

ROADMAP

WATER QUALITY MONITORING AND TRENDS

- ESNERR water quality monitoring
- Examples of spatial and temporal trends from monitoring
- Local WQ improvement due to restoration
- Nutrient sources and loads: new perspectives

EFFECTS OF NUTRIENT LOADING ON THE ESTUARY

- Eutrophication assessment of the estuary
- Ecological studies of negative effects of eutrophication

 Eelgrass
 - Fish
 - Oysters
 - Salt marsh

TAKE HOME MESSAGES















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Signatures of Restoration and Management Changes in the Water Quality of a Central California Estuary Mass K. Ger. Kersin Wassia-Snan L. Shaw -

Reserved: 29 June 2009 /Revised: 9 August 2009 (Ascepted: 6 February 2010 \odot The Anthonyi 2010. This settide is published with open secons at Springerlink core

Abstract Coastal managers and policy-makers are concerned
with tracking improvements to water quality linked to
management changes. Long-term water quality data acquired
from two wethard areas in the upper reaches of the Eikhorn
Slough estuary in central California were analyzed for
signatures of land restoration or water control structure
management. Post-restoration averaged NO ₃ , NH ₃ , and PO ₄
concentrations were 50-70% less than before-restoration
concentrations. Assessment of watershed-scale effects
revealed that proximity of restoration to sampling locations
had almost as strong an effect on water quality as the
percentage of land restored relative to watershed size.
Results also suggest that restoration of even 1% of an
agriculturally intensive watershed such as that of the Elkhorn
Slough may result in improvements to water quality. Finally,
results indicate that tide gate function can dominate water
quality in managed wetlands and must be carefully tracked
and managered in the context of estauring conservation targets.
Research Research River and the Abstract Inc.

Tale pate management - Entrophication A. K. Ore (ED- K. Wasser S. L. Shaw-J. Haskins Elkano, Skopp Noticeal Entrance Research Reserve, Physical Sciences, Conf. 1975 1976 Elkano, Baok Monte of Marine Sciences, Science Sciences, Sci

Santa Craz, CA. 2004, USA K. Wassen Dapartnass of Euclogy and Declationary Biolog University of California at Santa Craz, Santa Craz, CA. 2004, USA Antonia
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John Haskins, Brent Hughes, Kerstin Wasson...Presenters

11/15/2013





Seagrass unstable over the last century

Hypoxia also varies temporally
Graph excluded for download as publication is in prep
Hughes et al. (2013) <i>In prep</i>

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Declines in fish diversity during recent hypoxia

Graph excluded for download as publication is in prep

Hughes et al. (2013) in prep









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chlorophyll and turbidity











MARSH DROWNING

Our marshes are sinking •Subsidence measured at our monitoring stations

Eutrophication appears likely cause

•Studies elsewhere have shown faster decomposition, less organic deposition by roots in nutrient loaded vs. control sites •We have measured high decomposition rates in our marshes, much higher than















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Take home messages

- ESNERR has lots of data relevant to water quality issues — We're glad to make the data available: raw data, analyses, summary reports whatever is useful
- Our monitoring has revealed decades of high nutrients, with no general improvement over time
- However local upland and buffer restoration efforts have local benefits
 We have demonstrated significant negative effects of nutrient-loading
 - Strong evidence for eutrophication problems including diurnal hypoxia, extensive algal production and decreased eelgrass, oyster and fish habitat
 On gain work currents, extensive of margin logs in the optimatic algo during the structure in the optimatic and marginal structures.
 - On-going work suggests extensive salt marsh loss in the estuary is also due in large part to eutrophication
- There are clear spatial patterns to eutrophication
- The worst-affected regions are the 50% of the estuary behind water control structures, and upper Elkhom Slough which has a long residence time
- Decreased nutrient loading would support greater ecological health of the estuary
 - Especially in the majority of the estuarine ecosystem far from strong marine influence, where residence times are longer