SELECTING HIGHER-SPEED RAIL CORRIDORS BY CONSIDERING IMPACTS TO THE ENVIRONMENT, LAND USE, AND ENGINEERING REQUIREMENTS

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Outline

- Motivation
- Research goals
- Study area
- Methodology
- Results
- Discussion
- Future Work

Renewed Interest In Rail

- Urban renewal
- Mode choice
- Efficient
- Amtrak ridership
- Funding
- Highways

www.amtrak.com

Where Should It Be Built?

- Current alignments
  - Less expensive
  - Capacity
  - Engineering
- New alignments
  - Expensive
  - Higher speeds
  - Ridership

How Do You Decide?

- Involves several stakeholders
- National Environmental Protection Act (NEPA)
- Environmental Impact Statement (EIS)
  - Rigorous process
  - Oregon example

New Methods

- Environmental Corridor Optimization and Planning Alignments (ECO-PAL) toolkit
- USDOT
  - National Consortium for Remote Sensing in Transportation
- Goal: Utilize remote sensing data to streamline corridor planning process
  - Economic, environmental, historical, engineering, land use

Research Goals

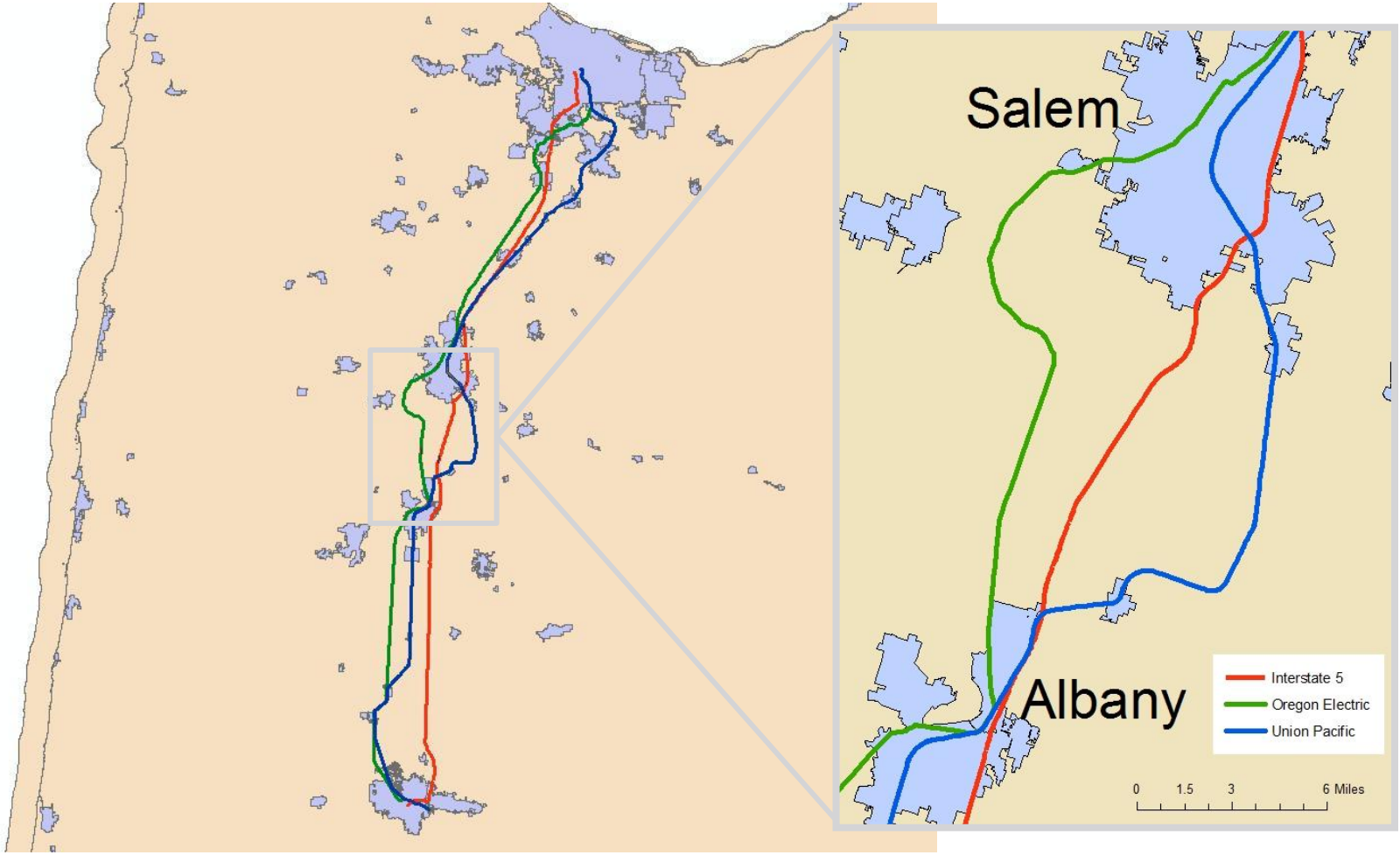
- Build toolkit for selecting rail alignments
- Oregon higher-speed rail project
- Research question:
  - Which choice of alignment has the least overall impact when considering land use, engineering requirements, and the environment?

Study Area

- Cascades Corridor

http://www.fra.dot.gov

Study Area


Salem
Albany
Interstate 5
Oregon Electric
Union Pacific
0
1.5
3
6 Miles

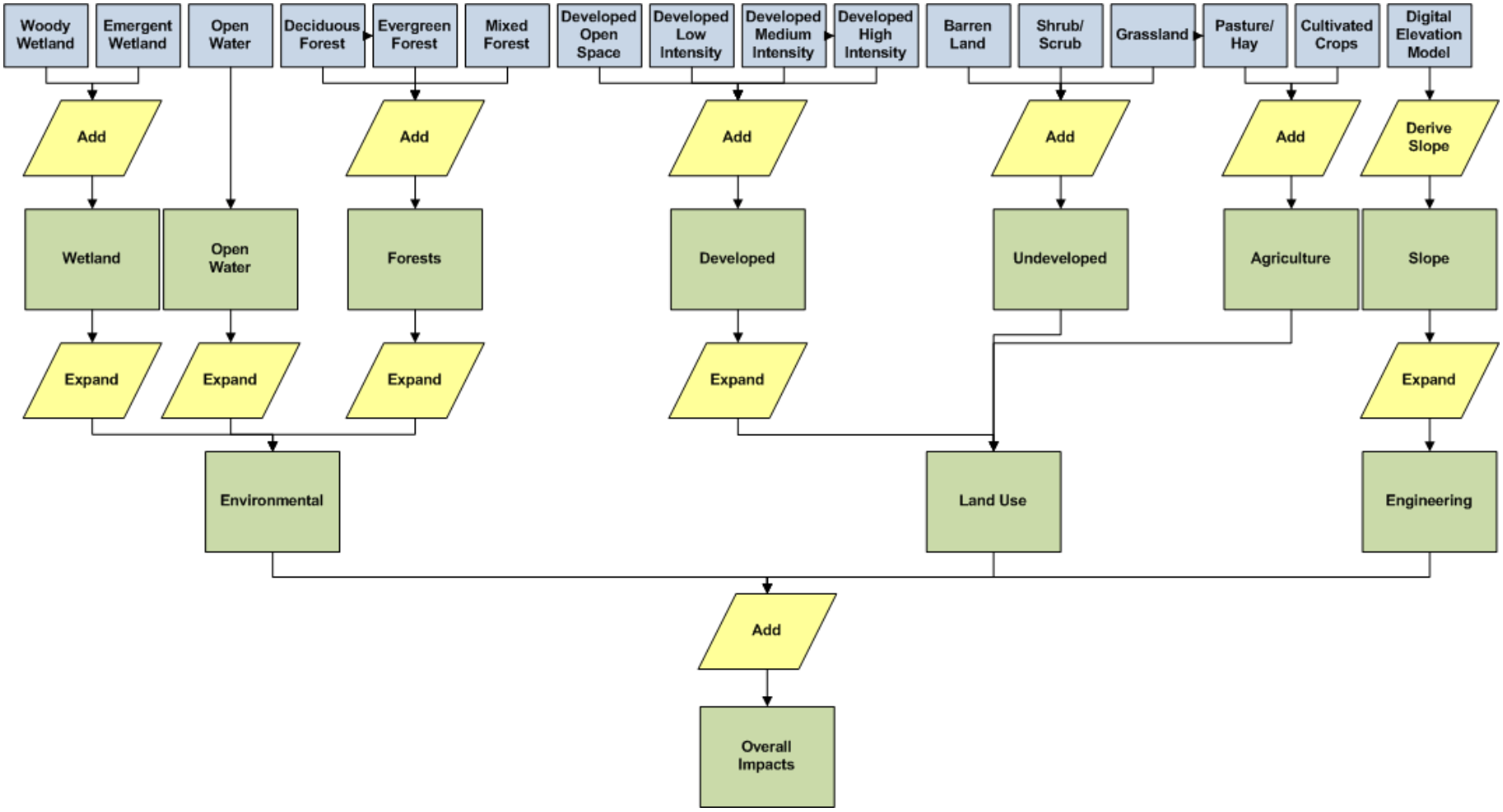
Methodology

- Gather data
- Create layers
- Combine layers
- Rank layers
- Combine layers to create models
- Combine to create overall model

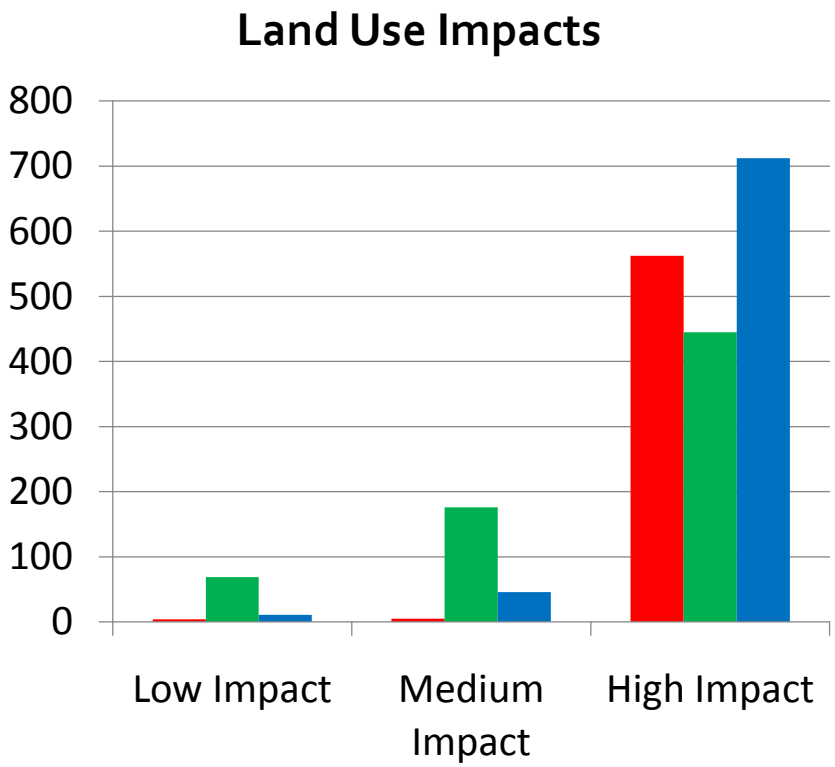
Data

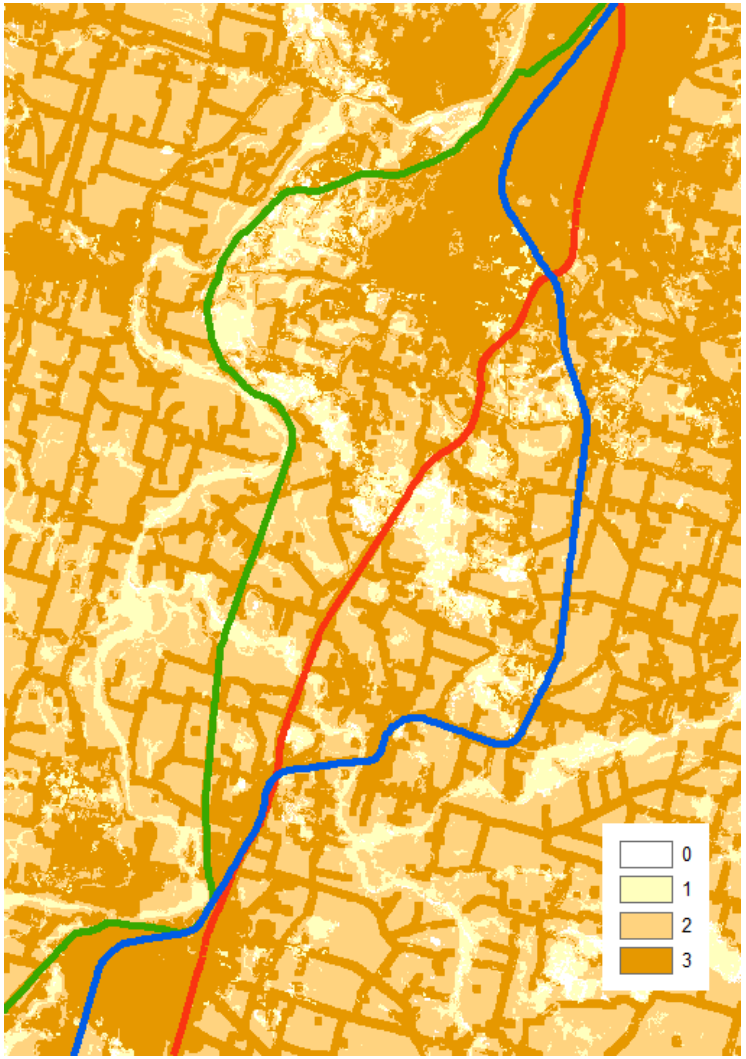
- USGS: National Map Seamless Server
- 2006 National Land Cover Data
  - Land use
  - 30m resolution
- 1 Arc Second National Elevation Dataset
  - DEM
  - ~33m resolution

Analysis Model

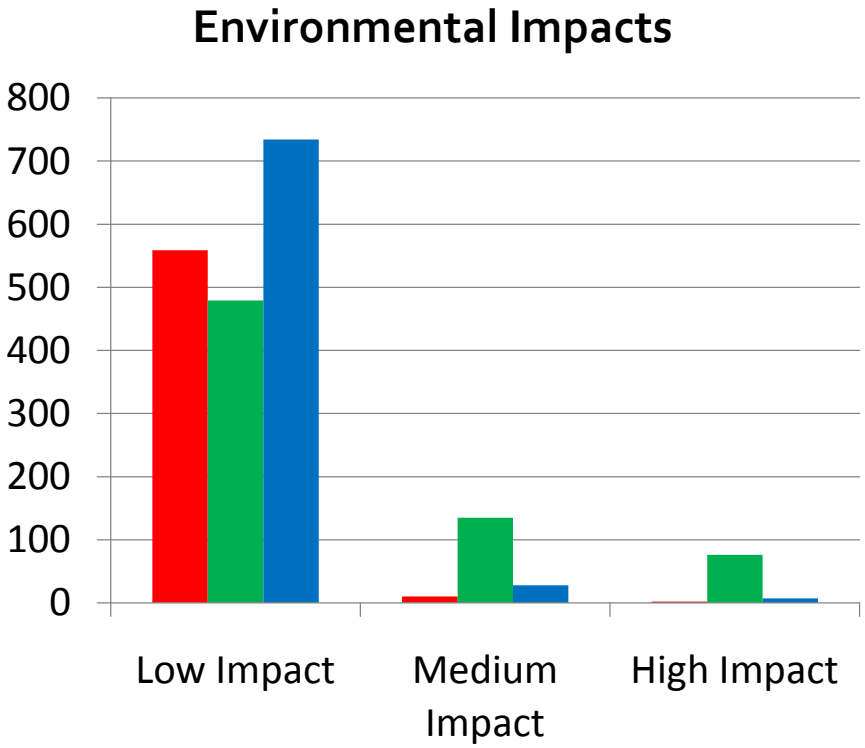


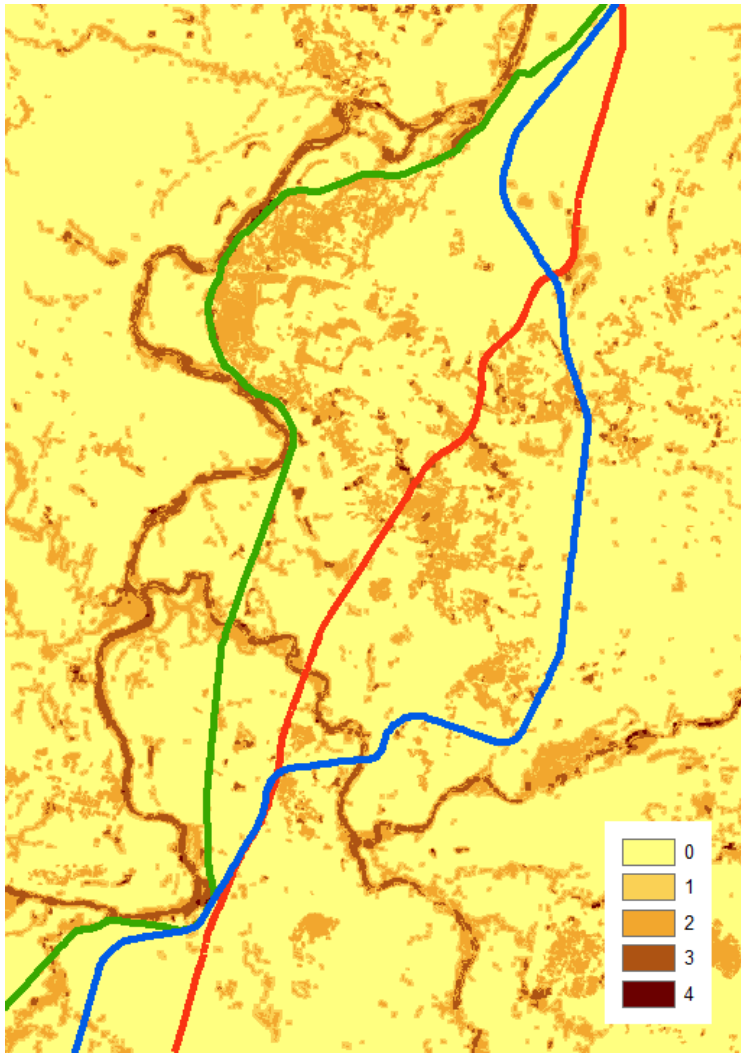
Results: Land Use



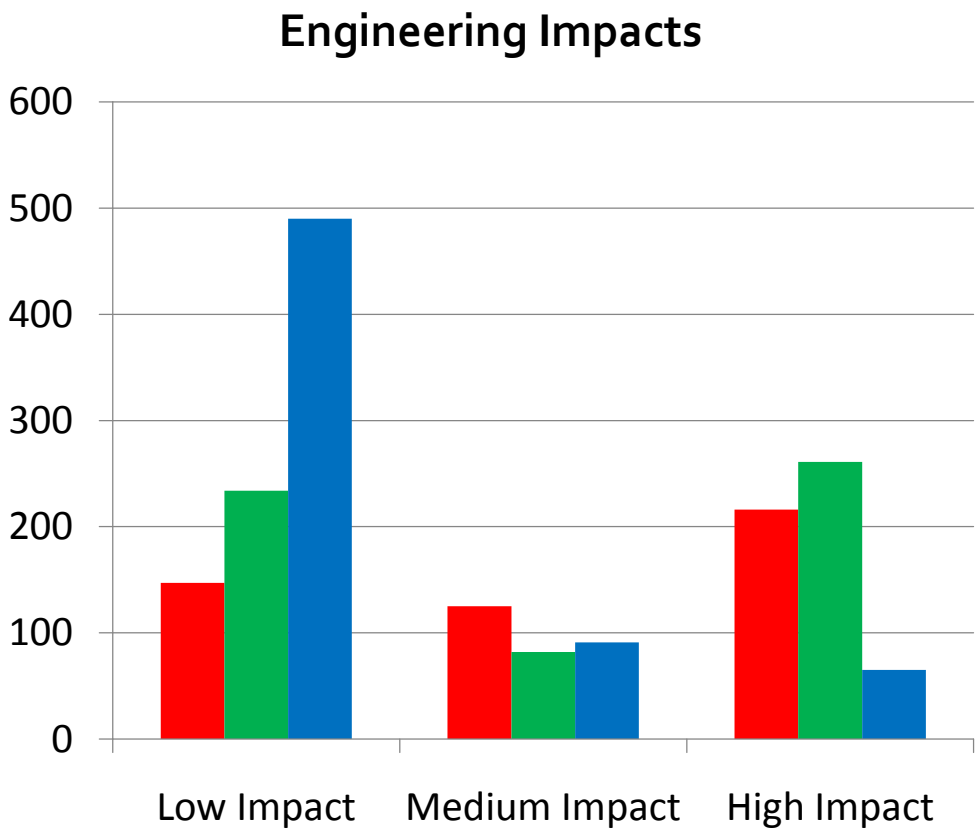


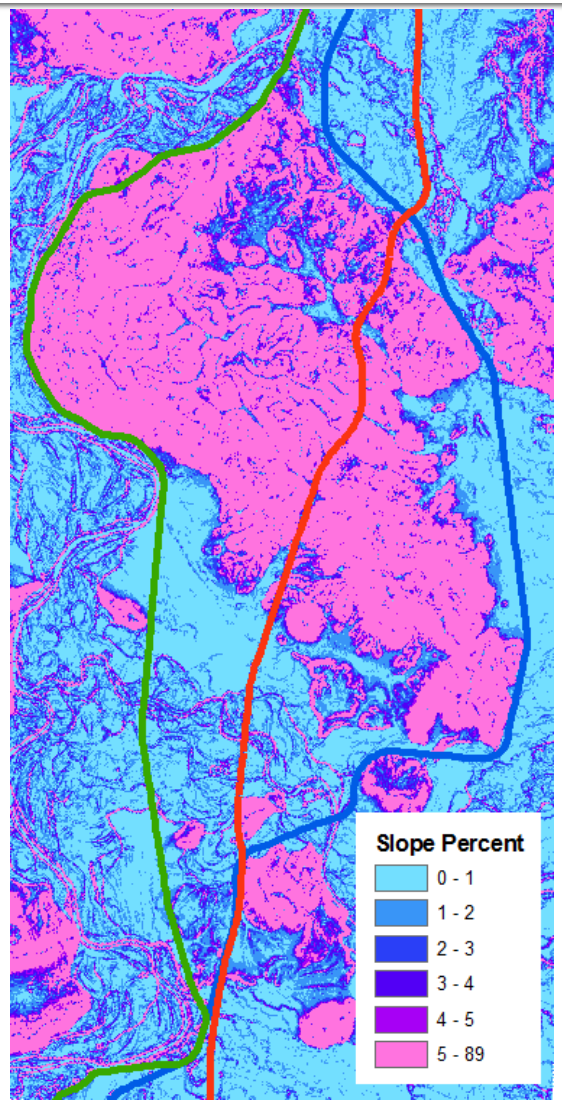
Results: Environment



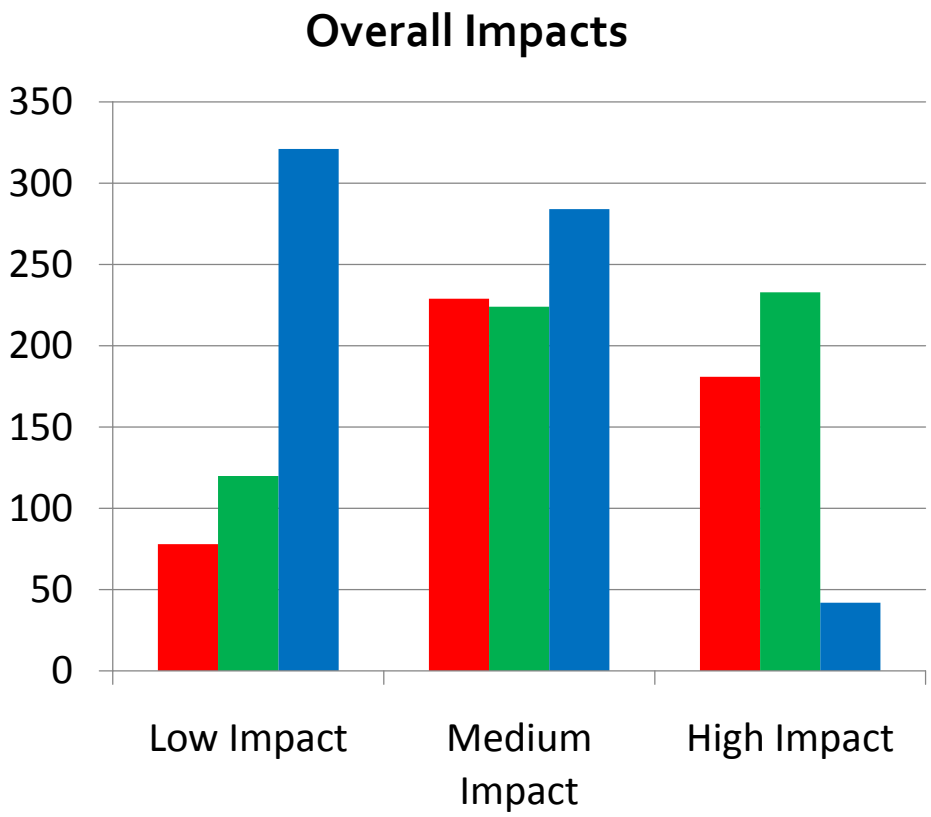


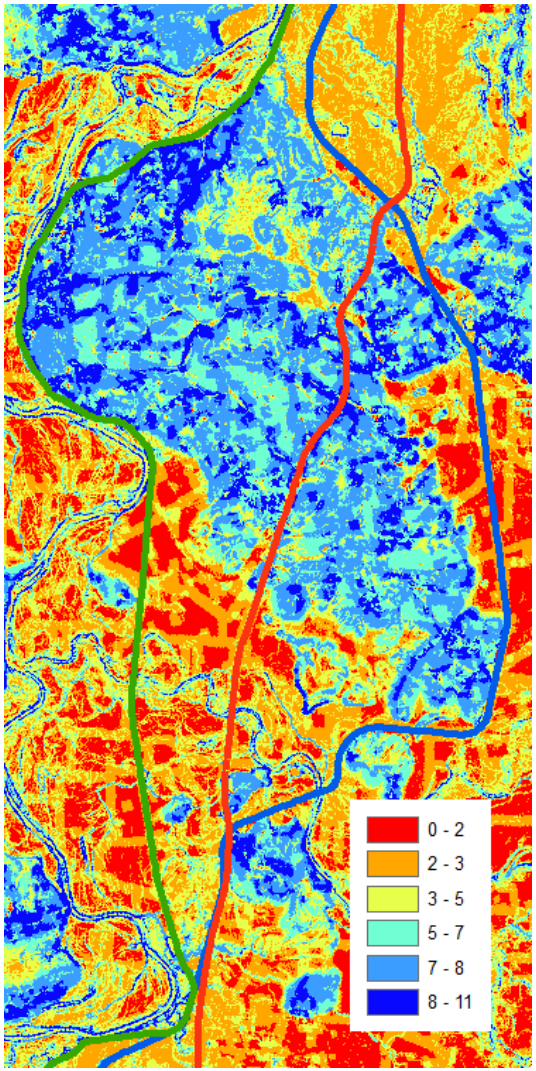
Results: Engineering





Results: Overall





Discussion

- Low DEM resolution
- Roads classified as developed
- Is it complete?
- Are rankings accurate?
- Future work

Future Work

- Make a Multi-Criteria Decision Making (MCDM) tool
  - Analytical Hierarchy Process (AHP)
- Develop an economic impact model
- Identify hazards and assess risk
- Incorporate Federal Railroad Administration track standards
  - Speed, curvature

Literature

- Nobrega, R.A.A., O'Hara, C., Stich, B. (2011), "Top-Down Landscape-Based Approach Toward The Assessment And Ranking Of Watershed And Wetland Impacted By Transportation Corridors."90th Annual Meeting of the Transportation Research Board. Washington, D.C.

- Nobrega, R.A.A., O'Hara, C. (2011), "Evaluating the Design of the Streamlined GIS-based Transportation Corridors" 90th Annual Meeting of the Transportation Research Board. Washington, D.C.

Questions?