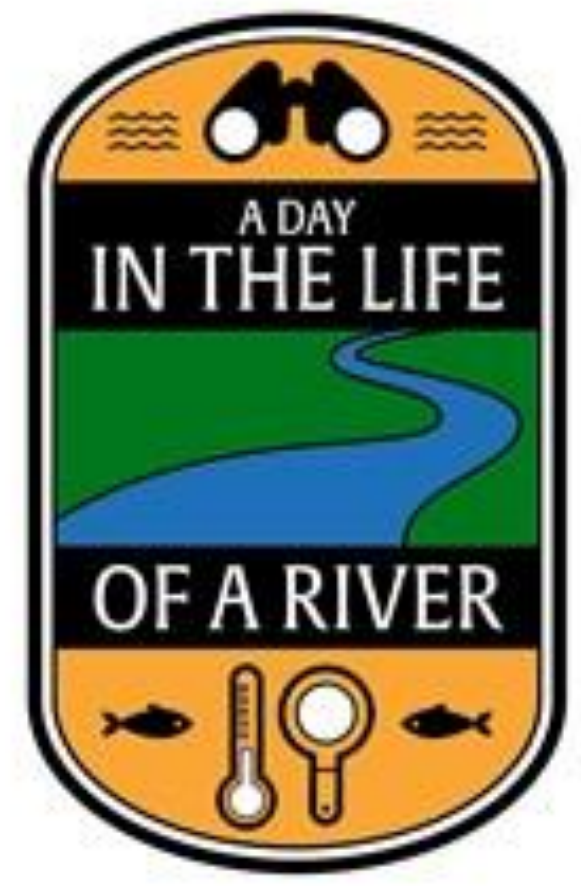




Analyzing Invertebrate Species Using DNA Barcoding and the CO1 Gene

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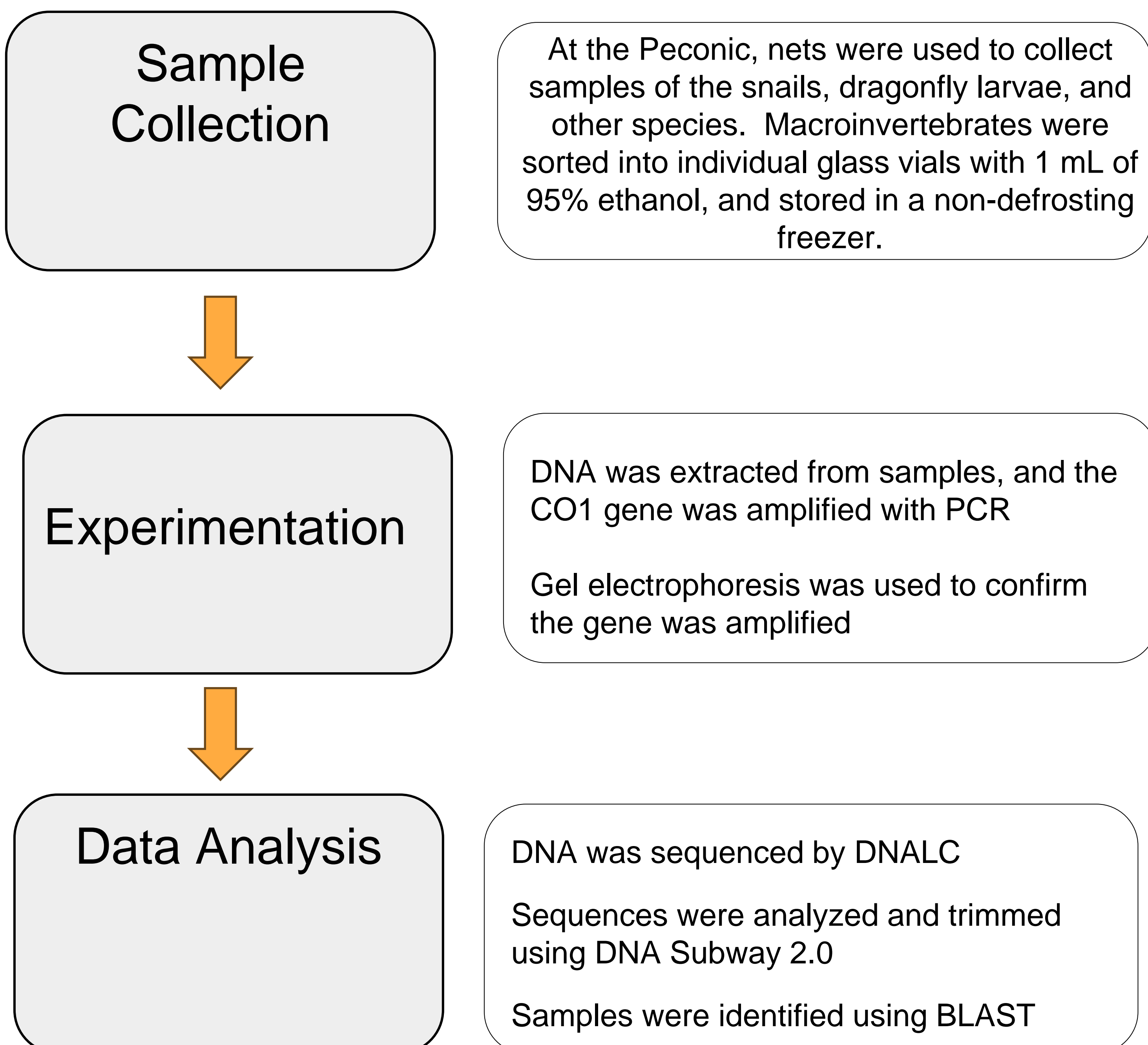
Abstract

The Peconic River is a large freshwater source on Long Island that holds many different species. There are some current problems with the Peconic estuary, one being nitrogen pollution and it leads to harmful algae blooms. The motivation to carry out this project was mainly to identify and learn more about species in the Peconic River. Measuring and maintaining biodiversity is critical because it is a key indicator of overall ecosystem health and ability to bounce back from disasters. The Peconic Estuary system supports rare habitats and a rich variety of species, providing essential ecological services and economic opportunities. The Rams Horn Snail, Orange Bluet damselfly and Blue Damselflies were identified using DNA barcoding.

Introduction

DNA barcoding is a way to identify a species by its genetic sequence. DNA from an organism is matched to a DNA barcode, which is a short fragment of DNA from a specific gene, the CO1 mitochondrial gene which can vary enough between species to be used as a method of identifying species. DNA barcoding is used in many different ways like differentiating species and identifying larval or juvenile stages. Scientists study the organisms of the Peconic River to monitor its health, assess the impact of pollution, and restore its ecosystem and fish populations. The major issues that impact the Peconic River is, the pollution (nitrogen), habitat degradation and loss, the presence of dams and physical barriers, the spread of invasive species, and overarching effects of climate change. The Peconic river is important because it is a vital freshwater source for the peconic estuary and it supports a wide variety of different species. Some issues of the peconic river are nitrogen pollution which leads to harmful algae blooms and low dissolved oxygen. Some human impacts of the Peconic River include pollution from residential septic systems and wastewater which contributes to nitrogen loading and algal blooms.

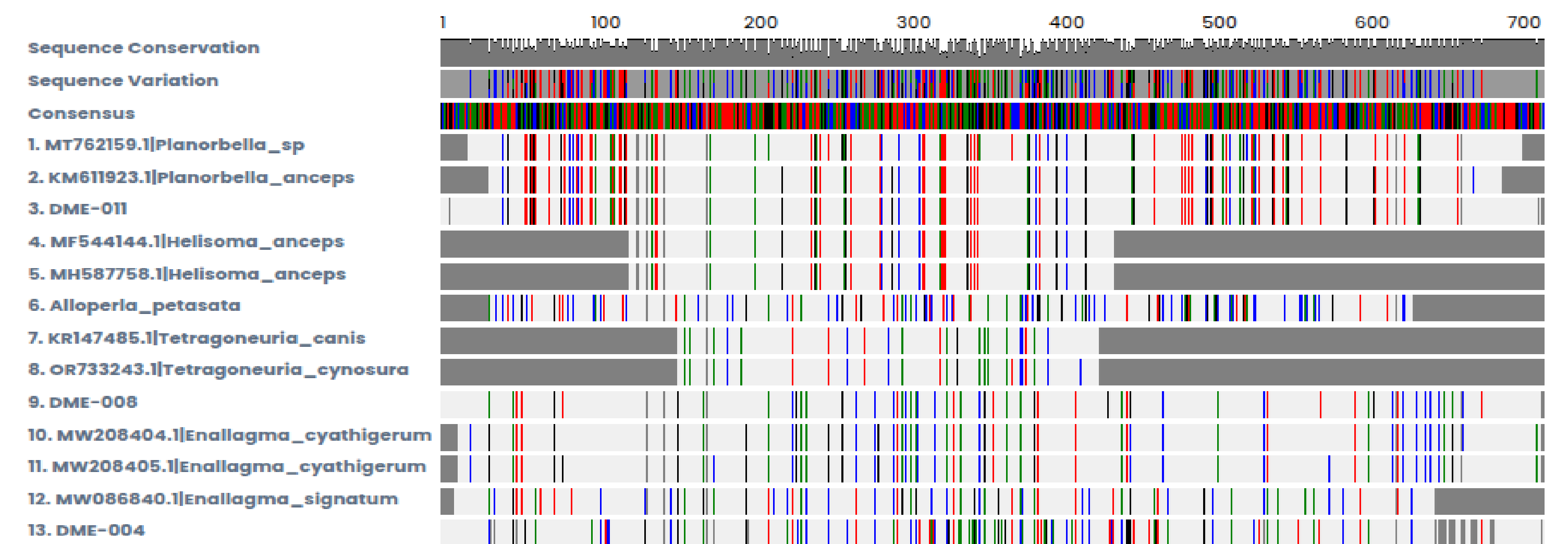
Materials and Methods



References



Results



	C	1	2	3	4	5	6	7	8	9	10	11	12	13
C	-	83.43	82.9	84.13	87.78	87.78	80.7	89.45	89.09	90.77	90.91	90.62	87.93	81.33
1	83.43	-	98.02	98.24	97.11	97.11	70.23	78.18	78.55	74.93	75.07	74.78	71.25	66.57
2	82.9	98.02	-	99.85	100.0	100.0	69.57	77.09	76.73	73.59	73.28	70.47	65.04	
3	84.13	98.24	99.85	-	100.0	100.0	69.57	77.09	76.73	75.56	74.89	74.61	71.5	67.56
4	87.78	97.11	100.0	100.0	-	100.0	72.35	77.09	76.73	76.21	76.21	75.88	73.31	66.56
5	87.78	97.11	100.0	100.0	100.0	-	72.35	77.09	76.73	76.21	76.21	75.88	73.31	66.56
6	80.7	70.23	69.57	69.57	72.35	72.35	-	77.09	76.0	79.2	79.2	78.87	77.87	71.88
7	89.45	78.18	77.09	77.09	77.09	77.09	-	-	98.91	82.55	81.82	81.82	82.55	74.18
8	89.09	78.55	76.73	76.73	76.73	76.73	76.0	98.91	-	81.45	81.45	81.45	82.91	74.55
9	90.77	74.93	73.59	75.56	76.21	76.21	79.2	82.55	81.45	-	97.59	97.16	87.62	80.0
10	90.91	75.07	73.59	74.89	76.21	76.21	79.2	81.82	81.45	97.59	-	99.43	88.21	79.97
11	90.62	74.78	73.28	74.61	75.88	75.88	78.87	81.82	81.45	97.16	99.43	-	88.21	79.69
12	87.93	71.25	70.47	71.5	73.31	73.31	77.87	82.55	82.91	87.62	88.21	88.21	-	88.4
13	81.33	66.57	65.04	67.56	66.56	66.56	71.88	74.18	74.55	80.0	79.97	79.69	88.4	-

Sample Number	Scientific Name	Common Name
DME-004	Enallagma signatum	Orange Bluet Damselfly
DME-008	Enallagma cyathigerum	Common Blue Damselfly
DME-011	Planorbella anceps	Two-Ridge Rams-Horn snail
DME-006	Mooreobdella melanostoma	Segmented Worm

Discussion

There is new biodiversity that we took from the Peconic.

Our biggest take away from finding DNA in the Peconic River is it can help us understand biodiversity and ecosystem health more efficiently.

Finding DNA in the river gave us a more complete picture of the aquatic life in the Peconic river and how the environment there is doing.

Our samples contain a diverse number of organisms and these are important as damselflies eat mosquitoes and act as a natural biological control.

Future Directions

In the future, additional groups from our school will continue to collect samples from the Peconic River every year. This enables a long-term study of biodiversity and identification of different species that may not have been captured this current year.

Acknowledgements

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