Managing Manure from Domestic Animals to Avoid Negative Impacts

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We’ll be covering:

- Negative impacts domestic animals can have on land.
- We’ll focus mostly on impacts from manure and how these impacts can be avoided and minimized.
What impacts can animals cause?
What parts of animals cause impacts?
Impacts from hooves

- On pastures
  - Compaction
  - Trails
  - Reduced productivity

- On stream banks
  - Trampling
  - Erosion
  - Pollution
Impacts from mouths

- Overgrazing plants can weaken their root structure, plants don’t recover
- Pasture productivity decreases
- Soil erosion increases
Impacts from bodies

- Objects in the pasture are damaged
  - Trees, posts, irrigation works, fences
- Weed seeds and pests are transported
Impacts from manure

- Polluted runoff
- Odor
- Dust
- Insects and parasites

UNCE, Reno, NV
How to avoid impacts?

- Good grazing management avoids hoof and mouth impacts
- Good facility design avoids animal body impacts

www.usda.gov
Good manure management

- Keeps livestock healthy
- Returns nutrients to the soil
- Improves pastures and gardens
- Protects the environment
Poor manure management

- Livestock get sick
- Unsanitary conditions
- Complaints from neighbors
- Increased insect and parasite populations
- Harms environment
How much manure do animals produce?

Example:
How much manure will be produced by two horses in a small stable for three months in the winter.
Horse manure production

- 2 horses, 1000 pounds each
  - WEIGHT: 50 lbs/day x 2 = 100 pounds
  - VOLUME: .81 cubic feet/day

- WEIGHT: 50 lbs/day x 30 days/month x 3 months = 4500 pounds of manure

- VOLUME: 0.81 cu ft/day x 30 days/month x 3 months = 73 cubic feet of manure
How much manure will your animals produce?

<table>
<thead>
<tr>
<th>Animal</th>
<th>Volume cu ft/day</th>
<th>Weight lbs/day</th>
<th>Moisture percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>1.02</td>
<td>63</td>
<td>88</td>
</tr>
<tr>
<td>Ducks</td>
<td>0.73</td>
<td>46</td>
<td>75</td>
</tr>
<tr>
<td>Goats</td>
<td>0.63</td>
<td>40</td>
<td>75</td>
</tr>
<tr>
<td>Horse</td>
<td>0.81</td>
<td>50</td>
<td>78</td>
</tr>
<tr>
<td>Sheep</td>
<td>0.63</td>
<td>40</td>
<td>75</td>
</tr>
</tbody>
</table>
## Nutrient value of manures

<table>
<thead>
<tr>
<th>Animal</th>
<th>N (lbs/ton)</th>
<th>P&lt;sub&gt;2&lt;/sub&gt;O&lt;sub&gt;5&lt;/sub&gt; (lbs/ton)</th>
<th>K&lt;sub&gt;2&lt;/sub&gt;O (lbs/ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>11.3</td>
<td>8.4</td>
<td>9.5</td>
</tr>
<tr>
<td>Chicken</td>
<td>27.3</td>
<td>23.5</td>
<td>13.2</td>
</tr>
<tr>
<td>Goat</td>
<td>22.0</td>
<td>5.4</td>
<td>15.1</td>
</tr>
<tr>
<td>Horse</td>
<td>12.1</td>
<td>4.6</td>
<td>9.0</td>
</tr>
<tr>
<td>Sheep</td>
<td>22.5</td>
<td>7.6</td>
<td>19.5</td>
</tr>
</tbody>
</table>
Manure can be a resource

- Livestock remove nutrients from land while grazing
- Returning manure to soil promotes soil fertility and plant growth
- Important nutrients
  - Nitrogen (N)
  - Potassium (K or K2O)
  - Phosphorus (P2O5)

www.senecaway.com/compost.htm
Can I use all my manure?

- How much will you have?
- Where can you safely store or compost it?
- Where can you safely incorporate it in or on your property?
How much manure is enough?

To provide annual phosphorus needs for a one acre pasture:

- one 1000-pound cow
- one 1400-pound horse
- three market (150-pounds) hogs
- twelve 100-pound sheep
- 225 laying hens
Effective management depends on

- Collection
- Storage
- Application
- Removal
Manure collects in:

- Pasture
- Cages
- Bedded stall or barn
- Dry lots/confinement areas, paddocks, corrals or other “sacrifice areas”
Pasture collection

- Requires the least amount of effort
- Natural weathering reduces volume up to 60 percent
- Nutrients are directly recycled
- May require occasional dragging of pasture to break up and distribute the manure
Cage collection

- Small animals like rabbits, fur animals and poultry/birds
- Manure drops through cage and is removed
- Waste includes bedding material such as straw or wood shavings
Bedded stall or barn

- Horses, cattle, swine, and poultry
- Manure and soiled bedding are removed by manual cleaning

www.nationalhorsestalls.com
Dry lots, corrals or other confinement areas
Manure storage considerations

- Distance from streams, ponds, wells
- Prevailing wind direction
- Slope of ground
- Soil type
Manure storage - avoiding runoff

- Install buffer strips
  - Vegetated area between storage and stream
- Install berms or ditches
  - Prevents water from entering or leaving storage area
Composting

- Reduces volume
- Kills parasites
- Reduces weed seeds
- Reduces odor
- Provides slow release fertilizer
- Provides soil amendment
Composting requirements

- Oxygen
- Moisture
- Correct carbon to nitrogen ratio (30:1)
- Temperature (120-160 F)
What do I do with the manure?

- **Apply it to your property**
- **Arrange with gardeners, landscapers, or farmers to remove it**
  - most interested in composted manure
- **Haul it yourself**
  - most expensive
- **Landfilling (bury on your property)**
  - not recommended, expensive and potential for runoff increases
Tips for safe manure/compost application

- Minimum of 100 feet from water source (if flat ground)
- Away from natural drainages
- Incorporate as soon as possible

www.nhq.nrcs.usda.gov
Tips for safe manure/compost application

- Monitor soil’s nitrogen content to avoid overapplication
- Complete the composting process to prevent spreading weed seeds
- Consider seasonal conditions – winter, wet conditions, etc.
The bottom line (no pun intended)

- Manage manure to maintain healthy animals and healthy land
- Applying manure to your property increases the nutrient value and organic content of your soil