

**2012
PROPOSED FISH HABITAT MANAGEMENT PLAN
FOR
HINCKSTON RUN RESERVOIR, CAMBRIA
COUNTY, PA
CAMBRIA COUNTY CONSERVATION DISTRICT**



**PLANS BY:
THE PA FISH & BOAT COMMISSION
DIVISION OF HABITAT MANAGEMENT, LAKE SECTION**



**2012
THREE-YEAR FISH HABITAT MANAGEMENT PROJECT**
For
HINCKSTON RUN RESERVOIR, CAMBRIA COUNTY, PENNSYLVANIA
Sponsored by
CAMBRIA COUNTY CONSERVATION DISTRICT
Plans designed by
**THE DIVISION OF HABITAT MANAGEMENT
LAKE SECTION**
PENNSYLVANIA FISH AND BOAT COMMISSION
Plans prepared by
Mike Swartz & Ben Page

MANAGEMENT PLAN

The purpose of this plan is to address the habitat needs of Hinckston Run Reservoir as they relate to its classification, fish species diversity and abundance, angler use and paid and/or volunteer work force. This plan is being installed at the request of the Cambria County Conservation District. This project is aimed at long-term and long-lasting artificial habitats that fit the reservoir's existing native habitat features.

This proposed plan will provide the basis for the Cooperative Habitat Improvement Program cooperator, Cambria County Conservation District, to place artificial fish habitat structures in Hinckston Run Reservoir. Construction supervision, structure placement and design are the responsibility of the Pennsylvania Fish and Boat Commission's (PFBC), Division of Habitat Management (DHM) and/or its designee. All structures constructed must meet the requirements of the Division of Habitat Management's Lake Section. All structures included in this plan meet the requirements of the Department of Environmental Protection and the U.S. Army Corps of Engineers General Permits (BDWW-GP-1 & SPGP-4).

FINANCIAL ASSISTANCE

Financial assistance is available through the Division of Habitat Management (maximum \$3,000 per project, per calendar year) for the purchase of materials on a 50/50 matching basis with the cooperator. All requests for funding must come from a representative of Cambria County Conservation District to the PFBC's Division of Habitat Management. The Cooperator is responsible for all other material and labor costs.

IMPOUNDMENT INVENTORY

Hinckston Run Reservoir is a man-made impoundment, rather than a natural lake. Due to this fact, this impoundment contains native fish habitats (existing physical characteristics), artificial fish habitats (structures or devices placed to act as fish habitat), and natural fish habitats (aquatic vegetation). The native fish habitats in the impoundment combined with the natural topography of the land provide a basis for classification of reservoirs in relationship to habitat. These native habitats existing in Hinckston Run Reservoir can be enhanced through the placement of appropriate artificial habitats that best match the reservoir's classification, the native habitats, and the fisheries and angler needs.

Hinckston Run Reservoir was physically surveyed by the Division of Habitat Management's Lake Section on August 24, 2011 using a Lowrance HDS8 sonar with StructureScan and an internal Lowrance GPS (global positioning system) with Insight USA on a 20' Boston Whaler Outrage utilizing a one 90-degree transducer and one LSS-1 imaging transducer. The survey was conducted to inventory the existing native habitats, classify the impoundment and find any existing artificial habitats. Any existing artificial

habitats found are shown on the attached plan map. Personnel from Cambria County Conservation District were present and involved in the inventory and the design phase of the plan.

IMPOUNDMENT CLASSIFICATION

Hinckston Run Reservoir is impossible to classify due to its small size. However, the impoundment has features of a Hill-land type reservoir and this plan will focus on those characteristics (Lalo, Houser 1982) (Linder 1987) (Houser 2007).

ARTIFICIAL HABITATS

Artificial habitats (refuge, spawning, nesting and nursery) are designed to be effective, long lasting structures that allow fish to accomplish their daily and seasonal tasks with greater efficiency. Some artificial habitats have dual purposes and may also provide increased opportunities for anglers to catch and harvest fish (fish attraction). They can also provide increased surface areas for algae attachment, aquatic insect colonization and other food organisms which may increase fishery production (Wege, Anderson 1979) (Nilsen, Larimore 1973) (Benke, et al. 1984). Many of these artificial habitats are designed to aide multiple fish species in completing various survival tasks (performance structures), which may also provide an opportunity to increase productivity within some impoundments.

Small fish may utilize habitat (artificial, native or natural) to avoid predation by occupying habitat where predators cannot forage (Glass 1971) (Savino, Stein 1982) or (as predators) to utilize complex habitat as foraging areas (Werner, et al. 1983). Increasing complex habitat may allow coexistence of predators and prey through the creation of microhabitat types (Crowder, Cooper 1977). Increasing habitat complexity may positively influence predator efficiency by providing small fish with refuge in areas of high structure densities (Hall, Werner 1977) (Werner, et al. 1983).

Complex structural cover may also provide important habitat for aquatic invertebrates (Nilsen, Larimore 1973) (Benke, et al. 1984) and in turn provide foraging opportunities for juvenile and adult panfish that rely on invertebrates as a food source. Complex structure may also serve as habitat for prey resources of black bass (and other predators), thus increasing prey/predator efficiency. Game and panfish also benefit from complex habitat related to the advantages of camouflage (Angermeier, Karr 1984).

Simple structural cover (Bass Nesting Structures, Half-Log structures) (Hoff 1992) can be more effective at providing positive spawning, nesting and parental habitat for black bass, than complex cover (Wills, Bremigan, Hayes 2004). Simple cover has less microhabitat types for invertebrates and refuge areas for small fish. Some studies have shown that angler success does not increase during spawning/nesting periods in spawning areas treated with simple artificial cover (Wills, Bremigan, Hayes 2004). Simple structural cover can play a major role in black bass spawning and nesting success when placed at appropriate sites with suitable substrate (Hoff 1992) (Hunt 2002) (Martin, Phillips 1998).

Some artificial habitat structure designs matched with appropriate native habitats (physical features existing in the impoundment) may be species select or have preferences toward individual size (juvenile vs. adult) and/or fish habits (Prince, Maughan 1979). Artificial habitats known as "forage type structures" are designed to provide basic habitat needs of the impoundment's forage base (baitfish, invertebrates, and crustaceans) (Warnecke, Forbis 1990). In many cases a number of artificial habitat types are required in one reservoir to create habitat diversity (complex and simple/wood and rock/shallow and deep). This creates an opportunity for a more diverse fish community to develop and flourish (Benson, Magnuson 1992).

Complex large wood structure in lakes may create positive fish habitat for a variety of species (Bozek 2001) (Barwick, Kwak 2004). Rough-cut hemlock lumber is used in all the wood structure designs due to its excellent submerged capabilities to create complex artificial fish habitat. In some cases large hardwood trees are used as large woody structure (Bozek 2001). Other materials used in construction of artificial fish habitats are sandstone, limestone rock, concrete blocks, nails and nylon banding.

All artificial habitats used in this plan have undergone a minimum one-year design phase and two-year durability test. Materials and construction techniques used in the construction of Pennsylvania artificial habitat structures provide the best balance of structure longevity and invertebrate, plankton colonization and fish utilization. Lumber used in the construction of Pennsylvania artificial habitat structures should be green (newly cut), rough-cut true dimensional hemlock or yellow poplar. If other lumber types are

required, they will be specified in the plans. All other material types used will be specified in the plan as a specific type of material required for that structure.

PENNSYLVANIA PORCUPINE CRIB

Porcupine Brush Cribs (see attached standard drawing) are long lasting, deep water, complex structures designed as a refuge type habitat. This design should provide juvenile protection and improve recruitment of panfish and gamefish in impoundments that lack abundant, deep-water submerged aquatic vegetation. Construction materials consist of rough cut, true dimensional, green (fresh cut), hemlock or yellow poplar (50 pieces of 2"X 2"X 4'), eight 2-core 8" concrete blocks (min. 36 lbs. ea.) and 2 lbs. of 16d common bright nails (approx. 2 strips of 12d strip nails for nail guns), plus a 14' piece of ½" nylon security banding and one steel buckle.

Placement is traditionally accomplished by specially equipped boats during softwater periods (no ice). Submerged structures are normally placed in a row with 4' to 8' spaces between individual structures. Normally 10 to 20 cribs are placed at one site. Structures are submerged in 10' to 60' depths (Lynch, Johnson & Kayle 1988) (Lynch, Johnson, Durfey 1988) along the contour parallel to the shore or the stream channel.



Typically native habitats in hill-land impoundments benefit most from coarse brush structures (Lalo, Houser 1992). These areas are characterized by steep gradient shores, leading into breaks and/or channels. Steep shores that break onto flats or benches appear to be effective native habitats, when treated with coarse brush type artificial structures (Lynch, Kayle & Johnson 1988). Typical placement density is 20 structures per acre.

This part of the plan will focus on the hill-land areas and their relationship to panfish and juvenile black bass. Twenty Porcupine Cribs are proposed at one site at an average depth of 7' to 10' (site numbers: 12-2450). All sites are inventoried by way of G.P.S. with each completed structure placement site having its own way-point (Lat/Lon).

PENNSYLVANIA PORCUPINE CRIB JR.

The Porcupine Crib Jr. (see attached standard drawing) is an adaptation of the original Porcupine Brush Crib. The original Porcupine Crib was designed as a deep-water structure. The "Jr." is a shallow water version with additional density in the gable ends (see standard drawing). The Porcupine Jr. was designed to mimic the habitat provided by native stumps. Stumps in shallow water provide an important habitat value in Pennsylvania reservoirs and sometimes are the only true native woody cover in the impoundment.



Typically native habitats in hill-land impoundments benefit most from coarse brush structures (Lalo, Houser 1992). As impoundments age native stump fields may disappear, due to erosion by wind and/or annual or maintenance drawdowns as the stump fields disappear, so does that particular type of cover (Bozek 2001). In some cases, impoundments do not contain any native stumps, due to the policies in place during impoundment construction. Porcupine Crib Jr.s should provide similar cover to pre and post spawning adult panfish and black bass, plus seasonal ambush and security cover for juveniles and adults.

Construction materials consist of rough cut, true dimensional green (fresh cut) hemlock or yellow poplar (38 pieces of 2"X 2"X 4'), eight 2-core 8" concrete blocks (min. 36 lbs. ea.) and 2 lbs. of 16d common

bright nails (approx. 2 strips of 12d strip nails for nail guns), plus a 10' piece of ½" nylon security banding and one steel buckle.

Placement is traditionally accomplished by specially equipped boats during soft-water periods (no ice). Normally 10 to 20 Porcupine Crib Jr.s are placed at one site. The Porcupine Crib Jr. is normally placed in a five-point star fashion with an open center (Bryant, G. L. 1992) on shallow water flats in depths between 6' and 10' (unlike full sized porcupines that is placed in rows near deep water breaks) with varied distances between each individual structure. The Jr. is only 28" high, so even at 6' depths, the structures are not a navigation hazard, except during any drawdown periods where structures may become exposed. This part of the plan will focus on the flats and their relationship to panfish and black bass. These sites do not contain any native stumps, but the flat is conducive to structure placement and fish use. Thirty Juniors are proposed at one site at an average depth of 5' to 7' (site numbers 12-2451). All sites are inventoried by way of G.P.S., with each completed structure placement site having its own way-point (Lat/Lon).

PENNSYLVANIA SHORT VERTICAL PLANK STRUCTURE

The Short Vertical Plank Structure is designed as a shallow water adult black bass habitat. "Shorty's" are designed for shallow water flats with depths ranging from 5' to 20'. The most effective flats lead into stream of river channels. Shorty's will be placed on these flats in areas void of submerged aquatic vegetation. Shorty's with brush or conifers added to the interior are a beneficial complex habitat. This type of habitat will create excellent overhead cover for ambush or hunt and flush foraging opportunities for adult black bass (Barwick, Kwak 2004). Shorty's should also provide outstanding early season adult panfish cover when coarse brush is added to the structure (Barwick, Kwak 2004).

Vertical wooded and coarse brush structures have been found successful in attracting fish in shallow water (less than 10') in hill-land and highland impoundments. The most effective placement appears to be in dense circles of structures with one or more openings in the center (Bryant 1992) or in an irregular line formation with large openings between individual devices (see standard placement drawing). Largemouth bass, sunfish, crappie and yellow perch favor coarse brush and wooden type structures when placed on or near steep gradient shores that break onto flats or benches (Lynch, Kayle & Johnson 1988).



Construction materials consist of rough-cut, true dimensional green (fresh cut) hemlock or poplar (32 pieces of 1" X 4" X 24", 10 pieces of 1" X 4" X 48" and 35 pieces of 2"X 2"X 48"), nine 2-core 8" concrete blocks (min. 36 lbs. ea.) and ½ lb. of 16d common bright nails (approx. 1 strip of 12d strip nails for nail guns) and 2 lbs of 8 d common bright nails (approx. 2 strips of 2 5/8" strip nails for nail guns) plus a 10' piece of ½" nylon security banding and one steel buckle (see standard drawing).

The Short Vertical Plank Structure is 29" high, so it can be placed in depths between 5' and 10' and still is safe from boating traffic (they may create a navigation hazard during draw-down periods where structures may become exposed). Placement is accomplished by specially equipped boats during soft-water periods (no ice). This part of the plan will focus on sites that have shallow water near shoreline and offshore flats. Typical placement density is 30 structures per acre. A total of thirty structures are proposed at one site at approximately 5' to 7' depths (site numbers: 12-2453). All sites are inventoried by way of G.P.S., with each completed structure placement site having its own way-point (Lat/Lon).



PENNSYLVANIA STYLE ROCK RUBBLE HUMPS

Rock Rubble Humps (see attached standard drawing) provide forage type habitats for a variety of invertebrates, crustaceans and baitfish. Rock Rubble may also benefit various year classes of black bass from young-of-the-year to adult (Jackson, Noble, Irwin, Van Horn 2000).

Rubble humps may also act as fish attractors for walleye, black bass and panfish. Fish use depends upon location and stone size diversity. Traditionally rubble humps are placed on flats or shoals in flatland or hill-land impoundments. The best method for placement is during maintenance or annual drawdowns with heavy

machinery, although the Division of Habitat Management's Lake Section has a rock rubble barge that can place small rubble humps or spawning substrate by watercraft during softwater periods (no ice). Typical placement density is 20 humps (20 tons) per acre.

A total of twenty 1 to 5 ton humps are proposed at one site at approximately 12' to 14' depths (site numbers: 12-2449). Placement method will be by heavy machinery or watercraft. All sites are inventoried by way of G.P.S., with each completed structure placement site having its own way-point (Lat/Lon).



FELLED SHORELINE TREES Where sufficient depths exist near shore (15'>) felling and cabling shoreline trees provide excellent fish habitat (Lalo, Houser 1982). Game fish and panfish use submerged trees in a variety of ways. Spawning, recruitment, foraging and refuge tasks are accomplished by many species and age-class using felled trees (Bozek 2001).

Large branching trees are more suitable due to the complexity of branches creating better fish habitat (Bozek 2001). Trees are felled and cabled to their stumps (see standard drawing) with 1/4" galvanized wire rope and cable clamps. Typical placement density is 5 trees per acre. A total of nine Felled Shoreline

Trees are proposed at one site at approximately 10' to 25' depths.

PENNSYLVANIA TURTLE BASKING HABITAT PLATFORM

Pennsylvania Turtle Basking Habitat Platforms were originally designed for Red-Bellied Turtles at Lake Marburg, York County, due to a recent sighting of these rare animals. During the initial evaluation of the basking habitat structures at Lake Marburg, it was soon realized that these basking habitats were utilized by a variety of turtle species, including Red-Bellied Turtles. From this it was then determined that other turtle species could also benefit from artificial basking habitats.

Many Pennsylvania reservoirs contain little, if any, woody debris appropriate for turtles to utilize as basking habitat. This is primarily due to pre-impoundment reservoir clearing and continued debris removal from impounded reservoirs.



Without an appropriate basking habitat many turtle species are not able to properly adjust their body temperature. Basking provides opportunities for resting and allows turtles to increase body temperature, which in turn promotes individual growth and aids digestion, reduces susceptibility to disease and improves overall health. Since the Pennsylvania Fish and Boat Commission is responsible for protection and management of turtles in the Commonwealth, the Commission's Division of Habitat Management's Lake Section has designed an artificial basking habitat, in cooperation with PFBC's Non-Game & Endangered Species Unit and DCNR/Bureau of State Parks, Codorus State Park.

Sites are normally selected due to past sightings of turtles in that area. This Pennsylvania Turtle Basking Platform is a modified version of the original Codorus design. This design modification is less complicated to construct than the original Codorus design, but provides increased escape possibilities than the original PFBC design. These structures will be constructed with rough-cut true dimensional hemlock or yellow poplar lumber (see attached standard drawing). Placement will be accomplished by specially equipped boats during soft-water periods (no ice). The basking habitat structures will be anchored in place with two 8" X 8" X 16" concrete blocks and 1/4" stainless steel wire rope. Typical placement density is 5 structures per acre. A total of three basking platforms are proposed at one site at approximately 3' to 5' depths (site numbers: 12-2452)

STRUCTURE CONSTRUCTION AND PLACEMENT

The construction and placement of all artificial structures in this plan must be coordinated with the Lake Section of the Division of Habitat Management. Representatives of the Lake Section (or a designated representative) will be on hand to supervise and assist in construction of all artificial habitats designed for this project. Specialized PFBC tools and equipment may also be utilized by the cooperator to accomplish construction of artificial structures supervised by Habitat Management Staff. Placement of artificial habitats can, in most cases, be accomplished by specially equipped DHM watercraft, operated by trained Lake Section staff. Other state and/or federal watercraft and operators may also be utilized to accomplish projects managed by the Division of Habitat Management. All artificial habitats must be constructed to the specification shown in the standard drawings attached to this plan packet.

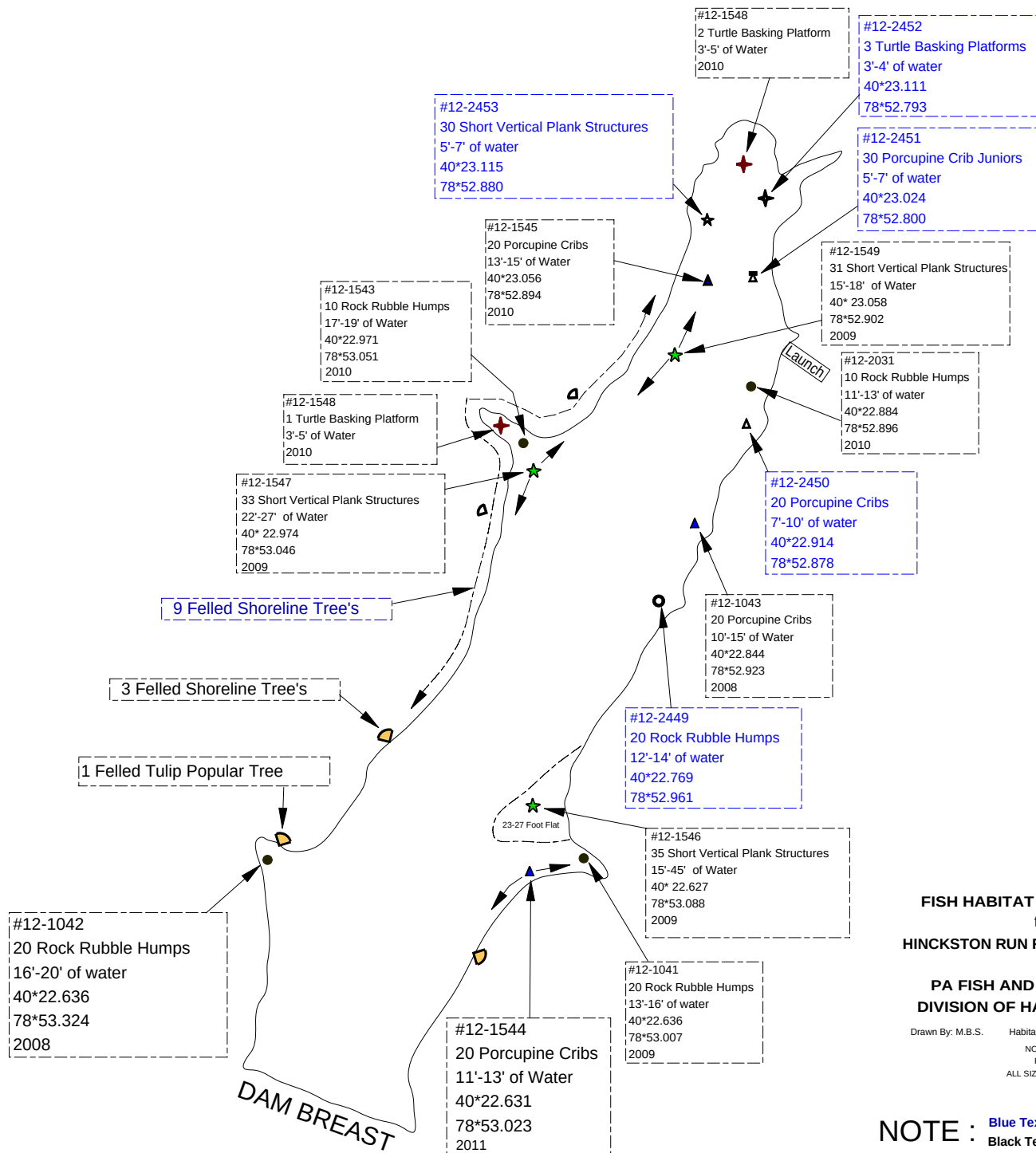
PROJECT APPROVAL AND COMPLETION

This project is automatically approved after a fifteen-day review period that begins from the date of the cover letter or memo. This three-year plan provides the Cooperative Habitat Improvement Program cooperator an opportunity to construct and place a total of one hundred twelve artificial habitat structures in Hinckston Run Reservoir at an approximate rate of thirty-seven per year. This three-year plan begins in 2012 and is planned for completion by 2014, unless otherwise extended by a cooperative agreement between the Cambria County Conservation District and the Pennsylvania Fish and Boat Commission's Division of Habitat Management (BSP, 12).

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PLAN MAP LEGEND		
	PROPOSED	COMPLETED
CATFISH SPAWNING BOX		
STAKE TREE		
TURTLE BASKING PLATFORM		
VERTICAL PLANK STRUCTURE		
BLACK BASS NESTING STRUCTURE		
FELLED SHORELINE TREE		
PORCUPINE CRIB		
PORCUPINE CRIB JUNIOR		
SHORT VERTICAL PLANK STRUCTURE		
ROCK RUBBLE HUMPS		
CONIFER STRING		
POST CLUSTER		
POST CLUSTERS PLUS		
SPIDER HUMPS		
ROCK STAR STRUCTURES		
POST STUMPS		
STONE FRAMED DEFLECTOR		
SAW-TOOTHED DEFLECTOR		
ROOT WAD/LOG DEFLECTOR		
TIRE STRUCTURE		
ROAD BED		

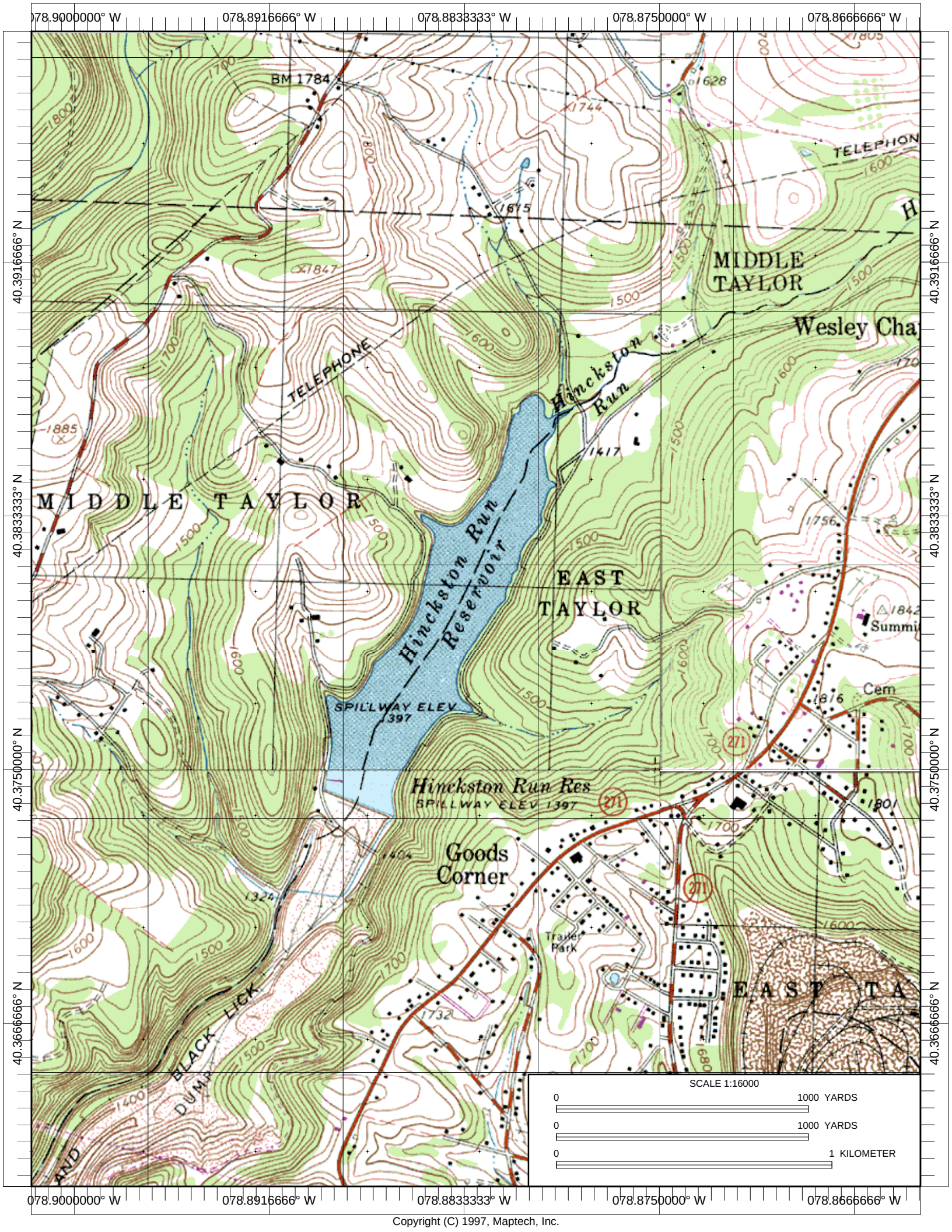


FISH HABITAT IMPROVEMENT PLAN
for
HINKSTON RUN RESERVOIR, CAMBRIA COUNTY
by
PA FISH AND BOAT COMMISSION
DIVISION OF HABITAT MANAGEMENT

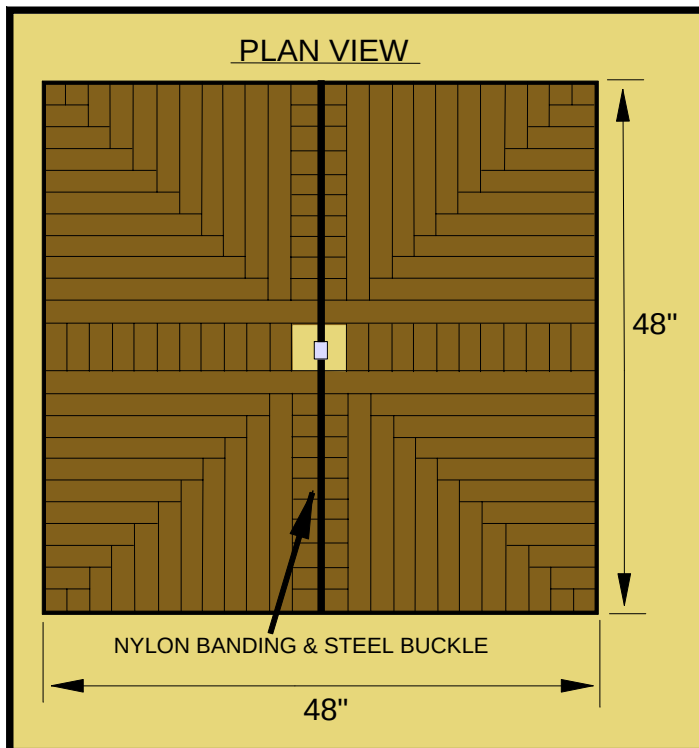
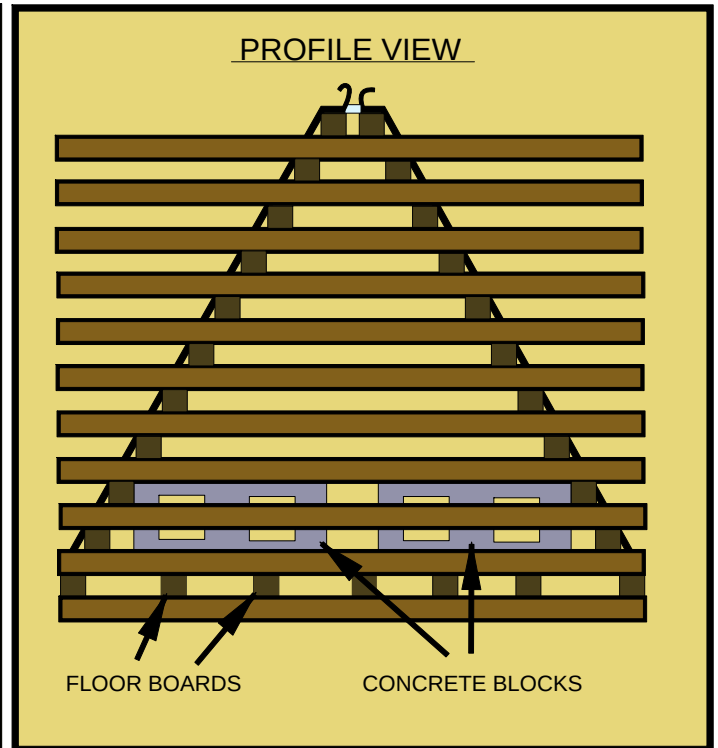
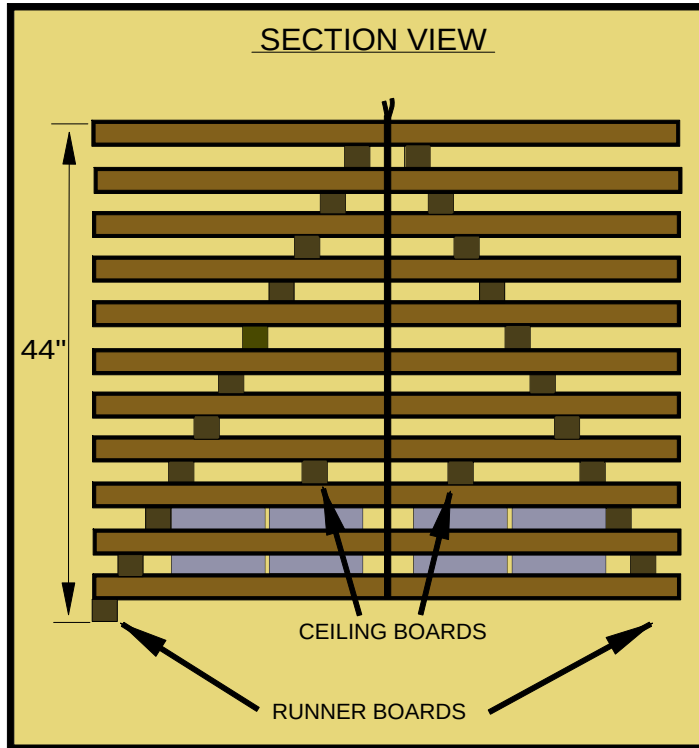
Drawn By: M.B.S. Habitat Manager: Benjamin Page Date: 1/12/12
NOT TO SCALE
FIT IN FIELD
ALL SIZES APPROXIMATE



NOTE : Blue Text Indicates Proposed Sites
Black Text Indicates Completed Sites



PENNSYLVANIA PORCUPINE CRIB STRUCTURE STANDARD DRAWING



MATERIALS AND NOTES

MATERIALS:

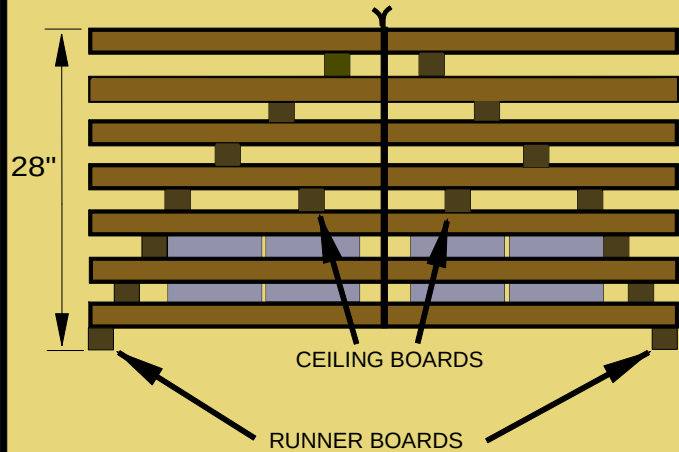
ROUGH CUT HEMLOCK LUMBER 2" x 2" x 4'- 50 PIECES
 8" x 8" x 16" 2 CORE CONCRETE BLOCKS- 8 TOTAL
 16D COMMON NAILS- 2 LBS. (OR 2 STRIPS OF 12D)
 1/2" NYLON BANDING- 18'
 1 STEEL BUCKLE

NOTES:

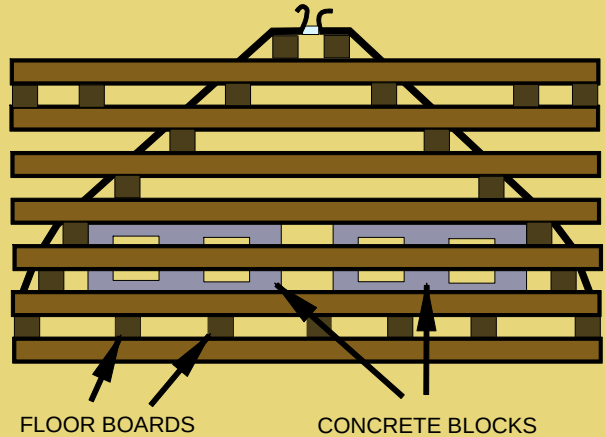
LUMBER MUST BE TRUE DIMENSIONAL
 LUMBER MUST BE GREEN (FRESH CUT)
 YELLOW POPLAR MAY BE SUBSTITUTED FOR HEMLOCK
 CONCRETE BLOCKS MINIMUM WEIGHT: 35 LBS
 NYLON BANDING: 600 LBS TENSILE STRENGTH
 NOT TO SCALE
 ALL SIZES ARE APPROXIMATE
 FIT IN FIELD

PENNSYLVANIA PORCUPINE CRIB JUNIOR STRUCTURE STANDARD DRAWING

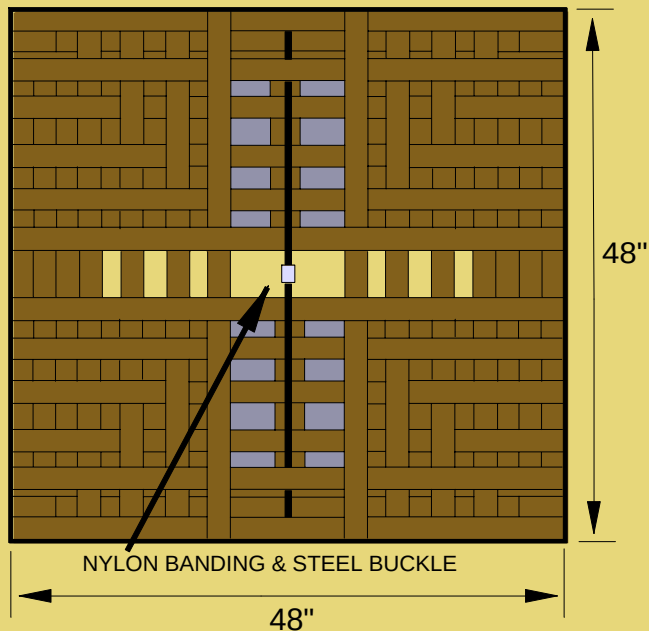
SECTION VIEW



PROFILE VIEW



PLAN VIEW



MATERIALS AND NOTES

MATERIALS:

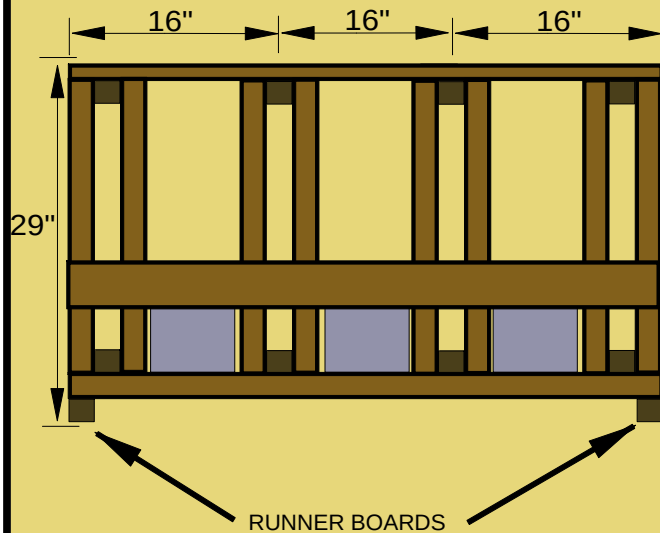
ROUGH CUT HEMLOCK LUMBER 2" x 2" x 4'- 38 PIECES
8" x 8" x 16" 2 CORE CONCRETE BLOCKS- 8 TOTAL
16D COMMON NAILS- 2 LBS. (OR 2 STRIPS OF 12D)
1/2" NYLON BANDING- 18'
1 STEEL BUCKLE

NOTES:

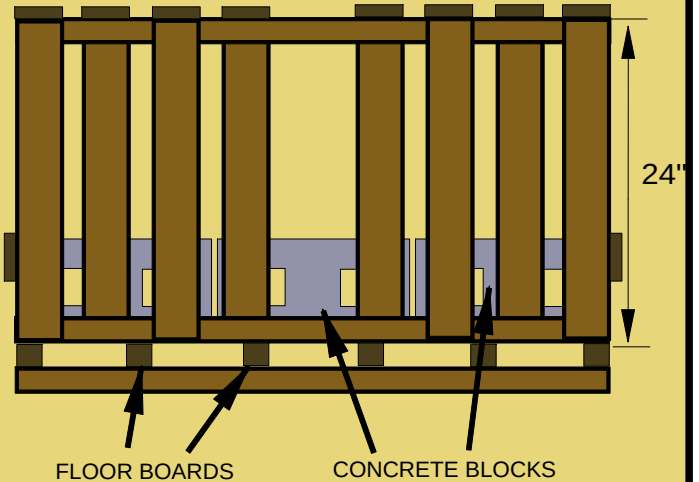
LUMBER MUST BE TRUE DIMENSIONAL
LUMBER MUST BE GREEN (FRESH CUT)
YELLOW POPLAR MAY BE SUBSTITUTED FOR HEMLOCK
CONCRETE BLOCKS MINIMUM WEIGHT: 35 LBS
NYLON BANDING: 600 LBS TENSILE STRENGTH
NOT TO SCALE
ALL SIZES ARE APPROXIMATE
FIT IN FIELD

PENNSYLVANIA "SHORT" VERTICAL PLANK STRUCTURE STANDARD DRAWING

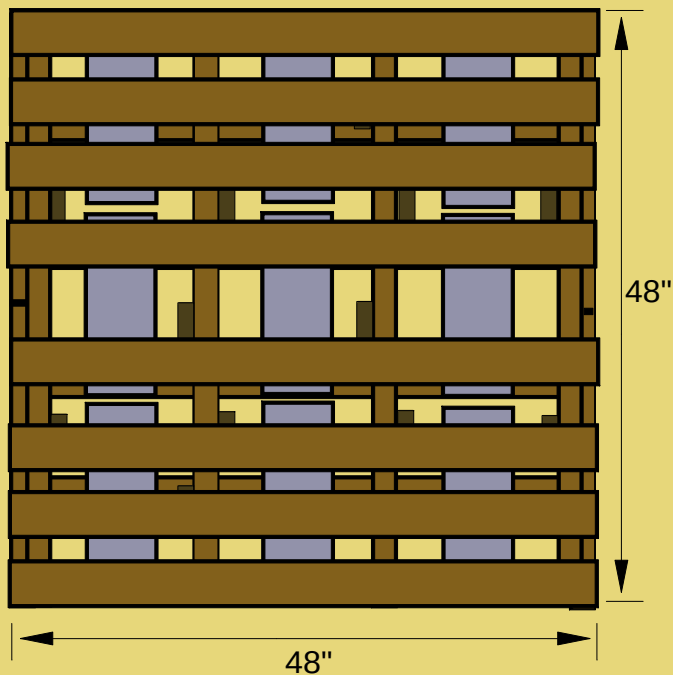
SECTION VIEW



PROFILE VIEW



PLAN VIEW



MATERIALS AND NOTES

MATERIALS:

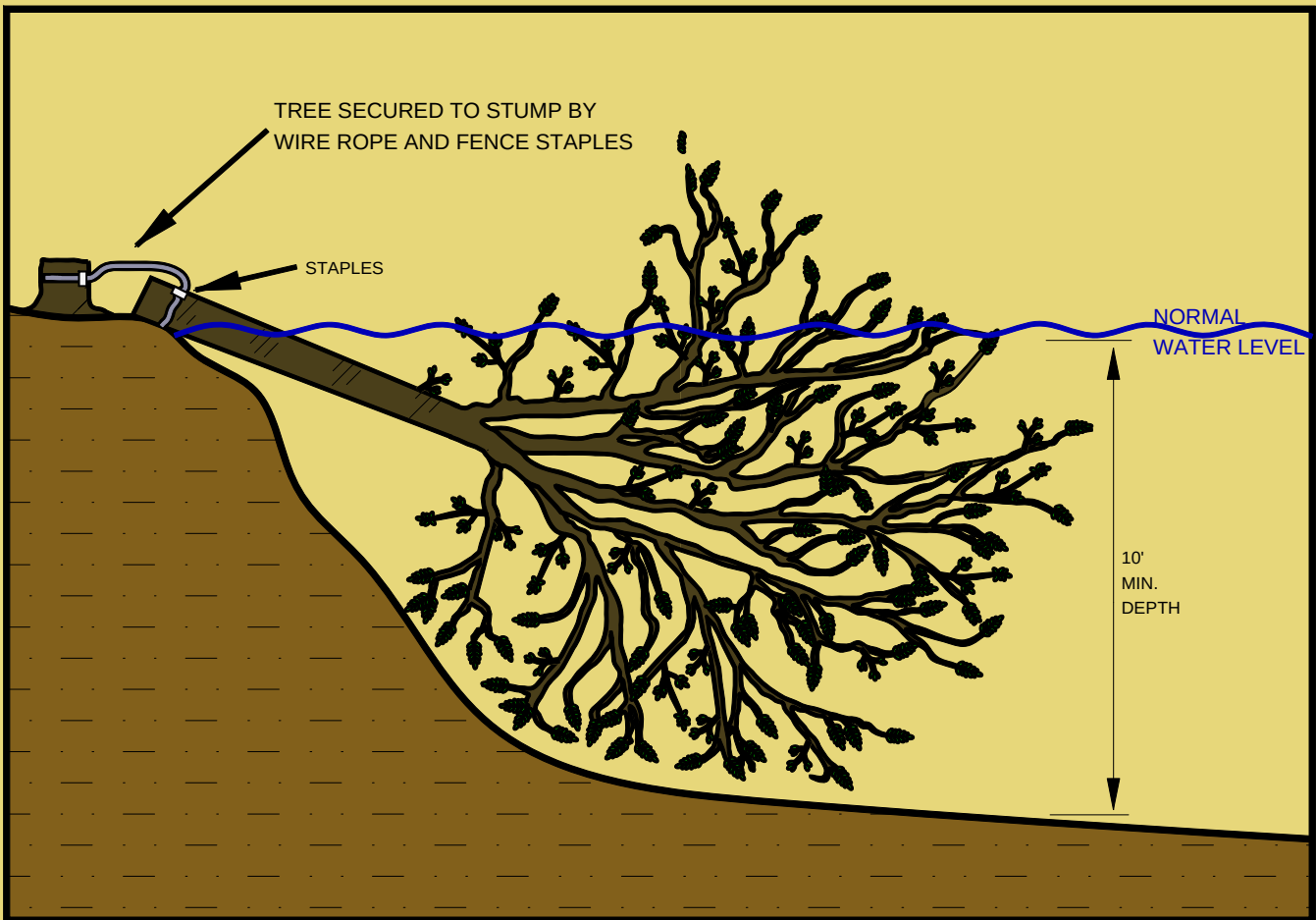
ROUGH CUT HEMLOCK LUMBER 1" X 4" X 24" - 32 PEICES
 ROUGH CUT HEMLOCK LUMBER 1" X 4" X 48" - 10 PEICES
 ROUGH CUT HEMLOCK LUMBER 2" X 2" X 48" - 16 PEICES
 8" X 8" X 16" 2 CORE CONCRETE BLOCKS- 9 TOTAL
 COMMON NAILS (12D) - 1/2 LB
 COMMON NAILS (BD) - 1 LB
 OPTIONAL: 1 OR 2 SMALL CONIFER TREES MAY BE ADDED

NOTES:

LUMBER MUST BE TRUE DIMENSIONAL
 LUMBER MUST BE GREEN (FRESH CUT)
 YELLOW POPLAR MAY BE SUBSTITUTED FOR HEMLOCK
 CONCRETE BLOCKS MINIMUM WEIGHT: 35 LBS
 NYLON BANDING: 600 LBS TENSILE STRENGTH
 NOT TO SCALE
 ALL SIZES ARE APPROXIMATE
 FIT IN FIELD

PENNSYLVANIA STYLE- FELLED SHORELINE TREE STANDARD DRAWING

SECTION VIEW



MATERIALS AND SUGGESTED EQUIPMENT

MATERIALS:

LARGE HARDWOOD TREE - 1 PIECE
1/4" GALVANIZED CABLE 20' - 1 PIECE
FENCE POST STAPLES - 4 TOTAL

SUGGESTED EQUIPMENT:

CABLE CUTTERS
CHAINSAW
WEDGES
MINI SLEDGEHAMMER

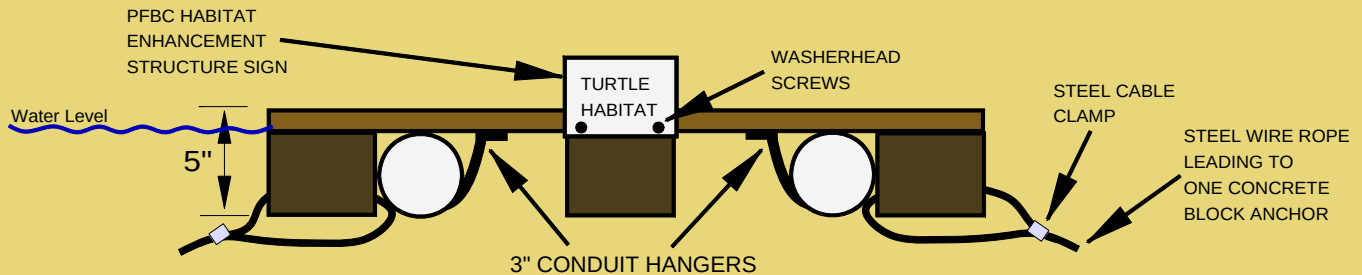
NOTES

NOTES:

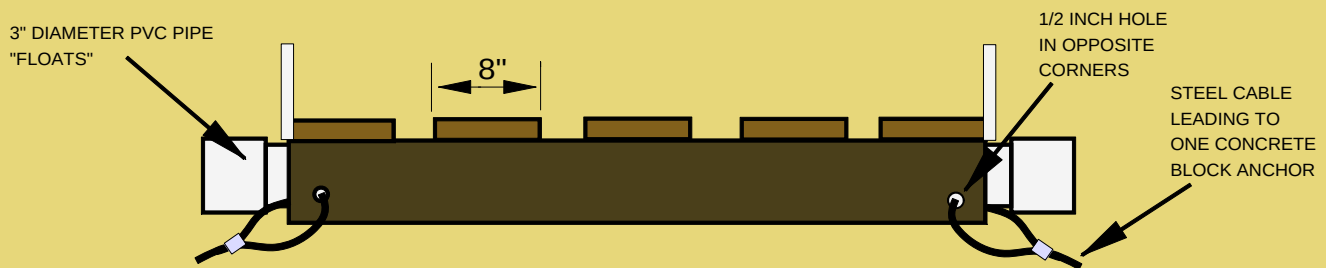
WIRE ROPE AND STAPLES MUST BE USED
TREES SHOULD BE CUT IN SUMMER WHEN THEY HAVE MAX. FOLIAGE
TREE CANOPY SHOULD BE MOSTLY SUBMERGED
TREES SHOULD BE CUT BY PROFESSIONALS
AREA MUST BE RESTRICTED TO OTHERS DURING THE CUTTING
NOT TO SCALE
ALL SIZES ARE APPROXIMATE
FIT IN FIELD

PENNSYLVANIA TURTLE BASKING PLATFORM STANDARD DRAWING

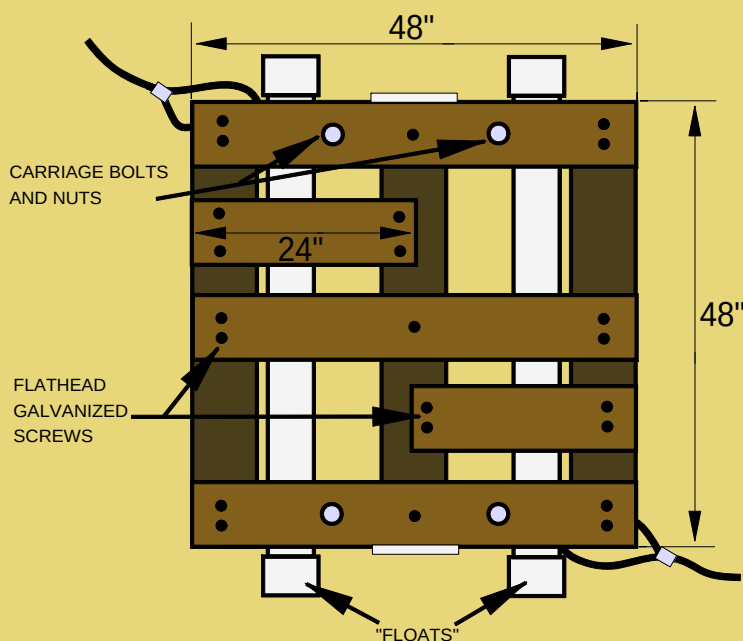
PROFILE VIEW



SECTION VIEW



PLAN VIEW



MATERIALS AND NOTES

MATERIALS:

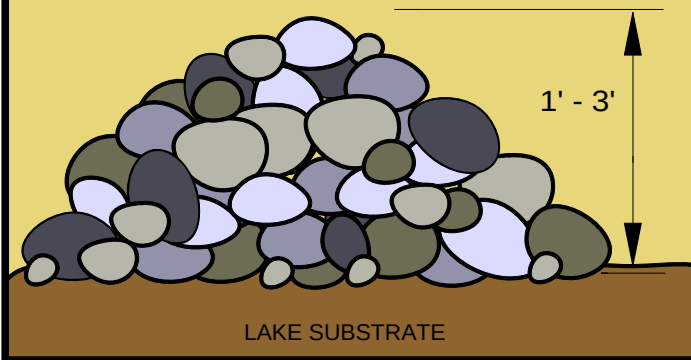
ROUGH CUT HEMLOCK LUMBER 1" X 8" X 4' - 3 PIECES
 ROUGH CUT HEMLOCK LUMBER 1" X 8" X 2' - 2 PIECES
 ROUGH CUT HEMLOCK LUMBER 4" X 4" X 4' - 3 PIECES
 2 CORE CONCRETE BLOCK 8" X 8" X 16" - 2 PIECES
 #10 X 3" FLATHEAD GALVANIZED SCREWS- 26 PIECES
 #10 X 1" WASHERHEAD GALVANIZED SCREWS- 8 PIECES
 1/2 X 2" CARRIAGE BOLTS AND NUTS- 4 EACH
 1/4" STAINLESS STEEL WIRE ROPE 10' - 2 PIECES
 1/4" STAINLESS STEEL CABLE CLAMPS- 4 PIECES
 3" CONDUIT HANGERS- 4 PIECES
 3" DIAMETER SCHEDULE 40 PVC PIPE 5' - 2 PIECES
 3" DIAMETER PVC END CAPS- 4 PIECES
 PVC PIPE CEMENT AND CLEANER
 PFBC HABITAT ENHANCEMENT SIGNS- 2 PIECES

NOTES:

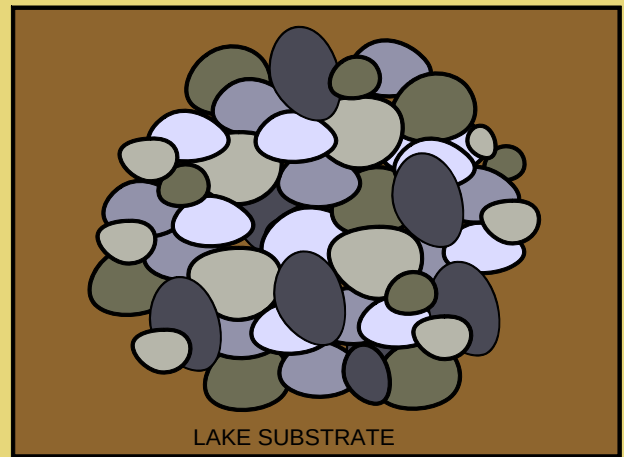
LUMBER MUST BE TRUE DIMENSIONAL
 YELLOW POPLAR MAY BE SUBSTITUTED FOR HEMLOCK
 LUMBER MUST BE GREEN (FRESH CUT)
 CONCRETE BLOCKS MINIMUM WEIGHT: 35 LBS
 NOT TO SCALE
 ALL SIZES ARE APPROXIMATE
 FIT IN FIELD

PENNSYLVANIA STYLE ROCK RUBBLE HUMPS STANDARD DRAWING

PROFILE & SECTION VIEW



PLAN VIEW



MATERIALS AND NOTES

MATERIALS:

R4 SANDSTONE- (9"-18")

NOTES:

RECOMMENDED DENSITY IS 20 TONS/ACRE

LIMESTONE CAN SUBSTITUTE SANDSTONE

NOT TO SCALE

ALL SIZES ARE APPROXIMATE

FIT IN FIELD

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATERSHED MANAGEMENT
GENERAL PERMIT
BDWW-GP-1
FISH HABITAT ENHANCEMENT STRUCTURES**

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ATTACHMENTS:

DRAWING NO. 1 - SAMPLE LOCATION MAP

EXHIBIT A - OFFICES OF THE PENNSYLVANIA FISH AND BOAT COMMISSION

EXHIBIT B - REGIONAL OFFICES OF THE DEPARTMENT OF ENVIRONMENTAL PROTECTION
AND U.S. ARMY CORPS OF ENGINEERS DISTRICT OFFICES

EXHIBIT C - COUNTY CONSERVATION DISTRICTS

GENERAL PERMIT REGISTRATION FORM (INCLUDES SINGLE AND COMPLETE PROJECT
SCREENING QUESTIONNAIRE)

PENNSYLVANIA NATURAL DIVERSITY INVENTORY FORM

**INSTRUCTIONS FOR USING THE GENERAL PERMIT
BDWW-GP-1
Fish Habitat Enhancement Structures**

PRIOR TO REGISTRATION TO USE:

1. Carefully review the definitions and requirements of the General Permit (Part One and Part Two) to determine if your project can qualify for authorization under this General Permit. Refer to Part One, Section B regarding area restrictions and Part One, Section D regarding criteria. If your project cannot be authorized under the General Permit, you may request approval of an individual permit by submitting an application to the appropriate Permitting and Technical Services Section in the Regional Office as listed on Exhibit B.
2. Contact the Pennsylvania Fish and Boat Commission, Division of Environmental Services or Division of Property Services at address and telephone number shown on Exhibit A to select a suitable structure and obtain Pennsylvania Fish and Boat Commission approval on the General Permit Registration form. For the Cooperative Adopt-A-Stream Program, the Pennsylvania Fish and Boat Commission will also register the use of the General Permit on behalf of the project sponsor.
3. Locate your project on a United States Geological Survey (U.S.G.S.) 7½ Minute Quadrangle Map¹ and prepare a project LOCATION MAP, utilizing a photocopy of the U.S.G.S. Quadrangle Map.
4. Complete the Pennsylvania Natural Diversity Inventory (PNDI) Form and submit it to the person conducting the online PNDI Project Planning and Environmental Review Tool search. This person performing the search could be someone from DEP, the County Conservation Districts, or a consultant. Alternatively, if you plan to conduct the PNDI online search yourself – a search form is not needed prior to the PNDI online search.

After conducting the PNDI online search, if your PNDI Project Environmental Review Receipt has "Potential Impacts," DEP and the jurisdictional agencies require that you submit additional information to the agencies noted on the Receipt for further review. Please send a copy of the PNDI Receipt, a completed PNDI Form, and a USGS 7.5 minute quadrangle map with project boundaries delineated on the map to the agencies referenced on your PNDI Receipt.

5. For any earthmoving activity² associated with your project, prepare an Erosion and Sediment Control Plan which must be reviewed and determined satisfactory by the County Conservation District in the county where your project is located. The required Erosion and Sediment Control Plan must be prepared and submitted to the Conservation District for review prior to or concurrent with your registration to use the General Permit.

THE REGISTRATION PROCEDURE:

6. Fill in all information on the GENERAL PERMIT REGISTRATION form and make multiple copies. Send one copy each to the municipality and the county in which the project is located.
7. To register use of the General Permit, prepare a complete registration "package" consisting of:
 - Two Copies of the GENERAL PERMIT REGISTRATION form
 - Two copies of the LOCATION MAP
 - Two copies of the PNDI form and an initialed search receipt

¹ Commonly called "topographic maps", U.S.G.S. Quadrangles may be available from local merchants dealing in books, hunting supplies and camping equipment.

² For the definition of earthmoving activity, see Part Two, Section C.

Send these items to either:

- The County Conservation District for projects located in all counties where there is a delegation agreement (see Exhibit C).

- OR -

- The Permitting and Technical Services Section having responsibility for the counties where there is no delegation agreement with the County Conservation District (see Exhibit B).

8. If you are also applying for an individual Water Obstruction and Encroachment Permit to authorize related work, you may register to use the General Permit in conjunction with your individual permit application (See Part Two, Section A, Item 2).

BEFORE AND DURING CONSTRUCTION:

9. Do not begin work until:
 - a. You have received an acknowledgement from the Permitting and Technical Services Section or County Conservation District that your General Permit Registration form has been received and registered.
 - b. Your Erosion and Sediment Control Plan has been reviewed and determined to be satisfactory by the County Conservation District.
 - c. You have notified the Pennsylvania Fish and Boat Commission and the County Conservation District 10 days prior to start of construction (See Part Two, Section D).
 - d. You have obtained any other Federal, State or local permits which may be required.
 - e. You have complied with any other applicable preconstruction requirements as listed in Part Two, Section E.
 - f. You have provided written notifications to the municipalities and county where the projects are located prior to the start of construction.
10. During construction of your project, you are responsible for adhering to all terms and conditions of the General Permit, including your approved Erosion and Sediment Control Plan and all applicable design and construction criteria in Part One, Section D.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATERSHED MANAGEMENT
GENERAL PERMIT
BDWW-GP-1
FISH HABITAT ENHANCEMENT STRUCTURES**

PART ONE

- A. GENERAL DESCRIPTION AND FEES** - The Department of Environmental Protection hereby authorizes, by General Permit, subject to the terms and criteria set forth, the installation, operation and maintenance of fish habitat enhancement structures in the regulated waters of this Commonwealth. **There is no registration fee required for a project authorized under this General Permit.**
- B. SITES AND CONDITIONS WHERE THIS GENERAL PERMIT DOES NOT APPLY** - This General Permit does not apply and is not valid in the following situations. Where the General Permit is not applicable, you may request approval of an individual permit by submitting an application to the appropriate Permitting and Technical Services Section in the Regional Office (see Exhibit B).
1. Historic, cultural or archaeological sites as identified in the latest published version of the Pennsylvania Inventory of Historical Places or the National Register of Historical Places. This information is available from the Pennsylvania Historical and Museum Commission, 400 North Street, Second Floor, Harrisburg, PA 17120-0093, telephone (717) 783-8946.
 2. Sites identified in the latest published version of the National Registry of Natural Landmarks.
 3. Construction activities in stocked trout streams from March 1 through June 15, in wild trout streams from October 1 through December 31, and in Lake Erie tributaries from March 1 through June 15 and from September 1 through December 31, unless approval is obtained from the Pennsylvania Fish and Boat Commission's Division of Environmental Services (see Exhibit A). Stocked and wild trout stream locations are compiled by the Commission's Division of Fisheries Management (see Exhibit A).
 4. Wetlands.
 5. Projects located where there would be an impact on species of special concern listed under the Endangered Species Act of 1973, the Wild Resources Conservation Act, the Fish and Boat Code or the Game and Wildlife Code. Records regarding species of special concern are maintained in a computer database called the "Pennsylvania Natural Diversity Inventory" (PNDI). To verify that there will be no such impacts for a specific project, the Department requires submission of the attached PNDI Form and an initialed search receipt.
 6. Areas in or within 100 feet of a watercourse designated wild in the National or State Scenic Rivers system in accordance with the National Wild and Scenic Rivers Act of 1968 or the Pennsylvania Scenic Rivers Act. For details on scenic river classifications, contact the DCNR, Division of Greenways and Conservation Partnerships, Pennsylvania Scenic Rivers Program, P.O. Box 8475, Harrisburg, PA 17105-8475, telephone (717) 787-2316.
- C. DEFINITIONS APPLICABLE TO THIS GENERAL PERMIT** - The following words and terms, when used in this General Permit, have the following meanings:

FISH HABITAT ENHANCEMENT STRUCTURES - Structures consisting of deflectors, low flow channel structures, channel blocks, mud sills, boulders, felled shoreline trees, special tire structures, brush structures, rubble reefs, half-log structures, elevated boulder structures and spawning/nursery structures placed in streams, lakes, ponds or reservoirs as developed and approved by the Pennsylvania Fish and Boat Commission.

RESERVOIR - A natural or artificial basin which contains or will contain the water or other fluid or semifluid impounded by a dam.

D. PROJECT DESIGN AND CONSTRUCTION CRITERIA

1. PENNSYLVANIA FISH AND BOAT COMMISSION APPROVAL - The owner must contact the Pennsylvania Fish and Boat Commission's Division of Property Services or Division of Environmental Services (see Exhibit A) to select a Fish Habitat Enhancement Structure suitable for his individual situation and obtain the required approval of the Pennsylvania Fish and Boat Commission to install the structure as required on the General Permit Registration form.
2. Fish Habitat Enhancement Structures shall be designed and constructed to preclude interference with normal fish migration.
3. Stream flow will not be constricted to a degree greater than the most narrow natural point of the stream in the immediate vicinity of the work within 500 feet upstream or downstream of the project site.
4. Fish Habitat Enhancement Structures located in stream channels shall not extend more than 3 feet above the normal stream bed. Tire structures are prohibited in stream channels.
5. Any archaeological artifacts discovered during the performance of work authorized under this General Permit must be adequately protected and their discovery promptly reported to the Bureau for Historic Preservation, Pennsylvania Historical and Museum Commission, 400 North Street, Harrisburg, PA 17120-0093, telephone (717) 787-2891.
6. Each Fish Habitat Enhancement Structure shall be constructed in such a way so that it does not hinder recreational navigation.
7. Excess fill or excavated and dredged material from the construction of a Fish Habitat Enhancement Structure shall be deposited outside of the adjacent floodplain, wetlands and other regulated waters of this Commonwealth and stabilized immediately in accordance with the Erosion and Sediment Control Plan. Waste materials, scrap or excess construction materials shall be collected, stored and disposed of in accordance with the Solid Waste Management Act and related rules and regulations.
8. Fish Habitat Enhancement Structures shall be maintained in a safe and functional condition. This includes the removal of debris. Where maintenance requires excavation or dredging, an Erosion and Sediment Control Plan must be reviewed and determined adequate by the County Conservation District in which the activity is located. Disposal of dredged material shall be in accordance with Item 7.
9. Only a clean, nonpolluting, rock material shall be used as fill material in order to minimize excessive turbidity by leaching of fines as well as to preclude the entrance of potentially polluted materials to the watercourse by natural runoff.
10. Slag is not authorized for use under this General Permit unless it qualifies as a co-product which is suitable for the specific use.
11. Construction of a Fish Habitat Enhancement Structure shall take place during periods coinciding with low stream flows.
12. Construction and other activities authorized by this General Permit shall be performed in a manner that minimizes use of equipment within the stream channel or body of water.
13. To the greatest extent possible, the project shall be designed and constructed in a manner which will (a) prevent permanent or long-term adverse changes in water quality,

(b) minimize alterations in natural aquatic habitat and (c) maintain natural stream flow velocities and mixing patterns.

- E. COOPERATIVE ADOPT-A-STREAM PROGRAM - SPECIAL PROCEDURES** - The Pennsylvania Fish and Boat Commission is authorized to register the use of this General Permit on behalf of sponsors and landowners who participate in the Commission's Cooperative Adopt-A-Stream Program. To register use of the General Permit for Adopt-A-Stream projects, the Commission shall utilize a modified version of the General Permit Registration form named Alternative "Exhibit D" which has been approved by the Department and the U.S. Army Corps of Engineers. The standard attachments to the General Permit Registration form, as specified in Part Two, Section A, are not required to register the use of this General Permit for a Cooperative Adopt-A-Stream Project.
- F. AUTHORITY AND CONTINUING AUTHORIZATION** - Authorization of this General Permit is under section 7 of the Dam Safety and Encroachments Act (32 P.S. §§693.1-693.27) and the rules and regulations promulgated thereunder at 25 Pa. Code §§105.441-105.449 (relating to General Permits). This General Permit shall authorize the continued operation and maintenance of fish habitat enhancement structures previously authorized by General Permit BDWM-GP-1 (Fish Enhancement Structures) issued on July 25, 1981 and reauthorized on August 29, 1987 and October 7, 1989.

1. PROJECT INFORMATION

Project Name: **Hinckston Lake**

Date of review: **2/17/2012 8:10:14 AM**

Project Category: **Habitat Conservation and Restoration, In-stream habitat restoration (habitat improvement structures)**

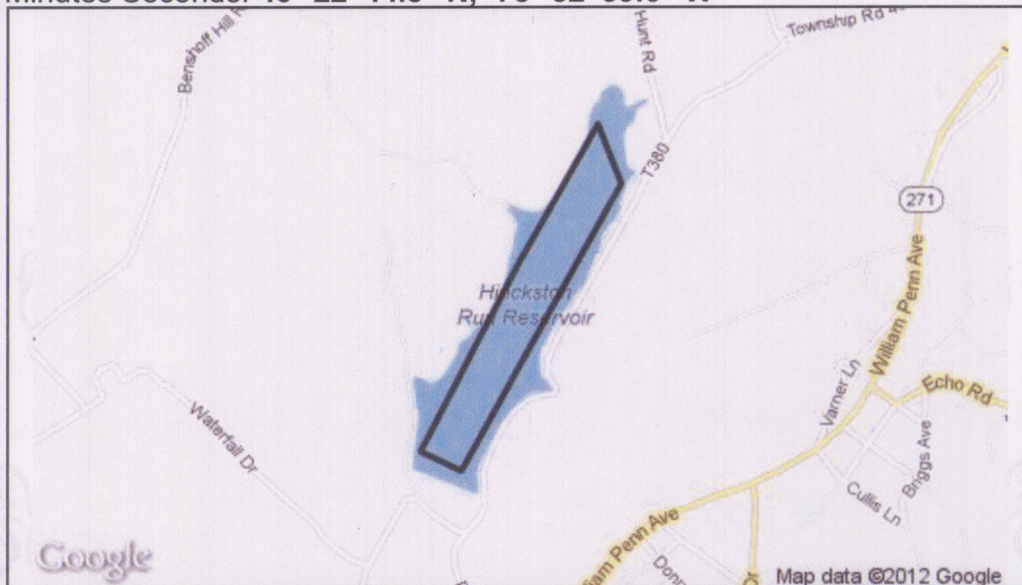
Project Area: **59.3 acres**

County: **Cambria** Township/Municipality: **East Taylor, Middle Taylor**

Quadrangle Name: **JOHNSTOWN** ~ ZIP Code: **15906, 15909**

Decimal Degrees: **40.378982 N, -78.883209 W**

Degrees Minutes Seconds: **40° 22' 44.3" N, -78° 52' 59.6" W**



2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate no known impacts to threatened and endangered species and/or special concern species and resources within the project area. Therefore, based on the information you provided, no further coordination is required with the jurisdictional agencies. This response does not reflect potential agency concerns regarding impacts to other ecological resources, such as wetlands.

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for one year** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jurisdictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service

RESPONSE: No impacts to federally listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. For cases where a "Potential Impact" to threatened and endangered species has been identified before the application has been submitted to DEP, the application should not be submitted until the impact has been resolved. For cases where "Potential Impact" to special concern species and resources has been identified before the application has been submitted, the application should be submitted to DEP along with the PNDI receipt, a completed PNDI form and a USGS 7.5 minute quadrangle map with the project boundaries delineated on the map. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. DEP and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at

<http://www.naturalheritage.state.pa.us>.



5. ADDITIONAL INFORMATION

The PNDI environmental review website is a **preliminary** screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources

Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552, Harrisburg, PA.
17105-8552
Fax: (717) 772-0271

U.S. Fish and Wildlife Service

Endangered Species Section
315 South Allen Street, Suite 322, State College, PA.
16801-4851
NO Faxes Please.

PA Fish and Boat Commission

Division of Environmental Services
450 Robinson Lane, Bellefonte, PA. 16823-7437
NO Faxes Please

PA Game Commission

Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA. 17110-9797
Fax: (717) 787-6957

7. PROJECT CONTACT INFORMATION

Name: Benjamin Page
Company/Business Name: PA Fish & Boat Commission
Address: 450 Robinson Lane
City, State, Zip: Bellefonte, PA 16823
Phone: (814) 359-5162 Fax: (814) 359-5153
Email: bepage@pa.gov

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

Benjamin Page
applicant/project proponent signature

3/15/12
date