

RESEARCH EXPERIENCE AND INTERESTS

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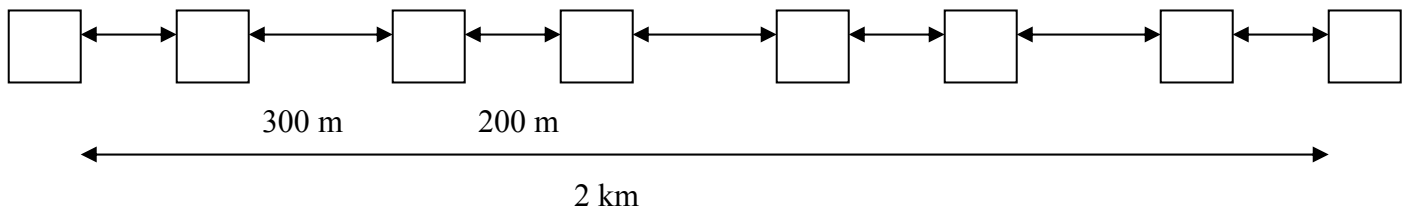
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At this time my primary research endeavors are at the intersection of population genetics and conservation biology. I am currently working as a Conservation Genetics Technician on a NSF funded project for which David Marsh and Paul Cabe are the Principal Investigator and Co-principal investigator respectively. We are currently finishing off data collection and beginning preliminary analyses of several microsatellite data sets from red-backed salamander (*Plethodon cinereus*) populations across western Virginia.

POPULATION/CONSERVATION GENETICS

Transect Data Set

The primary focus of the above mentioned grant is to investigate the extent to which roads interfere with red-backed salamander gene flow. However, prior to this study, we had only a fuzzy idea of what to expect in terms of microsatellite variation in *P. cinereus*. To address this problem we set up a transect with 50 m² plots spaced at intervals as described below.



We chose this spatial arrangement of eight plots so that we would have several different distances at which to make pair-wise comparisons of our plots. Our major objectives for this study were as follows: (1) investigate whether there is genetic structure, (2) investigate whether there is evidence for isolation by distance, and (3) estimate population parameters such as effective population size (N_e) and migration rates (m). Below are four figures that summarize our findings. At this point our data suggest that *P. cinereus* exhibits viscous population structure, that there is little long-distance dispersal, and that there is evidence for isolation by distance.

Figure 1: Regression of pair-wise F_{st} against geographic distance. $r = 0.723$, $P = 0.001$ as estimated by a simple Mantel Test.

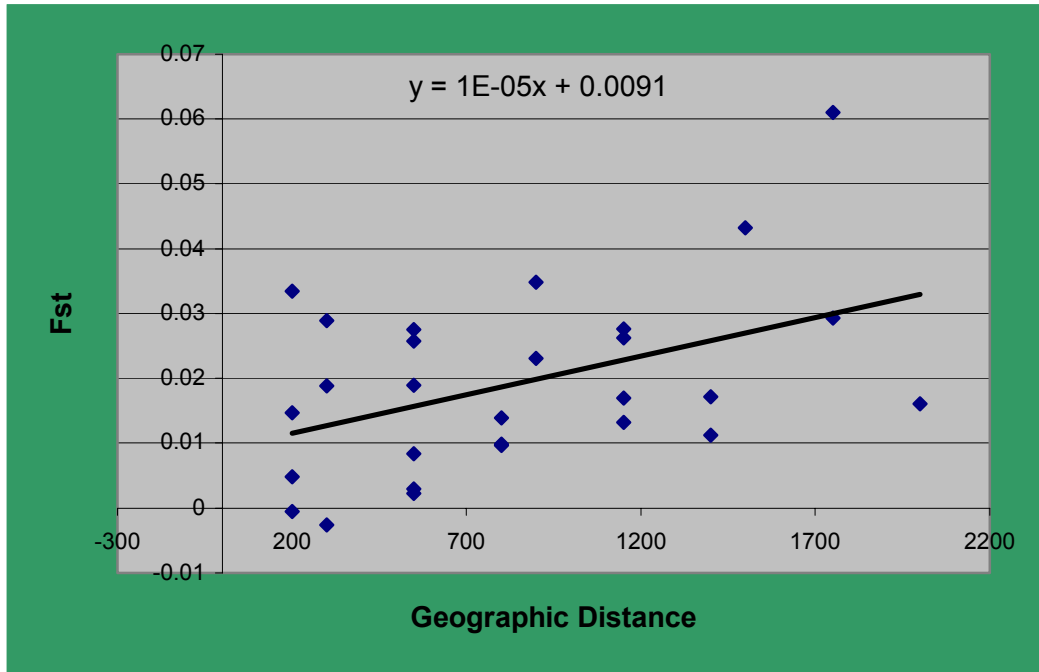


Figure 2: F_{st} based approach for estimating the product of effective population density (D) and the variance in the parental distance (σ^2) (Rousset, 1997). $D\sigma^2 \sim 9.95$.

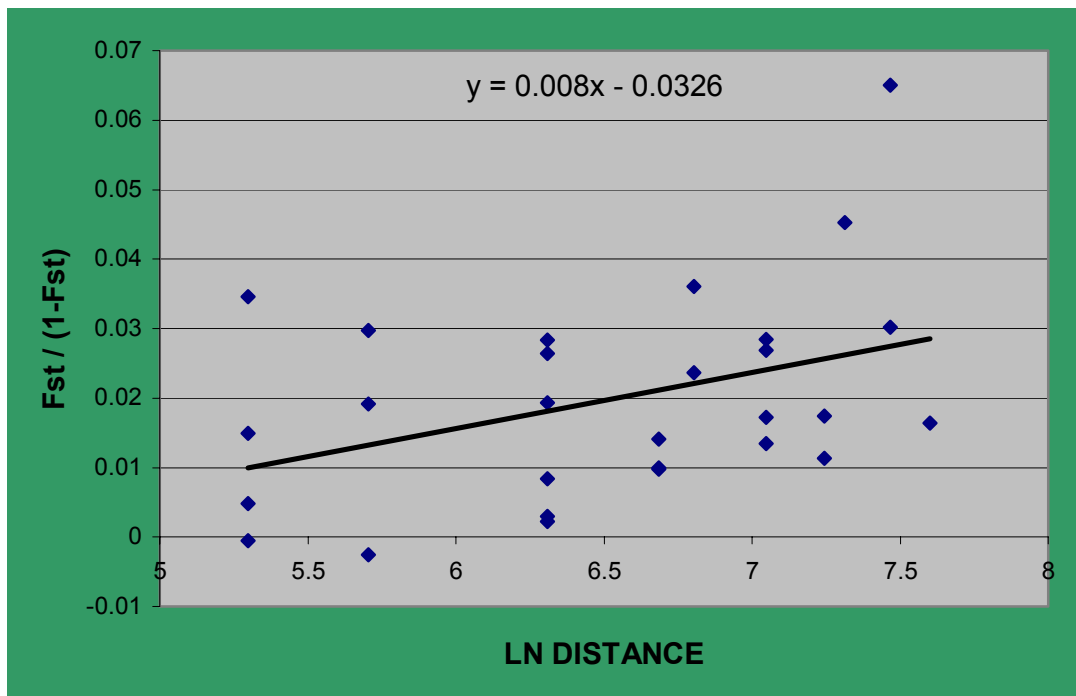


Figure 3: Alternative approach to isolation by distance based on probability of correct genotypic assignment for each distance class of population pairs.

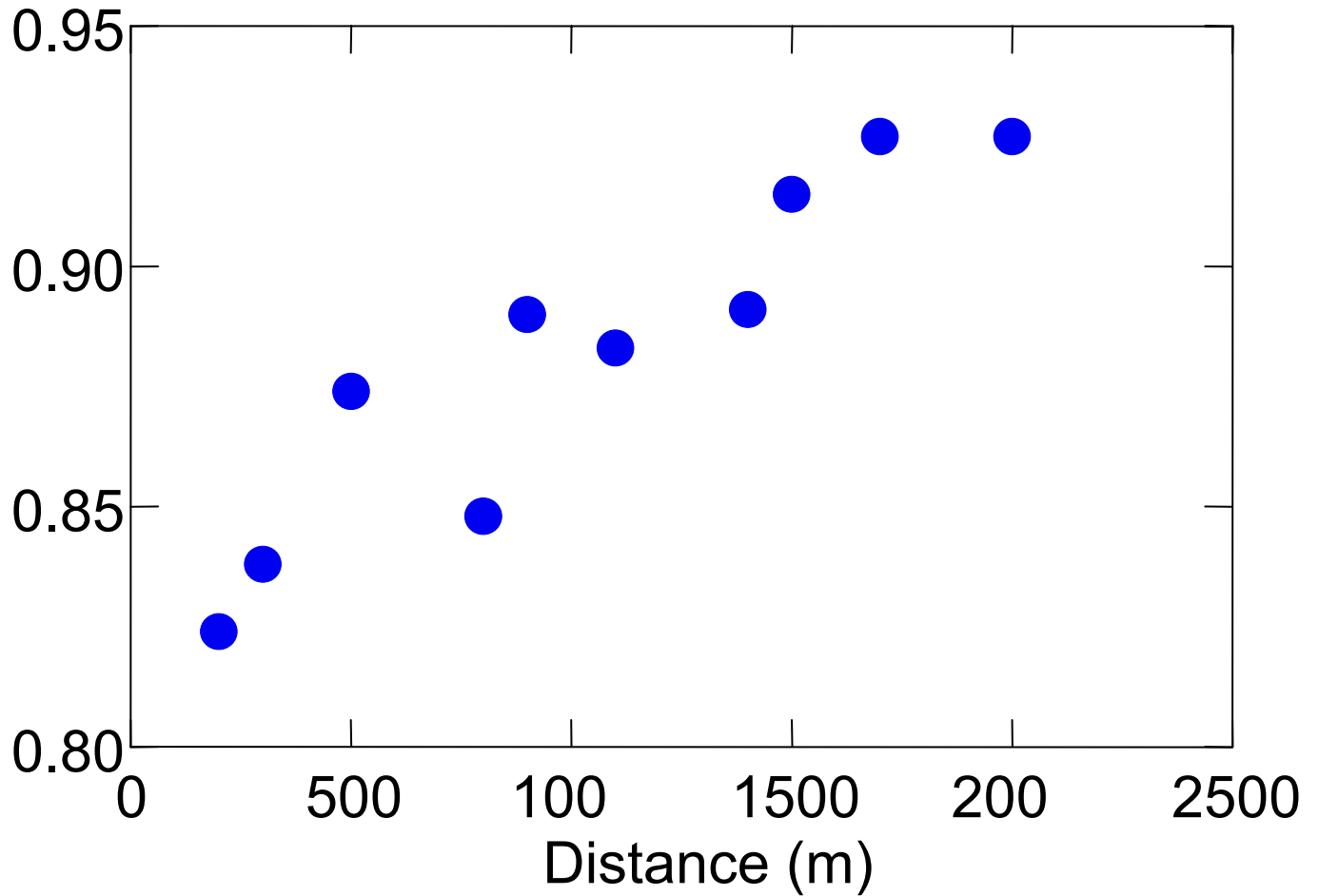
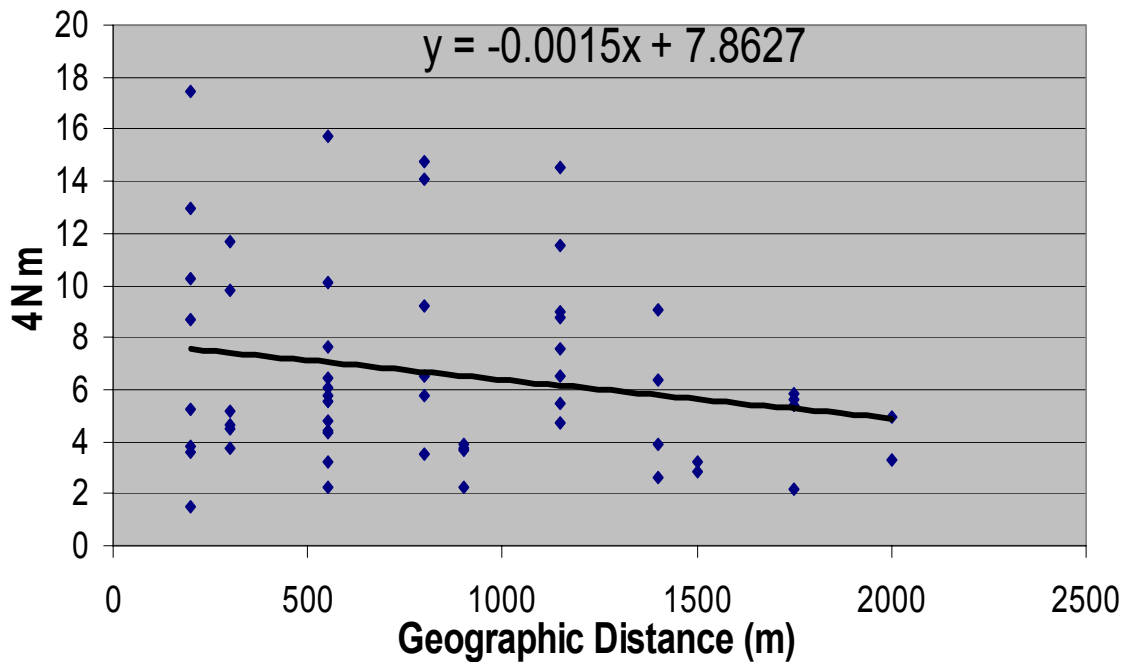
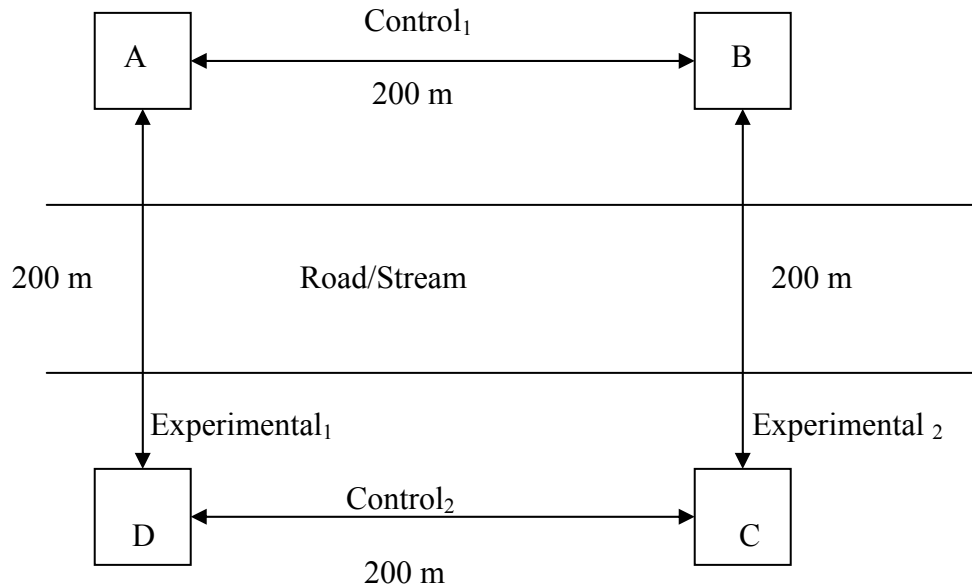


Figure 4: Maximum likelihood estimates of $4N_m$ plotted against geographic distance.



Roads/Streams and Gene Flow

We are currently wrapping up the data collection phase for this project. As of now, we have completed or nearly completed data sets for five 2-laned roads and two 4-laned road. Below is a diagram of the spatial arrangement of our design as well as the comparisons we intend to make. In addition to the roads data sets, we also have a data set that comes from the exact same experimental design except that a stream is bisecting the plots rather than a road.



We are currently not far enough along with our analyses of the roads data sets to project the extent to which roads interfere with red-backed salamander gene flow. However, preliminary analyses suggest that streams are likely to act as partial barriers to gene flow in *P. cinereus*.

Introduced Species

While I was a master's student at The University of Louisiana at Lafayette (ULL), I was lucky enough to take an independent study class with Dr. Joseph Neigel. While in Dr. Neigel's lab, I worked on a project that involved the Mediterranean Gecko (*Hemidactylus turcicus*). *H. turcicus* is an introduced species in North America, and Dr. Neigel was interested in using genetic markers to gain insight into the nature of its introduction. I designed primers for the cytochrome B gene of this organism and learned the basics of molecular techniques during the course of this class. However, the semester was over before I made a tremendous amount of progress, and I was forced to return to my thesis.

ECOSYSTEMS ECOLOGY OF BRACKISH MARSHES

I have limited experience working at the ecosystems level. I gained this experience by helping Paige McMurry with her master's thesis project while at ULL. We measured below ground biomass in managed vs. unmanaged marshes. Paige also measured above ground biomass and decomposition rates in these systems. The data from this research are in the process of being written up for Paige's master's thesis.