

# **CALIFORNIA'S COASTAL EMAP PROGRAM**

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**Southern California Coastal Water  
Research Project**

# COASTAL EMAP

- **Five year west coast-wide effort**
  - **Close coordination among California, Oregon and Washington**
  
- **Three habitats sampled**
  - **Estuaries (1999-2000)**
  - **Wetlands (2002)**
  - **Continental shelf (2003)**

# SAMPLING DESIGN

- **Stratified random sampling**
  - Approximately 80 sites per state, per year
- **Biology**
  - Benthic infauna
  - Wetland plants
- **Chemistry**
  - Sediment chemistry
  - Sediment toxicity
  - Fish tissue chemistry

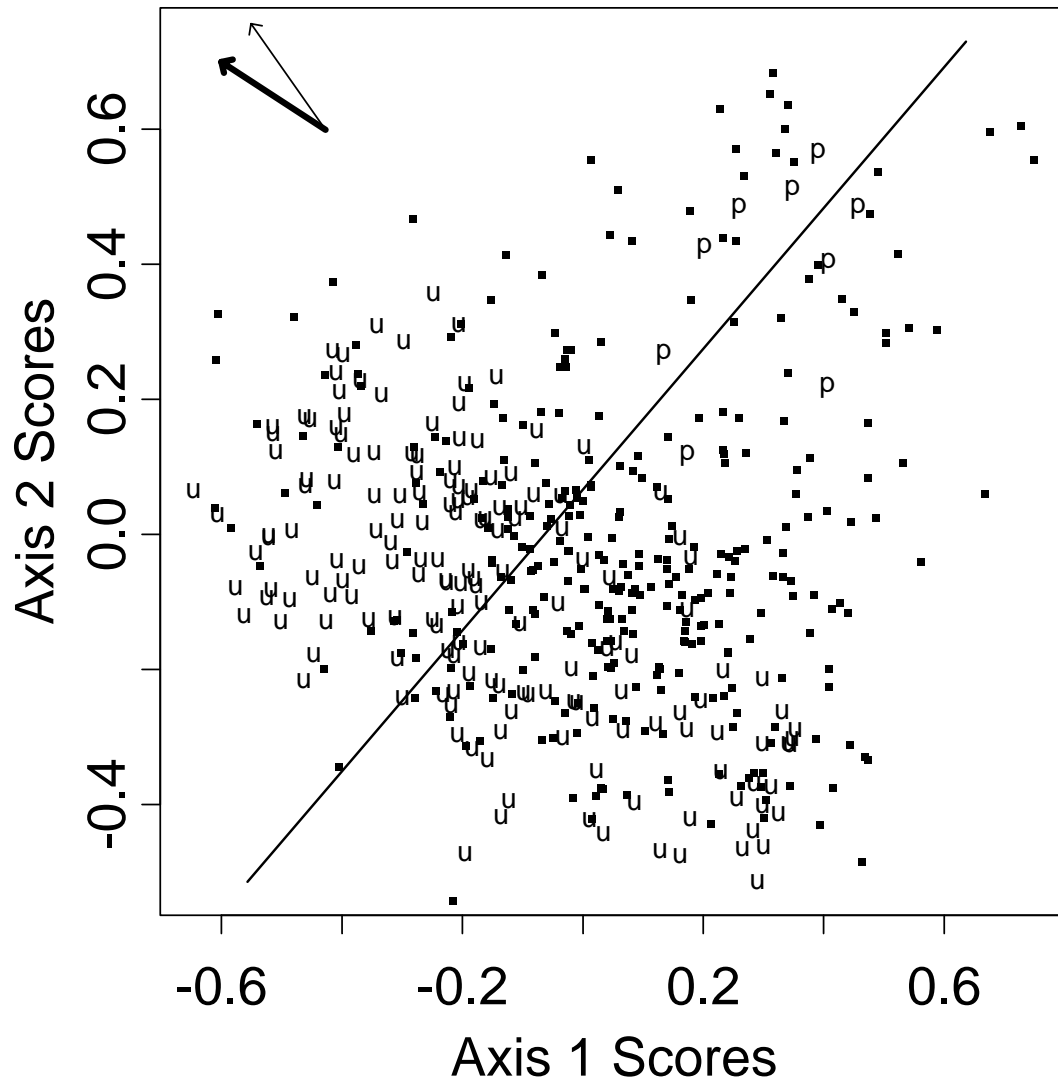
# BENTHIC INFAUNAL ASSESSMENT

- **Coastal EMAP is just beginning index development**
- **Building upon previous coastal efforts**
- **Most previous west coast marine benthic assessment tool development has taken place in California**
  - **Southern California Benthic Response Index**
  - **San Francisco Bay assessment**
  - **Bay Protection and Cleanup Program assessment**

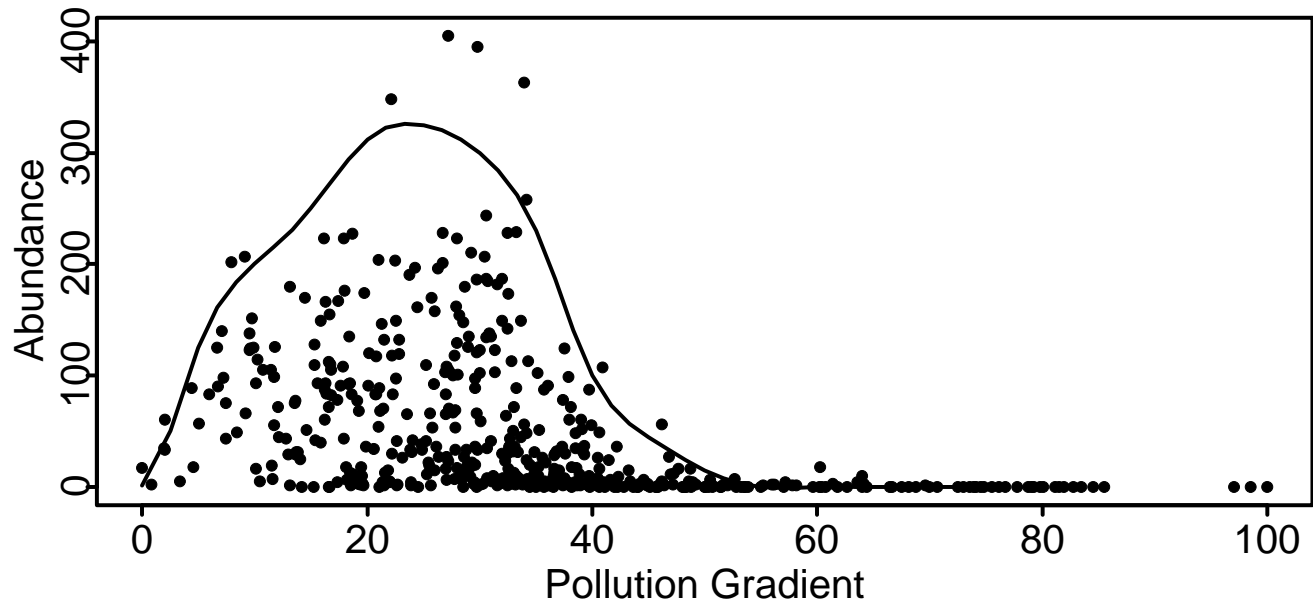
# SOUTHERN CALIFORNIA BENTHIC RESPONSE INDEX

- **Abundance–weighted pollution tolerance of species in a sample**
  - **Similar to the Hilsenhoff index from freshwater environment**
- **Unique part is how species tolerance scores are assigned**
  - **Based on principal coordinates analysis**

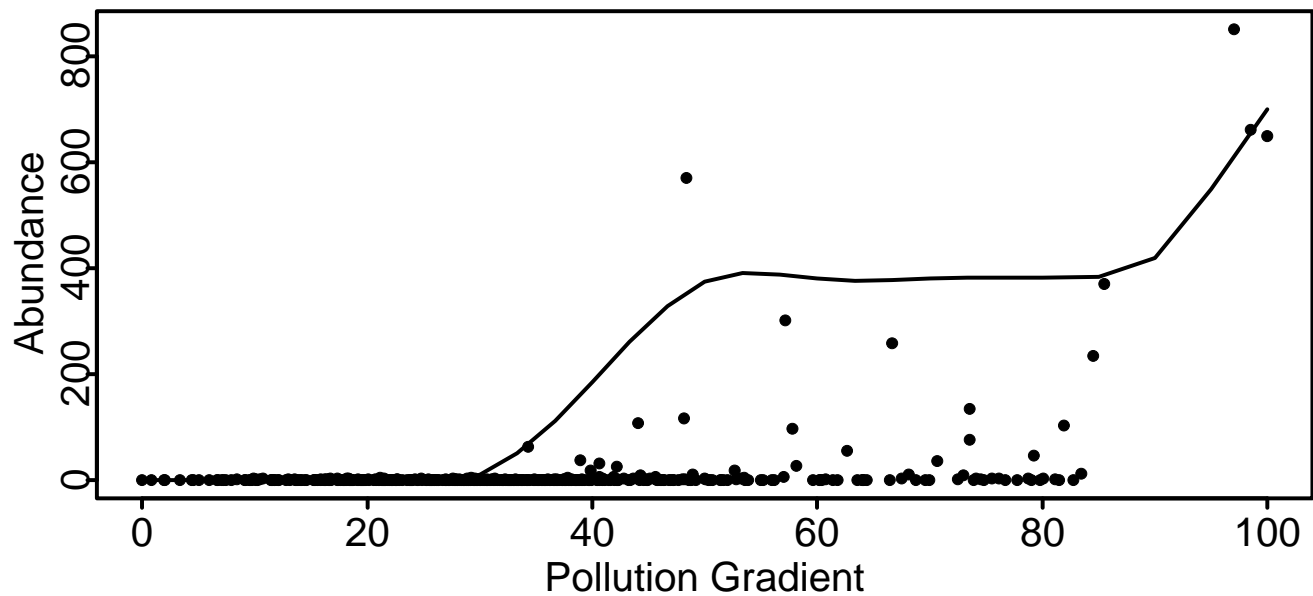
25 to 130 m  
Pollution Gradient



106. AMPHIODIA COMPLEX  $p = 24.7$



458. CAPITELLA CAPITATA COMPLEX  $p = 55.1$



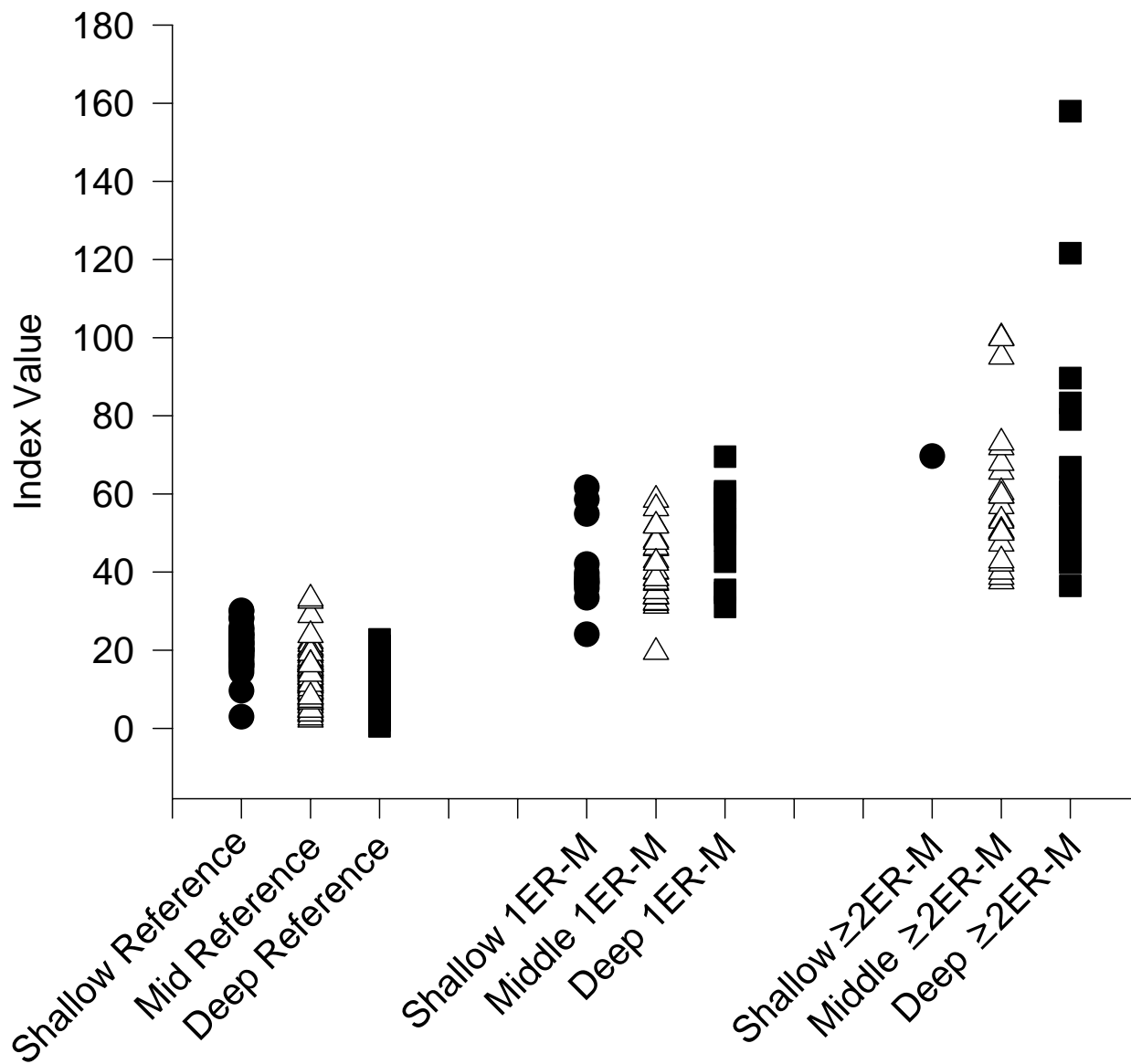
# WHY NOT USE THE ORDINATION GRADIENT DIRECTLY?

- **BRI is less complex**
  - **Can be calculated by biologists**
  - **Can be explained to managers**
- **Doesn't require re-calibration as new samples are collected**
- **Yields testable hypotheses about individual specie's tolerances**
- **Highly correlated with ordination gradient**
  - **Power of ordination with simplicity of Hilsenhoff approach**



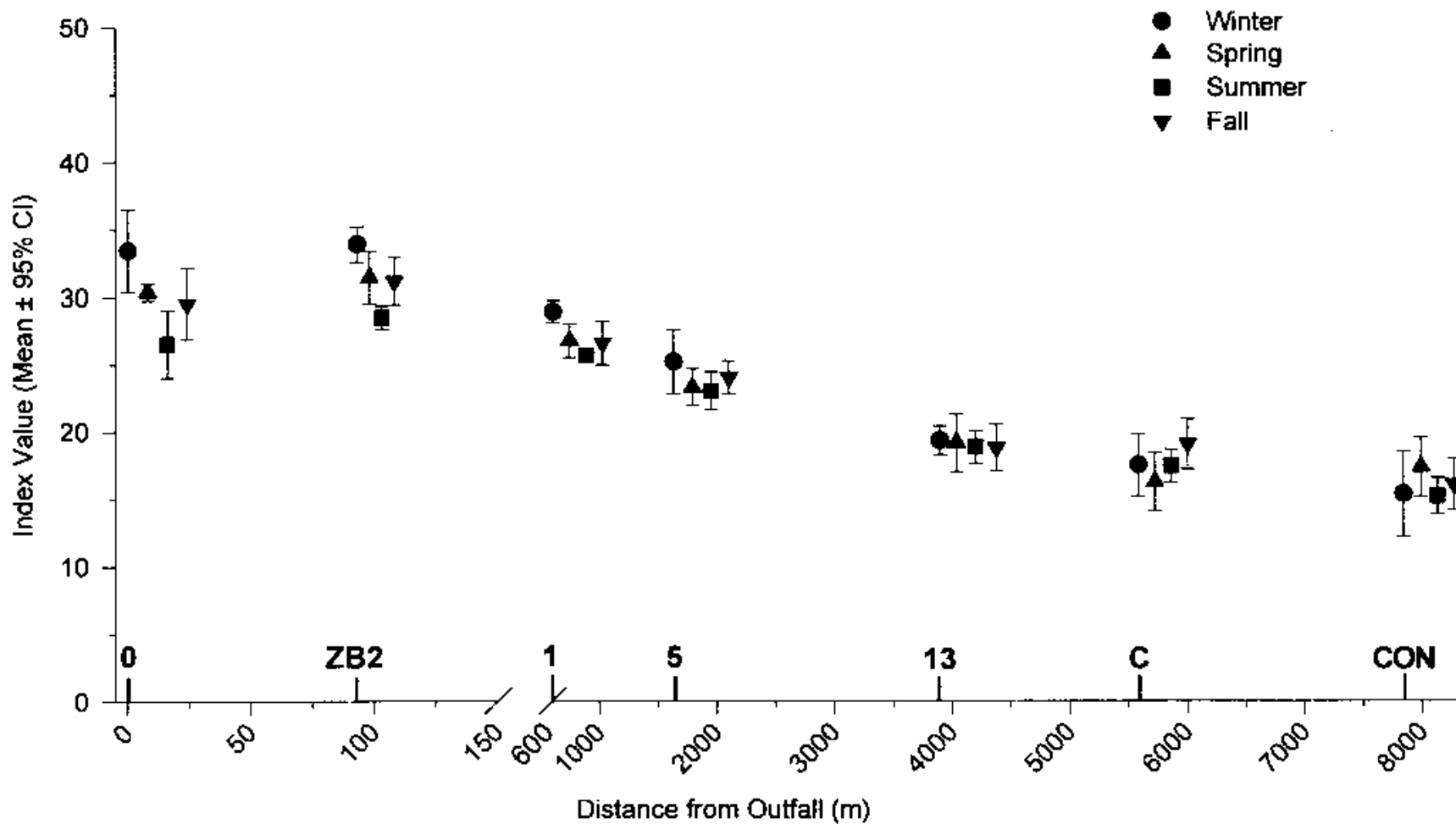
# FOUR TYPES OF VALIDATION

- **Does it correctly distinguish known impacted and reference sites?**
  - **Does it correlate with sediment chemistry and toxicity?**
- **Does it reproduce known spatial patterns?**
- **Does it reproduce known temporal patterns within a selected site?**
- **Are results reproducible across different habitats**
  - **Index is developed separately by habitat**
  - **Zone of overlap among habitats**



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# STATUS

- **Continental shelf index has been published**
  - Will be refined as additional data becomes available
- **Bays index developed, but needs more data**
  - Targeted sampling conducted this year
- **Expansion to other areas**
  - Planned intercalibration with San Francisco Bay assessment method
  - Evaluate stratification needs for entire west coast using EMAP data

# INTEGRATION WITH FRESHWATER EMAP

- **Not much happening**
  - It would be interesting to try the BRI approach in freshwater
  - More likely to happen through this group than through EMAP
- **Greatest opportunity is probably with wetlands**
  - Most upstream of coastal habitats
  - Wetlands grade naturally into streams
  - Freshwater wetlands border streams
- **Timing is right**
  - Efforts to develop wetlands assessment tools presently underway

## **SOME PRINCIPAL COORDINATES DETAILS**

- **Square root transform to reduce influence of dominant species**
- **Pollution gradient identified using canonical correlation analysis**