Healthy Stream Initiative

- Protect high quality streams
- Protect threatened streams from degradation
- Set restoration goals for impaired streams

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SWAMP

Surface Water Ambient Monitoring Program
SWAMP: Required by AB 982

- Comprehensive state program (surface water)
- Coordinate all Board ambient water quality monitoring Programs/projects
- High Quality Data (Quality Assurance)
- Comparable data
- Accessible
SWAMP Strategy

Comprehensive Monitoring and Assessment Strategy to Protect and Restore California’s Water Quality

10 Elements of a State Monitoring & Assessment Program:
- Strategy
- Objectives
- Design
- Indicators
- Quality Assurance
- Data Management
- Data Analysis and Assessment
- Reporting
- Peer Review
- Program Support and Infrastructure

Biological Indicators
# SWAMP Planning Matrix

<table>
<thead>
<tr>
<th>Water Body Type</th>
<th>Aquatic Life</th>
<th>“Swimmable”</th>
<th>“Fishable”</th>
<th>“Drinkable”</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wadeable Streams</strong></td>
<td>SWAMP Perennial Streams Survey (2005 – ongoing)</td>
<td>SWAMP-funded monitoring summary (2007-08)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Large Rivers</strong></td>
<td>EPA Flowing Waters Study (2008-2010)</td>
<td>SWAMP-funded monitoring summary (2007-08)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Coastal Waters, Bays &amp; Estuaries</strong></td>
<td>ASBS / SQOs</td>
<td>Clean Beach Program</td>
<td>SWAMP 2009-10</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Wetlands</strong></td>
<td>CRAM</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>
The Surface Water Ambient Monitoring Program

• SWAMP is a state framework for coordinating consistent and scientifically defensible methods and strategies for improving water quality monitoring, assessment, and reporting.
Building Comparability – Assessment Framework

- Common Indicators
- Common Assessment Thresholds (WQOs)
- Application Appropriate Methods
- Quality Assurance Program
- Database w/ metadata
- Information Exchange Network
- Tool Box and Training
- Help Desk
Integrating Across Scale and Regulatory Programs
Healthy Stream Initiative
Healthy Stream Initiative (HSI)

HSI is the set of physical chemical and biological objectives along with the programmatic tools to protect the streams of California

- Protect high quality streams
- Protect threatened streams from degradation
- Set restoration goals for impaired streams

Condition of wadeable perennial streams in CA
Healthy Stream Initiative is the set of physical chemical and biological objectives along with the programmatic tools to protect the streams of California.

### Objectives

<table>
<thead>
<tr>
<th>Chemical Objectives</th>
<th>Programmatic Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTR</td>
<td>- 305b and 303d Assessments</td>
</tr>
<tr>
<td>Basin Plan</td>
<td>- NPS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Toxicity Objectives</th>
<th>- NPDES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormwater</td>
<td>- Stormwater</td>
</tr>
</tbody>
</table>

| Biological Objectives | - 401 Certification; wetlands |
|-----------------------| - TMDLs |
| Perennial streams     | - Compliance/Enforcement |

| Habitat Objectives | - Antidegradation |
|--------------------| - Grant project effectiveness |
| Hydromodification  | - Water Rights impact assessment |
| Riparian Policy (phase 3) | |

### SWAMP Assessment Framework:

- Indicator Development (assessment tools)
- Perennial Stream Survey (background condition)
- Reference Condition (expectation - what should be)
- Statewide Pollution Trends (chemistry; toxicity)
Healthy Streams Initiative to protect physical, chemical and biological integrity of streams

- Chemical Measurement
  - Compliance with water quality objectives
- Toxicity tests
  - Affect on aquatic life
  - Pollutant identification (TIEs)
- Biological
  - Affect on aquatic communities
  - Effectiveness of actions
- Physical
  - Habitat degradation

Existing tools to interpret chemistry and toxicity
New tools needed to interpret on biology and alterations to physical habitat
Healthy Streams Initiative - Biology
Provide tools to protect and restore streams

- Perennial Streams Assessment
  - Flow (hydromodification)
  - Status and trends in biological condition
  - Associations with stressors
- Indicator Development
  - Stream invertebrates
  - Algal metrics
  - Wetland
- Reference Condition
  - Provides insight into natural conditions and sets expectations for biological metrics

Roughly 50% of streams have biological condition that is different from reference (link to PSA report or fact sheet)
Healthy Streams Initiative - Physical
Provide tools to protect and restore streams

- Hydromodification
  - Stream Channel Modification
    - Channelization/Channel Modification
      - Dams and Levees, Construction
      - Dams and Levees, Operation and Maintenance
      - Dams and Levees, Removal
  - Managing Hydromodification Impacts
    - Streambank and Shoreline Erosion
    - Flow and Temperature Maintenance
    - Low Impact Development (draft)
  - Education and Outreach
    - For Hydromodification

- Riparian Policy (Phase 3)
  - Protection of stream channel, bed and bank
  - Water quality objectives

Roughly 50% of streams have some form of habitat impairment
Healthy Stream Initiative – Assessment Framework

- Indicators - “bugs”; algae; phab. and CRAM
- Assessment Thresholds - Bio-objectives
- Appropriate Methods - SWAMP protocols
- Quality Assurance Program (March 2010)
- Database w/ metadata (March 2010)
- Information Exchange Network - CEDEN
- Tool Box and Training
- Help Desk
SWAMP Perennial Stream Survey
Landuse as a surrogate stressor

Agricultural and urban landscapes have degraded benthic invertebrate assemblages
Extent of Stream Resources in California

60% of California streams are non-perennial streams

Need tools to protect both perennial and non-perennial streams

Starting with HSI with focus on perennial streams

<table>
<thead>
<tr>
<th>Stream type</th>
<th>Miles</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perennial streams</td>
<td>64,438</td>
<td>30%</td>
</tr>
<tr>
<td>Non perennial streams</td>
<td>124,615</td>
<td>60%</td>
</tr>
<tr>
<td>Canals Ditches</td>
<td>22,059</td>
<td>10%</td>
</tr>
<tr>
<td>Total Stream miles</td>
<td>211,513</td>
<td>100%</td>
</tr>
</tbody>
</table>

Perennial streams by Watershed type

<table>
<thead>
<tr>
<th>Watershed type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forested watersheds</td>
<td>28%</td>
</tr>
<tr>
<td>(&gt;$75% forested land use)</td>
<td></td>
</tr>
<tr>
<td>Agricultural watersheds</td>
<td>12%</td>
</tr>
<tr>
<td>(&gt;50% ag land use)</td>
<td></td>
</tr>
<tr>
<td>Urban watersheds</td>
<td>2%</td>
</tr>
<tr>
<td>(&gt;25% urban land use)</td>
<td></td>
</tr>
<tr>
<td>Other watersheds</td>
<td>57%</td>
</tr>
<tr>
<td>(mixed land use)</td>
<td></td>
</tr>
</tbody>
</table>

Urban and Ag dominated watersheds are a small portion of perennial streams

These watersheds have
- poorer habitat quality
- poorer water quality
- more degraded biological condition

How do we protect streams in the mixed Watershed from the same fate?
Extent of stressors exceeding moderate thresholds

More than 40% of streams exceed this threshold for nutrients

Roughly 50% of streams have some form habitat impairment
Instream habitat/sediment degradation widespread in both urban and agricultural streams

Urban streams about 2% of population
- 85% have poor instream habitat
- 90% have excess fines
- 70% have high nitrogen (>0.6 mg/l)
- 90% have high chlorides

Ag streams about 12% of population
- 55% have poor instream habitat
- 75% have excess fines
- 60% have high nitrogen (>0.6 mg/l)
- 50% have high phosphorus
Where are high quality streams?

Where are streams at risk?

**Legend:**
- Reference
- Different from reference
- Very different

**Regional Map Features:**
- Mountain Regions
- Xeric Regions

**Urban**
- Agriculture
- Forested
- Other
Healthy Stream Initiative is the set of physical chemical and biological objectives along with the programmatic tools to protect the streams of California.

Objectives

Chemical Objectives
- CTR
- Basin Plan

Biological Objectives
- Perennial streams

Habitat Objectives
- Hydromodification
- Riparian Policy (phase 3)

Programmatic Tools

- 305b and 303d Assessments
- NPS assessment and restoration targets
- Permit monitoring
- 401 Certification
- Compliance/Enforcement
- TMDL targets
- Antidegradation

SWAMP Bioassessment Program

Perennial Stream Survey (background condition)
Indicator Development (assessment tools)
Reference Condition (expectation - what should be)