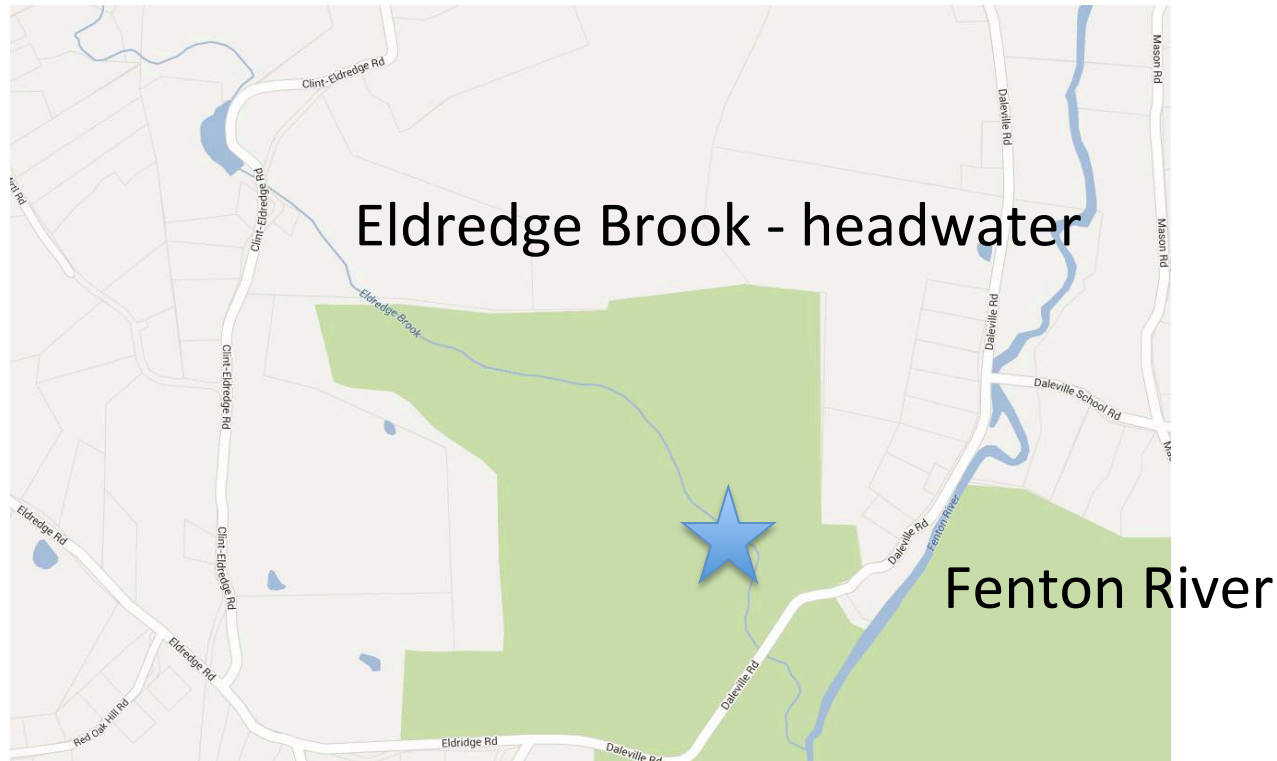


Species Diversity in Eldredge Brook

- Assignment Due Monday June 16th



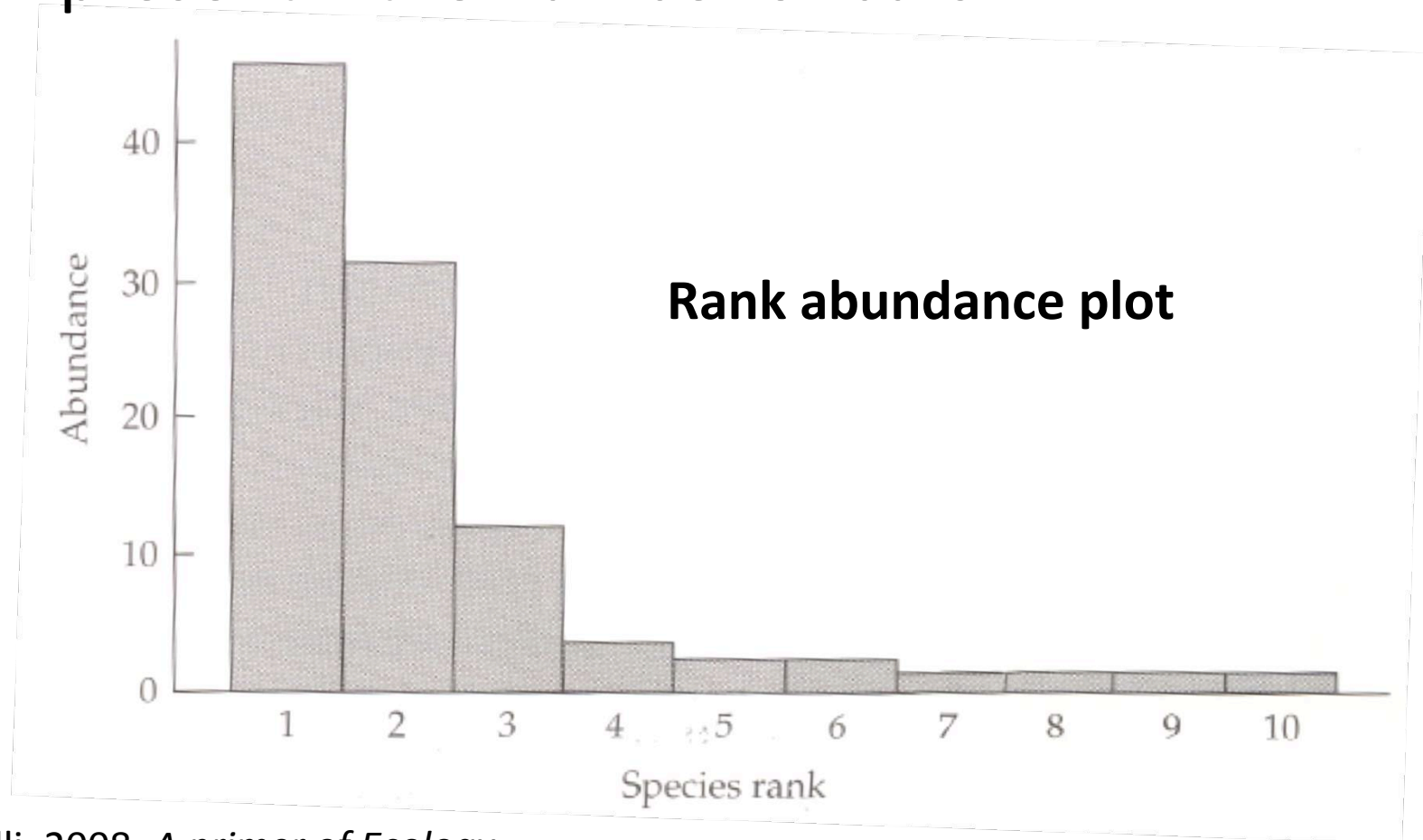
How do we measure species diversity?

- **Species richness** – the number of species present

<i>Ant species</i>	<i>Number of individuals collected</i>
<i>Aphaenogaster rudis</i>	45
<i>Formica neogagates</i>	32
<i>Myrmica punctiventris</i>	12
<i>Myrmica sculptilis</i>	3
<i>Formica subsericea</i>	2
<i>Stenamma impar</i>	2
<i>Temnothorax longispinosus</i>	1
<i>Lasius alienus</i>	1
<i>Lasius umbratus</i>	1
<i>Prenolepis imparis</i>	1

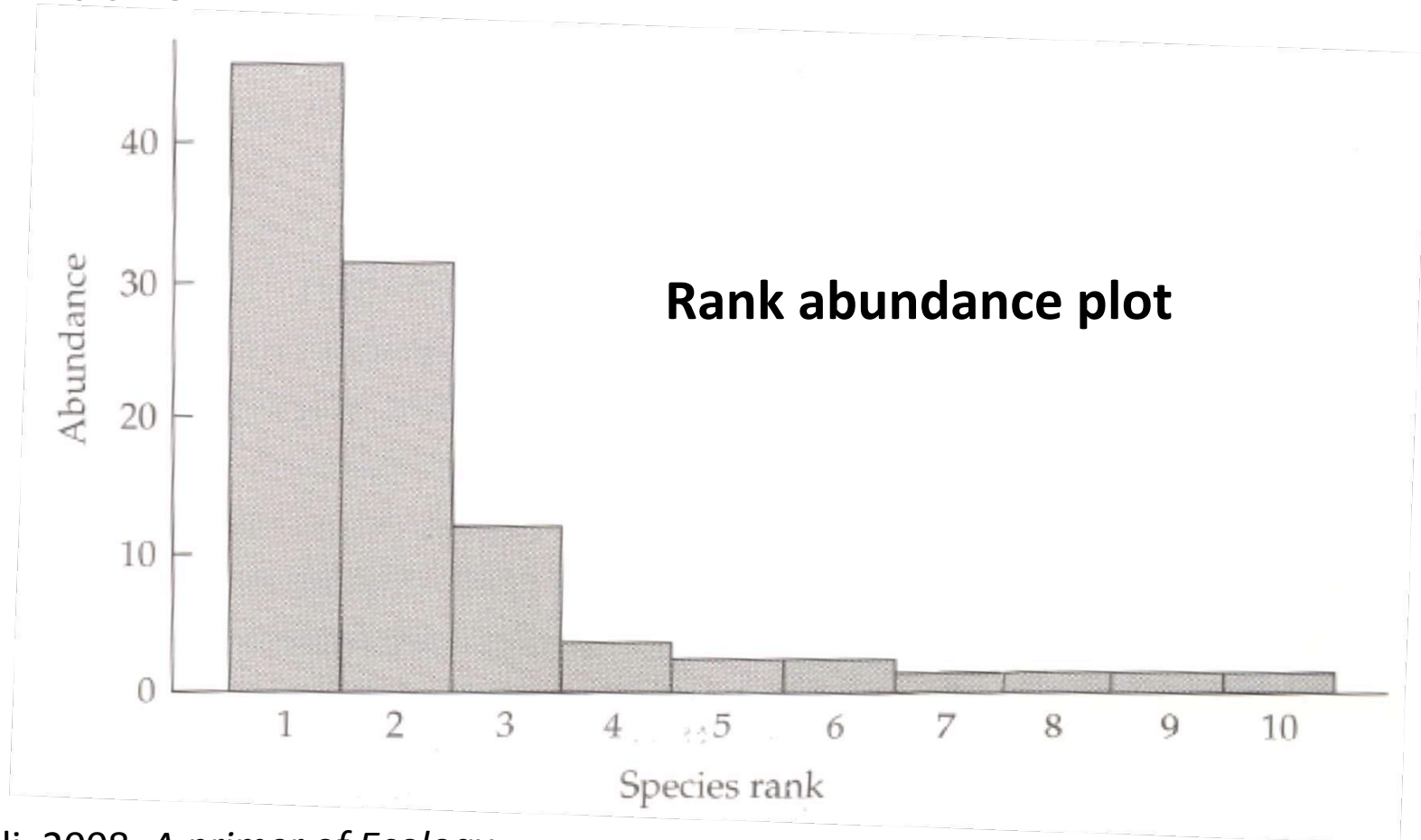
How do we measure species diversity?

- **Species richness** – the number of species present = the number of bars



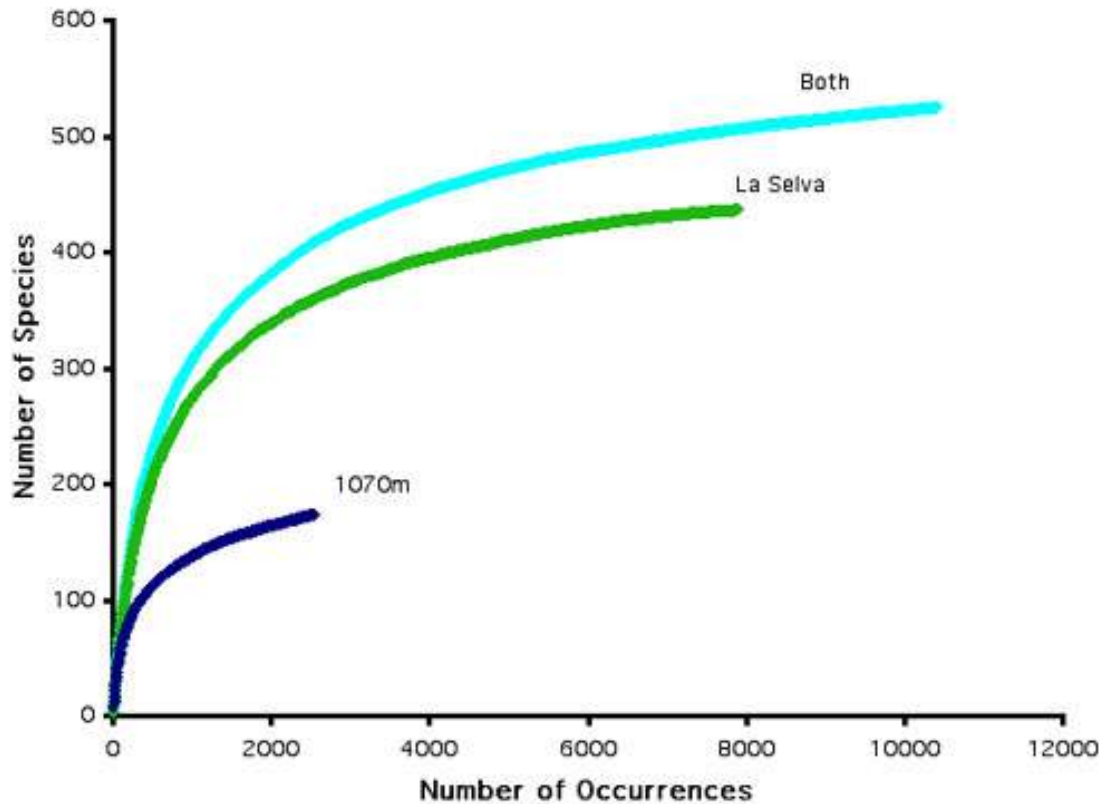
How do we measure species diversity?

- **Species evenness** – the relative height of the bars



How do we measure species diversity?

- Species richness depends on sampling effort



Species accumulation curve

Connecticut Fish Diversity II

June 13, 2014

Salmonidae are salmon, trout, char

Atlantic salmon

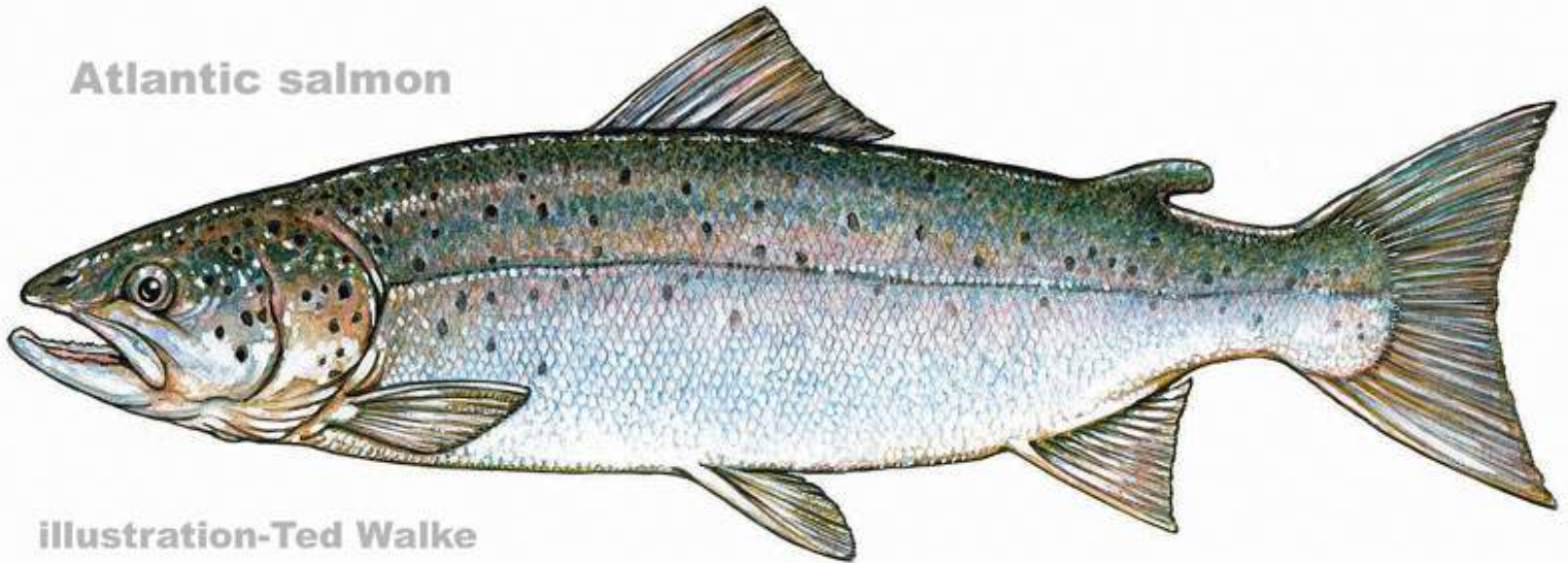
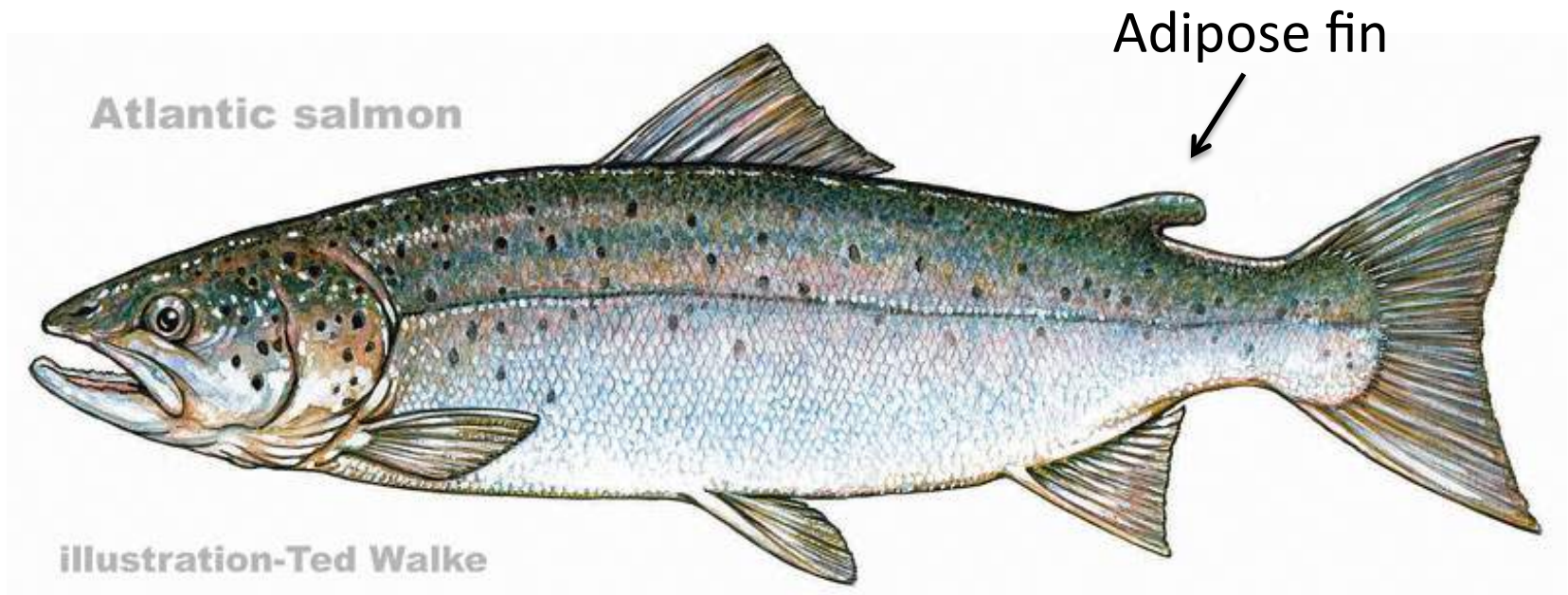


illustration-Ted Walke

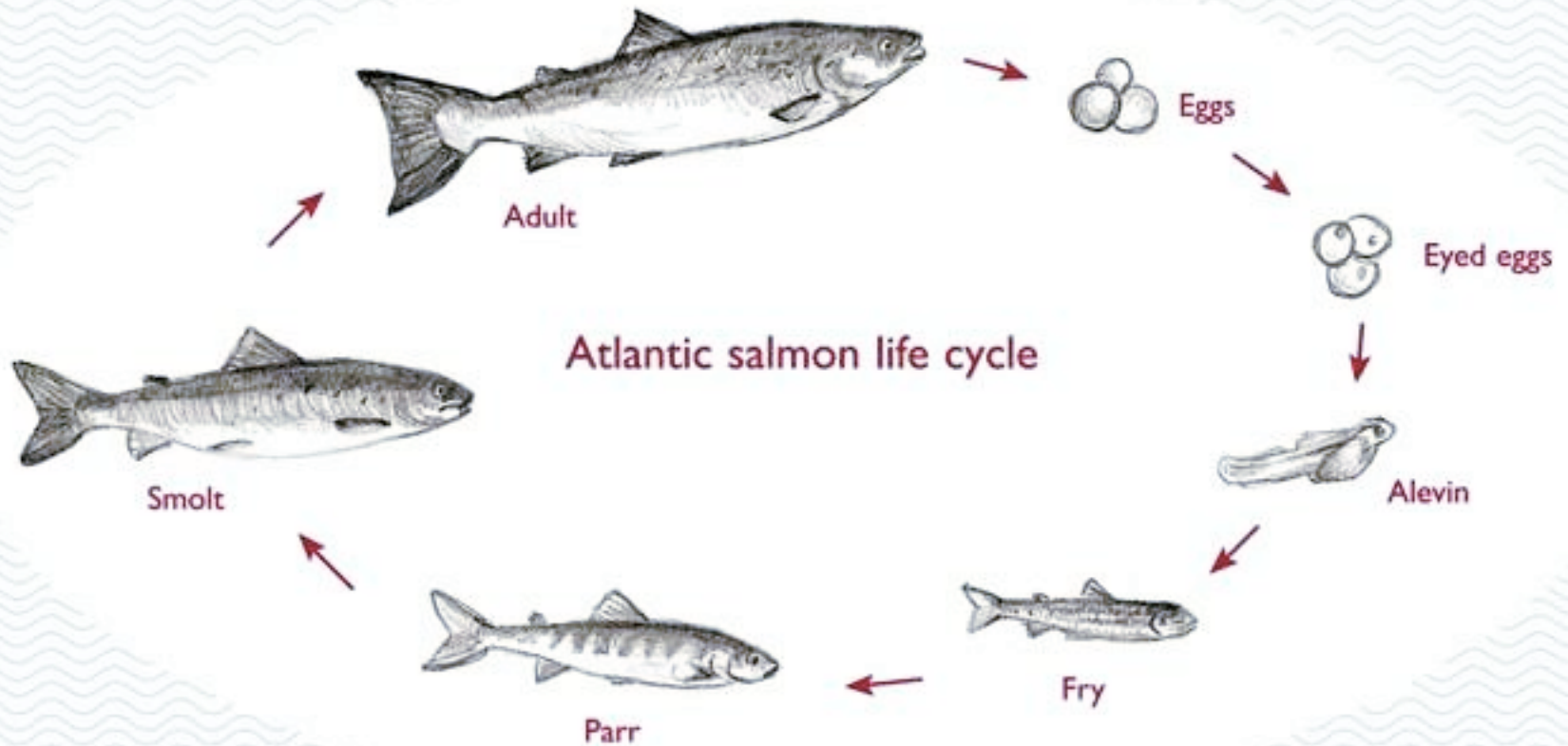
Salmonidae are salmon, trout, char

- No spines
- Small scales – feel smooth
- Streamlined shaped
- Single soft dorsal fin
- Adipose fin
 - A fleshy fin behind the dorsal fin

Salmonidae are salmon, trout, char



Typical salmon life cycle



Connecticut Salmonidae

- Atlantic Salmon (*Salmo salar*)
 - Anadromous – migrate up larger rivers in CT
 - Severely depleted – native runs became extinct in mid-1800's but were reintroduced in 1950's
- Brown trout (*Salmo trutta*)
 - Native to Europe, but widely distributed
 - heavily stocked
 - Some naturally reproducing populations
 - TMA's
 - Some “sea-run”

Connecticut Salmonidae

- Brook trout (*Salvelinus fontinalis*)
 - Native
 - Some stocked but seldom survive summer temperatures



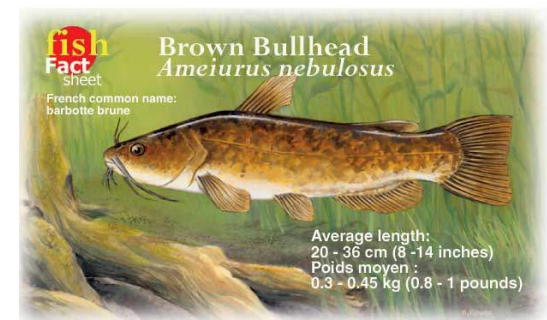
Brook trout
parr

CT *Salmonidae* habitat preferences

- Prefer cold, clear water, with high oxygen
- *Brown trout* are more tolerant of higher temperature and lower oxygen than *brook trout*
- Wild *brook trout* exist only in headwater streams, where water is cold and cover is high

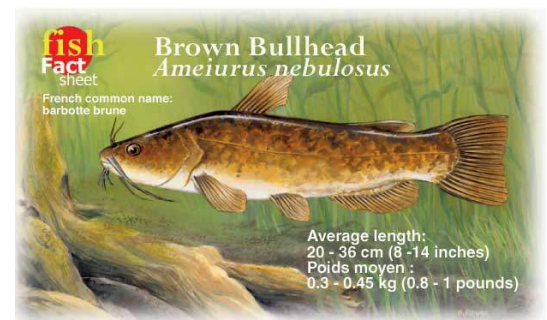
Ictaluridae are the catfishes

- **Ictaluridae** are the “North American” catfishes and they are entirely freshwater.
- Flattened head, wide mouth
- 8 chin barbels
- Scale-less
- 1 stout dorsal and pectoral fin spines
- Single dorsal fin
- Adipose fin



Ictaluridae are the catfishes

- Benthic – bottom feeding
- Use sensitive barbels to feel for food
- Venom glands at the base of spines
 - May cause mild pain if stabbed



Connecticut *Ictaluridae*

fish
Fact
sheet

Brown Bullhead *Ameiurus nebulosus*

French common name:
barbotte brune



Average length:
20 - 36 cm (8 -14 inches)
Poids moyen :
0.3 - 0.45 kg (0.8 - 1 pounds)

Connecticut *Ictaluridae*

- Introduced channel catfish and white catfish are not as widely distributed



Channel Catfish
Ictalurus punctatus

White Catfish - *Ameiurus catus*



- Often found in larger rivers

Esocidae are the pikes and pickerels

- Slender, torpedo-like body
- Sharp teeth
- Posterior dorsal fin
 - Fast-start, lurking predators



Chain pickerel (*Esox niger*)

Esocidae are the pikes and pickerels



Redfin pickerel (*Esox americanus americanus*)



Northern pike (*Esox lucius*)

Fundulidae are the killifishes

- Marine, estuarine and freshwater species
- *Fundulus diaphanus* – banded killifish - is the only all-freshwater killifish in CT.
- Small, schooling fish
- Prefer shallow, still water lakes and ponds
 - Found over sandy bottom, near vegetation



Passive Capture Techniques

Passive gear is not actively moved

- The behavior of the fish results in capture
- Fish must:
 - Encounter gear
 - Be caught by gear
 - Be retained by gear
- Must overlap with fish in time and space

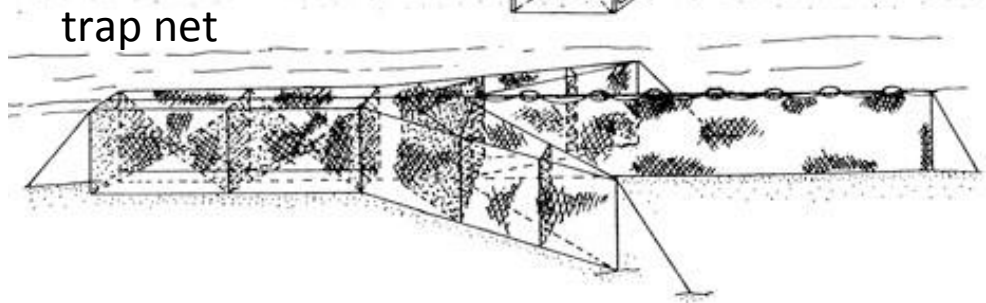
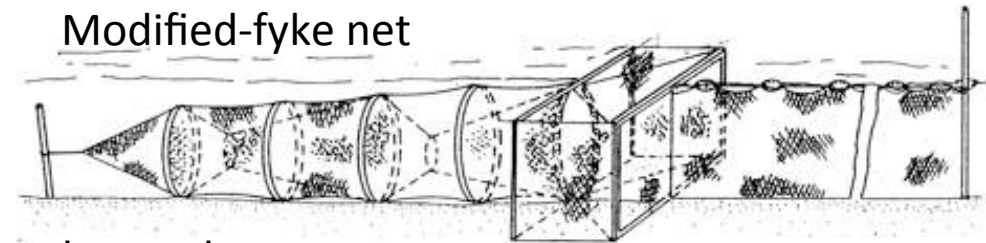
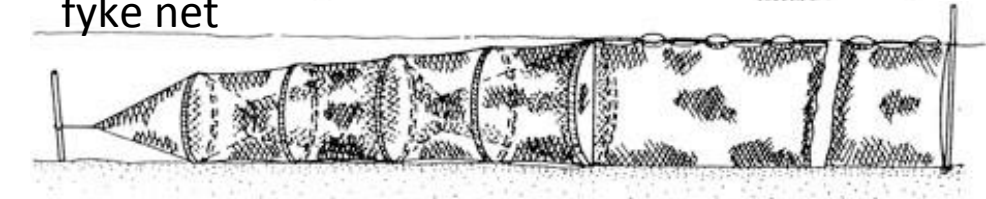
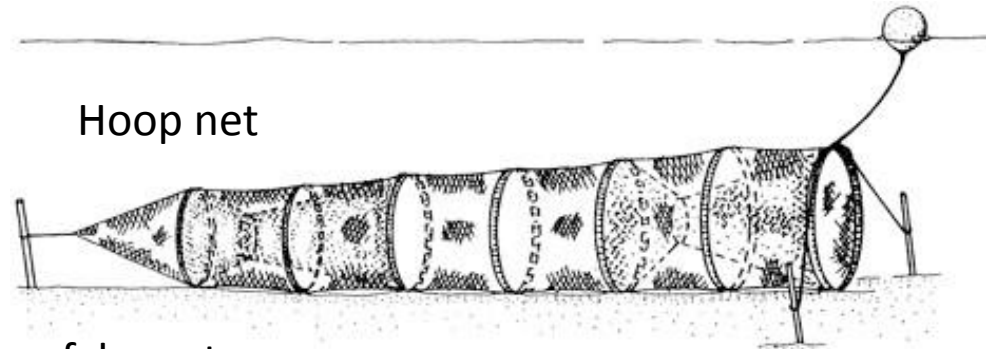
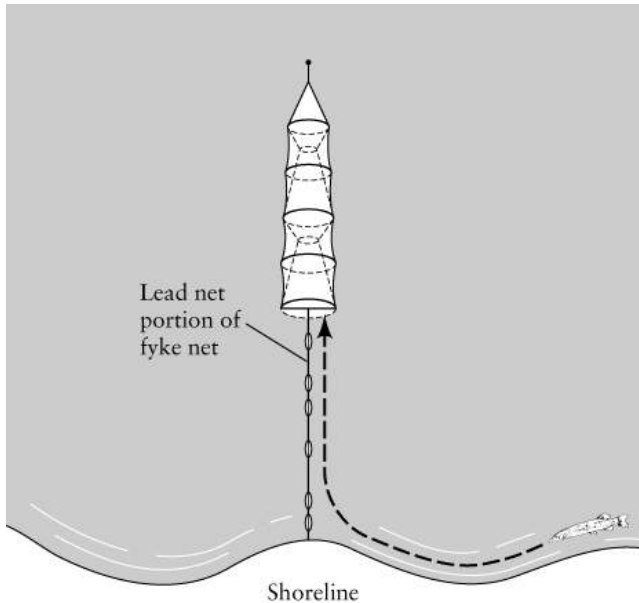
Passive gear is not actively moved

- 3 types:
 - Entrapment – hoop/fyke/trap nets
 - Entanglement – gill nets
 - Angling – baited hook at line, trotline and longline
- **Entrapment** gears are generally the least harmful and stressful

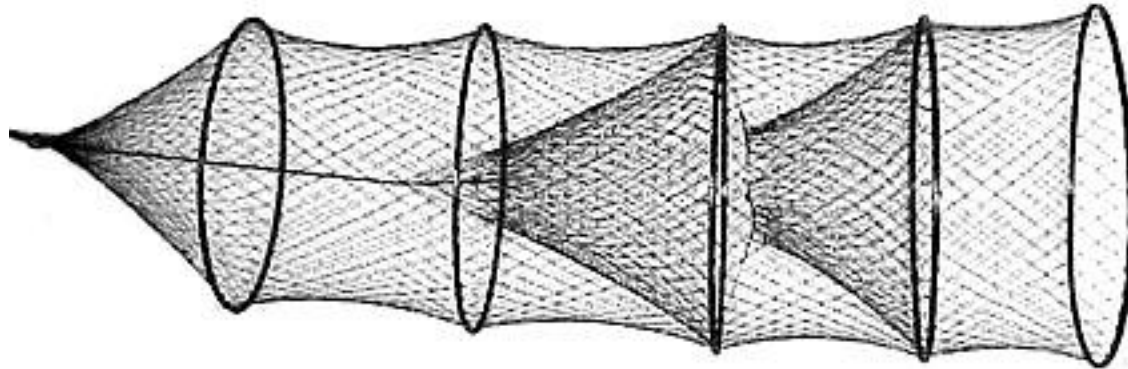
Entrapment gear are Hoop, fyke, modified-fyke, trap nets

Attracted to bait or the cover provided

Fish enter, but cannot find the way out



The Hoop Net



Population abundance estimates using passive gear

- CPUE or C/f – *catch per unit effort*
 - The **number of individuals** of a species over some sampling effort, generally **time or # of gears**.
 - A measure of **relative abundance**
 - A metric for abundance when absolute abundance cannot be measured
 - The number of fish captured is proportional to the amount of effort expended
 - Used to monitor populations over time and compare two or more populations

Population abundance estimates using passive gear

- Assumptions:
 - Population is in equilibrium
 - Units of effort operate independently, such that one unit of gear does not effect capture rate of another
 - The probability of catching an individual fish is constant over time
 - Every individual has the same probability of capture
- Must use standard sampling protocols in order to compare

Population abundance estimates using passive gear

- Influences/biases of fish capture and C/f
 - Species specific behavior
 - Cover seeking?
 - Attracted to bait?
 - Mesh size
 - Environmental variables – weather, water temp, season, currents