

# Nitrogen and Phosphorus

## Nitrogen and phosphorus issues with water quality

Nitrogen and phosphorus are two nutrients that are managed in order to protect the quality of surface and ground water.

- Nitrogen leaching out of the root zone can enter subsurface drains and be transported directly to surface waters or leach to ground water. Nitrate above 10 parts per million in water is a health and environmental risk.
- Phosphorus entering surface waters leads to accelerated weed and algae growth causing depressed oxygen levels in the water that impairs aquatic life and can cause odors or bad taste.
- The CNMP is designed to minimize the transport of nitrogen and phosphorus to surface waters.



*Soil testing is imperative to planning fertilizer applications.*

## Demonstration Horse Farm

In 2005, a team of Rutgers researchers affiliated with the Equine Science Center and several state and federal agencies began a multi-year collaboration. They sought to develop a demonstration working horse farm on the George H. Cook Campus that would use agricultural Best Management Practices (BMPs) to provide solutions to many of the problems facing farm owners and stable managers today.

Our researchers have identified numerous environmental issues, such as preserving water quality, proper nutrient and waste management, farm and pasture management, weed control, fencing, pasture rotation, and soil enrichment. These are just a few of the many facets of farm management that the project will address.

### **Goals of the Project:**

- To develop and maintain the facility as a Demonstration Horse Farm by implementing BMPs that address pasture management, stormwater, and manure issues.
- To conduct educational programs at the Demonstration Horse Farm that demonstrate the implementation of BMPs to enhance and maintain pasture and water quality.
- To utilize the farm site to conduct research on new forage varieties.
- To provide learning experiences and educational programs for the public.

For more information, visit <http://esc.rutgers.edu>.

*The project was funded by:*



## Best Management Practice Demonstration Horse Farm



## Comprehensive Nutrient Management Plan



# Why a CNMP?

Nutrient management and waste utilization means managing the source, rate, form, timing, placement, and utilization of manure, rather than just disposing of it as a waste residual. **The GOAL is to effectively and efficiently use nutrients derived from animal waste to adequately supply soils and plants to produce food, forage, fiber, and cover while minimizing environmental impacts.**

The CNMP is a component of the Resource Management System for the farm. It is used in conjunction with crop rotations, residue management, pest management, conservation buffers, and other best management practices needed on a site-specific basis.



*Corn harvest*

## Goals & Objectives for this CNMP

- Maximize nutrient efficiency for the cropland
- Control manure runoff from cropland fields
- Control soil erosion
- Improve pest management (weeds, insects, disease) related to crop production

# Operation Overview

Agricultural animals on the farm include horses, dairy heifers, goats, sheep, pigs, and deer.

- 150 animal units
- 1,500 tons of manure annually
- 80 acres pastureland
- 50 acres cropland

## Crop Management

### **Corn Silage**

- 50 acres
- Chisel plow, disc, plant
- Genetically Modified Organism or GMO seeds used to aid in weed control
- Permanent grass buffer strips to control erosion and run-off
- Contour planting – crop is planted perpendicular to slope of the fields
- Winter cover crop of rye to control erosion and run-off
- Annual soil analysis
- Lime is applied when necessary to maintain soil pH (6.7–6.8)

### **Pasture**

- Rotational grazing where feasible
- Maintained as grass pasture to aid in weed control
- Fertilized with ammonium nitrate to supply nitrogen
- Routine mowing to aid in weed control
- Semi-annual soil analysis
- Lime is applied when necessary to maintain soil pH (6.7-6.8)

# Conservation Practices



*Incorporating manure into soil*



*Grassed buffer strips*



*Winter cover crop*