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# Conditions in Brief

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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 south-central Alaska) 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.

## 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 another 6,000 acres of activity between Fairbanks and Minto. In most cases, this activity is classified moderate to heavy.

Three areas of significant birch leaf roller activity were mapped this year. 30,000 acres of heavy leaf roller activity was 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 percent over 2001 levels, to only 52,000 acres; the lowest level in more than thirty years. The activity at Lake Iliamna accounted for one-half of this total. This follows an epidemic, over decade long, that eliminated the majority of beetle host material (white spruce) on over 4 million acres. 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.

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. In its wake, a considerable, though unquantified amount of willow mortality, attributed to years of severe impact by this leaf miner, remains.

**Amber-marked birch leaf miner** 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. Investigation to consider biological control opportunities of this potentially significant and newly introduced pest are underway.

**Spruce aphid** defoliation in southeast Alaska 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 Heceta 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, most of it south of Sumner Strait. Much of hemlock sawfly defoliation, 1000 acres, occurred where it commonly occurs, 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 active mortality to yellow-cedar were observed on about 3,000 acres scattered across 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.

Cone 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 western hemlock 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 develop on and degrade dead spruce trees.

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

## **Invasive Organisms:**

### **Insects and Arthropods:**

In the past several years, several exotic pest introductions have been detected in the Anchorage area. In 2002, the **amber-marked birch leaf miner** (newly described in 2002), **uglynest caterpillar**, and the **European black slug** were all reported in Alaska. The amber-marked birch leaf miner caused heavy birch defoliation throughout Anchorage. This defoliator is the larval form of a sawfly. 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.

### **Plants:**

Several species continue to spread into different areas of the state. **White sweet clover**, *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.

Several other species are being mapped across the State. Interagency an interest group inventories are being coordinated for consistency and entered into a statewide GIS inventory base. As a result of these coordination efforts, cooperative control projects are expected to increase to address these relatively newly recognized forest health threats to Alaska resources.

**Table 1. 2002 forest insect and disease activity as detected during aerial surveys in Alaska by land ownership<sup>1</sup> and agent<sup>2</sup>. All values are in acres.**

Damage Agent	National Forest	Native Corp.	Other Federal	State & Private	Total 2002
Alder Defoliation <sup>3</sup>	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 Faders <sup>4</sup>	2,835	39	8	150	3,033
Cottonwood Defoliation <sup>5</sup>	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		3,513
Sub Alpine Fir Beetle	8			204	212
Willow Defoliation <sup>3</sup>			62	203	265
Total Acres	15,116	103,896	172,480	193,135	484,627

<sup>1</sup>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, of patented disposed federal lands municipal or other private parcels.

<sup>2</sup>Table entries do not include many of the most destructive diseases (e.g., wood decays and dwarf mistletoe) these losses are not detectable in aerial surveys.

<sup>3</sup>Significant contributors include leaf miners and leaf rollers for the respective host.

<sup>4</sup>Acres represent only spots where current faders were noticed. Cumulative cedar decline acres can be seen in Table 6.

<sup>5</sup>Significant contributors include cottonwood leaf beetle and leaf rollers.

**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 <sup>1</sup>	Prior Five Years (thousand acres)						Ten Year Cumulative <sup>2</sup>
	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

<sup>1</sup>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 6.

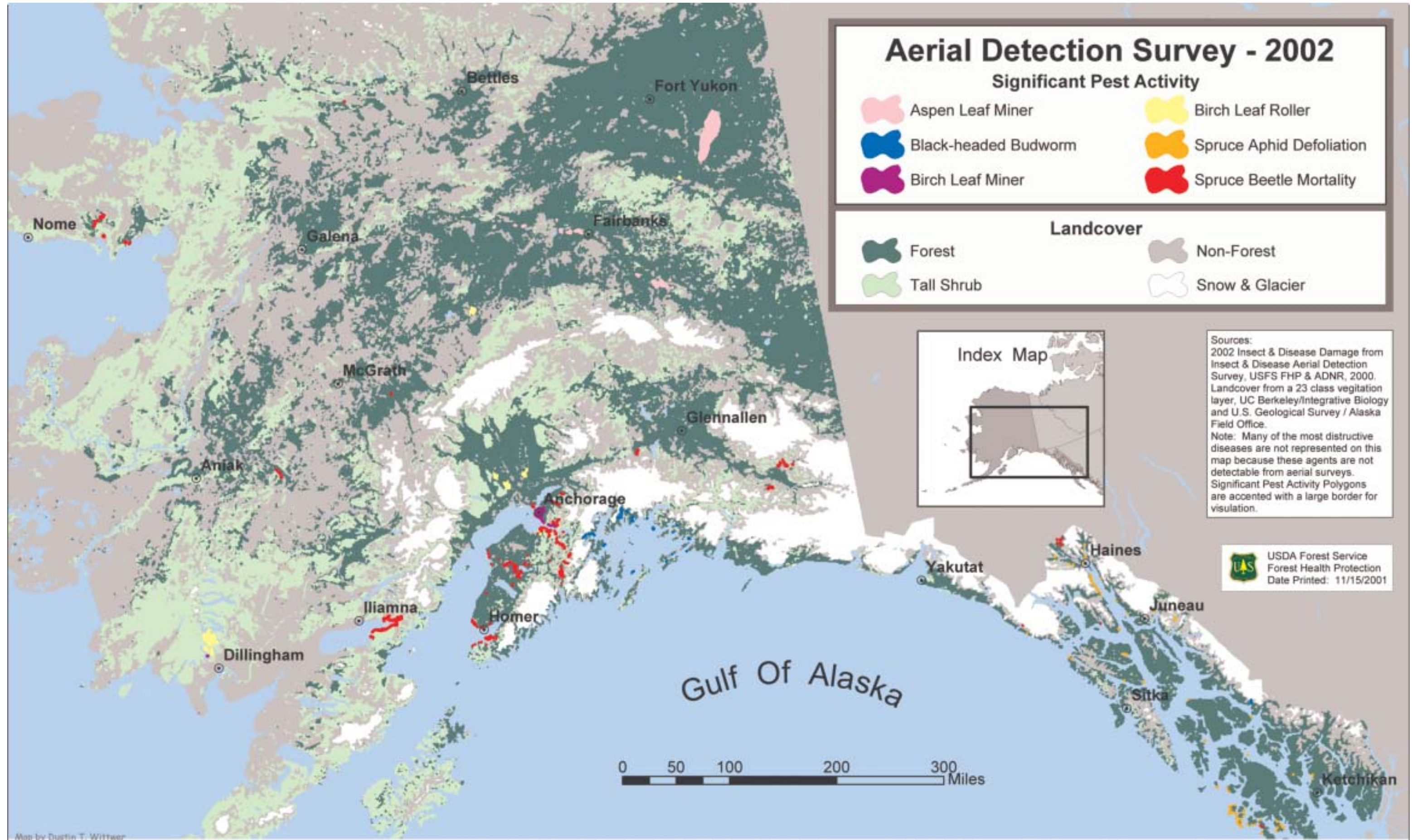
<sup>2</sup>The same stand can have active infestation for several years. The cumulative total is a union of all areas from 1993 through 2002.

**Table 3. Invasive plants that were identified at the 2nd annual Invasive plant meeting as potentially the most problematic species for Alaska.**

Genus	Species	Common Name	Family	Present in Alaska
<i>Acroptilon</i>	<i>repens</i>	Russian Knapweed	Asteraceae	N
<i>Alliaria</i>	<i>petiolata</i>	Garlic Mustard	Brassicaceae	Y
<i>Alopecurus</i>	<i>pratensis</i>	Candle grass	Poaceae	Y
<i>Capsella</i>	<i>bursa-pastoris</i>	Shepherds Purse	Brassicaceae	Y
<i>Centaurea</i>	<i>biebersteinii</i>	Spotted Knapweed	Asteraceae	Y
<i>Chenopodium</i>	<i>album</i>	Lambs quarters	Chenopodaceae	Y
<i>Chosenia</i>	<i>arbutifolia</i>	Korean Willow		N
<i>Cirsium</i>	<i>arvense</i>	Canada Thistle	Asteraceae	Y
<i>Cotula</i>	<i>coronopifolia</i>	Brass Buttons	Asteraceae	Y
<i>Crepis</i>	<i>tectorum</i>	Narrow-Leaf Hawksbeard	Asteraceae	Y
<i>Cytisis</i>	<i>scoparius</i>	Scotch Broom		Y
<i>Elymus</i>	<i>repens</i>	Quack grass	Poaceae	Y
<i>Euphorbia</i>	<i>esula</i>	Leafy Spurge	Euphorbiaceae	N
<i>Galeopsis</i>	<i>tetrahit</i>	Hemp nettle	Lamiaceae	Y
<i>Heracleum</i>	<i>mantegazzianum</i>	Giant Hogwort	Apiaceae	N
<i>Hieracium</i>	<i>umbellatum</i>	Narrow-Leaf Hawkweed	Asteraceae	Y
<i>Leucanthemum</i>	<i>vulgare</i>	Oxe-Eye Daisy	Asteraceae	Y
<i>Lythrum</i>	<i>salicaria</i>	Purple Loosestrife		N
<i>Matricaria</i>	<i>discoidea</i>	Pineapple Weed	Asteraceae	Y
<i>Melilotus</i>	<i>alba</i>	Sweet Clover (White)	Fabaceae	Y
<i>Myriophyllum</i>	<i>spicatum</i>	Eurasian Water milfoil	Haloragaceae	Y
<i>Neslia</i>	<i>paniculata</i>	Ball Mustard	Brassicaceae	Y
<i>Onopordum</i>	<i>acanthium</i>	Scotch Thistle	Asteraceae	N
<i>Phalaris</i>	<i>arundinacea</i>	Reed Canary Grass	Poaceae	Y
<i>Polygonum</i>	<i>convolvus</i>	Black Bindweed	Polygonaceae	Y
<i>Polygonum</i>	<i>cuspidatum</i>	Japanese Knotweed	Polygonaceae	Y
<i>Rumex</i>	<i>acetosella</i>	Sheep Sorrel	Polygonaceae	Y
<i>Senecio</i>	<i>vulgaris</i>	Tansy Ragwort	Asteraceae	Y
<i>Sonchus</i>	<i>arvensis</i>	Perennial Sow thistle	Asteraceae	Y
<i>Spergula</i>	<i>arvensis</i>	Corn Spurry	Caryophyllaceae	Y
<i>Taraxacum</i>	<i>officinale officinale</i>	Common Dandelion	Asteraceae	Y
<i>Vicia</i>	<i>cracca</i>	Tufted (Bird) Vetch	Fabaceae	Y

Nomenclature follows Kartesz and Meacham, Synthesis of the North American Flora, 1999.

Map 7. General Forest Pest Activity in 2002.



Map 8. 2002 Survey Flight Paths.

