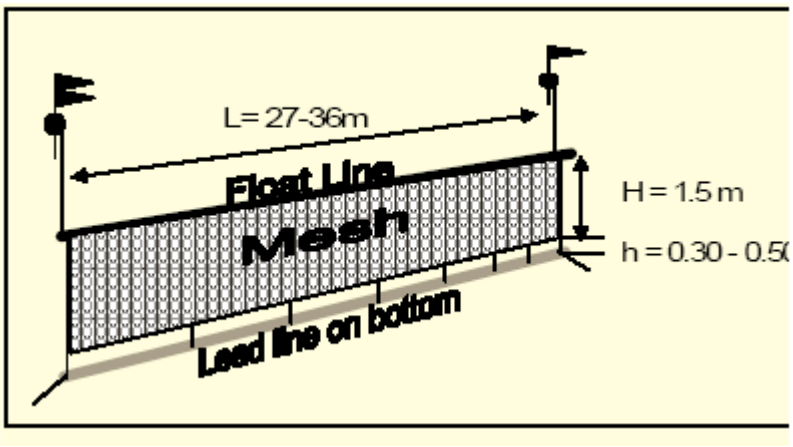
Topic/Lesson:	**Commercial Fisheries Gear Types – Nets**
Subject:	Fishing methods: Nets
Author:	Rob Yeomans
Time Duration:	Two 90 minute blocks or three 45 minute periods
Overview:	Students will work in groups to construct a net that would catch a fictitious fish. Once all the nets are built, the students will discuss their style with the other groups for comparison. The teacher will then bring the class together for a discussion of the three main classes of nets used by commercial fishermen; gill, trawl and seine and how the gill net is the gear type that catches the most sturgeon as bycatch. The students are then asked to build a prototype gill net that would allow safe passage for sturgeon based on their ecological niche.
Objectives:	Students will be able to: • Understand the three main styles of nets used by commercial fishermen. • Explain why each type of net is intended to focus on a particular type of fish. • Discuss the positive and negative effects of each gear type. • Determine how gill nets catch the most sturgeon as bycatch due to the fish's ecological niche. • Construct a prototype gill net that could provide safe passage for sturgeon but still catch the targeted fish.
Materials:	• Netting material • Meter sticks • Rope • Items that resemble buoys (ex. 2 liter soda bottles) • Items that resemble weights
Procedures:	1) Get the students into groups and give each group a fish card (each fish card describes a different species that fills a specific niche. Note: Cut and laminated cards are located in the "Miscellaneous Cards" bag in the SCUTES kit.). 2) Tell the students they are to build a net that will catch their fish type taking into account the body type, swimming style, niche, etc. All materials are at the front of the classroom. The net does not have to be free standing, but does need to have a means of

	collecting the fish and being retrieved by the fishermen. 3) Once built, each group will explain the niche of their target species and how their net is designed to catch that species. 4) The teacher should then bring the class together for a discussion of the three main types of gear used by commercial fishermen—starting with seine nets and finishing with gill nets. Visual diagrams of the nets should be used. The teacher should lead the discussion towards the students explaining the pros and cons of each type of net, including efficiency of catch, habitat destruction, ghost gear and bycatch. 5) Explain to the students that gill nets are the gear type that catches the most sturgeon as bycatch due to the fish's niche. 6) Student's should then get back into their groups and build a model of a gill net (not free standing) or be given a diagram of one. They are asked to build a prototype of a gill net that would allow safe passage of sturgeon, but still catch fish. 7) When completed, students should present their net prototypes to the rest of the class for comparison. 8) As a free writing exercise for homework to be handed in the next class, students are to write a description as to how they would test their prototype idea.
Conclusions:	The next day, the teacher should ask the students what their prototype design was and how it would be tested. The teacher should then show the class two prototype ideas already in place and how each was tested. Here is a prototype designed to potentially reduce sturgeon bycatch in gill nets.  "Windows were created on the bottom of the net by adding nylon spacers 30 or 50 cm high. This allows the benthic sturgeon to slip through the net while the targeted species that swims slightly off the bottom will still get caught (Gessner and Arndt, 2006).

Fish cards

Fish A

Your fish is a schooling species that spends its entire life in the ocean. It is benthic, but swims in the water column from the bottom up 5-10 meters and feeds on schooling bait fish, crustaceans and worms.

Fish B

This fish is a benthic species that lays flat on the bottom, for the most part never moving vertically. It moves about the ocean floor and at times swims into the estuaries of rivers with sandy bottoms.

Fish C

Your fish is a fast moving, pelagic species that swims in great schools. The only thing governing its position in the water column is food. It can be found from the surface to the bottom, and it migrates hundreds of miles in a short amount of time.

Fish D

Your species is not a fish, it's a bivalve. These mollusks live on the bottom, filter feed the water of plankton and move on occasion by clapping their two shells together and moving very short distances.

Fish E

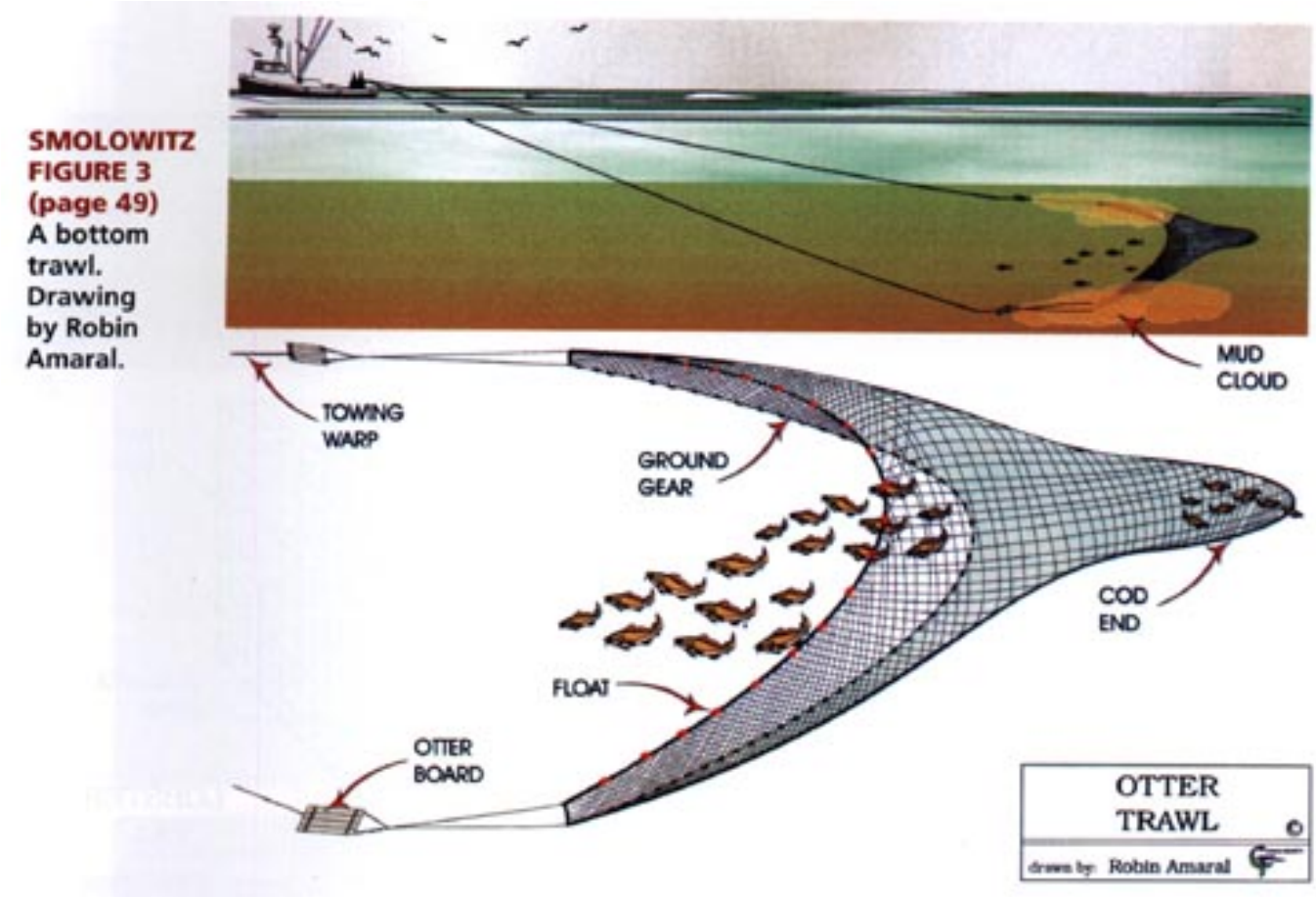
Your species is a bait fish that swims in the oceans in huge schools numbering thousands. They eat plankton and small shrimp, live near or in the photic zone and move slowly from place to place.

Fish F

This species lives in rivers as young adults and the oceans as adults. They are benthic, slow moving and feed on worms, mollusks and crustaceans.

Otter Trawl

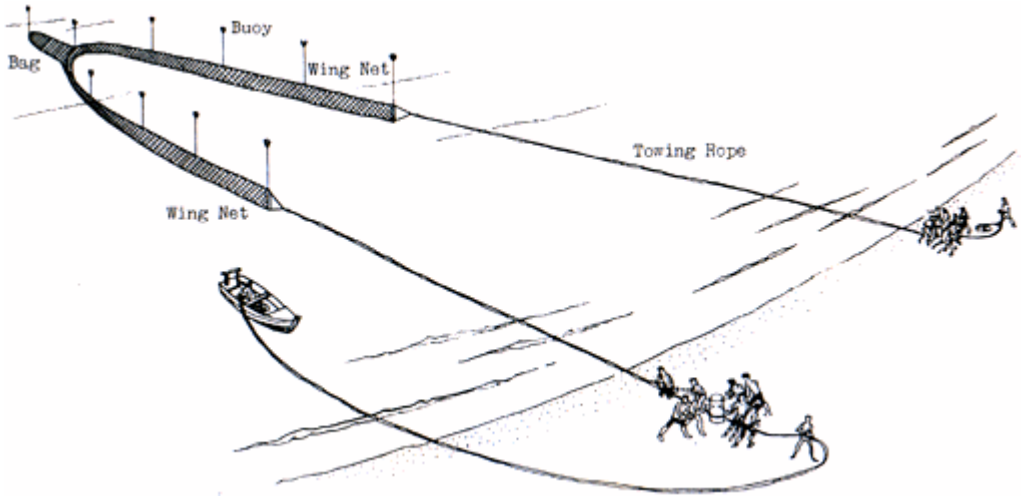
First design was tested aboard a vessel named the Otter. Vessels using this gear are usually called draggers, because they drag these nets across the bottom.



http://www.fishingnj.org/diaotter.htm

Beach Seine Net

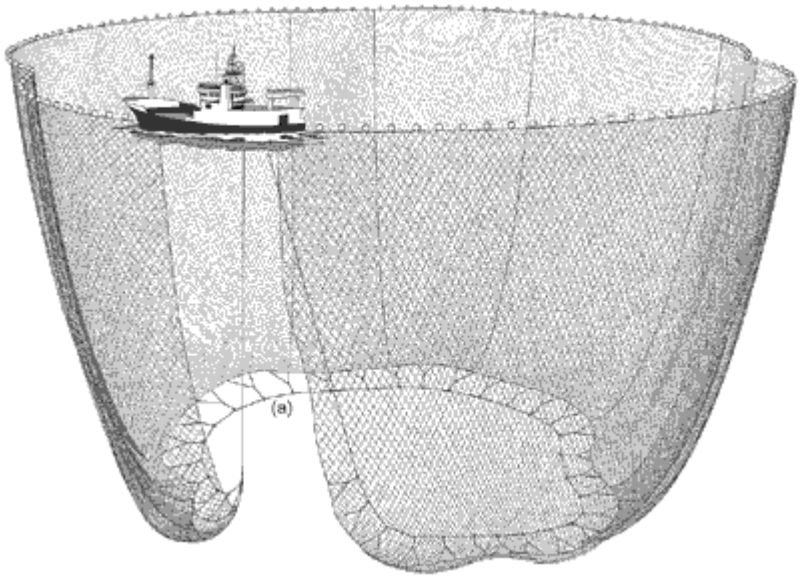
This net is deployed around a school and hauled in on land.



http://www.amita.co.jp/image/beach.gif

Purse Seine

This net is deployed around a schooling species and the bottom is pulled tight, trapping the entire school. Boats using this gear type are called seiners.



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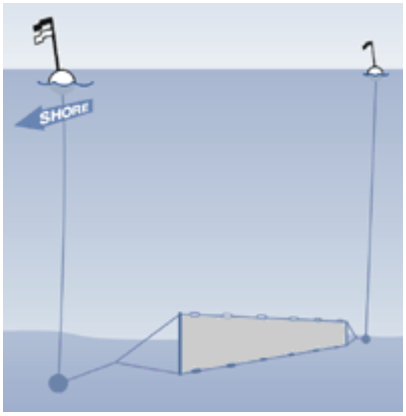
Gill Net

The actual netting material for this net is clear monofilament (plastic) netting that the fish cannot see, so they swim through it and catch their gills in the net. There are different versions of this style.



http://www.seagrant.umn.edu/fisheries/img/bottom_gill_net_sm.gif