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## Case Studies IV: Evaluation of the Owens Pond Fishway

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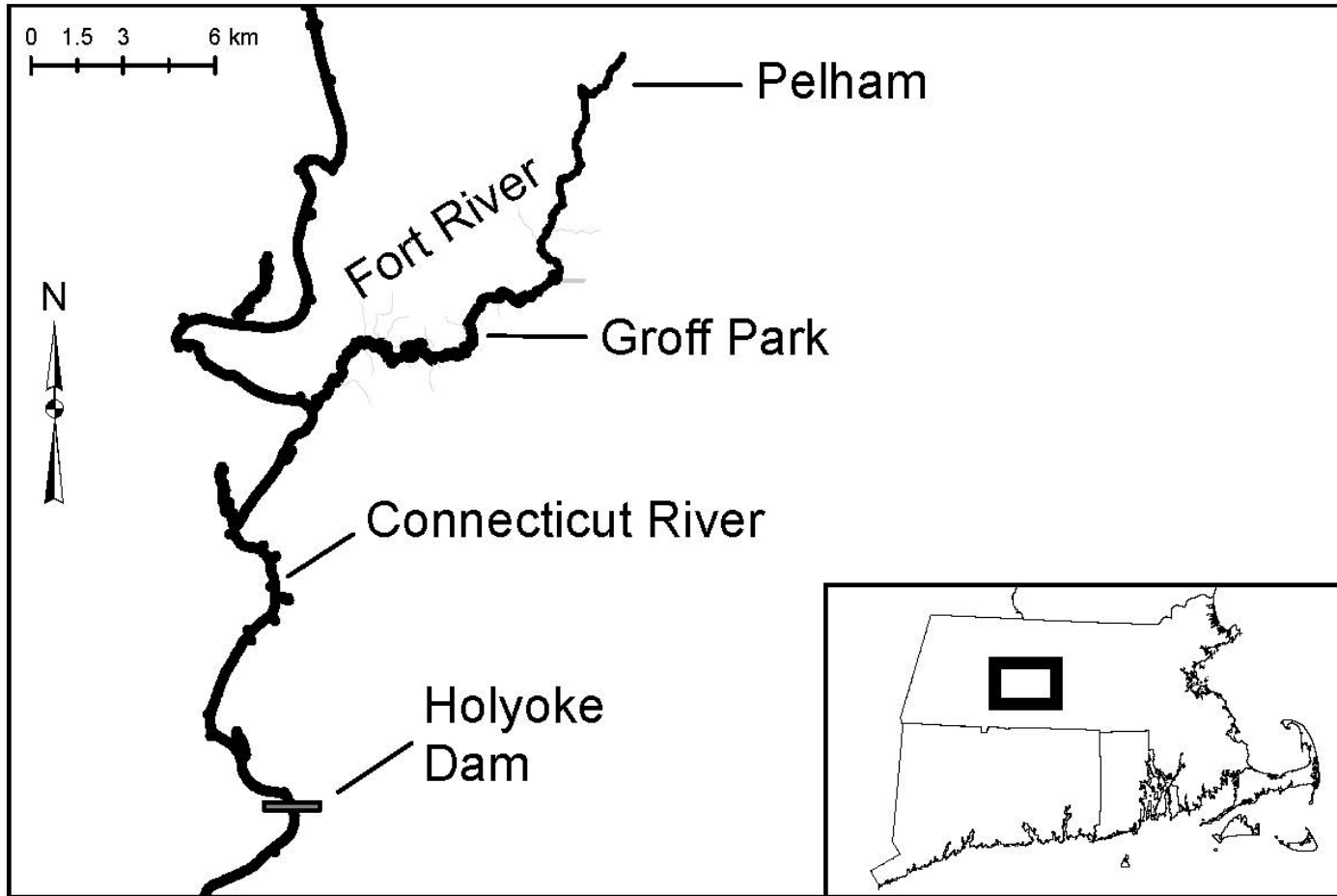
# Evaluation of the Owens Pond Fishway

**Boyd Kynard<sup>1,2</sup>, Brian Kynard<sup>2</sup>, Campbell Morgan<sup>2</sup>**

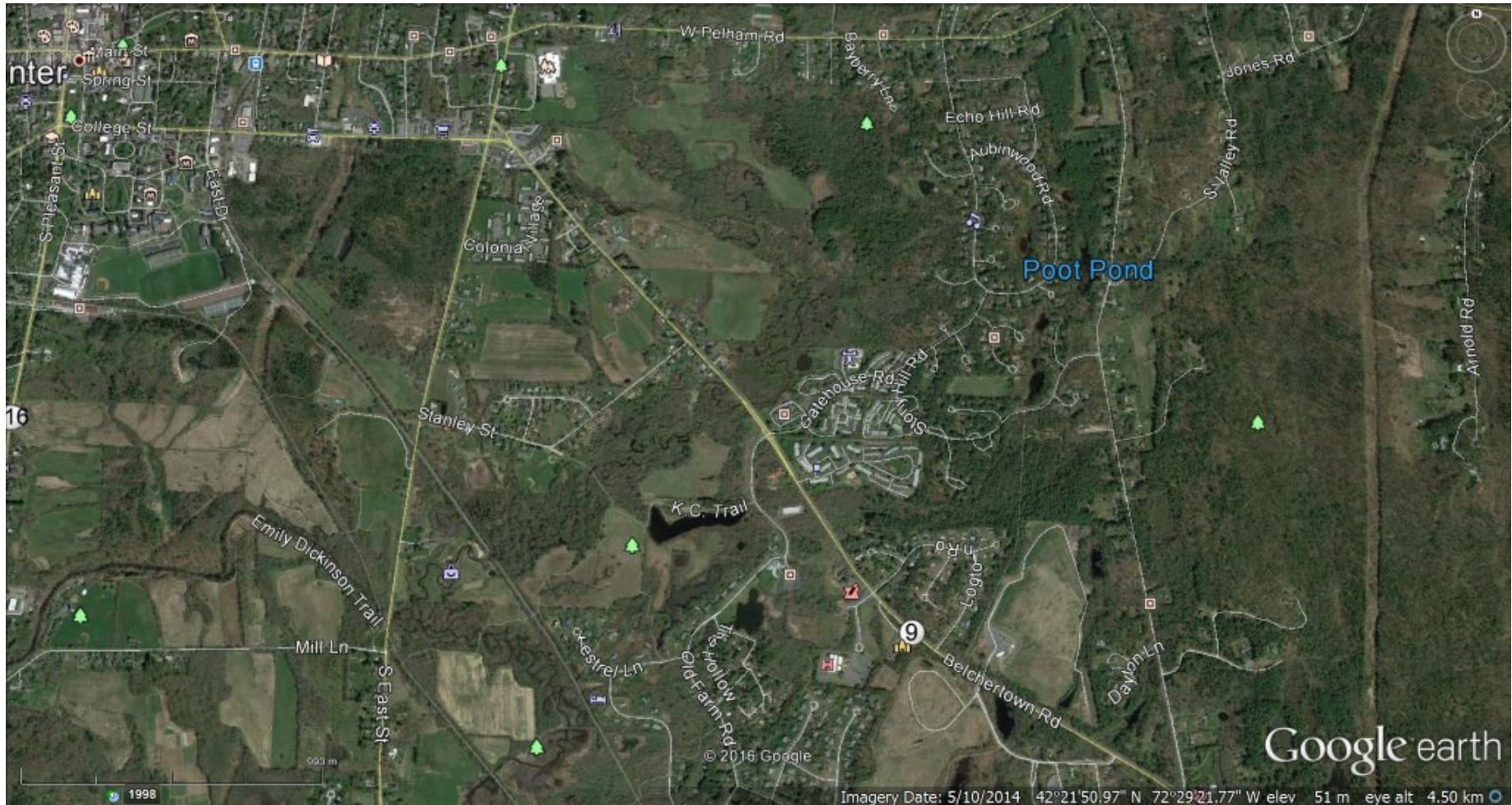
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<sup>2</sup> **BK-Riverfish, LLC, Amherst, MA**

# Fort River, MA



# Southeast Amherst, MA & Ponds Created by Damming Small Streams





A photograph of Owens Pond, a calm body of water surrounded by a dense forest of trees with vibrant autumn foliage in shades of red, orange, and yellow. The water is still, reflecting the sky and the surrounding trees. In the foreground, a rocky shoreline is visible, featuring a concrete fishway structure with several low, angled barriers. A small stream of water flows over these barriers, creating a gentle cascade. The sky is clear and blue.

# Owens Pond

Top of fishway



# Owens Pond Fishway

- 174 ft (53 m) long
- 4 % slope
- Rosgen Stream Restoration Design (2007)



- Mitigation Project of Eversource --Electric Power Company
- Designed by VBH Incorporated (Engineering Co.)

# Reach 1

- Steps 15-22 cm (6-9) inches high
- Single OR double overflow over steps





# Reach 2





# Reach 6



# Reach 7

Cut-off wall is the connection between Pond and Fishway





# Objectives

- Investigate up- & downstream fish movement between Pond and Fishway
- Identify fish species and body size in the Fishway
- Document use of Fishway by Amphibians and Reptiles
- Monitor water depth at Cut-off wall



**METHODS : Monthly Sampling- May to Nov 2015 (2 samples in June, Sep & Oct); N=10**

**Day 1-** Underwater video (GoPro) observe up- & downstream fish moves betw pond and fishway, during daylight hours.

**Day 2-** Electroshock fishway for fish +  
**Observ # Snakes & Frogs.**





# Results: Fish Species & Abundance

<u>Species</u>	<u>Abundance</u>	<u>Stage</u>
1. Pumpkinseed Sunfish	192	YOY
2. Central Mudminnow	114	Adu-Juv
3. Spottail Shiner	74	Adu-Juv
4. Common Shiner	34	Adu-Juv
5. Brown Bullhead Catfish	32	YOY
6. Largemouth Bass	20	YOY
7. White Sucker	7	Juv
8. Blacknose Dace	6	Adu-Juv
9. Golden Shiner	4	Juv
10. Chain Pickerel	<u>2</u>	Juv
	485	

# Fish Size & Fish Timing in Fishway

- **Most Abundant 6 Species (96.1% of total fish) were a mean of 60.2 mm = Most fish were small (about 2 inches long) ; YOY for 3 species.**
- **Largest fish were 7 white suckers (mean, 115 mm TL) and 2 chain pickerel (mean, 148 mm TL).**
- **82.1% of fish captured in May-Aug**



# Fishway Provided Habitat (+forage) for Amphibians & Reptiles

Number Observed During Electroshocking

<u>Snakes</u>	<u>Turtles</u>	<u>Frogs</u>
14	1	53

# Upstream Fish Passage Timing: n=20

<u>Months</u>	<u>Pumpk</u>	<u>LMB</u>	<u>Cyprinid</u>	<u>ChPi</u>	<u>?</u>	<u>Total</u>
May-Jul	1	2	1	1	0	5
Aug-Sep	8	4	1	0	2	15
Oct-Nov	0	0	0	0	0	0

**Conclusion:** Some YOY Pumpk & LMB (75%) may return to pond; Rare indiv. of other species ascend.

# Downstream Fish Passage Timing: n=220

<u>Months</u>	<u>Pumpkinseed YOY</u>	<u>LMB YOY</u>
May-June	104	3
July	24	79
Aug-Sep	10	0

**Conclusion:** Some YOY Pumpk & LMB emigrate from Pond into Fishway.



# **Water Depth in cut-off wall notch on days during monthly sampling**

**Mean = 6 cm (2.4 inches)**

**Minimum = 2.5 cm (1 inch)**

**Maximum = 11.4 cm (4.5 inches)**

**Depth logger recorded only 7 days during May-Nov when Cut-off notch depth was  $\geq 15$  cm (6 inches)—Low water flow into fishway is typical.**

# Conclusions: Habitat

- **HABITAT:** Fishway provides habitat for tens of small individuals of 10 fish species and tens of snakes and frogs.

# Conclusions: Fish Passage

- **DOWNSTREAM PASSAGE:** Successful downstream migration during June-July by YOY pumpkinseed Sunfish & LMB spawned in Pond. LMB are important to sport fisheries & small ponds + fishways may be an important way to add LMB to Connecticut River fisheries.
- **UPSTREAM PASSAGE:** Upstream passage is RARE; Occurs May-Sep (YOY Sunfish & LMB dominate). Rock at top of fishway is a likely barrier to fish movement.



# Thoughts for Future Pond + Fishway

- **Flow or water depth** – if water depth is typically low, design entire fishway to conserve water.
- **Size of fish** – use info to select step height.
- **Adapt the Rosgen stream design to include fish passage-movement, particularly, at the connection between a cut-off wall—top of fishway.**



A photograph of a concrete culvert in a stream. The culvert is a narrow concrete channel that runs through the center of the frame. Water is flowing through it, creating a small waterfall effect as it drops over a ledge. The surrounding area is rocky and has some sparse vegetation. The text is overlaid in red on the upper half of the image.

# Acknowledgements:

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Project Coordination: VBH

Permits: Mass Div. Fish & Wildlife

A. Danylchuk (UMass Prof.) use of video equipm.

**The End**

APR/21/2016