Progress to Date

- Planning calls with core project team (Laura Gabanski, Jon Marshack, Karen Larsen, and Terrence Fleming)
- Submitted draft Technical Approach
  - Input provided by HSP and WQMC
- Spoke with members of the HSP about available datasets for potential use in the California Healthy Watersheds Integrated Assessment
- Submitted draft List of Indicators
  - Input provided by HSP (last week)
- Looking ahead - working meeting planned for summer
Six Healthy Watersheds Attributes

1. Landscape Condition
2. Habitat Condition
3. Hydrologic Condition
4. Geomorphic Condition
5. Water Quality
6. Biological Condition

www.epa.gov/healthywatersheds
Scale

- California’s landscape is large and diverse
- PSA, EMAP, CMAP, and RCMP have characterized ecological conditions at broad scales
- California Healthy Watersheds Integrated Assessment focuses on smaller HUC12 watershed scale
  - Results can be rolled up into larger watersheds for reporting purposes
Selection of Indicators

- Need one or more indicators for each healthy watersheds attribute
- Field data, even those collected under probabilistic designs, are not sufficient for characterizing individual watershed scale
- Need to estimate indicator values for unmonitored watersheds
Statistical Models

- Build multiple linear regression models for estimating indicator values at unmonitored watersheds
- Example: Percent Sands and Fines = Percent Agricultural Land Use in Watershed + Stream Channel Slope + Mean Annual Precipitation
Ecoregional Differences

- Ecoregional patterns in the response of the indicator values will be investigated
- Different regression models may be built for each ecoregion
- Different subsets of indicators may be chosen for each ecoregion
# Proposed Indicators

<table>
<thead>
<tr>
<th>Landscape Condition</th>
<th>Habitat Condition</th>
<th>Hydrologic Condition</th>
<th>Geomorphic Condition</th>
<th>Water Quality</th>
<th>Biological Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Natural Land Cover in Watershed (N-Index)</td>
<td>Riparian Vegetation*</td>
<td>Indicators of Hydrologic Alteration*</td>
<td>% Sands and Fines*</td>
<td>Predicted Total Nitrogen*</td>
<td>O/E Macroinvertebrate Scores*</td>
</tr>
<tr>
<td>Landscape Connectivity</td>
<td>Stream Habitat Complexity*</td>
<td>Groundwater Stress</td>
<td></td>
<td>Predicted Total Phosphorus*</td>
<td>Wetland Biotic Structure*</td>
</tr>
<tr>
<td>Landscape Natural Disturbance Regime (% FRCC 1)</td>
<td>Stream Habitat Fragmentation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Indicators marked with an asterisk will be estimated with multiple linear regression models.
Index of Watershed Health

- All indicators will be normalized and scaled
- Input on weighting will be sought from Healthy Streams Partnership
- Sub-indices for each Healthy Watersheds Attribute will also be calculated
Input from HSP (2/22/2012)

- Ensure consistency with bio-objectives process
  - Working with Pete Ode to compare analysis methods and indicators
- Coordinate with Fraser Shilling to ensure no duplication of effort with his work
  - Made contact and have another call planned for next week
Input from HSP (2/22/2012)

- Include an additional indicator for geomorphic condition
  - Currently working with Eric Stein to incorporate “relative risk of geomorphic alteration” indicator through GIS-based modeling
- Include an additional indicator of high flows for hydrologic condition
  - Currently evaluating high flow metrics
- Validate the regression models using a couple of regional datasets
  - Great idea. Evaluating potential regional datasets for use