

# Nutrients and Modeling Update

1. Status overview: *5 min*
  - RMP Nutrients projects
  - RMP Modeling
  
2. Moored sensor project *10 min*
  - quick update
  - next steps
  
3. Conceptual model *25 min*
  - progress update
  - review process
  
4. Modeling update *15 min*
  
5. Stormwater *5 min*



# Status Overview – RMP-funded nutrient projects

<b>Conceptual Model</b>	
<i>Draft to RMP</i>	March 2013
<i>Last tech team meeting</i>	April 2013
<i>Final draft for external review</i>	May/June 2013
<b>Loading study: Draft/Final</b>	on-schedule: March/May 2013
<b>Moored sensor pilot study</b>	on-schedule
<b>Algal toxins</b>	on-schedule
<b>Stormwater sampling data analysis</b>	
<i>WY 2012</i>	Delayed; propose merge with WY 2013
<i>WY 2013</i>	On-schedule; report Aug 2013

# RMP Modeling Plan Overview

## Revised Timeline

<b>Recruit modeling technical advisory team</b>	Complete
<b>Develop draft management questions</b>	February 1 2013
<b>Modeling technical advisory team meetings</b>	mid-February 2013 mid-March 2013
<b>Draft modeling plan report</b>	April 2013
<b>Modeling workshop (CFWG, NWG, modeling experts)</b>	April 2013
<b>Final modeling report</b>	June 2013
<b>Begin model development</b>	Q3/Q4 2013

# Major Questions Related to Monitoring Program

## Scientific

- Parameters to be measured, most efficient approaches?
- What spatial/temporal frequency?
- What combination of approaches is needed
  - ship-based, moored sensors, others
  - maintenance, calibration, data analysis and application

Monitoring  
Program  
Development

Moored  
Sensor  
Pilot



## Institutional

- Single “owner” or shared among programs?
- Cost
- Institutional agreements (with USGS, IEP/DWR)?
- Funding
- Transition timeline?

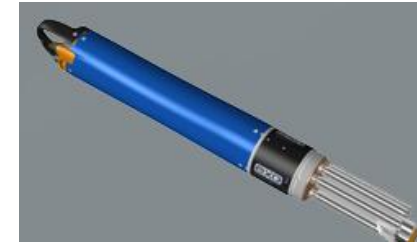
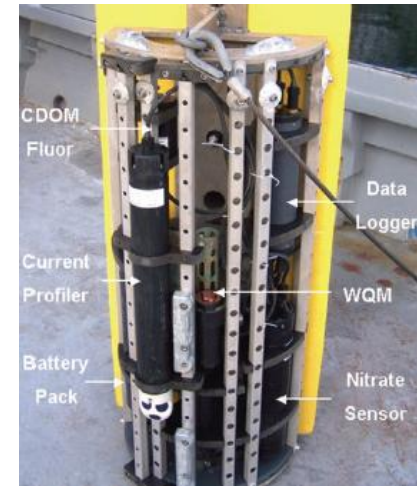


# Moored Sensor pilot program

- Discussion goals
  - Update on progress thus far
  - Advice on proceeding with project
- Original SFEI proposal (“plan A”)
  - Deploy moored sensor at Dumbarton bridge
  - Conductivity, temp, depth, turbidity, DO, chl-a, NO3
  - Timeline:
    - January-February: Research sensor options
    - March: Purchase sensor
    - May/June: Lab/Dock Calibration
    - July-December: Deploy at Dumbarton Bridge
    - March-May 2014: Data analysis and reporting

# Project Progress

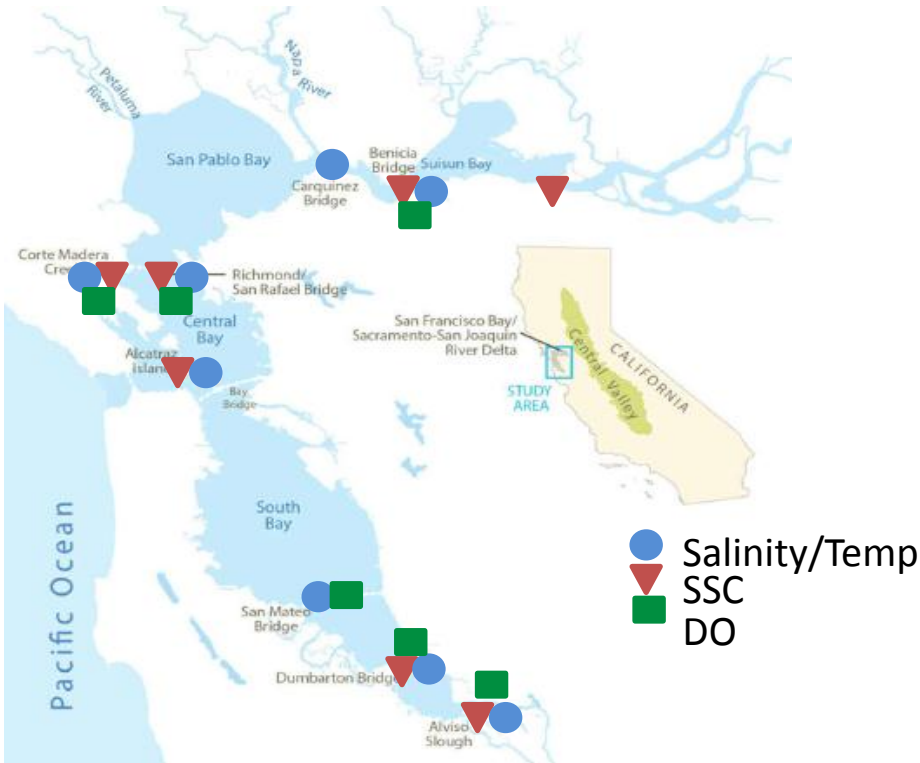
- Sensor options evaluated
  - LOBO (~\$80k)
  - YSI Exo (~\$25k) + nitrate (\$25k)
  - YSI 6600 (~\$12k) + nitrate (\$25k)
- Meetings with sensor experts at USGS-Sac
  - Expectations for maintenance, calibration
  - Potential for collaboration?
- Discussions/data analysis DWR-Suisun



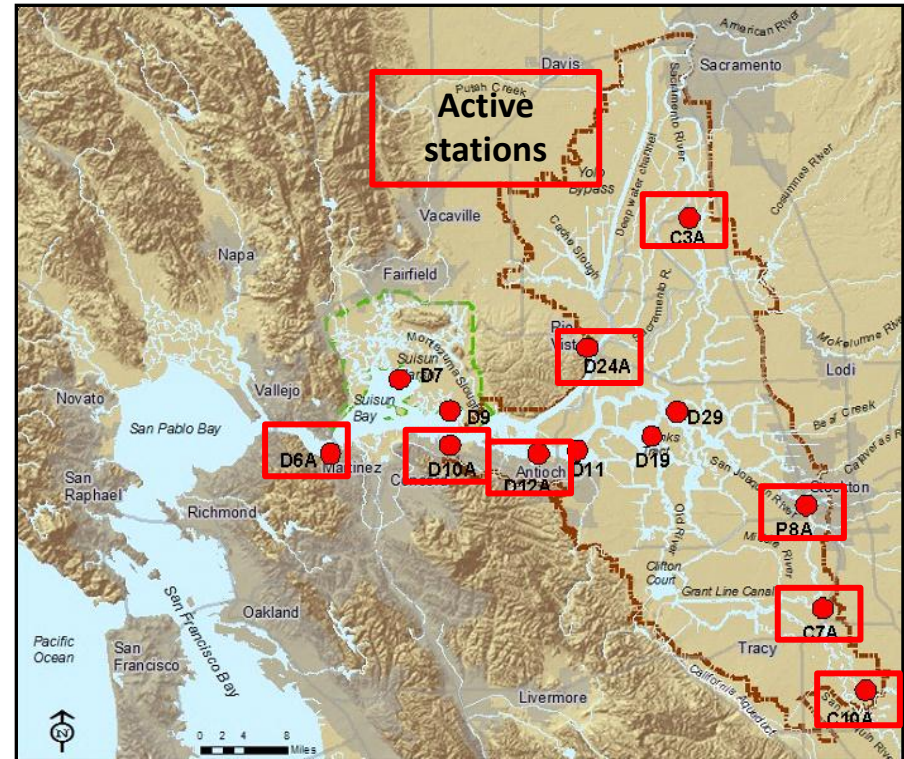


# Existing moored sensor stations

USGS-Sacramento (Schoellhamer et al)



DWR



# Possible benefits of collaboration

- Existing infrastructure
  - Sensor deployment housings
- Purchase additional instrumentation
  - Duplicate sondes or additional nutrient sensors
  - Allows for learning more about future deployments
- Develop inter-agency relationships
  - Capitalize on existing monitoring rather than “start from scratch”

Martinez (D8A)



Mallard Island (D10A)





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Plan B: Purchase 2 less expensive systems for deploying at additional locations to inform 2014 planning.



If “plan B” seems like the better option, what update/discussion does the SC want?

# Conceptual Model Update

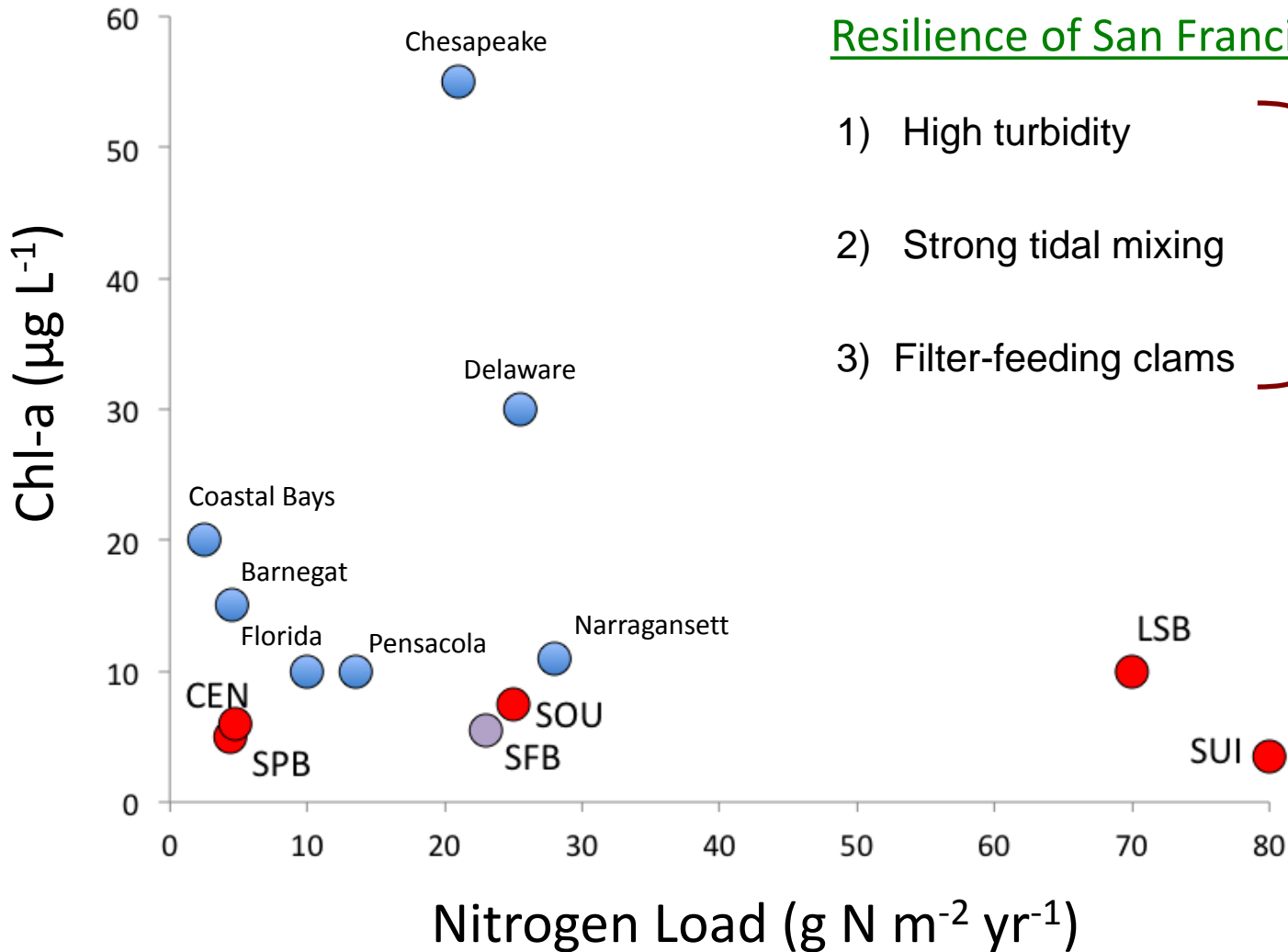
## Goals:

- Update on status
  - Synopsis
  - Timeline
- Discussion/agreement on steps for review
  - Broader discussion of program oversight

# RMP Nutrient Decision Making and Review

- What will be the RMP's role in on-going nutrient work?
- Should we form an RMP Nutrient Workgroup?
  - What is its role relative to the NNE SAG, and other bodies?
- What should the review process be for conceptual model report?

# High Direct N Loads to SFB Subembayments



## Resilience of San Francisco Bay

- 1) High turbidity
- 2) Strong tidal mixing
- 3) Filter-feeding clams

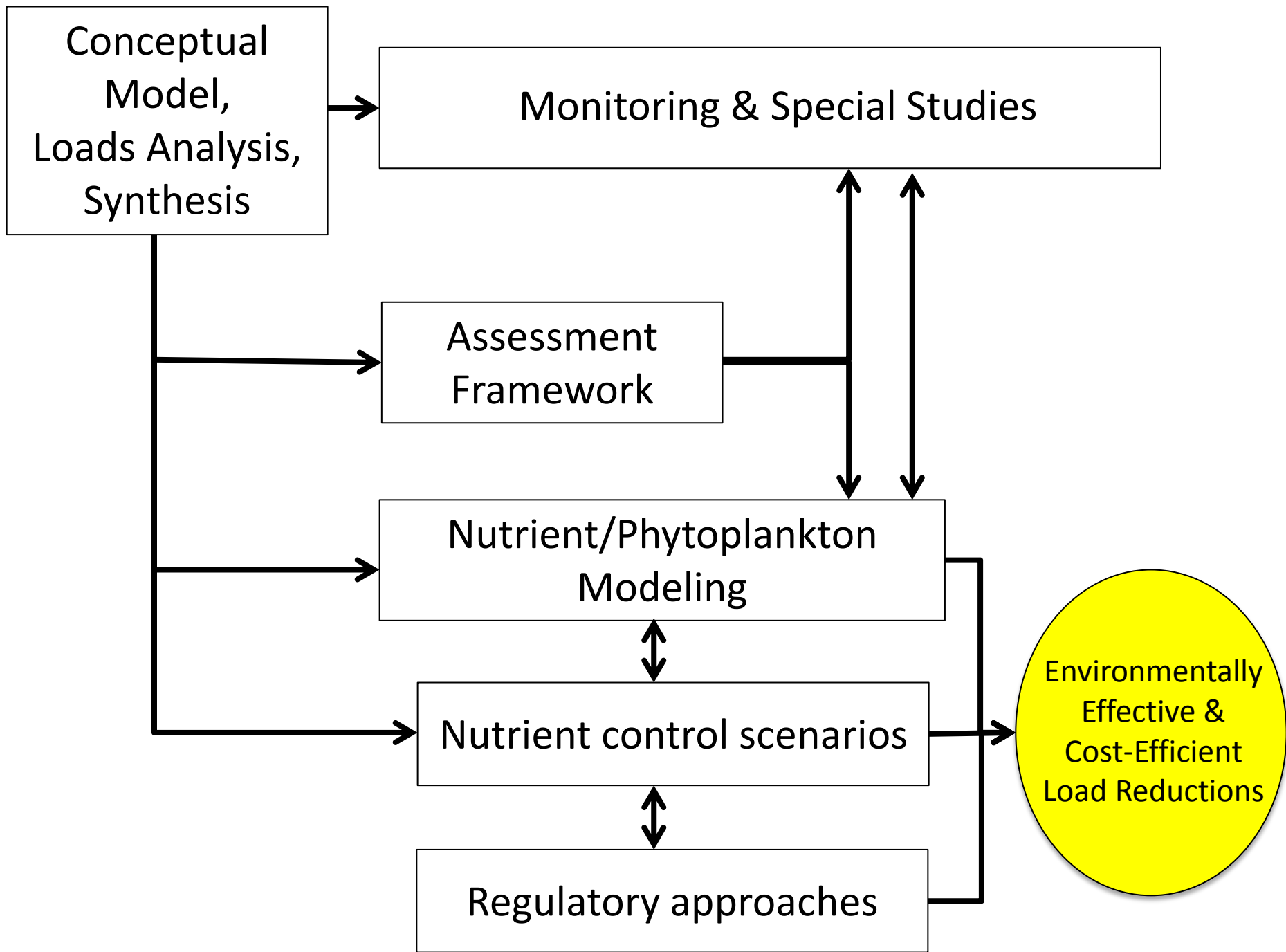
Subject to change?

# Nutrient Strategy – Key Management Questions

1. Is there a nutrient problem or signs of a future problem?
2. What are appropriate guidelines for identifying a problem?
3. What nutrient loads can the Bay assimilate without impairment of beneficial uses?
4. What is the relative contribution of loading pathways?

November 2012

San Francisco Bay Nutrient  
Management Strategy





# Conceptual Model Project

## Problem Statement

What would a problem look like in SFB?

## Conceptual Model

Conceptual gaps  
Data gaps

## Current/Future Scenarios

*Changes that would...*

- Cause problem, increase likelihood
- Mitigate problem

Environmental

Management

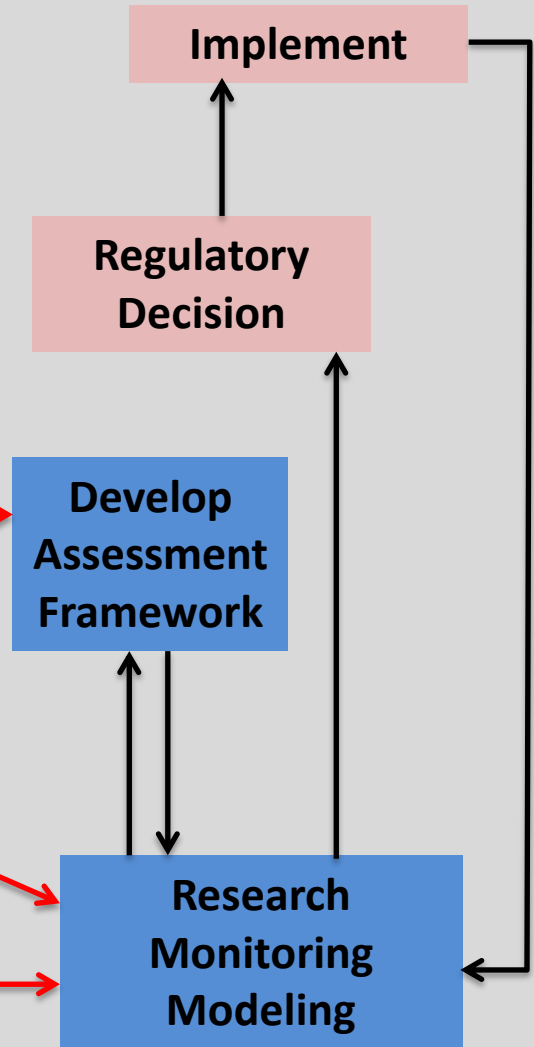
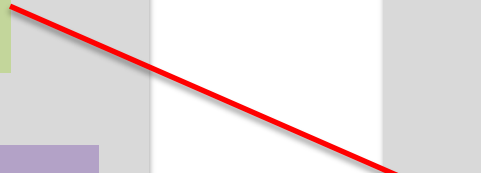
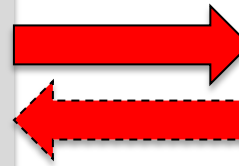
# Actions

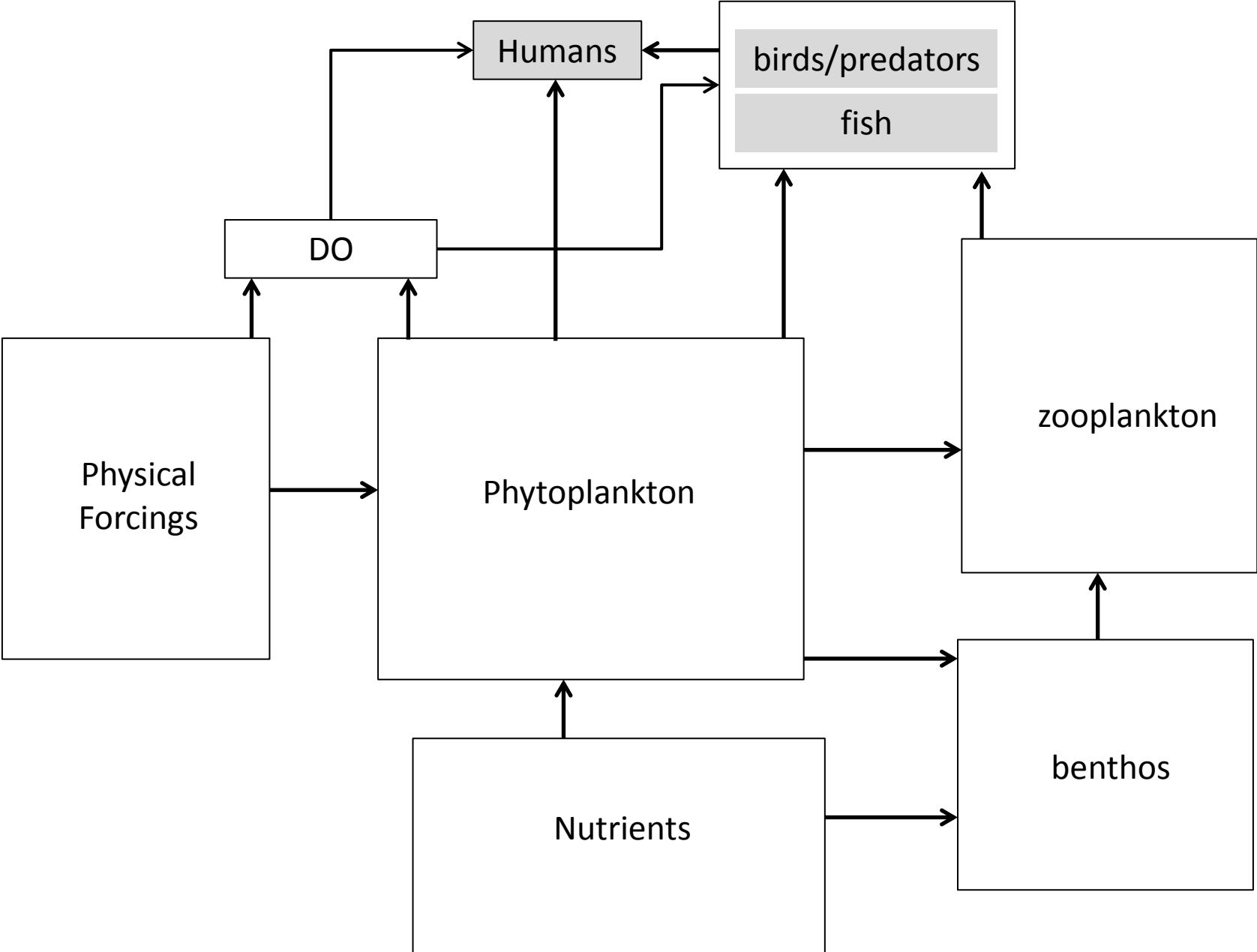
Implement

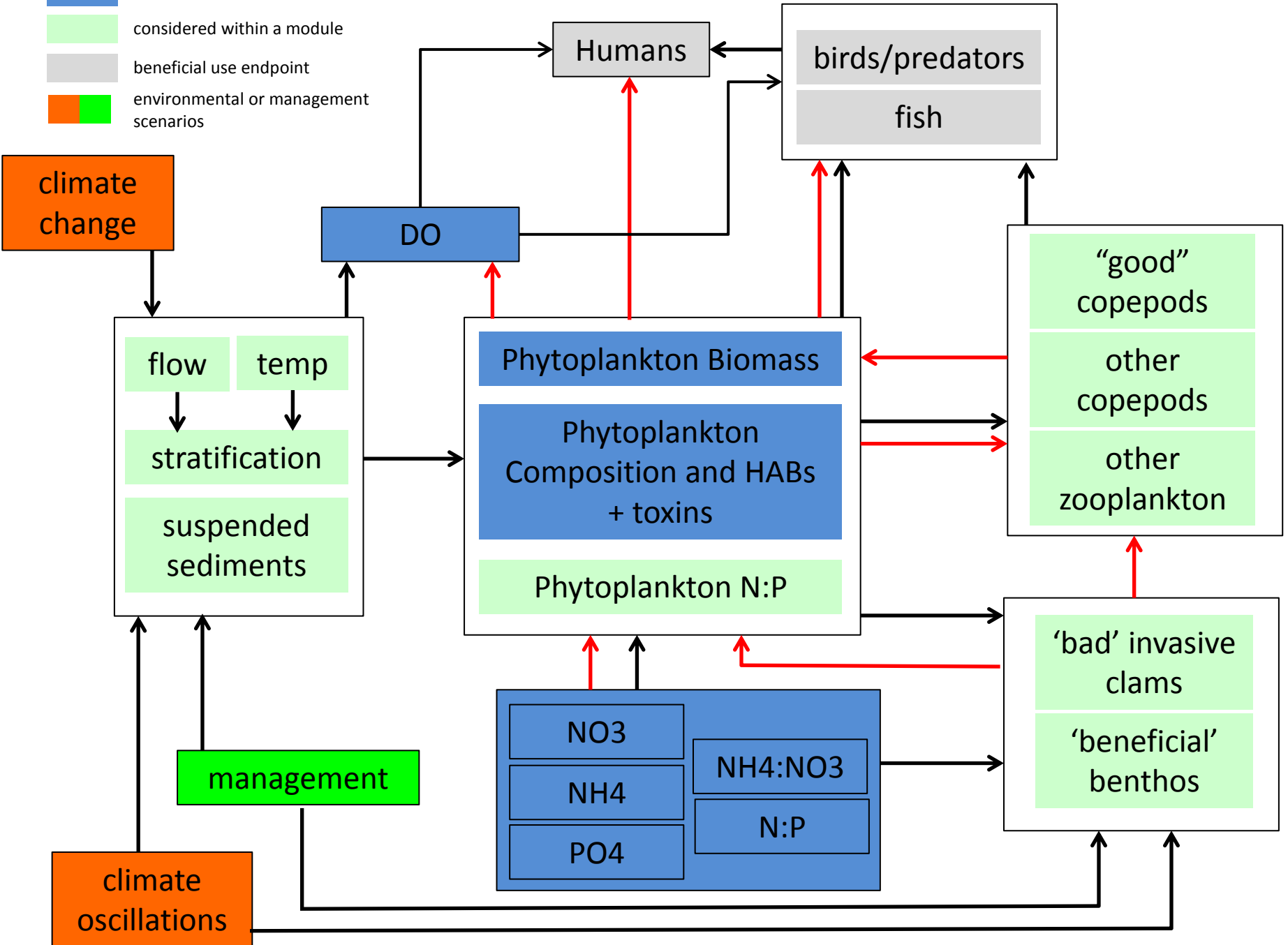
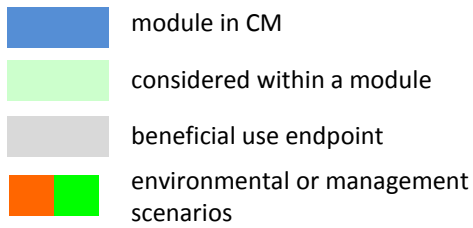
Regulatory Decision

Develop Assessment Framework

Research Monitoring Modeling







# Approach

- Technical team
  - J Cloern (USGS), M Connor (EBDA), D Dugdale (SFSU-RTC), T Hollibaugh (U Georgia), W Kimmerer (SFSU-RTC), L Lucas (USGS), R Kudela (UCSC), A Mueller-Solger (IEP), M Stacey (UC Berkeley)
- Technical Team Meetings:
  - May 7-8 2012, Sep 14 2012
  - April 2013
- Schedule
  - Full Draft Mar 2013 (*Dec 2012*)
  - Nutrient Workgroup Draft Mar 2013 (*Dec 2012*)
  - *Final Draft* May/June 2013
  - External Review May/June 2013

# Approach

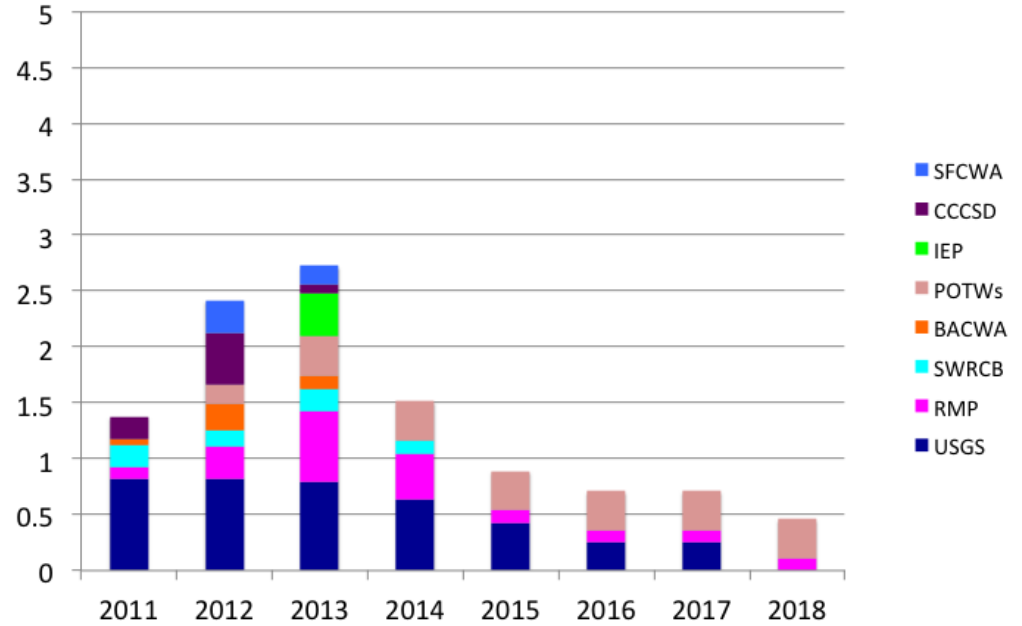
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- 

# RMP Nutrient Decision Making and Review

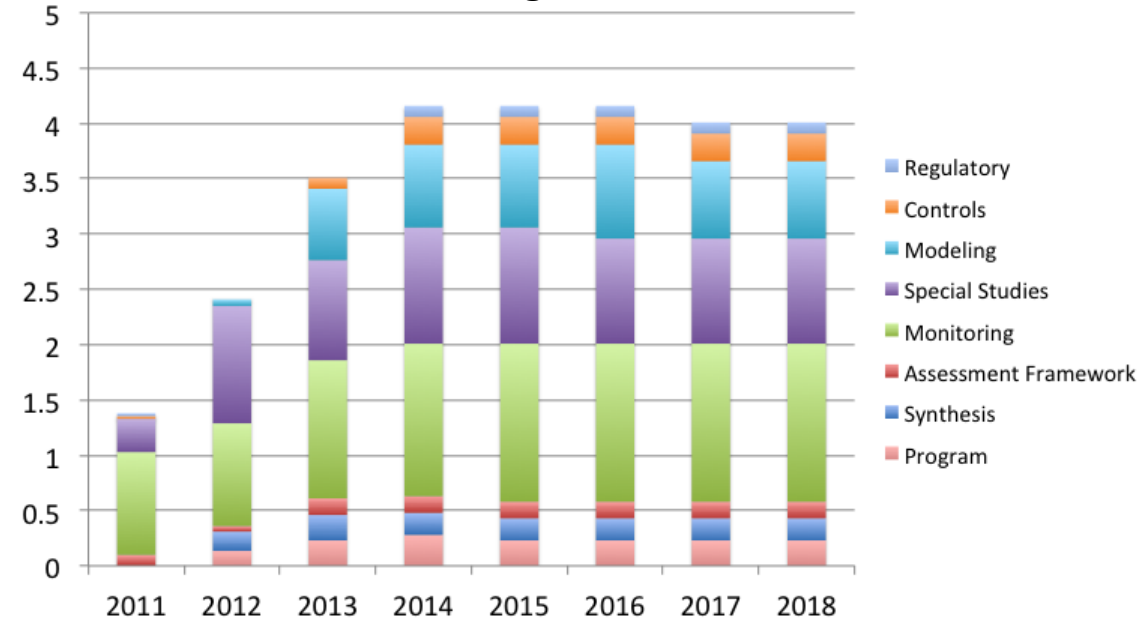
- What should the review process be for conceptual model report?
- What will be the RMP's role in on-going nutrient work?
- Should we (re-)form an RMP Nutrient Workgroup?
  - What is its role relative to the NNE SAG, and other bodies?



## Program Funding



## Forecasted Program Costs



# Developing a Bay-wide Modeling Tool

- Goal: Develop a model for informing important current and future management decisions
  - Balance sophistication with the resolution needed to inform management decisions
  - Optimized for use with multiple issues...
    - ‘contaminants’ – legacy, bioaccum., CEC
    - nutrients, phytoplankton, biogeochem.
    - sediments
    - sea-level rise?
  - Usable by SFEI/RMP staff
  - Built on existing tools
- Driven by nutrients in near-term

# Developing a Bay-wide Modeling Tool

- Overall Approach:
  - Engage Regional Board and stakeholders in identifying management questions and modeling needs
  - Develop a modeling program white paper
  - Engage expert community
  - Modeling workshop and joint work group meeting (nutrients, contaminants)
  - Recommend a modeling approach
  - Revise & Implement

# Approach and timeline

- |  |               |                |                   |               |  |  |  |  |
|--|---------------|----------------|-------------------|---------------|--|--|--|--|
| <ul style="list-style-type: none"> <li>Assemble “modeling advisory team”:           <ul style="list-style-type: none"> <li>Hydrodynamics, sediment transport, nutrient, phytoplankton</li> <li>Ed Gross (RMA), Oliver Fringer (Stanford), Lisa Lucas (USGS), Li Erickson (USGS), Frank Gobas (SFU), Jim Fitzpatrick (HDR-Hydroqual), Jim Cloern (USGS), Craig Jones (Sea Eng’g)</li> </ul> </li> </ul>           | recruit       | mid-Feb        | mid-Mar           |               |  |  |  |  |
| <ul style="list-style-type: none"> <li>Planning meetings</li> </ul>  | stakeholders  | regulators     | modeling experts  |               |  |  |  |  |
| <ul style="list-style-type: none"> <li>Develop white paper           <ul style="list-style-type: none"> <li>Management questions</li> <li>Model output requirements</li> <li>Model selection criteria</li> <li>Evaluation of model platform alternatives:               <ul style="list-style-type: none"> <li>Delft3D strawman (technical, \$, other)</li> </ul> </li> <li>Modeling plan</li> </ul> </li> </ul> | draft outline | revise outline | Draft 1 mid-March | Draft 2 April |  |  |  |  |
| <ul style="list-style-type: none"> <li>Modeling workshop           <ul style="list-style-type: none"> <li>Forum for stakeholder and expert discussion</li> <li>feedback/buy-in from regional modeling groups</li> </ul> </li> </ul>  | mid-April     |                |                   |               |  |  |  |  |
| <ul style="list-style-type: none"> <li>Revise and implement</li> </ul>   | July          |                |                   |               |  |  |  |  |

