

# Revegetation Equipment Catalog

Descriptions, applications, pictures, and sources for equipment used on rangelands.

## Site Preparation: Tillage

Site preparation is critical for successful revegetation projects. Preparation includes tilling to remove compacted layers, improving soil tilth, destroying weeds, and providing a firm, friable seedbed with safe sites for seeded species. Tillage implements are classified as primary and secondary. Primary tillage refers to initial soil disturbance while secondary tillage is the final seedbed preparation prior to planting. Rangeland is often littered with shrub debris so a portion of this chapter is dedicated to implements designed to traverse debris-littered land.

## Contents

### [Primary Tillage](#)

[Offset Disks](#)

[Moldboard Plows](#)

[Chisel Plows](#)

[Subsoilers](#)

[Rotary Tillers](#)

### [Secondary Tillage](#)

[Disk Harrows](#)

[Seedbed Finishers](#)

### [Debris-Littered Rangeland](#)

[Soil Sifter](#)

[Chains](#)

[Modified Chains](#)

[Spiral Blade Choppers](#)

[Land Imprinters](#)

[Pipe Harrows](#)

[Contour Trenchers & Disk Bedders](#)



## Primary Tillage

### Offset Disks



#### *Description*

Offset disks chop and turn under surface debris, breakup shallow compacted layers, till, and uproot small woody plants. Offset disks consist of two gangs of disks set at angles to each other. Each gang has a separate frame and axle assembly. On some models gang angles can be adjusted for varying soil conditions or desired disking action. Blades may be notched or straight-edged and vary from 22 to 28 inches in diameter. Some models are design specifically for rocky soil. Offset disks range from 6 to 22 feet in width and require tractors with 70 to 300 PTO horsepower. These disks have rubber tires that are raised and lowered hydraulically for depth control or transport.

#### *Application*

Offset disks are used for primary seedbed preparation where small to medium amounts of debris and vegetation are present. Blade diameters larger than 30 inches are used for brush control on undisturbed soil (see chapter on the [Mechanical Control](#) of plants). Disks are a popular method of tilling soil from a depth of a few inches to 9 inches for revegetation projects, and most disks used on rangeland employ notched disk blades to chop and bury debris. Disks can be used on a wide range of soil conditions and moderately rocky soil, but they cannot be used if there is excessive timber or large rocks. If brush debris is not present, then rubber-tired tractors are used to pull the disks. These disks are marketed as heavy-duty farm units.

#### *Sources*

The following manufacturers' websites list information on equipment sizes, accessories, dealers, and contact information.

[AMCO Manufacturing, Inc.](#)  
Yazoo City, MS 39194

[Deere & Company \(Skid-steer\)](#)  
Moline, IL 61265

[Rome Plow Company](#)  
Cedartown, GA 30125

[Case IH \(Skid-steer\)](#)  
Racine, WI 53404

[Krause Corporation](#)  
Hutchinson, KS 67504-2707

## Moldboard Plows



### *Description*

Moldboard plows are designed to slice and invert a layer of soil, thus covering the sod and leaving a rough surface. These plows have large curved bottoms called moldboards that attach to a frame. The moldboards have shears along the bottom edge and large curved wings above to turn the soil. Models are available that have 2 to 12 bottoms, a 12- to 22-inch width of cut, and plow to a depth of 14 inches. They attach to the 3-point hitch or they may be towed. Most models have furrow wheels, and the plows are raised or lowered hydraulically. Horsepower pulling requirements are high and vary widely because of soil type and conditions.

### *Application*

Moldboard plows are used on clean-tilled cropland with high amounts of residue. Some models have reset mechanisms that allow each bottom to rise over an obstruction and then return to its original position. They are ineffective in rocky soils. Because these plows have very high power requirements and leave little crop residue on the soil surface, they are not used as extensively as they once were in row-crop farming. They have been used on abandoned farmland being prepared for grass seeding.

### *Sources*

The manufacturers' websites list information on equipment sizes, accessories, dealers, and contact information.

[Case IH](#)

Racine, WI 53404

[Deere & Company \(Skid-steer\)](#)

Moline, IL 61265

[Wil-Rich Manufacturing](#)

Wahpeton, ND 58075-9337

## Chisel Plows



### *Description*

Chisel plows are used to control weeds, break up compacted soils, and increase water infiltration while leaving crop residue on the soil surface to reduce erosion. They have curved shanks mounted on a frame with ridged or spring-loaded clamps. A wide variety of chisel points, sweeps, and shovels are available to accomplish desired tillage. Plow widths vary from 8 to 62 feet, but 20 to 40 feet is most common. Extra wide units fold to a suitable transport width. Twelve-inch spacing between points is standard, but other settings are available. Plowing depth can be as much as 12 inches. Horsepower requirements vary from 75 to 400, depending on width and plowing depth.

### *Application*

Chisel plows are popular for conservation tillage where residue must be left on the soil surface, and they are widely available. Chisel sweeps sever the plant roots below the surface and fracture the subsoil for moisture retention. When seeding into crop stubble, chisel plowing provides weed control and conserves moisture in months prior to seeding. Some models are designed for use in areas with limited amounts of rocks. Chisel points wear with use and must be replaced or hard-surfaced to remain effective. Attachments such as a coil-tine harrow are often used to smooth the soil surface.

## Sources

Chisel plows are available from all major tractor manufacturers and tractor dealers. The manufacturers' websites list information on equipment sizes, accessories, dealers, and contact information.

[AGCO Corporation](#)

Duluth, GA 30096

[Antonio Carraro](#)

Napa, CA 94559

[Belarus Tractor International](#)

Milwaukee, WI 53223

[Branson Tractors](#)

Lafayette, GA 30728

[Case IH Agriculture](#)

Racine, WI 53404

[Challenger \(Caterpillar rubber-track\)](#)

Duluth, GA 30096

[Deere & Company](#)

Moline, IL 61265

[Fendt](#)

Duluth, GA 30096

[Kioti Tractor Division](#)

Wilson, NC 27893

[Kubota Tractor Corporation USA](#)

Torrance, CA 90504

[McCormick USA, Inc.](#)

Pella, IA 50219

[Mahindra USA, Inc.](#)

Houston, TX 77095

[Massey Ferguson](#)

Duluth, GA 30096

[New Holland North America](#)

New Holland, PA 17557

[Same Deutz-Fahr North America](#)

Stone Mountain, GA 30083-1101

[Tafe USA, Inc.](#)

Guntown, MS 38849

[Valtra USA, Inc.](#)

Hoffman Estates, IL 60195

[Zetor Tractors](#)

Harrisburg, PA 17112

## Subsoilers



### *Description*

Subsoilers (a.k.a. rippers) penetrate deep into the soil, fracture compacted layers, and leave crop residue on the soil surface. Subsoilers have large, stout standards (shanks) attached to a toolbar with shear bolts or spring-reset devices. Toolbars can be straight or v-shaped. Straight toolbars are used in multi-tasking, row-crop operations. V-shaped units are more energy efficient. Parabolic-shaped standards require less pulling horsepower than straight standards, and they lift the soil upward, resulting in excellent shattering of the subsoil area plus good surface disturbance. Horsepower requirements range from 30 to 50 per standard, and models can vary from 1 to 13 standards. Width will vary up to about 24 feet. Depth of operation varies from 12 to 30 inches. An L-shaped standard developed for maximum soil shattering is marketed under the trade name, Paratill.

### *Application*

Subsoilers are used on disturbed, highly compacted soils or land with compacted layers resulting from livestock or tractor/vehicle operations. Subsoiling breaks up the compacted soil for improved water infiltration, moisture retention, and root growth. A variety of points are available to vary the amount of surface disturbance, soil shattering, and protection in rocky conditions. Additional seedbed preparation is necessary prior to seeding.

### *Sources*

The manufacturers' websites list information on equipment sizes, accessories, dealers, and their contact information.

[AGCO Corporation](#)  
Duluth, GA 30096

[Bigham Brothers, Inc. \(Paratill\)](#)  
Lubbock, TX 79452

[Case IH \(Skid-steer\)](#)  
Racine, WI 53404

[Deere & Company \(Skid-steer\)](#)  
Moline, IL 61265

[Great Plains Manufacturing, Inc.](#)  
Salina, KS 67402

[New Holland North America](#)  
New Holland, PA 17557

[Wil-Rich Manufacturing](#)  
Wahpeton, ND 58075-9337

## Rotary Tillers



### *Description*

Rotary tillers are power-take-off-powered implements that incorporate crop residue or soil amendments with the soil and pulverize the soil to a fine tilth. Soil is tilled by a rotating, horizontal shaft with L-shaped tines that penetrate and stir the soil. Tiller width varies from 30 to 90 inches and requires 20 to 100 horsepower.

### *Application*

Rotary tillers are very effective for chopping crop residue or sod and incorporating it into the soil and for incorporating fertilizer, mulches, manure, or other amendments into the soil. They are used in gardens, landscaping, and site-specific agricultural applications. Rotary tillers require more horsepower than other tillage implements and do not lend themselves to large scale operations. Rocks and abrasive soils cause excessive wear on the tines. Some companies list rotary tillers as attachments for landscaping tractors with less than 80 horsepower.

### *Sources*

The manufacturers' websites list information on equipment sizes, accessories, dealers, and contact information.

[Alamo Group](#)  
Seguin, TX 78155

[Bush Hog, LLC](#)  
Selma, AL 36701

[Deere & Company \(Skid-steer\)](#)  
Moline, IL 61265

[New Holland North America](#)  
New Holland, PA 17557

[Land Pride](#)  
Salina, KS 67402

[Woods Equipment Company](#)  
Oregon, IL 61061

## Secondary Tillage

### Disk Harrows



#### *Description*

Disk harrows (a.k.a. tandem disks) are for secondary tillage including weed control, incorporation of fertilizers and herbicides or pesticides, breaking up surface crusts and clods, and mixing and leveling the top few inches of soil. Disk harrow widths between 11 and 46 feet are towed implements with wheels that are raised and lowered hydraulically. Narrower width models attach to the 3-point hitch and are listed as accessories to landscape-size tractors (less than 75 horsepower). Large, wide disks fold for a suitable transport width. Blade diameters are 20, 22, or 24 inches and spacing between blades varies between 7 and 9 inches. Selected models are designed to traverse small rocks.

#### *Application*

Disk harrows are seedbed finishing implements. They are lighter duty than offset disks and generally use smaller blade diameters and narrower spacing between blades. They are designed for clean-tilled land. The heavy duty models are advisable when crop residue is present or for rangeland applications. Several attachments are available to smooth the soil surface for planting. These disks are very effective in removing weeds prior to planting and incorporating herbicides, manure, or crop residue. They are not designed for rough, rocky, or brushy conditions.

#### *Sources*

Disk harrows are available from all major tractor manufacturers and tractor dealers. The manufacturers' websites list information on equipment sizes, accessories, dealers, and contact information.

[AGCO Corporation](#)  
Duluth, GA 30096

[Antonio Carraro](#)  
Napa, CA 94559

[Belarus Tractor International](#)  
Milwaukee, WI 53223

[Branson Tractors](#)  
Lafayette, GA 30728

[Case IH Agriculture](#)  
Racine, WI 53404

[Challenger \(Caterpillar rubber-track\)](#)  
Duluth, GA 30096

[Deere & Company](#)  
Moline, IL 61265

[Fendt](#)  
Duluth, GA 30096

[Kioti Tractor Division](#)  
Wilson, NC 27893

[Kubota Tractor Corporation USA](#)  
Torrance, CA 90504

[McCormick USA, Inc.](#)  
Pella, IA 50219

[Mahindra USA, Inc.](#)  
Houston, TX 77095

[Massey Ferguson](#)  
Duluth, GA 30096

[New Holland North America](#)  
New Holland, PA 17557

[Same Deutz-Fahr North America](#)  
Stone Mountain, GA 30083-1101

[Tafe USA, Inc.](#)  
Guntown, MS 38849

[Valtra USA, Inc.](#)  
Hoffman Estates, IL 60195

[Zetor Tractors](#)  
Harrisburg, PA 17112

## Seedbed Finishers



### *Description*

Seedbed finishers are various combinations of field cultivators, spring-tooth harrows, cultipackers, coil-tine harrows, spike-tooth harrows, chain-link harrows, and rolling baskets to prepare the soil for planting. They vary in width from 7 to 40 feet and are designed for easy transporting from field to field. Combinations vary widely among and within manufacturers for creating the desired soil conditions. Field cultivators and spring-tooth harrows can be purchased separately.

### *Application*

Finishers are designed to match conservation tillage methods used with various crops, soils, and geographic locations. The finishers chop up crop residues, break up clods and surface crusts, control weeds, incorporate chemicals, and stir and firm the soil for planting. Selected components are suitable for rangeland seedbed preparation. Soil packers used in rangeland seeding are often constructed in local shops.

### *Sources*

Seedbed finishers are available from all major tractor manufacturers and tractor dealers. The manufacturers' websites list information on equipment sizes, accessories, dealers, and contact information.

[AGCO Corporation](#)  
Duluth, GA 30096

[Antonio Carraro](#)  
Napa, CA 94559

[Belarus Tractor International](#)  
Milwaukee, WI 53223

[Branson Tractors](#)  
Lafayette, GA 30728

[Case IH Agriculture](#)  
Racine, WI 53404

[Challenger \(Caterpillar rubber-track\)](#)  
Duluth, GA 30096

[Deere & Company](#)  
Moline, IL 61265

[Fendt](#)  
Duluth, GA 30096

[Kioti Tractor Division](#)  
Wilson, NC 27893

[Kovar Mfg. \(Chain-link harrows\)](#)  
Anoka, MN 55303

[Kubota Tractor Corporation USA](#)  
Torrance, CA 90504

[McCormick USA, Inc.](#)  
Pella, IA 50219

[McFarlane Mfg. Co. Inc. \(Chain-link harrows\)](#)  
Sauk City, WI 53583

[Mahindra USA, Inc.](#)  
Houston, TX 77095

[Massey Ferguson](#)  
Duluth, GA 30096

[New Holland North America](#)  
New Holland, PA 17557

[Same Deutz-Fahr North America](#)  
Stone Mountain, GA 30083-1101

[Tafe USA, Inc.](#)  
Guntown, MS 38849

[Valtra USA, Inc.](#)  
Hoffman Estates, IL 60195

[Zetor Tractors](#)  
Harrisburg, PA 17112

## Debris-Littered Rangeland

### Soil Sifters



#### *Description*

Soil sifters clean fields by removing rocks, roots, and small brush debris from the soil and depositing the debris in windrows. The sifter cleans soil to a depth of 12 inches by combing rocks and roots from the soil with a 7-foot wide digging cylinder. Soil and debris are lifted onto a rotating transfer cylinder and then onto a steel-mesh conveyor belt. Soil falls to the ground as debris is carried up the belt and into a rear storage hopper. The unit is pulled by a rubber-tired tractor of at least 140 horsepower and the sifter mechanism is powered by the tractor's 1000-rpm power-take-off. Two hydraulic circuits are required: one for depth control and one for hopper dumping.

#### *Application*

Sifters are available as either rock or root machines. Prior to operating the sifter, the ground must be loosened with a chisel or root plow. The sifter treatment leaves the soil in a level and well-pulverized condition suitable for seeding. Brush piles are free of soil and easily burned. An attachment is available to convey debris to a mobile hopper pulled by a second tractor. The sifter is not adapted to excessively rocky soil or soil that is too wet or too dry.

#### *Sources*

Company website gives additional information.

[Rockland Manufacturing Company](#)

Bedford, PA 15522

## Chains



### *Description*

Anchor chains are designed for use on large ships and off-shore drilling rigs. Used anchor chain is sometimes used for seedbed preparation in revegetation. Their use in tree felling is covered in the chapter on [Mechanical Control](#) of plants). Chains are sized by the diameter of the round stock. Revegetation projects normally use chain sizes between 2 and 3 inches. Within this range, individual links are 12 to 18 inches in length and weigh between 25 and 86 pounds. The resulting weight per foot of chain is about 37 to 88 pounds, respectively. Anchor chain is usually sold in 90-foot lengths called "shots." Further specifications on weight and link size are listed in the [Appendix](#).

### *Application*

Anchor chains are pulled in a "U" shape between two crawler tractors. The distance between the two tractors depends on the force required to pull the chain. An initial distance of 1/3rd the length of the chain is a rule-of-thumb. Size and length of the chain are factors as well as the size of the tractors. The tractors can be further apart when preparing a seedbed than when felling trees. Chain length is usually between 200 to 400 feet. Length can be adjusted easily with standard cutting and welding tools. Crawler tractors used for chaining vary from 140 to 350 horsepower. Production rates vary from 20 to 70 acres/hour. Chaining has been used effectively on debris-littered land to prepare seedbeds for broadcast seeding. Soil disturbance is usually in the top 1 to 2 inches of soil. Chaining a second time in the opposite direction is useful if soil disturbance for seeding is insufficient after the first pass. Chaining has also been used to cover the seed following broadcast seeding. Chain size and soil type and condition must be considered to achieve desired results. Dry, clay soil may require multiple passes with a heavy chain while one pass may be sufficient in sandy loam soil. Chains have a tendency to become buried in very sandy soils with dunes.

*Sources*

Used anchor chain can be purchased from marine supply or salvage companies located in coastal cities of the United States.

## Modified Chains



### *Description*

Modified chains are anchor chains with material added to the chain links for the purpose of increasing soil disturbance. Railroad rails, rods, blades, or disks have been used. A modification known as an "Ely Chain" uses 18 inch pieces of railroad rail (70 to 90 lb/yard) welded to each or every other chain link. A chain with disk blades welded to every other chain link is known as a "disk chain." The optimum blade diameter is 28 inches. Diking chains use blades (12 x 4 inches) welded to opposite sides of every chain link to form small basins in the soil as the chain rotates. The combination of the disk and diking chain is called a disk-chain-diker. A unit with 20 disk blades is 35-foot wide and requires a 165- to 200-horsepower crawler tractor to pull it.

### *Application*

Modified chains must rotate to achieve the desired results. Swivels fabricated in welding shops or modified from track rollers are attached to each end of the chain to allow chain rotation. Railroad-rail chains are towed in a "J" shape rather than a "U" to achieve maximum soil disturbance. Disk chains are towed on a diagonal to achieve optimum disking action. This type chain was developed to achieve tillage on debris- and shrub-littered rangelands at chaining costs. As the diking chain rolls, diamond shaped basins 4-inches deep are formed at the rate of 18,000/acre to collect rainfall. The combination of disking and diking chains enhances seedbed preparation and provides limited shrub control. Seedbeds prepared with the disk-chain-diker have produced grass densities double those in seedbeds prepared by standard chaining, and the disk-chain-diker method is cost and energy effective. Information on these chains for brush control is covered in the [Mechanical Control](#) of plants chapter.

### *Additional Information*

Cain, D. 1971. The Ely Chain: A practical handbook of principles and practices of chaining and vegetative manipulation. Washington, DC: USDI Bureau of Land Management Handbook. 32 p.

Wiedemann, H.T.; Cross, B.T. 1990. Disk-chain-diker implement selection and construction. Center Technical Report 1. Vernon, TX: Chillicothe-Vernon Agricultural Research and Extension Center.

Wiedemann, H.T.; Cross, B.T. 2000. Disk chain effects on seeded grass establishment. Journal of Range Management. 53(1): 62-67.

Wiedemann, H.T.; Cross, B.T. 2001. Chain diker effect on seeded grass establishment following disk chaining. *Journal of Range Management*. 54(2): 138-143.

*Sources*

Used anchor chain and accessories can be purchased from marine supply or salvage companies located in coastal cities of the United States. Used railroad rails can be purchased from local train companies. Disk blades can be purchased from local tractor dealers. Local fabrication shops can modify the chains.

## Spiral Blade Choppers



### *Description*

Spiral-blade choppers, often called aerators or renovators, use small blades welded to heavy drums in a staggered, spiral pattern around the drum, rather than the long, longitudinally mounted blades used on conventional roller choppers. Spiral-blade choppers normally use two drums mounted on a frame similar to an offset disk, and they are equipped with rubber tires for transporting. Spiral-blade choppers are pulled by a crawler tractor or a four-wheel drive tractor with special tire protection (see the Modifications for Rangeland Use section of the [Tractor](#) chapter). Drum diameters vary from 18 to 42 inches, and the drums can be filled with water for extra weight. Width is 12 feet but options are available. Tractor horsepower requirements vary between 120 and 350 and depend on chopper size, weight, tree/shrub size, and type of terrain.

### *Application*

Spiral-blade choppers gained popularity in the 1990s, especially for use in brush-dominated landscapes, because of minimal vibration, effective top growth removal, soil fracturing, and the small basins formed in the soil to hold rainfall. These basins provide a good seedbed. Broadcast seeding can be conducted from a seed box attached to the rear of the chopper. Because of the rubber tires, the units are easily transported from site to site. Blade wear can be a problem, and new blades are welded in place. These choppers should not be used on rocky ground. Gravelly and some sandy soils can cause excessive blade wear. Information for use in brush control is covered in the [Mechanical Control](#) of plants chapter.

### *Sources*

The manufacturers' websites list information on equipment sizes, accessories, dealers, and contact information.

#### [Holt-Cat](#)

San Antonio, TX 78220-7916

#### [Lawson Manufacturing, Inc.](#)

Kissimmee, FL 34741

[Marden Industries, Inc.](#)  
Mulberry, FL 33860

## Land Imprinters



### *Description*

Land imprinters use a heavy drum with wedges to imprint small depressions into the soil to reduce runoff and erosion, increase infiltration, and crush small shrubs. Land imprinters are similar to roller choppers (see [Mechanical Control](#) of plants chapter). They can be fabricated in widths from 6 to 10 feet, with drum diameters ranging from 24 to 36 inches. Land imprinters are pulled by a crawler or rubber-tired tractor.

### *Application*

Land imprinters are used for seedbed preparation. The heavy drums firm soil while the wedges form depressions that trap rainfall and seed. They were developed for use in the desert Southwest but have been used elsewhere. A seeder can be attached to the front or rear frame. Land imprinters operate satisfactorily on rough terrain with small shrubs, but they are not suitable for dense stands of brush. They are not effective in moist, sticky soil. A current use is for seeding highway rights-of-way.

### *Sources*

The manufacturers' websites list information on equipment sizes, accessories, dealers, and contact information.

### [Western Ecology](#)

Santa Fe, NM 87502

## Pipe Harrows



### *Description*

Pipe harrows (a.k.a. Dixie harrows) thin low, brittle shrubs and scarify the soil surface for seeding. Triangular-shaped blades are welded to 10-foot long pipes attached with swivels to a heavy square beam that is pulled with a tractor. The modified pipes weigh about 300 pounds each, and a 15-foot wide unit weighs about 4,000 pounds. Required tractor horsepower is at least 130. Pulling a 25-foot-wide harrow requires a 210 horsepower tractor, while the 40-foot wide harrow requires a 400 horsepower tractor. The tractor can be equipped to simultaneously broadcast seed the harrowed site.

### *Application*

Pipe harrows were designed to remove sagebrush on rough terrain with rocks. One trip over removes a moderate amount of sagebrush and twice over removes a very high percentage. Pipes can be removed from the main beam to reduce brush removal and form special patterns. Users report 50 to 70 acres/day productivity. Pipe harrows are well suited to clearing sites in patterns that benefit wildlife. Seeding is conducted during single-pass harrowing and during the final pass of double-pass harrowing to establish desirable species. If sufficient desirable grasses are present, seeding may not be necessary.

### *Sources*

The manufacturers' websites list information on equipment sizes, accessories, dealers, and contact information.

Design Line Tool, Inc.  
Aurora, UT 84620  
435-529-3565

Herd Seeder Co., Inc.  
Logansport, IN 46947  
574-753-6311

## Contour Trenchers and Disk Bedders



### *Description*

Contour trenchers are used in the restoration of degraded rangeland to conserve rainfall. The contour trencher uses a single-shank ripper (subsoiler) to fracture the soil to a depth of 12 to 18 inches. Tractor Forty to 75 horsepower tractors are required to pull the ripper. Wings or a furrow opener can be attached to the ripper's shank to form a furrow. A single-row seeder is mounted on the frame of the ripper and powered by a hydraulic motor. The seed tube is attached so it can be positioned to place seed on the upslope side of the furrow or within the furrow. Shops construct these units from off-the-shelf components.

A multi-shank unit is under development for the Umatilla National Forest in cooperation with the Forest Service's Missoula Technology and Development Center for road and trail decommissioning. This 6-foot wide unit will rip to a depth of 24 inches and will require a crawler tractor with a minimum of 150 horsepower and a ripper toolbar for operation.

Contour disk bedders use two rows of cropland disk bedders to form soil dikes along the contour to trap rainfall. A single-row seeder can be mounted on the bedder's frame in the same manner as the ripper's installation.

### *Application*

Contour trenchers break-up hard pans, trap rainfall, improve infiltration, and promote the rejuvenation of resident grasses and the germination, emergence, and establishment of seeded grasses. Trenches and dikes are installed on the contour, and distances between these soil disturbances vary with the slope, amount of grass cover, and expected rainfall. Seed is placed above the ridge of soil on the upslope side of the trench/furrow or in the furrow. When ripping is not feasible due to rocky soil or other factors, disk bedders can be used to form ridges (borders, beds, dikes) to trap rainfall and promote growth of seeded grasses. Disk bedders can traverse limited amounts of rocks and brush debris. It is recommended that the contours be flagged using a level before installation. It is further recommended that skips be left on about 100 – 150 foot spacing when diking so that intense rainfall will not breach the dikes.

### *Sources*

The manufacturers' websites list information on equipment sizes, accessories, dealers, and contact information.

[Bigham Brothers, Inc. \(Paratill\)](#)  
Lubbock, TX 79452

[Deere & Company \(Ripper\)](#)  
Moline, IL 61265

Farm Equipment Distributing, Inc. (Bison Ripper)  
Hewitt, TX 76643  
254-666-0050

[Truax Company, Inc. \(Seeder\)](#)  
New Hope, MN 55428

[USDA Forest Service](#)  
Missoula, MT 59808-9361