

**SB**

**142**

# SENATE COMMITTEE REPORT

## First Committee of Referral

DATE: 4/12/99

FURTHER: Finance

Date of 5-Day Notice: 4/15/99  
(in accordance with Uniform Rule 23)

DATE TURNED  
IN TO OFFICE: 4/20/99

Resources Committee considered

SENATE BILL NO. 142

"An Act relating to infestations and diseases of timber."

and recommends:

- be replaced with \_\_\_\_\_ CS SIB 142 ( RES )
- adopt previous \_\_\_\_\_ CS \_\_\_\_\_ ( \_\_\_\_\_ )
- attached amendment(s)
- adopt Letter of Intent by \_\_\_\_\_ Committee
- further referral to the \_\_\_\_\_ Committee

- Senate Bill:**
- same title
  - new title
- House Bill:**
- same title
  - technical title
  - new: SCR" \_\_\_\_\_

SIGNING <u>DO</u> PASS	DP	OTHER RECOMMENDATIONS	NR	DNP	AM
		<i>[Signature]</i>	✓		
		<i>[Signature]</i>	✓		
		<i>[Signature]</i>	✓		
CHAIR: <i>[Signature]</i>		CHAIR:			

**NEW FISCAL NOTE(S):**

Department	Date	Zero	Fiscal
DNR	4/16		633.8

**PREVIOUS FISCAL NOTE(S):\***

Department	Date	Zero	Fiscal

APPLY TO CS

APPROPRIATION -- no fiscal note

\*include fiscal notes accompanying Governor's bill

# FISCAL NOTE

STATE OF ALASKA  
1999 LEGISLATIVE SESSION

BILL NO. SB 142

Revision Date: \_\_\_\_\_ Dept Affected: Natural Resources  
 Title: An Act relating to infestations and BRU: Forest Management & Development  
diseases of timber. Component: Forest Management & Development  
 Sponsor: Senator Taylor  
 Requestor: (S)RES Component Serial No. 435

Expenditures/Revenues (Thousands of Dollars)

OPERATING EXPENDITURES	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005
PERSONAL SERVICES	369.8	369.8	369.8	369.8	369.8	369.8
TRAVEL	45.0	45.0	45.0	45.0	45.0	45.0
CONTRACTUAL	219.0	219.0	219.0	219.0	219.0	219.0
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
<b>TOTAL OPERATING</b>	<b>633.8</b>	<b>633.8</b>	<b>633.8</b>	<b>633.8</b>	<b>633.8</b>	<b>633.8</b>
<b>CAPITAL EXPENDITURES</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>CHANGE IN REVENUES (fund code)</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts						
1003 GF Match						
1004 GF	633.8	633.8	633.8	633.8	633.8	633.8
1005 GF/Program Receipts						
1037 GF/Mental Health						
Other (Specify Type)						
<b>TOTAL</b>	<b>633.8</b>	<b>633.8</b>	<b>633.8</b>	<b>633.8</b>	<b>633.8</b>	<b>633.8</b>

Estimate of any current year (FY99) cost: \$ 0.0

POSITIONS

FULL-TIME	4	4	4	4	4	4
PART-TIME	7	7	7	7	7	7
TEMPORARY	0	0	0	0	0	0

ANALYSIS: (Attach a separate page if necessary)

- 1) This bill would require more extensive insect and disease surveys to identify all infested or diseased areas and to determine where insect or disease outbreaks are likely to spread from one land ownership to another. Estimated cost would be 15 additional surveys @ \$10.0/survey = \$150.0 for travel/contractual and \$24.3 for 4 mo. of a For II = 174.3
  - 2) Declaration of infestation zones would require documentation and publicity. Estimate 15 declarations @ \$1.0/declaration for travel, \$0.6/zone for public notice and \$ 43.2 for 9 mo. For II staff time for field inspections, land status, and documentation = \$67.2.
  - 3) DNR would need additional funding to develop infestation suppression agreements with all landowners in infestation zone. Estimate 30 agreements @ \$1.0.agreement for travel and 3 weeks staff time/agreement (21 mo. of For II) = \$90.6 = \$120.6 total.
- Cont. on attached page

Prepared by: Jeff Jahnke, Director *[Signature]* /mw Phone: 465-3379  
 Division: Forestry Date: 16-Apr-99  
 Approved by Commissioner: *[Signature]* Date: 4-16-99  
 Agency: Natural Resources

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1-LS0763VD  
Luckhaupt ✓  
4/22/99

CS FOR SENATE BILL NO. 142( )

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWENTY-FIRST LEGISLATURE - FIRST SESSION

BY

Offered:  
Referred:

Sponsor(s): SENATOR TAYLOR

A BILL

FOR AN ACT ENTITLED

1 "An Act relating to infestations and diseases of timber."

2 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

3 \* Section 1. AS 41.17.082(d) is amended to read:

4 (d) The commissioner may undertake surveys and appraisals to obtain data on  
5 regional insect infestations and disease conditions. Upon a determination that an area  
6 is infested with forest insects or infected with diseases injurious to forest resources,  
7 [AND] that the infestation or infection threatens the forest land or timber of adjacent  
8 owners, and that insect and disease control work is feasible, the commissioner shall  
9 [MAY] establish the boundaries of an infestation or infection zone. The commissioner  
10 shall [MAY] enter into an agreement with an owner or with a governmental agency  
11 to control or suppress infestation or infection within the zone and to implement  
12 necessary salvage measures. When timber on state land or when timber on  
13 municipal forest land that is subject to an agreement entered into under this  
14 subsection is (1) infested or diseased and thereby poses a significant threat to  
15 surrounding healthy timber or surrounding private property, or (2) subjected to

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an environmental catastrophe, and, as a result, is susceptible to infestation or disease, to prevent the spread of infestation or disease, the timber on state land and the timber on municipal land, as provided in the agreement, shall be salvaged as rapidly as practicable considering the available access to the timber and the marketability of the timber. If possible, salvage under this subsection should occur before there is a significant loss of merchantability of the timber. Upon a determination by the commissioner that insect and disease control work within the zone is no longer necessary or feasible, the commissioner shall terminate the zone.

\* Sec. 2. AS 41.17.082 is amended by adding a new subsection to read:

(e) The commissioner shall declare an emergency when 100 acres or more of timber is infested or diseased within the boundaries of an infestation or infection zone established under (d) of this section. Upon the declaration of an emergency, the commissioner may

- (1) offer emergency and salvage sales under AS 38.05 of infested or diseased state timber or state timber that is threatened with infestation or disease;
- (2) harvest infested or diseased state timber regardless of whether the proceeds from the harvested timber will provide a net return to the state;
- (3) exempt salvage and emergency sales of less than 200 acres from the preparation of a plan of operations under AS 41.17.090;
- (4) require reforestation of a greater degree, quantity, and type than otherwise required by this chapter for the reforestation of riparian areas; and
- (5) waive a requirement of this chapter and regulations adopted under this chapter, other than a requirement of or a regulation adopted under AS 41.17.115 - 41.17.119, if the commissioner finds that the waiver will substantially contribute to controlling or eliminating the infestation or disease.

L

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bbaker@alaska.net

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April 23, 1999

To: Senate Resources Committee Members  
Fax: 465-4928

**Subject: April 23 Senate Resources Committee Hearing on SB 142**

Dear Senate Resources Committee Members:

As a graduate forester, forest insect specialist, private small woodlot owner, and former employee of the Alaska Department of Fish and Game and the U.S. Forest Service, I strongly urge you to vote against SB 142. This bill would require salvage logging when it isn't even necessary or appropriate. SB 142 would result in government overregulation and interference with the rights of private property owners in the wise use of their forest land. By requiring salvage logging where it can't even pay its own way, it would be a waste of scarce public funds - a fiscal conservative's nightmare.

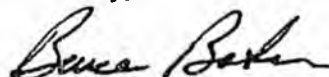
The timber salvage problems that this bill purports to address are not statewide problems. They're geographically localized situations that vary depending on the site-specific circumstances. They are situations in which sensible and responsible public officials, private land managers, and, where appropriate, the general public need to be involved in developing solutions on a case-by-case basis.

The best known current forest insect or disease condition in Alaska is the spruce bark beetle on the Kenai Peninsula, and that situation has been addressed by a variety of people working with the Kenai Borough. Let's let local government do its job without Legislative interference.

And finally, this bill offers no new solutions. The Department of Natural Resources already has the authority to put up emergency and below-cost timber sales in circumstances that call for that approach.

Thank you for the opportunity to comment.

Sincerely,

  
Bruce Baker

Copies: Governor Tony Knowles 465-3532 (fax)  
Senator Kim Elton 2108

# Alaska State Legislature

Chairman,  
Judiciary Committee  
Administrative Regulations  
Revenue Committee

Vice Chairman,  
Resources Committee



*Senator Robin L. Taylor*

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## SPONSOR STATEMENT

### CSSB 142 (Res)

An Act relating to infestations and diseases of timber.

SB 142 amends our statutes to require the Commissioner of National Resources to implement salvage measures on state or municipal forestland when the following conditions exist:

1. the timber is infested or diseased and thereby poses a significant threat to surrounding healthy timber or surrounding private property; or
2. the area is subjected to an environmental catastrophe thereby making the timber susceptible to infestation or disease.

The Miller's Reach Fire of 1997 caused over \$40 million in damage. The fire destroyed over 600 buildings including over 300 homes. In addition to the improvements that were lost, thousands of acres of valuable timber were also lost. At the same time that the fire in the MatSu Borough was raging, another blaze was roaring on the Kenai Peninsula in the Tustumena Lake area. This fire destroyed over 25,000 acres in just 12 hours. Much of the remaining Kenai Peninsula is like a haystack waiting for a match to be dropped. Numerous fires occur annually from lightening not to mention the carelessness of people. Currently Homer, Anchor Point, Ninilchik, and areas along the Kenai River face this risk. Similar conditions exist in Anchorage and other areas of the state as well. To prevent the spread of infestation or disease, and more importantly to reduce the risk of fire, the timber is to be salvaged as rapidly as possible. The salvage should occur before there is significant loss of merchantability of the timber.

The logging of beetle-killed timber is the first stage in a reforestation process that will lead to healthier forests faster than if nothing is done. If we are to have healthy forests in the future, we must embark upon a systematic reforestation program. This cannot be done in the areas of severe beetle impact until the dead and dying trees have been removed. Leaving dead timber stand on the stem is only inviting major forest fires with the serious potential for the loss of life and property. This is particularly true in the Homer area out East End Road because of the prevailing wind conditions. This bill will speed up the process of removing this dead timber and hence removing the fuel that forest fires thrive on ..... dead wood.

Some environmentalists who have previously opposed the harvesting of timber have now realized the necessity to remove infected trees from their own land. Some have now gone in and even clear-cut the infected timber to protect the healthy live trees.

District A:

Hyder • Ketchikan • Kupreanof • Meyers Chuck • Petersburg • Saxman • Sitka • Wrangell

As a side benefit, this will also generate revenue to the state. Unfortunately, the revenues will not be as high as they might have been. If we had undertaken a program such as this when the beetle kill first became evident in Alaska, we could have harvested vast quantities of high value timber. We must act quickly if we are to preserve any value in these vast infected stands of timber.

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Prepared by: Jeff Jahnke, Director *[Signature]* /mw Phone: 465-3379  
 Division: Forestry Date: 16-Apr-99  
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2. the area is subjected to an environmental catastrophe thereby making the timber susceptible to infestation or disease.

The Big Lake fire of 1997 destroyed over 300 homes not to mention the other building and loss of timber resources. All in all, over 600 buildings were loss as a result of the fire. Much of the Kenai Peninsula is like a haystack waiting for a match to be dropped. Numerous fires occur annually from lightening not to mention the carelessness of people. Currently Homer, Anchor Point, Ninilchik, and areas along the Kenai River face this risk. Similar conditions exist in Anchorage and other areas of the state as well.

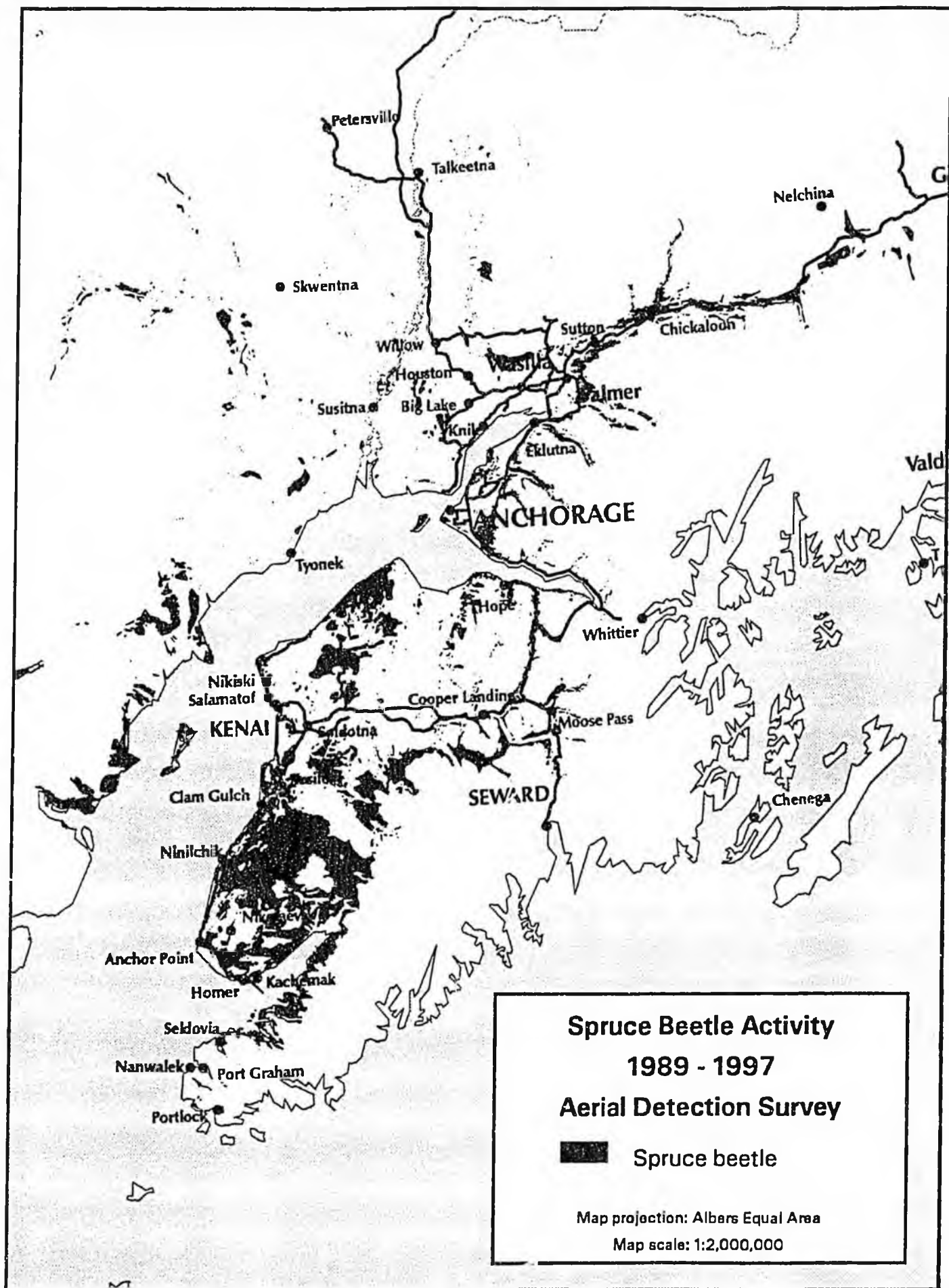
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District A:

Hyder • Ketchikan • Kupreanof • Meyers Chuck • Petersburg • Saxman • Sitka • Wrangell



Petersville

Talkeetna

Nelchina

● Skwentna

Willow

Sutton

Chickaloon

Houston

Wasilla

Palmer

Susitna

Big Lake

Knik

Eklutna

**ANCHORAGE**

Tyonek

Trope

Whittier

Nikiski

Salamatof

Cooper Landing

**KENAI**

Soldotna

Moose Pass

Clam Gulch

**SEWARD**

Ninilchik

Chenega

Anchor Point

Homer

Kachemak

Seldovia

Nanwalek



Port Graham

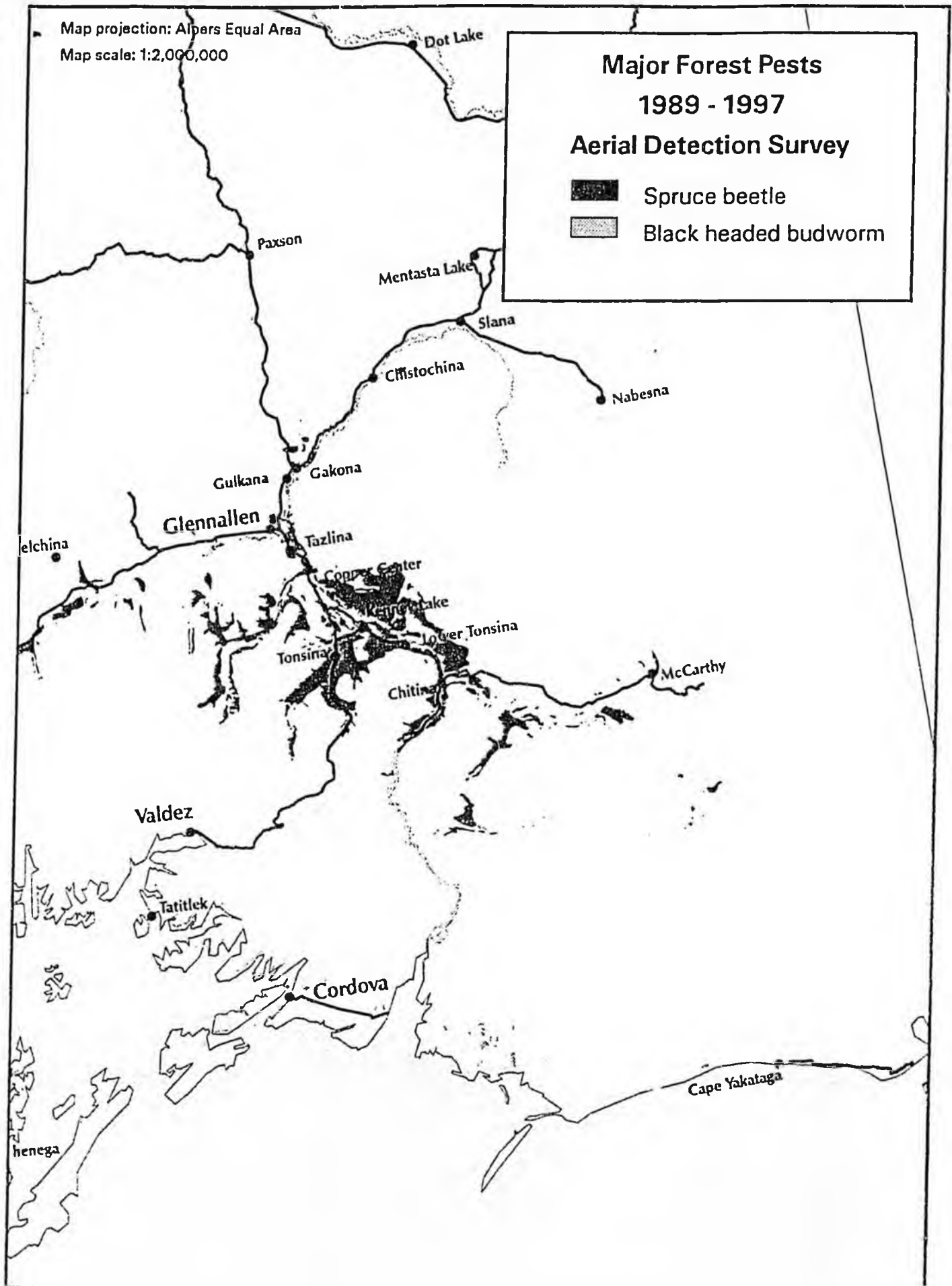
Portlock

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Map projection: Alpers Equal Area  
Map scale: 1:2,000,000

### Major Forest Pests 1989 - 1997 Aerial Detection Survey

-  Spruce beetle
-  Black headed budworm



recent fires on the Kenai Peninsula have shown an increase in crown fires. This fire behavior is caused by fire traveling up the dead spruce trees and spotting into the crowns of adjacent beetle killed trees. In some areas, there may be an increase in the lower level winds because of a "reduction" of the wind-break characteristic of a green forest, thus augmenting fire crowning behavior.

**6** **Impact to fisheries:** If salmon spawning streams are bordered by large diameter spruce and these trees are subsequently killed by spruce beetles, there is a concern as to the future availability of large woody debris in the streams. Large woody debris in spawning streams is a necessary component for spawning habitat integrity.

**7** **Impact to watersheds:** Intense bark beetle outbreaks can kill large amounts of forest vegetation. The "removal" of significant portions of the forest will impact to some degree the dynamics of stream flow, timing of peak flow, etc. There have been no hydrologic studies in Alaska quantifying or qualifying impacts associated with spruce beetle outbreaks. Impact studies, however, have been done elsewhere. In Idaho watersheds impacted by the Mountain Pine Beetle, there was a 15% increase in annual water yield, a 2-3 week advance in snow-melt, and a 10-15% increase in low flows.

**T**here are a variety of techniques that can be used to prevent, mitigate, or reduce impacts associated with spruce beetle infestations.

However, before pest management options can be developed, the resource objective(s) for a particular stand, watershed, landscape, etc. must be determined. The forest manager must evaluate the resource values and economics of management actions for each stand in light of management objectives. The beetle population level must also be considered because population levels will determine the priority of management actions and the type of strategy to be invoked. The key to

forest ecosystem management is to manage vegetation patterns in order to maintain species diversity, both plant and animal, while providing for a multitude of resources such as recreation, fisheries, wildlife, and the production of wood fiber. Properly applied silvicultural practices as well as fire management in south-central and interior Alaska, can maintain the forest diversity needed to provide the range of products and amenities available in the natural forest for now and in the future.

## CONDITIONS IN BRIEF

Annual aerial mapping is conducted to document where active forest damage is occurring, that is, where current defoliation or recently killed trees are located. These aerial surveys generally cover approximately 1/3 of the forested land in Alaska, however, surveying in the interior was hampered by smoke and inclement weather in 1997. Despite these limitations, insect and disease activity in Alaskan forests declined by one third to 1.7 million acres. Major declines in three of the four most active insects, spruce beetle, spruce budworm, and larch sawfly, accounted for this reduction.

**INSECTS:**

Active **spruce beetle** infestations declined by 50% from 1996 totals in both south-central and southeast Alaska to 563,741 acres. Many spruce stands are now 80-90% dead and have little or no susceptible host material remaining to support further spruce beetle activity. Visually, these stands appear to have few recently killed trees and the standing dead trees are grey in appearance. These stands are not mapped in the annual survey. It is estimated that over 2.3 million acres are in this condition as a result of spruce beetle activity over the last seven years. This factor accounts for the majority of active spruce beetle infestation reduction noted in 1997. Heavy mortality exists in most spruce stands in the lower Kenai Peninsula from Bradley Lake near Kachemak Bay northwest to Tustumena Lake and south to East End Road near Homer as well as the Copper River Valley. Although it may appear that the spruce beetle has run its course in many areas by removing susceptible host, areas remain where beetle populations could expand into.

The Homer area on the Kenai Peninsula experienced a tremendous beetle flight this year; more spruce trees will be showing red needles in 1998. The beetles have decimated most of the spruce stands in the main Copper River Valley; however, many side drainages remain under attack. Beetles have also been active in the Susitna River Valley for several years, although the loss of spruce will not be as devastating due to the hardwood forest component. Assuming that conditions favorable to beetle development continue, along with the presence of susceptible stands (i.e., stands composed of mature, even-aged, slow-growing spruce), it would be safe to predict that beetle activity is not yet over. However, it is not expected that beetle populations will reach the 1996 level of 1.13 million acres infested in the near future.

Total spruce beetle activity in southeast Alaska decreased from 35,700 acres in 1996 to 19,050 acres in 1997. The beetle outbreak in Glacier Bay National Park on the ridge east of Gustavus decreased as did the infestation at the mouth of the Stikine River. The beetle infestations in Haines and along the Taku River continued at 1996 levels.

The **spruce budworm**, which defoliated more than 230,000 acres of white spruce in 1996, declined by 84% in 1997 to 38,416 acres. Nearly all of the budworm activity has been confined to the Yukon and Tanana Rivers in interior Alaska. The major portion of this infestation has centered around Tanana; however, over the past two years the spruce budworm has migrated westward along the Yukon River to Ruby. Many trees in this area have severely diminished crowns having withstood budworm defoliation for several years. It is expected that this infestation will continue to decline toward endemic levels over the next few years.

Approximately 29,000 acres of hemlock and Sitka spruce were defoliated by the **Black-headed budworm** in Prince William Sound. While the Cordova area experienced some of the heaviest defoliation, most of the affected acres occurred in sheltered coves from Knight Island north to Valdez Arm and east to the Copper River. A

warm, early spring and summer were advantageous for the budworm. If this warm, dry weather continues in 1998, budworm populations should increase in the Sound. The budworm populations are decreasing in southeast Alaska-- only 1,200 acres were affected. These populations often rise and fall over a period of a few years and result in some tree topkill and minor mortality.

In south-central Alaska, nearly 272,000 acres of birch showed signs of stress. This condition was caused by a combination of drought and insects. Large populations of **birch leafminer** were prevalent in the Anchorage bowl and **birch aphids** were reported throughout the Mat-Su Valley. The combination of drought and insects caused most birch leaves to prematurely turn brown.

Willow defoliation by the **willow leaf blotchminer** declined 93% in 1997 to only 3,501 acres. This outbreak, which was scattered throughout the interior, the Copper River Valley and the Anchorage area, peaked at 150,000 acres in 1992. Since then, the outbreak has been in decline and appears to be returning to endemic levels.

Two other insects of note are the larch sawfly and hemlock sawfly. This marks the fifth consecutive year of defoliation by the **larch sawfly**, but it appears that this infestation is waning, as populations fell by 56% in 1997. Some mortality of larch, attributed to five years of heavy defoliation, was noted near Fairbanks. In southeast Alaska, **Hemlock sawfly** defoliation levels decreased slightly from 8,250 acres in 1996 to 6,638 acres in 1997.

## **DISEASES:**

The most important diseases and declines of Alaskan forests during 1997 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 habitats are produced directly by wood decay fungi, hemlock dwarf mistletoe and spruce broom rust through the formation of tree cavities and witches' brooms.

In southeast Alaska, approximately one-third of the gross volume of forests is defective due to **heart 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 left after harvesting. Some 477,000 acres of **yellow-cedar decline** have been mapped across an extensive portion of southeast Alaska. 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. Salvage opportunities for this valuable resource are now being recognized.

In south-central and interior Alaska, **root disease** continues to cause growth loss and mortality in white spruce stands. Impacts are greatest in young-growth managed stands where seedlings grow in close proximity to infected stumps. Volume losses of spruce due to **heart, butt, and sap rot fungi** are substantial; sap rot decay quickly develops and degrades spruce trees killed by spruce bark beetles. A high incidence of stem decay occurs in living hardwoods.

Foliar diseases of conifers had negligible ecological significance and were generally at moderate levels throughout Alaska in 1997, except for an outbreak of spruce needle cast in young-growth forests on Afognak Island. Canker and foliar fungi caused large, but unmeasured, damage to hardwood species in south-central and interior Alaska.

## **Other:**

In localized areas of southeast Alaska, **porcupines** continued to cause tree defect and mortality to several conifer species and **brown bears** caused a high incidence of wounding on the lower boles of yellow-cedar.

**Table 1. 1997 forest insect and disease activity (in acres) as detected aerially in Alaska by land ownership and agent<sup>1</sup>**

<i>Damage Agent</i>	<i>State &amp; Private</i>	<i>National Forest</i>	<i>Other Federal</i>	<i>Native Corp.</i>	<i>1997 Total</i>	<i>1996 Total</i>	<i>% Change</i>
Spruce beetle	263,187	14,773	142,462	143,319	563,741	1,130,756	-50
Engravers/spruce beetle	2,428	8	3,608	2,902	8,946	13,941	-36
Spruce budworm	21,326	--	8,637	8,453	38,416	235,936	-84
Black-headed budworm	3,725	17,657	578	8,882	30,842	1,227	+2,414
Conifer Defoliation	6,234	--	97	17,870	24,201	5,467	+343
Hemlock sawfly	447	5,961	--	230	6,638	8,251	-20
Spruce needle aphid	39	439	--	43	521	474	+10
Large aspen tortrix	3,913	--	582	588	5,083	6,447	-21
Birch defoliation	270,195	201	857	662	271,915	3,178	+8,456
Cottonwood defoliation	1,672	134	105	1,125	3,036	6,518	-53
Willow defoliation	2,202	--	220	1,079	3,501	50,112	-93
Larch sawfly	107,658	--	130,317	29,886	267,861	606,927	-56
Spruce needle rust	10	--	34	10,732	10,776	3,424	+215
Yellow-cedar decline <sup>2</sup>	6,971	454,656	----	15,913	477,540	474,864	+56
Porcupine damage	161	1,002	--	--	1,163	633	+84
Blowdown/windthrow	27	721	665	812	2,225	618	+260
Water damage	1,287	479	216	67	2,049	5,635	-64
Winter damage	1,755	898	295	--	2,948	--	+100
Landslide damage	111	123	156	59	449	498	-10
<b>Total acres by ownership</b>	<b>693,348</b>	<b>497,052</b>	<b>288,829</b>	<b>242,622</b>	<b>1,721,851</b>	<b>2,549,439</b>	<b>-32</b>

<sup>1</sup> Table entries do not include many of the most destructive diseases (e.g., wood decays and dwarf mistletoe) because these losses are not detectable in aerial surveys.

<sup>2</sup> Value of yellow-cedar decline is not restricted to the acreage with a high concentration of dying trees for this year; it represents stands that generally have long-dead trees, recently-dead trees, dying trees, and some healthy trees. See discussion of yellow-cedar decline for a detailed listing of affected acreage by island and Ranger District.

# THE ROLE OF DISTURBANCE IN ECOSYSTEM MANAGEMENT

One premise of ecosystem management is that native species are adapted to the natural disturbances common to an area. Disturbance events are responsible for the way the current landscape appears and functions today, and will determine the structure and composition of future landscapes. In Alaska, glaciation, earthquakes, wind storms, fire, flooding, avalanches and landslides greatly affect ecological processes. These types of disturbances remove existing vegetation and often expose mineral soil for new plants to become established.

Disturbance events such as insect and disease outbreaks also result in shifting landscape patterns. These disturbances usually affect only a few species directly, while indirectly affecting the remaining species through reduced competition or changes in forest structure. Changes resulting from these types of disturbances often occur over varying time periods, but can be very dramatic and cover large areas. Spruce beetles have radically affected the landscape in a single decade, heartrots and other internal diseases operate for decades, whereas yellow-cedar decline has been occurring for nearly 100 years.

To a certain extent, we can predict what type of disturbance is likely to occur in a particular area: fires are frequent in interior Alaska and wind storm events are important in southeast. Spruce beetles are an important disturbance agent in south-central Alaska. Disturbance agents and patterns are generally tied to geography, climate, and vegetation. When we understand the complexities of these relationships, we are able to predict and respond to natural disturbances and mimic the desirable effects with management activities. Ecological classification is one tool available to help us understand disturbance patterns.

Many useful systems of classification have been developed for Alaska's ecosystems and vegetation. Refining and standardizing these classifications across all ownerships will promote effective ecosystem management. ECOMAP (1993) is one system of ecological classification that the Forest Service has adopted and continues to develop. Within this hierarchical system, ecosystems are delineated at multiple scales using different sets of environmental factors. The levels established at this time include Domains, Divisions, Provinces and Sections. Domains represent subcontinental climatic zones. Divisions and Provinces represent climatic subzones as reflected by dominant lifeforms (meadows vs. forests) and broad vegetation types, respectively. Sections are distinguished mainly by geomorphic and topographic features. The Section level is the first level of the hierarchy where analysis of insect and disease activity becomes applicable.

In this edition of the Forest Insect and Disease Conditions in Alaska, we introduce and make reference to the Ecosystem Sections of Alaska (Map 1). This map was developed in the Alaska Region (Nowacki and Brock 1995). Section descriptions are included in Appendix C with a list of damaging agents reported during the 1997 aerial survey. Only Sections that were covered in this year's survey are described. As the ecological hierarchy classification and mapping are developed to finer scales, they become more valuable as management tools to predict the impacts of various disturbances on forest resources.

## Map 1. Ecosystem Sections of Alaska

### Polar Domain, Subarctic Division,

#### 131 - Yukon Intermontaine Taiga Province

131A - Yukon Bottomlands Section

131B - Kuskokwim Colluvial Plain Section

M131A - Upper Kobuk-Koyukuk Section

M131B - Nulato Hills Section

M131C - Kuskokwim Mountains Section

M131D - Nushagak-Line Hills Section

#### 135 - Alaska Range Taiga Province

135A - Copper River Basin Section

M135A - Northern Chugach Range Section

M135B - Wrangell Mountain Section

M135C - Alaska Range Section

#### 139 - Upper Yukon Taiga Province

M139A - Ray Mountain Section

M139B - Ogilvie Mountain Section

M139C - Dawson Range Section

### Humid Temperate Domain, Warm Continental Division

#### 213 - Alaska Mixed Forest Province

213A - Bristol Bay Lowlands Section

213B - Cook Inlet Lowlands Section

M213A - Northern Aleutian Range Section

M213B - Kenai Mountains Section

### Humid Temperate Domain, Marine Division

#### 244 - Pacific Coastal Icefields Province

M244A - Chugach Range Section

M244B - St. Elias Range Section

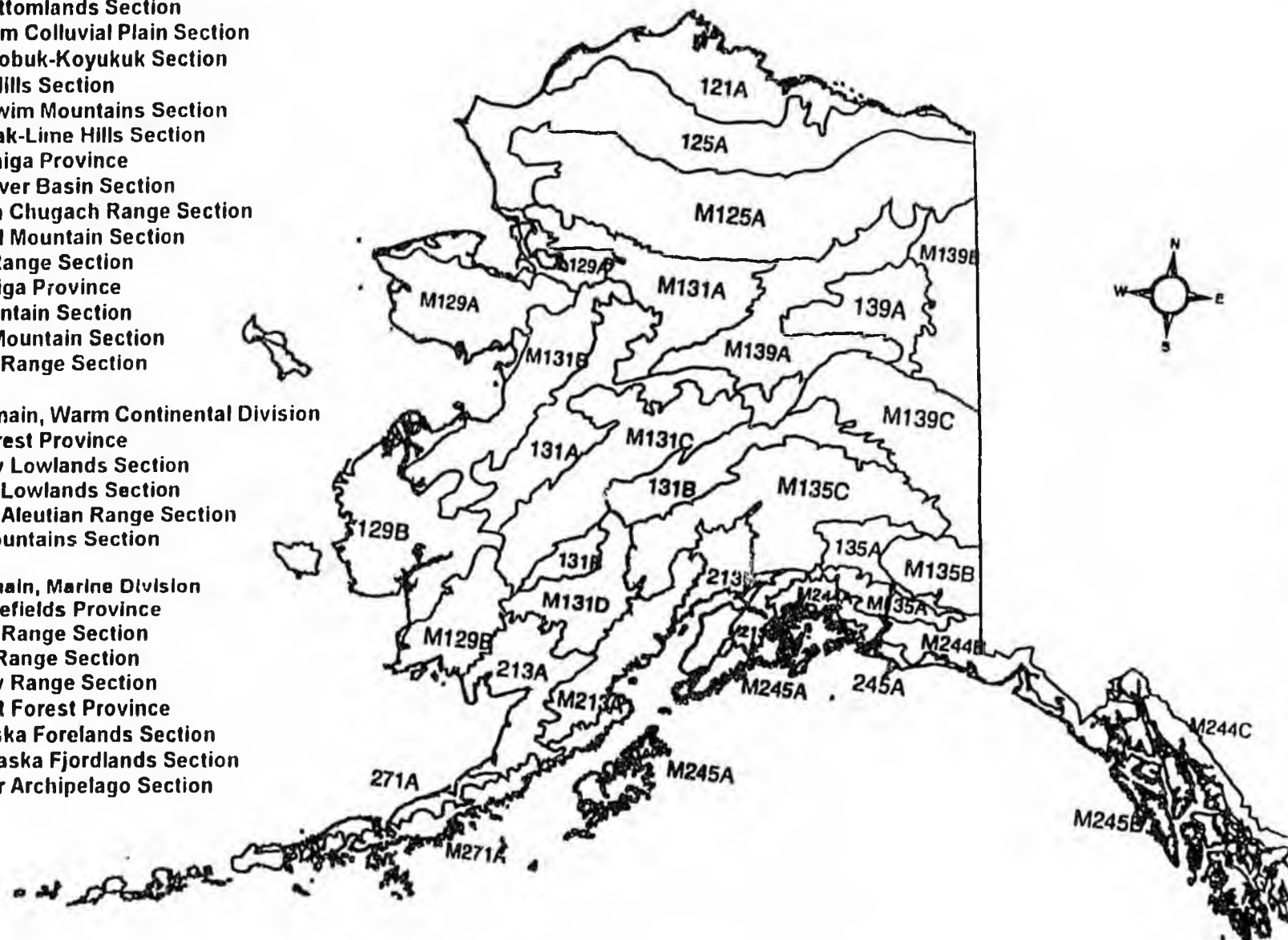
M244C - Boundary Range Section

#### 245 - Pacific Gulf Coast Forest Province

245A - Gulf of Alaska Forelands Section

M245A - Gulf of Alaska Fjordlands Section

M245B - Alexander Archipelago Section



# STATUS OF INSECTS

## INSECTS AS AGENTS OF DISTURBANCE

Alaska's insect populations are one of the most significant components of its forest ecosystems. Arctic/boreal insects are characterized by having few species and large population numbers. These insects are opportunistic in their behavior. They respond quickly to changes in climate and the availability of food and breeding material. The spruce beetle, for example, responds quickly to large scale blowdown, fire scorched trees, or spruce injured by flooding. Large numbers of beetles can be produced in such breeding material, leading to potential outbreaks.

Spruce beetles are one of the most important disturbance agents in mature spruce stands in Alaska. A variety of changes occur to forest resources when many trees are killed. Ultimately, these changes are biological or ecological in nature. There are also socio-economic consequences that can be viewed as either positive or negative, depending on the forest resource in question. Some of the impacts associated with spruce beetle infestations include, but are not limited to:

**1** **Loss of merchantable value of killed trees:** The value of spruce as saw timber is reduced within three years of attack in south-central Alaska as weather checking and increased sap-rot occur. The value of a beetle killed trees as house logs, chips, or firewood continues for many years if the beetle-killed tree remains standing.

**2** **Long term stand conversion:** The best regeneration of spruce and birch occurs on a seed bed of bare mineral soil with some organic material. Site disturbances such as fire, windthrow, flooding, or ground scarification provide excellent sites for germination and establishment of tree species if there is an adequate

seed source. However, on some sites in south-central Alaska, grass and other competing vegetation quickly invade the sites where spruce beetles have "opened up" the canopy. This delays re-establishment of tree species.

**3** **Impacts to wildlife habitat:** Wildlife populations, which depend on live, mature spruce stands for habitat requirements may decline. We expect to see decreases in red squirrel, spruce grouse, Townsend Warblers, and possibly Marbled Murrelet populations. On the other hand, wildlife species (moose, small mammals and their predators, etc.) that benefit from early successional vegetation such as willow and aspen may increase as stand composition changes.

**4** **Impacts to scenic quality:** Scenic beauty is an important forest resource. It has been demonstrated that there is a significant decline in public perception of scenic quality where spruce beetle impacted stands adjoin corridors such as National Scenic Byways. Maintaining or enhancing scenic quality necessitates minimizing impacts from spruce beetle infestations. Surveys have also shown that the public is evenly divided as to whether spruce beetle outbreaks damage scenic quality in back-country areas.

**5** **Fire hazard:** There is concern that fire hazard in spruce beetle impacted stands will increase over time. After a spruce beetle outbreak, grass or other fine vegetation ground cover increases; fire spreads rapidly through these vegetation types. As the dead trees break or blow down (5-10 years after an outbreak), large woody debris begins to accumulate on the forest floor. This wood is the heaviest component of the fuels complex. Heavy fuels do not readily ignite, but once ignited they burn at higher temperatures for a longer period. The combination of fine, flashy fuels and abundant large woody debris results in a dangerous fuels situation. Observations from