QUESTIONS FOR THE PANEL

- Is the approach technically sound?
- Can you provide additional advice for selecting case studies?
- Can you recommend improvements to the current strategy?

WHY CAUSAL ASSESSMENT?

- Not every stream is going to meet biological objectives
- When stream non-compliant, site-specific causes need to be determined for remediation
- Causal assessment approaches have not been well-vetted in California

PROJECT GOAL

- Conduct three case studies
- Produce a Guidance Document as a resource for stakeholders and regulatory agencies
- Provide recommendations for future activities
  - Optimize causal assessment designs for California
  - Distinguish tools that work (or don't work)
  - Identify data gaps or new tools that need to be refined/created

WE'RE LUCKY TO HAVE PARTNERS

- US EPA has, over the past 15 years, developed a causal assessment approach
  - www.epa.gov/CADDIS
- Conducted case studies in other states
  - biological impacts due to dissolved oxygen, sedimentation, habitat loss, temperature, and nutrients,
- EPA (ORD-National Center for Environmental Assessment) will be our project partner

CAUSAL ASSESSMENT EPA-CADDIS APPROACH

- Define the case
- List candidate causes
- Evaluate data from the case
- Evaluate data from elsewhere
- Identify probable causes

SELECTION CRITERIA FOR THE THREE CASE STUDIES

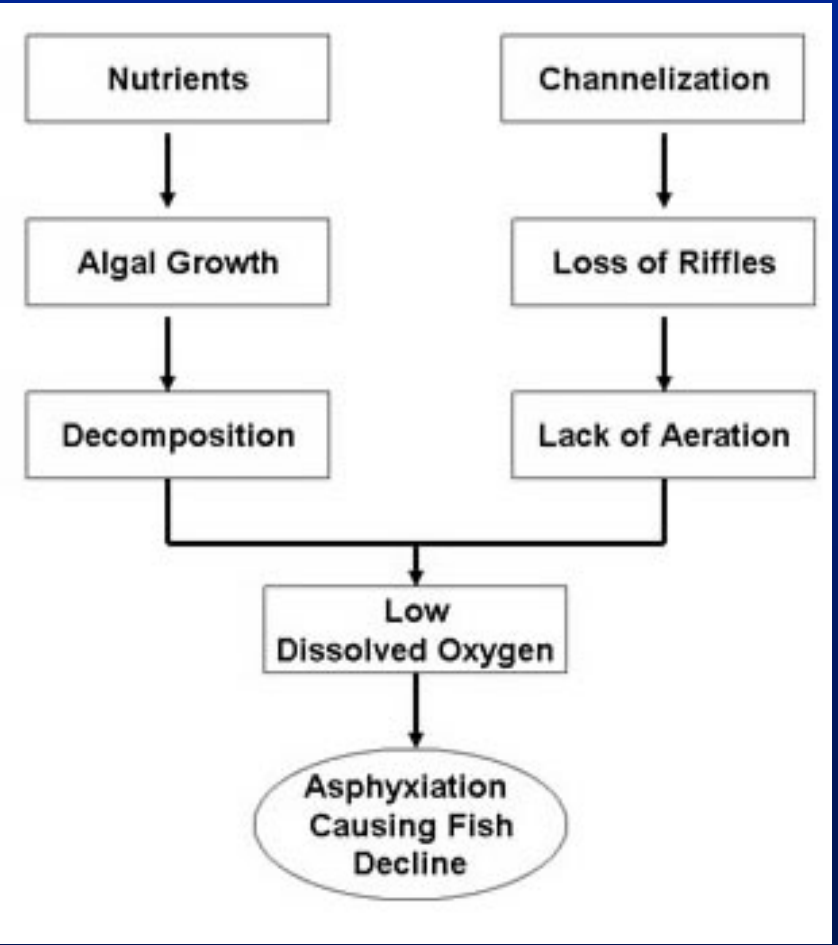
- Representativeness
- Stressor diversity and degree of biological impairment
- Availability of data
- Willing partners

1) DEFINE THE CASE

- Define the biological impairment
- Define geographic scope
- Define objectives of the assessment

2) LIST CANDIDATE CAUSES

- List candidate causes
- Create conceptual diagrams
- Identify linkages among candidate causes



3) EVALUATE DATA FROM CASE

- Data assembly and analysis
- Establish relations to candidate causes
- Create worksheets to synthesize information
- Assign data to evidence type
- Score candidate causes based on strength of evidence

TYPES OF EVIDENCE USED TO SUPPORT OR REFUTE A CANDIDATE CAUSE

- Spatial/temporal co-occurrence
- Exposure
- Biological mechanism
- Field based stress-response relationship
- Casual pathway
- Manipulation of exposure
- Laboratory tests of site media
- Temporal sequence
- Verified predictions
- Symptoms

4) EVALUATE DATA FROM ELSEWHERE

- Similar procedure for Evaluating Data From the Case: evidence is analyzed and scored
- Focused on gathering *INDEPENDENT* information
  - Laboratory experiments
  - Other studies in the region
  - Similar studies outside the region
- Especially looking for stressor-response associations

5) IDENTIFY PROBABLE CAUSES

- Table of summary scores
- Evaluate credibility and consistency
- Classify candidate causes
  - Refuted
  - Diagnosed
  - Probable
  - Unlikely
  - Uncertain

PROCESS AND SCHEDULE

- Form a Causal Assessment Team
  - EPA, SCCWRP, CDFG
- Each team member leads a case
  - With ongoing interactions
- Use a workshop format
  - Promotes regulatory and regulated stakeholder interactions

WORKSHOPS

- **Define the case, list candidate causes** — **Feb 2012**
  - All three cases together
  - Includes vested stakeholders
- **Evaluate data from the case and elsewhere** — **Jun 2012**
  - Each case individually
  - Includes vested stakeholders
- **Identify probable causes** — **Oct 2012**
  - All three cases together
  - Conducted in association with Sci Adv Group mtg

NEXT STEPS

- Sending out written workplan
- Review at the Science Advisory Group meeting
- Confirm case study locations