

LIMNOLOGY PRACTICUM POSTER SESSION 2012

STUDENT INDEPENDENT PROJECTS

12 ILLICK HALL, 13 DECEMBER 2012

ABSTRACT BOOK

SONG LAKE and other KETTLE LAKE PROJECTS

Hey Carp Get Off My Lawn:

The Age Determination Of Grass Carp To Verify the Presence of Reproduction

Eric R. Johns, Robert E. Alexander and Derek A. Gerber

With concerns over the possibility of reproduction occurring among stocked triploid grass carp in Song Lake, a survey of grass carp age was conducted. 2,557 triploid grass carp were stocked between 1996 and 2006, so there should not be any stocked grass carp present in the lake eight years old or younger. The survey was conducted by placing 4 trap-nets in Song Lake, and sampling for 11 days out of a period of 21 days. All captured fish were counted and released with the exception of any grass carp. Total length was measured and hard parts collected from any grass carp. A total of 5 grass carp were captured during the survey. The opercle of each grass carp was kept and cleaned of all flesh. Then ImageJ and Dahl-Lea direct proportions were used to back-calculate each grass carp's length at each year of its life. By back-calculating length at age, the average length of an 8 year grass carp was obtained, which was 30.5 inches. None of the grass carp we captured fell on or below the 30.5 inch marker. Any grass carp captured in the future that fall close to 30.5 inches or smaller should be submitted for aging. While conducting the survey, lake chubsuckers were observed and could easily be misidentified as young grass carp for they have a similar appearance to carp and ranged 9 to 12 inches in length.

Which Chubsucker is Which? Using Meristic Characteristics to Identify Possible Morphological Differences Between *Erimyzon sucetta* and *Erimyzon oblongus*

Justin Zimmerman, Caitlyn Saraceno and Mike Guinan

The Lake chubsucker, *Erimyzon sucetta*, is listed as a threatened fish of New York State and until recently a confirmed specimen had not been caught since the 1930s. We obtained three specimens of potential lake chubsuckers from Song Lake in attempt to compare their morphological characteristics to those of the creekchub sucker *Erimyzon oblongus*. We used Paleontological Statistics (PAST) to compare meristic measurements of three potential lake chubsuckers from Song Lake, N.Y. and 11 other chubsuckers from other locations that are more likely creek chubsuckers. Our morphometric analyses indicated two separate groups of fish existed; however, we were unable to differentiate the specimens from Song Lake from the chubsuckers sampled from various other sites. We believe morphological differences we detected are likely due to sexual dimorphism Future research should include morphological differences between male and female along with genetic analysis and examination of known lake and creek chubsuckers from museum collections.

Microsite Biodiversity Within Song Lake: Fish, Creepy Crawlies, and Plants

Adam S. Busman, Luke Gervase, and Trevor P. Oakley

Song Lake has a variety of environmental conditions that differ between shorelines due to the different uses of those shorelines. On the south side of the lake there are agricultural fields, and only the east side of the lake is relatively undisturbed by human development. By looking at the macrophyte, invertebrate and fish assemblages at the respective sites we can get an idea of what habitats certain species prefer, which can later be used to help achieve management goals. Our objective was to observe if there was any correlation of diversity and richness between macrophytes, invertebrates and fish among four abiotically different sites. Sampling was done using seine hauls to sample the fish community and d-nets to sample the macroinvertebrates. The results showed the sites of the most diverse assemblages varied for each biological parameter. While there were diversity differences between the sites, they were not solely due to the shoreline development, since the most developed sites were not always the least diverse. This could be due to high nutrient inputs creating an unsuitable environment for some animals, causing the non-sessile animals to leave the area, while the macrophytes might prefer these sites. Overall the data were variable, and in order to understand diversity patterns within the lake, more research needs to be done on the lower trophic levels and the specific water chemistry of each site. In addition, sampling should be conducted during different times of the year to account for seasonal differences. Finally, the south and west ends of the lake were found to be most similar to one another as were the north and east ends of the lake.

Salt Tolerance of Macroinvertebrates in Tully and Little York Lake

John Cleveland

Central New York is a region of the country that receives large amounts of snowfall and thus large amounts of road salt must be applied to maintain safe roadways. Tully and Little York Lakes may be experiencing the effects of road salts, because of the presence of roads in their watersheds, especially I-81 that runs directly over Little York Lake. The objective of this study was to determine which lake has the higher specific conductance, if the salt tolerance of macroinvertebrates in Little York Lake is higher than those in Tully Lake, and determine the salt tolerance of macroinvertebrates from each lake in the opposite lake's water. Macroinvertebrates were collected from each lake and placed in 900ml containers with their own lake water or the opposite lake's water. Salt was added every six hours in increasing increments for 36 hours. The specific conductance was slightly higher at Tully Lake than at Little York Lake (and both lakes had higher conductivity than Song Lake). There were no significant differences between the salt tolerances of macroinvertebrates in either lake, although mortality effects increased when macroinvertebrates were stressed by being moved to a different lake's water. This may have been because samples were collected in the fall, rather than in the spring after large amounts of road salts have been applied, or due to low sample size and testing of only certain taxa. Future research could be done comparing Tully Lake and Little York Lake to lakes in the area with a larger difference between their specific conductance, such as Song Lake.

PROJECTS ON OTHER AQUATIC SYSTEMS

Community Structure of Aquatic Macroinvertebrates in Three Eastern N.Y. Lakes

James P. Tucci

Aquatic macroinvertebrates serve vital roles in lentic ecosystems. They are a source of sustenance for fish, they breakdown large detritus and most importantly for this project they serve as indicators of water quality. This project highlighted the indirect effect, through possible fish predation, the chemical Sonar AS® had on diversity, species richness, HBI index value, and community assemblage in three eastern NY lakes. Sonar AS® is commonly used to treated nuisance macrophytes such as Eurasian milfoil *Myriophyllum spicatum*. The three lakes, Crooked, Crystal and Glass were treated as follows, respectively: once historically, twice in 2012, and never treated with this chemical. In streams, the orders ephemeroptera, plecoptera, and trichoptera are used for the EPT water quality tests. In this experiment a COTE (coleoptera, odonata, trichoptera, ephemeroptera) was used for lake water quality assessment. The HBI indexes for the Crooked, Crystal and Glass lakes were; 5.94, 5.90, and 3.79, respectively. The COTE indexes were 7, 13, and 16. Species richness were 15, 19, and 25. Shannon-Weiner diversity for the three lakes was 2.65, 2.39, and 2.77. The untreated lake, Glass exhibits a higher COTE value as well as great richness and diversity. In addition, it shows a lower HBI value which is indicative of better water quality for intolerant species. To determine the significance of this correlation the experiment should be performed again using multiple replicates. Also the chemical could be directly applied to the organisms at varying concentrations to test if any mortality occurs.

Chlorophyll and Buffering Capacity of 12 Lakes in Two Regions of New York State

Sarah Pratt

Acid deposition is a concern in the Northeast due to high levels of emissions and prevailing winds. A water body's resistance to acidification can be quantified using a gran titration to determine its buffering capacity, or acid neutralizing capacity. Chlorophyll is often correlated with water chemistry due to algae's dependence on nutrients in the water column. Both buffering capacity and chlorophyll are connected to the geology of the region. The Capital region and the Adirondack region were selected for this study, and a 500ml surface water sample was collected from six lakes in each of the regions. There was significantly higher chlorophyll and higher pH in the Capital region lakes. There was a strong correlation between pH and acid neutralizing capacity in these twelve lakes, which was strongest in the Adirondack region. Between the two regions, there was no significant difference in buffering capacity in this dataset.

Examining the Effects of Human Additions of Feed Corn on the Food Web in an Urban Pond in Syracuse, NY Using Stable Isotope Analysis

Stephen Balogh, Danielle Thiele and Brian van Ee

Webster's Pond is a small 4.2-acre urban pond that has a wide gradient of human influence. One side of the pond is fed by a natural spring and is rarely visited by park visitors, while the other side is urbanized and has dozens of visitors daily that feed corn to waterfowl. Some 40 short tons (36 metric tons) of feed corn enter this ecosystem each year. In most undisturbed lake ecosystems, primary production from phytoplankton, algae, and plants is the basis of the food web, however, inputs (natural or human-influenced) from terrestrial primary production can influence food webs. In some cases consumers rely more heavily on terrestrial organic inputs than on primary production by lake autotrophs. We hypothesized that terrestrial (corn) inputs support a majority of consumer biomass production at all trophic levels. To test this, we sampled the lake for representative species at each trophic level, and performed stable isotope analysis to quantify the utilization of autochthonous (within pond) and allochthonous (derived from corn) resources in both producers and consumers. Based upon the results of the stable isotope analysis, we reject the hypothesis that corn inputs support a majority of consumer biomass production at all trophic levels. Benthic algae appears to be the basis for a majority of the food web, although an alternative hypothesis is that carbon and nitrogen in higher trophic level consumers is derived from equal parts phytoplankton, algae, and corn. These results were unexpected and we plan to sample again in the spring to see if there the results change seasonally. We also want to sample a pond that does not have any corn inputs to see how the parameters compare between a lake with corn influence and a lake without.

Comparison of Benthic Macroinvertebrate Communities Between Open and Protected Embayments of the Upper St. Lawrence River

Kristen Sharpe, Kaitlyn Smith and Mariah S. Taylor

The purpose of this study is to get a better understanding of macroinvertebrate communities and their diversity in the upper St. Lawrence River in order to assess the quality of habitat available to these organisms. Embayments were classified into either open or protected based on direction to prevailing wind and relative vegetative cover. Three sites of each embayment type (total of n=6) were surveyed using a D-net in separate timed meanders until approximately 100 individuals were collected. Vegetation surveys were conducted along three transects placed randomly in each embayment where vegetative species were identified and percent cover of each species and overall cover was estimated. A dissecting scope was used to identify the organisms to the lowest possible taxa. Statistical methods included Shannon-Weiner diversity index for each site and a student's t-test to compare these values statistically. There was a higher macroinvertebrate richness in the protected embayments and there was significantly more biodiversity in protected embayments than open embayments ($p=0.04$). There are other intrinsic qualities (e.g., geology, substrate type, etc.) besides vegetation within an embayment that contribute to benthic invertebrate biodiversity, though vegetation is an important factor. The

information from this study provides insight on the abundance of prey available for higher trophic levels, vital aspects of food web dynamics and predator-prey relationships in aquatic systems.

Effects of *Ankistrodesmus* on the Calcite Precipitation Dynamic in Green Lake

Karen Yeung

Although not an uncommon occurrence, much regarding calcite precipitation in lakes is still relatively unknown; there is not an established unified overview of the mechanism inducing this precipitation. A leading idea as to why this occurs cites phytoplankton as the causal factor. This event was explored in Fayetteville's Green Lake, to see if the phytoplankton, *Ankistrodesmus*, influences its surrounding water conditions to provoke precipitation. Additional factors including temperature, light, and region from where water samples were taken were also included in the study. The results indicated that *Ankistrodesmus* presence, light, as well as depth helped control this precipitation process. However, temperature and most combinations of these variables were found not to influence calcite precipitation to a significant degree, although this may be attributed to the short duration of the study and the close temperatures at which the samples were incubated. Future research on the effects of *Synechococcus*, the primary algae in Green Lakes, will be also conducted to gain a broader scope of the influences on calcite precipitation

Determination of Food Type Preference within the Diet of the Rusty Crayfish *Orconectes rusticus*

Eric Lord

The rusty crayfish, *Orconectes rusticus*, is an invasive crayfish species found in some New York waters. It is native to the Ohio River basin and the states Ohio and Kentucky. In introduced waters the rusty crayfish displaces native crayfish by outcompeting for habitat space, reduces aquatic macrophyte diversity and populations by consumption, and also causes declines in some aquatic macroinvertebrate and fish populations by predation and competition for resources. The objective of this study is to attempt to determine what type of food items the rusty crayfish prefers to consume. This knowledge would lead to further understanding of the effects of this invader on native ecosystems and the biota contained within. The results indicate that easily handled food items high in proteins, such as aquatic macroinvertebrates, dead fish, and other invertebrate types are preferred. One item which should be included in future studies is fish eggs, because these represent a food source which may preferred over other types of food. This will lead to a better assessment of the diet of the rusty crayfish and future studies to determine if predation on fish eggs is a major source in the decline of fish populations in waters which this invader colonizes. While there are no effective methods for removing the rusty crayfish from invaded waters, this species is described as delicious tasting and is considered a delicacy in some parts of the country. A fishery allowing people to harvest this species should be encouraged for those with a state fishing license.