Institutional barriers and opportunities for improving policy approaches to reducing excess reactive nitrogen from U.S. Agriculture

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Reactive Nitrogen is a Wicked Problem
## The Problem

### Tame Problem
- The clear definition of the problem also unveils the solution.
- The outcome is true or false. Successful or unsuccessful.
- The problem does not change over time.

### Wicked Problem
- No agreement about what the problem is. Each attempt to create a solution changes the problem.
- The solution is not true or false – the end is assessed as “better” or “worse” or “good enough.”
- Problem changes over time.
# The Role of Stakeholders

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<thead>
<tr>
<th>Tame Problem</th>
<th>Wicked Problem</th>
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<td>• The causes of a problem are determined primarily by experts using scientific data.</td>
<td>• Many stakeholders are likely to have differing ideas about what the “real” problem is and what are its causes.</td>
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Nature of the Problem

Tame Problem
• Scientifically based protocols guide the choice of solution(s).
• The problem is associated with low uncertainty as to system components and outcomes.
• There are shared values as to the desirability of the outcomes.

Wicked Problem
• Solution(s) to problem is (are) based on “judgments” of multiple stakeholders.
• The problem is associated with high uncertainty as to system components and outcomes.
• There are not shared values with respect to societal goals.
Wicked Problems: Value Conflicts

• Experts are not allowed by stakeholders to dictate desired outcomes.
• Goals are negotiated, not determined analytically.
SENDING A MAN TO THE MOON

Tame Problems

Wicked Problems

Reactive Nitrogen

Uncertainty

Value Conflict
Primary Institutions involved in the Nr Problem

• **USDA** since 1936
• **EPA** since 1970

Different missions
Different stakeholders
Different Authorities and Intents

**USDA** – Conservation Title – Voluntary & incentives

**EPA** – Clean Water Act – Regulations & enforcement

**EPA** – Clean Air Act – Regulations & enforcement
USDA and EPA

A history of stakeholder:

Love vs dislike

Trust vs suspicion
Wickedness Intensifies Conflict

Case of EPA and Florida nutrient standards:

• State and Federal involvement
• Multiple interveners and stakeholders
• Conflicts between institutions and practices
• No best scientific answer for nutrient standards
What Opportunities?

Could we work towards:

• Increasing alignment of stakeholder perceptions?
• Utilizing both carrots and sticks?
• Increasing local actions if federal abandonment?
Our Earth