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State of Utah
Department of
Natural Resources
Division of Forestry,
Fire and State Lands

2001
FOREST INSECT AND DISEASE CONDITIONS UTAH

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FOREST INSECT AND DISEASE CONDITIONS

IN UTAH

2001

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Table of Contents

Forest Health Specialists **2**
Forest Health Conditions Summary **5**
Table 1. 2001 Insect and Disease activity detected during aerial survey by county 7
STATUS OF INSECTS
NATIVE 8
Defoliators **8**
Douglas-fir tussock moth 8
Forest tent caterpillar 8
Western spruce budworm 9
Bark beetles **10**
Douglas-fir beetle 10
Fir engraver beetle 11
Mountain pine beetle 11
Pinyon *Ips* 12
Spruce beetle 13
Spruce *Ips* 13
Pine *Ips* 13
INSECTS: NATIVE OTHER 14
Fall cankerworm 14
INSECTS: NON-NATIVE 14
Defoliators **14**
European gypsy moth 14
STATUS OF DISEASES
NATIVE 15
Stem and Branch Diseases **15**
Dwarf mistletoes 15
Root Diseases **15**
Annosum root disease 15
Armillaria root disease 16
Black stain root disease 16
Leaf and Needle Diseases **16**
Aspen Leaf Blight 16
COMPLEXES/DECLINES AND ABIOTICS
Complexes/Declines **17**
Subalpine fir mortality complex 17
Aspen decline 17
Abiotic damage **18**
Frost damage 18
Blowdown 18
NOXIOUS WEEDS **19**
Table 2. Utah noxious weeds by county 21
Appendix A
Table 3. Number of acres affected by insect or disease damage on all ownerships 22

Forest Health Conditions Summary

Forest health is a complicated topic. To keep things simple, this report focuses only on the effects of insects, diseases, and weather on trees. Within that realm, precipitation is crucial for trees to remain vigorous which increases the trees resistance to insects and pathogens. With adequate rainfall or snowmelt, the trees can maintain their defenses; flushing the attacking bark beetles with pitch or growing more leaves and needles to replace those eaten by defoliating insects. Without adequate precipitation, resistance is significantly reduced. The western states, including Utah, have been suffering from drought since 2000. The effect of drought and increased insect activity is becoming noticeable throughout the Intermountain Region.

Bark Beetles

In Utah, **spruce beetle** was responsible for more infested acres in 2001 than any other forest insect pest. The total number of infested acres reached 72,540. Portions of Sanpete and Iron Counties, located within the Manti-La Sal and Dixie National Forests respectively, have been experiencing devastating spruce beetle outbreaks for a number of years which started in scattered windthrown trees and debris created by landslides.

All but four counties surveyed in Utah had **Douglas-fir beetle** caused mortality for a total of 7,440- acres affecting federal, state, and private land ownerships. Hardest hit were Duchesne, Utah, Cache, and Wasatch counties with 1,341 acres, 1,250 acres, 926 acres, and 811 acres respectively. These infestations began in the early 1990's and are slowly diminishing.

Lodgepole pine mortality caused by the **mountain pine beetle** was mapped over 15,585-acres primarily in Duchesne County on the Ashley National Forest. To a lesser degree, mountain pine beetle caused tree mortality on 1,194 acres of ponderosa pine in Garfield, San Juan, and Kane counties. Mountain pine beetle also killed trees over 486 acres of limber pine. Limber pine is currently experiencing rapid decline in high-elevation pine communities in the western U.S. and Canada. Limber pine is an important element of high-elevation ecosystems in western North American forests. It is a pioneer subalpine and alpine species able to establish on cold, dry, and windy sites. Limber pine are important in watershed protection, because they help to stabilize soil and rock on harsh sites, and retain snowpack for extending ephemeral stream flow. The cones of limber pine are also a valuable food source for grizzly bears in the northern Rocky Mountain States.

Pinyon *Ips* is presenting an increasing problem in the pinyon pine forest ecosystem and affecting valuable home landscape trees. Continued drought conditions produce increased tree stress, which causes them to become more susceptible to *Ips* attack. Pinyon pine mortality observed for 2001 totaled 3,970-acres in Iron, Box Elder,and Sanpete counties. However, aerial observers did not fly the entire pinyon pine forest type in 2001, and the extent of pinyon pine mortality is larger than the recorded coverage.

Defoliators

Douglas-fir tussock moth defoliation was detected in four Utah counties encompassing 2,148- acres. Most of the defoliation occurred in Boxelder County. Sevier County accounted for 452-acres of heavy defoliation in areas where defoliation has been noted since 1999. At this time, Douglas-fir tussock moth is not causing tree mortality in the overstory.

Western spruce budworm was responsible for 10,318 total acres of defoliation in 2001, defoliating 3,211-acres in Garfield County alone. This insect affected subalpine, white, and Douglas-fir on the Dixie National

Forest in Garfield, Iron, and Wayne counties and Fishlake National Forest in Beaver County. The defoliation on the Dixie and Fishlake National Forests has been occurring since 1998. In some sites, successive years of defoliation have caused understory tree mortality. 2001 was the first year defoliation was noted within ten additional counties.

The **forest tent caterpillar** is the most widely distributed and destructive tent caterpillar in North America. Seven counties were observed to have areas of defoliation affecting primarily stands of aspen. Approximately 3,592 acres of defoliation were mapped statewide with the heaviest defoliation observed in Wasatch and Cache counties.

In 2001, the general pheromone trap detection grid scheme was resumed throughout Utah for **Gypsy moth**, with the exception of delimitation trapping in Salt Lake and Duchesne counties. One male moth was caught within the general trap detection grid in Duchesne County, so first year delimitation traps will be installed within this area in 2002. For 2002, a pheromone detection-trapping grid will resume at all other susceptible sites.

Table 1. 2001 Insect and Disease activity detected during aerial survey by county.

	Mountain Pine Beetle		Douglas-fir Beetle		Spruce Bark Beetle		Fir Engraver Beetle		Sub-alpine Fir Complex		Doug-fir Tussock Moth	Western Spruce Budworm	Forest Tent Caterpillar	Pinyon Ips	Frost Damage	Blow-down
County	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Beaver	60	20	275	76	4,391	839	144	28	5,031	782	-	1,154	-	-	-	-
Box Elder	350	98	157	105	20	10	-	-	1,071	309	1,603	23	46	857	-	-
Cache	150	70	2,285	926	130	78	-	-	1,792	420	-	219	775	-	483	-
Carbon	59	46	1,058	311	1,241	224	40	10	2,238	411	-	-	-	-	-	40
Daggett	83	23	549	221	-	-	-	-	251	61	-	-	-	95	37	-
Davis	-	-	-	-	-	-	-	-	-	-	-	-	89	-	66	-
Duchesne	34,040	12,993	4,553	1,341	1,694	927	134	35	3,904	1,109	-	-	-	60	-	-
Emery	60	20	671	148	8,818	1,353	-	-	1,191	126	-	-	-	-	146	-
Garfield	931	386	1,421	387	19,451	2,728	326	90	42,894	8,614	-	3,211	-	246	38	-
Grand	49	35	-	-	10	10	-	-	1,414	325	-	-	-	-	4,563	-
Iron	67	23	204	83	66,750	28,029	248	71	443	115	-	2,716	-	1,680	6,591	23
Juab	7	5	70	10	1,621	358	248	66	566	70	-	-	-	-	-	-
Kane	655	258	167	45	7,090	296	340	70	600	44	-	215	-	-	16	-
Millard	274	53	1,309	315	20	10	538	33	-	-	49	11	-	40	866	-
Morgan	-	-	140	20	-	-	-	-	471	73	-	28	666	-	20	-
Piute	-	-	385	100	680	92	530	133	17,564	1,657	-	201	-	186	527	142
Rich	-	-	30	10	10	10	-	-	131	23	44	-	-	-	-	-
Salt Lake	-	-	-	-	-	-	-	-	439	77	-	-	212	-	150	-
San Juan	982	329	190	60	521	160	202	70	1,785	341	-	-	-	-	3,229	-
Sanpete	406	78	1,177	306	100,509	32,335	2,553	915	3,376	414	-	340	-	506	823	-
Sevier	60	10	876	227	10,691	2,630	874	468	29,124	3,631	452	95	-	25	6,601	-
Summit	4,547	1,464	416	147	2,820	892	-	-	21,522	4,997	-	-	512	-	75	-
Tooele	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uintah	357	170	365	301	547	391	-	-	575	106	-	-	-	-	36	-
Utah	-	-	4,605	1,250	150	70	111	55	1,105	190	-	93	-	238	9,463	265
Wasatch	2,442	1,059	3,015	811	1,370	479	-	-	12,983	3,029	-	186	1,115	31	3,117	-
Washington	253	65	750	200	-	-	221	89	30	10	-	-	-	-	829	-
Wayne	128	60	40	20	2,000	619	-	-	3,759	566	-	1,826	-	-	-	-
Weber	-	-	55	20	-	-	-	-	80	10	-	-	177	-	24	-
Total	45,960	17,265	24,763	7,440	230,534	72,540	6,509	2,133	154,339	27,510	2,148	10,318	3,592	3,964	37,700	470

STATUS OF INSECTS

NATIVE

Defoliators

Douglas-fir tussock moth
*Orgyia pseudotsu*gata

Host: Douglas-fir, true firs, Engelmann and Colorado blue spruce

Mature DFTM larvae

The Douglas-fir tussock moth (DFTM) is an important native insect, causing significant defoliation and tree mortality. Defoliation occurs quickly, with treetops sometimes killed after only a single season of severe injury. Outbreaks are cyclic, usually appearing abruptly, and then typically subsiding after 1 to 4 years in the same manner.

In 2001, DFTM defoliation was detected in four Utah counties for a total of 2,148- acres. Most of the defoliation occurred in northwestern Boxelder County (1,603 acres), on the west side of the Raft River Division of the Sawtooth National Forest. Northwestern Sevier County accounted for 452-acres of heavy defoliation in areas around Beehive Peak and Strawberry Canyon, on the Fillmore Ranger District, Fishlake National Forest, where defoliation has been noted since 1999. At this time, DFTM caused tree mortality has not been detected in the overstory trees.

Forest tent caterpillar
Malacosoma disstria.

Host: Gambel oak, Aspen, Willow

The forest tent caterpillar is the most widely distributed and destructive tent caterpillar in North America. Trembling aspen is the forest tent caterpillar's preferred host, but it will attack a wide range of deciduous trees and shrubs. Larvae feed without building tents and when not feeding form clusters on leaves, branches or trunks (shown left). Outbreaks usually last only 2 to 3 years in western states, and may cover up to 200 square miles. Repeated defoliation and other stress factors may reduce growth rates, kill trees, or predispose them to other diseases or insect pests.

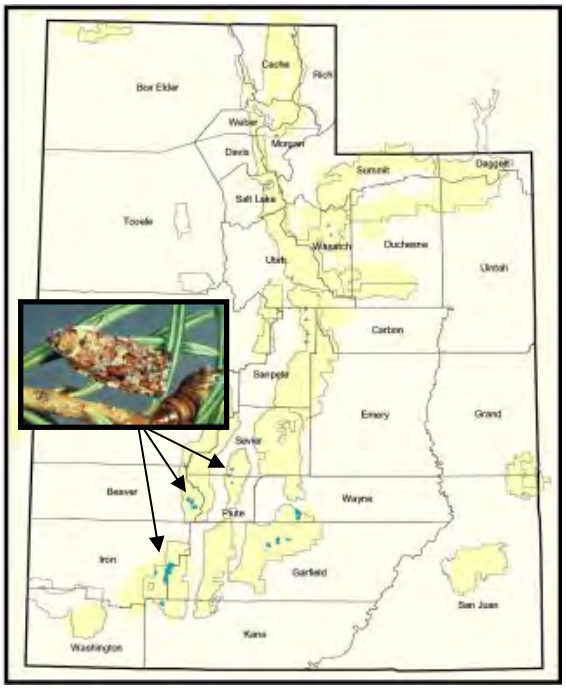
Cluster of forest tent caterpillar larvae.

Seven counties were observed to have areas of defoliation, totaling 3,592-acres. Wasatch County had the most defoliation, primarily in aspen, caused by this insect with 1,115-acres, found northwest of Heber City on a combination of Federal, State, and private lands. In Cache County, 775-acres of the aspen and maple component were defoliated within and on the

edge of the Wellsville Mountain Wilderness, Logan Ranger District, Wasatch-Cache National Forest, and on private lands adjoining the Wilderness. Morgan County was observed to have 666-acres of aspen defoliation dispersed along the drainage system of the east slope of the Wasatch Range, on Forest Service and private lands. Defoliated aspen in Summit County totaled 512-acres, which were detected on private and State lands south and northwest of Park City. All other counties had defoliation ranging from 46 to 212-acres (Table 1).

Western spruce budworm
Christoneura occidentalis

Host: Douglas-fir, True firs



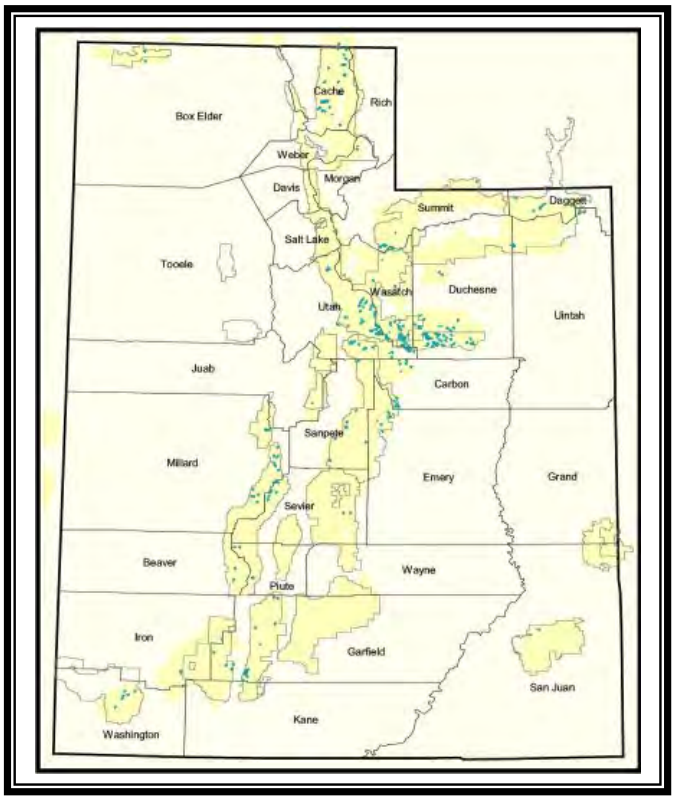
Western spruce budworm is the most widely distributed and destructive defoliator of coniferous forests in western North America. Trees may be extensively defoliated during outbreaks, resulting in stress that can directly kill the tree or make it susceptible to diseases and secondary insect pests, such as the Douglas-fir beetle.

Western spruce budworm was responsible for 10,318 total acres of defoliation for 2001 (Table 1), defoliating 3,211-acres in Garfield County alone. This affected subalpine, white, and Douglas-fir in areas predominantly south of Bear and Cyclone Lakes, around Roger Peak, and around the source of Sand Creek, Escalante Ranger District, Dixie National Forest. Iron County was observed to have 2,716-acres of defoliation, found primarily in areas of Mud Spring, Prince Mountain, and Blue Spring Mountain, Escalante Ranger District and near Duck Creek on the Cedar City Ranger District on the Dixie National Forest. Wayne County was observed to have 1,826-acres of defoliation, found southwest of the town of near the Jim Larsen Reservoir, Teasdale Ranger District, Dixie National Forest. In Beaver County, on the Beaver Ranger District, Fishlake National Forest, areas north of Baker's Peak and in the proximity of Mud Flat and Forked Flat sustained 1,154-acres of western spruce budworm defoliation. The defoliation on the Dixie and Fishlake National Forests has been occurring since 1998. 2001 was the first year defoliation was noted on 10 other counties within the state ranging from 11 to 340-acres of affected host type.

Bark beetles

Douglas-fir beetle
Dendroctonus pseudotsugae

Host: Douglas-fir



Douglas-fir beetle is the most destructive bark beetle of this tree species in western North American forests. At endemic levels, these insects infest scattered trees of low vigor and poor health. Where there is an abundance of trees of low vigor and poor health, populations can build rapidly and spread to adjacent healthy, green standing trees.

All but four counties surveyed in Utah had Douglas-fir beetle caused mortality encompassing 7,440- acres (Table 1). In Duchesne County, areas of mortality were widely distributed over the Duchesne Ranger District, Ashley National Forest, Bureau of Indian Affairs, State, and private lands for a total of 1,341-acres. In Utah County, a total of 1,250-acres were observed to have concentrations of mortality northwest of Coffeepot Ridge, northwest of Mill Fork Ridge, and in the Sweat Creek drainage, Sanpete Ranger District, Manti-La Sal National Forest; and, along Strawberry Ridge and the Tie Fork and Sheep Creek drainages on the Spanish Fork Ranger District, Uinta National Forest. Cache County's 926-acres of Douglas-fir beetle-caused tree mortality were detected over dispersed portions of the Logan and Ogden Ranger Districts, Wasatch-Cache National Forest, and on private lands, west and southwest of the Hardware Ranch Wildlife Management area. Wasatch County accounted for 811 infested acres from Strawberry Peak to Cat Peak on the border of the Uinta and Ashley National Forests. In all other affected counties, Douglas-fir beetle caused tree mortality ranged from 10 to 387-acres.

Historically, the Douglas-fir beetle infestation on the Ashley National Forest began in 1994 with 100 acres of tree mortality aerially mapped. Affected acreage increased to 1,300 acres by 1996 and has remained static around 1,300 acres. Uinta's DFB infestation began in 1992 with 200 acres, hit a peak of 3,300 acres in 1994 and has varied since then with 1,500 acres of mortality recorded in 2001. Pockets of tree mortality have been mapped on the Wasatch-Cache National Forest since 1991.

Fir engraver beetle
Scolytus ventralis

Host: Grand fir, Subalpine fir

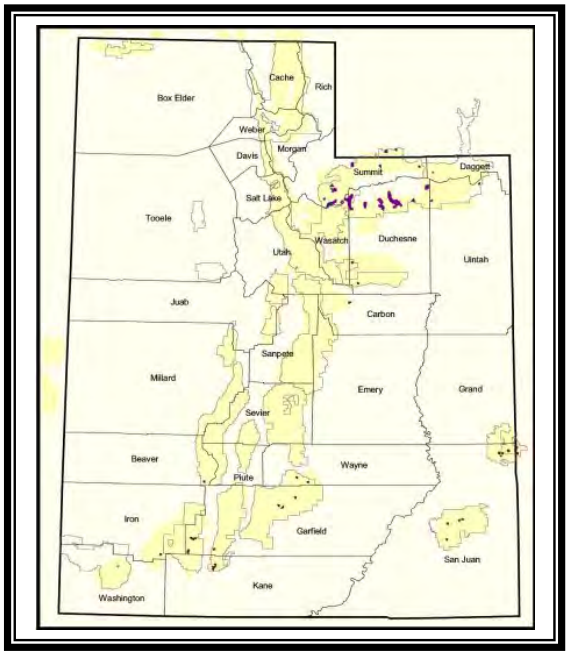
Grand fir infested with fir engraver beetle.

Fir engraver is a major pest of true firs in western forests. It attacks trees three inches in diameter at breast height (dbh) and larger. Tree stress due to drought, disease, and defoliation may incite outbreaks, causing severe tree mortality. It is often associated with other forest pests such as Douglas-fir tussock moth, spruce budworm, bark beetles, woodborers, and fomes annosus root disease.

Nearly half of the Utah counties included in the 2001 aerial survey had fir engraver beetle damage totaling 2,133-acres (Table 1). Sanpete County had 916-acres of detected mortality on areas of the Sanpete Ranger District, Manti-La Sal National Forest, on state lands southeast of the town of Mayfield and on the Mayfield State Wildlife Management Area. On the Uinta National Forest fir engraver beetle caused tree mortality was detected in Dandelion Flat, Dutchman Flat, and Hamburger Lake, located southeast of the Moroni Guard Station. In Sevier County, 468-acres of fir mortality were observed around areas of Steve's Pass and Bull Valley Mountain, Richfield Ranger District, Fishlake National Forest, and on private lands (Taylor Flat and Niotche Peak). All other affected counties had lower levels of mortality, ranging from 10 to 133-acres.

Mountain pine beetle
Dendroctonus ponderosae

Host: Limber, Lodgepole, and Ponderosa pine



A destructive forest insect capable of killing trees on a landscape level, mountain pine beetle (MPB) kills thousands of trees a year during outbreak conditions, and millions of trees during extended epidemic periods in western forests. At endemic levels, MPB will favor weakened, less vigorous trees to attack. During epidemics, trees down to 4 inches dbh may be attacked. Large forest landscapes may be altered, causing a pine forest ecosystem to revert to grass and shrub landscapes for a period of 10-20 years. Wildlife species, composition, and distribution may change, water yields in drainages may increase, and dead trees left after epidemics may serve as a fuel source for wildfires.

- Limber pine: Limber pine has been identified as an important element of high-elevation ecosystems in western North American forests. It is a pioneer subalpine and alpine species able to establish on cold, dry, and windy sites. Its presence may produce changes in microclimates of alpine ecotone communities to allow other trees, such as subalpine fir, to establish. These attributes of limber pine are important in watershed protection, because they help to stabilize soil and rock on harsh sites, and retain snowpack for extending ephemeral stream flow. Limber pine seeds are also an important source of food for many animal species.

Currently, Limber pine is rapidly declining in pine communities in the western U.S. and Canada. Mountain pine beetle has contributed significantly to this decline, along with white pine blister rust and fire exclusion. In Utah, MPB accounted for 486-acres of whitebark pine mortality in 2001 (Table 1). The highest levels of mortality were recorded in northwestern Box Elder County, where 98-acres were located in the south central portion of the Raft River Division of the Sawtooth National Forest. In Sanpete County, 78-acres of mortality occurred southeast of Flagstaff Peak, Ferron Ranger District, Manti-La Sal National Forest. In all other affected counties tree mortality ranged from 5 to 70-acres.

- Lodgepole pine: Mountain pine beetle caused mortality was mapped over 15,585-acres (Table 1). Duchesne County had the heaviest mortality, encompassing 12,928-acres. Much of this was observed on the Roosevelt and Duchesne Ranger Districts, Ashley National Forest, with significant amounts reaching into the south and southeast portions of the High Uintas Wilderness and lands that include the following areas: north and east of Moon Lake, along the Yellowstone, Timothy, and Swift Creek drainages, surrounding the Upper Stillwater Reservoir and the north portion of the Rock Creek drainage. Affected acreage in other counties with MPB infestations ranged from 23 to 1,454-acres.

- Ponderosa pine: Mountain pine beetle mortality was recorded over 1,194-acres, with Garfield, San Juan, and Kane counties accounting for the majority of the tree mortality at 376-acres, 329-acres, and 233-acres respectively (Table 1).

Pinyon *Ips*
Ips confusus

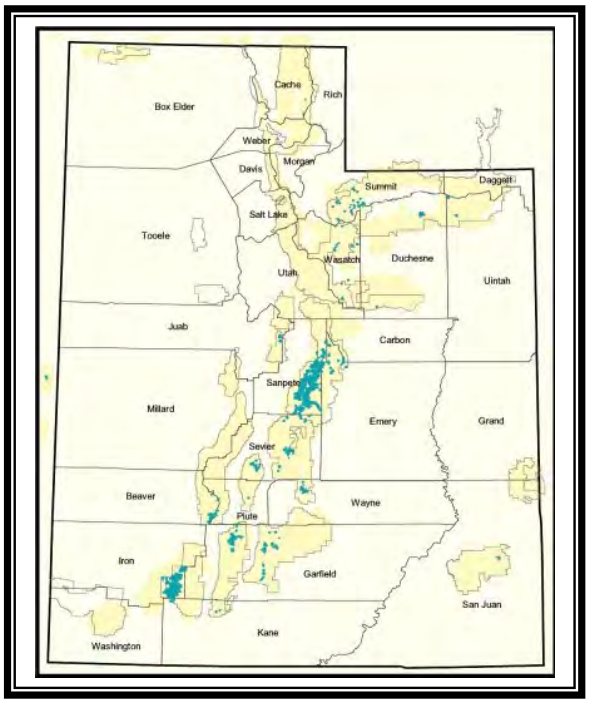
Host: Pinyon pine

Pinyon *Ips* is presenting an increasing problem in the pinyon pine forest ecosystem often affecting valuable home landscape trees. Continued drought conditions increases tree stress, which causes trees to become more susceptible to *Ips* attack. The rapid spread rate of an infestation can be attributed to the insect's ability to produce 2-4 generations per year.

Pinyon pine mortality observed for 2001 totaled 3,970-acres. Iron County accounted for 1,680-acres, in areas of Bureau of Land Management (BLM), State, and private lands north and east of Lone Tree Mountain, and along areas of Dairy Hill and Elephant and Middle Ridges. The 857-acres detected in Box Elder County occurred in areas on the west half of the Raft River Division of the Sawtooth National Forest. In Sanpete County, 506-acres of mortality were detected in areas north and northeast of Rattlesnake Peak, which includes the Sanpete Ranger District, Manti National Forest, and the Manti State Wildlife Management Area, and on private land just east of the town of Indianola in the vicinity of Black Hawk Peak. Other surveyed counties had lower levels of mortality, ranging from 25 to 246-acres. However, aerial observers did not fly the entire pinyon pine forest cover type in 2001, and the extent of pinyon pine mortality is larger than the recorded coverage.

Spruce beetle
Dendroctonus rufipennis

Host: Engelmann spruce, Colorado Blue spruce



The spruce beetle is the most significant natural mortality agent of mature spruce. Endemic populations usually exist in weakened or windthrown trees, logging slash, and fresh stumps. Outbreaks typically occur when beetle populations build to high levels in concentrations of windthrown trees. Dispersing adults may infest standing live trees, initially preferring larger diameter trees.

In Utah, spruce beetle was responsible for more infested acres in 2001 than any other forest insect pest. The total number of infested acres reached 72,540 (Table 1). Portions of Sanpete and Iron Counties, located within the Manti-La Sal and Dixie National Forests respectively, have been experiencing devastating spruce beetle outbreaks for a number of years which started in scattered windthrown trees and debris caused by landslides.

The 2001 aerial survey detected 32,335-acres of tree mortality in Sanpete County concentrated along areas of the Wasatch Plateau which includes both the Sanpete and Ferron Ranger Districts, Manti-La Sal National Forest. Iron County had 28,029-acres of infested spruce, with the heaviest concentrations along parts of the Markagunt Plateau, the north, south, and east edges of the Cedar Breaks National Monument, and areas around Navajo Lake. Reported spruce beetle caused tree mortality from other counties in the state ranged from 10 to 2,728-acres (Table 1).

Spruce *Ips*
Ips pilifrons

Host: Engelmann spruce, Colorado Blue spruce

Pine *Ips*
Ips pini

Host: Pines

Although not recorded during the aerial survey, spruce *Ips* and pine *Ips* have been causing scattered mortality in several urban landscapes for several years. The largest numbers of reported spruce *Ips* caused tree mortality in Utah occurred in 2000 and 2001. Many small and large diameter spruce have been killed in Salt Lake County and Cache County, with several other counties experiencing some spruce mortality.

Pine *Ips* has also been causing mortality in small and large diameter pines within urban landscapes and on abandoned tree farms in Salt Lake County. Populations have increased in isolated areas within the county in 2001.

INSECTS: NATIVE OTHER

Fall cankerworm
Alsophila pometaria

Host: Various deciduous species

Fall cankerworm outbreaks that occurred from 1998 to 2000 have generally been declining. The 2001 aerial survey showed fall cankerworm had caused 81-acres of defoliation primarily in gambel oak, within the Wasatch Mountain State Park. Areas near Mahogany Spring and the Dutch Hollow drainage east of The Peak were also affected.

INSECTS: NON-NATIVE

Defoliators

European gypsy moth
Lymantria dispar

Host: Various deciduous species

Adult gypsy moths, female above, male below.

The gypsy moth was first detected in Utah in 1988. Between 1989 and 1993 almost 72,000 acres of Federal, State, and private lands were treated with *Bacillus thuringiensis* (Bt). In 1995, after two years of intensive pheromone trapping resulted in no moth captures, the gypsy moth was declared eradicated. In 1997, 46 moths were captured in Salt Lake City and one moth on the adjacent Wasatch-Cache National Forest. In 1998, the Utah Department of Agriculture, in cooperation with the USDA Forest Service, treated 801 acres.

In 1999, 764 acres in Salt Lake City County were aerially treated using Bt; there were three applications made at 5-7 day intervals. Treatment was 95% effective with only one gypsy moth caught in the treatment block. Five additional single-moth catches occurred, but all were outside the treatment area. In 2000, a ten-acre mass-trapping grid was installed around each positive catch using nine pheromone traps per acre. Only one moth was caught. In 2001, the general pheromone trap detection grid scheme was resumed throughout Utah, with the exception of delimitation trapping in Salt Lake and Duchesne counties. One male moth was caught within the detection grid in Duchesne County for 2001; first year delimitation traps will be installed at this site in 2002. In 2002, a pheromone detection-trapping grid will resume at all other susceptible sites.

STATUS OF DISEASES

NATIVE

Stem and Branch Diseases

Dwarf mistletoes
Arceuthobium spp.

Host: Douglas-fir, Pines, True Firs, and Spruce

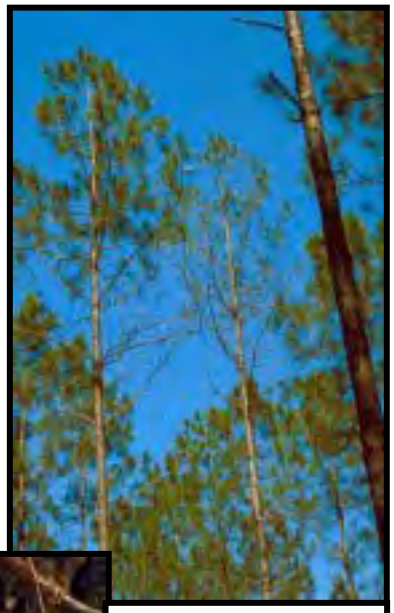
Dwarf mistletoes are the single-most damaging agent of coniferous trees. These parasitic plants remain the most widespread and frequently observed disease within the state. Profusely branched, dense masses of host branches called "witches brooms" are typically observed. Heavy dwarf mistletoe infestation can predispose trees to insects and other diseases, reduce incremental growth, affect the forest canopy structure, lower resistance to drought, and affect recreation and aesthetics. Since dwarf mistletoe infests trees of all ages, infestation problems may exist in secondary growth and regeneration, as well as mature and overmature tree stands. The percentage of infection by major host species in Utah is estimated as follows: Lodgepole pine 50%, ponderosa pine 20 %, and Douglas-fir 20% infected. These numbers represent the percentage of host stands having some level of infection.

Root Diseases

Annosum root disease
Heterobasidion annosum

Host: Bitterbrush, Chokecherry, Douglas-fir, Lodgepole pine, Ponderosa pine, Spruce, True firs

This disease can be found throughout the state, but mostly as a saprophyte on dead trees, stumps, roots, and cull logs or fallen stems. The fungus occasionally kills young ponderosa pine, especially in plantations on droughty soils. Symptoms include thinning crown and fruiting bodies that develop at the base of the tree.



Thinning crowns and conk of Annosum root disease.

Armillaria root disease
Armillaria spp.

Host: Douglas-fir, Grand fir, Pines, Spruce, Subalpine Fir

Armillaria fruiting bodies.

Evidence of Armillaria root disease can be found throughout the state but functioning primarily as a weak pathogen or saprophyte causing little direct mortality. In southern Utah, it may act as a primary pathogen, killing mature and immature ponderosa pine and mature fir and spruce on cool sites at higher elevations. Fruiting bodies grow in clusters from the roots or at the base of the tree.

Black stain root disease
Ophiostoma wageneri

Host: Pinyon pine

Black stain root disease is considered an important pathogen of pinyon pine. It usually kills affected trees within several years, and can produce groups of mortality several acres in size. Secondary infestations by bark beetles may become a focal point for the buildup of beetle infestations, in which nearby healthy trees may be attacked.

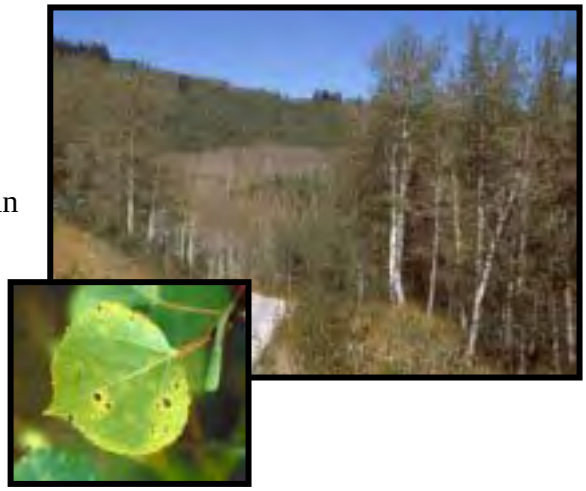
Aerial survey detected only two counties having a total of 110-acres of black stain root disease in pinyon pine. San Juan County was mapped in for 76-acres, while Washington County was observed to have 34-acres.

Leaf and Needle Diseases

Aspen Leaf Blight
Marssonina populi

Host: Aspen

Only one county in Utah was reported to have defoliation caused by aspen leaf blight. Two hundred and sixty-nine acres were defoliated in San Juan County, on the north side of South Mountain within the La Sal Mountain Range, Moab Ranger District, Manti-La Sal National Forest.



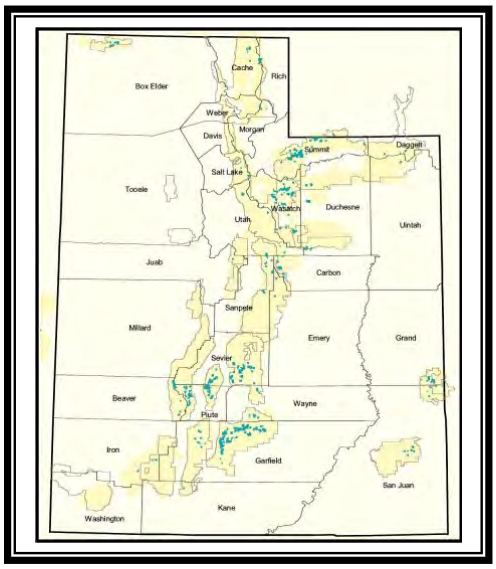
COMPLEXES/DECLINES AND ABIOTICS

Complexes/Declines

Subalpine fir mortality complex

Host: Subalpine fir

The western balsam bark beetle (WBBB) is the most significant mortality agent in a complex of forest insects and disease, causing subalpine fir mortality. Endemic populations will occur in storm-damaged trees, slash, or trees of poor vigor. Drought and environmental stress may cause subalpine fir stands to become susceptible to WBBB and other insect and disease agents. Western balsam bark beetle infestations may build to epidemic levels, where mortality can occur in groups of 100 to 10,000 trees.



In Utah, all but three counties had 27,510 total acres of subalpine fir mortality mapped by aerial surveys in 2001 (Table 1). In Garfield County, 8,614-acres of subalpine fir mortality complex were observed, with the largest concentrations occurring along the west and north sides of Griffin Top and areas along the Aquarius Plateau, Escalante and Teasdale Ranger Districts, Dixie National Forest. Summit County sustained 4,997-acres of mortality, with a majority observed on Forest Service and private lands surrounding Whitney Reservoir and areas north of Slader Ridge on the Wasatch-Cache National Forest. Sevier County accounted for 3,631-acres of mortality, which were predominantly on Forest Service lands and widely distributed over areas that included Richfield, Beaver, and Loa Ranger Districts, Fishlake National Forest. In Wasatch County 3,029-acres of mortality were found to be concentrated in areas of the Heber Ranger District, Uinta National Forest, and private lands, which included areas on and around Duchesne Ridge, on drainage systems to the north side of Vat Creek Ridge, and on parts of the Strawberry River drainage south of Bald Knoll. All other counties had mortality ranging from 10 to 1,657-acres.

Aspen decline

Host: Quaking aspen

Several private landowners in Iron County are concerned about aspen decline and lack of regeneration on their lands. Several types of canker diseases and heavy borer activity may be responsible for heavy mortality. Many clones with heavy mortality and general decline have little or no reproduction.

Abiotic damage

Frost damage

Host: Gambel oak, Aspen

Frost damage on oak.

In Utah, frost damage caused foliar browning on 37,700-acres of gambel oak. Counties sustaining the highest damage included Utah (9,463-acres), Sevier (6,601-acres) Iron (6,591-acres), and Grand (4,563-acres) counties. A range of 16 to 3,229-acres of damage was mapped over the remaining counties.

Blowdown

Areas of concentrated, high velocity winds can cause trees to blow over. Blowdown occurs in groups or as scattered trees within the landscape. Depending on the tree species, patches of blowdown in coniferous forests can provide a food source for various bark beetles, enabling populations to build to epidemic levels. These epidemic populations may then attack and kill standing, live trees adjacent to the blowdown.

Pine blowdown.

The aerial detection survey mapped a total of 470-acres of blowdown in four Utah counties. Utah County had 265-acres of mixed-species blowdown in an area directly south of Indian Head Mountain situated on Bureau of Land Management and private lands. In Piute County, 142-acres of downed aspen were located directly east of the Manning Meadows Reservoir, Richfield Ranger District, Fishlake National Forest. Carbon County had 40-acres of downed mixed conifer immediately north of Monument Peak on private lands and Price Ranger District, Manti-La Sal National Forest. In Iron County, 23-acres of blowdown were found west of the Brian Head Observation Point, Cedar City Ranger District, Dixie National Forest.

NOXIOUS WEEDS

Noxious weeds are a continuing problem for all western states. They have the ability to colonize disturbed habitats aggressively displacing native plant species and altering ecosystems. Several state and federal agencies have the responsibility for monitoring and controlling noxious weeds. Our intention by including this information is to increase awareness of these potential problems. Table 2 is the list of plants declared noxious weeds by the state of Utah or specific counties.

The following websites, while not inclusive, give additional information on the plants such as biology, history, and control.

http://pi.cdfa.ca.gov/weedinfo/NWIcommonname.html
California Department of Food and Agriculture has a very comprehensive webpage. The only weeds not mentioned are buffalobur, goatsrue, poison hemlock, houndstongue, blue-flowering lettuce, western whorled milkweed, Russian olive, and velvetleaf. Information includes description, distribution, habitat, and control methods. Pictures of the plants in various stages are just a click away.

http://www.wa.gov/agr/weedboard/weed_info/contents.html
State of Washington's noxious weed control board webpage has information on buffalobur, camelthorn, hoary cress, goatsrue, houndstongue, johnsongrass, diffuse, Russian and spotted knapweed, purple loosestrife, silverleaf nightshade, yellow nutsedge, perennial pepperweed, puncturevine, leafy spurge, St. Johnswort, yellow starthistle, Canada thistle, musk thistle, scotch thistle, Dalmation toadflax, velvetleaf, and dyer's woad. Topics include description, economic importance, geographic distribution, habitat, history, growth and development, reproduction, response to herbicides, response to cultural controls, and biocontrol potentials.

http://www.ipm.ucdavis.edu/PMG/selectnewpest.home.html#weeds
University of California pest management webpage has information on bermudagrass, field bindweed, yellow nutsedge, and yellow starthistle. Topics include identification and management through cultural and chemical control options.

http://www.ext.colostate.edu/pubs/natres/pubnatr.html
Colorado State University Cooperative Extension webpage has factsheets on musk thistle, leafy spurge, Canada thistle, toadflaxes, and diffuse, Russian, and spotted knapweeds. Information includes description, distribution, phenology, and management options such as cultural, chemical and biological.

http://www.nps.gov/plants/alien/common.htm
The National Park Service hosts the Plant Conservation Alliances weed webpage. Currently they have information on Canada thistle, leafy spurge, purple loosestrife, Russian olive, and musk thistle. Information includes native range, description, ecological threat, distribution, habitat, background, methods of reproduction and dispersal, and current management approaches.

http://www.fs.fed.us/pnw/bmnri/weeds.htm
The Blue Mountain Natural Research Institute for the USDA Forest Service website focuses on control and identification. Invasive plant species included are diffuse, Russian, and spotted knapweed, purple loosestrife, perennial pepperweed, puncturevine, medusahead, yellow starthistle, Canada thistle, musk thistle, scotch thistle, dalmation toadflax, St. Johnswort, leafy spurge, hoary cress and dyer's woad.

http://www.adaweb.net/adaweb.nsf
Idaho's Ada county webpage has good pictures and chemical control information on Canada thistle, hoary cress, puncturevine, purple loosestrife, and scotch thistle.

http://weedcenter.org/info/weedlist.html
An interagency website housed at the Montana State University. It has information on Field Bindweed, Canada Thistle, Dalmatian Toadflax, Diffuse Knapweed, Leafy Spurge, musk thistle, poison hemlock, puncturevine, purple loosestrife, Russian knapweed, spotted knapweed, squarrose knapweed, St. johnswort, and yellow starthistle. Topics include biology, distribution, habitat, and history.

http://www.dcr.state.va.us/dnh/invlist.htm
The Virginia Department of Conservation and Recreation webpage has fact sheets on Russian Olive, Canada thistle, Johnsongrass, purple loosestrife, and spotted knapweed. Information is in PDF format with line drawings of the plant with description, distribution, control,

The following webpages have links to other sites with information on invasive and noxious weeds.

http://invader.dbs.umt.edu
The University of Montana's Invaders Database has a search engine that links the user to informational websites on most of the invasive weeds. The plants not covered are buffalobur, goatsrue, blue-flowering lettuce, western whorled milkweed, silverleaf nightshade, yellow nutsedge, and puncturevine.

http://www.invasivespecies.gov/profiles/main.shtml#terplants
National Biological Information Infrastructure website has links to other websites with information on leafy spurge, musk thistle, Russian olive, scotch thistle, spotted knapweed, and yellow star thistle.

Table 2. Utah noxious weeds by county.

	State Declared Noxious Weeds [1]																		County Declared Noxious Weeds [2] (Invading Weeds)																
County	Bermudagrass*	Field Bindweed*	Hoary Cress*	Johnsongrass*	Diffuse Knapweed*	Russian Knapweed*	Spotted Knapweed*	Squarrose Knapweed*	Purple Loosestrife*	Medusahead*	Perennial Pepperweed*	Quackgrass*	Leafy Spurge*	Yellow Starthistle*	Canada Thistle*	Musk Thistle*	Scotch Thistle*	Dyer's Woad*	Buffalobur	Camelthorn*	Goatsrue*	Jointed Goatgrass*	Poison Hemlock*	Black Henbane*	Houndstongue*	Blue-flowering Lettuce	Western Whorled Milkweed	Silverleaf Nightshade	Yellow Nutsedge*	Russian Olive*	Puncturevine*	St. Johnswort*	Dalmatian Toadflax*	Yellow Toadflax*	Velvetleaf*
Beaver	+	+	+	+			+				+	+			+		+																		
Box Elder		+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+														+			
Cache	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+			+		+								+				
Carbon		+	+			+	+					+	+		+	+	+	+												+					
Daggett											+	+			+	+		+																	
Davis	+	+	+	+	+		+		+		+	+	+	+	+	+	+	+	+				+						+						
Duchesne		+	+			+	+		+		+	+	+		+	+	+	+												+					
Emery	+	+	+			+	+		+		+	+	+		+	+	+																		
Garfield		+	+		+	+						+			+	+	+																		
Grand	+	+	+		+	+	+				+				+	+	+	+																	
Iron		+	+		+	+	+		+		+	+			+	+	+	+									+								
Juab	+	+	+	+	+	+	+	+	+		+	+	+		+	+	+	+								+									
Kane		+		+		+											+																		
Millard		+	+		+	+	+	+			+	+			+	+	+	+	+																
Morgan	+	+	+		+	+	+				+	+	+		+	+	+	+																	
Piute		+	+	+								+			+	+	+																		
Rich		+	+			+	+				+	+	+	+	+	+	+	+						+											
Salt Lake	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+																	
San Juan		+	+	+	+	+	+	+			+				+	+	+	+	+	+		+					+	+							
Sanpete		+	+			+		+			+	+	+		+	+	+	+						+	+										+
Sevier		+	+			+	+	+			+	+	+		+	+	+													+					
Summit		+	+			+	+				+	+	+		+	+	+	+																	
Tooele	+	+	+			+	+	+			+	+	+		+	+	+																		
Uintah		+	+			+	+				+	+	+		+	+	+	+												+					
Utah	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+																	
Wasatch		+	+			+	+	+			+	+	+	+	+	+	+	+							+								+	+	
Washington		+	+	+	+	+	+	+			+	+		+			+										+								
Wayne		+	+	+		+						+	+		+															+					
Weber	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+													+				

[1] List of where the weed is reported as noted in county year-end reports.

[2] List of counties that have declared the specific weed noxious. The weed may or may not be present in other counties.

* Exotic plant introduced from another country

Appendix A

Table 3. Number of acres affected by insect or disease damage on all ownerships during 2001.

Bureau of Indian Affairs	
Uinta & Ouray Indian Reserve	
Douglas-fir Beetle	212
Mountain Pine Beetle	10
Bureau of Land Management	
Blowdown	83
Douglas-fir Tussock Moth	82
Douglas-fir Beetle	162
Fir Engraver	75
Forest Tent Caterpillar	13
Frost Damage	100
Ips – Pinyon Pine	44
Subalpine Fir Mortality Complex	1
Ashley National Forest	
Duchesne Ranger District	
Douglas-fir Beetle	1,108
Fir Engraver	39
Mountain Pine Beetle	1,899
Spruce Beetle	20
Subalpine Fir Mortality Complex	681
Flaming Gorge Ranger District	
Douglas-fir Beetle	179
Frost Damage	42
Mountain Pine Beetle	97
Subalpine Fir Mortality Complex	166
Roosevelt Ranger District	
Douglas-fir Beetle	278
Mountain Pine Beetle	7,339
Spruce Beetle	832
Vernal Ranger District	
Douglas-fir Beetle	30
Frost Damage	39
Mountain Pine Beetle	1,309
Spruce Beetle	405
Subalpine Fir Mortality Complex	106
Dixie National Forest	
Cedar City Ranger District	
Blowdown	27
Douglas-fir Beetle	72
Fir Engraver	66
Frost Damage	773
Mountain Pine Beetle	338
Spruce Beetle	26,481
Subalpine Fir Mortality Complex	74
Western Spruce Budworm	5,223
Escalante Ranger District	
Douglas-fir Beetle	10
Mountain Pine Beetle	75
Spruce Beetle	1,126
Subalpine Fir Mortality Complex	6,291
Western Spruce Budworm	822
Pine Valley Ranger District	
Douglas-fir Beetle	200
Fir Engraver	40
Mountain Pine Beetle	50
Subalpine Fir Mortality Complex	10
Powell Ranger District	
Douglas-fir Beetle	248
Fir Engraver	151
Frost Damage	16
Mountain Pine Beetle	229
Spruce Beetle	1,557
Subalpine Fir Mortality Complex	445
Teasdale Ranger District	
Douglas-fir Beetle	20
Mountain Pine Beetle	60
Spruce Beetle	75
Subalpine Fir Mortality Complex	2,514
Western Spruce Budworm	1,838
Fishlake National Forest	
Beaver Ranger District	
Douglas-fir Beetle	166
Fir Engraver	167
Frost Damage	144
Mountain Pine Beetle	30
Spruce Beetle	908
Subalpine Fir Mortality Complex	1,753
Western Spruce Budworm	1,196
Fillmore Ranger District	
Douglas fir Tussock Moth	501
Douglas-fir Beetle	476
Fir Engraver	27
Frost Damage	2,054
Mountain Pine Beetle	58
Spruce Beetle	20

Fishlake National Forest (Continued)

Loa Ranger District

Fir Engraver	22
Frost Damage	1,379
Spruce Beetle	1,029
Subalpine Fir Mortality Complex	2,707

Richfield Ranger District

Blowdown	147
Douglas-fir Beetle	71
Fir Engraver	244
Frost Damage	3,972
Spruce Beetle	1,981
Subalpine Fir Mortality Complex	1,716
Western Spruce Budworm	309

Manti-La Sal National Forest

Ferron Ranger District

Douglas-fir Beetle	10
Frost Damage	160
Mountain Pine Beetle	30
Spruce Beetle	24,631
Subalpine Fir Mortality Complex	88

Moab Ranger District

Aspen Leaf Blight	32
Fir Engraver	10
Frost Damage	4,501
Mountain Pine Beetle	75
Spruce Beetle	85
Subalpine Fir Mortality Complex	362

Monticello Ranger District

Aspen Leaf Blight	222
Douglas-fir Beetle	60
Fir Engraver	69
Frost Damage	1,104
Mountain Pine Beetle	130
Spruce Beetle	89
Subalpine Fir Mortality Complex	302

Price Ranger District

Blowdown	11
Douglas-fir Beetle	379
Fir Engraver	57
Frost Damage	1,418
Spruce Beetle	595
Subalpine Fir Mortality Complex	325
Western Spruce Budworm	168

Sanpete Ranger District

Douglas-fir Beetle	319
Fir Engraver	340
Frost Damage	914
Mountain Pine Beetle	56
Spruce Beetle	9,154
Subalpine Fir Mortality Complex	291
Western Spruce Budworm	106

Sawtooth National Forest in Utah

Burley Ranger District

Douglas-fir Beetle	50
Ips – Pinyon Pine	821
Mountain Pine Beetle	31
Subalpine Fir Mortality Complex	184

Uinta National Forest

Heber Ranger District

Douglas-fir Beetle	290
Frost Damage	593
Mountain Pine Beetle	20
Spruce Beetle	235
Subalpine Fir Mortality Complex	2,836
Western Spruce Budworm	248

Pleasant Grove Ranger District

Douglas-fir Beetle	50
Fir Engraver	36
Forest Tent Caterpillar	449
Frost Damage	97
Subalpine Fir Mortality Complex	81

Spanish Fork Ranger District

Douglas-fir Beetle	1,185
Fir Engraver	69
Frost Damage	5,789
Mountain Pine Beetle	5
Spruce Beetle	65
Subalpine Fir Mortality Complex	105
Western Spruce Budworm	38

Wasatch-Cache National Forest

Evanston Ranger District

Mountain Pine Beetle	77
Spruce Beetle	265
Subalpine Fir Mortality Complex	3,568

Kamas Ranger District

Douglas-fir Beetle	186
Mountain Pine Beetle	4,732
Spruce Beetle	786
Subalpine Fir Mortality Complex	500

Logan Ranger District

Douglas-fir Beetle	534
Forest Tent Caterpillar	449
Frost Damage	258
Mountain Pine Beetle	50
Spruce Beetle	37
Subalpine Fir Mortality Complex	394
Western Spruce Budworm	225

Mountain View Ranger District

Mountain Pine Beetle	87

Wasatch-Cache National Forest (Continued)

Ogden Ranger District	
Douglas-fir Beetle	60
Forest Tent Caterpillar	240
Frost Damage	28
Spruce Beetle	30
Western Spruce Budworm	25
Salt Lake Ranger District	
Forest Tent Caterpillar	350
Frost Damage	217
Subalpine Fir Mortality Complex	14

National Parks and Monuments

Cedar Breaks National Monument	
Spruce Beetle	6,036
Bryce Canyon National Park	
Fir Engraver	30
Capitol Reef National Park	
Mountain Pine Beetle	10
Glen Canyon National Recreation Area	
Douglas-fir Beetle	55

Private Lands

Aspen Leaf Blight	40
Blowdown	226
Douglas-fir Tussock Moth	1,602
Douglas-fir Beetle	1,179
Fir Engraver	825
Forest Tent Caterpillar	1,842
Frost Damage	12,470
Mountain Pine Beetle	479
Spruce Beetle	1,758
Subalpine Fir Mortality Complex	3,149
Western Spruce Budworm	255

State Lands

General	
Douglas-fir Beetle	201
Fir Engraver	34
Frost Damage	2,305
Mountain Pine Beetle	136
Spruce Beetle	144
Subalpine Fir Mortality Complex	331
Western Spruce Budworm	39
Wasatch Mountain State Park	
Forest Tent Caterpillar	497