

Bark beetles hit west side of Cook Inlet in the 1870-80's

by Ed Berg

In late July 1899 the steamship *Geo. W. Elder* of the Harriman Alaska Expedition sailed into lower Cook Inlet, as far north as Iliamna volcano. The Expedition was financed by railroad magnate Edward H. Harriman and had recruited some of the top scientific and literary talent of the day. The goal of the Expedition was to collect as much data as possible on the natural history of Alaska and its native inhabitants. Nature writers John Burroughs from New York State and John Muir from California were the grand old men on board, as was William Dall (as in *Dall Sheep*) who was renowned as the first American naturalist to study in Alaska. Also on board was a young photographer Edward S. Curtis, later to become famous for his striking portraits of American Indians throughout the West. Mammalogist C. Hart Merriam, head of the U.S. Biological Survey, was chief of the 25 scientists recruited for the two month trip.

The Harriman Alaska Expedition collected great quantities of specimens, photos, artifacts, and interviews, and ultimately published 12 volumes of technical studies. Homer writer Nancy Lord has recently revisited the Expedition in her delightful book *Green Alaska: Dreams from the Far Coast* (1999, Counterpoint), when she and her fish tendering partner Ken Castner retraced the Expedition's route along the Alaska Peninsula and the Aleutians.

Nancy Lord points out that when the Expedition cruised through lower Cook Inlet extensive tracts of dead forest were noticed. John Muir wrote, "On the stratified deposits (Tertiary) on the west side of Kachemak Bay and Cook Inlet considerable areas were covered with dead forest, said to have been killed by showers of ashes and cinders...from Iliamna; some say by ordinary forest fires." Having survived the spruce bark beetle outbreak of the 1990's, as well as various eruptions of the Cook Inlet volcanoes, Nancy rightly balks at the suggestion that volcanic ashes and cinders, or fires in the damp coastal forests, might be the sources of mortality in these dead forests. She suggests that Expedition naturalists were observing the results of precisely the same kind of spruce bark beetle outbreak that we know so well today.

My curiosity was more than piqued when I read

this observation and discussed it with Nancy Lord. At the Kenai Refuge we have spent several field seasons collecting tree-ring (dendrochronology) evidence of past spruce bark beetle outbreaks. We have looked at 16 sites from Seldovia to the Swanson River Oilfield, and east to the Mystery Hills and Cooper Landing. In the northern sites we can see regional beetle outbreaks in the 1810-20's, 1900-1910's, and 1970's. The southern sites were heavily hit in the 1870-80's, especially the north side of Kachemak Bay.

Several years ago we discovered William Langille's 1904 report on the forest conditions on the Kenai Peninsula. (Langille was the right-hand man in Alaska of Gifford Pinchot, Teddy Roosevelt's architect of the US Forest Service in 1905-06. Langille became supervisor in 1905 of what today is called the Tongass National Forest.) In his 1904 report Langille described the standing dead forest with 40-100% mortality between Coal Bay (Homer) and Anchor Point. In 1994 we studied a clearcut on the west side of Homer in great detail, cutting more than 500 slabs from stumps. Virtually every slab showed a major growth spurt (wider rings) in the early 1880's, due to a severe thinning of the forest canopy which "released" the survivors from competition. The fact that Langille described the dead trees as "standing" ruled out blowdown by wind as the mortality agent in this stand and left spruce bark beetles as the most plausible candidate.

The Harriman Expedition report of dead forest on the west side of Cook Inlet raised the possibility of a second historically confirmed dead forest. But could we find it? No specific location was reported, beyond being in the vicinity of Iliamna volcano. Nevertheless, if this was a beetle-kill event, it was probably a widespread regional event on the west side of the Inlet, just as it is today, and as it was on the southern Kenai Peninsula side in the 1870-80's and 1990's. Probably any forest from Kamishak Bay to Iliamna to Redoubt volcano should show evidence of this outbreak.

I decided to try Polly Creek, north of the Crescent River and Tuxedni Bay. Conversations with loggers and local setnetters indicated that this area possessed abundant mature spruce forest with trees old enough to have a good tree-ring record of 19th century

growth. On July 10th Refuge Biotech Doug Fisher, forest ecologist Andy DeVolder and I flew over to the Polly Creek beach, where we met John Swiss who homesteaded a setnet site here in 1949. John and his sons Tyler and Jack described their extensive efforts to clear fire-defensible space around their buildings, because the surrounding spruce forest was almost 100% beetle-killed. For the next three days we cored trees with increment borers to sample the tree-rings, collecting 120 cores, with the oldest dating back to 1696.

Back in our lab at Refuge Headquarters, Biotechs Candy Godin and Archer Larned set to work measuring the tree-ring widths in our core samples. When we analyzed all these measurements we could see a general period of accelerated growth from 1870 to 1890, especially in 1878-1880 when 24% of the trees initiated a growth release. With almost a quarter of the trees releasing in this three-year period, we can infer the occurrence of a major thinning of the forest canopy, i.e., substantial death of large overstory trees. When the Harriman Expedition in 1899 observed dead forests on the west side of Cook Inlet, they were presumably observing this mortality, which had peaked 20 years earlier, just as it had peaked earlier on the Kenai Peninsula side of the Inlet.

Polly Creek is the only site we have examined on the west side of the Cook Inlet, but it tends to confirm our view that the present bark beetle outbreak is basically a replay of the of the 1870-80's outbreak.

Both outbreaks have affected hundreds of thousands of acres of spruce forest on both sides of the Inlet, and the outbreaks have lasted ten years or more in a given area. In both outbreaks, sites with sunny southern exposures have been hit the hardest, presumably due to drought-stressed trees. Conversely, sites on cool, steep north-facing slopes have experienced less beetle kill, or in the case of Neptune Bay, they escaped the 1870-80's outbreak altogether.

The comments, however brief, of the Harriman Expedition writers about the dead forests in Cook Inlet have added another valuable piece of information to the spruce bark beetle story of southcentral Alaska. I would be very interested in hearing from readers who might know of other such historical reports of dead forests. This might take the form of old letters, newspaper articles, maps, or photos. The spruce bark beetle puzzle is slowly coming together, but we need more pieces!

An excellent collection of photos from the 1899 Harriman Expedition can be viewed on the web at <http://128.95.104.14/index.html> (University of Washington archives).

Ed Berg has been the ecologist at the Kenai National Wildlife Refuge since 1993. He can be reached at Refuge Headquarters at 262-7021. Previous Refuge Notebook columns can be viewed on the Web at <http://kenai.fws.gov>.