

The San Francisco Bay Index (Ecological Scorecard): A Tool for Summarizing Condition at Regional Scales

Issue

Large-scale regional restoration and management programs need measures of ecosystem condition, but only a handful of programs have developed compelling reporting tools to communicate results to the public. The large number of organizations working on Bay Delta issues has impeded the development of a cohesive suite of indicators. [The Bay Institute](#) developed the Bay-Delta [Ecological Scorecard](#) to provide a regional, landscape-level assessment of ecosystem condition and trends in order to facilitate communication with the public, managers and decision-makers.

Nearly 40 indicators are presented as eight multimetric indices that track the Bay's environment (Habitat, Freshwater Inflow, Water Quality), its fish and wildlife (Food Web, Shellfish, Fish), our management of its resources (Stewardship), and its direct value to the people who use it (Fishable-Swimmable-Drinkable). The process, products and lessons learned provide an important example for developing report cards in other regions. PEEIR has provided support for refining the Scorecard and preparation of manuscripts for the scientific literature.

Approach and Rationale

San Francisco Bay is a large estuary with problems reminiscent of many highly developed aquatic systems. Using existing data sources, we divided the system into discrete ecosystem attributes, sought to assess condition and trends for each of these attributes, and compared results to historical conditions as well as agency-supported restoration targets and standards.

The indicator development process, cohesive conceptual model, and results illustrate how existing regional level datasets can be used to develop a comprehensive overview of ecosystem quality to facilitate public-level communication.

In October of 2003 we first reported on these results using a highly aggregated set of 8 indices with associated scores, grades, and short and long-term trends ([Link to 2003 scorecard](#)). The scorecard for 2005 is shown in Figure 1. For many indices, we also reported on sub-regional conditions in the bay (Suisun, San Pablo, Central and South Bays). For an example, see Figure 2. This approach avoids some common pitfalls of the IBI approach that have been described by the PEEIR group. ([Link to IBI Critique](#))









AREA	GRADE	SUMMARY	SHORT TERM	LONG TERM
	D+ Score = 31	Habitat Bay habitat loss is slowly being reversed, but pace of restoration unchanged since 2003 – at current rate, more than 150 years to reach tidal marsh restoration goal.	▲	▼
	C+ Score = 58	Freshwater Inflow Reduced inflows still degrade the Bay ecosystem – inflow improved in 2004, but overall conditions since 2000 are worse than two previous decades.	◄	▼
	B- Score = 65	Water Quality Open waters are cleaner than in 2003, but not all standards are met in parts of the Bay. Toxic sediments, stormwater runoff are major problems. South and San Pablo Bays are most polluted.	▲	▲
	F Score = 10	Food Web Plankton levels in Suisun Bay are still critically low, reducing food resources for fish and birds. Phytoplankton levels in all other parts of the Bay are improving.	◄	▼
	B Score = 73	Shellfish Crab and shrimp numbers rise in Central and South Bays, but not in the upper Bay. Estuarine species lose ground to marine shellfish.	▲	▼
	C- Score = 45	Fish Recent upward trend reverses, fish populations return to critically low levels. Estuarine species of the upper Bay are hardest hit.	◄	▼
	C- Score = 38	Fishable-Swimmable-Drinkable More fish were caught but most are still unsafe to eat. Beach closures continue to rise, drinking water violations hold steady.	◄	▼
	C- Score = 46	Stewardship Little progress towards conserving more water, reducing pesticide use, and restoring freshwater inflows, but some efforts to issue pollution limits move forward.	◄	▼

Figure 1. Scorecard indicating the condition (status) and trends for 8 indices for 2005.



Findings and Impact

- The low scores indicated an impaired ecosystem: Freshwater inflow, habitat, fish and the food web all received C's to F's. Human uses (Fishable, Swimmable, Drinkable) and Stewardship also received low C's.
- Most indices depicted upward short term trends, indicating that ecosystem health is slowly improving, providing support that protection (Clean Water Act), and restoration programs (San Francisco Estuary Project; California Bay Delta Authority) are having positive effects.
- The comparison of results in the upper versus lower, more saline portion of the estuary indicated that the upper estuary was doing far worse than the lower estuary. The Delta's "Pelagic Organism Decline" is now a serious concern.
- Consistent with the observation of improvements in many of the indices in 2003 (upward short-term trends), the results for 2005 continued to depict slight increases for many parameters.
- The simple scoring system that included grades and trends has received significant local media attention as well as interest from other regional indicator efforts, supporting the need for highly aggregated findings for public consumption.

Applications

- This generalized public level communication tool and the process and approach that supported its development can be used by any collaborative group to provide a summary of ecosystem condition at the watershed, sub-regional and regional scales.
- The approach allows for updates on yearly to multiple year scales and the ability to "back calculate" conditions and scores based on revised reference conditions and improved scientific knowledge.
- The approach includes aggregation and disaggregation by topic area (ecological attributes) and by geographic area to facilitate messages that portray ecosystem condition at multiple scales that is applicable to a variety of target audiences.

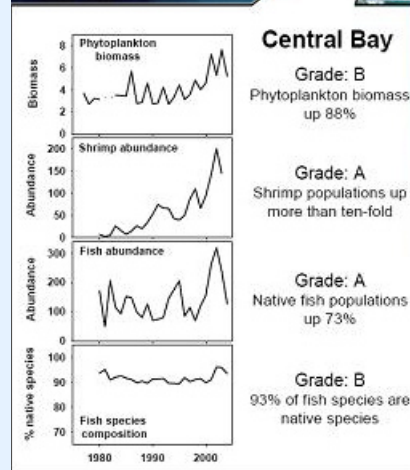
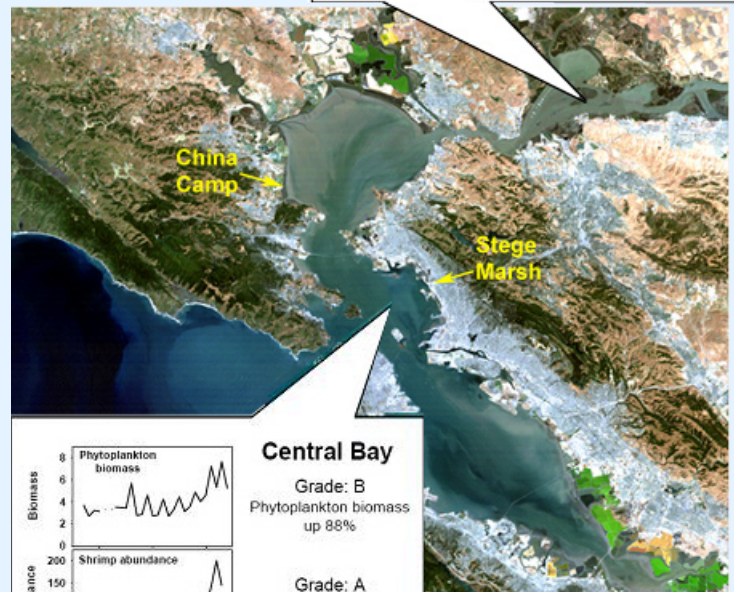
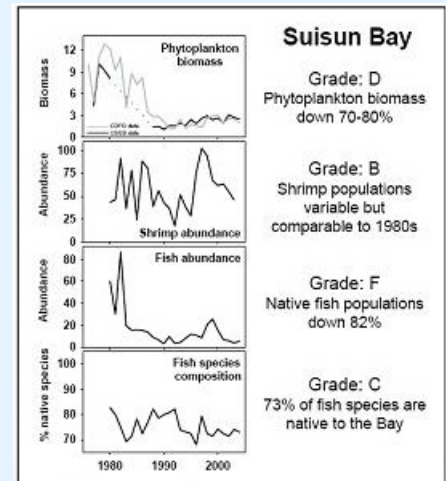


Figure 2. Not all regions of SF Bay are faring equally well. Here, two sub-regions, Suisun and Central Bays, show examples of indicators that measure current ecological condition compared to 10-20 years earlier. China Camp and Stege Marsh are PEEIR study sites.

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