P sustainability research coordination and emerging network: a North American view

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RCN SEES: Coordinating Phosphorus Research to Create a Sustainable Food System

- Five-year effort funded by the US National Science Foundation (2012 – 2017)
- Goal: catalyze an international network of researchers and practitioners to synthesize data, perspectives, and understanding about phosphorus to identify and implement solutions for P sustainability.

Who are we?

~45 core participants.

International: USA, Canada, Australia, Japan, United Kingdom, Ireland, Switzerland, India, China, Argentina, Congo

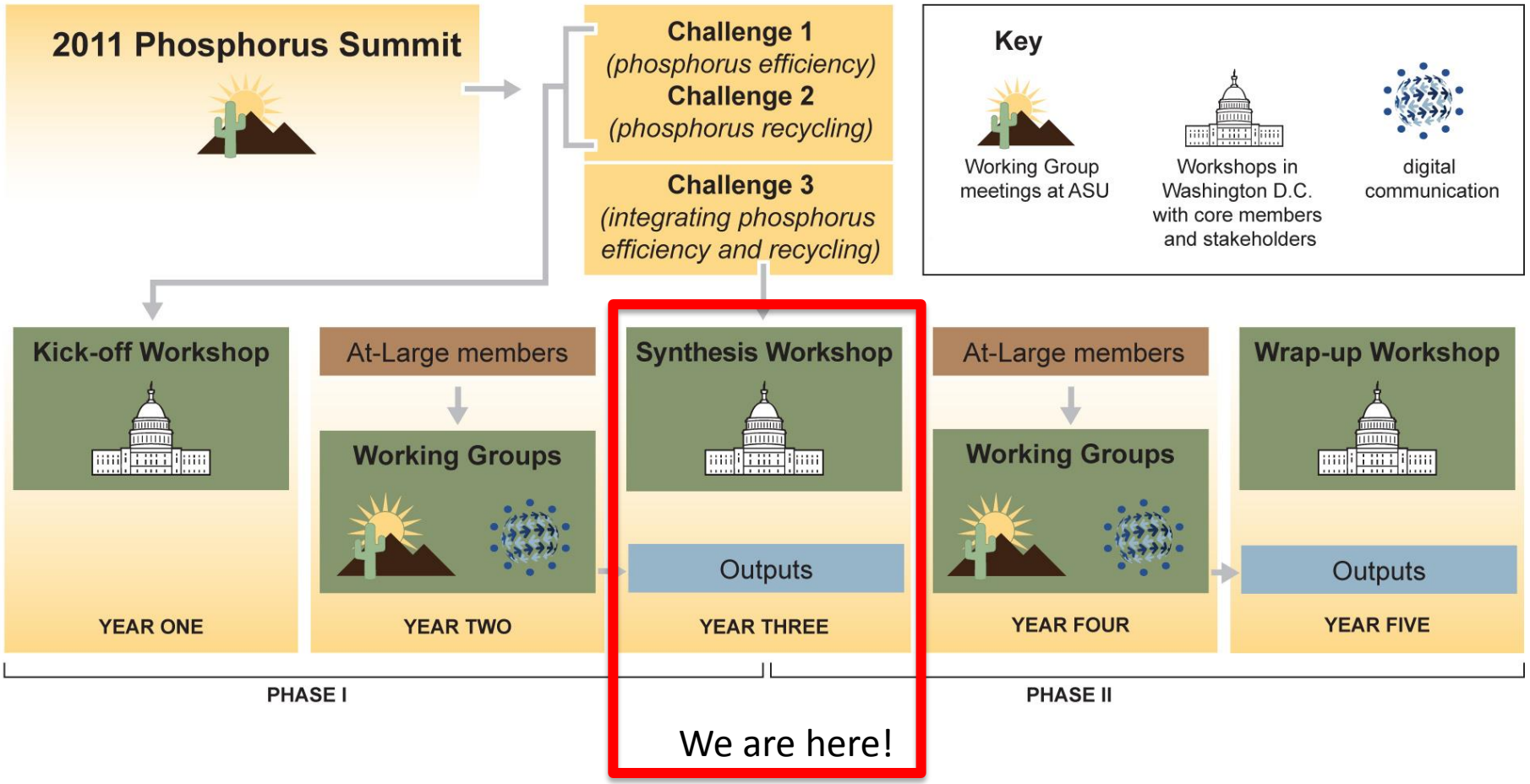
From university, industry, NGO, and government agencies.

P RCN Objectives

- Current human use of phosphorus (P) challenges the sustainability of the food system, as geological and geopolitical uncertainties threaten supplies of affordable fertilizer while runoff from cities and farms can cause damaging algal blooms in lakes and oceans.

- To address this challenge, the P Sustainability RCN will:
  1. Coordinate and integrate data and perspectives
  2. Design and assess institutional, commercial, technological, and psychological solutions
  3. Engage policy makers and other stakeholders

Timeline


2011 Phosphorus Summit
Challenge 1
(phosphorus efficiency)
Challenge 2
(phosphorus recycling)
Challenge 3
(integrating phosphorus efficiency and recycling)
Key
Working Group meetings at ASU
Workshops in Washington D.C. with core members and stakeholders
digital communication
Kick-off Workshop
At-Large members
Working Groups
Synthesis Workshop
At-Large members
Working Groups
Wrap-up Workshop
Outputs
Outputs
YEAR ONE
YEAR TWO
YEAR THREE
YEAR FOUR
YEAR FIVE
PHASE I
PHASE II
We are here!

Stage I Working Groups

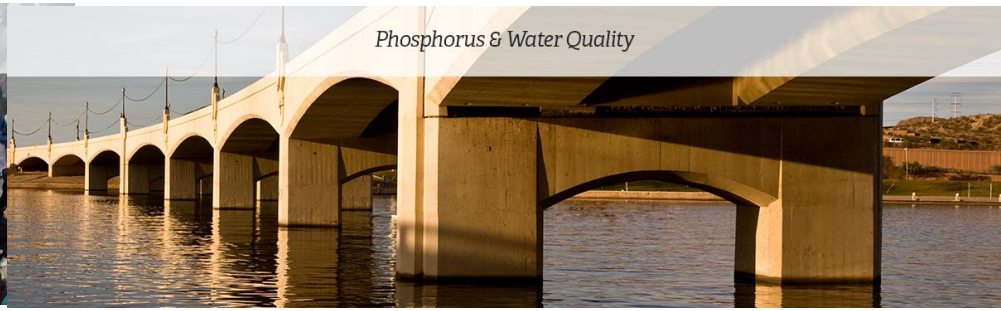
Stage II

Phosphorus Recycling

Phosphorus Efficiency in Food Production

P Demand Drivers

Phosphorus and Water Quality



Progress and products to date

Research Papers:

Haygarth, P; Jarvie, H; Powers, S; Sharpley, A; Elser, J; Shen, J; Peterson, H; Chan, NI; Howden, N; Burt, T; Worrall, F; Zhang, F; and Liu, X. 2014. Sustainable phosphorus management and the need for a long-term perspective: The legacy hypothesis. Environ. Sci. Technol., 2014, 48 (15), pp 8417–8419.

Doody, D.G.; Withers, P.J.A.; Dils, R.M. Prioritizing water bodies to balance agricultural production and environmental outcomes. Environ. Sci. Technol. 2014, 48(14), 7697-7699.

Elser, J.J., T.J. Elser, S.R. Carpenter, and W.A. Brock. 2014. Regime shift in fertilizer commodities indicates more turbulence ahead for food security. PLoS One 9: e93998. doi: 10.1371/journal.pone.0093998

Rowe, H., P. Withers, P. Baas, N. I. Chan, D. Doody, J. Holiman, B. Jacobs, H. Li, R. McDowell, A. Sharpley, J. Shen, W. Taheri, and M. Wallenstein. Invited manuscript in preparation. Integrating legacy soil P into sustainable nutrient management practices on farms. Nutrient Cycling in Agroecosystems.

Webeck, E; K Matsubae; T Nagasaka. 2014. Phosphorus requirements for the changing diets of China, India and Japan, *Environmental Economics and Policy Studies*, (DOI 10.1007/s10018-014-0088-8)

Webeck, E; K Matsubae; K Nakajima; K Nansai; T Nagasaka. 2014. Analysis of Phosphorus Dependency in Asia. *Sociotechnica*, 11:119-126.

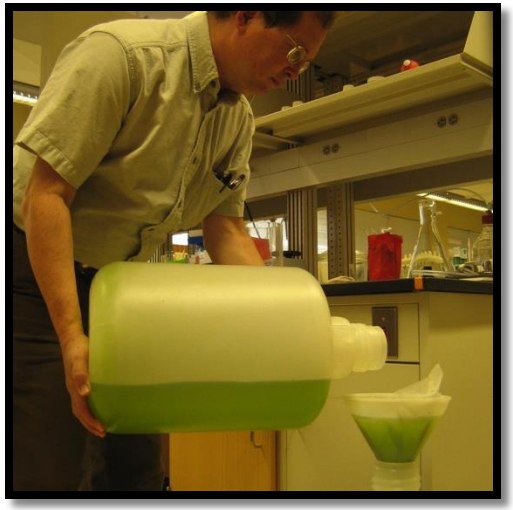
Public communications:

Article Elser, J.J. and B. Rittmann. 2013. "The Dirty Way to Feed 9 Billion People"; **Slate** online magazine (http://tinyurl.com/mnhuyup)

Website: http://sustainablep.asu.edu/

North American Partnership for Phosphorus Sustainability

- NAPPS proposed at the 2nd P-RCN meeting in Jan 2014
- Modeled after ESPP
- Seed funding from ASU



The goal of NAPPS is to work actively with stakeholders to **foster the implementation of** sustainable P solutions in public and private sectors.

- **Monitor, collect, review and circulate information concerning key dimensions of P sustainability**.

- **Foster implementation of innovative technologies and solutions**

- **Coordinate position statements and communication**

NAPPS Stakeholders

Agriculture: producers, consultants, fertilizer industry

P Recycling: companies/start ups

Water Quality: government agencies, non-profits

P Demand: bioenergy, food industry, food and detergent additives

Current Activities

- Organizational structure: strategic plan, advisory board, board of directors
- Founding partners
- May 19, Washington DC
  - The Future of Phosphorus
  - 1st Board Meeting
- Inventory of P recycling companies in N America

Thank you!

- Founding Partners
  - Alliance of Brookside Consulting Professionals
  - Ostara
- P RCN Steering Committee and members
- NAPPS Advisory Board

sustainableP.asu.edu
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Representative Activities

1. **Develop a common vision**
   for creating a sustainable P cycle in North America

2. **Identifying and helping** businesses and other organizations respond to opportunities offered by challenges in P management and emerging research in P sustainability

3. **Building networks**
   between different interest groups and sectors related to phosphorus management

4. **Evaluating new P efficiency and recycling technologies**,
   including feasibility, availability of suppliers, cost/benefit analysis, and life cycle analyses

5. **Fostering implementation of new technologies**
   by improving the efficiency of business value chains

6. **Assessing and facilitating regulatory development** pertaining to phosphorus management, including waste, environmental, discharge, and agriculture to improve P sustainability

7. **Representing stakeholders**
   North American phosphorus managers and innovators in international meetings and initiatives

8. **Preparing funding proposals**
   for demonstration projects and integration and dissemination of new technologies and concepts

Sustainable Phosphorus Initiative

The Phosphorus Sustainability Research Coordination Network (P RCN) and the North American Partnership for Phosphorus Sustainability (NAPPS) present:

The Future of Phosphorus
Phosphorus Sustainability Stakeholder Event
Tuesday, May 19, 2015
Fhi360 | 1825 Connecticut Ave. NW | Washington DC 20009

This event features two dynamic keynote speakers, **Nancy Rabalais** and **Danielle Nierenberg** (see bios below) and four expert panel discussions on four key areas of phosphorus sustainability: P Recycling, P and Agriculture, P Demand: Bioenergy and Food, and P and Water Quality. These panels will provide a forum for stakeholders of P sustainability to articulate "real world" policy and information gaps. The results of the panel discussions will be used in two ways. Researchers in the P RCN will use this information to transition current working groups into a new phase of interdisciplinary working groups. Second, tactical needs will be incorporated by NAPPS to identify key project areas of P sustainability implementation for its first year of operation in 2015-2016.

9:00 am Welcome and Introduction – Jim Elser
9:15-10:15 am
Keynote speaker: Nancy Rabalais "Why Farmers and Fishers Think Differently about Phosphorus (and Nitrogen)"
10:15-11:30 am
Panel 1: Phosphorus management and water quality, led by Andrew Sharpley
Small group discussion
11:30-11:45 am - Break
11:45-1:00 pm
Panel 2: Phosphorus recycling, led by Bruce Rittmann
Small group discussion
1:00-1:15 pm Lunch buffet
1:15-2:15 pm
Keynote speaker: Danielle Nierenberg, "Fixing the Food System: Hope And Success In Agriculture" (continue lunch)
2:15-3:30 pm
Panel 3: P sustainability in food production, led by Rimjhim Aggarwal
Small group discussion
3:30-4:45 pm
Panel 4: Phosphorus demand: Population, diet, biofuels, & other contributors, led by David Vaccari
Small group discussion
4:45-5:00 pm Closing comments – Jim Elser

Details for Panels and Discussions:
5 min – Panel leader introduction to topic
40 min – Panelist Q & A (questions from panel leader and audience)
30 min - Small groups discuss a set of 5 questions

The Future of Phosphorus

Phosphorus Sustainability Stakeholder Event

Tuesday, May 19, 2015

Washington, DC, USA

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Keynote$Speaker$Biographies$

Recipient of a MacArthur Genius Award in 2012, **Nancy$Rabalais** is a marine ecologist who is dedicated to documenting and mitigating the effects of hypoxic zones—aquatic areas with low dissolved oxygen levels commonly known as "dead zones"—that have expanded dramatically in the Gulf of Mexico and many other coastal systems due to increasing quantities of nutrients such as nitrogen and phosphorus flowing from watersheds globally. Over the past three decades, Rabalais's studies have evolved to include collaborations with researchers from many different disciplines and have used methods from physical oceanography, hydrology, geochemistry, and paleoecology to make ever more precise assessments of hypoxia dynamics and their impact on a range of fragile, interconnected ecosystems. In addition to her scientific contributions, Rabalais has played a prominent role in raising public awareness of dead zones and in informing strategies to restore the degraded waters of the Gulf by reducing nutrient pollution from urban and agricultural runoff upstream.

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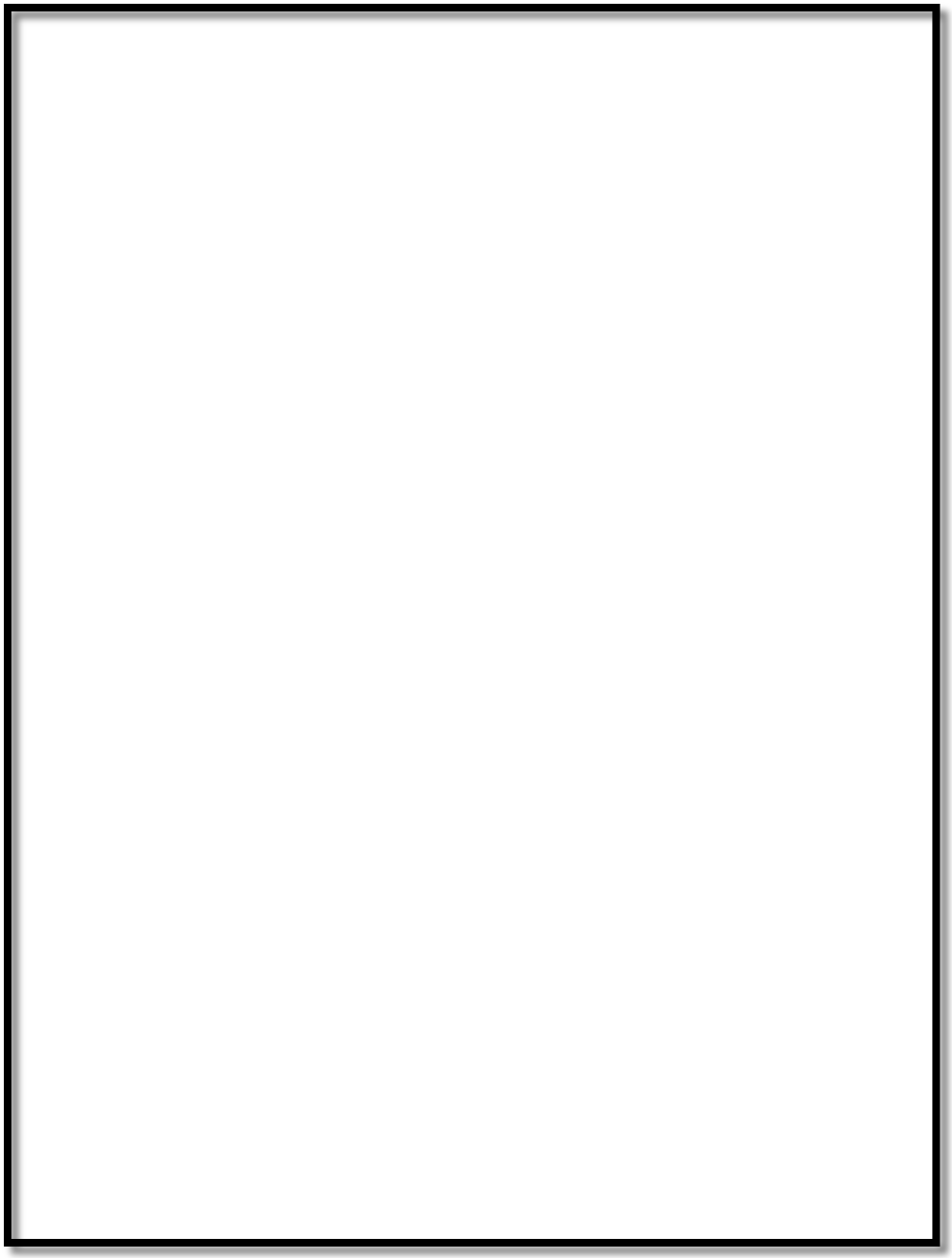
Danielle$Nierenberg is President of Food Tank and an expert on sustainable agriculture and food issues. She has written extensively on gender and population, the spread of factory farming in the developing world, and innovations in sustainable agriculture. Nierenberg co-founded *Food$Tank,* a 501(c)(3) non-profit organization, in 2013 as an organization focused on building a global community for safe, healthy, nourished eaters. Already the organization boasts more than twenty major institutional partners including Bioneers, the Chicago Council on Global Affairs, the Christensen Fund, IFPRI, IFAD, the Global Forum on Agriculture Research, Oxfam America, Slow Food USA, the UNEP, the UNDP, FAO, and the Sustainable Food Trust. Danielle has also recruited more than 40 of the world's top leaders in food and agriculture policies and advocacy work as part of Food Tank's Advisory Board. The organization hosted the 1st Annual Food Tank Summit in January 2015 partnering with The George Washington University.

Keynote Speakers

-Nancy Rabalais, 2012 MacArthur Genius Award

-Danielle Nierenberg, President of Food Tank



Niche for Napps

- NAPPS aims to be a lasting structure focused on the long-term implementation of P sustainability solutions in North America
- NAPPS will engage stakeholders with each other
- NAPPS will be a resource for creating and mobilizing a network, project development, finding funding for projects to address identified priorities
- NAPPS will collaborate, building on and work with other P sustainability organizations, e.g. ESPP, Global P summit, Global P Network, UN-GPNM

Current partners:

- Alliance of Brookside Consulting Professionals
- Ostara

Pending partners:

- Everglades Foundation
- Others