Three Lakes Council Plankton Summary 2020

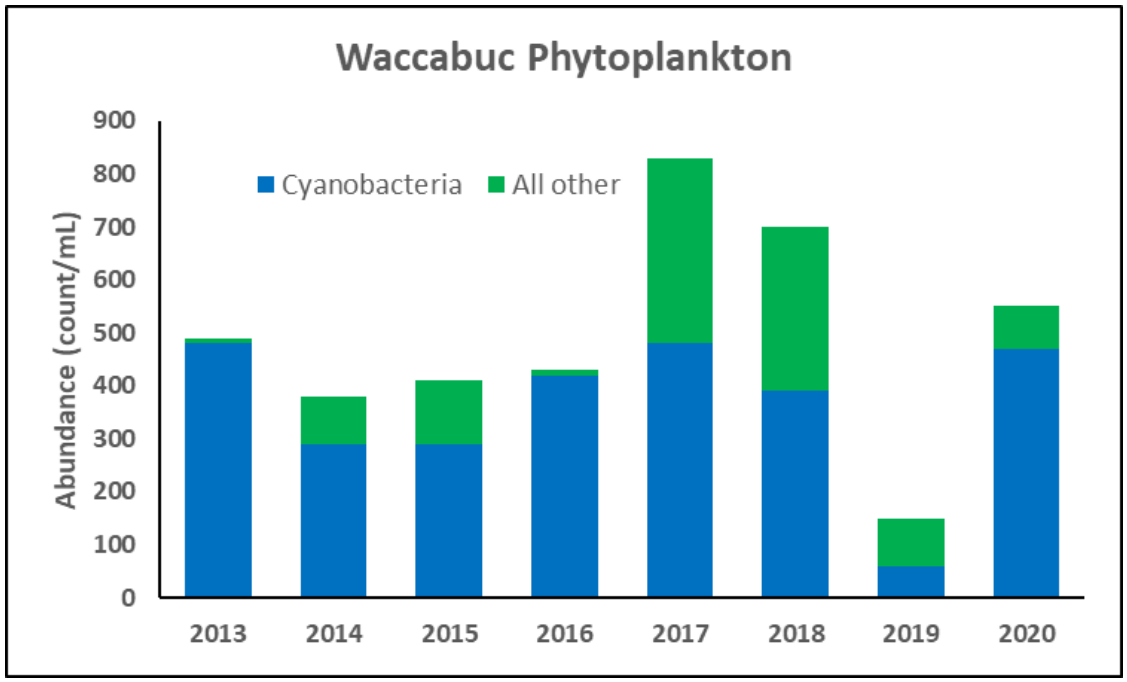
In addition to our usual sampling, we collect algae and zooplankton samples once each year. These are analyzed by Solitude Lake Management, and help us assess trends in algae and zooplankton over time. For algae, while the overall levels of algae affect the clarity and aesthetics, we especially track the cyanobacteria (blue-green algae) levels because those species can sometimes form toxins.

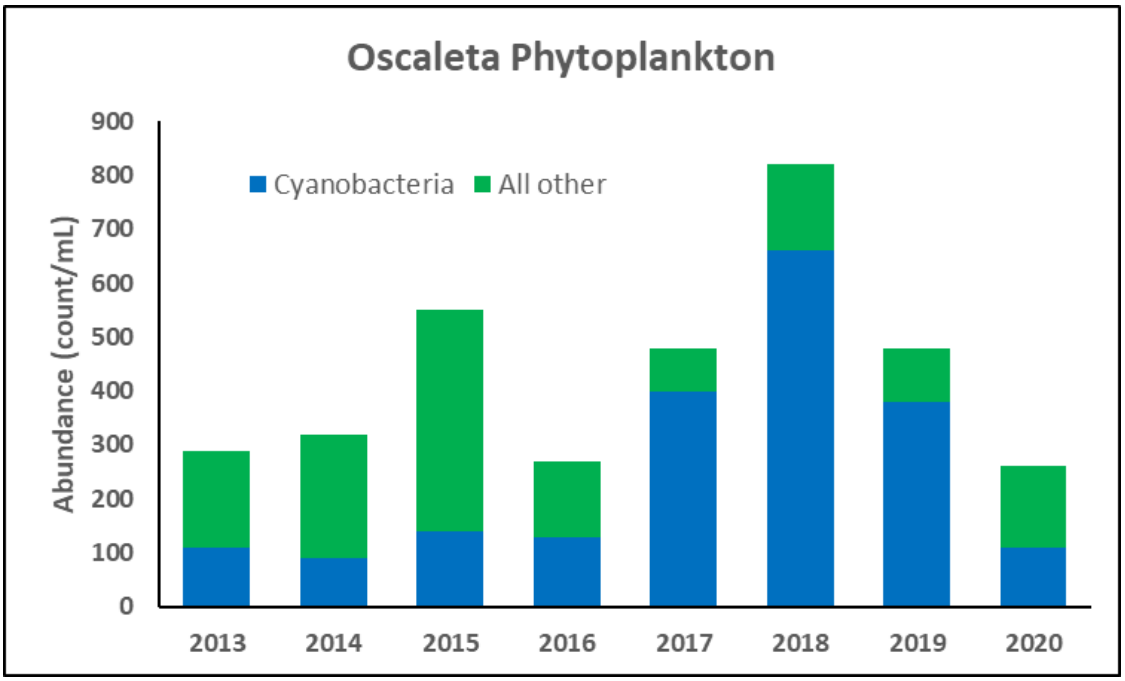
We also track zooplankton, which are the microscopic animals. These are an important component of the food web and provide food to many of the animals that live in our lakes. Zooplankton are also important as a consumer of algae, so generally we like to see higher levels of zooplankton. A good diversity helps as some zooplankton are more efficient at algae predation than others.

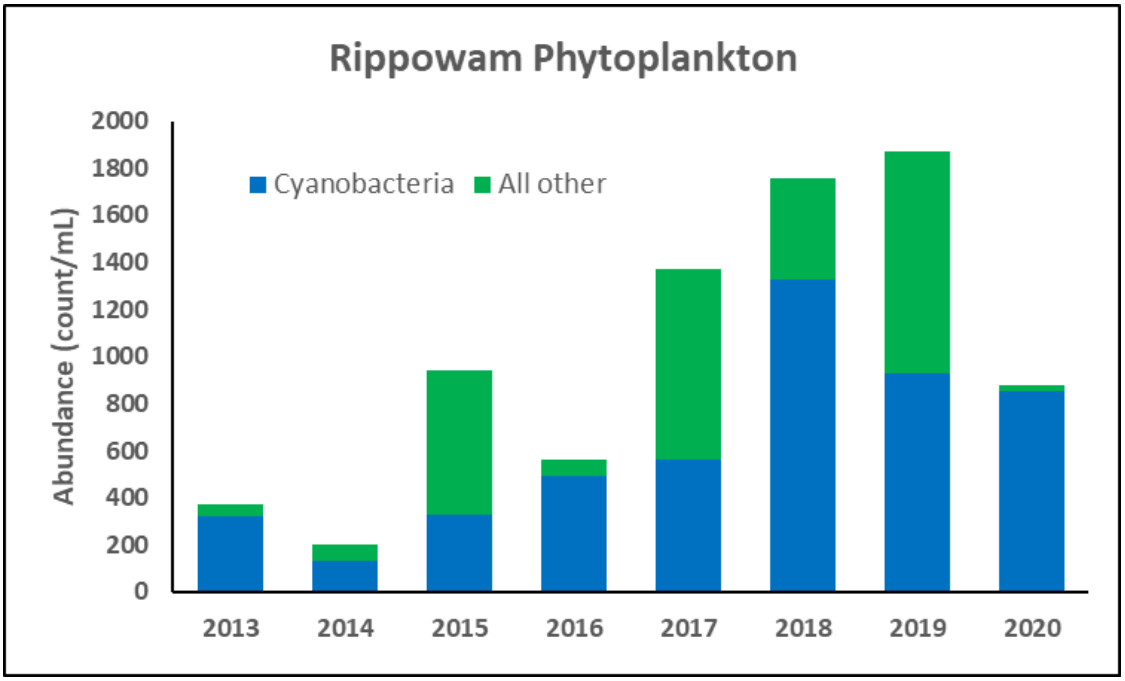
Algae

Our lakes had moderate levels of algae in 2000. Waccabuc algae levels rebounded in 2000 from an unusually clear level in 2019. Oscaleta had lower levels of algae and less cyanobacteria than typical. Rippowam's algae level declined but was dominated by cyanobacteria. Note that the numbers on the left axis for the Rippowam chart are much larger than those on the other graphs, reflecting the higher levels of algae found on Rippowam.

These charts show the cyanobacteria compared to all the other types of algae. See the appendix for a more detailed assessment of the algae found in the lakes.

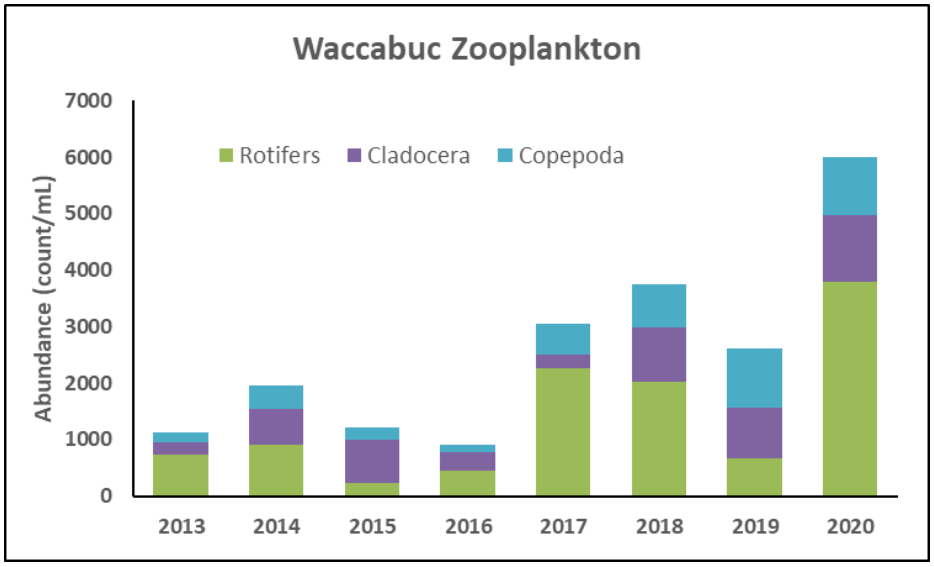


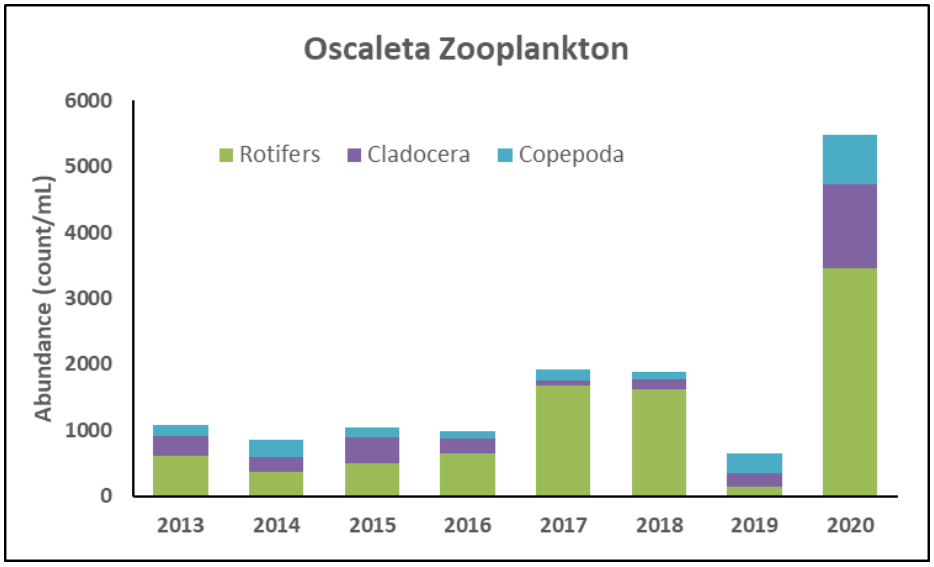


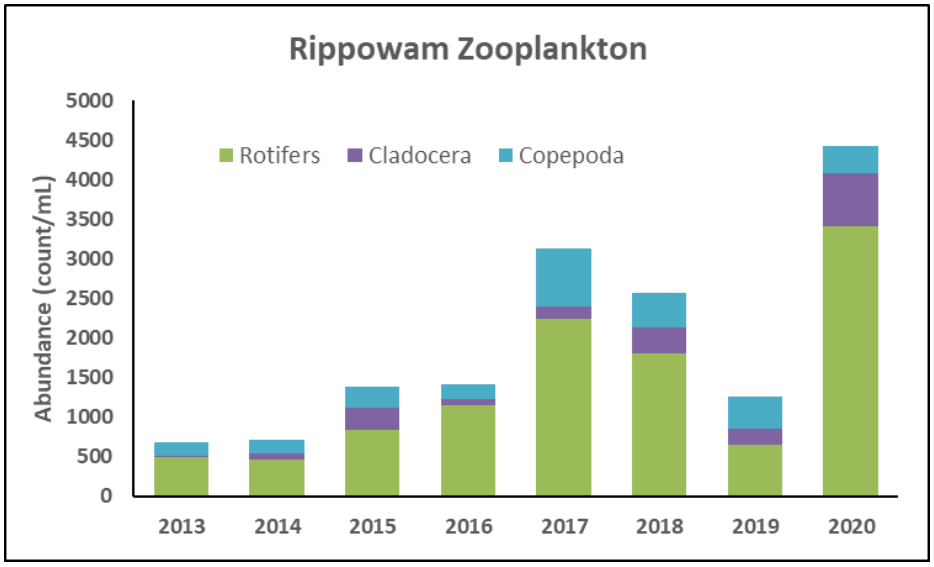


Zooplankton

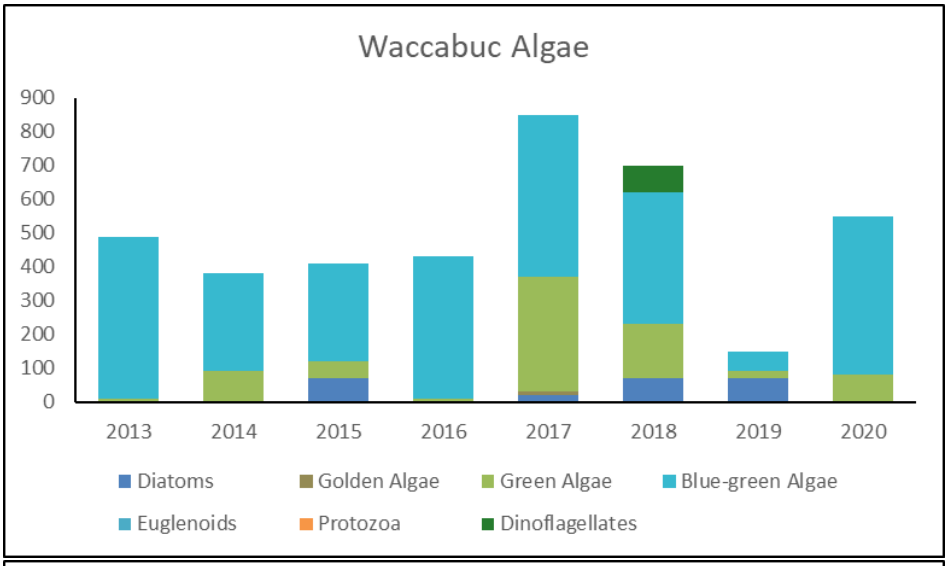
The zooplankton levels in each of the lakes were all higher in 2020 than typical. Rotifers are the smallest class of zooplankton, and were the most abundant on all of the lakes. Cladocera are the most efficient algae predators. Copepods are good algae consumers too, but their larger size means they can be seen (and eaten) by fish. Alewives consume a lot of zooplankton, and they have boom-and-bust population cycles, so perhaps the large number of zooplankton reflect that phenomenon.

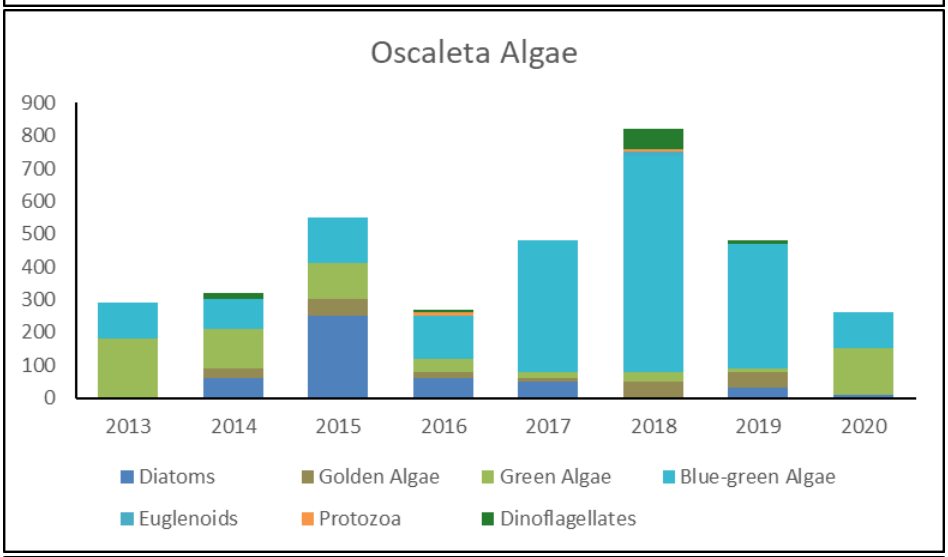

Waccabuc Zooplankton
Rotifers
Cladocera
Copepoda
Abundance (count/mL)
7000
6000
5000
4000
3000
2000
1000
0
2013
2014
2015
2016
2017
2018
2019
2020

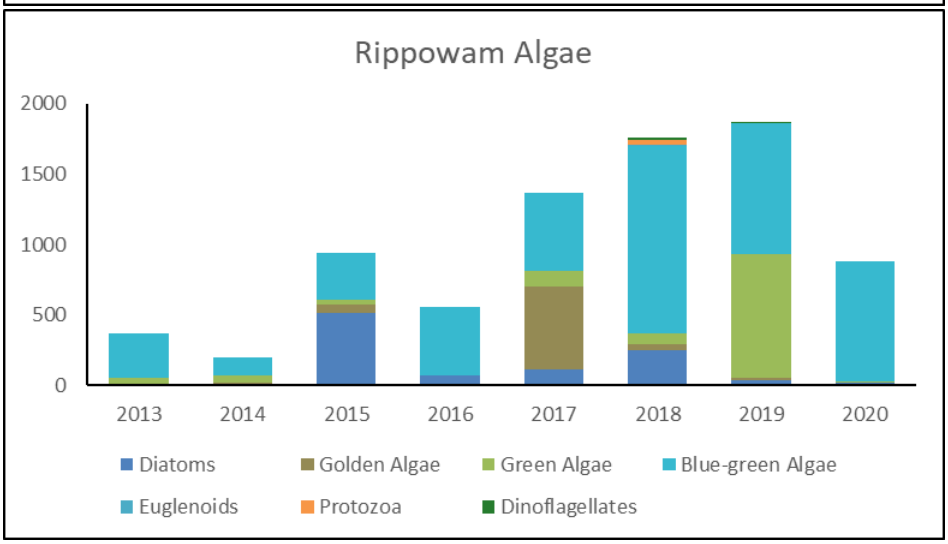

Oscaleta Zooplankton
Rotifers
Cladocera
Copepoda
Abundance (count/mL)
6000
5000
4000
3000
2000
1000
0
2013
2014
2015
2016
2017
2018
2019
2020


Rippowam Zooplankton
Rotifers
Cladocera
Copepoda
Abundance (count/mL)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
2013
2014
2015
2016
2017
2018
2019
2020

Appendix


Waccabuc Algae
900
800
700
600
500
400
300
200
100
0
2013
2014
2015
2016
2017
2018
2019
2020
Diatoms
Golden Algae
Green Algae
Blue-green Algae
Euglenoids
Protozoa
Dinoflagellates


Oscaleta Algae
900
800
700
600
500
400
300
200
100
0
2013
2014
2015
2016
2017
2018
2019
2020
Diatoms
Golden Algae
Green Algae
Blue-green Algae
Euglenoids
Protozoa
Dinoflagellates


Rippowam Algae
2000
1500
1000
500
0
2013
2014
2015
2016
2017
2018
2019
2020
Diatoms
Golden Algae
Green Algae
Blue-green Algae
Euglenoids
Protozoa
Dinoflagellates

MICROSCOPIC EXAMINATION OF WATER

Sample from: Three Lakes

Collection Date: 7/28/20	Examination Date: 7/29/20	Amount Examined: 200 ml.
Site A: Rippowam	Site B: Oscaleta	Site C: Waccabuc

BACILLARIOPHYTA (Diatoms)	**A**	**B**	**C**	**CHLOROPHYTA (Green Algae)**	**A**	**B**	**C**	**CYANOPHYTA (Blue-green Algae)**	**A**	**B**	**C**
Asterionella				*Ankistrodesmus*				*Anabaena*	10	80	470
Cyclotella				*Chlamydomonas*				*Anacystis*			
Cymbella				*Chlorella*				*Aphanizomenon*	830	30	
Diatoma				*Chlorococcum*				*Coelosphaerium*			
Fragilaria				*Closterium*				*Gomphosphseria*			
Melosira				*Coelastrum*		130	70	*Lyngbya*			
Navicula				*Eudorina*				*Microcystis*			
Nitzschia				*Mougeotia*				*Oscillatoria*			
Pinnularia				*Oedogonium*	10	10		*Pseudoanabaena*			
Rhizosolenia				*Oocystis*				*Synechocystis*			
Stephanodiscus				*Pandorina*				*Agmenellum*			
Stauroneis				*Pediastrum*				*Nodularia*	10		
Synedra	20	10		*Phytoconis*				**PROTOZOA**			
Tabellaria				*Rhizoclonium*				*Actinophyrs*			
Cocconeis				*Scenedesmus*			10				
CHRYSOPHYTA (Golden Algae)	**A**	**B**	**C**	*Spirogyra*				**EUGLENOPHYTA (Euglenoids)**	**A**	**B**	**C**
				Staurastrum							
Dinobryon				*Sphaerocystis*				*Euglena*			
Mallomonas				*Ulothrix*				*Phacus*			
Synura				*Volvox*				*Trachelomonas*			
Tribonema				*Zygnema*							
Uroglenopsis											
								PYRRHOPHYTA (Dinoflagellates)	**A**	**B**	**C**
								Ceratium			
								Peridinium			

SITE	**A**	**B**	**C**
TOTAL GENERA:	5	5	3
TRANSPARENCY:	1.7m	2.55m	1.15m
ORGANISMS PER MILLILITER:	**880**	**260**	**550**

NOTES: This is the first sampling event of 2020. Samples were collected by client on 07/28/20 and were handed over to SLM on the same day. Algal diversity is considered low at all sites. Algal density is considered low at site B and moderate at sites A and C. The assemblage of sites A and C are both dominated by nuisance blue-green algae. Site B is dominated by green algae, specifically by *Coelastrum.* Green algae and diatoms were also observed this week. Water clarity is considered fair at sites A and C, while site B is considered excellent.

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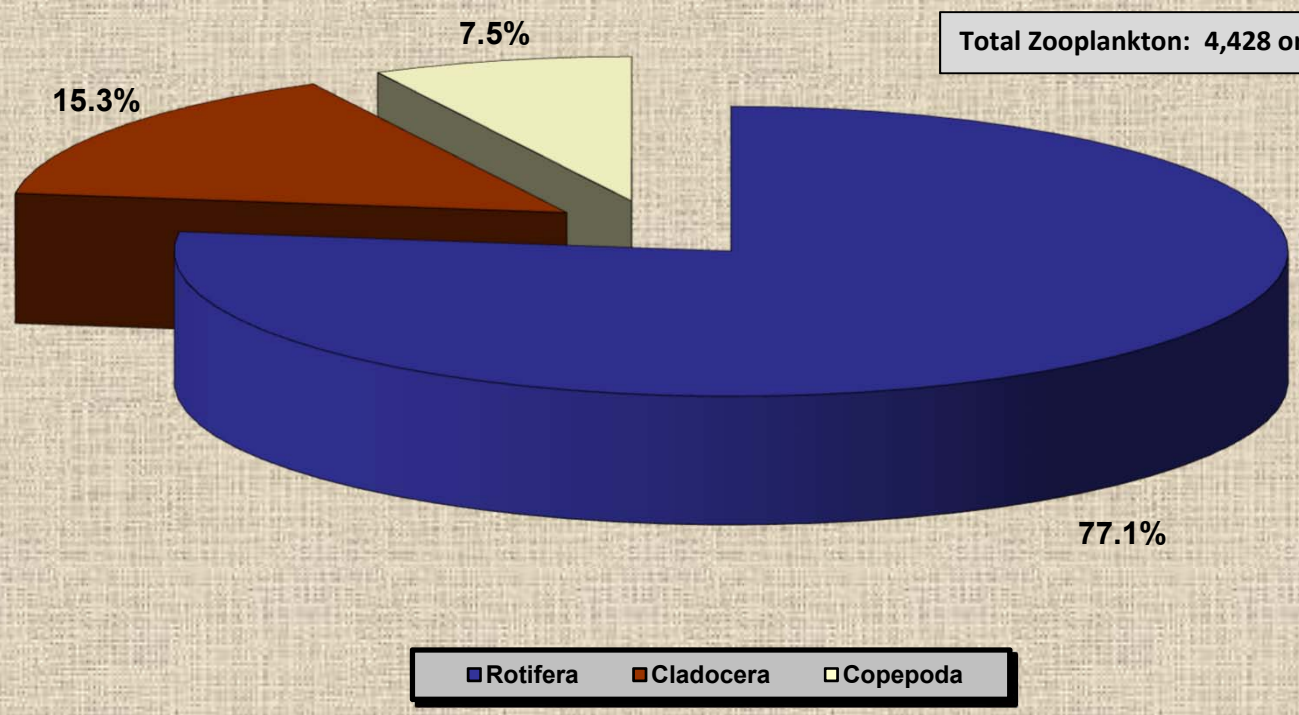
Lake Rippowam
July 28, 2020
Zooplankton Distribution



Total Zooplankton: 4,428 organisms per L

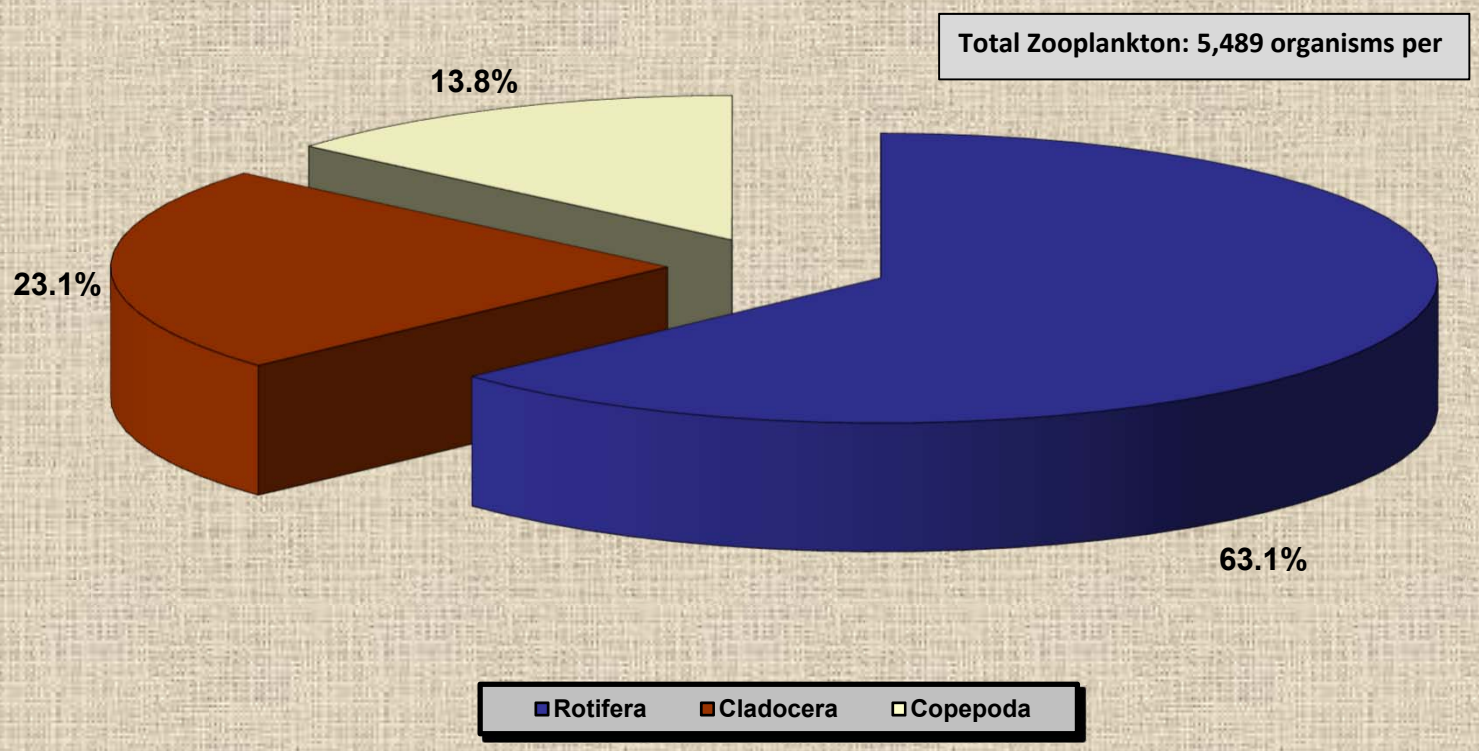
Zooplankton Count Results

Site: Lake Rippowam **Date: 7/28/20**

Group	Order	Family	Genus	Replicate A	Replicate B	Replicate C	Total/3 (# per mL)	x1000 mL (= 1 L)	Water sampled (L)	# organisms per L
Rotifera	**Ploima**	Brachionidae	*Kellicottia longispina*	134	249	157	180.00	180000	68.8	2616
			Keratella crassa	3	5	6	4.67	4667	68.8	68
		Synchaetidae	*Synchaeta oblonga*	20	37	47	34.67	34667	68.8	504
		Asplanchnidae	*Asplanchna herricki*	11	10		7.00	7000	68.8	102
		Trichocercidae	*Trichocerca pusilla*	7	9	7	7.67	7667	68.8	111
	Collothecaceae	Collothecidae	*Collotheca pelagica*	1			0.33	333	68.8	5
	Flosculariacea	Conochiliidae	*Conochilus unicornis*	1	1		0.67	667	68.8	10
							0.00	0	68.8	0
									Total:	**3416**
Cladocera	**Cladocera**	Bodminidae	*Bosmina longirostris*	8	69	63	46.67	46667	68.8	678
							0.00	0	68.8	0
									Total:	**678**
Copepoda	**Cyclopoida**	Cyclopoidae	*Microcyclops rubellus*	9	18	7	11.33	11333	68.8	165
			Cyclopoid nauplius	15	15	4	11.33	11333	68.8	165
	Calanoida	Centropagidae	*Limnocalanus macrurus*		1		0.33	333	68.8	5
		Calanoida	*Calanoid nauplius*		10		3.33	3333	68.8	48
									Total:	**334**

Total Organisms per L	Rotifera	%	Cladocera	%	Copepoda	%
4428	3416	77.1%	678	15.3%	334	7.5%

Lake Oscaleta
July 28, 2020
Zooplankton Distribution



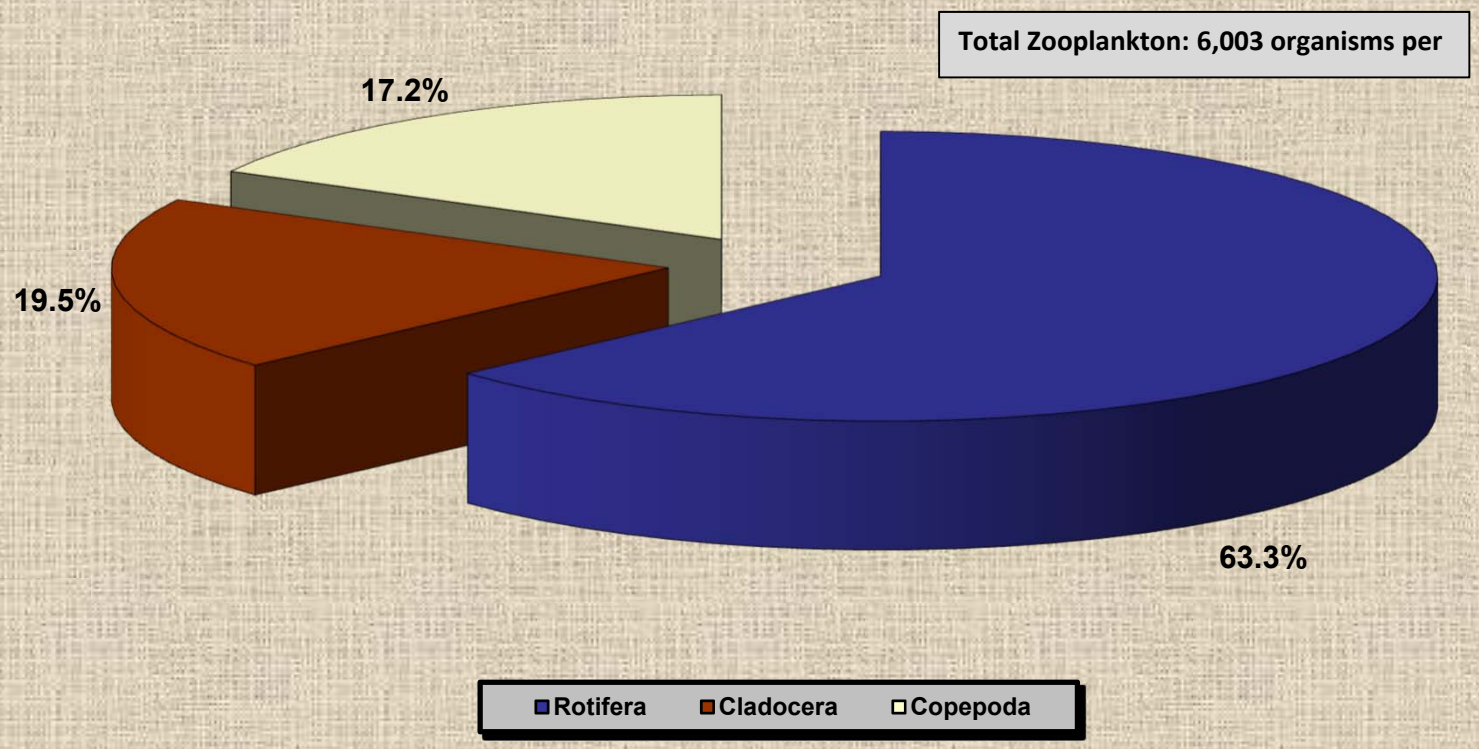
Zooplankton Count Results

Site: Lake Oscaleta **Date: 7/28/20**

Group	Order	Family	Genus	Replicate A	Replicate B	Replicate C	Total/3 (# per mL)	x1000 mL (= 1 L)	Water sampled (L)	# organisms per L
Rotifera	**Ploima**	Branchionidae	*Kellicottia longispina*	222	73	84	126.33	126333	68.8	1836
			Kellicottia bostoniensis	8	2	3	4.33	4333	68.8	63
			Keratella testudo		1		0.33	333	68.8	5
			Keratella crassa	31	11	16	19.33	19333	68.8	281
		Syncheatidae	*Synchaeta oblonga*	44	13	4	20.33	20333	68.8	296
			Polyarthra remata	2	2	1	1.67	1667	68.8	24
		Asplanchnidae	*Asplancha herricki*	97	28	39	54.67	54667	68.8	795
		Trichoceridae	*Trichocera pusilla*	14	9	8	10.33	10333	68.8	150
	Flosculariacea	Conochiliidae	*Conochilus unicornis*	1	1	1	1.00	1000	68.8	15
									Total:	**3464**
Cladocera	**Cladocera**	Bosminidae	*Bosmina longirostris*	172	45	45	87.33	87333	68.8	1269
							0.00	0	68.8	0
									Total:	**1269**
Copepoda	**Cyclopoida**	Cyclopidae	*Microcyclops rubellus*	58	15	14	29.00	29000	68.8	422
			Cyclopoid nauplius	30	11	10	17.00	17000	68.8	247
	Calanoida	Calanoid	*Calanoid nauplius*	6	4	8	6.00	6000	**68.8**	87
									Total:	**756**

Total Organisms per L	Rotifera	%	Cladocera	%	Copepoda	%
5489	3464	63.1%	1269	23.1%	756	13.8%

Lake Waccabuc
July 28, 2020
Zooplankton Distribution



Zooplankton Count Results

Site: Lake Waccabuc **Date: 7/28/20**

Group	Order	Family	Genus	Replicate A	Replicate B	Replicate C	Total/3 (# per mL)	x1000 mL (= 1 L)	Water sampled (L)	# organisms per L
Rotifera	**Ploima**	Branchionidae	*Kellicottia longispina*	79	266	221	188.67	188667	68.8	2742
			Kellicottia bostoniensis	3	3	3	3.00	3000	68.8	44
			Keratella crassa	2	7	6	5.00	5000	68.8	73
		Syncheatidae	*Synchaeta oblonga*	18	51	45	38.00	38000	68.8	552
		Asplanchnidae	*Asplancha herricki*	10	23	7	13.33	13333	68.8	194
		Trichoceridae	*Trichocera pusilla*	5	15	6	8.67	8667	68.8	126
	Flosculariacea	Testudinellidae	*Filinia terminalis*		6	8	4.67	4667	68.8	68
							0.00	0	68.8	0
									Total:	**3798**
Cladocera	**Cladocera**	Bosminidae	*Bosmina longirostris*	41	97	104	80.67	80667	68.8	1172
							0.00	0	68.8	0
									Total:	**1172**
Copepoda	**Cyclopoida**	Cyclopidae	*Microcyclops rubellus*	22	42	42	35.33	35333	68.8	514
			Cyclopoid nauplius	14	47	39	33.33	33333	68.8	484
	Calanoida	Calanoid	*Calanoid nauplius*	3	4		2.33	2333	**68.8**	34
									Total:	**1032**

Total Organisms per L	Rotifera	%	Cladocera	%	Copepoda	%
6003	3798	63.3%	1172	19.5%	1032	17.2%