

# The Benthos BioGuide: A Guide to Abundant Benthic Organisms in the San Francisco Estuary

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## What is the Benthos Bioguide?

The *Benthos BioGuide* is a web-based tool providing scientific information about the biology and ecology of benthic species present in the upper San Francisco Estuary. This program element also complements the IEP Environmental Monitoring Program (EMP) benthic community composition and abundance data which has been collected since 1975.

## Benthos Bioguide Project Objectives

- Provide a single comprehensive resource on the benthos monitored by the EMP in the upper San Francisco Estuary and make this information more easily accessible.
- Produce an up to date and user friendly web-based guide with links to other IEP/EMP programs and studies.
- Improve and ensure quality of long-term consistency of EMP benthos data and analyses by encouraging peer review of the program and *Benthos Bioguide*.
- Facilitate integration of benthos data for more comprehensive ecological assessments by providing readily available, detailed information, visual images, etc.
- Provide pertinent information for analysis of long term changes in the benthic community.
- Provide an important QA/QC tool for identification of benthic species in the San Francisco Estuary.

## Methods for Developing the Benthos Bioguide

We initially plan to create informational guides for forty of the most abundant benthic organisms collected by the EMP. These will include both the most commonly collected species and those of special concern or interest. We will later create pages for most other species that are collected by our program.

## Poster Objectives

We would like to solicit recommendations to help make the *Benthos Bioguide* a more valuable resource for the general public and scientific community. These include improving the information provided or enhancing identification tools as shown in the following *Benthos Bioguide* Web Page Template and Web Page Sample.

Questions or comments can be directed to Rachel Barnett at [rbarnet@water.ca.gov](mailto:rbarnet@water.ca.gov).

## Benthos BioGuide Web Page Template

**Scientific Name**  
**Common Name(s)**

### Picture

Photograph taken of collected organism.

### Reference Collection Code:

(IEP Relational Database) Code that identifies each species in the database including a link to the database.

### Taxonomic Identification

**Phylum:**  
**Class:**  
**Subclass:**  
**Order:**  
**Superfamily:**  
**Family:**  
**Genus:**  
**Species:**

### Drawing

Generalized drawing of the organism illustrating key structural features.

### Life Stages

Basic life cycle stages.

### Identification

Detailed description on the identification of the organism including information on similar species. *Scientific terms* will be linked to the *Benthic Bioguide* glossary page.

### Reproduction

Key elements in the reproductive cycle.

### Behavior

Organism behavior with the surrounding environment.

### Food Web Analysis

Organism position in the food web including predator-prey interactions.

### Environmental Requirements in San Francisco Estuary

Basic habitat requirements in the San Francisco Estuary.



Map of current monitoring sites courtesy of Marc Vayssières

Current EMP sampling sites where the organism has been found are indicated by a ★

### Species Status in San Francisco Estuary

Information on organism origins and their benefits or threats to the surrounding environment and/or to humans.

[References](#) [Internet Links](#) [Glossary](#) [Additional Information](#)

## Benthos BioGuide Web Page Sample

*Corbula amurensis* Schrenck, 1861  
Asian Clam, Chinese Clam, Overbite Clam



Photograph taken by Lisa A. Salvaran

**Reference Collection Code:** 6890  
(IEP Relational Database)

### Taxonomic Identification

**Phylum:** Mollusca  
**Class:** Bivalvia  
**Subclass:** Heterodonta  
**Order:** Myoida  
**Superfamily:** Myoidea  
**Family:** Corbulidae  
**Genus:** *Corbula*  
**Species:** *amurensis*

### Life Stages

Egg → trochophore larvae → veliger  
→ spat → adult

### Reproduction

Individuals are **dioecious**. **Gametogenesis** usually occurs in fall. Fertilized eggs are released into water (16-20°C) and **settlement** occurs after 30 to 40 days. May have several **reproductive events** depending on environmental conditions.

### Behavior

**Infaunal** burrowers, leaving one third to one half of the shell exposed for feeding purposes. They move vertically to utilize the sediment-water interface.

### Food Web Analysis

Filter feeds on **diatoms** and **nauplii** of **copepods**. Predators include diving birds (Scaups and Scoters), Dungeness Crabs and White Sturgeon.

### Environmental Requirements in San Francisco Estuary

Habitat is predominantly subtidal, some intertidal mudflats. Substrate is all sediment types, most abundantly mud-sand bottoms. Salinity is freshwater (<1ppt) to saline (32.6 ppt). Temperature range is 8°C to 23°C.

### Identification

Small clam (maximum size = 27.5mm). Shell is thin and **ovate**, white, tan or yellow in color. Shell is **equivalve** with the left **valve** being smaller, flat and drawn into the larger more swollen right valve. Prominent **external keel** and **umbonal keel** on the **posterior** end of the left valve extending to the **ventro posterior margin**. Fine **striae** present on older specimens. **Siphons** are brown. The incumbent siphon bears **pinnate tentacles**, the ecurrent siphon has **non-pinnate tentacles** which bear two long **medial filaments**. The entire **mantle** is fringed with **papillae**. The **pallial sinus** is very small.



Map of current monitoring sites courtesy of Marc Vayssières

### Species Status in San Francisco Estuary

First introduced around 1986. Native to China, Japan and Korea. Though non-threatening to humans, has caused significant reduction in phytoplankton density in the San Francisco Estuary since its introduction.

[References](#) [Internet Links](#) [Glossary](#) [Additional Information](#)