Welcome to Manure Du Jour – Season II

Serving Pennsylvania’s Best Practices for Animal Ag-, Air- and Water Quality Protection

BMPs & Environmental Stewardship on Equine Operations

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Penn State State Agriculture & Environment Center
BMPs and Environmental Stewardship on Equine Operations

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National Fish and Wildlife Foundation
Dedicated to the conservation of fish, wildlife and plants, and the habitats on which they depend.
Pennsylvania Equine Nutrient and Sediment Management Project

PSU Partners:

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• Douglas B. Beegle, Ph.D., Extension Soil Fertility Specialist, Department of Crop and Soil Sciences
• Donna Foulk, Agronomist, PSU Extension Educator
• Helene McKernan, PSU Extension Associate
• Mike Harper, Graduate Student,
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Project Partners

• Amy Welker, Nutrient Management Specialist, Cumberland Valley Cooperative
• Suzette Truax, South Central Grazing Specialist, USDA Natural Resources Conservation Service
• Frank Schneider, Watershed Manager, PA Dept. of Environmental Protection
• Shelly Dehoff, Agriculture/Public Liaison, Lancaster County Conservation District
• Jana Malot, State Resource Conservationist, USDA Natural Resources Conservation Service
• Michael Brubaker, S. E. Regional Nutrient Management Program Coordinator, State Conservation Commission, Pa Dept of Agriculture.
Pennsylvania Equine Population

• Equine are the fastest growing segment of the livestock industry.

• PA’s equine population has increased by 50% from 1993 to 2005 (170,000 to 255,000) but the density of the average equine/operation decreased from 10 to 4 head.

• Regulation (Act 38 Regulatory Requirements) of this industry is not covered under the CAO designations and many of these small horse facilities are more concentrated than larger animal operations.

Penn State University Dept. of Dairy and Animal Science and PA Dept. of Agriculture, Pennsylvania’s Equine Industry Inventory, Basic Economic and Demographic Characteristics, May 2003.
Components of good “Environmental Stewardship on Equine Operations”

• Mud/Dust Management
• Manure/Oder Management
• Water Quality
• Balanced Rations
• Pasture Management
• Total Farm Balance
Equine Nutrient and Sediment Management Field Survey

• An Equine Nutrient and Sediment Management field survey was conducted to define BMP for equids and develop a formula to quantify the "efficiency" of those practices.

• Twenty-three surveyed equine operations (from several counties within the CBW) were used to develop a baseline for total nutrient balances and levels on horse farms.
The study consists of visiting farms and asking questions about the farm’s management conservation strategies.
Collection of data consist of recording the operations existing strategies such as pasture plant cover, manure handling, manure storage, land application of manure, bedding, housing, air quality, flooring, holding/sacrifice lot management, buffer/green belts, erosion, soil compaction, cropland and stocking rates.
Results

- An Average 1000 Pound Horse:
  9 tons of manure a year (50 pounds per day), add in bedding material or 730 cubic ft/horse/yr.

- Average fertilizer content in horse manure (feces):
  8 lb N/ton, 9 lb $P_2O_5$/ton, 7 lb $K_2O$/ton

- Average fertilizer content in horse manure (feces, urine, bedding):
  12.9 lb N/ton, 7.8 lb $P_2O_5$/ton, 17 lb $K_2O$/ton
  12 lb N/ton, 5 lb $P_2O_5$/ton, 9 lb $K_2O$/ton (book values)
Ration Evaluation

Horse owners fed:  
161% of NRC for Crude Protein  
184% of NRC for Phosphorus  
(2007 National Research Council, Equine Nutritional Requirements)  
Maintenance level horse rations exceeded NRC’s.
Manure Handling

- 53% Equine operations (7 to 99 horses) hauled manure off the farm soon after it was removed from the stalls.

- None of the surveyed farms left un-managed manure piles indefinitely.
• Windrow manure pile

• Storing and removing can be in one step if done on a regular basis
• Manure storage areas
• Method for manure storage used at a therapeutic riding center
Confined Animal Housing

• An attractive safe area
• Generates manure and bedding
• Requires more management
Confined Animal Housing

12’x24’ attached to a stall will allow the horse to run and play.

20-30’ x 100’ in length will allow the horse to trot.

30-40’ x 200’ will allow the horse to gallop.

1,000 sq. ft. per Animal Unit (1,000 lbs) Feedlots.
Sacrifice Area
How Do You????
Constructing – A Hard Surface

- Create a hard surface with layers of stone aggregate topped with finer stone.

- Soft hoof friendly top layer.

- Surround your storage pad with vegetation to filter out run off.
Sacrifice Lots
Fence Livestock Out of Bodies of Water

- Streams
- Ponds
- Waterways & other drainage areas
Drainage in Outdoor Ring
Containment of Ring Materials
Wash Racks and Washing Areas
French Drains to Contain Water Runoff
Rotational Grazing
Limited Hourly Turn Out
Ground Cover
Hay Storage
Bedding Storage

• Covered to prevent losses.
Roof Runoff Control
Erosion Problems
Drainage Problems
To the Horse Owner--What Seems Right Can Be Wrong

- Lack of control in turn-out areas
- Erosion from roof run-off
- Improperly constructed sacrifice lots
- Poorly maintained manure storage
Odors

• Remember downwind neighbors
Summary - Manure Management

• Each farm should have a plan for managing manure, pastures and mud.
• Formulate feed rations to meet the horses NRC requirements.
• Store manure in a dry, level, location free from storm-water runoff. Actively compost manure and bedding.
• Construct Sacrifice Areas to keep horses off pastures.
• Manage storm-water to prevent manure contamination of water and eliminate runoff.
Equine Environmental Stewardship and nutrient management leads to healthier horses, attractive farms, friendlier neighbors, and control of water pollution.
Manure Du Jour

April 29, 2010

Barry Frantz
PA Natural Resources Conservation Service
USDA Conservation Funding Programs of Interest to Equine Operations

- CBWI Chesapeake Bay Watershed Initiative
- CRP Conservation Reserve Program
- CSP Conservation Stewardship Program
- EQIP Environmental Quality Incentives Program
- GRP Grassland Reserve Program
- WHIP Wildlife Habitat Incentive Program
Types of Assistance

- Payments to install conservation practices
  (CBWI, CREP, CSP, EQIP, WHIP)
- Rental payments or Easement payments to manage grassland for pasture or hay (GRP)
- Rental payments to remove land from production and maintain in grass or trees (CRP, CREP)
Applications and Contracting

- Must be registered in USDA Farm Service Agency system. AGI, Conservation Compliance
- Control of Land for life of contract.
- Generally, participant implements first and is reimbursed.
- Operation and Maintenance.
Practices: Prescribed Grazing Systems (CBWI and EQIP)

- Grazing Management Plans
- Fencing (limitations on perimeter fencing)
- Watering systems
- Spring Developments
- Improved Trails
- Stream Crossings
Practices: Farmstead and Heavy Use (CBWI and EQIP)

- Comprehensive Nutrient Mgt. Plan
- Heavy Use Area Protection
- Waste Storage Facility
- Composting Facility
- Surface Water Controls
- Nutrient Management
Applicant Eligibility for CBWI, EQIP

A person, legal entity or tribe that has an interest in an agricultural operation, as defined in part 1400 of this chapter:

- Owner or renter of the land; OR
- Interest in the ag products, commodities or livestock produced;
- $1,000 Annual Gross Receipts
Stream Corridor Protection (CRP and WHIP)

- Don’t need to be a farmer to participate
- Buffers
- Stream Fencing
- Crossings
- Watering Systems
Grassland Reserve Program (GRP)

Limits rental agreement options to 10-, 15-, and 20-years; average $7-$16/acre

Annual $50,000 payment limitation per person for rental agreements

Easement payments based on a market rate assessment, average $1,100 - $10,000 /acre

In Cooperation with FSA

Requires a Grazing or Hayland Management plan

No ag income requirement for eligibility
Conservation Stewardship Program (CSP)

- Higher levels of management (Enhancements)
- Payments based on a management scoring system
- Average PA Ag Land Payment $29/acre
- Five year contracts with one annual payment
- No Ag Income requirement; must be operator as shown in FSA records
For More Information, visit:

- Your local USDA Service Center
- Your local conservation district
Equine Best Management Practices

Setting Realistic Pasture Management Goals
Horses evolved as grazing animals!
Horses should consume 1.5 to 3% of their body weight in feed each day. At least 70% should be forage!
Grazing Benefits

- Nutrition
- Enhances overall health
- Reduces stress
- Reduces feed costs - more $$$ for horses!
A well managed pasture can recycle nutrients from dropped manure and reduces the need to deal with manure and bedding from stalls and dry lots.
Pasture-related health issues:

- Excessive weight gain
- Equine metabolic syndrome
- Colic and laminitis
- Spread of gastrointestinal issues
- Toxic plants
Factors that influence best management practice recommendations...
1. Grazing Pressure and Stocking Rate

Horses bite off pasture grasses with their front teeth and can graze the pasture at ground level. Forage species that store food above ground can be eliminated if grazing pressure is high.
Horses spot graze favorite areas, selectively graze favorite species, and are capable of eliminating plants if pastures are not managed.
Some sugar and starch is stored so that plants can initiate growth in spring and after clipping.

<table>
<thead>
<tr>
<th>Species</th>
<th>Storage Site</th>
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<tbody>
<tr>
<td>Alfalfa</td>
<td>Tap root</td>
</tr>
<tr>
<td>Red clover</td>
<td>Tap root</td>
</tr>
<tr>
<td>White clover</td>
<td>Stolons and tap root</td>
</tr>
<tr>
<td>Bluegrass</td>
<td>Roots and rhizomes</td>
</tr>
<tr>
<td>Tall fescue</td>
<td>Lower stem (0”-3”)</td>
</tr>
<tr>
<td>Orchard Grass</td>
<td>Lower stem</td>
</tr>
<tr>
<td>Timothy</td>
<td>Lower stem and corms</td>
</tr>
</tbody>
</table>
## Acreage Required to Provide Forage for One Horse

<table>
<thead>
<tr>
<th></th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug.</th>
<th>Sept.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>White Clover + Bluegrass</strong></td>
<td>10.7</td>
<td>1.2</td>
<td>2.7</td>
<td>11.1</td>
<td>11.1</td>
<td>4.5</td>
</tr>
<tr>
<td>1 ton / acre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tall Grass fertilized</strong></td>
<td>5.4</td>
<td>.8</td>
<td>1.3</td>
<td>2.8</td>
<td>2.3</td>
<td>1.8</td>
</tr>
<tr>
<td>2 tons / acre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. Industry Goals

- **Product** - foals and finished horses
- **Service** – lessons, boarding, etc.

Economic benefits are derived from increasing horse numbers; stocking rates may be high. Farms may be near urban areas where land values are high.
3. Farm Management Goals

Exercise area < 1.5 acres per horse
Pasture > 2 acres per horse
4. Present Pasture Conditions
Pasture Conditions on 20 Farms in Chesapeake Bay Watershed – Determined by Line Intercept Methodology

<table>
<thead>
<tr>
<th>Canopy Cover</th>
<th># of Farms</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-100%</td>
<td>11</td>
</tr>
<tr>
<td>80-89%</td>
<td>7</td>
</tr>
<tr>
<td>70-79%</td>
<td>1</td>
</tr>
<tr>
<td>53%</td>
<td>1</td>
</tr>
<tr>
<td>Desirable Plants</td>
<td># of Farms</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------</td>
</tr>
<tr>
<td>90-100%</td>
<td>0</td>
</tr>
<tr>
<td>80-89%</td>
<td>2</td>
</tr>
<tr>
<td>70-79%</td>
<td>1</td>
</tr>
<tr>
<td>60-69%</td>
<td>5</td>
</tr>
<tr>
<td>50-59%</td>
<td>8</td>
</tr>
<tr>
<td>40-49%</td>
<td>0</td>
</tr>
<tr>
<td>30-39%</td>
<td>3</td>
</tr>
<tr>
<td>11%</td>
<td>1</td>
</tr>
</tbody>
</table>
% Canopy Cover & % Desirable plants from test farms in the Chesapeake Bay Watershed

<table>
<thead>
<tr>
<th>Farm Number</th>
<th>% Canopy Cover</th>
<th>% Desirable Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>80%</td>
<td>43%</td>
</tr>
<tr>
<td>2</td>
<td>83%</td>
<td>64%</td>
</tr>
<tr>
<td>10</td>
<td>98%</td>
<td>83%</td>
</tr>
<tr>
<td>13</td>
<td>90%</td>
<td>41%</td>
</tr>
<tr>
<td>17</td>
<td>92%</td>
<td>97%</td>
</tr>
<tr>
<td>19</td>
<td>53%</td>
<td>21%</td>
</tr>
</tbody>
</table>
5. What practices the farm operation is willing to adopt.

It is important to regularly monitor and evaluate pastures.
Grazing “Guidelines”

One horse can be maintained on:

• ½ acre of pasture, if turnout time = < than 3 hr/d
• 1 acre of pasture, if turnout time = 3 to 8 hr/d
• 1 ½ acre of pasture, if turnout time = 8 to 12 hr/d
• > 2 acres = unlimited turnout time

Mowing, irrigating, fertilizing, over-seeding, and resting and rotating pastures can allow higher animal densities while still maintaining proper vegetative cover.
Rest and Rotation are the key to maintaining good pastures on high density farms.

Increase stall time
Use sacrifice areas
Use grazing muzzles
Increase number of paddocks
Sacrifice Area

- Small enclosure such as a paddock, corral, or pen.
- Called a sacrifice area because a small area is “sacrificed” to benefit the rest of the pastures.
Horses should be confined to stress areas

- During wet conditions
- During drought
- Early spring
- If horse population exceeds carrying capacity of the pasture
- If horses cannot tolerate quality of the forage
- If pastures are being renovated or fertilizer or herbicides are being applied.
Pasture Rotation Plans

Diagram 1:
- Area 1
- Area 2
- Area 3
- Area 4

Diagram 2:
- Area 1
- Area 2
- Area 3
- Area 4
- Area 5
- Area 6
- Area 7

Diagram 3:
- Area 1
- Area 2
- Area 3
- Area 4

Diagram 4:
- Area 1
- Area 2
- Area 3
- Area 4

Diagram 5:
- Area 1
- Area 2
- Area 3
- Area 4

Diagram 6:
- Area 1
- Area 2
- Area 3
- Area 4
Sacrifice Lots and Grazing

- Do not turn horses out on lush green pastures all at once
  - Founder
  - Colic

- Gradually introduce or use a grazing muzzle
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This publication is available in alternative media on request.
Question and Answers

• Recordings of this session will be posted at www.aec.cas.psu.edu

Ann Swinker

Barry Frantz

Donna Foulk
What’s ahead for season II?

• Manure du jour switches to MONTHLY sessions beginning May 13:
  • May 13 – 1:30 PM Dr. Rick Day on Decision Support Tools – One Stop Conservation
  • Full schedule for the Manure du jour program: [http://aec.cas.psu.edu](http://aec.cas.psu.edu)