Iowa Nutrient Reduction Strategy
A science and technology-based framework
to assess and reduce nutrients to Iowa
waters and the Gulf of Mexico

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Extension and Outreach
Healthy People. Environments. Economies.
Why? And why now?
• Iowa’s productive soils and cropping systems also contribute to water quality concerns
• Society and EPA expect more from cities, industry and agriculture
• Gulf Hypoxia Task Force requires plan to reduce N and P load to Gulf by 45%
• EPA requests strategy that emphasizes state implementation of new and existing N and P practices for point and non-point sources

• Iowa has several streams and lakes listed as impaired waters. The Gulf of Mexico is a natural resource that is being impacted by excessive nutrients that arrive from the rivers that feed into it. The hypoxic or “dead zone” is an area in the Gulf that lacks oxygen and life. The corn and soybean systems are “leaky” and our highly organic matter soils will lose nitrates even without fertilizer.
• There are several lawsuits against EPA for not enforcing the Clean Water Act, including one in the Mississippi River Basin. In the Chesapeake Bay, after many years of voluntary program, EPA is increasing regulations.
• In 2008 the Gulf Hypoxia Task Force required each state on the Mississippi to develop a strategy by 2013 to reduce N and P loading to the Gulf.
• March 16, 2011 “Stoner Memo” from EPA outlined an 8-point framework that emphasizes state level implementation of new and existing practices and technologies to address N and P for point and non-point sources.
What is the Iowa Nutrient Reduction Strategy?

• Voluntary, science-based program to reduce Nitrogen and Phosphorous impact on water
• Includes cities, industry and agriculture
• A practice-based method to show meaningful and measurable progress
• A framework for innovation and verification of new practices and technologies

• Voluntary because one size does not fit all and it is very costly to police. The strategy is based on sound science from research in Iowa and surrounding states with similar climate, soils and cropping systems to assure the results are applicable to Iowa.
• This is the first time point sources (cities and industries with wastewater treatment plants) and nonpoint source (mainly agriculture) have worked together on a common strategy. Too often the approach has been finger pointing and blaming the other. There are 102 of the largest cities with 55-60% of Iowa’s population and that treat 80% of Iowa’s wastewater, plus 28 industrial facilities that have high volumes of N and P.
• The science assessment quantifies the amount of N and P load reduction per acre we should expect from adoption of practices. Then we can document the number of practices installed and number or acres protected. Using the ISU model we can aggregate across practices and across the state to estimate the load reduction.
• The science assessment is based on published research results in and applicable to Iowa. As new technologies and practices emerge, research will be conducted to quantify the N and P load reduction and the cost estimates to provide farmers and society confidence if adopted.
How it was developed

- Led by IDALS and IDNR with input from point and nonpoint source stakeholders who will make the investments to reach the goal.
- The Science Assessment was led by ISU with scientists from IDALS, IDNR, USDA-ARS and NRCS, and other institutions
- Point source technical assessment by wastewater engineers and cities

- IDALS and IDNR with a small group representing wastewater plants and agriculture developed the policy document.
- Nonpoint source Science Assessment team included 23 individuals who spent two years evaluating published research and using their collective professional judgment to identify the list of practices. The team also estimated the number of applicable acres for each practice by Major Land Resource Area (MLRA). A model was developed that incorporates the practice effectiveness and adoption rate by MLRA and aggregates the load reduction at the state level.
- Point sources based the limit of technology on the biological removal rate for all plants.
What's in the strategy?

- Watershed Prioritization & Goals
- Setting Priorities
- Research and Technology
- Improve Outreach, Education, Collaboration
- Increased Public Awareness and Recognition
- Funding
- Accountability and Verification Measures

• Prioritization of watersheds – Water Resources Coordinating Council (WRCC)
  • HUC 8s (large watersheds) and HUC 12s (small watersheds)
  • Determine watershed goals – WRCC

• Setting Priorities
  • Conservation programs – coordinate focus to targeting nutrient reduction to waters, increase program delivery in straight-forward, flexible manner
  • Balance in-field and off-field practices – to optimize reductions of nutrients to waters
  • Establish small watershed pilot projects
  • Explore nutrient trading/innovative approaches

• Research and Technology
  • Policy framework that facilitates new technologies and creative solutions
  • Enhanced and consistent funding to develop new technologies, private-sector entrepreneurial opportunity for new technologies, sustained public funding of research
  • Support advancing the science of Gulf hypoxia

• Strengthen Outreach, Education and Collaboration
  • Enhanced public and private-sector roles – leadership, new technologies and services
  • Enhanced role of CCAs – consulting, advisory services, accountability and certification
  • Build broader awareness and information to farmers and landowners

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• There are few practices that have a meaningful impact on reducing both N and P because the nutrients have different modes of transportation.
Nitrogen reduction practices

- In-field
  - Rate, source and time of application
  - Nitrification inhibitor
  - Cover crops
- Edge-of-field
  - Drainage water management
  - Wetlands, bioreactors and buffers
- Land-use
  - Extended rotations
  - Living mulches
  - Land retirement: pasture, energy crops, perennials

In-field practices are annual management practices. Rate, source and time of application have small average reduction and wide variability of effectiveness. N inhibitor is compared to applying N when soils are 50 degrees and cooling. Rye cover crop was used because of availability of research data.

Edge-of-field technologies have large upfront costs and relatively low annual costs. Higher and more predictable effectiveness.

Land-use changes reduce N loss because N is not added and is taken up by plants. Capturing income on these areas is difficult.
Phosphorous reduction practices

• In-field
  – Rate and source of application
  – Incorporation and tillage
  – Cover crops
• Edge-of-field
  – Buffers
• Land use
  – Land retirement: pasture, energy crops, perennials

• In-field: No P applied to soil with high or very high soil test P (STP) levels. Switching from conventional to conservation tillage or to no-till. Cover crops reduce erosion.
• Edge-of-field: buffers along streams.
• Land-use changes reduce P loss through reduced erosion. Capturing income on these areas is difficult.
Where to start

• Learn more about the Strategy and comment by January 4, 2013 at www.nutrientstrategy.iastate.edu
• Consider the practices outlined
  – What makes sense in your farming operation
  – How can you support adoption

• The full Iowa Nutrient Reduction Strategy is available at this website. View online or download parts or all. The Executive Summary and Policy statement is approximately 20 pages. The summary of the nonpoint source is the first 9 pages of the Science Assessment. The point source document is 16 pages. Leave comments at the site or mail them to Nutrient Reduction Strategy, ANR Program Services, 2101 Agronomy Hall, Ames, Iowa 50011-1010.
• Document what you are doing now, and think about which practices make sense on your farm.
Why is strategy important?

- Based on sound science in Iowa, for Iowa
- Meaningful and measureable progress
- Builds on current programs and targeted watersheds
- Progress and success avoids regulation
- Improves water quality in Iowa and Gulf

• Strategy was developed by Iowa point and nonpoint source stakeholders who will have to make the investments to achieve the goals. Science assessment based on research applicable to Iowa.
• Practice-based strategy is tangible and allows for proof of progress. Model will be compared to long-term monitoring.
• Improves coordination of existing programs across agencies. Prioritizes watersheds and encourages pilot projects and innovation.
• EPA embraces practical approach where the state emphasizes implementation and rewards progress toward goal.
• Benefits Iowa water quality and the Gulf.