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STUDENT SHOWCASE
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DEPARTMENT:
Physical and Environmental Sciences

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PROJECT TITLE:
Using ARCGIS to Interpolate Beetle Mortality in Pinyon Pines in the Colorado National Monument

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By Hunter Doyle

Background

Ips beetle general type bark beetle attacks spruces and pines

Species Ips confusus attacks pinyon pine trees and has been shown to kill pinyons over a large area

Variety of factors that lead to infestations, difficult to predict movement of beetles

Spatial Interpolation is process of estimating values of points based on the know values of other points

Various methods of spatial Interpolation

Objectives

Map real world data previously obtained showing plots and beetle kill mortality
Use ARCGIS to interpolate areas with the highest mortality, utilizing a variety of interpolation techniques

Methods

Real world data obtained from Deb Kennard regarding beetle mortality in Colorado National Monument
Each point is a 100m^2 plot
Used these points and total morality for the interpolation

Conclusion/Future

Nearest neighbor most accurate interpolation for situation, nearest values are more influential in a points interpolation.

Due to COVID-19 much of the work and proposed objectives are uncomplete due to access issue

Future of the project would look at larger area of beetle mortality and utilize other mechanics to help with the prediction and early detection of beetle mortality
Use of remote sensing in conjuncture with ARCGIS
Grand truthing of data, look at real world factors

Acknowledgements

Verner Johnson[1], Deb Kennard[1]
1 Colorado Mesa University, Department of Physical and Environmental Sciences

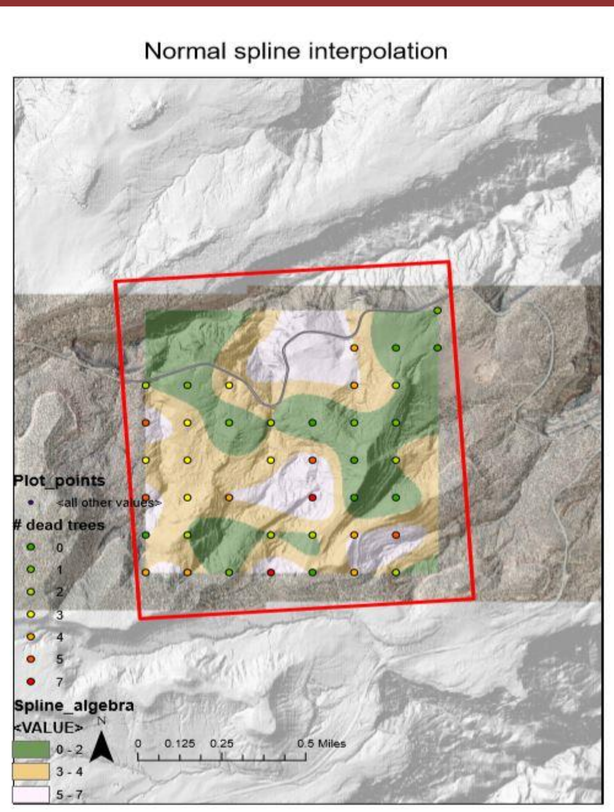

Fig. 1 Regularized spline. Interpolates by creating surface that is like bending a sheet of rubber over the points

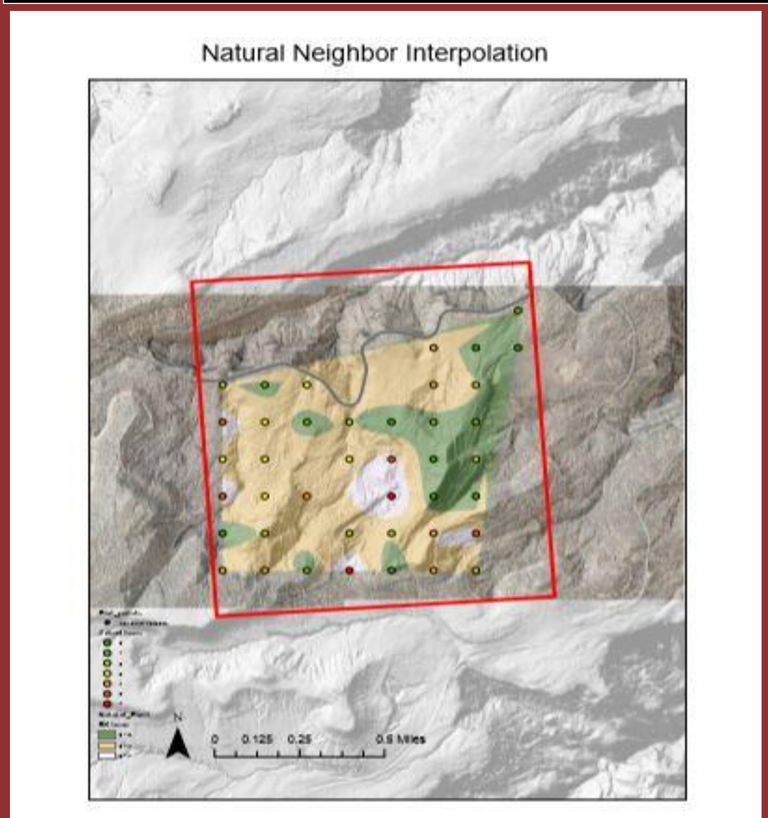

Fig. 2 Nearest neighbor interpolation creates a surface by predicting values from nearby values, Closer values have more input

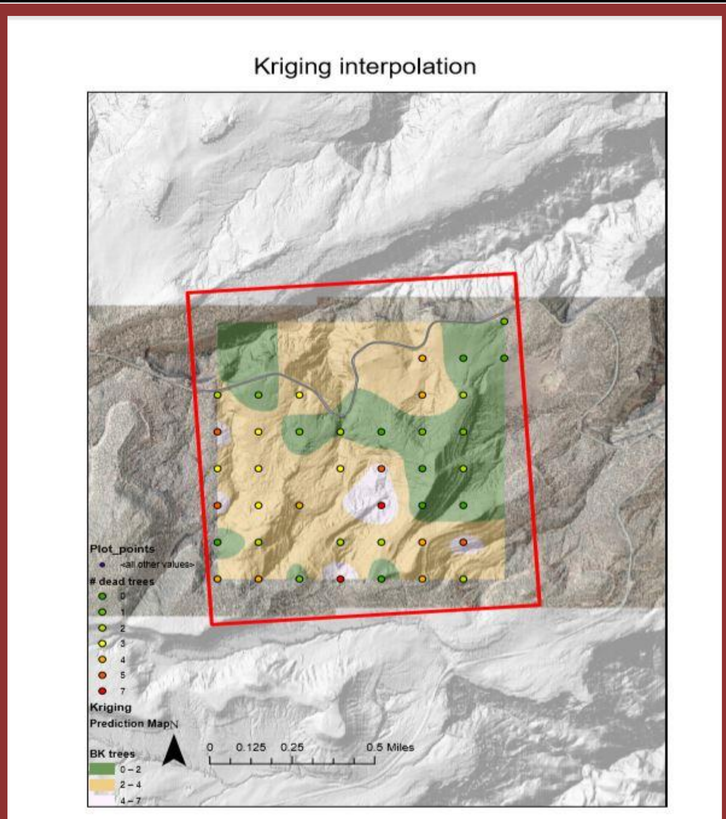

Fig. 3 Uses a Gaussian process to create a prediction surface