Planning Far into the Future: the Minnesota Water Sustainability Framework

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What is the Framework?

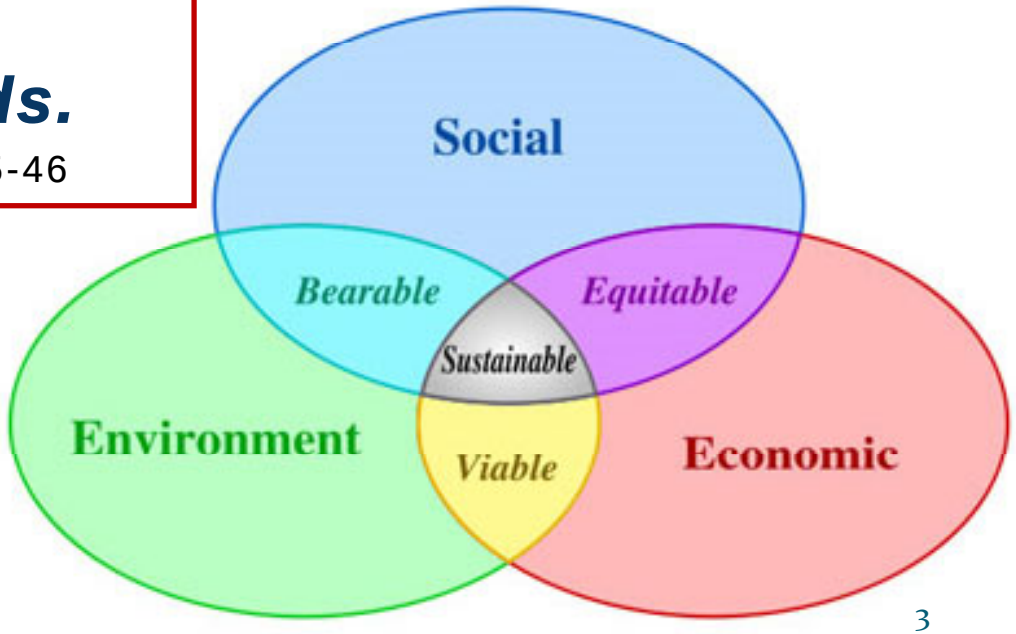
- A 25-year plan to protect, conserve, and enhance the quantity and quality of the state's groundwater and surface water

- An approach to manage the state's water resources that is
  - Sustainable
  - Comprehensive
  - Integrated

Sustainability

Sustainable water use does not harm ecosystems, degrade water quality, or compromise the ability of future generations to meet their own needs.

2009 Minn. Laws. Ch. 172, Art. 2 § 30 at 45-46



Mandate – to address needs related to:

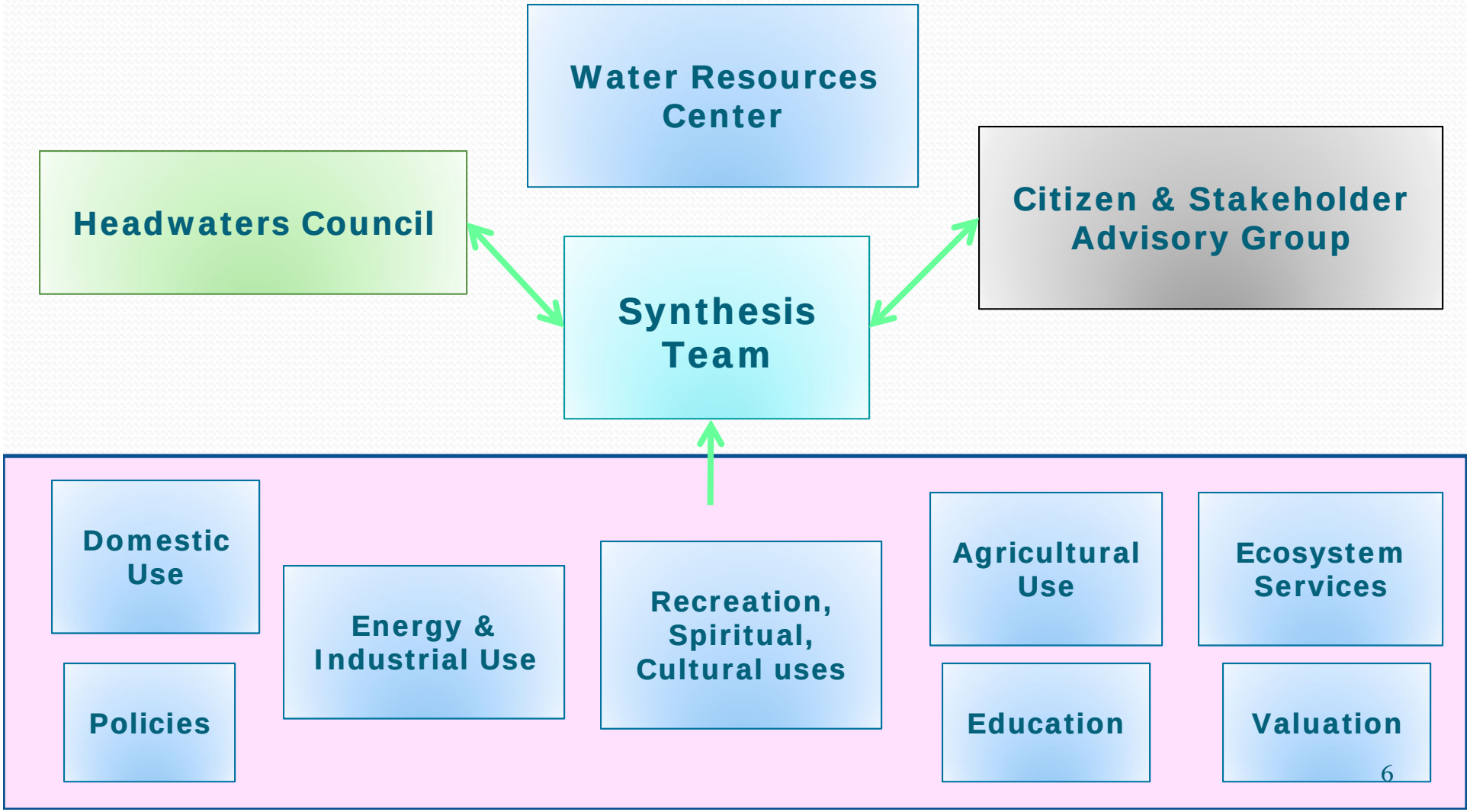
- Drinking water
- Stormwater
- Agricultural use
- Industrial use
- Surface and groundwater interactions
- Infrastructure
- Interface of water resources with climate change, land use, development, demographics

A Collaborative Approach

UNIVERSITY OF MINNESOTA

- DNR
- MDA
- MDH
- MPCA
- EQB
- BWSR
- WDs
- WMOs
- SWCDs
- NGOs
- Counties & Cities

Approach


Water Resources Center
Headwaters Council
Citizen & Stakeholder Advisory Group
Synthesis Team
Domestic Use
Energy & Industrial Use
Recreation, Spiritual, Cultural uses
Agricultural Use
Ecosystem Services
Policies
Education
Valuation

Technical Team White Papers

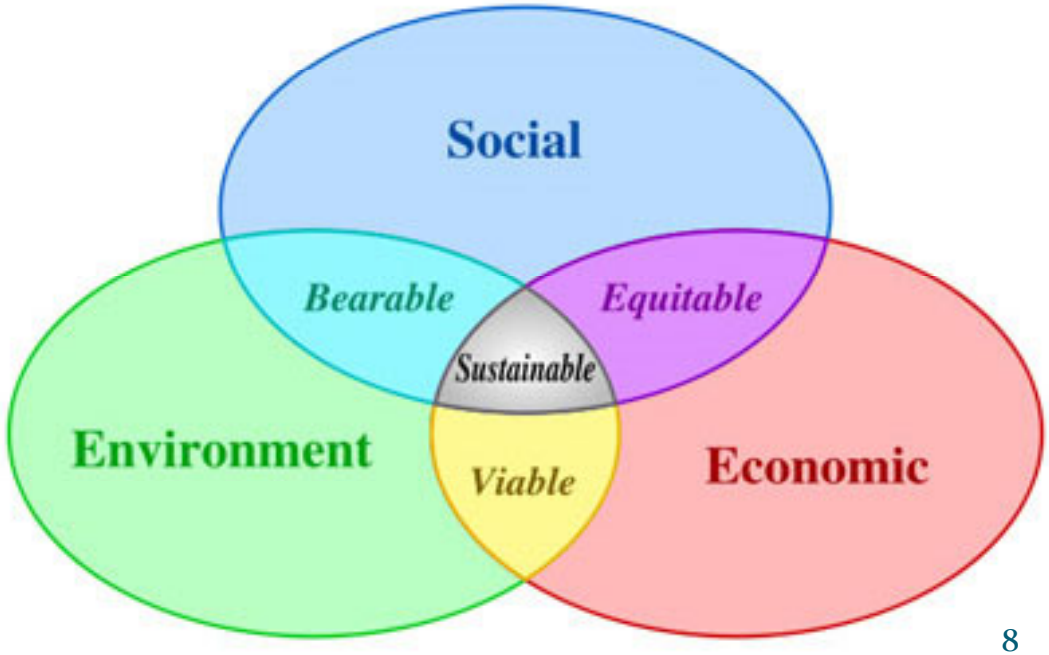
- Water Use in Minnesota
- Water Supply in Minnesota
- Water Quality in Minnesota

- Policy
- Education
- Valuation
- Agriculture
- Ecosystem Services
- Domestic
- Energy/Manufacturing
- Rec/Cultural/Spiritual

All background info available at wrc.umn.edu

Framework

- Framed 90 specific needs
- Collected under 10 “Big” Issues
- Contained in 3 categories of sustainability



Issues/needs

Environmental

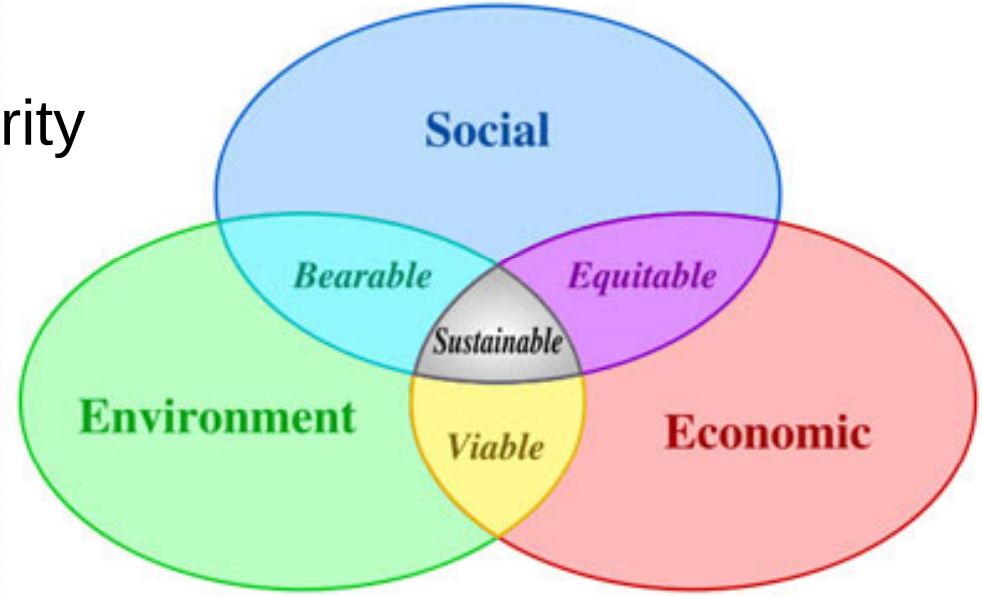
- Sustainable water supply
- Excess nutrients & conventional pollutants
- Contaminants of emerging concern
- Land-water connection
- Ecological & hydrologic integrity
- Water-energy “nexus”

Social

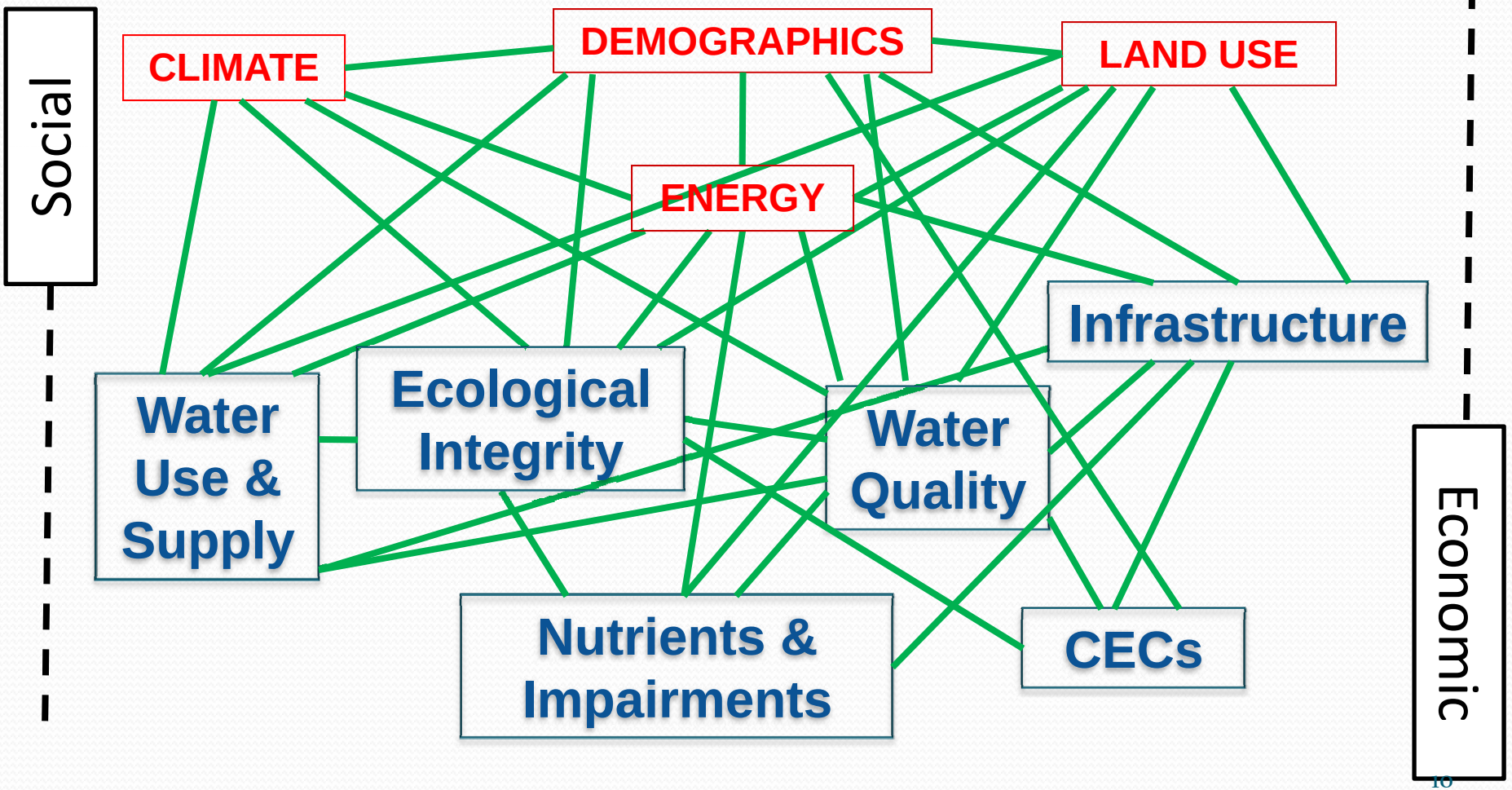
- Citizen engagement & education
- Governance & institutions

Economic

- Water pricing
- Infrastructure needs



Issue Relationships and Drivers



For each Issue:

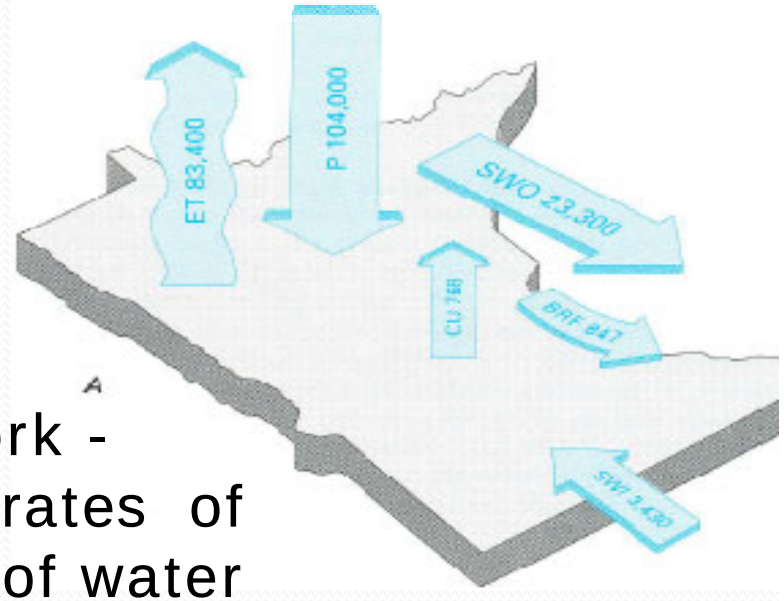
- Problem statement
- Desired future Minnesota condition
  - Objective & Strategies (“what”)
    - Recommended action (“how”)
  - Benchmarks for measuring progress
- Implementation schedule
- Impact matrix

Issue: Sustainable, Clean Water Supply

Strategy 1:

Determine state water balance

From USGS Circular 1139



- **Rec:** accelerate county geologic atlases and aquifer characterization mapping

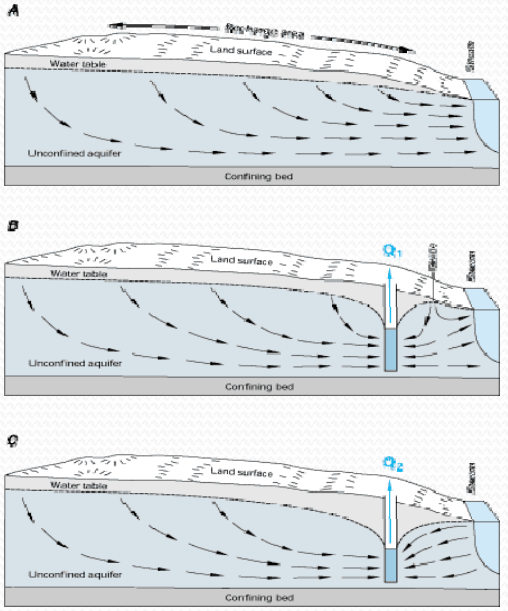
- **Rec:** hydrologic monitoring network - determine flows, storage, recharge rates of major aquifers; and develop model of water balance

Issue: Sustainable, Clean Water Supply

Strategy 1, cont:

Institute a water withdrawal permit process that accounts for surface/groundwater interactions and ecological needs

- **Rec:** electronic permit screening tool; cumulative withdrawal effects; base permits on minimum base flow that is protective of ecological needs for given hydrologic regime



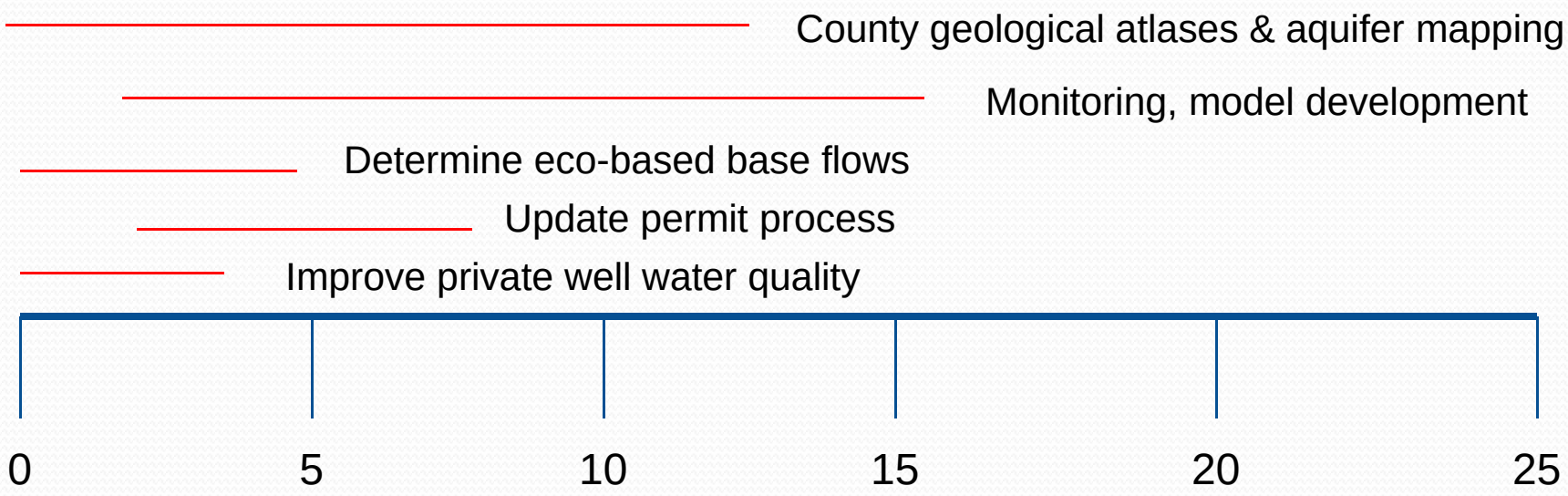
From USGS Circular 1139

Issue: Sustainable, Clean Water Supply

Strategy 2: Reduce risk from drinking private well water

- **Rec:**
  - map all private wells
  - test at time of sale and refinance
  - offer homeowners testing clinics
  - educate homeowners on effects of nitrates, arsenic, bacteria

Issue: Sustainable, Clean Water Supply



Implementation Schedule

Issue: Excess Nutrients & other Conventional Pollutants

Strategy 1:

- Develop statewide guidance for nutrient enrichment management plans that are:
  - implemented at watershed level
  - adaptive
  - address all aspects of excess nutrients from all sources
  - includes sediments, pesticides, bacteria

Issue: Excess Nutrients & other Conventional Pollutants

Rec:

- Require that all TMDL assessments also have Implementation Plans for pollutant reduction, and require that these plans be implemented for all sources
  - Accelerate assessments and implementation plans
  - Require compliance timelines, effectiveness monitoring, and consequences for failure to comply
  - Include allocations and implementation of load reductions in every watershed nutrient enrichment management plan

Issue: Excess Nutrients & other Conventional Pollutants

Strategy 2:

Accelerate improvements in water quality and provide equity in solutions to meeting water quality standards – include agriculture in solution

- **Rec:**
  - Establish farmer-led, performance-based approach to meeting water quality standards in agricultural areas
  - Agricultural management areas would decide as cooperative how to meet discharge threshold

Issue: Contaminants of Emerging Concern

Strategy 1: Move upstream of hundreds of potentially harmful, trace level contaminants entering from different sources

- **Rec:** Promote green chemistry and manufacturing

Strategy 2: Manage the CECs already in water

- **Rec:** Develop framework that uses multi-pollutant approach
- **Rec:** develop comprehensive policy for drug disposal

Issue: Land-water connection

Strategy 1:

Integrate water and land sustainability planning

- **Rec:** incorporate water sustainability in land use permitting processes
- **Rec:** Increase compliance capacity for current regulations
- **Rec:** monitor for effectiveness of land practices

Issue: Ecological and Hydrologic Integrity

Strategy 1: Protect critical aquatic ecosystems

- **Rec**: Ecosystem Integrity Act
- **Rec:** Consider ecological benefits in environmental review
- **Rec:** Research and implement climate adaptation strategies

Issue: Ecological and Hydrologic Integrity

Strategy 2: Prevent introductions and reduce impacts of aquatic invasive species

- **Rec:** Develop statewide policy for aquatic invasive species
- **Rec:** Research effectiveness of control measures

Issue: Ecological and Hydrologic Integrity

Strategy 3: Keep more water on the land where it falls, and slow it down

- **Rec:** accelerate development of hydrologic assessment model for drainage and flood control
- **Rec:** develop model for water flow at field scale
- **Rec:** require new or replacement drainage to incorporate drainage conservation technology
- **Rec:** Expand incentives program to retrofit existing tile drainage

Issue: Ecological and Hydrologic Integrity

Strategy 4: maximize placement of marginal lands in conservation protection

- **Rec:** invest in conservation land set aside programs
- **Rec:** work on next Farm Bill to maximize conservation elements

Issue: Water-Energy "Nexus"

Problem: It takes energy to clean water; it takes water to make energy

Desired MN Future: *energy and water policy are aligned*

Issue: Water-Energy "Nexus"

Strategy 1:

Quantify all water - energy relationships and evaluate energy policy for water sustainability

- **Rec:** Use full-cost accounting to quantify water – energy relationships
- **Rec:** Revise Minnesota energy policy for water sustainability

Issue: Water pricing & Valuation

Strategy 1:

Incorporate the economic value of ecological benefits provided by water in decisions and assessments

- **Rec:** Incorporate value of ecological benefits into new 2013 pricing structures
- **Rec:** Use funds to further protect source water

Issue: Public Water Infrastructure

Strategy 1:

Incorporate new technologies and adaptive management into public water infrastructure

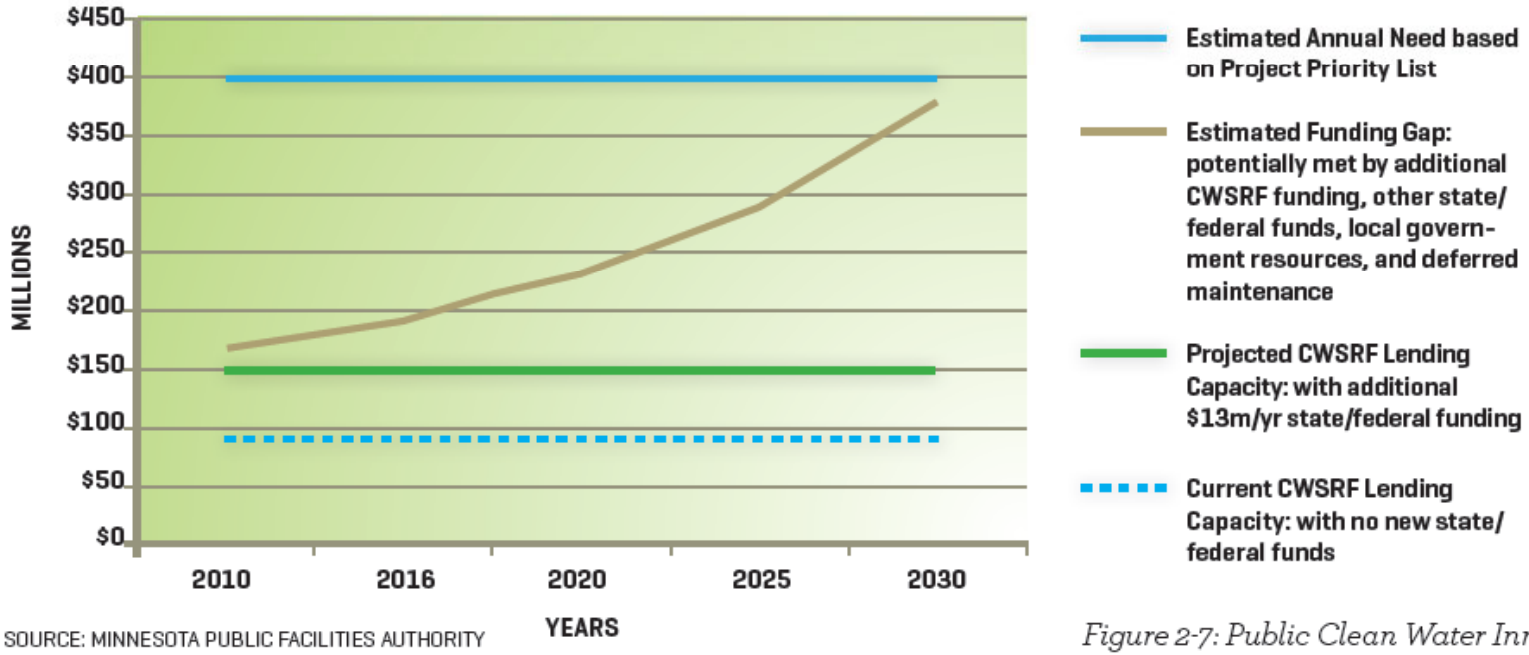
- **Rec:** Create standing advisory committee to provide updates and advice on new technologies, report every two years

Issue: Public Water Infrastructure

Strategy 2:

Develop long-term strategy for funding new, expanded, and updated infrastructure

- **Rec:** Determine strategic options for funding; implement



SOURCE: MINNESOTA PUBLIC FACILITIES AUTHORITY

Figure 2-7: Public Clean Water Inrastructure Funding Gaps

Issue: Citizen Engagement & Education

Strategy 1: Citizens hold a water ethic and act on it

- **Rec:** Educate children through K-12 education
- **Rec:** Educate citizens and decision-makers
- **Rec:** Engage the public, communities and businesses in water conservation and stewardship through multiple efforts and with stable funding

Issue: Governance & Institutions

Strategy 1:

Align water, land use, energy policies to ensure water sustainability

- **Rec:** Review water laws and statutes and revise as needed to incorporate sustainability as a guiding principle
- **Rec:** align land, energy, and transportation policies with water sustainability
- **Rec:** Re-establish Legislative Water Commission

Issue: Organization & Institutions

Strategy 2: Provide cross-cutting governance

- **Rec:** Establish State Water Sustainability Board
- **Rec:** form Watershed and Soil Conservation Authorities at watershed scale
- **Rec:** Establish interagency Compliance Task Force

Strategy 3: Provide for "living" Framework informed by best information available

- **Rec:** Interagency data "portal"
- **Rec:** Five-year review and update

Summary: Essential Top 5

- **Protect and Restore Water Quantity and Quality**
  - Revise permitting, model water balance
  - Require implementation of pollutant reductions and equity in solution
  - Address future contaminants

- **Address Interconnected Nature of Water**
  - Integrate water and land use planning
  - Align water, energy, land, transportation policies for sustainability

"Dashboard" Summary

RECOMMENDATION	IF FUNDED, WHO SHOULD IMPLEMENT	RESEARCH TASK	IMPLEMENTATION PHASE	LEVEL OF BENEFIT TO WATER RESOURCES	MULTIPLE BENEFITS
A.1.a i, ii, iii: accelerate water balance mapping and monitoring needs	Executive		Phase 1		
A.1.a iv: design and complete water balance hydrologic models	Executive	R	Phase 1		
A.1.b i, ii: develop a web-based screening permit system	Executive		Phase 1		
A.1.b iii: restrict water exports from state	Legislative		Phase 3		
A.1.b iv: develop eco-based thresholds for minimum flows	Executive	R	Phase 1		
A.2.a: improve quality of private drinking water	Other		Phase 2		

Minnesota Water Sustainability Framework

CLEAN WATER LAND & LEGACY AMENDMENT

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