



The Minnesota Water Risk Atlas: Aligning Economic Pace with Water Security

An emerging issues proposal

Presented by:

Carrie Jennings, Freshwater

In partnership with:

SharedGeo

The World Resources Institute

Budget Request:

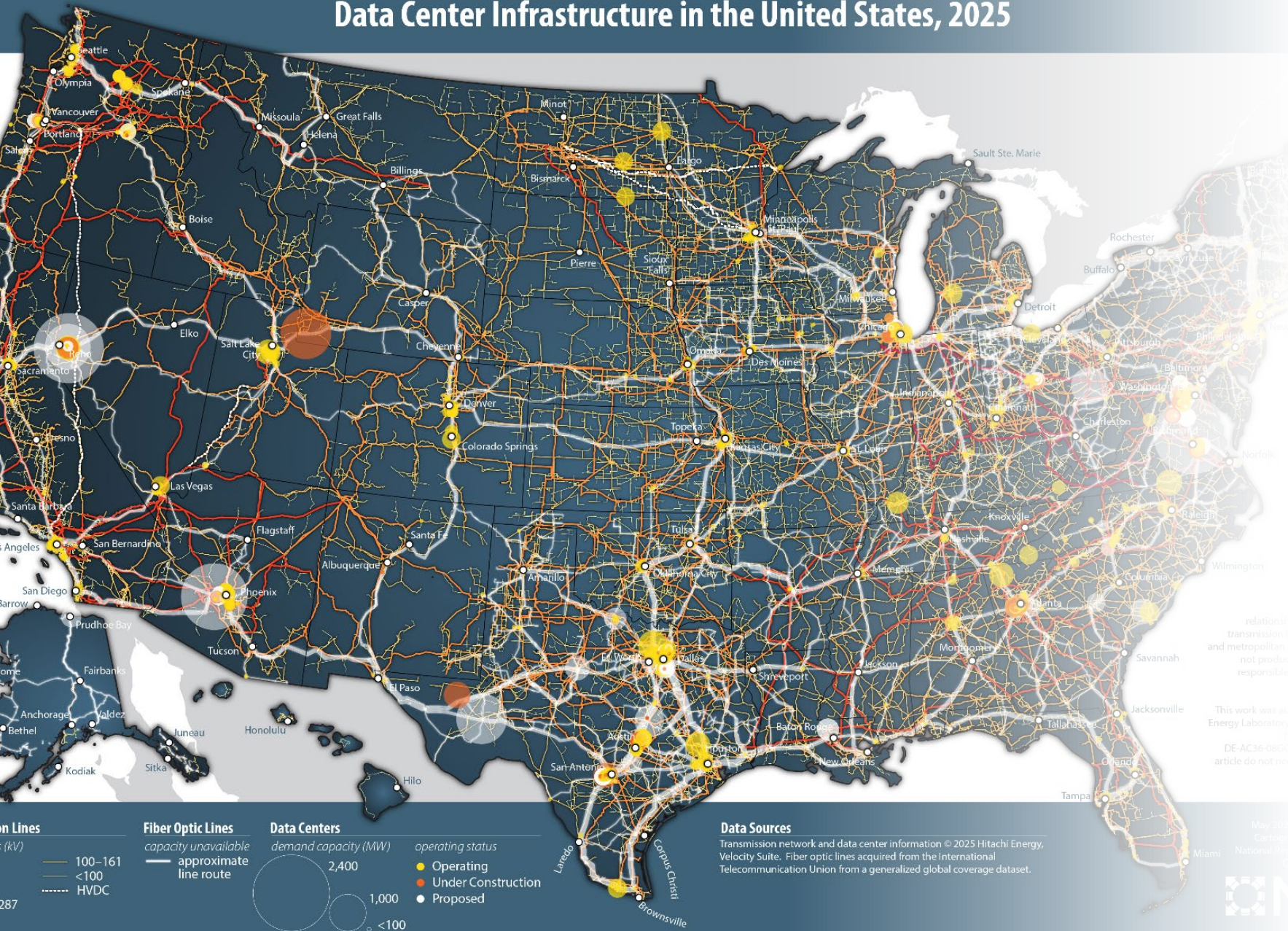
\$399,999 (2 years with product in 1)

The Problem: Speed of Business vs. Policy



- **Minnesota is a Target for Water-Intensive Industries**
 - Data Centers
 - Biofuels (sustainable aviation fuel)
 - Green Hydrogen
 - Beverages
- **Over 20 cities approached in the last year alone**
- **Decisions move quickly, often under NDAs**

Data Center Infrastructure in the United States, 2025



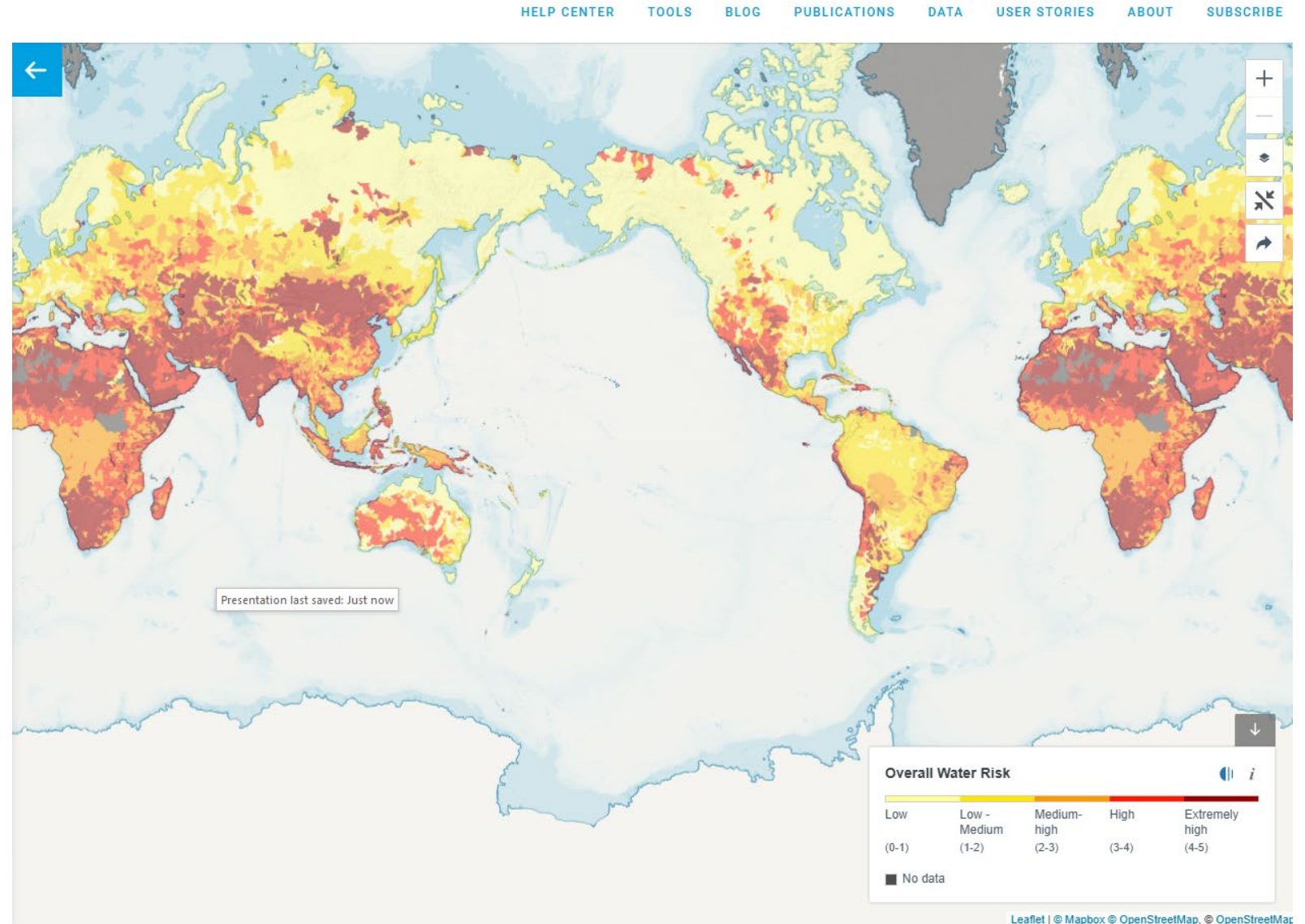
Blind Water-Decision-Making

- Sites chosen for power/fiber/land
- Assume water is available

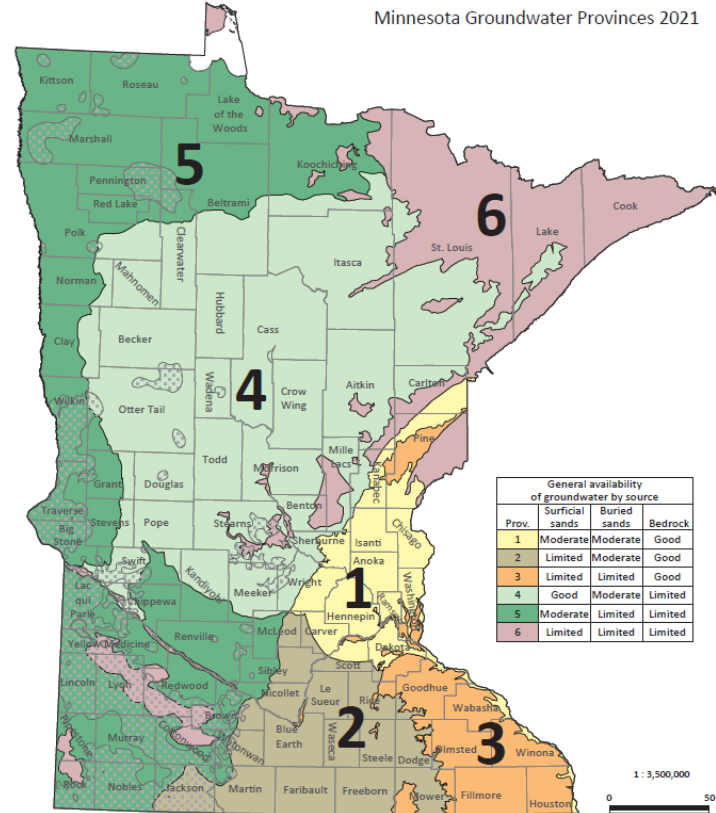
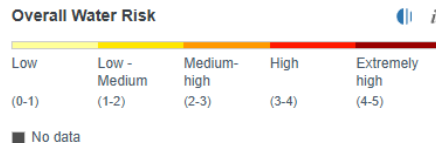
The Tool Gap

Industry uses WRI's
Aqueduct Global
Model.

ISSUE: Global model
is too coarse (~10km
resolution) and
misses Minnesota-
specific geology and
water data.

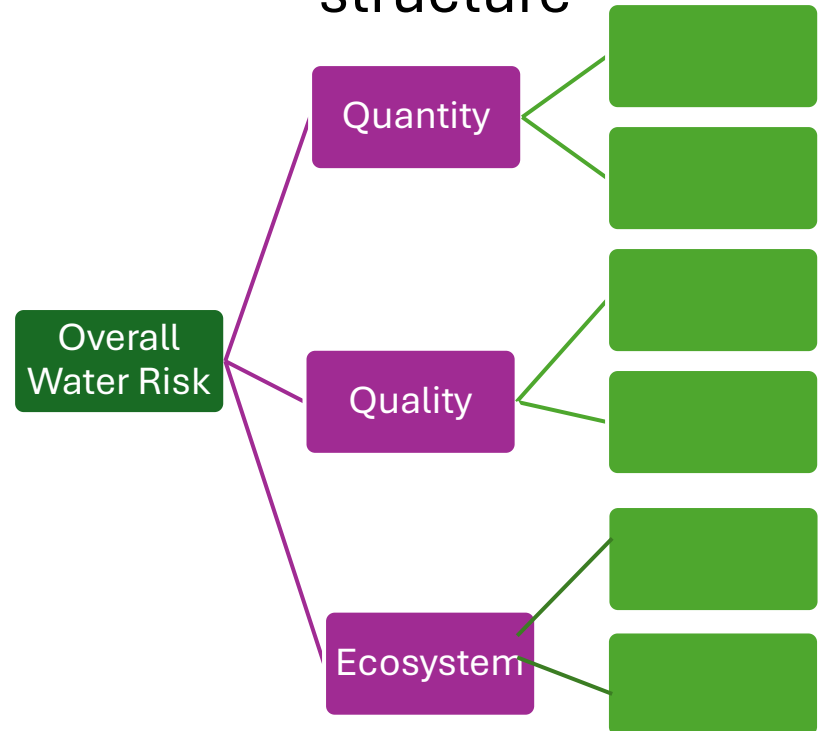


The Goal: Sharpen the Tool for Minnesota



DNR Map currently being used by DEED

Minnesota-specific data used in WRI model structure



Who We Are: the Right Team

Lead & Science & Policy FRESHWATER

Carrie Jennings: 35+ years in Minnesota geology and hydrology

Minnesota Geol. Survey, DNR EcoWaters, U of MN

Deep connection to state datasets and policy implications.

The Technology



Experts in open-source geospatial platforms for public good

Specialists in dynamic data integration

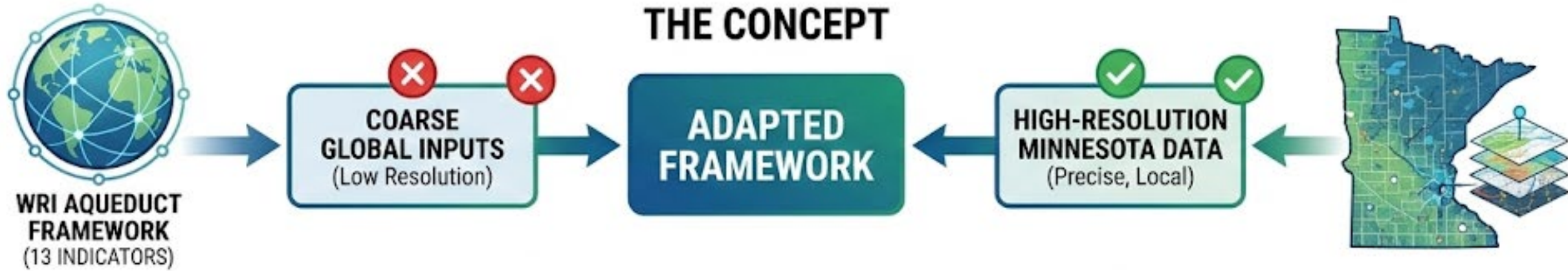
The Framework



Creators of 'Aqueduct,' the global standard for water risk.

Role: Advisory ensuring atlas aligns with global industry standards.

Our Approach



Expert and User Advisory Panel

-
- State Agency
 - Tribal Agency
 - Academic
 - City Managers
 - Business
 - Engineering Firms



Criteria and Guidelines
for
Assessing Geologic Sensitivity
of Ground Water Resources
in Minnesota



MINNESOTA
Department of Natural Resources
Division of Waters

June 1991

Delivery of Products

THE OUTPUT



**WEB-BASED,
OPEN-SOURCE
WATER RISK ATLAS
FOR MINNESOTA**



PHASE 1 (YEAR 1)
INTERIM PRODUCT /
PROOF OF CONCEPT



PHASE 2 (YEAR 2)
FULL DYNAMIC PLATFORM

How will this be used?

1. City Planners & Local Govt:



- Screen proposals **BEFORE** signing NDAs or changing zoning.
- Answer: "Can we actually support this data center long-term?"

2. State Agencies (DEED/DNR):



- Direct water-intensive industry **AWAY** from stressed areas.
- Direct industry **TOWARD** water-rich regions (e.g., former mine pits).

3. Industry Site Selectors:



- Provides the "certainty" they crave early in the process.
- Allows them to see MN-specific constraints (e.g., trout streams) instantly.

The Investment: Buying Resolution & Certainty

WHAT YOU ARE BUYING (GRANULARITY)



CURRENT GLOBAL MODEL:
~10km GRID CELLS
(6x6 miles)

Data often interpolated, lacks local detail.

INCREASED
PRECISION &
ACCURACY



MN WATER RISK ATLAS:
[INSERT: e.g., <1km resolution /
Parcel-level accuracy]

High precision, uses actual state data.

Agency Support for Water Risk Atlas

- **DEED**—improved water map too complicated for them to undertake
- **MNGEO**—Wants to work with us on hosting.
- **DNR**—Offered to work with our team.

RE: Mapping for large water users



Siderius, Natalie (DEED) <natalie.siderius@state.mn.us>

To ○ Michelle Stockness

Cc ● Carrie Jennings

You forwarded this message on 11/20/2025 2:30 PM.

Reply Reply All Forward

Thu 11/20/2025 2:24 PM



Director | Minnesota Geospatial Information Office (MnGeo)

Freshwater's history of work on this

HF 2918 Status in the House - 94th Legislature (2025 - 2026)

[Current bill text: As Introduced](#)
[Add HF2918 to MyBills](#)
[Version List](#)
[Long Description](#)

[Companion: SF3015](#)
[Companion Text](#)
[Senate Search](#)
[Further Committee Actions](#)

Description

Funding provided to develop water availability atlas and siting methodology, report required, and money appropriated.

Authors (2)

[Pursell](#); [Nelson](#)

SF 3015 Status in the Senate - 94th Legislature (2025 - 2026)

[Current bill text: As Introduced](#)
[Add SF3015 to MyBills](#)
[Version List](#)
[Long Description](#)

[Companion: HF2918](#)
[Companion Text](#)
[House Search](#)
[Committee Hearings and Actions](#)

Description

Water availability atlas development appropriation and siting methodology


Authors (3)

[McEwen](#); [Lieske](#); [Johnson Stewart](#)

- 1.1 A bill for an act
1.2 relating to natural resources; appropriating money to develop water availability
1.3 atlas and siting methodology; requiring a report.
1.4 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MINNESOTA:
- 1.5 Section 1. **APPROPRIATION; WATER AVAILABILITY ATLAS AND SITING**
1.6 **METHODOLOGY FOR LARGE WATER USERS.**
- 1.7 (a) \$..... in fiscal year 2026 is appropriated from the general fund to the commissioner
1.8 of natural resources to work with the Minnesota Geospatial Information Office to develop:
1.9 (1) a water availability atlas that uses existing data sets to quantify the availability of
1.10 water across the state; and
1.11 (2) a methodology that can be used by state agencies, local governments, and other
1.12 economic development authorities to determine appropriate siting for large water users and
1.13 businesses.
1.14 (b) By January 15, 2028, the commissioner must submit the atlas and methodology
1.15 developed under paragraph (a) to the chairs and ranking minority members of the legislative
1.16 committees and divisions with jurisdiction over environment and natural resources and
1.17 employment and economic development and must make them available to the entities
1.18 described in paragraph (a), clause (2).
1.19 (c) The appropriation in this section is onetime.

Senate Information

Committee Hearings and Actions for S.F. 3015

Date	Committee Hearing or Action
Committee on Environment, Climate, and Legacy	
04/03/2025	Meeting scheduled for 03:00 PM in Room 1150 Minnesota Senate Bldg.  Meeting Minutes
04/03/2025	Laid over for possible inclusion in the omnibus bill



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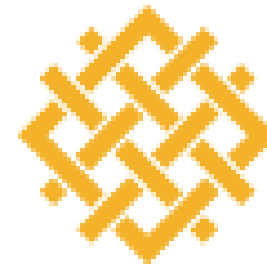
The World Resources Institute

Budget Request:

\$399,999 (2 years with product in 1)

About the World Resources Institute

- **Independent research organization**, leveraging **data, expertise and global reach** to **influence policy** and catalyze change across systems like food, land and **water**; energy; and cities.
- To **improve people's lives, protect** and **restore** nature, and stabilize the climate.
- **WRI's work on freshwater** aims to build water security and water resilience through **accessible data, policy guidance**, nature-based solutions, and corporate water stewardship



WORLD
RESOURCES
INSTITUTE

Our Standards

Our research publications are peer reviewed and held to traditional "academic" standards of excellence. We ensure that all our research publications are timely, targeted and rooted in a [strategic plan](#) for achieving positive change in the world.

WRI turns complex hydrological data into decision-relevant insights and tools

Examples from data/modelling and planning support in Ethiopia



WORKING PAPER

Water-resilient economic development planning in Ethiopia

Authors: Eliza L. Swedenborg, Zablon Adane, Tinebeb Yohannes, and Francesca Battistelli | Contributor: Mekonnen Wakeyo

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Working Papers contain preliminary research, analysis, findings, and recommendations. They are circulated to stimulate timely discussion and critical feedback, and as influence ongoing debate on emerging issues.

Suggested Citation: Swedenborg, E.L., Z. Adane, T. Yohannes, and F. Battistelli. 2025. "Water-resilient economic development planning in Ethiopia." Working Paper. Washington, DC: World Resources Institute. Available online at doi.org/10.46302/wrhp.22.00102.

HIGHLIGHTS

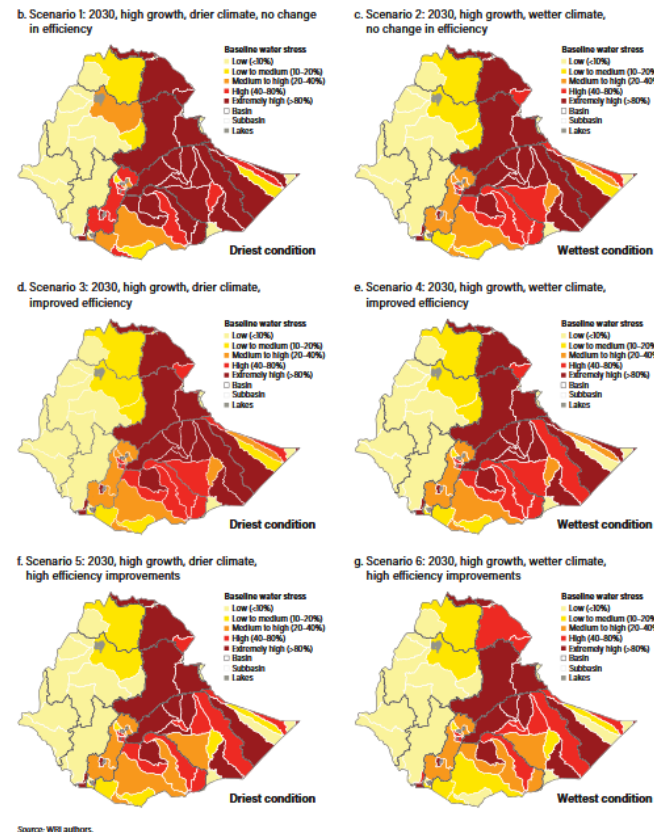
- Ethiopia's rainfall is highly variable and unevenly distributed across the country. Climate change is intensifying floods and droughts and increasing uncertainty. Meanwhile, growing populations and economic development are increasing demand for water even as many still lack safe water access.
- In Ethiopia, climate action has increasingly been integrated with economic planning processes, including the identification of priorities for water-related climate resilience. However, national planning neither adequately considers underlying water resource requirements nor their vulnerability to growing water stress and climate shocks.
- Decision-makers must be proactive to prevent development gains from being undermined by increasing water challenges. Our analysis of the recent 10-Year Development Plan (10-YDP) found that current economic development targets increase water stress and climate vulnerability if these interconnected challenges are not well managed. Water use efficiency improvements alone are not enough. Decision-makers should prioritize strategies that increase resilience to climate shocks as well as strategic macroeconomic shifts to avert unsustainable development paths.
- Strengthening institutional capacity for cross-sectoral and multilevel water-sensitive planning and governance can help to better align Ethiopia's economic trajectory with freshwater systems.

EXECUTIVE SUMMARY

About this working paper

This working paper is intended to guide planners and policymakers in Ethiopia in examining the interrelations between economic development objectives, water resources, and water-related climate risks. This paper builds upon World Resources Institute's development of a baseline water risk model for Ethiopia by applying a scenario planning approach (Adane et al.

Figure 1 | Water stress scenario maps (cont.)



- Established MOU with Ethiopian water ministry to enhance available data on water supply and demands, in support of planning and cross-sectoral coordination
- Developed national model for scenario planning and monitoring

What does SharedGeo do?



Help government, nonprofit, education, and corporate entities use mapping technologies and shared geographic data for the public good.

- Federally recognized Minnesota-based nonprofit.
- Merges technology, preparedness, and collaboration.
- Emphasis on building reusable open-source mapping tools.
- For the benefit of all.



SharedGeo™
Bringing the world together, one piece at a time!

Community Service

- **COVID Tracking** – Provided for free. At the beginning of the outbreak, the second most accessed COVID site on the internet behind John Hopkins.
 - <https://www.sharedgeo.org/portfolio-item/covid-19-tracking/>
 - <https://www.sharedgeo.org/COVID-19/>
- **Great Lakes Alliance for Remote Sensing (GLARS)** – International collaboration. SharedGeo part funded by EPA and SharedGeo contributions of volunteer time. Only comprehensive Digital Surface Model of the entire Great Lakes Basin.
 - <https://www.sharedgeo.org/portfolio-item/great-lakes-digital-surface-models/>
 - <https://glars.org/>
 - <https://glars.org/home/sharedgeo/>
- **Fiscal Sponsorship: U.S. National Grid Institute** – The single largest donor of money and time to the national effort to promote and develop technologies that support implementation of the federal location communication standard for emergency response.
 - <https://www.sharedgeo.org/portfolio-item/fiscal-sponsorship/>
 - <https://usngi.org/>

Example Products

FuzionView – Five year project primarily funded by Gopher State One Call (GSOC), Minnesota’s legislatively mandated “Call Before You Dig” service. Additional funders included U.S. Pipeline Hazardous Materials and Pipeline Administration (PHMSA), One Call Concepts, Common Ground Alliance and SharedGeo. Capability to display the location of all buried underground infrastructure in the state. National unique system estimated to be able to save Minnesota’s underground community \$100 million per year. Planned release date is 12/29/25. <https://fuzionview.org/about/>

Field Data Collector – Complimentary product to FuzionView which allows personnel in the field to submit reports which can be pulled into GSOC’s “Call Before You Dig” system. Funded by PHMSA and SharedGeo. Planned release date is 12/19/25. <https://fielddatacollector.org/>

TimberView – Project which is modernizing the Minnesota Forestry Association’s “Call Before You Cut” program as funded by the Minnesota Department of Natural Resources. Currently in pre-release testing. <https://timberview.info/>

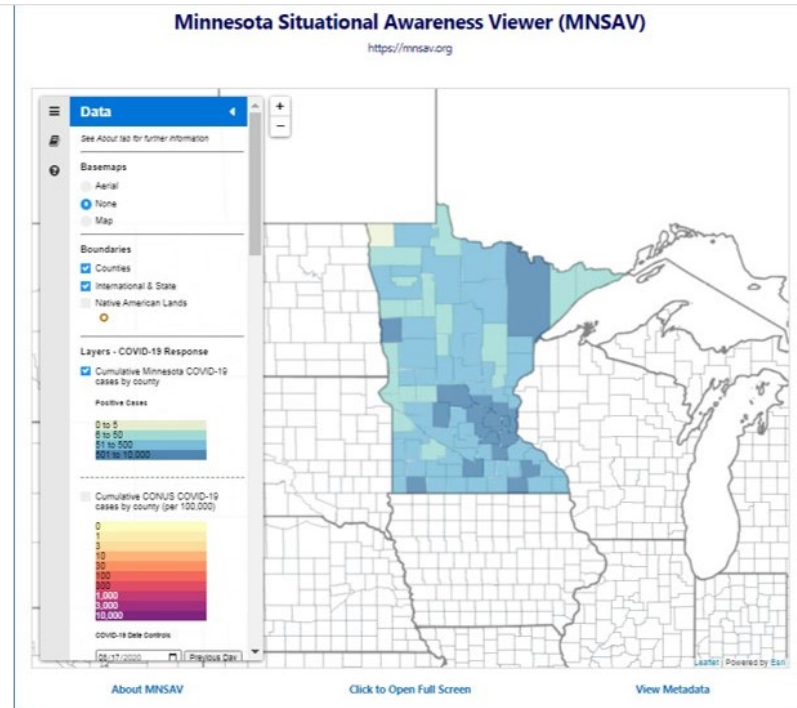
2009 – Civil Air Patrol ARCHER



During the Republican National Convention (RNC) held in Twin Cities Metro in August and September 2008, the SharedGeo development team worked closely with the Minnesota Wing of the Civil Air Patrol (CAP) to put in place high speed download, conversion and WMS distribution of CAP ARCHER (Airborne Real-time Cueing Hyperspectral Enhanced Reconnaissance) imagery on an as needed basis. As a result, event planners had web distributed access to near real-time imagery down to 6 inch resolution if circumstances warranted. This is believed to have been a first in the nation effort during a National Special Security Event (NSSE).



Click on image for expanded view



As a way to provide the Minnesota public with a “one-stop-shop” for publicly available emergency/disaster planning and response mapped information, SharedGeo has created the [Minnesota Situational Awareness Viewer \(MNSAV\)](https://mnsav.org). Extensive research was conducted to ensure the public domain data sources used were the best available as of date of map release in August 2020.

Although initial incident information presented focuses on response to COVID-19, data related to other types of incidents common in Minnesota such as significant flooding and wildfires can be added as they occur in the years ahead. Similarly, future development plans anticipate directly incorporating many of the individual data resources presently listed in the “Other Situational Awareness Maps and Info” section.

Great Lakes Restoration Initiative Collaborative Mapping

The Great Lakes Restoration Initiative (GLRI), a taskforce of 11 federal agencies, is investing resources to clean up toxic substances, combat invasive species and restore wetland and shore habitats in the Great Lakes basin. To accomplish these goals, spatial data are needed about current and historical conditions across this large area.

The goal of the SharedGeo GLRI Project is to serve and share current and historical imagery and spatial data that are related to the Great Lakes area, surrounding watersheds and wildlife habitats. The project uses open-source tools to serve, catalog, map and distribute spatial data and has main 3 parts:

- 1) Spatial data web services and data download tools
- 2) A spatial data catalog
- 3) A web map integration tool

What makes the SharedGeo GLRI project unique is that we host 40+ TB of imagery data that are served in a fast, reliable and scalable manner. These datasets are viewable alongside data from eight US states and the Province of Ontario. The solution is built on Open Source software and standards.



The system is specifically designed to accommodate expansion, or can be easily replicated for use in other scenarios.

| info@sharedgeo.org | 651-285-5015 | Toll Free 1-888-877-SGEO (7436)

Example Projects

2025 Minnesota Legislature bill (SSH16)



Stop Gap Measure

- Coordination with **MN Business First Stop**.
- **Defines a large-scale data center** as over 100 MW and 100 MGY.
- Pre-application with **MN DNR** if water use exceeds 100 MGY and requires a new permit or permit amendment.
- **More transparency** in water and energy use in the preapplication process.
- Encourages **water conservation**.
- Outlines **energy fees** and encourages renewable energy.

DEED tool to site complex projects

Sec. 10. EMPLOYMENT AND ECONOMIC DEVELOPMENT

\$444,000 the first year and \$444,000 the second year are for additional business permitting assistance through the Minnesota Business First Stop Program. Of this amount, \$100,000 the first year and \$100,000 the second year are for the development and maintenance of a GIS platform to identify sites with the least amount of conflict for complex development projects. The base for this appropriation is \$369,000 in fiscal year

- *Water is not included*

Decision critical information on water availability and impact lacking

