A Collaborative Approach to Water Resource Management for the Pomperaug River

Presented At: Water Supply In Western Connecticut Conference
May 18, 2018

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Pomperaug River Watershed Coalition

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The Connecticut Water Company

Presentation Overview

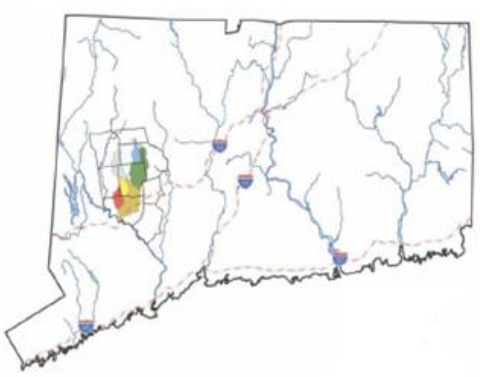
- Introduction to the Pomperaug Watershed / PRWC
- Pomperaug River Assessment Project Overview
- Instream Habitat Study
- Introduction to HVWC/CWC
- Drought Hydrographs As A Tool
- UMass Adjustment
- Next Steps

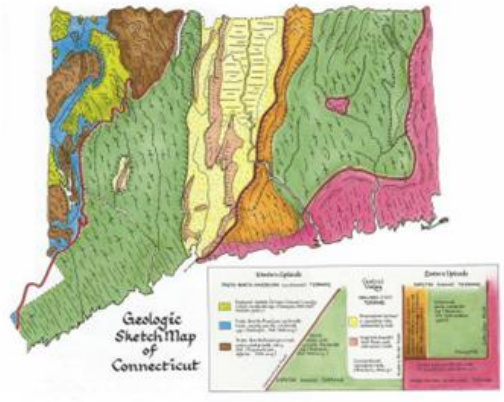
POMPERAUG RIVER WATERSHED COALITION

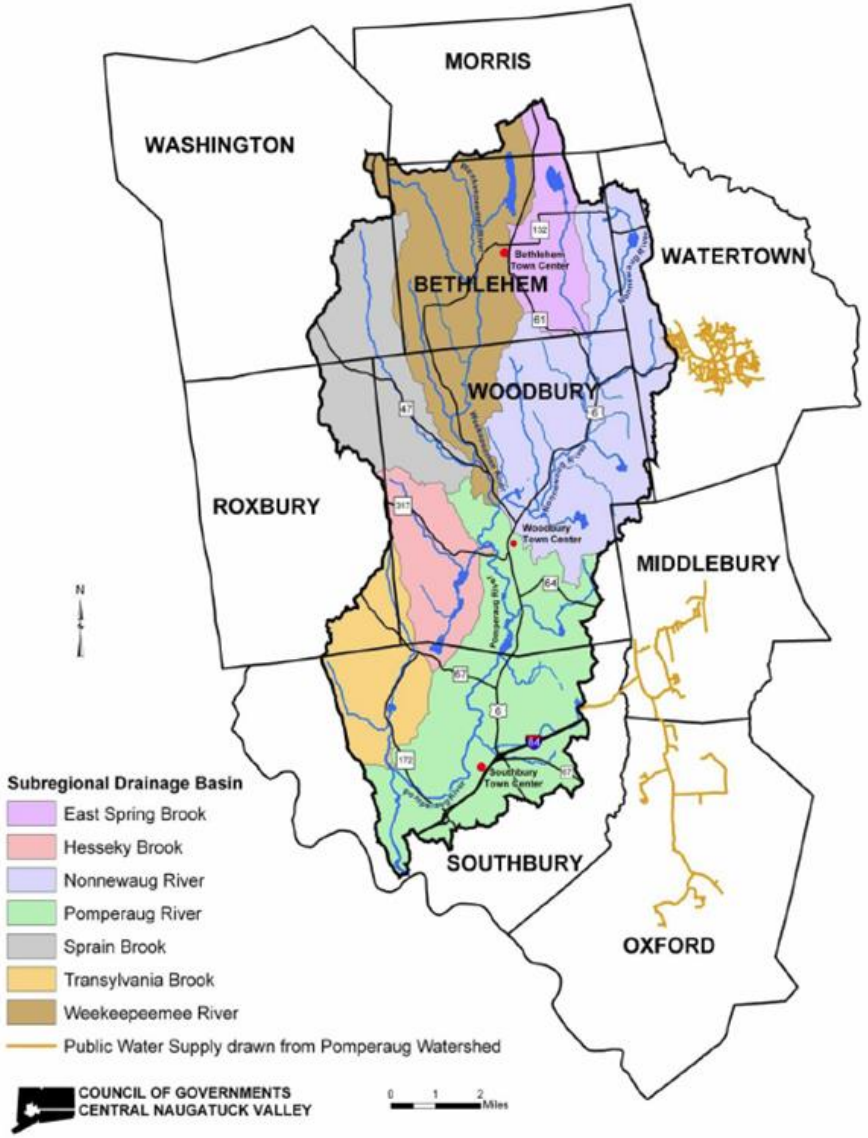
HERITAGE VILLAGE
ConnecticutWater
www.heritagevillagewater.com

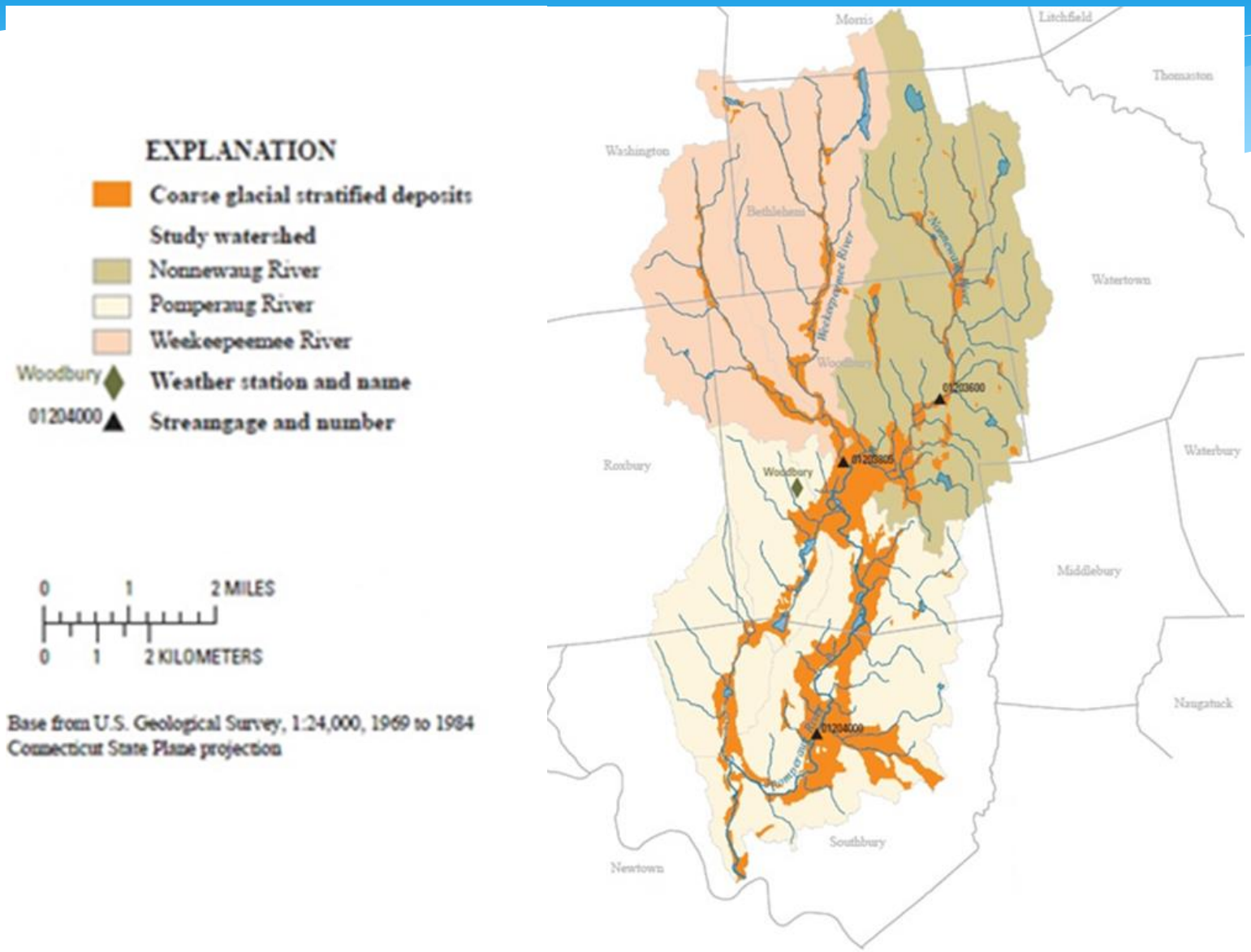
Pomperaug River Watershed

A 90-square mile watershed that drains to the Housatonic River Watershed in western Connecticut and that has geology mimicking the centrally located Connecticut River Watershed.

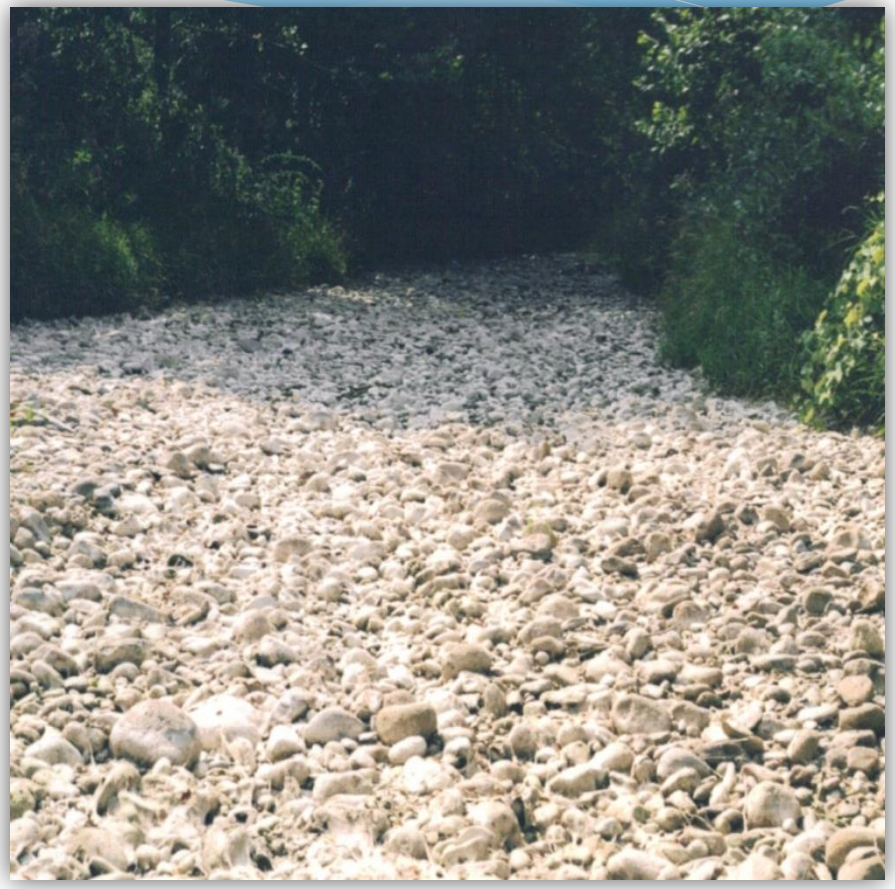




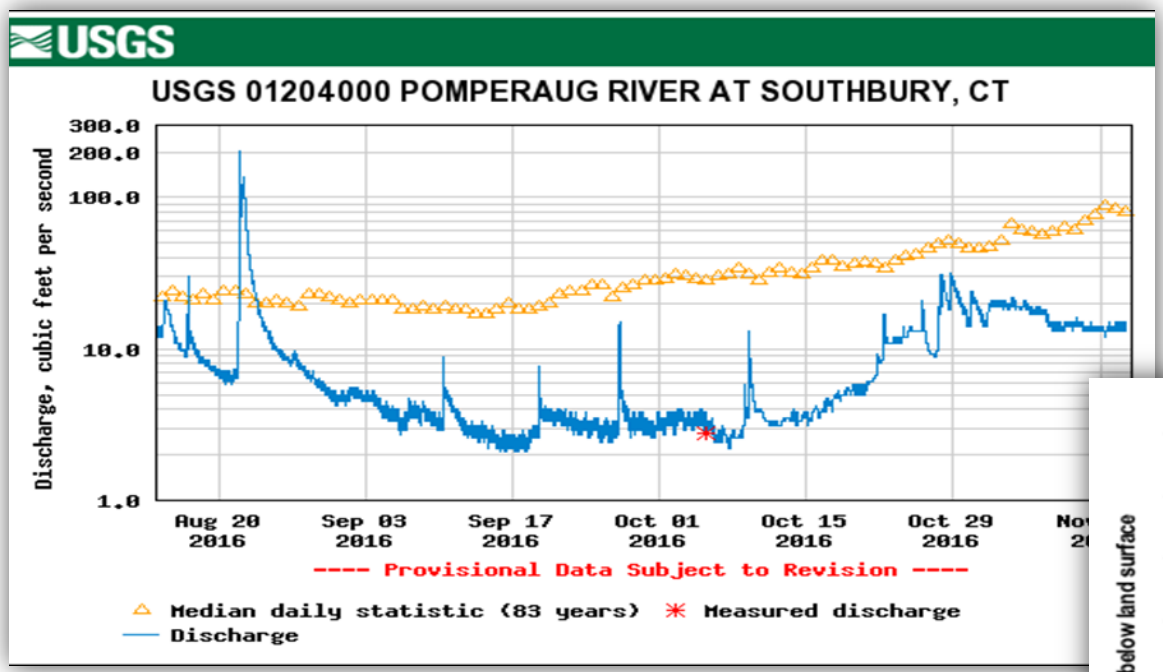


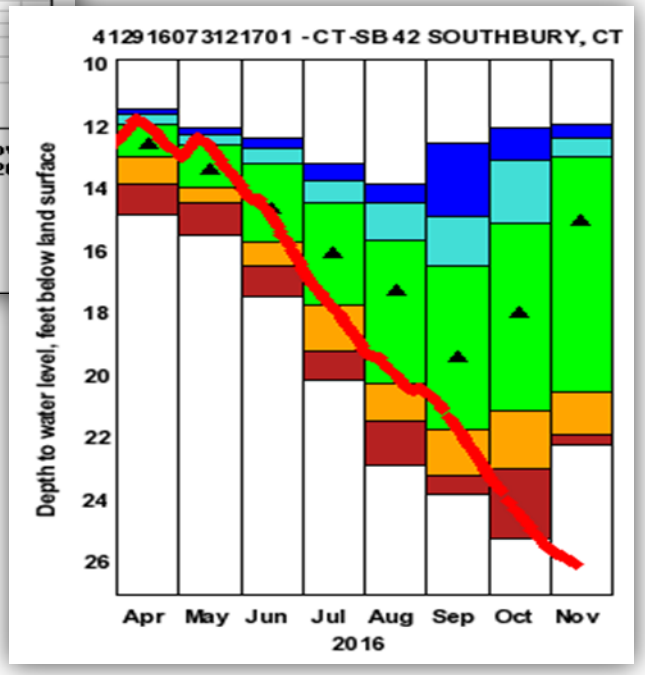

EXPLANATION
Coarse glacial stratified deposits
Study watershed
Nonnewaug River
Pomperaug River
Weekeepeemee River
Woodbury
Weather station and name
01204000
Streamgage and number
0 1 2 MILES
0 1 2 KILOMETERS
Base from U.S. Geological Survey, 1:24,000, 1969 to 1984
Connecticut State Plane projection
Morris
Litchfield
Thomaston
Washington
Bethlehem
Watertown
Woodbury
Roxbury
Waterbury
Middlebury
Naugatuck
Southbury
Newtown
01203600
01203805
01204000

Flow Extremes



USGS Data – 2016 Drought





Pomperaug River Watershed Coalition's Mission

"…to ensure the availability of high quality water in the Pomperaug Watershed communities through the use of science and education."

We share our knowledge and expertise with others committed to the protection of water resources for future generations.

Pomperaug River Assessment

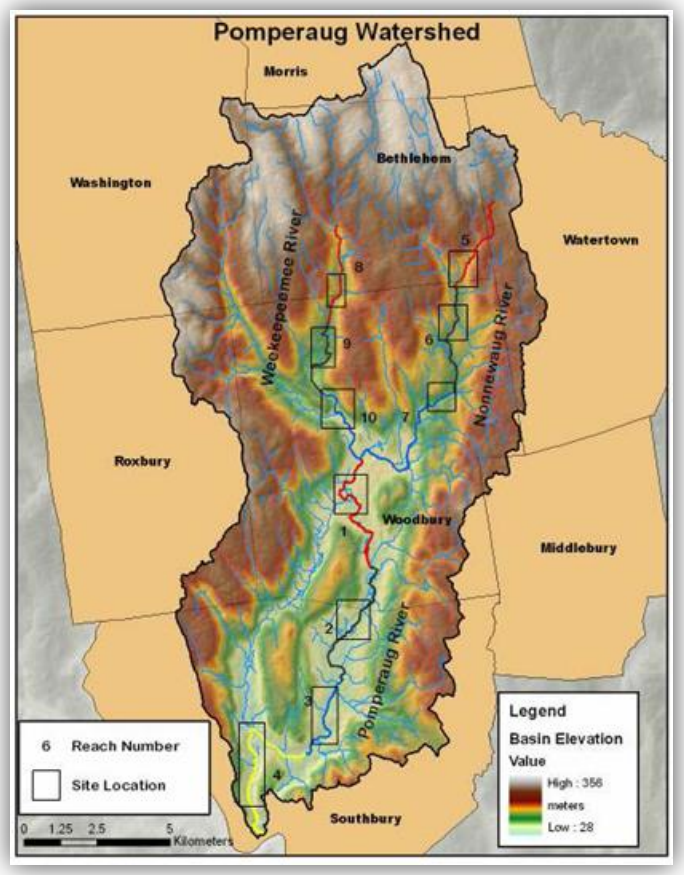
December 2016 Agreement

"Within six months of when HVWC and CWC systems are operationally interconnected under CWC ownership… HVWC and CWC shall initiate a study… to study system operations and develop operating procedure designed to mitigate impacts of HVWC well operation and improve streamflows in the Pomperaug River."

Pomperaug River Assessment

Project Participants

- First Selectman's Office
- Land Use Department
- HVWC/CWC
- Milone and MacBroom, Inc.
- PRWC



Pomperaug River Assessment

Scope of Services

- **Task 1:** Review of 2007 MesoHABSIM Study and establishment of pertinent data
  Goal: Agreed upon revised operational thresholds

- **Task 2:** Recommended operating procedures based on Task 1
  Goal: Select priorities and implement operating procedures.

- **Task 3:** Up to four meetings with project participants
  Goal: Meetings will provide the opportunity to review, discuss, and affirm consultant tasks 1 & 2

Pomperaug River Assessment

Project Status

- Two Meetings Held
- Memorandum for Task 1 Approved
- Task 2 Consultant Effort Underway
- Next Participant Meeting To Focus On Task 2 Operating Procedures

2007 NIHP Study

Assessment and restoration of instream habitat for the Pomperaug, Nonnewaug and Weekeepeemee Rivers of Connecticut

By Northeast Instream Habitat Program
University of Massachusetts, Amherst
For Pomperaug River Watershed Coalition and Connecticut Department of Environmental Protection

Authors: Piotr Parasiewicz, Jeffrey Legros, Joe Rogers, Miira Wirth

Collaborators: Scott Jackson, Hollie Kitson, Roland Deblois, Jennifer Hogue, Hunter Brawley, Thomas VanAcker, Brett Longworth, Robette Schmidt, Sean Werle, Marshall Thomas, Jessica Dodge.

January 22, 2007

Purpose of Instream Habitat Study

- **Overall Goal:** to collect the instream and watershed-scale information necessary to determine the biological objectives of a management plan for the Pomperaug River watershed

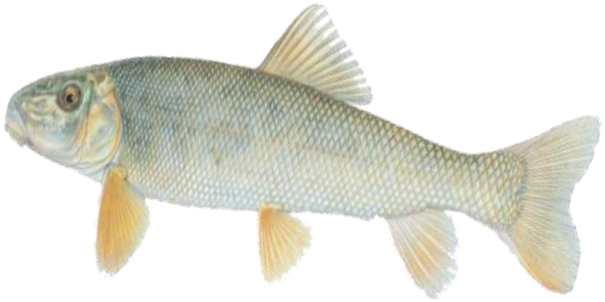
- **Primary Methodology:** Evaluate the low-flow related stresses to physical habitat and fish community using the MesoHABSIM approach

What is MesoHABSIM?

- An approach to modeling instream habitats
- A quantitative planning model to assess and simulate biological response to environmental change at the watershed-scale
- Consists of data collection strategy and analytical techniques that allow for the computation of available habitat for select fauna at specific flows

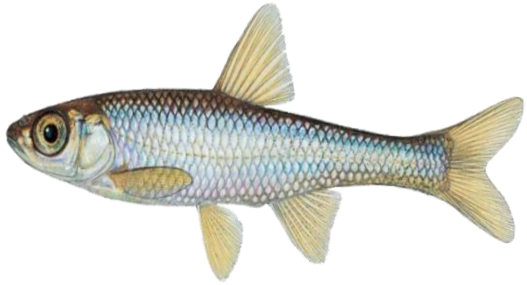
MesoHABSIM Methodological Steps

1. Develop reference fish community (RFC)
2. Select the indicator community for bioperiods
3. Define suitability criteria
4. Develop suitability maps for species at surveyed flows
5. Interpolate habitat between measured flows into rating curves

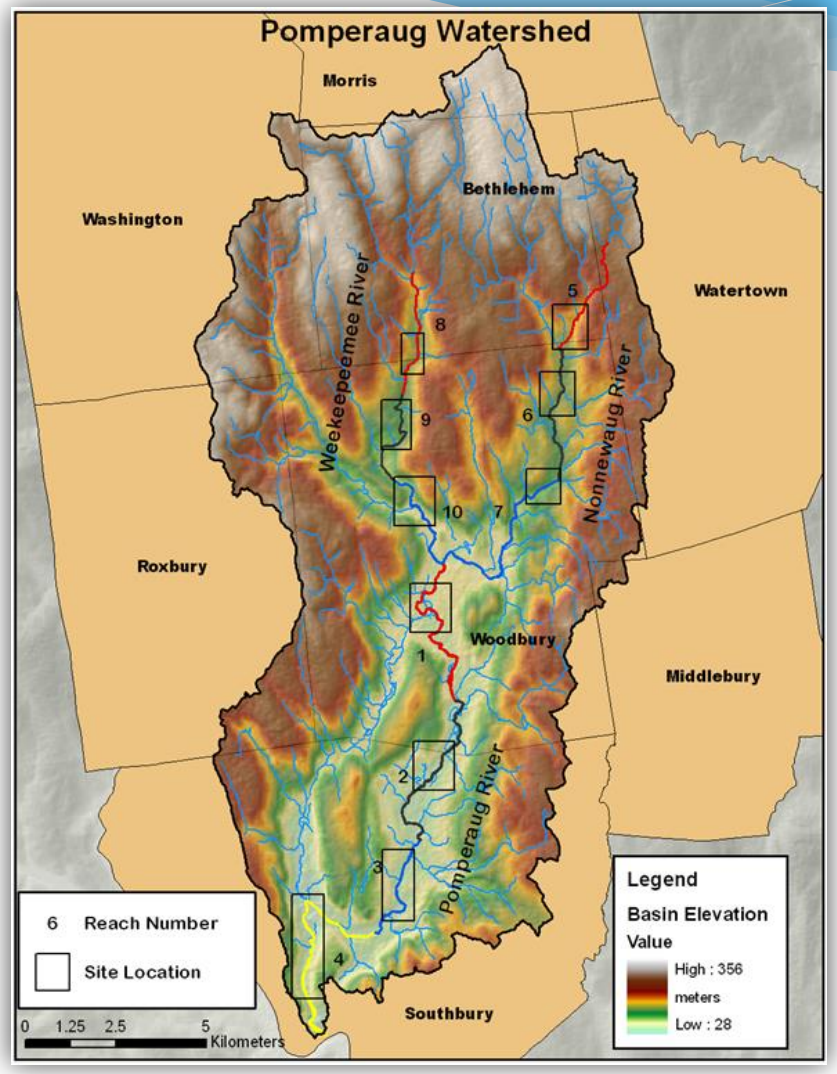


MesoHABSIM Steps (continued)

6. Aggregate models to represent seasonal habitat needs in the river
7. Reconstruction of rating curves for habitat supporting target community
8. Analysis of temporal habitat distribution
9. Management recommendations



Study Area

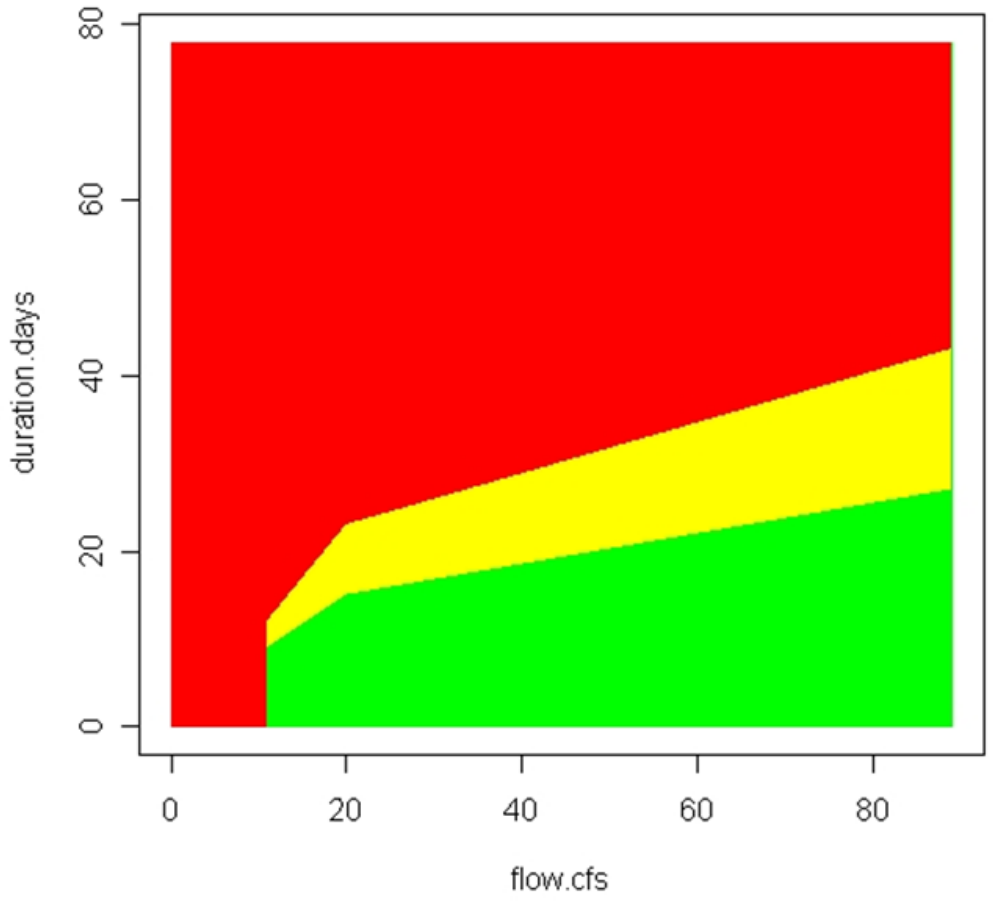

Pomperaug Watershed
Morris
Bethlehem
Washington
Watertown
Roxbury
Woodbury
Middlebury
Southbury
Weekeepeemee River
Nonnewaug River
Pomperaug River
1
2
3
4
5
6
7
8
9
10
6 Reach Number
Site Location
0 1.25 2.5 5
Kilometers
Legend
Basin Elevation
Value
High : 356
meters
Low : 28

Indicator Species for MesoHABSIM Modeling

Based on the species dominating the two RFCs, the indicator species of the MesoHABSIM modeling process included:

- American eel
- Atlantic salmon
- Blacknose dace
- White sucker
- Common shiner
- Longnose dace
- Tessellated darter
- Brook trout (Upper only)

ACTOGRAM
(Assessment of Continuous Thresholds)



Catastrophic
Persistent
Common

Conclusions and Recommendations for the *Pomperaug River Watershed* based on MesoHABSIM results

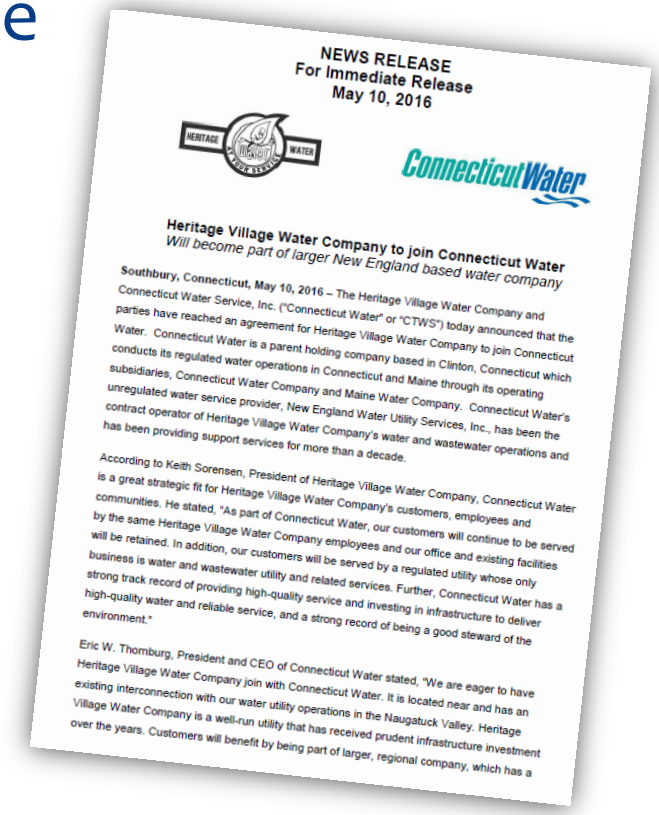
- A river with vibrant fish populations
- Pomperaug watershed represents a high quality stream with high density of fish that roughly corresponds with the RFC
- Number of stress days is higher during spawning seasons and may have some effects on stability of fish populations

Conclusions and Recommendations for the *Pomperaug River Watershed* based on MesoHABSIM results

- Development of watershed has caused reduced availability of riffle and sidearm habitats, where gravel substrate and woody debris are dominant features
- Restoration – improving habitat conditions – would reduce the number of habitat stress days, with less required flow
- Flow management – monitor and manage water withdrawals and watershed development until restoration efforts can be made

Big Picture Background

- Acquisition of Heritage Village Water Company by CTWS
- Towantic Power Plant in Oxford
- Regulatory Tools – especially Water Revenue Adjustment Mechanism (WRA)



NEWS RELEASE
For Immediate Release
May 10, 2016

Heritage Village Water Company to join Connecticut Water
Will become part of larger New England based water company

Southbury, Connecticut, May 10, 2016 – The Heritage Village Water Company and Connecticut Water Service, Inc. ("Connecticut Water" or "CTWS") today announced that the parties have reached an agreement for Heritage Village Water Company to join Connecticut Water. Connecticut Water is a parent holding company based in Clinton, Connecticut which conducts its regulated water operations in Connecticut and Maine through its operating subsidiaries, Connecticut Water Company and Maine Water Company. Connecticut Water's unregulated water service provider, New England Water Utility Services, Inc., has been the contract operator of Heritage Village Water Company's water and wastewater operations and has been providing support services for more than a decade.

According to Keith Sorensen, President of Heritage Village Water Company, Connecticut Water is a great strategic fit for Heritage Village Water Company's customers, employees and communities. He stated, "As part of Connecticut Water, our customers will continue to be served by the same Heritage Village Water Company employees and our office and existing facilities will be retained. In addition, our customers will be served by a regulated utility whose only business is water and wastewater utility and related services. Further, Connecticut Water has a strong track record of providing high-quality service and investing in infrastructure to deliver high-quality water and reliable service, and a strong record of being a good steward of the environment."

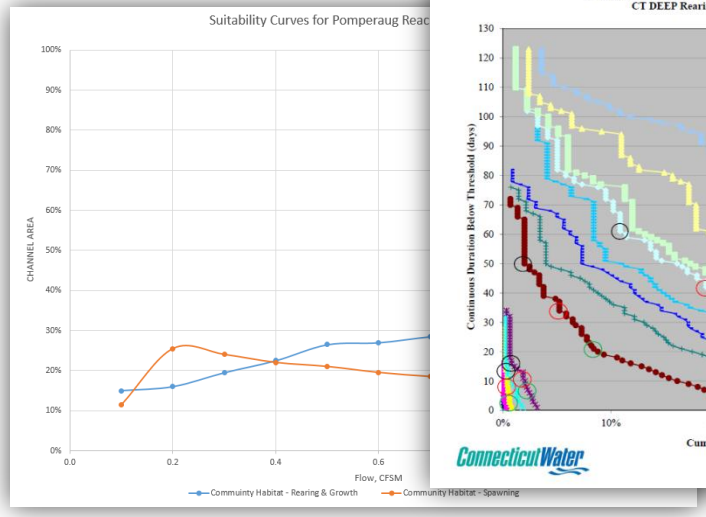
Eric W. Thornburg, President and CEO of Connecticut Water stated, "We are eager to have Heritage Village Water Company join with Connecticut Water. It is located near and has an existing interconnection with our water utility operations in the Naugatuck Valley. Heritage Village Water Company is a well-run utility that has received prudent infrastructure investment over the years. Customers will benefit by being part of larger, regional company, which has a

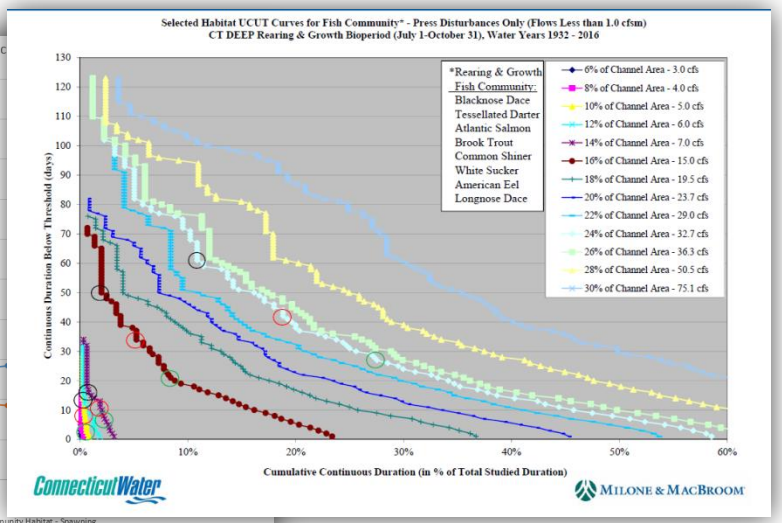
Study

- MMI updated/refined 2007 UMass work
- Focused on reaches downstream from HV Wellfield
  - 5 Wells with 2.05 MGD Registration
  - 1 MGD average daily withdrawal; 1.5 MGD peak
- 30% of withdrawals returned to river (USGS estimate)
  - 20% HV Wastewater Facility; 10% Septic

Habitat Suitability & UCUT Curves

- Graph % channel area vs flow for generic fish population
- Used to generate uniform continuous under threshold (UCUT) curves





- Selected common, critical, rare and extreme thresholds for Rearing & Growth Bioperiod (July 1 – Oct 31), and Spawning Bioperiod (June)

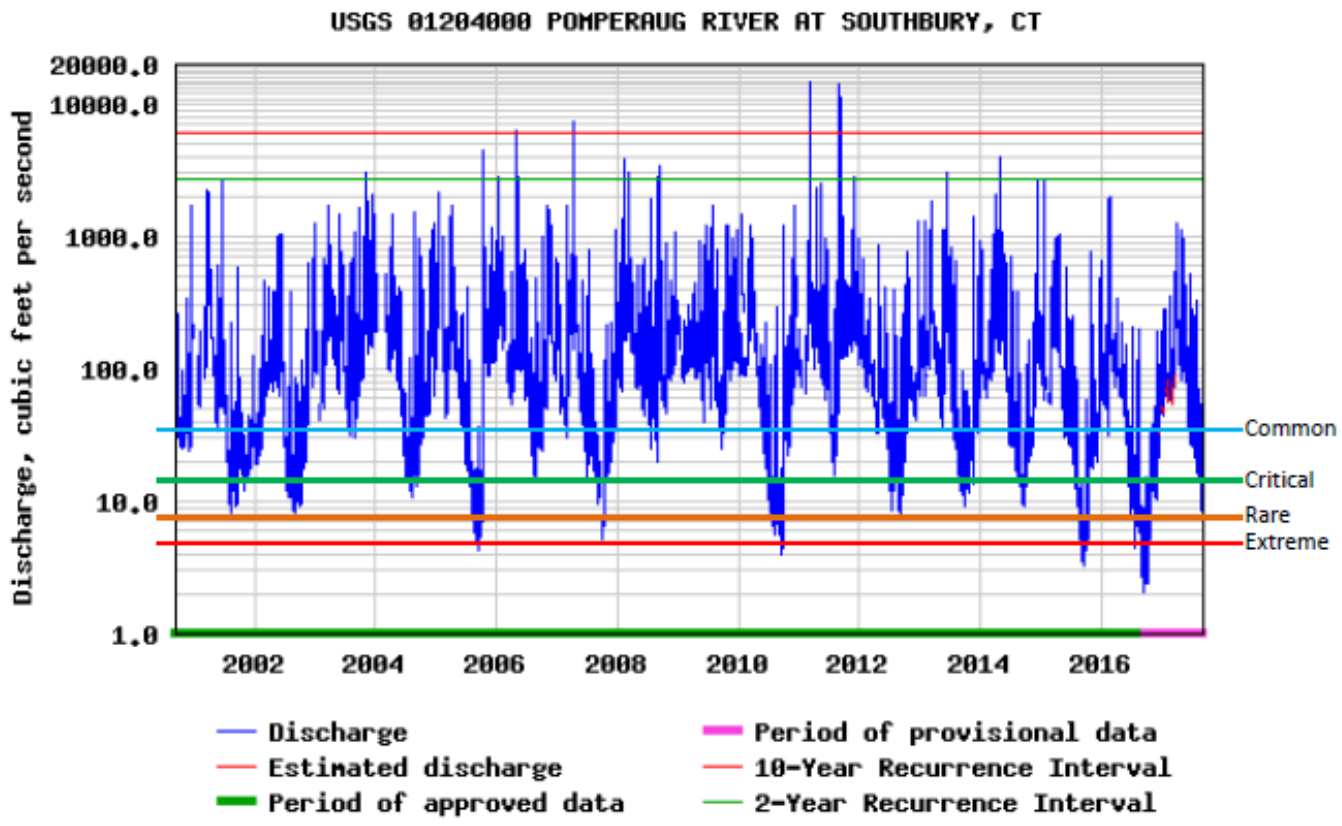
Study Results

- R&G: Existing fish community considers flows declining to 33 cfs to be "normal" (common threshold);
- Begin to experience stress when flows fall to 15 cfs (critical);
- Become very stressed at 7 cfs (rare)
- Extreme stress when flows at 5 cfs or below.
- Also identified durational aspect to thresholds, i.e., xxx number of days at each flow level.

Habitat Stressor Threshold	Parameter	Community Fish Habitat 6/1-6/30
Common	Habitat (%CA)	23%
	Discharge (cfs)	12.9
	Common Duration (Days)	8
	Persistent Duration (Days)	11
	Catastrophic Duration (Days)	16
Critical	Habitat (%CA)	22%
	Discharge (cfs)	12.3
	Common Duration (Days)	7
	Persistent Duration (Days)	10
	Catastrophic Duration (Days)	12
Rare	Habitat (%CA)	18%
	Discharge (cfs)	10.3
	Common Duration (Days)	1
	Persistent Duration (Days)	3
	Catastrophic Duration (Days)	4
Extreme	Habitat (%CA)	17%
	Discharge (cfs)	9.8
	Common Duration (Days)	1
	Persistent Duration (Days)	2
	Catastrophic Duration (Days)	3

Study Results

USGS Flow Record

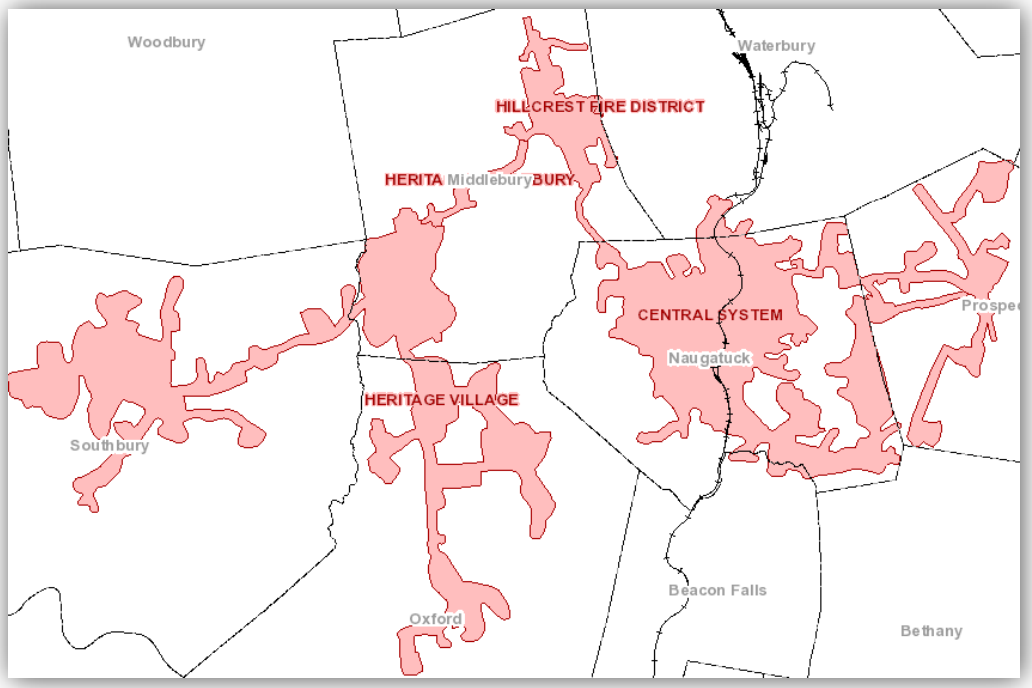


ConnecticutWater

Milone & MacBroom

Towantic

- Concurrently, negotiating water supply agreement with CPV Towantic to source 100% of plant water needs during R&G Bioperiod through interconnection with CWC Naugatuck System (Middlebury)
- Up to 150k gpd additional demand during summer
- Challenge: Rate differential = direct O&M expense impact (why HVWC avoided)
- Agreement would eliminate customer impact by compensating HVWC for added expense



Water Revenue Adjustment

- Adding sales to CPV provides no financial benefit to HVWC – actually negative incentive because adds O&M expense (purchased water expense) that is not reflected in rates
- On positive side, WRA eliminates disincentive to promote conservation; helps facilitate implementation of operations plan

Next Steps

- Finalize/execute CPV Towantic Agreement
- Controls to "sync" interconnection to plant use
- Review draft ops plan with Southbury and PRWC
- Develop realistic conservation measures and messaging

  Challenge: 63 % residential; 50 % unmetered

  For every 1.0 mgd, 0.63 mgd goes to residential end use, 0.37 mgd commercial/industrial

  1/3 (0.32 mgd) unmetered

Summary

- Pomperaug high quality river system with diverse fish population that regularly experiences stress
- Studies point to habitat restoration as providing greatest overall benefit to river
- HVWC wells add to stress during low flow periods, with 70% of withdrawals on long term basis not returned
- Balance PWS obligation with stewardship responsibilities
- Opportunity through ownership, rate making tools, conjunctive use of supplies, and simple willingness to engage with Town and PRWC to find better path forward

Questions?

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