



# Applying the Watershed Assessment Framework (WAF) to the Napa River Watershed



## The Project

The Watershed Assessment Framework (WAF), as applied to the Napa River watershed, is a method of reporting on key indicators of watershed health over time to guide watershed management actions. Watershed health is defined broadly, to include ecological, terrestrial, aquatic, water-related, social, and economic measures. The outcomes of this application are an easily understood watershed health Report Card on the health of the Napa River watershed, and more in-depth technical report detailing the process and analysis behind the WAF application and development of the Report Card.

**Watershed Goals and Indicators**

A major objective of this project is to develop a system of indicators to track progress towards community watershed goals.

We surveyed stakeholders, examined planning documents, and consulted with our Technical Advisory Committee to come up with 6 overarching community watershed goals.

Indicators, which are measurable characteristics related to the structure, composition, or function of a watershed, were then compiled from local and regional planning documents, and other indicator projects throughout the world. We selected indicators for each community goal that met the following criteria:

- Availability of high-quality data
- Data affordability

### How Healthy is the Watershed?

The watershed condition scores across all 14 indicators are not extreme; based on these objective indicators, the overall health of the Napa River watershed is fair. There is considerable variation in health for most indicators across subregions. Some indicators in some subregions reflect very good watershed health. For example, terrestrial and aquatic conditions tend to be best in the less disturbed eastern and western mountains. For other indicators and subregions, conditions were poor. For example, aquatic and biological conditions in the developed valley floor tend to be worse than in the mountains.

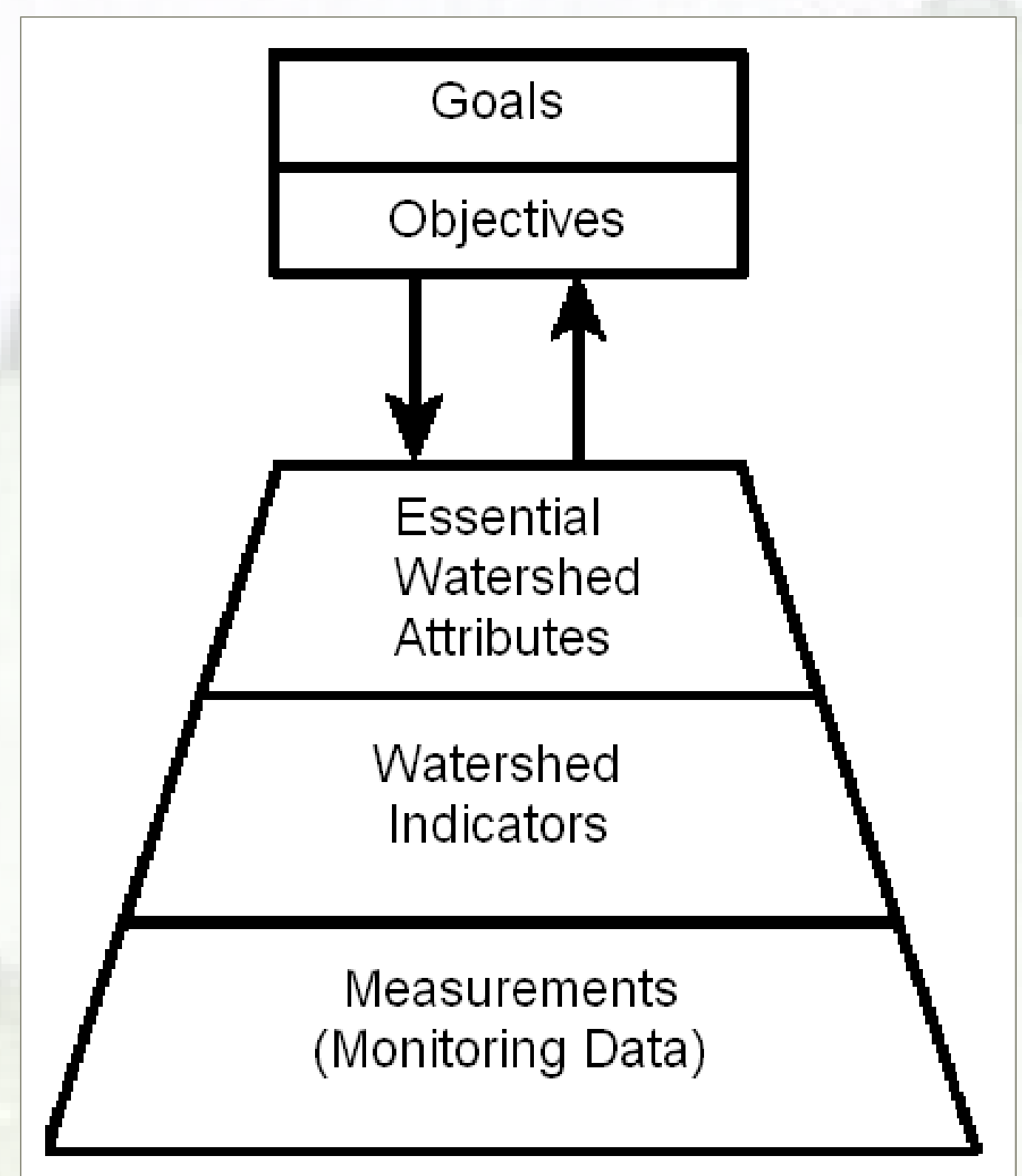
What should be of most concern to the Napa River watershed community is that current conditions are only fair, and, for some indicators, there has been a measurable decline in condition over the past several years. None of the indicators show that watershed health is improving.

It is important to keep in mind that the reliability of these findings varies dramatically among the 14 indicators. A given indicator may have no score for a particular subregion because it does not apply there or because there are insufficient data to support a statistically significant scoring.

It is clear that the community needs more and better data, and deeper analysis, to understand the health of its watershed. Many basic conditions—such as the state of the streams during the driest time of year—cannot be understood until monitoring efforts are increased and improved.

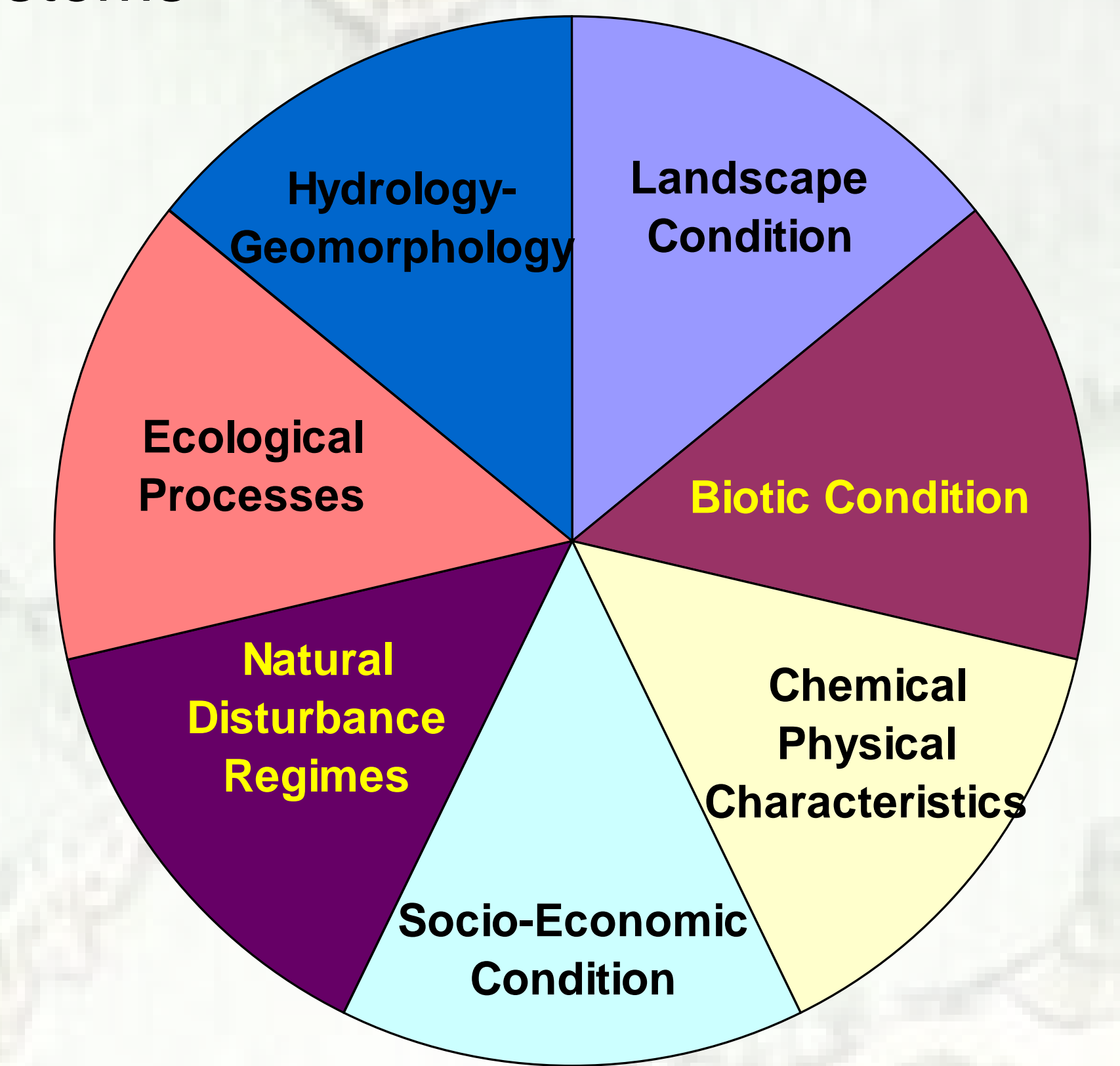
Tracking watershed vital signs can help guide community decisions to turn declining trends around and encourage a trajectory toward a healthy and more sustainable watershed.

Goals	Indicators	Watershed Subregion Condition Score					Watershed Condition Score	Trend	Confidence for Subregion Scores
		WM	LW	EM	SVF	NVF			
Improve and protect geomorphic and hydrologic processes	Impervious area	ND	ND	ND	ND	ND	75	Declining	Moderate
Promote watershed awareness and stewardship through improved education, recreational access, and community involvement in decision-making	Local media coverage of watershed topics	ND	ND	ND	ND	ND	46	No trend	High
	Access to public open space	2	22	1	74	58	38	ND	Low - High
Conserve, protect and improve native plant, wildlife and fish habitats and their communities	Fish community	ND	37	ND	78	ND	ND <sup>1</sup>	ND	Moderate
	Habitat fragmentation and connectivity	77	34	100	29	51	67	ND	High
	Sensitive bird species	64	77	82	88	60	74	No trend	Low
	Aquatic insects	59	33	53	39	41	45	ND	Moderate - High
Improve and sustain watershed conditions and functions that advance human and environmental economies, in particular water quality and quantity	Fire recurrence	84	80	42	99	48	65	ND	Moderate
	Groundwater	Spring: Main Basin = 100, MST Basin = 29; Fall: Main Basin = 67, MST Basin = 7					ND <sup>1</sup>	ND	Moderate
	Water conservation	ND	ND	ND	39	ND	ND <sup>1</sup>	ND	High
Reduce greenhouse gas emissions and adaptively manage watershed resources to address climate change	Stream temperature	100	81	ND	87	54	82	No trend	Moderate
	Carbon storage and net primary productivity	98	100	97	93	94	97	No trend	Moderate



## The Framework

The Watershed Assessment Framework (WAF) is based on an approach developed by the US EPA and others. The WAF organizes environmental information into categories corresponding to major watershed attributes and processes. Indicators selected under each category are based upon the goals and objectives for the watershed being evaluated. The WAF approach is based on metrics and indicators that are organized into a hierarchical structure corresponding to aspects of natural and human systems that are termed system “attributes”.



## Goals & Objectives

Central to the application of the WAF is the description of goals for the watershed or region being evaluated. From these goals, measurable objectives are developed. Indicators are chosen that allow evaluation of the objectives and thus the goals. A critical and sometimes missing component of indicator system is an explicit or transparent link between the goals for the system and the indicators chosen to represent the system’s condition.

## The Results

The condition scores across all 14 indicators are not extreme. Overall watershed health of the Napa River can be described as fair (many of California’s watersheds are in fair or worse condition). What should be of most concern to the Napa River watershed community is that conditions are only fair and for many indicators there is a measurable decline in condition over time. The reliability of these findings varies dramatically among the 14 indicators scored. Ideally, all indicators would be independent of each other. However, none of the indicators analyzed is strictly independent, but each is different enough from the each other to reflect a useful aspect of watershed health.

## The Setting

The Napa River is the largest river system that empties into the northern portion of San Francisco Bay. Relative to other watersheds in the North Bay, the Napa River watershed remains predominately rural. The watershed supports an abundance of wildlife and native fish species, including steelhead and Chinook salmon. Similar to the rest of the Bay-Delta region, the abundance and distribution of anadromous fish in the watershed has diminished since the 1940s.



Although not perfect, use of these measures (i.e., indicators) of watershed vital signs can help guide community decisions to turn declining trends around and encourage a trajectory toward a healthy and more sustainable watershed. In general, the community needs more and better data, and deeper analysis, to fully understand the health of its watershed and if the watershed is meeting established goals. A full report on the WAF project is available at the Napa County Conservation, Development & Planning Dept. and on the Watershed Information Center & Conservancy (WICC) website: [www.napawatersheds.org](http://www.napawatersheds.org).

## Funding & Partners

The WAF project was funded by the California Dept. of Water Resources. The project team included, the Napa County Conservation, Development and Planning Dept., UC Davis, Dept. of Environmental Science & Policy, Napa County Resource Conservation Dist., Sonoma Ecology Center, and Oregon State Univ., Agricultural & Resource Economics Dept.

Application of the WAF in the Napa River watershed is one means by which to track a limited number of informative indicators, allowing watershed residents and managers to assess the condition of the watershed, to see trends or changes in those conditions over time, and to adapt their management actions to achieve desired conditions (i.e., watershed goals).