

# Dairy Industry Sustainability – Phosphorus Management

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# What is ACS?

- Farm-hired firm that provides crop production and environmental stewardship consulting
  - Agronomists
  - Environmental Planners
- Began as a “one man shop” crop and business consulting firm in the 1980s



# What is ACS?

- An early 2000s lawsuit brings new focus on environmental management of “large” farms
  - ACS clients have a new need for environmental permitting consulting
- ACS and other stakeholders help NYS DEC create a workable program for farm environmental sustainability (CAFO Permitting)

# Who is ACS Today?

- Approximately 20 people
  - Backgrounds in environmental science, agronomy, ag-business, & other related disciplines
- Offices in Henrietta and Ithaca



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# CAFO Permits

- Confined Animal Feeding Operation
- When a farm's herd or flock size meets a threshold, the State requires that they have a permit to operate
- Not required for "small" farms





# CAFO Permits

- Require that farm management hire a P.E. to oversee the design and installation of certain structural practices
- Require that farm management hire and work closely with a Planner who is certified by NYS DAM
- Farm management and Planner develop and update a Comprehensive Nutrient Management Plan (CNMP)
- Ongoing process—in many cases the cost of this planning work exceeds \$10,000 per year, counting neither the labor of the farm management nor the structural practices that the plan outlines

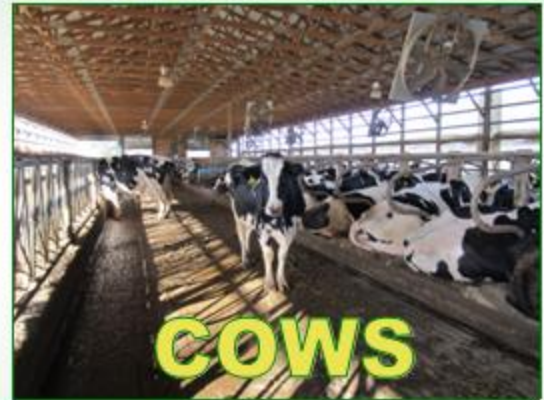
# Anatomy of a CNMP

- Production Area
  - Farmstead evaluation
  - Operation and maintenance
  - Manure testing
- Cropland
  - Soil testing
  - Fertility management
    - Nitrogen
    - Phosphorous
  - Sensitive surface and groundwater areas
  - Erosion





# DAIRY FARM NUTRIENT CYCLE



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# Soil & Manure Testing

- Soil analysis done for each field once every 3 years
  - Allows us to monitor soil nutrient levels over time and plan for the efficient use of fertilizers and manure in the future
- Manure analysis done once every year for each type of manure produced on the farm
  - Allows us to determine the fertilizer (and dollar) value of the manure

# Fertility Management

- Finding ways to utilize nitrogen, phosphorous, potassium, and other micronutrients as efficiently as possible to feed our crops
- Cornell & other entities develop guidelines based on replicated research
- Underfeeding crops results in less-than-optimal yields
- Overfeeding crops results in wasted money and losses to the environment
- Everyone benefits from hitting the target of “not too much and not too little”

# Phosphorous Index

- Tool used to assign an estimate of risk level of environmental losses of P for each field
  - does not calculate or estimate actual P loss
- Considers both particulate and dissolved P
- Considers not only the P level from the soil sample, but also other physical attributes of each field
  - Distance to stream
  - Vegetated flow distance
  - Flooding frequency
  - Soil hydrologic class
  - Erosion estimate

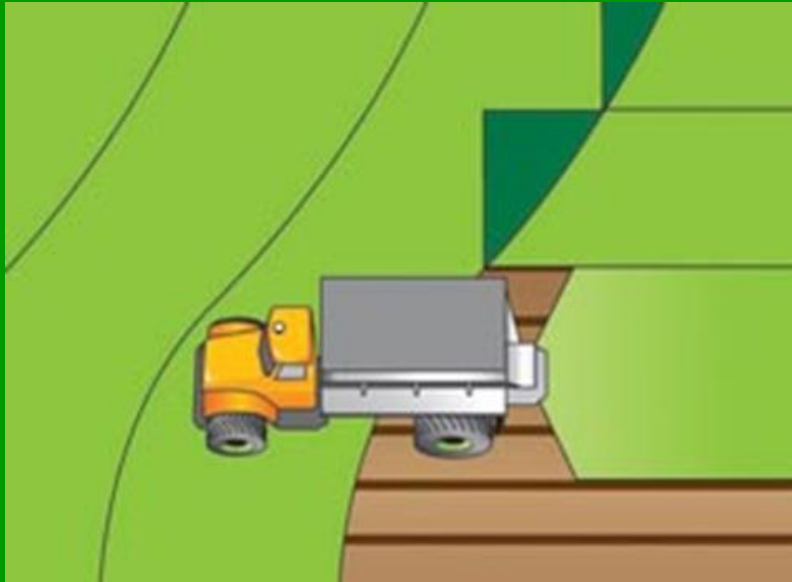
# Phosphorous Index (cont.)

- All fields in a CNMP are assessed multiple times each year
- Fields require special management when the relative risk reaches a certain level
  - Changed timing or method of P applications
  - Growing cover crops
  - Installing vegetated buffers
  - Eliminating P applications all together

# Future Opportunities

- More sophisticated equipment
  - Helps with record keeping
  - Eliminates human error and overlaps
  - Varies manure and fertilizer rates as it moves across field





# Future Opportunities (cont.)

- Double-cropping
- Advances in feed management
- Nutrient separation technology?
- Not all technologies are appropriate for all farms

# Resources

- Phosphorous Index
  - <http://nmssp.cals.cornell.edu/guidelines/factsheets.html>
- Trends in nutrient mass balances on four New York dairy farms
  - <https://blogs.cornell.edu/whatscroppingup/2015/06/17/trends-in-nutrient-mass-balances-on-four-new-york-dairy-farms/>

# Questions?

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