Welcome To San Francisco Bay

John Bourgeois, Wetland Ecologist

Valley Water
Clean Water • Healthy Environment • Flood Protection

South Bay Salt Pond Restoration Project
Restoring the Wild Heart of the South Bay

CHARG
“A good day’s bag.”
CONVERSION TO SALT PONDS, 1850s to 1950s:

SOUTH BAY CIRCA 1850

- Deep bay / channel
- Shallow bay / channel
- Total bar / intertidal channel
- Beach
- Total unburnt marsh / channels and panels
- Total unburnt marsh with sea detail
- Willow grove (asphalt)
- UNSC topographic maps, circa 1960
- 19th-century whaling
- Creek
- Undersea shellmound (approximate locations)
- Tidal jetties

1:62,500 SCALE
approximately 1 inch per mile

SALINAS BECOME SALT PONDS

Salt mining was a major, traditional activity. While the Chinese, then the Spanish, after the Americans, harvested salt from the tidal and coastal areas, the salt ponds became a major industry. Crystal Salt Pond, shown in a map of 1904, was eventually closed and abandoned, resulting in the 1907 construction of a new salt pond, with a capacity of 4,000,000 gallons. The salt was packed into 100-pound bags and shipped by rail to San Francisco.

LIFE BETWEEN TWO SLOWS

Where the South Pacific Coast Railroad crossed Mission Bay in 1871, the original mudflats and sloughs, the bridges swing over to allow the sloughs to flow freely. The railroad cutters were wooden boats, and the cutters were manned by men who lived in the area. They were known as "the slough cutters," and they worked the mudflats and sloughs, living in small houses and cabins. The area is now known as "the Sloughs."
SAN FRANCISCO BAY PROJECT -- THE REBER PLAN

FRESH WATER LAKE

EARTH AND ROCK DAM
600 FT WIDE
4 MILES LONG

AIRPORT

FLOOD CONTROL SPILLWAY

SUBMARINE BASE SITE

NAVAL ANCHORAGE

ANGEL ISLAND

TORPEDO BOAT

BASE SITE

SHIP LOCKS

GATE

SAN FRANCISCO

OUTLINE of the San Francisco Bay Project conceived by John Reber is here shown. New jobs to be created by hydraulic fill are indicated in red, while the rock quarries which might be secured in provide underground storage space for gasoline and munitions, and connected trenches are shown in the gray shading.

SEE STORY ON PAGE 51
Why Should I Care?
Wetlands Provide:

- Fish and wildlife habitat
- Recreation/aesthetics
The San Francisco Bay hosts millions of shorebirds and waterfowl during migration.
~7.5 million people
Wetlands Provide:

- Fish and wildlife habitat
- Recreation/aesthetics
- Water quality improvement
### ESTUARY HEALTH SCORECARD 2019

<table>
<thead>
<tr>
<th>INDICATOR</th>
<th>STATUS AND TREND</th>
<th>AT A GLANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRESHWATER FLOW</td>
<td>![ESTUARY]</td>
<td>Freshwater flows in the Estuary have been highly altered, causing reductions in inter-annual and seasonal variability, and peak-flows. Freshwater flows into the Estuary in recent years reflect chronic artificial drought conditions, in sharp contrast to unimpaired flows.</td>
</tr>
<tr>
<td>TIDAL MARSH</td>
<td>![BAY] ![DELTA]</td>
<td>Tidal marsh acreage throughout the Estuary has declined significantly from the historical amount, but restoration efforts are bringing back this critical ecosystem and associated benefits. Projects in the Bay are making extensive contributions to tidal marsh area, while efforts in the Delta are beginning to make progress towards regional goals.</td>
</tr>
<tr>
<td>FISH</td>
<td>![BAY] ![DELTA]</td>
<td>The condition of fish communities varies across the Estuary. In the lower Estuary, fish communities are abundant, diverse, and dominated by native species. However, in the brackish and freshwater upper Estuary, native fish communities are in poor condition. Based on long-term monitoring data, native fish communities across the Bay are declining. In San Francisco and San Pablo Bays, this long-term data set is from sampling only the offshore areas of the Bay and may not reflect benefits to fish populations from recent wetland restoration.</td>
</tr>
<tr>
<td>BENEFICIAL FLOODS</td>
<td>![BAY] ![DELTA]</td>
<td>The frequency, magnitude, and duration of floodplain inundation in both the Bay and the Delta are too low to support healthy estuarine habitats and sustain important ecological processes. While conditions have been variable over time, they have, in general, remained poor in the Delta and have declined in the Bay.</td>
</tr>
<tr>
<td>URBAN WATER USE</td>
<td>![BAY] ![DELTA]</td>
<td>In both the Bay and Delta, total and per-capita urban water use have declined over the last several decades, despite growing populations. More efficient urban water use means that both regions met and exceeded benchmarks for per-capita use and drought-reduction targets. The regions have modestly increased water use since the end of the drought but still maintained improvements over their 2020 benchmarks for reductions in per-capita use.</td>
</tr>
</tbody>
</table>

### LEGEND

<table>
<thead>
<tr>
<th>STATUS</th>
<th>TREND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>Improving</td>
</tr>
<tr>
<td>Fair</td>
<td>No Change</td>
</tr>
<tr>
<td>Poor</td>
<td>Declining</td>
</tr>
<tr>
<td></td>
<td>Mixed</td>
</tr>
</tbody>
</table>
Wetlands Help Filter Contaminants

How wetlands work

- Source: Utah State University
Wetlands Provide:

- Fish and wildlife habitat
- Recreation/aesthetics
- Water quality improvement
- Flood storage
- Shoreline protection
Marshes Can Grow

Sea-level rise  
Natural marsh adaptation  
Marsh expansion/retreat  
Dike reinforcement
**Levee Adjacent to Open Water**

- Wave runup
- 100-year high water level
- Open Bay or Managed Pond

**Levee Adjacent to Tidal Marsh**

- Reduced wave runup due to wave attenuation
- 100-year high water level
- Tidal Marsh
- Marsh vegetation and shallower water conditions (from sedimentation) dissipate wave energy
- Smaller levee crest elevation required due to reduced wave runup
“horizontal levee”
Challenges
SEA LEVEL *rise* FOR CALIFORNIA

- HIGH
- PROJECTION
- LOW

you are here

0 ft
2.5 ft
5 ft

2000
2020
2040
2060
2080
2100
Dumbarton Bridge concentration

Mid-depth SSC at Dumbarton Bridge,
Water year median and interquartile range,
1993-2016

* 2012-2013 data gap due to bridge construction
Innovation
Rethinking Policies
To Fit A Changing Reality
WHAT WE CAN DO

• Restore complete systems, including processes

• Restore soon, in areas marshes are likely to persist

• Plan for the Baylands to migrate
Investment
- $12/year parcel tax
- $500 million over 20 years
- Passed with >70% approval
Partnerships
Thank you!

-John Bourgeois, Valley Water, jbourneois@valleywater.org