

DEPARTMENT OF HEALTH

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January 23, 1978

Bill Stephenson, Superintendent
Lassen Volcanic National Park
Mineral, California 96063

Dear Mr. Stephenson:

This will serve as a report of our plague suppression operations at Lassen Volcanic National Park during the 1976-1977 seasons.

Bubonic plague was isolated from rodents in 1976 and 1977 in all seven counties in northeastern California. Plague also occurred in mountain and foothill areas in counties to the south from Lake Tahoe to Los Angeles. Temporary closure of public recreation sites and emergency plague control operations became necessary in some areas of rodent die-off. There have been 5 human cases of plague in the last two years in California, three of which were fatal. Four of these resulted from contact with wild rodents and fleas. Two of the cases were in northern California; one at Lake Tahoe, the other at Plumas-Eureka State Park.

Our Vector and Waste Management Section maintains surveillance for disease in rodents through population surveys and live trapping to obtain samples for laboratory testing. Control operations to suppress flea populations and potential plague transmission are recommended where a high health hazard exists. Campgrounds with large populations of wild rodents and close human contact with rodents and fleas represent a situation with high potential for a human plague case.

A plague positive serological test indicates an animal has had plague and developed antibodies against the disease. The infection may have been recent or several months old. Animals dying from plague or harboring plague infected fleas constitute a much greater human health hazard and dictate immediate preventive action.

Plague was suspected in late August 1976 in Lassen Park when golden-mantled ground squirrels were found sick or dying in Craggs Campground. Plague was confirmed in two golden-mantles by State Health Department laboratory testing. Jill Beede and Marilyn Hattenhauer of our Redding office trapped the campground to further evaluate, and a sick golden-mantle from Site #16 was positive, as were the fleas from this ground squirrel.

Based on the above findings of positive animals and fleas, we recommended closure of Craggs Campground to public use. Since it was late fall, it remained closed until the end of the tourist season.

In 1977, an attempt was made to evaluate the status of plague activity prior to the opening of park campgrounds for the tourist season. A trapping survey

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was conducted in April at Manzanita Lake, Crags, and Lost Creek Campgrounds. Snow hampered the trapping, but two chipmunks from Lost Creek Organizational Camp were serologically positive for plague. All other animals and fleas tested negative. We recommended that all campgrounds in the Park be posted with plague warnings and that groups using Lost Creek Camp be warned about plague in person by park rangers.

The campgrounds at Butte Lake, Summit Lake, and lava rims near Crags and Lost Creek Campgrounds were trapped in June and July 1977. A chipmunk from 1.7 miles west of Crags Campground was serologically positive.

In August, two chipmunks were found dead at Manzanita Lake Campground. One animal was from behind the campground store. Both chipmunks were positive for plague. This campground has a very high population of wild rodents and receives high human use, therefore we recommended closing the facility and implementing a flea control program. Members of your staff worked closely with us during the control program.

Flea control was achieved with 5% carbaryl dust in bait-dust stations of PVC plastic pipe, using oat-peanut butter-paraffin bait blocks. The bait block, which is non-toxic, is suspended on wire above a compartment which contains insecticide dust. The animal picks up dust in its fur as it feeds on the bait block. Fleas are killed on the animal and in the nest when it returns to its underground burrow. The rodents themselves are not harmed, and environmental effects from the control operation are minimal. A total of 43.5 pounds of insecticide was used in 228 bait stations placed throughout Manzanita Lake Campground. Stations were maintained by your staff and operated for a 2-week period. Pre- and post-treatment trapping of animals were utilized to determine rodent/ectoparasite population ratios. At the end of the second week, the number of fleas per animal was reduced to a safe level, minimizing the potential of plague transmission to humans. The campground was then re-opened.

The following week, we re-evaluated all camping areas within the National Park. There was again serological evidence of plague in chipmunks at Crags, Lost Creek, and at Butte Lake Campgrounds, but no positive fleas were collected, and no apparent die-offs of rodents were observed. No additional positive rodents or fleas were taken from Manzanita Lake Campground following the flea control operation in late August.

We want to thank you and your staff for the splendid cooperation and assistance in carrying out the plague investigation and control program. We

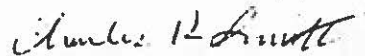
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appreciate your assistance in keeping the staff alert to the potential of bubonic plague in the park, and in assisting us in our surveillance program each year.

Sincerely,

VECTOR AND WASTE
MANAGEMENT SECTION



Charles R. Smith
Associate Public Health Biologist

CRS:vs

cc: R.F. Peters, Chief
John Walker, Asst. Chief - VWMS - Berkeley
Dale Watson - Shasta Co. Health Dept.
Bruce Wade - Shasta Co. Agric. Commissioner
Natl. Park Service Regional Office - San Francisco
Bernard Nelson, PhD - Berkeley - Zoonoses Unit

all trapping in campgrounds
those 2 years

1976 TRAPPING - LASSEN NATIONAL PARK

California Dept. of
Public Health
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CAPTURE RATE

<u>Location</u>	<u>Date</u>	<u># Traps</u>	<u>Chipmunks</u> <u><i>Eutamias sp.</i></u>	<u>Ground Squirrels</u> <u><i>Spermophilus lateralis</i></u>	<u>Mice</u> <u><i>Peromyscus sp.</i></u>
Drags Camp- ground	9/15	65	6	5	9
Manzanita Campground	9/15	45	8	1	10
Summit Lake Campground	9/22	120	11	8	4
<u>Totals</u>		230	25	14	23

1977 TRAPPING - LASSEN NATIONAL PARK

Drags Campground	4/27	70	2	2	2
Drags Campground	6/2	80	2	8	1
Drags Campground	7/14	50	3	12	2
Drags Campground	8/24	70	5	6	0
Post Creek Campground	4/26	44	5	1	0
Post Creek Campground	4/27	35	2	1	1
Post Creek Campground	7/14	30	5	7	0
Post Creek Campground	8/24	52	6	10	1
Summit Lake Campground	8/24	25	2	6	7
Little Lake Campground	6/2	90	21	14	1
Little Lake Campground	8/23	14	7	7	0
Little Lake Campground	8/24	60	8	21	3

1977 LASSEN NATIONAL PARK

<u>Location</u>	<u>Date</u>	<u># Traps</u>	<u>Chipmunks</u> <u><i>Eutamias sp.</i></u>	<u>Ground Squirrels</u> <u><i>Spermophilus lateralis</i></u>	<u>Mice</u> <u><i>Peromyscus sp.</i></u>
Manzanita Lake Campground	4/27	55	2	0	3
Manzanita Lake Campground	5/23	110	1	0	9
Manzanita Lake Campground	6/1	139	5	16	7
Manzanita Lake Campground	7/14	140	10	19	3
Manzanita Lake Campground	8/31	116	15	33	8
Manzanita Lake Campground	9/2	29	13	--	--
	<u>TOTALS</u>	<u>1209</u>	<u>114</u>	<u>163</u>	<u>48</u>

ANIMALS POSITIVE FOR PLAGUE - LASSEN PARK

1976

August 1976	2- <i>Spermophilus lateralis</i>	Crags Campground	+ *
September 14	1- <i>Spermophilus lateralis</i> and fleas from this animal	Crags Campground	+

1977

April 26	1- <i>Eutamias townsendi</i>	Lost Creek Campground	+1:256 **
April 27	1- <i>Eutamias townsendi</i>	Lost Creek Campground	+1:32
July 15	1- <i>Eutamias townsendi</i>	1.7 mi. W of Crags Camp- ground	+1:512
August 3	2- <i>Eutamias</i> sp.	Manzanita Lake Campground	+
August 23	1- <i>Eutamias townsendi</i>	Butte Lake Campground	+1:32
August 24	1- <i>Eutamias townsendi</i>	Lost Creek Campground	+1:16
August 24	1- <i>Eutamias townsendi</i>	Crags Campground	+1:128

* + = plague organism (bacteria) isolated from animal or fleas

** +1:256 = serologic antigen/antibody response indicating the animal has had plague and developed antibodies against the plague organism

FLEA INDICES - MANZANITA LAKE CAMPGROUND

Pre-treatment - June 1, 1977

Spermophilus lateralis (golden mantle ground squirrel)

No. animals collected - 16
Flea infestation rate - 87%
Flea index - 5.4 fleas/animal

Eutamias sp. (chipmunks)

No. animals collected - 15
Flea infestation rate - 80%
Flea index - 2.8 fleas/animal

Peromyscus sp. (deer mice)

No. animals collected - 7
Flea infestation rate - 71%
Flea index - 2.8 fleas/animal

Post-treatment - August 31, 1977

(5% carbaryl dust in PVC pipe
bait stations)

S. lateralis

No. animals collected - 33
Flea infestation rate - 18%
Flea index - 0.21 fleas/animal

Eutamias sp.

No. animals collected - 15
Flea infestation rate - 47%
Flea index - 1.1 fleas/animal

Peromyscus sp.

No. animals collected - 8
Flea infestation rate - 25%
Flea index - 0.25 fleas/animal