
5th National Conference on Ecosystem Restoration
NCER 2013

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Goals for Resource Management

- CALFED Act of 2007 directed USACE to address resource management issues in the Delta with California Department of Water Resources
- Surface water modeling framework developed to support planning efforts to meet co-equal goals for sustainable resource management
  - Ensure availability of abundant clean water supply for municipal and agricultural uses
  - Restoration and maintenance of ecological resources
EFDC Overview
Environmental Fluid Dynamics Code (EFDC)

- Hydrodynamics
- Water Quality
- Sediment Transport
- Toxics
- Sediment Diagenesis
Delta Water Quality Model

- 16,510 horizontal cells
- Four vertical layers
- 2003-2004
- Tides: Carquinez Strait
- 6 Rivers (USGS)
- 5 Pump stations
- 4 Structures
- 15 Wastewater Plants
Sediment Bed
TOC & TON
(Pilon, 2006)
10 Sediment Diagenesis Zones
Water Quality Calibration Validation Stations 2003-2004
TSS (Surface)
Mallard Island
2004

RMS=12.6 mg/L; Relative RMS Error=14%
Wind Waves & Sediment Transport

- Improved simulation of sediment transport for shallow water and wind wave mixing
- Help design structures: breakwater, storm surge barriers, manage wetlands
- Help design physical or vegetative barriers to reduce sediment suspension & wave action
Wind Effects: Suisun Bay

TSS without wind-waves
Dissolved Oxygen (Surface) 2003
P8-Stockton Deep Channel

RMS = 1.6 mg/L; Relative RMS Error = 22%
Dissolved Oxygen
Ammonium (Surface) C3A – Sacramento R 2003-2004

RMS=0.07 mg/L
Relative RMS Error=11%
Ammonium Profile: July 2003
Ammonia Profile: Sacramento River
Findings

- Bay-Delta hydrodynamic model - good agreement with water level, salinity & water temperature
- Delta WQ model - TSS and most WQ variables show reasonable agreement with observed data
- Delta WQ model reasonably depicts key large scale water quality transport & processes
- Delta hydrodynamic/WQ model linked to lower trophic level model (CASM) to describe interaction of flow, transport, salinity & WQ on food web resources
Summary

- Model framework provides US Army Corps of Engineers, other State/Federal/local agencies and Stakeholders with advanced modeling tool for resource planning & restoration evaluations.
- Public investment by USACE in the Bay-Delta & Delta EFDC models can be leveraged to support State/Federal/Local regulatory, policy and ecological restoration efforts.
Discussion

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