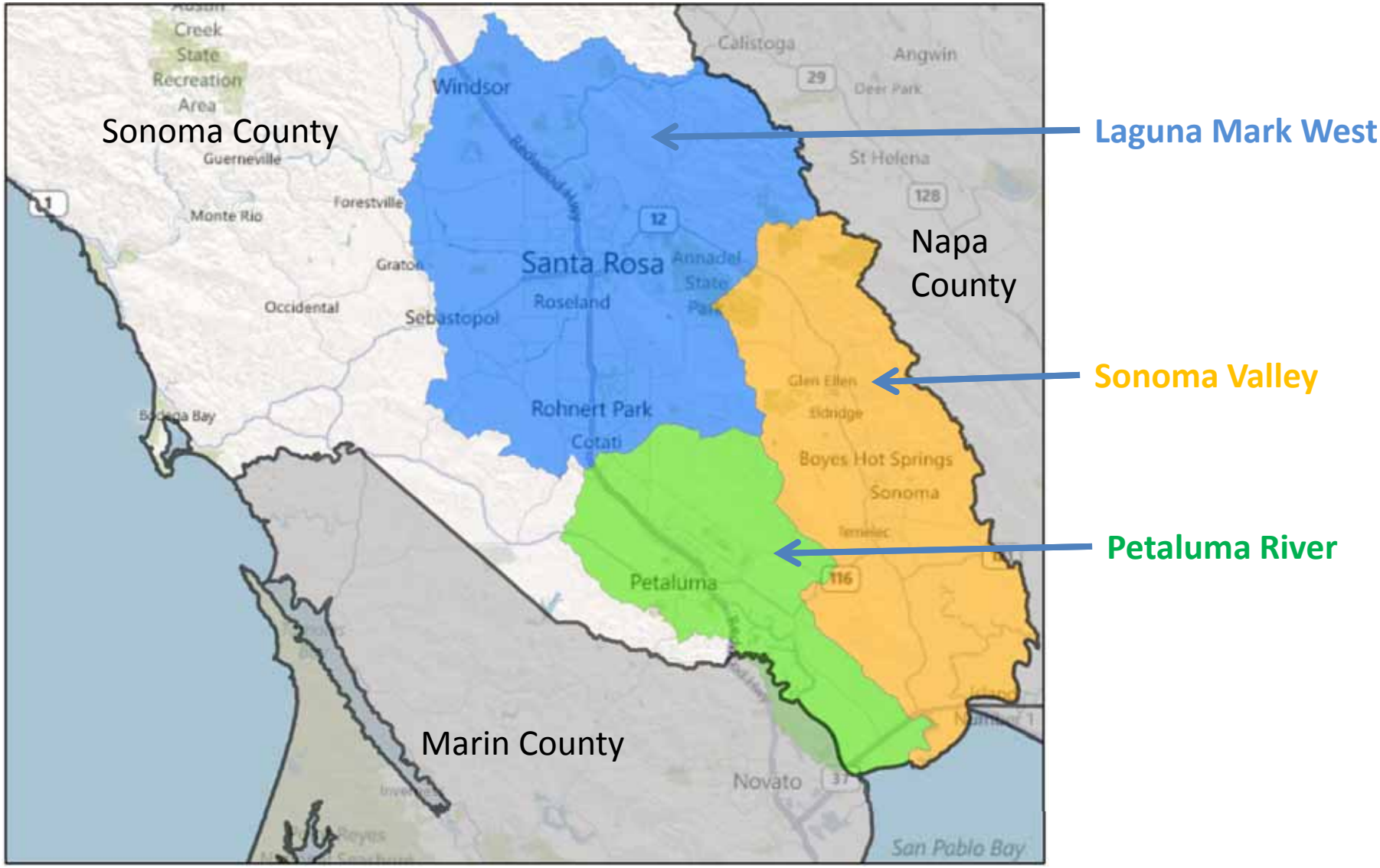
Stormwater Management and Groundwater Recharge Watershed Scoping Studies

- Laguna-Mark West
- Petaluma River
- Sonoma Creek

SONOMA COUNTY WATER AGENCY

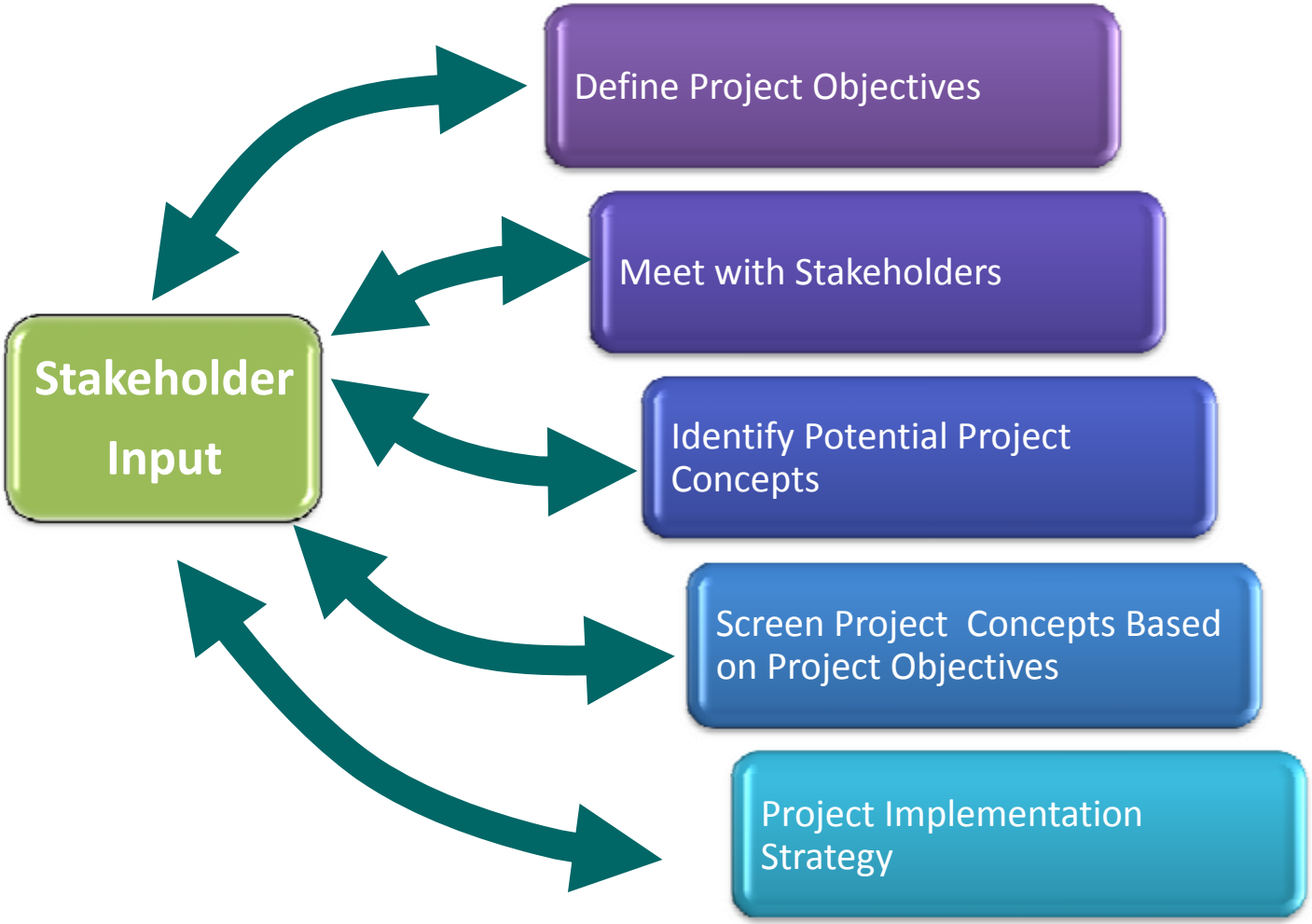
www.sonomacountywater.org

Scoping Studies in Three Watersheds

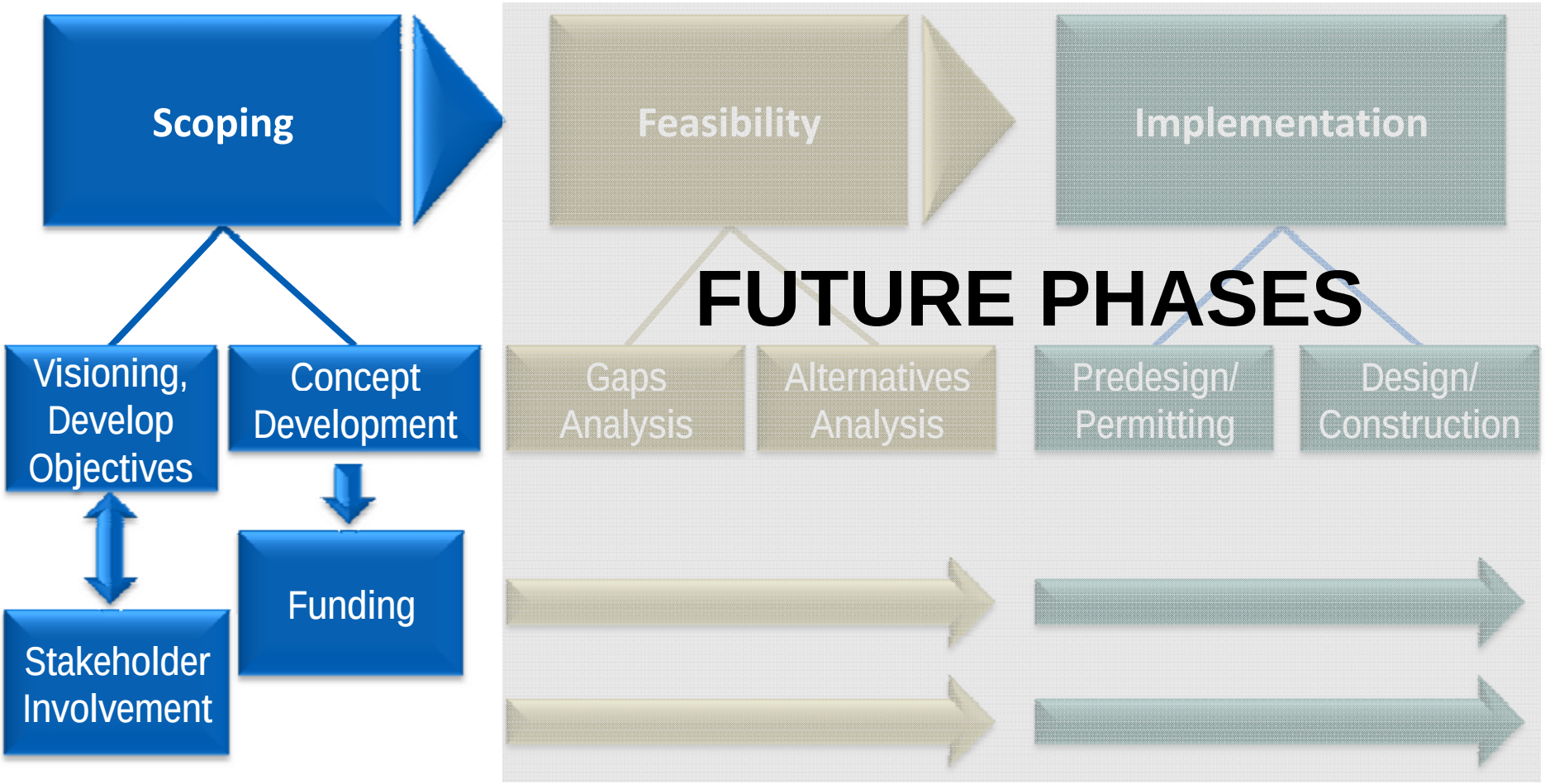


Project Concepts- Multi-Benefit Approach

Scoping Study Elements



Planned Process – Phases of Work



Stormwater Management and Groundwater Recharge Scoping Studies

Project objectives

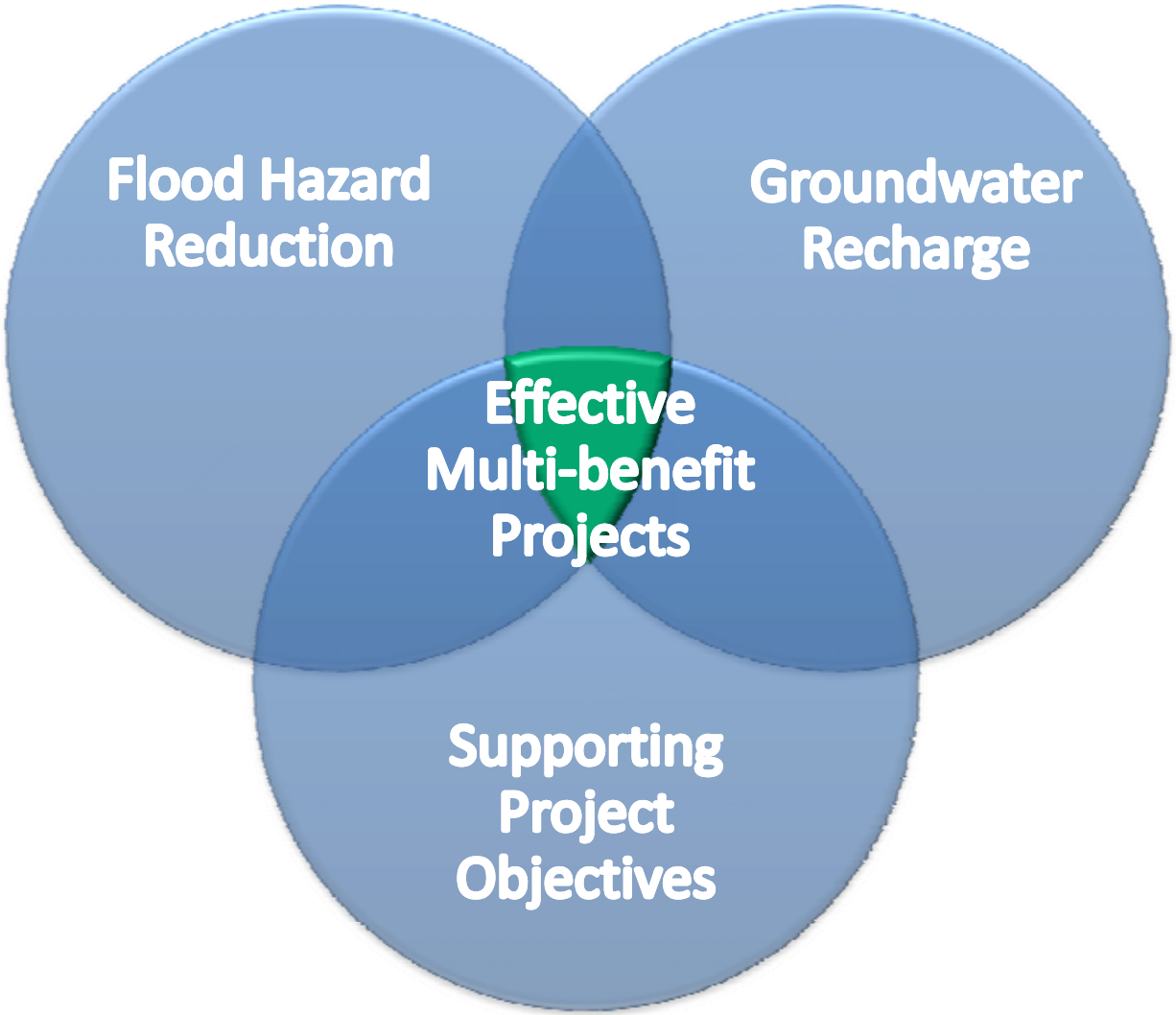
Developing the objectives

- Sources
  - Sonoma County Water Agency
  - State policy and grant program guidance
  - Stakeholder input

- Core objectives – required
- Supporting objectives – desired

- General consistency among the 3 watersheds

Project Objectives



Potential Project Types or Measures

Flood Management

- Decrease flood flows
- Increase conveyance
- Modify susceptibility to flooding

Groundwater Recharge

- Enhance groundwater recharge

Low Impact Development

- Mimic natural site hydrology

Core & Supporting Objectives

Flood Hazard Reduction

Groundwater Recharge

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

Core Project Objectives

- Flood hazard reduction
  - Improve management of stormwater that contributes, directly or indirectly, to reduced flood hazards.
- Groundwater recharge
  - Increase beneficial recharge of groundwater, whether or not that recharged groundwater is directly accessible as water supply.

Supporting Project Objectives

Water quality

Water supply

System sustainability

Ecosystem

Agricultural land

Open space

Community benefits

- Water quality
  - Improve water quality of surface and/or groundwater supplies
- Water supply
  - Increase or improve water supply availability, reliability and flexibility for domestic, municipal, industrial and agricultural use and for the environment
- System sustainability
  - Support energy and water efficiency and climate change resiliency of water management systems and developed supplies

Supporting Project Objectives

Water quality

Water supply

System sustainability

Ecosystem

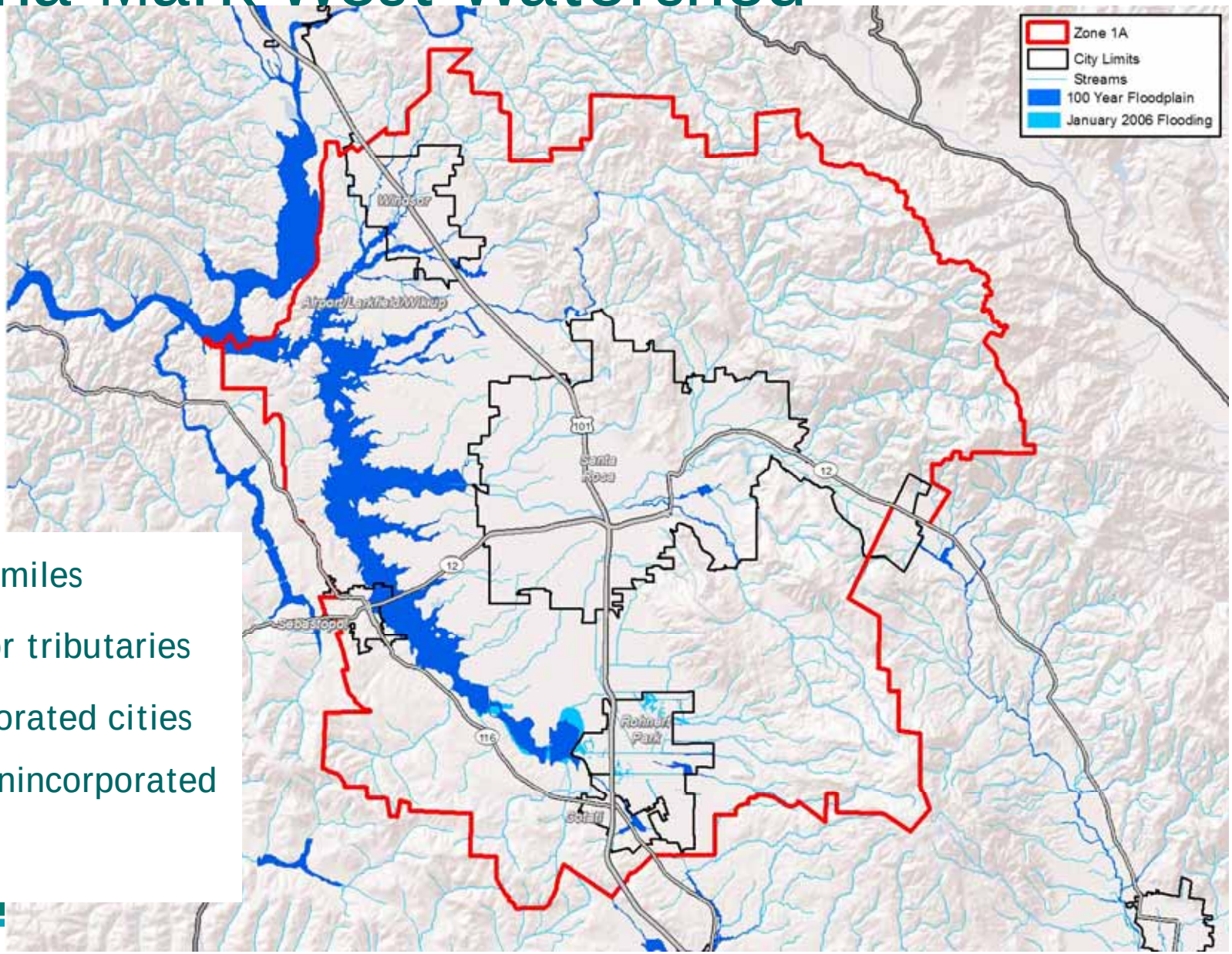
Agricultural land

Open space

Community benefits

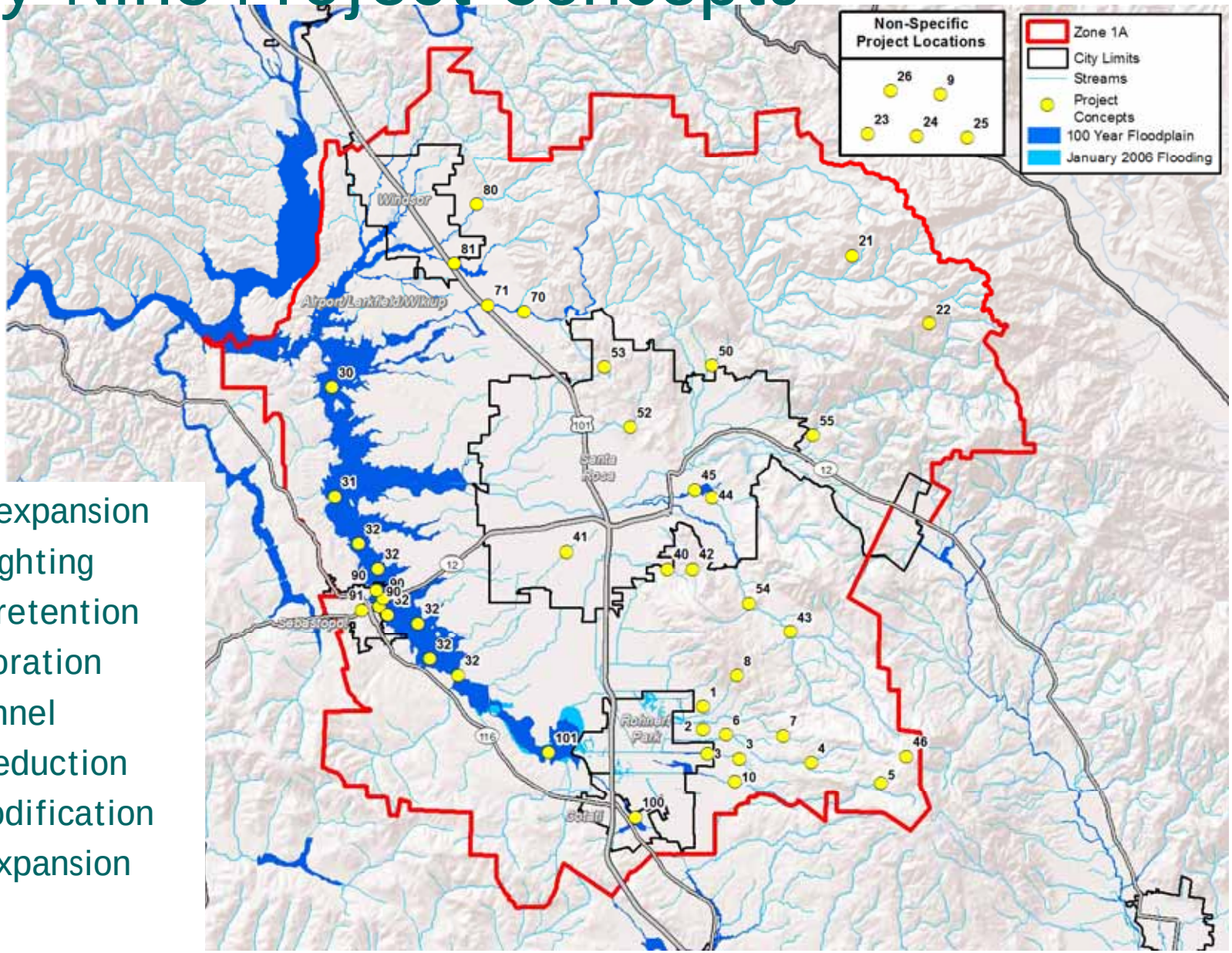
- Ecosystem
  - Improve ecosystem function and/or enhance habitat, especially for special status species
- Agricultural land
  - Preserve agricultural land uses
- Open space
  - Preserve and/or enhance open space
- Community benefits
  - Create and/or enhance recreation, public access, education, etc.

Laguna-Mark West Watershed



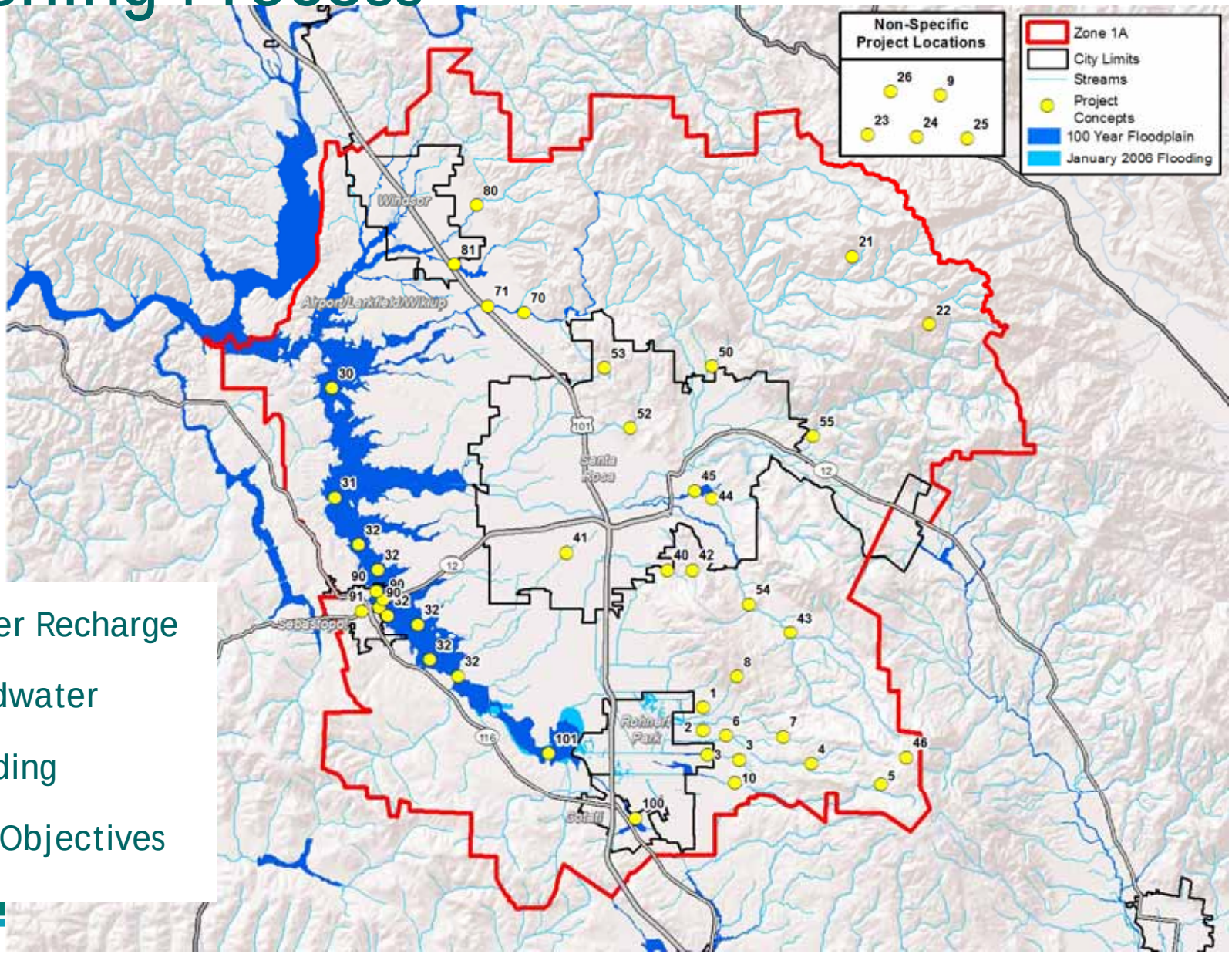
- 250 square miles
- Three major tributaries
- Five incorporated cities and large unincorporated areas

Thirty-Nine Project Concepts



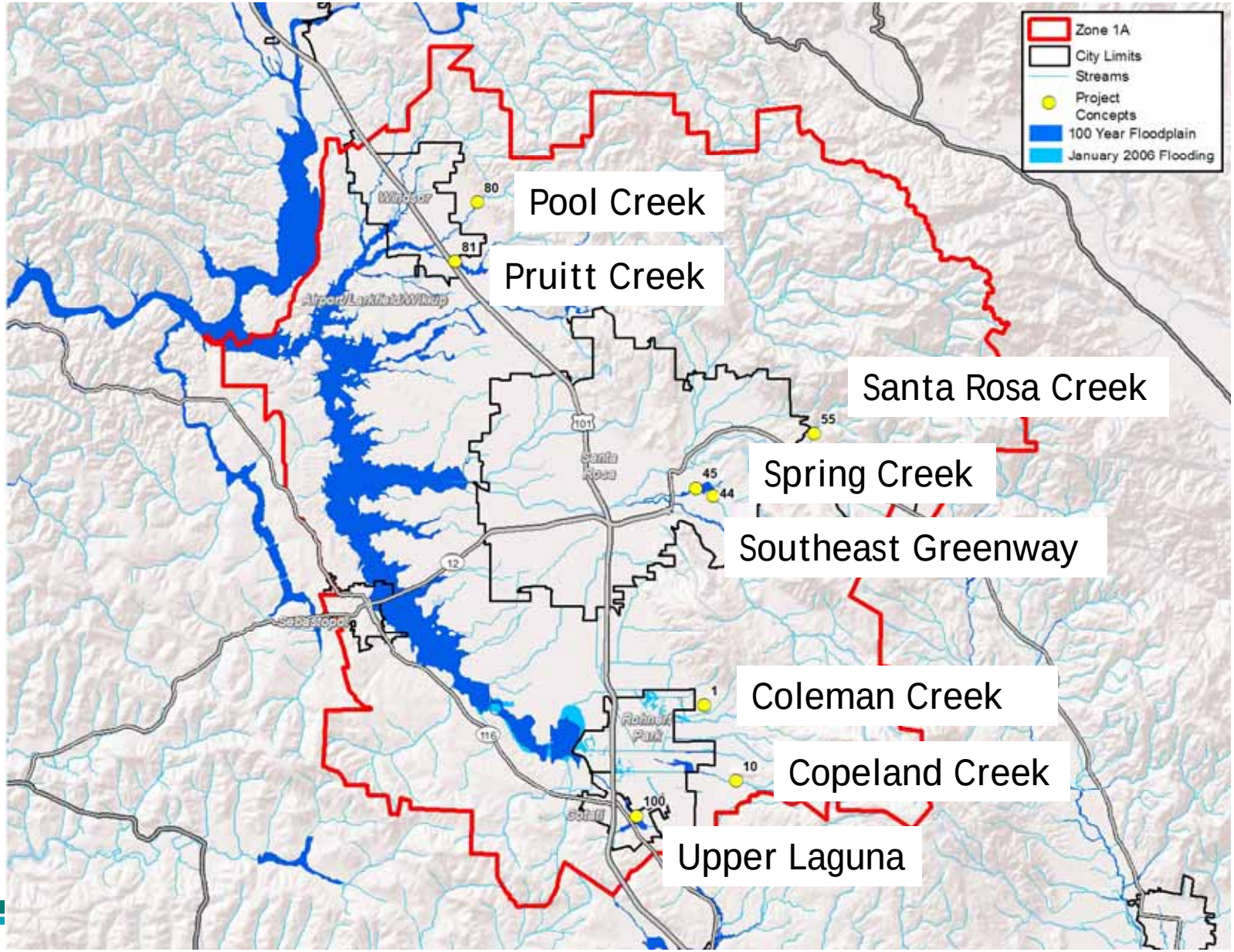
- Floodplain expansion
- Creek daylighting
- Detention/retention
- Forest restoration
- Bypass channel
- Sediment reduction
- Channel modification
- Reservoir expansion
- Strategies

Screening Process

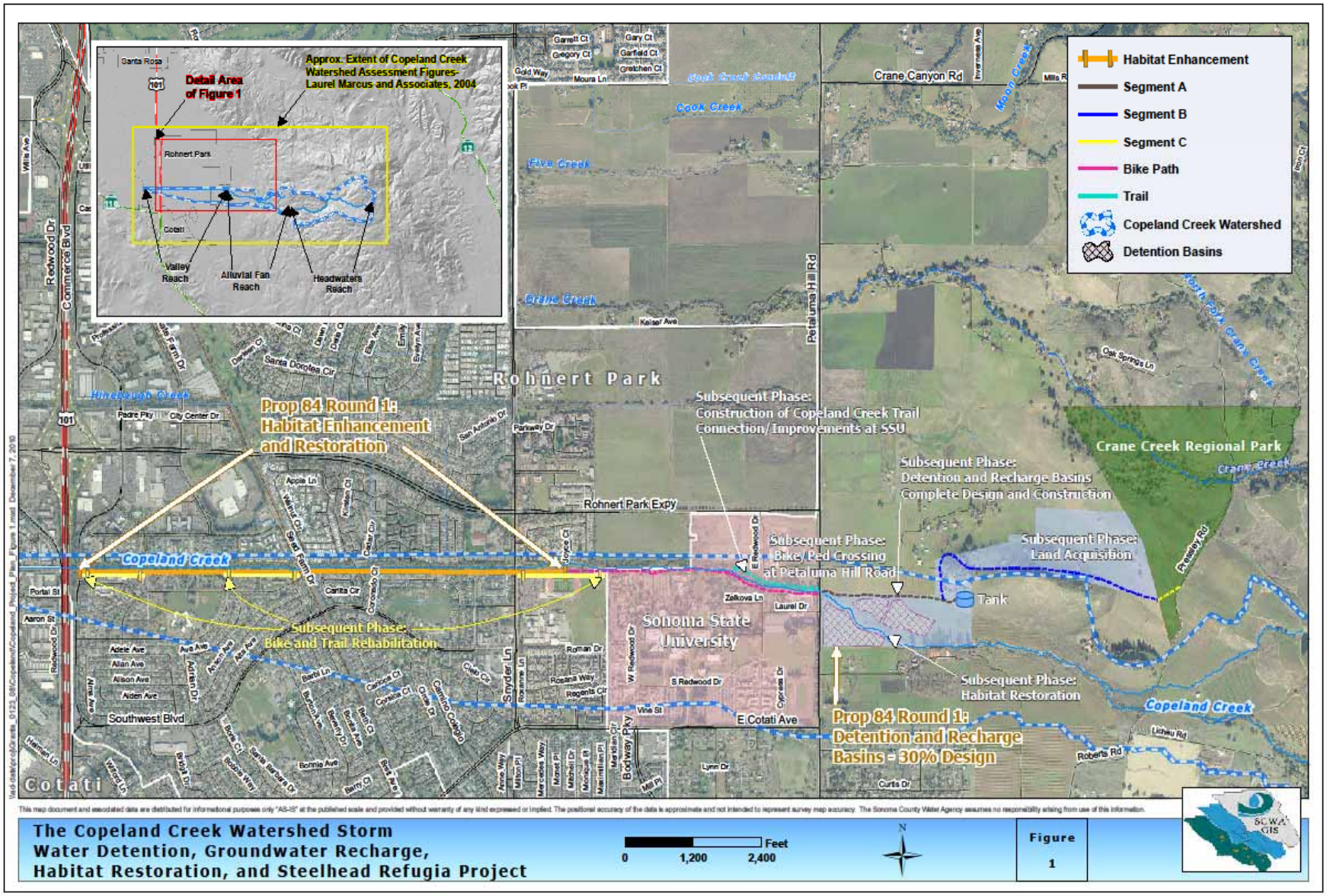


- Groundwater Recharge
- High groundwater
- Urban Flooding
- Supporting Objectives

Eight Projects Meet Both Core Objectives and Two or More Supporting Objectives



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

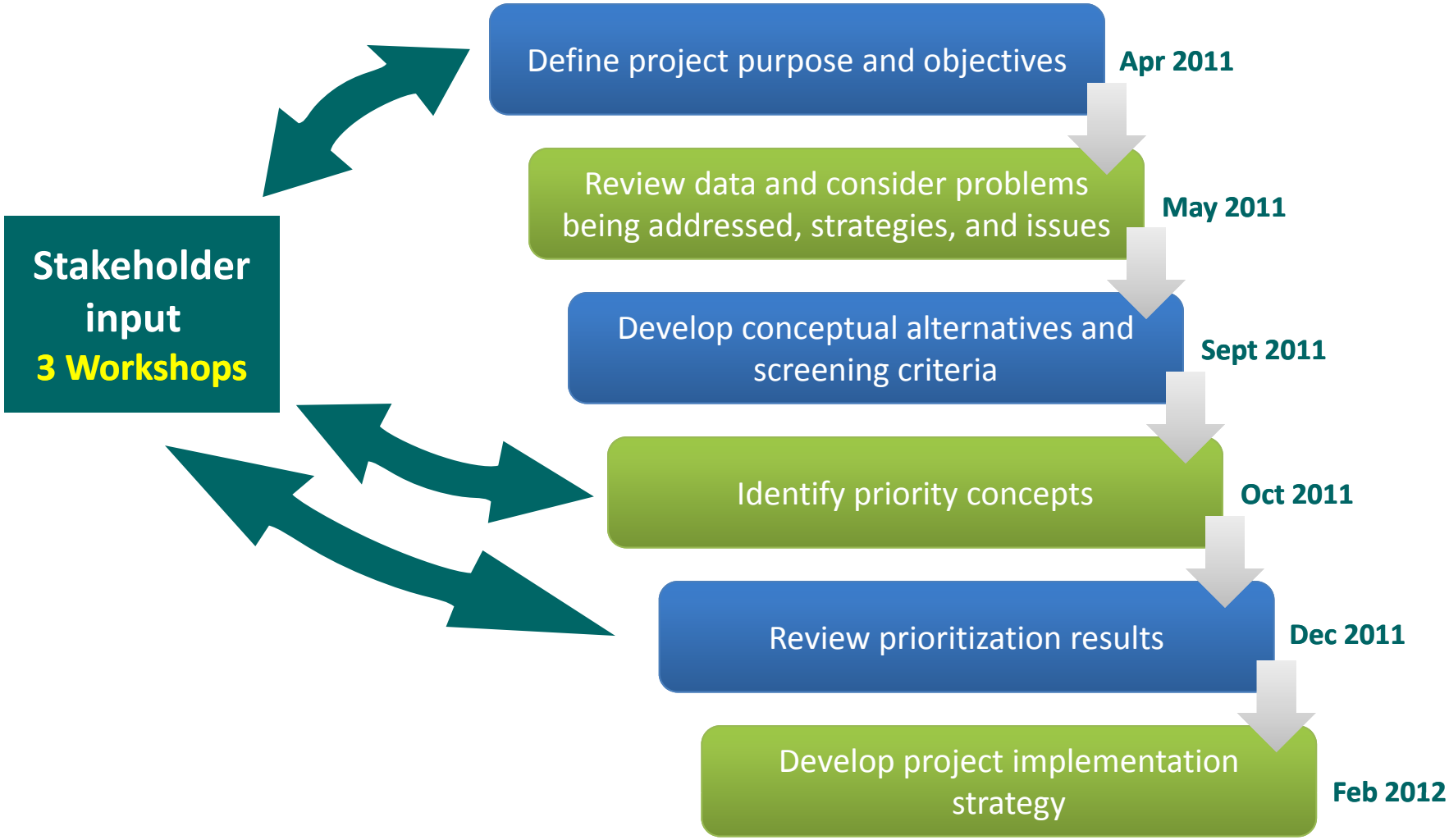


Upper Petaluma River Watershed Flood Control Project

Project Basis

- Two core objectives
  - Provide flood hazard reduction
  - Increase groundwater recharge
- Seven supporting objectives
  - Water quality
  - Water supply
  - System Sustainability
  - Ecosystem
  - Agricultural land
  - Undeveloped land
  - Community benefits
- Projects are multi-benefit
  - Improve likelihood of outside funding
  - Provide additional implementation value
- Projects reflect input of partners, stakeholder groups, regulators and study area residents
  - Multiple workshops
  - Project tour
- Consistent with Water Agency mission and initiatives

Petaluma Scoping Study Process



Project Participants

SOLICITING INPUT FROM…

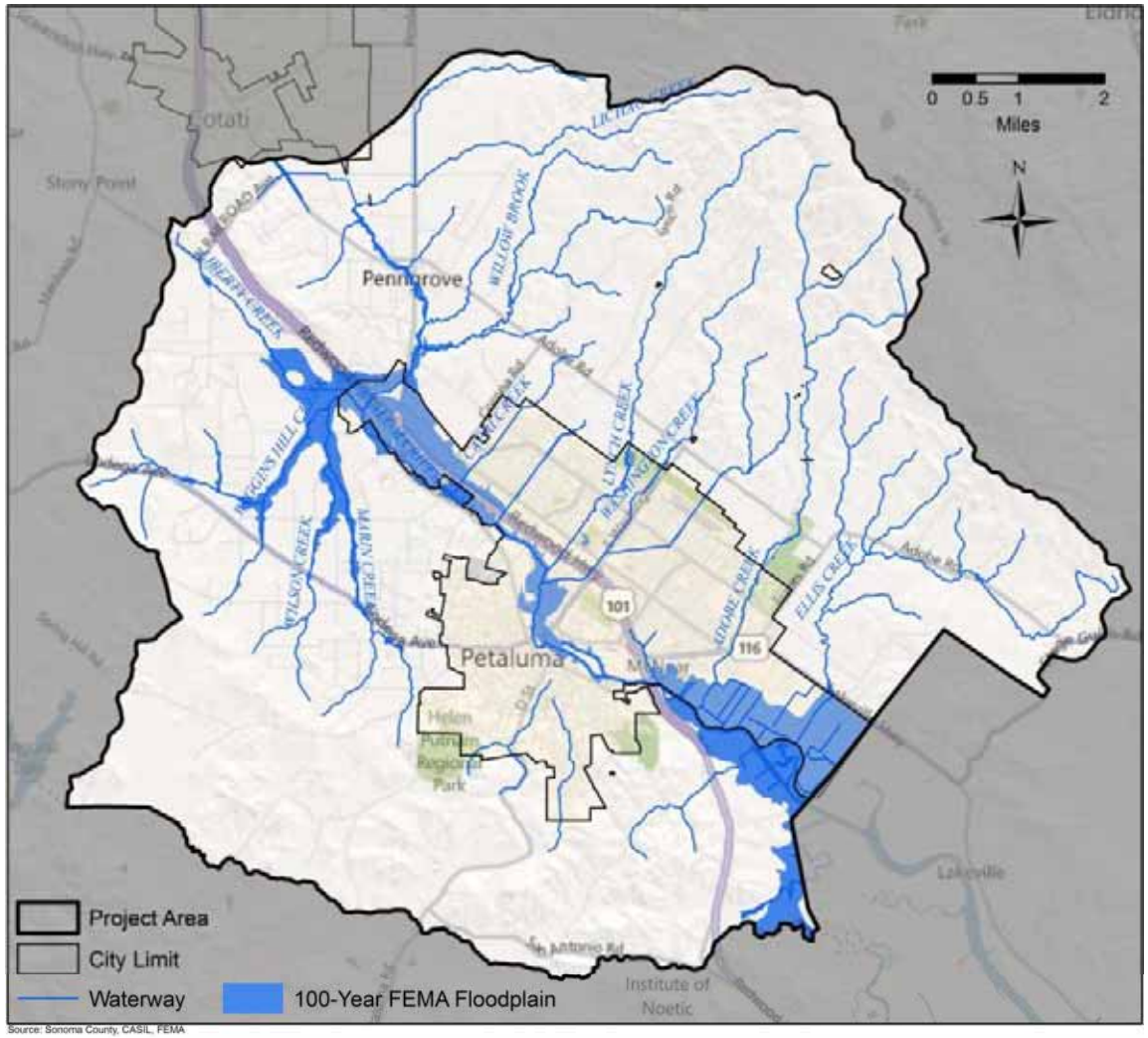
- Study Area Residents
- City of Petaluma
- Sonoma County
- Zone 2A
- Friends of the Petaluma River
- Petaluma River Council
- North Bay Watershed Association
- North Bay Agricultural Alliance
- United Anglers
- OWL Foundation
- Southern Sonoma County RCD
- The Bay Institute
- Petaluma Wetlands Alliance
- LandPaths
- Sonoma Land Trust
- Sonoma Mountain Preservation Group
- Western United Dairymen
- River Clean-up Committee
- KOA Campground
- P.L.A.N.
- Regulatory Agencies

RMC Water and Environment

Sonoma County Water Agency

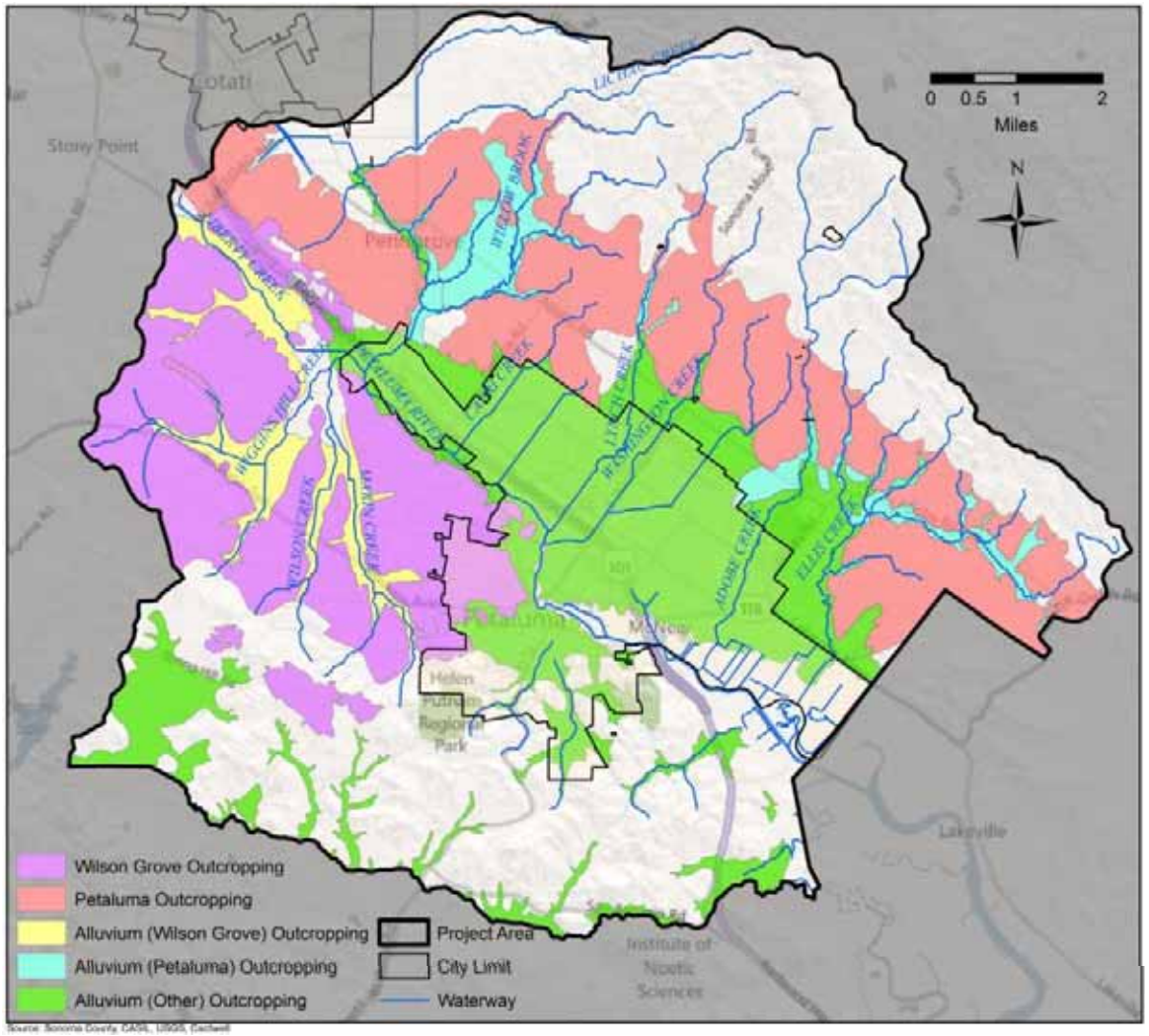
Flood Hazard Reduction Criteria

- Need to:
  - Reduce peak flows OR
  - Increase hydraulic capacity
- Impacts to downstream projects to be evaluated in feasibility phase
- Waterways upstream of and including Lynch Creek confluence
- Areas within 100-year floodplain are principal recipients of benefits



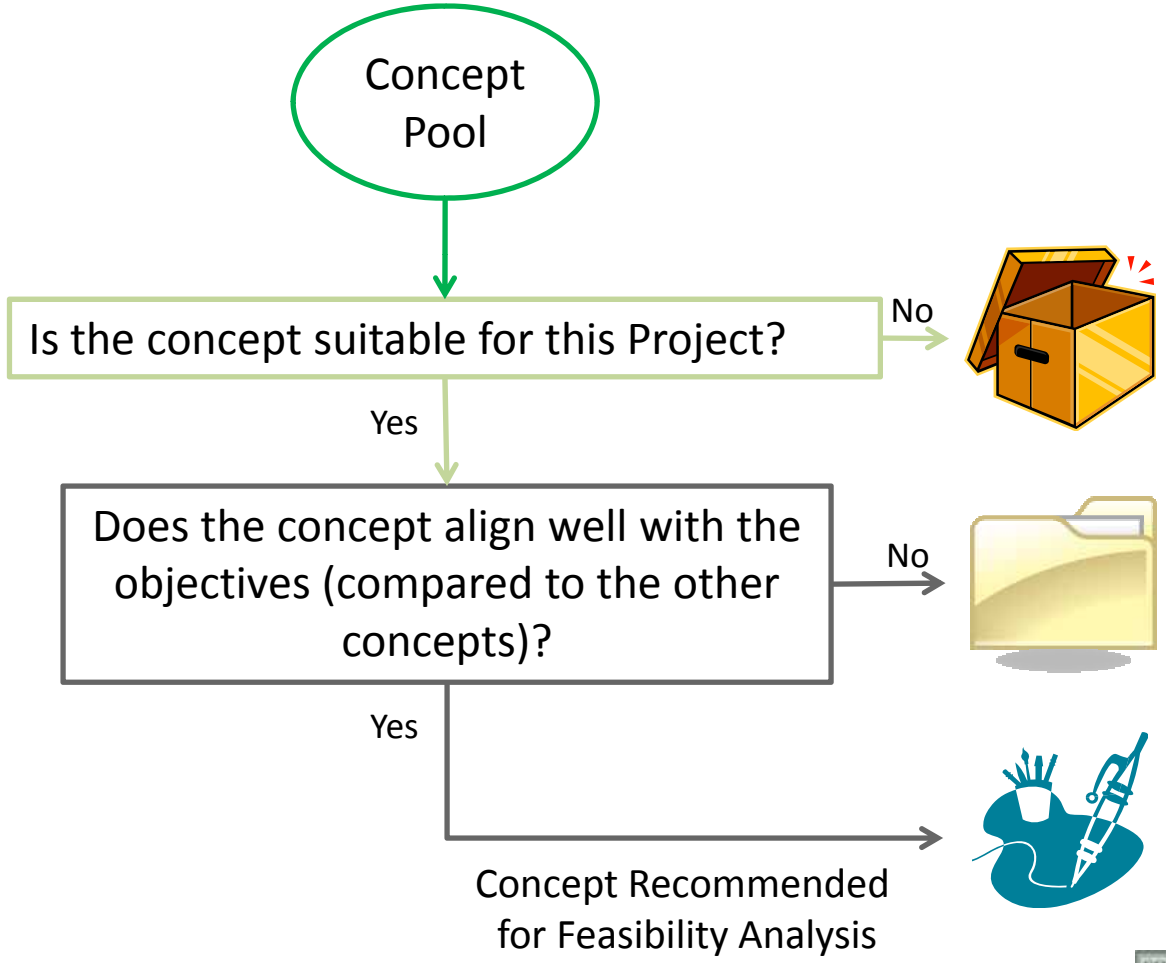
Recharge Criteria

- Wilson Grove Formation and Petaluma Formation are most effective for water supply recharge
- Alluvium above Wilson Grove and Petaluma also considered viable for water supply recharge
- Other alluvium could provide benefits other than water supply recharge



Screening & Prioritization Process

- 2 Stages
  - Screening
  - Prioritization



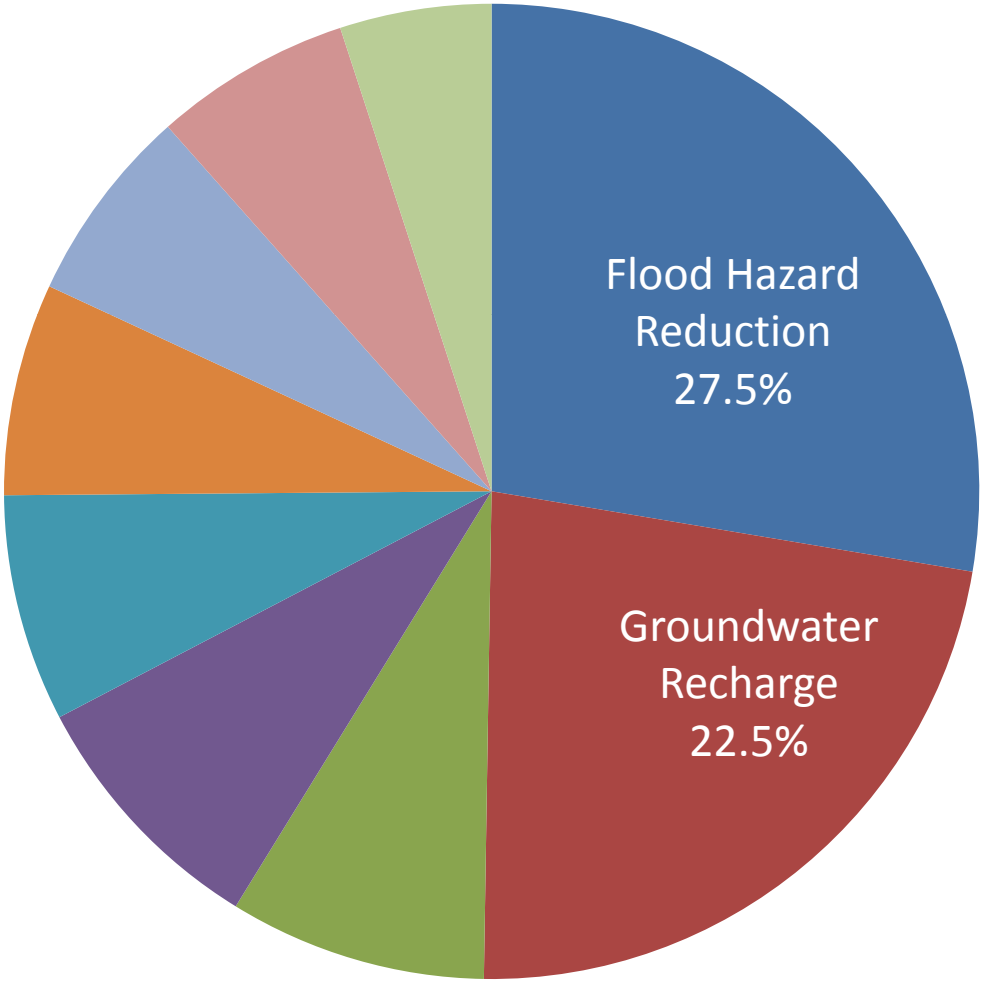
Screening Process

Does the Concept Provide Flood Hazard Reduction and Groundwater Recharge (Key Project Purpose)?

- Yes = Advanced to the prioritization process
- No = Not advanced to the prioritization process
  - Water Agency could consider participation through other venues

Concept	Response
1. Managed Floodplain	Yes
2. Off-stream Detention	Yes
3. In-stream Detention	Yes
4. Floodplain Modification	Yes
~~5. Levee/Floodwall~~	~~No~~
6. Channel Modification	Yes
7. Bypass Channel	Yes
~~8. Bridge Improvement & Debris Removal~~	~~No~~
9. Low Impact Development	Yes
10. Policy Review and Development	Yes
~~11. Direct Recharge~~	~~No~~

Results of Objective Weighting, Oct 5th



- Flood Hazard Reduction (27.5%)
- Groundwater Recharge (22.5%)
- System Sustainability (8.5%)
- Agricultural Land (8.5%)
- Water Quality (7.5%)
- Undeveloped Land (7.0%)
- Water Supply (6.5%)
- Ecosystem (6.5%)
- Community Benefits (5.0%)

Core objectives received 50% of overall weighting

Step 2: Evaluate Each Concept and How it Satisfies Objectives

Objective	Managed Floodplain	Off-stream Detention Basin	In-stream Detention Basin	Floodplain Modification	Channel Modification	Bypass Channel	Low Impact Development	Policy Review and Development
Flood Hazard Reduction	1	3	3	3	3	3	1	1
Groundwater Recharge	1	1	1	1	1	1	1	1
Water Quality	1	2	2	2	1	1	2	1
Water Supply	1	1	1	1	1	1	2	1
System Sustainability	3	3	1	3	2	2	3	1
Ecosystem	3	3	0	2	1	3	1	1
Agricultural Land	3	1	1	2	2	1	3	1
Undeveloped Land	3	2	2	2	2	1	3	1
Community Benefits	1	1	1	1	1	1	1	1

3 = Provides a high level of benefit

2 = Partially meets objective

1 = Uncertain ability to fulfill intent of objective

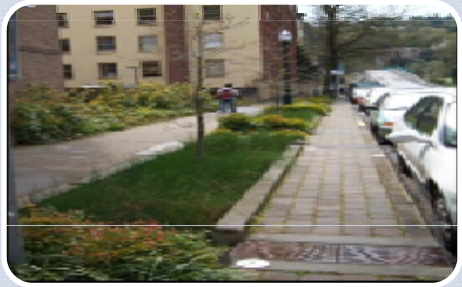
0 = Does not fulfill objective

Recommended Prioritization

Tier 1	Floodplain modification	Off-stream detention basin		Recommended basis for feasibility phase
Tier 2	Channel modification	Surface bypass channel		Support project concepts in Tier 1
Tier 3	Buried off-stream detention basin	In-stream detention basin	Buried bypass channel	Not recommended for implementation at this time

Enhancement Concepts

Managed Floodplain



Low Impact Development

Policy Review and Development

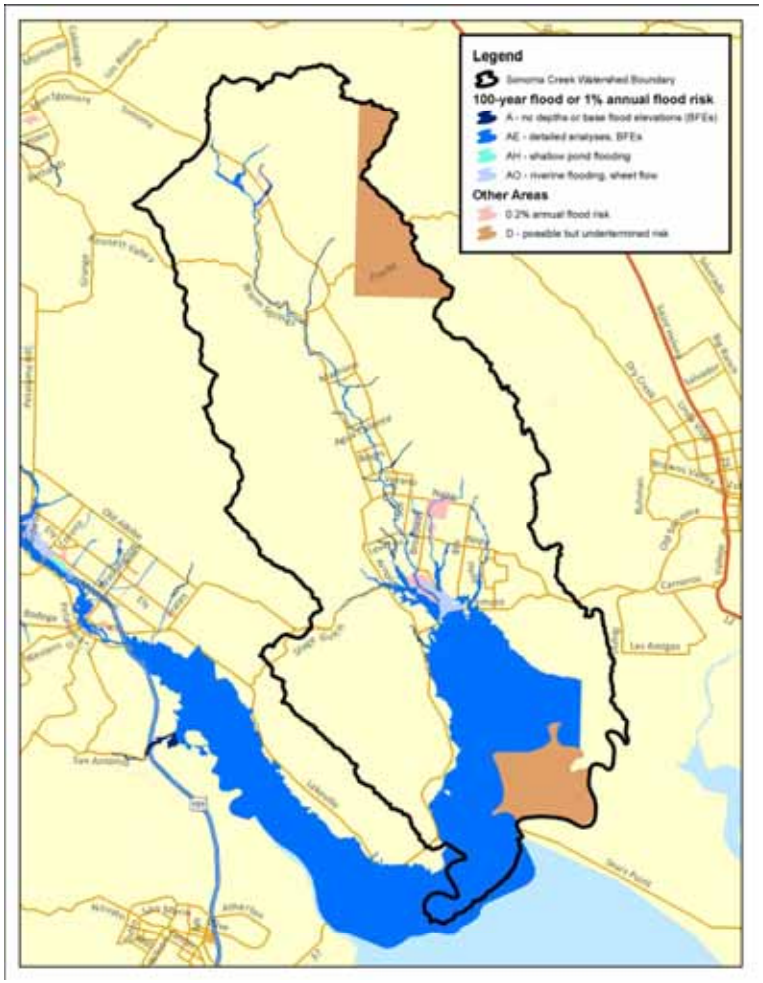
- Potential implementation in parallel with one or more tiered concepts to:
  - Increase security of existing benefits
  - Improve overall benefits
  - Increase funding chances

Sonoma Valley Stormwater Management and Groundwater Recharge Scoping Study

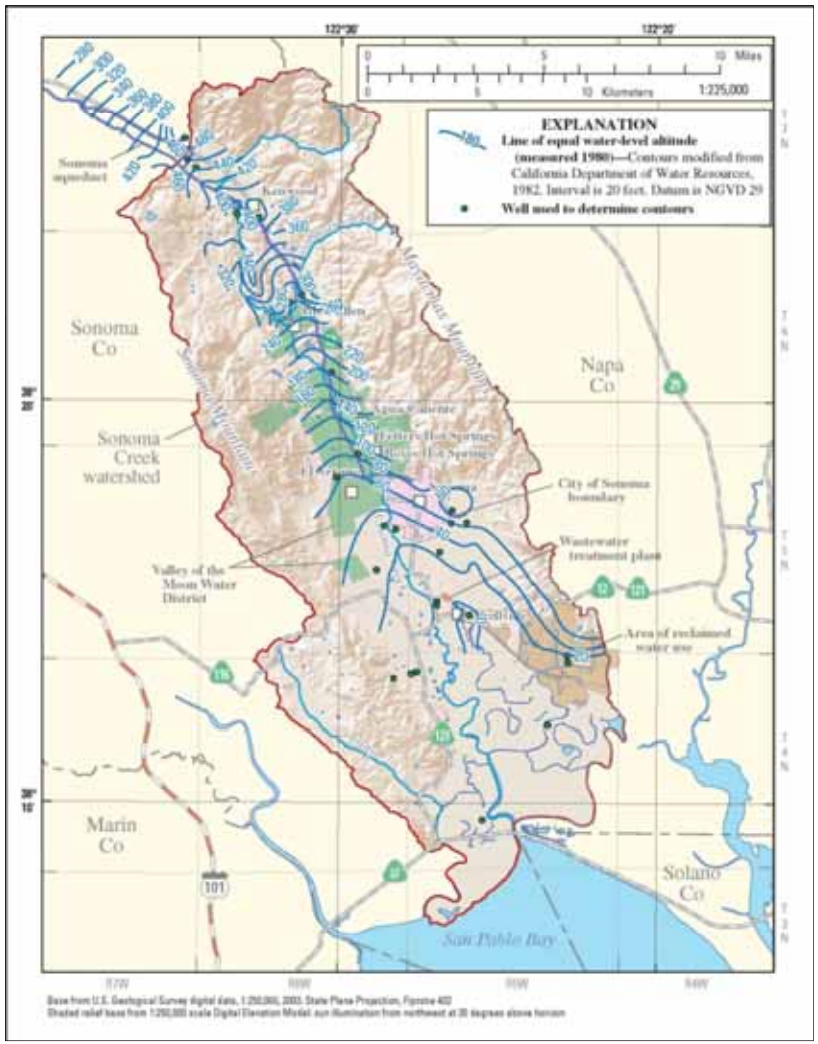
Findings

Issues: Flood hazards

- Large floods: reported damages & flood mapping center on Kenwood, Schellville, and Sonoma
- Flood effects may be much broader



Issues: Groundwater



- Groundwater conditions study and management plan completed
- Declining groundwater levels
  - El Verano
  - Southern Sonoma Valley
  - Carriger Creek

Screen and prioritize

inventory

- Project types
- Stakeholder ideas

screen

Likelihood of physical feasibility:

- Fair or better recharge geology
- Slope < 10%

Likelihood of achievement of both core objectives

prioritize

- Low likelihood of significant regulatory constraints
- Siting feasibility
- Absence of significant water quality concerns
- Expected cost/units of core objective benefit
- Magnitude of potential core benefits
- Ability to meet supporting objectives

Short list of potential project concepts (type, location)

Prioritization

prioritize

Step 1	Step 2	Step 3
Low likelihood of significant regulatory constraints	Magnitude of potential core benefits	Absence of significant water quality concerns
Siting feasibility		Ability to meet supporting objectives
Expected cost/units of core objective benefit		

Short list of potential project concepts (type, location)

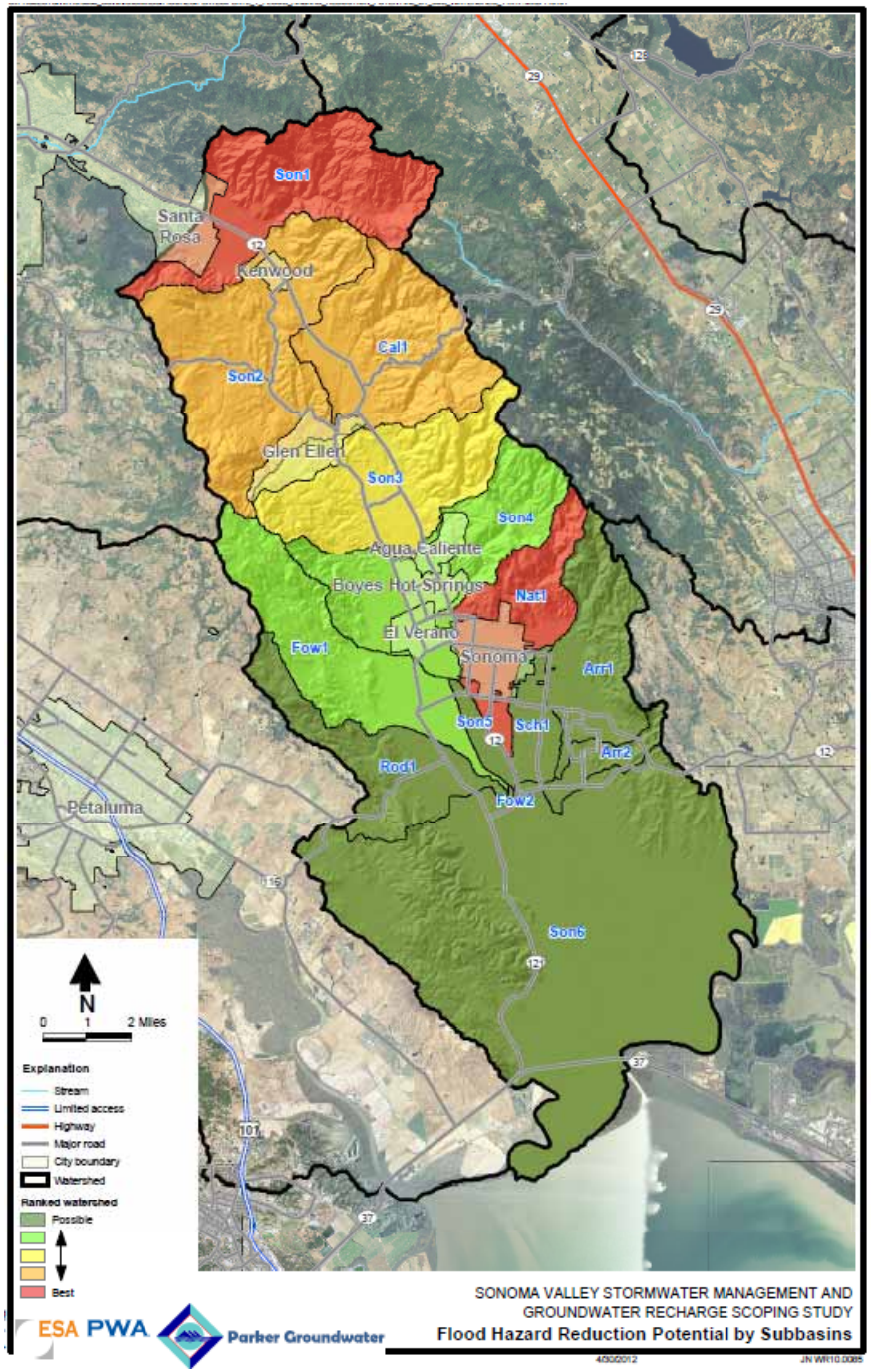
Prioritization

prioritize

Step 1

- Low likelihood of significant regulatory constraints
- Siting feasibility
- Expected cost/units of core objective benefit

Post-screening project types
~~In-line detention/retention/recharge basins~~
Off-line detention/retention/recharge basin
~~High flow diversion/recharge~~
~~Floodplain attenuation/recharge~~
~~Above-ground or underground storage tank/recharge~~
Infiltration gallery/detention
Self-cleaning infiltration trench/detention
LID



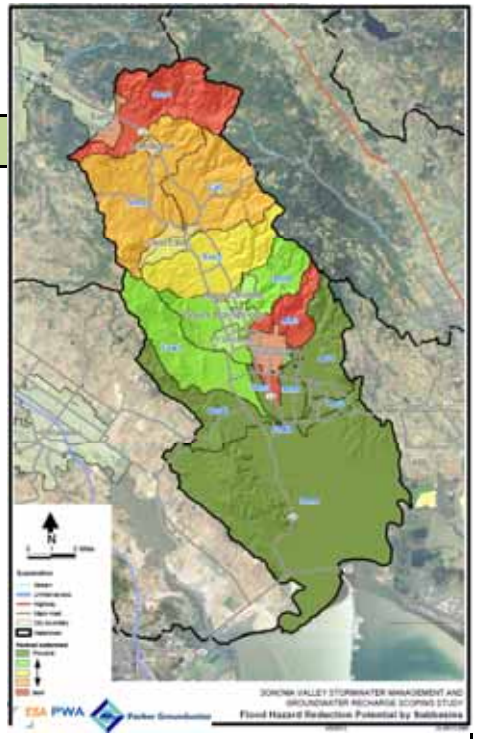
- Surface water subbasins used to subdivide the watershed

Prioritization

Step 1

Table 3:

Project types	Locations
Off-line basin	(everywhere except the olive zone)
High flow diversion/recharge	▪ Son1: Sonoma Creek at Lawndale ▪ Nat1: Nathanson Creek at Schell Creek
Infiltration gallery	*(Subbasins as listed for off-line basins)*
Self-cleaning infiltration trench	*(Subbasins as listed for off-line basins)*
LID	*(Subbasins as listed for off-line basins)*



Prioritization

by project type…

prioritize

Step 2

Magnitude of potential core benefits

Post-screening project types
~~In-line detention/retention/recharge basins~~
Off-line detention/retention/recharge basin
~~High flow diversion/recharge~~
~~Floodplain attenuation/recharge~~
~~Above-ground or underground storage tank/recharge~~
Infiltration gallery/detention
~~Self-cleaning infiltration trench/detention~~
~~LID~~

Prioritization

by project location…

prioritize

Step 2

Magnitude of potential core benefits

Best location for flood hazard reduction

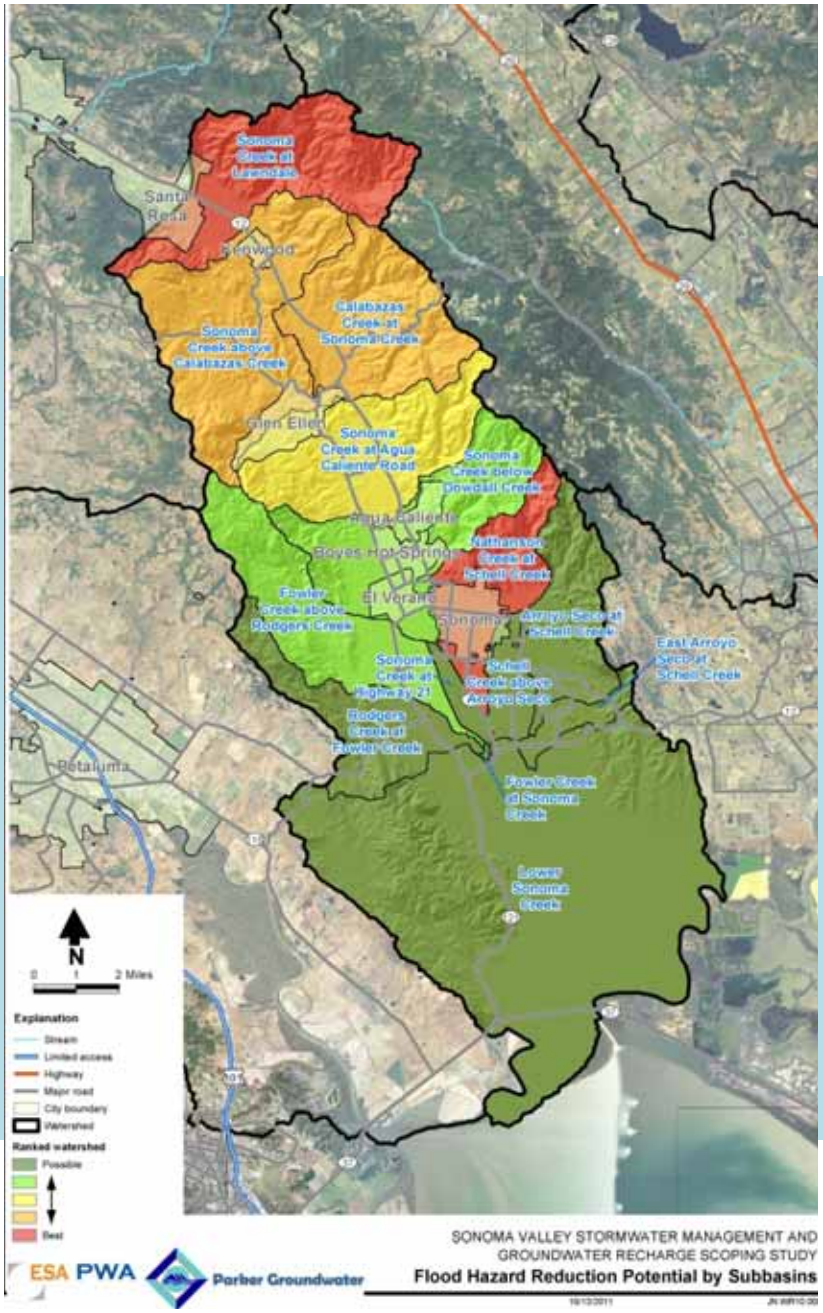
Best location for groundwater recharge

Prioritization

prioritize

Step 2

Best location for flood hazard reduction

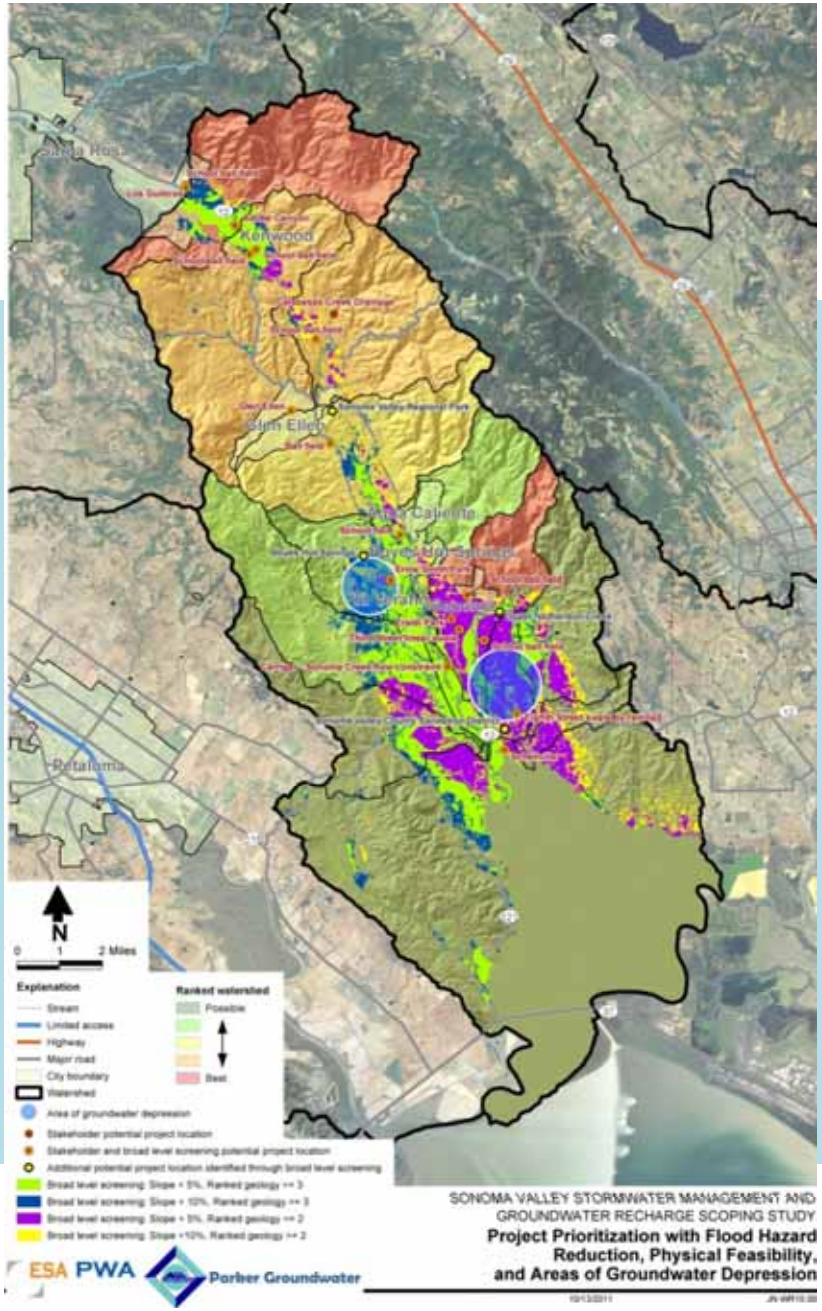


Prioritization

prioritize

Step 2

Best location for groundwater recharge



Prioritization

Step 2

Table 4:

Project types	Locations
Off-line basin	*In lower-slope, recharge-suitable portions of the following subbasins:* ▪ Son1: Sonoma Creek at Lawndale ▪ Son4: Sonoma Creek below Dowdall Creek ▪ Nat1: Nathanson Creek at Schell Creek
High-flow diversion/ recharge	*Approximately along existing high-flow pathways:* ▪ Son1: Sonoma Creek at Lawndale ▪ Nat1: Nathanson Creek at Schell Creek
Infiltration gallery	*(Subbasins as listed for off-line basins)*

Prioritization

Step 3

prioritize

Absence of significant water quality concerns

Ability to meet supporting objectives

No broad water quality concerns in prioritized subbasins

Prioritization

Step 3

Ability to meet supporting objectives

	Good potential to address supporting objectives		
Supporting Objectives	**Off-line basins**	**High-flow diversions**	**Infiltration galleries**
Water Quality	X	X	X
Water Supply	X		X
System Sustainability	X	X	X
Ecosystem	X	X	
Agricultural Land	X	X	X
Open Space	X	X	
Community Benefits	X		X

Table 5:

Prioritization

prioritize

Step 1	Step 2	Step 3
Low likelihood of significant regulatory constraints	Magnitude of potential core benefits	Absence of significant water quality concerns
Siting feasibility		Ability to meet supporting objectives
Expected cost/units of core objective benefit		

Short list of potential project concepts (type, location)

Prioritization

prioritize

Short list of potential project concepts (type, location)

100 – 500 acre-feet of storage

Low-gradient, high recharge potential lands

Project types	Locations
Off-line basin	▪ Son1: Sonoma Creek at Lawndale ▪ Son4: Sonoma Creek below Dowdall Creek ▪ Nat1: Nathanson Creek at Schell Creek
High-flow diversion/ recharge	▪ Son1: Sonoma Creek at Lawndale ▪ Nat1: Nathanson Creek at Schell Creek
Infiltration gallery	*(Subbasins as listed for off-line basins)*

Stormwater basins

Spring Lake, 3500 AF

Matanzas Basin, 1300 AF

Stormwater basins

Brush Creek/Rincon Valley Little League Field, 120 AF

Carley Rd Detention (Slater MS), 8 AF

Stormwater basins

PA

MN

Stormwater/recharge basins

Kings River Basin, On-Farm
Recharge/Stormwater Management

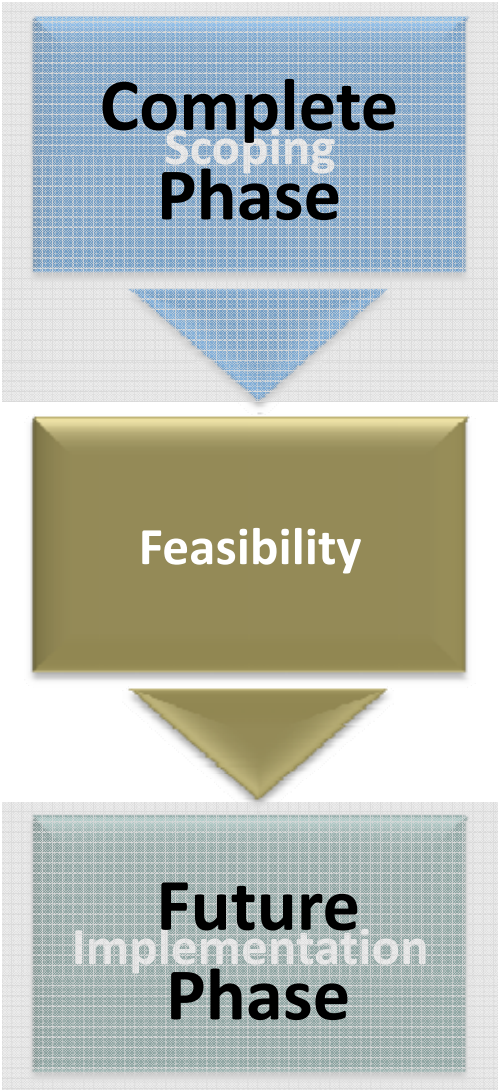
Implementation Strategies for Stormwater Management – Groundwater Recharge Projects

Feasibility Phase Purpose

- Establish standards and criteria
- Evaluate and refine project concepts
- Demonstrate technical feasibility
- Solicit public input
- Identify alternative(s) for implementation

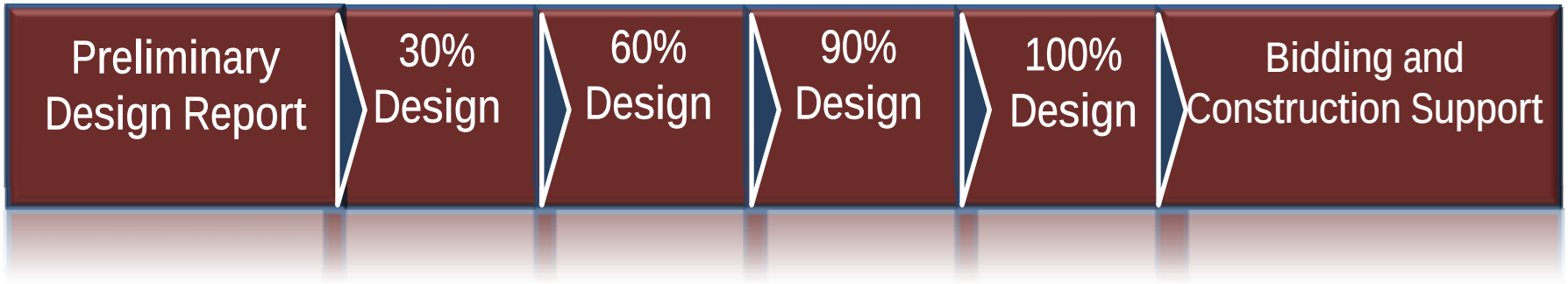
Feasibility Study Components

- **Identify alternative sites**
- Define alternatives
- **Model hydraulic system to verify benefits and avoided impacts**
- Perform field testing (e.g. sediment, groundwater quality, geologic)
- Model sediment transport, water quality, and recharge
- Develop alternative details
- **Benefit and cost analyses**
- **Preferred alternative selection**



Implementation Components

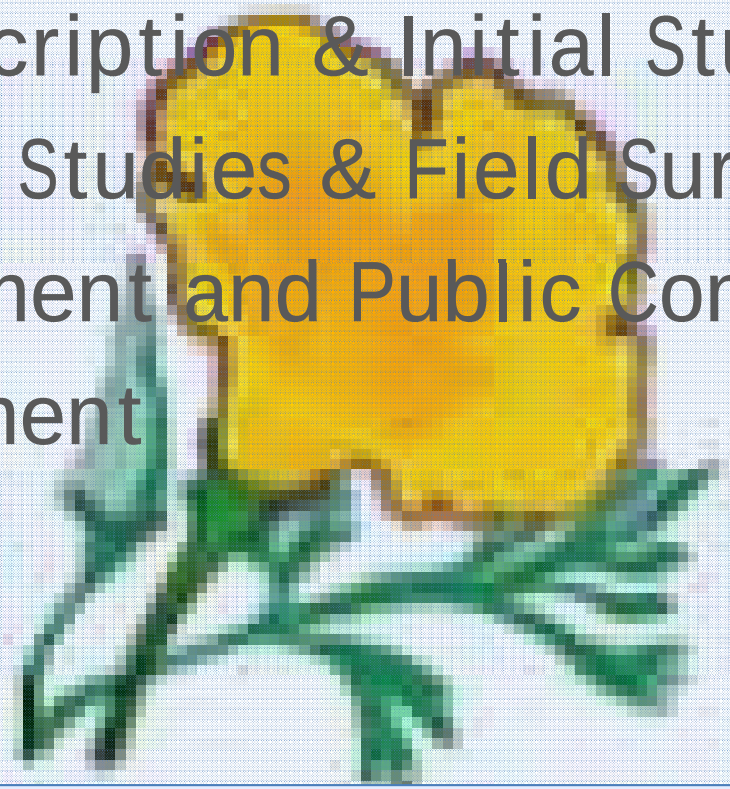
Project Design Development



- 30% - lay the foundation
- 60% - finalize form of the project
- 90% - develop biddable package
- 100% - finalize biddable package

Environmental Documentation - CEQA

- Project Description & Initial Study
- Background Studies & Field Surveys
- Draft Document and Public Comment
- Final Document



See CEQA studies/surveys handout

Environmental Documentation - NEPA

NEPA applicable if federal funding is involved or project is on federal lands

- Additional documentation beyond CEQA
  - **Finding of No Significant Impact (FONSI)**
  - **Environmental Justice Analysis**
  - **Indian Trust Assets**
  - **Compliance with Section 7 of the Endangered Species Act**
  - **Compliance with Section 106 of the National Historic Preservation Act**
  - **Air Quality Conformity Report**

Regulatory Coordination

Starts with this meeting!

Permits/Approvals Dependant on:

- Project location
- Preliminary design
- Field survey results

See permits/regulatory approvals handout

Obtain Outside Funding

- State funding options
  - DWR
    - IRWM - Prop 84
    - IRWM - Prop 1E
    - Local Groundwater Assistance Grant (AB 303)
    - Prop 82 (Loan)
  - SWRCB
    - IRWM - Prop 84
    - Clean Water SRF Loans
  - CA Infrastructure and Economic Development Bank (SRF Loans)

See funding handout

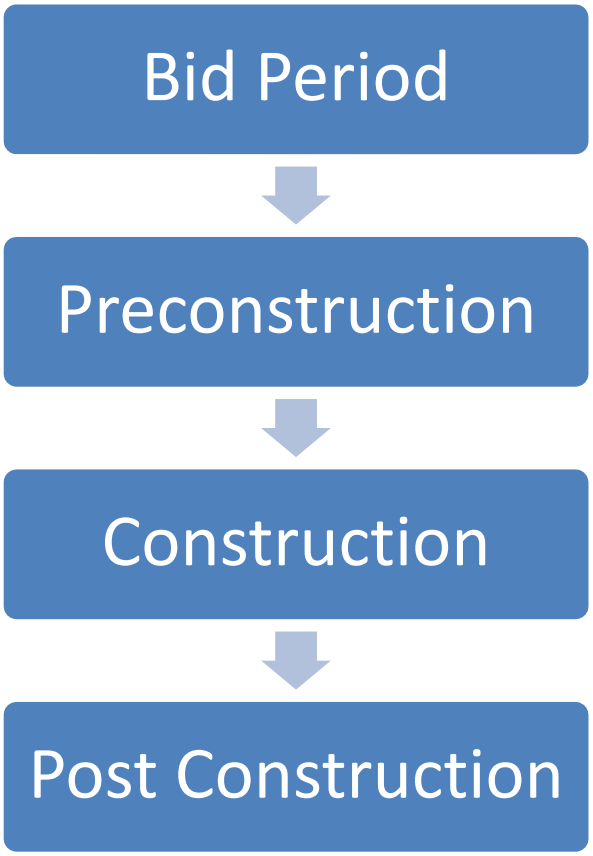
Outreach/Communication Tools

Fact Sheets/Project Updates

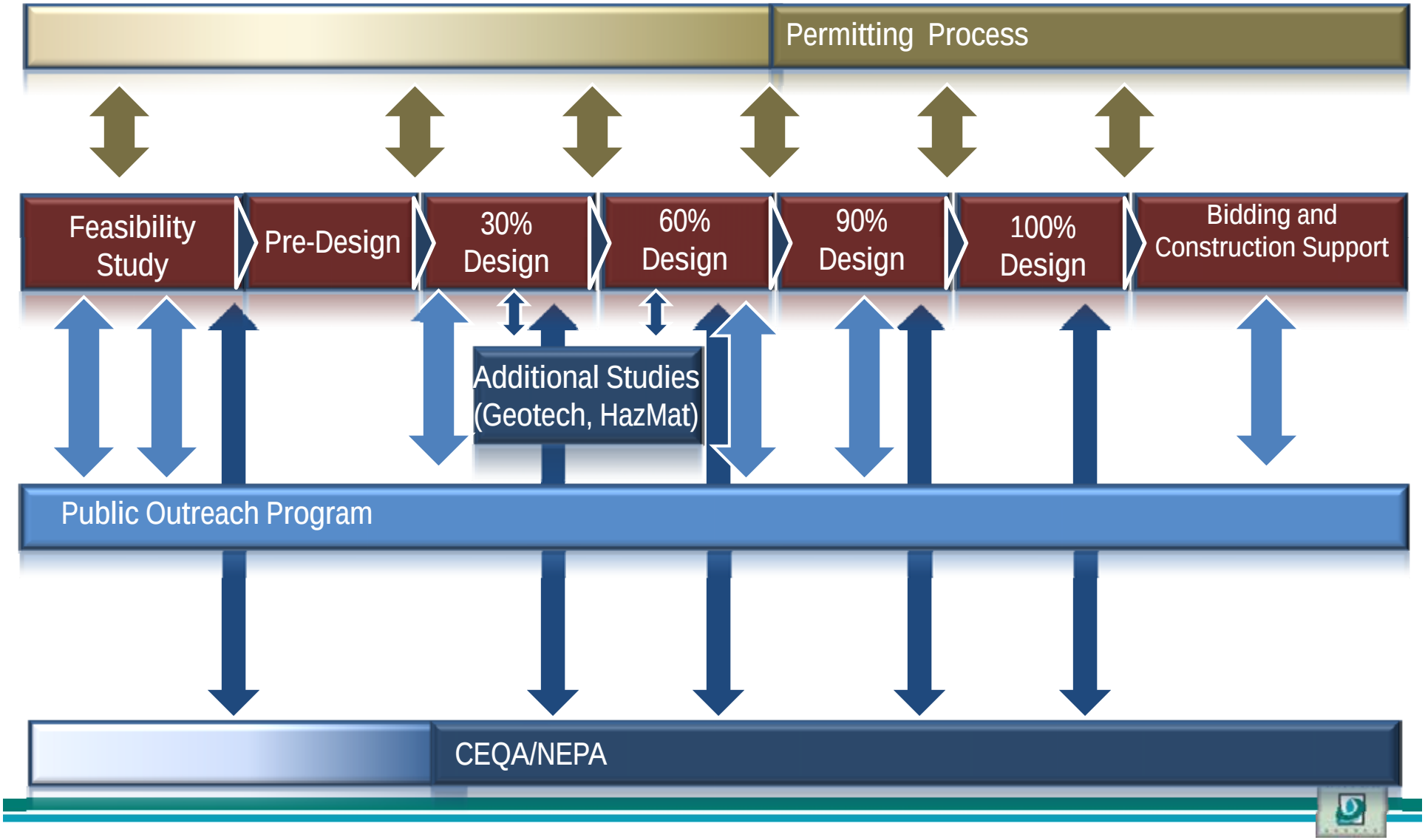
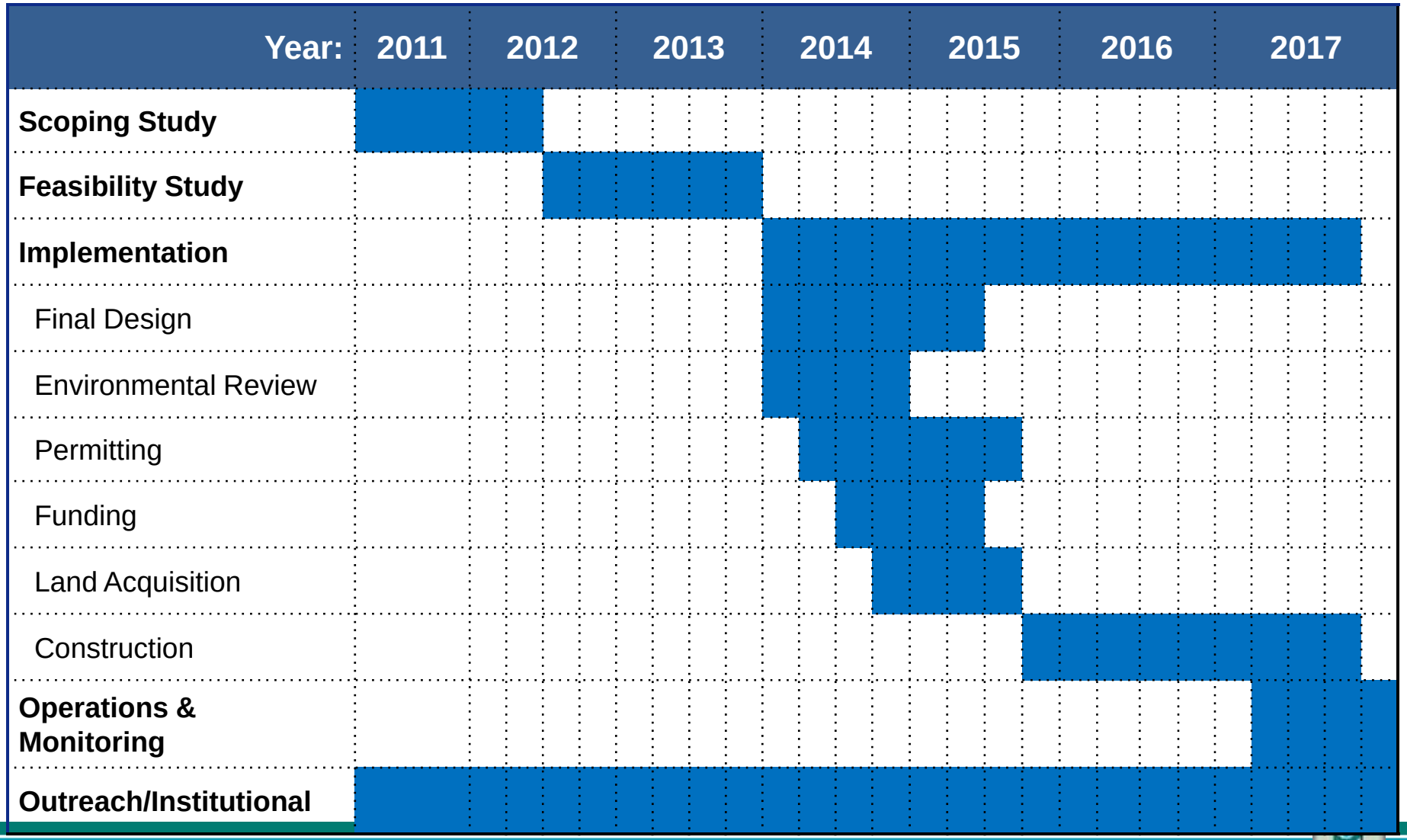
Project Website

Local Meetings

Construction Phase



Implementation Overview



Implementation Schedule