RESEARCH VESSEL SAN CARLOS

TECHNICAL STATS

Length: 56ft Beam: 18ft

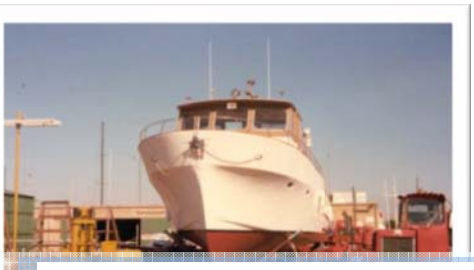
Draft: 4.5ft Weight: 48 tons

HISTORY

In 1976 the "San Carlos" set out on her maiden voyage from her birth place in San Diego, CA, to the San Francisco bay. She was custom built as a research vessel for DWR by the Campbell Yacht Company to provide a platform from which to perform scientific research and monitoring in the San Francisco bay and Sacramento-San Joaquin delta. As California's population grew it became more important to maintain water quality standards in the delta, so as to provide safe and reliable fresh water for Californians while protecting the fragile and unique delta ecosystems. SWRCB Resolution 78-43 of 1978 introduced a comprehensive set of standards to be maintained throughout the bay-delta and outlined mandated monitoring to ensure these standards were being maintained. Monitoring is now mandated by State Water Right Decision D-1641, and requires water quality, phytoplankton, zooplankton and benthic macro-invertebrate monitoring. While she makes her home in Antioch, CA, the San Carlos has been cruising the bay-delta, actively involved in the mandated monitoring and special studies, for over 3 decades.

San Carlos, in San Diego, CA, during construction

Installation of the twin diesel motors



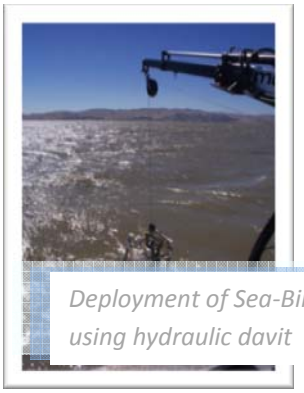
R/V San Carlos ready to be launched for the first time

SAMPLING

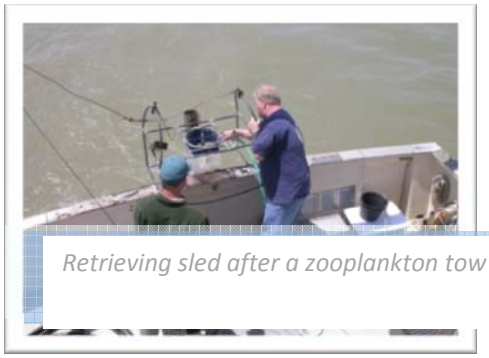
The San Carlos is powered by twin V8 Detroit diesel model 92 engines and has a top speed of 11.5 knots. The vessel's aft deck is outfitted with 2 hydraulic winches, helping to deploy and retrieve tow nets and sleds, used for collecting zooplankton and fish samples. A hydraulic davit, mounted on the roof of the lab, is used for the deployment of a benthic PONAR dredge and a Sea-Bird water quality profiler. Water quality parameters recorded include: water temperature, specific conductance, dissolved oxygen, pH, and chlorophyll florescence. The San Carlos is equipped with an analytical laboratory, allowing for the crew to process many of the samples collected during her sampling runs, including filtering stations for chlorophyll and nutrients, and a Winkler titration station used to assess dissolved oxygen levels. While strip charts that once recorded water quality parameters are still in place, computers now record and store data allowing for more accurate and fine scale readings.

Winkler titration for dissolved oxygen

Special studies throughout the years have also called on the San Carlos to provide an onsite lab, as well as a base station for crews working on overnight and multi-day sampling. Equipped with a galley, bunkhouse, and head, she provides some comforts to a crew looking for a reprieve from the weather or a quick nap. As with the rest of the vessel her once modern galley, while still in place, has been replaced with a microwave and hot water kettle.



Deployment of Sea-Bird using hydraulic davit



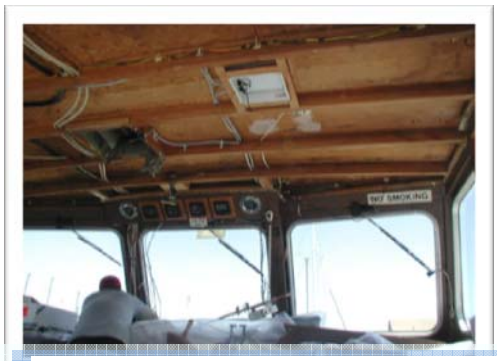
Retrieving sled after a zooplankton tow

PONAR dredge after grabbing a benthic sample

The San Carlos mother ship during 24 hour studies

UPGRADES

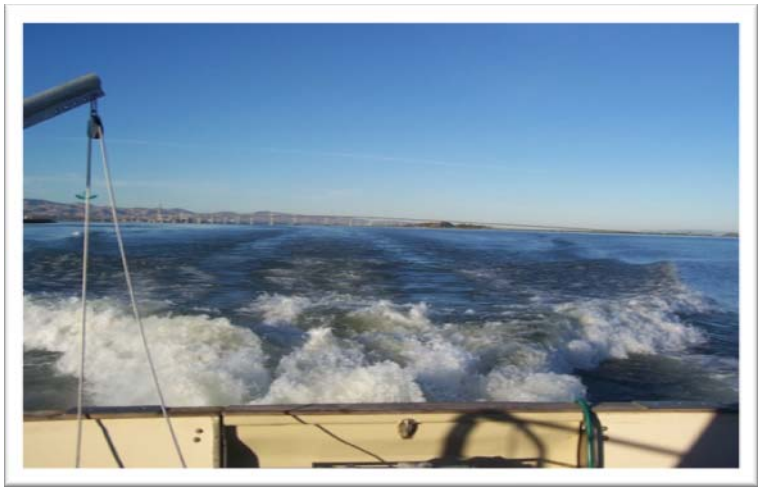
As we move into a new decade we are faced with more challenges and questions surrounding the status of the delta. It is vital that we continue to update our sampling methods and gear so as to provide the best quality scientific data. During her 30 year tenure the San Carlos has been retrofitted with many upgrades and undergone extensive maintenance. In 1992 she received her first major refurbishment with the replacement of her diesel engines. In 2004 she was dry-docked and received a major overhaul. All above-deck structures were upgraded or replaced, including the wheelhouse and onboard lab. New sensors were installed in her hull to allow for more modern electronics to enhance the monitoring runs. The vessel's radar, electronics, and deck machinery received upgrades where possible. As we rely more on electronics and digital sampling devices the San Carlos's electrical circuits are now at their maximum capacity and need to be replaced. The vessel is out on sampling runs most weeks of the year and her 18 year old motors have accumulated 15000 hours of running time and are due to be replaced.



The 2004 overhaul included replacement of the above ground structure

The bridge is now equipped with modern radar, GPS, and auto pilot

One of the diesel engines receiving major maintenance

Future

As California grows, it is imperative that water quality in the Sacramento-San Joaquin Delta continues to be monitored using the best available scientific methods, so as to help improve and maintain a healthy aquatic ecosystem as well as remain a safe and reliable source of water for Californians. In order for reliable sampling to continue constant periodic upgrades are going to be required to keep the vessel running safely and remain an effective research platform.