

Dedicated to the Memory of
Commissioner Enoch S. "Inky" Moore Jr.



PLAY

Winter
2013

Pennsylvania • League • of • Angling • Youth

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Good Fishing Needs Good Habitat

Good habitat provides good fishing. When water, food and shelter are present in proper amounts, fish populations provide good fishing. When one or more of these things are not available in proper amounts, populations are limited. Biologists call



these things **limiting factors**. Limiting factors may keep certain fish species out of a habitat.



Before Habitat Improvement

Vocabulary *(Watch for these words!)*

- **hydrology:** study of water movement and distribution
- **limiting factors:** factors that control a population's growth, such as organism growth or species population, size or distribution
- **riparian:** the area of land or banks next to a stream or river
- **riparian buffer:** streamside vegetation that protects banks in high water
- **stabilization:** efforts to reduce erosion of stream banks or lake shoreline
- **shelf:** a projecting layer of rock on land
- **grading:** to level or smooth to a desired slope



During Habitat Improvement



After Habitat Improvement

Big Spring Creek, Cumberland County

Diverse Habitat

Ingredients:

- Mix of rock and gravel bottom, free of silt
- Meandering stream channel
- Stable stream banks, network of roots from streamside vegetation

Clean stream bottom provides shelter for aquatic invertebrates and young fish. Mix of riffles and runs provides protection from predators. Aquatic invertebrates provide food to fish.



Recipes...

for a *Healthy Stream*



Good Riparian Buffer

Ingredients:

- Streamside vegetation
- Stable banks

Streamside vegetation provides shade, keeping water cooler. Roots keep banks from eroding. Overhanging vegetation provides shelter from bird and mammal predators. Leaves and other woody debris provide food and cover. Decomposing vegetation provides important nutrients.

Runaway Stream

Steep, eroded banks are one sign that the stream is out of its natural state. These streams have little to no vegetation on the banks or **riparian buffer**. The stream may also be very wide and shallow with the water moving slowly. Silt often covers the bottom of these streams.

These streams can be great candidates for habitat improvement. Biologists sample the stream at different places. They collect data on fish, bugs and water quality. Analysis of the stream **hydrology** occurs. Biologists and other technical staff review the data and develop habitat improvement plans.

Most projects work to stabilize banks and create diverse instream habitat. Narrowing the channel increases the water speed. Fast water keeps the bottom clean and creates places for fish to hide. Things



PFBC and Greater Latrobe High School students build multi-log deflectors.

like logs, root wads, rocks and native plants are used to provide places to hide.

It may take many years to see the full benefit of stream improvements. Trout are stocked when natural reproduction doesn't support fishing.



Stream Improvement Toolbox

Bank Grading and Riparian Shelf

- Reduces erosion
- Narrows the channel
- Replaces steep banks with a gradual slope or shelf
- Restores native vegetation

Multi-log Deflectors

- Installed on outside bend of streams
- Built with rocks and logs, triangle-shaped structure
- Installed in an alternating pattern on straight channels
- Used to direct flow away from the bank
- Spaced 30 feet apart

Cross Vanes

- Deflects current from the bank towards the middle of the channel
- Creates plunge pools
- Constructed as single or double vanes
- Made with logs or stones
- Resembles a "V" pointing upstream
- Spaced 50 feet apart
- Protects eroded banks
- Narrows stream channel

Building up a riparian shelf



Multi-log deflectors direct stream flow away from the bank.



Log cross vane



Partners

Trout Unlimited, local conservation districts, watershed groups and other similar organizations are important partners in habitat improvement.



Lake Improvement Toolbox

The Pennsylvania Fish & Boat Commission also provides habitat help for lake fish. Only a few lakes in Pennsylvania are natural. Others were constructed many years ago to provide

flood control or recreation. Vegetation and woody debris were often removed during construction. Habitat improvement projects work to create a more diverse fish habitat.

Porcupine Crib

- Built on land and sunk to the bottom
- Uses rough-cut hemlock lumber
- Placed in water 10- to 15-foot deep and parallel to the shoreline
- Placed 20 structures per acre
- Creates a microhabitat for aquatic invertebrates
- Provides a deep-water refuge for young fish



Porcupine crib

Meet the Fleet

The Commission uses a specialized fleet of boats for lake habitat improvement.



The rollers on crib boats make it easier to install porcupine cribs.



Rocks and gravel are loaded and then discharged from dump boats.

Post Cluster Structures

Post cluster structures

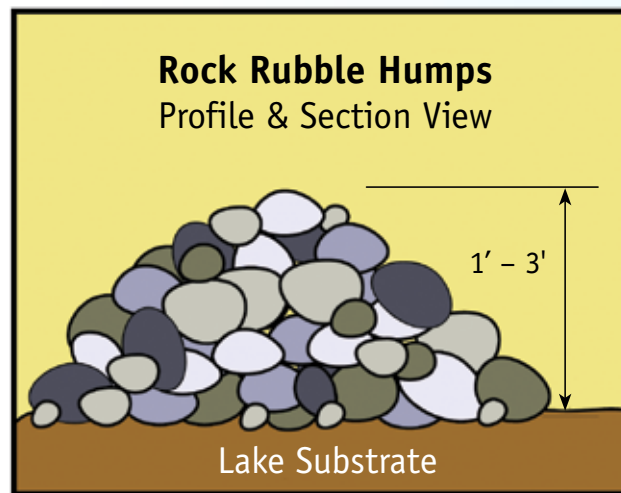
- Sunk in the lake bottom to provide vertical post structure
- Establishes 4 clusters per acre (each cluster has 25 posts)
- Placed in water 3- to 4-feet deep and at slight angles to the water surface
- Creates a microhabitat for aquatic invertebrates, and baitfish eat the invertebrates

Heavy construction equipment is used to build these structures.



Rock Rubble Humps

- Made with 1 to 2 tons of stone
- Constructed 1- to 3-foot high
- Built on flat or gradual slopes
- Establishes 20 rock rubble humps per acre
- Creates microhabitat for aquatic invertebrates
- Provides refuge for baitfish and young gamefish



Shoreline Stabilization

- Steep banks are regraded and planted
- Stone deflectors are built



Help this Habitat

Below are some characteristics of stream and lake habitats in need of improvement. Develop a habitat improvement plan for both a lake and a





stream. Answer the questions in the boxes. Using the icons in the Habitat Legend, draw the structures on the map below.



Lake

- Lake is approximately 40 acres
 - ✓ 20 acres of the lake is shallow, 7 feet or less
 - ✓ 20 acres of the lake is 7 feet or deeper
- Largemouth bass population is low and limited to small fish
- Baitfish populations are very low

HABITAT LEGEND

-  = 20 Clusters
-  = 50 Cribs
-  = 1 Multi-log Deflector
-  = 1 Cross Vane



Lake Habitat Plan

Goal: Create refuge areas for young bass and baitfish.

1. What type of fish habitat and how many should be placed in the 3- to 4-foot water of the lake?

Type: _____

How many? _____
(20 acres x clusters per acre)

2. What type of fish habitat and how many should be placed in the 10- to 15-foot water of the lake?

Type: _____

How many? _____
(20 acres x structures per acre)

See "Lake Improvement Toolbox."

DAM

7 plus feet (20 acres)

0-7 feet (20 acres)



Stream

- Eroded banks are near the lakeshore and carries silt into the lake
- Wide channel in straight sections
- Bottom covered with silt
- Stocked with trout but many leave the area shortly after stocking

Stream Habitat Plan

Goal: Stabilize banks to reduce erosion and sedimentation. Narrow the stream channel.

1. What type and how many habitat structures would you need to narrow and center water flow in the impaired stream?
2. What type and how many habitat structures would you need to protect the eroded outside bank and provide cover for trout?

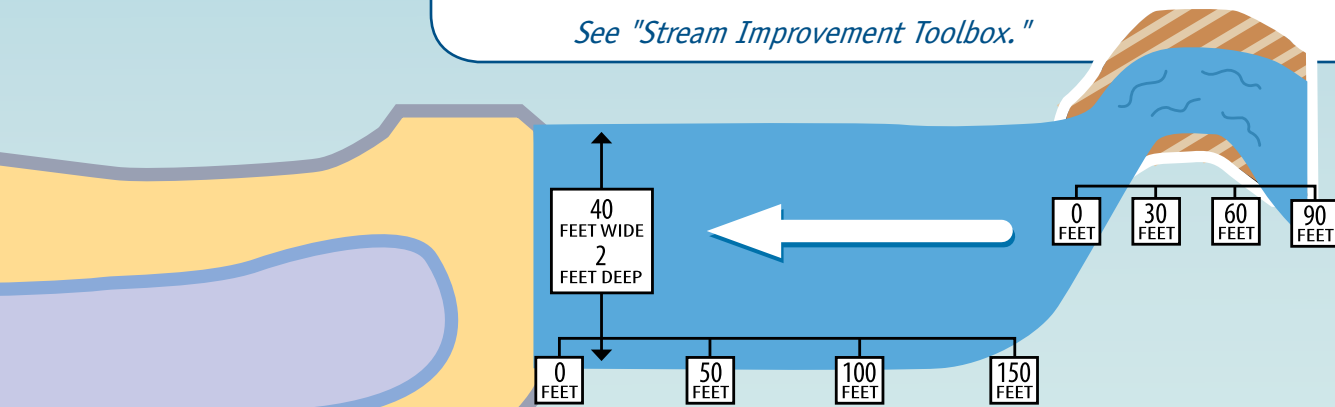
Type: _____

How many: _____
(spaced 50 feet apart)

Type: _____

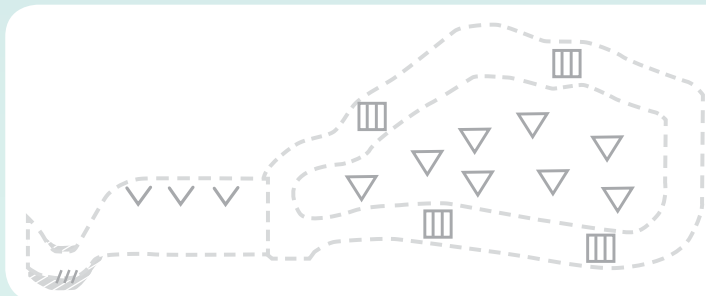
How many: _____
(spaced 30 feet apart)

See "Stream Improvement Toolbox."



PLAY

Editor: Spring Gearhart
 Design and Illustrations: Jeff Decker
 Photos: PFBC archives
 PLAY Subscriptions: Norine Bahnweg
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- Lake Habitat Plan**
1. post cluster structures; 80 clusters
 2. porcupine cribs; 400 cribs
- Stream Habitat Plan**
1. cross vane; 3
 2. multi-log deflector; 3