Integrated Modeling of Estuarine Systems: Lessons for the Sacramento-San Joaquin Delta

Peter Goodwin, Jay R. Lund, Josué Medellín-Azuara, Christopher Enright, Benjamin Bray

California Water and Environmental Modeling Forum
March 20, 2016
Authors Team

- Robert Argent, Bureau of Meteorology Melbourne, AU
- Jiro Ariyama, California Delta Stewardship Council
- John F. Bratton, Limnotech
- Jon Burau, US Geological Survey
- Michael Chotkowski, US Geological Survey
- Alvar Escriva-Bou, Public Policy Institute of California
- Joseph Lee, Hong Kong University of Science and Tech.
- Steve Lindley, US Geological Survey
- Michael McWilliams, Delta Modeling Associates & AnchorQEA
- Scott Peckham, University of Colorado
- Nigel Quinn, Reclamation, L. Berkeley National Laboratory
- David Senn, San Francisco Estuary Institute
- Stuart Siegel, Siegel Environmental
- John Wolfe, Limnotech
- Integrated Environmental Management of Estuarine Systems Symposium Participants

http://integratedmodeling.ucdavis.edu
White Paper Integrated Modeling Estuarine Systems

Integrated Modeling of Estuarine Systems: Lessons for the Sacramento-San Joaquin Delta

Josué Medellín-Azuara, Jay Lund, Peter Goodwin, Christopher Enright, Benjamin Bray, Robert Argent, Jiro Ariyama, John F. Bratton, Jonathan Burau, Michael Chotkowski, Alvar Escriva-Bou, Joseph Lee, Steve Lindley, Michael McWilliams, Scott Peckman, Nigel Quin, David Seru, Stuart Siegel and John Wolfe

February 22, 2017

Summary

Complexity in estuarine systems calls for integrated and community-based approaches for using and developing models and data. Environmental and hydrodynamic models have helped organize and extend knowledge and predictions for physical, biological, and chemical aspects. However, specialization has often steered science and management to fragmentation among models, data, and management of estuarine systems. Integration of models and data in platforms that increase collaboration, interdisciplinary work, organization and transparency have been successful in other systems.
A Delta Modeling Collaboratory

- Physical location
- Minimum staff
- Venue for collaborative work
- Model repository
- Conceptual model development
- Forum for problem solving:
  - algorithms,
  - data infrastructure,
  - web service interface
## A Business Case

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Current Practice</th>
<th>Proposed Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial costs and financing</td>
<td>Project specific</td>
<td>Economies of scale for general capability and staff for specific project,</td>
</tr>
<tr>
<td>Fragmentation and inefficiency</td>
<td>Costs of fragmented modeling high</td>
<td>Reduce fragmentation</td>
</tr>
<tr>
<td>Maintaining capabilities</td>
<td>Costly for entities to maintain</td>
<td>Lower costs distributed across entities</td>
</tr>
<tr>
<td>Timeframe of information</td>
<td>Drawn out, discussion on details, small group</td>
<td>Common models</td>
</tr>
<tr>
<td>Integrated understanding</td>
<td>Discipline specialization</td>
<td>Multidisciplinary</td>
</tr>
<tr>
<td>Prioritizing model and data</td>
<td>Difficult to achieve</td>
<td>Coordination committee</td>
</tr>
<tr>
<td>Access to modeling expertise</td>
<td>Institutional barriers</td>
<td>Broad access, available resources, rapid to deploy</td>
</tr>
<tr>
<td>Building and retaining long term talent</td>
<td>Limited career paths, misalignments, mentoring</td>
<td>Opens career path, collaboration to build expertise supports agency program</td>
</tr>
</tbody>
</table>

[http://integratedmodeling.ucdavis.edu](http://integratedmodeling.ucdavis.edu)