Equipment Suitable for Steeper Slopes

Some specialized machines are designed for slopes up to 100% and even steeper. When machines with no self-leveling characteristics are used on steep slopes, the operator sits at a slanted attitude. The slanted attachment, depending on its rotational or swing capabilities, may or may not be in the correct attitude for optimum cutting. Slope specifications for machines covered in this section are included in the technical specifications for each piece of equipment.

In Site Preparation Equipment for Steep Slopes (9324-2804-MTDC), Dick Karsky notes that:

"On steep slopes where equipment cannot operate, preparing the site by hand with hand tools is always an option. The option may be the only one available on some sites, but it is very expensive and time consuming."

Self-Leveling Cab Feller-Bunchers

Concept—The cab-tilting ability of self-leveling cab feller-bunchers allows the cutting head to be kept at an efficient cutting angle for the material when the feller-bunchers are working on steep slopes. Self-leveling cab feller-bunchers are also more comfortable and efficient for the operator. The power of the machines allows them to run many heads, including brush heads designed for excavators.

Comments—The feller-buncher's reach using its turret and boom means fewer passes across the ground, resulting in less soil disturbance. The tilt function keeps the machine and operator more stable on steep slopes.

If non-leveling cab feller-bunchers are already onsite from a commercial harvest operation, it may be efficient to use them. They have plenty of power to run implements and are able to work on moderately steep slopes. The larger feller-bunchers would not be appropriate for a fuel reduction job with a Slashbuster-type head because of the added cost of the machine and possible increased residual stand damage in tight quarters (non-zero tail swing).

On the other hand, tracked, non-self-leveling cab feller-bunchers with zero tail swing would also be appropriate for thinning. Although not covered in this catalog, the Valmet T-500 (Partek Forest, Inc.) may be a useful piece of equipment for some applications. While it is technically not a feller-buncher, it is similar to a Timbco feller-buncher with a squirt boom and processor head.

Allied Systems Co.'s ATH 28 Tree Harvester could also be considered a self-leveling feller-buncher. See Extreme Machines for technical data.

Other Manufacturers or Sources—Self-leveling cab feller-bunchers are much less common than their non-tilting counterparts. Check your local feller-buncher dealers and see the Canadian Forest Industries annual steep slope issue, or the Timber West or Timber Harvesting annual buyer's guides for additional information on logging-related equipment (see Appendix B for details).

Other unconfirmed sources of tilting cab feller-bunchers listed in Timber West 1999/2000 Buyer's Guide & Directory include:

- Madill, Inc.
- Risley Equipment, Ltd.
- Tigercat Industries, Inc.

Self-Leveling Cab Feller-Bunchers

Self-Leveling Track Boom Feller-Buncher

Prentice Track Boom Feller-Bunchers

Prentice Track Boom 730A (620 shown at left).

Make/Model	Prentice Track Boom Feller-Bunchers: 620; 720; 630A; 730A
Manufacturer/Source	Blount, Inc.
Distributor	Contact manufacturer for dealer information
Price	Contact dealer
Status	In production
Prime Mover	620, 720, 630A, 730A Track Boom Feller-Bunchers are prime movers
Prime Mover Engine Power	620: 215/250/260 hp; 720: 250/260 hp; 630A and 730A: 260 hp
Gas/Diesel	Diesel
Transmission	Hydrostatic
Max. Travel Speed	620 and 720: Low, 1.25 mph; High, 3.25 mph. 630A: Low, 1.14 mph; High, 2.91 mph. 730A: Low, 1.11 mph; High, 2.84 mph
Width	620: 119 in; 720: 125.5 in; 630A: 136 in; 730A: 139 in
Length	620: 181.73 in; 720: 184.59 in (without heads); 630A: 181 in; 730A: 184 in
Height	620: 144.66 in; 720: 148.27 in; 630A: 160 in; 730A: 161 in
Weight	620: 58,100 lb, 720: 67,000 lb; 630A: 70,000 lb; 730A: 76,000 lb
Ground Clearance	620: 28.03 in; 720: 31.6 in; 630A: 28 in; 730A: 32 in
Turning Radius	Data not supplied
Tail Swing	620, 720: 0; 630A, 730A: back, 25 in; side, 45 in; tracks, 24 in
Slope Limitations and Specified Conditions	Turntable level: 620, 720 to 51%; 630A, 730A to 27%
Mount (lift arms/booms/3-point/other)	Boom
Power Source	620, 720 CLT harvester plumbing is 35 to 125 gpm, up to 4,000 psi; 630A, 730A power-flow hydraulics is 1 x 32 gpm; 3,500 psi
Boom Type and Reach	620, 720: 23 ft; 630A, 730A: 23 ft 6 in
Track: Type, Width (options); and Gpsi	(Steel) 620: 5.19 to 7.70 psi with tracks 24 to 36 in; 720: 7.05 to 7.56 psi with tracks 24 to 36 in; 630A, 730A: 24- to 30-in pad options with gpsi from 10 to 6.74 psi depending upon model and configuration
Attachments or Integral Heads (type/model)	Contact manufacturer for discussion
Attachment Usable by this Machine	Felling head adapters available for O.E.M. approved felling heads
Special Uses/Adaptations/Other Uses	4-way leveling; some models also available without leveling capabilities
Manufacturer's Comments Regarding Equipment Application	Data not supplied

Self-Leveling Cab Feller-Bunchers

Hydro-Buncher

Timbco T-400-D Series Self-Leveling Hydro-Bunchers

Make/Model	Timbco T-400-D Series Self-Leveling Hydro-Bunchers: T425-D; T445-D; T450-D; T455-D
Manufacturer/Source	Timbco Hydraulics Inc.
Distributor	Contact manufacturer for dealer information
Price	Contact dealer
Status	In production
Prime Mover	T-400-D Series Self-leveling Hydro Bunchers are prime movers
Prime Mover Engine Power	Custom matched to requirements: 200 to 250 hp
Gas/Diesel	Diesel
Transmission	Dual hydrostatic
Max. Travel Speed	T425-D: 3.5 mph; T445-D: 3.3 mph; T450-D: 3.2 mph; T455-D: 3.0 mph
Width	T425-D: 9 ft 8 in to 10 ft 8 in; T445-D, T450-D, T455-D: 10 ft 4 in to 11 ft 4 in
Length	Overall track length: T425-D: 14 ft 4 in; T445-D, T450-D: 15 ft 4 in; T455-D: 15 ft 2 in
Height	T425-D: 12 ft 2 in; T445-D: 12 ft 5 in; T450-D: 12 ft 6 in; T455-D: 12 ft 7 in
Weight	T425-D: 52,535 lb; T445-D: 56,675 lb; T450-D: 56,075 lb; T455-D: 59,275 lb
Ground Clearance	T425-D: 27 in; T445-D: 30 in; T450-D: 31 in; T455-D: 32 in
Turning Radius	Data not supplied
Tail Swing	Zero over track, rear
Slope Limitations and Specified Conditions	Cab levels 27 degrees (51% slope) forward; 7 degrees (12% slope) rear and 20 degrees (36% slope) to each side
Mount (lift arm/booms/3-point/other)	Boom
Power Source	Implement pump: 75 gpm; relief pressures (implement): 3,800 psi
Boom Type and Reach	Patented boom geometry; standard reach of 21 ft 5 in to attachment pin; max. available reach of 30 ft 11 in to attachment pin.
Track: Type, Width (options); and Gpsi	Steel. Pressure ranges: T425-D, 7.41 to 5.20 psi; T445-D, 7.66 to 5.39 psi; T450-D, 6.46 to 5.25 psi; T455-D, 6.40 to 5.49 psi
Attachments or Integral Heads (type/model)	Contact manufacturer
Attachment Usable by this Machine	Has interchangeable boom configurations for close cut and power sticks, telescopic sticks for dangle-mount, CLT-brand attachments
Special Uses/Adaptations/Other Uses	Slopes
Manufacturer's Comments Regarding Equipment Application	Data not supplied

Self-Leveling Cab Feller-Bunchers

Level-Swing Feller-Buncher

Timberjack 608L Leveling Feller-Buncher

Make/Model	Timberjack 608L Leveling Feller-Buncher
Manufacturer/Source	Timberjack, Inc.
Distributor	Contact manufacturer for dealer information
Price	Contact dealer
Status	In production
Prime Mover	608L is a prime mover (D6D-sized track and tractor-type rollers)
Prime Mover Engine Power	230-hp Cummins 6CTA8.3
Gas/Diesel	Diesel
Transmission	Data not supplied
Max. Travel Speed	High: infinitely variable to 2.5 mph; Low: 1.1 mph
Width	120 in over 24-in tracks
Length	174 in less booms
Height	150 in
Weight	59,150 lb including S547 felling, standard equipment, half-tank of fuel, and all fluids
Ground Clearnace	30 in
Tail Swing	12 in over side (24-in tracks)
Slope Limitations and Specified Conditions	Cab levels to 27 degrees (51% slope) forward; 10 degrees (18% slope) rear; and 20 degrees (36% slope) to each side
Mount (lift arms/booms/3-point/other)	Boom
Power Source for Attachments	Designed for Timberjack high-speed disk felling heads; contact Timberjack for other applications.
Boom Performance	Max. cut radius: 23 ft 3 in; min. cut radius: 12 ft 7 in. Net cut capacity at max reach, 3,366 lb
Track: Type, Width (options); and Gpsi	24-in single grouser (std): 8.1 psi; 28-in single grouser (opt): 7.2 psi (all pressures measured with S547 felling head)
Attachments (type/model)	Timberjack S547 high-speed disc-saw felling head with accumulator and +/- 15-degree wrist (weighs 5,510 lb)
Price, If Not Included With Prime Mover	Contact distributor
Maximum Treatable Material Size	22 in
Attachments Usable by this Machine	Disc-saw felling head, dangle-mounting processing head. Contact Timberjack before using other attachments to ensure use will not void machine warranty.
Special Uses/Adaptations/Other Uses	Slopes; leveling system shifts upper structure 36 inches ahead over track frame while tilting forward
Manufacturer's Comments Regarding Equipment Application	Can do full tree or cut to length

Extreme Machines

Concept—Some landscapes have small pockets of terrain that are difficult to access. These highly specialized machines may prove effective in such cases. They have even been used to perform work in stream beds. For the purpose of this report, extreme machines are those capable of working on slopes much steeper than 50%.

Comments—The high cost and relative rarity of extreme machines may be a deterrent to their use on all but the most exceptional sites (such as the forest/urban interface).

Other Manufacturers or Sources—Due to the specificity of their design, the extreme machines are not commonly available.

See the Canadian Forest Industries annual steep-slope issue, or the Timber West or Timber Harvesting annual buyer's guides for additional information on logging-related equipment (see Appendix B for details).

Extreme Machines

Tree Harvester

ATH 28 Tree Harvester

Make/Model	ATH 28 Tree Harvester
Manufacturer/Source	Allied Systems Co.
Distributor	Allied Systems Co.
Price	$625,000 (head included)
Status	In production
Prime Mover	ATH 28 is a prime mover
Prime Mover Engine Power	210 hp
Gas/Diesel	Diesel
Transmission	Hydrostatic
Max. Travel Speed	1.9 mph
Width	13 ft
Length	22 ft 4 in
Height	17 ft (can be lowered for transit)
Weight	94,700 lb
Ground Clearance	30 in
Turning Radius	Can turn in its own length by pogoing with boom and sawhead
Tail Swing	104 in
Slope Limitations and Specified Conditions	Designed to operate at 70% slope; best efficiency is around 50% slope
Attachment Mount (lift arms/boom/3-point/other)	Boom
Attachment Power Source	166 gpm; 4,800 psi
Boom Type and Reach	Welded, fabricated box boom construction; 28 ft
Track: Type, Width (options); and Gpsi	Steel track, clipped and mud relieved; 24 in; length on ground = 70 in; ground contact pressure = 14 psi
Cutting Head	Rotosaw 2600 (special design for ATH 28)
Special Uses/Adaptations/Other Uses	Extreme slopes
Manufacturer's Comments Regarding Equipment Application	Purpose built, steep-slope feller-buncher with self-leveling upper works

Extreme Machines

Walking Excavators

Kaiser S2 Spyder All-Terrain Walking Excavator

Make/Model	Kaiser All Terrain Walking Excavator: S2 Spyder, 4 x 4 (three models)
Manufacturer/Source	Kemp West, Inc.
Distributor	Kemp West, Inc.
Price	$160,000 to 215,000
Status	In production
Prime Mover	S2 is a prime mover
Prime Mover Engine Power	122 hp
Gas/Diesel	Diesel
Transmission	Hydrostatic 2 speed
Max. Travel Speed	6.2 mph
Width	8.86 ft to 14.93 ft
Length	20.01 ft
Height	8.37 ft
Weigh	19,420 lb
Ground Clearance	6.68-ft maximum, 1 ft while traveling
Turning Radius	Minimal
Tail Swing	0
Slope Limitations and Specified Conditions	All terrain, works safely at 50% slope; also travels in water
Attachment Mount (lift arms/boom/3-point/other)	Boom
Attachment Power Source	47.5 gpm, 3,625 psi
Boom Type and Reach	Extenda-boom, 27 ft
Tires: Size and Gpsi	(Drive tires) 1300 x 530-533; steer tires 36 x 11; ground pressure approx. 6.8 psi
Cutting Head	KDX Mulcher (See Extreme Machine Attachments section)
Attachments Usable by this Machine	Mulcher, tree harvester, digging bucket, grapple bucket, stump grinder, flail mower, ripper tooth, gravel suction unit, drill rig, boom rotator, hammer
Special Uses/Adaptations/Other Uses	Extreme slopes
Manufacturer's Comments Regarding Equipment Application	Data not supplied

Extreme Machines

Walking Excavators

Menzi Muck A71 Mobile All-Terrain Excavator

Make/Model	Menzi Muck All Terrain Excavator: A71 Mobile
Manufacturer/Source	Menzi USA Sales, Inc.—Menzi Muck AG
Distributor	Menzi USA Sales, Inc.
Price	Models A21, A51, A71; A71 Mobile: $60,000 to $200,000
Status	In production
Prime Mover	A71 Mobile is a prime mover
Prime Mover Engine Power	A71 Mobile, 114-hp Perkins engine
Gas/Diesel	Diesel
Transmission	Hydrostatic
Max. Travel Speed	5 mph
Width	Adjustable
Length	Adjustable
Height	Adjustable
Weight	18,000 to 19,000 lb
Ground Clearance	Adjustable
Turning Radius	Turns on own axis
Tail Swing	4 ft 1 in
Slope Limitations and Specified Conditions	Up/downslope: 100%; across slope: 70%
Attachment Mount (lift arms/boom/3-point/other)	Boom
Attachment Power Source	31 gpm, adjustable psi
Boom Type and Reach	Telescoping; 26 ft 6 in
Tires: Size and Gpsi	20 x 20 flotation; approximately 3-6 psi (depending upon attachments)
Cutting Head	Menzi heavy-duty flail (See Extreme Machine Attachments section)
Attachments Usable by this Machine	Buckets, mowers, brush-cutters, timber handling, grapples, hydraulic hammers
Special Uses/Adaptations/Other Uses	Extreme slopes; has claws/pads
Manufacturer's Comments Regarding Equipment Application	Ditch cleaning, ditch mowing, swamp work, bridge areas, construction, canal and lake maintenance, extreme slope construction, adverse conditions
MTDC Comment	A21 and A51 are very small machines and may be too underpowered to run large brush-cutting heads.

Extreme Machines

Walking Excavators

Schaeff Walking Excavators

Make/Model	Schaeff Walking Excavator: HS41 M ; HS41 MM
Manufacturer/Source	Schaeff of North America, Inc.
Distributor	Contact Schaeff of North America, Inc.
Price	Contact manufacturer
Status	In production
Prime Mover	HS41 M; HS41 MM are prime movers
Prime Mover Engine Power	80 hp
Gas/Diesel	Diesel
Transmission	Hydrostatic
Max. Travel Speed	HS41 M: Low, 1.5 mph; high, 3.7 mph. HS41 MM; Low, 1 mph; high, 3 mph
Width	82 in
Length	268 in
Height	157 in
Weight	19,380 lb
Ground Clearance	14 in when in travel position
Turning Radius	Inside is 157 in; outside is 237 in
Tail Swing	0
Slope Limitations and Specified Conditions	Across hillside/slope: 70%; up and downhill slope: 100%; travels in water up to 6 ft
Attachment Mount (lift arms/boom/3-point/other)	Boom
Attachment Power Source	60 gpm, 3,625 psi
Boom Type and Reach	Two-piece with extender hoe; 272 in
Tires: Size and Gpsi	HS41 M: 20 x 20 front; 7.50 x 15 rear; HS41 MM: 4 x 20 x 20
Cutting Head	Uses: mowers by Pro Mac Manufacturing, Ltd.; saw heads/shears by Esco, Corp. or Denharco, Inc. (See Brush-Cutting, Thinning, Shredding, and Crushing Attachments section)
Attachments Usable by this Machine	Variety of buckets (including ditch cleaning with or without rotator), mowing attachments, brush-cutters, sawheads and shears; in general will take most excavator attachments if they meet weight and flow requirements; Schaeff makes several sizes of mobile walking excavators
Special Uses/Adaptations/Other Uses	Extreme slopes
Manufacturer's Comments Regarding Equipment Application	Forest clearing work, cleaning work around lakes and waterways; construction; demolition

Extreme Machine Attachments

Concept—This section includes brush-cutting heads that are designed specifically for extreme machines. They can also be used by other excavator-type carriers with appropriate specifications.

Comments—Most extreme machines are also capable of using excavator-type grapples. The KDX mulcher head, while listed as an extreme machine attachment, has been used successfully on excavators.

Other Manufacturers or Sources—Extreme machines can often use standard attachments with compatible hydraulic and other requirements. Refer to the other attachment sections in this catalog for other possible extreme-machine attachments and check with manufacturers for details.

Also see the Equipment Today annual attachment issue, or the Timber West or Timber Harvesting annual buyer's guides for additional information on logging-related equipment (see Appendix B for details).

Extreme Machine Attachments

Disc Saw, Vertical Shaft, Boom Mounted

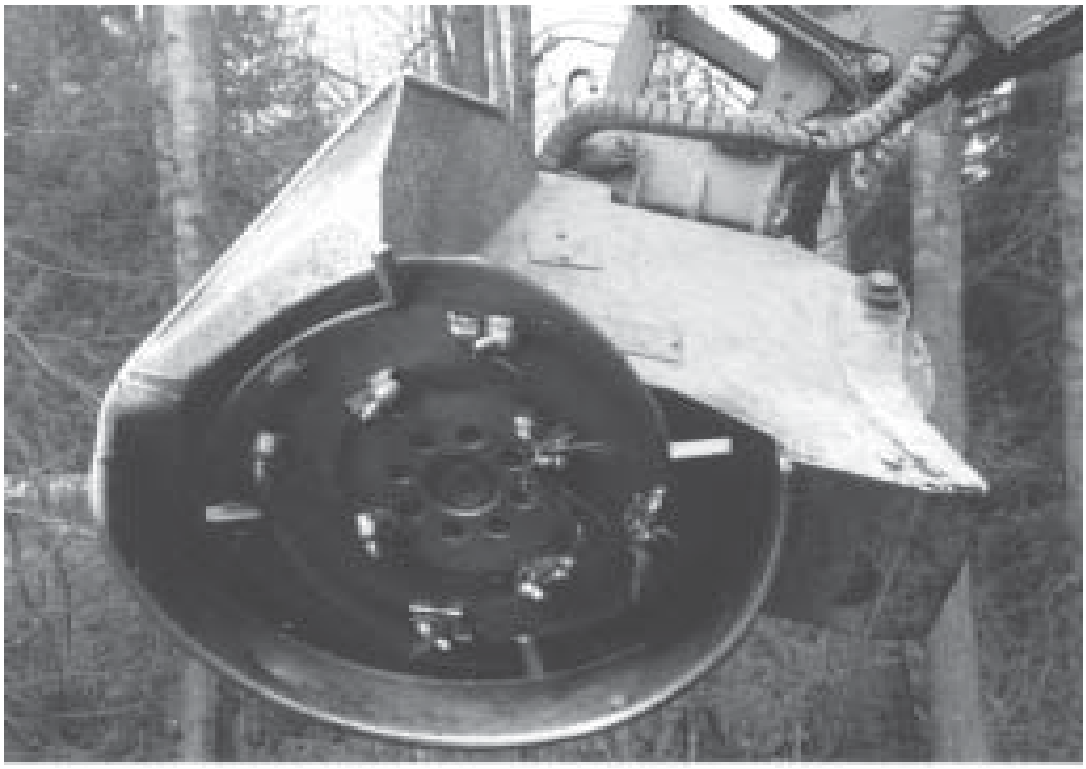
Risley Rotosaw 2600 ATH Harvester Head

Make/Model	Risley Rotosaw 2600: ATH Harvester Head
Manufacturer/Source	Risley
Distributor	Allied Systems Co.
Price	Included in price of prime mover
Status	In production
Preferred Prime Mover	ATH 28
Other Suitable Prime Movers	Excavator-type feller-bunchers
Attachment Mount (lift arms/boom/3-point/other)	Bucket link at end of boom
Maximum Treatable Material Size	28 in
Cutting Mechanism	Disc saw with insert-type teeth
Width of Cut	Up to 28 in
Width of Head	58 in
Weight	8,600 lb
Shaft (horizontal/vertical)	Vertical
Rotation Speed	150 rpm
Power Source Required	80+ gpm, 2,500 psi; motor spool control valve required
Special Uses/Adaptations/Other Uses	Very steep slopes
Manufacturer's Comments Regarding Equipment Application	Rugged and fast

Extreme Machine Attachments

Mulcher, Vertical Shaft, Boom Mounted

KDX Mulcher

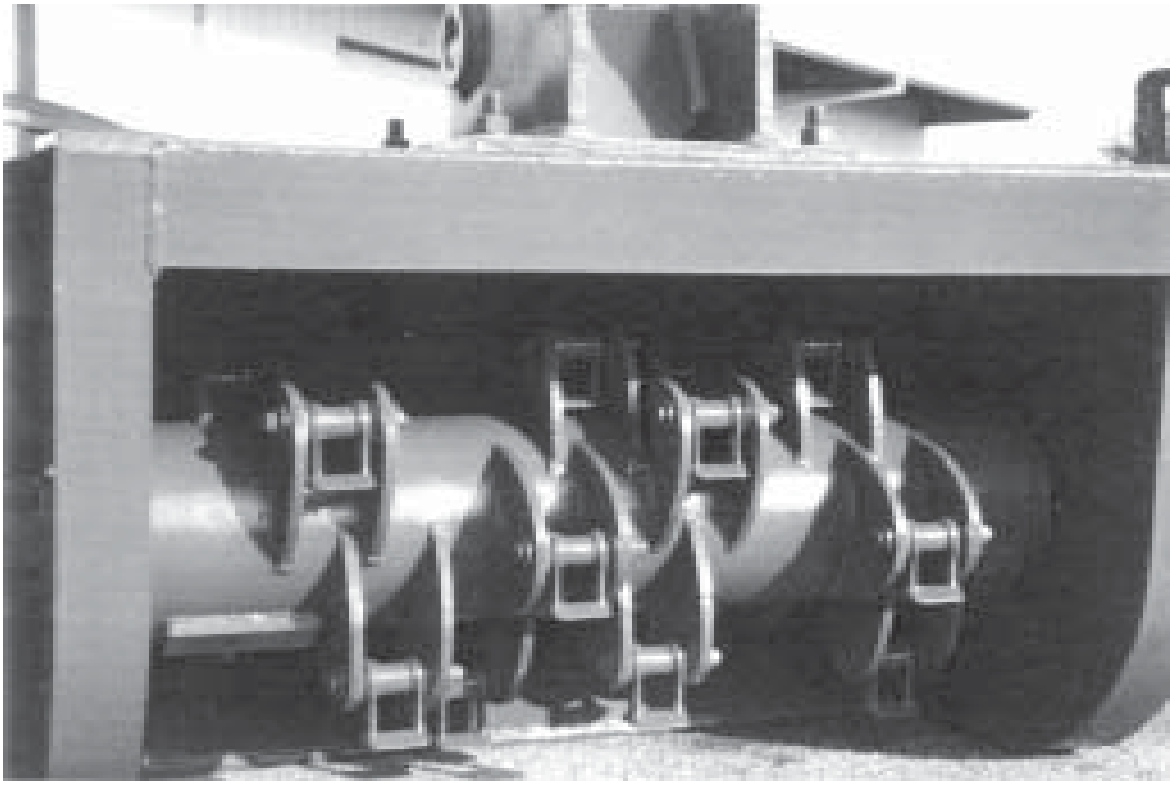


Make/Model	KDX Mulcher
Manufacturer/Source	Kemp West, Inc.
Distributor	Kemp West, Inc.
Price	$36,254
Status	In production
Preferred Prime Mover	Kaiser walking excavator (Spyder)
Other Suitable Prime Movers	150-series excavator or larger
Attachment Mount (lift arms/boom/3-point/other)	Boom
Maximum Treatable Material Size	6 to 8 in
Cutting Mechanism	Fixed
Width of Head	38 in
Weight	900 lb
Shaft (horizontal/vertical)	Vertical
Rotation Speed	1,200 rpm
Power Source Required	20 gpm, 3,600 psi
Special Uses/Adaptations/Other Uses	Often used on excavators
Manufacturer's Comments Regarding Equipment Application	Mulcher wheel and housing creates fine mulch

Extreme Machine Attachments

Flail, Horizontal Shaft, Boom Mounted

Menzi Muck Heavy-Duty Flail Mower



Make/Model	Menzi Heavy-Duty Flail Mower
Manufacturer/Source	Menzi USA Sales, Inc.
Distributor	Contact Menzi USA Sales, Inc.
Price	$12,000
Status	In production
Preferred Prime Mover	Menzi Muck
Other Suitable Prime Movers	Data not supplied
Attachment Mount (lift arms/boom/3-point/other)	Boom
Maximum Treatable Material Size	Brush to 5 in
Cutting Mechanism	Flail
Width of Cut	(Flail) hydraulic tilt 70% left and right 3 ft
Width of Head	39 in
Weight	1,200 lb
Shaft (horizontal/vertical)	Horizontal
Rotation Speed	2,300 rpm
Power Source Required	280 bar is 75 liters; hydraulic motor built in direct drive
Special Uses/Adaptations/Other Uses	Many
Manufacturer's Comments Regarding Equipment Application	Mulches best

Small Cable Yarders

Concept—Yarding may be an option in areas of steep slopes or difficult terrain when feller-bunchers or other machines would not be effective. For this report we chose to stay with small cable-yarding systems of 10,000-pound line pull or less. We also included some unique monocable systems. The Jewell/Allied Power Products, Inc. Yoader (combination yarder and loader) was included for its unusual flexibility—it can be used to shovel-log, load logs at landing, shotgun log, and it has a slack thrower for tongs. Allied Power Products, Inc. can put cable drum winches on most equipment to meet yarding needs. Winches were not included in this section as they were considered outside the scope of this project.

Comments—Stem extraction can be done aerially (helicopter), by ground (skidding or forwarding), or by cable yarding. Highlead and skyline cable systems require a cleared path and appropriate slope to allow clearance of the yarded material and to haul the material. Each cable requires a separate drum, and a yarder can have up to 4 drums: mainline, skyline, slackpull, and strawline (to pull the rest of cable into position). Monocable systems require a capstan winch and a series of special blocks to position the cable in the stand. Yarding can be done uphill or downhill. While moving the material by a cable reduces traffic over ground, roads are required within yarding distance.

Some yarders employ carriages to move the material. The main types of carriages are radio controlled and slackpull.

Other Manufacturers or Sources—See the Canadian Forest Industries annual steep-slope issue, or the Timber West or Timber Harvesting annual buyer's guides for additional information on yarding equipment (see Appendix B for details).

Other unconfirmed sources of small commercial wood yarders listed in Timber West 1999/2000 Buyer's Guide & Directory include:

- Christy Manufacturing, Inc.
- Madill, Inc.
- Ross Corp.
- TLD Gauthier, Inc.

Carriage manufacturers include:

- Acme Manufacturing Co.
- Christy Manufacturing, Inc.
- Diamond Manufacturing, Inc.
- Eagle Carriage and Machine, Inc.
- Enviroquip Sales, Ltd.
- Koller USA Corp.
- Maki Manufacturing, Inc.
- Northwest Harvesters, Inc.
- Ross Corp.
- Skylead Logging Equipment Co.

Other unconfirmed sources of carriages listed in Timber West 1999/2000 Buyer's Guide & Directory include:

- Boman Industries, Inc.
- TLD Gauthier, Inc.
- Global Forest Equipment, Ltd.

Small Cable Yarders

Yarding Converter Packages

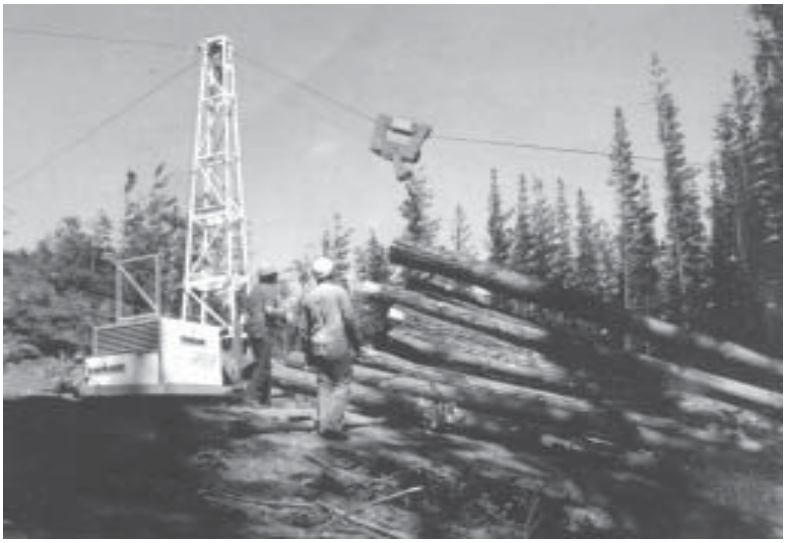
Jewell Hydraulic Dual-Winch Yarding Packages

Make/Model	Jewell Hydraulic Dual-Winch Yarder for log loaders; with mast assembly for excavators; Yoader conversion (combination log loader, winch/tong—thrower and yarder winch; also with dual winches)
Manufacturer/Source	Jewell Manufacturing, Inc.
Distributor	Contact Jewell Manufacturing, Inc.
Price	Contact manufacturer
Status	In production
Prime Mover	Excavator; log loader, 20- to 40-ton range
Yarder Power Plant	Depends upon host machine
Gas/Diesel	Depends upon host machine
Transmission	Hydraulic two-speed, self-contained winches
Weight	Two-drum system adds 5,000 lb to base machine
Boom/Tower	Tower (36 to 52 ft) varies by machine requirements
Controls	Winch controls are direct-acting pilot
Number of Drums	Four
Cable Capacity	Drum 1: 296 ft, $^{5}/_{8}$-in or 210 ft, $^{3}/_{4}$-in cable; Drum 2: 728 ft, $^{5}/_{8}$-in or 516 ft, $^{3}/_{4}$-in cable; Drum 3: 1,125 ft, $^{5}/_{8}$ in or 797 ft, $^{3}/_{4}$-in cable; Drum 4: 1,456 ft, $^{5}/_{8}$-in or 1,032 ft, $^{3}/_{4}$-in cable Mainline pull (lb/kg), dual winch specifications: Mean drum = 16,049 lb, 218 fpm; or 3,427 lb, 1,018 fpm; Main yoader winch has 9,000-lb line pull, 800 fpm Inhaul line speed; capacity 400 ft, $^{9}/_{16}$-in cable; comes with logging grapple
Mainline Speed	Line pulls to 50,000 lb
Maximum Yarding Distance	Yarder conversion—tong throw to 300 ft, shotgun yard to 1,000 ft
Carriage	Most commonly used is Christy manual slack-pulling carriage; some use
Shaft (horizontal/vertical)	small motorized carriages such as Eaglet II or Acme 10
Special Uses/Adaptations/Other Uses	Data not supplied
Manufacturer's Comments Regarding Equipment Application	Data not supplied

Small Cable Yarders

Three-Drum Yarder

Koller Three-Drum Cable Yarders



Koller K501 cable yarder (left) and K300.

Make/Model	Koller Three-Drum Cable Yarders: K300 Trailer-Mount; K501Trailer-Mount; K501 Truck-Mount; K501 Track-Mount
Manufacturer/Source	Koller Austria
Distributor	Northwest Harvesters, Inc.
Price	K300 trailer-mount with Koller SKA 1 carriage: $94,600; K501 trailer-mount with Koller SKA 2.5 carriage: $169,000; K501 truck-mount with Koller SKA 2.5 carriage: $187,000; K501 track-mount with Koller SKA 2.5 carriage: $234,000
Status	In production
Prime Mover	K301; K501 trailer-mount: 3-ton truck; K501 truck-mount: 5 ton, 6 x 6 military truck; K501 track-mount: M32 tank undercarriage
Yarder Power Plant	K300 trailer-mount: 62 hp; K501 trailer- or truck-mount: 112 hp or 160 hp; K501 track-mount: 160 hp
Gas/Diesel	Diesel
Transmission	K300 trailer-mount: hydrostatic; K501 truck-mount: 4-speed automatic; K501 track-mount: 545 Allison automatic
Weight	K300 trailer-mount: 9,000 lb; K501 trailer-mount: 17,500 lb; K501 truck-mount: 46,200 lb; K501 track-mount: 51,000 lb, including lines
Boom/Tower	K 300 trailer-mount: 23 ft; K501 (all): 33 or 40 ft
Controls	Generally ground; radio and cab options
Number of Drums	Three or four
Cable Capacity	Trailer-mounted models: Mainline: 1,150 ft, $^{3}/_{8}$-in cable; Skyline: 1,150 ft, $^{5}/_{8}$-in cable; Guyline: 100 ft, $^{9}/_{16}$-in cable. Truck- and track-mounted models: Mainline: 1,800 ft, $^{1}/_{2}$-in cable; Skyline: 1,600 ft, $^{3}/_{4}$-in cable; Haulback: 2,900 ft, $^{7}/_{16}$-in cable; Guyline: 145 ft, $^{3}/_{4}$-in cable
Mainline Pull	K300: 4,000 lb at medium drum; K501 (all): 8,100 lb at medium drum
Mainline Speed	K300: 985 ft/min; K501 (all) is 1,000 ft/min
Maximum Yarding Distance	K300: 1,200 ft; K501 (all) is 1,640 ft
Carriage	K300: Koller SKA 1; K501(all): Koller SKA 2.5 or Eaglet
Special Uses/Adaptations/Other Uses	K501 truck- and track-mounted models have a 7-ft tower extension
Manufacturer's Comments Regarding Equipment Application	Data not supplied

Small Cable Yarders

Four-Drum Yarder

Skylead Four-Drum Cable Yarder

Make/Model	Skylead Four-Drum Cable Yarder: C-40 16000 Series with Skidder, Truck, or Trailer Mount
Manufacturer/Source	Skylead Logging Equip. Corp.
Distributor	Contact Skylead Logging Equip. Corp.
Price	Contact manufacturer
Status	In production
Prime Mover	Skidder, truck, or trailer
Yarder Power Plant	130 to 174 hp
Gas/Diesel	Diesel
Transmission	Four-speed transmission
Weight	Approximately 41,000 lb, mounted on typical skidder without cable or rigging
Boom/Tower	40-ft round, tubular latticed tower
Controls	Hydraulic
Number of Drums	Four
Cable Capacity	Mainline: 2,000 ft of $^{1}/_{2}$-in cable; Haulback: 4,200 ft of $^{1}/_{2}$-in cable; Skyline: 2,000 ft of $^{3}/_{4}$-in cable; Guyline: 200 ft of $^{3}/_{4}$-in cable; Strawline: 4,000 ft of $^{1}/_{4}$-in cable
Mainline Pull	16,180 lb at mid-drum
Mainline Speed	1,525 fpm at mid-drum
Maximum Yarding Distance	2,000 ft
Carriage	Mini Maki I, Mini Maki II, Eaglet, Koller SKA-1, Skylead C7
Special Uses/Adaptations/Other Uses	Data not supplied
Manufacturer's Comments Regarding Equipment Application	Data not supplied

Small Cable Yarders

Three- or Four-Drum Yarder

Urus I 300 Skyline Mini Tower Yarder and Urus II Universal 600 Skyline Yarder

Make/Model	Urus I 300 Skyline Mini Tower Yarder; Urus II Universal 600 Skyline Yarder
Manufacturer/Source	Global Forest Equipment Ltd.
Distributor	Contact Global Forest Equipment Ltd.
Price	Urus I 300: $118,000; Urus II 600: $190,000
Status	In production
Prime Mover	Truck, trailer-mounted, or skidder
Yarder Power Plant	Urus I 300: 100 hp; Urus II 600: 185 hp
Gas/Diesel	Diesel
Transmission	Urus I 300: Allison 4 speed transmission: Urus II 600: Volvo hydraulic drive; also available with standard transmission
Weight	Urus I 300: 5,020 kg on trailer with cables; Urus II 600: 22,000 kg on truck with cables
Boom/Tower	Urus I 300: 33-ft steel tower; Urus II 600: 40-ft steel tower
Controls	Urus I 300: Ground-operated, hydraulic controls; Urus II 600: Cab-operated, hydraulic controls
Number of Drums	Urus I 300: 3; Urus II 600: 4
Cable Capacity	Urus I 300: Mainline: 1,050 ft of $^{3}I_{8}$-in cable; Skyline: 1,050 ft of $^{5}I_{8}$-in cable; Haulback: 2,100 ft of $^{5}I_{16}$-in cable; Guyline: 150 ft of $^{5}I_{8}$-in cable Urus II 600: Mainline: 2,000 ft of $^{1}I_{2}$-in cable; Skyline: 2,000 ft of $^{3}I_{4}$-in cable; Haulback: 4,100 ft of $^{3}I_{8}$-in cable; Strawline: 4,165 ft of $^{1}I_{4}$-in cable; Guyline: 160 feet of $^{3}I_{4}$-in cable
Mainline Pull	Urus I 300: 4.6-ton breakout force; Urus II 600: 5.5-ton breakout force; 2.8 tons throughout working distance
Mainline Speed	Urus I 300: 1,180 ft/min; Urus II 600: 885 ft/min with load, 1,770 ft/min empty
Maximum Yarding Distance	Urus I 300: 1,000 ft; Urus II 600: 2,000 ft
Carriage	Urus I 300: Steufer Hydraulic; Urus II 600: Eaglet or Maki or Steufer
Special Uses/Adaptations/Other Uses	See below
Manufacturer's Comments Regarding Equipment Application	Urus yarders are commonly used for commercial thinning or selective harvesting second growth timber from steep slopes, swampy ground or rocky terrain not suitable for ground-based equipment

Small Cable Yarders

Monocable Yarders

Howe-Line Trailer-Mount Monocable System

Make/Model	Howe-Line Trailer-Mount Monocable System
Manufacturer/Source	Howe-Line, CC; exported as Truckhowe, CC
Distributor	Howe-Line, CC
Price	Ready to use, including training in USA, not including shipment is $25,000; Freight estimate to Idaho is $2,000
Status	In production
Yarder Power Plant	14-hp Hatz
Gas/Diesel	Diesel
Transmission	Data not supplied
Weight	Depends on amount of cable: empty, 750 kg
Controls	Operator or radio control option, manufacturer suggests buying radio model locally known
Cable Capacity	600-m standard; starts with 400 m of cable and adds 100-m sections with special quick coupler; not tested with more than 900 m of cable
Mainline Pull	Line pull is tailored to suit operation, e.g.: 600 m of cable with 200-mm capstan = 3.5 tons (metric) at 20 m/min; 280-mm capstan = 2.6 tons (metric) at 30 m/min
Maximum Yarding Distance	Tension controls: manually move trailer forward; put cable on a separate drum that can tension; or move the trailer forward with a vehicle 600 m of cable swaged 10 mm can effectively penetrate forest about 250 m (lead) with a further 50-m lead for roadside stacking; Not tested with more than 900-m cable which equals 400-m penetration
Special Uses/Adaptations/Other Uses	Cost efficient to operate; handles 8-ft logs, 12-in diameter, or anything 2 people can pick up (approximately 100 kg); has had over 3 metric tons on system at once
Manufacturer's Comments Regarding Equipment Application	Good for steep, deep, rocky and swampy areas

Small Cable Yarders

Truck- or Trailer-Mounted Miniyarder

Bitterroot Miniyarder

Make/Model	Bitterroot Miniyarder
Manufacturer/Source	Plans available from USDA Forest Service, Missoula Technology and Development Center
Price	Varies, depending upon fabricator
Status	Plans only; custom made
Prime Mover	Can be mounted on a $^{3}/_{4}$-ton truck or trailer
Yarder Power Plant	18 hp
Gas/Diesel	Gasoline
Transmission	Hydrostatic
Weight	1,600 lb rigged
Boom/Tower	$2^{1}/_{2}$-in pipe A-frame, $17^{1}/_{2}$ ft long; 180-degree swivel head; manually raised/lowered
Controls	15-ft mechanical push/pull cable
Number of Drums	2
Cable Capacity	Skyline, mainline drums: 800 ft of $^{1}/_{4}$-in cable or 650 ft of $^{3}/_{8}$-in cable
Mainline Pull	0 to 2,000 lb
Mainline Speed	0 to 400 fpm
Maximum Yarding Distance	800 ft
Special Uses/Adaptations/Other Uses	Light enough to transport via helicopter
Manufacturer's Comments Regarding Equipment Application	Publication number 4100-8541-2601, September 1985

Small Cable Yarders

Truck-Mounted Small Yarder

Clearwater Cable Yarder

Make/Model	Clearwater Cable Yarder
Manufacturer/Source	Plans available from the Forest Service, Missoula Technology and Development Center
Price	Varies depending upon fabricator
Status	Plans only; custom made
Prime Mover	5-ton truck recommended
Yarder Power Plant	Ford industrial model LSG-633 P 6-cylinder; 200 cu in; 68 hp at 2,800 rpm
Gas/Diesel	Diesel
Transmission	Hydrostatic
Weight	13,000 lb, fully rigged
Boom/Tower	Mast is 10 x 10 x $^{1}/_{2}$-in-wall square-wall tubing; 170-degree fairlead swivel; hydraulically raised and lowered
Controls	Remote up to 50 ft; 12-volt dc electric over hydraulic; remote to 50 ft
Number of Drums	Three
Cable Capacity	Mainline Drum: 900 ft of $^{3}/_{8}$-in cable; Skyline Drum: 800 ft of $^{1}/_{2}$-in cable
Mainline Pull	3,500 lb, maximum
Mainline Speed	0 to 1,000 fpm
Maximum Yarding Distance	800 ft
Carriage	Christy carriage suggested
Special Uses/Adaptations/Other Uses	See Forest Service plans
Manufacturer's Comments Regarding Equipment Application	Lightweight, three-drum system that makes harvesting small material practical; publication number: 5100-8151-2602, May 1981

Appendix A—Equipment and Techniques Survey Response Summary

The equipment and techniques used to treat ponderosa pine ecosystems are reflected in this summary of survey reponses.

Equipment and Techniques Response Summary

Region or unit responding	Equipment	Purpose or technique	Maximum percent slope	Maximum material size	Wheels or tracks	Production rate	Contract cost	Comments
Cedar City RD Dixie NF	Chipper (Morbark)	Change fuel structure	0 to 10%	3 to 10"	Wheels	5 ac/day	$1600/day	
Cedar City RD Dixie NF	Wheeled Bobcat	Piling of fuels for burning	20 to 40%	2 to 14" (10' long)	Wheels	10 to 20 ac/day	$700/day	
Cedar City RD Dixie NF	Tracked machine (CAT, D-4)	Piling of fuels for burning	Up to 60%	4 to 18" (10' long)	Tracks	10 to 20 ac/day	$700/day	
Cedar City RD Dixie NF	Track hoe hoe (CAT 234 with grapple)	Piling of fuels for burning	40 to 60%	8 to 24" (30' long)	Tracks	15 to 30 ac/day	$1500/day	
Intermountain Region	Dozers (all sizes)	Piling, crushing, rearranging	35%+		Tracks			Used to construct fuel-free zones near houses and property.
Toiyabe NF	Chippers	Chipping						Used to construct fuel-free zones near houses and property.
Stanislaus NF	Brontosaurus on excavator	Cutting and grinding thinned trees			Tracks	2 ac/day (20' by 20' plantation spacing)	$600/ac	Figures are estimates from contractor putting on demonstration.
Stanislaus NF	CTL system	Thinning	30%	22 to 24"				Max. limb diameter 2". Max. avg. skid distance 1000'.
Stanislaus NF logging	Whole tree	Thinning	35%	24"				Max. limb diameter 4.5". Max. average skid distance 460'.
Beckwourth RD Plumas NF	Chain saw	Cutting	All	All	N/A	Less than 1 ac/day	$70 to $100/ac	Useful on steep ground. Disadvantage is slash disposition.
Beckwourth RD Plumas NF	Mechanical shears/saws	Shearing/ cutting	Varies	Varies	Both	6 ac/day (Timbco) 4 ac/day (Fortec 160)		Timbco best all around. Saw heads have fire potential due to rock impacts and overheated kerfs in dead materials. Accumulators help production. Hydro-ax, Morbark Wolverine, and three-wheelers are all productive, but cause more ground disturbance.
Beckwourth RD Plumas NF	Wheeled skidders with grapple	Transporting material			Wheels	Varies		Cat 520 series most reliable–works slopes well. Ground disturbance may require mitigation. Used whole-tree yarding.
Beckwourth RD Plumas NF	Peterson 7300 chipper	Chipping material on landing (clean chips)				NA.		Used in combined clean-chip, small-log operation that was considered efficient. Logs were processed on landing with processor head mounted on an excavator. On clean chip production, nonconforming chips were put on the landing and flail was put on the trail.
Beckwourth RD Plumas NF	Morbark 20	Biomass processing on landing				NA.		Used on landing. Also used a tub chipper for biomass.
Beckwourth RD Plumas NF	People with chain saws	Hand piling						Necessary on steep slopes. Spec was 30' dia. around a fluorescent stick. Min. 6'-high pile. Bid on per-pile basis. Piles burned by FS worked well. Had to stake toe of pile to keep it from sliding down steeper slopes.
Beckwourth RD Plumas NF	Tractors with brush rakes	Moving understory material. Piling (method last used in 1995).				10 ac/day	$100/ac	Benefits: Cost and range of slope conditions. Disadvantages: slow production, soil disturbance, and compaction are limitations.

Equipment and Techniques Response Summary, continued

Region or unit responding	Equipment	Purpose or technique	Maximum percent slope	Maximum material size	Wheels or tracks	Production rate	Contract cost	Comments
Beckwourth RD Plumas NF	Excavator with finger grapple or bucket with thumb (free-swinging grapples require more operator experience	Grapple piling in thinning and site-prep operations (changed to this method in 1995)				5 to 7 ac/day	$215 to $300/ac	Benefits: Can site piles where wanted, work among stumps, work slopes with less soil disturbance and compaction. Clean piles, better positioning ability on steep slopes compared to tractors (safety). Disadvantage: Cost, but no callbacks after burning.
Beckwourth RD Plumas NF	Kemp-West (Kaiser Spyder)	Brush mastication	Used up to 60%				$600/ac	Very slow. Mobilization and operating costs make it unusable except for special situations.
Beckwourth RD Plumas NF	Morbark Model 20 Total Chiparvestor	Mobile chipping and dispersion	35%	Up to 12" no trouble		3 to 5 ac/day	$600/ac	Disadvantages: Free-swinging grapple, feed roller not powered.
Beckwourth RD Plumas NF	Morbark 50/36 Mountain Goat in tandem with shear	Mobile chipping and dispersion (demo)	Less than 20%			$1^{1}I_{4}$ to $1^{1}I_{2}$ ac/hour		Machine meets a need we have. Average chip depth did not exceed 4". Good concept, but operational problems with machine.
Beckwourth RD Plumas NF	Track-Mac, Shar, Hydro-Ax, Madge Roto-Clear, Slashbuster	Shattering of vegetation				Slow		Disadvantages: Did not do a good job treating materials laid down (Roto-Clear did okay on downed material, but could not lay down standing material). Rock impacts. Shrapnel. Machine damage due to impacts. Safety hazard due to flying debris.
Malheur NF	Track-Mac	Mastication, shredding, rearranging	Up to 35%	3 to 10"	Tracks (8 psi or less)	7 to 10 ac/day	$62 to $88/ac	
Malheur NF	Excavator with bucket and thumb or grapple	Grapple piling of debris for burning	Up to 35%	2 to 20"	Tracks (8 psi or less)	5 to 8 ac/day	$106 to $132/ac	
Malheur NF	Dozer	Crushing	Up to 35%	3 to 10"	Tracks (8 psi or less)	6 ac/day	$35/acre	
Chiloquin RD Winema NF	Slashbuster on excavator	Shredding or mulching and selective thinning	35 to 40%	3 to 10"	Tracks	3 ac/day	$215/hour	Use in combined thin-and-slash treatments in heavily stocked plantations with one entry. Also works well for brush release. (Little reduction in material less than 3" diameter. More likely to spin larger material off head than shred it).
Chiloquin RD Winema NF	Seppi M, PTO-driven hammer flail mulching mower. 3-point hitch to D-4 dozer.	Shredding or mulching and selective thinning	30%	3 to 10"	Tracks	0.75 ac/hour (more if only brush reduction)	$70/acre	To thin, dozer must back up to each tree. Works better than Slashbuster for brush release. Dozer crushes slash also. (Little reduction in material less than 3" diameter. Not really effective on larger material).

Equipment and Techniques Response Summary, continued

Region or unit responding	Equipment	Purpose or technique	Maximum percent slope	Maximum material size	Wheels or tracks	Production rate	Contract cost	Comments
Chiloquin RD Winema NF	Tomahawk on dozer	Crushing	30%	3 to 10" (some effect on larger material)	Tracks	1 to 2 ac/hour	$35/ac	May or may not be followed by underburning. Soil surveys have led to restricted use of mechanized equipment in some areas.
Barlow RD Mt. Hood NF	Feller-buncher (tracked or wheeled) and skidder. Second system is processor/forwarder.	Logging to facilitate reintroduction of prescribed fire (see Notes below).	20% (both systems)	18" or less (average 10 to12")				Trees are bunched and skidded full length to the landing. In the second system, logs are processed and decked in unit. Forwarder takes material to landing. Tops are piled with excavator or grapple pilers and burned.
Wenatchee NF	Kaiser Spyder	Shreds slash	70%	0 to 8"	Wheels on road. Hydraulic legs in woods.	1 to 2 ac/day	$850/ac	
Wenatchee NF	Bombardier with hydraulic arm and 5-ft dia. rotary disk.	Shreds slash	35%	3 to 10"	Tracks in woods. Lowboy on highway.	2 ac/day	$450/ac	
Ochoco NF	Dozer (D4-D6)	Piling	30%	All	Tracks	5 ac/day	$50 to $80/ac	
Ochoco NF	Grapple	Piling	35%	All	Tracks	8 ac/day	$90 to $150/ac	
Ochoco NF	Dozer (D5-D6)	Crushing	30%	0 to 3"	Tracks	10 ac/day	$23/ac	
Bend-Ft Rock RD Deschutes NF	Schmeiser Till an' Pack. Pull with med-sized dozer.	Crushing	Less than 20% due to soil disturbance while turning.	0 to 6"	Tracks (6 psi)	20 ac/day	$33/ac	Must be operated in open stands. Based on 500 acres treated between 1985 and 1995 and 8,000 acres between 1995 and 1998.
Bend-Ft Rock RD Deschutes NF	Industrial mower on farm tractor or ASV Posi-Track	Shearing to 2" height and mulching (used in bitterbrush)	5% (tractor) 30% (ASV Posi-Track (Still testing for soil disturbance)	0 to 3" (highly effective 3 to 6" marginally effective	Rubber-wheeled tractor (5 psi) Rubber-tracked ASV Posi-Track (less than 3 psi).	10 to 29 ac/day (tractor)	$29/ac (force account) $37/ac (contracted)	ASV Posi-Track can operate in tightly spaced stands.

Notes: The following are some of the measures used by the Forest Service (Barlow Ranger District, Mt. Hood National Forest) to reintroduce fire into the landscape:

- Require full-length yarding by purchaser, normally with rubber-tired skidders on slopes less than 20% and materials less than 18 inches diameter.
- Leave tops attached. This is used in material larger than 18 inches d.b.h., normally with rubber-tired skidders on slopes less than 20%.
- A third method of abatement that has been used in the past and will continue to be used is a Slashbuster (masticating head). This is normally track mounted with street pads. Production is 2 to 3 acres per 8-hour day, on slopes less than 20%.
- The most commonly used method of slash preparation is an excavator with a modified basket-mounted head for piling. These are relatively small or mid-sized machines with street pads. Production is generally 2 to 4 acres per 8-hour day, and is limited to slopes less than 20%.
- The use of crawler-tractors for machine piling has been greatly reduced over the last few years due to concerns about soil compaction.

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Canadian Forest Industries. JCFT Forest Communications, 1 Pacifique, St-Anne-De-Bellevue, QC, H9X 1C5, Canada. 514/457-2211. E-mail: jcft@aei.ca. Published eight times annually. Noteworthy: annual steep slope issue in September and semiannual harvesting heads issue in April/May.

Equipment Today. Cygnus Publishing, Inc.; P.O. Box 803, 1233 Janesville Avenue, Fort Askinson, WI 53538 Phone: (920) 563-6388 Website: http://www.equipmenttoday.com. Published monthly with an extra edition mid-March. Noteworthy: annual January attachment issue, annual June excavator issue.

Timber Harvesting. Hatton-Brown Publishers; P.O. Box 2268, Montgomery, AL 36104. Phone: (334) 834-1170 E-mail: mail@timberharvesting.com. Published 10 times annually. Noteworthy: annual Loggers' Resource Guide in January.

Timber West. Timber West Publications, Inc.; P.O. Box 610, Edmonds, WA 98020. Phone: (425) 778-3388 E-mail: timberwest@aol.com. Published monthly. Noteworthy: annual Buyer's Guide & Directory in June.

Web Sites

Forest Engineering Research Institute of Canada:
Web site: http://www.feric.ca

Forest Industry Network (has links to many sites):
Web site: http://www.forestind.com

Logging and Sawmilling Journal
Web site: http://www.forestnet.com

Appendix C—Manufacturer or Source Addresses

Acme Manufacturing Co.
136 North 42nd Street
Springfield, OR 97478
Phone: (541) 741-2200
Fax: (541) 741-2212

Acrowood Corp.
4425 South 3rd Avenue
Everett, WA 98206
Phone: (425) 258-3555
Fax: (425) 252-7622

ACS Industries, Inc.
2151 Mogadore Road
Kent, OH 44240
OH Phone: 800-321-2348
WA Phone: 800-688-6266
Fax: (330) 678-0859
E-mail: rlarwin@acs-coupler.com
Web site: www.acs-coupler.com

AFM-Forest, Ltd.
Ahjokatu 26
40320 Jyvaskyla Finland
Phone: (358) 14-675100
Fax: (358) 14-675355

Agra Axe International, Inc.
P.O. Box 250
Caney, KS 67333
Phone: (316) 879-5858 or 888-394-6598
Fax: (316) 879-5844
E-mail: ese-intec@terraworld.com

Alamo Industrial
1502 East Walnut Street
Seguin, TX 78155
Phone: 800-882-5762
Fax: (830) 379-0864
E-mail: slock@alamo-industrial.com
Web site: http://www.alamo-industrial.com

Allied Power Products, Inc.
6590 South West Fallbrook Place
Beaverton, OR 97008
Phone: (503) 626-0654
Fax: (503) 644-9223
E-mail: sales@alliedpower.com
Web site: http://www.alliedpower.com

Allied Systems Co.
2300 Oregon Street
Sherwood, OR 97140
Phone: (503) 625-2560
Fax: (503) 625-7980
E-mail: engineering@alliedsystemsco.com
Web site: www.alliedsystems.com

Ammbusher, Inc.
P.O. Box 456
Dillsboro, IN 47018
Phone: 800-432-5955
Fax: (812) 926-1616
E-mail: ammbush@one.net
Web site: http://www.ammbusher.com

Amulet Manufacturing Co.
5640 West End Road
Arcata, CA 95521
Phone: (707) 822-2282
Fax: (707) 822-2398
Web site: http://www.amuletmfg.com

ASV—All Season Vehicles, Inc.
P.O. Box 5160
Grand Rapids, MN 55744
Phone: (218) 327-3065 or 800-346-5954
Fax: (218) 327-2376
E-mail: sales@asvi.com

Attachments International
RR2, Box 444
Pelican Rapids, MN 56572
Phone: (218) 863-6444
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Bandit Industries, Inc.
6750 Millbrook Road
Remus, MI 49340
Phone: (517) 561-2270 or 800-952-0178
Fax: (517) 561-2273
E-mail: brushbandit@eclipsetel.com
Web site: http://www.banditchippers.com

Barko Hydraulics, LLC
P.O. Box 16227
Duluth, MN 55811
Phone: (715) 392-5641
Fax: (715) 392-3931
E-mail: sales@barko.com
Web site: http://www.barko.com

Bell Equipment N.A., Inc.
2843 Highway 80
Garden City, GA 31408
Phone: (912) 966-2615
Fax: (912) 964-1594
Web site: http://www.bell.co.za

Blondin, Inc.
P.O. Box 1287
Indiana, PA 15701
Phone: (724) 349-9240
Fax: (724) 349-9242
E-mail: rotblon@aol.com
Web site: http://www.rottneusa.com

Blount, Inc.
Forestry and Industrial Equipment Division
535 Mack Todd Road
Zebulon, NC 27597
Phone: (919) 269-2438
Fax: (919) 269-0257
Web site: http://www.blount-fied.com

Bobcat Co.
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West Fargo, ND 58078-6000
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Fax: (701) 241-8704
E-mail: infocenter@bobcat.com
Web site: htp://www.bobcat.com

Boman Industries, Inc.
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Fax: (503) 399-8535

Brigden Manufacturing, Inc.
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Fax: (250) 992-3841
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Fax: (515) 322-3527
E-mail: brnbear@mddc.com
Web site: http://www.brownbearcorp.com

Brown Manufacturing Corp.
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Ozark, AL 36360
Phone: (334) 795-6603 or 800-633-8909
Fax: (334) 795-3029
Web site: www.brownmfgcorp.com

Brush Technology Division
Carlson Tractor and Equipment Co.
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Rogers, MN 55374
Phone: (763) 428-5099 or 800-642-4441
Fax: (763) 428-5051
E-mail: seppi@ct-e.com
Web site: www.ct-e.com/brushtech.htm

Cameco Industries
P.O. Box 968
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Fax: (504) 447-0299

Case Corp.
700 State Street
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Fax: (414) 636-7809
Web site: http://www.casecorp.com

Caterpillar, Inc.
100 NE Adams Street
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Phone: (309) 675-8995
Fax: (309) 675-4757

Christy Manufacturing, Inc.
P.O. Box 2259
Orofino, ID 83544
Phone: (208) 476-4870
Fax: (208) 476-5339

Crane Equipment Manufacturing
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CWS Industries, Ltd.
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Davco Manufacturing, Ltd.
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Fax: (780) 532-3626
E-mail: davco@telusplanet.net
Web site: http://www.telusplanet.net/public/davco

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P.O. Box 8806
Moline, IL 61266
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Fax: (309) 765-1859
Web site: http://www.deere.com/ind

Denharco, Inc.
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Web site: http://www.denharco.com

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Dika Industries, Ltd.
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Web site: http://www.slashbuster.com

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Web site: http://www.dura-ind.com

Eagle Carriage and Machine, Inc.
2104 26th Street
La Grande, OR 97850
Phone: (541) 963-4646
Fax: (541) 963-5521

Eagle Log Loader/IMT, Inc.
P.O. Box 189
Garner, IA 50438
Phone: (515) 923-3711
Fax: (515) 923-2424

Esco Corp.
2141 NW 25th Avenue
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Web site: http://www.escocorp.com

Estill's Windbreak Trimming, Inc.
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E-mail: estills@estills.com
Web site: http://www.estills.com

E-Z Implements, Inc.
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Fabtek, Inc.
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Forestry Suppliers, Inc.
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Fax: 800-543-4203

Franklin Equipment Co.
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Fax: (757) 562-1580
Web site: http://www.franklin-treefarmer.com

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Web site: http://www.hakmet.com

Harvest Systems, Inc.
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Fax: (908) 485-1462

Hensley Attachments
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Fax: (503) 230-1101
Web site: http://www.jewelmfg.com

John Brown & Sons
14 B&B Lane, Sawyer Industrial Park
Weare, NH 03281
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Fax: (603) 529-7976
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Johnson Industries, Ltd.
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Montgomery, AL 36124
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Fax: (334) 215-7551
E-mail: mbalcom@progressrail.com

King Forestry Equipment, Inc.
P.O. Box 3370
Spruce Grove, AB T7X 3A7 Canada
Phone: (780) 962-8061
Fax: (780) 962-8435

Komatsu America International Co.
P.O. Box 8112
Vernon Hills, IL 60061
Phone: (847) 970-4100
Fax: (847) 970-4102
Web site for nearest dealer: http://www.KomatsuAmerica.com

LaBounty
1538 Highway 2
Two Harbors, MN 55616
Phone: (218) 834-2123
Fax: (218) 834-3879
Web site: http://www.stanleyworks.com

Lakewood Mechanical
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Lako Oy
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Lane Equipment Co.
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LMC Corp.
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Phone: (701) 347-5441 or 800-373-5441
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E-mail: lmi@loegering.com

Loftness Specialized Farm Equipment, Inc.
P.O. Box 337
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Phone: (320) 848-6266 or 800-828-7624
Fax: (320) 848-6269
E-mail: loftness@means.net
Web site:http://www.LoftnessEq.com (or)
http://www.FlailMower.com

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187 South Illinois Avenue
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Loggtech AB
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Fax: (334) 653-1365
Web site: http://www.mackmfg.com

Madill, Inc.
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Magnum Mulching Mowers, Inc.
7269 Bee Ridge Road
Sarasota, FL 34241
Phone: (941) 379-5833
Fax: (941) 379-5916

Maki Manufacturing, Inc.
HC 64 Box 60
Pierce, ID 83546
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Fax: (208) 464-2120

Mann, a product of ACS Industries, Inc.
ACS Industries, Inc.
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Web site: www.acs-coupler.com

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Web site: http://www.mardenind.com

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Medford Fabrication
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Web site: http://www.morbark.com

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Multitek, Inc.
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Web site: http://www.forestindustry.com/
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Pierce Pacific Manufacturing Co.
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Ponsse USA, Inc.
987 Air Park Road
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Precision Husky Corp.
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Index—Equipment List by Category

Locating Equipment and Manufacturers/Sources in the Catalog Section

Other Machines and Miscellaneous Attachments

Brush-Cutting, Thinning, Shredding, and Crushing Attachments

Brush-Cutting, Thinning, Shredding, and Crushing Attachments

Small Tree-Cutting/Processing Heads

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Slash-Piling Attachments

Skid-Steer Attachments

Self-Leveling Cab Feller-Bunchers

Extreme Machines

Extreme Machines (continued)

Extreme Machine Attachments

Small Cable Yarders

Notes

Notes

Library Card

Windell, Keith; Bradshaw, Sunni. 2000. Understory biomass reduction methods and equipment catalog. Tech. Rep. 0051-2826-MTDC. Missoula, MT: U.S Department of Agriculture, Forest Service, Missoula Technology and Development Center. 156 p.

Ladder fuels and dense pockets of young Douglas-fir make it especially difficult, if not impossible, to get desirable results with prescribed fire in ponderosa pine stands without some creative burning techniques or mechanical preburn treatment using equipment and techniques discussed in this report. Although stands of ponderosa pine with Douglas-fir encroachment are the focus for fuel treatments in this report, the equipment and techniques discussed will probably have applications for other species.

This report consists of two sections. The first section contains the results of numerous interviews, a field survey, and a literature search. This section discusses fuel reduction equipment and methods that have been tried in the past, those that are currently being used, and those that may warrant consideration in the future.

The second section is a catalog of equipment suitable to treat landscape areas before prescribed burns. It is the result of an extensive market search. The catalog is designed to help forest managers make informed decisions. It profiles a variety of small and large pieces of equipment suitable for many different situations and budgets. To keep the size of the catalog manageable, equipment that is commonly available and well known is not included (equipment such as skidders, excavators, loaders, and so forth).

An abbreviated version of this report (32 p.) is available for managers interested in the first section, but not the detailed equipment specifications. The abbreviated report is Understory Biomass Reduction Methods and Equipment (Tech. Rep. 0051-2828-MTDC).

Keywords: Douglas-fir, fuel treatment, ponderosa pine, prescribed fire, residues, thinning

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