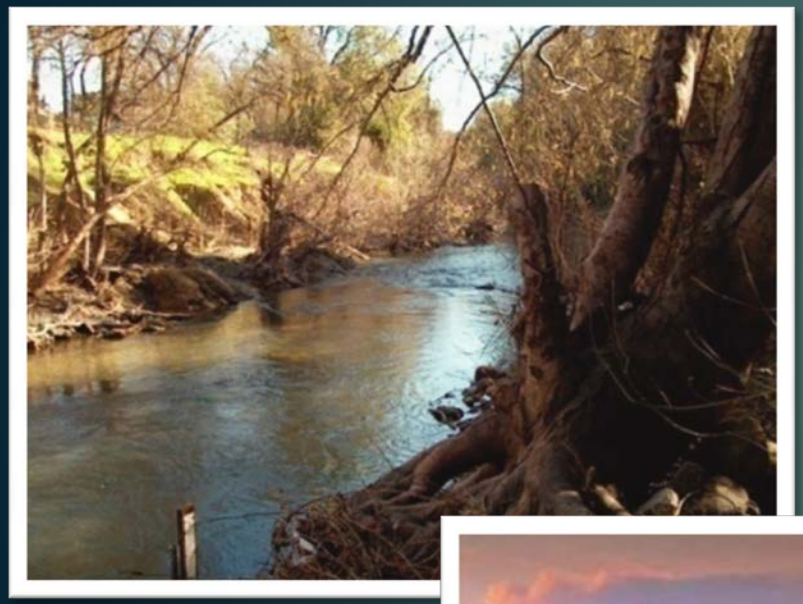
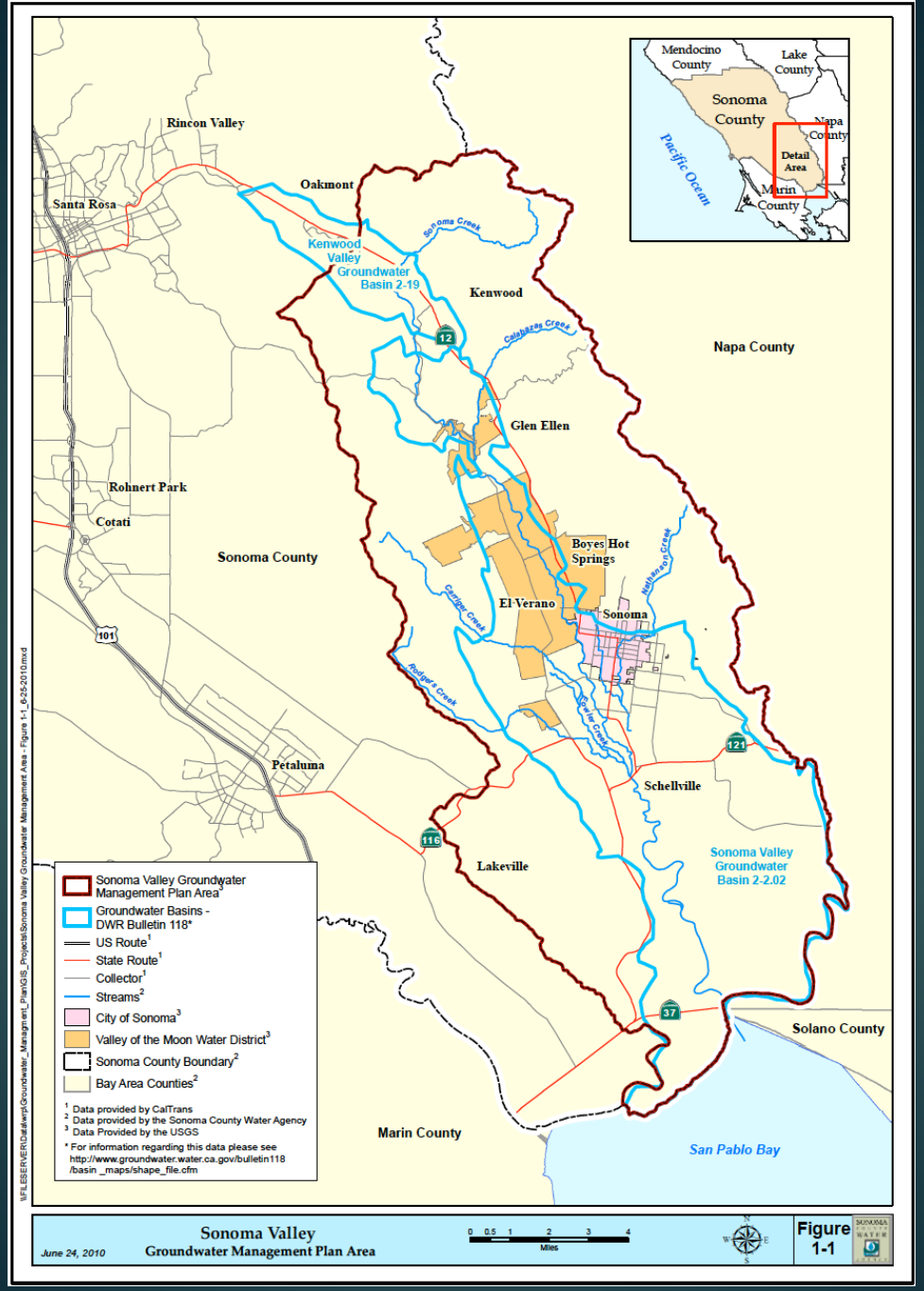
Sonoma Valley Groundwater Management Program

Five-Year Update and Review



Purpose of the Five-Year Update

1. Summarize and document the activities conducted and accomplishments achieved during the first five years of GMP implementation
2. Provide an overview of groundwater conditions, and monitoring results and trends during this time period
3. Continue to assess whether management activities are achieving basin management objectives
4. Present a summary of planned future management activities


Mendocino County
Lake County
Sonoma County
Napa County
Detail Area
Marin County
Pacific Ocean
Rincon Valley
Santa Rosa
Oakmont
Kenwood Valley Groundwater Basin 2-19
Sonoma Creek
Kenwood
Calabazas Creek
Napa County
Glen Ellen
Rohnert Park
Cotati
Sonoma County
Boyes Hot Springs
Nathanson Creek
Calling Creek
El Verano
Sonoma
Rodger's Creek
Dry Creek
Petaluma
Schellville
Lakeville
Sonoma Valley Groundwater Basin 2-2.02
Solano County
Marin County
San Pablo Bay
12
101
121
116
37
Sonoma Valley Groundwater Management Plan Area[3]
Groundwater Basins - DWR Bulletin 118*
US Route[1]
State Route[1]
Collector[1]
Streams[2]
City of Sonoma[3]
Valley of the Moon Water District[3]
Sonoma County Boundary[2]
Bay Area Counties[2]
[1] Data provided by CalTrans
[2] Data provided by the Sonoma County Water Agency
[3] Data Provided by the USGS
* For information regarding this data please see http://www.groundwater.water.ca.gov/bulletin118 /basin _maps/shape_file.cfm
June 24, 2010
Sonoma Valley
Groundwater Management Plan Area
0 0.5 1 2 3 4
Miles
Figure 1-1

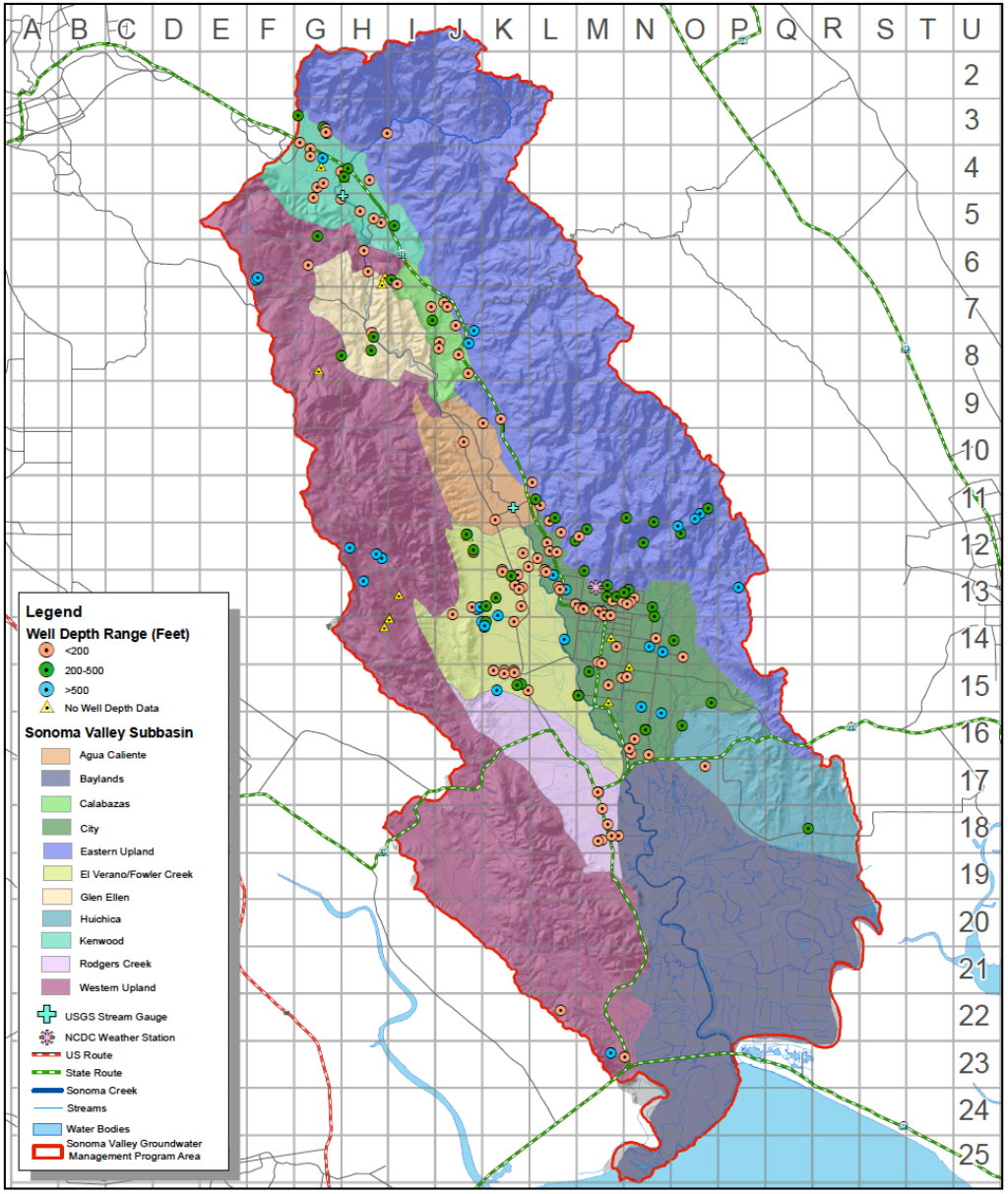
2008-2013 Accomplishments	Basin Management Objectives										
	BMO No.1 Maintain groundwater elevations for the support of beneficial uses of groundwater, and to proctect against inelastic land subsidence.	BMO No.2 Balance use of groundwater relative to other water sources.	BMO No.3 Protect against adverse impacts on surface water quantity from interation between groundwater and surface water flows.	BMO No.4 Identify and protect groundwater recharge areas and enhance the recharge of groundwater where appropriate.	BMO No.5 Maintain or improve groundwater quality for beneficial uses. Minimize saline intrusion.	BMO No.6 Protect against adverse impacts on water quality from interaction between groundwater and surface water flows.	BMO No.7 Improve the community's awareness of groundwater planning, water resources, and legal issues.	BMO No.8 Increase water conservation and water use efficiency practices that help achieve the plan goal.	BMO No.9 Improve understanding of the Sonoma Valley basin groundwater resource through consistent monitoring and continuing focused studies.	BMO No.10 Manage groundwater with local control.	BMO No.11 Explore, Identify and maximize non-regulatory approaches to manage the groundwater resource.
Component No.1 Stakeholder Involvement											
Developed, updated periodically, and implemented Public Outreach Plan				√			√	√		√	√
Regular, periodic communications including periodic reporting, fact sheets, and annual updates to stakeholders				√			√	√		√	√
GMP coordination and policy decisions through Basin Advisory Panel quarterly meetings				√			√	√		√	√
Technical review and input on program activities via Technical Advisory Committee monthly meetings				√			√	√		√	√
Focused outreach and briefings to expand volunteer monitoring program				√			√	√		√	√
Conducted local technical presentations and briefings							√	√		√	√
Produced a video highlighting key elements of the Sonoma Valley GMP							√	√		√	√
Stakeholder visits to possible Sonoma Valley sites for stormwater retention/groundwater recharge projects			√				√			√	√
Sponsored public meetings on the Stormwater Management/Groundwater Recharge Scoping Study			√				√			√	√
Sponsored public meetings on the Salt and Nutrient Management Plan			√	√			√			√	√
Component No.2 Monitoring Program											
Developed a Sampling and Analysis Plan for monitoring well data collection	√		√		√	√			√	√	√
Semi-annual measurement of water levels were coordinated with DWR, VOMWD, the City of Sonoma, SCWA and local trained volunteers	√		√		√	√			√	√	√
Expanded the groundwater level monitoring program by 81 additional wells bringing the total number of voluntary wells to 141.	√		√		√	√			√	√	√
Installed two multi-depth wells with a $250K grant.	√		√		√	√			√	√	√
Instrumented select wells for automated groundwater level monitoring	√		√		√	√			√	√	√
Installed one new stream gage on Sonoma Creek and initiated stream gage monitoring	√		√		√				√	√	√
Conducted stable isotope testing to assess age and flowpaths in parts of the Sonoma Valley	√		√		√				√		√
Developed plan for a volunteer rainfall monitoring program	√						√		√		√
Monitoring data compiled into a GIS database, evaluated and reported on annual basis	√		√		√				√		√
Developed work plan for the California Statewide Groundwater Elevation Monitoring Program and submitted groundwater level data to DWR	√		√		√				√	√	√
Prepared and distributed the Annual Reports and Data Transmittals	√		√		√	√	√		√	√	√
Component No.3 Groundwater Resources Protection											
Preparation and distribution of a private wells owners guide ("WELLness – A Guide to Your Water Well")				√	√		√			√	√
Conducted groundwater recharge mapping under a $20,000 grant received		√		√	√				√	√	√
Additional groundwater quality sampling in southern Sonoma Valley for salinity				√	√				√	√	√
Assembled and compiled additional Department of Public Health groundwater data on wells in the valley	√	√		√	√				√	√	
Assembled and compiled additional GeoTracker cleanup site groundwater data on wells in the valley				√	√				√	√	
Component No.4 Groundwater Sustainability											
Conducted unincorporated area water conservation audit and prepared a report under a $25,000 grant	√	√					√	√		√	√
Distributed and publicized the "Slow It, Spread It, Sink It" guidebook as a resource for property owners to implement stormwater retention and groundwater recharge projects	√	√					√	√		√	√
The SVGMP Panel developed and gives Annual Conservation Awards	√	√					√	√		√	√
Provided input on stormwater capture/groundwater recharge and groundwater banking feasibility studies	√	√								√	√
Updated the groundwater flow model to better simulate groundwater recharge distribution	√	√			√				√	√	√
Component No.5 Planning Integration											
Coordinated funding and participation by Lead and Cooperating Agencies in the SVGMP		√								√	√
Conducted coordinated efforts to pursue funding for additional groundwater monitoring and conservation projects that resulted in the award of two AB303 Grants and one water conservation audit grant		√			√					√	√
Developed and continued coordinated monitoring in the Sonoma Valley		√			√					√	√
Participation and input on the recycled water project and development of the Salt and Nutrient Management Plan for Sonoma Valley		√			√					√	√
Participation in the CUWCC Memorandum of Understanding (MOU) for water conservation		√			√			√		√	√
Conduct periodic constituent briefings for information dissemination, to receive input and continue looking for additional opportunities to integrate future planning and program efforts		√					√			√	√

Accomplishments to Date

- Stakeholder Involvement
  - Outreach and briefings
  - Communications
  - Media
- GW Level Monitoring Program
  - Coordinated data collection
  - Sampling & Analysis Plan
  - Additional Evaluations
  - High-Frequency Level Monitoring
  - Stream-gaging
  - Streamflow/Groundwater Interaction Monitoring
  - Rainfall Monitoring
- Groundwater Sustainability
  - Stormwater Management Guide
  - Groundwater recharge mapping
  - Visits to graywater facilities
  - Visits to possible recharge sites
  - Rural area water conservation assessments
  - Water conservation awards program
  - Recycled water enhancements
  - Stormwater management/groundwater recharge study
  - Groundwater Banking Feasibility Study
  - Groundwater Model Update

Accomplishments to Date

- Groundwater Quality Protection
  - Groundwater Quality Monitoring Program
  - Well Owner's Guide
- Planning Integration
  - Through increased communications and leveraging of resources
- Grant Awards
  - North Bay Watershed Association
    - Rural area water conservation audits
      - $25,000
  - AB303 Groundwater Management
    - Multi-depth monitoring wells
      - $250,000
    - Additional monitoring wells for Enhanced Recharge Projects
      - $168,000
  - Prop 1E
    - City Watersheds Project
      - $1.9 Million

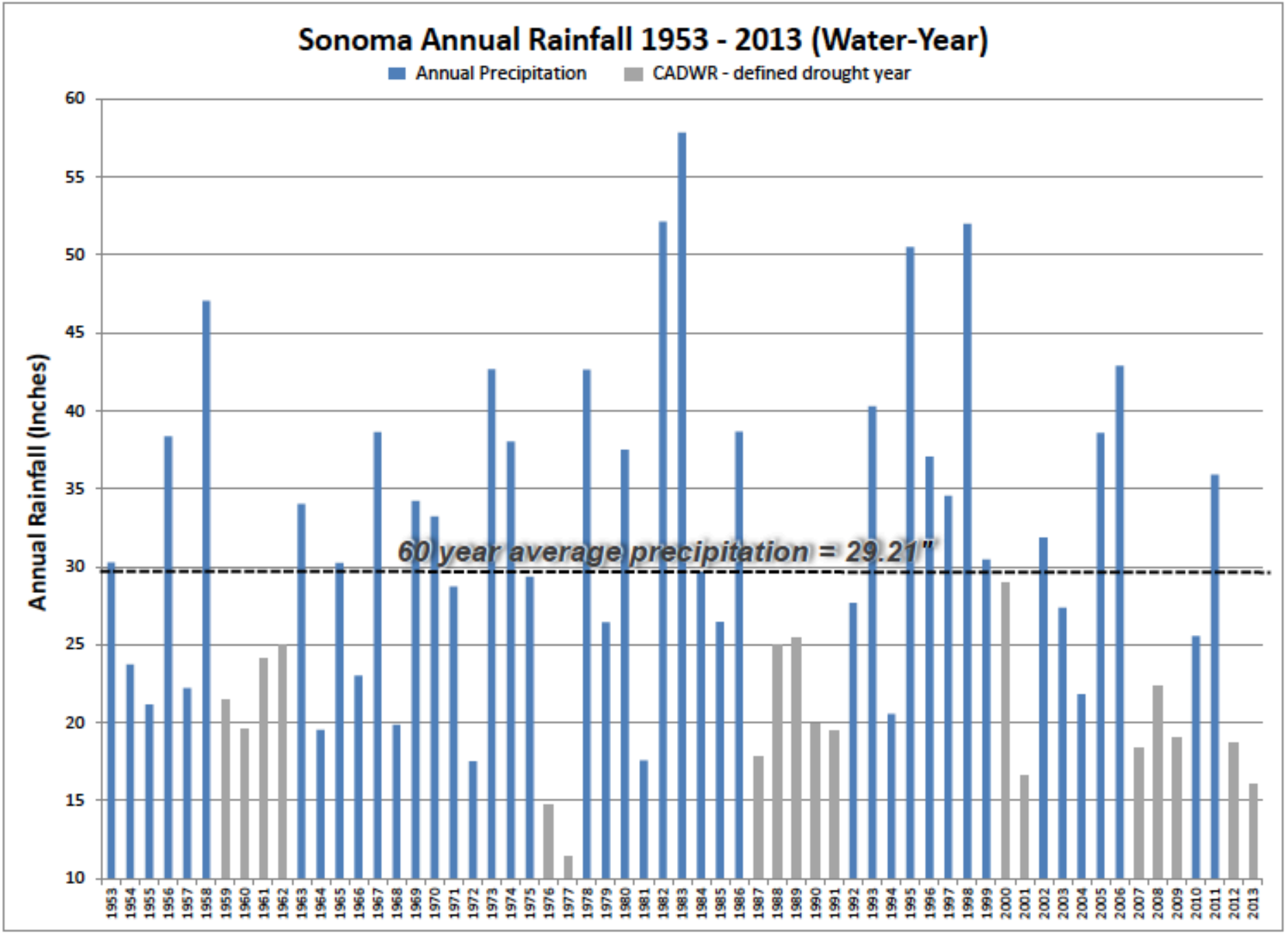


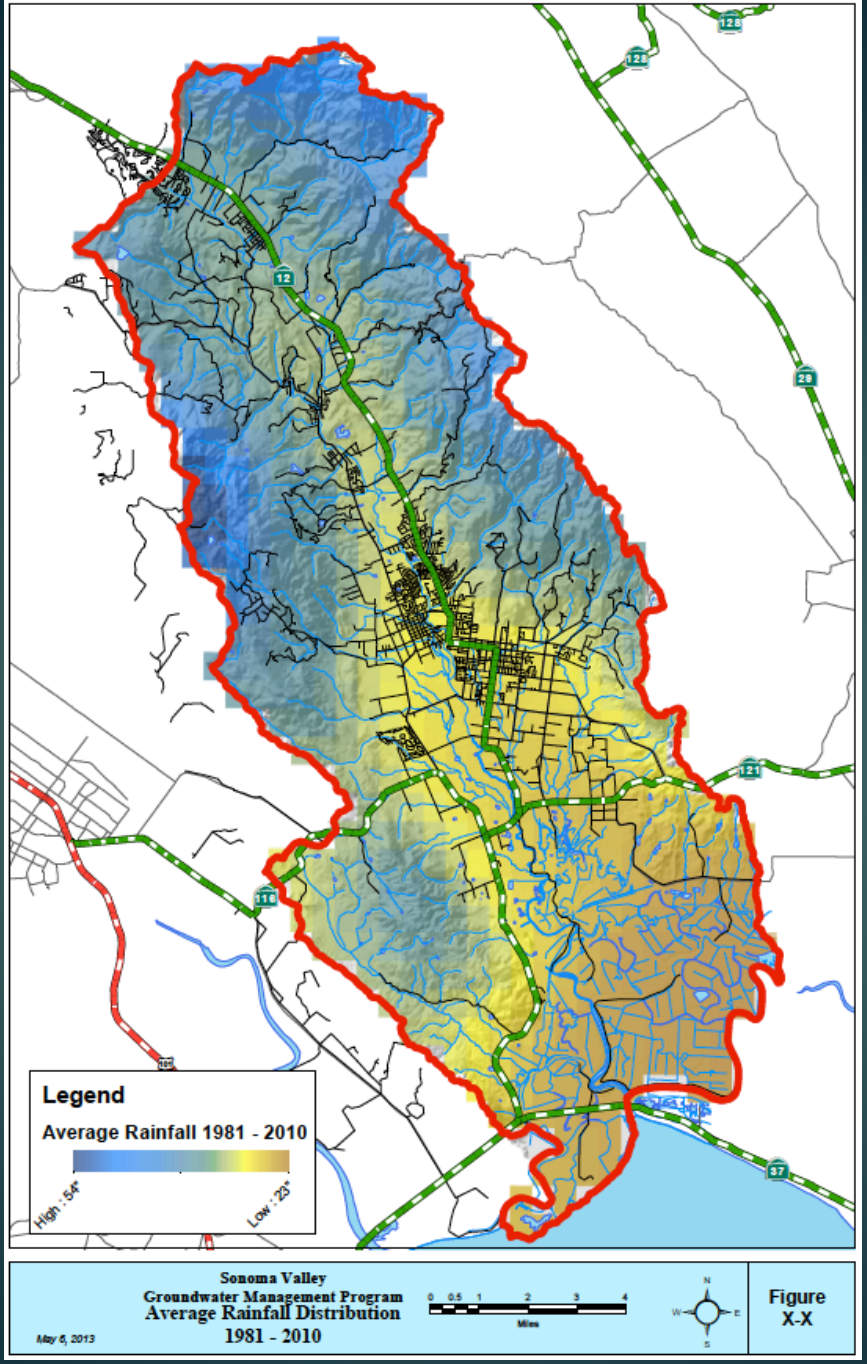
Sonoma Valley
Groundwater Management Program
Groundwater Level Monitoring Network

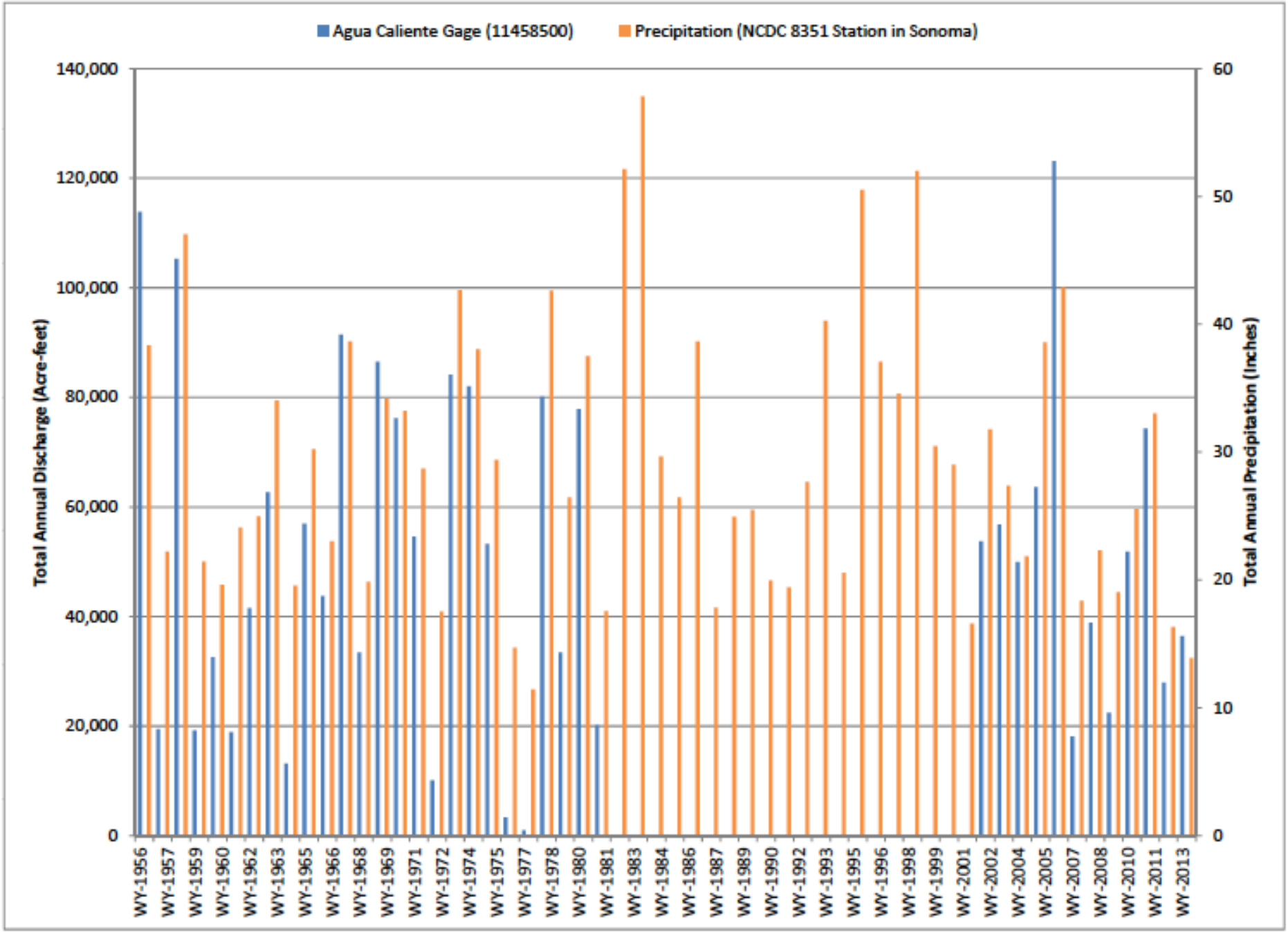
November 26, 2013

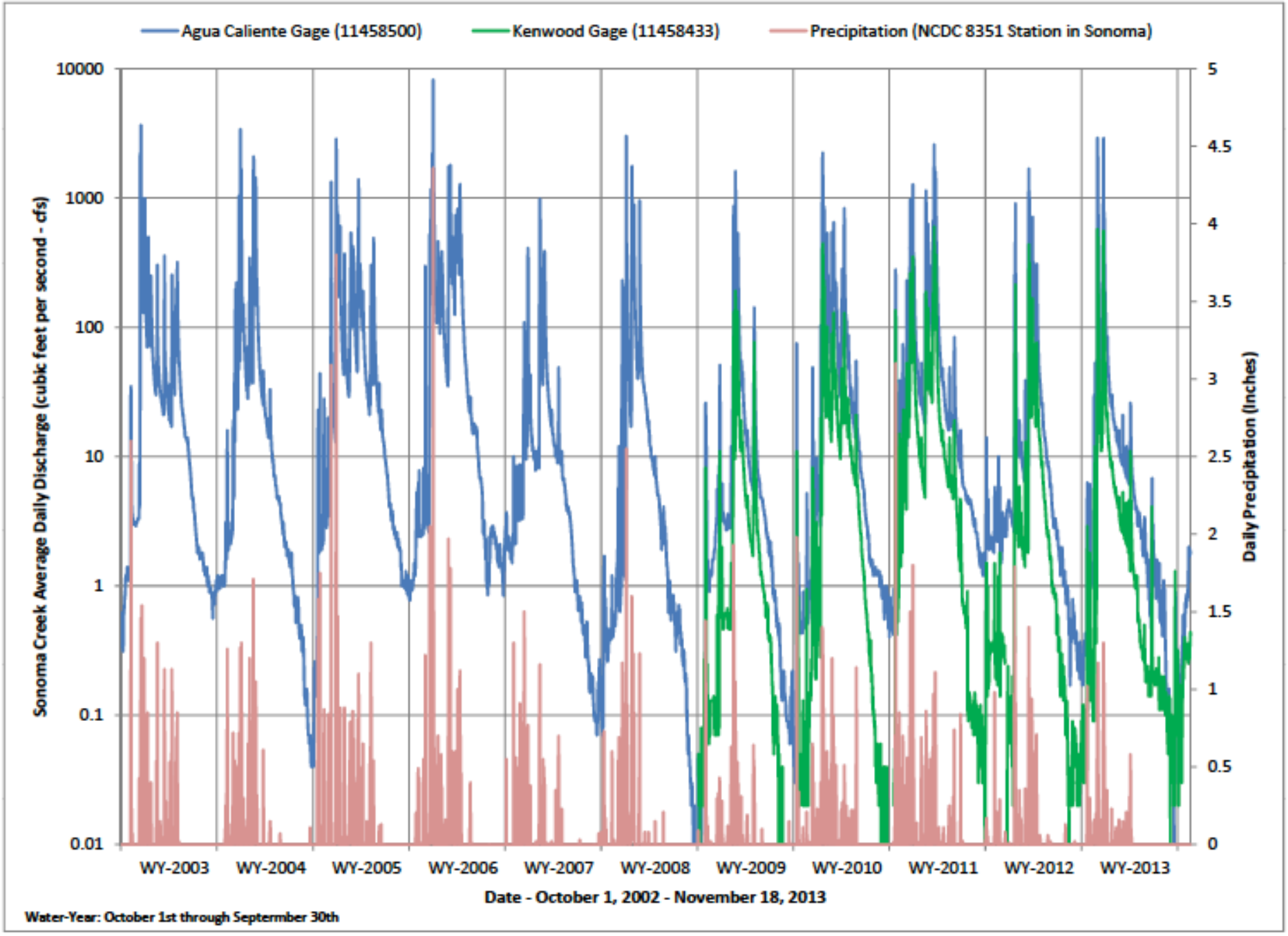
0 0.5 1 2 3 4 5
Miles

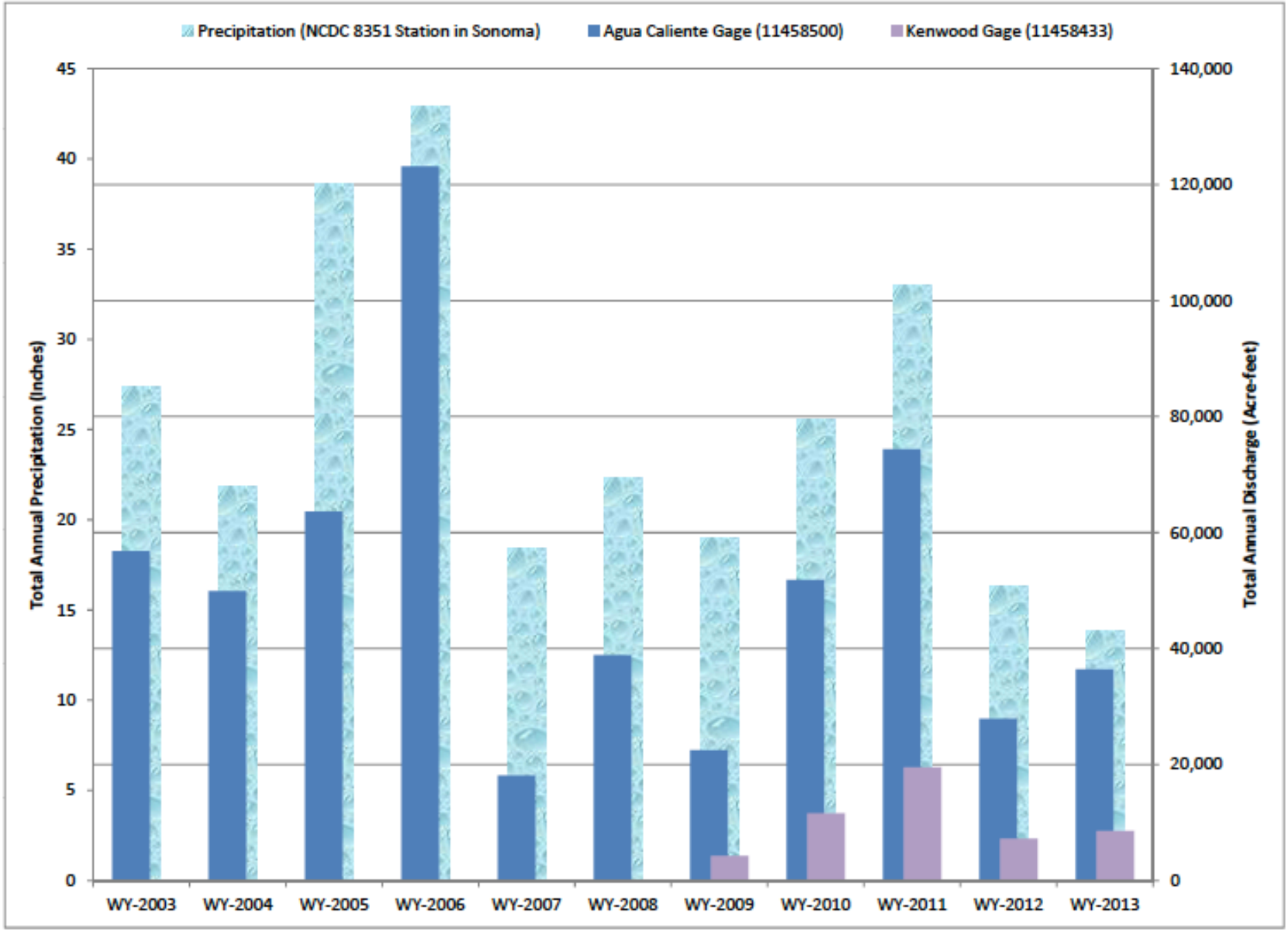
Figure 2-1

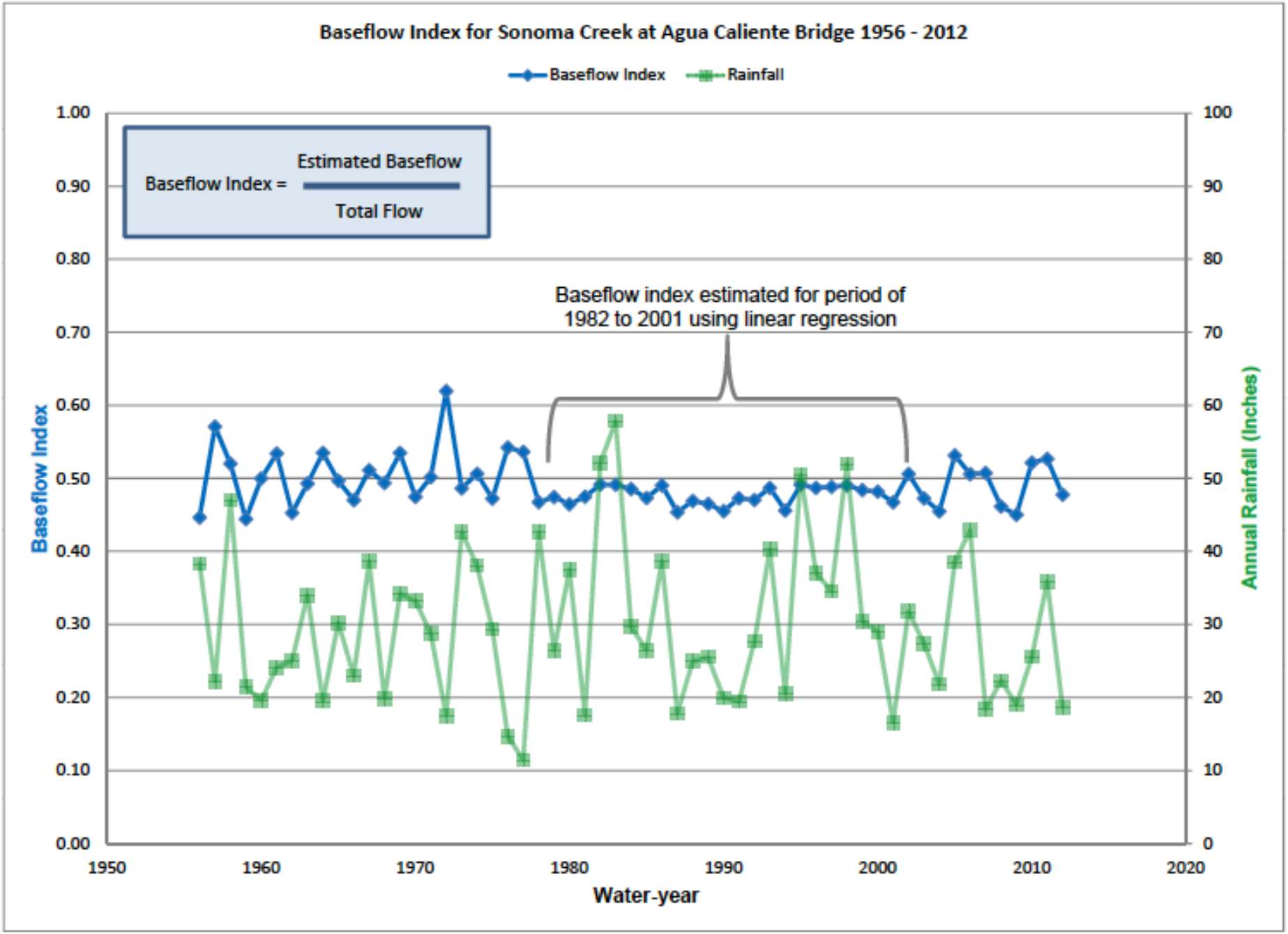

Sonoma Annual Rainfall 1953 - 2013 (Water-Year)
Annual Precipitation
CADWR - defined drought year
Annual Rainfall (Inches)
60
55
50
45
40
35
30
25
20
15
10
60 year average precipitation = 29.21"
1953 1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013

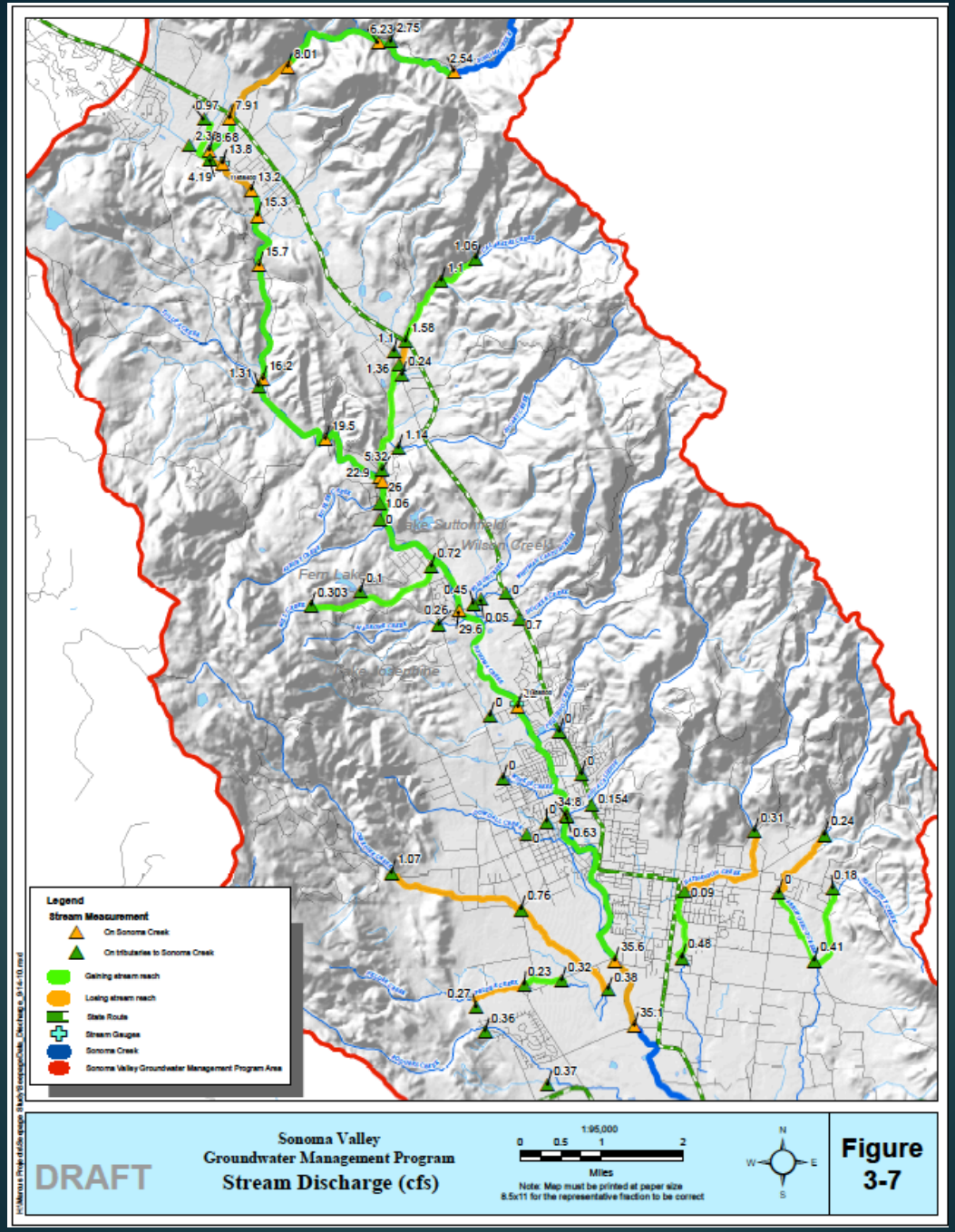

Legend
Average Rainfall 1981 - 2010
High : 54"
Low : 23"
Sonoma Valley
Groundwater Management Program
Average Rainfall Distribution
1981 - 2010
May 6, 2013
0 0.5 1 2 3 4
Miles
N
W
E
S
Figure
X-X

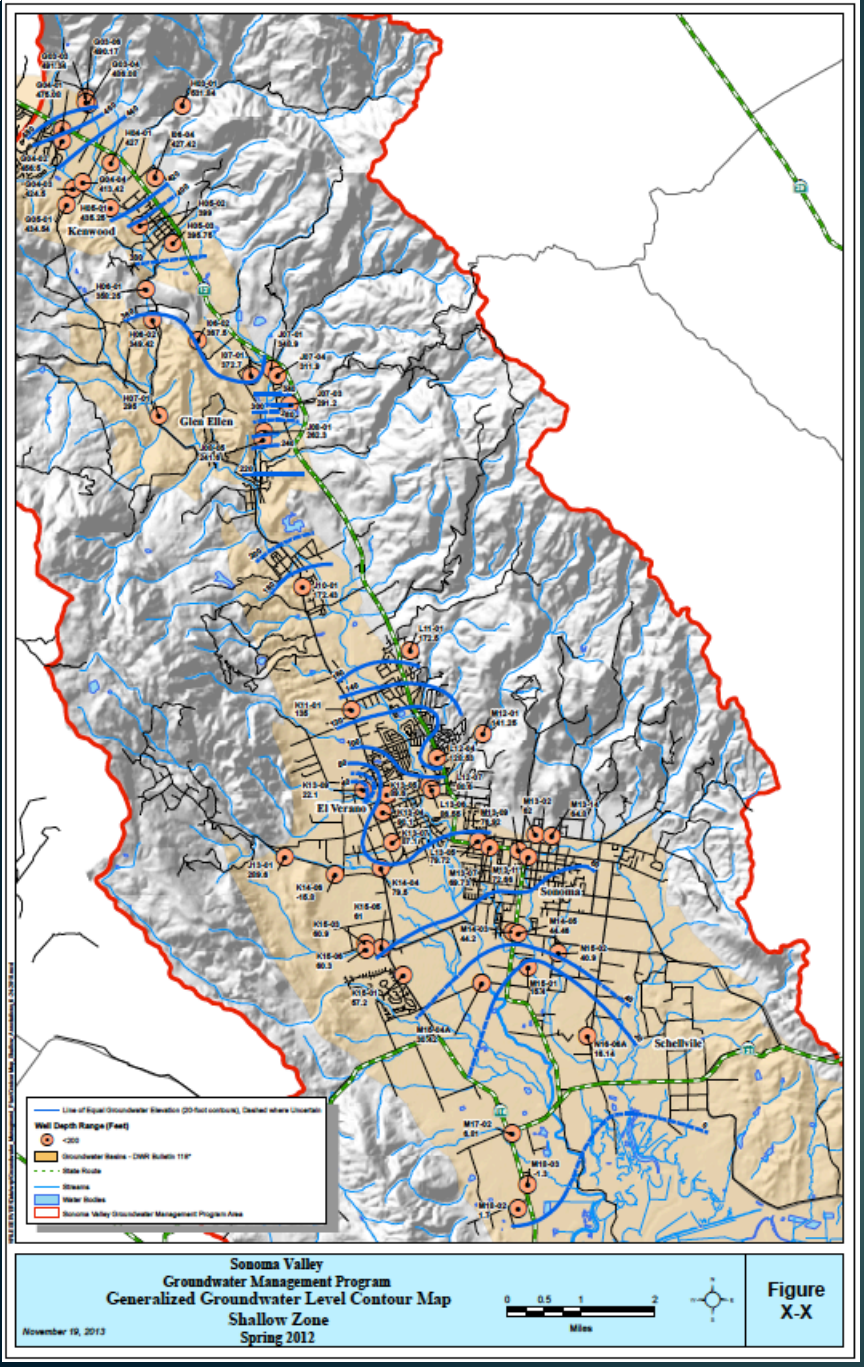

Agua Caliente Gage (11458500)
Precipitation (NCDC 8351 Station in Sonoma)
Total Annual Discharge (Acre-feet)
Total Annual Precipitation (Inches)
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
60
50
40
30
20
10
0
WY-1956
WY-1957
WY-1959
WY-1960
WY-1962
WY-1963
WY-1965
WY-1966
WY-1968
WY-1969
WY-1971
WY-1972
WY-1974
WY-1975
WY-1977
WY-1978
WY-1980
WY-1981
WY-1983
WY-1984
WY-1986
WY-1987
WY-1989
WY-1990
WY-1992
WY-1993
WY-1995
WY-1996
WY-1998
WY-1999
WY-2001
WY-2002
WY-2004
WY-2005
WY-2007
WY-2008
WY-2010
WY-2011
WY-2013

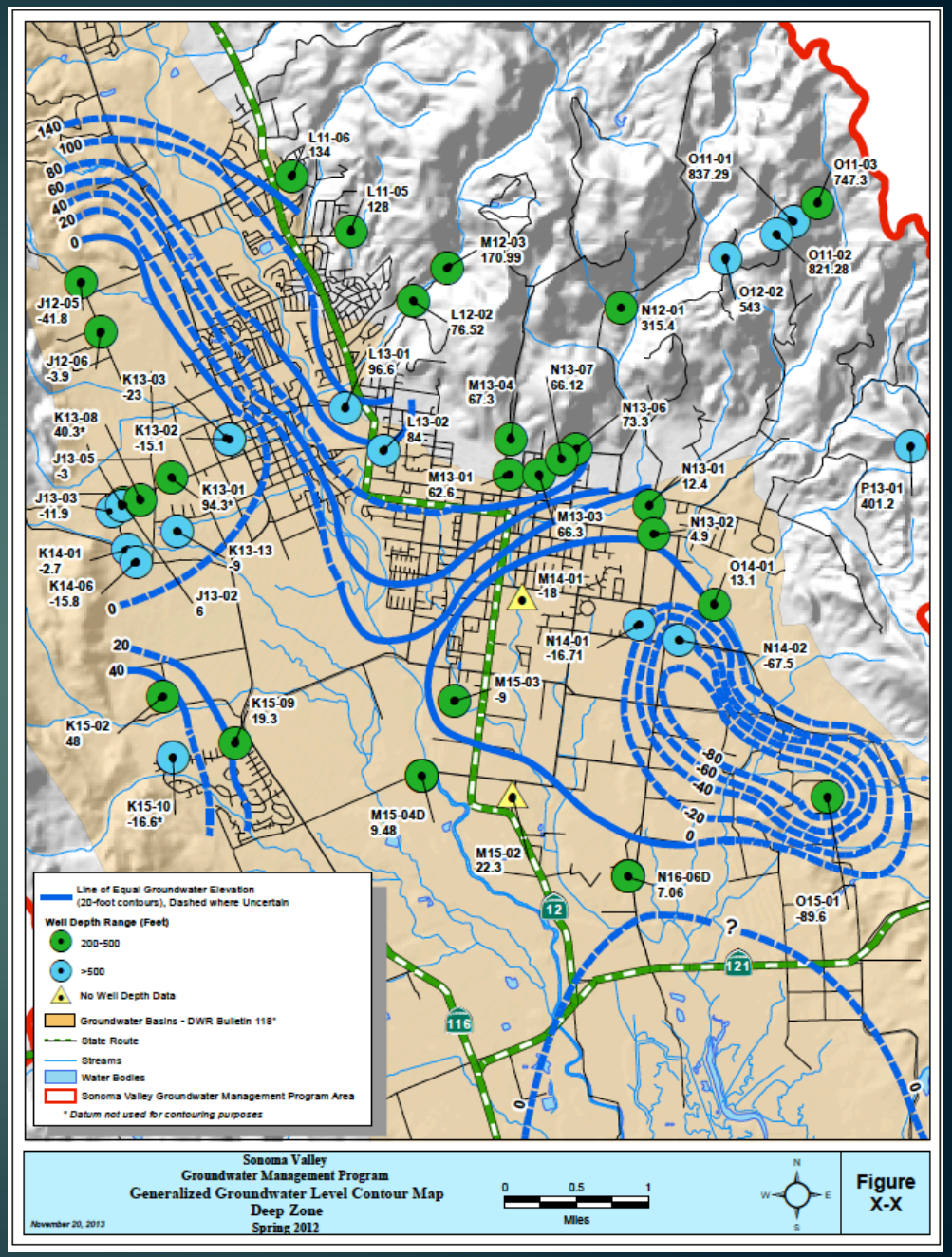

Agua Caliente Gage (11458500)
Kenwood Gage (11458433)
Precipitation (NCDC 8351 Station in Sonoma)
Sonoma Creek Average Daily Discharge (cubic feet per second - cfs)
10000
1000
100
10
1
0.1
0.01
Daily Precipitation (Inches)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
WY-2003
WY-2004
WY-2005
WY-2006
WY-2007
WY-2008
WY-2009
WY-2010
WY-2011
WY-2012
WY-2013
Date - October 1, 2002 - November 18, 2013
Water-Year: October 1st through September 30th

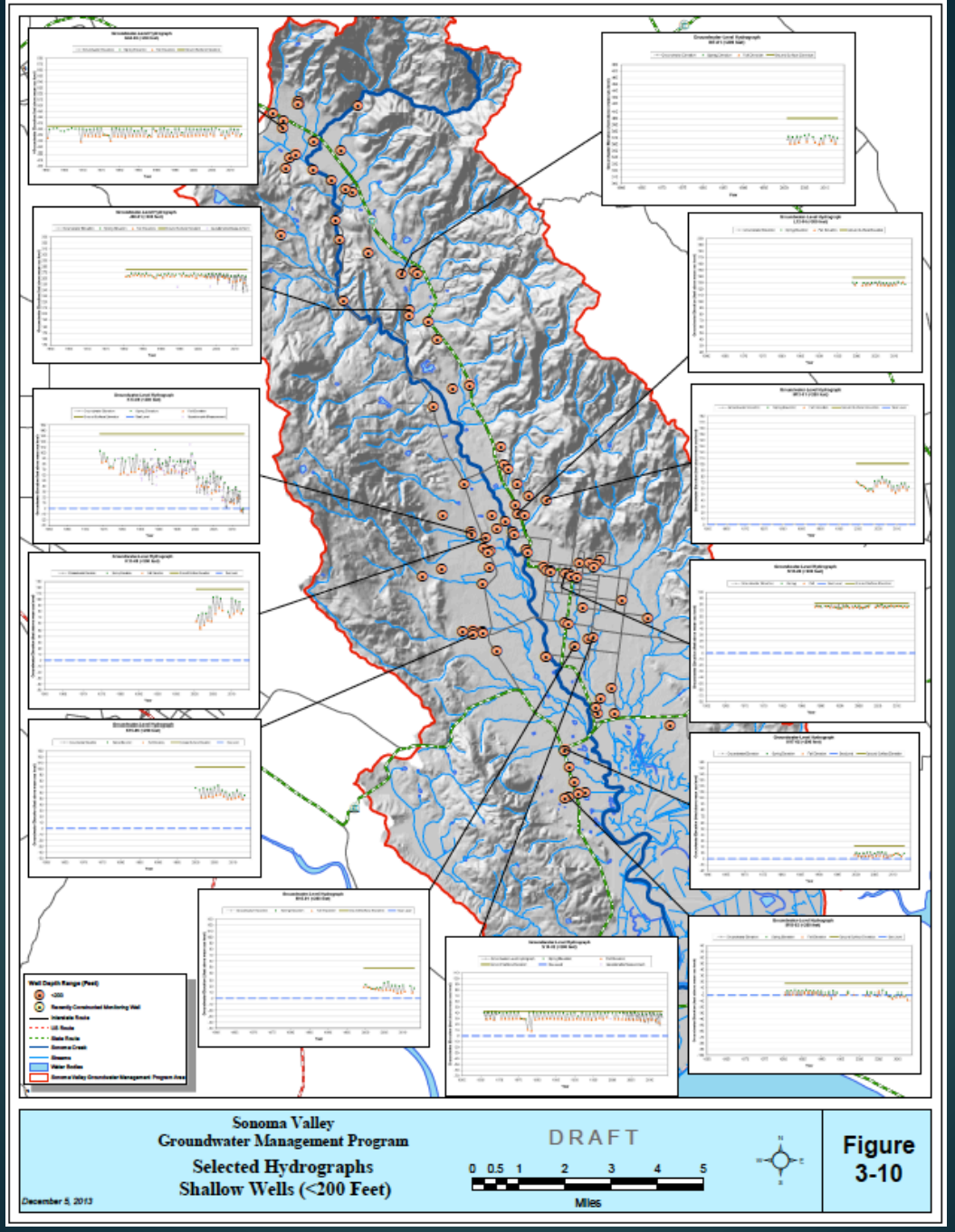

Precipitation (NCDC 8351 Station in Sonoma)
Agua Caliente Gage (11458500)
Kenwood Gage (11458433)
Total Annual Precipitation (Inches)
Total Annual Discharge (Acre-feet)
0
5
10
15
20
25
30
35
40
45
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
WY-2003
WY-2004
WY-2005
WY-2006
WY-2007
WY-2008
WY-2009
WY-2010
WY-2011
WY-2012
WY-2013

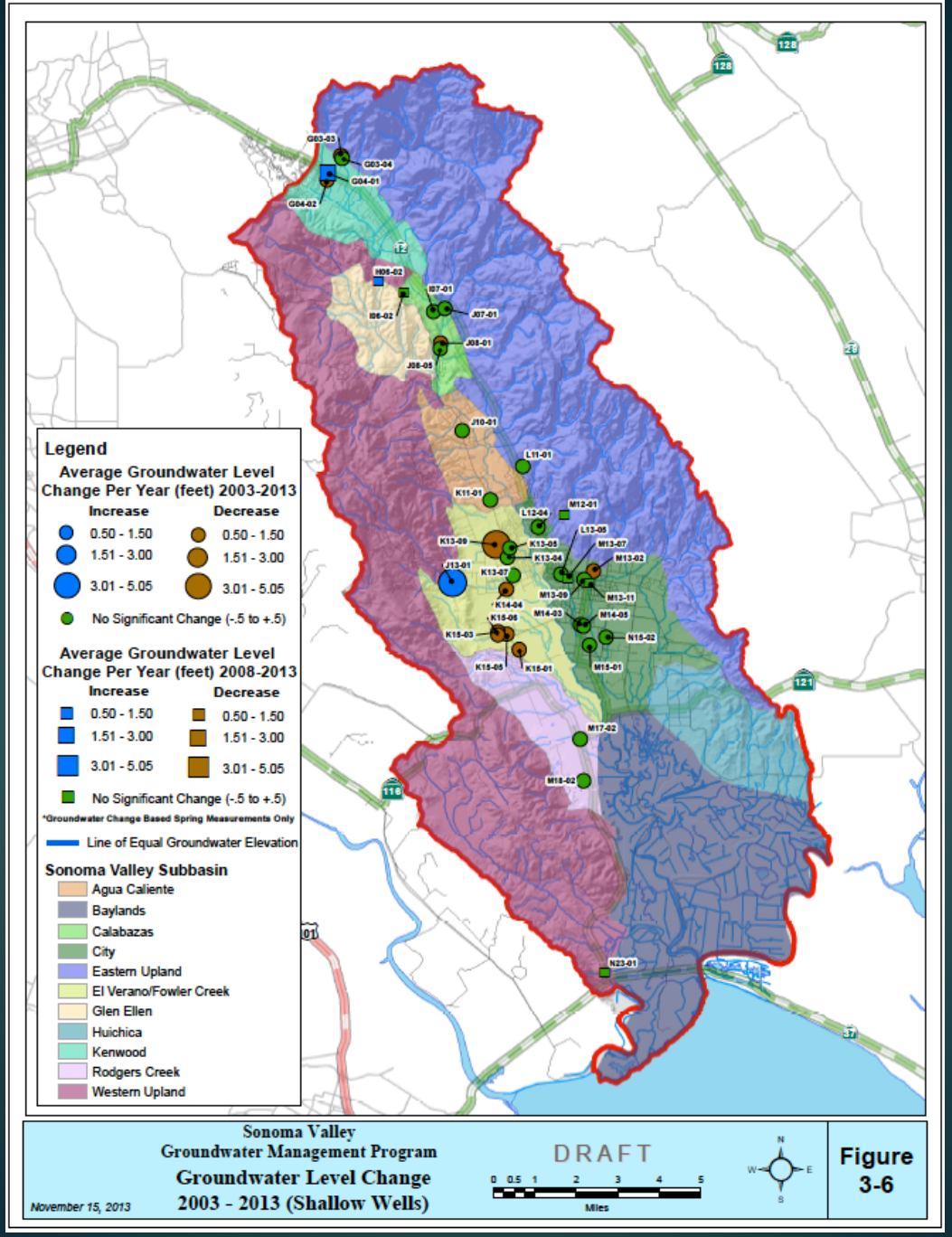

Baseflow Index for Sonoma Creek at Agua Caliente Bridge 1956 - 2012
Baseflow Index
Rainfall
Baseflow Index = Estimated Baseflow / Total Flow
Baseflow index estimated for period of 1982 to 2001 using linear regression
Baseflow Index
Annual Rainfall (Inches)
Water-year
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
100
90
80
70
60
50
40
30
20
10
0
1950
1960
1970
1980
1990
2000
2010
2020

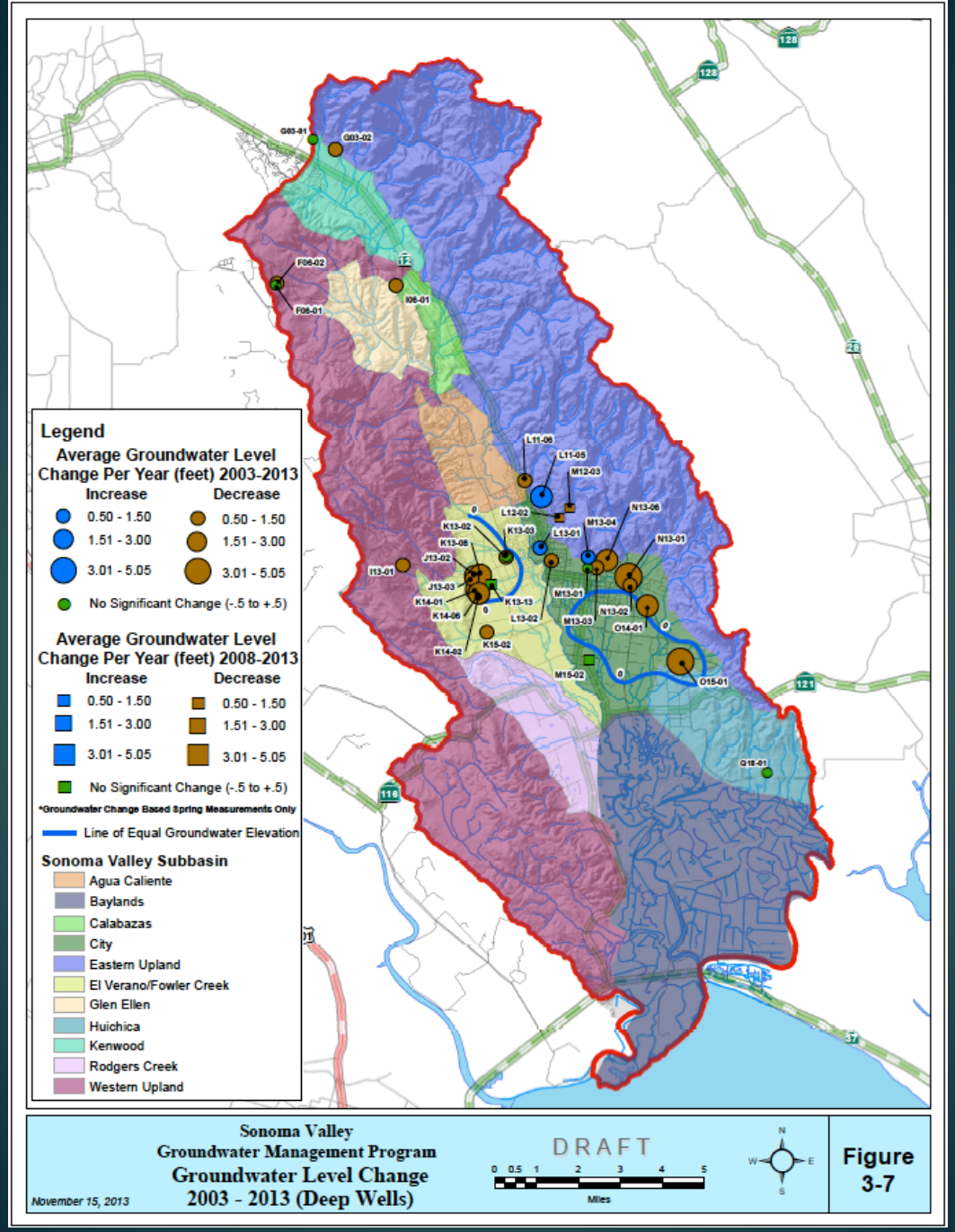

Legend
Stream Measurement
On Sonoma Creek
On tributaries to Sonoma Creek
Gaining stream reach
Losing stream reach
State Route
Stream Gauges
Sonoma Creek
Sonoma Valley Groundwater Management Program Area
Lake Suttonfield
Fern Lake
DRAFT
Sonoma Valley
Groundwater Management Program
Stream Discharge (cfs)
1:95,000
0 0.5 1 2
Miles
Note: Map must be printed at paper size 8.5x11 for the representative fraction to be correct
N
W
E
S
Figure 3-7

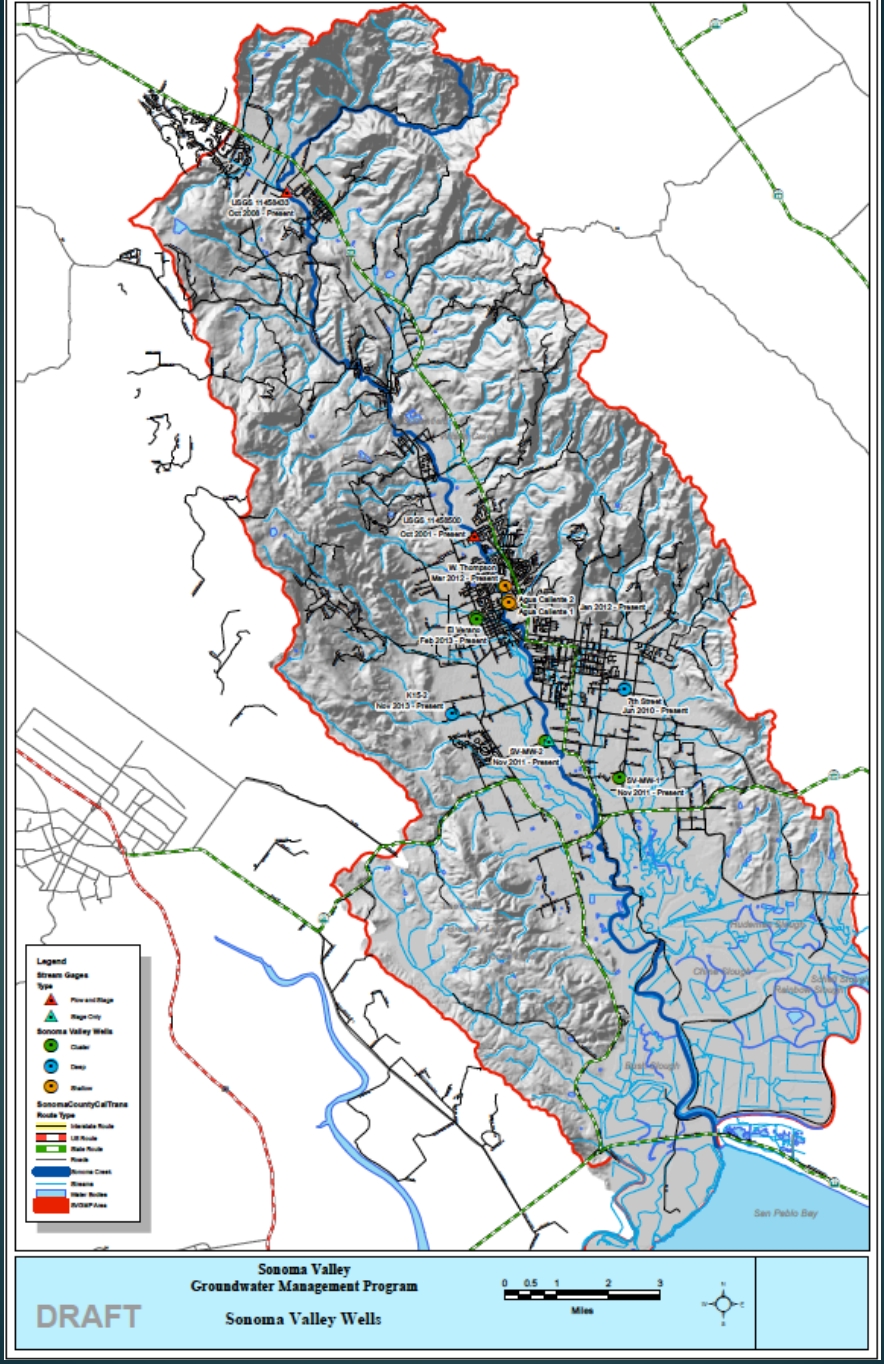

Kenwood
Glen Ellen
El Verano
Sonoma
Schellville
Line of Equal Groundwater Elevation (20-foot contours), Dashed where Uncertain
Well Depth Range (Feet)
<200
Groundwater Basins - DWR Bulletin 118*
State Route
Streams
Water Bodies
Sonoma Valley Groundwater Management Program Area
Sonoma Valley
Groundwater Management Program
Generalized Groundwater Level Contour Map
Shallow Zone
Spring 2012
November 19, 2013
0 0.5 1 2
Miles
Figure X-X

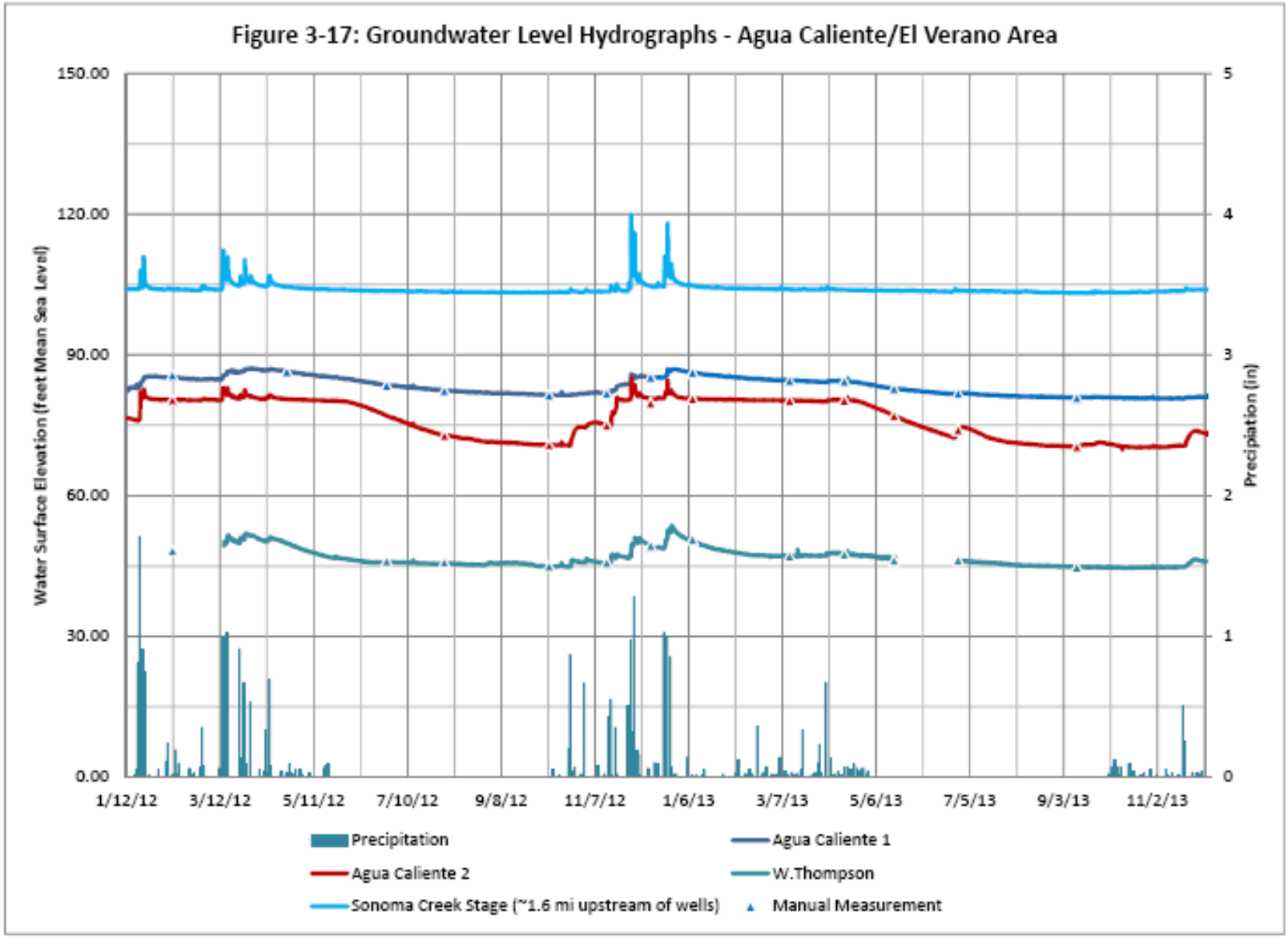

L11-06 134
L11-05 128
M12-03 170.99
L12-02 76.52
L13-01 96.6
L13-02 84
J12-05 -41.8
J12-06 -3.9
K13-03 -23
K13-08 40.3*
K13-02 -15.1
J13-05 -3
J13-03 -11.9
K13-01 94.3*
K14-01 -2.7
K14-06 -15.8
K13-13 -9
J13-02 6
M13-01 62.6
M13-04 67.3
N13-07 66.12
N13-06 73.3
M13-03 66.3
N13-01 12.4
N13-02 4.9
N12-01 315.4
O11-01 837.29
O11-03 747.3
O11-02 821.28
O12-02 543
P13-01 401.2
O14-01 13.1
M14-01 -18
N14-01 -16.71
N14-02 -67.5
M15-03 -9
K15-09 19.3
K15-02 48
K15-10 -16.6*
M15-04D 9.48
M15-02 22.3
N16-06D 7.06
O15-01 -89.6
Line of Equal Groundwater Elevation (20-foot contours), Dashed where Uncertain
Well Depth Range (Feet)
200-500
>500
No Well Depth Data
Groundwater Basins - DWR Bulletin 118*
State Route
Streams
Water Bodies
Sonoma Valley Groundwater Management Program Area
* Datum not used for contouring purposes
Sonoma Valley
Groundwater Management Program
Generalized Groundwater Level Contour Map
Deep Zone
Spring 2012
November 20, 2013
0 0.5 1
Miles
Figure X-X


Sonoma Valley
Groundwater Management Program
Selected Hydrographs
Shallow Wells (<200 Feet)
DRAFT
0 0.5 1 2 3 4 5
Miles
Figure
3-10
December 5, 2013

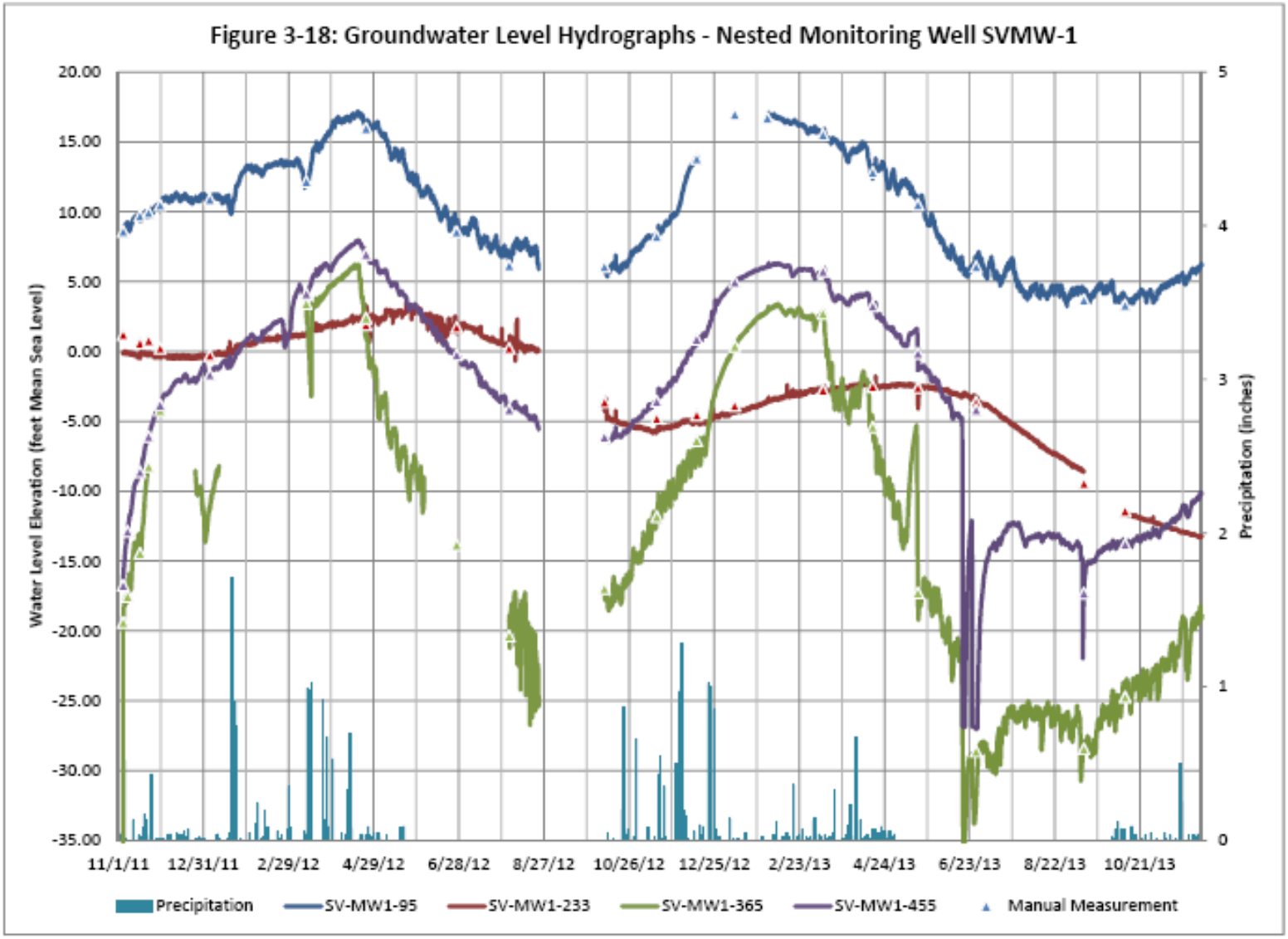

Legend
Average Groundwater Level Change Per Year (feet) 2003-2013
Increase
Decrease
0.50 - 1.50
1.51 - 3.00
3.01 - 5.05
No Significant Change (-.5 to +.5)
Average Groundwater Level Change Per Year (feet) 2008-2013
Increase
Decrease
0.50 - 1.50
1.51 - 3.00
3.01 - 5.05
No Significant Change (-.5 to +.5)
*Groundwater Change Based Spring Measurements Only
Line of Equal Groundwater Elevation
Sonoma Valley Subbasin
Agua Caliente
Baylands
Calabazas
City
Eastern Upland
El Verano/Fowler Creek
Glen Ellen
Huichica
Kenwood
Rodgers Creek
Western Upland
Sonoma Valley
Groundwater Management Program
Groundwater Level Change
2003 - 2013 (Shallow Wells)
November 15, 2013
DRAFT
0 0.5 1 2 3 4 5
Miles
N
W
E
S
Figure
3-6


Legend
Average Groundwater Level Change Per Year (feet) 2003-2013
Increase
Decrease
0.50 - 1.50
1.51 - 3.00
3.01 - 5.05
No Significant Change (-.5 to +.5)
Average Groundwater Level Change Per Year (feet) 2008-2013
Increase
Decrease
0.50 - 1.50
1.51 - 3.00
3.01 - 5.05
No Significant Change (-.5 to +.5)
*Groundwater Change Based Spring Measurements Only
Line of Equal Groundwater Elevation
Sonoma Valley Subbasin
Agua Caliente
Baylands
Calabazas
City
Eastern Upland
El Verano/Fowler Creek
Glen Ellen
Huichica
Kenwood
Rodgers Creek
Western Upland
Sonoma Valley
Groundwater Management Program
Groundwater Level Change
2003 - 2013 (Deep Wells)
November 15, 2013
DRAFT
0 0.5 1 2 3 4 5
Miles
N
W
E
S
Figure
3-7

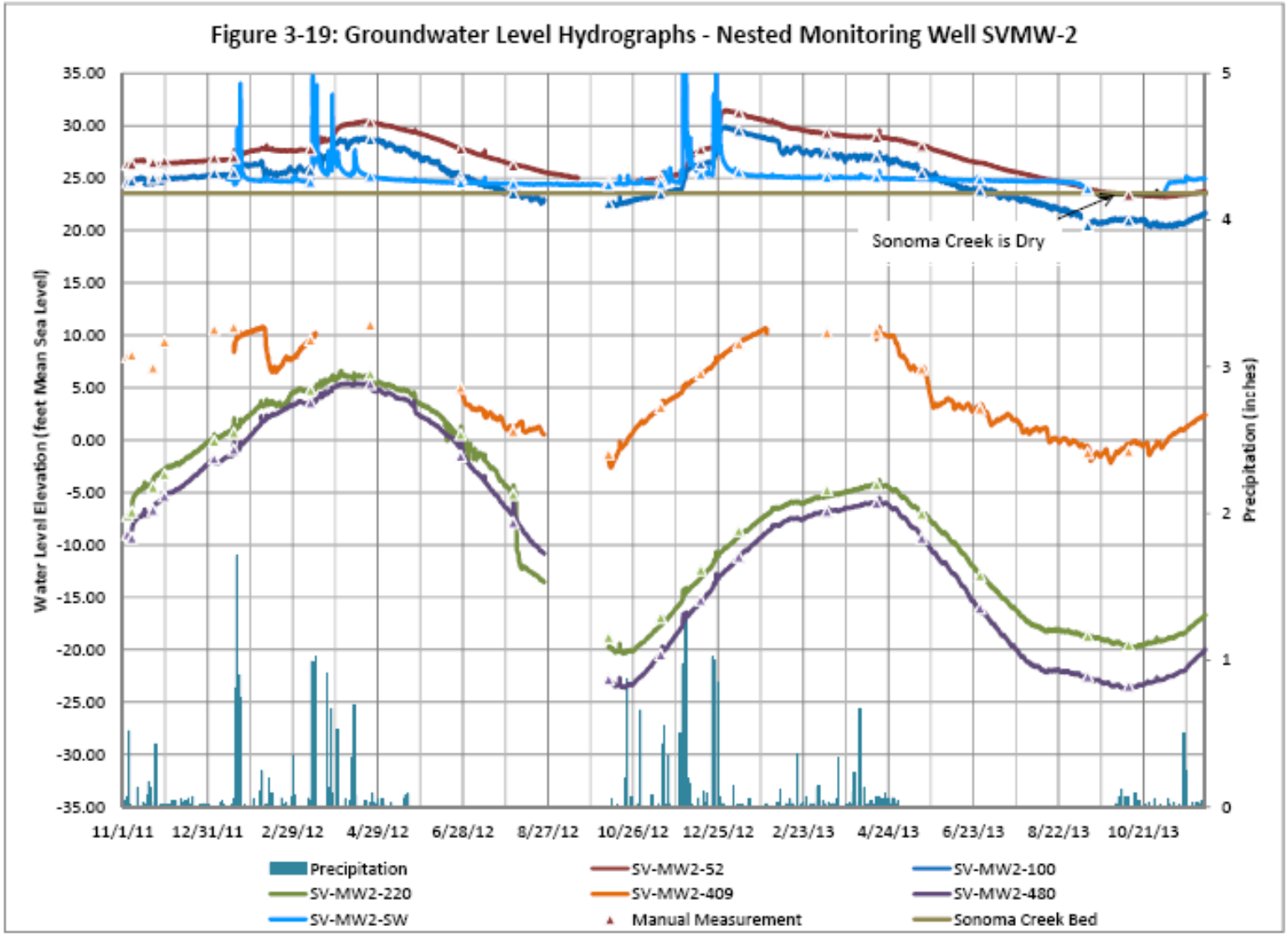

USGS 11458433
Oct 2008 - Present
USGS 11458000
Oct 2001 - Present
W. Thompson
Mar 2012 - Present
Aqua Caliente 2
Aqua Caliente 1
Jan 2012 - Present
B. Swartz
Feb 2013 - Present
KYS-2
Nov 2013 - Present
7th Street
Jun 2010 - Present
SV-MW-2
Nov 2011 - Present
SV-MW-1
Nov 2011 - Present
Legend
Stream Gages
Type
Flow and Stage
Stage Only
Sonoma Valley Wells
Cluster
Deep
Shallow
SonomaCountyCalTrans
Route Type
Interstate Route
US Route
State Route
Roads
Sonoma Creek
Streams
Water Bodies
SVGMP Area
San Pablo Bay
DRAFT
Sonoma Valley
Groundwater Management Program
Sonoma Valley Wells
0 0.5 1 2 3
Miles



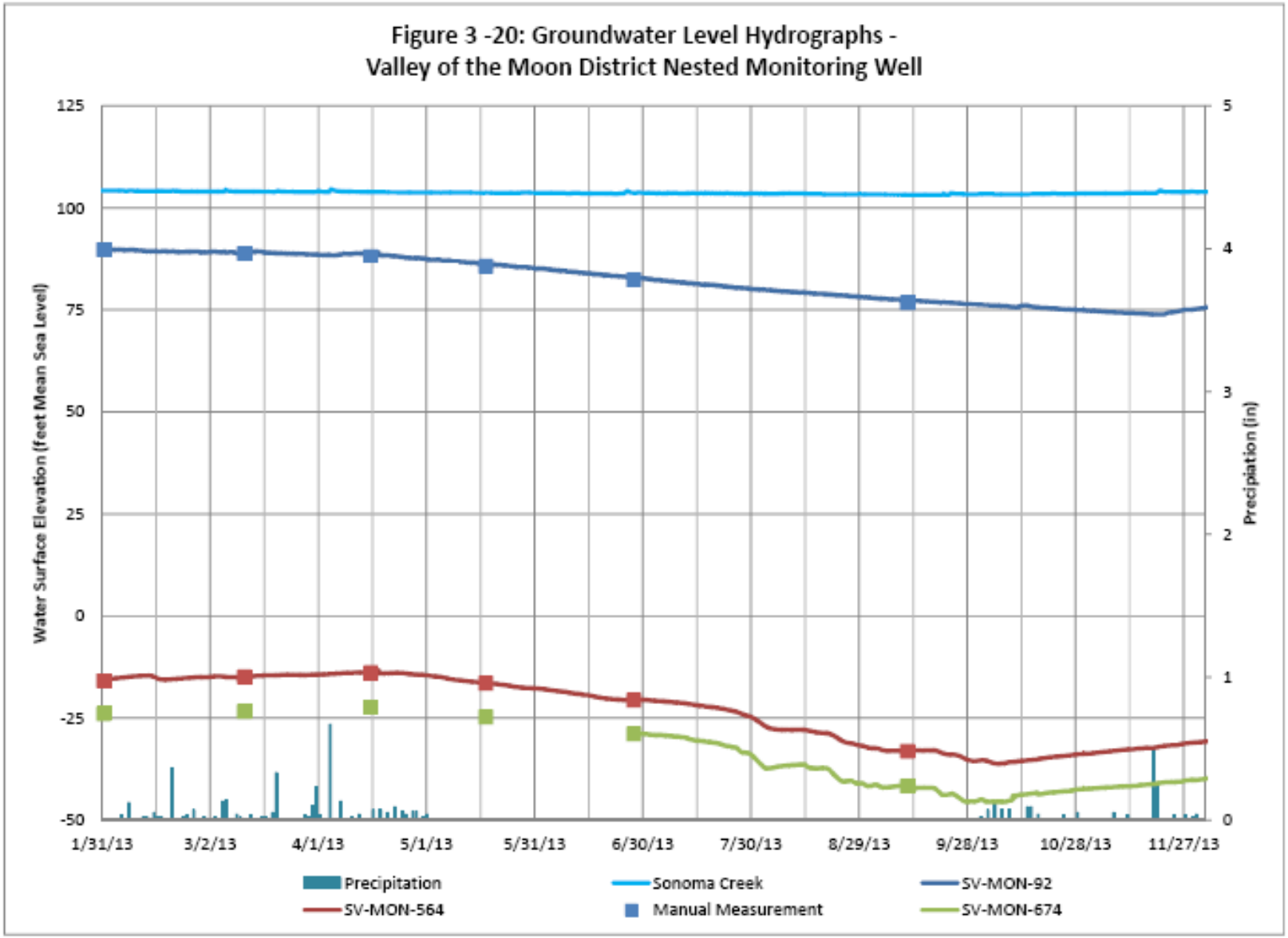
*Note: Gaps in data occur when pressure transducer is temporarily out of service or removed for sampling



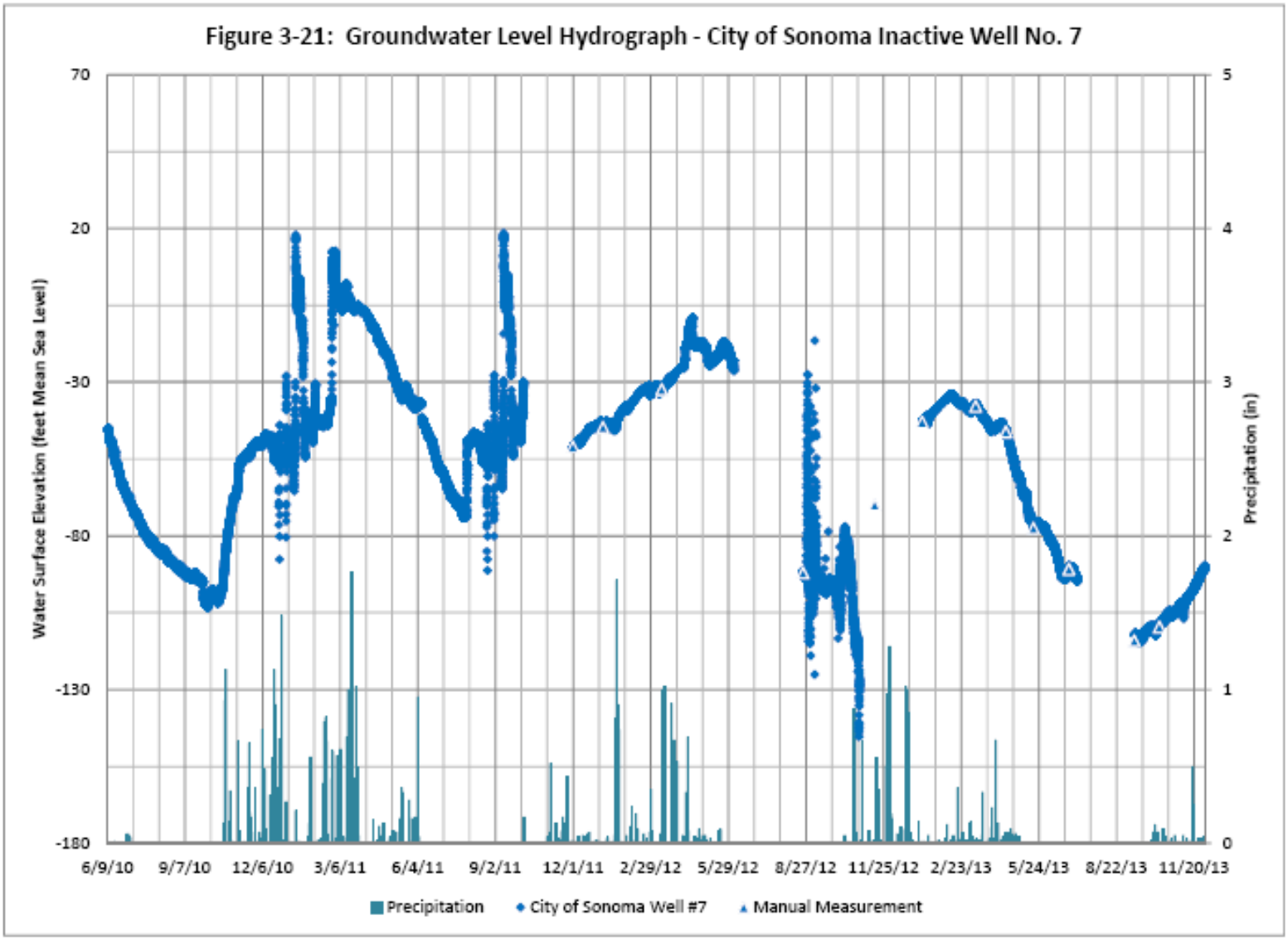
*Note: Gaps in data occur when pressure transducer is temporarily out of service or removed for sampling



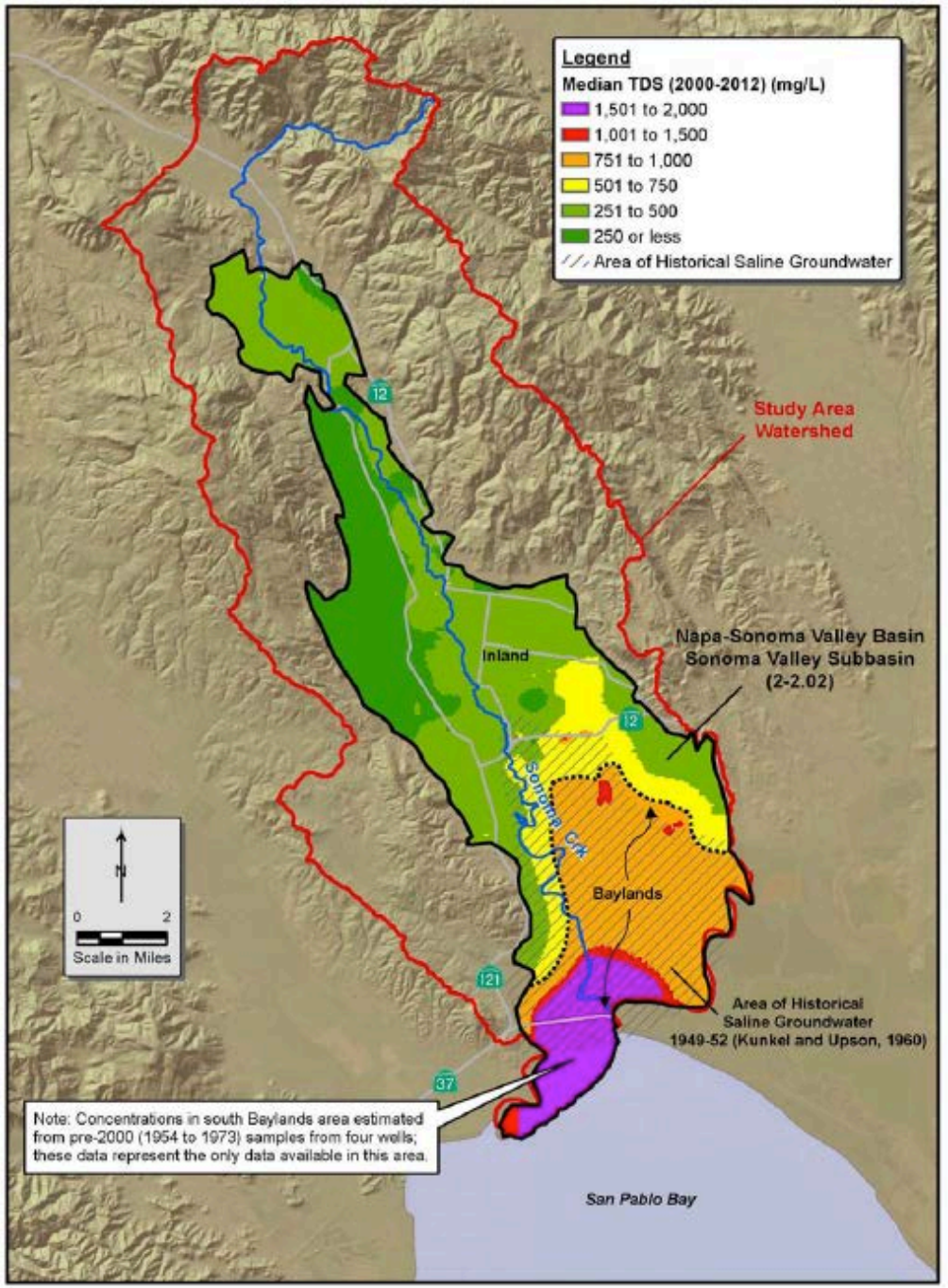
*Note: Gaps in data occur when pressure transducer is temporarily out of service or removed for sampling

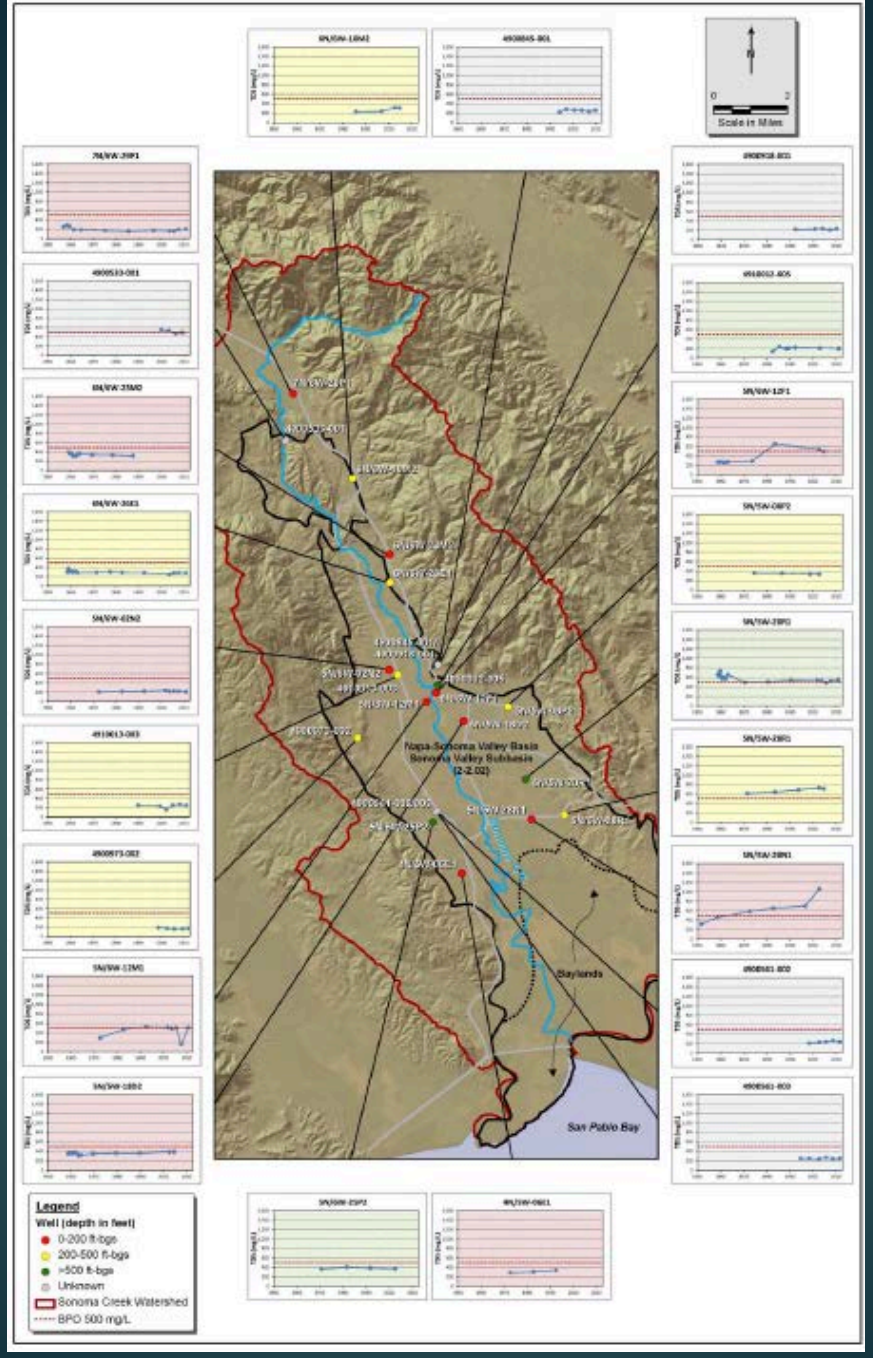


*Note: Gaps in data occur when pressure transducer is temporarily out of service or removed for sampling



*Note: Gaps in data occur when pressure transducer is temporarily out of service or removed for sampling

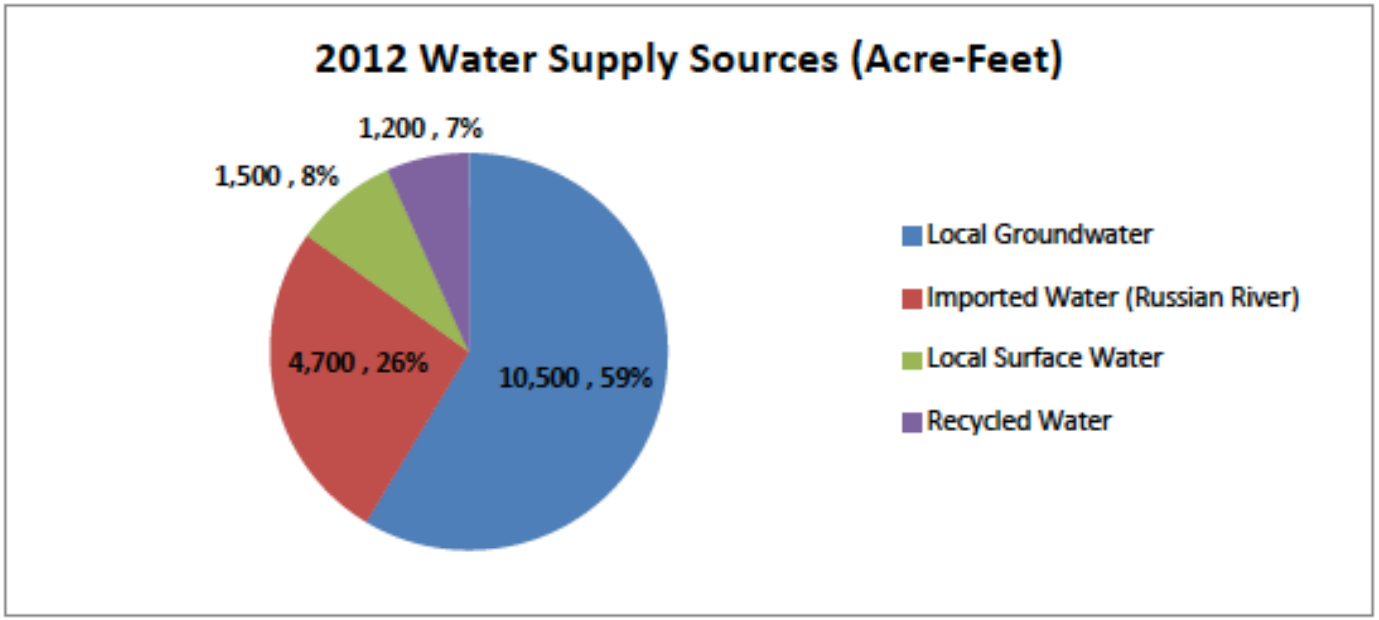

Legend
Median TDS (2000-2012) (mg/L)
1,501 to 2,000
1,001 to 1,500
751 to 1,000
501 to 750
251 to 500
250 or less
Area of Historical Saline Groundwater
Study Area Watershed
Napa-Sonoma Valley Basin
Sonoma Valley Subbasin
(2-2.02)
Inland
Baylands
Sonoma Crk
Area of Historical Saline Groundwater 1949-52 (Kunkel and Upson, 1960)
Note: Concentrations in south Baylands area estimated from pre-2000 (1954 to 1973) samples from four wells; these data represent the only data available in this area.
San Pablo Bay
N
0
2
Scale in Miles
12
121
37

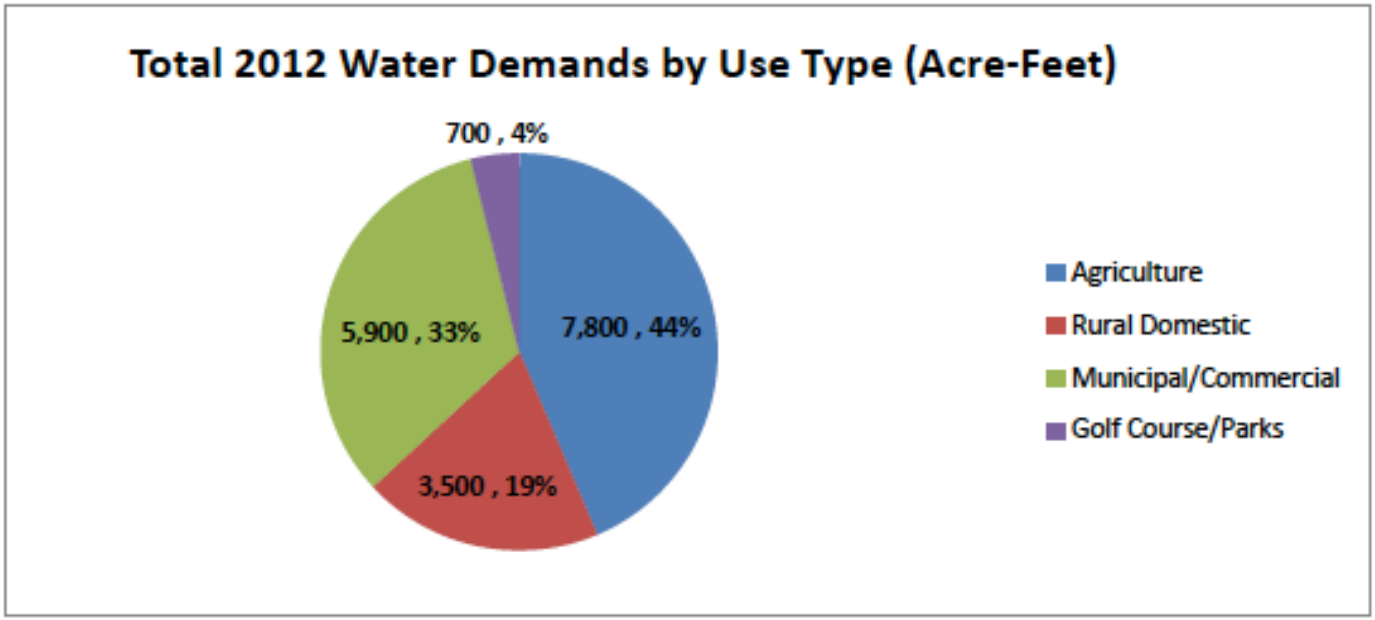

Scale in Miles
Napa-Sonoma Valley Basin
Sonoma Valley Subbasin
(2-2.02)
Baylands
San Pablo Bay
Legend
Well (depth in feet)
0-200 ft-bgs
200-500 ft-bgs
>500 ft-bgs
Unknown
Sonoma Creek Watershed
BPO 500 mg/L

Summary of Water Resources Section

- Precipitation trends – dry last 10 years
- Climate change - increased variability
- Surface water – groundwater interaction important
  - Baseflow – estimated at 50% north of Agua Caliente
  - Reaches of groundwater discharge with declining levels in shallow aquifer susceptible to going dry in summer season
- Thick sequences of clay between 100 and 360 feet bgs
  - Appears largely present in southern Sonoma Valley
  - Limits connectivity between shallow and deeper aquifer systems
- Shallow aquifer system levels largely stable except in El Verano/Fowler Creek Subarea
- Deeper aquifer system has two depressions with groundwater level declines of up to several feet per year
  - Brackish groundwater intrusion a future threat if depressions continue

Questions and Discussion


2012 Water Supply Sources (Acre-Feet)
1,200 , 7%
1,500 , 8%
4,700 , 26%
10,500 , 59%
Local Groundwater
Imported Water (Russian River)
Local Surface Water
Recycled Water


Total 2012 Water Demands by Use Type (Acre-Feet)
700 , 4%
5,900 , 33%
7,800 , 44%
3,500 , 19%
Agriculture
Rural Domestic
Municipal/Commercial
Golf Course/Parks

Subarea	Agriculture	Rural	Public Supply			Irrigated Turf*	Totals	
			Municipal	Small Systems	Mutual/Private		AF	AF/ (100 Acres)
Calabazas (1,347 ac)	131	70					202	15
Wetland (17,139 ac)	214						214	1
Glen Ellen (2,778 ac)	138	120			11		269	10
Carneros (4,753 ac)	224	150		9			383	8
Agua Caliente (2,809 ac)	263	222				16	500	18
Western Upland (27,720 ac)	306	351			176		833	3
Rodgers Creek (3,618 ac)	915	155		39		41	1,150	32
Kenwood (5,140)	565	540		51	140		1,296	25
Eastern Upland (30,044 ac)	628	439	277	83	126	47	1,601	5
City (6,798 ac)	814	497	80	112	90	22	1,615	24
El Verano/Fowler Creek (6,098 ac)	1,227	427	145			575	2,374	39
Total Sonoma Valley (108,244 ac)	5,426	2,971	502	294	544	701	10,437	10

*Irrigated golf course, parks, and sports fields

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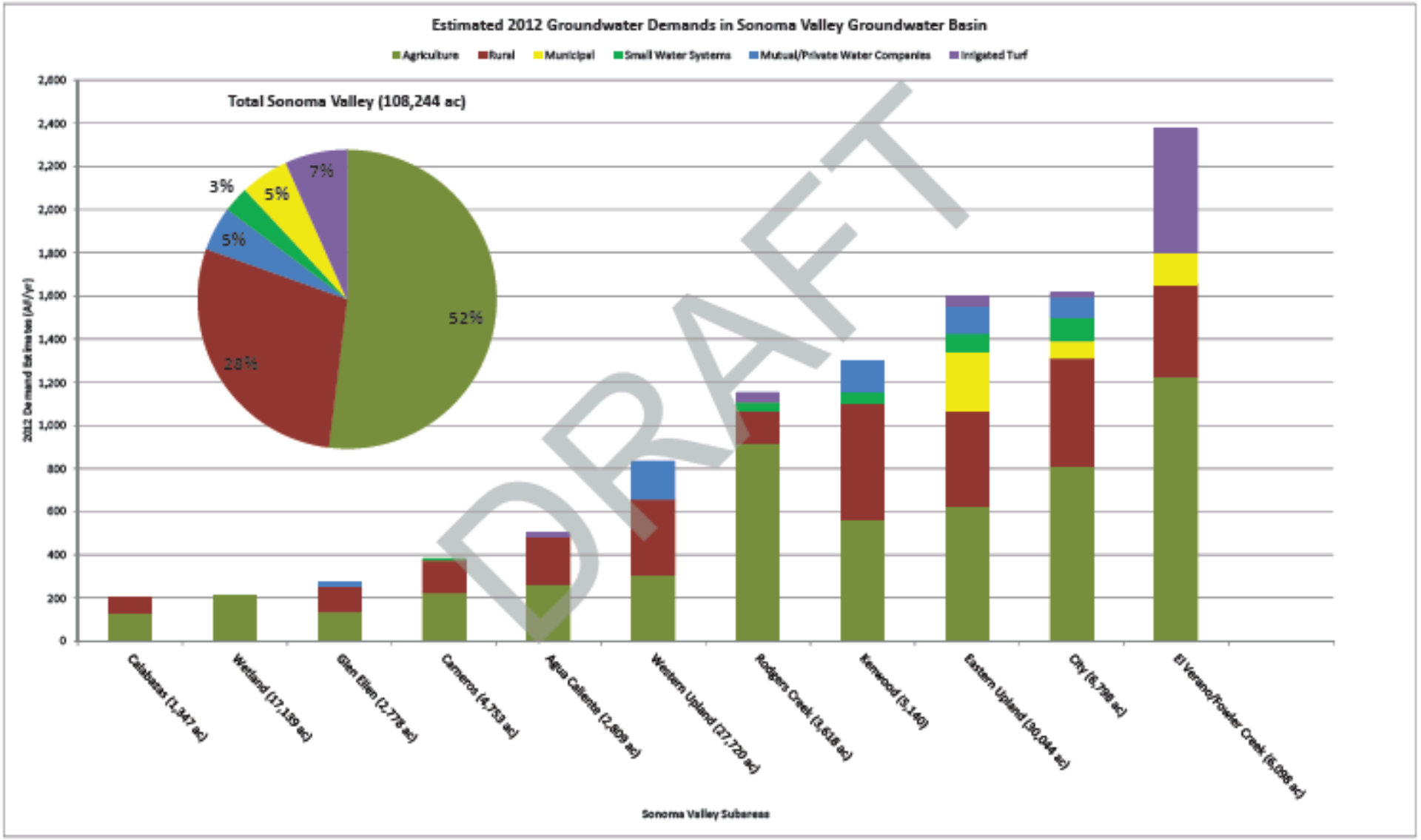
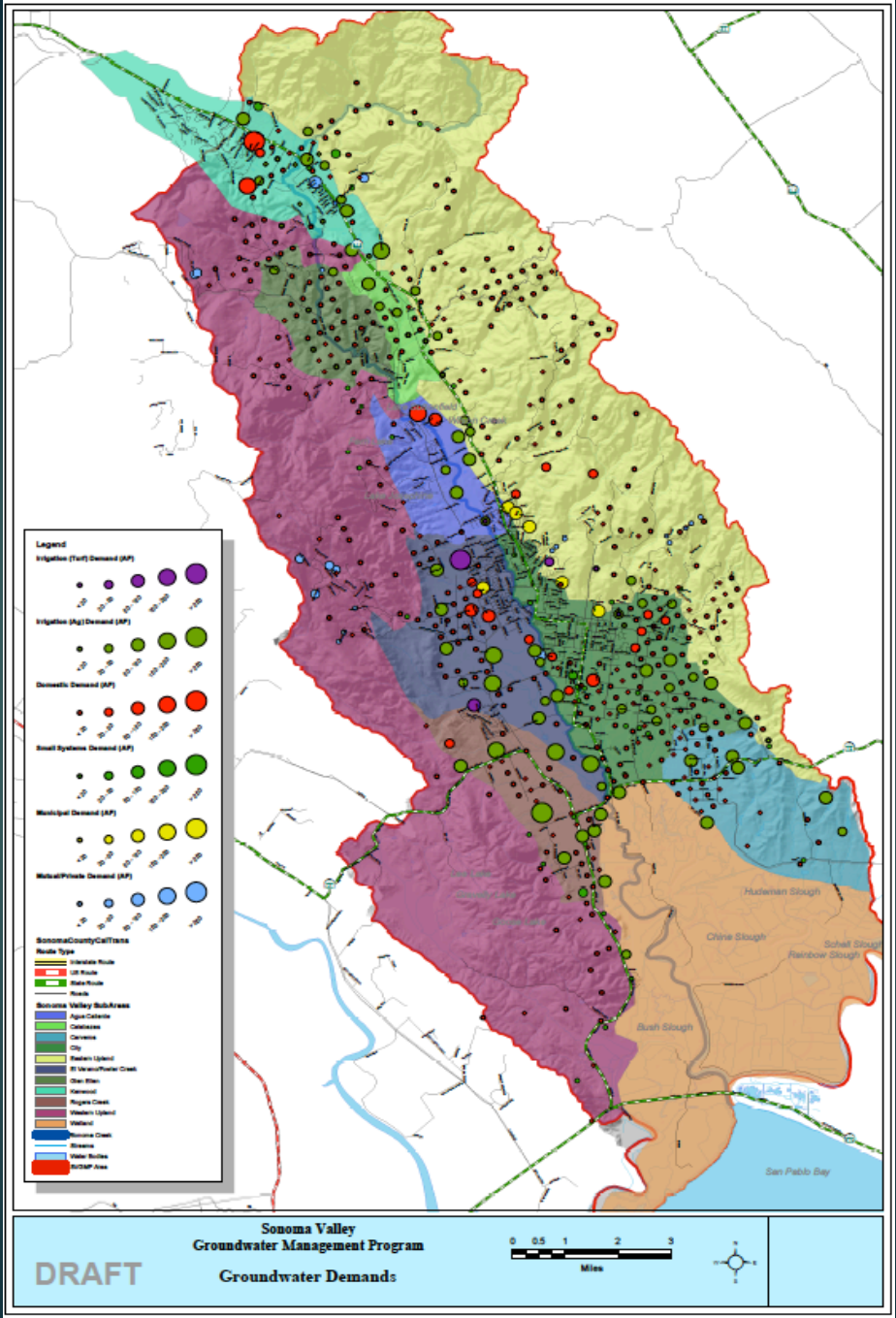
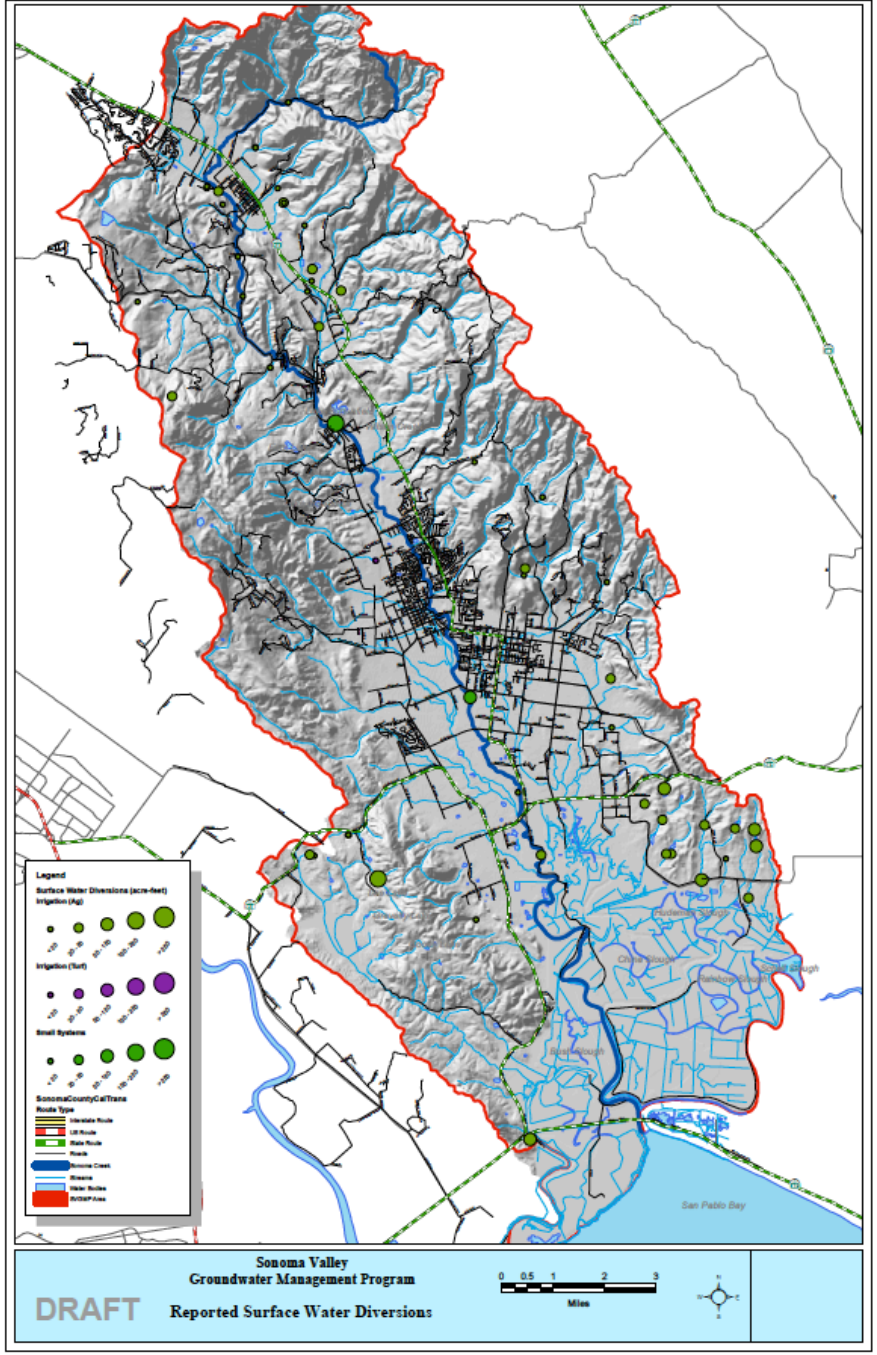
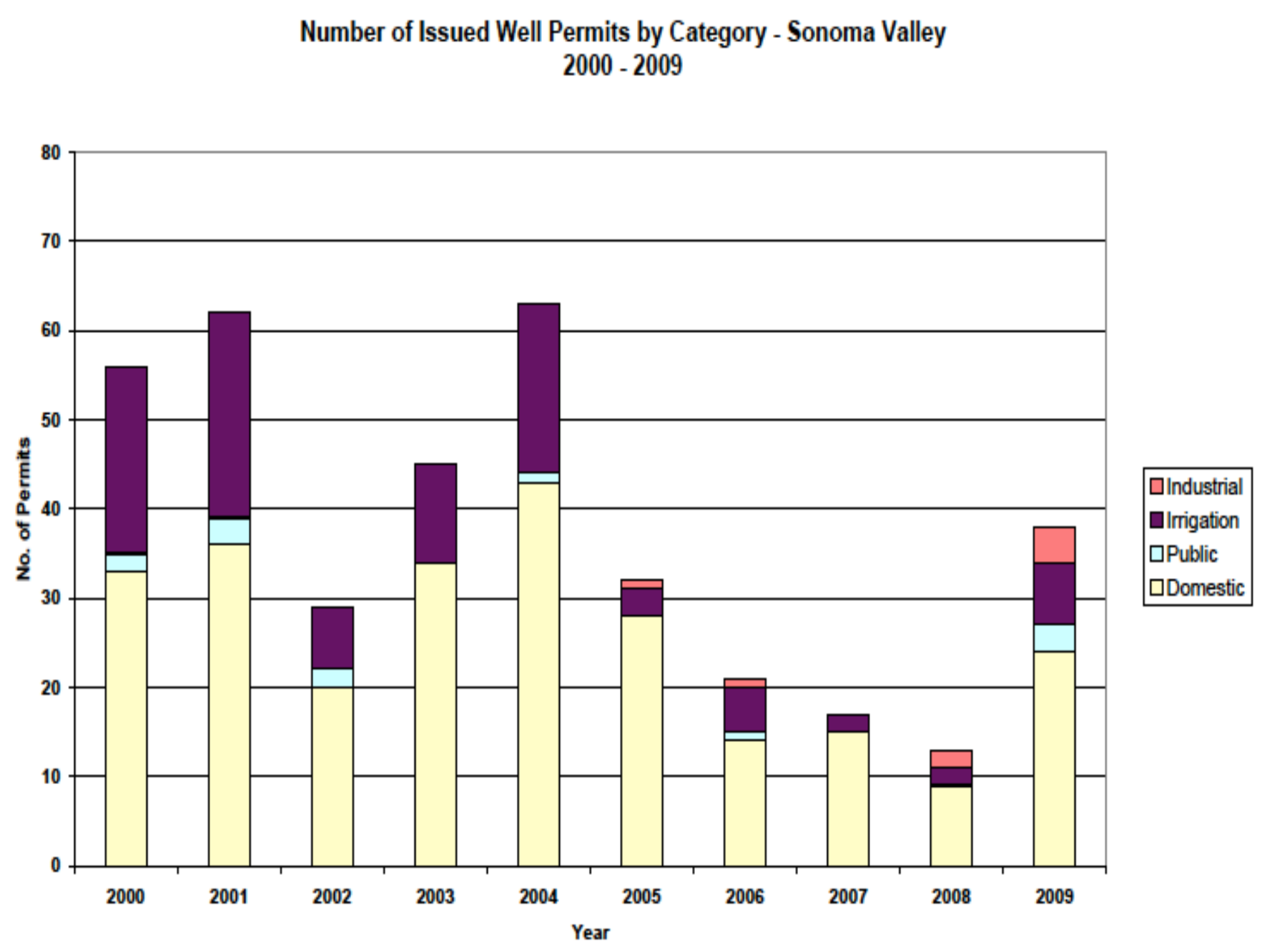
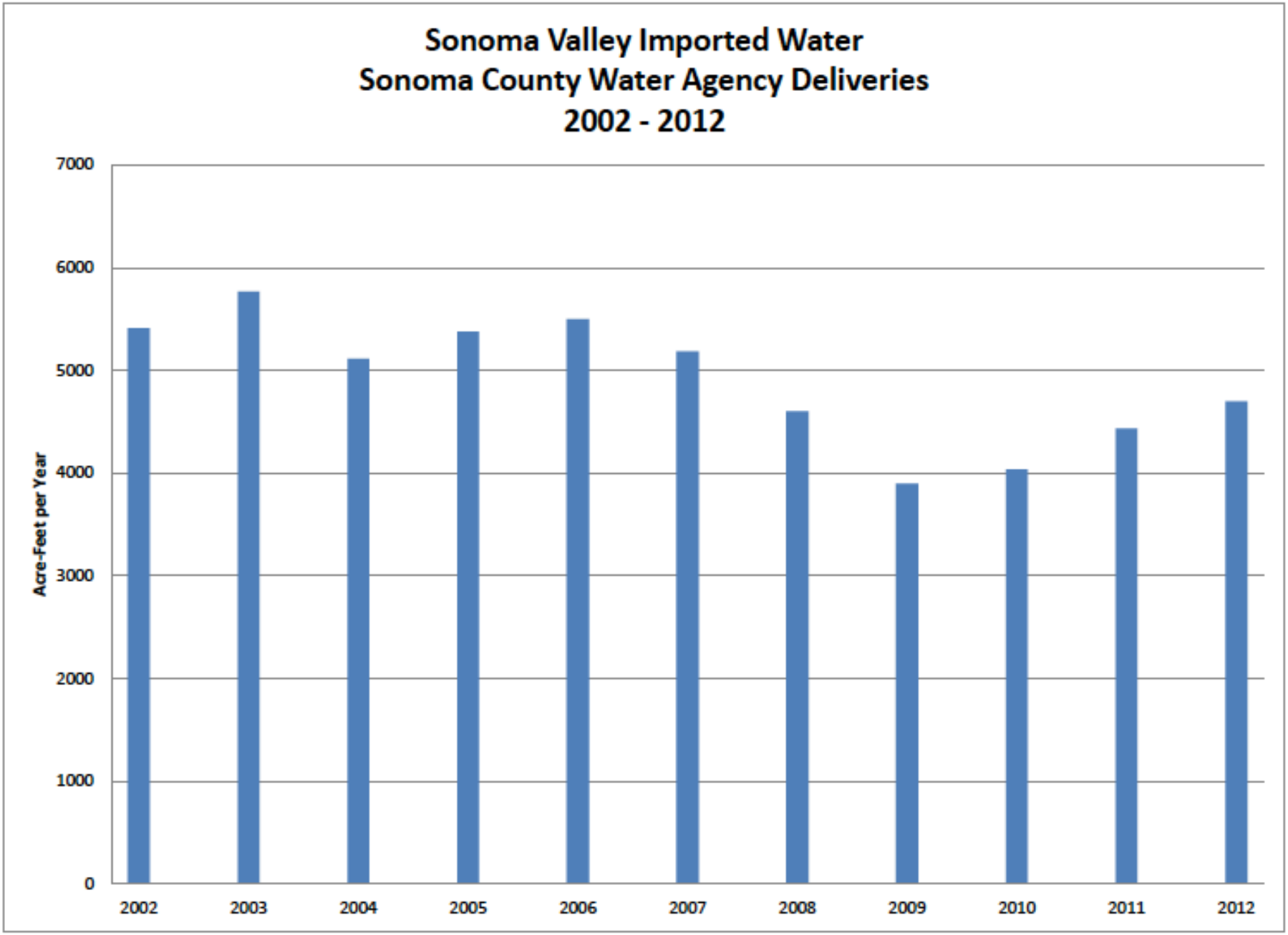

Estimated 2012 Groundwater Demands in Sonoma Valley Groundwater Basin
Agriculture
Rural
Municipal
Small Water Systems
Mutual/Private Water Companies
Irrigated Turf
Total Sonoma Valley (108,244 ac)
52%
28%
5%
3%
5%
7%
2012 Demand Estimates (AF/yr)
2,600
2,400
2,200
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Calabazas (1,347 ac)
Westland (17,159 ac)
Glen Ellen (2,776 ac)
Carneros (4,753 ac)
Agua Caliente (2,609 ac)
Western Upland (27,720 ac)
Rodgers Creek (3,618 ac)
Kenwood (5,140)
Eastern Upland (30,044 ac)
City (8,798 ac)
El Verano/Fowler Creek (8,098 ac)
Sonoma Valley Subareas
DRAFT


Legend
Irrigation (Turf) Demand (AF)
Irrigation (Ag) Demand (AF)
Domestic Demand (AF)
Small Systems Demand (AF)
Municipal Demand (AF)
Metered/Private Demand (AF)
SonomaCountyCalTrans
Route Type
Interstate Route
US Route
State Route
Roads
Sonoma Valley Sub-Areas
Agua Caliente
Celebrezze
Carneros
City
Eastern Upland
El Verano/Fetter Creek
Glen Ellen
Kenwood
Rogers Creek
Western Upland
Wetland
Nathanson Creek
Streams
Water Bodies
SVGMP Area
Huichica Slough
China Slough
Schell Slough
Rainbow Slough
Bush Slough
San Pablo Bay
DRAFT
Sonoma Valley
Groundwater Management Program
Groundwater Demands
0 0.5 1 2 3
Miles


Legend
Surface Water Diversions (acre-feet)
Irrigation (Ag)
Irrigation (Turf)
Small Systems
SonomaCountyCalTrans
Route Type
Sonoma Creek
Rivers
Water Bodies
SVGMP Area
San Pablo Bay
Sonoma Valley
Groundwater Management Program
DRAFT
Reported Surface Water Diversions
0 0.5 1 2 3
Miles


Number of Issued Well Permits by Category - Sonoma Valley
2000 - 2009
No. of Permits
0
10
20
30
40
50
60
70
80
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Year
Industrial
Irrigation
Public
Domestic


Sonoma Valley Imported Water
Sonoma County Water Agency Deliveries
2002 - 2012
Acre-Feet per Year
7000
6000
5000
4000
3000
2000
1000
0
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012

Summary of Water Demands & Supplies

- Total water demands in Sonoma Valley for Water Year 2012 were estimated to be 17,900 acre-ft and were sourced from the following supplies:
  - Local groundwater pumped from water wells located within Sonoma Valley – 10,500 AF;
  - Imported water from the Russian River Watershed – 4,700 AF;
  - Local surface water diverted from Sonoma Creek and its' tributaries - 1,500 AF; and
  - Recycled water produced at the Sonoma Valley Wastewater Treatment Plant – 1,200 AF.

Summary of Water Demands & Supplies

- Total groundwater demands in Sonoma Valley for Water Year 2012 were estimated to be:
  - 52 % - Agriculture \
  - 29% - Rural domestic
  - 7% - Irrigation of golf courses and parks
  - 3-5% - Municipal, small commercial, and mutual/private systems
- Groundwater demands greatest in El Verano/Fowler Creek Subareas
  - Primarily a combination of agricultural and rural pumping

Water Resources Data Gaps

- Additional groundwater-level and groundwater quality data is needed, particularly in the vicinity of the two groundwater pumping depressions.
- Additional multi-depth groundwater monitoring wells are needed to further assess the hydrostratigraphy and interconnection of shallow and deep aquifer zones, and salinity sources and distribution in the Sonoma Valley.
- The hydrogeologic conceptual model should be updated to include the additional hydrostratigraphic and hydraulic information, particularly in the areas of groundwater pumping depressions.
- The numerical groundwater flow model should be updated with priority given to the southern Sonoma Valley portions of the model

Questions and Discussion

What's Recommended Next

- Persistent groundwater level declines of up to several feet per year in two areas in the deeper aquifers will need additional efforts
  - Potential consequences of no action include wells going dry, water quality degradation and land subsidence
- Consider quantitative values for BMO-1 (gw levels) and BMO-5 (gw quality)

What's Recommended Next

- Additional Stakeholder Outreach Efforts
  - Develop database/mailing list for City and El Verano subareas.
  - Refine materials on groundwater level conditions with hydrographs, groundwater level contours, and salinity contours and provide to public.
  - Provide Slow It Spread It Sink It guide to land owners in these areas.
  - Provide well owners guide to well owners in these areas.
  - Brief stakeholder constituencies on GMP draft five-year update report.
  - Hold community workshop(s) on GMP draft five-year update report to receive public input prior to finalizing the report for Panel approval.
  - Conduct focused neighborhood style meetings in the declining areas with release of five-year update.

What's Recommended Next
Feasibility Study

- Identify potential technical, regulatory, land use and institutional response actions to mitigate declining groundwater levels.
- Develop screening criteria to evaluate the viability of possible response actions.
- Prioritize response actions and develop scenarios consisting of one or more of these actions to evaluate how effective they might be in mitigating declining groundwater levels.
- Refine conceptual model in the southern Sonoma Valley and refine MODFLOW groundwater flow model to support scenario based planning use a representative stakeholder group to develop and consider scenarios and results
- Panel ultimately to approve feasibility study and make recommendations regarding any technical or policy proposals that come out of the process.
- Community outreach will be needed throughout this process to educate local stakeholders of basin conditions, inform them of possible policy recommendations and consider their input.

Proposed 2014 Program

- Stakeholder Involvement
  - Continue/improve public outreach
  - Conduct briefings
  - Communications & Media
- Groundwater Sustainability
  - Hydrogeology Update
  - Groundwater Model Update
  - Rural Water Conservation Incentives
- Monitoring Program - Levels
  - Install additional wells – grant
  - Expand monitoring network
  - CASGEM submittals
  - Continued stream gaging
  - Seepage runs
  - Plan for subsidence monitoring
- Groundwater Quality Protection
  - Depth-specific salinity monitoring
  - Long-term water quality program

Proposed 2014 Program

- Annual Data Transmittals and Summaries
- Five-Year Plan Implementation Progress Report

- Possible Projects 2014-2018
  - Groundwater banking pilot project
  - Stormwater management/groundwater recharge projects
  - Recycled water enhanced applications

Table 4-1 - Management Components and Actions - Years 1-5 Progress and Years 6-10 Plans

Management Components/Actions	Completed Actions 2008-2012					Future Plans 2013-2018					Relative Cost
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
4.1 Stakeholder Involvement											
4.1.1 Involving the Public											
Meetings, coordination, and communication	√	√	√	√	√	✣	✣	✣	✣	✣	---
Public Outreach Plan for Implementation - update and imporve	√	√				✣				✣	---
4.1.2 Advisory Groups											
Reform Panel, form TAC, and hold TAC monthly meetings	√	√	√	√	√	✣	✣	✣	✣	✣	---
Hold Quarterly Meetings with the Panel	√	√	√	√	√	✣	✣	✣	✣	✣	---
4.1.3 Informing Public Agencies and Stakeholders											
Meetings, coordination, and communication	√	√	√	√	√	✣	✣	✣	✣	✣	---
4.1.4 Partnerships & Coordination											
Meetings, coordination, and communication	√	√	√	√	√	✣	✣	✣	✣	✣	---
Seek grant funding for Plan actions	√	√	√	√	√	✣	✣	✣	✣	✣	---
4.2 Monitoring Program											
4.2.2 Groundwater Elevation Monitoring											
Groundwater Elevation Monitoring & Expand Volunteer Wells	√	√	√	√	√	✣	✣	✣	✣	✣	---
Project - Install New Multi-depth Monitoring Wells	1	1	1	1	1	✣					$$
CASGEM Monitoring Plan and Annual Data Submittals						✣					$
4.2.3 Groundwater Quality Monitoring											
Groundwater Quality Monitoring-long-term porgram		√	√	√	√	✣				✣	---
Conduct Depth Specifc Salinity Monitoring - South Valley				√	√	✣				✣	---
4.2.4 Land Subsidence Monitoring											
Establish Long-Term Monitoring Program for Land Subsidence						✣				✣	$
4.2.5 Surface Water-Groundwater Interaction Monitoring											
Study - Tracer Test and Modeling								✣			$$$
Study - Stable Isotope Analysis	√		√	√	√			✣			$$
Project - Install and Maintain New Stream Gauges	√								✣		$$
Project - Conduct Seepage Runs		√	√	√	√	✣	✣	✣	✣	✣	$
4.2.6 Monitoring Protocols											
Adopt and Implement Protocols & Monitoring Program	√	√									---
4.2.7 Central GIS Data Management System											
Update GIS Mapping of Drainage Network								✣			$
Maintain and Update GIS Groundwater Database			√	√	√	✣	✣	✣	✣	✣	$
WEBH2O Web-Based Data Management System	√	√	√	√	√	✣	✣	✣	✣	✣	$
4.3 Groundwater Quality Protection											
4.3.1 Well Construction, Abandonment, and Destruction											
Study - Obtain Better Information during Well Installations							✣				---
Study - Conduct Well/Abandoned Well Survey								✣			$$
Project - Develop & Distribute Guide for Well Owners		√	√	√	√						---
4.3.2 Wellhead Protection											
Incorporate Information from DWSAP Plans								✣			---
4.3.3 Control Migration and Remediation of Contaminated Groundwater											
Provide Well Owners with County Guide			√	√	√	✣					---
Incorporate & Distribute Information on Sources							✣				---
4.3.4 Control of Saline Water Intrusion											
Study - Salinity Sources and Distribution (Salt & Nutrient Plan)					√	✣			✣		$$
Study - Seawater Intrusion Mitigation Measures (If appropriate)									✣		$$$
4.4 Groundwater Sustainability											
4.4.1 Stormwater Recharge											
Study - Groundwater Recharge Area Mapping & Analysis		√	√	√	√						$
Study - Recharge Area Alternatives								✣			$$
Project - Public Outreach Program			√	√	√	✣					$
Study/Pilot - Stormwater Capture/Groundwater Recharge Scoping			√	√	√	✣					$$$
4.4.2 Groundwater Banking											
Study - Conduct Groundwater Banking/Conjunctive Use Assessment			√	√	√	✣					$$$
Study/Pilot - Feasibility Analysis/Pilot Groundwater Banking							✣				$$
4.4.3 Recycled Water Supply											
Study - Evaluate Graywater			√	√	√						$$$
Project - Increase Recycled Water for Irrigation			√	√	√	✣					$$$
Study - Evaluate Recycled Water Groundwater Recharge Feasibility										✣	$$
4.4.4 Conservation & Demand Reduction											
Continue Implementing Conservation BMPs & Report Annually	√	√	√	√	√	✣	✣	✣	✣	✣	---
Encourage Water Conservation BMPs for Non-Viticulture Agriculture								✣			$
Encourage Additional Conservation and Best Practices for Viticulture						✣				✣	$
Study - Voluntary Water Conservation BMPs for Uninc. Areas		√	√	√	√						---
Project - Landscape Irrigation Efficiency							✣				$
Pilot/Project - Stormwater Capture and Reuse for Irrigation							✣				$$
4.4.5 Groundwater Modeling											
Study - Update Land Cover Map & Water Use Estimates						✣		✣			$$
Update Hydrogeologic Conceptual Model						✣					$$
Project - Upgrade Groundwater Flow Model							✣	✣	✣		$$$
Feasibility Study to Assess Ways to Address Groundwater Depletion							✣				$
4.5 Planning Integration											
Project - Develop Multi-Beneficial Projects for Flood Hazards						✣					$$$
5 Implementation Administration											
Implementation Prioritization and Financing	√	√	√	√	√	✣	✣	✣	✣	✣	---
Annual Summary Status Report and Data Transmittal							✣	✣	✣		---
Five-Year Program Review and Implementation Report						✣				✣	---

Notes:

--- - Funded action

$$$ - Unfunded action; indicates relative order magnitude cost - ($) Low; ($$) Medium; ($$$) High.

1 - Obtained funding commitment in 2008, funding in late 2010, implementation in 2011.

Basin Management Objective	Progress to Date	Plans for 2014-18
BMO-1 Maintain groundwater elevations for the support of beneficial uses of groundwater and to protect against inelastic land subsidence.	Public outreach and stakeholder involvement on groundwater, increased voluntary monitoring, and obtained funding and installed two new multi-depth wells. Distributed and publicized the "Slow It, Spread It, Sink It" guidebook as a resource for property owners to implement stormwater retention and groundwater recharge projects.	Refined and increased public outreach and stakeholder involvement on groundwater, increased voluntary monitoring, and install new multi-depth wells. Propose conducting a feasibility study to update and reassess scenario based planning and consider possible technical, land use and institutional approaches to address groundwater depletion.
BMO-2 Improve water use efficiency and conservation.	Provided annual awards for water conservation. Conducted conservation assessments and prepared report for unincorporated areas with NBWA grant.	Pursue grants for incentive programs. Continue giving awards and publicity for increasing water conservation.
BMO-3 Identify and protect groundwater recharge areas and enhance the recharge of groundwater where appropriate.	Completed recharge-mapping study. Completed stormwater management-groundwater recharge scoping study and groundwater banking feasibility study.	Conduct groundwater banking pilot study and stormwater recharge pilot projects.
BMO-4 Manage groundwater in conjunction with other water sources.	Under the GMP, groundwater is being managed in conjunction with other water resources.	Continue implementation of the GMP with pilot projects on groundwater banking, stormwater and recharge opportunities. Continue to promote the use of recycled water for irrigation to offset groundwater demands.
BMO-5 Protect groundwater quality for beneficial uses including minimizing saline intrusion.	Coordinated monitoring efforts and increased number of wells through voluntary efforts, incorporated selected water quality data from public water systems. Developed and implemented outreach to distribute a Well Owner's Guide "WELLness – A Guide to Your Water Well". Completed a Salt and Nutrient Management Plan.	Continue coordinating monitoring efforts and increase number of wells through voluntary efforts, and install two new multi-depth monitoring wells. Implement the Salt and Nutrient Management Plan monitoring program.
BMO-6 Protect against adverse interactions between groundwater and surface water flows.	Continued stream gage monitoring of the Sonoma Creek watershed and conducted seepage runs along creek beds. Instrumented several shallow monitoring wells adjacent to Sonoma Creek and tributaries with pressure transducer/datalogger systems.	Continue stream gage monitoring of Sonoma Creek watershed; further consider possible additional groundwater-surface water studies.
BMO-7 Improve the community's awareness of groundwater planning, water resources, and legal issues.	Public outreach and stakeholder involvement through Panel and TAC meetings, newsletters, fact sheets, press releases and GMP website.	Continue public outreach and stakeholder involvement through Panel and TAC meetings, newsletters, fact sheets, press releases and the GMP website. Focus outreach efforts on areas in Southern Sonoma Valley exhibiting groundwater-level declines
BMO-8 Improve the groundwater database and basin understanding through consistent monitoring and additional surveys, and improve basin analytical tools including the groundwater simulation model.	Developed a database for storage and reporting of groundwater data. Coordinated monitoring efforts, conducted volunteer training, increased 86 monitoring wells through voluntary efforts.	Continue coordination and efforts for voluntary monitoring; install two new multi-depth monitoring wells. Update hydrogeologic conceptual model, and upgrade groundwater model. Consider further upgrade to fully-coupled surface water-groundwater flow model.
BMO-9 Manage groundwater with local control.	Implemented the GMP with regular input and direction from local stakeholders through the Panel.	Continue implementation of GMP with regular input and direction from the Panel and TAC.
BMO-10 Explore, identify and maximize non-regulatory approaches to management.	Promoted voluntary groundwater-level monitoring and conservation efforts.	Continue promoting voluntary groundwater-level monitoring and conservation efforts.

Questions and Discussion