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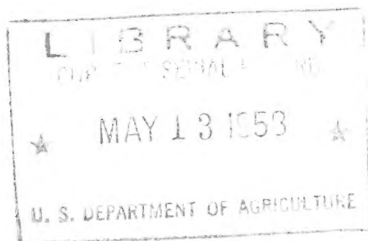


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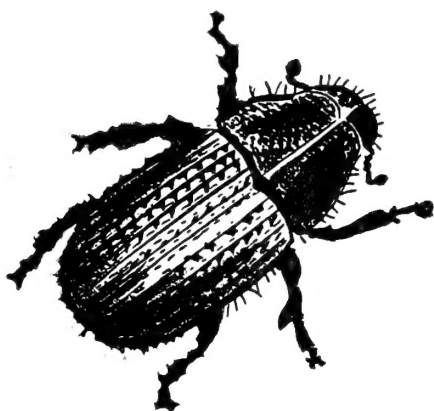
1957



by

F. M. Yasinski and D. A. Pierce

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ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

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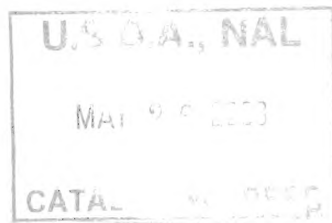
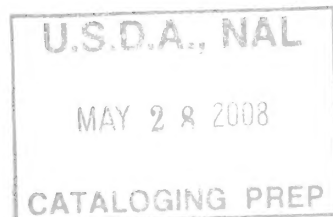
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by

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# C O N T E N T S

	<u>Page</u>
INTRODUCTION. . . . .	1
MAJOR FOREST INSECT PESTS . . . . .	1
PINE BARK BEETLES . . . . .	1
<u>Ips</u> and <u>Dendroctonus</u> spp. . . . .	1
Black Hills beetle. . . . .	2
Roundheaded pine beetle . . . . .	2
Arizona five-spined ips . . . . .	3
FIR AND SPRUCE BEETLES. . . . .	3
Douglas-fir beetle. . . . .	3
Fir engraver beetle . . . . .	3
Western balsam bark beetle. . . . .	4
Engelmann spruce beetle . . . . .	4
DEFOLIATORS . . . . .	5
Spruce budworm . . . . .	5
Great Basin tent caterpillar . . . . .	5
Aspen leaf roller . . . . .	5
Needle miner (ponderosa pine) . . . . .	5
Sawfly. . . . .	5
Tussock moth. . . . .	6
MISCELLANEOUS PESTS . . . . .	6
Red turpentine beetle . . . . .	6
Prescott scale . . . . .	6
Pinyon needle scale . . . . .	6
Mites . . . . .	6
Fall webworm . . . . .	6
Walnut caterpillar . . . . .	7
Lacebug . . . . .	7
Tiger moth . . . . .	7
Needle miner (pinyon pine) . . . . .	7

## INTRODUCTION

Insect epidemics increased during 1957, both in acreage and timber loss. The aerial and ground surveys showed that 3,251,310 acres were infested in 1957 as compared to 1,564,600 in 1956. Losses caused by bark beetles were placed at 610.5 million board-feet. Spruce budworm and Great Basin tent caterpillar infestations are relatively unchanged. A new heavy infestation of a tussock moth was found on white fir. A sawfly on ponderosa pine and a leaf roller on aspen caused noticeable defoliation in 1957.

Survey arrangements in the Southwest remained the same as in 1956. Methods of evaluating forest insect conditions were described in the 1956 Report.<sup>1/</sup>

The regionwide annual aerial survey in 1957 required 155.9 hours. Total flying time includes hours flown over several areas where 100-percent tree counts were made to supplement ground survey data. The 11 million acres of forested land in Arizona and New Mexico was gridironed with flight lines spaced from 4 to 5 miles apart. No contour flying was done except to recheck heavily infested areas. All flying was done in early morning hours and from a height of 500 to 800 feet.

### MAJOR FOREST INSECT PESTS

#### PINE BARK BEETLES

Ips and Dendroctonus spp.--In 1956 a complex of Dendroctonus and Ips species were associated in recently killed pine on 1,711,400 acres in Arizona and New Mexico. Field examinations made during the current year revealed Ips species (usually Arizona five-spined ips, Ips lecontei Sw.) killing the top and Dendroctonus species (usually southwestern pine beetle, Dendroctonus barberi Hopk.) filling in and killing the basal part of the tree. Other bark beetles found but not nearly so numerous as the two insects previously mentioned were: roundheaded pine beetle, Dendroctonus convexifrons Hopk., Colorado pine beetle, Dendroctonus approximatus Dietz, and western six-spined ips, Ips ponderosae Sw.

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<sup>1/</sup> Yasinski, F. M. and Pierce, D. A. Forest Insect Conditions in Arizona and New Mexico - 1956. U. S. Forest Service, Rocky Mountain Forest & Range Experiment Station, Sta. Paper 26, 18 pp., illus. June 1957. (Processed.)

Areas suffering severe losses were on the Gila, Cibola, and the Santa Fe National Forests in New Mexico. The infested acres for these forests were 344,500, 284,010 and 172,920, respectively. Sanitation-salvage logging is being stepped up wherever possible.

Table 1.--Distribution of damage caused by Ips and Dendroctonus spp., 1957 data

Class	Arizona	New Mexico	Total
of	(92 centers	(121 centers	(213 centers
Infestation	of infestation)	of infestation)	of infestation)
	----- Acres -----		
Light	326,290	354,650	680,940
Moderate	126,850	323,510	450,360
Heavy	47,090	175,110	222,200
Very Heavy	<u>49,050</u>	<u>308,850</u>	<u>357,900</u>
Total	549,280	1,162,120	1,711,400

Black Hills beetle (Dendroctonus ponderosae Hopk.)--The Carson National Forest infestation increased from 10,720 to 18,100 acres in 1957. A 100 percent aerial count of the area recorded 450 trees killed in 1956. The attacks are widely scattered and occur in groups of 2 to 5 trees.

To prevent a further build-up in the beetle population, chemical control is contemplated in the spring or early summer of 1958. The estimated number of trees in need of treatment is 500 to 750.

The Navajo Indian Reservation infestation, active since 1954, was brought under control in 1957. During the past several years the Bureau of Indian Affairs treated approximately 1,250 beetle-infested trees with a water emulsion of ethylene dibromide; 60 of these infested trees were treated in 1957. No control is planned for 1958.

Roundheaded pine beetle (Dendroctonus convexifrons Hopk.)--The Mt. Graham outbreak is still active. Total acreage infested is 600 with an estimated 250 beetle-infested trees. The Forest Service plans to treat the infested trees with ethylene dibromide in fuel oil in 1958.



The small localized outbreak (23 trees) of this beetle in Oak Creek Canyon on the Coconino National Forest was successfully controlled by the Forest Service in 1957.

Arizona five-spined ips (Ips lecontei Sw.)-- Tree mortality caused by this species was extensive throughout the pinyon-juniper type in Arizona and New Mexico. An aerial survey was made of Ips damage on the South Rim of the Grand Canyon. Damage was epidemic on 3,840 acres. No other surveys in the woodland type were made.

Below normal rainfall for the past decade has apparently made conditions favorable for an increase of this beetle.

### FIR AND SPRUCE BEETLES

Douglas-fir beetle (Dendroctonus pseudotsugae Hopk.)--In 1956 the volume of Douglas-fir losses from this bark beetle was estimated at 96 million board-feet on 821,200 acres. The Santa Fe National Forest sustained the most loss on 311,950 infested acres. A noticeable increase in tree killing by this beetle was also recorded on the Jicarilla Apache Indian Reservation and the Gila National Forest. Much of the area is inaccessible or of low economic value.

Table 2.--Acreage of epidemic infestation of Douglas-fir beetle, 1956

Class of Infestation	Arizona (37 centers of infestation)	New Mexico (97 centers of infestation)	Total (134 centers of infestation)
----- Acres -----			
Light	30,990	236,750	267,740
Moderate	21,710	309,700	331,410
Heavy	11,070	135,050	146,120
Very Heavy	<u>4,820</u>	<u>71,110</u>	<u>75,930</u>
Total	68,590	752,610	821,200

Fir engraver beetle (Scolytus ventralis Lec.)-- The outbreak of the fir engraver beetle that began in 1948 is still active in the white fir stand in the Sandia Mountains east of Albuquerque, New Mexico. Results of the 1957 aerial survey reveal a slight increase of infested acres (7,880 as compared with 6,880 in 1956). Complete elimination of commercial white fir is expected in certain parts of the area. Limited salvage of dead and dying trees is in progress.

Western balsam bark beetle (Dryocoetes confusus Sw.). The status of this insect changed very little during the past year. Epidemic infestation acreage recorded during 1957 was 167,780 with areas on the Santa Fe and Carson National Forests suffering the greatest losses.

Engelmann spruce beetle (Dendroctonus engelmanni Hopk.). A small localized outbreak is active on Rancho Del Rio Grande Grant, adjacent to Carson National Forest, near Taos, New Mexico. The localized build-up was caused by logging practices which left numerous culls and butt logs in the cutting area. Heavy woodpecker feeding on the standing infested trees should keep the beetle population in check.

Natural mortality factors controlled the infestation on the Tres Piedras District, Carson National Forest.

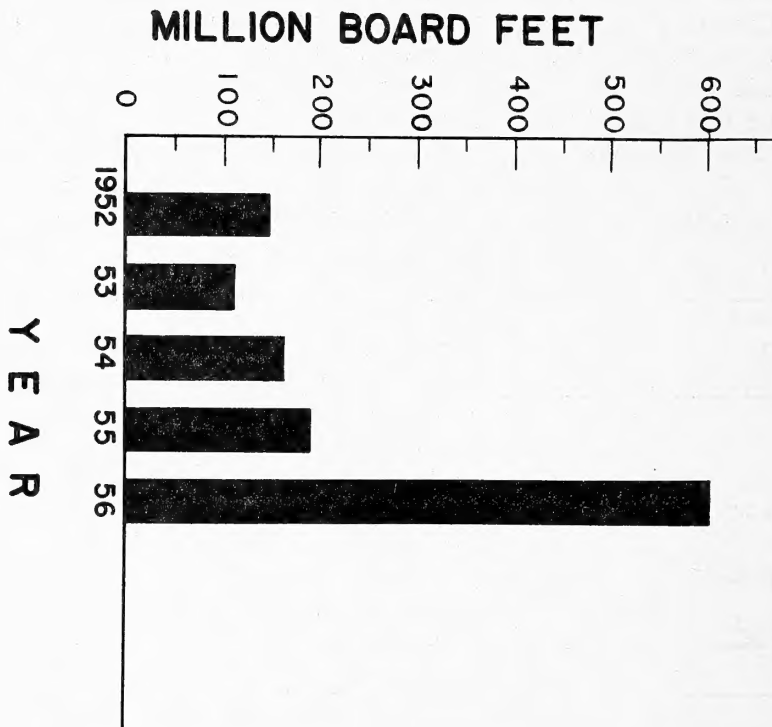


Figure 1. Estimated volume of sawtimber killed by major barkbeetles in Arizona - New Mexico, 1952-1956.

## DEFOLIATORS

Spruce budworm (Choristoneura fumiferana (Clem.))--The 1957 aerial and ground survey showed that budworm partially defoliated 154,950 acres, a small decline over 1956. The unsprayed infestation on the Mescalero Indian Reservation is subsiding because of unknown mortality factors.

In sprayed areas on the Carson and Santa Fe National Forests an increase in defoliation was observed.

Eight years of light to moderate defoliation of mixed conifers on the Kaibab Plateau, which includes the North Rim of Grand Canyon National Park and part of the Kaibab National Forest, has culminated in heavy top-kill of dominant trees and complete destruction of understory in restricted areas. Heavy moth flight on the plateau was observed by the district ranger. The Forest Service plans to treat the entire susceptible type, approximately 80 thousand acres, on the Kaibab plateau.

Great Basin tent caterpillar (Malacosoma fragile (Stretch)). Population of this insect declined slightly in 1957. Defoliated acreage dropped from 296,600 to 250,690.

Aspen leaf roller.--This unidentified defoliator was numerous on 500 acres of aspen on the Carson National Forest. Past records mention localized defoliation by an aspen leaf roller, Archips conflictana (Wlkr.), which is probably the same insect now active on the Carson National Forest.

Needle miner (Recurvaria spp.)--Two new infestation centers of this needle miner in ponderosa pine were found in 1957. The first is near El Rito on the Carson National Forest and the second is near Williams, Arizona, on the Kaibab National Forest. Both infestations are moderate in intensity.

The other two infestation centers reported in 1956 are still active. The needle miner population increased in the Datil, New Mexico, outbreak and decreased slightly in the Springerville, Arizona, outbreak.

Infestation acreage for 1957 is 111,070, as compared with 49,760 for 1956. Damage is limited to previous year's growth. No mortality has occurred.

Sawfly.-- An unidentified sawfly has defoliated approximately 600 acres of ponderosa pine south of Grants, New Mexico. Sawfly feeding is on previous years' growth. The infestation is heavy, but no tree mortality has occurred.

Tussock moth (probably Hemerocampa sp.)--A new heavy infestation of a tussock moth on white fir was observed in the vicinity of Pinal Mountain south of Globe, Arizona. Approximately 100 acres are infested. The top 6-10 feet of many of the firs were completely stripped, and all crowns were heavily defoliated. Since this insect is a very destructive pest, immediate control action is planned by the Forest Service in 1958.

#### MISCELLANEOUS PESTS

Red turpentine beetle (Dendroctonus valens Lec.)--Several green standing trees have been killed by this bark beetle in restricted areas. The attacked trees were all widely scattered.

Prescott scale (Matsucoccus vexillorum Morrison)-- The moderate infestation of Prescott scale on ponderosa pine on the North Rim of the Grand Canyon National Park, reported last year, remained static. Scale damage is limited to branch killing and covers approximately 640 acres.

In the spring of 1957, Malathion spray was used in a pilot test to control the scale but it was not effective. Light to moderate infestations were also observed on the Prescott National Forest.

Pinyon needle scale (Matsucoccus acalyptus Herbert)--A heavy infestation of this scale insect on pinyon was observed along a road on the South Rim of Grand Canyon National Park and near Prescott, Arizona. The Grand Canyon infestation is in a scenic area.

Mites--In 1956 a mite infestation on Douglas-fir was observed near Lost Lodge on the Lincoln National Forest. The infestation covered approximately 50 acres. The mite infestation is in an area sprayed for budworm control in 1955. There was little change in the infestation in 1957.

Fall webworm (Hyphantria cunea (Drury))--Population levels of this insect remained unchanged in 1957. It was found on a variety of hosts in Arizona, New Mexico, and West Texas.

The insect was reported active in the following recreational or scenic areas: Oak Creek Canyon Recreational Area, Coconino National Forest, Canyon de Chelly and Montezuma Castle National Monuments in Arizona; Aztec Ruins and Chaco Canyon National Monuments, Carlsbad Caverns National Park, in New Mexico; Big Bend National Park in Texas.

Walnut caterpillar.-- An infestation of Datana sp. persisted on Texas black walnut in Carlsbad Caverns National Park in spite of annual maintenance control.

Lacebug.--An unidentified lacebug on sycamore in Montezuma Castle National Monument caused rather severe leaf injury in 1957.

Tiger moth (Halisodota ingens Hy Edws.). The infestation of this caterpillar on young ponderosa pine in the Santa Fe National Forest reported in 1956 declined in 1957.

Needle miner.--A moderate infestation of an unidentified needle miner on pinyon pine was observed near Tres Piedras on Carson National Forest. The injury may be serious since it is in conjunction with existing drought conditions. Rather heavy mortality of pinyon can be seen from roads in the area, but it is not known to what extent the needle miner contributed to the death of the trees.

Table 3.--Summary of forest insect infestations recorded during the 1957 survey in Arizona and New Mexico

Insect	: Arizona :		: New Mexico :		: Total :	
	: Centers : Area :		: Centers : Area :		: Centers : Area :	
	<u>No.</u>	<u>Acres</u>	<u>No.</u>	<u>Acres</u>	<u>No.</u>	<u>Acres</u>
<u>Pine bark beetles</u>						
<u>Ips &amp; Dendro-</u> <u>tonus spp. 1/</u>	92	549,280	121	1,162,120	213	1,711,400
Black Hills beetle	--	--	4	19,380	4	19,380
Roundheaded pine beetle	1	600	--	--	1	600
Arizona five-spined ips (pinyon pine)	1	3,840	--	--	1	3,840
Subtotal	94	553,720	125	1,181,500	219	1,735,220
<u>Fir &amp; spruce beetles</u>						
Douglas-fir beetle	37	68,590	97	752,610	134	821,200
Fir engraver beetle	--	--	1	7,880	1	7,880
Western balsam bark beetle	5	4,580	27	163,200	32	167,780
Engelmann spruce beetle	--	--	2	1,280	2	1,280
Subtotal	42	73,170	127	924,970	169	998,140
<u>Defoliators</u>						
Spruce budworm	3	74,030	13	80,920	16	154,950
Great Basin tent caterpillar	10	59,680	25	191,010	35	250,690
Aspen leaf roller	--	--	1	500	1	500
Needle miner (ponderosa pine)	1	250	8	110,820	9	111,070
Sawfly (ponderosa pine)	--	--	1	640	1	640
Tussock moth (white fir)	1	100	--	--	1	100
Subtotal	15	134,060	48	383,890	63	517,950
Total	151	760,950	300	2,490,360	451	3,251,310

1/ Arizona five-spined ips associated with southwestern pine beetle and occasionally one or both of these associated with roundheaded pine beetle, Colorado pine beetle and western six-spined ips.

Table 4.--Known infestations of forest insects on forested areas of Arizona by species and intensity of damage, 1957 season

Forested area	Insect	Centers	Intensity of infestations				Total
			Light	Moderate	Heavy	Very heavy	
		No.	-Acres-				
Apache National Forest and adjacent land	Douglas-fir beetle	6	11,120	9,410	6,400	1,500	28,430
	<u>Ips and Dendroctonus spp. 1/</u>	7	6,030	1,320	--	--	7,350
	Subtotal	13	17,150	10,730	6,400	1,500	35,780
Coconino National Forest	Douglas-fir beetle	6	970	2,820	600	680	5,070
	Great Basin tent caterpillar	1	--	2,400	--	--	2,400
	<u>Ips and Dendroctonus spp. 1/</u>	14	163,860	43,890	4,330	2,660	214,740
	Western balsam bark beetle	4	--	1,500	--	--	1,500
Subtotal	25	164,830	50,610	4,930	3,340	223,710	
Coronado National Forest	Douglas-fir beetle	8	6,820	3,680	480	2,160	13,140
	<u>Ips and Dendroctonus spp. 1/</u>	8	7,680	9,560	6,880	11,360	35,480
	Roundheaded pine beetle	1	--	600	--	--	600
Subtotal	17	14,500	13,840	7,360	13,520	49,220	
Fort Apache Indian Reservation	Douglas-fir beetle	8	7,710	--	--	--	7,710
	<u>Ips and Dendroctonus spp. 1/</u>	8	50,930	13,130	8,080	360	72,500
	Subtotal	16	58,640	13,130	8,080	360	80,210
Gila National Forest	Douglas-fir beetle	2	160	160	--	--	320
	<u>Ips and Dendroctonus spp. 1/</u>	2	2,290	--	--	10	2,300
	Subtotal	4	2,450	160	--	10	2,620
Grand Canyon National Park	Arizona five-spined ips (pinyon pine)	1	--	3,840	--	--	3,840
	Douglas-fir beetle	1	2,240	480	640	--	3,360
	Great Basin tent caterpillar	1	--	--	--	7,680	7,680
	Spruce budworm	1	10,000	--	--	--	10,000
	Subtotal	4	12,240	4,320	640	7,680	24,880
Kaibab National Forest	Douglas-fir beetle	5	1,970	5,160	2,030	480	9,640
	Great Basin tent caterpillar	5	--	1,120	--	30,560	31,680
	<u>Ips and Dendroctonus spp. 1/</u>	9	10,070	800	360	--	11,230
	Needle miner (ponderosa pine)	1	250	--	--	--	250
	Spruce budworm	1	60,500	2,500	--	--	63,000
Subtotal	21	72,790	9,580	2,390	31,040	115,800	
Navajo Indian Reservation	Douglas-fir beetle	1	--	--	920	--	920
	Great Basin tent caterpillar	3	--	9,440	--	8,480	17,920
	<u>Ips and Dendroctonus spp. 1/</u>	7	20,800	3,360	1,280	--	25,440
	Spruce budworm	1	1,030	--	--	--	1,030
	Western balsam bark beetle	1	--	2,760	--	320	3,080
Subtotal	13	21,830	15,560	2,200	8,800	48,390	
Prescott National Forest and adjacent land	<u>Ips and Dendroctonus spp. 1/</u>	6	4,180	15,020	17,360	18,730	55,290
San Carlos Indian Reservation	<u>Ips and Dendroctonus spp. 1/</u>	8	8,810	25,950	5,180	13,020	52,960
Sitgreaves National Forest	<u>Ips and Dendroctonus spp. 1/</u>	12	24,330	10,510	480	10	35,330
Tonto National Forest	<u>Ips and Dendroctonus spp. 1/</u>	11	27,310	3,310	3,140	2,900	36,660
Total		150	429,060	172,720	58,160	100,910	760,850

1/ Arizona five-spined ips associated with southwestern pine beetle and occasionally one or both of these associated with roundheaded pine beetle, Colorado pine beetle, and western six-spined ips.

Table 5.--Known infestations of forest insects on forested areas of New Mexico by species and intensity of damage, 1957 season

Forested area	Insect	Centers	Intensity of infestations				
			Light	Moderate	Heavy	Very heavy	Total
		No.	Acres				
Apache National Forest and adjacent land	Douglas-fir beetle	8	8,000	16,080	2,410	--	26,490
	Ips and Dendroctonus spp. 1/	11	78,460	29,040	11,960	8,380	127,840
	Needle miner (ponderosa pine)	5	--	29,120	--	6,400	35,520
	Subtotal	24	86,460	74,240	14,370	14,780	189,850
Bandelier National Monument	Ips and Dendroctonus spp.1/	1	--	--	1,500	6,500	8,000
Carson National Forest and adjacent land	Aspen leaf roller	1	--	500	--	--	500
	Black Hills beetle	3	2,880	4,480	10,740	--	18,100
	Douglas-fir beetle	12	26,480	14,000	4,000	3,240	47,720
	Engelmann spruce beetle	2	--	--	1,280	--	1,280
	Great Basin tent caterpillar	10	--	63,490	--	44,840	108,330
	Ips and Dendroctonus spp. 1/	9	50,400	25,900	160	1,920	78,380
	Needle miner (ponderosa pine)	1	--	19,940	--	--	19,940
	Spruce budworm	4	52,000	--	--	--	52,000
	Western balsam bark beetle	10	30,480	37,920	24,000	4,640	97,040
	Subtotal	52	162,240	166,230	40,180	54,640	423,290
Cibola National Forest and adjacent land	Douglas-fir beetle	12	23,960	41,090	49,480	12,920	127,450
	Fir engraver beetle	1	--	--	480	7,400	7,880
	Great Basin tent caterpillar	1	--	1,480	--	1,920	3,400
	Ips and Dendroctonus spp. 1/	29	75,710	81,920	54,080	72,300	284,010
	Needle miner (ponderosa pine)	2	--	23,360	32,000	--	55,360
	Sawfly (ponderosa pine)	1	--	--	640	--	640
	Spruce budworm	2	2,000	--	--	--	2,000
	Western balsam bark beetle	1	--	--	320	--	320
Subtotal	49	101,670	147,850	137,000	94,540	481,060	
Gila National Forest and adjacent land	Douglas-fir beetle	15	20,080	51,840	14,060	10,850	96,830
	Ips and Dendroctonus spp. 1/	19	38,340	122,230	54,080	129,850	344,500
	Western balsam bark beetle	2	4,120	--	--	--	4,120
Subtotal	36	62,540	174,070	68,140	140,700	445,450	
Jicarilla Apache Reservation	Douglas-fir beetle	6	10,560	16,560	160	14,440	41,720
	Ips and Dendroctonus spp.1/	4	3,840	800	--	--	4,640
	Subtotal	10	14,400	17,360	160	14,440	46,360
Lincoln National Forest and adjacent land	Douglas-fir beetle	11	10,850	21,970	4,330	5,600	42,750
	Great Basin tent caterpillar	5	--	4,000	--	320	4,320
	Ips and Dendroctonus spp. 1/	14	16,560	8,990	7,160	21,300	54,010
	Western balsam bark beetle	1	1,760	1,600	--	--	3,360
Subtotal	31	29,170	36,560	11,490	27,220	104,440	
Mescalero Apache Indian Reservation	Douglas-fir beetle	6	14,140	20,140	11,780	7,040	53,100
	Ips and Dendroctonus spp. 1/	4	28,090	14,920	6,490	1,280	50,780
	Spruce budworm	1	--	5,120	--	--	5,120
Subtotal	11	42,230	40,180	18,270	8,320	109,000	
Navajo Indian Reservation	Black Hills beetle	1	1,280	--	--	--	1,280
	Great Basin tent caterpillar	3	--	15,200	--	24,400	39,600
	Ips and Dendroctonus spp. 1/	7	28,770	1,760	--	1,120	31,650
	Spruce budworm	4	11,180	--	--	--	11,180
	Western balsam bark beetle	3	8,640	640	--	640	9,920
Subtotal	18	49,870	17,600	--	26,160	93,630	
Santa Clara Indian Reservation	Douglas-fir beetle	1	--	3,800	800	--	4,600
	Ips and Dendroctonus spp. 1/	1	480	2,030	800	2,080	5,390
	Subtotal	2	480	5,830	1,600	2,080	9,990
Santa Fe National Forest and adjacent land	Douglas-fir beetle	26	122,680	124,220	48,030	17,020	311,950
	Great Basin tent caterpillar	6	--	16,640	--	18,720	35,360
	Ips and Dendroctonus spp. 1/	22	34,000	35,920	38,880	64,120	172,920
	Spruce budworm	2	10,620	--	--	--	10,620
	Western balsam bark beetle	10	24,470	16,440	2,520	5,010	48,440
Subtotal	66	191,770	193,220	89,430	104,870	579,290	
Total		300	740,830	873,140	382,140	494,250	2,490,360

1/ Arizona five-spined ips associated with southwestern pine beetle and occasionally one or both of these associated with roundheaded pine beetle, Colorado pine beetle, and western six-spined ips.



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