

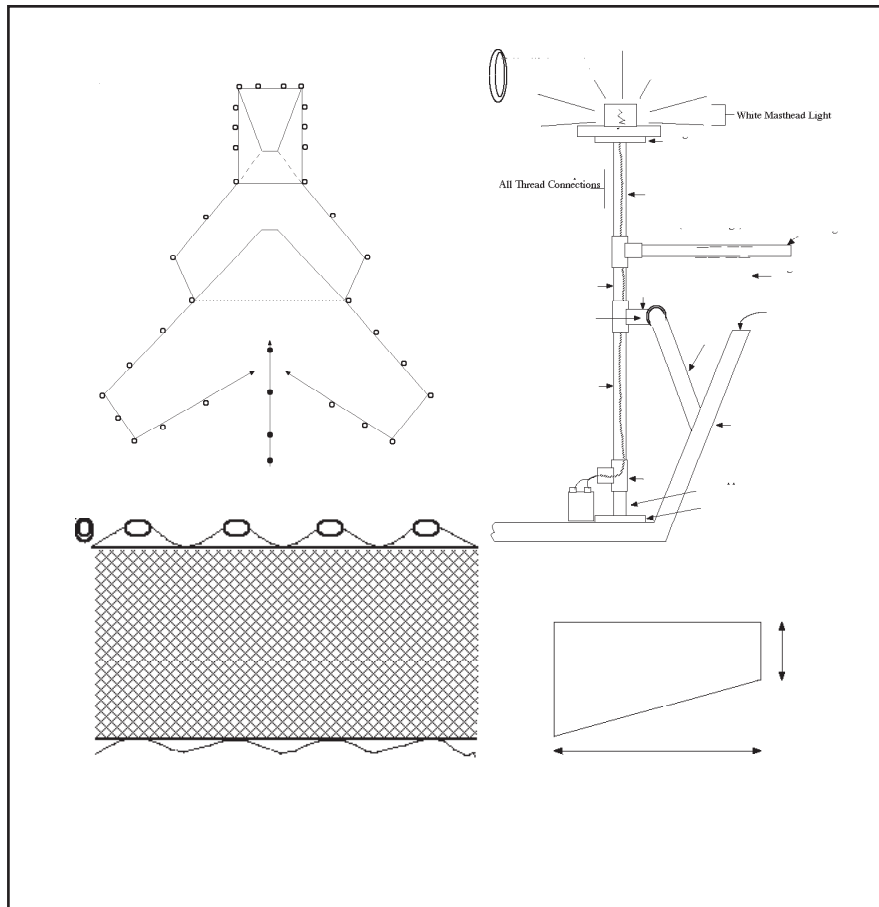
**The Sound School
Regional Vocational Aquaculture Center**

Our Connecticut Shad Fishery

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Text & Diagrams -By: Alicia Cook



Introduction

Shad has always been important to the Native Americans here in Connecticut as well as to the first colonists. After all, it is suggested that it was shad, not menhaden, that was utilized as “fish fertilizer” to increase corn yields. Menhaden is a midsummer arrival to our shores and was easy to catch only after spring planting. Shad was a popular manure, an early form of plant food – fish emulsion which is so popular today, arrived in early spring. It is important to remember that in Connecticut between 1750 and 1800 its agricultural were soils exhausted three times and the great exodus of Connecticut’s farmers to the west was mainly in search of better soil, not more land. The slash and burn agricultural practices were in direct conflict to sustainable agriculture long practiced by native Americans. Connecticut’s soil consists of outwash plain and glacier till and just couldn’t hold up. Shad was plentiful in colonial times, and the late 1700’s much of it therefore was used as fertilizer to sustain the soils. But by the 1700’s shad runs were in decline linked at that time by the construction of the Holyoke Dam in 1849. By 1865 shad catches declined from over fifty thousand at Hadley falls to thirty five thousand, which alarmed the Connecticut legislature. By 1867 a special commission was created by Resolution during the May session 1866 covering “The Protection of Fish in the Connecticut River” that his Excellency the Governor be authorized to appoint two Commissions to consider the subjects “Of the Protection of Sea fish in the Connecticut River”.

The chief reason for concern was the life cycle of shad and other anadromous fish was the need after spending several adult years in the Atlantic Ocean the requirement of returning to its parent stream to spawn producing a new generation that will return to its source. Dams block returning fish thus depriving them access to spawning grounds. The concern at the time was shad was an important source of food for immigrants employed in ever-larger numbers of factories being constructed in Connecticut. The practice of utilizing shad as fertilizer was long gone since gone as now they were prized as food. A scarcity had developed so that the price for a large shad had gone from 10 to 20 cents each were now over a dollar each. (1867) Shad was well on its way to being considered a delicacy before the First World War. Imagine was a dollar per fish then would equate to today’s dollar!

Our Present Shad Fisheries

According to Tom Savoy of Connecticut DEP Marine Fisheries the return of shad into the Connecticut River continues to change. For the period 1976 to 1992 about 750,000 shad returned, some years over a million. The largest return was about 1.4 million shad. More recently however, returns have diminished from about 1993 on to about 500,000 annual returns.

The Commercial Shad Fishery has also declined. In the 1980’s, Connecticut Commercial shad Fishermen captured between 50 to 100 thousand shad. In the 1990’s, 20,000 to 40 thousand. The year 2000, saw a 20,000 fish catch. In 1875 this represented the catch of just on fish trap off Westbrook!

Tom also stated that the State of Connecticut issues less shad licenses each year- the future of or Connecticut River shad bakes is not guaranteed. Many feel sad at the thought of the end of planked shad. Let’s hope that doesn’t happen.

Harvesting Shad

In the lower Connecticut River, Shad was caught by three major gear types the long haul seine, the fish trap and lastly the gill net. Today, the gill net remains the only commercially viable fishing gear as per person productivity and return on investment declined. It also parallels the shad fisheries decline from colonial times to present. The decline in shad, salmon, and other anadromous fish is also indicators of Connecticut's economy. Its generally poor agricultural soils but abundant rivers and streams provided the energy sources to sustain Connecticut's rapid industrialization. The many mill dams of the 1800 and 1900's while providing economic success would prove devastating to runs of shad and salmon. Those same mills powered by the dams that blocked returning fish in search of habitat to spawn produced twine and webbing used to make nets. At one time Connecticut was the largest producer of twine for the fishing industry, Willamantic and Norwich became centers for the manufacturer of linen and cotton twine used in the capture of shad in the lower Connecticut River. [My interest in fishing gear concerns the gear designs, the actual planning and construction of the gear. That interest led to the construction of fishing net models some of which form part of the shad exhibit you see today.]

History of the fishing gear utilized to catch shad in the Connecticut River. A reprint of George Brown Goode's U.S. Fish Commission Reports 1884-1887 of the Fisheries and Fishery Industries of the United States provides an excellent review of the shad fisheries in Connecticut. Alicia Cook, Sound School Communications had reproduced the text of the sections relating to shad fisheries with tables and charts.

Long Haul Seines.

This gear type the earliest used to capture shad was employed in the lower Connecticut River. The design plan for a Connecticut River seine. I have not been able to locate. As gear designs were held by the fishing company and or family they most likely were discarded decades ago. It is unlikely that a net plan for one of these Connecticut River shad seines will ever be located. A fishing gear manual, which details similar shad seines, was given to me by the Wilcox family in Stonington in 1978. The Linen Thread Company gear manual does provide a good design for a similar long haul seine.

“The seines of the 1880’s were constructed of cotton fine yarns twisted into heavy cotton twine. Cotton was the preferred material as it had great strength even when wet. The length of these seines was 2000 feet in length and commonly divided into three main sections. The wings or arms the quarters the bunt, and an optional bag at center of the bunt.

The seine is used to drag or encircle fish within the sweep of the net. Nets can be set from shore or a boat to encircle fish and hauled back to the beach or shore. They were often tapered to adjust to the deeper set in the middle “bunt” and wings were less deep and of thinner twine which made setting easier and was less resistant to drag in the water when hauling back.”

Seines typically required dense fish concentrations to make them cost effective, the cost of seines even by today’s standards were huge and required a large crew to fish it. Fishing companies were paid on a share basis with two nonworking or capital shares to the owner. Each person had to work to earn a share – a practice that still exists in the fishing industry today. If a share owner couldn’t work, they might find someone to split the share or hey would be forced to sell it – a value usually determined by the past fishing season.

As the catch dwindled, seines quickly became too expensive and George Goode mentions this regarding the haul seine at Griswold’s Pier (Presently Old Lyme). In 1845 the operation returned over 10,000 shad but by 1869 only 1,500 shad were caught. He adds “As long as thirty years ago the catch from each pier averaged 20,000 shad, but of late years the annual yield has gradually decreased, and if falling off continues, a few years more will see these fishing piers given up”.

Find they were – It was estimated that by 1900 the haul seine operations had ceased. The remnants of these fishing piers remain however, marked on local charts as hazards to navigation. If someone had the time, the answer as to when the last haul seine operation took place will most likely be found in copies of the Old Lyme Gazette, the local newspaper that covered the local fishing industries in great detail. References can be found regarding haul seine operations in Middletown in the 1940’s.

The set begins (A) as the boat crew pays out the wing walls, the quarters and bunt set (B), and haul line run back to fish pier (C), wing walls hauled one at a time and seine is slowly drawn to the pier (D). Haul complete, fish are dipped up after the seine is dried up (E) – by hauling the footrope under the float line. The seine was most likely drawn opposite the Pier by the flooding tide. The pier would have created a substantial back eddy assisting in the hauling process. It was common to have a mechanical winch for the haul lines, a modified capstan with four handles – accommodation 8 people, one pushing, one pulling one each handle. Goode describes this process very clearly. An easy description of a seine is a sock split halfway with each cut side drawn apart with the still intact section where the shad would be “dried – up” and dipped netted into small scows or skiffs for boxing and shipment. This fishery was not easy. Not only did the net have to be set by hand, but also hauled. I’m certain that strong currents ruined many a set. I’m sure that the seines didn’t haul clean, that seaweed, eelgrass, sticks and other debris was a constant challenge that had to be cleared before the next set.

Modern Seines.

Seines are still used today, but on a much smaller scale. The most common and familiar on many Connecticut beaches is the minnow or bait seine. Although smaller and of simpler design the principle remains the same. To circle, enclose and draw up to the shore fish (in this case bait) fish trapped in this wall of netting.

The Fish Traps

Three types of fish traps were utilized in the Connecticut Shad fishery. Traps, pounds and to a lesser extent fykes. Models of each can be found in the exhibit. Again good historical information can be found in George Goode and the Connecticut General Assembly report of 1867 as well as other sources.

Traps are a passive fish gear – as compared to the labor intensive or active long haul seines mentioned earlier. They depend upon the tides and movement of the fish themselves to be effective. Traps for anadromous fish were not new to the early European settlers. Native Americans had long developed similar technologies. The first Governors of the Virginia Colony sent to England detailed drawings of the fish traps in use by Indian tribes in Massachusetts, Rhode Island and Connecticut. The largest Native American fish trap ever discovered lies underneath the Boston Public Library in the Back Bay section of Boston. It was a huge fish trap consisting of wood poles placed close so as to hold Brush forming a wall similar to mesh nets and was several acres in size. Traps also had a huge initial investment but could be far more remunerative.

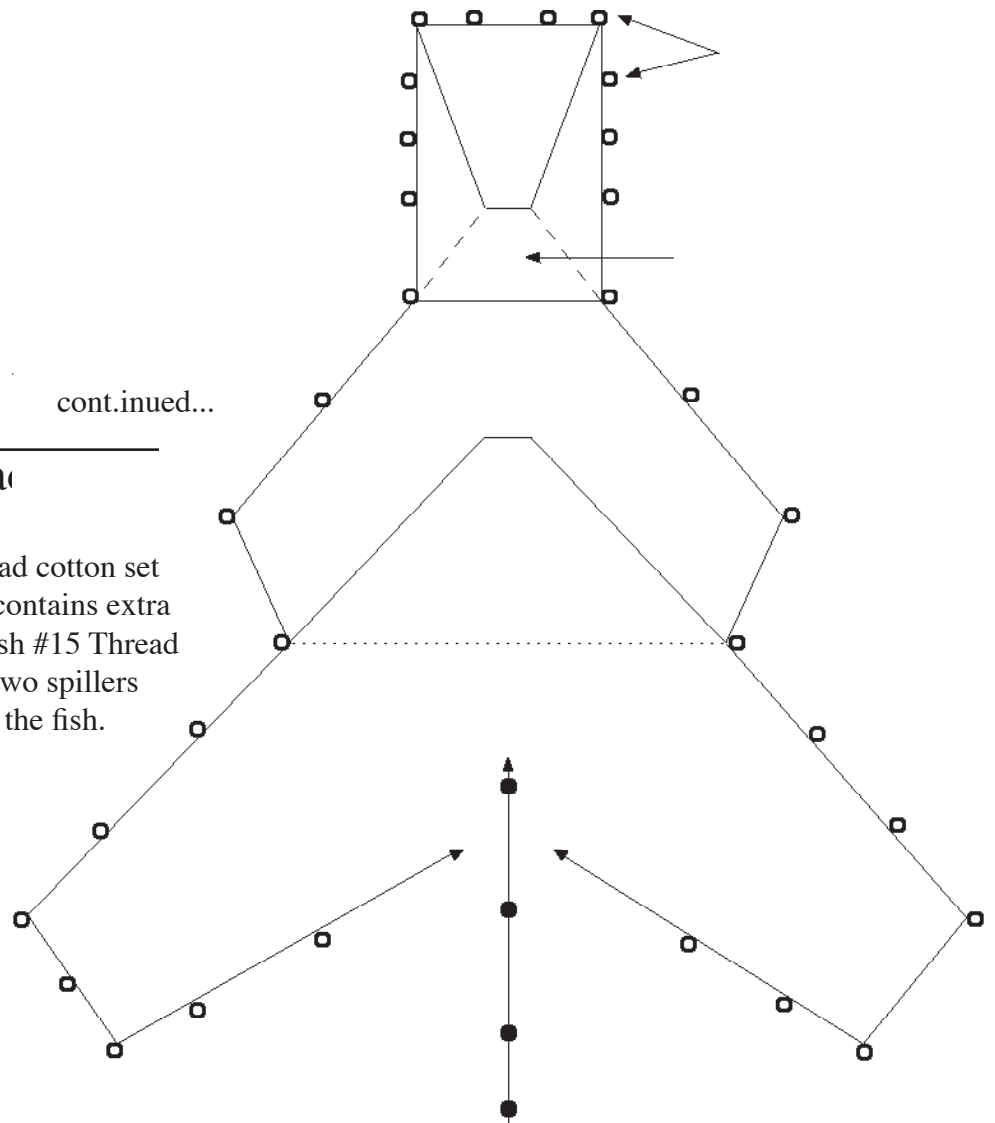
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American Linen Threa

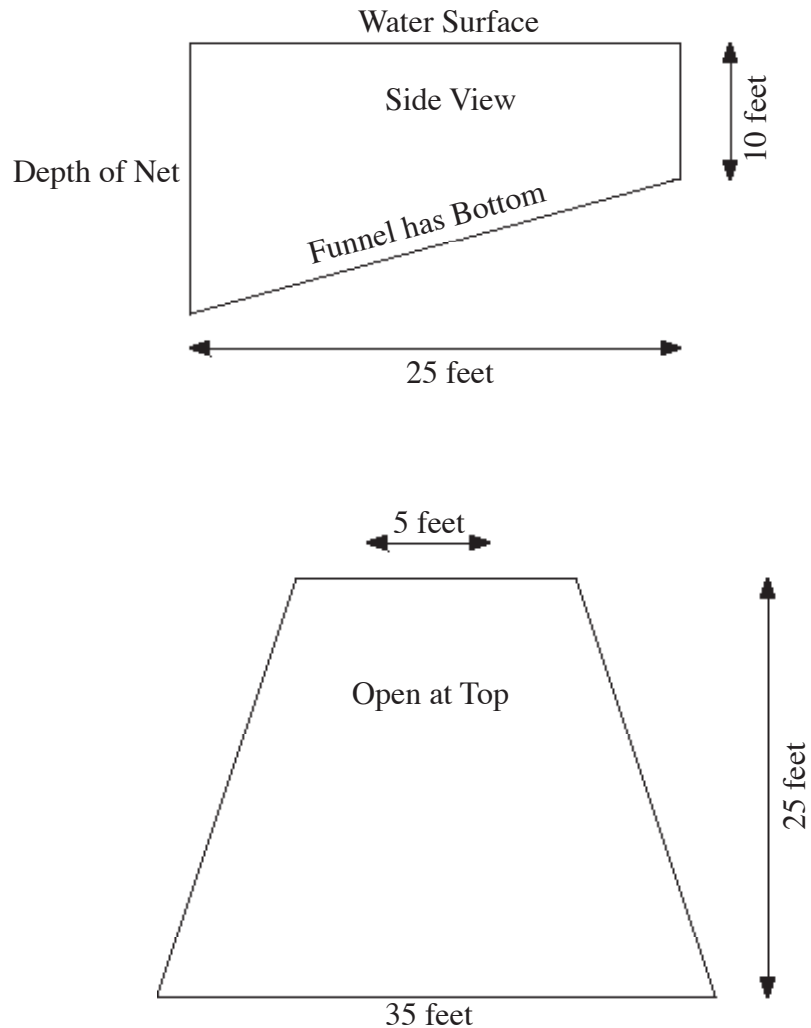
Pound walls 2.5", mesh #15 Thread cotton set to depth of water, Pound bottom contains extra slack web to reduce stress, 2" mesh #15 Thread some traps in heavy catches had two spillers on each side of the pound to hold the fish.

Pound open at surface, but has web (net) bottom.

Funnel 35' wide tapers 5' at opening. Also funnel at pound bottom 25' long and is kept 10' deep from surface.



Funnel Details



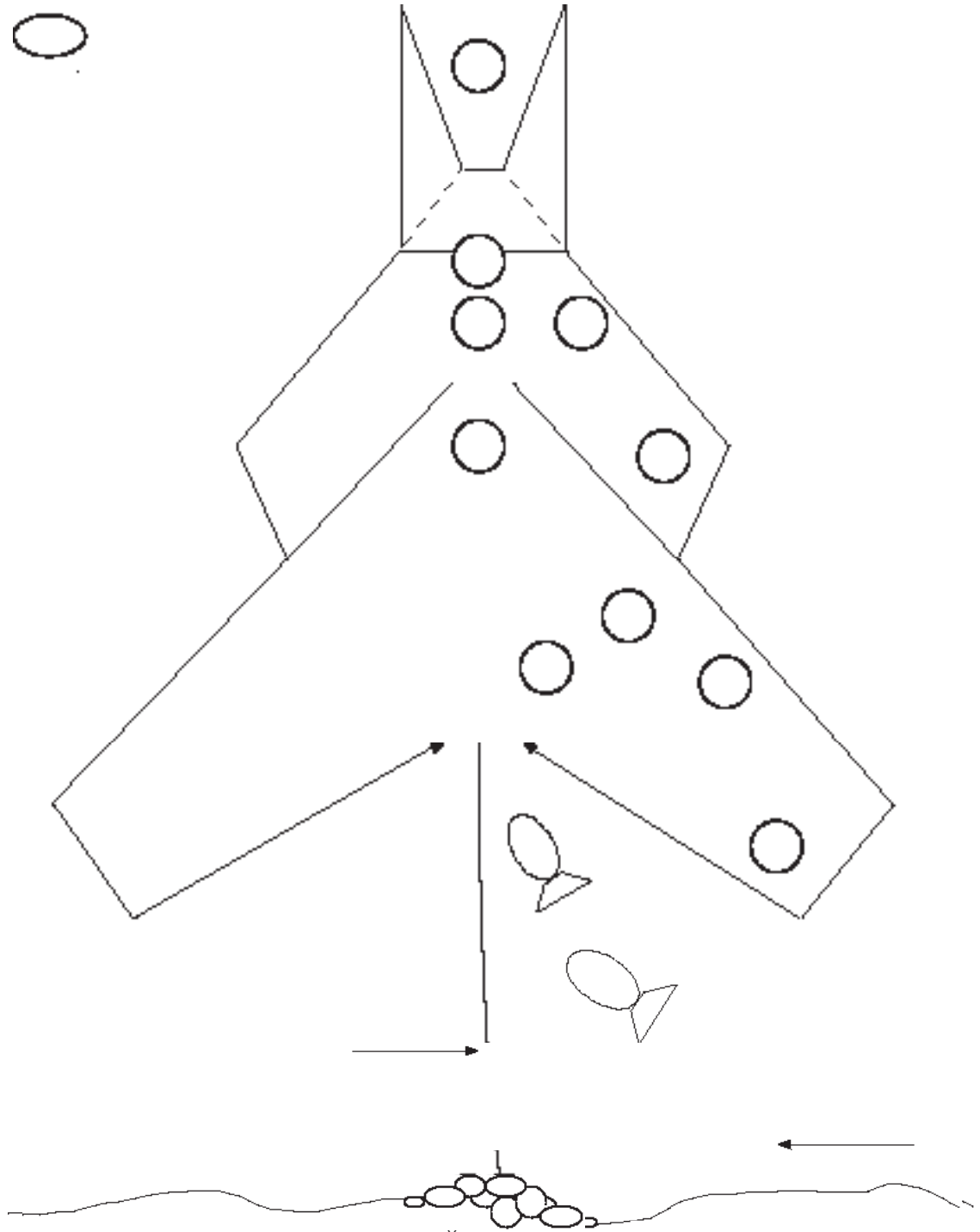
Small Heart - Wall: 6 inch mesh, 18 thread cotton, Hung by 1/3, 135 feet total each side

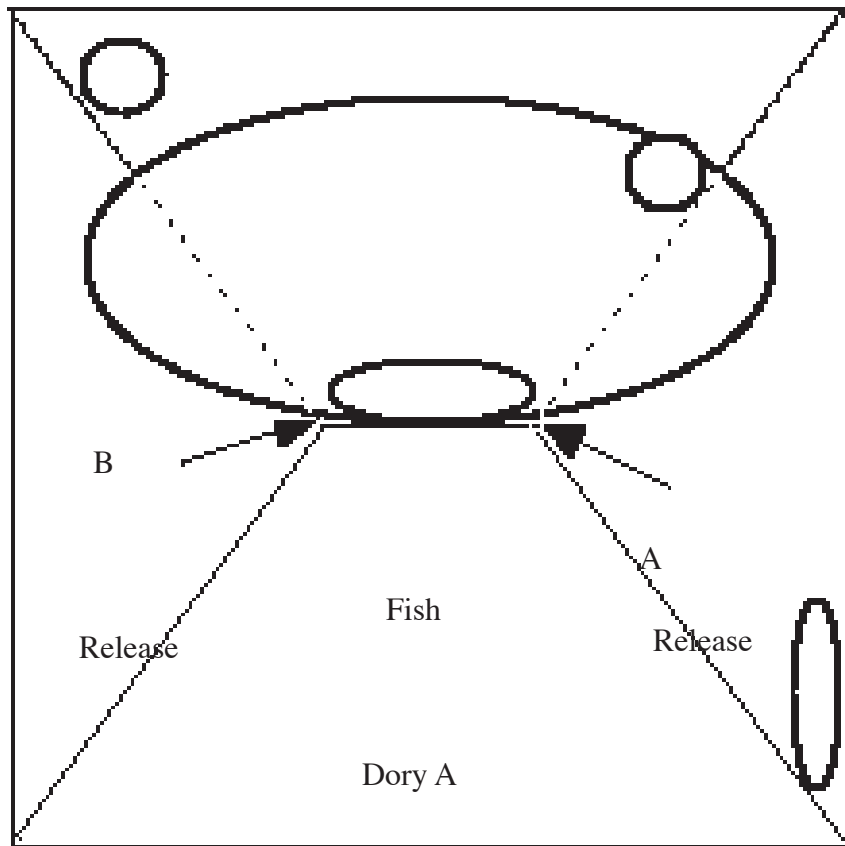
Large Heart - Wall: 8 inch mesh, 18 thread cotton, hung by 1/3, 185 feet total each side. Note: 50 of large heart becomes a wing into the small heart

Leader - Depended upon location, usually 200 fathoms / 1,200 feet, could be shorter, 10 inch, 21 thread hung by 1/3.

Capture Details

- 1 Fish enter the trap mouth, hit heart wall
- 2 Can swim toward shore
- 3 Or seaward
- 4 Redirected further into trap
- 5 Hit inner heart wall
- 6 Seek way out
- 7/8 Redirected into pound through funnel
- 9 Captured in trap
- 10 Caught in pound





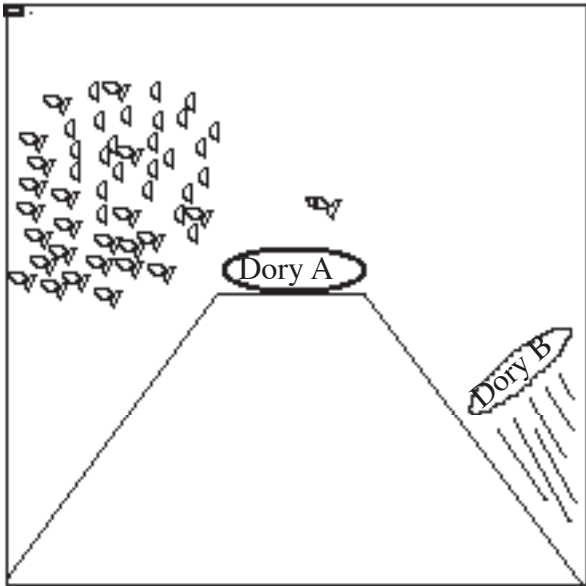
Dory A unties funnel lines and hauls funnel mouth aboard closing the trap.

Dory B

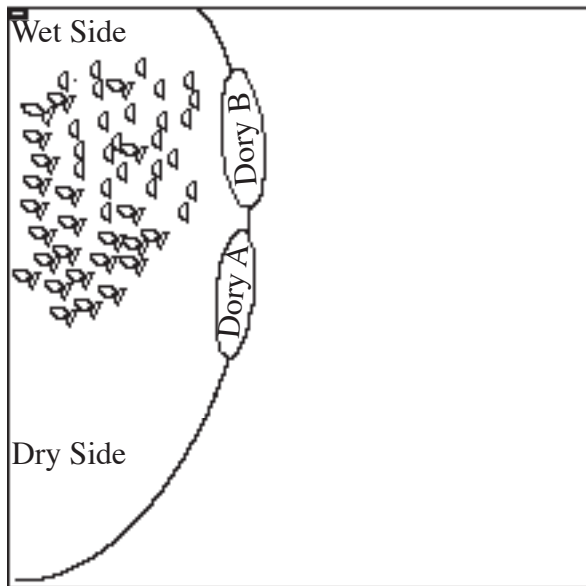
As dory B hauls the trap floor it is released causing the dory to ripple towards the other side of the pond.

Once the fish are pocketed, they can be dipped out with circular nets on long poles. (Not unlike giant blue crab capture nets used today)

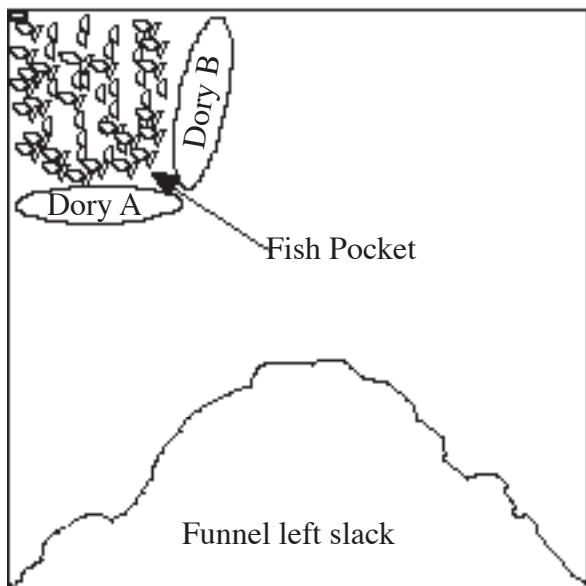
Once the trap was emptied the funnel lines reset and tied with tension to hold shape of the funnel.



Dory B under hauls the floor scaring the fish to the opposite side



Dory B clears midpoint and Dory A begins to release funnel as the “Dry Side” of the pond surfaces



Dory A& B join and continue to “Dry” the fish in the wet end. When fish break water meshes are gathered and tied off. This forms a pocket.

The trap is ready to “fish” until hauled. Advantages of the trap include larger catches, longer season (A trap could be fished for about two months then hauled quietly cleaned and dried)

Small undersize fish can be returned alive and closed season monitored. Disadvantages include storm & wave damage, seaweed and jellyfish (In fact those bothersome red stingy jellyfish have long plagued our shore. Mr. Challer writes about the 1878 pound fishing season that so many jellyfish were in the traps their weight (resistance) carried entire traps including all the poles away!

Fyke Nets

A fyke net is a static type of fishing gear, usually placed near bays, rivers, and other inshore areas. Essentially a small trap, the fyke is simply made of nylon webbing and wood, steel or Fiberglass. Like other static—or passive—fishing gear, fykes are fuel-efficient, easily managed, and able to make quick use of technological advances. Among these other advantages, if rough weather or other problems prevent the ideal daily trip to the trap, the catch remains alive and unspoiled in a fyke.

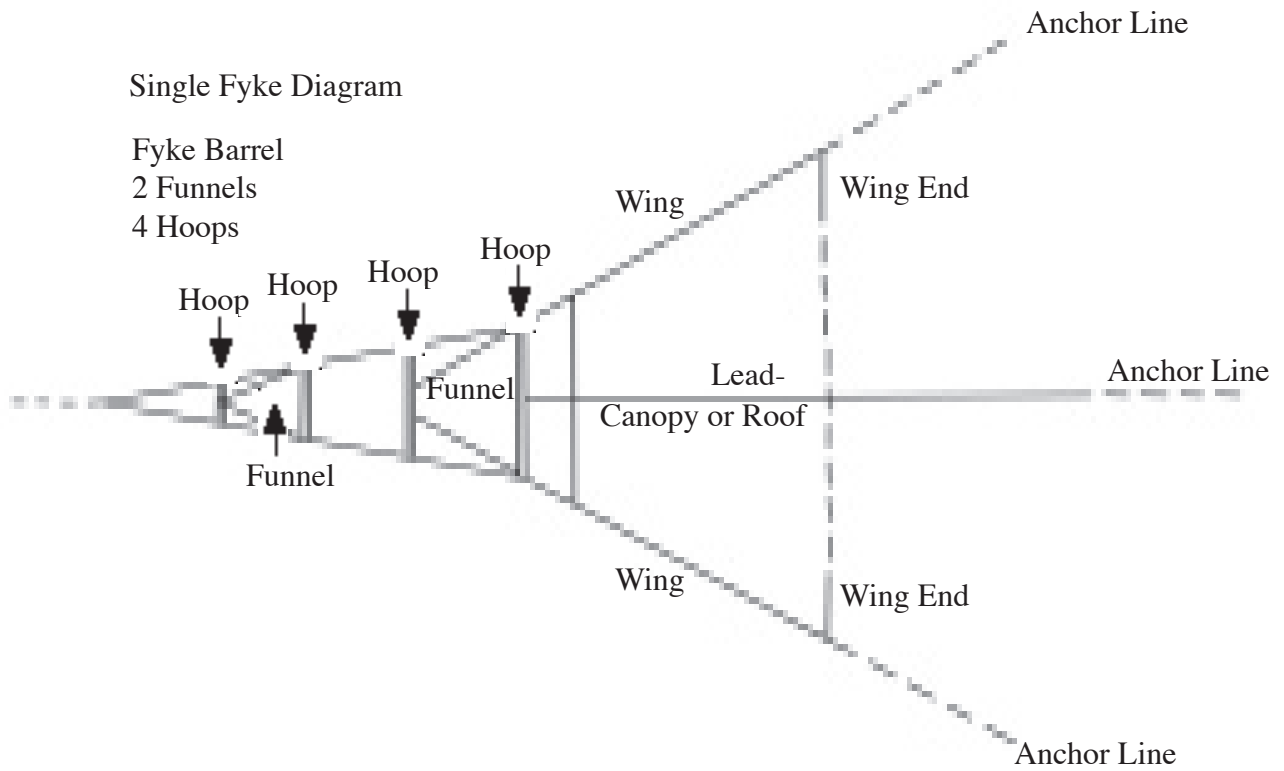
Thought to have been created by the great fisherman of Norway and Denmark, the fyke net (a Viking Term) was introduced to the East Coast of the United States late in the last century. In Maine, it was used extensively for eels. In other areas, fykes were modified to capture flounder in coastal areas and white perch in rivers and streams. In the Old Saybrook area and in the coves in Essex shad were captured in fyke nets.

At the turn of the century about 50 fyke nets were set at Mystic and Noank, Connecticut, to fish for sea bass, cod, bluefish and flounders. The fykes were set as soon as the ice broke in the spring, and used until August. In October the fykes were set again; this time, they stayed in place until early winter.

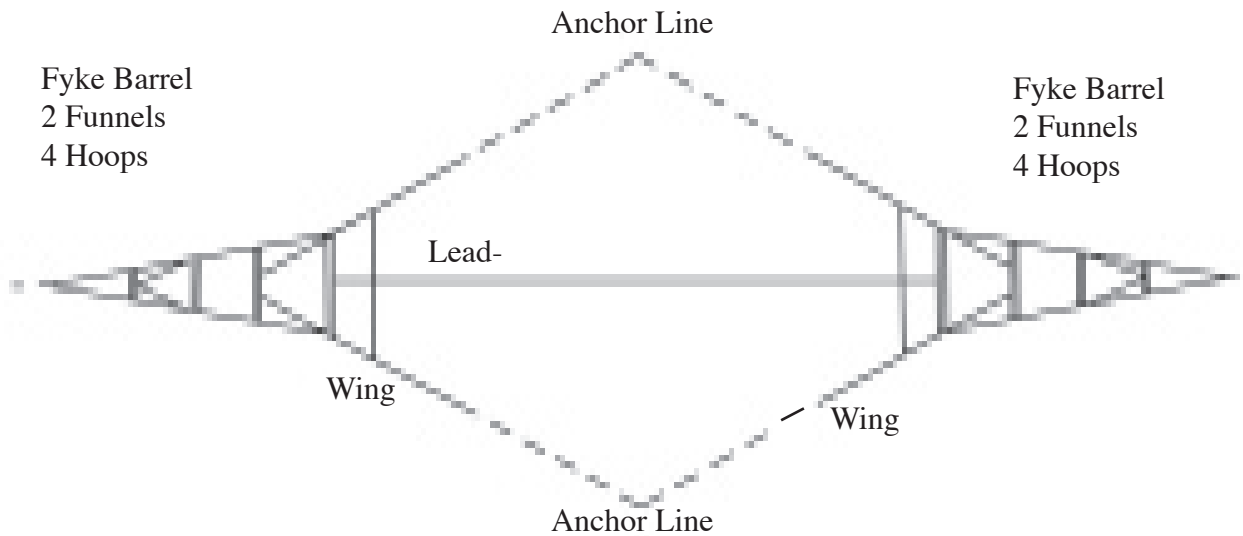
Fyke nets comprise just three distinct parts: the leader, the barrel, and the wings. The leader acts as the name suggests, guiding fish into the fyke barrel. Two throats trap fish between hoops of the fyke barrel. The size of the meshes within the webbing determines the size of the fish retained. Small fish can escape through the meshes. The barrel is made of round hoops of wood, galvanized steel, or cut Fiberglass; of these, Fiberglass holds up the best but is the most expensive.

Fykes are fished in anywhere from 10 to 50 feet of water. A weighted line (leadline) keeps the leader on the bottom; evenly spaced floats attached to the leader and wings allow the fyke to fish. Anchors keep the fyke stationary and below the surface.

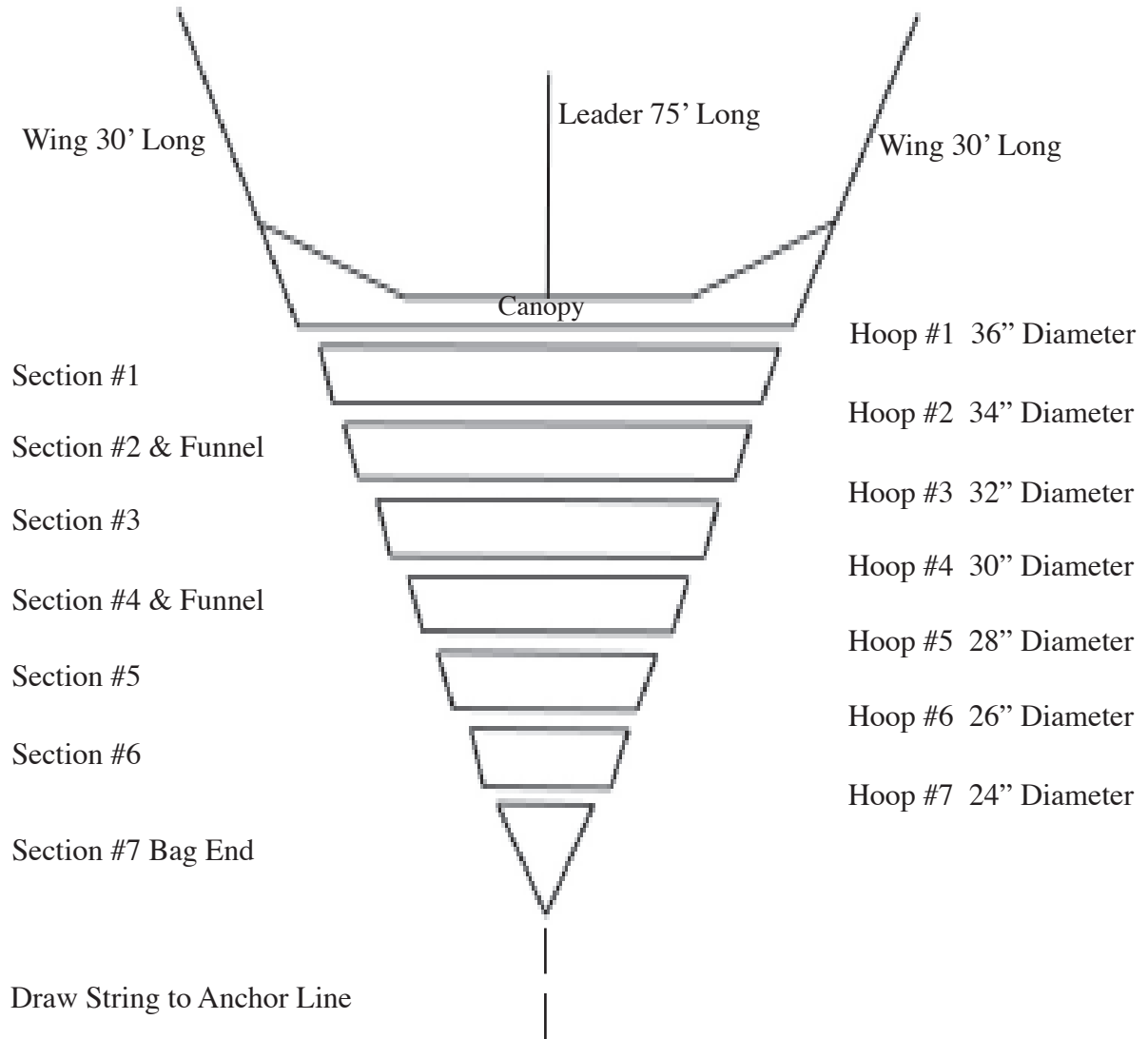
Fyke Net Configurations



Double Fyke Diagram



7 Hoop Fyke Net Diagram



Gill Nets

Although the gill net is among the oldest types of fishing gear, its versatility explains why it remains popular today. The basic design of this passive gear is simple: when set or placed in productive fishing areas, the nets capture and hold individual fish in a sheet of webbing until the web can be hauled or checked. This webbing is usually set and hauled by means of top and bottom lines, to which it is secured. By selecting a particular size of stretched mesh, fishermen can determine which size fish will be caught by the web. Fish swim into the mesh easily, but are “gilled” and cannot escape.

To be sure, the gill net has undergone some changes. The basic gill net design - essentially an underwater barrier, or fence-has evolved differently all over the world, and distinct design types can be found as one travels from place to place. Even within a given fishing ground, variations in the design of gill nets allow fishermen to fish for either bottom or surface species of fish as well as those who dwell in the middle waters. Gill nets are used by both large-scale fishing operations in tandem with hydraulic fishing equipment, and by small-scale operations using small rollers and chutes. In the United States, gill nets can be found on both coasts as well as in inland waters; they are equally well suited for both environments.

But all gill nets have some common features: they are selective, portable, and easily rigged, regardless of the fishing grounds. Though some states forbid gill nets and most require licenses for commercial gill net fishing and have restrictions regarding season, area, and the type and size of gill net allowed, the method remains popular among United States fishermen. The gill net is a fuel-efficient and flexible fishing gear, and continued design improvements virtually guarantee that gill nets will be used well into the future.

Setting and Hauling the Shad Gill Net

The shad gill net like other gill nets captures fish in a flexible frame of mesh. Gill nets are set in areas known to produce good catches, called reaches. Nets are allowed to drift with the river currents and at night fish run into the mesh wall becoming gilled (hung at the gill plate).

The gill net mesh is very fine, 69 tex one of the thinnest twines utilized to capture fish. It's strong but because of its small diameter it will break. The thinner the twine, the less “noise” it makes in the water and thus catches greater numbers of fish.

If you touch the 69 tex gill netting, you will see just how fine the twine is. However, thin twines tangle more readily and require great care in handling. Just dropping the net could cause snarls and several hours of frustrating time to straighten it out. Once set the net would “drift” for a period of time. The water lights marked the night in the hopes that river traffic would avoid it.

My first experience with shad fishing is during the early spring 1980. A spring freshet had created an early run. It was cold and windy. That is the night I learned all about tugs borges, oak leaves, trees and sticks. One leaf stem could foul several feet of our 1,000 foot gill net.

At one point, Lucien who was fishing at the time “I was just a guest” said we were not in the fish business were the business of removing sticks from the sea. It was hard, cold, work.

Report of the Commissioners Concerning the Protection of Fish in the Connecticut River, &c. to the General Assembly, May Session, 1867

This report is now available through The State DEP Marine Fisheries in Old Lyme, the Connecticut Sea Grant at The University of Connecticut at Avery Point, and through us here at The Sound School Regional Vocational Aquaculture Center in New Haven. This report details many of the concerns of the General Assembly and Fish Commissions of 1867. Specifically, this report explores related topics including: the protection of sea fish (shad and salmon) in the Connecticut River aligned with the restriction of available fishing days and gear used, the introduction of new varieties of fresh water fish and the stocking of Connecticut water ways, the development and life cycles of shad and salmon, issues of contamination and pollution of water ways, and provisions for interstate communication concerning the preservation of natural fish and water resources.

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