An Analysis of Crayfish Populations in the Rouge River Compared with Select Water Quality Parameters

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Abstract

The Rouge River watered of Southeastern Michigan is accompanied within a region that has become highly urbanized during the 21st century. The development that has led to a significant number of fragmented ecosystems and has decreased species biodiversity. The waterbodies, backwaters, and tributaries of the Rouge River make up a system of smaller sub-ecosystems, each with its set of unique characteristics. There must be attention and research into the species that inhabit these smaller regions if we hope to realize, preserve and protect the species that remain. The crayfish is one such creature that can utilize these island-like waterbodies and branches of the Rouge River. Crayfish are considered a keystone species in many aquatic ecosystems. They control plant and fish populations and are needed food source for many aquatic animals. The crayfish is an indicator species and is used to monitor water quality of pollutants, pH, BOD, and dissolved oxygen. These important bioindicator species are used by biologists to monitor the health of aquatic ecosystems. As a result, their populations can be used as a sign of a change in a certain bioindicators where their population numbers correlate heavily to specific environmental conditions. As our society continues to develop, we need to do our part in monitoring and keeping track of how it affects our local ecosystems. Crayfish are a great indicator species for water quality assessment. This experiment was designed for the purpose of determining the health of our local river system through the capture of these species compared to their habitat. Results have found trends that varied from the Lower Branch and Middle branch of the Rouge River. The aspects that were shared by the two sites was that populations of crayfish increased as surface temperature went up, the two sites contained the same species, and they both had a majority of females caught. The trend for global temperatures in the world is expected to increase because of the increase amount of greenhouse gases entering our atmosphere annually. Since our data shows that crayfish populations fair better in cooler temperatures, this global warming trend is not good at all. Crayfish most likely aren’t the only species in danger of a growing industrialized society. If crayfish are disturbed by higher temperatures, whole food chains can collapse.

Introduction/ Hypotheses

Crayfish are aquatic crustaceans found in inland bodies of water around much of the world. They have a varied diet of small insects including insects, crickets, beetles, snails, plants, and even decaying material (Faulkes). This wide-ranging diet allows them to fill in a niche where energy is transferred within aquatic food webs. However, this varied diet makes some crayfish species non-selective feeders. Once signals are sent to an area, they can move and prey, making growing populations possible for species known as turf crayfish (Procambarus clarkii). Crayfish can also be important biomonitors where their population numbers correlate heavily to specific environmental conditions. As a result, their populations can be used as a sign of a change in a certain condition of an aquatic ecosystem. According to Dr. Lucas, some of these indicators include water quality of pollutants, pH, BOD, and dissolved oxygen. These important biomonitor properties and the significance of crayfish as a keystone species, makes understanding their local populations even more essential to property assessing and managing the Rouge River watershed.

Methodology

Crayfish populations were monitored throughout the autumn of 2021. Crayfish were trapped, measured, identified, and returned to the river. As autumn progressed and temperature dropped, the quantity of crayfish collected increased. Only one crayfish species was trapped in both areas of the Rouge River during sampling - the Procambarus clarkii. During this research, crayfish populations were monitored throughout the autumn of 2021. Crayfish were trapped, measured, identified, and returned to the river. As autumn progressed and temperature dropped, the quantity of crayfish collected increased. Only one crayfish species was trapped in both areas of the Rouge River during sampling - the Procambarus clarkii.

Results

There is no correlation in crayfish numbers and turbidity. There is no correlation in crayfish numbers and turbidity. There is no correlation in crayfish numbers and turbidity. There is no correlation in crayfish numbers and turbidity. There is no correlation in crayfish numbers and turbidity. There is no correlation in crayfish numbers and turbidity.

Discussion

The Middle Rouge Branch seemed to not correlate with temperature as closely as the Lower Branch had. The Middle Rouge’s crayfish population seemed to strictly decrease as fall progressed, rather than correlating to measured temperature. Crayfish of the Lower Rouge Branch seemed to highly correlate with air temperature throughout the research. The graph shows a negative correlation between air temperature (dark blue line) and crayfish populations (green line). There is also a less clear negative correlation between air temperature (dark blue line) and crayfish populations (green line). The graph shows little to no correlation between turbidity (brown line) and crayfish populations (green line). There is also a less clear negative correlation between turbidity (brown line) and crayfish populations (green line). The graph shows a negative correlation between turbidity (brown line) and crayfish populations (green line). There is also a less clear negative correlation between turbidity (brown line) and crayfish populations (green line). The graph shows little to no correlation between turbidity (brown line) and crayfish populations (green line).

Conclusion

As our society continues to develop, we need to do our part in monitoring and keeping track of how it affects our local ecosystems. Crayfish are a great indicator species for water quality assessment. This experiment was designed for the purpose of determining the health of our local river system through the capture of these species compared to their habitat. Results have found trends that varied from the Lower Branch and Middle Branch of the Rouge River. The aspects that were shared by the two sites was that populations of crayfish increased as surface temperature went up, the two sites contained the same species, and they both had a majority of females caught. The trend for global temperatures in the world is expected to increase because of the increase amount of greenhouse gases entering our atmosphere annually. Since our data shows that crayfish populations fair better in cooler temperatures, this global warming trend is not good at all. Crayfish most likely aren’t the only species in danger of a growing industrialized society. If crayfish are disturbed by higher temperatures, whole food chains can collapse.

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