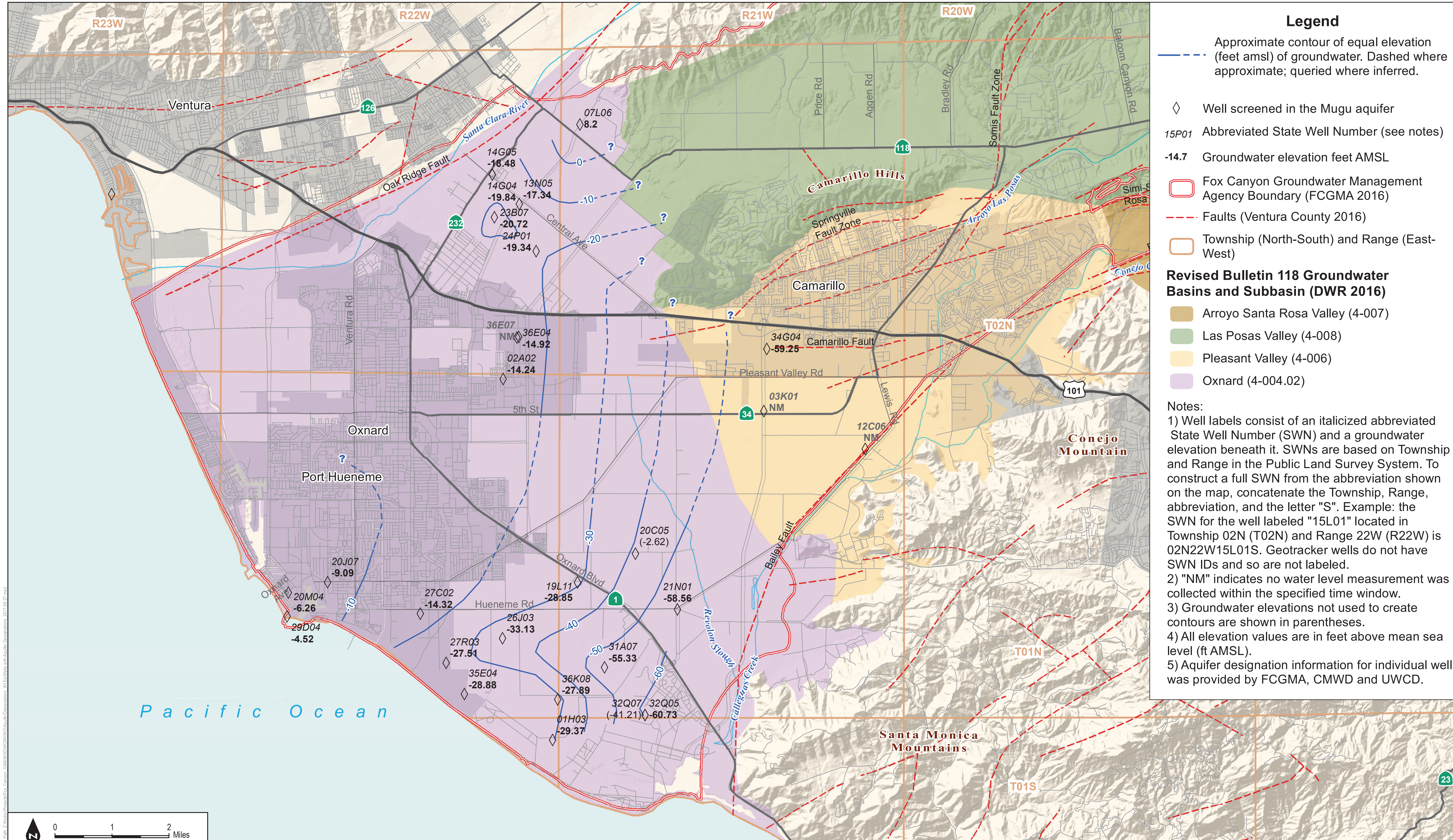

DUDEK

SOURCE: DWR; Ventura County; UWCD; CMWD

FIGURE 2-10

Groundwater Elevation Contours in the Mugu Aquifer (Older Alluvium), March 2-29, 2015

Groundwater Sustainability Plan for the Pleasant Valley Basin

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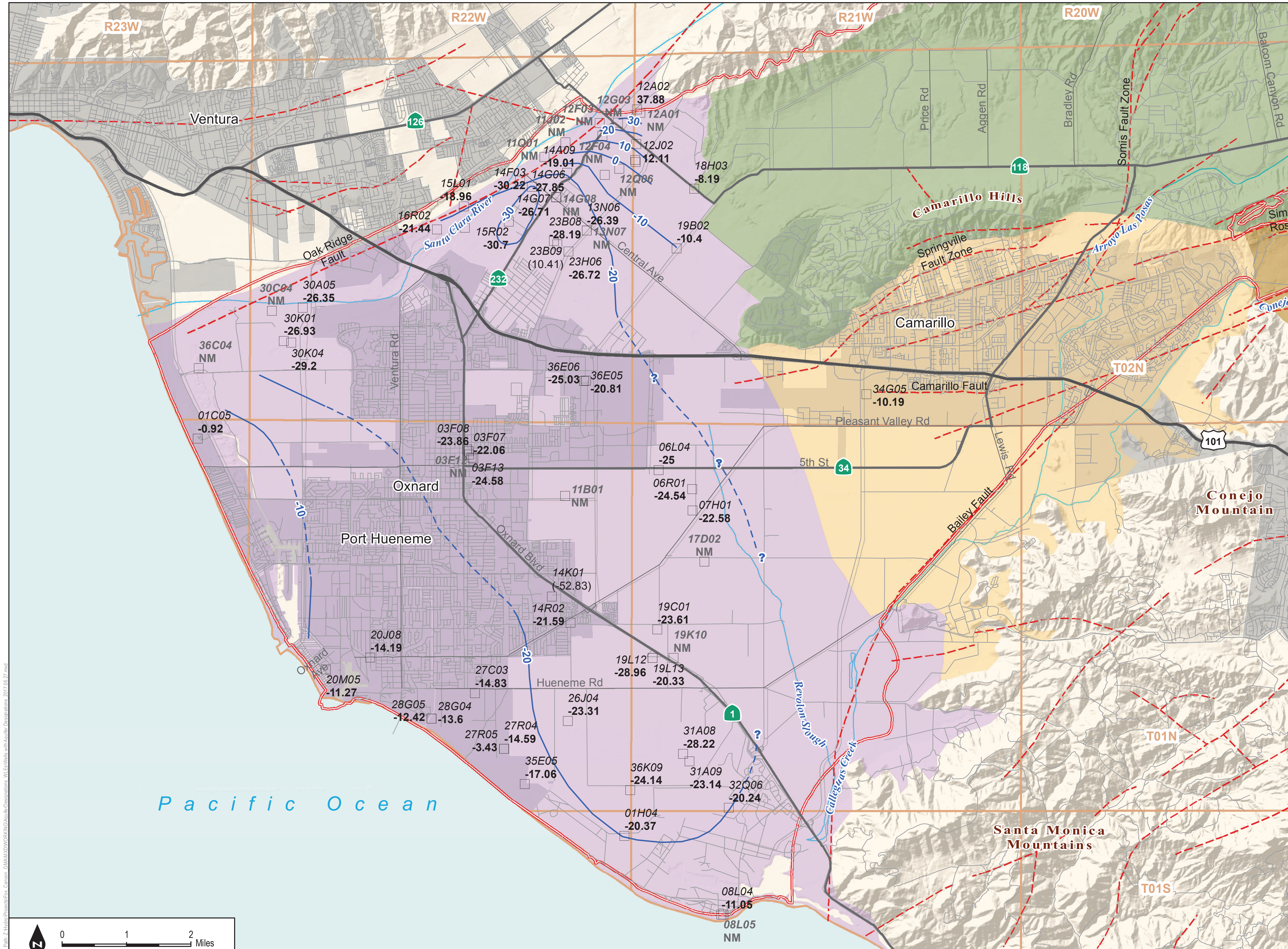

Legend

Approximate contour of equal elevation (feet amsl) of groundwater. Dashed where approximate; queried where inferred.

Well screened in the Oxnard aquifer

15P01 Abbreviated State Well Number (see notes)

-14.7 Groundwater elevation feet AMSL

Fox Canyon Groundwater Management Agency Boundary (FCGMA 2016)

Faults (Ventura County 2016)

Township (North-South) and Range (East-West)

Revised Bulletin 118 Groundwater Basins and Subbasin (DWR 2016)

Arroyo Santa Rosa Valley (4-007)

Las Posas Valley (4-008)

Pleasant Valley (4-006)

Oxnard (4-004.02)

Notes:

1) Well labels consist of an italicized abbreviated State Well Number (SWN) and a groundwater elevation beneath it. SWNs are based on Township and Range in the Public Land Survey System. To construct a full SWN from the abbreviation shown on the map, concatenate the Township, Range, abbreviation, and the letter "S". Example: the SWN for the well labeled "15L01" located in Township 02N (T02N) and Range 22W (R22W) is 02N22W15L01S. Geotracker wells do not have SWN IDs and so are not labeled.

2) "NM" indicates no water level measurement was collected within the specified time window.

3) Groundwater elevations not used to create contours are shown in parentheses.

4) All elevation values are in feet above mean sea level (ft AMSL).

5) Aquifer designation information for individual wells was provided by FCGMA, CMWD and UWCD.

DUDEK

SOURCE: DWR; Ventura County; UWCD; CMWD

FIGURE 2-11

Groundwater Elevation Contours in the Oxnard Aquifer (Older Alluvium), October 2-29, 2015

Groundwater Sustainability Plan for the Pleasant Valley Basin

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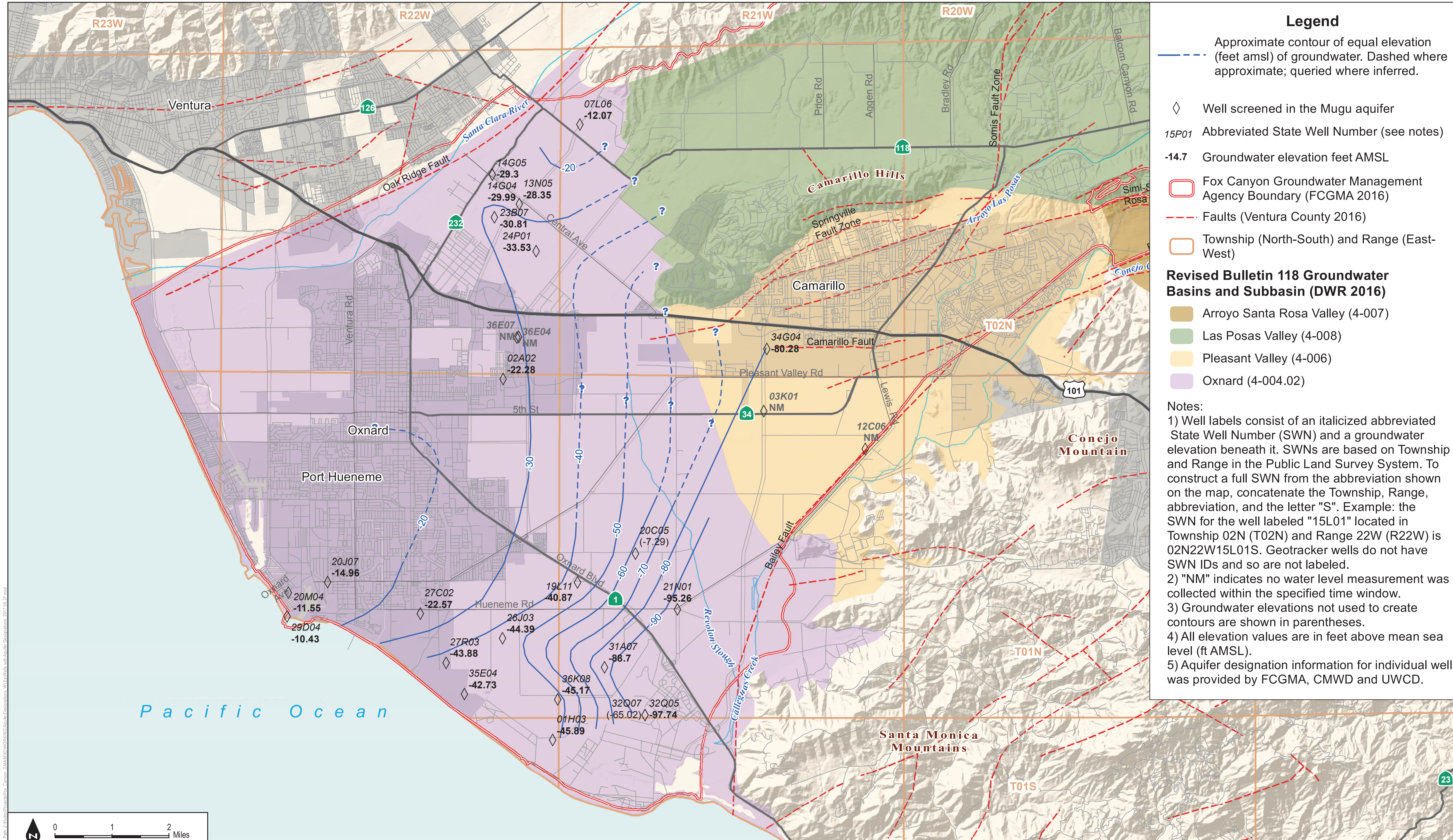

DUDEK

SOURCE: DWR; Ventura County; UWCD; CMWD

FIGURE 2-12

Groundwater Elevation Contours in the Mugu Aquifer (Older Alluvium), October 2-29, 2015

Groundwater Sustainability Plan for the Pleasant Valley Basin

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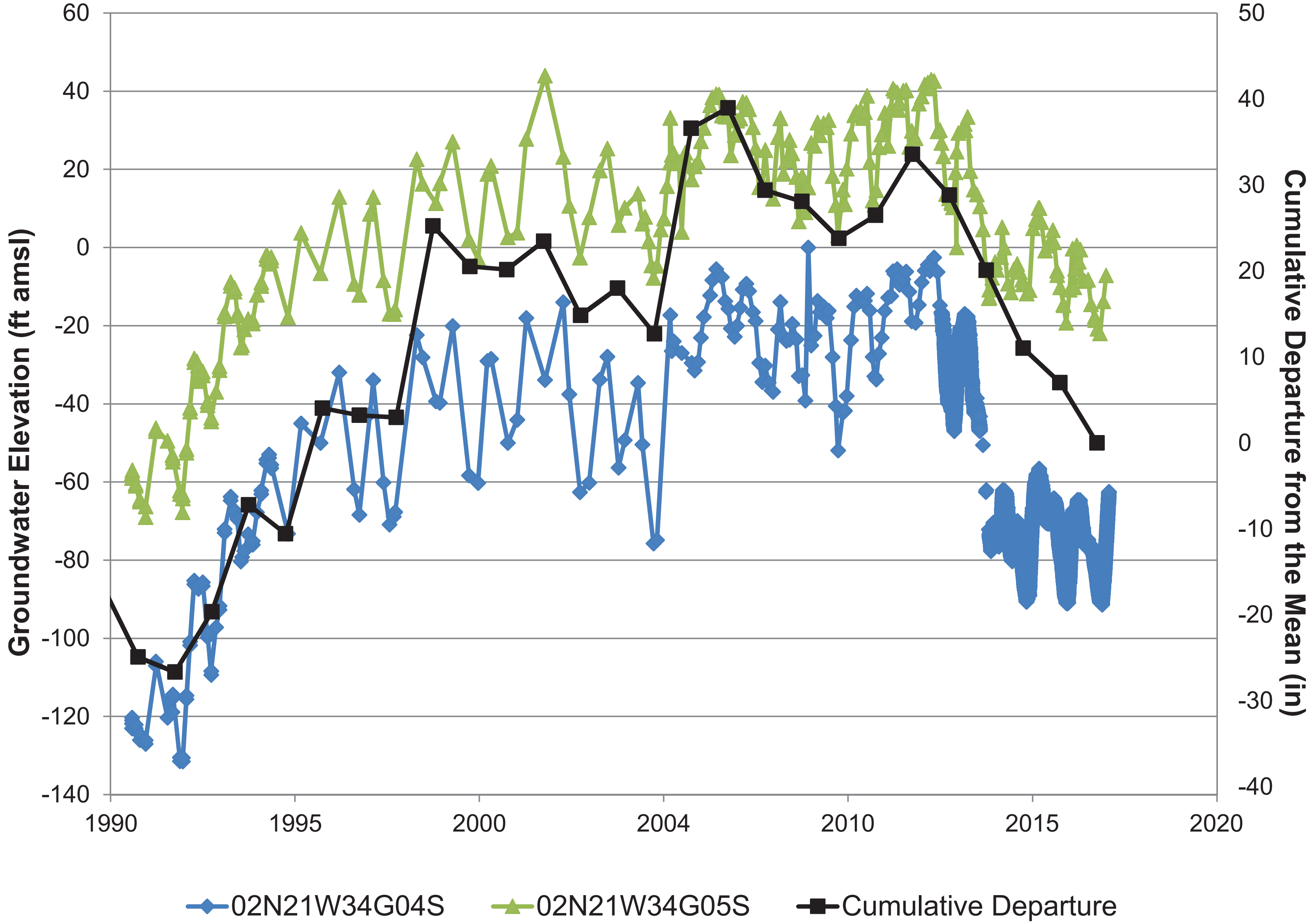

DUDEK

FIGURE 2-13

Groundwater Elevation Hydrographs in the Older Alluvium

Groundwater Sustainability Plan for the Pleasant Valley Basin

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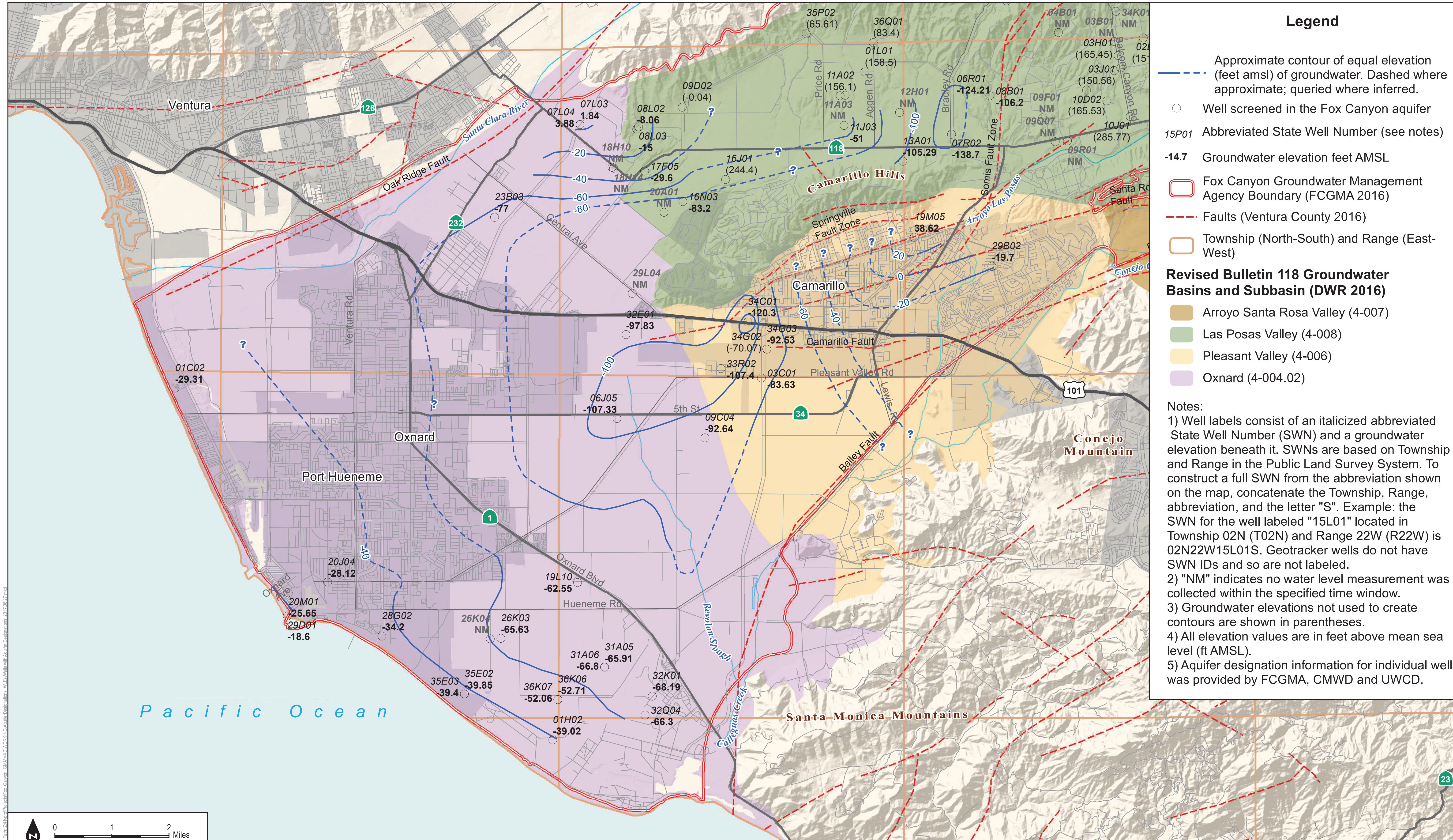

SOURCE: DWR; Ventura County; UWCD; CMWD

FIGURE 2-14

Groundwater Elevation Contours in the Fox Canyon Aquifer, March 2-29, 2015

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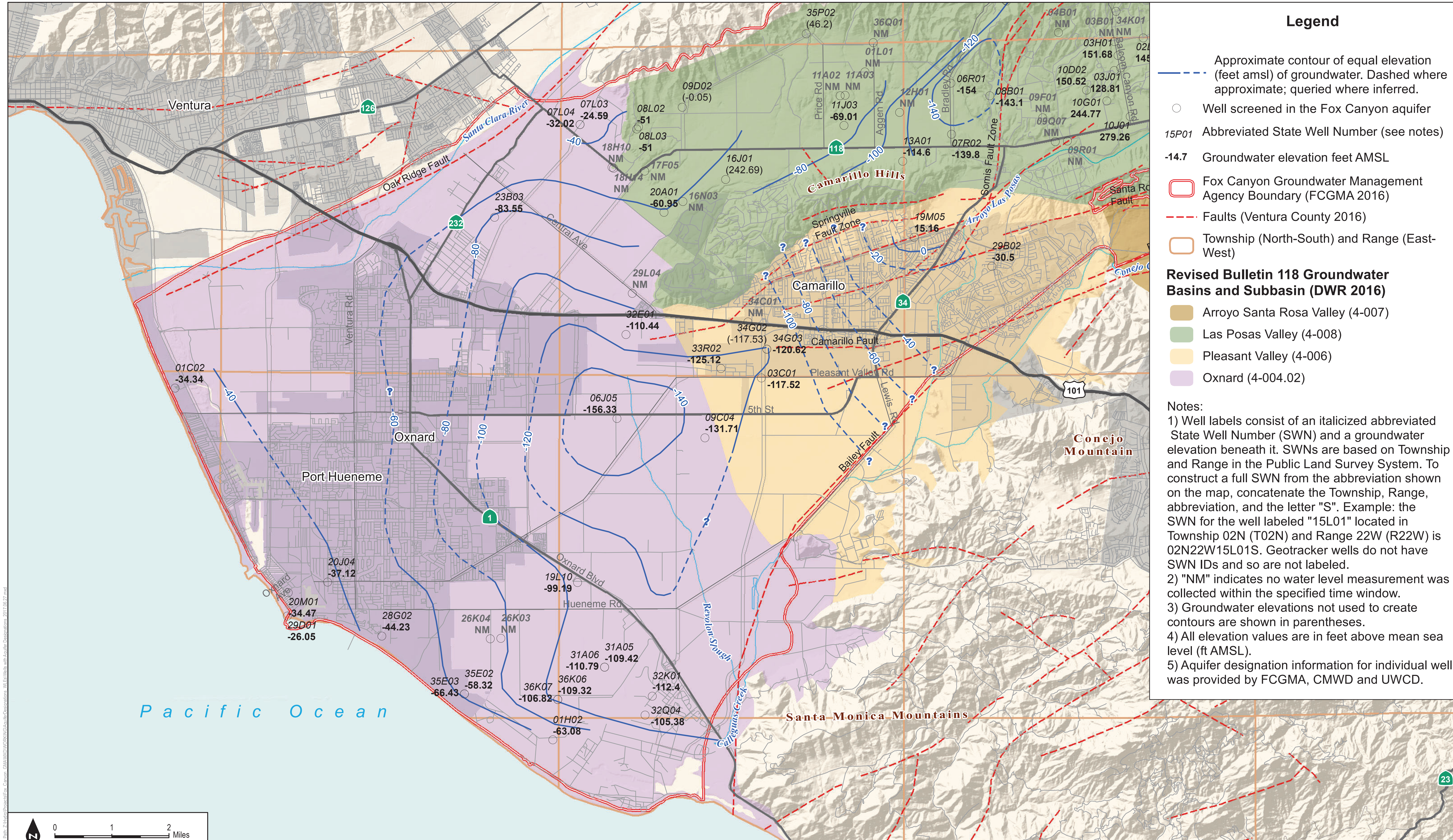

SOURCE: DWR; Ventura County; UWCD; CMWD

FIGURE 2-15

Groundwater Elevation Contours in the Fox Canyon Aquifer, October 2-29, 2015

DUDEK

Groundwater Sustainability Plan for the Pleasant Valley Basin

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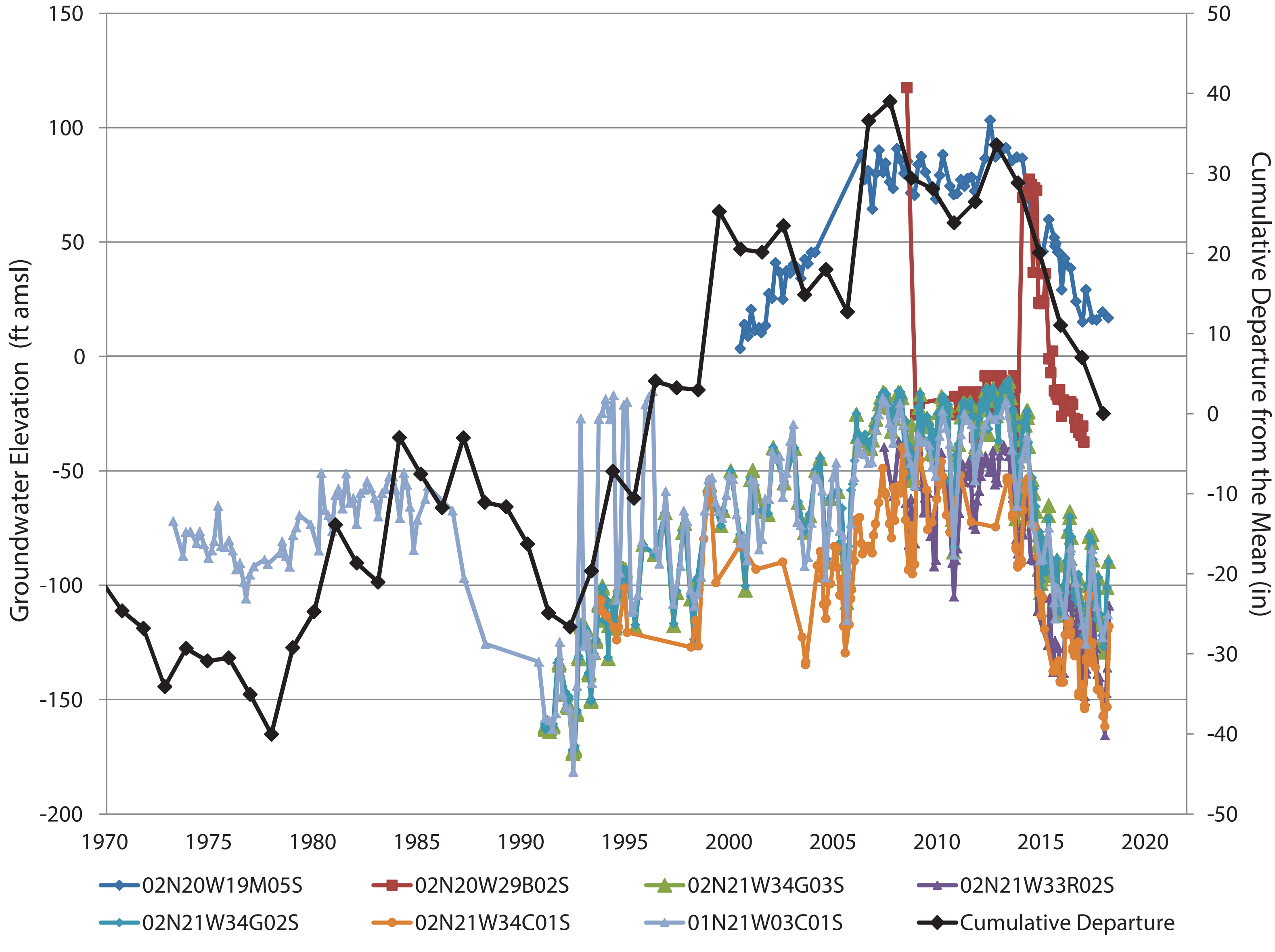

DUDEK

FIGURE 2-16

Groundwater Elevation Hydrographs in the Fox Canyon Aquifer

Groundwater Sustainability Plan for the Pleasant Valley Basin

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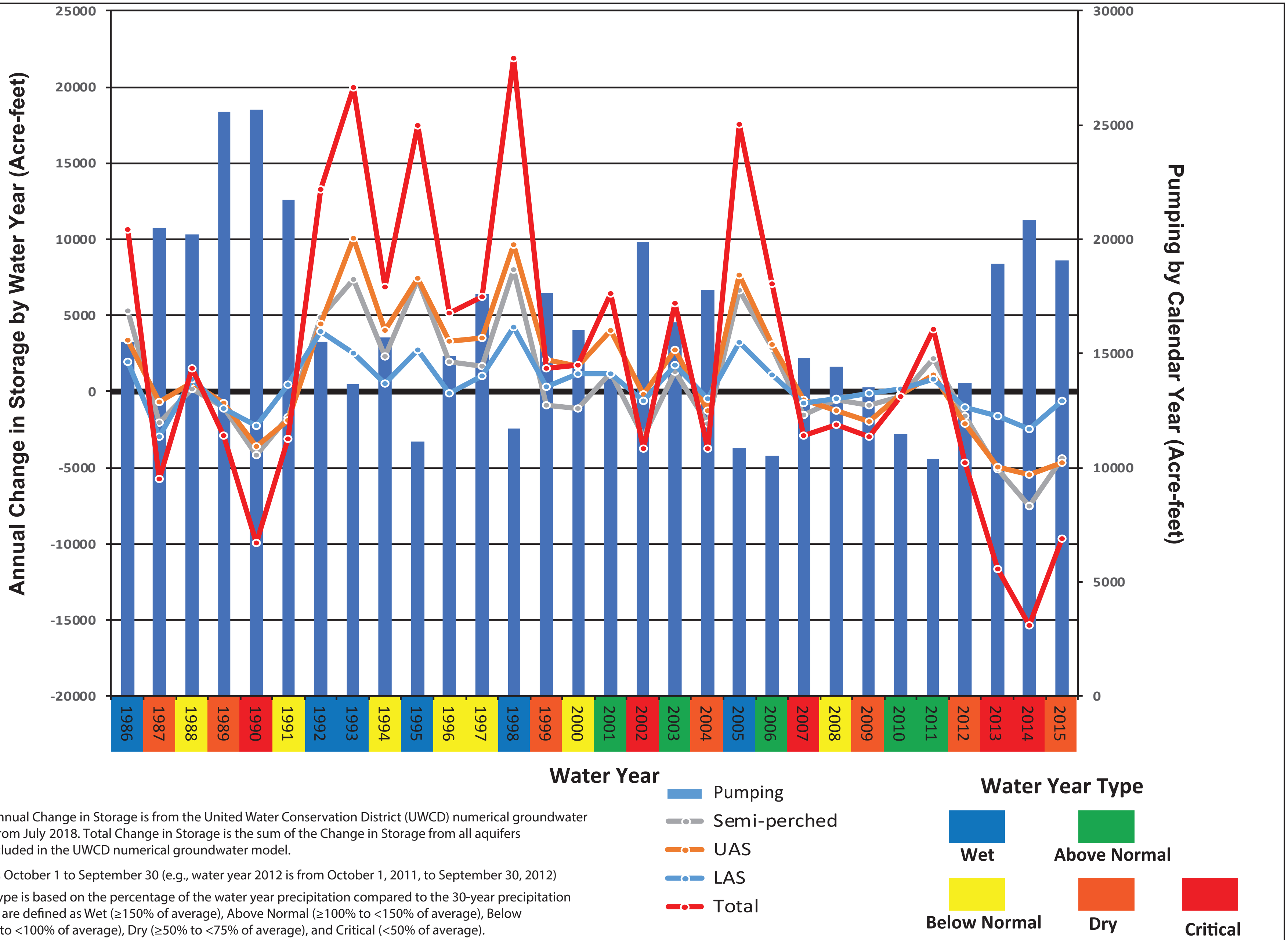

Notes:

1) Estimated Annual Change in Storage is from the United Water Conservation District (UWCD) numerical groundwater model report from July 2018. Total Change in Storage is the sum of the Change in Storage from all aquifers in the basin included in the UWCD numerical groundwater model.

2) Water year is October 1 to September 30 (e.g., water year 2012 is from October 1, 2011, to September 30, 2012)

3) Water year type is based on the percentage of the water year precipitation compared to the 30-year precipitation average. Types are defined as Wet (≥150% of average), Above Normal (≥100% to <150% of average), Below Normal (≥75% to <100% of average), Dry (≥50% to <75% of average), and Critical (<50% of average).

DUDEK

FIGURE 2-17

Annual Change in Storage

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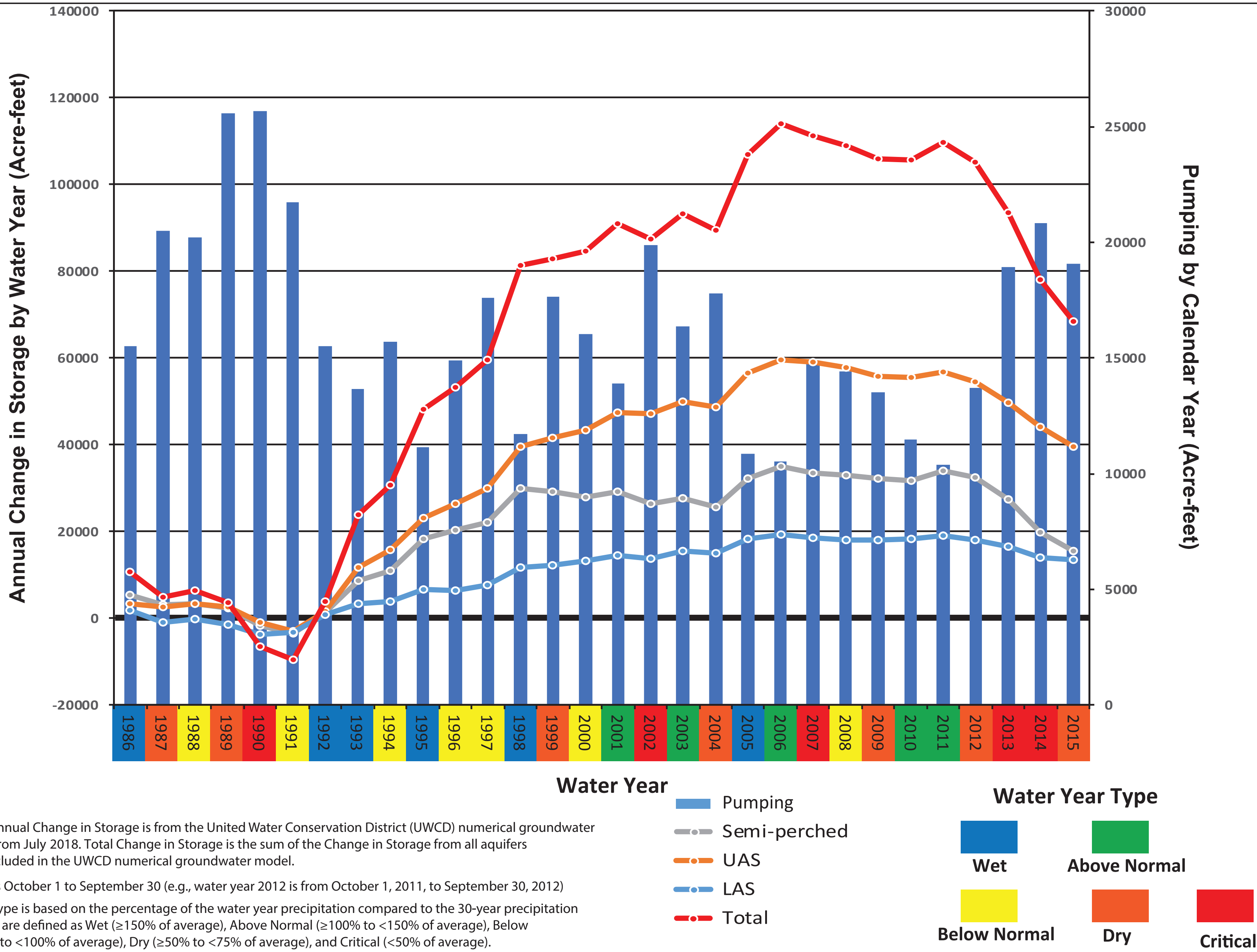

Notes:

1) Estimated Annual Change in Storage is from the United Water Conservation District (UWCD) numerical groundwater model report from July 2018. Total Change in Storage is the sum of the Change in Storage from all aquifers in the basin included in the UWCD numerical groundwater model.

2) Water year is October 1 to September 30 (e.g., water year 2012 is from October 1, 2011, to September 30, 2012)

3) Water year type is based on the percentage of the water year precipitation compared to the 30-year precipitation average. Types are defined as Wet (≥150% of average), Above Normal (≥100% to <150% of average), Below Normal (≥75% to <100% of average), Dry (≥50% to <75% of average), and Critical (<50% of average).

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FIGURE 2-18

Cumulative Change in Storage

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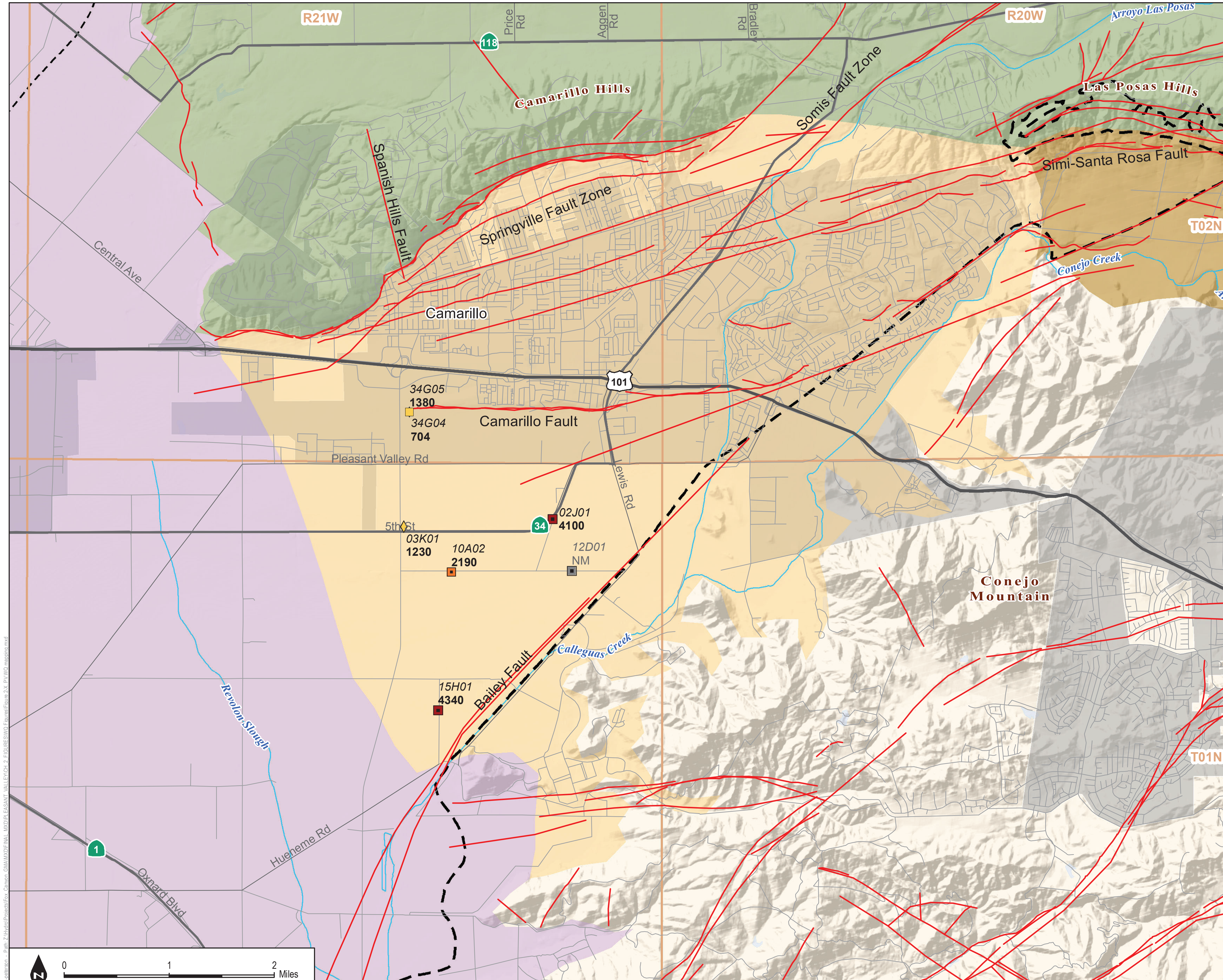

Legend

Fox Canyon Groundwater Management Agency Boundary (FCGMA 2016)

Major Rivers/Stream Channels

Township (North-South) and Range (East-West)

Revised Bulletin 118 Groundwater Basins and Subbasin (DWR 2016)

- Arroyo Santa Rosa Valley (4-007)
- Las Posas Valley (4-008)
- Pleasant Valley (4-006)
- Oxnard (4-004.02)

Oxnard Forebay

TDS concentration (mg/L), 2011-2015

- 290 - 500
- 500 - 750
- 750 - 1000
- 1000 - 1500
- 1500 - 2500
- 2500 - 49,800
- Not Measured (NM)

Aquifer designation

- Well screened in the Oxnard aquifer
- Well screened in the Mugu aquifer
- Wells screened in multiple aquifers in the UAS

15P01 Abbreviated State Well Number (see notes)

10.5 Concentration (mg/L)

Notes:
1) Well labels consist of an italicized abbreviated State Well Number (SWN) and a concentration value beneath it.The concentration is the most recent concentration measured in water quality samples collected at that well in the five years from 2011-2015. For a complete water quality record for each well, see Appendix F.
2) "ND" signifies non-detect.
3) SWNs are based on Township and Range in the Public Land Survey System. To construct a full SWN from the abbreviation shown on the map,concatenate the Township, Range, abbreviation, and the letter "S". Example: the SWN for the well labeled "15L01" located in Township 02N (T02N) and Range 22W (R22W) is 02N22W15L01S.
4) The shape of each well symbol correspondsto the aquifer(s) in which it is screened (see above).
5) The color of each well symbol corresponds to the most recent concentration measured in a water quality sample from that well.
6) All concentrations are in mg/L.
7) Aquifer designation information for individual wells was provided by FCGMA, CMWD and UWCD.

DUDEK

SOURCE: DWR, FCGMA, VCWPD, CMWD, UWCD

FIGURE 2-19

Upper Aquifer System - Most Recent Total Dissolved Solids (mg/L) Measured 2011-2015

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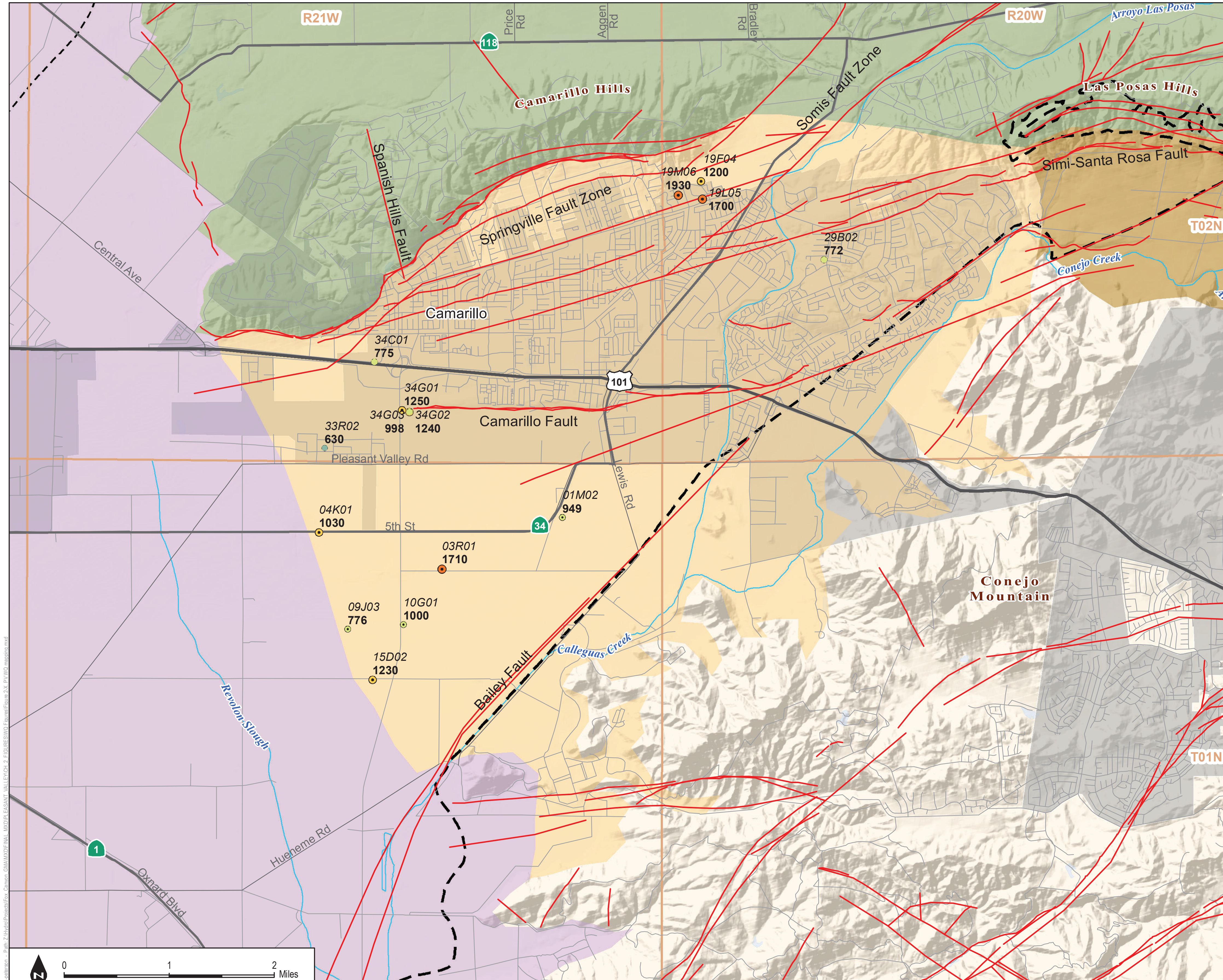

Legend

- Fox Canyon Groundwater Management Agency Boundary (FCGMA 2016)
- Major Rivers/Stream Channels
- Township (North-South) and Range (East-West)

Revised Bulletin 118 Groundwater Basins and Subbasin (DWR 2016)

- Arroyo Santa Rosa Valley (4-007)
- Las Posas Valley (4-008)
- Pleasant Valley (4-006)
- Oxnard (4-004.02)
- Oxnard Forebay

TDS concentration (mg/L), 2011-2015

- 290 - 500
- >500 - 750
- >750 - 1000
- >1000 - 1500
- >1500 - 2500
- >2500 - 49,800

Aquifer designation

- Well screened in the Hueneme aquifer
- Well screened in the Fox Canyon aquifer
- Well screened in the Grimes Canyon aquifer
- Wells screened in multiple aquifers in the LAS
- *15P01* Abbreviated State Well Number (see notes)
- **10.5** Concentration (mg/L)

Notes:
1) Well labels consist of an italicized abbreviated State Well Number (SWN) and a concentration value beneath it.The concentration is the most recent concentration measured in water quality samples collected at that well in the five years from 2011-2015. For a complete water quality record for each well, see Appendix F.
2) "ND" signifies non-detect.
3) SWNs are based on Township and Range in the Public Land Survey System. To construct a full SWN from the abbreviation shown on the map,concatenate the Township, Range, abbreviation, and the letter "S". Example: the SWN for the well labeled "15L01" located in Township 02N (T02N) and Range 22W (R22W) is 02N22W15L01S.
4) The shape of each well symbol correspondsto the aquifer(s) in which it is screened (see above).
5) The color of each well symbol corresponds to the most recent concentration measured in a water quality sample from that well.
6) All concentrations are in mg/L.
7) Aquifer designation information for individual wells was provided by FCGMA, CMWD and UWCD.

DUDEK

SOURCE: DWR, FCGMA, VCWPD, CMWD, UWCD

FIGURE 2-20

Lower Aquifer System - Most Recent Total Dissolved Solids (mg/L) Measured 2011-2015

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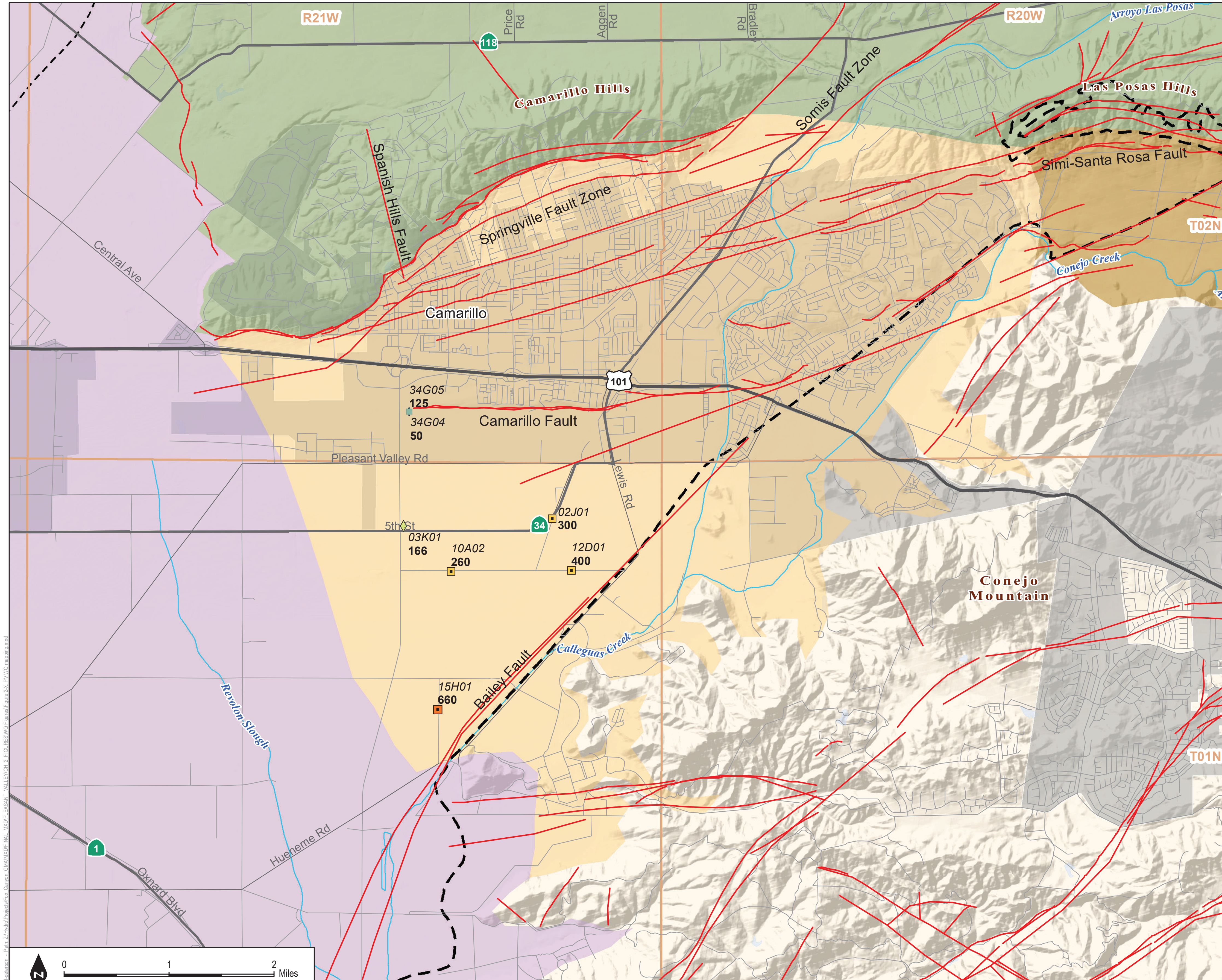

Legend

- Fox Canyon Groundwater Management Agency Boundary (FCGMA 2016)
- Major Rivers/Stream Channels
- Township (North-South) and Range (East-West)

Revised Bulletin 118 Groundwater Basins and Subbasin (DWR 2016)

- Arroyo Santa Rosa Valley (4-007)
- Las Posas Valley (4-008)
- Pleasant Valley (4-006)
- Oxnard (4-004.02)
- Oxnard Forebay

Chloride concentration (mg/L), 2011-2015

- 23 - 100
- 101 - 150
- 151 - 200
- 201 - 500
- 501 - 1000
- 1001 - 22500

Aquifer designation

- Well screened in the Oxnard aquifer
- Well screened in the Mugu aquifer
- Wells screened in multiple aquifers in the UAS

15P01 Abbreviated State Well Number (see notes)
10.5 Concentration (mg/L)

Notes:
1) Well labels consist of an italicized abbreviated State Well Number (SWN) and a concentration value beneath it.The concentration is the most recent concentration measured in water quality samples collected at that well in the five years from 2011-2015. For a complete water quality record for each well, see Appendix F.
2) "ND" signifies non-detect.
3) SWNs are based on Township and Range in the Public Land Survey System. To construct a full SWN from the abbreviation shown on the map,concatenate the Township, Range, abbreviation, and the letter "S". Example: the SWN for the well labeled "15L01" located in Township 02N (T02N) and Range 22W (R22W) is 02N22W15L01S.
4) The shape of each well symbol correspondsto the aquifer(s) in which it is screened (see above).
5) The color of each well symbol corresponds to the most recent concentration measured in a water quality sample from that well.
6) All concentrations are in mg/L.
7) Aquifer designation information for individual wells was provided by FCGMA, CMWD and UWCD.

DUDEK

SOURCE: DWR, FCGMA, VCWPD, CMWD, UWCD

FIGURE 2-21

Upper Aquifer System - Most Recent Chloride (mg/L) Measured 2011-2015

Groundwater Sustainability Plan for the Pleasant Valley Basin

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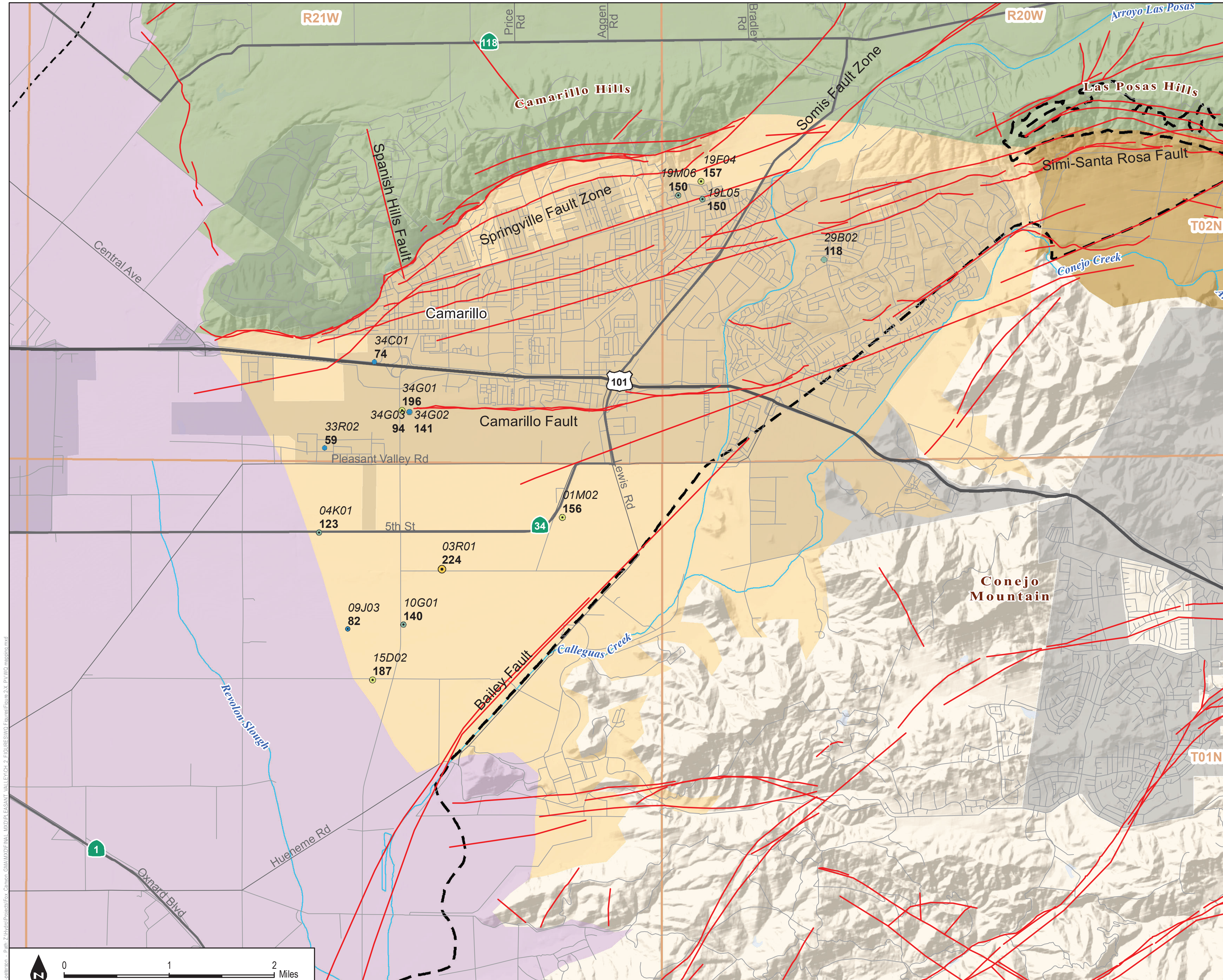

Legend

- Fox Canyon Groundwater Management Agency Boundary (FCGMA 2016)
- Major Rivers/Stream Channels
- Township (North-South) and Range (East-West)

Revised Bulletin 118 Groundwater Basins and Subbasin (DWR 2016)

- Arroyo Santa Rosa Valley (4-007)
- Las Posas Valley (4-008)
- Pleasant Valley (4-006)
- Oxnard (4-004.02)
- Oxnard Forebay

Chloride concentration (mg/L), 2011-2015

- 23 - 100
- 101 - 150
- 151 - 200
- 201 - 500
- 501 - 1000
- 1001 - 22500

Aquifer designation

- Well screened in the Hueneme aquifer
- Well screened in the Fox Canyon aquifer
- Well screened in the Grimes Canyon aquifer
- Wells screened in multiple aquifers in the LAS

15P01 Abbreviated State Well Number (see notes)
10.5 Concentration (mg/L)

Notes:
1) Well labels consist of an italicized abbreviated State Well Number (SWN) and a concentration value beneath it.The concentration is the most recent concentration measured in water quality samples collected at that well in the five years from 2011-2015. For a complete water quality record for each well, see Appendix F.
2) "ND" signifies non-detect.
3) SWNs are based on Township and Range in the Public Land Survey System. To construct a full SWN from the abbreviation shown on the map,concatenate the Township, Range, abbreviation, and the letter "S". Example: the SWN for the well labeled "15L01" located in Township 02N (T02N) and Range 22W (R22W) is 02N22W15L01S.
4) The shape of each well symbol correspondsto the aquifer(s) in which it is screened (see above).
5) The color of each well symbol corresponds to the most recent concentration measured in a water quality sample from that well.
6) All concentrations are in mg/L.
7) Aquifer designation information for individual wells was provided by FCGMA, CMWD and UWCD.

DUDEK

SOURCE: DWR, FCGMA, VCWPD, CMWD, UWCD

FIGURE 2-22

Lower Aquifer System - Most Recent Chloride (mg/L) Measured 2011-2015

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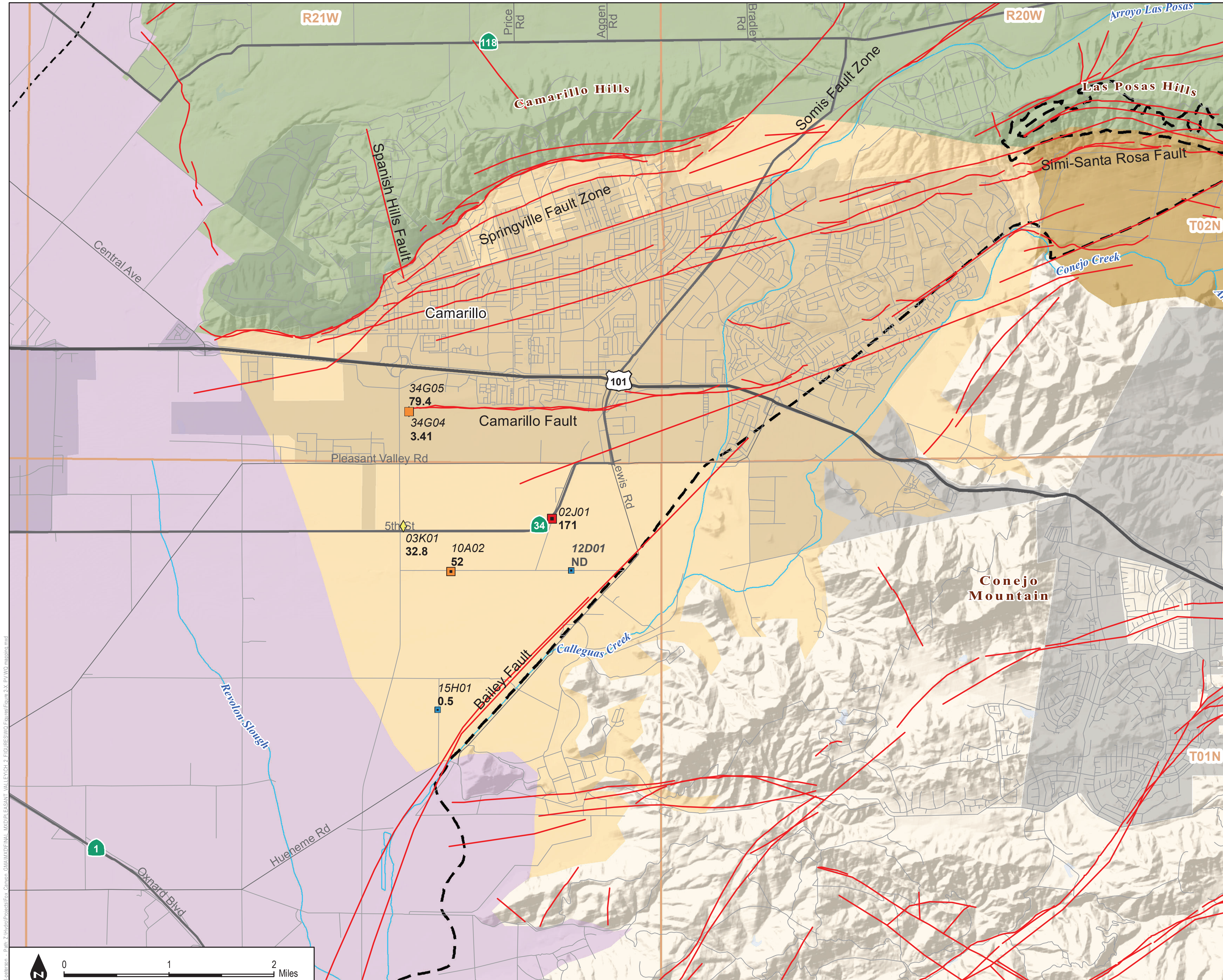

Legend

- Fox Canyon Groundwater Management Agency Boundary (FCGMA 2016)
- Major Rivers/Stream Channels
- Township (North-South) and Range (East-West)

Revised Bulletin 118 Groundwater Basins and Subbasin (DWR 2016)

- Arroyo Santa Rosa Valley (4-007)
- Las Posas Valley (4-008)
- Pleasant Valley (4-006)
- Oxnard (4-004.02)
- Oxnard Forebay

Nitrate concentration (mg/L as Nitrate), 2011-2015

- 0 - 10
- >10 - 22.5
- >22.5 - 45
- >45 - 90
- >90 - 528

Aquifer designation

- Well screened in the Oxnard aquifer
- Well screened in the Mugu aquifer
- Wells screened in multiple aquifers in the UAS

15P01 Abbreviated State Well Number (see notes)
10.5 Concentration (mg/L)

Notes:
1) Well labels consist of an italicized abbreviated State Well Number (SWN) and a concentration value beneath it.The concentration is the most recent concentration measured in water quality samples collected at that well in the five years from 2011-2015. For a complete water quality record for each well, see Appendix F.
2) "ND" signifies non-detect.
3) SWNs are based on Township and Range in the Public Land Survey System. To construct a full SWN from the abbreviation shown on the map,concatenate the Township, Range, abbreviation, and the letter "S". Example: the SWN for the well labeled "15L01" located in Township 02N (T02N) and Range 22W (R22W) is 02N22W15L01S.
4) The shape of each well symbol correspondsto the aquifer(s) in which it is screened (see above).
5) The color of each well symbol corresponds to the most recent concentration measured in a water quality sample from that well.
6) All concentrations are in mg/L.
7) Aquifer designation information for individual wells was provided by FCGMA, CMWD and UWCD.

DUDEK

SOURCE: DWR, FCGMA, VCWPD, CMWD, UWCD

FIGURE 2-23

Upper Aquifer System - Most Recent Nitrate (mg/L as Nitrate) Measured 2011-2015

Groundwater Sustainability Plan for the Pleasant Valley Basin

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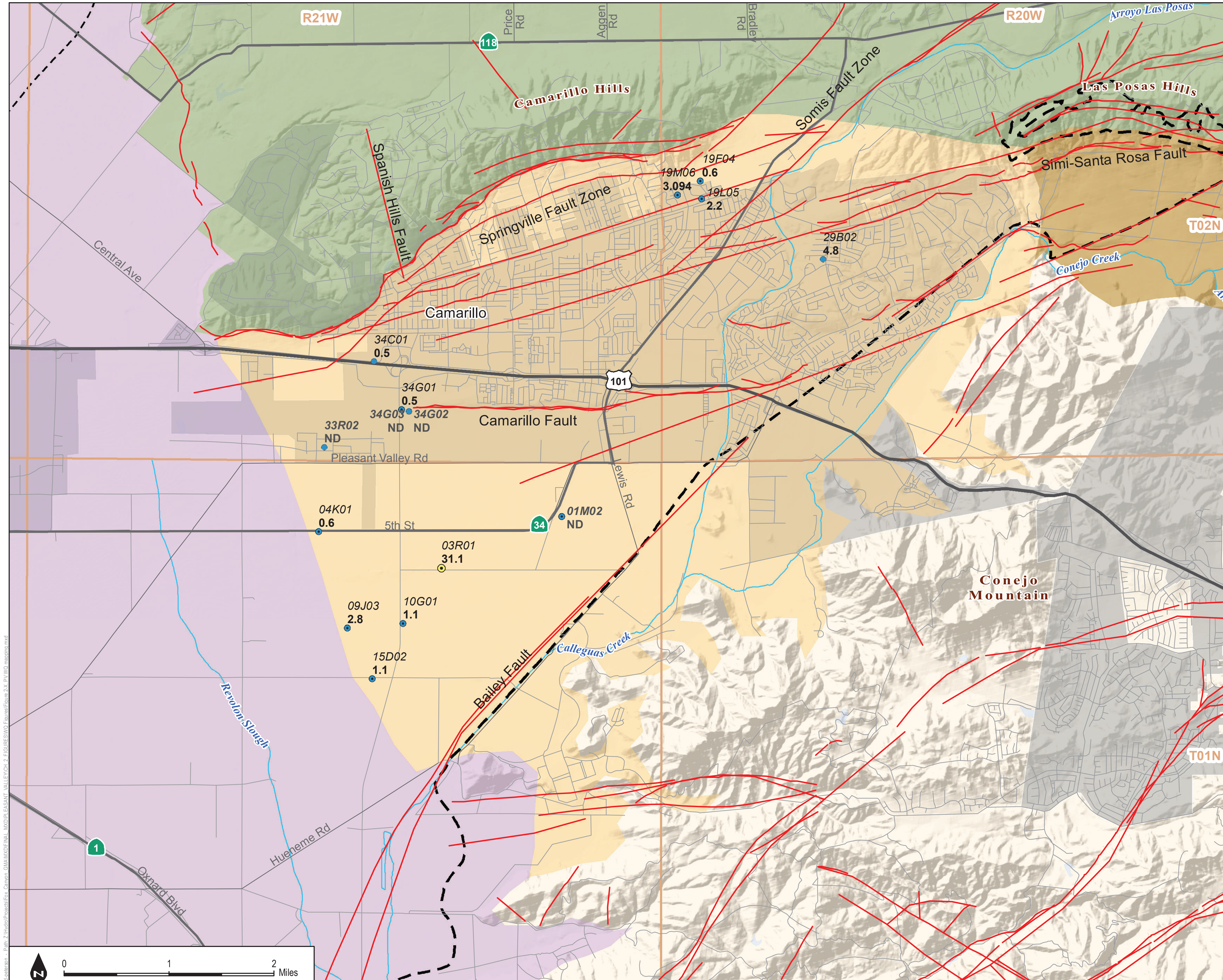

Legend

- Fox Canyon Groundwater Management Agency Boundary (FCGMA 2016)
- Major Rivers/Stream Channels
- Township (North-South) and Range (East-West)

Revised Bulletin 118 Groundwater Basins and Subbasin (DWR 2016)

- Arroyo Santa Rosa Valley (4-007)
- Las Posas Valley (4-008)
- Pleasant Valley (4-006)
- Oxnard (4-004.02)
- Oxnard Forebay

Nitrate concentration (mg/L as Nitrate), 2011-2015

- 0 - 10
- >10 - 22.5
- >22.5 - 45
- >45 - 90
- >90 - 528

Aquifer designation

- Well screened in the Hueneme aquifer
- Well screened in the Fox Canyon aquifer
- Well screened in the Grimes Canyon aquifer
- Wells screened in multiple aquifers in the LAS

15P01 Abbreviated State Well Number (see notes)
10.5 Concentration (mg/L)

Notes:
1) Well labels consist of an italicized abbreviated State Well Number (SWN) and a concentration value beneath it.The concentration is the most recent concentration measured in water quality samples collected at that well in the five years from 2011-2015. For a complete water quality record for each well, see Appendix F.
2) "ND" signifies non-detect.
3) SWNs are based on Township and Range in the Public Land Survey System. To construct a full SWN from the abbreviation shown on the map,concatenate the Township, Range, abbreviation, and the letter "S". Example: the SWN for the well labeled "15L01" located in Township 02N (T02N) and Range 22W (R22W) is 02N22W15L01S.
4) The shape of each well symbol correspondsto the aquifer(s) in which it is screened (see above).
5) The color of each well symbol corresponds to the most recent concentration measured in a water quality sample from that well.
6) All concentrations are in mg/L.
7) Aquifer designation information for individual wells was provided by FCGMA, CMWD and UWCD.

DUDEK

SOURCE: DWR, FCGMA, VCWPD, CMWD, UWCD

FIGURE 2-24

Lower Aquifer System - Most Recent Nitrate (mg/L as Nitrate) Measured 2011-2015

Groundwater Sustainability Plan for the Pleasant Valley Basin

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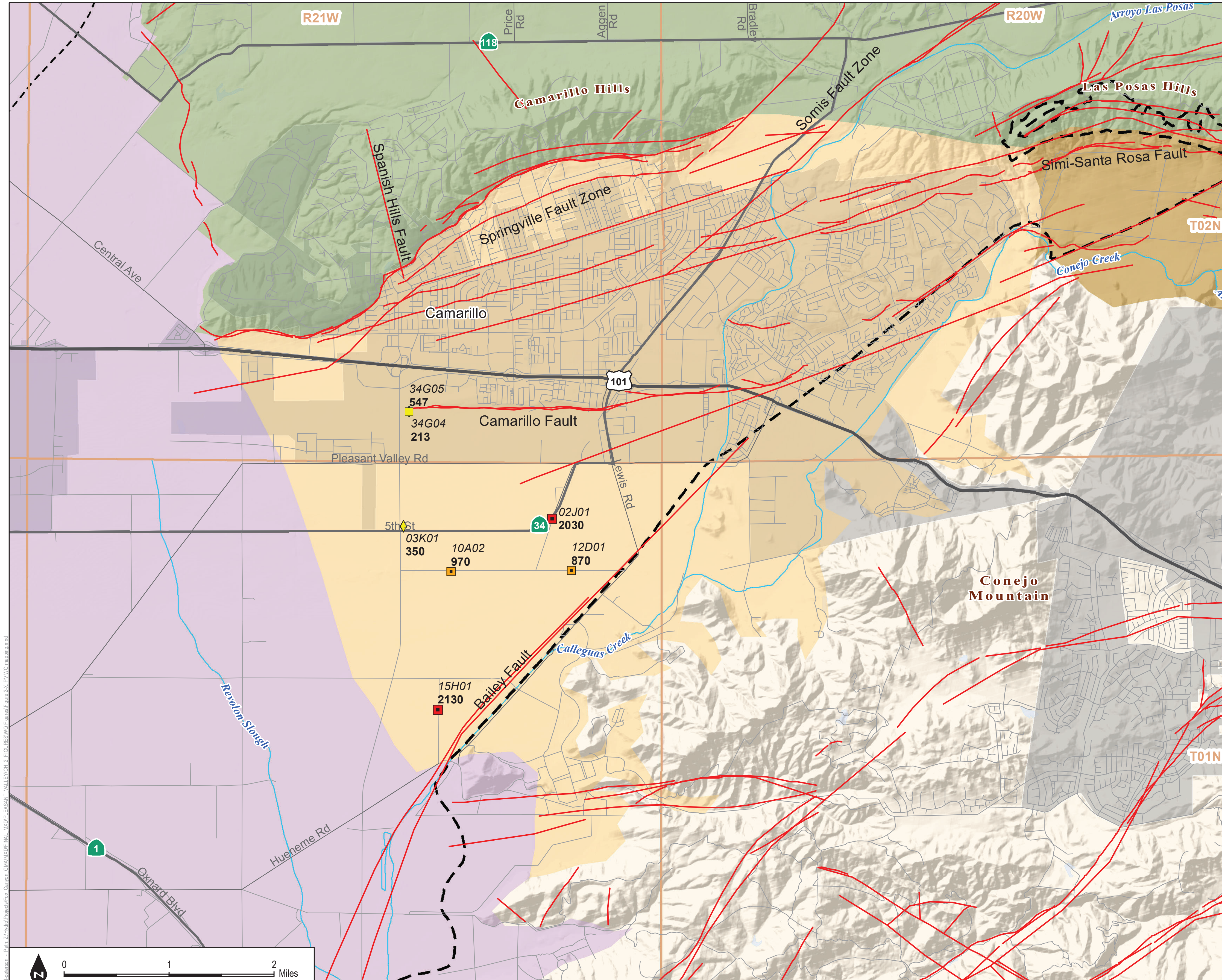

Legend

Fox Canyon Groundwater Management Agency Boundary (FCGMA 2016)

Major Rivers/Stream Channels

Township (North-South) and Range (East-West)

Revised Bulletin 118 Groundwater Basins and Subbasin (DWR 2016)

- Arroyo Santa Rosa Valley (4-007)
- Las Posas Valley (4-008)
- Pleasant Valley (4-006)
- Oxnard (4-004.02)

Oxnard Forebay

Sulfate concentration (mg/L), 2011-2015

- 29 - 300
- 301 - 600
- 601 - 1000
- 1001 - 5740

Aquifer designation

- Well screened in the Oxnard aquifer
- Well screened in the Mugu aquifer
- Wells screened in multiple aquifers in the UAS

15P01 Abbreviated State Well Number (see notes)

10.5 Concentration (mg/L)

Notes:
1) Well labels consist of an italicized abbreviated State Well Number (SWN) and a concentration value beneath it.The concentration is the most recent concentration measured in water quality samples collected at that well in the five years from 2011-2015. For a complete water quality record for each well, see Appendix F.
2) "ND" signifies non-detect.
3) SWNs are based on Township and Range in the Public Land Survey System. To construct a full SWN from the abbreviation shown on the map,concatenate the Township, Range, abbreviation, and the letter "S". Example: the SWN for the well labeled "15L01" located in Township 02N (T02N) and Range 22W (R22W) is 02N22W15L01S.
4) The shape of each well symbol correspondsto the aquifer(s) in which it is screened (see above).
5) The color of each well symbol corresponds to the most recent concentration measured in a water quality sample from that well.
6) All concentrations are in mg/L.
7) Aquifer designation information for individual wells was provided by FCGMA, CMWD and UWCD.

DUDEK

SOURCE: DWR, FCGMA, VCWPD, CMWD, UWCD

FIGURE 2-25

Upper Aquifer System - Most Recent Sulfate (mg/L) Measured 2011-2015

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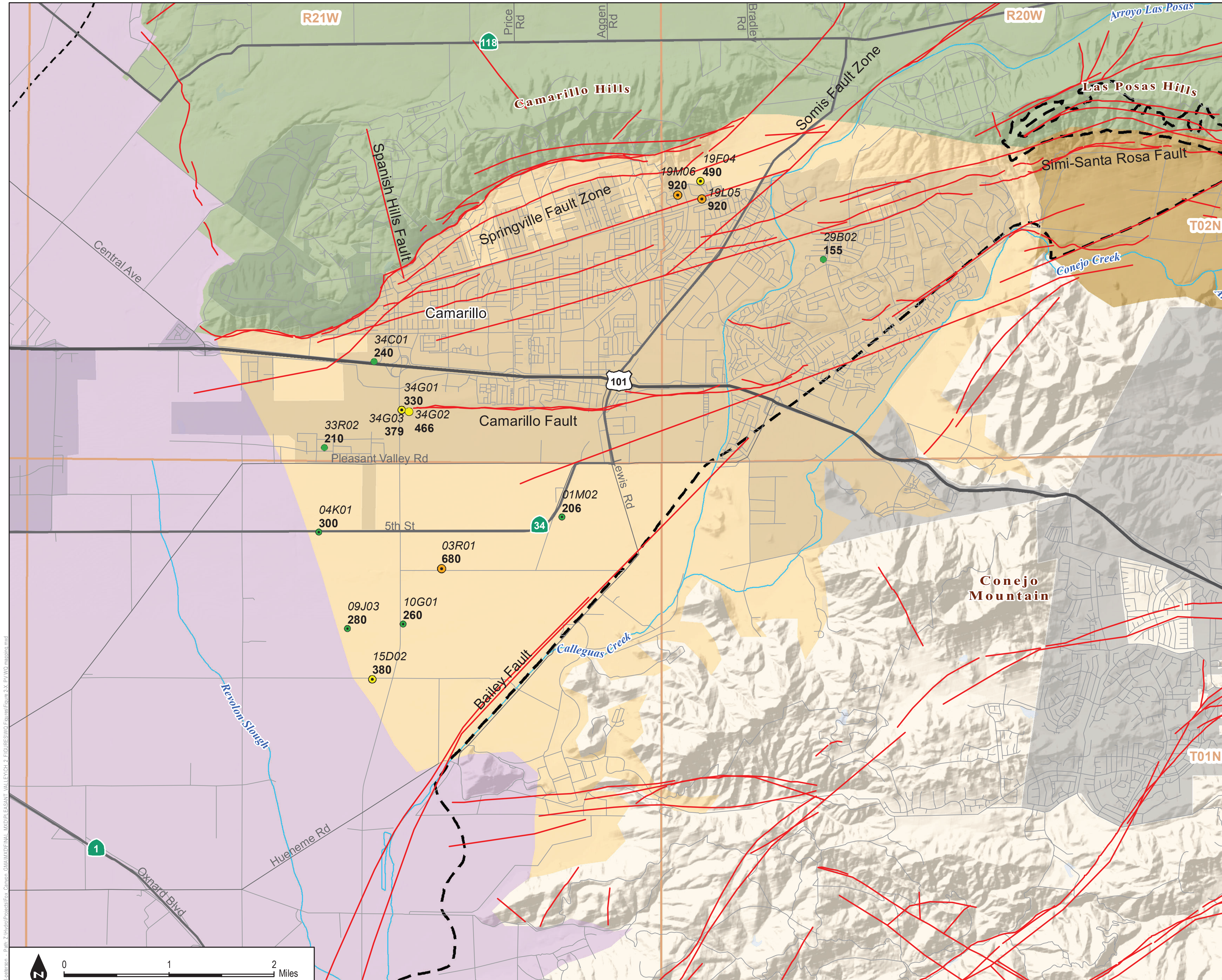

Legend

- Fox Canyon Groundwater Management Agency Boundary (FCGMA 2016)
- Major Rivers/Stream Channels
- Township (North-South) and Range (East-West)

Revised Bulletin 118 Groundwater Basins and Subbasin (DWR 2016)

- Arroyo Santa Rosa Valley (4-007)
- Las Posas Valley (4-008)
- Pleasant Valley (4-006)
- Oxnard (4-004.02)
- Oxnard Forebay

Sulfate concentration (mg/L), 2011-2015

- 29 - 300
- 301 - 600
- 601 - 1000
- 1001 - 5740

Aquifer designation

- Well screened in the Hueneme aquifer
- Well screened in the Fox Canyon aquifer
- Well screened in the Grimes Canyon aquifer
- Wells screened in multiple aquifers in the LAS

15P01 Abbreviated State Well Number (see notes)
10.5 Concentration (mg/L)

Notes:
1) Well labels consist of an italicized abbreviated State Well Number (SWN) and a concentration value beneath it.The concentration is the most recent concentration measured in water quality samples collected at that well in the five years from 2011-2015. For a complete water quality record for each well, see Appendix F.
2) "ND" signifies non-detect.
3) SWNs are based on Township and Range in the Public Land Survey System. To construct a full SWN from the abbreviation shown on the map,concatenate the Township, Range, abbreviation, and the letter "S". Example: the SWN for the well labeled "15L01" located in Township 02N (T02N) and Range 22W (R22W) is 02N22W15L01S.
4) The shape of each well symbol correspondsto the aquifer(s) in which it is screened (see above).
5) The color of each well symbol corresponds to the most recent concentration measured in a water quality sample from that well.
6) All concentrations are in mg/L.
7) Aquifer designation information for individual wells was provided by FCGMA, CMWD and UWCD.

DUDEK

SOURCE: DWR, FCGMA, VCWPD, CMWD, UWCD

FIGURE 2-26

Lower Aquifer System - Most Recent Sulfate (mg/L) Measured 2011-2015

Groundwater Sustainability Plan for the Pleasant Valley Basin

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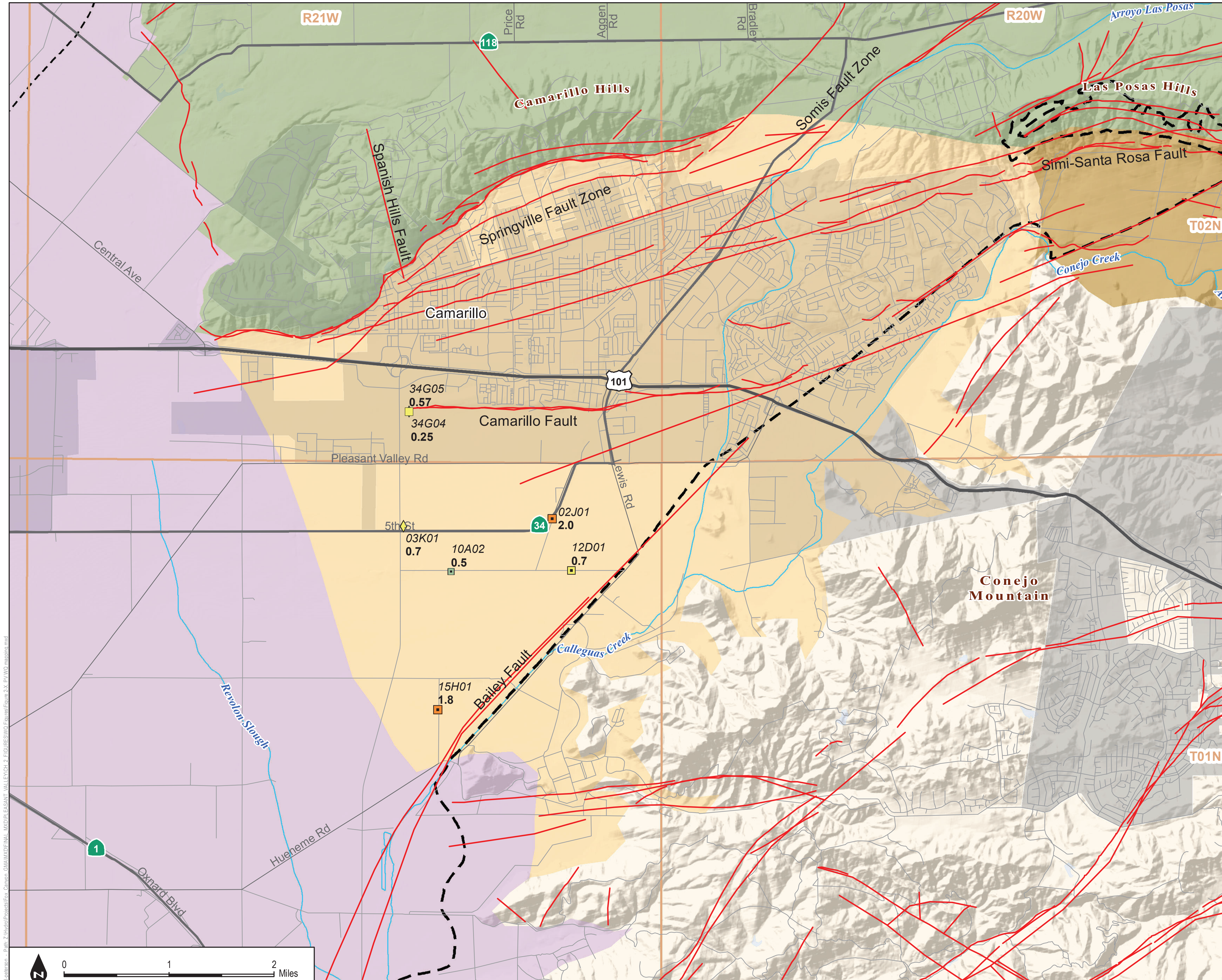

Legend

- Fox Canyon Groundwater Management Agency Boundary (FCGMA 2016)
- Major Rivers/Stream Channels
- Township (North-South) and Range (East-West)

Revised Bulletin 118 Groundwater Basins and Subbasin (DWR 2016)

- Arroyo Santa Rosa Valley (4-007)
- Las Posas Valley (4-008)
- Pleasant Valley (4-006)
- Oxnard (4-004.02)
- Oxnard Forebay

Boron concentration (mg/L), 2011-2015

- 0 - 0.2
- >0.2 - 0.5
- >0.5 - 1.0
- >1.0 - 2.0
- >2.0 - 6.0

Aquifer designation

- Well screened in the Oxnard aquifer
- Well screened in the Mugu aquifer
- Wells screened in multiple aquifers in the UAS

15P01 Abbreviated State Well Number (see notes)
10.5 Concentration (mg/L)

Notes:
1) Well labels consist of an italicized abbreviated State Well Number (SWN) and a concentration value beneath it.The concentration is the most recent concentration measured in water quality samples collected at that well in the five years from 2011-2015. For a complete water quality record for each well, see Appendix F.
2) "ND" signifies non-detect.
3) SWNs are based on Township and Range in the Public Land Survey System. To construct a full SWN from the abbreviation shown on the map,concatenate the Township, Range, abbreviation, and the letter "S". Example: the SWN for the well labeled "15L01" located in Township 02N (T02N) and Range 22W (R22W) is 02N22W15L01S.
4) The shape of each well symbol correspondsto the aquifer(s) in which it is screened (see above).
5) The color of each well symbol corresponds to the most recent concentration measured in a water quality sample from that well.
6) All concentrations are in mg/L.
7) Aquifer designation information for individual wells was provided by FCGMA, CMWD and UWCD.

DUDEK

SOURCE: DWR, FCGMA, VCWPD, CMWD, UWCD

FIGURE 2-27

Upper Aquifer System - Most Recent Boron (mg/L) Measured 2011-2015

Groundwater Sustainability Plan for the Pleasant Valley Basin

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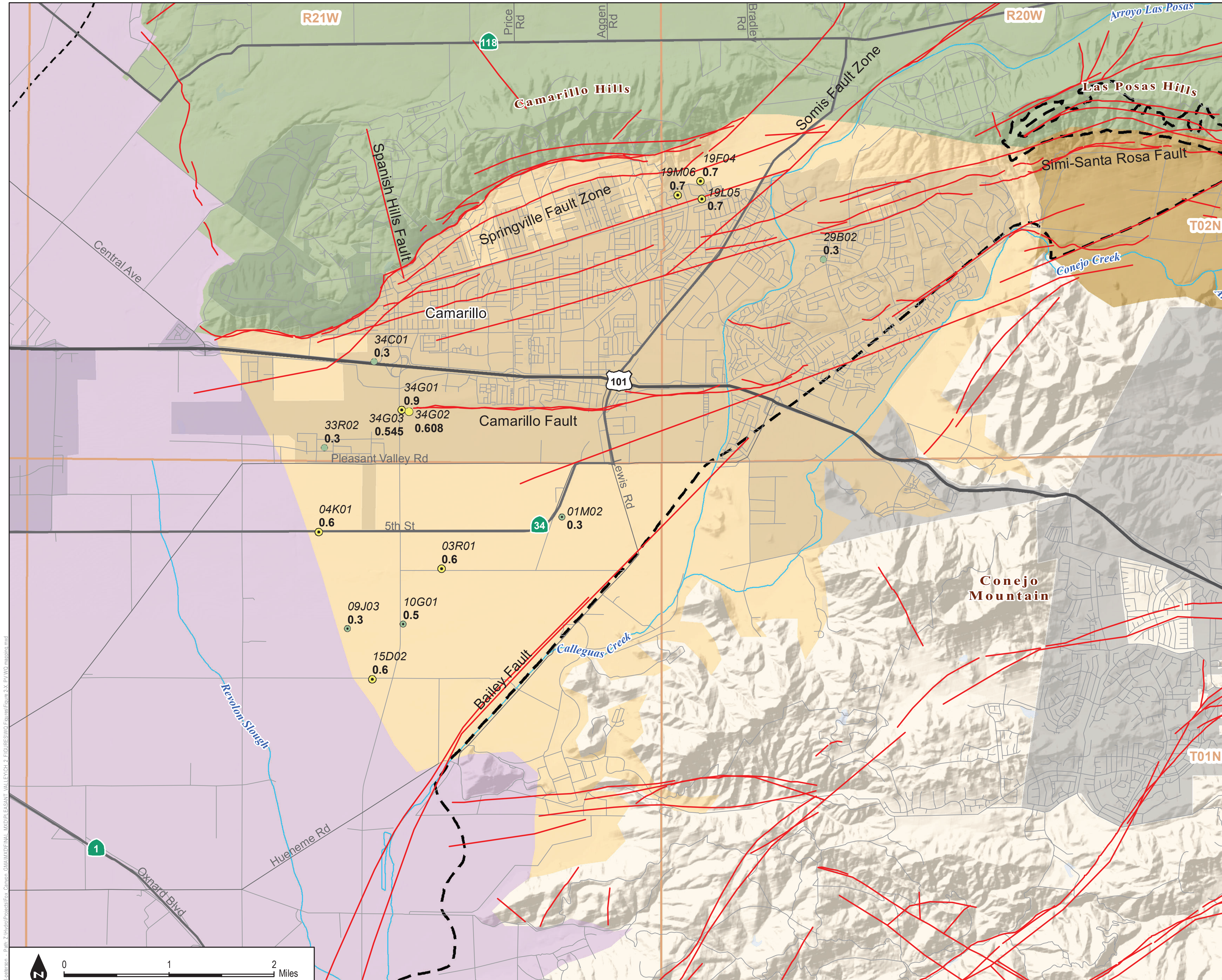

Legend

- Fox Canyon Groundwater Management Agency Boundary (FCGMA 2016)
- Major Rivers/Stream Channels
- Township (North-South) and Range (East-West)

Revised Bulletin 118 Groundwater Basins and Subbasin (DWR 2016)

- Arroyo Santa Rosa Valley (4-007)
- Las Posas Valley (4-008)
- Pleasant Valley (4-006)
- Oxnard (4-004.02)
- Oxnard Forebay

Boron concentration (mg/L), 2011-2015

- 0 - 0.2
- >0.2 - 0.5
- >0.5 - 1.0
- >1.0 - 2.0
- >2.0 - 6.0

Aquifer designation

- Well screened in the Hueneme aquifer
- Well screened in the Fox Canyon aquifer
- Well screened in the Grimes Canyon aquifer
- Wells screened in multiple aquifers in the LAS

15P01 Abbreviated State Well Number (see notes)
10.5 Concentration (mg/L)

Notes:
1) Well labels consist of an italicized abbreviated State Well Number (SWN) and a concentration value beneath it.The concentration is the most recent concentration measured in water quality samples collected at that well in the five years from 2011-2015. For a complete water quality record for each well, see Appendix F.
2) "ND" signifies non-detect.
3) SWNs are based on Township and Range in the Public Land Survey System. To construct a full SWN from the abbreviation shown on the map,concatenate the Township, Range, abbreviation, and the letter "S". Example: the SWN for the well labeled "15L01" located in Township 02N (T02N) and Range 22W (R22W) is 02N22W15L01S.
4) The shape of each well symbol correspondsto the aquifer(s) in which it is screened (see above).
5) The color of each well symbol corresponds to the most recent concentration measured in a water quality sample from that well.
6) All concentrations are in mg/L.
7) Aquifer designation information for individual wells was provided by FCGMA, CMWD and UWCD.

DUDEK

SOURCE: DWR, FCGMA, VCWPD, CMWD, UWCD

FIGURE 2-28

Lower Aquifer System - Most Recent Boron (mg/L) Measured 2011-2015

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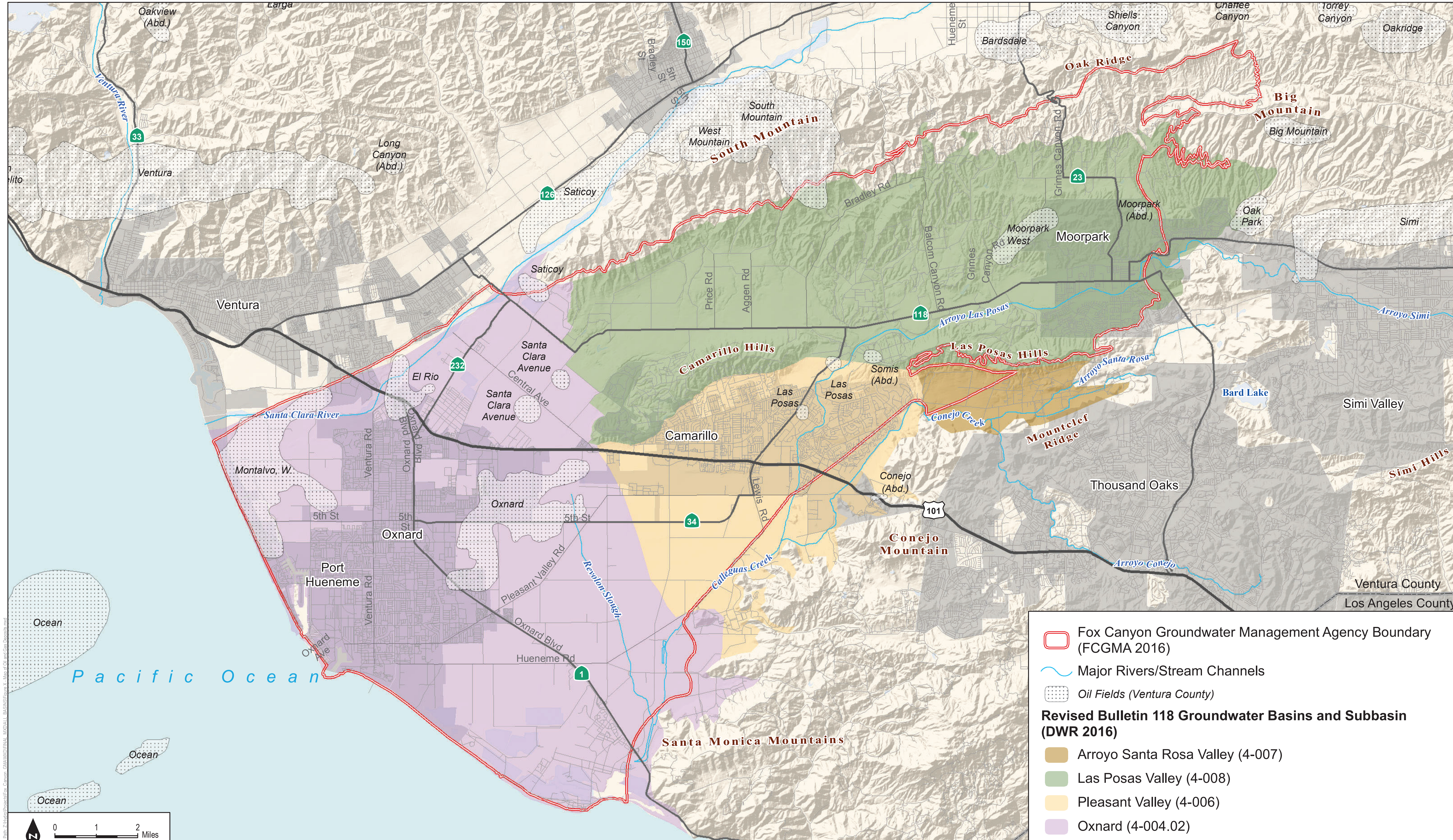

SOURCE: DWR; Ventura County

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FIGURE 2-29

Oil Fields in the Vicinity of FCGMA Groundwater Basins

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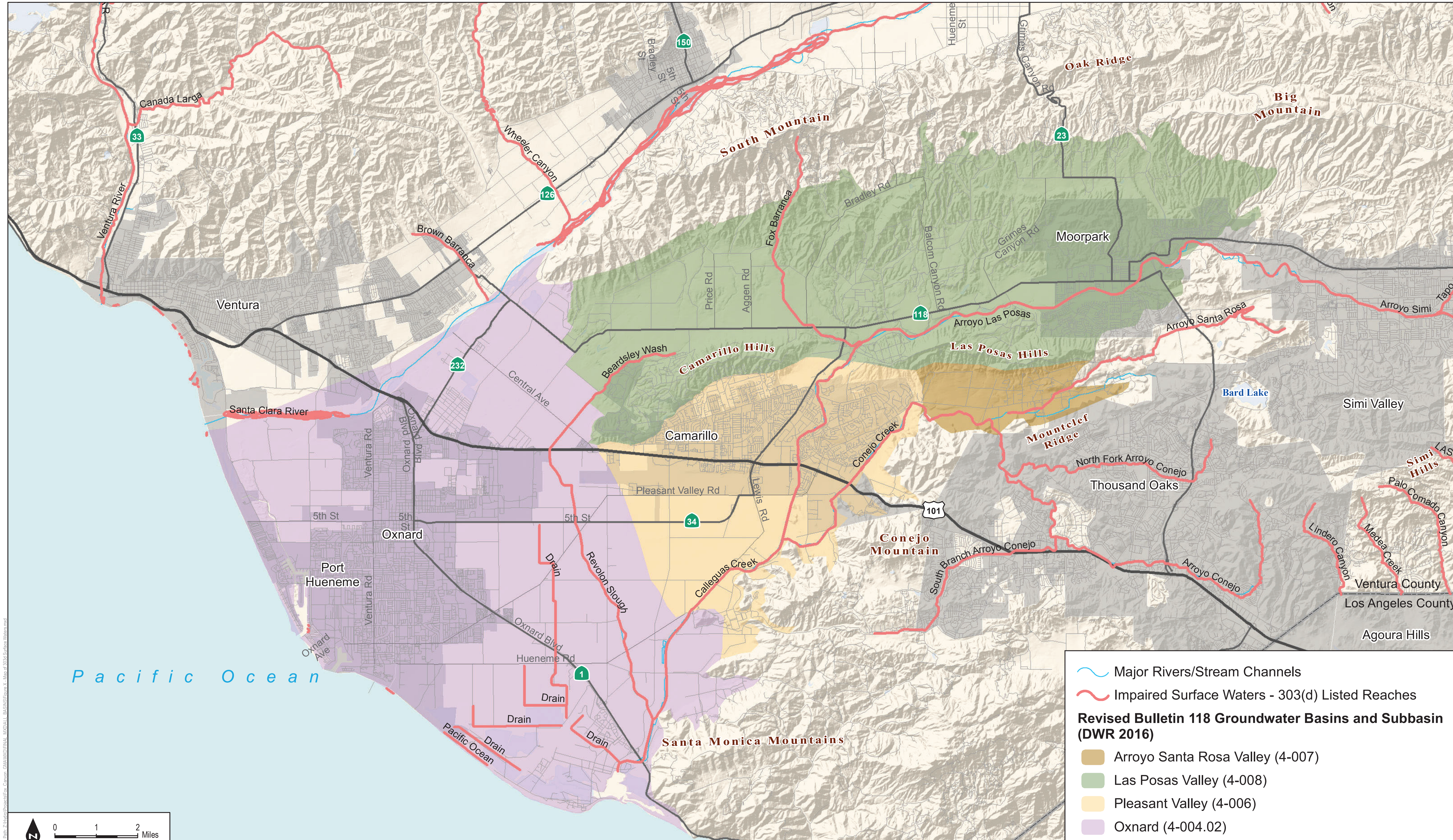

SOURCE: DWR; Ventura County

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FIGURE 2-30

Impaired Surface Waters in the Vicinity of FCGMA Groundwater Basins

Groundwater Sustainability Plan for the Pleasant Valley Basin

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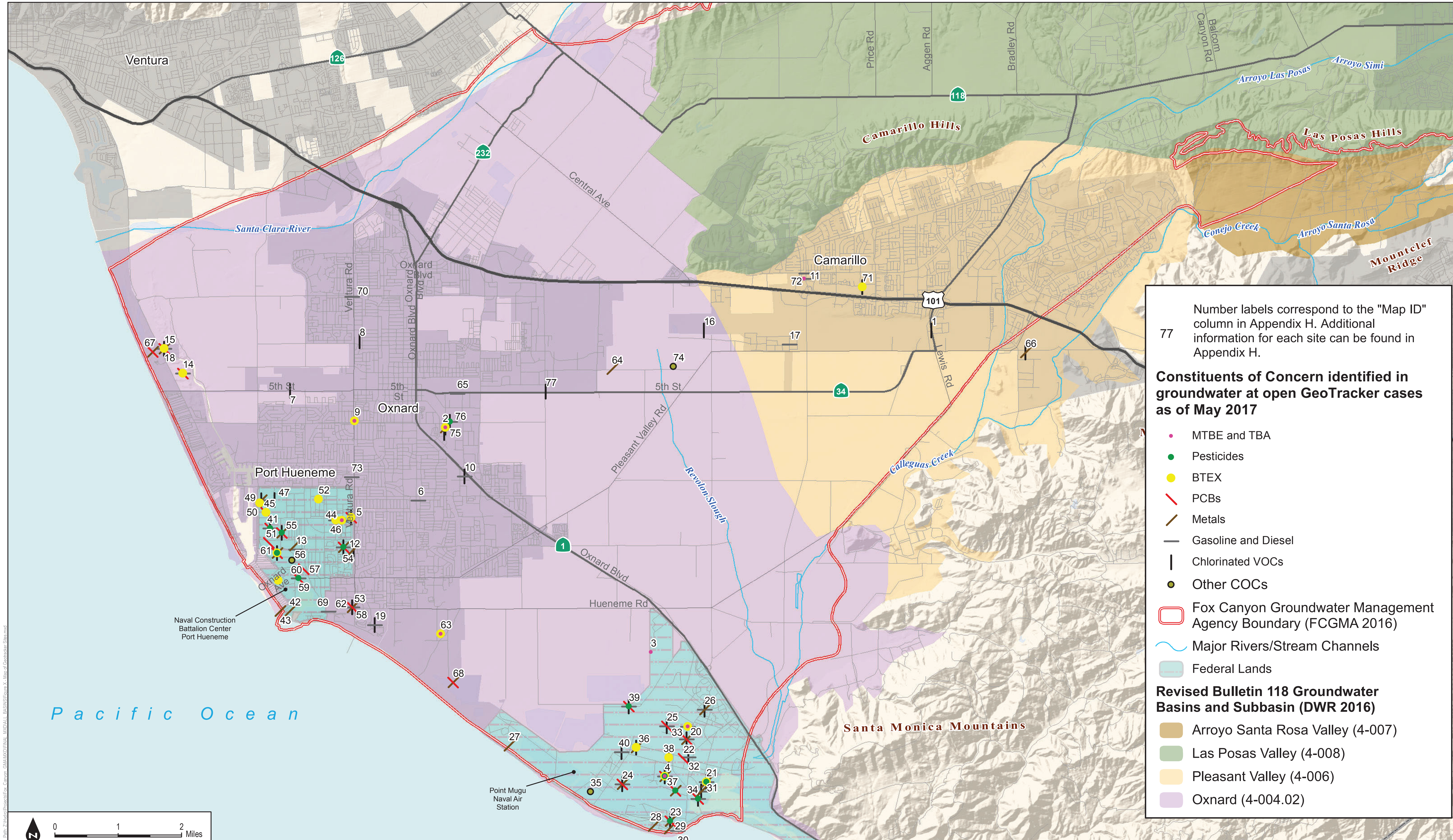

SOURCE: DWR; Ventura County; Geotracker

FIGURE 2-31

Constituents of Concern at Open GeoTracker Cases with Impacted Groundwater within FCGMA Groundwater Basin Boundaries

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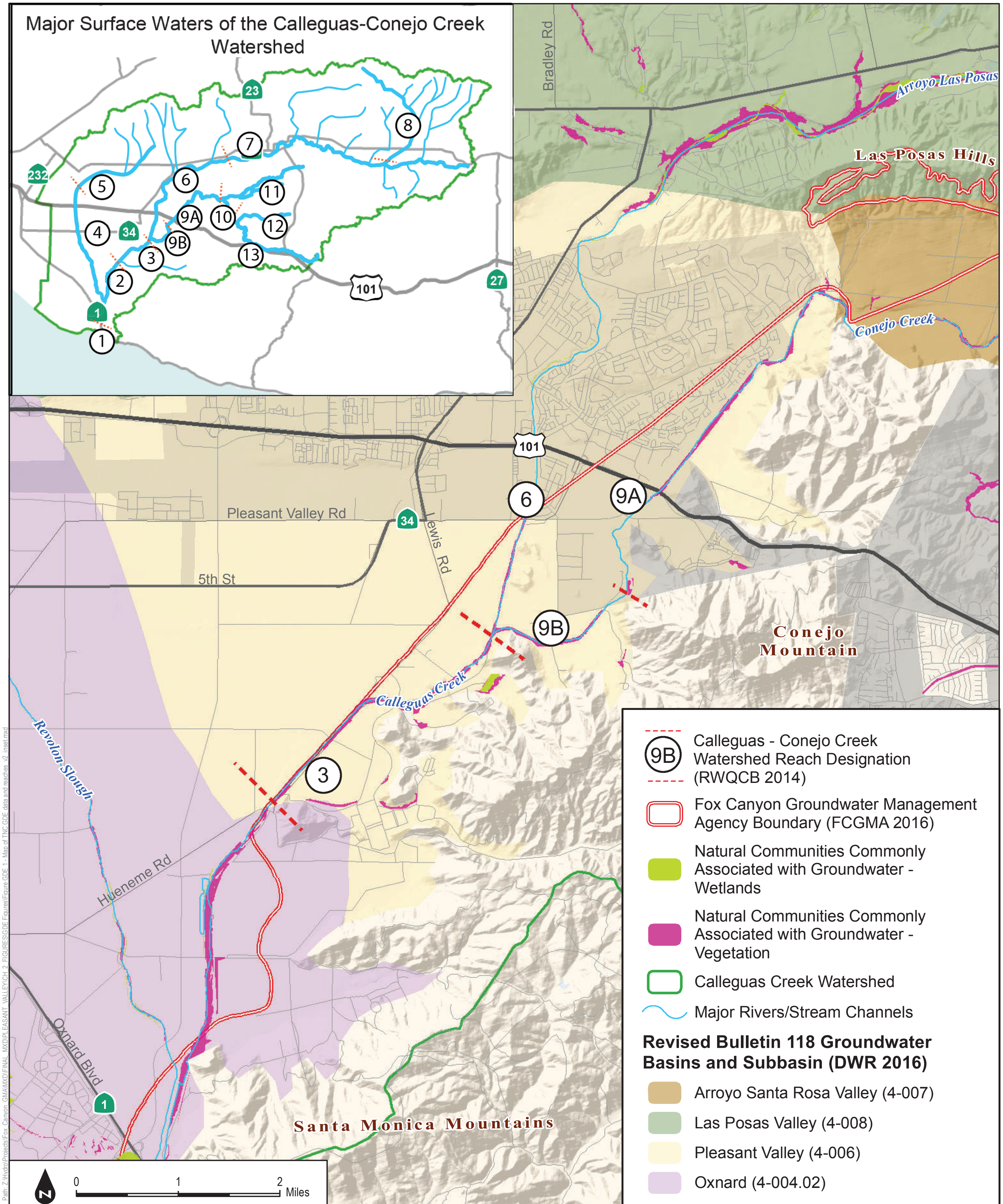

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SOURCE: DWR; Ventura County; RWQCB 2014
TNC GDEs Version 0.3.1 (March 2017)

FIGURE 2-32

Groundwater-Dependent Ecosystems and Stream Reaches in Pleasant Valley

Groundwater Sustainability Plan for the Pleasant Valley Basin

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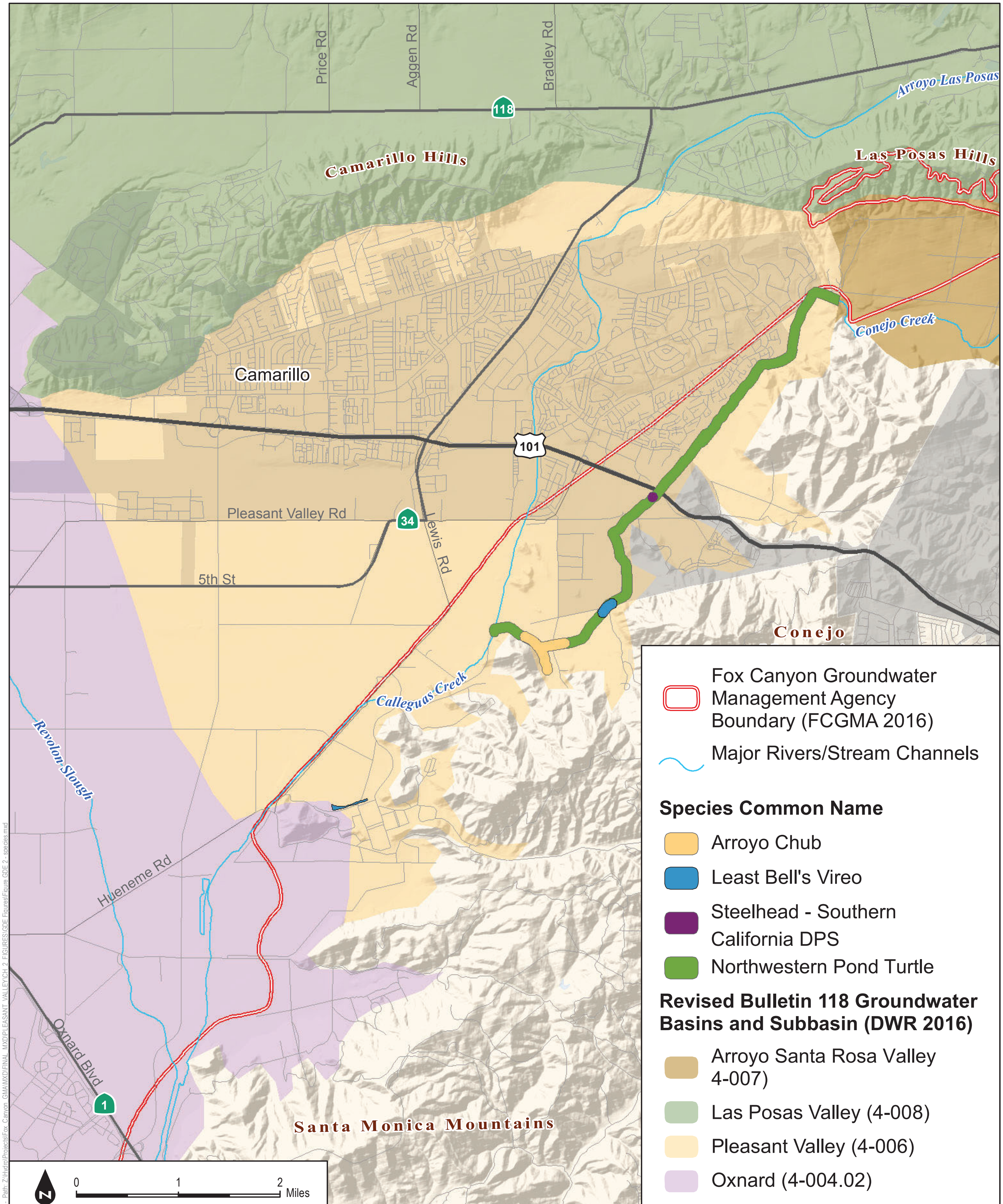

SOURCE: DWR; Ventura County; CNDDB;
TNC GDEs Version 0.3.1 (March 2017)

FIGURE 2-33

Species Occurrences in Pleasant Valley

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Groundwater Sustainability Plan for the Pleasant Valley Basin

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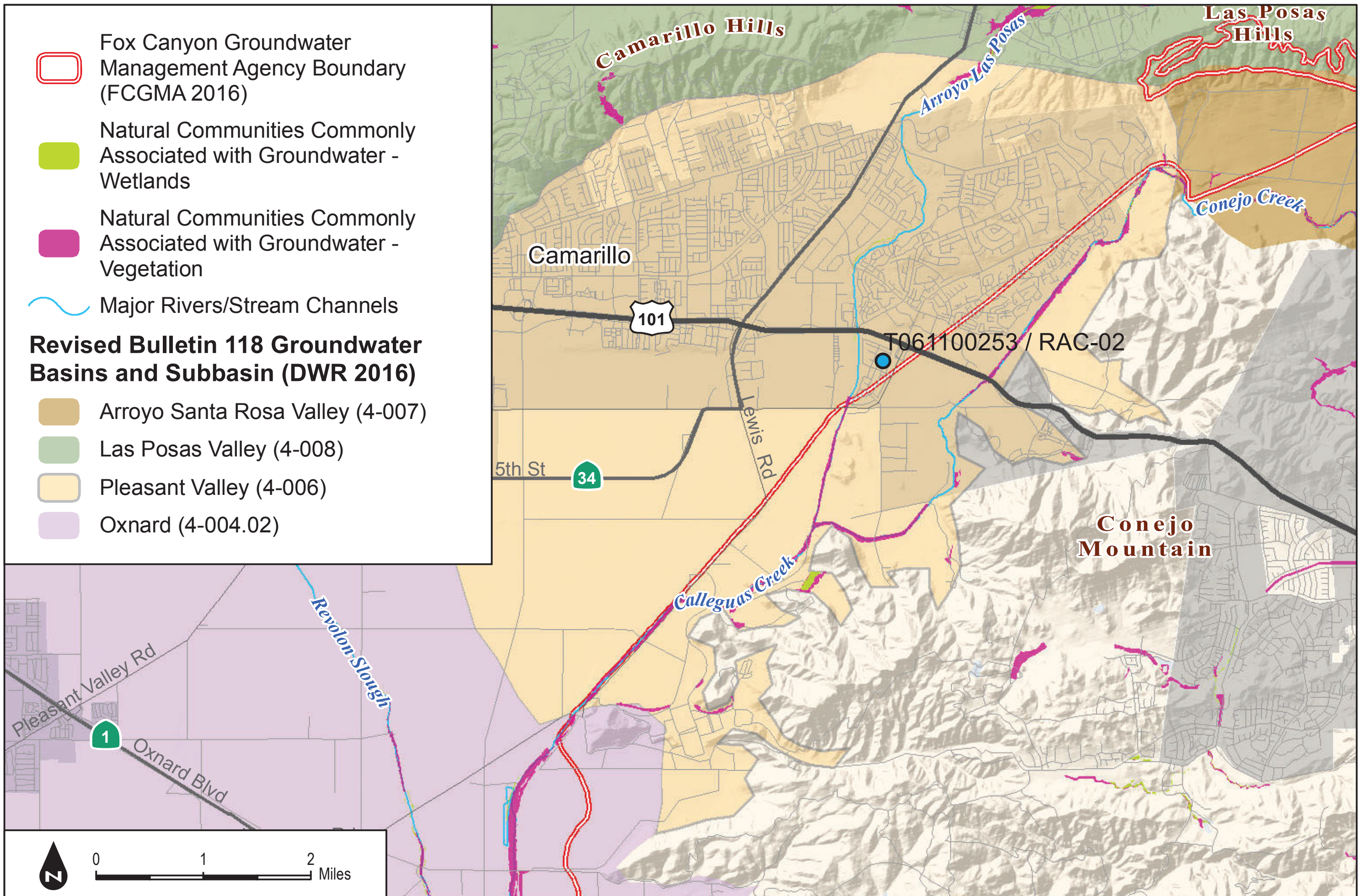

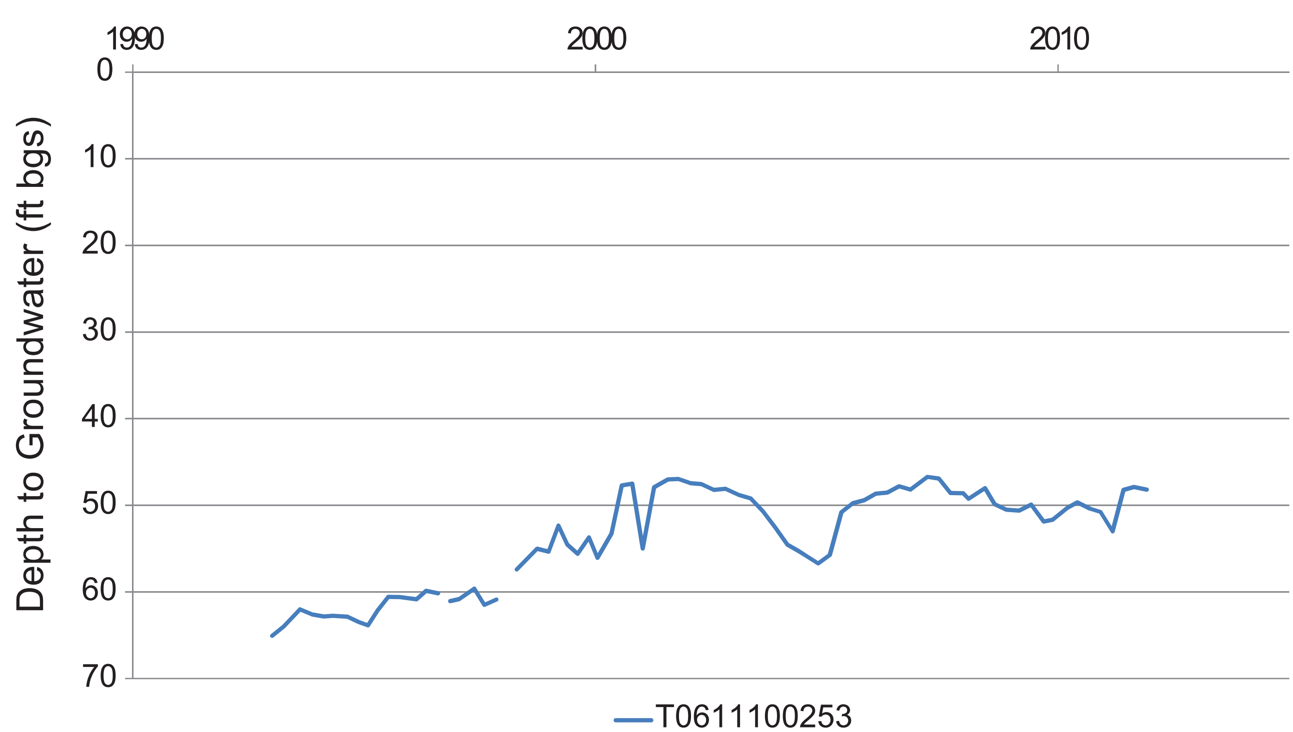

SOURCE: DWR; Ventura County

FIGURE 2-34

Water Level Record for Well Locations Adjacent to Arroyo Las Posas

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Groundwater Sustainability Plan for the Pleasant Valley Basin

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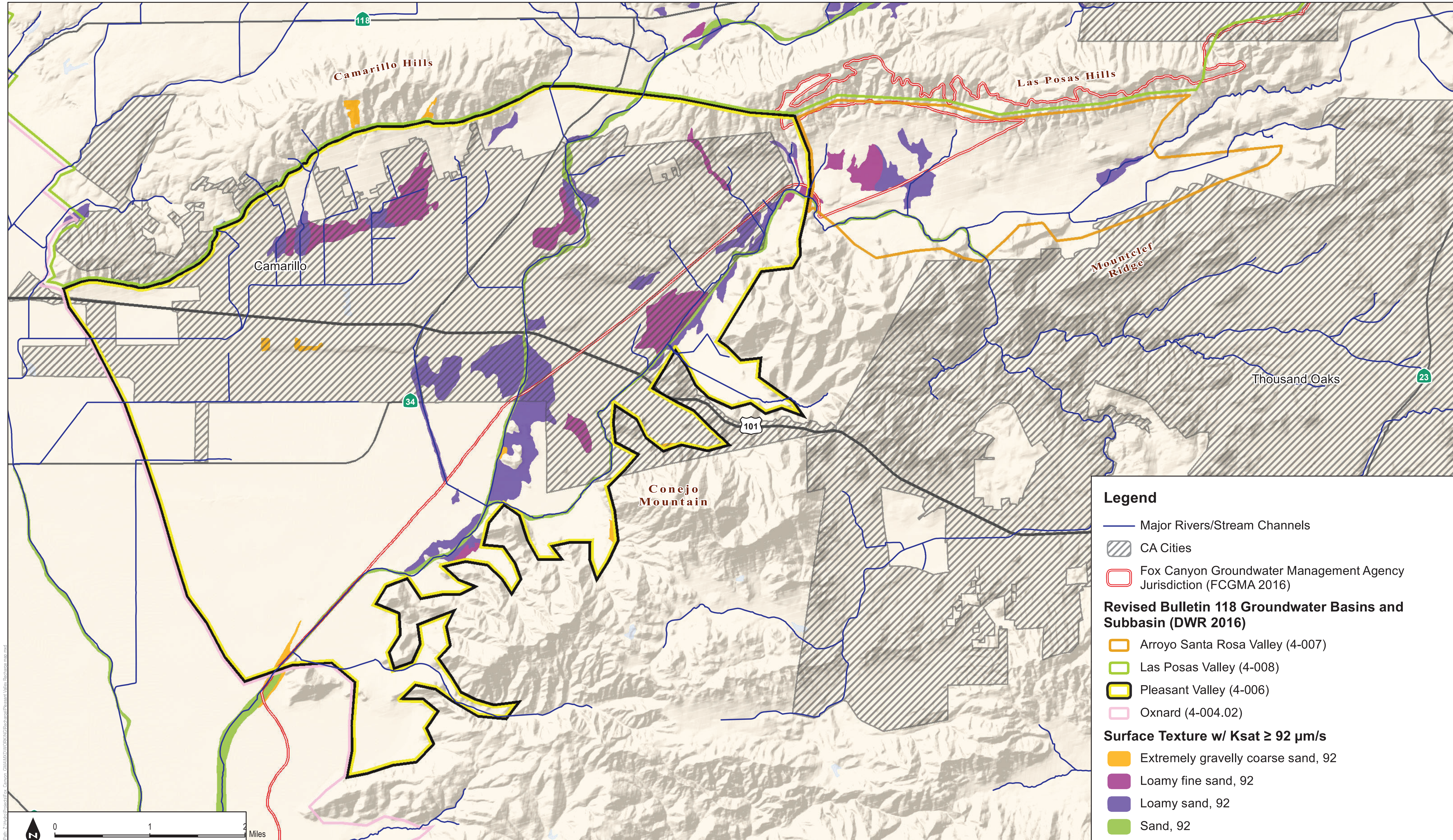

SOURCE: DWR, USGS, NRCS

FIGURE 2-35

Pleasant Valley Potential Recharge Areas

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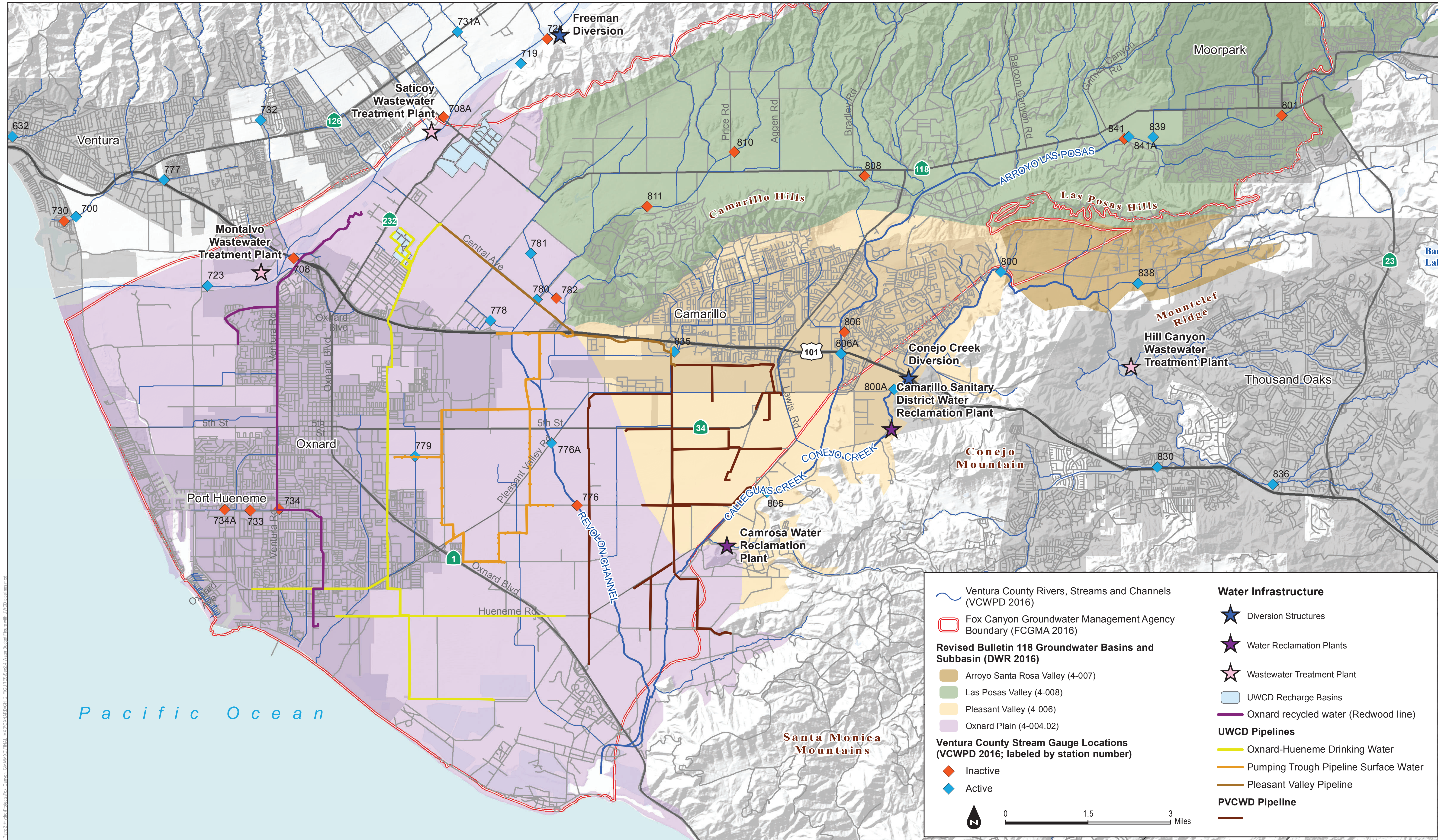

SOURCE: DWR; Ventura County; VCWPD

FIGURE 2-36

Pleasant Valley Basin Stream Gauges and Water Infrastructure

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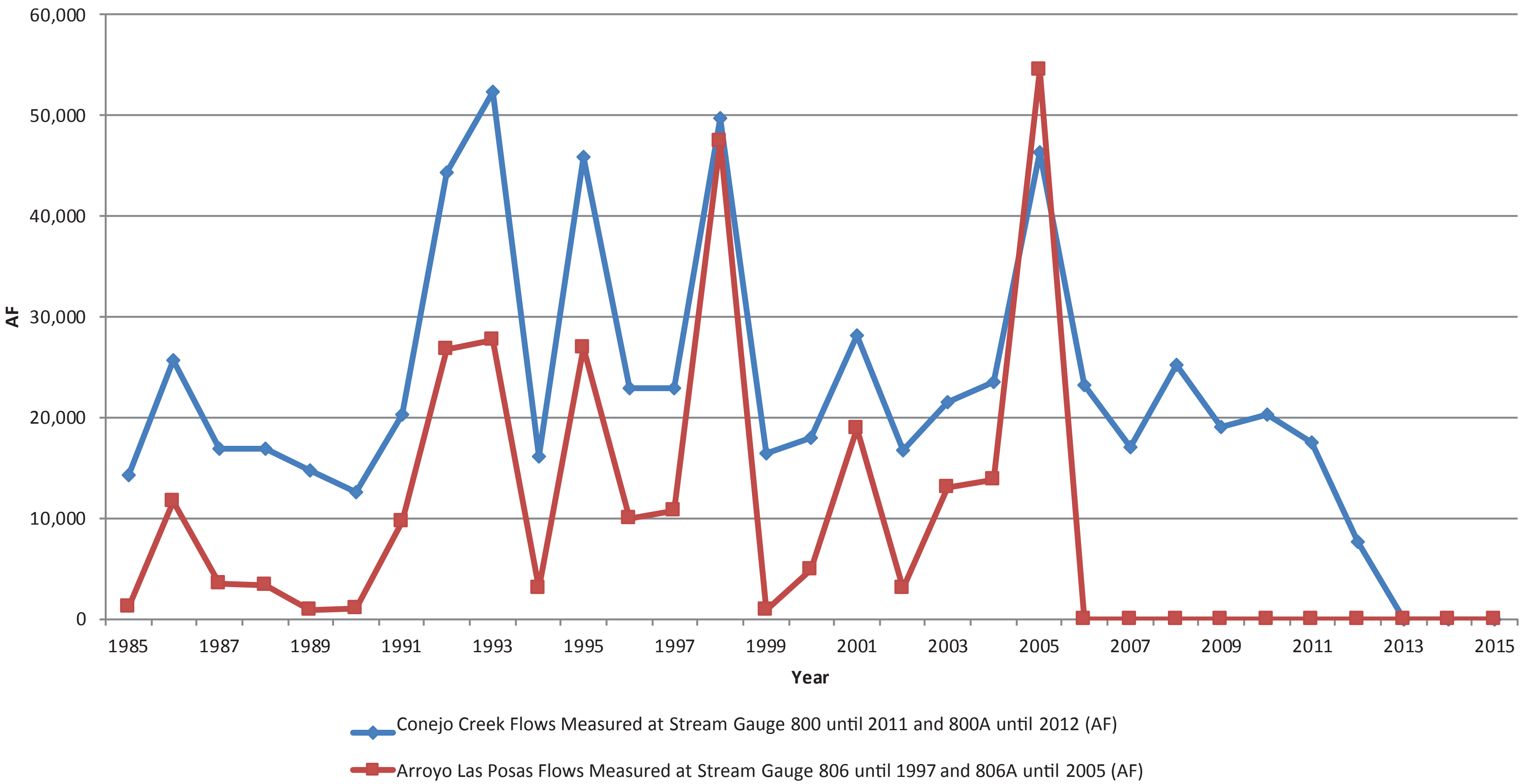

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FIGURE 2-37

Pleasant Valley Basin Stream Flows

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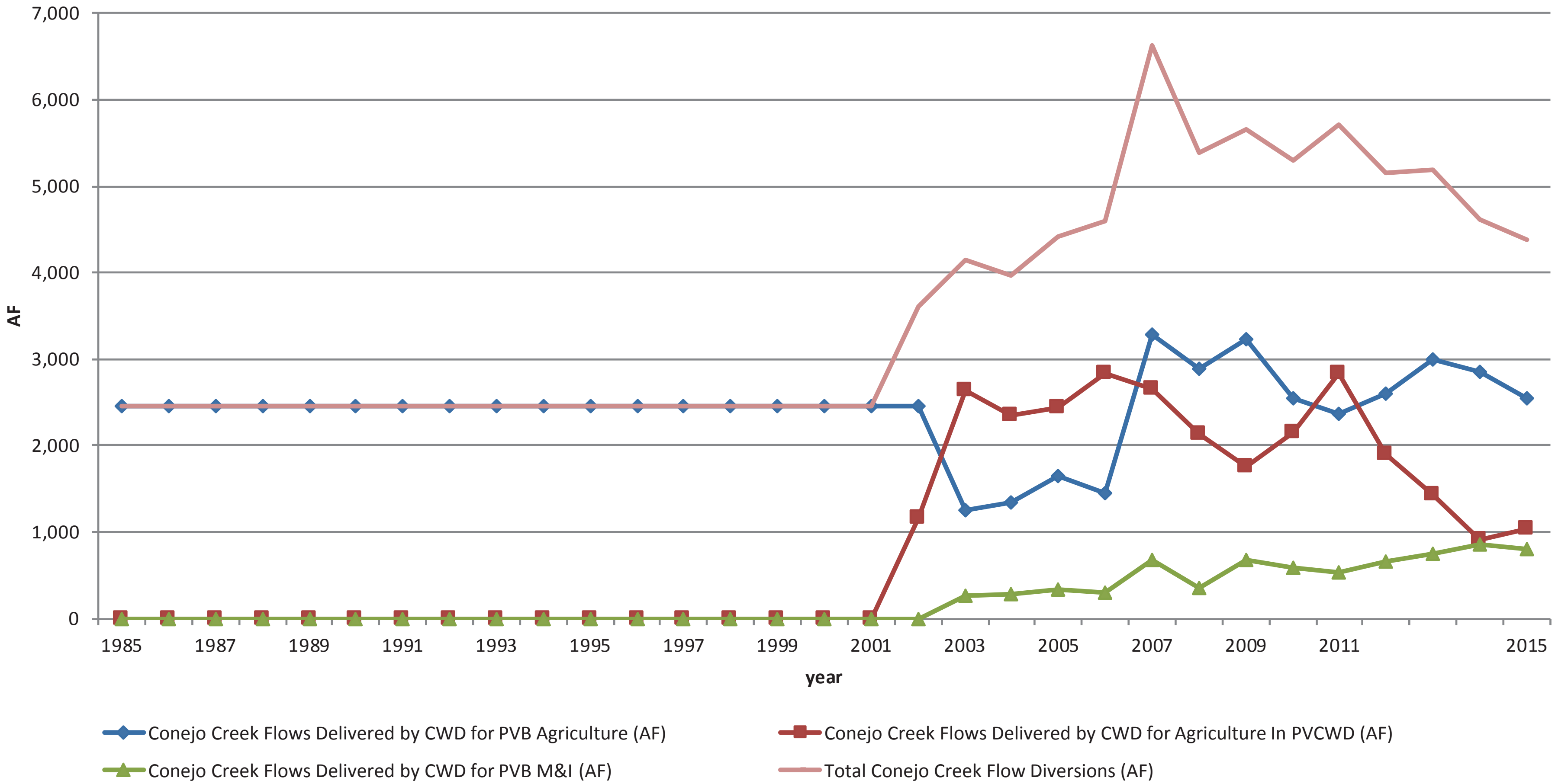

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FIGURE 2-38
Conejo Creek Diversions

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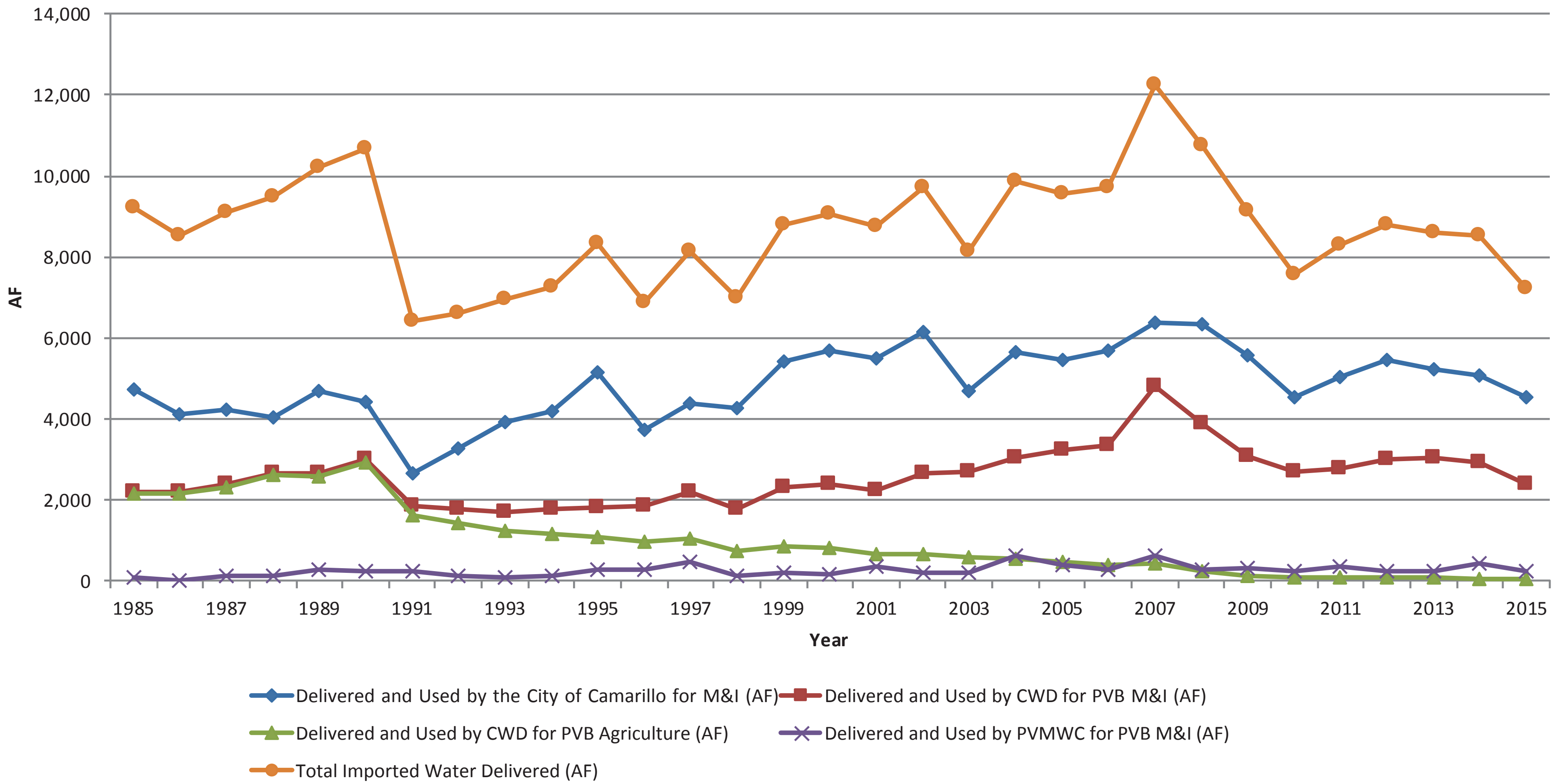

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FIGURE 2-39
Imported Water Deliveries

Groundwater Sustainability Plan for the Pleasant Valley Basin

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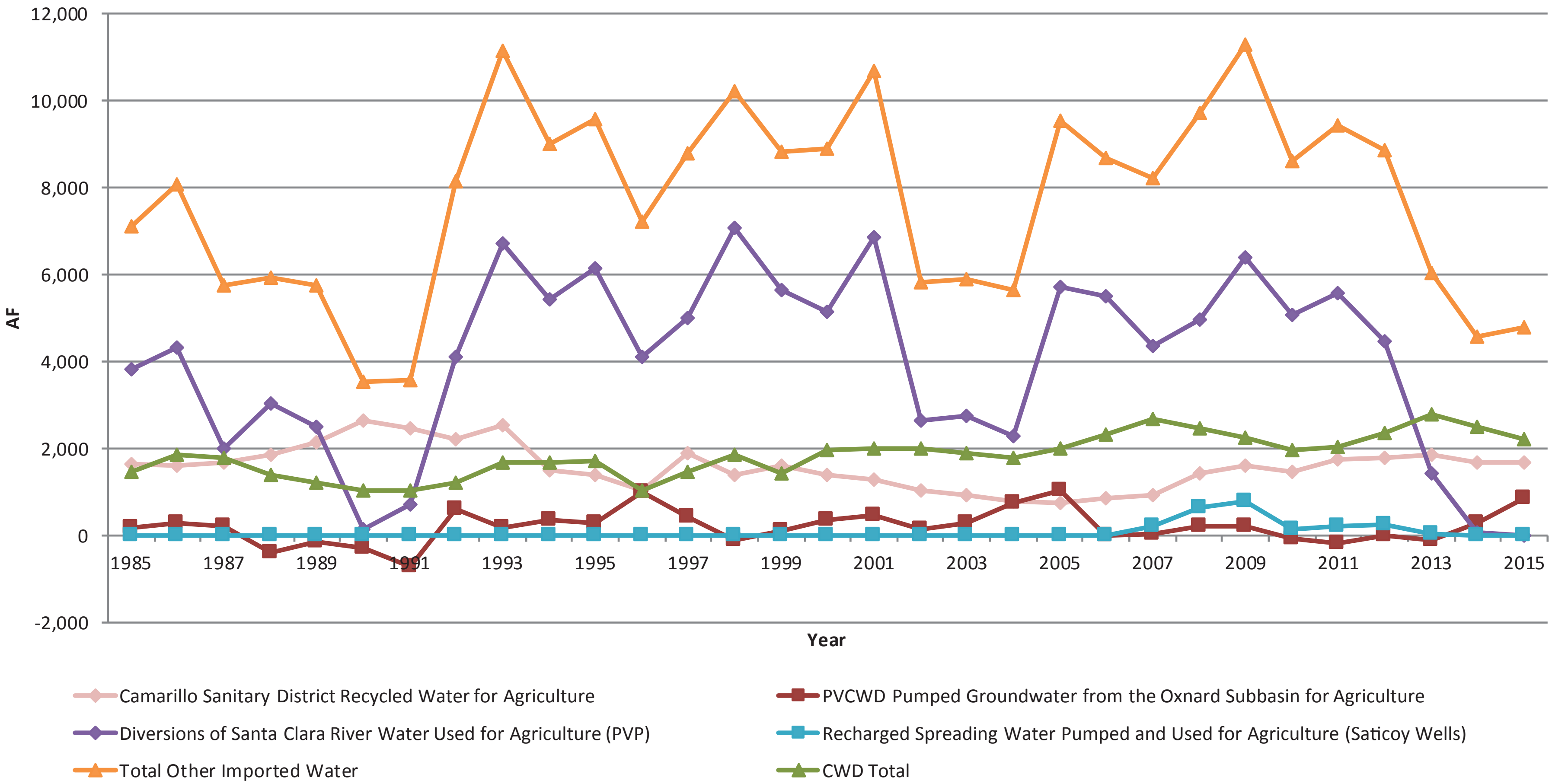

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FIGURE 2-40

Other Water Deliveries

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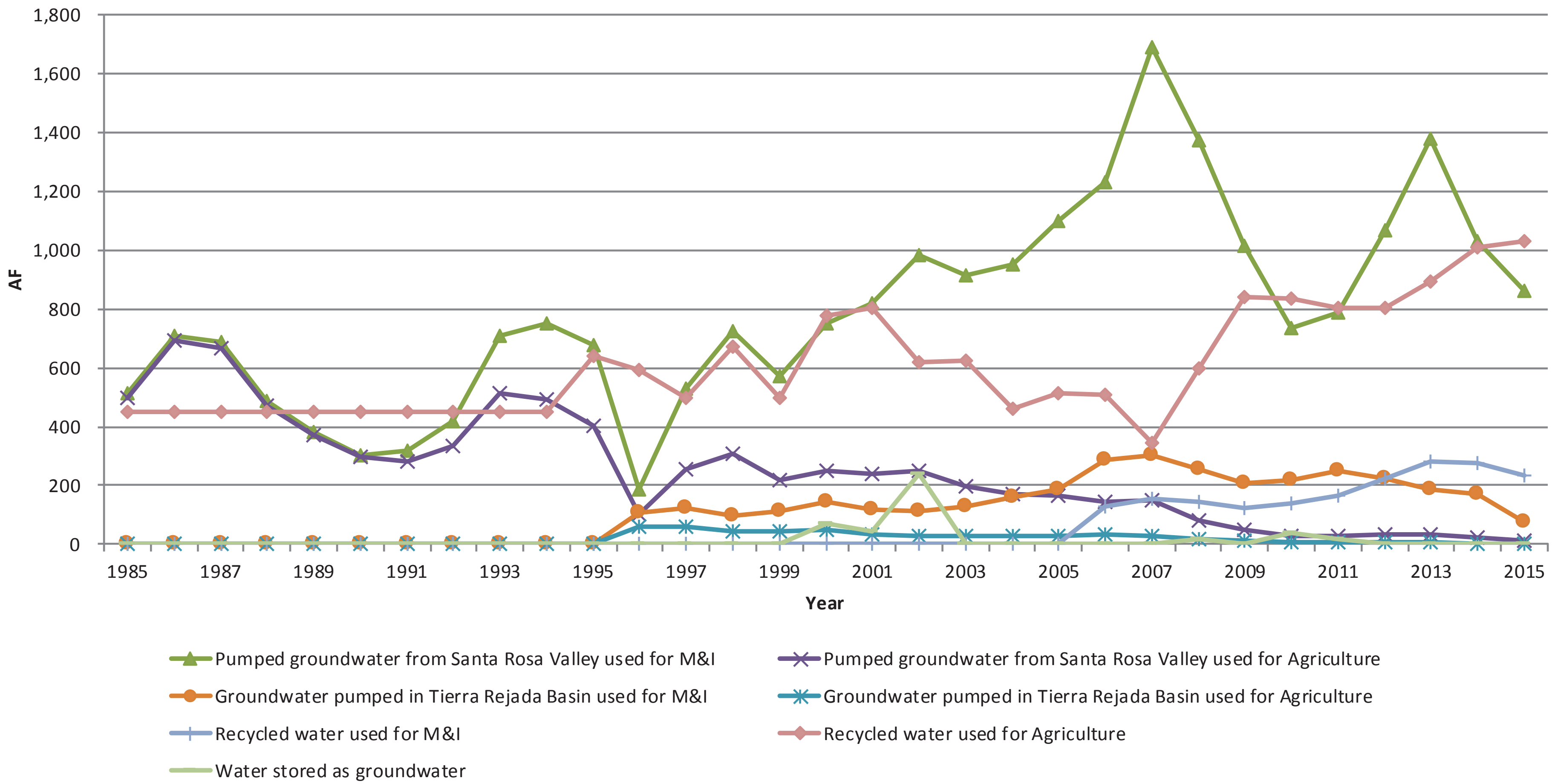

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FIGURE 2-41

Other Camrosa Water District Water Deliveries

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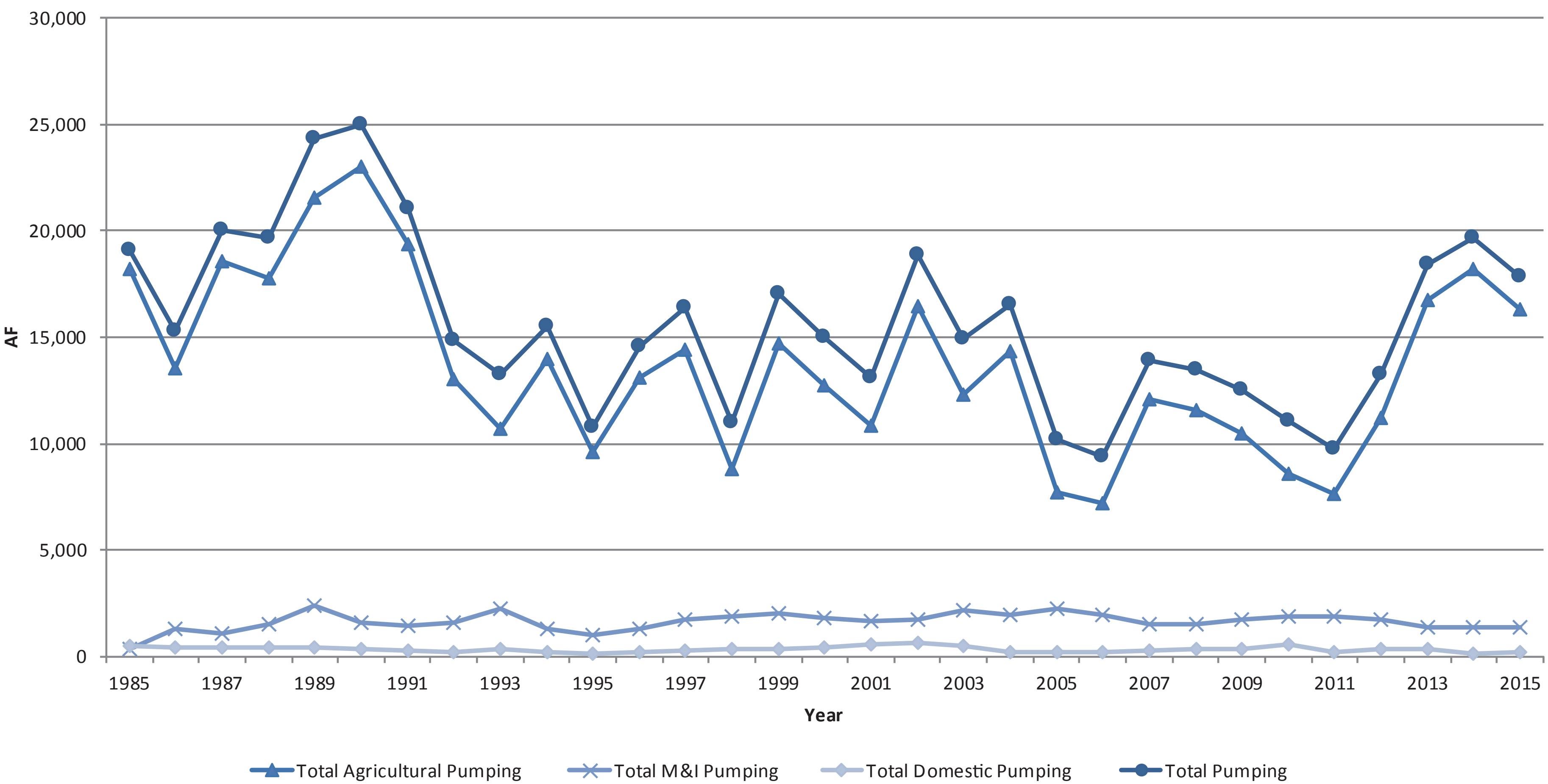

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FIGURE 2-42

Pleasant Valley Basin Groundwater Pumping

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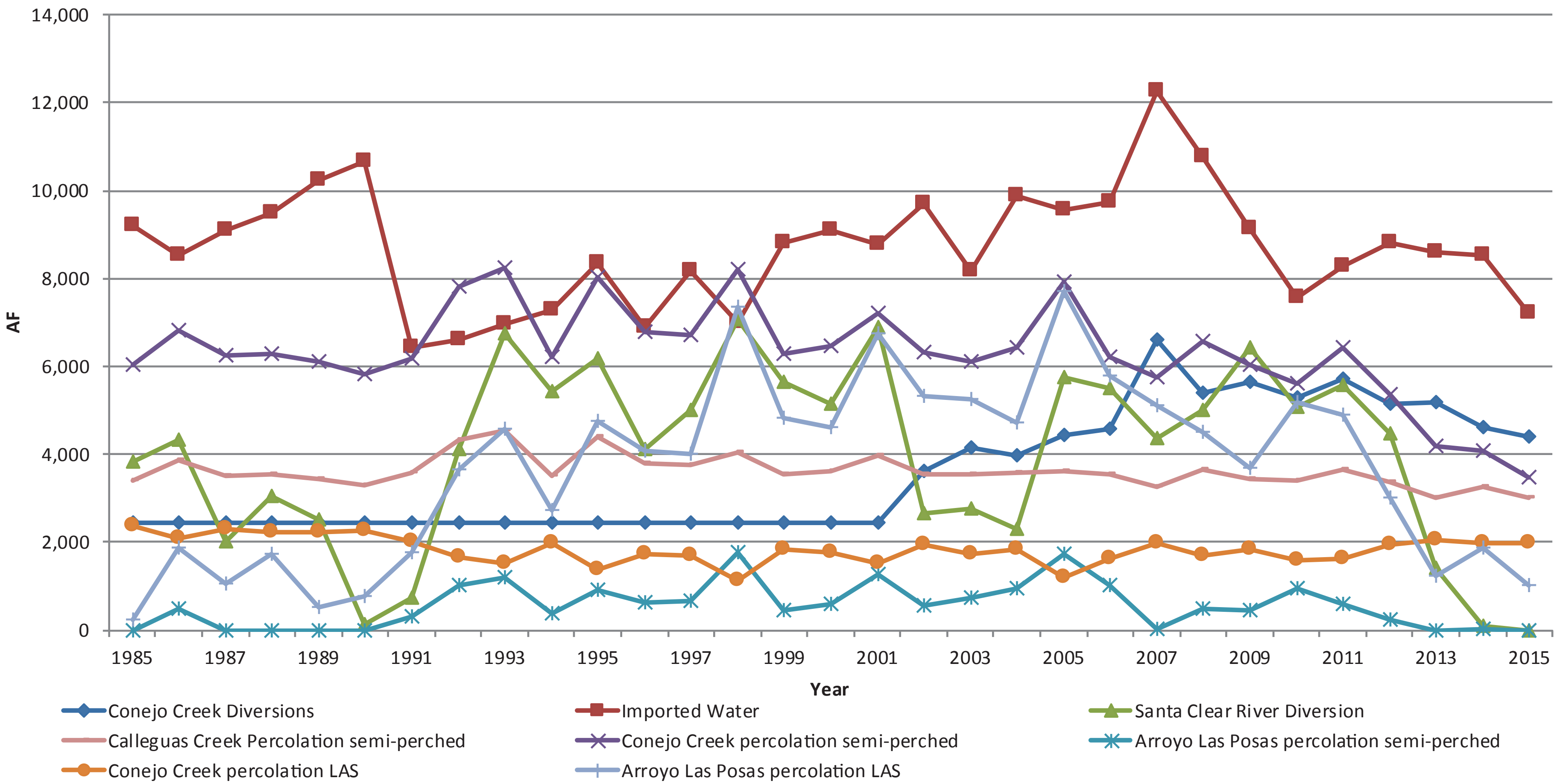

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FIGURE 2-43

Total Pleasant Valley Basin Surface Water Supplies

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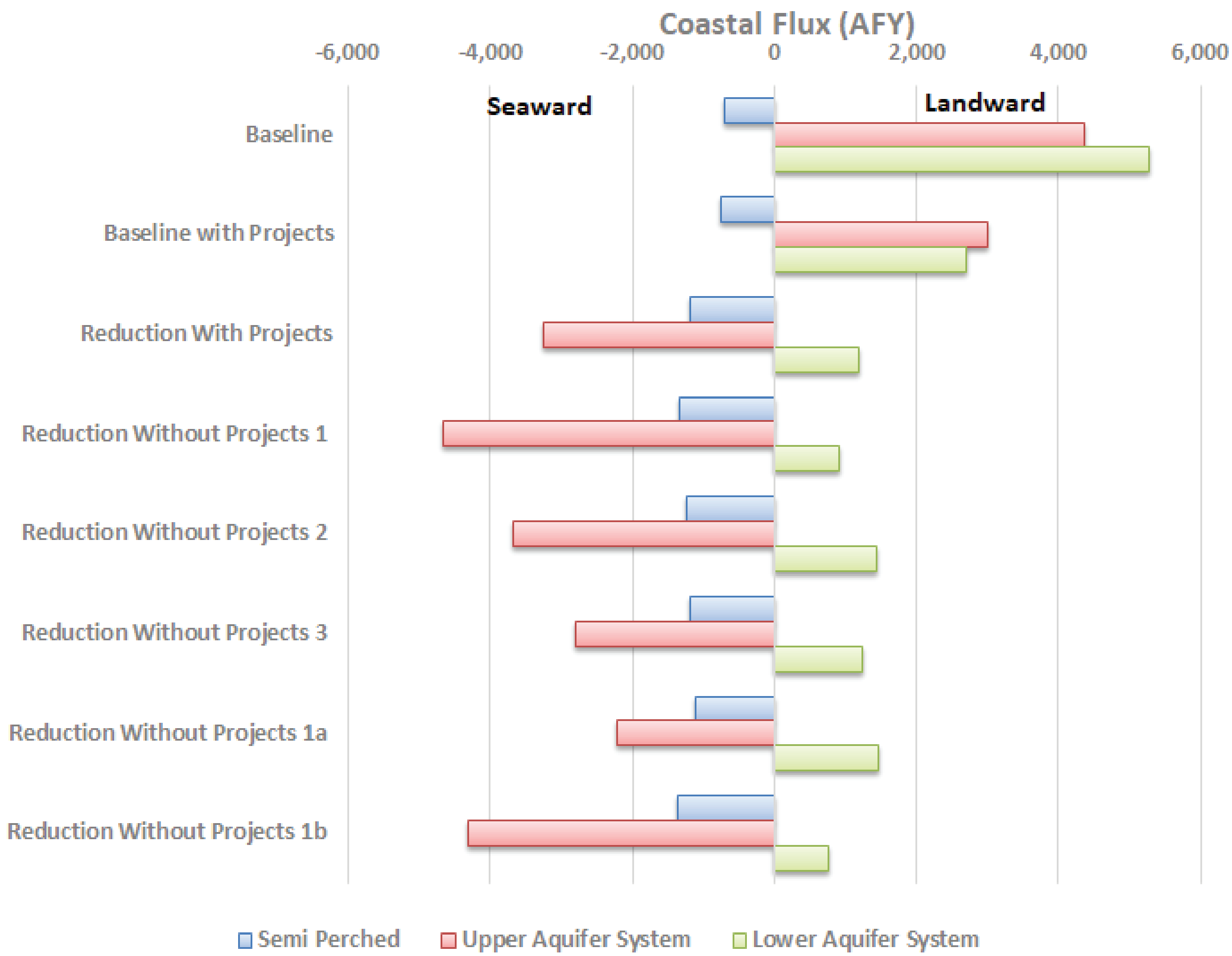

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FIGURE 2-44

Coastal Flux From the UWCD Model Scenarios

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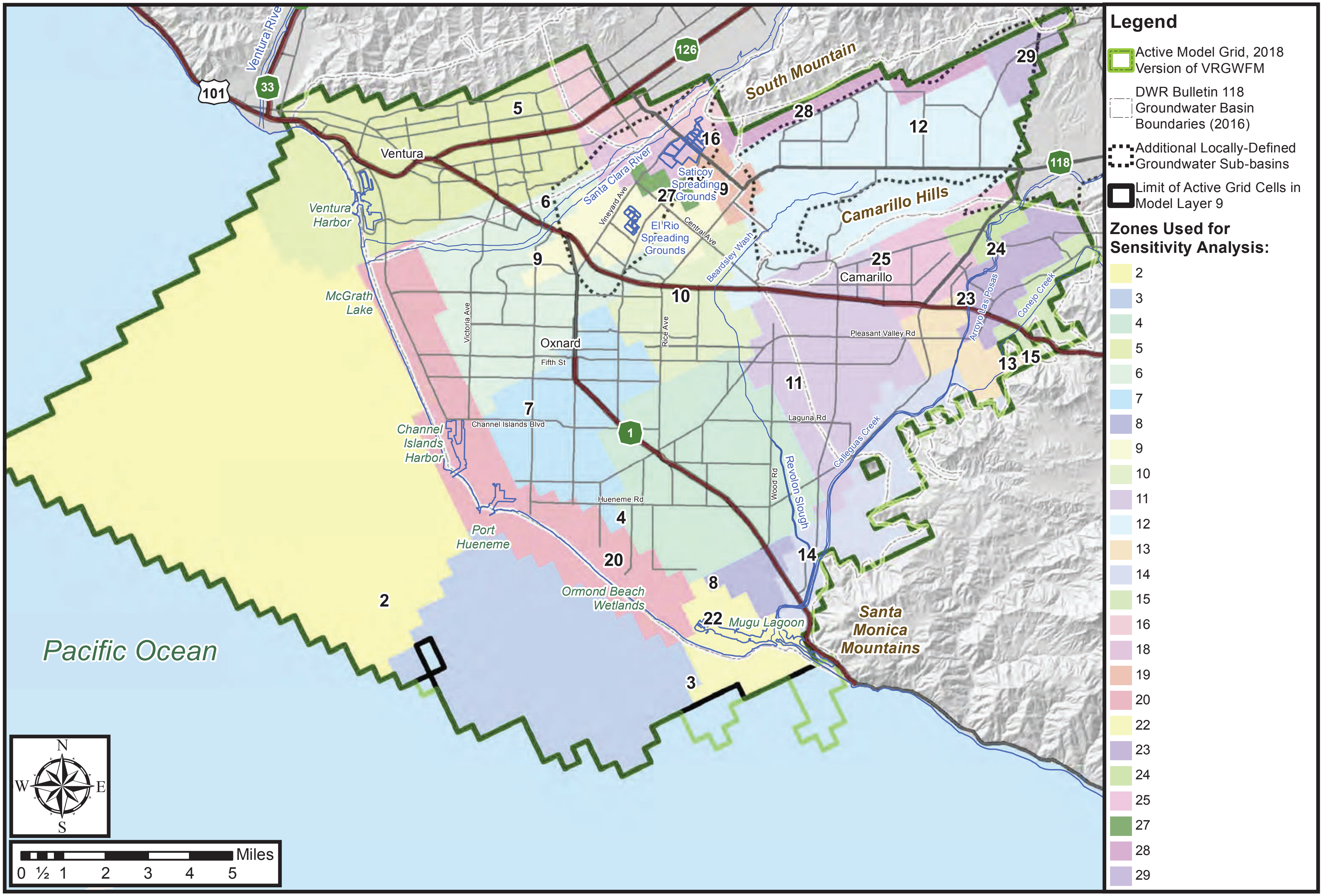

SOURCE: Figure 4-53; UWCD, 2018

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FIGURE 2-45

UWCD Model Zones

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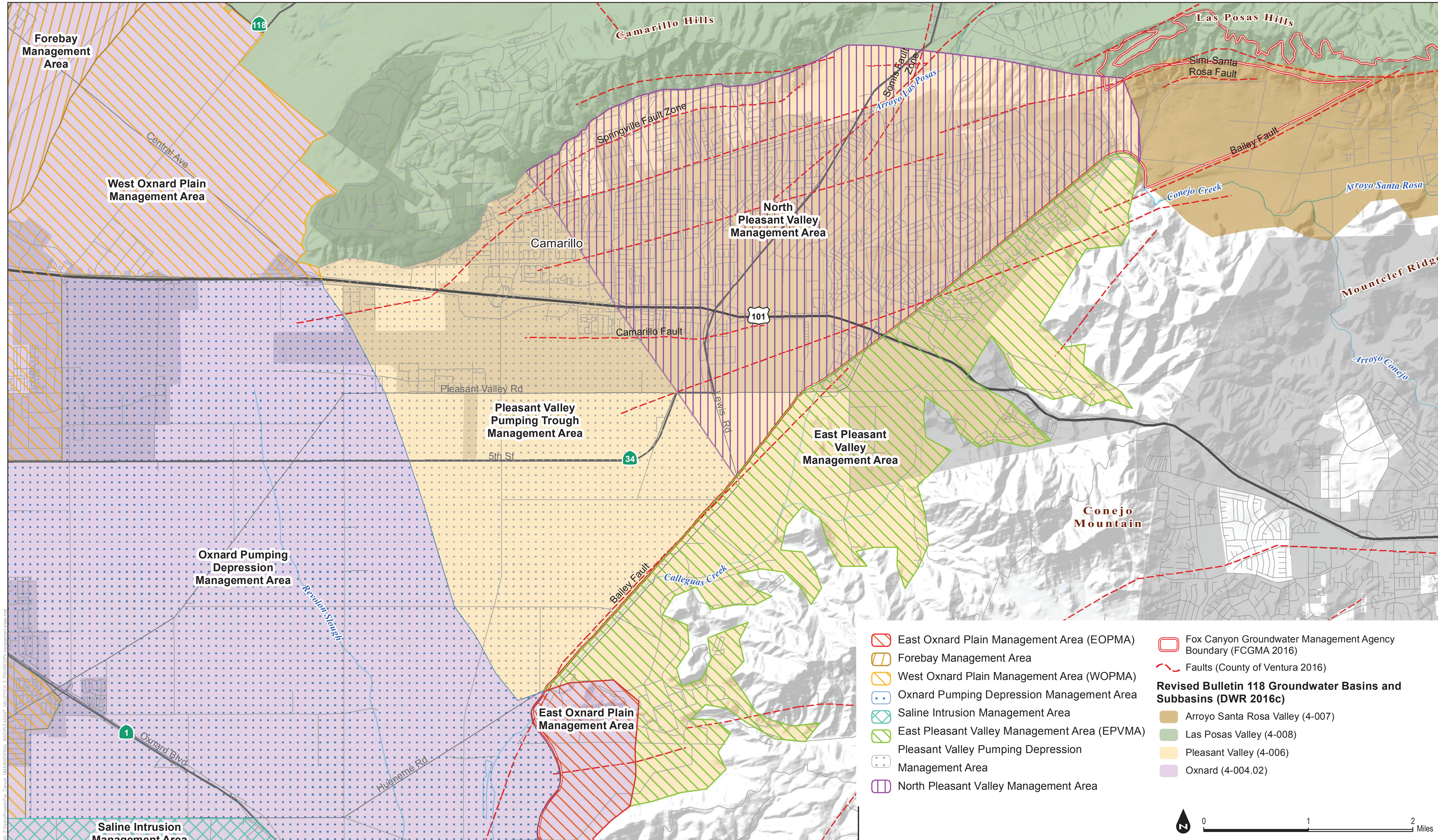

SOURCE: DWR; County of Ventura

FIGURE 2-46

Pleasant Valley Basin Management Areas

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Groundwater Sustainability Plan for the Pleasant Valley Basin

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CHAPTER 3
SUSTAINABLE MANAGEMENT CRITERIA

3.1 INTRODUCTION TO SUSTAINABLE MANAGEMENT CRITERIA

In the Pleasant Valley Basin (PVB), significant and unreasonable chronic declines in groundwater levels, along with a corresponding loss of storage and potential for subsidence due to groundwater withdrawal are the primary undesirable results that can occur when groundwater production exceeds the sustainable yield. Groundwater elevations in the Fox Canyon Aquifer (FCA) declined by more than 50 feet throughout the PVB since the onset of drought in 2011 (Chapter 2, Basin Setting). In order to effectively manage the groundwater resources of the PVB, the PVB has been divided into three management areas (see Section 2.5, Management Areas, Figure 2-46, Pleasant Valley Basin Management Areas). These areas are defined by differences in their hydrogeologic properties, relative influence on the Oxnard Subbasin, groundwater quality, or historical groundwater elevations.

Critically, declines in groundwater elevation in the PVB affect the groundwater gradient across the boundary between the PVB and the Oxnard Subbasin of the Santa Clara River Valley Groundwater Basin (Oxnard Subbasin). Changes to this gradient impact seawater intrusion in the Oxnard Subbasin, which is in hydraulic communication with the PVB (Chapter 2). The boundary between the PVB and the Oxnard Subbasin is not a barrier to flow, but rather is based on a change of lithology in the Upper Aquifer System (UAS) (see Chapter 2). In the Lower Aquifer System (LAS), the FCA and the Grimes Canyon Aquifer are continuous across the boundary. Therefore, although the PVB has not experienced direct seawater intrusion historically, determination of the sustainable management criteria for the PVB is coupled to sustainable management of the Oxnard Subbasin.

On October 28, 2015, the Fox Canyon Groundwater Management Agency (FCGMA) Board of Directors (Board) adopted the following planning goals regarding management of the basins within its jurisdiction (FCGMA 2015):

- Control saline water impact front at its current position.
- Do not allow groundwater quality to further degrade without mitigation.
- No net subsidence due to groundwater withdrawal.
- Promote water levels that mitigate or minimize undesirable results (including pumping trough depressions, surface water connectivity, and chronic lowering of water levels).

These goals, which apply to all basins within FCGMA jurisdiction, guide the definition of undesirable results, minimum thresholds, and measurable objectives in the subsequent sections.

Groundwater elevations are the primary metrics by which progress toward meeting the sustainability goals in the PVB will be measured. Sustainable management of the PVB does not necessarily mean, however, that springtime high groundwater levels in the basin remain the same year over year. Rather sustainability can be achieved over cycles of drought and recovery, so long as the impacts to the basins that may occur during periods of drought are not significant or unreasonable. Thus, year over year, groundwater levels may decline during a drought, but sustainable management will result in groundwater levels—and, by extension, land surface elevations and groundwater in storage—returning to pre-drought levels in the wet years following a drought.

3.2 SUSTAINABILITY GOAL

The primary sustainability goal in the PVB is to maintain a sufficient volume of groundwater in storage in the older alluvium and the LAS so that there is no net decline in groundwater elevation or storage over wet and dry climatic cycles. Further, groundwater levels in the PVB should be maintained at elevations that are high enough to not inhibit the ability of the Oxnard Subbasin to prevent net landward migration of the saline water impact front (see Section 3.3.3, Seawater Intrusion) after 2040.

The sustainability goal for the PVB recognizes the influence of climatic cycles on groundwater elevations over multi-year periods and requires that assessment of undesirable results in the PVB be tied to a time period over which net impacts are measured. This Groundwater Sustainability Plan (GSP) assesses net impacts to the Oxnard Subbasin over both a 50-year period beginning in 2020, and a 30-year period beginning in 2040. Undesirable results may occur in the Subbasin between 2020 and 2039, as progress is made toward sustainable management. By 2040, however, management of the Subbasin should achieve the sustainability goal. The 30-year period from 2040 through 2069 is referred to as the sustaining period in this GSP, as it is the period on which the evaluation of sustainability is based.

Historically, groundwater elevations in the PVB have declined and recovered over climatic cycles, assisted in part by additional recharge to the PVB beginning in the late 1980s and early 1990s (Chapter 2). However, groundwater elevations in the Mugu Aquifer equivalent unit in the older alluvium have been below sea level since 1990 (Figure 2-13, Groundwater Elevation Hydrographs in the Older Alluvium) and groundwater elevations in the FCA have been below sea level throughout much of the PVB since 1975 (Figure 2-16, Groundwater Elevation Hydrographs in the Fox Canyon Aquifer). In order to achieve the sustainability goal, groundwater production from the PVB will need to be reduced relative to historical groundwater production rates so that groundwater elevations in the older alluvium and in the UAS are high enough to allow the Oxnard Subbasin to eliminate net migration of the saline water impact front after 2040. During the first 5 years following GSP adoption, it is anticipated that the combined groundwater production from both the older alluvium and the LAS will begin to be reduced toward the estimated sustainable yield, accounting for the uncertainty assessed in the model water budget and sustainable yield predictions (Section 2.4, Water Budget).

Proposed reductions in groundwater production must take into account the potential economic disruption to the agricultural industry, M&I, and the uncertainty in the estimated sustainable yield of the PVB. The estimated sustainable yield of the PVB is approximately 11,600 acre-feet per year (AFY), with an uncertainty estimate of ±1,200 AFY (see Section 2.4.4, Uncertainties in the Water Budget). The average 2015 groundwater production rate was approximately 13,200 AFY. The difference between the upper estimate of the sustainable yield, 12,600 AFY, and the 2015 production rate is 600 AFY. If production is reduced linearly between 2020 and 2040, the estimated groundwater production reduction necessary throughout the geographic extent of the PVB over the first 5 years is approximately 150 AFY. However, the sustainability goal allows for operational flexibility, as groundwater production patterns are anticipated to change during the GSP implementation period. Progress toward sustainability will be evaluated throughout the 20-year implementation period from 2020 through 2039. The estimated sustainable yield may be revised based progress towards sustainability in PVB and the Oxnard Subbasin.

The following sections describe the undesirable results that have occurred and may occur within the PVB, the minimum thresholds developed to avoid future undesirable results, and the measurable objectives that account for the need to continue groundwater production during drought cycles and the associated interim milestones to help gauge progress toward sustainability over the next 20 years.

3.3 UNDESIRABLE RESULTS

Under the Sustainable Groundwater Management Act (SGMA), undesirable results occur when the effects caused by groundwater conditions occurring throughout the basin cause significant and unreasonable impacts to any of the six sustainability indicators. These sustainability indicators are as follows:

- Chronic lowering of groundwater levels
- Reduction of groundwater storage
- Seawater intrusion
- Degraded water quality
- Land subsidence
- Depletions of interconnected surface water

The definition of what constitutes a significant and unreasonable impact for each sustainability indicator is determined by the Groundwater Sustainability Agency (GSA), which is FCGMA in the PVB, using the processes and criteria set forth in the GSP. Each of the sustainability indicators is discussed below, in the context of undesirable results.

3.3.1 Chronic Lowering of Groundwater Levels

Chronic lowering of groundwater levels resulting in a significant and unreasonable depletion of supply is an undesirable result applicable to the PVB. Chronic lowering of groundwater levels in the PVB is also associated with depletion of groundwater in storage, degradation of groundwater quality, and subsidence. Depletion of groundwater in storage will occur in the PVB if groundwater production exceeds the natural and artificial recharge over a multi-year period that includes both wetter than average and drier than average conditions. Degradation of groundwater quality may occur in the PVB if water levels fall below threshold elevations that maintain sufficient hydrostatic pressure to prevent upwelling of brines along the Bailey Fault and from the geologic formations underlying the PVB. Subsidence can occur in the PVB if groundwater elevations fall below historical low water levels for a sufficient time to allow collapse of the pore structure and settling of geologic formations.

Direct seawater intrusion is not a concern in the PVB (see Section 3.3.3); however, groundwater elevations in the PVB impact groundwater elevations in the Oxnard Subbasin to the west. Consequently, chronic lowering of groundwater levels in the PVB has the potential to exacerbate seawater intrusion in the Oxnard Subbasin and may inhibit the ability of the Oxnard Subbasin to prevent net landward migration of the saline water impact front after 2040. This potential is greatest in the Pleasant Valley Pumping Depression Management Area (PVPDMA), which is adjacent to the Oxnard Subbasin. Declines in groundwater elevation in the eastern part of the North Pleasant Valley Management Area (NPVMA) are less likely to influence seawater intrusion in the Oxnard Subbasin.

The primary cause of groundwater conditions in the PVB that would lead to chronic lowering of groundwater levels is groundwater production in excess of natural and artificial recharge. Groundwater production from the PVB would result in significant and unreasonable lowering of groundwater levels if the groundwater levels were lowered to an elevation below which:

- Groundwater levels do not recover to pre-drought conditions during multi-year periods of above-average precipitation that follow a drought.
- The Oxnard Subbasin is unable to prevent net landward migration of the saline water impact front after 2040.
- The brine migration along the Bailey Fault and from underlying formations is measurably increased.
- Subsidence that substantially interferes with surface land uses is induced.

Of these criteria, chronic lowering of groundwater levels and impacting the landward migration of the saline water impact front are the most likely to occur in the PVB. Historically, the PVB has not experienced subsidence that substantially interfered with surface land uses, and no direct correlation between groundwater elevation and brine concentration has been established.

Groundwater elevations have created low-pressure conditions that have the potential to promote the migration of brines along faults and the upwelling of brines from deeper formations (FCGMA 2007; UWCD 2016).

Historically, groundwater elevations in the PVB have recovered over climate cycles (Section 2.3, Groundwater Conditions). Some of this recovery, however, is related to increased recharge to the PVB since 1990 (see Chapter 2). Since 2010, groundwater elevations in several wells have declined in response to the combined influences of reduced groundwater flow across the boundary with the East Las Posas Management Area (ELPMA), drought, and groundwater production. Continued groundwater production at the current rates may not allow groundwater elevations to recover after the drought, because recharge from the ELPMA has been reduced since 2006 (see Section 2.4).

Additionally, PVB groundwater elevations below sea level in the LAS have impacted groundwater elevations in the LAS in the Oxnard Subbasin where net seawater intrusion has occurred over climate cycles of drought and recovery. In October 2015, groundwater elevations in the FCA in the western part of the PVB adjacent to the Oxnard Subbasin ranged from −125.12 to −117.51 feet above mean sea level (msl) (Figure 2-15, Groundwater Elevation Contours in the Fox Canyon Aquifer, October 2–29, 2015; Section 2.3.1.3, Fox Canyon Aquifer). These elevations are lower than groundwater elevations in the FCA at the coast in the Oxnard Subbasin, which is currently experiencing seawater intrusion. Groundwater elevations in Well 01N21W03C01, in PVB, have been below sea level since they were first measured in the 1970s, corresponding to the time during which seawater intrusion was first detected in the LAS Oxnard Subbasin. Because groundwater elevations in both the older alluvium and the LAS have been below sea level historically, are currently lower than groundwater elevations at coastal wells in the Oxnard Subbasin, and are not separated from the aquifers of the Oxnard Subbasin by subsurface barriers to flow, the current groundwater elevations are contributing to seawater intrusion in the Oxnard Subbasin. Furthermore, groundwater elevations in the Oxnard Subbasin are currently too low to prevent seawater intrusion (FCGMA 2019). The minimum thresholds to prevent seawater intrusion in the Oxnard Subbasin are 10 to 100 feet higher than the groundwater elevations measured in 2015. Consequently, groundwater elevations in the PVB that will allow the Oxnard Subbasin to control seawater intrusion must also be higher than the October 2015 groundwater elevations. Therefore, the minimum thresholds for the PVB are directly tied to the undesirable results in the Oxnard Subbasin.

Based on the FCGMA sustainability goals for the coordinated management of the PVB and the Oxnard Subbasin, the criteria used to define undesirable results for chronic lowering of groundwater levels in the PVPDMA and the western part of the NPVMA are groundwater levels that indicate a long-term decline over periods of drought and recovery, and net landward migration of the 2015 saline water impact front after 2040. It is expected that there will be some landward migration of this front between 2020 and 2040 as the FCGMA Board and stakeholders undertake the necessary projects and management actions toward achieving sustainability in 2040. The minimum thresholds metric against which chronic lowering of groundwater levels will be measured is groundwater levels that were selected to prevent net landward migration of the 2015 saline water impact front, and net seawater intrusion over the 30-year sustaining period from 2040 through 2069. These groundwater elevations are higher than previous historical low water levels, many of which were measured in the fall of 2015 (Table 3-1; Figures 3-1 through 3-5, Minimum Thresholds and Groundwater Elevation Contours).

The criterion used to define undesirable results for chronic lowering of groundwater levels in the eastern part of the NPVMA is groundwater levels that indicate a long-term decline over periods of drought and recovery. The minimum thresholds metric against which chronic lowering of groundwater levels will be measured is groundwater levels from which complete recovery can be achieved over anticipated periods of drought and above average precipitation.

Groundwater elevations within each management area will be used to determine whether significant and unreasonable chronic lowering of groundwater levels is occurring and affecting the Oxnard Subbasin. All of the management areas except the East Pleasant Valley Management Area (EPVMA) have wells in which water levels can be monitored. Until a monitoring well is installed in the EPVMA, the water level thresholds set for the wells closest to the EPVMA are presumed to be protective for the EPVMA, which has considerably less groundwater production than the adjoining management areas. This presumption will be revisited as groundwater elevation data are collected from the EPVMA.

Chronic lowering of groundwater levels in the PVB has the potential to impact the beneficial uses and users of groundwater in the PVB and the adjacent Oxnard Subbasin by (1) exacerbating seawater intrusion in the Oxnard Subbasin, (2) reducing the volume of freshwater in storage, and (3) causing groundwater levels to drop below current well screens.

3.3.2 Reduction of Groundwater Storage

Reduction of groundwater storage resulting in a significant and unreasonable depletion of supply is an undesirable result applicable to the PVB. Reduction of groundwater storage in the PVB is also associated with chronic lowering of groundwater levels, degradation of groundwater quality, and subsidence. Additionally, because reduction of groundwater storage in the PVB is correlated with declines in groundwater elevations, reduction in groundwater storage in the PVB has the potential to exacerbate seawater intrusion in the Oxnard Subbasin and may inhibit the ability of the Oxnard Subbasin to prevent net landward migration of the 2015 saline water impact front after 2040. Landward migration will occur in the Oxnard Subbasin if groundwater levels in the PVB fall below threshold levels that maintain sufficient hydrostatic pressure to keep seawater from moving landward. The threshold groundwater levels differ between the older alluvium and the LAS, as well as with geographic location in the PVB.

The primary cause of groundwater conditions in the PVB that would lead to reduction in groundwater storage is groundwater production in excess of recharge over cycles of drought and recovery. Groundwater production from the PVB may result in a significant and unreasonable reduction of groundwater in storage if the volume of water produced from the basin exceeds the volume of freshwater recharging the basin over a cycle of drought and recovery. Changes in groundwater in storage can be tracked using groundwater elevations and would become significant and unreasonable if (1) groundwater levels were lowered to an elevation below which they could not recover during a multi-year period of above-average precipitation or (2) groundwater levels in the PVB were lowered to elevations below which the Oxnard Subbasin would experience net seawater intrusion in the UAS and LAS over cycles of drought and recovery from 2040 through 2069.

Numerical model groundwater model simulations indicate that since 1985 the volume of groundwater in storage has increased in the older alluvium and the LAS (Section 2.3.2, Estimated Change in Storage; UWCD 2018). This overall increase reflects rising groundwater levels between water years 1991 and 2006 (Figure 2-18, Cumulative Change in Storage). These water levels are independent of water year type because they were driven by increased recharge as perennial flow from wastewater treatment plant (WWTP) discharge and dewatering wells in Simi Valley reached the PVB. As these flows were diminished, groundwater production exceeded recharge in the PVB and the quantity of groundwater in storage decreased. Between water year 2006 and 2015, the older alluvium lost an average of 2,200 AFY from storage and the LAS lost an average of 670 AFY. The rate of storage loss increased during the drought beginning in 2011.

Based on the sustainability goals for the PVB, the criteria used to define undesirable results for reduction in groundwater storage are groundwater levels that indicate a long-term decline over periods of drought and recovery, and landward migration of the 2015 saline water impact front in the Oxnard Subbasin after 2040. The minimum thresholds metric against which reduction in groundwater storage will be measured in the PVPDMA and the western part of the NPVMA is water levels that were selected to prevent net landward migration of the 2015 saline water impact front, and net seawater intrusion after 2040. These groundwater elevations are higher than previous historical low water levels (Table 3-1). The minimum thresholds metric against which reduction in groundwater storage will be measured in the eastern part of the NPVMA is a groundwater level that allows for complete recovery during multi-year periods of above-average precipitation that follow a drought.

Groundwater elevations within each management area of the PVB will be used to determine whether significant and unreasonable reduction of groundwater in storage is occurring. All of the management areas except the EPVMA have wells in which water levels can be monitored. Until a monitoring well is installed in the EPVMA, the water level thresholds set for the wells closest to the EPVMA are presumed to be protective for the EPVMA, which has considerably less groundwater production than the adjoining management areas. This presumption will be revisited as groundwater elevation data are collected from the EPVMA.

Reduction of groundwater storage has the potential to impact the beneficial uses and users of groundwater in the PVB by limiting the volume of groundwater available for agricultural, municipal, industrial, and domestic use. These impacts will affect all users of groundwater in the PVB.

3.3.3 Seawater Intrusion

Seawater intrusion resulting in a significant and unreasonable depletion of supply is not an undesirable result that applies to the PVB. Direct seawater intrusion has not occurred historically in the PVB. Seawater intrusion has impacted the Oxnard Subbasin, which is adjacent to and in hydraulic communication with the PVB. Currently, the area of the Oxnard Subbasin impacted by concentrations of chloride greater than 500 milligrams per liter (mg/L) is generally west of Highway 1 and south of Hueneme Road. Sources of water high in chloride in the Oxnard Subbasin include modern seawater as well as non-marine brines and connate water in fine-grained sediments. Therefore, this area is referred to as the "saline water impact area," rather than the "seawater intrusion impact area," to reflect all the potential sources of chloride to the aquifers in this area.

Because the PVB and the Oxnard Subbasin are in hydraulic communication, it is theoretically possible for seawater intrusion to impact the PVB. However, particle tracks from groundwater model simulations that continue the present groundwater production rates in the PVB and the Oxnard Subbasin over the next 50 years suggest that the current extent of the saline water impact front will not progress farther east than Wood Road in the southeastern part of the Oxnard Subbasin (FCGMA 2019). This is still approximately 2.5 miles southwest of the boundary between the PVB and the Oxnard Subbasin. Additionally, FCGMA is the GSA for both the Oxnard Subbasin and the PVB and has the authority to manage groundwater flows between the Oxnard Subbasin and the PVB to prevent the net landward migration of the 2015 saline water impact front. Therefore, seawater intrusion is unlikely to occur in the PVB in the future. Because seawater intrusion has not occurred historically in the PVB and is not likely to occur in the PVB in the future, specific criteria for undesirable results related to seawater intrusion are not established in this GSP.

3.3.4 Degraded Water Quality

3.3.4.1 Chloride and TDS

Degraded water quality resulting in a significant and unreasonable depletion of supply is an undesirable result applicable to the PVB. Increases in chloride and total dissolved solids (TDS) have been observed in the northern part of the NPVMA, adjacent to the ELPMA, where perennial flows of WWTP and shallow dewatering well discharge along Arroyo Simi–Las Posas have flowed into the PVB both as subsurface recharge in the Shallow Alluvial Aquifer and at times as surface water flow in the Arroyo Simi–Las Posas. Additionally, parts of the PVPDMA have experienced increases in chloride and TDS associated with upward migration of brines from deeper geologic formations (USGS 1996; UWCD 2016).

Degradation of groundwater quality from increased concentrations of chloride and TDS has the potential to impact the beneficial uses and users of groundwater in the PVB by (1) limiting the volume of groundwater available for agricultural, municipal, industrial, and domestic use or (2) requiring construction of treatment facilities to remove the constituents of concern. Existing groundwater quality in the NPVMA has already impaired municipal use by the City of Camarillo (City of Camarillo 2015).

The primary causes of groundwater conditions in the PVB that would lead to degradation of water quality from increased concentrations of TDS and chloride vary geographically within the PVB. In the northern part of the NPVMA, ongoing subsurface inflows from the Las Posas Valley Basin are the primary cause of degradation of water quality. Groundwater production from the NPVMA may result in a significant and unreasonable degradation of water quality if the groundwater gradient causes expansion of the currently impacted area into areas that were not previously impacted, thereby limiting agricultural and potable use.

In the PVPDMA, lowered groundwater elevations from groundwater production may influence the rate of brine migration from underlying formations and along the Bailey Fault. To date, however, no causal effect between groundwater production and chloride concentrations has been established in the PVPDMA. Groundwater production from the PVPDMA may result in a significant and unreasonable degradation of water quality if areas that have not previously been impacted become impacted by chloride and TDS concentrations that limit agricultural and potable use.

Based on the sustainability goals for the PVB, the criteria used to define undesirable results for degraded water quality in the PVPDMA and the NPVMA are groundwater elevations that indicate a long-term decline over periods of drought and recovery, and groundwater elevations in the PVB that impact landward migration of the 2015 saline water impact front in the Oxnard Subbasin after 2040. The minimum thresholds metric against which degradation of water quality will be measured is groundwater levels that were selected to accomplish these dual goals. These groundwater elevations are equal to, or higher than, previous historical low water levels (Table 3-1).

Water quality will continue to be monitored over the next 5 years. As additional data are collected, the effectiveness of applying a water level threshold to groundwater quality degradation will continue to be assessed.

Sustainable groundwater management of the PVB will mitigate or minimize the undesirable result of degraded water quality from migration of brackish water or brines related to groundwater production. The relationship between groundwater quality impacts from flows along Arroyo Simi–Las Posas that originate outside of the PVB and groundwater production within the PVB is not well established. This constitutes a data gap that will be evaluated over the next 5 years.

3.3.4.2 Nitrate, Sulfate, and Boron

Concentrations of nitrate, sulfate, and boron are above the Water Quality Objectives in some wells in the PVB; however, these concentrations are not caused by groundwater conditions occurring throughout the PVB. Rather, these concentrations reflect the influence of past land use practices in both the PVB and adjacent basins, as well as surface water flows to Arroyo Simi–Las Posas and Conejo Creek upstream of the PVB boundary.

Degradation of groundwater quality from increased concentrations of nitrate, sulfate, and boron has the potential to impact the beneficial uses and users of groundwater in the basin by (1) limiting the volume of groundwater available for agricultural, municipal, industrial, and domestic use or (2) requiring construction of treatment facilities to remove the constituents of concern. Existing groundwater quality in the northern part of the NPVMA has already impaired municipal use by the City of Camarillo (City of Camarillo 2015).

The primary cause of groundwater conditions in the PVB that would lead to degradation of water quality from increased concentrations of nitrate, sulfate, and boron is ongoing subsurface inflows from the Las Posas Valley Basin. Groundwater production from the NPVMA may result in a significant and unreasonable degradation of water quality if areas that have not previously been impacted become impacted by nitrate, sulfate, and boron concentrations that limit agricultural and potable use.

Based on the sustainability goals for the PVB, the criteria used to define undesirable results for degraded water quality from nitrate, sulfate, and boron are groundwater elevations that indicate a long-term decline over periods of drought and recovery, and landward migration of the 2015 saline water impact front in the Oxnard Subbasin after 2040. The minimum thresholds metric against which degradation of water quality will be measured is groundwater levels that were selected to prevent long-term declines over periods of drought and recovery. These groundwater elevations are equal to, or higher than, previous historical low water levels (Table 3-1).

The relationship between groundwater quality impacts from flows along Arroyo Simi–Las Posas that originate outside of the PVB and groundwater production within the PVB is not well established. This constitutes a data gap that will be evaluated over the next 5 years. Water quality will continue to be monitored at monitoring well locations identified by FCGMA and its partner agencies. As additional data are collected, the effectiveness of applying a water level threshold to groundwater quality degradation will continue to be assessed.

3.3.5 Land Subsidence

The undesirable result associated with land subsidence in the PVB is subsidence that substantially interferes with surface land uses. The FCGMA Board resolution discussed in Section 3.1, Introduction to Sustainable Management Criteria, calls for groundwater management that will not result in net subsidence due to groundwater withdrawal. Subsidence related to groundwater withdrawal can occur as groundwater elevations decline below previous historical low water levels, because the groundwater acts to reduce the effective stress, or pressure, on the sediment in the Subbasin. As water levels decline, the pressure on the sediment matrix increases, and the pore structure of the sediment can collapse, resulting in subsidence.

Land subsidence related to groundwater production has the potential to impact the beneficial uses and users of groundwater in the PVB by interfering with surface land uses in a way that causes additional costs from releveling fields, replacing surface infrastructure, and other actions necessitated by surface land use interference.

Groundwater production is only one cause of subsidence in the PVB. In addition to groundwater production, tectonic forces and oil and gas production can also result in subsidence in the PVB (Section 2.3.5, Subsidence). Currently there are no monitoring stations that separate the effects of groundwater withdrawal from those of the other causes of subsidence.

Groundwater production from the PVB may result in significant and unreasonable land subsidence if the subsidence "substantially interferes with surface land uses" (California Water Code, Section 10721[x][5]). Direct measurement of historical subsidence in Pleasant Valley is limited geographically and temporally (Section 2.3.5). The California Department of Water Resources (DWR) designated the PVB as an area that has a low potential for future subsidence (DWR 2014).

Even though substantial interference with land surface uses is not anticipated, actions taken in both the Oxnard Subbasin and the PVB to prevent long-term declines in groundwater storage and net landward migration of the 2015 saline water impact front in the Oxnard Subbasin will minimize the potential for subsidence related to groundwater production in the PVB. The minimum thresholds metric against which subsidence will be measured is water levels in the PVPDMA and western part of the NPVMA that allow the Oxnard Subbasin to prevent landward migration of the 2015 saline water impact front after 2040. These groundwater elevations are equal to, or higher than, previous historical low water levels, which will limit the potential for future land subsidence in the PVPDMA and western NPVMA resulting from groundwater withdrawal (Table 3-1).

In the northern part of the NPVMA, the minimum thresholds metric against which subsidence will be measured is a groundwater level that allows for complete recovery during multi-year periods of above-average precipitation that follow a drought. Although the minimum threshold groundwater elevation in a key well is lower than the historical low measured in that well, groundwater elevations in adjacent wells have been lower in the past (see Appendix C, Water Elevation Hydrographs). Additionally, because groundwater elevations will be offset by groundwater recovery over multi-year drought cycles, the potential for future land subsidence in the NPVMA resulting from groundwater withdrawal in the northern NPVMA is limited.

3.3.6 Depletions of Interconnected Surface Water

The undesirable result associated with depletion of interconnected surface water in the PVB is loss of groundwater-dependent ecosystem (GDE) habitat. Although lower Arroyo Simi–Las Posas, Calleguas Creek, and Conejo Creek were identified as potential GDEs, which are potentially connected to the Shallow Alluvial Aquifer, there are no dedicated monitoring wells that identify groundwater elevations in the vicinity of these potential GDEs.

The primary cause of groundwater conditions in the PVB that could lead to lowering of the groundwater table in the Shallow Alluvial Aquifer is reduced streamflow in these creeks, both upstream and within the boundaries of the PVB. Additionally, groundwater production within the Shallow Alluvial Aquifer can lower the groundwater elevation near the potential GDEs. Few wells produce from the Shallow Alluvial Aquifer, and no production wells are screened solely within this aquifer (Section 2.4.1.2, Imported Water Supplies).

Because lower Arroyo Simi–Las Posas, Calleguas Creek, and Conejo Creek are ephemeral streams; groundwater elevations in the Shallow Alluvial Aquifer, where known, are deeper than 30 feet below land surface; and few wells produce from the Shallow Alluvial Aquifer within the boundaries of the PVB, depletion of interconnected surface water in the PVB is not currently occurring and is unlikely to occur in the future. Installation of monitoring wells screened in the Shallow Alluvial Aquifer in the vicinity of the potential GDEs will help clarify whether the ecosystems along these creeks are using pore water from infiltrating surface water or are accessing shallow groundwater. If future projects propose to use water from the Shallow Alluvial Aquifer, depletion of interconnected surface water may be possible, and significant and unreasonable impacts may occur. Reevaluation of the effects on potential GDEs should be conducted in conjunction with the project approval process for any such future projects.

If the currently identified potential GDEs are found to depend on groundwater in the future, depletion of interconnected surface water in the PVB has the potential to negatively impact the health of the GDEs. However, the link between groundwater in the Shallow Alluvial Aquifer and the location of the potential GDEs must be established before possible impacts to the health of the potential GDEs can be determined.

3.3.7 Defining a Basin-Wide Undesirable Result

To better manage groundwater production and projects within the PVB, the PVB has been divided into three management areas (see Section 2.5). The majority of the groundwater production in the PVB is in the PVPDMA and the NPVMA. The EPVMA supports limited groundwater production, and no groundwater monitoring wells were identified in this management area. Within the PVPDMA and the NPVMA, historical groundwater production is roughly equally divided between the older alluvium and the LAS (Table 2-10, Groundwater Extraction).

There are a limited number of wells in the PVB that can be used to monitor conditions in the older alluvium and the LAS (Table 3-1). Eight wells were selected in the PVPDMA and one well was selected in the NPVMA. Of the eight wells selected in the PVPDMA, three are screened in the older alluvium, three are screened in the LAS, and two are screened in both the older alluvium and the LAS. The only well selected to monitor conditions in the NPVMA is screened in the LAS. The limited number of wells introduces uncertainty in defining basin-wide effects. There are currently too few wells in the PVB to separate out potential undesirable results in the older alluvium from those in the LAS. Therefore, until additional monitoring wells are drilled and additional data are gathered, basin-wide undesirable results will not distinguish between the aquifers. Additionally, the basin-wide effects are not defined based on management area because there is only one suitable key well in the NPVMA.[1]

Basin-wide undesirable results are defined in three ways for the PVB. The first is based on the total number of wells, independent of management area or aquifer. Under this definition, the PVB will be determined to be experiencing undesirable results if, in any single monitoring event, water levels in four of the nine key wells are below their respective minimum thresholds.

The second definition of undesirable results for the PVB is based on the degree to which a single well exceeds a minimum threshold. Under this definition, the PVB would be determined to be experiencing an undesirable result if the groundwater elevation at any individual key well exceeded the historical low groundwater elevation at the individual monitoring site, or in a nearby well if the historical record at the monitoring location is not long enough to capture the historical low water levels in the PVB. This additional criterion reflects the need to increase groundwater elevations relative to their historical lowest values, as well as the unknown potential consequences should groundwater elevations at an individual site drop below the historical low. Two key wells do not have a sufficiently long historical record to capture previous historical low water levels in the PVB. These wells are Well 02N20W19M05S, in the northern part of the NPVMA, and Well 01N32W04K01S, in the PVPDMA. For these wells, the historical low groundwater elevations were selected for nearby wells with longer historical records (Table 3-1). The historical low elevation for Well 02N20W19M05S will be −167.7 feet msl, which is the low water level recoded in Well 02N20W19M04S on October 20, 1988 (see Appendix C). The historical low elevation for Well 01N32W04K01S will be −164.3 feet msl, which is the low water level recorded in Well 1N32W04M01S on November 12, 1991.

The third definition of undesirable results is based on the time over which a well may exceed the minimum threshold. Under this definition, the PVB would be determined to be experiencing an undesirable result if the water level in any individual key well were below the minimum threshold

1 The City of Camarillo is installing two nested groundwater monitoring wells as part of the development of the North Pleasant Valley Desalter project. These wells will be added to the network of monitoring wells in the NPVMA when they have been completed.

for either three consecutive monitoring events or three of five consecutive monitoring events. Monitoring events are scheduled to occur in the spring and fall of each year.

If conditions in the PVB meet any of the definitions of undesirable results listed above, the PVB would be considered to be experiencing undesirable results.

3.4 MINIMUM THRESHOLDS

The following sections and discussion set forth the minimum thresholds for chronic lowering of groundwater levels, reduction of groundwater storage, degraded water quality, land subsidence, and depletions of interconnected surface water. A minimum threshold is not established for seawater intrusion because direct seawater intrusion has not occurred and is unlikely to occur in the future in the PVB (Section 3.3.3). The thresholds discussed below are the minimum groundwater elevations at individual wells that avoid undesirable results, which have been defined as follows:

- Groundwater levels in the PVB that do not recover to pre-drought levels during multi-year periods of above average precipitation that follow a drought
- Increased rate of brine migration along the Bailey Fault and from underlying formations related to groundwater production
- Induced subsidence that substantially interferes with surface land uses
- Water levels in the PVB that prevent the Oxnard Subbasin from stopping net landward migration of the saline water impact front after 2040

Of the undesirable results listed above, only brine migration from underlying formations and along the Bailey Fault and water levels that contribute to seawater intrusion in the Oxnard Subbasin have occurred historically within the PVB.

The results of groundwater model simulations suggest that groundwater elevations in the PVB will need to be higher than the recorded historical low elevations in order for the Oxnard Subbasin to prevent net migration of the saline water impact front after 2040 (Section 2.4.5, Projected Water Budget). Because the groundwater elevations necessary to prevent net migration of the saline water impact front are higher than those necessary to prevent other undesirable results, the minimum thresholds proposed for the PVPDMA and the western part of the NPVMA are water levels that do not interfere with the ability of the Oxnard Subbasin to prevent net seawater intrusion after 2040 (Table 3-1). These minimum thresholds apply to chronic lowering of water levels, change in groundwater storage, groundwater quality, and land subsidence because all of these undesirable results are interrelated. The minimum thresholds for the northern part of the NPVMA are water levels that allow for complete recovery during multi-year periods of drought and recovery.

The minimum threshold groundwater levels are based on a review of the historical groundwater elevation data, incorporation of potential projects, and an analysis of the potential for seawater intrusion in the Oxnard Subbasin under multiple future groundwater production scenarios. Predicted groundwater levels were simulated over a 50-year period from 2020 to 2069 (Section 2.4.5). The future climate simulated in the model recreated the observed climate from 1930 to 1979 with adjustments to precipitation and streamflow based on climate-change factors provided by DWR. The historical period from 1930 to 1979 includes periods of drought and periods of above-average precipitation, but has the average precipitation of the entire climate record for the Oxnard Subbasin. The 50-year future simulations were used to assess the rate of groundwater production in the PVB, Oxnard Subbasin, and West Las Posas Management Area that results in no net seawater intrusion in either the UAS or the LAS in the Oxnard Subbasin after 2040.

Two simulations were found to minimize net seawater intrusion after 2040 (Figure 2-44, Coastal Flux from the UWCD Model Scenarios; Section 2.4.5). Groundwater production in the first simulation, referred to as the Reduction With Projects scenario, averaged approximately 9,000 AFY, with 2,000 AFY of production in the older alluvium, and 7,000 AFY in the LAS. This simulation incorporated projects, including temporary fallowing of land resulting in an annual extraction reduction of 2,200 AFY in the PVB (Section 2.4.5.3, Reduction With Projects Scenario). Groundwater production in the second simulation, referred to as the Reduction Without Projects Scenario 1, which did not include projects, averaged approximately 8,000 AFY, with 3,000 AFY of production in the older alluvium, and 5,000 AFY in the LAS (Section 2.4.5.4, Reduction Without Projects Scenario 1). In general, the simulated groundwater elevations in the model scenario with projects were close to those in the scenario without projects, with any observed difference between the two limited to less than approximately 10 feet (Figures 3-6 through 3-8, Key Well Hydrographs).

The minimum threshold groundwater elevations in the PVB selected to protect against net seawater intrusion in the UAS and LAS in the Oxnard Subbasin depend on the aquifer system and proximity to the Oxnard Subbasin. For wells within the PVPDMA, the minimum thresholds are based on the lowest simulated groundwater elevation after 2040 for the two model simulations in which net seawater intrusion was minimized. To account for some of the uncertainty in the simulated future groundwater elevations, the lowest simulated value in either of the two simulations was used as starting point for selecting the minimum thresholds. The lowest simulated value was then rounded down to the nearest 5-foot interval to further account for uncertainty in the future simulated groundwater elevations.

For Well 02N20W19M05S, which is located in the NPVMA in an area of the PVB that is extensively faulted and distant from the Oxnard Subbasin, the minimum threshold is based on the lowest simulated groundwater elevation from all of the future simulations investigated. This elevation was selected as the minimum threshold because the water level in this well is heavily influenced by groundwater production from the planned North Pleasant Valley Desalter project in the area. The project has its own set of restrictions on groundwater elevation declines, and was included in the modeling for future conditions in the PVB. The future groundwater model simulations suggest that water levels will recover to pre-project levels even under the highest drawdown scenario (Figure 3-7, Key Well Hydrographs for Wells Screened in the Fox Canyon Aquifer). The minimum thresholds for each well are presented in Table 3-1 and on Figures 3-6 through 3-8.

There are no proposed minimum thresholds in the EPVMA because there are no suitable monitoring wells in the EPVMA. The thresholds for the PVPDMA, which borders the EPVMA, are presumed to protect the EPVMA, which has considerably less groundwater production than the adjoining management areas (see Section 2.5). This presumption will be revisited as groundwater elevation data are collected from the EPVMA.

3.4.1 Chronic Lowering of Groundwater Levels

The selected minimum thresholds for chronic lowering of groundwater levels are presented in Table 3-1. These minimum thresholds are water levels that were selected based on future groundwater model simulations that allow groundwater elevations to recover during multi-year cycles of drought and recovery, and limit migration of the 2015 saline water impact front in the Oxnard Subbasin, after 2040. Numerical groundwater model simulations indicate that, under the conditions modeled, declines in groundwater elevations during periods of future drought will be offset by recoveries during future periods of above-average rainfall throughout all of the management areas of the PVB.

Minimum thresholds were selected for individual wells in the PVPDMA and the NPVMA. The minimum threshold selection was guided by a numerical groundwater model that incorporates production throughout the PVB, the Oxnard Subbasin, and the West Las Posas Management Area. Because the minimum thresholds are based on simulated groundwater elevations from integrated simulations across the PVB, the minimum thresholds selected for the NPVMA are consistent with those selected for the PVPDMA. These minimum thresholds are anticipated to improve the beneficial uses of the PVB by preventing chronic lowering of groundwater levels. This allows for long-term use of groundwater supplies in the PVB without ongoing loss of storage that would cause economic harm to the users of groundwater in the PVB and impair the beneficial uses of groundwater in the PVB.

These minimum thresholds may impact groundwater users in the PVPDMA and the western part of the NPVMA both by requiring an overall reduction in groundwater production relative to historical levels, and potentially by requiring a redistribution of groundwater pumping between the PVB and the adjacent Oxnard Subbasin. A redistribution of groundwater production to shift groundwater production inland may affect users of groundwater in the PVB and may require adjustment of the currently proposed minimum thresholds in the future.

The minimum thresholds for reduction of groundwater storage are water levels that will be measured at the monitoring wells listed in Table 3-1. Groundwater levels in these wells, which are referred to as "key wells," will be reported to DWR in the annual reports that will follow the submittal of this GSP. Additionally, as funding becomes available, it is recommended that each of these monitoring wells be instrumented with a pressure transducer capable of recording hourly water levels. The groundwater elevation in each well will be compared to the minimum threshold assigned in Table 3-1 to determine whether water levels in individual wells are above the minimum thresholds.

3.4.2 Reduction of Groundwater Storage

The minimum thresholds for reduction in groundwater storage in the PVB are water levels that were selected based on future groundwater model simulations that limit seawater intrusion in the Oxnard Subbasin, and indicate that declines in groundwater elevations during periods of future drought will be offset by recoveries during future periods of above-average rainfall (Table 3-1). The minimum thresholds impacts to groundwater users for reduction of groundwater storage are the same as those for chronic lowering of groundwater levels (see Section 3.4.1). These minimum thresholds are anticipated to improve the beneficial uses of the PVB by allowing for long-term use of groundwater supplies in the PVB.

The minimum thresholds for reduction of groundwater storage are water levels that will be measured at the key wells. Additionally, as funding becomes available, it is recommended that each key well be instrumented with a pressure transducer capable of recording hourly water levels. The groundwater elevation in each well will be compared to the minimum threshold assigned in Table 3-1 to determine whether water levels in individual wells are above the minimum thresholds.

3.4.3 Seawater Intrusion

No minimum thresholds are required for seawater intrusion in the PVB because the PVB is not adjacent to the Pacific Ocean (see Section 3.3.3).

3.4.4 Degraded Water Quality

Water quality impacts to the aquifers of the PVB are limited to locally high concentrations of nitrate, sulfate, boron, chloride, and TDS (Section 2.3 and Section 3.3.4, Degraded Water Quality). The sources and mechanisms controlling the concentration of these constituents differs throughout the PVB (Section 2.3). The primary water quality concerns in the PVB are inflows of poor quality surface water and saline intrusion in the FCA and the Grimes Canyon Aquifer from brine migration along the Bailey Fault. Distribution of the poor quality water is influenced by groundwater production, although groundwater production is not the cause of the poor-quality water. Groundwater production may exacerbate upward migration of brines from lower aquifers, but a direct correlation between increased brine migration and groundwater elevation has not yet been established. Additionally, the influence of groundwater production on migration of poor quality water is not well understood in the PVB. As a result, the minimum thresholds for groundwater quality are the same as the water level minimum thresholds for chronic lowering of groundwater levels (Section 3.4.1). They are groundwater elevations, rather than groundwater concentrations, that are higher than historical low elevations in the PVPDMA and the western NPVMA. Maintaining groundwater elevations above the historical low groundwater levels is anticipated to limit any increases in brine migration rates if these rates are related to groundwater elevation. Groundwater quality will continue to be monitored to evaluate the potential connection between groundwater quality and groundwater production. As the understanding of this connection improves, the minimum thresholds may be revised and may incorporate direct concentration minimum thresholds in the future.

The minimum threshold in the northern part of the NPVMA is not expected to exacerbate migration of poor quality water from the ELPMA, because it was selected in connection with a project that is intended to remove the poor quality water and treat it in an area that is already impacted (City of Camarillo 2015). Additionally, the source of the poor quality water is anticipated to decrease in the future. Over the next 5 years, additional work will be done to better understand the potential for pumping to exacerbate groundwater quality concerns in the PVB.

The minimum thresholds impacts to groundwater users for degraded water quality are anticipated to be the same as those for chronic lowering of groundwater levels and reduction of groundwater in storage, which are described in Sections 3.4.1 and 3.4.2.

The minimum thresholds for degraded water quality are water levels that will be measured at the key wells. Additionally, as funding becomes available, it is recommended that each key well be instrumented with a pressure transducer capable of recording hourly water levels. The groundwater elevation in each well will be compared to the minimum threshold assigned in Table 3-1 to determine whether water levels in individual wells are above the minimum thresholds.

3.4.5 Land Subsidence

The minimum thresholds for land subsidence in the PVB are water levels that were selected based on future groundwater model simulations that limit seawater intrusion in the Oxnard Subbasin, and indicate that declines in groundwater elevations during periods of future drought will be offset by recoveries during future periods of above-average rainfall (Table 3-1). As groundwater withdrawals will be reduced to achieve these goals in the PVPDMA and the western NPVMA, groundwater elevations in the aquifer systems will rise, and the resulting minimum thresholds are higher than historical low water levels. In the northern NPVMA, the minimum threshold groundwater elevation in Well 02N20W19M05 is lower than the historical low groundwater elevation in this well. However, the historical record in this well begins in 1999, after groundwater elevations in this area began to rise. The minimum threshold elevation selected is higher than the historical groundwater elevations for nearby wells.

Because groundwater elevations must be maintained above the minimum threshold in order to avoid undesirable results, water levels in the PVB will remain above historical low water levels after 2040. Therefore, water levels in the PVB will not induce inelastic subsidence. If the distribution of pumping is altered, the potential subsidence risk in the PVB may have to be revisited. This risk evaluation should be tied to areas in which the minimum thresholds are lowered below previous historical low water levels.

As discussed previously, the minimum thresholds are anticipated to improve the beneficial uses of the PVB by increasing the overall amount of freshwater storage in the PVB, and limiting the further intrusion of seawater in the Oxnard Subbasin. These minimum thresholds will also limit future subsidence, because currently the thresholds are greater than the historical low groundwater elevation. The minimum thresholds impacts to groundwater users for land subsidence are anticipated to be the same as those for chronic lowering of groundwater levels and depletion of groundwater storage, which are described in Sections 3.4.1 and 3.4.2.

The minimum thresholds for subsidence are water levels that will be measured at the key wells (Table 3-1). Additionally, as funding becomes available, it is recommended that each key well be instrumented with a pressure transducer capable of recording hourly water levels. The groundwater elevation in each well will be compared to the minimum threshold assigned in Table 3-1 to determine whether water levels in individual wells are above the minimum thresholds.

3.4.6 Depletions of Interconnected Surface Water

No minimum thresholds specific to the depletion of interconnected surface water are proposed at this time. Because lower Arroyo Simi–Las Posas is an ephemeral stream; groundwater elevations in the Shallow Alluvial Aquifer, where known, are deeper than 30 feet below land surface; and the Shallow Alluvial Aquifer is not used for groundwater production within the boundaries of the PVB, depletion of interconnected surface water in the PVB is not currently occurring.

Currently there is very little groundwater production from the Shallow Alluvial Aquifer. If future projects investigate producing water from the Shallow Alluvial Aquifer, these projects will have to evaluate the potential impact to interconnected surface water and GDEs as part of the feasibility and permitting process. Additionally, if projects that produce groundwater from the Shallow Alluvial Aquifer are implemented, the need for specific water-level minimum thresholds in the Shallow Alluvial Aquifer should be reevaluated.

3.5 MEASURABLE OBJECTIVES

The measurable objectives are quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted GSP to achieve the sustainability goal. For the PVB, the measurable objective is the water level, measured at each of the key wells, at which there is neither seawater flow into nor freshwater flow out of the UAS or LAS in the Oxnard Subbasin. If water levels in the PVB remained at the measurable objective in perpetuity, no groundwater would flow from the aquifer systems into the Pacific Ocean, and no ocean water would flow into the aquifer systems. This is the theoretical ideal water level for managing the aquifer systems of the combined PVB/Oxnard Subbasin system, because seawater intrusion would be prevented while maintaining the maximum freshwater use from the aquifer systems. However, because groundwater elevations in the PVB respond to climatic cycles, actual groundwater levels in the PVB cannot be maintained at the measurable objective indefinitely. Therefore, to allow for operational flexibility while still preventing net migration of the 2015 saline water impact front in the Oxnard Subbasin, the measurable objectives were selected to work with the minimum thresholds in the PVB and the Oxnard Subbasin.

To allow for operational flexibility during drought periods, water levels in the PVB are allowed to fall below the measurable objective, so long as they remain above the minimum threshold. As water levels fall below the measurable objective, seawater will flow toward the freshwater aquifer systems in the Oxnard Subbasin, even if the water levels remain above the minimum threshold. The longer groundwater elevations remain between the measurable objective and the minimum threshold, the greater the volume of seawater that will migrate into the aquifer systems of the Oxnard Subbasin. In order to allow the Oxnard Subbasin to prevent net seawater intrusion over periods of drought and recovery, the periods during which seawater intrusion occurs must be offset by periods when the groundwater elevations are higher.

There are two components to balancing groundwater levels over climate cycles. The first is not allowing groundwater levels in the PVB to decline below an elevation at which net seawater intrusion will occur in the Oxnard Subbasin. This elevation is the minimum threshold. The second is ensuring that periods during which groundwater levels are above the minimum threshold but below the measurable objective are offset by equal periods during which groundwater levels are above the measurable objective. Therefore, the measurable objectives for the PVB were selected based on the median groundwater elevation between 2040 and 2070, simulated for each well, in model simulations that prevented net landward migration of the 2015 saline water impact front in the Oxnard Subbasin.

The median groundwater elevation was rounded down to the nearest 5-foot interval to account for uncertainty in the model simulated future groundwater elevations. In order to account for future sea level rise, the rounded groundwater elevations were increased by 2 feet. The median simulated groundwater elevation (from 2040 to 2070) at each well after rounding and accounting for sea level rise is the measurable objective (Table 3-1). In order to prevent net seawater intrusion in the Oxnard Subbasin after 2040, observed groundwater levels in the PVB should be above the measurable objective 50% of the time. Ideally, the periods during which the water levels are above the measurable objectives will coincide with periods of above-average precipitation. If this occurs, additional reductions in groundwater production are not anticipated to be required. If, however, prolonged periods of drought limit the ability to recharge the groundwater aquifers in the Oxnard Subbasin, additional reductions in groundwater production may be required in both the Oxnard Subbasin and the PVB.

3.5.1 Chronic Lowering of Groundwater Levels

The measurable objective for the chronic lowering of groundwater levels in the PVB is the groundwater level at which there is neither seawater flow into nor freshwater flow out of the UAS or LAS in the Oxnard Subbasin. The measurable objective groundwater level was selected for each of the key wells (Table 3-2). At each of these wells, the difference between the measurable objective and the minimum threshold is greater than 10 feet, which provides a margin of safety for operational flexibility in the PVB.

Groundwater elevations within each management area of the PVB will be used to determine whether chronic lowering of groundwater levels is occurring. All of the management areas except the EPVMA have monitoring wells. Until a monitoring well is installed in the EPVMA, the measurable objectives set for the wells in the PVPDMA and the NPVMA, are presumed to also protect the EPVMA. The EPVMA has considerably less groundwater production than the NPVMA and does not have an independent suitable monitoring well for selecting a separate measurable objective. This presumption will be revisited as groundwater elevation data are collected from the EPVMA.

Interim Milestones for Chronic Lowering of Groundwater Levels

Interim milestones, which are target groundwater levels in 2025, 2030, and 2035 at key wells, will be used to assess progress toward sustainable groundwater management in the PVB between 2020 and 2040. The interim milestones for chronic lowering of groundwater levels are the same as the interim milestones for the other sustainability indicators, because the interim milestones measure progress toward the groundwater elevations in the PVB that will prevent undesirable results.

Two sets of interim milestones were determined for the key wells in the PVB (Table 3-2). The first set of interim milestones was calculated using linear interpolation between the fall 2015 low groundwater elevation and measurable objective (Figure 3-9, Interim Milestones for Dry and Average Conditions – Linear Interpolation). The second set was calculated using linear interpolation between the fall 2015 low groundwater elevation and the minimum threshold (Figure 3-9).

Two sets of interim milestones were calculated because the actual groundwater elevation in 2040 will depend both on groundwater production from the PVB and the climatic conditions between 2020 and 2040. Groundwater model simulations of future groundwater levels show that groundwater levels throughout the PVB vary by tens of feet at constant groundwater production rates over 5-year periods. This variability reflects the variability in annual precipitation, deliveries of surface water to the PVB, and flow in Arroyo Simi–Las Posas, Calleguas Creek, and Conejo Creek. Just as annual climate conditions vary from the calculated long-term historical mean conditions, so do 5-year average climate conditions (Figure 3-10, Distribution of 5-Year Average Climate Conditions in the Historical Record of Precipitation in the Pleasant Valley Basin). Therefore, progress toward the measurable objective must be evaluated in the context of the climate that occurred during the preceding 5 water years.

If, for example, the average precipitation from water years 2020 through 2024 (October 1, 2019, through September 30, 2024) equals the long-term historical average precipitation for the PVB, then, as groundwater production is reduced, the groundwater level at each key well should reach the interim milestone for average climate conditions shown in Table 3-2. Under these conditions, groundwater levels in the PVB would be expected to reach the measurable objective by 2040. If, however, the precipitation from water years 2020 through 2024 is less than 70% of the average long-term historical precipitation, as has occurred seven times in the historical record (Figure 3-10), reductions in groundwater production anticipated as part of this GSP would not be sufficient for groundwater elevations to reach the interim milestone for average climate conditions. In order for the PVB to be sustainable in 2040 under ongoing dry climate conditions, the interim milestones should reflect progress toward the minimum threshold at each key well, rather than the measurable objective (Figure 3-9). Five-year climate conditions that fall between average and less than 70% of average would be expected to produce interim milestone groundwater elevations between those listed in Table 3-2.

Although specific interim milestones were not selected at each key well for above average climate conditions, a similar analysis should be performed as part of the 5-year assessment process. For example, if the average precipitation from water years 2020 through 2024 exceeds 140% of the average long-term historical precipitation, as has occurred four times in the historical record (Figure 3-10), groundwater elevations in the fall of 2024 should be higher than the interim milestone groundwater elevation for average conditions listed in Table 3-2. Further, although Table 3-2 provides interim milestone groundwater elevations for the years 2030, 2035, and 2040, these interim milestones should be reassessed as part of the 5-year GSP evaluation process because of their climate dependence. The linear interpolation and resultant interim milestones should be updated based on the measured water level in the fall of 2024, 2029, and 2034 at each key well.

3.5.2 Reduction of Groundwater Storage

The measurable objective for reduction of groundwater in storage in the PVB is the groundwater level at which there is neither seawater flow into nor freshwater flow out of the UAS or LAS in the Oxnard Subbasin (Table 3-2). The measurable objective groundwater level was selected for each of the key wells. This groundwater level is the same groundwater level that is used to protect against undesirable results for the other sustainability indicators. At each of the key wells, the difference between the measurable objective and the minimum threshold is greater than 10 feet, which provides a margin of safety for operational flexibility in the PVB.

Groundwater elevations within each management area of the PVB will be used to determine whether reduction in groundwater storage is occurring. All of the management areas except the EPVMA have monitoring wells. Until a monitoring well is installed in the EPVMA, the measurable objectives set for the wells in the PVPDMA and the NPVMA are presumed to also protect the EPVMA. The EPVMA has considerably less groundwater production than the NPVMA and does not have an independent suitable monitoring well for selecting a separate measurable objective. This presumption will be revisited as groundwater elevation data are collected from the EPVMA.

Interim Milestones for Reduction of Groundwater in Storage

Interim milestones for reduction of groundwater in storage are presented for two climate scenarios in Table 3-2. The two sets of interim milestones were calculated from a linear interpolation between the fall 2015 low groundwater elevation and either the measurable objective or the minimum threshold at each well. These interim milestones will be used to assess progress toward sustainable groundwater management in the PVB between 2020 and 2040. The interim milestones for reduction of groundwater in storage are the same as the interim milestones for chronic lowering of groundwater levels.

3.5.3 Seawater Intrusion

No measurable objectives are required for seawater intrusion in the PVB because the PVB is not adjacent to the Pacific Ocean (Section 3.3.3).

3.5.4 Degraded Water Quality

The measurable objective for degraded water quality in the PVB is the groundwater level at which there is neither seawater flow into nor freshwater flow out of the UAS or LAS in the Oxnard Subbasin (Table 3-2). The measurable objective groundwater level was selected for each of the key wells. This groundwater level is the same groundwater level that is used to protect against undesirable results for the other sustainability indicators. At each of the key wells, the difference between the measurable objective and the minimum threshold is greater than 10 feet, which provides a margin of safety for operational flexibility in the PVB.

Groundwater elevations within each management area of the PVB will be used to determine whether reduction in groundwater storage is occurring. All of the management areas except the EPVMA have monitoring wells. Until a monitoring well is installed in the EPVMA, the measurable objectives set for the wells in the PVPDMA and the NPVMA are presumed to also protect the EPVMA. The

EPVMA has considerably less groundwater production than the NPVMA and does not have an independent suitable monitoring well for selecting a separate measurable objective. This presumption will be revisited as groundwater elevation data are collected from the EPVMA.

Interim Milestones for Degraded Water Quality

Interim milestones for degraded water quality are the same as those for chronic lowering of groundwater levels and reduction of groundwater in storage. These interim milestones are presented for two climate scenarios in Table 3-2. The two sets of interim milestones were calculated from a linear interpolation between the fall 2015 low groundwater elevation and either the measurable objective or the minimum threshold at each well. These interim milestones will be used to assess progress toward sustainable groundwater management in the PVB between 2020 and 2040. The interim milestones for reduction of groundwater in storage are the same as the interim milestones for chronic lowering of groundwater levels.

3.5.5 Land Subsidence

The measurable objective for inelastic land subsidence in the PVB is the groundwater level at which there is neither seawater flow into nor freshwater flow out of the UAS or LAS in the Oxnard Subbasin (Table 3-2). This groundwater level is higher than the historical low water level in each key well. Therefore, it will protect against land subsidence related to groundwater withdrawal. The measurable objective groundwater level was selected for each of the key wells. This groundwater level is the same groundwater level that is used to protect against undesirable results for the other sustainability indicators. At each of the key wells, the difference between the measurable objective and the minimum threshold is greater than 10 feet, which provides a margin of safety for operational flexibility in the PVB.

Groundwater elevations within each management area of the PVB will be used to determine whether reduction in groundwater storage is occurring. All of the management areas except the EPVMA have monitoring wells. Until a monitoring well is installed in the EPVMA, the measurable objectives set for the wells in the PVPDMA and the NPVMA are presumed to also protect the EPVMA. The EPVMA has considerably less groundwater production than the NPVMA and does not have an independent suitable monitoring well for selecting a separate measurable objective. This presumption will be revisited as groundwater elevation data are collected from the EPVMA.

Interim Milestones for Land Subsidence

Interim milestones for land subsidence are the same as those for chronic lowering of groundwater levels and reduction of groundwater in storage. These interim milestones are presented for two climate scenarios in Table 3-2. The two sets of interim milestones were calculated from a linear interpolation between the fall 2015 low groundwater elevation and either the measurable objective or the minimum threshold at each well. These interim milestones will be used to assess progress toward sustainable groundwater management in the PVB between 2020 and 2040. The interim milestones for land subsidence are the same as the interim milestones for chronic lowering of groundwater levels.

3.5.6 Depletions of Interconnected Surface Water

No measurable objectives or minimum thresholds specific to the depletion of interconnected surface water are proposed at this time. Because lower Arroyo Simi–Las Posas is an ephemeral stream; groundwater elevations in this aquifer, where known, are deeper than 30 feet below land surface; and the Shallow Alluvial Aquifer is not used for groundwater production within the boundaries of the PVB, depletion of interconnected surface water in the PVB is not currently occurring.

Currently there is very little groundwater production from the Shallow Alluvial Aquifer. If future projects investigate producing water from the Shallow Alluvial Aquifer, these projects will have to evaluate the potential impact to interconnected surface water and GDEs as part of the feasibility and permitting process. Additionally, if projects that produce groundwater from the Shallow Alluvial Aquifer are implemented, the need for specific water-level measurable objectives in the Shallow Alluvial Aquifer should be reevaluated.

3.6 REFERENCES CITED

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Table 3-1
Minimum Threshold Groundwater Elevations by Well, Management Area, and Aquifer for Key Wells in the Pleasant Valley Basin

State Well Number	Management Area	Aquifer	Perforations (ft bgs)	Top Perforations (ft msl)	Bottom Perforations (ft msl)	Historical Water Level Low (ft msl) and Date Measured		Fall 2015 Water Level (ft msl) and Date Measured		GSP Undesirable Result	Minimum Threshold (ft msl)	Historical Low Water Level Used for Undesirable Result (ft msl), Well Name, and Date Measured		
02N21W34G05S	PVPDMA	Older Alluvium (Oxnard)	170–190	−77.55	−97.55	−69	12/14/1990	10.12	3/02/2015	Chronic GW Depletion – Storage Reduction – Subsidence – SWI in Oxnard Subbasin	32	−69	02N21W34G05S	12/14/1990
01N21W03K01S	PVPDMA	Older Alluvium (Mugu)	403–1,433	−345.98	−1,375.98	−107.06	9/04/1996	−72.98	3/31/2015	Chronic GW Depletion – Storage Reduction – Subsidence – SWI in Oxnard Subbasin	−53	−107.06	01N21W03K01S	9/4/1996
02N21W34G04S	PVPDMA	Older Alluvium (Mugu)	360–380	−267.55	−287.55	−131.5	12/18/1991	−59.25	3/15/2015	Chronic GW Depletion – Storage Reduction – Subsidence – SWI in Oxnard Subbasin	−48	−131.5	02N21W34G04S	12/18/1991
01N21W03C01S	PVPDMA	FCA	956–1,216	−883.72	−1,143.72	−162.89	12/04/1990	−83.63	3/18/2015	Chronic GW Depletion – Storage Reduction – Subsidence – SWI in Oxnard Subbasin	−48	−162.89	01N21W03C01S	12/04/1990
02N20W19M05S	NPVMA	FCA	654–990	−453.53	−789.53	3.47	9/24/1999	38.62	3/18/2015	Chronic GW Depletion – Storage Reduction – Subsidence – SWI in Oxnard Subbasin	−135	−167.7	02N20W19M04S	10/20/1988
02N21W34G02S	PVPDMA	FCA	938–998	−845.55	−905.55	−172.8	11/19/1991	−70.06	3/02/2015	Chronic GW Depletion – Storage Reduction – Subsidence – SWI in Oxnard Subbasin	−53	−172.8	02N21W34G02S	11/19/1991
02N21W34G03S	PVPDMA	FCA	800–860	−707.55	−767.55	−173.7	11/19/1991	−92.53	3/15/2015	Chronic GW Depletion – Storage Reduction – Subsidence – SWI in Oxnard Subbasin	−53	−173.7	02N21W34G03S	11/19/1991
01N21W02P01S	PVPDMA	Multiple	117–1,041	−49.02	−973.02	−122.36	12/15/1989	−53.45	3/17/2015	Chronic GW Depletion – Storage Reduction – Subsidence – SWI in Oxnard Subbasin	−43	−122.36	01N21W02P01S	12/15/1989
01N21W04K01S	PVPDMA	Multiple	400–1,220	−352.48	−1,172.48	−145.47	10/30/2014	−92.48	3/31/2015	Chronic GW Depletion – Storage Reduction – Subsidence – SWI in Oxnard Subbasin	−48	−164.3	01N21W04K01S	11/25/1991

Notes: FCA = Fox Canyon Aquifer; ft bgs = feet below ground surface; ft msl = feet above mean sea level; GSP = Groundwater Sustainability Plan; GW = groundwater; NPVMA = North Pleasant Valley Management Area; PVPDMA = Pleasant Valley Pumping Depression Management Area; SWI = seawater intrusion.

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Table 3-2
Measurable Objectives and Interim Milestones

Well Number	Aquifer	Minimum Threshold (ft msl)	Measurable Objective (ft msl)	Fall 2015 Water Level Low (ft msl) and Date Measured		Interim Milestone Average Climate (ft msl)				Interim Milestone Dry Climate (ft msl)			
						2025	*2030*[a]	*2035*[a]	*2040*[a]	*2025*	*2030*[a]	*2035*[a]	*2040*[a]
02N21W34G05S	Older Alluvium (Oxnard)	32	40	−10.19	10/2/2015	2	15	28	40	0	11	22	33
01N21W03K01S	Older Alluvium (Mugu)	−53	5	−79.98	6/30/2015	−59	−38	−17	5	−73	−66	−59	−53
02N21W34G04S	Older Alluvium (Mugu)	−48	5	−80.28	10/15/2015	−59	−38	−17	5	−72	−64	−56	−48
01N21W03C01S	FCA	−48	0	−117.52	10/15/2015	−88	−59	−30	0	−100	−83	−66	−48
02N20W19M05S	FCA	−135	65	15.17	10/13/2015	—	—	—	—	—	—	—	—
02N21W34G02S	FCA	−53	0	−117.53	10/2/2015	−88	−59	−30	0	−101	−85	−69	−53
02N21W34G03S	FCA	−53	0	−120.62	10/15/2015	−90	−60	−30	0	−104	−87	−70	−53
01N21W02P01S	Multiple	−43	5	−91.77	10/13/2015	−68	−44	−20	5	−80	−68	−56	−43
01N21W04K01S	Multiple	−48	0	−133.47	10/29/2015	−100	−67	−34	0	−112	−91	−70	−48

Notes: FCA = Fox Canyon Aquifer; ft msl = feet above mean sea level.
[a] Interim milestones for 2030, 2035, and 2040 will depend on climate conditions and basin water level recoveries between 2020 and 2025. These thresholds are proposed for the current GSP but will be reviewed and revised with each 5-year evaluation.

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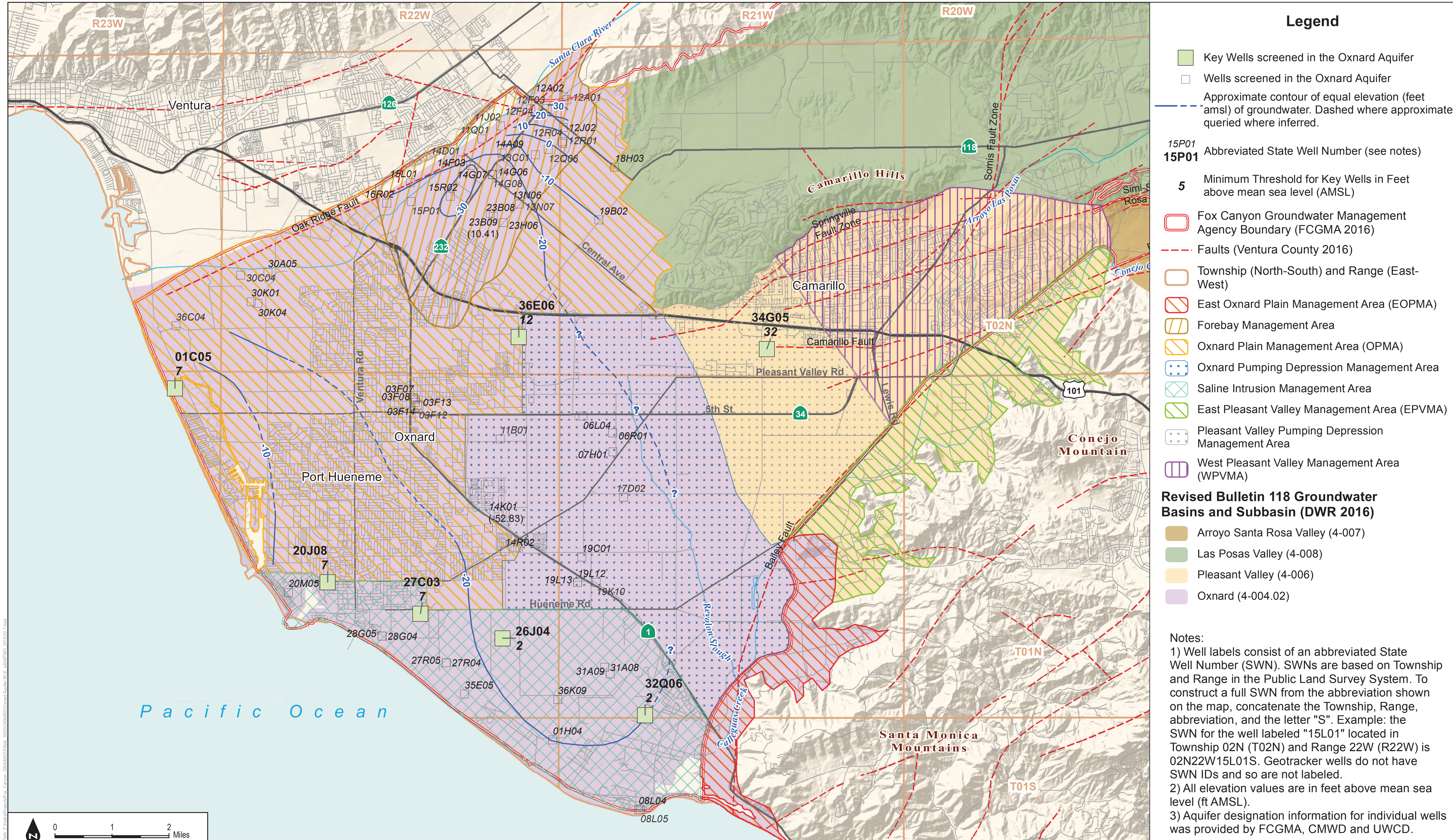

SOURCE: DWR; Ventura County; UWCD; CMWD

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FIGURE 3-1
Minimum Thresholds and Groundwater Elevation Contours in the Oxnard Aquifer, October 2-29, 2015

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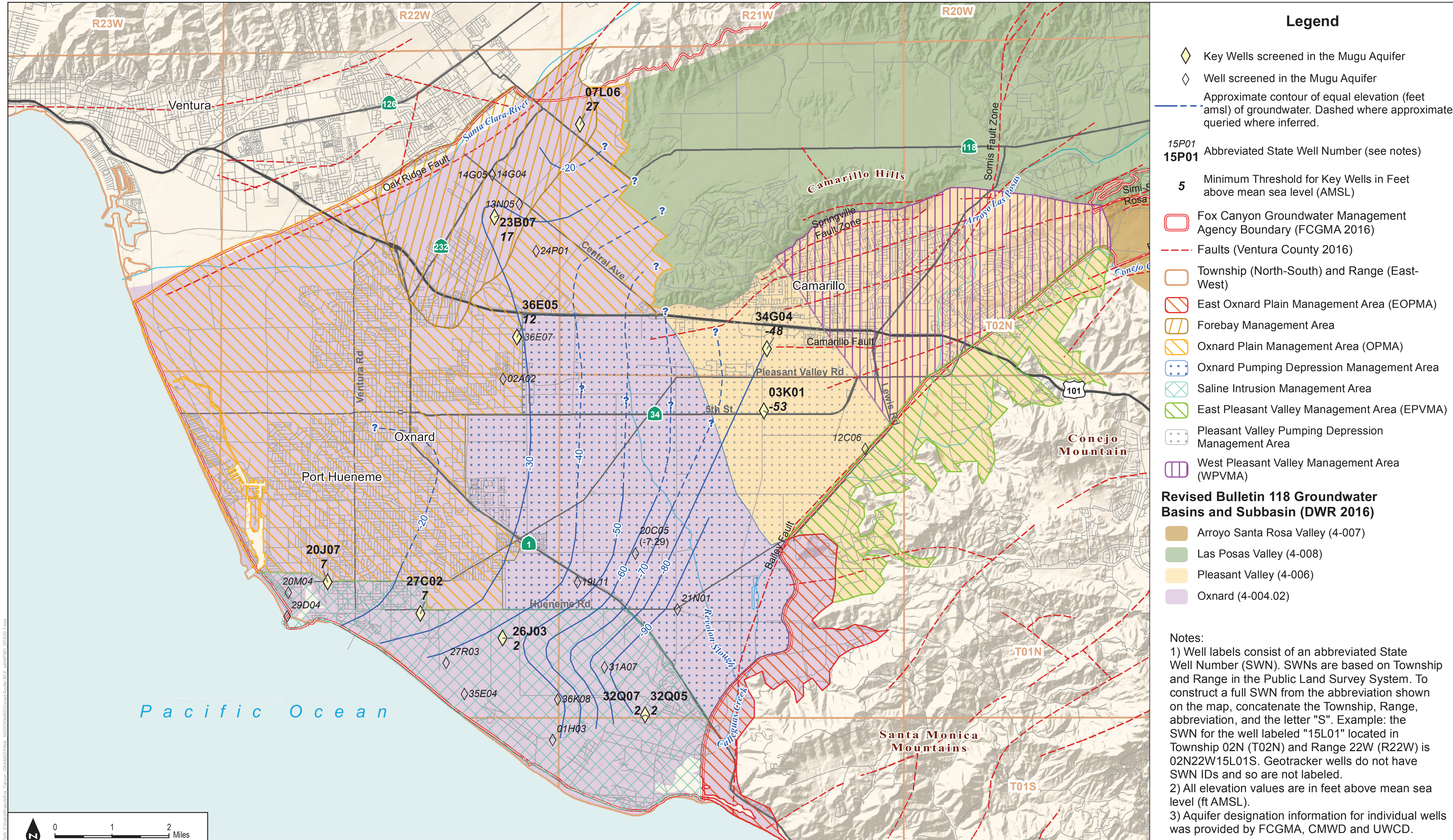

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SOURCE: DWR; Ventura County; UWCD; CMWD

FIGURE 3-2

Minimum Thresholds and Groundwater Elevation Contours in the Mugu Aquifer, October 2-29, 2015

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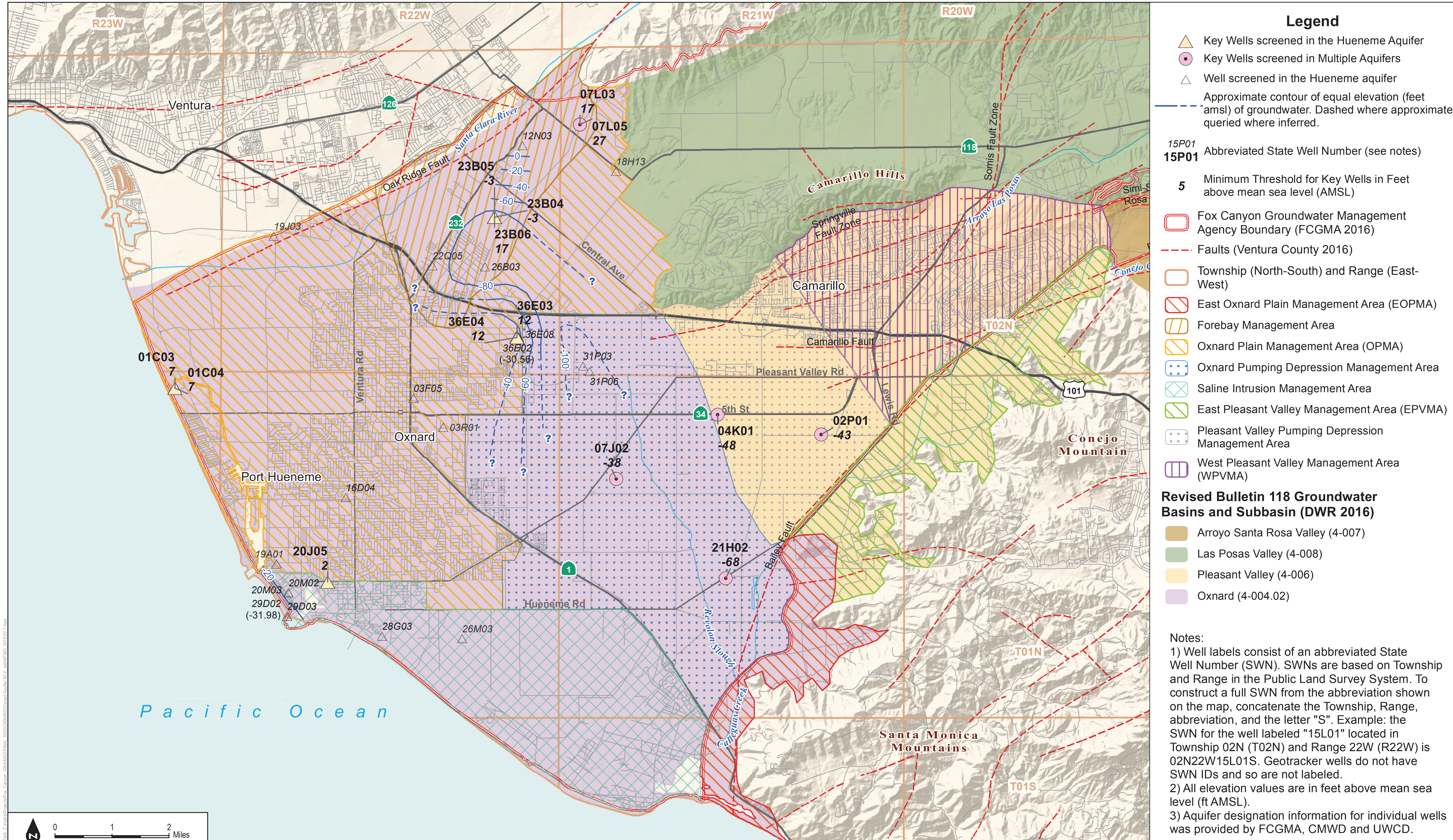

SOURCE: DWR; Ventura County; UWCD; CMWD

FIGURE 3-3

Minimum Thresholds and Groundwater Elevation Contours in the Hueneme Aquifer, October 2-29, 2015

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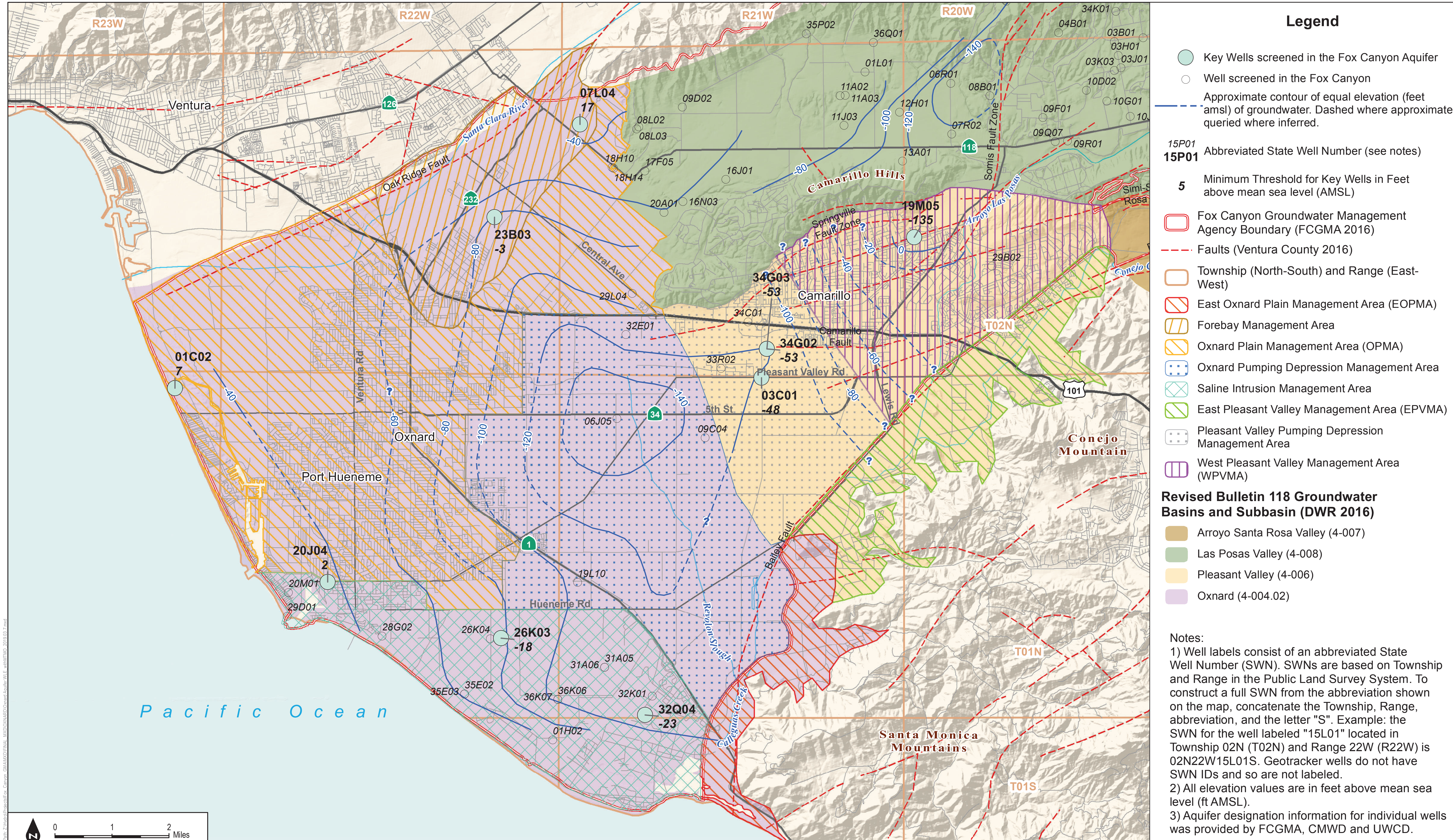

SOURCE: DWR; Ventura County; UWCD; CMWD

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FIGURE 3-4

Minimum Thresholds and Groundwater Elevation Contours in the Fox Canyon Aquifer, October 2-29, 2015

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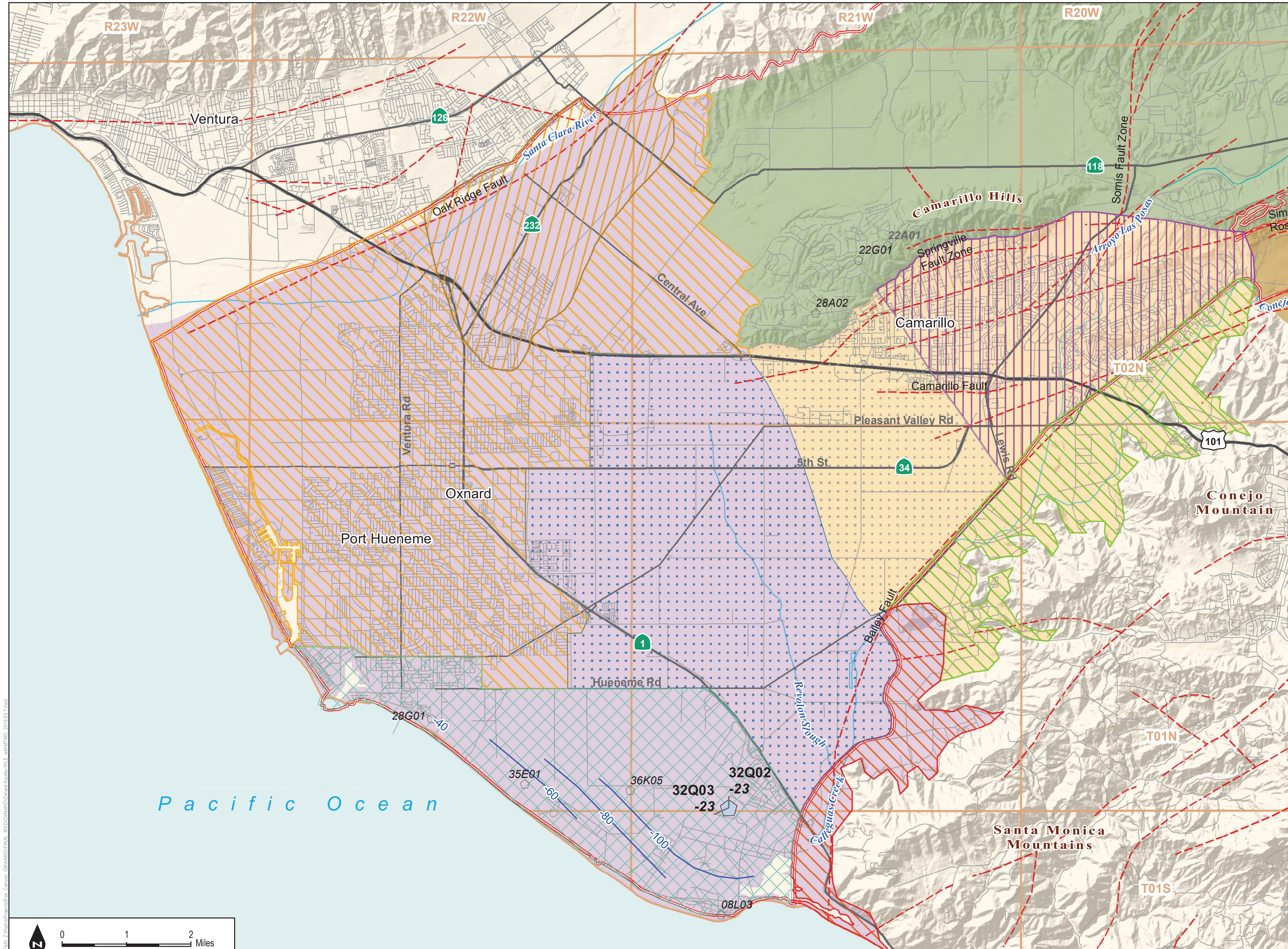

Notes:
1) Well labels consist of an abbreviated State Well Number (SWN). SWNs are based on Township and Range in the Public Land Survey System. To construct a full SWN from the abbreviation shown on the map, concatenate the Township, Range, abbreviation, and the letter "S". Example: the SWN for the well labeled "15L01" located in Township 02N (T02N) and Range 22W (R22W) is 02N22W15L01S. Geotracker wells do not have SWN IDs and so are not labeled.
2) All elevation values are in feet above mean sea level (ft AMSL).
3) Aquifer designation information for individual wells was provided by FCGMA, CMWD and UWCD.

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SOURCE: DWR; Ventura County; UWCD; CMWD

FIGURE 3-5

Minimum Thresholds and Groundwater Elevation Contours in the Grimes Canyon Aquifer, October 2-29, 2015

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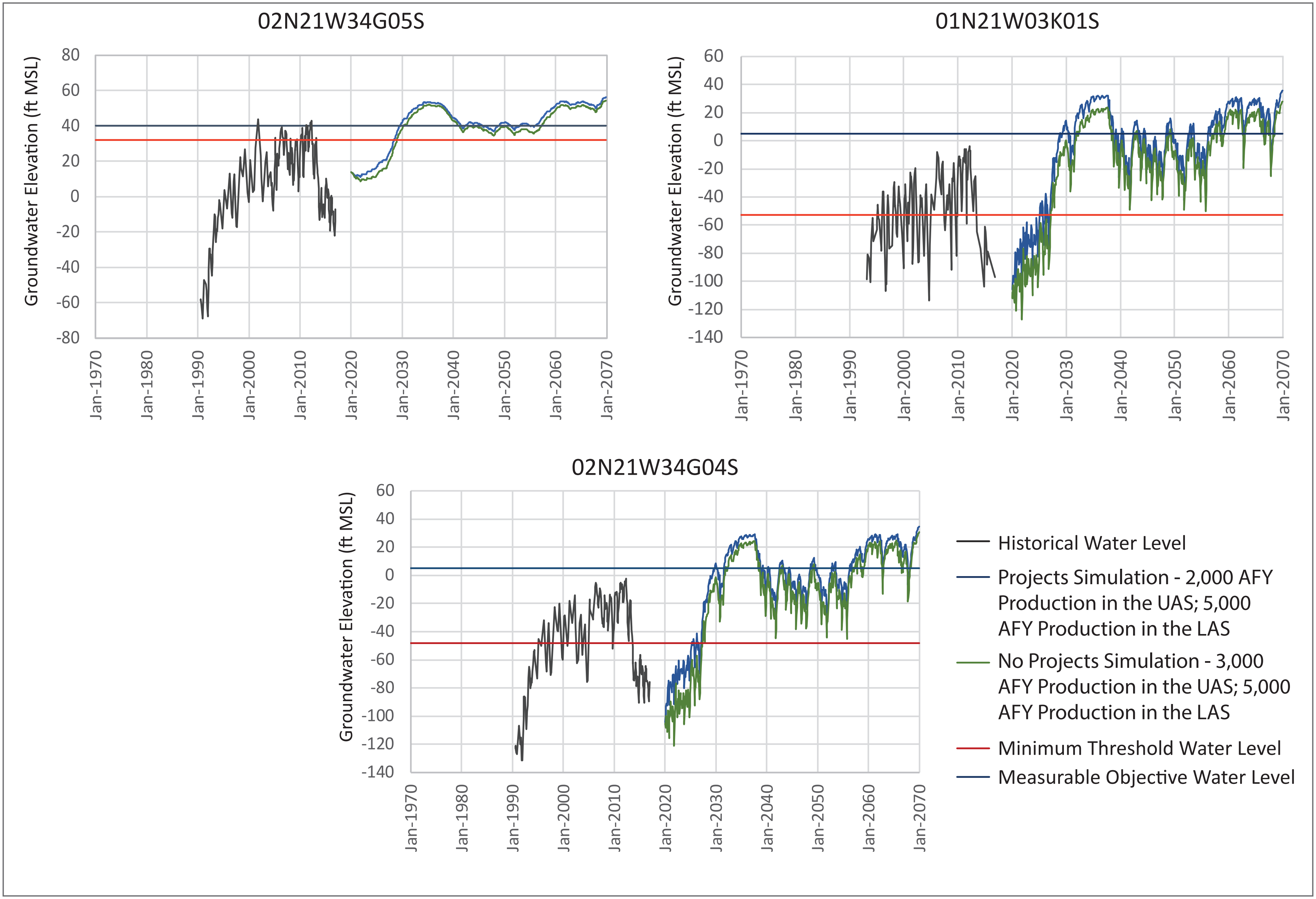

FIGURE 3-6

Key Well Hydrographs for Wells Screened in the Older Alluvium

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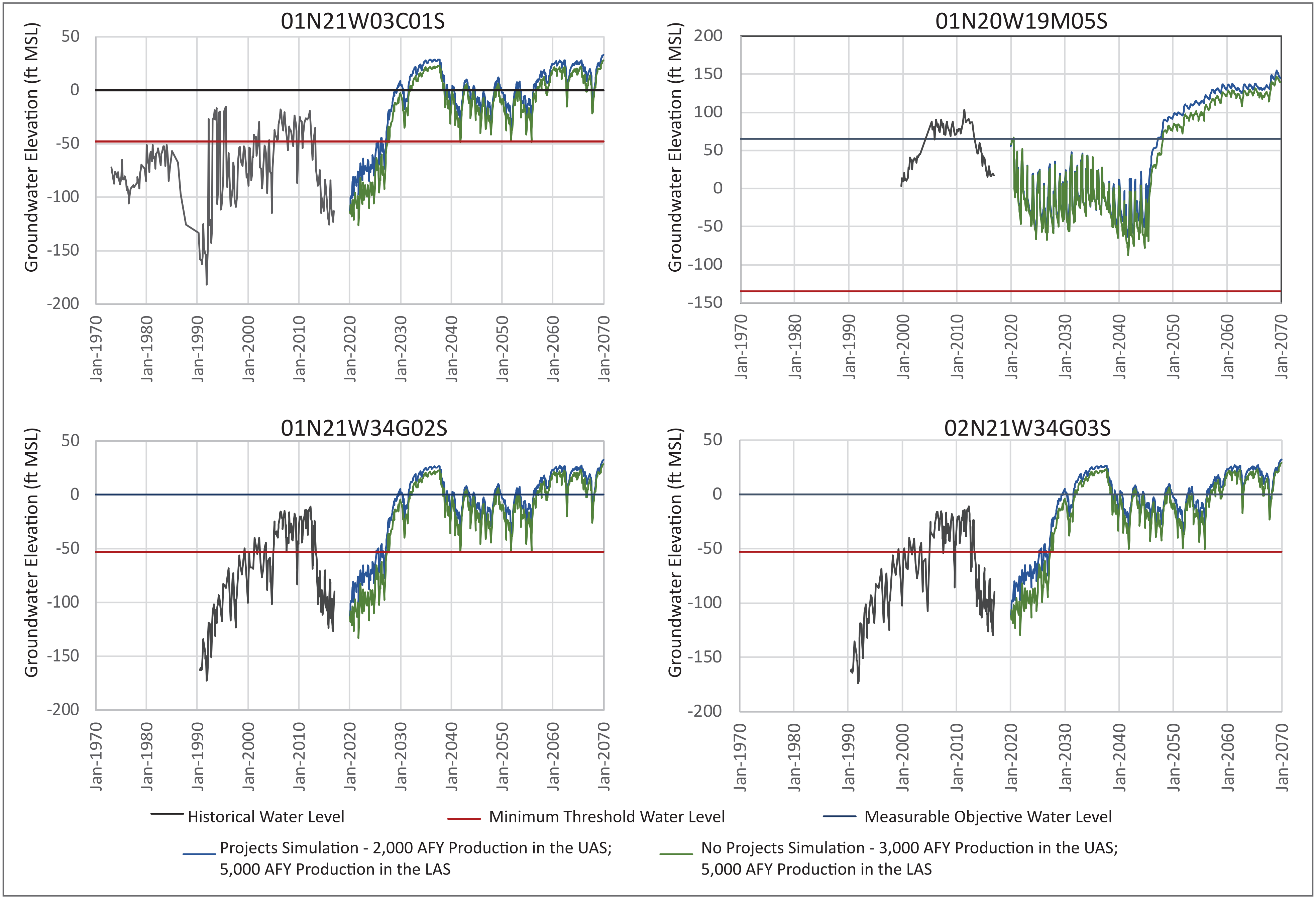

FIGURE 3-7

Key Well Hydrographs for Wells Screened in the Fox Canyon Aquifer

Groundwater Sustainability Plan for the Pleasant Valley Basin

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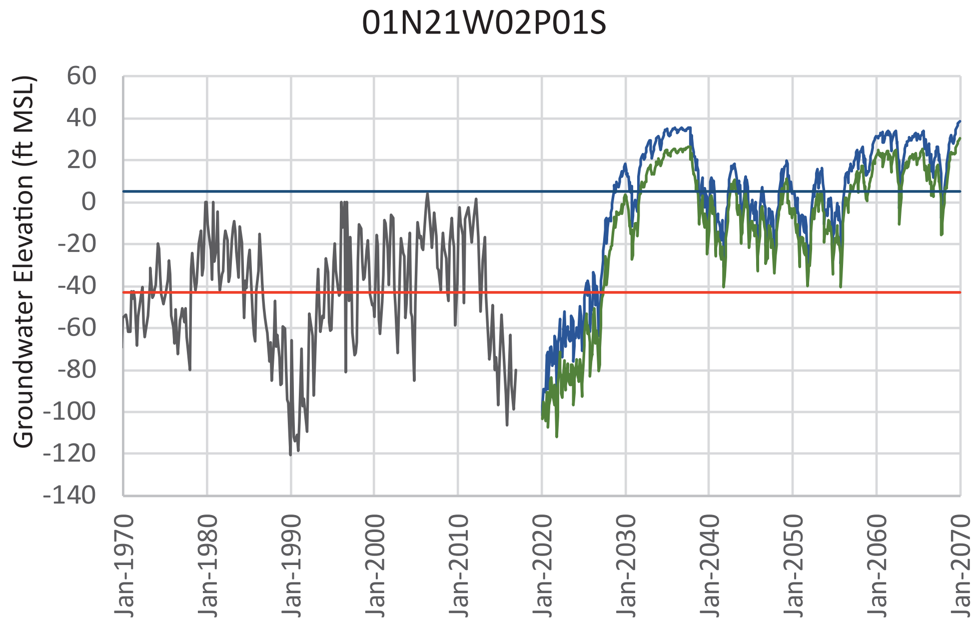

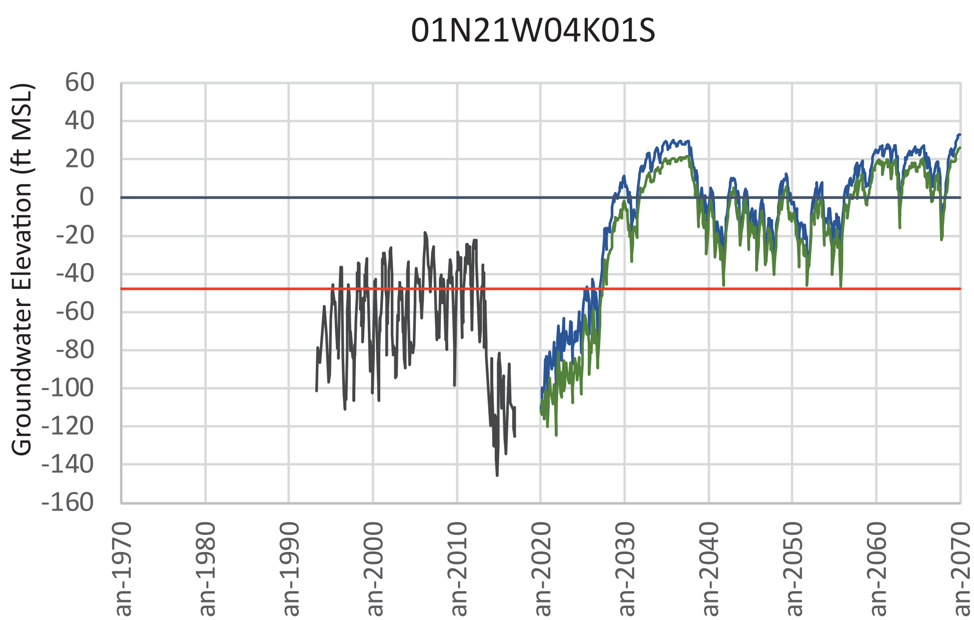

Historical Water Level

Projects Simulation - 2,000 AFY Production in the UAS; 5,000 AFY Production in the LAS

No Projects Simulation - 3,000 AFY Production in the UAS; 5,000 AFY Production in the LAS

Minimum Threshold Water Level

Measurable Objective Water Level

FIGURE 3-8

Key Well Hydrographs for Wells Screened in Multiple Aquifers

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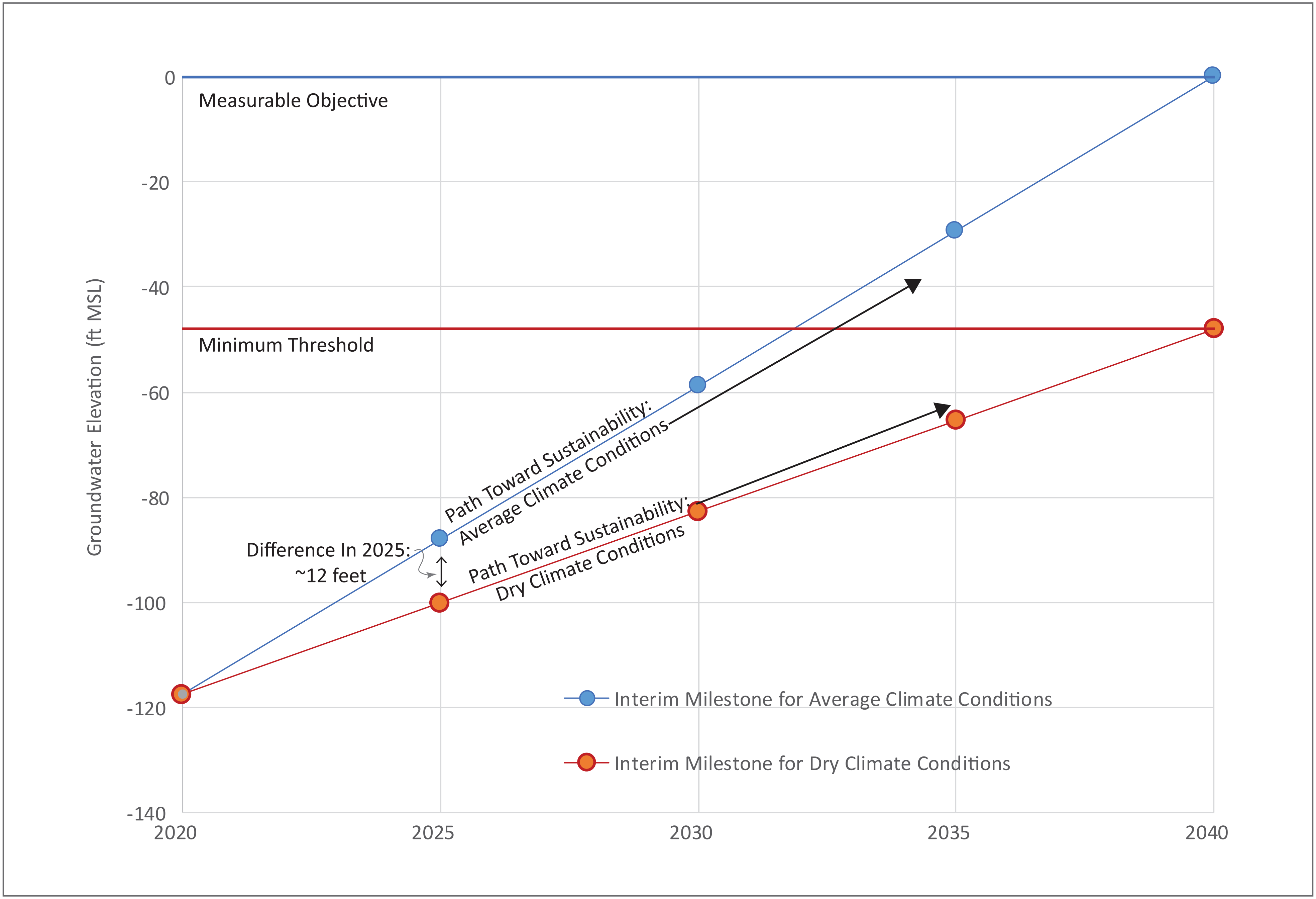

FIGURE 3-9

Interim Milestones for Dry and Average Conditions - Linear Interpolation

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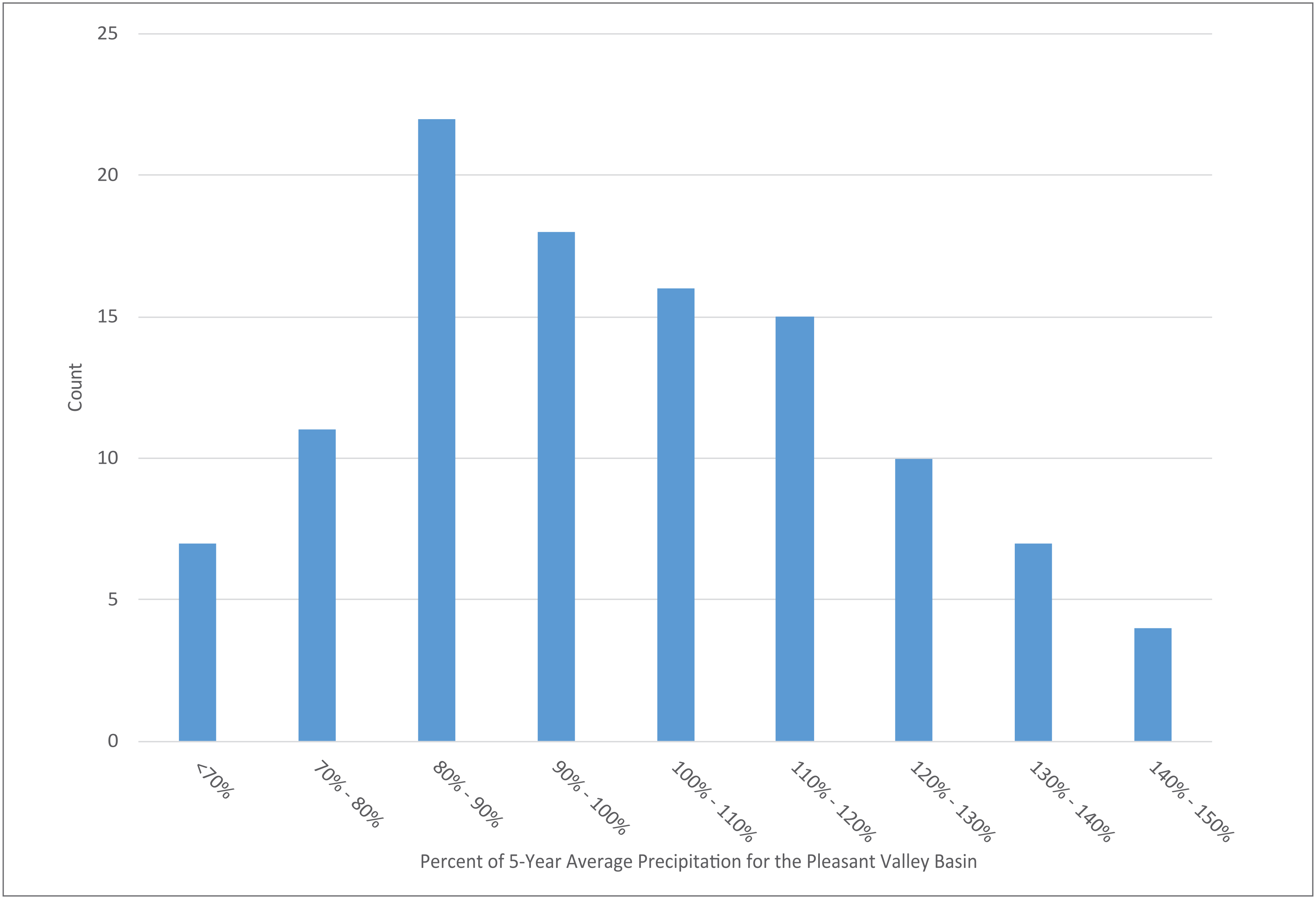

FIGURE 3-10

Distribution of 5-Year Average Climate Conditions in the Historical Record of Precipitation in the Pleasant Valley Basin

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CHAPTER 4
MONITORING NETWORKS

4.1 MONITORING NETWORK OBJECTIVES

The overall objective of the monitoring network in the Pleasant Valley Basin (PVB) is to track and monitor parameters that demonstrate progress toward meeting the sustainability goals. In order to accomplish this objective, the monitoring network in the PVB must be capable of the following:

- Monitoring changes in groundwater conditions (in six sustainability indicator categories)
- Monitoring progress toward minimum thresholds and measurable objectives
- Quantifying annual changes in water budget components

The existing network of groundwater wells includes both monitoring wells and production wells. This network is capable of delineating the groundwater conditions in the PVB and has been used for this purpose in the past. The current groundwater well network will be used to monitor groundwater conditions moving forward, to continue to assess long-term trends in groundwater elevation and groundwater quality in the PVB.

In the future, to the extent possible, additional dedicated monitoring wells will be incorporated into the existing monitoring network. These wells will provide information on groundwater conditions in geographic locations where data gaps have been identified, or where a dedicated monitoring well would better represent conditions in the aquifers than a production well currently used for monitoring.

4.2 DESCRIPTION OF EXISTING MONITORING NETWORK

The existing monitoring network for groundwater and related surface conditions in the PVB includes groundwater production wells, dedicated groundwater monitoring wells, stream gauges, and weather stations. The components of the monitoring network are discussed in Section 4.2.1, Network for Monitoring Groundwater, and Section 4.2.2, Surface Conditions Monitoring, in the context of their ability to demonstrate short-term, seasonal, and long-term trends in groundwater and related surface conditions, as well as the ability of the network to provide representative conditions in the PVB. A discussion of how the monitoring network relates to each of the sustainability criteria follows this discussion in Section 4.3, Monitoring Network Relationship to Sustainability Indicators.

4.2.1 Network for Monitoring Groundwater

Data collected from 80 wells in the PVB have been used to demonstrate historical groundwater elevation conditions in the older alluvium and the Lower Aquifer System (LAS) (Appendix C, UWCD

Model Report). However, the current groundwater well monitoring network is much smaller (Figure 4-1, Monitoring and Non-Monitoring Wells Screened in the Oxnard, Mugu, and Hueneme Aquifers in the Pleasant Valley Basin, and Figure 4-2, Monitoring and Non-Monitoring Wells Screened in the Fox Canyon Aquifer in the Pleasant Valley Basin). A total of 12 wells in the PVB are designated as screened in a single aquifer (County of Ventura 2016). Of these, four are designated monitoring wells that belong to a single nested well cluster (02N21W34G02S-05S). The remaining eight wells are production wells. The majority of the wells in the PVB monitoring network are located in the Pleasant Valley Pumping Depression Management Area (PVPDMA). This management area has nine wells screened in a single aquifer, four of which are in the nested well cluster. In contrast, the North Pleasant Valley Management Area (NPVMA) has three wells screened in a single aquifer. There are no single-aquifer wells located in the East Pleasant Valley Management Area.

The United Water Conservation District (UWCD) collects groundwater elevation data from the nested well cluster, as well as from three agricultural wells that are screened in multiple aquifers in the PVB. The wells are monitored either monthly or bimonthly (once every 2 months). Water levels are measured both manually and with pressure transducers, which record the pressure of water (or height of the water column) above the transducer in the well. Pressure transducers have been installed in two of the wells in the nested well cluster and one of the agricultural wells the UWCD monitors in the PVB. These transducers record the height of the water column in the well every 4 hours, thereby providing high temporal resolution data on groundwater conditions in the aquifers. Data are downloaded from the transducers and the transducer records are subject to quality control review before being added to UWCD databases and reported to the Ventura County Watershed Protection District (VCWPD).

Manual groundwater elevation measurements are collected monthly or bimonthly from the groundwater wells in the PVB that are part of the UWCD monitoring network. These data are used to assess seasonal and long-term trends in groundwater elevation in the PVB, where groundwater elevations were first measured in the 1920s. Seasonal and long-term groundwater elevation trends have been assessed based on the data collected from the existing and historical network of groundwater monitoring wells, and are discussed in Section 2.3, Groundwater Conditions, of this Groundwater Sustainability Plan (GSP).

The spatial and temporal coverage of the existing groundwater monitoring network is sufficient to provide an understanding of representative conditions in the upper alluvium and LAS in the PVB and this network will be used to demonstrate progress toward the sustainability goals for the PVB. Although evaluation of the current network suggests that the network is sufficient to document groundwater conditions in the PVB areas for future improvement of the network are identified in Section 4.6, Potential Monitoring Network Improvements.

Groundwater Quality

Wells in the PVB that are currently monitored for groundwater quality include those in the nested monitoring well cluster (02N21W34G02S-05S) and an adjacent monitoring well (02N21W34G06S) that is screened in an aquitard, rather than in any of the primary aquifers. UWCD collects the samples from these wells. UWCD water quality monitoring is conducted in a rotating pattern such that each well is monitored at least one time per year. Annual monitoring of groundwater quality is sufficient to demonstrate long-term trends in groundwater quality. Water quality does not change as rapidly as groundwater elevation because the physical processes that drive changes in groundwater quality operate on a longer time-scale. Currently groundwater elevations are the primary metric by which progress toward sustainability will be measured. However, groundwater quality data will continue to be collected and analyzed in order to assess whether groundwater elevation thresholds are sufficiently protective of groundwater conditions in the PVB. Recommendations for improvement of the groundwater quality monitoring network are identified in Section 4.6.

Groundwater Extraction

The Fox Canyon Groundwater Management Agency (FCGMA) has required reporting of groundwater extraction from the PVB since 1983. Historically, groundwater extraction data from wells within the FCGMA jurisdictional boundary have been self-reported by the well owner semi-annually (Figure 2-5, Groundwater Extraction [acre-feet] in 2015 in the Las Posas Valley Basin). In 2018, FCGMA adopted an ordinance that required installation of advanced metering infrastructure (AMI) telemetry on wells that were equipped with flowmeters (FCGMA 2018). All agricultural wells were required to install AMI by December 31, 2018, municipal and industrial wells are required to install AMI by October 1, 2019, and all other metered wells are required to install AMI by October 1, 2020. Requiring AMI on all metered wells within FCGMA jurisdiction will provide for broader simultaneous reporting of groundwater extractions, improve FCGMA's ability to monitor and manage groundwater use, and facilitate implementation of this GSP.

4.2.2 Surface Conditions Monitoring

The primary surface conditions that impact groundwater conditions in the PVB are surface water flows and precipitation. The monitoring networks for both surface conditions are discussed in this section.

Surface Water

Surface flows in the PVB are monitored by a network of gauges that are maintained by VCWPD (Table 4-1; Figure 4-3, Active Surface Water Monitoring Network for the Pleasant Valley Basin). The network includes three types of gauges:

1. Recording Gauges (also known as Daily and Peak Stations). These stream gauges record daily average flowrates as well as “peak” flowrates during rain events.
2. Peak Only (Event) Gauges. This type of stream gauge records only “peak” flowrates during rain events (the threshold over which a flowrate is considered to be part of a rain event is site-specific).
3. ALERT Peak Gauges. These stream gauges serve only as a flood warning system. These gauges register high flows but are not used to measure numerical flow rates.

The recording stations at Conejo Creek, near Highway 101 and at Ridgeview Street, and the recording station on Calleguas Creek, at California State University Channel Islands (CSUCI), are the gauges that provide the primary data on surface flows. These gauges collect daily data, while the other gauges in the PVB only record flows during precipitation events.

In addition to the surface flow monitoring network in the PVB, Camrosa Water District monitors diversions from Conejo Creek. These diversions are used to deliver surface water to agricultural users in lieu of groundwater production.

Surface water flows have been recorded in the PVB since the 1970s (Figure 1-4). There are currently gauges on the major surface water bodies in the PVB (Figure 4-3). The historical and existing spatial and temporal coverage from the surface water flow gauge network provides adequate coverage for the short-term, seasonal, and long-term surface flow conditions in the PVB. Although the current network is sufficient to document surface flow conditions in the PVB, areas for improvement are identified in Section 4.6.

Precipitation

Eight precipitation gauges currently monitor precipitation in the PVB (Table 4-2; Figure 4-4, Active Precipitation Monitoring Network for the Pleasant Valley Basin). The precipitation gauges are maintained, and data are collected, by VCWPD and the National Weather Service.

Precipitation in the PVB has been recorded for more than a century (Figure 1-5, Pleasant Valley Annual Precipitation). Although the locations of individual precipitation gauges have changed through time with some gauges being removed from service and others added, there is overlap between the records collected from the various gauges. Therefore a continuous precipitation record can be constructed for the PVB to demonstrate long-term trends. More recent data collected at higher frequencies can be used to demonstrate short term and seasonal trends in precipitation.

In addition to providing adequate temporal coverage of precipitation in the PVB, the current network of precipitation gauges includes sites in every management area of the PVB. This is sufficient spatial coverage to document precipitation in the PVB and to connect the precipitation measurements to both streamflow and groundwater conditions. Additional precipitation monitoring locations are not currently recommended for characterizing surface conditions in the PVB.

4.3 MONITORING NETWORK RELATIONSHIP TO SUSTAINABILITY INDICATORS

To document changes in groundwater conditions related to each of the six sustainability indicators, monitoring will be conducted, using the existing network of groundwater wells (Figures 4-1 and 4-2). This network includes a greater number of wells than the list of key wells provided in Chapter 3, Sustainable Management Criteria, of this GSP (see Tables 4-3 and 4-4). Minimum thresholds and measurable objectives have been selected for the set of key wells, but have not been selected for every well used to monitor groundwater conditions in the PVB. Conditions measured in the key wells will be used to document progress toward the sustainability goals. Groundwater conditions measured in the broader network of wells, which includes the key wells, will be used to document conditions in the PVB at a greater spatial coverage than is provided by the key wells. Recommendations and findings based on the key well data will be supported by the data collected by the broader well network.

4.3.1 Chronic Lowering of Groundwater Levels

To monitor conditions related to chronic lowering of groundwater levels, the groundwater monitoring network must be structured to accomplish the following:

- Track short-term, seasonal, and long-term trends in water elevation.
- Demonstrate groundwater elevations in mid-March and mid-October for each primary aquifer or aquifer system.
- Record groundwater elevations in key wells in which minimum thresholds and measurable objectives have been identified to track progress toward the sustainability goals for the PVB.

Spatial Coverage by Aquifer

The PVB monitoring well density for groundwater elevations varies by aquifer. There are no dedicated monitoring wells or production wells screened solely in the Shallow Alluvial Aquifer in the PVB. Currently the Shallow Alluvial Aquifer is not a major source of groundwater for agricultural or industrial use in the PVB. If future projects propose using water in the Shallow Alluvial Aquifer, a dedicated monitoring well will need to be added to the monitoring network to assess the potential impacts on the ability of the PVB to meet the sustainability goals.

In the older alluvium, there is one dedicated monitoring well that is screened in the age equivalent strata to what is referred to as the Oxnard Aquifer in the Oxnard Subbasin (Figure 4-1). In addition to the dedicated monitoring well in the older alluvium, there is also a production well that is screened in the age-equivalent strata to what is referred to as the Mugu Aquifer in the Oxnard Subbasin (Figure 4-1). The density of wells screened in the older alluvium is approximately 1 well per 16 square miles (the PVB area is approximately 31 square miles). Although there is no definitive rule for the density of groundwater monitoring points needed in a basin, for comparison the monitoring well density recommended by CASGEM Groundwater Elevation Monitoring Guidelines ranges from 1 to 10 wells per 100 square miles (DWR 2010). Additional DWR guidelines recommend a well network with a density of 1 observation per 16 square miles (DWR 2010, 2016b). Therefore, the density of wells in the older alluvium meets the criteria for adequate coverage to accomplish the objectives of the monitoring well network for determining chronic declines in groundwater elevation.

There is one dedicated monitoring well screened in the Upper San Pedro Formation (USP) in the PVB, which is the age equivalent of the Hueneme Aquifer in the Oxnard Subbasin (34G04; Figure 4-1). Thus, the density of monitoring network wells that are screened in the USP is approximately 1 well per 31 square miles. The USP is not a major water-producing aquifer in the PVB (see Section 2.4, Water Budget). Because the well density fits within the CASGEM Groundwater Elevation Monitoring Guidelines and the USP is not a primary aquifer in the PVB, the density of wells in the USP is adequate to accomplish the objectives of the monitoring well network for determining chronic declines in groundwater elevation.

The Fox Canyon Aquifer (FCA), which is the primary groundwater aquifer in the PVB, has the highest density of wells in the monitoring network. There is one dedicated monitoring well screened solely within the FCA, and there are six production wells screened solely in the FCA (Figure 4-2). These production wells are included in the network of wells that is used to monitor groundwater conditions in the PVB. The density of wells in the monitoring network for the FCA is approximately 1 well per 4 square miles. Therefore, the density of wells in the FCA meets the criteria for adequate coverage to accomplish the objectives of the monitoring well network for determining chronic lowering of groundwater levels.

Although the active network of wells used to document chronic lowering of groundwater levels in the PVB has sufficient spatial density on the scale of the entire PVB, there are local areas in which coverage can be improved. Potential improvements in local coverage are discussed in Section 4.6.

Temporal Coverage by Aquifer

Groundwater elevation data will be collected from the network of groundwater wells to provide groundwater elevation conditions in the spring and fall of each year. Further discussion of the monitoring schedule is provided in Section 4.4, Monitoring Network Implementation.

4.3.2 Reduction of Groundwater Storage

To monitor conditions related to reduction of groundwater storage, the groundwater monitoring network must be structured to accomplish the following:

- Demonstrate groundwater elevations in mid-March and mid-October for each primary aquifer or aquifer system.
- Calculate year-over-year (mid-March to mid-March) change in storage by aquifer.
- Provide data from which lateral and vertical hydraulic gradients within and between aquifers can be calculated.
- Record groundwater elevations in key wells in which minimum thresholds and measurable objectives have been identified to track progress toward the sustainability goals for the PVB.

The requirements for documenting reduction in groundwater storage are similar to those for chronic lowering of groundwater levels (see Section 4.3.1), because these two sustainability indicators are interrelated. The primary difference between the two sets of requirements is the need to document potential gradients between aquifers. These gradients influence the movement of water between aquifers, which in turn influences storage in the aquifer.

Historically, the change in groundwater stored in freshwater aquifers in the PVB has been modeled by UWCD. After GSP adoption, modeled volumes of annual change in storage will be reported by aquifer and by year in annual reports. A standardized method to calculate the change in storage that relies solely on water elevations within each aquifer, rather than a numerical model, may also be developed as a check on the model predictions.

The spatial and temporal density of groundwater elevation data necessary to document groundwater storage changes in the aquifers of the PVB is the same as that necessary to document groundwater elevation changes. The current network of wells is capable of documenting changes to both sustainability indicators. Specific recommendations for potential improvements to local coverage are discussed in Section 4.6.

4.3.3 Seawater Intrusion

Direct seawater intrusion does not impact the PVB. To monitor groundwater conditions related to seawater intrusion in the Oxnard Subbasin, groundwater elevations will be measured in the PVB in such a way as to accomplish the following:

- Track short-term, seasonal, and long-term trends in water elevation.
- Demonstrate groundwater elevations in mid-March and mid-October for each primary aquifer or aquifer system.
- Record groundwater elevations in key wells in which minimum thresholds and measurable objectives have been identified to track progress toward the sustainability goals for the Subbasin.

These goals are the same as those for chronic lowering of groundwater levels and the spatial density of monitoring network wells required to meet these goals is also the same as the density requirement for documenting chronic lowering of groundwater levels. The current monitoring network provides adequate spatial coverage to accomplish these goals (see Section 4.3.1).

4.3.4 Degraded Water Quality

To monitor conditions related to degraded water quality, water quality samples will be collected in such a way as to track long-term trends in water quality that may impact beneficial uses and users of groundwater in the PVB. Specifically, these water quality samples should be targeted to constituents of concern and areas of the PVB that have documented or potential degradation related to groundwater production from the PVB.

Spatial Coverage by Aquifer

The network of wells currently used to monitor groundwater elevation conditions in each aquifer is sufficient to determine trends in groundwater quality as well. The primary area of concern for groundwater quality degradation relating to groundwater elevations in the PVB is the PVPDMA. Seven wells in the monitoring network are located in the PVPDMA. Four of these wells are screened in the FCA, while the other three are screened in the Older Alluvium and the USP. This provides an adequate spatial density for the PVPDMA, although it should be noted that all of the monitoring network wells in this management area are located north of 5th Street (Figures 4-1 and 4-2). Consequently, recommendations for potential improvements to local coverage in the PVPDMA are discussed in Section 4.6.

In the NPVMA, the primary concern with groundwater quality is related to infiltration of surface water along Arroyo Las Posas. This concern occurs from both direct surface water infiltration in the PVB and from infiltration of surface water in the Las Posas Valley Basin that migrates into the PVB as subsurface flow in the Shallow Alluvial Aquifer (see Section 2.3). There is one well in the PVB monitoring network adjacent to the boundary with the Las Posas Valley Basin and close to Arroyo Las Posas. Data from this well will be used to constrain groundwater conditions and groundwater quality related to infiltrating surface water in the NPVMA.

Water Quality Constituents

Monitoring and annual reporting has occurred for constituents that are associated with a water quality threshold adopted by the FCGMA Board of Directors or by the Los Angeles Regional Water Quality Control Board. These constituents are TDS, chloride, nitrate, sulfate, and boron. The network of existing wells is capable of providing an adequate assessment of groundwater quality trends for these constituents.

Temporal Resolution

Degradation of groundwater quality occurs on a longer time scale than changes in groundwater elevation. Historically, UWCD has collected water quality samples on a quarterly basis, and VCWPD has collected samples annually, although more frequent sampling can occur in some wells. These samples have provided information on trends in groundwater quality throughout the PVB. The temporal resolution of the data collection is adequate to document trends in groundwater concentration for the constituents identified by the FCGMA Board of Directors and the Los Angeles Regional Water Quality Control Board.

4.3.5 Land Subsidence

To monitor conditions related to land subsidence, groundwater elevations will be measured to determine if water levels fall below historical lows. Groundwater elevations are being used as a proxy for land subsidence in the PVB. The minimum thresholds identified at the key wells are above the historical low groundwater elevation. Therefore, it is not anticipated that specific land subsidence monitoring will be required for the PVB. Instead, the network of groundwater monitoring wells discussed in Sections 4.2.1 and 4.3.1 will be used to determine if land subsidence related to groundwater production may occur.

4.3.6 Depletions of Interconnected Surface Water

To monitor conditions related to depletions of interconnected surface water, surface water flows and shallow groundwater will be measured in such a way as to accomplish the following:

- Track short-term, seasonal, and long-term trends in groundwater elevation in the Shallow Alluvial Aquifer adjacent to Arroyo Las Posas, Conejo Creek, and Calleguas Creek.

- Demonstrate groundwater elevations in mid-March and mid-October for the Shallow Alluvial Aquifer adjacent to Arroyo Las Posas, Conejo Creek, and Calleguas Creek.
- Record groundwater elevations in key wells in which minimum thresholds and measurable objectives have been identified to track progress toward the sustainability goals for the PVB.

The existing network of wells used to document groundwater conditions in the PVB does not include a well screened solely in the shallow aquifer. Historical data indicate that groundwater elevations are typically lower than the bottom of the ephemeral stream channels in the PVB, and have been lower than typical riparian vegetation rooting depths as recently as the 1980s along Arroyo Las Posas (see Section 2.3.7, Groundwater-Dependent Ecosystems). Portions of lower Arroyo Las Posas, Calleguas Creek, and Conejo Creek have been identified as potential groundwater dependent ecosystems because riparian communities have developed adjacent to the stream bed. However, these streams are losing streams and the degree to which the vegetation is reliant on groundwater versus unsaturated soil water is unknown (see Section 2.3.7). To characterize the relationship between the riparian vegetation and water levels in the Shallow Alluvial Aquifer, shallow monitoring wells could be installed in the Shallow Alluvial Aquifer. These potential improvements to the monitoring well network are discussed further in Section 4.6.

4.4 MONITORING NETWORK IMPLEMENTATION

4.4.1 Groundwater Elevation Monitoring Schedule

To reduce uncertainty associated with hydraulic gradients and to follow guidance documents produced by DWR (DWR 2016b), water level measurements used in the evaluation of seasonal high and seasonal low groundwater conditions should collected in a 2-week window in mid-March and mid-October (specifically, March 9–22 and October 9–22 of any given calendar year).

Short-term trends in groundwater elevation are currently, and will continue to be, monitored using transducers that are operated and maintained by UWCD. Data from these transducers are downloaded quarterly and are stored in a central database.

Seasonal and long-term trends in groundwater elevation are monitored using the transducer data and manual measurements made by UWCD on a monthly or bimonthly basis, and manual measurements made by VCWPD on a quarterly basis. Additional manual water level measurements made by other partner agencies (e.g., the City of Camarillo or mutual water districts) are typically sent to VCWPD annually.

4.4.2 Groundwater Storage Monitoring Schedule

Groundwater storage is directly related to, and calculated from, groundwater elevations. Consequently, the schedule for monitoring groundwater storage is the same as that for monitoring groundwater elevations.

4.4.3 Seawater Intrusion Monitoring Schedule

No monitoring schedule is required for seawater intrusion because the PVB does not experience direct seawater intrusion.

4.4.4 Water Quality Monitoring Schedule

UWCD conducts annual monitoring of groundwater quality in the dedicated nested monitoring well cluster in the PVB. Groundwater quality monitoring should continue on the same schedule in order to document groundwater quality trends in the PVB. Annual reviews of the groundwater quality trends will be used to assess whether sampling frequency needs to be adjusted.

4.4.5 Groundwater Extraction Monitoring Schedule

Monitoring of groundwater extraction rates will take place continuously, using flow meters and telemetry equipment installed on individual wellheads, and monthly totals of pumped water will be transmitted to a central database maintained by FCGMA.

4.5 PROTOCOLS FOR DATA COLLECTION AND MONITORING

Protocols for collecting groundwater level measurements and water quality samples, as well as downloading transducers and logging the borehole of newly drilled wells, are included in the Monitoring Protocols Best Management Practices (BMPs) produced by DWR (DWR 2016a). The FCGMA plans to work with agency partners to ensure that future data collection is conducted according to relevant protocols in the BMPs. Current practices used by VCWPD and UWCD are described in this section.

VCWPD Protocols

VCWPD technicians collect water levels using steel tapes. For a well that is too deep for the tape, an acoustical sounder or an air pressure gauge is used, and the measurement is stored in the database with a Questionable Measurement Code indicating that alternate equipment was used.

VCWPD technicians collect water quality samples from production wells using the installed pump equipment. A three-volume purge, or a testing of groundwater parameters including pH, temperature, and electrical conductivity, is conducted to determine whether the water at the wellhead is representative of groundwater in the aquifer. Water quality samples are then sent to an analytical laboratory, where they are filtered and preserved.

UWCD Protocols

UWCD technicians collect water levels using a variety of equipment, including dual wire and single wire sounders and metal tapes. In the event that the well contains a pump, the technician manually tests the approximate temperature of the pump housing. If the pump housing is warm, the water level that is entered into the database is qualified with a Questionable Measurement Code, indicating recent pumping. UWCD also considers other indicators, such as wet conditions at wells and in nearby fields, to evaluate if water levels may not be static.

UWCD technicians collect water quality samples using the three-volume purge method, and follow U.S. Geological Survey guidelines for groundwater quality sampling. For shallow wells, a Grundfos Redi-Flo pump is used to purge and sample the groundwater. For deeper wells, a compressor is used to airlift the groundwater for purging and sampling. On rare occasions, a bailer is used to purge and sample.

4.6 POTENTIAL MONITORING NETWORK IMPROVEMENTS

The existing monitoring network in the PVB is sufficient to document groundwater and can be used to document progress toward the sustainability goals for the PVB. However, analysis of the monitoring network also indicates that there are areas in which data coverage and monitoring efforts can be improved in the future. Areas for improvement of the existing monitoring network and data infrastructure system are described in the following sections.

4.6.1 Water Level Measurements: Spatial Data Gaps

Additional monitoring wells could be used to improve spatial coverage for groundwater elevation measurements in all three management areas of the PVB. Wells that are added to the network should be dedicated monitoring well clusters, with individual wells in the cluster screened in a single aquifer. The potential improvements to the monitoring network in each aquifer are shown on Figure 4-5, Approximate Locations and Screened Aquifers for Proposed New Monitoring Wells in the Pleasant Valley Basin.

In the PVPDMA, the groundwater monitoring network in the PVB could be improved by adding a monitoring well or wells to the south of 5th Street (Figure 4-5). An additional well, or wells, in this area would provide aquifer specific groundwater elevations in an area that does not have a well screened in any of the primary aquifers in the PVB that is suitable for inclusion in the monitoring network. Groundwater elevation measurements in this area would help constrain groundwater gradients across the boundary between the PVB and the Oxnard Subbasin. FCGMA has applied for funding through a DWR Technical Support Services (TSS) monitor well funding grant to add a monitoring well in the PVPDMA.

In the NPVMA, the groundwater monitoring network could be improved by adding a monitoring well or wells. Currently, there are no dedicated monitoring wells screened in any of the primary aquifers in this NPVMA. Adding a monitoring well would provide for aquifer-specific water levels that would improve the understanding of groundwater gradients between the PVPDMA and the NPVMA.

There are no monitoring wells in the East Pleasant Valley Management Area (Figures 4-1 and 4-2). Addition of a monitoring well in the vicinity of Calleguas Creek, downstream of the junction between Lower Arroyo Las Posas and Conejo Creek, would improve understanding of groundwater conditions in this management area. It would also provide data to help constrain the relationship between groundwater elevations in the East Pleasant Valley Management Area and groundwater conditions in the adjacent PVPDMA.

In the shallow alluvial aquifer a dedicated shallow monitoring well adjacent to Calleguas Creek, Conejo Creek, and Lower Arroyo Las Posas could be used to help understand the relationship between surface water and groundwater along these stream courses. These wells would be used to help assess whether riparian vegetation is accessing groundwater in the Shallow Alluvial Aquifer, or is reliant on soil moisture from infiltrating surface water.

New wells will be constructed to applicable well installation standards set in California DWR Bulletin 74-81 and 74-90, or as updated (DWR 2016b). It is recommended that, where feasible, new wells be subjected to pumping tests in order to collect additional information about aquifer properties in the vicinity of new monitoring locations.

Proposed locations are approximate and subject to feasibility review (accounting for infrastructure, site acquisition, and site access among other factors), after GSP submittal. The schedule for new well installation will be developed in conjunction with feasibility review.

4.6.2 Water Level Measurements: Temporal Data Gap

The DWR Monitoring Protocols BMP (DWR 2016a) states the following:

> Groundwater elevation data … should approximate conditions at a discrete period in time. Therefore, all groundwater levels in a basin should be collected within as short a time as possible, preferably within a 1 to 2 week period.

The DWR Monitoring Networks BMP (DWR 2016b) states the following:

> Groundwater levels will be collected during the middle of October and March for comparative reporting purposes.

Currently, groundwater elevation measurements are not scheduled according to these criteria. To minimize the effects of this type of temporal data gap in the future, it will be necessary to coordinate the collection of groundwater elevation data so it occurs within a 2-week window during the key reporting periods of mid-March and mid-October. The recommended collection windows are October 9–22 in the fall and March 9–22 in the spring (see Section 4.4).

Additionally, as funding becomes available, pressure transducers should be added to wells in the groundwater monitoring network. Pressure transducer records provide the high-temporal-resolution data that allows for a better understanding of water level dynamics in the wells related to groundwater production, groundwater management activities, and climatic influence.

4.6.3 Groundwater Quality Monitoring

Improvements to the groundwater quality monitoring network include increasing the spatial density of samples by collecting water quality samples from all wells in the monitoring network, and ensuring that water quality samples are collected at least annually from each well. Annual groundwater quality samples should also be collected from wells that are added to the groundwater elevation monitoring network in the future.

Additionally, the current analyte list should be expanded to include a full general minerals suite so that Stiff or Piper diagrams can be created to fully characterize the geochemical characteristics of the groundwater and track changes over time.

4.6.4 Subsidence Monitoring

Currently, neither FCGMA nor its partner agencies in the region monitor land subsidence. UNAVCO monument CSCI is located immediately adjacent to the southern boundary of PVB in the foothills of the Santa Monica Mountains (see Section 2.3.5). There has been no net subsidence at this monument since its installation in November 2000. Because of the placement of this monument in the foothills of the Santa Monica Mountains, elevations measured there reflect tectonic forces rather than the influence of groundwater withdrawals. Subsidence related to groundwater production is not anticipated to occur in the PVB in the future as groundwater elevations recover to levels that are above the minimum thresholds, which are above historical low groundwater elevations. Preexisting GPS-based benchmarks are not well suited for monitoring land subsidence in the event that groundwater elevations drop below historical low levels for an extended period of time and the potential for land subsidence to substantially interfere with surface land uses is determined (see Section 3.3.5, Land Subsidence). If this occurs, subsidence monitoring would have to be added to the monitoring network.

4.6.5 Shallow Groundwater Monitoring near Surface Water Bodies and GDEs

As discussed in Section 4.6.1 (Water Level Measurements: Spatial Data Gaps), there are no dedicated monitoring wells that can be used to monitor shallow groundwater that may be interconnected with surface water bodies, or sustain potential GDEs in the PVB. Additionally, historical records of shallow groundwater elevations are limited. Water level records in the younger alluvium are available from shallow wells associated with groundwater remediation cases and made available on GeoTracker. Because these shallow wells were installed for specific remediation cases and are not controlled by FCGMA or its partner agencies, these wells may be destroyed after the cases are closed. Therefore, the possibility of using them for future monitoring is uncertain.

To fill the existing data gap and to assist with understanding the potential connectivity between shallow groundwater and potential GDEs, shallow dedicated monitoring wells can be added within the boundaries of the potential GDE along the Arroyo Las Posas, Conejo Creek, and Calleguas Creek.

4.6.6 Surface Water: Flows in Agricultural Drains in the PVB

Discharge flows are currently unmeasured in the drainage system, frequently referred to as the "tile drains," that was installed in order to develop land in the western PVB, which was formerly affected by high soil salinity levels, for agriculture (Isherwood and Pillsbury 1958). The tile drains are typically located 6 to 7 feet below ground surface, though the depth varies and is not well documented in most areas. Shallow groundwater entering the drains discharges to central drainage ditches, and from there flow into local surface waters.

Metering flow in the tile drains would provide an important check on numerical groundwater results and would also provide valuable information about the water resource potential of the semi-perched aquifer. A feasibility study is recommended to identify the best locations in the drainage system for installing flowmeters.

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Table 4-1
Network of Stations Monitoring Surface Flows in the Vicinity of the Pleasant Valley Basin

Station Number	Station Name	Latitude	Longitude	Elevation (ft msl)	Gauge Type	USGS ID
800	Conejo Creek by Highway 101	34.236528	−118.964583	145	Recording Stream Gauge	11106400
800A	Conejo Creek at Ridge View Street	34.205828	−118.998789	105	Recording Stream Gauge	—
805	Calleguas Creek at CSUCI	34.179028	−119.039528	58	Recording Stream Gauge	11106550
806A	Calleguas Creek at Highway 101	34.215374	−119.01554	152	Peak Only (Event) Gauge	11106000
835	Camarillo Hills Drain by Highway 101	34.216361	−119.068556	84	Peak Only (Event) Gauge	-

Notes: CSUCI = California State University Channel Islands; ft msl = feet above mean sea level; USGS = U.S. Geological Survey.
Table shows results from active gauges only, as of August 2016.

Table 4-2
Network of Stations Monitoring Precipitation in the Vicinity of the Pleasant Valley Basin

Station Number	Station Name	Latitude	Longitude	Elevation (ft msl)	Gauge Type	USGS ID
194A	Camarillo–Adohr (Sanitation Plant)	34.196769	−119.00241	110	Recording Precipitation Gauge	—
219A	Camarillo–Hauser	34.237126	−119.027131	192	Standard Precipitation	—
259	Camarillo–PVWD	34.213014	−119.069475	80	Recording Precipitation Gauge	—
263A	Camarillo–Leisure Village CIMIS 152	34.219553	−118.992344	115	CIMIS Site	—
500A	Camrosa Water District	34.238726	−118.967411	200	Recording Precipitation Gauge	—
505	Camarillo–CSUCI (Type B)	34.179028	−119.039528	58	Non-Standard Recorder	—
509	Spanish Hills–Las Posas Res (Type B)	34.226355	−119.086301	300	Non-Standard Recorder	—
512	Camarillo–Upland (Type B)	34.239469	−119.007585	0	Non-Standard Recorder	—

Notes: CIMIS = California Irrigation Management Information System; CSUCI = California State University Channel Islands; ft msl = feet above mean sea level; USGS = U.S. Geological Survey.
Table shows results from active gauges only, as of August 2016.

Table 4-3
Current VCWPD Monitoring Schedule for Wells in the Pleasant Valley Basin

State Well Number	Main Use	Screened Aquifer	Screened Aquifer System	Manual Water Levels Monitored by VCWPD[a]	Water Quality Samples Collected by VCWPD[a]	Twice-Yearly Water Quality Sampling Required after GSP Adoption
01N21W01B05S	Agricultural	Unassigned	Unassigned		Yes	Yes
01N21W02J02S	Agricultural	Multiple	UAS	Yes		
01N21W02P01S	Domestic	Multiple	Unassigned	Yes		Yes
01N21W03C01S	Agricultural	FCA	LAS	Yes		
01N21W03D01S	Agricultural	Multiple	Both		Yes	Yes
01N21W03K01S	Agricultural	Mugu	LAS		Yes	Yes
01N21W03R01S	Agricultural	Multiple	LAS		Yes	Yes
01N21W04K01S	Agricultural	Multiple	LAS	Yes	Yes	Yes
01N21W09J03S	Agricultural	Multiple	LAS	Yes		
01N21W10A02S	Domestic	Unassigned	UAS		Yes	Yes
01N21W10G01S	Agricultural	Multiple	LAS	Yes	Yes	Yes
01N21W12D02S	Agricultural	Unassigned	Unassigned		Yes	Yes
01N21W14A01S	Agricultural	Unassigned	Unassigned	Yes		
01N21W15D02S	Agricultural	Multiple	LAS		Yes	Yes
01N21W15H01S	Domestic	Multiple	UAS	Yes	Yes	Yes
02N20W19M05S	Monitoring	Multiple	Unassigned	Yes		
02N20W28G02S	Agricultural	Multiple	Unassigned	Yes		
02N20W29B02S	Municipal	Unassigned	Unassigned		Yes	Yes
02N21W33P02S	Agricultural	Multiple	LAS	Yes		
02N21W34C01S	Municipal	FCA	LAS		Yes	Yes
02N21W34G01S	Agricultural	Multiple	LAS		Yes	Yes
02N21W35M02S	Agricultural	Multiple	LAS	Yes		
02N21W36N01S	Agricultural	Multiple	UAS	Yes		

Notes: FCA = Fox Canyon Aquifer; GSP = Groundwater Sustainability Plan; LAS = Lower Aquifer System; UAS = Upper Aquifer System; VCWPD = Ventura County Watershed Protection District.
Table shows monitoring schedule and status as of October 2017.
[a] As of October 2017.

Table 4-4
Current UWCD Monitoring Schedule for Wells in the Pleasant Valley Basin

State Well Number	Main Use	Screened Aquifer	Screened Aquifer System	Manual Water Levels Measured Bimonthly or Monthly	Transducer in Well	Water Quality Samples Collected Quarterly	Twice-Yearly Water Quality Sampling Required after GSP Adoption
01N21W10G01S	Agricultural	Multiple	LAS	Yes	Yes		
01N21W12D01S	Agricultural	Multiple	UAS	Yes			
01N21W15J04S	Agricultural	Multiple	LAS	Yes			
02N21W34G02S	Monitoring	FCA	LAS	Yes		Yes	Yes
02N21W34G03S	Monitoring	FCA	LAS	Yes	Yes	Yes	Yes
02N21W34G04S	Monitoring	Hueneme	LAS	Yes	Yes	Yes	Yes
02N21W34G05S	Monitoring	Oxnard	UAS	Yes		Yes	Yes
02N21W34G06S	Monitoring	Unknown	Aquitard	Yes		Yes	Yes

Notes: FCA = Fox Canyon Aquifer; GSP = Groundwater Sustainability Plan; LAS = Lower Aquifer System; UAS = Upper Aquifer System; VCWPD = Ventura County Watershed Protection District.
Table shows monitoring schedule and status as of October 2017.
[a] As of October 2017.

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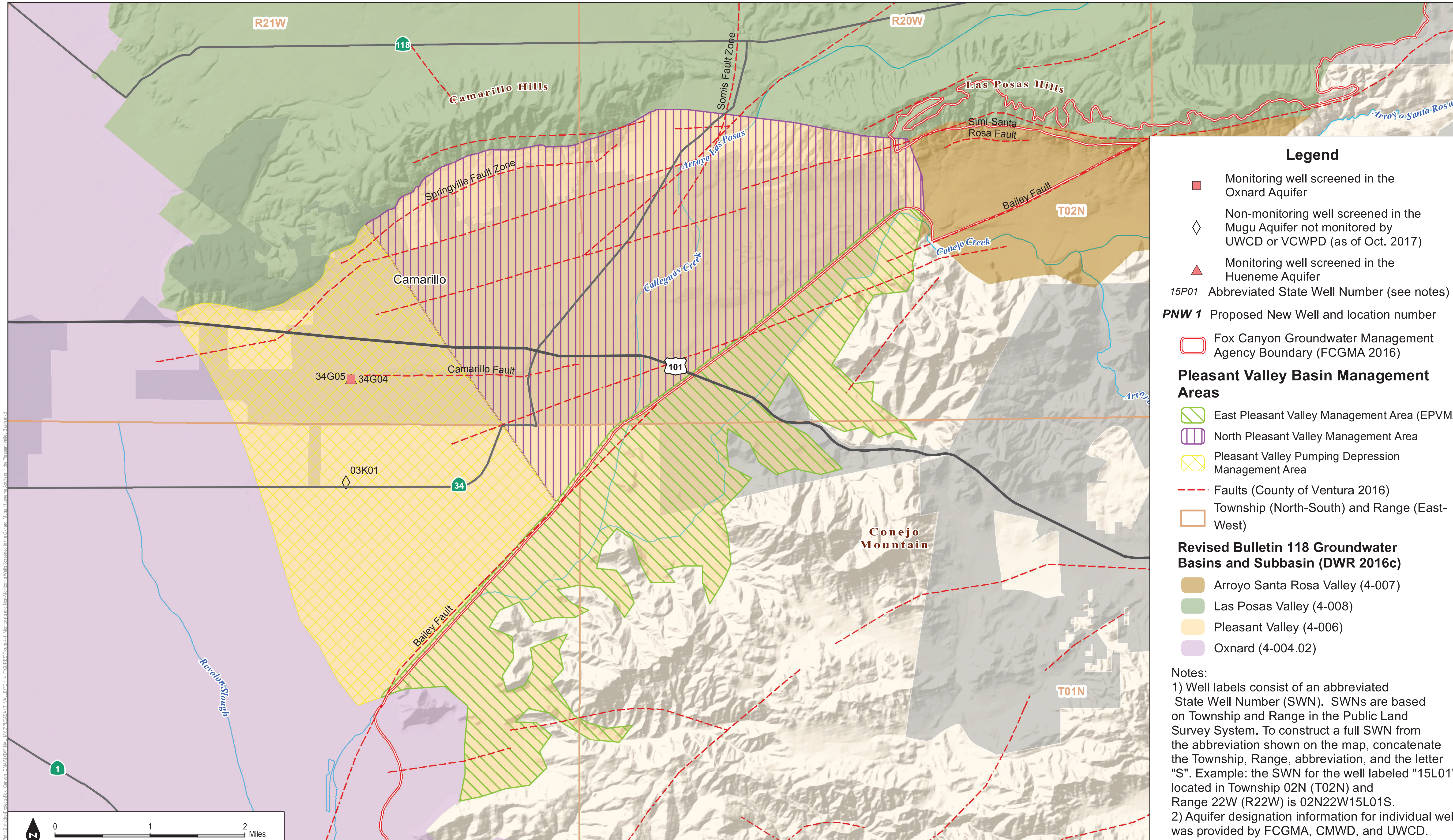

DUDEK

SOURCE: DWR; County of Ventura; UWCD; CMWD

FIGURE 4-1

Monitoring and Non-Monitoring Wells Screened in the Oxnard, Mugu, and Hueneme Aquifers in the Pleasant Valley Basin

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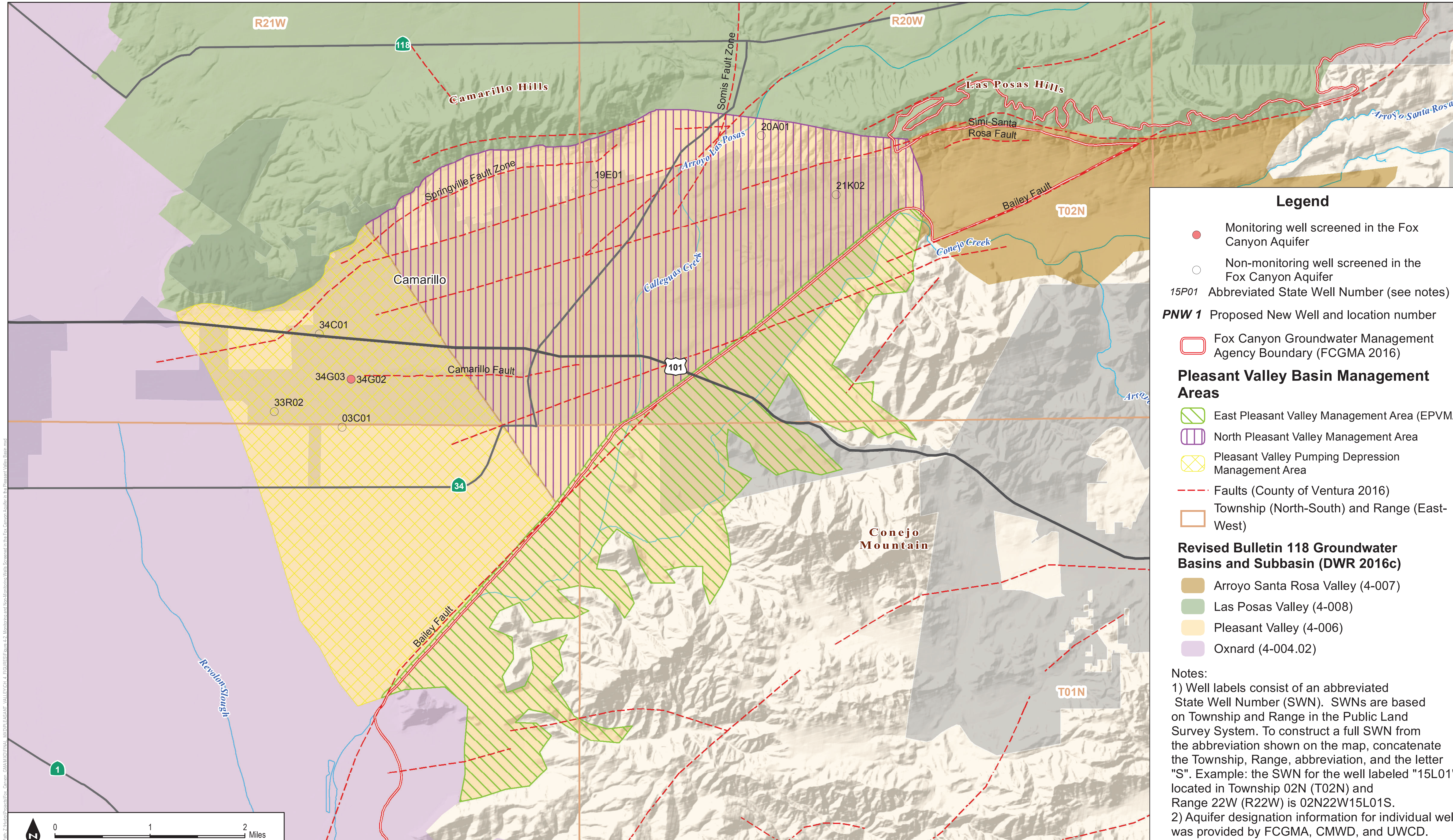

DUDEK

SOURCE: DWR; Ventura County; UWCD; CMWD

FIGURE 4-2

Monitoring and Non-Monitoring Wells Screened in the Fox Canyon Aquifer in the Pleasant Valley Basin

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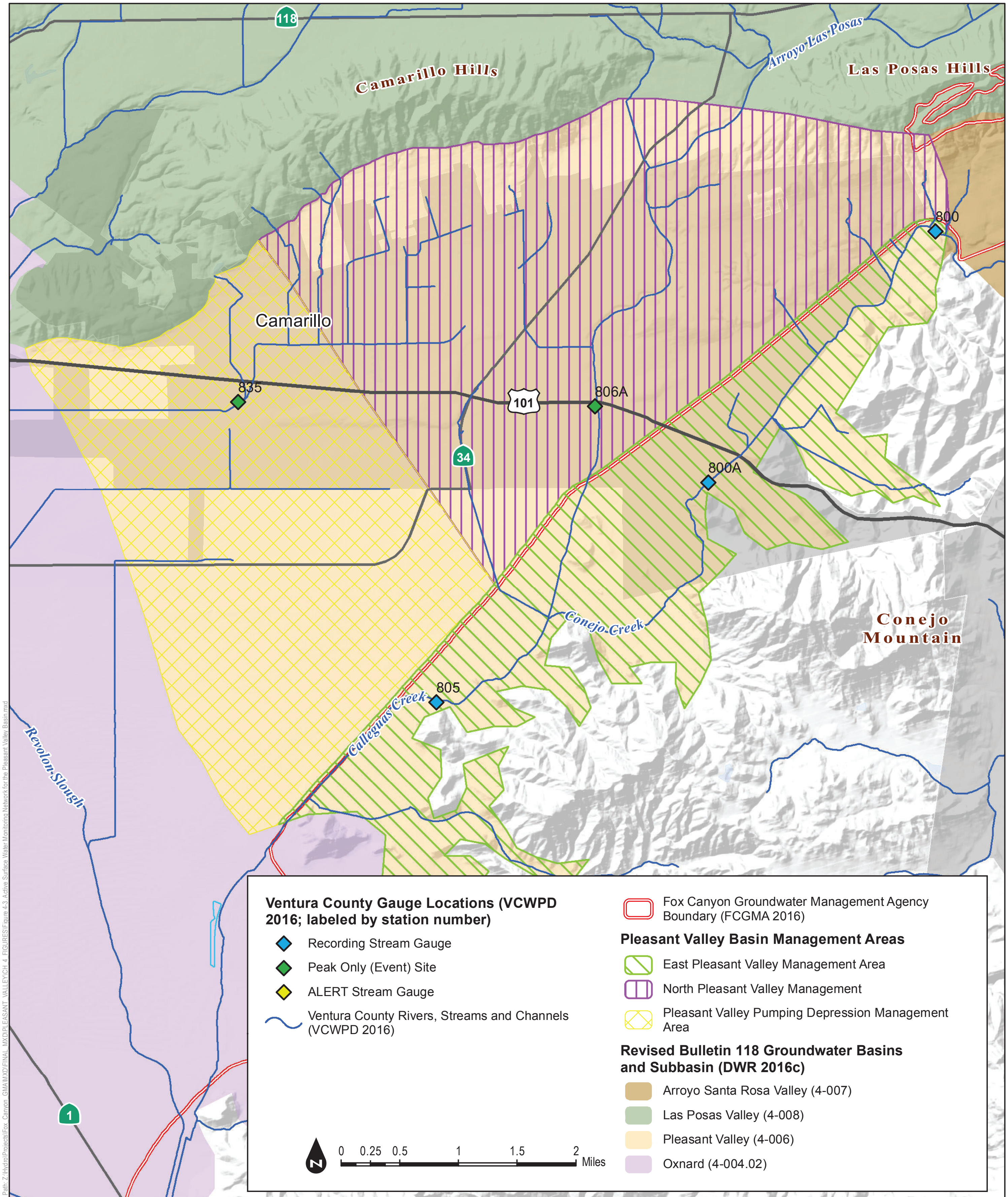

DUDEK

SOURCE: DWR; County of Ventura; VCWPD

FIGURE 4-3

Active Surface Water Monitoring Network for the Pleasant Valley Basin

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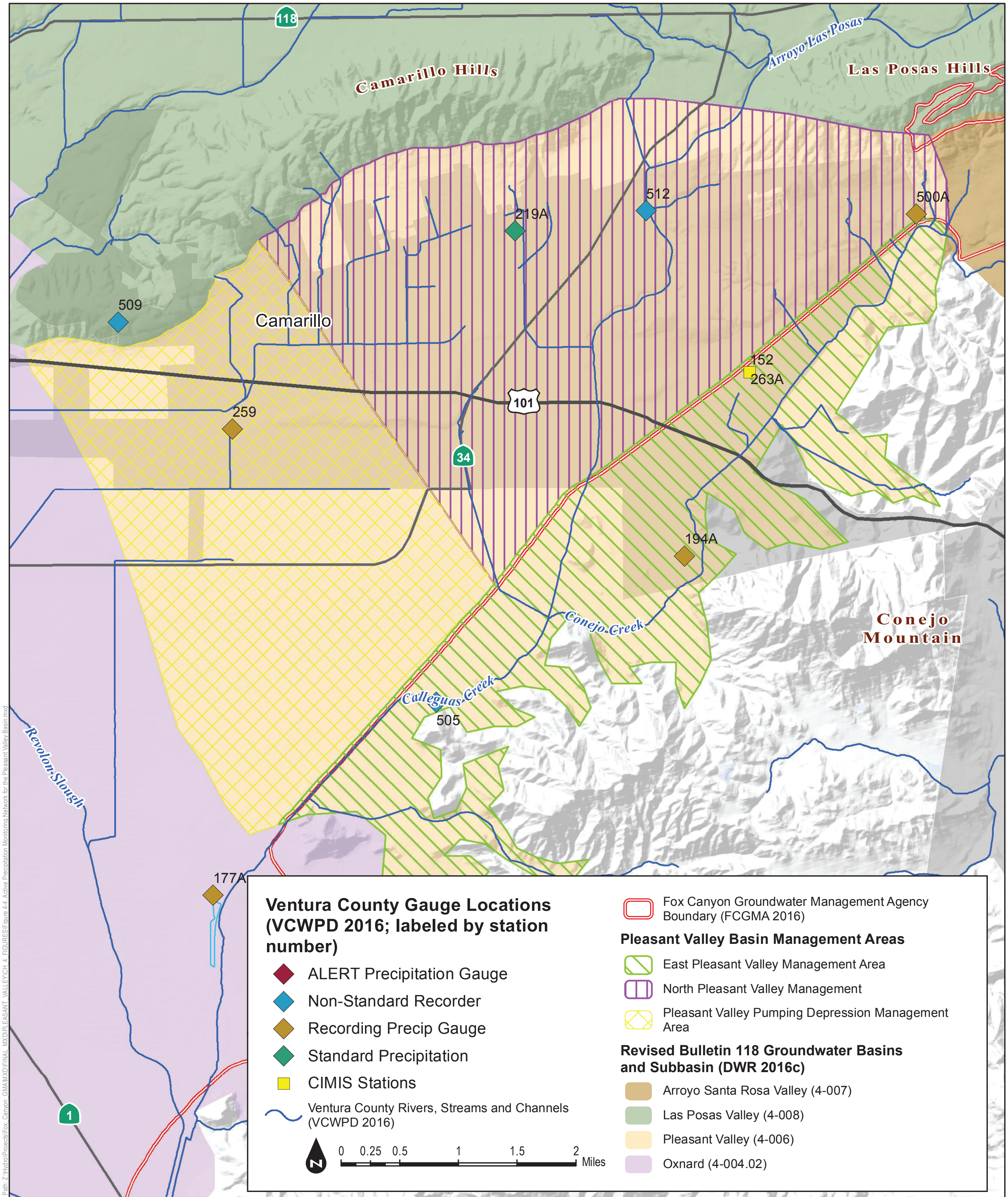

SOURCE: DWR; County of Ventura; VCWPD

FIGURE 4-4

Active Precipitation Monitoring Network for the Pleasant Valley Basin

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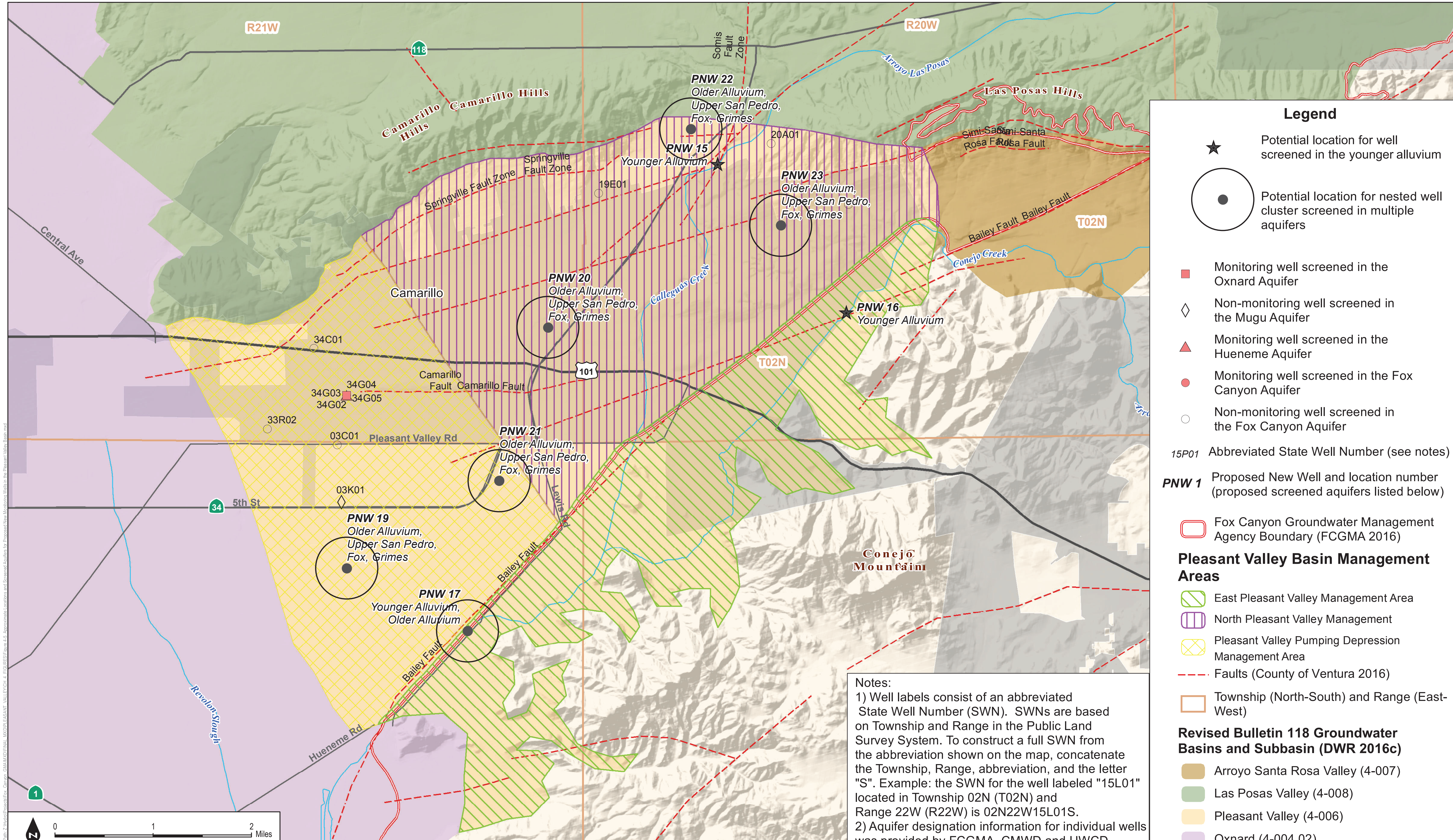

DUDEK

SOURCE: DWR; Ventura County; UWCD; CMWD

FIGURE 4-5

Approximate Locations and Screened Aquifers for Proposed New Monitoring Wells in the Pleasant Valley Basin

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CHAPTER 5
PROJECTS AND MANAGEMENT ACTIONS

5.1 INTRODUCTION TO PROJECTS AND MANAGEMENT ACTIONS

Projects and management actions have been developed to meet the sustainability goal, measurable objectives, and undesirable results identified for the Pleasant Valley Basin (PVB) in Chapter 3, Sustainable Management Criteria, of this Groundwater Sustainability Plan (GSP). Groundwater elevations in the PVB that contribute to seawater intrusion in the aquifers of the Upper Aquifer System and Lower Aquifer System of the Oxnard Subbasin, as well as chronic lowering of groundwater levels and associated loss of storage have been identified as the undesirable results that have the potential to impact beneficial uses of groundwater in the PVB.

One project in the PVB was approved for incorporation in the predictive numerical model simulations of future conditions in the PVB and Oxnard Subbasin. The project described below was suggested by stakeholders, selected for inclusion in the GSP through a process by the Operations Committee of the Fox Canyon Groundwater Management Agency (FCGMA) Board of Directors (Board), and approved for inclusion in the GSP by the FCGMA Board. The criteria for including a project in the GSP included the following:

- Sufficient project information is available for evaluation and modeling.
- Project increases sustainable yield, or reduces groundwater demand.
- Project implementation is planned within 20 years,
- Project meets GSP Emergency Regulations Section 354.44 criteria.
- There is an agency proponent for the project.
- Funding for the project is identified.

In the PVB, the projects that were determined by the Operations Committee to meet these criteria were incorporated into the future model scenarios to the extent possible (see Section 2.4.5, Projected Water Budget and Sustainable Yield). The inclusion of these projects does not constitute a commitment by the FCGMA Board to undertake them, but rather signals that these projects were sufficiently detailed to be included in groundwater modeling efforts that examined the quantitative impacts of the projects on groundwater elevations and the sustainable yield of the PVB and the adjacent Oxnard Subbasin. As currently envisioned, the projects in this GSP would be implemented by the project proponent or sponsoring agency. However, FCGMA may opt to implement projects in the future, as necessary to achieve sustainability in the PVB. Additionally, it should be noted that any future projects undertaken in the PVB will need to be approved and permitted by all relevant regulatory agencies. These agencies may include, but are not limited to, the Regional Water Quality Control Board and the State Water Resources Control Board.

In addition to the project discussed below, the FCGMA Board has the authority to implement management actions to ensure that the PVB and the adjacent Oxnard Subbasin do not experience undesirable results. The primary management action that can be implemented by the FCGMA Board is restrictions on groundwater production. This authority was granted to the FCGMA Board in the enabling legislation that formed FCGMA, and this action has been undertaken in the past to eliminate overdraft.

As discussed in Chapter 2, Basin Setting, groundwater modeling was used to evaluate projected water budget conditions and potential impacts to beneficial uses and users of groundwater in the basin. Without the type of projects described below, substantially greater reductions in groundwater production will be needed to meet the sustainability goal for the basin, which would lead to significant economic disruption and prevent groundwater in the basin from being put to beneficial use to the fullest extent possible. It is anticipated, and recommended, that FCGMA will evaluate, model, and conduct feasibility studies of other projects for achieving sustainable groundwater management for the 5-year update to this GSP to optimize basin management and minimize extraction restrictions.

5.2 PROJECT NO. 1 – TEMPORARY AGRICULTURAL LAND FALLOWING PROJECT

5.2.1 Description of Project No. 1

Temporary fallowing is a quick way to reduce demand with no capital costs or infrastructure needed. Because it is inexpensive, it is envisioned that it could be implemented early while other long-term solutions are being investigated and implemented. The Temporary Agricultural Land Fallowing Project would use replenishment fees to lease and temporarily fallow agricultural land (FCGMA 2018). This would result in decreased groundwater production on the parcels or ranches that are fallowed, and an overall reduction in groundwater demand in the PVB. Parcels or ranches in areas susceptible to contributing to seawater intrusion in the adjacent Oxnard Basin would be the focus of this project (FCGMA 2018).

5.2.2 Relationship of Project No. 1 to Sustainability Criteria

Temporary fallowing of agricultural land was included in future groundwater modeling scenarios to examine the impact that the project will have on the sustainability criteria (see Section 2.4.5). The future model scenarios incorporated additional projects in the adjacent Oxnard Subbasin, and did not quantify the impact from any individual project included in the model. Rather, the potential effect of this project in the context of all of the projects is presented below.

Relationship to Minimum Thresholds

As modeled, the Temporary Agricultural Land Fallowing Project reduced production from the PVB by approximately 2,230 acre-feet per year (AFY; see Section 2.4.5). The project as proposed would generate a reduction in pumping of approximately 2,400 AFY. The difference between the proposed project reduction and the model reduction is related to considerations of existing contracts for the delivery of surface water from the Santa Clara River.

The numerical groundwater model simulation of the Future Baseline With Projects Scenario, which incorporates potential future projects including the Temporary Agricultural Land Fallowing Project, results in higher groundwater elevations than the Future Baseline Scenario, which does not incorporate projects (see Section 2.4, Water Budget). This suggests that the projects will assist with water level recovery in the PVB, a necessary first step to avoid exceedance of the minimum thresholds. Although implementation of the projects increases water levels in the PVB, these projects alone did not provide sufficient supplemental water or redistribution of groundwater production to meet the minimum thresholds.

Relationship to Measurable Objectives

The relationship of the Temporary Agricultural Land Fallowing Project to the measurable objectives is similar to its relationship to the minimum thresholds. By increasing water levels and fallowing agricultural land, the Temporary Agricultural Land Fallowing Project will help the PVB meet the measurable objective water levels defined in Chapter 3.

5.2.3 Expected Benefits of Project No. 1

The Temporary Agricultural Land Fallowing Project will benefit the PVB by lessening pumping reductions for agricultural users of the PVB whose lands remain in production, while providing compensation for agricultural users who choose to fallow parcels of land. This project would complement a water market that is currently being developed for the Oxnard Subbasin and may be expanded into the PVB by providing an alternative method for landowners to monetize pumping allocations (FCGMA 2018).

5.2.4 Timetable for Implementation of Project No. 1

Temporary fallowing is a quick way to reduce demand with no capital costs or infrastructure needed. Because it is inexpensive, it is envisioned that it could be implemented early while other long-term solutions are being investigated and implemented. The project is currently in the planning phase but does not require construction of new facilities and is unlikely to require permitting. California Environmental Quality Act compliance has not yet been initiated, but the project proponents anticipate that a negative declaration or a mitigated negative declaration may be sufficient (FCGMA 2018). The project could be implemented when FCGMA is able to collect replenishment fees and willing lessors are found to participate.

5.2.5 Metrics for Evaluation of Project No. 1

The metric for evaluation of the Temporary Agricultural Land Fallowing Program will be the volume of groundwater that is not produced from wells that supply the fallowed acreage. FCGMA has required groundwater production reporting since 1983. Groundwater production rates from before the project is implemented will be compared to groundwater production rates when the parcel or ranch has been fallowed. The historical production rates and associated base period for calculating those rates will be determined in the future if the project is implemented.

5.2.6 Economic Factors and Funding Sources for Project No. 1

The funding source for this project is anticipated to be replenishment fees collected by FCGMA. The cost of the water is estimated to be $1,200 to $1,800 per acre-foot.

Any action taken by the FCGMA Board, acting as the GSA for the portion of the PVB in its jurisdiction, to impose or increase a fee shall be taken by ordinance or resolution. Should the FCGMA Board decide to fund a project through imposition of a replenishment fee, the FCGMA will hold at least one public meeting, at which oral or written presentations may be made. Notice of the meeting will include an explanation of the fee to be considered and the notice shall be provided by publication pursuant to Section 6066 of the California Government Code.[1] At least 20 days prior to the meeting, the GSA will make the data on which the proposed fee is based available to the public.

5.3 MANAGEMENT ACTION NO. 1 – REDUCTION IN GROUNDWATER PRODUCTION

5.3.1 Description of Management Action No. 1

The primary management action proposed under this GSP is a Reduction in Groundwater Production from the PVB. FCGMA has had the authority to monitor and regulate groundwater production in the PVB since 1983. The FCGMA Board has used its authority to reduce groundwater production from the PVB in the past, and will continue to exert its authority over groundwater production as the Groundwater Sustainability Agency for the PVB.

[1] Publication of notice pursuant to Section 6066 of the California Government Code "shall be once a week for two successive weeks. Two publications in a newspaper, published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates are sufficient."

The estimated long-term rate of groundwater production in the older alluvium that will prevent net seawater intrusion in the Upper Aquifer System of the adjacent Oxnard Subbasin after 2040 is approximately 4,300 AFY (see Section 2.4.5). The estimated long-term rate of groundwater production in the Lower Aquifer System that will prevent net seawater intrusion after 2040 is approximately 7,300 AFY (see Section 2.4.5). The uncertainty in the combined production from the older alluvium and the Lower Aquifer System is approximately ±1,000 AFY. Reductions in groundwater production were modeled as a linear decrease from the 2015–2017 production rates, and the modeled reductions in the PVB were higher than the estimated sustainable yield calculated based on all of the model scenarios (see Section 2.4.5). The exact reductions that will be implemented in the PVB over the next 5 years will be determined by the FCGMA Board based on the data collected and analyzed for this GSP. These reductions will be evaluated based on the potential paths to reaching sustainability discussed in Chapter 3.

5.3.2 Relationship of Management Action No. 1 to Sustainability Criteria

Reduction in Groundwater Production in the PVB has a measurable impact on groundwater elevations. Groundwater elevations, in turn, are a measure of groundwater in storage in the PVB, and influence seawater intrusion in the adjacent Oxnard Subbasin. The effect of reduced groundwater production on groundwater level elevations was simulated using a numerical groundwater model (see Section 2.4.5). The results of the model and the relationship between Reduction in Groundwater Production and the sustainability criteria is discussed in this section.

Relationship to Minimum Thresholds

In the absence of additional projects, purchase of imported water, and shifting groundwater production locations, Reduction in Groundwater Production in the PVB is a critical component of achieving sustainability. When groundwater production was reduced from the 2015–2017 average production rates, simulated future groundwater elevations in the PVB recovered to elevations that remained above the minimum threshold after 2040 (see Section 2.4.5). The long-term production rate necessary to maintain groundwater elevations above the minimum threshold depended on several factors, including the simulated future climate, the quantity of surface water available to recharge the PVB, and the number of projects undertaken. Therefore, the numerical groundwater simulation results suggest a range of potential reductions in groundwater production that will maintain groundwater elevations above the minimum thresholds. This range is anticipated to change as additional data are collected and additional projects are implemented over the next 5 years. Therefore, any reductions implemented by the FCGMA Board over the initial 5-year period after the GSP is adopted will be evaluated and may be changed as warranted by future conditions in the PVB and the adjacent Oxnard Subbasin.

Relationship to Measurable Objectives

The relationship between Reduction in Groundwater Production and the measurable objectives is similar to the relationship between Reduction in Groundwater Production and the minimum thresholds. Numerical groundwater model simulations suggest a range of potential groundwater production rates that would result in groundwater elevations that are higher than the measurable objective half of the time and lower than the measurable objective half of the time (see Section 3.5, Measurable Objectives). As discussed previously, this range is anticipated to change as additional data are collected and additional projects are implemented over the next 5 years. Therefore, any reductions implemented by the FCGMA Board over the initial 5-year period after the GSP is adopted will be evaluated and may be changed as warranted by future conditions in the PVB and the adjacent Oxnard Subbasin.

5.3.3 Expected Benefits of Management Action No. 1

The primary benefit related to reduction in groundwater production is recovery of groundwater elevations that have historically contributed to seawater intrusion in the Oxnard Subbasin. Reductions in groundwater production can be used to close any differential between groundwater elevations that can be obtained through implementation of projects and the groundwater elevations necessary to meet the sustainability goals for the PVB.

5.3.4 Timetable for Implementation of Management Action No. 1

The FCGMA Board already has the authority to reduce groundwater production in the PVB. Therefore, reductions can be implemented within months of GSP adoption, once the proposed reductions have gone through the FCGMA Board approval process.

5.3.5 Metrics for Evaluation of Management Action No. 1

The metric for evaluation of Reduction in Groundwater Production will be groundwater elevations in the older alluvium and the Lower Aquifer System. As groundwater elevations recover, additional projects are developed, and basin management is optimized, groundwater production rates will continue to be evaluated and adjusted accordingly.

5.3.6 Economic Factors and Funding Sources for Management Action No. 1

Program administration, investigations, inspections, compliance assistance, and enforcement of the Reduction in Groundwater Production management action will utilize pumping fees imposed by FCGMA. Economic factors that will affect Reduction in Groundwater Production include impacts to the users of groundwater in the PVB. Potential economic impacts to stakeholders will be considered in the decision process for selecting future groundwater production rates and reductions necessary to meet the sustainability goals for the PVB.

5.3.7 Management Action No. 1 Uncertainty

There is uncertainty regarding the exact reduction in groundwater production required to achieve the sustainability goals for the PVB and the adjacent Oxnard Subbasin. Uncertainty in the hydrogeologic conceptual model and the numerical groundwater model is discussed in Chapter 2 of this GSP. Uncertainty in the minimum thresholds and measurable objectives is discussed in Chapter 3. Chapters 2 and 3 also discuss uncertainty associated with the future location of groundwater production and impacts of projects that will optimize management of the PVB and the adjacent Oxnard Subbasin.

Because of the existing uncertainty associated with future conditions in the PVB, a plan for exact reductions and groundwater elevation triggers for those reductions has not been developed as part of this GSP. Instead, FCGMA will work to develop and refine this plan over next 20 years, as the level of uncertainty is reduced. FCGMA recognizes that a specific long-term plan that incorporates stakeholder feedback and the need for flexibility in groundwater management will have to be adopted by 2040 to provide users of groundwater in the PVB with the tools necessary to plan for sustainable groundwater production into the future.

5.4 REFERENCES CITED

FCGMA. 2018. "Full Agenda Package: Special Board Meeting of August 29, 2018." Meeting agenda, minutes, and preliminary project descriptions for GSPs currently in progress. August 29, 2018. Accessed May 10, 2019. https://ventura.granicus.com/MetaViewer.php?view_id=45&clip_id=5067&meta_id=661400.

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APPENDIX A

GSA Formation Documentation

APPENDIX A-1

FCGMA NOI to Become a GSA

January 26, 2015

Mark Cowin
California Department of Water Resources
PO Box 942836
Sacramento, CA 94236-0001

SUBJECT: NOTICE OF INTENT TO BECOME A GROUNDWATER SUSTAINABILITY AGENCY FOX CANYON GROUNDWATER MANAGEMENT AGENCY

Dear Mr. Cowin:

As outlined in the California Water Code, Part 2.74, Sustainable Groundwater Management Act (Act), Section 10723 (c), the Fox Canyon Groundwater Management Agency (FCGMA) shall be deemed the exclusive Groundwater Sustainability Agency (GSA) within its boundaries with powers to comply with Act. On January 09, 2015 the FCGMA held a public hearing and passed Resolution 2015-01, Attachment 1, wherein the FCGMA elected to become the GSA for the Arroyo Santa Rosa Valley, Las Posas Valley (West, South, and East), Oxnard Forebay, Oxnard Plain and Pleasant Valley Basins within the FCGMA boundaries. Therefore, this letter shall service as the Notice of Intent for the FCGMA to assume the role as the GSA for the aforementioned basins, depicted on Attachment 2.

Per Section 10723.2 of the Act, the GSA shall consider the interests of all beneficial uses and users of groundwater, as well as those responsible for implementing groundwater sustainability plans. The FCGMA as enacted has a Board of Directors and operating structure that clearly represents the interests of all users and uses of groundwater and surface water within the FCGMA boundaries. The five member Board of the FCGMA is comprised as follows:

- One member shall be chosen by United Water Conservation District, the member's district or divisions must overlie at least in part the territory of the FCGMA;
- One member shall be chosen by the County of Ventura, the member's district must overlie at least in part the territory of the FCGMA;
- One member shall be chosen from the members of the city councils of the cities whose territory at least in part overlies the territory of the FCGMA;
- One member shall be chosen from the members of the governing boards of the following mutual water companies and special districts not governed by the County Board of Supervisors which are engaged in water activities and whose territory at least in part overlies the territory of the FCGMA: the Alta Mutual Water Company, the Anacapa Municipal Water District, the Berylwood Mutual Water Company, the Calleguas Municipal Water District, the Camrosa County Water District, the Del Norte Mutual Water Company, the Pleasant Valley County Water District, and the Zone Mutual Water Company; and
- The fifth member of the Board shall be chosen by the other four members from a list of at least five nominations from the Ventura County Farm Bureau and the Ventura County Agricultural Association acting jointly for a two-year term to represent agricultural interests within the territory

of the FCGMA. The fifth member shall reside and be actively and primarily engaged in agriculture within the territory of the FCGMA.

Acting as a groundwater management agency since 1983 the FCGMA has undertaken a collaborative and inclusive model to include all users and uses of groundwater as it strives to protect this valuable resource. It has enacted numerous policies and ordinances aimed at protecting the resource. A history of the FCGMA and pertinent ordinances and resolutions are available at http://fcgma.org/.

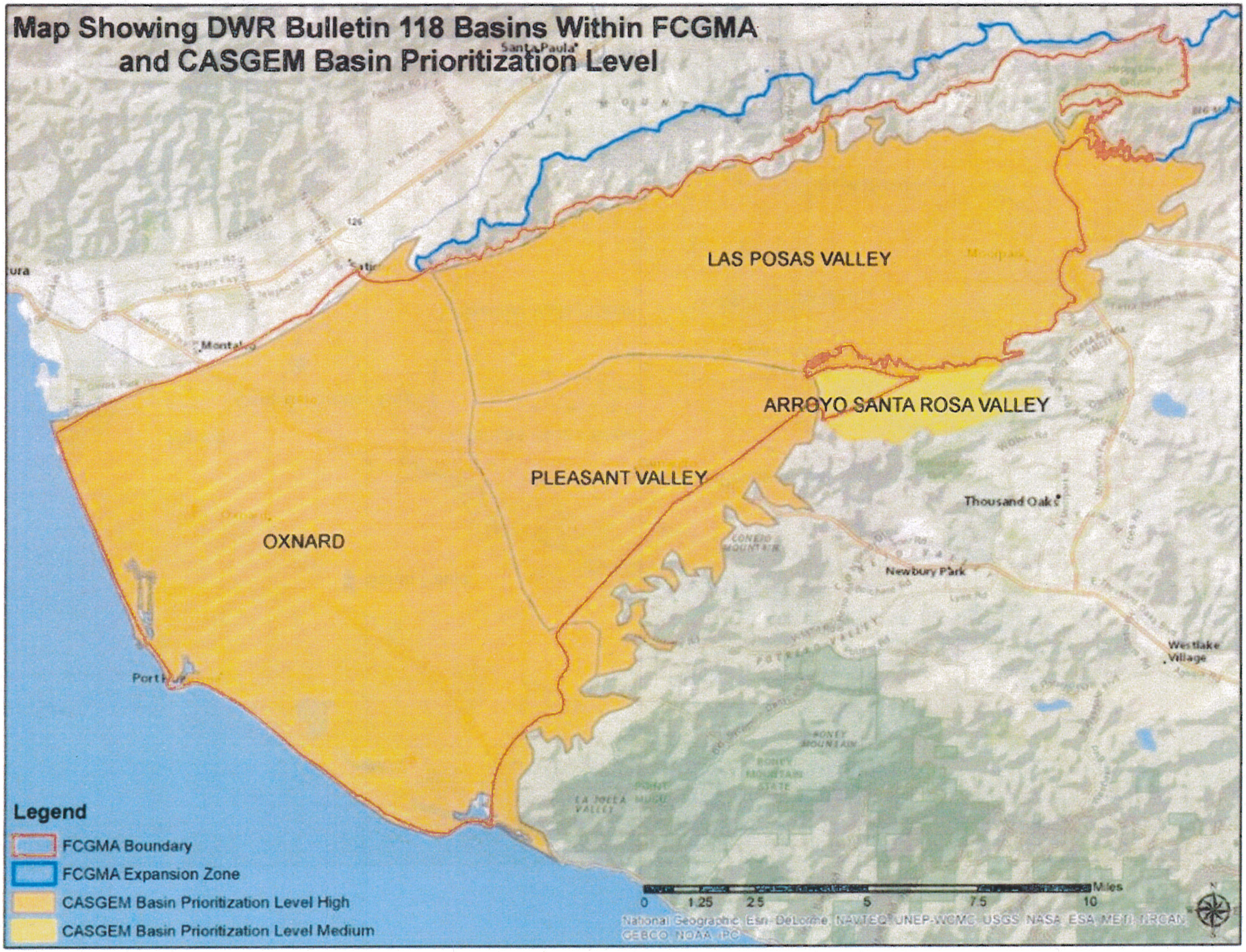
Should you require additional information or a clarification of this Notice of Intent, please contact me at (805) 654-2073.

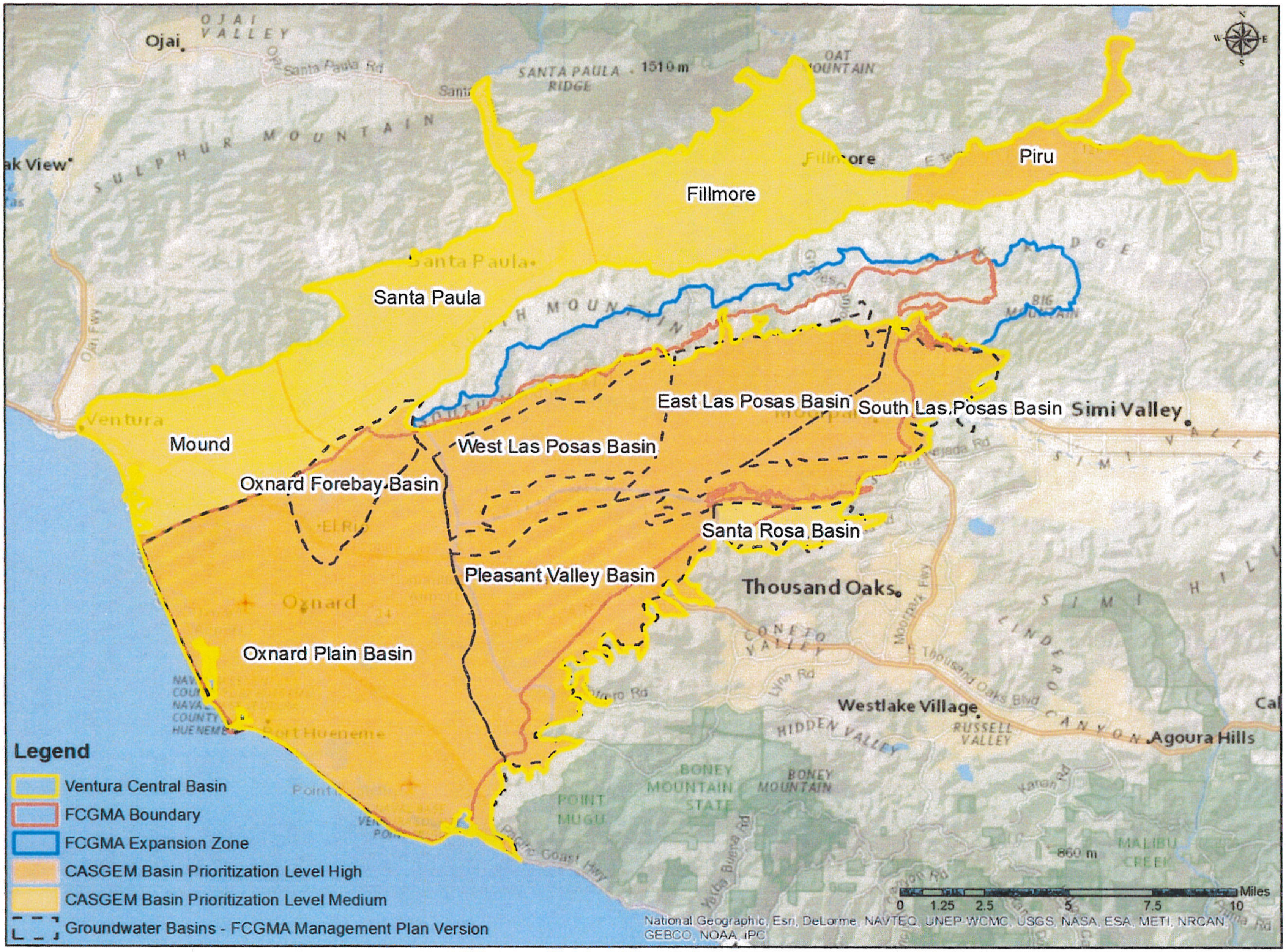
Sincerely,

Jeff Pratt, P.E.
FCGMA Executive Officer

Attachments: (1) FCGMA Resolution 2015-01
(2) FCGMA Boundary and Basins

cc: Bob Pierotti, Supervising Engineering Geologist
California Department of Water Resources
Southern Region
770 Fairmont Avenue, Suite 102
Glendale, CA 91203


Map Showing DWR Bulletin 118 Basins Within FCGMA
and CASGEM Basin Prioritization Level
LAS POSAS VALLEY
ARROYO SANTA ROSA VALLEY
PLEASANT VALLEY
OXNARD
Thousand Oaks
Newbury Park
Westlake Village
Legend
FCGMA Boundary
FCGMA Expansion Zone
CASGEM Basin Prioritization Level High
CASGEM Basin Prioritization Level Medium
Miles
0 1.25 2.5 5 7.5 10



Piru
Fillmore
Santa Paula
Mound
Oxnard Forebay Basin
West Las Posas Basin
East Las Posas Basin
South Las Posas Basin
Santa Rosa Basin
Pleasant Valley Basin
Oxnard Plain Basin
Simi Valley
Thousand Oaks
Westlake Village
Agoura Hills
Ojai
Legend
Ventura Central Basin
FCGMA Boundary
FCGMA Expansion Zone
CASGEM Basin Prioritization Level High
CASGEM Basin Prioritization Level Medium
Groundwater Basins - FCGMA Management Plan Version
0 1.25 2.5 5 7.5 10 Miles
National Geographic, Esri, DeLorme, NAVTEQ, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, iPC

APPENDIX A-2

County of Ventura Resolution No. 17-088
re: GSA Formation

BOARD MINUTES
BOARD OF SUPERVISORS, COUNTY OF VENTURA, STATE OF CALIFORNIA

SUPERVISORS STEVE BENNETT, LINDA PARKS,
KELLY LONG, PETER C. FOY AND JOHN C. ZARAGOZA
June 20, 2017 at 10:30 a.m.

Public Hearing Regarding Adoption of a Resolution to Become the Groundwater Sustainability Agency for Unmanaged Areas Within the Santa Paula and Oxnard Sub-Basins of the Santa Clara River Valley Groundwater Basin, Las Posas Valley Groundwater Basin, and the Pleasant Valley Groundwater Basin.
(Public Works Agency)

(X) All Board members are present.

(X) The Board holds a public hearing.

(X) The following person is heard: Arne Anselm.

(X) Upon motion of Supervisor Foy, seconded by Supervisor Bennett, and duly carried, the Board hereby approves recommendations as stated in the Board letter.

I hereby certify that the annexed instrument is a true and correct copy of the document which is on file in this office.
Dated: 6/23/17
MICHAEL POWERS
Clerk of the Board of Supervisors
County of Ventura, State of California

By: Lori Gaines
Deputy Clerk of the Board

By: [signature]
Brian Palmer
Chief Deputy Clerk of the Board

Item #55
6/20/17

RESOLUTION NO. 17-088

RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF VENTURA TO BECOME THE GROUNDWATER SUSTAINABILITY AGENCY FOR UNMANAGED AREAS WITHIN THE SANTA PAULA AND OXNARD SUB-BASINS OF THE SANTA CLARA RIVER VALLEY GROUNDWATER BASIN, AND THE PLEASANT VALLEY AND LAS POSAS VALLEY GROUNDWATER BASINS

WHEREAS, the California Legislature has adopted, and the Governor has signed into law,the Sustainable Groundwater Management Act of 2014 ("SGMA"), which authorizes local agencies to manage groundwater in a sustainable fashion; and

WHEREAS, SGMA provides that for all groundwater basins designated by the Department of Water Resources (DWR) as a high- or medium priority basin a local agency, or combination of agencies, must decide to become the groundwater sustainability agency or agencies (GSAs) for the entire basin to avoid state intervention; and

WHEREAS, DWR has designated the Santa Paula and Oxnard Sub-Basins of the Santa Clara River Valley Groundwater Basin, Las Posas Valley Groundwater Basin, and the Pleasant Valley Groundwater Basin (Basins) as high- or medium priority basins; and

WHEREAS, SGMA further provides that in the event there is an area within a high- or medium priority basin that is not within the management area of a GSA, the County of Ventura will be presumed to be the GSA for that area unless the County opts out of being the GSA for that area; and

WHEREAS, there are currently areas within the Basins that are not within the management area of a GSA and are considered unmanaged under SGMA; and

WHEREAS, SGMA requires the County to provide notification to DWR of the County's decision to become a GSA for any unmanaged area within a high- or medium priority basin on or before June 30, 2017;

WHEREAS, the Board of Supervisors of the County has determined it to be in the County's best interest and in the public interest for the County to act as the GSA for any areas within the Basins that are unmanaged as of June 30, 2017; and

WHEREAS, adoption of this resolution does not constitute a "project" under California Environmental Quality Act Guidelines Section 15378(b)(5), including organization and administrative activities of government, because there would be no direct or indirect physical change in the environment.

NOW, THEREFORE, BE IT RESOLVED by the Board of Supervisors of the County of Ventura as follows:

1. The County of Ventura shall become the groundwater sustainability agency for areas within the Santa Paula and Oxnard Sub-Basins of the Santa Clara River Valley Groundwater Basin, the Las Posas Valley Groundwater Basin, and the Pleasant Valley Groundwater Basin that are unmanaged as of June 30, 2017;

2. The Director of the Public Works Agency is authorized to: (a) notify the Department of Water Resources (DWR) of the action taken by this resolution and to develop and file with DWR the information required to be submitted as part of the notification, (b) withdraw or modify the County's notification to DWR to fulfill the purposes of this resolution and (c) take such further actions as are necessary to carry out the intent of this resolution.

Upon a motion of Board Member Foy, seconded by Board Member Bennett, and duly carried, the Board hereby approves and adopts this resolution on the 20 day of June, 2017.

Chair, Board of Supervisors
County of Ventura

ATTEST:

MICHAEL POWERS, Clerk of the
Board of Supervisors, County of Ventura
State of California

By: ______________________
Deputy Clerk of the Board

COUNTY OF VENTURA ★ CALIFORNIA ★

APPENDIX A-3

Camrosa Water District Resolution No. 17-11
re: GSA Formation

CAMROSA WATER DISTRICT
BUILDING WATER SELF-RELIANCE

Resolution No: 17-11

A Resolution of the Board of Directors
of Camrosa Water District

Declaring Camrosa Water District's Intent to Act as the Groundwater Sustainability Agency for the Portions of the Pleasant Valley Basin, Oxnard Subbasin of the Santa Clara River Valley Basin, and the Las Posas Basin Outside the Boundaries of the Fox Canyon Groundwater Management Agency and Within the Camrosa Service Area

Whereas, on September 16, 2014, Governor Jerry Brown signed into law Senate Bills 1168 and 1319 and Assembly Bill 1739, known collectively as the Sustainable Groundwater Management Act (SGMA); and,

Whereas, the SGMA went into effect on January 1, 2015; and,

Whereas, the SGMA requires all high- and medium-priority groundwater basins, as designated by the California Department of Water Resources (DWR), to be managed by a Groundwater Sustainability Agency (GSA); and,

Whereas, the Pleasant Valley Basin, the Oxnard Subbasin of the Santa Clara River Valley Basin, and the Las Posas Basin, as defined by DWR's California's Groundwater Bulletin 118, have been characterized by DWR as high-priority basins; and,

Whereas, the majority of said basins are under the jurisdiction of the Fox Canyon Groundwater Management Agency (FCGMA) and Section 10723 (c) of Senate Bill 1168 defines the FCGMA as the exclusive local agency within its respective statutory boundaries with the power to comply with the SGMA; and,

Whereas, Section 10723.2 of Senate Bill 1168 requires that GSAs consider the interests of all beneficial uses and users of groundwater; and

Whereas, the SGMA requires that the GSA notify the Department of Water Resources of its intent to undertake sustainable groundwater management within thirty days of its election; and

Whereas, the SGMA requires that the GSA develop and implement a groundwater sustainability plan, according to guidelines to be developed forthwith by DWR;

Now, Therefore, Be It Resolved by the Camrosa Water District Board of Directors that Camrosa will act as the Groundwater Sustainability Agency for the portions of the Pleasant Valley Basin, the Oxnard Subbasin of the Santa Clara River Valley Basin, and the Las Posas Basin outside the boundaries of the Fox Canyon Groundwater Management Agency and within the Camrosa Service area; and

Be It Further Resolved that the Board of Directors of Camrosa Water District will act as the governing board of the newly created GSAs; and

Be It Further Resolved that, abiding by Section 10727 (b) (3) of Senate Bill 1168, Camrosa will develop a coordination agreement with the FCGMA to ensure that the groundwater sustainability plans covering the entirety of the three basins are coordinated; and

Be It Further Resolved the Camrosa Water District will notify DWR of its intent to sustainably manage the portions of the Pleasant Valley Basin, the Oxnard Subbasin of the Santa Clara River Valley Basin, and the Las Posas Basin outside the boundaries of the FCGMA within thirty days of the date this resolution is signed; and

Be It Further Resolved that such notification shall include the service area boundaries of the portions of the three basins that Camrosa intends to manage, a copy of this resolution, a list of interested parties developed pursuant to Section 10723.2 of Senate Bill 1168 and described above, and an explanation of how their interests will be considered in the development and operation of the groundwater sustainability agency and the development and implementation of the agency's sustainability plan.

Adopted, Signed and Approved this 8th day of June, 2017.

Eugene F. West, President
Board of Directors
Camrosa Water District

(ATTEST)
Tony L. Stafford, Secretary
Board of Directors
Camrosa Water District

APPENDIX A-4

Allocation System Ordinance

AN ORDINANCE TO ESTABLISH AN ALLOCATION SYSTEM FOR THE OXNARD AND PLEASANT VALLEY GROUNDWATER BASINS

ARTICLE 1. FINDINGS

1.1. The Pleasant Valley Groundwater Basin and Oxnard Groundwater Subbasin (collectively, "the Basins") are located within Fox Canyon Groundwater Management Agency ("Agency") and have been designated by the California Department of Water Resources as high priority groundwater basins that are subject to critical conditions of overdraft.

1.2. The Agency is required under the Sustainable Groundwater Management Act ("SGMA") to manage the Basins under a groundwater sustainability plan by January 31, 2020.

1.3. The groundwater sustainability plan must include an estimate of the sustainable yield for the Basins.

1.4. Based on current projections, the sustainable yield of the Basins will be less than recent average annual groundwater extractions from the Basins.

1.5. The 10-year period prior to January 1, 2015, the date SGMA became effective, includes a complete climate cycle and is representative of annual average precipitation, groundwater extractions from the Basins and deliveries of surface water from the Santa Clara River through United Water Conservation District's Pleasant Valley Pipeline and Pumping Trough Pipeline in lieu of groundwater extractions from the Basins. During the 10-year period, these in lieu deliveries averaged 15,600 acre-feet annually and consisted of surface water that otherwise would have been used for groundwater recharge.

1.6. During the 10-year period prior to January 1, 2015, the Conejo Creek Project supplied an average of 4,978 acre-feet of surface water annually to Pleasant Valley County Water District for agricultural use which otherwise could have been supplied by pumping groundwater from the Basins. During that period, there was a corresponding decrease in groundwater use within Pleasant Valley's service area.

1.7. The adoption of this ordinance is a necessary step in the transition from the Agency's current groundwater management programs to sustainable groundwater management under SGMA. As part of that transition, the Agency intends to move from a wellhead-based to a land-based allocation system; however, implementation of that change is not feasible until such time as the Agency has developed sufficient parcel-based water-use data to allow for effective regulation of extractions on that basis.

1.8. The measures set forth in this ordinance are necessary to improve and protect the quantity and quality of groundwater supplies within the Basins.

1.9. This ordinance is exempt from the California Environmental Quality Act (CEQA) pursuant to Water Code section 10728.6 and CEQA Guidelines sections 15061(b)(3), 15307 and 15308.

1.10. The extraction allocations established under this ordinance are consistent with the land use elements of the applicable general plans to the extent that there is sufficient sustainable yield in the Basins to serve the land use designations therein.

ARTICLE 2. PURPOSE

The purpose of this ordinance is to facilitate adoption and implementation of the groundwater sustainability plan and to ensure that the Basins are operated within their sustainable yields. It is not the purpose of this ordinance to determine or alter water right entitlements, including those which may be asserted pursuant to California Water Code sections 1005.1, 1005.2 or 1005.4.

ARTICLE 3. PERIODIC REVIEW PROCEDURE

The Board will periodically review the effectiveness of this ordinance toward meeting its purpose. This review shall occur at least once every five years. If necessary, this ordinance will be amended to ensure that the sustainability goals of the groundwater sustainability plans are met.

ARTICLE 4. DEFINITIONS

4.1 "Agency" shall mean the Fox Canyon Groundwater Management Agency.

4.2 "Agricultural Operator" shall mean an owner or operator of an extraction facility used to produce groundwater for use on lands in the production of plant crops or livestock for market and uses incidental thereto.

4.3 "Assessor's Parcel Map" shall mean an official map designating parcels by Assessor's Parcel Number.

4.4 "Assessor's Parcel Number" shall mean the number assigned to a parcel by the County of Ventura for purposes of identification.

4.5 "Base Period" shall mean calendar years 2005 through 2014.

4.6 "Base-Period Conejo Creek Deliveries" shall mean the average annual amount of Conejo Creek Water Deliveries during the base period.

4.7 "Base-Period Extraction" shall mean the average annual groundwater extraction based on reported extractions during the base period, excluding any extractions that incurred surcharges.

4.8 "Base-Period PTP Deliveries" shall mean the average annual amount of PTP deliveries during the base period as reported to the Agency by United.

4.9 "Base-Period PV Deliveries" shall mean the average annual amount of PV deliveries during the base period as reported to the Agency by United.

4.10 "Basins" shall mean the Pleasant Valley Groundwater Basin and the Oxnard Groundwater Subbasin.

4.11 "Board" shall mean the Board of Directors of the Agency.

4.12 "Conejo Creek Project" shall mean the Conejo Creek Diversion structure and appurtenances owned and operated by Camrosa Water District through which recycled water discharged from the Hill Canyon Wastewater Treatment Plant is diverted from Conejo Creek for delivery to Camrosa Water District and Pleasant Valley.

4.13 "Conejo Creek Water Deliveries" shall mean deliveries of water to Pleasant Valley from the Conejo Creek Project.

4.14 "Executive Officer" shall mean the individual appointed by the Board to administer Agency functions or his/her designee.

4.15 "Extraction Allocation" shall mean the amount of groundwater that may be obtained from an extraction facility during a given water year before a surcharge is imposed.

4.16 "Extraction Facility" shall mean any device or method (e.g. water well) for extraction of groundwater within the Basin.

4.17 "Groundwater Sustainability Plan" shall mean the plan or plans, and any amendment thereof, developed and adopted by the Agency for the Basins in accordance with SGMA.

4.18 "Management Area" shall mean an area within the Basins for which the groundwater sustainability plan may identify different minimum thresholds, measurable objectives, monitoring or projects and management actions in accordance with regulations adopted pursuant to chapter 10 of SGMA.

4.19 "Municipal and Industrial Operator" shall mean an owner or operator that supplied groundwater for domestic, industrial, commercial or other non-agricultural use.

4.20 "Municipal and Industrial (M&I) Use" shall mean any use other than agricultural irrigation.

4.21 "Mutual Water Company" shall mean a corporation organized for, or engaged in the business of, selling, distributing, supplying, or delivering water to its stockholders and members at cost for irrigation purposes or for M&I use.

4.22 "O-H Pipeline" means the water distribution system operated by United that supplies groundwater to contractors under the O-H Pipeline Agreement.

4.23 "O-H Pipeline Agreement" means the Water Supply Agreement for Delivery of Water Through the Oxnard/Hueneme Pipeline dated July 1, 1996, and any amendment thereto.

4.24 "Operator" shall mean a person operating an extraction facility. The owner of an extraction facility shall be conclusively presumed to be the operator unless a satisfactory showing is made to the Agency that the extraction facility actually is operated by some other person.

4.25 "Owner" shall mean a person owning an extraction facility or an interest in an extraction facility other than a lien to secure the payment of a debt or other obligation and shall include any mutual water company and incorporated ownership.

4.26 "Parcel" shall mean a lot or parcel shown on an Assessor's Parcel Map with an assigned Assessor's Parcel Number.

4.27 "Person" shall mean any state or local governmental agency, private corporation, firm, partnership, individual, group of individuals, or, to the extent authorized by law, any federal agency.

4.28 "Pleasant Valley" shall mean Pleasant Valley County Water District.

4.29 "Pleasant Valley's Service Area" shall mean all lands shown on the map of the boundaries of Pleasant Valley on file with the Ventura Local Agency Formation Commission.

4.30 "PTP Deliveries" shall mean deliveries of surface water from the Santa Clara River through United's Pumping Trough Pipeline.

4.31 "PV Deliveries" shall mean deliveries of surface water from the Santa Clara River through United's Pleasant Valley Pipeline.

4.32 "Sustainable Groundwater Management Act" or "SGMA" shall mean Part 2.74 of Division 6 of the California Water Code, sections 10720 et seq.

4.33 "Sustainable Yield" shall mean the maximum quantity of water that can be withdrawn annually from the Basins as provided in the groundwater sustainability plan.

4.34 "United" shall mean United Water Conservation District.

4.35 "Water Market" shall mean a program which, by ordinance, allows the transfer of extraction allocations through a market administered by or on behalf of the Agency.

4.36 "Water Purveyor" shall mean a mutual water company, special district, or municipality that supplies groundwater to others for agricultural or municipal and industrial use.

4.37 "Water Year" shall mean the period from October 1 of one calendar year through September 30 of the following calendar year.

ARTICLE 5. GENERAL PROVISIONS

5.1 Notwithstanding any other Agency ordinance provision to the contrary, including article 2 of Emergency Ordinance E, the Executive Officer shall establish an operator's extraction allocation for each extraction facility located within the Basins as set forth herein. The alternative extraction allocations authorized under section 5.6 of the Agency Ordinance Code shall not be available to an operator for extracting groundwater from the Basins. Except as expressly provided herein, the provisions governing extraction allocations set forth in section 5.2 of the Agency Ordinance Code shall apply to groundwater extractions from the Basins.

5.2 Except as provided in section 5.5, an extraction allocation established under this ordinance is assigned to an extraction facility. An operator with more than one extraction facility in the same groundwater basin may combine the extraction allocations for the individual facilities. If the groundwater sustainability plan creates one or more management areas within the Basins, the Board may limit the ability to combine extraction allocations assigned to extraction facilities in different management areas. Limitations on combining extraction facilities in different management areas shall be set forth in a Resolution adopted by the Board based on a determination that the limitation is necessary in order to implement the groundwater sustainability plan.

5.3 All extractions in excess of an allocation established by this ordinance shall be subject to extraction surcharges in the same manner as provided in the Agency Ordinance Code for extractions that exceed the historical and/or baseline allocation.

5.4 Extraction allocations may be transferred or temporarily assigned only as provided in article 9 of this ordinance.

5.5 The extraction allocation assigned to extraction facilities operated by United to supply water through the O-H Pipeline is "held in trust [by United] for Any or All Contractors" as a "Suballocation" as those terms are defined in the O-H Pipeline Agreement. Upon termination of or withdrawal of any party from the O-H Pipeline Agreement, the distribution of the extraction allocation assigned to the O-H Pipeline extraction facilities shall be decided by mutual agreement of United and the affected parties or as determined by a court. Notwithstanding any such agreement or court determination or the O-H Pipeline Agreement, the extraction allocation assigned to the O-H Pipeline extraction facilities shall be subject to all applicable Agency rules and regulations for the use and adjustment of extraction allocations, including chapter 5 of the Agency Ordinance Code, and to any allocation reductions implemented in accordance with article 10 of this ordinance.

5.6 In the event of a local, State, or Federal declaration of emergency with the potential to affect water supplies within the Agency, at the next scheduled meeting, the Board will consider whether to allow an operator to request an adjustment of the extraction allocation as a result of the emergency. The information required in support of the request will be set forth in a Resolution adopted by the Board.

ARTICLE 6. INITIAL ALLOCATIONS

6.1 Until such time as the reductions described in article 10 are implemented and except as otherwise provided in this article, an operator's extraction allocation shall be the base-period extraction as reported to the Agency pursuant to chapter 2 of the Agency Ordinance Code. The extraction allocation established under this section is called "base-period allocation."

6.1.1 In recognition of the use of surface water from the Conejo Creek Project and the corresponding reduction in total agricultural extractions within Pleasant Valley's service area during the base period, Pleasant Valley's base-period allocation shall be increased in an amount equal to base-period Conejo Creek water deliveries, subject to the adjustment described in subsection 6.1.1.1.

6.1.1.1 Pleasant Valley shall include in the Semi-Annual Extraction Statement required under section 2.3 of the Agency Ordinance Code a report on the use of Conejo Creek water during the reporting year. In each year in which Pleasant Valley receives Conejo Creek water deliveries, its base-period allocation for that year shall be reduced in an amount equal to the Conejo Creek water deliveries during the year.

6.1.1.2 The Board may transfer a portion of the allocation established under subsection 6.1.1 from Pleasant Valley to an operator of an extraction facility located within Pleasant Valley's service area upon a showing that the operator reduced extractions during the base period as a result of taking deliveries from Pleasant Valley. The transfer will avoid a windfall allocation that may otherwise result under subsection 6.1.1 of this ordinance and shall be subject to the procedures set forth in subsection 5.3.9 of the Agency Ordinance Code.

6.2 In order to encourage the coordinated use of groundwater from the Basins and surface water supplies from the Santa Clara River while eliminating overdraft and maintaining the sustainability goals established under SGMA, Pleasant Valley and United may increase groundwater use in years when these surface water supplies are less than normal, provided that a corresponding reduction in extractions occurs in years when surface water supplies from the Santa Clara River are more abundant. The coordinated use of these water supplies shall be implemented through adjustments to the extraction allocation as provided in this section. This extraction allocation flexibility is called "Santa Clara River Water Flex Allocation."

6.2.1 Santa Clara River Water Flex Allocation

6.2.1.1 In any year in which the volume of surface water available for PV deliveries is less than base-period PV deliveries, Pleasant Valley's base-period allocation for that year shall be increased in an amount equal to the shortfall in available PV deliveries. The extraction allocation available under this subsection shall be subject to any allocation reductions implemented in accordance with article 10 of this ordinance.

6.2.1.2 In any year in which the volume of surface water available for PV deliveries exceeds base-period PV deliveries, Pleasant Valley's base-period allocation for that year shall be reduced by the amount of excess available PV deliveries. In order to provide a minimum extraction allocation during periods when PV deliveries are not available, Pleasant Valley's allocation shall not be reduced below 50 percent of Pleasant Valley's base-period extraction. The minimum extraction allocation available under this subsection shall not be eligible for carryover under article 8 of this ordinance.

6.2.1.3 Surface water shall be deemed available for PV deliveries as demonstrated in an annual report to be submitted by United pursuant to subsection 6.2.1.8. In any year in which Pleasant Valley does not make full use of the surface water available for PV deliveries, Pleasant Valley's base-period allocation for that year shall be reduced by the amount of available surface water not taken by Pleasant Valley.

6.2.1.4 In any year in which the volume of surface water available for PTP deliveries is less than base-period PTP deliveries, United's base-period allocation for that year shall be increased in an amount equal to the shortfall in available PTP deliveries. The extraction allocation available under this subsection shall be subject to any allocation reductions implemented in accordance with article 10 of this ordinance.

6.2.1.5 In any year in which the volume of surface water available for PTP deliveries exceeds base-period PTP deliveries, United's base-period allocation for that year shall be reduced by the amount of excess available PTP deliveries. In order to provide a minimum extraction allocation during periods when PTP deliveries are not available, United's allocation shall not be reduced below 50 percent of United's base-period extraction. The minimum extraction allocation available under this subsection shall not be eligible for carryover under article 8 of this ordinance.

6.2.1.6 Surface water shall be deemed available for PTP deliveries as demonstrated in an annual report to be submitted by United pursuant to subsection 6.2.1.8. In any year in which United does not make full use of the surface water available for PTP deliveries, United's base-period allocation for that year shall be reduced by the amount of available surface water not used by United.

6.2.1.7 To provide Pleasant Valley and United with the operational flexibility to respond to annual variations in the availability of Santa Clara River water, any surcharge for excess extractions that would otherwise be assessed annually shall be determined at the end of each five-year period following the operative date of this ordinance. Surcharges for any excess extractions shall be assessed as provided in sections 6.3 and 6.4.

6.2.1.8 United shall submit an annual report on its diversion of Santa Clara River water during the preceding water year. The report shall state the total volume of river diversions, the total volume of surface water made available for PTP deliveries and PV deliveries and the total volume put to other uses. The report shall state these volumes in acre-feet, supported by meter readings, and include such other information determined by the Executive Officer to be reasonably necessary to carry out the intent of this article.

6.2.2 Pleasant Valley and United shall include in the Semi-Annual Extraction Statement required under section 2.3 of the Agency Ordinance Code a report on the use of Santa Clara River water and the resulting Santa Clara River Water Flex Allocation for the reporting year.

6.3 Pleasant Valley shall be subject to surcharges on extractions in excess of cumulative base-period allocations, as adjusted in accordance with this article, during the preceding five-year period. If excess extractions occur, Pleasant Valley shall be deemed to have exceeded the extraction allocation in each of the preceding five years. A surcharge assessed under this section shall be due and payable within 30 days of issuance of a notice of imposition of surcharges.

6.4 United shall be subject to surcharges on extractions in excess of cumulative base-period allocations, as adjusted in accordance with this article, during the preceding five-year period. If excess extractions occur, United shall be deemed to have exceeded the extraction allocation in each of the preceding five years. A surcharge assessed under this section shall be due and payable within 30 days of issuance of a notice of imposition ofsurcharges.

ARTICLE 7. ADDITIONAL REQUIREMENTS FOR REPORTING EXTRACTIONS

In order to facilitate a transition from a wellhead-based to a land-based allocation system, operators in the Basins shall comply with the following reporting requirements in addition to those specified in the Agency Ordinance Code.

7.1 Agricultural operators not subject to section 7.2 shall report thefollowing:

7.1.1 Each assessor's parcel number being supplied with groundwater produced by the operator's extraction facility;

7.1.2 The number of irrigated acres within each parcel; and

7.1.3 The source of all water used to irrigate those lands.

7.2 Mutual water companies, special districts and municipalities supplying groundwater or in lieu deliveries for agricultural use shall report the following:

7.2.1 Total volume of water from each source being supplied by the mutual water company, special district, or municipality;

7.2.2 Location and identifier of each agricultural turnout and meter owned by the mutual water company, special district, or municipality;

7.2.3 Monthly water deliveries to and meter readings from each agriculturalturnout;

7.2.4 List of assessor's parcel numbers served by each agricultural turnout and meter; and

7.2.5 Customer name associated with each parcel.

7.3 Mutual water companies, special districts and municipalities supplying groundwater or in lieu deliveries for municipal and industrial use shall report the following:

7.3.1 Total volume of water from each source being supplied by the mutual water company, special district, or municipality;

7.3.2 Monthly water deliveries for all water being supplied by the mutual water company, special district, or municipality; and

7.3.3 List of assessor's parcel numbers (or a GIS shape file) served by the mutual water company, special district, or municipality.

7.4 Domestic and municipal and industrial well operators shall report the following:

7.4.1 Each assessor's parcel number being supplied with groundwater produced by the operator's extraction facility.

ARTICLE 8. ALLOCATION CARRYOVER

Except as otherwise provided and subject to the provisions of this article, an unused extraction allocation may be carried over for use in a subsequent water year. A maximum of fifty percent of an extraction allocation shall be available for carry over. The first water extracted during any year shall be deemed to be an exercise of the carryover authorized by this article. The cumulative allocation carryover shall not exceed one hundred percent of an extraction allocation. An unused carryover extraction allocation is not transferable between operators, except in an Agency-approved water market, and shall expire five (5) years after it was accrued. Annual allocation carryover for extraction facilities combined under a single operator in accordance with section 5.2 shall be evenly divided among the combined extraction facilities. The Board may limit the use of carry over allocations consistent with the provisions of the groundwater sustainability plan, provided that any such limitation shall be imposed on all operators on an equal basis.

ARTICLE 9. ALLOCATION TRANSFERS

9.1 Allocation transfers may be necessary to provide flexibility during and after the transition from the Agency's current groundwater management program to sustainable groundwater management under SGMA. Notwithstanding section 5.3 of the Agency Ordinance Code, transfers of allocation established under this ordinance shall comply with the provisions of this article or be allowed under an Agency-approved water market.

9.2 Upon adoption of the groundwater sustainability plan, and except as otherwise provided, transfers or temporary assignments of an extraction allocation are authorized provided the Agency finds that it does not impede achievement of the sustainability goals of the groundwater sustainability plan and would not be detrimental to an Agency-approved water market. In making this determination, the Agency shall, at a minimum, consider the location of the extraction facilities, the total quantity of groundwater extracted in any year, groundwater quality impacts of the transfer and whether the proposed transfer or temporary assignment could be approved under an Agency-approved water market. Requests for the transfer or temporary assignment of extraction allocations shall be submitted jointly by the operators and owners involved and shall include the specific details of their proposal. To ensure consistency with the sustainability goals of the groundwater sustainability plan, transfers or temporary assignments of an extraction allocation shall be subject to conditions as determined by the Executive Officer. A temporary assignment of allocation shall not exceed one year.

9.3 Where there is a sale or transfer of a part of the acreage served by any extraction facility, the extraction allocation for that facility shall be equitably apportioned between the real property retained and the real property transferred by the owner of the extraction facility. This apportionment shall be approved by the Executive Officer who may modify the apportionment to assure equity.

9.4 When irrigated acreage changes to M&I use, the extraction allocation used to irrigate the acreage shall be transferred from the agricultural operator to the M&I operator on a one-to-one basis.

9.5 Transfers or temporary assignments of allocations between extraction facilities located within the same groundwater basin shall be considered for approval by the Executive Officer. All other requests for transfers or temporary assignments shall be submitted to the Board for approval.

ARTICLE 10. REDUCTION OF ALLOCATIONS

10.1 If the sustainable yield is less than the total extraction allocations established in article 6, then extraction allocations, adjusted or otherwise, shall be reduced according to a schedule and method to be determined by the Board following adoption of the groundwater sustainability plan. An operator's use of surface water in lieu of groundwater after the effective date of this ordinance shall not subject that operator to a greater allocation reduction than is imposed on other operators.

10.2 It is the intent of the Board to establish a minimum allocation for agricultural operators based on the sustainable yield and to exempt minimum allocations from the reductions contemplated in section 10.1 until such time as the Board determines that a reduction of the minimum allocation is necessary in order to facilitate implementation of the groundwater sustainability plan.

ARTICLE 11. VARIANCES

The Executive Officer may, on written request from a land owner or operator, grant a variance from the requirements of this ordinance based on the standards set forth in this article.

11.1 Variance Purpose and Standards - The sole purpose of any variance shall be to enable an owner or operator to make reasonable use of groundwater in the same manner as other users of groundwater in the Basins. Before any variance may be granted, the owner or operator must establish and the Agency must determine that all of the following standards are met:

11.1.1 That there are special circumstances or exceptional characteristics applicable to the owner or operator which do not apply generally to comparable owners or operators in the Basins; and

11.1.2 That granting a variance will not confer a special privilege inconsistent with the limitations upon other owners and operators in the Basins; and

11.1.3 That denial of a variance will result in practical difficulties or unnecessary hardships inconsistent with the general purpose of this ordinance; and

11.1.4 That the granting of a variance will not be inconsistent with the groundwater sustainability plan or the provisions of SGMA or with other regulations or ordinances of the Agency or detrimental to the Agency's ability to improve and protect the quantity or quality of groundwater supplies within the Basins; and

11.1.5 That the granting of a variance will not substantially impede the Agency's ability to achieve sustainable groundwater management or the actual sustainability of groundwater in the Basins.

11.2 Burden of Proof – A person seeking a variance shall have the burden of proving to the satisfaction of the Executive Officer that the above standards can be met.

11.3 The Agency may recognize and consider other mitigating factors demonstrated or proposed by the applicant. The Agency at its discretion may include and impose those or other factors as conditions of granting the variance request.

11.4 The Executive Officer may consider any prior requests, permits, other Agency decisions, or enforcement actions associated with the owner or operator.

11.5 Any new or increased extraction allocation granted by the Agency pursuant to a variance request may not be transferred without prior Agency approval.

11.6 Variance Procedures – All requests for a variance shall be filed in writing with the Agency.

11.7 Application Period – For the water year beginning October 1, 2020, variances may be applied for by June 30, 2010. For all subsequent water years, variances may be applied for by June 30 for use in the following the water year.

11.8 Review Period – The Executive Officer shall make reasonable efforts to render a decision on all applications within 90 days from the date the variance is requested. The Executive Officer's decision shall be in writing and include the findings made relative to the standards set forth in section 11.1.

11.9 Appeals – The Executive Officer's decision under this article is appealable in accordance with chapter 6.0 of the Agency Ordinance Code.

ARTICLE 12. CONFLICTS

Should any conflicts occur between the provisions of this ordinance and any other duly enacted Agency code or ordinance, the provisions of this ordinance shall govern.

ARTICLE 13. SEVERABILITY

Should any provision, section, subsection, paragraph, sentence or word of this ordinance be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, subsections, paragraphs, sentences or words of this ordinance as hereby adopted shall remain in full force and effect.

ARTICLE 14. EFFECTIVE DATE; OPERATIVE DATE

This ordinance shall take effect on the thirty-first day after adoption and become fully operative on October 1, 2020.

PASSED AND ADOPTED this 23rd day of October, 2019, by the following vote:

AYES: 5

NOES: Ø

ABSENT: Ø

Chair, Board of
Directors Fox Canyon
Groundwater
Management Agency

ATTEST:

By: Jamie Maloy
Clerk of the Board

APPENDIX A-5

Public Draft GSP Comments

FCGMA Draft Groundwater Sustainability Plan Comments

September 2019

Pleasant Valley Basin

Commenter			Chapter	Section	Subsection	Comment
Mary	Ngo	CDFW	2 - Basin Setting	2.1- Introduction to Basin Setting	N/A	Please see attached comment Letter.
Dan	Detmer	UWCD	5 - Project Management Actions	5.1- Introduction to Projects and Management Actions	N/A	Section 5.1 This section describes just one “water-supply” project (fallowing of farmland) for the Pleasant Valley Basin and one management action (reduced pumping). The existence of additional water-supply and optimization (conjunctive use) projects proposed by United and others last year when requested by the FCGMA should also be mentioned. Some of these projects are anticipated to boost water supplies or sustainable yield for both the Oxnard Subbasin and Pleasant Valley Basin, and could make up much, if not all, of the shortfall indicated by the Draft GSP. We feel it’s important that the Draft GSP at least mention these new water-supply and optimization projects, even if they couldn’t be modeled with the available information, as they could add to our region’s water portfolio prior to 2040. Stakeholders and the public should have at least basic information about these projects so they can make appropriate decisions about when to commence any future rampdown in groundwater allocations (if rampdowns are truly needed). An excessive or premature rampdown could affect business and municipal planning decisions and have significant financial, social, and environmental impacts in the Pleasant Valley Basin. 5.3.7 p 5-7 Disappointing that the consultants didn’t coordinate more with the board so the draft GSP would look more like a plan.
Dan	Detme	UWCD	4 - Monitoring Networks	4.1-Monitoring Network Objectives	N/A	Sec 4.5 p 4-12 United relies on other indications of recent pumping besides just warm pump motors, wet conditions in fields and near the well. Table 4-3. Screened aquifer zone and aquifer system determined how? UWCD aquifer picks?
Dan	Detmer	UWCD	3 - Sustainable Management Criteria	3.1- Introduction to Sustainable Management Criteria	N/A	Sec 3.3.4.1 p 3-9 Incorrect to say no causal effect has been established between high chloride and TDS in the PVPDMA. The USGS and Izbicki references you cite say otherwise. Groundwater overdraft causes the upwelling of brines and compactions of clays, both of with can contribute poor-quality water to wells. Sec 3.4 p 3-16 GSP should specify the WLE restrictions associated with operation of the NPV desalter and offer discussion as to whether they are compatible with the MTs and MOs put forth in this document. Sec 3.4.4 p 3-18 How can you say maintaining higher water levels will help mitigate upwelling of brines but you are unwilling to say upwelling of brines is caused by groundwater overdraft? Why do you expect to gain an improved understanding of this issue without proposing specific monitoring to investigate the issue? Section 3.5.1 The interim milestones described in this section indicate that the FCGMA will define success of GSP implementation by achieving a linear, 25% increase in groundwater elevations in the Pleasant Valley Basin from 2020 to 2025, and over each subsequent 5-year period. However, Section 4 of the Draft GSP recommends collection of additional data during the next 5 years (2020 to 2025) to improve monitoring of groundwater elevations in specific aquifers and areas. In addition, Section 5 of the Draft GSP recommends “that FCGMA will evaluate, model, and conduct feasibility studies of other projects for achieving sustainable groundwater management for the 5-year update to this Draft GSP to optimize basin management and minimize extraction restrictions” (presumably referring to a 2025 update of the GSP). We agree that both collection of additional groundwater data and further evaluation of potential projects are the most critical sustainability planning activities that the FCGMA and other stakeholders should be focused on for the next 5 years. Considering that the Draft GSP indicates the FCGMA will spend the next 5 years improving the monitoring network and evaluating feasibility of new and existing projects, it seems counterproductive to set target groundwater elevations for 2025 that are almost certainly not going to be achieved (rising 25% toward the 2040 sustainable target levels), without a clear, explicit description of what actions will be taken during those 5 years to achieve that target. At present, the Draft GSP includes just one “water-supply” project—fallowing, which doesn’t produce any new water—and one management action (“Reduction in Groundwater Production”) that could potentially be implemented by FCGMA. However, the Draft GSP notes in Section 5.3.7 that “Because of the existing uncertainty associated with future conditions in the Subbasin, a plan for exact reductions and groundwater elevation triggers for those reductions has not been developed as part of this Draft GSP. Instead, FCGMA will work to develop this plan over next (sic) 20 years, as the level of uncertainty is reduced.” We recommend that the FCGMA work with stakeholders to select a more realistic interim milestone for 2025, with the expectation that subsequent interim milestones may require a “steeper path” to achieve the sustainability goals by 2040. Figure 3-9 Figure should include language that linear interpolation of path to sustainability is not necessarily the path being proposed by the plan.

Commenter			Chapter	Section	Subsection	Comment
Dan	Detmer	UWCD	2 - Basin Setting	2.1-Introduction to Basin Setting	N/A	Sec 2.1 p 2-1 Why is semi-perched aquifer described as being deposited by SCR when previous paragraph states aquifers of the UAS in PVB deposited by Calleguas Creek? Sec 2.2 p2-2 Should mention United's conceptual model for the PV basin along with others. Numerical modelling in this GSP is based on United's conceptual model and not that of Bachman Hanson or Turner, even though they are generally comparable. Sec 2.2.3 p 2-7 Should cite United's mapping of base of GCA in addition to Turner. Sec 2.3.7 p 2-26 Be careful with how you characterize TNC mapping of "potential GDEs." TNC relied on state-wide mapping of riparian vegetation by various agencies. Original mapping never characterized areas of riparian veg as potential GDEs. Sec 2.3.8 p 2-27 Need more context for the discussion of potential recharge areas in PVB. Many of the more permeable soils overlie confined aquifers, leading one to question the benefit of recharging more water to the semi-perched aquifer in these areas. Sec 2.4.3.4 p 2-41 Be aware that earlier estimated of sustainable yield in PVB did not rely on the DWR basin boundaries. United and Ventura County traditionally mapped the OP-PV near the Revolon channel which resulted in a larger PV basin than with the current DWR boundaries. Sec 2.4.4 p 2-43 Typo referencing OP and not PV (tile drains). Sec 2.4.5.1 p 2-45 Should describe pumping associated with the planned NPV desalter. This could be considered with the new projects as that pumping did not exist in the baseline period. Camarillo is expected to pump 4500 AF/Y in addition to their existing allocation for the next 20 years? Section 2.4.5.9 The first sentence of this section states "The sustainable yield for PVB was assessed by examining the modeled flux of seawater into the UWCD future water scenarios over the 30-year sustaining period predicted for the UWCD model for the Oxnard Subbasin, the PVB, and the WLPMA." It should be noted that the Draft GSP for the Oxnard Subbasin correctly notes that seawater intrusion has largely been halted in most areas within the Upper Aquifer System (UAS) of the Oxnard Subbasin (except during extreme droughts), despite a slow continuous advance of the seawater intrusion front in the Lower Aquifer System (LAS). As also noted in the Draft GSP for the Oxnard Subbasin, the most challenging long-term sustainability issue that needs to be mitigated in the Oxnard subbasin is seawater intrusion in the LAS, which, due to different aquifer properties, occurs at a much slower pace than in the UAS. The groundwater flow paths depicted on Figures 2-63 through 2-68 of the Oxnard Subbasin GSP show few additional water-supply wells being impacted by seawater intrusion during the next 5 to 10 years, regardless of whether groundwater production continues "as-is" or is ramped-down starting in 2020. Furthermore, the difference in the estimated seawater intrusion fronts 5 years from now for "as is" versus "reduced pumping" scenarios are almost indistinguishable. Therefore, although mitigating seawater intrusion is the long-term driver for achieving groundwater sustainability in the Pleasant Valley Basin, the Oxnard Subbasin, and the West Las Posas basin, it does not appear that implementing pumping reductions immediately will provide a significant benefit to the aquifers while data gaps are filled and additional water-supply projects are evaluated. We do not want to minimize the importance of addressing seawater intrusion in the LAS, and will continue working with the FCGMA to find viable solutions for this long-term challenge. However, we suggest that the FCGMA coordinate closely with stakeholders to decide whether they would prefer to commence pumping rampdowns immediately (while the FCGMA closes data gaps and evaluates potential future water-supply projects), or if they would prefer to wait until those uncertainties are reduced by 2025, even if pumping rampdowns may be a little steeper due to the delayed start.
Dan	Detmer	UWCD	1 - Administrative Information	1.1-Purpose of the Groundwater Sustainability Plan	N/A	Sec 1.4.2 p 1-20 United's Habitat Conservation Plan is still draft and final version has not been submitted to NMFS. Sec 1.8.2 p 1-37 United is not a "surface water user" in the PVB. United supplies surface water to PVCWD when it is available. United's PTP system is in the OP basin, not PV. Sec 1.8.2 p 1-38 "the primary crops grown in PV are cropland with some orchards and vineyards." Consider rewording. Table 1-2 Unclear what tasks will be performed by GSP consultant in coming years, especially in next two years while we wait for DWR review of the initial GSP.
Dan	Detmer	UWCD	Executive Summary	ES.1-Introduction	N/A	ES-1 Language appears to characterize distribution of UAS/LAS pumping for the entire OPV area and not just PVB. Should also clarify in text and not just footnote that the saline water impact front is located in OP and not PV. ES-4 Perennial surface water flows currently do not reach PV from LPV. They may again in the future under wetter climatic conditions.

Commenter			Chapter	Section	Subsection	Comment
Ruthie	Redmond	The Nature Conservancy	1 - Administrative Information	1.8-Notification and Communication	1.8.2-Summary of Beneficial Uses and Users	Environmental Beneficial Uses and Users [Checklist Item 1 - Notice & Communication (23 CCR §354.10)] • Section 1.8.2, pp. 1-45 - 1-46 The GSP identifies the primary environmental users in the Pleasant Valley Basin as the willow/mulefat riparian scrub and Arundo vegetation communities found along the banks of Conejo Creek, and Calleguas Creek, lower Arroyo Las Posas and Conejo Creeks. The degree to which these ecosystems use groundwater versus percolating surface water is uncertain. The GSA has included representation of environmental users on their TAG, in a special meeting on GDEs and in GSP email and meeting notifications. We also recommend that the GSP specifically list the natural resource agencies, NOAA Fisheries, US Fish and Wildlife Service, CA Department of Fish and Wildlife, as stakeholders since they are important parties representing the public trust. In addition, both the CA DFW and the US FWS agencies have attended the special TAG GDE meeting.
Ruthie	Redmond	The Nature Conservancy	Tables	1-8 Past and Present Land Use within Pleasant Valley, 1990–2015	N/A	Environmental Beneficial Uses and Users [Checklist Item 1 - Notice & Communication (23 CCR §354.10)] • Table 1-8 Please revise the Land Use Category from "Vacant" to "Open Space". As noted in Section 1.3.2.3 - Historical, Current, and Projected Land Use and Section 1.6.1 – General Plans, this is a substantial acreage that is valued highly in Ventura County as open space, with ordinances such as the 1998 Save Open Space and Agricultural Resources ordinance. We need to do a better job of delineating open space and native habitat from the "vacant" category, as this devalues the environment and its water need.
Ruthie	Redmond	The Nature Conservancy	1 - Administrative Information	1.4-Existing Monitoring and Management Plans	1.4.2-Operational Flexibility Limitations	Description of general plans and other land use plans relevant to GDEs and their relationship to the GSP [Checklist Items 2 to 3 - (23 CCR §354.8)] • Section 1.4.2 Operational Flexibility Limitations (p. 1-19 to 1-20)] A Multiple Species Habitat Conservation Plan prepared by UWCD specifies flow conditions at the Freeman Diversion to be constrained by the habitat requirements for the federally endangered Southern California steelhead (Oncorhynchus mykiss) in the Santa Clara River.
Ruthie	Redmond	The Nature Conservancy	2 - Basin Setting	2.2-Hydrogeologic Conceptual Model	2.2.4-Principal Aquifers and Aquitards	Description of general plans and other land use plans relevant to GDEs and their relationship to the GSP [Checklist Items 2 to 3 - (23 CCR §354.8)] Hydrogeologic Conceptual Model [Checklist Items 6, and 7 (23 CCR §354.14)] • Section 2.2.4 Principal Aquifers and Aquitards (p.2-6 to 2-7), with additional detail in Sections 1.3.2.1, 2.3.1.1, 2.3.6, 2.3.7, 2.4.1.1, 2.4.2.5, Appendix K Notes: Description & Cross-sections are contradictory in presenting extent of Shallow Alluvial Aquifer. Also discussion of semi-perched aquifer – not clear where it is (need areal extent maps for both. Both make it clear are not principal aquifers. Section 2.2.4 describes the Shallow Alluvial Aquifer that is interconnected with surface waters (Arroyo Las Posas, Conejo Creek, and Calleguas Creek) and potential GDEs. The basin-wide cross sections provided in Figures 2-3 and 2-5 include a graphical representation of the manner in which shallow groundwater may interact with ISWs or GDEs that would allow the reader to understand this topic, though the representation doesn't match the text language in Section 2.3.1.1, which states "The Shallow Alluvial Aquifer comprises the recent alluvial deposits [emphasis added] that line Arroyo Las Posas, Arroyo Santa Rosa, Conejo Creek, and Calleguas Creek in the PVB". Also Figure 2-4 does not indicate presence of the Shallow Alluvial Aquifer in this area. Figure 2-2 shows the recent alluvium along Conejo Creek and lower part of Calleguas Creek, but the placement of the Shallow Alluvial Aquifer in the cross-section A-A' in Figure 2-3 doesn't quite match up. Including the locations of the Conejo and Calleguas Creeks would help clarify the understanding. It is also unclear where the semi-perched aquifer exists within the Pleasant Valley Basin. Neither the Shallow Alluvial Aquifer nor the semi-perched aquifer are considered principal aquifers in the Pleasant Valley Basin.
Ruthie	Redmond	The Nature Conservancy	1 - Administrative Information	1.3-Description of Plan Area	1.3.2-Geography	Interconnected Surface Waters (ISW) [Checklist Items 8, 9, and 10 – (23 CCR §354.16); Identification of ISWs is a required element of Current and Historical Groundwater Conditions (23 CCR §354.16).] • Sections 1.3.2.1, 2.3.6, 2.3.7, 2.4.1.1 Arroyo Las Posas, Conejo Creek, and Calleguas Creek have all been identified as surface water bodies that may have a connection to the Shallow Alluvial Aquifer in the Pleasant Valley Basin. Arroyo Las Posas is ephemeral in the Pleasant Valley Basin and is likely to be a disconnected losing stream. Conejo Creek and Calleguas Creek, which are perennial due to wastewater treatment discharges. Numerical modeling estimates of annual quantification of recharge to groundwater from Arroyo Las Posas, Conejo Creek, and Calleguas Creek are provided in Section 2.3.6. However, while the model results list net recharge to groundwater via stream loss, the discussion in Sections 2.3.6 and2.3.7 indicates there is insufficient knowledge to build a conceptual model of the extend of losing and gaining reaches.

Commenter			Chapter	Section	Subsection	Comment
Ruthie	Redmond	The Nature Conservancy	2 - Basin Setting	2.3-Groundwater Conditions	2.3.7-Groundwater-Dependent Ecosystems	Identification, Mapping and Description of GDEs [Checklist Items 11 to 20 (23 CCR §354.16)] • Section 2.3.7 (pp. 2-25 to 2-27) GDEs have been identified and mapped during the GSP development process using an earlier version of the statewide database of GDE indicators (iGDE v0.3.1; TNC, 2017) and TNC's GDE Guidance document (Rohde et al., 2018). In addition to the mapping of basin GDEs, it also includes both an assessment of the hydrologic and ecological conditions of the potential GDEs. Given the uncertainty regarding the depths to groundwater within these areas, the ecosystems are appropriately considered potential GDEs, with future monitoring needs identified to assess the degree to which existing habitat is reliant on groundwater.
Ruthie	Redmond	The Nature Conservancy	2 - Basin Setting	2.4-Water Budget	2.4.1-Sources of Water Supply	Water Budget [Checklist Items 21 and 22 (23 CCR §354.18)] • Section 2.4 The water budget includes the natural system surface hydrology components including the surface water recharge from the Arroyo Las Posas, Conejo Creek, and Calleguas Creek and natural vegetation evapotranspiration (ET) along these riparian systems. These have been modeled using the UWCD numerical model.
Ruthie	Redmond	The Nature Conservancy	3 - Sustainable Management Criteria	3.1-Introduction to Sustainable Management Criteria	N/A	Sustainability Goal [Checklist Items 23 to 25 (23 CCR §354.24)] • Section 3.1 Introduction to Sustainable Management Criteria (p. 3-2) Fox Canyon Groundwater Management Agency (FCGMA) Board of Directors (Board) adopted planning goals in 2015 that "Promote water levels that mitigate or minimize undesirable results (including pumping trough depressions, surface water connectivity [emphasis added], and chronic lowering of water levels)." Under current and known future conditions, as described in Section 3.3.6, the sustainability goal does not require inclusion of sustainability criteria for surface water connectivity.
Ruthie	Redmond	The Nature Conservancy	3 - Sustainable Management Criteria	3.3-Undesirable Results	3.3.6-Depletions of Interconnected Surface Water	Undesirable Results [Checklist Items 30 to 46 (23 CCR §354.26)] • Section 3.3.6 Depletions of Interconnected Surface Water (p. 3-12 - 3-13) The GSP clearly states: "The undesirable result associated with depletion of interconnected surface water in the PVB is loss of groundwater-dependent ecosystem (GDE) habitat." We applaud this clear recognition of GDEs as an important beneficial use that must be protected. We also agree with further statements that 1) undesirable results are not currently occurring, 2) linkage between groundwater and the potential GDEs must be established and 3) if future projects involve the use of the Shallow Alluvial Aquifer, then "depletion of interconnected surface water may be possible, and significant and unreasonable impacts may occur."
Ruthie	Redmond	The Nature Conservancy	3 - Sustainable Management Criteria	3.4-Minimum Thresholds	3.4.6-Depletions of Interconnected Surface Water	Minimum Thresholds [Checklist Items 27 to 29 (23 CCR §354.28)] • Section 3.4.6 Minimum Thresholds – Depletions of Interconnected Surface Water (p. 3-20) We agree that no minimum thresholds need to be proposed at this time. The statement that Calleguas Creek and Conejo Creek are ephemeral streams need to be corrected as they are perennial within PBV. We would also request that the statement "depletion of interconnected surface water in the PVB is not currently occurring and is unlikely to occur in the future" be struck. Earlier text in Section 2.3.7 makes it clear that this is not known. Rather, we recommend language like that from the Oxnard Subbasin GSP: "if projects that produce groundwater from the Shallow Alluvial Aquifer are implemented, the need for specific water level minimum thresholds in the should be reevaluated".
Ruthie	Redmond	The Nature Conservancy	3 - Sustainable Management Criteria	3.5-Measurable Objectives	3.5.6-Depletions of Interconnected Surface Water	Measurable Objectives -Checklist Item 26 – (23 CCR §354.30) • Section 3.5.6 Measurable Objectives – Depletions of Interconnected Surface Water (p. 3-25) We agree that no minimum thresholds need to be proposed at this time. The statement that Calleguas Creek and Conejo Creek are ephemeral streams need to be corrected as they are perennial within PBV. We would also request that the statement "depletion of interconnected surface water in the PVB is not currently occurring and is unlikely to occur in the future" be struck. Earlier text in Section 2.3.7 makes it clear that this is not known. Rather, we recommend language like that from the Oxnard Subbasin GSP: "if projects that produce groundwater from the Shallow Alluvial Aquifer are implemented, the need for specific water level minimum thresholds in the should be reevaluated".