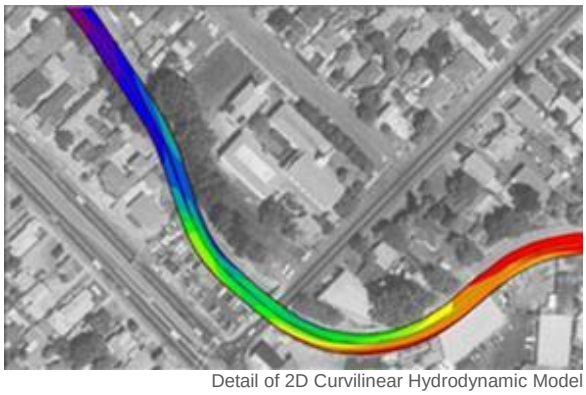

Detail of 2D Curvilinear Hydrodynamic Model

Client: **Alameda County Flood Control and Water Conservation District, Hayward, California**

Services Provided:

- ✓ Hydraulic modeling
- ✓ Sediment transport
- ✓ River morphology
- ✓ Curvilinear hydrodynamics
- ✓ Fish passage modeling
- ✓ Flood simulation (1D & 2D)
- ✓ Tidal exchange
- ✓ Levee breaching and restoration

Project Objective

The Alameda County Flood Control and Water Conservation District (District) is responsible for flood control and levee work and owns and maintains several flood control channels. One of these channels is a twelve-mile-long flood control channel that crosses the San Francisco Bay Plain in southern Alameda County. The Alameda Creek Federal Project (ACFP) constitutes the channelization and partial realignment of the lower reach of the larger Alameda Creek drainage system. The lower four miles of this channel cross the Eden Landing complex of salt ponds and have accumulated a significant amount of sediment. Excess sedimentation has reduced the capacity of the channel to carry its design flow. The District wanted to understand the potential impacts of various upstream activities such as the removal of the Sunol and Niles dams in 2006 and the operations of two rubber dams on the transport and deposition of sediment. Based on previous work, an alternative was recommended to allow flood flows to spill from Alameda Creek into adjacent salt ponds. The overall desired effect would be to restore the tidal flushing action and scour in the channel by creating an optimal system of levee breaches that minimizes channel deposition, maximizes flood control, and restores habitat.

The District also wanted to understand the potential impacts of breaching levees on lower Old Alameda Creek (OAC). Proposed levee breaching of the ACFP flood control channel in conjunction with levee breaching on OAC is likely to have profound impacts on both OAC and salt ponds north of the creek. Preliminary modeling of the flood control facility indicated there is potential flooding in areas adjacent to the channel. In addition, excessive sedimentation of the lower reaches of the creek reduced the capacity of the creek to carry design flows. The District wanted to investigate alternatives for reducing or eliminating flooded areas and feasible solutions to reduce sedimentation problems downstream. While with a previous employer, Dr. Robert Annear of Geosyntec was responsible for leading the team of hydraulic and sediment transport modelers and sub-consultants to develop and investigate the impacts of various management and restoration alternatives. The project included the following tasks:

- Data analysis for incorporation with hydraulic and sediment transport modeling
- 1-D and 2-D hydraulic flood modeling (MIKE FLOOD)
- Salt pond restoration alternatives analysis
- Reservoir hydrodynamic and sediment transport modeling
- Low flow fish passage analysis
- Levee breach impact analysis
- River morphological modeling using MIKE 21 C
- Documentation and information/technology/knowledge transfer

Notable Accomplishments

This complex project was conducted in close coordination with the client and regulatory agencies to ensure numerous project objectives were successfully met.