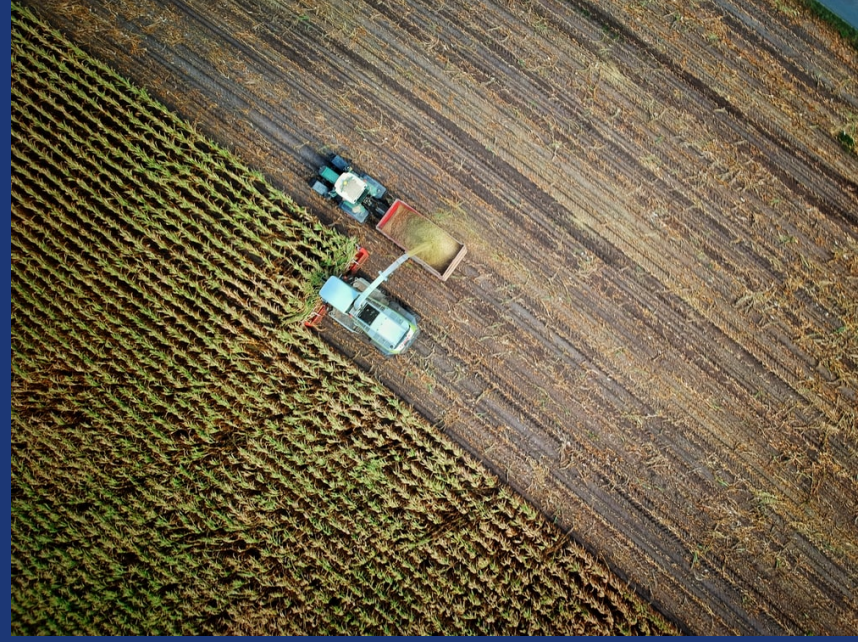

Reducing the Health Impacts of the Nitrogen Problem

Catherine L. Kling
Tisch University Professor, Dyson School of Applied Economics and Management

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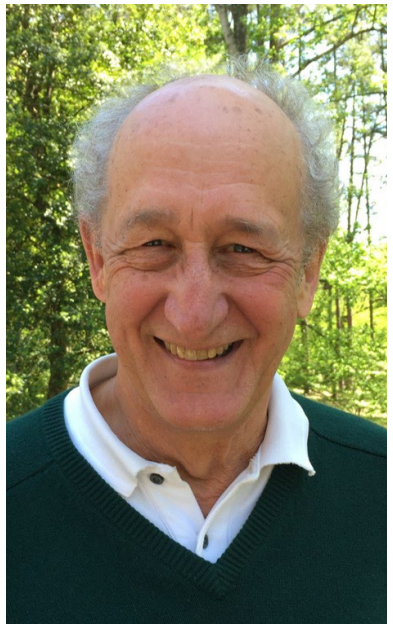
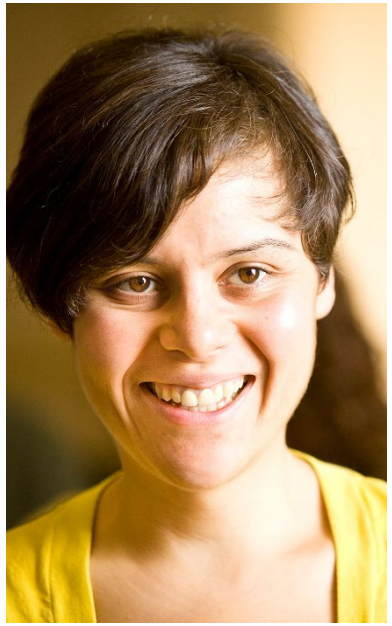
Elena Austin
U. Washington

Jerry Hatfield
USDA-ARS (retired)



Jim Galloway
U. Virginia



Jennifer McPartland
EDF

Robyn Wilson
Ohio State

Raj Khosla
Kansas State

Planning Committee

NAS Staff: Kara Laney, Senior Program Officer Board on Agriculture and Natural Resources
Sarah Harper, Program Assistant, Board on Chemical Sciences and Technology

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Opportunities in U.S. agriculture to reduce public health risks of nitrogen in water.

Workshop Goals:

1. Information exchange. Bring together experts to provide high level understanding of the state of scientific knowledge (natural, physical, and social) and current policies addressing agricultural sources of nitrogen in water.

2. Informed discussion. From that foundation, provide a platform to consider possible actions to address these problems (including producers, consumers, NGOs, state and federal government policies).

3. Accelerate progress. New technology, changes in policy, behavioral change, etc.

Workshop Products

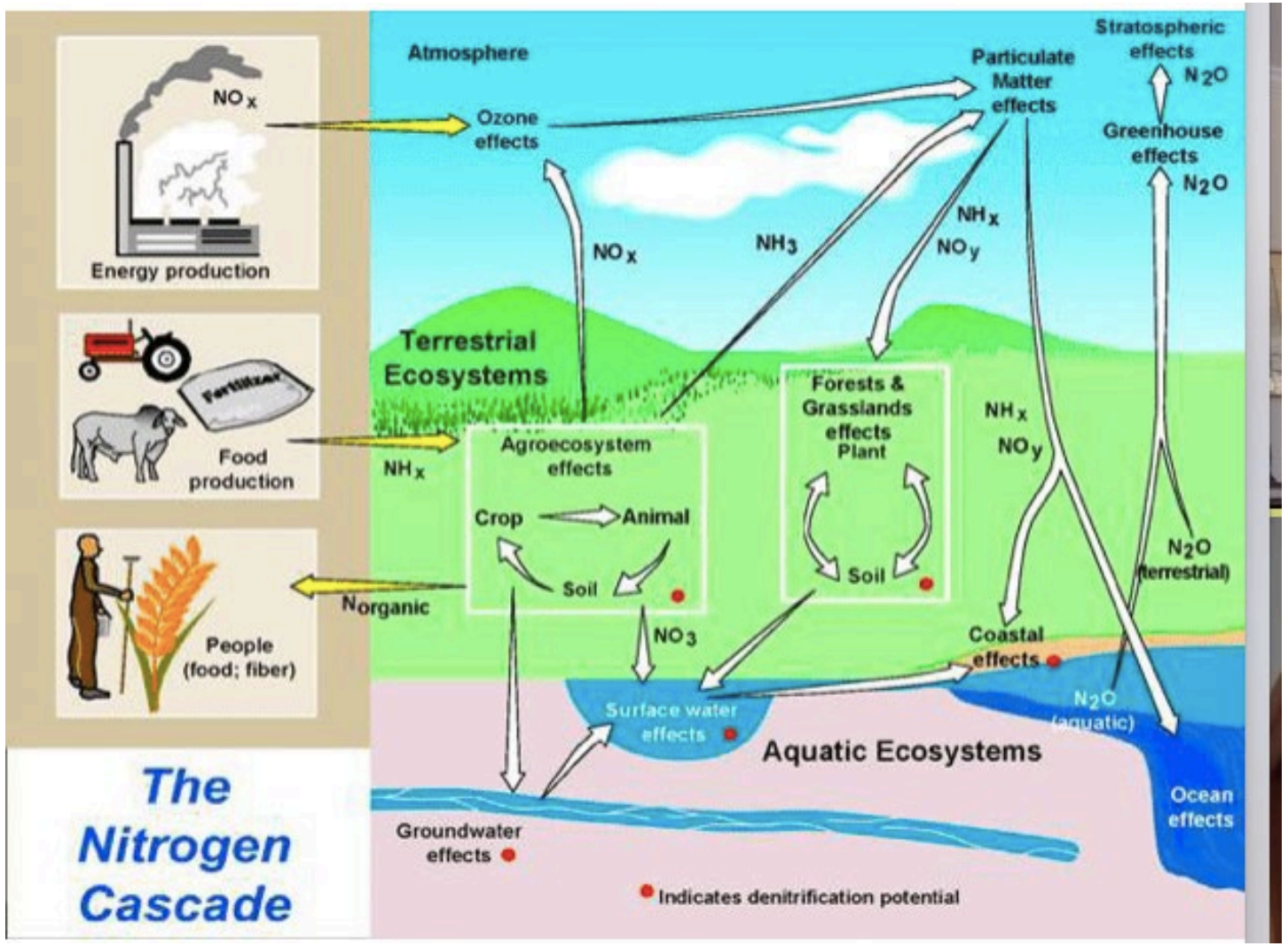
1. Robust data and science driven communication, laying a foundation for a systemwide understanding that engages public health, agriculture, economics, and policy communities

2. Discussion and synthesis identifying what we do, and don't, know about:

   - The nature and extent of human health risks from N exposure via water
   - The contribution and pathways from agriculture to that exposure
   - Changes in farming systems and land use that can reduce those exposures
   - The geographic extent and intensity of change needed
   - The economic and social costs and benefits of achieving those reductions
   - The ability of existing state and federal policies to reduce human health risk
   - New technologies on the horizon, and
   - Potential new policy, governance, and NGO practices that can achieve gains

3. The workshop will not produce conclusions or recommendations, but a summary capturing the presentations and discussions will be available after the workshop ends.

System-Wide Perspective of Nitrogen



Related and Intertwined Systems

1. Phosphorus and sediment
2. Greenhouse Gas Emissions
3. Carbon sequestration, Soil Health
4. Water Movement

Figure adapted from: James N. Galloway, John D. Aber, Jan Willem Erisman, Sybil P. Seitzinger, Robert W. Howarth, Ellis B. Cowling, B. Jack Cosby, The Nitrogen Cascade, *BioScience*, Volume 53, Issue 4, April 2003, Pages 341–356

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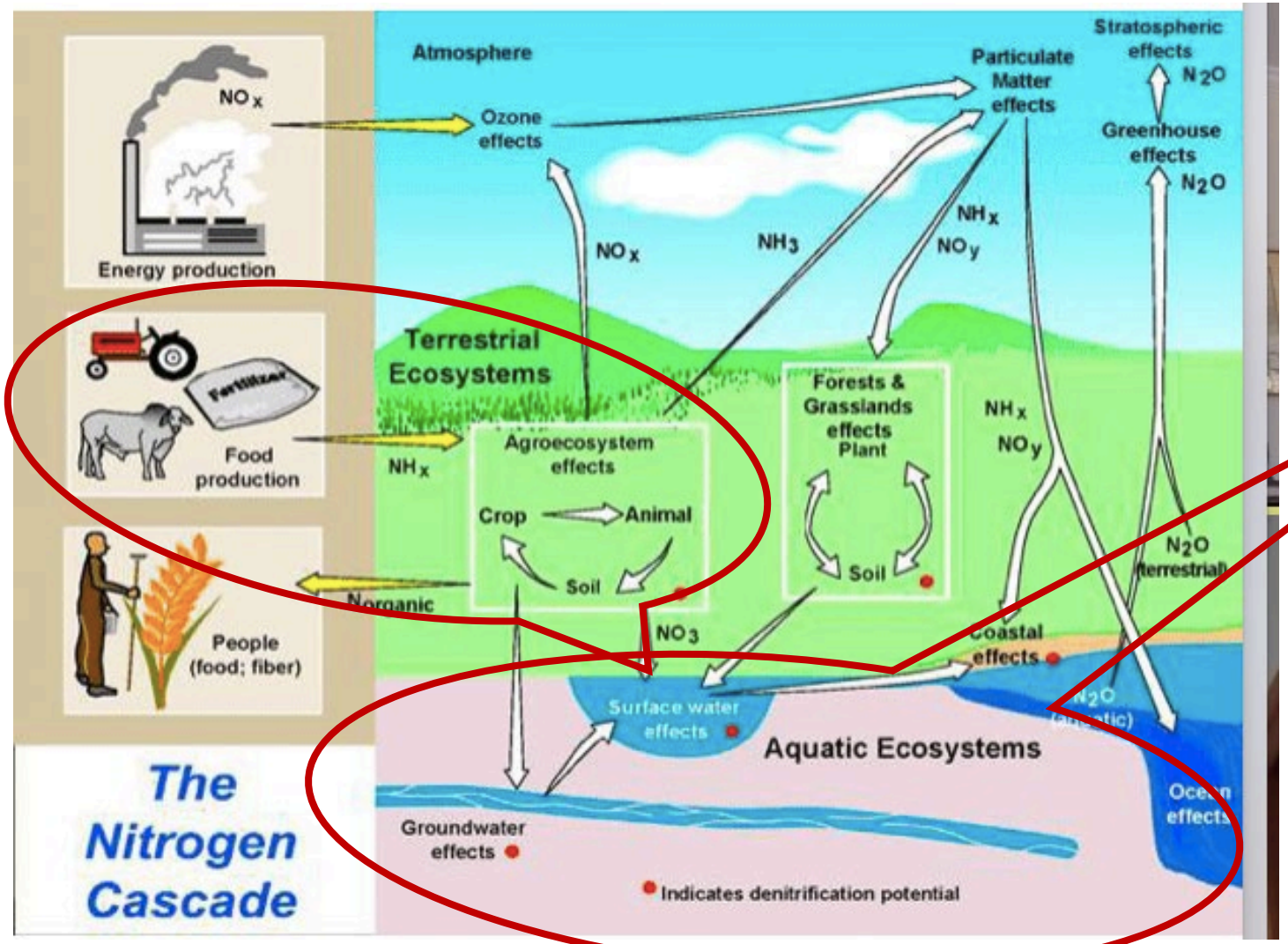
System-Wide Perspective, Focus of this Workshop



Human health effects from agricultural sources of N through water pathways

Figure adapted from: James N. Galloway, John D. Aber, Jan Willem Erisman, Sybil P. Seitzinger, Robert W. Howarth, Ellis B. Cowling, B. Jack Cosby, The Nitrogen Cascade, *BioScience*, Volume 53, Issue 4, April 2003, Pages 341–356

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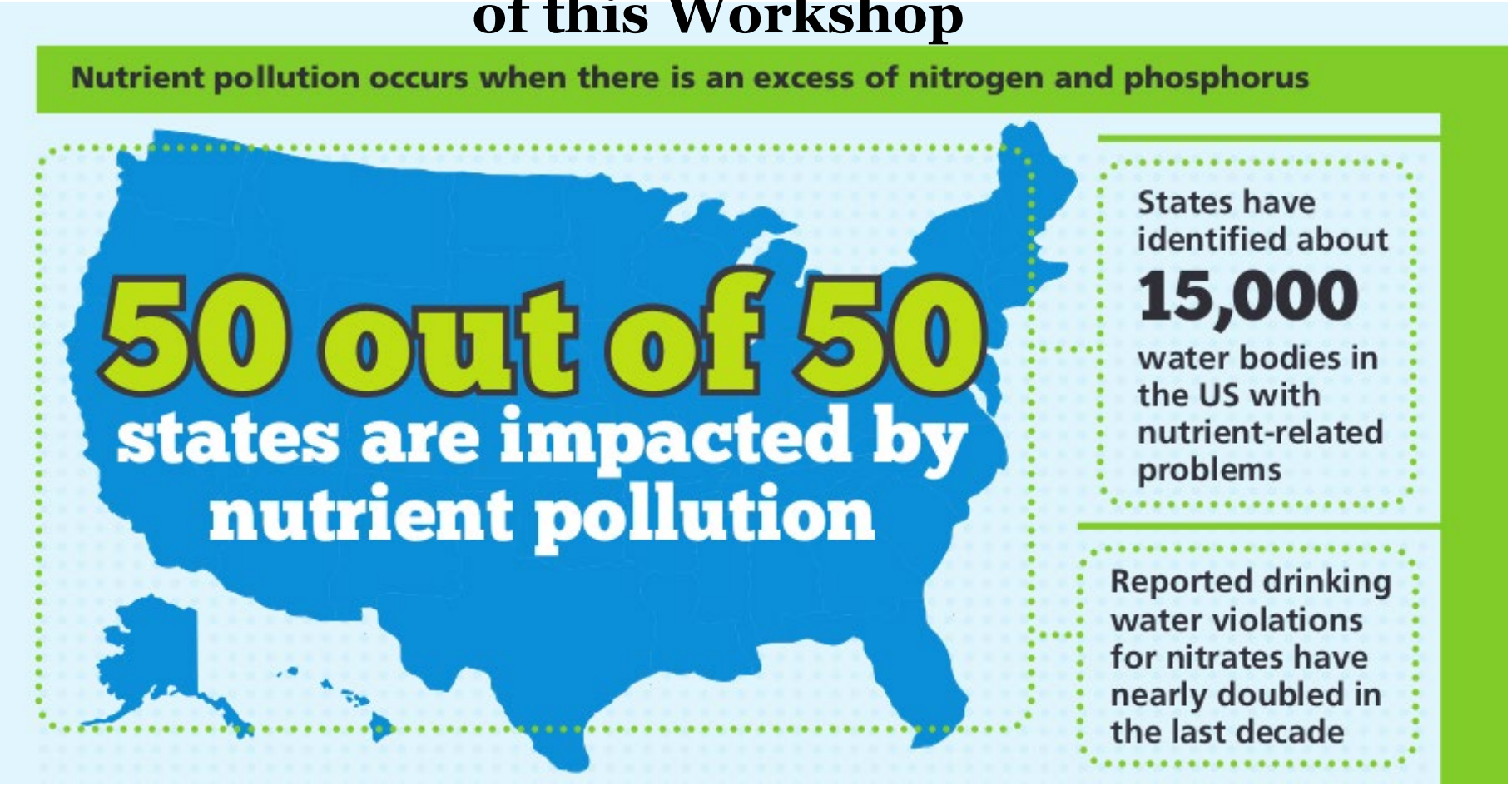
System-Wide Impact that are Important but not focus of this Workshop



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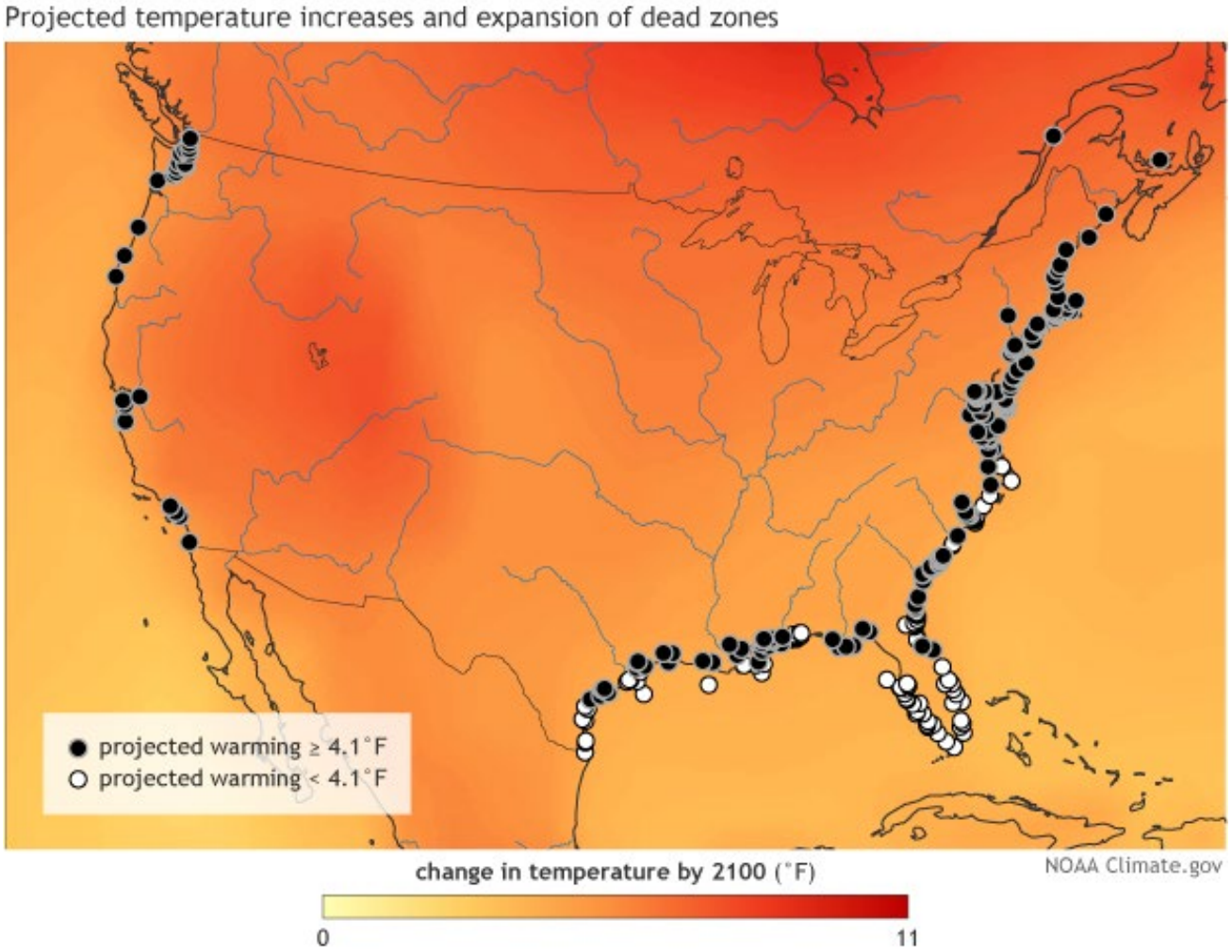
Hypoxic Zones Along US Coasts



Dead zones—coastal regions where bottom waters are so low in dissolved oxygen during the summer that marine life can't survive—are expected to increase in both size and number as climate change intensifies.

-Emily Greenhaigh

NOAA: Climate.gov

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Key Federal Regulations and Policies

Clean Water Act (1972) regulates point sources from emitting pollution into waters

- For industrial and municipal water pollution, direct regulation
- Consistent with the polluter-pays principle (as US does for air pollution)
- Agricultural sources except large animal operations are exempt from regulation, the policy is to rely on voluntary action by farmers

Safe Drinking Water Act (1974) regulates public sources of drinking water – covers 86% of US drinking water

- Establishes minimum standards to protect tap water and requires all owners or operators of public water systems to comply with these primary (health-related) standards.
- Private wells provide water for 14% of US, no required testing or treatment

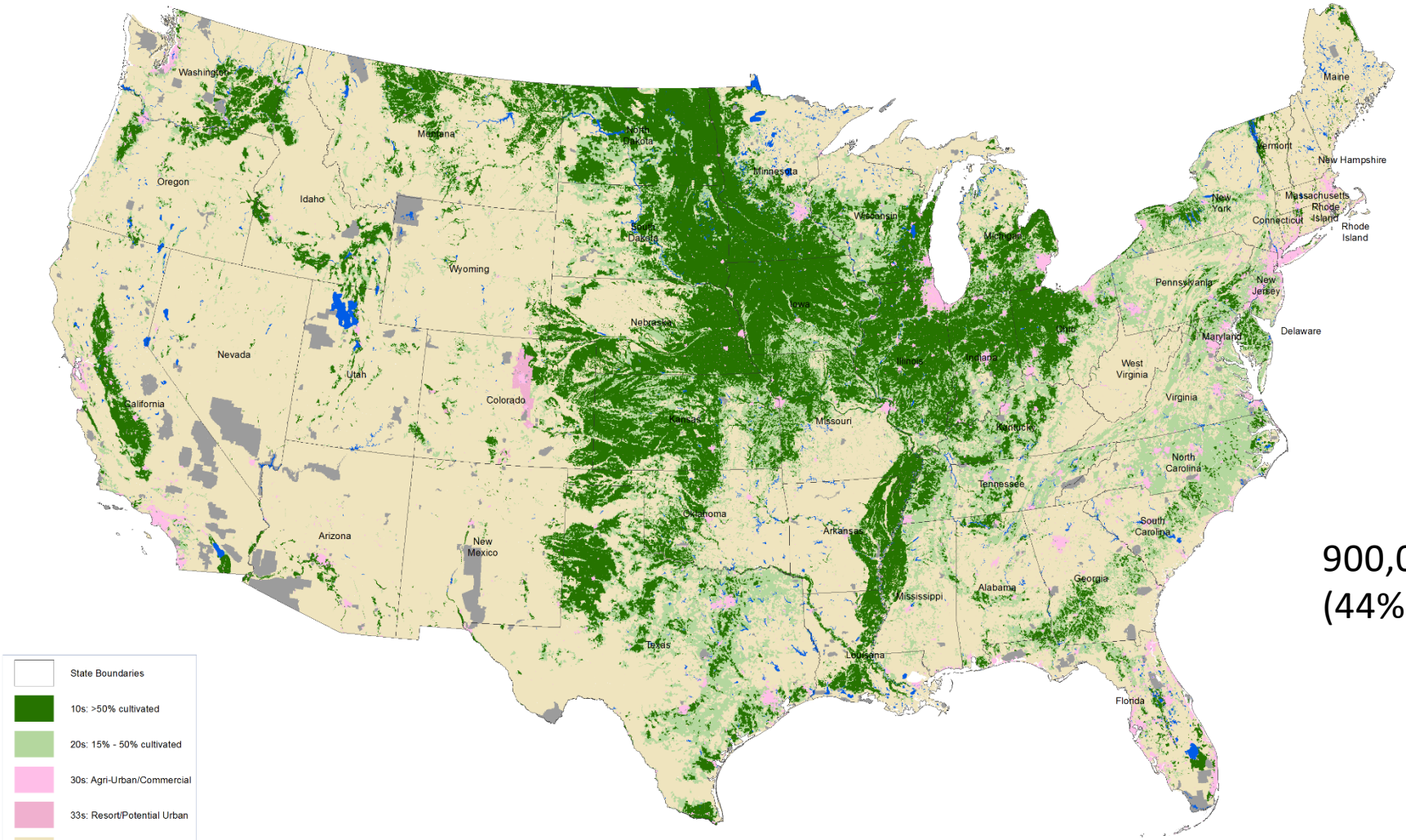
Other Federal and State Policies

USDA-NRCS Federal Conservation Federal conservation programs that pay farmers to adopt actions that reduce pollution (termed “voluntary” but farmers get paid)

State Regulations and Policies

- Some states have regulated agriculture (e.g., winter bans on manure spreading, buffers along streams)
- Florida Everglades Agricultural Area required permits to farm sugar cane, easily met 25% reduction targets
- Voluntary approaches remain primary state policy

Scale of the Agricultural Footprint



900,000,000 acres of farmland
(44% of total land area)
-2017 Ag Census

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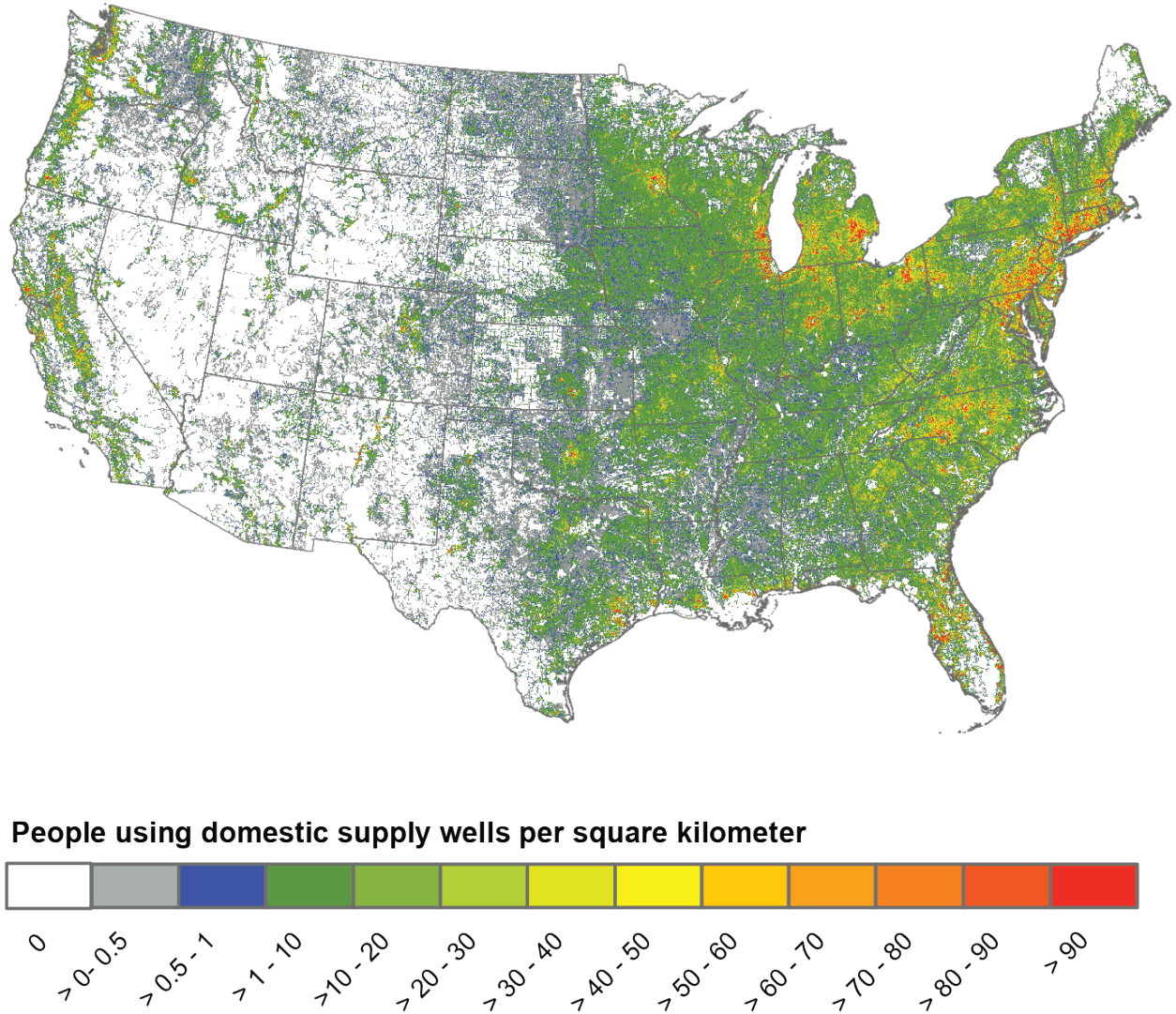
Scale of Private Drinking Water

According to the USGS National Water Quality Program 43 million people rely on private wells (about 14% of the U.S.)



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Webinar Schedule
Reducing the Health Impacts of the Nitrogen Problem

Session I. What is the Nitrogen Problem	Jan. 28, 2021
Session II. What Farm-Level Actions Could be Taken to Address the Nitrogen Problem?	Feb. 4, 2021
Session III. What Landscape-Level Actions and Innovative Technologies Could be Used to Address the Nitrogen Problem?	Feb. 11, 2021
Session IV. What Policies and Markets Could be Created to Address the Nitrogen Problem?	Feb. 18, 2021
Session V. Reflection and Synthesis	Feb. 25, 2021