

Building a Clean Water Future

Are Conservation Goals
Compatible with High
Production Agriculture?

A high-speed photograph of a water droplet rising from a surface, creating a series of concentric ripples. The droplet is perfectly spherical and reflects light, creating a bright highlight. The background is a deep blue, and the ripples are a lighter shade of blue.

Crystal A. Powers
Nebraska Water Center
University of Nebraska Extension
Daugherty Water for Food Global Institute

Super *Wicked* Problems



Today

How are we doing?

Why should we care?

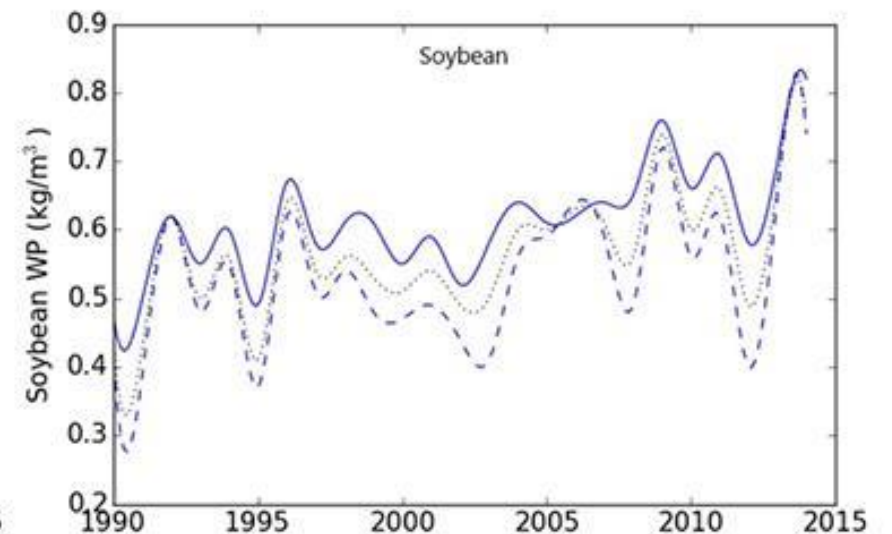
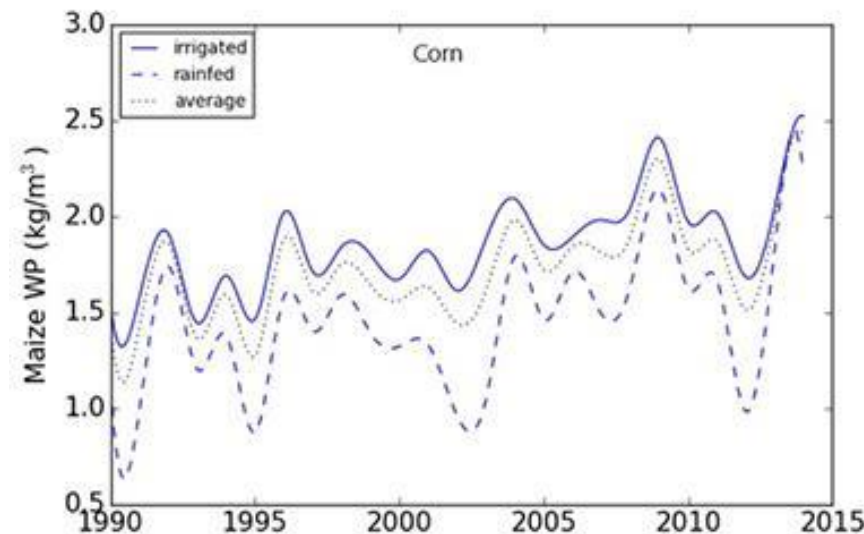
How do we get to our goals?

What is the process?

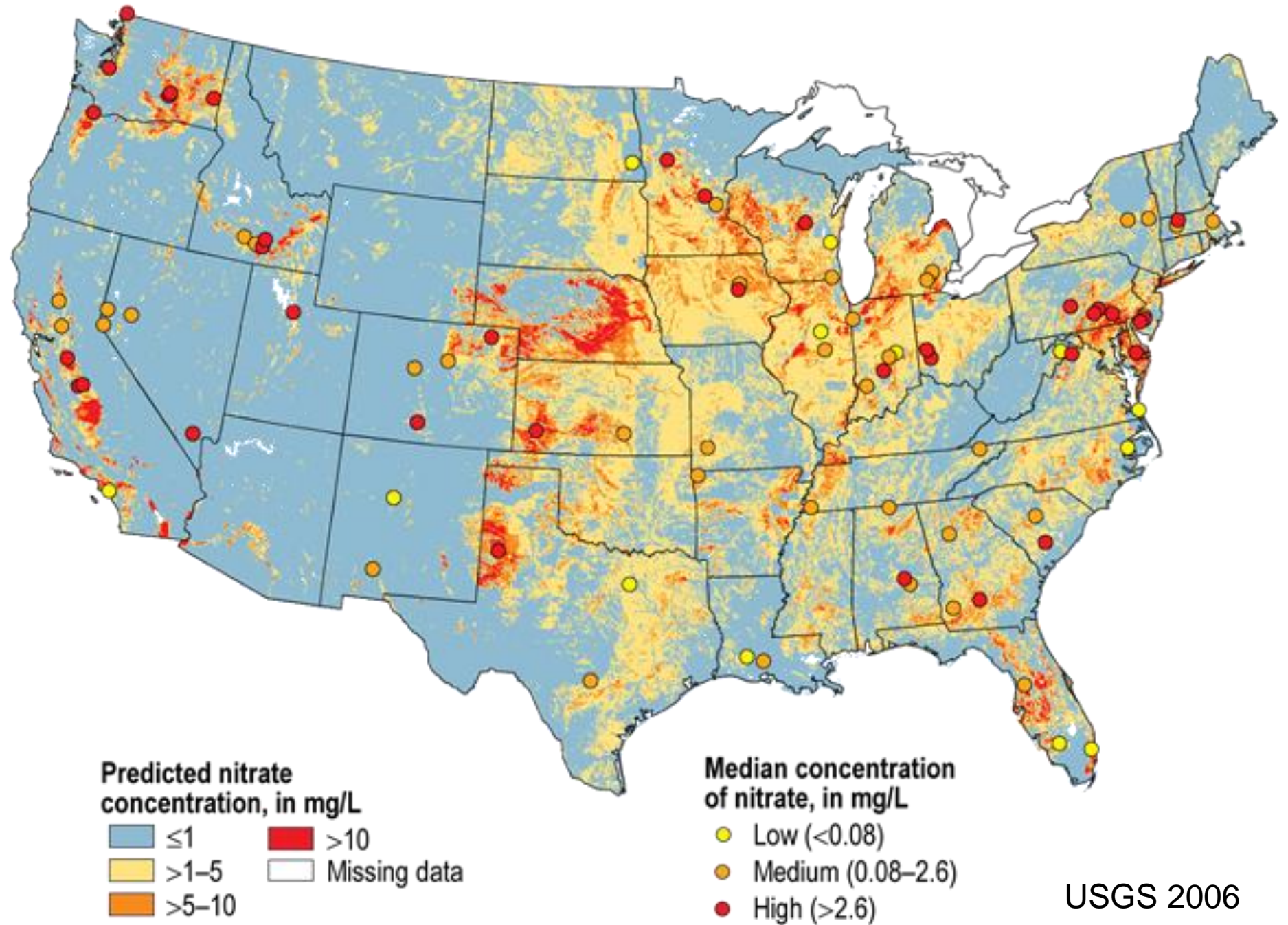
So how are we doing?

Success stories

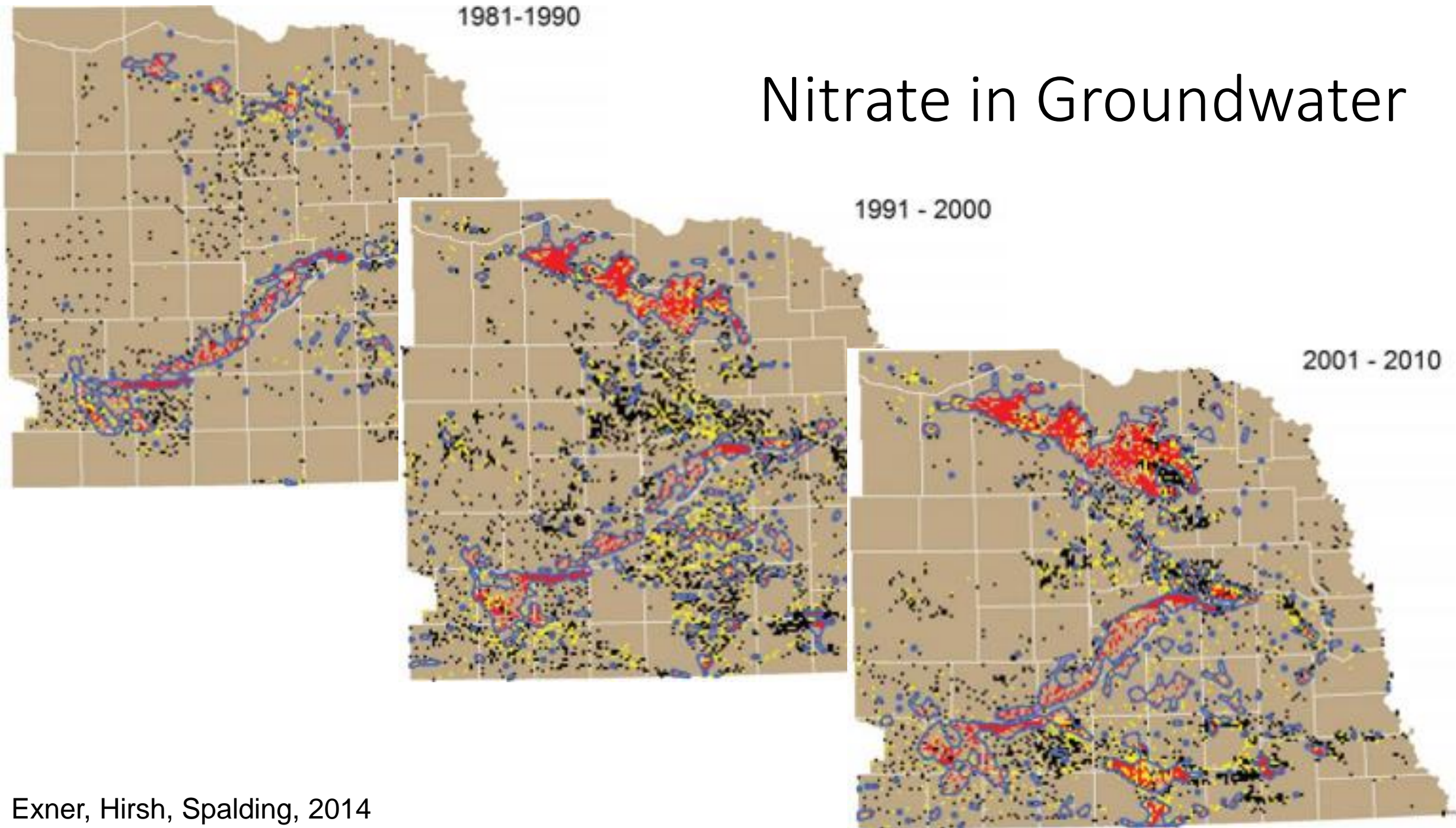
- ✓ Central Platte growers have lowered 5ppm
- ✓ 1/3 of Hastings sampled sites reduced nitrate levels over last 5 years
- ✓ Water productivity
- ✓ Nitrogen use efficiency



Nitrate Risk

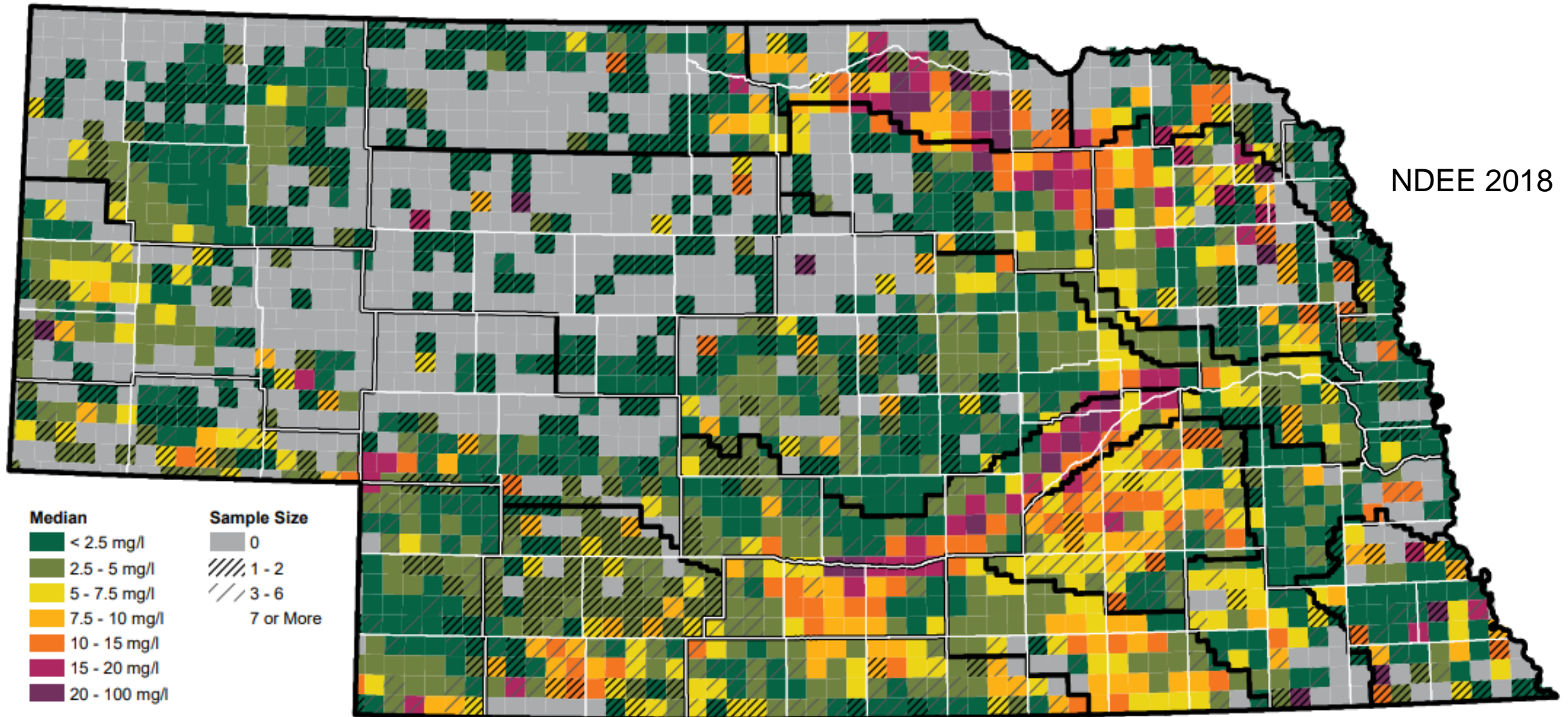


Nitrate in Groundwater



Nitrate in Groundwater

86 communities exceed standards (NDHHS 2017)



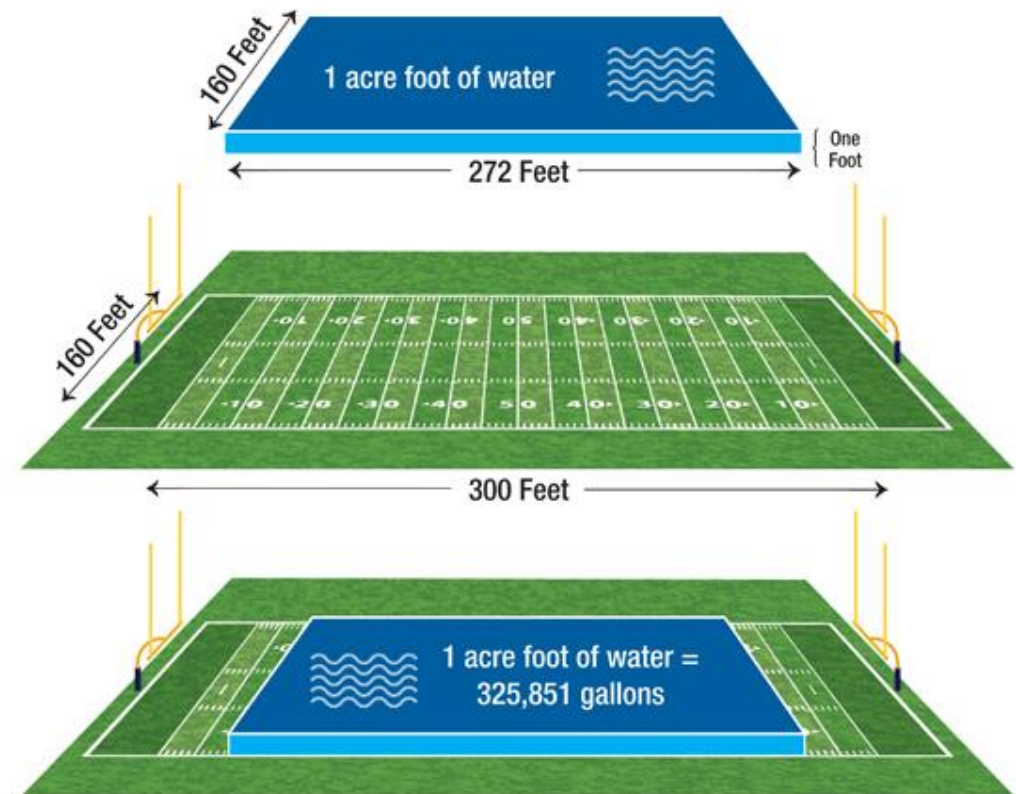
How much nitrate is in the groundwater?

Northeast Nebraska

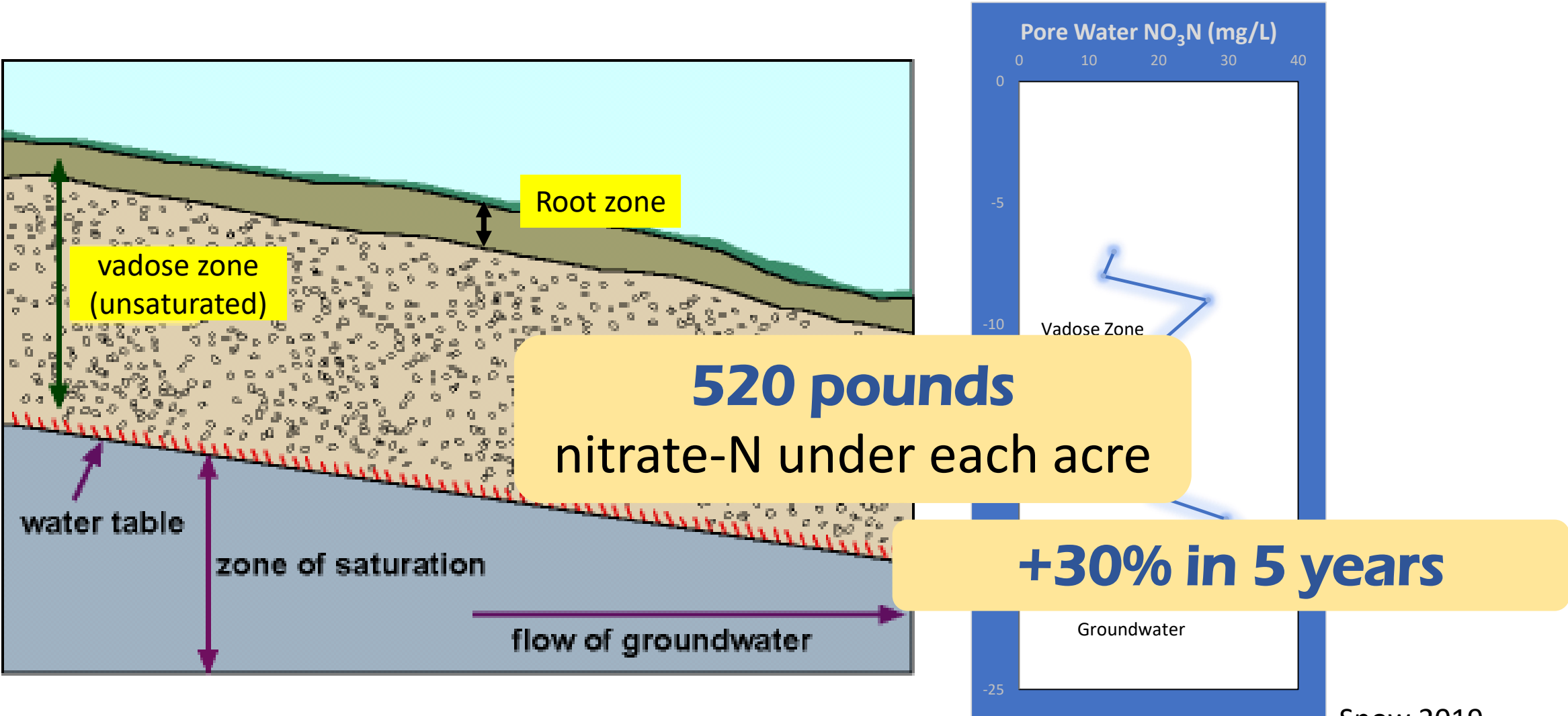
(similar aquifer conditions as UBB)

17ppm nitrate in 12 acre-ft water

578 pounds
nitrate-N under each acre



How much nitrate is on it's way to the groundwater?

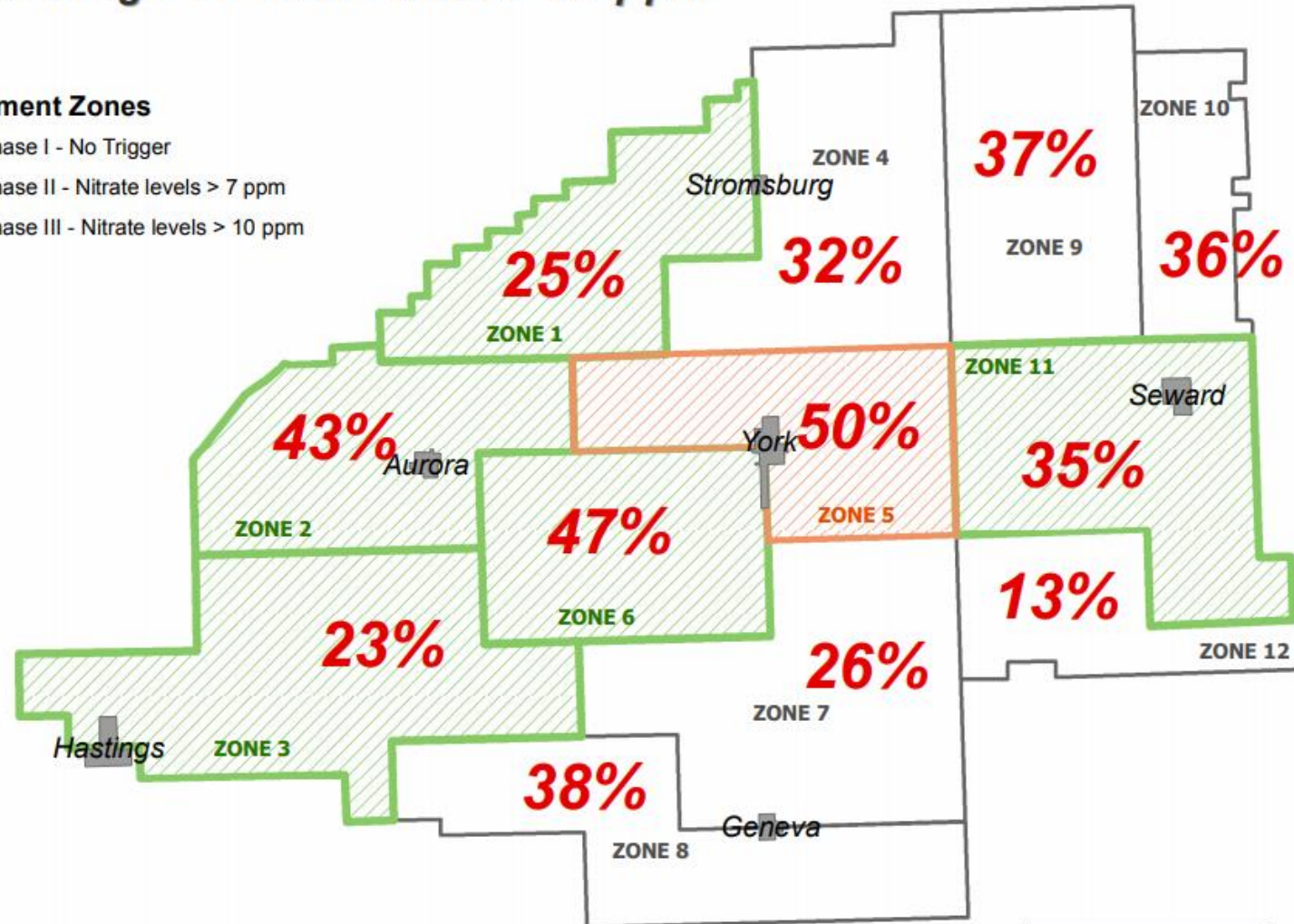


UBBNRD Fall Domestic Sampling 2018: Percentage of Wells above 10 ppm

Legend

Managment Zones

- Phase I - No Trigger
- Phase II - Nitrate levels > 7 ppm
- Phase III - Nitrate levels > 10 ppm

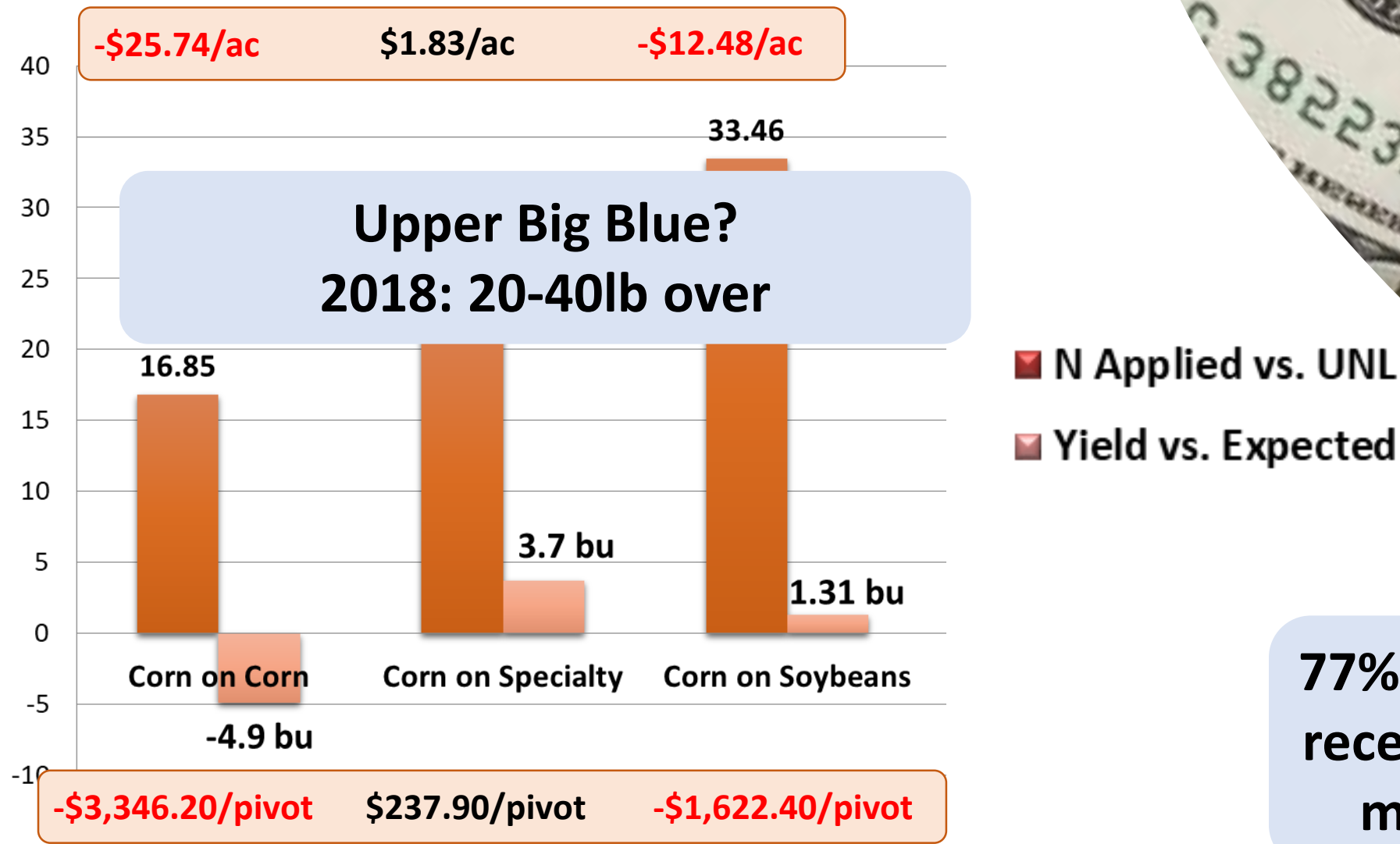


*This would indicate wells producing potential drinking water with unsafe levels of nitrate



Why should we care?

\$\$ left in field, excess N



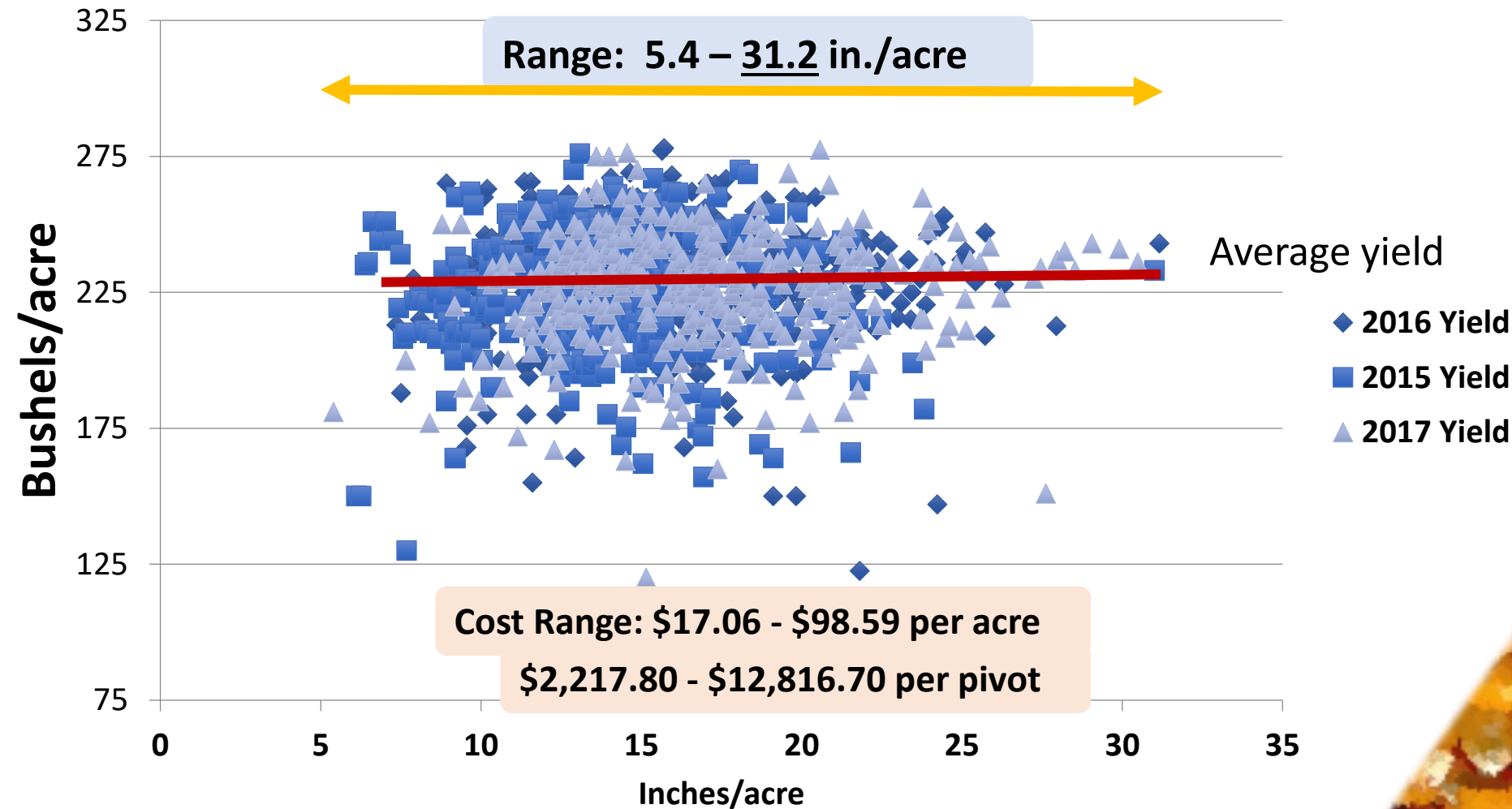
77% of fields received too much N



2015-2017 LNNRD Phase II Crop Reporting Data. Represents 190,000 corn acres.

\$\$ left in field, excess irrigation

Corn Yield vs. Water Applied



Health

Definitive link: Blue baby syndrome

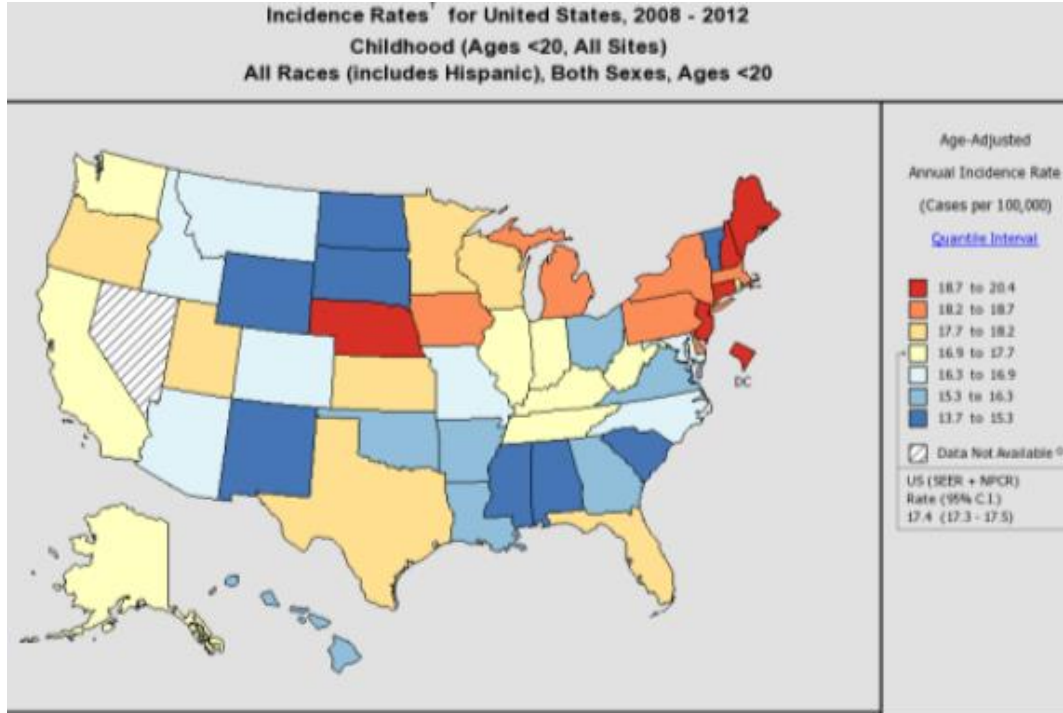
Statistically significant links:

- Cancers: particularly colorectal
(+2,300-12,000 cases annually)
- Thyroid disease
- Negative birth outcomes
(+4,700 annually)

**Each year:
\$250 million to
\$1.5 billion**

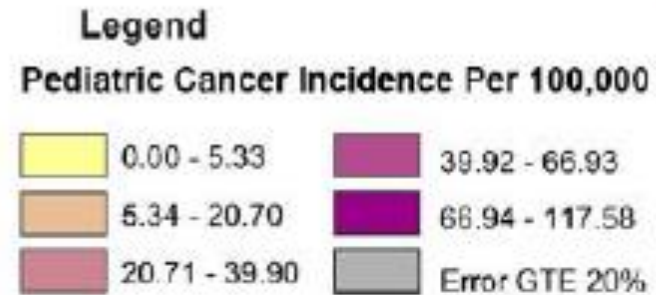
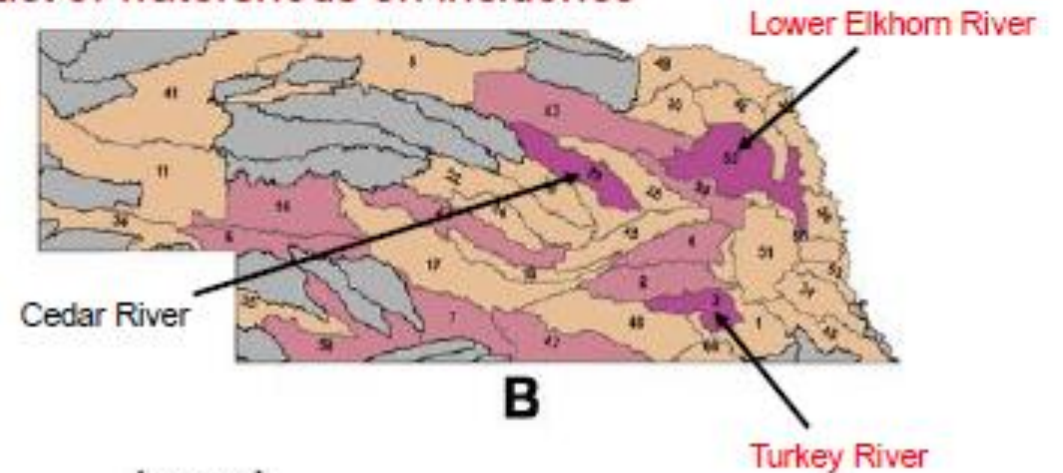


Why



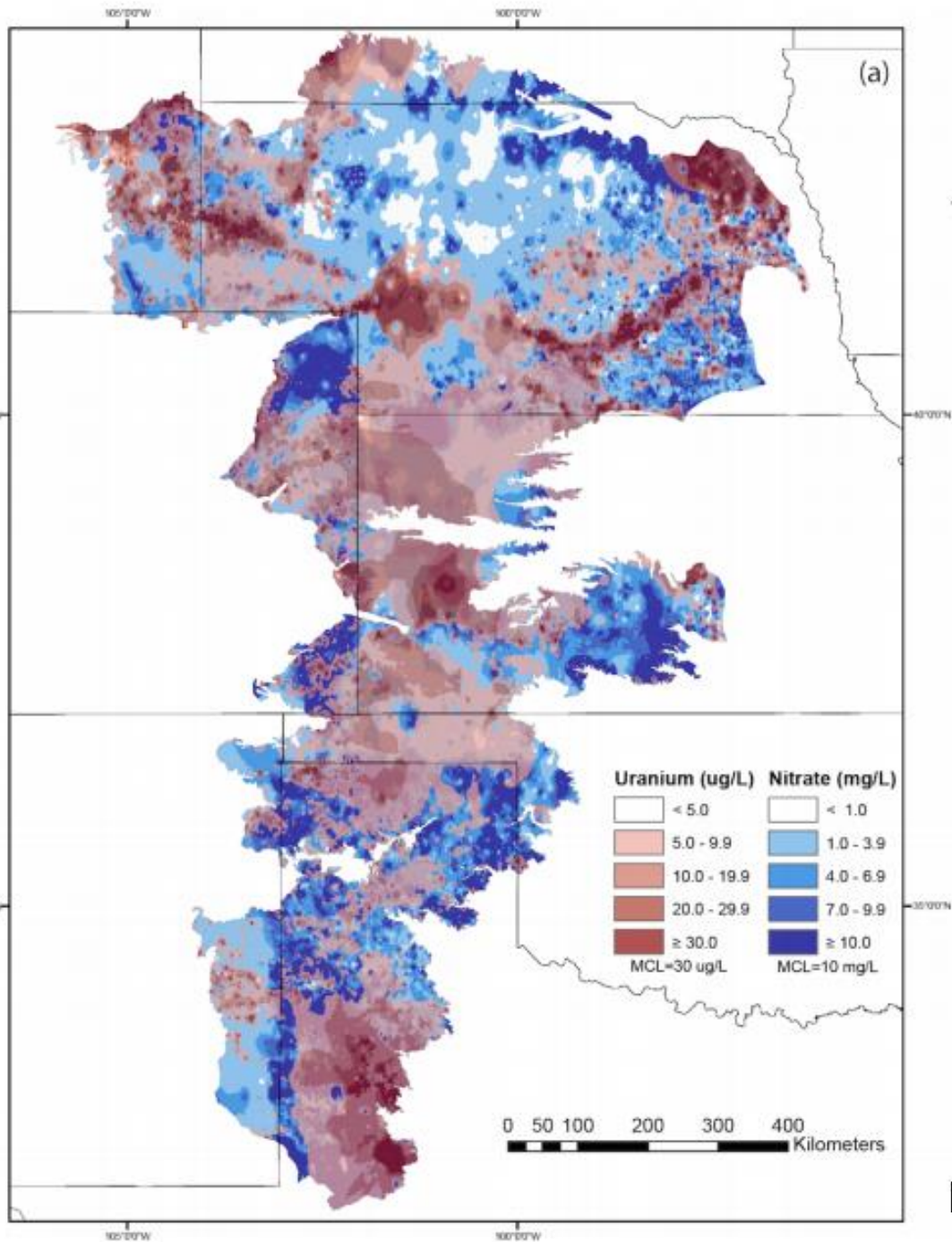
Source: State Cancer Profiles, CDC. Retrieved from <https://statecancerprofiles.cancer.gov>

Impact of watersheds on incidence



Health

Uranium released into
groundwater by nitrates

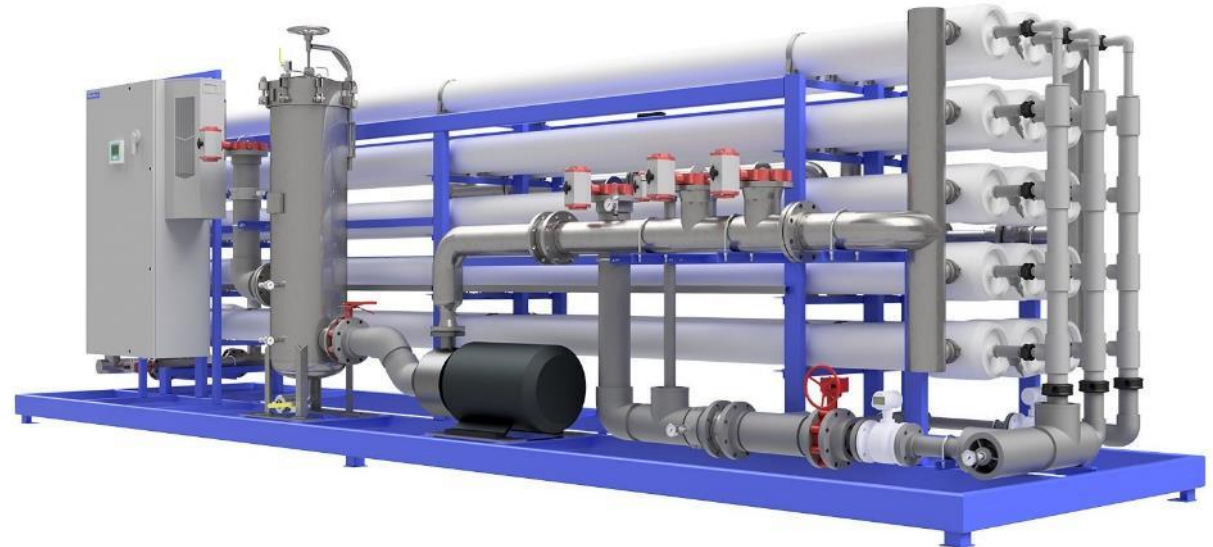


Nolan & Weber 2015

Community vitality

Annual Cost to treat:

- Hastings: \$60/person (\$80+/lb N)
- Communities pop.<500 : \$90-650/person
- Point-of-use systems: \$50-250/person (\$7500+/lb N)



Tourism & Recreation

**83% of Nebraska's
lakes impaired**



NDEE 2018

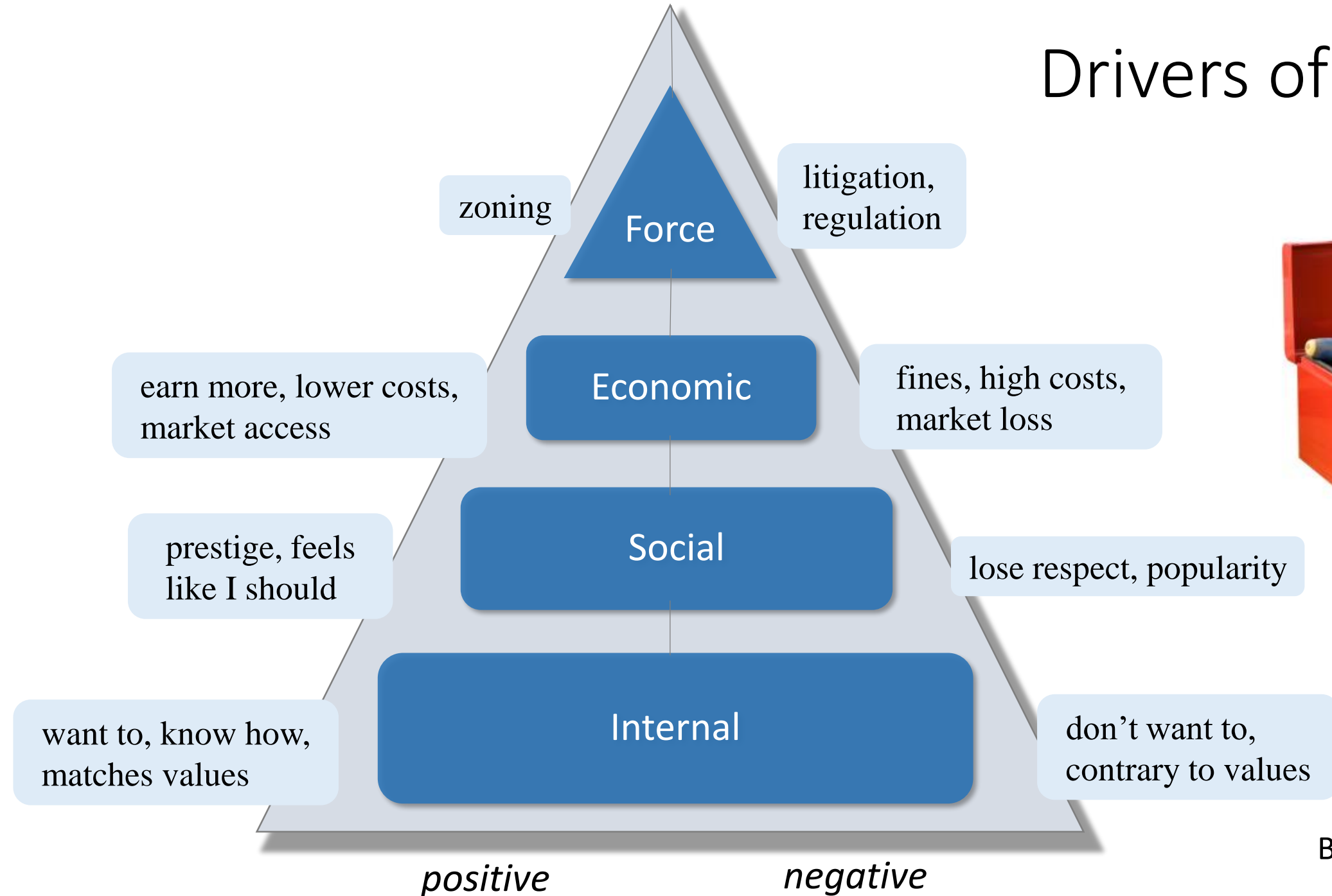
How do we get to our goals?



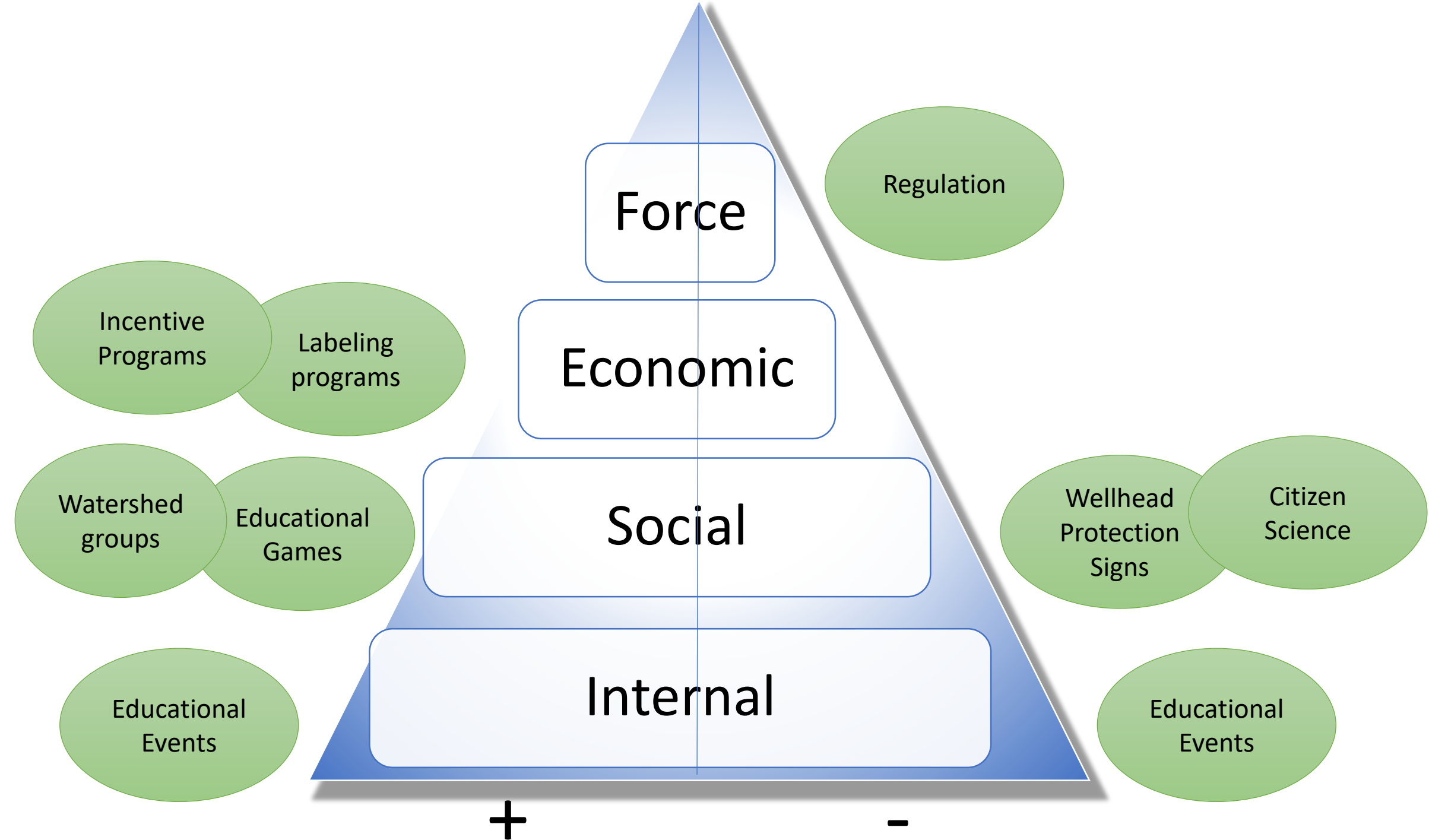
Crete 2011

photo by Jamie Vesay

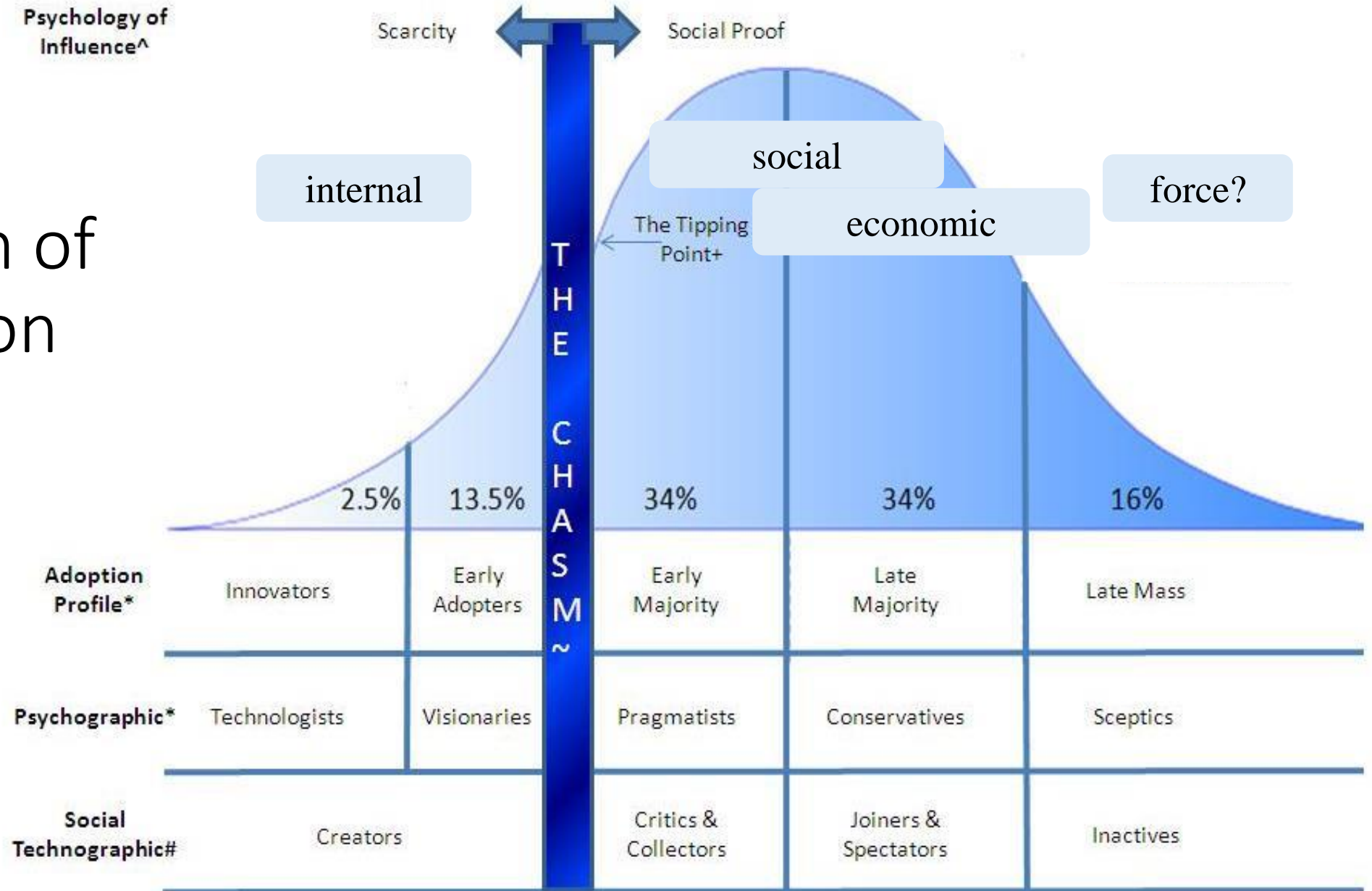
Drivers of Change Toolbox



Butler Flora, 2004

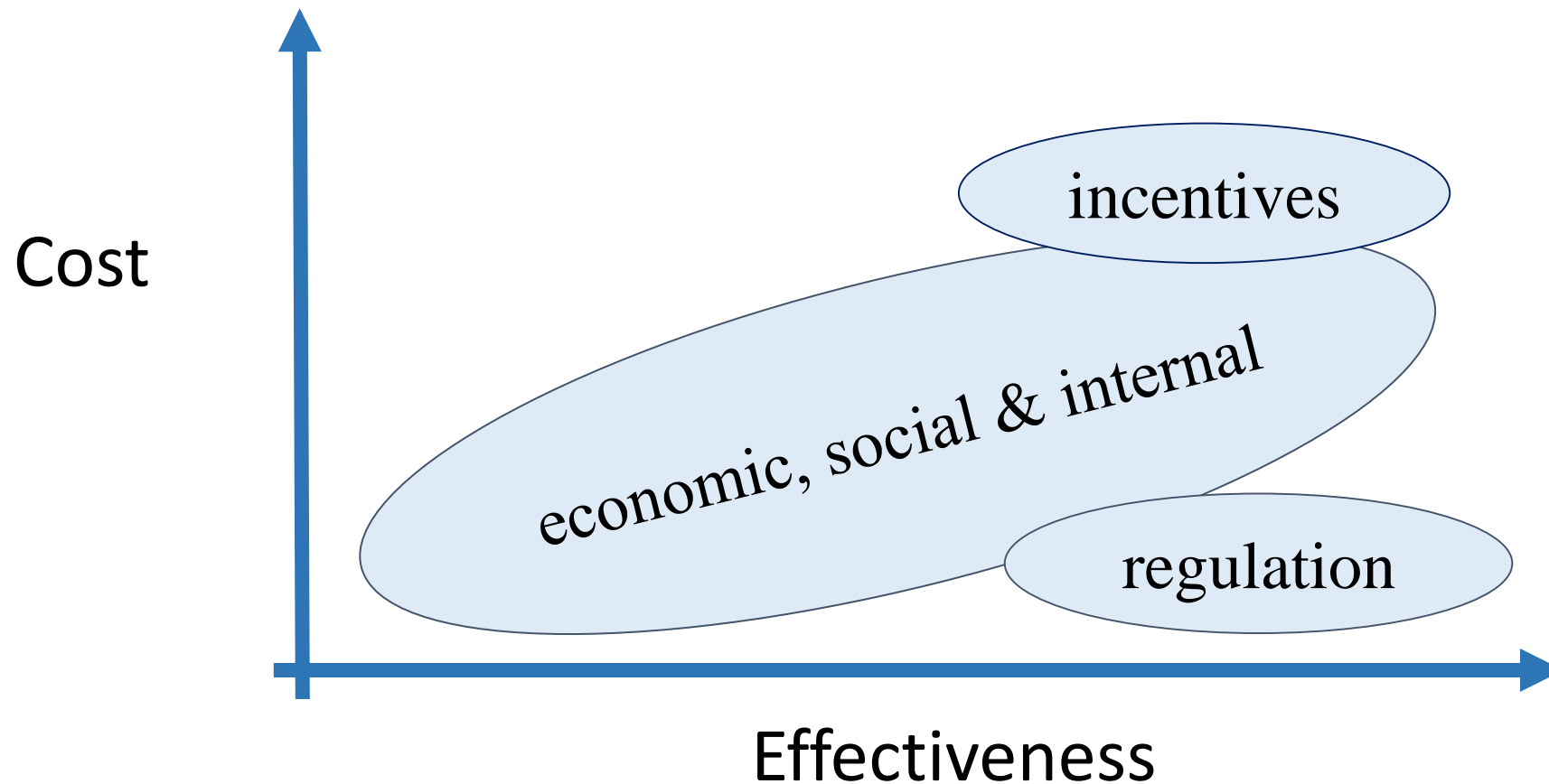


Adoption of Innovation



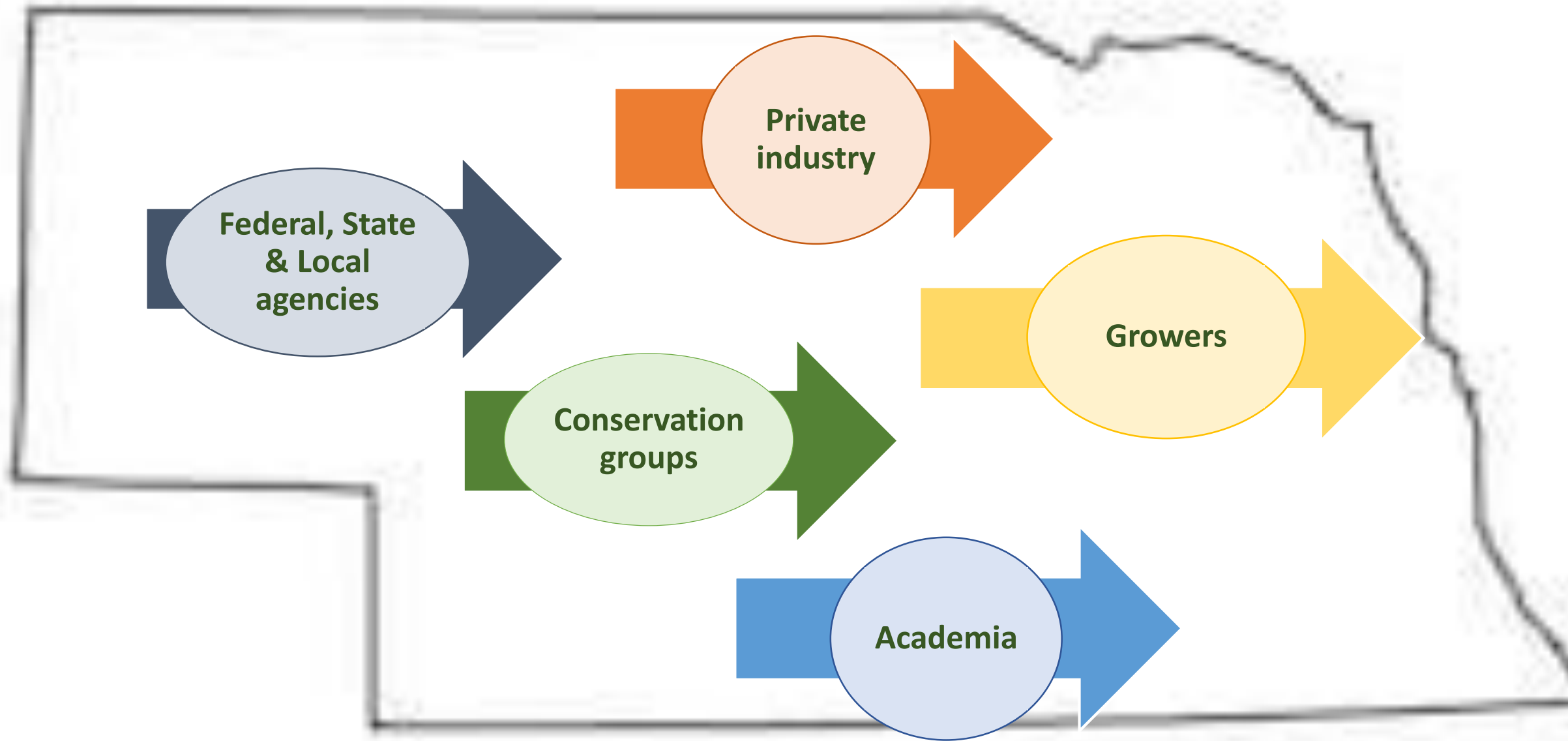
^ Robert Cialdini *Everett Rogers #Forresters ~Geoffrey Moore + Malcolm Gladwell

Evaluate the ag practices toolbox



What is the process?

Building a Framework for Change



Collaborative Impact



**Common
Goals**

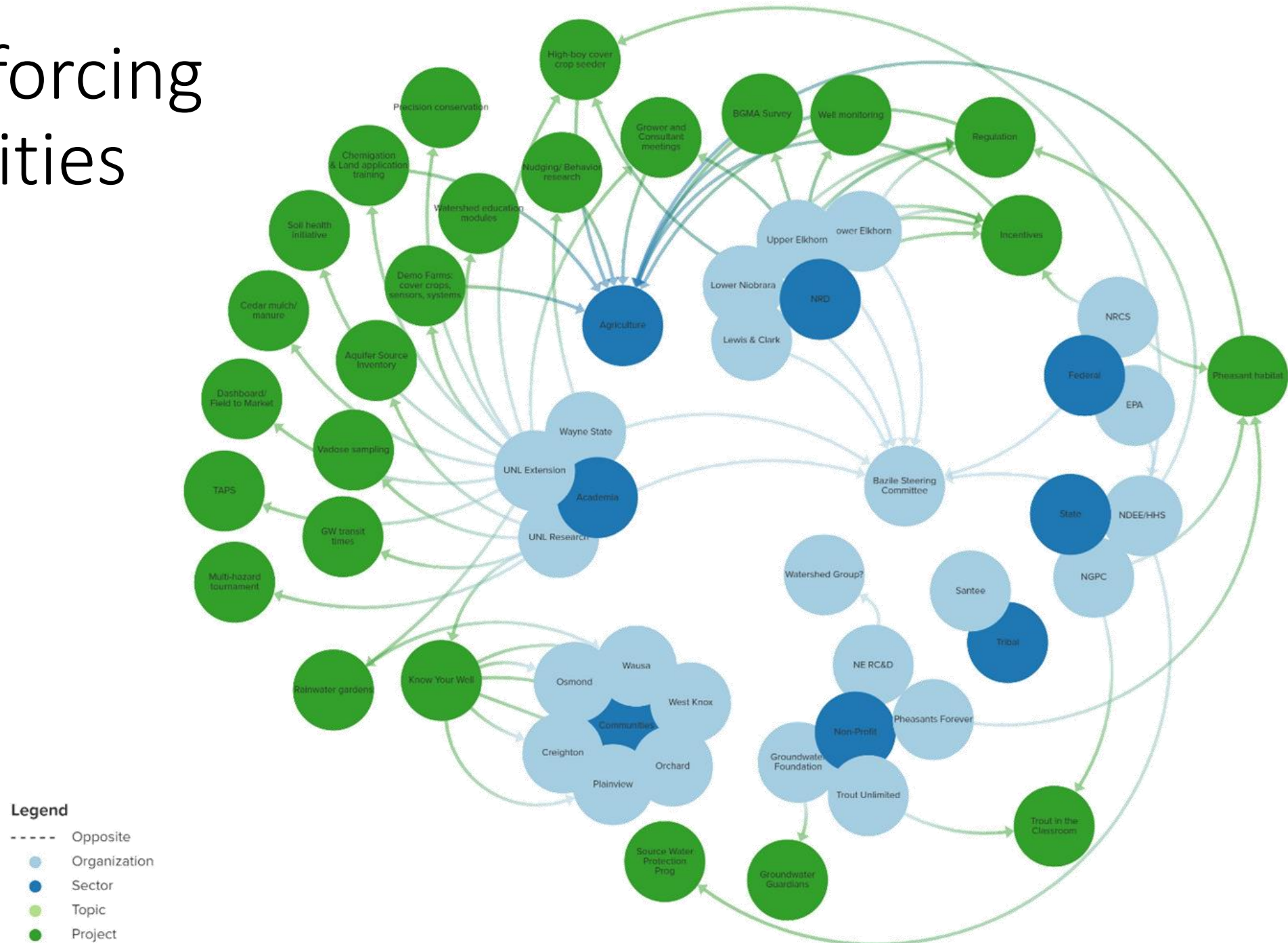
**Shared
Measurement**

**Reinforcing
Activities**

**Continuous
Communication**

**Backbone
Organization**

Reinforcing activities



URGENCY

&

Persistence

Will we build our
legacy?

