

Bangor Waterways

Are they in danger?

Nathan Henigan, Bangor High School, June 2008

Motivation

Environmentalists and big chain box stores compete for control of open, green areas. Understanding the needs of both groups and the protection of sensitive areas is critical for the economic growth and environmental health of Bangor. Penjajawoc Marsh and Birch Stream were mapped using hillslope and land use data to help predict areas at risk of pollution from development.

Goals/Questions

The goal for this research is to gain further knowledge of urban streams and the stresses put on them by human activity. Predictions might be made for future areas of concern in the Penjajawoc Marsh.

Research Questions include:

- How are the landscapes of Birch Stream and Penjajawoc Marsh similar and how do they differ?
- What are the greatest risk areas in terms of heavy development to the health of Penjajawoc Marsh?

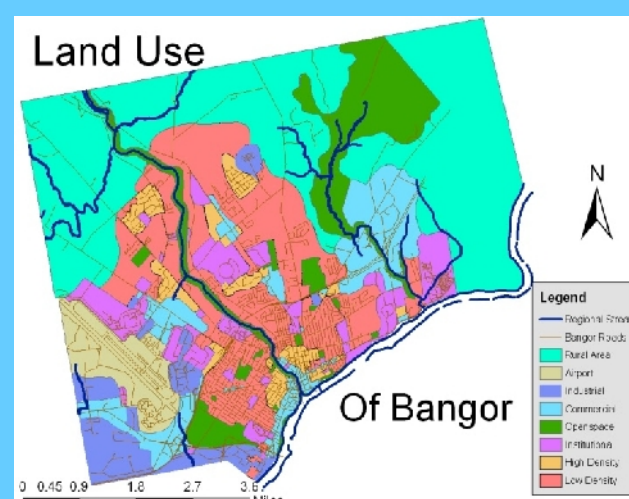
Literature Review

Major contributions to the project were the articles written by John Peckenham, assistant director of the Mitchell Water Research Institute at the University of Maine. The study concluded that the health of the Birch stream was extremely compromised by artificial sources. The airport was a major contributor along with the construction of the airport mall, which subsequently was built right over the stream.

Approach and Results

Bangor Land Use and Development

While this study highlights streams at risk of pollution, the water quality of Bangor waterways have improved greatly over the past 20 years. Bangor citizens have become more aware of the importance of healthy waterways and have taken control of their surroundings. Rules and regulations have been established to guarantee a healthy Bangor



Comparison of Birch Stream and Penjajawoc Marsh

The two waterways differ greatly in slope and land use. Birch Stream has a greater slope risk, while Penjajawoc Marsh is more level and therefore at less risk to runoff. However, they both are surrounded by commercial areas and high human activity.

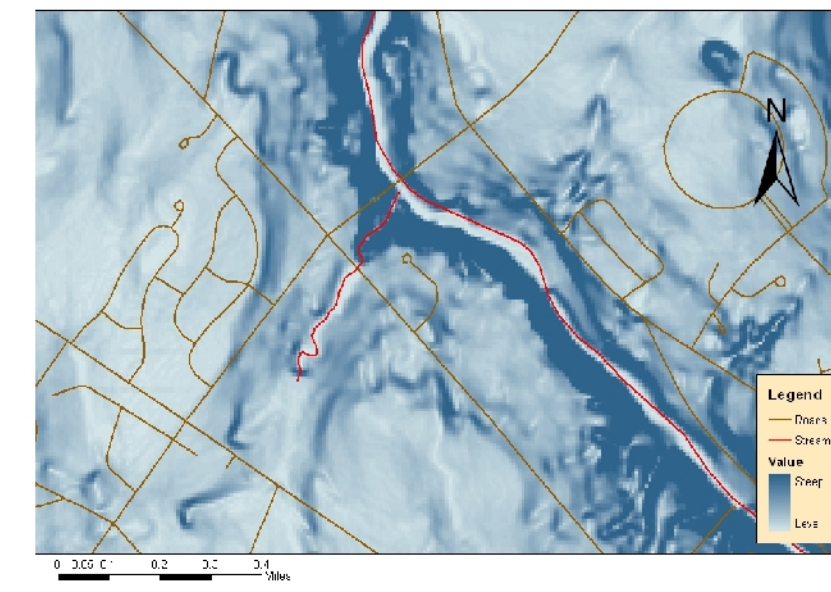
High Risk Areas

Overall, the stream running through Penjajawoc Marsh is not high risk because the slope of its banks are not steep, however there are surrounding areas within the marsh at a greater risk. In the land use map, most of the area is slated for commercial use, creating a higher risk for those waterways and tributaries within those zones.

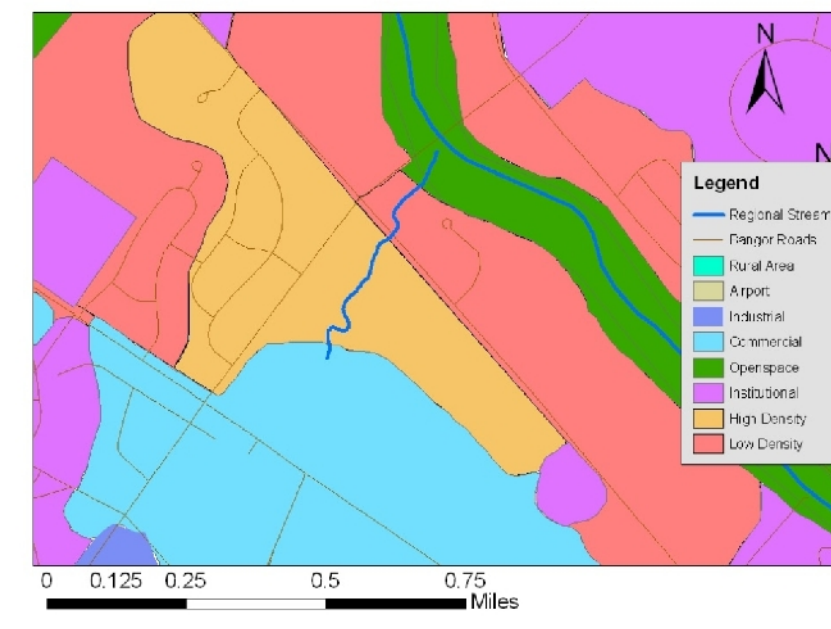
The small tributary in the southwest corner of the map crosses a high density use zone and meets a commercial zone.

Another tributary in the north eastern hillslope map, while mostly located in a rural zone, begins at the edge of a commercial zone and its slope becomes increasingly steep as it flows into an industrial zone.

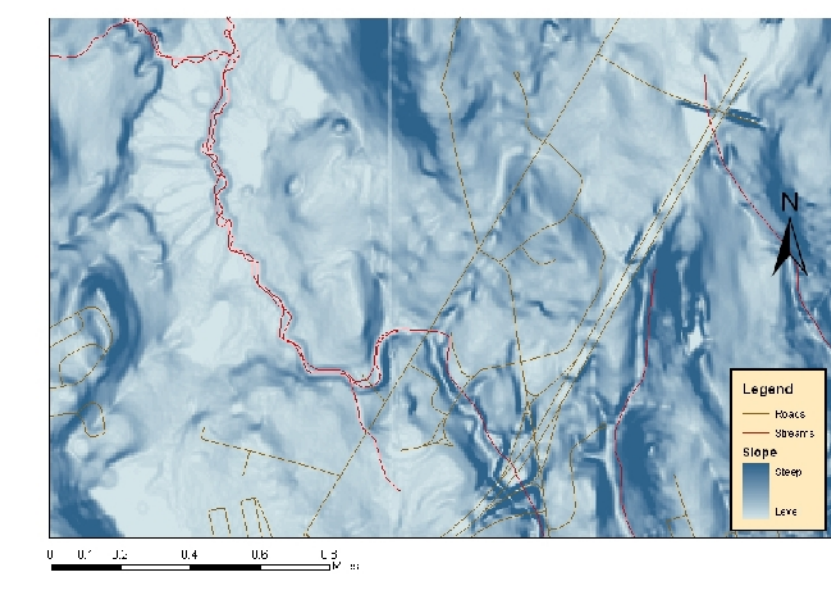
Hillslope of Birch Stream



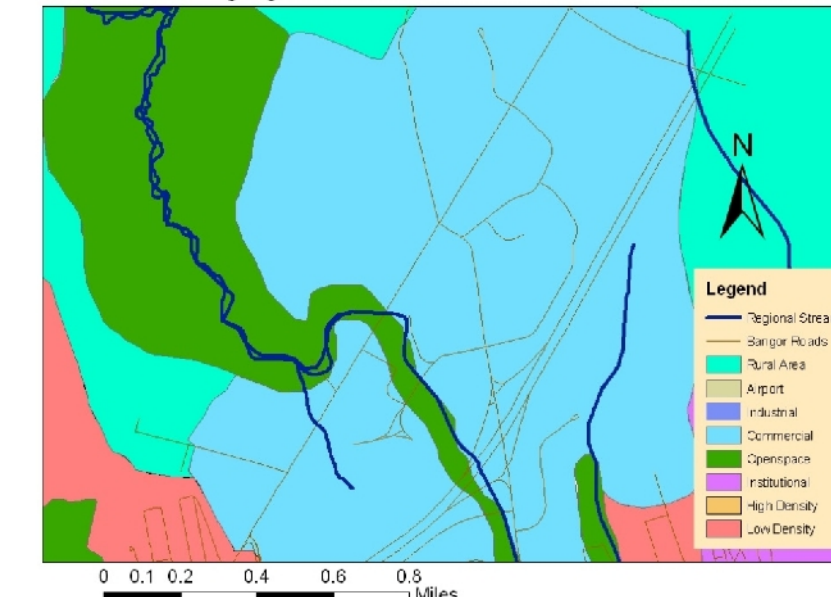
Land Use of Birch Stream



Hillslope of Penjajawoc Marsh and Stream



Penjajawoc Stream Land Use



Methods

This project required the design of a geographic information system to analyze and present a variety of data sets about these areas of concern.

- Jpeg's of Birch Stream were georeferenced and turned into shape files
- Shape files were created for different landuse areas, such as high and low density, commercial, industrial, open space, institutional, and rural.
- Hillslope files were created from the converted shapefile conveyed a major theme of this project. The views of the hillslopes illustrate the scale of elevation changes along the stream showing in particular the highest areas or areas that present the highest risk for pollutant runoff.
- With the information from the resulting visualizations and the knowledge of Birch Stream, a prediction can be made about the impact of development in the Penjajawoc Marsh area.

Conclusion

With increased attention, these sensitive environments will be able to be maintained at healthy levels. Maine markets its pristine environment as its greatest resource and it should continue to uphold that goal through research and protection despite the promise of economical returns from large scale retail or industrial development

Future Work

Future work should be considered on Birch Stream and Penjajawoc Marsh. High School students should go to these waterways, taking samples and surveying the water and water quality of the Bangor Area.