Eureka Area Watersheds
Storm Water Resource Plan

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Outline

• Background, Purpose and Setting
• Goals and Objectives
• Project Prioritization
• Multi-Criteria Analysis
• Example Project Outcome
Background and Purpose

Storm Water Resource Plan (SWRP)

- Planning document
- Watershed-based management
- Provides metrics to prioritize multi-benefit projects SWRP required to obtain Prop 1 Stormwater funds in communities greater than 20,000 people
Project Setting
Hydrologic Understanding

[Map of Humboldt Bay area with various streams and sub-watersheds labeled, including Fields Landing, Lower Elk River, Upper N. Fork Elk River, Upper S. Fork Elk River, and others.]

Legend:
- Project Watershed
- Sub-watersheds
- Streams
- US Highway

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

Data source: Calwater: watersheds; Humboldt county GIS: streams; Copyright © 2014 Esri. Created by jclark2
Hydrologic Understanding

Legend
- Project Watershed
- Land Use:
  - Agriculture
  - Recreation and Conservation
  - Commercial
  - Industrial
  - Public
  - Residential
  - Timber

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet
## Pollutants of Concern

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Primary Pollutant</th>
<th>Location(s)</th>
<th>Source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sediment</td>
<td>X</td>
<td>Elk River, Freshwater, City of Eureka</td>
<td>NCRWQCB 2016, PWA 2006, W&amp;K 2005</td>
</tr>
<tr>
<td>Nutrients</td>
<td></td>
<td>City of Eureka</td>
<td>W&amp;K 2005</td>
</tr>
<tr>
<td>Trash</td>
<td>X</td>
<td>Countywide</td>
<td>SWRCB 2017b</td>
</tr>
<tr>
<td>Indicator bacteria</td>
<td>X</td>
<td>Lower mainstem Elk River, Martin Slough, Humboldt Bay</td>
<td>SWRCB 2017a, NCRWQCB 2011</td>
</tr>
<tr>
<td>Dioxin toxic equivalents</td>
<td>X</td>
<td>Humboldt Bay</td>
<td>SWRCB 2015b</td>
</tr>
<tr>
<td>Polychlorinated Biphenyls</td>
<td>X</td>
<td>Humboldt Bay</td>
<td>SWRCB 2015b</td>
</tr>
<tr>
<td>Pesticides</td>
<td></td>
<td>City of Eureka</td>
<td>W&amp;K 2005</td>
</tr>
<tr>
<td>Hydrocarbons</td>
<td></td>
<td>City of Eureka</td>
<td>W&amp;K 2005</td>
</tr>
</tbody>
</table>
Hydrologic Understanding

- Opportunities for infiltration are limited by existing hydrology.
- High groundwater levels combined with high annual precipitation makes infiltration different than in other parts of the state.
Hydrologic Understanding

Stormwater Evaluations needed to take into account climate change and sea level rise
Key Hydrologic Understanding Findings

• Most of the major water bodies are listed on the 303(d) Impaired Water Bodies List

• Primary pollutants include sediment, trash, indicator bacteria, dioxin toxic equivalents, and polychlorinated biphenyls

• Typical LID implementation is more challenging in the project watershed due to hydrologic conditions specific to our region

• Sea level rise will likely impact storm water management
Local Coordination Benefits

Technical Advisory Committee

- City of Eureka
- Humboldt County
- Humboldt County Services District (HCSD)
- North Coast Regional Water Quality Control Board

Legend
- Project
  - Watershed
- Municipalities

Map Projection: Lambert Conformal Conic
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Eureka Area Watersheds
Storm Water Resource Plan Goals

- Characterize watershed processes, surface water quality, storm drainage systems, and land use characteristics
- Provide a quantitative and transferable methodology for the identification and prioritization of storm water projects
- Outline specific storm water projects within the SWRP area
- Leverage stakeholder expertise and knowledge through past planning documents, community engagement efforts, and continued communication and data sharing among stakeholder groups
- Develop framework for future storm water resource planning and program implementation through adaptive management
Eureka Area Watersheds Storm Water Resource Plan Management Objectives

• Increase regional coordination

• Support MS4 Permit compliance

• Improve water quality

• Improve flood management

• Protect and enhance natural resources and community benefits
# Project Prioritization

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Score</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trash capture</td>
<td>• Provides partial trash removal</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>EAWSWRP priority pollutant removal</td>
<td>• Provides minimal secondary priority pollutant removal</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>• Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hour storm event</td>
<td></td>
</tr>
<tr>
<td>Nonpoint source pollution control</td>
<td>• Implements BMPs that cover less than 5 acres of land</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>• Implements BMPs that cover between 5 and 10 acres of land</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Implements BMPs that cover more than 10 acres of land</td>
<td></td>
</tr>
</tbody>
</table>
SWRP Development Process

• Data review and gap analysis
• Literature review
• Watershed characterization
• Water quality compliance approach
• Data collection
• Project screening and prioritization
• Stakeholder Outreach
• Draft/Final Storm Water Resources Plan
Project Prioritization through Spatial Analysis

- Story Map

Multiple Criteria Analysis for Storm Water Projects in the Eureka Area Watersheds
LID/BMP Opportunity Types
### LID/BMP Project Screening Criteria

<table>
<thead>
<tr>
<th>Screening Criterion</th>
<th>Tree Planter</th>
<th>Bioswale/Vegetated Swale</th>
<th>Rain Garden</th>
<th>Permeable Pavers</th>
<th>Infiltrator Pipe</th>
<th>Rain Barrels**</th>
<th>Trash Capture Devices</th>
<th>Conservation setback**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Slope &lt; 10%</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Parcel is publically-owned (parcels only)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Available Area* (roads only)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Located within Trash Priority Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Located within 20 feet of existing storm water infrastructure</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Located within 100 feet of a water course</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

*Available area varies based on LID BMP type. Screening criteria for available area by LID BMP type are shown in Section 5.1.2.3.

**These LID BMPs were not considered applicable to road segments
LID/BMP Project Screening Criteria

Ownership: publicly owned
Slope: less than 10% (avg)
Surface water: within 100ft
Existing stormwater infrastructure: within 20ft
Trash priority areas: within identified areas
# LID/BMP Project Ranking Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Points</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Located within 500 ft of an existing project</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Located in the 100-year flood plain</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Located within 500 ft of a known issue</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Located in a Priority Storm Water Area</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Land use is open space, parks, or schools*</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Top-ranked for more than three LID BMP types*</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Top-ranked for more than two LID BMP types**</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Located within MS4 Permit Area</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*This ranking criterion applies only to parcels

*This ranking criterion applies only to road segments
LID/BMP Project Ranking Criteria

Total number of potential project types: more than three

Existing project within 500ft

Within MS4 Permit Area

Existing stormwater problem area within 500ft

Outside 100yr Flood Zone

Land use: Open Space, Parks, or Schools

Within priority storm Water Area
MCA Results
Project Identification

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Flood Reduction and Sea Level Rise Mitigation Project
Eureka Flood Reduction and Sea Level Rise Mitigation Project

Project Drivers

• Flooding in upper and lower basin

• Aging infrastructure

• Increased regulatory requirements – Trash Capture / Water Quality
Eureka Flood Reduction and Sea Level Rise Mitigation Project

Project Goals

- Flood Reduction
- Sea Level Rise Mitigation
- Water quality treatment / Trash Capture
Eureka Flood Reduction and Sea Level Rise Mitigation Project

Project Approach

• Utilize SWRP data / City GIS

• Model system w/ SWRP 2D model

• Develop alternatives to address issues utilizing MCA
Planned Project

- Upper Watershed LID features
- Stormwater infrastructure upsizing
- Pipe network overflow control
- Outfall upgrades
  - Tide gate modification
  - Trash capture
Summary

• Stormwater as a resource is viewed differently in our basin.

• Our focus is on water quality and protecting the resources of Humboldt Bay and its tributaries rather than drinking water and groundwater recharge.

• Main challenges are likely regulatory with Coastal Commission Permitting and finding funding sources for project implementation.