BACKGROUND
Throughout the past 10 years, pollinating bee populations have been steadily declining, without a clear reason. Extensive research has been conducted in an attempt to determine the cause of this decline. Recently, "failure to thrive" in bees has been linked to the consequences of habitat loss and fragmentation, human disruption, the use of a particular class of insecticides called Neonicotinoids, and other factors. A potential conservation tactic could be the reintroduction of bee colonies to areas suffering from bee loss in order to encourage population growth. A suitability study of pollinating bee populations in those areas. Unfortunately, data on existing bee populations organized by anything narrower than the state level are not currently available. This data is projected to be available by June 2016, and may be incorporated into future studies.

SUITABILITY FACTORS
From the final suitability map, the best location for the reintroduction of pollinating bee colonies can be determined. The five factors that this project was based on are not the only factors that significantly impact the survival and success of bee colonies in New England. In future studies, factors such as climate, flower diversity, and toxic emissions should be explored in depth to ensure the highest likelihood of bee colony success. The locations most in need of bee recolonization could also be identified by examining existing bee populations in those areas. Data Sources: Tufts GIS Data Server, US Geological Survey Pesticide National Synthesis Project 2008-2012

METHODS
For each factor that could potentially be affecting bee success, data was gathered and spatially displayed in a raster format. The data for the insecticide imidacloprid was interpolated from county data. Road proximity was measured via euclidean distance methods, centered on major roads in New England. In the production of the five maps below, each of which displaying a different factor affecting bee success, each 1000mx1000m cell (pixel) was assigned a suitability value from 1 (low) to 5 (high). Then, all of the map data was aggregated into one final map to display the locations with the highest and lowest combined suitability. The aggregated map is weighted, in that some factors have more of an impact on site suitability than others.

From the final suitability map, the best location for the reintroduction of pollinating bee colonies can be determined.

WEIGHTED SITE SUITABILITY
All of the factors hypothesized to affect bee colony success were combined via algebraic functions (the combination of the aforementioned suitability values) into a weighted suitability map. Each factor was weighted by the specified percentage. The eastemmost points in Maine were excluded from this aggregated map, as no values were obtained for imidacloprid data, so an overall suitability value for those areas could not be calculated. The red areas on the map indicate low suitability, the beige moderate suitability, and the green high suitability.

WEIGHTED SITE SUITABILITY

DATA AND REFERENCES
All work done in ArcGIS and Microsoft Excel
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References: