

## Soils

- 533 soil samples collected in 6 sampling events over past 4 years — began Fall 2003
- Sample sites re-located with GPS technology
- 10-12 waypoints per field
- Samples collected with Giddings rig and shovel
- 7 sampling depths in top 8 feet
- Analyzed for both SAR & ESP (exchangeable sodium percentage)
- Sampling & Analysis plan followed
- Quality controls implemented
- Statistical analysis used

## Crops

- Crops include alfalfa, grass, barley, sugar beets, wheat & corn
- Forages sampled before each harvest from every field — began Spring 2004
- Collected at same waypoints as where soil sample
- Yields determined at standard H<sub>2</sub>O
- Feed analyses performed on each sample
- Sodium & other minerals determined
- Monitor changes in crop yields
- Evaluates causes for crop yield changes

## TRIP Overview

- Starting 5<sup>th</sup> year as a scientific research project
- Currently funded by MBOGCC
- Focus is Tongue River, irrigated Ag, and CBNG
- 13 ranchers & farmers volunteered for program
- Cooperators receive all data & contribute to data
- Data available to public via web
- 3 Tiers of sampling performed
- 14 fields are sampled
- 2 reference fields- 1 on Yellowstone & 1 on Bighorn River
- Measured baseline soil characteristics
- Monitors soil chemical and physical properties
- Sampling is regular and systematic
- Tongue River hydrology component added in 2006
- Hydrology report relies on existing Federal & State data
- Hydrology report provides overview of water & land use

For TRIP reports:

<http://bogc.dnrc.state.mt.us.CoalBedMeth.asp>

For soil test data:

<http://www.energylab.com/ampp.aspx>

## Results: Soils & Crops

- Generally loamy textures
- Low shrink/swell clays
- No impaired soils due to SAR
- No change in EC (salts)
- ESP declined Fall 2004 to Fall 2005
- Yields vary due to management
- Yields of study fields comparable to county averages
- Yields affected by climatic factors

## Results: Tongue River Basin

### Hydrology

- No increases in EC & SAR at Tongue River USGS Stations
- EC & SAR naturally increase during low flows
- 4 of last 6 water years have been lowest average flows of last 46 years
- 60,000+ irrigated acres in Basin (73% in WY)
- ~ 3,000 CNBG wells in the basin (73% in WY)
- Each well averages 3.1 gpm
- All wells in the basin produced a total of 19.4 cfs in 2006
- 75% of produced water discharged into off-channel storage, beneficially used, treated prior to discharge to streams or injected
- 25% discharged untreated to streams untreated via MPDES or WYPDES permits
- Beneficial uses are: managed irrigation, livestock water & dust suppressant





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