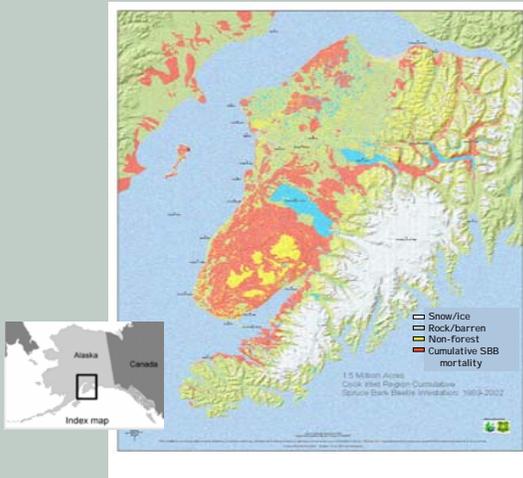


Broad-scale Spruce Forest Change, Kenai Peninsula, Alaska 1987-2000

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Introduction

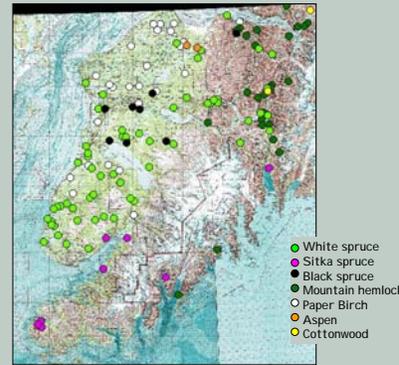
Forests of the Kenai Peninsula have changed dramatically over the past two decades as a result of a major spruce bark beetle (*Dendroctonus rufipennis* (Kirby)) outbreak. An inventory was conducted in 1987 by the USDA Forest Service, Pacific Northwest Research Station (PNW), Forest Inventory and Analysis (FIA) Program to assess the impact of the spruce beetle on the forest resources of the Kenai Peninsula. The plots were remeasured over a 2-year period (1999 and 2000) after the spruce bark beetles had affected most of these stands. Plot remeasurement was funded through the Evaluation Monitoring program.



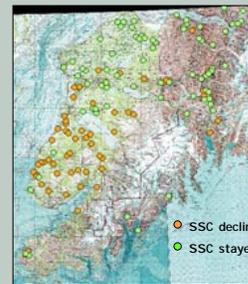
Cumulative infestation 1989-2002

Inventory Design

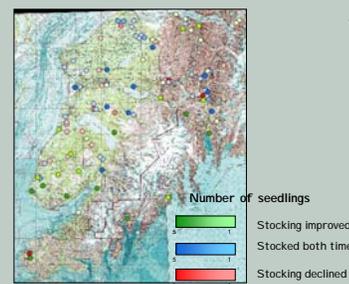
- Double sample – stratification
 - 5,597 photo points
- Ground sample focus on productive
 - 1,216 potential ground plots, 130 possible productive forest plots actually visited
- Five point cluster plot (variable radius)
- Understory vegetation data taken on 2 points (5.6m radius)
- Seedling micro plots (1.5m radius)
- Down woody material transects (11.28m N/S)
- Plots visited in 1987 and remeasured in 2000



FIA plots by Forest Type



Stand size class dynamics



Spruce Reproduction: spruce seedlings per plot 1987-2000

Downed woody material: Average change by fuel size class

	n	Fuel Classes				
		1- hour	10- hour	100- hour	Sound 1000- hour	Rotten 1000- hour
All plots	127	0.17	0.38	0.23	4.75	-2.18
Birch	26	-0.02	.66	0	3.06	-1.0
Mountain hemlock	13	.12	.4	.04	2.16	-7.9
White spruce	48	.23	.46	.6	2.85	-7.1
Nonharvested white spruce	38	.19	.28	.38	3.02	-7.5
Harvested white spruce	10	.35	1.13	1.41	2.16	-5.3

Significant changes indicated in bold font. Significantly different changes between nonharvested and harvested white spruce are underlined.



1987



1999

Southern Kenai Lowland forests showed the most marked change in vegetation composition.

Results

Stand size class dynamics:

Poletimber down 31K ac; Sawtimber down 136K ac
Cubic volume down 50% on productive forest
1242 mmcf in 1987 vs. 616 mmcf in 2000

Mortality > growth almost 2 to 1

80% of mortality in white and Sitka spruce

Spruce reproduction -

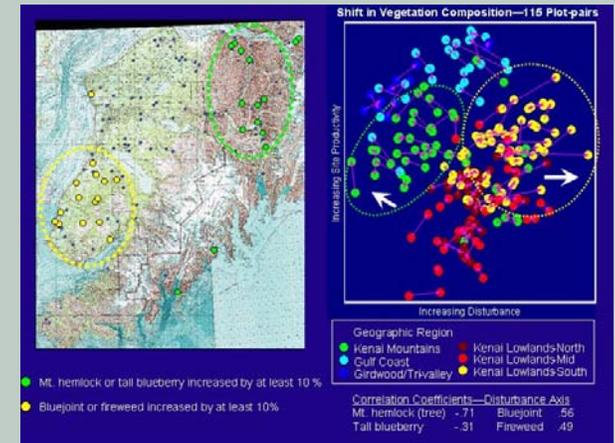
Plots where stocking didn't change or where it improved exceeds number of plots where stocking declined

Downed Woody Material - fuel management planning

Increases in all sound size classes, increases in fuel heights, decrease in moss depth in all forest types. Salvage logging did not significantly reduce large sound fuels; in fact, 10- and 100-hour fuels increased.

Vegetation changes -

- Forests of the southern Kenai lowlands showed the most marked change in composition: high spruce mortality, increases in bluejoint grass and fireweed.
- Forests of the Kenai mountains show an increase in mountain hemlock, tall blueberry, and rusty menziesia.
- Forests on the coast and forests in the mid- to northern Kenai did not show any consistent change in composition.



Ordination of vegetation data



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