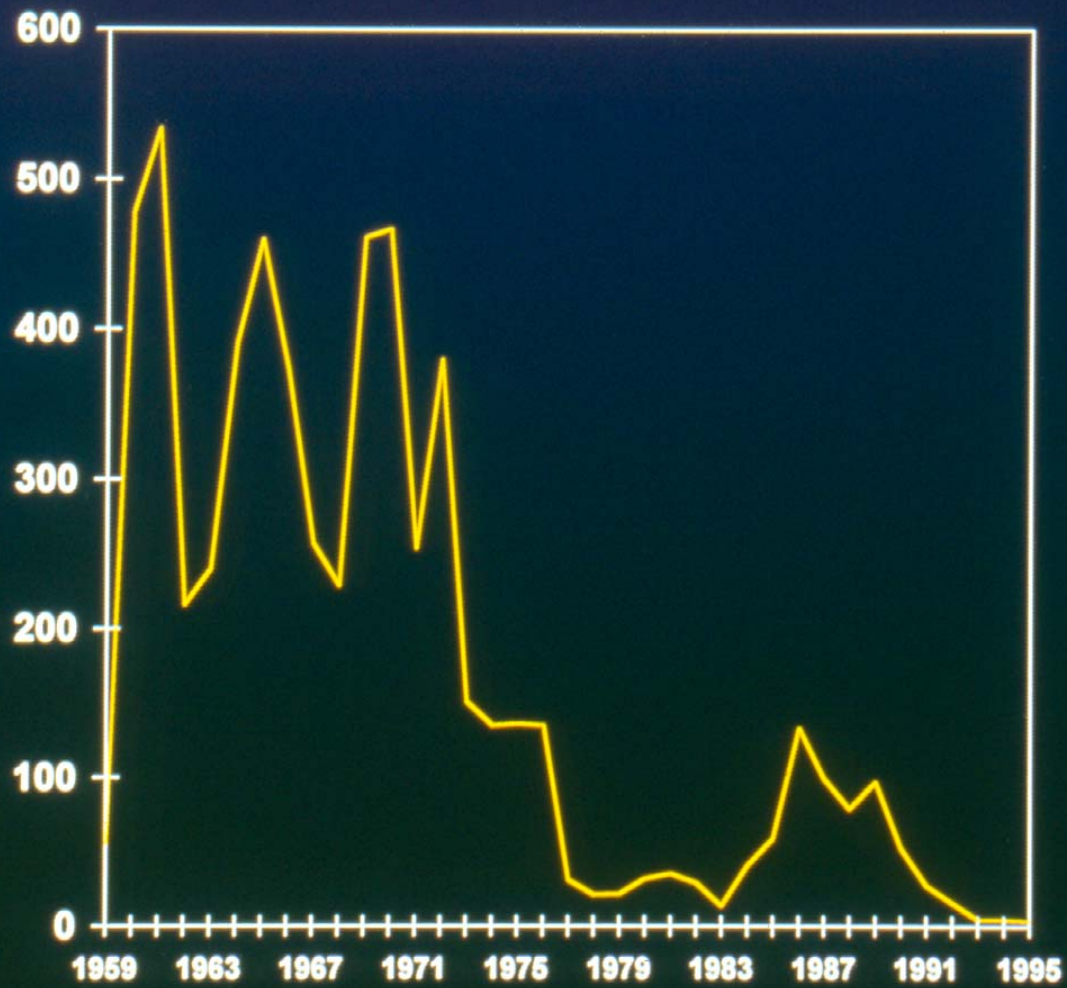
BY-CATCH

- charismatic species

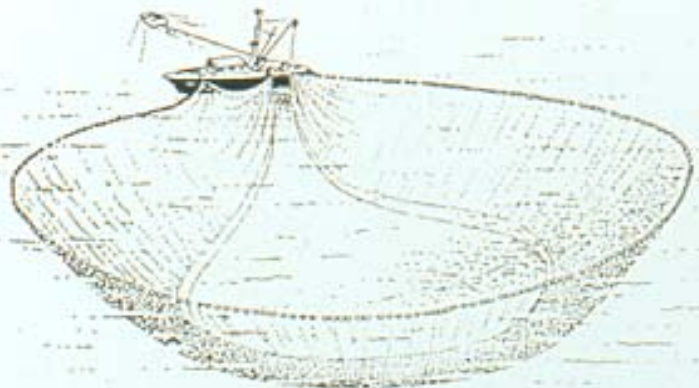
Tuna – Dolphin interactions



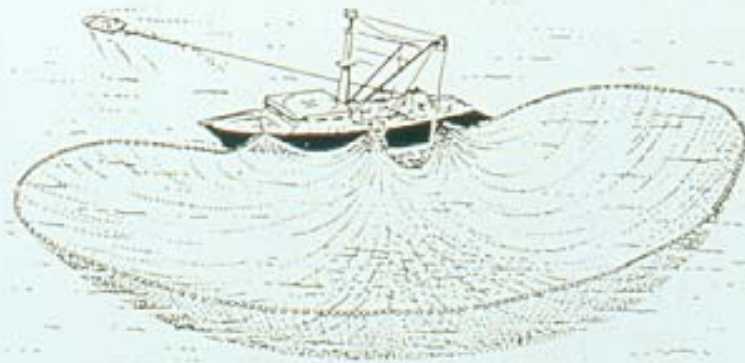
TOTAL MORTALITY (x1000) 1959-1995



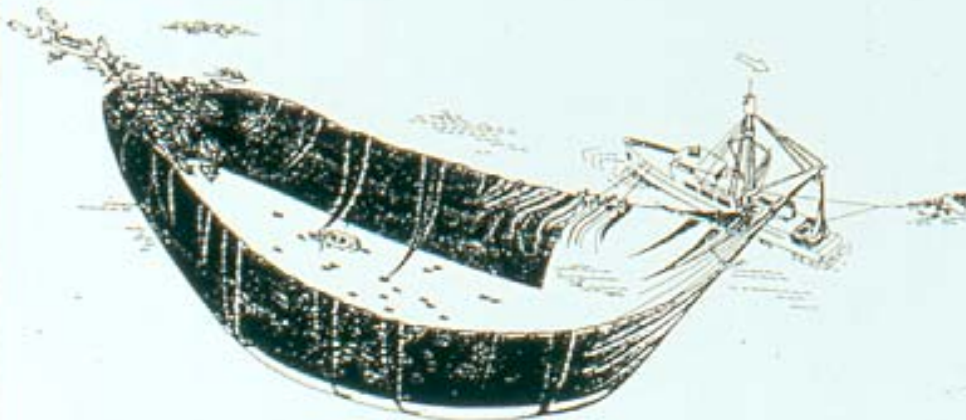
STAGES OF A PURSE-SEINE SET ON DOLPHINS (cont.)



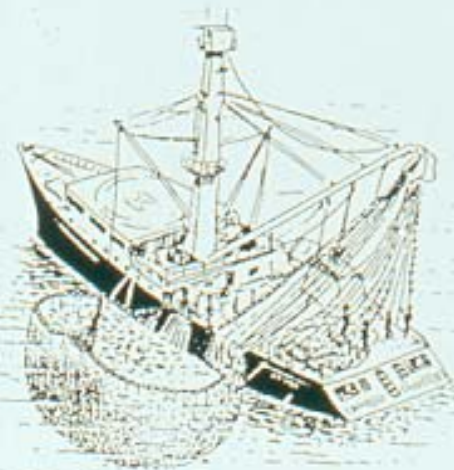
(5) Pursing the net



(6) Rings up; net pursed



(7) Backdown



(8) Sack-up and brailing

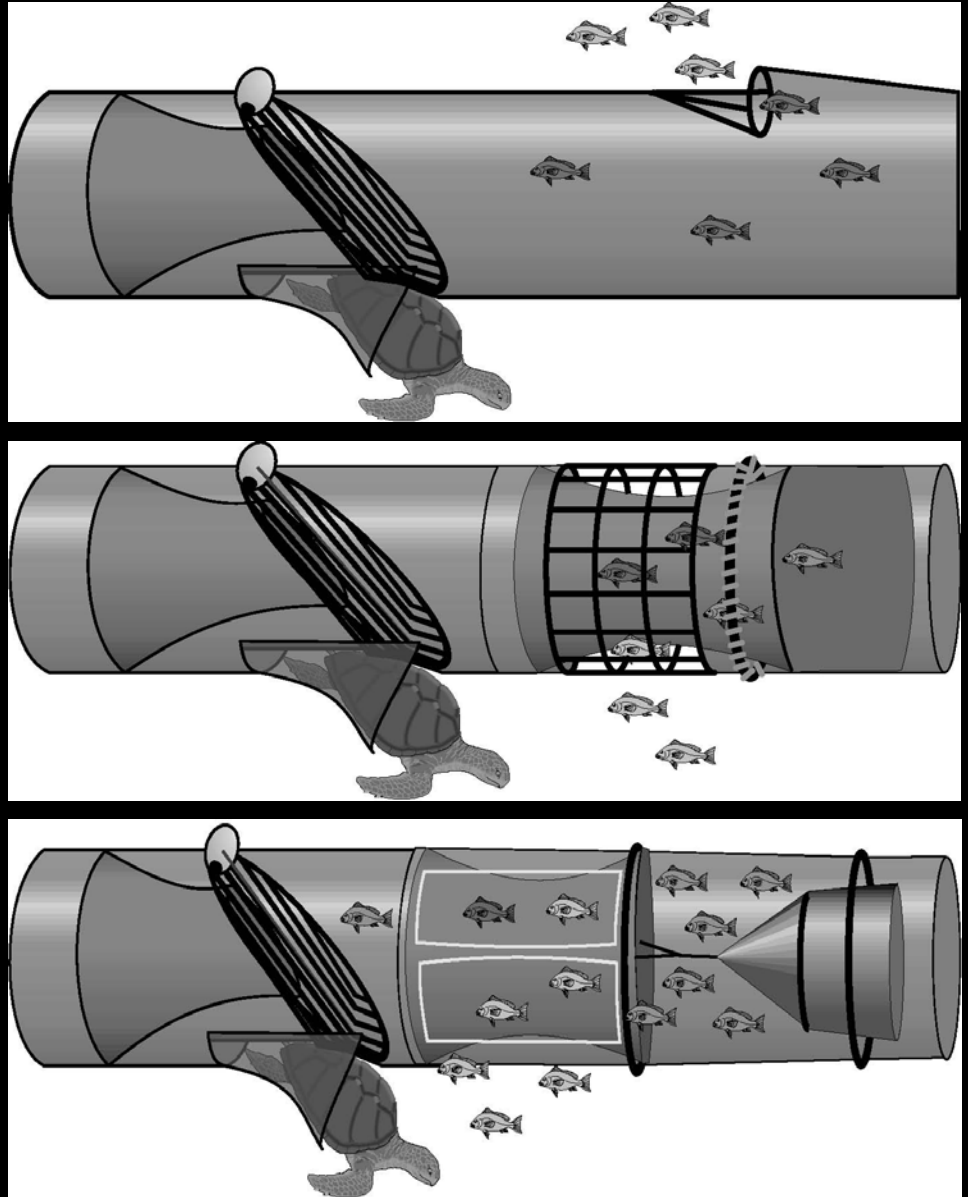
OPIC-62-90





Other charismatic Species

- Turtles



BY-CATCH

- other species, especially juveniles



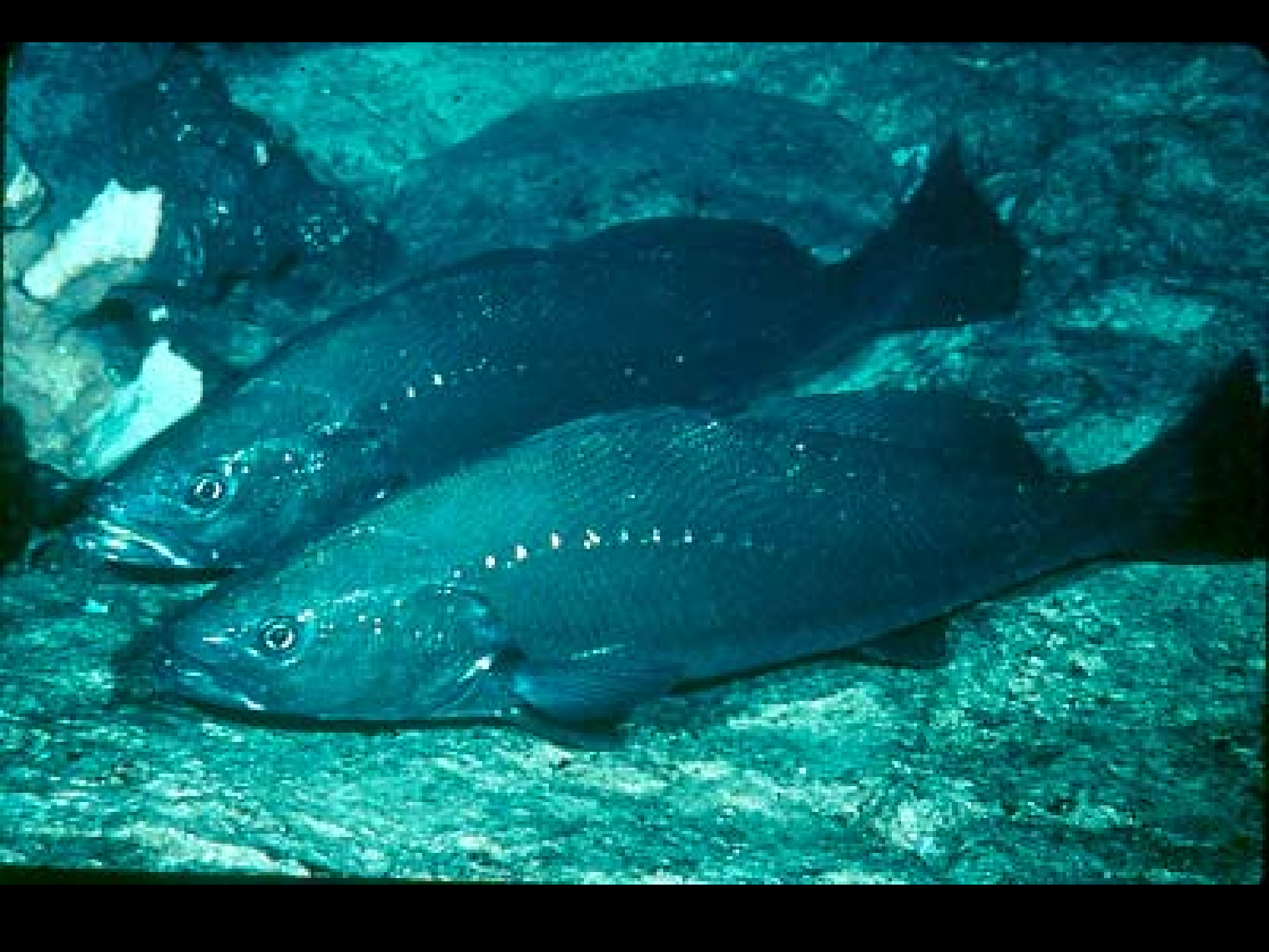


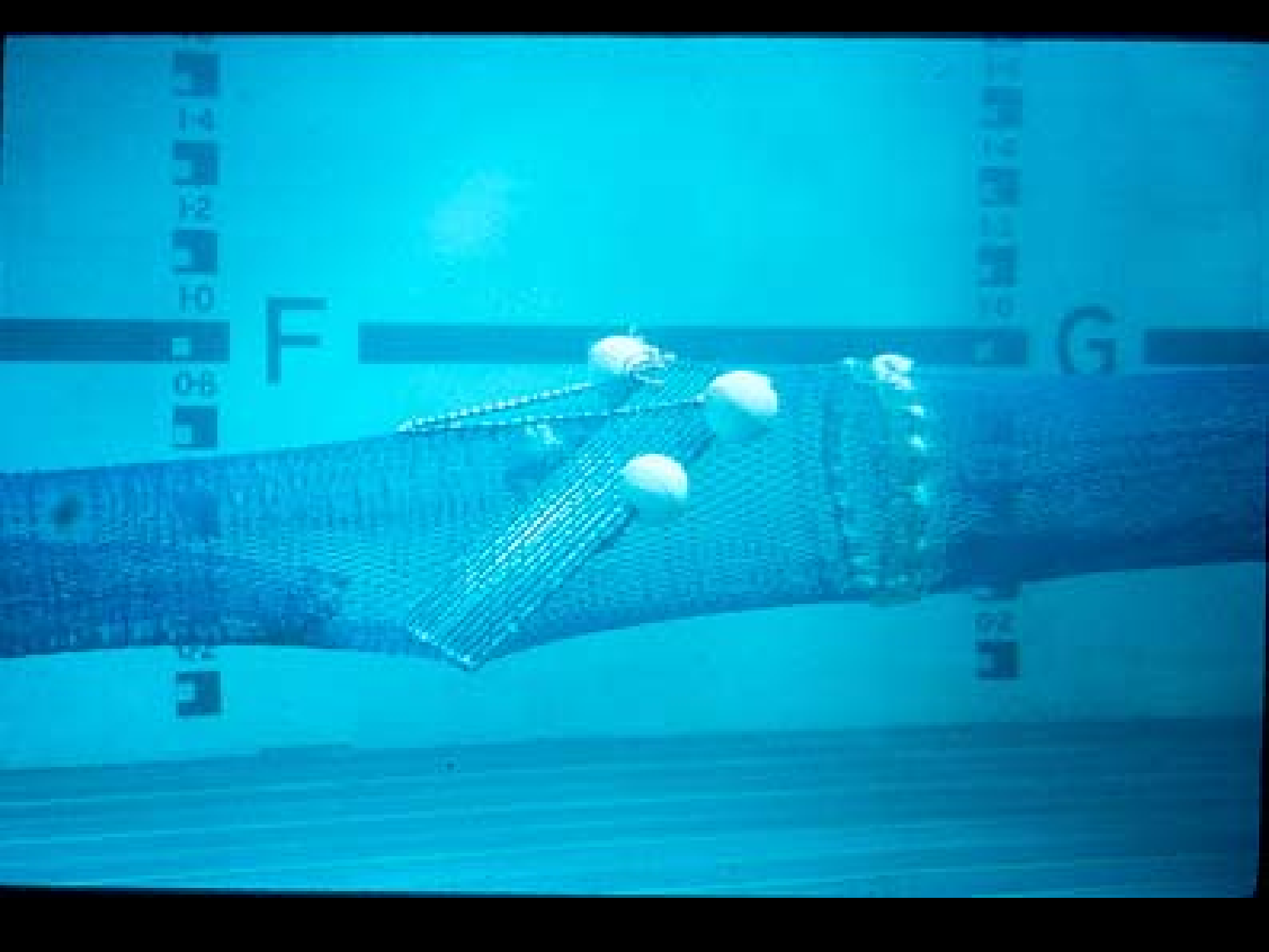


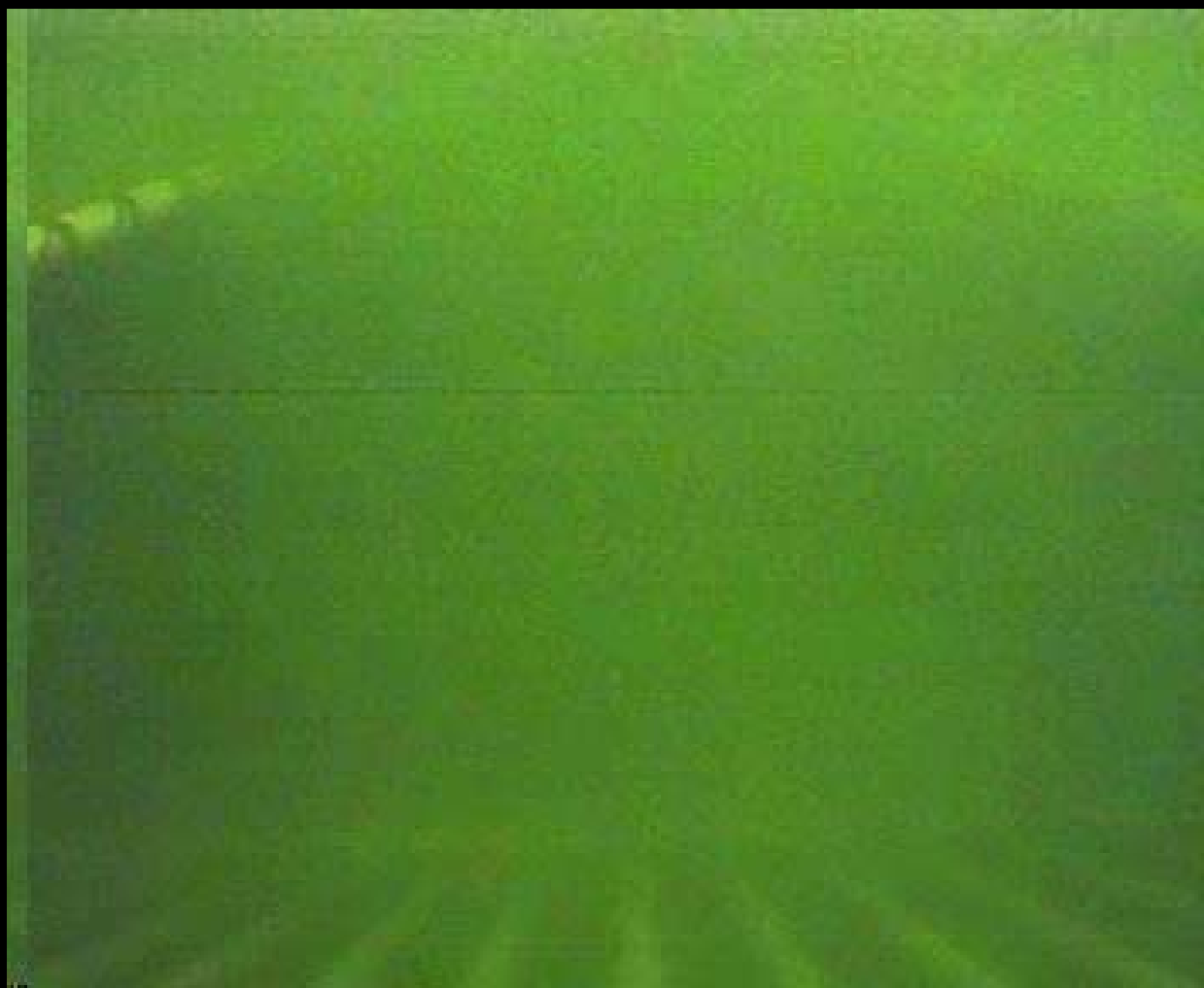


















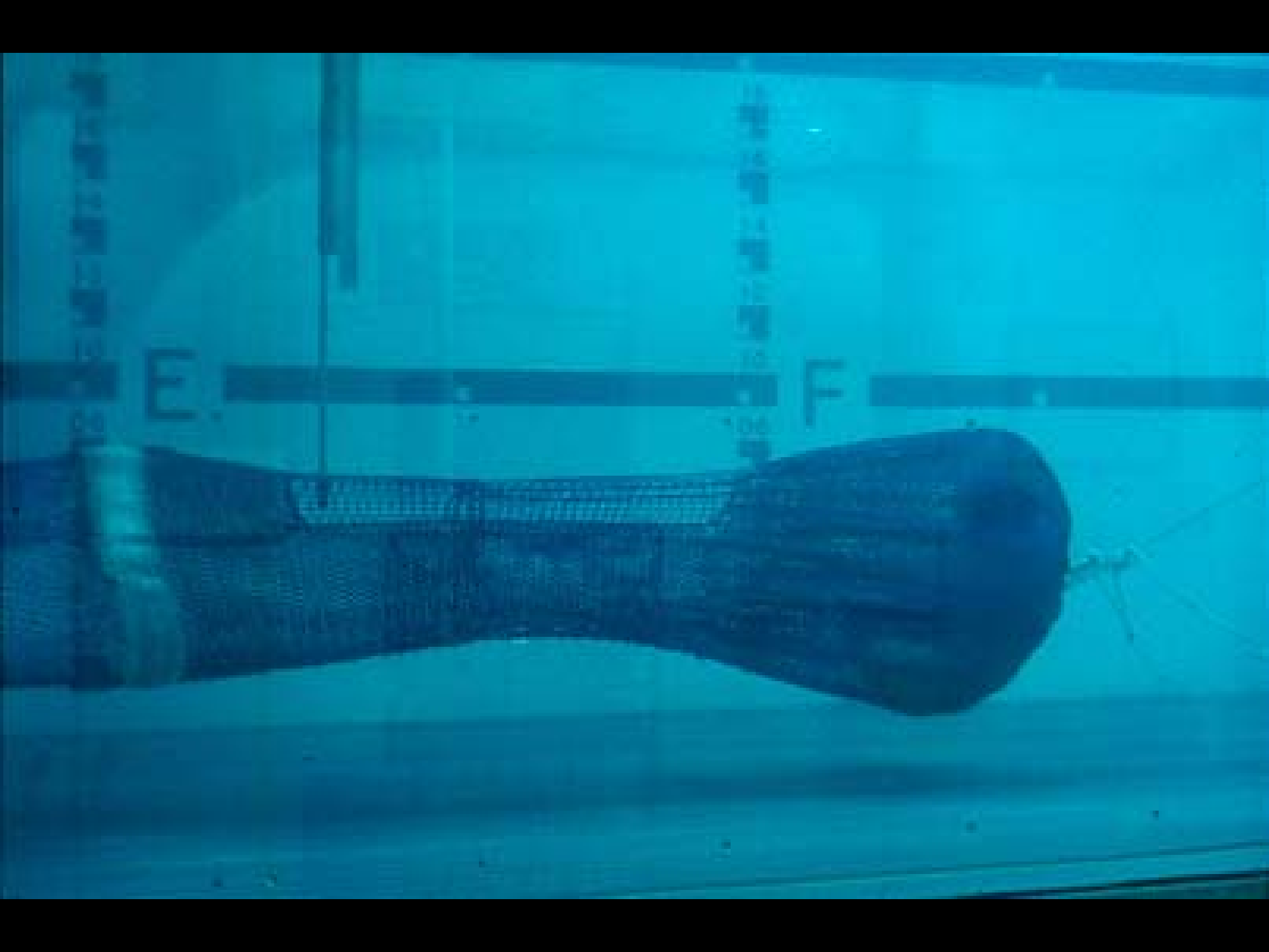


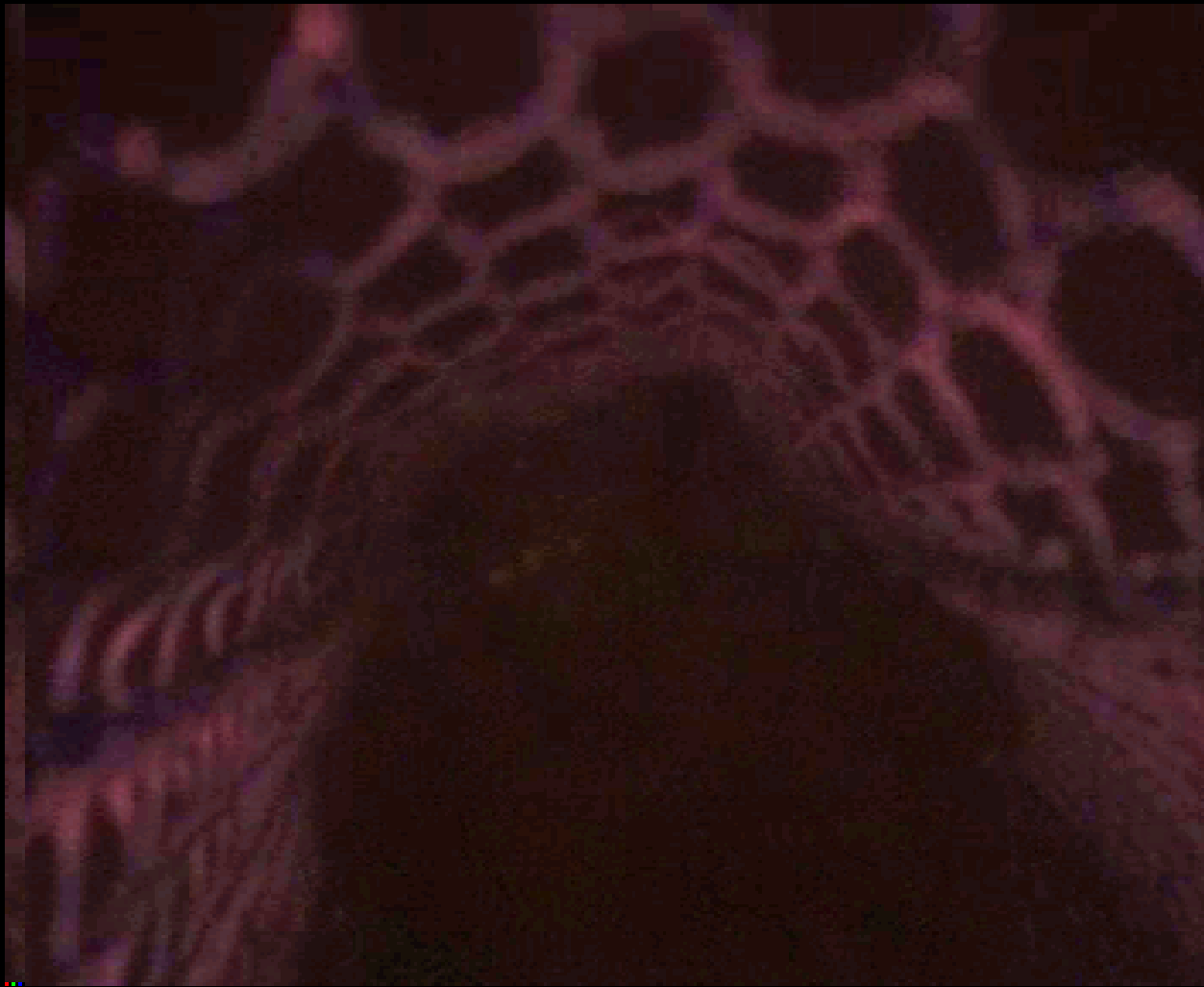














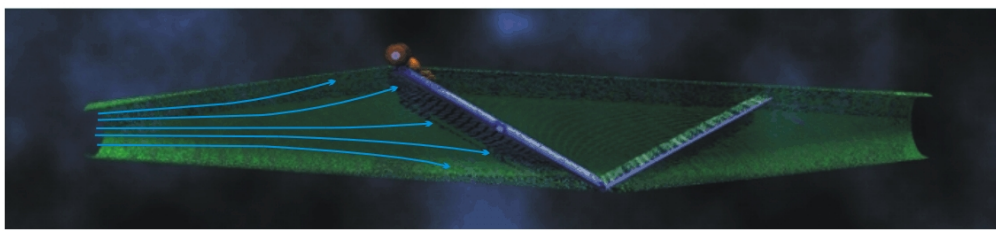
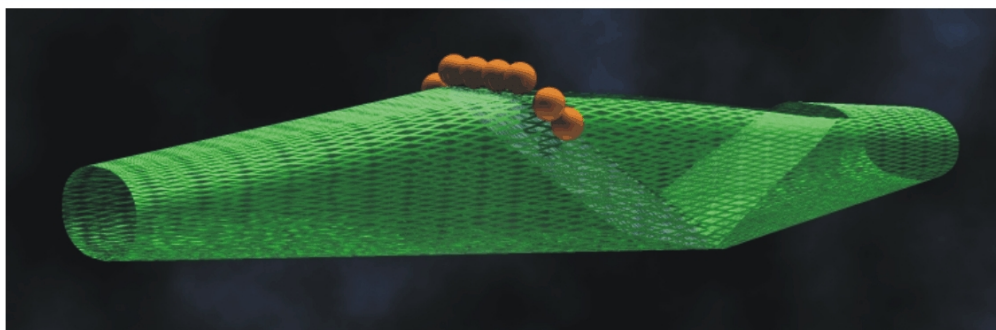
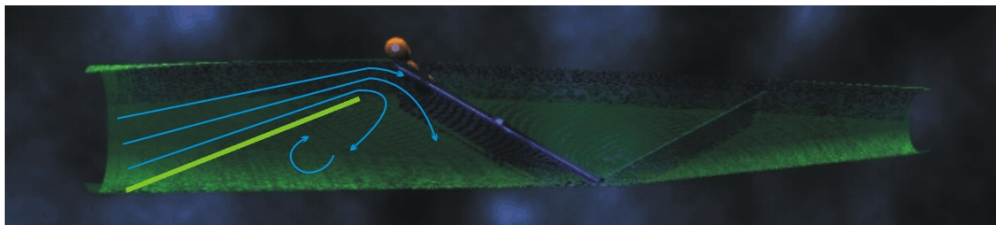
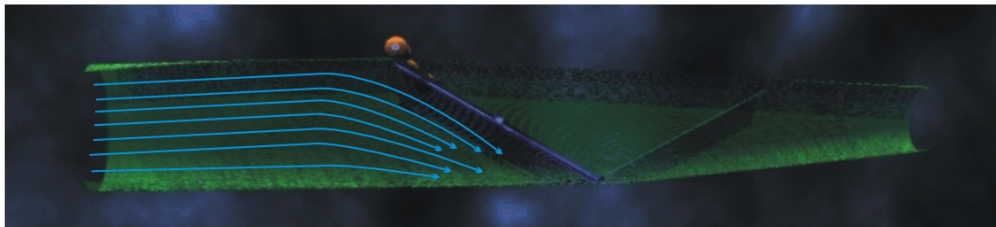
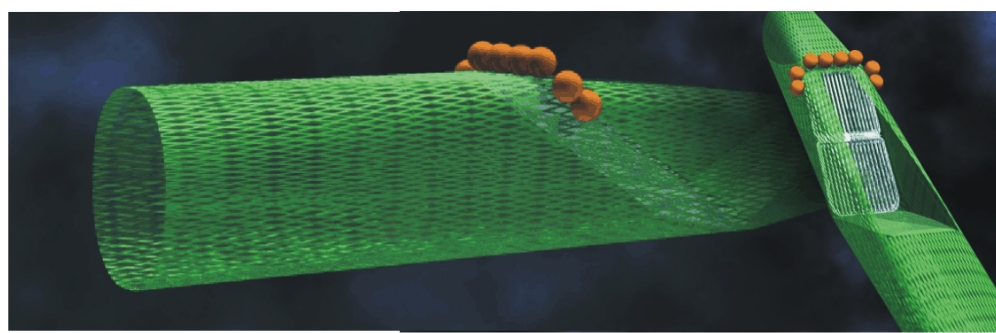
BY-CATCH

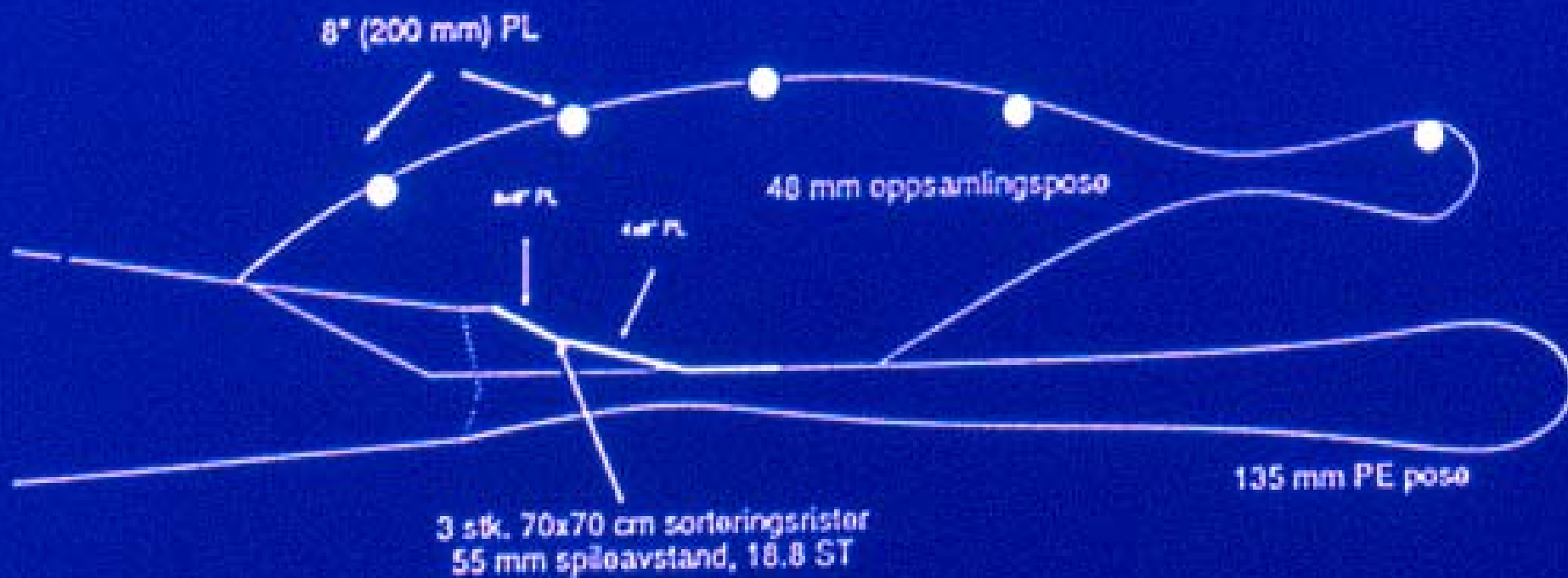
- conspecifics, especially juveniles





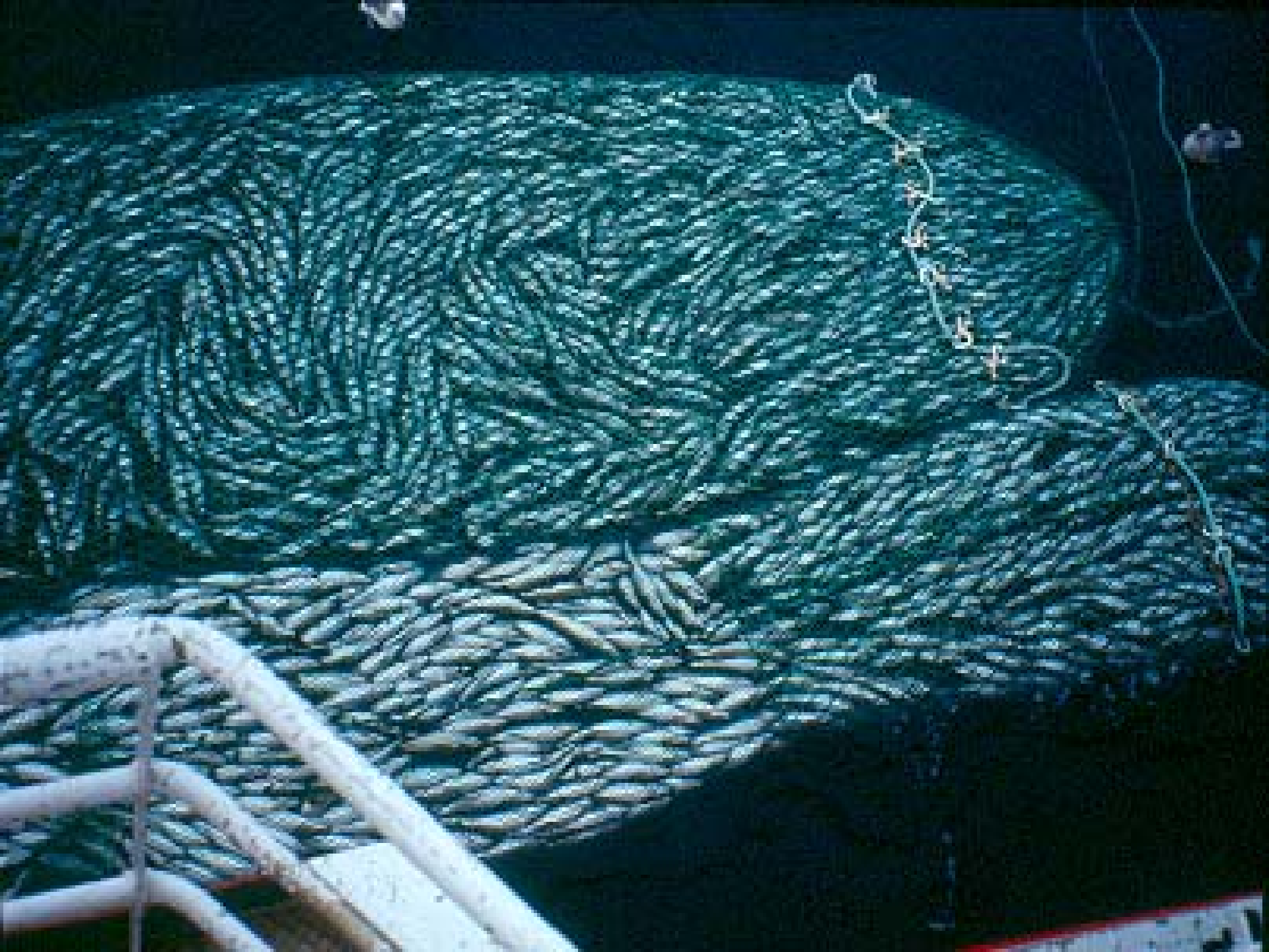






Isaksen, 1993





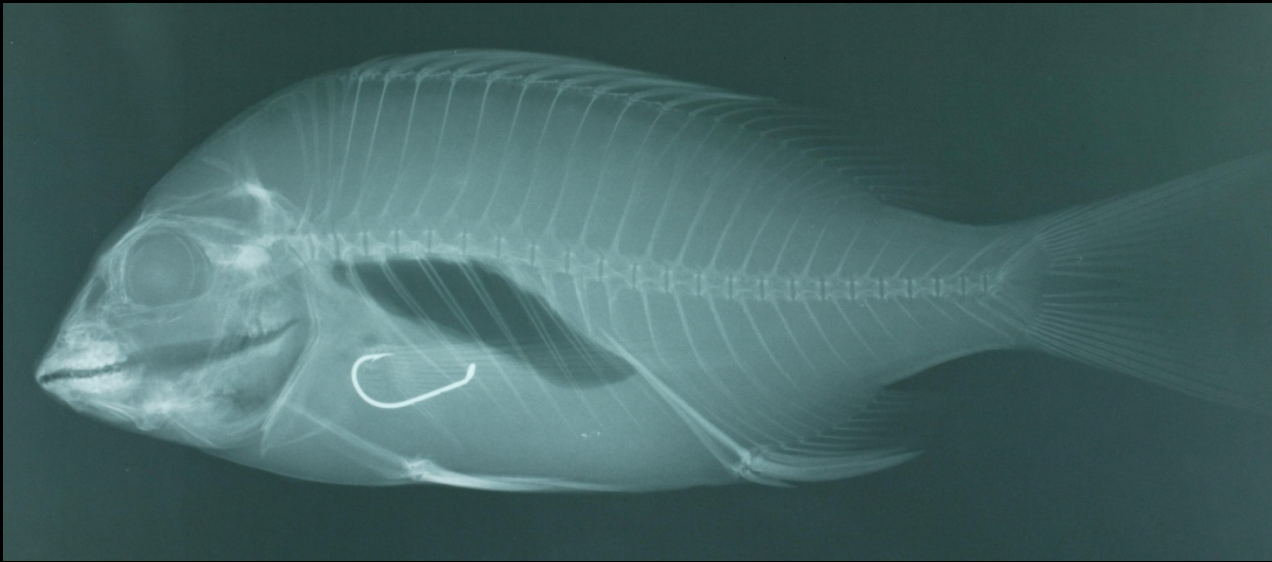




BY-CATCH

- conspecifics, especially juveniles
 - not only commercial
but recreational fisheries







BY-CATCH

- perceived, not real, problems





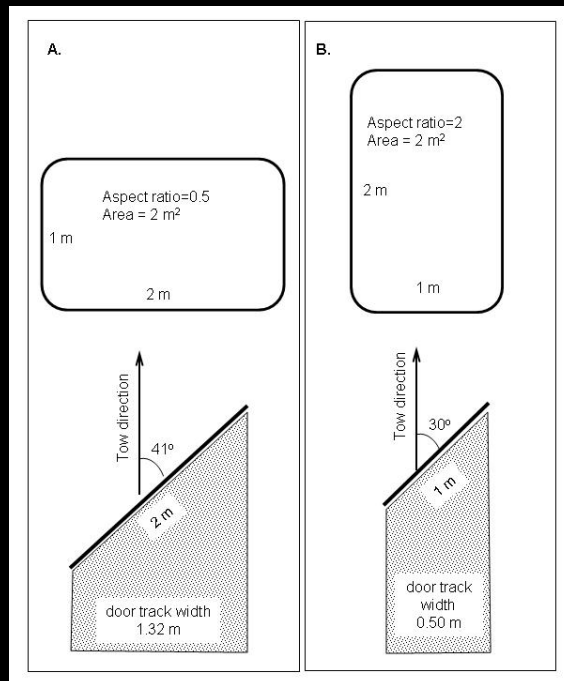
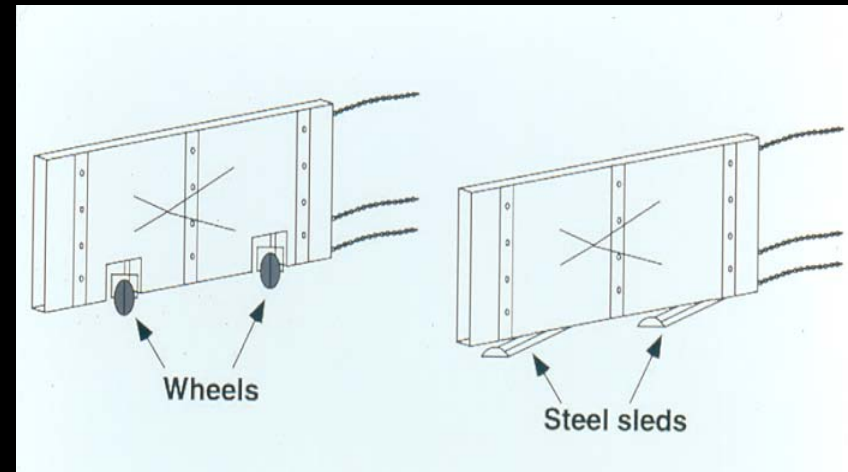






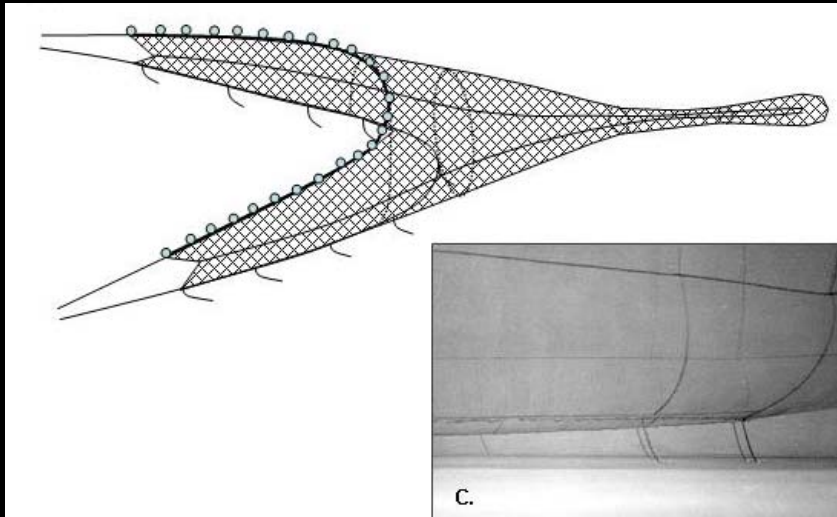
Ecosystem Impacts



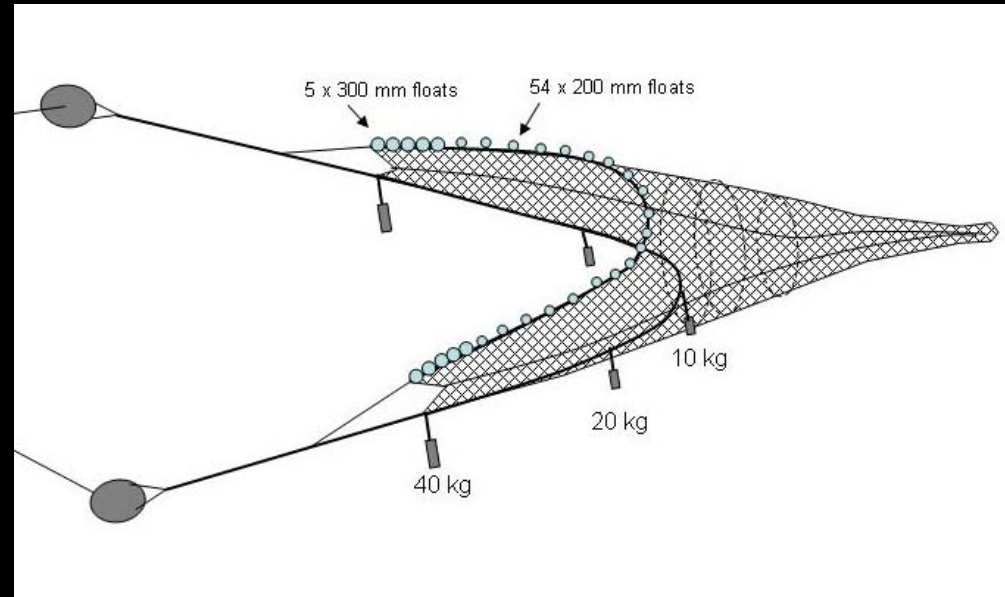


Reducing width of door impacts
using high aspect trawl doors

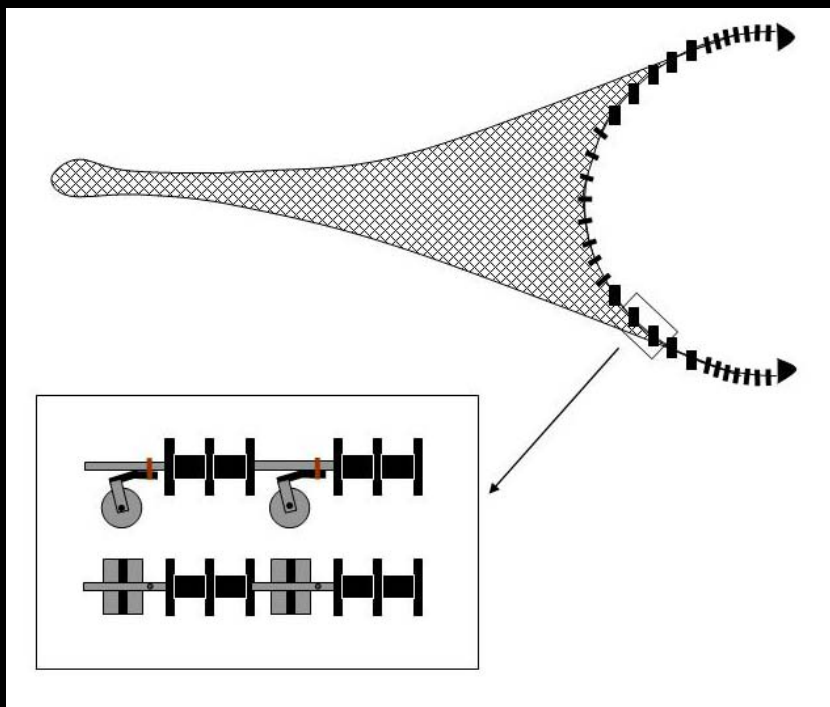
Parafoil "soft" trawl door



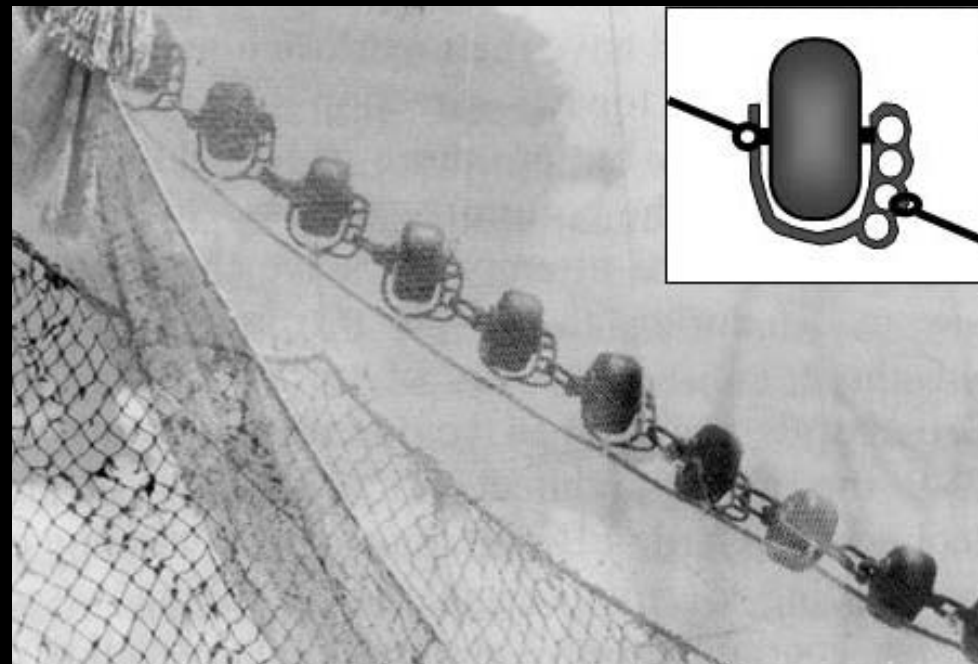
Sweepless trawl for whiting
– Gulf of Maine



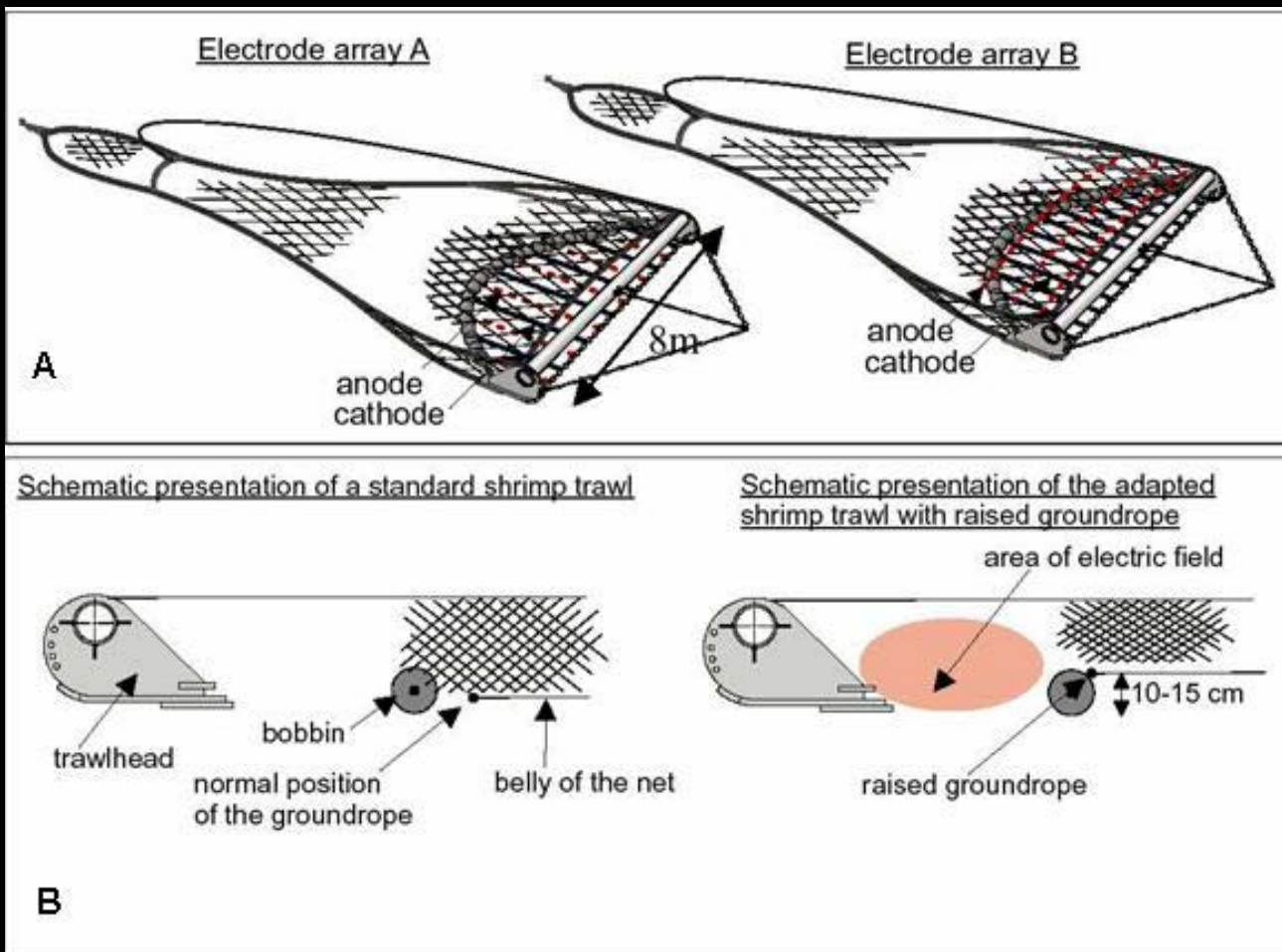
Quasi-bottom trawl for snapper
- Northern Australia



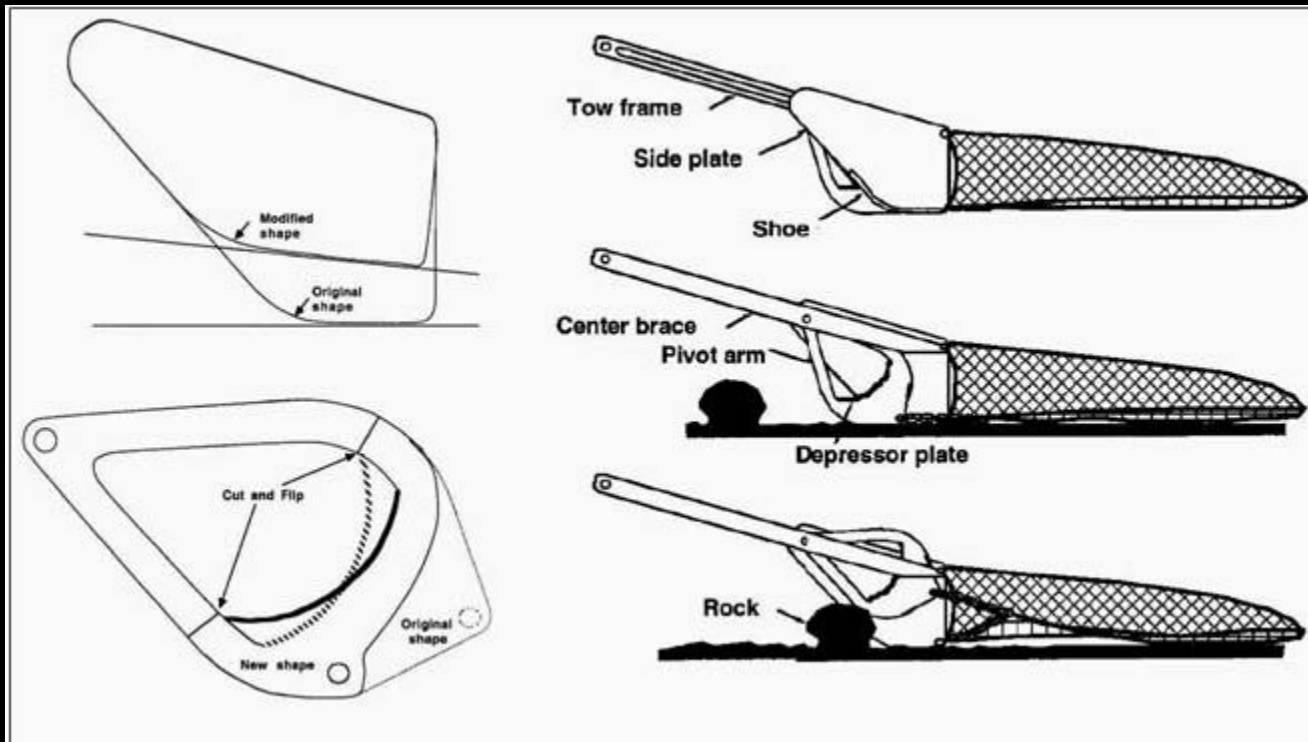
Swivelled wheels on
ground gear
- Feroe Islands



Bobbin axes running
perpendicular to
towing direction



Using electric stimuli in brown shrimp trawls
- Belgium



Low impact scallop dredge
- New England

The common thread in solving
by-catch problems:

The common thread in solving
by-catch problems:

- Involve fishers at every step
of the way













The problem: Concern over a particular bycatch issue by various interest groups

1. Identify and quantify the problem using observer programmes

- scientists working with fishermen on typical fishing trips



2. Think of alternatives to solve the problem (i.e. reduce bycatch)

- scientist's ideas from other studies and the literature
- fishermen's ideas from their knowledge of their gear and practices



3. Test these various ideas to identify the best solutions

- scientists analysing the data for the best solution
- scientists doing field experiments onboard fishermen vessels
- fishermen making it practical for their operations



4. Publicise the solutions throughout the fleet

- scientists doing talks, videos, articles, papers for fishermen not directly involved in the tests
- fishermen discussing and teaching each other how to use the modification



5. Publicise this adoption to those concerned

- fishermen and scientists making various interest groups aware of the solutions through the media, meetings, etc.



6. and so reduce the concern, solving the problem



Reviews: Methods and Technologies in Fish Biology and Fisheries

By-catch Reduction in the World's Fisheries

Edited by

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