BSPH Honors Thesis Final Oral Defense

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Comparing Euclidean and River Distance Metrics in the Bayesian Maximum Entropy (BME) Estimation of E. coli Concentrations in Connecticut Rivers

McGavran Greenberg 2306
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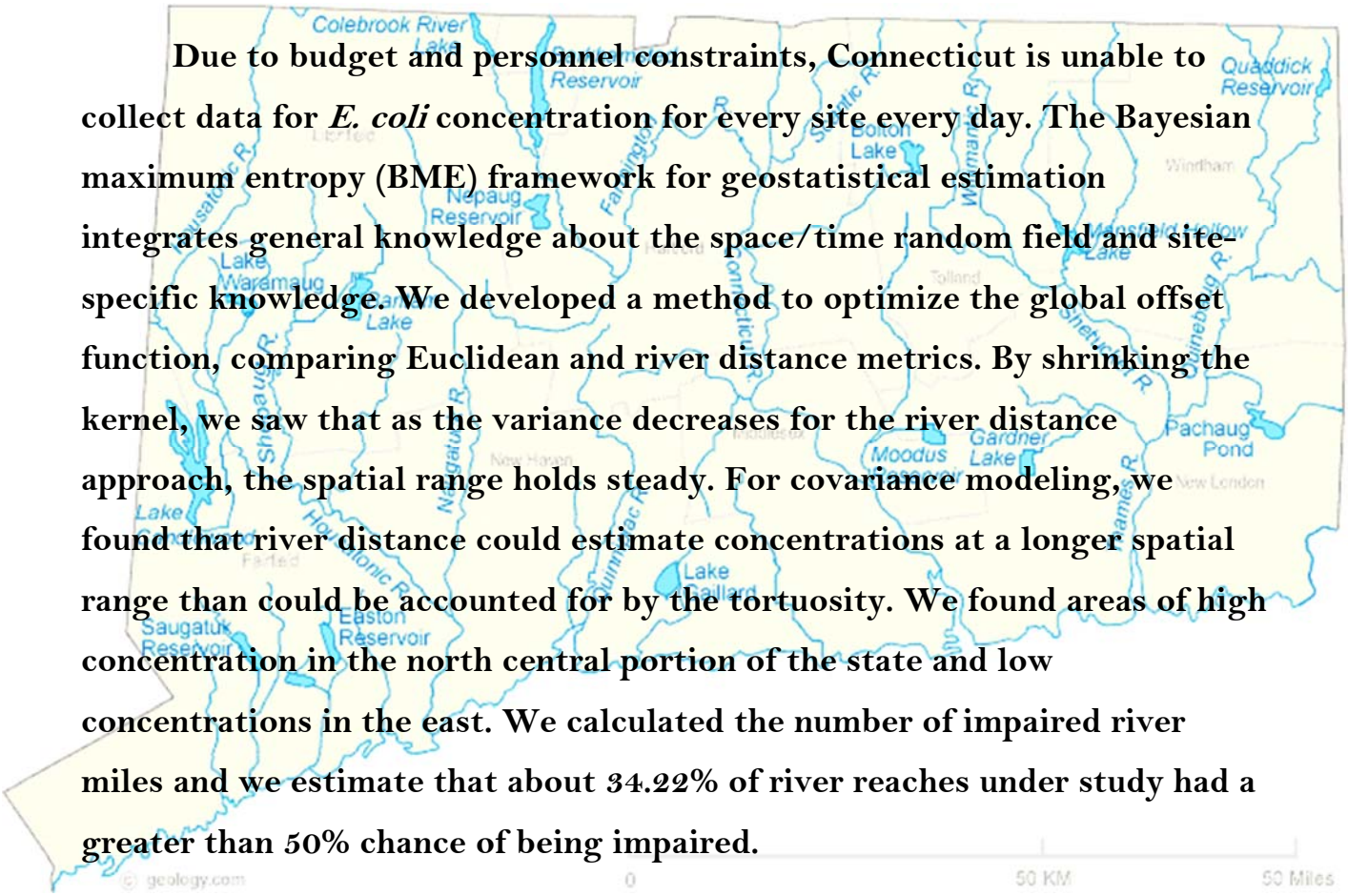
2:00 P.M.



Due to budget and personnel constraints, Connecticut is unable to collect data for *E. coli* concentration for every site every day. The Bayesian maximum entropy (BME) framework for geostatistical estimation integrates general knowledge about the space/time random field and site-specific knowledge. We developed a method to optimize the global offset function, comparing Euclidean and river distance metrics. By shrinking the kernel, we saw that as the variance decreases for the river distance approach, the spatial range holds steady. For covariance modeling, we found that river distance could estimate concentrations at a longer spatial range than could be accounted for by the tortuosity. We found areas of high concentration in the north central portion of the state and low concentrations in the east. We calculated the number of impaired river miles and we estimate that about 34.22% of river reaches under study had a greater than 50% chance of being impaired.

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