REPORT NO. 79-4

COMPACT

Bark Beetle Conditions

in the Northern Region

1978

Cover: Over 164,000 acres of lodgepole pine within Glacier National Park have been infested by the mountain pine beetle. This photograph, looking east into the park across the North Fork of the Flathead River, depicts a portion of the more than 12 million trees killed there in 1977.

BARK BEETLE CONDITIONS

NORTHERN REGION

1978

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TABLE OF CONTENTS

SUMMARY

Mountain pine beetle continued to ravage high risk lodgepole, ponderosa, and whitebark pine stands on Federal, State, and private lands in 1978. Outbreaks during this past decade began in 1969 in Montana. Major infestations occur on the Beaverhead, Gallatin, Flathead, Lewis & Clark, Lolo, and Kootenai National Forests, and in Glacier and Yellowstone National Parks. Mortality increased in second growth ponderosa pine stands on the Crow and Rocky Boy's Indian Reservations in Montana.

Pine engraver beetle populations increased substantially in ponderosa pine stands on mixed ownership in Idaho and Montana in 1978. More than 23,000 trees were killed in Idaho, and about 8,500 trees were killed in western Montana.

Fir engraver beetle infestations increased significantly, killing more than 15,000 grand fir on mixed ownership in Idaho. Infestations in Montana remained low.

A complex of bark beetles killed thousands of subalpine fir in American and Boundary Creek drainages in northern Idaho; but mortality declined in subalpine fir stands on the Flathead and Beaverhead National Forests, Montana. Increased mortality occurred in subalpine fir at Logan Pass in Glacier National Park, but a marked decline in tree kill occurred in Yellowstone National Park. An epidemic continued in high elevation stands of subalpine fir on the Lewis & Clark National Forest.

BEAVERHEAD NATIONAL FOREST, MONTANA

Mountain Pine Beetle

The mountain pine beetle[1] infestation in high risk lodgepole pine[1] stands declined from 27.7 trees/acre in 1977 to 5.7 trees/acre in 1978 on Burlington Northern and National Forest lands in the Jack Creek drainage, Madison Ranger District. The epidemic has encompassed about 13,800 acres since 1973 and more than 60 MMBF of merchantable timber has been killed. In 1978, nearly 79,000 trees containing 6 MMBF were killed[2]. A continued decline is predicted for the Jack Creek infestation since most of the large diameter trees have been killed. Infestation has increased in lodgepole pine stands the past 3 years on an additional 48,200 acres from Reynolds Pass north to Standard Creek on the west side of the Madison River, and in whitebark pine stands from Quake Lake north to the South Fork of Jack Creek east of the Madison River. An epidemic infestation was also detected between Tom Creek and Lillian Lakes in the southeast corner of Centennial Valley. New epidemics were detected in North and South Willow and North and South Meadow Creek drainages on the east side of the Tobacco Root Mountains. As many as 100 trees/group were killed in many areas, and many 5- to 10-tree groups are scattered throughout small side-tributaries. Within this 48,200 acres about 867,600 trees were killed containing 2,088 bd. ft./acre in 1977; and 983,280 trees containing 2,606 bd. ft./acre were killed in 1978 (table 2).

Table 1.—*Common name/scientific name cross reference for insect and plant species referred to in report*

	Common name	Scientific name
Insects	Mountain pine beetle	*Dendroctonus ponderosae* Hopkins
	Western balsam bark beetle	*Dryocoetes confusus* Swaine
	Pine engraver beetle	*Ips pini* (Say)
	Fir engraver beetle	*Scolytus ventralis* LeConte
	Douglas-fir engraver beetle	*Scolytus unispinous* LeConte
	Douglas-fir beetle	*Dendroctonus pseudotsugae* Hopkins
	Western pine beetle	*Dendroctonus brevicomis* LeConte
	None	*Cryphalus ruficollis* (Hopkins)
	None	*Pityophthorus pseudotsugae* Swaine
Plants	Lodgepole pine	*Pinus contorta* Dougl.
	Subalpine fir	*Abies lasiocarpa* (Hook) Nutt.
	Whitebark pine	*Pinus albicaulis* Engelm.
	Ponderosa pine	*Pinus ponderosa* Laws
	Western white pine	*Pinus monticola* Dougl.
	Douglas-fir	*Pseudotsuga menziesii* (Mirb.) Franco

[1]See table 1 for common name/scientific name cross reference.

[2]See map, which shows bark beetle infestation in Northern Region for 1978.

Table 2.--*Trees killed by mountain pine beetle on National Forest, State, and private lands in the Northern Region, 1978*

		Acres			Trees		
		LPP	PP	WBP	LPP	PP	WBP
Beaverhead	FS	44,207		4,783	437,649		15,550
	NFS	17,865		520	176,863		850
Bitterroot	FS	499	1,098		499	1,098	
	NFS		1,794			1,794	
Deerlodge	FS	32			32		
	NFS			6,118			6,118
Flathead	FS	48,519	25	150	3,833,001	25	432
	NFS	30,042	1,266		2,373,318	1,266	
Gallatin	FS	194,589			8,473,916		
	NFS	52,110			1,459,080		
Helena	FS	737	75	453			1,375
	NFS		125				
Kootenai	FS	23,269	30		488,649		100
	NFS	3,266	100		69,239		
Lewis & Clark	FS		4,088			4,088	
	NFS		30,156			30,156	
Idaho Panhandle	FS		550			550	
	NFS						
Lolo	FS	7,425	1,457	50	170,775	82,757	145
	NFS	3,634	3,292		83,582	177,109	
Nezperce	FS	800			4,000		
	NFS						
Glacier NP		164,017			14,761,530		
Yellowstone NP		171,244			10,274,640		
Totals	FS	320,077	7,323	5,436	13,408,521	88,518	17,602
	NFS	442,178	36,733	6,638	29,198,252	210,325	6,968
Grand total		762,255	44,056	12,074	42,606,773	298,843	24,570

Abbreviations used:
FS = Forest Service
NFS = Non-Forest Service
LPP = Lodgepole pine
PP = Ponderosa pine
WBP = Whitebark pine

Western Balsam Bark Beetle

Western balsam bark beetle infestations declined from 6,886 acres in 1977 to 2,120 acres in 1978. About 1,000 subalpine fir were killed in 16 groups in drainages between Daisy and South Willow Creek in the Tobacco Root Mountains, Madison Ranger District. Mortality in subablpine fir stands also occurred between Sheep Mountain and Tipton Creek in Centennial Valley. About 1,800 trees were killed in nine groups in seven drainages. In the Hogback Mountains, 550 trees were killed; and mortality has exceeded 640 cu. ft./acre in infested areas during the past 4 years (table 3).

Table 3.—*Subalpine fir mortality caused by western balsam bark beetle and other bark beetle complex, 1975-1978, Idaho and Montana*

Forest	Area	Trees/acre killed 1975-1978	Volume/acre killed (cu. ft.) 1975-1978	Predicted trend
Flathead	Listle Creek	56	1,305	Epidemic decreasing
	Dunshire Creek	192	1,628	Epidemic decreasing
	Sylvia Lake	188	2,679	Epidemic decreasing
	Plume Creek	121	1,775	Epidemic increasing
	Martin Creek	99	1,451	Epidemic decreasing
	Skyland Creek	186	3,433	Epidemic decreasing
	Moose Creek	107	1,628	Epidemic decreasing
Kaniksu	Boundary	31	325	Epidemic static
	American	69	401	Epidemic static
Beaverhead	Crockett Lake	264	1,661	Epidemic increasing
Gallatin	Baconrind Creek	268	1,894	Epidemic increasing
	Monument Creek	266	2,074	Epidemic decreasing
Glacier NP	Logan Pass	147	1,807	Epidemic decreasing

GALLATIN NATIONAL FOREST, MONTANA

Mountain Pine Beetle

Beetle populations continued to devastate mature stands on the Hebgen Lake Ranger District in 1978. Infested acreage increased from 78,000 in 1977 to about 79,000 in 1978. Trees killed increased from 22 to 60 per acre, a 1:2.2 buildup ratio. More than 4.1 million trees containing 230 MMBF were killed. Redtopped trees occur from the Moose Creek Plateau on the south end of the District, north to Tepee Creek. Faders have increased along the west side of Hebgen Lake and throughout the south and west portions of the District. Infestation continued to build up in the Beaver Creek drainage and around Quake Lake.

More than 4.6 million trees containing 233 MMBF were killed on approximately 165,600 acres of mixed Federal, State, and private lands within the boundaries of, or adjacent to, the Bozeman-Gallatin Ranger District. The buildup ratio of old to newly attacked trees was 1:1.7 from 1977 to 1978, with an average of 28 newly infested trees per acre in 1978. Beetle populations continued to increase and spread in the Gallatin Canyon as far south as Grouse Mountain; throughout most of the South Fork Gallatin River drainage, as far west as the Big Sky Ski Complex; and west along the Gallatin Front Range to the Madison River. Extensive tree-kill occurs in most drainages from the Gallatin Canyon Highway east to Bozeman Pass between the Bozeman-Gallatin and the Livingston and Gardiner Ranger Districts.

In an effort to recover some of the tree mortality, the Gallatin National Forest has logged 625 acres containing about 2.2 MMBF on the Bozeman-Gallatin District. Another 1,028 acres have been logged containing 4.8 MMBF, from Horse Butte and Cougar Creek of the Hebgen Lake District, plus additional small sales in Cream and Danny Creeks, the Madison Plateau, and along the South Fork of the Madison River.

We predict that beetle populations will intensify in all areas, with new infestations developing on the Livingston and possibly the Gardiner Ranger Districts. A decline in infestation intensity is predicted for Logger, Hell Roaring, and some drainages in the Gallatin Canyon south to Portal Creek, where tree killing has occurred for 7-8 years.

YELLOWSTONE NATIONAL PARK, WYOMING

Mountain Pine Beetle

Mountain pine beetle infestation increased from 129,280 acres in 1977 to more than 171,244 acres in 1978. Based on infested trees/acre on adjacent National Forest lands more than 10 million trees are currently infested in the Park. Massive groups of red-topped trees occur from Plateau Lake north to Divide Lake and as far east as Upper Geyser Basin north to White Peaks. A decline in populations may occur in 1979 due to inclement winter temperatures.

Western Balsam Bark Beetle

A marked decline from 7,300 acres to 712 acres in western balsam bark beetle infestation occurred in the Park. Current active infestation occurred in Clea and Weasel Creeks and at Potts Hot Spring Basin.

FLATHEAD NATIONAL FOREST, MONTANA

Mountain Pine Beetle

The most spectacular mountain pine beetle infestation in the Region is on State, private, and Federal lands in the North Fork Flathead River drainage, Glacier View Ranger District, and adjacent Glacier National Park.

The infestation increased from about 44,300 acres to over 78,500; a 1.7-fold increase from 1977 to 1978. The number of infested trees increased from 55 to 79 per acre, a buildup ratio of 1:3.2 from 1977 to 1978. More than 6.2 million trees containing 347 MMBF were killed between Big Creek drainage and the Canadian border. About 3,000 infested acres containing 28 MMBF were logged from Federal land on the Glacier View Ranger District in 1978. Plans for 1979 are to log an additional 8 MMBF from 700 infested acres. The State of Montana has sold 10 MMBF on 4,000 acres in the North Fork drainage and plans to log an additional 6 MMBF from another 2,000 acres.

Beetle activity increased at the north end of Lower Stillwater Lake and additional hot-spots occur near Olney. New red-topped groups ranging from 5 to 500 trees per group were detected at Ashley, Little Bitterroot, Rogers, and Hubbart Lakes. The infestation is building rapidly at these locations, and in some instances is being influenced by an adjacent infestation in the Thompson River drainage, Lolo National Forest.

New infestations are developing in lodgepole pine stands along Highway 2 between West Glacier and Essex. Red-topped faders were detected for the first time at Bruce Meadow and along the South Fork Flathead River near Spotted Bear Ranger Station. Seven groups, with 5-10 trees per group, occurred at Emery and Abbott Bay, Hungry Horse Ranger District.

Ponderosa Pine

Incidental killing of mature and overmature ponderosa pine occurred on the west side of Lake Mary Ronan. Faded groups ranged from 25 to 300 trees per group and were scattered throughout the Dayton Creek drainage. One group of 100 trees was detected near Hubbart Lake, Tally Lake Ranger District.

Western White Pine

Mountain pine beetle infestations in western white pine remain static, with groups of 5-30 trees per group scattered along both sides of the Hungry Horse Reservoir, Hungry Horse Ranger District, and between Spoon Lake and McGinnis Creek in the Canyon, Kimmerly, and Depuy drainages, Glacier View Ranger District.

Predictions are for mountain pine beetle populations to increase and spread into other susceptible lodgepole pine stands in the North Fork drainage. New infestations will develop in the Middle and South Fork drainages, Hungry Horse Ranger District. Most of the mature and overmature lodgepole pine could be killed within the next 5-8 years on the Flathead National Forest.

Infestations in ponderosa and western white pines will remain static. Additional tree killing is expected particularly in stands adjacent to large areas of infestation in lodgepole pine.

Western Balsam Bark Beetle

Infestations of western balsam bark beetle declined from 8,800 acres to 2,045 acres in Pinnacle, Paola, South Fork Dickey, Twenty-five Mile, Granite, and Challenge Creek drainages, Hungry Horse Ranger District.

Three hundred trees were killed in two groups in Hay Creek, Glacier View Ranger District. Another 1,000 trees were killed in Martin, 100 in Good, 60 in Plume, and 140 in Sheppard, Griffin, and Sylvia Creek drainages, Tally Lake Ranger District. More than 420 cu ft/acre (range 20-820 cu ft/ac) have been killed during the past 4 years in these infested areas.

GLACIER NATIONAL PARK, MONTANA

Mountain Pine Beetle

The Glacier National Park infestation has encompassed more area with more trees killed per acre than any other infestation experienced in the Region in the past 3 decades.

Infestation developed to epidemic proportions in 1970, and by 1978 had spread to over 164,017 acres. Extensive tree mortality extends from the Canadian border at the north end of the Park south to Howe Ridge. More than 100 trees per group occur around McDonald Lake and Park Headquarters near West Glacier. The infestation has extended from the North Fork Flathead River east to Upper Kintla, to the east end of Bowman, Quartz, and Rodgers Lakes, and in many areas east throughout the lodgepole pine type. In 1978, an average of 87.9 trees was killed per acre. This is more than 14 million trees. As many as seven trees per acre of overmature old growth ponderosa pine are also being killed near Bowman Lake. Ponderosa pine mortality from mountain pine beetle is low elsewhere in the Park.

Beetle populations will continue at an epidemic level in 1979. A population decline is occurring due to host depletion between Logging Ridge and Quartz Ridge where the epidemic first developed. Populations will continue to invade stands toward Park Headquarters and in the Middle and North Fork Flathead River drainages of Federal, State, and private ownerships adjacent to the Park.

Western Balsam Bark Beetle

Western balsam bark beetle killed about 1,400 subalpine fir on 100 acres near Logan Pass. Continued tree killing is predicted in 1979.

KOOTENAI NATIONAL FOREST, MONTANA

Mountain Pine Beetle

Infested area increased from over 21,700 acres in 1977 to about 29,800 acres in 1978 on the Forest. Another 3,200 acres occurred on State and private lands. Number of infested trees increased from about 237,300 in 1977 to more than 488,649 in 1978, a 1:2.6 buildup. In excess of 39 MMBF were killed in 1978.

The most active infestation is in the Yaak River drainage, Yaak Ranger District, with 21.2 infested trees per acre. Red-topped trees occurred in Caribou, Blacktail, Yaak, and the West Fork of the Yaak drainages, south to Rederick Butte. Large groups of faders were observed in Basin, Porcupine, Vinal, Yodkin, Coal, Lap, and Pete Creek drainages. Salvage sales removed 5.2 MMBF from 8,800 acres in 1978. Additional sales in 1979 will remove 7.3 MMBF from 7,000 acres.

Increased beetle attacks also occurred on the Rexford Ranger District, where the following numbers of lodgepole pine were killed: Young Creek, 80 trees; Holdup Gulch, 250 trees; Gold Creek, 4,000 trees; Good Creek, 50 trees; Roberts Creek, 20 trees; Little North Fork, 100 trees; Sutton Creek, 380 trees in 4 groups; Parsnip Creek, 10 trees; Still Creek, 10 trees; and Briery Creek, 10 trees.

Beetle attacks increased on Federal, State and private land on the Fisher River Ranger District. The most significant increase was on the south side of McGregor Lake where in excess of 4,500 trees were killed. Groups ranging from 5 to 1,000 trees per group were detected throughout the remainder of the District from Black Tail Peak on the south, north to Horse Creek. Areas of greatest concern are Tepee Creek, Snell Mountain, Tensaw Creek, Island Creek, and in high risk stands throughout Pleasant Valley.

An explosive situation appears to be developing throughout the south end of the Forest. Many small 5-20 tree groups will probably enlarge to several hundred tree groups in 1979. Beetles from infestations in high-hazard lodgepole pine stands are migrating to and causing incipient killing in second growth and mature to overmature ponderosa pine stands throughout the Forest.

Beetle activity will increase and tree killing will intensify in areas now infested. Many new groups of red-topped trees will become visible in 1979.

LOLO NATIONAL FOREST, MONTANA

Mountain Pine Beetle

Epidemics increased in high hazard lodgepole pine stands from about 10,300 acres in 1977 to almost 11,069 acres in 1978. Greatest mortality was in the Thompson River drainage, Plains Ranger District. Tree killing increased from approximately 241,800 trees in 1977 to more than 254,357 on Federal, State, and private lands in 1978. Older mortality centers continued to expand in place as well as spread in Indian, Whiting, Lazier, Meadow, Fishtrap, and Bend drainages. Salvage sales in beetle infested stands removed 2.6 MMBF from 507 acres in 1978. Additional sales in 1979 will remove 3.2 MMBF from 430 acres. Red-topped groups occur elsewhere throughout the Thompson River drainage from Jungle Creek north to Thompson Lakes. As many as 300 trees were killed at some locations. A definitive plan has been developed by the District for coordinating the management of mountain pine beetle infestations with all other land management disciplines in the Thompson River drainage.

Infestations are just developing in susceptible stands in Munson and Mantrap drainages, Thompson Falls Ranger District, and are predicted to increase in 1979.

Group kills occurred in mixed lodgepole and second growth ponderosa pine stands in most tributaries from Quartz Flat to DeBorgia, Superior Ranger District. Concentrated mortality of 100 tree groups was observed in Fourmile and Mill Creek drainages near St. Regis.

Ponderosa Pine

Mortality in overstocked second growth ponderosa pine was extensive on State and private lands in nearly all drainages between Mulkey Gulch on the east and Bonner, Missoula Ranger District. Red-topped groups of more than 100 trees per acre were common. Several thousand trees were killed on private lands near Sunset Hill where the epidemic has persisted since the early 1970's. Several new small infested groups were detected between Ninemile and East Twin Creeks. Few attacked trees occur on Federal land.

Tree mortality declined between Milltown and Johnson drainage east and north of Missoula. However, several hundred trees were killed in Marshall, Loads, Sawmill, Butler, and Johnson drainages. Additional 5-80 tree group kills occurred in adjacent areas.

Scattered infestation developed in second growth ponderosa pine stands from Howard to Hollenster Gulch in the Lolo Creek drainage, where more than 800 trees were killed; an additional 700 trees were killed in scattered groups between Lolo and Rock Creek west of the Bitterroot River, Missoula Ranger District. Beetle activity increased throughout the Ninemile Ranger District. Ground assessments show in excess of 259,866 trees killed in 1978 in second growth ponderosa pine stands of all ownerships.

Beetle-caused tree mortality is predicted to increase in both lodgepole and ponderosa pine stands throughout the Forest in 1979.

LEWIS AND CLARK NATIONAL FOREST, MONTANA

Mountain Pine Beetle

Infestations in second growth ponderosa pine stands declined from about 81,900 acres in 1977 to 34,244 acres in 1978. More than one-half of the epidemic is on State and private lands bordering the Judith Ranger District. Static infestation of less than one tree/acre has persisted for 10 years in the South and Lost Forks of the Judith River and tributaries of Yogo Creek.

Although infestation appears extensive on Bureau of Land Management, State, and private lands south and east of Lewistown, infested groups are small, and many dead trees are widely scattered over extensive areas in Flat Willow, Holt, and Willow Creek drainages southeast of Lewistown.

In the Judith Mountains north of Lewistown the following three areas of considerable mortality were found during aerial detection surveys: 3,000 trees near Burnette Peak, 500 trees near Judith Peak, and 500 trees near Maiden. Additional red-topped groups ranging from 5 to 150 trees per group are scattered throughout the Judith Mountains. About 1,100 infested trees occur on several hundred acres along the southwest side of the Moccasin Mountains northwest of Lewistown.

More than 1,300 whitebark pine were killed by mountain pine beetle in tributaries of Swamp Creek, White Sulphur Springs Ranger District. Most large diameter trees have been killed. Tree mortality declined between 1977 and 1978, and continued population decline is predicted in 1979.

The infestation in lodgepole pine stands in Sulphur Bar drainage and its tributaries has remained static since 1970-71. More than 500 trees were killed in 12 groups. Tree killing is expected to continue in 1979.

Western Balsam Bark Beetle

Subalpine fir mortality caused by western balsam bark beetle continued in high elevation subalpine fir stands in the Belt Mountains as follows: Little Camas Creek, 9,000 trees; Moose Creek, 1,500 trees; and Slough Creek, 300 trees. In addition, more than 200 subalpine fir were killed on 500 acres near Kings Hills, and 600 trees were killed along the Musselshell River near Ant Flat, White Sulphur Springs Ranger District.

HELENA NATIONAL FOREST, MONTANA

Mountain Pine Beetle

Mortality in ponderosa pine declined in Grizzly, Nelson, Orofino, and Squaw Gulches southwest of Helena. About 200 trees were killed in 12 small groups on about 225 acres in these drainages. Small group kills ranging from 5 to 10 trees per group were observed on Federal, State, and private lands in Deer, Wasson, Sauerkraut, Poorman, Stonewall, and Liverpool Creek drainages northwest of Helena. Beetle populations are expected to remain static in 1979.

CROW INDIAN RESERVATION, MONTANA

Mountain Pine Beetle

Infestation increased from almost 3,400 acres in 1977 to about 7,200 acres in 1978 in second growth and mature ponderosa pine stands in the Wolf Mountains. Thousands of red-topped trees occurred in three large groups in Cache and Crow Creek drainages. Several hundred trees were killed in groups ranging from 5 to 125 trees/group in Thompson, Sioux Pass, Little Owl, and Blanket Creek drainages east of Lodgegrass. About 700 trees were killed in five groups in Little Youngs, Youngs, and Owl Creek drainages east of Aberdeen. More than 100,000 trees were killed in these drainages during 1978. The Bureau of Indian Affairs salvage logged 1.1 MMBF from 250 acres in 1978. Contracts have been awarded for removal of 1.5 MMBF from 500 acres in 1979. Tree mortality is expected to continue at epidemic status or increase until logging reduces basal area of the stands to less than 80 sq. ft./acre.

FORT BELKNAP INDIAN RESERVATION, MONTANA

Mountain Pine Beetle

Mountain pine beetle populations persisted at epidemic proportions in second growth ponderosa pine stands on Bureau of Indian Affairs and Bureau of Land Management lands in the Little Rocky Mountains. Small (5-25 tree) groups of faders occurred from Saddle Butte extending northwest to Mission Peak and St. Park near Landusky. Extensive tree kill occurred for the third year in Bear Gulch north of Zortman. During 1978, 800 MBF were salvage logged from 800 acres. About 200 MBF will be logged in 1979. Unless cold temperatures this winter cause extensive brood mortality, the epidemic is expected to continue in 1979.

OTHER FEDERAL, STATE, AND PRIVATE LAND, MONTANA

Mountain Pine Beetle

A 1:5.7 buildup ratio in tree mortality caused by the mountain pine beetle occurred between 1977 and 1978 on Federal, State, and private lands. About 1 million lodgepole and ponderosa pines were killed on 38,900 acres in the Thompson River State Forest. This is part of the large beetle infestation in the Thompson River drainage. Nearly 394,000 second growth ponderosa pine were killed within the Garnet Mountain Range on Bureau of Land Management, State, and private lands east of Bonner (table 4).

Mortality in second growth ponderosa pine appears to be directly associated with dense stands, and may be associated with shallow soils where trees are stressed during drought years.

Pine Engraver Beetle

Pine engraver beetle infestations increased substantially from 1977 to 1978 on the Flathead Indian Reservation. About 8,200 trees were killed on 11,500 acres. On the Thompson River State Forest, over 100 trees were killed on 50 acres, 45 trees were killed on the Kootenai Valley State Forest, and more than 400 trees were killed within the Garnet Mountain Range.

Table 4.—*Infested acres and trees killed by bark beetles on other Federal, State, and private lands in Montana, 1978*

Area	Pine engraver		Mountain pine beetle		Douglas-fir beetle		Fir engraver	
	Acres	Trees	Acres	Trees	Acres	Trees	Acres	Trees
Flathead IR	11,540	8,235	180	21				
Crow IR			7,155	2,547				
Rocky Boy IR			150	130	10	25		
Ft. Belknap IR			995	1,981				
Stillwater State Forest			1,138	1,256	75	176	1,902	160
Swan River State Forest				30			132	132
Thompson River State Forest	50	126	17,721	1,006,552		4		
Kootenai Valley State Forest		45		110				
Garnet	75	411	9,351	394,331		118		
Judith River BLM			2,338	6,789				
Total	11,665	8,817	39,028	1,413,747	85	323	2,034	292

IR = Indian Reservation
BLM = Bureau of Land Management

Fir Engraver Beetle

Fir engraver beetle-caused mortality in grand fir did not differ significantly from 1977 to 1978. Tree kill declined from 260 to 100 trees in the Stillwater State Forest but increased in the Swan River State Forest.

Douglas-fir Engraver Beetle

Douglas-fir engraver beetle infestations in pole size Douglas-fir increased from about 600 acres in 1977 to 1,300 acres in 1978. Trees killed/acre declined from 1,740 in 1977 to 610 in 1978. Major infestations occurred again on the Bitterroot, Lewis & Clark, Lolo, and Kootenai National Forests.

Bark Beetle Complex

Tree mortality caused by the western balsam bark beetle complex declined in most areas sampled. Infestation in Plume Creek drainage showed an increase in mortality from 1977 to 1978. No new infested trees were found in other areas sampled. *Cryphalus ruficollis* was responsible for the majority of dead trees less than 6 inches dbh; and *Pityophthorus pseudotsugae* and *Dryocoetes confusus*, either singly or in combination, killed trees larger than 6 inches dbh. There was no apparent association between root disease and bark beetle infestation.

CLEARWATER NATIONAL FOREST, IDAHO

Douglas-fir Beetle

Infestations of the Douglas-fir beetle declined from about 2,200 trees in 1977 to 1,260 trees in 1978. The majority of tree mortality occurred on the Lochsa Ranger District in both years. Ground evaluations indicate fewer than 200 newly attacked trees in 1978. A continued decline is predicted for 1979.

Fir Engraver Beetle

Grand fir mortality caused by the fir engraver beetle increased from 200 trees in 1977 to more than 1,000 trees in 1978 on the Pierce Ranger District. Group kills, usually less than 100 trees/ group, occurred in Lolo, Maggie, and Orofino Creek drainages.

OTHER FEDERAL, STATE, AND PRIVATE LAND, IDAHO

Pine Engraver Beetle

Pine engraver beetle infestations increased in second growth ponderosa pine stands in 1978 (table 5). In 1977, 9,000 trees were detected on about 1,400 acres; this increased to more than 23,200 trees on nearly 3,400 acres in 1978.

The pine engraver beetle killed second growth ponderosa pine in the following areas: Kootenai Valley State Forest, 45 trees; Priest Lake Forest Protective Association, 248 trees; Pend Oreille State Forest, 4,538 trees; Mica State Forest, 7,325 trees; Kendrick State Forest, 1,107 trees; Clearwater-Potlatch Protective Association, 2,040 trees; and Craig Mountain State Forest, 2,824 trees.

Trees on shallow soils were moisture stressed during the 1977 drought. This favored a population buildup of engraver beetles, which killed many small trees and top-killed larger trees. Top-killed trees were later attacked by *Ips* spp., western pine beetle, and in some areas, mountain pine beetle, during 1977 and 1978. Since engraver beetles produce two or more generations yearly, a large population buildup and extensive tree killing can result in a short period of time. Climatic conditions adverse to engraver beetle populations should result in fewer trees being killed in 1979.

Table 5.—*Infested acres and trees killed by bark beetles on other Federal, State, and private lands in Idaho, 1978*

	Pine engraver		Fir engraver		Mountain pine beetle			Douglas-fir beetle	Western balsam bark beetle
	Acres	Trees	Acres	Trees	W. white pine Trees	LPP Acres	LPP Trees	Trees	Trees
Priest Lake Protective Assn.	—	248	—	12	5	—	—	4	270
Pend Oreille State Forest	1,000	4,538	—	221	25	—	—	218	5
Mica State Forest	1,125	7,325	250	1,697	17	—	11	305	—
Cataldo State Forest	—	135	—	274	3	—	—	65	—
West St. Joe State Forest	1,000	5,099	750	3,060	21	—	10	92	—
Kendrick State Forest	—	1,107	—	2,530	7	—	—	21	—
Clearwater-Potlatch Protective Assn.	238	2,040	3,035	6,296	12	—	50	1,049	—
Craig Mountain State Forest	—	2,824	700	1,285	10	2,520	10,210	462	—
Total	3,363	23,316	4,735	15,375	100	2,520	10,281	2,216	275

Fir Engraver Beetle

Mortality due to the fir engraver beetle increased from about 3,500 trees on 2,800 acres in 1977 to nearly 15,400 trees on 4,700 acres in northern Idaho in 1978.

Tree mortality occurred mainly on State and private lands where the following number of grand fir trees were killed: Priest Lake Protective Association, 12 trees; Pend Oreille State Forest, 25 trees; Mica State Forest, 1,700 trees; West St. Joe State Forest, 3,060 trees; Kendrick State Forest, 2,530 trees; Clearwater-Potlatch Protective Association, 6,300 trees; and Craig Mountain State Forest, 1,285 trees. About 1,400 trees were also killed on the Avery and St. Maries Ranger Districts, Idaho Panhandle National Forests.

Fir engraver beetle activity appears to be drought related. Mortality increased in 1974 following the 1973 drought and increased fourfold in 1978 following the 1977 drought. Greatest number of group kills were on lands managed by the Clearwater-Potlatch Protective Association near Orofino.

Mountain Pine Beetle

Mountain pine beetle killed an average of one lodgepole pine per acre on 2,600 acres in the Craig Mountain State Forest in 1977. A 1:5 buildup ratio occurred from 1977 to 1978 when 10,200 trees were killed in three large groups in Doe and Swamp Creek drainages. Scattered smaller groups were detected in adjacent drainages: Continued tree killing is expected during 1979.

Western Pine Beetle

Western pine beetle killed about 275 trees at widely scattered locations in 1978. Ground examination of group kills revealed that most trees had been predisposed to attack by drought or were top killed by pine engraver beetles. Damage is predicted to decline in 1979.

Douglas-fir Beetle

Tree mortality from Douglas-fir beetle increased slightly from about 1,700 trees in 1977 to over 2,200 trees in 1978. More than one-half of the trees killed were on lands managed by the Clearwater-Potlatch Protective Association near Orofino. Additional red-topped groups occurred in the Craig Mountain, Mica, and Pend Oreille State Forests. Less than 100 trees were killed in each of the other units surveyed.

Bark Beetle Complex

A complex of bark beetles caused extensive tree mortality in high elevation subalpine fir stands in Boundary and American Creek drainages, Bonners Ferry Ranger District, Idaho Panhandle National Forests. About 1,160 bd ft/acre were killed in the Boundary Creek drainage, and 719 bd ft/acre in the American Creek drainage and its tributaries.

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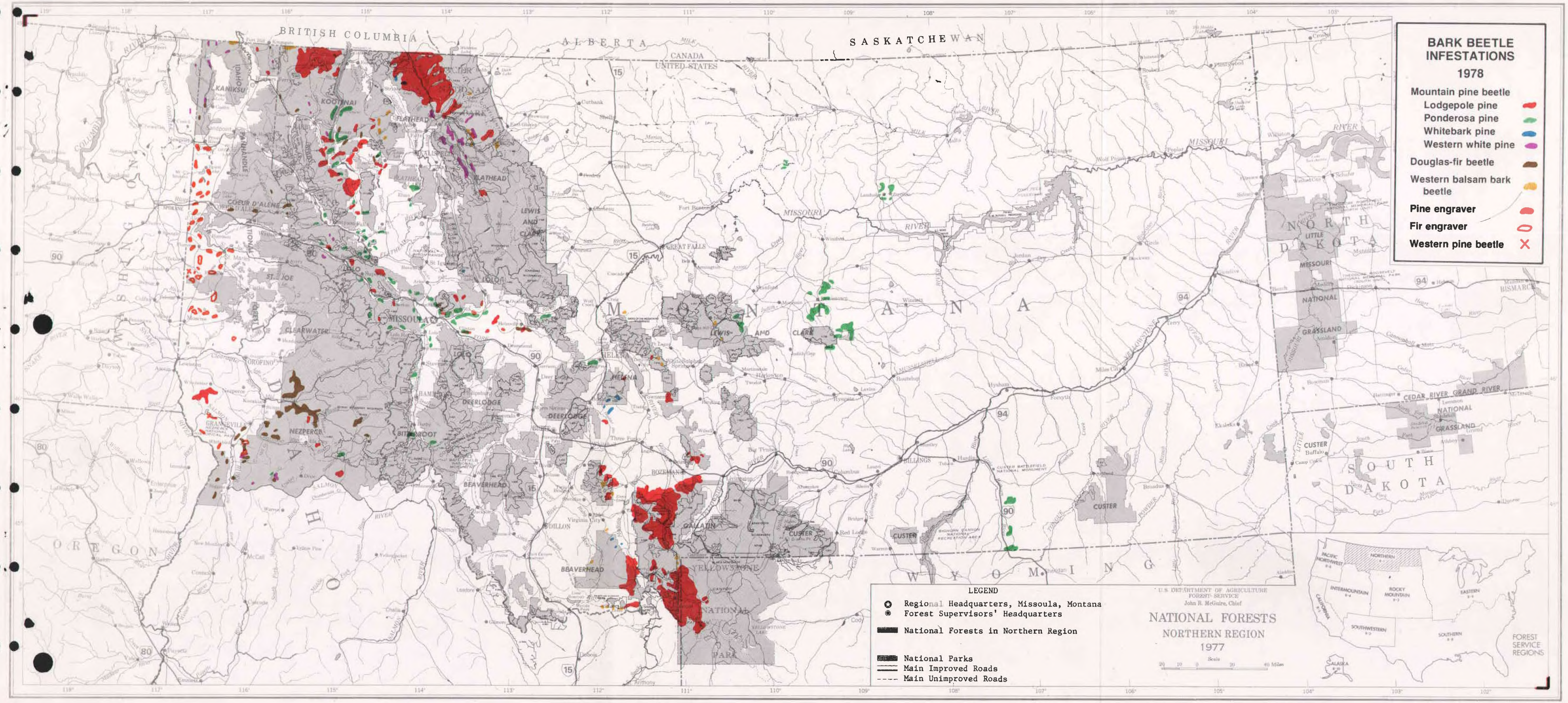
BARK BEETLE INFESTATIONS
1978
Mountain pine beetle
Lodgepole pine
Ponderosa pine
Whitebark pine
Western white pine
Douglas-fir beetle
Western balsam bark beetle
Pine engraver
Fir engraver
Western pine beetle
LEGEND
Regional Headquarters, Missoula, Montana
Forest Supervisors' Headquarters
National Forests in Northern Region
National Parks
Main Improved Roads
Main Unimproved Roads
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
John R. McGuire, Chief
NATIONAL FORESTS
NORTHERN REGION
1977
Scale
FOREST SERVICE REGIONS
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
CANADA
UNITED STATES
MONTANA
IDAHO
WYOMING
NORTH DAKOTA
SOUTH DAKOTA
OREGON
KANIKSU
KOOTENAI
FLATHEAD
COEUR D'ALENE
ST. JOE
CLEARWATER
NEZPERCE
MISSOULA
LOLO
BITTERROOT
DEERLODGE
HELENA
BEAVERHEAD
GALLATIN
YELLOWSTONE
LEWIS AND CLARK
GREAT FALLS
BOZEMAN
DILLON
BILLINGS
CUSTER
MISSOURI
LITTLE MISSOURI
GRASSLAND
CEDAR RIVER GRAND RIVER
BISMARCK
PACIFIC NORTHWEST
NORTHERN
INTERMOUNTAIN
ROCKY MOUNTAIN
EASTERN
CALIFORNIA
SOUTHWESTERN
SOUTHERN
ALASKA