

Forest Health Highlights In Alaska - 2002



Tomentosus Root Disease
USDA Forest Service Archives, Image 4213083
<http://www.forestryimages.org>

August 2003

Aerial Detection Survey - 2002

Significant Pest Activity

-  Aspen Leaf Miner
-  Birch Leaf Roller
-  Black-headed Budworm
-  Spruce Aphid Defoliation
-  Birch Leaf Miner
-  Spruce Beetle Mortality

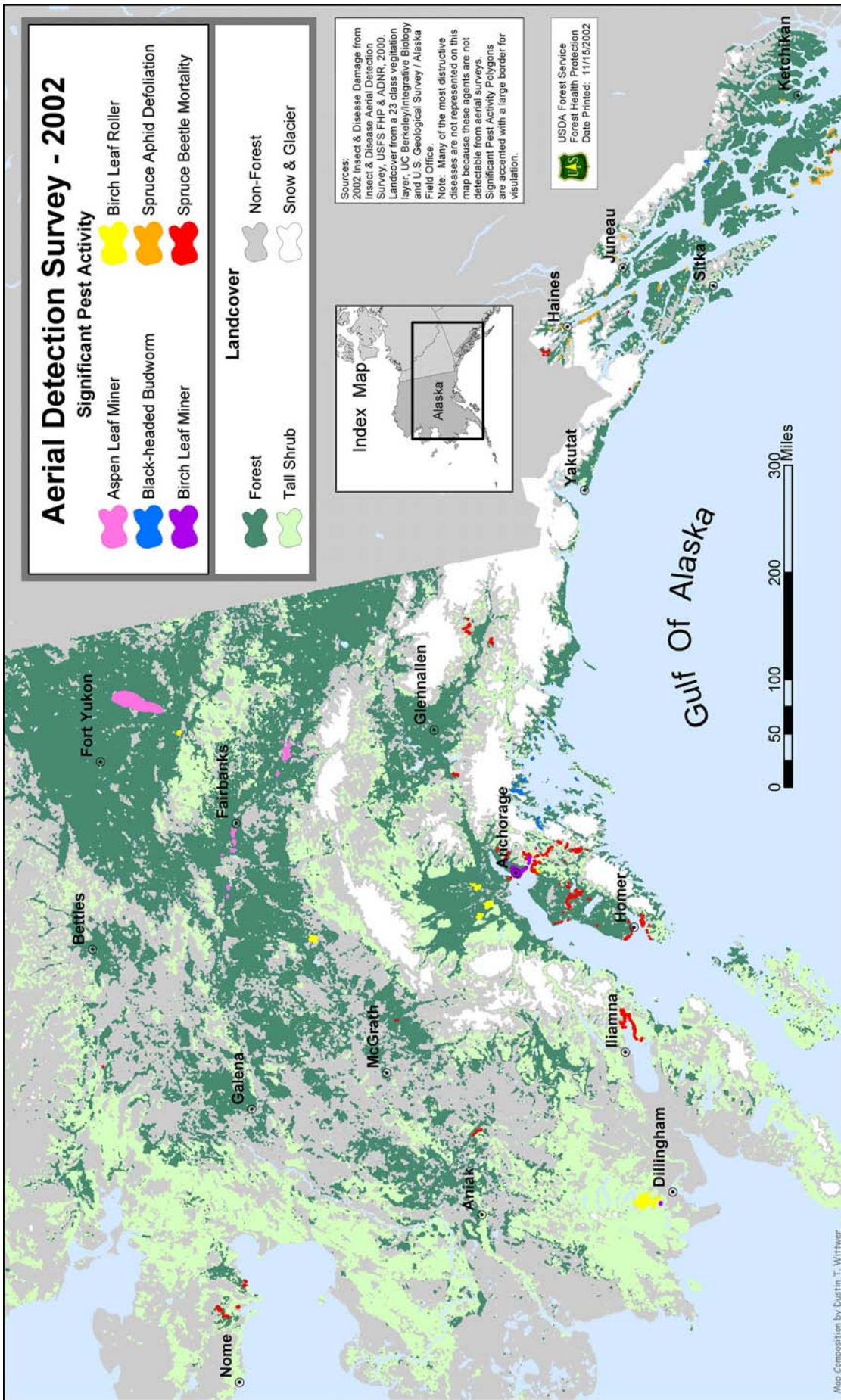
Landcover

-  Forest
-  Tall Shrub
-  Non-Forest
-  Snow & Glacier



Sources: 2002 Insect & Disease Damage from Insect & Disease Aerial Detection Survey, USFS FHP & ADN, 2000. Landcover from a 23 class vegetation layer, UC Berkeley/Integrative Biology and U.S. Geological Survey / Alaska Field Office.

Note: Many of the most destructive diseases are not represented on this map because these agents are not detectable from aerial surveys. Significant Pest Activity Polygons are accentuated with a large border for visualization.



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Contributors:

Alison Nelson ¹
Roger Burnside ²
Dustin Wittwer²
Michael Shephard ¹
Kathy Sheehan ¹

¹ US Department of Agriculture, Forest Service
² Alaska Department of Natural Resources

Aerial Survey

Aerial detection mapping is conducted annually to document the location and extent of active forest insect and disease damage. Each of these surveys (Southeast Alaska, Interior Alaska, and Southcentral Alaska segments) covers approximately one-fifth of the forested land in the State. Twenty-four million acres throughout Alaska were surveyed in 2002. Insect and disease activity, mapped via aerial surveys, nearly doubled in 2002 over 2001 levels (484,626 acres vs. 266,299 acres). This significant increase was due to an outbreak of aspen leaf miner near Fort Yukon, in Interior Alaska, totaling 300,000 acres.

Table 1. 2002 forest insect and disease activity as detected during aerial surveys in Alaska by land ownership¹ and agent². All values are in acres.

Damage Agent	National Forest	Native Corp.	Other Federal	State & Private	Total 2002
Alder defoliation ³	1,159	502	113	75	1,848
Aspen Leaf Miner		66,871	128,115	104,482	299,468
Birch Leaf Miner		310	159	29,702	30,171
Birch leaf roller		9,384	6,060	37,380	52,824
Black-headed budworm	2,494	334	2	524	3,354
Cedar decline mortality ⁴	2,835	39	8	150	3,033
Cottonwood defoliation ⁵	3,842	38	14,640	1,337	19,857
Hemlock canker	230			9	239
Hemlock sawfly	743			612	1,355
Ips engraver beetle	32	379	601	241	1,253
Larch beetle			4,849		4,849
Large aspen tortrix			2,197	283	2,480
Spruce aphid	1,640	127	32	537	2,336
Spruce beetle	2,133	23,692	13,406	13,157	52,388
Spruce budworm		943		4,239	5,182
Spruce Needle Cast		1,277	2,236		3,512
Sub Alpine Fir Beetle	8			204	212
Willow defoliation ³			62	203	265
Total Acres	15,116	103,895	172,480	193,135	484,627

¹ Ownership derived from 2002 version of Land Status GIS coverage, State of Alaska, DNR/Land records Information Section. State & private lands include: state patented, tentatively approved or other state acquired lands, patented disposed federal lands, municipal or other private parcels.

² Table entries do not include many of the most destructive diseases (e.g., wood decays and dwarf mistletoe) because they are not detectable in aerial surveys.

³ Significant contributors include leaf miners and leaf rollers for the respective host.

⁴ Acres represent only spots where current mortality was noticed. Cumulative cedar decline acres can be seen in Table 2.

⁵ Significant contributors include cottonwood leaf beetle and leaf rollers.

Insects

The largest outbreak of **aspen leaf miner** on record in Alaska was noted approximately 40 miles east of Fort Yukon, between the Yukon and Porcupine Rivers. 271,000 acres of activity were mapped in this area, while 20,000 acres were mapped near Big Delta, and 6,000 acres of activity between Fairbanks and Minto. In most cases, this activity was classified moderate to heavy.

The **willow leaf miner** infestation in the Yukon Flats area of northeastern interior Alaska has subsided to nearly undetectable levels. This infestation impacted hundreds of thousands of acres in this area over a span of more than 10 years. A considerable, though unquantified amount of willow mortality has been attributed to years of severe impact by this leaf miner.

Ambermarked birch leafminer populations once again exploded in the Anchorage Bowl. More than 30,000 acres of heavily defoliated birch were detected this year. This introduced insect has now spread north and south of Anchorage and was recently introduced into the Fairbanks area. Investigations to consider biological control opportunities of this potentially significant and newly introduced pest are underway.



Birch leaves affected by leaf miners. Photo by Forest Service.

Three areas of significant **birch leaf roller** leaf roller activity were mapped this year. 30,000 acres of heavy leaf roller activity were found in the Wood River-Tikchik Lakes State Park, north of Dillingham; 15,000 acres of moderate activity near Mt. Susitna, 50 miles northwest of Anchorage and; 6,000 acres of light activity 20 miles east of Lake Minchumina. Leaf roller defoliated cottonwood on 5,287 acres along the shores of Russell Fiord and Yakutat Forelands. Another 8,849 acres of cottonwood were defoliated in Glacier Bay National Park.

Spruce beetle activity declined statewide by 50% over 2001 levels to only 52,000 acres, the lowest level in more than thirty years. This follows an epidemic, over decade long, that eliminated the majority of beetle host material (white spruce) on over 4 million acres. The activity at Lake Iliamna accounted for one-half of this total. Spruce beetle is still active in several other areas, most notably McCarthy, the Kenai Peninsula, and near White Mountain on the Seward Peninsula. Throughout the remainder of the state, with the exception of a few small, active areas, spruce beetle populations have fallen to endemic or near-endemic levels. The outbreak on the Haines State Forest continues to collapse with less than 300 acres mapped in 2002.

Spruce aphid defoliation occurred on approximately 2,300 acres in southeast Alaska from Dall Island on the south end of Alexander Archipelago to Skagway. Most of the defoliation occurred on national forest lands (1,640 acres) on the outside islands from Hecata Island south to Port Bazan, Dall Island, and along Lynn Canal to Skagway. Spruce aphid defoliation was virtually absent from the Juneau, Sitka, Ketchikan, and Wrangell boroughs.

In 2002, **black-headed budworm** activity was mapped on 3,400 acres, down significantly from 2001 levels of approximately 51,000 acres. Nearly all of this acreage was mapped in Prince William Sound.

Hemlock sawfly occurred on 1,400 acres, mostly south of Sumner Strait. Most hemlock sawfly defoliation occurred on the southwest end of Kosciusko Island on state (600 acres) and national forest (400 acres) lands.

Diseases

The most important diseases and declines of Alaskan forests in 2002 were wood decay of live trees, root disease of white spruce, hemlock dwarf mistletoe, and yellow-cedar decline. Except for yellow-cedar decline, trees affected by these diseases are difficult to detect by aerial surveys. Nonetheless, all are chronic factors that significantly influence the commercial value of the timber resource and alter key ecological processes including forest structure, composition, and succession. Wildlife habitat is enhanced through the development of hollow tree cavities by heart rot fungi and witches' brooms by hemlock dwarf mistletoe and broom rust fungi.

In **Southeast Alaska** - approximately one-third of the gross volume of forests is defective due to **stem and butt rot fungi**. **Hemlock dwarf mistletoe** continues to cause growth loss, top-kill, and mortality in old-growth forests; its impact in managed stands depends on the abundance of large infected trees remaining on site after harvesting.

Nearly 500,000 acres of **yellow-cedar decline** have been mapped across an extensive portion of southeast Alaska. In 2002, areas of particularly current yellow-cedar mortality were observed on about 3,000 acres scattered around Southeast Alaska, with the most numerous areas being in Peril Strait, western Baranof Island and southwest Chichagof Island. Snags of yellow-cedar accumulate on affected sites and forest composition is substantially altered as yellow-cedar trees die, giving way to other tree species. The wood in dead standing trees remains valuable long after tree death and salvage opportunities for this resource are now being recognized.



Trees affected by cedar decline. Photo by Paul Hennon, Forest Service.

Cone diseases and other **foliar diseases** of conifers were generally at low levels throughout Alaska in 2002. **Canker fungi** were at endemic levels, causing substantial, but unmeasured, damage to hardwood species in south-central and interior Alaska. Canker fungi on conifers, particularly on Sitka spruce and subalpine fir, occurred at higher than normal levels and caused branch dieback in southeast Alaska.

In **south-central and interior Alaska** - **tomentosus root rot** continues to cause growth loss and mortality of white spruce in all age classes. Various stem and butt rot fungi cause considerable defect in mature white spruce, paper birch and aspen stands. Saprophytic decay of spruce bark beetle-killed trees, primarily caused by the red belt fungus, continues to rapidly degrade dead spruce trees.

A late spring **frost** damaged vegetation throughout southeast Alaska in 2002. Many conifers species and evergreen broadleaf plants expressed shoot dieback as the result of warm spring temperatures followed by a cold spell in early April.

Invasive Organisms

Arthropods - In the past several years, several introduced pests have been detected in the Anchorage area. In 2002, the **ambermarked birch leafminer** (newly described in 2002), **uglynest caterpillar**, and the **European black slug** were all reported in Alaska. The ambermarked birch leafminer caused heavy birch defoliation throughout Anchorage. These invasive pests and others may become established throughout Alaska if detection and eradication methods are not employed early. Primary detection of these introductions has been through the Integrated Pest Management Program sponsored by the USDA Forest Service and administered by the Alaska Cooperative Extension Service.

Plants - Several species continue to spread into different areas of the state. **White sweetclover**, *Melilotus alba*, occupies hundreds of acres along the Stikine River in southeastern Alaska, and is now showing up on the Nanana River in the interior. **Bird vetch**, *Vicia cracca*, is widely distributed in southern Anchorage, the Matanuska Valley, and in portions of Fairbanks. A new species of noxious weed for Alaska is **garlic mustard**, *Alliaria petiolata*, which was first found in Alaska in 2001. This new infestation is located just below the Governor's mansion in Juneau. Thousands of plants were collected at this sole known infection site to prevent seed set in 2002.



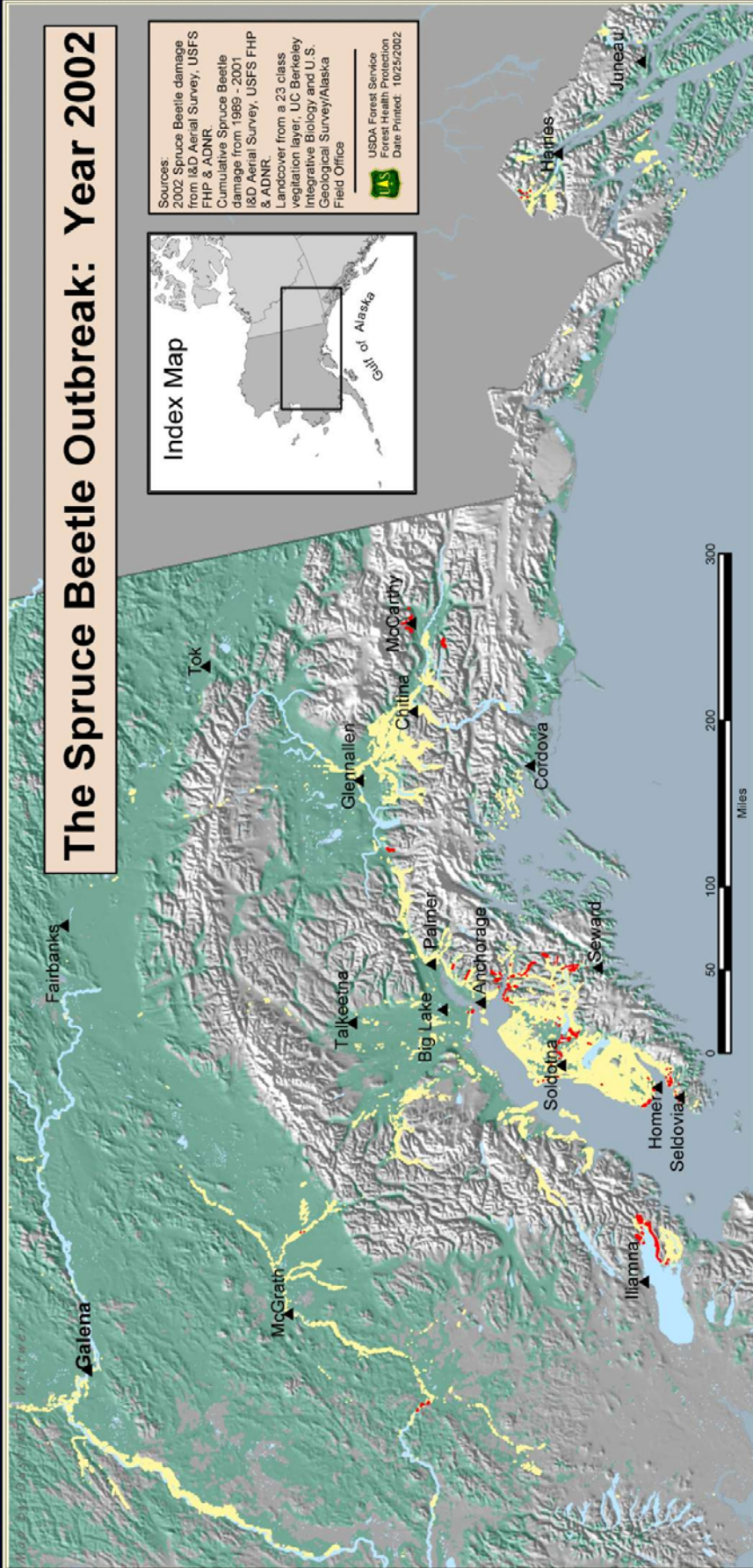
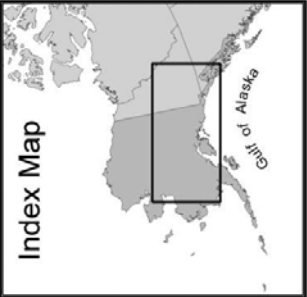
*White sweetclover (Melilotus alba) growing along the Stikine River.
Photo by Michael Shephard, Forest Service.*

Several other species are being mapped across the State. Agency inventories are being coordinated for consistency and entered into a state-wide GIS inventory base. As a result of these coordination efforts, cooperative control projects are planned to address these relatively newly recognized threats to Alaska forest resources.

The Spruce Beetle Outbreak: Year 2002

Sources:
 2002 Spruce Beetle damage from I&D Aerial Survey, USFS FHP & ADNIR.
 Cumulative Spruce Beetle damage from 1989 - 2001 I&D Aerial Survey, USFS FHP & ADNIR.
 Landcover from a 23 class vegetation layer, UC Berkeley Integrative Biology and U.S. Geological Survey/Alaska Field Office

USDA Forest Service
 Forest Health Protection
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Spruce Beetle Impact

- Current Infestation (Red square)
- Old Infestation (Yellow square)

Landcover

- Forested (Green square)
- Non-Forested (Grey square)
- Snow and Ice (White square)
- Water (Blue square)

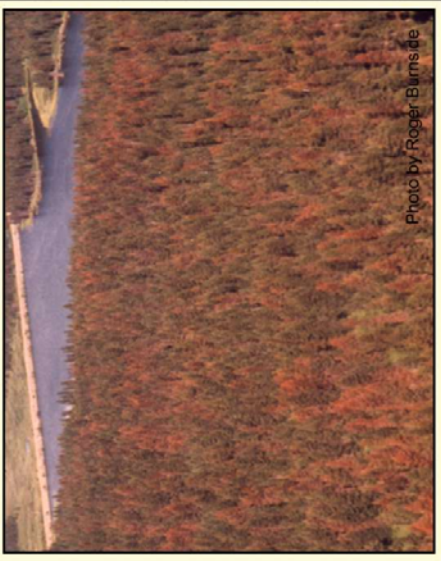
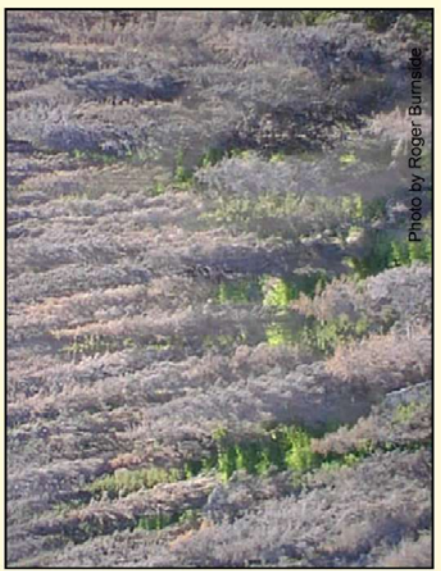


Table 2. Affected area (in thousands of acres) for each host group and damage type over the prior five years and a 10-year cumulative sum.

Host Group / Damage Type ¹	Prior Five Years (thousand acres)						Ten Year Cumulative ²
	1997	1998	1999	2000	2001	2002	
Alder Defoliation	0.0	0.8	1.8	5.6	1.2	1.8	11.2
Aspen Defoliation	5.1	21.9	13.4	12.6	9.4	301.9	522.1
Birch Defoliation	271.9	0.7	2.8	2.8	3.2	83.0	375.2
Cottonwood Defoliation	3.0	6.6	5.6	5.4	9.9	19.9	61.2
Hemlock Defoliation	6.6	3.9	0.1	5.2	1.3	1.4	35.4
Hemlock Mortality	0.0	0.0	0.0	0.0	0.1	0.2	0.6
Larch Defoliation	267.9	461.8	159.5	64.9	17.8	0.0	1,556.6
Larch Mortality	0.0	0.0	18.4	0.0	0.0	4.8	23.5
Spruce Defoliation	49.7	136.0	5.1	84.7	61.1	11.0	814.9
Spruce Mortality	569.4	331.0	258.0	120.9	104.2	53.6	2,630.3
Spruce/Hemlock Defoliation	30.8	0.0	0.1	0.0	50.7	3.4	460.2
Spruce/Larch Defoliation	0.3	0.0	0.0	0.0	0.0	0.0	16.8
Sub Alpine Fir Mortality	0.0	0.0	0.0	0.0	0.1	0.2	0.3
Willow Defoliation	3.5	123.2	181.6	36.5	10.9	0.3	428.6
Total thousands acres	1,208.2	1,085.9	646.4	338.6	269.9	481.5	6,936.9

¹ Summaries here identify damage mostly from insect agents. Foliar disease agents contribute to the spruce defoliation and hemlock mortality totals. Damage agents such as fire, wind, flooding, slides and animal cause damage are not included. Cedar mortality is summarized in Table 1.

² The same stand can have active infestation for several years. The cumulative total is a union of all areas from 1993 through 2002.

Contacts and Further Information

If you have questions about forest health in Alaska, please contact:

Michael Shephard
 USDA Forest Service
 Alaska Region
 Forest Health Protection
 3301 'C' Street, Suite 202
 Anchorage, AK 99503
mshephard@fs.fed.us
 (907) 743-9454

Roger Burnside
 Alaska Dept. of Natural Resources
 550 W. 7th Ave., Suite 1450
 Anchorage, AK 99501-3566
rogerb@dnr.state.ak.us
 (907) 269-8460

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