Identifying Agricultural Issues

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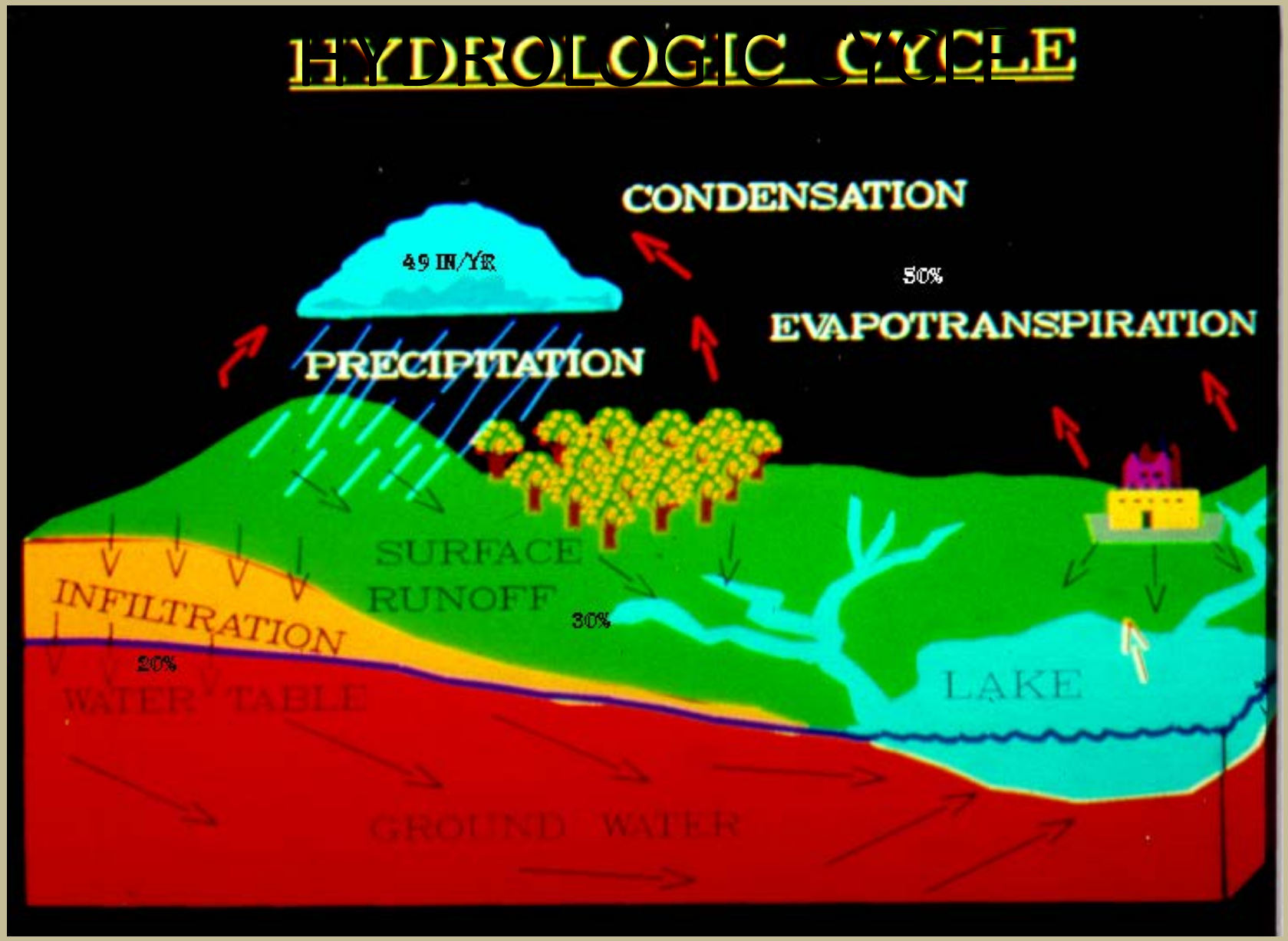
What's in livestock waste and waste-waters that impact water quality?

- Nutrients: Nitrogen
  Phosphorus
- Oxygen depleting organic matter
- Bacteria and pathogens
- sediments


HYDROLOGIC CYCLE
CONDENSATION
49 IN/YR
50%
EVAPOTRANSPIRATION
PRECIPITATION
SURFACE
RUNOFF
30%
INFILTRATION
20%
WATER TABLE
LAKE
GROUND WATER

HEAVY USE AREA

CHANNELIZED FLOW

LOCATION OF ACTIVITIES

LOCATION OF SENSITIVE RECEPTORS

Number of animals per acre

PASTURE?

Erosion- Soil Loss

COMPACTION OF SOILS

SACRIFICE AREA

BMPs NEEDED

OVERFLOWING WASTE STORAGE

FAILED BERM ON WASTEWATER LAGOON

MANURE AND WASTEWATER STORAGE

MANURE & WASTEWATER STORAGE

LINED MANURE AND WASTEWATER STORAGE

MANURE AND WASTEWATER STORAGE

MANURE PILE LOCATION

LOW DENSITY

GOOD VEGETATIVE COVER

Vegetated Buffer

BARNYARD RUNOFF

ROOF GUTTERS

Roofed Heavy Area

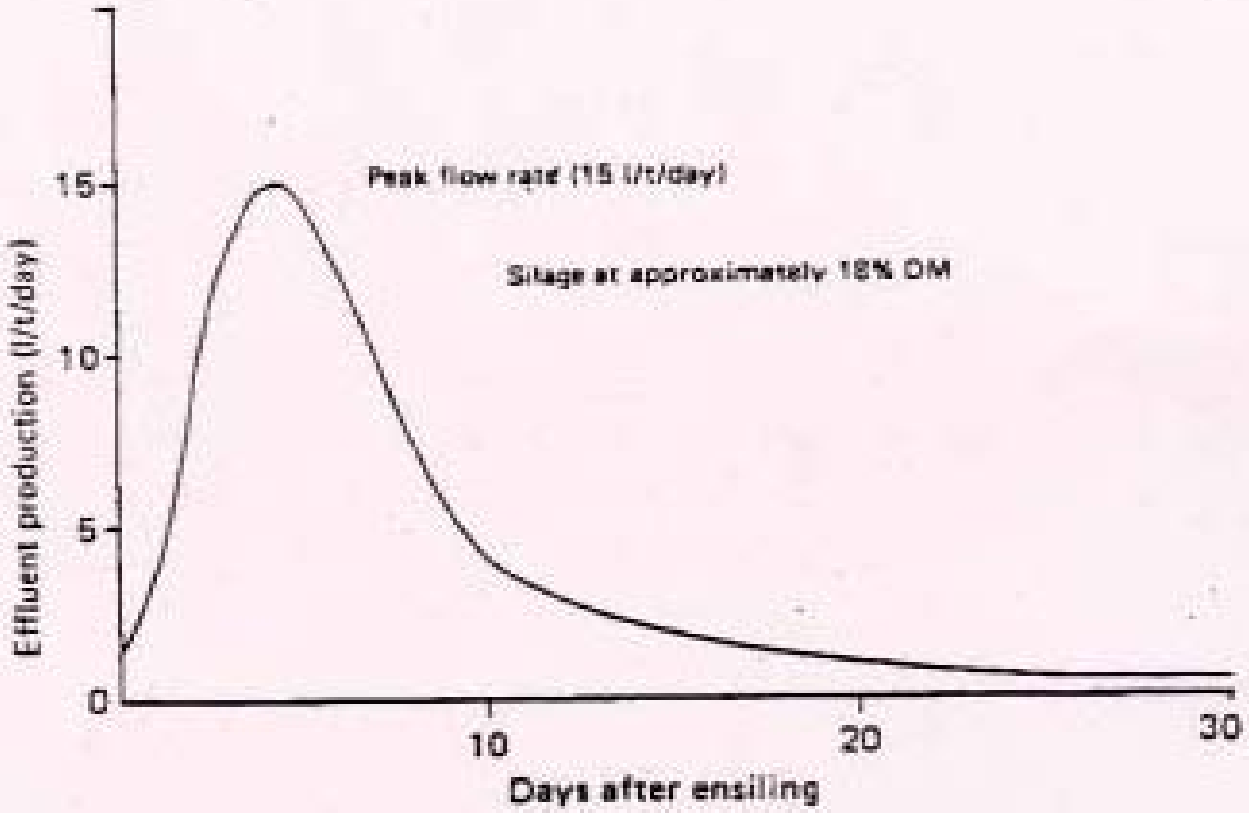
Covered Heavy Use Area & Manure Storage

Covered Heavy Use Area

Covered Manure Storege

Horse Operation

SILAGE BUNKER



TYPICAL PATTERN OF EFFLUENT FLOW

SOURCE: ADAS, BOOKLET, NUMBER 24

SILAGE LEACHATE

Leachate Traveling Off-site

Channelized Leachate & Stormwater

Leachate Entering Stream

FUNGAL MAT

FUNGAL MAT

Leachate in groundwater

Leachate Percipitating Iron


20.3.20

Fish kill

FISH KILL

Leachate control

Covers

Divert surface and groundwater

COVERED BUNKER SILO

LEACHATE COLLECTION

Stormwater and Leachate Collection

Land application of manure and wastewaters

- Application of manure at agronomic rates
- Minimize winter spreading
- Move towards Phosphorus-based application rates

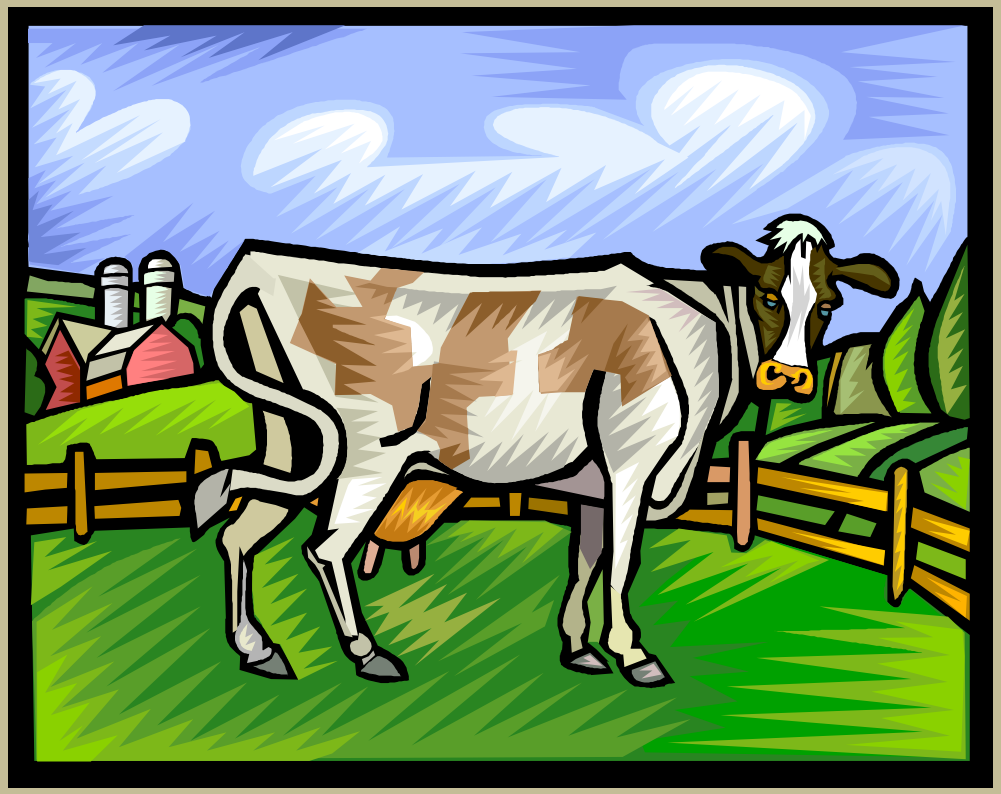
Land application

Pelletized Biosolids


RIP

OPTIONS

- RENDERING
- INCINERATION
- BURIAL
- COMPOSTING



ON-SITE SOLUTIONS

- **BURIAL**
- **COMPOSTING**

  - **Environmental Concerns**
    - **Pathogens**
    - **Nutrients**
    - **Odors**
    - **Disease**

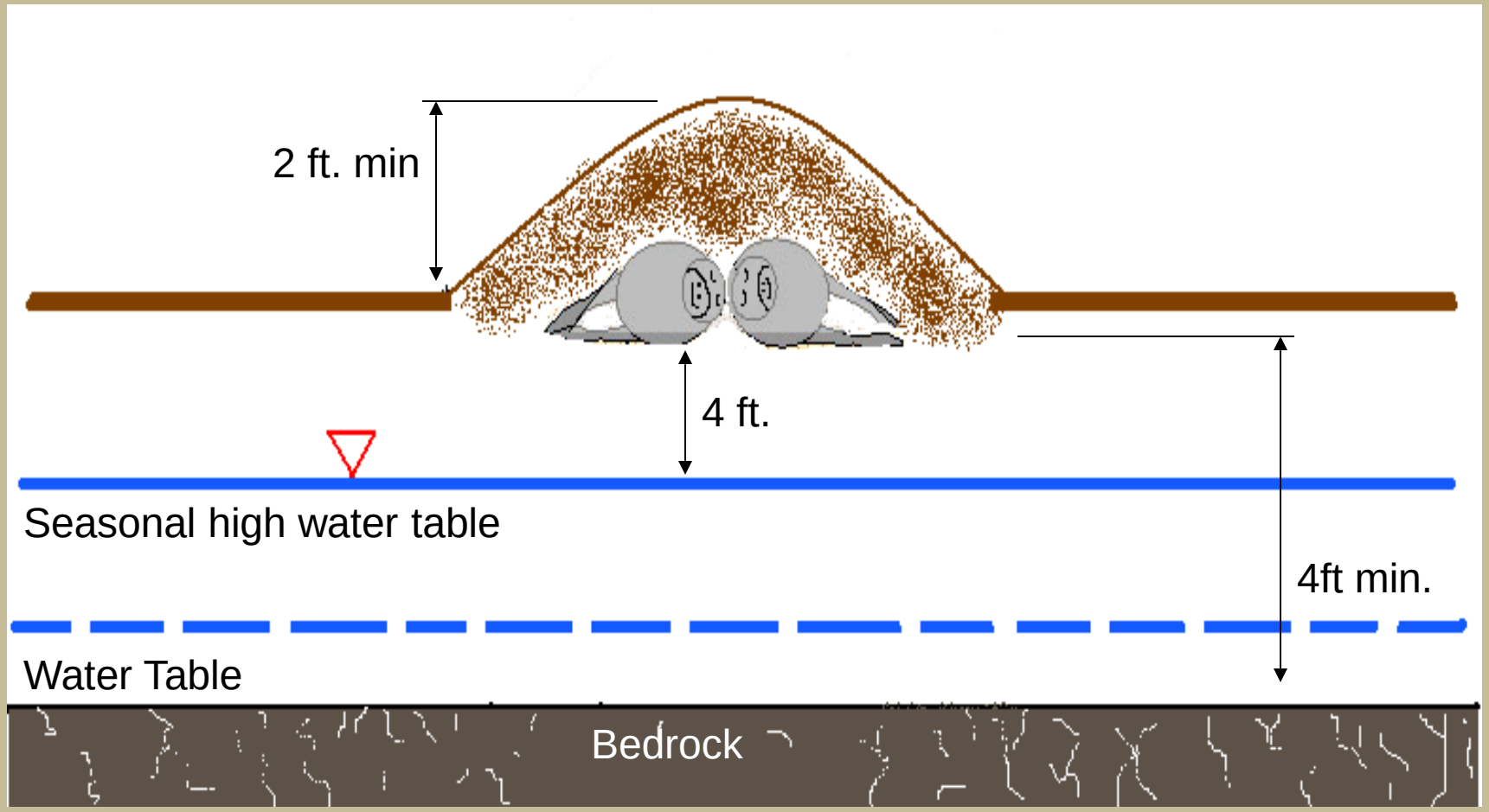
RECOMMENDED SEPARATING DISTANCES

AREAS OF CONCERN	SEPARATION DISTANCE	CT SEPARATION
Property Line	50-150	100
Residence or Businesses	200-500	300
Private Well	100-200	200
Public Well		500
Surface Water or Wetlands	100-200	200
Subsurface Drainage or Ditch Draining to Watercourse	25	50
Seasonal High Water Table	2-5	2-4
Bedrock	2-6	4

BURIAL

- Quick, simple, economical
- BUT
  - Potential to pollute groundwater,wells,surfacewaters
  - May not eliminate diseases
  - Residue can persist for many years
  - Burial sites can negatively effect land values and future use.
  - Doesn’t work well when the ground is frozen

Burial


2 ft. min
4 ft.
Seasonal high water table
4ft min.
Water Table
Bedrock

COMPOSTING

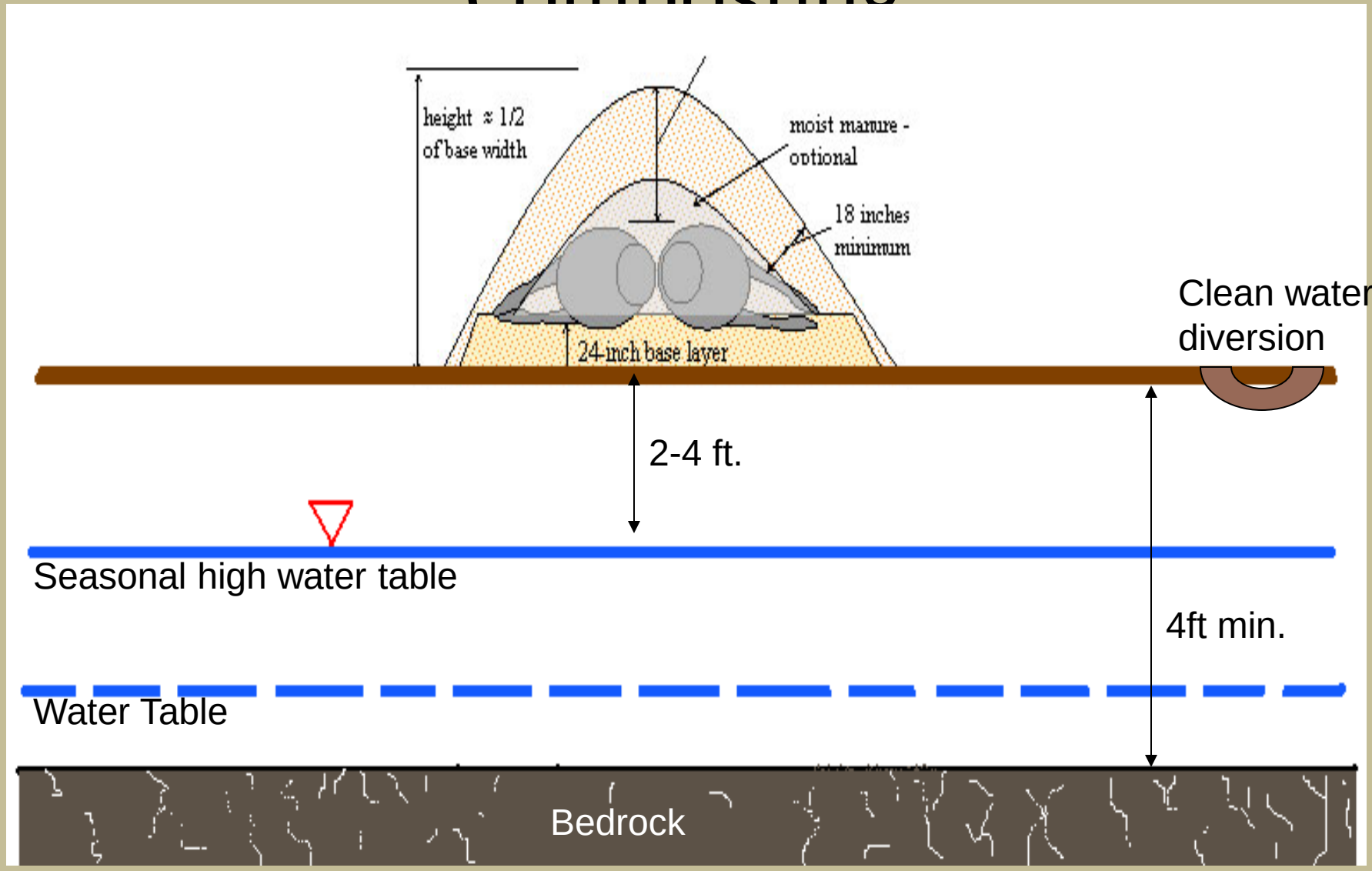
- “Composting dead animals can best be described as above ground burial in a biofilter with pathogen kill by high temperature.”
- Carcass composting followed by land application of the compost can pose less of a pollution risk to shallow groundwater than burial.
- On-site option eliminates transport of potentially infection material
- Relatively simple process done with equipment already available on the farm

COMPOSTING

- Options: Small pile
  - » Bin composter

Static windrow composter

Composting
Composting



COMPOSTING POLLUTION CONTROL MEASURES

- Minimize Leaching
- Minimize Runoff
- Divert Clean Water
- Follow Recommended Separation Distances
- Turn piles after the active composting phase
- Land apply fully composted material

CT--

- Dairy & Poultry produce greater than 1 million tons of manure every year.
- 4.5 million chickens produce 340 tons of manure a day.

Manure Nutrient Surplus in Connecticut

- UConn Cooperative Extension performed a statewide analysis:
  - Utilized 2012 US Census data and animal numbers by county to calculate fertilizer nutrients from manure generated in CT
  - Utilized 2012 cropland census data to estimate how much of the nutrients could theoretically be utilized in each county as well as statewide

Manure Nutrient Surplus in Connecticut

- Statewide all farm animals produce:
  - 14.2 million pounds of nitrogen, and
  - 8.5 million pounds of phosphorus annually
- UConn study found a nutrient surplus of:
  - 3.1 million pounds of nitrogen, and
  - 6.1 million pounds of phosphorus annually

This assumes all CT cropland was available for nutrient application

(Meinert, UConn Coop Ext Dept)

Manure Nutrient Surplus in Connecticut

Over application of manure can have negative impacts on surface and groundwater.

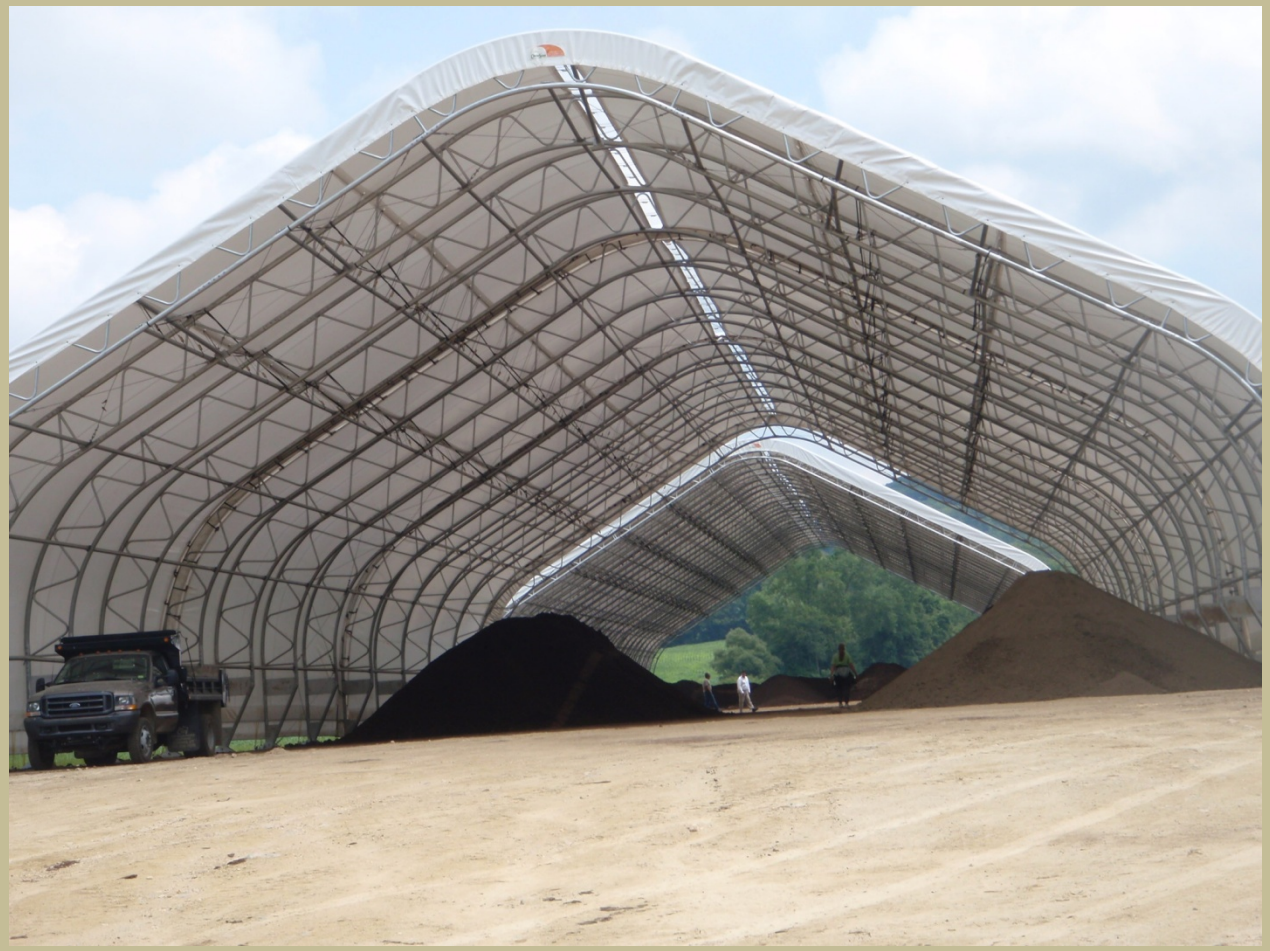
Some dairy farms are currently utilizing manure from poultry operations. As dairy farms address the nutrient management issue, poultry manure management will become much more difficult as existing options of land application become unavailable.

Both dairy and poultry farms will need to develop alternative manure management methods, in addition to land application.

Alternative Technology

- Manure solids separation equipment
- Solids storage, handling and mixing equipment

Cushman Farm



Covered composting facility

Self-propelled windrow turner

Value added product

Centrifuge


CowPots
The pots you plant!
Made with 100% Renewable Composted Cow Manure!

COWPOTS

MANURE SOLIDS AS PLANTING POTS AND PACKAGE MATERIALS

COWPOTS

Poo Power

Once Issues Are Identified Livestock Operated Needs To:

- Develop a plan or revisit plan
- Implement the plan
- Maintain BMPs
- Inspection during chronic rainfall or large storm events
- Additional alternative utilization for manure

Additional Information

- Northeast Recycling Council

  Manure Management Handbook for

  Small and Hobby Farms

  http://www.nerc.org/documents/index.html#MM
- Connecticut Natural Resources Conservation Service (NRCS)

  http://www.ct.nrcs.usda.gov/