



January 31, 2019

Mr. Charles Anderson
Natural Resources Program Supervisor-Fisheries Research
Minnesota Department of Natural Resources
500 Lafayette Road
St. Paul, MN 55155-4020

Re: Annual MN DNR Report-Permit #24225
WSB Project No. 12969-0

Dear Mr. Anderson:

The MN DNR issued permit #24225 to WSB in October 2018, which allowed WSB staff to implement fisheries data collection activities as part of an initial phase common carp abundance study in Sibley County.

These activities included capturing, marking with a fin clip, and releasing carp in Silver Lake and High Island Lake using electrofishing gear. Carp marked in Silver Lake received a left pelvic fin clip and carp marked in High Island Lake received a right pelvic fin clip. Observations of native fish assemblage were made during electrofishing surveys and are included in the attached report.

One requirement of this permit is that WSB submits an annual report to MN DNR-Division of Fish and Wildlife by January 31 of the following year.

Please accept the attached report as a fulfillment of this requirement. A fish collection report and notification of sampling are included as additional attachments.

If you have any questions or need additional information please contact me at (612)246-9346 or thavranek@wsbeng.com.

Sincerely,

WSB

Tony Havranek
Senior Ecologist

Attachments: Sibley Co Carp Assessment Report; Fish Collection Report; Notification of Sampling

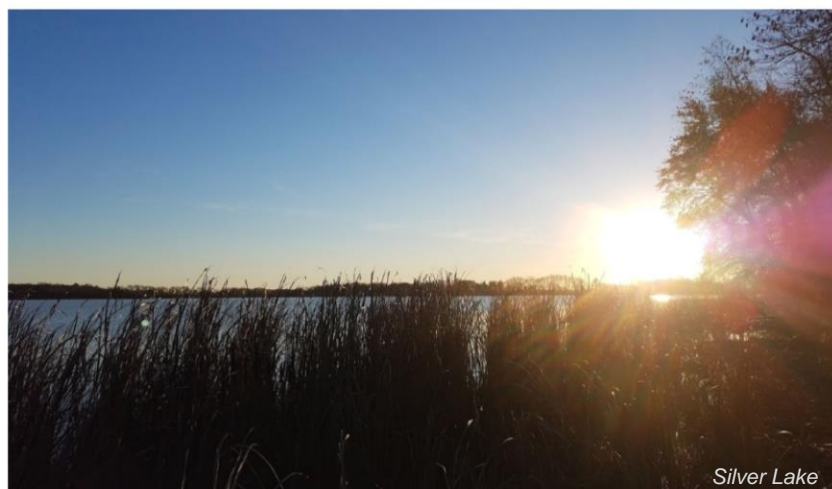
cc: Mary Newman, WSB
Colleen Telander, MN DNR

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1/25/2019

Common Carp Assessment Report: Silver Lake and High Island Lake

for Sibley Soil and Water
Conservation District (Sibley
SWCD)



wsb

Tony Havranek – Senior Ecologist
Mary Newman – Environmental Scientist
WSB & ASSOCIATES

Introduction

In fall 2018, the Sibley County Soil and Water Conservation District (SWCD) commissioned WSB to design and initiate an initial common carp assessment of Silver and High Island Lakes in Sibley County. This project was initiated to form a fundamental understanding of the carp population; specifically, abundance and size structure. Ultimately, the goal of this project is to first determine the abundance of carp within these lakes to understand if carp biomass is elevated to a level that may be negatively affecting water quality and ecological integrity.

In consultation with the Sibley SWCD, WSB recommended a simple, high level approach to developing a baseline carp dataset since the project could not be started until later in the fall. This approach would be less expensive and provide some initial understanding as to where additional efforts, if necessary, should be directed.

Common Carp Management

Although carp management is not the only action to improve water quality, it may be a necessary component of an overall lake management plan. Carp can cause loading of nutrients internally within a basin due to their feeding habits and excretion rates when biomass becomes elevated. An elevated carp biomass threshold value currently used and established by the scientific community is ~90 lbs/acre (Bajer, 2012).

By estimating the population size, resource managers may be able to assess existing carp density against this threshold value to determine if additional carp management is necessary. If future management is required and/or desired, additional components of an integrated pest management (IPM) approach, which may include collection of movement data (radio-telemetry, PIT tag monitoring), physical or chemical removal, and suppression of carp recruitment with use of barriers to movement, predator species enhancement, habitat restoration, and a component of outreach and education, may be pursued.

Shallow lake basins in the Upper Midwest are prone to low oxygen levels that lead to winterkill events. These basins can support recruitment of young fish because of low predator abundance resulting from such events. Carp commonly use migration routes in the springtime to access shallow lake basins to exploit the absence of predator species to hatch young. Additionally, carp are able to withstand low oxygen conditions and live to exploit basins they overwinter in that also experience winterkill.

Project Area

Sibley County is located in central Minnesota approximately 50 miles to the southwest of the Twin Cities Metropolitan Area. The most dominant land use is agriculture while ditches, streams and 39 lakes dot the landscape.

High Island Lake and Silver Lake are the two largest waterbodies in the High Island Creek Watershed (HICW), Sibley County. They are both considered to be hypereutrophic due to high concentrations of nutrients, intense warm weather algal blooms, and limited submerged aquatic vegetation. They were added to the Minnesota Pollution Control Agency 303(d) list of impaired waterbodies in 2018 due to high nutrient concentration. A Total Maximum Daily Load study is slated to be completed in 2019 on a number of lakes in Sibley County. This study will better assign pollutant loading sources.

MN DNR data shows that carp are present in these lakes but an abundance estimate is not provided. This project was completed to develop that abundance estimate and determine if carp may be having an impact on water quality.

High Island Lake is a shallow lake basin and is being managed, in part, as a walleye rearing pond by the MN DNR who have stocked walleye fry in 2009, 2011, 2013, 2014, and 2016, and harvest them for stocking other Minnesota Lakes. Adult crappie (876 adults) were stocked in 2015.

In the winter of 2018-19 the DNR plans to do maintenance on the outlet structure downstream of High Island Lake and will complete a drawdown to gain access to the structure and promote kill of undesirable fish species. The drawdown may have an impact on fish assemblage, size structure, and abundance (specifically common carp) within High Island Lake. This project will provide data on those metrics. This data may be used to evaluate how the fishery responds.

Silver lake is a shallow (mean depth = 5 feet, maximum depth= 8 feet) lake basin within the High Island Creek Subwatershed and the Northcentral Hardwood Forests Ecoregion. Roughly 99% of Silver lake is considered littoral area, but there is little aquatic vegetation within the lake. Trophic state index values show that the lake is eutrophic (transparency index), and hypereutrophic using chlorophyll-a and total phosphorous concentration index values. Due to this, the lake was listed as impaired for aquatic recreation based on nutrient impairments in 2016.

The 1994 status of the fishery (MN DNR) states that the fishery is limited due to low dissolved oxygen levels that is prone to frequent winterkill. To address this the Silver Lake Sportsmen Club installed a pump and baffle aerator, but the efficacy of this structure was unknown.

Methodology

As part of this project we proposed to use two methodologies to estimate carp population and biomass. The first, and most rapid is to employ an electrofishing catch per unit effort (CPUE) methodology. To do this, a boat electrofisher is used to stun and capture carp and other fish species as it traverses representative habitat types in the lake littoral zones. Time spent electrofishing is recorded and all carp are captured, measured for length and weight, given a unique fin clip, and released. The number of carp captured is used as an input into an existing model that provides an estimate on the number of individual carp per acre. Average weights and lake acreage can be used to estimate carp density and overall abundance.

Typical protocol for these surveys is to complete three (3) separate electrofishing CPUE events per waterbody during each season (late summer/early fall). This is done to gain confidence in estimates developed through this method of estimation. Because this project was initiated in late fall, it was only possible to visit each lake on one date in late October.

The second method is the mark-recapture estimate which takes additional effort but may be more accurate. If a large enough sample is marked and recaptured, this method can be used to confirm estimates developed by the electrofishing CPUE estimate. The typical mark that we utilize is a unique fin clip. Once carp are marked, they are released for eventual recapture. By using the number of recaptured carp, the total number of carp, and the total number captured, we can develop an estimate. This estimate will be used to report if a 95% confidence interval is achieved.

These two methods are typically completed simultaneously to reduce the amount of effort and cross validate estimates generated by each method.

Since only one visit to the lake was accomplished in this project period, a recapture event was not completed and numbers are not reported here. Marks employed in 2018 can be used in future sampling events to determine any potential mixing of the population of carp into neighboring lakes. Using these marks to complete a mark-recapture after the winter of 2018-19 is not recommended since it is unknown if movement out of or into the basin occurs.

In addition to marking and capture, we measure and weigh each captured carp to calculate average weight to be used as in the CPUE model. Lengths and weights will also be used to develop a length-weight frequency to understand size structure of the population and to plot size frequency distribution which may be used as a surrogate for aging data to estimate recruitment intervals.

Native fish CPUE was estimated based on observations during the electrofishing survey. Fish were counted that were within nettable distance from the boat and the CPUE estimate is calculated by observation per hour. This rough estimate is compared to MN DNR normal range

for this gear type and lake type to provide analysis. The lake classification for Silver Lake is 43 while the lake classification for High Island is 41.

A fisheries research permit was obtained from the MN DNR in October 2018 that authorized the collection of fish for this project (Appendix A).

Results

Carp Population/Biomass Estimate

Using a boat electrofisher, three transects were traversed on Silver Lake and five transects were traversed on High Island Lake on October 23, 2018. Time, number of carp captured, and length and weight data was collected to be used in a common carp catch per unit effort model. Each transect was used to develop a CPUE and averaged to report 2018 Carp CPUE estimate (Table 1). The results of the electrofishing CPUE survey indicate that biomass in Silver Lake is 27.6 ± 7.0 lbs/acre, below the management threshold of 90 lbs/acre while biomass in High Island Lake is 127.1 ± 74.8 lbs/acre and slightly exceeds the threshold value.

Lake	Date (2018)	Event Type	Transect / Time (hour)	# Carp Captured & marked	Fin Clip	CPUE estimate (lbs/ac) By Transect	2018 CPUE estimate (lbs/ac)
Silver	10/23	CPUE/Fin Clip	T1 / .73	3	Left Pelvic	35.74	27.6 ± 7.0
Silver	10/23	CPUE/Fin Clip	T2 / .86	3	Left Pelvic	28.54	
Silver	10/23	CPUE/Fin Clip	T3 / .27	1	Left Pelvic	18.57	
High Island	10/23	CPUE/Fin Clip	T1 / .75	9	Right Pelvic	151.12	127.1 ± 74.8
High Island	10/23	CPUE/Fin Clip	T2 / .33	1	Right Pelvic	32.63	
High Island	10/23	CPUE/Fin Clip	T3 / .68	5	Right Pelvic	51.01	
High Island	10/23	CPUE/Fin Clip	T4 / .19	4	Right Pelvic	169.63	
High Island	10/23	CPUE/Fin Clip	T5 / .68	16	Right Pelvic	231.33	

Table 1 – Sibley County Silver Lake and High Island Lake Electrofishing CPUE transect survey data. In Silver Lake, a total of 7 carp were marked with a left pelvic fin clip and in High Island Lake 35 carp were marked with a right pelvic fin clip. These marks are not used to develop a mark-recapture estimate in this project period since no recapture event was achieved but can be used in future sampling events to determine mixing of carp populations into nearby lakes or to complete a mark-recapture estimate in the case a large-scale capture is achieved in the winter of 2018-2019.

Length data collected on captured and observed common carp has been analyzed and used as a surrogate for aging data. In Silver Lake carp ranged from ~6 to 21.1 inches while High Island ranged from 15.2 to 27.3 inches (figure 1; figure 2). Studies show that carp can grow upwards of 6.3 inches in their first growing season, therefore we have classified the two observed small carp in Silver Lake to likely be young of the year. Length to age data is more variable as carp lengths increase greater than 10 inches, however, it can be assumed that these fish are greater than 2 years old.

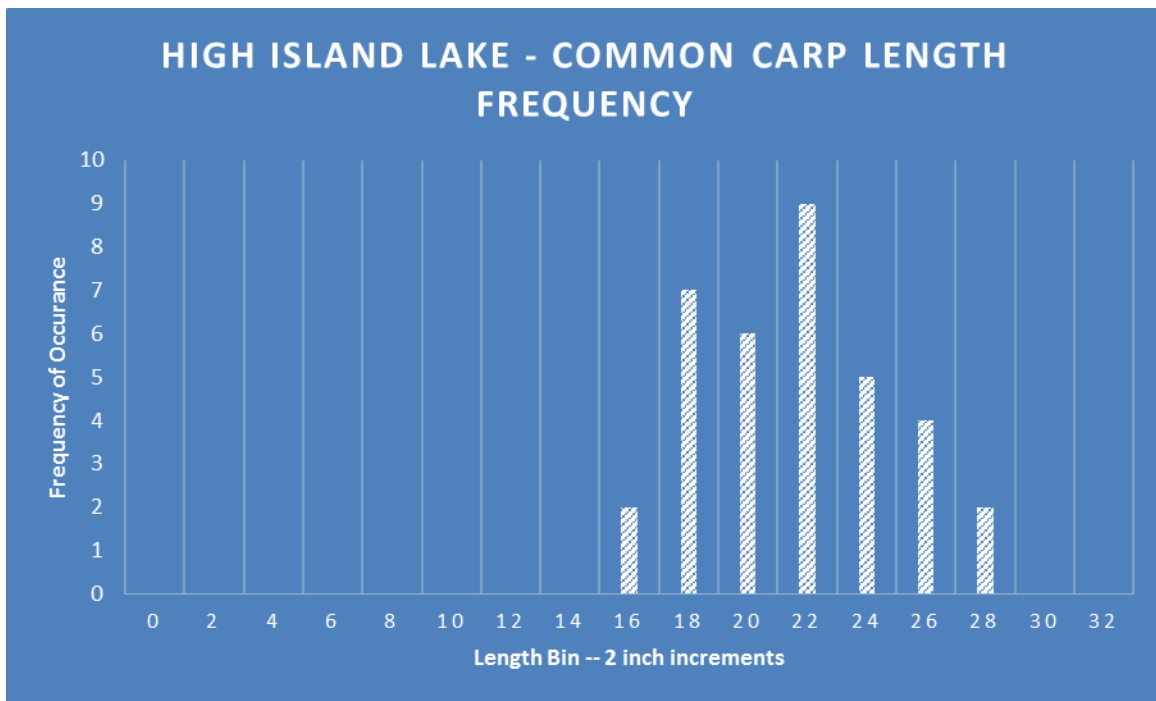


Figure 1: Length histogram of carp captured in High Island Lake via boat electrofishing on October 23, 2018

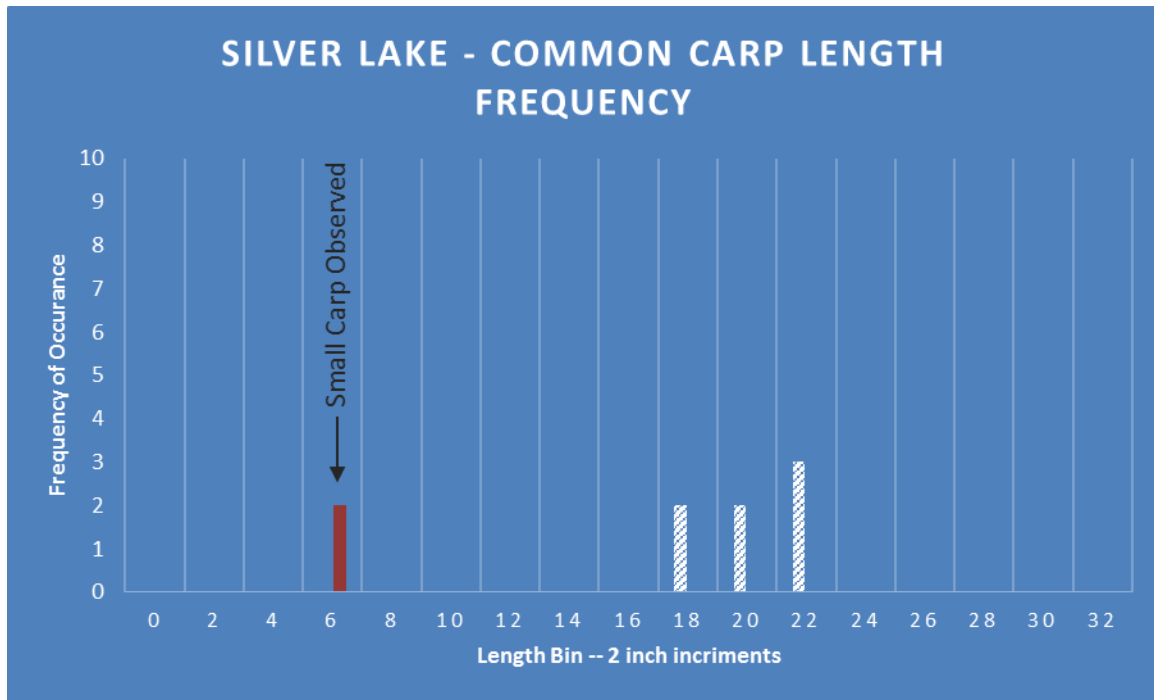


Figure 2: Length histogram of carp captured or observed in Silver Lake via boat electrofishing on October 23, 2018

Native Fish Assemblage and Electrofishing Observations CPUE

Native fish catch rates are included with this report to give managers an opportunity to use data comparisons if carp management actions are pursued in the future. Observations of native fish counts were estimated in each transect and are reported in observations per hour (table 2). Native fish were not captured and measured for length and weight on October 23, 2018. An attempt was made to identify carp less than 6 inches that were not easily retrieved to report them as young of the year or age-0 carp.

High Island Lake is slated to be drawn down in the winter of 2018-19 to facilitate the repair of a MN DNR dam structure on the outlet stream. To provide a relative abundance and compare to normal catch rates MN DNR electrofishing data (from a query of the Fisheries Survey Module-FSM) was used to report MN DNR average CPUE. Queried data was requested that reported electrofishing survey data from October in all years. This data was then sorted by lake class and date and CPUE is reported in catch per hour averaged over all sampling dates. In comparison, WSB data collected in October 2018 is higher for walleye, sucker, bluegill/sunfish, and bullhead. DNR data was not available for shad and buffalo fish species. Since native fish were not captured as a part of WSB survey, length data is not available to do further analysis and use in this comparison.

Lake	MN DNR Lake Class	Fish	WSB observed CPUE (Oct 23, 2018)	MN DNR average CPUE (Oct)
Silver	43	Black Crappie	18.87	
Silver	43	Walleye	18.87	
Silver	43	Yellow Perch	7.55	
Silver	43	YOY Carp	7.55	
Silver	43	Bluegill/sunfish	3.77	
Silver	43	Minnow	3.77	
Silver	43	Bullhead	3.77	
High Island	41	Shad	293.70	n/a
High Island	41	Walleye	101.80	74.5
High Island	41	White Sucker	44.05	25.6
High Island	41	Bluegill	10.28	4.35
High Island	41	Bullhead	4.41	2
High Island	41	Buffalo	1.90	n/a

Table 2: Native fish catch per unit effort comparison for High Island, lake class 41.

Discussion

Results using the carp electrofishing CPUE model show that common carp biomass density is elevated in High Island and below management thresholds in Silver (figure 3). However, the timing and low water temperatures during the first and only survey completed as part of this project, may have suppressed the CPUE value for carp and other fish species. Additional electrofishing surveys, completed between August and September, when water temperatures are above 59°F, would provide additional data points to calibrate the existing estimate.

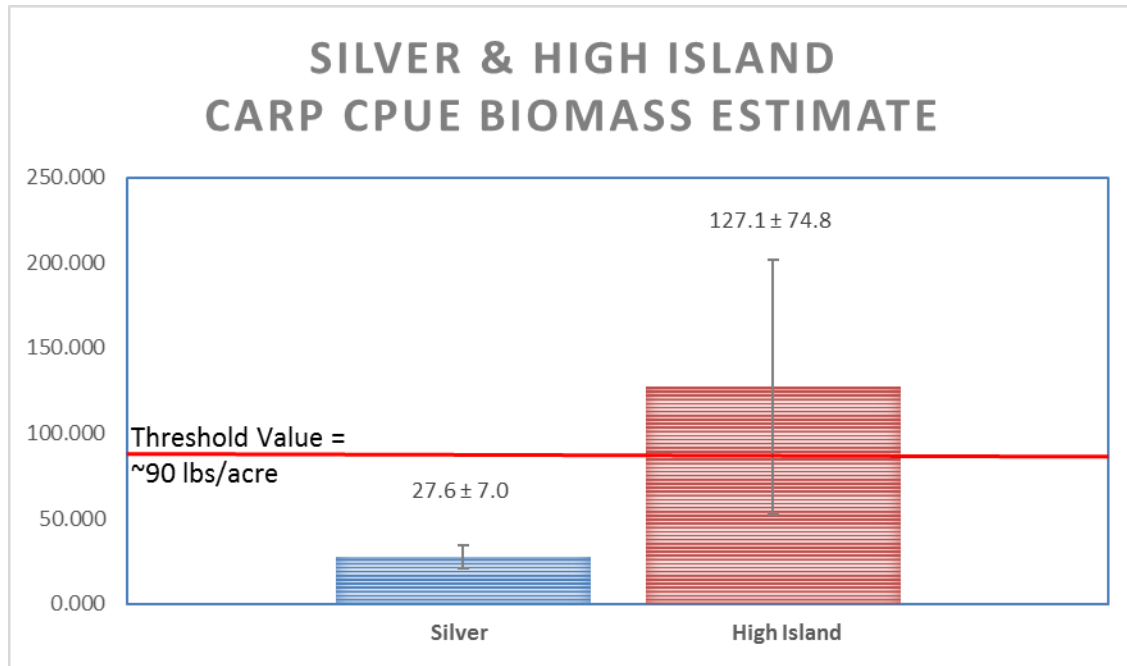


Figure 3: Graphical representation of 2018 CPUE estimate in Silver and High Island Lake and how it compares to threshold value known to be damaging in a shallow lake system.

If the carp biomass estimate for Silver is accurate, then no additional management of carp would be necessary, as the biomass density is quite low (27.6 lbs./acre). However, consideration should be given to the observation of young of the year carp, which may indicate new recruitment or that adult carp biomass may be higher during different periods of the year, specifically during the carp spawning period (Bajer, 2010). The carp biomass may be elevated intermittently if Silver functions as a nursery site where carp are aggregating to spawn from other waterbodies. This hypothesis could be tested with more frequent sampling events or carp movement data collection.

The average CPUE estimate for High Island is roughly 28 lbs./acre higher than the ecological tipping point identified in Bajer, 2012. This elevated carp biomass may be negatively impacting water quality and be the cause of low densities of submerged aquatic vegetation. It is important to note that this estimate is calculated based on data from only one (1) electrofishing survey. Additional surveys would help to improve the confidence of this existing estimate. There are currently plans to complete a drawdown on High island in 2019, so no additional electrofishing would be able to be completed in 2019 if the hydrology of High Island is not restored by fall 2019. If that is the case, then follow up electrofishing surveys could be completed in fall 2020 to determine how the drawdown affected the carp population as well as other gamefish and panfish species.

Because of the drawdown, no additional management efforts focused on carp would be necessary in the near future or until existing hydrology is restored.

References:

- Bajer, P.G., Sorensen, P.W. (2010). Recruitment and abundance of an invasive fish, the common carp, is driven by its propensity to invade and reproduce in basins that experience winter-time hypoxia in interconnected lakes. *Biological Invasions*. 12(5): 1101-1112.
- Bajer, P. G., Sorensen, P. W. (2012). Using boat electrofishing to estimate abundance of invasive common carp in small Midwestern lakes. *North American Journal of Fisheries Management*, 32:5, 817-822.
- Osborne, J. B. (2012). Distribution, abundance and overwinter survival of young-of-the-year common carp in a Midwestern watershed. *Thesis submitted to the faculty of the graduate school of the University of Minnesota*.

Appendix A:

MN DNR Fisheries Research Permit #24225

Appendix A:
2018 Fish Collection Report

DOW	T-S-R	Directions	Lake	Date	Gear	EventType	Species	Number	Lt (in)	Wt (lbs)	FinClip
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	CPUE	Carp	1	21.2		L Pelvic
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	CPUE	Carp	1	18.8	3.7	L Pelvic
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	CPUE	Carp	1	20.4	4.2	L Pelvic
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	Observed "other"	YEP	2	na	na	
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	Observed "other"	BLG	1	na	na	
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	Observed "other"	minnow unk	1	na	na	
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	Observed "other"	Carp	2	na	na	
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	CPUE	Carp	1	21.1	4.2	L Pelvic
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	CPUE	Carp	1	19.3	4.2	L Pelvic
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	CPUE	Carp	1	17.2	2.45	L Pelvic
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	Observed "other"	BCRP	3	~3-9	na	
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	Observed "other"	WAE	4	~5	na	
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	Observed "other"	BHD	1	~10	na	
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	Observed "other"	YOY Carp	1	~6	na	
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	Observed "other"	Carp	6		na	
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	CPUE	Carp	1	16.5	2.2	L Pelvic
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	Observed "other"	BCRP	2	na	na	
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	Observed "other"	YOY WAE	1	na	na	
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	Observed "other"	YOY Carp	1	~6	na	
72001300	113-05-026	5.5 miles east of Arlington MN	Silver Lake	10/23/2018	Electro Boat	Observed "other"	Carp	1	na	na	
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	25.2	7.95	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	21.8	5.2	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	24.9	7.7	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	23.2	8.2	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	19.3	3.95	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	24.2	8.2	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	24.4	7.7	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	19.1	3.45	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	20.7	4.2	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	Observed "other"	WAE	55	na	na	
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	22.9	4.7	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Buffalo	1	23.2	4.95	
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	18.1	2.7	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	22.3	6.45	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Buffalo	1	15.3	2.2	
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	17.8	3.2	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	16.7	2.2	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Buffalo	1	15.3	1.95	
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	16.1	2.2	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	Observed "other"	WAE	70	na	na	
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	Observed "other"	BLG	7	na	na	
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	Observed "other"	Wsucker	30	na	na	
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	Observed "other"	BHD	3	na	na	
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	Observed "other"	Shad	200	na	na	
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	Observed "other"	Carp	1	na	na	

DOW	T-S-R	Directions	Lake	Date	Gear	EventType	Species	Number	Lt (in)	Wt (lbs)	FinClip
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	20.7	4.45	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	21.8	5.95	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	21.2	3.95	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Buffalo	1	15.3	2.2	
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	15.2	1.95	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	Observed "other"	WAE	40	na	na	
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	Observed "other"	Carp	3	na	na	
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Buffalo	1	17.1	3.95	
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	17.5	2.7	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	18.2	3.45	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	26.8	12.2	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	22.8	5.95	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	19.8	3.45	R Pelvic
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72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	17.3	1.95	R Pelvic
72005000	114-17-028	.5 miles east of New Auburn MN	High Island	10/23/2018	Electro Boat	CPUE	Carp	1	27.3	11.45	R Pelvic

Appendix B:
2018 Notification of Sampling

Tony Havranek

From: Tony Havranek
Sent: Monday, October 22, 2018 8:53 AM
To: Mackenthun, Scott (DNR); cory.palmer@state.mn.us
Cc: Mary Newman
Subject: Electrofishing surveys on High Island and Silver Lakes

Cory and Scott,

I am providing notice, as a requirement of MN DNR Research permit #23255, that we will be conducting electrofishing surveys on both High Island and Silver Lakes tomorrow (10/23/18) in an effort to develop abundance estimates for common carp and index values for panfish and gamefish. This will involve weighing, measuring for length, and fin clipping carp and counting gamefish and panfish species within index stations.

Please let me know if you need any additional information.

Thanks,