ASSESSING ECOLOGICAL HEALTH OF THE SAN MATEO WATERSHED

ARE ECOSYSTEMS HEALTHY

Is it safe to swim

Are fish and shellfish safe to eat

Is water safe to drink

San Mateo Watershed quick facts:

- *139 square miles*

- *One of the least-developed watersheds on California's south coast, and among the last unchannelized streams*

- *Drains portions of the Cleveland National Forest and Camp Pendleton*

- *Home to several threatened and endangered animal species: arroyo toad; steelhead trout and tidewater goby (fish); least Bell's vireo and southwestern willow flycatcher (birds)*

San Mateo Watershed

BENEFITS OF WATERSHED ASSESSMENT

Watershed assessment helps managers understand the status of aquatic resources and stressors across the landscape and efficiently allocate efforts toward improvement. The San Diego Water Board's Surface Water Ambient Monitoring Program (SWAMP), working with the southern California Stormwater Monitoring Coalition (SMC), sampled instream biological communities over several years at various stations within the San Mateo watershed (Figure 1). This fact sheet summarizes the ecological health of the watershed based on biological and habitat indicators. As one of the least-developed watersheds in coastal southern California, it is crucial to characterize baseline conditions in the San Mateo to ensure that they do not degrade over time, as well as to establish and track expectations for local healthy stream communities in the absence of major anthropogenic stressors. Results indicate that ecosystem conditions are generally healthy throughout the San Mateo watershed.

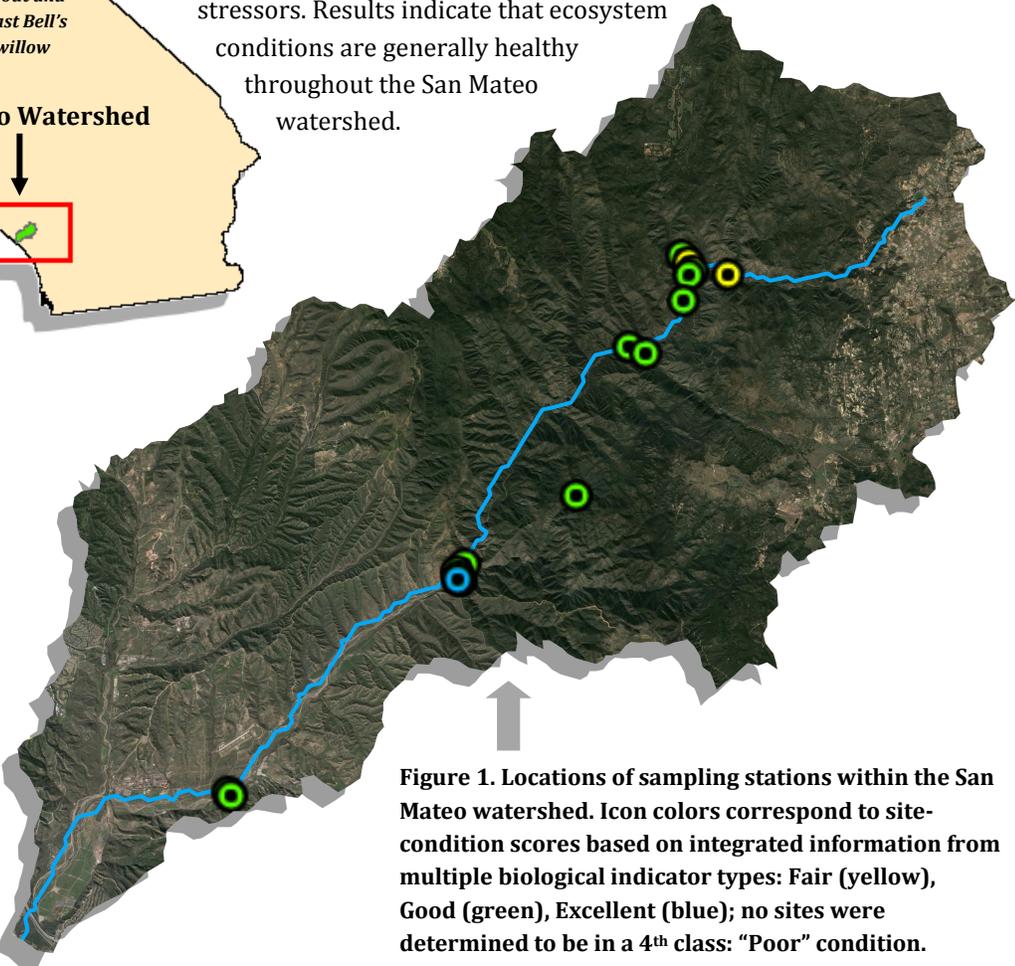**A sampling station in the upper San Mateo Creek watershed. (photo: E. Thomas)**

Figure 1. Locations of sampling stations within the San Mateo watershed. Icon colors correspond to site-condition scores based on integrated information from multiple biological indicator types: Fair (yellow), Good (green), Excellent (blue); no sites were determined to be in a 4th class: "Poor" condition.

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Project partners:

SWAMP Surface Water Ambient Monitoring Program

SMC Southern California Stormwater Monitoring Coalition

California Department of Fish and Wildlife

MULTIPLE INDICATORS OF ECOSYSTEM HEALTH, TOGETHER AND SEPARATELY

The composition of stream biological communities, which may include animals and plants, can reveal stream condition because it reflects the negative effects of various human activities (i.e., "stressors") over time and space. Several biological community types have been sampled for use as ecosystem-condition indicators in the San Mateo watershed:

1. benthic (i.e., bottom-dwelling) macroinvertebrates ("BMIs", or informally, "bugs", which include insects, snails, crustaceans),
2. diatoms (single-celled algae encased in ornamented, glass-like structures), and
3. non-diatom (or "soft") algae.

In addition, wetland habitat condition has been assessed in the watershed using the California Rapid Assessment Method (CRAM).

75% of stream kilometers in the San Mateo watershed are estimated to be in Good or Excellent condition, *based on survey data combining the biological indicator types.*

Taken separately, the indicators provide complementary perspectives on stream health, because different indicators respond somewhat differently (e.g., in terms of magnitude of response)

Larvae of the caddisfly, *Agapetus*, a relatively stress-intolerant type of BMI (bug) that was found in several stream reaches of the San Mateo watershed (photo: B. Isham)

"Sacs" of the soft "blue-green" alga, *Nostoc* (see arrows) attached to a rock in a stream; inset above is a microscopic image of an *Epithemia* diatom. Both organisms are nitrogen fixers that thrive in the low-nutrient conditions of high-quality streams, and are abundant in the San Mateo watershed (photos: B. Fetscher)

to various stressors. Figure 2 shows how ambient survey results in the San Mateo watershed compare with analogous results across coastal southern California streams, overall, as well as with a collection of statewide "Reference" streams that are exposed to minimal anthropogenic stress, thus providing two "meter sticks" against which to gauge the San Mateo results. From the standpoint of BMIs (bugs), the condition within San Mateo watershed is better, on average, than that of streams across the rest of the region, although not quite as good as conditions among the Reference streams. In the case of CRAM (habitat) and soft algae, San Mateo results exceeded those of even the Reference collection. Diatoms were the only indicator for which San Mateo performed subpar. The observed differential results among the biological indicators can be used as a first step in identifying likely stressors in San Mateo watershed.
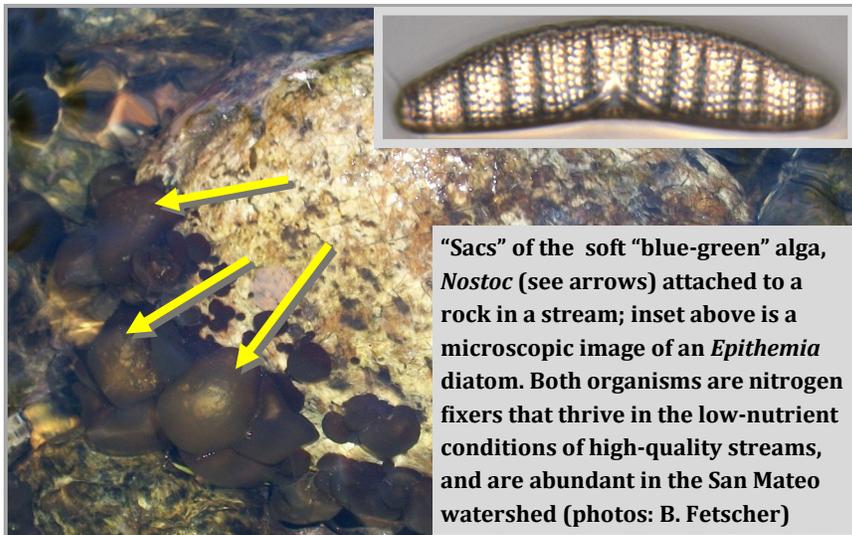
The California Rapid Assessment Method (**CRAM**) uses "guided, best-professional judgment" for determining the condition of wetlands, including stream riparian habitat. Practitioners collect observational data in the field and calculate an overall condition score based on metrics reflecting 1) habitat buffer/ landscape context, 2) hydrology, 3) physical structure, and 4) biotic structure. Many sites in the San Mateo received perfect scores for a number of CRAM metrics (photo E. Thomas)
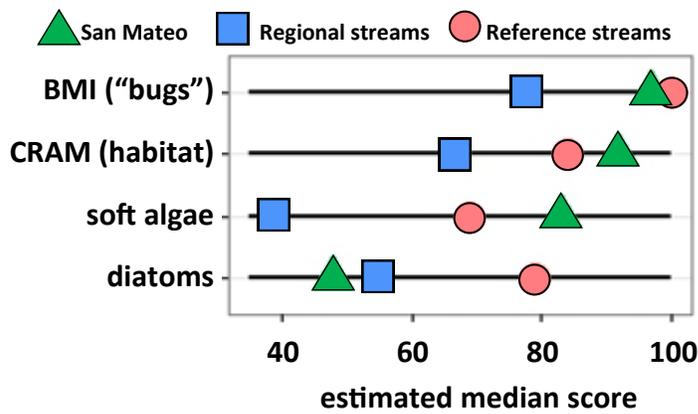

Figure 2. Estimated median biological indicator scores for San Mateo watershed, relative to southern California streams as a whole and minimally disturbed "Reference" streams.

SAN DIEGO WATER BOARD: http://www.waterboards.ca.gov/sandiego/

Healthy waters realized through collaborative, outcome-focused efforts that support both human uses and sustainable ecosystems.