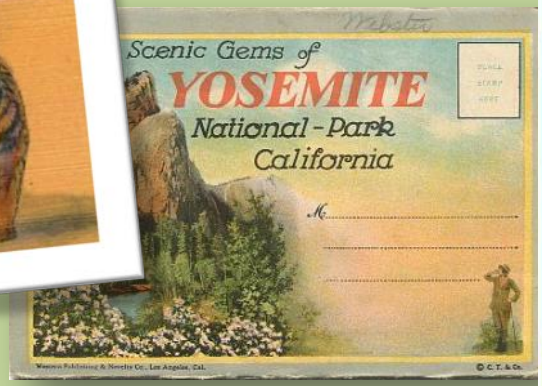
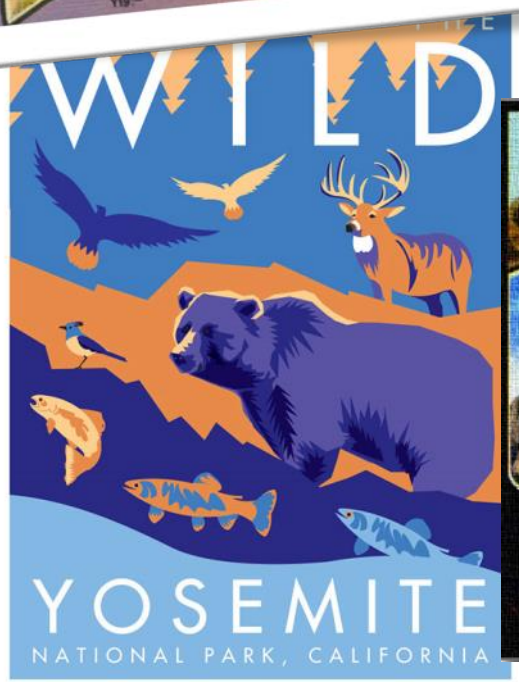
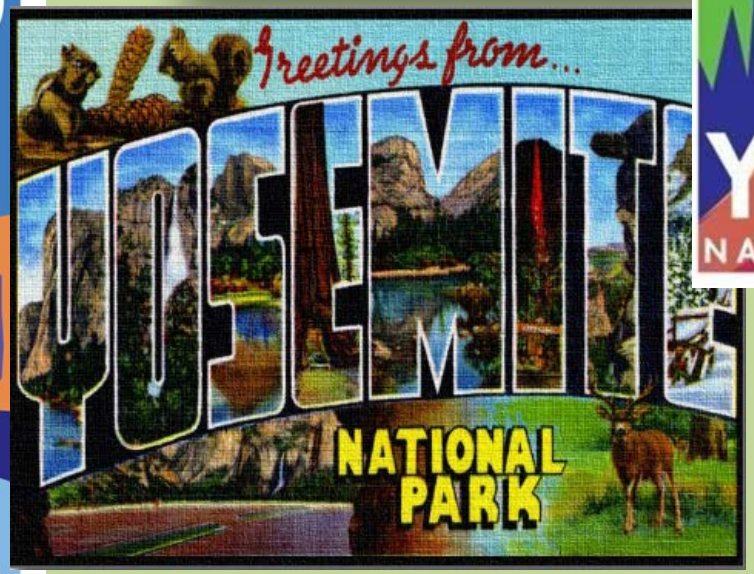
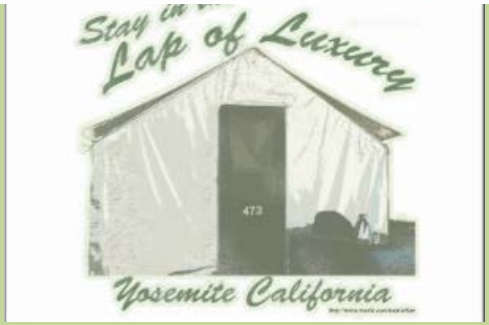
Our Summer in Yosemite…



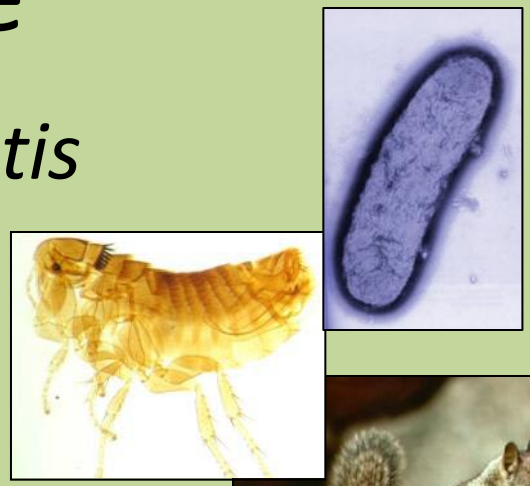






Plague

- Etiologic agent: *Yersinia pestis*
- Vector- Fleas
- Reservoir - Rodents



Reservoirs of plague in CA

Resistant reservoirs: deer mice, voles, some chipmunks

Enzootic Cycle

Susceptible/amplifying reservoirs: ground squirrels and chipmunks

Epizootic Cycle

Reservoirs of plague in CA

Resistant reservoirs: deer mice, voles, some chipmunks

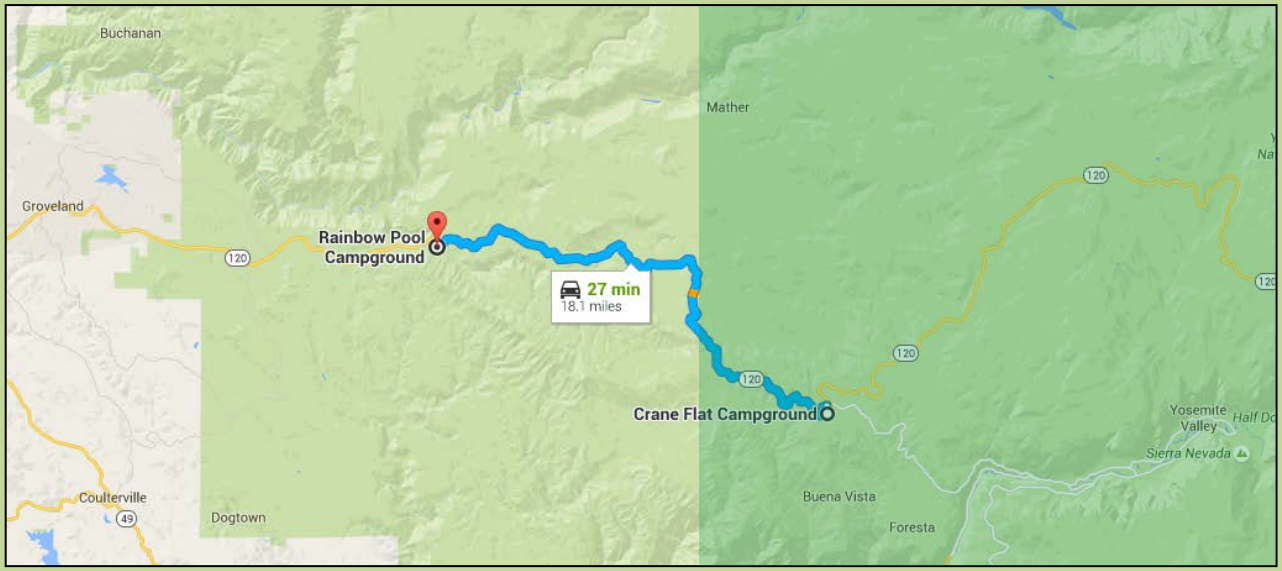
Enzootic Cycle

Susceptible/amplifying reservoirs: ground squirrels and chipmunks

Epizootic Cycle

Plague in Yosemite, Part 1

- Aug 2: Notified by L.A. County DPH of human plague case
  - –travel to Yosemite NP (YOSE) and surrounding areas
- Aug 3: Conference call with CDC/NPS/CDPH
- Aug 4: Visual assessments at Rainbow Pool (USFS) and Crane Flat CG (YOSE)



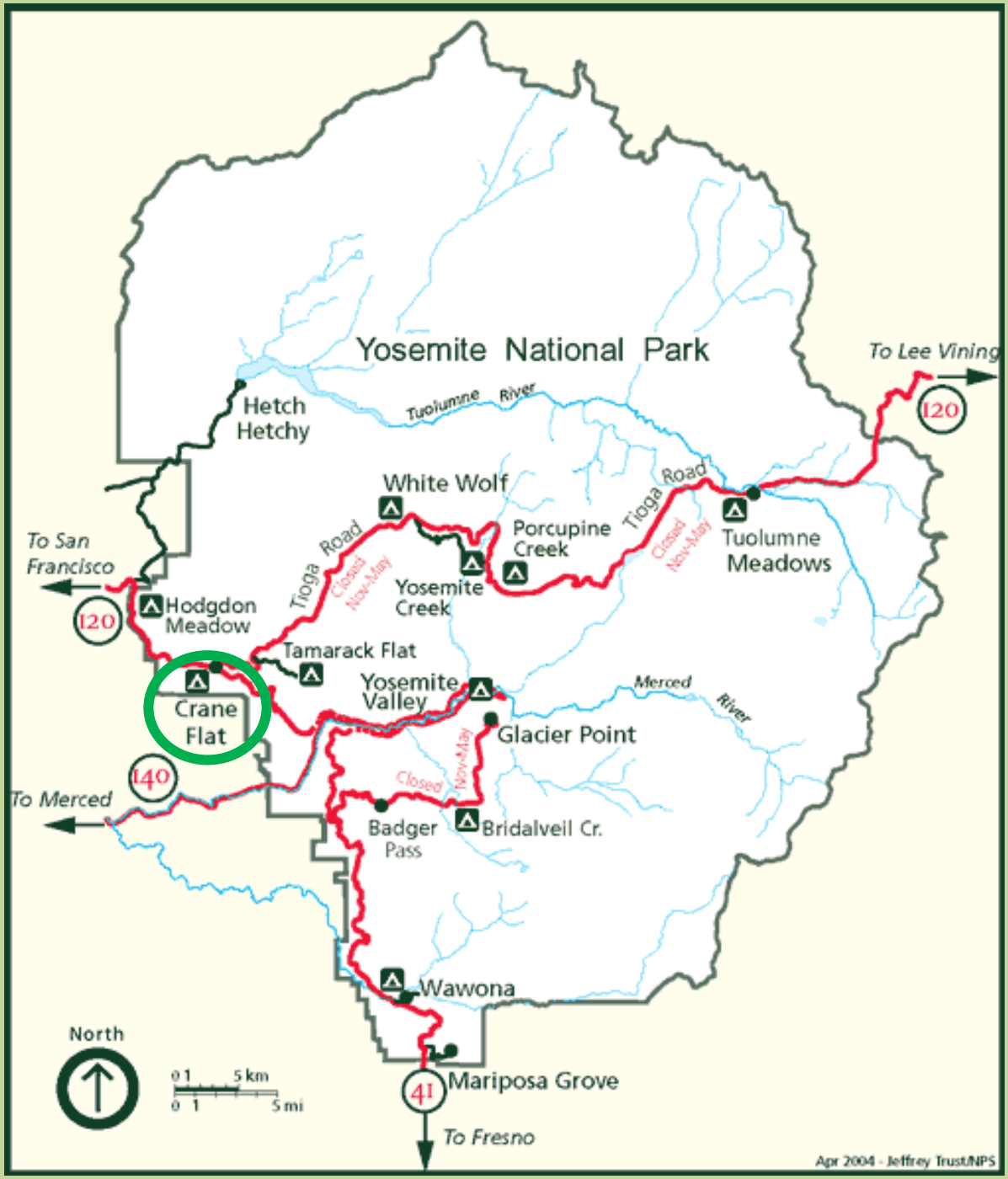
CDPH Plague Risk Assessment

- History
  - Plague activity, human cases documented in area
- Reservoir species
  - Abundance of resistant and susceptible (amplifying) rodents
- Human exposure potential
  - Abundance and proximity of rodents and burrows to human use areas
- Release assessment
  - Signs of rodent die-off, fleas at burrow entrances

Stanislaus National Forest
Elevation: 2800 ft.

Few CGS

Too low elevation for other ground squirrels or chipmunks


Yosemite National Park
To Lee Vining
120
Hetch Hetchy
Tuolumne River
White Wolf
Tioga Road
Porcupine Creek
Tioga Road
Closed Nov-May
Tuolumne Meadows
To San Francisco
120
Hodgdon Meadow
Tioga Road
Closed Nov-May
Yosemite Creek
Tamarack Flat
Crane Flat
Yosemite Valley
Merced River
Glacier Point
140
To Merced
Closed Nov-May
Badger Pass
Bridalveil Cr.
Wawona
North
0 1 5 km
0 1 5 mi
41
Mariposa Grove
To Fresno
Apr 2004 - Jeffrey Trust/NPS

Yosemite National Park
Crane Flat CG
Elevation: 6200 ft.

Few CGS relative to number of burrows

Inactive burrows common

Fleas and carrion flies found at some burrow entrances

Flea and fly collections at Crane Flat CG

PLAGUE CAUTION

Chipmunks, ground squirrels, or other wild rodents in this area may be infected with plague.

You can get plague by:

- **Being bitten by an infected flea**
- Touching or holding an infected rodent
- Being bitten, scratched, or coughed upon by a cat infected with plague

OBSERVE THESE PRECAUTIONS:

1. **AVOID ANIMAL FLEAS.** Do not camp, rest, or sleep near animal burrows.
2. **DO NOT FEED OR TOUCH** chipmunks, squirrels, or other wild animals.
3. **DO NOT HANDLE** sick or dead animals. Report them to park, forest, campground, or local health authorities.
4. **PROTECT YOUR PETS IN THIS AREA. Keep pets confined or on a leash; do not allow them to chase or hunt rodents. Protect them with flea control products. If a pet, especially a cat, becomes sick** after visiting this area, see a veterinarian and inform the veterinarian that you have been in an area where rodents have plague.

Early symptoms of plague include fever, chills, headache, muscle aches, and swollen and tender lymph nodes. If you develop any of these symptoms within 7 days of your visit to this area, let your doctor know that you have been in an area where rodents may have plague.

Distributed by:
California Department of Public Health
Vector-Borne Diseases Section
(916) 552-9740 vbcs@cdph.ca.gov
http://www.cdph.ca.gov/

Plague in Yosemite, Part 1

- Aug 5: Rodent trapping at Crane Flat CG

Crane Flat CG assessment

- Many California ground squirrel (CGS) burrows
- Few live rodents / Numerous inactive burrows
- Low rodent trapping success rate (7%)
- 8 CGS, 3 chipmunks captured
- Fleas and flies at some burrow entrances
- Numerous fleas on CGS (>17 per animal)

Aug 6: News Release

News Release

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

FOR IMMEDIATE RELEASE
August 6, 2015
PH15-056

CONTACT: Anita Gore
Orville Thomas
(916) 440-7259

California Department of Public Health Investigates Human Plague Case

SACRAMENTO – California Department of Public Health (CDPH) Director and State Health Officer Dr. Karen Smith today announced the department is investigating a case of human plague in California, and conducting an environmental evaluation in the Stanislaus National Forest, Yosemite National Park and the surrounding areas.

Plague in Yosemite, Part 1

- Aug 7: Preliminary results indicated one seropositive CGS from Crane Flat CG
  - Call with CDPH/NPS/CDC
  - Plague Warnings posted
  - Close CG and conduct flea control
- Aug 11: CDC reports positive flea pool from CGS

PLAGUE WARNING

Chipmunks, ground squirrels, or other wild rodents in this area have been found infected with plague.

You can get plague by:

The bite of an infected flea
Touching or holding an infected rodent
Being around a pet cat infected with plague

OBSERVE THESE PRECAUTIONS:

1. **AVOID ANIMAL FLEAS.** Do not camp, rest, or sleep near animal burrows. Apply insect repellent to socks and pant cuffs.

2. **DO NOT FEED OR TOUCH** chipmunks, squirrels, or other wild animals.

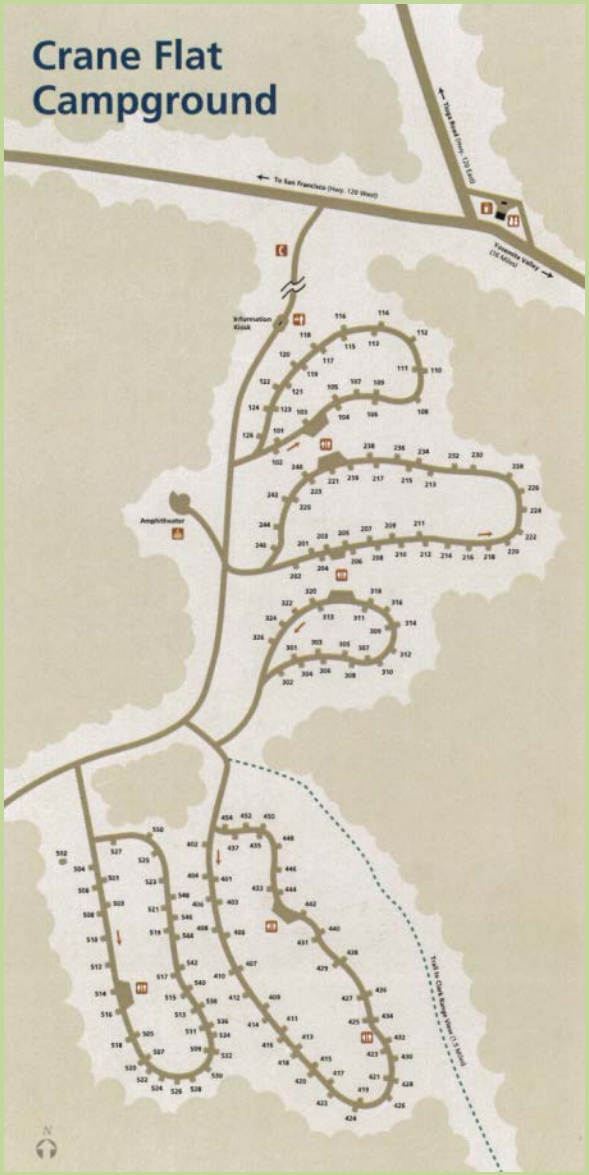
3. **DO NOT TOUCH** sick or dead animals. Report them to park, forest, campground, or local health authorities.

4. **PROTECT YOUR PETS IN THIS AREA.** Keep pets confined or on a leash; do not allow them to chase or hunt rodents. Protect them with flea control products. If a pet, especially a cat, becomes sick after visiting this area, see a veterinarian and inform the veterinarian that you have been in an area where rodents have plague.

Early symptoms of plague include fever, chills, headache, muscle aches, and swollen and tender lymph nodes. If you develop any of these symptoms within 7 days of your visit to this area, let your doctor know that you have been in an area where rodents have plague.

Insecticides may be used here to kill plague-infected fleas. PLEASE DO NOT DISTURB rodent traps or insecticide stations.

Distributed by:
California Department of Public Health
Vector-Borne Disease Section
(510) 552-9730
http://www.cdph.ca.gov/



DeltaDust
(0.05% deltamethrin)

Approx. 25 acres, 164 campsites

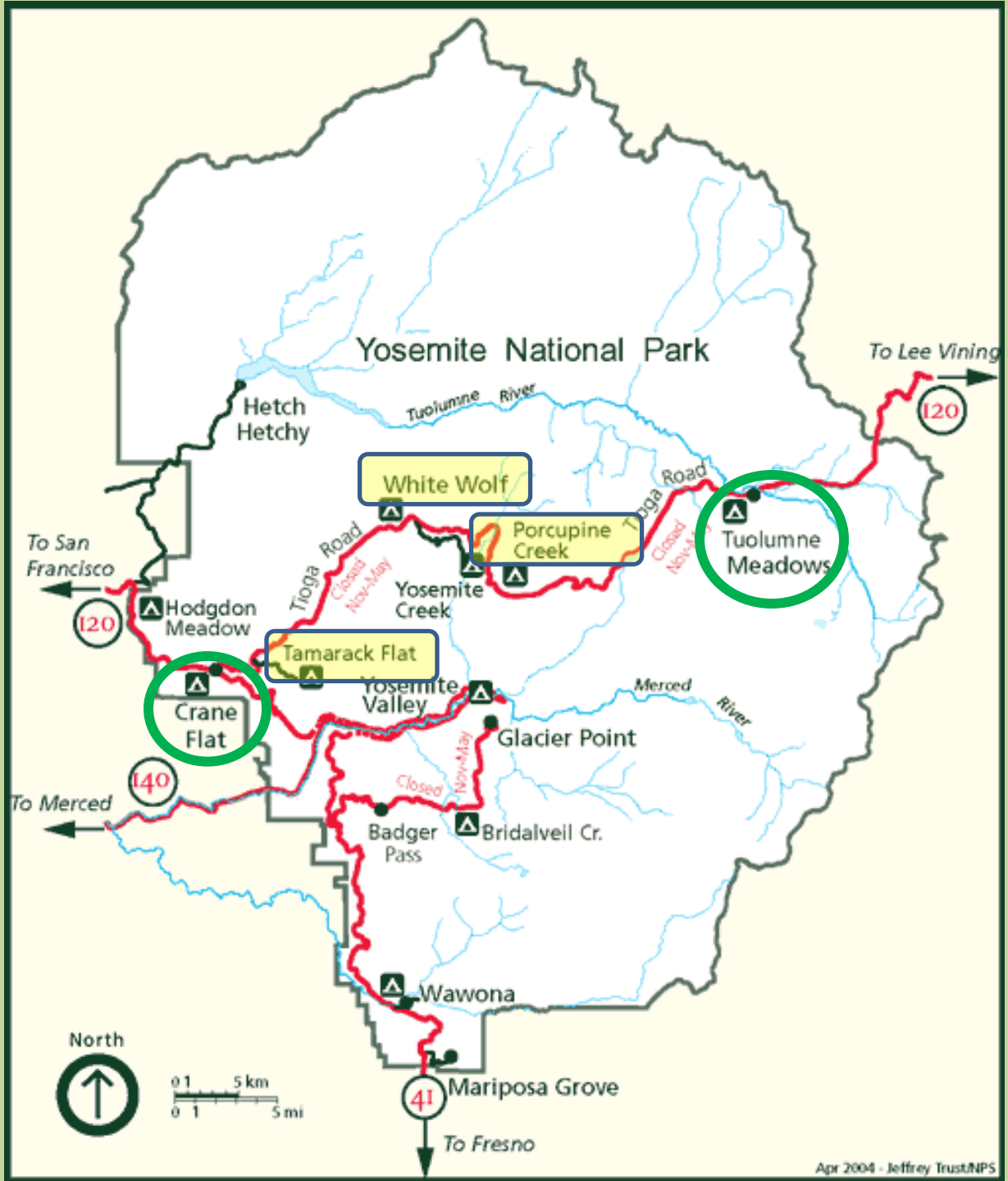
> 850 burrows treated
August 10-11

Plague in Yosemite, Part 2…

- Aug 10: Notified by YOSE Wildlife Office of rodent carcasses in Tuolumne Meadows CG
- Aug 11: Visual assessment of Tuolumne Meadows CG

Crane Flat to Tuolumne Meadows: 26 mi.

Additional campgrounds evaluated for plague activity and potential risk



Tuolumne Meadows
Campground
Approx. 125 acres

8600 ft. elevation

Reports of dead rodents

Typical rodent diversity and abundance

Plague in Yosemite, Part 2 and 3…

- Aug 13: MDL reports 2 golden-mantled ground squirrel carcasses from Tuolumne Meadows CG tested positive for plague
  - Conference call with CDC/NPS/CDPH
  - Decision to close and treat the campground
- Aug 14: CDC notifies CDPH of human plague case (#2) with prior travel to YOSE
  - Second CDPH news release
- Aug 17: Tuolumne Meadows CG closed and treated

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US & Canada

Yosemite plague: Camp ground closed after second case

19 August 2015 | US & Canada

Officials believe that the plague has been spread by squirrels and fleas

US health officials have closed a portion of Yosemite National Park after it emerged that a second tourist might have contracted plague.

Plague in Yosemite, Part 3

- Aug 18: Conference call with CDC/NPS/CDPH
  - Third CDPH News Release
- Aug 18-19: Visual assessments of potential exposure locations for case #2
  - Glacier Point (7200 ft. elev.)
  - Sentinel Dome (8100 ft. elev.)
  - Vernal Falls (4900 ft. elev.)
  - Yosemite Valley (4000 ft. elev.)
  - Nelder Grove and Lewis Creek Trail (3700-4200 ft. elev.)
  - Bass Lake (3400 ft. elev.)

Plague in Yosemite, Part 3

- Aug 24-26: Rodent trapping at Glacier Point, Tamarack Flat CG, and Tuolumne Meadows Lodge; post-treatment assessments at Crane Flat and Tuolumne Meadows CGs

Plague in Yosemite, Part 3

- Aug 31-Sep 1: Flea control at Glacier Point, Tamarack Flat CG, Nature-Bridge Campus

Plague in Yosemite…The End?

- Sep 24: Post-treatment assessment at Glacier Point
- Oct 22: Rodent trapping Yosemite Valley

Surveillance Summary

- 14 areas assessed in Yosemite for plague risk
- 7 areas trapped – all but Yosemite Valley with positive samples
  - 199 rodents trapped
  - 165 sampled for plague antibodies
    - 3 of 41 (7%) CGS seropositive (11%, excluding Yosemite Valley sampling)
    - 5 of 33 (15%) lodgepole chipmunks seropositive
    - 0 of 66 deer mice seropositive
- 7 plague positive rodent carcasses (Tuolumne Meadows)
  - 4 chipmunks (1 lodgepole, 3 unidentified sp.)
  - 2 golden-mantled ground squirrels
  - 1 pine squirrel
- >500 fleas tested (70% from rodents, 30% from burrows)
  - 4 positive flea pools (CGS, deer mouse pine squirrel, lodgepole chipmunk)

Widespread plague activity detected in 2015 – in and outside of Yosemite

Flea Control Summary

- Flea control treatments at 5 sites (180 acres)
  - 3 campgrounds (Crane Flat, Tuolumne Meadows, Tamarack Flat)
  - Glacier Point day use areas
  - NatureBridge Crane Flat campus

- Treated more than 3,700 burrows
- Applied 36 lbs of DeltaDust (0.05% deltamethrin)

Greetings from Yosemite!