Introduction to Bedded Pack Manure Management

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Why Bedded Packs?

Pros

- Protect water quality
- Improve soil quality
- Animal health & comfort
- Higher air quality
- Conventional manure handling

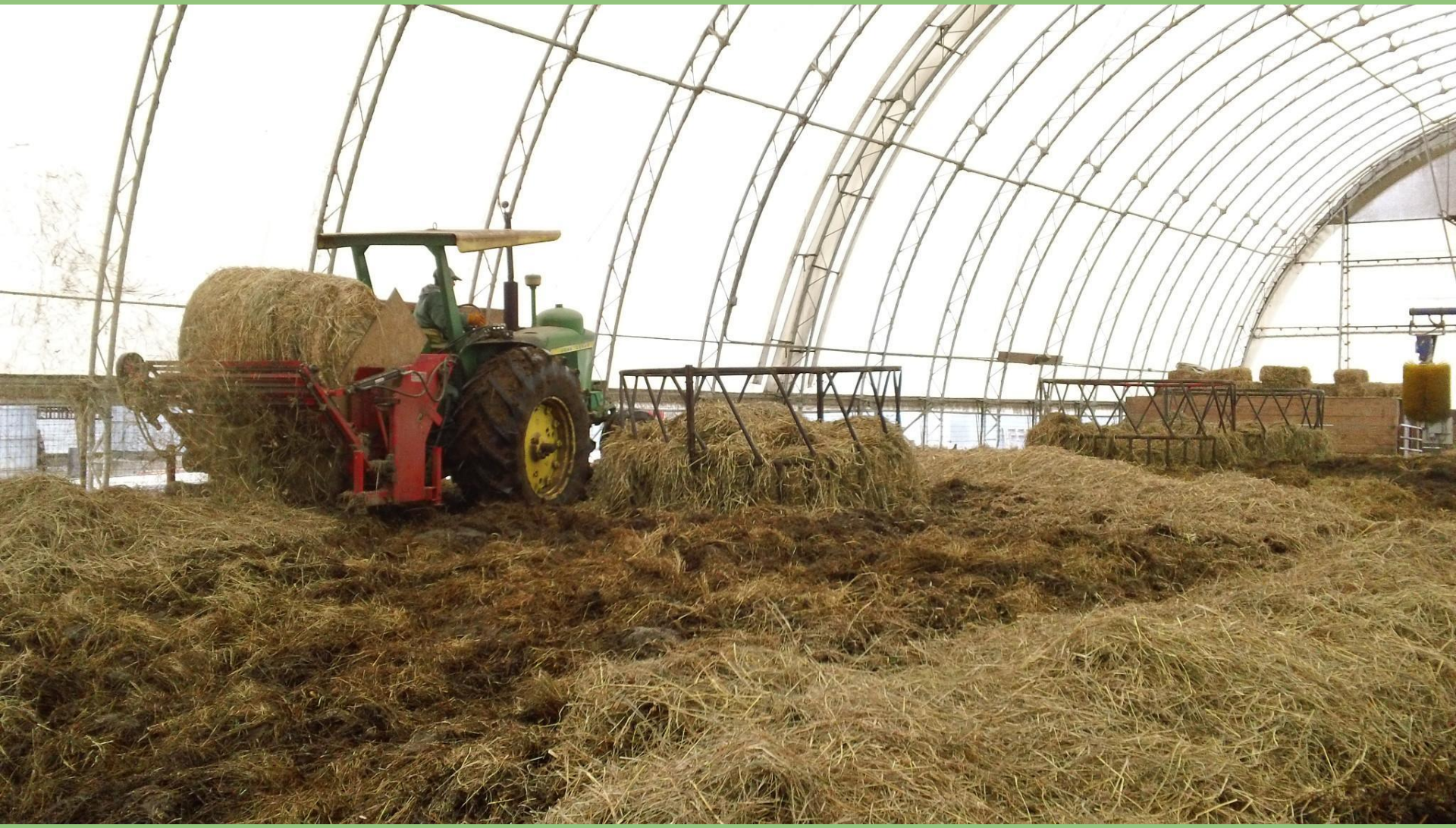
Cons

- High bedding costs & changing availability
- High labor/management
- High maintenance, structure costs
- Handling manure multiple times
- If not maintained properly, high SCC

Bedded Pack Variables

- Variables of animal type, age group, length of time on pack, bedding type, frequency and volume of new bedding
- Goals of herd health, animal comfort, air quality, ability to check/socialize animals
- Goals of manure management, soil quality and fertility improvement
- Avoid lagoon construction/expansion

Regular, Consistent Management



Guy Choiniere adds new bedding with shredder daily

Vermont Bedded Packs: 5 Cases

Days on pack: 180-360

Animals: 25-90 dairy

Annual operating expenses:

$9,914-$40,726 median: $14,848

Operating expenses per animal/day:

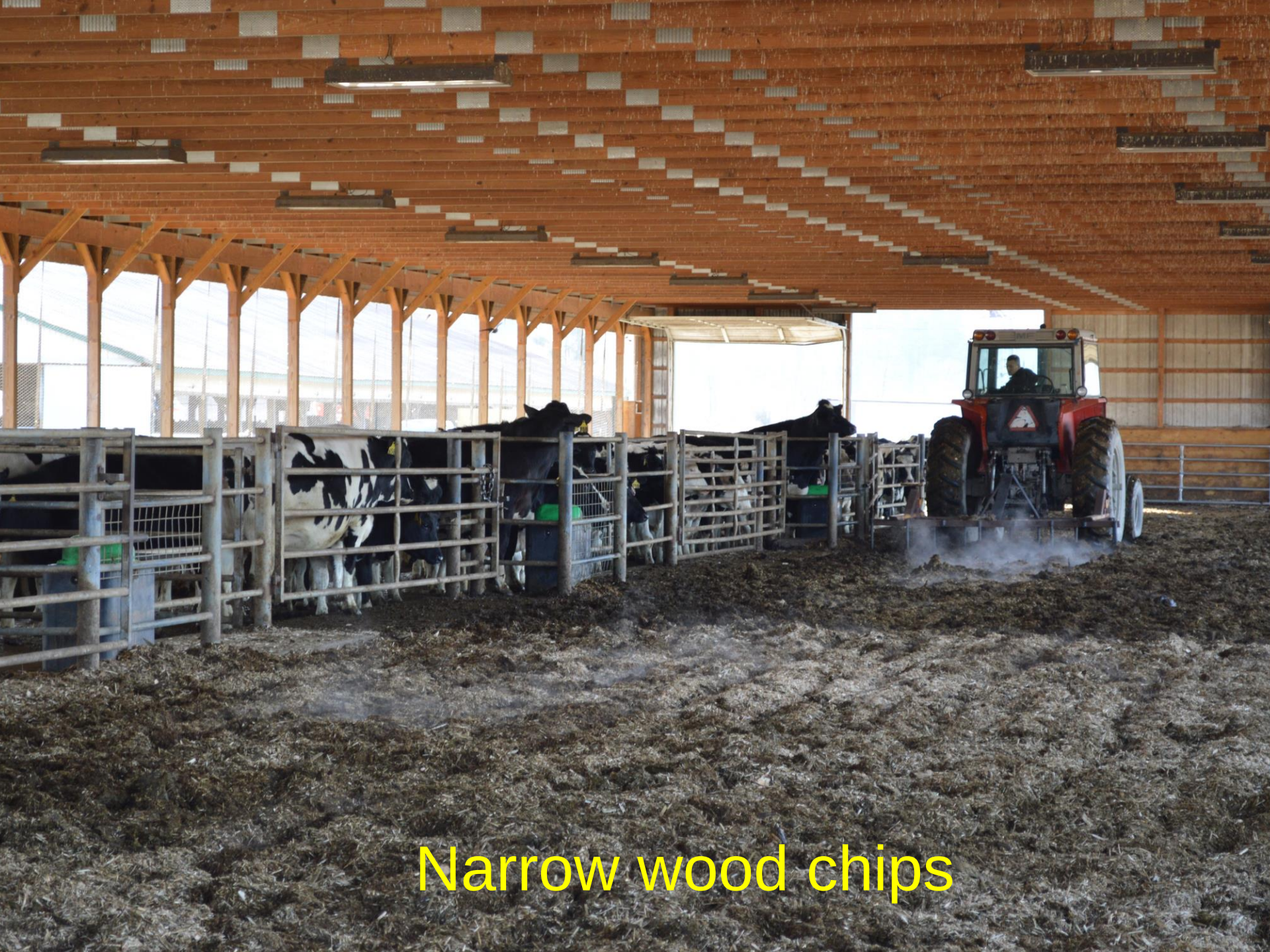
$2.07 to $5.03 median: $2.75

Annual labor hours: 42-567 median: 206

--Bedded Packs in Vermont: Five Stories, 2012

Wood chip base - shavings and rock dust added to shredded hay

Shavings with a chip base and occasional round bale.


Narrow wood chips

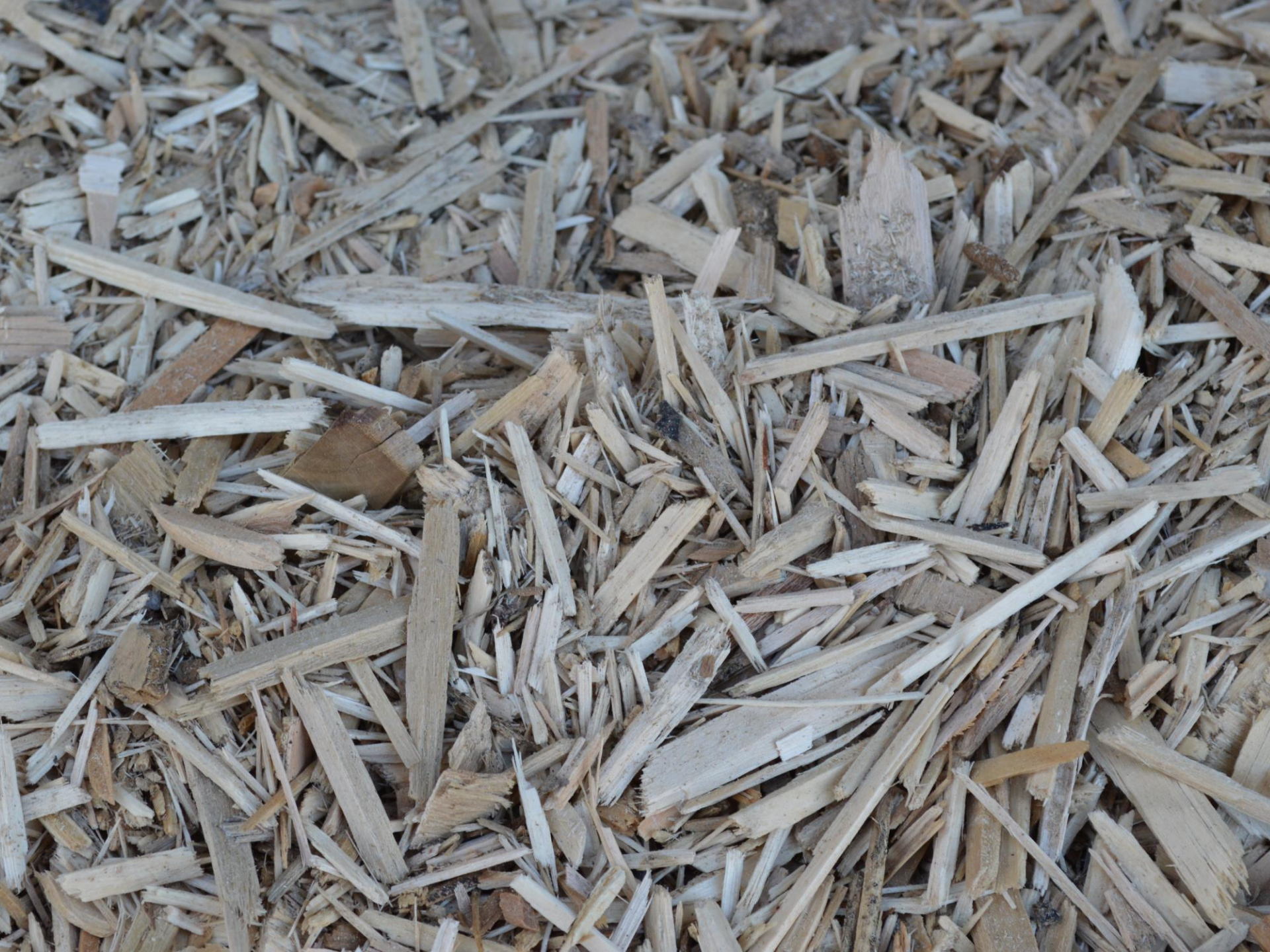
Vermont Bedded Packs: Survey

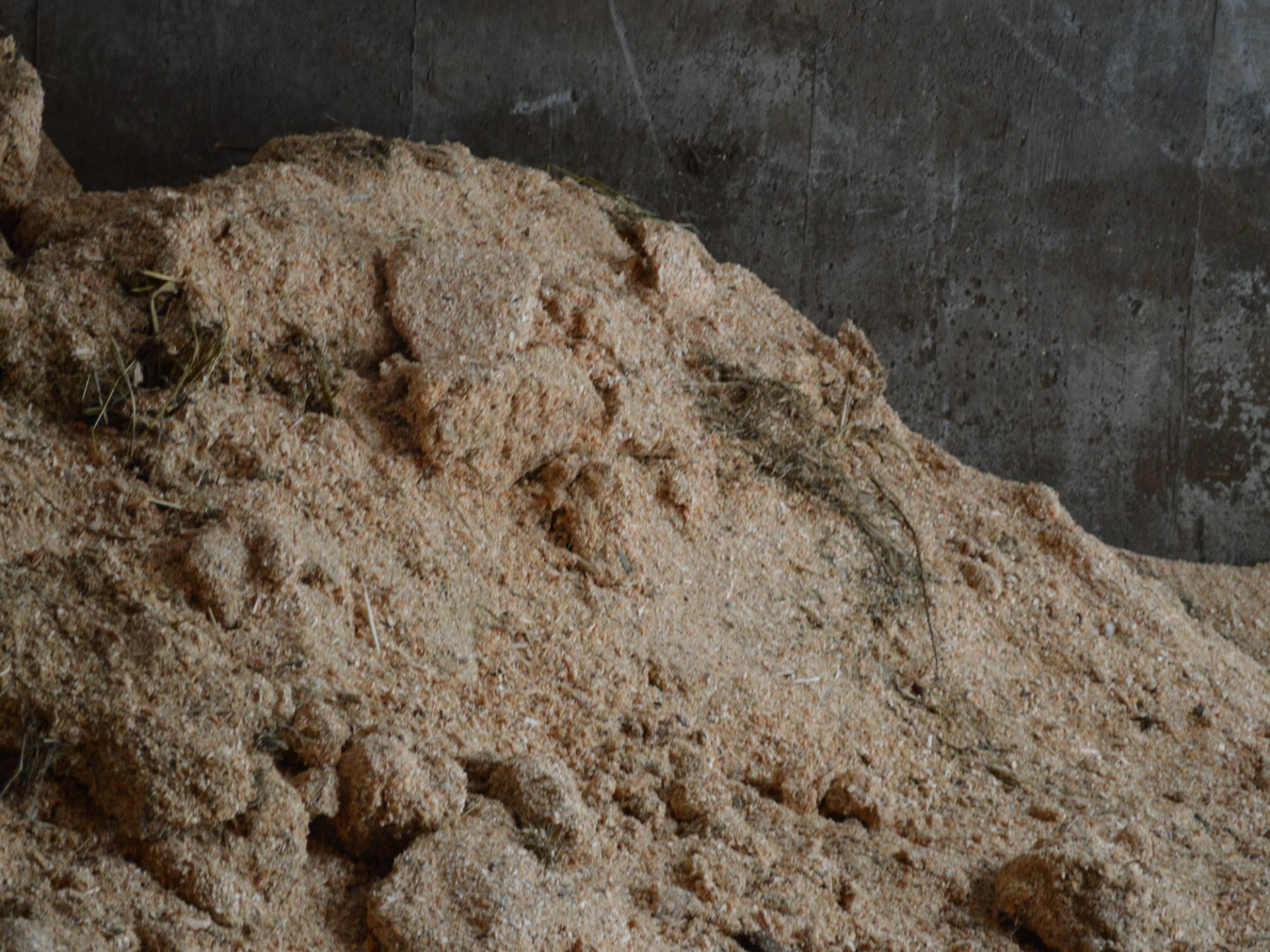
Bedding Materials	Count	%
Hay	24	20.87
Sawdust	11	13.91
Shavings	10	8.70
Chips	9	7.83
Straw	7	6.09
Combination of the above	3	2.61
Other materials used: (leaves, shredded paper, corn cobs)		

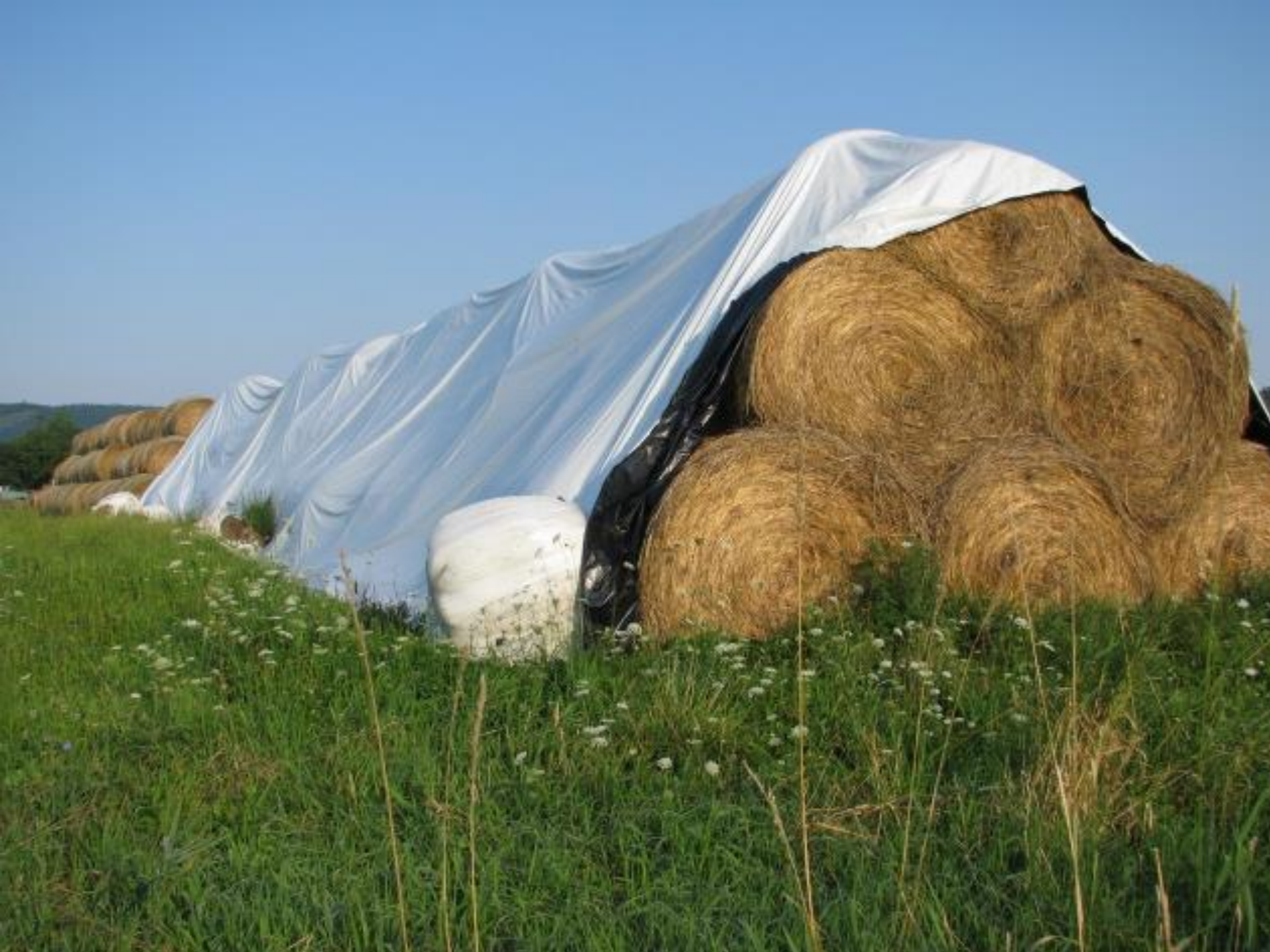
Figure 6. What bedding materials are you using, have used or plan to use on your bedded pack?

- 70% took 15-30 minutes to manage pack daily
- 1-14 days to clean out pack
- $100-$3,000 to clean (labor + equipment)

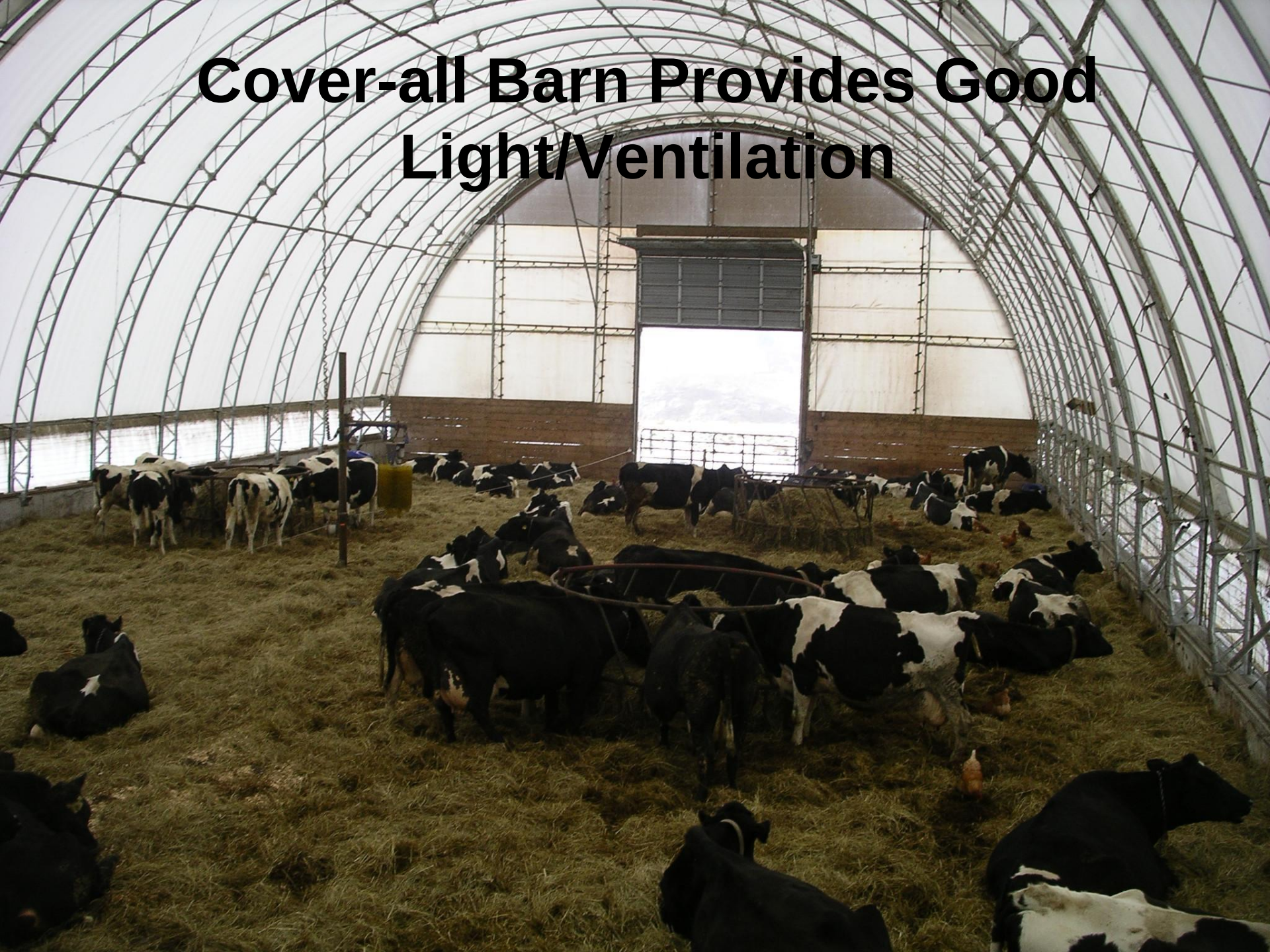
--Vermont Bedded Pack Survey, 2012

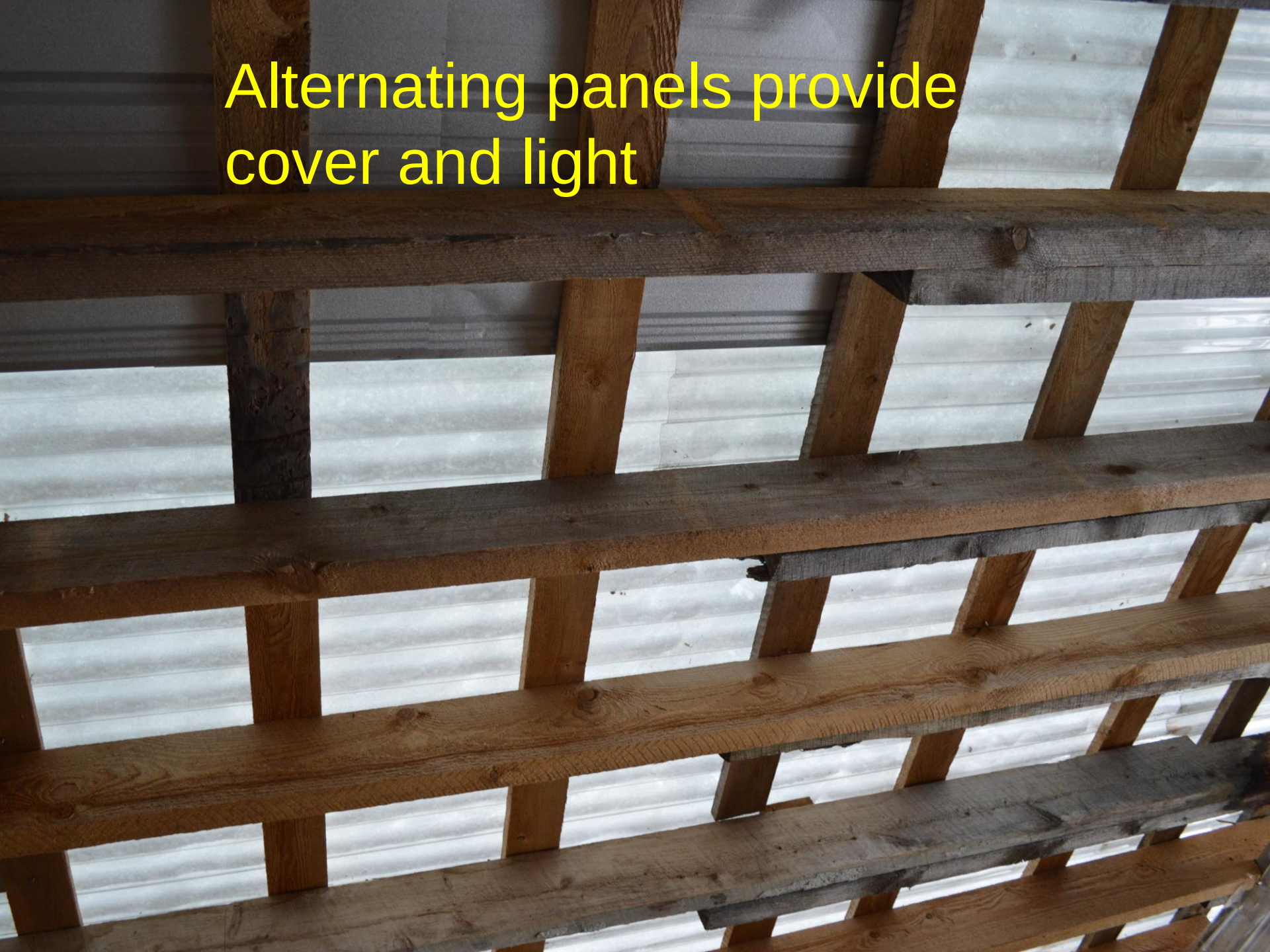


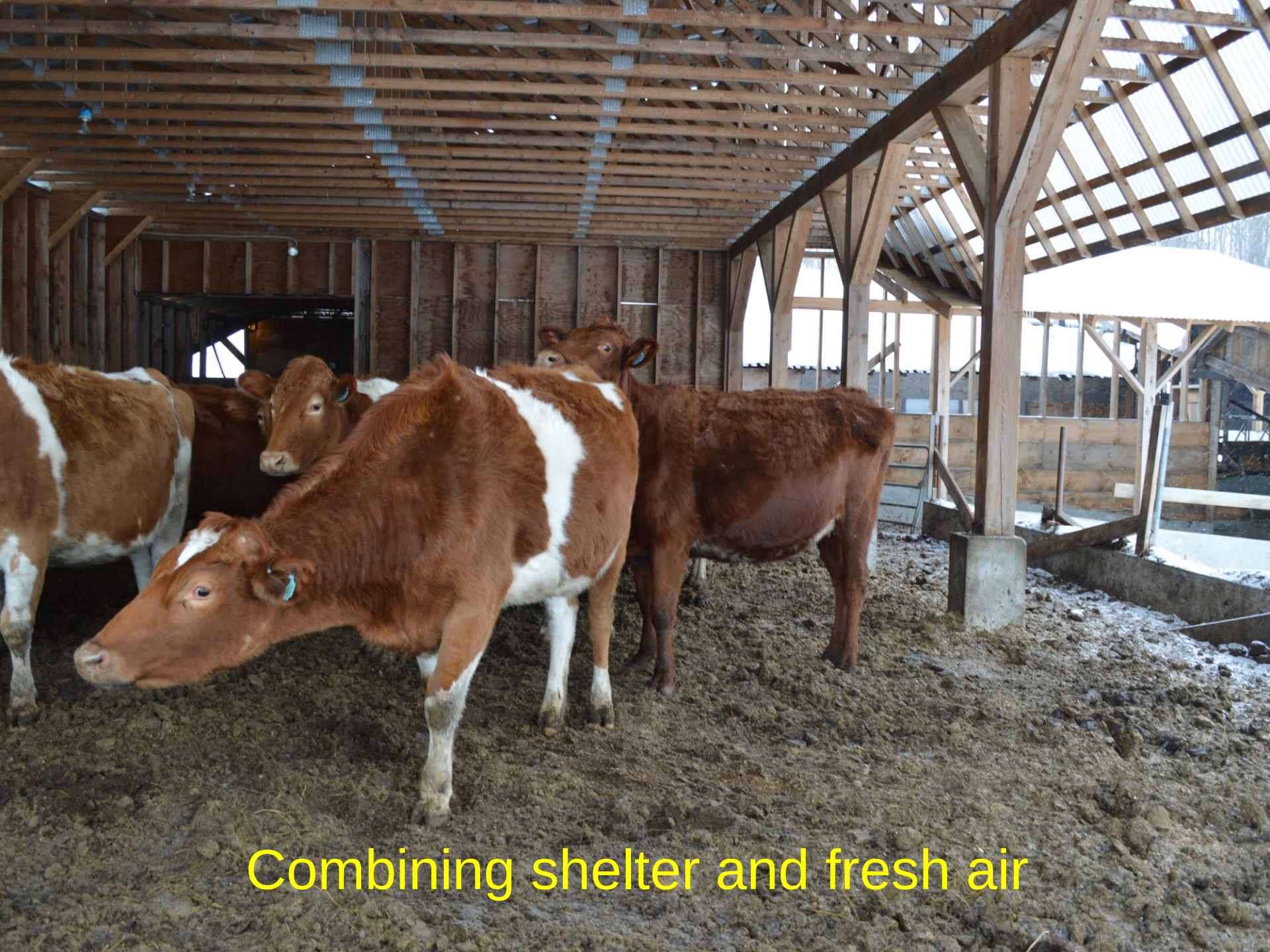


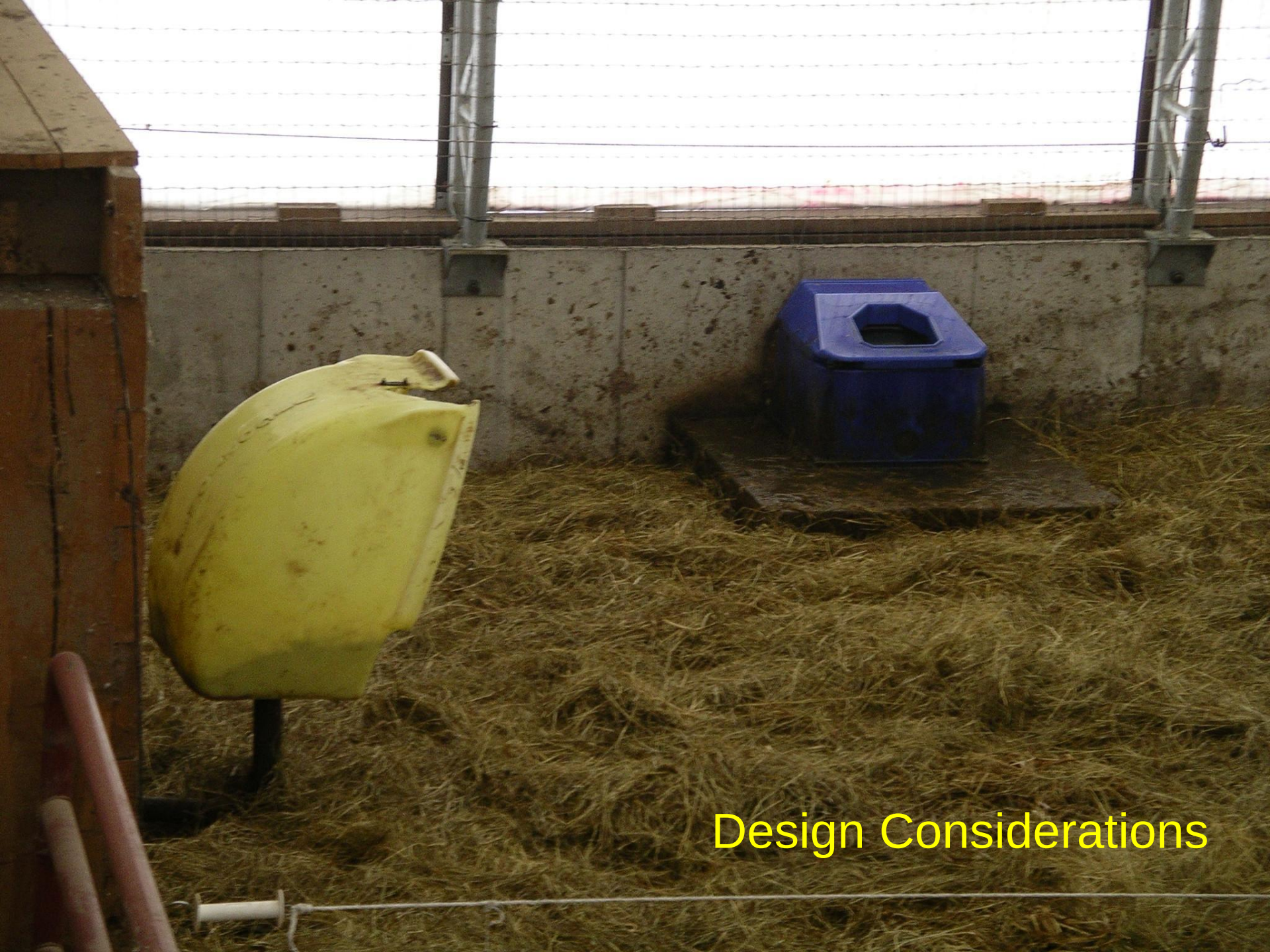


Cover-all Barn Provides Good Light/Ventilation




Alternating panels provide
cover and light


Combining shelter and fresh air


Design Considerations

Pack moisture targets

- Total pack moisture 63% (above 70% can expect leaching/free moisture)
- Surface moisture less than 40% (dry surface for animals to lay on)
- Sun/wind can promote surface drying
- Damp/humid weather can wet fresh bedding even before manure/urine
- Extra bedding may be needed around waterers/animal congregation areas
- Shredded hay/straw more absorbent

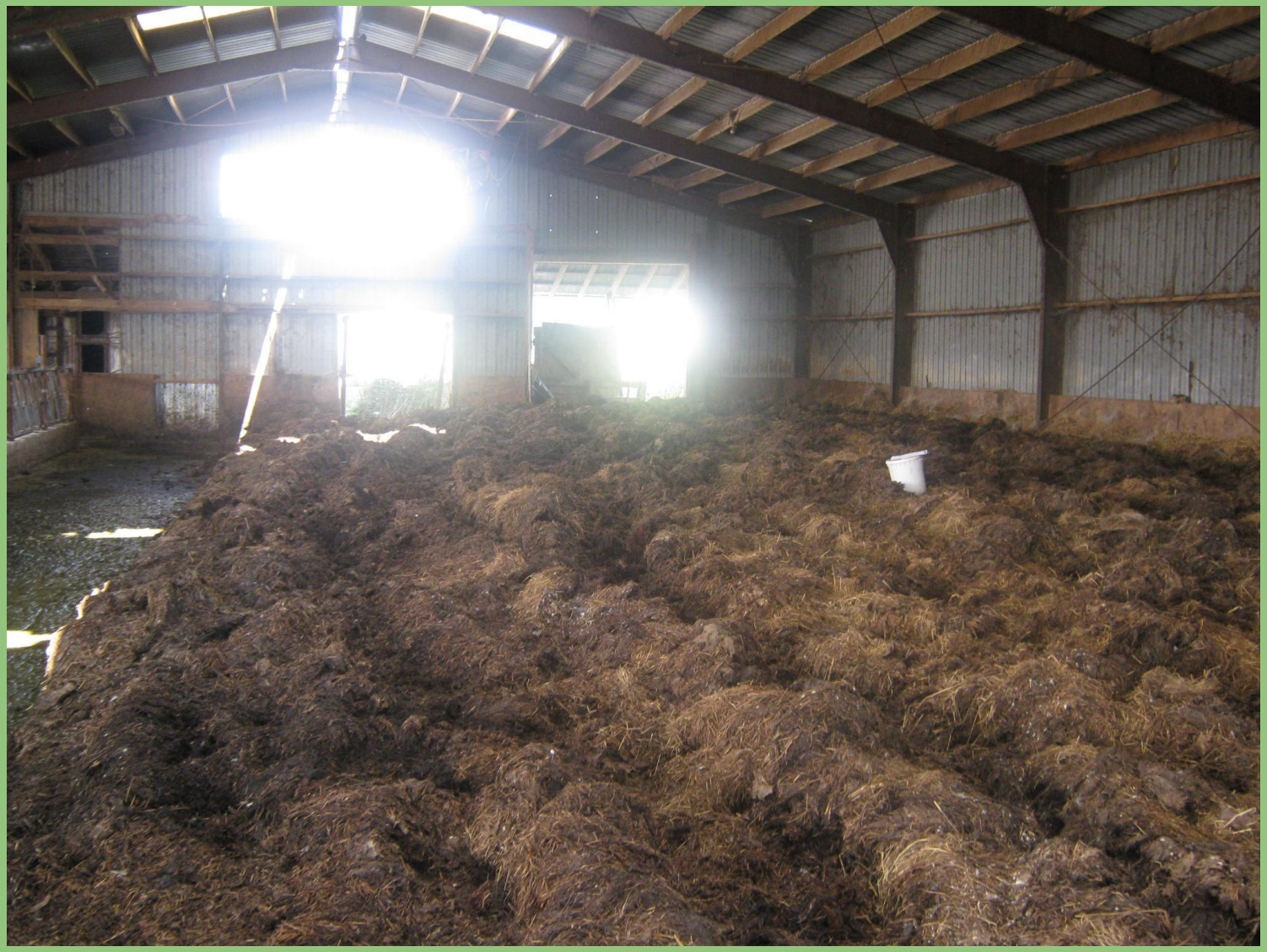
Soil additives through pack bedding

Chickens grazing for bugs/feed

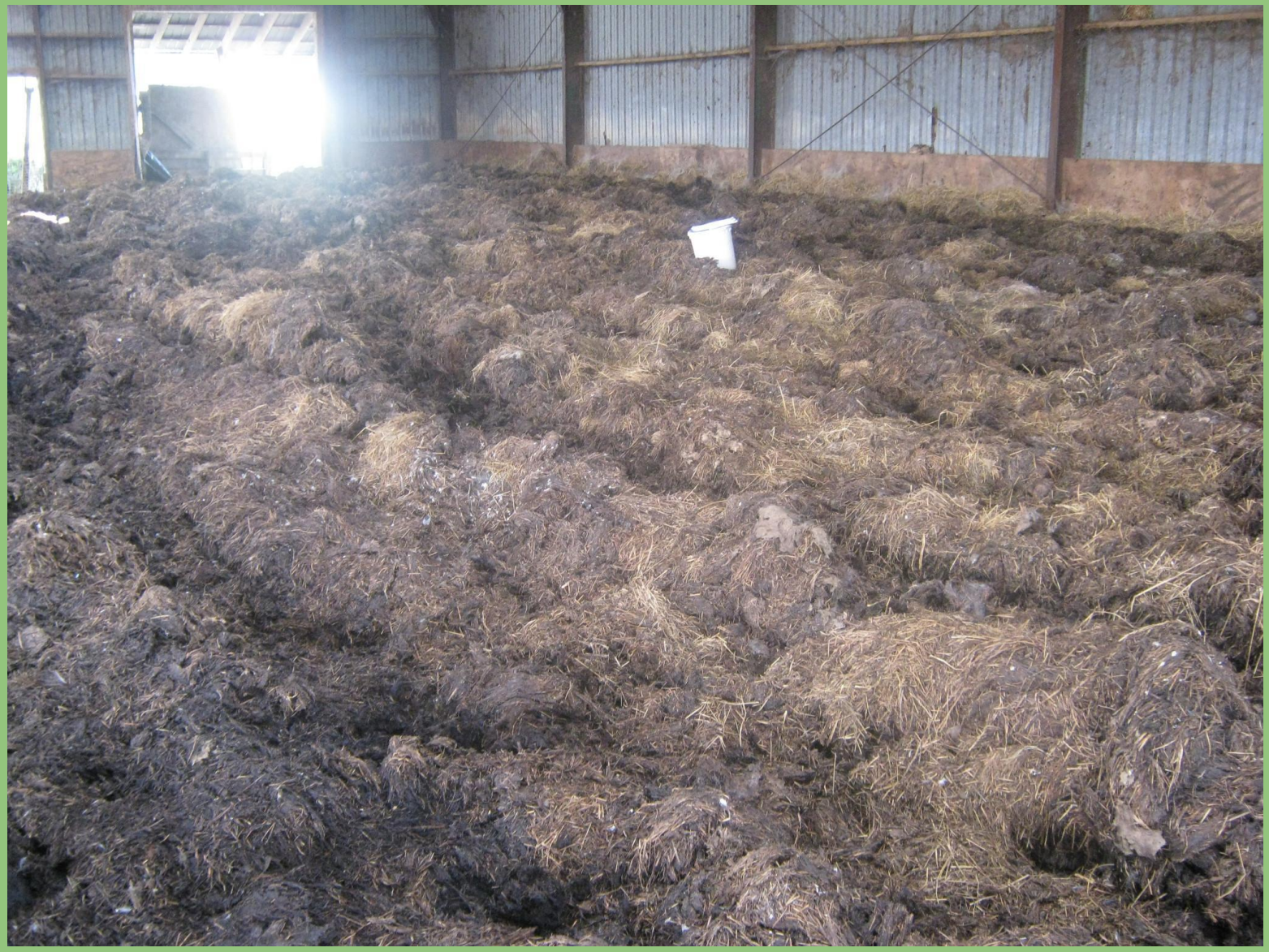
Animal health on the pack

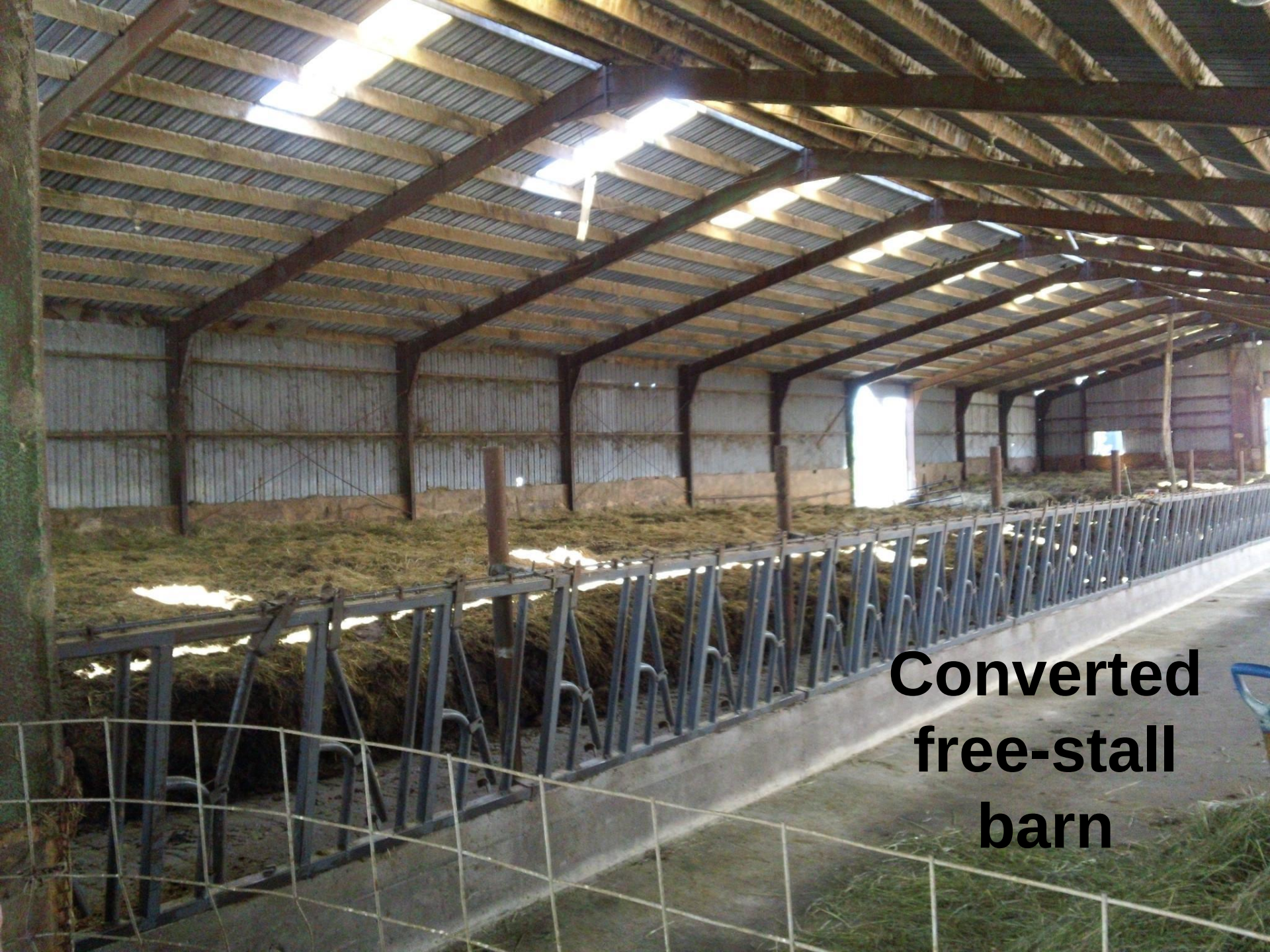
- Lower lameness rate (4.4% compared to cross- and naturally ventilated free stalls at 13.1% and 15.9%)
- Mastitis was reduced by 12% in 6 out of 9 farms (see study)
- Improved reproductive performance on 4 out of 7 farms (26% heat, 34.5% pregnancy rate)

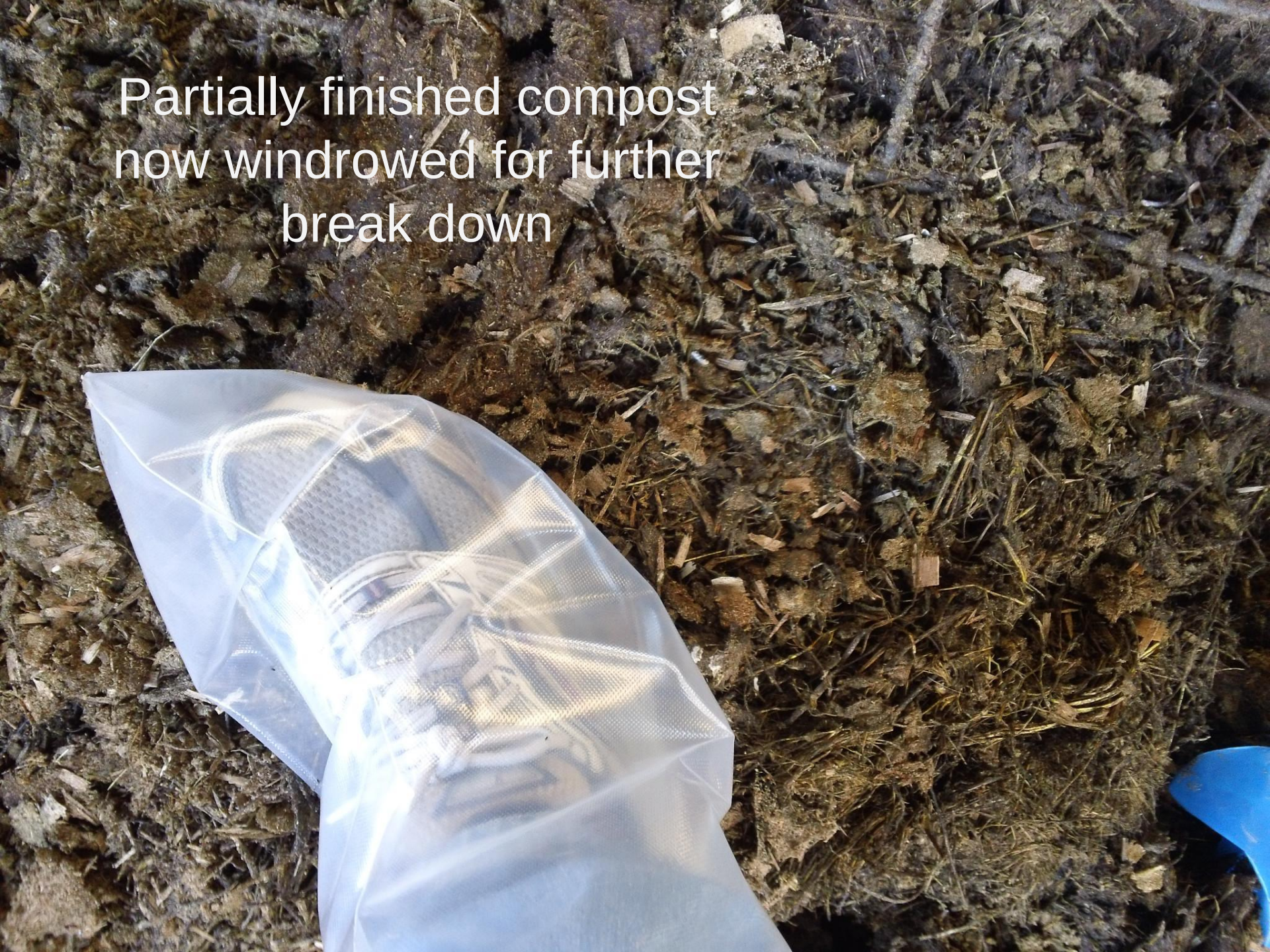
Pack is sloped upwards alley to wall

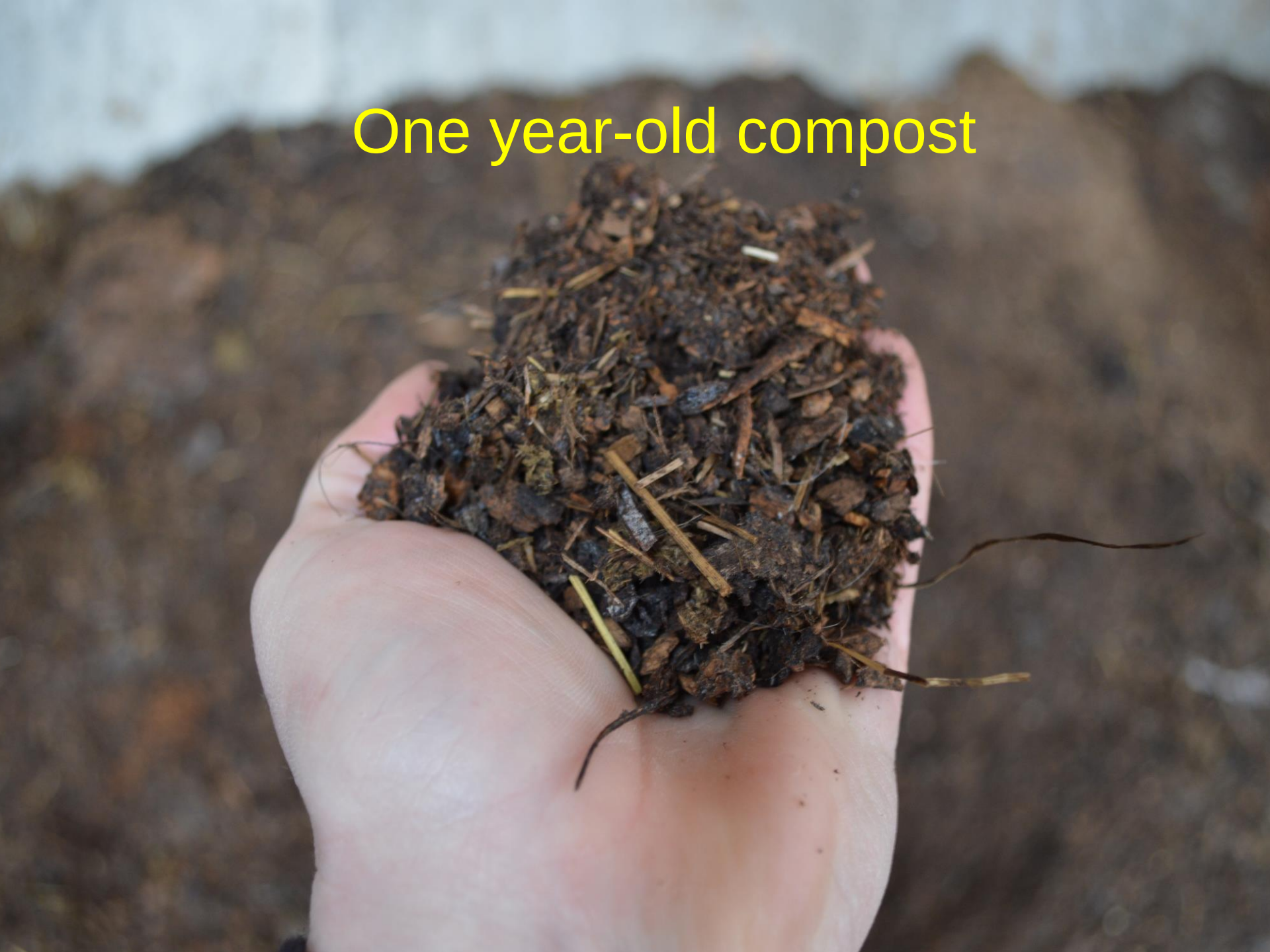


Hay without woodchips/shavings




Converted
free-stall
barn

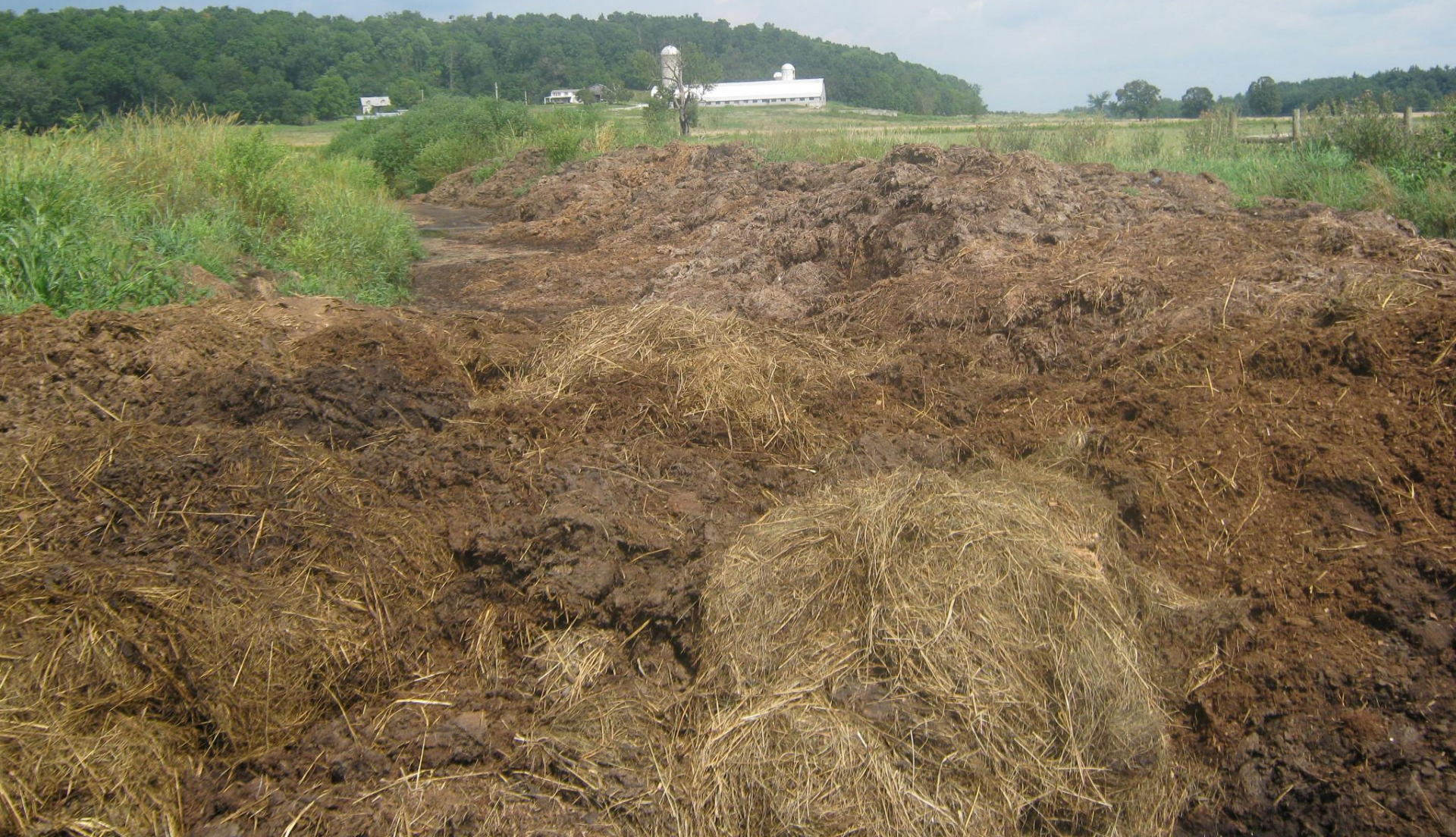

Partially finished compost
now windrowed for further
break down


One year-old compost

Where to Stack Pack?

Barnyard at this site drains to lagoon

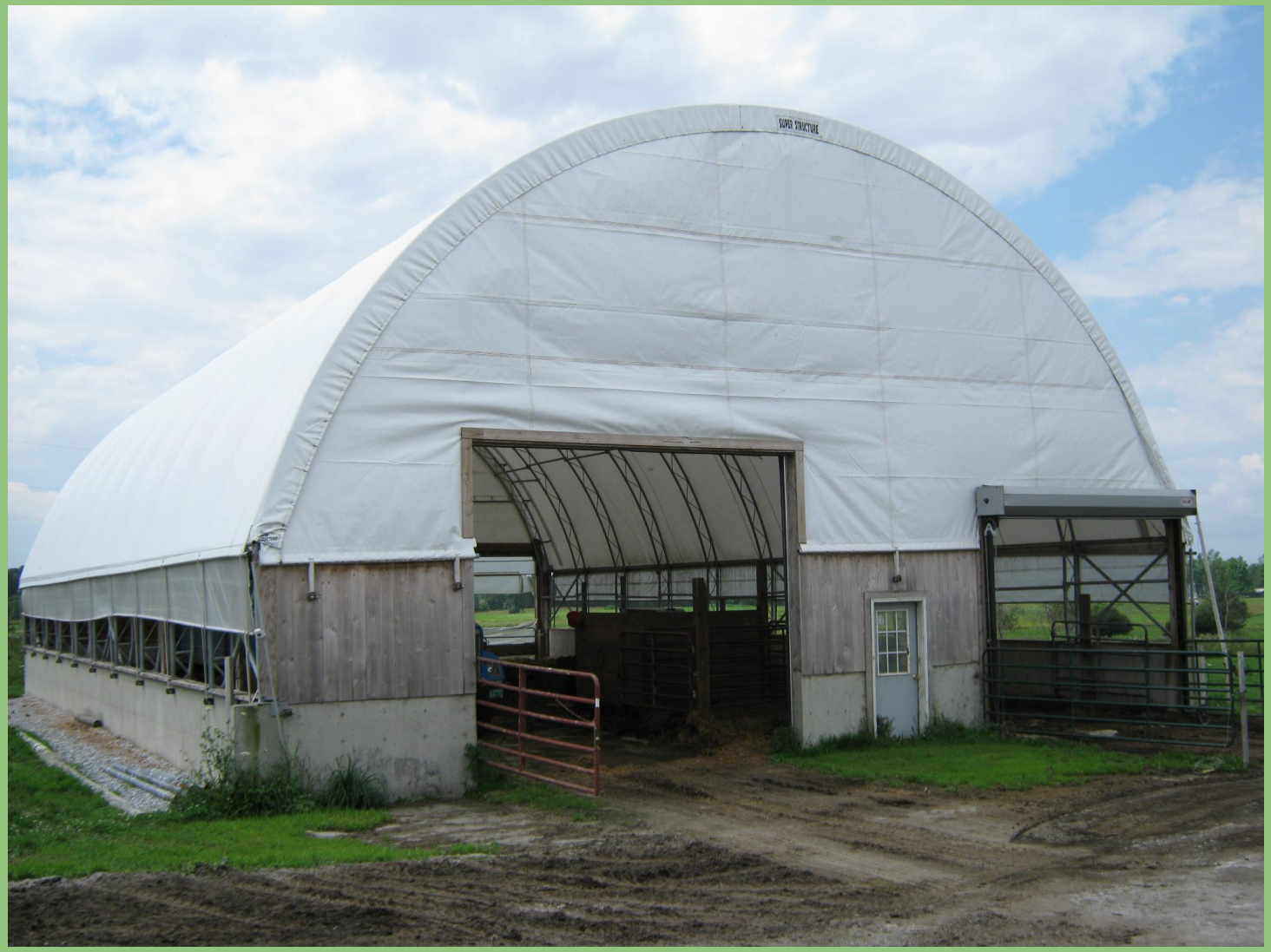
Windrow and stack of bedded pack



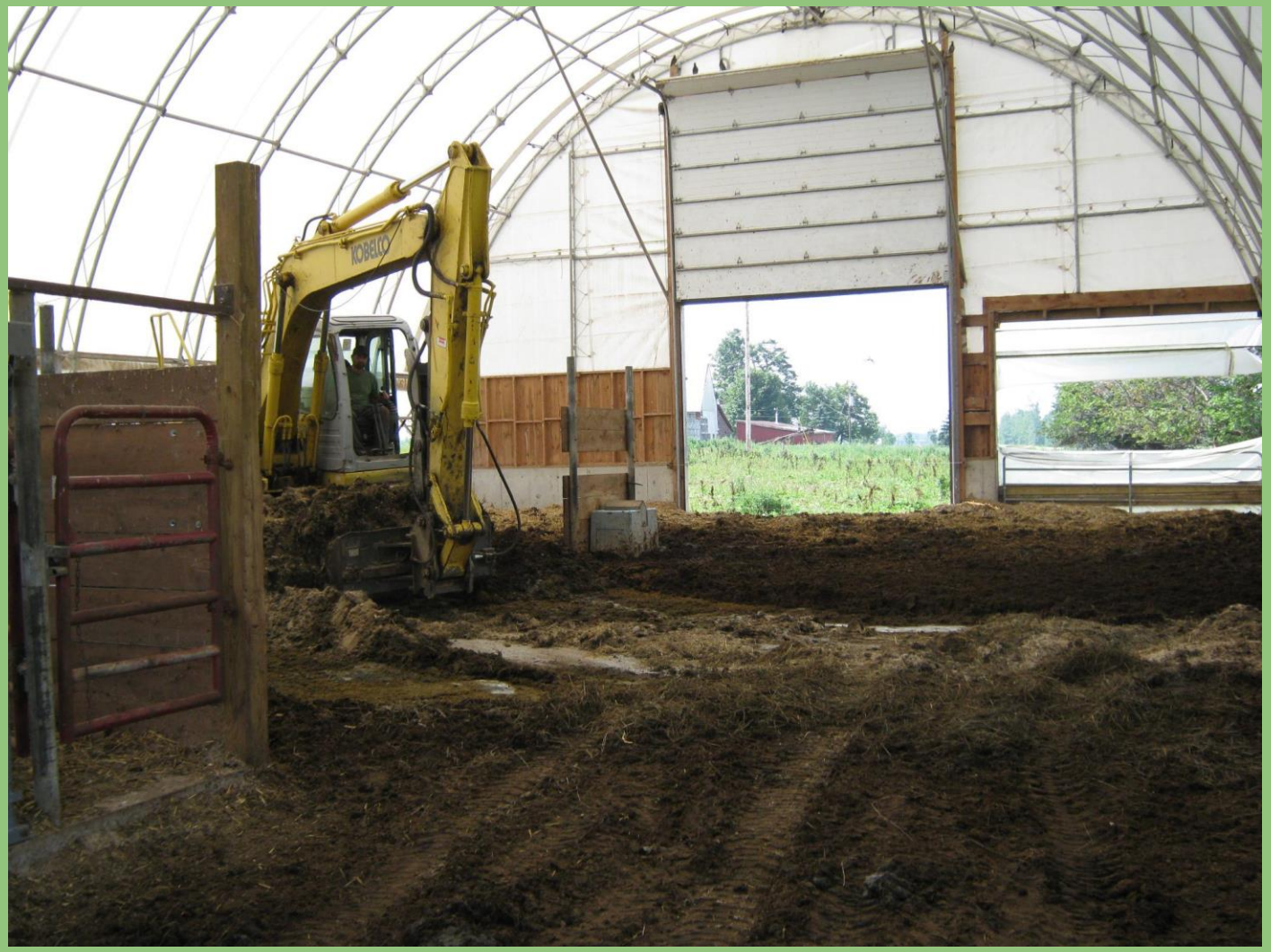
2018 Figures and Economics

- $30/cow/year. $22.70/ cow on the base. The remainder for topdressing.
- Using about 2.5 4×5 round bales/day for 86 cows. Reed Canary grass & swamp hay.
- ~150 cu. yds on the base & 50 for topdressing. Top dressing about $.04/cow/day. Labor: variable. Currently 1.5 hrs/day÷86 cows
- Woodchips were $13/cu. yd. Delivered.
- Courtesy of Mark Russell

Earl Fournier - Solar Barn for Heifers



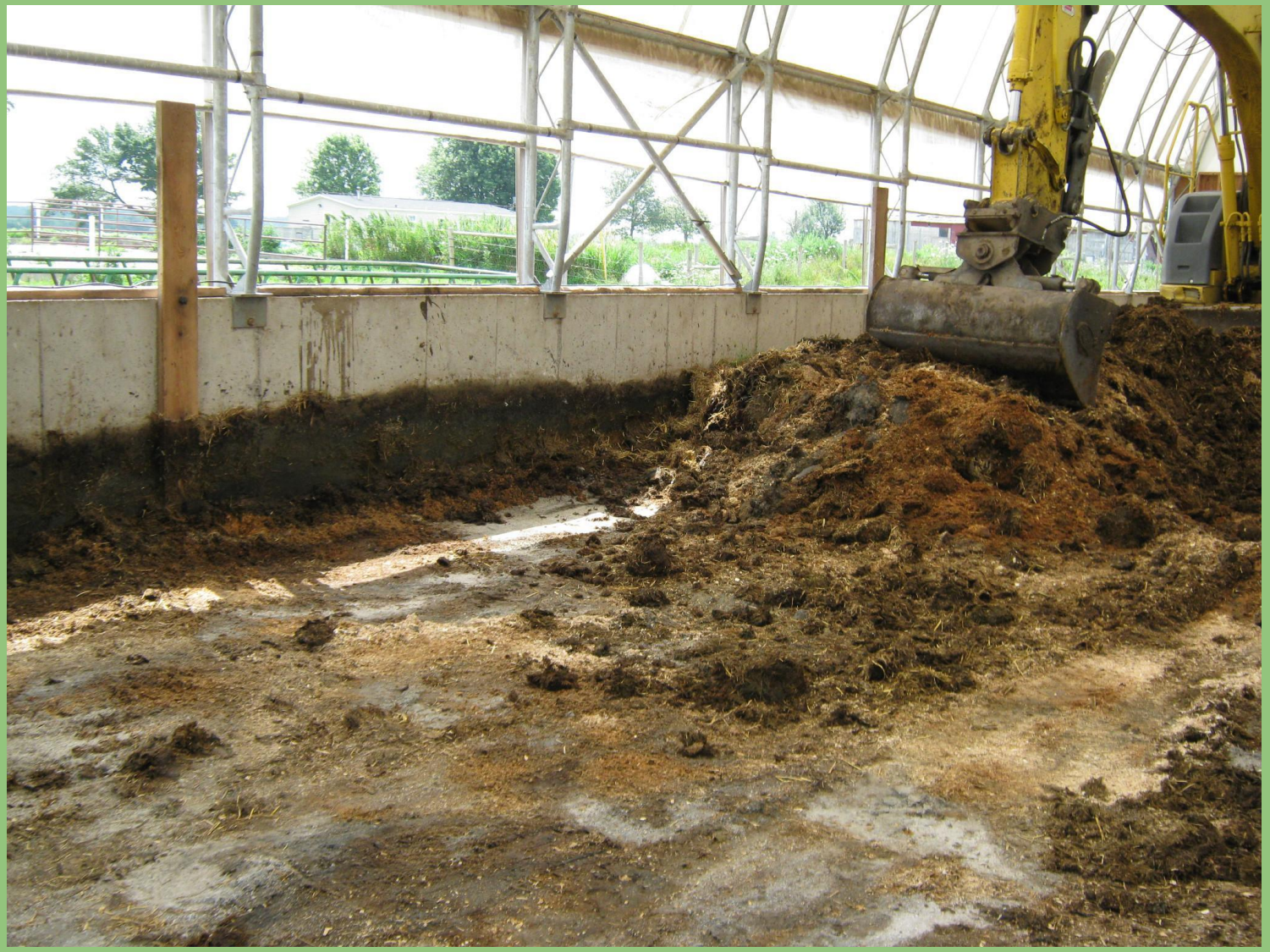
Fournier Pack - Clean out in July

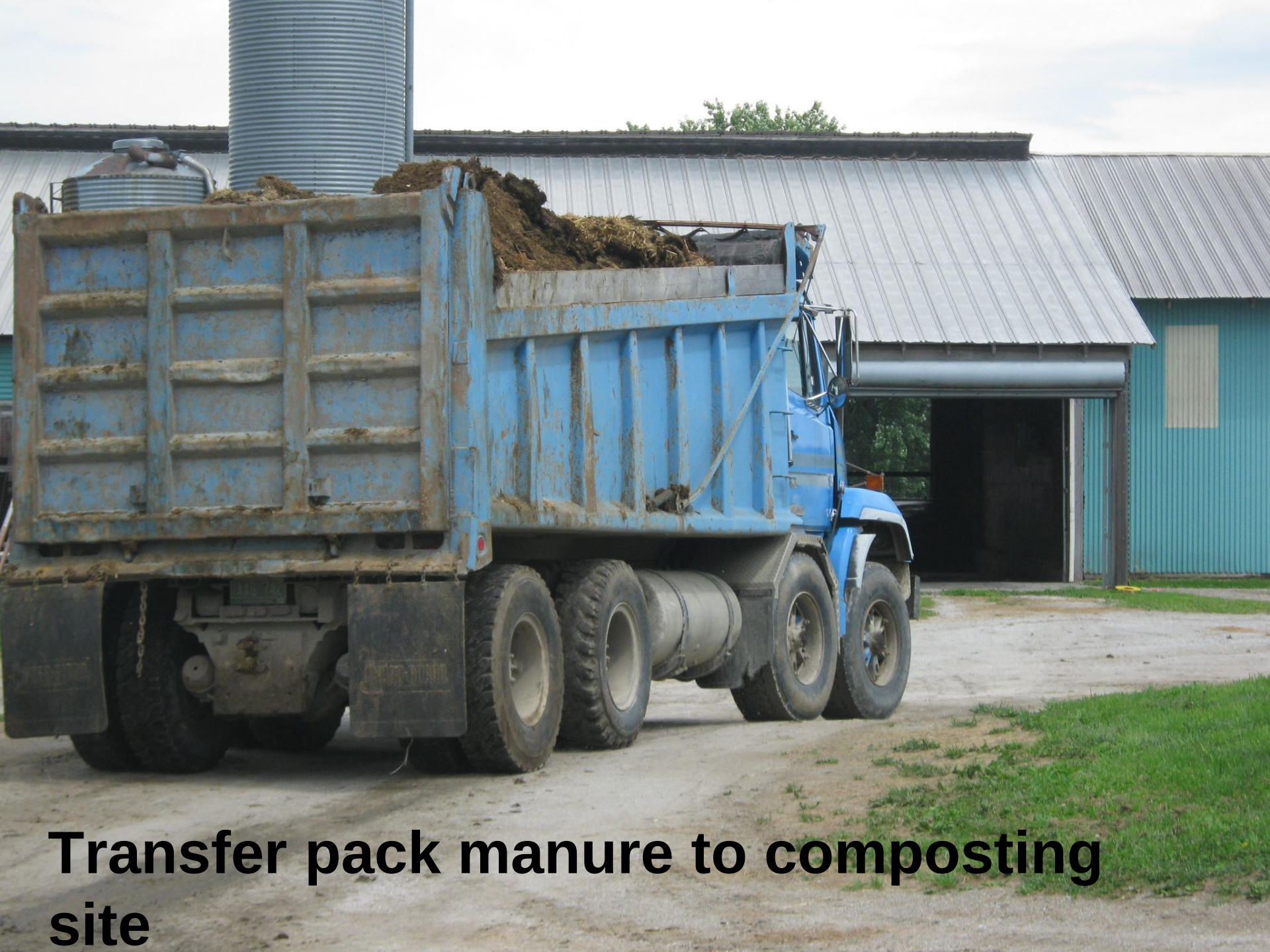


Fournier Pack -
Layers of Moisture/Decomposition

Areas of concentrated moisture - waterers/hydrants

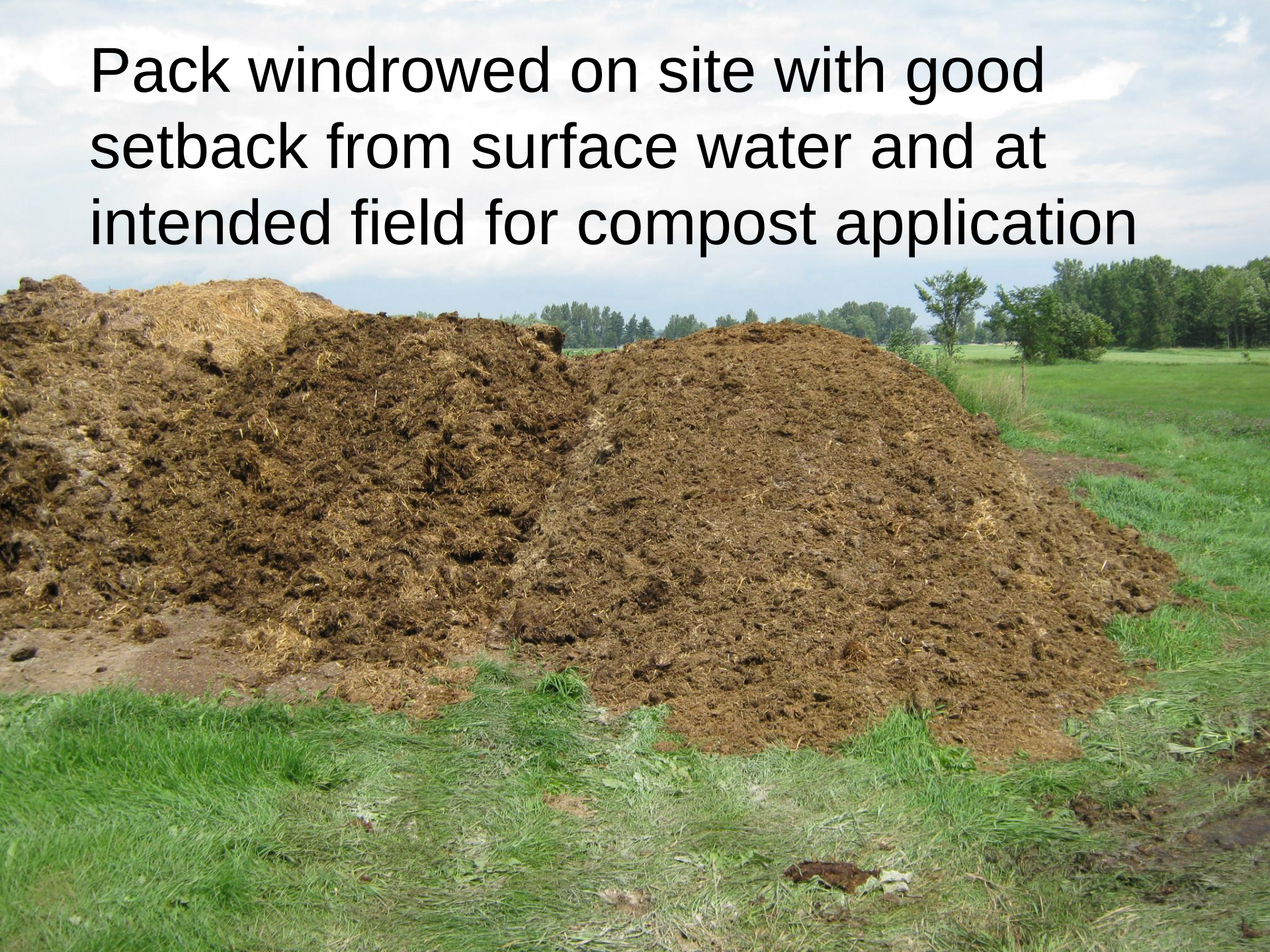
Pack accumulation against concrete sidewall - plan for depth/durability



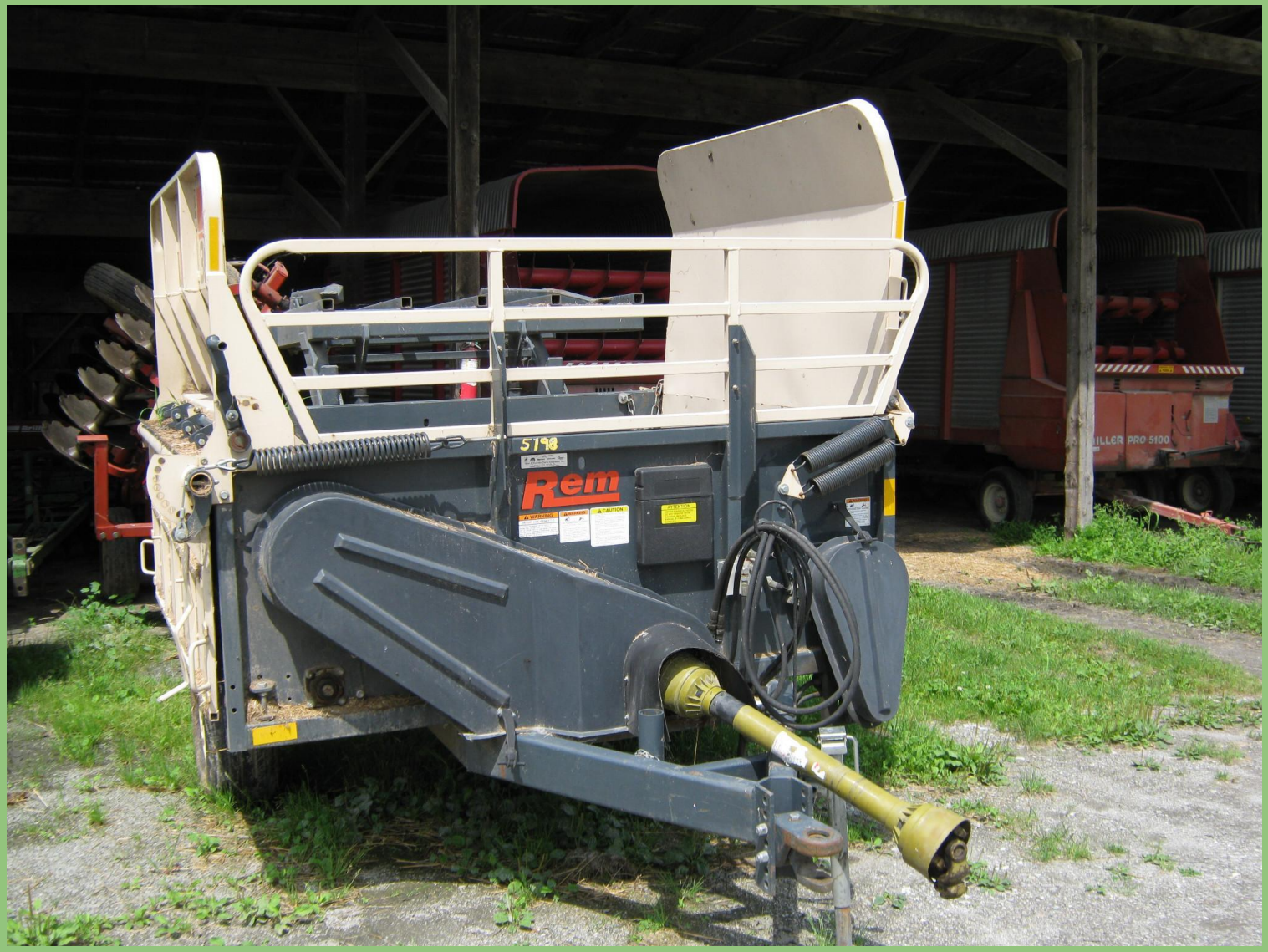


Transfer pack manure to composting site

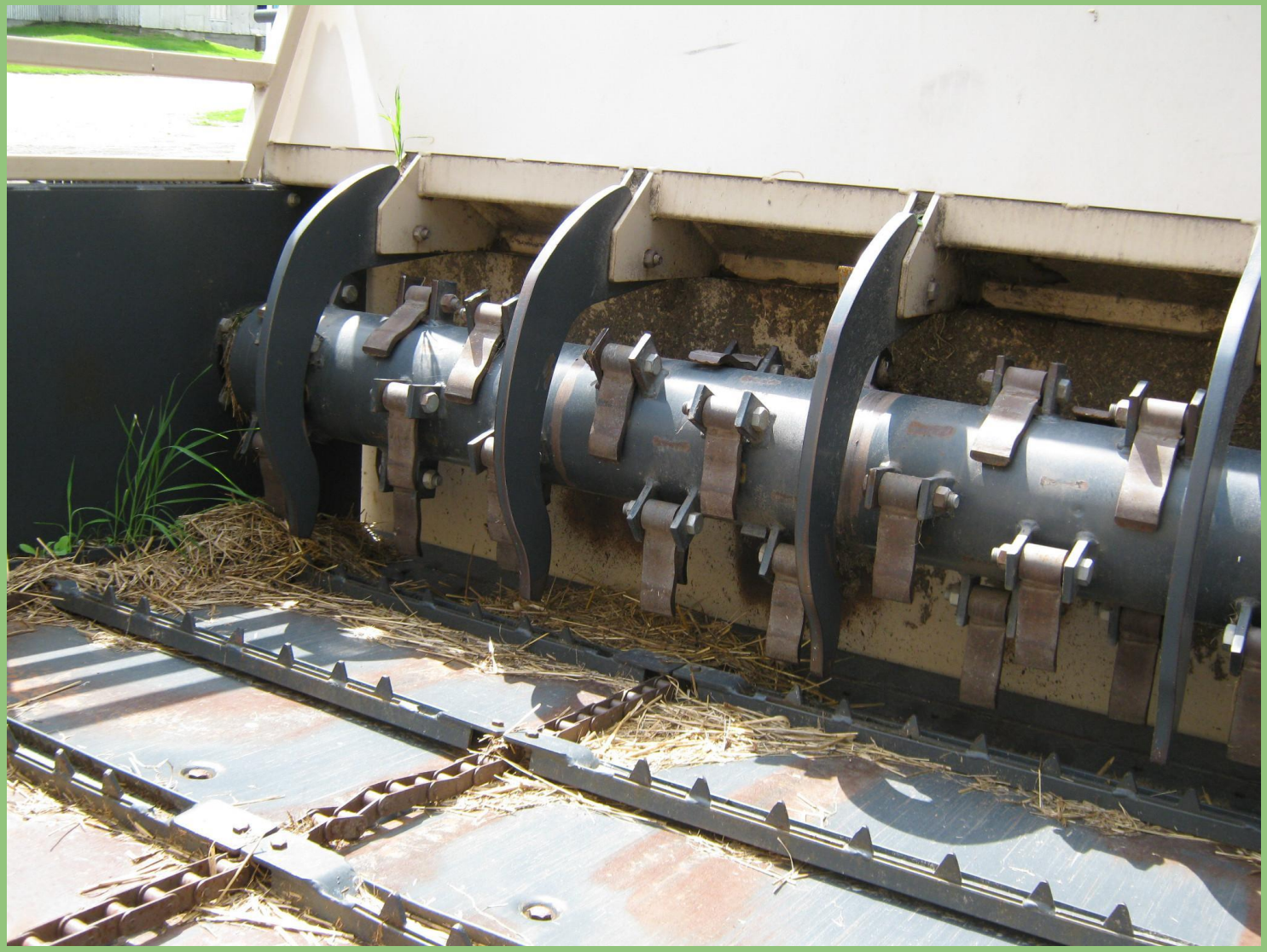
Pack windrowed on site with good setback from surface water and at intended field for compost application



Fournier -
Spreader for pack material

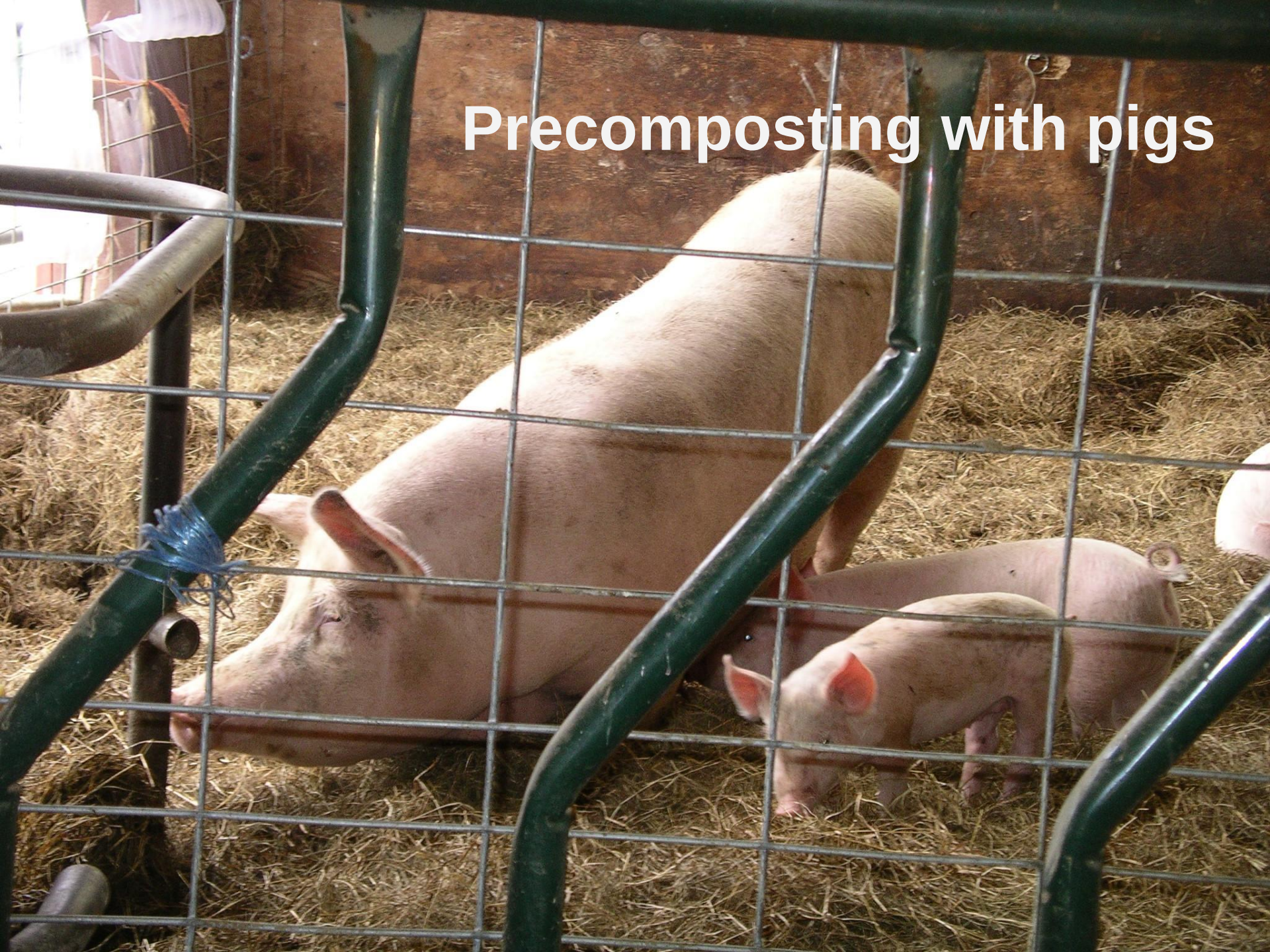


Bed chain and aggressive beaters



Handling Strategies - Options

- Full clean-out and windrow at designated spreading site for composting
- Windrow within bedded pack structure - partially compost to reduce volume and trips to field/site after a few weeks/months of decomposition
- Spread in fall with aggressive spreader
- Bury corncobs/other feed for pigs to dig and "turn over" the pack in summer


Precomposting with pigs

Bedded pack facilities can be very successful and beneficial

if managed properly!