ASSESSING ECOLOGICAL HEALTH OF THE SAN DIEGO RIVER WATERSHED

STATE OF CALIFORNIA · REGIONAL WATER QUALITY CONTROL BOARD · SAN DIEGO REGION

ARE ECOSYSTEMS HEALTHY | **Is it safe to swim**

Are fish and shellfish safe to eat | **Is water safe to drink**

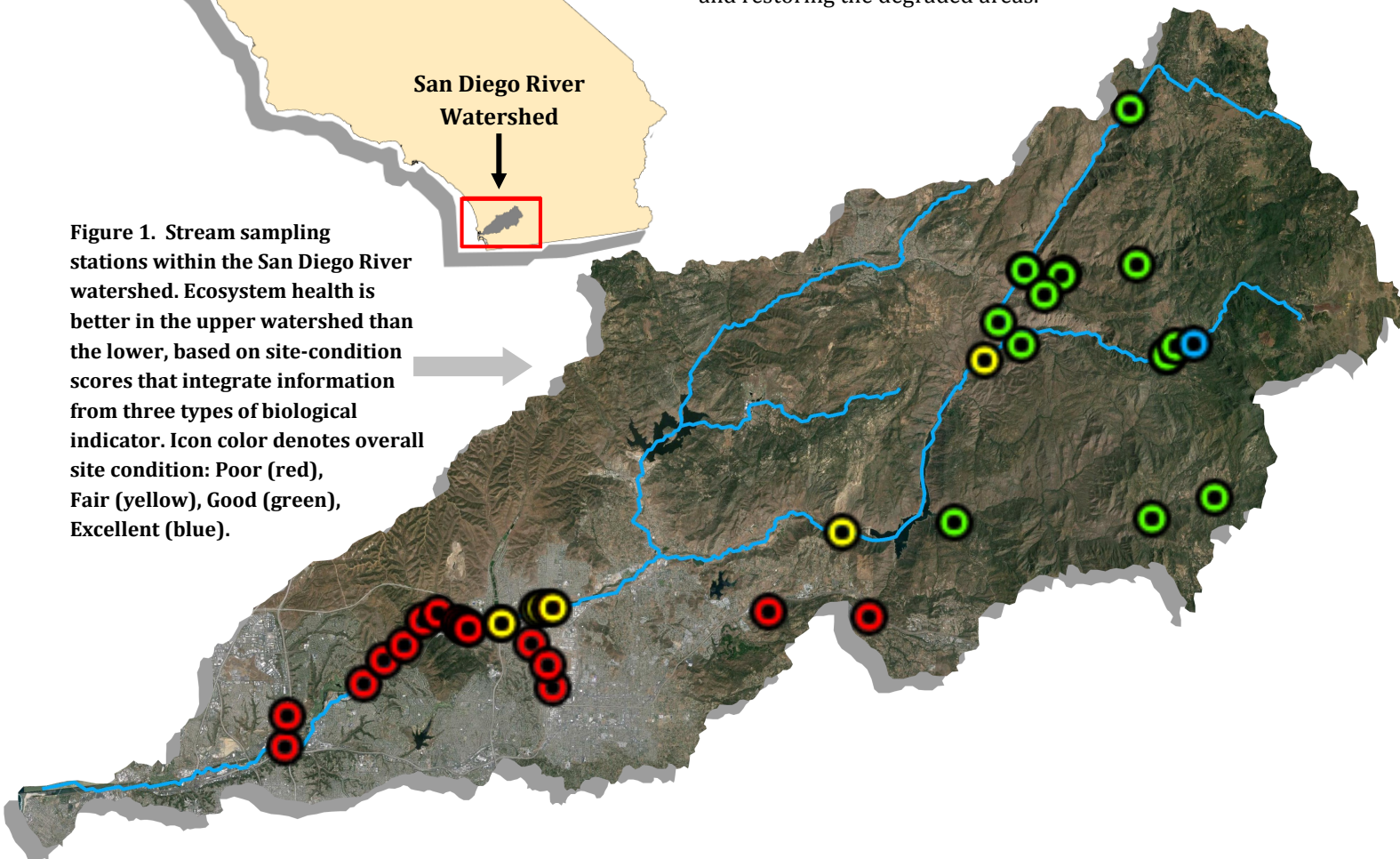*San Diego River Watershed quick facts:*

- 440 square miles
- 500,000+ residents
- six municipalities
- five tribes
- five reservoirs
- California's "birthplace"
- 25+ sensitive species
- 25 million visitors

San Diego River 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. Several groups collect water- and habitat-quality data in the San Diego River watershed, and the San Diego Water Board is working with them to establish a long-term, coordinated San Diego River Watershed Monitoring and Assessment Program (SDRWMAP). The first steps include understanding existing conditions, as described herein, and identifying data gaps. Ecosystem conditions are generally healthy in the upper San Diego River watershed and poor in the lower watershed (Figure 1). With this knowledge, the Water Board and community partners can focus on preserving the high quality conditions and restoring the degraded areas.
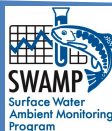
Figure 1. Stream sampling stations within the San Diego River watershed. Ecosystem health is better in the upper watershed than the lower, based on site-condition scores that integrate information from three types of biological indicator. Icon color denotes overall site condition: Poor (red), Fair (yellow), Good (green), Excellent (blue).

ASSESSING 3 INDICATORS OF ECOSYSTEM HEALTH

The composition of biological communities, which may include aquatic animals and plants, can reveal stream condition because these communities reflect the negative effects of various human activities (i.e., "stressors") over time and space. Three types of biological indicator of condition are assessed in the San Diego River watershed by the southern California Stormwater Monitoring Coalition (SMC) and the Perennial Stream Assessment of the Surface Water Ambient Monitoring Program (SWAMP):

1. Community composition of benthic (i.e., bottom-dwelling) macroinvertebrates (BMIs, or informally, "bugs", which include insects, snails, crustaceans),
2. Community composition of benthic algae, and
3. An index of wetland habitat condition called the California Rapid Assessment Method (CRAM).


underwater image of larvae of the dobsonfly, a type of *BMI* or *"bugs"* (photo: R. Mazor)
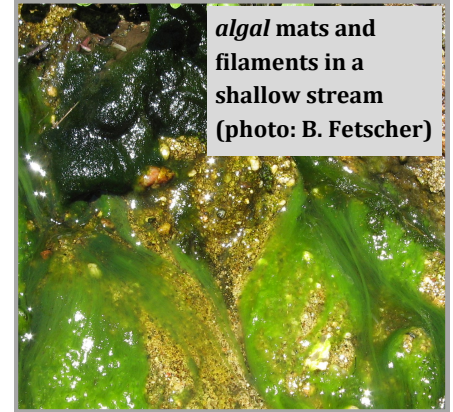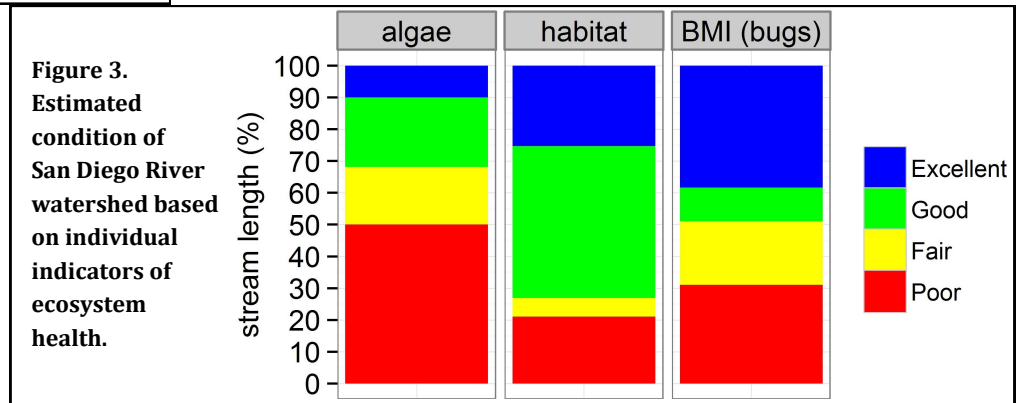

algal mats and filaments in a shallow stream (photo: B. Fetscher)

San Diego River watershed surveys to date indicate that, collectively, nearly half of the stream kilometers are in Fair condition or better, based on the three biological indicator types, combined (Figure 2).

Figure 2. San Diego River watershed stream ecosystem conditions based on 3 biological indicators.

Fair 8%
Good 37%
Poor 55%
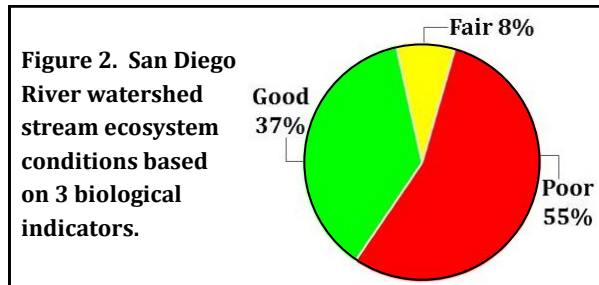
Taken separately, the indicators provide complementary perspectives on stream health: for example, anywhere from 10% to nearly 40% of stream kilometers are estimated to be in Excellent condition, depending upon the indicator assessed (Figure 3).

The different indicator types vary in terms of stressor sensitivity. For example, BMIs tend to be very responsive to stream habitat conditions, whereas algae tend to be particularly well tuned to water quality.

Figure 3. Estimated condition of San Diego River watershed based on individual indicators of ecosystem health.

algae | habitat | BMI (bugs)

stream length (%)

Excellent
Good
Fair
Poor

ARE CONDITIONS CHANGING OVER TIME?

BMIs are the biological indicator with the longest monitoring history in San Diego River watershed, and can therefore be used to begin assessing trends in condition. BMI index scores across 17 San Diego River watershed sampling stations with repeat-visits over time reveal that most stations have either not changed much, or have improved (Figure 4).

Better 35%
Same 41%
Worse 24%

Figure 4. Trends in San Diego River watershed stream condition using BMI (bug) scores.

NEXT STEPS

The basic groundwork for the SDRWMAP has been laid out, with the establishment of a stakeholder group, compilation and analysis of existing data, and preparation of a report detailing program elements (see link below). Next steps include facilitating integration of additional stakeholders in SDRWMAP and the Stormwater Monitoring Coalition through permit modifications. For more information, please see:

http://www.waterboards.ca.gov/sandiego/water_issues/programs/swamp/docs/SD_River_Program_Document_Final_04_30_2014.pdf