Laguna de Santa Rosa TMDL Update

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North Coast Regional Water Quality Control Board
History of Modification

• Changes to Land Use
  • Deforestation
  • Agriculture
  • Urbanization
  • Increased loads overall

• Changes to Hydrology
  • Flood control (trapezoidal)
  • Increased channel network density
  • Wetland draining
  • Increased transport of loads

• Loss of Habitat, Function
  • Wetlands
  • Riparian forest
  • Open water and lakes
  • Less assimilative capacity
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Introduction

• Goal: Fishable & Swimmable
• Waterbody-pollutant pairs
  • Biostimulation
    • Temp, DO, Sed, Phosphorus
• Sets targets necessary to support Beneficial Uses
  • Wildlife, rare and threatened, recreation, drinking water, etc.
• Need to control all controllable contemporary sources
• Restoration essential in Laguna de Santa Rosa watershed
TMDL: Complementary Mechanisms

Reduce Pollutant Sources

Increase Assimilative Capacity

Diet + Exercise
Framework for Recovery & Reconciliation

- Point Source Control Programs (NPDES)
- Nonpoint Source Control Programs (WDRs)
- Water Quality Trading Program (WQTF)
- Regionally-Coordinated Monitoring (R3MP)
- Restoration Planning & Actions
- TMDL
Load Targets for Salmonid Protection

- **Sediment (tons/yr)**: Current Load = 91,370, Natural Conditions = 7,658, Target Load = 9,572
- **Phosphorus (kg/yr)**: Current Load = 87,660, Natural Conditions = 13,648, Target Load = 17,883
- **Nitrogen (kg/yr)**: Current Load = 361,638, Natural Conditions = 61,804, Target Load = 96,919
Sediment Sources

Total Watershed
- Channel Incision and Widening: 55.1%
- Sheet and Rill Erosion: 23.0%
- Colluvial Bank Erosion, Gully Erosion, and Landslides: 13.3%
- Road Tread, Cuts, and Stream Crossings: 8.5%

Sheet and Rill Erosion
- Cropland: 7.2%
- Herbaceous: 4.4%
- Forest: 6.6%
- Developed: 1.9%
- Barren: 1.4%
- Shrub: 1.2%
- Pasture/Hay: 0.3%
Proportional Responsibility for Channel Derived Sediment Loads

- Must assign channel-derived sediment loads (>55% total)
  - Ongoing, contemporary, anthropogenic loads
- Could assign proportional responsibility for channel-derived sediment loads
- Based on the additional runoff caused by land cover change above a background runoff rate ($\Delta Q$)
  - Stream power, sediment transport capacity (STC)
Proportional Responsibility for Channel Derived Sediment Loads
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Phosphorus Sources

Total Watershed

- Internal Cycling: 37.3%
- Overland Flow: 55.2%
- Misc.: 4.7%
- WWTPs: 2.5%

Overland Flow

- Developed: 22.5%
- Herbaceous and Shrub: 16.5%
- Orchards & Vineyards: 6.6%
- Pasture: 4.4%
- Forest: 3.3%
- Other Land Uses: 1.6%
Surrogate Parameter

A surrogate parameter may be necessary because of the complexity of biostimulation and difficulty in monitoring discrete parameters in non-point source context.

1. Controlling sediment transport capacity (STC) leads to control of sediment
2. Controlling sediment leads to the control of discharged Phosphorus
3a. Crediting projects using the surrogate parameter encourages restoration
3b. Restoration controls temperature and internal cycling of Phosphorus
4. Controlling the above and encouraging restoration addresses DO conditions
Temperature

- Implement Temperature Policy
- “Site potential effective shade”
  - Riparian shade is the primary controllable factor
  - Also want to:
    - Encourage cool groundwater (GSA)
    - Implement groundwater protection strategy (RB1)
    - Reduce sedimentation (TMDL)
- Encourage increased shade through restoration
- Riparian setbacks could be part of solution – Riparian Corridors
Action Plan

- Direction to develop a watershed-wide reconciliation plan framework, including:
  - Sonoma Water Vision
  - TetraTech’s watershed opportunities map
  - GHD’s watershed opportunities map
  - Hydrologic model, compare futures
- Won’t prescribe specific projects
- Will encourage restoration through:
  - Permits
  - Water quality trading and/or offsets
  - Creative use of partnerships and multiple agency authorities
- Would ideally be stewarded by a formal, watershed-wide collaborative or agency with funding
# TMDL Project Timeline through 2022

<table>
<thead>
<tr>
<th>Date</th>
<th>Milestone/Deliverable</th>
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<tbody>
<tr>
<td>Oct. ‘21</td>
<td>Finalize Load Allocations</td>
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<td>Dec. ‘21</td>
<td>Public Workshop</td>
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<tr>
<td>Mar. ‘22</td>
<td>Draft Staff Report into Peer Review</td>
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<td>June ‘22</td>
<td>Respond to Peer Review</td>
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<td>Fall ‘22</td>
<td>Revise Staff Report</td>
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<tr>
<td>Winter ‘22</td>
<td>Draft for Public Comment</td>
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Proportional Responsibility

• Evaluate natural condition runoff for watershed

• Evaluate current condition runoff for watershed

• Difference between these two numbers ($\Delta Q$) is the total responsibility to assign

• Determine percentage of $\Delta Q$ that each individual entity is responsible for

• Multiply that percentage by the total channel-derived sediment load in tons/yr
Riparian Shade

Change in Angular Canopy Distance with Thinning Adjacent to No-Cut Buffers of Varying Widths

Buffer Width and Shade: Angular Canopy Density from Brazier and Brown (1973) and Steinblums (1977), and Effective Shade from Cupp and Lofgren (2014) and McIntyre et al. (2017)