Friends of Trees
Survival of Plants by Site

Meara Butler
Jenny DiMiceli
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About Friends of Trees

- Mission:

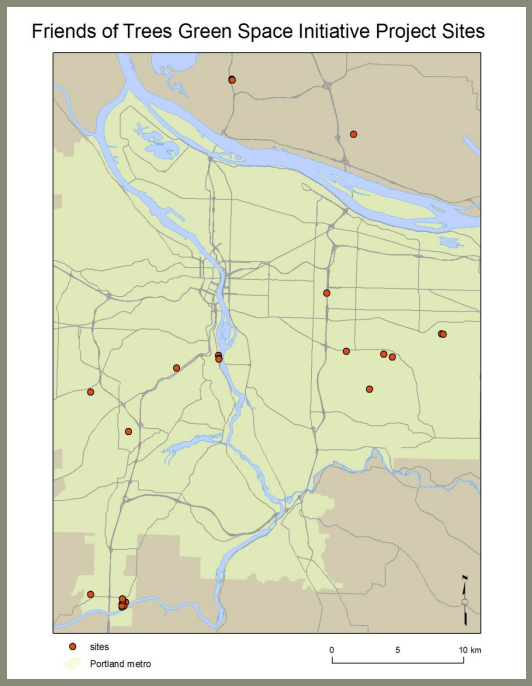
To bring people in the Portland-Vancouver metro area together to plant and care for city trees and green spaces"

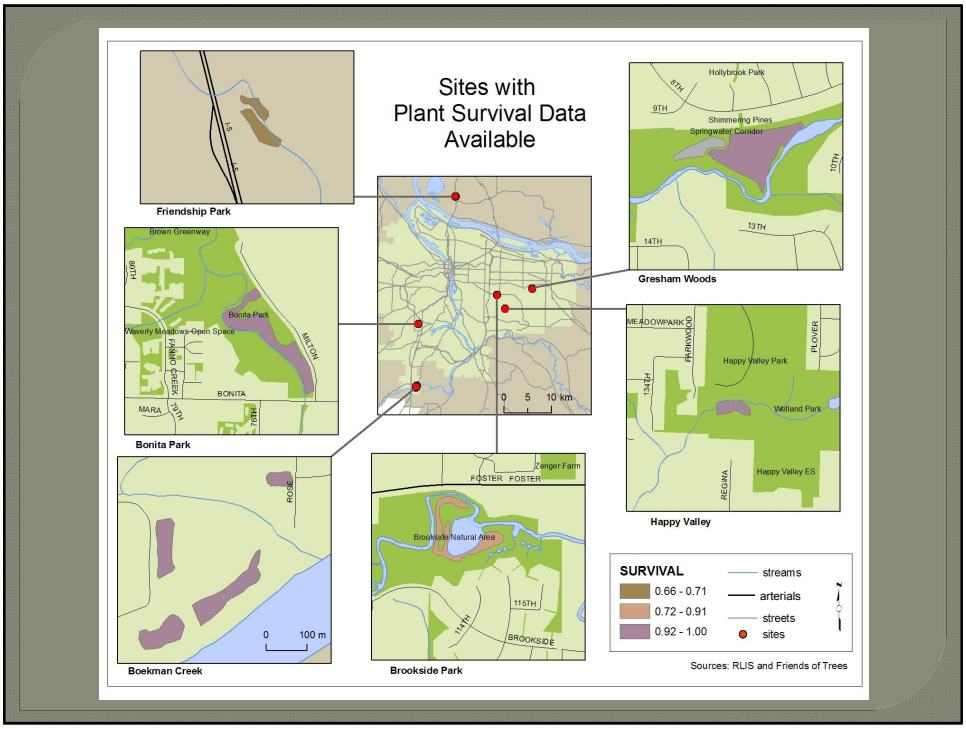
www.friendsoftrees.org

We specifically looked at plantings in the Green Space Initiative
(large plantings in public spaces)

Problem

- Determine factors that influence plant survival by planting site
  - As preliminary research for a multicriteria site suitability analysis

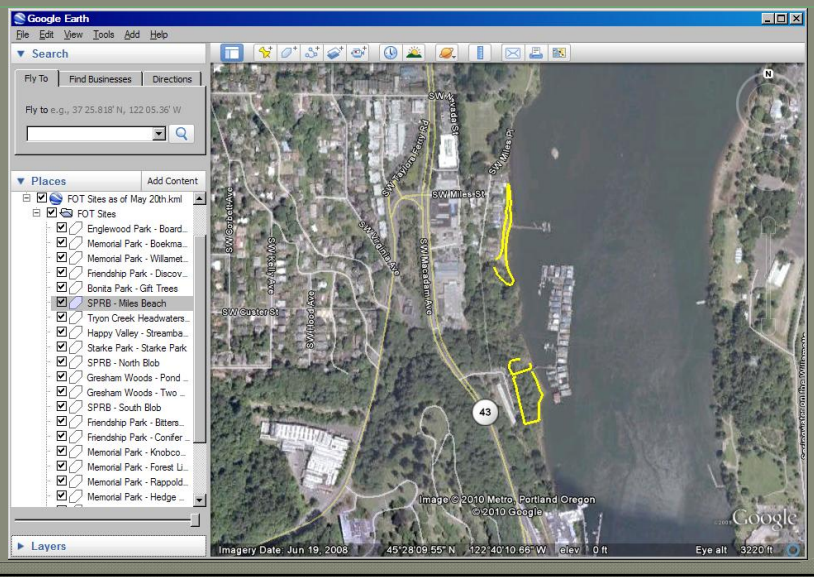




Data Collection

- Site Locations
  - GPS Points
  - KML File
- Access Database
- Ancillary Data
  - Soil Types
  - Land Cover Types
  - Distance to Roads
  - Distance to Streams
  - Distance to Parks
  - Distance to Schools
  - Census Population

Site Locations Digitized in Google Earth



Example of Our Digitized Site Vs. Example of Betsy's Digitized Site

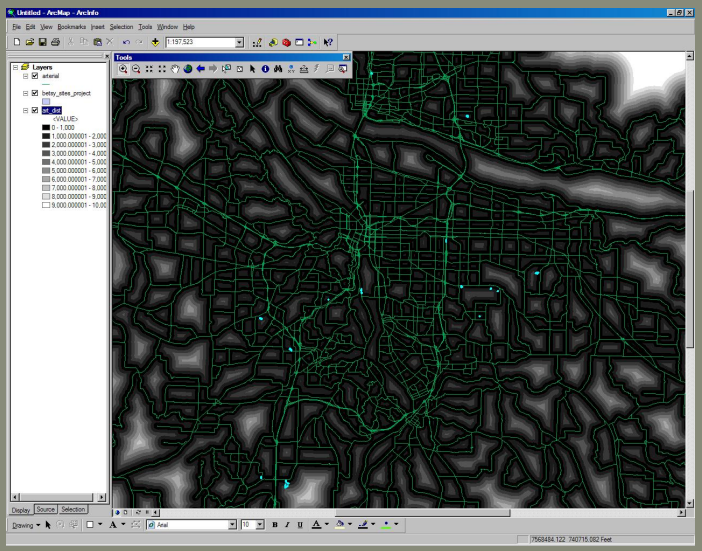
Connecting GPS points in ArcGIS

Using her knowledge and GPS points as reference in Google Earth

Methods

- Used Access to query data
- Joined Access tables to feature classes for analysis
- Created distance rasters in Spatial Analyst
- Ran Zonal Statistics to obtain distance data
- Ran Identity with Census Block Groups to obtain population data
- Ran Identity with soil and land cover
  - Used class with majority of area within site
- Ran statistical analysis using SPSS
  - Regression and ANOVA between factors and survival rates

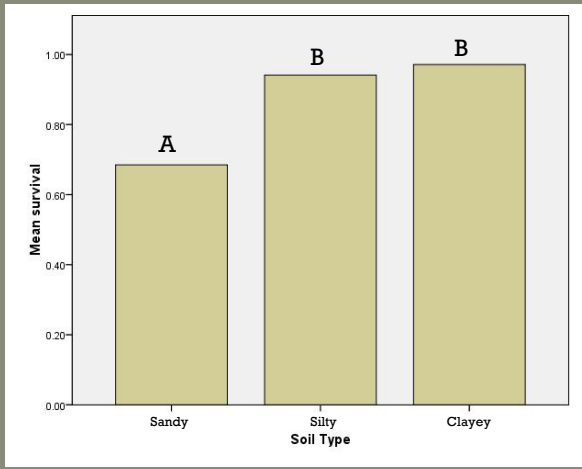
Distance Raster Example: Distance to Arterial Roads



Possible Influence on Survival Rates

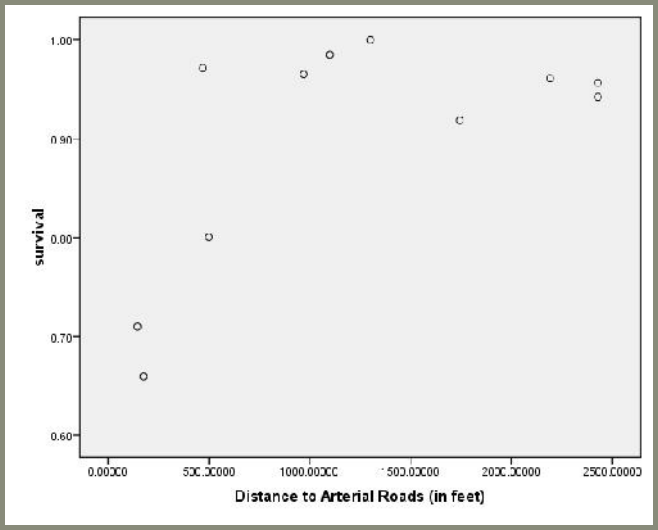
Factor	Correlation Coefficient	Significance at 95% Confidence	Significant ?
Soil Type	.784	.004	Yes
Distance to Arterials	.628	.039	Yes
Land Cover	.422	.196	No
Distance to Streams	.415	.204	No
Population Density	.402	.199	No
Distance to Schools	-.378	.316	No
Distance to Parks	.172	.659	No
Distance to Streets	-.148	.705	No

Correlation between Soil Type and Plant Survival



Using a contrast test we determined that Sandy soil has a statistically significant lower survival rate than Silty and Clayey soil types.

Correlation between Distance to Arterial Roads and Plant Survival



Results

- Sites with Sandy soil type have a statistically lower survival rate
- Correlation between distance to *arterial roads* and survival, but not between *streets* and survival.
  - Implies that proximity to larger roads has an impact on survival rates, but not smaller streets.
- One species of plant was an outlier with a low survival rate:

  Western Red Cedar 48% survival

  (next lowest was 66% survival)

Next Steps

- If we had more time and more FOT site data, these findings would be a good basis for a multi-criteria site selection.
  - A multi-criteria evaluation could strongly weight distance to roads and soil type of potential sites, as those factors are correlated to plant survival and therefore the success of a planting site.
- Look more closely at survival data by species, to determine if certain species were driving the lower survival rates.

Sources

- Photo Credits: Friends of Trees
- Site and Survival Data: Friends of Trees
- Ancillary Data:
  - RLIS
  - GAP Land Cover
  - USDA Soil Data Mart
- Google Earth
- Background Imagery: Oregon Imagery Explorer
  - http://oregonexplorer.info/imagery/