### Small Dozer

**Sweco Trail Dozer**

**Model:** Sweco 480

**Manufacturer:**
Sutter Equipment Company  
80 Chamberlain Avenue  
Novato, CA 94947  
Phone: (415) 898-5955

**Purchase Price:** $49,800

**Status:** In production  
**Prime mover:** Sweco 480 is a prime mover.  
**Engine power:** 80 hp  
**Gas or diesel:** Diesel  
**Transmission:** Hydrostatic  
**Width:** 4 ft  
**Length:** 11 ft 1 inch with blade and rippers  
**Height:** 6 ft 4 inches  
**Ground clearance:** 8 inches  
**Weight:** 9,000 lb  
**Ground pressure:** 7.3 psi  
**Boom type:** Backhoe  
**Boom reach:** 13 ft  
**Turning radius:** Zero, counter rotation  
**Slope limitations:** 35°  
**Travel speed:** 0 to 5 mph  

**Track:** Steel  
**Track width:** Two 11-inch  
**Hydraulic pressure:** (minimum) 2,200 psi, auxiliary circuit  
**Flow:** 10 to 30 gpm, auxiliary circuit  
**Dedicated attachments:** Blade, three-point hitch, others

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### Tracked Brush Cutter

**Gyro-Trac**

**Model:** GT-18 XP

**Manufacturer:**
Gyro-Trac, Inc.  
603 Fairington Drive  
Summerville SC, 29485  
Phone: (888) 490-8722, (843) 821-1588  
Fax: (843) 821-1587  
E-mail: gyrotrac@gyrotrac.com  
Web site: [http://www.gyrotrac.com](http://www.gyrotrac.com)

**Purchase Price:** $155,000 (U.S.)

**Status:** In production  
**Prime mover:** GT-18 XP brush cutter is a prime mover.  
**Engine power:** 180 or 190 hp  
**Gas or diesel:** Diesel  
**Transmission:** Hydrostatic  
**Width:** 100 inches  
**Length:** 229 inches  
**Height:** 113 inches  
**Ground clearance:** 14 inches  
**Weight:** 17,300 lb  
**Ground pressure:** 2.0 psi  
**Turning radius:** Zero  
**Track:** Two, rubber with steel cross links  
**Track width:** 28 inches  
**Brush-cutting head:** Two disks, each disk has two swinging blades; max. size material is 8 inches  
**Full width of cut:** 8 ft  

**Hydraulic pressure:** Cutting head: 4,500 psi; primary: 6,000 psi; auxiliary: 1,200 psi.  
**Flow:** Cutting head: 38 gpm; primary: 38 gpm; auxiliary: 10 gpm.  
**Other potential uses:** Precommercial strip thinning  
**Other attachments:** Flail mower. Contact manufacturer for information on other attachments.
### Feller-Buncher
#### Hydro-Ax Tri-Wheel

**Model:** Hydro-Ax 321 Tri-Wheel shown as an example. Other manufacturers include Morbark and Bell.

**Distributor:**
Blount, Inc.
Forest and Industrial Equipment Division
P.O. Box 568
Owatonna, MN 55060
Phone: (507) 451-8654
Fax: (507) 455-4268

**Purchase Price:** With shear, $130,000

| Status: | In production |
| Cutting-head mechanism: | Drum type |
| Cutters: | 5-ft drum has 38 teeth; 7-ft, 2-inch drum has 54 teeth |
| Timing: | The blades are arranged in four rows and are designed to be fully recovered in full extension and forward momentum on the next revolution. |
| Cutting width: | 5 ft or 7 ft 2 inches, depending upon head. |
| Maximum cutting size: | 15 inches |
| Practical outsies: | 12-inch diameter |
| Type drive: | Dual drive hydraulic and PTO |
| Rotation speed: | 2,100 rpm |
| Prime mover: | T-7 mounted on Hydro-Ax 411EX (150 hp); GT-18 mounted on Gyro-Trac GT-18 (180 or 190 hp) |
| Gas or diesel: | Diesel |
| Transmission: | Hydrostatic |
| Width: | T-7: 8 ft; GT-18: 100 inches |
| Length: | T-7: 23 ft 6 inches; GT-18: 229 inches |
| Height: | T-7: 11 ft; GT-18: 113 inches |
| Ground clearance: | T-7: 20 inches; GT-18 XP: 13 inches |
| Weight: | T-7: 23,500 lb; GT-18: 17,300 lb |
| Slope limitation: | GT-18: 50° |
| Ground pressure: | T-7: 7.49 psi; GT-18: 2.0 psi |
| Turning Radius: | T-7: 42°; GT-18: 0° |
| Track: | Rubber and nylon w/steel crosslinks |
| Track width: | GT-18: 28 inches |
| Wheels: | T-7: four Firestone Forestry Special 23.1x26 |

R.O.W. King GT-18 XP mower mounted on a Gyro-Trac utility vehicle.

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### Track Brush Cutter
#### R.WMEC R.O.W. King Mower

**Models:** T-7 and GT-18 XP

**Manufacturer:**
ROWMEC
11443 Old Highway 105 East
Conroe, TX 77303
Phone: (409) 539-5488 or 800-259-9548
Fax: (409) 539-5648
E-mail: rowmec@lcc.net

**Purchase Price:** T-7: $185,000; GT-18: $180,000

| Status: | In production |
| Cutting-head mechanism: | Drum type |
| Cutters: | 5-ft drum has 38 teeth; 7-ft, 2-inch drum has 54 teeth |
| Timing: | The blades are arranged in four rows and are designed to be fully recovered in full extension and forward momentum on the next revolution. |
| Cutting width: | 5 ft or 7 ft 2 inches, depending upon head. |
| Maximum cutting size: | 15 inches |
| Practical outsies: | 12-inch diameter |
| Type drive: | Dual drive hydraulic and PTO |
| Rotation speed: | 2,100 rpm |
| Prime mover: | T-7 mounted on Hydro-Ax 411EX (150 hp); GT-18 mounted on Gyro-Trac GT-18 (180 or 190 hp) |
| Gas or diesel: | Diesel |
| Transmission: | Hydrostatic |
| Width: | T-7: 8 ft; GT-18: 100 inches |
| Length: | T-7: 23 ft 6 inches; GT-18: 229 inches |
| Height: | T-7: 11 ft; GT-18: 113 inches |
| Ground clearance: | T-7: 20 inches; GT-18 XP: 13 inches |
| Weight: | T-7: 23,500 lb; GT-18: 17,300 lb |
| Slope limitation: | GT-18: 50° |
| Ground pressure: | T-7: 7.49 psi; GT-18: 2.0 psi |
| Turning Radius: | T-7: 42°; GT-18: 0° |
| Track: | Rubber and nylon w/steel crosslinks |
| Track width: | GT-18: 28 inches |
| Wheels: | T-7: four Firestone Forestry Special 23.1x26 |

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Two-blade adjustable shears, maximum shear blade capacity 16 inches, bunching capacity 2.5 square ft. Thinning shear attachment, two-blade pivotal adjustable shears, cuts 15-inch-maximum-diameter softwood, bunching capacity 2.75 square ft. Safety Note: The Tri-Wheel is stable only on relatively flat ground. It is very effective in plantation settings.
Appendix B—Equipment Specifications

Feller-Buncher

**Bell Tracked Slewboom**

**Model:** TF 120 B

**Distributor:**
Bell Equipment
2843 Highway 80 West
Garden City, GA 31408-2999
Phone: (912) 966-2615
Fax: (912) 964-1594

**Purchase Price:** Contact manufacturer.

**Status:** In production
**Prime mover:** TF 120 B is the prime mover.
**Engine power:** 113 hp gross power, 106 hp net power
**Gas or diesel:** Diesel
**Transmission:** Hydrostatic
**Width:** 89 inches
**Length:** 14 ft 1 inch, without felling attachment
**Height:** 10 ft
**Ground clearance:** 2 ft 1 inch
**Weight:** 24,970 lb, with felling head
**Ground pressure:** 6.71 psi with 16-inch shoe; 5.41 psi with 20-inch shoe
**Turning Radius:** Zero
**Tracks:** Two. Shoe width 16 or 20 inches
**Flow:** 39.6 gpm, main circuit
**Felling head:** Standard: 23 inches maximum cutting diameter; optional head: 28 inches maximum cutting diameter
**Crane:** Slewing range: 170°; reach: 13 ft 5 inches

**Low-Impact Skidder**

**Turboforest**

**Model:** TF-42C

**Manufacturer:** Turboforest Nova Sylva, Inc.
73, Chemin St-Georges Nord
Asbestos, PQ, Canada J1T 3M7
Phone: (819) 879-4343 or 800-567-7318
Fax: (819) 879-4999
E-mail: info@turboforest.com

**Canadian Purchase Prices:** TF-42C
Mini-Skidder (double drum): $80,000; TF-42C Mini-Skidder (grapple): $96,000

**Status:** In production
**Prime mover:** TF-42C is a prime mover.
**Engine power:** 50 hp (37 kw)
**Gas or diesel:** Diesel
**Transmission:** Hydrostatic
**Width:** 74.8 inches (1,900 mm)
**Length:** 201.2 inches (5,110 mm)
**Height:** 100.3 inches (2,548 mm)
**Ground clearance:** 20.0 inches (500 mm)
**Weight:** 9,140 lb (4,155 kg)

**Ground pressure:** Front with 14.9x24 tires: 7.4 psi/51 kPa; rear: 4.9 psi/33.8 kPa. Front with 500-60x26.5 tires: 5.4 psi/37.2 kPa; rear: 3.6 psi/24.8 kPa.
**Tires:** Standard: 14.9x24, 14 PR. Optional: 500-60x26.5, 14 PR (PR refers to ply rating.)
**Hydraulic pressure:** System pressure 2,540 psi (175 bars)
**Flow:** (at 2,200 rpm) 22 gpm (83.6 L/min)
**Secondary hydraulic system:** Hydraulic pump: 6 gpm (22.7 L/min) for steering and dozer blade. System pressure: 3,000 psi (207 bars).
**Attachments and Implements:** TF-42C winches, double drum (11,500 lb, 65 fpm); or single drum, 12,000 lb, 65 fpm. TF-41G grapple, 13,000-lb capacity, opening 59.1 inches; Dozer blade, overall width 56 inches, overall height 27.7 inches.
Low-Impact Skidder

**KMC Track Skidder**

**Model:** KMC 1000 Series

**Manufacturer:** Kootenay Manufacturing Company, Ltd.
606 Lakeside Drive
Nelson, BC Canada V1L 5S7
Phone: (250) 352-5303
Fax: (250) 352-5302

**Purchase Price:** From about $200,000 to $300,000 (U.S.). Price varies according to options.

**Status:** In production

**Prime mover:** KMC 1000 is a prime mover.


**Gas or diesel:** Diesel

**Transmission:** Mechanical drive, 3-speed, power-shift transmission with integral torque converter or hydrostatic drive.

**Width:** 96 inches (2.44 m)

**Length:** 17 ft 4 inches (4.67 m), bare machine

**Height:** 10 ft 6 inches (2.87 m)

**Ground clearance:** 1 ft 7 inches (0.5 m)

**Weight:** With choker arch: 23,860 lb (10,832 kg); with single arch grapple: 26,031 lb (11,808 kg); with dual arch grapple: 26,280 lb (11,921 kg); with swing grapple: 27,350 lb (12,432 kg).

**Ground pressure:** 6.03 psi (41.58 kPa) at 0 penetration; 3.95 psi (27.24 kPa) at 6-inch penetration

**Tracks:** Two steel

**Track width:** 22 inches

**Attachment hydraulics:** 37 gpm at 3,500 psi

**Travel speed:** 0 to 15 mph

**Dedicated attachments:** Winch; dozer blade; single-arch or dual-function grapple; swing grapple; backhoe; extendable choker arch; crane and auger attachment; dump bed.

Contact manufacturer for additional information on these attachments.

**Attachments under development:** Wood processor or thinning machine that can be converted to brush-cutter/strip-thinning machine; clam-bunk forwarder.

---

**Small Y arder**

**Bitterroot Mini Y arder**

**Developed by:**
USDA Forest Service
Missoula Technology & Development Center
Building 1, Fort Missoula
Missoula, MT 59804
Phone: (406) 329-3900
Fax: (406) 329-3719

**Purchase Price:**
Varies, depending upon your fabricator.

**Status:** Custom made. Plans are available from MTDC.

**Prime mover:** Can be mounted on the back of a 1/2-ton truck or a trailer

**Engine:** 18-hp Briggs & Stratton

**Gas or diesel:** Gas

**Transmission:** Hydrostatic

**Weight:** Rigged: 1,600 lb

**Boom:** 2.5 inch pipe A-frame, 17.5 ft long, 180° swivel head, hydraulically raised and lowered

**Controls:** 15 ft mechanical push/pull cable

**Skyline and mainline drums:** 800 ft of 1/8 inch cable, or 625 ft of 3/16-inch cable. Zero- to 2,000-lb line pull; 0- to 400-fpm line speed
**Small Yarder**

### Clearwater Yarder

**Developed by:**
USDA Forest Service
Missoula Technology & Development Center
Building 1, Fort Missoula
Missoula, MT 59804
Phone: (406) 329-3900
Fax: (406) 329-3719
E-mail: wo_mtdc_pubs@fs.fed.us

**Status:** Custom made. Plans available from MTDC.

**Prime mover:** Recommended size is 5-ton flatbed truck (2 1/2-ton truck is acceptable)

**Engine power:** Detroit Diesel Allison, 3-53N, rated 97 BHP at 2,800 rpm

**Gas or diesel:** Diesel

**Transmission:** Hydrostatic

**Weight:** 13,500 lb, fully rigged

**Mast:** 10x10x1/2-inch wall square tubing, 170° fairlead swivel, hydraulically raised and lowered

**Controls:** Remote up to 50 ft, 12-volt dc electric over hydraulic

**Skyline drum:** 800 ft of 1/2-in cable; 7,500-lb maximum line pull; 0- to 500-fpm line speed

**Mainline drum:** 900 ft of 1/2-in cable; 3,500-lb maximum line pull; 0- to 1,000-fpm line speed

**Haulback:** 1,800 ft of 3/8-in cable; 3,500 lb maximum line pull; 0- to 1,000-fpm line speed

**Yarding distance:** Up to 800 ft

---

**Small Yarder**

### Koller Cable Yarder

**Model:** K 300

**Manufacturer:**
Koller USA Corporation
8828 NE Killingsworth Street
Portland, OR 97220
Phone: (503) 257-9778
Fax: (503) 257-9780

**Purchase Price:**
Contact manufacturer.

**Status:** In production

**Prime mover:** Can be transported by 3/4-ton truck (minimum), or 1-ton truck (preferred).

**Engine power:** Three-point hitch tractor mounted 50-hp engine, minimum. Trailer mounted, 62 hp with hydrostatic drive

**Gas or diesel:** Diesel

**Weight:** 9,000 lb (3 drum, trailer mounted)

**Boom:** 23 ft 6 inches

**Drums:** 2 or 3

**Cable capacity:** Mainline: 1,200 ft of 1/2-inch cable; skyline: 1,200 ft of 5/8-inch cable; guyline: 100 ft of 3/8-inch cable; haulback: 2,100 ft of 3/16-inch cable

**Mainline drum:** 900 ft of 1/2-in cable; 3,500-lb maximum line pull; 0- to 1,000-fpm line speed

**Haulback:** 1,800 ft of 3/8-in cable; 3,500 lb maximum line pull; 0- to 1,000-fpm line speed

**Yarding distance:** Up to 800 ft

---

Note: Koller manufactures a variety of different yarders, including the K301, K500, and K501.
Small Yarder

**Miller Mono-Cable**

**Manufacturer:**
Miller Timber Services  
24745 Alsea Highway  
Philomath, OR 97370  
Phone: (541) 929-2640  
Fax: (541) 929-4489  
Website: [http://www.forestnet.com/miller](http://www.forestnet.com/miller)

**Purchase Price:** Varies. Systems start around $18,000.

**Status:** In production  
**Engine power:** 13- or 18-hp Honda  
**Gas or diesel:** Gas  
**Starting system:** Rope or electric  
**Drum:** Holds 2,000 ft of 3/4-inch wire cable.

**Mainline pull:** About 1,000 lb  
**Gear train:** Line speeds of 59 to 82 fpm  
**Weight:** 1,500 lb  
**Note:** Uses one zigzag block about every 75 ft.

**Note:** The Howe-Line Mono Cable system does not use zigzag blocks. It uses its own design of inline supports and corner blocks to change direction. Under this system, cables can be laid out in any pattern to suit the operation. The hydraulic design system allows the use of relief valves for overload protection.

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Small Yarder

**Howe-Line Mono-Cable**

**Model:** M.C.  
**Distributor:** Howe-Line  
P.O. Box 2831  
Pietermaritzburg, South Africa 3200  
Phone: (27) 331-942146 or (27) 823-721310  
Fax: (27) 335-691646 or (27) 331-947260  
E-mail: howeline@netactive.co.za

**Purchase Price:** $25,000 (U.S., plus S&H)

**Status:** In production  
**Engine power:** 14 hp  
**Gas or diesel:** Diesel  
**Line pull:** Custom designed to suit operation by choice of capstan diameter. For instance, 3.5 metric tons at 20 m per minute, 2.6 metric tons at 30 m per minute.  
**Cable length:** Standard 600 m. Note: With 600 m of cable, you have a working range of 250 m. With 900 m of cable, you have a working range of 400 m. Cables are joined by special couplers provided by Howe-Line. Cable is 10 mm in diameter.  
**Choker system:** Cable system uses bailing twine in place of steel chokers to yard material to landing site. In-line bailing-twine cutter is available. Standard chokers are also available.
## INDEX

(Prices subject to change)

NOTE: Some of these implements are designed for larger tree diameters than those this report focuses on. These implements can be mounted on the smaller prime movers.

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Appendix C—Attachments and Implements

**Brush Mower**

**Davco**

**Model:** Davco BC 704  
**Manufacturer:** Davco Manufacturing, Ltd.  
Box 17, Site 1, Rural Route 3  
Grande Prairie, AB, Canada T8V-5N3  
Phone: (780) 532-1850  
Fax: (780) 532-3626  
E-mail: davco@telusplanet.net  
**Distributor:** ASV, Inc.  
P.O. Box 5160, 840 Lily Lane  
Grand Rapids, MI 55744  
Phone: 800-346-5954 or (218) 327-3065  
Fax: (218) 327-2376  
E-mail: sales@asvi.com  
**Purchase Price:** From Davco, $6,800 (U.S.)

![Davco BC 704 brush mower.](image)

**Cutting mechanism:** Disk  
**Cutting width:** 70 inches  
**Cutting capacity:** 4 inches  
**Weight:** 1,400 lb  
**Hydraulic pressure:** 2700 psi  
**Flow:** 25 to 30 gpm  
**Suggested prime mover:** ASV Posi-Track or large skid-steer machine, universal quick attach

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**Brush Cutter**

**Rotary Brushcat**  
**(Bobcat only)**

**Distributor:** Melroe Company  
P.O. Box 6019  
Fargo, ND 58108-6019  
Phone: (701) 241-8705  
Fax: (701) 241-8779  
**Purchase Price:** $4,900 for cutting head

![Brushcat rotary cutter made for the Bobcat.](image)

**Status:** In production  
**Prime mover:** Bobcat 700- and 800-Series skid-steer loaders  
**Cutting capacity:** Brush material up to 3 inches in diameter  
**Cutting width:** 60 inches  
**Overall width:** 62 inches  
**Blade tip speed:** 11,190 fpm at 13-gpm minimum flow; 24,100 fpm at 28-gpm maximum flow  
**Weight:** 1350 lb (1200 kg)  
**Other Bobcat attachments:** Bobcat makes numerous other dedicated attachments that may address a small forest operation. Contact a dealer or the manufacturer for a complete listing.
Tree Cutter/Mower

**Brown**

**Models**: Open Decks: TCO-2515, 2615 and 2620; Folding Decks: TCF-2615 and 2620

**Manufacturer**: Brown Manufacturing Corporation
Route 3, Box 339
Ozark, AL 36360
Phone: (334) 795-6603
Fax: (334) 795-3029

**Purchase Price**: TCO-2515, $4,200; TCO-2615, $4,380; TCO-2620, $5,970; TCF-2615, $5,470; TCF-2620, $7,335

**Status**: In production

**Cutting mechanisms**: TCO-2515: four blades, double offset, ⅝ x 5 inches. TCO-2615: four blades, double offset, ⅞ x 6 inches. TCO-2620: four blades, double offset, ⅝ x 6 inches. TCF-2615: four blades, double offset, ⅝ x 6 inches. TCF-2620: four blades, double offset, ⅞ x 6 inches.

**Weight**: TCO-2515: 1,700 lb; TCO-2615: 2,050 lb; TCO-2620: 2,250 lb; TCF-2615: 2,300 lb; TCF-2620: 2,600 lb

**Cutting width**: TCO-2515: 60 inches; TCO-2615 and 2620: 72 inches; TCF-2615 and 2620: 72 inches

**Cutting height**: All models 1½ to 12 inches

**Deck width**: TCO-2515: 69 inches. All other models: 81 inches.

**Maximum material size**: TCO-2515, 2516, and TCF-2615: 6 inches; all other models: 8 inches.

**Recommended prime mover**: Rear tractor mount, PTO operated: TCO-2515, 50 to 90 hp; TCO-2615, 60 to 90 hp; TCO-2620, 70 to 100 hp; TCF-2615, 70 to 90 hp; and TCF-2620, 80 to 100 hp

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Shredder

**Seppi**

**Models**: Midiforest 125, 150, 175, 200, 225, and 250 tractor/loader mounted; and BMS 100, 125, and 150 excavator mounted

**Distributor**: Seppi M/Carlson Tractor and Equip. Co.
P.O. Box 69
Rosemount, MN 55068
Phone: (651) 423-2222 or 800-624-4441
Fax: (651) 423-4551
E-mail: carlson@ct-e.com

**Purchase Price**: Contact distributor.

**Status**: In production

**Cutting mechanisms**: Hammers, 20 to 24, depending on model

**Weight**: 1,750 to 3,300 lb, depending on model

**Cutting width**: 3 ft 3 inches to 8 ft 3 inches, depending on model

**Cutting height**: All models 1½ to 12 inches

**Cutting capacity**: Largest Midiforest models can cut and shred whole standing trees up to 9½ inches in diameter. BMS models can cut and shred whole standing trees up to 8 inches in diameter.

**Overall width**: 4 ft 3 inches to 9 ft 3 inches, depending on model

**Hydraulics**: Midiforest models: 6,200 psi, 30 gpm. BMS models: 4,000 psi to 6,000 psi, 25 to 50 gpm

**Recommended prime mover**: Midiforest models require a minimum of 40- to 90-hp, depending on model. They are designed to be mounted on tractors and loaders. BMS models require a minimum of 40- to 60-hp, depending on the model, and are designed to be mounted on excavators. Maximum on both is 120 hp. Double drive available on some models to increase max. to 140 hp.

**Additional models**: Larger models of mulching mowers are available that will fell and chip standing trees up to 18 inches in diameter. These models are in the Forest, Forest-V, and Forest-M series. Contact the manufacturer for additional information.
Shredder

**Alamo**

**Model:** FML 100H, FMH 100H, FML 175, FMH 125H, FML 200, FMM 125H, FMM 200, and FMM 225

**Manufacturer:**
Alamo Industrial
1502 East Walnut Street
Seguin, TX 78155
Phone: (830) 379-1480 or 800-882-5762

**Purchase Price:** Contact manufacturer.

**Status:** In production
**Cutting mechanism:** 14 to 36 knives, depending on model. Horizontal drum shredder with free-swinging knives.
**Cutting width:** 3 ft 2 inches to 7 ft 2 inches, depending on model
**Cutting capacity:** FML series: 6 inches; FMM series: 10 inches; FMH series: 15 inches

**Weight:** 1,127 to 4,162 lb, depending on model
**Hydraulics:** 1,710 to 2500 psi, 20 to 40 gpm
**Recommended prime mover:** Tractor mount using three-point hitch (models with H designation are to be boom mounted). Minimum horsepower required: FML 100H, 35 hp; FML 175, 60 hp; FML 200, 70 hp; FMM 125H, 60 hp; FMM 200, 90 hp; FMM 225, 100 hp; FMH 100H, 70 hp; FMH 125H, 90 hp

**Options:** Mounting kits and boom extensions available.
**Additional models:** Larger loader-mount shredders available, and larger excavator boom-mount shredders.

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**Bull Hog**

**Models:** BH80H (Hydraulic), BH80 (PTO), BH100H (Hydraulic), and BH100 (PTO)

**Manufacturer:**
Fecon, Inc.
10350 Evendale Drive
Cincinnati, OH 45241
Phone: (513) 956-5700 or 800-528-3113
Fax: (513) 956-5701
E-mail: fecon@fuse.net
Web site [http://www.fecon.com](http://www.fecon.com)

**Purchase Price:** Contact manufacturer.

**Status:** In production
**Cutting mechanism:** BH80: 30 fixed hammers on horizontal drum; BH100: 42 fixed hammers on horizontal drum
**Working width:** BH80: 4 ft 8 inches; BH100: 6 ft 3 inches
**Weight:** BH80H and BH80 2,700 lb; BH100H and BH100 3,800 lb

**Hydraulics:** BH80H: 2,500 psi, 61 gpm; BH100H: 2,500 psi, 84 gpm
**Prime mover:** Tractor mounted. BH80 and BH100 are PTO operated. All models require hydraulic connections to the supply and return lines of the trapdoor cylinder and top-link cylinder.

**PTO horsepower required:** BH80: 80 to 100 hp; and BH100: 100 to 140 hp
**PTO speed:** BH80: 540 rpm; and BH100: 1,000 rpm

**Additional models:** Larger models are also available. Some models mount on front-end loaders.
Shredder

Slashbuster

Models: HD 422 and LW 420B featured here. Slashbuster also makes smaller models such as the mini 360.

Manufacturer:
D&M Machine Division, Inc.
12 Monte-Brady Road
Montesano, WA 98563
Phone: (360) 249-3366
Fax: (360) 249-1171
Web site: http://www.slashbuster.com

Purchase Price: HD 422: about $50,000 installed. LW 420B: about $60,060 installed.

Status: In production
Cutting mechanism: Hardened teeth on wheel
Cutting width: HD 422: 46-inch cutting swath; LW 420B: 46-inch cutting swath
Cutting capacity: Both models cut and mulch trees up to 14 inches in diameter.
Weight: HD 422: 2,300 lb total weight. LW 420B: 2,600 lb total weight.

Recommended prime mover: HD 422: 30,000- to 100,000-pound excavators. LW 420B: 30,000- to 60,000-pound excavators.
Options: Optional tilt-mount, 45° either side of center
Additional models: Larger tractor-mount shredders and larger excavator boom-mount shredders available. Contact manufacturer. Mini 360 available on special order.

Brontosaurus shredder/brush-mowing head mounted on a CAT 312.

Shredder

Brontosaurus

Models: Standard 4-ft head, 3-ft head, and 2.5 model

Manufacturer and distributor:
John Brown and Sons, Inc.
14 B&B Lane, Sawyer Industrial Park
Weare, NH 03281
Phone: (603) 529-7974
Fax: (603) 529-7976

Purchase price: Standard 3- and 4-ft heads without auxiliary power pack, $26,500. With power pack, rock guards, and frame-strengthening, $72,500. 2.5 model, $22,500—power pack not available.

Status: In production
Cutting capacity: 3 and 4 ft (steady): 6-inch hardwood, 8-inch softwood; (random): 8-inch hardwood, 10-inch softwood; 2.5 model: 4 to 5 inches

Weight: Standard 4 ft: 4,200 lb; standard 3 ft: 3,600 lb; and 2.5 model: 3,000 lb.
Cutting width: Standard 4 ft: 48 inches; standard 3 ft: 36 inches; 2.5 model: 30 inches.
Hydraulics: Standard 4 ft: 3,500 to 5,000 psi, up to 50 gpm; standard 3 ft: 3,500 to 5,000 psi, up to 50 gpm; 2.5 model: 2,500 to 4,000 psi, 29 gpm.
Recommended prime mover: Designed for tracked or rubber-tired excavators in the 15- to 20-ton class using the auxiliary power pack. Larger excavators (including some 20-ton machines) have sufficient hydraulics to power the head.
Options: Three- and 4-ft models available with optional auxiliary power pack, John Deere 4045T, 117 hp.
Tree Shear

**Models:** 10- and 14-inch land-clearing shears, and 14-inch forestry tree shear

**Manufacturer:**
New Dymax, Inc.
P.O. Box 287, 402 Miller Drive
Warnego, KS 66547
Phone: (785) 456-2081
Fax: (785) 456-8328

**Distributors:** Bobcat, ASV Posi-Track, New Holland, Case, and Gehl

**Purchase Price:** Contact dealer.

**Status:** In production
**Cutting mechanism:** Two steel shear blades
**Maximum tree diameter:** 10 to 14 inches
**Overall width:** 10-inch land-clearing shear: 68 inches. 14-inch land-clearing shear and forestry tree shear: 63 inches
**Weight:** 10-inch land-clearing shear: 720 lb; 14-inch land-clearing shear: 1,310 to 1,420 lb; and 14-inch forestry tree shear: 1,810 lb without accumulator; 1,950 lb with accumulator
**Drive:** Hydraulic
**Hydraulics:** Auxiliary required. 10-inch land-clearing shear: 10 to 18 gpm, 1,700 to 3,000 psi; 14-inch land-clearing shear: 13 gpm, 2,500 to 3,000 psi; 14-inch forestry tree shear: 13 gpm, 2,500 to 3,000 psi
**Recommended prime mover:** Skid steer
**ASV Posi-Track (minimum 40 hp required)**
**Other attachments:** Stacking forks, longwood/lumber grapple forks, buckets, hoe, universal mounting plate, and 20-inch forestry tree shear

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*Tree Shear*

**Agra Axe and L’il Snip**

**Models:** Agra Axe and L’il Snip

**Manufacturer:**
Agra Axe International, Inc.
East Highway 166 Industrial Park
P.O. Box 250
Caney, KS 67333
Phone: 888-394-6598 or (316) 879-5858
Fax: (316) 879-5844
E-mail: ese-intec@terraworld.net

**Purchase Price:** Contact dealer.

**Status:** In production
**Cutting mechanism:** Blades
**Weight:** Agra Axe: 1,120 lb; L’il Snip: 570 lb
**Frame width:** Agra Axe: 66 inches, and L’il Snip: 54 inches
**Frame height:** Agra Axe: 7.5 inches; L’il Snip: 6 inches
**Overall height:** Agra Axe: 26 inches; L’il Snip: 19 inches
**Blade length:** Agra Axe: 21.5 inches; L’il Snip: 18.5 inches
**Blade width:** Agra Axe: 11 inches; L’il Snip: 8 inches
**Cutting capacity:** Agra Axe: 24 inches; L’il Snip: 14 inches
**Recommended prime mover:** Designed to be attached to most skid-steer machines
**Options:** Accumulator
**Additional models:** Mega Axe for shearing 30-inch trees
Tree Shear

**E-Z Shear Delite**

**Model:** Shear Delite

**Manufacturer:**
E-Z Implements, Inc.
3311 NW 166th Street
Jordan, MN 55352
Phone: (612) 492-2867 or 800-278-2531
Fax: (612) 492-7706

**Purchase Price:** $2,995 for tree shear alone, and $3,995 for tree shear with accumulator

**Status:** In production

**Cutting mechanism:** Two hard-tooled steel blades on horizontal shaft, 1/8-inch spacing between blades. Below-ground cutting ability with no damage to blades.

**Weight:** Tree shear, 700 lb; tree shear with grapple, 750 lb

**Maximum cutting diameter:** 8 inches

**Hydraulics:** Free flowing blades, non-hydraulic cutting action. Hydraulics required for accumulator, 2,200 to 2,400 psi.

**Flow:** 8 gpm, for accumulating grapple only.

**Recommended prime mover:** Skid-steer machine with minimum of 37 hp

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Tree Shear

**Big Red Little Mite Tree Cutter**

**Model:** Big Red Little Mite Tree Cutter

**Manufacturer:**
Taylor Machine Works, Inc.
650 North Church Avenue
Louisville, MS 39339-2017
Phone: (662) 773-3421
Fax: (662) 773-9146

**Web Site:** [http://www.taylorbigred.com](http://www.taylorbigred.com)

**Purchase Price:** $6,500

**Status:** In production

**Prime mover:** Designed to be mounted on farm tractors or front-end loaders/skid steers, with a minimum of 50 hp

**Cutting capacity:** 12-inch softwood, 6-inch hardwood

**Note:** For additional information, contact manufacturer directly.
Small Harvesting Head

**Hahn**

**Models:** HSG-140 and HSG-160

**Manufacturer:**
Hahn Machinery, Inc.
P.O. Box 220
Two Harbors, MN 55616
Phone: (780) 532-1850
Fax: (780) 532-3626
E-mail: hahnmach@lakenet.com

**Distributors:** Manufacturer or Posi-Track dealers

**Purchase Price:**
HSG-140: $49,805, and HSG-160: $53,275

**Status:** In production

**Cutting-head mechanism:** Chain saw

**Cutters:**
11 BC 3/4-inch pitch

**Maximum material size:**

**Type drive:** Hydraulic

**Prime mover:** Small excavator, skid-steer loaders, or three-wheel carriers

**Engine power:** Minimum 55 hp required

**Width:**
HSG-140: 38.50 inches; HSG-160: 42.0 inches

**Height:**
HSG-140: 66.5 inches; HSG-160: 66.5 inches

**Weight:**
HSG-140: 1,850 lb; HSG-160: 2,050 lb

**Hydraulic pressure:** 3,300 psi maximum operating pressure

**Flow:** Minimum two pumps delivering total of 34 gpm

**Suggested prime movers:** Small excavators, skid-steer loaders, or three-wheeled carriers with minimum 55 hp

**Note:** This head shown as an example, and more processing heads are available through other manufacturers and distributors. Some heads to review are:

- Keto 2000 series, Single-grip harvester by Hakmet; P.O. Box 248; Vaudreuil-Dorion, Quebec J7V 7J5
  Phone: (514) 455-6101 or 800-361-2288
  Fax: (514) 455-1890
  Web site: [http://www.hakmet.com](http://www.hakmet.com)

- Fabtek Series 2000 13-inch processor head

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Small Harvesting/Feller-Buncher Head

**Davco**

**Models:**
TP 1000 Tree Harvester Head, and QC 1200 Feller-Buncher Head

**Manufacturer:**
Davco Manufacturing, Ltd.
Box 17, Site 1, Rural Route 3
Grande Prairie, AB, Canada T8V 5N3
Phone: (780) 834-2156
Fax: (780) 834-5640
E-mail: hahnmach@lakenet.com

**Distributors:** Manufacturer or Posi-Track dealers

**Purchase Price:**
TP 1000, $42,850; QC 1200, $20,900 (U.S., freight not included)

**Status:** In production

**Cutting mechanism:**
TP 1000: 404 harvester chain; QC 1200: 36-inch, high-speed saw

**Maximum tree diameter:**
TP 1000: 12-inch cutting capacity; QC 1200: 14-inch cutting capacity

**Accumulator:**
QC 1200 has a spring-loaded accumulator arm.

**Weight:**
TP 1000: 1,100 lb; QC 1200: 1,100 lb

**Dimensions:**
TP 1000: 54 inches high, mounting width 49 inches; QC 1200: 57 inches high, 42 inches wide

**Hydraulics:**
TP 1000: 3,450 psi, 30 gpm; QC 1200: 3,450 psi, 30 gpm

**Recommended prime mover:**
Posi-Track HD4500 or Posi-Track HD4520

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Hahn TP 1000 tree harvester.

Davco TP 1000 tree harvester.

Hahn harvesting head mounted on an excavator.


Appendix C—Attachments and Implements

Tractor Grapples/Grapple With Winch

**ImpelMax**

**Models:** 6042R, 4836R, FG60, FG48, 6042Rw, 4836Rw, FG60w, FG48w, 4836L, and 4836Lw

**Manufacturer:** ImpelMax Equipment Company, Inc.
P. O. Box 549
Bozeman, MT 59771-0549
Phone: (406) 587-2662
Fax: (406) 587-2808

**Purchase Price:** 6042R, $6,632; 4836R, $5,611; FG60, $4,932; FG48, $4,185; 6042Rw (9,000 lb), $8,518; 6042Rw (12,000 lb), $9,505; 4836Rw, $7,421; FG60w (9,000 lb), $6,942; FG60w (12,000 lb), $7,189; FG48w, $6,180; 4836Lw, $5,870; and 4836Lw, $7,643

**Status:** In production

**Grapple type:** 6042R/FG60: Category II 3-pt-hitch tractor grapple; 4836R/FG48: Category I 3-pt-hitch tractor grapple; 6042Rw/FG48w: Category I 3-pt-hitch tractor grapple/winches; 4836L: Loader-arm grapple; 4836Lw: Loader-arm grapple/winches

**Grapple capacity:** 6042R/FG60/6042Rw/FG50w: 9.0-sq-ft enclosure area, 60-inch maximum opening width, 42-inch maximum opening height. 4836R/4836L/FG60w/FG48Lw: 6.94-sq-ft enclosure area, 48-inch maximum opening width, 36-inch maximum opening height

**Grapple weight:** 6042R: 940 lb; 4836R: 604 lb; FG60: 750 lb; FG48: 615 lb; 6042Rw: 1,118 lb; 4836Rw: 740 lb; FG60w: 850 lb; FG48w: 715 lb; 4836L: 640 lb; 4836Lw: 800 lb

**Winch type:** 6042Rw: 12,000-lb winch built into boom, 10-inch drum, up to 185 ft of 3/8-inch cable, with reel speed 48 fpm at 15 gpm; 4836Rw/4836Lw: 9,000-lb winch built into boom, 8-inch drum, up to 148 ft of 3/8-inch cable, with reel speed 72 fpm at 15 gpm; FG48w/FG60w: 9,000-lb winch built into boom, 10-inch drum, up to 104 ft of 3/8-inch cable, with reel speed 72 fpm at 15 gpm; FG60w: 12,000-lb winch built into boom, 8-inch drum, up to 185 ft of 3/8-inch cable, with reel speed 48 fpm at 15 gpm.

**Hydraulics:** 4836R/6042R/4836L/FG48: 3,000 psi, unlimited gpm; 4836Rw/6042Rw/4836Lw/FG60w: 3,000 psi, 15 to 24 gpm

**Recommended prime mover:** 6042R designed for 55-hp tractors; 6042Rw designed for 55- to 110-hp tractors; 4836R/4836Rw designed for 30- to 55-hp tractors; FG48/FG48w/FG60/FG60w designed for tractors over 30 hp; 4836L/4836Lw designed for skid steer or front-end loader with minimum 1,500-lb lift capacity.

**Other attachments:** Custom attachment brackets for special applications

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Tractor Grapple

**Little Red Logger**

**Models:** Little Red Logger

**Manufacturer:**
Taylor Machine Works
650 North Church Avenue
Louisville, MS 39339-2017
Phone: (601) 773-3421
Fax: (601) 773-9148
Web site: [http://www.taylorbigred.com](http://www.taylorbigred.com)

**Purchase Price:** $5,500

**Status:** In production

**Prime mover:** 50- to 80-hp tractors with a three-point hitch

**Length:** 40 inches

**Weight:** 750 lb

**Grapple fully opened:** 35 inches

**Grapple fully closed:** 3.5 inches

**Grapple rotation:** 85° either direction

**Hydraulic requirements:** One hydraulic function on tractor and two quick-disconnect hydraulic outlets
Appendix C—Attachments and Implements

**Scarification Rake**

**FERIC**

**Manufacturer:**
Forest Engineering Research Institute of Canada
580 Boulevard Saint-Jean
Pointe-Claire, PQ Canada H9R 3J9
Phone: (514) 694-1140
Fax: (514) 694-4351
E-mail: admin@mtl.feric.ca

**Purchase Price:** $2,500 (Canadian)

**Status:** Prototype, special order only
**Scarification mechanism:** Three-prong rake with bucket tooth tips. Wings for subsoil ripping. Moldboard side attachments. Kickback tines for pushing away logging debris.

**Width:** 70 cm
**Weight:** No information from manufacturer
**Hydraulics:** Implement not powered
**Suggested prime mover:** Mini-excavator (such as the Kubota 101)

**Scarification Head**

**VH Mulching Head**

**Models:** VH Mulcher (spot site-preparation attachment)

**Manufacturer:**
West-Northwest Forestry, Ltd.
370 Armour Place
Kamloops, BC, Canada V2H 1L2
Phone: (250) 578-6966
Fax: (250) 578-6967
Web site: [http://www.vhmulcher.com](http://www.vhmulcher.com)

**Purchase Price:** $30,000 (U.S.)

**Status:** In production
**Scarification/mulching mechanism:** Circular tool plate with nine cutting bits and blocks.
**Scarification diameter:** 41 inches
**Scarification depth:** 18 to 36 inches

**Height:** 4 ft
**Weight:** 3,200 lb
**Hydraulics:** 3,200 to 3,400 psi, 50 gpm
**Recommended prime mover:** Can be mounted on most 15- to 20-ton excavator-type machines.
Spot Site Preparation Tool

**Hawk Power Scalper**

**Manufacturer:**
Hawk Forest Enterprises
1667 Rebman Crescent
Prince George, BC Canada V2L 429
Phone: (250) 563-0727
Fax: (250) 563-6087

**Modification Developed By:**
USDA Forest Service
Missoula Technology & Development Center
Building 1, Fort Missoula
Missoula, MT 59804-7294
Phone: (406) 329-3900
Fax: (406) 329-3719

**Purchase Price:** Contact manufacturer for basic tool. MTDC highly recommends its modification (see below for information).

**Status:** In production

**Cutting mechanism:** OEM head uses four tines attached to a metal hub. MTDC advises not using OEM heads and has developed an alternative head to reduce the chance of head failure. Contact MTDC for information and engineering drawings. Documents: *Hawk Power Scalper* (9824-2336-MTDC), and *Hawk Scarifier* (9624-2842-MTDC), Drawing Number: MTDC-937

**Weight:** About 27 3/4 lb with modifications mounted on a Stihl 044 chain saw

**Bar length:** 24 inches

**Cutting width:** Teeth contacting the ground is about 1/2 inch. Tool is used in a sweeping motion to make a swath of any size.

**Cutting capacity:** MTDC recommends about 1 1/2-inch-diameter stems. Larger stems and rotten logs can be gradually chewed away.

**Cutting head rotation speed:** About 8,500 rpm

**Recommended power head:** Stihl 044 chain saw
Appendix D—Setting Priorities for Tasks Identified by the Small-Area-Forestry Equipment Survey

Numerical Ranking of Categories and Individual Tasks

Analysis approach. Every Region was given one full vote for each category and each individual task. If a Region submitted multiple votes, the votes were weighted appropriately (five responses from the same Region would be given 0.2 votes each). Votes placed in the high-priority box were multiplied by 5, votes in the medium-priority box were multiplied by 3, and votes placed in the low-priority box were multiplied by 0. The total points for each item in the Category section were compared to establish the relative significance of each category (thinning’s relative significance to planting, for instance). The total points for each item in the Individual Task section were multiplied by the relative significance factor (depending on the category they belonged to). The final numerical value was used to rank the need Servicewide for each development effort.

Regions 2, 6, 9, and 10 returned one response each. Regions 1 and 3 each returned two responses, Regions 4 and 5 each returned five responses, and Region 8 did not return a form.

<table>
<thead>
<tr>
<th>Category</th>
<th>Points1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thinning</td>
<td>35.2</td>
</tr>
<tr>
<td>Brush slash disposal</td>
<td>30.7</td>
</tr>
<tr>
<td>Site preparation for planting</td>
<td>19.7</td>
</tr>
<tr>
<td>Site prep for natural regeneration</td>
<td>15.1</td>
</tr>
<tr>
<td>Planting</td>
<td>14.2</td>
</tr>
</tbody>
</table>

1 Also used as relative significance factor [rsf].

<table>
<thead>
<tr>
<th>Final Ranking2</th>
<th>Individual Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1003.89</td>
<td>Equipment with ability to extract small wood products (firewood, posts and poles, small sawlogs, fiber) at low cost, with low site damage, in conjunction with thinning or brush disposal. (0 to 60%, $10,000)</td>
</tr>
<tr>
<td>862.67</td>
<td>Figure out something to do with biomass residue.</td>
</tr>
<tr>
<td>781.44</td>
<td>Small version of feller-buncher/forwarder to facilitate removal of thinning slash/fiber.</td>
</tr>
<tr>
<td>752.15</td>
<td>Portable chipper/shredder that can be pulled by ATV.</td>
</tr>
<tr>
<td>742.72</td>
<td>Mechanized thinning equipment capable of safe operation on 65% slope.</td>
</tr>
<tr>
<td>736.80</td>
<td>Small, lightweight equipment with ability to work on steep slopes and close to residual trees without damaging them (no root damage, minimal soil disturbance).</td>
</tr>
<tr>
<td>715.31</td>
<td>Small masticating, grinding, or chipping system to reduce fuel loading after unit is harvested.</td>
</tr>
<tr>
<td>715.31</td>
<td>Expand idea of skidding with ATVs. Comparison of ATVs for cost of operation.</td>
</tr>
<tr>
<td>675.40</td>
<td>Smaller machine that could operate within 12- to 15-foot tree spacing and not exceed 10 to 12 feet in height. Equipment that works with arm should have multiple attachments (bucket, grapple, rotary head).</td>
</tr>
<tr>
<td>630.08</td>
<td>Thinning of numerous seedlings without the use of heavy equipment.</td>
</tr>
<tr>
<td>601.72</td>
<td>Ground-based cable systems to harvest or perhaps remove residue (i.e., precommercial thinning slash) from unit economically and do something with it.</td>
</tr>
<tr>
<td>580.80</td>
<td>Motorized hand-held equipment for thinning on steep slopes.</td>
</tr>
<tr>
<td>574.09</td>
<td>Portable chipper/shredder that can be pulled behind crawler-type tractor on steeper slopes. Engine must be designed to operate in a tilted position so that oil flows to all parts.</td>
</tr>
<tr>
<td>561.81</td>
<td>Develop a grapple for ATV.</td>
</tr>
<tr>
<td>549.53</td>
<td>Equipment that is less than 12-ft wide to be transported on roads. Should be able to reach 25 feet (to minimize tracked area) and be capable of picking up partially rotten logs 18 inches in diameter on small end and returning them to the cut-over area from cull decks and slash piles.</td>
</tr>
</tbody>
</table>
## Final Ranking[^2] Individual Task

<table>
<thead>
<tr>
<th>Rank</th>
<th>Task Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>439.01</td>
<td>Design excavator bucket that allows soils to fall through easier.</td>
</tr>
<tr>
<td>436.48</td>
<td>Remote-controlled, cable-stabilized mechanical thinner for steep slopes.</td>
</tr>
<tr>
<td>417.64</td>
<td>Application methods and equipment for chemical site preparation</td>
</tr>
<tr>
<td>408.32</td>
<td>A more economical Slashbuster head for use with low ground-pressure prime mover.</td>
</tr>
<tr>
<td>359.19</td>
<td>Look for track material that may prevent fires or slippage on rocks.</td>
</tr>
<tr>
<td>309.76</td>
<td>Come up with an improved bowbar for thinning that is lightweight and safe.</td>
</tr>
<tr>
<td>299.15</td>
<td>Subsoiler to help alleviate soil compaction.</td>
</tr>
<tr>
<td>294.72</td>
<td>Remote-controlled cable-stabilized equipment capable of working on steep slopes</td>
</tr>
<tr>
<td>289.59</td>
<td>Develop implement to be used in conjunction with ATV. Must be able to yard logs 10-feet long and 10 inches in diameter. A head with attachments that could masticate, grapple pile, or chip with the flick of a lever.</td>
</tr>
<tr>
<td>282.10</td>
<td>Less expensive and more versatile modification of Salmon blade to work in shallow soils. Possible replacement of wear tips on brush blade with a curved blade to provide tilling action similar to Salmon blade.</td>
</tr>
<tr>
<td>260.04</td>
<td>Remote controlled, cable-stabilized scalper for steep slopes.</td>
</tr>
<tr>
<td>249.55</td>
<td>Need equipment to do site preparation on steep slopes, 35 percent or steeper, especially on pinegrass sites.</td>
</tr>
<tr>
<td>249.05</td>
<td>Power increment borer.</td>
</tr>
<tr>
<td>232.32</td>
<td>Propane torch equipment to burn small trees.</td>
</tr>
<tr>
<td>223.20</td>
<td>Small machine that is light on the land, low ground base, with extension arm for reaching 25 feet.</td>
</tr>
<tr>
<td>183.04</td>
<td>Product report on industrial/continuous-use brush-cutting saws.</td>
</tr>
<tr>
<td>165.78</td>
<td>A shield (or dangling chains) for Slashbuster that would deflect material.</td>
</tr>
<tr>
<td>124.96</td>
<td>Alternative auger power heads for planting (such as gas-powered hand drills, cordless drills).</td>
</tr>
<tr>
<td>116.44</td>
<td>Need improved muffler system on auger power heads.</td>
</tr>
<tr>
<td>110.52</td>
<td>Operator’s manual for safe use of Lipke Arch.</td>
</tr>
<tr>
<td>95.04</td>
<td>Improved mechanized equipment to thin junipers.</td>
</tr>
<tr>
<td>88.35</td>
<td>A narrow version of the Rangeland or Towner Disk. A disk width of 10 to 12 feet, or one that has variable width.</td>
</tr>
<tr>
<td>85.96</td>
<td>Tilt meter in cab.</td>
</tr>
<tr>
<td>52.80</td>
<td>Cryogenic equipment to freeze small trees.</td>
</tr>
<tr>
<td>24.80</td>
<td>Teflon or rubber grousers.</td>
</tr>
<tr>
<td>18.42</td>
<td>Improved ignition source for Terra Torch.</td>
</tr>
</tbody>
</table>

[^2]: The formula used to arrive at these final rankings: \( rsf \times \left( \frac{\text{number of points for high priority} \times 5}{} + \frac{\text{number of points for medium priority} \times 3}{} + \frac{\text{number of points for low priority} \times 0}{\text{Total Points}} \right) \).
**Responses To “Most Significant Equipment Need” Question**

**Northern Region (R-1)**

“Current harvesting techniques in this area are primarily feller-bunchers and grapple skidders. This results in nearly all tops being skidded to landings, with subsequent loss of nutrients and seed in serotinous cones. We don’t need or want to keep all tops onsite, but would like to have equipment that can safely and economically sever and retain 25 to 35 percent of the tops. Current techniques are hand sawing some of the tops and hoping they fall out of the drag or taking all tops to a landing and then bringing some of them back. The first causes safety concerns and is not very effective. The second involves additional soil impact by traveling twice over the same ground with loaded equipment. This problem is more of a concern on large rather than small units.” —Alfred Gilbert

**Southwestern Region (R-3)**

“Tracking them on the ground and in a data base.” —Jim Dick

**Eastern Region (R-9)**

“Spot-planting machine that can be transported on small trailer instead of a lowboy. This equipment should have the features of a commercially available 4- or 6-wheel ATV, but be bigger with heavy-duty components.

Equipment suitable for air blast herbicide treatment on steep or rocky slopes (>35%).

Low ground pressure feller bunchers and skidders. A small, powered clipper operated from a standing position to clip undesirable competition (birch, striped maple, and beech) overtopping desirable tree seedlings.” —Monty Maldonado

**Alaska Region (R-10)**

“About 95% of Region 10’s reforestation is natural regeneration without site preparation. Most planting is done by hand. Existing equipment meets our needs.” —Richard Zaborske

**Other Suggested Development Projects**

**Thinning**

Small-scale spot scalper that does not cause unnecessary soil disturbance. —Monty Maldonado

**Site Preparation for Natural Regeneration**

Mechanized herbicide application on steep slopes (35%). —Monty Maldonado
About the Authors

Keith Windell is Project Leader for reforestation, fire, and residues projects. He has a bachelor’s of science degree in mechanical engineering from Montana State University, and has an extensive field background. He has worked for the California Department of Forestry and the Bureau of Land Management.

Bob Beckley received a bachelor’s degree in political science from the University of Montana in 1982. He began his Forest Service career as a forest technician on the Nez Perce National Forest. Bob was a smokejumper when he came to the Missoula Technology and Development Center in 1990 to work as a videographer, photographer, and project assistant/project leader.

Describes equipment that can be used in small-area forestry operations, defined here as operations on areas 10 acres or smaller. The traits that were considered desirable for small-area forestry equipment were high maneuverability, ability to work in tight spaces, ready availability, reliability, and the ability to work lightly on the land. Appendixes contain listings of machinery and attachments that can be used for small-area forestry operations as well as the addresses of manufacturers.

Keywords: attachments, dozers, excavators, feller-bunchers, grapples, mowers, yarders