Resource Brief

National Park Service
U.S. Department of the Interior

Klamath I&M Network
Natural Resource Stewardship and Science

Vital Sign Update: 2017 Results for Streams Monitoring at Lassen Volcanic National Park

Importance

Spreading water and essential nutrients across the land and gracing the scenery, streams are key natural resources at Lassen Volcanic National Park. Because streams carry evidence of upstream and upslope disturbances, both natural and human-caused, we can examine their biological, physical, and chemical qualities to understand watershed health. Since 2011, we've been monitoring streams as a vital sign of the park's health to inform park managers about current conditions and any concerning changes. This brief describes how we measure the *biological* component of stream health—aquatic invertebrates—and what we found in 2017.

Why aquatic invertebrates (stream bugs)?

Many aquatic invertebrate species inhabit Lassen's streams. Because each one requires different food sources, habitat, and tolerates different water chemistry, the species that show up in our samples tell us a lot about conditions in the stream. Furthermore, their habits and life history make them ideal for monitoring. They reproduce quickly, providing immediate evidence of changes happening in the stream that affect them. They remain close to their birthplace, tying their occurrence more closely to the immediate conditions around them. As a critical link in the food web, they can teach us about the condition of the primary producers they consume (algae or fallen leaf litter, for example) and predators (fish and amphibians) that eat them. They also tend to respond predictably to human-caused disturbances.



Using the "kick net" method to sample aquatic invertebrates on the West Fork of Hat Creek in Lassen Volcanic National Park, 2017. Submerging an open net just downstream of our feet, we kick the streambed to knock invertebrates loose, which then drift into our waiting net.

What are multimetric indices?

To assess stream health, we calculate several multimetric indices based on the mix of invertebrate species in our samples. Each species or species group, with its unique characteristics, provides different information about water quality, such as the number of species in the sample that tolerate sediments, or the number of individuals that can't tolerate warm water. The unique mix of each sample translates into an overall measure of water quality, ranging from pristine to severely degraded. You can think of each index a little bit like the Dow Jones Industrial Average or NASDAQ, with each providing a slightly different picture of the stock market.

What are O/E scores?

One useful metric we calculate is the O/E score, or Observed/Expected Ratio of Taxa Loss. Simply put, it is the ratio of how many species of invertebrates we observed in a stream compared with how many species we'd expect to find in healthy conditions. The smaller the ratio (fewer species observed than expected), the more concerned we are about biodiversity loss in the stream.

Results and Future Monitoring

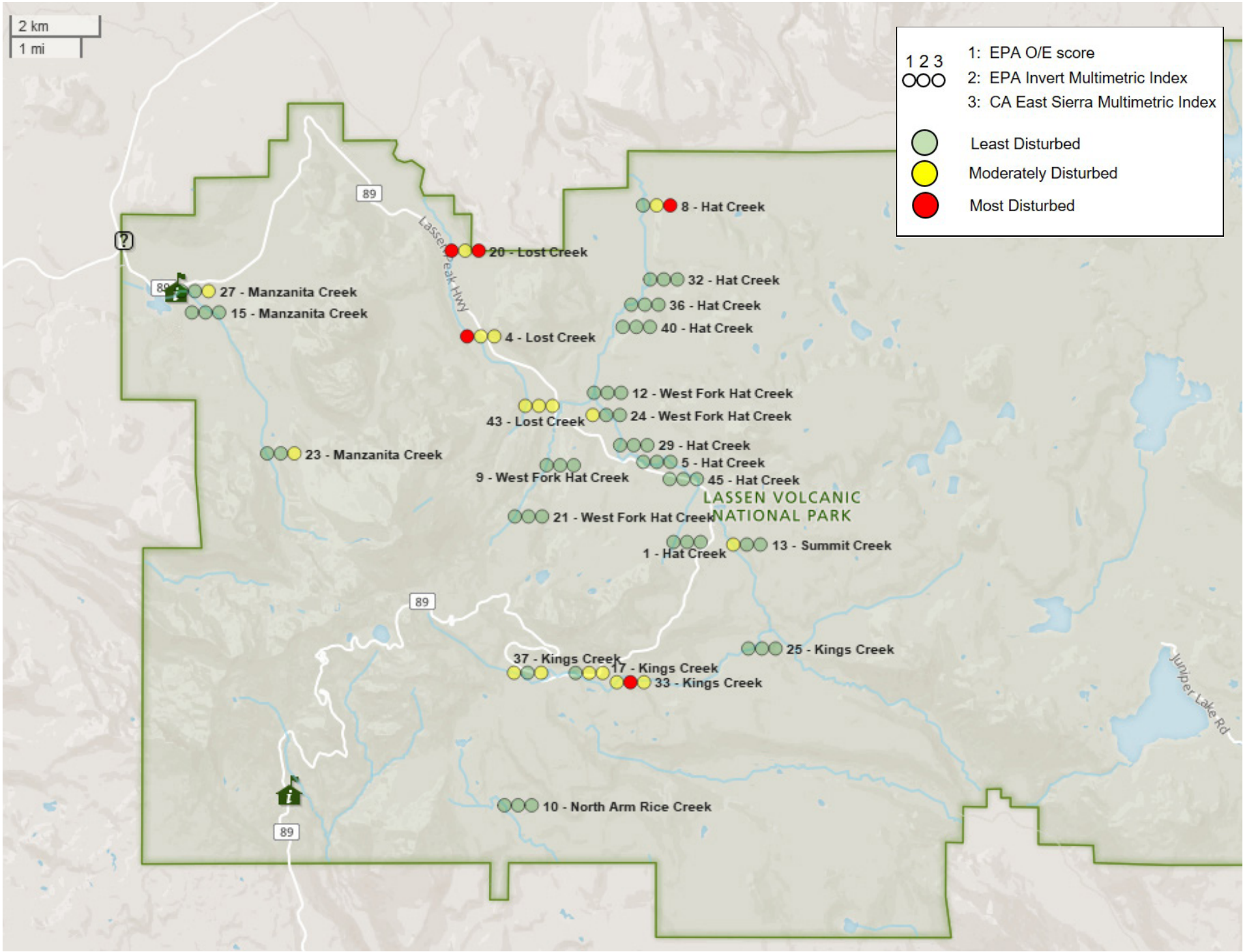
From August to September, we sampled 24 stream sites at Lassen in 2017. View the map on the back for detailed results. We'll sample Lassen streams again in 2020.

More Information

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Project overview, reports, and protocol:
https://www.nps.gov/im/klmn/streams.htm

Datasets and all related publications:
https://irma.nps.gov/DataStore/Reference/Profile/2171797


2 km
1 mi
1 2 3
1: EPA O/E score
2: EPA Invert Multimetric Index
3: CA East Sierra Multimetric Index
Least Disturbed
Moderately Disturbed
Most Disturbed
89
Lassen Peak Hwy
8 - Hat Creek
20 - Lost Creek
32 - Hat Creek
36 - Hat Creek
40 - Hat Creek
27 - Manzanita Creek
15 - Manzanita Creek
4 - Lost Creek
12 - West Fork Hat Creek
43 - Lost Creek
24 - West Fork Hat Creek
29 - Hat Creek
23 - Manzanita Creek
5 - Hat Creek
9 - West Fork Hat Creek
45 - Hat Creek
LASSEN VOLCANIC
NATIONAL PARK
21 - West Fork Hat Creek
1 - Hat Creek
13 - Summit Creek
25 - Kings Creek
37 - Kings Creek
17 - Kings Creek
33 - Kings Creek
Juniper Lake Rd
10 - North Arm Rice Creek