





CT DEEP Fisheries: Habitat Conservation and Enhancement Program:

Overview of Activities and Useful Resources





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Overview

- CT DEEP Fisheries Division: Habitat Conservation and Enhancement Program (HCE)
- Fisheries Consultation Process
- Common Project Types
- Overview of Fisheries Concerns
- Technical Resources
 - To be used on Fisheries Consultations
 - Some that I find useful and want to share



CT DEEP Fisheries Division

- Inland Fisheries Management
- Marine Fisheries Management
- C.A.R.E.
- Diadromous
- Habitat Conservation and Enhancement (HCE)





CT DEEP Fisheries Division





HCE Program

- Review projects that require DEEP Permits for Fisheries Impacts:
 - Fisheries Consultation
- Habitat Mitigation Projects.
- Habitat Enhancement
- Triploid Grass Carp Permitting and Management
- Fish Kill Investigations



Fisheries Consultation

- Required Consultation before DEEP Permit Applications are submitted.
- Takes place early in the process and allows time for coordination, incorporation of comments, and design revisions.
- ~30 day turnaround



Connecticut Department of Energy & Environmental Protection Bureau of Natural Resources Fisheries Division

DEEP Fisheries Consultation Form

To the Applicant - Prior to the submission of your license application to the Connecticut Department of Energy & Environmental Protection (DEEP) Water Planning and Management Division (WPMD) or Land and Water Resources Division (LWRD) or Water Permitting and Enforcement Division (WPED), please complete Part I below and e-mail the following to <u>deep inland (isheries@ct.gov</u>;

- 1. this completed DEEP Fisheries Consultation Form
- a site location map,
- a PDF version of the proposed project plans including a site survey of existing conditions (if available), and
 photos of the site.

Fisheries Division staff will contact you if further details are needed. Once the Fisheries Division staff returns the completed form to you, please include the form, and any signed plans (if applicable) in your license application submittal to DEEP.

Part I: Applicant and Site Information (to be completed by APPLICANT)

1.	Applicant/Registrant Information				
	Name:	State: Ext.: Phone:	Zip Code:		
2.	Engineer/Surveyor/Agent Information (list as applica Name: Mailing Address: City/Town: Business Phone:	State: Ext.:	Zip Code:		
	Contact Person: E-mail Address: Service Provided:	Phone:	Ext:		
3.	Site Location: Name of Site: Address of Site or Location Description: City/Town: Parcel Location/Tax Assessor's Reference: Map Name of Stream or Waterbody: Name of Stream or Waterbody:	State: Block	Zip Code: Lot		
4.	Letivity: Check the box bast describing your activity: (check all that spply): new publiching access: new publiching access: activities in inlandino-idal waterbodies and watercourses: withdrawal of water from a wetland, marsh, swamp, or bog hydrologically connected to a non-idal/inland river, stream, port or lake; withdrawal of groundwater from stratified drift deposits hydrologically connected to a non-idal/inland river, stream, port or lake;				
pond or lake. Note: Fisheries consultation is not required for docks and marinas on Long Island Sound.					
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time

Fisheries Consultation

- Chance to discuss the project and understand the project and any limitations.
- Need to listen and have interdisciplinary approach and skill set.
- Not just fish, not just wetlands.
- On personal level it is important to understand the "Why" of this process: using your knowledge in context of environmental laws and permitting process.
- Too easy to focus on the "What" (Fish, wetlands) and the "How" (Sampling and Monitoring Practice)



Fisheries Consultations

- Common Projects Include but not Limited to:
 - Bridge and Culvert Replacements
 - Dredging
 - Dam Repairs
 - In Water Work
 - Water Diversion



- Lake Herbicide Applications (Depends on Waterbody)
- Lake Drawdowns (State Lakes)
- Construction Activity within 100ft buffer of Coldwater Streams



Fisheries Concerns

Habitat Connectivity

- Fish need to move from one section of stream to another throughout the year.
- Dispersal from one stream to a connected stream allows genetic diversity, and population resiliency (Source and Sink Streams)
- Spawning, Feeding, Avoidance of Harsh Conditions (Low Water, High Temperatures, Ice). Access to deep pools for holdover periods.
- Dams and Road Crossings create a highly fragmented stream landscape









Perched Culverts

- Fish cannot ascend due to water drop at culvert outlet.
- "Physical" barrier.
- Perched culverts are created by either improper installation or excessive scour.
- Replace with an appropriate culvert design or use rock weirs or other fish passage measures to overcome elevation change.





Velocity Barrier

- Water velocities exceed fish swimming performance.
- Fish are unable to pass under some or all flows.
- Varies with roughness, culvert size, slope.
- <u>Swim Speed & Swim Time Tool</u> (fishprotectiontools.ca)





Velocity Barrier

Salmon & Walleye Group



Estimates

2.5% of 165 mm Salmon & Walleye can achieve 1.19 m/s when swimming for 600 s 12.5% of 165 mm Salmon & Walleye can achieve 0.91 m/s when swimming for 600 s 50% of 165 mm Salmon & Walleye can achieve 0.618 m/s when swimming for 600 s 87.5% of 165 mm Salmon & Walleye can achieve 0.419 m/s when swimming for 600 s 97.5% of 165 mm Salmon & Walleye can achieve 0.319 m/s when swimming for 600 s

Salmon & Walleye Group



Estimates

2.5% of 175 mm Salmon & Walleye in 0.15 m/s current can swim 410 m 12.5% of 175 mm Salmon & Walleye in 0.15 m/s current can swim 310 m 50% of 175 mm Salmon & Walleye in 0.15 m/s current can swim 210 m 87.5% of 175 mm Salmon & Walleye in 0.15 m/s current can swim 140 m 97.5% of 175 mm Salmon & Walleye in 0.15 m/s current can swim 110 m



Depth Barrier

- Water depth too shallow for fish to pass.
- Sheet flow barrier
- Smooth flat bottom concrete culverts.
- Culvert can be too wide, exacerbated in low flow conditions.
- No low flow channel or substrate.
- Baffles
- Diversion Weirs for multi cell culverts
- Substrate to form channel.





Low Flow Channel





Depth Barrier

- Replacement stream bed materials can lack fine materials to fill interstitial spaces.
- Excess interstitial space can cause the water to flow subsurface and create intermittent flow conditions.
- Need to mix in fines and or wash fine material to fill voids.





Protection Measures

- Seasonal Unconfined Work Windows
- Isolates the Work Area with Cofferdams and Protects Stream from Impacts.







Water Handling: Pumping

Pump sizes and operation should allow for steady downstream discharge, instead of "pulsed" as pump goes on and off.



Habitat Enhancements

- Boulder Clusters
- Rock Weirs
- Root Wads
- Log Deflectors
- J-Hook Vanes
- Pool Digging Structures
- Plantings





Habitat Enhancements









Technical Memorandum

Federal Interagency Nature-like Fishway Passage Design Guidelines for Atlantic Coast Diadromous Fishes



May 2016





Includes species specific design criteria for dimensions shown



- USGS Stream Stats
- Free online service
- Allows estimated seasonal and flood duration flows at any point in stream
- Great for ungauged streams.
- Useful for determining minimum flow requirements.

Cranbury Meadow Brook StreamStats Report

 Region ID:
 CT

 Workspace ID:
 CT20220720163122239000

 Clicked Point (Latitude, Longitude):
 41.43488, -72.34212

 Time:
 2022-07-20 12:31:41 -0400



Seasonal Flow Statistics Flow Report [Duration Flow 2010 5052]

Statistic	Value	Unit
25 Percent Duration December to February	2.39	ft^3/s
50 Percent Duration December to February	1.42	ft^3/s
75 Percent Duration December to February	0.851	ft^3/s
95 Percent Duration DEC FEB	0.395	ft^3/s
99 Percent Duration December to February	0.22	ft^3/s











Useful Resources: New Skills!

- Use programing languages like R or Python to create reproducible work flows.
- Allows you to capture your work in a way that it can be error checked, and used again on a similar effort, without having to redo everything manually in excel.
- More accessible than ever with tons of free resources online.



USGS dataRetrieval Package

- Allows you to read USGS gage data right into R for selected gages and time frames.
- Can immediately enter that data into your graphing or analysis process. Once you have it built you can use it for any gaged stream!
- <u>dataRetrieval Tutorial (usgs.gov)</u>



dataRetrieval Tutorial

Advance slides using right and left arrow keys

USGS: Laura DeCicco 22 August, 2016



Plotting Data in R: ggplot





Plotting Data in R: ggplot







Questions?

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