THE BAY INSTITUTE
Ecological Scorecard

2005 San Francisco Bay Index

San Francisco Bay is a unique national treasure. The largest estuary on the west coast of the United States – where fresh water from California's vast Central Valley meets the Pacific Ocean – provides habitat for hundreds of plant and animal species, many found nowhere else in the world. The Bay supplies seafood for businesses and anglers. Its watershed is a major source of water for cities and agriculture. Residents and tourists sail and swim in its waters, play along its shoreline and tributary creeks, and value its wildlife and scenic qualities.

One hundred and fifty years of pollution, overfishing, fill and shoreline development, and upstream water diversions have severely impaired the Bay. The amounts of wetland habitat and freshwater inflow to the Bay have decreased dramatically, along with the once abundant fish and wildlife populations that depended on them. The fish that remain are not safe to eat, and their habitat is being overrun by harmful alien species.

In 2003, the first San Francisco Bay Index used more than three dozen science-based indicators to grade the condition of the Bay region: how well its ecological resources were faring, how much human activities were harming or helping the Bay, and how human uses of the Bay's resources were affected by the Bay's health. These indicators were combined into eight Indexes that tracked 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 grading system compared conditions in the Bay and its watershed to historical conditions, environmental and public health standards, and restoration targets.

The 2005 San Francisco Bay Index updates and refines those results, using new and additional data where available. For some indicators, calculation methods and/or reference conditions used to grade indicator results have been revised based on suggestions from reviewers of the 2003 Bay Index, availability of new information, or changes in environmental standards or goals. Detailed information on indicator calculations, indicator grading, and data sources is available in the 2003 San Francisco Bay Index and its accompanying Endnotes and Technical Appendices at www.bay.org/ecological_scorecard.htm and in this document.

MAKING THE GRADE

Ecological Scorecard San Francisco Bay Index	2003	2005
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.	**D+** **Score=31**	**D+** **Score=31**
Freshwater Inflow Reduced inflows still degrade the Bay ecosystem – inflow improved in 2004, but overall conditions since 2000 are worse than two previous decades.	**D** **Score=29**	**C+** **Score=58**
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.	**C-** **Score=45**	**B-** **Score=65**
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.	**F** **Score=10**	**F** **Score=10**
Shellfish Crab and shrimp numbers rise in Central and South Bays, but not in the upper Bay. Estuarine species lose ground to marine shellfish.	**B-** **Score=67**	**B** **Score=73**
Fish Recent upward trend reverses, fish populations return to critically low levels. Estuarine species of the upper Bay are hardest hit.	**C** **Score=50**	**C-** **Score=45**
Fishable-Swimmable-Drinkable More fish were caught but most are still unsafe to eat. Beach closures continue to rise, drinking water violations hold steady.	**D+** **Score=31**	**C-** **Score=38**
Stewardship Little progress towards conserving more water, reducing pesticide use, and restoring freshwater inflows, but some efforts to issue pollution limits move forward.	**C-** **Score=46**	**C-** **Score=46**

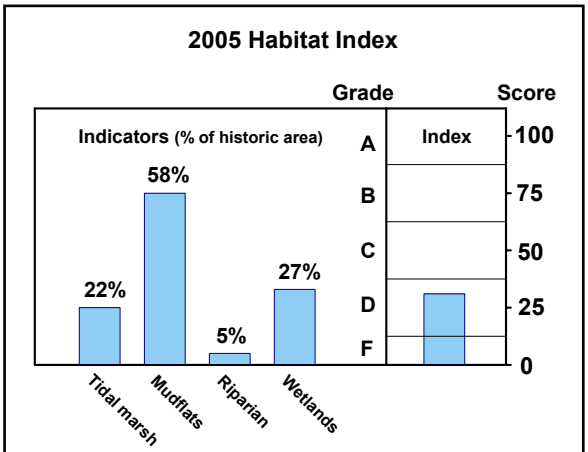
A = Excellent B = Good C = Fair D = Poor F = Critical
Score = 0 - 100

Note: Since 2003, methods used to calculate and grade some indicators have been revised to include new information and/or additional data. These indicators have been recalculated and regraded for the entire time period for which the data were available. Therefore, some of the 2003 Index grades above and indicator grades in the following sections may differ from those reported in the 2003 San Francisco Bay Index.

HABITAT INDEX

Grade: D+
Score: 31 (out of 100)
Trends: long-term (50-150 years) = declining; short-term (5 years) = improving

Historically, San Francisco Bay was ringed with lush marshes, expansive mudflats, and thickly wooded stream corridors, all teeming with life. These habitats serve many functions: they are rich sources of nutrients and food, and important spawning, nesting, and rearing areas for Bay fish and wildlife; they improve water quality by filtering pollutants from runoff and help minimize floods; and for Bay Area residents and visitors, they support birding, fishing, hunting and other recreational activities. After more than a century of conversion for agriculture, salt production, and urban development, only 5% of the Bay's riparian corridors, 22% of the tidal marshes, 27% of the seasonal wetlands, and 58% of the mudflats remain. Today, restoration of these habitats has become a key tool in the effort to protect San Francisco Bay and recover its fish, shellfish, bird, and mammal populations.



The Habitat Index uses four indicators to measure the extent of four critical habitat types: tidal wetlands (or marshes), tidal mudflats, seasonal wetlands, and riparian (or river corridor) habitats.

Key Findings

- More than 700 acres of tidal marsh have been restored in the last two years, bringing the restoration total since 1998 to more than 2500 acres. However, total tidal marsh area is still less than half of the Bay-wide restoration goal and, at the current restoration rate, it could take more than 150 years to reach this objective.

- During the past two years, tidal marsh restoration projects have been completed in all four regions of the Bay.

- Efforts to update and improve mapping of tidal mudflat, seasonal wetland and riparian habitats are ongoing, but little new information was available in 2005. However, the most recently measured acreages for these types of habitats were all substantially below restoration goals.

- During the past several years, tens of thousands of acres of salt ponds, agricultural lands, and decommissioned military bases have been acquired and slated for restoration. When restoration is completed, the area of Bay shoreline habitat could increase by as much as 50%.

Habitat Index Summary

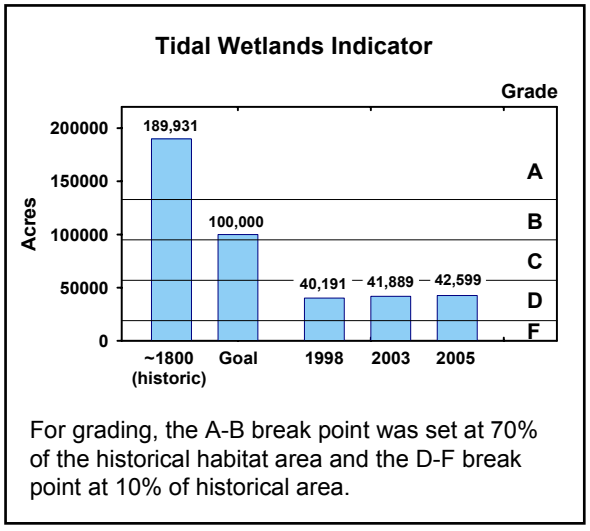
Indicator	2005 Result	2003 Grade	2005 Grade
Tidal wetlands	700 acres restored since 2003 but still less than 23% of historic extent	D (1)	**D (1)**
Tidal mudflats	58% of historic extent (not updated for 2005)	B (3)	**B (3)**
Seasonal wetlands	27% of historic extent (not updated for 2005)	D (1)	**D (1)**
Riparian habitat	16% of historic extent along Bay shores; 5% of historic extent regionally (not updated for 2005)	F (0)	**F (0)**
Habitat Index Grade (grade point average)		D+ (1.25)	**D+ (1.25)**
Habitat Index Score (out of 100)		31	**31**

Highlighted Indicator – Tidal Wetlands

Tidal marshes are the vegetated areas along the Bay's margins that are open to tidal action. At high tide, the marsh's sinuous channels carry Bay water deep into the marsh, bringing along fish, shrimp, and crabs who shelter and forage in the highly productive habitat. At low tide, the draining waters transport nutrients, plankton (microscopic floating plants and animals), and the fish and shellfish back to the Bay. A host of bird and mammal species, many of them rare and endangered, also live, feed, and nest in the Bay's tidal marshes. The Tidal Wetlands Indicator measures the amount of tidal marsh around the Bay and compares it to historic extent and restoration goals for this type of habitat.

Key Findings

- In 2005, 42,599 acres of tidal marsh, less than 23% of the historic amount and just 43% of the restoration goal, remained in the Bay. Compared to 2003, this is a slight improvement, reflecting the more than 700 acres that have been restored during the past two years.



For grading, the A-B break point was set at 70% of the historical habitat area and the D-F break point at 10% of historical area.

- Three quarters of the Bay's remaining tidal marshes are in Suisun Bay (32%) and San Pablo Bay (42%). Since 1998, tidal marsh restoration projects have been completed in all four regions of the Bay.

- Since 1998, tidal marsh restoration efforts have averaged 340 acres per year. At this rate, it will take more than 170 years to reach the restoration goal.

- A large proportion of the thousands of acres recently acquired along the shores of San Pablo and South Bays will be restored to tidal marsh. When these projects are completed, the Bay's tidal marsh area will be substantially increased.

Index Methods: Only the Tidal Wetlands Indicator was updated for 2005. Data used for calculation of the Tidal Wetlands Indicator are from 2005; all other indicators use data from 1998. The 2005 Habitat Index is calculated using indicator results from these years. For a detailed description of data sources, methods, and calculations, see the Habitat Index Technical Appendix, available at www.bay.org/ecological_scorecard.htm.

Data sources: San Francisco Estuary Institute (EcoAtlas Version 1.5); Habitat Goals Project; San Francisco Bay Joint Venture; and numerous restoration project databases.

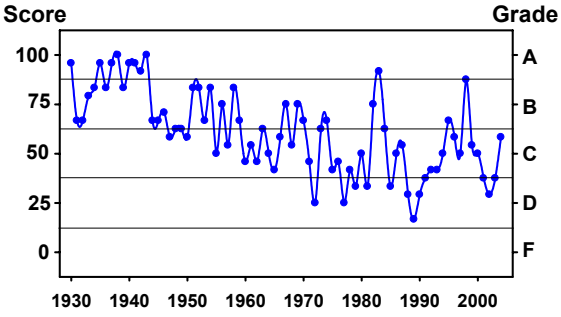
FRESHWATER INFLOW INDEX

Grade: C+
Score: 58
Trends: long-term (50-75 years) = declining; short-term (5 years) = stable

The amounts, timing and seasonal variation of freshwater inflow to San Francisco Bay are critical environmental factors affecting the quality of estuarine habitat, and the distribution and abundance of the Bay's plants and animals. Freshwater flows create low-salinity habitat for estuary-dependent species; trigger reproduction and migration; transport nutrients and organisms to and through the Bay; and flush contaminants. Spring flows, in particular, track closely with the population abundance of many estuarine species. Dams on nearly all of the Bay's tributary rivers and the diversion of inflowing fresh water from rivers and at the Delta export pumps have dramatically changed the pattern and volumes of freshwater flows into the Bay.

Key Findings

- In 2004, only 75% of total estimated annual runoff from the Sacramento-San Joaquin watershed reached the Bay. This was an improvement over conditions two years earlier when 50% of total runoff was diverted. However, overall conditions in the period since 2000 – an average of 37% of runoff diverted from the Bay – have been even worse than those of the last two decades (an average of 36% diverted in the 1990s and 33% in the 1980s).



The Freshwater Inflow Index uses six indicators, annual inflow, water year type, spring inflow, change in spring inflow, seasonal variability, and change in peak flow, to measure key aspects of freshwater flow into the Bay.

- Water Year 2004 was a "below normal" (or roughly average) year in the Bay's watershed but the Bay received only the amount of freshwater expected in a "dry" year. This was the fourth consecutive year of "dry" or "critically dry" conditions in the Bay.

- In 2004, ecologically important spring flows were reduced by 30% and low-salinity habitat was located nearly 7 kilometers (4.3 miles) farther upstream than predicted based on spring runoff from the mountains, conditions that historically corresponded to a 10-60% decrease in abundance for Bay species such as longfin smelt, Pacific herring and California bay shrimp. Compared to two years earlier, when spring inflows were reduced by 68% and low salinity habitat was shifted nearly 15 km (9.3 miles) upstream, with a corresponding 30-80% abundance decrease, this was also an improvement. Since 2000, low-salinity habitat was

shifted upstream by 10 km (6.2 miles) on average, with a corresponding 20-60% abundance decrease for these species.

- The frequency of high, or peak, freshwater inflows was reduced by a third in 2004, compared to the 80% reduction measured in 2002. Seasonal variability in inflow was reduced by 30%, compared to 46% in 2002. Since 2000, peak flows were reduced by 66% on average, and seasonal variability by 38%.

Freshwater Inflow Index Summary

Indicator	2005 Result	2003 Grade	2005 Grade
Annual Inflow	Annual inflow reduced 25%	D (1)	**B (3)**
Water Year Type	Bay's watershed is "below normal" but Bay is "dry"	F (0)	**D (1)**
Spring Inflow	Spring inflow reduced 30%, placing low-salinity habitat at 68 km upstream of Golden Gate	C (2)	**C (2)**
Change in Spring Inflow	Low-salinity habitat shifted nearly 7 km further upstream than expected	D (1)	**C (2)**
Change in Peak Flow	43 days of high peak flows compared to 67 expected – a 35% reduction	D (1)	**B (3)**
Seasonal Variation	Difference between high and low flows reduced by 30%	C (2)	**B (3)**
Freshwater Inflow Index Grade (grade point average)		D+ (1.2)	**C+ (2.3)**
Freshwater Inflow Index Score (out of 100)		29	**58**

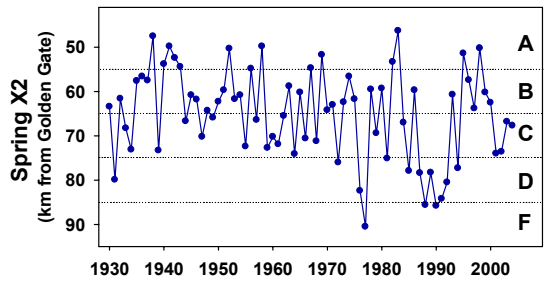
Highlighted Indicator - Spring Inflow

Low-salinity habitat, where fresh water from the Bay's rivers and saltwater from the ocean meet, is one of the most important ecological zones in the estuary. The location of this habitat, known in scientific shorthand as "X2", depends on the amount of fresh water flowing into the Bay. When inflows are high, X2 is located in San Pablo or Suisun Bay (50-60 km upstream of the Golden Gate); when inflows are low, X2 moves upstream into the Sacramento and San Joaquin River channels (90 km upstream of the Golden Gate). For many Bay fish and invertebrate species, population abundance and/or survival are significantly higher when springtime flows are high and X2 is located in Suisun or San Pablo Bay, and lower when springtime X2 is farther upstream. The Spring Inflow Indicator measures the amount of freshwater inflow, expressed as X2, during the spring (February-June).

Key Findings

- In the spring of 2004, X2 was located at 68 km, a value typical for "dry" years and which corresponds to "fair" ecological conditions for Bay fish and invertebrates. This was an improvement compared to 2002, when spring X2 was 6 km farther upstream (at 74 km) and springtime ecological conditions were poor. Since 2000, the average springtime X2 has been at 69 km, compared to an average of 67 km in the 1990s and 68 km in the 1980s.

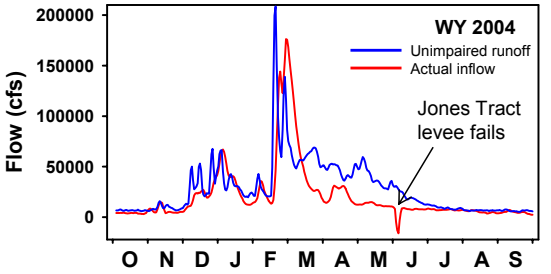
- At 68 km, low-salinity habitat was located nearly 7 kilometers (4.3 miles) farther upstream than predicted based on spring runoff from the mountains, conditions that historically corresponded to a 10-60% decrease in abundance for Bay species such as longfin smelt, Pacific herring and California bay shrimp. Compared to two years earlier, when low salinity habitat was shifted nearly 15 km (9.3 miles) upstream, with a corresponding 30-80% abundance decrease, this was also an improvement. Since 2000, low salinity habitat was shifted upstream by 10 km (6.2 miles) on average, with a corresponding 20-60% abundance decrease for these species.



For grading, the A-B break point was set at 55 km, an X2 location that corresponds to high survival and abundance for a variety of Bay fish and invertebrate species. The D-F break point was set at 85 km, 11 km of average X2 during critically dry years between 1930 and 1943.

- Following very high freshwater inflows in late February-early March, flow was reduced to near-minimum levels as snowmelt runoff was stored in upstream reservoirs for the remainder of the spring.

- In June 2004, a levee on Jones Tract, a large Delta island, failed. As the island flooded, water from the Bay flowed upstream, causing X2 to shift 10 km upstream in just three days and disrupting water export operations in the Delta.



Actual freshwater inflow into San Francisco Bay and unimpaired (natural) runoff from the Sacramento-San Joaquin watershed for Water Year 2004.

Index Methods: All indicators for the Freshwater Inflow Index were updated using data for Water Years 2003 and 2004. The 2005 Freshwater Inflow Index is calculated from indicator results for Water Year 2004. For a detailed description of data sources, methods, and calculations, see the Freshwater Inflow Index Technical Appendix, available at www.bay.org/ecological_scorecard.htm.

Data sources: California Department of Water Resources (Dayflow model); California Data Exchange Center (CDEC; Central Valley Full Natural Flow data); and W. Kimmerer, Romberg Tiburon Center, San Francisco State University (data for fish abundance-X2 relationships).

WATER QUALITY INDEX

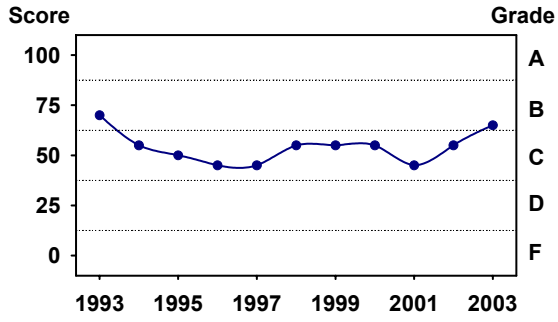
Grade: B-
Score: 65
Trends: long-term (30-50 years) = improving; short-term (5 years) = improving

San Francisco Bay, one of the most heavily urbanized estuaries in the United States, has received polluted discharges and runoff from urban, industrial, mining, and agricultural areas along its shores and from its many watersheds for more than a century. Pollution can harm the plants, animals, and people that live in and around the bay, reduce the productivity and health of the ecosystem, and contaminate fish, birds, and shellfish to the point where they are unsafe to eat. Decades of efforts to implement the Clean Water Act have reduced direct discharges of pollutants into the Bay – today most contaminants measured in Bay waters come from stormwater runoff or leach into the water from the Bay's muddy bottom sediments.

Key Findings

- Water quality standards for most contaminants tested were met in most open water samples collected from most areas in the Bay. In 2003, water quality standards for PCBs, hydrocarbons, and copper were exceeded.

- Nearly 90% of all water samples collected in the Bay exceeded water quality standards for PCBs, a banned toxic industrial chemical that continues to runoff into the Bay and persists in Bay sediments.



The Water Quality Index uses five indicators to compare the concentrations pesticides, trace elements, PCBs, hydrocarbons, and low dissolved oxygen to water quality standards for protection of human health and aquatic life.

- Portions of South and San Pablo Bays remain the most polluted areas in the Bay.

- Compared to two years earlier, overall water quality of the Bay was slightly improved. Water quality standards were exceeded for fewer contaminants (although fewer were tested) and the concentrations of some problem contaminants such as PCBs declined.

- For many contaminants found in the Bay there are no established standards, and thus the Index probably underestimates water pollution in the Bay. In addition, because the Index measures only contaminants in open waters but not in the Bay's muddy bottom or in stormwater runoff that flows into the Bay, it tells only part of the Bay's water quality story.

Water Quality Index Summary

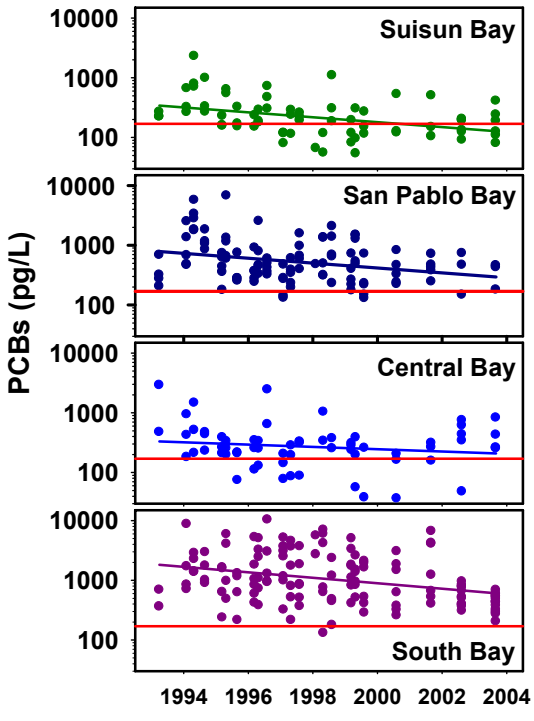
Indicator	2005 Result	2003 Grade	2005 Grade
Trace elements	Copper exceeded water quality standard	C (2)	**B (3)**
Pesticides	Standards not exceeded but fewer pesticides measured	B (3)	**A (4)**
PCBs	Nearly 90% of all water samples exceeded standard but concentrations decrease	F (0)	**F (0)**
PAHs	Standards exceeded in 13% of samples and in all regions of the Bay	D (1)	**C (2)**
Dissolved oxygen	Standard not exceeded	B (3)	**A (4)**
Index Grade (grade point average)		C- (1.8)	**B- (2.6)**
Index Score (out of 100)		45	**65**

Highlighted Indicator - PCBs

Polychlorinated biphenyls (PCBs) are highly toxic man-made chemicals that were used extensively by a variety of industries for more than 50 years. Manufacture of PCBs was banned more than 25 years ago but runoff from PCB-contaminated streams and urban areas continues to deliver these pollutants to the Bay. Once in the environment, PCBs do not break down and, because they bind to the Bay's bottom sediments, these pollutants have, and will, persist in the Bay for decades. The PCBs Indicator measures the extent of PCB pollution in the Bay, the frequency that the water quality standard was exceeded, and the degree to which the standard was exceeded.

Key Findings

- In 2003, 89% of all water samples collected in the Bay exceeded the water quality standard for PCBs.
- All of the Bay's four regions – South, Central, San Pablo, and Suisun Bays – are polluted with PCBs.
- PCB concentrations are highest in South and San Pablo Bays.
- PCB concentrations are declining in South, San Pablo, and Suisun Bay but not in Central Bay.



PCB concentrations in four regions of the San Francisco Bay from 1993 to 2003. The red line shows the water quality standard.

Index Methods: All indicators for the Water Quality Index were updated using data for 2002 and 2003. The 2005 Water Quality Index is calculated from indicator results for 2003. Since first reported in 2003, the Water Quality Index and its component indicators have been slightly revised to incorporate refinements in water quality standards and recalculated for all years (1993-2003). Since 2000, the San Francisco Estuary Regional Monitoring Program for Trace Substances, which collects the data used to calculate the Index, has reduced the frequency of their sampling program and reduced the numbers of contaminants tested. For a detailed description of data sources, methods, and calculations, see the Water Quality Index Technical Appendix, available at www.bay.org/ecological_scorecard.htm.

Data source: San Francisco Estuary Regional Monitoring Program for Trace Substances (RMP)

FOOD WEB INDEX

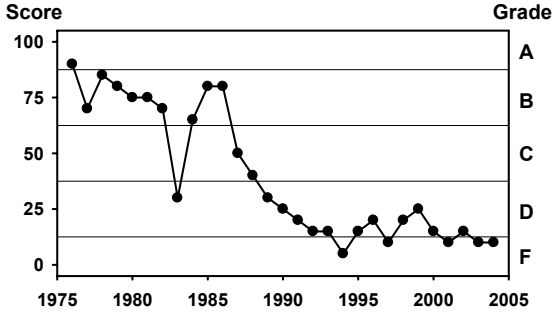
Grade: F
Score: 10
Trends: long-term (30 years) = declining; short-term (5 years) = stable

Phytoplankton and zooplankton – microscopic floating plants and animals – are the foundation of the San Francisco Bay open water food web. Healthy populations of these organisms provide food for Bay fish and wildlife, fueling the Bay's vibrant ecosystem and supporting its commercial and recreational fisheries. The abundance of these food web organisms is affected by physical factors such as freshwater inflows, sediment and nutrient inputs, and water pollution levels, and by biological factors such as the extent and productivity of the Bay's wetlands, and the rate at which they are consumed by other organisms.

Key Findings

- In 2004, Suisun Bay phytoplankton biomass remained critically low, less than 20% of average levels measured 25 years earlier.

- Abundance of the smallest zooplankton, rotifers, doubled between 2001 and 2004 but was still less than 10% of pre-1980 levels. The upper estuary's largest zooplankton species, mysid shrimp, have nearly disappeared.



The Food Web Index uses five indicators to measure the abundance, species composition, and size of phytoplankton and zooplankton in Suisun Bay.

- Virtually all copepods found in Suisun Bay are not native to the Bay. Because most non-native copepods are smaller, average zooplankton size was just 20% of that measured for zooplankton in the 1970s.

- Since 2001, there has been no significant improvement in the condition of the food web in the upstream portion of San Francisco Bay.

- Phytoplankton biomass measured in other areas of the Bay is stable or increasing. The extreme decline in the food web measured in the upper Bay is associated with reduced freshwater inflow and alien species introductions.

Food Web Index Summary

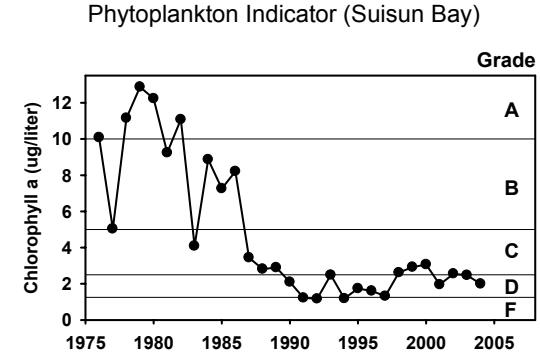
Indicator	2005 Result	2003 Grade	2005 Grade
Phytoplankton	Suisun Bay numbers less than 25% of pre-1980 levels	D (1)	**D (1)**
Rotifers	Rotifer numbers less than 10% of pre-1980 levels	F (0)	**F (0)**
Copepods	Suisun Bay dominated by non-native copepods	F (0)	**F (0)**
Mysids	Mysid shrimp have virtually disappeared from Suisun Bay	F (0)	**F (0)**
Zooplankton size	Zooplankton are 80% smaller than pre-1980 sizes	D (1)	**D (1)**
Food Web Index Grade (grade point average)		F (0.4)	**F (0.4)**
Food Web Index Score (out of 100)		10	**10**

Highlighted Indicator - Phytoplankton

Phytoplankton are the base of the Bay's food web, converting sunlight and nutrients into the food. Phytoplankton productivity is limited by light, temperature, nutrients, pollution, and the rate at which the phytoplankton is consumed by other animals. Many zooplankton species feed on phytoplankton, but phytoplankton are also eaten other animals, including clams, oysters, and mussels. While the Phytoplankton Indicator measures the abundance of phytoplankton in Suisun Bay using data collected by the California Department of Fish and Game, the U.S. Geological Survey also surveys phytoplankton (but not zooplankton) throughout the entire Bay. The large differences in phytoplankton abundance in the different regions of the Bay explain, in part, regional differences shown by other Bay species.

Key Findings

- Since the late 1980s, phytoplankton abundance in Suisun Bay has averaged less than 20% of levels measured before 1980.
- While phytoplankton in Suisun Bay declined dramatically, phytoplankton levels increased in South and Central Bays and were stable in San Pablo Bay.
- During the past decade, Suisun Bay phytoplankton levels have been 42% lower than in San Pablo Bay, 50% lower than in Central Bay, and 77% lower than in South Bay.



For grading, the A-B break point was set at 10 ug per liter, the average chlorophyll concentration measured between 1976 and 1980. Each lower grade was set at 50% of the grade above.

- The decline in Suisun Bay phytoplankton was likely caused by the mid-1980s invasion of the upper estuary by a non-native clam, which consumes phytoplankton faster that it can reproduce. Because this clam requires low salinity water, it has not spread to saltier regions of the Bay.

Index Methods: The component indicators of the Food Web Index are calculated using data from Suisun Bay only. All indicators for the Food Web Index were updated using data for 2002, 2003, and 2004. The 2005 Index is calculated from indicator results for 2004. Since 2003, several indicators in the Food Web Index have been slightly revised and recalculated for the 1974-2004 period to incorporate newly available information on zooplankton species origins. For a detailed description of data sources, methods, and calculations, see the Food Web Index Technical Appendix, available at www.bay.org/ecological_scorecard.htm.

Data sources: California Department of Fish and Game (Neomysis and Zooplankton Survey) and U.S. Geological Survey (Water Quality of San Francisco Bay website, phytoplankton data only).

SHELLFISH INDEX

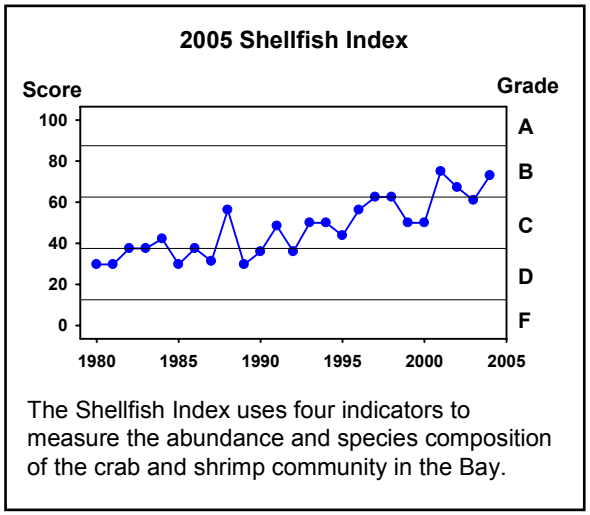
Grade: B
Score: 73
Trends: long-term (25-50 years) = declining; short-term (5 years) = improving

Shellfish – crabs, shrimp, clams, and oysters – were once a mainstay of San Francisco Bay's commercial fisheries. Today, Bay oysters are nearly extinct and only shrimp are still harvested from the Bay, although the catch is a fraction of that landed 50 years ago. Still, shellfish remain an important component of the Bay's ecosystem and, for many species, the estuary is an essential habitat for at least some portion of their lives. Within the Bay, shellfish distribution and abundance are affected by environmental conditions in the estuary, including freshwater inflows, amounts and quality of tidal marsh habitat, and water quality. In addition, because most shellfish feed on plankton or graze among bottom sediments and then are themselves eaten by fish, birds, other Bay wildlife, and people, they are a key link in the Bay's food web.

Key Findings

- In 2004, abundance of young Dungeness crabs, which use the Bay as nursery habitat, was the third highest since monitoring began in 1980 and double that measured two years earlier.

- Abundance of rock crabs, which reside in the Bay year-round, also increased in 2004 compared to 2002, although the overall abundance for the past ten years has been roughly stable.



The Shellfish Index uses four indicators to measure the abundance and species composition of the crab and shrimp community in the Bay.

- Shrimp abundance, which increased in the late 1990s, remained roughly stable at levels double that of the 1980s. Nearly all of the increase occurred in Central and South Bays – shrimp numbers in San Pablo and Suisun Bays have been stable or declining for the past two decades.

- Nearly all the shrimp found in the Bay are native species (98% native). However, non-native shrimp are more common in the upper reaches of the Bay. In 2004, 7% of the shrimp collected in Suisun Bay were not native to the Bay or local coastal waters.

Shellfish Index Summary

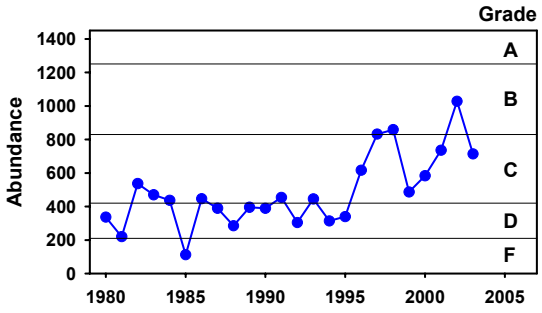
Indicator	2005 Result	2003 Grade	2005 Grade
Dungeness crab	Abundance of juveniles third highest in 25 years	C (2)	**B (3)**
Rock crab	Rock crab abundance also third highest in 25 years	C (2)	**B (2)**
Shrimp	Abundance still higher than 1980s but estuarine species loosing ground	C (2)	**C (2)**
Percent Native Species	98% of shrimp are natives but more non-natives present in Suisun Bay	A (3.75)	**A (4)**
Index Grade (grade point average)		B- (2.5)	**B (2.9)**
Index Score (out of 100)		67	**73**

Highlighted Indicator – Shrimp

Since 1980, more than a dozen native shrimp species have been collected in the Bay. Some are estuarine species, needing low-salinity water; others are coastal marine species that prefer the saltier regions of the Bay. Changes in shrimp abundance and in the types of shrimp species present in different regions of the Bay may reflect changes in estuary conditions – like several Bay fish species, at least one estuarine shrimp species, the California Bay shrimp, thrives on high freshwater inflows during the spring. In contrast, coastal shrimp species are likely more affected by ocean conditions. The Shrimp Indicator measures the abundance of native shrimp species within the Bay.

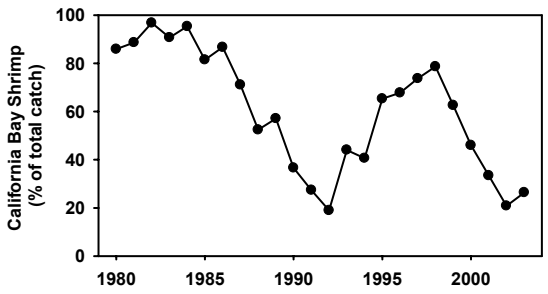
Key Findings

- Overall abundance of shrimp in the Bay doubled during the past decade.
- This increase was attributable to a ten-fold increase of shrimp in Central Bay and a three-fold increase in South Bay. Native shrimp abundance in San Pablo Bay decreased by 20% and was variable but roughly stable in Suisun Bay.
- In 2004, shrimp abundance in Central Bay was more than twice as high as in any other region of the Bay, suggesting that most shrimp in the Bay are marine rather than estuarine species.



Based on commercial harvest data, shrimp numbers declined more than 60% in the 1960s. Therefore, for grading, the B-C break point was set at 830, the average of the five highest abundances measured for the 1980-2003 period. Each lower grade was set at 50% of the grade above.

- The abundance of the estuarine California Bay shrimp declined by 35%. In the 1980s, this species constituted more than 80% of all shrimp collected in the Bay; in 2004, despite a brief recovery in the late 1990s, it was only 26% of the shrimp catch.



The percentage of the estuarine California bay shrimp in the total shrimp catch in San Francisco Bay from 1980 to 2003.

Index Methods: All indicators for the Shellfish Index were updated using data for 2002 (shrimp indicators only), 2003, and 2004 (crab indicators only). The 2005 Index is calculated from indicator results from 2004 for the Dungeness Crab and Rock Crab indicators and the 2003 results for Shrimp and Percent Native Species indicators (2004 results for shrimp are not yet available from the California Department of Fish and Game, which conducts the surveys). The original 2003 Index was calculated using 2002 results for the two crab indicators and 2001 results for the two shrimp indicators. The 2003 Index presented here is calculated using 2002 results for all four indicators. The Shrimp Indicator has been slightly revised to calculate abundance for each year as average total native shrimp catch per trawl for 35 survey stations located in the Bay and recalculated for the 1980-2003 period. The reference conditions used to set grade levels for the two crab indicators and the Shrimp Indicator have been revised to set the B-C break point at the average of the five highest abundances measured for the 1980-2004 (or 1980-2003 fro shrimp) period. The Percent Native Species Indicator was also revised to better evaluate regional differences in the results of this indicator and was recalculated as the average of the grades of the indicator measured for each of the Bay's four regions.

Data source: Interagency Ecological Program for the San Francisco Estuary and California Department of Fish and Game (San Francisco Bay Study)

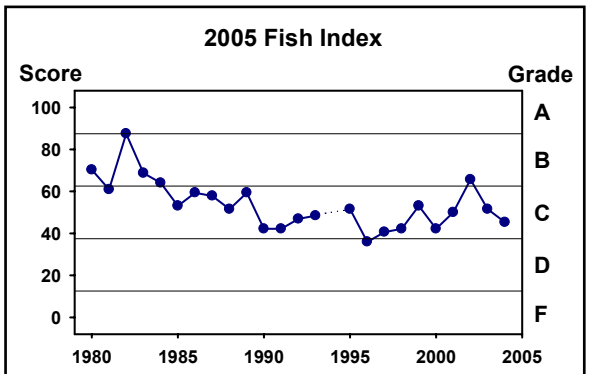
FISH INDEX

Grade: C-
Score: 45
Trends: long-term (25-50 years) = declining; short-term (5 years) = stable

San Francisco Bay is home, way station, and highway for dozens of fish species. Some species live in the Bay for their entire lives; others use the Bay for spawning or as a nursery area where the young fish shelter and feed in estuary's brackish water and tidal marshes. Environmental and ecological conditions in the estuary, including freshwater inflows, availability of tidal wetlands, water quality, and the productivity of the food web, affect the population size and distribution of Bay fishes.

Key Findings

- In 2004, the abundance of native Bay-dependent fish species was less than half of the level measured in 2001 and just 53% of the 1980-1984 average.



The Fish Index uses four indicators to measure the abundance, diversity, and species composition of the Bay's native fish community.

- Since the early 1980s, populations of open-water species have decreased in all regions of the Bay, but the decline is greatest in Suisun Bay (down 85%) and San Pablo Bay (down 69%). Abundance of bottom-oriented fishes also declined in the upper bays (down 59-76%) but it increased in the Central Bay (up 196%) and South Bay (up 29%).

- Diversity of the Bay fish community improved compared to three years earlier. In 2004, 32 of 34 native Bay-dependent fish species were present in the Bay compared to 29 of 34 in 2001.

- Native species made up 85% of the Bay's fish community in 2004, compared to 83% in 2001. The highest percentage of non-native species was found in Suisun Bay (27%) and the lowest in Central Bay (7%).

- The abundance of four "sensitive" Bay species – longfin smelt, delta smelt, Pacific herring, and striped bass – remained critically low.

Fish Index Summary

Indicator	2005 Result	2003Grade	2005 Grade
Abundance	57% of 1980-1984 abundance; populations of open water species drop to 18% of 1980-1984 average	B (3)	**D (1)**
Diversity	94% of Bay-dependent species present	C (2)	**B (3)**
Percent Native Species	85% of species are native to the Bay	B/C (2.5)	**B (2.75)**
Sensitive Species	Abundance of longfin smelt and striped bass still 8-15% of 1980-1984 average	D/F (0.5)	**D/F (0.5)**
Index Grade (grade point average)		C (2.0)	**C- (1.8)**
Index Score (out of 100)		50	**45**

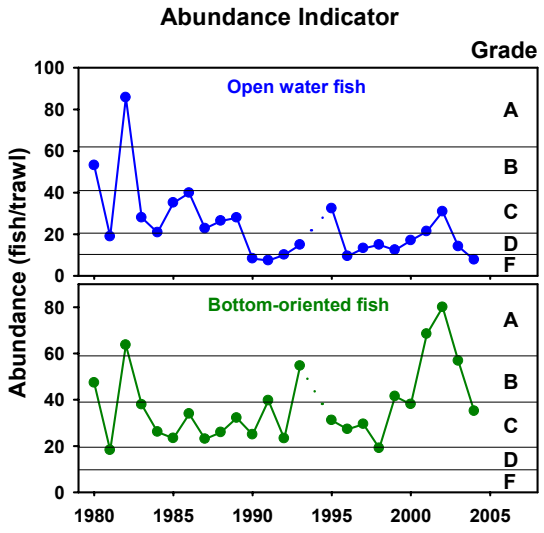
Highlighted Indicator - Abundance

The abundance of native fishes in an aquatic ecosystem is a commonly used indicator of habitat condition. Although regular monitoring of Bay fishes did not begin until the late 1960s, commercial and sport fishery catch data from earlier years indicate that the populations of at least some Bay fish species had been declining since at least the mid-1900s. Even then, some of the likely causes for the decline were easy to identify – overfishing, water pollution, loss of shoreline habitat, and changes in freshwater inflow to the estuary. During the past three decades some of these problems have been reduced – today, Bay water quality is much better than it was in the 1970s. Other impacts, such as alterations in freshwater inflow and invasion of the Bay by new non-native species, have worsened. The Abundance Indicator uses data from two surveys, one that collects open-water species like delta smelt and the other that samples bottom-oriented fish such as starry flounder, to measure the combined population size of 34 Bay-dependent species.

Key Findings

- In 2004, the overall abundance of native Bay-dependent fishes was 52% lower than in 2001 and 43% lower than the 1980-1984 average. This decline largely reflected lower numbers of open water (pelagic) species: the 2004 abundance of these types of fishes was the second lowest ever measured and comparable to low levels measured at the end of the 1987-1992 drought.

- Populations of open water (pelagic) species declined in all regions of the Bay, but the decline was greatest in Suisun Bay (down 28%



For grading, the B-C break point was set at the 1980-1984 average abundance. Each lower grade was set at 50% of the grade above.

since 2001 and down 90% compared to the 1980-1984 period) and San Pablo Bay (down 73% since 2001 and down 84% compared to the 1980-1984 period). In South Bay, 2004 abundance was 46% lower than in 2001 and 67% below the 1980-1984 average while, in Central Bay, open-water fish abundance dropped 68% in the last three years to levels that are 80% lower than in the early 1980s.

- During the past 25 years, abundance of bottom-oriented (demersal) fishes has generally declined in Suisun and San Pablo Bay, fluctuated in South Bay, and increased in Central Bay. In 2004, abundance in Central Bay was 49% lower than in 2001 but nearly double the 1980-1984 average. In South Bay, 2004 abundance was just one third that measured in 2001 and down 40% compared the 1980-1984 average. In San Pablo Bay, abundance of bottom-oriented fishes declined 16% during the past three years to levels that are 70% lower than in the early 1980s. Suisun Bay abundance was stable for the past three years at levels that were 80% lower than the 1980-1984 average.

Index Methods: All indicators for the Fish Index were updated using data for 2002, 2003, and 2004. The 2005 Index is calculated from indicator results for 2004. Since 2003, the Fish Index and its component indicators have been revised in several ways and recalculated for the 1980-2004 period. Data from the California Department of Fish and Game's Bay Study Otter Trawl survey (which samples bottom-oriented) fishes were added to those from the Midwater Trawl survey (which samples open-water species) to calculate all indicators. The Abundance Indicator was revised to include only Bay-dependent species that reside year-round in the Bay, rely on the Bay for a key life history stage, and/or have a substantial portion of their populations regularly present in the Bay. For these species, abundance was calculated and graded separately for open water and bottom-oriented species and the Abundance Indicator was calculated as the average of the tow grades To better evaluate regional differences, the Percent Native Species Indicator was calculated as the average of the grades of the indicator measured for each of the Bay's four regions. For additional information on data sources, methods, and calculations, see the Fish Index Technical Appendix, available at www.bay.org/ecological_scorecard.htm.

Data source: Interagency Ecological Program for the San Francisco Estuary and California Department of Fish and Game (San Francisco Bay Study)

FISHABLE-SWIMMABLE-DRINKABLE INDEX

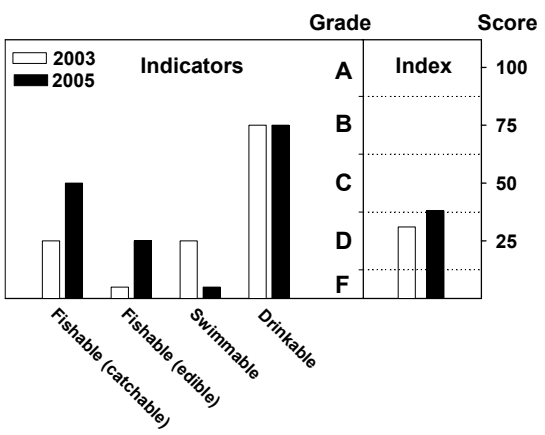
Grade: C-
Score: 38
Trends: long-term (50 years) = declining; short-term (5 years) = stable

San Francisco Bay is an important and heavily used resource for the Bay Area's human population. Bay fish and crabs are caught by recreational and subsistence anglers. Bay beaches attract swimmers, kayakers, and board sailors. Surface runoff and groundwater from the Bay's many watersheds – near and far – provide drinking water to Bay Area residents. Human uses of the Bay and its watersheds are most often directly affected by pollution that can render Bay-caught fish unsafe to eat, Bay beaches unfit for swimming, and local drinking water supplies contaminated. But other changes in the Bay's ecosystem are also important – less freshwater inflow and shoreline wetland habitat reduces productivity and fish abundance, and weakens the Bay's capacity to absorb and neutralize contaminants discharged into the system.

Key Findings

- Recreational fishing success improved in 2004. On average, most anglers caught more than one fish per trip, compared to an average of less than one fish per trip in 2001.

- More than three quarters (80%) of fish caught in the Bay were contaminated with either PCBs or mercury at levels that rendered them unsafe to eat. Compared to 2000, when 94% of sampled fish exceeded EPA screening levels for human consumption, this was an improvement.



The Fishable-Swimmable-Drinkable Index uses four indicators to measure fishing success, fish contaminant concentrations, beach closures, and contamination of drinking water sources.

- In 2004, Bay beaches were posted or closed to swimmers for 212 days because of sewage spills, discharges of contaminated stormwater runoff, or high bacteria counts from unknown causes. During the past four years, the frequency of beach closures has nearly tripled, although monitoring and reporting have also increased.

- Most drinking water sources used by Bay Area drinking water suppliers are relatively good quality but, in 2004, 11% of suppliers reported exceedences of maximum contaminant limits for nitrogen compounds, industrial chemicals, or pesticides in at least one of their sources.

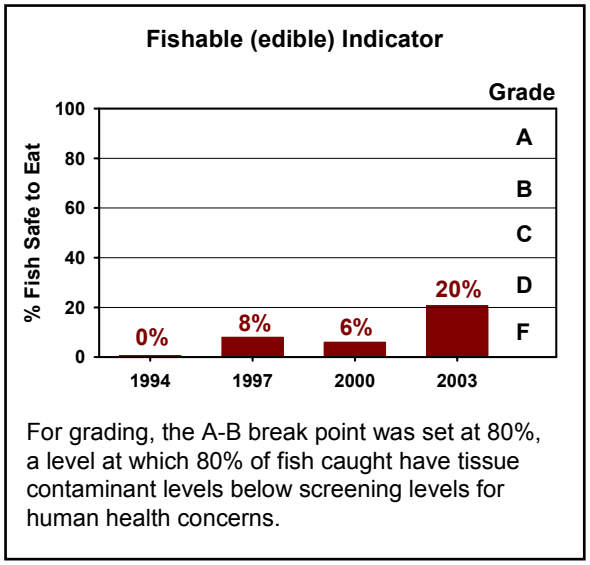
Fishable-Swimmable-Drinkable Index Summary

Indicator	2005 Result	2003 Grade	2005 Grade
Fishable (catchable)	Fishing success improves; most anglers catch at least one fish	D (1)	**C (2)**
Fishable (edible)	80% of fish contaminated with PCBs and mercury, unsafe to eat	F (0)	**D (1)**
Swimmable	Beaches posted or closed for 58% of the year	D (1)	**F (0)**
Drinkable	11% of suppliers reported elevated contaminant levels	B (3)	**B (3)**
Index Grade (grade point average)		D+ (1.25)	**C- (1.5)**
Index Score (out of 100)		31	**38**

Highlighted Indicator – Fishable (edible)

San Francisco Bay was once an important source of seafood for local markets as well as export. Today, few commercial fisheries remain in the Bay but many Bay Area residents still catch and consume fish (and crabs) from the Bay. However, after decades of water pollution and the associated contamination of the Bay's bottom sediments, many contaminants have been transported and biomagnified up the food web to contaminate the flesh of Bay fishes, particularly large species popular with anglers. Since the 1990s, the California Department of Health Services has advised the public against consuming many fish species that reside in the Bay. The Fishable (edible) Indicator evaluates contaminant levels in six fish species commonly caught in the Bay and measures the percentage of fish with tissue contaminant concentrations that are below the U.S. Environmental Protection Agency (EPA) screening levels for human consumption.

- In 2003, 80% of fish collected in the Bay exceeded EPA screening levels for PCBs, 53% for mercury, and 2% for DDT. Compared to 2000, when 94% of sampled fish exceeded the screening levels (89% for PCBs and 40% for mercury), this was an improvement. Since 1994, the percentage of fish collected from the Bay with high tissue contaminant levels appears to be declining.



For grading, the A-B break point was set at 80%, a level at which 80% of fish caught have tissue contaminant levels below screening levels for human health concerns.

- Higher proportions of fish caught in South Bay were contaminated with PCBs (92%) than fish from Central Bay (81%) and San Pablo Bay (64%). Mercury contamination was more common in San Pablo Bay (68%) and South Bay (62%) than in Central Bay (38%)

- All striped bass, white croakers, shiner surfperch, and leopard sharks caught in the Bay exceeded the screening level for either PCBs or mercury.

Index Methods: The Fishable (catchable) Indicator was updated using data from 2002, 2003, and 2004. The Fishable (edible) Indicator was updated using data from 2003. The Swimmable Indicator was updated using data from 2003 and 2004, and revised slightly to reflect reported beach posting and closure data from a larger number of Bay beaches. The Drinkable Indicator was updated using data from 2004. The Index was calculated from indicator results from the most recent year available for each indicator. For additional information on data sources, methods, and calculations, see the Fishable-Swimmable-Drinkable Index Technical Appendix, available at www.bay.org/ecological_scorecard.htm.

Data sources: *Fishable (catchable)*: California Department of Fish and Game (Commercial Passenger Fishing Vessel database); *Fishable (edible)*: San Francisco Estuary Regional Monitoring Program for Trace Substances; *Swimmable*: State Water Resources Control Board, East Bay Regional Park District, County of Marin (Environmental Health Services Division), County of San Mateo (Health Department); *Drinkable*: California Department of Health Services (Drinking Water Quality Monitoring database).

STEWARDSHIP INDEX

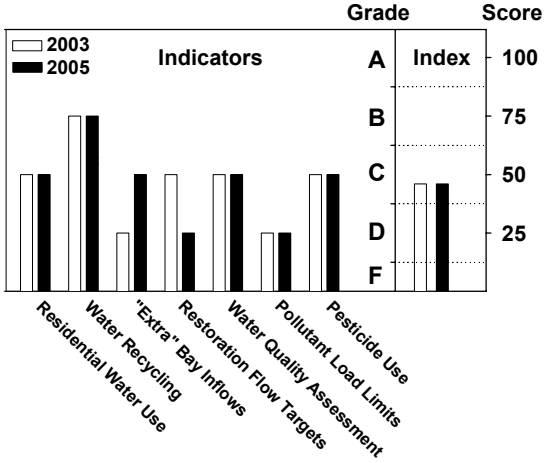
Grade: C-
Score: 46
Trends: long-term (25 years) = declining; short-term (5 years) = stable

The health of San Francisco Bay has been profoundly affected by human activities – reductions in freshwater inflow, loss of shoreline habitat, and inputs of toxic chemicals and alien species. Stewardship of the Bay involves more efficient use and reuse of current water supplies, adequate monitoring and evaluation of water quality conditions, and aggressive efforts to remedy the Bay's problems by such measures as reducing pollutant loads and increasing Bay inflow.

Key Findings

- Water use efficiency by Bay Area residents continued to increase but there is still significant room for improvement. In 2003, the average residential user consumed 91 gallons per day, compared to 95 gallons in 2001. This was still 38% more than the conservation target of 66 gallons per day.

- Use of recycled water increased 9% in 2004 but the total amount was just 75% of the reuse target for the year. By comparison, recycled water use in 2003 was at 90% of the target for that year, suggesting that recycling programs in the Bay Area are not keeping pace with regional water reuse goals.



The Stewardship Index uses seven indicators to measure residential water use, water recycling, management of the Bay's freshwater inflows, and efforts to monitor and control pollution of the Bay's water and habitats.

- In 2004, overall springtime freshwater inflows to the Bay were 88% greater than the minimum required to meet current water quality standards, an improvement compared to 2002 when spring inflows were 20% less than the minimum needed to maintain low salinity habitat. However, none of three freshwater inflow targets identified for restoring the Bay-Delta ecosystem were fully met.

- Water quality monitoring of creeks, lakes and wetlands within the Bay's local watershed area remains incomplete: 60% (compared to 56% in 2003) of the Bay's tributary creeks and just one third (no change from 2003) of the Bay's tidal

wetlands are monitored for ambient water quality. Funding to continue existing monitoring programs is uncertain.

- On average, government efforts to protect the water quality-impaired water bodies in the Bay region have completed little more than two of the eight steps necessary to adopt pollutant load limits. Since 2003, progress has been made on developing programs to control and limit two key pollutants – mercury and diazinon – that affect many of the Bay's water bodies. State and Federal regulators have not adopted any recommended pollutant limits for the high priority water bodies in the Bay region.

- In 2003, use of organophosphate pesticides, many of which being phased out for agricultural and non-agricultural use, declined to less than 20% of 1993 levels. However, use of pyrethroid insecticides, which replaced organophosphates but are more toxic to aquatic animals, has more than doubled during the past ten years.

Stewardship Index Summary

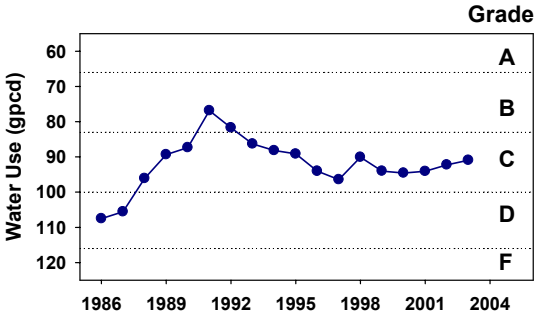
Indicator	2005 Result	2003 Grade	2005 Grade
Residential Water Use	91 gallons per person per day, 38% more than conservation target	C (2)	**C (2)**
Water Recycling	Water reuse is just 75% of target	B (3)	**B (3)**
"Extra" Bay Inflows	88% more than minimum needed to maintain low-salinity habitat	D (1)	**C (2)**
Restoration Flow Targets	None of the three restoration flow targets fully met	C (2)	**D (1)**
Water Quality Assessment	40% of Bay water bodies still not monitored; funding to continue existing programs uncertain	C (2)	**C (2)**
Pollutant Reduction Status	Still no pollutant load limits implemented, and on average only two of eight phases completed	D (1)	**D (1)**
Pesticide Use	Organophosphate use down but use of pyrethroid is up	C (2)	**C (2)**
Index Grade (grade point average)		C- (1.86)	**C- (1.86)**
Index Score (out of 100)		46	**46**

Highlighted Indicator – Residential Water Use

In the San Francisco Bay Area, most water is used by urban residential, commercial, industrial, and institutional users, as compared to the agricultural use that dominates the Bay's Central Valley watershed. Residential use is the factor most directly controlled by individuals and families, whose decisions to conserve water in and around the home can collectively create large-scale benefits. More efficient water use can reduce costs for transporting, storing, and treating water supplies, as well as for developing new water sources. It can also reduce both ecologically harmful water diversions from streams and pollutant loads from irrigating lawns, gardens and crops.

- In 2003, Bay Area residents used an average of 91 gallons per person each day (gpcd), an improvement in efficient water use compared to the average 95 gpcd used in 2000. However, this amount was still 38% greater than the conversation target of 66 gpcd.

- Compared to the years before the 1987-1992 drought, when Bay Area residents used an average of 106 gpcd (1986-1987), water use efficiency has improved, although not to the degree measured at the end of the drought (1990-1992 average: 79 gpcd). Following the drought, per capita water increased steadily until the late 1990s, a trend that was not reversed until the last few years.



For grading, the A-B break point was set at the conservation target of 66 gallons per person per day (gpcd), assuming full implementation of currently available water efficient devices for indoor use and a 20% reduction in average outdoor use (for 2000). The D-F break point was set at 116 gpcd, the hypothetical average daily residential use without any conservation.

- Residential water use is lowest in San Francisco (61 gpcd) and highest in the hotter inland areas with more extensive irrigated landscapes (134 gpcd).

Index Methods: The Residential Water Use and Pesticide Use indicators were updated using data for 2002 and 2003. The "Extra" Bay Inflows and Restoration Flow Targets indicators were updated using data for 2003 and 2004. The other three indicators were updated using data through 2005. The Index was calculated using indicator results from the most recent year available for each indicator. The Residential Water Use Indicator for the 2001-2003 period was calculated using data that covered somewhat fewer Bay Area residents (4.9-5.7 million people for the 1986-2000 period compared to 4.3 million people for the 2001-2003 period). The Recycled Water Use Indicator was revised to include new data from earlier years and recalculated and regarded for the 1998-2004 period. The Pesticide Use Indicator was revised and regraded for the 1993-2004 period using a new lower reference condition based on the 1993-1995 average use for each of the four types of pesticides evaluated. For additional information on data sources, methods, and calculations, see the Stewardship Index and its accompanying Endnotes in the 2003 San Francisco Bay Index, available at www.bay.org/ecological_scorecard.htm.

Data sources: *Residential Water Use*: California Department of Water Resources (Public Water System Survey), Marin Municipal Water District, Contra Costa Water District, East Bay Municipal Utility District, Alameda County Water District, San Francisco Public Utilities Commission, Zone 7 Water Agency, Santa Clara Valley Water District, Bay Area Water Users Association; *Water Recycling*: State Water Resources Control

Board (Recycling Water Survey), Bay Area Regional Water Recycling Program; *"Extra" Bay Inflows* and *Restoration Flow Targets*: California Department of Water Resources (Dayflow), CALFED Bay-Delta Program (Ecosystem Restoration Program Plan); *Water Quality Assessment* and *Pollutant Reduction Status*: State Water Resources Control Board; San Francisco Regional Water Resources Control Board; San Francisco Estuary Regional Monitoring Program for Trace Substances; and *Pesticide Use*: Pesticide Action Network.

THE BIG PICTURE

Alarm Bells For The Upper Estuary

San Francisco Bay is really four bays. The upper bays, Suisun and San Pablo, are most influenced by freshwater flows from the estuary's main tributary rivers, the Sacramento and San Joaquin. Further downstream, Central Bay is dominated by ocean conditions outside the Golden Gate. Lagoon-like South Bay receives some freshwater flows from local streams but is more affected by Central Bay and marine conditions.

The San Francisco Bay Index measures conditions of the whole Bay, but many of its component indicators are based on data that are collected at numerous locations throughout the estuary. As evidenced by the indicators shown here, some parts of the Bay are faring more poorly than others.

The Bay's upper reaches – San Pablo and Suisun Bays – are in serious trouble. Populations of native fish and other aquatic organisms, from the bottom to the top of the food web, have crashed. Invasive, non-native plant and animal species have taken hold in greater numbers than elsewhere in the Bay. As the upstream, "freshwater" part of the estuary, these two bays are most highly influenced by conditions in the Bay's watershed. Declining freshwater inflows from large-scale water development throughout the watershed are closely linked to declines in the upper Bay's health, and the problem is magnified by agricultural runoff, urban and industrial pollution, loss of habitat, and the loss of food organisms and fish to giant Delta pumps that move water to the San Joaquin Valley and Southern California facilities.

In contrast, the Bay's lower reaches – Central and South Bays – are healthier. The lower Bay, the more marine part of the estuary is more influenced by ocean conditions outside the Golden Gate, and therefore less vulnerable to problems occurring in the Bay's watershed. In addition, large scale habitat restoration programs and improvements in controlling pollutant discharges have helped increase native fish and wildlife populations, and non-native invasive species are less prevalent.

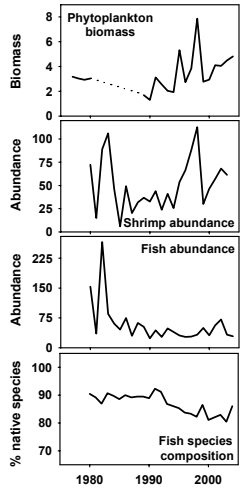
Alarm Bells For The Upper Estuary

The Bay Institute

Ecological Scorecard
2005 San Francisco Bay Index

The San Francisco Bay Index measures conditions of the whole Bay – but not all regions in the estuary are faring equally well. The indicators below measure current ecological conditions compared to ten and twenty years earlier for each of the Bay's four regions.

San Pablo Bay



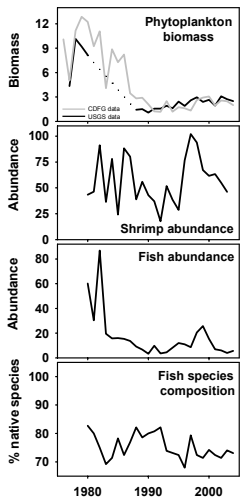
Grade: C
Phytoplankton biomass up 34%

Grade: B
Shrimp populations variable but down 20% since 1980s

Grade: D
Native fish populations down 63%

Grade: B
83% of fish species are native but alien species increasing

Suisun Bay

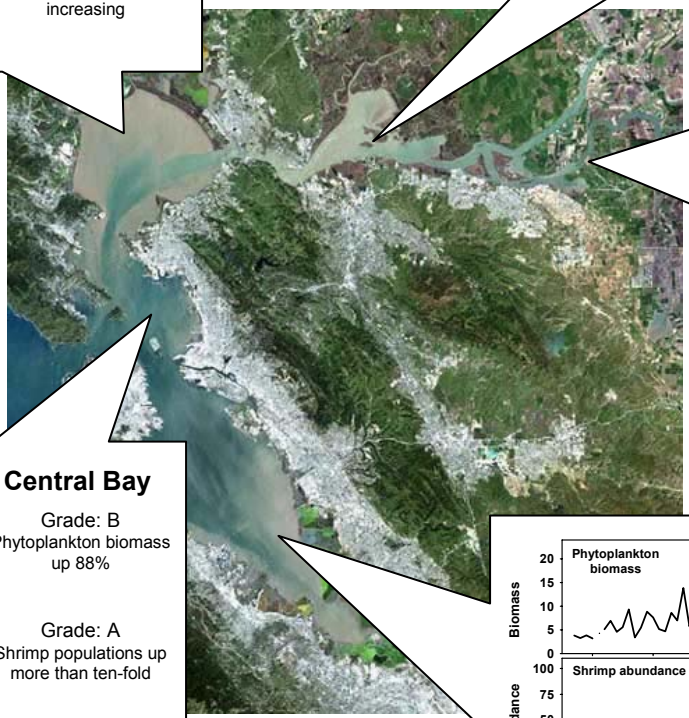


Grade: D
Phytoplankton biomass down 70-80%

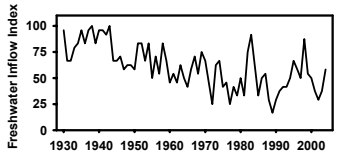
Grade: B
Shrimp populations variable but comparable to 1980s

Grade: F
Native fish populations down 82%

Grade: C
73% of fish species are native to the Bay

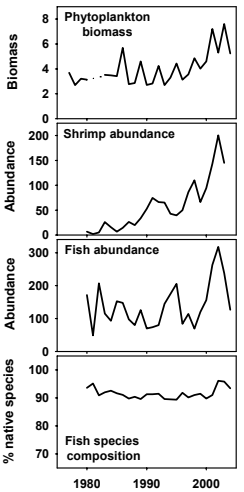


Freshwater Inflow



Grade: C
Inflow conditions improved in 2004 but 2000-2004 average worse than in 1980s and 1990s

Central Bay



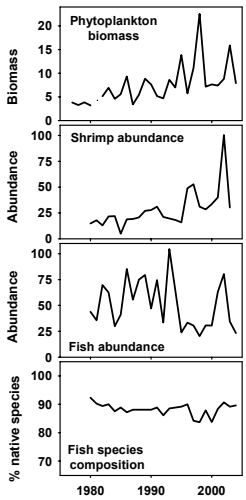
Grade: B
Phytoplankton biomass up 88%

Grade: A
Shrimp populations up more than ten-fold

Grade: A
Native fish populations up 73%

Grade: B
93% of fish species are native species

South Bay



Grade: B
Phytoplankton biomass up 169%

Grade: D
Shrimp populations increasing but low in 2003

Grade: B
Native fish populations variable but comparable to 1980s

Grade: B
90% of fish species are native to the Bay

Data sources: CA Department of Water Resources (Freshwater Inflow); CA Department of Fish and Game/Interagency Ecological Program (Phytoplankton [Suisun Bay], Shrimp, and Fish); U. S. Geological Survey (Phytoplankton)

5 Things To Do

The Five Most Important Things You Can Do To Improve The Bay's Grades

1. Be a smart water user. Fix leaks, replace inefficient toilets and washing machines, and switch to less water-intensive plants in your lawn and garden. Start by contacting your local water district or www.h2ouse.org.
2. Don't pollute the Bay. Use safe substitutes for household and lawn chemicals, adopt greener cleaning and gardening methods, and properly dispose of all toxic materials. The Pesticide Advisor (www.panna.org/resources/advisor.html) is a good place to begin.
3. Restore your local habitat. Join a community group helping to clean up and restore wetlands, streams and shorelines in your area. A listing of some of these groups is available at www.aoinstitute.org/creekcontacts.html. More about wetlands restoration projects can be found at the San Francisco Bay Joint Venture website (www.sfbayjv.org).
4. Keep rivers flowing to the Bay. Support the Bay Institute and other organizations in the Environmental Water Caucus that are working to reduce the amount of water diverted from the Bay's watersheds and improve how water supplies are managed throughout the state. Visit www.bay.org to read TBI's *The Year in Water* Report and learn about our initiatives to increase river flows and San Francisco Bay inflows, including the restoration of the second biggest river to the Bay, the San Joaquin, which now runs dry in several places.
5. Vote for the environment. Track politicians' voting records, and support legislation and ballot measures to protect the Bay. You can get the lowdown from the California League of Conservation Voters at www.ecovote.org.

CONTRIBUTORS and ACKNOWLEDGEMENTS

The 2005 Bay Index was prepared by three staff scientists at The Bay Institute (TBI):

Christina Swanson, Ph.D. (fisheries biology; principal author)
Anitra Pawley, Ph.D. (aquatic ecology)
Peter Vorster (hydrology)

The Ecological Scorecard project is managed by Gary Bobker, TBI Program Director. Important data gathering and analytical assistance for the 2005 edition was provided by Emily Allen, TBI intern, 2004-2005 and Ann Dickinson, TBI communications manager.

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