Using GIS to Locate Riparian Vegetation Areas in the Johnson Creek Watershed

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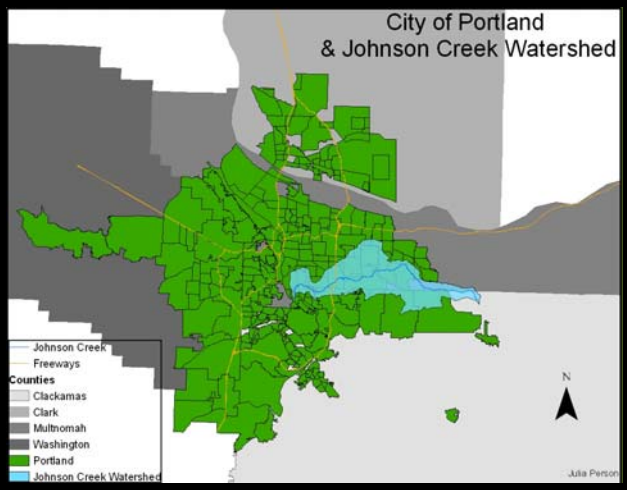
Objectives & Goals

- Examine suitable riparian vegetation sites in study area
- Potential sites will have characteristics for most effective riparian vegetation implementation
- Priority maps can provide guidance for planners and communicate ideas to the public
- Exploratory/descriptive analysis

Study Area

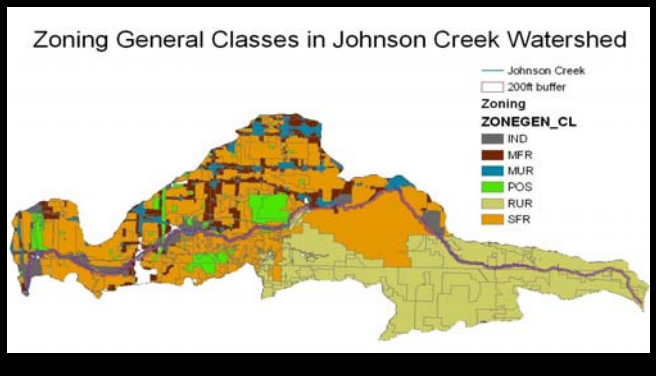


Background – Johnson Creek Watershed

- 54 square mile watershed.
- Population = 175,000.
- Last free-flowing stream in East Portland.
- Creek has been adversely affected by rapid urbanization (USGS)
- Inhabited by two endangered species.
- Listed as water quality impaired by the DEQ.

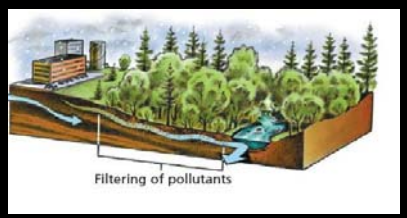
Background – Land use

- Neighborhoods have large share of Portland's multi-dwelling zoned residential land (2040 Metro Growth Plan)
- Residential land use is associated with highest amount of impervious surfaces--
  - Surface runoff increases as impervious surfaces increase.
  - Surface runoff picks up pollutants such as nutrients from lawn fertilizers and sediment (nonpoint source pollution)
  - "Runoff is the third largest source of water quality impairment" - (EPA, 2004)



Background – Riparian Vegetation

- Removes soluble pollutants through filtration.
- Best Management Practice (BMP)
- Most effective for urban pollutants:
  - Sediment
  - Nutrients
- Inexpensive to implement.
- Controls temperature.
- Reduces erosion.
- Creates habitat

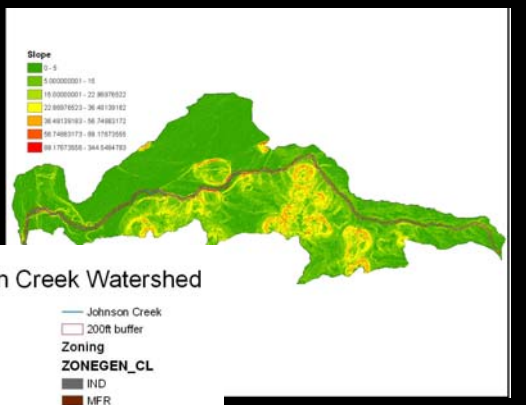


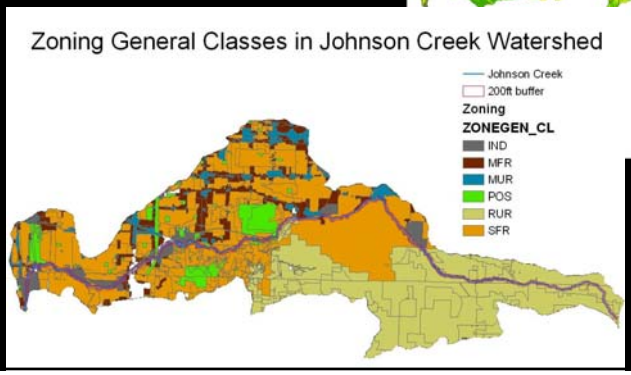
Site Characteristics

- Slope
  - <5 percent gradient, up to <15 percent
- Vegetative cover
  - Forest or Woody & Shrub
- Land use
  - Zoning Parks/Open Space
  - Residential zoning
- Existing public parks
- Stream distance
  - 50 ft. min., 200 ft preferred

Datasets

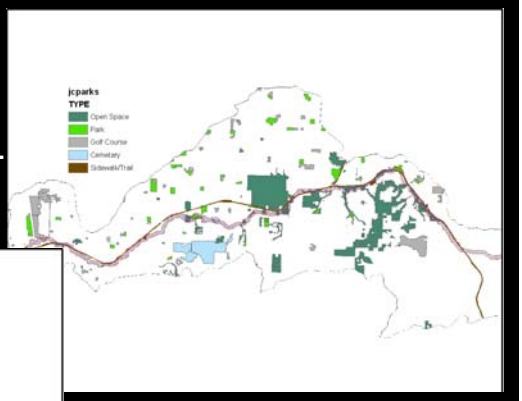
- Slope – DEM
- Land use – Zoning

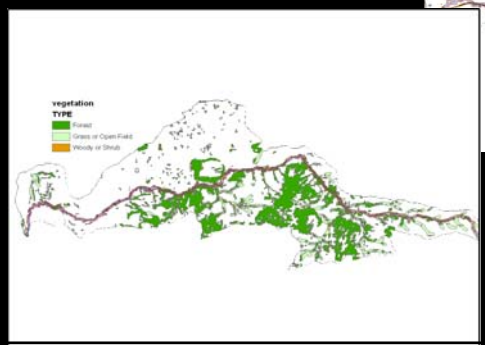




Datasets con't.

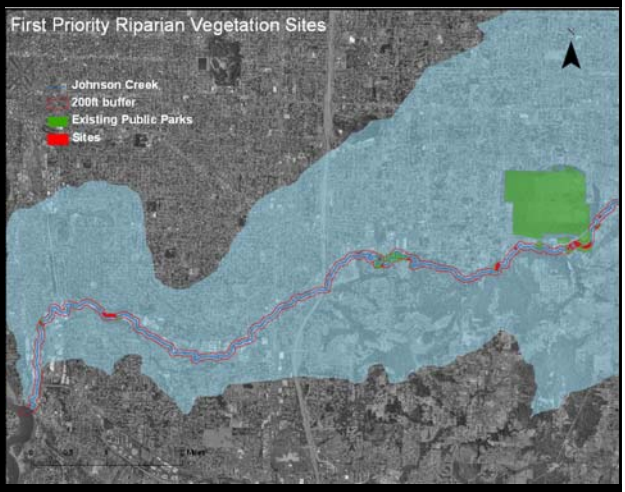
- Existing Parks – Parks
- Vegetative Cover - Vegetation





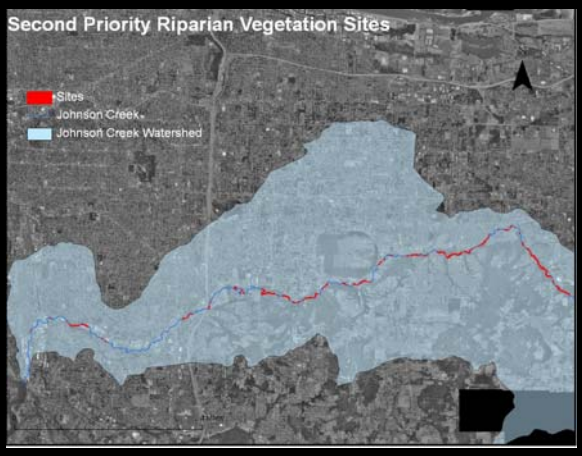
First Priority Sites

- Parameters:
  - <5 percent slope
  - Forest cover
  - Existing parks
  - Zoned POS
  - 200 ft stream distance
- Clip – watershed
- Convert Features to Raster
- Reclassify
  - 1, 2, or 3 – 3 optimal
- Weighted Overlay
  - Equal influence – 25%
- Convert Raster to Features
- Clip – 200 ft. buffer



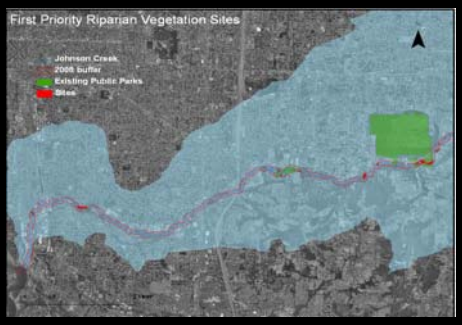
Second Priority Sites

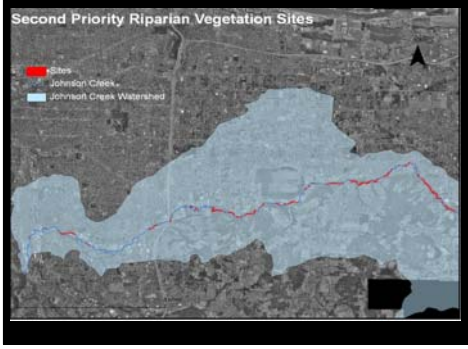
- Parameters:
  - <15 percent slope
  - Forest, woody or shrub cover
  - Zoned POS or residential (MFR, SFR, MUR)
  - 50 ft stream distance
- Convert Features to Raster
- Reclassify
  - 1, 2, or 3 – 3 optimal
- Weighted Overlay
  - Equal influence – 33.3%
- Clip – 50 ft. buffer



Results

- More potential sites identified with relaxed parameters





Results

Conclusion

- Suitable sites for riparian vegetation are present along Johnson Creek
- Planners can make specific recommendations based on GIS analysis
  - 1st priority sites will be most effective in filtering pollutants and easiest to implement
  - 2nd priority sites harder to implement and less effective, but will address a larger area of the watershed

Questions, Suggestions?

- Valuable analysis?
- Existing riparian vegetation areas

Thank you!