

Planning Far into the Future: the Minnesota Water Sustainability Framework

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Photo courtesy of Jon Kreski

What is the Framework?



- Funded by the Clean Water Fund of the Clean Water Land and Legacy Amendment
- Requested by Legislature, delivered to Legislature
- A 25-year plan to protect, conserve, and enhance the quantity and quality of the state's groundwater and surface water

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

Identify BMPs for WWTP, DW source protection, pollution prevention, conservation, and water valuation

Sustainability Definition

“SUSTAINABLE WATER USE DOES NOT HARM ECOSYSTEMS, DEGRADE WATER QUALITY, OR COMPROMISE THE ABILITY OF FUTURE GENERATIONS TO MEET THEIR OWN NEEDS.”

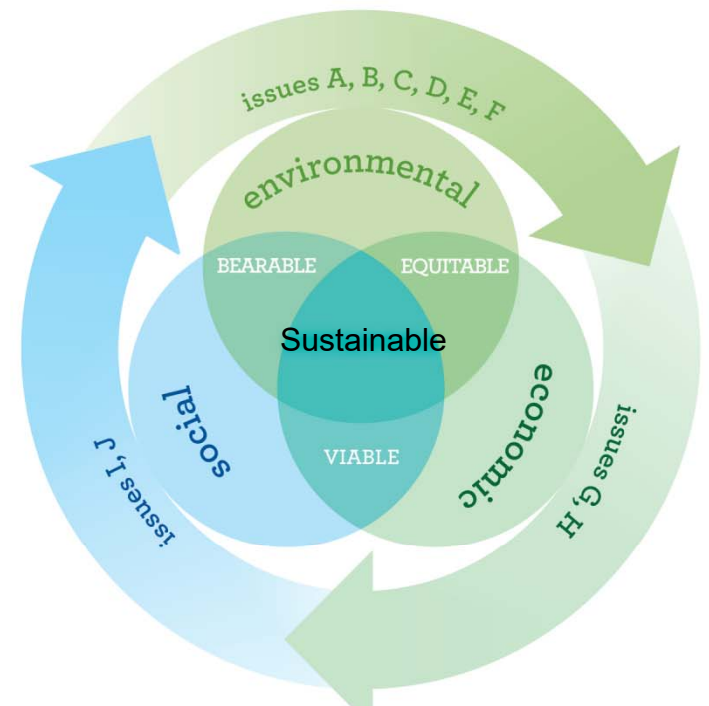
—Minnesota Laws 2009, Chapter 172

Process

- 💧 Science-based
 - 💧 Background papers at wrc.umn.edu
- 💧 Collaborative
 - 💧 8 Technical Teams
 - 💧 Synthesis Team
 - 💧 200+ direct participants
 - 💧 4,500 survey participants

Framework

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



Framework 10 Issues

	The Need for a Sustainable and Clean Water Supply	Issue A	27
	Excess Nutrients and Other Conventional Pollutants	Issue B	39
<i>Environmental</i>	Contaminants of Emerging Concern	Issue C	53
	Land, Air, and Water Connection	Issue D	61
	Ecological and Hydrological Integrity	Issue E	69
	Water-Energy Nexus	Issue F	81
<i>Economic</i>	Water Pricing and Valuation	Issue G	87
	Public Water Infrastructure Needs	Issue H	93
	Citizen Engagement and Education	Issue I	101
<i>Social</i>	Governance and Institutions	Issue J	107

Crosscutting Themes

 **SYSTEMS THINKING**

 **SCIENCE-BASED
DECISIONS**

 **DECISION-MAKING IN THE
FACE OF UNCERTAINTY**


 **ADAPTIVE MANAGEMENT**

 **WATERSHED-BASED
APPROACH**

 **OUTCOME-BASED
RECOMMENDATIONS**

 **ACCOUNTABILITY**

 **SUPPORT FOR COMPLIANCE
WITH EXISTING POLICY**

 **TRANSBOUNDARY
STEWARDSHIP**

Organization for Each Issue



- 💧 Problem statement
- 💧 Desired future Minnesota condition
 - 💧 Objective & 26 Strategies (“what”)
 - 💧 60 Recommended actions (“how”)
 - 💧 Benchmarks for measuring progress
- 💧 Implementation schedule
- 💧 Impact matrix

Table of Desired Future, Issues & Strategies

DESIRED MINNESOTA FUTURE	ISSUE	STRATEGIES
<i>A water supply that is protected for all future generations that is of high quality and that is sustainable for all uses of water.</i>	A. The Need for a Sustainable and Clean Water Supply	<p>A.1: Determine the state's water balance and improve water appropriations permitting</p> <p>A.2: Improve privately supplied drinking water quality</p> <p>A.3: Plan for water re-use</p>
<i>The "Land of Unimpaired Waters," where we have met all our water standards for nutrients and solids, we are not contributing to eutrophication problems beyond our borders, we can safely eat local fish.</i>	B. Excess Nutrients and Other Conventional Pollutants	<p>B.1: Reduce excess nutrient and conventional pollutant loads by strengthening policies to meet clean water standards, and require implementation of pollutant load reductions by all sources</p> <p>B.2: Establish a farmer-led, performance-based approach to meeting clean water standards</p> <p>B.3: Address "legacy" contaminants</p>
<i>A society that has embraced green manufacturing and chemistry so as to eliminate new toxic contaminants, and in which drinking water, recreation water, and food are free from harm from microbial contaminants.</i>	C. Contaminants of Emerging Concern	<p>C.1: Enact Green Chemistry Act</p> <p>C.2: Develop a framework for managing contaminants of emerging concern</p> <p>C.3: Address beach pathogens to improve recreation</p>
<i>A society where all of our land use decisions and plans are inextricably linked with sustainable water use and planning.</i>	D. Land, Air, and Water Connection	D.1: Require integrated land and water planning; integrate water sustainability in permitting

DESIRED MINNESOTA FUTURE	ISSUE	STRATEGIES
<p><i>A society in which healthy ecosystems are considered the foundation on which human well-being is based, all damaged ecosystems have been remedied and all ecosystems are protected, while maintaining a healthy economy. Changes to the hydrological system are minimized and historic changes have been addressed to achieve water quality and aquifer recharge needs.</i></p>	<p>E. Ecological and Hydrological Integrity</p>	<p>E.1: Enact Ecosystems Services Act E.2: Prevent and control aquatic invasive species E.3: Improve management of hydrologic systems E.4: Preserve and encourage land set-aside programs</p>
<p><i>A society in which energy policy and water policy are aligned.</i></p>	<p>F. Water-Energy Nexus</p>	<p>F.1: Understand and manage water and energy relationships</p>
<p><i>A society in which water is considered a public service and is priced appropriately to cover the costs of its production, protection, improvement, and treatment, and the economic value of its ecological benefits.</i></p>	<p>G. Water Pricing and Valuation</p>	<p>G.1: Include the value of ecological benefits in the pending water pricing schemes G.2: Provide for shared resources between large and small community water supplies</p>
<p><i>A society that maintains and protects its infrastructure for drinking water, wastewater, stormwater, and flood protection in a manner that sustains our communities and our water resources, maintains and enhances ecosystems, and reuses water where appropriate to conserve our sustainable supply.</i></p>	<p>H. Public Water Infrastructure Needs</p>	<p>H.1: Determine a long-term strategy for funding new, expanded, and updated infrastructure and its maintenance H.2: Incorporate new technologies and adaptive management into public water infrastructure decisions</p>
<p><i>A resilient society that values, understands, and treasures our water resources, and acts in ways to achieve and maintain sustainable and healthy water resources.</i></p>	<p>I. Citizen Engagement and Education</p>	<p>I.1: Ensure long-term citizen engagement I.2: Ensure youth and adult water literacy and education</p>
<p><i>Governments, institutions, and communities working together to implement an overarching water sustainability policy that is aligned with all other systems policies (land use, energy, economic development, transportation, food and fiber production) through laws, ordinances, and actions that promote resilience and sustainability.</i></p>	<p>J. Governance and Institutions</p>	<p>J.1: Provide a governance structure to ensure water sustainability J.2: Ensure that the Water Sustainability Framework is reviewed and updated regularly and informed by current, accessible data and information</p>

“Dashboard” Summary of 60 recommendations

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 needs and implement hydrologic monitoring network	Executive		Phase 1		








Summary: Phased Implementation

- Phase 1 (start now)
 - Revise permitting, begin water balance modeling/monitoring
 - Require implementation and equity in achieving water quality standards
 - Address CECs
 - Align water, energy, land, etc policies for sustainability
- Phase 2 (begin in ~3 years)
 - Integrate water and land use planning
 - Improve water pricing
 - Address hydrologic integrity issues







Summary: Phased Implementation

- Phase 3 (begin in 5 years)
 - Determine water-energy relationships
 - Address ecological integrity issues
 - Address infrastructure needs
 - Provide for public engagement and education
- Phase 4 (begin in 10 years)
 - Address water re-use








A. The Need for a Sustainable and Clean Water Supply

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 needs and implement hydrologic monitoring network	Executive		Phase 1		
A.1.a iv: design and complete the 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. The Need for a Sustainable and Clean Water Supply

RECOMMENDATION	IF FUNDED, WHO SHOULD IMPLEMENT	RESEARCH TASK	IMPLEMENTATION PHASE	LEVEL OF BENEFIT TO WATER RESOURCES	MULTIPLE BENEFITS
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		
A.3.a : plan for water reuse	Executive		Phase 4		
A.3.b : develop reuse standards	Executive		Phase 4		









B. Excess Nutrients and Other Conventional Pollutants

RECOMMENDATION	IF FUNDED, WHO SHOULD IMPLEMENT	RESEARCH TASK	IMPLEMENTATION PHASE	LEVEL OF BENEFIT TO WATER RESOURCES	MULTIPLE BENEFITS
B.1.b : strengthen approaches to stormwater pollution	Executive		Phase 3		
B.1.c : strengthen shoreland rules	Executive		Phase 3		
B.1.d : increase capacity for local land use compliance	Legislative		Phase 2		
B.1.e : strengthen rules managing septic treatment systems	Executive		Phase 3		






D. Land, Air and Water Connection

RECOMMENDATION	IF FUNDED, WHO SHOULD IMPLEMENT	RESEARCH TASK	IMPLEMENTATION PHASE	LEVEL OF BENEFIT TO WATER RESOURCES	MULTIPLE BENEFITS
D.1.a: require comprehensive land and water planning	Legislative		Phase 1		
D.1.b: integrate sustainability in land use permitting	Legislative		Phase 1		
D.1.c: increase local enforcement and compliance capacity	Legislative		Phase 2		
D.1.d: monitor effectiveness	Executive	R	Phase 1		

E. Ecological and Hydrological Integrity

RECOMMENDATION	IF FUNDED, WHO SHOULD IMPLEMENT	RESEARCH TASK	IMPLEMENTATION PHASE	LEVEL OF BENEFIT TO WATER RESOURCES	MULTIPLE BENEFITS
E.3.a: accelerate watershed hydrological characteristics and response landscape model application	Executive		Phase 1		
E.3.b: model drainage from field scale to watershed scale	Other	R	Phase 3		
E.3.c: require multi-benefit drainage management practices with new or replaced tile drainage	Legislative		Phase 1		
E.3.d: expand cost-share program for retrofitting existing tile drainage	Executive		Phase 1		

H. Public Water Infrastructure Needs

RECOMMENDATION	IF FUNDED, WHO SHOULD IMPLEMENT	RESEARCH TASK	IMPLEMENTATION PHASE	LEVEL OF BENEFIT TO WATER RESOURCES	MULTIPLE BENEFITS
H.1.b: address water reuse	Legislative		Phase 4		
H.1.c: adopt Effective Utility Management programs	Other		Phase 1		
H.2.a i: determine long-term funding strategy for public water infrastructure	Executive	R	Phase 1		
H.2.a ii: implement long-term funding strategy for public water infrastructure	Executive		Phase 3		

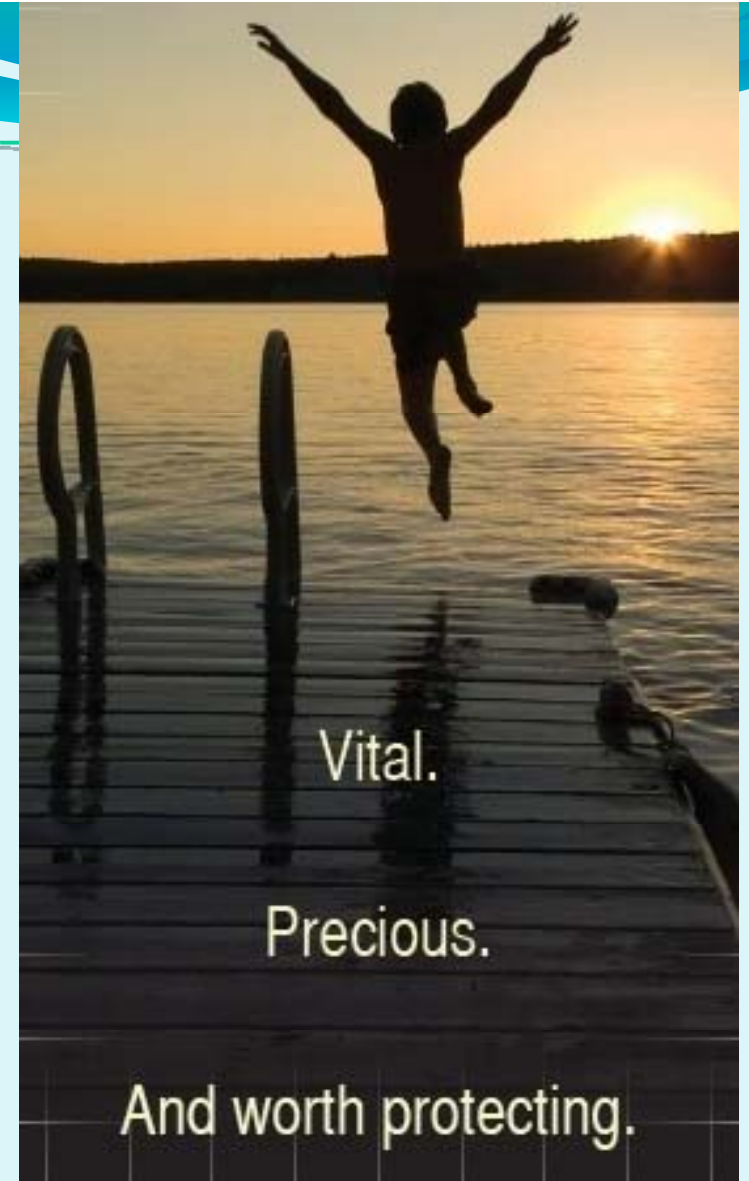


How the Framework Will be Used

- 💧 Inform Clean Water Fund priorities
- 💧 Legislation
- 💧 Agency budgeting and programs
- 💧 Research

It is up to all of us to work on implementation

Minnesota Water Sustainability Framework



wrc.umn.edu/watersustainabilityframework/