



# Managing Manure from Domestic Animals to Avoid Negative Impacts

Developed by:

Holly George, University of California Cooperative Extension

Susan Kocher, University of California Cooperative Extension

Bruce Miller, Utah State University

Melody Hefner, University of Nevada Cooperative Extension

With Contributions From:

Cinda Williams, University of Idaho



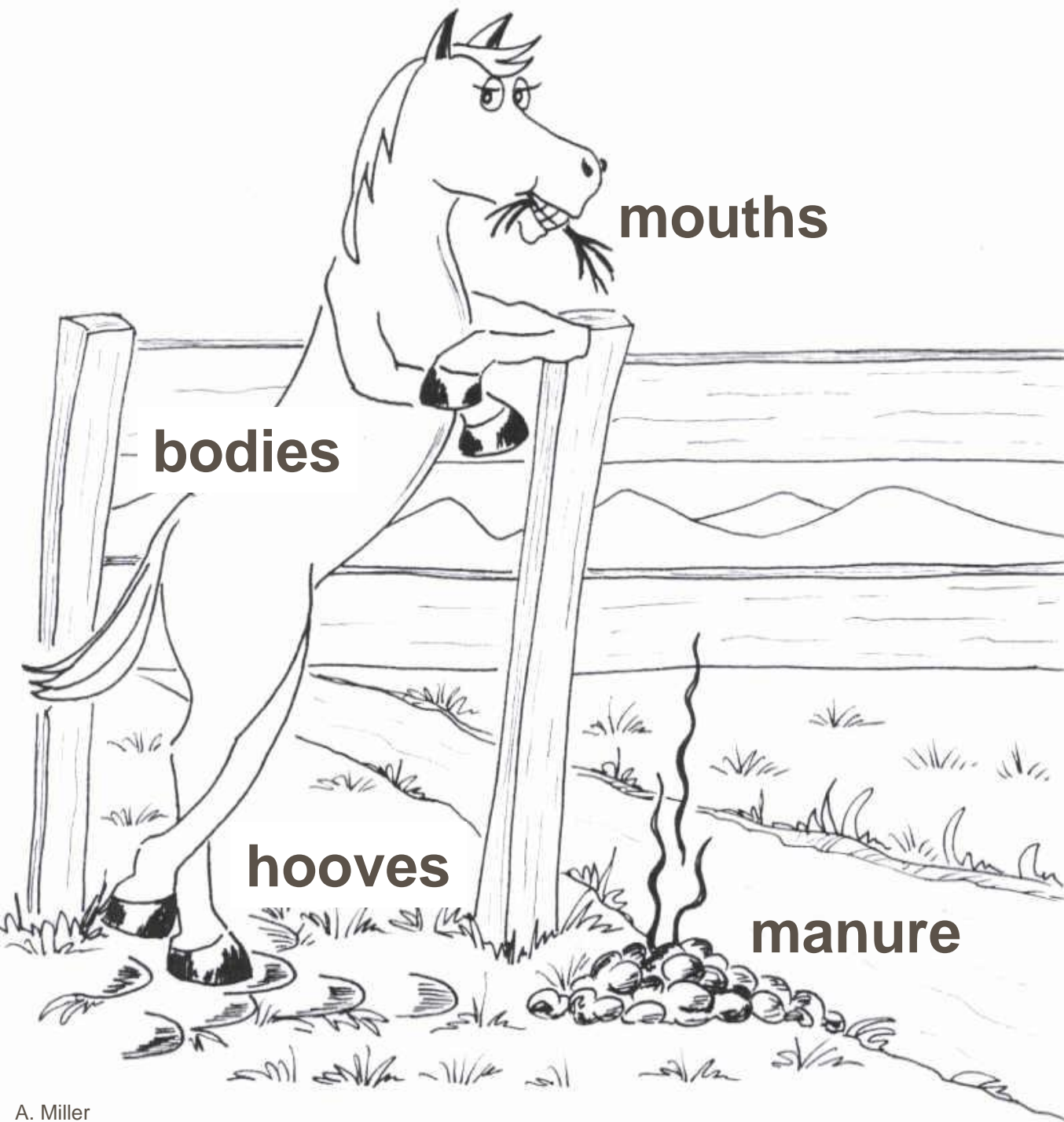


# **We'll be covering:**

- **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?**



**mouths**

**bodies**

**hooves**

**manure**

**What  
parts of  
animals  
cause  
impacts?**

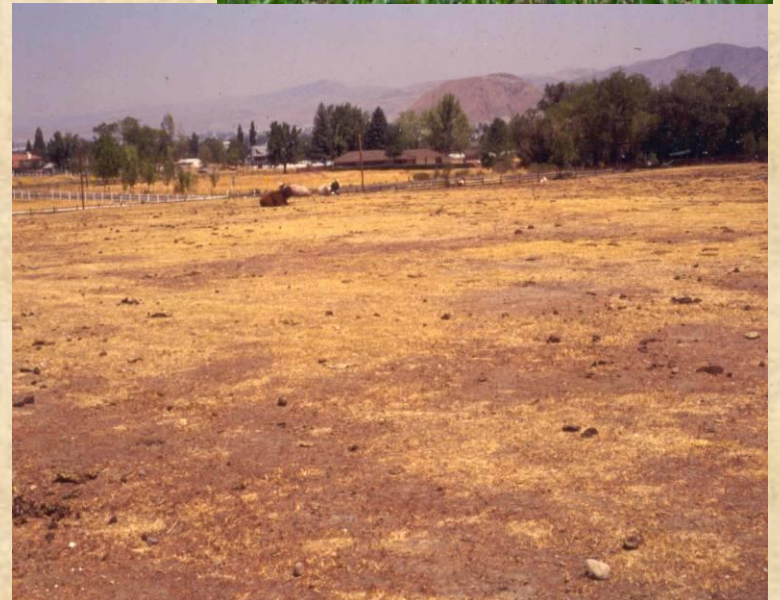
# Impacts from hooves

- 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



UNCE, Reno, NV



UCCE

# 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**



# 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:  $50 \text{ lbs/day} \times 2 = 100 \text{ pounds}$
  - VOLUME:  $.81 \text{ cubic feet/day}$
- WEIGHT:  $50 \text{ lbs/day} \times 30 \text{ days/month} \times 3 \text{ months} = 4500 \text{ pounds of manure}$
- VOLUME:  $0.81 \text{ cu ft/day} \times 30 \text{ days/month} \times 3 \text{ months} = 73 \text{ cubic feet of manure}$

# How much manure will your animals produce?

<b>Animal</b>	<b>Volume cu ft/day</b>	<b>Weight lbs/day</b>	<b>Moisture percent</b>
<b>Beef</b>	<b>1.02</b>	<b>63</b>	<b>88</b>
<b>Ducks</b>	<b>0.73</b>	<b>46</b>	<b>75</b>
<b>Goats</b>	<b>0.63</b>	<b>40</b>	<b>75</b>
<b>Horse</b>	<b>0.81</b>	<b>50</b>	<b>78</b>
<b>Sheep</b>	<b>0.63</b>	<b>40</b>	<b>75</b>

# Nutrient value of manures

<b>Animal</b>	<b>N lbs/ton</b>	<b>P<sub>2</sub>O<sub>5</sub> lbs/ton</b>	<b>K<sub>2</sub>O lbs/ton</b>
<b>Beef</b>	<b>11.3</b>	<b>8.4</b>	<b>9.5</b>
<b>Chicken</b>	<b>27.3</b>	<b>23.5</b>	<b>13.2</b>
<b>Goat</b>	<b>22.0</b>	<b>5.4</b>	<b>15.1</b>
<b>Horse</b>	<b>12.1</b>	<b>4.6</b>	<b>9.0</b>
<b>Sheep</b>	<b>22.5</b>	<b>7.6</b>	<b>19.5</b>

# 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 K<sub>2</sub>O)
  - Phosphorus (P<sub>2</sub>O<sub>5</sub>)





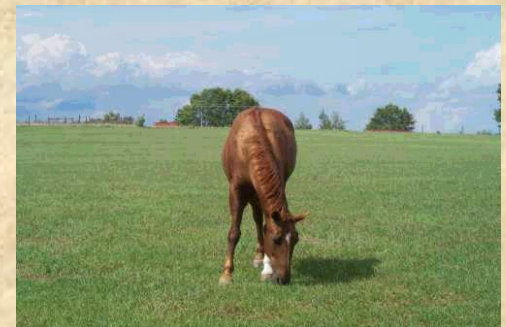
# Can I use all my manure?

- 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





**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





# 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**