Outline

- Assumptions and guiding principles
- Portal development roadmap
- Case studies
- CA Wetland Monitoring Workgroup used as model
Assumptions and Principles

- Organize around decisions and core motivating questions
- Identify and directly engage target audiences/users
- Meet technical and institutional challenges together
- Develop and implement portals in phases
- Identify a global point of entry to organize access
Organize Around Decisions/Questions

- Data warehouses vs. organized portals
- Need to
  - Prioritize key datasets
  - Improve resolution, credibility
  - Relieve users of job of sorting and evaluating
- Technical tools alone not enough
## Organize Around Decisions

<table>
<thead>
<tr>
<th>Decision category</th>
<th>Management decision or activity</th>
<th>Ocean information needed for decisions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public health: CA Dept. Public Health</strong></td>
<td>Open/close commercial shellfish growing and harvesting / recreational shellfishing to assure that shellfish are safe for human consumption.</td>
<td>Do domoic acid and PSP toxin concentrations in shellfish exceed safe limits?</td>
</tr>
<tr>
<td></td>
<td>Issue public health advisories and warnings</td>
<td>Is there a threat to human health?</td>
</tr>
<tr>
<td><strong>Marine wildlife health: CA F&amp;W, marine wildlife rescue organizations</strong></td>
<td>Determine potential HAB impacts on living marine resources and ecosystems</td>
<td>Are animal mortalities due to HABs?</td>
</tr>
<tr>
<td></td>
<td>Focus watch efforts and recovery resources for rapid response to strandings</td>
<td>What is the probability of HAB formation in a specific location and time? What is current location, spatial extent, and future movement of bloom? When will the HAB dissipate?</td>
</tr>
<tr>
<td></td>
<td>When to release wildlife back to environment</td>
<td>What are current phytoplankton levels and community composition? Are toxic species present? What is current location, spatial extent, and future movement of bloom? When will the HAB dissipate?</td>
</tr>
</tbody>
</table>
Identify and Engage Audiences

- Independently designed portals much less effective
  - Lesson learned by Council and others
- Data, information must be delivered in ways directly useful to specific users/audiences
  - Anthropological perspective
- Link to existing and/or pending decisions essential
  - Information in a vacuum not interesting or useful
- Three audience categories
  - High-level policy makers and stakeholders
  - Agency and NGO managers
  - Scientists
Combine Technical/Institutional

- Simple access to broad universe of data/information not enough
- Answering core questions requires coordination/integration across institutional boundaries and barriers (silos)
  - Priorities, goals, values, scale, standards can all differ
  - Common motivation, payoff often lacking
  - Resources to surmount “energy” threshold often missing
Apply Phased Development

- Need to understand taxonomy of portals
  - Data catalogues
    - Collection of data sets, links
    - Simple search function
  - Data portals
    - Thematic organization linked to decisions, concerns
    - Simple interactivity, metadata, data policies/standards
    - Structured participation
  - Analysis and assessment portals
    - Targeted data integration, assessment tools
    - Run more complex comparisons, stream real-time information
Four Generic Phases

1. Access to program description and loosely organized data, information
2. Access to management questions and related validated data, information
3. Coordinated indicators, methods, QA/QC, assessment endpoints, reporting
4. Automated assessment and real-time data presentation

Programmatic and portal aspects to each phase
Identify Global Point of Entry

• Problem
  • Huge range of data, information sources for each issue
  • Portals often emphasize search/access capacity but ignore data resolution and QA/QC
  • User has responsibility for searching across platforms, assessing reliability, and creating information

• Solution
  • Single, global point of entry to priority, authoritative data and information
Flexible Entry Points

- Workgroups should decide structure, presentation, data access/integration, external links
- However, apply three key design principles
  - Allow for future adaptation and expansion
  - Avoid attractive dead ends that close off future options
  - Tune presentation to needs of multiple audiences
Portal Development Roadmap

- Identified ten priority issues
- Defined strategic approach
- Suggested management/governance structure
- Presented three case studies
Ten Priority Issues

<table>
<thead>
<tr>
<th>Protected areas &amp; water quality</th>
<th>Seafood consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ocean acidification</td>
<td>Anadromous fishes</td>
</tr>
<tr>
<td>Harmful algal blooms</td>
<td>Oil spills</td>
</tr>
<tr>
<td>Marine debris</td>
<td>Facility siting</td>
</tr>
<tr>
<td>Swimming safety</td>
<td>Fisheries</td>
</tr>
</tbody>
</table>

- All have web-based information system of some sort
- None include capabilities defined by scoping group for effective decision making
- Authoritative information available to support portal development for all issues
- Many evaluated by Council in 2008; 5 included in OPC’s 2011 evaluation of observing systems
Strategic Approach

- Adopts Council’s strategic emphasis on workgroups
  - Bring key audiences together with monitoring & assessment specialists
  - Venue for identifying priorities/questions, highlighting information, addressing institutional hurdles
- Workgroups require programmatic support
  - Governance, relationships, funding
  - IT infrastructure, data policies/standards
  - Standardization, coordination, reporting, assessment
Generic Governance

- Use Council’s existing process
- Separate workgroups within overall governance structure
- Common accountability and coordination
- Workgroups are locus for collaboration, coordination, surmounting institutional boundaries

Diagram:
- Managing entity (e.g., Council)
- Other agencies
  - Council Data Management Workgroup
  - Oceans Workgroup
    - Protected areas / water quality workgroup
      - Subgroups
    - OA workgroup
      - Subgroups
    - HABs workgroup
      - Subgroups
Three Case Studies

- Three highest priorities
  - Protected areas & water quality
  - Harmful algal blooms
  - Ocean acidification

- Differ in terms of
  - Management/regulatory maturity
  - Monitoring and database coordination
  - Access
  - Availability of integrated assessment tools
Protected Areas & Water Quality

- OPC evaluation of discharges is basis for portal design
- Separate monitoring/databases for water quality, MPAs, ASBSs
- Regionally coordinated monitoring and data access
- Protocols identify authoritative data
- Some assessment tools exist, others being developed
- Structural differences reflect differing goals
- OPC priority provides impetus
- S CA pilot integrated assessment is framework
Protected Area Opportunities

- Improve regional coordination, raise visibility
- Wider access to data/info, integrated assessment tools
- Promote coordinated methods and regional assessments, including on living resources
- ID/prioritize data gaps (small POTWs, loads, plumes)
## Protected Area Workgroup

<table>
<thead>
<tr>
<th>Management agencies</th>
<th>Fish catch (CA Dept. Fish &amp; Wildlife)</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Water Board</td>
<td>Oceanographic data (OOSes)</td>
</tr>
<tr>
<td>CA Dept. Fish &amp; Wildlife</td>
<td>Conservation, public interest</td>
</tr>
<tr>
<td>Regional Water Boards</td>
<td>Heal the Bay</td>
</tr>
<tr>
<td>NOAA Fisheries</td>
<td>CA Waterkeeper organizations</td>
</tr>
<tr>
<td>Ocean Protection Council</td>
<td>Comm/rec fishing organizations</td>
</tr>
<tr>
<td><strong>Monitoring/assessment entities</strong></td>
<td><strong>Data management/portal design</strong></td>
</tr>
<tr>
<td>MPA Monitoring Enterprise/OST</td>
<td>Council data management group</td>
</tr>
<tr>
<td>MS4 monitoring (CASQA)</td>
<td>Ocean Science Trust</td>
</tr>
<tr>
<td>POTW monitoring (CASA)</td>
<td>SCCWRP</td>
</tr>
<tr>
<td>Regional monitoring (SCCWRP, Reef Check)</td>
<td></td>
</tr>
</tbody>
</table>
Harmful Algal Blooms

- OPC evaluation is basis for portal design
- Well known human, wildlife health impacts
- Statewide monitoring network; some web access
- Emerging collaborative effort, e.g., NOAA remote sensing
- National NOAA HAB program provides context and some guidance
- S CA pilot to develop 3D biological-geochemical model
HAB Opportunities

- Improve linkages to programmatic, water quality, oceanographic data
- Raise visibility to improve program support
- Improve coordination, validation of key monitoring (e.g., nutrients)
- Strengthen link to other ecosystem issues; fill related data gaps
- Improve predictive and tracking capability

Southern California: An ideal place to study anthropogenic versus natural nutrient sources

- Are the relative magnitudes of anthropogenic and natural nutrient sources similar?
- Are anthropogenic nutrients enhancing primary production, algal blooms and HABs?
# HAB Workgroup

<table>
<thead>
<tr>
<th>Management agencies</th>
<th>Researchers &amp; modelers</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA Dept. Public Health</td>
<td>Conservation, public interest</td>
</tr>
<tr>
<td>State Water Board</td>
<td>Heal the Bay</td>
</tr>
<tr>
<td>Ocean Protection Council</td>
<td>CA Waterkeeper organizations</td>
</tr>
<tr>
<td>Monitoring/assessment entities</td>
<td>Commercial/rec shellfish orgs.</td>
</tr>
<tr>
<td>CA Dept. Public Health</td>
<td>Data management/portal design</td>
</tr>
<tr>
<td>Wildlife rescue groups</td>
<td>Council data management group</td>
</tr>
<tr>
<td>MS4 monitoring (CASQA)</td>
<td>Ocean Science Trust</td>
</tr>
<tr>
<td>POTW monitoring (CASA)</td>
<td>SCCWRP</td>
</tr>
<tr>
<td>Regional monitoring (SCCWRP, CCLEAN)</td>
<td>HABMAP</td>
</tr>
<tr>
<td>Oceanographic data (OOSes)</td>
<td></td>
</tr>
</tbody>
</table>
Ocean Acidification

- Emerging state priority, likely large implications
- WCGAOH priority provides impetus
- NOAA OA Program and plan provides guidance
- Int’l R&D programs provide context
- No existing regulatory/management frameworks
- Authoritative data and information readily available
- Developing methods provide basis for coordination
OA Opportunities

- Identify common questions to guide research, monitoring
- Support development of standardized methods
- Catalyze development, integration of monitoring networks & assessment frameworks
## OA Workgroup

<table>
<thead>
<tr>
<th>Management agencies</th>
<th>Conservation, public interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Water Board</td>
<td>Heal the Bay</td>
</tr>
<tr>
<td>NOAA (e.g., PMEL)</td>
<td>CA Waterkeeper organizations</td>
</tr>
<tr>
<td>Ocean Protection Council</td>
<td>Commercial/rec shellfish orgs.</td>
</tr>
<tr>
<td><strong>Monitoring/assessment entities</strong></td>
<td><strong>Data management/portal design</strong></td>
</tr>
<tr>
<td>Oceanographic data (OOSes, CalCOFI..)</td>
<td>Council data management group</td>
</tr>
<tr>
<td>Methods development (C-CAN)</td>
<td>Ocean Science Trust</td>
</tr>
<tr>
<td>MS4 monitoring (CASQA)</td>
<td>SCCWRP</td>
</tr>
<tr>
<td>POTW monitoring (CASA)</td>
<td>OOSes</td>
</tr>
<tr>
<td>Researchers &amp; modelers</td>
<td></td>
</tr>
</tbody>
</table>