## Water Sampling Drain Tile Research-Phase II

**PROJECT LOCATIONS:** Tile drain fields located in Cass, Grand Forks, Ransom, Richland, Sargent, Steele, Traill and Walsh counties.

The goals of this project are: 1) measure the water quality of the outflow from tile drains in the Red River Basin at 8 representative sites; 2) measure the amount of salinity in the outflow of tile drains located on salt affected soils, 3) measure the quantity and quality of water leaving a field via tile and surface runoff at 4 sites to determine mass discharge of mineral constituents, 4) Present results at meetings and in printed publications, and 5) use results to help develop best management practices (BMP) for land that is tile drained in North Dakota.

Samples of water at a tile drain outlet will be collected on a weekly basis by personnel in 8 SCD's. Flow measurement devices will be installed at one site in 2009 and an additional 3 sites in 2010. Flow will be measured at the tile drain outlet (preferably lift stations) and at a surface runoff site on the tiled field. Grab samples from a comparable field and downstream from the outlet will be taken when possible. Downstream grab samples will be collected at these 4 sites to determine filtration of nutrients through the riparian area.

Samples will be sent to the North Dakota Department of Health laboratory to be tested for Boron (B), Aluminum (Al), Sodium (Na), Magnesium (Mg), Potassium (K), Calcium (Ca), Manganese (Mn) Iron (Fe), Beryllium-Chromium (Be) (Cr), Nickel (Ni), Copper (Cu), Zinc (Zn), Arsenic (As), Selenium (Se), Silver (Ag), Cadmium (Cd), Antimony (Sb), Barium (Ba), Thallium (Tl), Lead (Pb), Chloride (Cl), Nitrogen (N), pH, Carbonate (CO3), Bicarbonate (HCO3), Hydroxide (OH), Calcium Carbonate (CaCO3) (Total), Conductivity, Total Phosphorus, SO4, Nitrate + Nitrite (N), Nitrogen (Total Kjeldahl), Nitrogen (Total), Hardness Total (as Calcium Carbonate [CaCO3]), Cation Sum, Anion Sum, Difference, Percent Difference, Percent Sodium, Sodium Absorption Ratio (SAR), Total Dissolved Solids (TDS).

Photos and GPS data will be taken at each sample site. Laboratory findings and in-field data will be sent to NDSU for analysis.

Annual soil samples will be collected in each field to determine movement of salts on tiled and comparable un-tiled fields.

Dewey rain gauges will be placed at each sampling site to monitor rainfall. Automated tipping buckets will be installed at the 4 locations where flow measurements are conducted. NDSU personnel will download data at the automated rain stations on a monthly basis.

Cooperating producers will agree to provide information needed for a reliable analysis of the sampled data including: a tile drain design indicating the spacing, diameter and depth of tile; maintain a log for rainfall at each site; provide a current soil test; fertilizer applied for the 2009 - 2013 crop; cropping history including the crop rotation for the previous three years prior to 2009, planting and harvesting dates, yield data for the current and previous year's crop.

The goal of the project is to characterize the quality and quantity of water discharged from representative tile drains and surface drains on saline soils in the Red River Valley. As a secondary goal, the project will identify feasible land management options for improving the quality of tile and surface drain effluent