

A GIS-Based Landscape Scale Model for Native Bee Habitat

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(Abstract)

Through pollination, bees are responsible for the persistence of many biological systems on our planet. Bees have also been used for thousands of years in agriculture to improve crop quality and yield. Recently, there have been declines in honeybees worldwide. This decline is concerning because it threatens food supplies and global biodiversity. An alternative to alleviating the effect of a honey bee shortage could be to use native bees. Problems with adoption of native bees in agriculture occur because of a lack of large scale analysis methods for native bees, regional species lists and management knowledge.

This research explores the use of GIS in modeling native bee habitat to provide a landscape scale analysis method for native bees and develop a systematic sampling method for regional species list development. Raster GIS modeling, incorporating decision support and Poisson statistical methods were used to develop a native bee habitat model. The results show landscape composition is important to bee abundance and diversity. In addition, habitat fragmentation may not be as detrimental to bees as previously thought. Bees are most sensitive to landscape composition at a scale of 250 m, but require large patches of floral resources. GIS proved to be very useful in modeling bee habitat and provides an opportunity to conduct landscape scale bee population analysis.

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