Gathering Data to Assess Your Watershed

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Presentation Goals:

- What data do you need?
- Where do you find the data?
- How do you get info from TCEQ and other agencies?
- This session will examine
  1) materials from Chapters 5-6 of the *Handbook*;
  2) how GIS may be used for watershed analysis, source identification and watershed characterization;
  3) sources of data in Texas and how best to obtain it.
Useful Types of Data

- Physical and Natural Features
  - Watershed Boundaries
  - Hydrology
  - Topography
  - Soils
  - Climate
  - Habitat
  - Wildlife
Useful Types of Data

- Land Use and Population Characteristics
  - Land use and Land Cover
  - Existing Management Practices
  - Demographics

- Waterbody Conditions
  - Water Quality Standards
  - 305(b) report
  - 303(d) list
  - TMDL reports
  - Source Water Assessments
Useful Types of Data

- Pollutant Sources
  - Point Sources (PS)
  - Nonpoint Sources (NPS)
Information from Local Governments

- County and City Planning Offices
  - Master Plans
  - Local Ordinances and
  - Stormwater Pollution Prevention Plans
- Environmental Depts.
  - Water Quality Data
  - Recycling Programs
- Economic Development
  - Census Data & Demographics
  - Tax Records
Information from Local Governments

- Water and Sanitation Dept.
  - Stormwater plans
  - Maps of water and sewer
- Public Health Department
  - OSSF permits and violations
  - Records of outbreaks
- Transportation Dept.
  - Transportation master plan
  - Permits
  - Road & Bridge Construction
Information from Local Governments

- Soil & Water Conservation Districts and USDA NRCS
  - Agricultural Land Use Information
  - Soil Surveys
  - Erosion Control Information

- Council of Governments
  - Wealth of data and information including GIS layers
  - Grant Funding Programs
Data from State Agencies

- Texas Parks and Wildlife Data (TPWD)
  - Wildlife Data, Deer Counts and Endangered Species
  - Ecoregions and Habitat Data
  - Fish Kills

- Texas Water Development Board (TWDB)
  - Ground Water/Well Data
  - Water and Wastewater Planning and Assessments
  - Population Projections

- Railroad Commission (RRC)
  - Oil and Gas Well Data, Orphaned/Abandoned Wells
Data from State Agencies

- Texas State Soil & Water Conservation Board (TSSWCB)
  - Water Quality Management Plans
  - Poultry CAFOs
  - Brush Control Program

- Texas Forest Service (TFS)
  - Forest Management and Sustainable Forestry
  - Urban Forestry and Pest Management
  - Fire and Emergency Response
Data from State Agencies

- Texas Commission on Environmental Quality (TCEQ)
  - 305b reports and 303d Lists
  - Previous reports such as TMDLs, waste load reports, source water protection and any other studies
  - New online data retrieval system
Data from Federal Agencies

- Environmental Protection Agency (EPA)
  - Enforcement and Compliance History Online
  - Permit Compliance System
- US Fish and Wildlife Service (USFWS)
  - Wildlife and Endangered and Threatened Species
  - Wetlands and Habitat
Data from Federal Agencies

- US Department of Agriculture (USDA)
  - Agricultural Census Data
- USDA Natural Resources Conservation Service (NRCS)
  - Soils Data
  - Agricultural Management and Plans
- USDA Farm Service Agency (FSA)
  - Farm and Crop Information
Data from Federal Agencies

- US Geological Survey
- Real time and historical water data
  - Stream Flow Data
  - Groundwater Data
  - Water Quality
  - Precipitation
  - Lake/Reservoir
  - Geology
Maps of the Watershed

- Determine the boundaries of the watershed
- Determine Counties and Municipalities
- Partner with someone with GIS if you do not have the capability yourself
HUCs and Subwatersheds

- Determine the 8-digit hydrologic unit code (HUC) that the watershed is located.
- If you do not know your HUC, visit EPA’s “Surf your Watershed” website (www.epa.gov/surf) to find it.
- NRCS Watershed Boundary Dataset is available at www.ncgc.nrcs.usda.gov/products/datasets/watershed.
Topography

- Derives slopes of stream segments and watershed areas to identify unstable areas and to characterize segments or subwatersheds to model
- Evaluate altitude changes
Hydrology

- Identify locations of waterbodies
- Many databases are organized or referenced by HUC. GIS coverages are available in EPA’s BASINS modeling system [www.epa.gov/ost/basins/](http://www.epa.gov/ost/basins/) or from USGS at [http://water.usgs.gov/GIS/huc.html](http://water.usgs.gov/GIS/huc.html)
- Identify the spatial relationship of waterbodies and how their connected
- How water flows through the watershed
Soils

- Soil characteristics will help identify high erosion prone areas, poor drainage & runoff
- STATSGO: State Soil Geographic Database, generalize the detailed soil maps at a scale of 1:250,000
- SSURGO: Soil Survey Geographic Database, at scale of 1:12,000 to 1:63,360, the most detailed level of soil mapping
- [http://soils.usda.gov/survey/online_surveys/texas/](http://soils.usda.gov/survey/online_surveys/texas/)
Climate

- Determine climate conditions for your watershed including annual rainfall amounts, runoff, and evaporation amounts.
- Will help understand what drives the rainfall-runoff processes in watershed models.
- Online sites of weather data include:
  - Weather.com

The long-term average annual rainfall across Texas from 1961 to 1990. Texas Water Development Board, 1997
Land Use & Land Cover

- Land Use data can be obtained as GIS Coverages from: MRLC/NLCD data – www.mrlc.gov/index.asp
- USGS’s LULC data: http://edc.usgs.gov/geodata
- May be obtained from local and regional agencies such as Counties or Council of Governments
- Land Use data can also be updated from Aerial Photographs, satellite images and ground surveys.
Habitat

- Wetlands Inventories and Assessments:
  - http://www.fws.gov/nwi/WetlandsData/GoogleEarth.htm

- Habitat Conservation Plans
- Fish and Wildlife
- Endangered or Threatened species
- Natural Heritage Program
Demographic data includes information on the people in the watershed such as:

- Persons or families,
- Commuting patterns,
- Household structure,
- Age, Gender, and Race,
- Economic conditions,
- Employment and
- Education
Water Quality Standards

The standards establish explicit water quality goals throughout the state. Set to maintain the quality of water in the state of Texas consistent with public health and enjoyment, protection of aquatic life, and the operation of existing industries and economic development of the state.

Website: [http://www.tceq.state.tx.us/nav/eq/eq_swqs.html](http://www.tceq.state.tx.us/nav/eq/eq_swqs.html)
Water Quality Reports

- Determine locations of concerns and impairments within the watershed

- Find any reports completed on the watershed by others:
  - Water Quality Standards
  - 305(b) report & 303 (d) list
  - TMDL Reports
  - Source Water Assessments
  - Fish Kill Reports
  - TCEQ, TPWD, RRC, Counties, TWDB, River Authority, Universities
Water Quality Data

- Water Quality Data in tabular form can be obtained from:
  - River Authorities are generally CRP - [http://www.tceq.state.tx.us/compliance/monitoring/crp/partners.html](http://www.tceq.state.tx.us/compliance/monitoring/crp/partners.html)
Biannual 305(b) State Water Quality Report

Under Section 305(b) of the Clean Water Act, states are required to prepare a report describing the status of the water quality every two years.

If your watershed has been monitored, the report should have:

- Status of use support with descriptions of water quality impairments
- Identification of problem parameters for impaired waters, along with potential sources of the stress
- Priority for TMDL development
303(d) List of Impaired Waters

- 2006 Assessment – 419 Impairments in the state
- Draft 2008 Assessment
303(d) List of Impaired Waters

- Identify known pollutant impairments
- Identify geographic extent of impaired segments
- Identify potential causes and sources of impairments
Existing TMDL Reports & Source Water Assessments

- TMDLs provide information on:
  - watershed characteristics,
  - waterbody conditions,
  - sources, and
  - pollutant loads
  

- Source Water Assessments provide:
  - Identify water supply areas to be protected
  - Identify potential sources of contamination to the water supply
  
Point Source Pollutant Sources

- Point Source
  - Permitted Discharges
    - Wastewater Treatment Plants
    - Industrial Facilities
    - Confined Animal Feeding Operation
- Stormwater Permit
## WWTP Permit Limits

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<th>TSS mg/L</th>
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Nonpoint Sources - Livestock

- Livestock Sources
  - If Local USDA information is not available, use the Census of Agriculture to find information about the number and type of animal units per county.
Nonpoint Sources - Cropland

- **Cropland Sources**
  - Contact the local USDA to obtain information about types of crops and their management. The Census of Agriculture can provide crop types and fertilizer and chemical applications.
  - [www.agcensus.usda.gov](http://www.agcensus.usda.gov)
  - Land use coverages can identify cropland areas
Nonpoint Sources - Urban

- Urban Sources
  - Impervious coverage information is typically used to characterize the density of and potential loading from urban areas.
  - Urban areas are typically sources of pet wastes, lawn fertilizers, and pollutants from car maintenance in the stormwater runoff.
Nonpoint Sources – Onsite Sewage Facility

- On-site Sewage Facility
  - Local agencies can provide estimates of the total numbers for an area or the county and violations.
  - County level data can also be found from the Census Bureau for the 1990 Census at http://quickfacts.census.gov
  - The National Small Flows Clearinghouse has a wealth of information on Septic Systems on the website: www.nesc.wvu.edu/wastewater.cfm
Nonpoint Sources – Silviculture

- Silviculture Sources
- Bureau of Land Management has an Amarillo Field Office:
- Texas Forest Service website:
  http://txforestservice.tamu.edu/main/default.aspx
- Both of these agencies can help you identify areas of silvicultural activity and management
Nonpoint Sources - Wildlife

- Determine the types of wildlife to identify areas for protection
- Determine if there are any endangered or threatened species
- Local and State Parks and Wildlife Offices may be able to provide you wildlife species and distribution
- Maps indicate RMUs for Deer survey data by TPWD
Endangered Species Contacts: Texas Ecological Services Field Offices

- **Arlington**
  711 Stadium Dr. Ste 252
  Arlington, TX 76011
  Telephone: 817-277-1100

- **Austin**
  Compass Bank Bldg, 10711 Burnet Rd, Ste 200
  Austin, TX 78758
  Telephone: 512-490-0057

- **Corpus Christi**
  c/o Corpus Christi State Univ, Unit 5837, 6300 Ocean Dr.,
  Corpus Christi, TX 78412
  Telephone: 512-994-9005

- **Clear Lake**
  17629 El Camino Real, Ste 211
  Houston, TX 77058
  Telephone: 281-286-8282
- USFWS website for Texas T&E Species: 
  http://ecos.fws.gov/tess_public//pub/stateListing.jsp?state=TX&status=listed

- TPWD website for Texas T&E Species: 
  http://www.tpwd.state.tx.us/huntwild/wild/species/?c=endangered
Nonpoint Sources – Feral Hogs (Non-Domestic Animals)

- Texas Department of Agriculture (TDA)
- Texas Agrilife Extension Service
- Texas Wildlife Damage Management Service