Resource Brief

National Park Service
U.S. Department of the Interior

Klamath I&M Network
Natural Resource Stewardship and Science

Vital Sign Update: 2021 Results for Streams Monitoring at Crater Lake National Park

Importance

Spreading water and essential nutrients across the land and gracing the scenery, streams are key natural resources at Crater Lake 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 2012, 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 2021.

Why aquatic invertebrates (stream bugs)?

Many aquatic invertebrate species inhabit Crater Lake streams. Because each one requires different food sources and 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. We kick the streambed to knock invertebrates loose into our submerged net waiting just downstream.

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

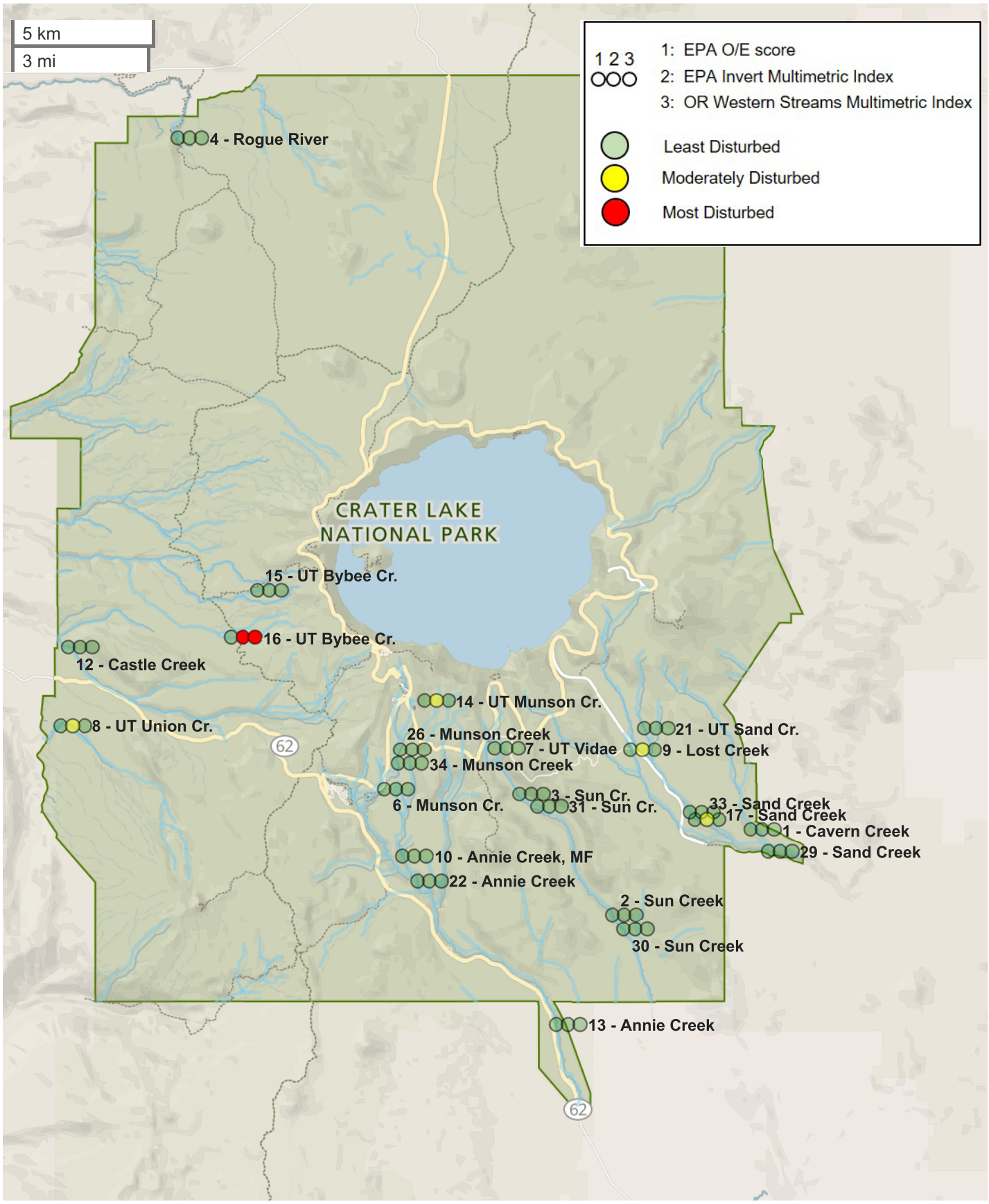
In Aug–Sep 2021, we sampled 23 stream sites in the park. Sampling this year was originally scheduled for Lassen Volcanic National Park but switched to Crater Lake instead due to the Dixie Fire at Lassen. View the map on the back for detailed results. We'll sample Crater Lake streams again in 2025.

More Information

Eric Dinger, Aquatic Ecologist
Klamath Inventory and Monitoring Network
eric_dinger@nps.gov; 541-552-8574

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


5 km
3 mi
1 2 3
1: EPA O/E score
2: EPA Invert Multimetric Index
3: OR Western Streams Multimetric Index
Least Disturbed
Moderately Disturbed
Most Disturbed
CRATER LAKE NATIONAL PARK
4 - Rogue River
15 - UT Bybee Cr.
16 - UT Bybee Cr.
12 - Castle Creek
8 - UT Union Cr.
14 - UT Munson Cr.
26 - Munson Creek
7 - UT Vidae
34 - Munson Creek
21 - UT Sand Cr.
9 - Lost Creek
6 - Munson Cr.
3 - Sun Cr.
31 - Sun Cr.
33 - Sand Creek
17 - Sand Creek
1 - Cavern Creek
29 - Sand Creek
10 - Annie Creek, MF
22 - Annie Creek
2 - Sun Creek
30 - Sun Creek
13 - Annie Creek
62
62