Emergency Mortality Management Recommendations

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Herd Population Management Webinar

April 29, 2020

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Emergency Mortality Management

What are allowed in the state, and the protocols?

Options: Compost, burial, incineration, rendering, and land fill

Consider training, costs and materials availability

Appropriate type, method, size, and equipment

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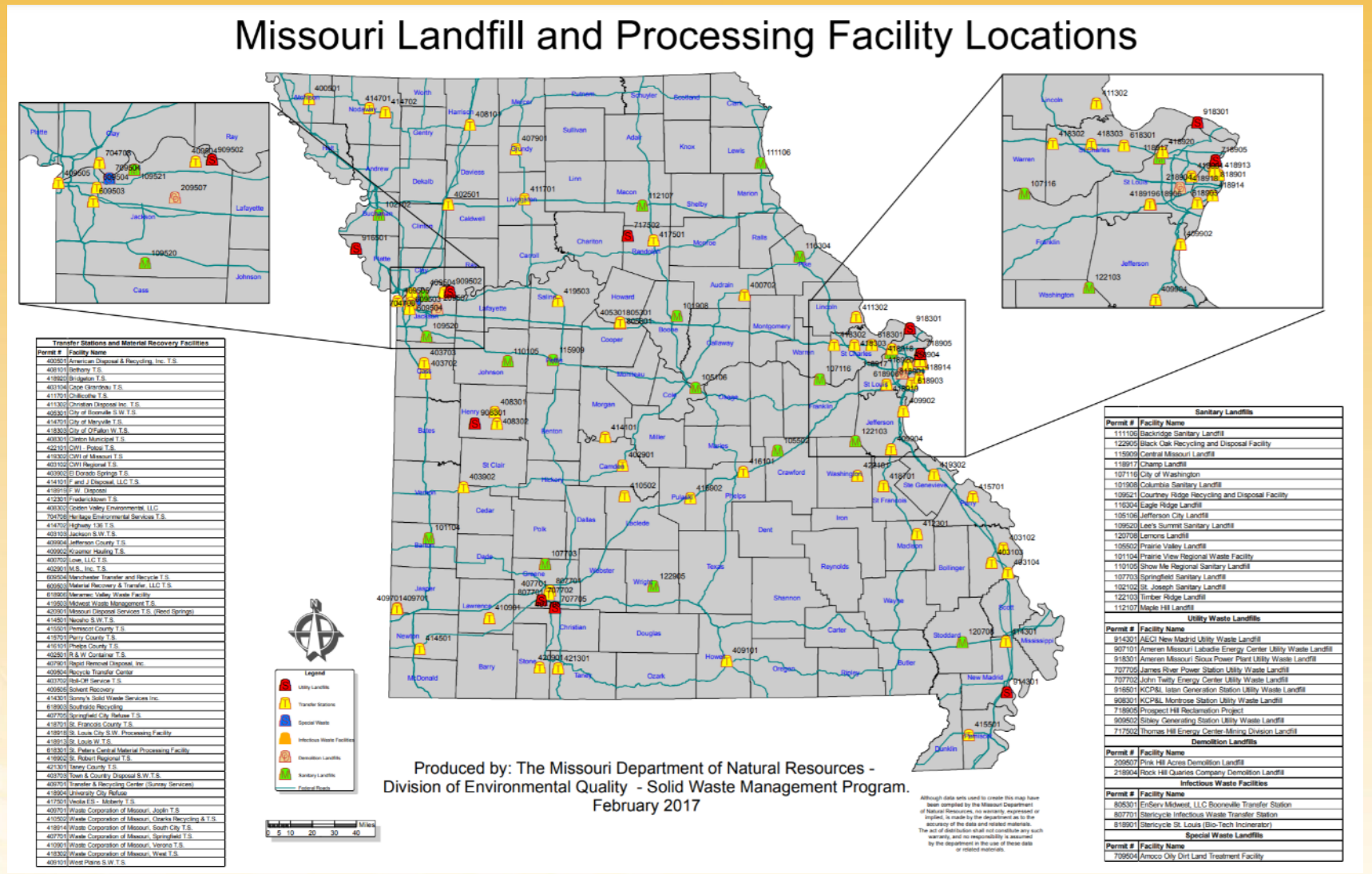
Where to Find Local Landfill?



Transfer Stations and Material Recovery Facilities	
Permit #	Facility Name
400501	American Disposal & Recycling, Inc. T.S.
409101	Bethany T.S.
418920	Bridgeton T.S.
403104	Cape Girardeau T.S.
411701	Chillicothe T.S.
411302	Christian Disposal Inc. T.S.
405301	City of Boonville S.W.T.S.
414701	City of Marceline T.S.
418303	City of O'Fallon W.T.S.
409301	Clinton Municipal T.S.
422101	CWI - Potosi T.S.
419302	CWI of Missouri T.S.
403102	CWI Regional T.S.
403902	El Dorado Springs T.S.
414101	F and J Disposal, LLC T.S.
418919	F. W. Disposal
412301	Fredericktown T.S.
409302	Golden Valley Environmental, LLC
704706	Heritage Environmental Services T.S.
414702	Highway 136 T.S.
402103	Jackson S.W.T.S.
409904	Jefferson County T.S.
409902	Kraemer Hauling T.S.
400702	Lowe, LLC T.S.
402901	M.S., Inc. T.S.
609504	Manchester Transfer and Recycle T.S.
609503	Material Recovery & Transfer, LLC T.S.
618906	Meramec Valley Waste Facility
419503	Midwest Waste Management T.S.
429901	Missouri Disposal Services T.S. (Reed Springs)
414501	Neosho S.W.T.S.
415501	Perryscot County T.S.
415701	Perry County T.S.
416101	Phelps County T.S.
402501	R & W Container T.S.
407901	Rapid Removal Disposal, Inc.
409504	Recycle Transfer Center
403702	Roll-Off Service T.S.
409805	Solvent Recovery
414301	Sonny's Solid Waste Services Inc.
618903	Southside Recycling
407705	Springfield City Refuse T.S.
418701	St. Francois County T.S.
418918	St. Louis City S.W. Processing Facility
418913	St. Louis W.T.S.
618301	St. Peters Central Material Processing Facility
418902	St. Robert Regional T.S.
421301	Taney County T.S.
403703	Town & Country Disposal S.W.T.S.
409701	Transfer & Recycling Center (Sunray Services)
418904	University City Refuse
417101	Vecilia ES - - Moberly T.S.
409701	Waste Corporation of Missouri, Joplin T.S
410502	Waste Corporation of Missouri, Ozarks Recycling & T.S.
418914	Waste Corporation of Missouri, South City T.S.
407701	Waste Corporation of Missouri, Springfield T.S.
410901	Waste Corporation of Missouri, Verona T.S.
418302	Waste Corporation of Missouri, West T.S.
409101	West Plains S.W.T.S.

Sanitary Landfills	
Permit #	Facility Name
111106	Backridge Sanitary Landfill
122905	Black Oak Recycling and Disposal Facility
115909	Central Missouri Landfill
118917	Champ Landfill
107116	City of Washington
101908	Columbia Sanitary Landfill
109521	Courtney Ridge Recycling and Disposal Facility
116304	Eagle Ridge Landfill
105106	Jefferson City Landfill
109520	Lee's Summit Sanitary Landfill
120708	Lemons Landfill
105502	Prairie Valley Landfill
101104	Prairie View Regional Waste Facility
110105	Show Me Regional Sanitary Landfill
107703	Springfield Sanitary Landfill
102102	St. Joseph Sanitary Landfill
122103	Timber Ridge Landfill
112107	Maple Hill Landfill
Utility Waste Landfills	
Permit #	Facility Name
914301	AECI New Madrid Utility Waste Landfill
907101	Ameren Missouri Labadie Energy Center Utility Waste Landfill
918301	Ameren Missouri Sioux Power Plant Utility Waste Landfill
707705	James River Power Station Utility Waste Landfill
707702	John Twitty Energy Center Utility Waste Landfill
916901	KCP&L Iatan Generation Station Utility Waste Landfill
908301	KCP&L Montrose Station Utility Waste Landfill
718905	Prospect Hill Reclamation Project
909502	Sibley Generating Station Utility Waste Landfill
717502	Thomas Hill Energy Center-Mining Division Landfill
Demolition Landfills	
Permit #	Facility Name
209507	Pink Hill Acres Demolition Landfill
218904	Rock Hill Quaries Company Demolition Landfill
Infectious Waste Facilities	
Permit #	Facility Name
805301	EnServ Midwest, LLC Boonville Transfer Station
807701	Stericycle Infectious Waste Transfer Station
818901	Stericycle St. Louis (Bio-Tech Incinerator)
Special Waste Landfills	
Permit #	Facility Name
709504	Amoco Oily Dirt Land Treatment Facility

https://dnr.mo.gov/env/swmp/facilities/docs/MissouriLandfillandTransferStationmanFebruary2017update.pdf

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Rendering?

Very limited option in Mo. Cost varies.

Less likely to be shut down, proactive with training/PPE.

45,000 lb or 160 head of load for 40 ft end dump trailer.

No barbiturates and sedatives allowed in euthanasia.

Booking out from today through the middle part of June.

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Burial? New Above Ground Burial Option?

Most commonly used during major disease outbreak – need to do your homework!

Class I operations are not to use burial as their normal method of disposing of routine mortalities

Good: Economical, simple and relatively bio-secure

Bad: Deep enough soil, what type of soil? Threat to water quality, residue, does not eliminate disease agents

Initial review suggests above Ground Burial may be limited to areas of Missouri

MO DNR: Animal Production Mortalities Emergency Procedures
https://dnr.mo.gov/pubs/pub1250.htm

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What is Considered Mortality Composting?

Composting requires addition of carbon source: acceptable carbon-to-nitrogen (C/N) ratio

Provide enough foundation/base and pad, and cover

Provide about 100 ft^3 (about 4 $yard^3$) of carbon per 1,000 pounds of carcass to be composted

Do not bury/compost in sinkholes, caves, mines, low-lying areas subject to flooding

Composting: ≥131° F for 72 consecutive hours

https://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/livestock-mortality-compost-sop.pdf

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Composting: It Took Decades to Evolve …

Windrow System

Things to consider:

Pile size, turning frequency, equipment, moisture control, porosity, temperature.

Odor control, consolidation?

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Successful Mortality Composting

Site, facility, equipment, and materials?

Options: methods, duration, turning, monitoring

Woodchip/shaving/sawdust/cornstover? $20-35/yard^3?
Delivery cost?

How to handle temporary compost site?

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Roofed? Concrete? Barrier? Windrow?

https://www.nrcs.usda.gov/Internet/FSE_MEDIA/nrcs144p2_026619.jpg

Large Beef Finishing Compost – Dry region

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Large Dairy with Bedding Materials

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Compost for How Long? Turning? Monitoring?

What it looks like by turning the pile after 75 days

Turn again after 5-6 months

Longer if no turning, and if recycling the materials

Horse Bedding

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Composting Carbon Materials, Proper Size?

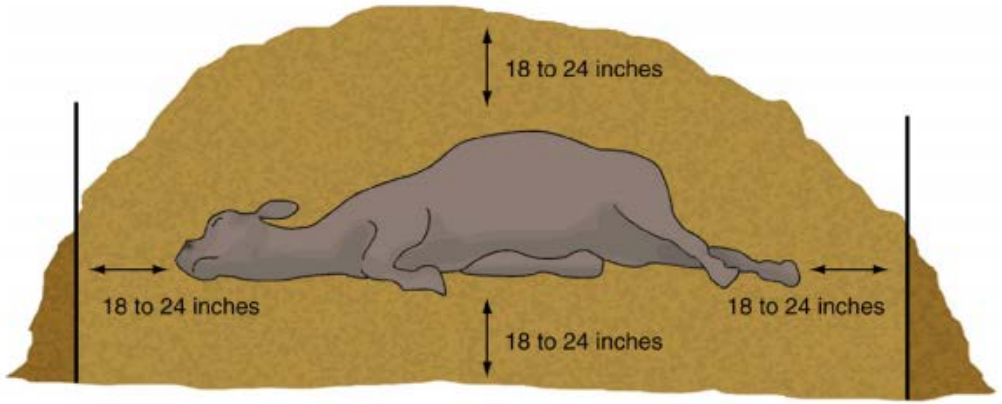

Figure 3. Proper pad design and carcass placement when composting livestock, as well as the potential reduction in required bulking agent when utilizing a barrier.

Source: Payne and Pugh, OKSU Extension, BAE-1749, On-Farm Mortality Composting

Table 3. Common compost materials.

Compost Material	*C:N*
Sawdust[1]	442:1
Straw-wheat[1]	127:1
Rice hulls[1]	121:1
Straw-general[1]	80:1
Corn stalks[1]	60-73:1
Finished compost[1]	30-50:1
Hay-general[1]	15-32:1
Horse manure-general[1]	30:1
Cattle manure[1]	19:1
Grass clippings[1]	17:1
Sheep manure[1]	16:1
Turkey litter[1]	16:1
Broiler litter[1]	14:1
Swine manure[2]	14:1
Cottonseed meal[1]	7:1
Soybean meal[1]	4-6:1
Animal carcass[2]	5:1

[1]On-Farm Composting Handbook, Agriculture, and Engineering Service, NRAES-54, Natural Resource, Ithaca, New York.
[2]Compost Materials, 1996 EBAE172-93, North Carolina Cooperative Extension Service, Raleigh, North Carolina.

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Composting: How much Carbon/Area?

Consider 1000, market pigs, average 290-lbs.

Assume using windrow composting, of 10’ wide, 6’ tall, spacing 8’.

Calculator: Compost core volume is then 48,000 ft^3, 171 $yard^3$ carcass, and 1,619 $yard^3$ carbon needed (this is about 5.5 $yard^3$/1000-lb).

Area needed is 1 row of 1,680’ x 26’ windrow, or 1.1 acre.

And 1,619 $yard^3$ woodchip x \$20/$yard^3$ = \$32,400.

Source:

USDA Composting Livestock 2017 Livestock Mortality Composting Protocol

https://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/livestock-mortality-compost-sop.pdf

Spartan Compost Recipe Optimizer v1.05

https://www.canr.msu.edu/managing_animal_mortalities/composting_tools

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Other Options: Cost vs. Feasibility

Carcass Management Calculator

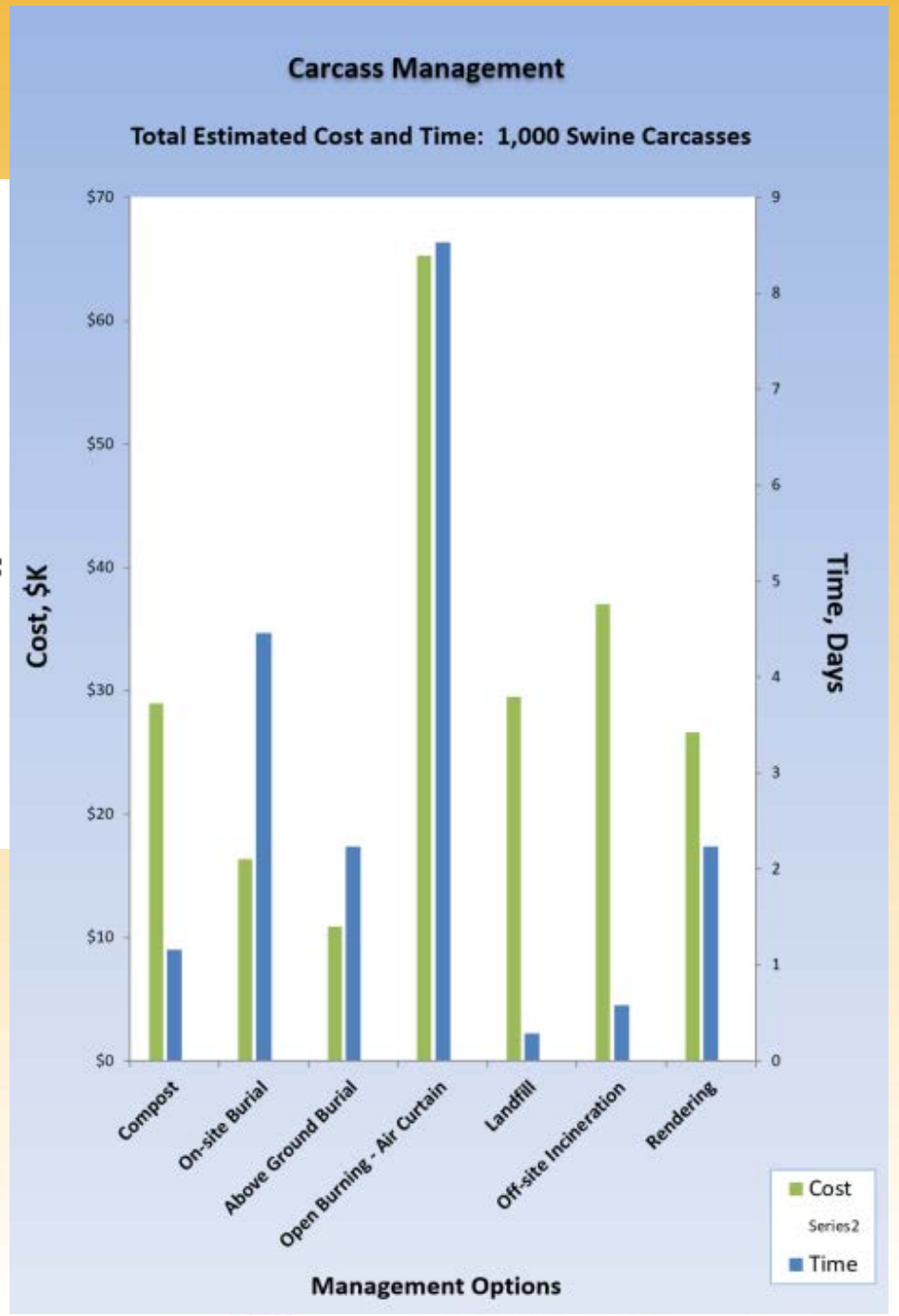
Please enter data in blue cells.

Animal type	Swine
Average weight	290
Number of carcasses	1,000
Reason for livestock loss	Virus
Land available for disposal (acres)	5.0
Number of roll-off trailers available	4
Roll-off trailer capacity (cu yd)	30.0
Distance to off-site landfill (miles)	20
Distance to off-site incineration (miles)	250
Distance to off-site rendering (miles)	65
Total biomass (tons)	145
Days to depopulate	8

ONSITE OPTIONS BELOW

OFFSITE OPTIONS BELOW

United States Department of Agriculture



Source:

USDA APHIS Carcass Management Dashboard

https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/emergency-management/carcass-management/carcass

Other Options: Cost vs. Feasibility

ONSITE OPTIONS BELOW		
Compost	Rank	52
Tons/acre		118
Acres needed		1.23
Acres available		5
% of carcasses that will fit on land available		407
Days to complete		1.2
Carbon source required (tons)		435
Total estimated cost ($K)		$29
Above Ground Burial	Rank	60
Tons/acre		352
Acres needed		0.4
Acres available		5
% of carcasses that will fit on land available		1,214
Days to complete		2.2
Soil excavation volume (yd^3)		580
Carbon source required (tons)		82
Total leachate (gal/day)		261
Total estimated cost ($K)		$11
On-site Burial	Rank	38
Tons/acre		909
Acres needed		0.2
Acres available		5
% of carcasses that will fit on land available		3134.5
Days to complete		4.5
Soil excavation volume (yd^3)		1,160
Total leachate (gal/day)		261
Total estimated cost ($K)		$16
Open Burning - Air Curtain	Rank	11

OFFSITE OPTIONS BELOW		
Engineered Landfill	Rank	100
Landfill accept rate (ton/day, default=500)		500
Days to transport		0.4
30-day transport capacity ratio		76.8
Days to process at facility		0.3
30-day facility capacity ratio		103.4
Transport estimated cost ($K)		$1
Landfill estimated cost ($K)		$29
Total estimated cost ($K)		$30
Fixed-facility Incineration	Rank	45
Incineration rate (ton/day, default=250)		250
Days to transport		1.2
30-day transport capacity ratio		24.8
Days to process at facility		0.6
30-day facility capacity ratio		51.7
Transport estimated cost ($K)		$8
Incineration estimated cost ($K)		$29
Total estimated cost ($K)		$37
Rendering	Rank	43
Rendering rate (ton/day, default=65)		65
Days to transport		0.6
30-day transport capacity ratio		54.5
Days to process at facility		2.2
30-day facility capacity ratio		13.4
Transport estimated cost ($K)		$2
Rendering estimated cost ($K)		$25
Total estimated cost ($K)		$27

Source:

USDA APHIS Carcass Management Dashboard

https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/emergency-management/carcass-management/carcass

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Grinder was Helpful for Composting

https://www.petersoncorp.com/products/2700d-horizontal-grinder/

60K lbs per hour or 200 pigs per hour, with 500+ HP grinder. Rental is about $10K/week for 500 HP.

Mixer type grinder with knife to grind down sizes.

Grinding only reduces composting time with same carbon volume.

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Other Consideration?

- Most MO sawdust is obtained from sawmills, lumbering and logging operations.
- Consider moisture content and density.
- Aged sawdust: 50 to 70% MC
- Ideal moisture content in a composting pile is 50 to 60%.

- 100 feet from surface water such as ponds, streams and lakes
- 300 feet from springs, losing streams, wells

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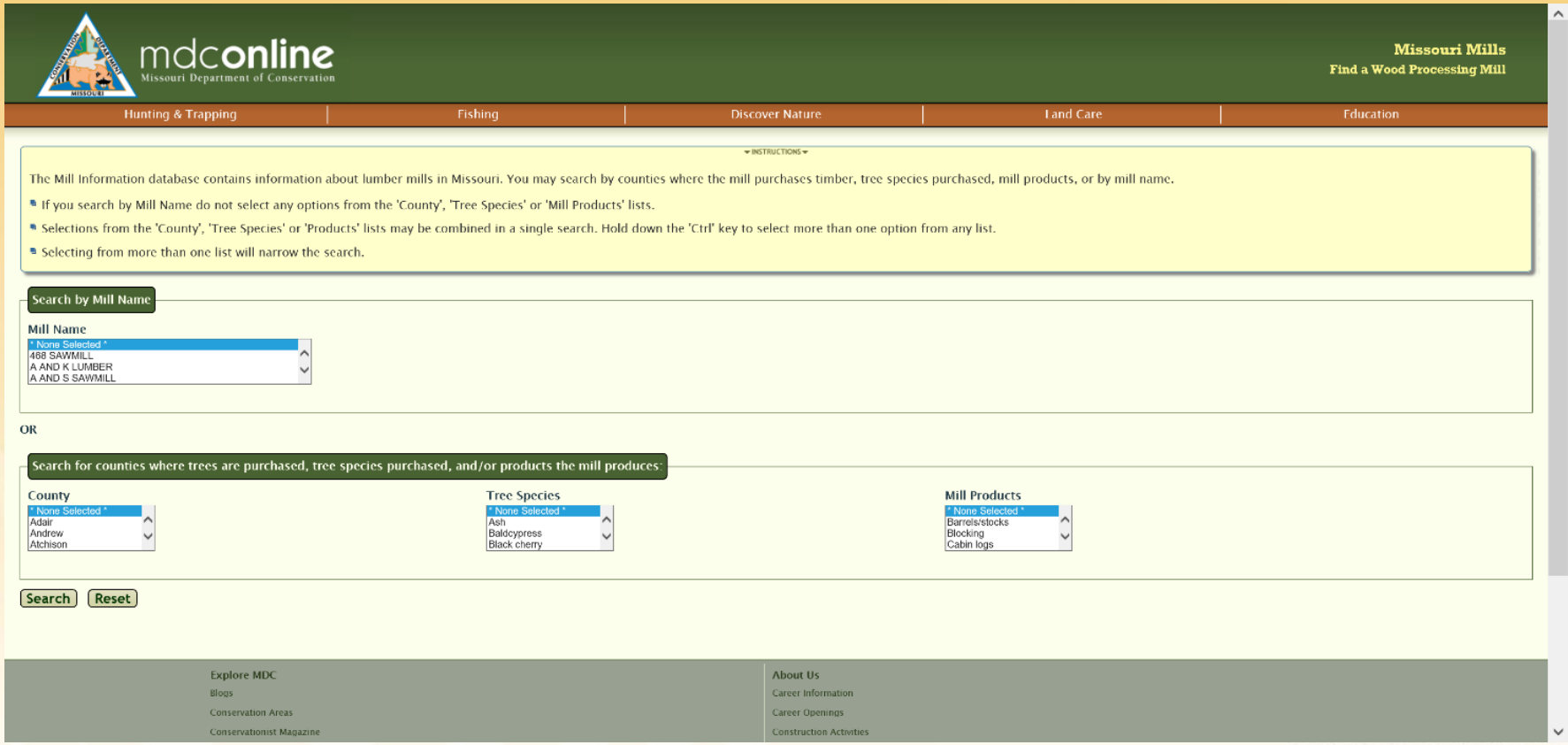
Where to Find Local Mills?

Missouri Forest Products Association, www.moforest.org.

Missouri Department of Conservation,
http://mdc7.mdc.mo.gov/applications/MOMills/MOMillsSearch.aspx



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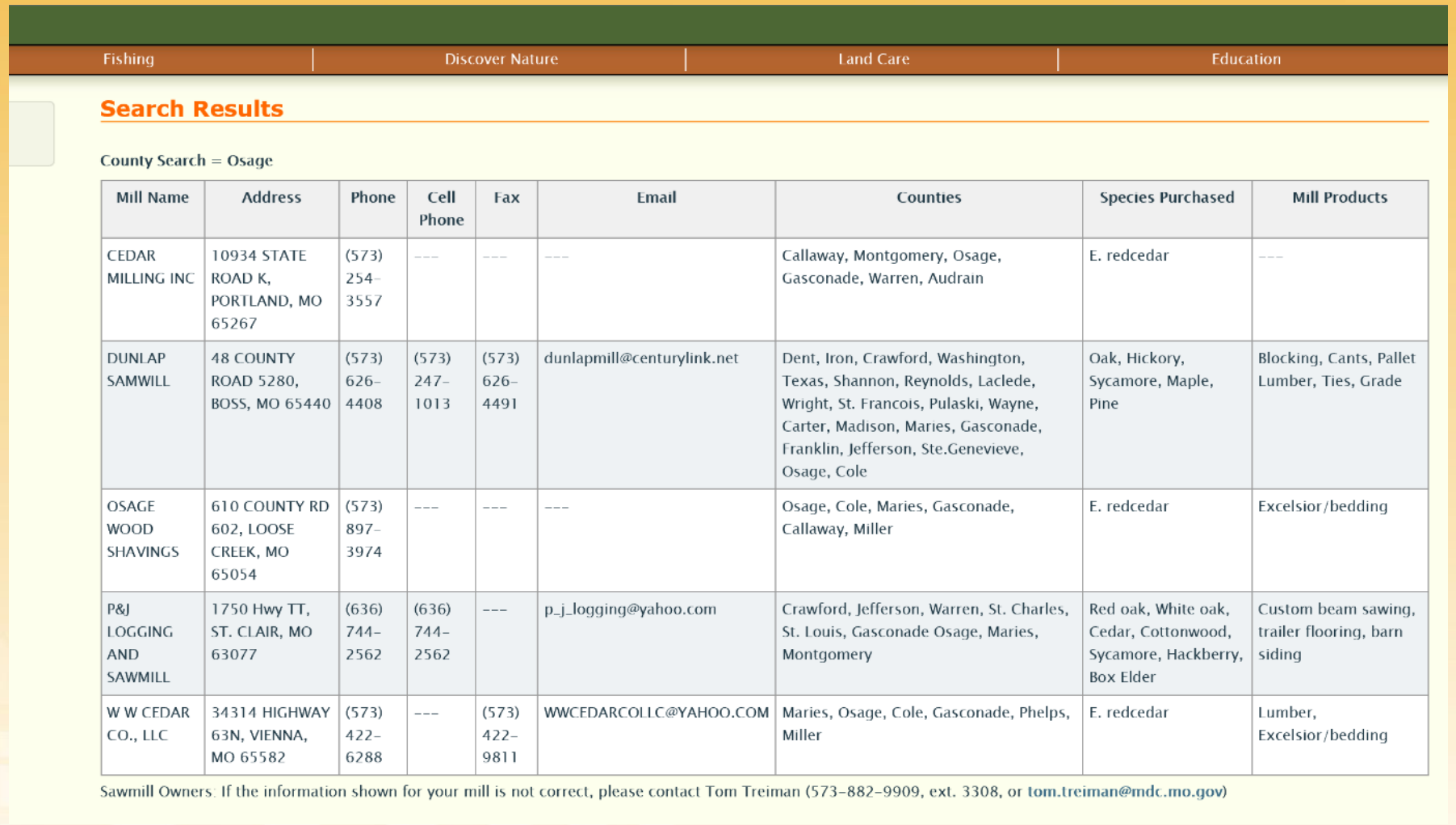
Example of Mills at Osage County



Fishing | Discover Nature | Land Care | Education

Search Results

County Search = Osage

Mill Name	Address	Phone	Cell Phone	Fax	Email	Counties	Species Purchased	Mill Products
CEDAR MILLING INC	10934 STATE ROAD K, PORTLAND, MO 65267	(573) 254-3557	---	---	---	Callaway, Montgomery, Osage, Gasconade, Warren, Audrain	E. redcedar	---
DUNLAP SAMWILL	48 COUNTY ROAD 5280, BOSS, MO 65440	(573) 626-4408	(573) 247-1013	(573) 626-4491	dunlapmill@centurylink.net	Dent, Iron, Crawford, Washington, Texas, Shannon, Reynolds, Laclede, Wright, St. Francois, Pulaski, Wayne, Carter, Madison, Maries, Gasconade, Franklin, Jefferson, Ste.Genevieve, Osage, Cole	Oak, Hickory, Sycamore, Maple, Pine	Blocking, Cants, Pallet Lumber, Ties, Grade
OSAGE WOOD SHAVINGS	610 COUNTY RD 602, LOOSE CREEK, MO 65054	(573) 897-3974	---	---	---	Osage, Cole, Maries, Gasconade, Callaway, Miller	E. redcedar	Excelsior/bedding
P&J LOGGING AND SAWMILL	1750 Hwy TT, ST. CLAIR, MO 63077	(636) 744-2562	(636) 744-2562	---	p_j_logging@yahoo.com	Crawford, Jefferson, Warren, St. Charles, St. Louis, Gasconade Osage, Maries, Montgomery	Red oak, White oak, Cedar, Cottonwood, Sycamore, Hackberry, Box Elder	Custom beam sawing, trailer flooring, barn siding
W W CEDAR CO., LLC	34314 HIGHWAY 63N, VIENNA, MO 65582	(573) 422-6288	---	(573) 422-9811	WWCEDARCOLLC@YAHOO.COM	Maries, Osage, Cole, Gasconade, Phelps, Miller	E. redcedar	Lumber, Excelsior/bedding

Sawmill Owners: If the information shown for your mill is not correct, please contact Tom Treiman (573-882-9909, ext. 3308, or tom.treiman@mdc.mo.gov)

http://mdc7.mdc.mo.gov/applications/MOMills/MOMillsSearch.aspx

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Contact list!

(Part of MU Biosecurity Workshops, 2017 and 2019)

Source: http://faculty.missouri.edu/limt/Biosecurity.shtml

Extension
University of Missouri

Biosecure

Preventing Disease Outbreak - Contact List

Missouri Department of Agriculture, Animal Health Division
Phone: (573) 751-3377
Email: Animal.Health@mda.mo.gov

Veterinarian Districts of Missouri

Missouri Department of Natural Resources
Environmental emergency, call (573) 634-2436
CAFO webpage: http://dnr.mo.gov/env/wpp/cafo/
Regional Offices: Kansas City – (861) 251-0700
Macon (NE) – (660) 385-8000
Springfield (SW) – (417) 891-4300
St. Louis – (314) 416-2960
Poplar Bluff (SE) – (573)-840-9750

MISSOURI DEPARTMENT OF NATURAL RESOURCES

USDA Animal and Plant Health Inspection Service
District Office, Jefferson City, MO
(573) 893-6833

Veterinary Services
APHIS • USDA

University of Missouri
Veterinary Medical Diagnostic Laboratory
(573) 882-6811 or 1-800-862-8635

University of Missouri
Food Systems and Bioengineering Extension
(573) 882-0085

Extension
University of Missouri

Disclaimer: The facts/information listed are suggestions for biosecurity, but are in no way a comprehensive and exhaustive list of all actions needed to ensure disease prevention.

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Mortality Management Recommendations for Effective Biosecurity

Most practical method for my farm?

Does the method reduce disease risk? Environmentally acceptable? And public perception?

Have rainwater drain away from piles. Runoff running into local water is not acceptable.

CAFO Rules to consider? Notification and getting OKs from DNR is critical. Record Keeping is important!

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Thank you!

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