

# TECHNICAL

U. S. DEPARTMENT OF AGRICULTURE  
IOWA STATE OFFICE

# NOTES

SOIL CONSERVATION SERVICE  
DES MOINES, IOWA.

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ADMINISTRATIVE MATERIAL - FOR USE ONLY WITHIN THE SOIL CONSERVATION SERVICE

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Agronomy #22

Date: November 9, 1993

SUBJECT: REPAIRING FLOOD DAMAGED FIELDS

The damage resulting from rushing flood water ranges from scouring to sand deposits. There are management options for restoring or at least improving soil productivity, but they deserve careful consideration.

In order for us to give any landowner/user accurate and appropriate information concerning the reclamation of floodplain soils where there are significant sand deposits, it will be necessary to determine the extent and distribution of these deposits.

From limited detailed observations, it has been determined that broad assumptions as to the depth of sand can not be made. Depths may vary greatly over very short distances. No rule of thumb can be used to make recommendations on reclaiming the areas with sand deposits.

The following key pieces of information need to be gathered before making any decisions:

1. Location, texture and depth of the various soil map units in the field(s) prior to the flood. Published soil survey maps can provide this information. On-site verifications may be needed.
2. Thickness of the sand deposit, in inches. Develop a map showing depth of sand and location on the landscape. A grid system of sampling may be needed to develop such a map. This map can be compared to the soil map for later determination as to the depth of tillage needed to incorporate the sand.
3. Size and cost of the tillage equipment available for incorporating the sand. A standard moldboard plow might be limited to plowing only eight inches deep. However, plows are available that will plow three to five feet deep. (Attached is a list of sources for deep plows in the Midwest.)

Table 1 provides guidance on the depth of tillage needed to incorporate sand into the underlying soil and provide a minimum available water capacity (AWC) which will average one inch in ten inches in soil. The one inch in ten inches was selected as the standard since this is one requirement for a soil to be classified as prime agricultural land. As illustrated by this table, if the pre-flood soil texture is loamy very fine sand or coarser, very little will be accomplished by incorporation.

Example: If the sand deposit is 12 inches deep over a fine sandy loam (from published soil survey map or field verified), the landowner would have to plow 22 inches deep to produce a soil condition equivalent to one inch of available water in ten inches. This would only be an option if the landowner has the capability of plowing 22 inches.

Fields with sand deposits of six inches or less can generally be "reclaimed" using standard field plows, large plowing disks, or twisted shank chisels, since tillage to a depth of eight inches will generally provide the desired one inch of AWC per ten inches.

It is anticipated that in most situations where the sand is more than six inches deep, some smoothing will be required prior to tillage.

Deep plowing of sands to prepare a more productive soil environment is an effective management tool. It will still be beneficial to the soil rebuilding process to add organic matter. Fall sowing of winter cover crops like wheat, rye, and vetches will produce the organic matter needed to produce the humus. Humus is necessary to tie the soil together and provide the structure that plants require for profitable yields.

Growing green manure crops isn't the only option. If livestock manure is available, even a light spreading will make a difference.

For those field where the sand is too deep to economically deep plow, sand removal may be an option.

Future cropping methods will have direct impact on the continued rebuilding of the soil. The limited use of tillage will reduce the deterioration of the new humus and speed the increase of organic matter in the soil. No-till plantings should be strongly considered. Rebuilding soil organic matter after past floods with conventional tillage systems took years. High residues, as in no-till, will speed the process.

#### CAUTIONS:

**Wetlands:** To insure continued USDA program eligibility, FSA/FACTA wetland criteria and program requirements must be followed during land reclamation work. Producers must have a current SCS-CPA-026 with post-flood wetland determinations.

**Utilities:** The amount of cover over buried utility lines may have changed due to scouring or deposition. Check with the Utility company and call the Iowa One Call system at 1-800-292-8989. Don't take a chance on hitting a buried utility and disrupting service or endangering lives.

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# How to Incorporate Sand to Restore Bottomlands to Crop Production

Soil Beneath the Sand	Recommended Tillage Depth (Inches)									
	2" sand deposit	4" sand deposit	6" sand deposit	12" sand deposit	18" sand deposit	24" sand deposit	30" sand deposit	36" sand deposit	40" sand deposit	
Silt Loam	3	6	8	17	25	33	42	50	56	
Very Fine Sandy Loam Silty Clay Loam	3	6	9	18	28	37	46	55	61	
Sandy Clay Loam Fine Sandy Loam Clay Loam Sandy Clay	4	7	11	22	33	44	55	66	74	
Silty Clay Clay	4	8	12	25	37	50	62	74	82	
Sandy Loam	6	12	19	37	56	74	93	112	124	
Loamy Very Fine Sand Loamy Fine Sand Loamy Sand Fine Sand Sand	Tillage will not improve the ability of these soils to hold water.									

How to use the table:

- 1: Determine and locate thickness of sand deposit at top of table
- 2: Determine and locate texture of pre-flood upper soil profile on left side of table
- 3: Intersect sand deposit line with pre-flood upper soil profile line
- 4: Number at intersection indicates depth of tillage required to achieve an average of one inch AWC to ten inch soil material

Example: A site with 12 inch sand deposit over a pre-flood upper soil profile texture of Fine Sandy Loam would require 22 inch tillage to obtain 1 inch AWC per soil material

## Sources for Deep Plows in the Midwest

### Companies that will do custom plowing:

Aholt & Sons Excavating  
6235 Highway 94 South  
Augusta, MO 63332  
Phone: (314) 228-4869 Office  
(314) 228-4493 Shop

Can plow as least five feet with 3 D-8's pulling. Has three feet cut; may plow one acre/hour. Have plowed under two to three feet of sand. Will travel. Charged \$550/acre in 1986, will probably charge \$600/acre in 1993.

Howell & Sons Grading  
185 Holden Road  
Defiance, MO 63341  
Phone: (314) 987-2498

Will work over a radius to include Columbia, Hannibal, and Cape Girardeau, Missouri. Has a plow similar to Aholt's. Can plow as deep as six feet. Pulls with two D-8K's. Charges \$137/hour for each D-8K and \$25/hour for the plow = \$299/hour. Can plow one acre/hour in good running. May cost \$150/acre to smooth with dozer after the plow. (Total cost may be about \$300 to \$450/acre.)

Twehous Excavating Company, Inc.  
8514 Liberty Road  
Jefferson City, MO 65101  
Phone: (314) 395-4354

Will probably charge about \$300 to \$350 per hour. Call for prices.

### Company that has a plow for rent:

Ideker Construction Company  
4614 South 40th Street  
St. Joseph, MO 64503  
Phone: (816) 364-3970

Have a large disk plow that they might rent.

### Companies that have used plows for sale:

West Texas Equipment Company (Lubbock branch, Caterpillar dealer)  
Phone: (806) 745-4495  
Ask for Ron Strown

Has some used Towner disk plows with 50 inch diameter blades. Three to five disks per plow. Will plow at least 32 inches deep. Might go four feet if power is available to pull.

Jim Cannon  
Cannon Farm Equipment  
1329 East Main Street  
Brawley, CA 92227  
Phone: (619) 344-1144

Cannon has access to some used Post plows. See Post Brothers Construction below for description.

**Companies that manufactures plows and big disks:**

Rome Industries  
P.O. Box 48  
Cedartown, GA 30125  
Phone: (404) 748-4450  
FAX: (404) 748-4450, Ext. 140

Rome makes offset disks with 36 inch diameter blades and one model with 50 inch blades (figure they will operate to depth equal to 1/3 of diameter). Sold by Caterpillar dealers.

Post Brothers Construction  
2967 E. Coronado  
Anaheim, CA 92806  
Phone: (714) 632-5290  
FAX: (714) 632-7967

Post makes one-way plows that operate two feet, three feet, four feet deep

JBK Manufacturing  
100 E. Broadway  
Roscoe, TX 79545  
Phone: (915) 766-3942

Anxious to bring plows anywhere to demonstrate. JBK makes bi-directional moldboard plows that will operate 12 to 32 inches deep and bi-directional disk plows that will operate as deep as four to five feet (require 500-600 hp).

Tractor Plow Company  
1903 Navy Drive  
Stockton, CA 95206  
Phone: (209) 466-1105  
FAX: (209) 948-2505  
Ask for Van Lawrence

Makes roll-over, two-way mounted disk plows with blades up to 38 inches diameter. Can plow 65-70 percent as deep as blade diameter. Will send video.

Blanchat Manufacturing Compnay  
P.O. Box 444  
Harper, KS 67058  
Phone: (316) 896-7145  
FAX: (316) 896-7148

Makes huge (many bottoms) flexible plows with 16 to 20 inch moldboards with variable cut. Should plow at least 12 inches deep with 20 inch moldboards

These are companies we have learned of so far. We are not recommmending these companies but are supplying their names and addresses as a service.

If anyone know of others, please let us know, especially contractors that have the plows and "cats."