



Napa River watershed by Lowell Downey

How are we doing?

Watershed Scorecard for the Napa River and Sonoma Creek Watersheds

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The Project

The Sonoma Creek and Napa River communities share a need for tools that focus attention on watershed management, describe current conditions and trends, and provide a common vocabulary for discussing natural resource stewardship in their watersheds. To meet this need, we are developing a Watershed Health Scorecard, a simple one-page report card on the condition of our natural resources, backed by the best science available.

Ultimately, the scorecards will evaluate all aspects of watershed health. Initially, we focused on one key element: water supply. We selected five indices with which to answer the question:

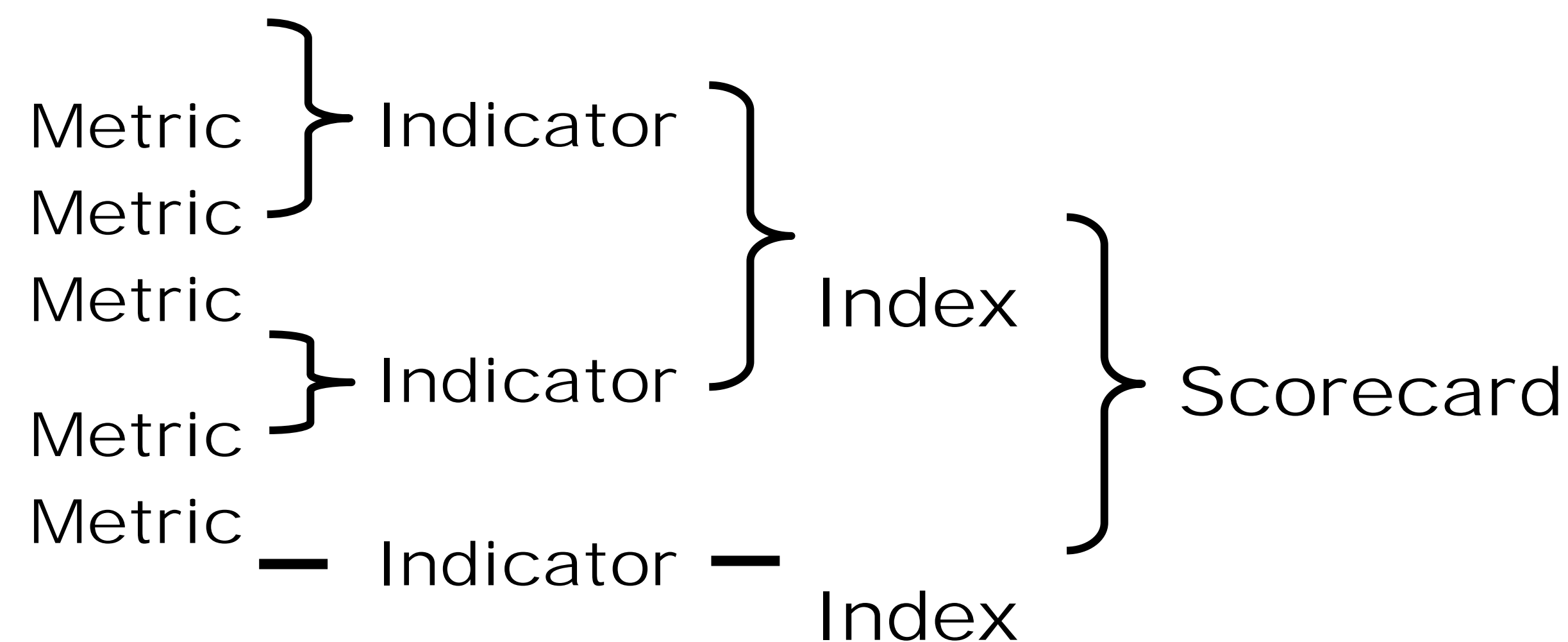
How is the watershed doing at providing enough water, now and in the future, for people and nature?

Each index is composed of one or more indicators scored for the 2007 water year based on a reference condition or management target. Developing a watershed health scorecard highlights the kinds of monitoring data needed to produce indicators that lead to better natural resource management.

Project Goals

- Develop and score a set of multi-metric indices for water supply that is based in water supply model for Napa River and Sonoma Creek watersheds
- Develop visually appealing scorecard for each watershed that is scientifically accurate, comprehensible, relevant, and addresses: *How are we doing?*
- Provide decision makers with information on assessments for planning and recommendations for necessary monitoring, regulatory, restoration, and management actions
- Analyze lessons learned from process that may assist other scorecard projects

From metric to scorecard

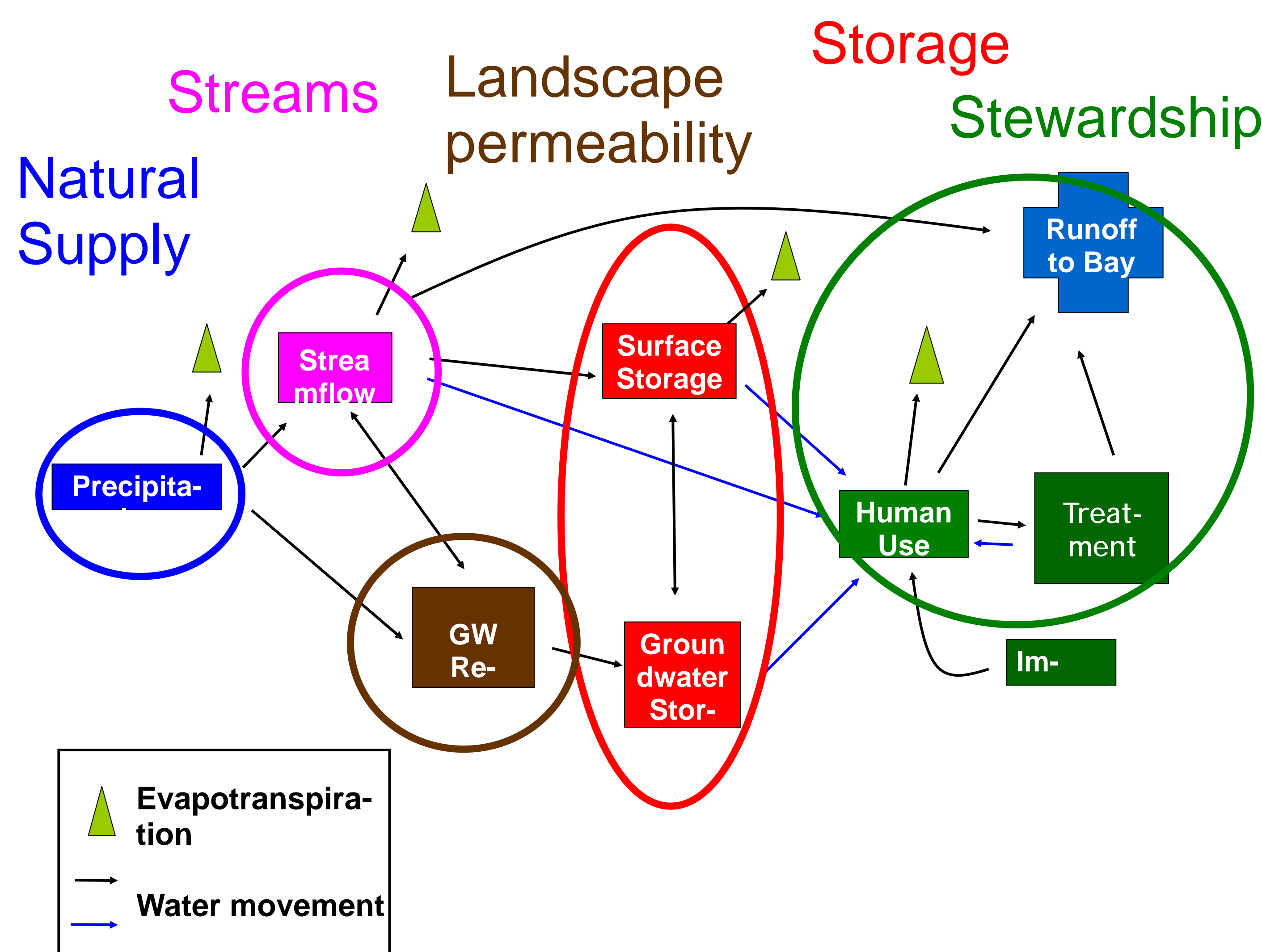


- Criteria for Metrics:**
- collected consistently, funded
 - public, reliable, accurate, useable
 - report on sustainability and watershed health

- Criteria for Indicators & Indices:**
- relevant to human concerns, watershed integrity
 - components determine function of the watershed

Approach

Conceptual model of water supply was used to derive 5 indices



Water Supply Scorecard

Water Supply Scorecard for the Napa River Watershed: 2004-2007

Index	Indicator	Score	Trend
Natural Supply	Precipitation Annual rainfall was extremely low relative to the historical record. As a result, there was less water flowing in creeks and rivers, and less water available to recharge the groundwater table.	●	
	Annual Flow Because of very low annual rainfall, there was less water flowing in streams and in the Napa River. Less water in streams means there was less habitat for wildlife, as well as less water for urban and agricultural use.	●	
Storage	Groundwater - Main Basin Fall groundwater levels have declined in the main basin over the past 30 years, spring levels have stayed constant. Recharge from winter rains was similar to what it was from 1980 to 2000.	●	◀▶
	Groundwater - Milliken-Sarko-Tulocay Basin Fall and spring groundwater levels have declined in the MST basin over the past 30 years. Recharge from winter rains was slightly greater that it was from 1980 to 2000.	●	▼
Landscape Permeability	Impervious Area Impervious surfaces like pavement and roofs cover over 6% of the watershed. This level of coverage interferes with groundwater recharge, surface flow, and other critical watershed functions.	●	▼
	Water Conservation Water used per person was moderate relative to the historic record, but far from targets set by regional water planners.	●	●
Stewardship	Water Independence Residents used more water than the watershed naturally supplied - they were dependant on water from the Sacramento River delta for their supply. Use of recycled water has increased recently, but is far from local agency targets.	●	●

Criteria for Scorecard design:

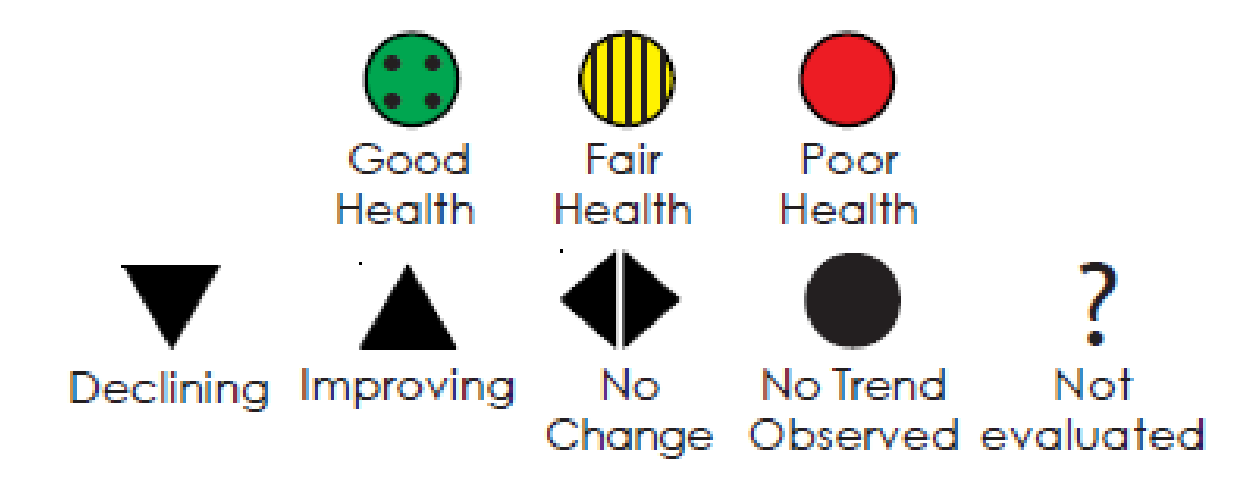
- Appeal to diverse readers
- Make use of the web
- Mention indicators for which data are lacking
- Score indicators against a defensible target
- Teach about water system

- Good historical data for metrics
- Present condition of metric (avg of most recent 4 years) scored with respect to historic average
- Trend could be analyzed

- Good historical data for most metrics
- We struggled to determine ways to score each metric
- How should management targets be defined?

- Scores and trends have several sources of uncertainty:
- analyses of individual metrics
- combining metrics to indicators
- We have not yet accounted for error in our analyses

Interpreting the scores and trends:

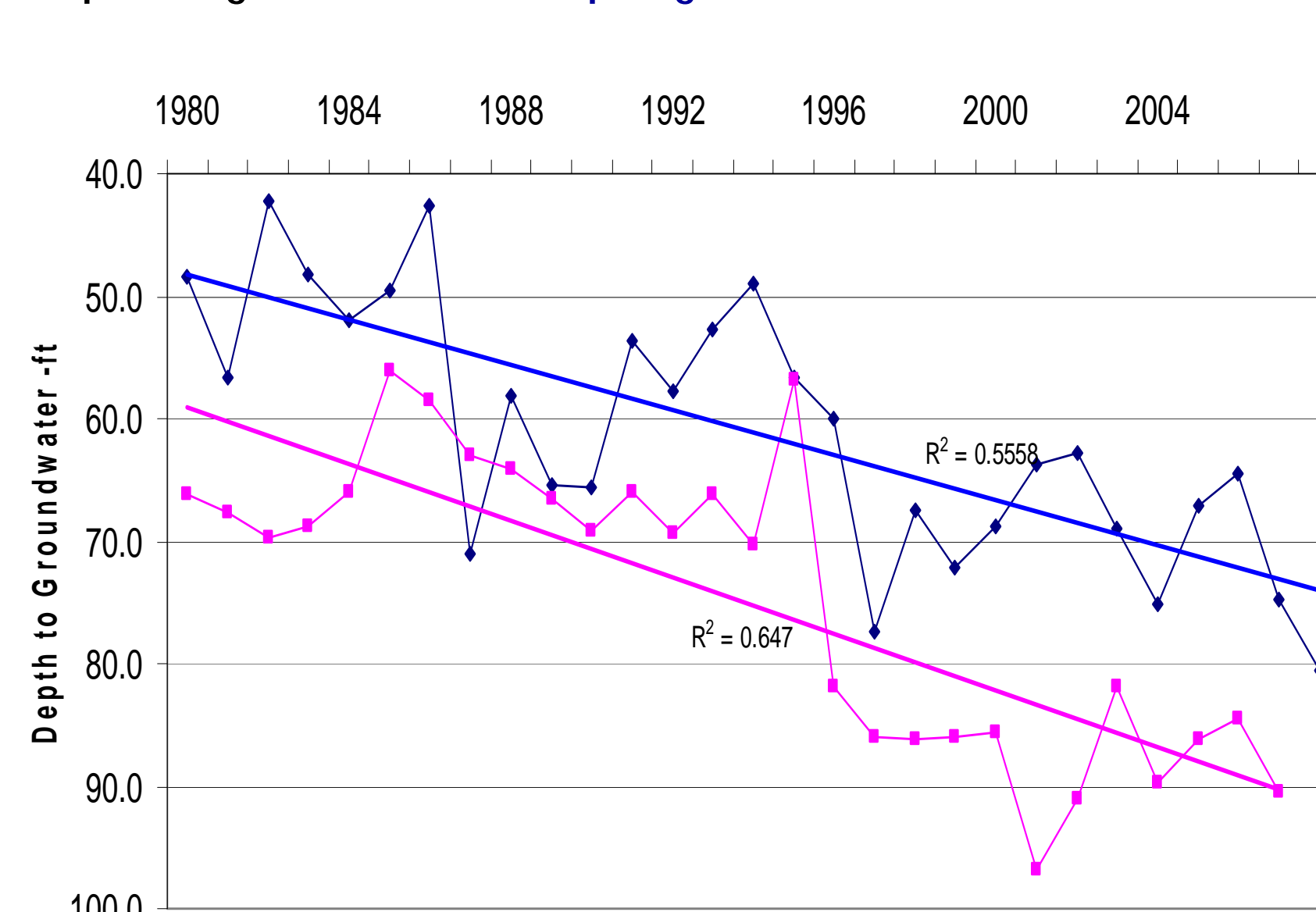


Three scores were possible. This reflects the level of accuracy in our datasets

Anatomy of an indicator: Groundwater - MST Basin in Napa Valley

- 3 metrics: depth to groundwater in spring, depth to groundwater in autumn, groundwater recharge
- Data from 7 wells, over 27 years
- Present condition of each metric (average of most recent 4 years) scored with respect to historic average, 3 scores averaged to create indicator score
- Statistical error for score has not yet been evaluated

Depth to groundwater in spring and autumn in MST basin



Lessons Learned

The project team wrestled with matching up information we want to convey with the limited set of available data to develop health indicators and indices

- Depending on questions and indicators, scoring a single year's worth of data may not be the best approach.
- Scoring indicators is challenging, but important. Project teams should agree to score with the best available standard.
- Indices should be adaptable to specific metrics and characteristics of individual watersheds; in two adjacent watersheds, data and ecosystem drivers varied widely.
- Accounting for uncertainty can be a huge technical hurdle. Other scorecard efforts should account for this early and transparently.