Homework assignment.

- Read the conclusion and write 250 word abstract on what you think of it. Turn it in on Wed. Jan 19th.
Oklahoma Comprehensive Water Plan, 2011 Executive Report

Total Water Demand in Oklahoma

The graph illustrates the total water demand in Oklahoma over different planning horizons from 2010 to 2060. The demand is categorized into several sectors: Crop Irrigation, Livestock, Municipal & Industrial, Self-Supplied Industrial, Self-Supplied Residential, Oil & Gas, and Thermoelectric Power. The data shows a significant increase in water demand from 2010 to 2060, with the highest demand expected in 2060.
Assumptions for future Ag. Demand

- Irrigated acreage will increase to historic highs.
- Efficiencies will not change.
- Commodity value will drive use.
Distribution among sectors is very similar throughout time.
Predominate Water Supply Source

Predominant Water Supply Source (2060)
- Alluvial Groundwater
- Bedrock Groundwater
- Surface Water
Probability of Surface Water Supply Gaps (2060)

- 0%
- 1% - 25%
- 26% - 75%
- 76% - 100%
Probability of Alluvial Groundwater Depletions

Probability of Alluvial Groundwater Depletions (2060)

- 0%
- 1% - 25%
- 26% - 75%
- 76% - 100%

Alluvial Groundwater Aquifers
Maximum Bedrock Groundwater Supply Depletions (2060) (AF)

- 0
- 1 - 1,000
- 1,001 - 10,000
- 10,001 - 47,100

Bedrock Groundwater Aquifers
Surface Water Estimated Permit Availability (2060) AFY

- 0
- 1 - 25,000
- 25,001 - 100,000
- 100,001 - 500,000
- 500,000 - 10,676,500
- GRDA Jurisdiction (Not Assessed)
Surface Water Permit Availability

Surface Water - Permit Availability Assessment (2060)
- Good Permit Availability
- Moderate Permit Availability
- No Permit Availability
- GRDA Jurisdiction (Not Assessed)
The groundwater permit availability analyses identified no near- or long-term groundwater permitting gaps in the state. Projected groundwater demand in 2060, assuming the continued use of current proportions of surface and groundwater in each basin, could be fully permitted under current law and permitting protocol. As additional aquifers are studied and updated, available groundwater for permits may increase or decrease relative to temporary or regular permit values.
Historic perspective on the consequences of soil degradation

- Improper management of soil and water resources has caused the downfall of many civilizations.
- Dr. Lowdermilk toured the world to evaluate land degradation (1938-1939) *(URL)*

Cradle of Civilization (Mesopotamia, present day Iraq)

- Deforestation, cultivation and over grazing of steep slopes cause massive erosion
- The population grew to 25 million
- Increased demand for food and decreased productivity caused steeper slopes to be cultivated
- Erosion filled the irrigation canals
- Salts in irrigation water accumulated in soils
- In the 1930 the population had fallen to 4 million
North Africa (Carthage, present day Tunisia)

- Carthage was very productive region in Roman era
- Erosion during the winter fallow periods caused extensive erosion
- Desert dwellers attacked Carthage and agriculture declined
- Neglect and over grazing caused further decline in productivity
North Africa (Tunisia)

- Lowdermilk found scattered areas of productive soils.
- Suggesting that climate change was not responsible for the decreased productivity of the region but that soil degradation is to blame.
A long-lived success under Recent Stress (Nile Floodplain)

- Agriculture in the Nile River floodplain because it provide irrigation with no canals and little soil eroded.
- Fine textured and fertile sediments from erosion in Ethiopia were deposited in the Egyptian floodplain.
- The Aswan High Dam built in 1970 has
  - Removed fertile sediments
  - Increased erosion
  - Increased fertilizer use and water quality degradation.
The American Dust Bowl

- Settlement of the high plains was encourage after the civil war
- A wet period encouraged this settlement and cultivation of the area.
- Another wet period occurred in the 1920
- This corresponded to a dramatic increase in wheat prices and mechanization of farming
The Plow that Broke the Plains

- [http://www.youtube.com/watch?v=fQCwhjWNcH8](http://www.youtube.com/watch?v=fQCwhjWNcH8)
- Very good about black Friday and Hugh Bennett
  - [http://www.youtube.com/watch?v=psVsc74DLIE](http://www.youtube.com/watch?v=psVsc74DLIE)
Black Sunday Article

- A dust storm occurred which carried soil from the high plains to Washington DC.
- It arrived during a congressional hearing where Hugh Bennett was requesting for the formation of the Soil Conservation Service.
- The SCS was created before the end of the year.
- [http://www.srh.noaa.gov/oun/?n=blacksunday](http://www.srh.noaa.gov/oun/?n=blacksunday)
Graham-Hoeme

There are Numerous examples of Current Soil Degradation

- Turkmenistan
- Gobi desert in China
- Sub-Saharan Africa
Desertification, Gobi Desert in China

- **Dust Cloud**
- Estimates predict that around 950 square miles of land become desertified on a yearly basis (Reference)
Desert Expansion in Gobi
West Texas Dust Storm 10/17/11

- http://www.youtube.com/watch?v=fDgsrbri-8k&feature=related
- http://www.youtube.com/watch?v=CZ8XZ3L2Fe8&feature=fvsr
- http://www.youtube.com/watch?v=fDgsrbri-8k&feature=related