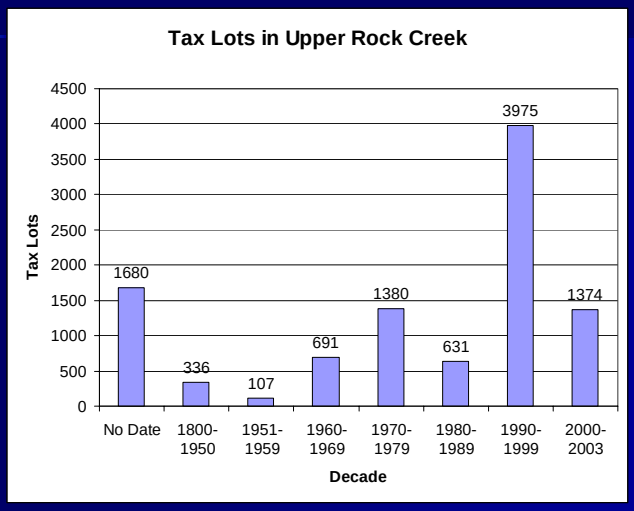
Database to Relate Urbanization with Water Quality and Fish in the Rock Creek Watershed

Compiled by:
Chris Massingill
Ty Conley
Nicholas LaRue

Background

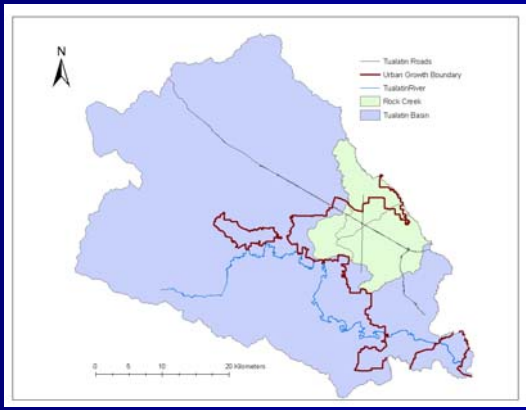
- The Rock Creek Watershed has experienced increased urbanization with each passing decade
- Urbanization affects water quality in streams
- 10%-30% Effective Impervious Area (EIA) is considered 'impacted' and Rock Creek has ~16% EIA. Therefore careful preventative planning is required in the watershed

Background



Geographic Extent

- Rock Creek Sub basin in the Tualatin River watershed
- Including the:
  - Upper Rock Creek
  - Lower Rock Creek
  - Beaverton Creek



Study Area in Green

Design Objectives

Create a Database to assist assessment of:

- Impacts of urbanization on fish populations in the Rock Creek Basin Watershed
- Impacts of urbanization on a variety of water quality measures
- Create a framework to easily add new data measuring water quality and urbanization

Data & Their Sources Used to Create the Database

- Metro RLIS 2003 Data
  - Roads (shapefiles) , Urban Growth Boundary (shapefiles), and tax lots (shapefiles)
- Department of Environmental Quality
  - 6th field HUC's (Hydrologic Unit Codes) (shapefiles)
  - Tabular water quality data (1 site, late 1960 – mid 1990's)
- Clean Water Services
  - Rock Creek Basin streams (shapefiles)
  - Effective Impervious Areas (shapefiles)
  - Tabular water quality data (mid 1990's-present)

Data & Their Sources Used to Create the Database

- Oregon Department of Fish & Wildlife
  - Fish population for 1995 and 2001
- Mike Boeder PSU Geography
  - Land cover shapefiles from 1994 and 2000

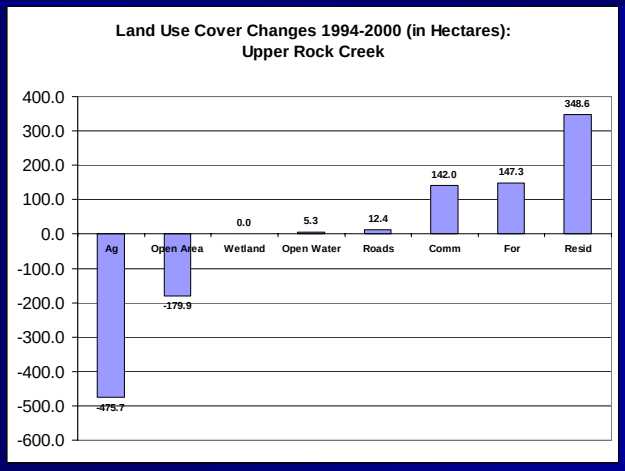
Methods & Techniques

- Reprojection to HARN_83 StatePlane Oregon North FIPS3601, Lambert Conformal Conic
- Isolating study area via various clipping and masking operations (avoiding the MAUP)
- Formatting, cleaning and summarizing tabular data
- Relates
  - Fish sample stations to fish tables
  - Water sample station

Intended Applications

- Determine what fish population or water quality parameters are best to monitor
- Determine where best to sample fish populations and water quality
- Assist future planning decisions in Rock Creek Watershed
- Assist assessment of effectiveness of previous, current and future planning decisions

Demonstration Application



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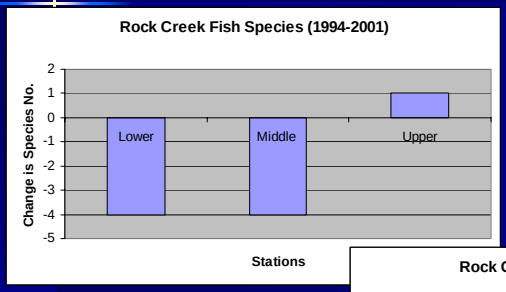

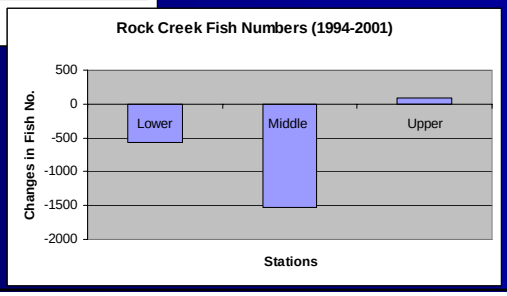

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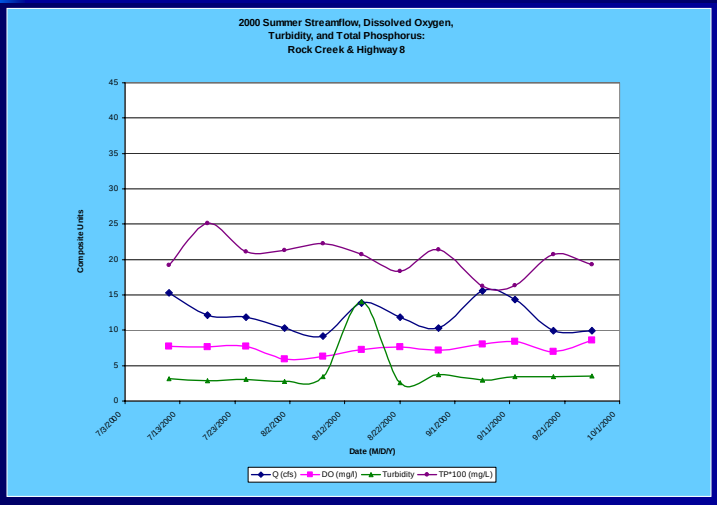

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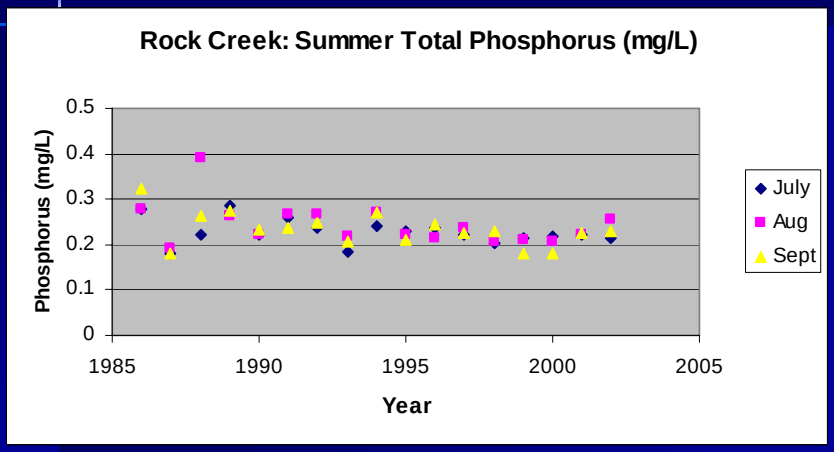
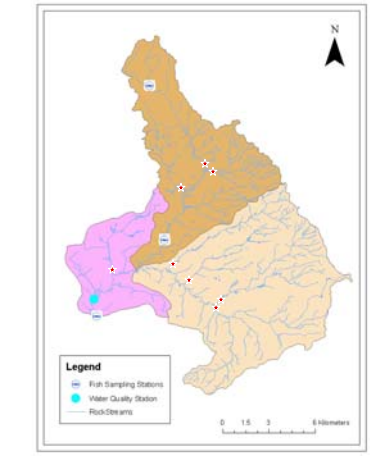


Limitations & Quality Statements

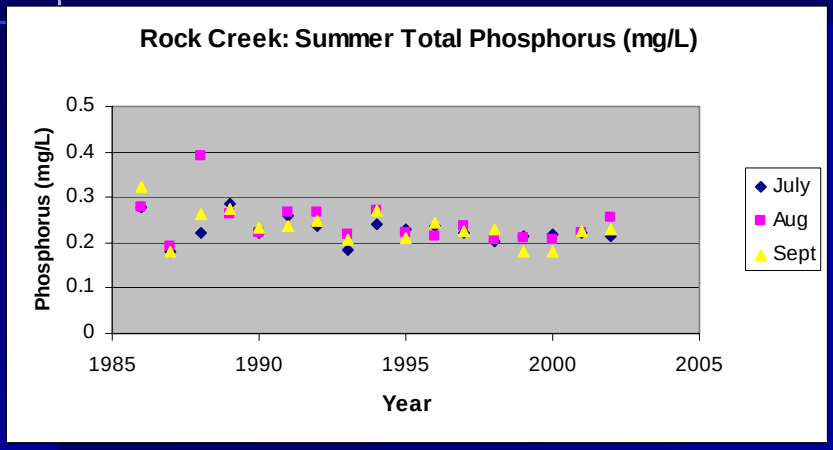
- Location & number of long term monitoring stations (WQ and fish)
- Water quality data completeness and variance
- Incomplete tax lot build dates
- Lack of hydrologic modeling of stream flow (Available DEM is too coarse)

Sampling Stations in Rock Creek Basin



- Specific stream reaches are not covered by the sampling stations available
- Additional stations would increase the usefulness of the database

Limitations and Quality Cont.



Questions?