

Best Management Practices For Managed Aquifer Recharge



*Southern Sonoma County
Resource Conservation District*



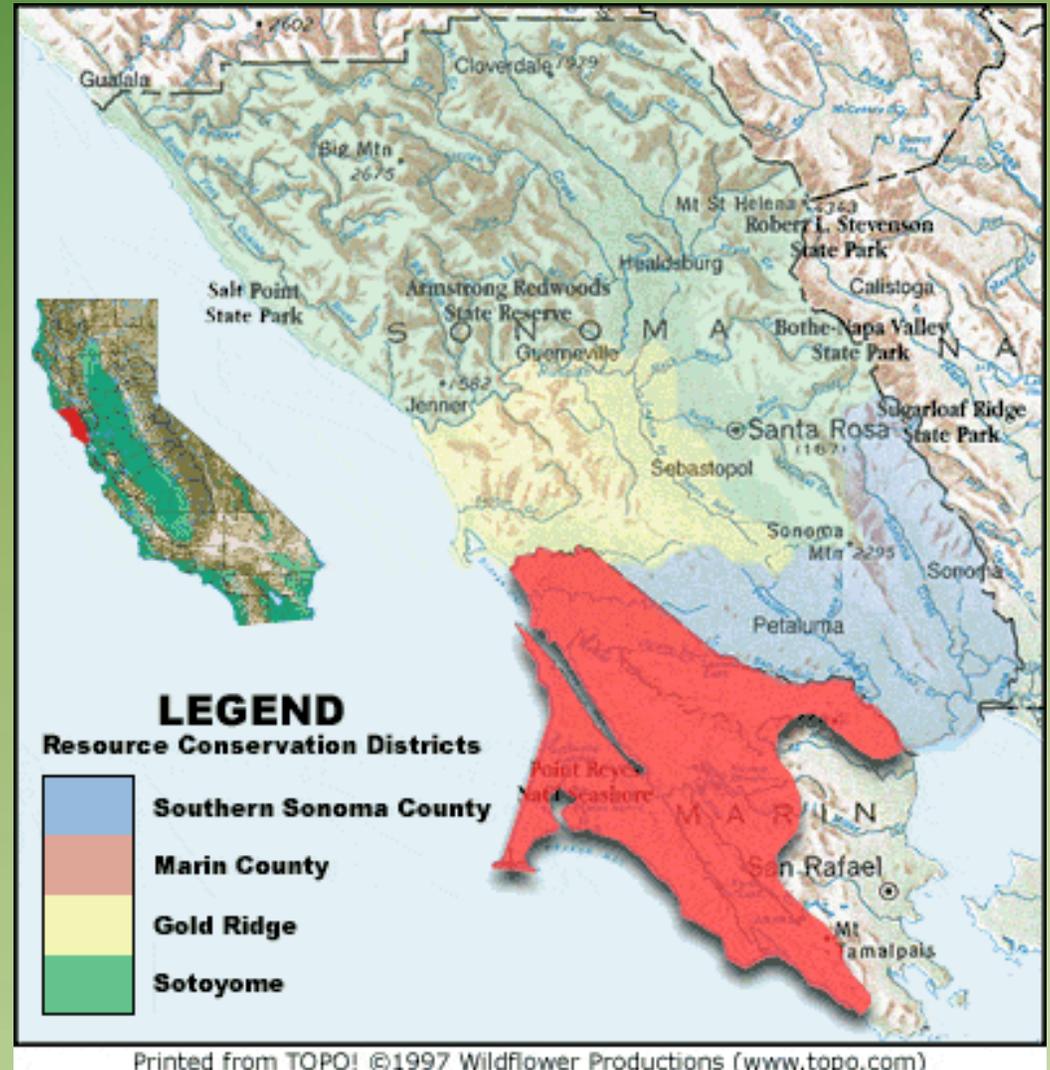
Southern Sonoma County Resource Conservation District

- ☉ We are a non-regulatory special district
- ☉ RCDs help private landowners conserve soil, water, and other natural resources
- ☉ 50+ year history of assistance to landowners in the watershed
- ☉ RCDs are the only entities authorized by the State of California Public Resources Code to provide locally lead conservation and implementation of projects



Watersheds Served by SSCRCD

- Sonoma Creek
- Petaluma River
- Stemple Creek



Integration with existing resource and regulatory plans, programs

- Similar or overlapping goals
- Effective implementation of the SVGMP will require:
 - Coordination
 - Consistency
 - Cooperation

with other plans, policies and regulatory programs



Plan Integration

- Benefits:
 - Data sharing
 - Minimizes duplication
 - Maximizes efficiency: project prioritization
 - Pooled resources
 - Holistic approach
 - Multiple benefit projects*



Project Integration

- Multiple benefit projects:
 - Implement holistic solutions
 - Restore/Enhance habitat
 - Conserve and protect water resources
 - NPS pollutant reductions
 - Cutting edge technical assistance
 - And more...



Related Plans, Policies, Regulatory Programs and Projects

- Sonoma Watershed Enhancement Plan (update)
- Sonoma Creek and Tributaries Feasibility Study
- San Francisco Bay Area Integrated Regional Water Management Plan
- North San Pablo Bay Restoration and Reuse Project
- Sonoma Valley Recycled Water Project
- Sonoma Creek TMDLs
- Critical Coastal Areas Program



Sonoma Valley Groundwater Management Plan

- **Component 1 – Stakeholder Involvement**
- 4.1.3 Informing Public Agencies and Stakeholders
- 4.1.4 Partnerships & Coordination
- **Component 4 – Groundwater Supply Sustainability**
 - 4.2 Monitoring
 - 4.4.1 **Stormwater Recharge** –
 - Study/Pilot Stormwater Capture and Recharge
 - Project – Stormwater Capture and Groundwater Recharge
 - Project – Stormwater Capture and Late Year Release
 - 4.4.4: **Conservation and Demand Reduction**
 - Water Conservation BMPs for Non-Viticulture Agriculture
 - Encourage Additional Conservation and BMPs to Address Soil Erosion and Surface Water Runoff for Viticulture
 - Project – Stormwater Capture for Reuse and Irrigation



Best Management Practices (BMPs) & Managed Aquifer Recharge (MAR)

- Stormwater/Erosion BMP's
 - Techniques used to control (or collect) stormwater runoff, sediment control, and soil stabilization, as well as land management decisions to prevent or reduce nonpoint source pollution.
- Managed Aquifer Recharge
 - Methods for adding water sources to underground aquifers under controlled conditions to store excess water for later use while protecting groundwater quality



Best Management Practices

Subject to constantly evolving county, state and federal regulations

- Clean Water Act
- Porter Cologne Act
- Ca Fish & Game Codes
- Ca Water Code
- County ordinances
- State and Federal Endangered Species Laws
- Total Maximum Daily Load (TMDL's)
- Minimum Base Flow Policies

“Best” is a moving target



Best Management Practices

Relevant oversight agencies

- USDA Natural Resources Conservation Service
- California Department of Fish & Game
- State and Regional Water Boards
- Environmental Protection Agency
- US Fish and Wildlife Service
- Sonoma County PRMD



MAR Strategies and BMP's

- Site specific, but may include:
 - Wetland construction & restoration
 - Detention ponds/basins (percolation ponds)
 - Bioretention cells
 - Infiltration structures: dry wells, trenches, cisterns
 - Check dams



MAR Strategies and BMP's

- Site specific, but may include :
 - Pervious pavement materials
 - Riparian cover/re-vegetation
 - Spreading & surface diversion techniques
 - Water conservation
 - Water sustainable development
 - Combined methods



MAR Techniques and BMP Benefits

- Restore natural drainage functions
- Attenuate peak storm flows
- Promote recharge: direct and indirect
- Control upland and channel erosion
- Restore and enhance habitat
- Improve base flows
- Offset groundwater usage



Best Management Practices for Managed Aquifer Recharge

Challenges:

- Established BMPs & water quality standards compliance
- Providing outreach to many private landowners of all sizes
 - **“One size/BMP does NOT fit all”**
 - **Technical assistance funding and delivery**
- Paperwork demands
- Funding
- Project permitting requirements



Best Management Practices for Managed Aquifer Recharge

Resource Issues:

- Impervious land cover
- Hydromodification
 - Surface diversions directly to creeks: urban & rural
 - Tributary connections to main stem
 - Lack of riparian or natural ground cover
- Non-point source pollutants



Best Management Practices for Managed Aquifer Recharge

- **Needs**
 - Feasibility analysis
 - Pilot and full-scale projects*
 - Identification of appropriate BMP's
 - Programmatic landowner outreach and technical support*
 - Agency & plan coordination*
 - Candidate project identification*
 - Integrated project management*



Best Management Practices for Managed Aquifer Recharge

Opportunities:

- Providing a suite of recommended BMPs across spectrum of parcel sizes, types and budgets
- Promote voluntary stewardship actions
- Cumulative impacts from many small parcels/projects
- Watershed-wide efforts
- Promote integrated solutions



MAR Strategies and BMP's



Pilot Projects

- Rainwater harvesting programs and projects
- Stormwater:
 - Detention: short-term capture & release/infiltration
 - Retention: long-term storage, infiltration, irrigation, pollutant removal
 - Capture and release: intentional collection and controlled release

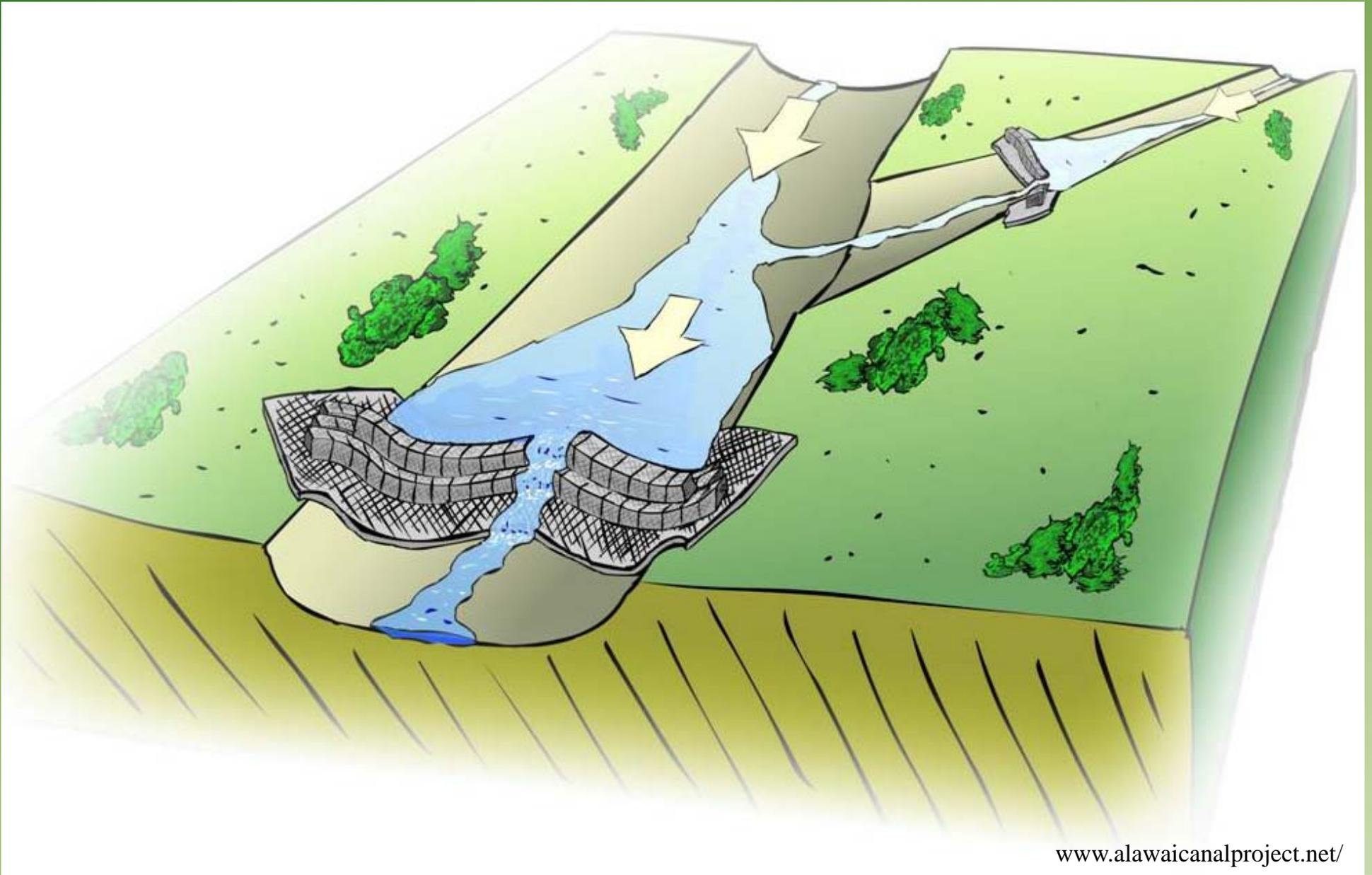


MAR Strategies and BMP's

- Suggested Tiers of BMPs
 - Tier 1:
 - Low cost, “do-it-yourself” solutions
 - Small-medium parcels
 - No permits required
 - Tier 2:
 - Require some professional planning & assistance
 - Permit(s) may be needed
 - Tier 3:
 - Requires engineered designs
 - Requires permits from multiple agencies



Check Dams



www.alawaicanalproject.net/



Check Dams



www.co.ottawa.mi.us



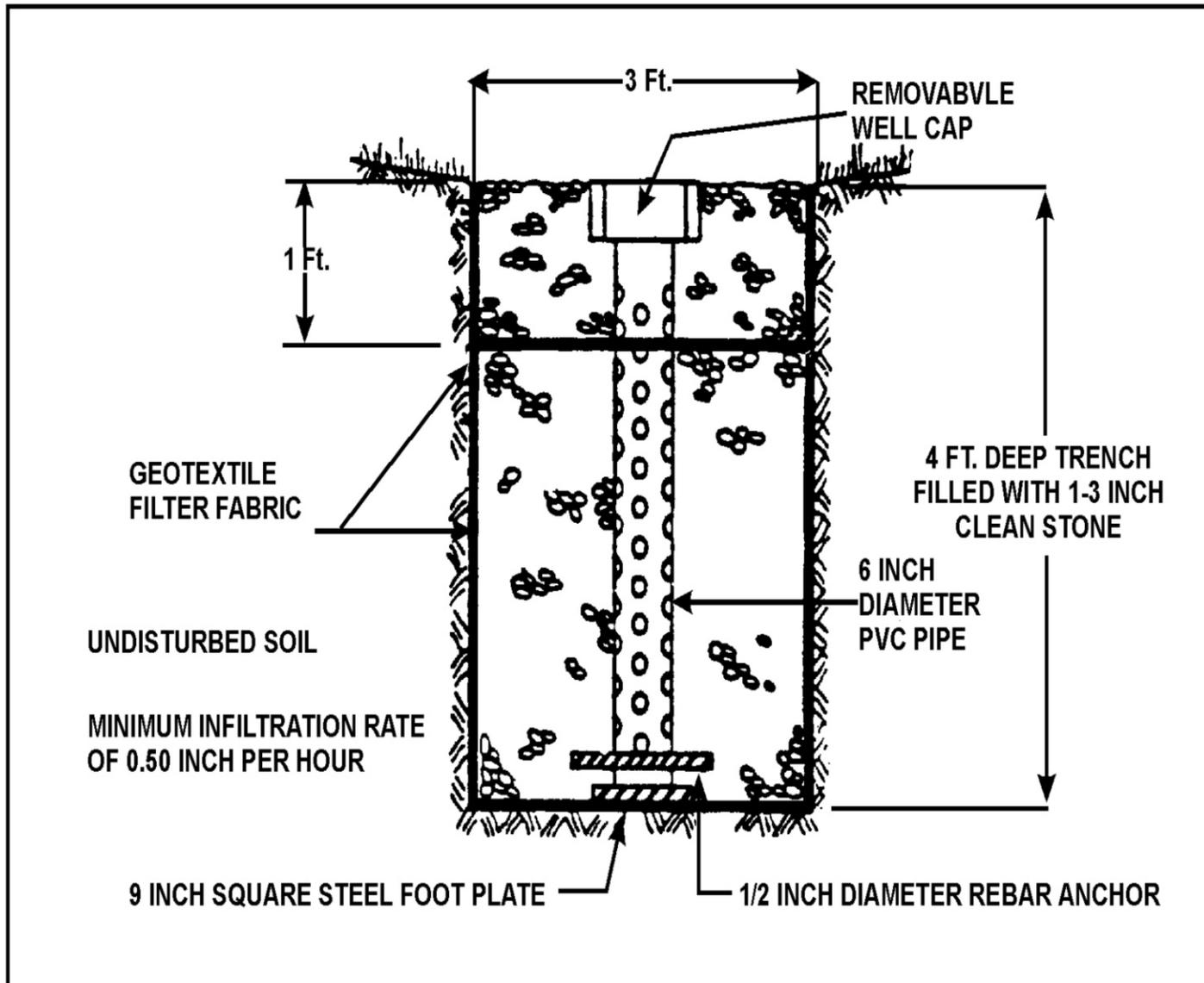
Check Dams



Photo courtesy of SSCRC



Infiltration Trench



Source: Southeastern Wisconsin Regional Planning Commission, 1991.

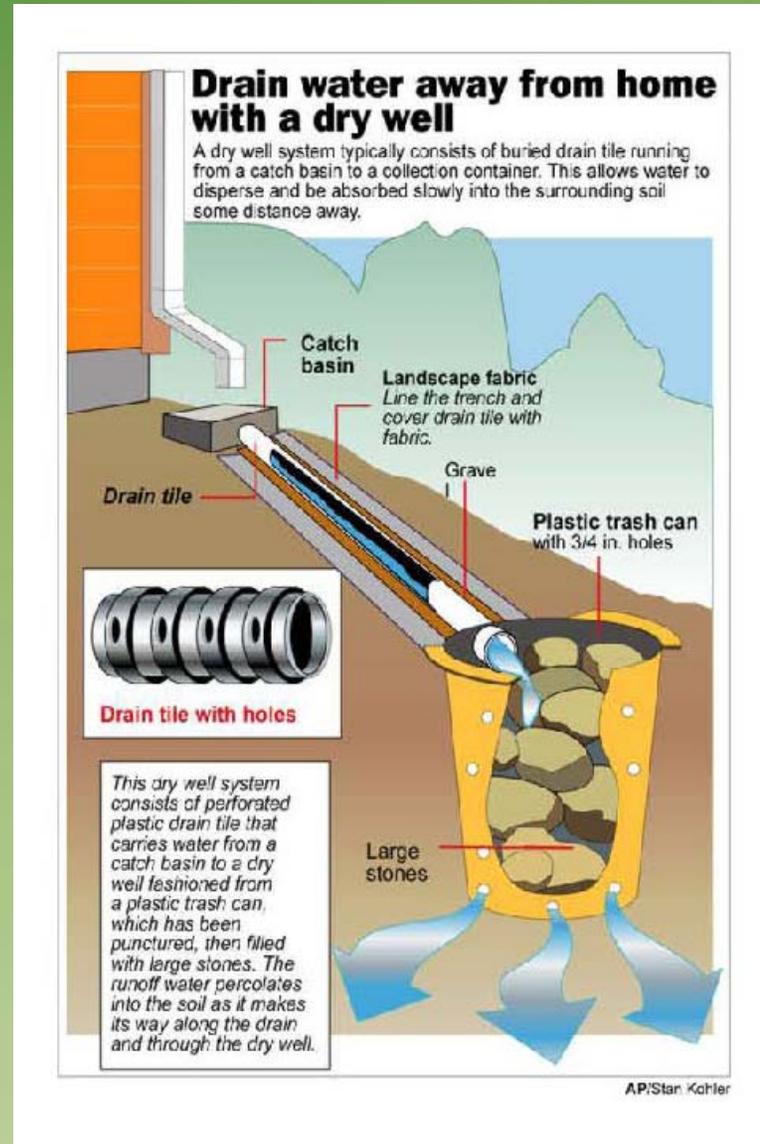
FIGURE 1 TYPICAL INFILTRATION TRENCH



Dry Wells



Photo courtesy of SSCRC



Dry Wells



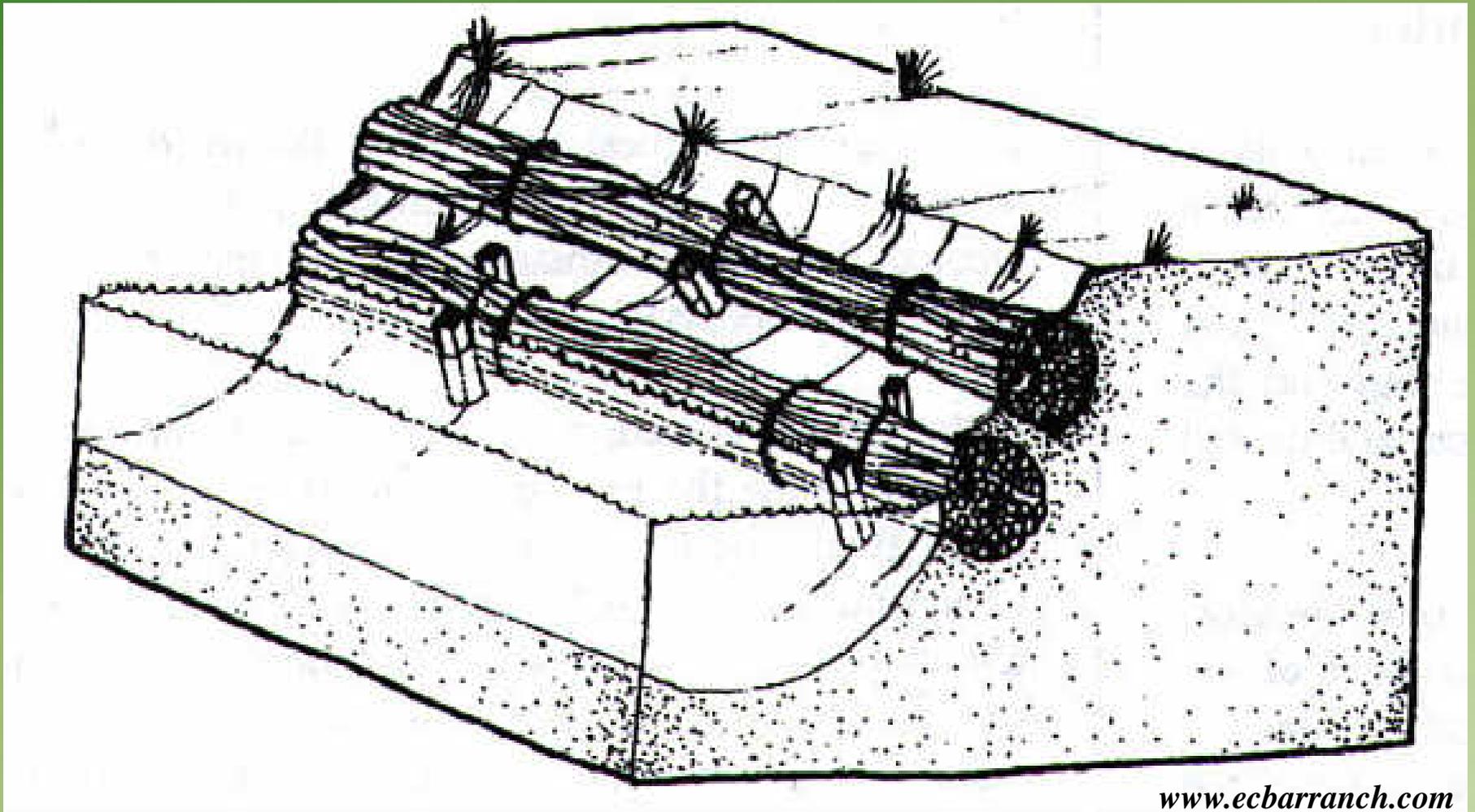
Photo courtesy of SSCRCD



Photo courtesy of SSCRCD



Willow Wattles/Live Fascines



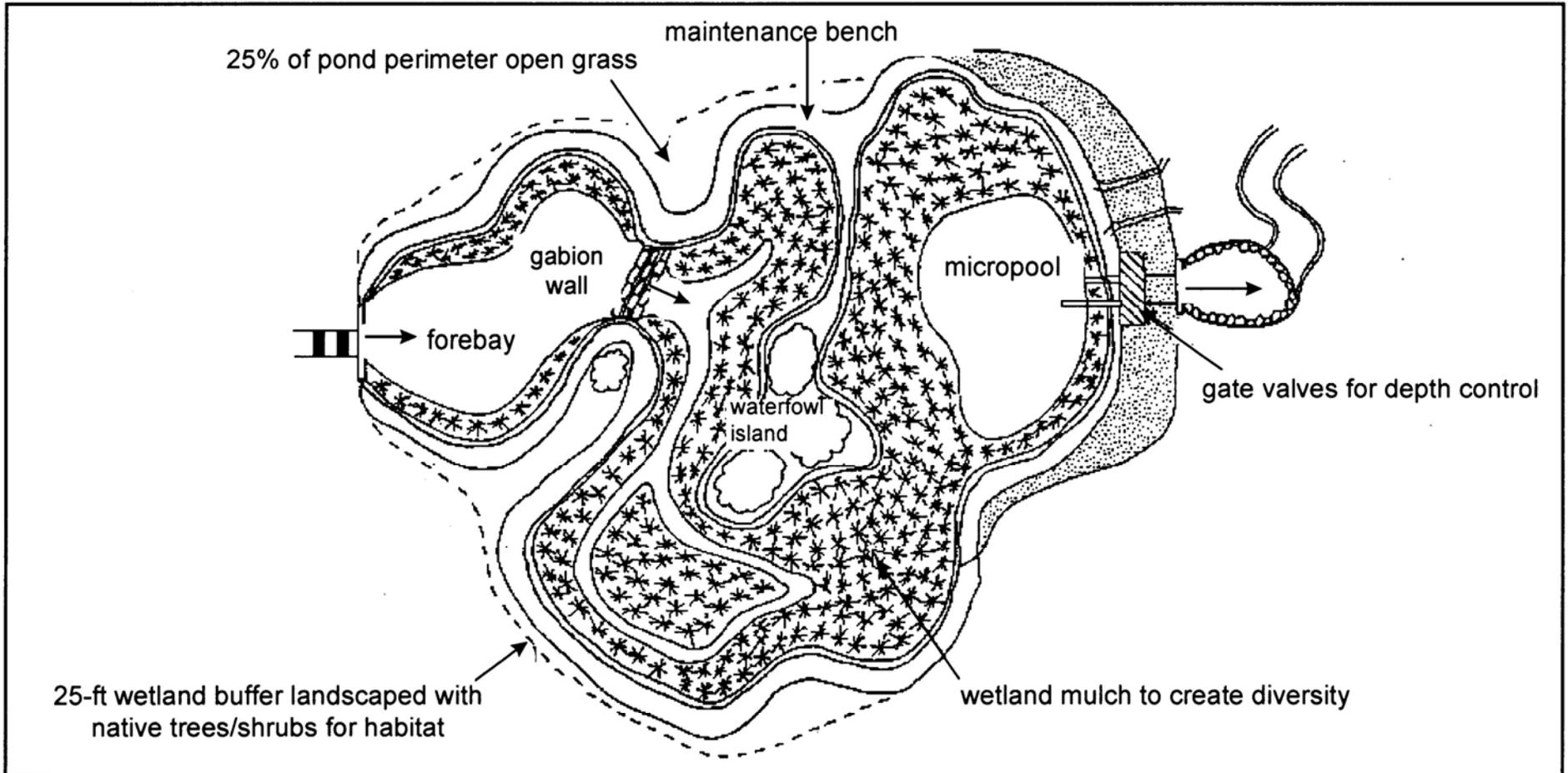
Willow Walls



Photo courtesy of SSCRC



Constructed Wetland



Source: MWCOG, 1992a.

FIGURE 1 SHALLOW MARSH WETLAND



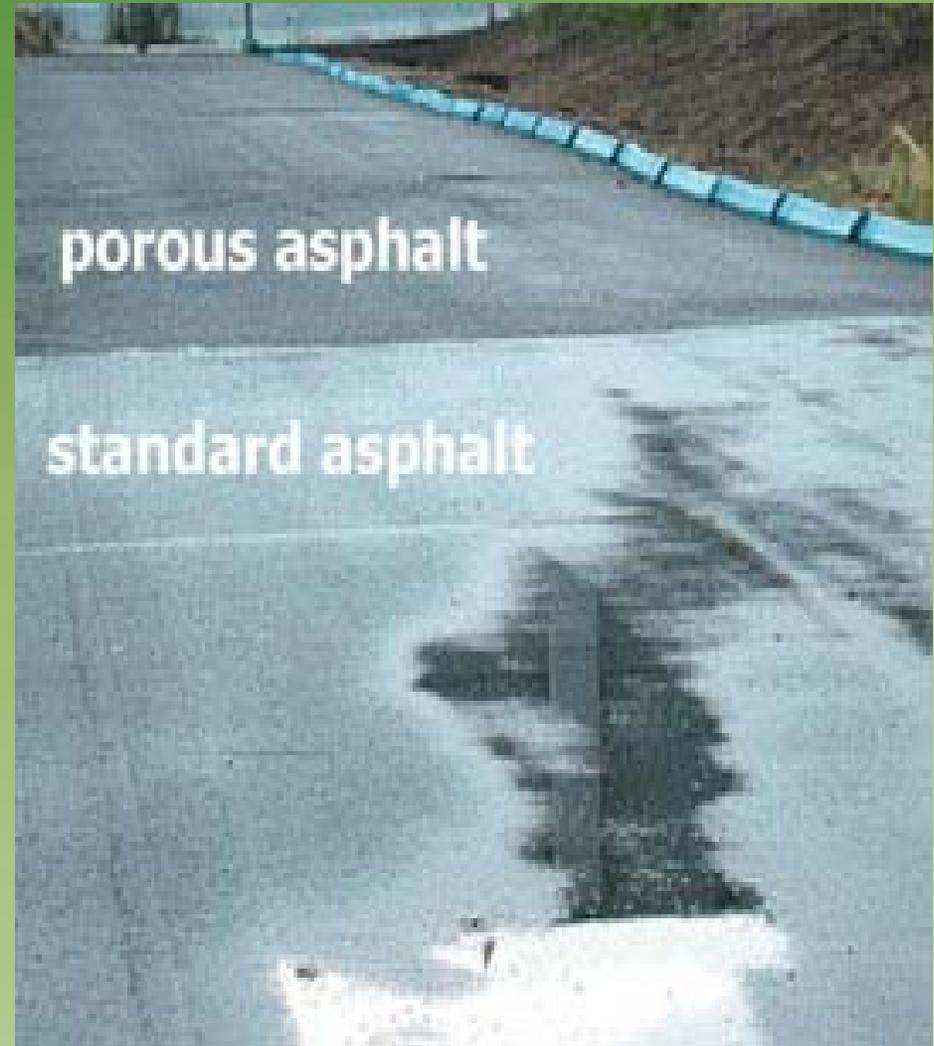
Constructed Wetland



Photo courtesy of SSCRC



Porous Pavement



Stormwater, "Porous Asphalt Pavement With Recharge Beds: 20 Years & Still Working"



Rainwater Harvesting



Source: District of Columbia Water & Sewer Authority



Rain barrels



Rainwater Harvesting



Source: Experiments in Sustainable Urban Living

Above Ground Cistern



Rainwater Harvesting Potential

Sonoma County's average precipitation =
30 inches/year

The amount of rain that falls on a 2,000
square foot home = **37,403 gallons/year**

102.5 gallons/day



Grade Stabilization



Photo courtesy of SSCRC



Next Steps

- Landowner outreach
- Identify candidate sites for pilot and project-scale testing
- Determine appropriate BMPs
- Address permitting issues
 - Agency coordination, cost & time
- Funding
- Implementation
- Reporting



Contact



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