# Stormwater Management and Groundwater Recharge Watershed Scoping Study

## Laguna-Mark West Watershed

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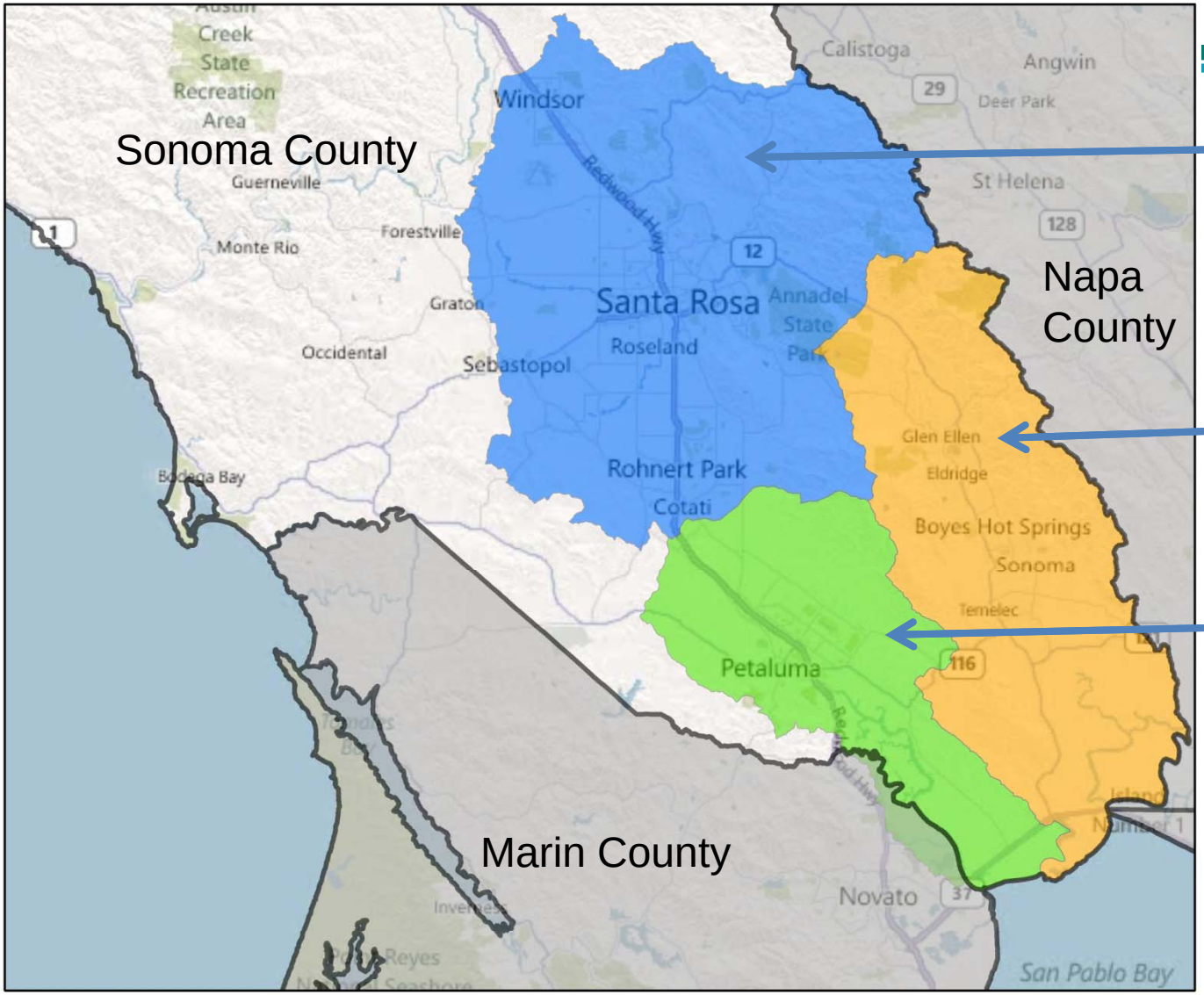
SONOMA COUNTY WATER AGENCY

# Scoping Studies in Three Watersheds



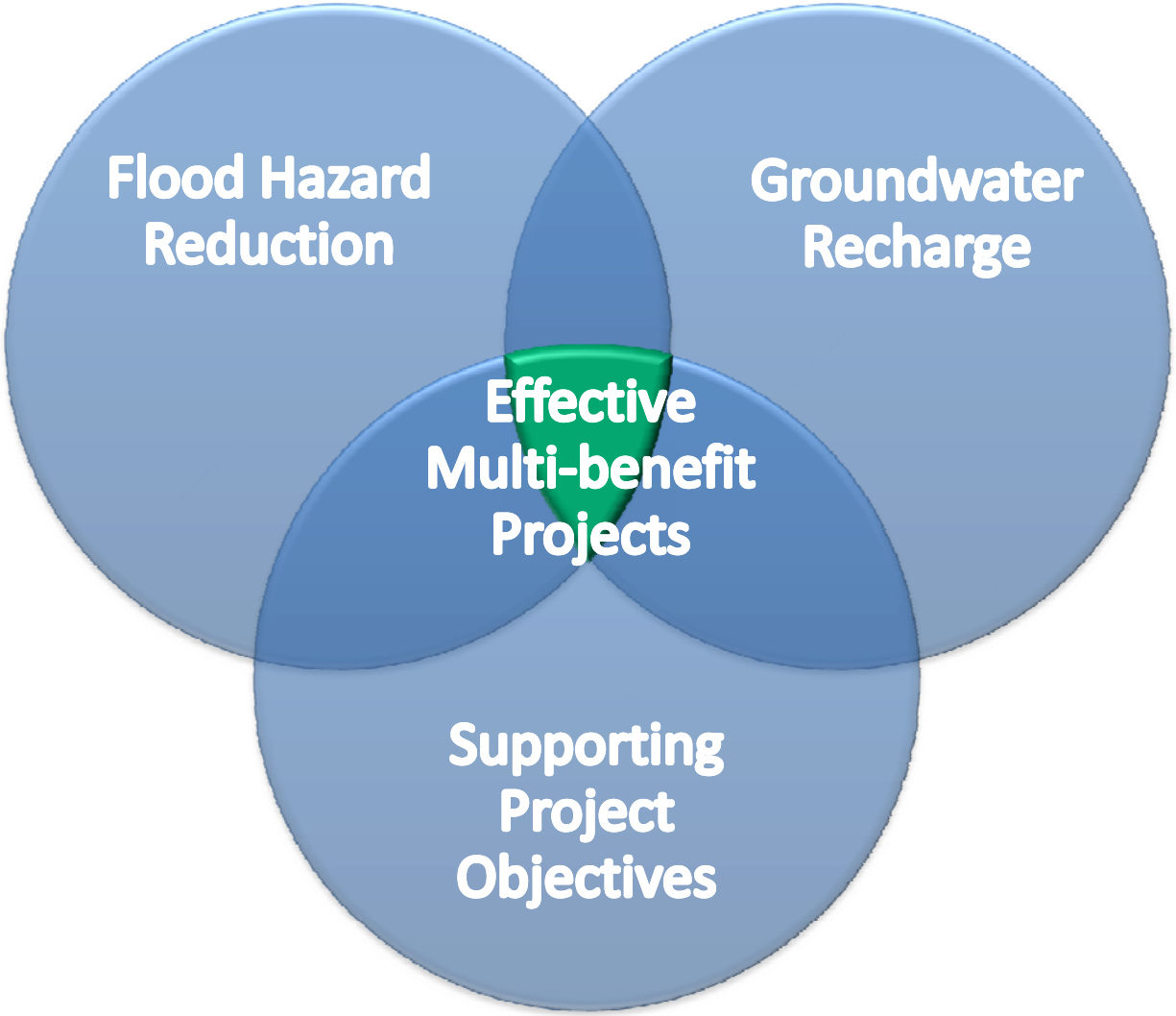
# Core & Supporting Objectives

## Flood Hazard Reduction

## Groundwater Recharge

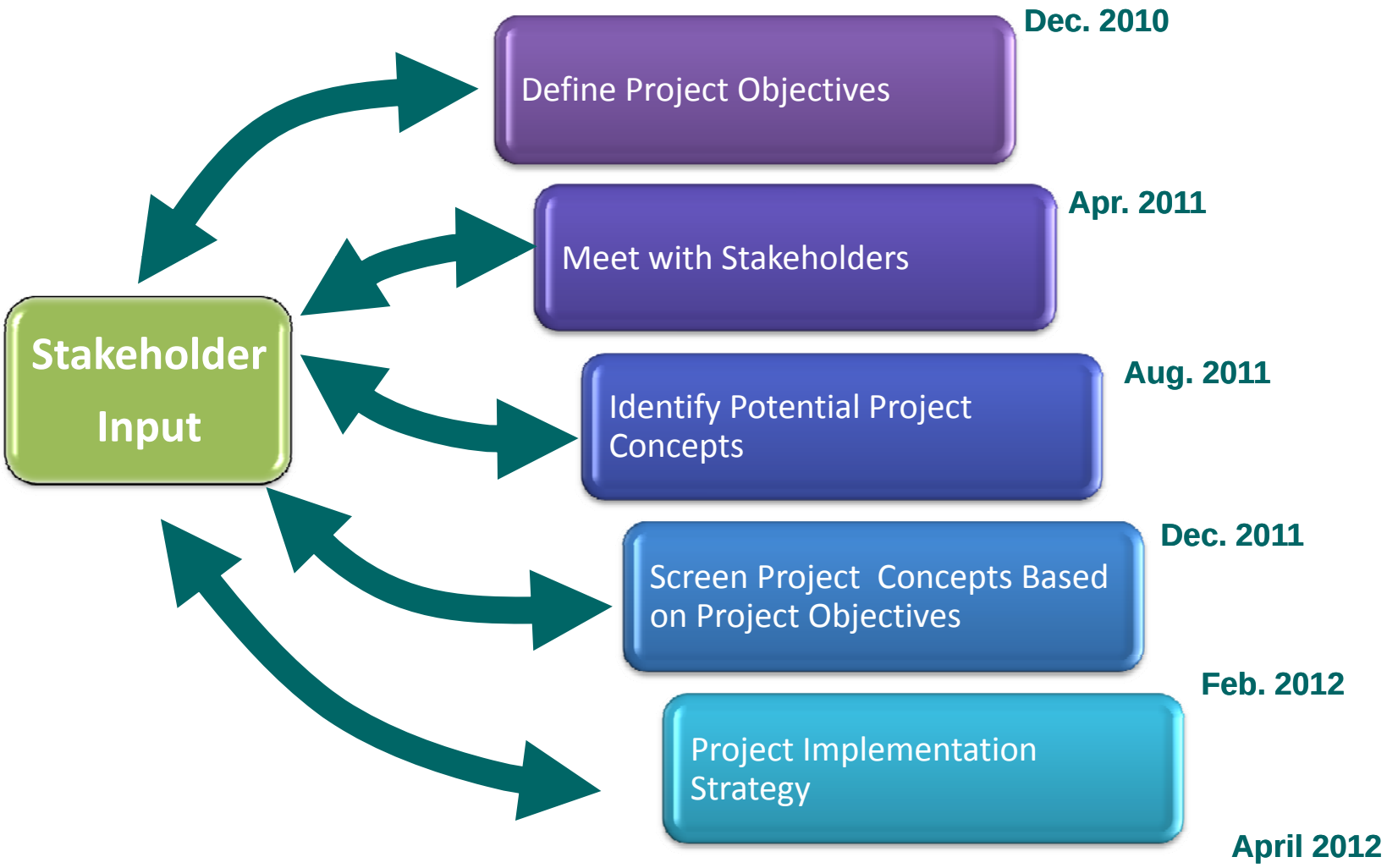
- Water Quality
- Water Supply
- System Sustain-ability
- Ecosystem
- Agricul-tural Land
- Open Space
- Com-munity Benefits

# Project Objectives

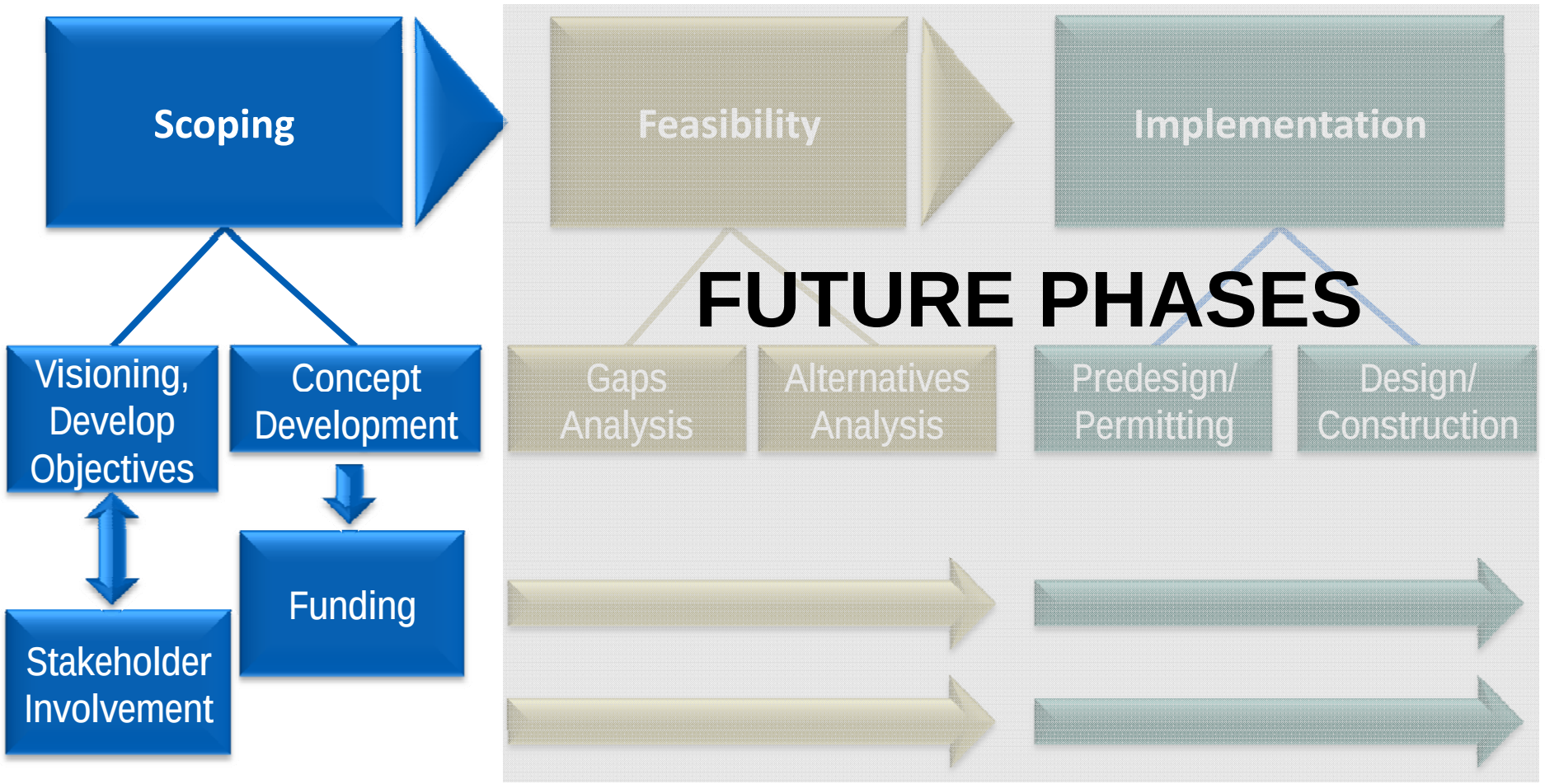


# Project Concepts- Multi-Benefit Approach

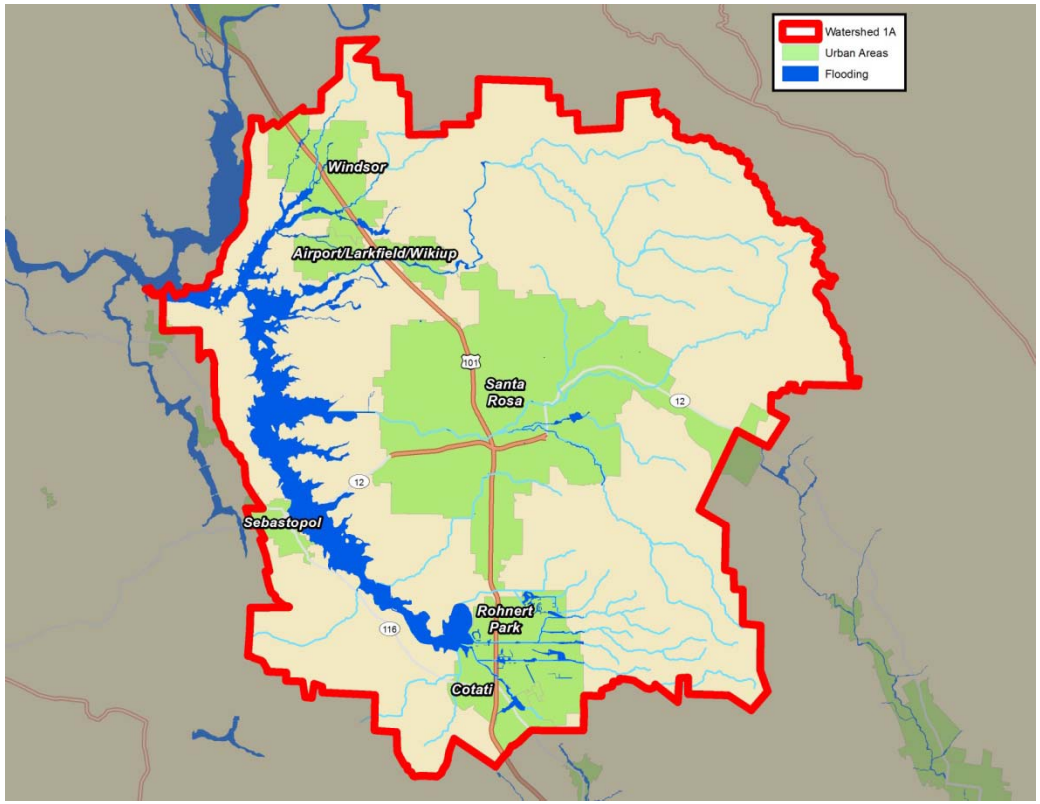
# Scoping Study Elements



# Planned Process – Phases of Work



# Laguna-Mark West Watershed

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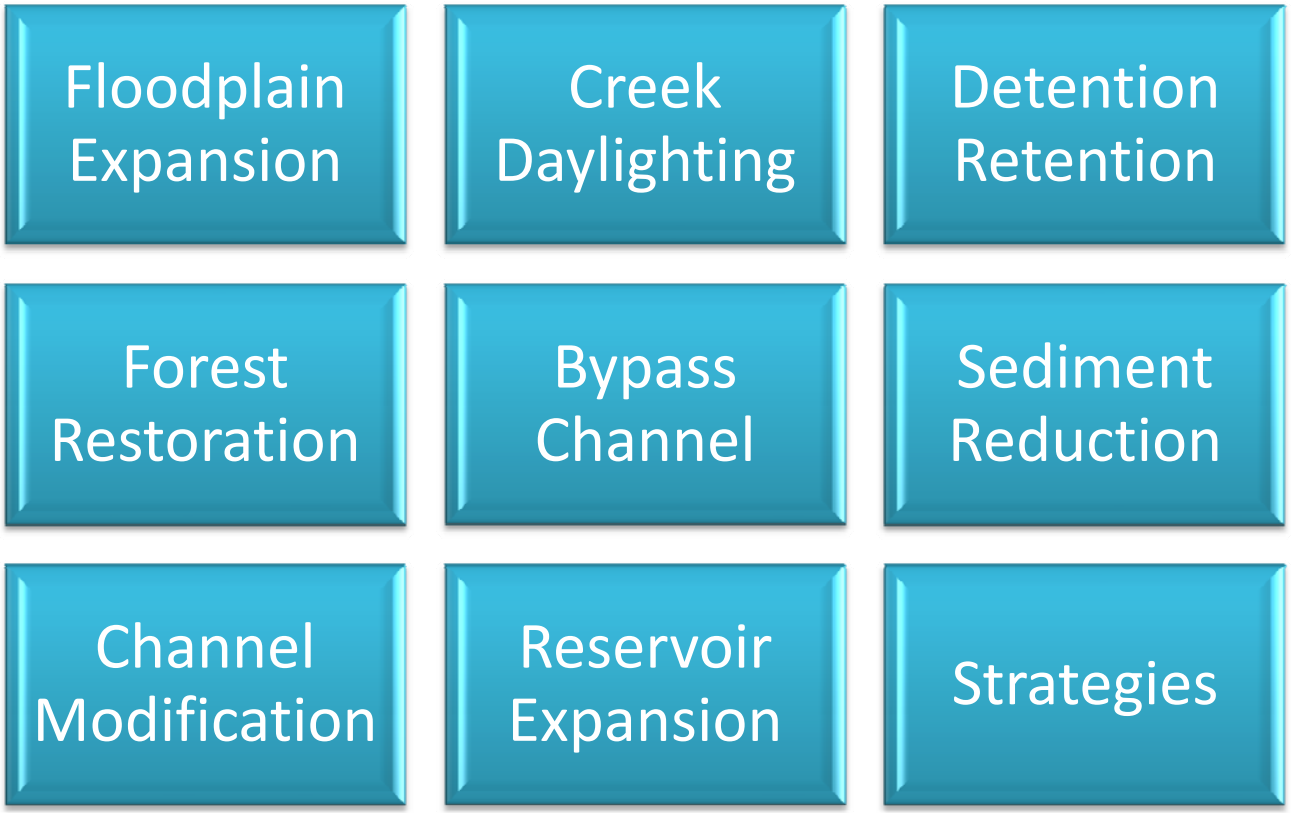
# Watershed Planning Consultant Team

- Hydrogeology – Todd Engineers
- Geomorphology and Feasibility – Horizon Water and Environment
- Project Management, Hydrology and Hydraulics – GHD

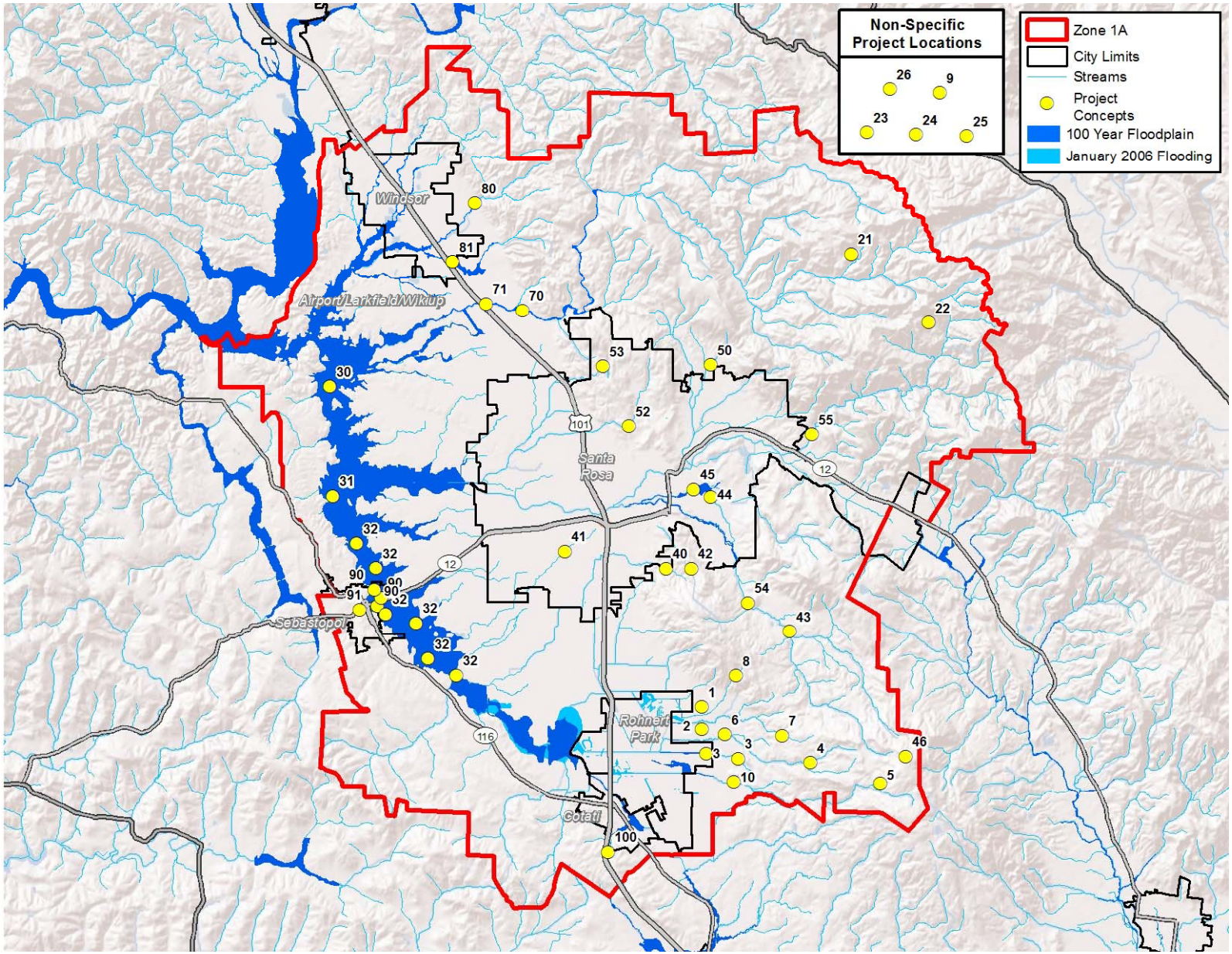
# Laguna-Mark West Watershed Overview

- 250 square miles
- Three major tributaries
- Five incorporated cities
- Three major unincorporated areas

# We conducted interviews with stakeholders to develop an inventory of project concepts.



# Project Concepts



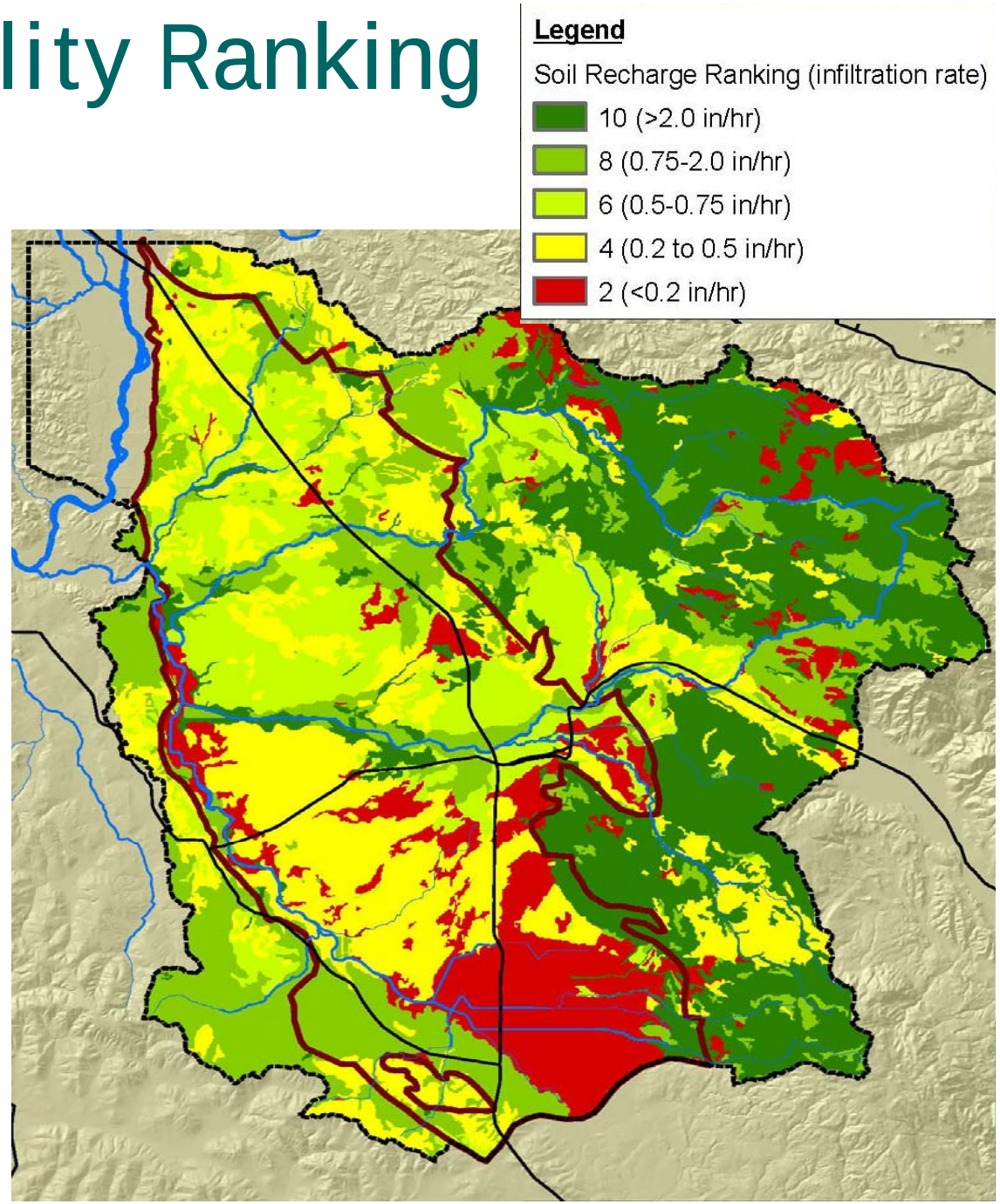
# Recharge Potential Assessment

## Recharge Maps

1. Natural Recharge: Soil/Slope/Geology
   - Assumes shallow soils remain in place
2. Engineered Recharge: Geology/Slope
   - Assumes shallow soils are excavated

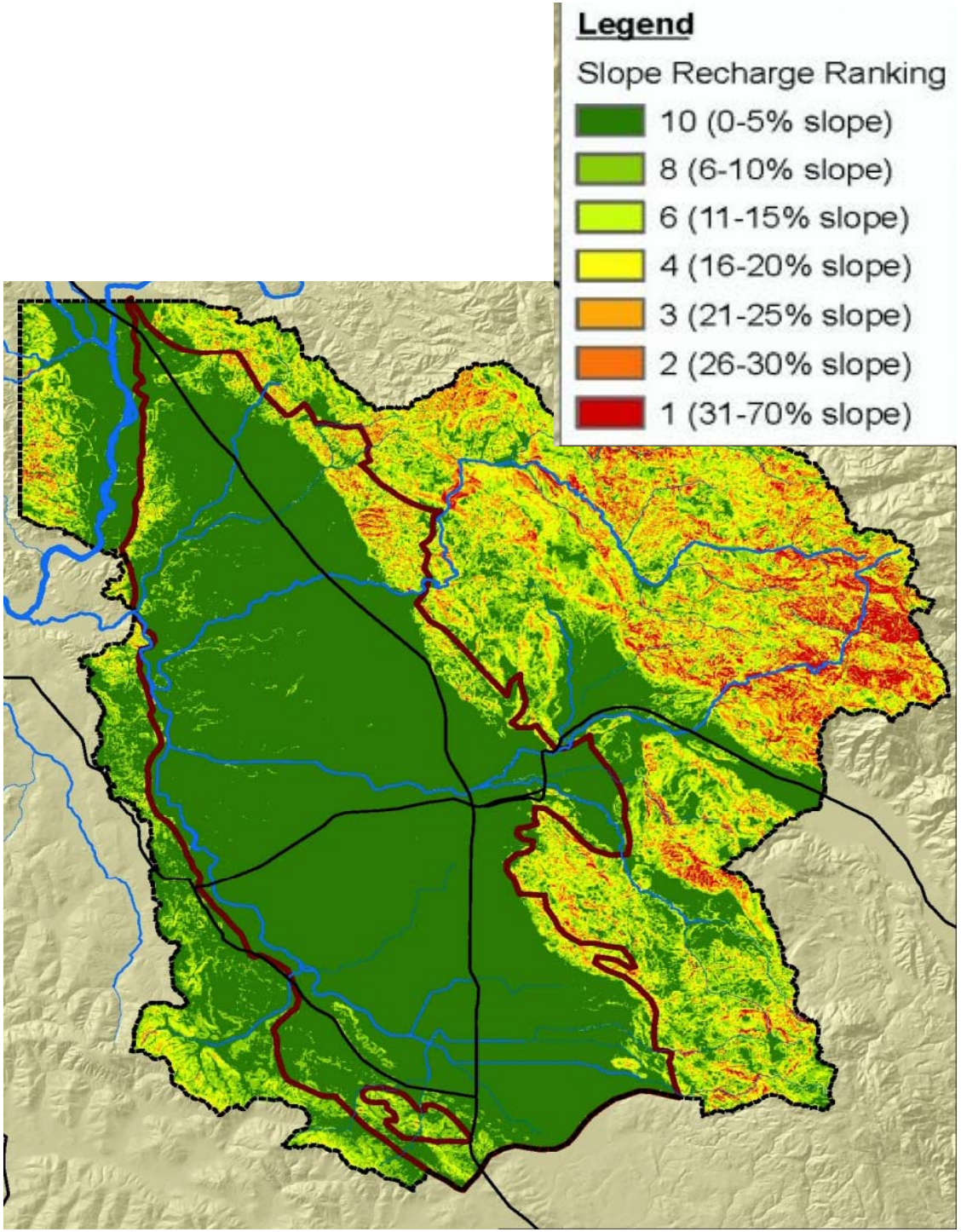
# Soil Permeability Ranking

- Data from USDA Soil Survey
- Infiltration rate ranked from low to high
- Considerable variability in soil recharge ranking



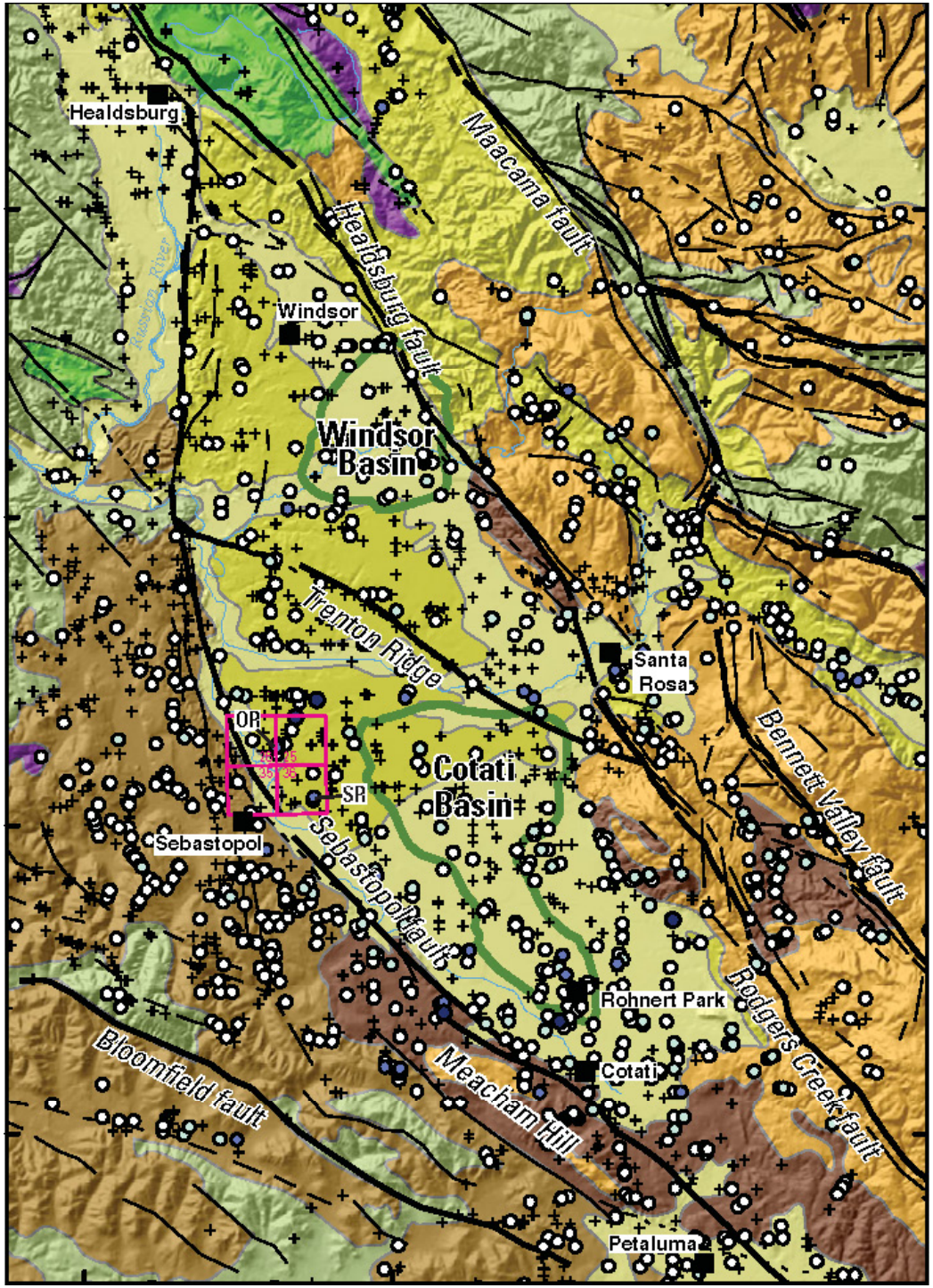
# Slope Ranking

- Data from USGS topographic maps
- Steep slopes limit both natural and managed recharge potential
- Most of Santa Rosa Plain has high slope recharge ranking



# Recent Refined Geologic Data

- Data from USGS June 2010
- Data from 2,683 well logs interpreted



# Refined Geologic Data Used to Characterize Geology Recharge Potential

- Geologic characteristics described for 16 depth-discrete layers
- Formation and texture descriptions used to rank permeability of geology
- Shallowest layer 0 to 50 ft used

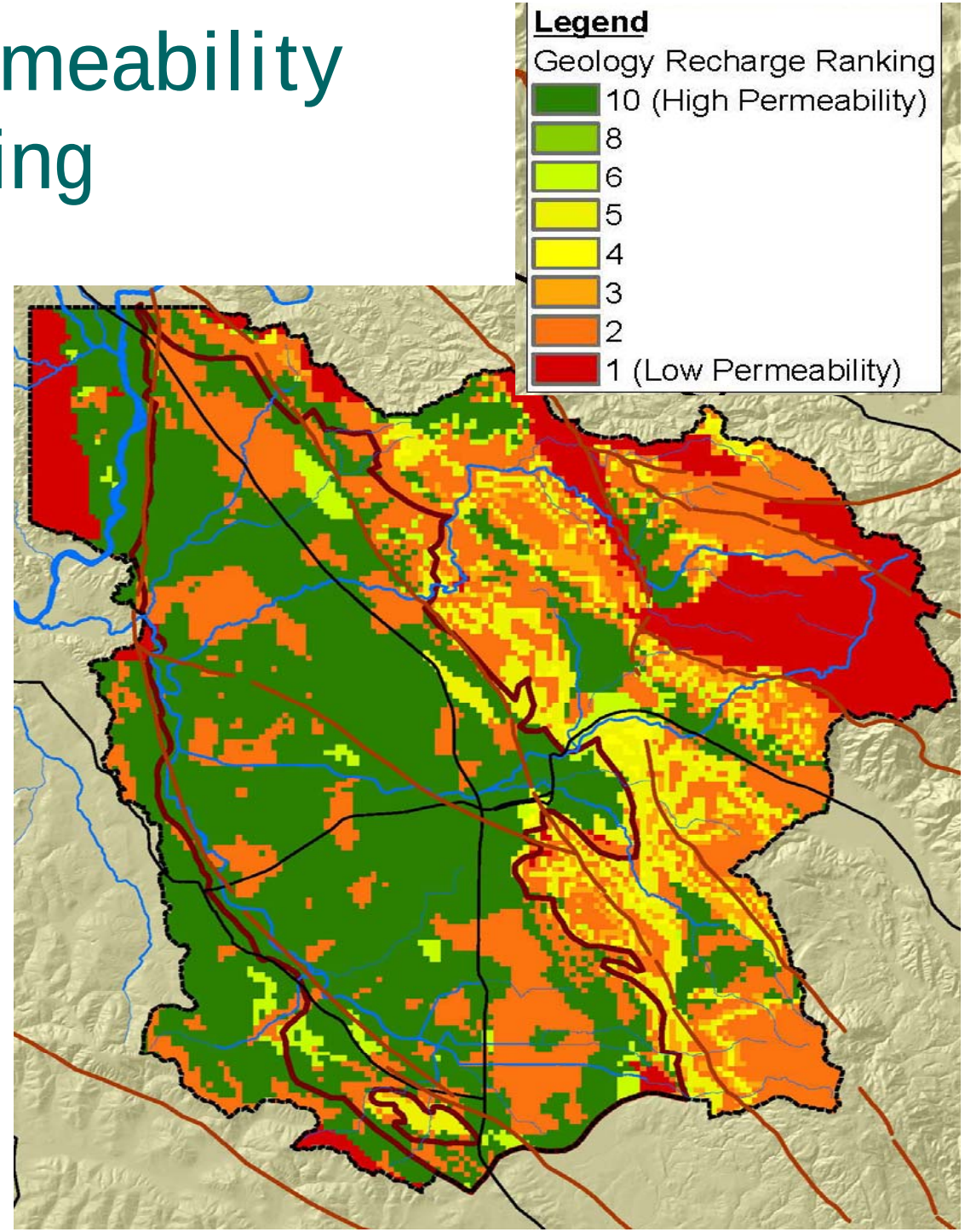
# Geology formations/textures ranked from most (10) to least (1) permeable

| GEOLOGY (0'-50') | | | | | | |
|---|---|---|---|---|---|---|
| Stratigraphic Unit | Texture Class | | | | | |
| | Undifferentiated | Coarse | Intermediate | Fine | Tuff | Basalt |
| **Glen Ellen Formation** | | | | | | |
| Texture Class | 1000 | 1001 | 1002 | 1003 | 1004 | 1005 |
| Recharge Ranking | 10 | 10 | 6 | 2 | 2 | 1 |
| **Wilson Grove Formation** | | | | | | |
| Texture Class | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| Recharge Ranking | 10 | 10 | 6 | 2 | 2 | 1 |
| **Neogene Volcanics** | | | | | | |
| Texture Class | 3000 | 3001 | 3002 | 3003 | 3004 | 3005 |
| Recharge Ranking | 2 | 5 | 4 | 3 | 2 | 1 |
| **Petaluma Formation** | | | | | | |
| Texture Class | 4000 | 4001 | 4002 | 4003 | 4004 | 4005 |
| Recharge Ranking | 2 | 10 | 6 | 2 | 2 | 1 |
| **Mesozoic Basement** | | | | | | |
| Texture Class | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 |
| Recharge Ranking | 1 | 1 | 1 | 1 | 1 | 1 |

Stratigraphic unit with undifferentiated texture call assigned the texture most typical of the formation.

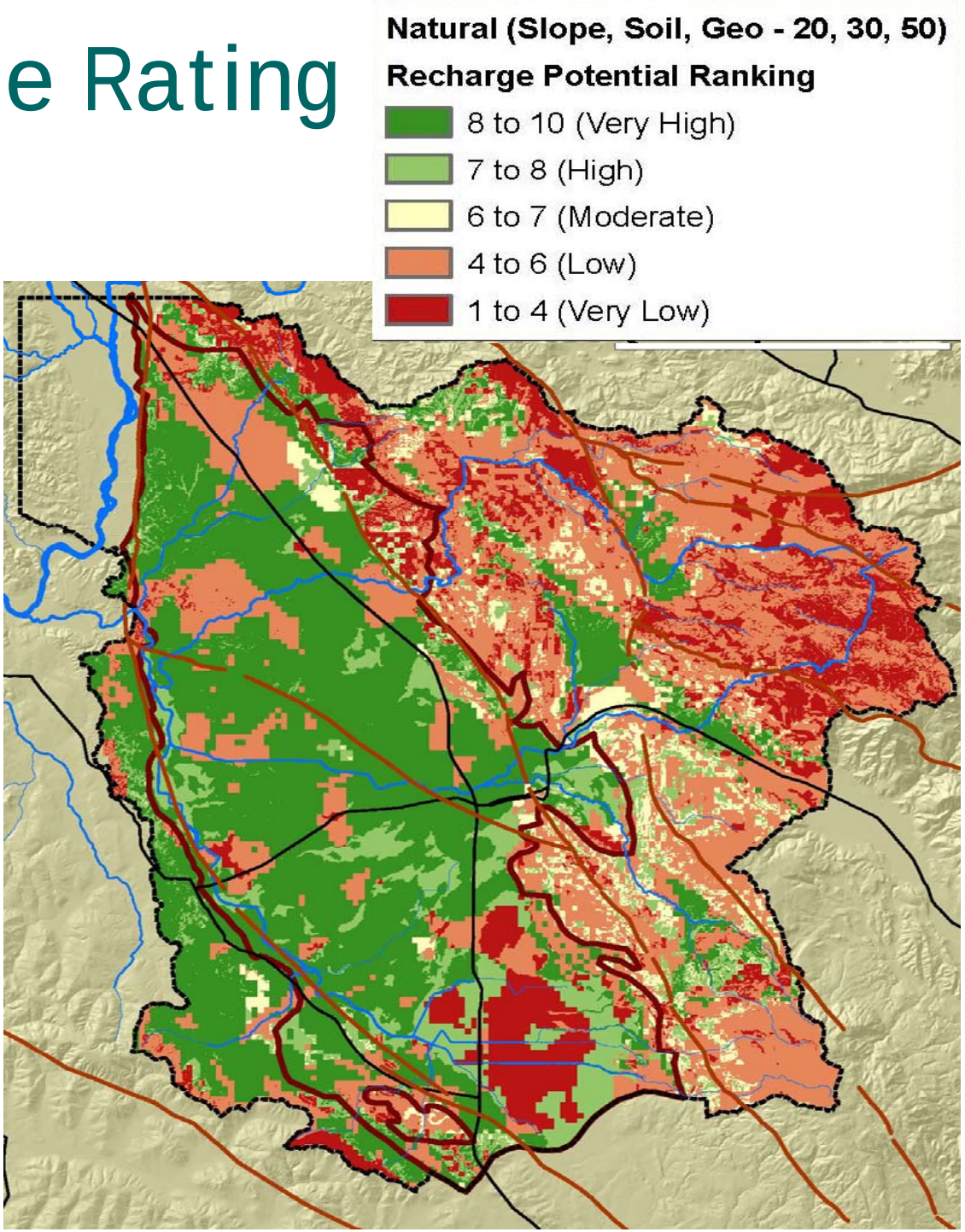
# Geology Permeability Ranking

- Some variability
- Most of Santa Rosa Plain suitable



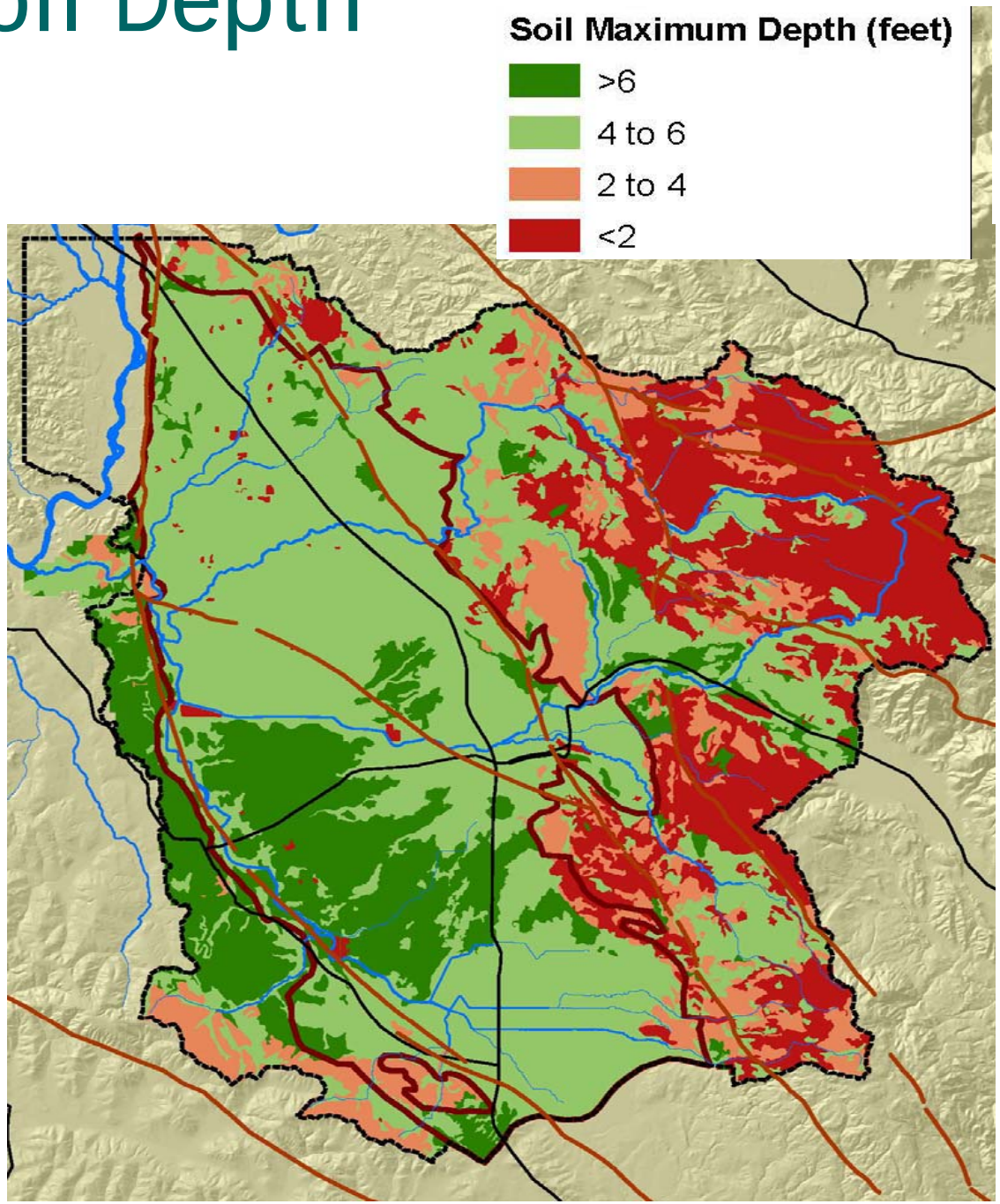
# Natural Recharge Rating

- Project types
  - Minimal or no excavation of surface soils
  - Swales
  - Small diversions
  - Land spreading
- Combines and weights
  - Soil permeability – 30%
  - Slope – 20%
  - Geologic unit permeability – 50%



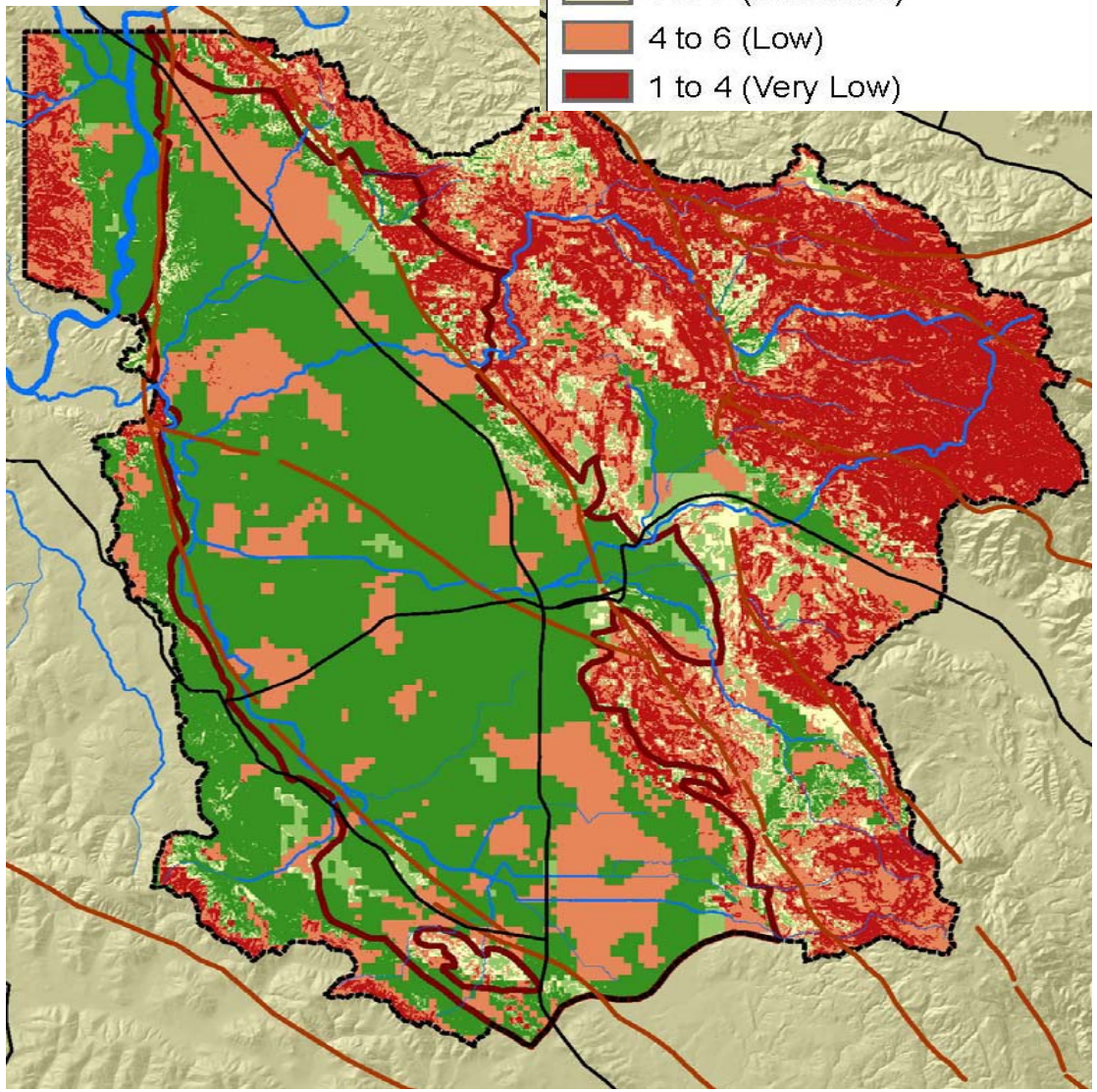
# Soil Depth

- Soil less than 6 feet deep can be excavated for engineered recharge projects
- Engineered Recharge Projects
  - Spreading basins
  - Detention basins

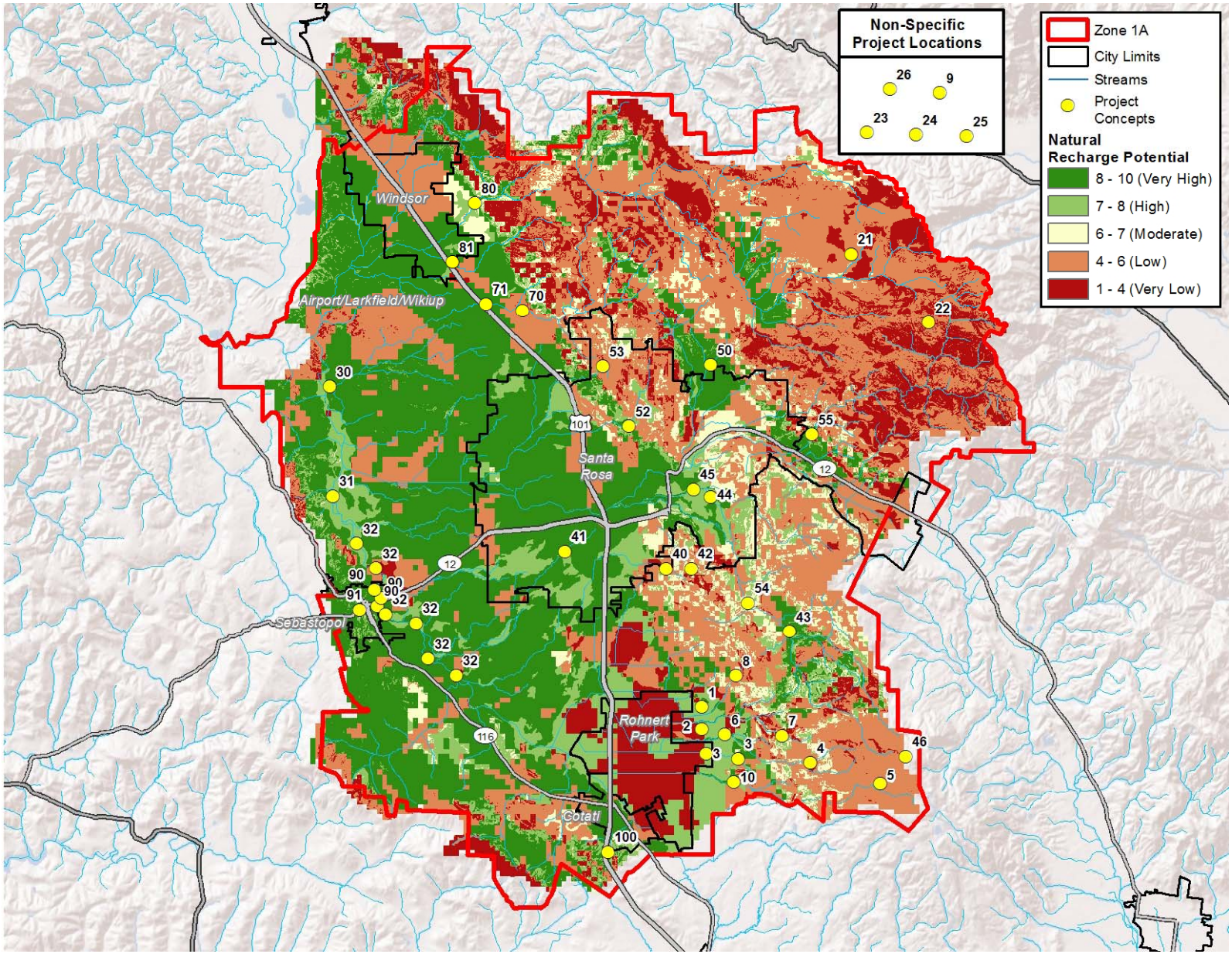


# Engineered Recharge Ranking

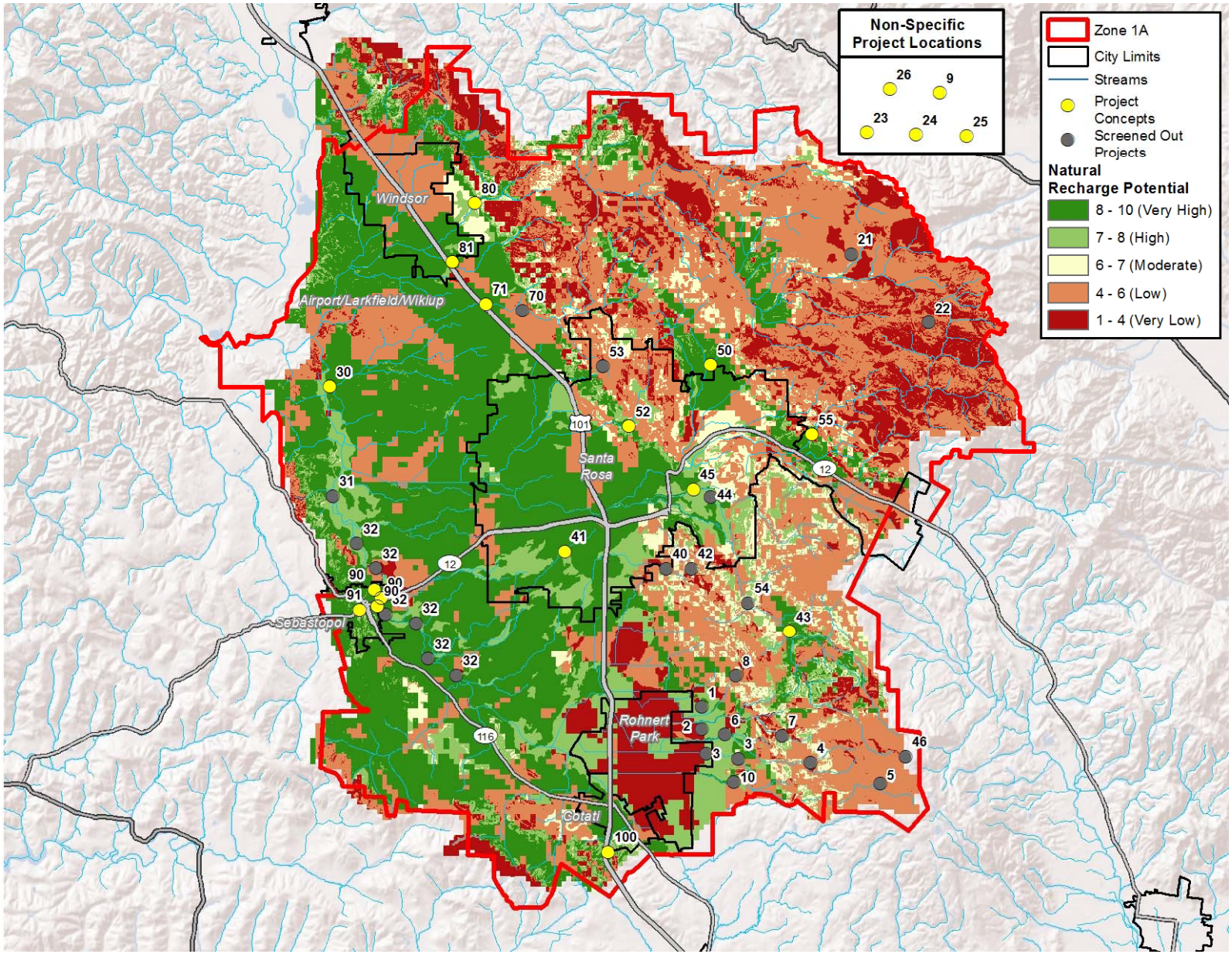
- Combine and weight
  - Geology – 50%
  - Slope – 50%
- More area is suitable compared with natural recharge ranking



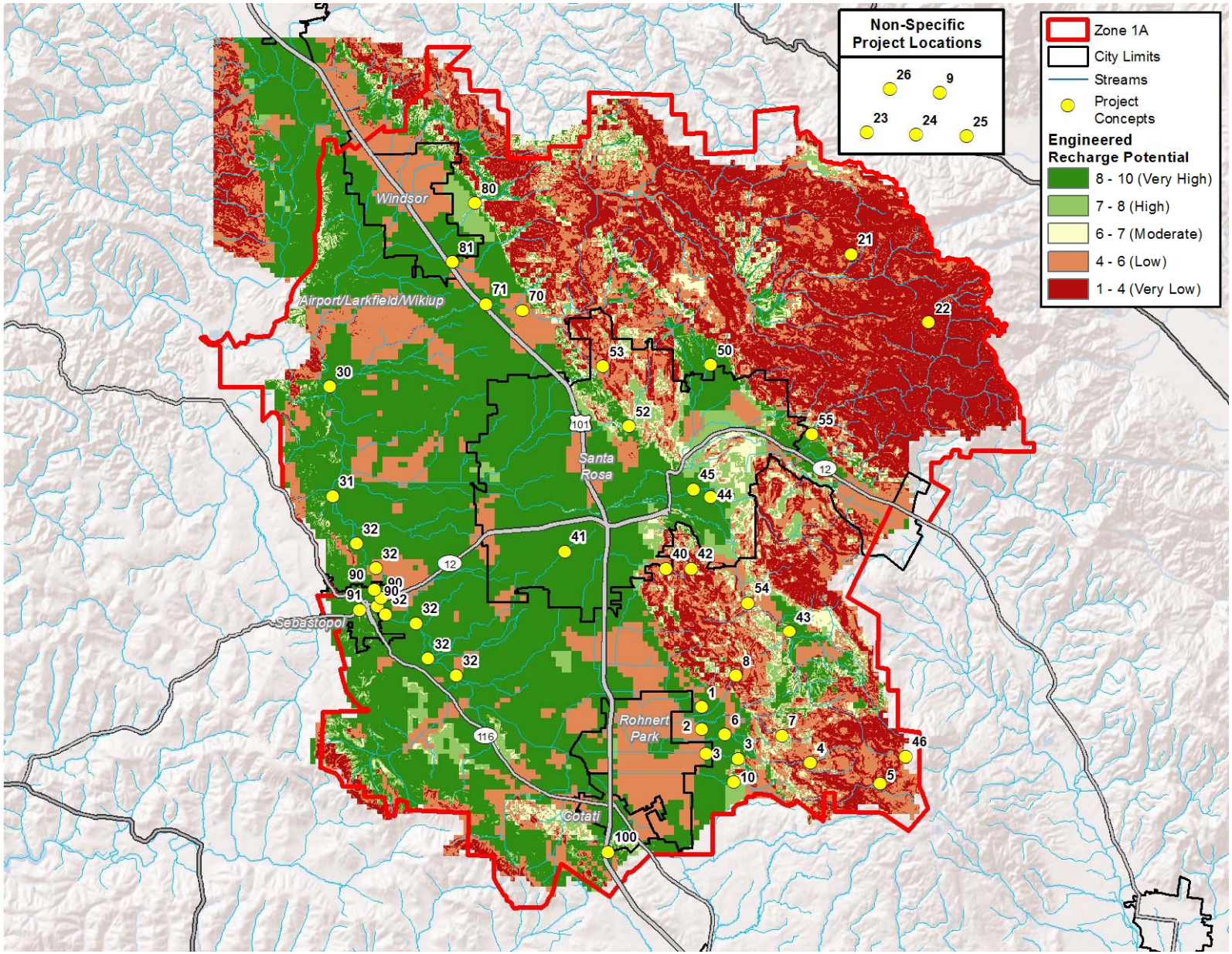
# Natural Recharge Potential



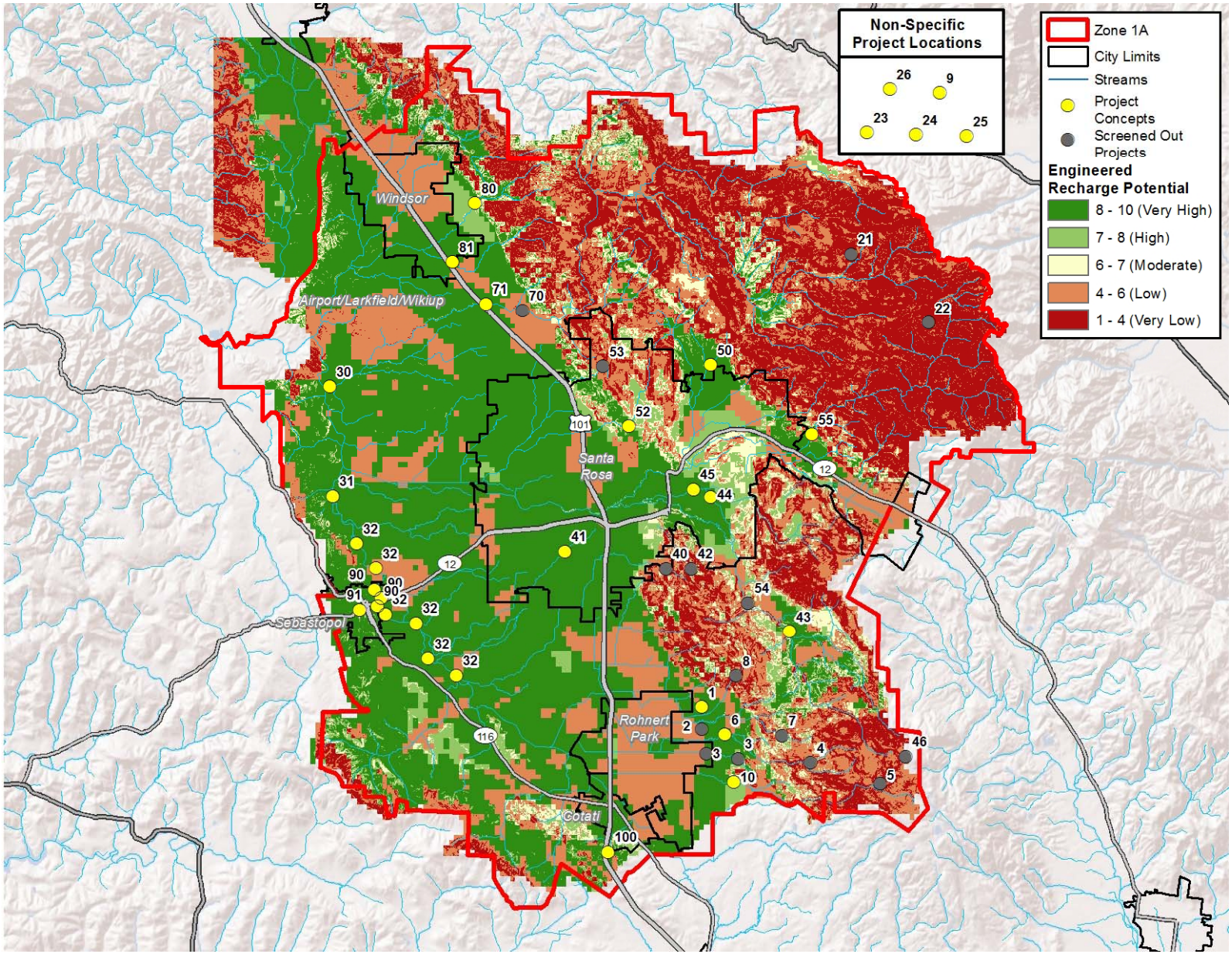
# Natural Recharge Potential



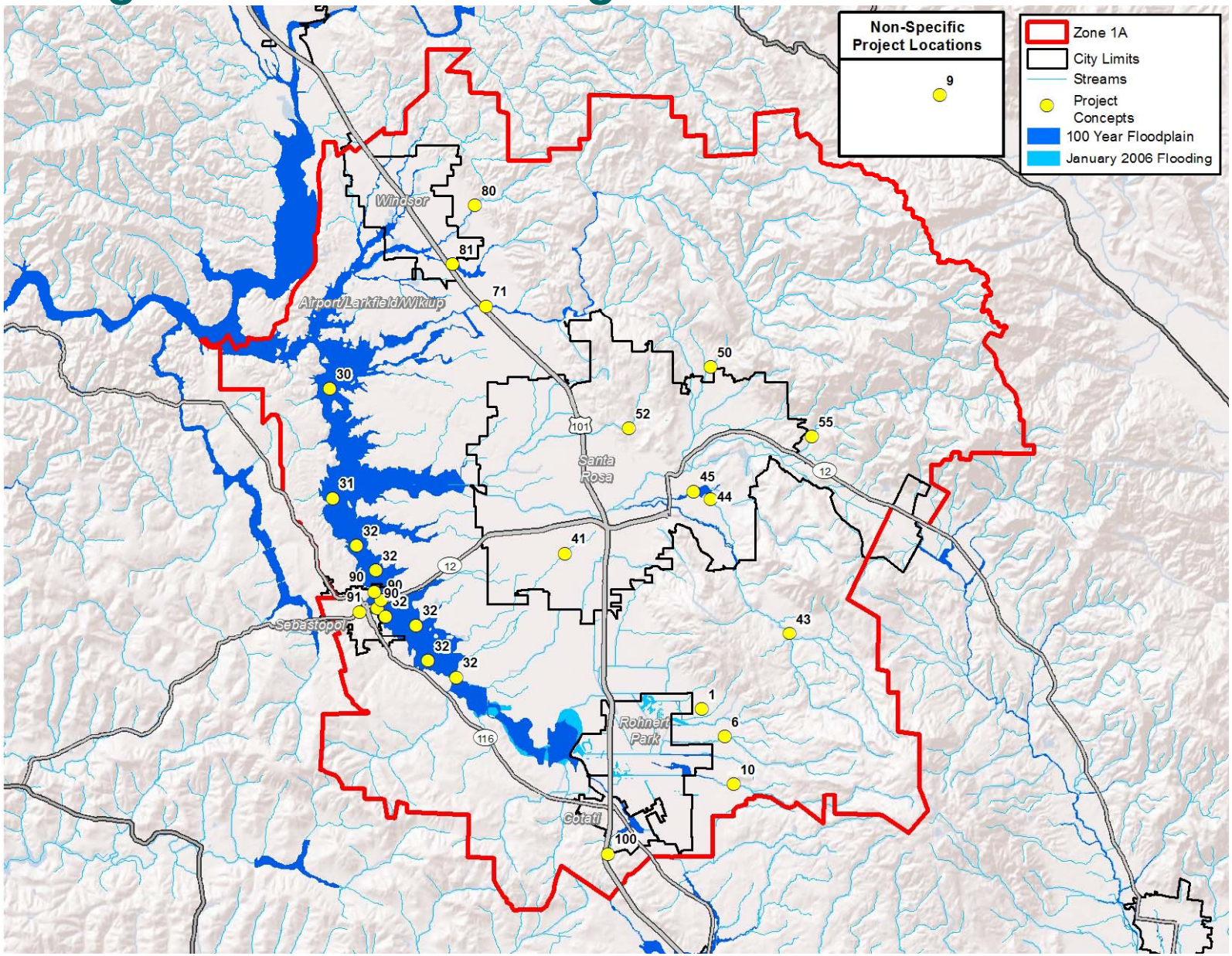
# Engineered Recharge Potential



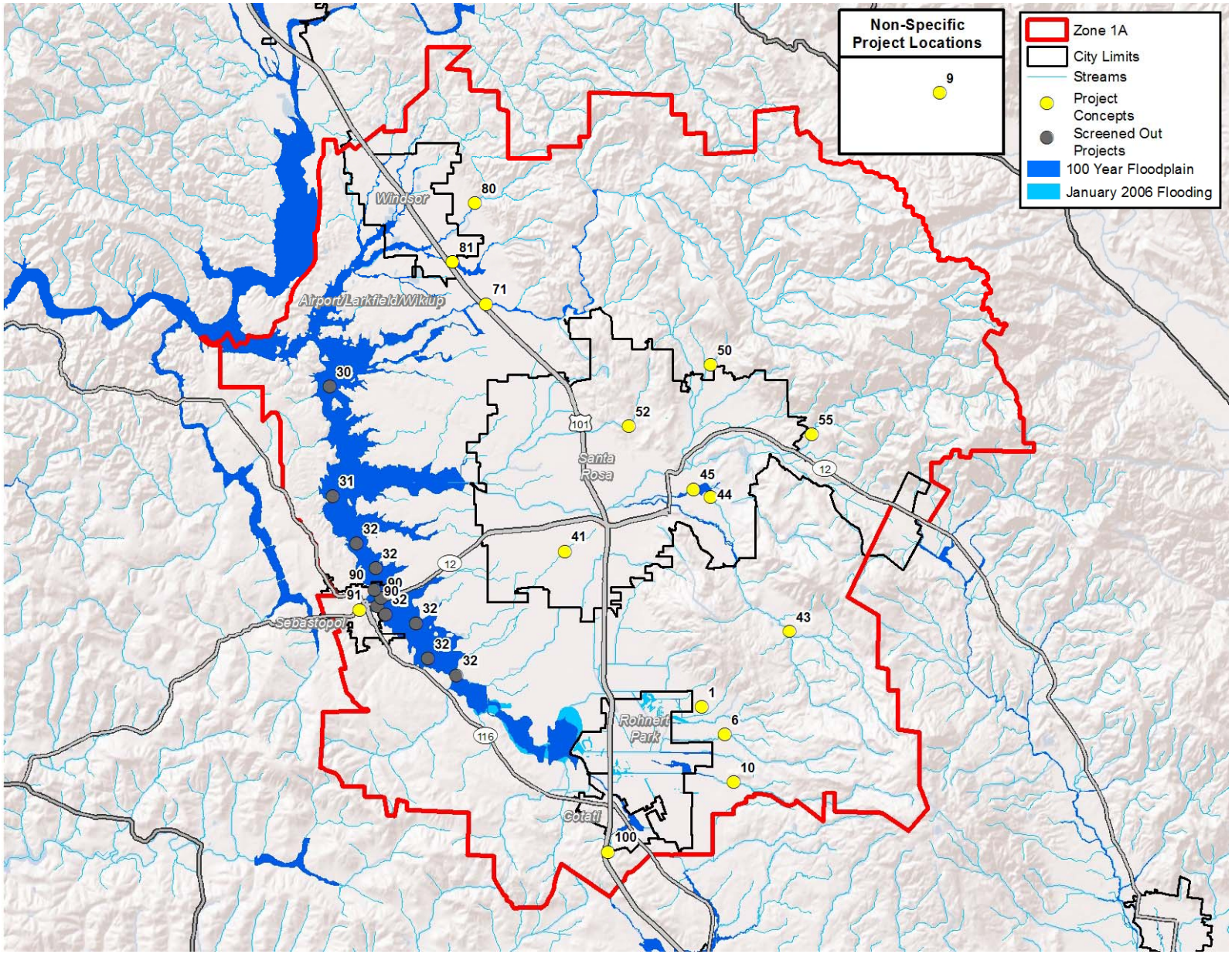
# Engineered Recharge Potential



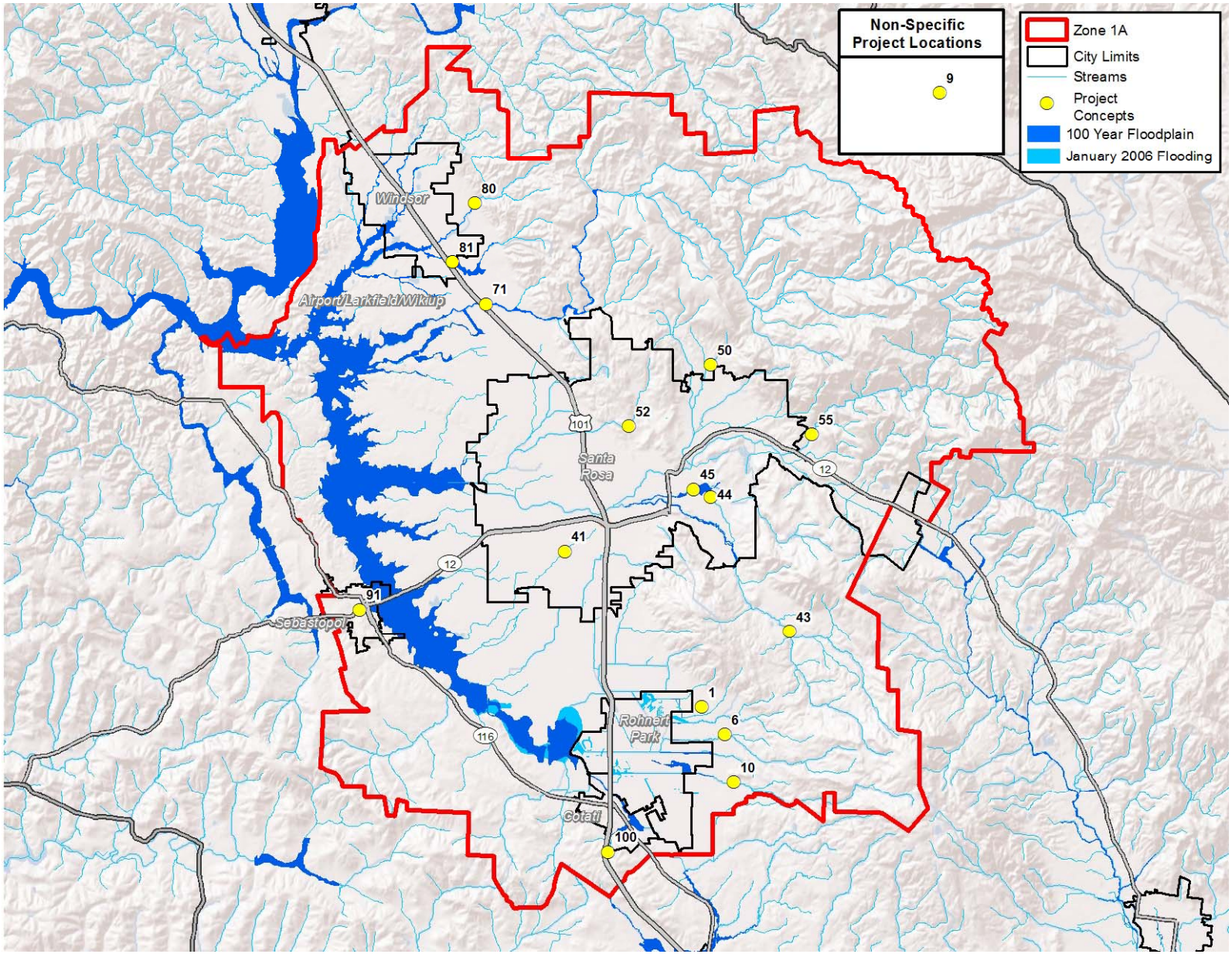
# Project Concepts with Natural or Engineered Recharge Potential



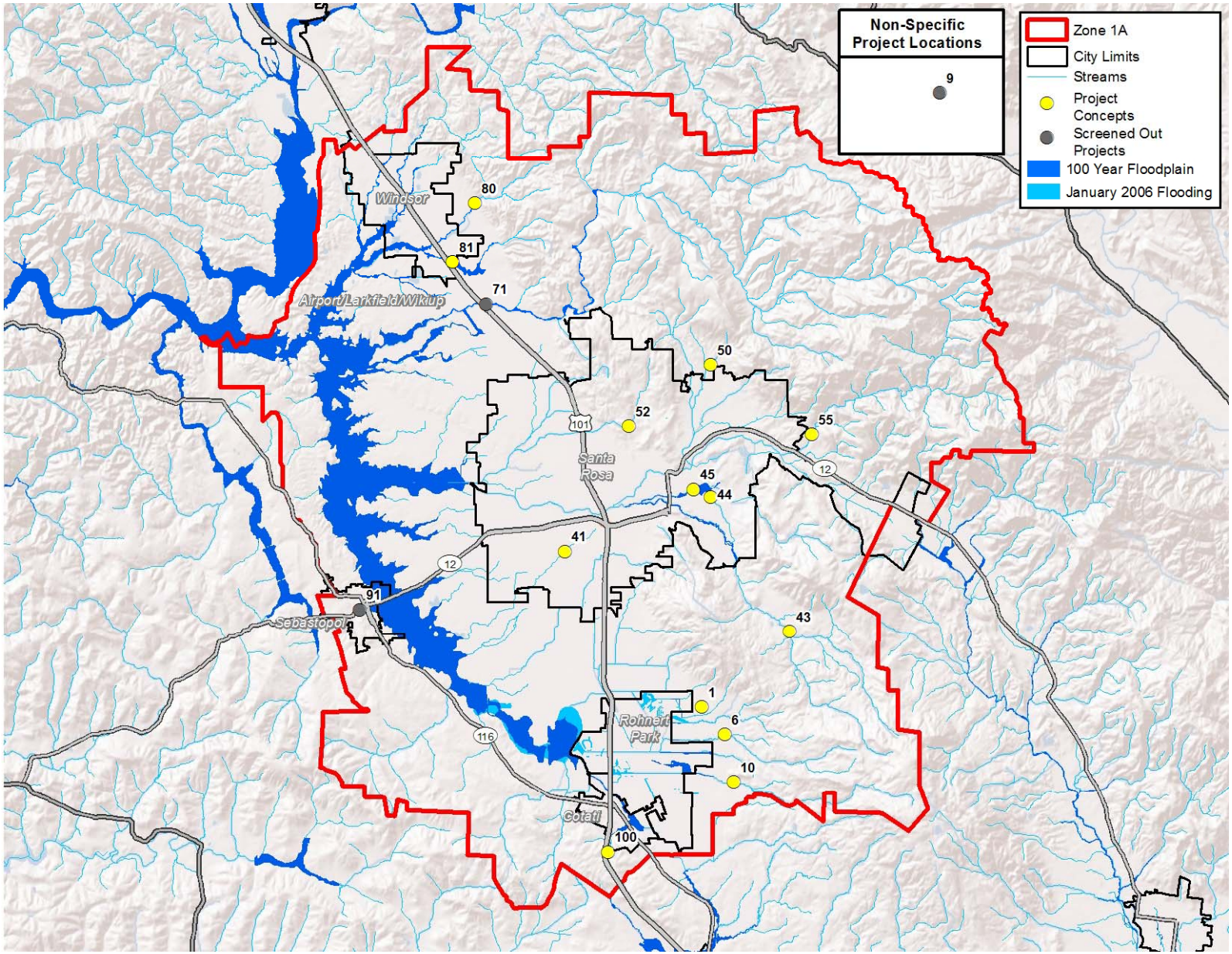
# Recharge Potential: High Groundwater



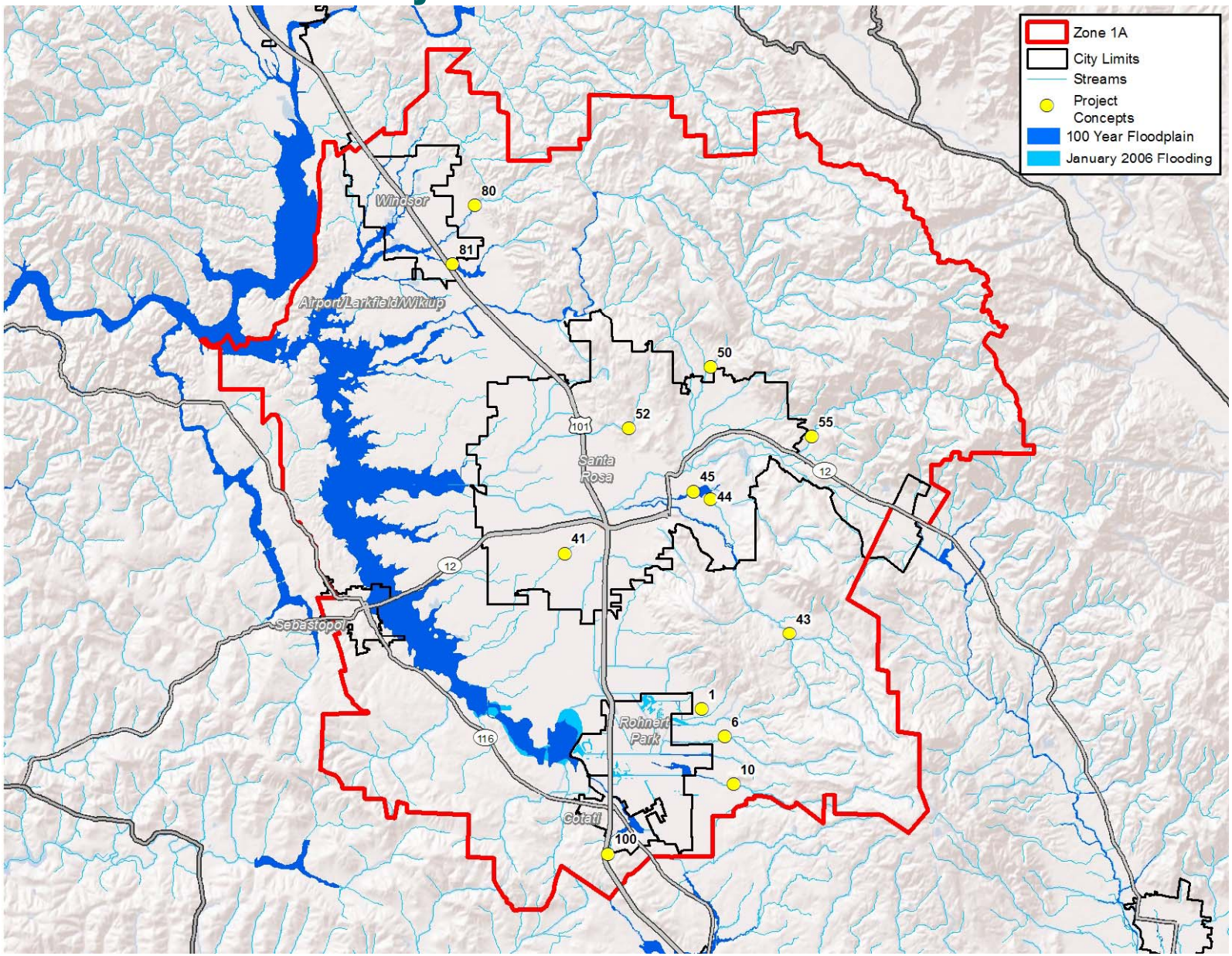
# Urban Flooding



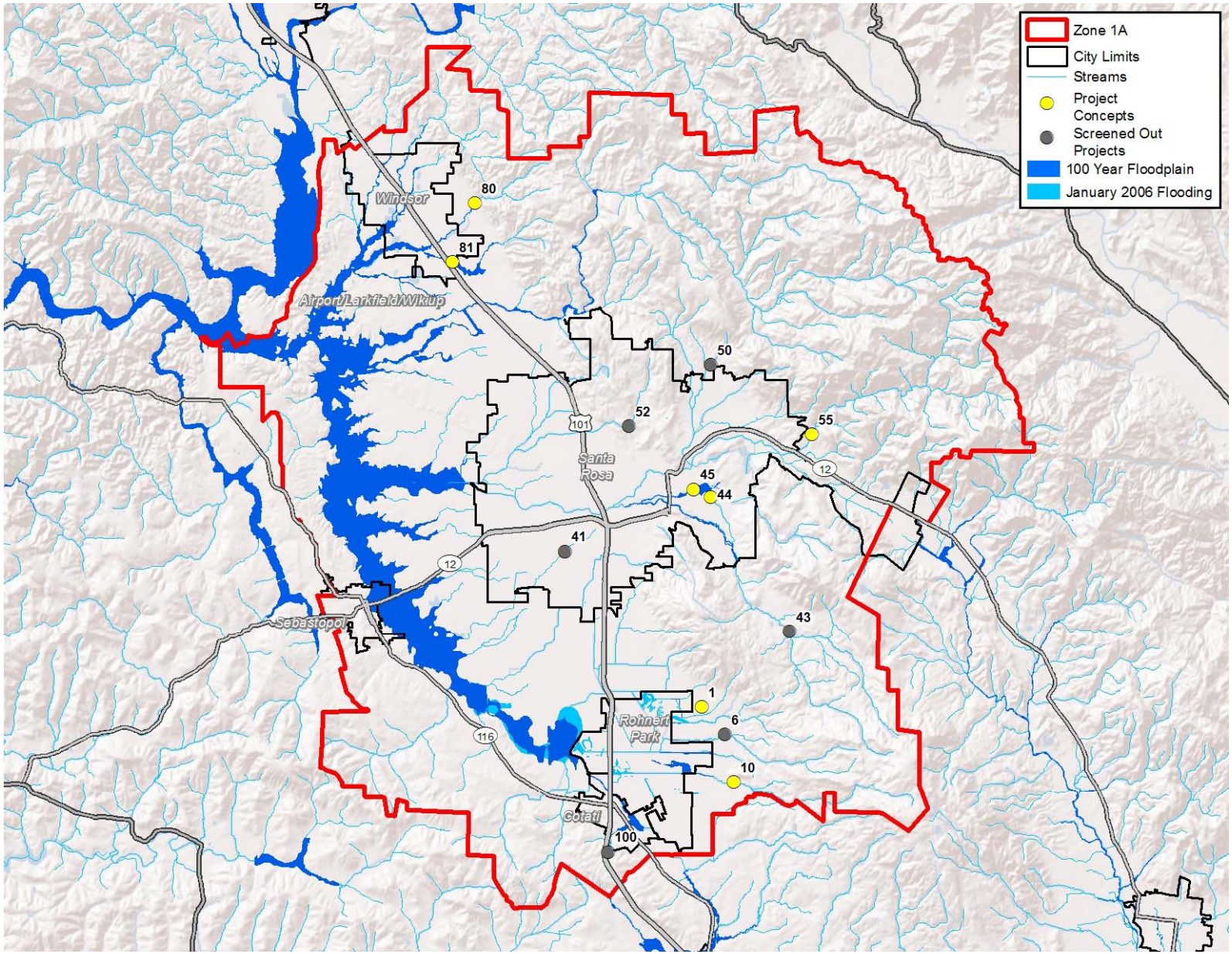
# Urban Flooding



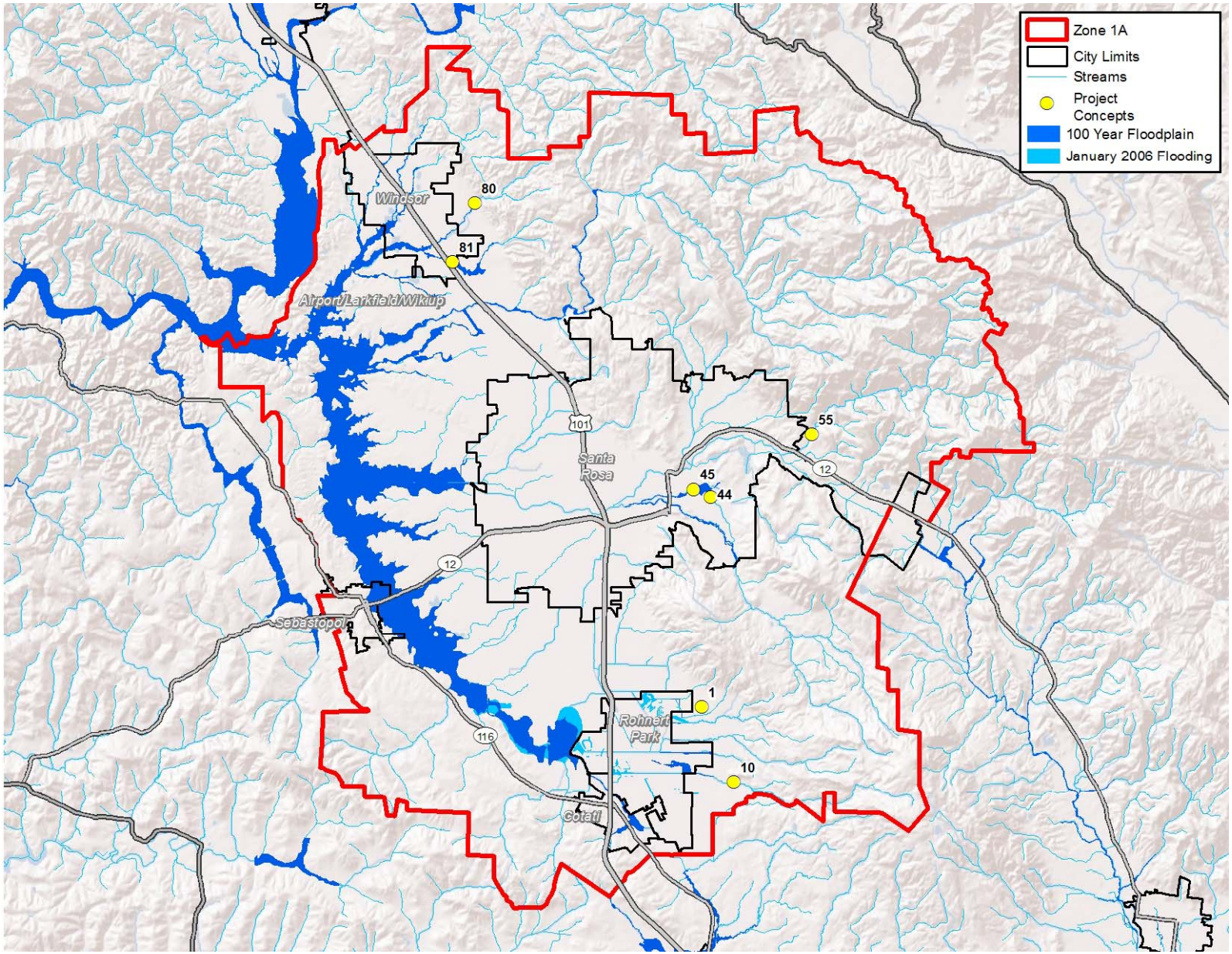
# Project Concepts that Meet Both Core Objectives



# Supporting Objectives



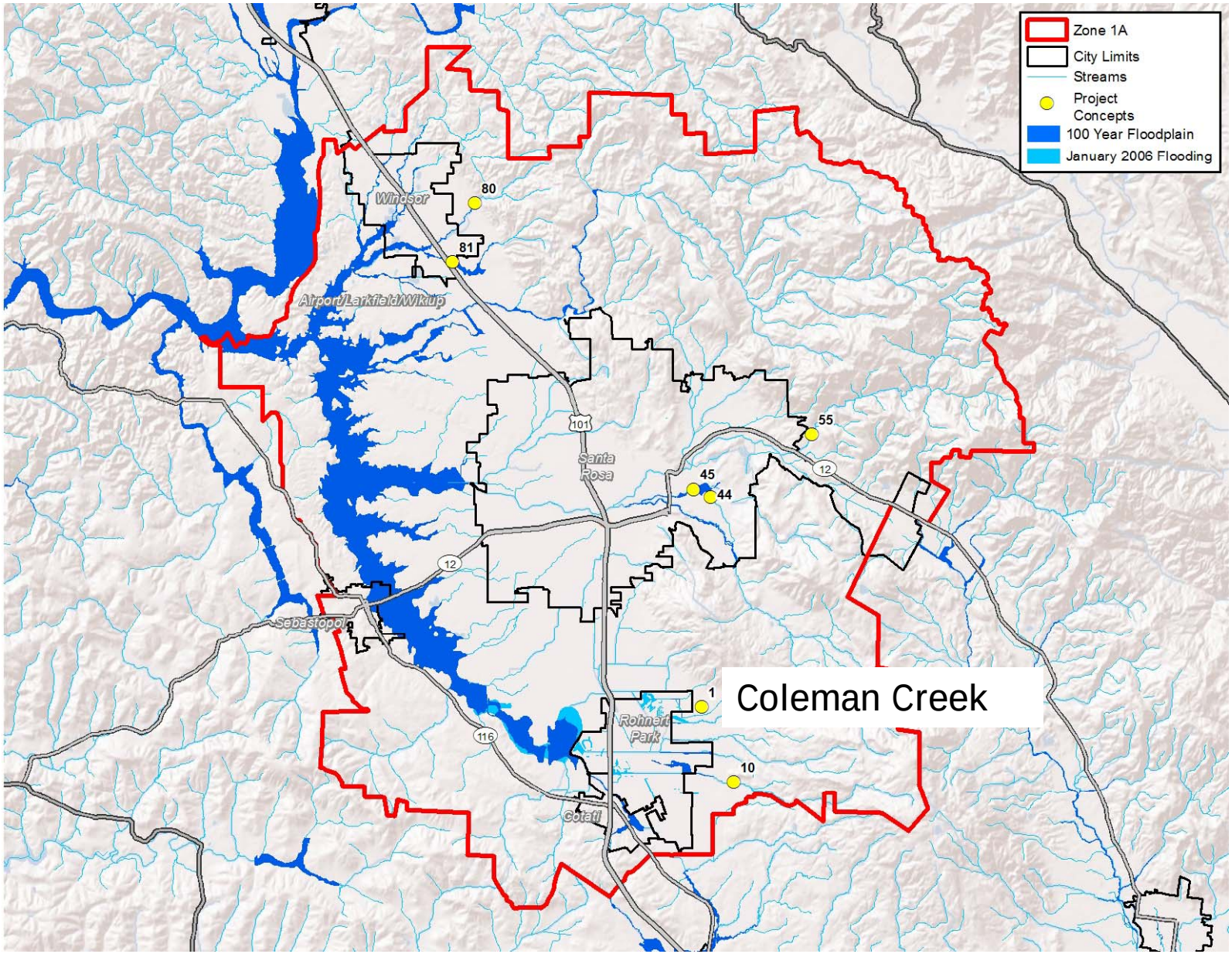
# Remaining Projects Meet Both Core Objectives and Two or More Supporting Objectives



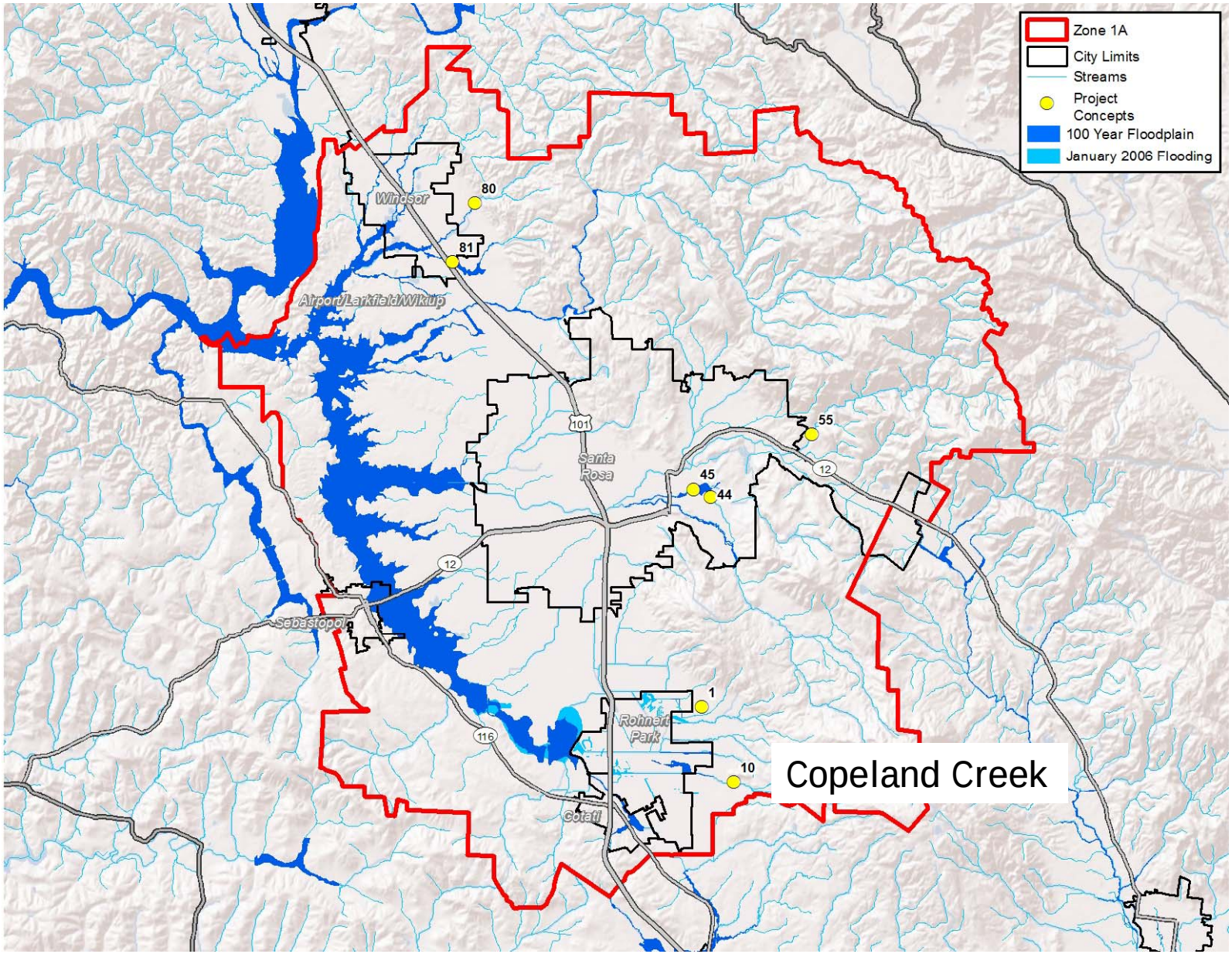
# Proposed Project Concepts

- Project #1 on Coleman Creek
- Project #10 on Copeland Creek
- Project #44 Southeast Greenway
- Project #45 on Spring Creek
- Project #55 on Santa Rosa Creek
- Project #80 on Pool Creek
- Project #81 on Pruitt Creek

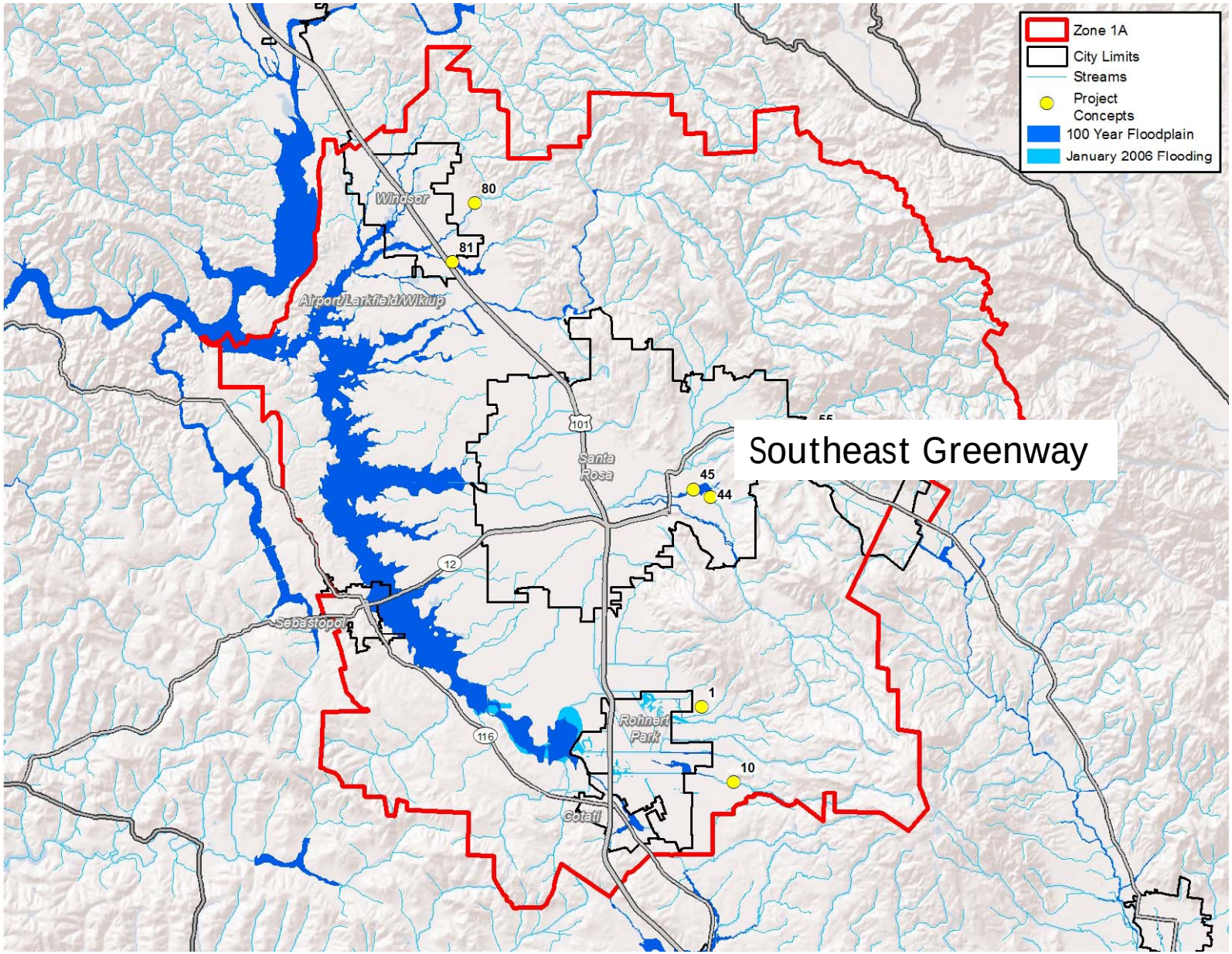
# Coleman Creek Daylighting: Water Quality, Sustainability, and Community Benefits.



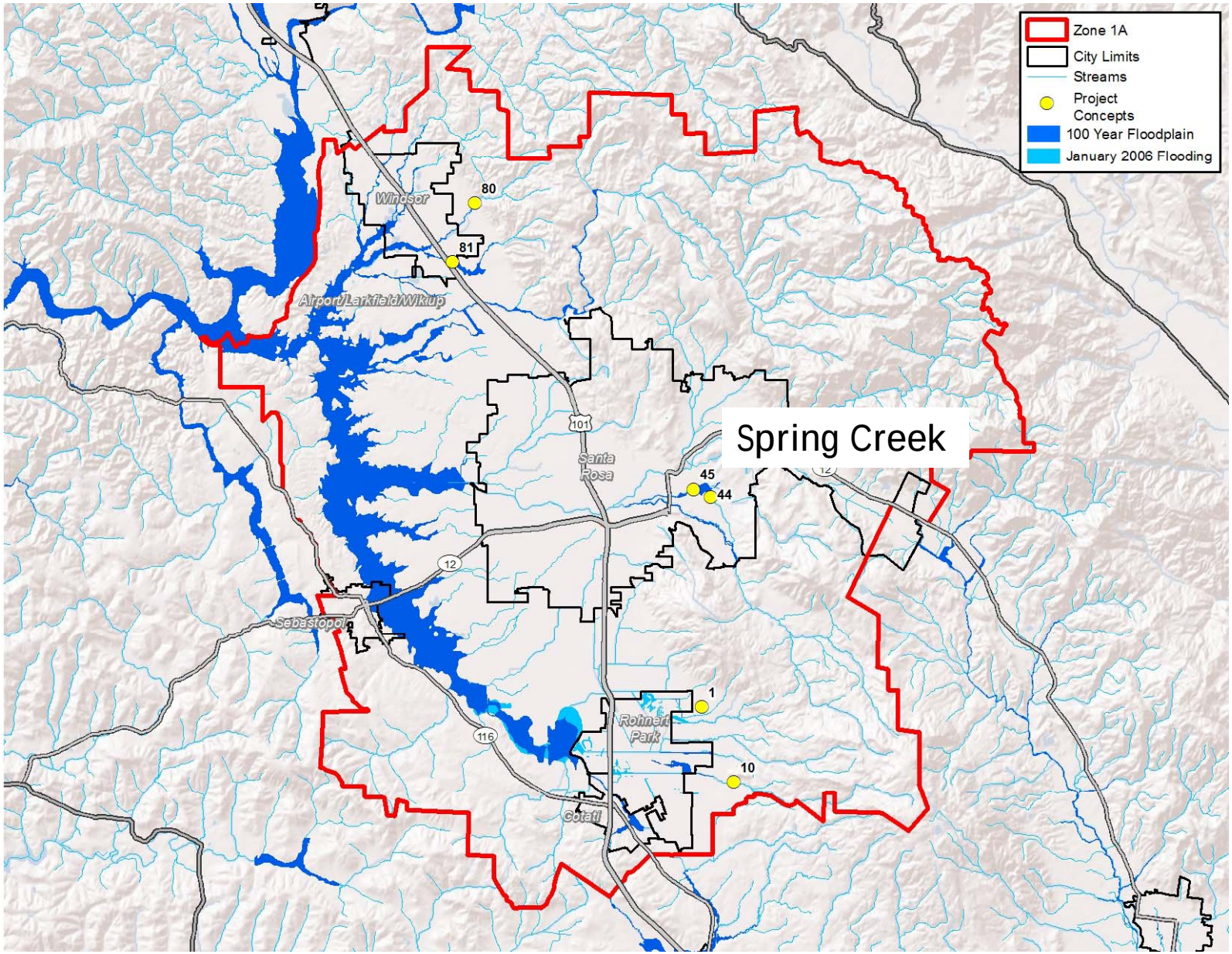
# Copeland Creek Stormwater Retention, Groundwater Recharge, Habitat Restoration, and Steelhead Refugia: Water Quality, Ecosystem, Open Space, and Community Benefits



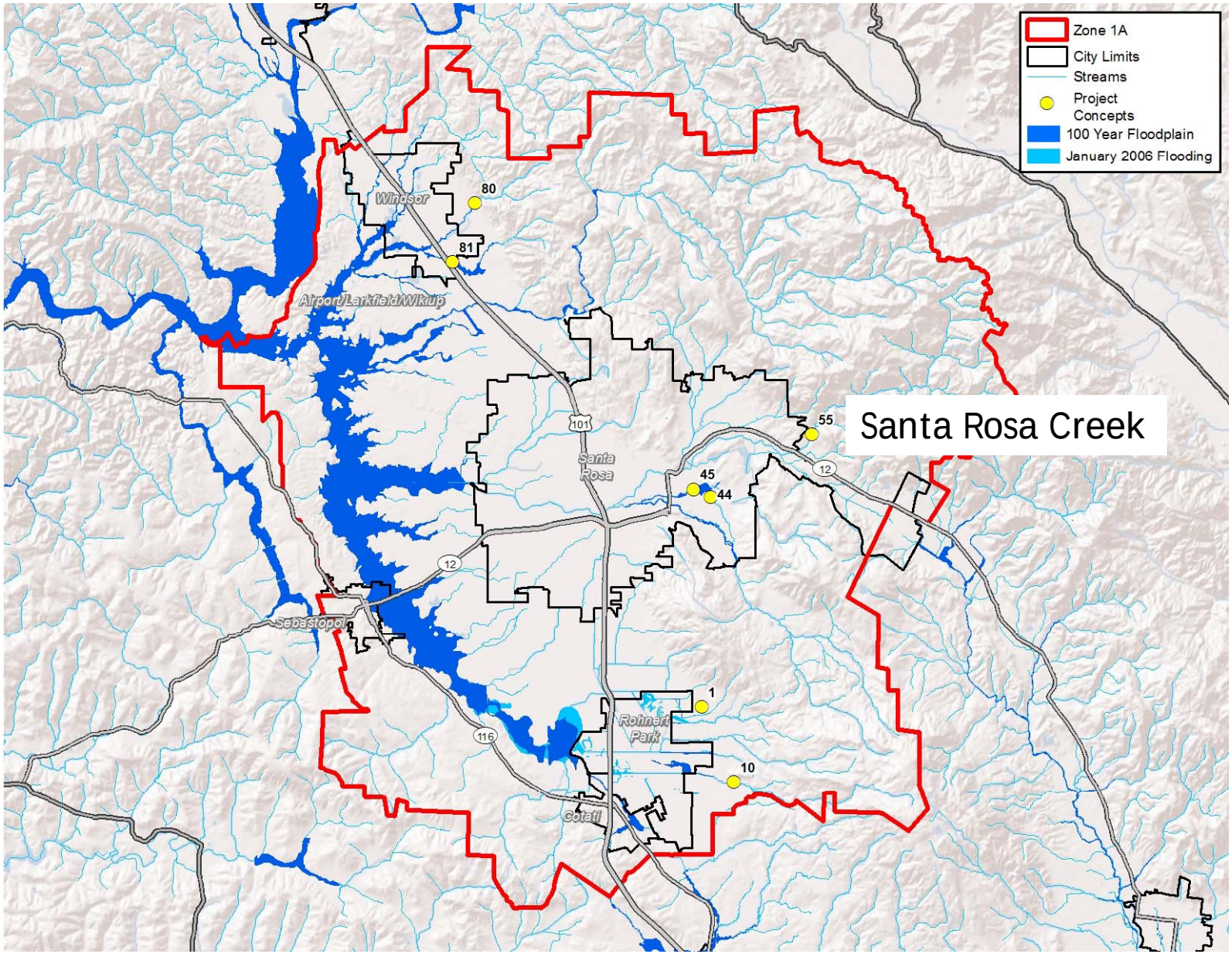
# Southeast Greenway: Greenway with Water Quality, System Sustainability, Ecosystem, Open Space, and Community Benefits



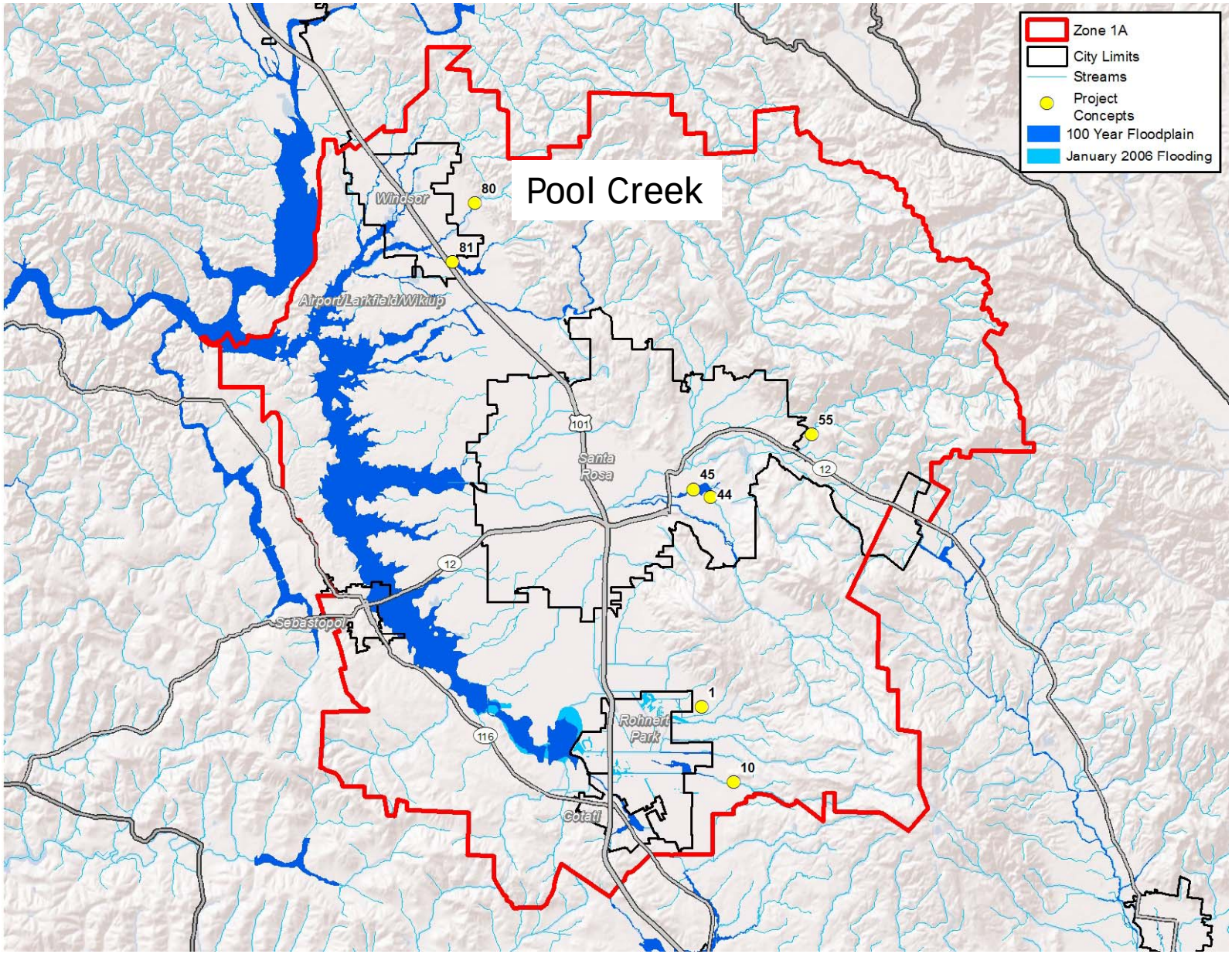
# Spring Creek Restoration:
# Water Quality, Ecosystem Benefits



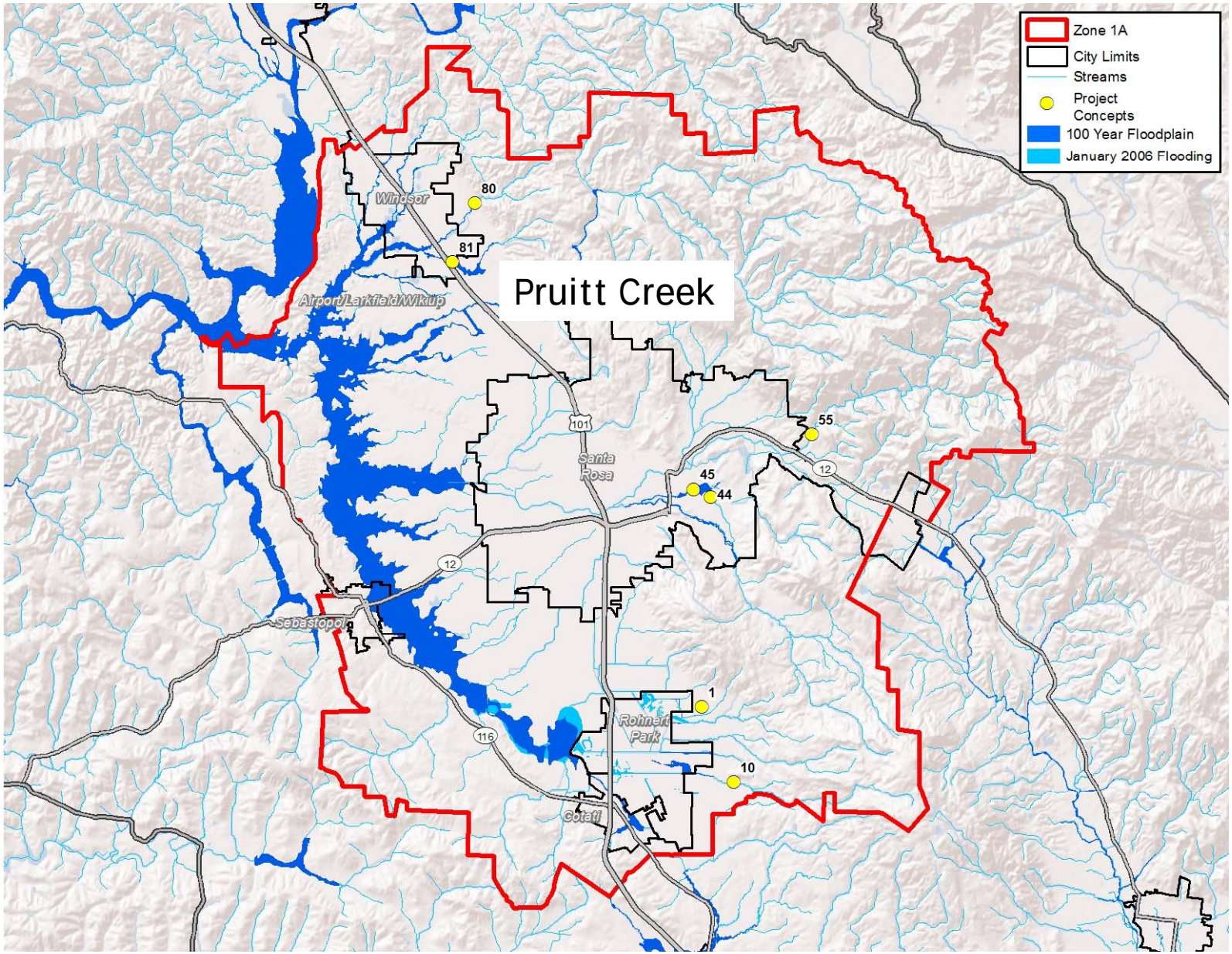
# Santa Rosa Creek: Water Quality, Ecosystem, Open Space, and Community Benefits



# Upper Pool Creek Watershed Engineered Recharge: Water Quality and Ecosystem Benefits



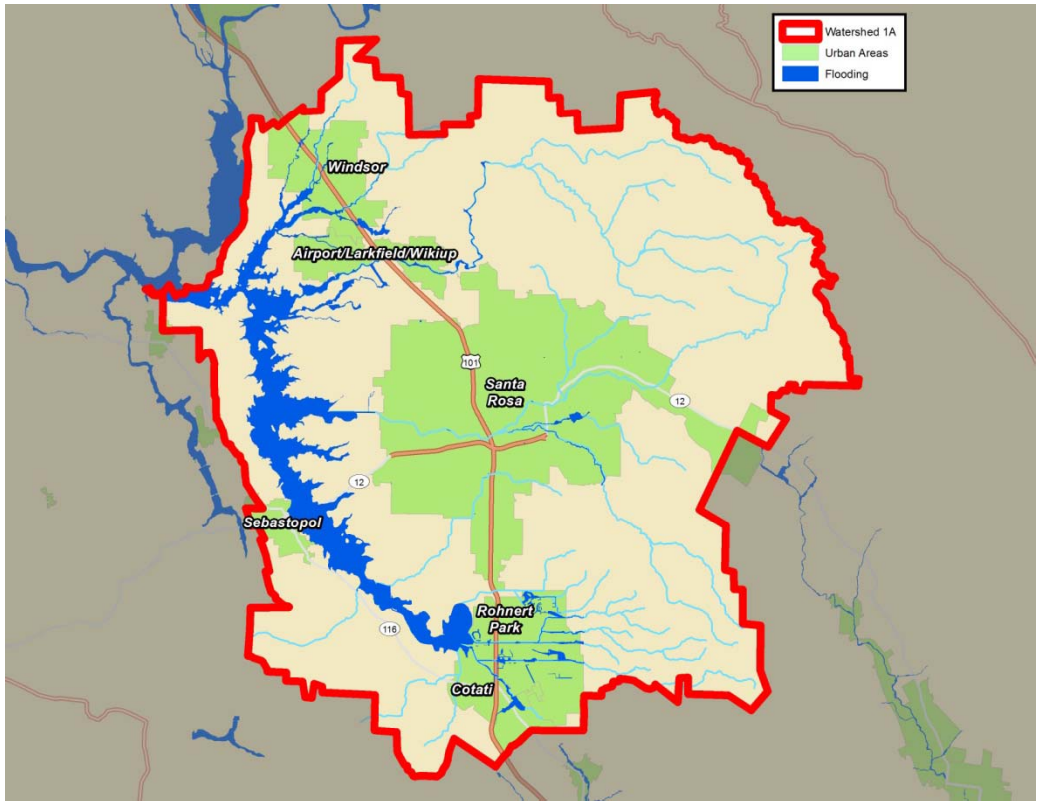
# Pruitt Creek Engineered Recharge: Water Quality and Ecosystem Benefits



# Next Steps

# Questions

# Laguna-Mark West Watershed

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