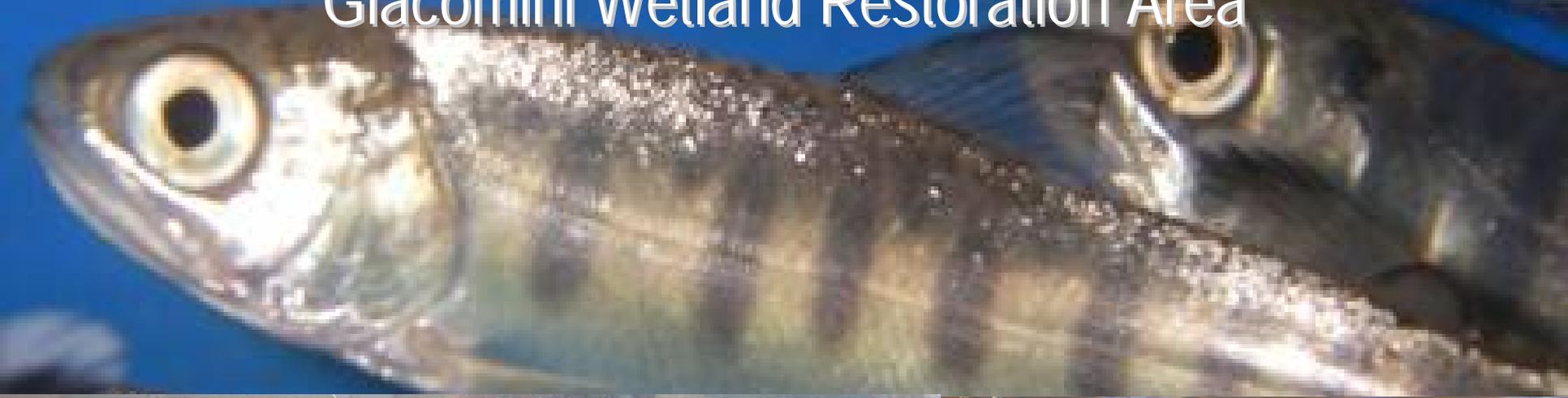


# Changing Fish Assemblages and Aquatic Habitat Giacomini Wetland Restoration Area



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## Lagunitas Creek Estuary

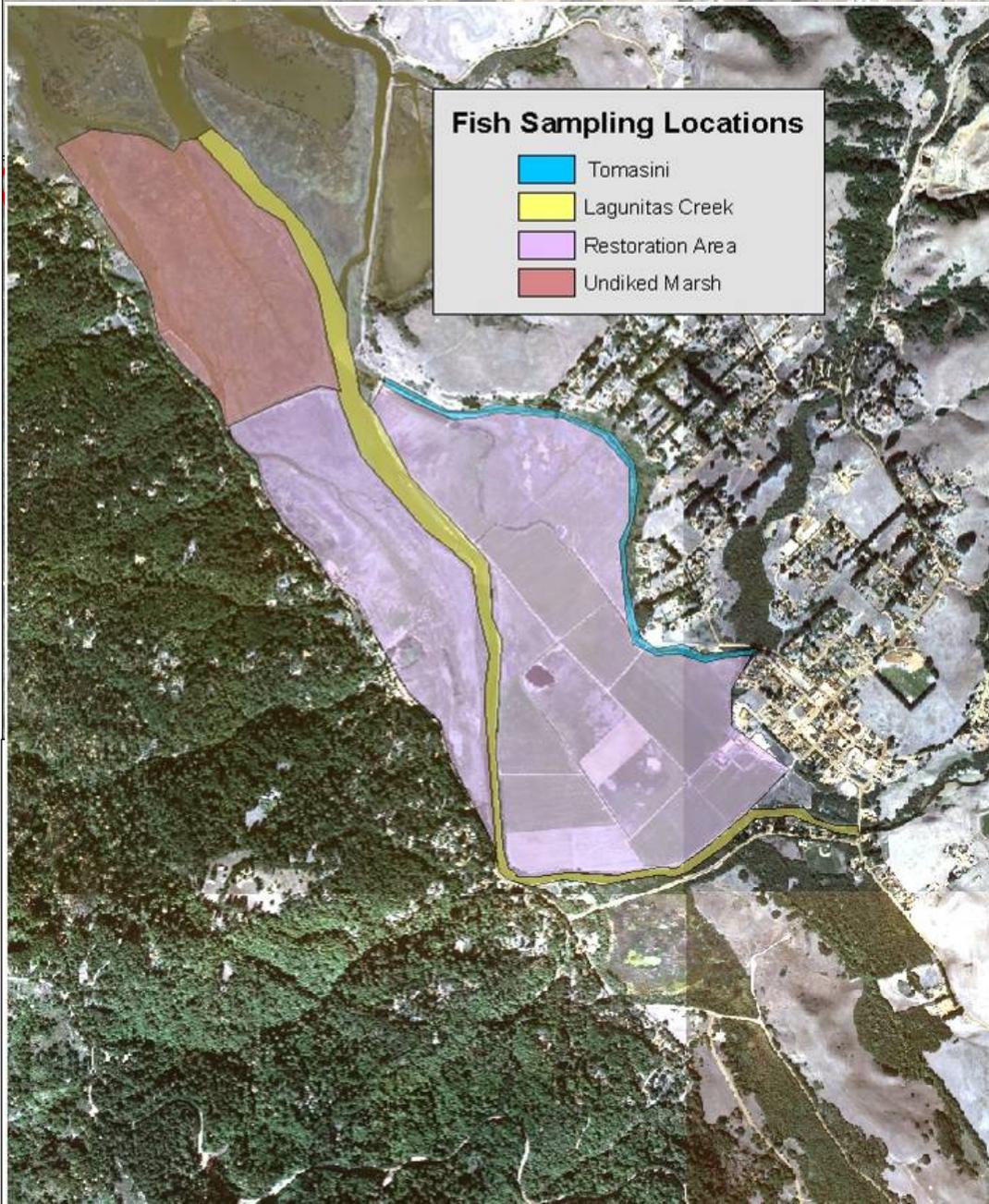
Dynamic Estuarine  
Transition Zone

Area has undergone  
dramatic shifts in habitat  
in the last 150 years.

December 2008  
Robert Campbell/Chamois Moon

# Plan View - Project Restoration

Giacomini Wetland Restoration Project



## Pre-Restoration Condition

- Drainage ditches and abandoned slough
  - Primarily stickleback and mosquitofish
  - Low species diversity
  - Drainage ditches did support tidewater goby
- Flooding constrained to major events
  - Levees prevented overbank flow
  - Only major events overtopped or breached levees
  - Ponding condition, no lasting habitat effects.

# Giacomini Restoration Area

Giacomini Project a connected freshwater tidal complex at the head of Tomales Bay thereby expanding estuarine transition zone

## – Tidal Restoration

- Daily tidal regime restored to nearly half of restoration area
- Extreme tide events cover more than 67% of the restoration area
- Subtidal and tidally ponded areas represent ~20% of project area

## – Floodplain Restoration

- Active area flooded at ~1.5 to 2-year event
- Inundation depth and duration varies based on tidal elevation at time of event

## – Seasonal Hydrologic Regime

- Primarily freshwater in winter
  - December – May
- Saline to hypersaline in summer
  - June – November

October 29, 2008

Robert Campbell/Chamois Moon

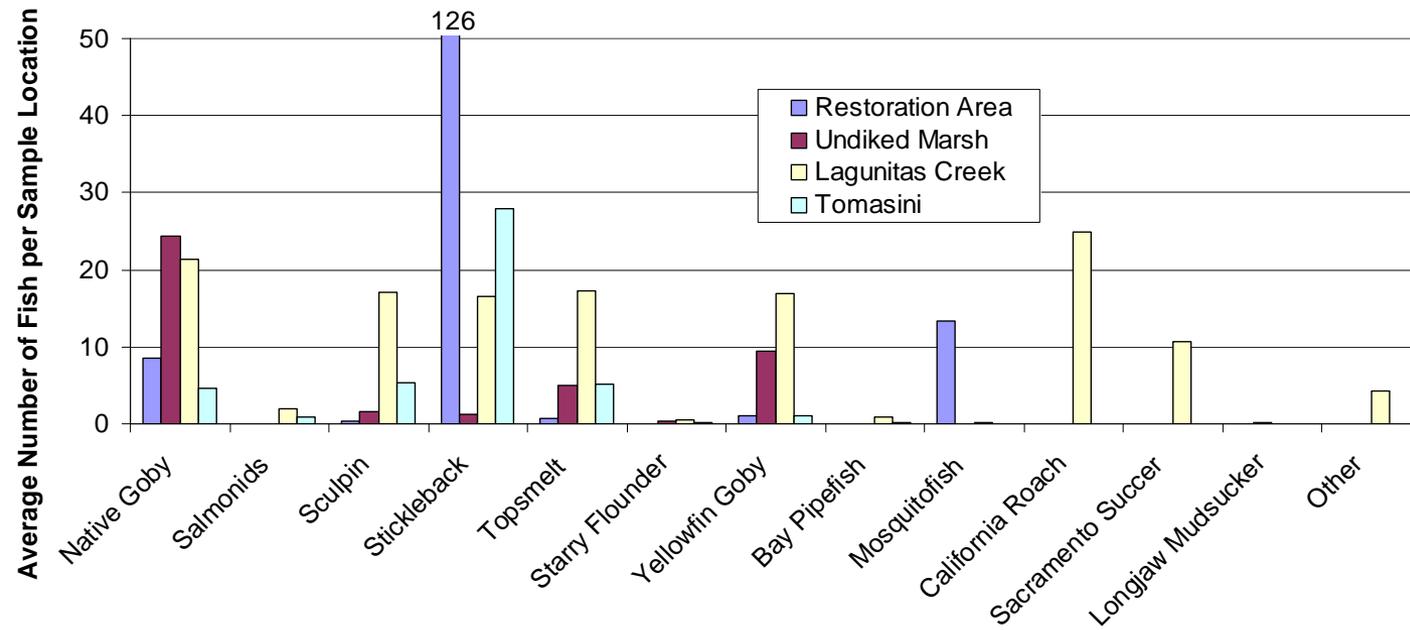
# Giacomini Restoration Area

With only one full post-restoration monitoring event complete, preliminary results indicate:

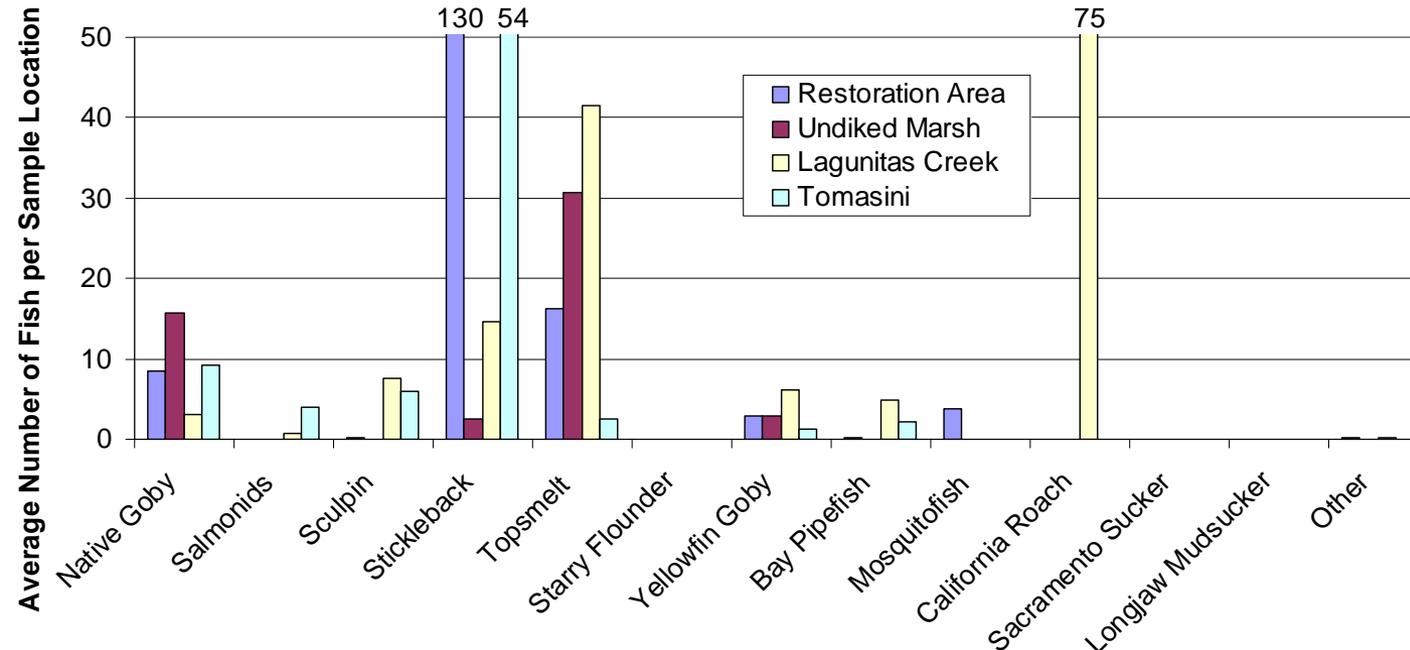
- Shift in species within Restoration Area
  - Reduction in mosquitofish, increase in other marine influenced species
- Increase in species diversity
- Fall 2009 observations
  - Continued increase in diversity
  - Tidewater goby documented at multiple sites in newly restored habitat
  - Increase in marine derived species
  - Decrease in non-native mosquitofish (less freshwater habitat)

October 29, 2008

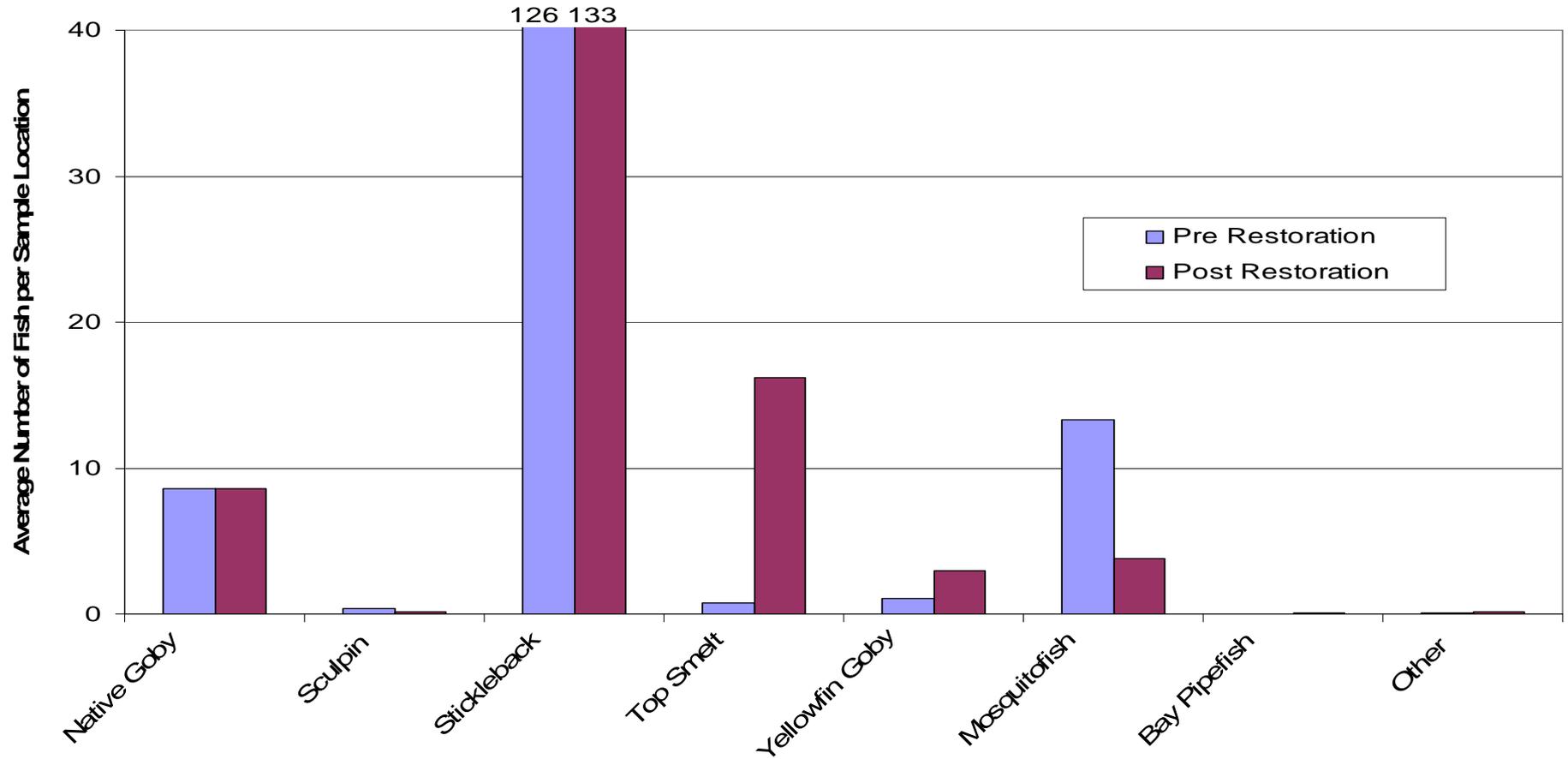
Robert Campbell/Chamois Moon



**Figure 1 Average number of fish per station, 2005-2008.**



**Figure 2 Average number of fish per station, June 2009.**



**Figure 3 Average fish per station within Restoration Area. Pre-restoration results include 2005-2008, Post-restoration includes June 2009 only.**

# Giacomini Restoration Area

## Factors influencing ongoing aquatic habitat changes

- Activation of the floodplain habitat on southern edge of project area
  - Differential scour and deposition on floodplain and marshplain areas
  - Recruitment of woody debris and riparian vegetation
- Continued evolution of tidal channel
  - Expansion of existing channels and development of new channels

October 29, 2008  
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Daily Tidal  
Inundation

1.5 to 2 year  
floodplain

October 29, 2008  
Robert Campbell/Chamois Moon





September 2009  
Robert Campbell/Chamois Moon

... and what about the coho salmon



# Giacomini Restoration Area

Potential expanded overwinter habitat for coho salmon

- Project area primarily fresh water for winter and spring months
  - Monitoring has documented salmonids in the mainstem of Lagunitas
  - Tidal channels and marshplain could support overwintering fry and smolts until outmigration.
  - Expanded monitoring efforts include PIT tagging to document individuals