Wasatch Front Water Quality Council

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# Historic Gastropod Assemblages in Goshen Bay, Utah Lake based on Relict Shells

## Progress Report 2019

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**Rationale**

There have been few attempts to characterize historical snail assemblages that include relative abundance of the constituents of the Great Basin's former snail assemblages. Utah Lake was once a snail diversity hotspot and the purpose of this study was to closely examine relict snail shells collected from Goshen Bay on Utah Lake to characterize historical assemblage composition to provide managers with baseline data by which to compare current snail assemblages and water quality conditions, and to provide reintroduction goals.

**Methods**

Dr. David Richards collected a one-liter sample of relict snail shells from the shoreline of Goshen Bay, Utah Lake (approx. 40.11987, -111.84602). The sample was spread out in a 9"x13" dish and randomly subsampled into 10- approximately 15 ml sub samples. Each sub sample was sorted, and all snails identified to the lowest practical taxon with a dissecting microscope following taxonomy of Mollusks of Utah a Simple Guide, and a UDWR unpublished draft gastropod key (Kate Holcomb and Eric Wagner pers comm). Due to taxonomic uncertainty of certain groups (e.g. Physidae, Sphaeriidae), some were not taken to species. Processed vouchers are stored at the Utah Lake Research Lab at Timpanogos Special Service District Water Reclamation Facility in Pleasant Grove, UT.

**Results**

Examination of Goshen Bay relict snail samples resulted in identification of 11 snail taxa (Table 1). The most numerically dominant species were *Gyraulus parvus* (38%), *Pyrgulopsis* sp. (26%), *Valvata humeralis* (26%) (Figure 1; Table 1). Several relict shells of rare taxa including the now presumably extinct *Valvata utahensis* and Great Basin Ramshorn, *Helisoma newberryi* were also common.

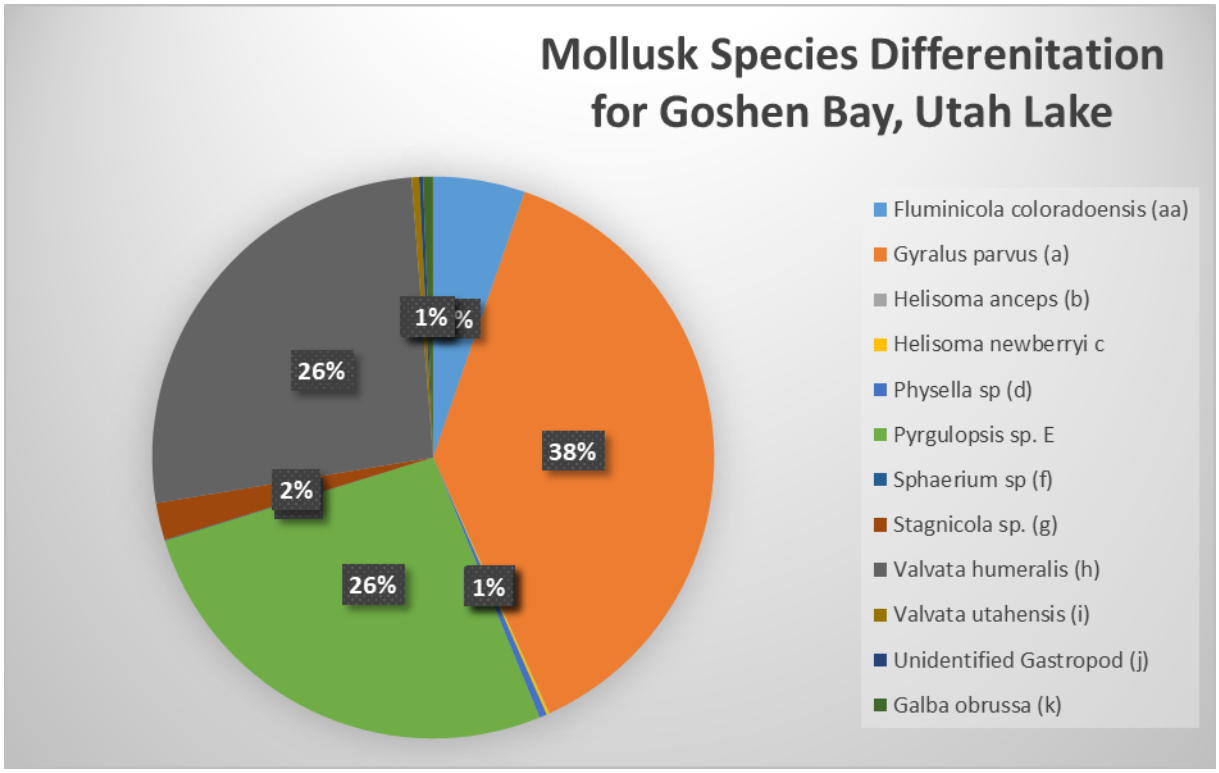


Figure 1. Percent composition of relict snail taxa from Goshen Bay, Utah Lake.

Table 1. List of taxa, their total number and percent composition from subsamples from Goshen Bay, Utah Lake.

| Taxon | Total # | % of Total |
|---|---|---|
| *Fluminicola coloradoensis* | 351 | 5.29 |
| *Galba obrussa* | 38 | 0.57 |
| *Gyralus parvus* | 2513 | 37.90 |
| *Helisoma anceps* | 2 | 0.03 |
| *Helisoma newberryi* | 10 | 0.15 |
| *Physella sp* | 29 | 0.44 |
| *Pyrgulopsis sp.* | 1750 | 26.40 |
| *Sphaerium sp.* | 3 | 0.05 |
| *Stagnicola sp.* | 142 | 2.14 |
| *Valvata humeralis* | 1749 | 26.38 |
| *Valvata utahensis* | 28 | 0.42 |
| *Unidentified Gastropod* | 15 | 0.23 |

**Discussion**

Our findings of almost a dozen relict snail taxa shows that at least along the shoreline of Goshen Bay, a rich and diverse gastropod assemblage existed until recently. Reasons for their disappearance are

unknown but we suggest that a combination of several factors are responsible including; introduction of fish predators, increased water temperatures, decreased aquatic vegetation, decreased dissolved oxygen, droughts in the 1930s, increased harmful cyanobacteria blooms, and decreased water quality. Feedback loops of loss of this rich gastropod diversity also contributed to their eventual demise because they were an integral component of the functioning of the lake and were no longer able to contribute to Utah Lakes biological integrity and health.

**Conclusion**

**T**he loss of what was once a rich and functionally diverse molluskan assemblage in Utah Lake that helped maintain its integrity and health is a Utah natural heritage travesty. Every effort should be may to improve conditions and begin a reintroduction program in earnest.