

# Water Quality and Fisheries in Huntington Wildlife Forest - Roles of Climate and Jellyfish

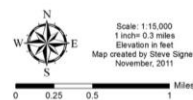
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# Background

## Huntington Wildlife Forest



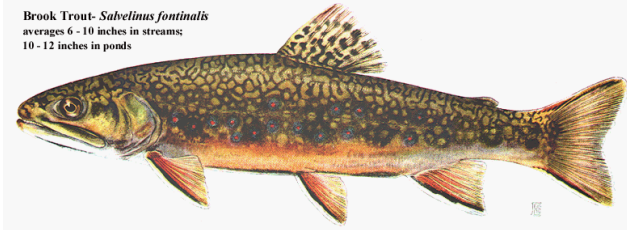
State University of New York  
College of Environmental Science and Forestry



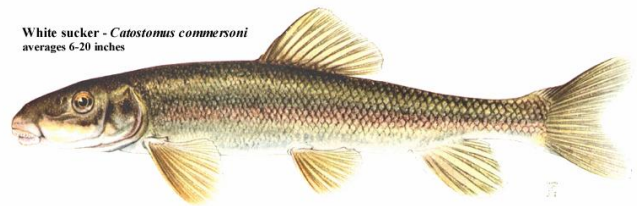
# Overview of HWF Lakes

- ▶ Wolf Lake
  - ▶ 58 hectares, 14 meters maximum depth
  - ▶ Pristine, native fish community
- ▶ Rich Lake
  - ▶ 160 hectares, 18 meters maximum depth
  - ▶ Brook Trout (confirmed 2017); Lake Trout
- ▶ Arbutus Lake
  - ▶ 49 hectares, 8 meters maximum depth
  - ▶ Reclaimed in 1973
  - ▶ Brook Trout, Brown Bullhead, Blacknose Dace
- ▶ Catlin Lake
  - ▶ 16.8 m maximum depth
  - ▶ Brook Trout and Lake Trout historically
  - ▶ Current SMB, LMB, yellow perch
- ▶ Deer Lake
  - ▶ 38.2 hectares, 3.0 m maximum depth
- ▶ All participate in ALAP

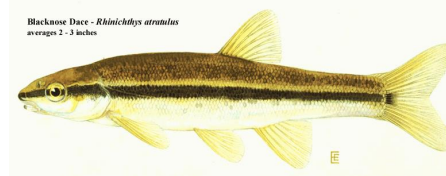
Brook Trout - *Salvelinus fontinalis*  
averages 6 - 10 inches in streams;  
10 - 12 inches in ponds



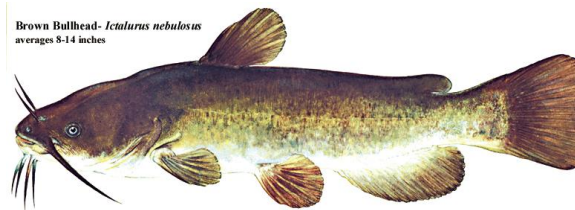
Lake trout - *Salvelinus namaycush*  
averages 15-34 inches



White sucker - *Catostomus commersoni*  
averages 6-20 inches



Blacknose Dace - *Rhynchichthys atrimulus*  
averages 2 - 3 inches



Brown Bullhead - *Ictalurus nebulosus*  
averages 8-14 inches



# Wolf Lake - Summer 2016



# Wolf Lake Changes - July 2016



- ▶ Color change in Wolf Lake (2015 and 2016)
- ▶ Low numbers of fish in surveys

# Wolf Lake - September 2016

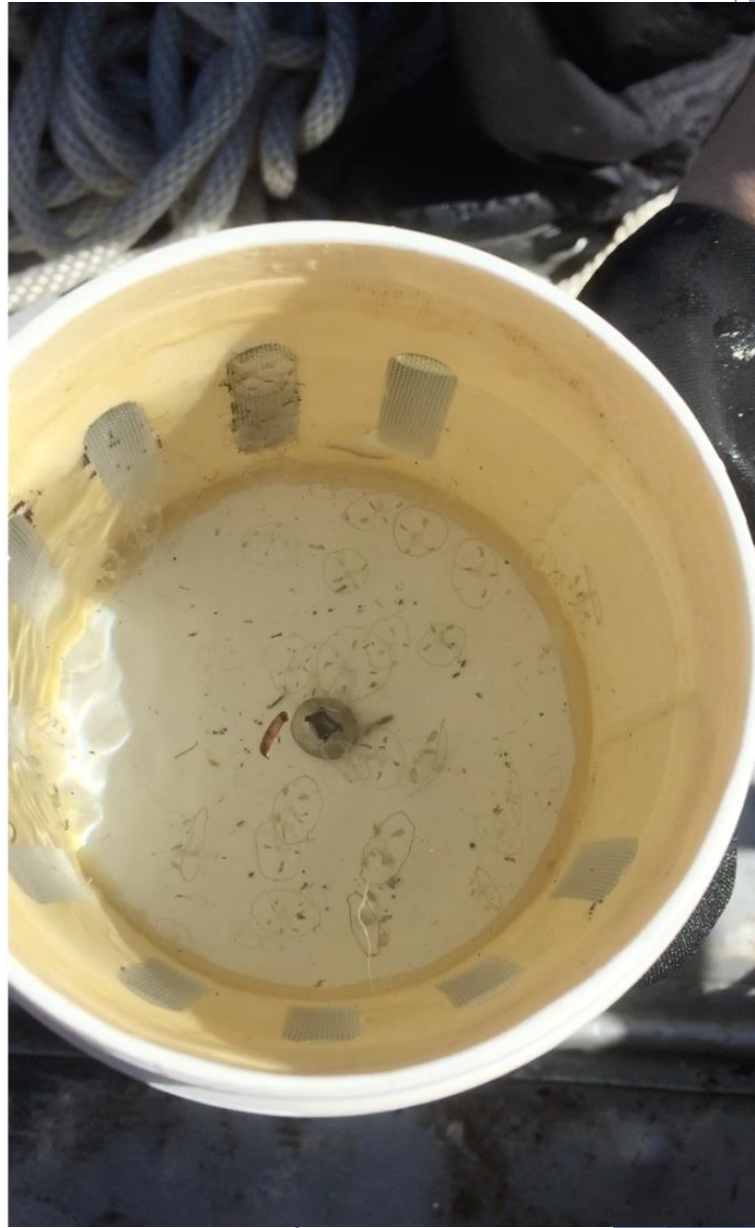
- Discovery of non-native freshwater jellyfish *Craspedacusta sowerbii* in Wolf Lake





# Freshwater Jellyfish

- ▶ *Craspedacusta sowerbyi*
- ▶ Native to China
- ▶ Impact is contradictory
  - ▶ Medusa stage preys on zooplankton
  - ▶ Cause of color change?



# Research Summer 2017

- ▶ What are the potential detrimental effects of freshwater jellyfish
  - ▶ Cascading effects?
  - ▶ Assess habitat suitability for fish and plankton in 3 lakes
  - ▶ Quantify zooplankton communities among the 3 lakes
- ▶ What role does climate change have?
  - ▶ Compare new data to historical data sets
- ▶ Strategic location of the HWF
  - ▶ Lack of human disturbances, except atmospheric changes



# Summer 2017 Study Sites



# Sampling Methods





# 2016 vs 2017

- ▶ Cooler water temperatures
- ▶ No algal bloom as seen previous 2 years





# Climate Data

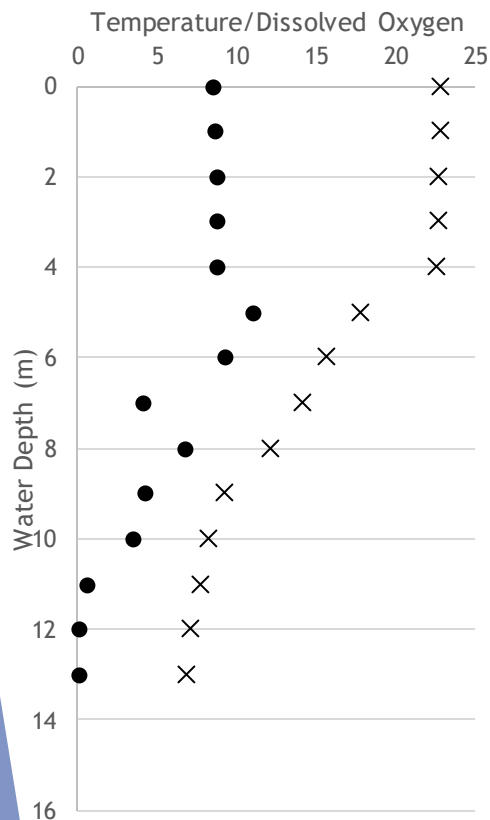
	30 Year Average	2016	2017
Month	Precipitation (cm)		
June	9.85	10.82	16.26
July	10.29	8.45	12.83
August	9.95	12.52	11.48
Total	30.09	31.79	40.57

Month	Air Temperature (°C)		
June	15.8	15	16.2
July	18.0	18.6	18.1
August	17.1	19.1	15.5
Average	16.9	17.6	16.6

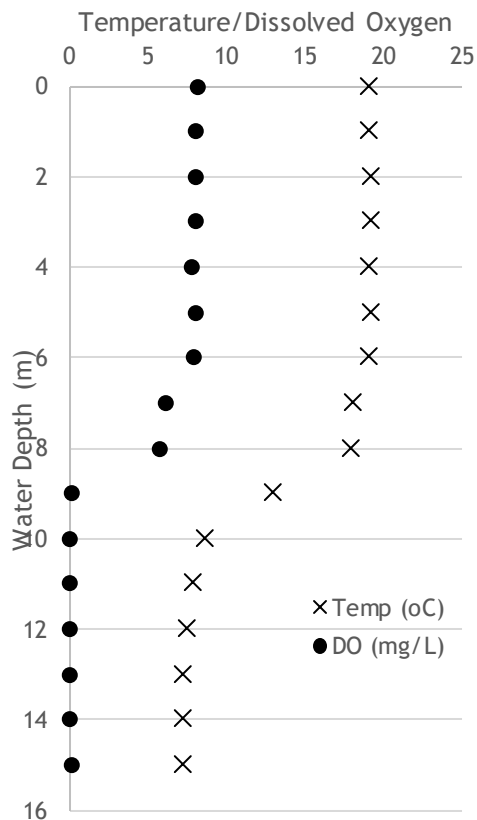
Data from NOAA: Newcomb, NY

# Water Quality - Wolf Lake

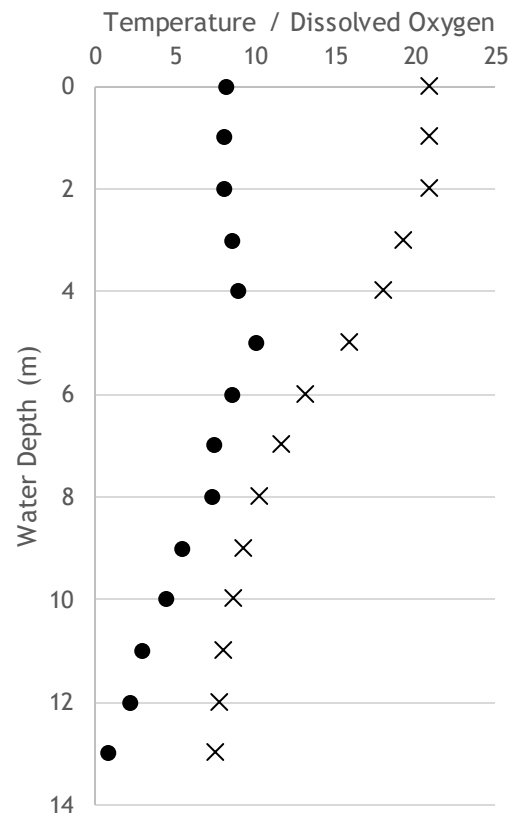
July 20, 2016



Sept. 24, 2016



July 6, 2017



# Fish Community - July 2016, 2017

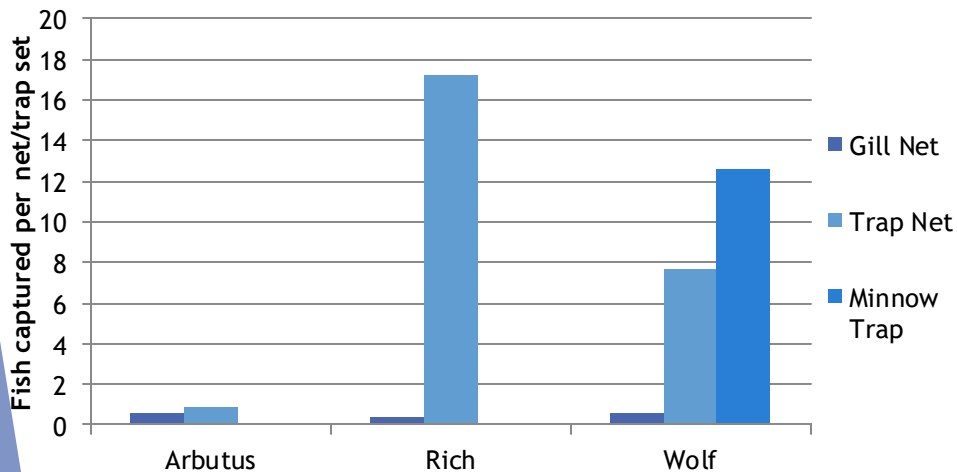
Summary of fish count HWF (all gears) July 2016 and 2017

	Arbutus		Catlin		Wolf		Rich
	2016	2017	2016	2017	2016	2017	2017
Banded Killifish							2
Blacknose Dace	56	64			4		
Brook Trout		5			2		1
Brown Bullhead	4			4			
Central Mudminnow				1			
Common Shiner					12	27	
Creek Chub			1		1	4	
Cutlips Minnow					3	11	
Fallfish				2			
Largemouth Bass			1	1			
No. Redbelly Dace					6		
Pumpkinseed			11	1	3		5
Redbreast Sunfish			27		5	93	1
Rock Bass			5	9			2
Smallmouth Bass			7	9			11
Walleye							2
White Sucker				11	1	4	1
Yellow Perch			1	4			18
<b>No. Species</b>	<b>2</b>	<b>2</b>	<b>7</b>	<b>9</b>	<b>9</b>	<b>5</b>	<b>9</b>

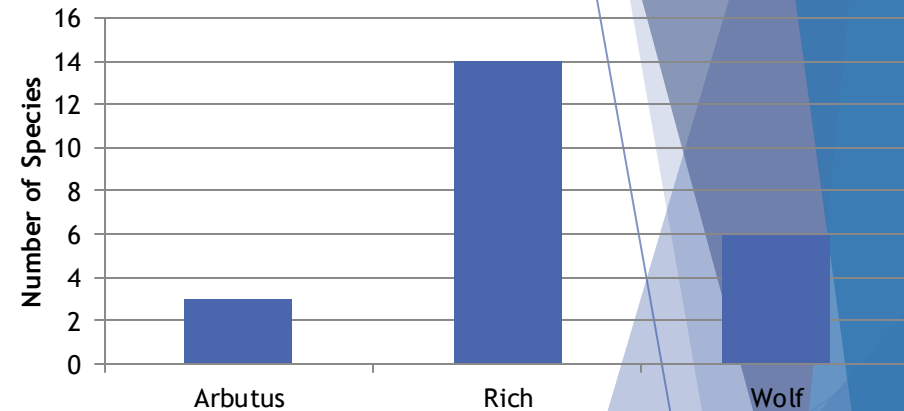


# Fish Community June-Aug 2017

## Catch Per Unit Effort of Gear Types Among Lakes on HWF



## Species Richness among 3 Lakes on HWF



- ▶ Species richness ranged from 3 - 14
- ▶ Effort ranged from 29 - 34 net sets among lakes

# Arbutus Lake - Summer 2017

- ▶ Total of 17 fish caught all summer
  - ▶ 32 nets set over course of summer
- ▶ Dead Brook Trout found 8/2/2017



Depth (m)	Temp (°C)	DO (mg/L)
0	24.7	7.42
1	23.9	7.5
2	22.2	7.53
3	20.9	6.76
4	18.5	2.36
5	14.9	0.65
6	11.9	0.4
7	10.3	0.43

Water quality data from  
8/2/2017

# Rich Lake - Summer 2017

- ▶ 14 species observed, 7 non-native
- ▶ One large brook trout from 12 m water depth





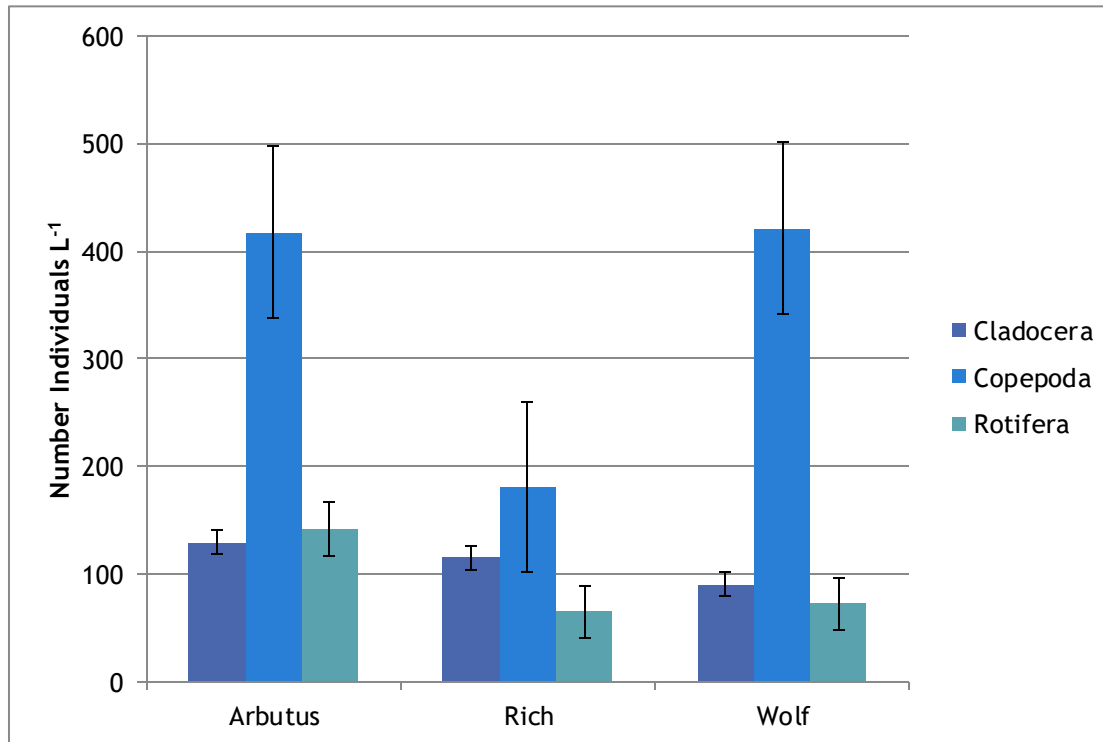
# Wolf Lake - Summer 2017

- ▶ No Brook Trout captured during summer sampling
- ▶ Dwarf sucker, *Catostomus commersonnii utawana*
  - ▶ Subspecies of White Sucker
  - ▶ Late spawner (June)



Captured near north inlet, 6/15/2017

# Zooplankton Analysis



no statistically significant difference in relative zooplankton class abundance between the sample lakes ( $F_2=0.41$ ;  $p=0.681$ )

# Chlorophyll-a 2016-2017

	Rich Lake		Wolf Lake		Arbutus Lake	
	2016	2017	2016	2017	2016	2017
June	1.9	3.1	2.2	2.4	1.6	1.2
July	0.9	4.2	0.2	1.9	1.4	1.3
August	3.9	3.9	1.7	1.4	3.0	1.3
Average	2.2	3.7	1.3	1.9	2.1	1.3

Outlier highlighted in yellow – does not coincide with observations of green water in July 2016

# Summary

- ▶ No medusa stage *Craspedacusta* in 2017
  - ▶ Zooplankton in all three lakes were of similar composition
- ▶ Water quality in question with little historical data
  - ▶ Low DO in Wolf Lake hypolimnion may limit habitat for coldwater fish
- ▶ Overall fish catches have been down over the past several years compared to historical catches



# What's Next?





# Questions

