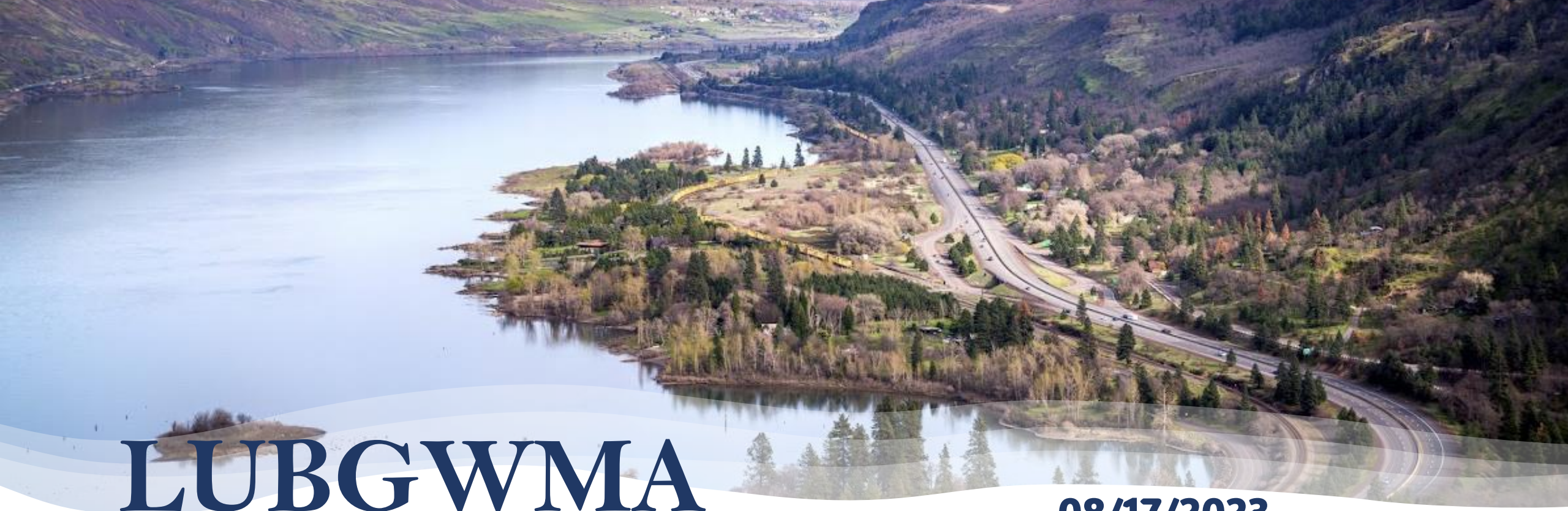


LUBGWMA Committee Regional Workshop 1

08/17/2023

Port of Morrow Riverfront Center

Hosted By

Salini Sasidharan
Oregon State University
LUBGWMA Committee Chair


Welcome

Please use the provided citation when using any of the information from this document

[Authors' Last Names, First Initials from the corresponding presentation]. (2023, August 17). Lower Umatilla Basin Groundwater Management Area (LUBGWMA) Committee Regional Workshop 1. Presentation conducted at the LUBGWMA Committee Regional Workshop 1, Port of Morrow Riverfront Center, Oregon, USA. Hosted by Salini Sasidharan, Oregon State University, LUBGWMA Committee Chair. Published 10/10/2023.[Date of Accession: Add Date]. Retrieved from https://lubgwma.org/

Please replace "[Authors' Last Names, First Initials from the corresponding presentation]" with the actual names of the authors of the presentation and if applicable, replace "[Date of Accession: Add Date]" with the actual date you accessed the document.

Reflecting on a Year of Progress

Milestones:

- **Established Bylaws:** Strengthened our operational foundation through collaborative bylaw enhancements.
- **Updated Structure:** Restructured the committee for improved synergy and effective goal achievement.
- **Expanded Membership:** Enriched our voting membership, embracing diverse perspectives and expertise.
- **Revitalized Webpage:** Renewed our online presence, engaging stakeholders and sharing information effectively.
- **Successful Workshop:** Orchestrated an impactful regional workshop uniting experts for innovative solutions and shared learning.

Help to Build an Actionable Roadmap to Success

Identify Our Priorities, Goals, Solutions, and Resources

Reduce the Nitrate Concentration Less than 7 mg/L in the groundwater at LUBGWMA

Agenda

schedule		
8:00 am	Registration & sign-in	15 min
8:15 am	Welcome Speaker: Salini Sasidharan (Oregon State University)	5 min
8:20 am	Workshop Overview and Outcomes Speaker: Timothy Corey (Colibri Facilitation)	10 min
8:30 am	Eastern Oregon and LUBGWMA History Speakers: • Lyndsi Lewis: Tribal History of Eastern Oregon (CTUIR) • Justin Green: History of Lower Umatilla Basin (JustinGreen Consultancy) • Discussion: Panel	 10 min 15 min 5 min
9:00 am	State Agency's Responsibilities in Bringing Solutions to LUBGWMA Panel: • DEQ, ODA, OHA, OWRD	45 min
9:45 am	Success Stories, Solutions, and Obstacles from Elsewhere Speakers: • Matt Kohlbecker (GSIWS) • JR Cook (NOWA) • Gregg Jones (HDR) • Discussion: Panel	 15 min 15 min 15 min 15 min
10:45 am	Break	10 min
10:55 am	Road Map to Implementation Speakers: • Salini Sasidharan (OSU) • Gregg Jones (HDR) • Discussion: Panel	 10 min 20 min 10 min
11:35 am	Forensic Hydrology: An Investigation of LUBGWMA Speakers: • Salini Sasidharan (OSU) • Suraj Jena (OSU) • Discussion: Suraj Jena, Todd Jarvis(IWW), Salini Sasidharan (OSU)	 10 min 20 min 10 min
12:15 pm	Lunch Break	45 min
1:00 pm	Best Management Practices in LUBGWMA Speakers: • Jake Madison : A Perspective from Production Agriculture • Gregg Harris : A Perspective from Confined Animal Feeding Operation • Darrell Gale : A Perspective from the City of Irrigon • Debbie Radie : A Perspective from the Industry – Indirect through Port of Morrow • Tom Straughan : A Perspective from Livestock • Discussion	 25 min 10 min 10 min 5 min 10 min 20 min
2:20 pm	Break	10 min
2:30 pm	Evaluation of the Second Action Plan and Prioritization of Goals (World Café) • All Participants: Breakout Session and Discussion	 105 min
4:15 pm	Break	15 min
4:30 pm	Recap and Step Forward Speakers: • Timothy Corey, Salini Sasidharan, HDR	60 min
5:45 pm	Closing Remark	15 min
6:00 pm	Adjourn	

Wifi: POM_Public
Password: PortGuest

Sponsors

Industry Sponsorship

($5000)

THE ROUNDHOUSE FOUNDATION

Oregon State University

In partnership with the OSU Foundation

($1500)

MORROW COUNTY

($250)

BOARDMAN FOODS, INC.

POM

PORT OF MORROW

(Venue for Free)

($500)

MORROW

Soil & Water Conservation District

($1000)

Our Employees Are Our Greatest Asset

UMATILLA COUNTY

est. 1862

Participants

- Respectful Communication
- Active Participation
- Time Management
- Open-Mindedness
- Confidentiality
- Constructive Feedback
- Cell Phone Etiquette
- Stay on Topic
- Follow the Facilitator’s Instruction
- Do not interrupt the Speaker

Speakers

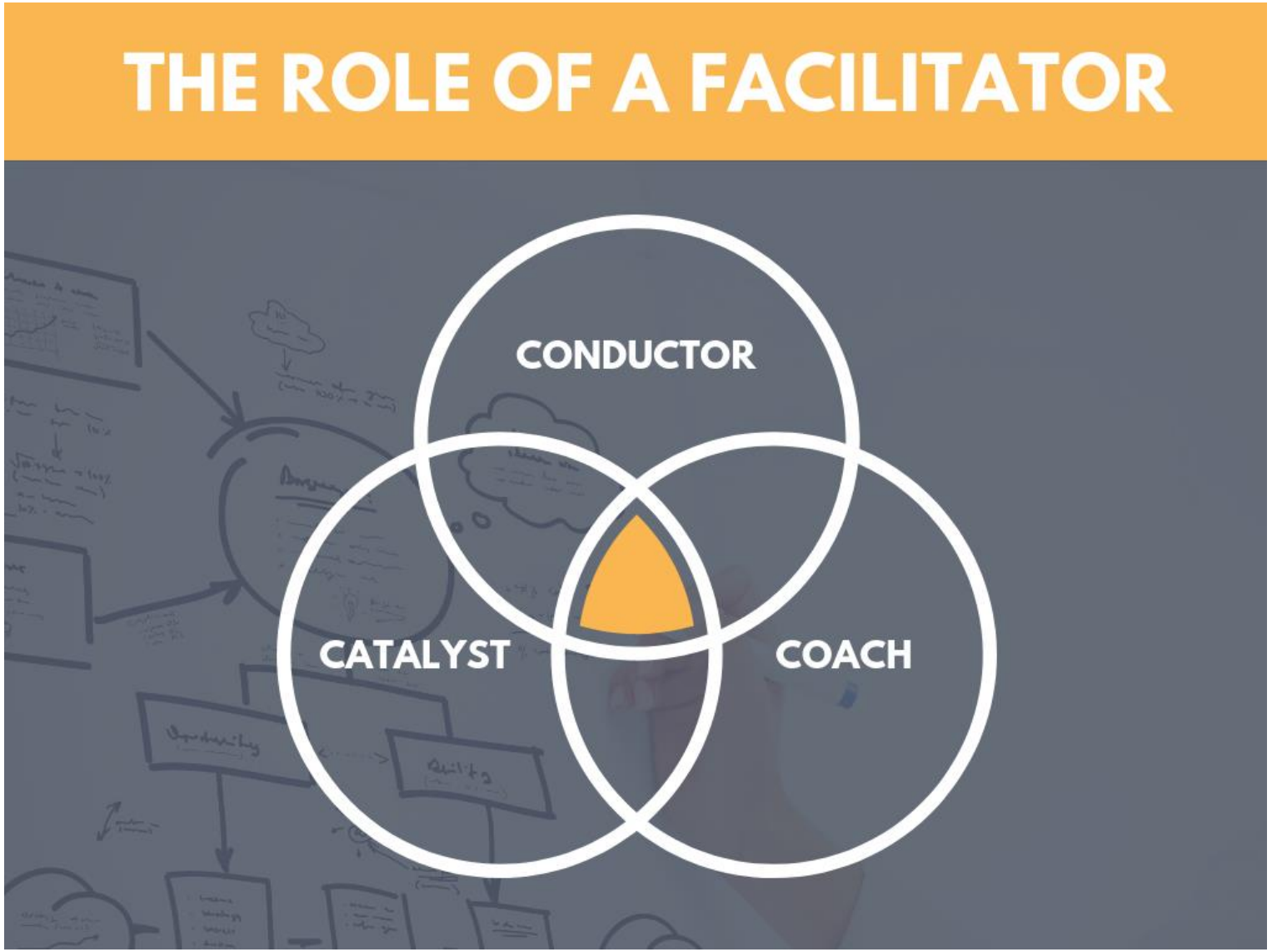
- Time Adherence
- Respectful Language
- Q&A Participation at the end of each section as a panel

Let's Begin Together
Uniting in Sharing, Learning, and Collaborating – Igniting Solutions for a Sustainable Future in the LUBGWMA Community

Workshop Overview and Outcomes

Timothy Corey
Colibri Facilitation

8:20 am – 8:30 am



Eastern Oregon and LUBGWMA History

Lyndsi Lewis

Tribal History of Eastern Oregon

(*Confederated Tribes of the Umatilla Indian Reservation*)

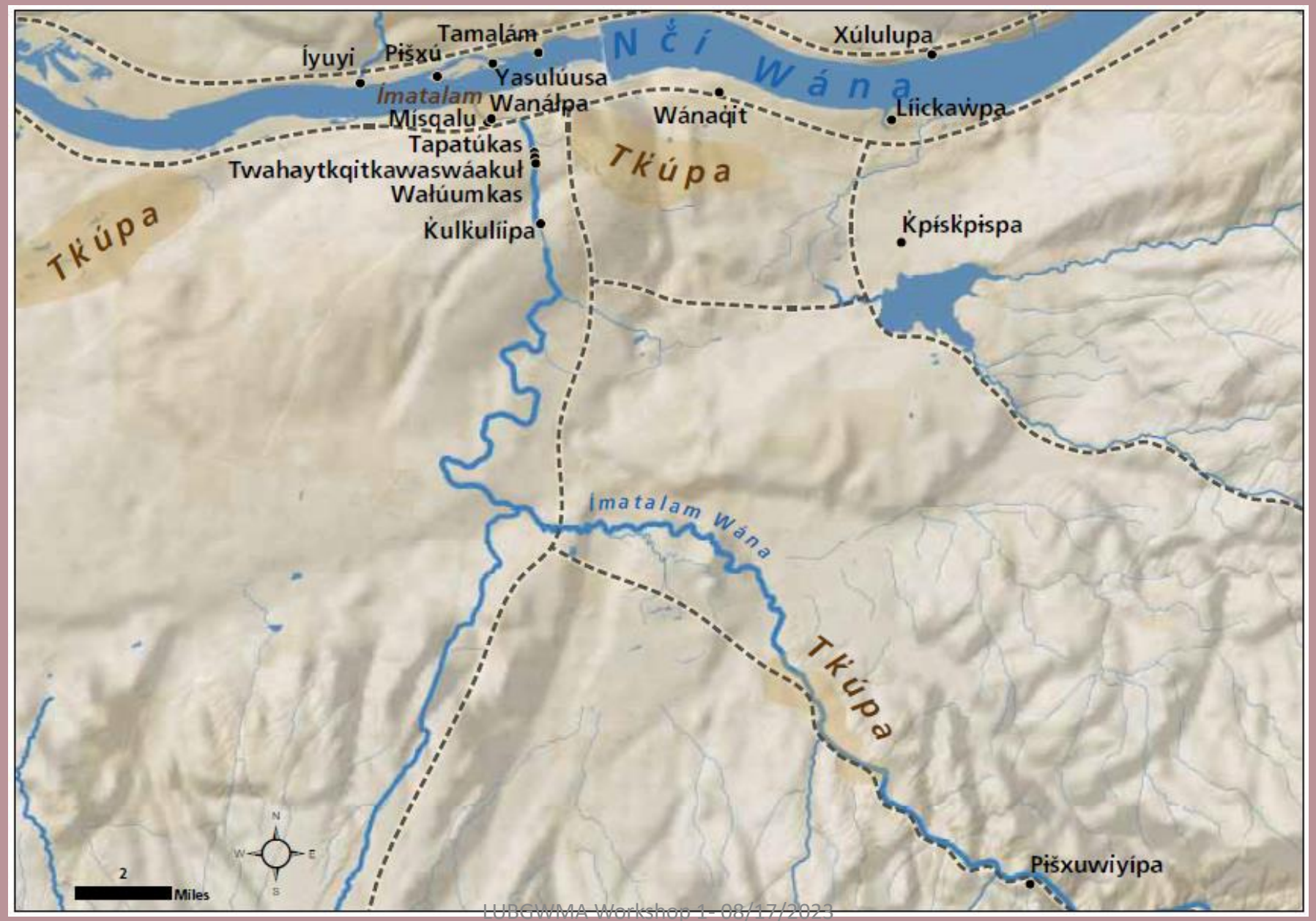
Justin Green

History of Lower Umatilla Basin

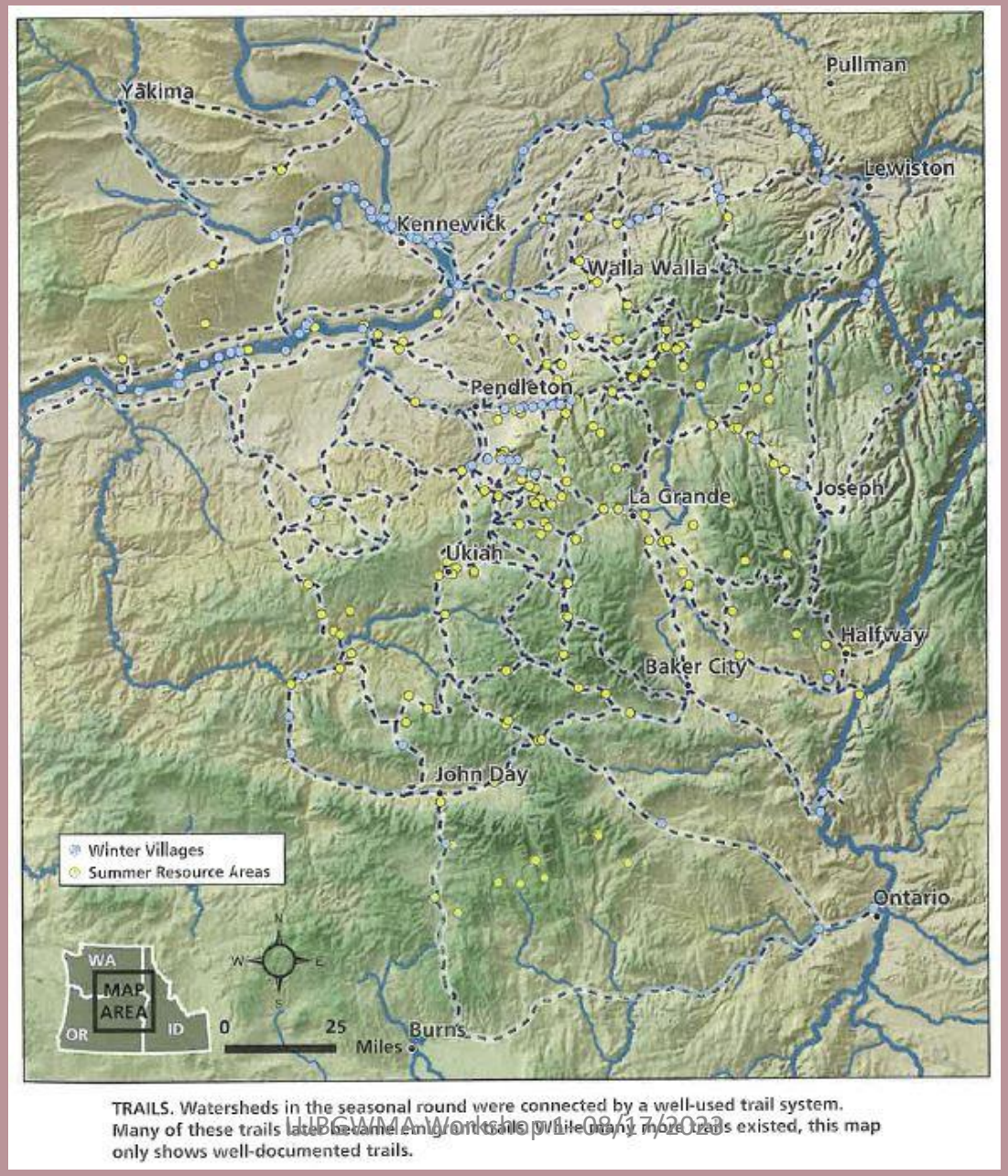
(*JustinGreen Consultancy*)

8:30 am – 9:00 am

Brief Tribal History of Lower Umatilla Basin Area



Seasonal Trails



TRAILS. Watersheds in the seasonal round were connected by a well-used trail system. Many of these trails later became emigrant roads. While many more trails existed, this map only shows well-documented trails.

Department of Natural Resources Mission

Cúuš (Water)	Núsux (Salmon)	Yáamaš (Deer)	Xáwš (Cous)	Wíwnu (Huckleberry)

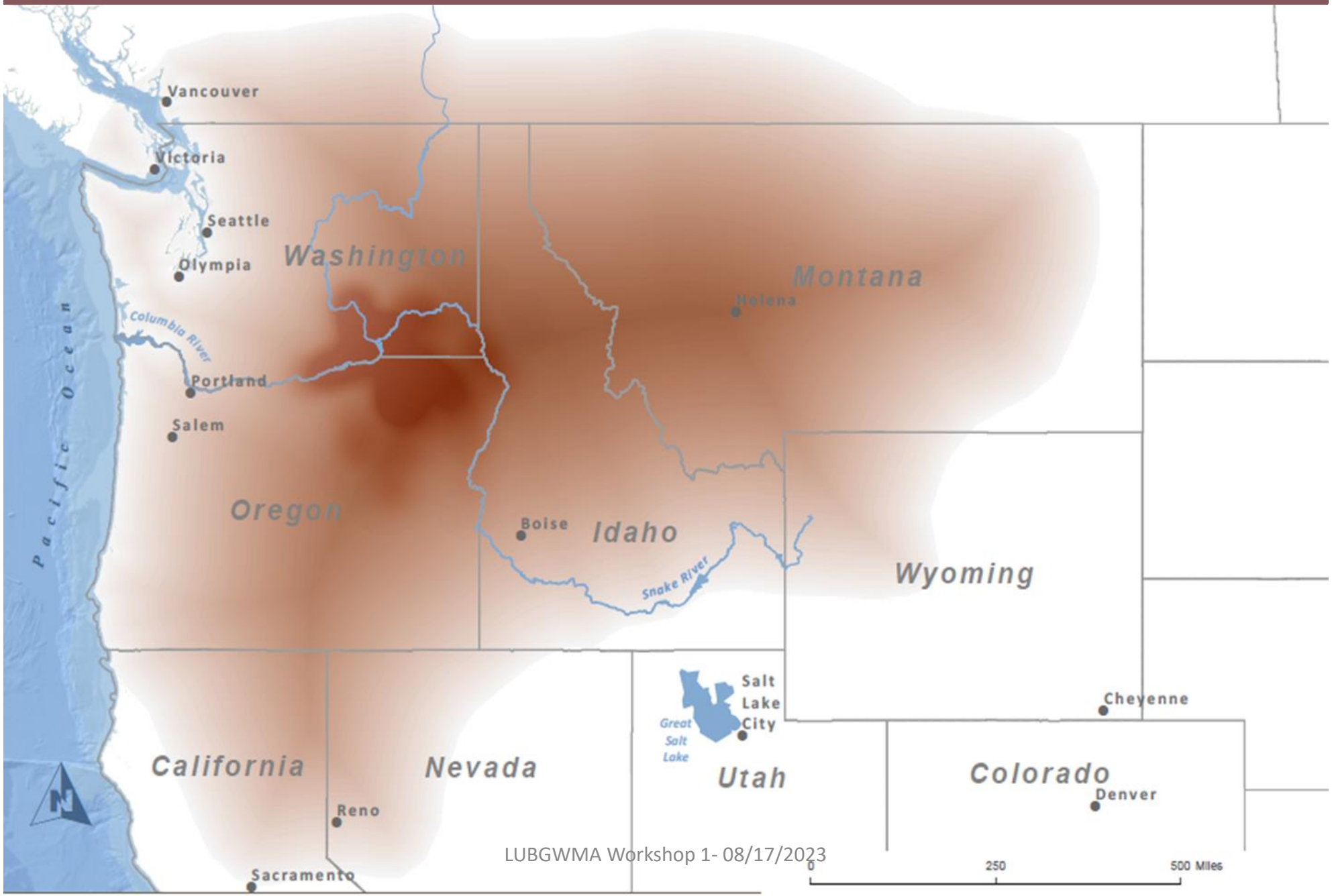




CTUIR DNR Mission, adopted 2007

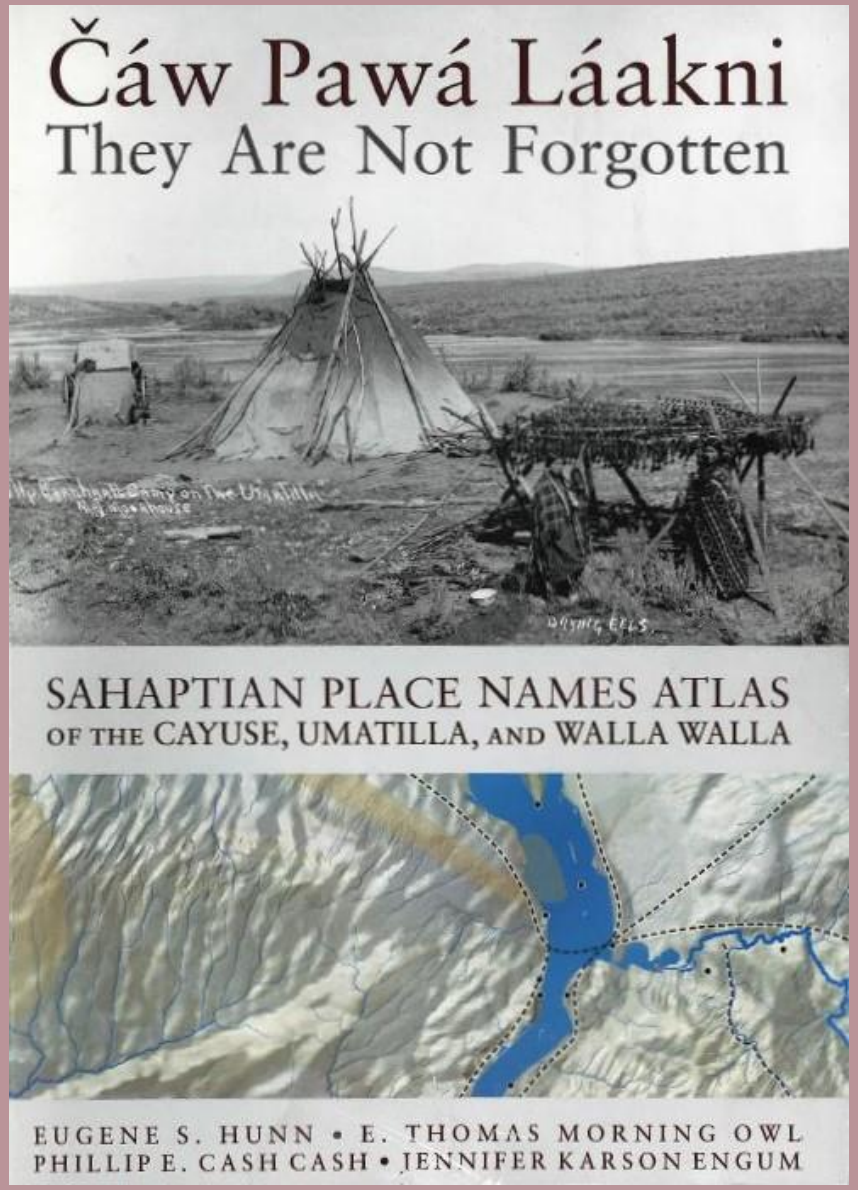
To protect, restore, and enhance the First Foods – water, salmon, deer, cous, and huckleberry – for the perpetual cultural, economic, and sovereign benefit of the CTUIR. We will accomplish this utilizing traditional ecological and cultural knowledge and science to inform: 1) population and habitat management goals and actions; and 2) natural resource policies and regulatory mechanisms.

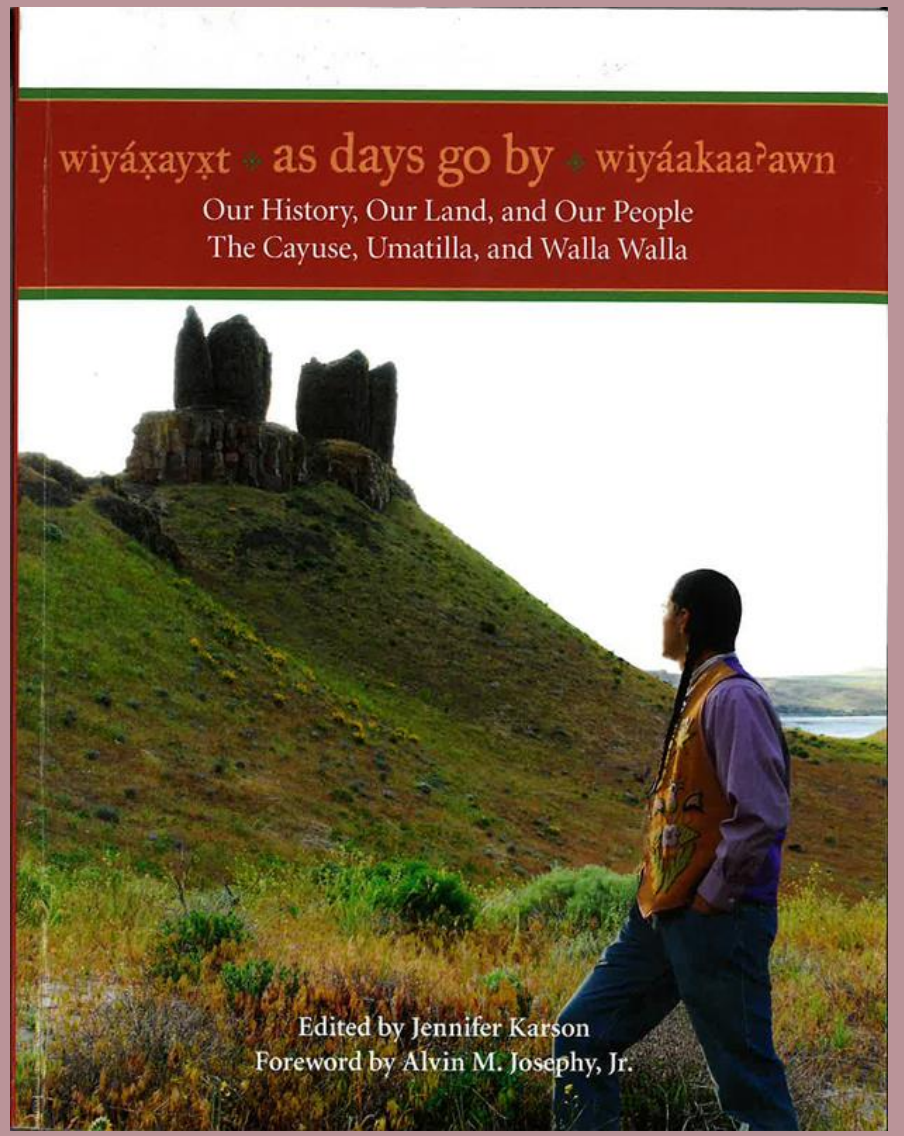
Traditional Use of the Cayuse, Umatilla and Walla Tribes



1855 Treaty Rights in Ceded Land

References


Čáw Pawá Láakni
They Are Not Forgotten
SAHAPTIAN PLACE NAMES ATLAS
OF THE CAYUSE, UMATILLA, AND WALLA WALLA
EUGENE S. HUNN • E. THOMAS MORNING OWL
PHILLIP E. CASH CASH • JENNIFER KARSON ENGUM


wiyáxayxt • as days go by • wiyáakaaʔawn
Our History, Our Land, and Our People
The Cayuse, Umatilla, and Walla Walla
Edited by Jennifer Karson
Foreword by Alvin M. Josephy, Jr.

LOWER UMATILLA BASIN CHRONOLOGY (1862-PRESENT)

LUBGWMA Committee Workshop

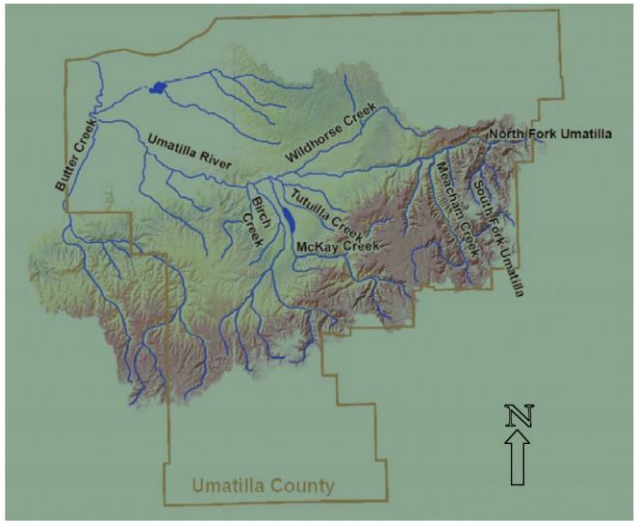
Boardman, Oregon

August 17, 2023

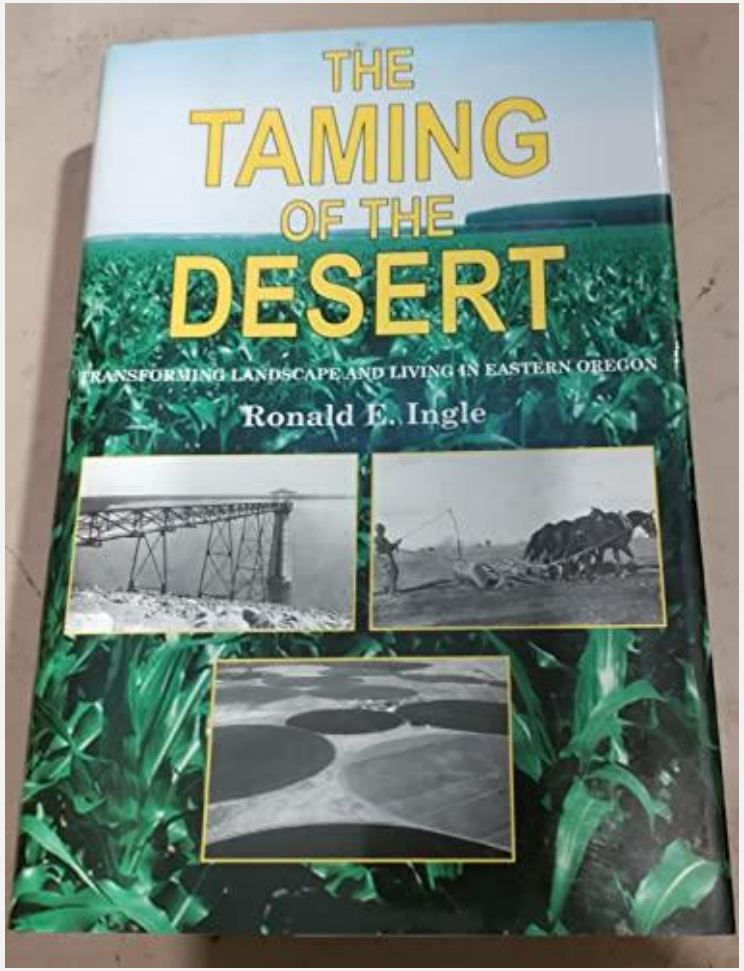
SOURCES

Umatilla Sub-Basin Data Synthesis and Summary

Prepared by the
Institute for Water and Watersheds
at Oregon State University



For the
Umatilla County Critical Groundwater Task Force
and the Stakeholders of Umatilla County
July 4, 2006



LOWER UMATILLA BASIN CHRONOLOGY (1862-PRESENT)

1862

Umatilla County founded

First European settlers arrive as part of Gold Rush

Irrigation begins in Umatilla County

1881

Railroad arrival leads to first major population increase

1885

Morrow County founded

1908

Umatilla Irrigation Project

- Cold Springs Dam and Reservoir
- Feed Canal Diversion Dam
- Feed Canal completed

Hermiston Irrigation District created

LOWER UMATILLA BASIN CHRONOLOGY (1862-PRESENT)

1910

Homesteaders create population boom

- Encouraged by the federal government to settle in the region because of affordable land and availability of irrigation water
- 20 acres average farm size

1910-1950

Flood irrigation is the norm

- Water pumped from canals flows down furrows running through crops
- Highly non-technical
- Overuse of water
- Water pools on surface and flows into natural karst features and into aquifer

1917

West Extension Irrigation District created

1950s

"Hand lines" become popular. Irrigation hoses moved by hand from field to field

FLOOD IRRIGATION

LOWER UMATILLA BASIN CHRONOLOGY (1862-PRESENT)

1966 - 70s

Pivot sprinkler technology developed

- Allows for precise irrigation
- Decreases water needs dramatically
- Less water used, less likelihood of migration to groundwater

1972

Federal Clean Water Act

1974

Oregon LCDC adopts 14 statewide planning goals

1980s

Increased electricity costs incentivize further irrigation efficiencies to reduce costs of operating pumps

Weather data integrated into irrigation

1980s

Salmon become listed species under Endangered Species Act

Coalition between CTUIR and local irrigators to recover salmon population

1989

Oregon Groundwater Quality Protection Act

CENTER PIVOT IRRIGATION

LOWER UMATILLA BASIN CHRONOLOGY (1862-PRESENT)

1990

Lower Umatilla Groundwater Management Area declared

1997

First LUBGWMA Action Plan approved

2004

Umatilla Groundwater Task Force created by Umatilla County to develop a "2050 Plan" to assure adequate groundwater for broad community needs through the year 2050

2000s

Exponential increase in irrigation and monitoring technology

- Irrigation controlled from smartphones
- Soil moisture sensors
- Variable speed drives allow irrigation rates to change how much water is pumped based on demand

2020

Second LUBGWMA Action Plan approved

Eastern Oregon and LUBGWMA History

Lyndsi Lewis

Tribal History of Eastern Oregon

(*Confederated Tribes of the Umatilla Indian Reservation*)

Justin Green

History of Lower Umatilla Basin

(*JustinGreen Consultancy*)

8:30 am – 9:00 am

State Agency's Responsibilities in Bringing Solutions to LUBGWMA

- **Laura Gleim**

  Oregon Department of Environmental Quality
- **Rob Hibbs**

  Oregon Department of Agriculture
- **Chris . C. Kowitz**

  Oregon Water Resources Department
- **Russell A. Kazmierczak and Gabriela Goldfarb**

  Oregon Health Authority
- **Kevin Payne**

  Morrow County Soil Water Conservation District

9:00 am – 9:45 am

Lower Umatilla Basin Groundwater Management Area

Committee Workshop – Aug. 17, 2023

- **Laura Gleim**, Oregon Department of Environmental Quality
- **Robb Hibbs**, Oregon Department of Agriculture
- **Chris Kowitz**, Oregon Water Resources Department
- **Russell Kazmierczak** and **Gabriela Goldfarb**, Oregon Health Authority

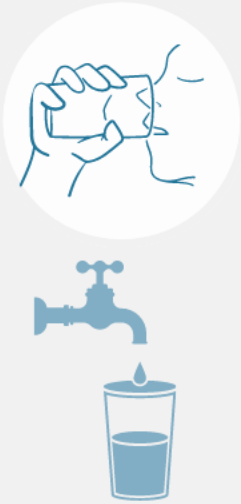
Oregon State and County Government
Roles and Responsibilites in LUBGWMA

Oregon Department of Agriculture (ODA)

Oregon Department of Environmental Quality (DEQ)

Oregon Water Resources Department (OWRD)

Oregon Health Authority (OHA)



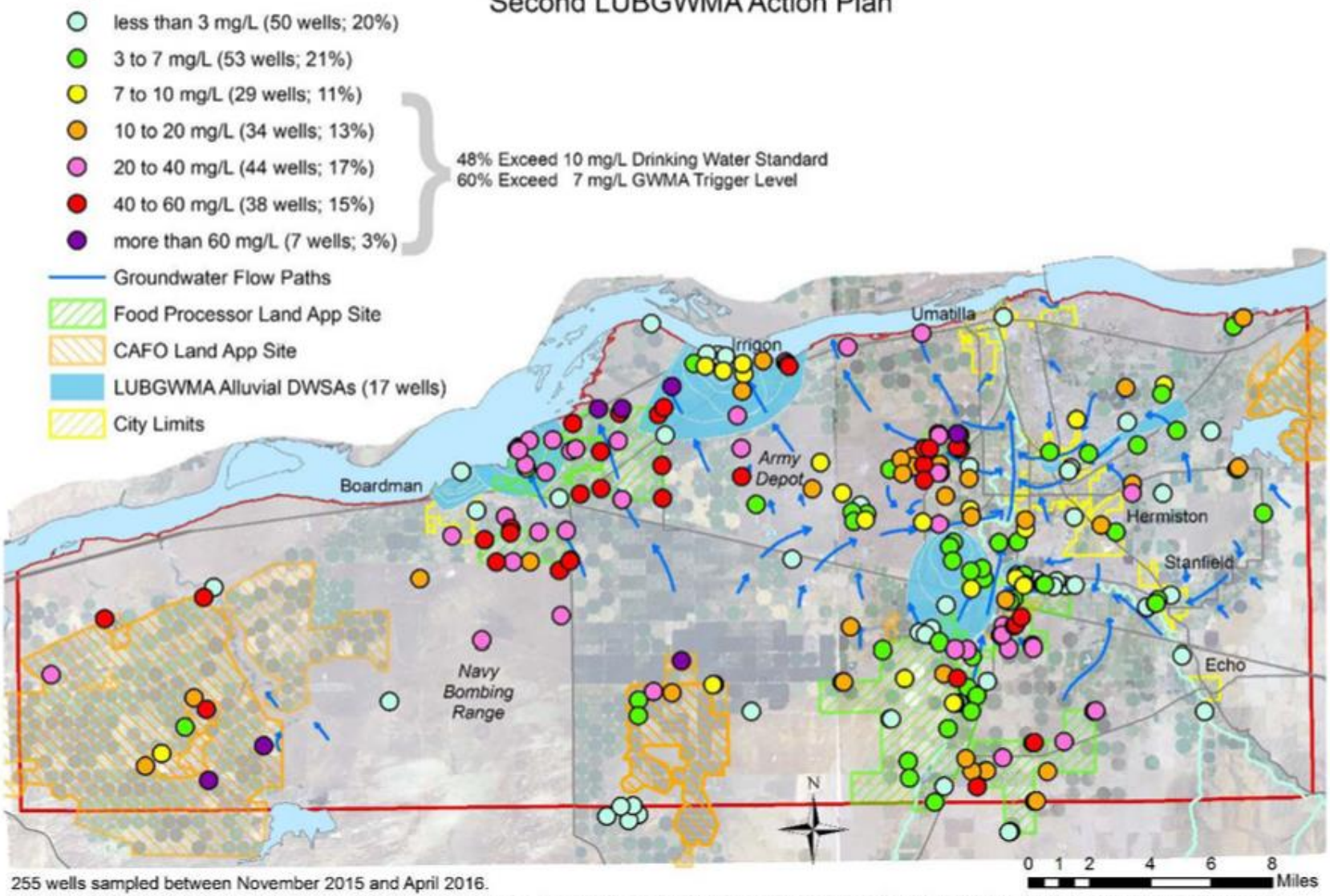
+ County Public Health

Morrow County

Umatilla County

Land use planning, septic systems, public health

Figure 2-12
Composite of Available Nitrate Data in the LUBGWMA
Second LUBGWMA Action Plan



255 wells sampled between November 2015 and April 2016.
Wells sampled include the 17 alluvial aquifer public supply wells, 56 private water supply wells, 10 irrigation wells, 171 monitoring wells, and 1 stock watering well.

Nitrate Contamination Risk in U.S.

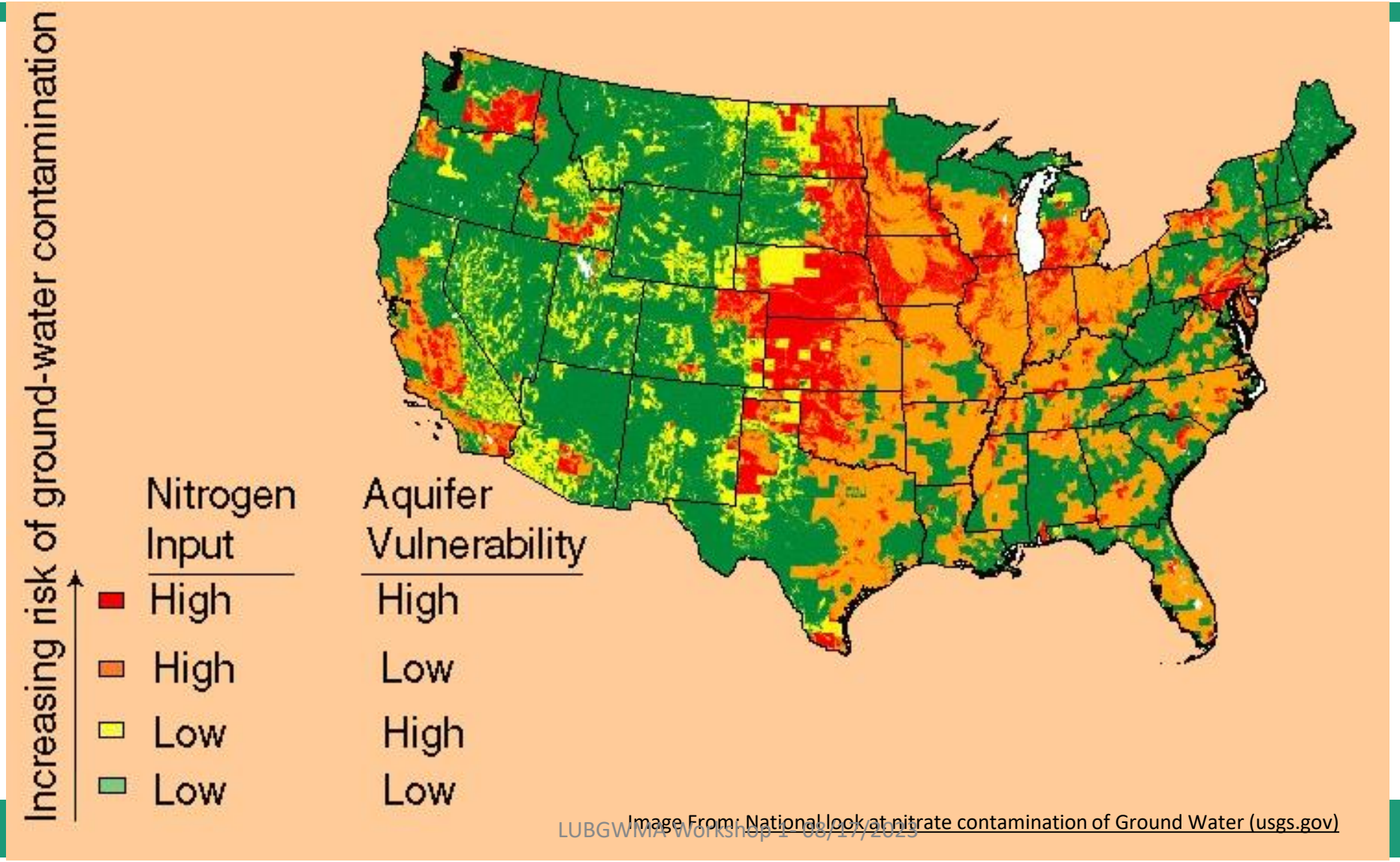


Image From: National look at nitrate contamination of Ground Water (usgs.gov)

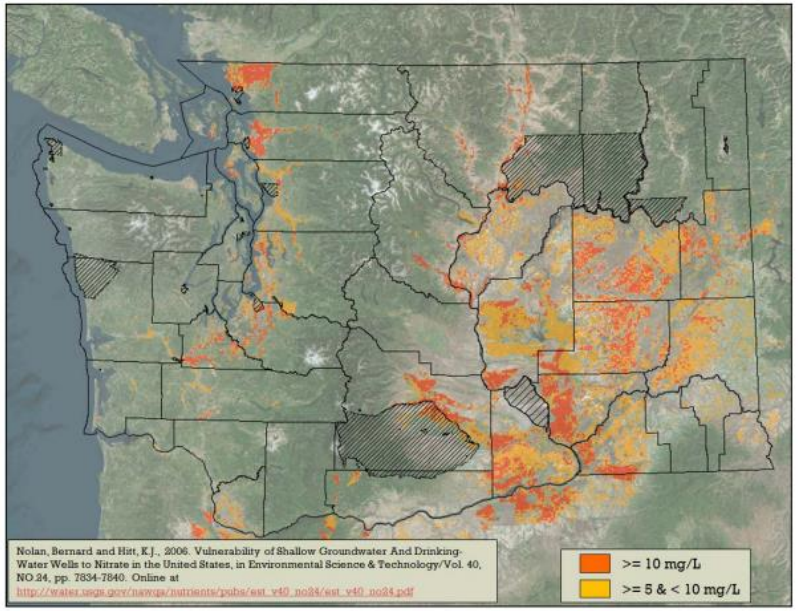
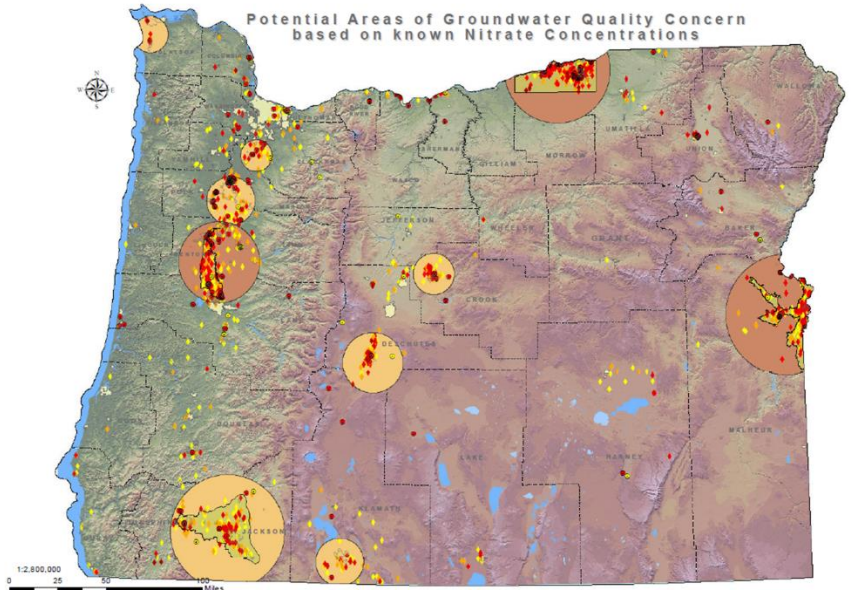


Figure 11: USGS nitrate prediction grid categories greater than or equal to: 5 mg/L Nitrate as N in shallow groundwater (extracted from Nolan, 2006).



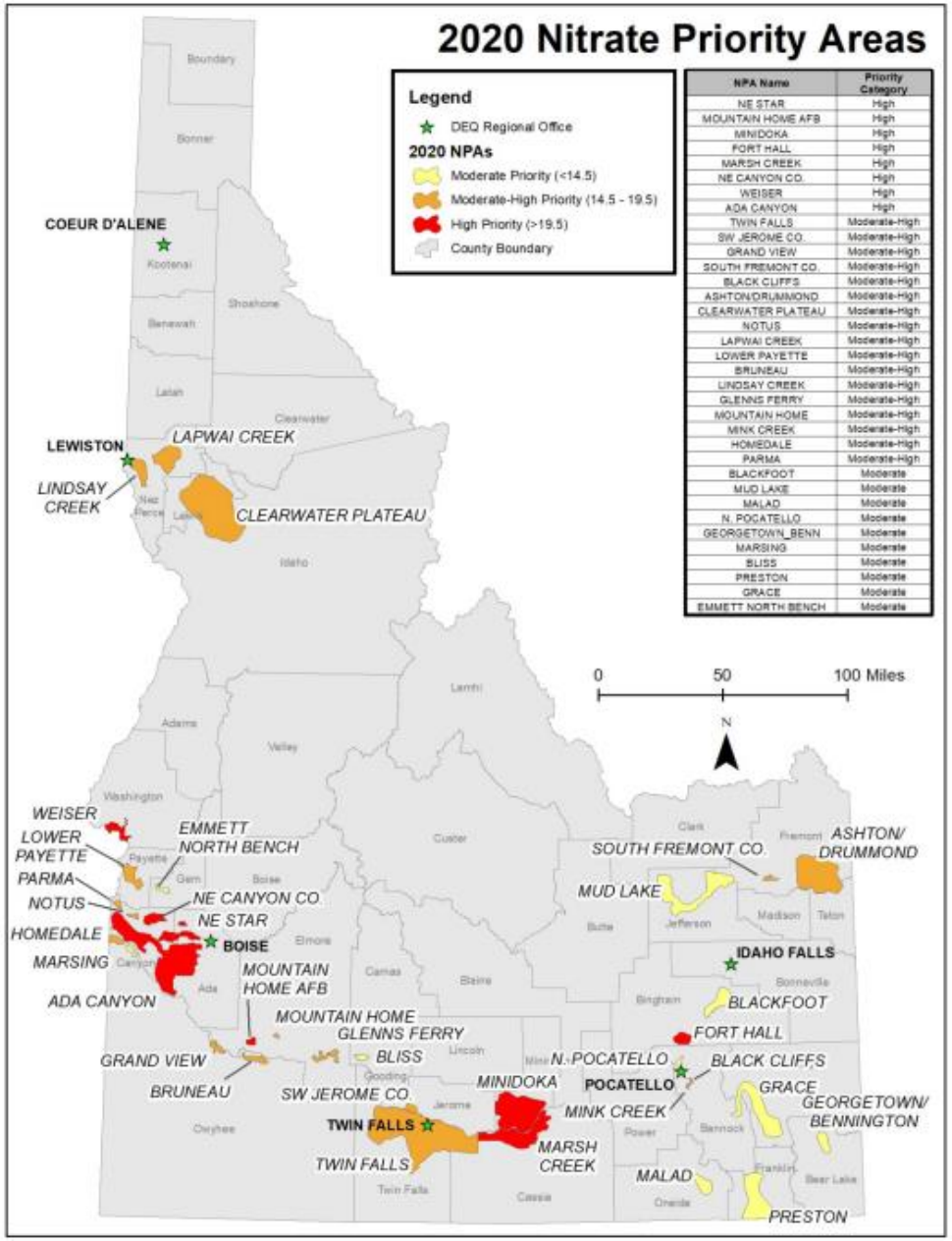


Figure 2-3
Nitrate Leaching Potential Rating of the Lower Umatilla Basin Groundwater Management Area
Second LUBGWMA Action Plan

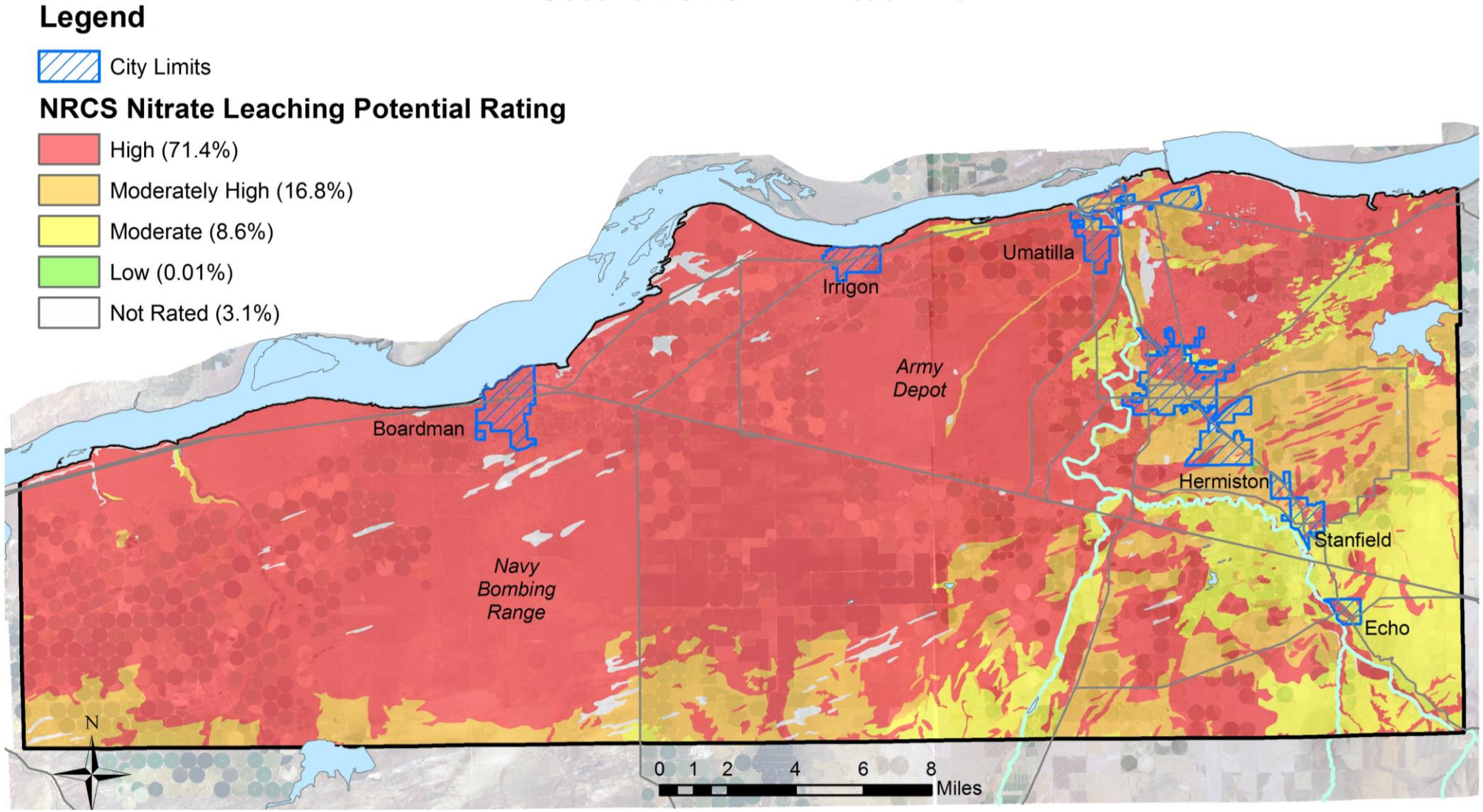
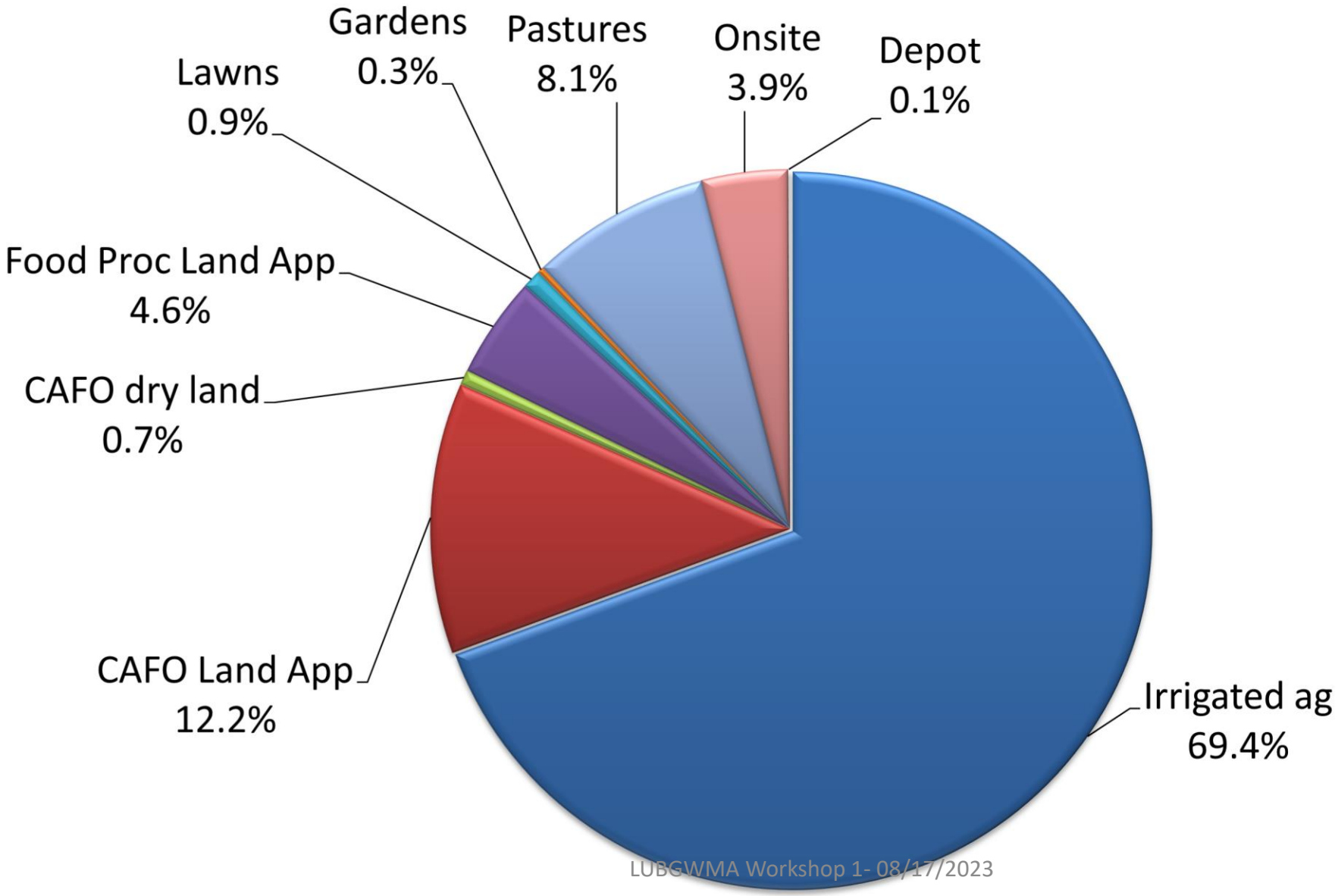


Figure 2-5
Estimation of Nitrogen Leached to Groundwater
Second LUBGWMA Action Plan



Wastewater Permits (Industrial and municipal)

- State permitting system for discharging wastewater to land.
- Requires:
  - monitoring soil moisture, residual nitrogen, crop uptake
  - tracking/reporting all nitrogen sources and adherence to crop-specific agronomic rates.
  - Continuous adjustment based on monitoring data

Large food processing operations:

1. Port of Morrow – 10,102 acres
2. Lamb Weston – 6,018 acres
3. JR Simplot - 4,415 acres – facility no longer food processing, water is low nitrogen

Smaller food processing operations:

1. Shearer's Foods – 301 acres - not operating
2. Olam West Producers – 120 acres
3. General permit holders (very small operations)
   i. JSH Farms
   ii. Follett's Meat Company
   iii. Starvation Ridge Farming

DEQ

Oregon Department of Agriculture

LUBGWMA

August 15, 2023

Rob Hibbs; Agricultural Engineer, MS

State Monitoring Specialist

Agricultural Water Quality Program

OREGON DEPARTMENT OF AGRICULTURE

Food Safety and Animal Health

Market Access and Certification

OREGON
DEPARTMENT OF
AGRICULTURE

Plant Protection and Conservation

Natural Resource Program Area

OREGON
DEPARTMENT OF
AGRICULTURE

Natural Resource Program Area

Agriculture & Consumer Products – Regulate and educate on the sale and use of pesticides, fertilizers, and soil amendments

Water Quality – Compliance to prevent pollution and soil erosion from agricultural activities

Natural Resource Protection – Incorporate Oregon's land use laws, CAFO laws, and Right to Farm laws to sustain resources for future generations.

Confined Animal Feeding Operations (CAFO) – * concentrated feeding or holding of animals *

ODA Administers Oregon's Point-Source CAFO Program

in cooperation with DEQ

CAFO Program's mission is to protect Oregon's water quality by working with CAFO facilities to prevent discharges of animal wastes to surface and groundwater.

CAFO Program:

- Issues Oregon CAFO NDPES Permits
- Approves Permit Coverage; Reviews and approves plans and specifications
- Determines and Enforces Compliance of CAFO Rules

.

OREGON DEPARTMENT OF AGRICULTURE

CAFO – New Legislation: Senate Bill 85 2023

Nutrient Application Permit (NAP)

- *Required for exported Land Application of manure/litter/process wastewater*
- *NAP to include: application rate, nutrient source, placement, timing and volume of water per time*
- *Receivers of CAFO nutrients must also have a NAP, and this permit must be supplied to the CAFO*

Water Supply Plan

- *Required for new and renewing CAFO permits*
- *Must identify all sources of water to be used*
- *CAFO's that use stockwater must estimate Gallons/day using ODA consumption guidelines*
- *WRD may require water metering devices with quarterly water use data*

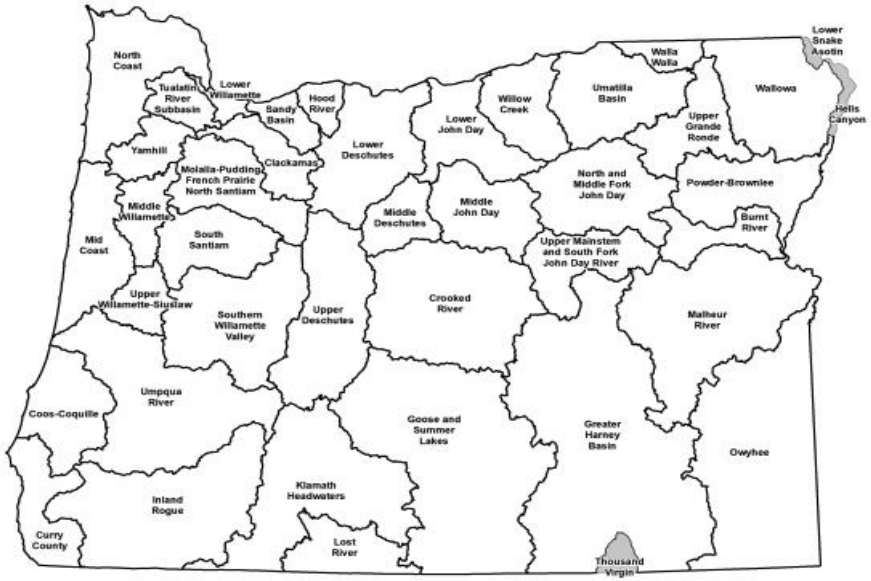
Stockwater Exemption

- *CAFO's utilizing more than 12,000 G/day requires registration/permit/ground water right certificate*

.

OREGON DEPARTMENT OF AGRICULTURE

ODA Water Quality Program (Non-Point Source)



- Ag Water Quality Area Plans
  - Responsible for developing plans and ensuring rule compliance to prevent and control water pollution on agricultural lands
  - 38 Management Areas across State
  - Historically focused on Surface Waters
  - More recent versions include GWMA sections where appropriate
  - 2024 versions for Willow Creek and Umatilla to include LUBGWMA specific detail, including expectations for irrigated Ag

ODA WQ Program

Regulatory Authority for Oregon Agriculture WQ Concerns

Streamside Vegetation Rule

At a minimum, agricultural landowners must comply with the streamside vegetation rule by allowing vegetation to establish and grow along:

- Year-round streams to provide shade, stabilize banks, and filter out pollutants from overland flows…*and*

- Seasonal streams to stabilize banks and filter out pollutants from overland flows.

ODA WQ Program

Regulatory Authority for Oregon Agriculture WQ Concerns

Waste Law ORS 468B.025

Waste Rule

Agricultural landowners must comply with the Waste Rule by not polluting ground or surface water, discharging wastes into waters of the state, or placing any wastes in a location where they are likely to enter waters of the state.

- Wastes include excess soil, manure, fertilizer, or other substances that can pollute water.
- Waters of the state can include ponds, groundwater, canals, ditches, and rivers.

ODA Water Quality Program Announces
2023 LUBGWMA Strategic Implementation Area (SIA)

SIA = Focused on-the-ground efforts to locally identify and collaborate on water quality issues

Local Partner is Morrow SWCD

OREGON
DEPARTMENT OF
AGRICULTURE

LUBGWMA Irrigated Ag SIA
Listen, Assist, Demonstrate, Verify

- ***Listen*** to what Irrigation Management practices are being utilized
- ***Demonstrate*** Irrigated Ag utilizing effective irrigation management for the Community
- ***Assist*** growers with Management Plans and obtaining management monitoring tools
- ***Verify*** the effectiveness of the Management Plans to limit leaching

ODA Expectations for LUBGWMA Irrigated Ag

1

Match Irrigation Application to Crop/Environmental Demand

2

Match Nutrient Application to Agronomic Demand

3

Maximize Field/Crop Profit by Application Timing and Limiting Inputs

LUBGWMA Agriculture:

Track:

- Sprinkler Type Inventory
- Crop Type Inventory
- Crop Rotations

To Develop:

- Best Management Practices
- Management Tools

> ODA WQ Funded Morrow SWCD to do inventory in 2024

ODA Contact Information

Rob Hibbs
rob.hibbs@oda.oregon.gov
971-719-1576

Thank You!

OREGON DEPARTMENT OF AGRICULTURE

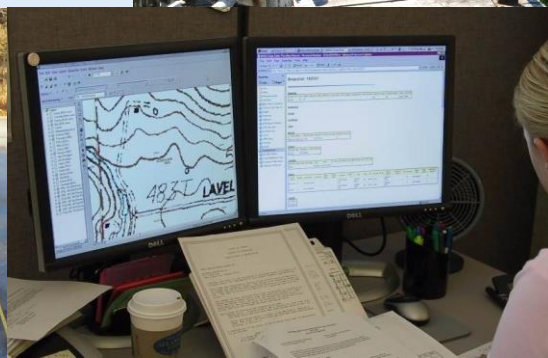
OREGON

WATER RESOURCES DEPARTMENT

OREGON WATER RESOURCES DEPARTMENT

Key Responsibilities

- Collecting, analyzing, and providing data
- Protecting public safety
- Distributing water under the system of prior appropriation
- Providing planning, technical assistance, and funding to address water supply needs
- Processing water rights transactions



OREGON WATER RESOURCES DEPARTMENT

Exempt Use Statutory Authority

- Under Oregon law, “all water within the state from all sources of water supply belongs to the public.”

Exempt Use - Statutory Authority

ORS 537.545

(1) Establishes the list of exempt groundwater uses

(2) Establishes the right of exempt groundwater uses

(3) Establishes the means of documenting the priority date for exempt groundwater uses

Exempt Use - Statutory Authority

ORS 537.545(1) – Exempt Groundwater Uses

- **Stock watering**
- **Lawns and non-commercial garden up to 1/2 acre**
- School lawns, grounds, and fields up to 10 acres in critical ground water areas
- **Single or group domestic purposes, not exceeding 15,000 gallons/day**
- Down-hole heat exchanges
- **Industrial or commercial uses, not to exceed 5,000 gallons/day**

Exempt Use - Statutory Authority

ORS 537.545(2) – Exempt Groundwater Uses

"The use of ground water for a use exempt under subsection (1) of this section, **to the extent that it is beneficial,** constitutes a right to appropriate ground water **equal to that established by a groundwater right certificate**…"

OREGON WATER RESOURCES DEPARTMENT

Exempt Use – Drilling a Well

Exempt Use – Drilling a Well

Communicate with a licensed driller for an estimate and plan for drilling

- Select a driller
  - Additional details can be found on OWRD's website under Well Construction and Compliance
- Select the site for the well
  - Minimum 5 ft distance from permanent structures
  - Minimum 50 ft from septic tanks or closed sewage or drain systems
  - Minimum 100 ft from sewage disposal areas (drain fields)

Exempt Use – Drilling a Well

Driller follows procedures and rules for new well

- Driller submits a start card 72 hrs before starting construction of the well
- Start card give proposed well construction plans including commencement date and seal date/time
- Well site meets location offsets as mentioned in previous slide and OAR 690-210
- Well construction follows rules in OAR 690-210

Exempt Use – Drilling a Well

Driller submits well report and exempt use map when well is finished

- Within 30 days of well construction completion a well report is submitted and include:
  - Exempt use map showing: Township, Range, Section, Quarter/Quarter, and tax lot. Also includes latitude and longitude
  - Well construction procedures
  - Well log
- Well requires an ID or Well ID Number

OREGON WATER RESOURCES DEPARTMENT

Exempt Use – Drilling a Well

Landowner maintains well to prevent site from being wasteful or defective

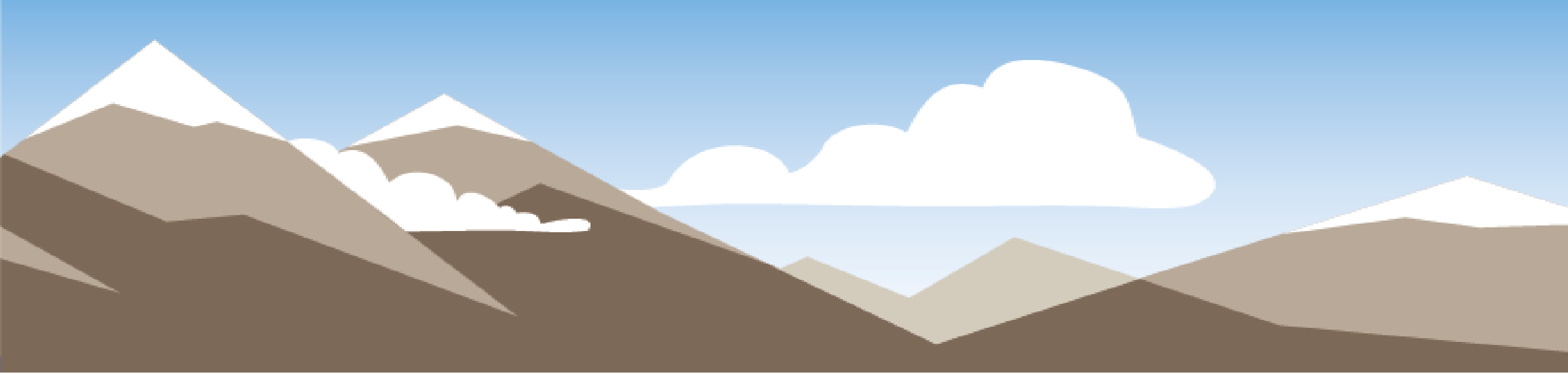
- Well cap - Periodically check the sanitary seal/well cap on the well to ensure a tight fit. Well cap should be vented and clear of debris.
- Well casing - Minimum construction requirement is 1 ft above land surface.
- Well shelter - Do not store hazardous materials or fertilizer/pesticides near the well or within the pump house. Do not use a pump house to shelter animals.

OREGON WATER RESOURCES DEPARTMENT

Summary

Exempt domestic use of groundwater:

- No application required
- No permit or certificate issued
- Constitute a water right with priority date
- Must be beneficially used without waste
- Regulation is consistent with other water rights
- No review of water availability
- Must comply with well construction requirements



OREGON
WATER RESOURCES
DEPARTMENT

Thank you!

Contact Information:

Chris Kowitz – North Central Region Manager
(541) 278-5456
chris.c.kowitz@water.oregon.gov

Nitrate and health

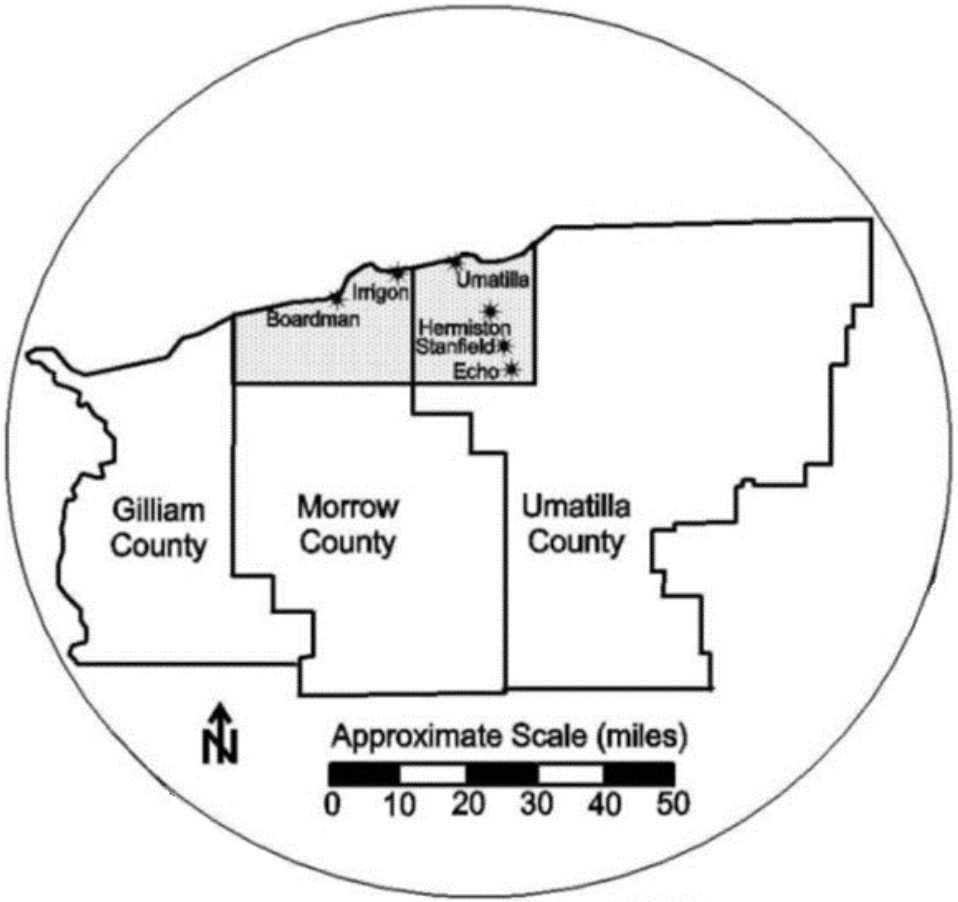
- Nitrate levels up to 10mg/L are »SAFE for all people to use and drink.
- Nitrate levels above 10mg/L are:
  » NOT SAFE: for anyone to drink or cook with.
  » SAFE: for other domestic uses, including bathing, washing food, dishes, laundry, and garden irrigation, so long as the water is not being swallowed.

High nitrate in drinking water:

- Reduces ability of red blood cells to carry oxygen
- Greatest concern = bottle fed babies and possible miscarriage risks
- Long term exposure = respiratory, thyroid, some cancers, other conditions

LUBGWMA Background

Estimated 12,000 household members served by ~ 4500 domestic wells.



- Sources
- Health action a focus of active concern starting in 2020
- Local/state public health interventions start 2022

LUBGWMA Public Health Project Goal

Ensure all residents who rely on nitrate-contaminated domestic wells in the LUBGWMA have immediate access to safe water (less than 10 milligrams/liter of nitrate) while awaiting longer-term solutions.

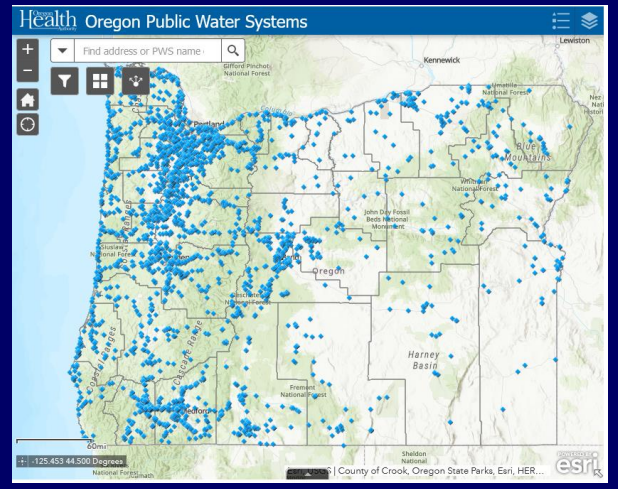
- Communications & Outreach
- Water testing
- Water provisioning
- In-home treatment systems, where effective

Oregon Health Authority (OHA)-Public Health Division (PHD)

Oregon Health Authority (OHA)
Public Health Division (PHD)

Drinking Water Services

- Administrative Unit
- Data Management, Compliance, and Enforcement Unit (DMCE)
- Technical Services Unit (TS)
- Protection, Planning, and Certification Unit (PPC)



Drinking Water Services (DWS)

- Administers and enforces state and federal safe drinking water quality standards for 3,600 public water systems (PWS) in the state
- Prevents contamination of public drinking water systems by:
  - Protecting drinking water sources (Source Water Protection)
    - Joint effort between DEQ and OHA-DWS
    - Source Water Assessments for PWSs
    - Participate in State GWMA meetings and provide assistance as needed
  - Assuring that PWSs meet standards for design, construction, and operation
  - Inspecting PWSs and assuring that identified deficiencies are corrected
  - Providing technical assistance to public water suppliers
  - Providing financial assistance to construct safe drinking water infrastructure; and certifying and training water system operators
- DWS does not have oversight or regulatory authority over domestic wells
  - We do assist and answer questions from domestic well users

Morrow County SWCD

Kevin Payne

State Agency's Responsibilities in Bringing Solutions to LUBGWMA

- **Laura Gleim**

  Oregon Department of Environmental Quality
- **Rob Hibbs**

  Oregon Department of Agriculture
- **Chris . C. Kowitz**

  Oregon Water Resources Department
- **Russell A. Kazmierczak and Gabriela Goldfarb**

  Oregon Health Authority
- **Kevin Payne**

  Morrow County Soil Water Conservation District

9:00 am – 9:45 am

Success Stories, Solutions, and Obstacles from Elsewhere

- **Matt Kohlbecker**
  GSI Water Solutions
- **JR Cook**
  Northeast Oregon Water Association
- **Gregg Jones**
  HDR

9:45 am – 10:45 am

Managed Aquifer Recharge Success Stories

LUBGWMA Workshop No. 1

Matt Kohlbecker, RG

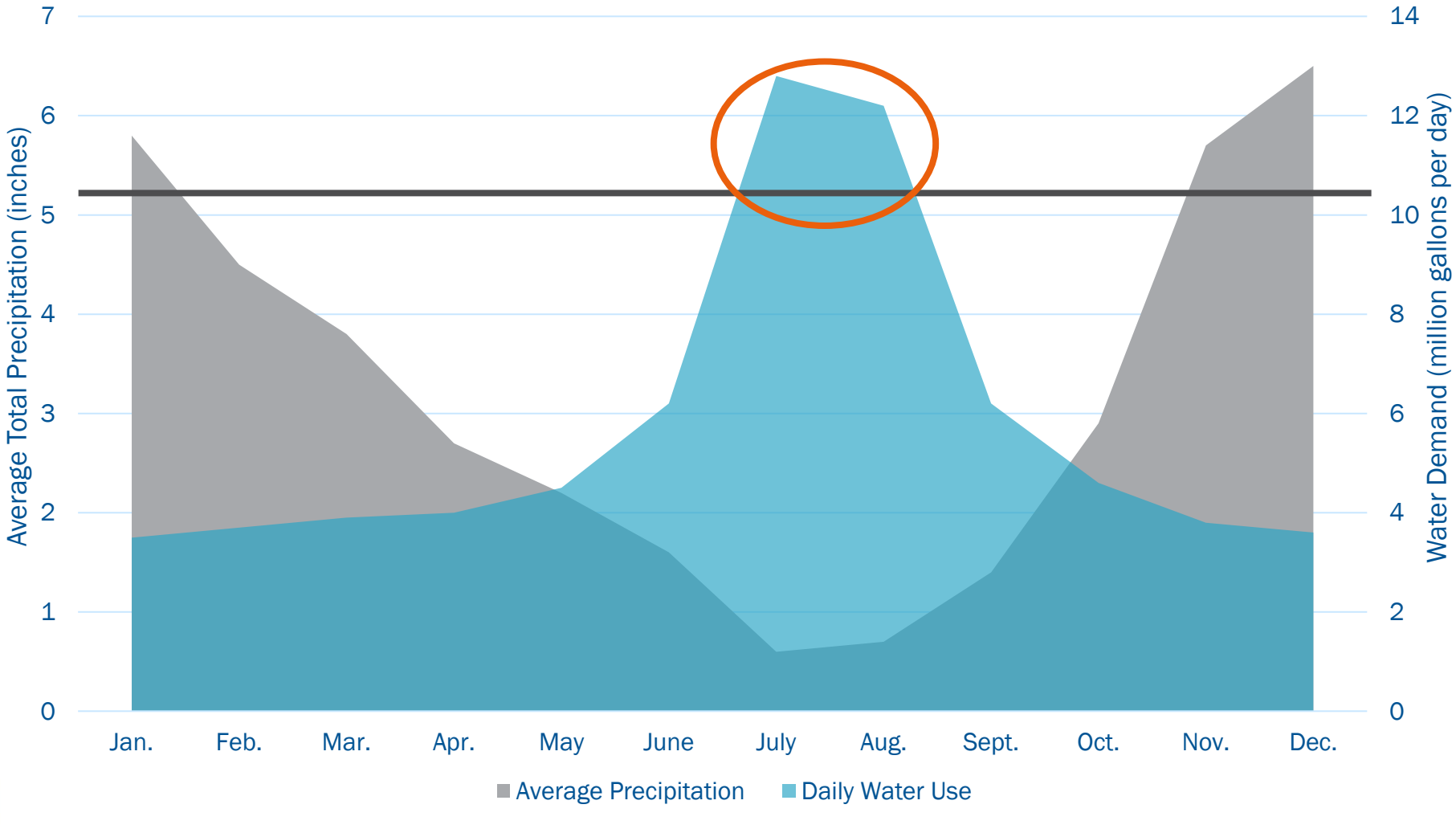
August 17, 2023

GSI Water Solutions, Inc.

Outline

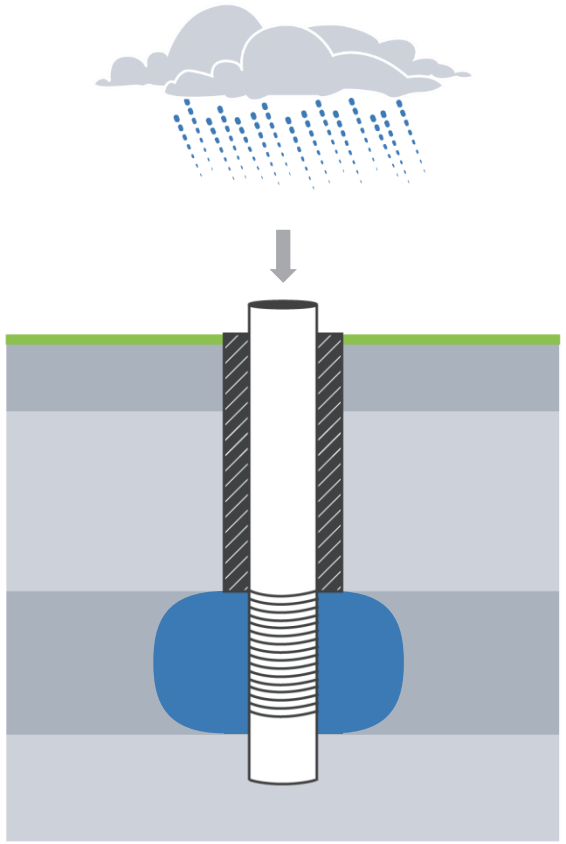
- Introduction to MAR
- Example project
- Stakeholders, involved agencies, and strategies for success

The Challenge: Water Demand is Highest When Rainfall is Lowest

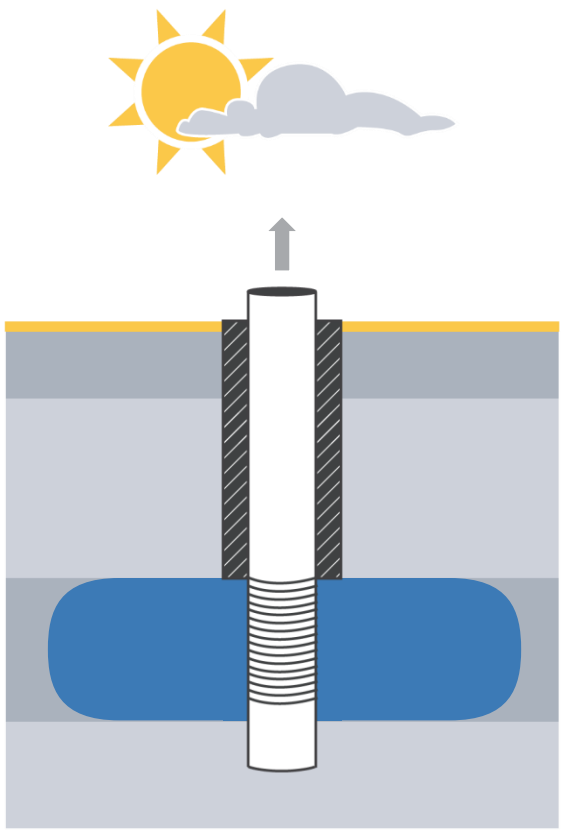


MAR Utilizes the Aquifer as an Underground Reservoir

INJECTION (WINTER)

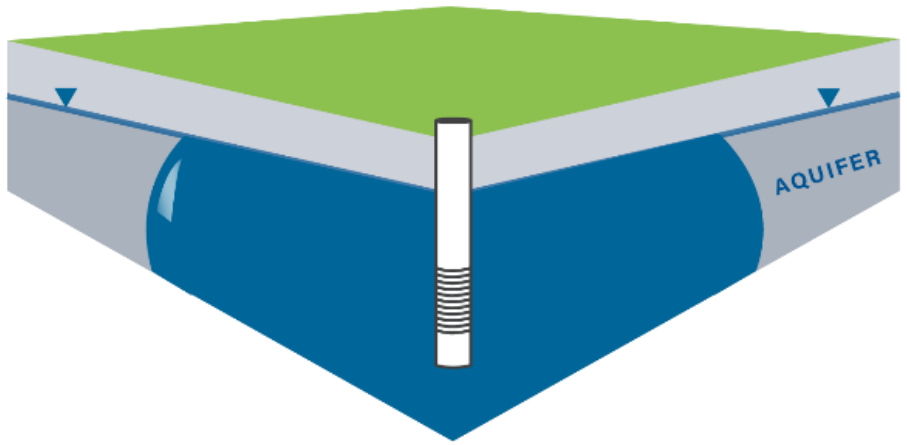


RECOVERY (SUMMER)



MAR Project Scale

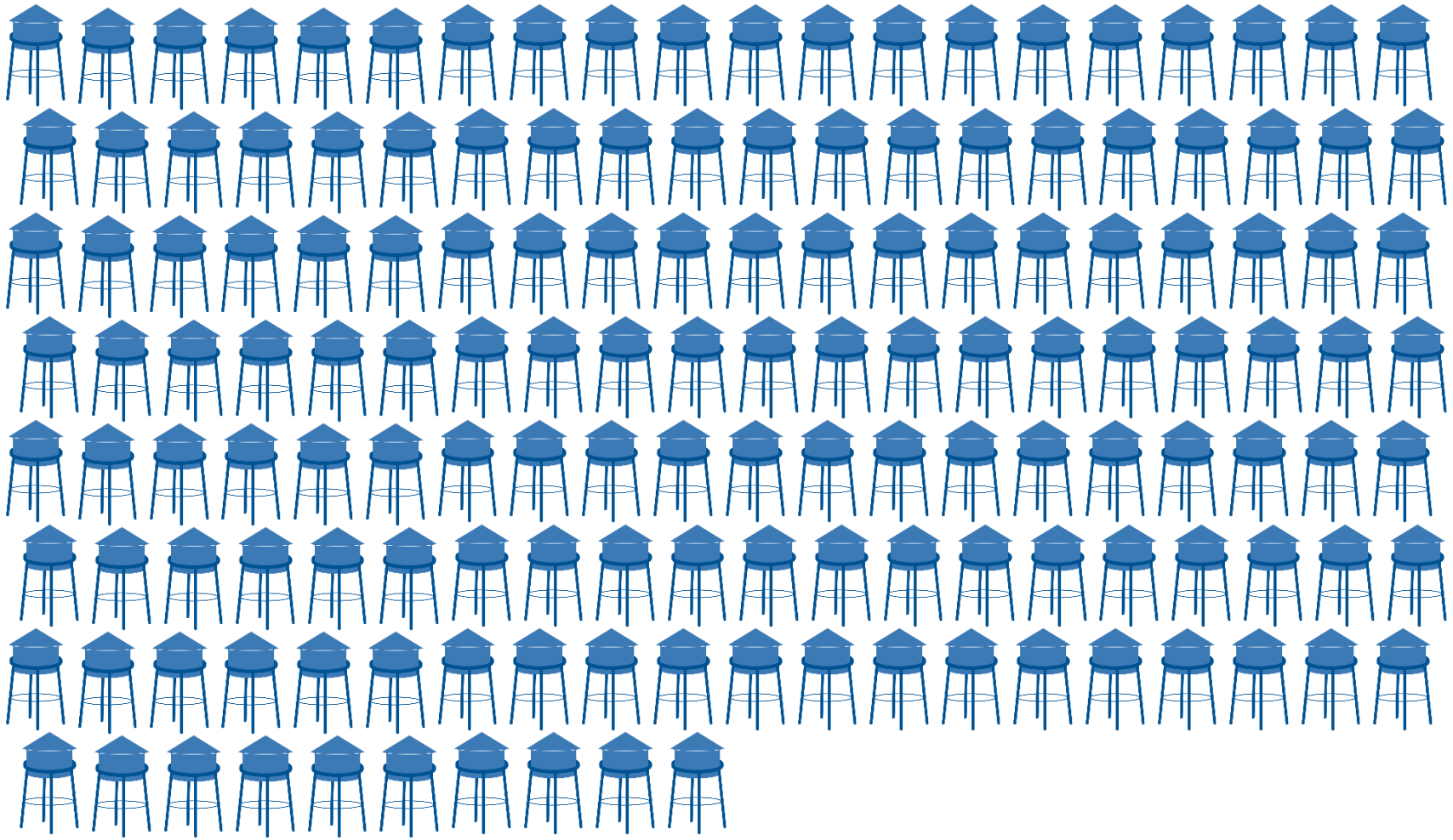
ASR = 150 MG



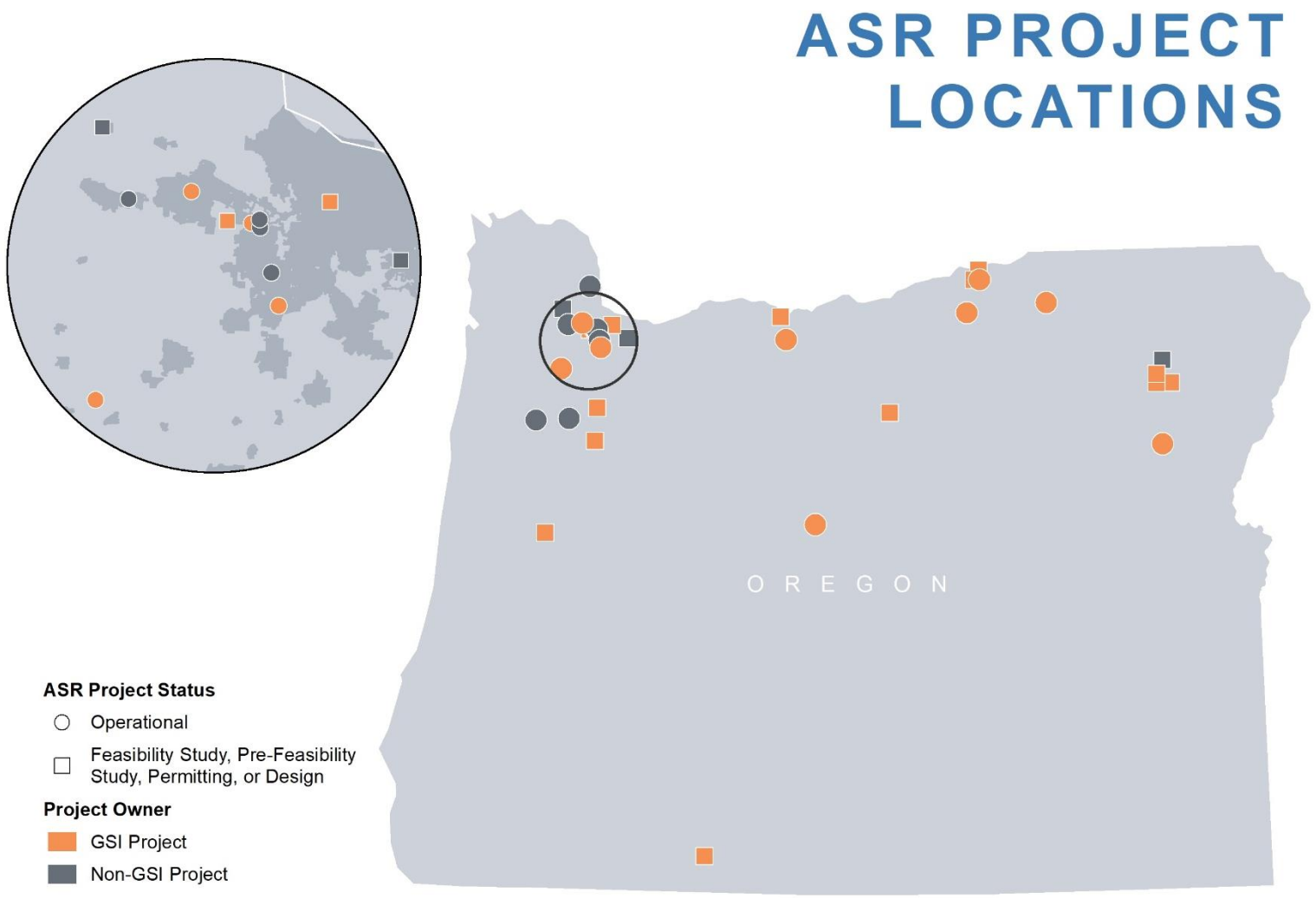
TOWER = 1 MG

Note: ASR storage capacity depends on aquifer conditions and other factors. GSI recommends a target storage capacity of at least 150 MG for municipal projects.

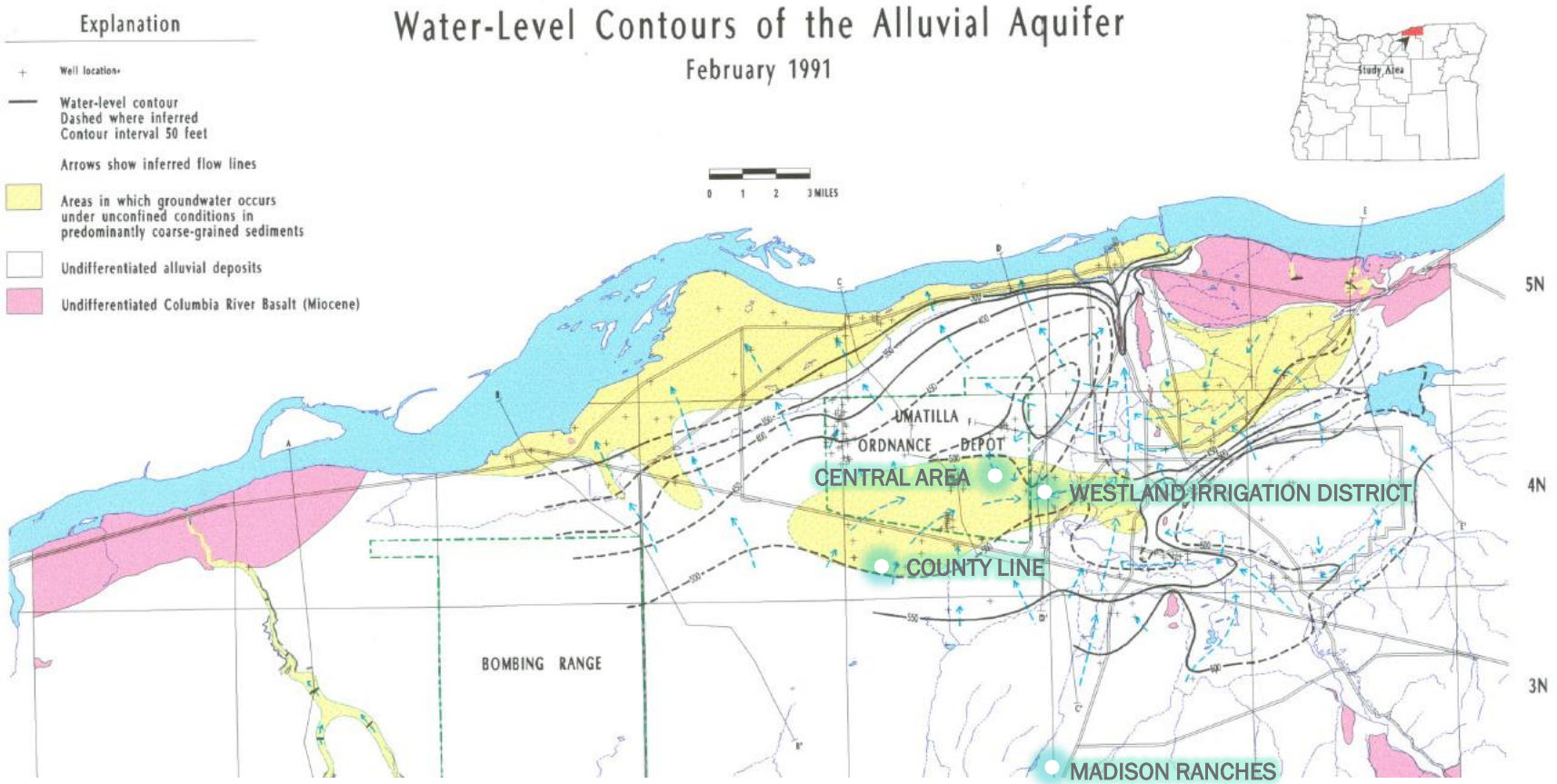
1 ASR Well = 150 Storage Towers



MAR Projects in Oregon

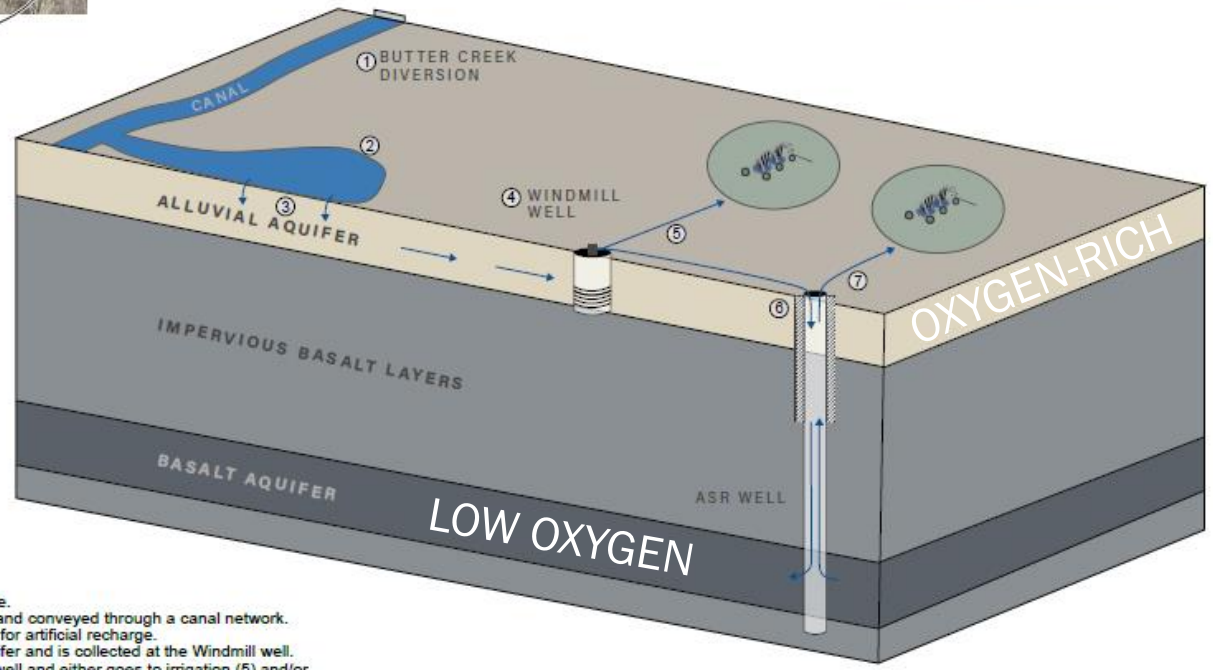


Project Examples



SOURCE: OWRD (1995)

Project Example: Madison Farms AR/ASR



NOTES

1. Well diagram conceptual, not to scale.
2. Water is diverted from Butter Creek and conveyed through a canal network.
3. Water is applied to infiltration basins for artificial recharge.
4. Water infiltrates into the shallow aquifer and is collected at the Windmill well.
5. Water is pumped from the Windmill well and either goes to irrigation (5) and/or the ASR well (6), depending on irrigation needs.
6. Water is recovered from the ASR well and used for irrigation.

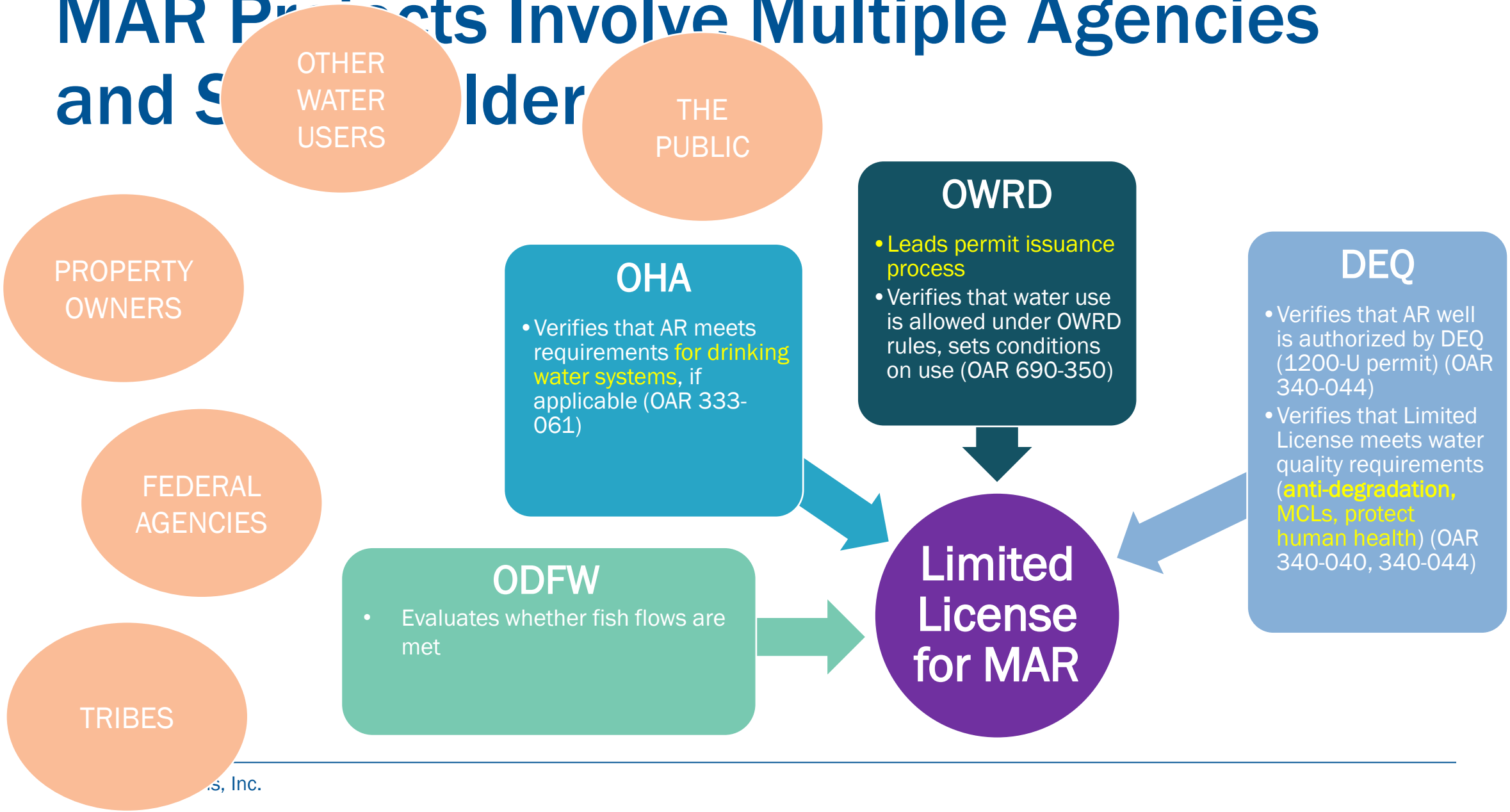
Nitrate in Source and Recovered Water

Site	Madison	Madison
Sample	[3]Source Water	Recovered Water
Date	3/24/2010	3/22/2010
Meter NO_3 (mg/L)	N/A	1.14
Lab NO_3 (mg/L)	5.63	<0.02
∂15 N (per mil)	+5.10[1]	+20.5[1]

Denitrification

- Reduced nitrate concentrations exceed reductions that can be explained by simple mixing between source water and groundwater alone
- Caused by reactions with organic matter, or inorganic reactions involving Fe^{2+}, Mn^{2+}, or sulfide
- Nitrogen isotopes indicate denitrification is occurring in the aquifer

MAR Projects Involve Multiple Agencies and Stakeholders



Strategies for Success

- Pre-Application Conference
- Communication throughout the application process
- Relationships

NORTHEAST OREGON WATER ASSOCIATION

LIFE DEPENDS ON WATER, WE DEPEND ON YOU.

The NOWA Director

- Planner then Assistant Planning Director at Umatilla County from 2002-2009
- Staffed the process and authored the Umatilla Sub-Basin 2050 Water Management Plan ("2050 Plan")
- City Manager of Umatilla from 2009-2010
- On formation board of the Umatilla Basin Water Coalition and Umatilla Basin Water Commission
- Served as Executive Director of the Umatilla Basin Water Commission from 2011-2013
- Served on the Columbia River-Umatilla Solutions Task Force and Governor's Drought Task Force
- Founded NOWA in 2013 and was hired to serve as NOWA's director the same year (2013-Current)
- Assisted in Creation of the Mid-Columbia Water Commission and serve as contract director and water rights administrator
- Graduate of Pendleton High School and committed to the success and sustainability of the region

Compressed Basin Timeline

- 1855 Treaty with the Walla Walla, Cayuse and Umatilla Tribes (Note: CTUIR Water Rights Claim is still NOT SETTLED)
- 1916 Adjudicated decree of water rights to use waters of Umatilla River and its tributaries
- 1958 First reports of water table decline in Butter Creek area
- 1976 OWRD designates Butter Creek a Critical Groundwater Area (remanded until 1986)
- 1976 Critical Groundwater Area designated by OWRD for Ordnance Basalt and Gravel
- 1977 Lost Lake/Depot well owners initiated project to artificially recharge shallow gravel aquifer using existing canal system
- 1986 Critical Groundwater Area designated by OWRD for Buttercreek Basalt (Governor Atiyeh forms first Groundwater Task Force in Region, great plan but not memorialized implementation)
- 1988 Umatilla Basin Project authorized and funded by Congress -- allows irrigators to exchange Umatilla River water for Columbia River water
- 1990 DEQ declares 352,000 acres in Umatilla and Morrow counties as a groundwater management area (GWMA) due to nitrate contamination (Note: groundwater quality designation uses different data set than OWRD data set regarding who is connected to who. Those data sets continue to be segregated today)
- 1991 Critical Groundwater Area designated by OWRD for Stage Gulch Basalt
- 2004-2008 Development of the Umatilla Sub-Basin 2050 Water Management Plan
- 2008 Oregon Legislature passes SB 1069 authorizing $750 K to complete a feasibility study of the Umatilla Basin Aquifer Restoration Project (A milestone in OR water planning efforts – OR and AK w/o plan but still no clarity on how to memorialize implementation)
- 2009 Oregon legislature passes HB 3369 authorizing $2.5 million in grants and loan funding (a milestone in state water development efforts but still no emphasis on implementing regional water sustainability efforts and implementation. Just a band aid)
- 2010 - Umatilla Basin Water Commission (UBWC) forms to coordinate the implementation of the Umatilla Basin Aquifer Restoration Project and address basin wide needs
- March 2011 – Stage I of Umatilla Basin Aquifer Restoration Project Completed
- August 2013 – UBWC completes work authorized by IGA and dissolves due to finding that recharge can't fix everything, CRUST Declaration of Cooperation Signed
- August 2013 - Northeast Oregon Water Association (NOWA) forms to continue water development projects under a coordinated, comprehensive effort
- 2013 – NOWA unveils "*new*" water supply plan that takes pressures off of fish rearing tributaries of the Columbia River, improves aquifer conditions and builds the local economy (legislation to memorialize implementation and accountability from the state fails)
- 2015 – Oregon legislature approves $11 million in funding for regional Columbia River water supply projects
- 2015 – NOWA begins to implement the 2013 plan without structural memorialization

The NOWA Effort (A results-based approach and what is success?)

- NOWA formed after multiple different attempts at institutional structure failed or came up short, but informed needs (OWC,UBC, UBWC)
- Without the 2050 Plan, local leadership & advocacy, and local institutional capacity
  & resources, the effort would have fallen flat multiple times
  - Legislators and Agencies have short memories
- Following a model of Vision, Time, Incremental Gains and Patience (It took 50 years to get to this point, we are not going to fix it over night)

Deliverable and Vision

- Deliverable: Gradual recovery of all or most of the alluvial and basalt AQUIFERS to ensure a resilient, sustainable future for the Mid-C
- Vision:
  - Deficit reduction (Water supply to the irreplaceable land base and "do no harm")
  - Protect savings and ensure all beneficiaries pay their fair share of sustainability
  - Use data and testing to ground truth models (easiest way to ground truth a model is by adding water to the aquifer or "bucking the TREND")
  - Use data and technology to help mother nature recover and sustain faster than she can do on her own (recharge, re-use, exchange)

THE PROJECTS (Remember it took 50 years to get here)

2015-2023+: Water rights and infrastructure

- Facilitates economic benefit and investment base
- Facilitates environmental benefit
- Facilitates social benefit if protections are established to prevent speculation and splinter efforts

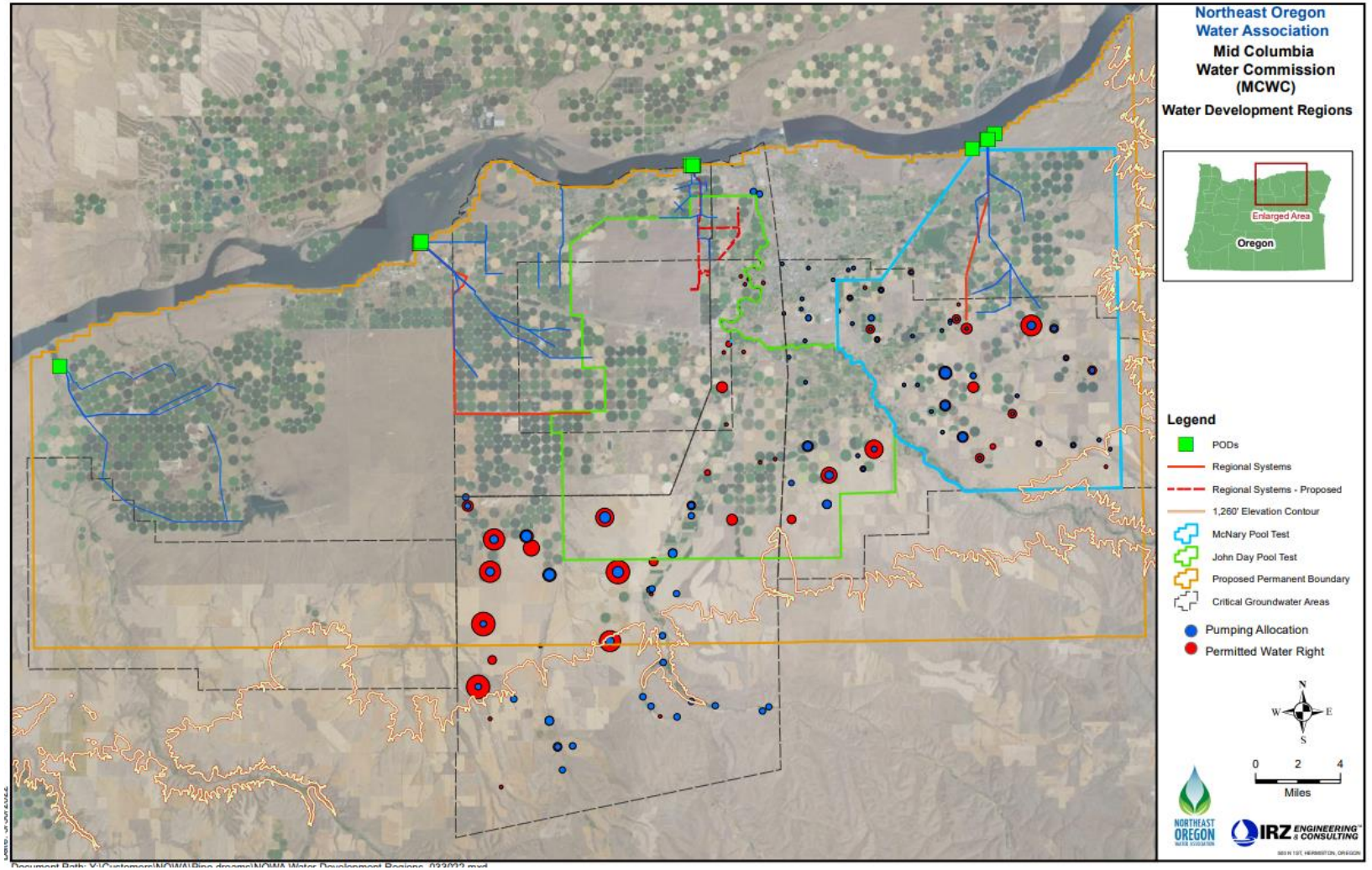
7 Years for 7 Generations:

A) 150,000 AF of certificated mitigated water rights through a Permanent Mitigation Program and

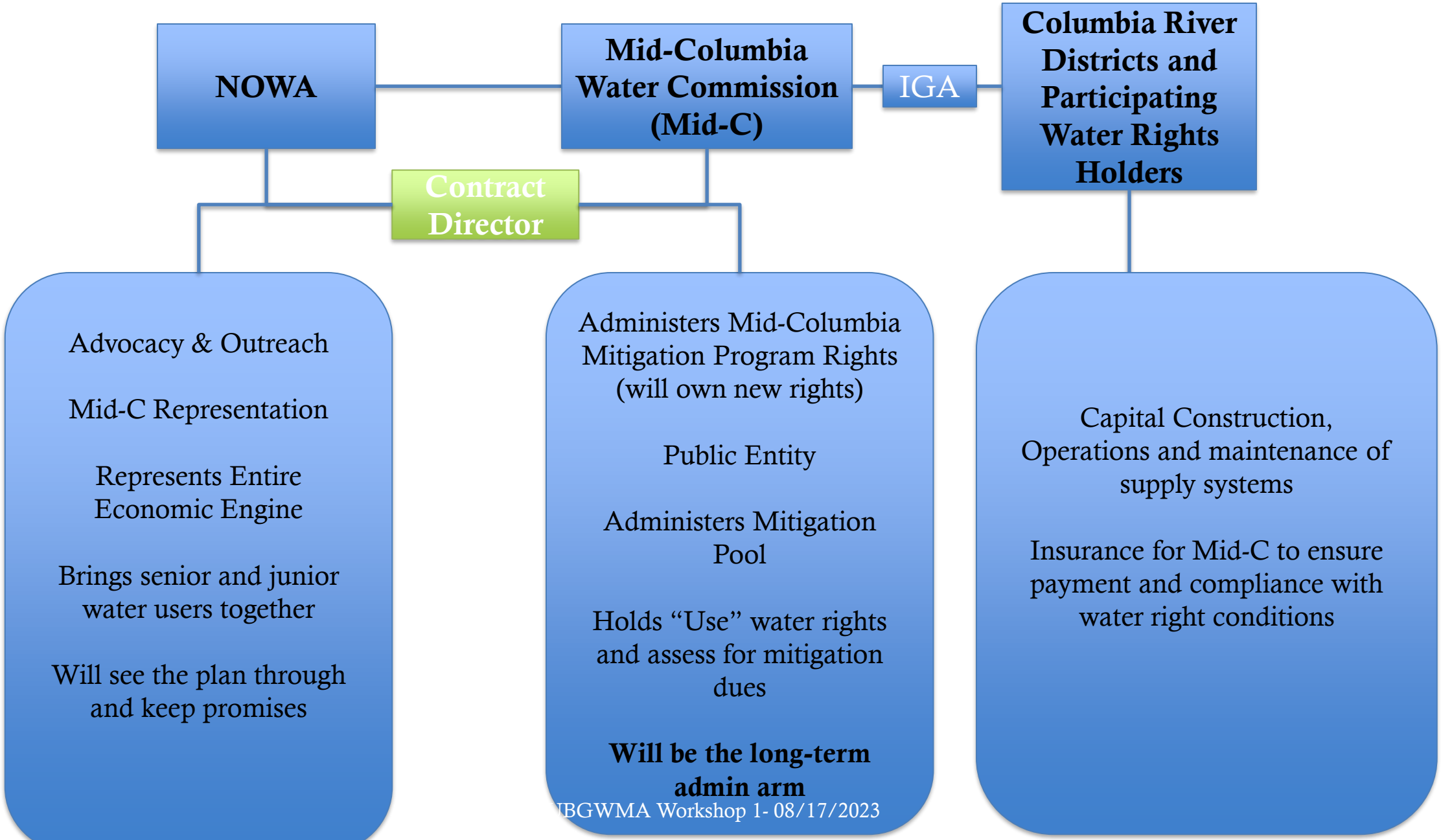
B)Basalt Relief Account and Legal Protections

- This is the true social benefit
- This component is most likely critical to the potable water discussion you are about to have

The Final Regional Boundary (Managing Expectations is Challenging But Necessary)



*Over $1.1 million ANNUALLY to administer this program



Promises NOWA Made and Remains Committed too:

- Private Business will Pay its fair share (We didn't mean ag only)
  - The first three projects (not counting time value of money) breakdown to the following
    - East and West costs = $94 Million ($11 million public/$83 million private)
    - Ordnance = $42 Million ($6 million public/ $36 million private/non-state or federal)
    - 12% public/88% private investment
    - **Over $250 million invested and over $130 million in non-federal in-kind match WASTED**
- Projects will facilitate measurable economic return
  - Ag will always be our economic base amounts to over $1 Billion in state and local returns
  - Over $600 million in new plant investments in the last year alone
- Projects will facilitate tangible environmental and public benefit (note for discussion here)
  - Basalt Savings, groundwater recovery and Banking
  - Fish Screens
  - C. Basin Mitigation/fishery enhancement
  - Support CTUIR tribal water rights settlement

All of this is coordinated at the local level
There is NO structural foundation if
NOWA dissolves. LET THIS SINK IN!

What it Took

- **TRUST**
- Took County leadership to say, “NO MORE regulating to the last drop, lets fix this.”
- Took State (executive and legislative) leadership to quit pointing blame and commit to meeting in the middle and creating a results-based agenda
- Took Local leadership, committed staff and over a decade of reliable funding/capacity and other resources to weather the ebbs and flows and continue to fight for a solution
- Took data developed for a purpose (what are we studying for and what quality of data) and an understanding that there is no silver bullet but that each region will have different opportunities and constraints
- Took identifying a result and develop a results based agenda to achieve it
- Its still a fight everyday
  - No Memorialized direction (WA has found a way)
  - No formal oversight to agencies to help solve the problem, not just regulate
  - Continued roll over of staff and “interest groups” continues to lead to more process not progress
  - Continued changes in landownership and understanding at the local level

Spinning Wheels or Full Speed Ahead

- **Water Quantity**
  - Have a plan and trust*
  - Started with Ag but Ag is not the only beneficiary
  - Said “no more” to regulating to the last drop and said lets fix this
  - No silver bullet but targeted results based approach using science
  - Local capacity and leadership from residents and results organizations to fight through the ebbs and make full use of the flows
- **Water Quality**
  - Have a plan but is there trust?
  - Where do you want to start (What are you trying to accomplish)?
  - Are the parties willing to commit to “due no harm” and focus on solutions?
  - Is this a 352,000 acre silver bullet or multiple solutions to multiple aquifers/issues
  - Who will lead?

NORTHEAST OREGON WATER ASSOCIATION

Contact Information

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EMAIL: JRCOOK@NORTHEASTOREGONWATER.ORG

WEB: NORTHEASTOREGONWATER.ORG (Under Construction but updates coming soon)

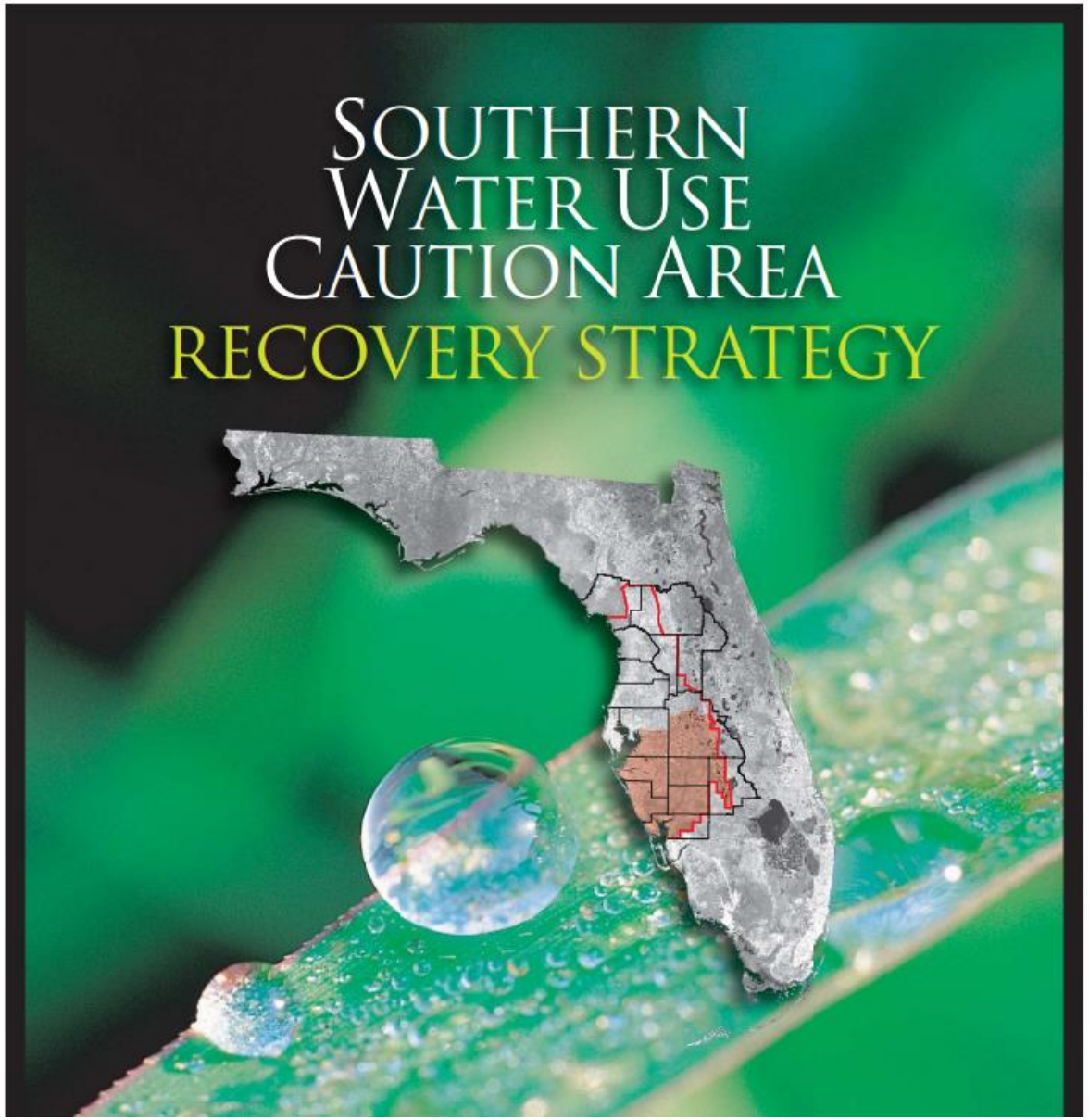
Success Stories

Southern Water Use Caution Area - SW Florida
Nitrate Contamination of Springs - NW Florida

Gregg Jones, PG, PhD

08/17/23

Southern Water Use Caution Area (SWUCA)



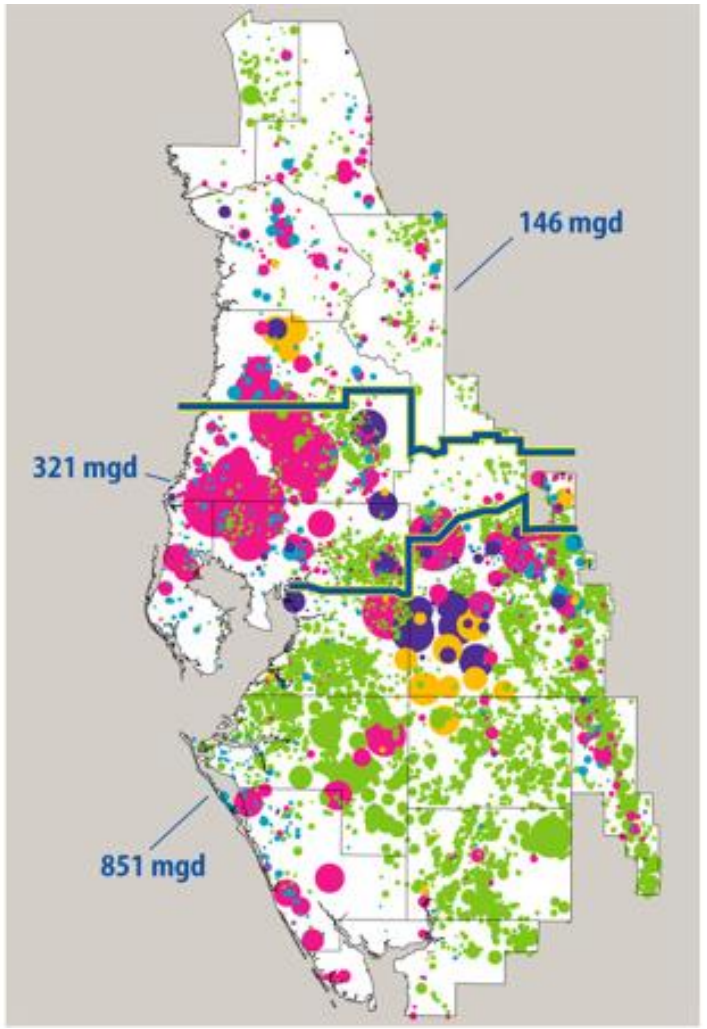
Southern Water Use Caution Area

- Encompasses all or part of 8 counties
- Southwest Florida Water Management District has jurisdiction.
- Overdevelopment of groundwater resulted in extreme water resource impacts.
- Impacts were violations of state environmental laws so mitigation of impacts was required.

Groundwater Withdrawals vs Safe Yield

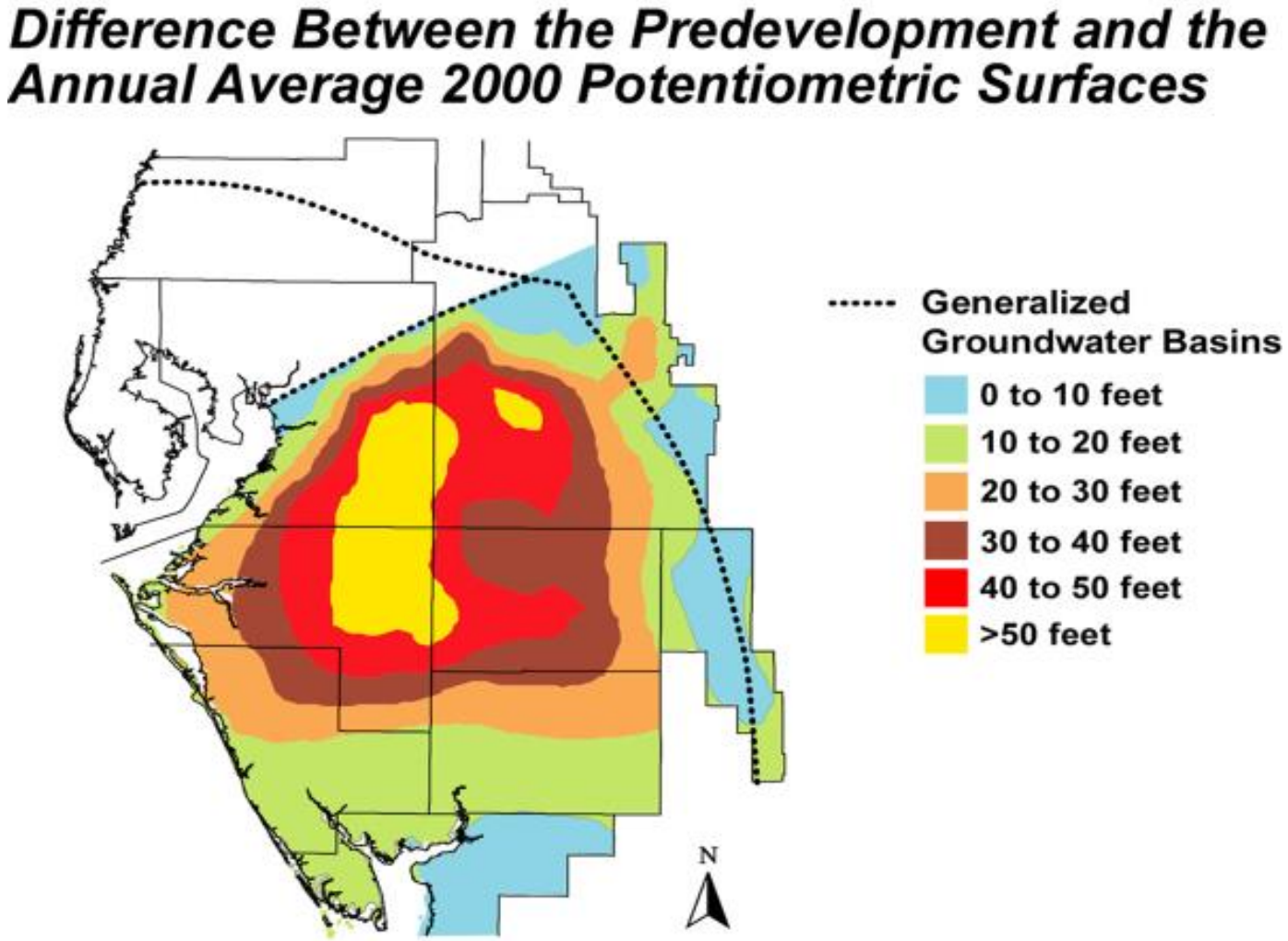
Groundwater Pumping = 850 mgd

Safe Yield = 450 mgd

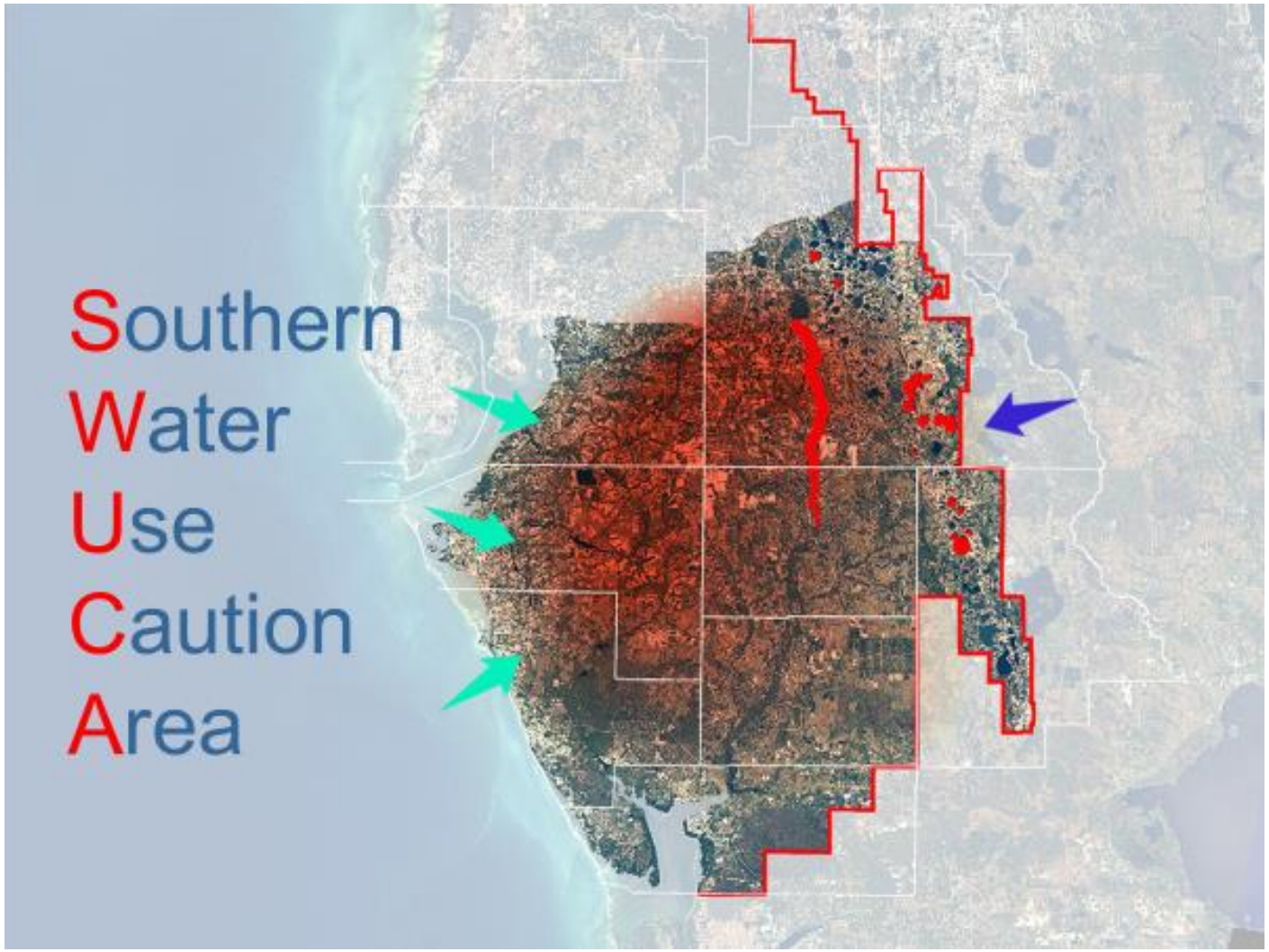


Groundwater-Level Declines

- Exceeded 50 ft



Environmental Impacts



Kissengen Springs

1945

1995

Water Resource Impacts

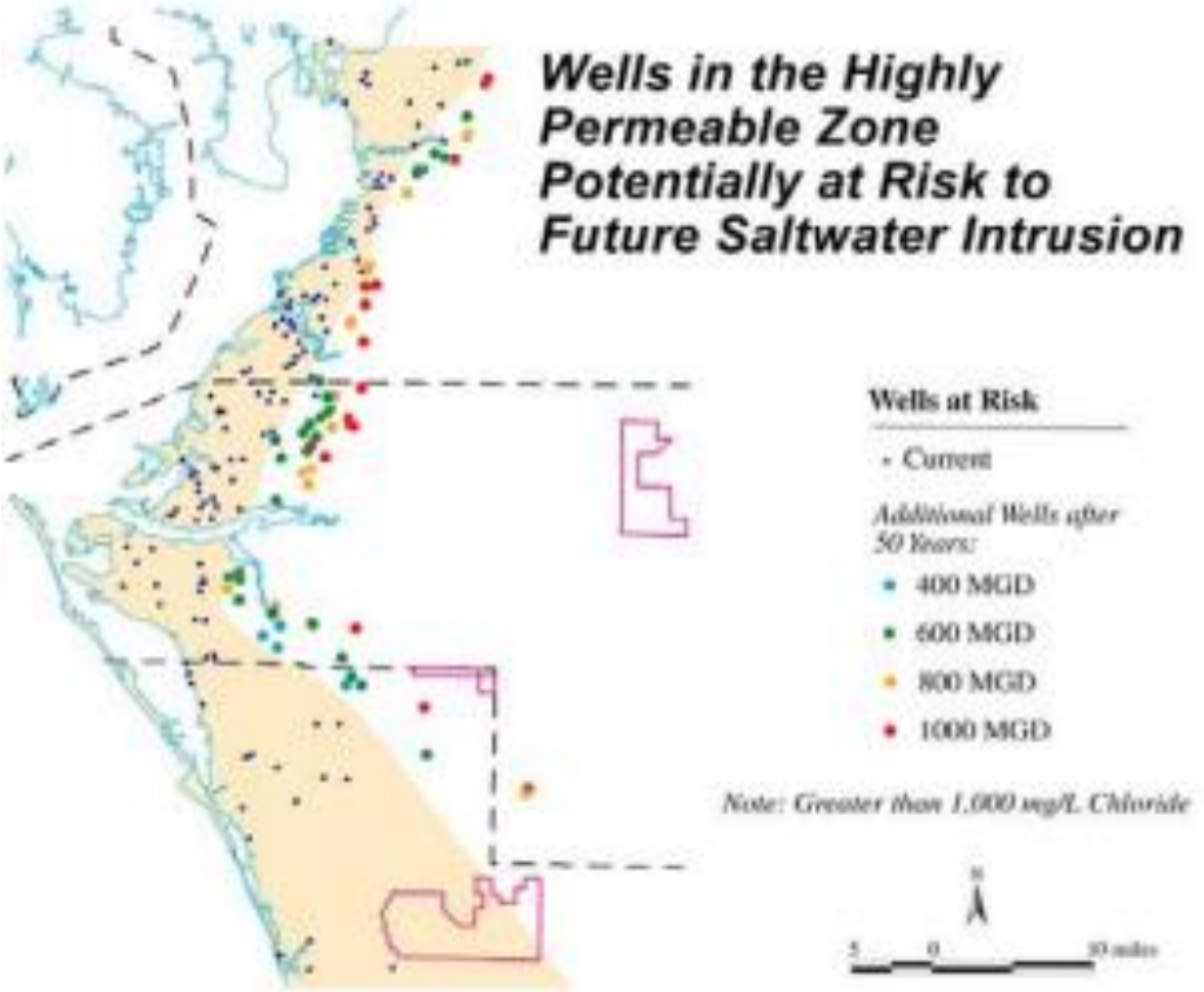
- Rivers became Losing Steams

Water Resource Impacts

- Lake-Level Declines

Water Resource Impacts

- Wells Lost to Saltwater Intrusion



Attempts to Mitigate Water Resource Impacts

SWUCA 1

- Regulatory Strategy
  - Complicated plan to reduce the permitted quantities of the thousands of groundwater users by a total of 300 mgd.
- 27 different entities challenged the plan.
- Water War! The challenge process took 5 years and the estimated cost of litigation was over $10 million.
- Hearing Officer Ruling:
  - The District’s science was valid and the required cutbacks were justified due to significant harm to water resources.
  - The cutbacks could not be put into place because the health, safety, and economics of users were too severely impacted.

Attempts to Mitigate Water Resource Impacts

SWUCA 2

- Multipronged Strategy to Reduce Groundwater Use while Protecting Users
  - The District put together a group of stakeholders and met with them monthly for over 2 years to reach consensus on solutions.
    - Agriculture
    - Phosphate Mining
    - Public Water Utilities
    - Developers
    - Golf Courses
    - Environmental Groups

Two Phases of SWUCA

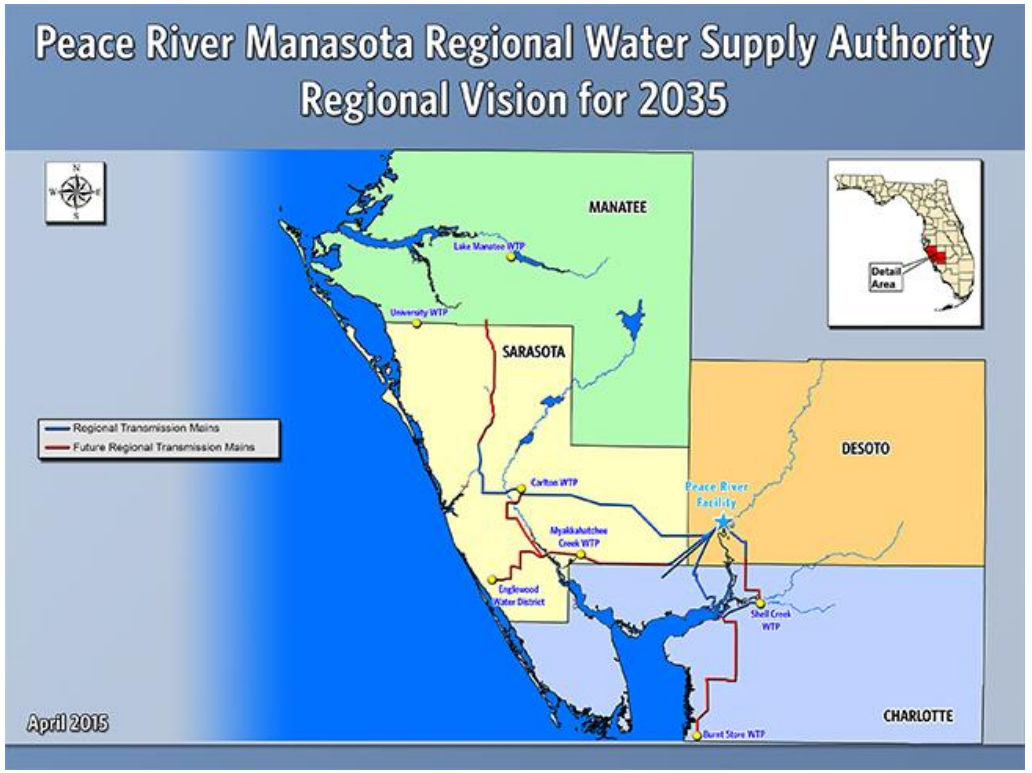
SWUCA 2

Solutions

- Groundwater would be reserved for agricultural use.
- Water supply for the expanding public supply sector would be provided by 1) a new regional utility that would capture and store surface water from rivers during Florida's monsoon season, 2) massive reclaimed water distribution systems for landscape and golf course irrigation and 3) extensive water conservation practices.
- As residential development expanded into agricultural lands, agricultural groundwater use would be retired permanently. The new residential development that replaced agriculture would be served with surface water from the regional utility.
- An extensive incentive plan for increasing the efficiency of agricultural water use was implemented. The District would pay 50% to 75% of the cost of implementation.
- Phosphate industry was required to recycle nearly 100% of process water.
- District provided over $500 million in funding

The SWUCA 2 Strategy was accepted and successfully implemented with no legal challenges.

Regional Water Utility

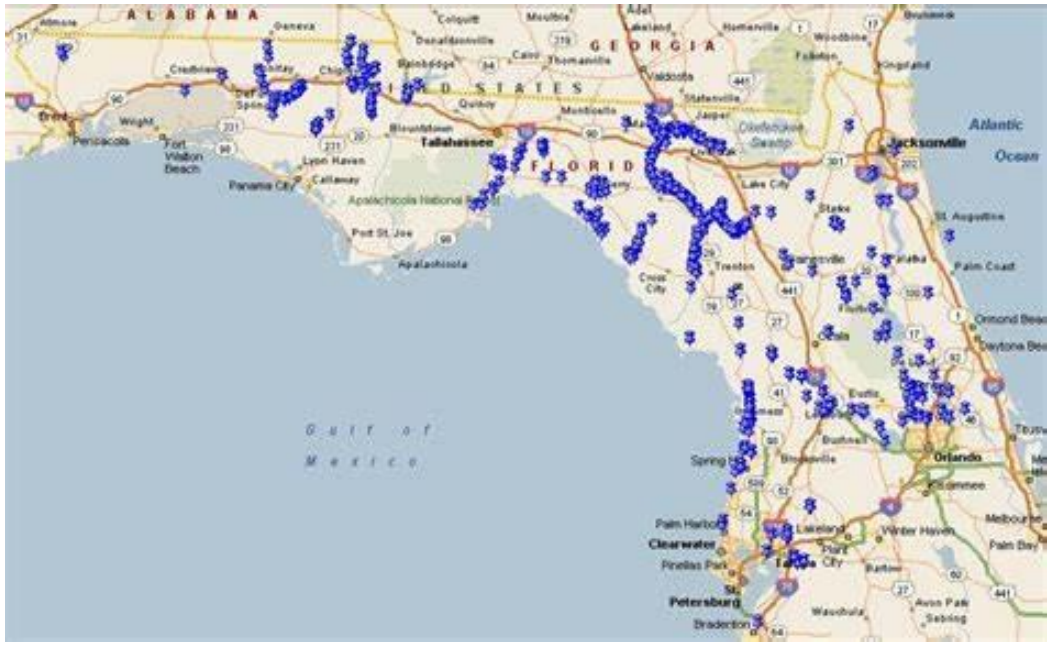


SWUCA Recovery Strategy

Reasons for Success

- Inclusive Public Process where Stakeholders Helped Develop Solutions
- Widespread Public and Political Support
- Incentives, Permitting and Financial, Resulted in Widespread Stakeholder Buy In
- Dedicated Funding Source
- One State Agency was Responsible for Implementing Recovery

Basin Management Action Plans for Nitrate Reduction Florida Springs



Basin Management Action Plans for Nitrate Reduction
Florida Springs

- Framework for reversing environmental degradation of springs ecosystems
- Contain state and local commitments to reduce nitrate loading through strategies designed to address all nitrate contributing land uses.
- Strategies are developed and refined collaboratively through public meetings and workshops within an established framework.
- Adopted by enforceable state order.
- Long-term process – 20 years to achieve significant reduction in nitrate in spring water.
- Multiple phases that include nitrogen load reduction milestones.
- Dedicated funding source
    - Legislative appropriations - $5 billion in grants since 2019.

Basin Management Action Plans for Nitrate Reduction
Wakulla Springs

Basin Management Action Plans for Nitrate Reduction Wakulla Springs

- One of the largest springs in the world.
  - Average discharge is 516 mgd
- Nitrate concentrations steadily increasing.
  - Algae blooms
  - Reduced water clarity
  - Disruption of fish and wildlife habitat
- Spring basin encompasses 1,325 square miles.

Basin Management Action Plans for Nitrate Reduction
Wakulla Springs

The Process

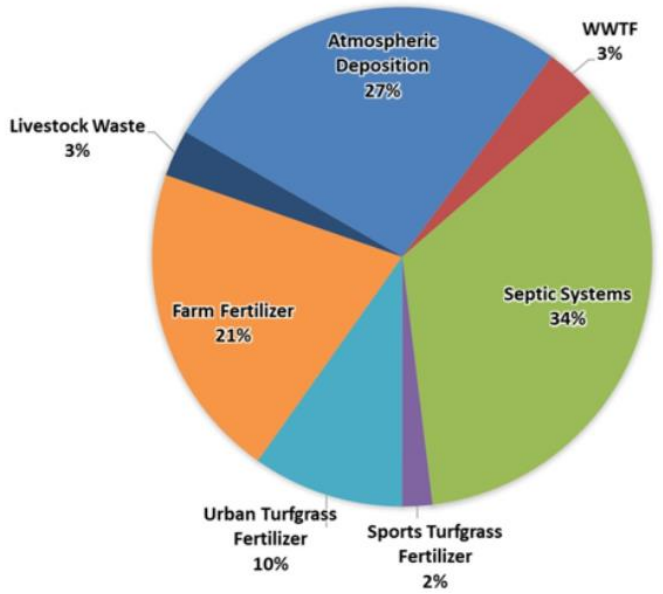
- Delineation of groundwater contribution area

Basin Management Action Plans for Nitrate Reduction
Wakulla Springs

The Process

- Inventory and quantification of nitrate sources within the contribution area

Nitrogen Source	Total Nitrogen Load to Groundwater in Pounds of Nitrogen Per Year (lb-N/yr)	% Contribution
Onsite Sewage Treatment and Disposal Systems (OSTDS)	272,313	34
Urban Turfgrass Fertilizer (UTF)	77,282	10
Atmospheric Deposition	212,134	27
Farm Fertilizer (FF)	161,985	21
Sports Turfgrass Fertilizer (STF)	15,398	2
Livestock Waste (LW)	23,840	3
Wastewater Treatment Facility (WWTF)	26,697	3
Total	795,386	100



Basin Management Action Plans for Nitrate Reduction
Wakulla Springs

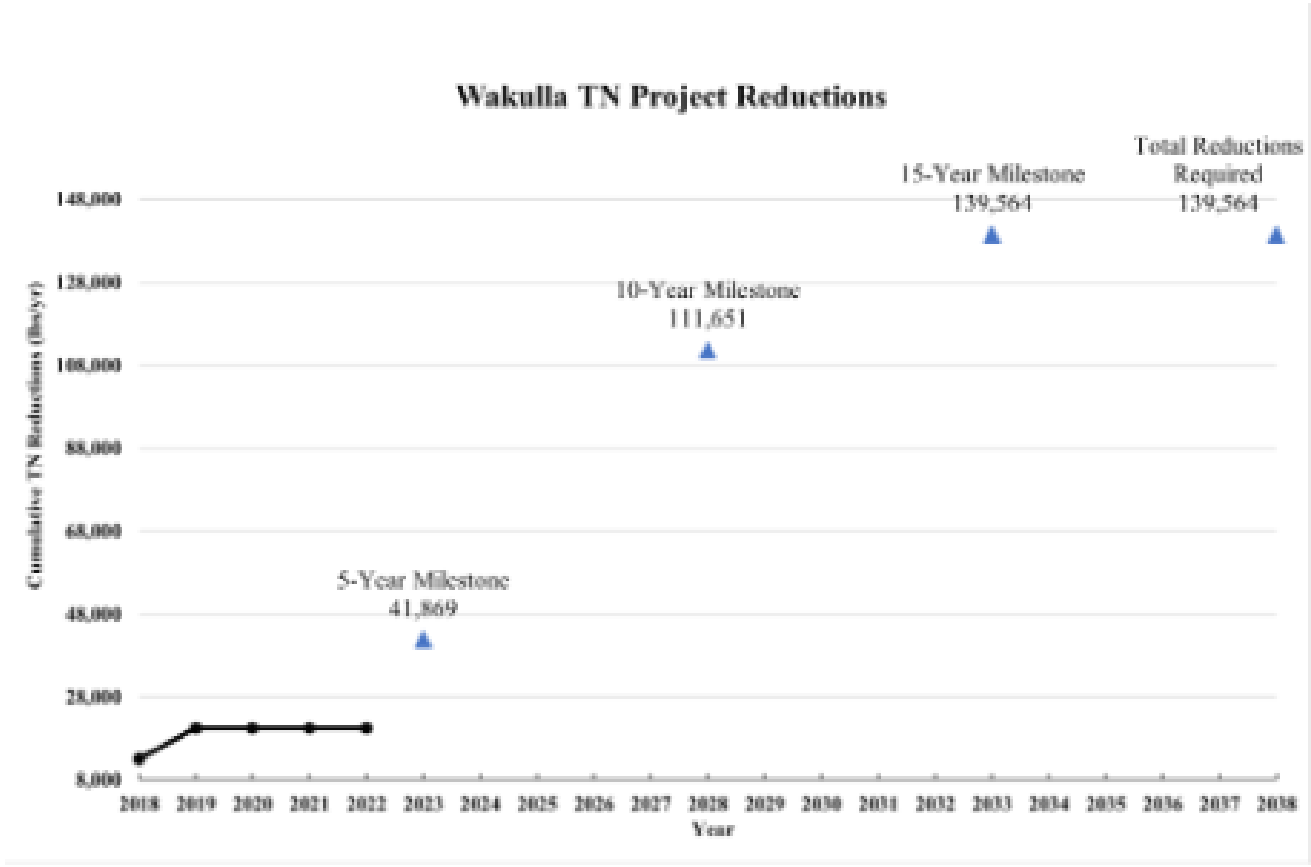
The Process

- Restoration Strategies
  - Phase out and/or enhance onsite sewage treatment & disposal systems (OSTDS).
  - Mandated wastewater treatment facility effluent standards and discharge locations.
  - Agricultural nonpoint sources must implement BMPs and conduct water quality monitoring.
  - Urban BMPs for stormwater must be implemented.
  - Strict rules for confined animal feeding operations and land spreading.

Basin Management Action Plans for Nitrate Reduction
Wakulla Springs

The Process

- Milestones and Tracking



Basin Management Action Plans for Nitrate Reduction

Reasons for Success

- Established Statewide Process with some Regulatory Requirements
- Widespread Public and Political Support
- Incentives, Permitting and Financial, Resulted in Widespread Stakeholder Buy In
- Dedicated Funding Source
- Very Effective Interaction between State Agencies

Springs in the Southwest Florida Water Management District

Success Stories, Solutions, and Obstacles from Elsewhere

- **Matt Kohlbecker**
  GSI Water Solutions
- **JR Cook**
  Northeast Oregon Water Association
- **Gregg Jones**
  HDR

9:45 am – 10:45 am

Break

10 min

10:45 am – 10:55 am

Road Map to Implementation

- **Salini Sasidharan**

  Oregon State University

- **Gregg Jones**

  HDR

10:55 am – 11:35 am

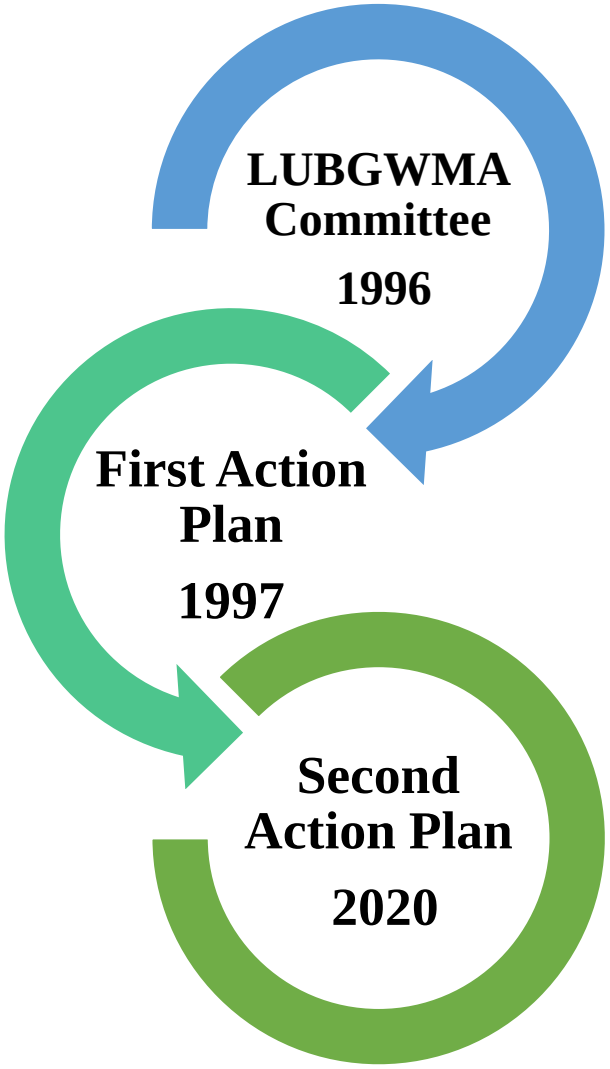
Path to Success: Envisioning the LUBGWMA Committee's Roadmap Towards Achieving Its Goal

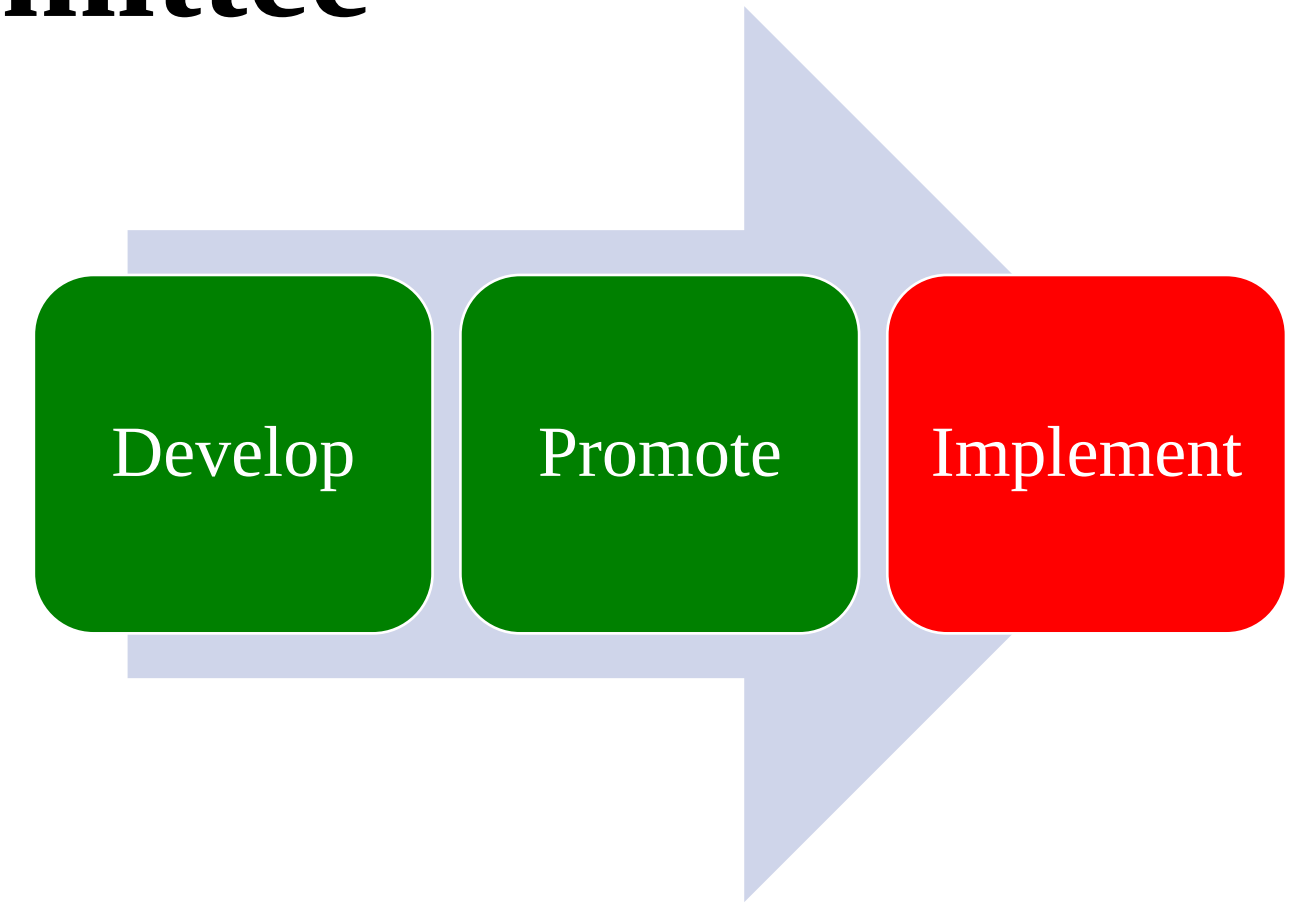
Salini Sasidharan

Oregon State University

LUBGWMA Committee Chair

LUBGWMA Committee





Goal of The LUBGWMA Committee

Second Lower Umatilla Basin Groundwater Management Area Local Action Plan

Identification and implementation of practices that will reduce groundwater **nitrate concentrations** to less than **7 mg/L** throughout the region.

Sustain this reduction so that public and private drinking waters remain safe to drink

Repeal GWMA declaration via ORS 468B.188.

Purpose of LUBGWMA

PROVIDE LOCAL KNOWLEDGE AND EXPERTISE

DEVELOP AND PROMOTE A LOCAL ACTION PLAN

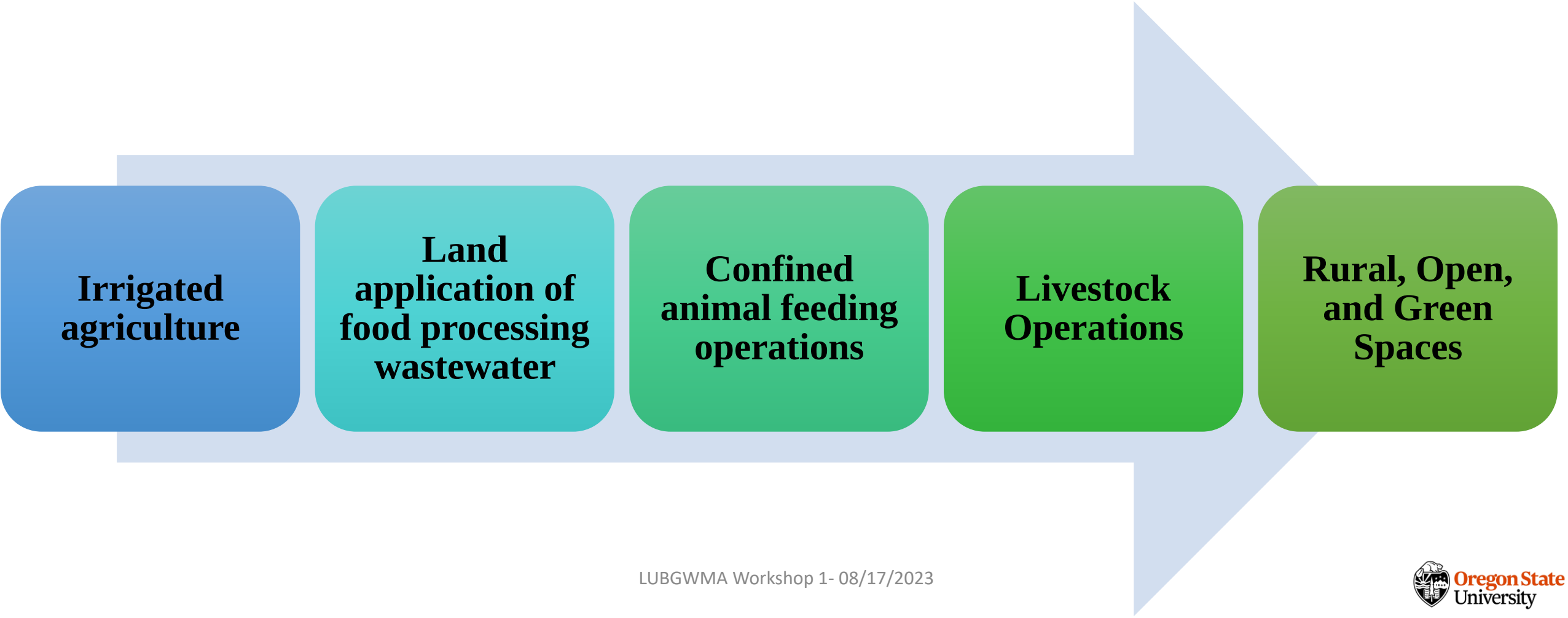
WORK WITH AGENCIES AND STAKEHOLDERS

RECEIVE FEEDBACK

ENCOURAGE A HOLISTIC LOOK AT WATER IN THE GWMA

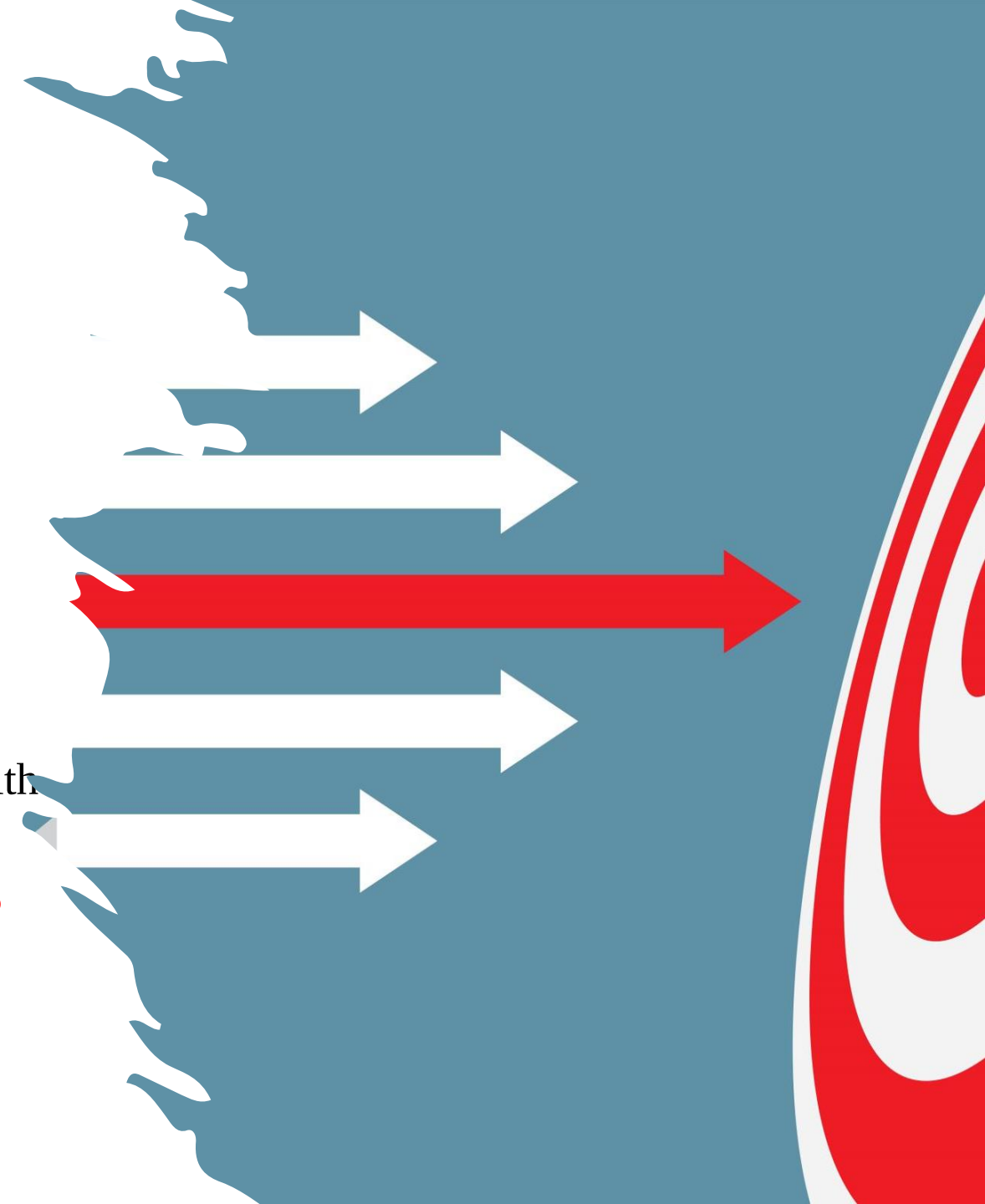
FIND FUNDING OPPORTUNITIES

Potential Sources of Nitrate Contamination (Second LUBGWMA Action Plan)



Sources and Solutions

- **Goal:** An ultimate aim or aspiration = **22**
- **Strategy:** Conceptual means to achieve a goal = **~61**
- **Action:** Specific procedures, processes, and activities to accomplish strategies, and, ultimately, the goal = **~243**
- **Objective:** Measurable, longer-term ways to determine if the goals are being achieved.
- **Responsible Entity:** Local, State, or Private Sector entity with primary responsibility for implementing an action = **~18+**
- **Schedule:** Timeline for completion of Action = **~2020 - 2025**



Action-Based Categorization for Clear Implementation Roadmap

Groundwater Research and Modeling

Best Management Practices (BMPs) Development and Implementation

Education, Outreach, and Public Awareness

Monitoring and Assessment

Navigating Progress: Goals and Their Current Status

Goals Achieved

- Feedback
- Timeline of Success Indicator

Goals Under Implementation

- Feedback
- Challenges
- Resources Required
- Collaboration Required
- Timeline of Implementation
- Timeline of Success Indicator

Goals Require Additional Information

- Feedback
- Challenges
- Resources Required
- Collaboration Required
- Timeline of Implementation
- Timeline of Success Indicator

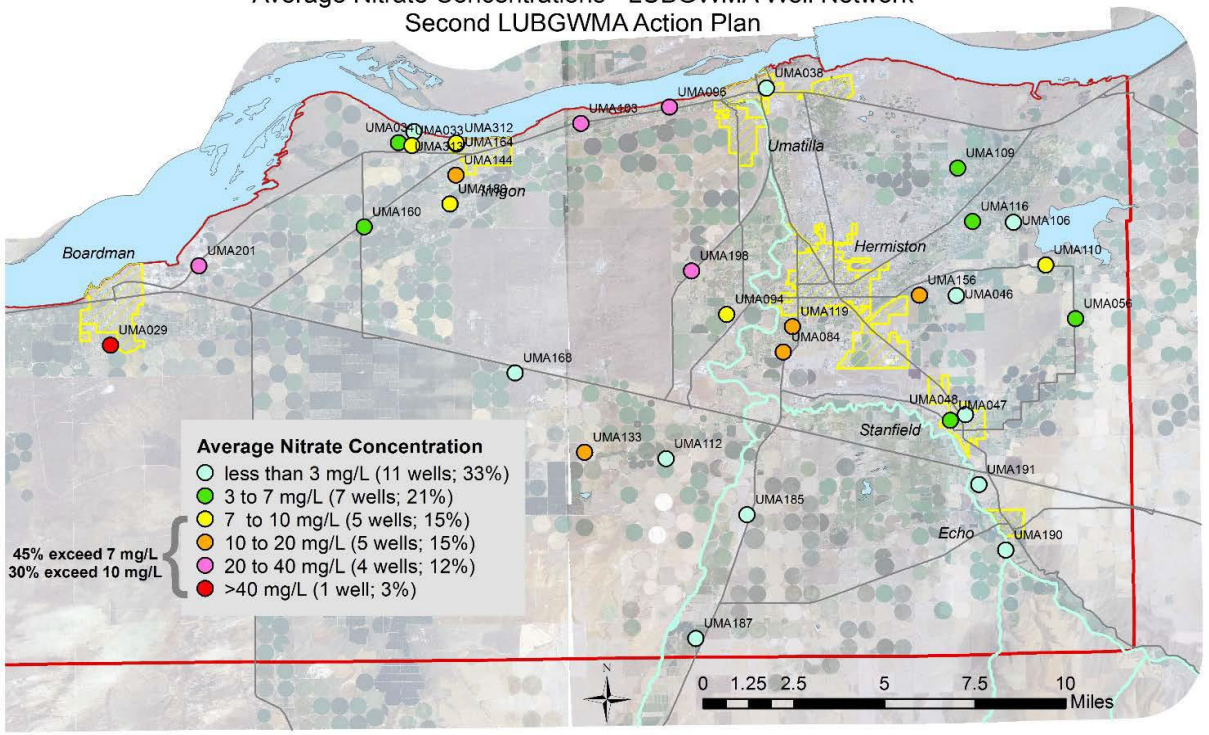
Goals Need to be Updated/Merged//New Goals

- Strategies and new actions
- Resources Required
- Collaboration Required
- Timeline of Implementation
- Timeline of Success Indicator

Building Confidence: Data Recovery and Trust in Available Information

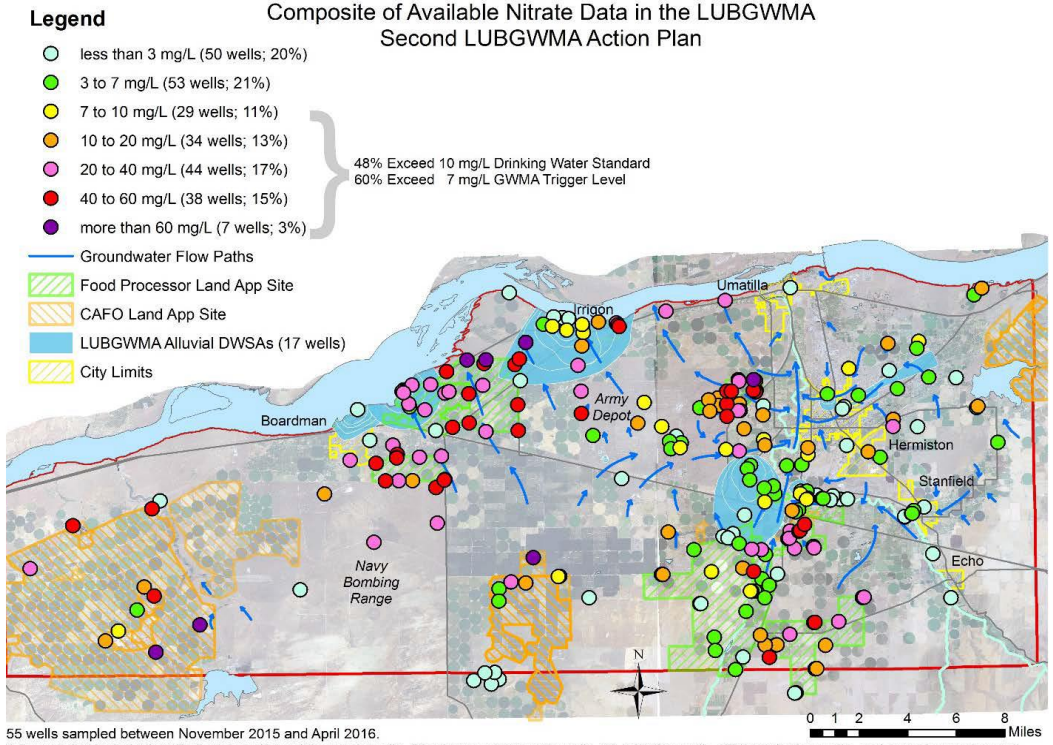
September 1991 through May 2016

Figure 2-7
Average Nitrate Concentrations - LUBGWMA Well Network
Second LUBGWMA Action Plan



November 2015 through April 2016

Figure 2-12
Composite of Available Nitrate Data in the LUBGWMA
Second LUBGWMA Action Plan



55 wells sampled between November 2015 and April 2016.
Wells sampled include the 17 alluvial aquifer public supply wells, 56 private water supply wells, 10 irrigation wells, 171 monitoring wells, and 1 stock watering well.

Oregon State University

Effective Strategies: Best Management Practices Tailored for Our Basin

- **Complex Interactions:** Balancing multiple goals and interests can complicate decision-making.
- **Limited Resources:** Securing funding and resources for implementation could be challenging.
- **Data Accuracy:** Ensuring reliable data collection is crucial for informed decisions.
- **Regulatory Hurdles:** Adhering to regulations and coordinating with authorities may pose difficulties.
- **Behavioral Change:** Encouraging widespread BMP adoption may require changing practices.
- **Community Engagement:** Sustaining community support and involvement.
- **Technical Expertise:** Effectively integrating research findings and technical aspects.
- **Adaptation:** Adjusting strategies in response to evolving conditions.
- **Time Constraints:** Progressing effectively within specified timeframes.

Lack of Resources

Dedicated Funding: A budget to fund projects, research, and community engagement.

Trained Personnel: Experts to provide technical guidance and drive initiatives.

Strategic Partnerships: Collaborations with agencies and stakeholders.

Access to Quality Data: Reliable data for informed decisions and monitoring.

Communication Platforms: Tools for streamlined committee communication and stakeholder engagement.

Use Available

Resources

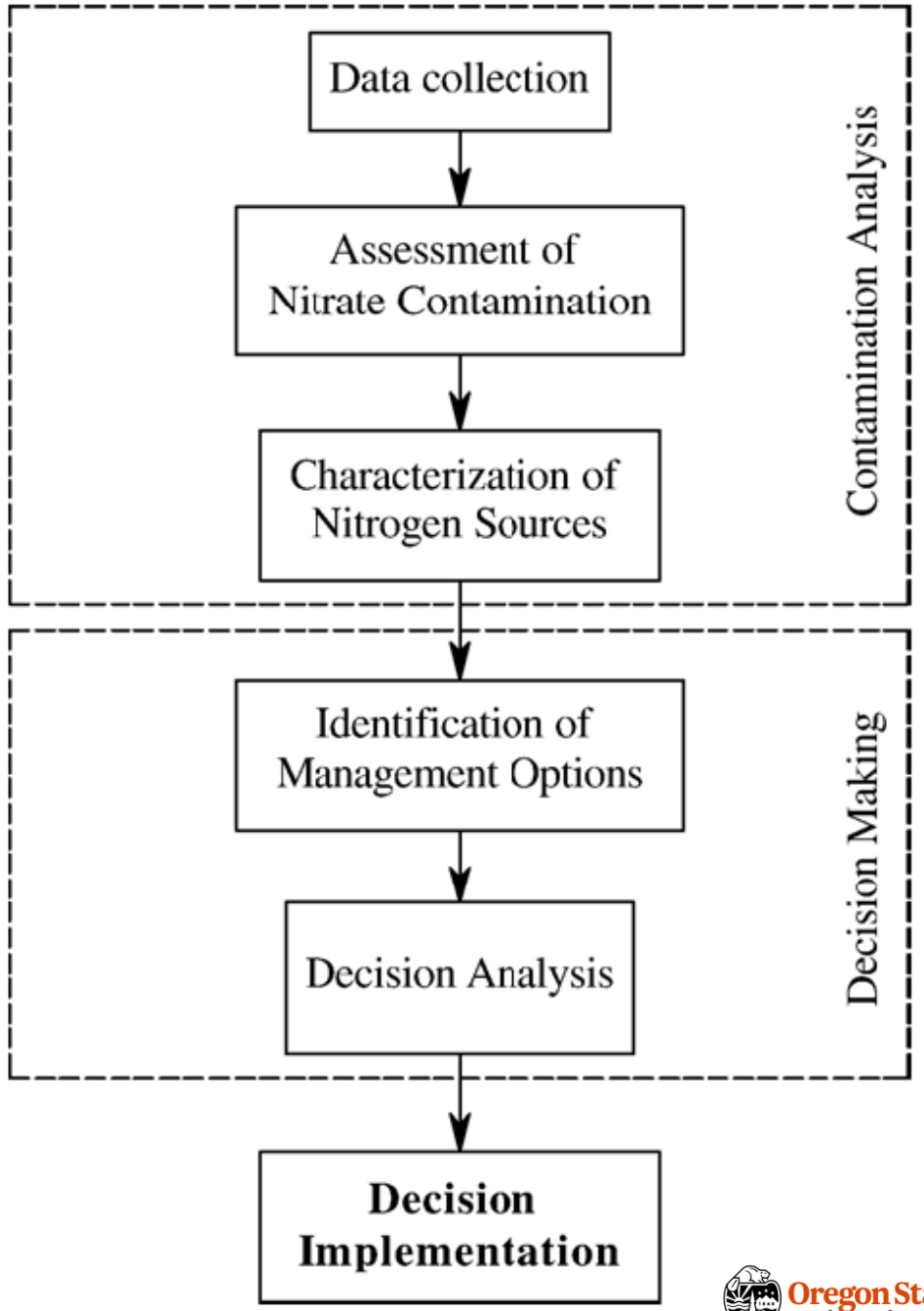
Data

Road Map to Implementation

Research

Stakeholder

Acquire Unavailable



What are you hoping to achieve from this workshop?

1. Develop Implementation **Framework/Roadmap**
2. Create **Public Engagement** Strategy
3. **Consensus on Framework/Roadmap**, Select 3-5 Strategies
4. **Geographically Focused Strategies** for Nitrate Reduction
5. Acquire **Hydrologic/Hydraulic Model** for System Understanding
6. Enhance Understanding of **Contamination, Data, Funding**
7. Align with **LUBGWMA Action Plan, Achievable Goals**
8. Share **Hydrogeologic Knowledge** Among **State Agencies**
9. Recognize **Modern Ag and CAFO Practices Differ**
10. **Prioritize Consensus-Building** for Effective Solutions

Strategic Prioritization: Directing Our Goals and Action Plans

Short Term

Long Term

SMART Approach: specific, measurable, achievable, relevant, and time-bound

Identify Goal → Actions → Implementation → Goal Achieved

Action Item
- Site Specific BMP
- New Product
- Educational Materials
- Model
- Data Collection
- Policy Change
- Monitoring
- Seek Funding

Nitrate Management Model

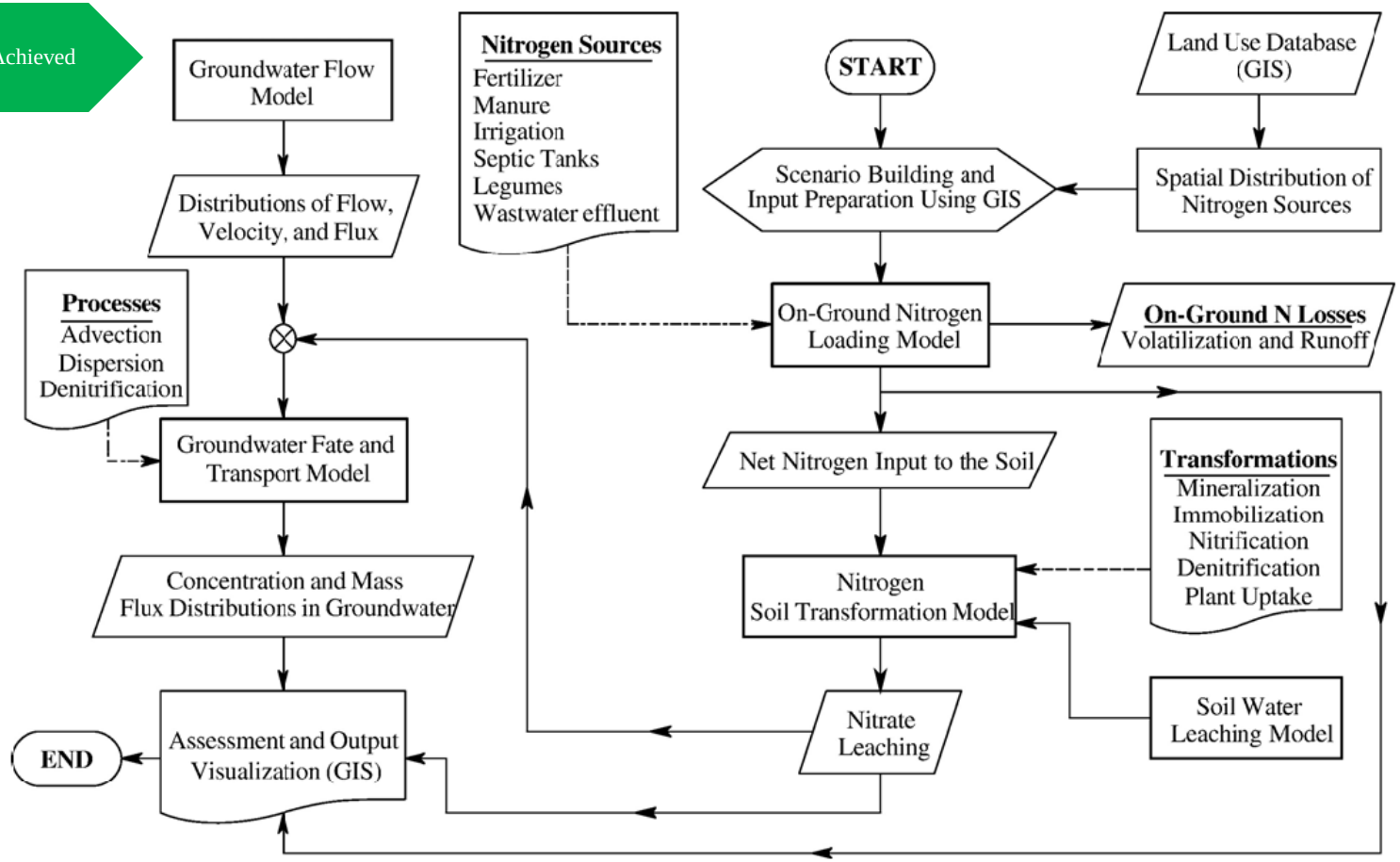


Fig. 6. A flow chart describing the development of the mathematical models for the ultimate assessment of nitrate concentrations at the critical receptors in response to the implementation of the management options.

Almasri, 2007

Oregon State University

Workshop Goal

Develop a **common recommendation** through brainstorming and collaborative sessions

Identify actionable insights by leveraging expertise

Engage stakeholders and **develop flexibility and adaptation**

Define milestones, timelines and develop the building block for the **roadmap with pilot projects**

Lower Umatilla Basin
Ground Water Management Area

Roadmap Framework

Gregg Jones PG, PhD

08/17/23

Roadmap Framework

- What is it?
- Why is it Necessary?
- Why HDR?
- Overview of Roadmap Elements

Roadmap Framework

What is it?

A clear and readily implementable strategy for how ground water nitrate in the LUBGWMA can be reduced within a reasonable timeframe.

Process

- Promotes organization and coordination
- Strong oversight to drive process forward
- Communications plan
- Dedicated sources of funding
- Incentive-based solutions

Technical

- Divides the LUBGWMA into manageable divisions (pilot project areas).
- Systematically implements small-scale research projects (pilot projects) that apply proven nitrogen reducing BMPS for the major land uses in these areas.
- Does not reinvent the wheel – uses what's already in place and what's already been learned.
- Centralized Best Management Practices (BMP) project data base.
- Provides plan to expand BMPs basin-wide

Roadmap Framework

Why is it Necessary?

There is a need for a greater degree of:

- Organization
- Coordination
- Oversight
- Communication
- Funding

Roadmap Framework

Why HDR?

- Experienced with similar efforts both from the technical and process sides.

What is HDR’s Role?

- Assist with program management.

Key Elements of the Roadmap Framework

Process Elements

- Establish Roles & Responsibilities in Regard to Roadmap Elements
- Establish Effective Oversight
- Strategic Communications Plan

Technical Elements

- Establish Pilot Project Areas
- Identify Appropriate Best Management Practices (BMPs)
- Identify/Recruit Land Use Group Participants
- Identify Researchers to Conduct Pilot Projects
- Implement, Complete and Evaluate Pilot Projects and Promote Successes
- Basin-Wide Implementation

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Establish Roles and Responsibilities

Clarify roles and responsibilities of Committee members in regard to the roadmap elements.

Enhances the existing decision-making process by further defining of the roles and responsibilities.

Creates a vision statement to guide the Committee.

- States the Committee's intention and reason for existence.
- Conveys the Committee's values and commitments to achieving its goals.

Creates a process to secure dedicated sources of funding

Key Elements of the Roadmap Framework

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Establish Effective Oversight

Appoint an independent, empowered facilitator with the local knowledge, relationships, and skillset necessary to foster efficient leadership.

The facilitator will:

- Lead coordination between the Committee and local governments, land use groups, the public, and interested parties.
- Foster coalition between agencies to reduce overlap, redundancy and conflicts.
- Facilitate consensus on roles, responsibilities, and schedules.
- Facilitate progress tracking and documentation of initiatives.
- Identify disagreements and roadblocks and work to overcome them.
- Coordinate funding efforts between the Committee, agencies, and government.

Key Elements of the Roadmap Framework

Process Elements

- Establish Roles & Responsibilities in Regard to Roadmap Elements
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Technical Elements

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Develop Strategic Communications Plan

Inform and Educate Dtakeholders About the Actions of the Committee.

- Promote Committee initiatives
- Share progress
- Promote successes
- Build stakeholder support for basin-wide implementation
- Influence elected officials to provide support
- Help establish dedicated funding sources

Key Elements of the Roadmap Framework

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- Basin-Wide Implementation

Establish Pilot Project Areas

Basin will be divided into small manageable areas where best management practice (BMP) projects can be implemented and carefully studied for all the major land uses.

- Technical representatives of the Committee will collaborate to establish criteria for pilot project areas.
- Pilot project areas will be chosen where sufficient availability of data exists to minimize the need for additional data collection.
- An inventory of BMPs that are currently in place and in progress will be compiled and integrated into the pilot project area process.
- New BMPs must have been successfully implemented in other areas with similar climate, soils, hydrogeology, irrigation practices, subdivision densities, CAFO densities, etc.
- Centralized data base will be created to store and manage all aspects of existing and new BMP project data. A data base manager will be identified to receive, upload, manage, and report on the BMP data.

Pilot Project Areas

Demonstration areas that will highlight successful BMPs

- How they were implemented
- Lessons learned
- Costs to implement
- Operational impacts to land users

Communications plan will be used to disseminate this information to expand BMPs basin-wide

Key Elements of the Roadmap Framework

Process Elements

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Identify Appropriate BMPs

Identify Appropriate BMPs

- Technical representatives of the Committee will collaborate to identify BMPs to be implemented in pilot project areas.
- BMPs include those that are already in place in the LUBGWMA and/or have been successfully implemented in other areas where conditions are similar (crop type, irrigation method, soil, climate, hydrogeology, water quality, etc).

Key Elements of the Roadmap Framework

Process Elements

- Establish Roles & Responsibilities in Regard to Roadmap Elements
- Establish Effective Oversight
- Develop a Strategic Communications Plan

Technical Elements

- Establish Pilot Project Areas
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Identify/Recruit Land Use Groups

Identify land use groups who will agree to participate in the pilot projects.

Promote the benefits of participation though the communications plan

Participation may include the following:

- Granting right-of-entry of their land for the studies.
- Cooperation with and providing input to researchers.
- A degree of operational flexibility to implement BMPs.
- Information to assess economic impacts or benefits (where applicable).

Key Elements of the Roadmap Framework

Process Elements

- Establish Roles & Responsibilities in Regard to Roadmap Elements
- Establish Effective Oversight
- Develop a Strategic Communications Plan

Technical Elements

- Establish Pilot Project Areas
- Identify Appropriate Best Management Practices (BMPs)
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- Identify Researchers to Conduct Pilot Projects
- Implement, Complete and Evaluate Pilot Projects, and Promote Successes
- Basin-Wide Implementation

Identify Researchers to Conduct Pilot Projects

Identify institutions and agencies that have personnel with the experience, capability and willingness to conduct the studies. These individuals will:

- Design the studies.
- Determine study funding requirements.
- Conduct the studies.
- Compile and present results to the LUBGWMA Committee.
- Ensure results are uploaded to the project data base.

Key Elements of the Roadmap Framework

Process Elements

- Establish Roles & Responsibilities in Regard to Roadmap Elements
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- Develop a Strategic Communications Plan

Technical Elements

- Establish Pilot Project Areas
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- Identify/Recruit Land Use Group Participants
- Identify Researchers to Conduct Pilot Projects
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- Basin-Wide Implementation

Implement, Complete, and Evaluate Pilot Projects and Promote Successes

Researchers and land use groups will work cooperatively to conduct the pilot projects.

- Get the projects up and running
- Collect and analyze data
- Present the results and degree of success
- Ensure data is uploaded to the centralized BMP data base
- The reduction in nitrate concentrations in groundwater from BMP implementation may not be apparent for decades.
  - BMP success will be evaluated based on reduction of nitrogen in effluent discharge or in soil layer, not in reduction in nitrate concentrations in groundwater underlying the land use.

Key Elements of the Roadmap Framework

Process Elements

- Establish Roles & Responsibilities in Regard to Roadmap Elements
- Establish Effective Oversight
- Develop a Strategic Communications Plan

Technical Elements

- Establish Pilot Project Areas
- Identify Appropriate Best Management Practices (BMPs)
- Identify/Recruit Land Use Group Participants
- Identify Researchers to Conduct Pilot Projects
- Implement, Complete and Evaluate Pilot Projects and Promote Successes
- Basin-Wide Implementation

Basin-Wide Implementation

Create support

- Use communications plan to educate stakeholders (local governments, elected officials, environmental groups, the public, and the media as to the effectiveness and benefits of the BMPs.

Establish a dedicated source of funding.

Establish incentive programs.

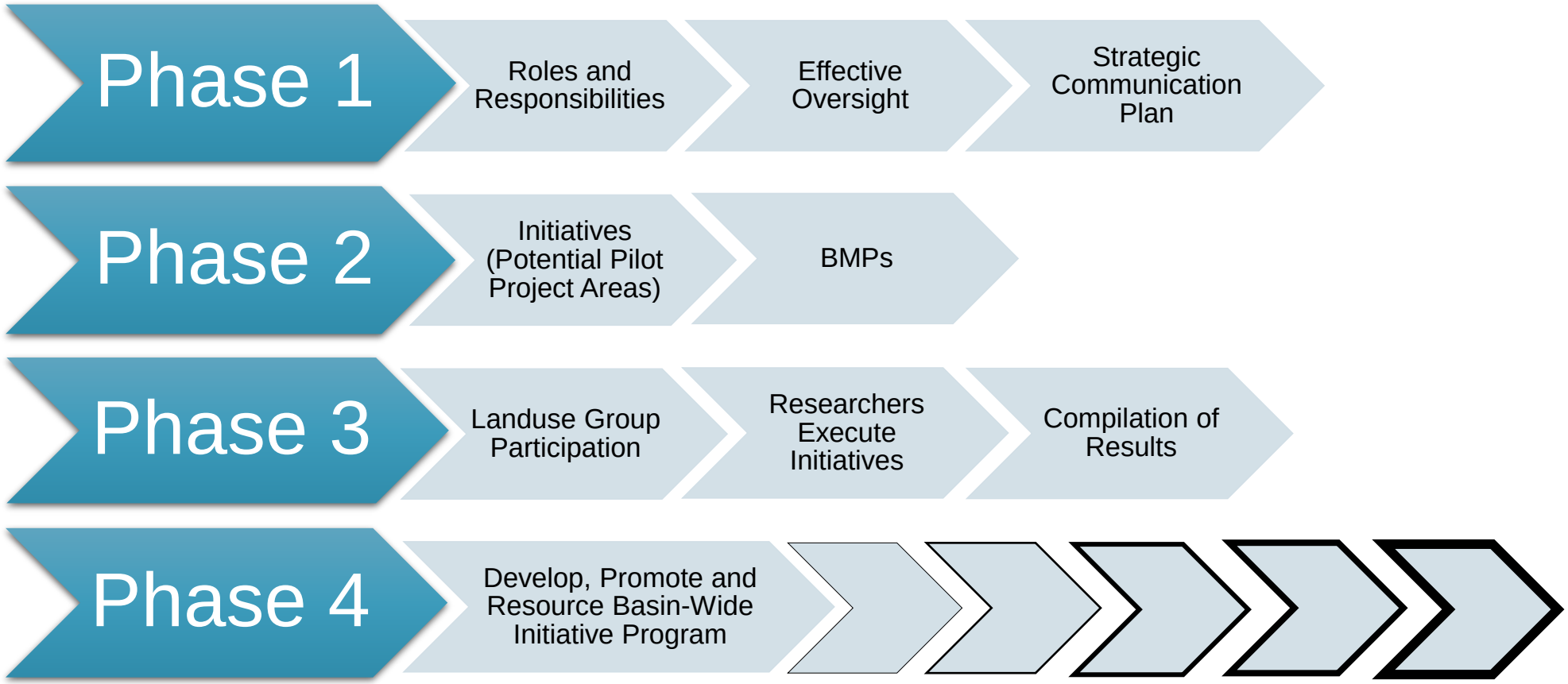
Empower an agency to oversee implementation.

- Determine where to allocate resources to achieve largest benefit
- Foster land use group acceptance and buy-in to facilitate their participation
- Allocate funding and incentives
- Form technical assistance teams to work with land use groups to implement and maintain BMPs

Questions?

Roadmap Framework

08/17/23


Phase 1
Roles and Responsibilities
Effective Oversight
Strategic Communication Plan
Phase 2
Initiatives (Potential Pilot Project Areas)
BMPs
Phase 3
Landuse Group Participation
Researchers Execute Initiatives
Compilation of Results
Phase 4
Develop, Promote and Resource Basin-Wide Initiative Program

Road Map to Implementation

- **Salini Sasidharan**

  Oregon State University
- **Gregg Jones**

  HDR

10:55 am – 11:35 am

Forensic Hydrology: An Investigation of LUBGWMA

- **Salini Sasidharan OSU**

  Oregon State University

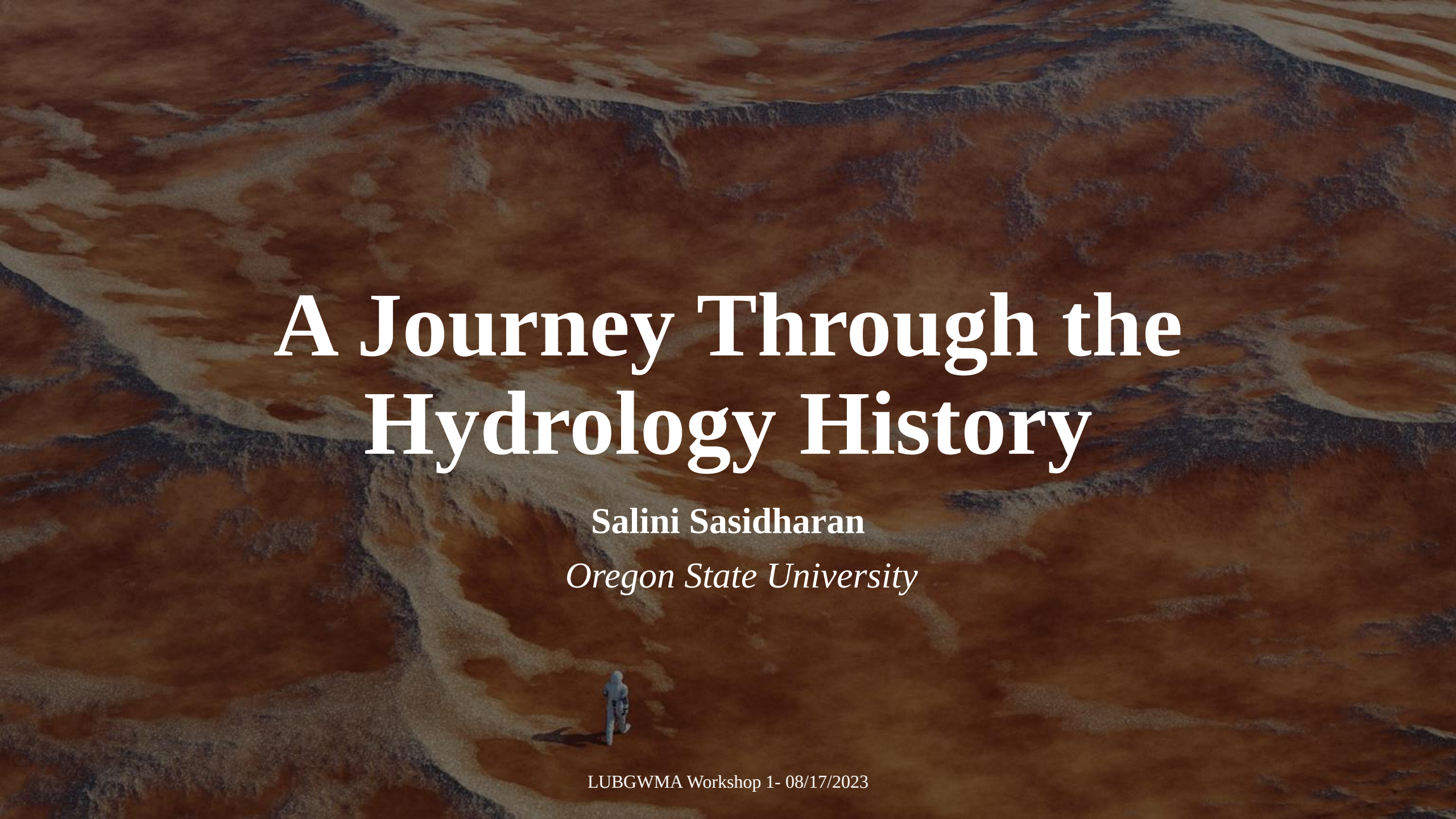
- **Suraj Jena**

  Oregon State University and Institute of Water Watersheds

- **Todd Jarvis**

  Institute of Water Watersheds

10:35 am – 12:15 pm



A Journey Through the Hydrology History

Salini Sasidharan

Oregon State University

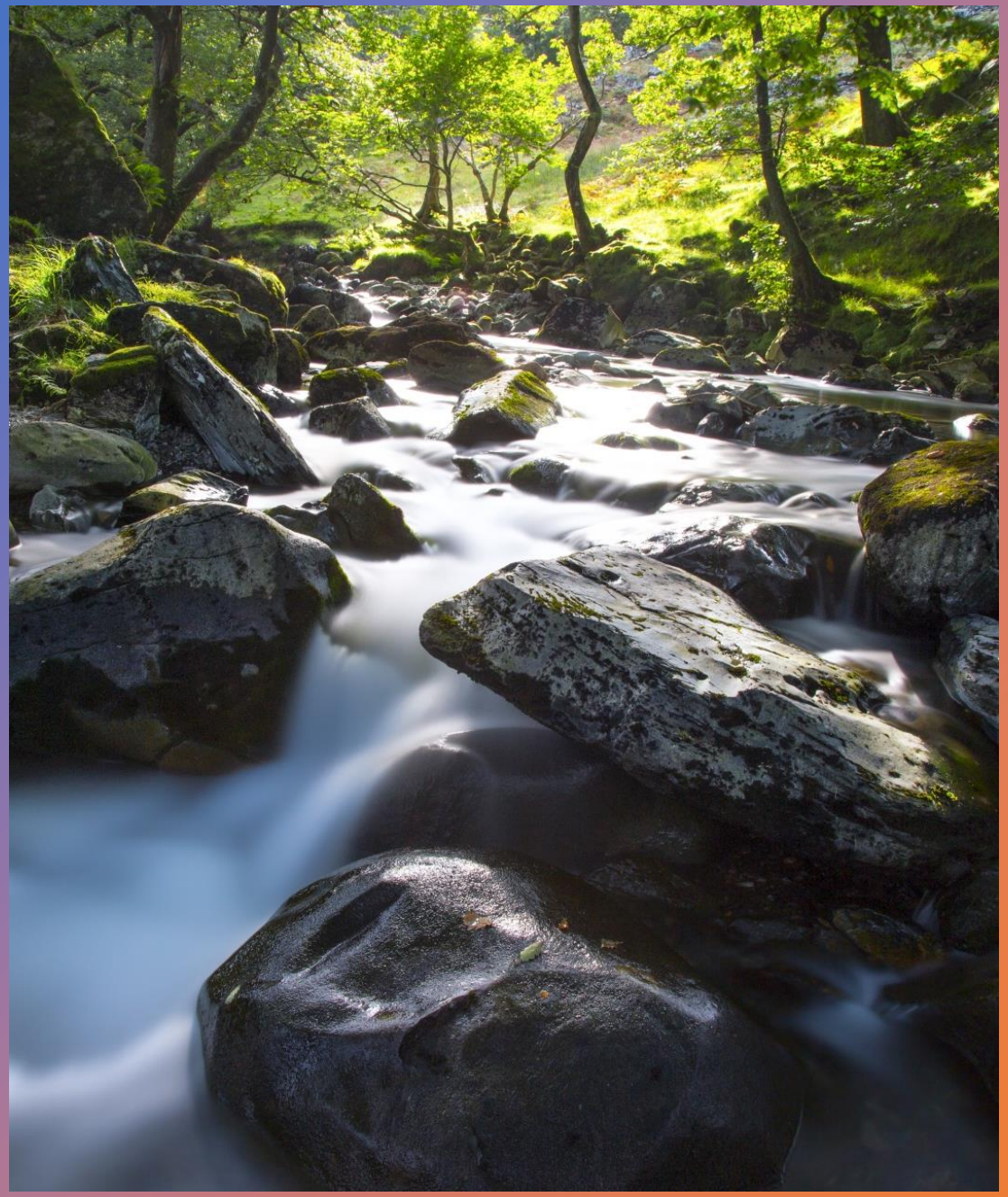
LUBGWMA Workshop 1- 08/17/2023

Second Action Plan Goals for Mitigating Nitrate Pollution Under Irrigated Agriculture

Goal

Goal 8: Evaluate the **feasibility of a nitrogen mass-balance model** and biogeochemical research projects that would spatially identify nitrogen loading in support of Goal 9.

Goal 9: Evaluate the feasibility of **re-defining the LUBGWMA** into smaller sections based upon land use, a USGS hydrogeology transport, model and possibly a nitrogen mass-balance model.



Action

Pathway to Funding, Resources, Technical Experts

LUBGWMA Postdoc Subcommittee - 2021

- Dan Dorran
- Melissa Lindsay
- Greg Harris
- Karen Lowkey
- Justin Green
- JR Cook

Funding Acquisition and Ongoing Effort

Action

- **ODA Funding = $249,132**
- **Dr. Todd Jarvis,**
- **Institute of Water and Watershed**
  - Technical Expertise
  - Facility and resources

Salini Sasidharan,

Biological & Ecological Engineering (~30,000+)

- High-performance Computer
- MODFLOW Software
- Undergraduate Student Support
- National and International Conference Travel
- LUBGWMA Meeting and Workshop Attendance
- Salini – Technical Expertise and Time to project

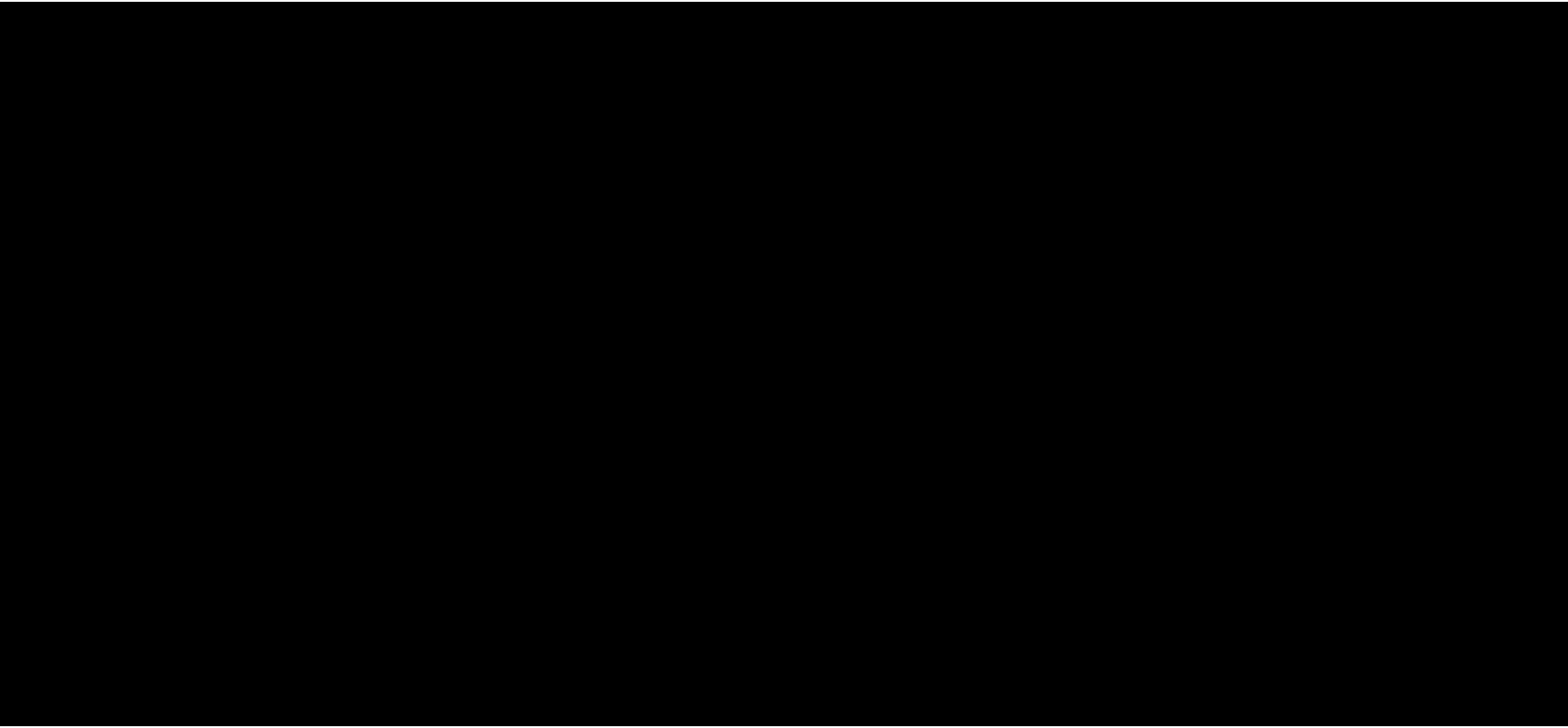
Research - Objectives

Step 1. Understand the **hydrologic make-up and aquifer characterization of the LUBGWMA** through collecting, compiling and correlating the existing data

Step 2. Determination of **physical controls for observed spatio-temporal variability in nitrate concentration** in LUBGWMA

Step 3. Develop conceptual and numerical models for vadose zone as well as groundwater flow and transport considering the refined boundary conditions to identification of source and sink for nitrate

Step 4. Identify data gaps and formulate the monitoring strategies along with the monitoring infrastructure development, cost estimation and timeline determination



Forensic Hydrology: An Investigation of LUBGWMA

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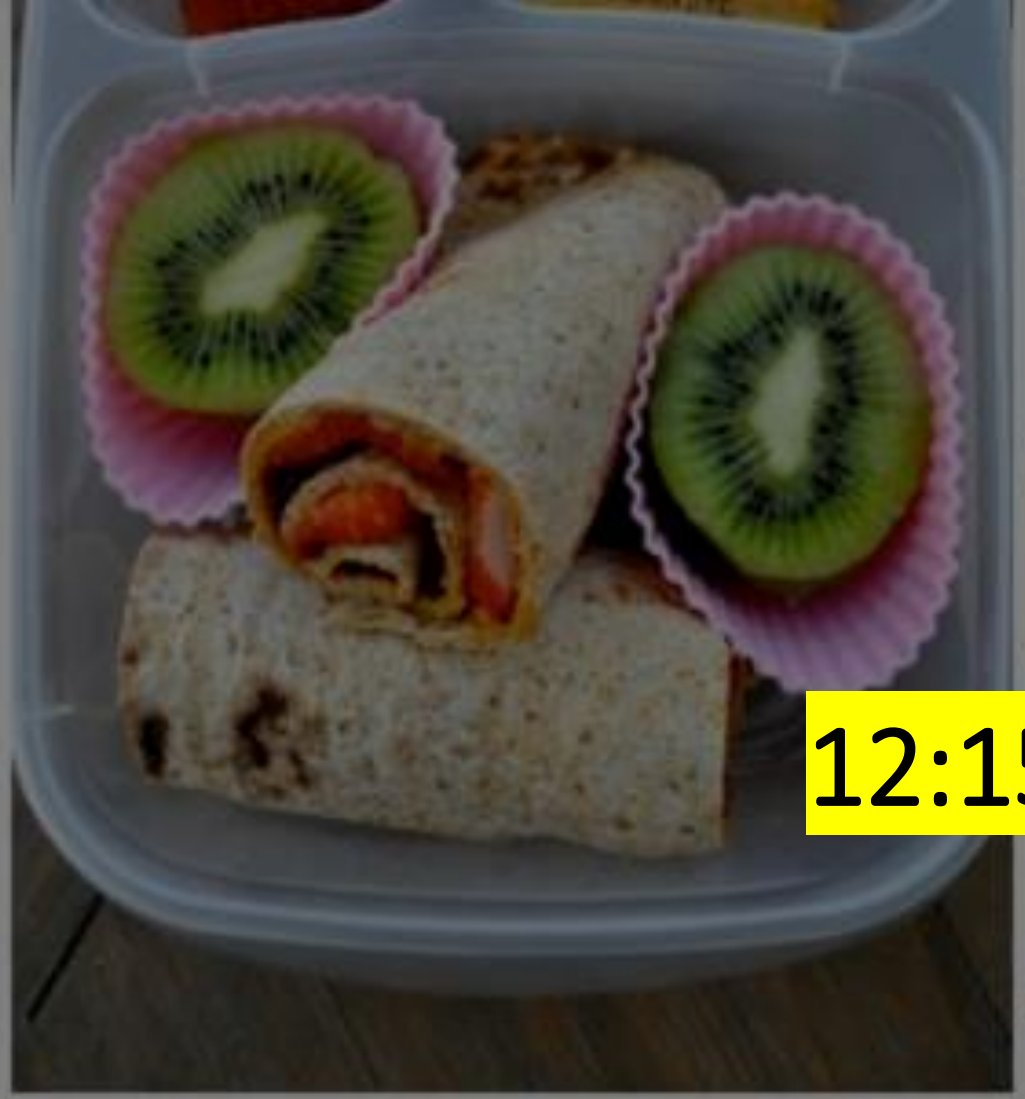
- **Todd Jarvis**

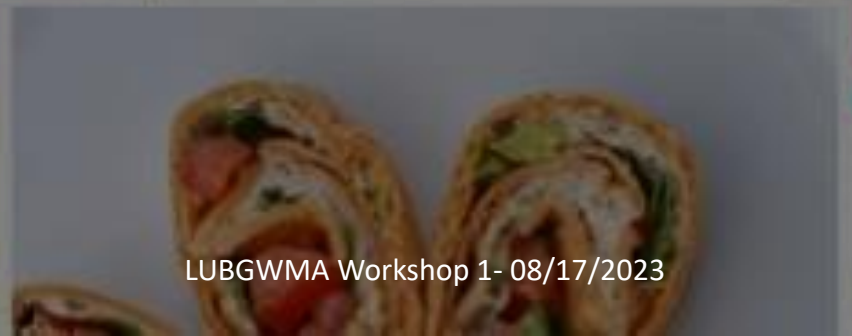
  Institute of Water Watersheds

OSU research work will be Published as Peer Reviewed Journal Publication in the near Future

10:35 am – 12:15 pm



LUNCH
12:15 pm – 1:00 pm



1:00 pm – 2:20 pm

Best Management Practices in LUBGWMA

- **Jake Madison** : A Perspective from Production Agriculture

Madison Ranches

- **Gregg Harris** : A Perspective from Confined Animal Feeding Operation

Threemile Canyon

- **Darrell Gale** : A Perspective from the City

City of Irrigon

- **Debbie Radie** : A Perspective from the Industry – Indirect through Port of Morrow

Boardman Foods

- **Tom Straughan** : A Perspective from Livestock

Sustainability Practices in Modern Agriculture

A High-Level Discussion Around Key Best Management Practices Used

In Modern Agriculture.

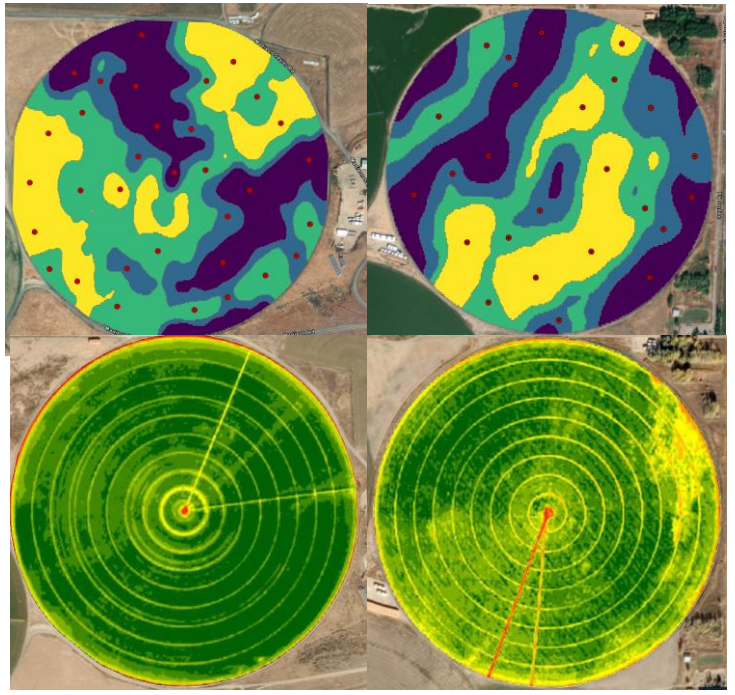
Variable Rate Fertility

Takeaway: we manage each acre individually to ensure no more is applied than what the crop needs.

- Electro conductivity (EC) cart is drug across the field to map spatial soil changes, which can be grouped into sub-zones within the field. Other methods for developing zones include yield maps, and satellite imagery.
- Zones are sampled individually, and the nutrient data can then be used to create variable rate nutrient application prescriptions.
- This practice tailor's the nutrient application to each, distinct area of the field, eliminating over application as well as producing a more even, consistent crop.

Client	SGS Umatilla			Recv'd Date:		2/16/2023
Ranch	Madison Ranches			Report Date:		2/17/2023
Field	34			Report:		S7524-2
Sampler:		Brian				
Sample ID	NO3-N #/ac	NH4-N #/ac	NO3+NH4 #/ac	P ppm	K ppm	S ppm
34 Z1 1'	43	18	61	28	716	8
34 Z1 2'	43	18	61			
34 Z1 3'	36	10	46			
			168			
34 Z2 1'	41	13	54	20	604	7
34 Z2 2'	45	14	59			
34 Z2 3'	29	14	43			
			156			
34 Z3 1'	47	33	80	24	522	7
34 Z3 2'	50	12	62			
34 Z3 3'	32	12	44			
			186			
34 Z4 1'	47	26	73	20	550	7
34 Z4 2'	45	12	57			
34 Z4 3'	37	11	48			
			178			

Client	SGS Umatilla			Recv'd Date:		2/16/2023
Ranch	Madison Ranches			Report Date:		2/17/2023
Field	4-Feb			Report:		S7524-3
Sampler:		Brian				
Sample ID	NO3-N #/ac	NH4-N #/ac	NO3+NH4 #/ac	P ppm	K ppm	S ppm
40 Z1	40	30	**70**	14	990	27
40 Z2	44	32	**76**	13	1000	29
40 Z3	82	30	**112**	22	699	27
40 Z4	67	22	**89**	17	687	26



Low Pressure Drop Tube Sprinklers

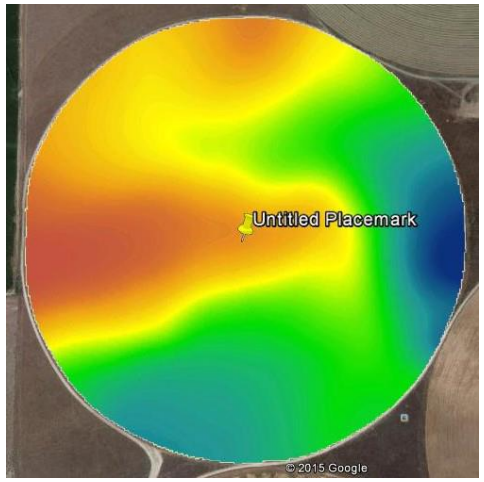
Takeaway: Using less water by getting more where we need it reduces chances of leaching.

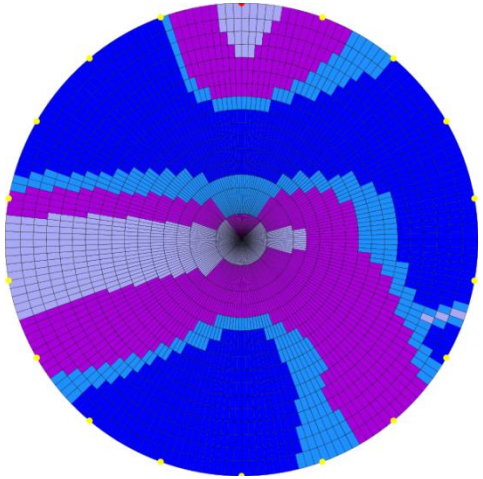
- Center pivot is the most common irrigation method in the basin. Has gone from 11.2 gpm per acre overhead impact sprinklers requiring over 70 psi to low hanging nozzles requiring 33% less gpm while reducing required pressure by 70% at the end of the pivot. This has allowed farmers to better match the application rate to the infiltration rate of the soil, significantly increased water use efficiency and decreased the amount of pumping electricity required to irrigate the crop.
- Newer sprinklers also fight the wind better and hit the ground softer and sooner, allowing for more of the pumped water to get into the ground and stay within the application area. This helps to limit water running out of the field and ponding within the field.

Variable Rate Irrigation

Takeaway: Very granular control of irrigation applications help to eliminate leaching.

- Allows producers to write prescriptions for very small zones within a field. Controlling how much and what nozzles water comes out of.
- Helps to ensure that every acre of production is maximized by helping to control over watering or under watering. Increases management options for wet areas, low areas, or steep areas.





Soil and Tissue Sampling

Takeaway: Applications are made in small doses when needed to reduce risk of leaching past the root zone.

- Soil and tissue tests are taken weekly on high valued crops such as potatoes, onions, and carrots.
- Other crops are typically tissue sampled at various growth stages throughout the growing season.
- Allows for precise applications of nutrients only when needed.

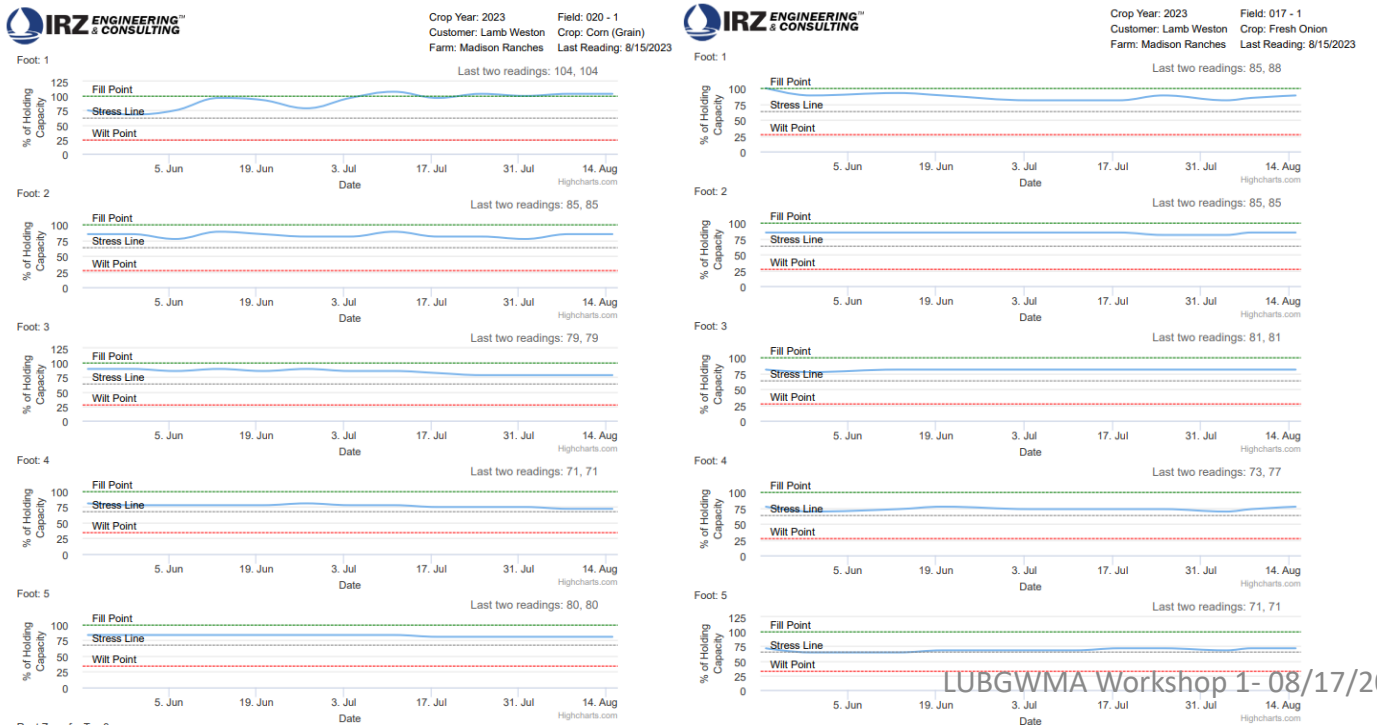
Client:	SGS - Umatilla			Sample Date:	07/25/23						AV Labs, Inc.											
Grower:				Report Date:	07/26/23						64 No. Broadway Ave.											
Ranch:				Soil Report ID:							Othello, WA 99344											
Crop Advisor:											(509) 488-2468											
Field ID & Date:	NO3-N	NH4-N	NO3+NH4	P	K	S	pH	SS	B	OM	Zn	Mn	Cu	Fe	Ca	Mg	Na	Total Bases	Ca	Mg	K	Na
53																						
16-May	83	35	118	58	551	10	7.2	0.39	0.45	1.74	5.4	5	0.7	51	3.1	1.7	0.41	6.62	46.8	25.7	21.3	6.2
23-May	120	26	146	45	632	13	6.9	0.35	0.42	2.20	4.8	5	0.7	52	3.9	2.1	0.45	8.07	48.3	26.0	20.0	5.6
30-May	98	24	122	62	636	10	7.0	0.39	0.49	1.64	5.0	4	0.7	41	2.8	1.4	0.25	6.08	46.1	23.0	26.8	4.1
6-Jun	174	20	194	55	506	15	7.3	0.49	0.49	2.14	5.1	4	0.7	42	2.3	1.4	0.41	5.40	42.6	25.9	23.9	7.6
13-Jun	60	28	88	58	626	8	7.2	0.28	0.48	1.96	4.7	5	0.6	38	4.1	1.9	0.32	7.92	51.8	24.0	20.2	4.0
20-Jun	60	28	88	46	602	10	7.6	0.32	0.51	1.80	4.4	5	0.7	41	2.8	1.7	0.37	6.41	43.7	26.5	24.0	5.8
27-Jun	48	21	69	51	540	11	6.8	0.27	0.44	1.80	3.5	3	0.6	40	2.6	1.4	0.30	5.68	45.8	24.6	24.3	5.3
11-Jul	73	18	91	42	770	10	6.9	0.29	0.45	1.50	5.0	6	0.6	40	3.1	1.8	0.41	7.28	42.6	24.7	27.1	5.6
18-Jul	40	18	58	42	560	11	7.0	0.19	0.29	2.22	5.4	6	0.7	41	4.6	1.9	0.35	8.28	55.5	22.9	17.3	4.2
25-Jul	43	13	56	42	649	10	7.2	0.20	0.36	1.96	4.7	3	0.60	43	4.6	1.9	0.28	8.40	54.2	22.7	19.8	3.3

Client:	SGS - Umatilla			Sample Date:	07/25/23						AV Labs, Inc.											
Grower:				Report Date:	07/26/23						64 No. Broadway Ave.											
Ranch:				Plant Report ID:							Othello, WA 99344											
Crop Advisor:											(509) 488-2468											
Sufficiency - Onion Leaf																						
Early-Middle	5.00-6.00	0.35-0.50	4.00-5.50	0.50-1.00	22-60	25-80	50-250	15-35	60-300	1.00-3.50	0.30-0.50											
Middle-Late	4.50-5.50	0.31-0.41	3.50-5.00	0.50-1.00	25-75	25-100	50-250	15-35	60-300	1.50-2.20	0.25-0.40											
Field ID & Date:	Total Nitrogen	P	K	S	B	Zn	Mn	Cu	Fe	Ca	Mg											
53																						
6-Jun	4.52	0.49	3.83	0.41	19.7	21.4	19	1.8	7	0.82	0.28											
13-Jun	3.95	0.68	3.60	0.34	25.3	23.8	21	2.5	69	0.78	0.30											
20-Jun	3.19	0.46	2.58	0.23	23.4	20.3	21	8.2	75	0.65	0.23											
27-Jun	4.15	0.56	2.87	0.39	31.7	19.5	27	0.8	105	0.46	0.20											
11-Jul	2.92	0.32	2.47	0.35	28.7	17.2	35	24.7	120	0.84	0.26											
18-Jul	2.92	0.31	2.84	0.28	37	12.5	37	11.7	71	0.74	0.20											
25-Jul	3.33	0.26	3.05	0.34	57.4	10.5	32	48.8	93	1.20	0.26											

Soil Moisture Monitoring

Takeaway: Irrigation decisions are highly managed to ensure water and fertility stay in the root zone.

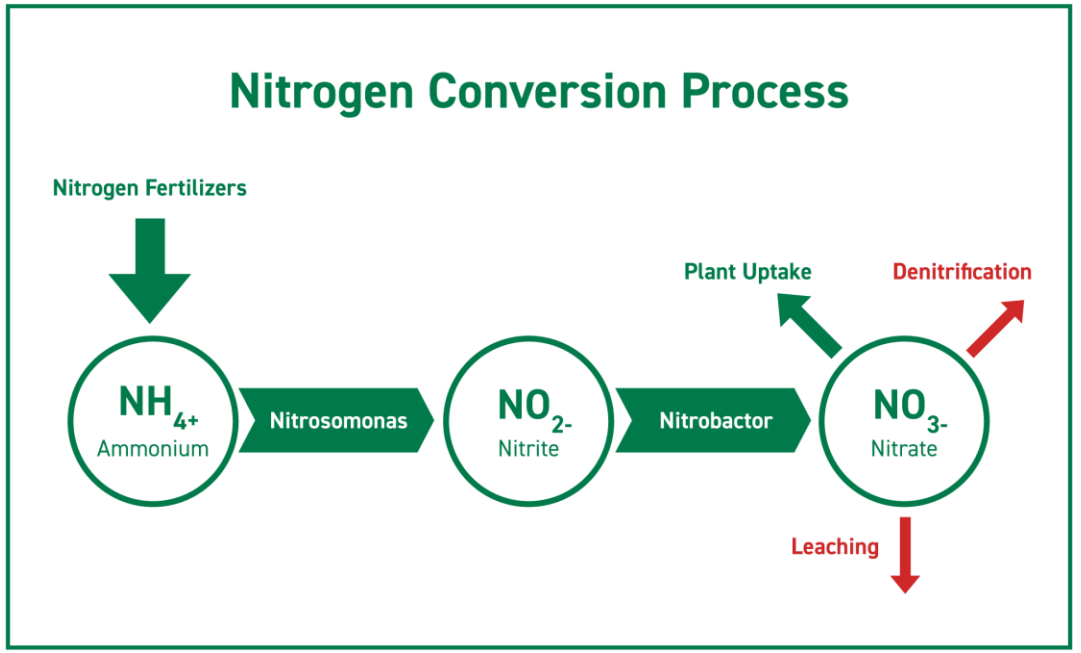
- Reliable real time soil moisture management allowing for precise irrigation decisions.
- Helps to eliminate over application of irrigation water while ensuring optimal growing conditions and yields.



Nitrogen Stabilizing Products

Takeaway: Fertility is more predictable and stable than in the past, greatly reducing the risk of leaching.

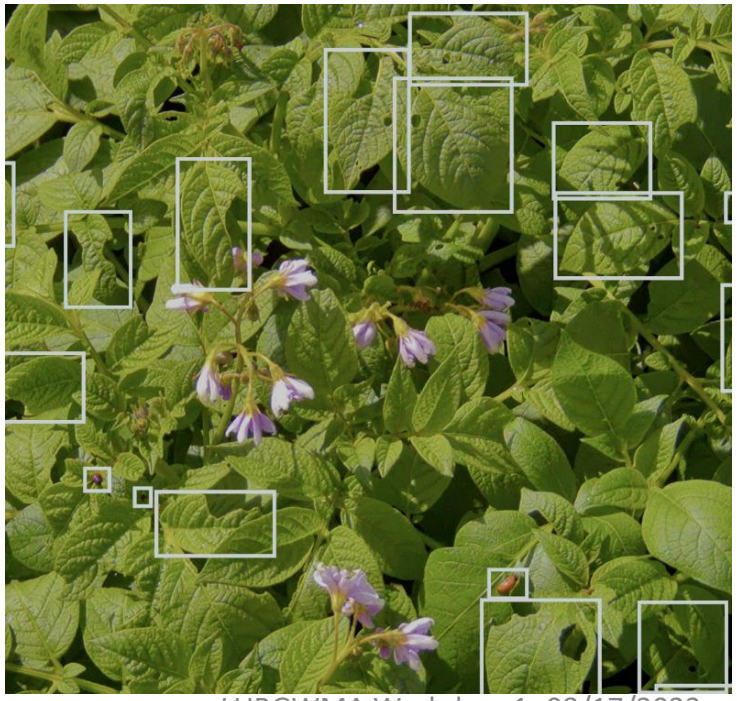
- Nitrogen stabilizers are products that can be added to both liquid and dry nitrogen fertilizers.
- Nitrogen stabilizers slow down the conversion process that takes place in the soil when ammonium is being converted to nitrate.
- This gives the plants more time to access the Nitrate before it can be leached past the root zone.



Farming by the Square Inch

Takeaway: As technology advances, so does the scale at which decisions are made, helping to eliminate negative environmental impacts.

- Management decisions are getting made down to the square inch as technology advances.



Key Takeaways

- **Farms today are using less water and fertility to produce more food per acre than ever.**
- **New data tracking and measurement tools are implemented regularly, providing real time data that allows for real time decisions.**
- **The level of science surrounding the application of fertility and irrigation has increased exponentially over the last 30 years and has drastically reduced the volumes of each used as well as potential environmental impacts.**
- **Today's agricultural BMPs are targeting zero wasted fertility or irrigation.**

Thoughts, Questions?

Thank you for your time and interest.

Jake Madison
4th Generation, Madison Ranches Inc.

MADISON RANCHES INC

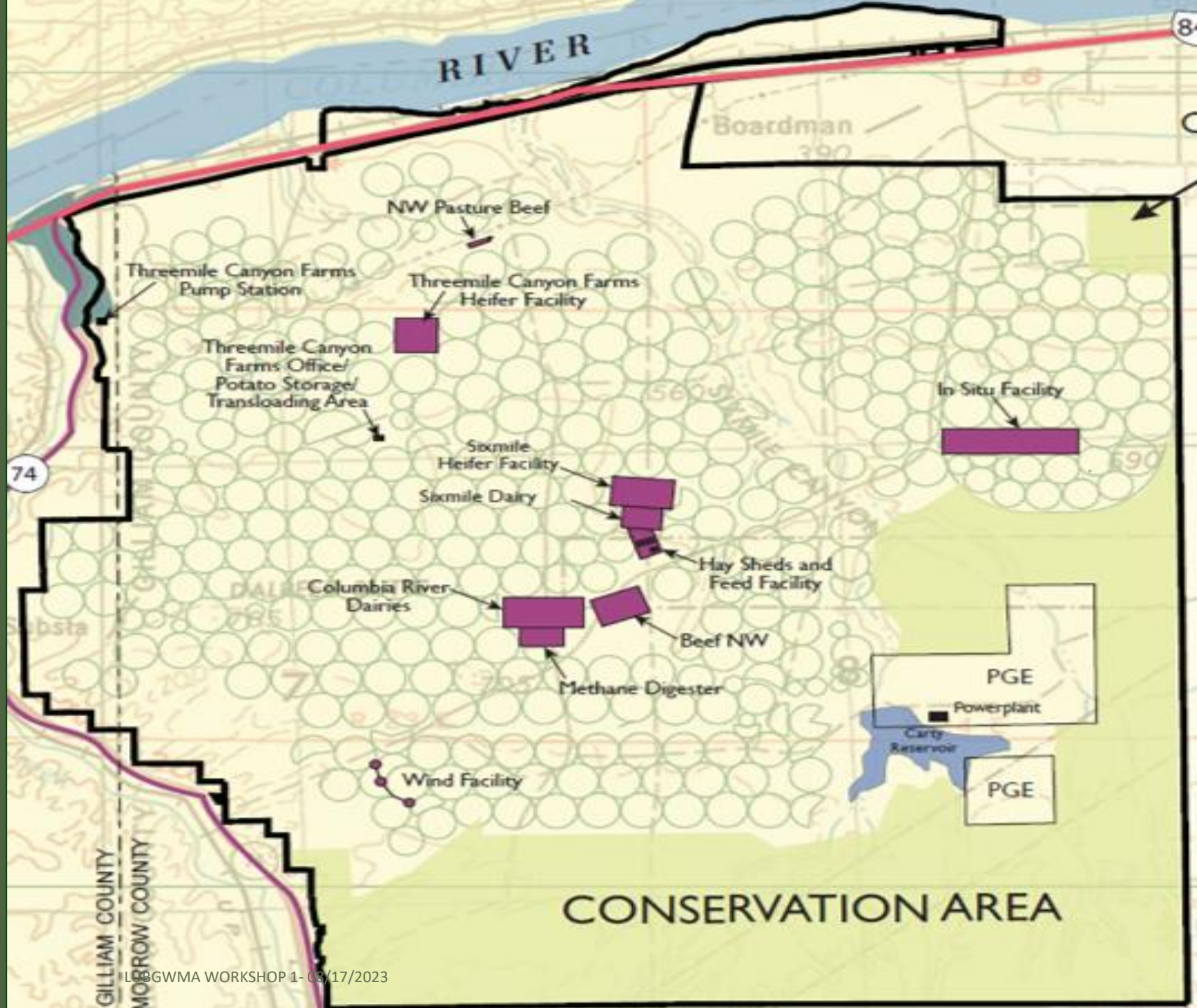
29299 Madison Rd. Echo, Oregon 97826: WWW.MadisonRanches.com : Office:(541)376-8107

Threemile Canyon Farms:
Where sustainability is front and center

THREEMILE CANYON FARMS

Farm Scale

- **93,000** acres
- Approximately **145 square miles** (think the area of Portland, OR)
- **23,000** acres in conservation area
- **39,500** acres of irrigated farmland on Threemile
- **12,000** acres of irrigated leased ground
- **15,000** acres of organic crops
- **2,000** acres La Grande Seed Farm



Agricultural Practices

THREEMILE CANYON FARMS

- USDA GAP Audits (9 audits on 5 different crops. 100% score)
- Global GAP Certified (SCS Global 100% majors, 98% minors)
- Customer Audits and Certifications (Costco Addendum/Non GMO, PSA, Whole Foods Regenerative Ag)
- Oregon Department of Agriculture Organic Certification (3 Farms)
- In-House Agronomy Team
- Energy Trust Partner (Irrigation/Water Use Efficiency)

Farm Scope

Dairy Operations

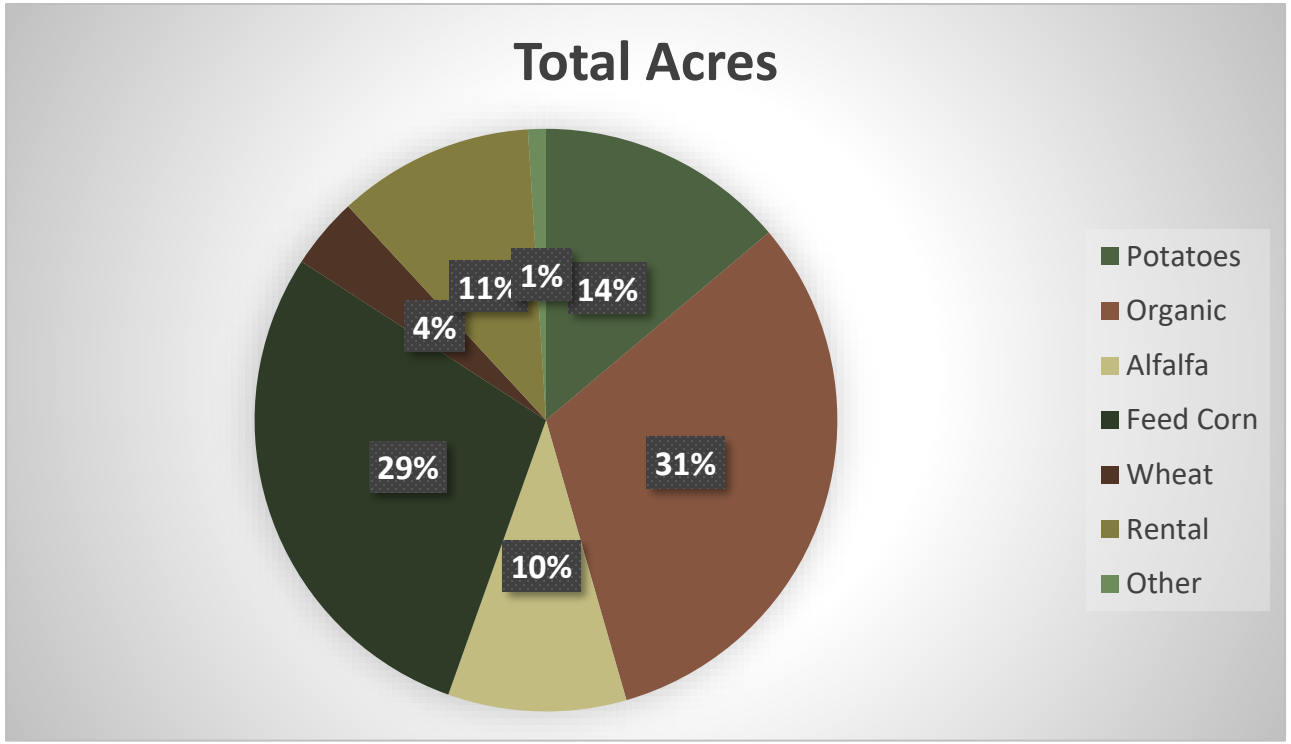
36,000 milk cows

40,000 young stock

2,600,000 pounds of milk produced daily

2020 Dairy Sustainability Award, Innovation Center for U.S. Dairy.

Traditional and Organic Crop Farming



THREEMILE CANYON FARMS

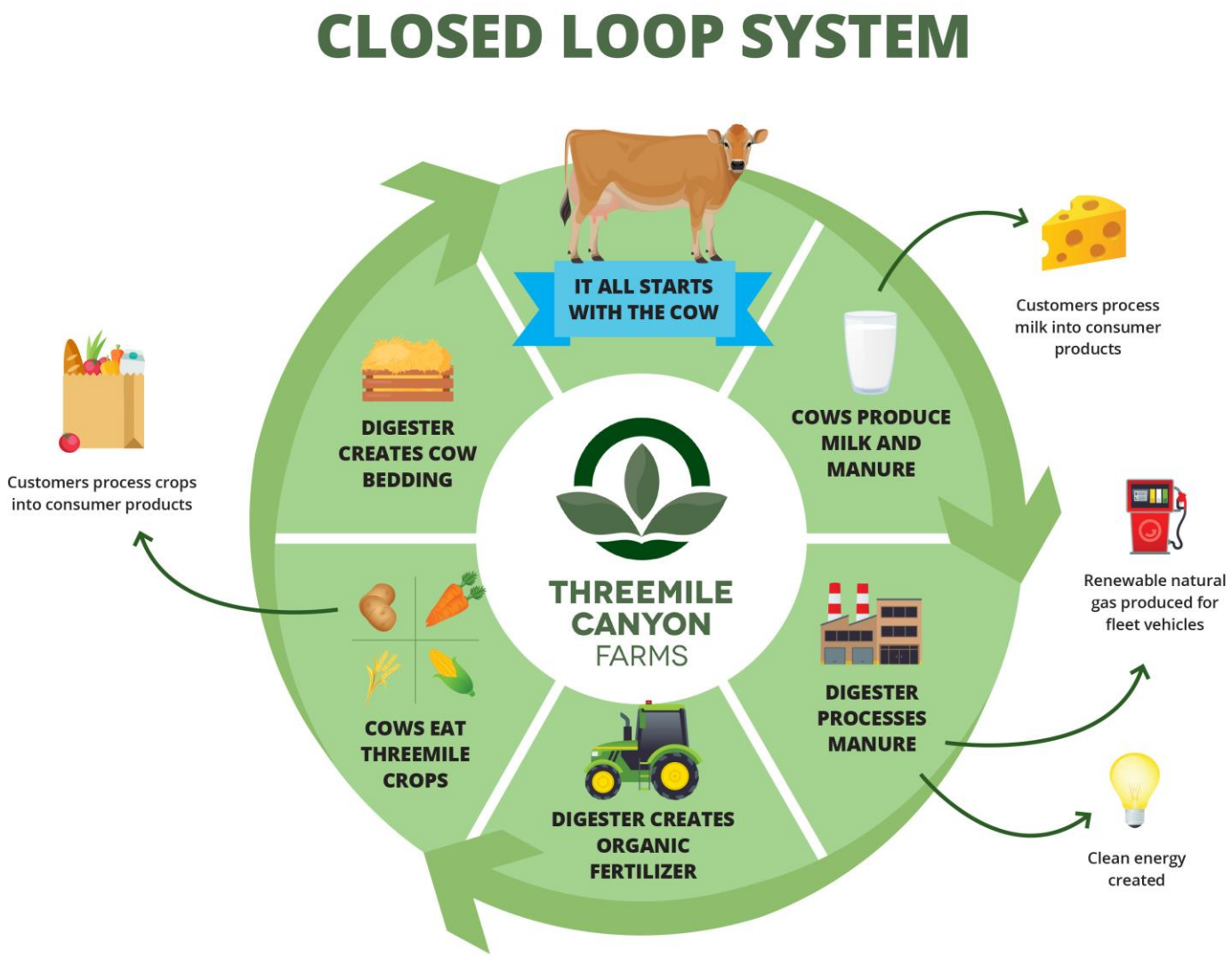
Reducing GHG emissions

Sequesters around 136,000 metric tons per year of CO_2

Equivalent to the annual greenhouse gas emissions from 28,875 passenger vehicles

Would require 160,000 acres of forest land to have the same impact

Renewable natural gas produced from the digester is carbon negative



Nothing is wasted in Threemile's closed loop system

- Farm and dairy produce consumer goods for a growing population
- Digester creates renewable natural gas, clean energy, organic fertilizer and cow bedding
- Cows eat crops grown on farm

Confined Animal Feeding Operation

THREEMILE CANYON FARMS

- **10 CAFOs in LUBGWMA at time of second action plan.**
- **Each facility operates under a water quality permit**
  - **NPDES Permit or WPCF Permit**
  - **Inspections for compliance**
- **Operate under an approved Animal Waste Mgmt Plan.**
- **Groundwater Monitoring wells**

2nd Action Plan CAFO GOALS

THREEMILE CANYON FARMS

- **Goal 1: Collect, contain, treat and/or store manure and process wastewater CAFO's in a manner that is protective of groundwater.**
- **Goal 2: Beneficially utilize nutrients at CAFOs and prevent leaching of nutrients.**
- **Goal 3: Keep current with CAFO BMPs and provide CAFO education outreach**

THREEMILE CANYON FARMS

Thank You

De-Nitrification of Irrigon's Wastewater

A City's Journey to Safer Water

Darrell Gale

August 17, 2023

AGENDA

- Introduction and Overview
- Brief History
- Pilot Study – Methanol Injection
- DEQ SRLFP/CBDG (design and construction)
- Methanol Injection Program
- Conclusion and Questions

INTRODUCTION AND OVERVIEW

The City of Irrigon has been under a MAO (Mutual Agreement Order) with DEQ to improve our WWTP Operations of discharge and waste.

A brief on where we came from and where we are headed will be provided. We do not have all the answers but do have successes in being good stewards and operators.

BRIEF HISTORY

Many systems and process can add contaminates to the ground water.

Irrigon began collecting the effluent from city property tanks in 1988. Subsequently Irrigon applied and was granted a WPCF permit through DEQ.

With on-site tanks known to produce high nitrates efforts to mitigate the problems by pumping the effluent to riparian basins and the city was forced to design and build a treatment facility.

BRIEF HISTORY CONT.

In 2004 the new Bio-Lac system was constructed to meet and control high levels of nitrates. Only a small percentage of improvements were met at that time. Irrigon was committed to a 20-year plan to build a "conventional" system.

Miles of deep collector pipes and access manholes were required, with outstanding expenditures for a small community.

As flows increased and DEQ levels of nitrates tightened the treatment plant and began triggering red flags and caused DEQ non-compliance letters to be levied against the city.

PILOT STUDY – METHANOL INJECTION

It became clear that this system alone could not manage nor reduce the increasing levels of nitrates, especially during cold weather.

The city embarked on a 3-year pilot study to confirm the viability of using food grade methanal as a food source. Multiple products were tried to see if nitrates would be reduced, such as sugar, molasses, and dog food, but these methods failed.

DEQ SRLFP/CBDG FUNDING

In 2015 the City of Irrigon was awarded a Block grant combined with a loan through the DEQ State Revolving Loan Funding Program to design and constructed increased capacity of conventional sewer to serve the Bio-lac WWTP system. This was to increase solids to assist with de-nitrification.

However, this alone was not sufficient to meet the need during the cold weather and meet the increased DEQ permit requirements for those located in the LUBGWMA. Additional funding was sought through the DEQ SRLFP for denitrification.

METHANAL INJECTION PROGRAM

In 2021 the design and construction of an approved DEQ methanal injection system was implemented. With provisions made to service components as well as environmental protection, the system now runs as expected. Current warm weather BOD loading the plan maintains around 2-3 nitrate in the effluent.

In the colder weather (October – March) the switch to methanal, maintaining a level of 2-4 Ppm of nitrate. While natural processes show 2 Ppm or lower this level combined with the treatment and process of Irrigon's WWTP well within our WPCF permit requirements, maintaining a nitrate livable and safe environment.

CONCLUSION

Questions

For additional information

Aaron Palmquist – Irrigon City Manager
manager@ci.irrigon.or.us

A Perspective from the Industry

Debbie Radie
Boardman Foods

Livestock Subcommittee Updates

Committee Sub-chairs:

Tom Straughan – Umatilla SWCD Board Member, Treas/Sec

3.5 Livestock Goals, Objectives, Strategies, Actions

- Goal 1: Reduce groundwater nitrate concentrations caused by livestock.
- Goal 2: Organize outreach and education efforts to increase community awareness of groundwater vulnerability and best management practices for livestock operations.
- Goal 3: Identify best management practices (BMP) effectiveness and best management practice adoption of updated BMP's

Goal 1: Reduce groundwater nitrate concentrations caused by livestock.

Objectives: By 2020, determine sub-regions of the GWMA with high risk of groundwater contamination from livestock operations.

- Strategy 1.1: ODA and the SWCDs will complete a comprehensive inventory of large and small livestock operations including acreage, irrigation methods and drainage paths.
- Actions:
- Inventory large and small livestock operations.(Cursory inventory completed in 2019 by Umatilla SWCD)
- Inventory livestock operations manure and irrigation management (More in depth inventory TBC 2021)
- Assess information to determine sub-regions of the GWMA with highest risk of groundwater contamination from livestock operations. (Will be completed 2021)
- Responsible Entity: ODA, Morrow and Umatilla SWCDs
- Schedule: 2020

Goal 1: Reduce groundwater nitrate concentrations caused by livestock.

- Strategy 1.2: Select and implement a Focus Area (FA) in the GWMA.
- Actions:
- Based on initial inventory, the SWCDs will select a sub-region determined to be a high risk of groundwater pollution The intent in selecting Focus Areas is to deliver systematic, concentrated outreach and technical assistance in small geographic areas through the SWCDs and other partners. (TBC after inventory)
- Working within a Focus Area is not intended to prevent implementation within the remainder of the GWMA. The remainder of the GWMA will continue to be addressed through general outreach and technical assistance.
- Responsible Entity: ODA, Morrow and Umatilla SWCDs
- Schedule: 2020 (timeline will need to be adjusted due to COVID and the way the Focus Area system work)

Goal 2: Organize outreach and education efforts to increase community awareness of groundwater vulnerability and best management practices for livestock operations.

- Objectives:
- In three years, a survey of livestock producers and field representatives in the GWMA shows that 90% are aware of the GWMA and 25% are taking steps to protect groundwater.
- By 2020, the number of livestock operations converting from flood irrigation to sprinklers have increased by 20%. (Will be completed through use of Focus Area)

Goal 2: Organize outreach and education efforts to increase community awareness of groundwater vulnerability and best management practices for livestock operations.

- Strategy 2.1 Write and publish articles to promote and improve the livestock producer's awareness of water quality issues in the GWMA. (Current NFWF CPP Grant form Umatilla SWCD brings capacity for outreach)
- Actions:
- Implement LUBGWMA Outreach Plan. Organize and deliver workshops and demonstration projects aimed at livestock producers to show BMP implementation and foster improved BMP use.
- Work with the Umatilla and Morrow County Land Use Departments to review and update county livestock ordinances for compatibility with GWMA goals.
- Once a year, provide an update on the status of the Lower Umatilla Basin GWMA and associated water quality data in each of the Umatilla & Morrow County SWCD newsletters. This should begin in the first state fiscal year after DEQ approves and implements the Local Action Plan.
- Publish two media articles or public service announcements per year in the LUBGWMA about FA activities and successful agricultural resource management practices.
- Work with Irrigation Districts to continue upgrading delivery systems and conversion of flood irrigation to sprinkler and drip systems.
- Work with ROGS committee to address livestock operations in small acreage rural residential settings.
- Responsible Entity: Morrow and Umatilla SWCDs Schedule: 2020 (needs to be adjusted with Focus Area timeline)

Goal 2: Organize outreach and education efforts to increase community awareness of groundwater vulnerability and best management practices for livestock operations.

- Strategy 2.2 Share information and coordinate with agribusiness, producers, and producer groups to promote groundwater quality. (will begin in conjunction with Focus Area, COVID depending)
- Actions
- Meet with agribusiness field representatives active in the LUBGWMA to review the groundwater nitrate issue and share appropriate outreach materials from ODA, DEQ, SWCDs, OSU Extension Service, and other appropriate sources. This should occur once every two years. Some possible ways to meet with field representatives include:
  - • Grower meetings, Hermiston Farm Fair. • Individual company meetings. • Oregon Agriculture Chemical and Fertilizer safety training workshops. • Breakfast or lunch for local field representatives sponsored by local SWCDs and partners such as ODA, OSU Extension Service, and Natural Resource Conservation Service.
- Each SWCD will deliver one groundwater quality presentation (either as a stand-alone presentation or part of a broader presentation) at one Ag-related or producer group meeting per year.
- Target one producer group per year and distribute OSU Extension Service best management practice (BMP) descriptions to producers and field representatives.
- Make at least 20 groundwater quality contacts per year within the areas served by the Umatilla and Morrow SWCDs.
- Deliver compliance and BMP implementation % and success rates discovered in initial FA implementation. Have operators located in FA describe process from their perspective. Responsible Entity: Morrow and Umatilla SWCDs Schedule: 2020 (needs to be adjusted with Focus Area timeline)

Goal 2: Organize outreach and education efforts to increase community awareness of groundwater vulnerability and best management practices for livestock operations.

- Strategy 2.3 Encourage conversion of flood irrigation systems to more efficient systems. (Focus area will bring in small grant dollars for conversions)
- Actions:
- Work with Irrigation Districts and irrigators to continue upgrading delivery systems and conversion of flood irrigation to more efficient systems. Assist landowners in obtaining financial support for conversion of flood irrigation to more efficient system
- Responsible Entity: Morrow and Umatilla SWCDs Schedule: 2020 (needs to be adjusted with Focus Area timeline)

Goal 3: Identify best management practices (BMP) effectiveness and best management practice adoption of updated BMP's

- Objectives: ODA and SWCDs will survey local livestock owners for currently used BMPS, evaluate and publish results to the livestock community. (Current NFWF CPP grant has capacity for BMP guidebook related to soil health, including crossover practices. Publishing 2021.)
- Responsible Entity: ODA, Morrow and Umatilla SWCDs Schedule: 2020
- Strategy 3.1: Write and publish articles to promote and improve the livestock producer's awareness of current BMPs in the GWMA (part of Focus Area Effort).
- Actions:
- Organize and deliver workshops and demonstration projects aimed at livestock producers to show BMP implementation and foster improved BMP use.
- Review county livestock ordinances for compatibility with GWMA goals.
- Collaborate with OSU, SWCDs on the updated list of BMPS that should be utilized more frequently to protect groundwater quality.
- Survey (2nd time) local livestock owners of updated BMPS, evaluate and publish results to the livestock community and document changes.
- Responsible Entity: Morrow and Umatilla SWCDs Schedule: 2020 (needs to be adjusted with Focus Area timeline)

Goal 3: Identify best management practices (BMP) effectiveness and best management practice adoption of updated BMP's

- Strategy 3.2: Develop methodology to assist landowners to evaluate the proper carrying capacity of pastures. (Current NFWF CPP grant has funds for soil testing, to be completed 2021)
- Actions:
- Assist landowners determine carrying capacity of pasture by evaluating soil and pasture health.
- Use soil sampling and tissue sampling techniques to determine individual pasture health based on soil fertility and plant health (organic matter, protein and carbohydrate content).
- Responsible Entity: Morrow and Umatilla SWCDs Schedule: 2020 (needs to be adjusted with Focus Area timeline)

In Summary:

- 2021 Schedule:
  - Complete inventory, soil tests, outreach (COVID depending), BMP guidebook, select region that would suit Focus Area
- 2022 – 2024?:
  - Start Focus Area through normal ODA channels, enabling the capacity to reach the rest of the goals

1:00 pm – 2:20 pm

Best Management Practices in LUBGWMA

- **Jake Madison** : A Perspective from Production Agriculture

Madison Ranches

- **Gregg Harris** : A Perspective from Confined Animal Feeding Operation

Threemile Canyon

- **Darrell Gale** : A Perspective from the City

City of Irrigon

- **Debbie Radie** : A Perspective from the Industry – Indirect through Port of Morrow

Boardman Foods

- **Tom Straughan** : A Perspective from Livestock

Break

10 min

2:20 pm – 2:30 pm

Evaluation of the Second Action Plan and Prioritization of Goals

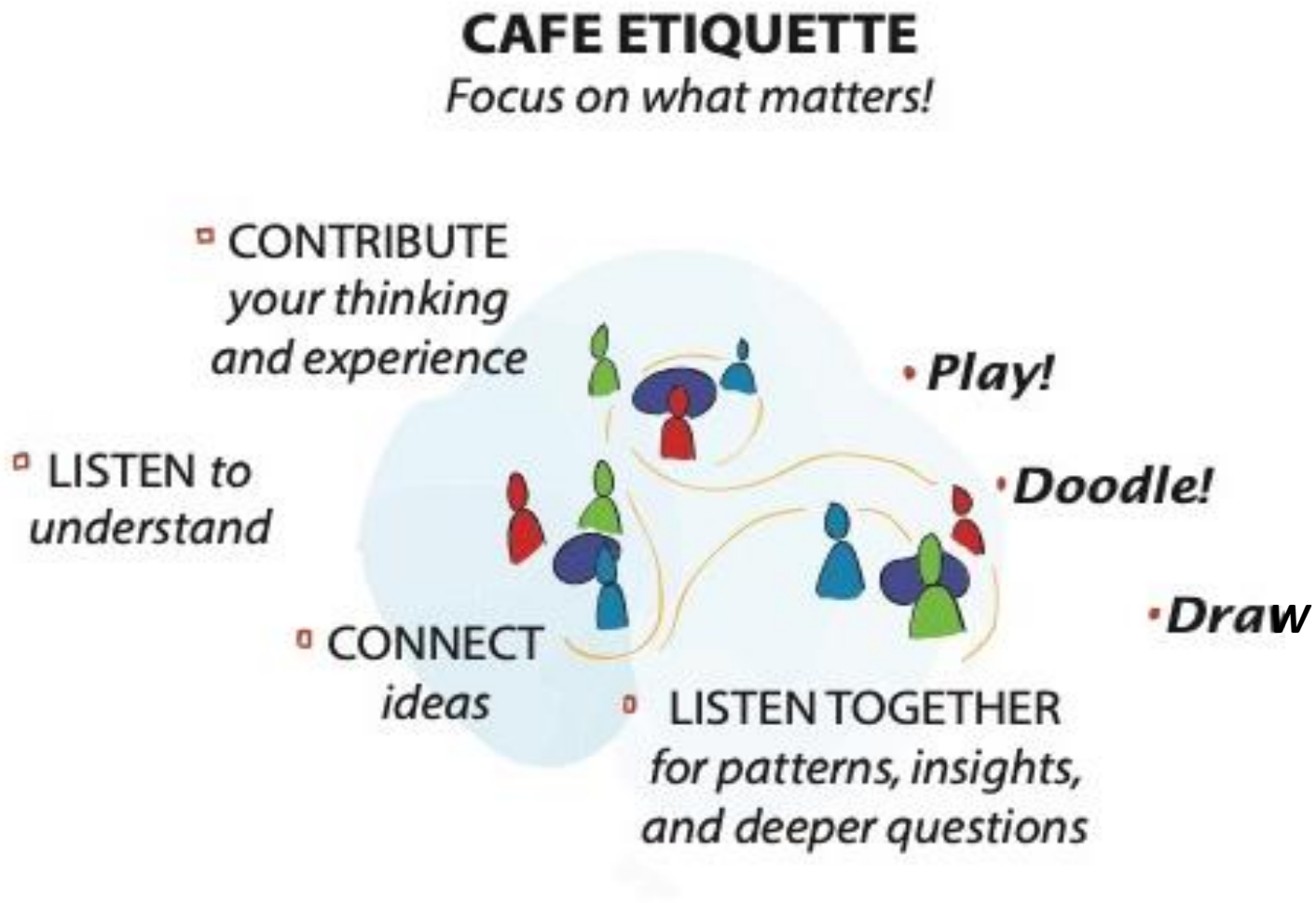
World Café

2:30 pm – 4:15pm

All Participants: Breakout Session and Discussion

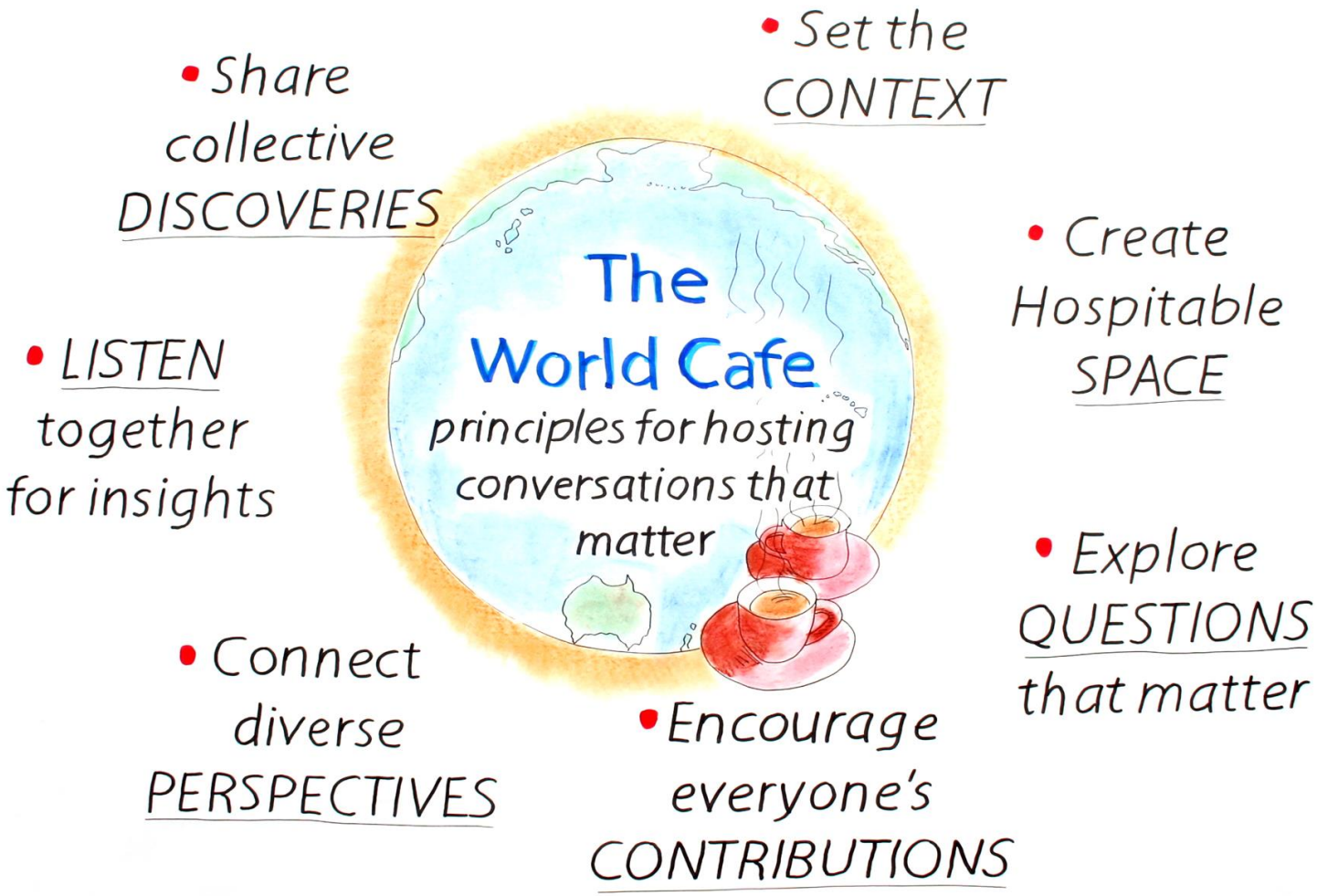
Café Etiquette

Focus on what Matters



The World Cafe

Exploring Questions that Matter



World Café Process

Focus on what Matters

1. Refer to survey results and presentations
2. Discuss the question provided to the group
3. Write, draw and summarize
4. When bell rings one person stays as the table host to welcome others
5. The rest of the table spread out to neighboring tables
6. Table host summarizes and table mates build on the existing information
7. Move to a new table as directed by facilitator
8. Return to the original table, combine efforts with a second table and develop recommendations
9. Focus on developing recommendations that provide the LUBGWMA Committee direction
10. Report out and vote on recommendations

The Goals of the Committee

Focus on what Matters

- **Develop and promote long-term strategies and plans to reduce groundwater nitrate levels in the LUBGWMA to less than 7.0 mg/l**
- **Repeal the GWMA declaration**

What is the Purpose of our work?

Focus on what Matters

Help to Build an Actionable Roadmap to Success

Identify Our Priorities, Goals, Solutions, and Resources

Café Question

Focus on what Matters

Considering the voluntary nature of the LUBGWMA Committee and our limited resources in terms of personnel and funds, which specific action plans and goals from the Second Action Plan should we prioritize to maximize the committee's effectiveness?

Café Question

Focus on what Matters

If the LUBGWMA Committee were allocated a budget of $1 million, which of the following ideas should be prioritized to address the nitrate contamination in the LUBGWMA most effectively?

Café Question

Focus on what Matters

What essential foundational resources should the LUBGWMA Committee prioritize to ensure its success, and where can these resources be effectively obtained?

Break

15 min

4:15 pm – 4:30 pm

Recap and Step Forward

- *Tim Timothy Corey*
- *Salini Sasidharan*
- *HDR*

Development of an Actionable Outcome such as a proposal for a bill or emergency fund or federal grant

Q & A and Discussion

Closing Remark

Salini Sasidharan

Oregon State University

LUBGWMA Committee Chair


Embrace challenges as opportunities, obstacles as stepping-stones. Every step of the journey shapes our potential. Together, let's reach new heights