

Sustainability of Surface and Groundwater Resources

Division of Waters, Minnesota Department of Natural Resources January 15, 2010

Sustainability of Minnesota's surface and ground water resources depends on good information. Improved understanding of the state's water resources allows for the sustainable use and management of these resources – DNR continually refines its management approach based on scientific understanding of the whole hydrologic system. There are many ways to define sustainability, but water use can be considered sustainable when the use does not harm ecosystems, degrade water quality, or compromise the ability of future generations to meet their own needs.

DNR considers three broad elements – or actions – as critical components to understanding and achieving water sustainability in the state:

- 1) Mapping – understanding the distribution of the state's surface and ground water resources and the behavior of water resources within the landscape
- 2) Monitoring – understanding changes in water availability over time
- 3) Managing – utilizing this information to make informed decisions that provide for the sustainable use of the state's water resources

Elements or Actions to Achieve Sustainability	FY 10-11 Expected Outcomes (based on current funding)	10 Year Targets (contingent on funding)	25 Year Targets (contingent on funding)
<p>Mapping - Understanding the hydrogeology and hydrology of Minnesota</p> <ol style="list-style-type: none"> 1. <i>County Geologic Atlas</i> 2. <i>Aquifer characterization studies</i> 3. <i>Watershed hydrology</i> 4. <i>Mining Hydrology</i> 5. <i>County Biological Survey and Natural Resource Heritage Database</i> 6. <i>LiDAR</i> 	<ol style="list-style-type: none"> 1. <i>County Atlas</i>: Complete Part B for Todd and Carlton Counties. Start McLeod, Carver, and Benton Counties (GF \$435, Bonding \$1M, LCCMR \$1.875M over 3yrs, includes drilling of deep Mt. Simon-Hinckley Ob wells). 2. <i>Aquifer characterization</i>: Aquifer tests and technical studies to support two or more resource management plans (CWF Drinking Water \$375K). 3. <i>Watershed hydrology</i>: Watershed delineations and drainage studies (CWF Legacy \$550K) to support TMDL work. Initiate work on shallow lakes and 2,500 basins between 50 – 100 acres. 4. <i>Mining hydrology</i>: Technical assistance and Environmental Review (Direct billings). 5. <i>County Biological Survey</i>: (LCCMR \$2.1M). 6. High resolution digital elevation (<i>LiDAR</i>) data collection (CWF Drinking Water \$5.6M). 	<ol style="list-style-type: none"> 1. <i>County Atlas</i>: Complete Part B for 25 atlases in targeted areas: (\$940K/yr). 2. <i>Aquifer characterization</i>: Target priority areas identified in the state assessment. Develop resource protection thresholds, determine GW/SW interactions, technical studies with MGS/USGS and others, develop models, and recharge estimates: (\$1.5M/year). 3. <i>Watershed hydrology</i>: Watershed delineations and drainage studies to support TMDL work. Use LiDAR data to improve delineations. Spring and Seep mapping: (\$1.4M/yr). 4. <i>Mining hydrology</i>: Mine hydrology and reclamation studies: (\$1.5M/yr). 5. <i>County Biological Survey</i>: (\$1M/yr) until the statewide survey complete. 6. <i>LiDAR</i>: Complete statewide coverage: (\$1.8M). 	<ol style="list-style-type: none"> 1. <i>County Atlas</i>: Complete state coverage (\$940K/yr). 2. <i>Aquifer characterization</i>: Continue 10 Year work: (\$1.5M/year). 3. <i>Watershed hydrology</i>: Watershed delineations and drainage studies) to support TMDL work. Use LiDAR to improve delineations. Spring and Seep mapping: (\$1.4M/yr). 4. <i>Mining hydrology</i>: Mine hydrology and reclamation studies: (\$1.5M/yr).

<p>Monitoring - Measuring water resource levels and trends</p> <ol style="list-style-type: none"> 1. <i>Surface water</i> <ul style="list-style-type: none"> • <i>Lake levels/outflows</i> • <i>Stream flow</i> 2. <i>Groundwater levels (Ob Wells)</i> 3. <i>Spring and Seeps (SW/GW)</i> 4. <i>County Biological Survey and Natural Resource Heritage Database</i> 	<ol style="list-style-type: none"> 1. <i>Surface water</i>: Add 6 stream flow gages with real time satellite telemetry access to data. Add new lake gages and do hydrology/hydraulics analysis for lake outlets to support impaired waters work: (GF \$200K - CWF Legacy \$1.59M). 2. <i>Ob Wells</i>: Develop a state ground water level monitoring priorities plan. Add 10 observation wells, seal 10 wells that no longer function, install 25 data loggers, complete data analysis for two management areas: (CWF Drinking Water \$375K). 	<ol style="list-style-type: none"> 1. <i>Surface Water</i>: Network of stream flow gages (one permanent and average of 9 temporary gages per major watershed). As necessary, add new lake gages and do hydrology/hydraulics analysis for lake outlets to support impaired waters work: (\$1.8M/yr). 2. <i>Ob Wells</i>: Minimum network to track aquifer status and trends (1,250 wells); Additional wells for surface water/ground water interaction research; (\$3.5M/yr). 3. <i>Spring and Seeps</i>: (\$250K/yr). 4. <i>County Biological Survey</i>: Data system development, maintenance, status and trends: (1.5M/yr). 	<ol style="list-style-type: none"> 1. <i>Surface Water</i>: Maintain stream flow network and continue data collection. As necessary, add new lake gages and do hydrology/hydraulics analysis for lake outlets to support impaired waters work: (\$1.8M/yr). 2. <i>Ob Wells</i>: Network of 7,000 observation wells: (\$120M). 3. <i>Springs and Seeps</i>: (\$250K/yr). 4. <i>County Biological Survey</i>: Data system maintenance, status and trends (1.5M/yr).
<p>Managing - Water supply planning and permitting</p> <ol style="list-style-type: none"> 1. <i>Water Supply Plans</i> 2. <i>Resource protection plans</i> 3. <i>Drainage Reform</i> 4. <i>Data Management</i> 5. <i>Water appropriation permits</i> 	<ol style="list-style-type: none"> 1-2. <i>Water Supply and Resource Protection Plans</i>: Complete a statewide assessment of areas with potential supply issues; define study needs for communities w/potential supply issues identified in the statewide assessment and the TCMA Water Supply Master Plan. Initiate two aquifer management plans: (CWF Drinking Water \$375K). 4. <i>Data Management</i>: Develop gw/sw data management system for statewide data collection, storage and sharing: (\$500K/year – 4 yrs). 5. <i>Permitting</i>: Cost recovery for projects over 100 million gallons (NR \$30K). 	<ol style="list-style-type: none"> 1-2. <i>Water Supply and Resource Protection Plans</i>: Technical studies and aquifer tests to support development of resource protection thresholds and management plans. Provide community assistance to integrate County Atlas and aquifer management plans with local water supply plans: (\$500K/yr). 3. <i>Drainage Reform</i>: Technical assistance to help LGU's hold water on the landscape: (\$500K/yr). 4. <i>Data Management</i>: Design a consolidated water resource monitoring data system (\$2M). Maintain and manage a consolidated water resource monitoring system: (\$300K/yr). 5. <i>Water appropriation permits</i>: Develop a web-based hydrogeologic assessment tool and water appropriation permit application process (\$1.5M). 	<ol style="list-style-type: none"> 1-2. <i>Water Supply and Resource Protection Plans</i>: Continue 10 Year work elements: (\$500K/yr). 3. <i>Drainage Reform</i>: Technical assistance to help LGU's hold water on the landscape: (\$500K/yr). 4. <i>Data Management</i>: Maintain and manage a consolidated water resource monitoring system: (\$300K/yr).