Appendix G

Giant Garter Snake Important Populations Maps

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2021 Tehama-Colusa Canal Authority Water Transfers Initial Study/ Environmental Assessment

Appendix G: Giant Garter Snake Important Population Maps

IMPORTANT GIANT GARTER SNAKE POPULATIONS

American Basin Recovery Unit

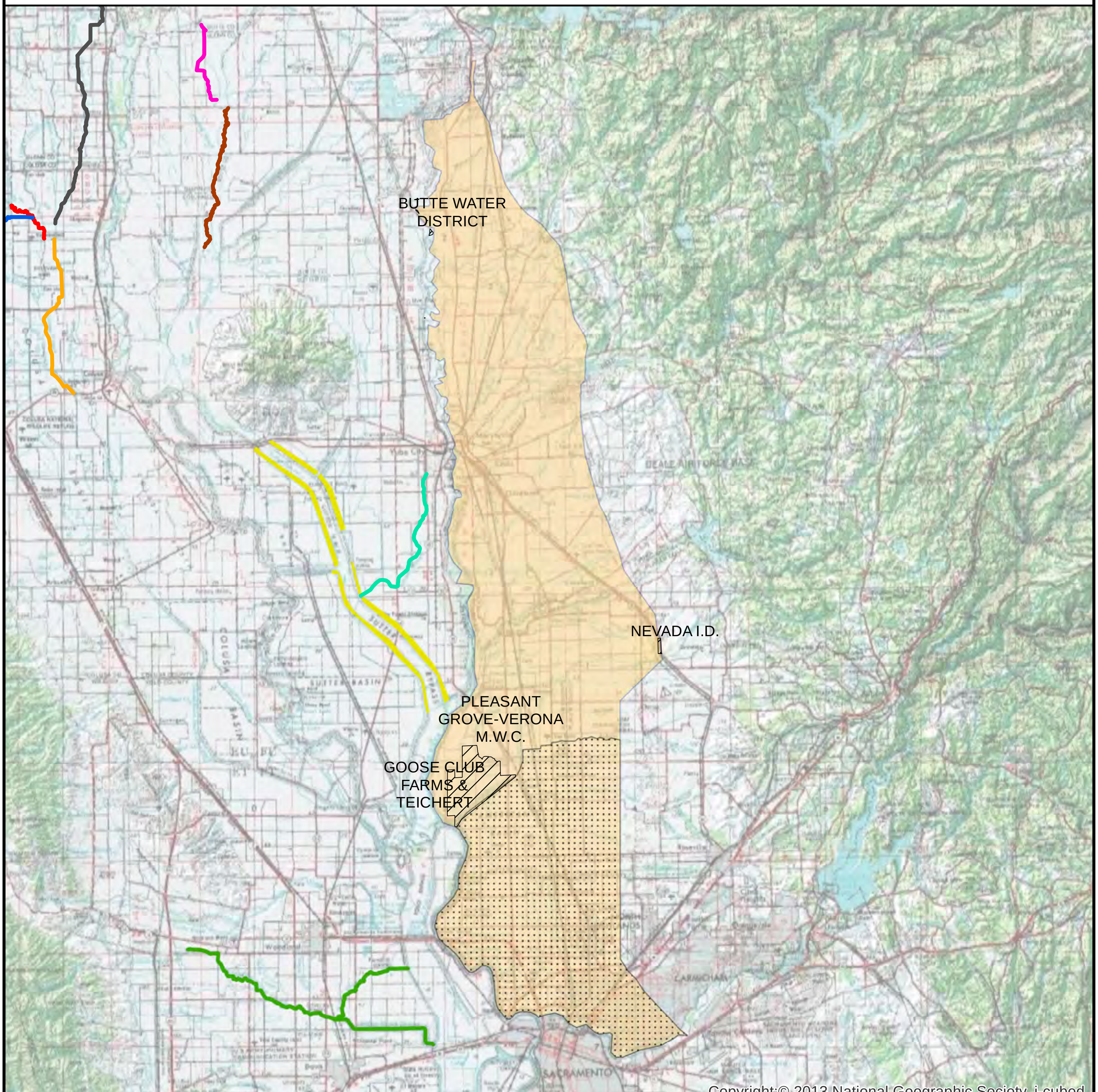
- Seller Areas in American Basin
- American Basin (376,104 acres)
- Butte Creek Selection
- Colusa Basin Drainage Canal Selection
- Colusa Drainage Canal
- Gilsizer Slough
- Hunters Creek Selection
- Logan Creek Selection
- Little Butte Creek
- Natomas Basin
- Sutter Bypass Toe Drain
- Willow Slough & Bypass

SELLER AREAS IN AMERICAN BASIN (acres)	
BUTTE WATER DISTRICT	55
GOOSE CLUB FARMS & TEICHERT	4
NEVADA IRRIGATION DISTRICT	132
PLEASANT-GROVE-VERONA MUTUAL WATER COMPANY	7429

N

Datum: NAD 1983

0 2.75 5.5 11 Miles



IMPORTANT GIANT GARTER SNAKE POPULATIONS

Butte Basin Recovery Unit

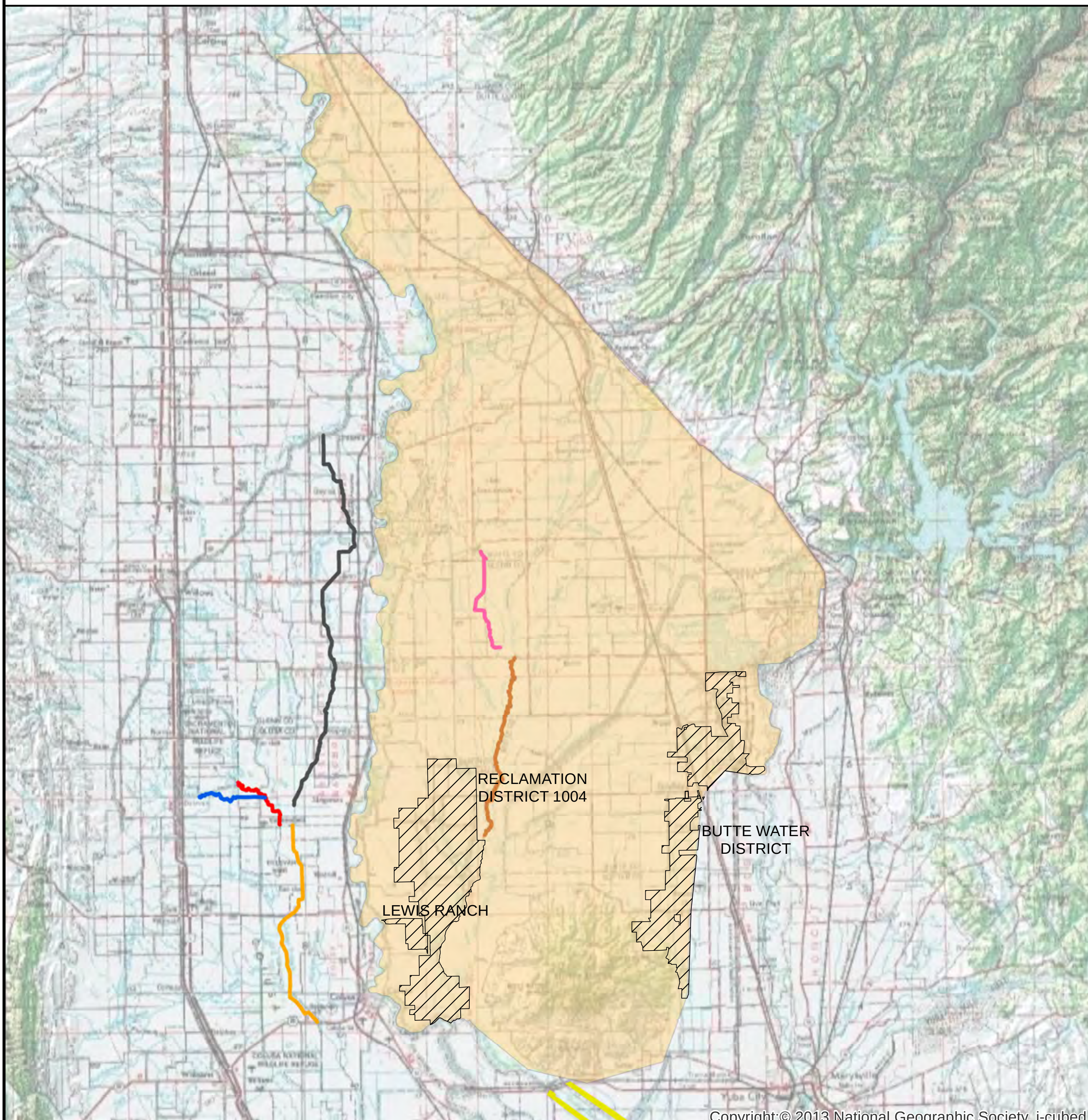
N

- Seller Areas in Butte Basin
- Butte Basin (479,117 acres)
- Butte Creek Selection
- Colusa Basin Drainage Canal Selection
- Colusa Drainage Canal
- Gilsizer Slough
- Hunters Creek Selection
- Little Butte Creek
- Logan Creek Selection
- Natomas Basin
- Willow Slough & Bypass
- Sutter Bypass Toe Drain

SELLER AREAS IN BUTTE BASIN (acres)	
BUTTE WATER DISTRICT	17656
LEWIS RANCH	1172
RECLAMATION DISTRICT 1004	23159

Datum: NAD 1983

0 2.25 4.5 9 Miles



IMPORTANT GIANT GARTER SNAKE POPULATIONS

Colusa Basin Recovery Unit

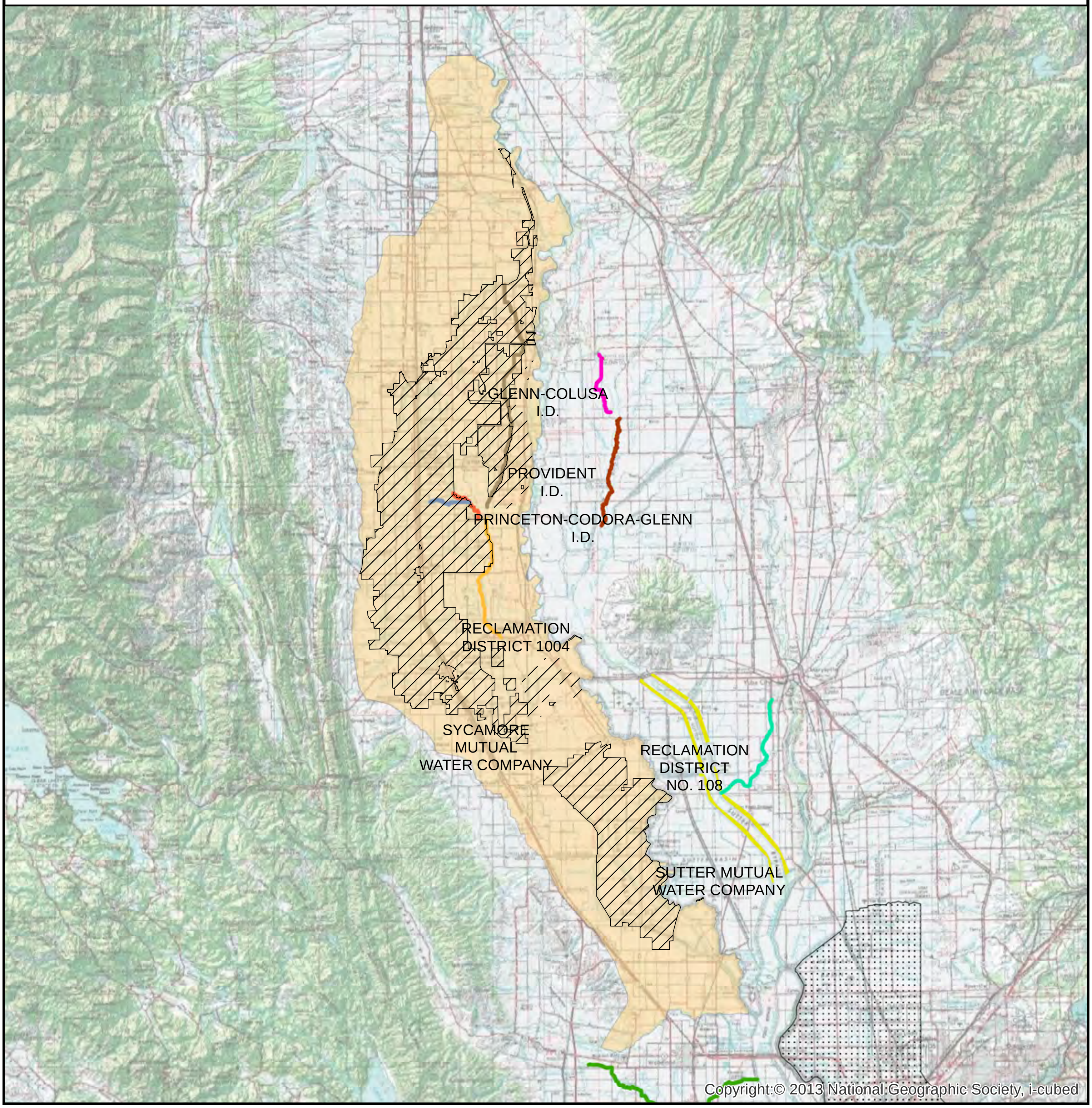
- Seller Areas in Colusa Basin
- Colusa Basin (686,096 acres)
- Butte Creek Selection
- Colusa Basin Drainage Canal Selection
- Colusa Drainage Canal
- Gilsizer Slough
- Hunters Creek Selection
- Little Butte Creek
- Logan Creek Selection
- Natomas Basin
- Sutter Bypass Toe Drain
- Willow Slough & Bypass

SELLER AREAS IN COLUSA BASIN (acres)	
GLENN-COLUSA IRRIGATION DISTRICT	174886
PRINCETON-CORDORA-GLENN IRRIGATION DISTRCIT	12112
PROVIDENT IRRIGATION DISTRICT	17019
RECLAMATION DISTRICT 1004	54
RECLAMATION DISTRICT 108	58821
SUTTER MUTUAL WATER COMPANY	33
SYCAMORE MUTUAL WATER COMPANY	8431

Datum: NAD 1983

0 3.75 7.5 15 Miles

N



IMPORTANT GIANT GARTER SNAKE POPULATIONS

Delta Basin Recovery Unit

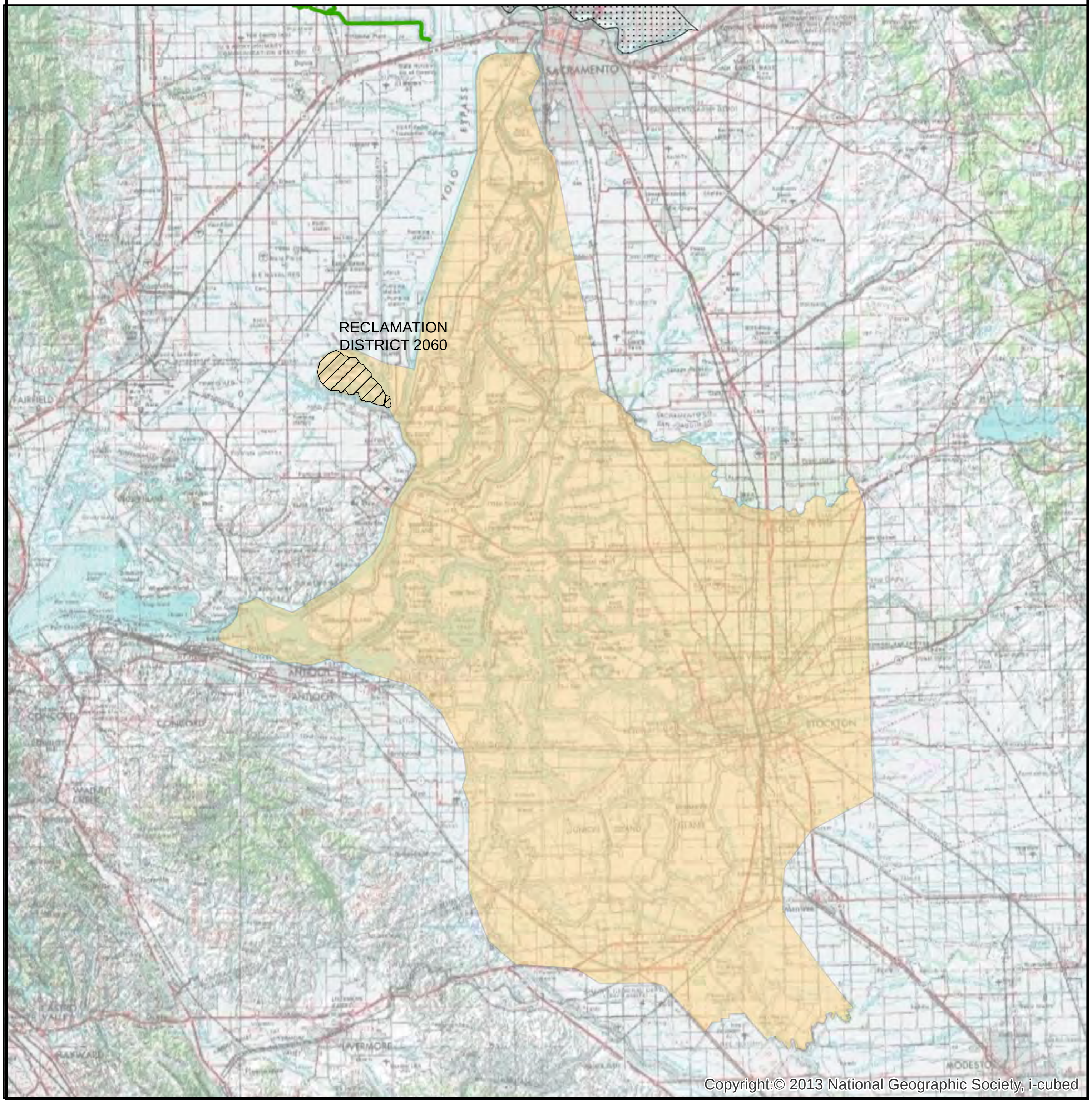
- Seller Areas in Delta Basin
- Delta Basin (786,268 acres)
- Butte Creek Selection
- Colusa Basin Drainage Canal Selection
- Colusa Drainage Canal
- Gilsizer Slough
- Hunters Creek Selection
- Little Butte Creek
- Logan Creek Selection
- Natomas Basin
- Willow Slough & Bypass
- Sutter Bypass Toe Drain

SELLER AREAS IN DELTA BASIN (acres)	
RECLAMATION DISTRICT 2060	5232

Datum: NAD 1983

0 2.75 5.5 11 Miles

N



IMPORTANT GIANT GARTER SNAKE POPULATIONS

Sutter Basin Recovery Unit

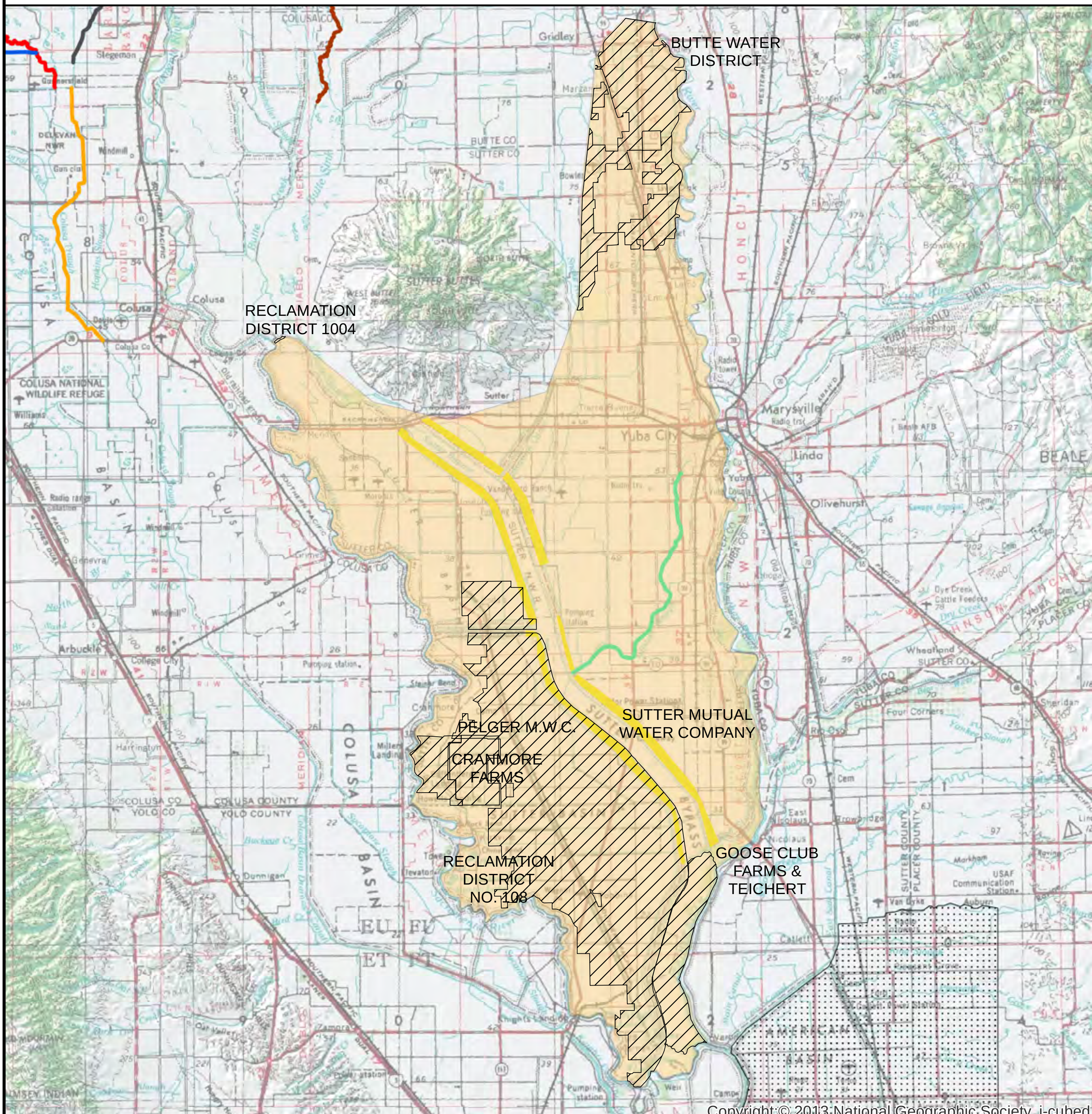
- Seller Areas in Sutter Basin
- Sutter Basin (239,927 acres)
- Butte Creek Selection
- Colusa Basin Drainage Canal Selection
- Colusa Drainage Canal
- Gilsizer Slough
- Hunters Creek Selection
- Little Butte Creek
- Logan Creek Selection
- Natomas Basin
- Willow Slough & Bypass
- Sutter Bypass Toe Drain

SELLER AREAS IN SUTTER BASIN (acres)	
BUTTE WATER DISTRICT	14508
CRANMORE FARMS	2219
GOOSE CLUB FARMS & TEICHERT	5724
PELGER MUTUAL WATER COMPANY	2970
RECLAMATION DISTRICT 1004	23
RECLAMATION DISTRICT 108	0.02
SUTTER MUTUAL WATER COMPANY	51085

Datum: NAD 1983

0 1.75 3.5 7 Miles

N



IMPORTANT GIANT GARTER SNAKE POPULATIONS

Yolo Basin Recovery Unit

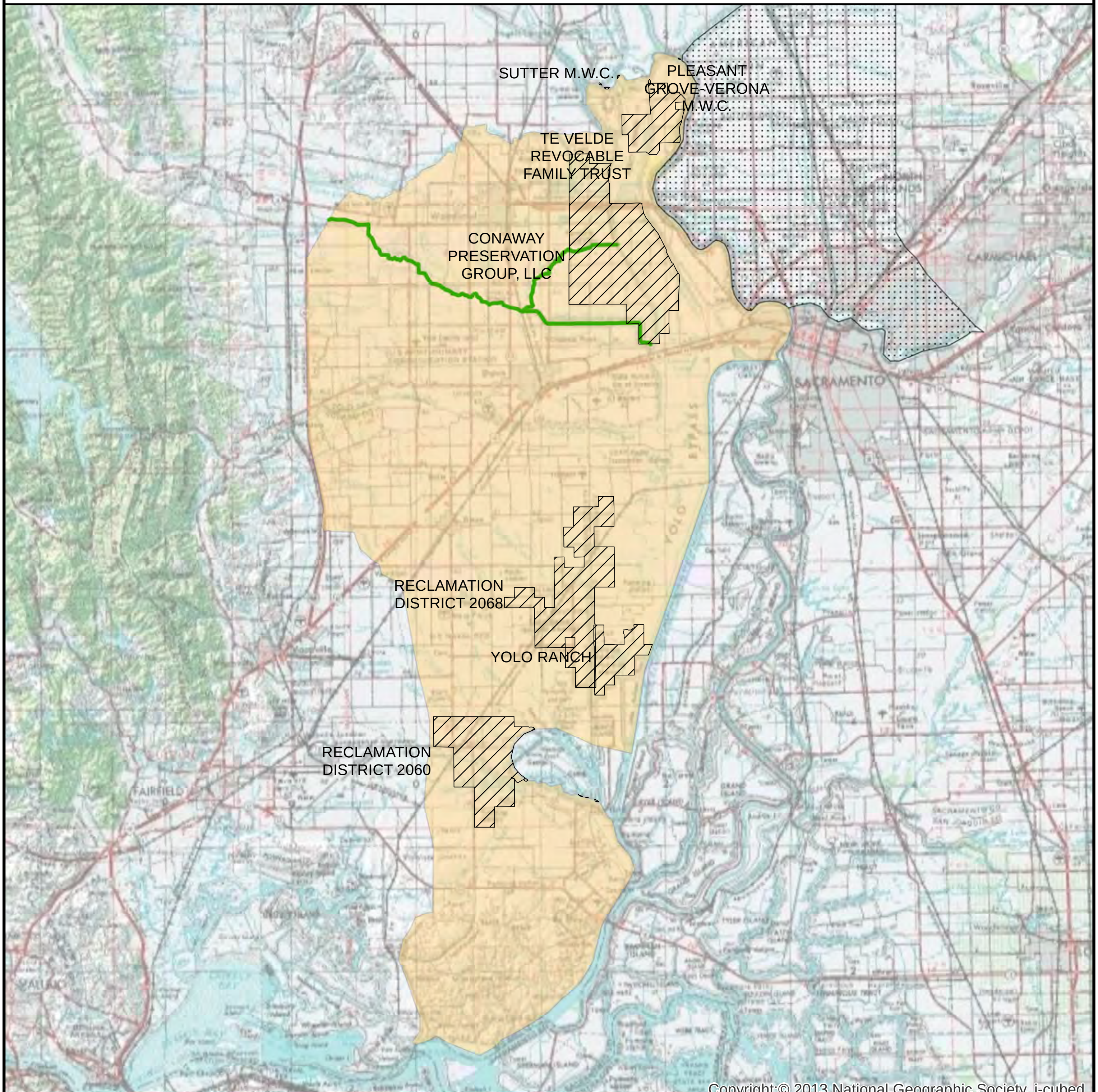
- Seller Areas in Yolo Basin
- Yolo Basin (410,915 acres)
- Butte Creek Selection
- Colusa Basin Drainage Canal Selection
- Colusa Drainage Canal
- Gilsizer Slough
- Hunters Creek Selection
- Little Butte Creek
- Logan Creek Selection
- Natomas Basin
- Sutter Bypass Toe Drain
- Willow Slough & Bypass

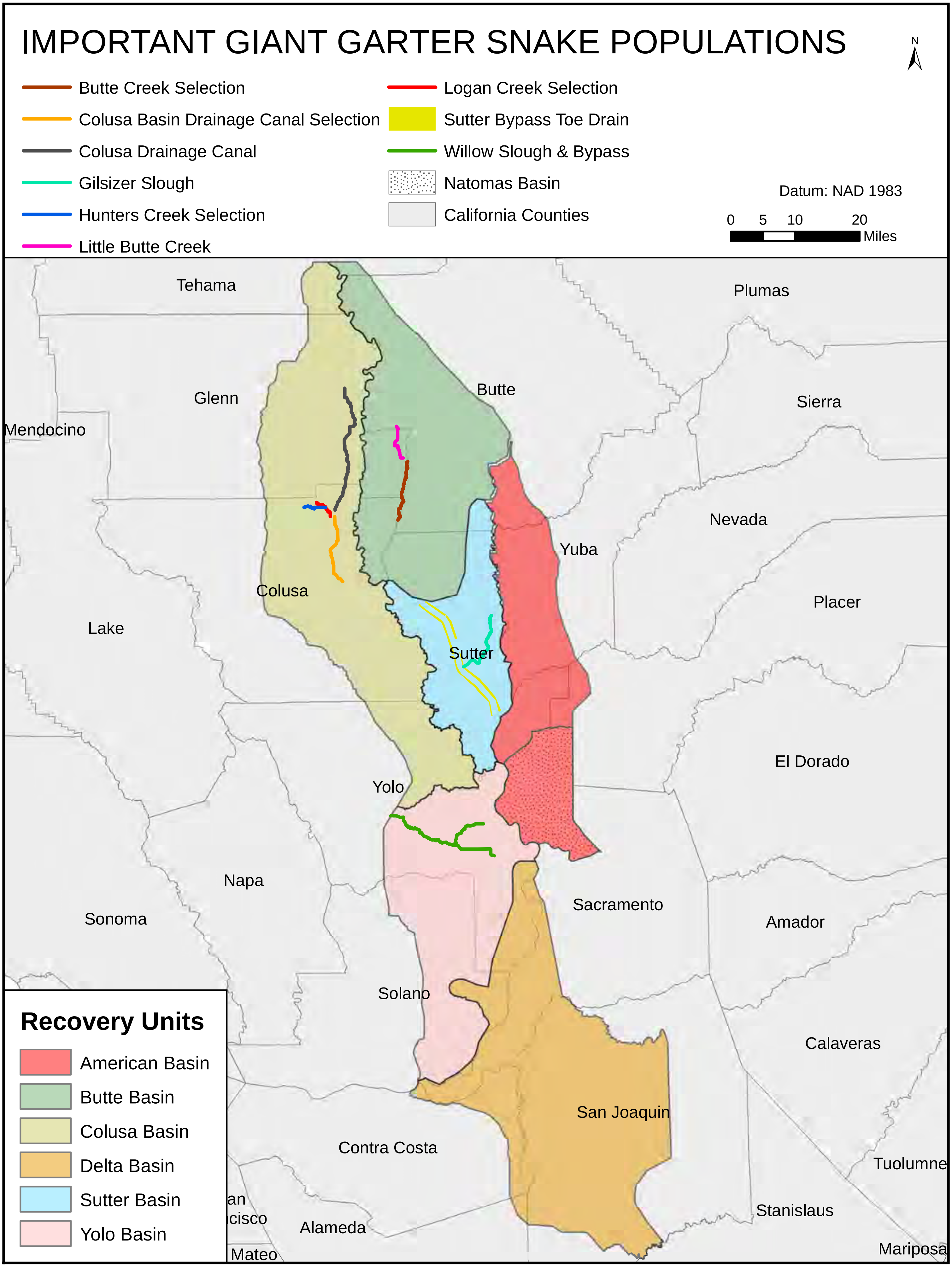
SELLER AREAS IN YOLO BASIN (acres)	
CONAWAY PRESERVATION GROUP, LLC	20463
PLEASANT-GROVE-VERONA MUTUAL WATER COMPANY	3
RECLAMATION DISTRICT 2060	9982
RECLAMATION DISTRICT 2068	13262
TE VELDE REVOCABLE FAMILY TRUST	4406
SUTTER MUTUAL WATER COMPANY	21
YOLO RANCH	3350

N

Datum: NAD 1983

0 2.25 4.5 9 Miles




IMPORTANT GIANT GARTER SNAKE POPULATIONS
N
Butte Creek Selection
Colusa Basin Drainage Canal Selection
Colusa Drainage Canal
Gilsizer Slough
Hunters Creek Selection
Little Butte Creek
Logan Creek Selection
Sutter Bypass Toe Drain
Willow Slough & Bypass
Natomas Basin
California Counties
Datum: NAD 1983
0 5 10 20
Miles
Tehama
Plumas
Butte
Sierra
Glenn
Mendocino
Nevada
Yuba
Colusa
Placer
Lake
Sutter
El Dorado
Yolo
Napa
Sacramento
Sonoma
Amador
Solano
Calaveras
San Joaquin
Contra Costa
Tuolumne
Stanislaus
Alameda
Mariposa
Mateo
Recovery Units
American Basin
Butte Basin
Colusa Basin
Delta Basin
Sutter Basin
Yolo Basin

Appendix H
Groundwater Modeling Results

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Appendix H
Groundwater Modeling Results

H.1 Numerical Groundwater Modeling Analysis

Numerical groundwater modeling analysis was performed using the Sacramento Valley Finite Element Groundwater Model (SACFEM2013) developed to simulate groundwater conditions in the Sacramento Valley Groundwater Basin. SACFEM2013 was selected as the numerical modeling tool for this analysis based on the state of the model and its capabilities to simulate groundwater conditions at a greater level of detail than other potential modeling tools within the Seller Service Area. Reclamation commissioned a peer review of the SACFEM2013 model in 2010 (WRIME 2011). Revisions were made to the model and the revised model was used for the impacts analysis described here.

SACFEM2013 uses the MicroFEM finite-element numerical modeling code. MicroFEM is capable of simulating multiple aquifer systems in both steady state and transient conditions. The model is capable of simulating groundwater conditions and groundwater/surface water interactions in the valley. SACFEM2013 was also used to estimate how groundwater pumping and recharge affects surface water.

SACFEM2013 covers the entire Sacramento Valley Groundwater Basin from just north of Red Bluff to the Cosumnes River in the south (see Figure H-2). The model was calibrated to historic conditions from Water Years (WY) 1970 through WY 2009. This SACFEM2013 model simulation, which includes highly variable hydrology (from very wet periods to very dry periods), was used as a basis for simulating groundwater substitution pumping. Potential water transfers for 2021 were simulated in SACFEM2013 using September 1977 hydrologic conditions because this year represents the driest condition available during the SACFEM2013 simulation period (WY 1970 to WY 2003).

Groundwater drawdown impacts were assessed based on SACFEM2013 model simulations of the contemplated 2017 TCCA Water Transfers (i.e., groundwater substitution locations and pumping volumes). These simulation results were used to determine the effects to groundwater resources. Some of the 184 well locations used in the contemplated 2017 transfer vary slightly from the well locations that would be proposed for a potential 2021 water transfer. A potential 2021 water transfer would include the addition of 41 transfer wells and the removal of 8 transfer wells compared to 2017. Figure H-1 shows the location of the modeled 2017 groundwater substitution pumping locations and groundwater substitution pumping locations for a potential 2021 water transfer.

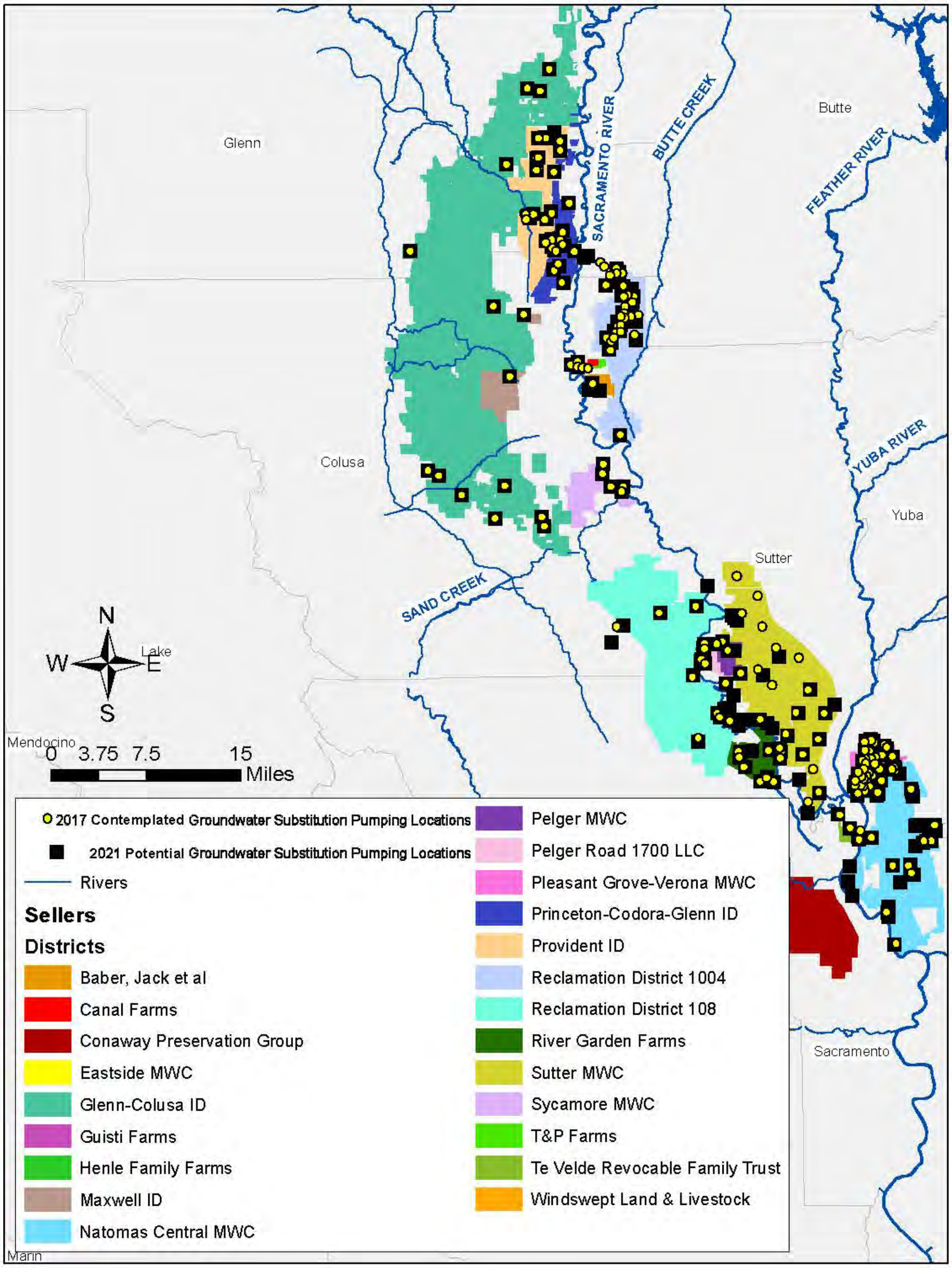

Figure H-1. 2017 and Potential 2021 Groundwater Substitution Pumping Well Locations

Table H-1 summarizes the number of groundwater substitution pumping wells, pumping rates, and range of screened intervals modeled for the contemplated 2017 groundwater substitution transfers. The locations and depths of these wells are specified in the model based on data collected from the potential groundwater substitution sellers. Table H-2 summarizes the pumping details of the potential 2021 groundwater substitution pumping wells for comparison. Table H-3 summarizes the difference between the number of 2017 pumping wells and the number of pumping wells for a potential 2021 water transfer shown in Table H-1 and Table H-2.

Table H-1. Water Transfers through Groundwater Substitution under the Contemplated 2017 TCCA Water Transfers (2017 Modeled Wells)

Potential Seller	Number of Wells	Pumping Rate or Range of Rates (gpm)	Range of Screened Interval(s) (feet bgs)
Redding Area Groundwater Basin[1]			
Anderson- Cottonwood Irrigation District	2	1,000-5,500	150-455
Sacramento Valley Groundwater Basin			
Burroughs Farms	3	2,000 – 3,200	120 - 580
Canal Farms	3	3,500 - 5,000	65 - 660
Eastside Mutual Water Company	1	4,720	150 - 240
Giusti Farms	2	3,200	150 - 400
Glenn-Colusa Irrigation District	13	800 – 4,300	25 –945
Maxwell Irrigation District	2	3,800	150 - 240
Natomas Central Mutual Water Company	14	1,000 - 2,500	10 - 952
Pelger Mutual Water Company	4	1,500 - 5,000	101 - 485
Pelger Road 1700 LLC	4	3,000 - 3,500	200 - 820
Pleasant Grove-Verona Mutual Water Company	34	1,500 - 5,000	99 - 260
Princeton-Codora- Glenn Irrigation District	13	1,000 - 3,000	120 - 380
Provident Irrigation District	16	2,000 – 4,500	100 - 420
Reclamation District 108	5	1,700 - 5,900	250 - 680
Reclamation District 1004	28	1,000 - 5,800	56 - 430
River Garden Farms	8	1,700 - 3,000	170 - 686
Sutter Mutual Water Company	20	2,500 – 5,000	160 - 400
Sycamore Mutual Water Company	5	3,200 - 6,500	160 - 906
T&P Farms	2	3,500 - 4,000	256 - 862
Te Velde Revocable Family Trust	5	2,200 - 4,700	115 - 455

Note:
[1] Anderson-Cottonwood ID's proposed transfer was not simulated in the Sacramento Valley Finite Element Groundwater Model (SACFEM2013) because the model area does not include the Redding Area Groundwater Basin.
Key:
gpm = gallons per minute
bgs = below ground surface

Table H-2. Water Transfers through Groundwater Substitution under the Proposed Action (Potential 2021 Wells)

Potential Seller	Number of Wells	Pumping Rate or Range of Rates (gpm)	Range of Screened Interval(s)(feet bgs)
Redding Area Groundwater Basin[1]			
Anderson- Cottonwood Irrigation District	2	1,000-5,500	150-455
Sacramento Valley Groundwater Basin			
Burroughs Farms	1	3,000	120 - 580
Canal Farms	3	1,900-5,000	210-660
Eastside Mutual Water Company	3	4,000-4,720	160-450
Giusti Farms	2	3,200	160-400
Glenn-Colusa Irrigation District	13	600-3,600	604-945
Henle Family Farms	1		
Maxwell Irrigation District	2	3,800	150-240
Natomas Central Mutual Water Company	33	1,000-3,200	310-952
Pelger Mutual Water Company	4	2,300-4,800	140-485
Pelger Road 1700 LLC	6	3,000-3,500	340-820
Pleasant Grove-Verona Mutual Water Company	35	0-3,600	174-520
Princeton-Codora- Glenn Irrigation District	13	1,000-4,000	220-380
Provident Irrigation District	13	2,000-3,800	160-420
Reclamation District 108	5	1,700-5,900	335-680
Reclamation District 1004	30	1,000-5,800	410-730
River Garden Farms	9	2,200-3,300	365-686
Sutter Mutual Water Company	30	1,300-5,500	300-600
Sycamore Mutual Water Company	5	3,270-6,409	256-906
Te Velde Revocable Family Trust	4	2,250-4,200	200-455
Windswept Land & Livestock	3	2,000-3,200	320-580

Note:
[1] Anderson-Cottonwood ID's proposed transfer was not simulated in the Sacramento Valley Finite Element Groundwater Model (SACFEM2013) because the model area does not include the Redding Area Groundwater Basin.
Key:
gpm = gallons per minute
bgs = below ground surface

Table H-3. Change in Number of Potential 2021 Groundwater Substitution Wells Compared to the Number of 2017 Groundwater Substitution Wells

Potential Seller	Total Number of 2017 Wells	Number of Wells Removed	Number of Wells Added	Total Number of 2021 Wells
Redding Area Groundwater Basin				
Anderson- Cottonwood Irrigation District	2	--	--	2
Sacramento Valley Groundwater Basin				
Burroughs Farms	3	2	--	1
Canal Farms	3	--	--	3
Eastside Mutual Water Company	1	--	2	3
Giusti Farms	2	--	--	2
Glenn-Colusa Irrigation District	13	--	--	13
Henle Family Farms	--	--	1	1
Maxwell Irrigation District	2	--	--	2
Natomas Central Mutual Water Company	14	--	19	33
Pelger Mutual Water Company	4	--	--	4
Pelger Road 1700 LLC	4	--	2	6
Pleasant Grove-Verona Mutual Water Company	34	--	1	35
Princeton-Codora- Glenn Irrigation District	13	--	--	13
Provident Irrigation District	16	3	--	13
Reclamation District 108	5	--	--	5
Reclamation District 1004	28	--	2	30
River Garden Farms	8	--	1	9
Sutter Mutual Water Company	20	--	10	30
Sycamore Mutual Water Company	5	--	--	5
T&P Farms	2	2	--	--
Te Velde Revocable Family Trust	5	1	--	4
Windswept Land & Livestock	--	--	3	3
Total Number of Wells	**184**	**8**	**41**	**217**

Figures H-2 through H-5 show the simulated drawdown due to the Proposed Action under September 1977 hydrologic conditions. During dry years, surface water resources are limited and users have historically increased groundwater pumping to address shortages. Simulating transfers during this period illustrates the potential to compound impacts from dry-year pumping as compared to the No Action Alternative.

- Figure H-2 shows the simulated drawdown at the water table based on results from the top layer of the SACFEM2013 model. This layer has a depth of up to 35 feet below ground surface (bgs).

- Figure H-3 shows simulated drawdown at approximately 200 to 300 feet bgs.
- Figure H-4 presents the simulated drawdown at approximately 300 to 400 feet bgs.
- Figure H-5 presents the simulated drawdown at approximately 700 to 900 feet bgs.
- Figure H-6 overlays the Indian Trust Assets (ITAs) within the Sacramento Valley Groundwater Basin over the simulated drawdown at the water table.

Drawdown at the water table (Figure H-6) represents the estimated decline in the groundwater surface within the shallow, unconfined portion of the aquifer (i.e., the height of water within a shallow groundwater well). The drawdown in the deeper portions of the aquifer (Figures H-3 through H-5) represents a change in hydraulic head (i.e., water pressure) in a well that is screened in this deeper portion of the aquifer.

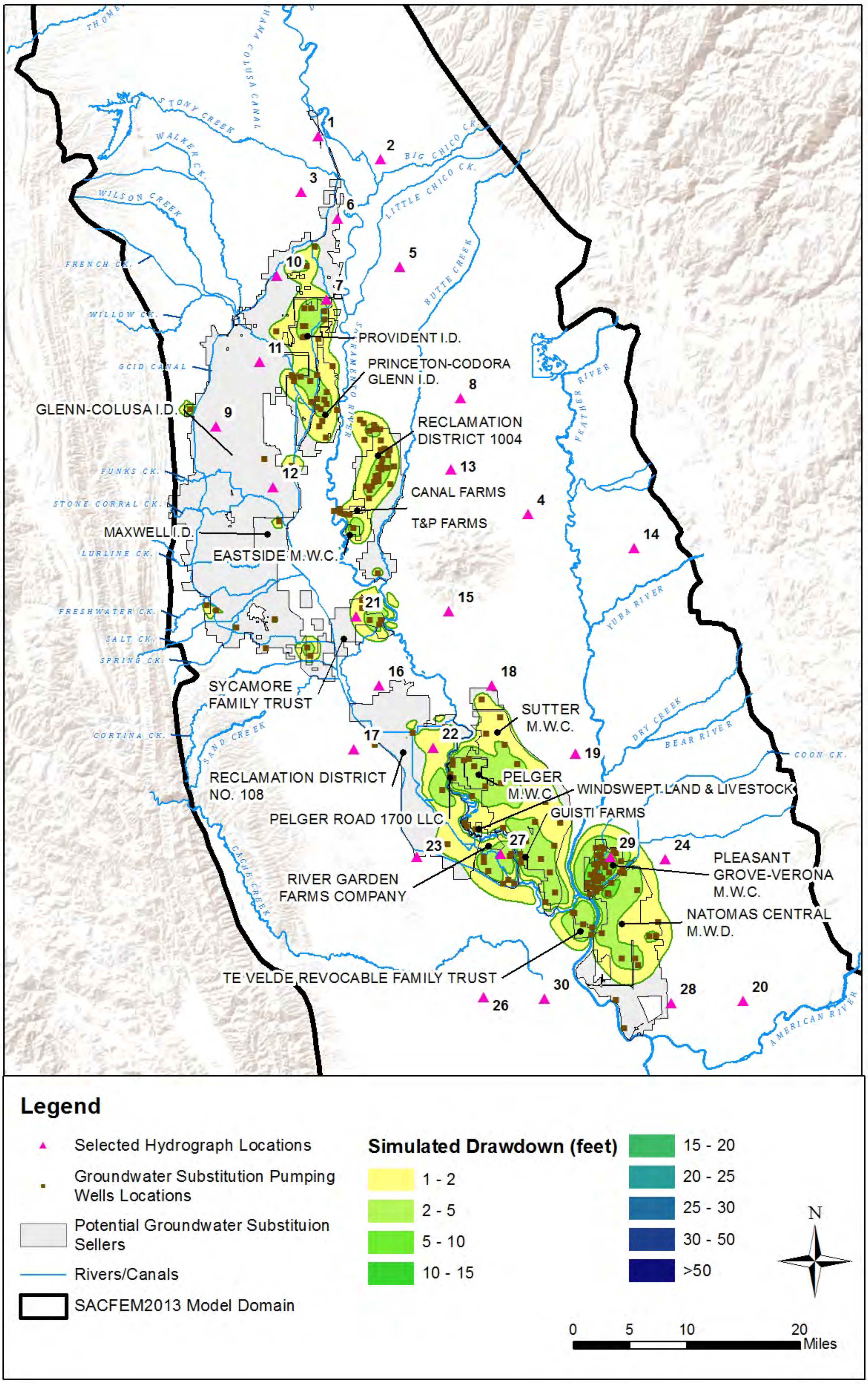

Figure H-2. Simulated Drawdown in Water Table Elevation (0 to approximately 35 feet bgs), Based on September 1977 Hydrologic Conditions

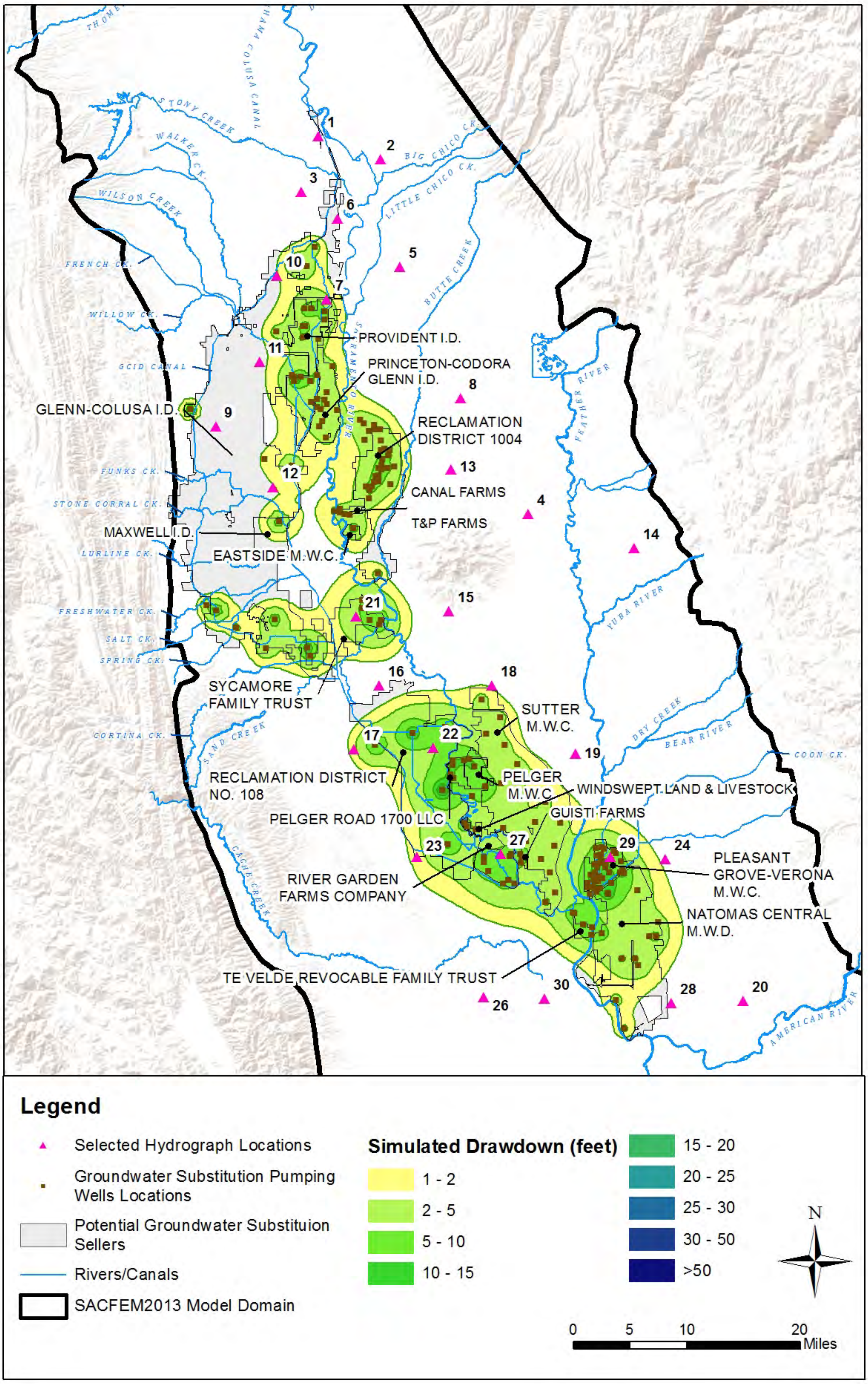

Figure H-3. Simulated Drawdown in Groundwater Head (approximately 200 to 300 feet bgs), Based on September 1977 Hydrologic Conditions

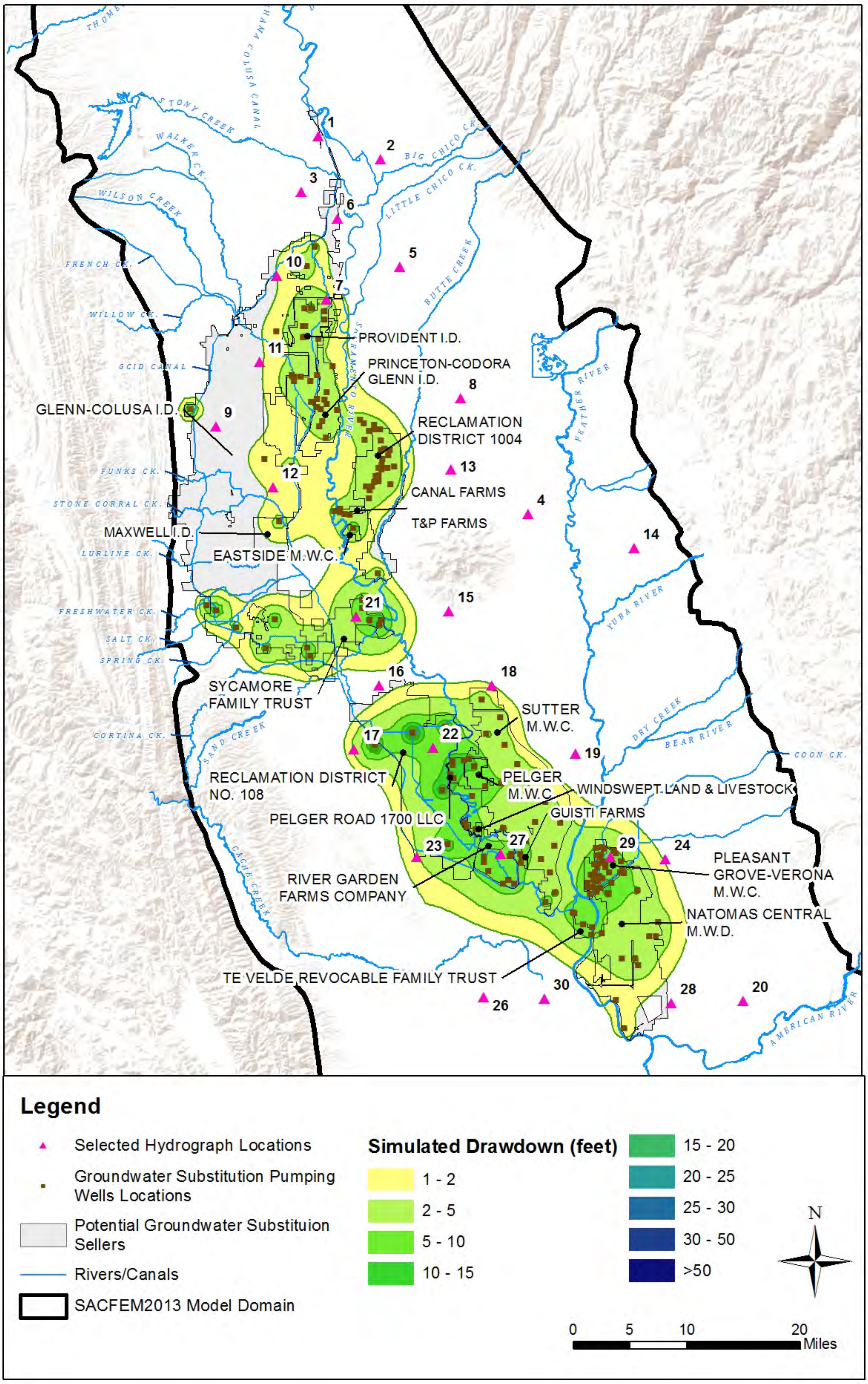

Figure H-4. Simulated Drawdown in Groundwater Head (approximately 300 to 400 feet bgs), Based on September 1977 Hydrologic Conditions

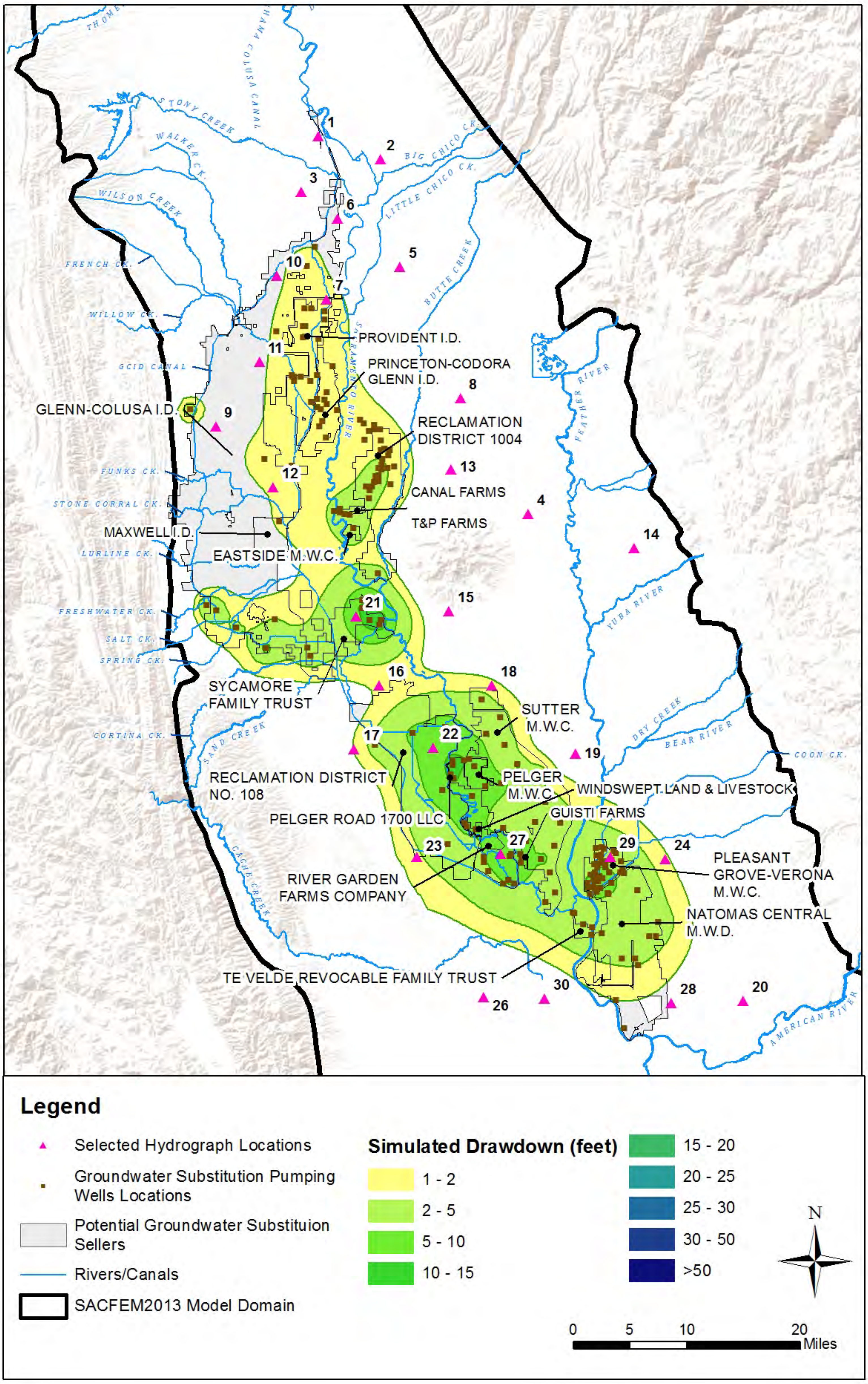

Figure H-5. Simulated Drawdown in Groundwater Head (approximately 700 to 900 feet bgs), Based on September 1977 Hydrologic Conditions

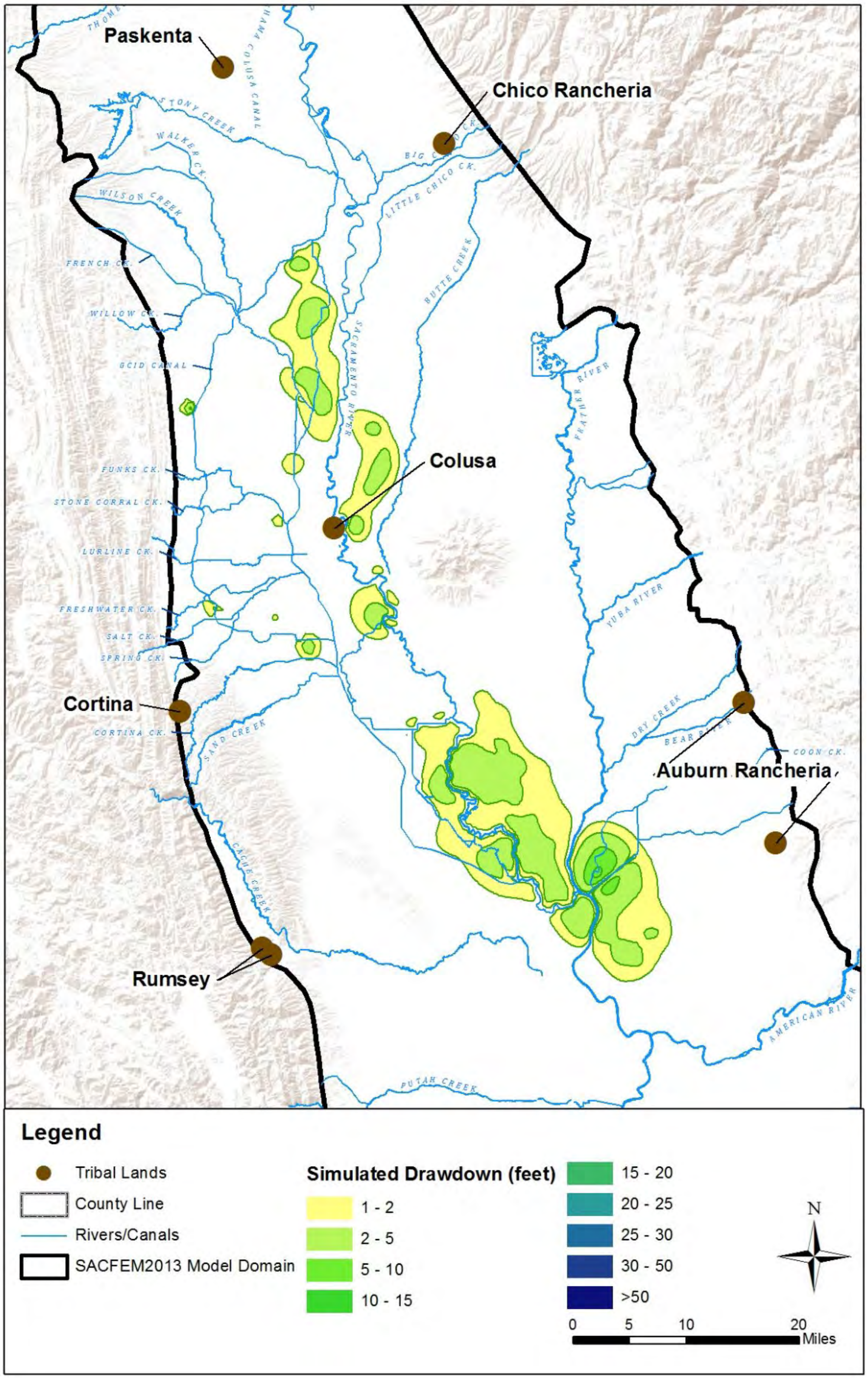

Figure H-6. Groundwater Effects to ITAs in the Sacramento Valley Groundwater Basin (simulated drawdown at the water table)

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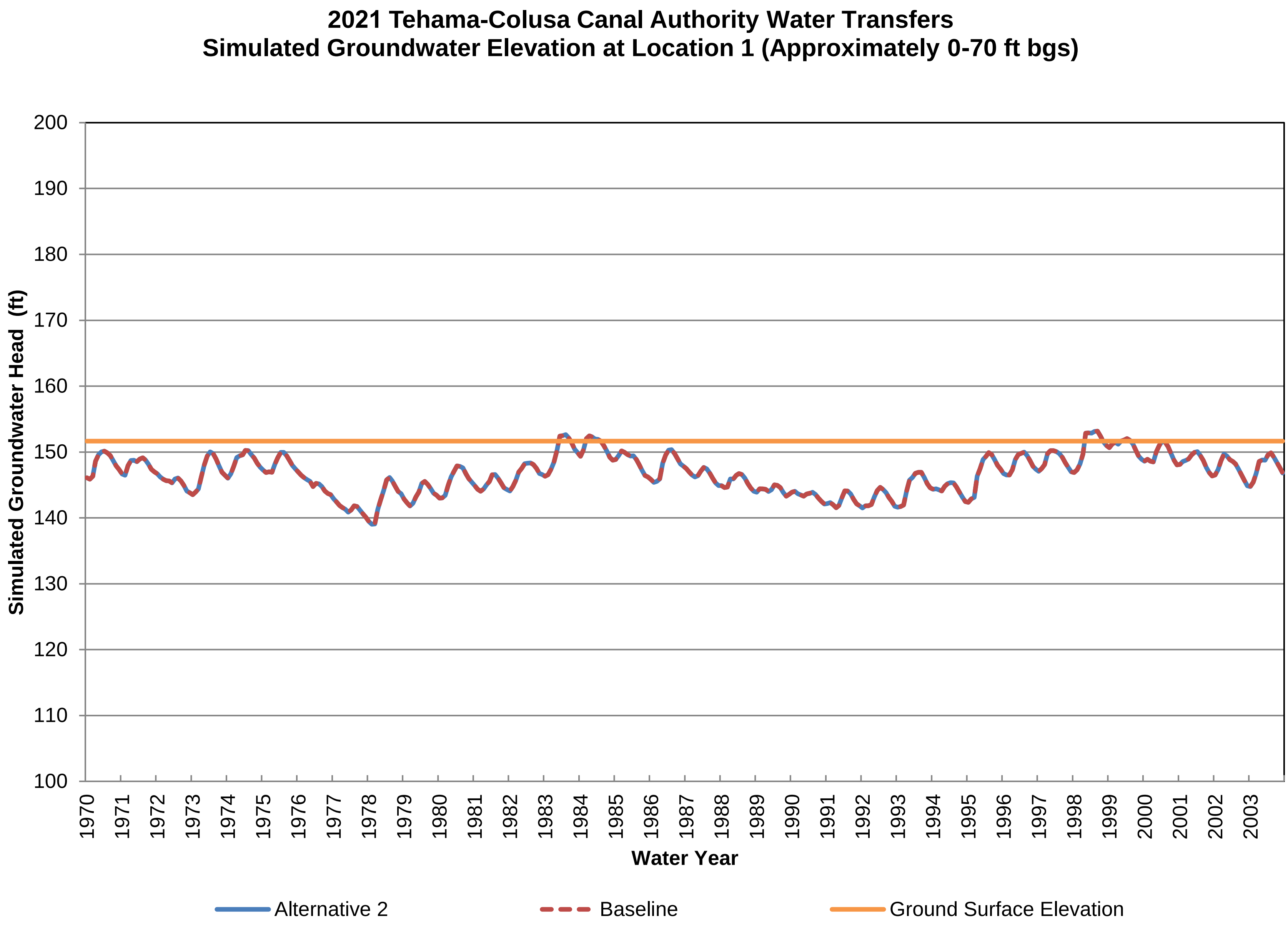
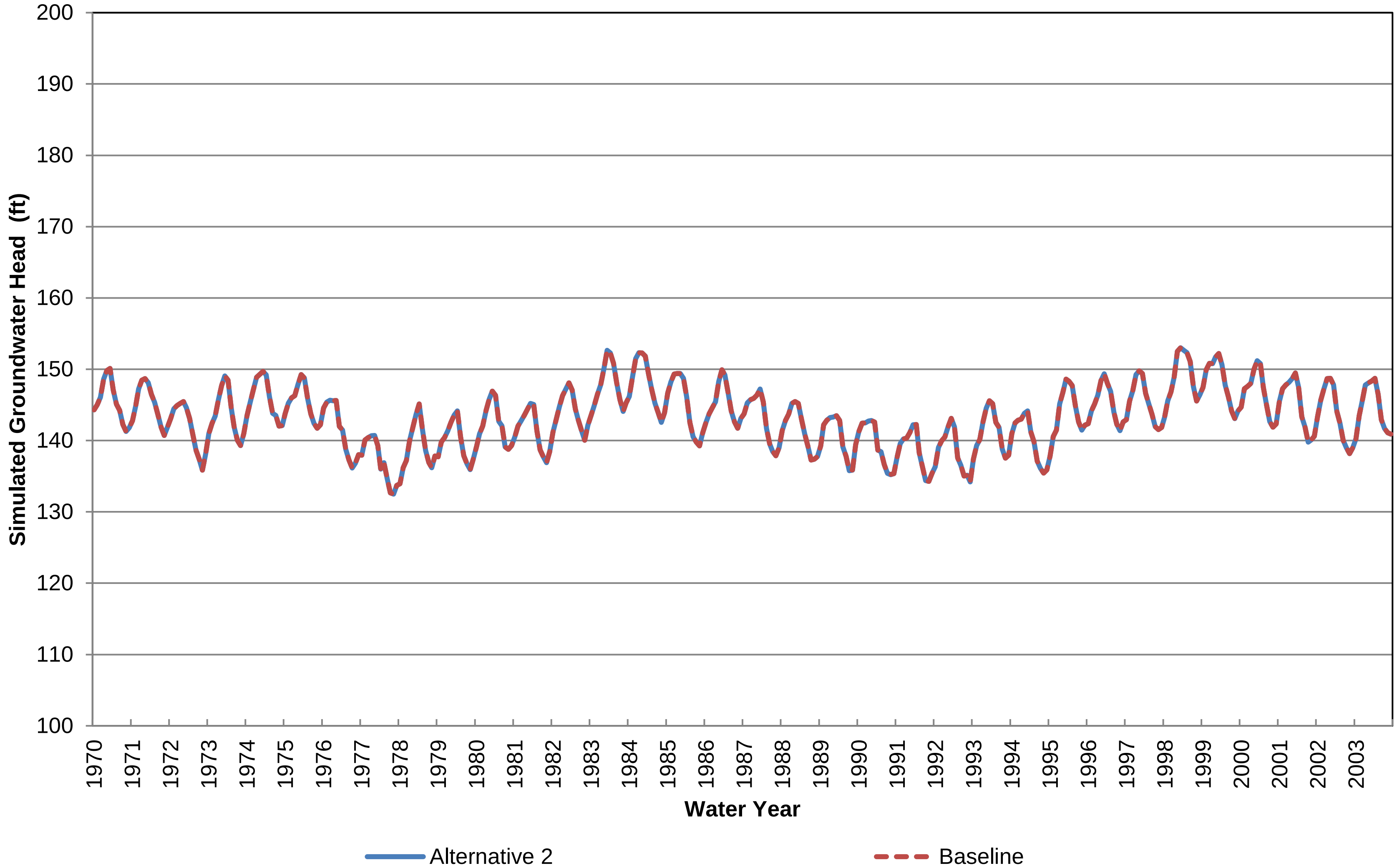
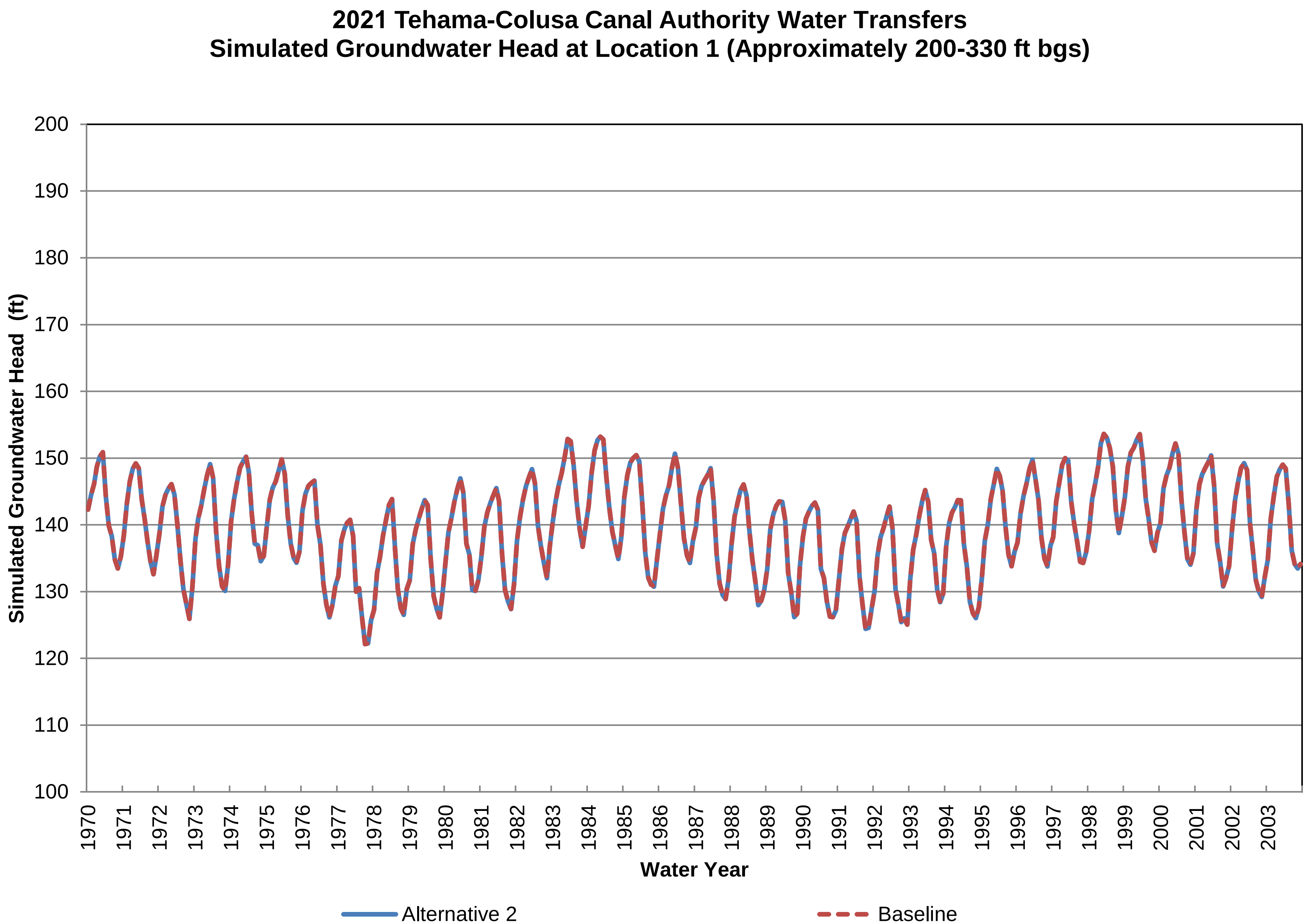
Groundwater head hydrographs for Locations 1 to 34

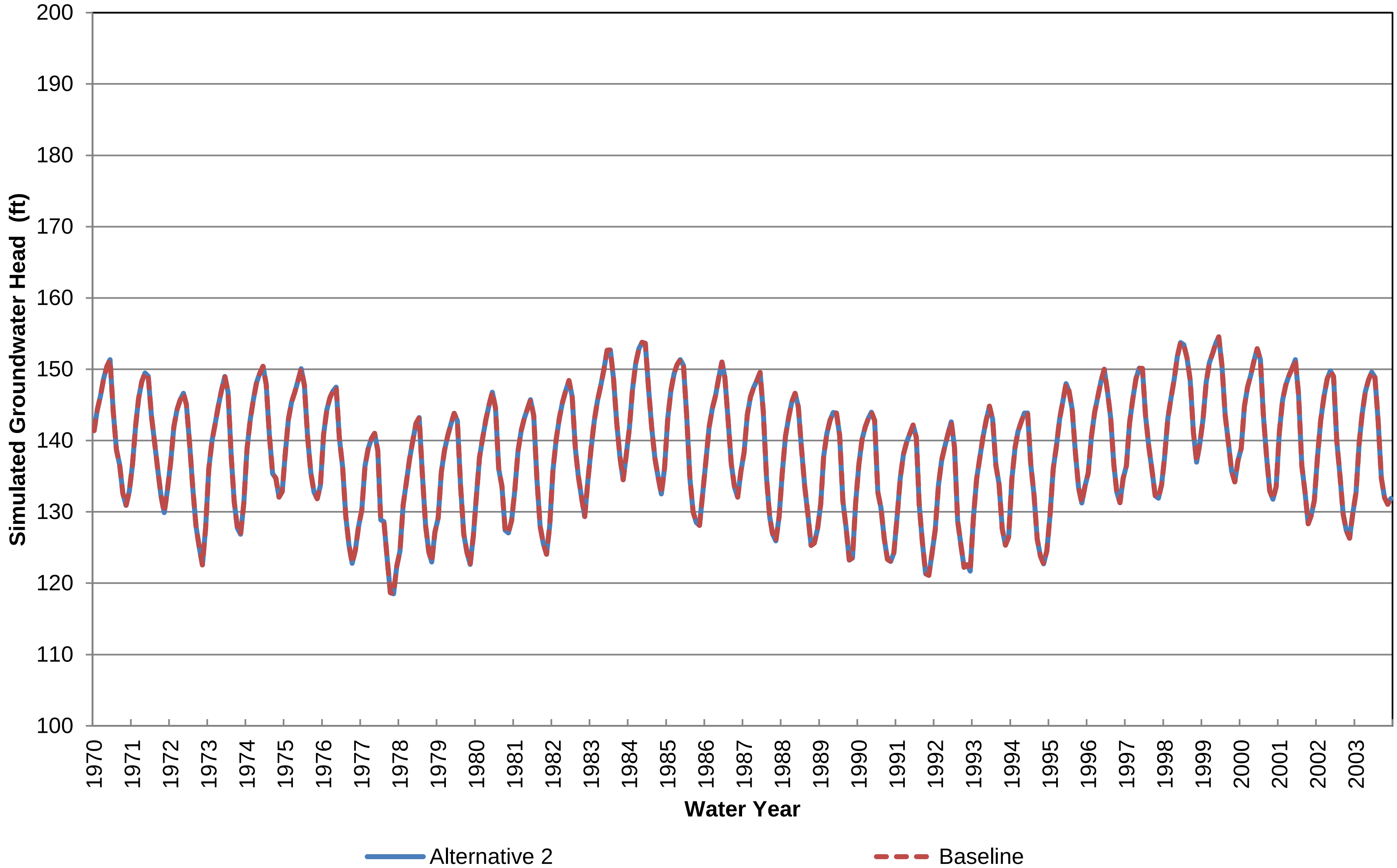

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 1 (Approximately 0-70 ft bgs)
Simulated Groundwater Head (ft)
200
190
180
170
160
150
140
130
120
110
100
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline
Ground Surface Elevation

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 1 (Approximately 70-200 ft bgs)

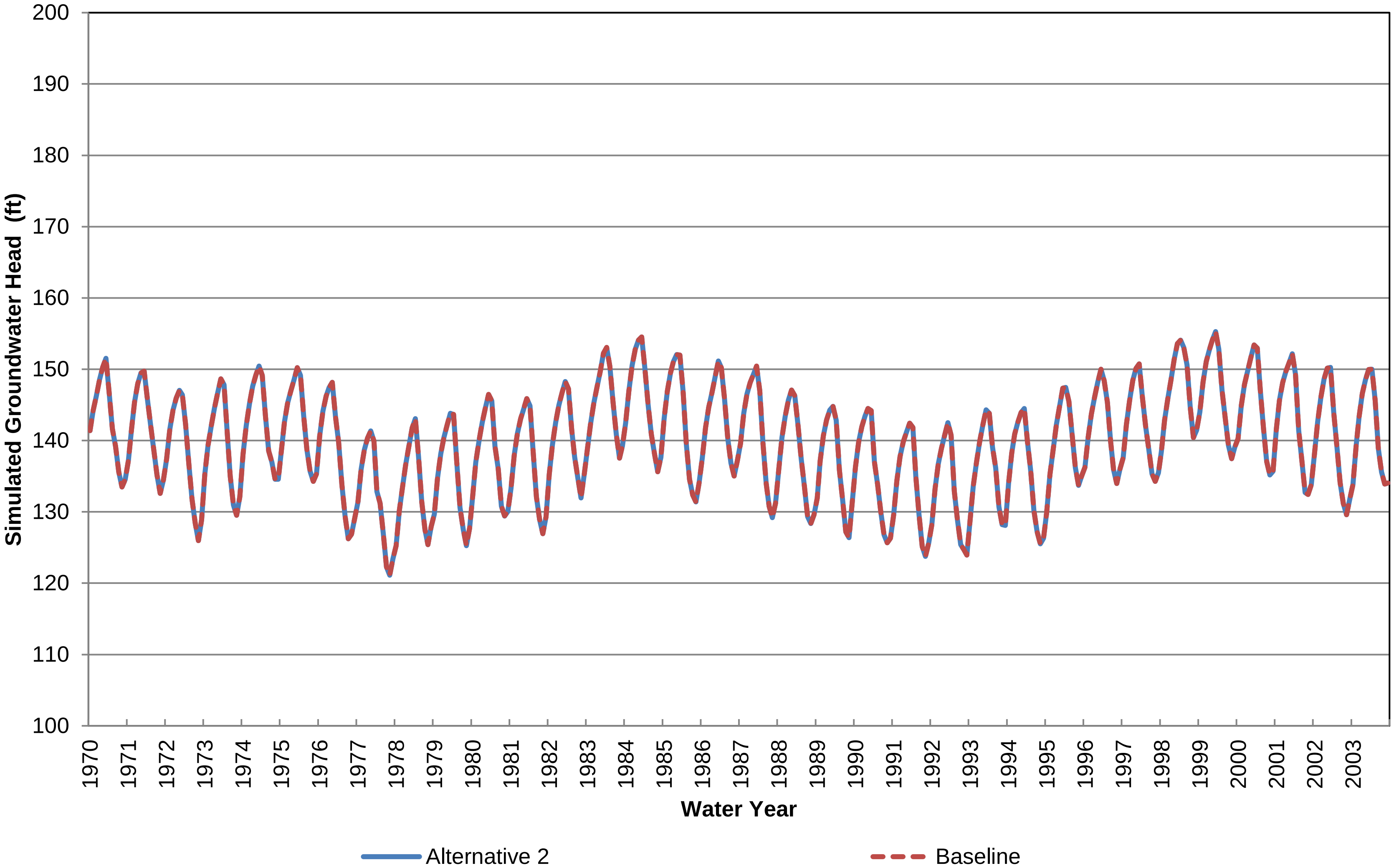


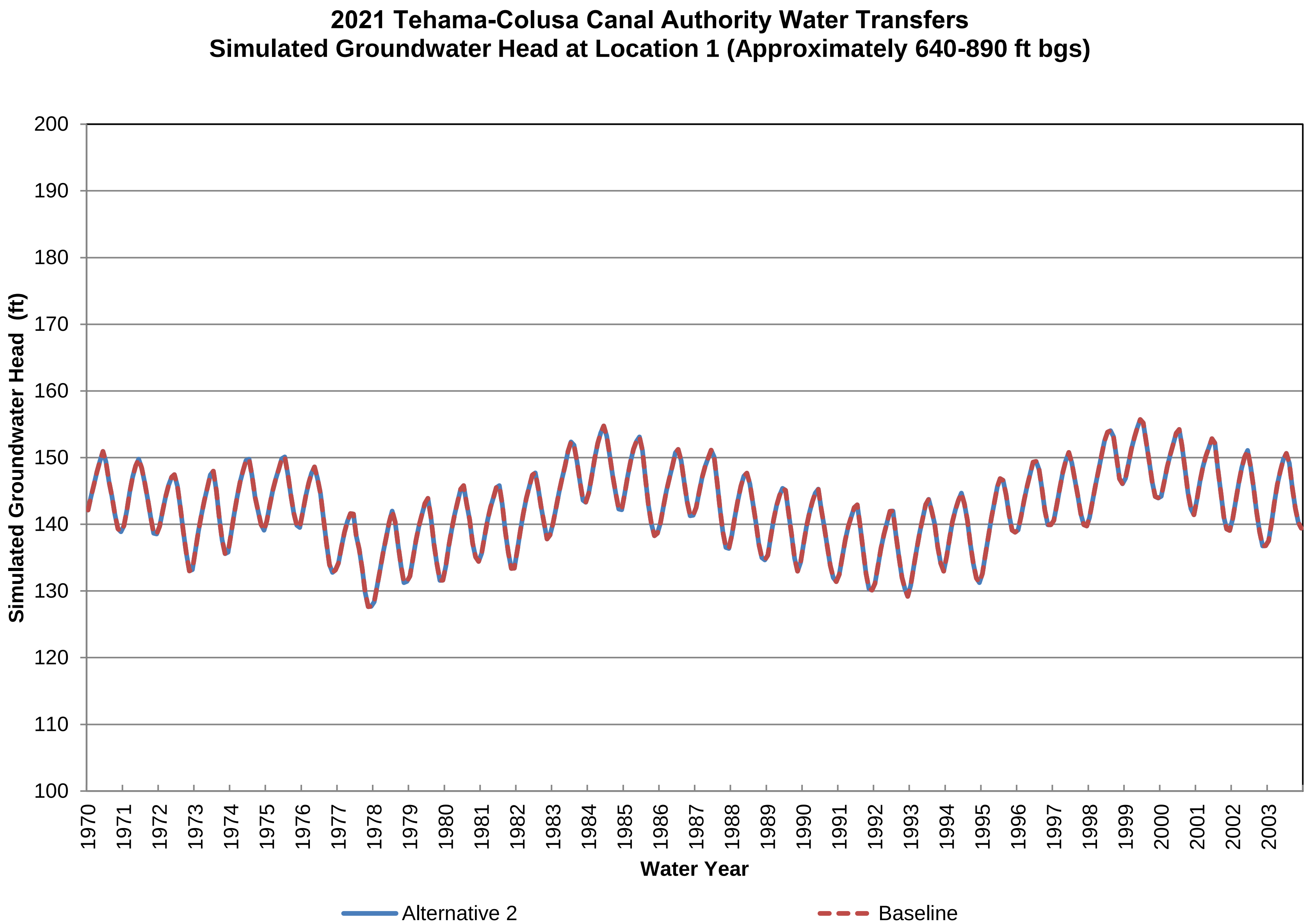

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 1 (Approximately 200-330 ft bgs)
Simulated Groundwater Head (ft)
200
190
180
170
160
150
140
130
120
110
100
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

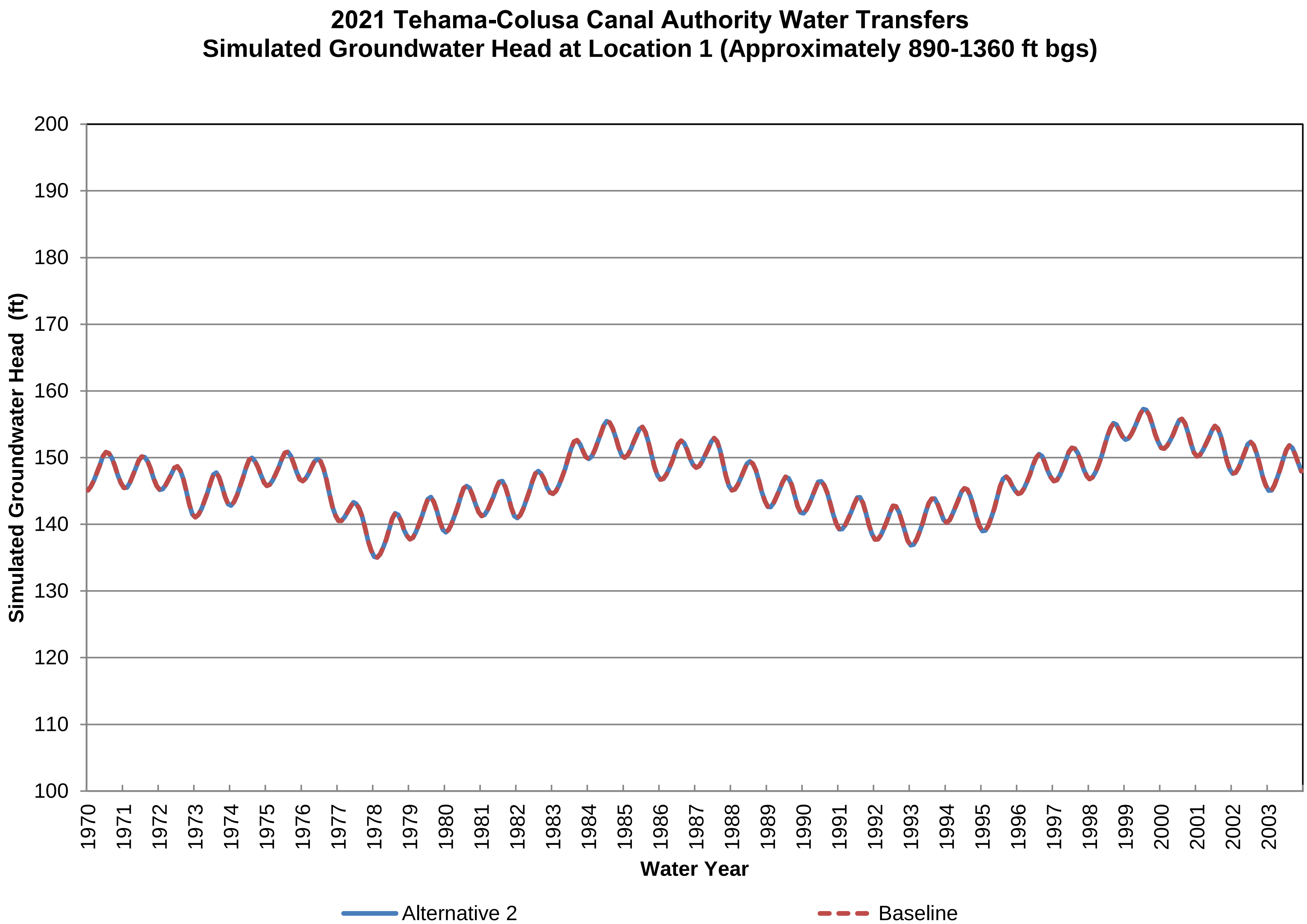
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 1 (Approximately 330-450 ft bgs)



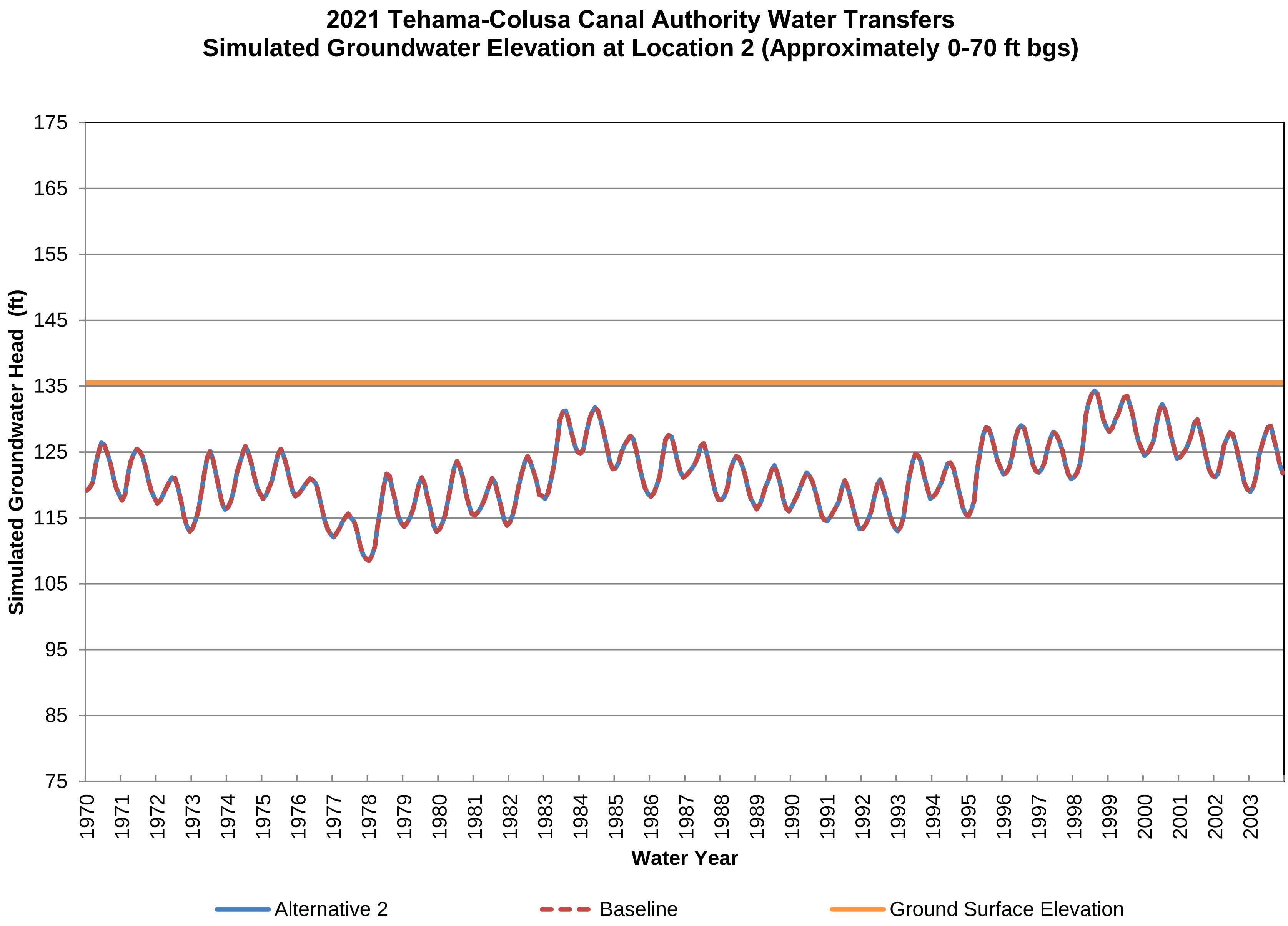
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 1 (Approximately 450-640 ft bgs)



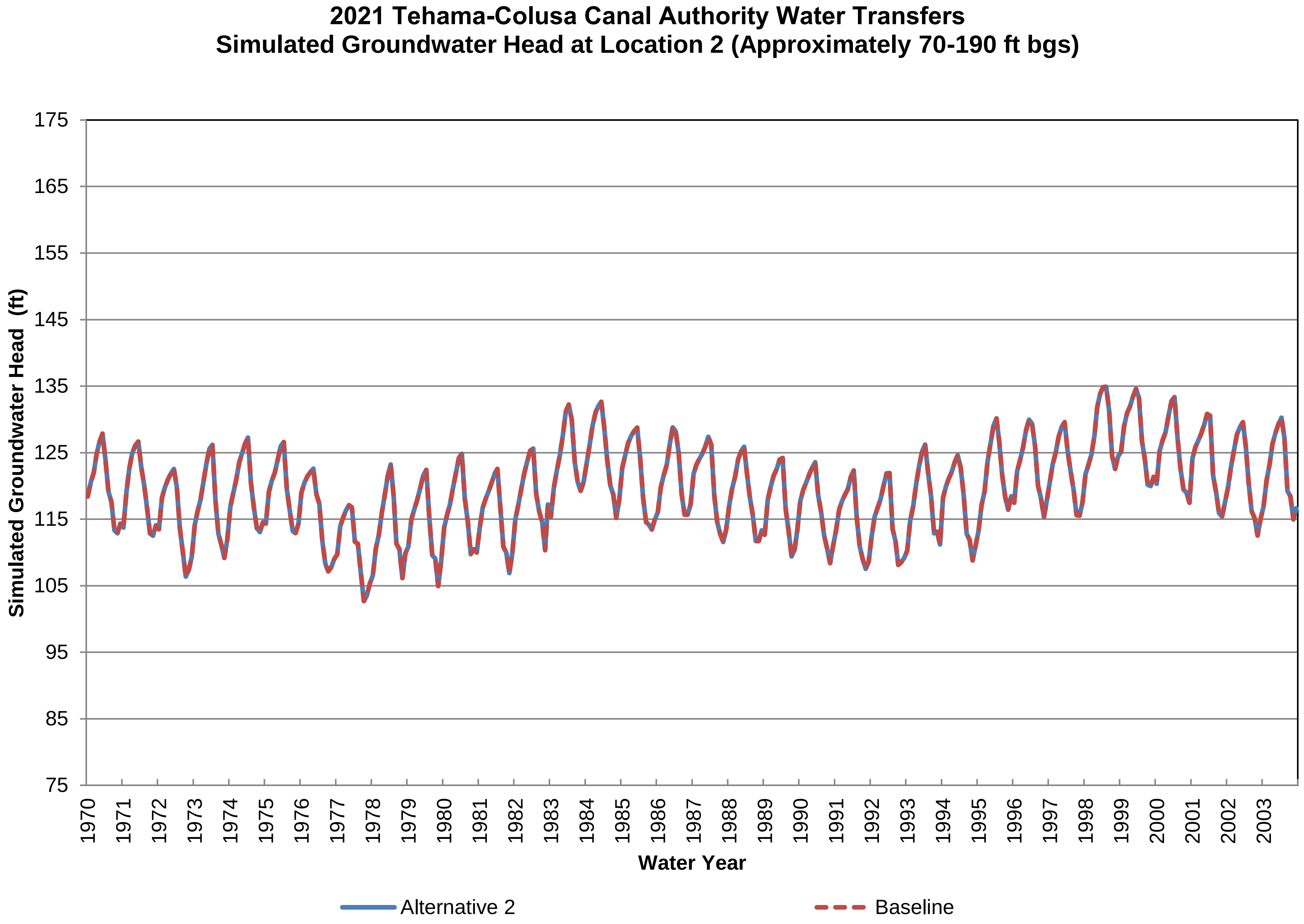

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 1 (Approximately 640-890 ft bgs)
Simulated Groundwater Head (ft)
200
190
180
170
160
150
140
130
120
110
100
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline



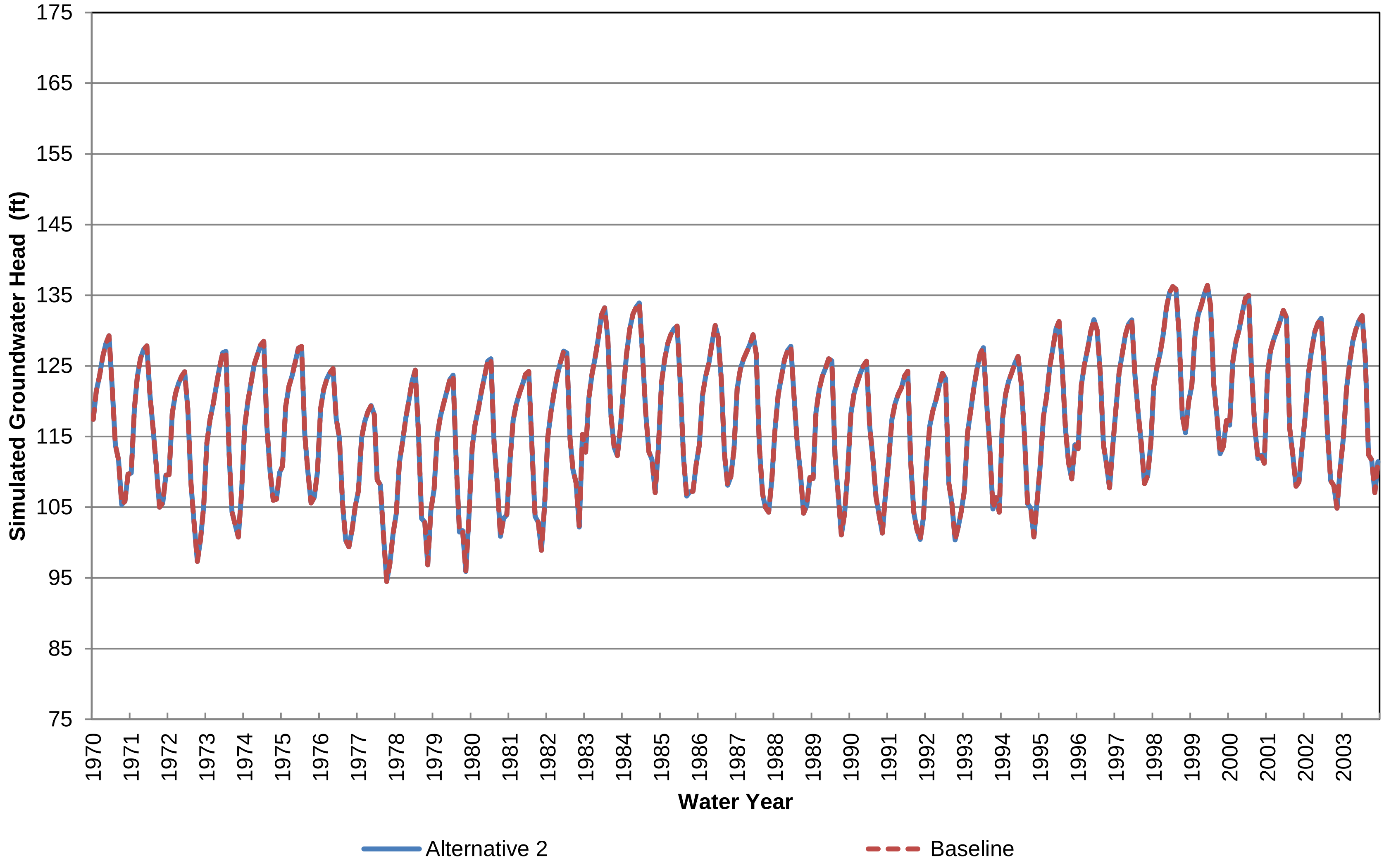
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 1 (Approximately 890-1360 ft bgs)
Simulated Groundwater Head (ft)
200
190
180
170
160
150
140
130
120
110
100
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

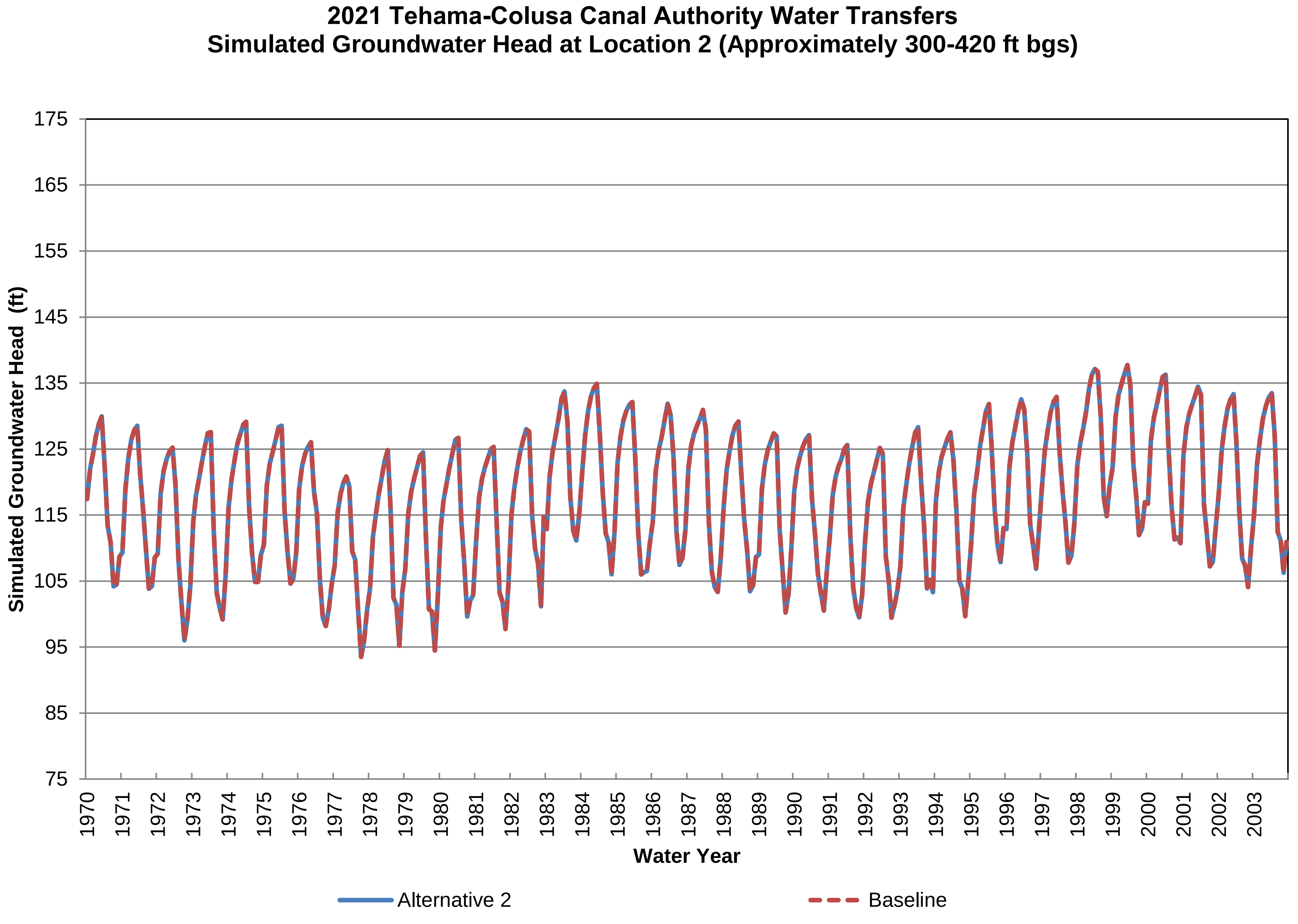


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 2 (Approximately 0-70 ft bgs)
Simulated Groundwater Head (ft)
175
165
155
145
135
125
115
105
95
85
75
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline
Ground Surface Elevation


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 2 (Approximately 70-190 ft bgs)
Simulated Groundwater Head (ft)
175
165
155
145
135
125
115
105
95
85
75
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 2 (Approximately 190-300 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 2 (Approximately 300-420 ft bgs)
Simulated Groundwater Head (ft)
175
165
155
145
135
125
115
105
95
85
75
1970
1971
1972
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1974
1975
1976
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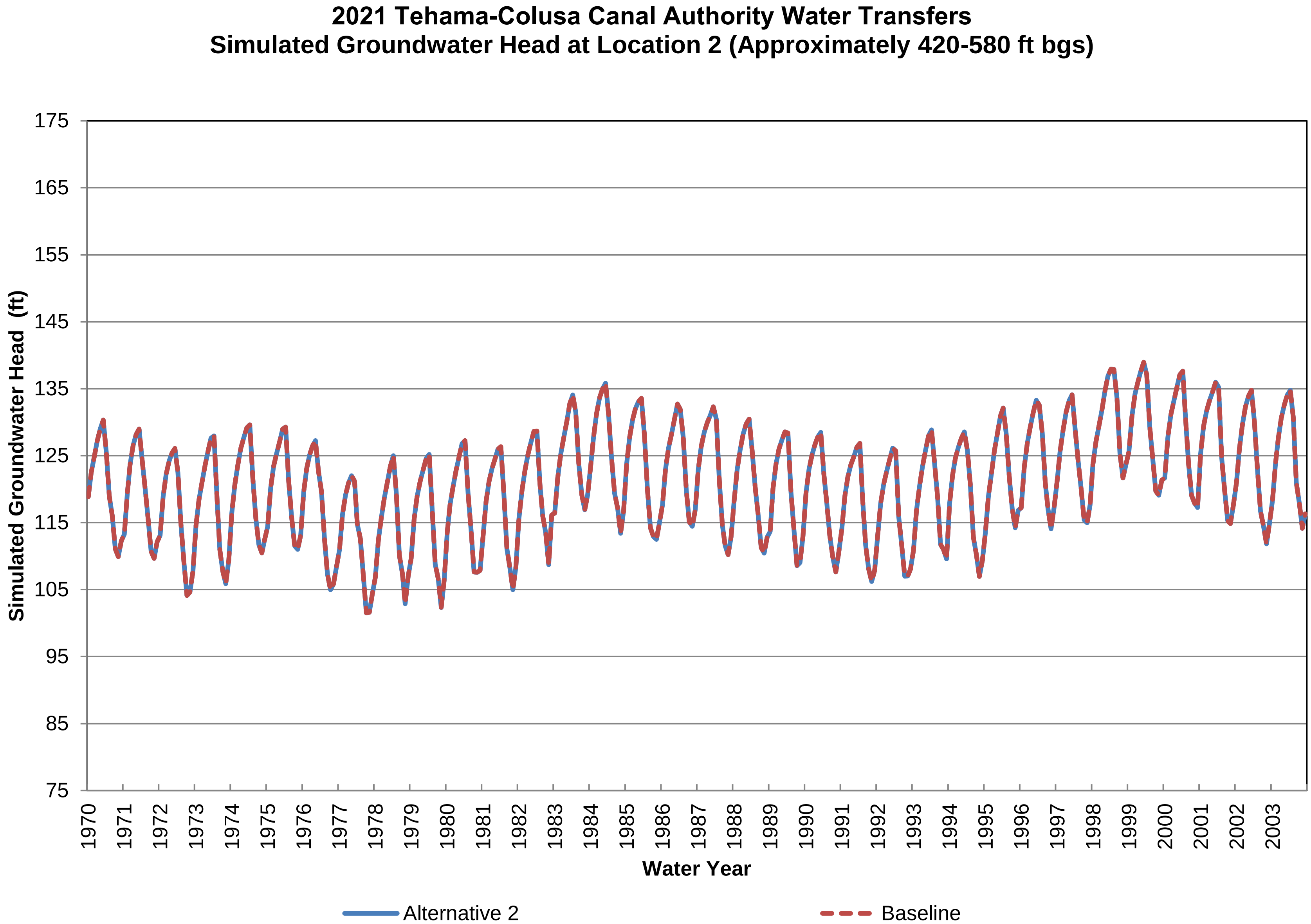
2002
2003
Water Year
Alternative 2
Baseline


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 2 (Approximately 420-580 ft bgs)
Simulated Groundwater Head (ft)
175
165
155
145
135
125
115
105
95
85
75
1970
1971
1972
1973
1974
1975
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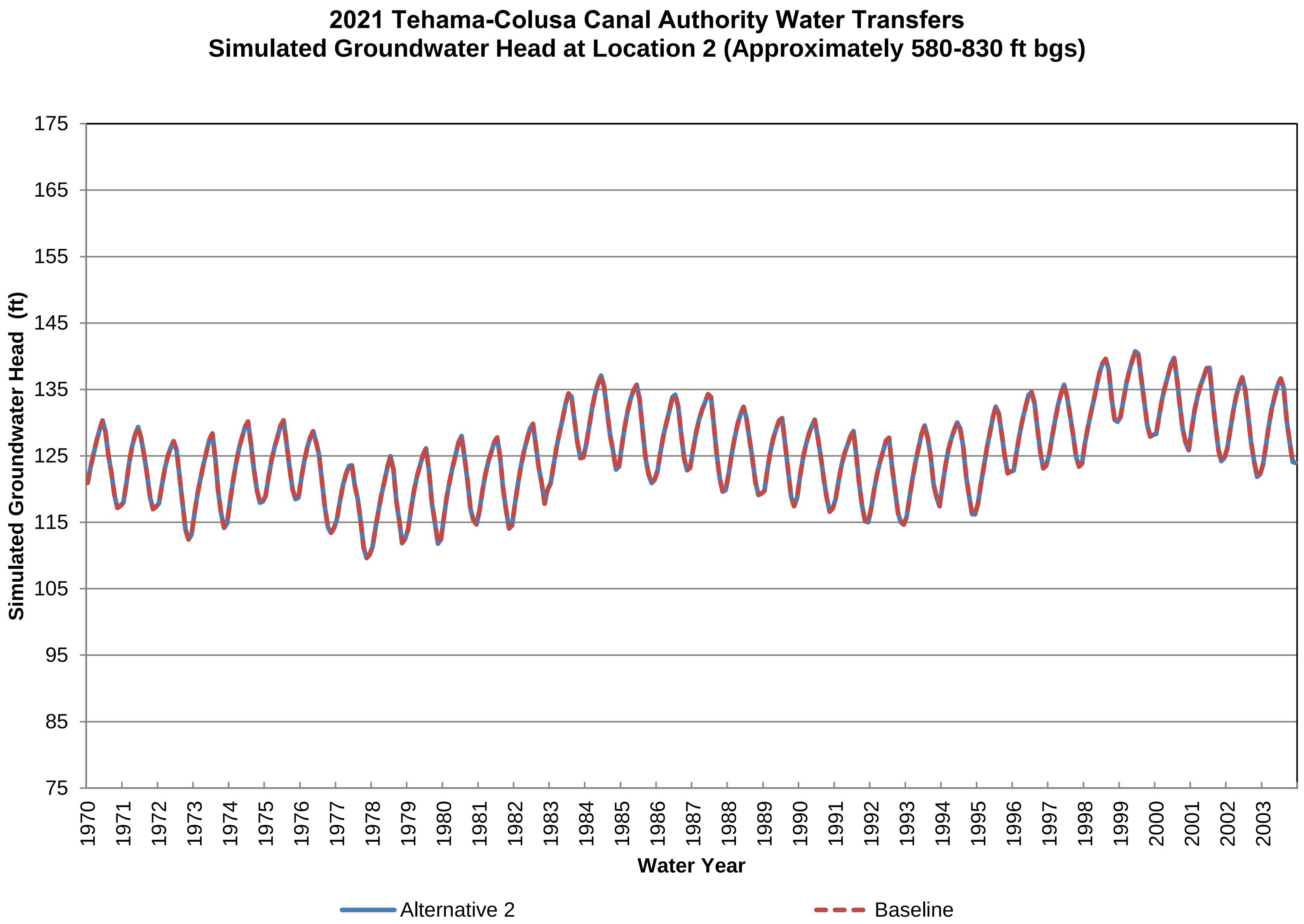
2001
2002
2003
Water Year
Alternative 2
Baseline



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 2 (Approximately 580-830 ft bgs)
Simulated Groundwater Head (ft)
175
165
155
145
135
125
115
105
95
85
75
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
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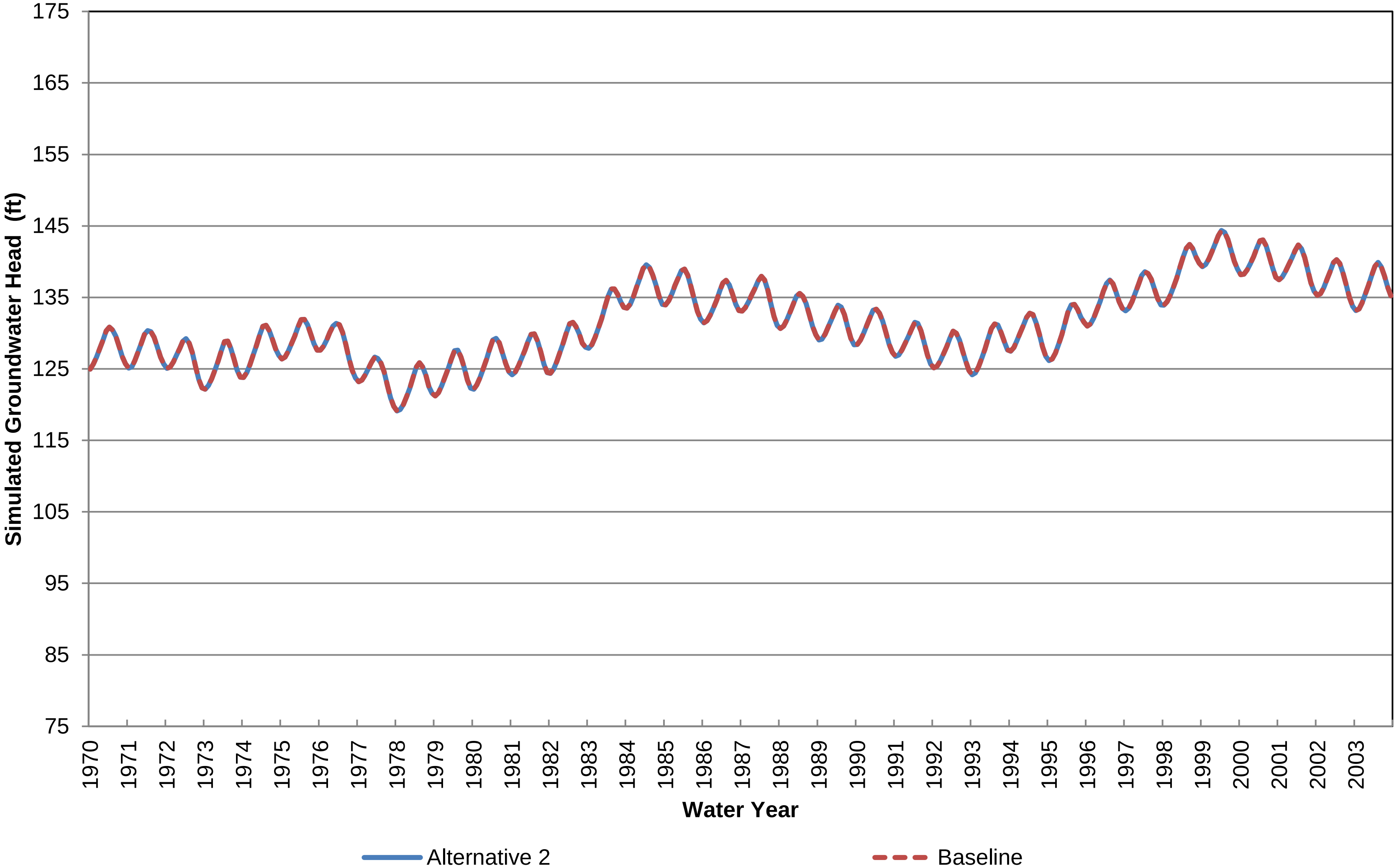
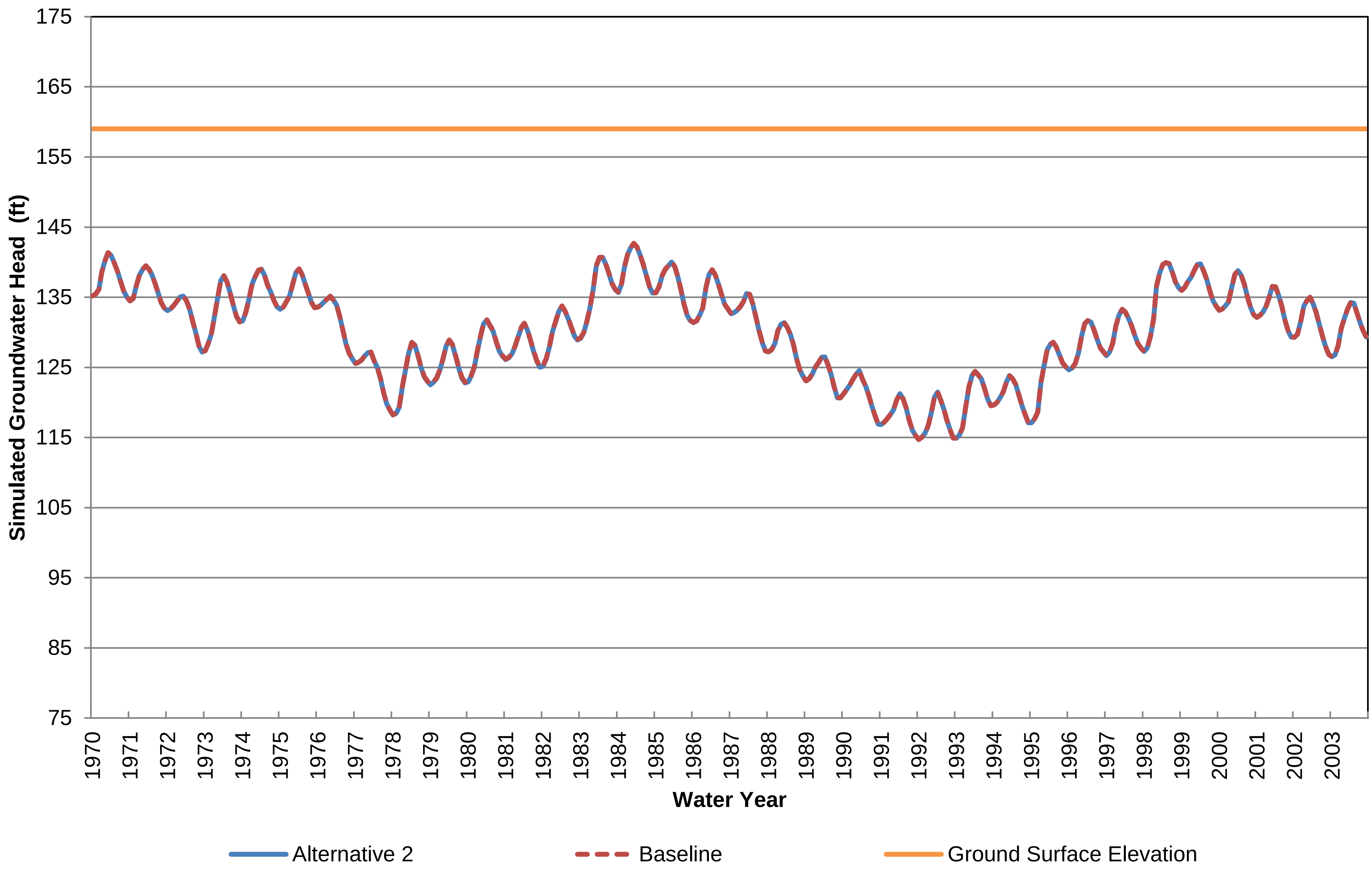
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

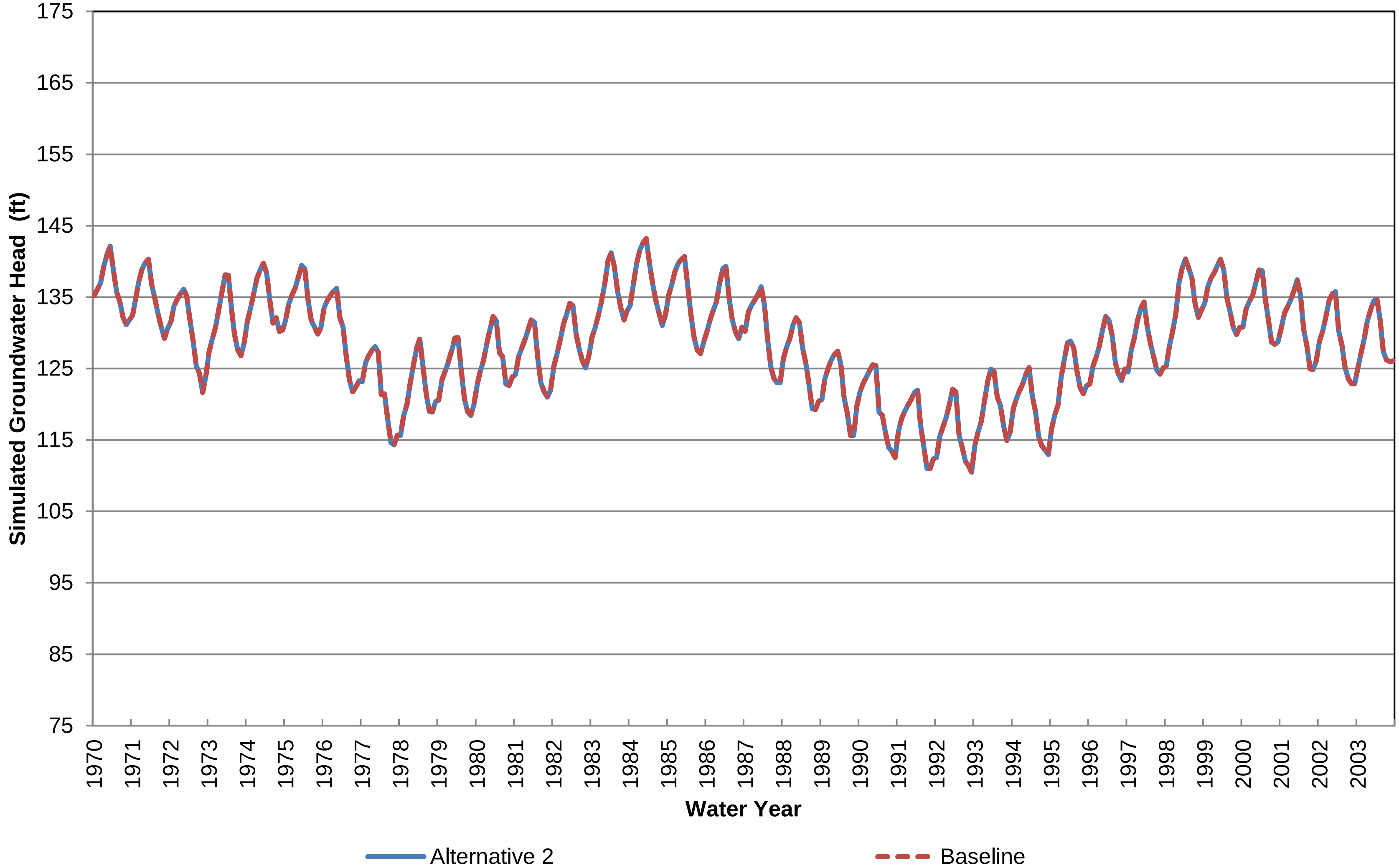
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 2 (Approximately 830-1330 ft bgs)



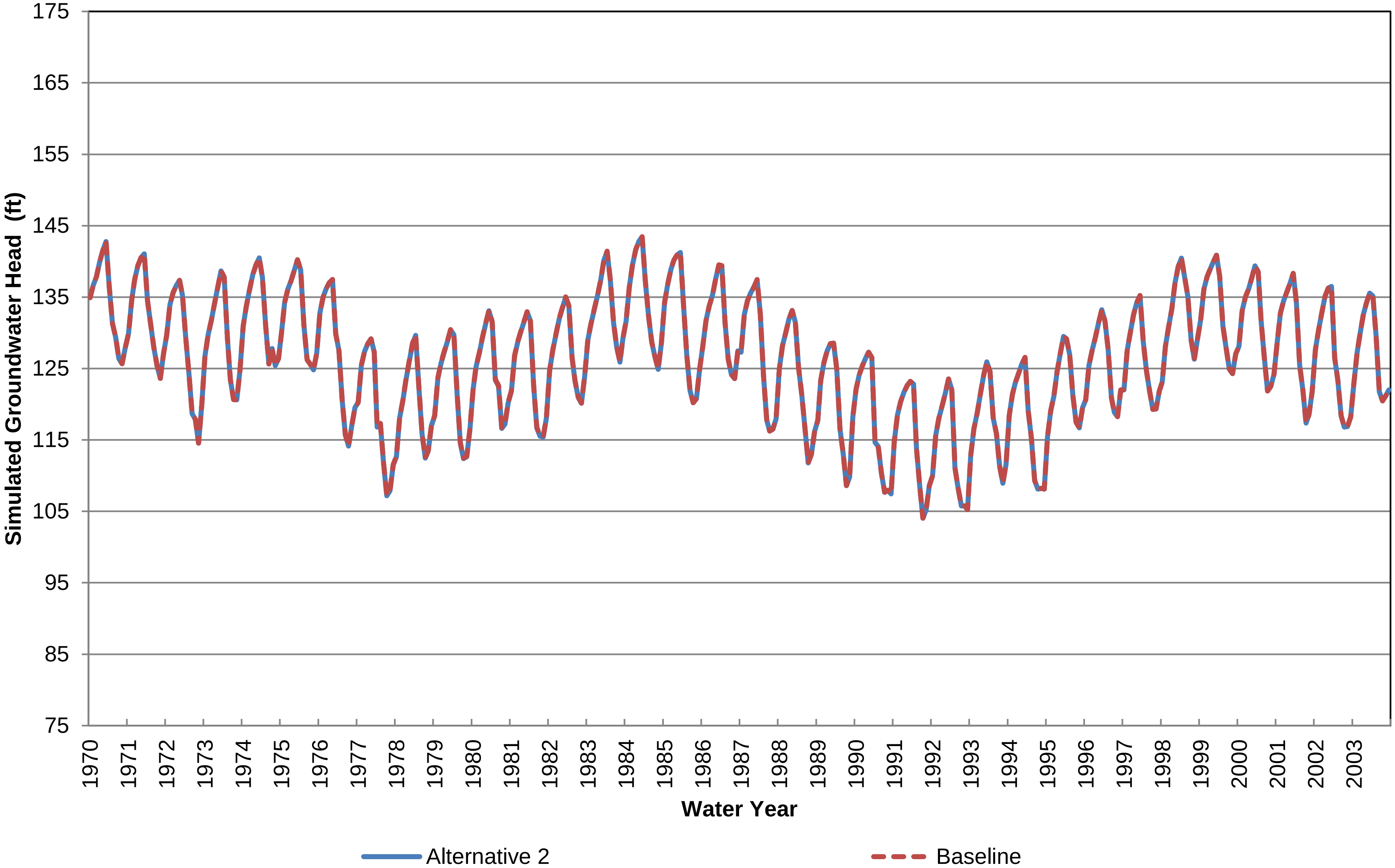
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 3 (Approximately 0-70 ft bgs)

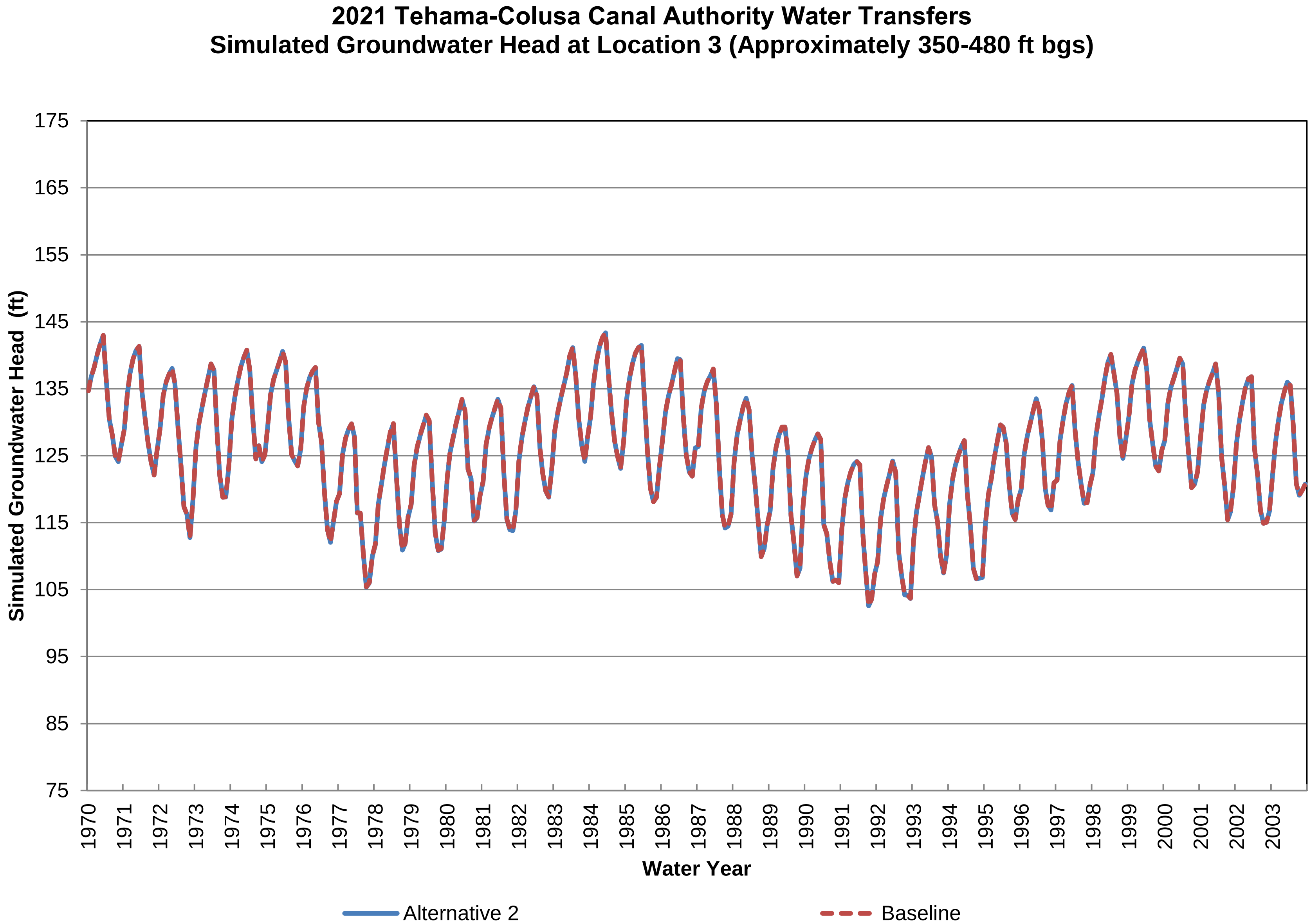


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 3 (Approximately 70-210 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 3 (Approximately 210-350 ft bgs)





2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 3 (Approximately 350-480 ft bgs)
Simulated Groundwater Head (ft)
175
165
155
145
135
125
115
105
95
85
75
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
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1998
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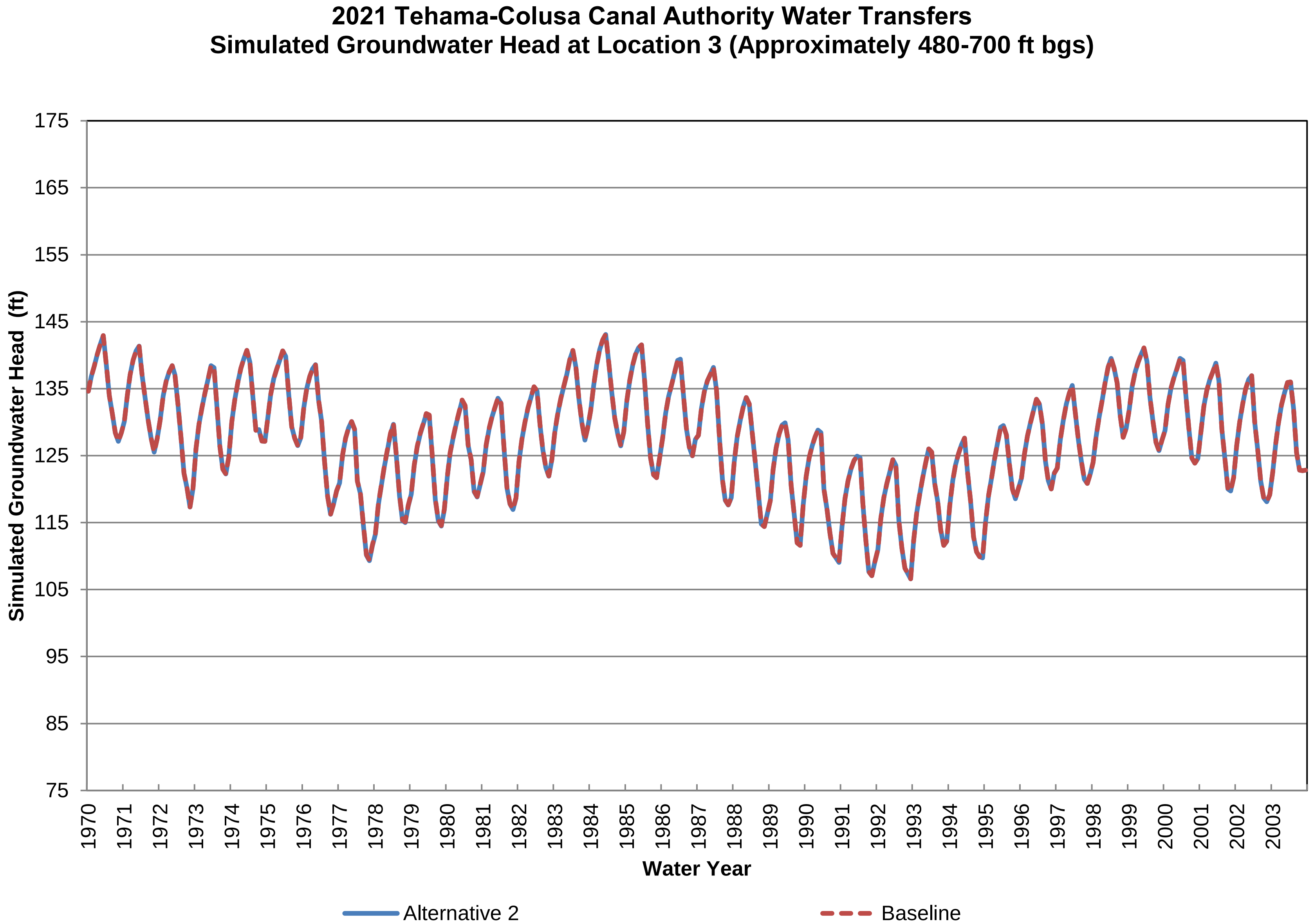
2001
2002
2003
Water Year
Alternative 2
Baseline


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 3 (Approximately 480-700 ft bgs)
Simulated Groundwater Head (ft)
175
165
155
145
135
125
115
105
95
85
75
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
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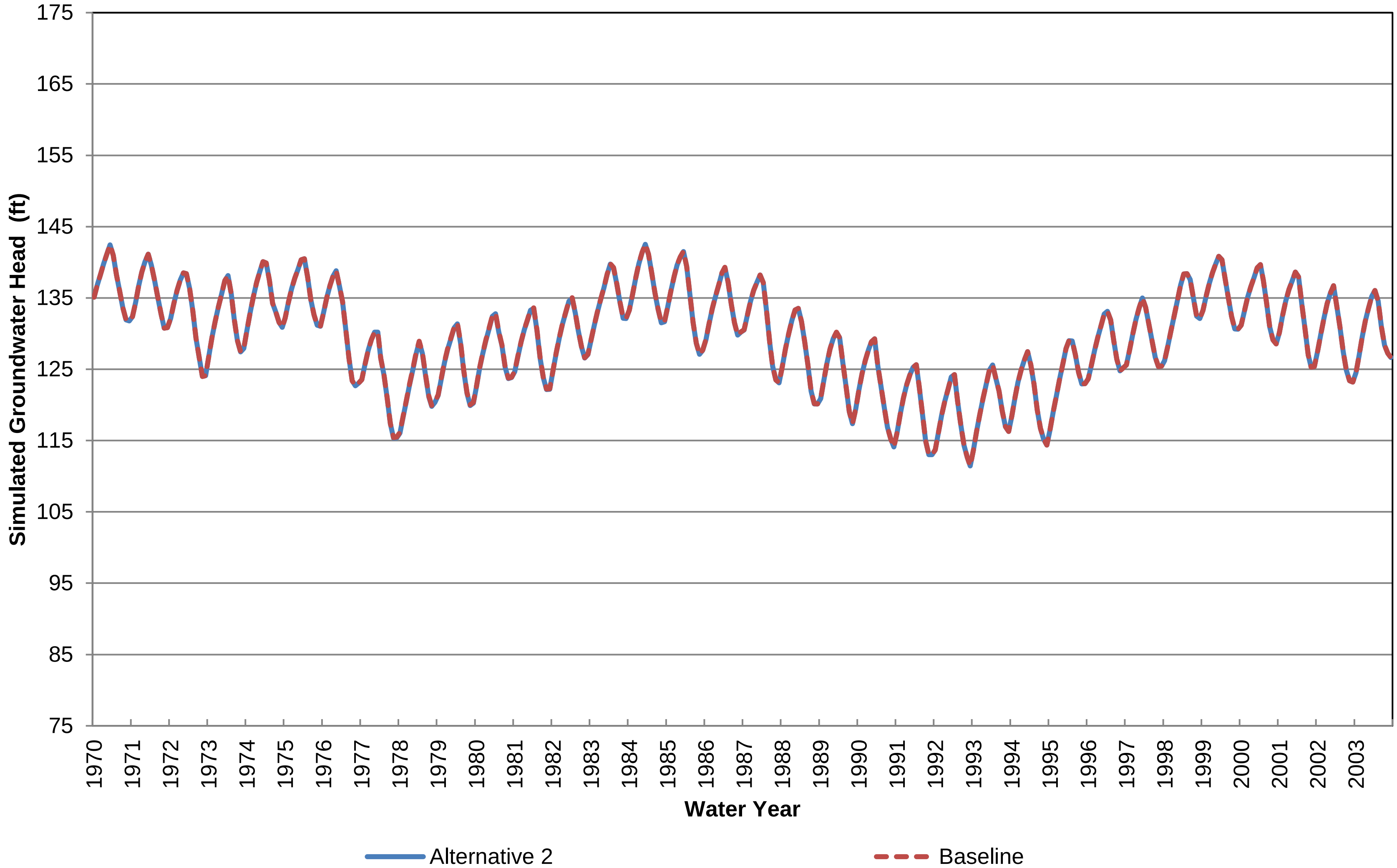
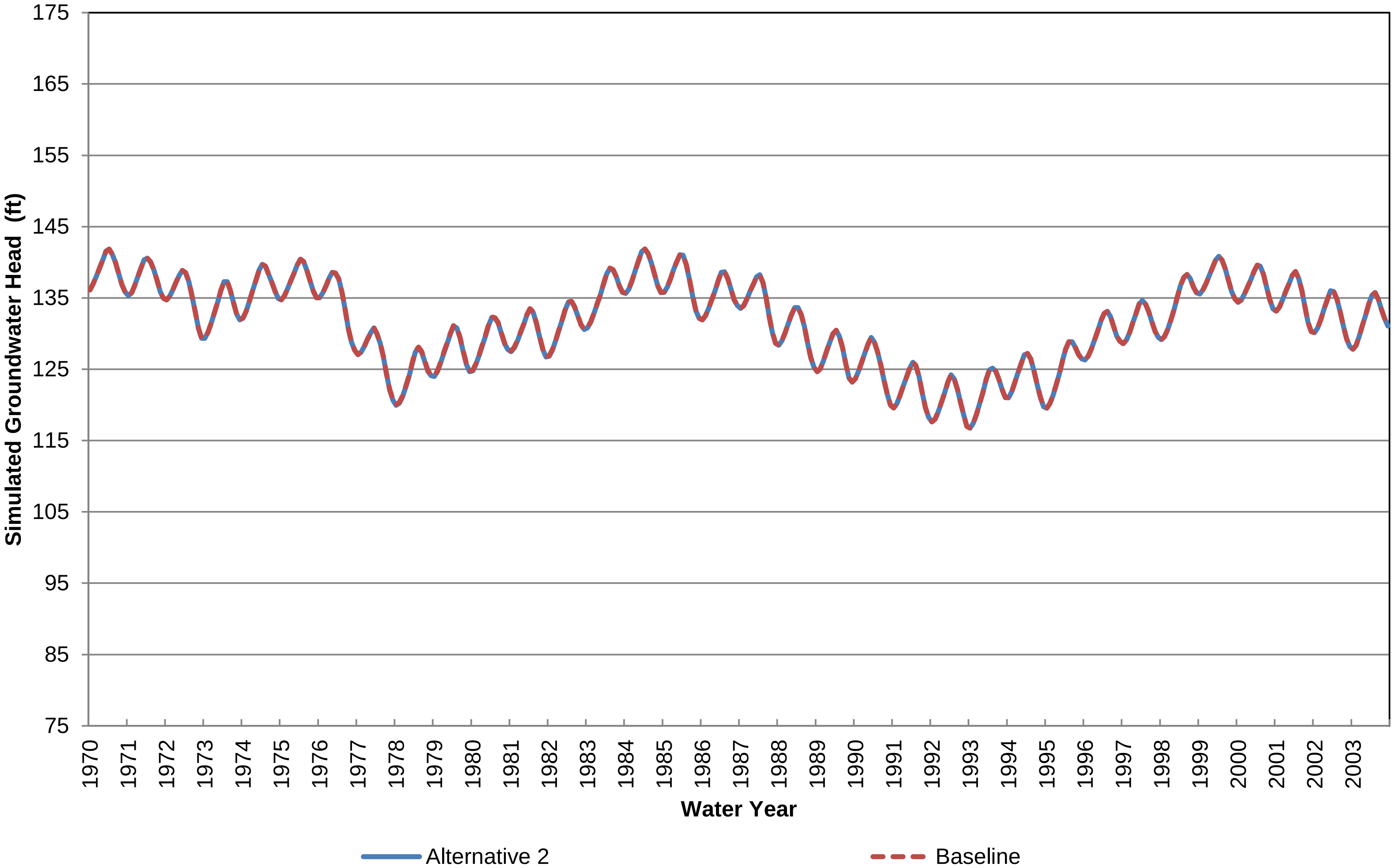
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

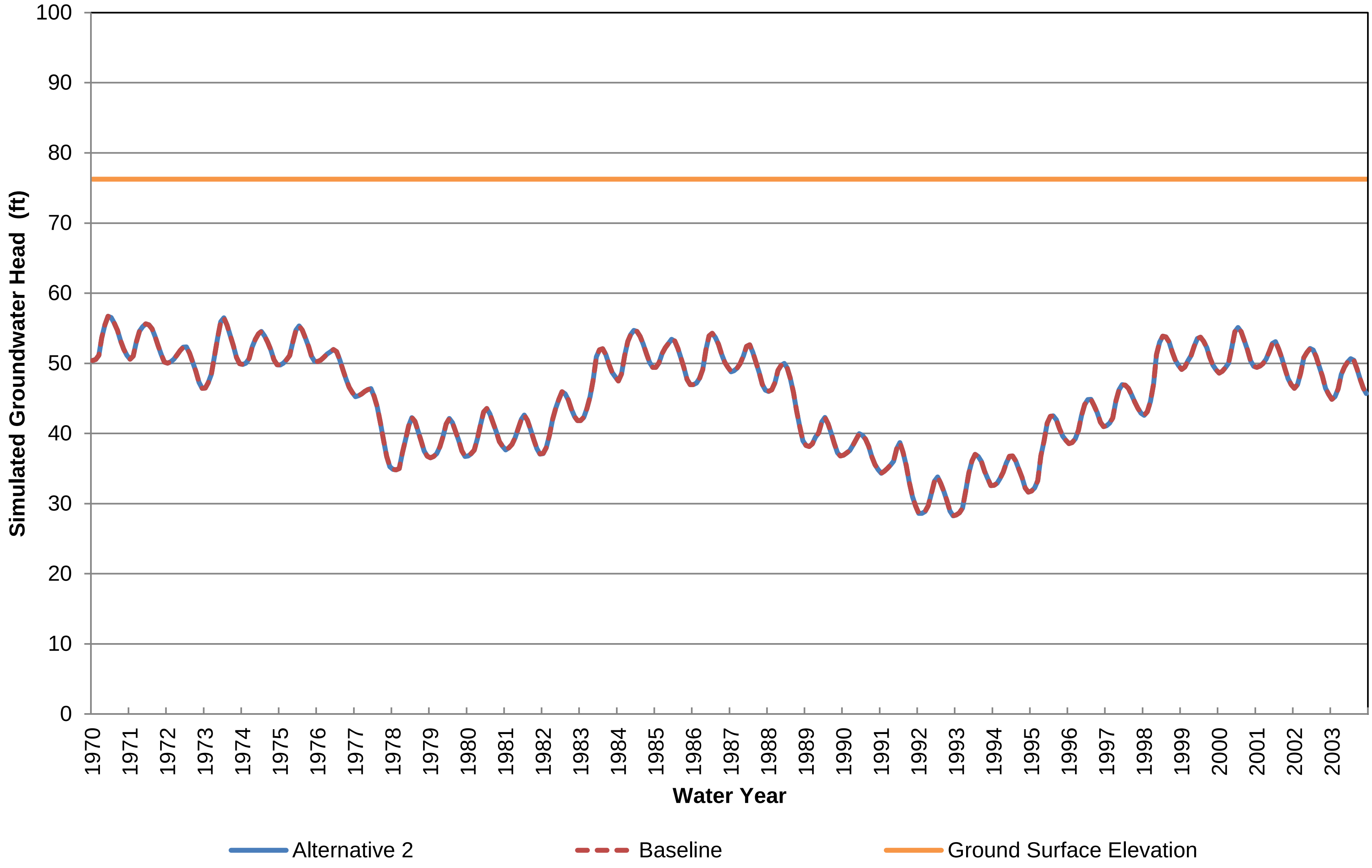
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 3 (Approximately 700-930 ft bgs)



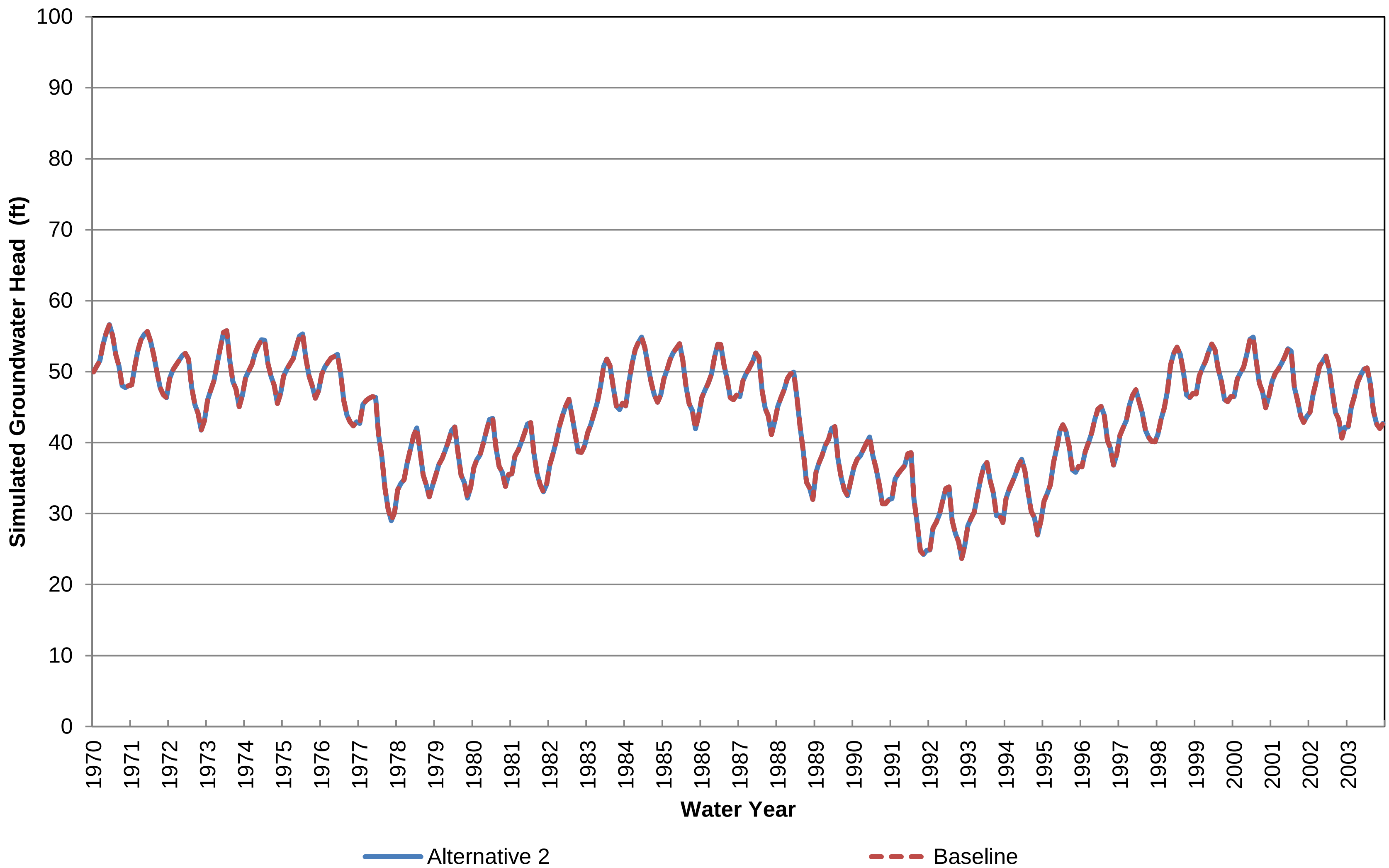
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 3 (Approximately 930-1290 ft bgs)



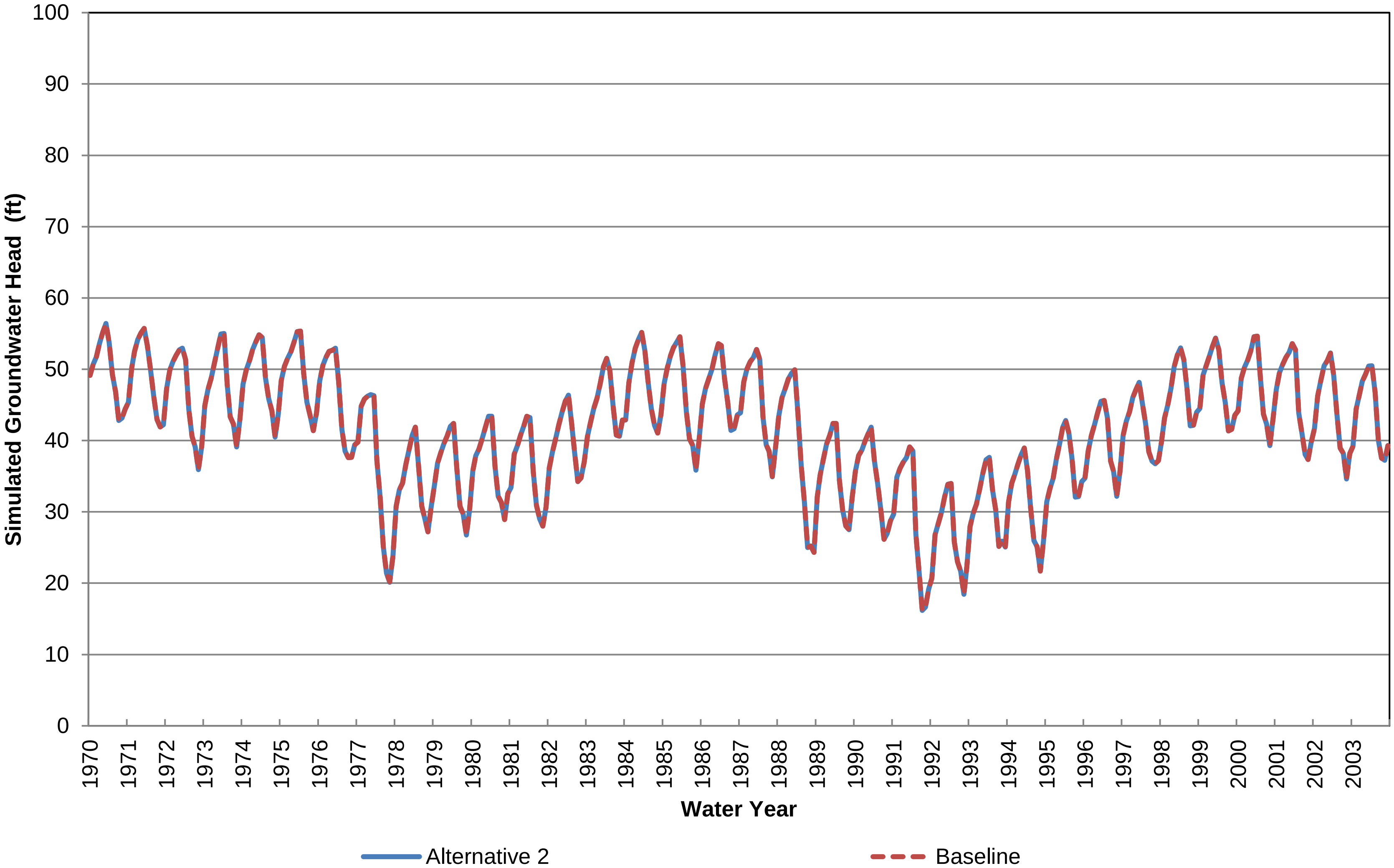
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 4 (Approximately 0-70 ft bgs)



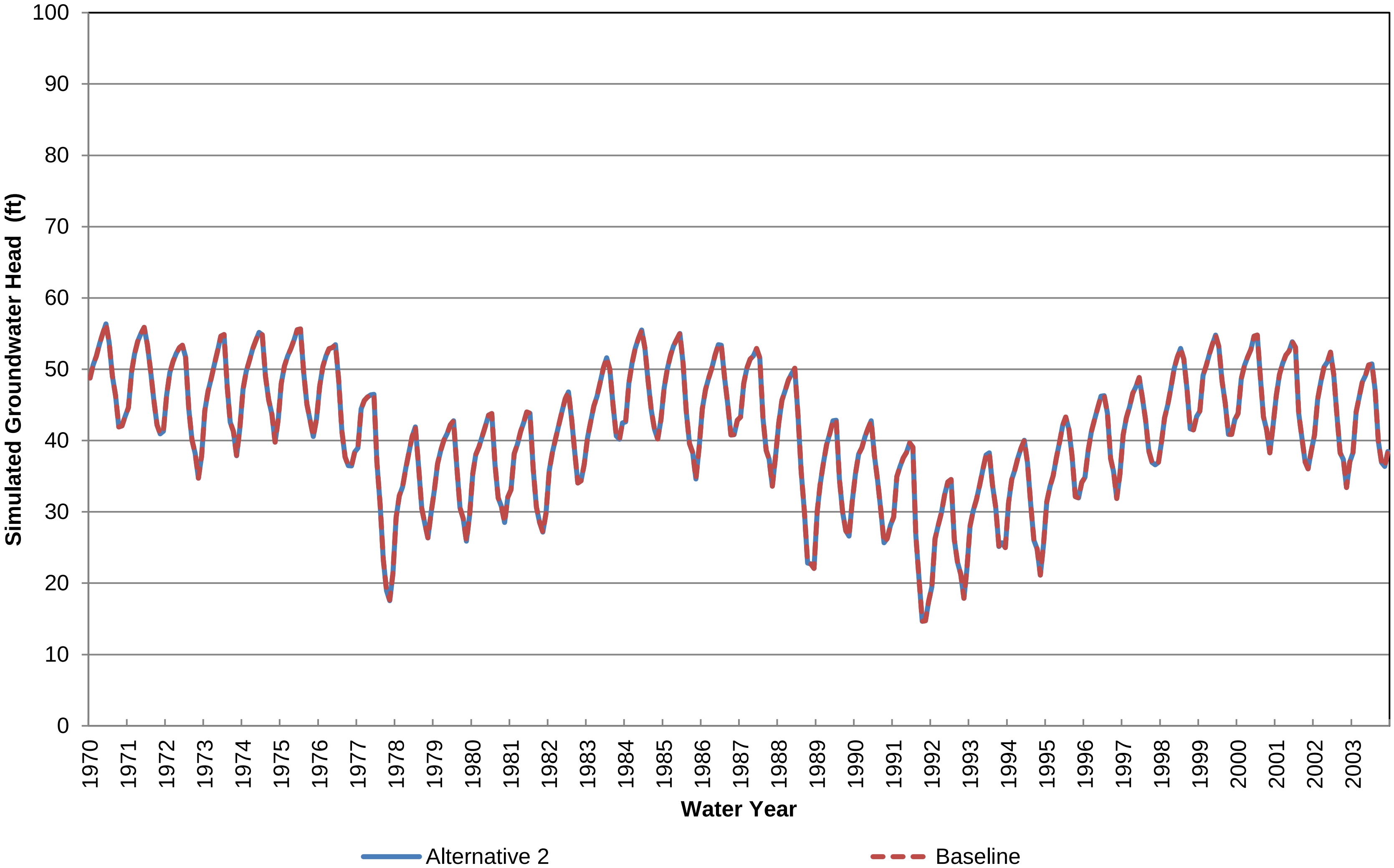
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 4 (Approximately 70-190 ft bgs)

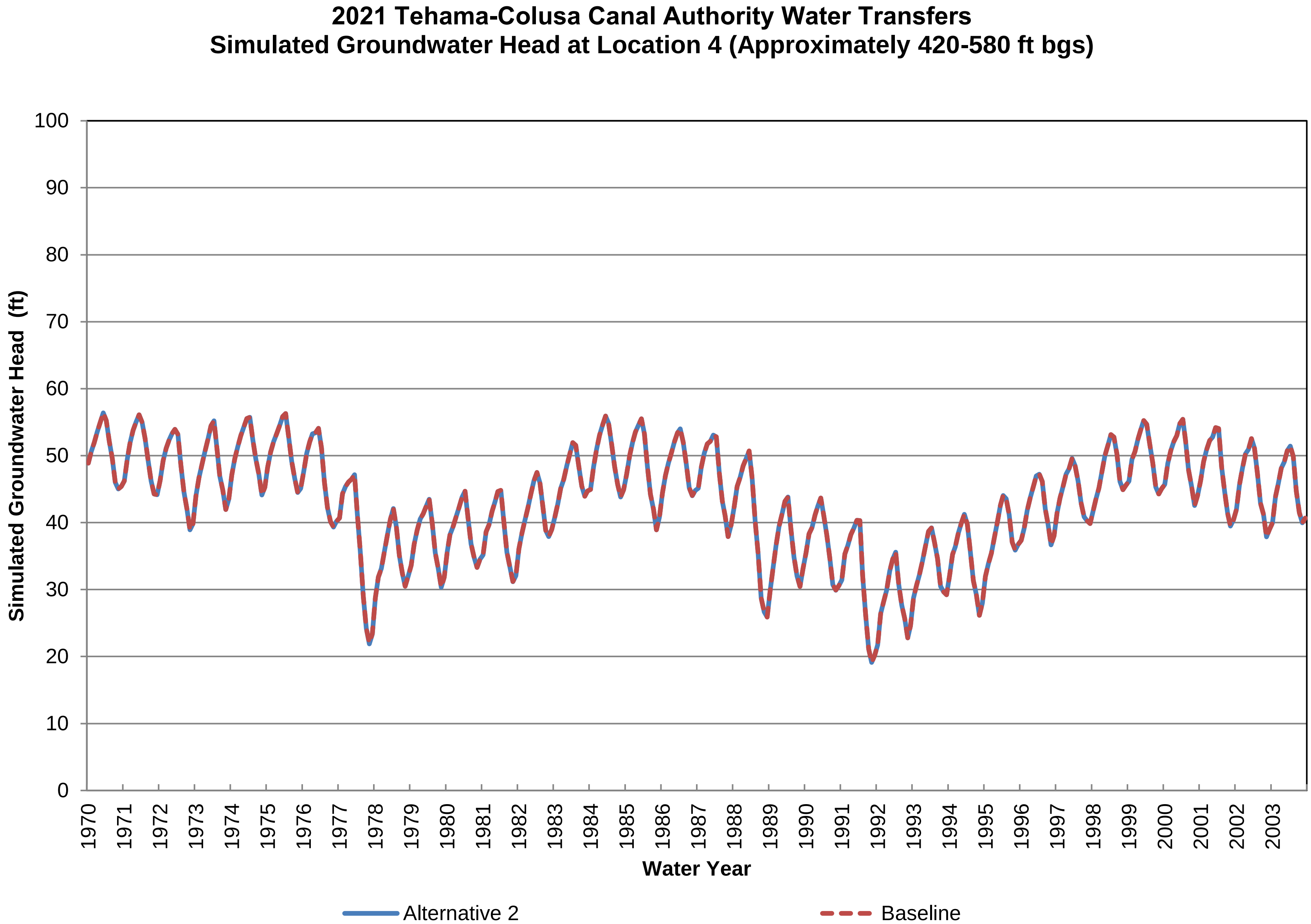


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 4 (Approximately 190-300 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 4 (Approximately 300-420 ft bgs)





2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 4 (Approximately 420-580 ft bgs)
Simulated Groundwater Head (ft)
100
90
80
70
60
50
40
30
20
10
0
1970
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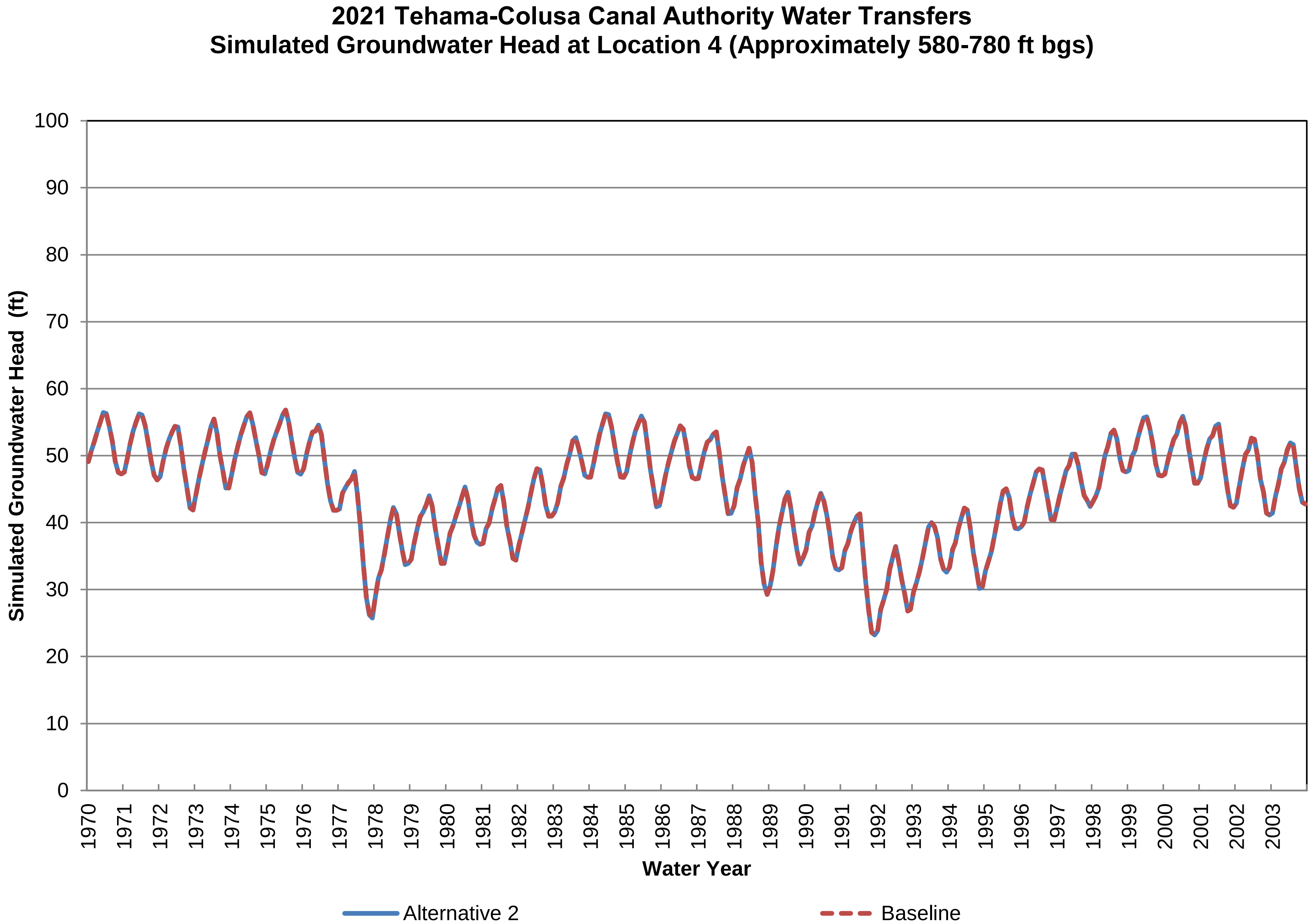
2002
2003
Water Year
Alternative 2
Baseline


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 4 (Approximately 580-780 ft bgs)
Simulated Groundwater Head (ft)
0
10
20
30
40
50
60
70
80
90
100
1970
1971
1972
1973
1974
1975
1976
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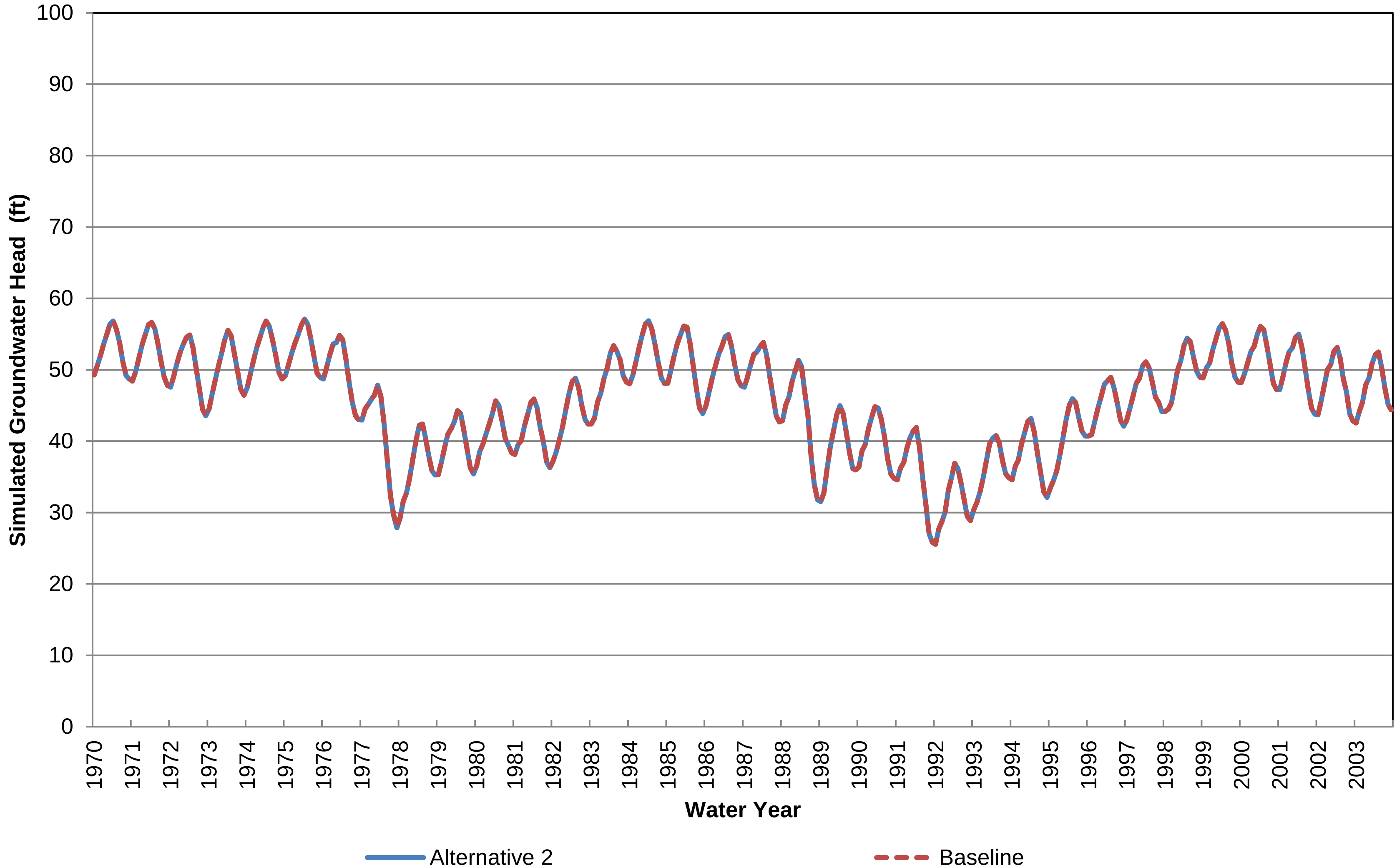
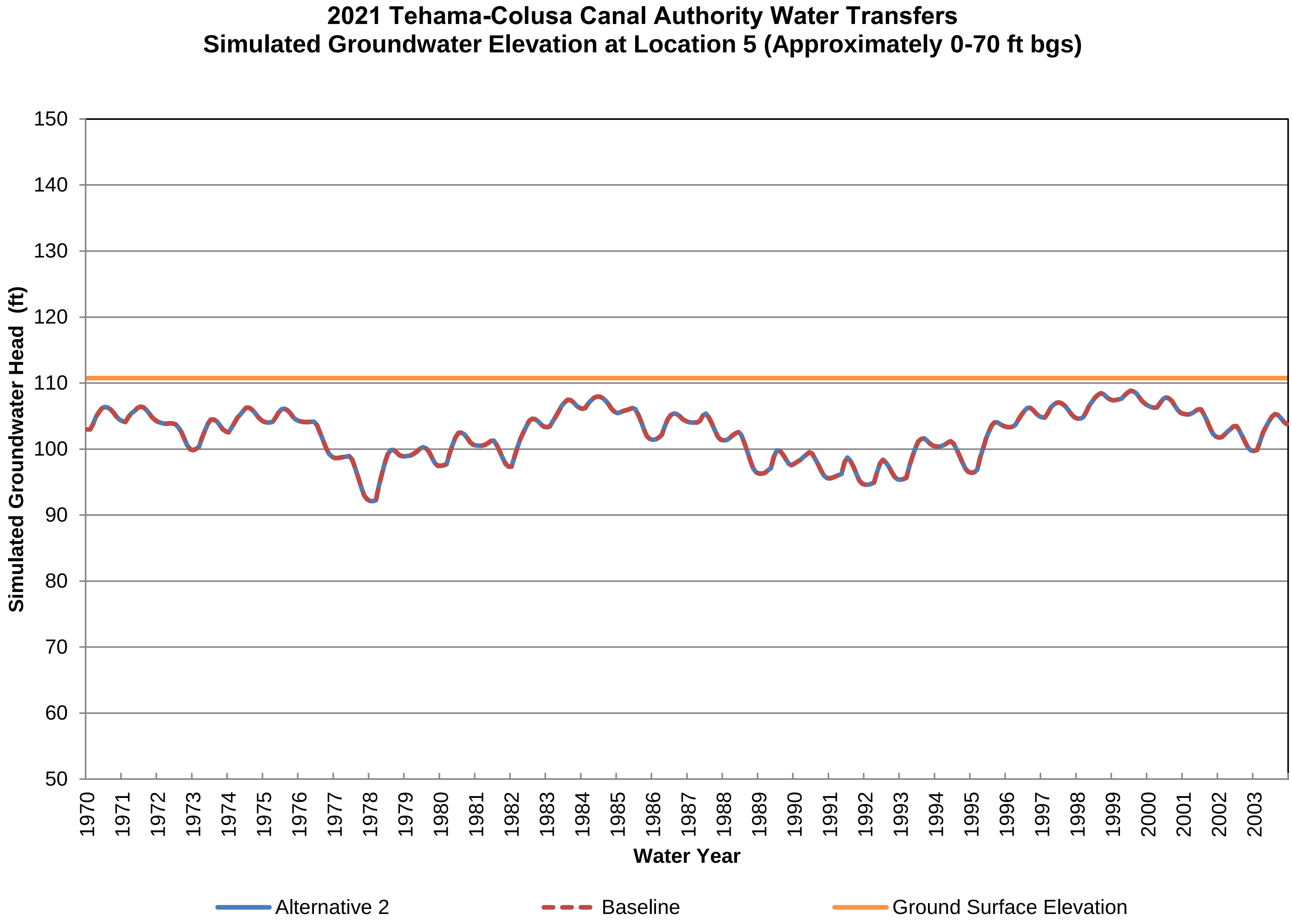
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 4 (Approximately 780-1060 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 5 (Approximately 0-70 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
1976
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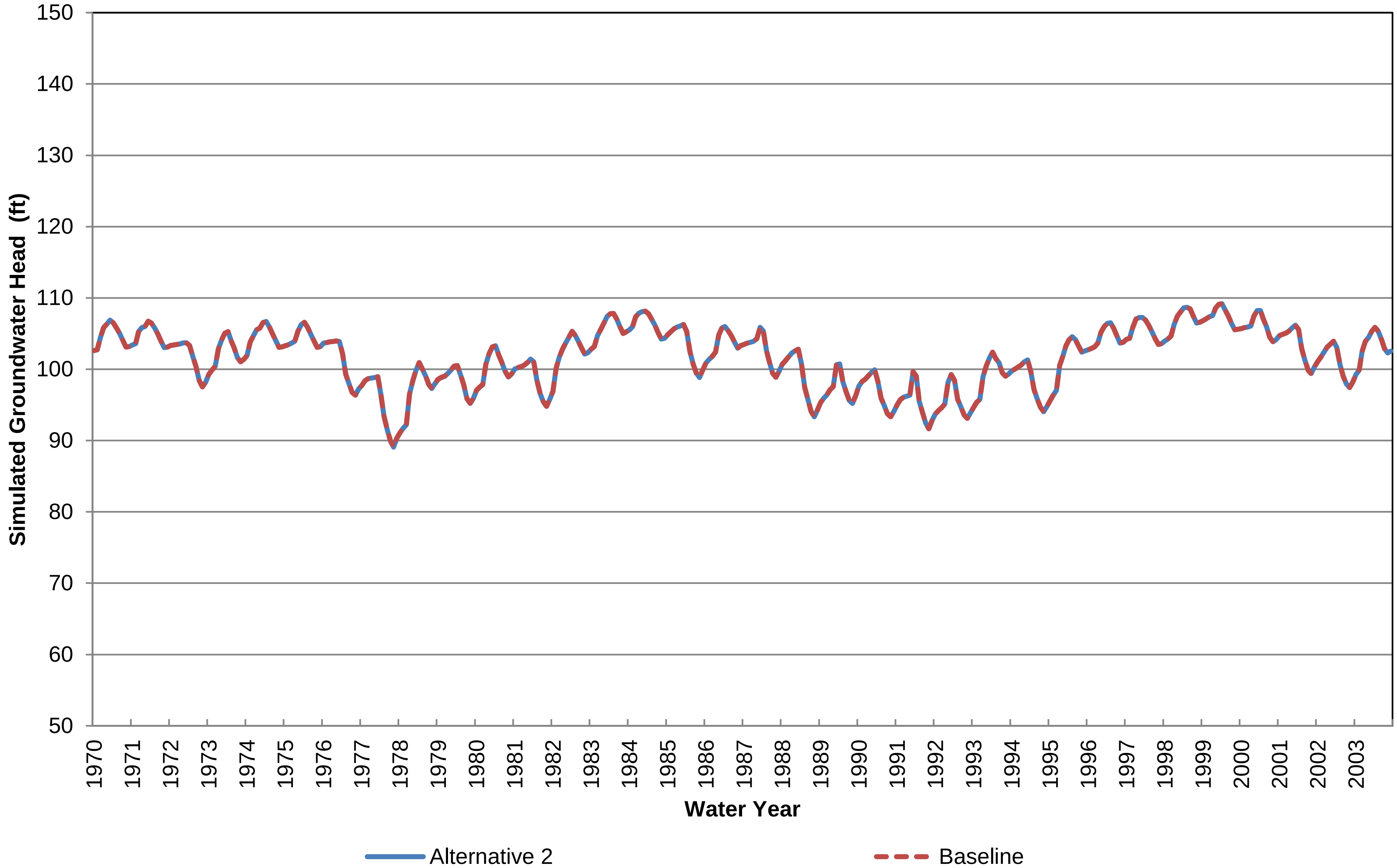
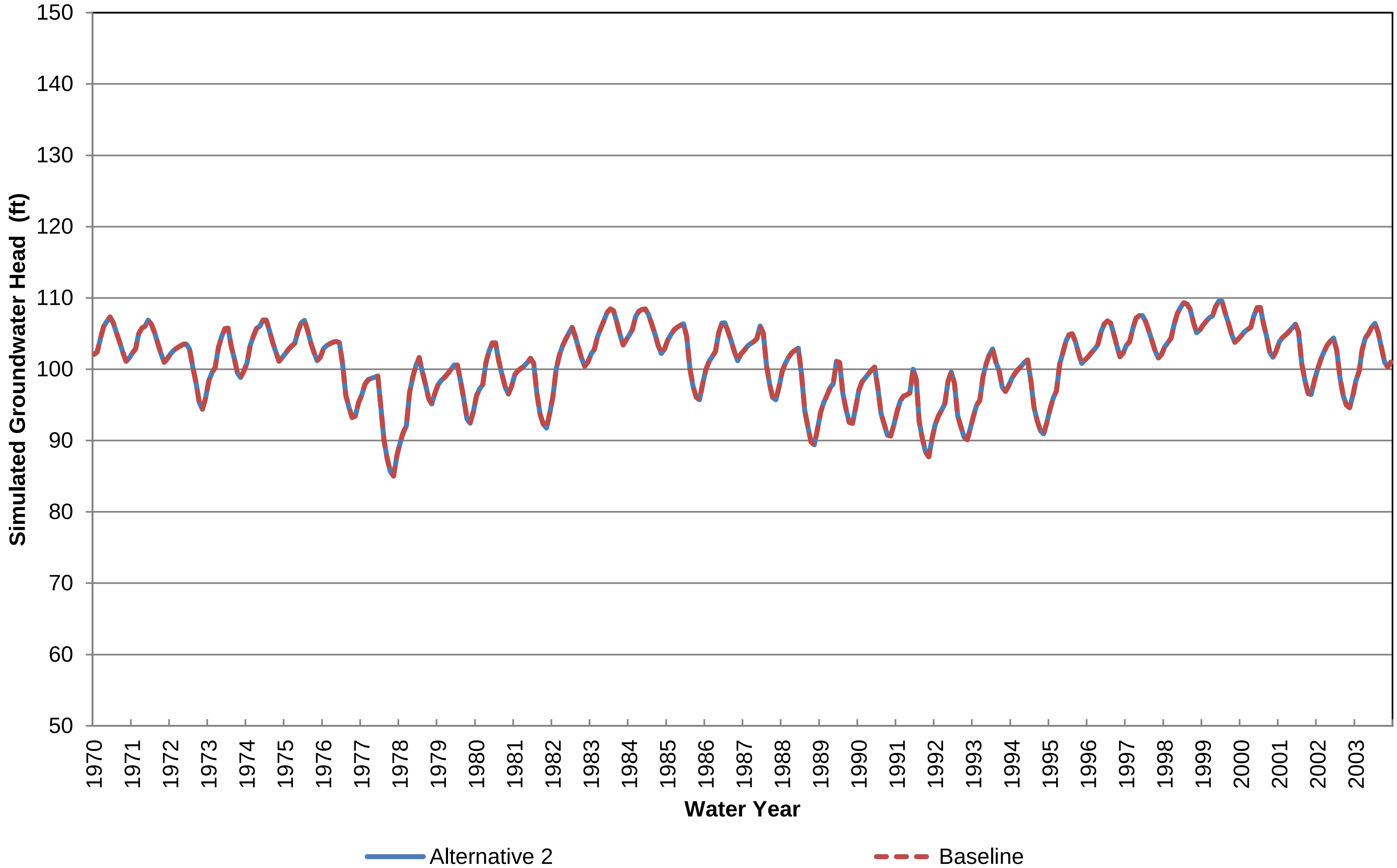
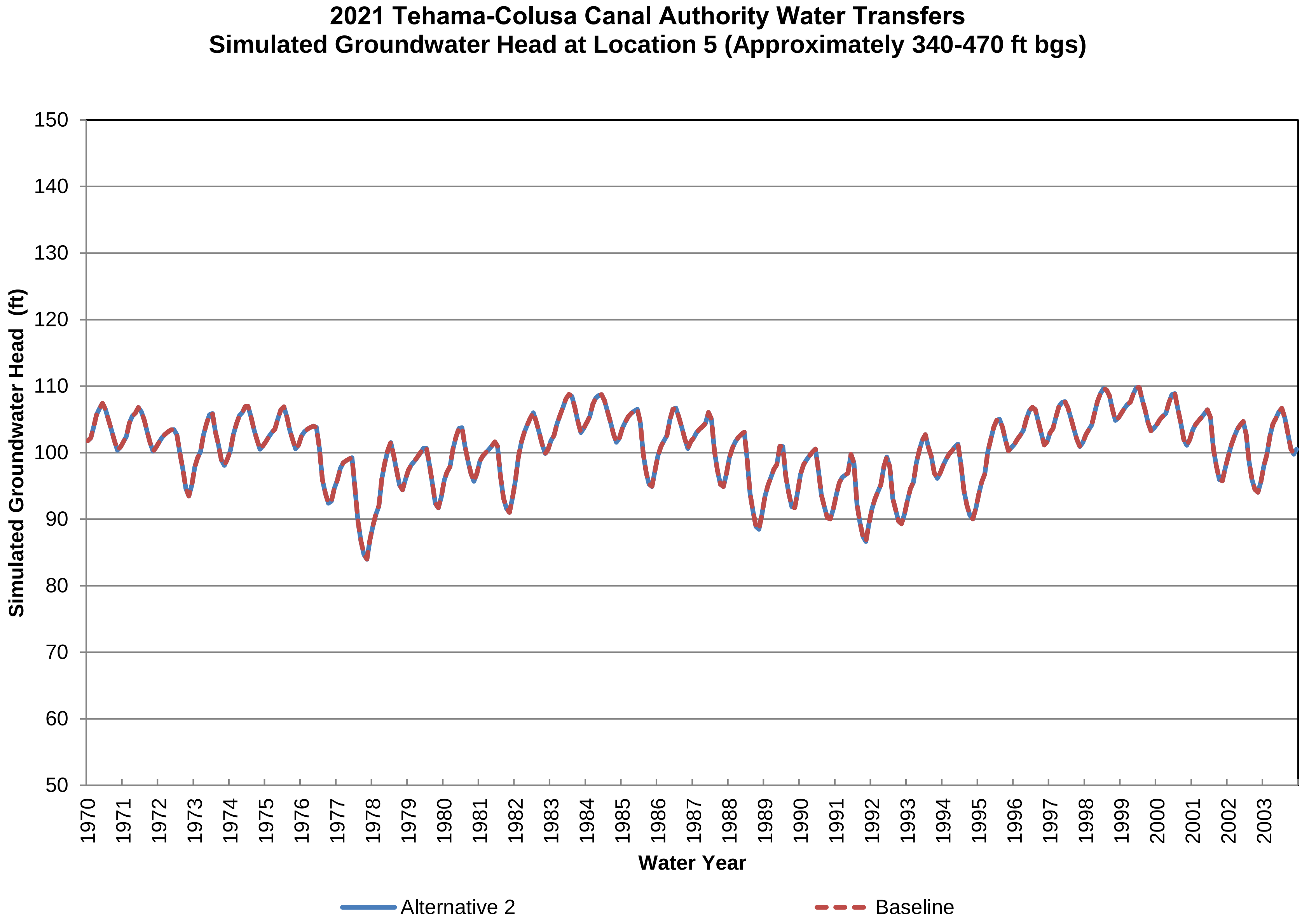
2000
2001
2002
2003
Water Year
Alternative 2
Baseline
Ground Surface Elevation

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 5 (Approximately 70-200 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 5 (Approximately 200-340 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 5 (Approximately 340-470 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
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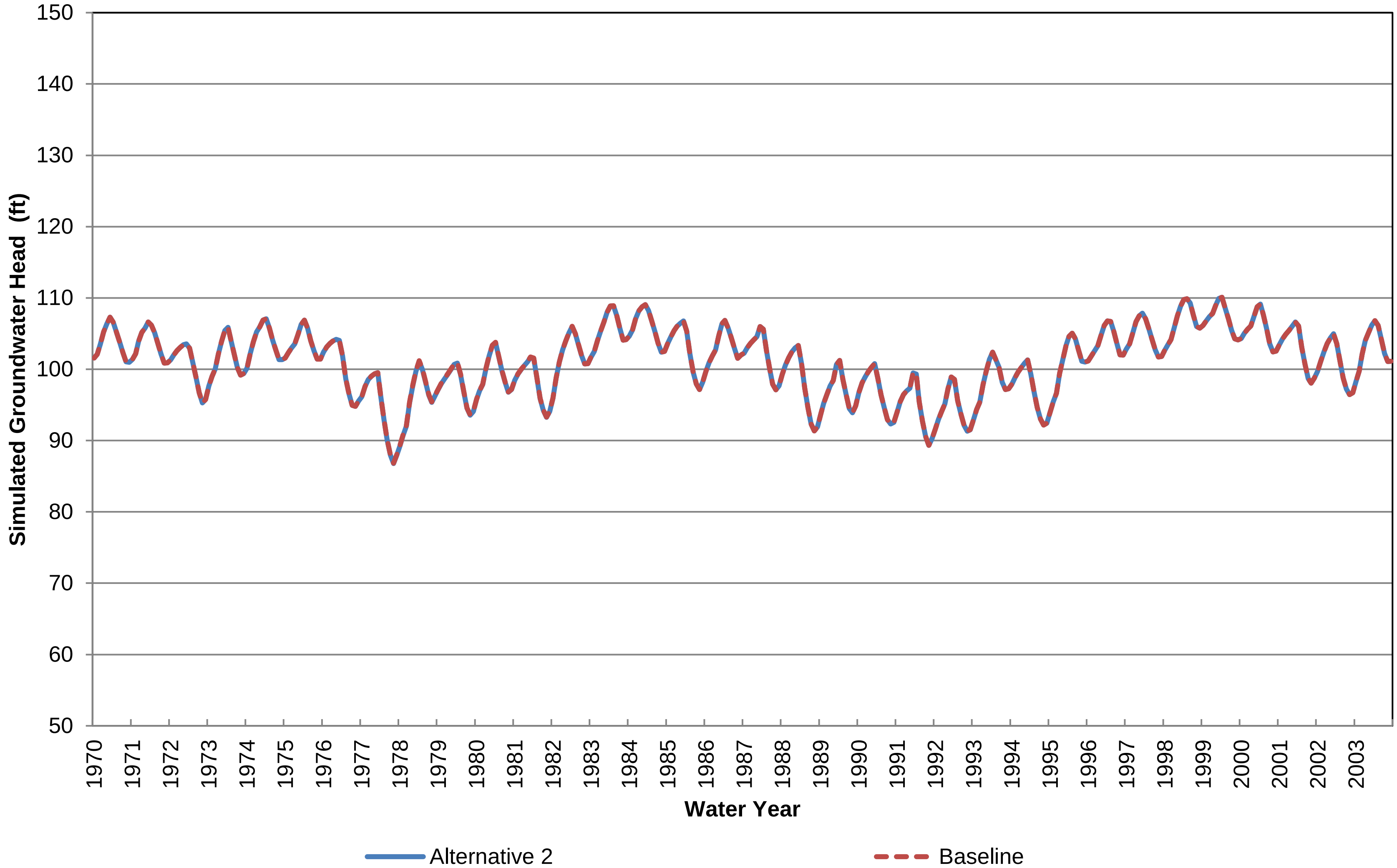
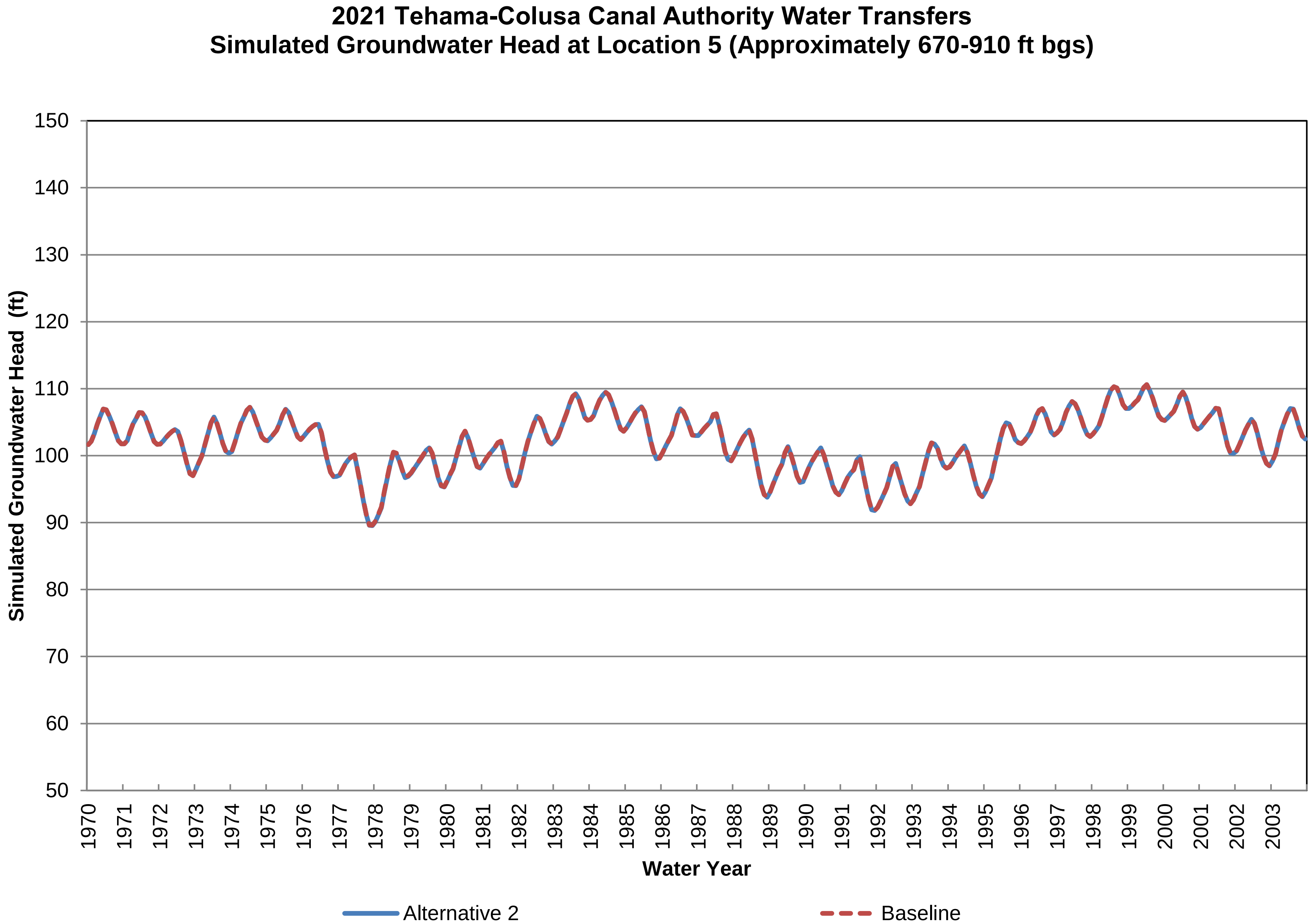
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 5 (Approximately 470-670 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 5 (Approximately 670-910 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
1976
1977
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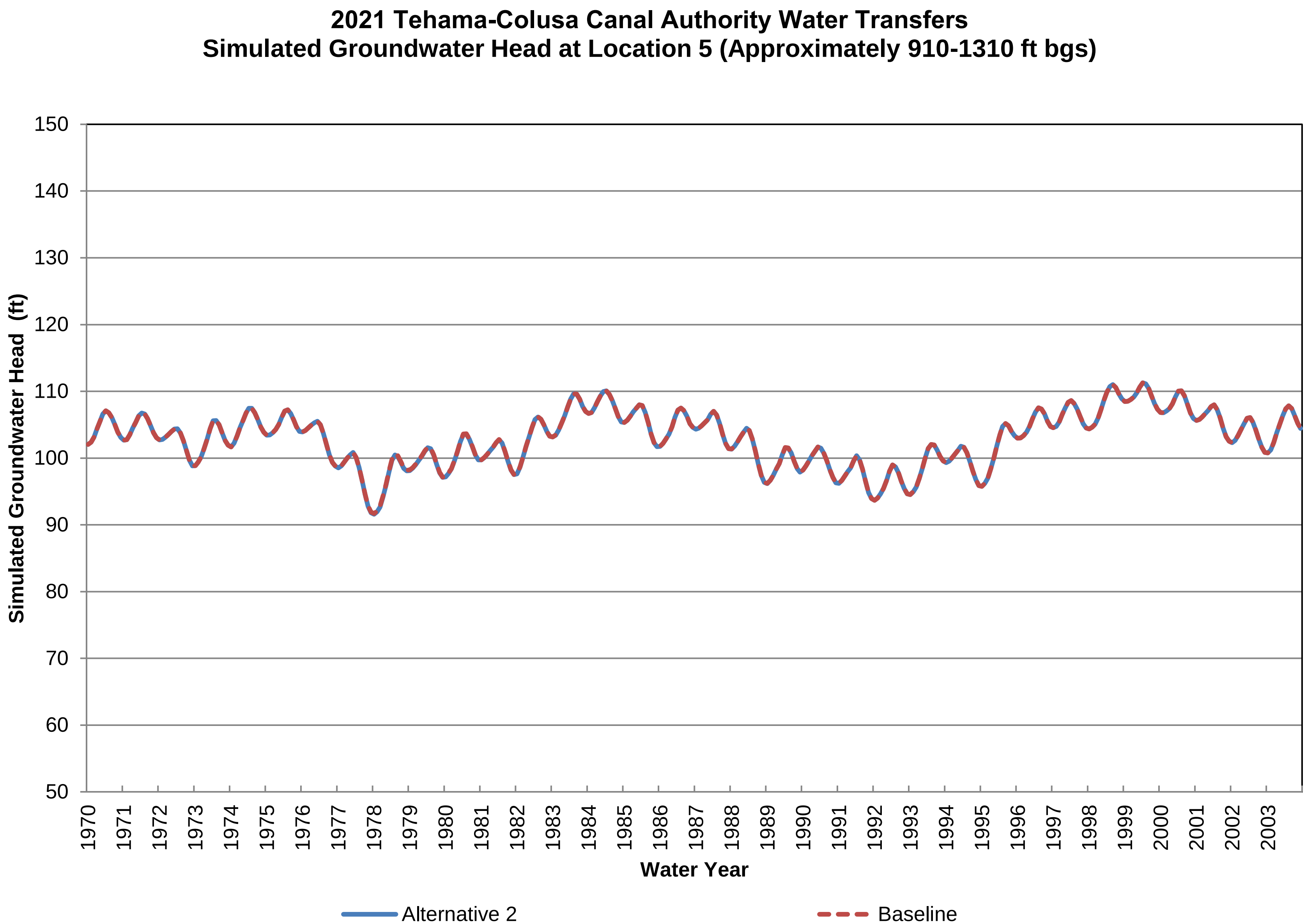
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 5 (Approximately 910-1310 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
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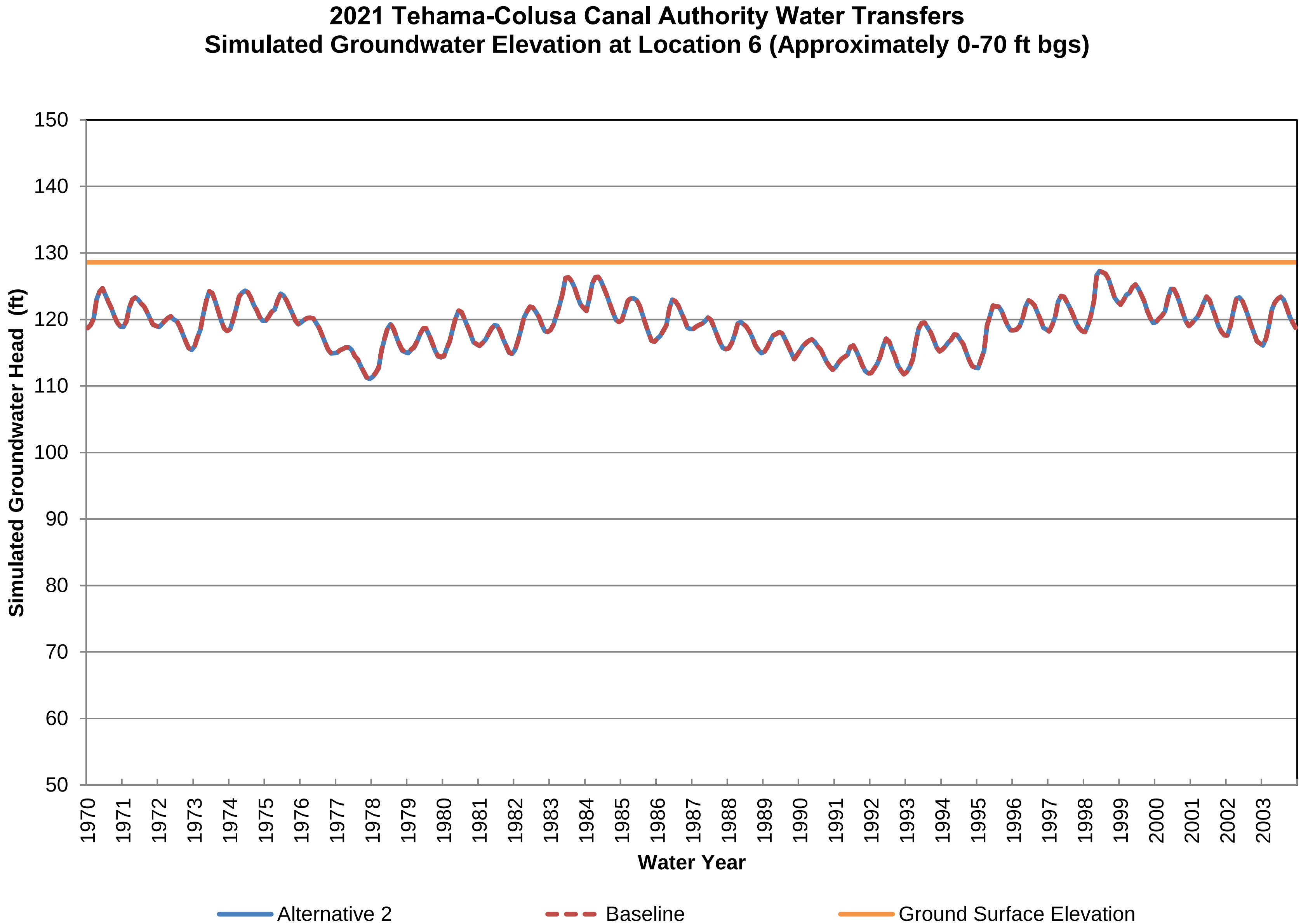
2002
2003
Water Year
Alternative 2
Baseline


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 6 (Approximately 0-70 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
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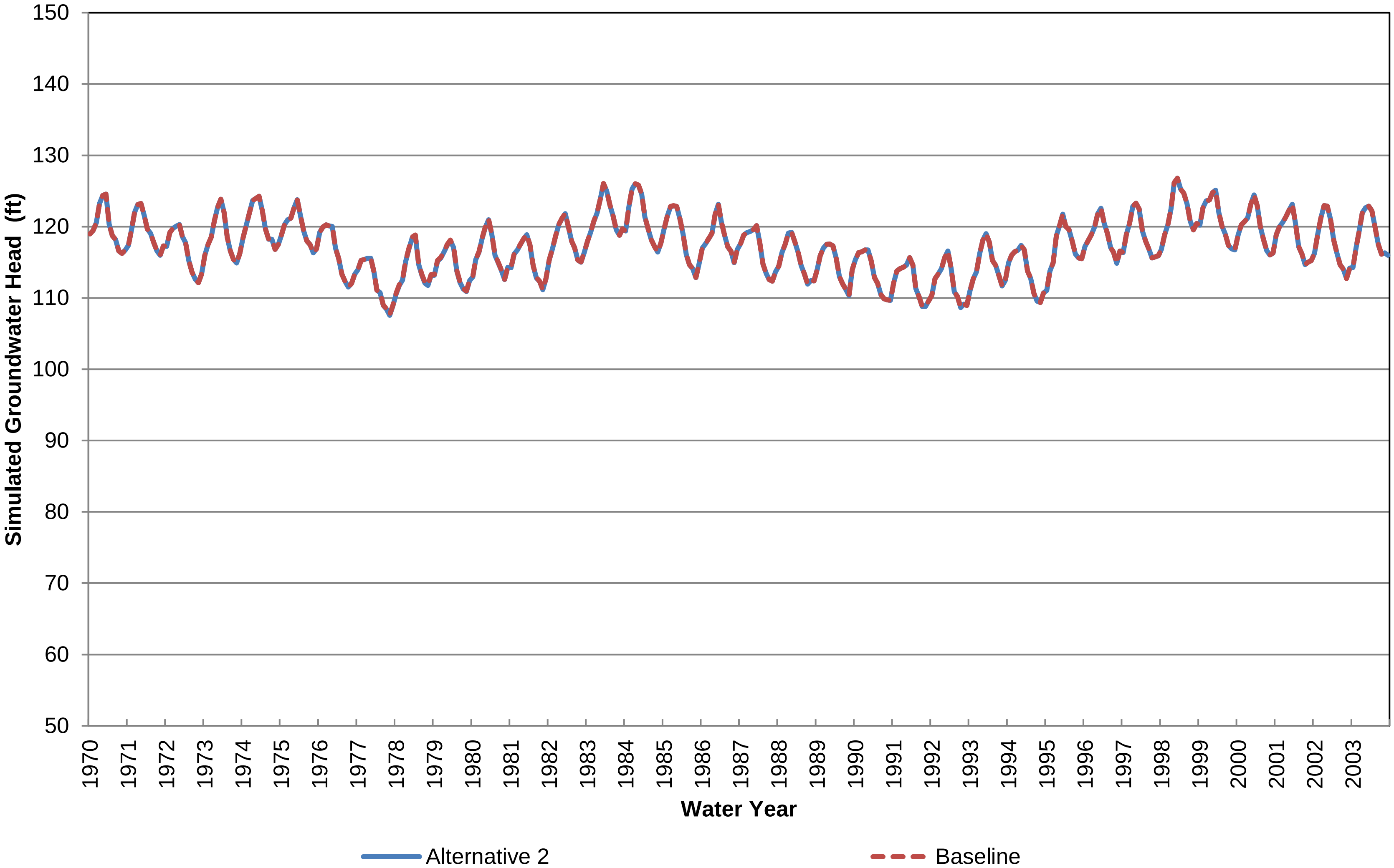
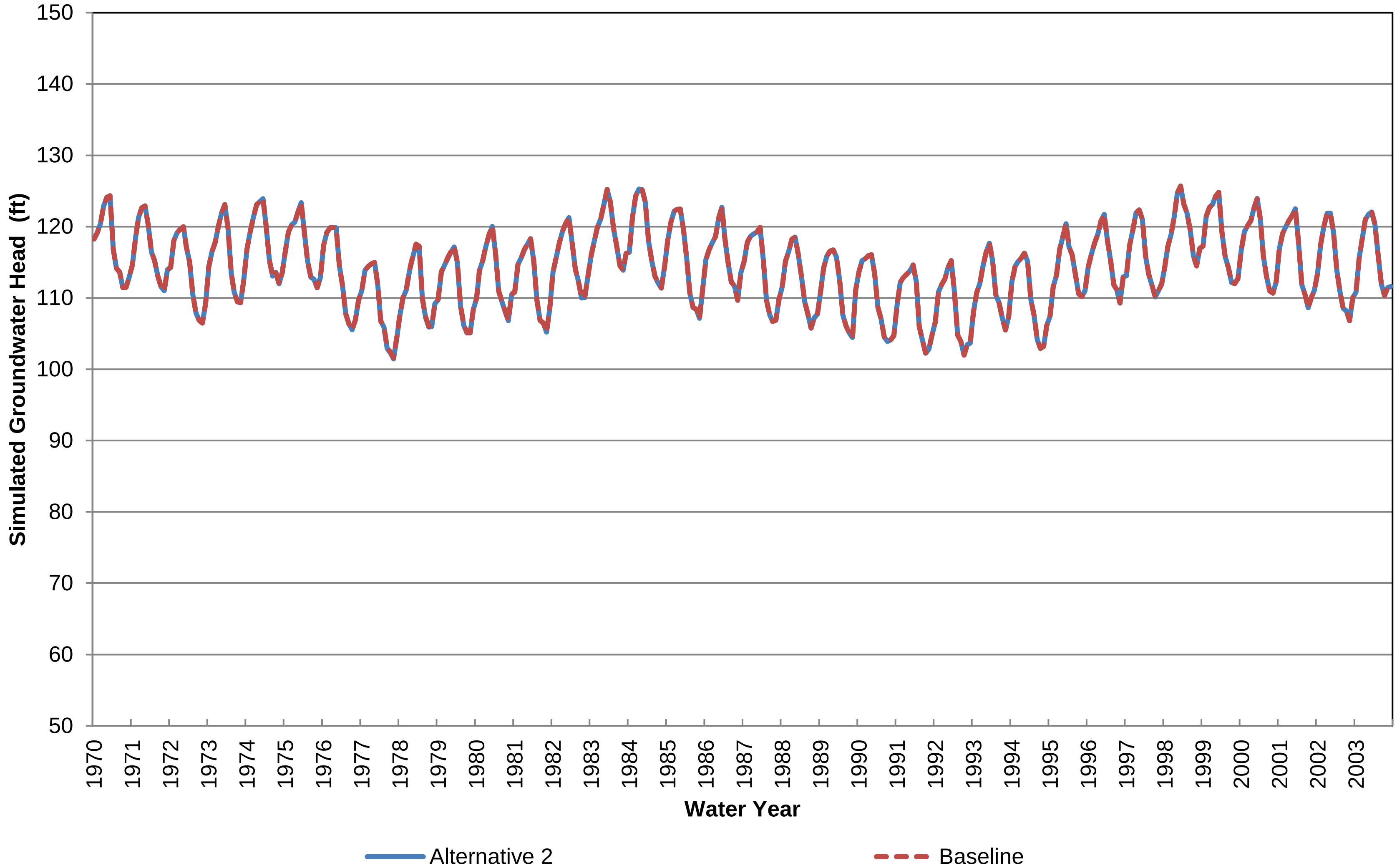
2001
2002
2003
Water Year
Alternative 2
Baseline
Ground Surface Elevation

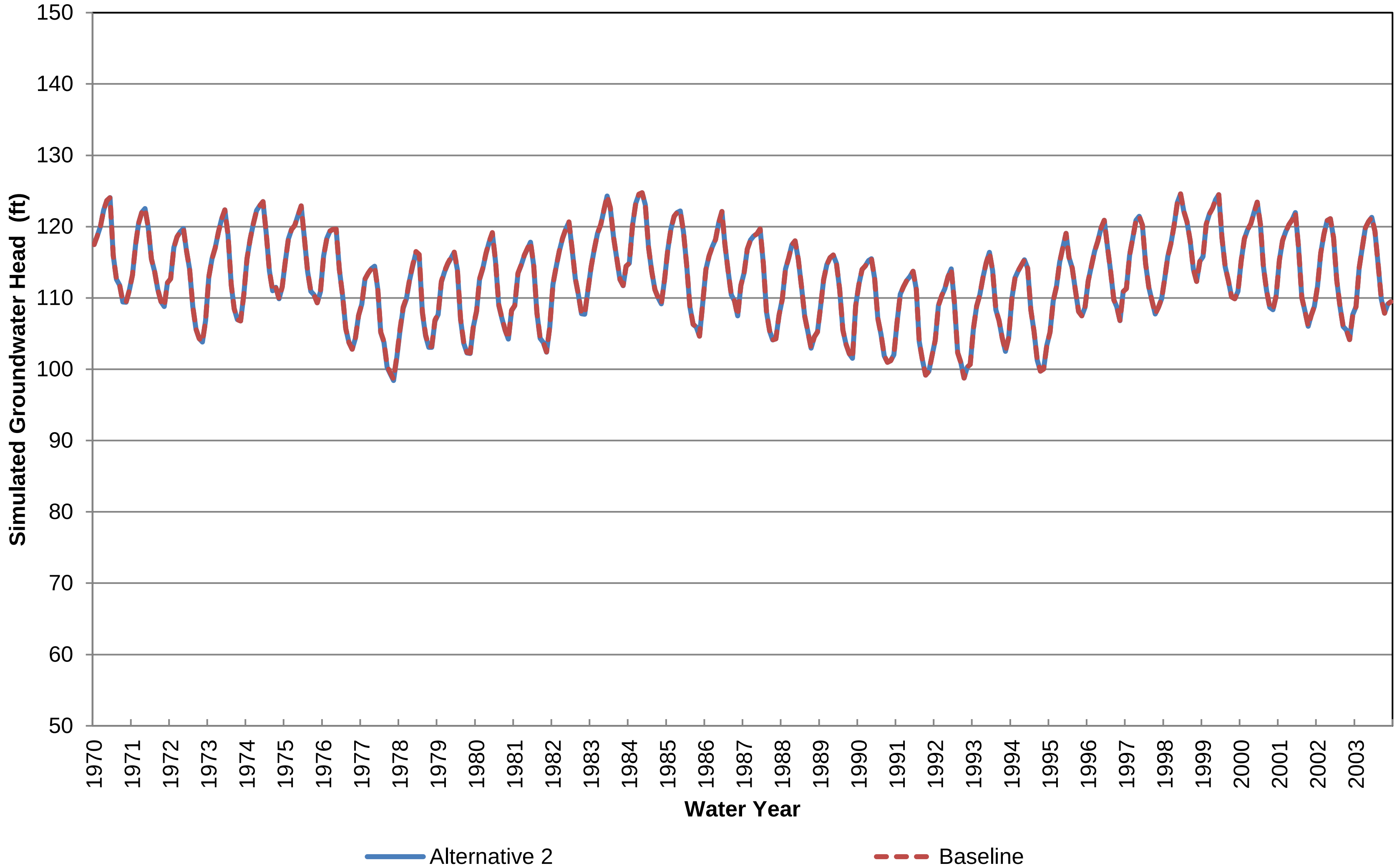
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 6 (Approximately 70-200 ft bgs)

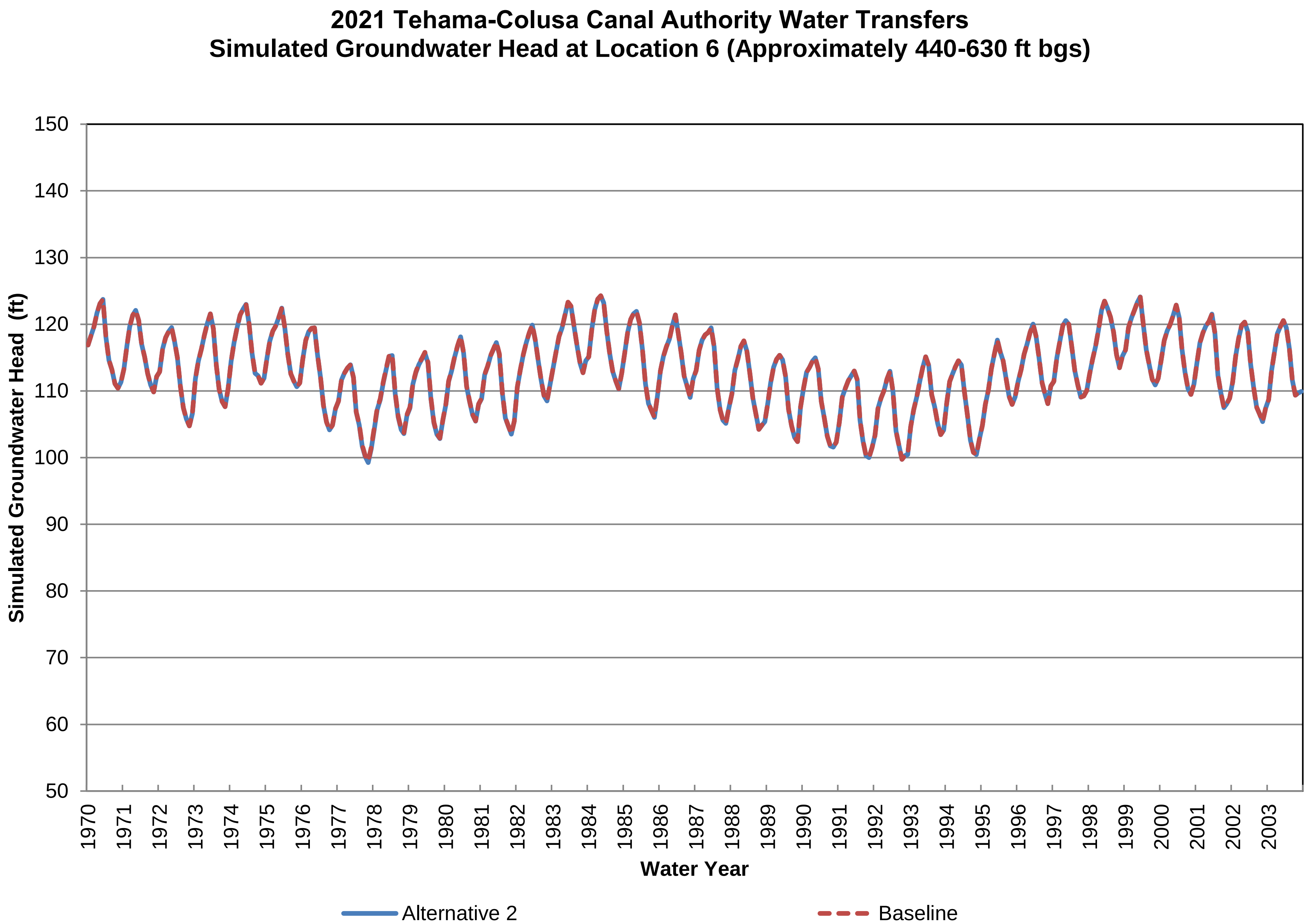


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 6 (Approximately 200-320 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 6 (Approximately 320-440 ft bgs)





2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 6 (Approximately 440-630 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
1976
1977
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1979
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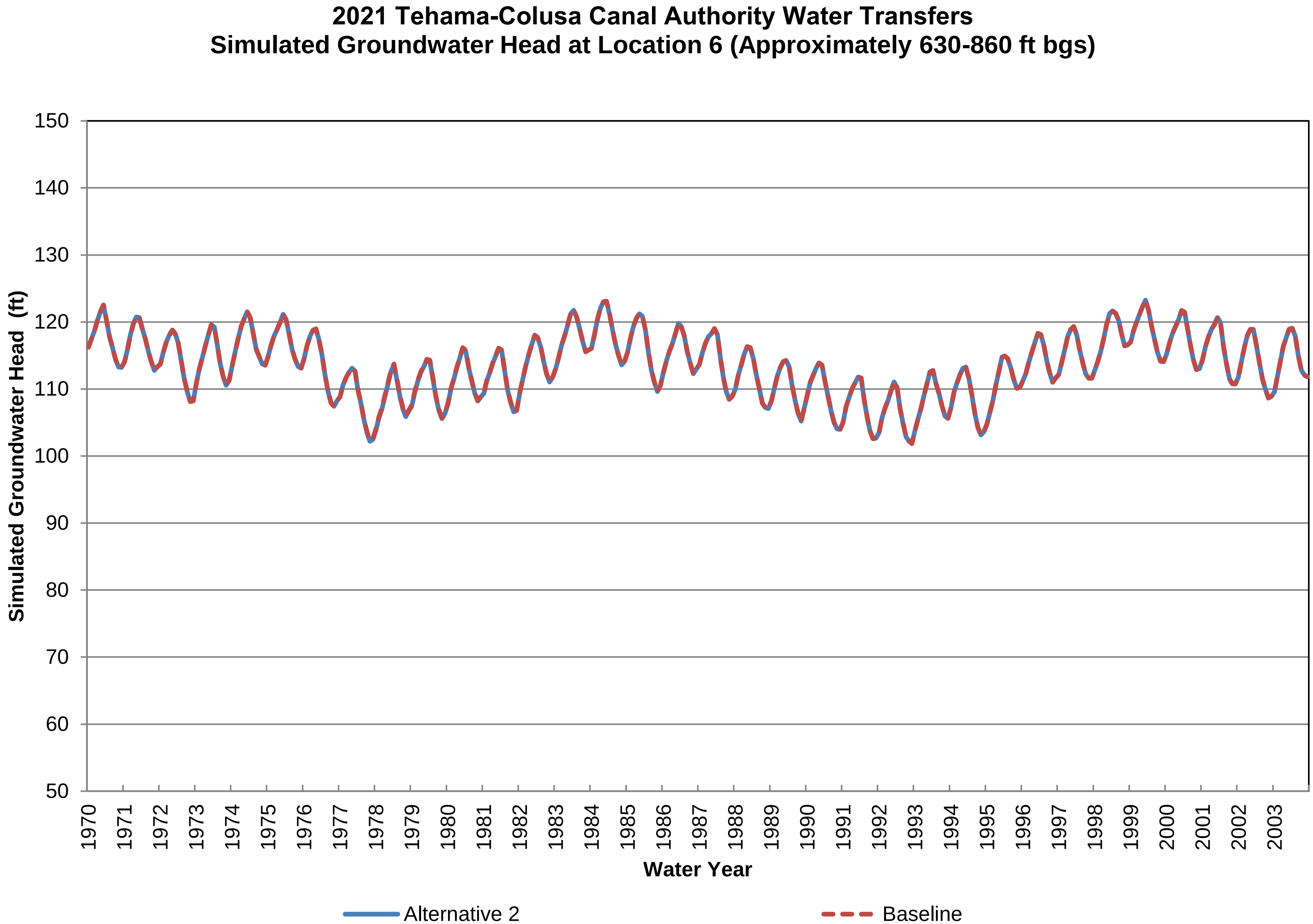
2002
2003
Water Year
Alternative 2
Baseline


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 6 (Approximately 630-860 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
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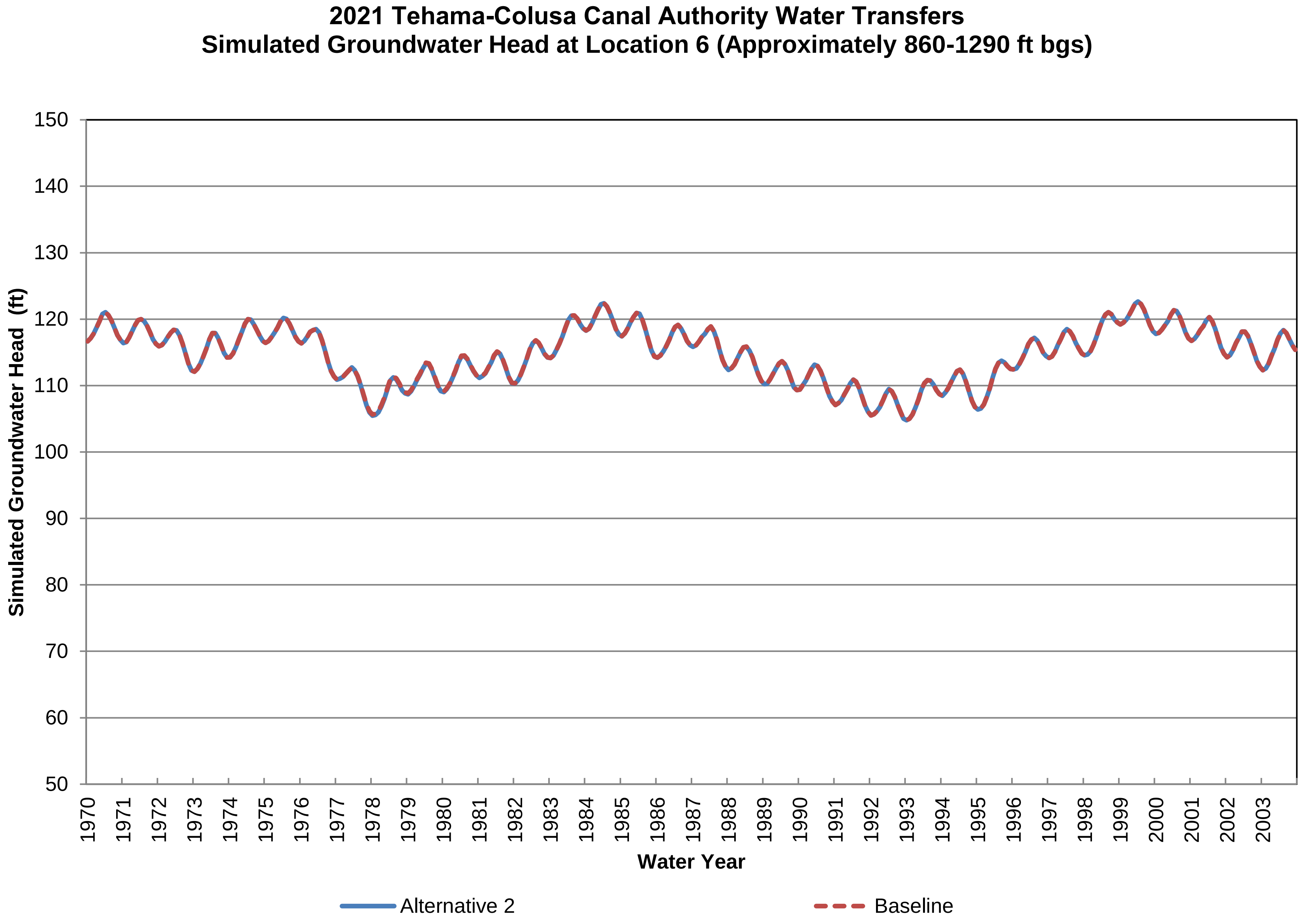
2001
2002
2003
Water Year
Alternative 2
Baseline



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 6 (Approximately 860-1290 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
1976
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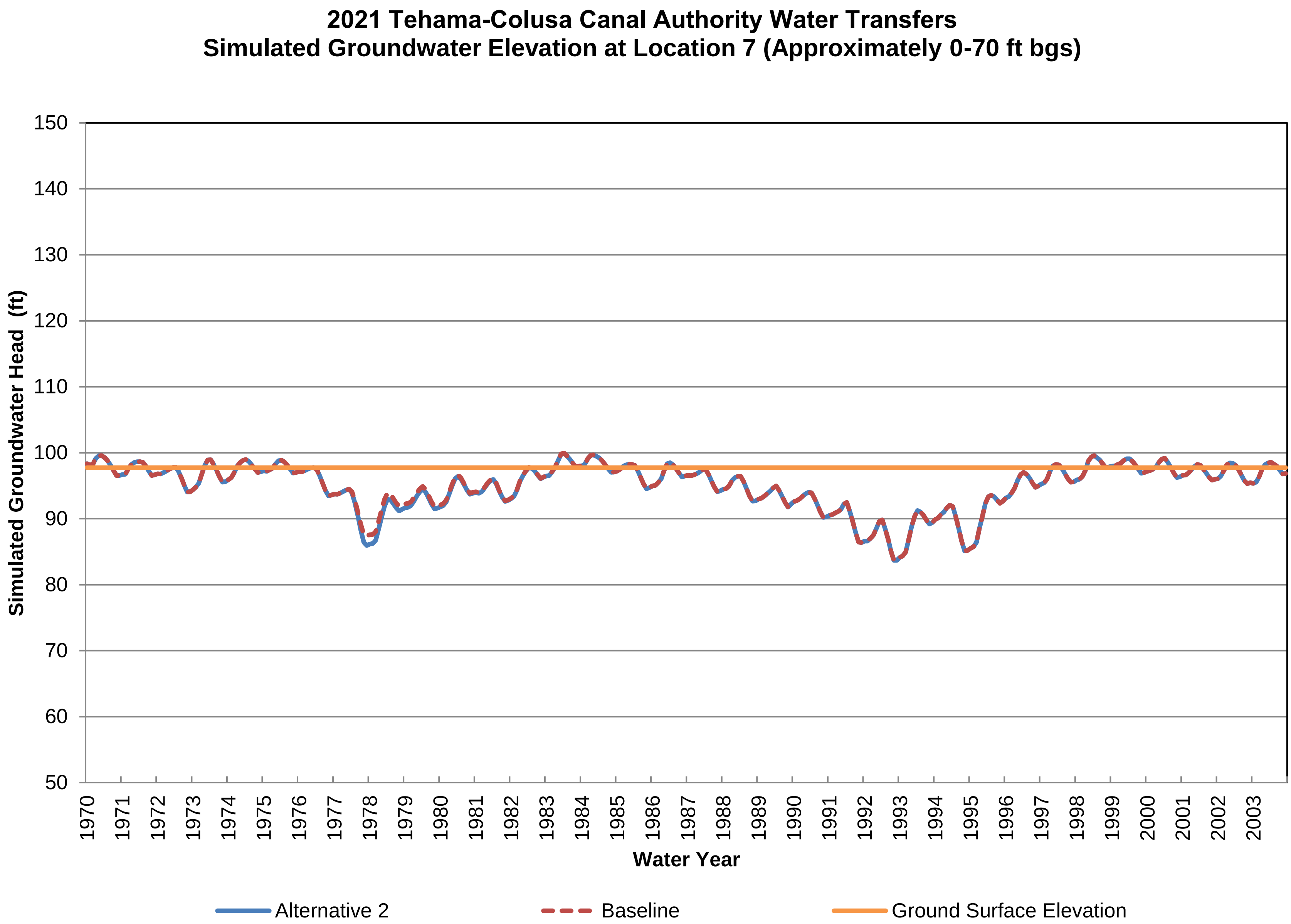
2001
2002
2003
Water Year
Alternative 2
Baseline


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 7 (Approximately 0-70 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
1976
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1998
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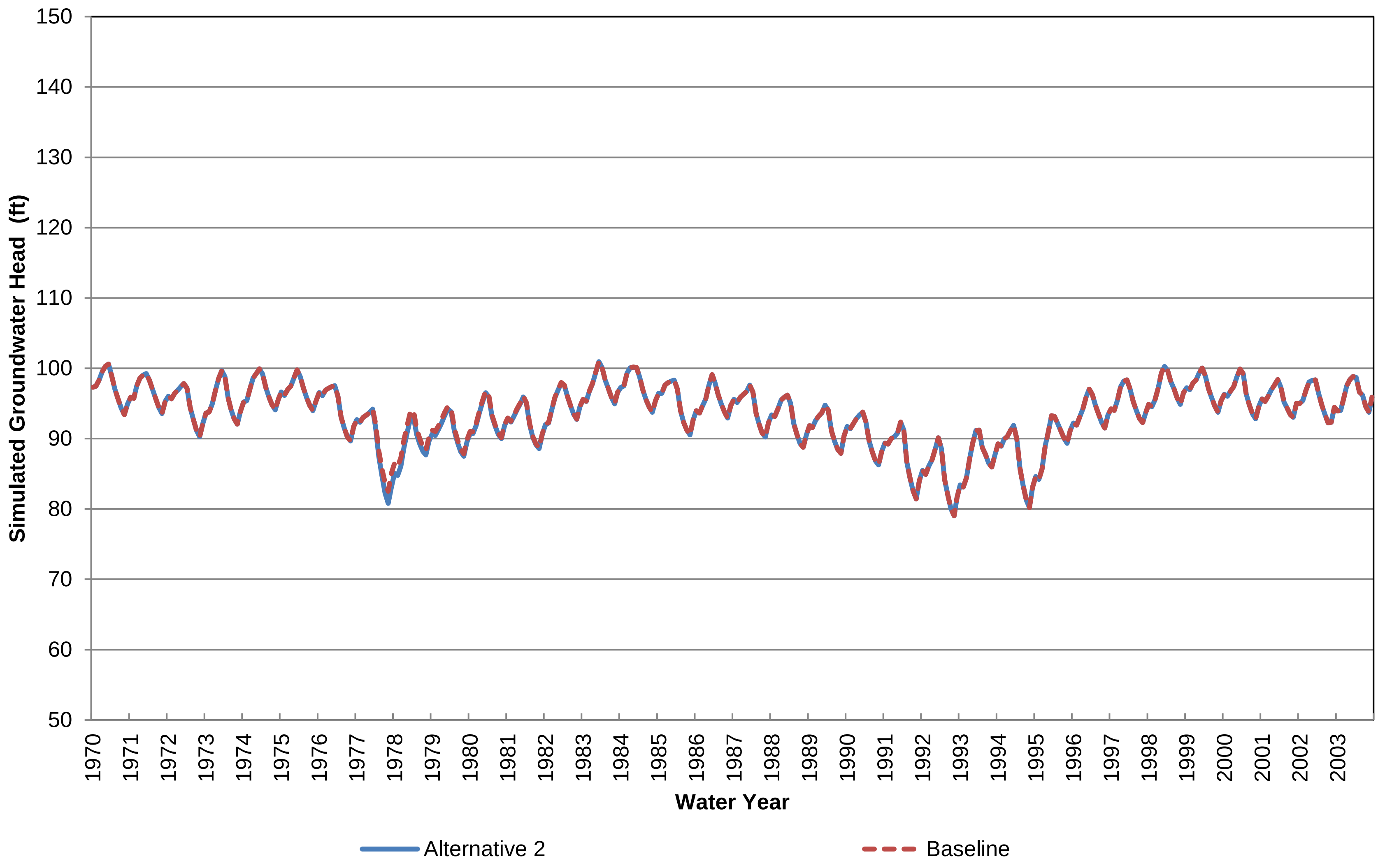
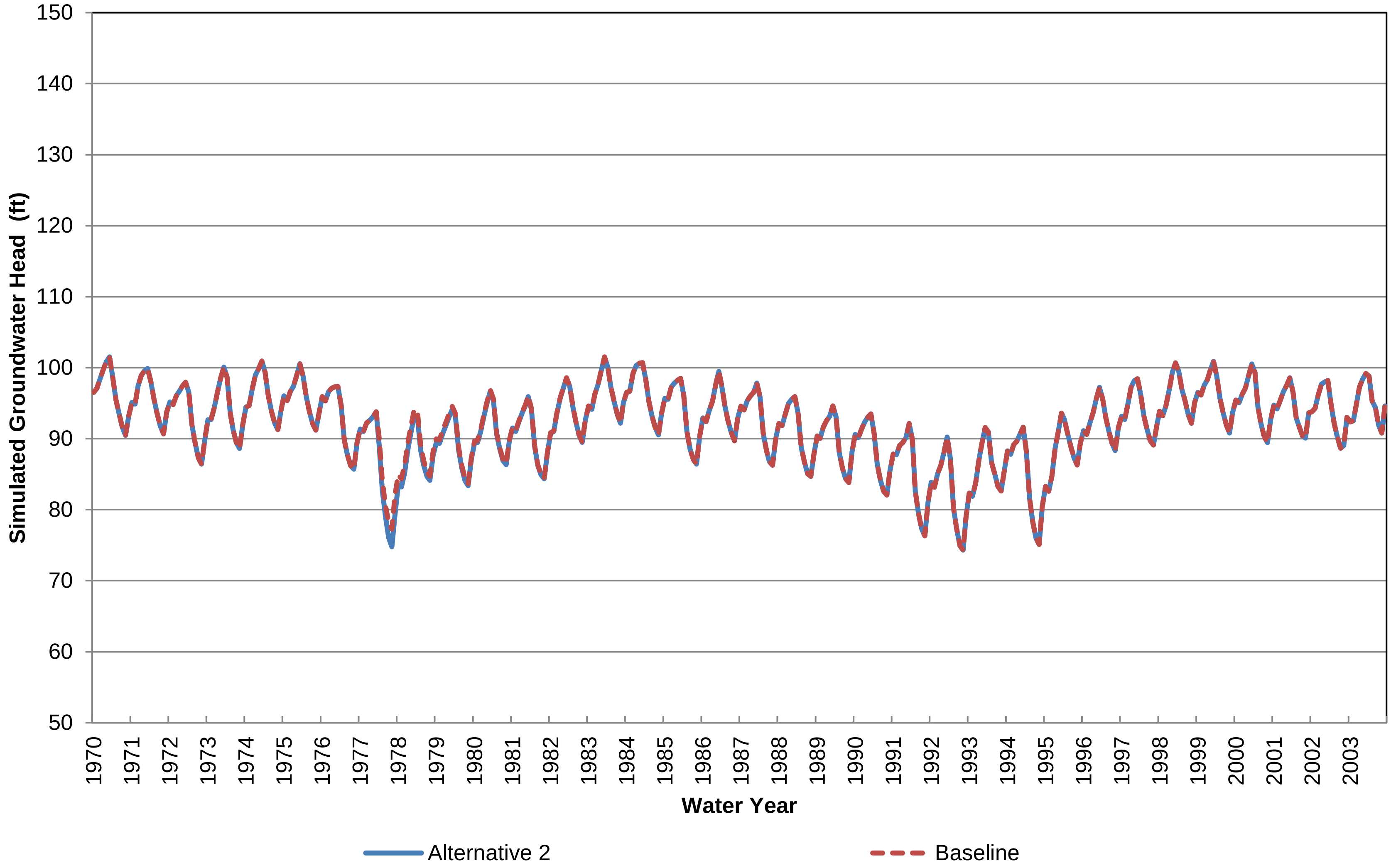
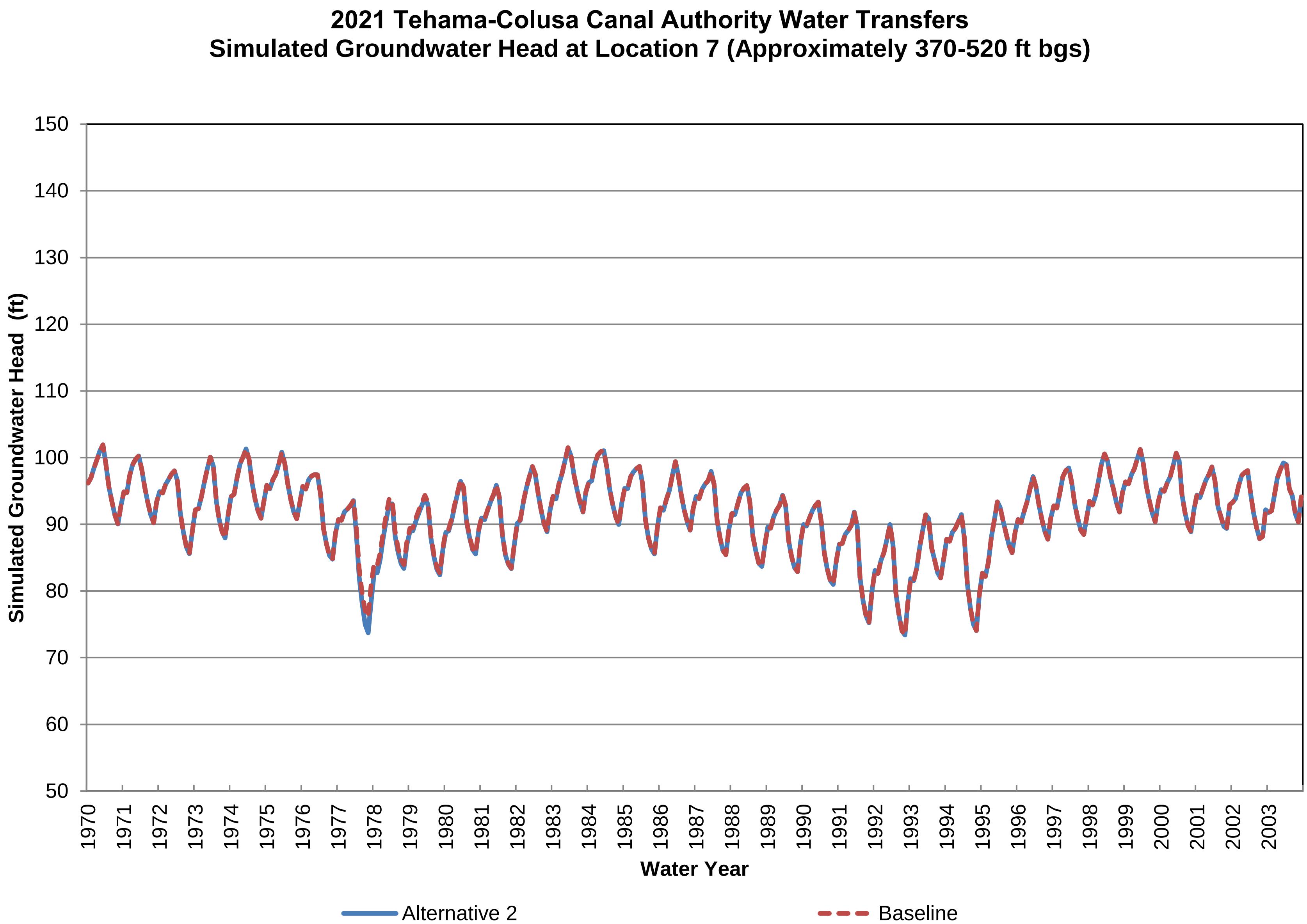
2000
2001
2002
2003
Water Year
Alternative 2
Baseline
Ground Surface Elevation

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 7 (Approximately 70-220 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 7 (Approximately 220-370 ft bgs)





2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 7 (Approximately 370-520 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
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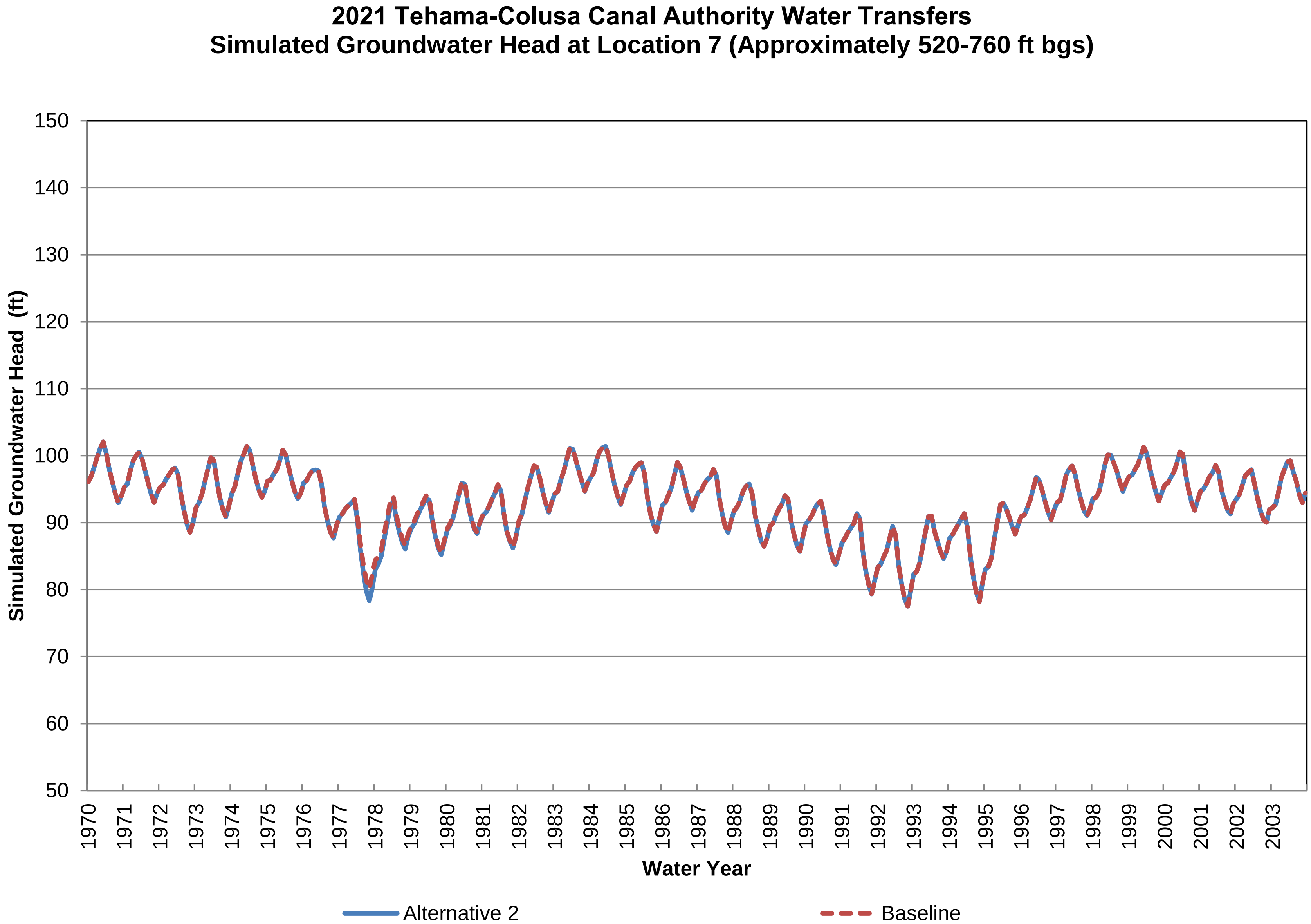
2000
2001
2002
2003
Water Year
Alternative 2
Baseline


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 7 (Approximately 520-760 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
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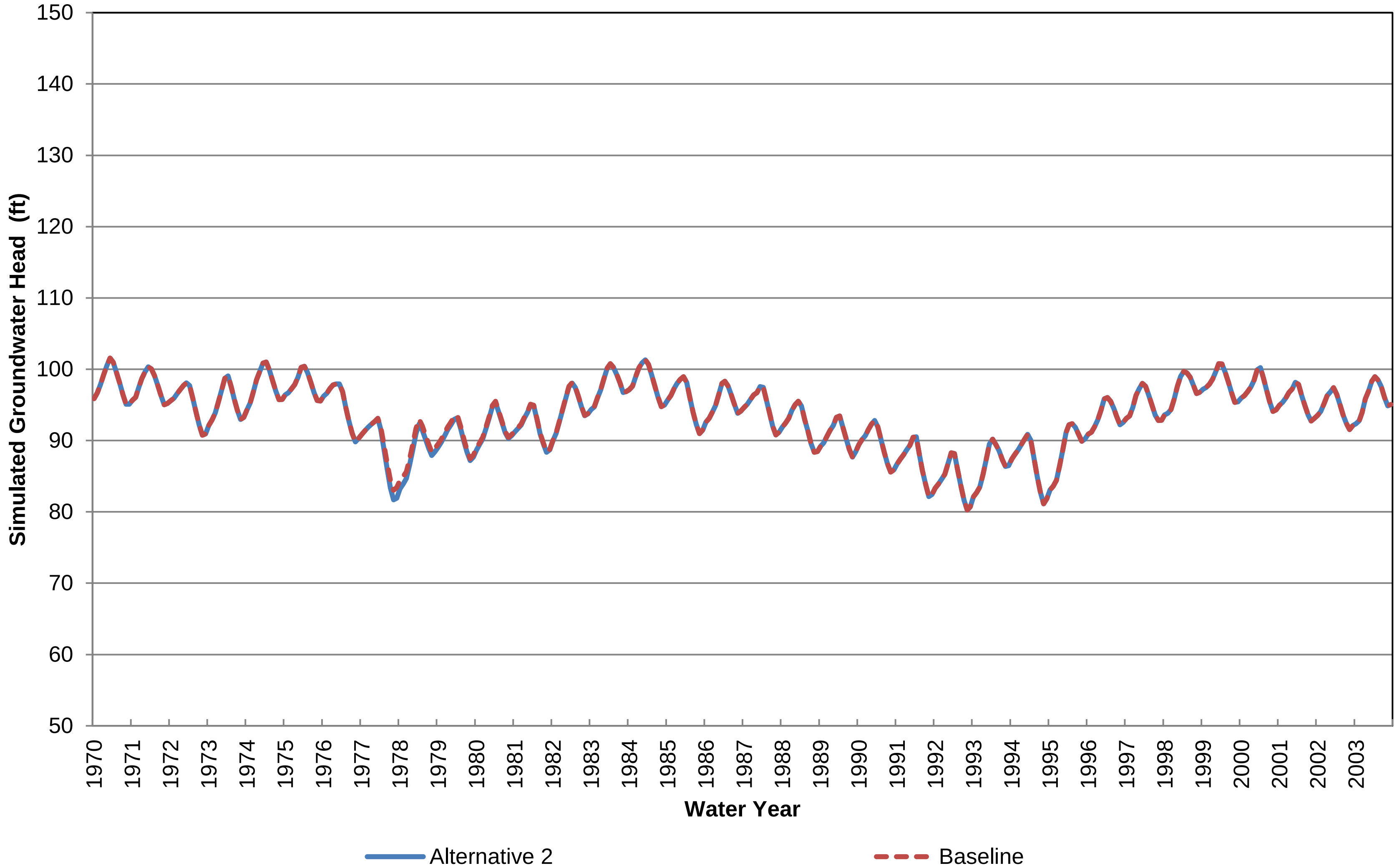
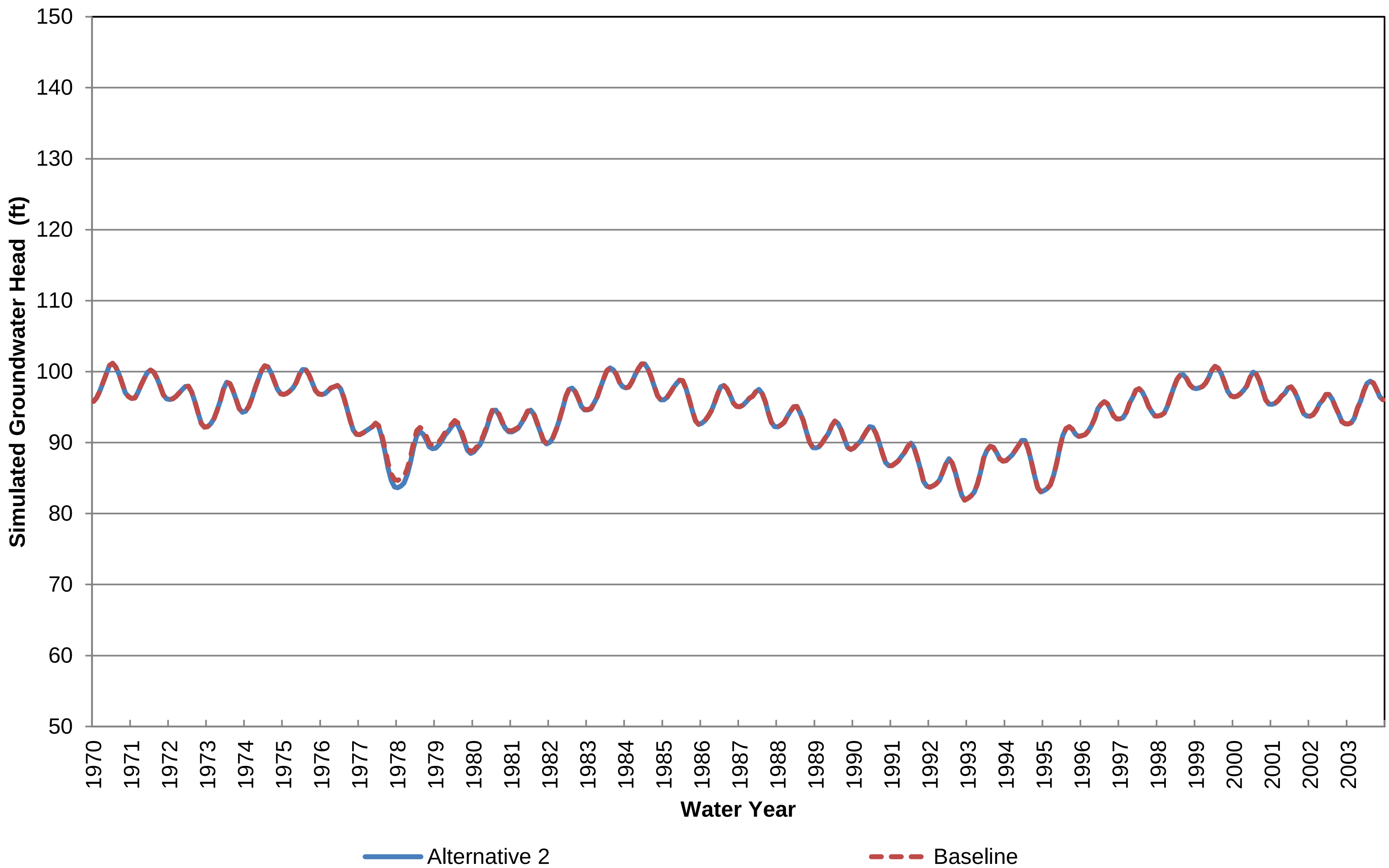
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

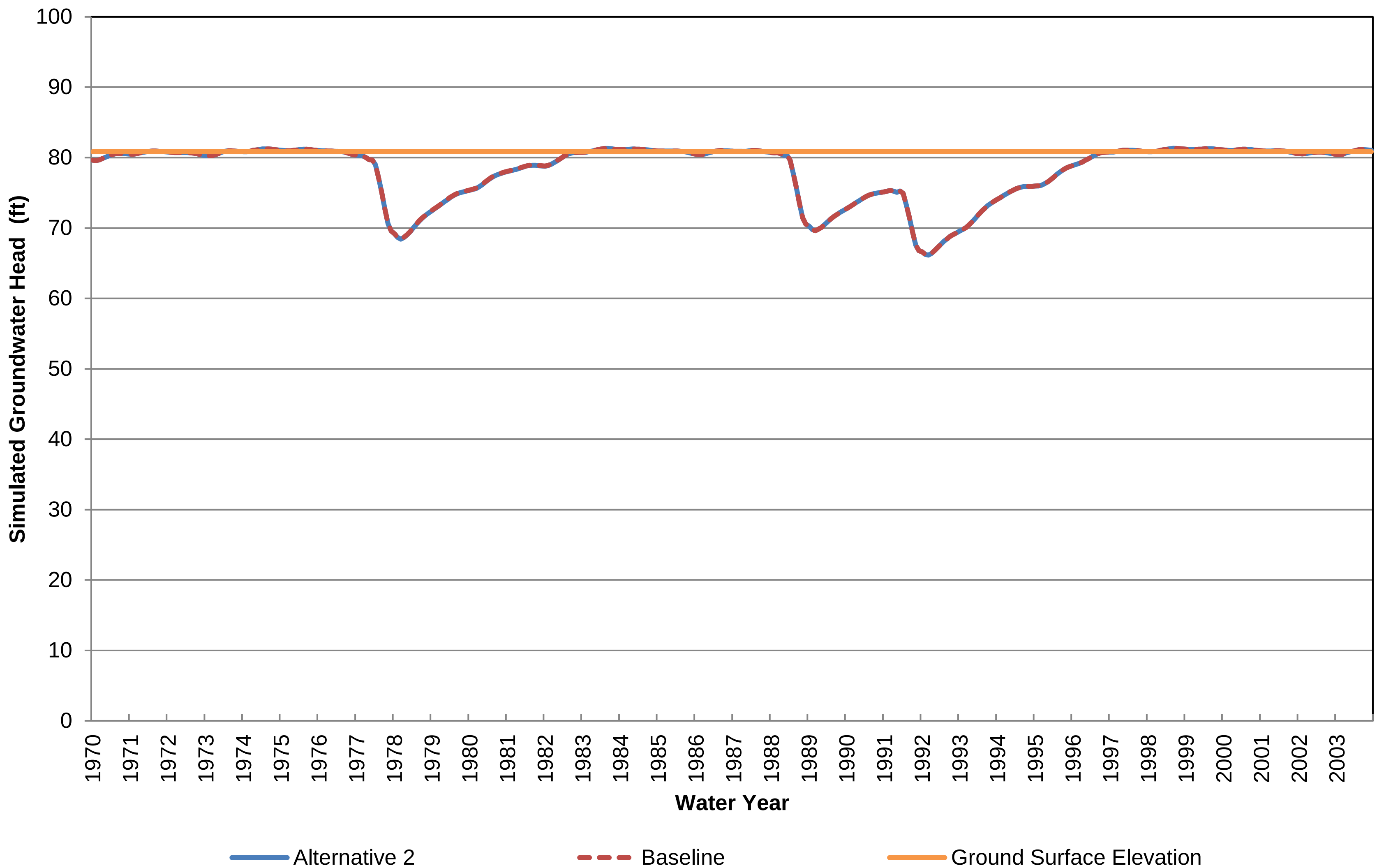
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 7 (Approximately 760-1030 ft bgs)



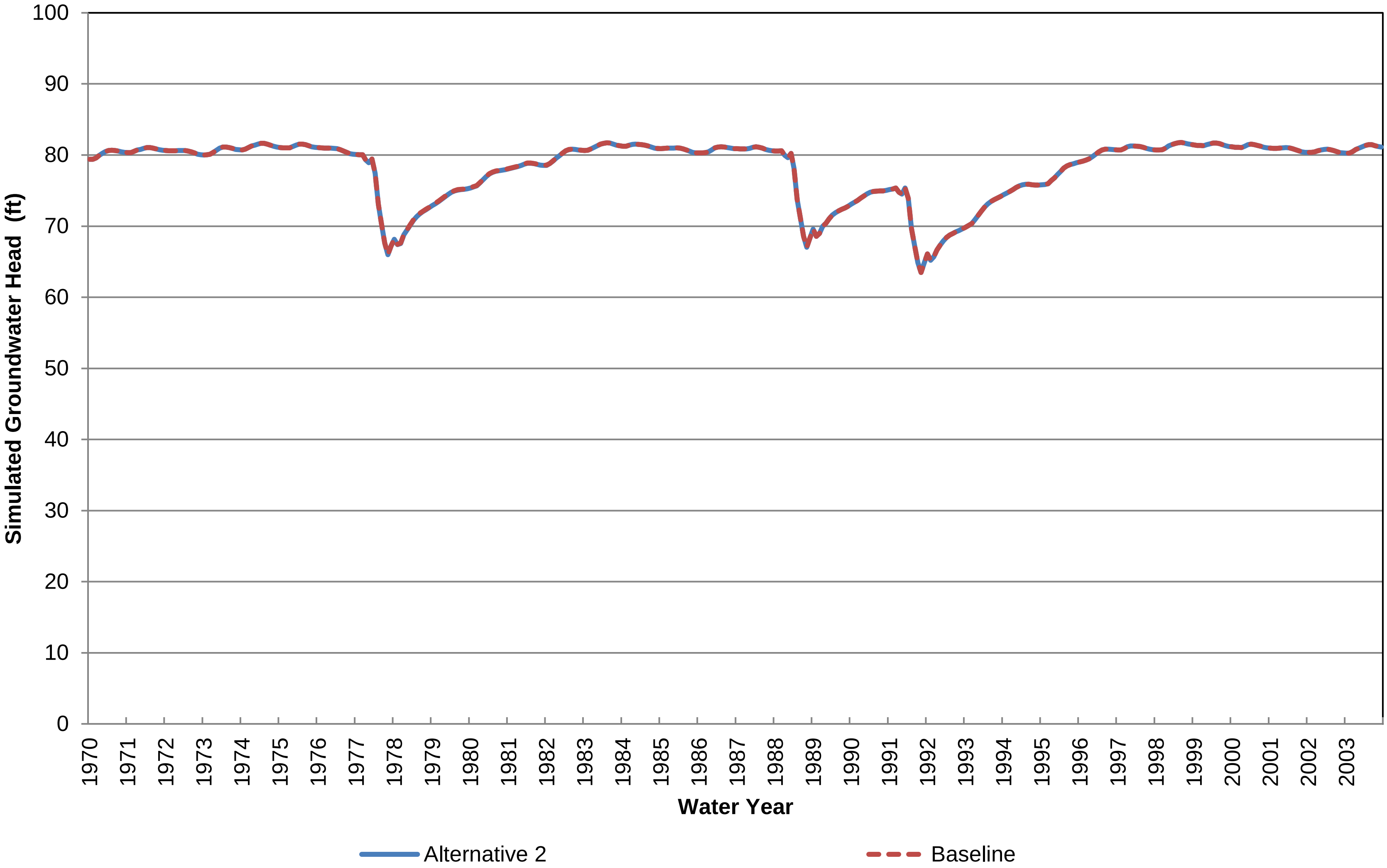
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 7 (Approximately 1030-1520 ft bgs)



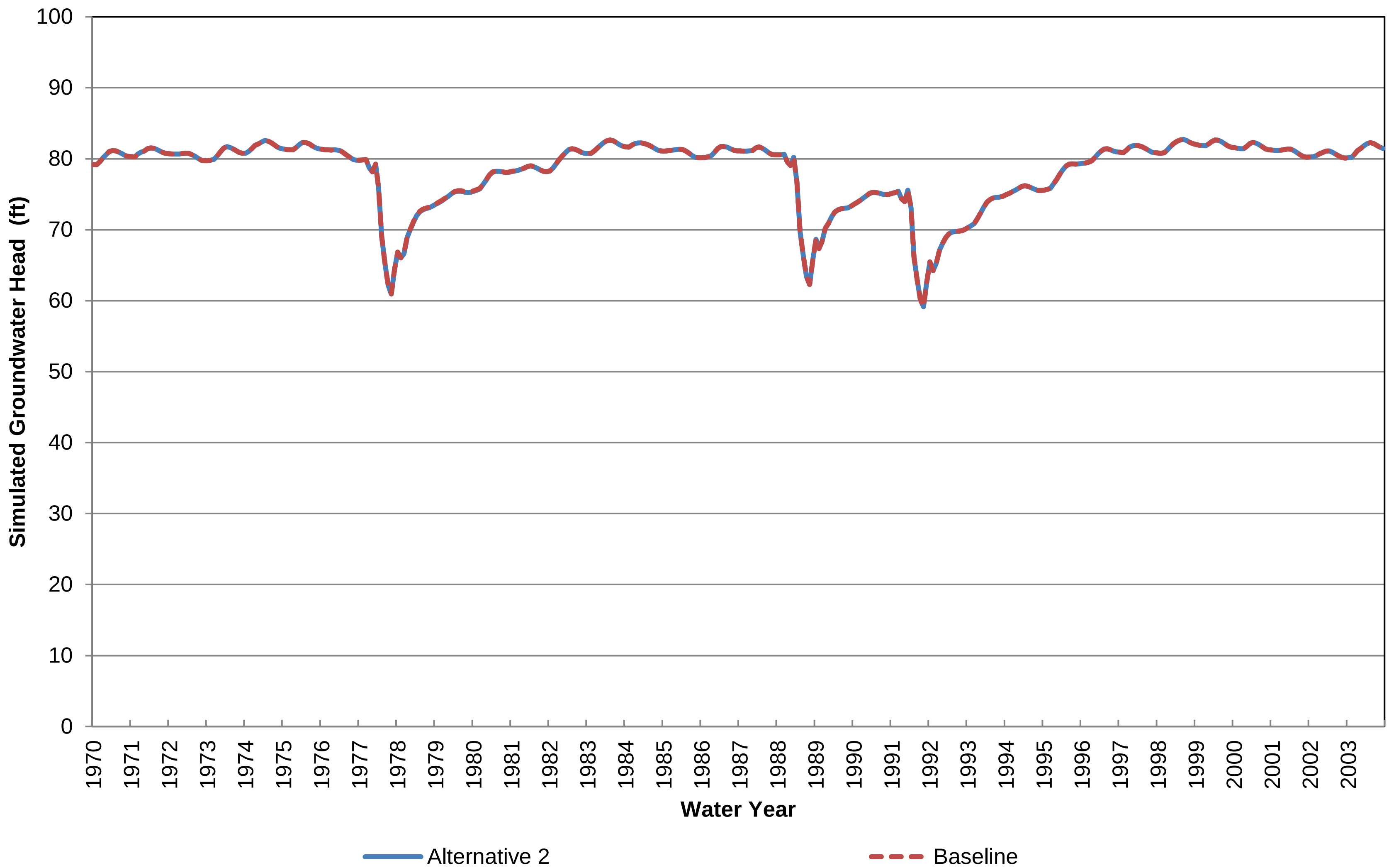
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 8 (Approximately 0-70 ft bgs)



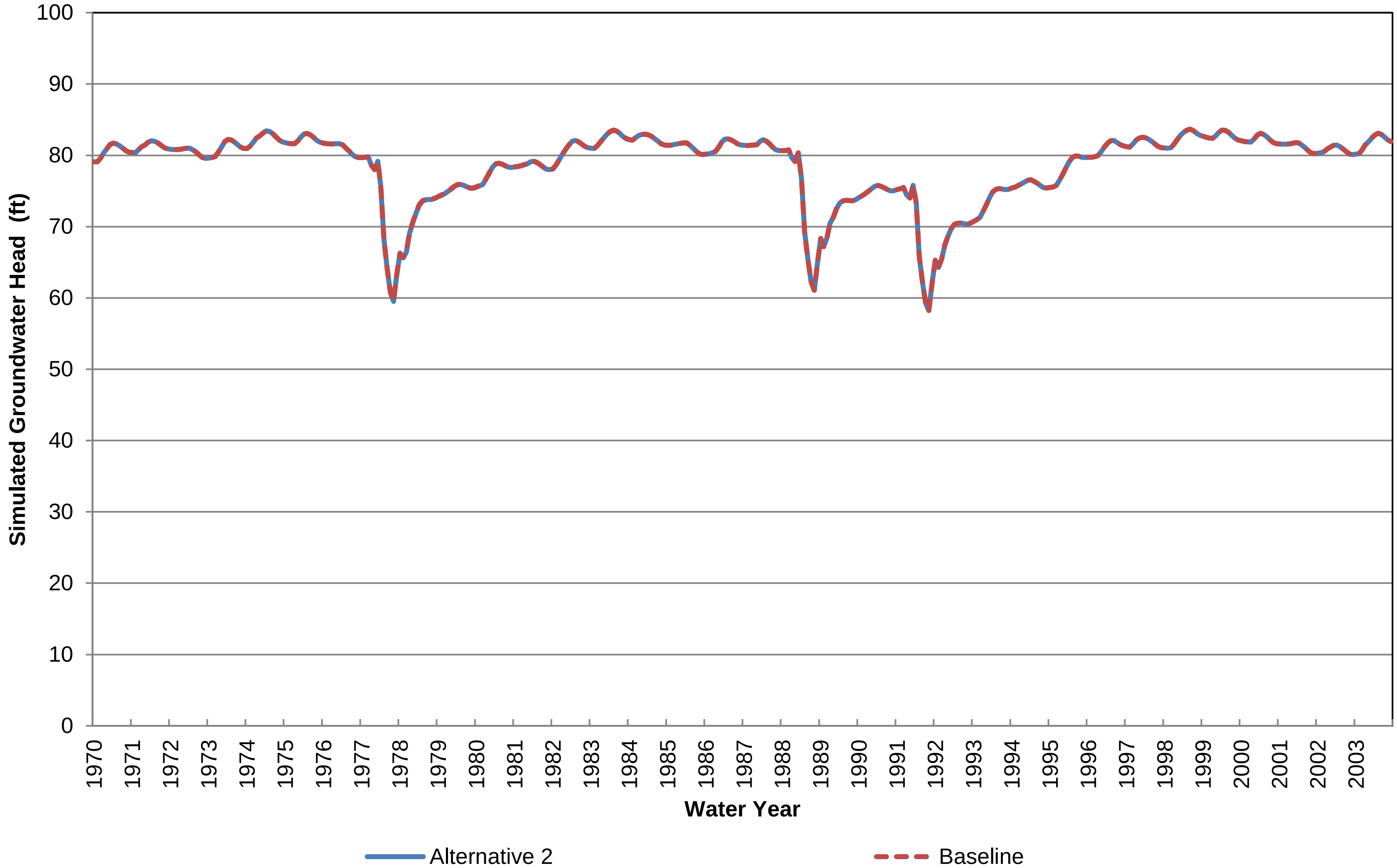
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 8 (Approximately 70-200 ft bgs)

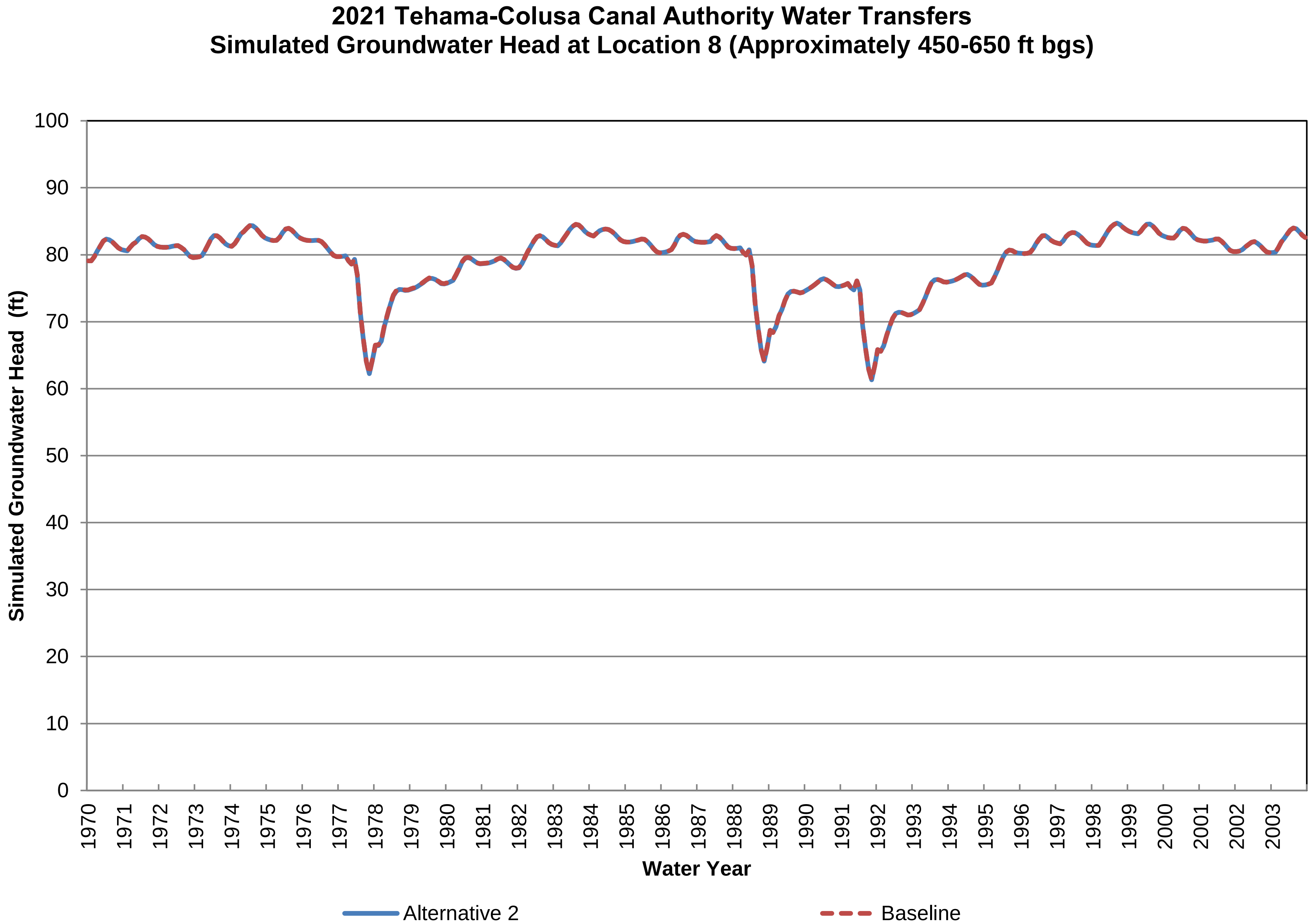


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 8 (Approximately 200-330 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 8 (Approximately 330-450 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 8 (Approximately 450-650 ft bgs)
Simulated Groundwater Head (ft)
100
90
80
70
60
50
40
30
20
10
0
1970
1971
1972
1973
1974
1975
1976
1977
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1979
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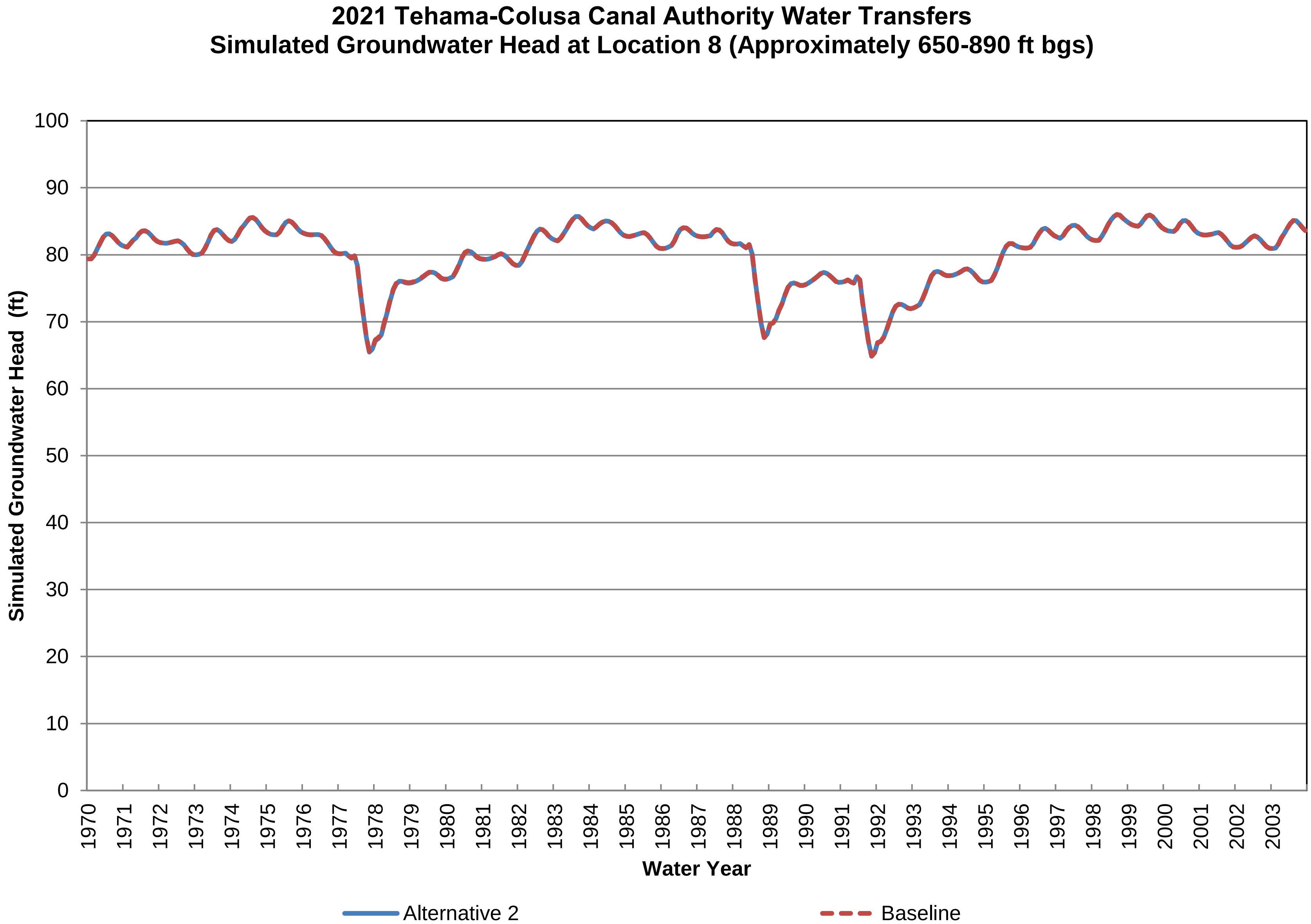
2002
2003
Water Year
Alternative 2
Baseline


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 8 (Approximately 650-890 ft bgs)
Simulated Groundwater Head (ft)
100
90
80
70
60
50
40
30
20
10
0
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
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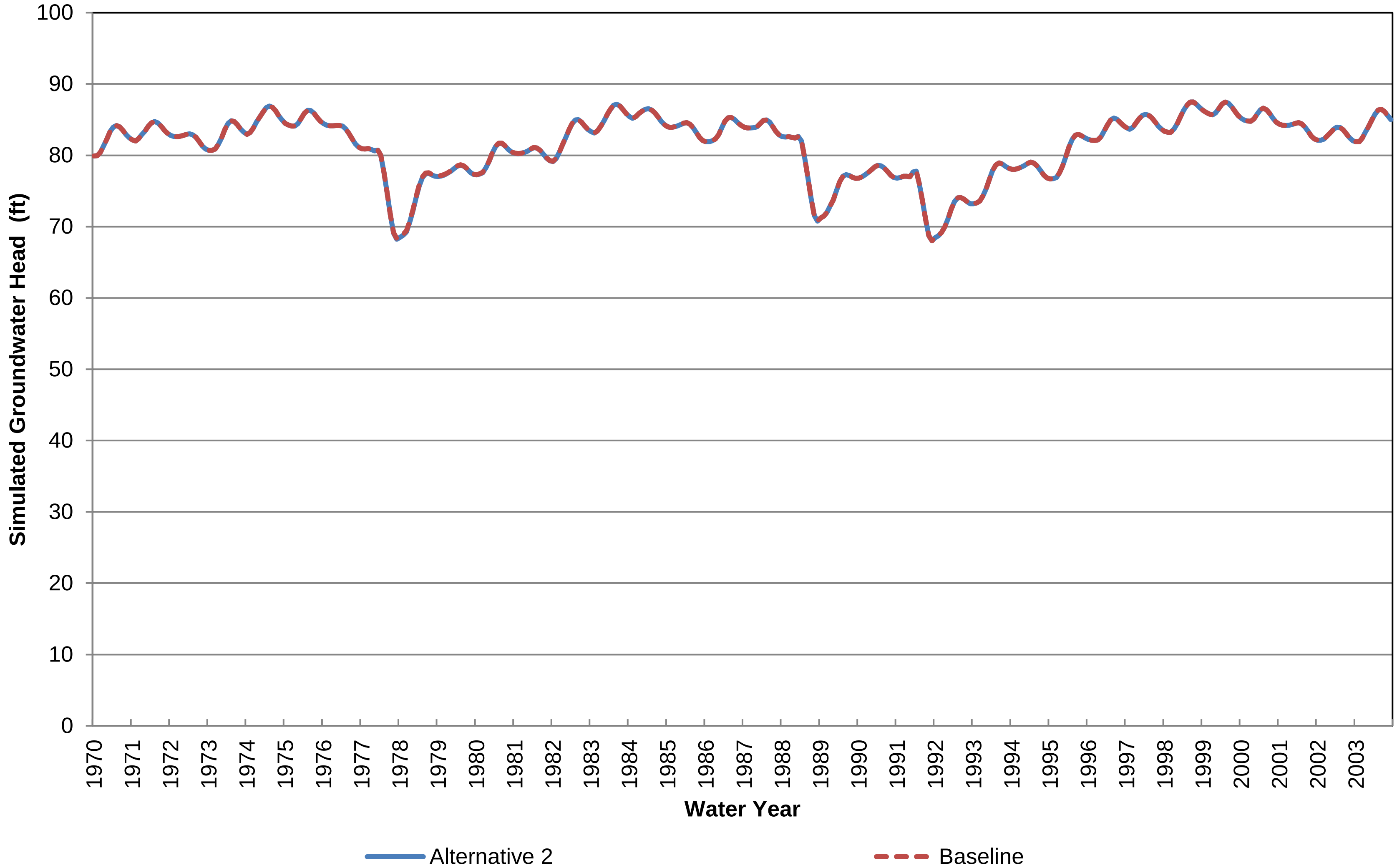
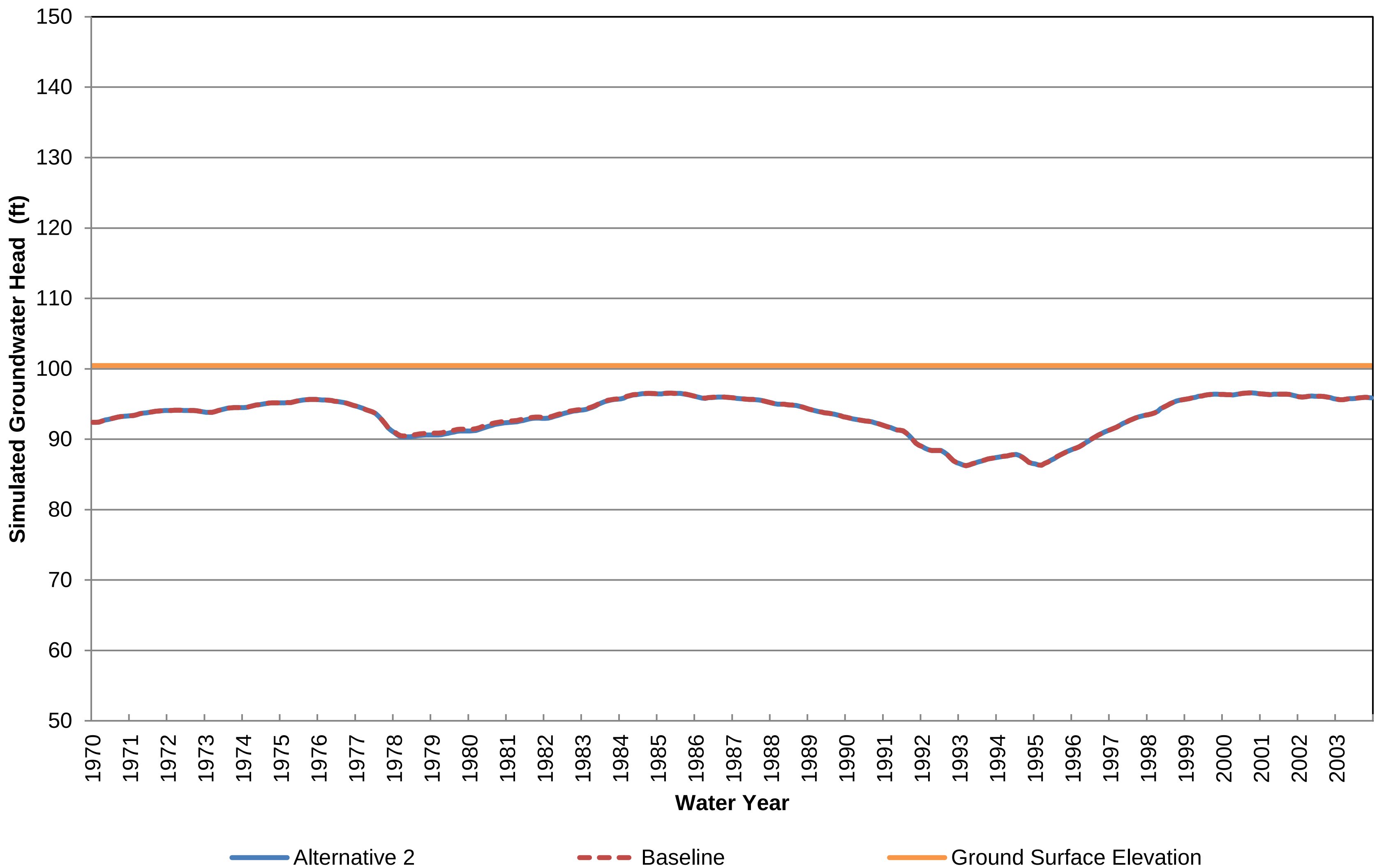
2002
2003
Water Year
Alternative 2
Baseline

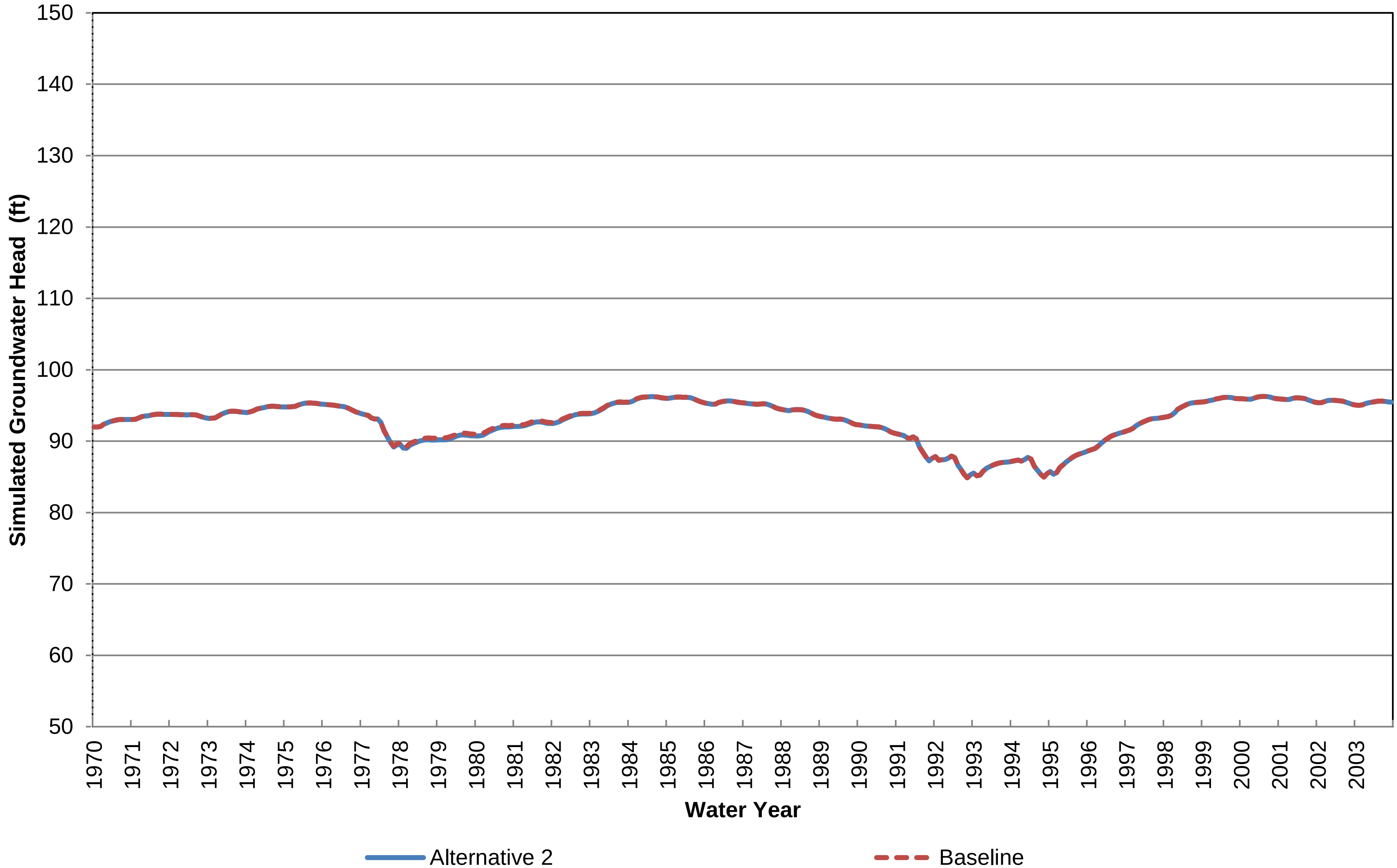
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 8 (Approximately 890-1330 ft bgs)

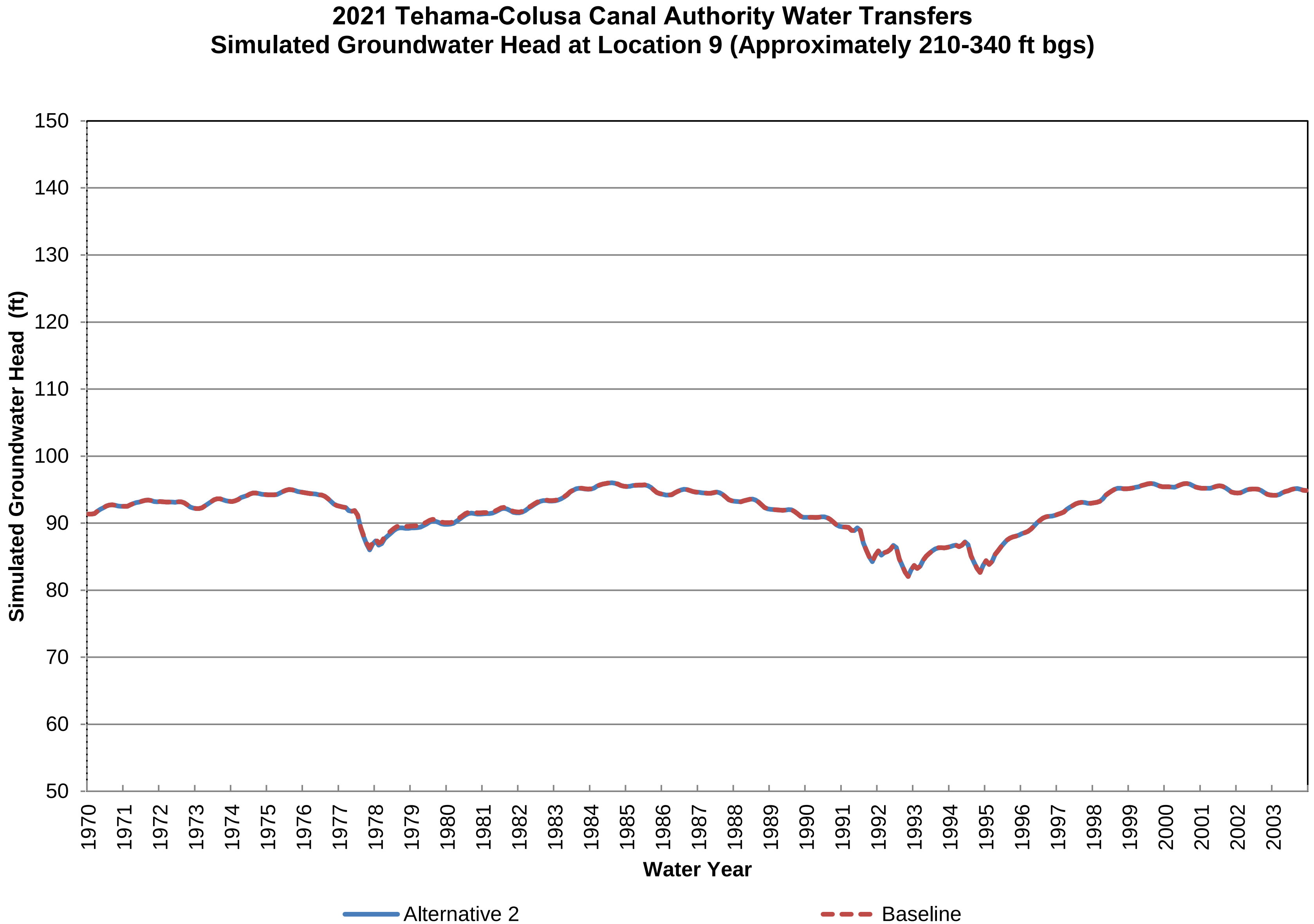


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 9 (Approximately 0-70 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 9 (Approximately 70-210 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 9 (Approximately 210-340 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
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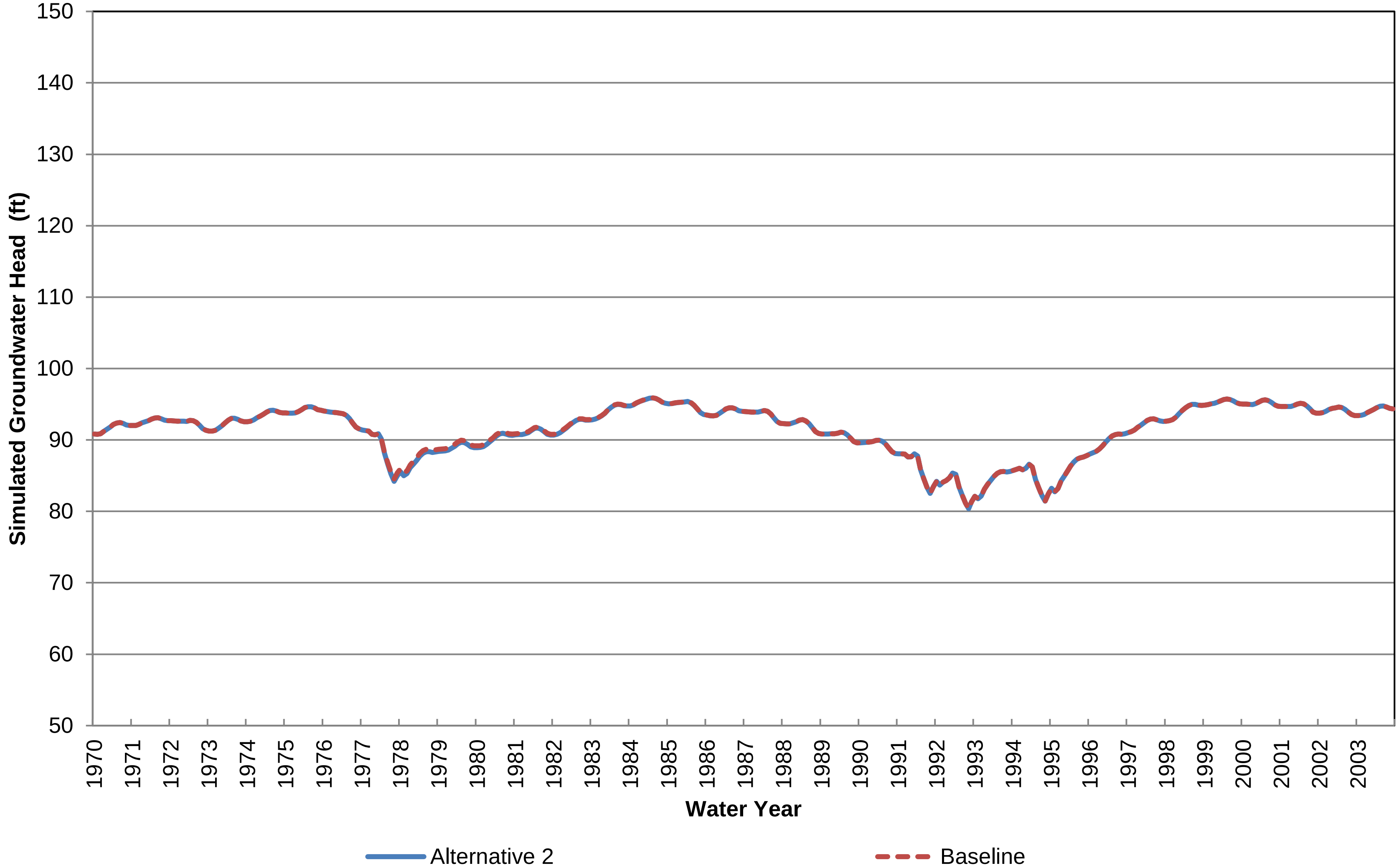
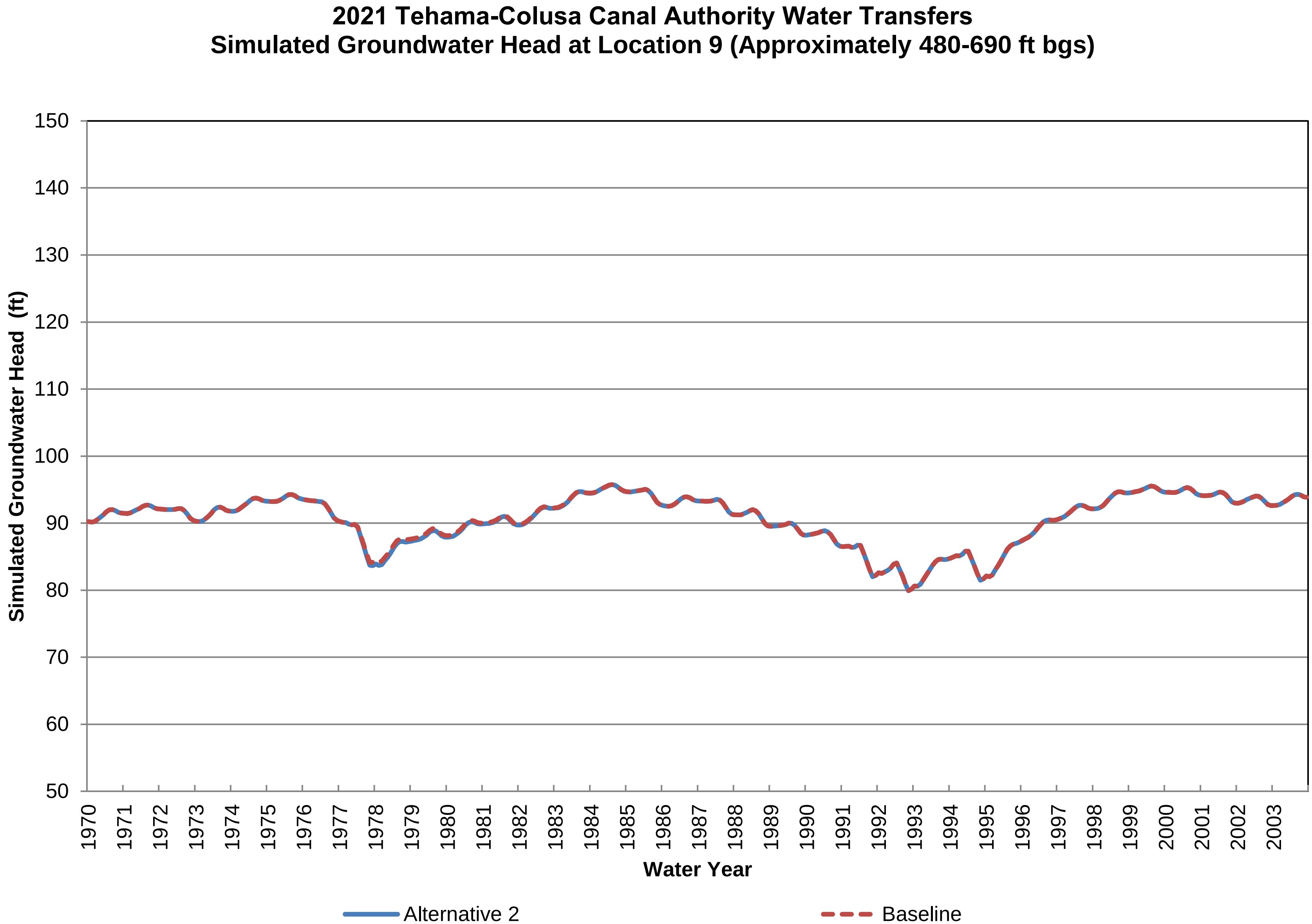
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 9 (Approximately 340-480 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 9 (Approximately 480-690 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
1976
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1979
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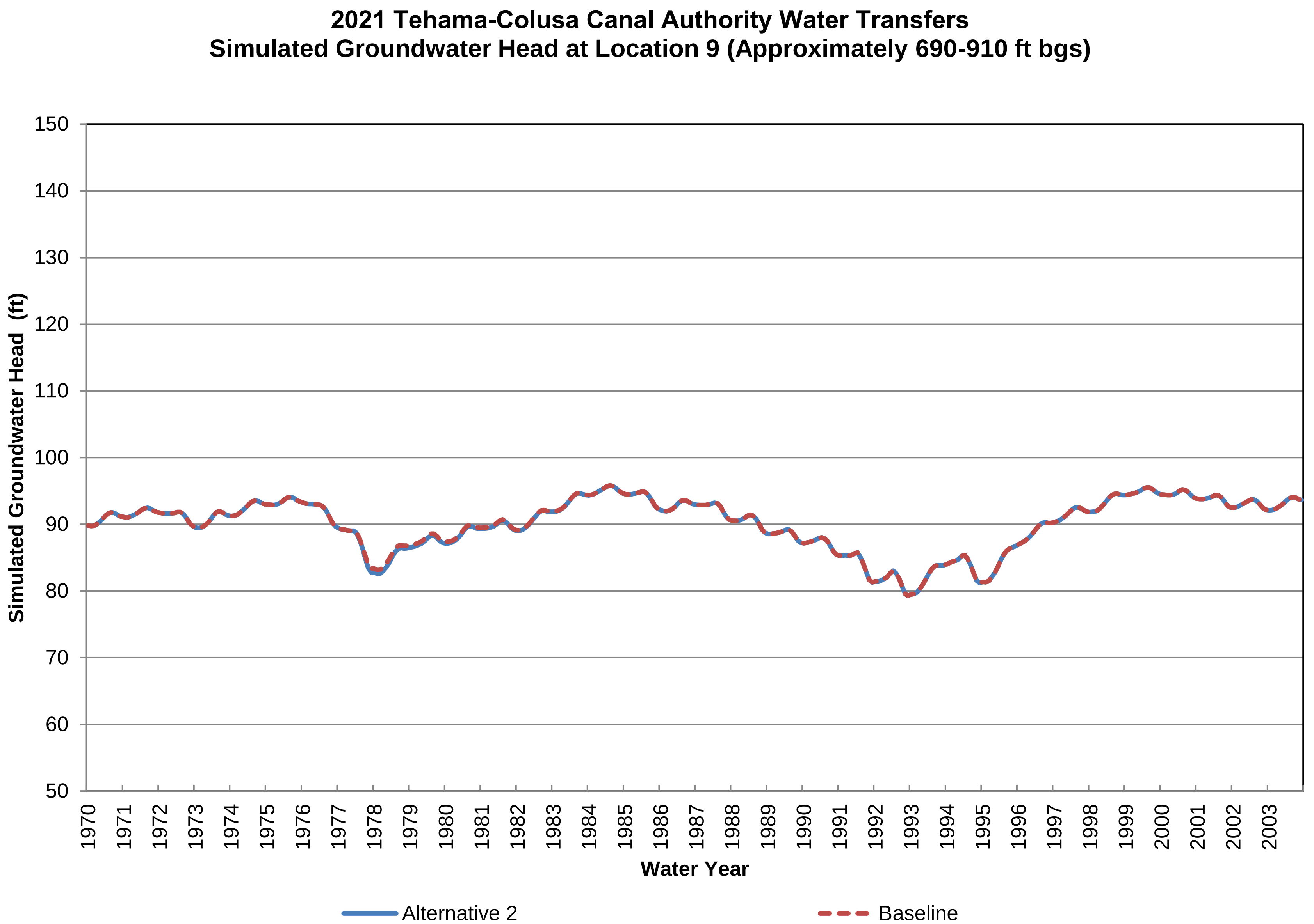
2001
2002
2003
Water Year
Alternative 2
Baseline


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 9 (Approximately 690-910 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
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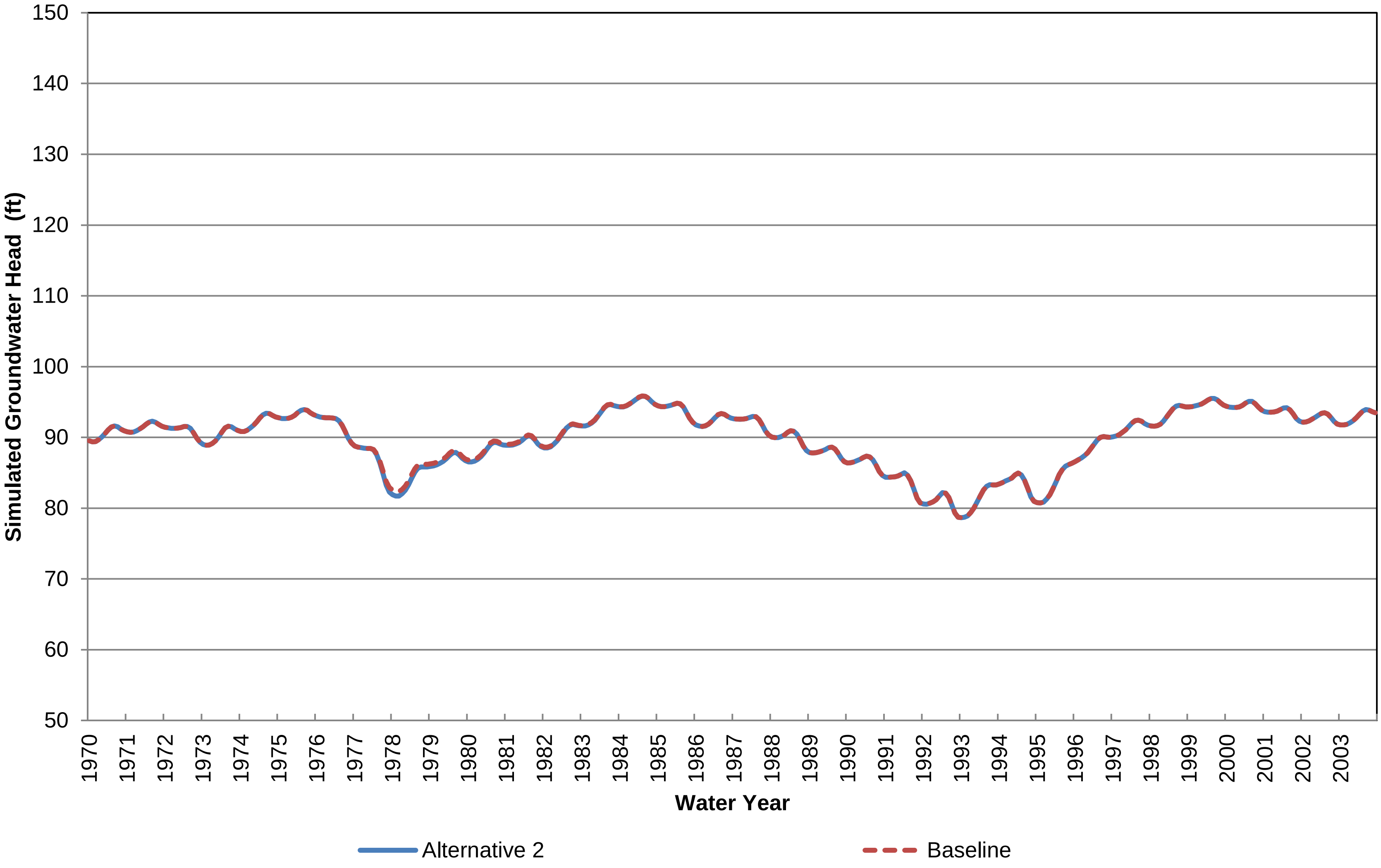
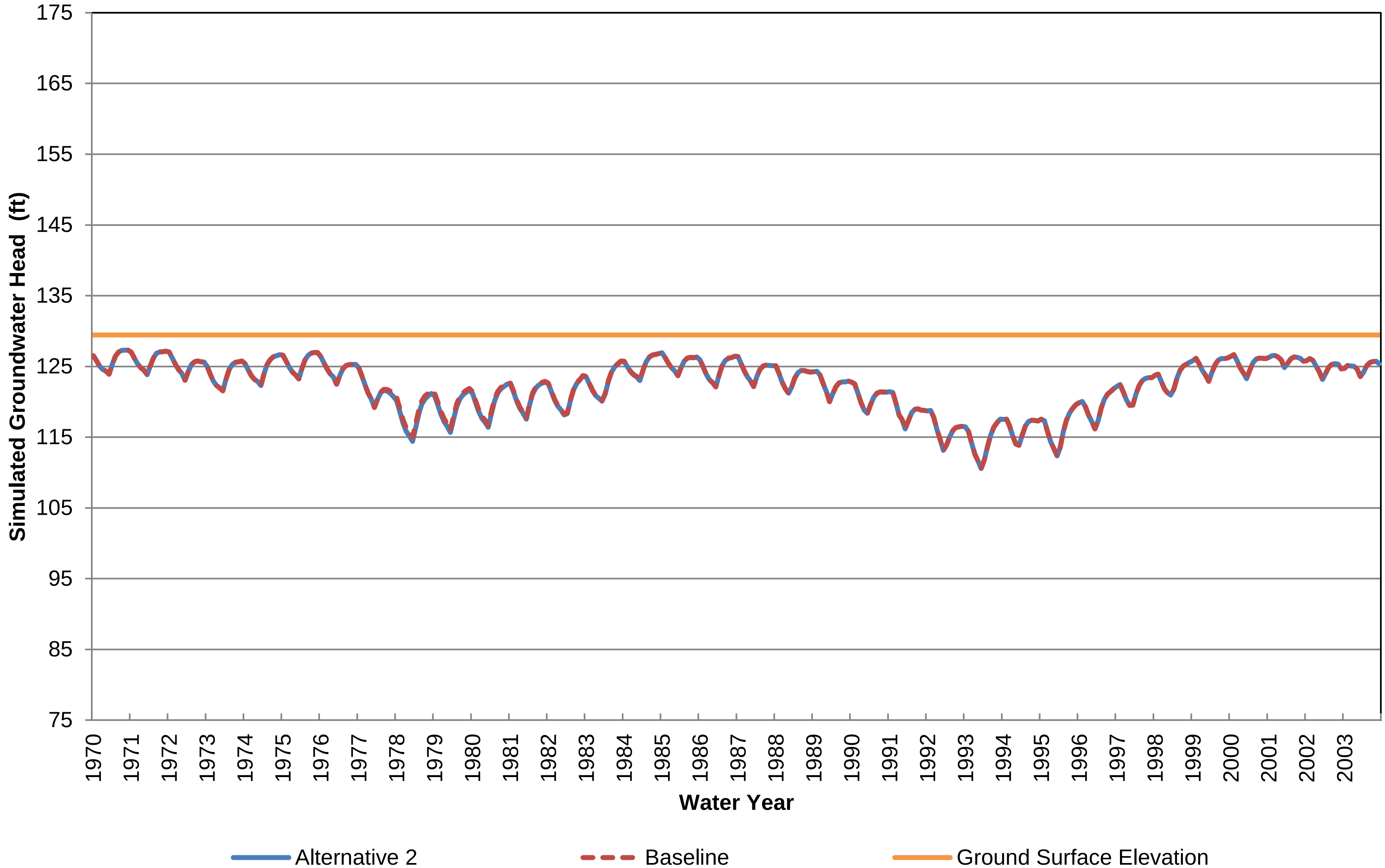
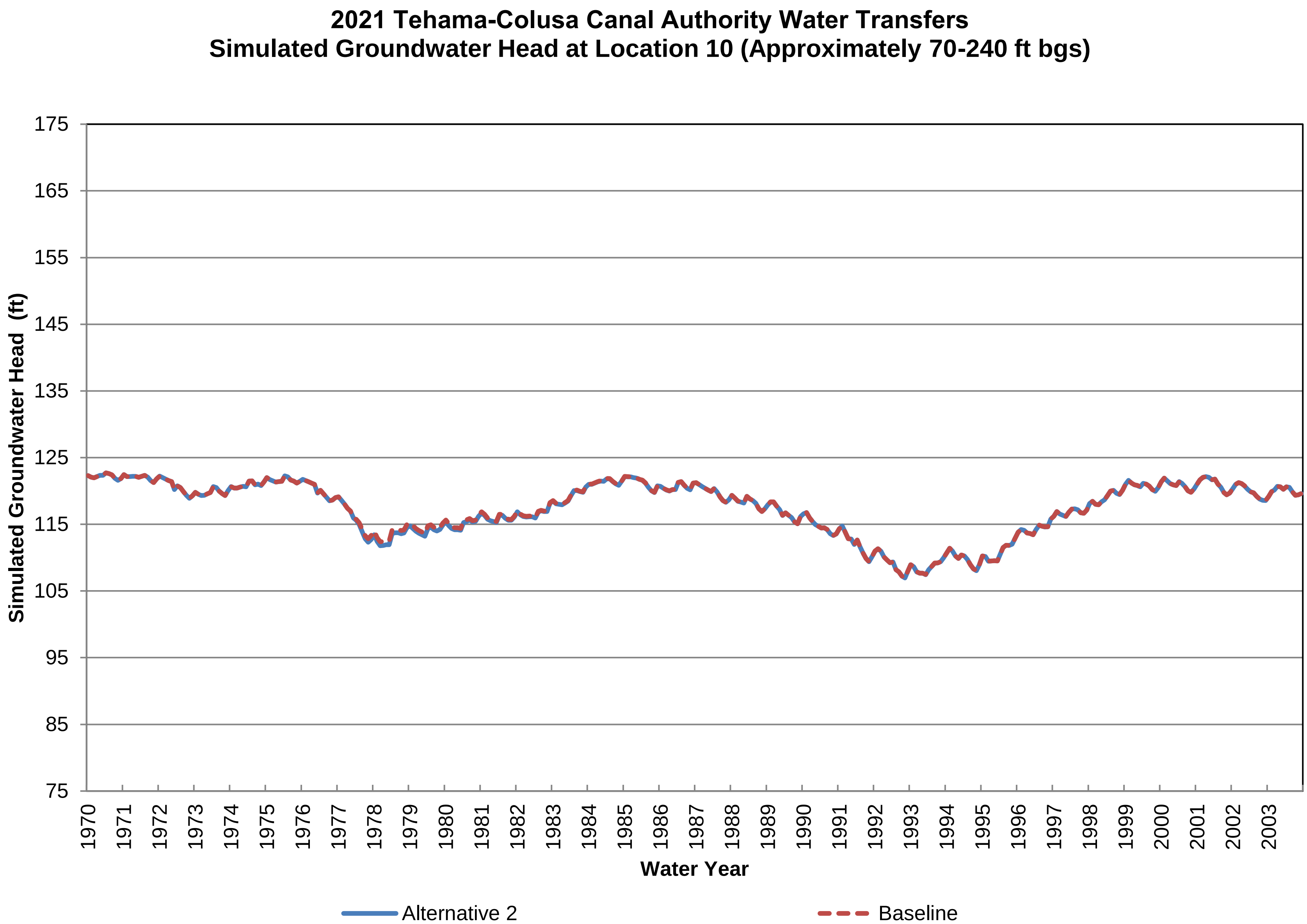
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 9 (Approximately 910-1250 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 10 (Approximately 0-70 ft bgs)





2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 10 (Approximately 70-240 ft bgs)
Simulated Groundwater Head (ft)
175
165
155
145
135
125
115
105
95
85
75
1970
1971
1972
1973
1974
1975
1976
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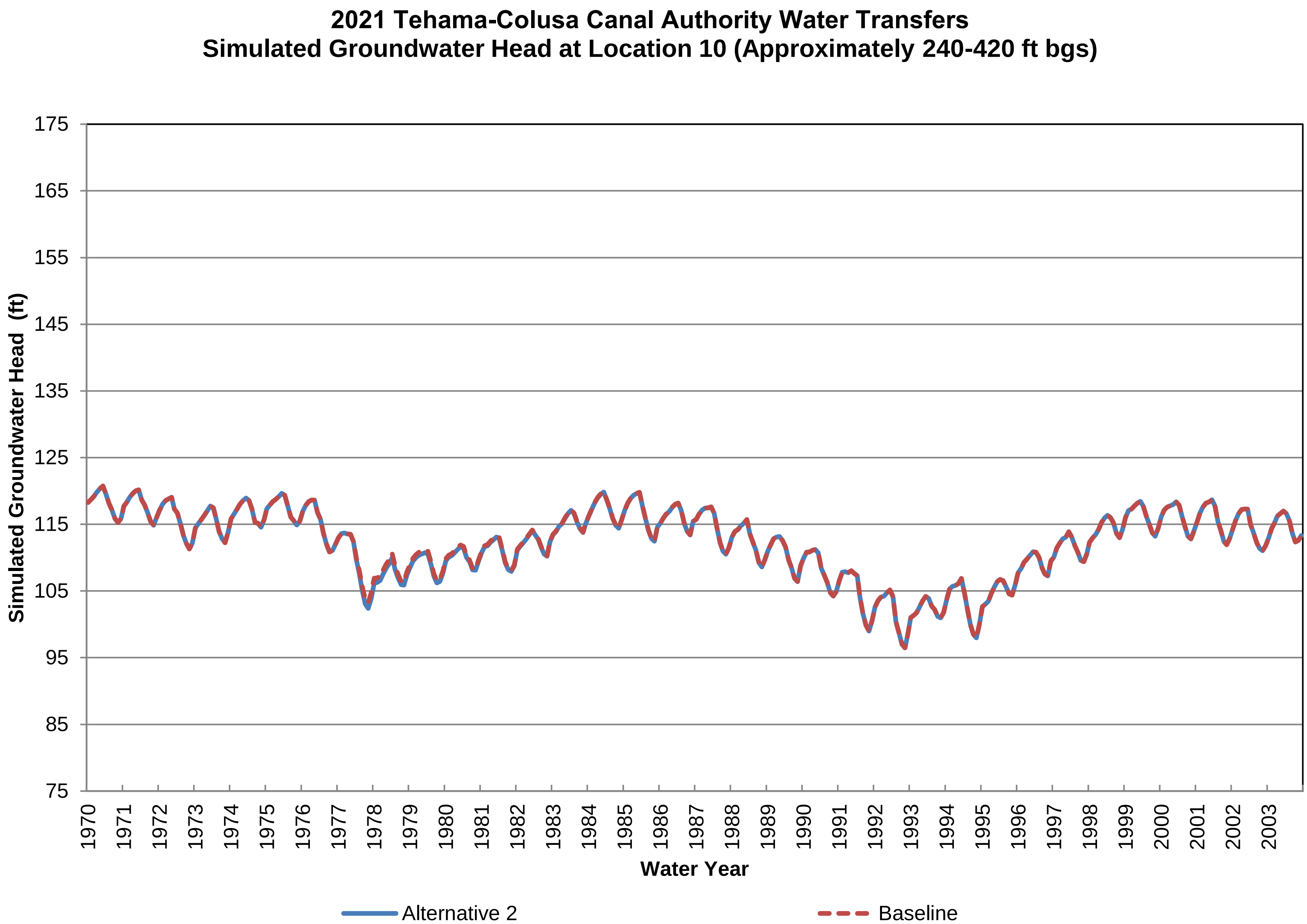
2002
2003
Water Year
Alternative 2
Baseline



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 10 (Approximately 240-420 ft bgs)
Simulated Groundwater Head (ft)
175
165
155
145
135
125
115
105
95
85
75
1970
1971
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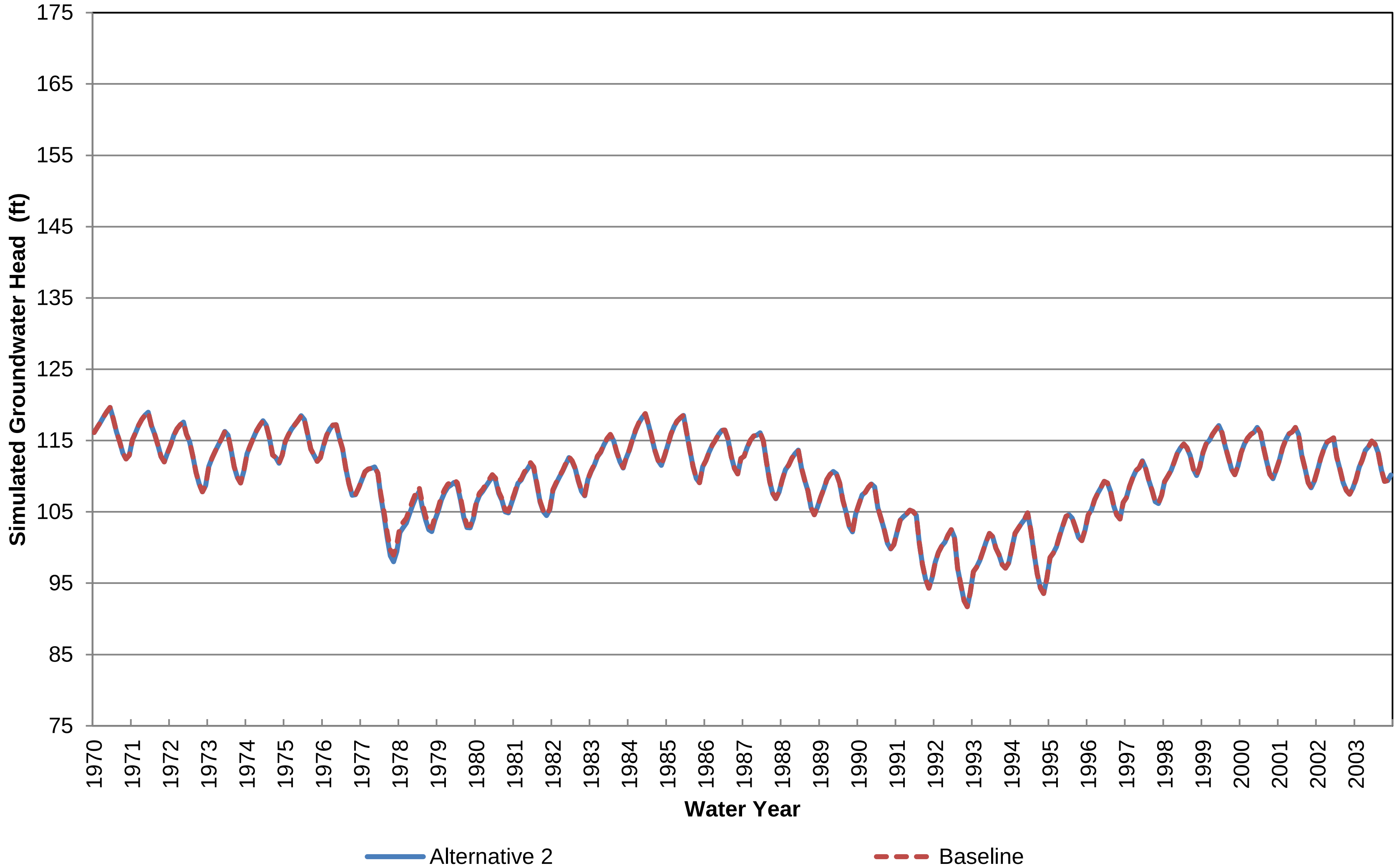
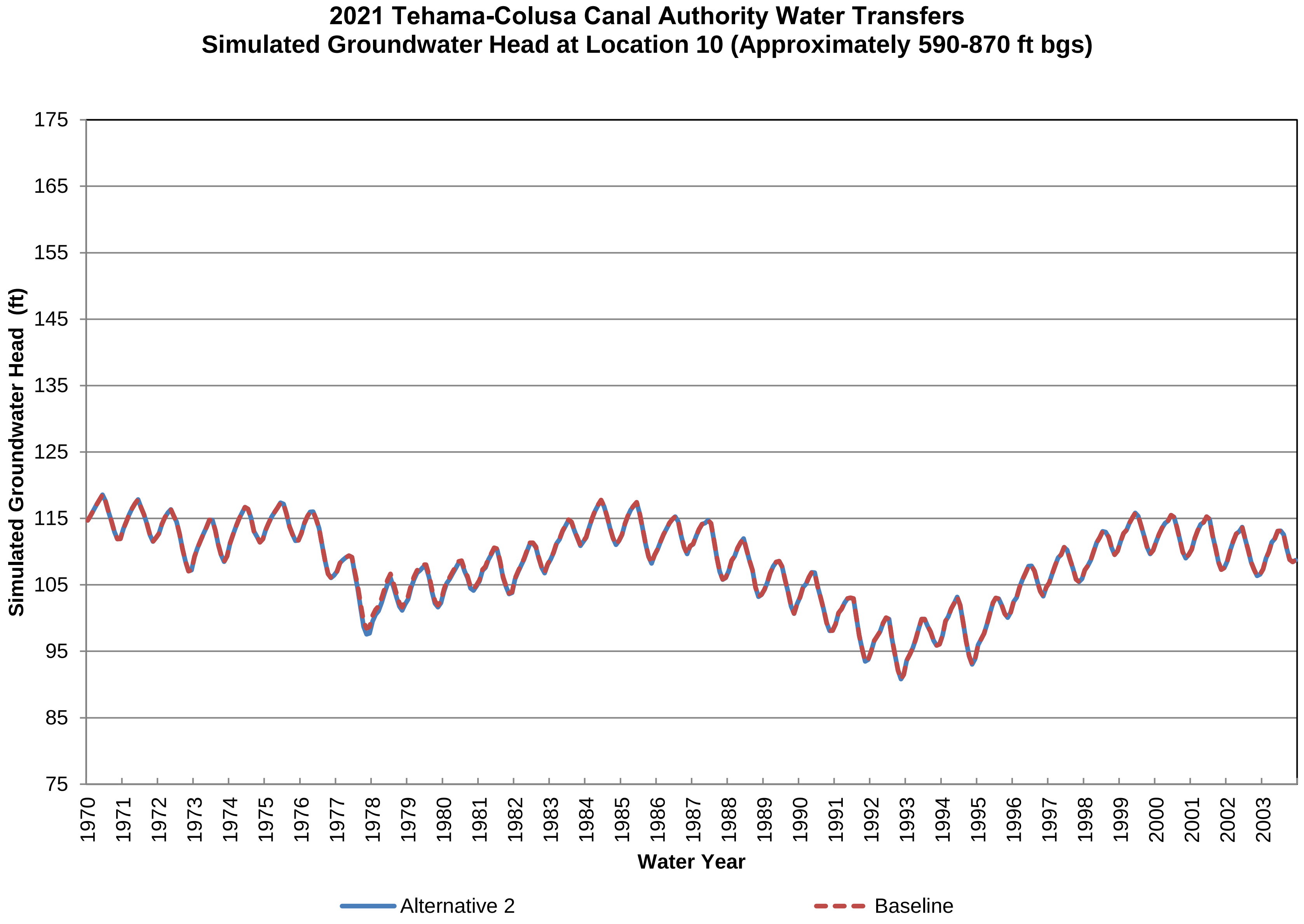
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 10 (Approximately 420-590 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 10 (Approximately 590-870 ft bgs)
Simulated Groundwater Head (ft)
175
165
155
145
135
125
115
105
95
85
75
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
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1998
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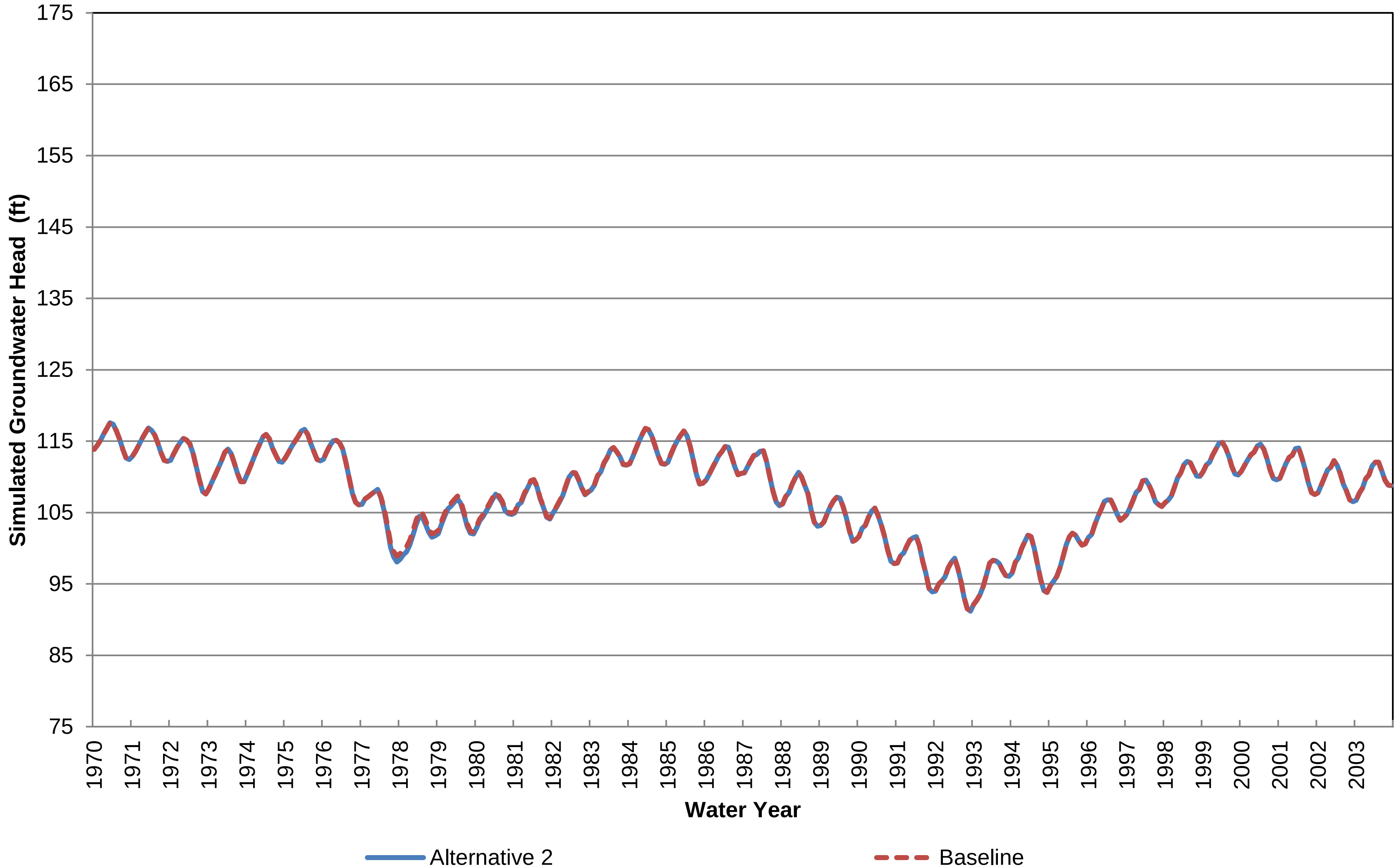
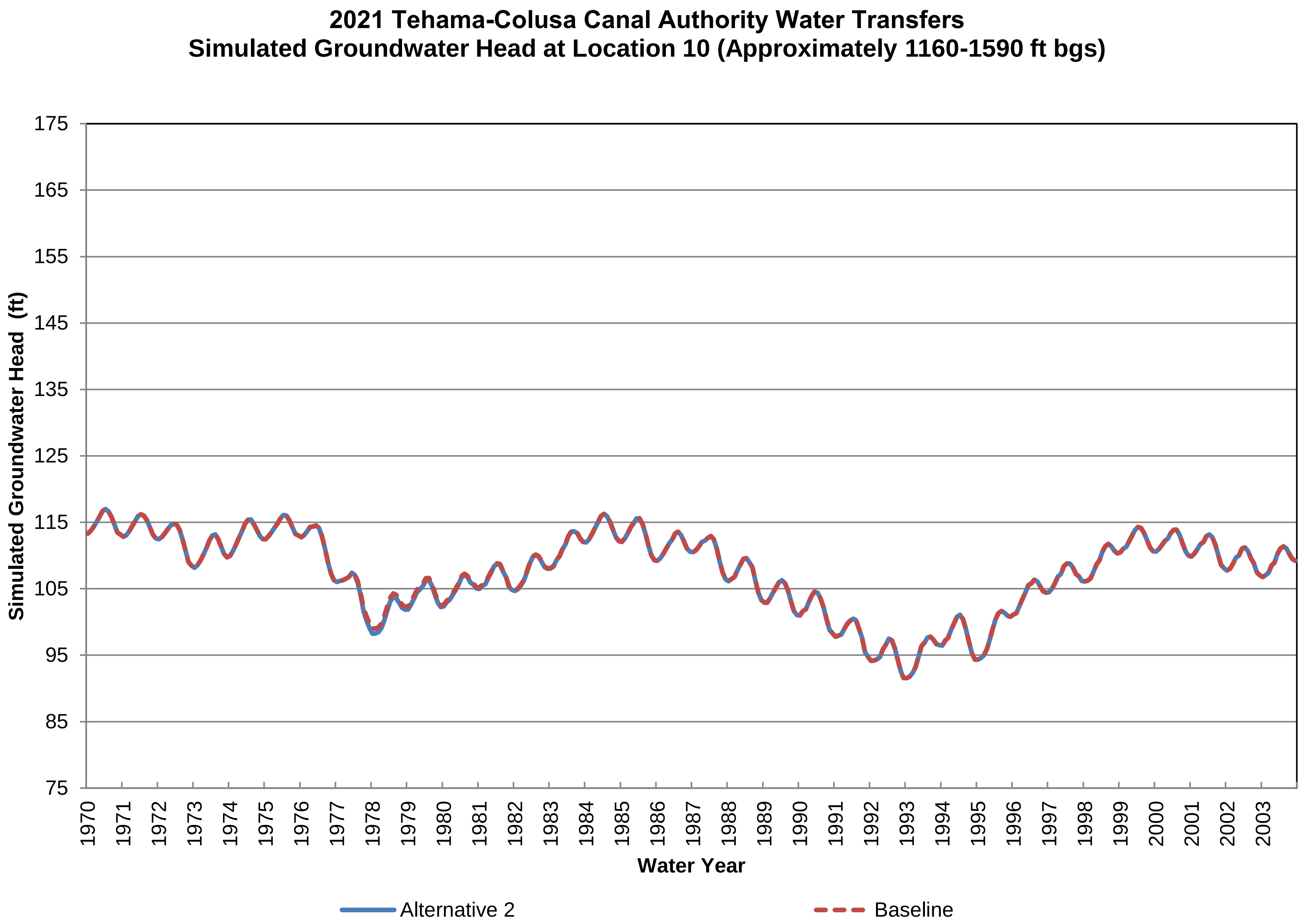
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 10 (Approximately 870-1160 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 10 (Approximately 1160-1590 ft bgs)
Simulated Groundwater Head (ft)
175
165
155
145
135
125
115
105
95
85
75
1970
1971
1972
1973
1974
1975
1976
1977
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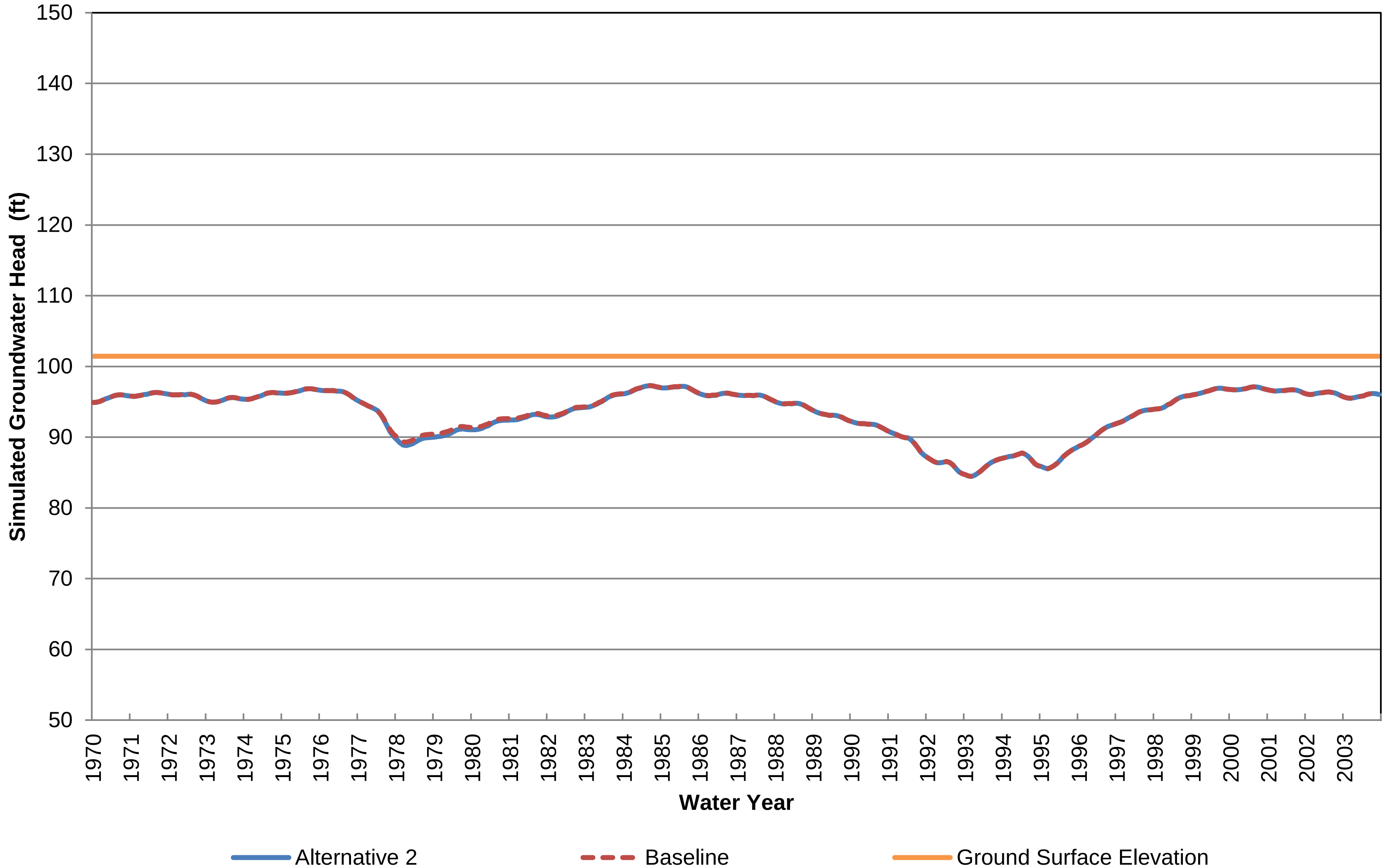
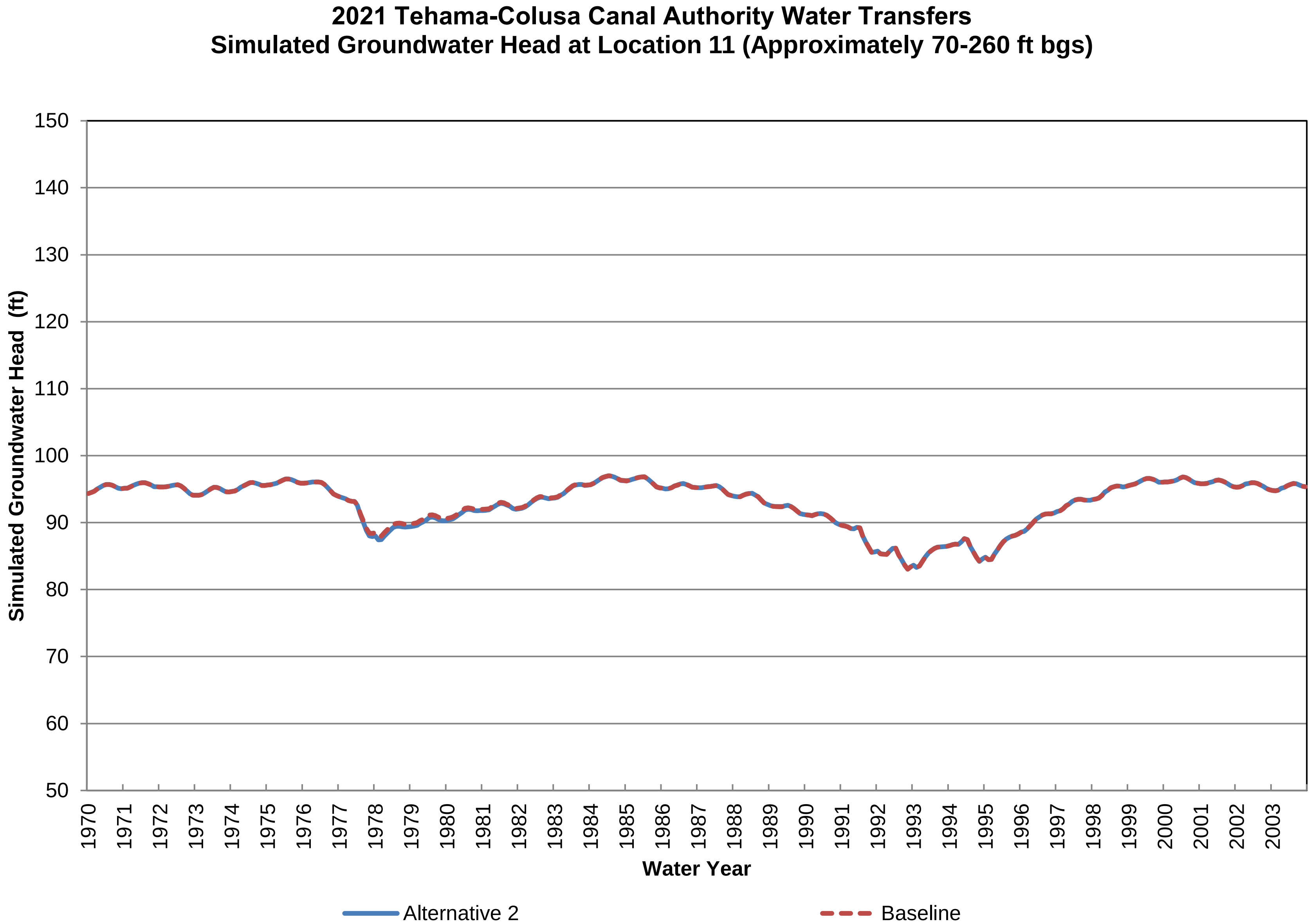
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 11 (Approximately 0-70 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 11 (Approximately 70-260 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
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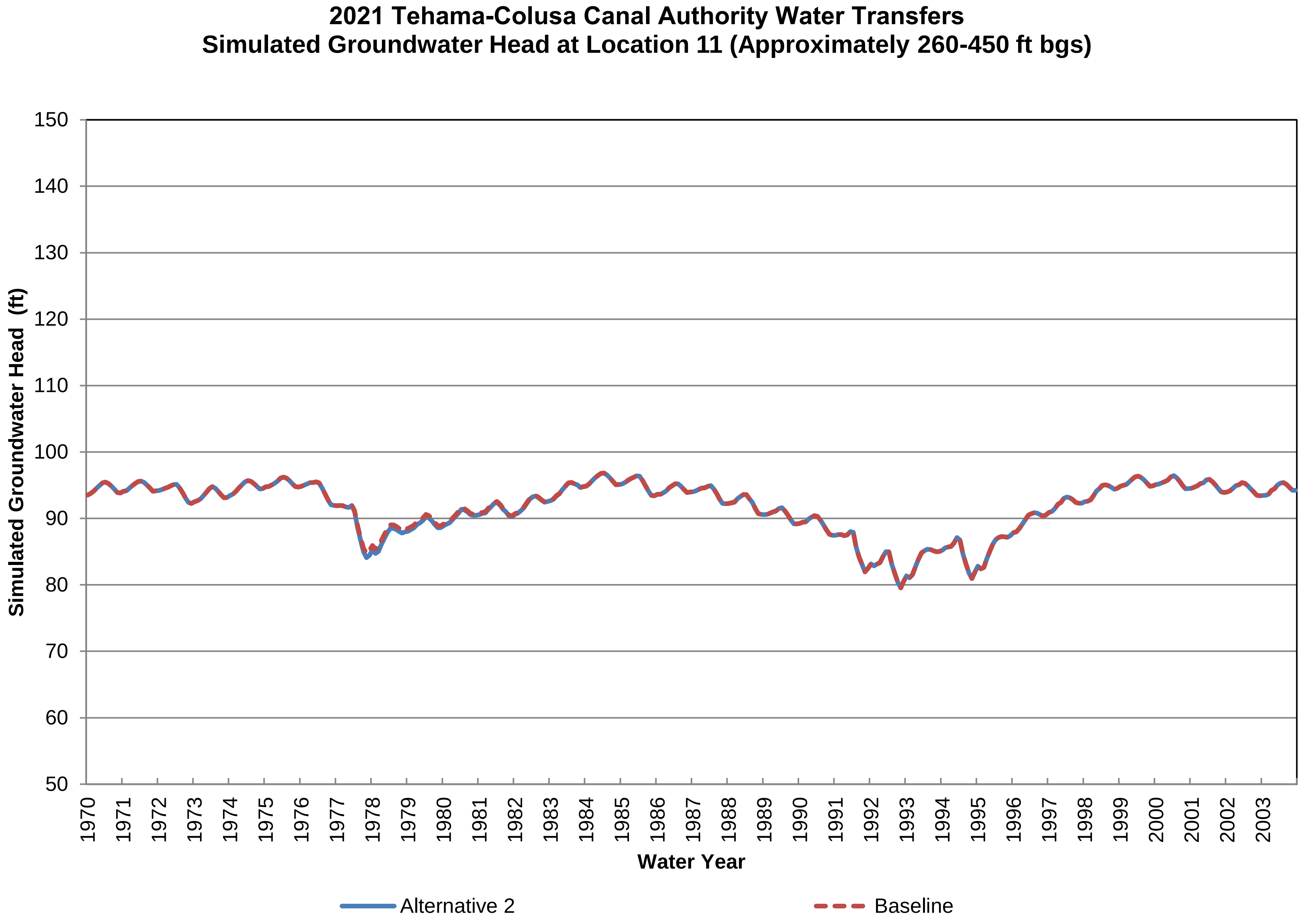
2001
2002
2003
Water Year
Alternative 2
Baseline


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 11 (Approximately 260-450 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
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1998
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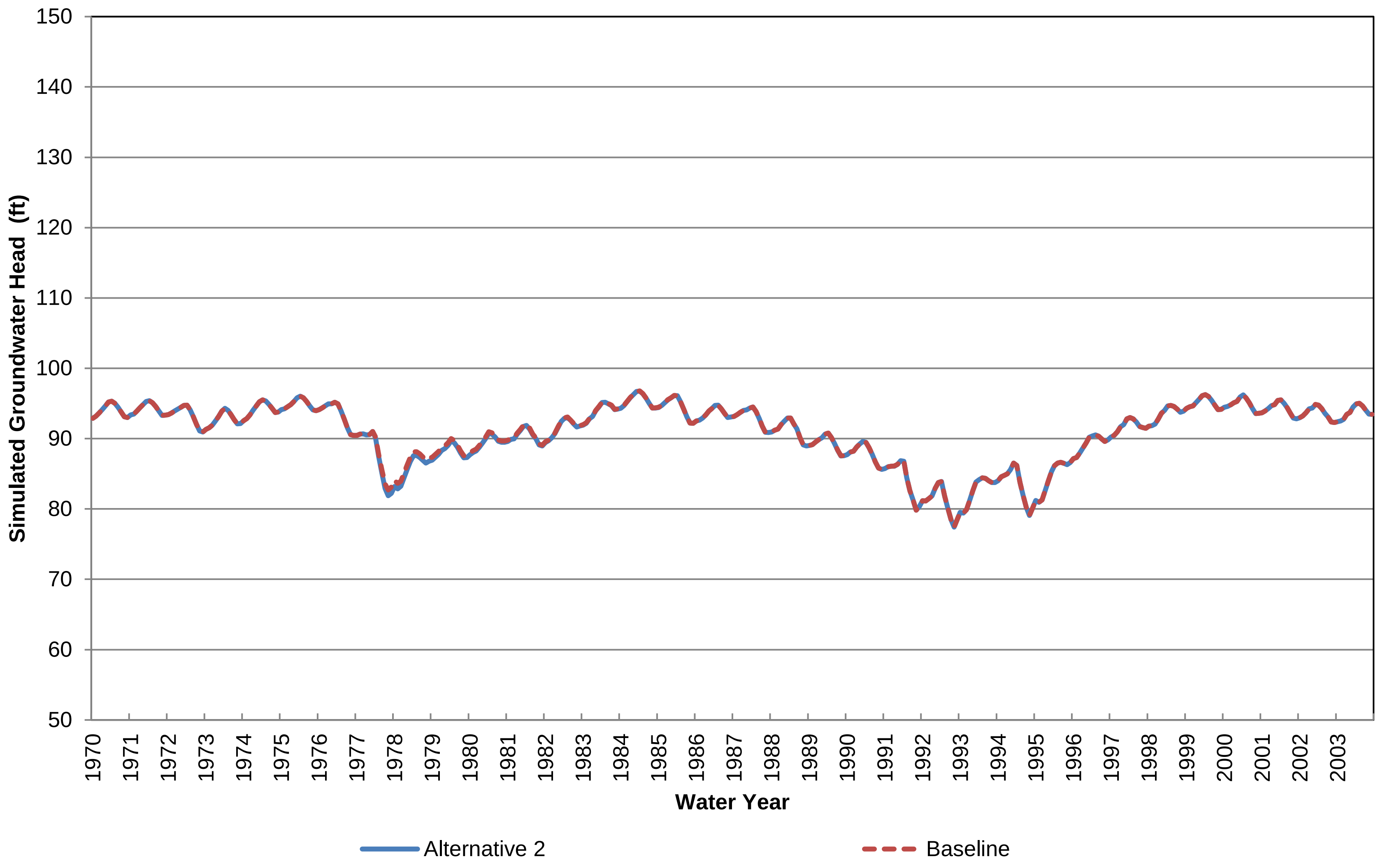
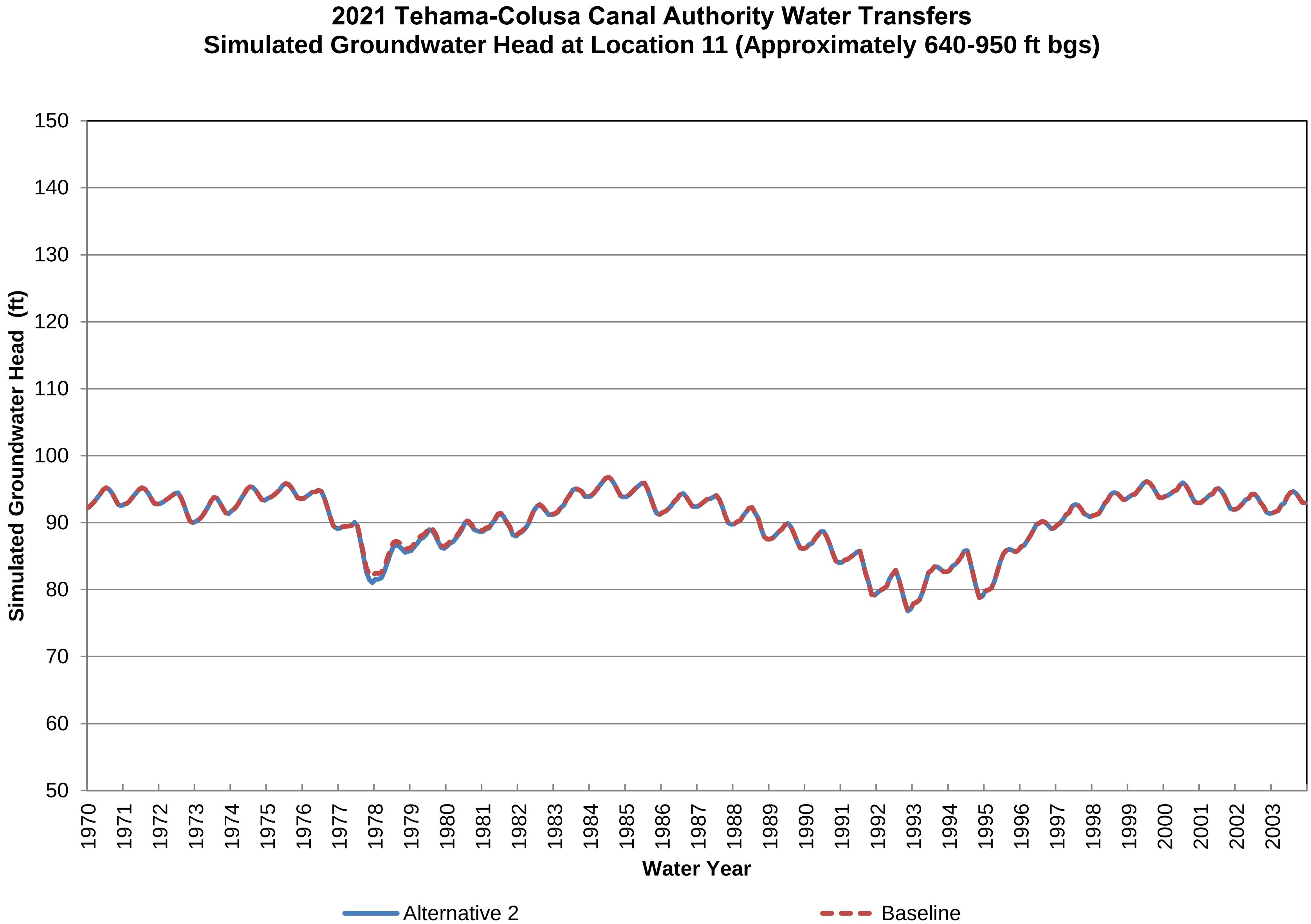
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 11 (Approximately 450-640 ft bgs)





2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 11 (Approximately 640-950 ft bgs)
Simulated Groundwater Head (ft)
150
140
130
120
110
100
90
80
70
60
50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
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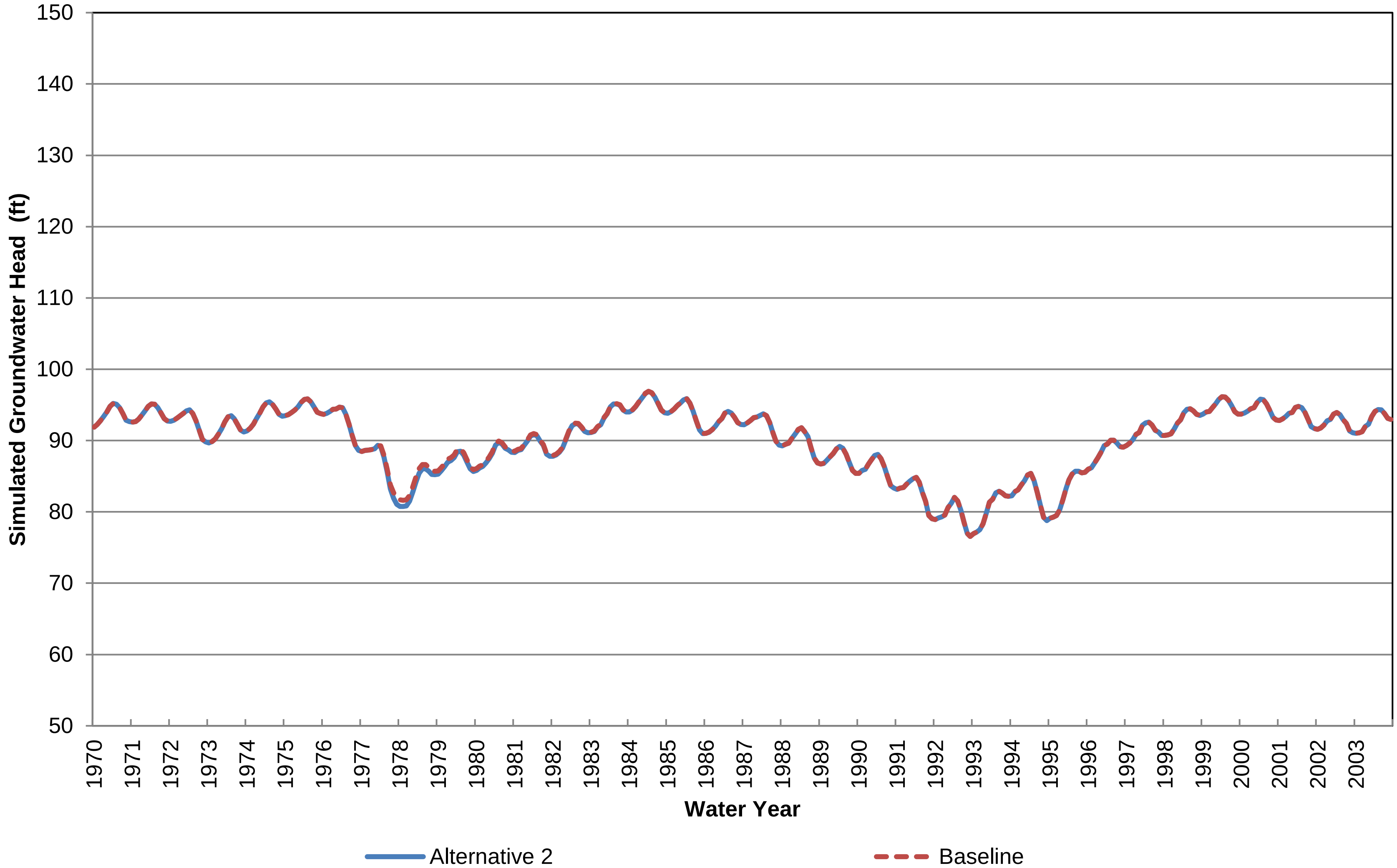
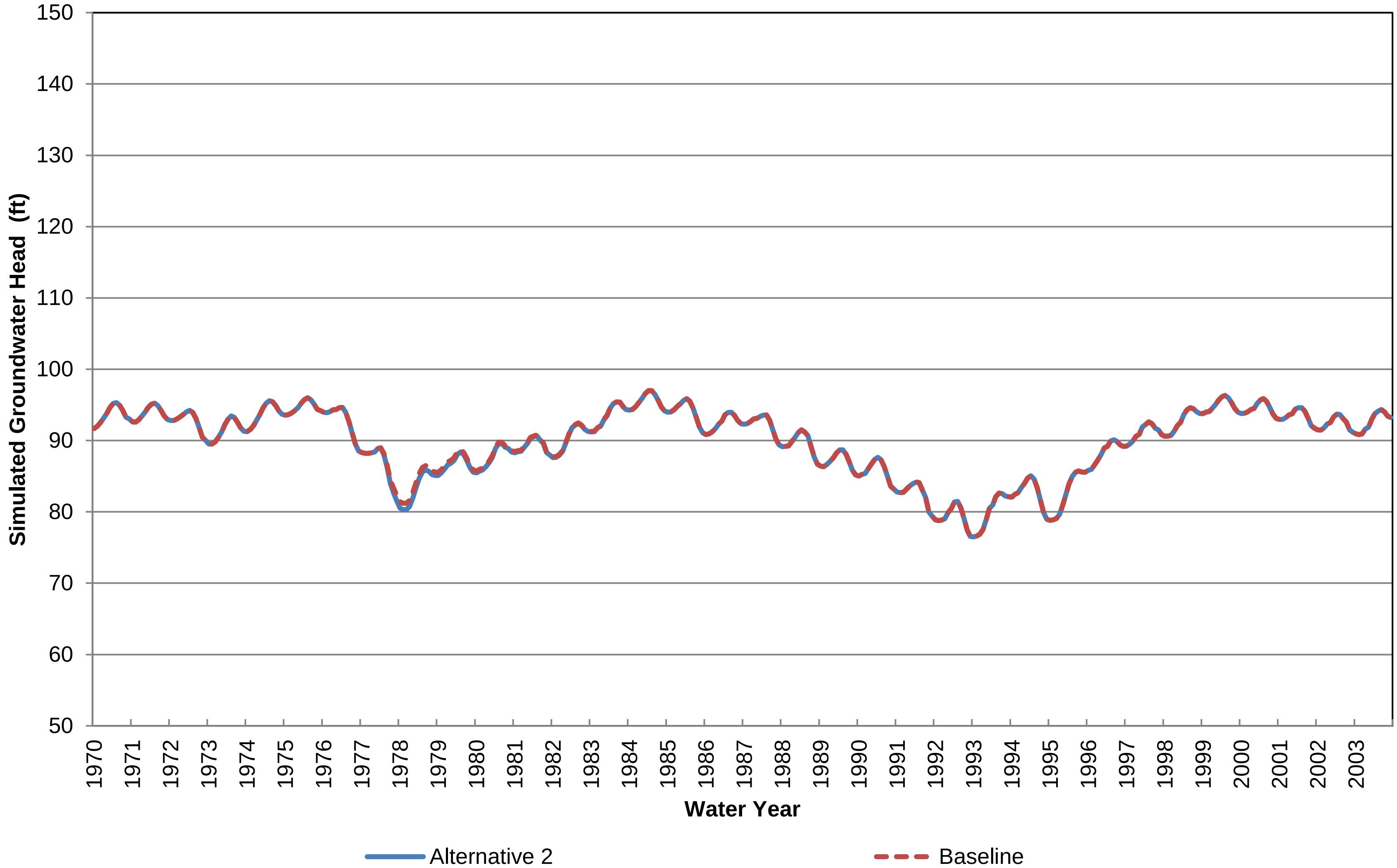
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

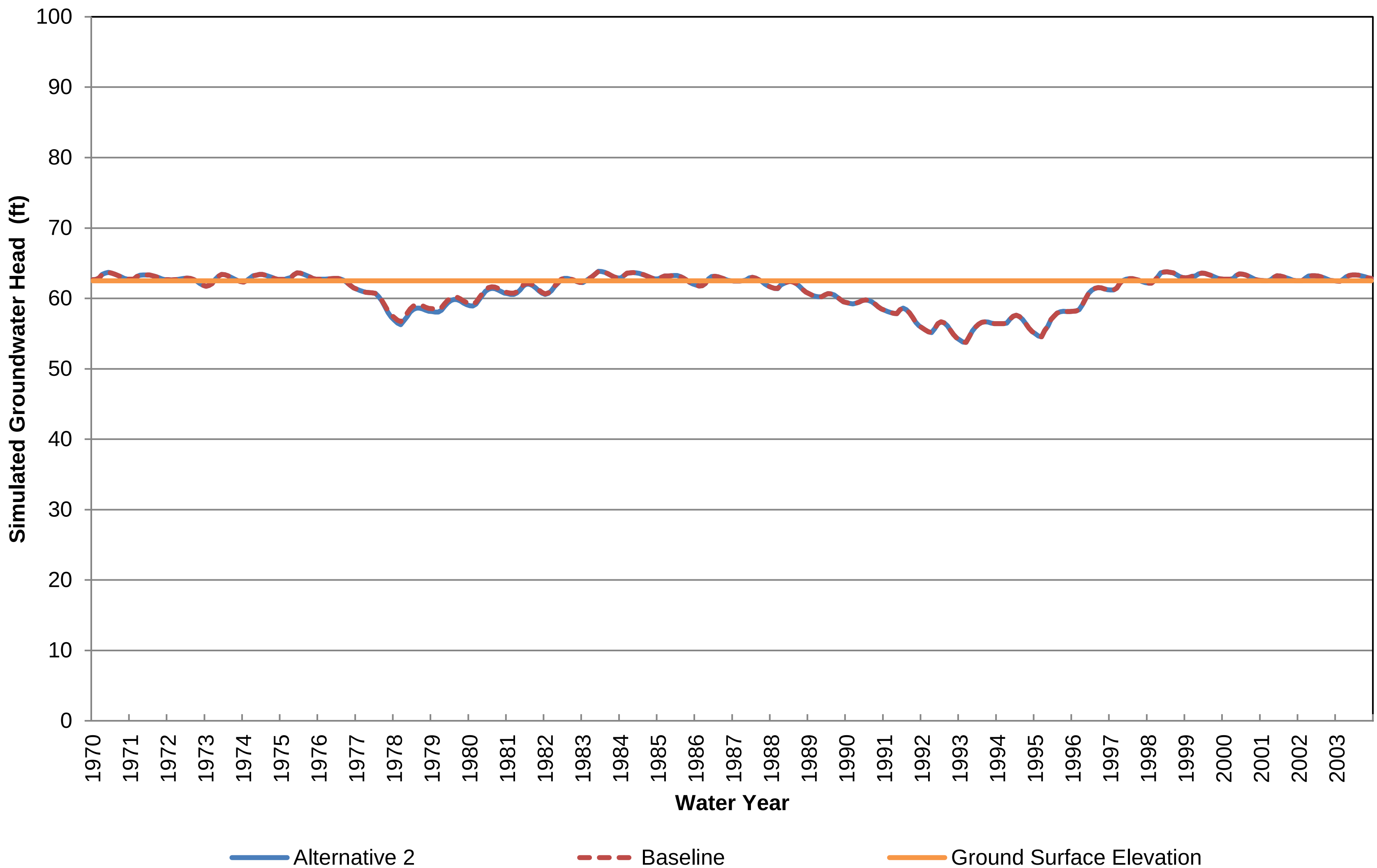
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 11 (Approximately 950-1260 ft bgs)

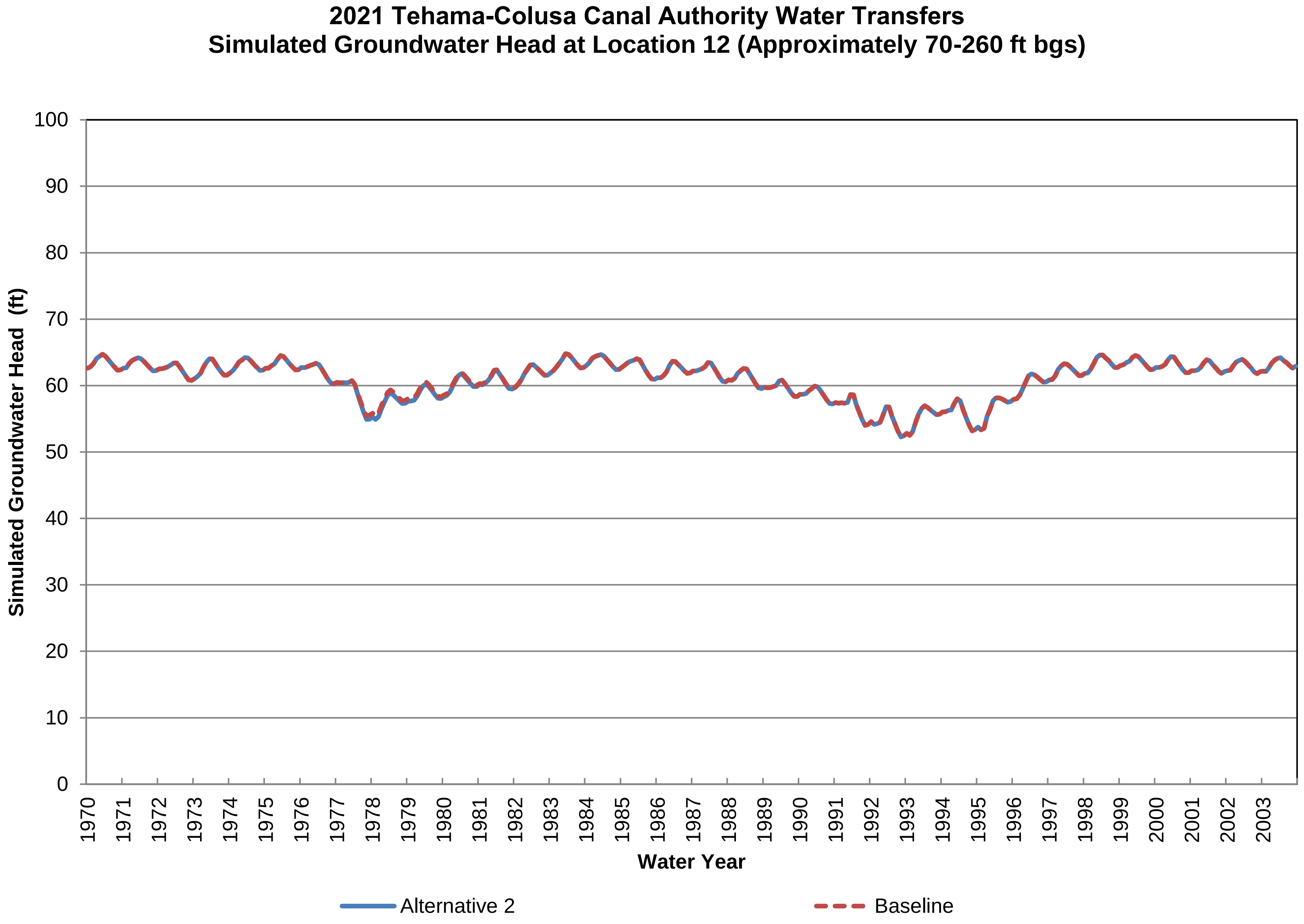


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 11 (Approximately 1260-1740 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 12 (Approximately 0-70 ft bgs)





2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 12 (Approximately 70-260 ft bgs)
Simulated Groundwater Head (ft)
100
90
80
70
60
50
40
30
20
10
0
1970
1971
1972
1973
1974
1975
1976
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1979
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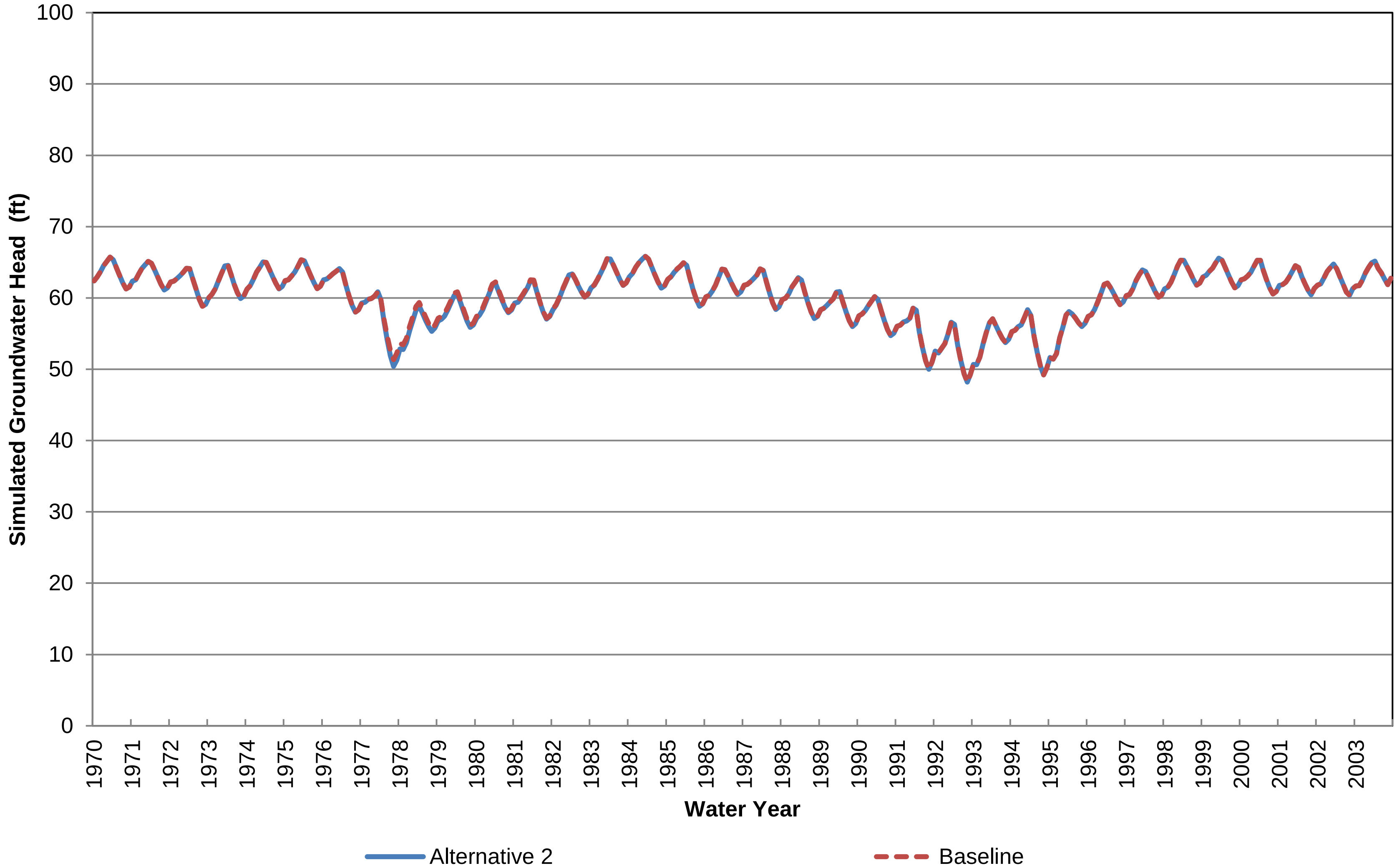
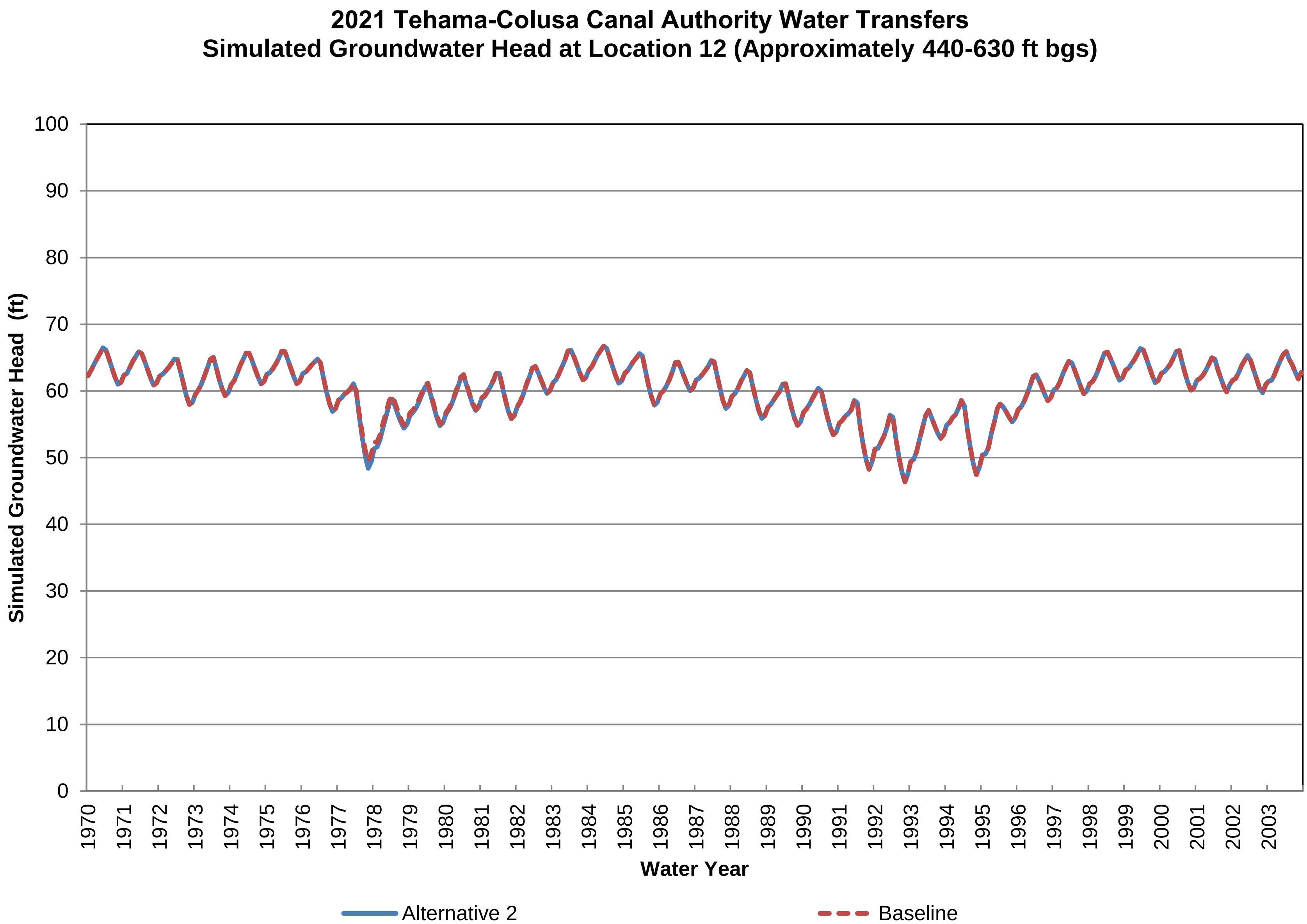
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 12 (Approximately 260-440 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 12 (Approximately 440-630 ft bgs)
Simulated Groundwater Head (ft)
100
90
80
70
60
50
40
30
20
10
0
1970
1971
1972
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1975
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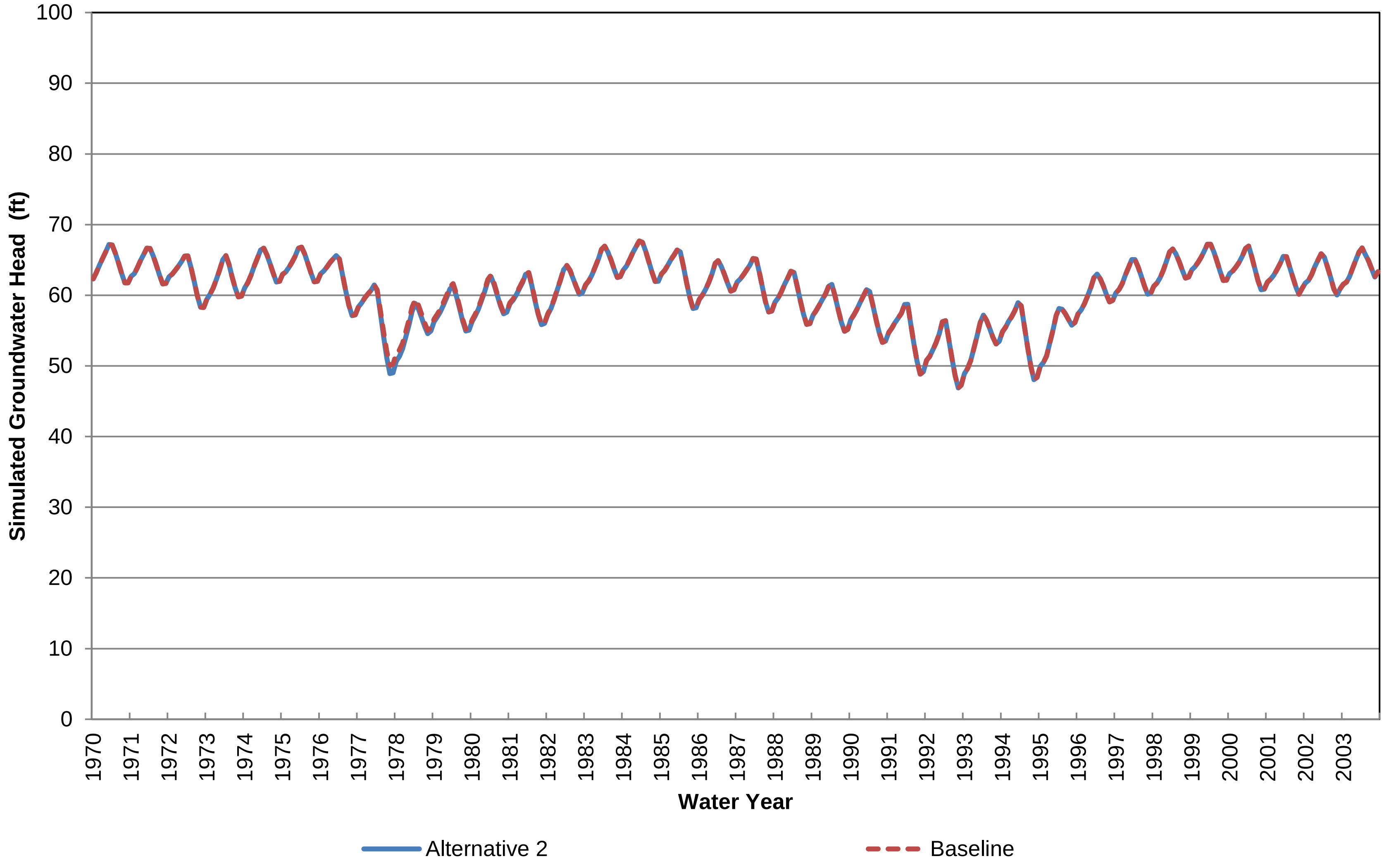
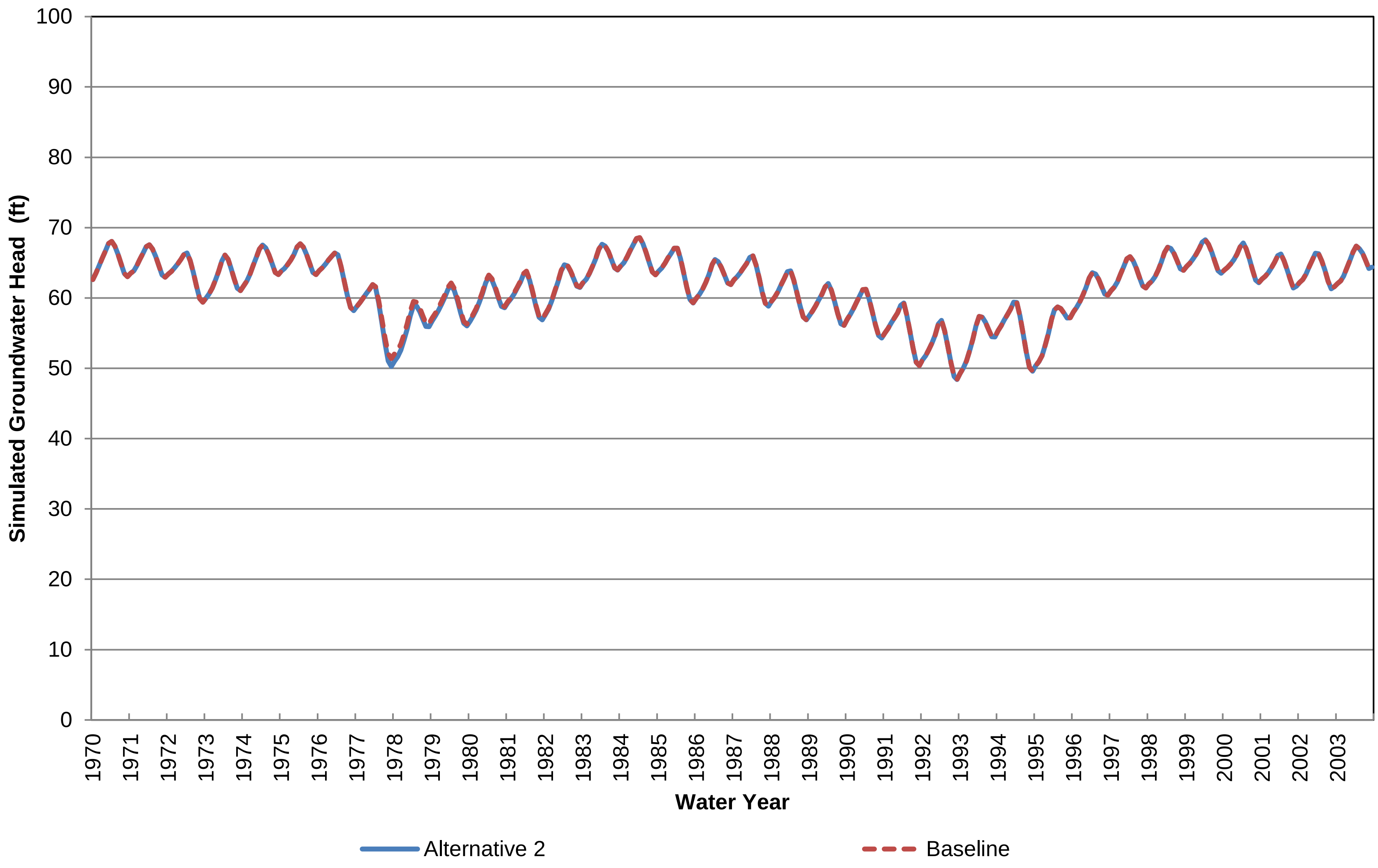
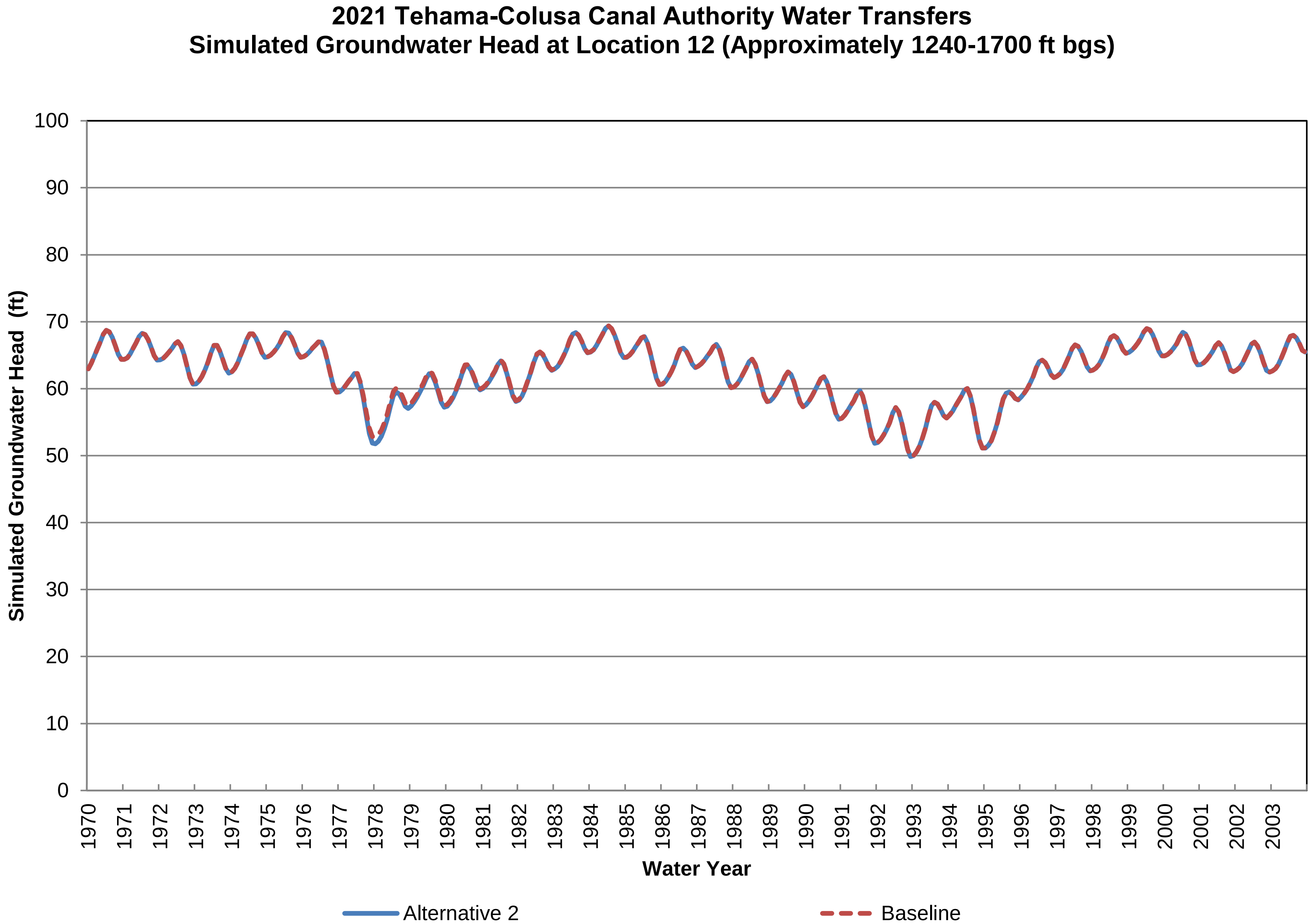
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 12 (Approximately 630-930 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 12 (Approximately 930-1240 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 12 (Approximately 1240-1700 ft bgs)
Simulated Groundwater Head (ft)
100
90
80
70
60
50
40
30
20
10
0
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
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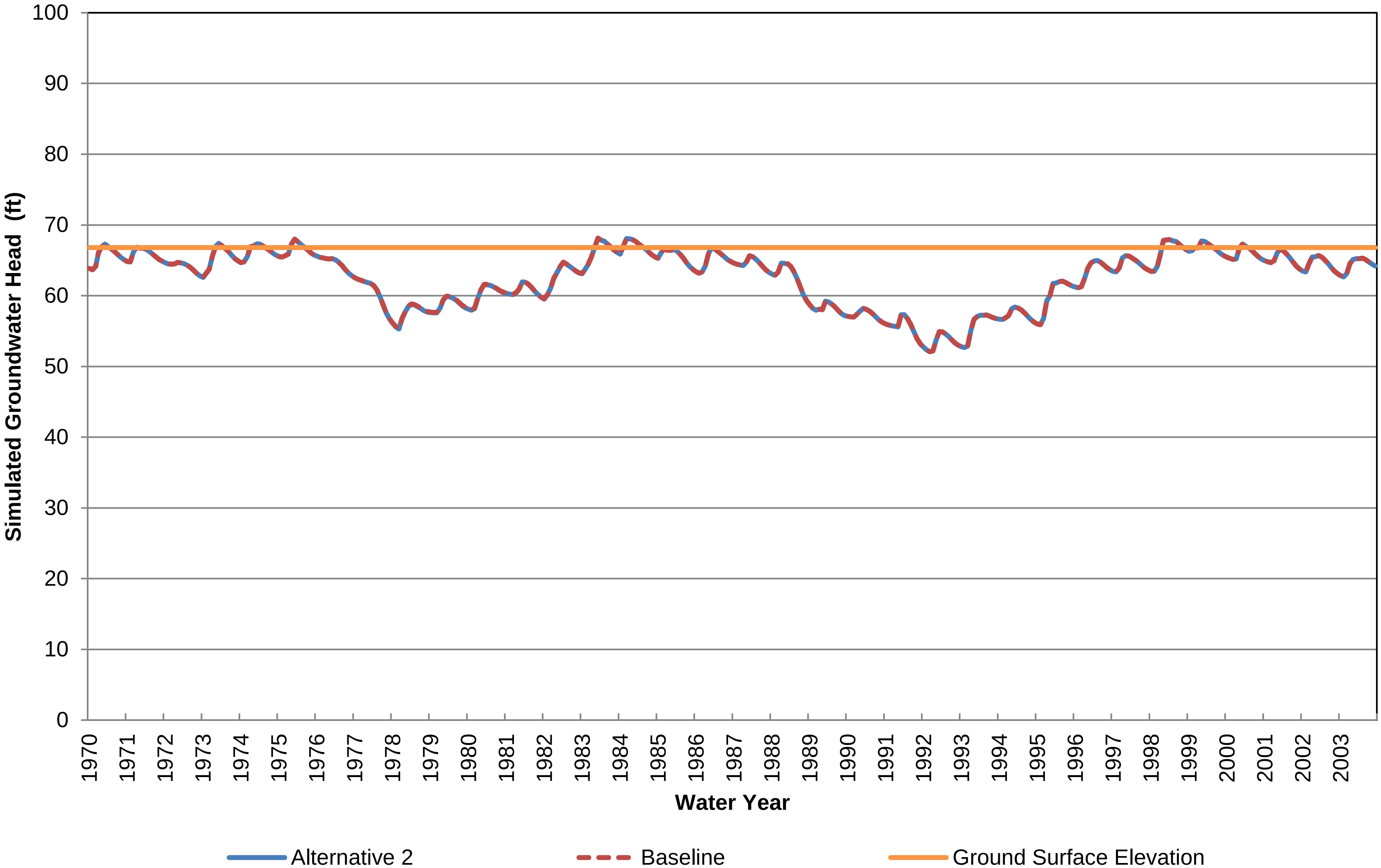
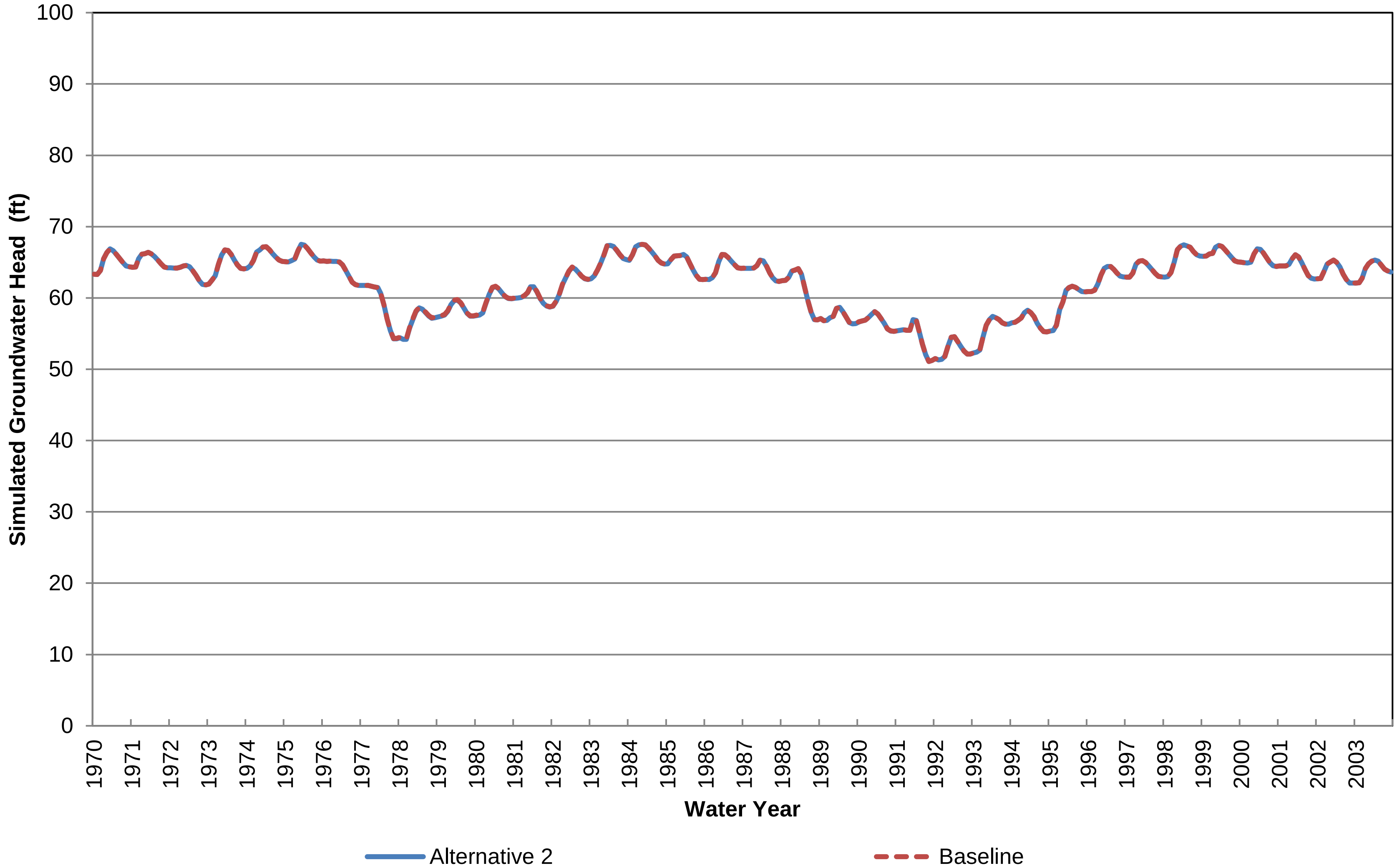
2002
2003
Water Year
Alternative 2
Baseline

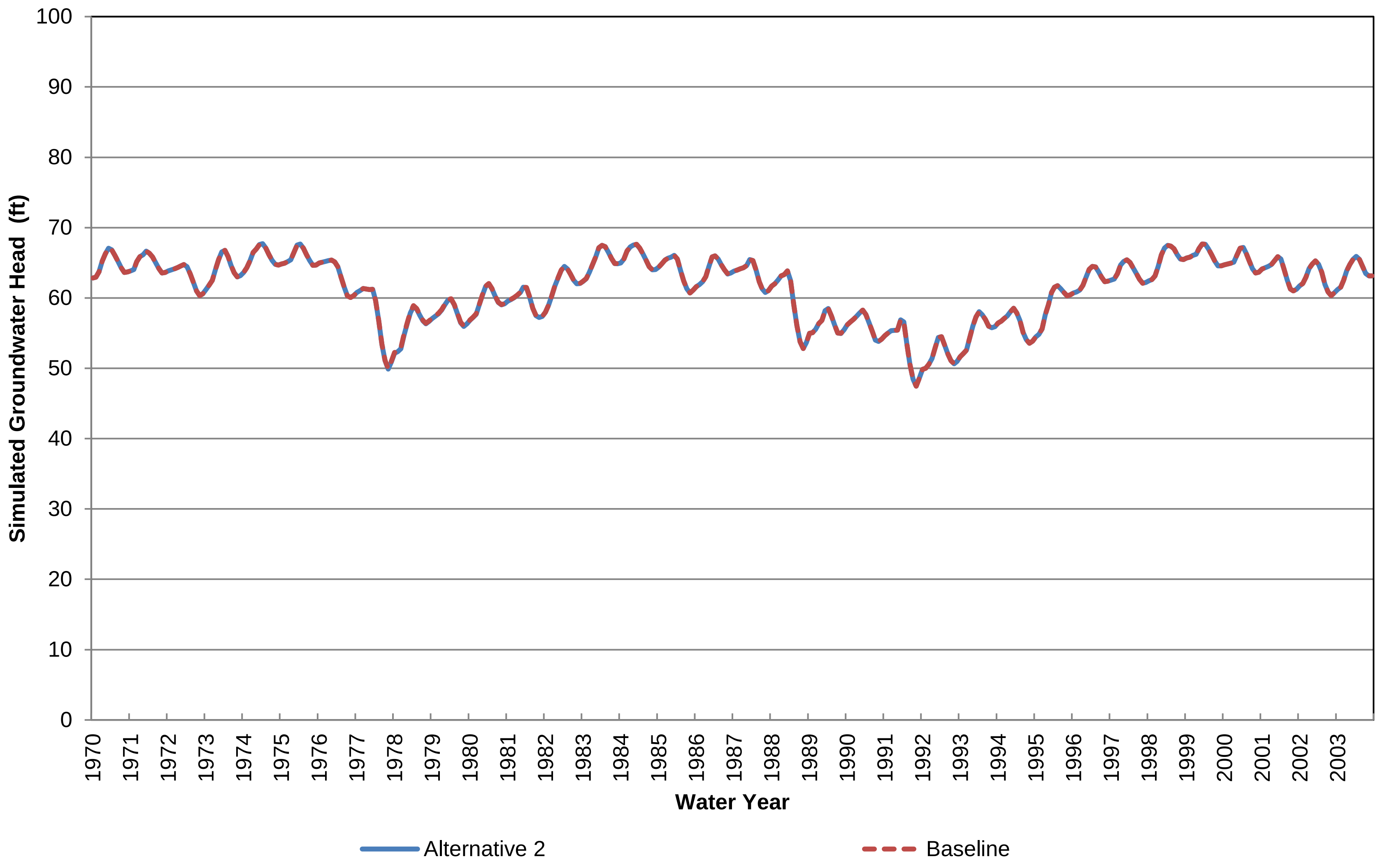
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 13 (Approximately 0-70 ft bgs)



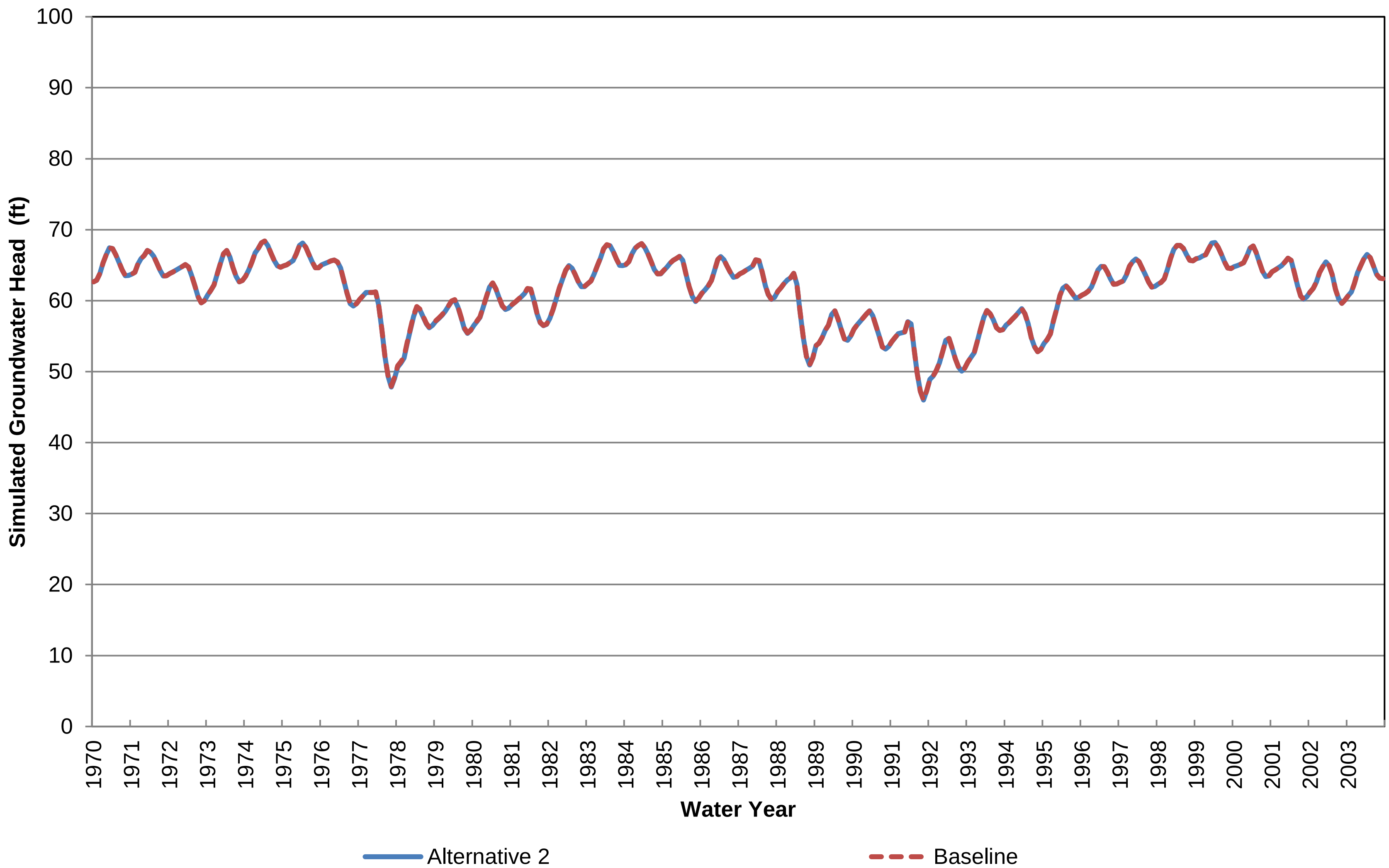
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 13 (Approximately 70-210 ft bgs)

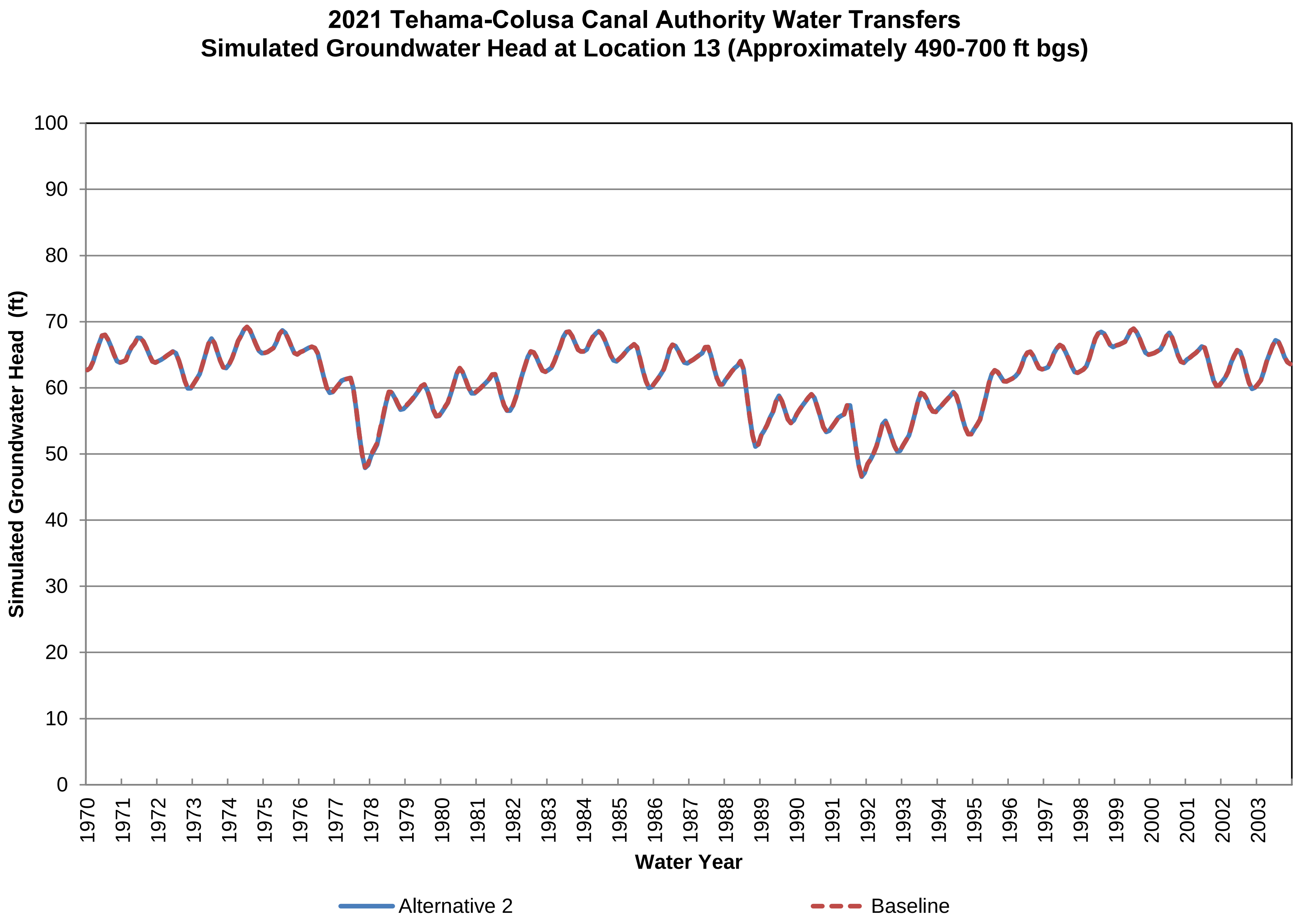


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 13 (Approximately 210-350 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 13 (Approximately 350-490 ft bgs)





2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 13 (Approximately 490-700 ft bgs)
Simulated Groundwater Head (ft)
0
10
20
30
40
50
60
70
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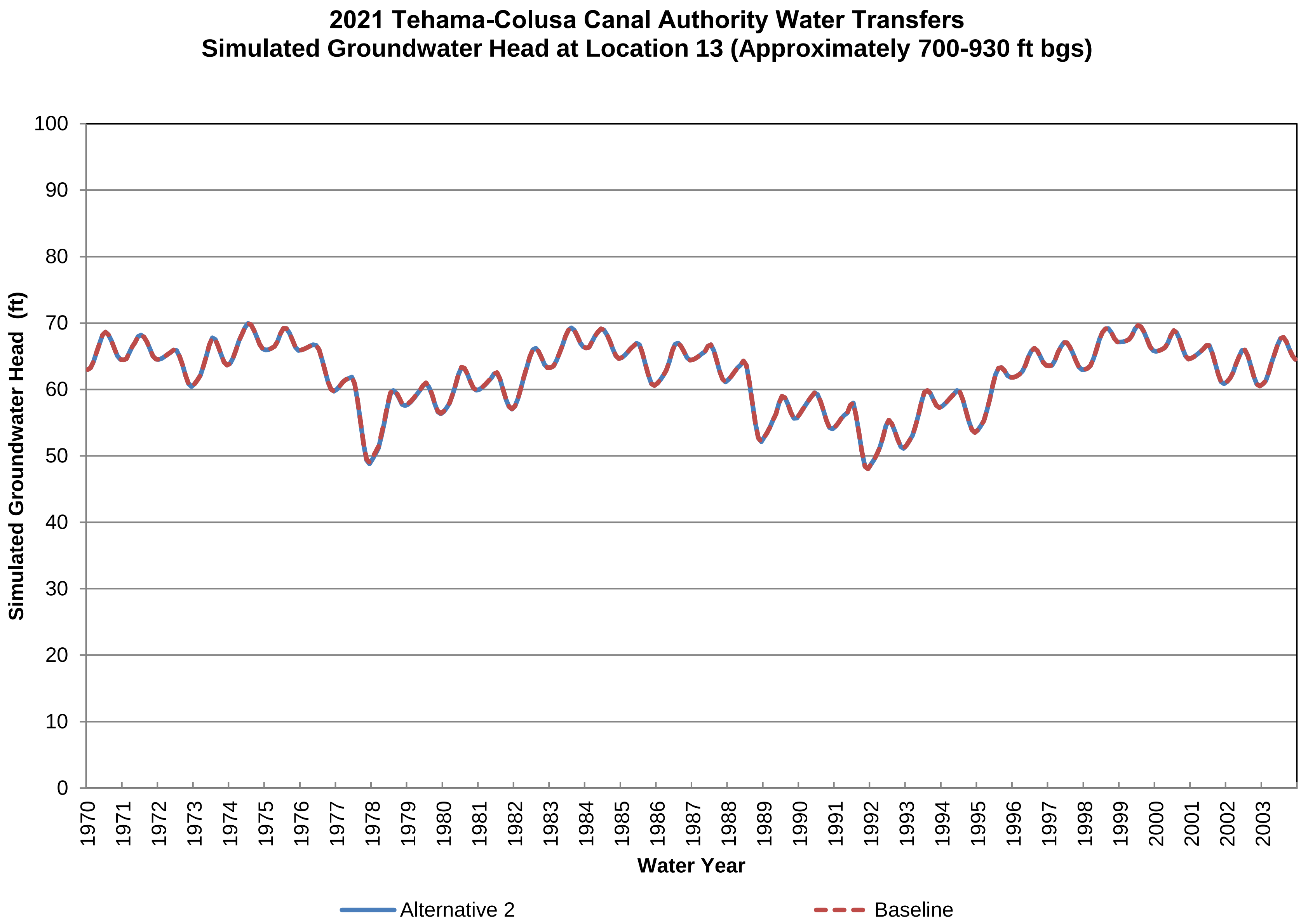
2003
Water Year
Alternative 2
Baseline


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 13 (Approximately 700-930 ft bgs)
Simulated Groundwater Head (ft)
Water Year
0
10
20
30
40
50
60
70
80
90
100
1970
1971
1972
1973
1974
1975
1976
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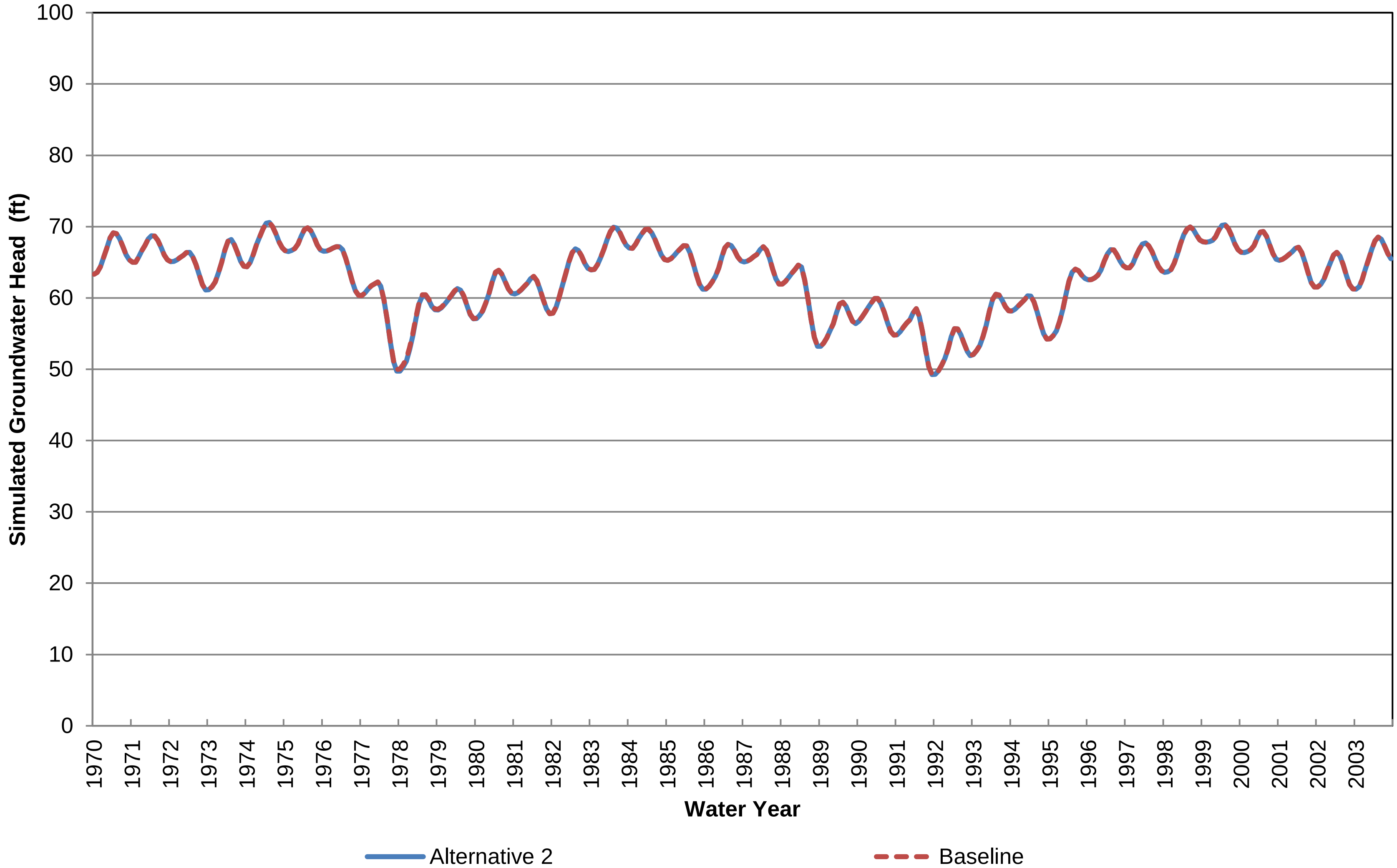
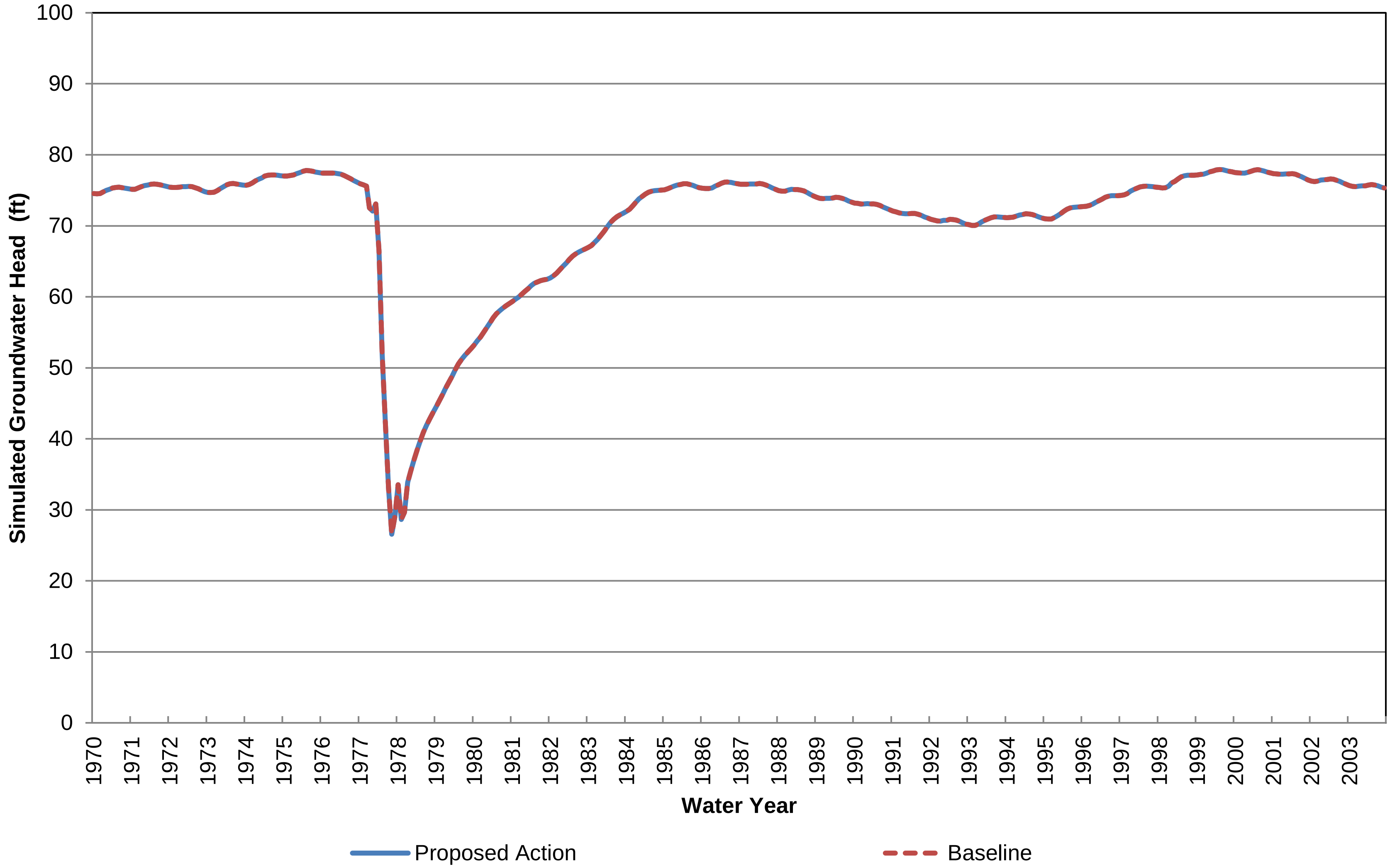
2002
2003
Alternative 2
Baseline

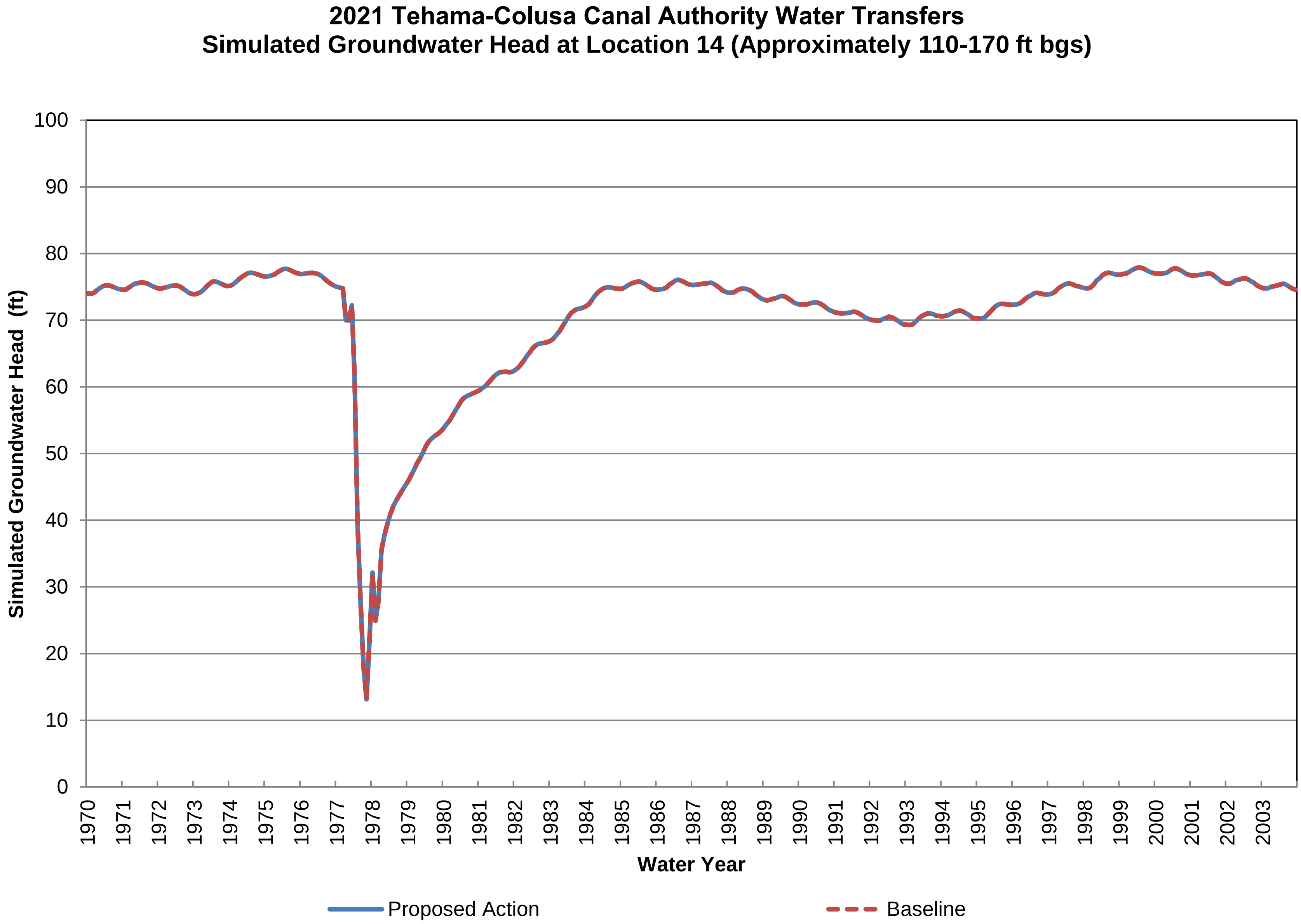
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 13 (Approximately 930-1280 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 14 (Approximately 0-40 ft bgs)

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 14 (Approximately 40-110 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 14 (Approximately 110-170 ft bgs)
Simulated Groundwater Head (ft)
0
10
20
30
40
50
60
70
80
90
100
1970
1971
1972
1973
1974
1975
1976
1977
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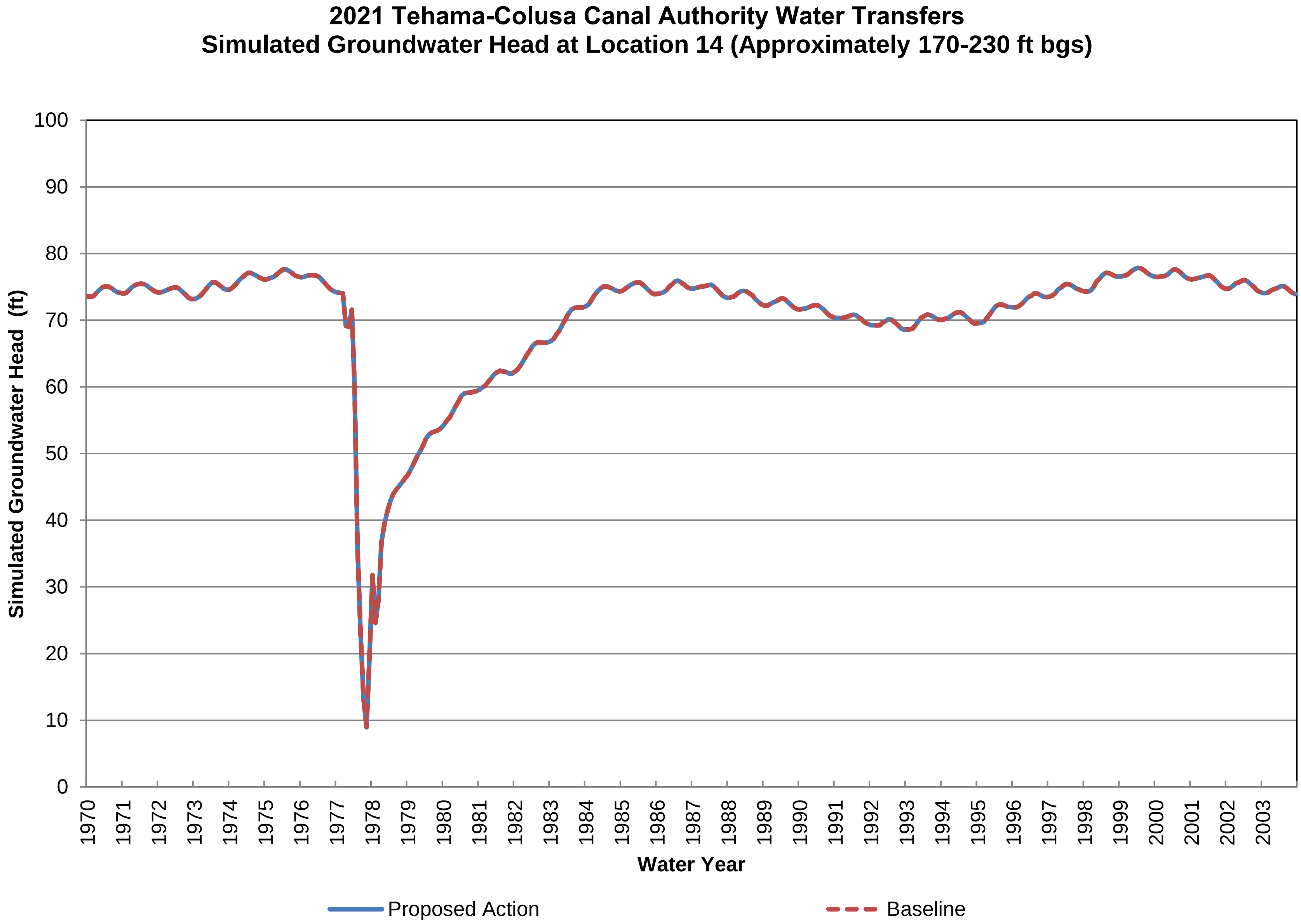
2002
2003
Water Year
Proposed Action
Baseline



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 14 (Approximately 170-230 ft bgs)
Simulated Groundwater Head (ft)
0
10
20
30
40
50
60
70
80
90
100
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
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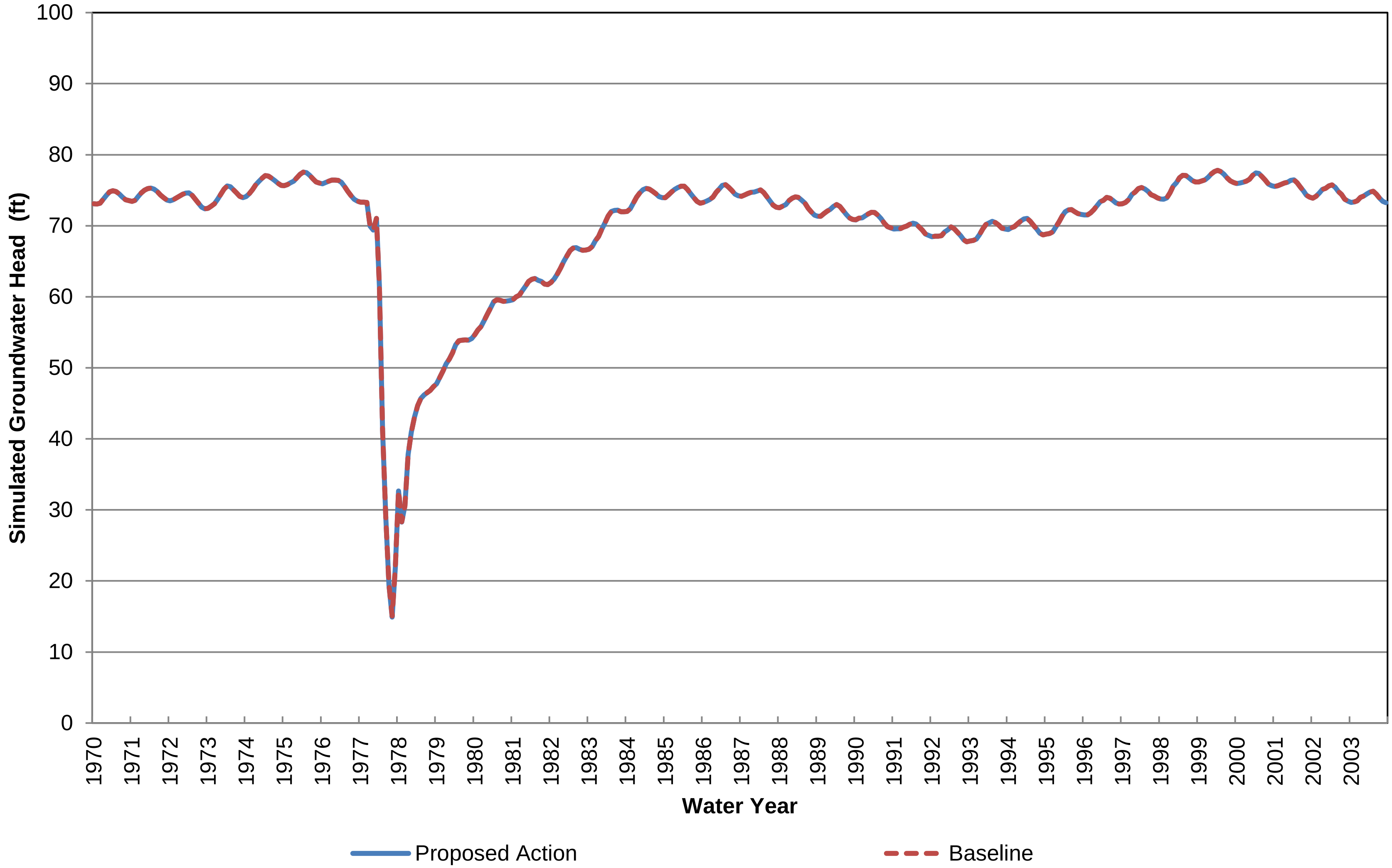
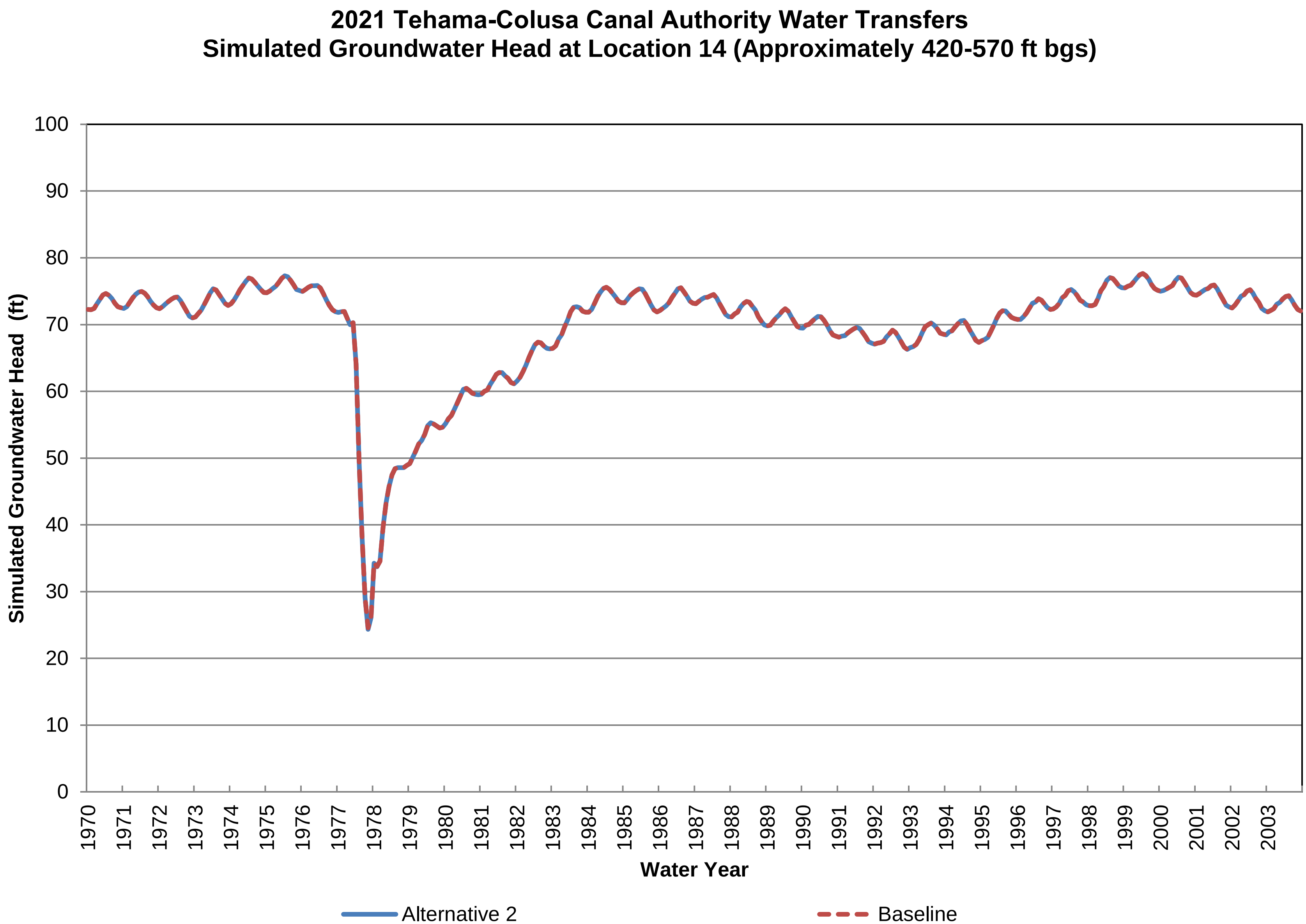
2001
2002
2003
Water Year
Proposed Action
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 14 (Approximately 230-310 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 14 (Approximately 310-420 ft bgs)


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 14 (Approximately 420-570 ft bgs)
Simulated Groundwater Head (ft)
100
90
80
70
60
50
40
30
20
10
0
1970
1971
1972
1973
1974
1975
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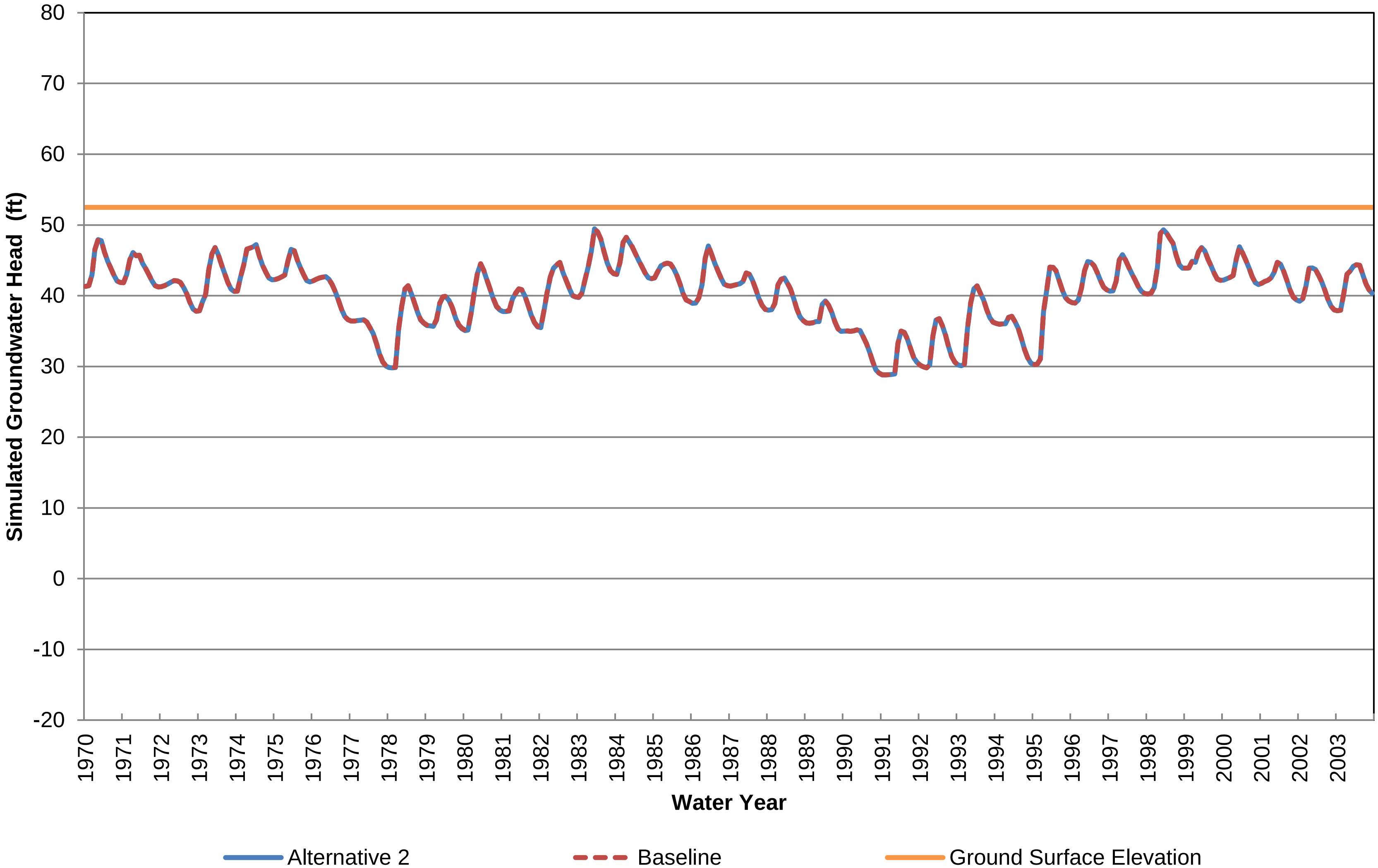
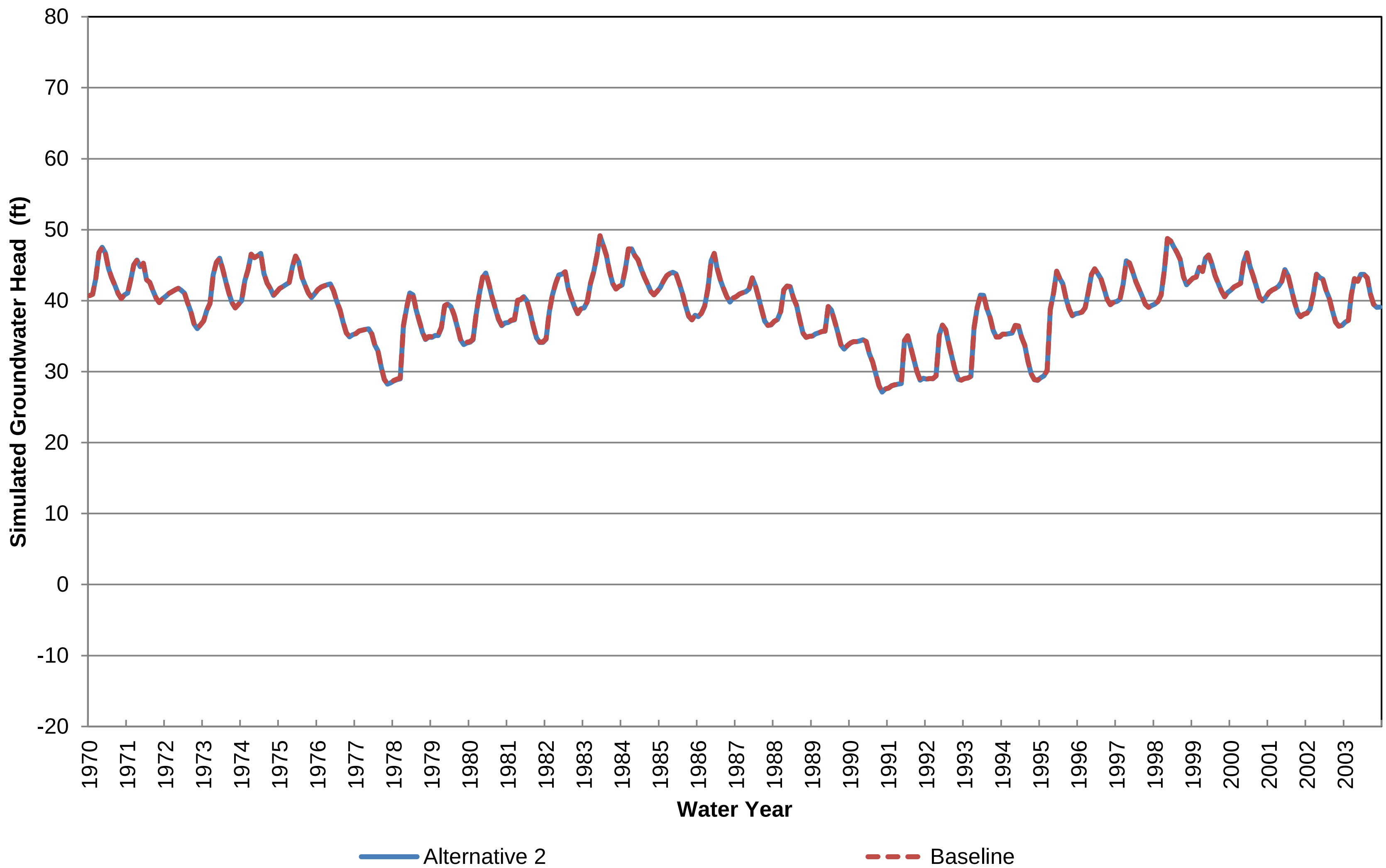
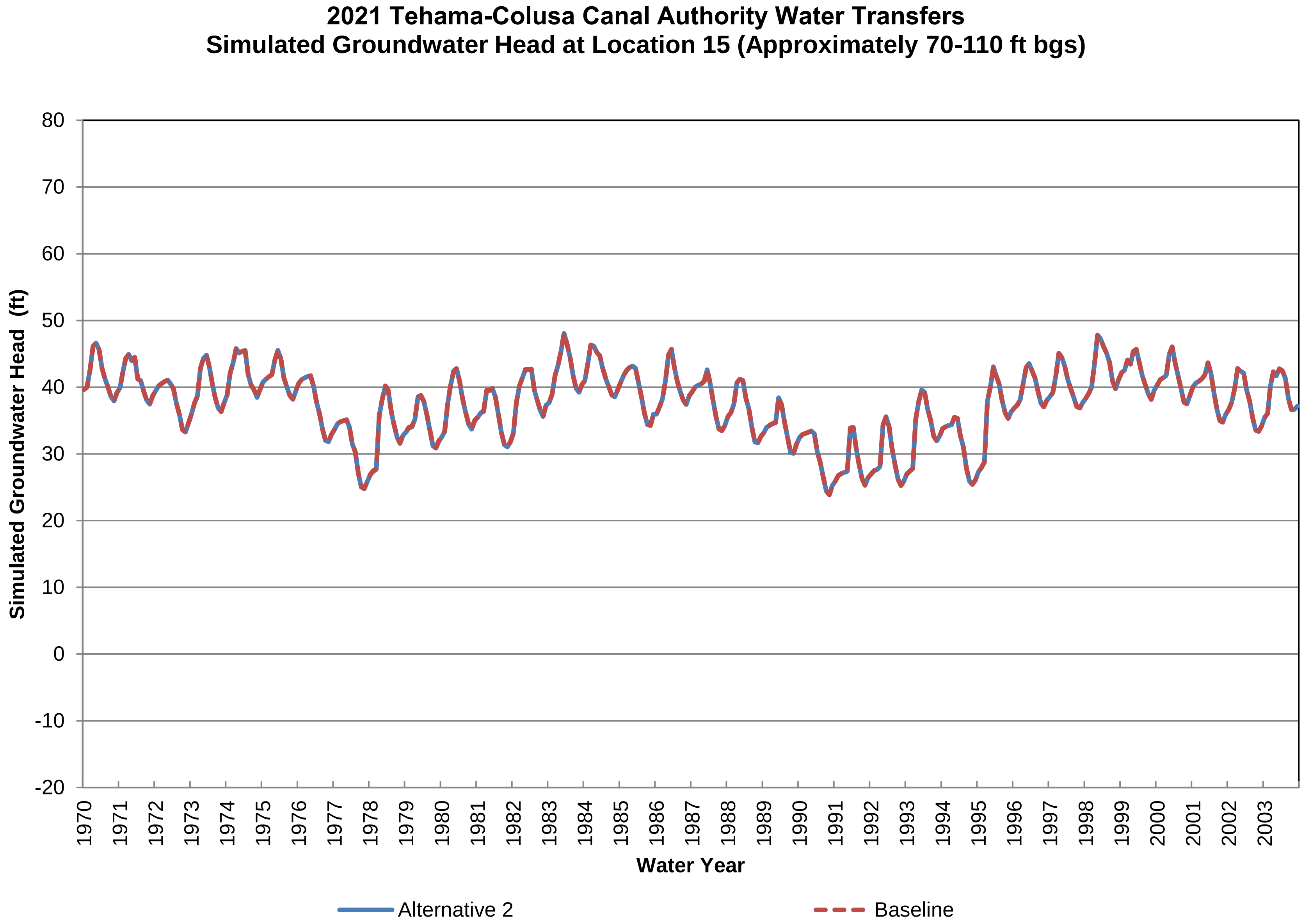
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 15 (Approximately 0-30 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 15 (Approximately 30-70 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 15 (Approximately 70-110 ft bgs)
Simulated Groundwater Head (ft)
80
70
60
50
40
30
20
10
0
-10
-20
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
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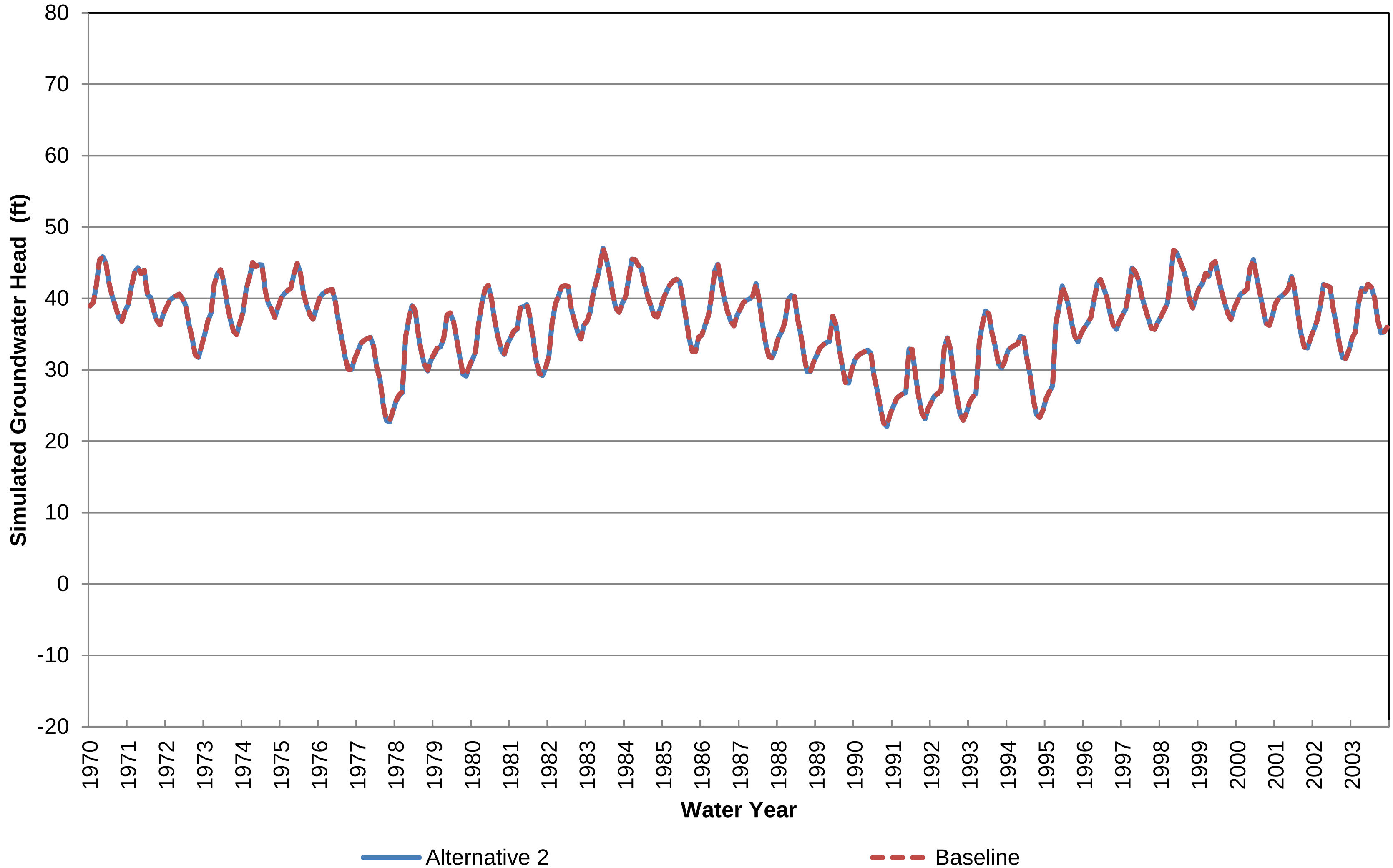
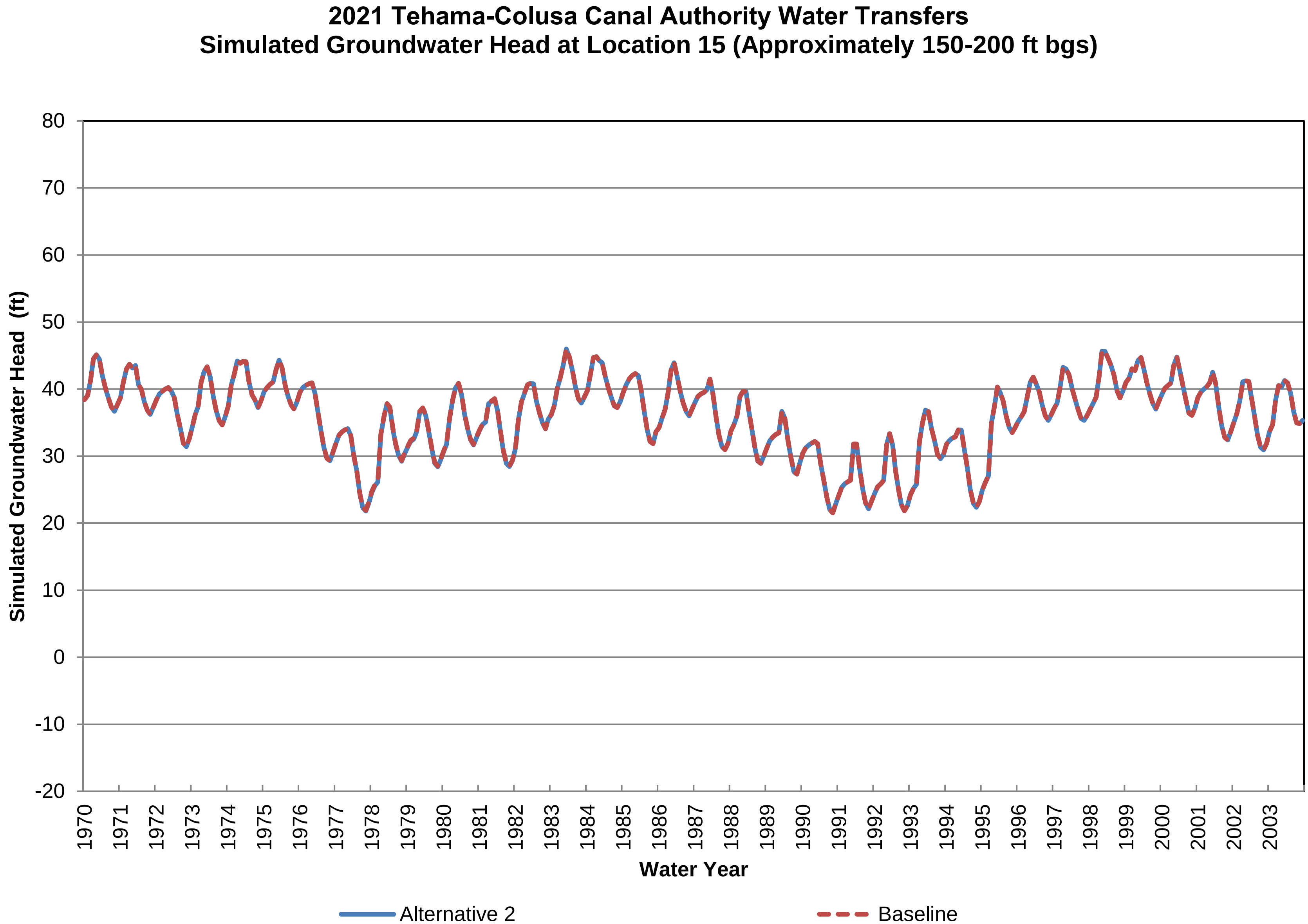
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 15 (Approximately 110-150 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 15 (Approximately 150-200 ft bgs)
Simulated Groundwater Head (ft)
80
70
60
50
40
30
20
10
0
-10
-20
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
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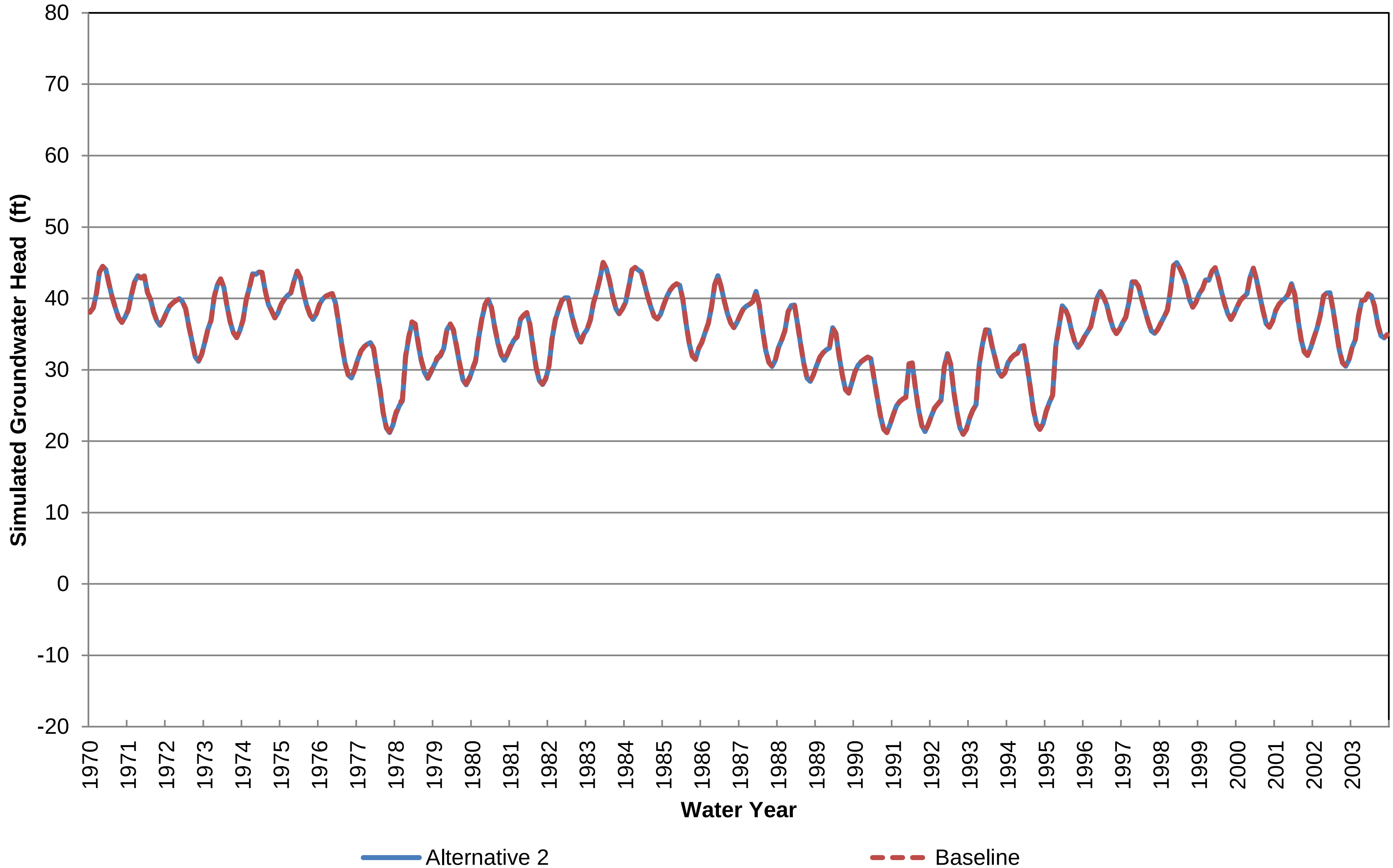
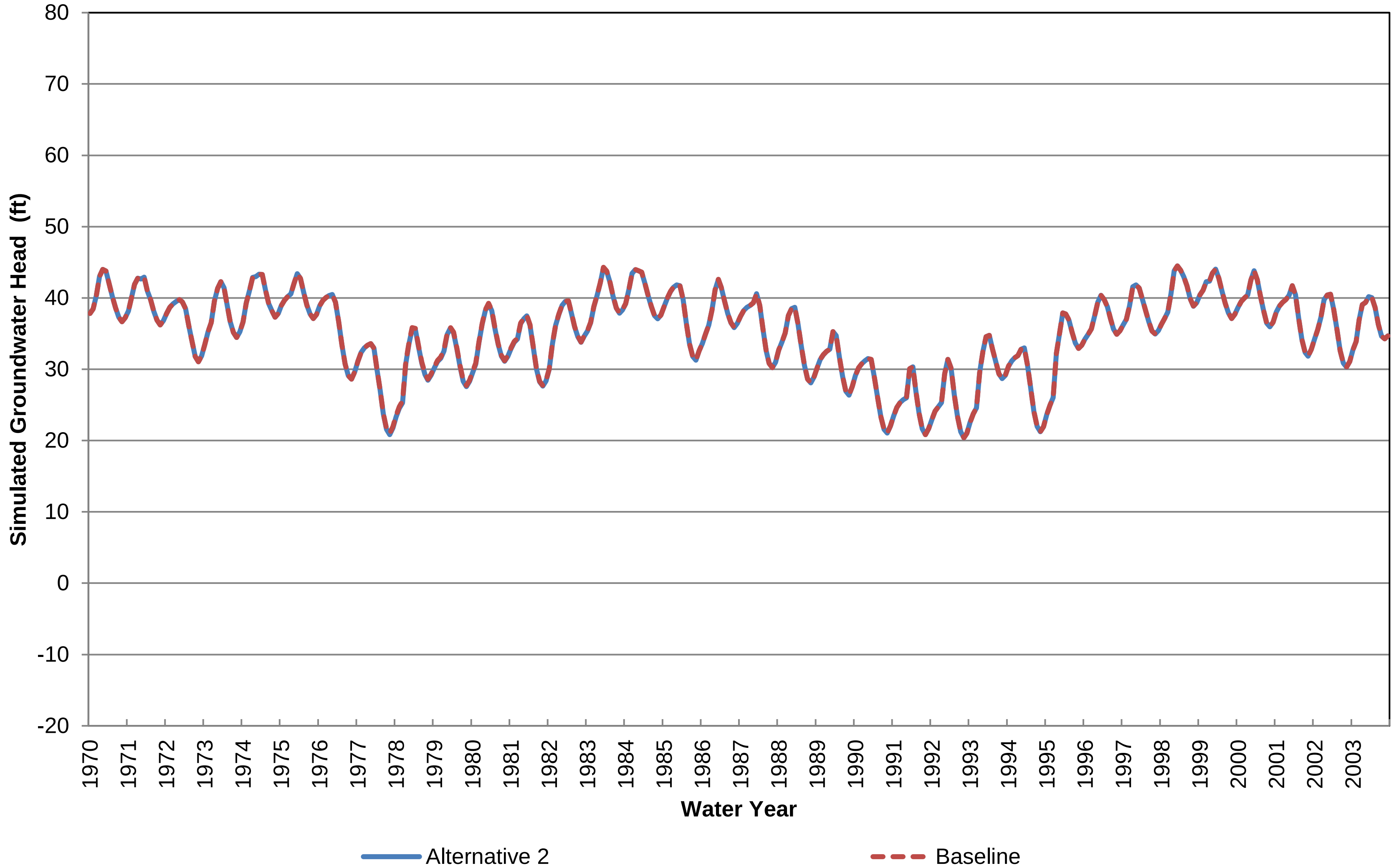
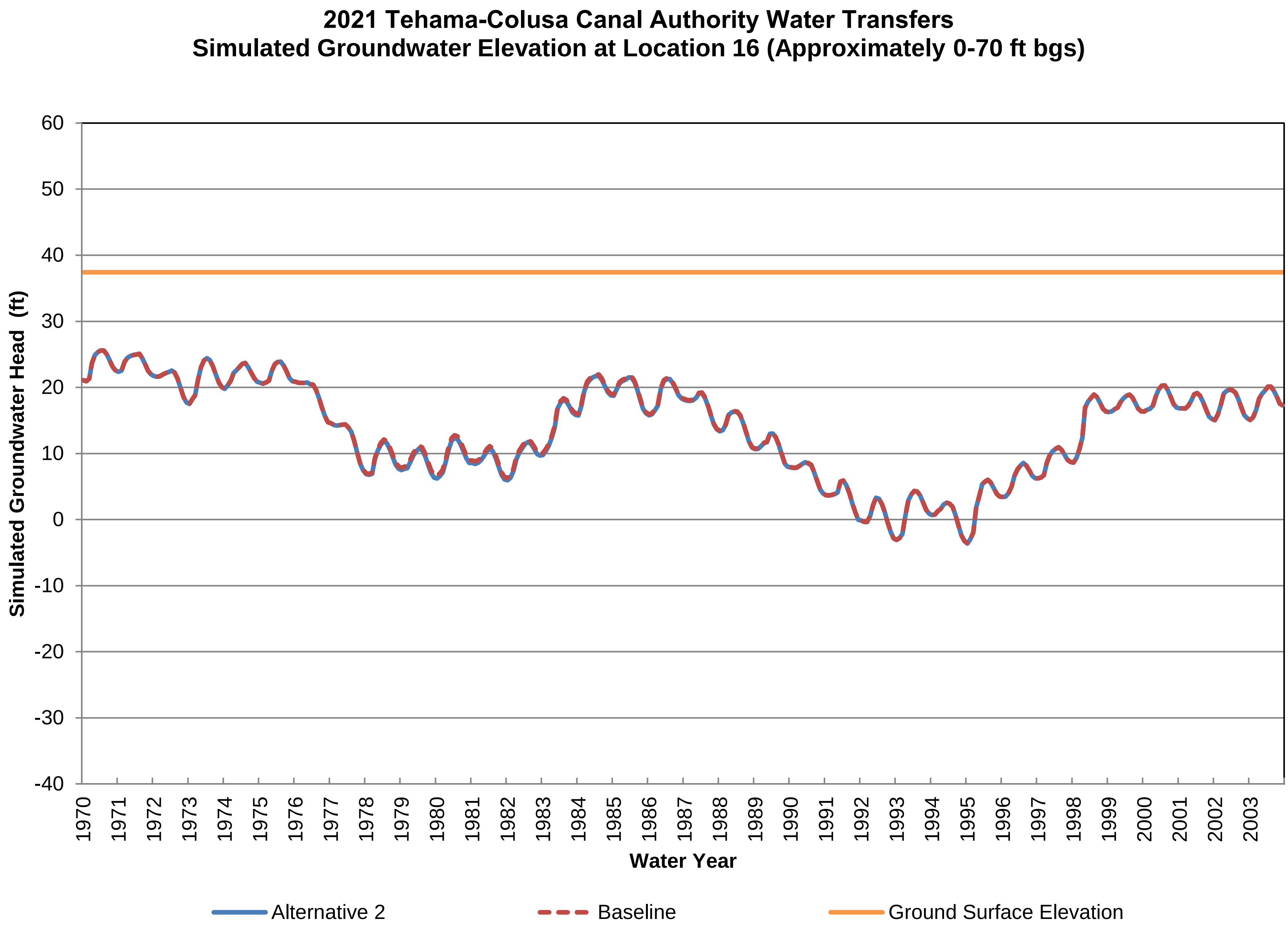
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 15 (Approximately 200-270 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 15 (Approximately 270-360 ft bgs)





2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 16 (Approximately 0-70 ft bgs)
Simulated Groundwater Head (ft)
60
50
40
30
20
10
0
-10
-20
-30
-40
1970
1971
1972
1973
1974
1975
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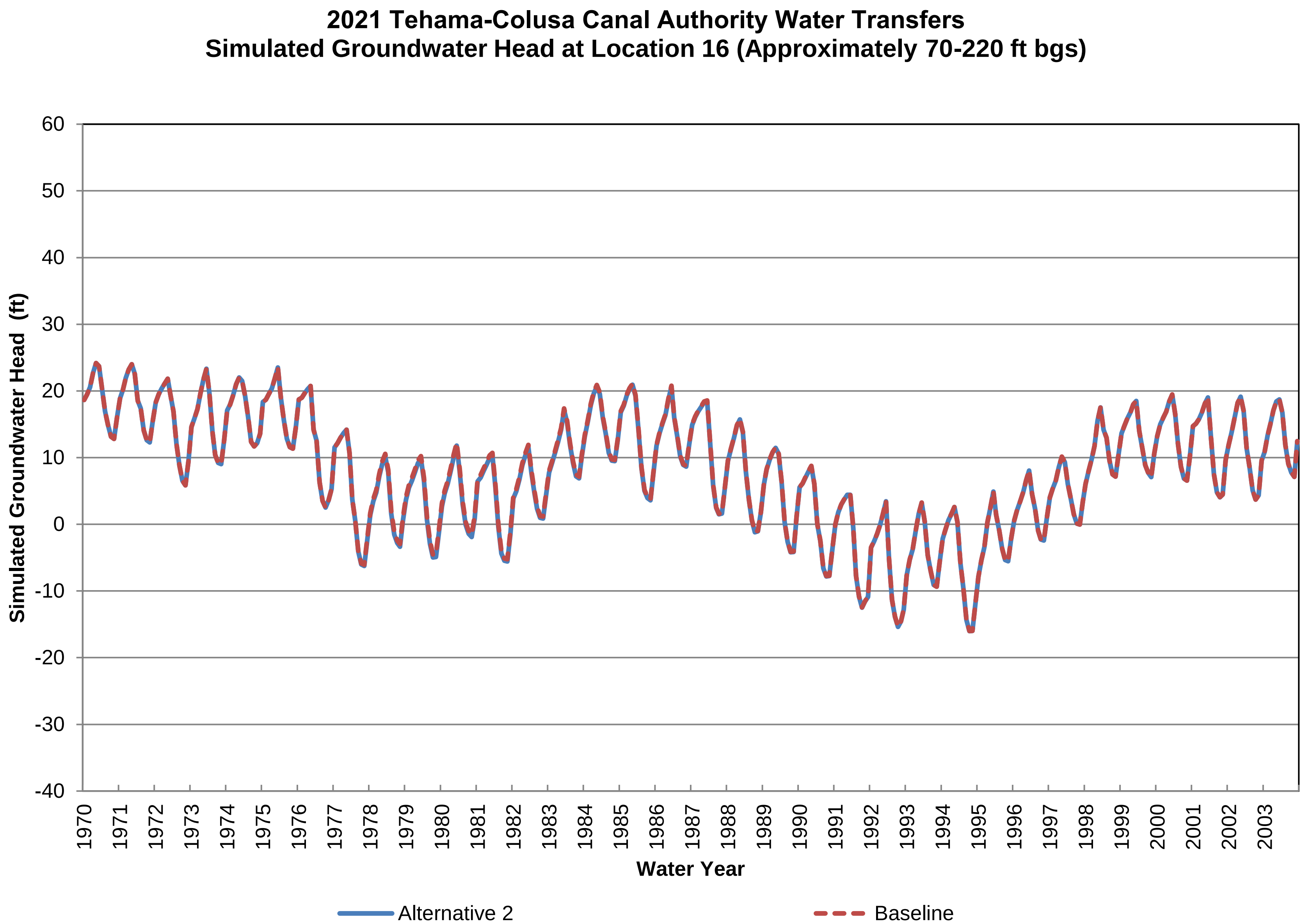
2003
Water Year
Alternative 2
Baseline
Ground Surface Elevation


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 16 (Approximately 70-220 ft bgs)
Simulated Groundwater Head (ft)
60
50
40
30
20
10
0
-10
-20
-30
-40
1970
1971
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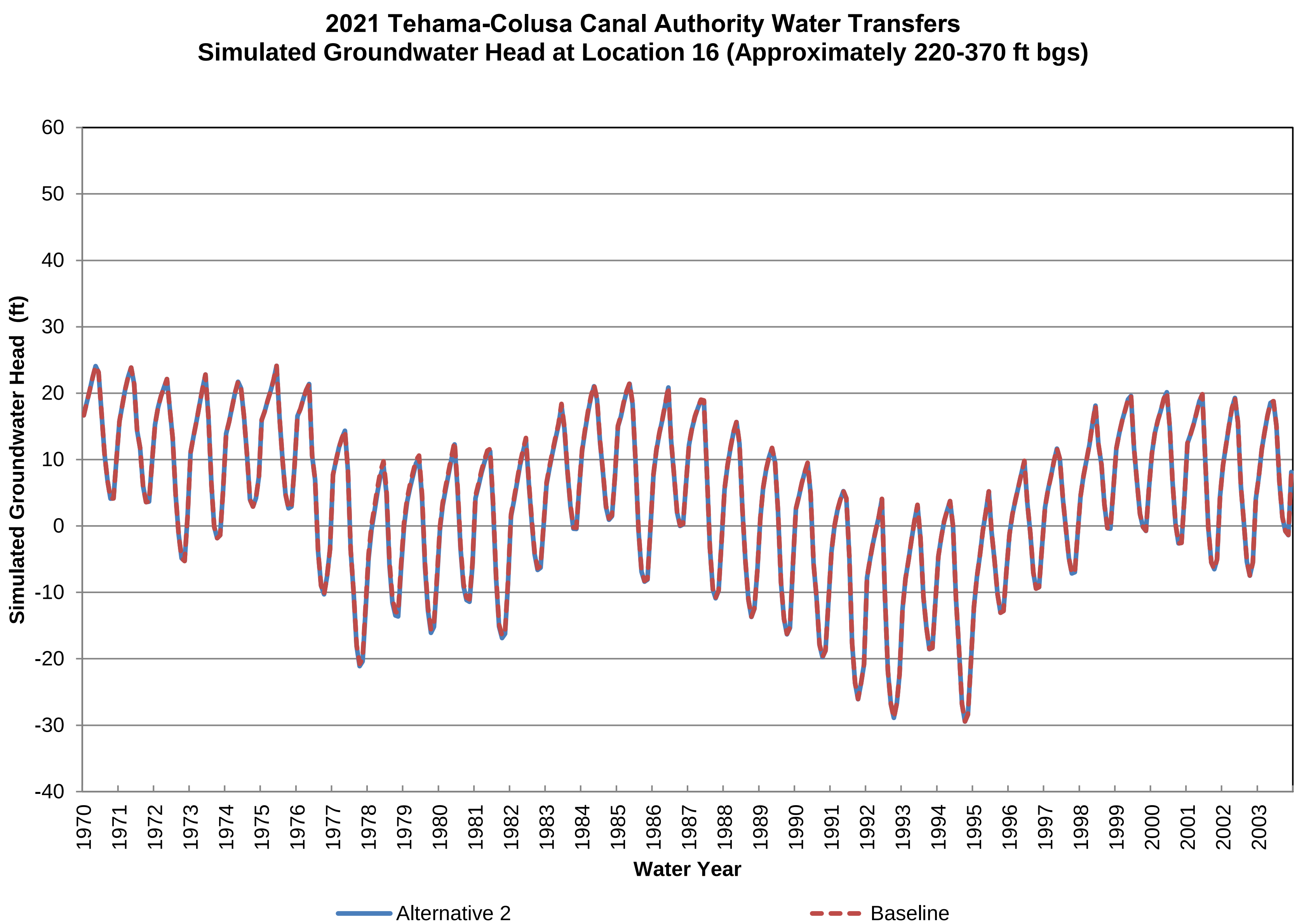
2002
2003
Water Year
Alternative 2
Baseline


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 16 (Approximately 220-370 ft bgs)
Simulated Groundwater Head (ft)
60
50
40
30
20
10
0
-10
-20
-30
-40
1970
1971
1972
1973
1974
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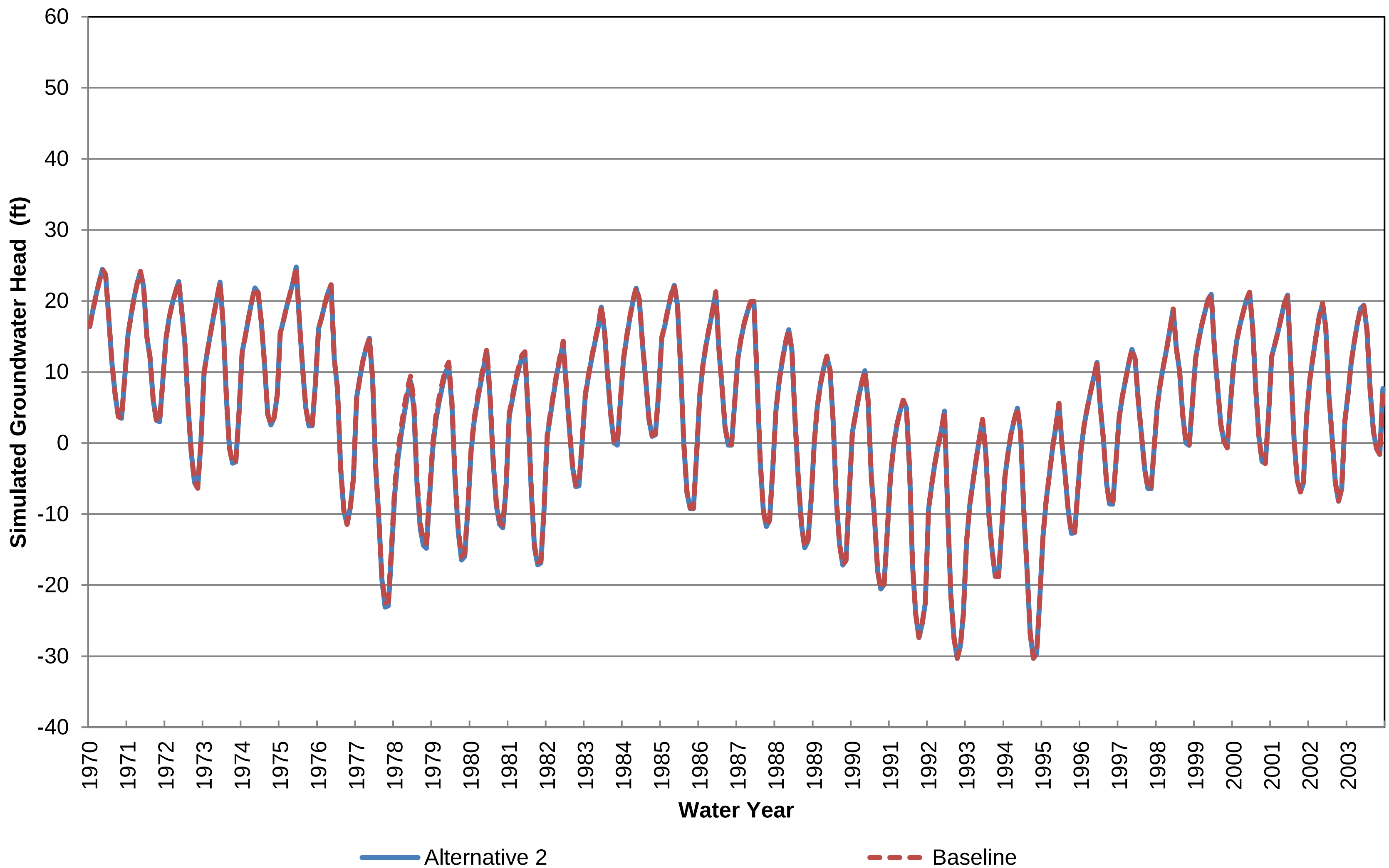
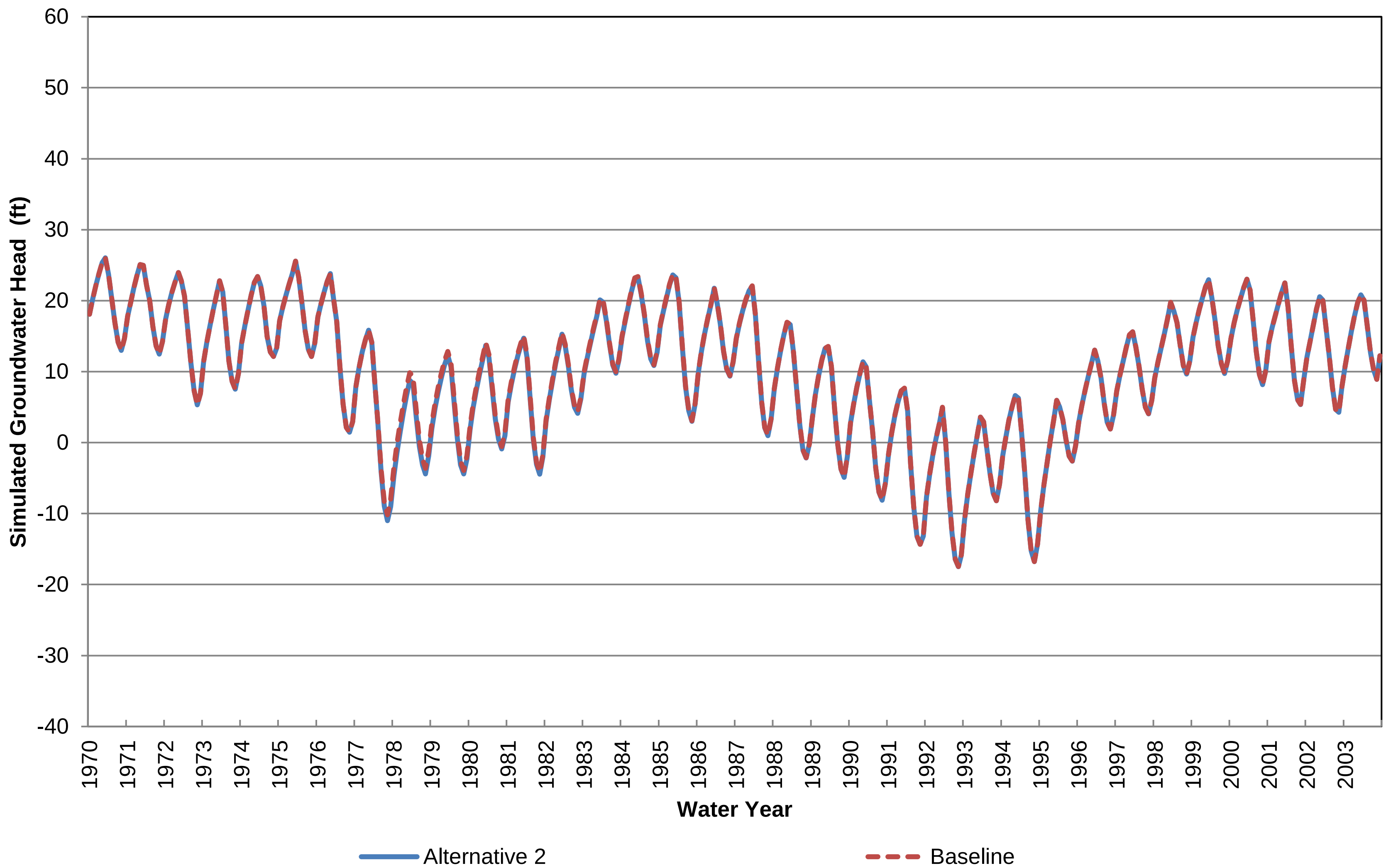
2002
2003
Water Year
Alternative 2
Baseline

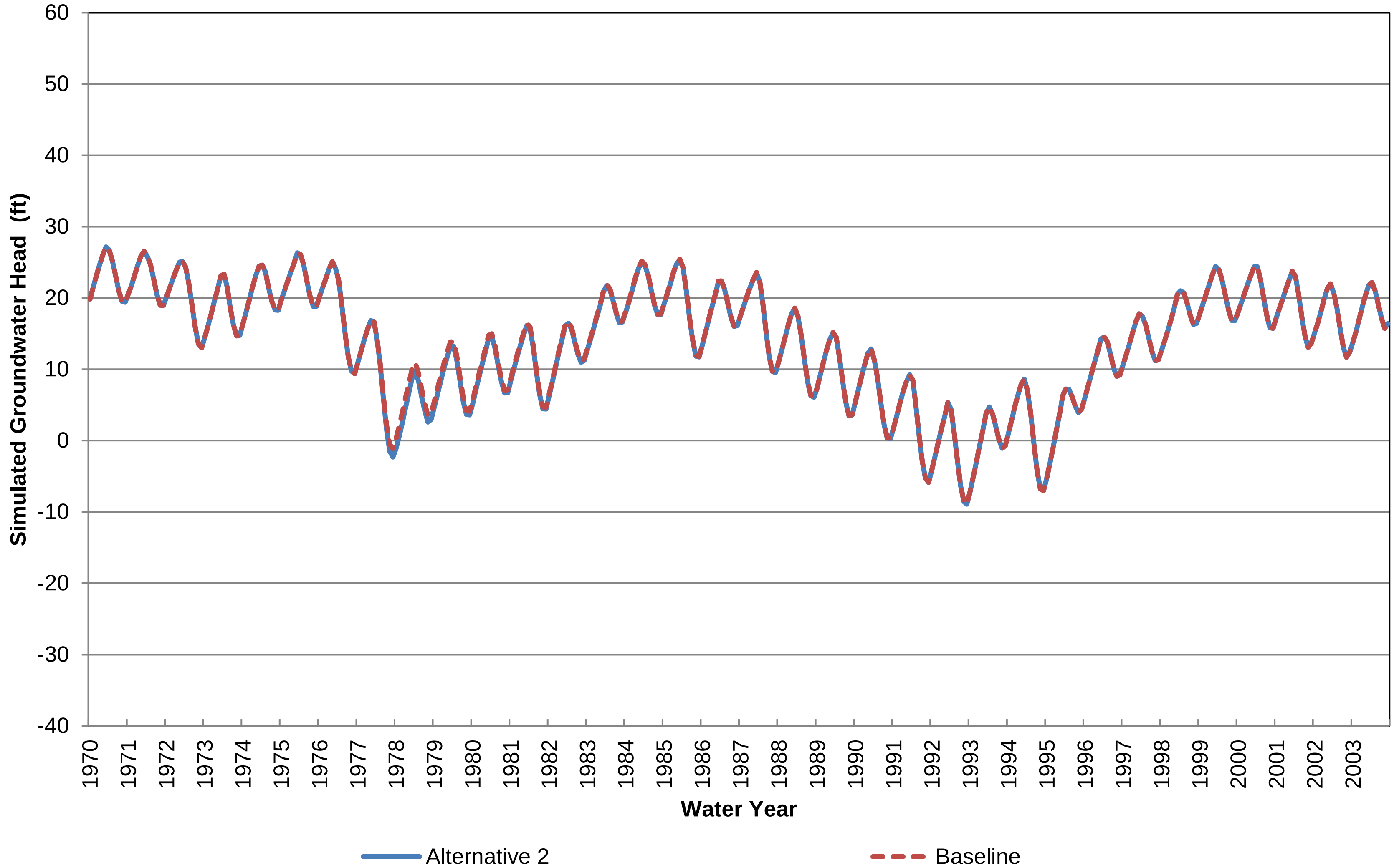
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 16 (Approximately 370-530 ft bgs)



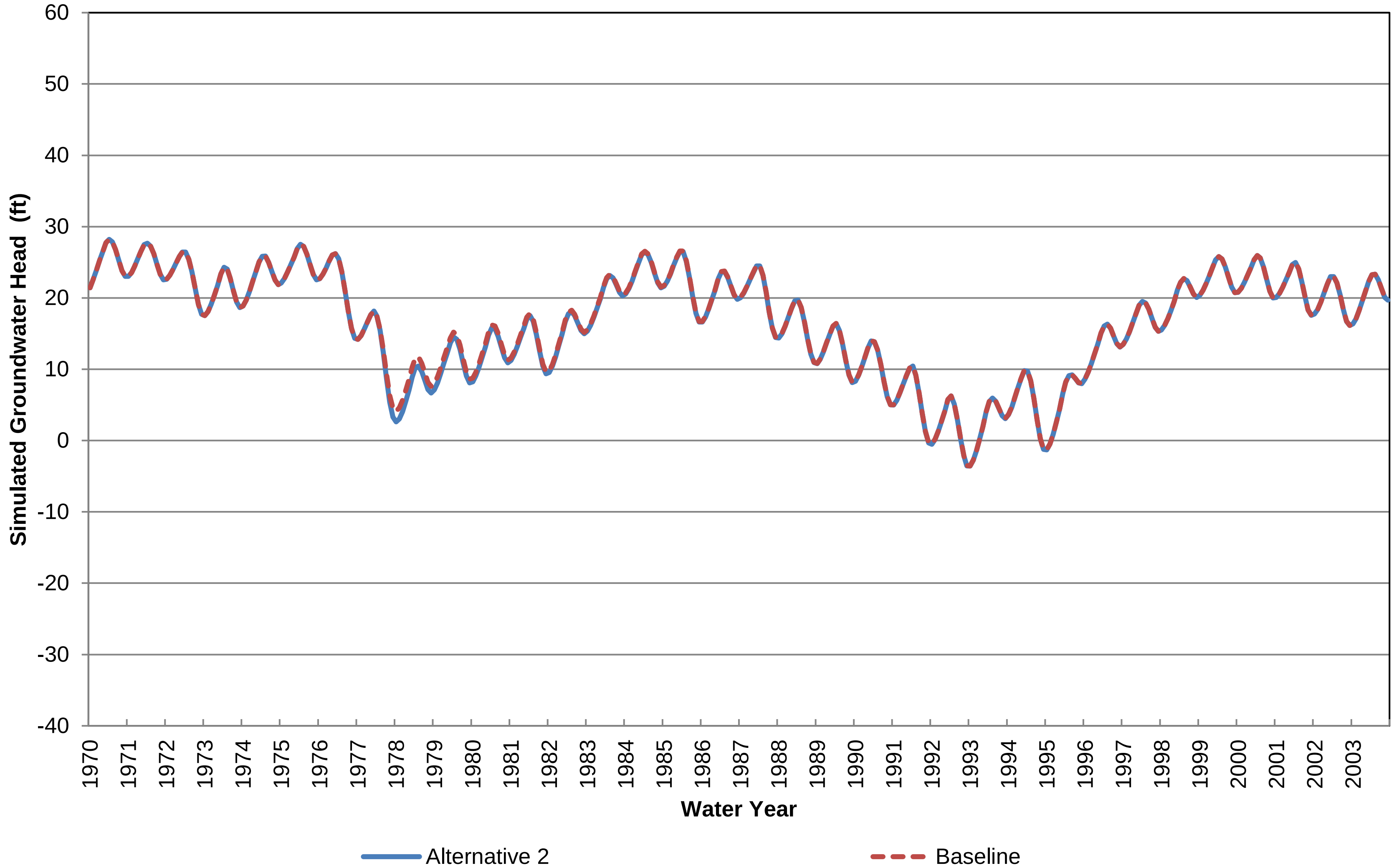
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 16 (Approximately 530-760 ft bgs)

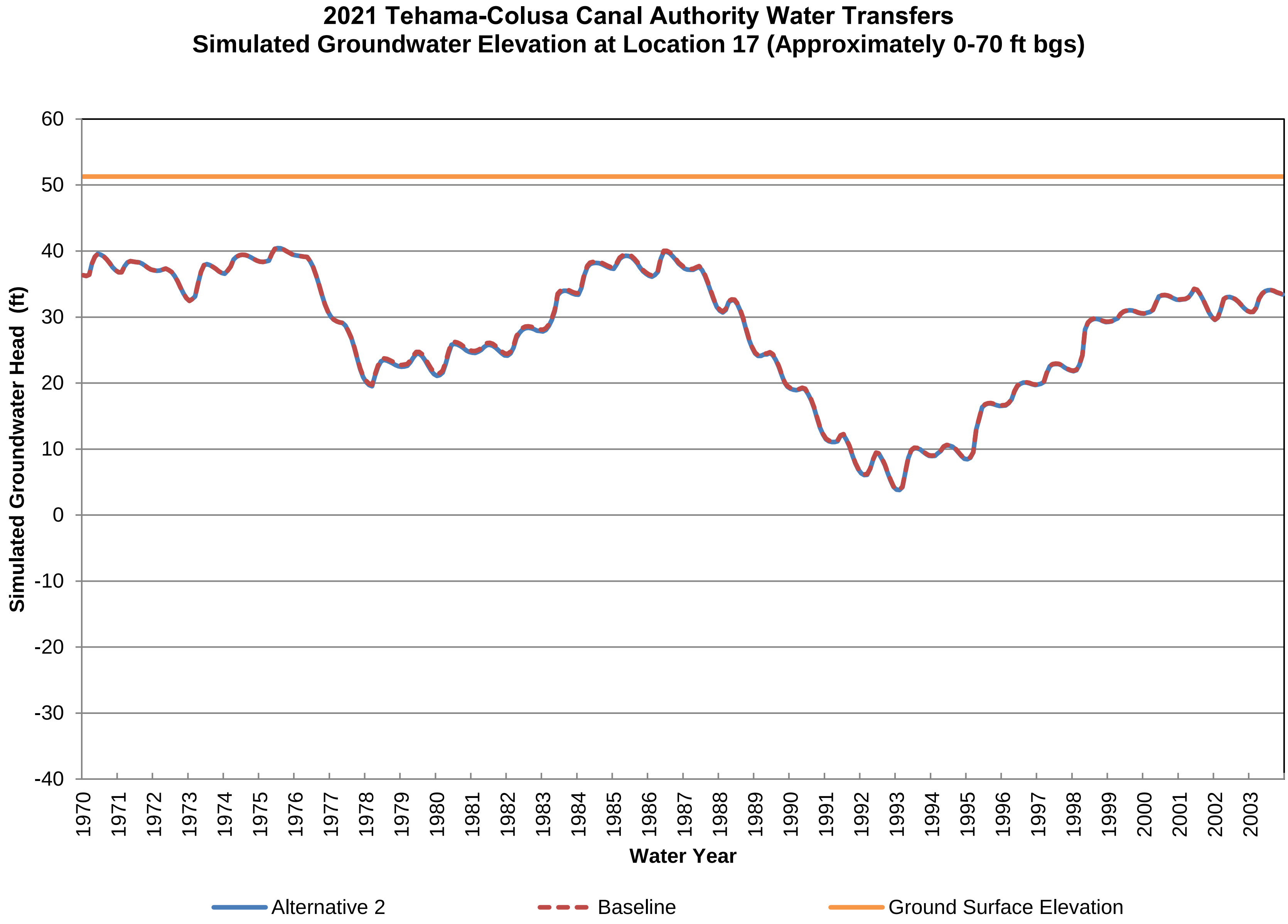


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 16 (Approximately 760-1020 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 16 (Approximately 1020-1390 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 17 (Approximately 0-70 ft bgs)
Simulated Groundwater Head (ft)
60
50
40
30
20
10
0
-10
-20
-30
-40
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
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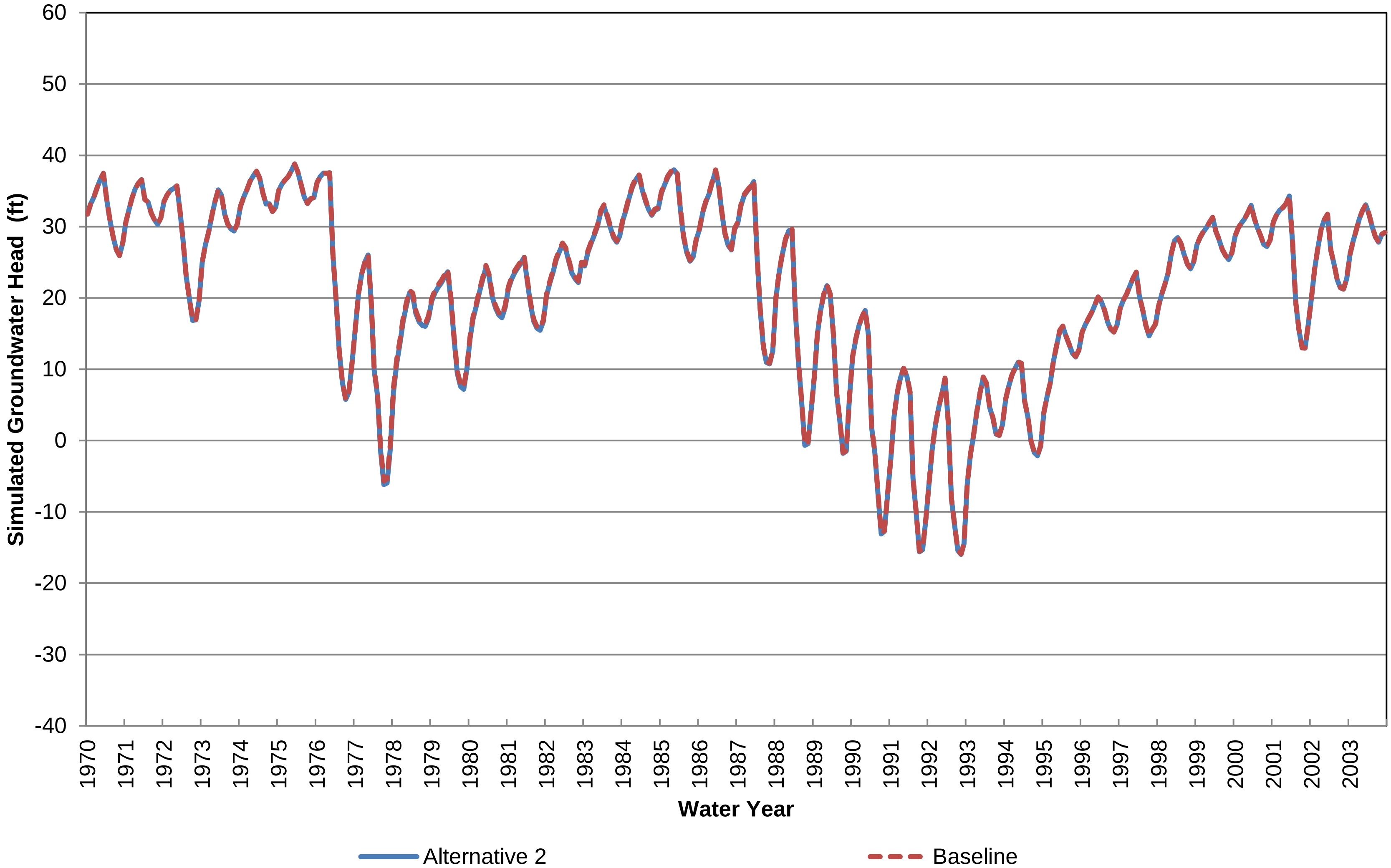
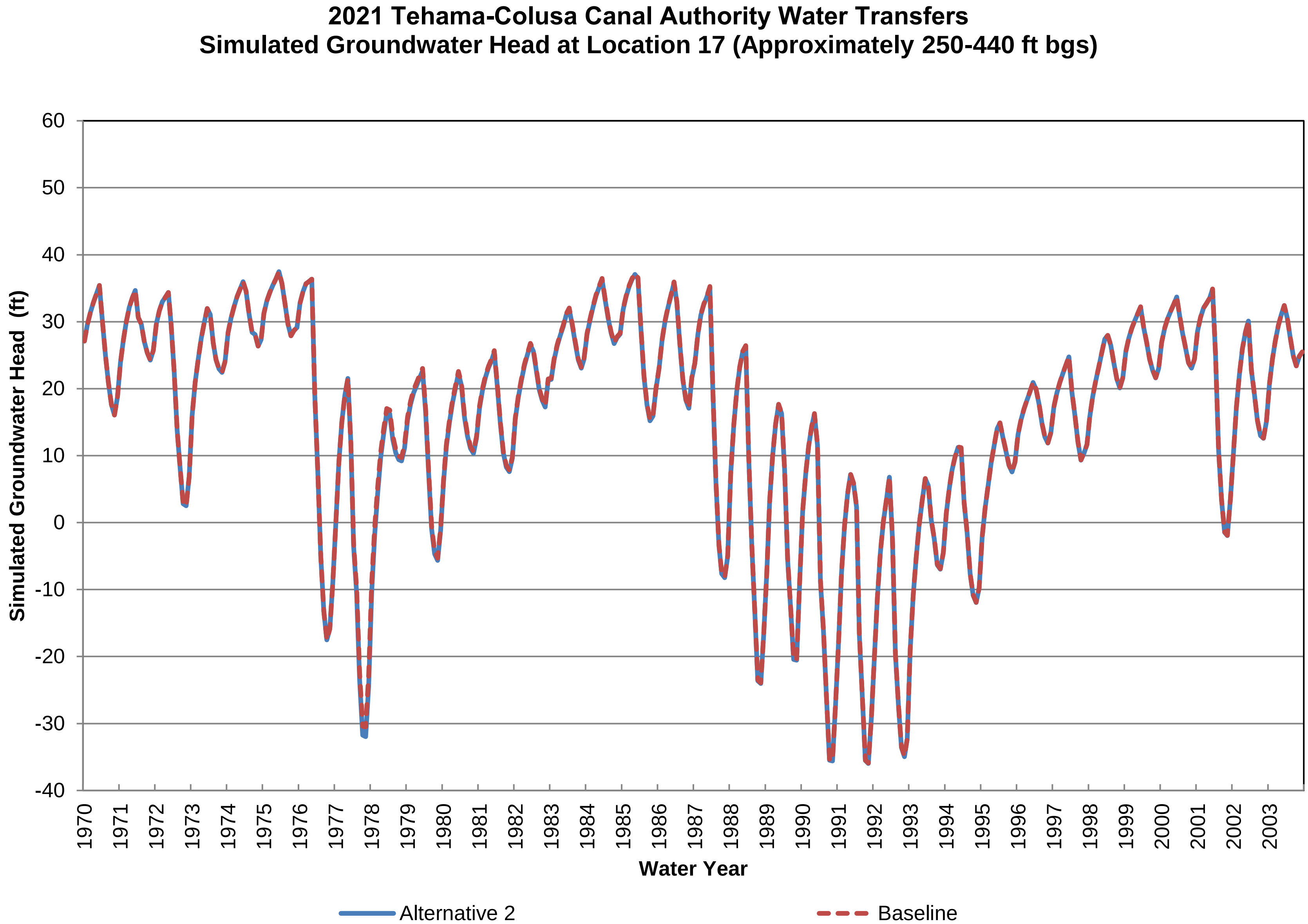
2000
2001
2002
2003
Water Year
Alternative 2
Baseline
Ground Surface Elevation

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 17 (Approximately 70-250 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 17 (Approximately 250-440 ft bgs)
Simulated Groundwater Head (ft)
60
50
40
30
20
10
0
-10
-20
-30
-40
1970
1971
1972
1973
1974
1975
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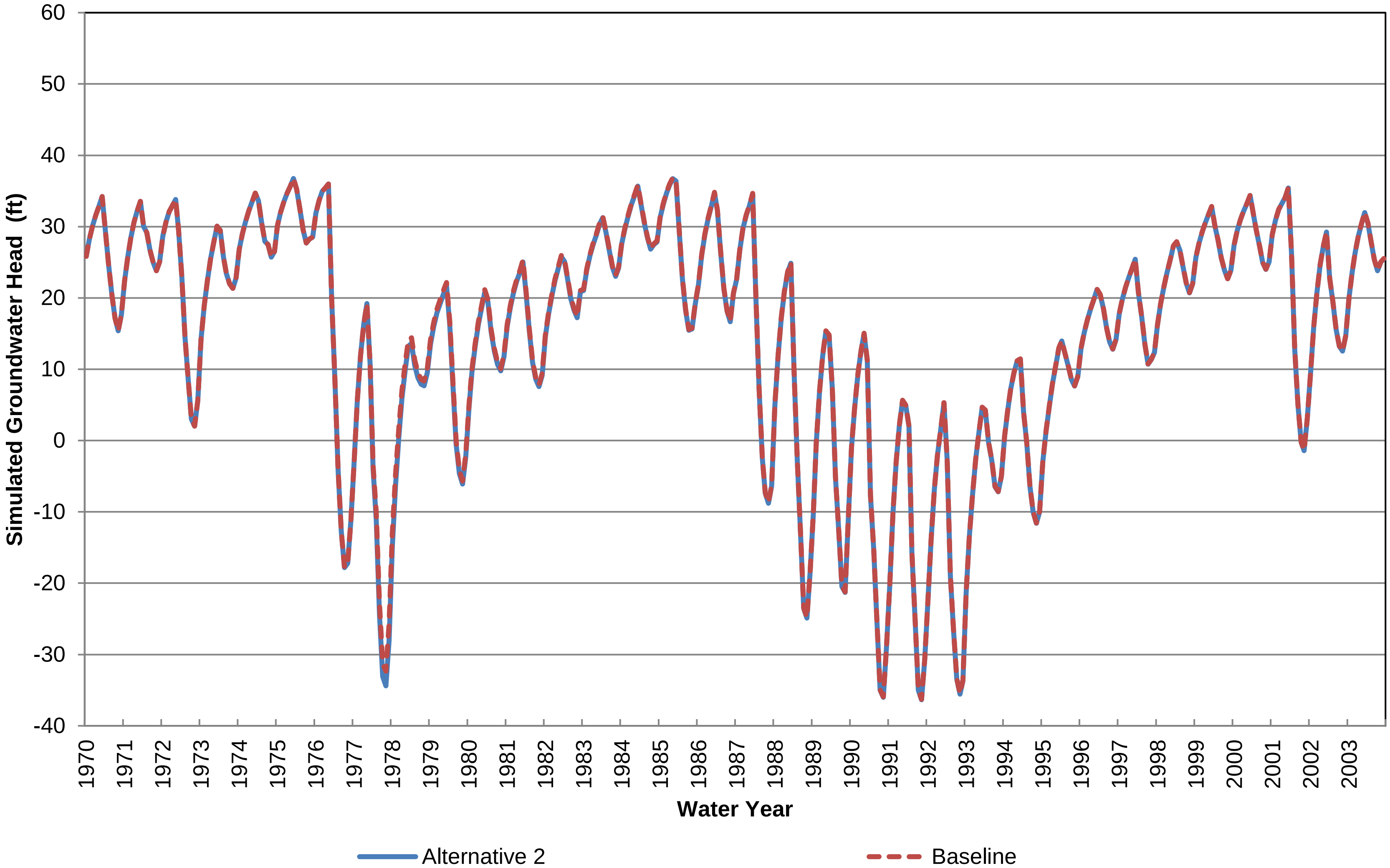
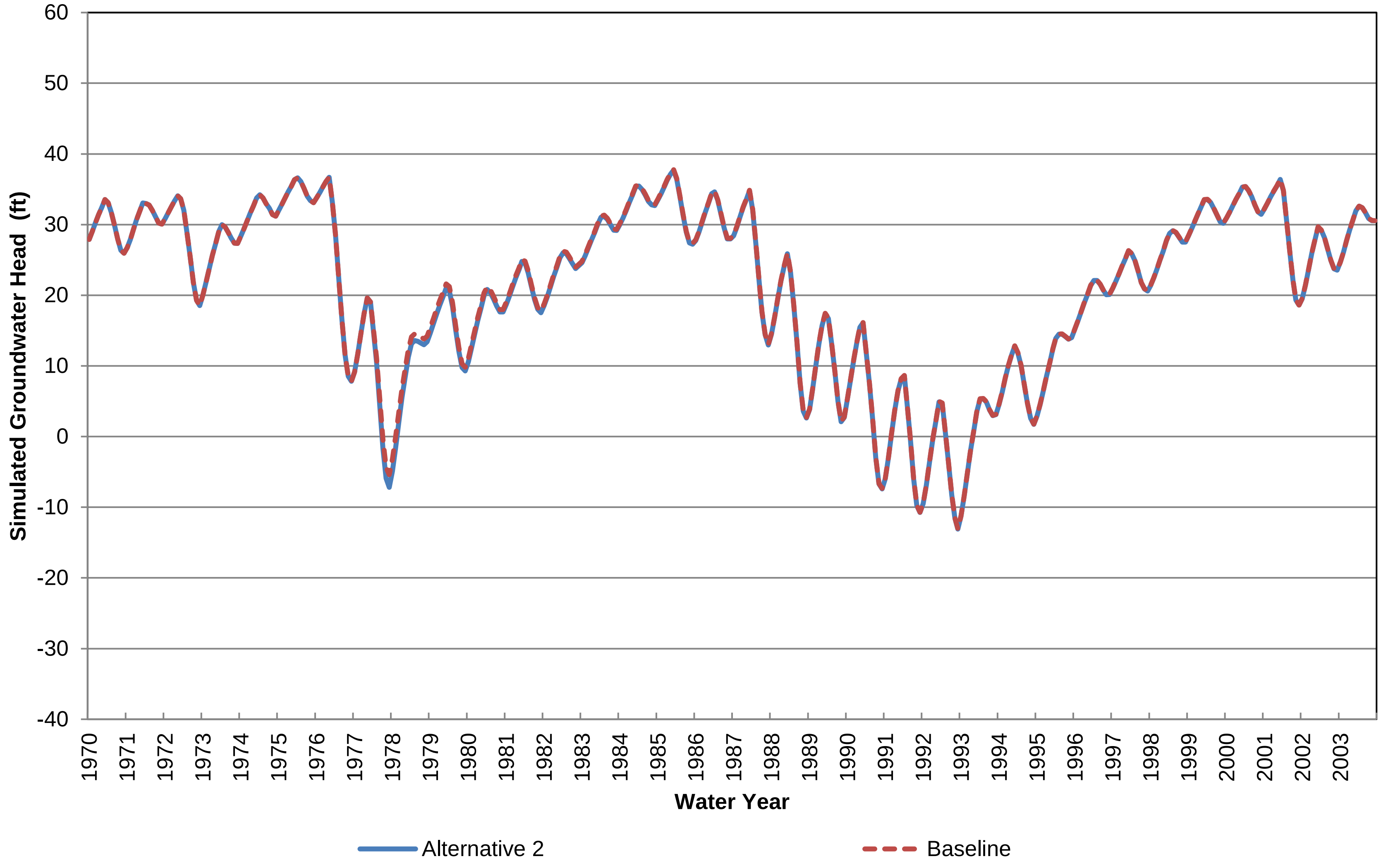
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

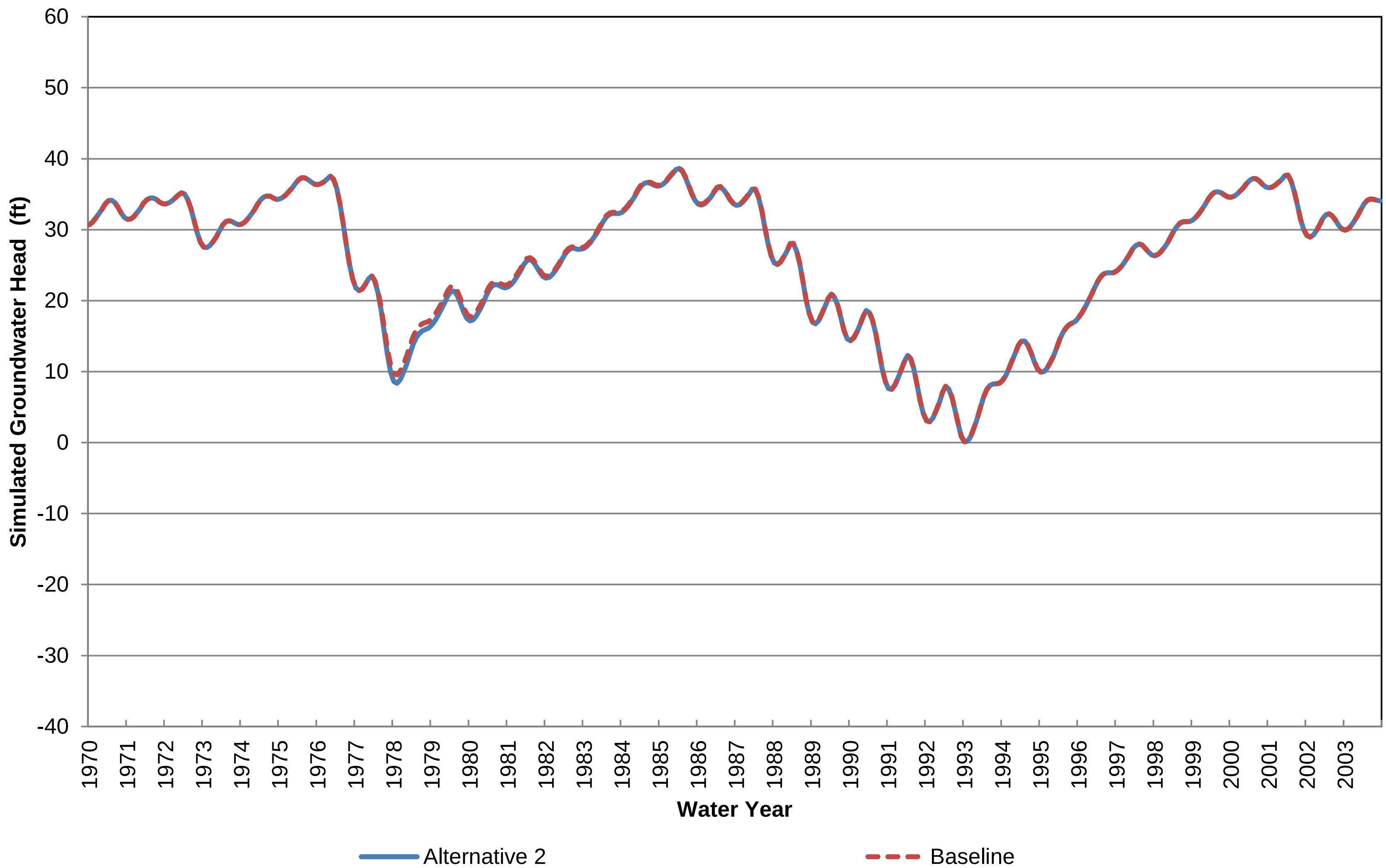
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 17 (Approximately 440-620 ft bgs)



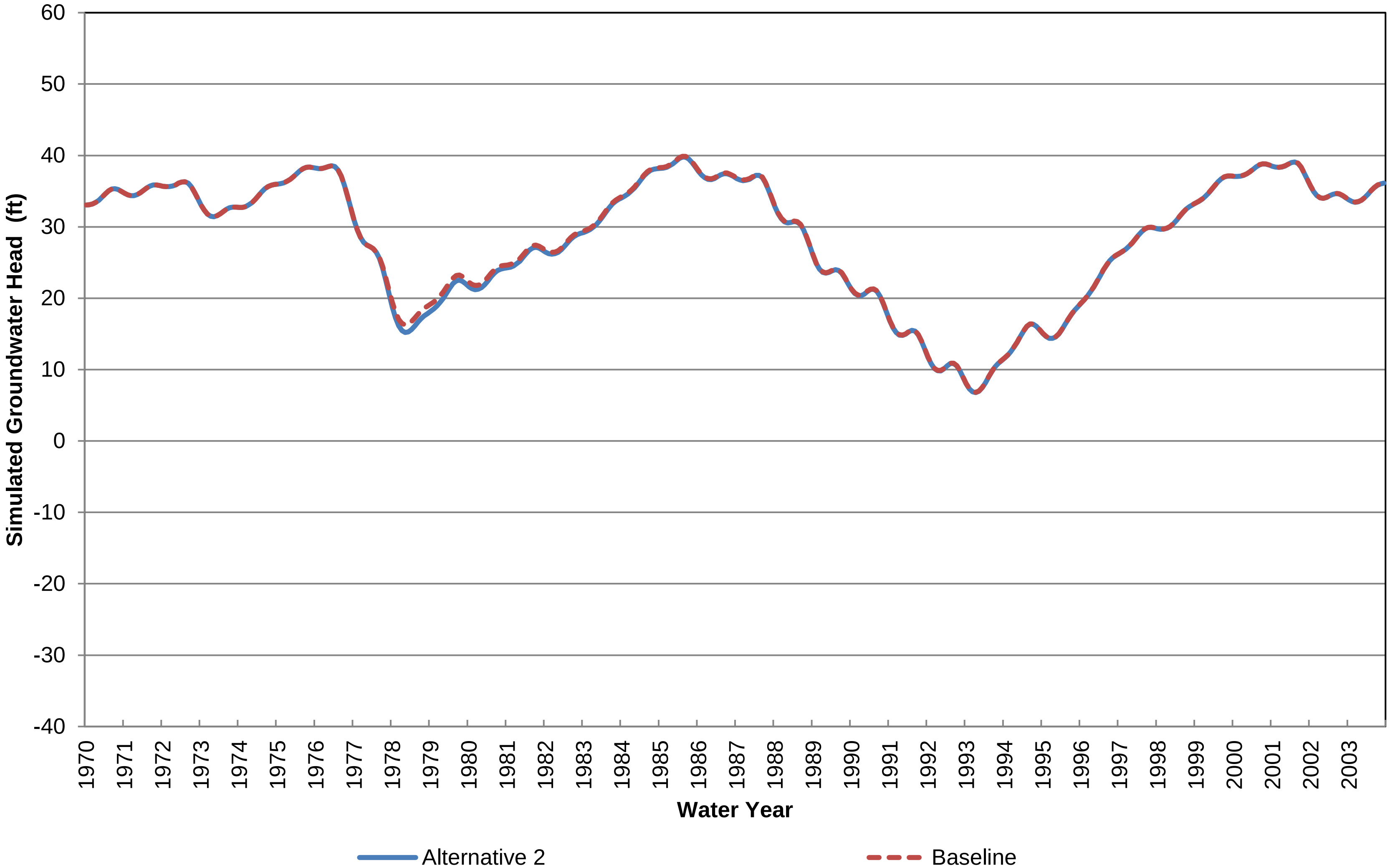
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 17 (Approximately 620-920 ft bgs)

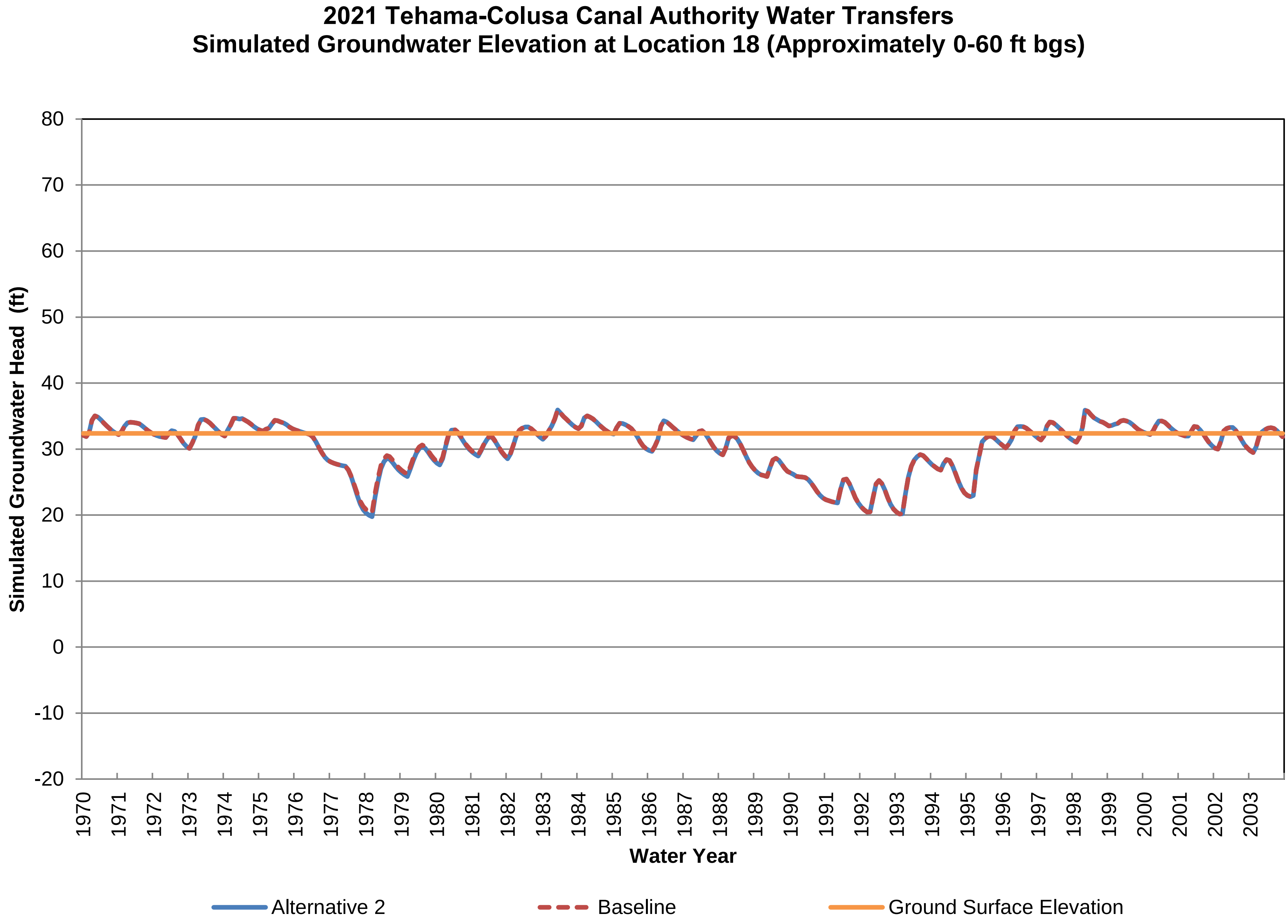


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 17 (Approximately 920-1220 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 17 (Approximately 1220-1680 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 18 (Approximately 0-60 ft bgs)
Simulated Groundwater Head (ft)
80
70
60
50
40
30
20
10
0
-10
-20
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
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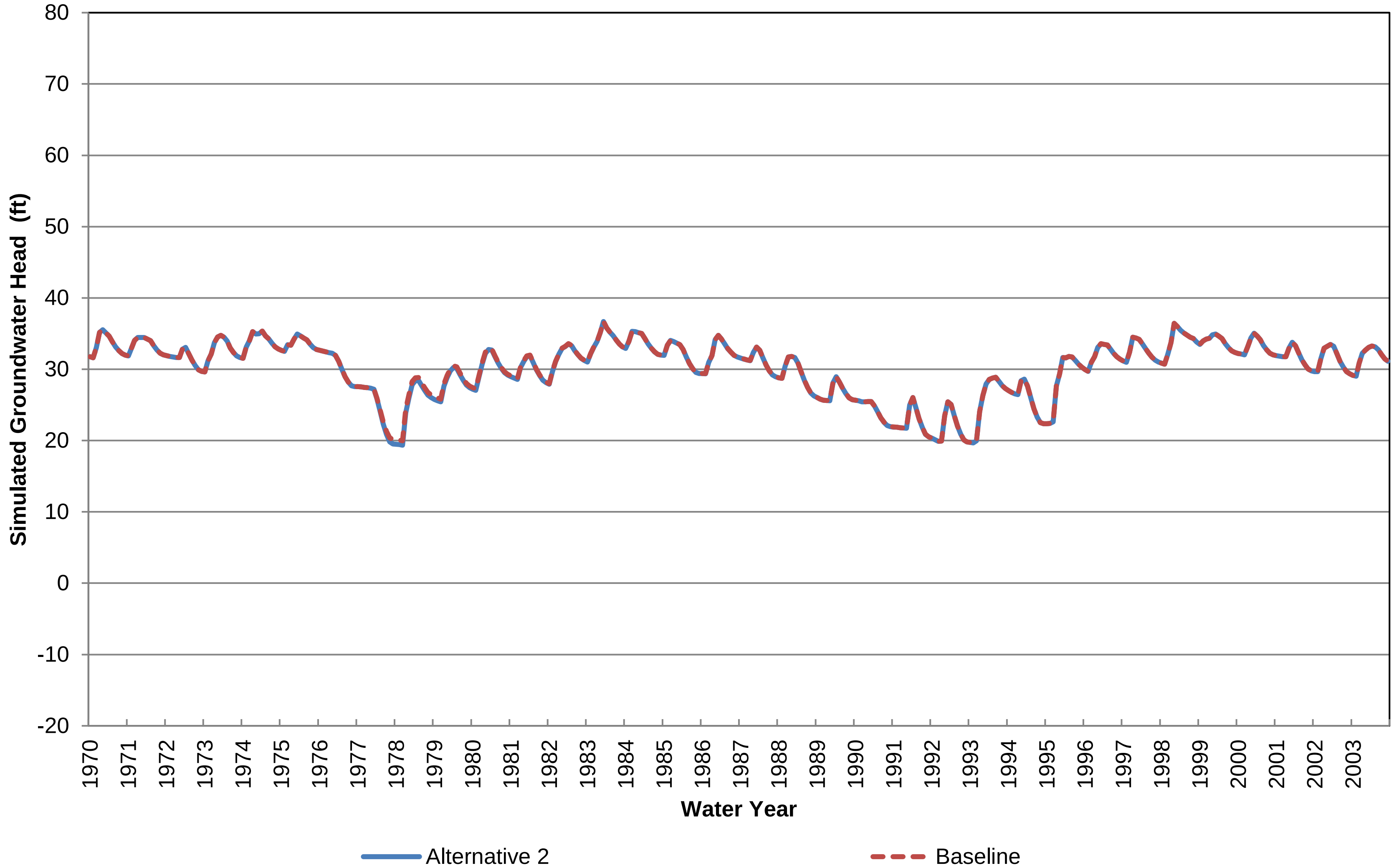
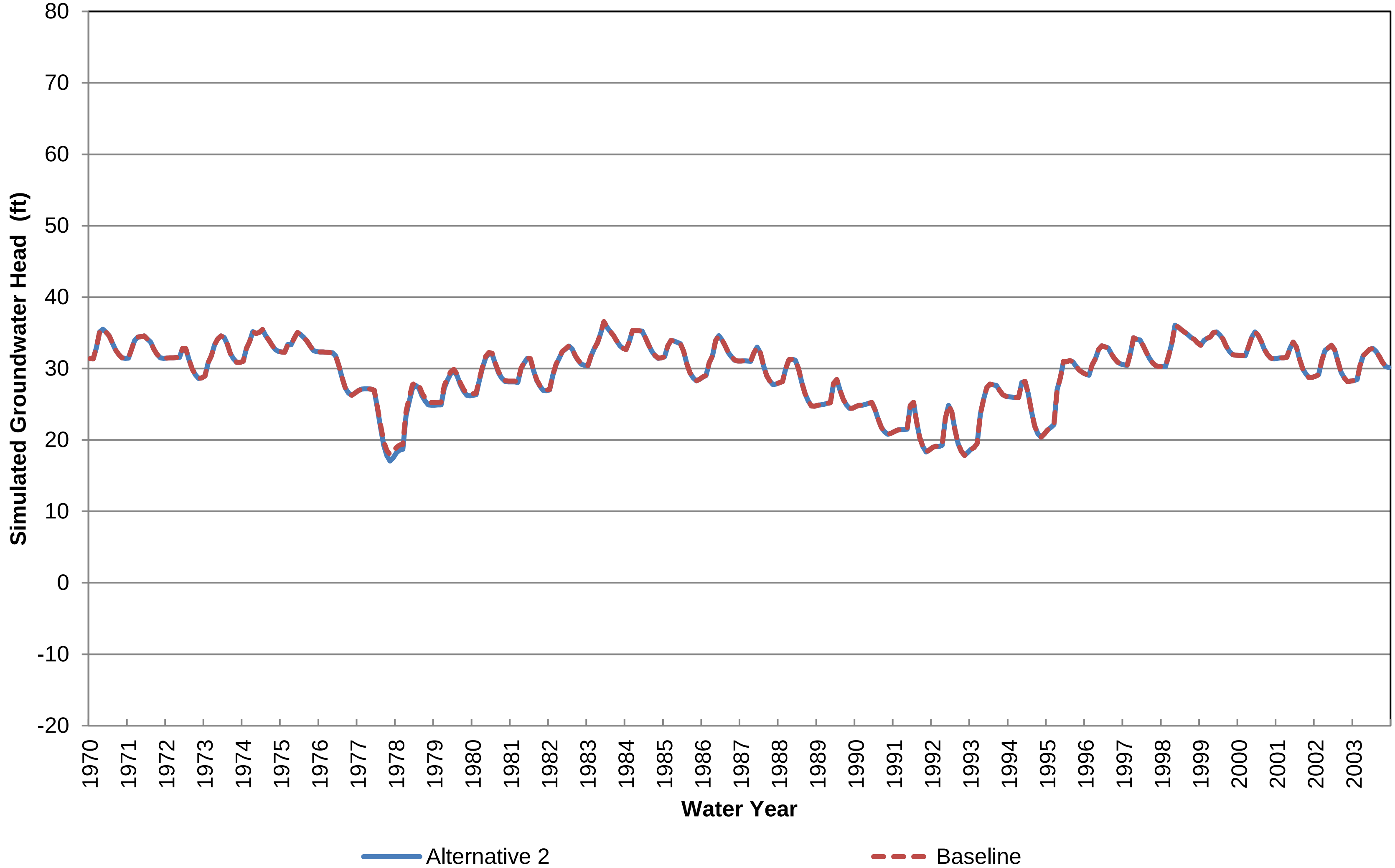
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline
Ground Surface Elevation

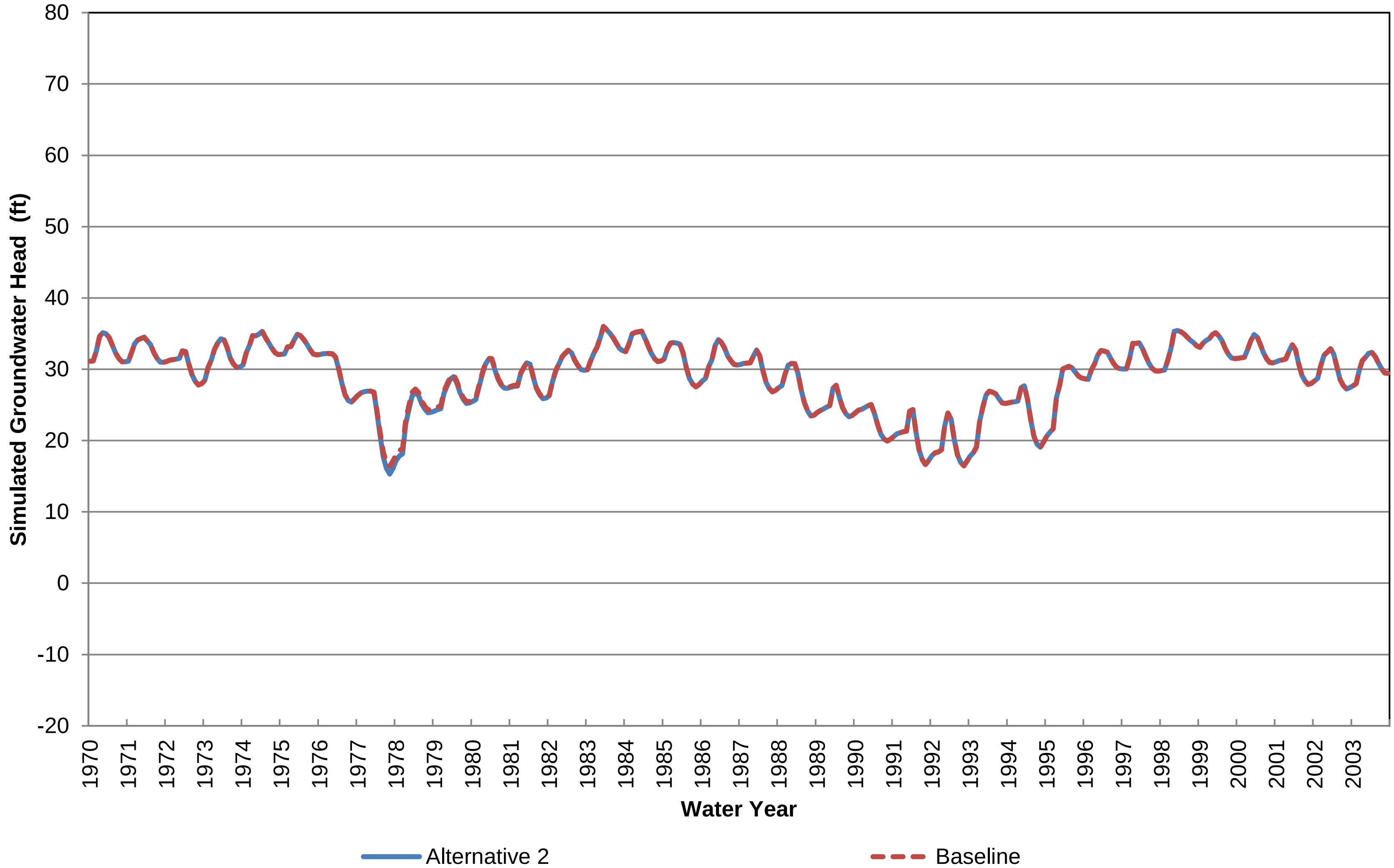
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 18 (Approximately 60-150 ft bgs)

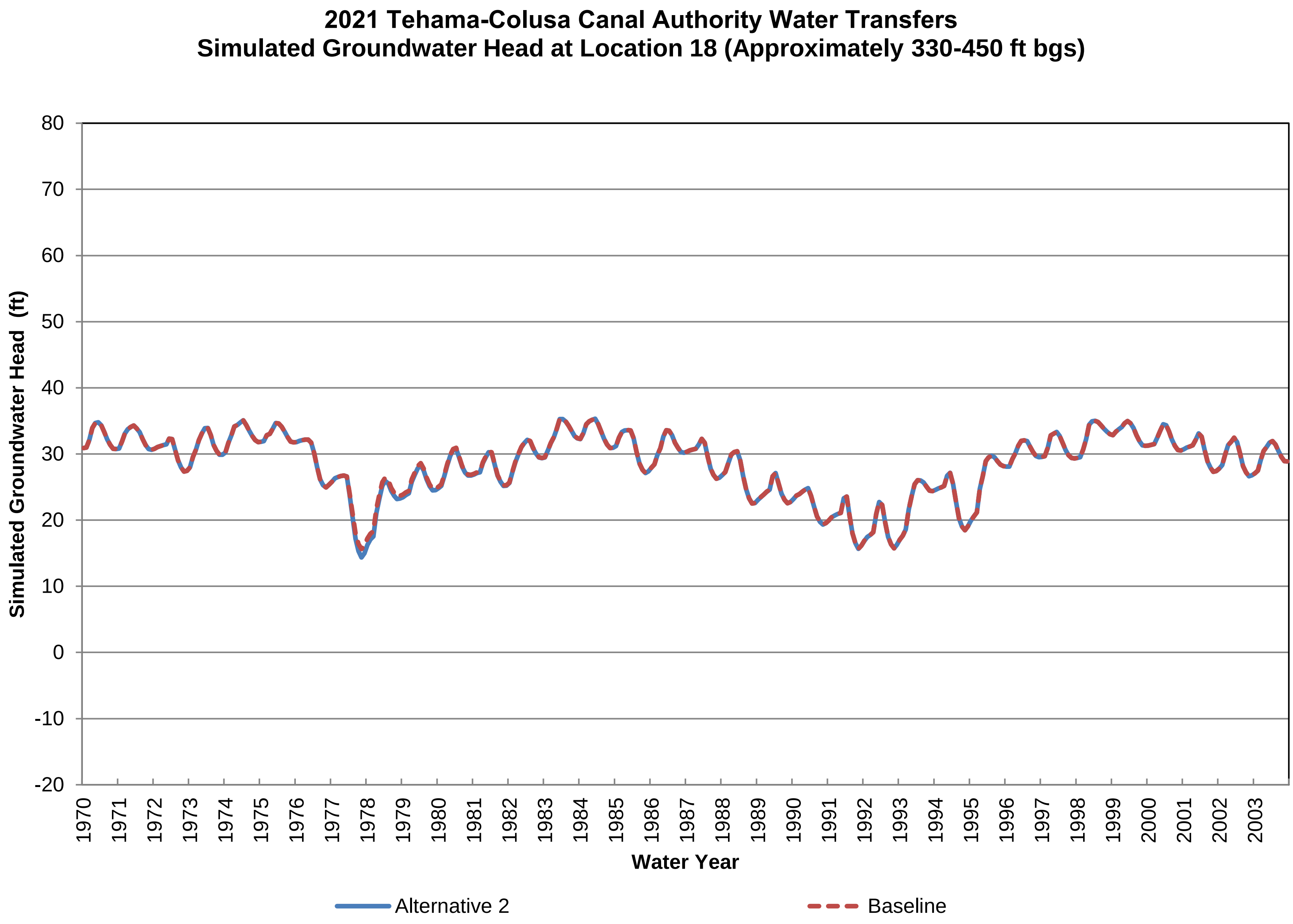


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 18 (Approximately 150-240 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 18 (Approximately 240-330 ft bgs)





2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 18 (Approximately 330-450 ft bgs)
Simulated Groundwater Head (ft)
80
70
60
50
40
30
20
10
0
-10
-20
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
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1998
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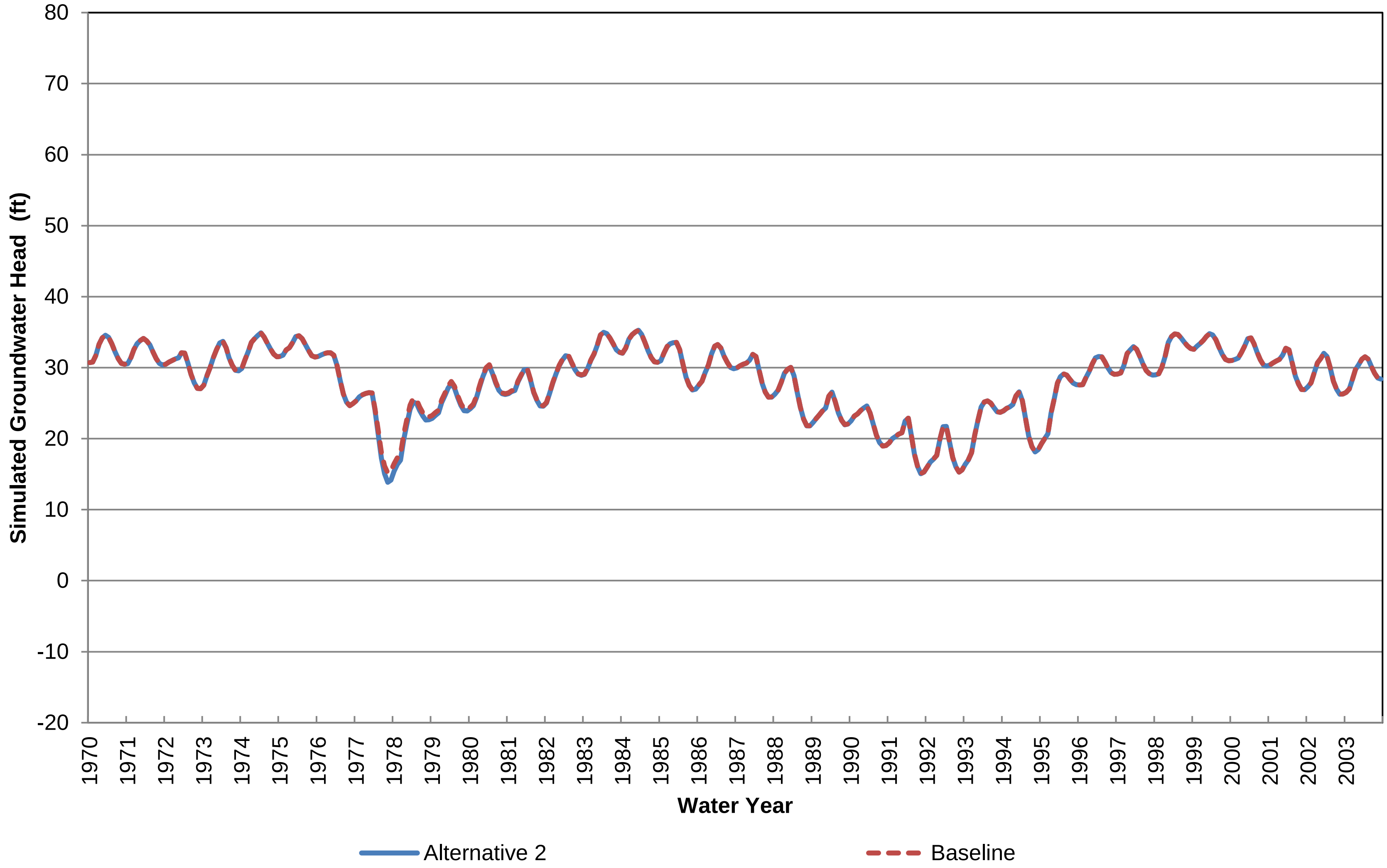
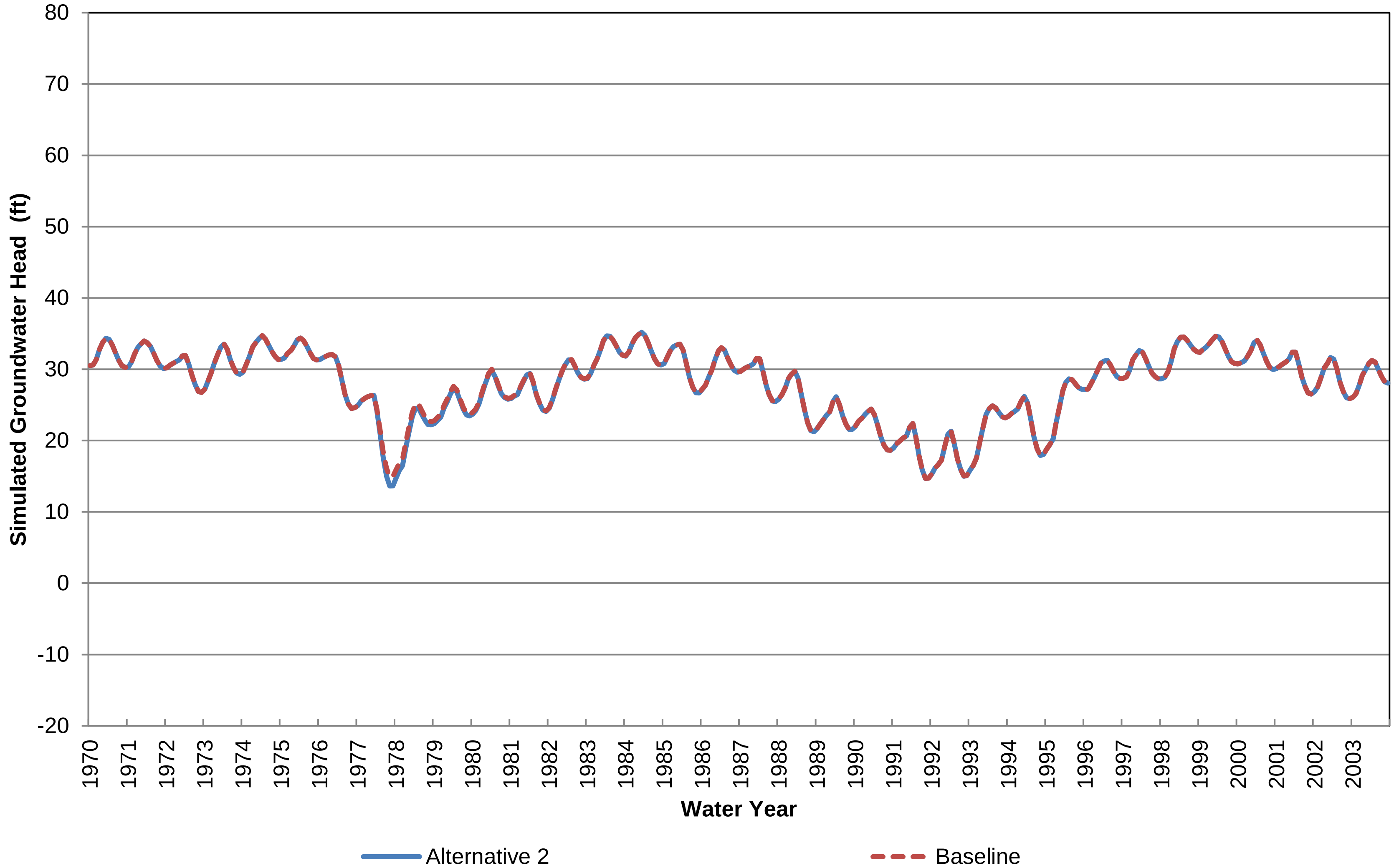
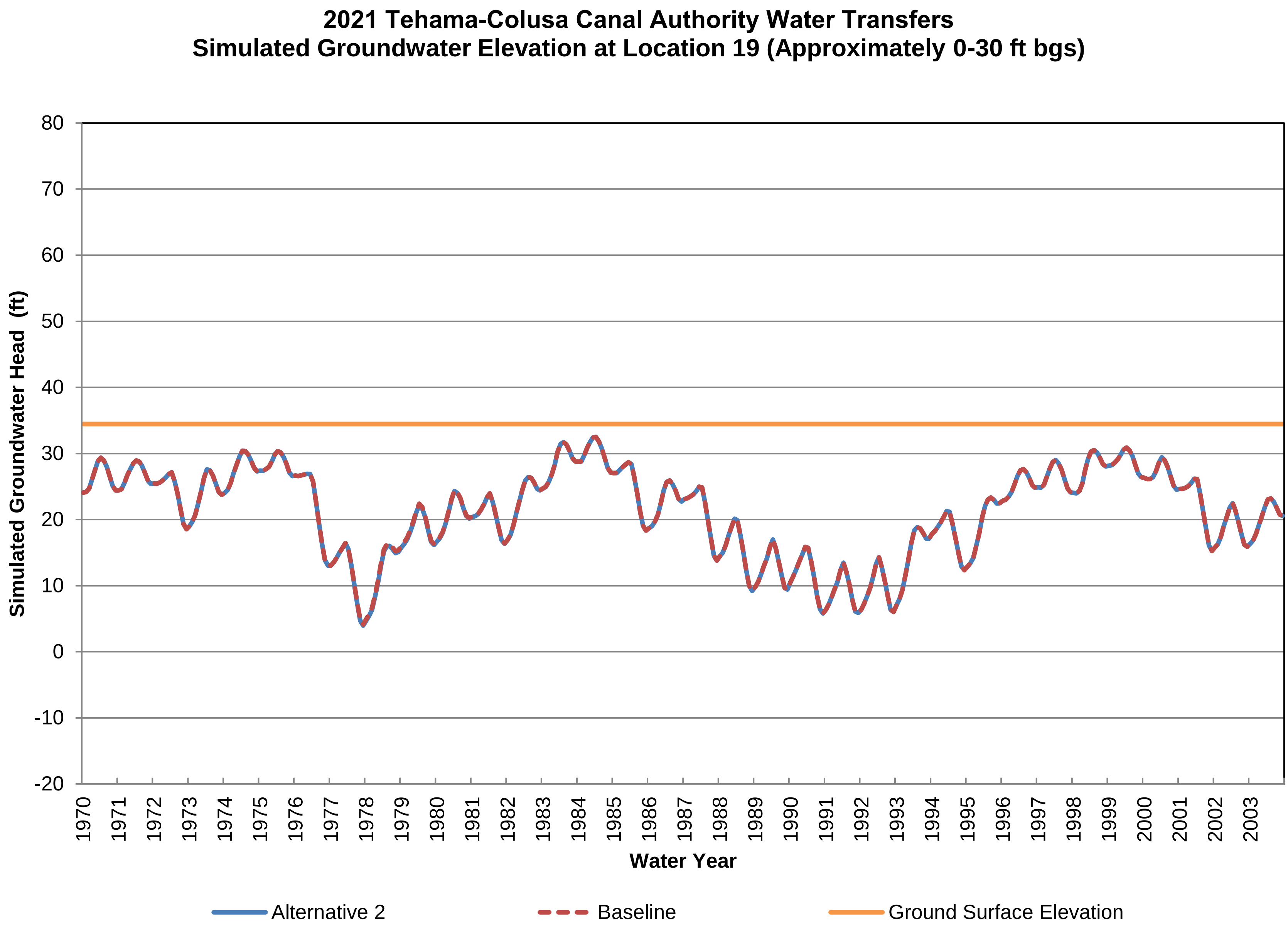
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 18 (Approximately 450-600 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 18 (Approximately 600-820 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 19 (Approximately 0-30 ft bgs)
Simulated Groundwater Head (ft)
80
70
60
50
40
30
20
10
0
-10
-20
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
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1992
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1994
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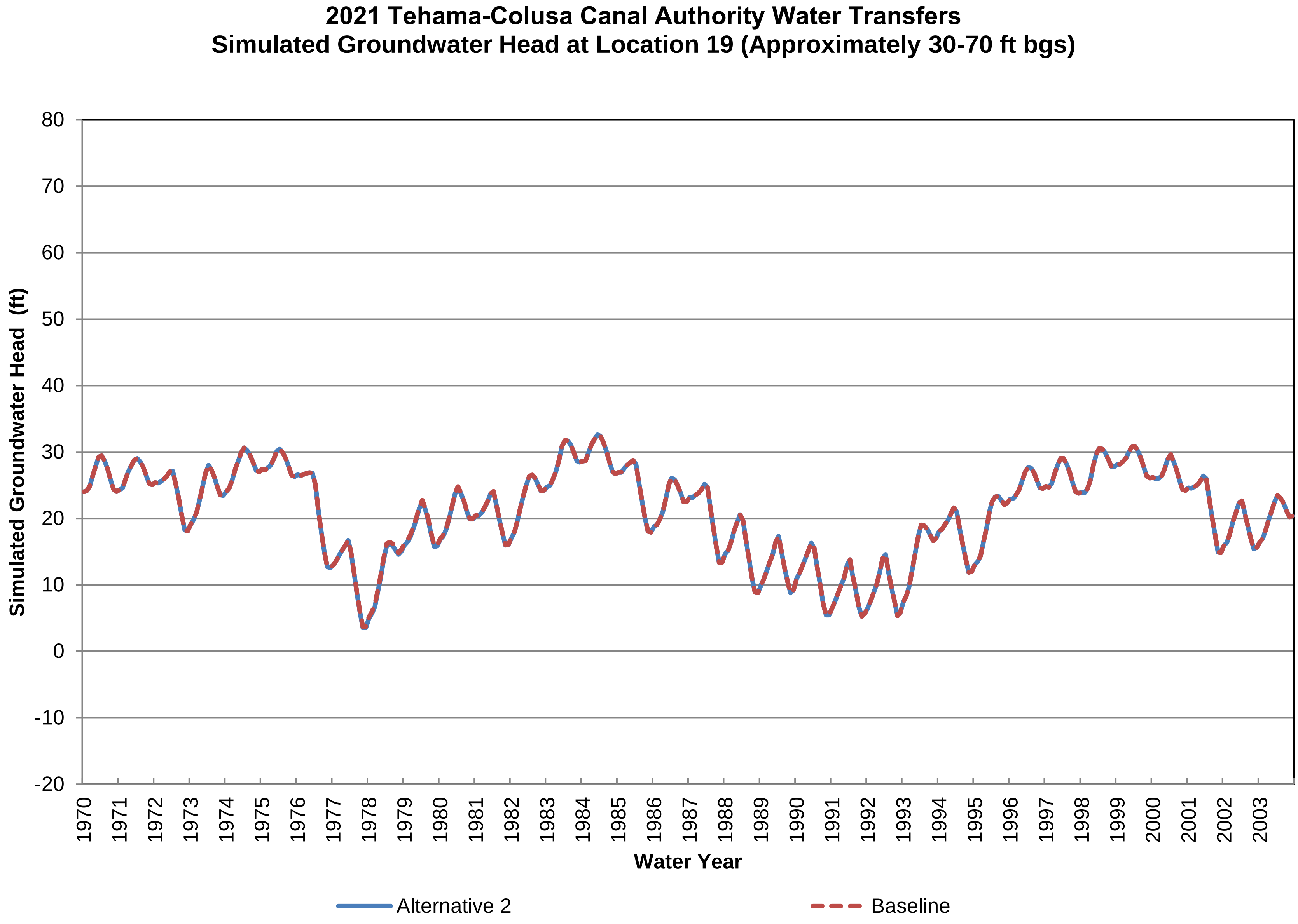
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline
Ground Surface Elevation


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 19 (Approximately 30-70 ft bgs)
Simulated Groundwater Head (ft)
80
70
60
50
40
30
20
10
0
-10
-20
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
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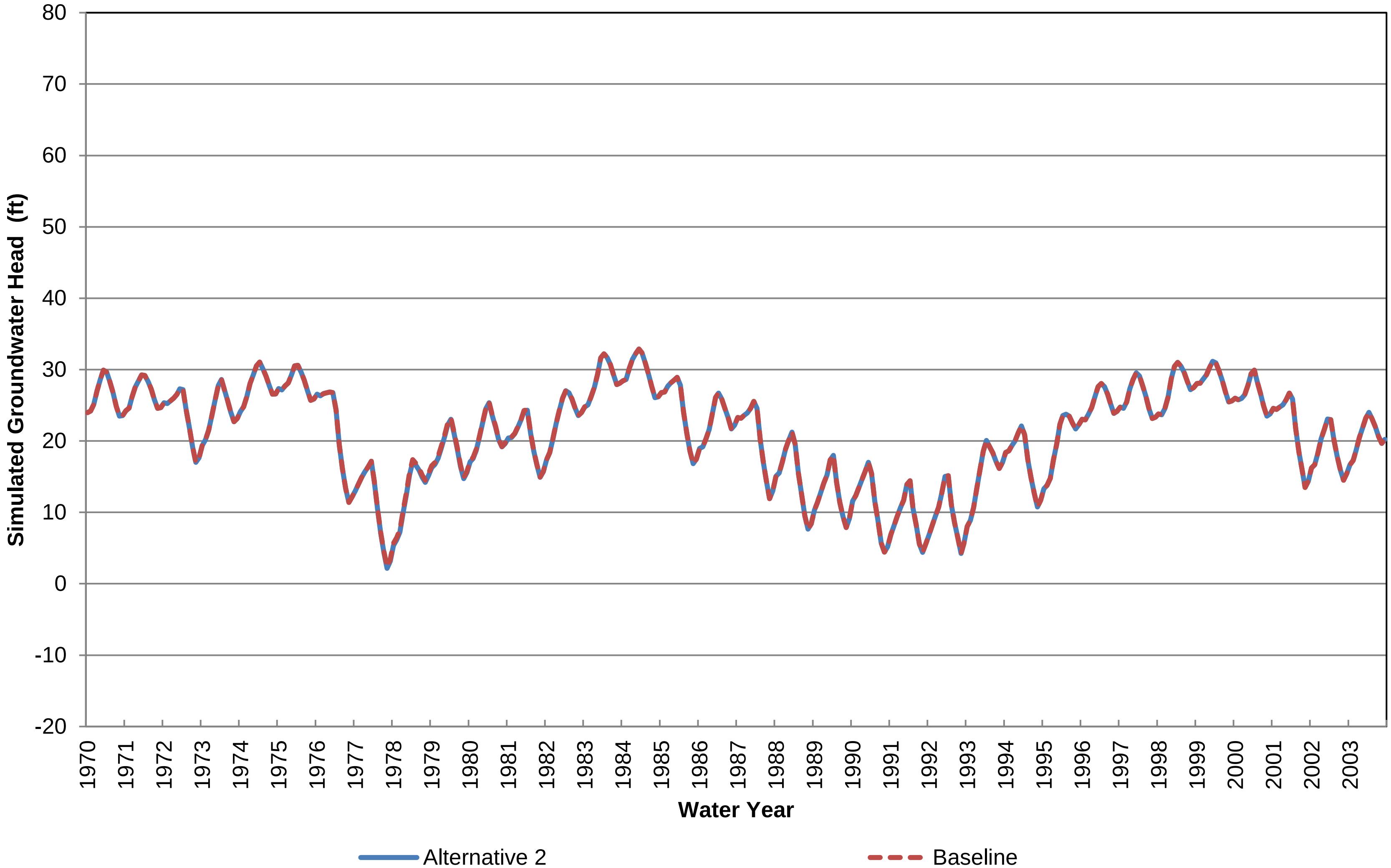
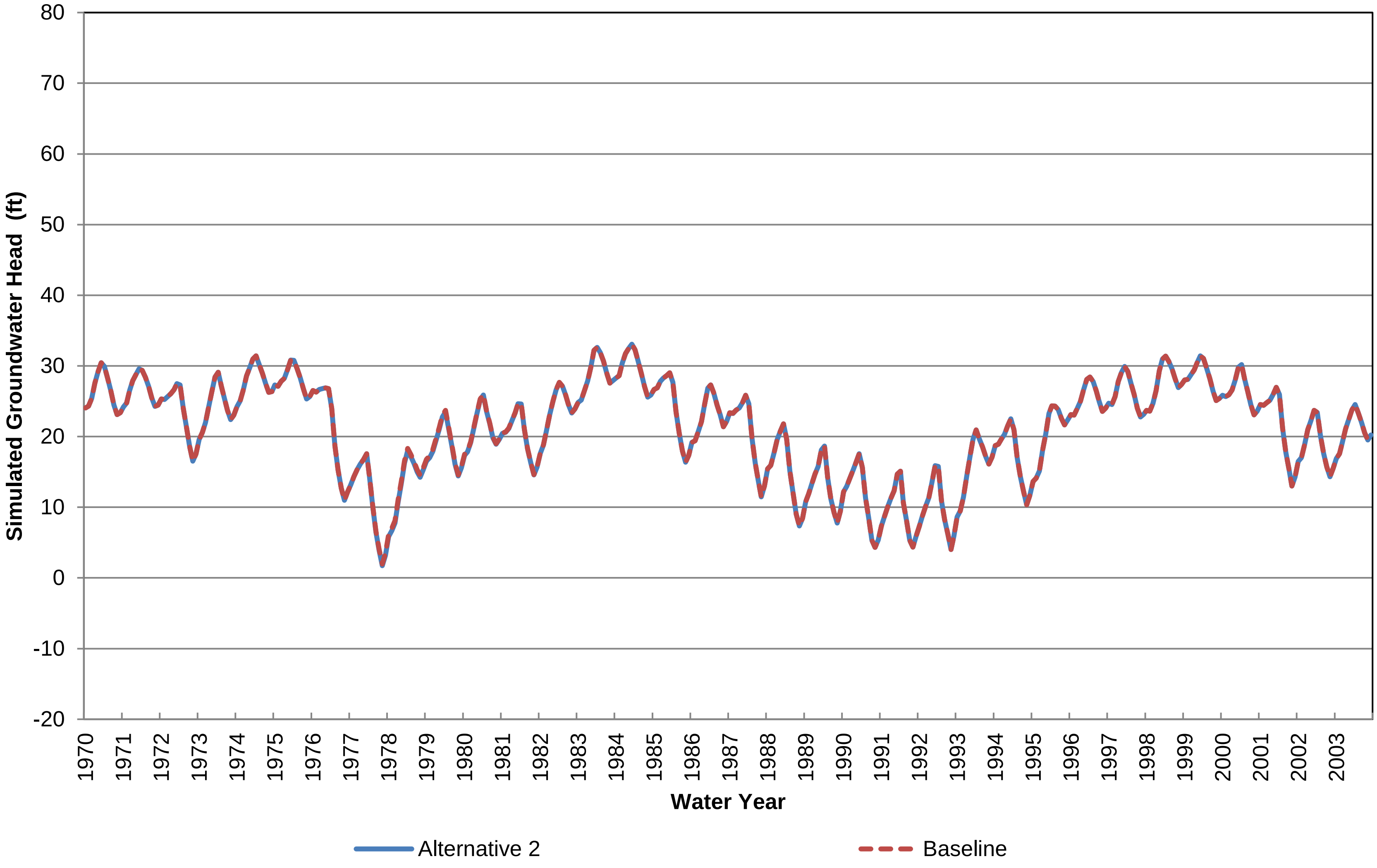
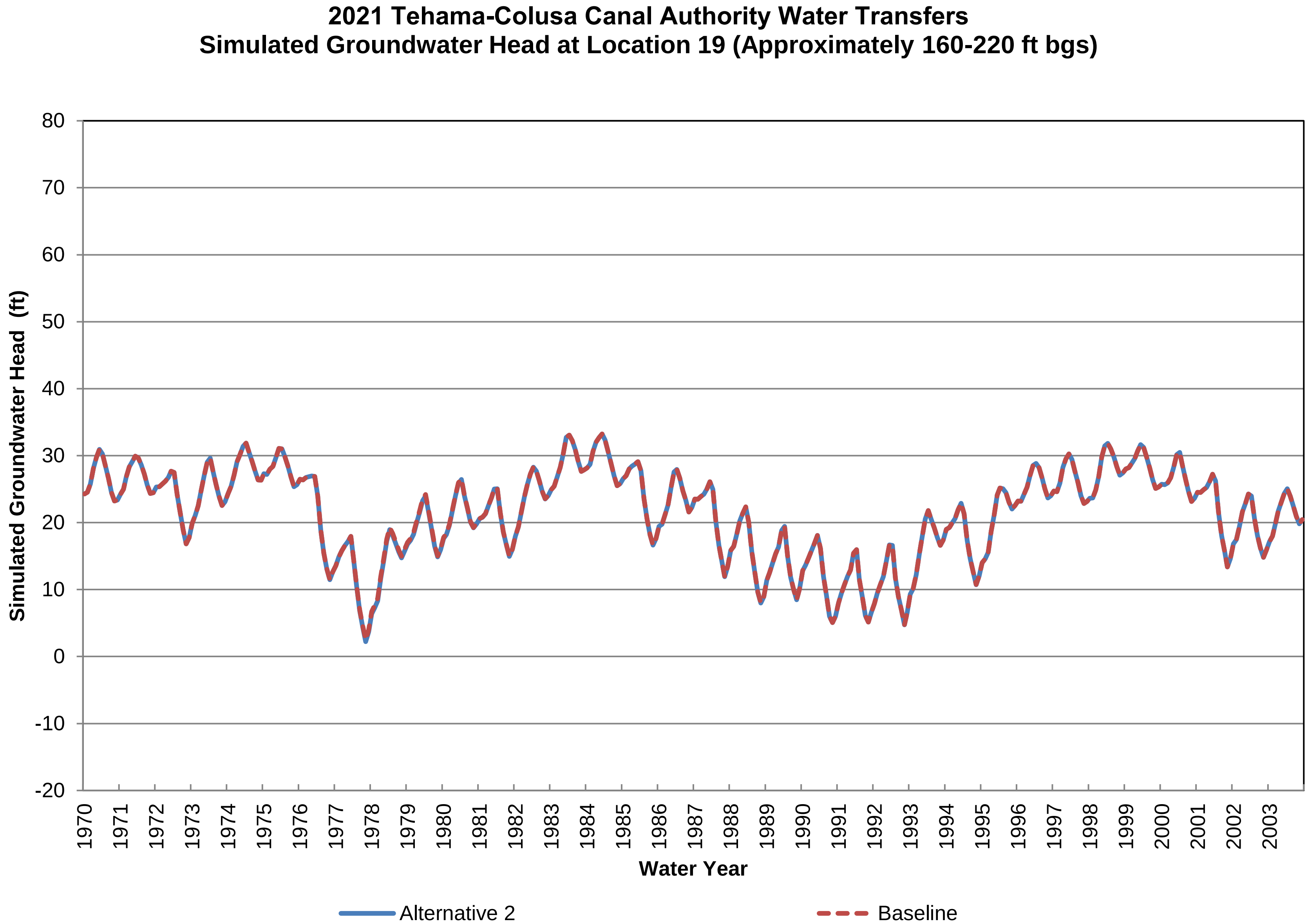
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 19 (Approximately 70-120 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 19 (Approximately 120-160 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 19 (Approximately 160-220 ft bgs)
Simulated Groundwater Head (ft)
80
70
60
50
40
30
20
10
0
-10
-20
1970
1971
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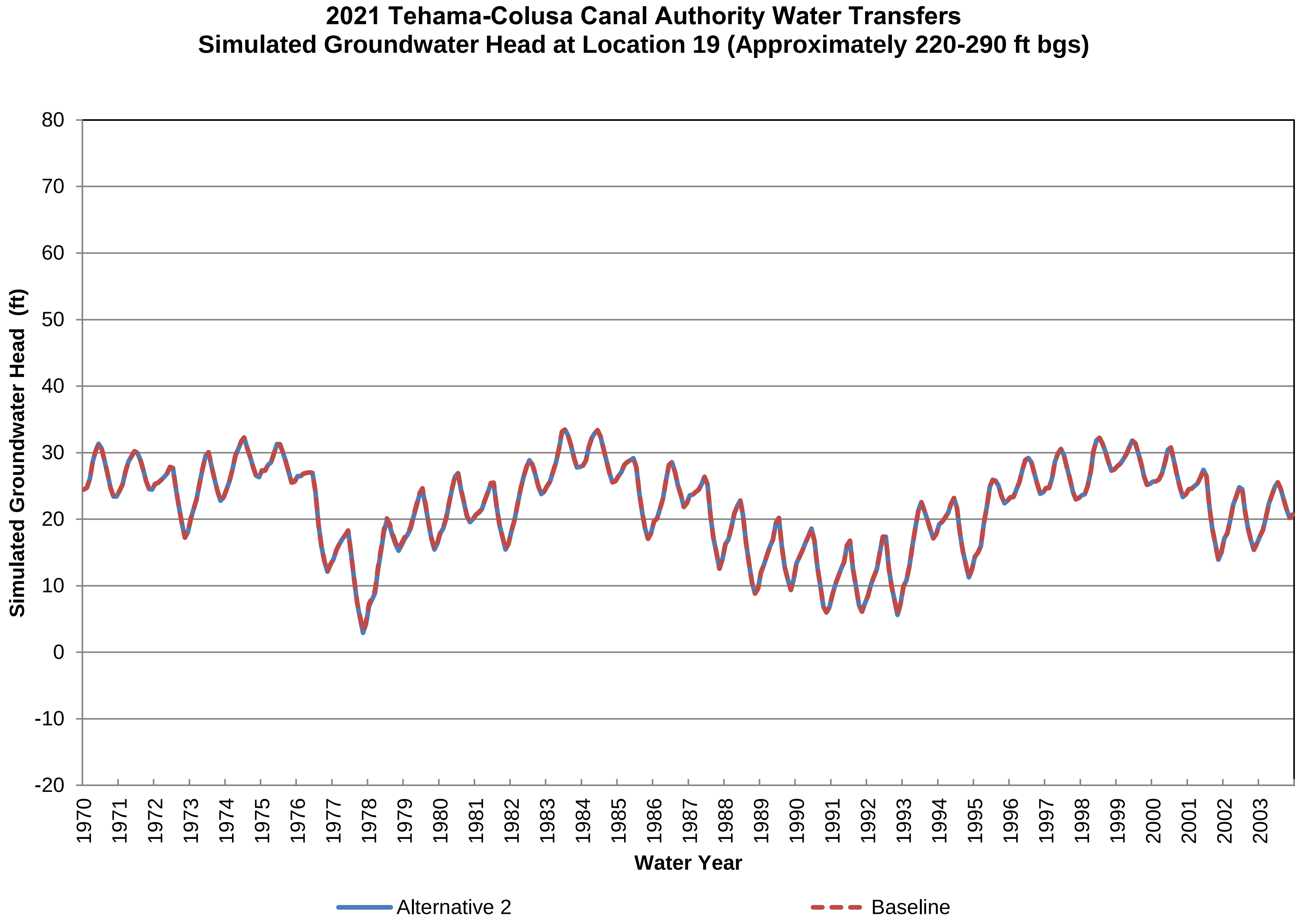
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 19 (Approximately 220-290 ft bgs)
Simulated Groundwater Head (ft)
80
70
60
50
40
30
20
10
0
-10
-20
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
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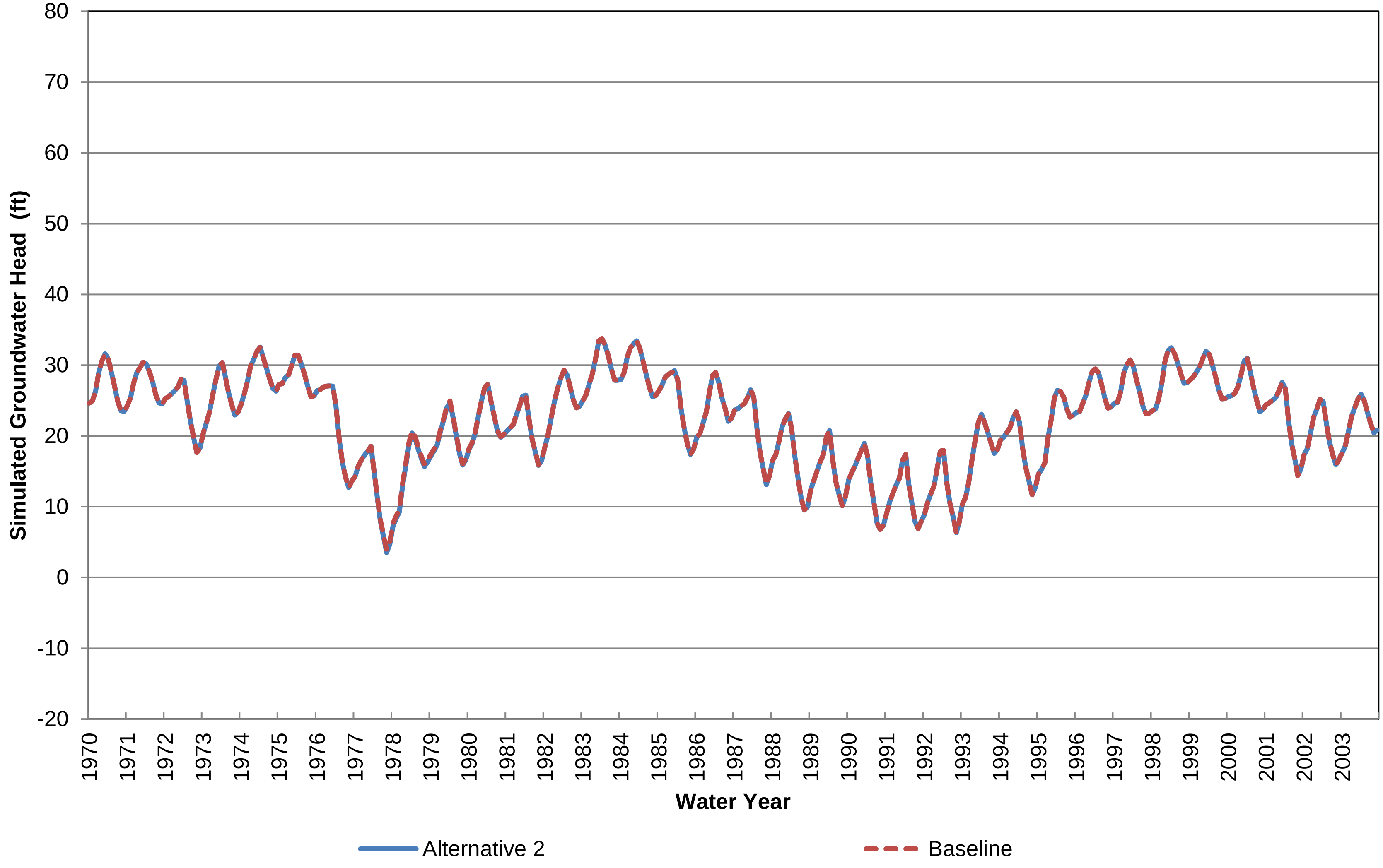
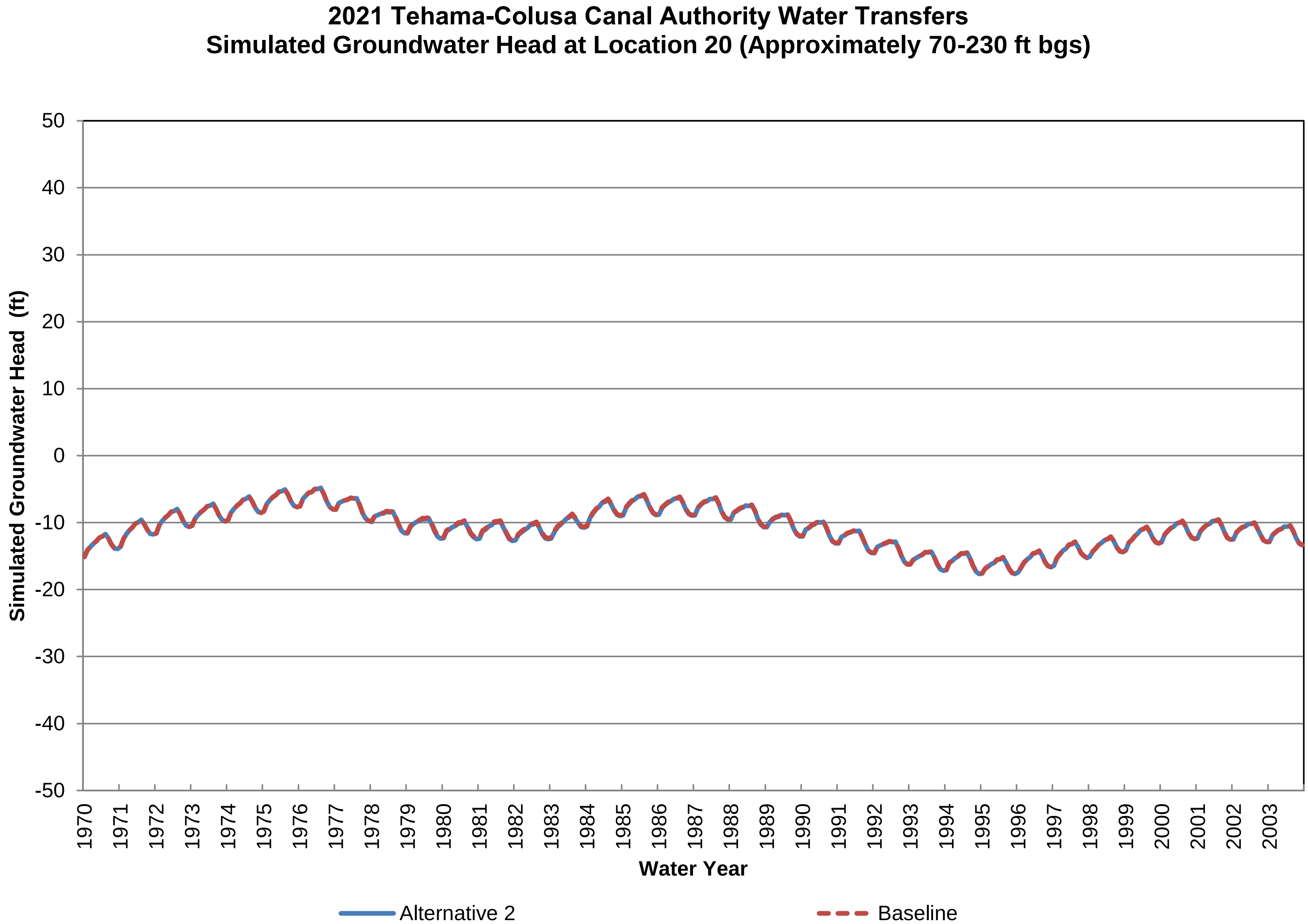
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 19 (Approximately 290-400 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 20 (Approximately 0-70 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 20 (Approximately 70-230 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
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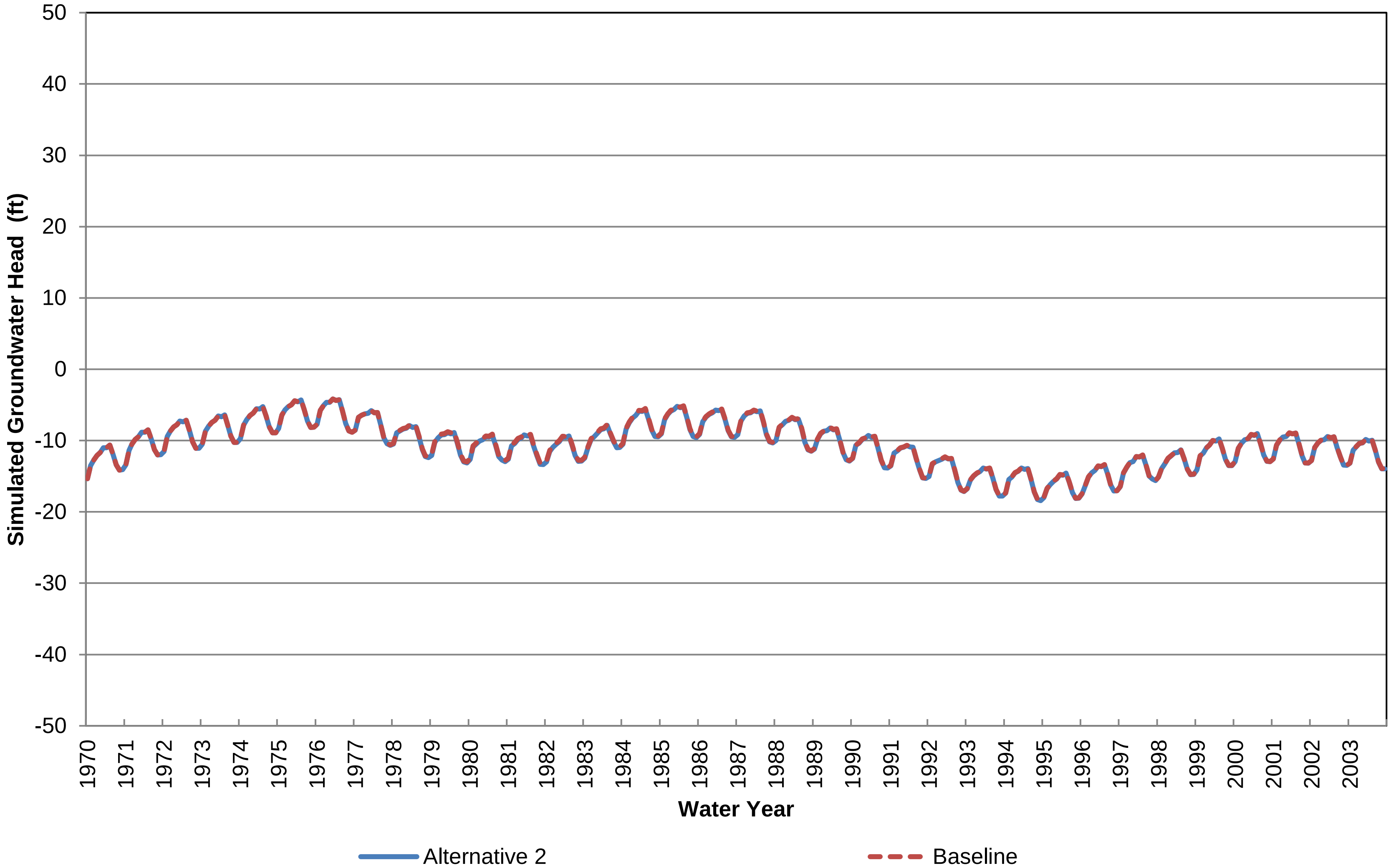
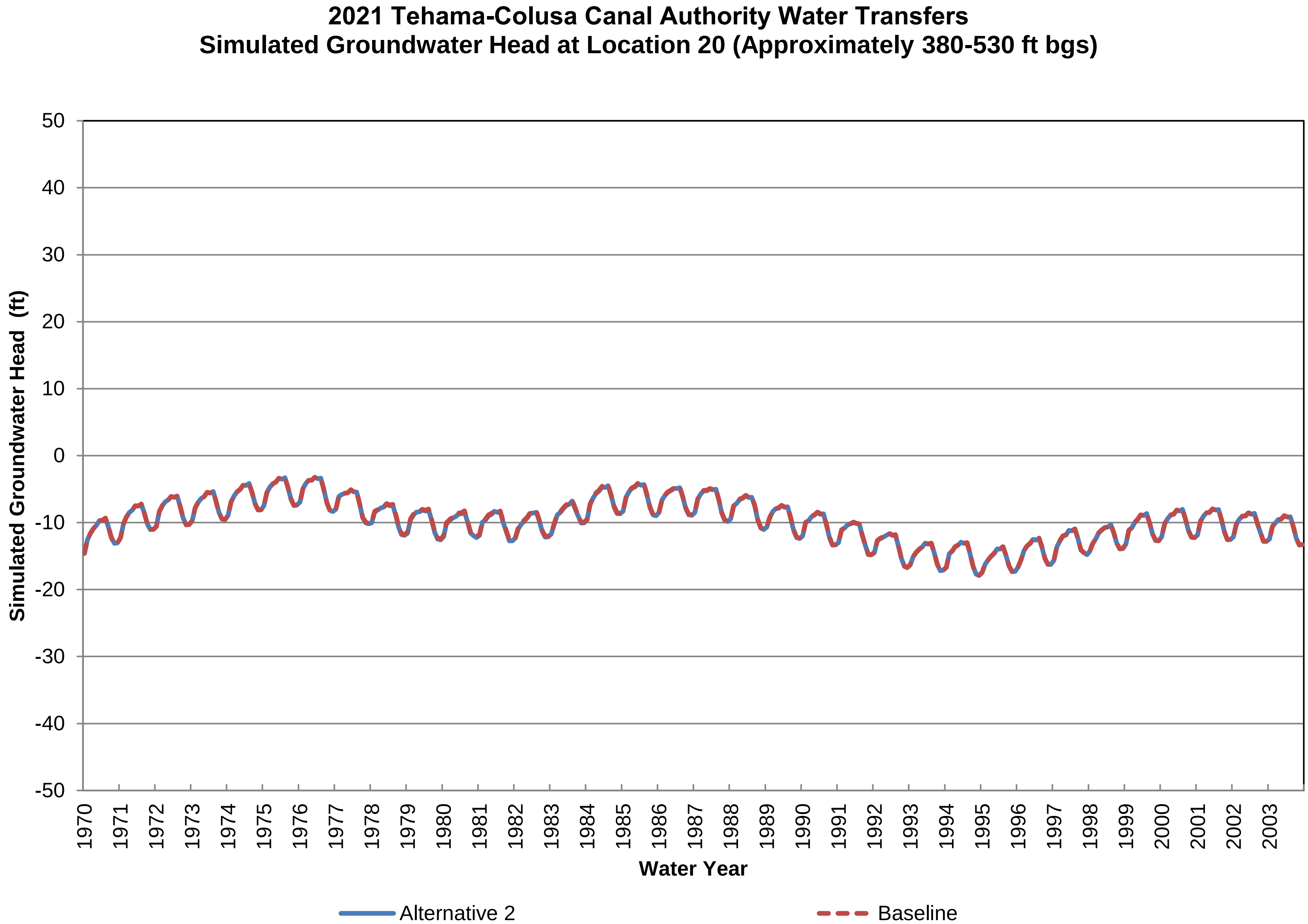
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 20 (Approximately 230-380 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 20 (Approximately 380-530 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
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1998
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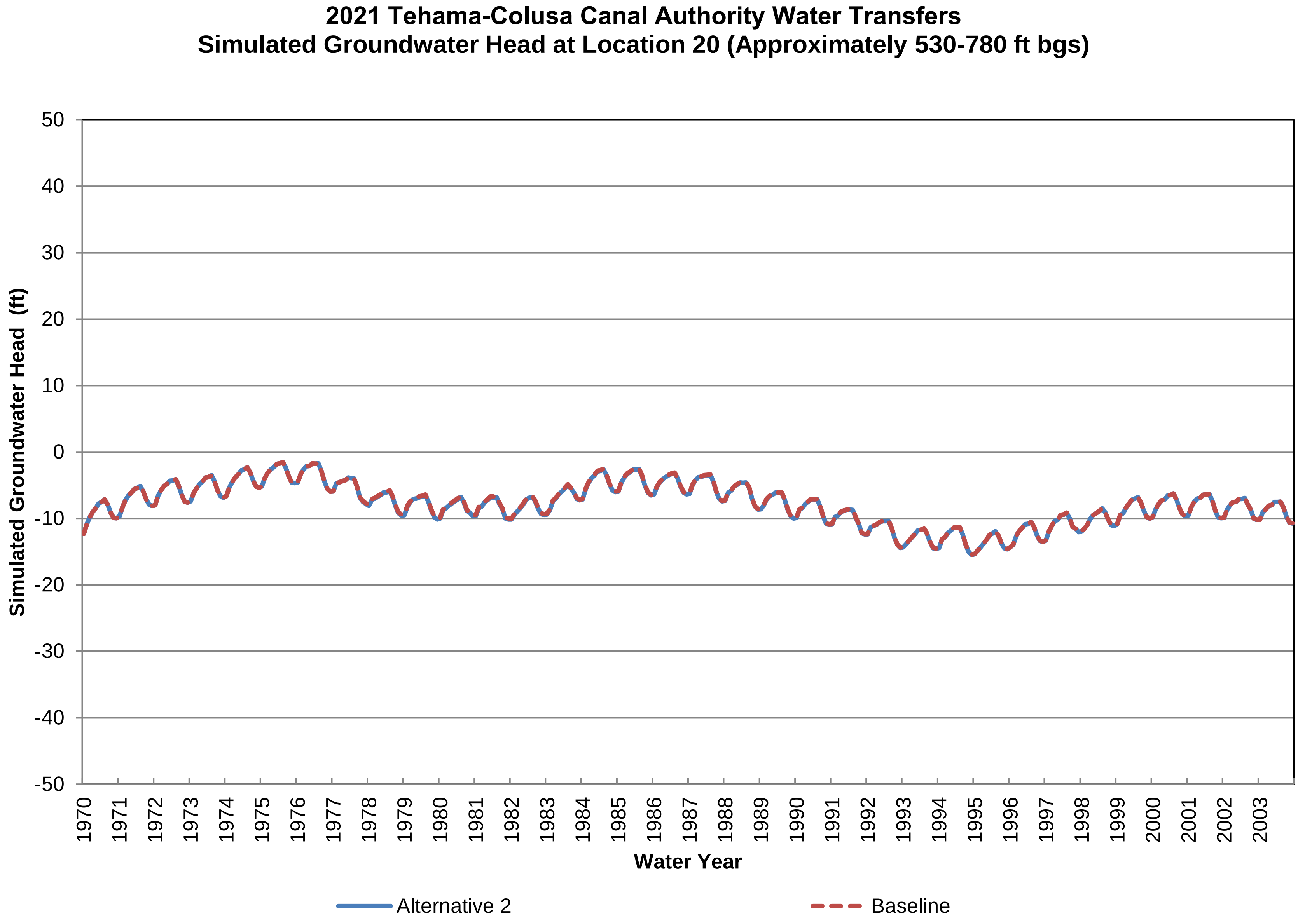
2000
2001
2002
2003
Water Year
Alternative 2
Baseline



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 20 (Approximately 530-780 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
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1987
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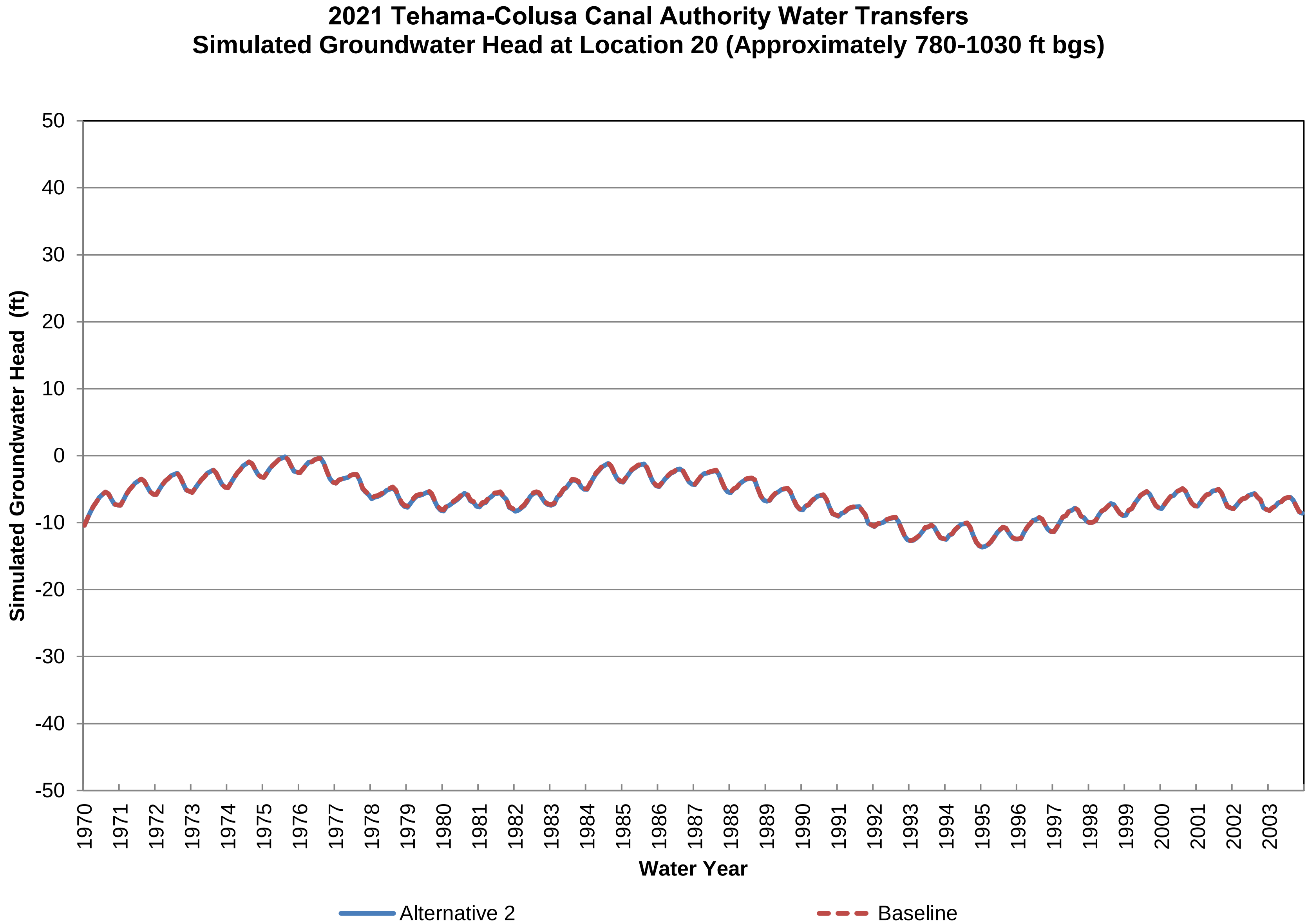
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 20 (Approximately 780-1030 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
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1976
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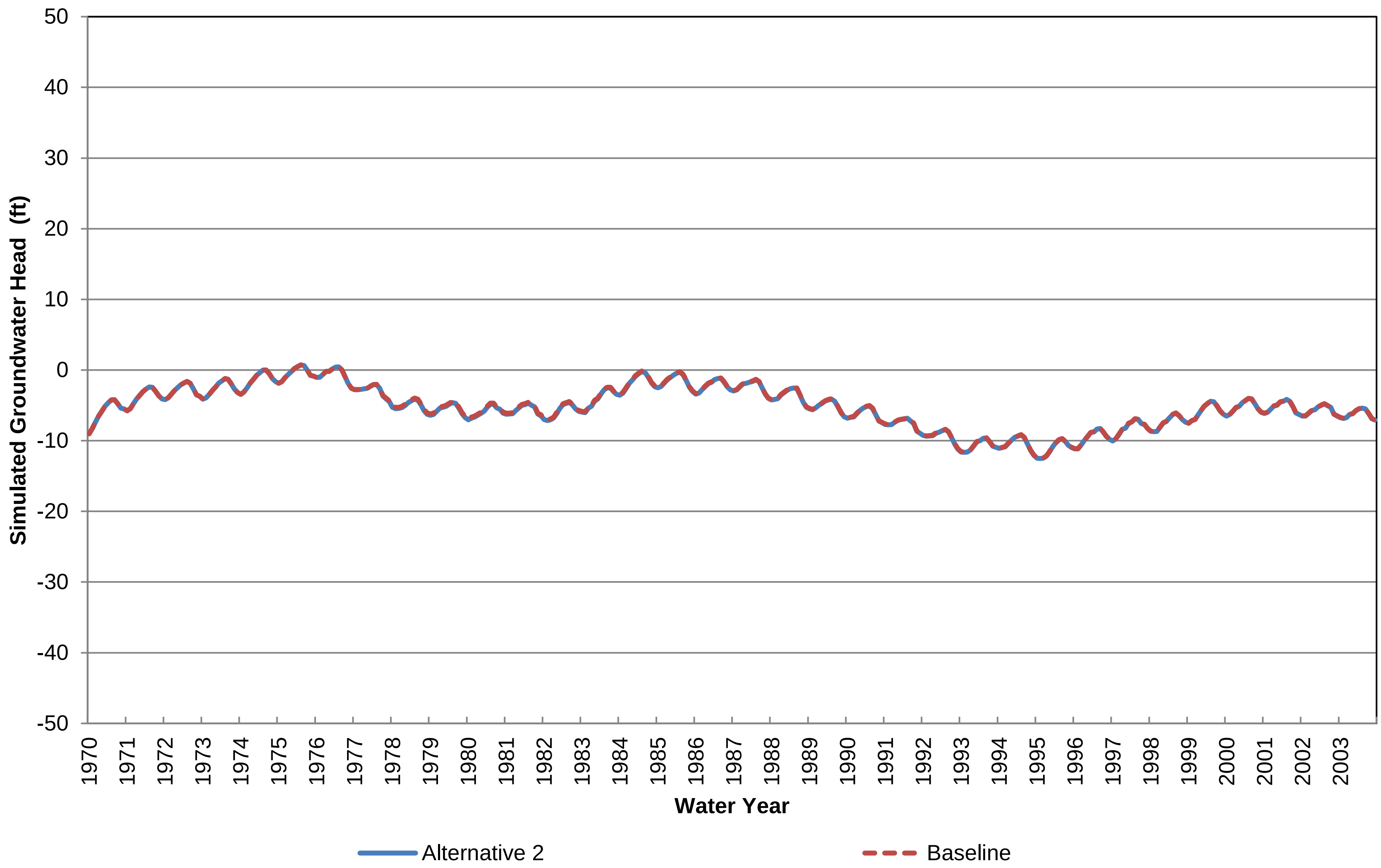
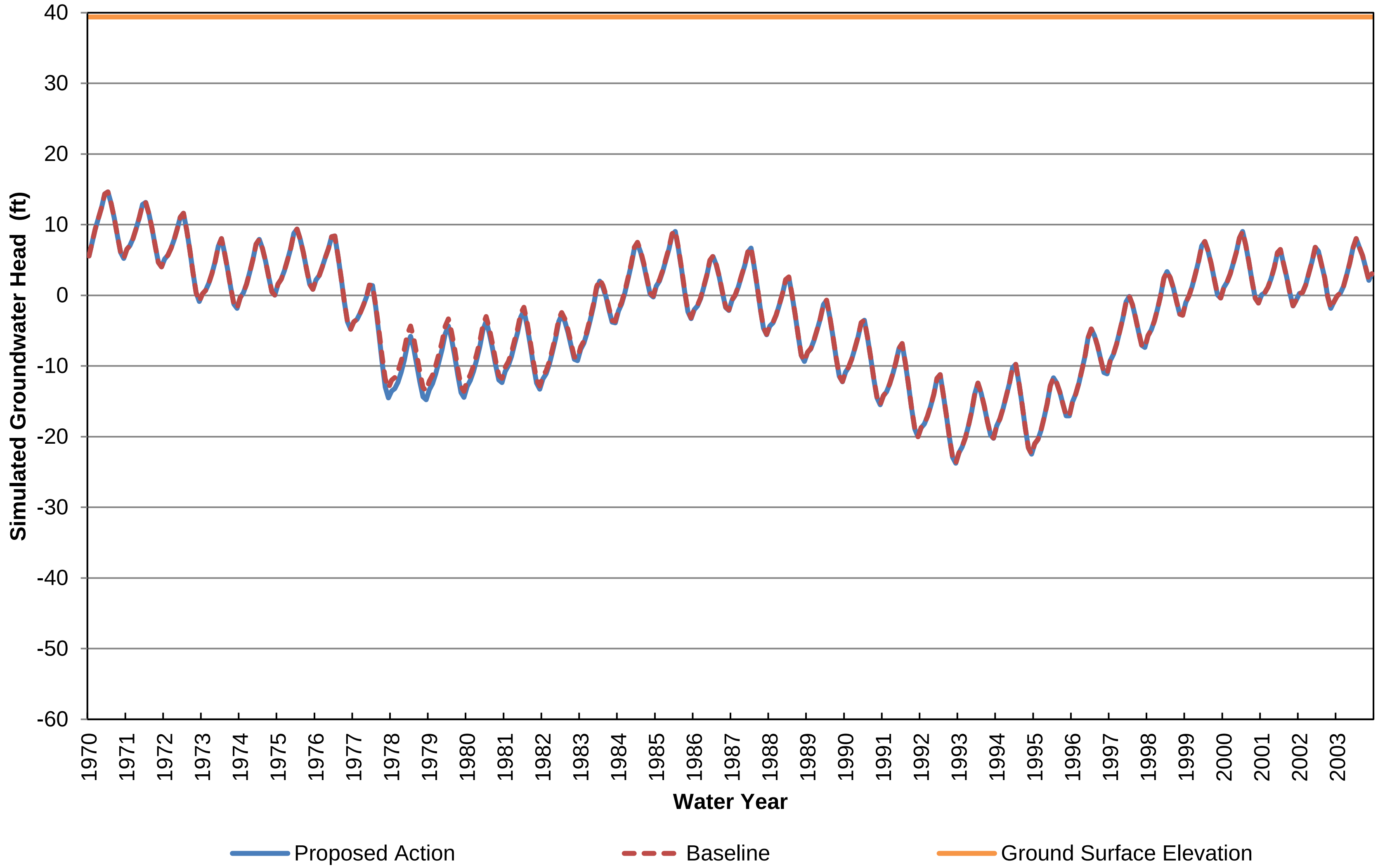
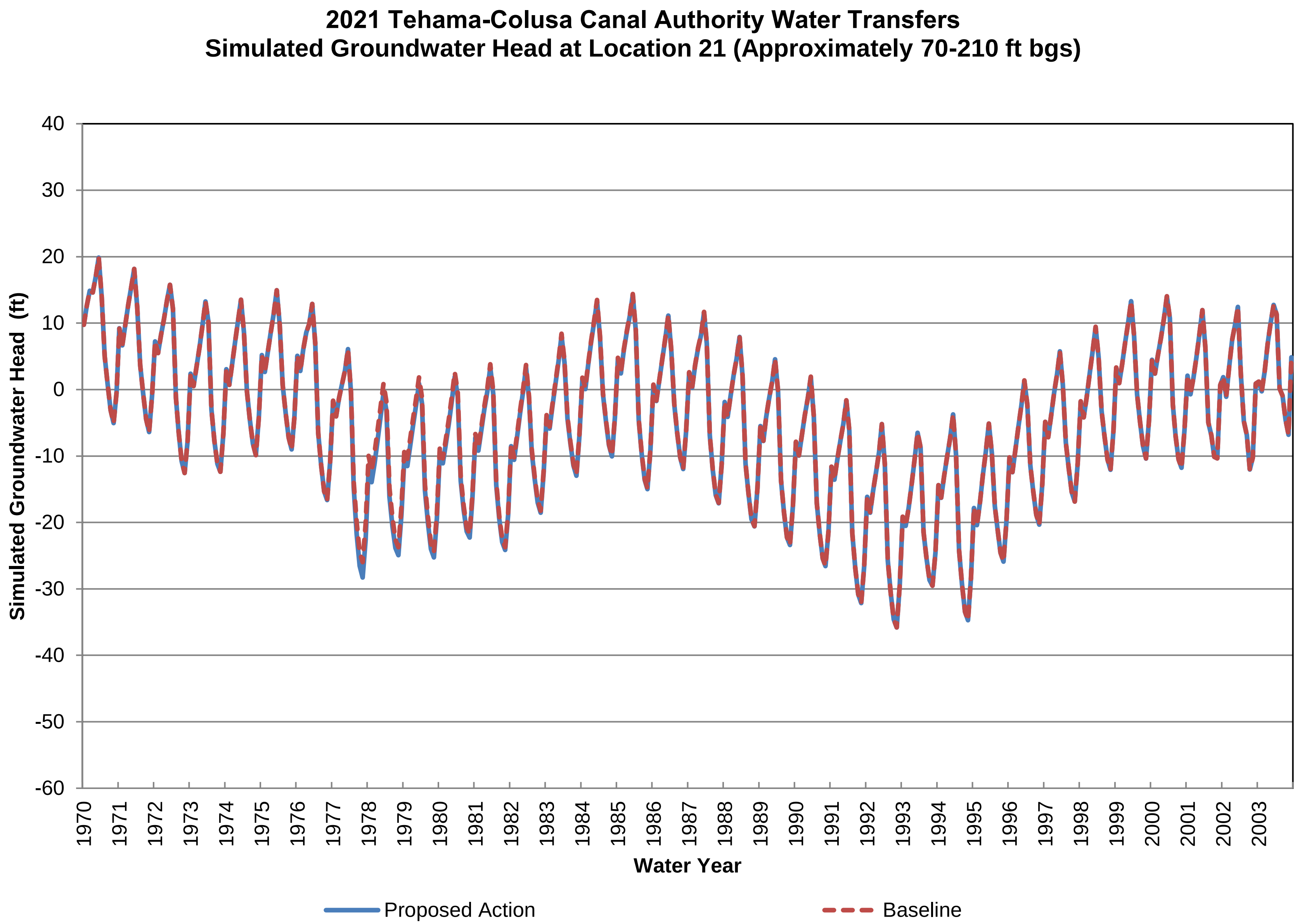
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 20 (Approximately 1030-1420 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 21 (Approximately 0-70 ft bgs)





2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 21 (Approximately 70-210 ft bgs)
Simulated Groundwater Head (ft)
40
30
20
10
0
-10
-20
-30
-40
-50
-60
1970
1971
1972
1973
1974
1975
1976
1977
1978
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1984
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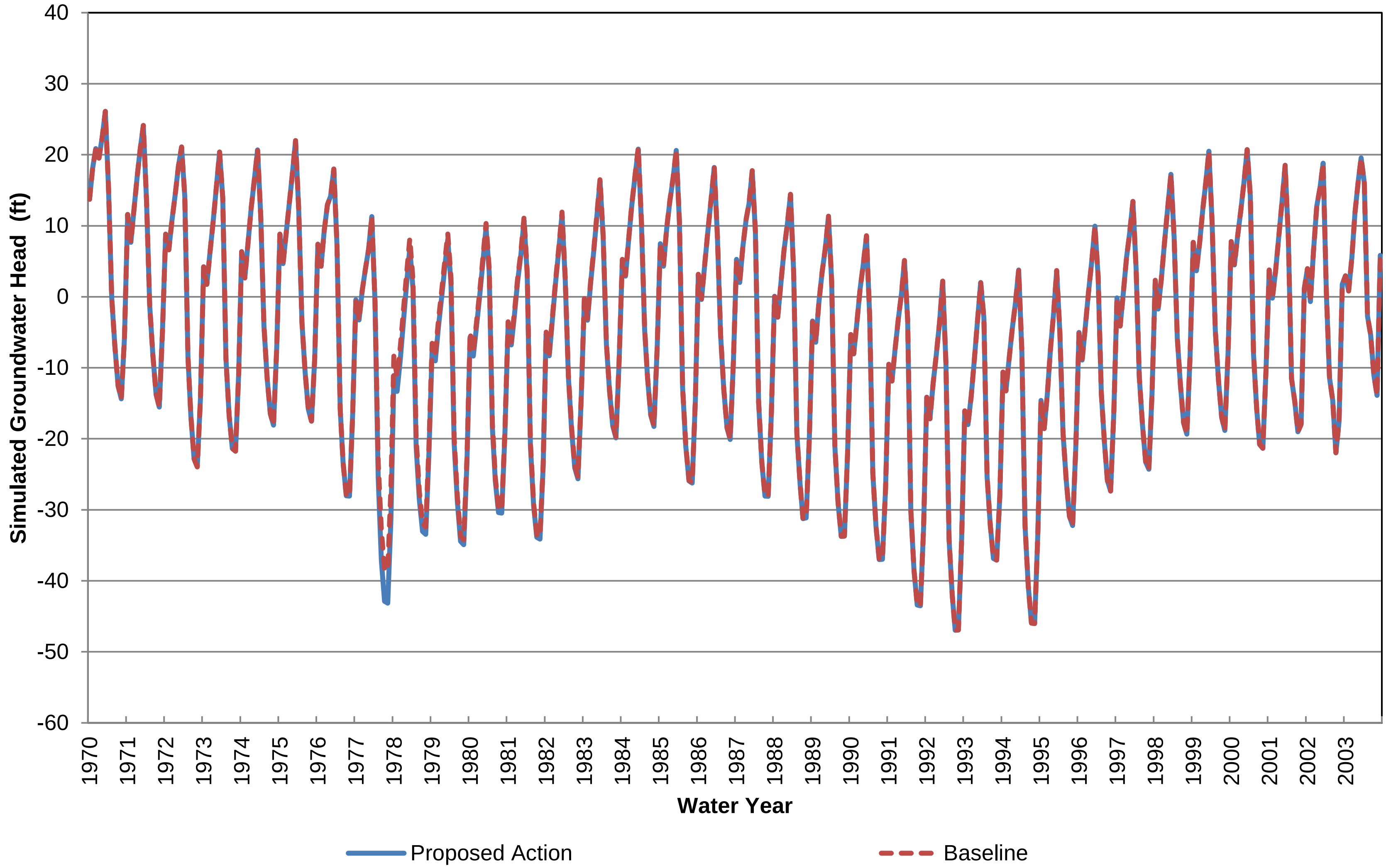
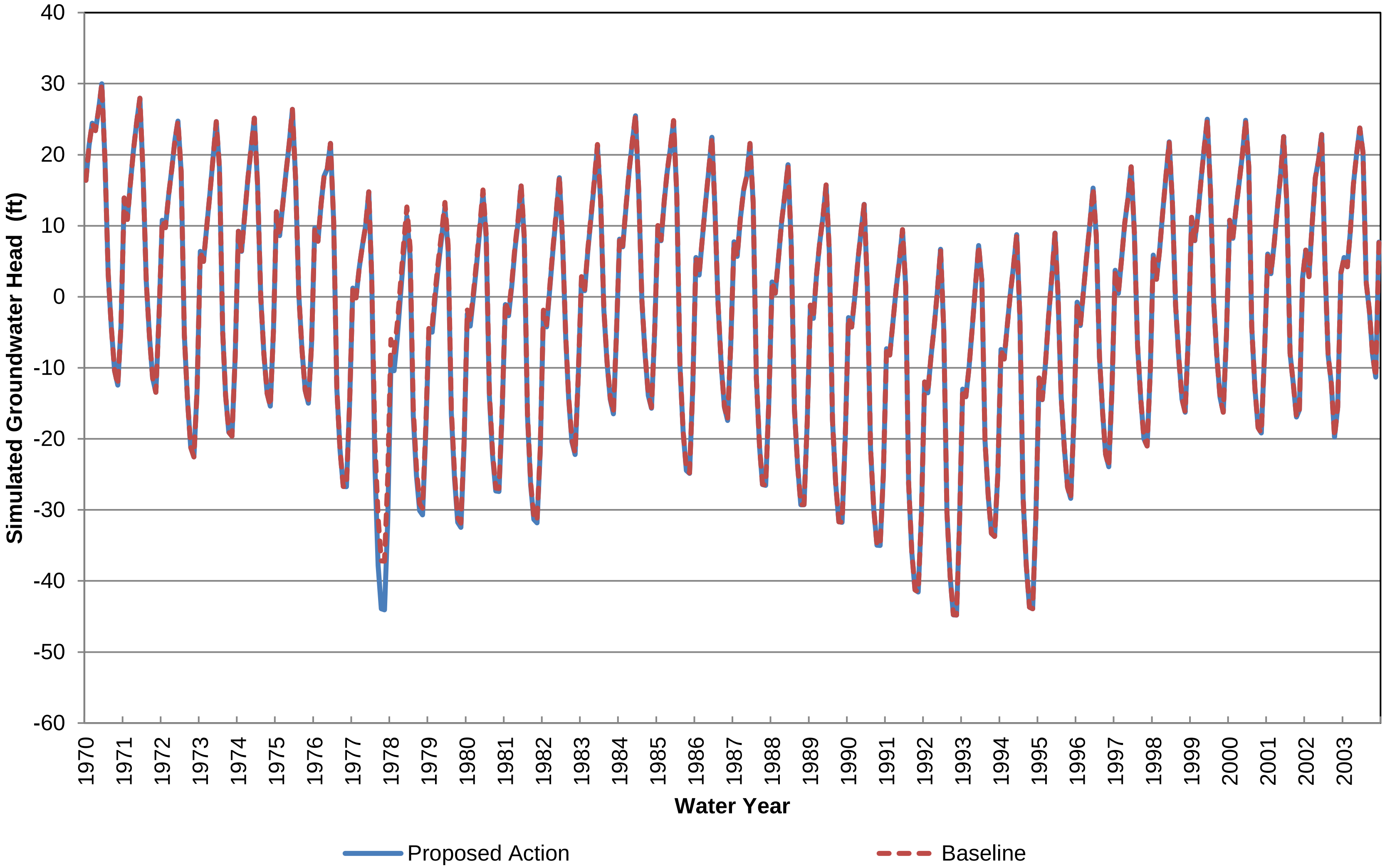
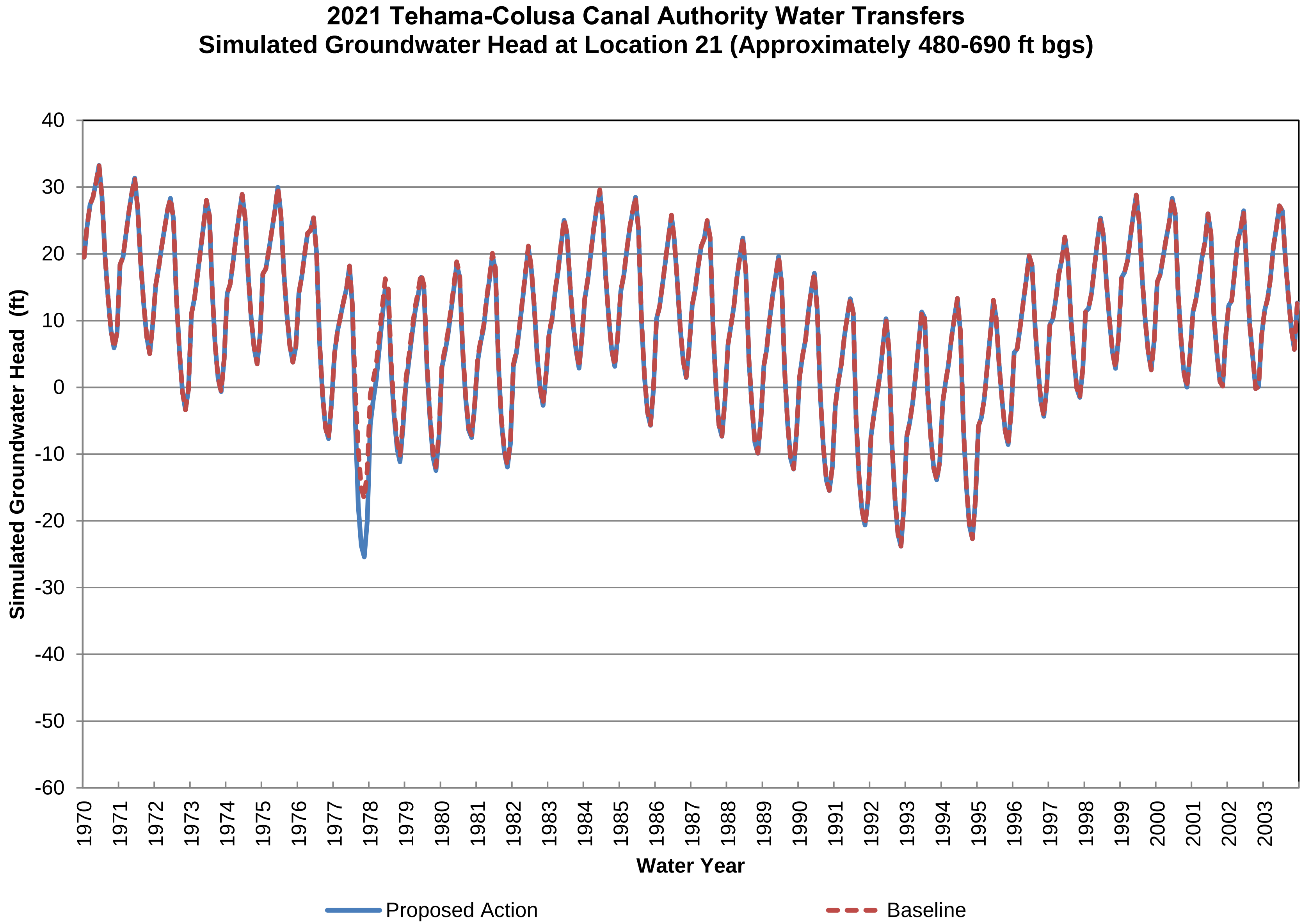
2002
2003
Water Year
Proposed Action
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 21 (Approximately 210-340 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 21 (Approximately 340-480 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 21 (Approximately 480-690 ft bgs)
Simulated Groundwater Head (ft)
40
30
20
10
0
-10
-20
-30
-40
-50
-60
1970
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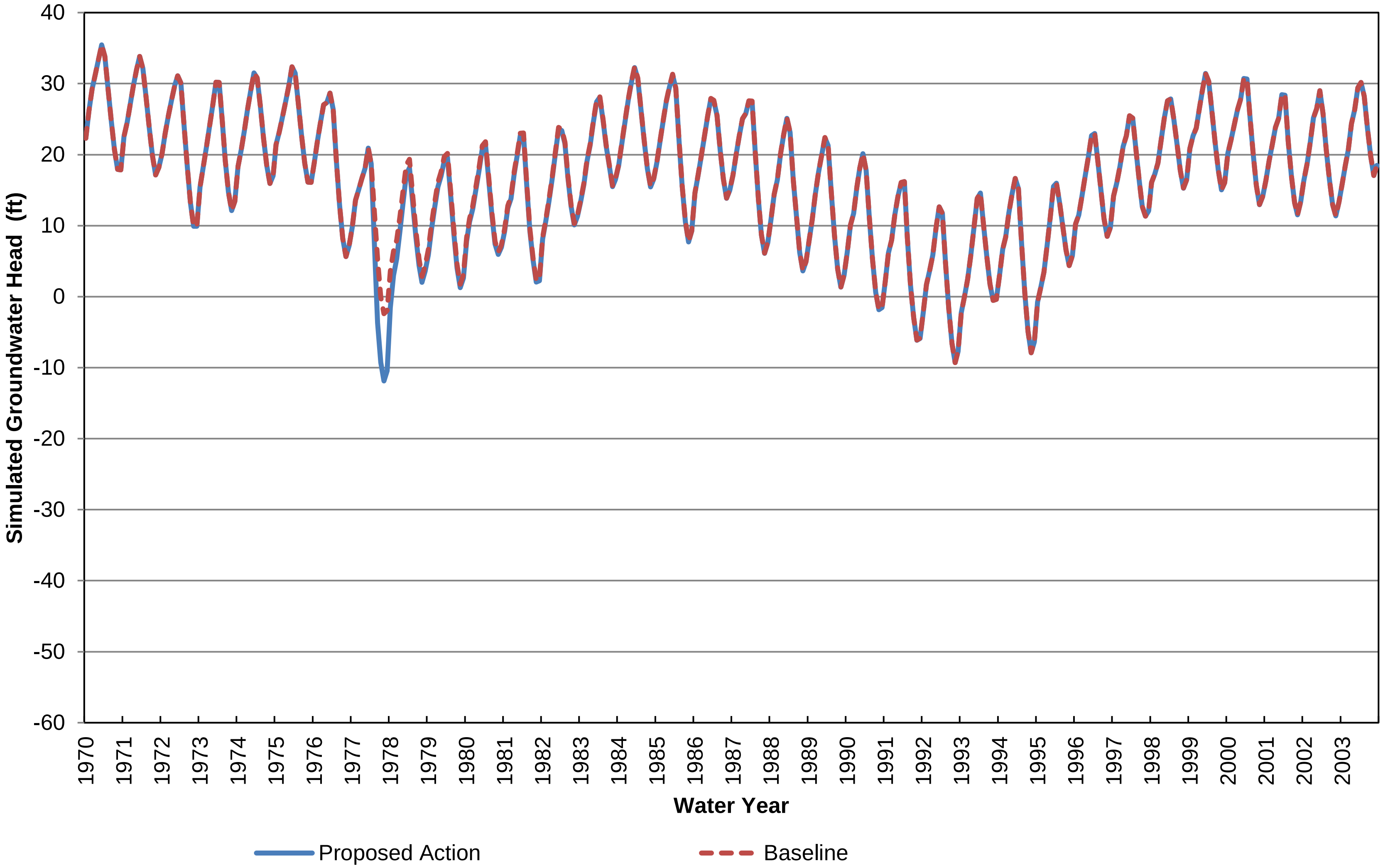
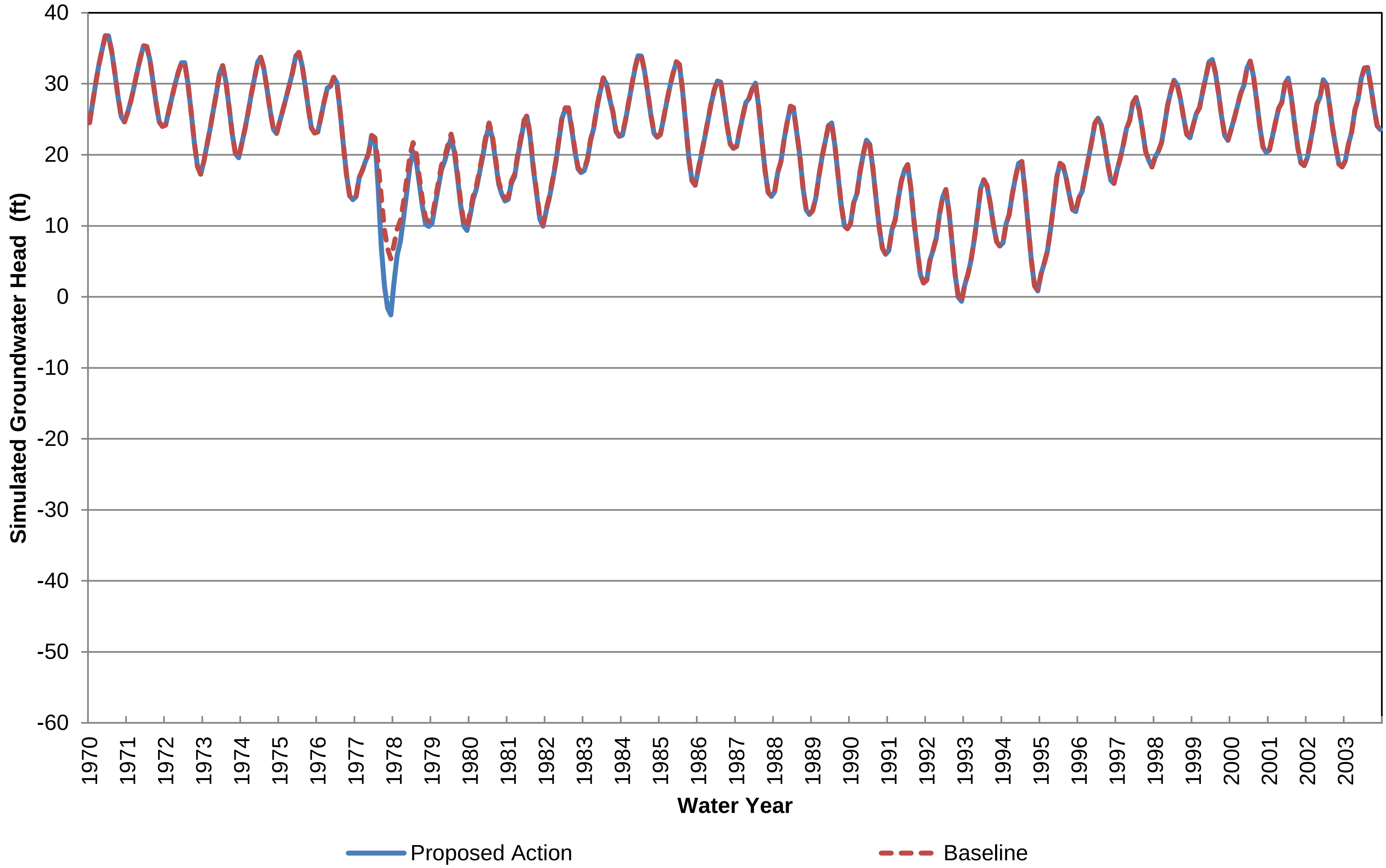
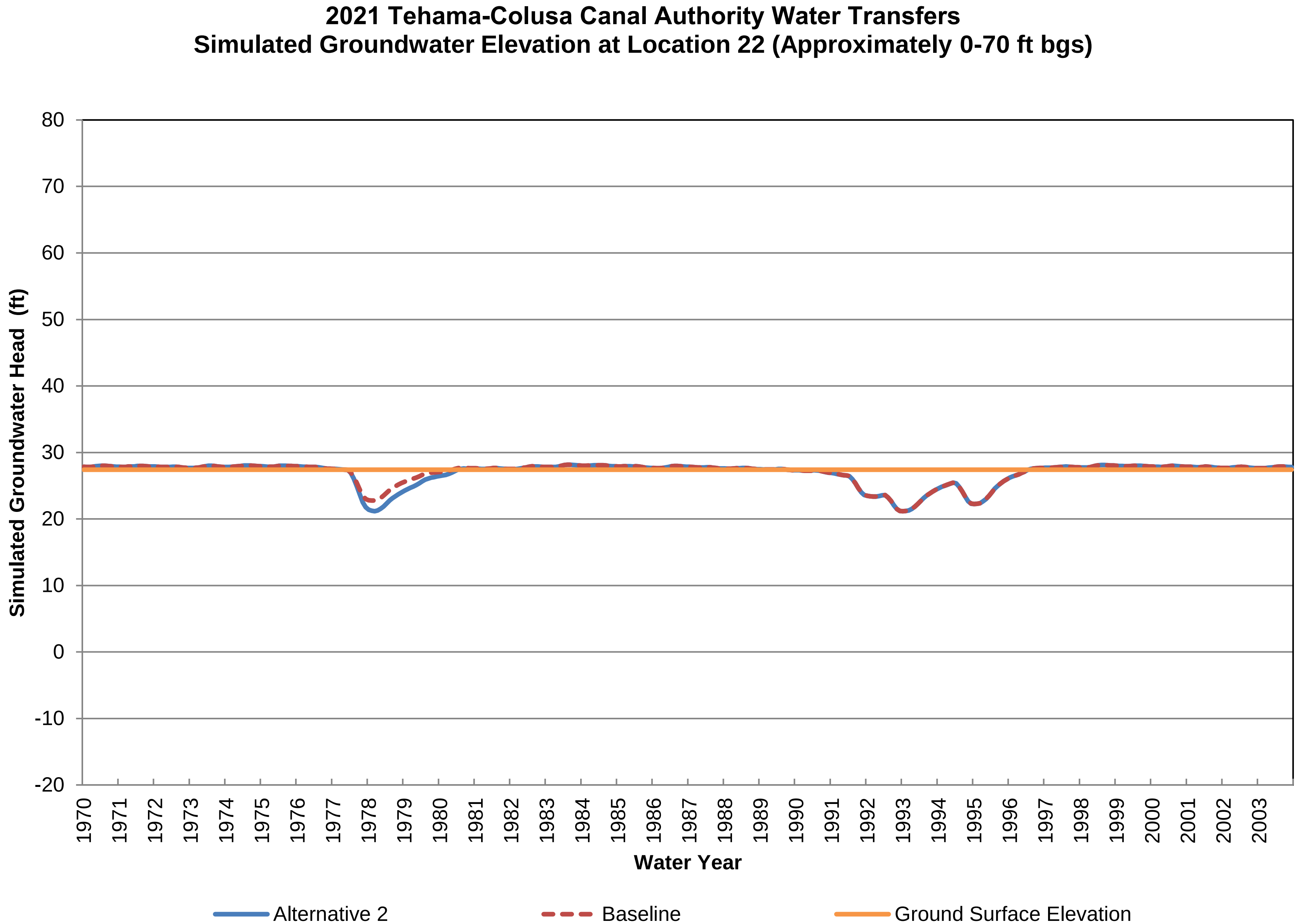
2002
2003
Water Year
Proposed Action
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 21 (Approximately 690-910 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 21 (Approximately 910-1250 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 22 (Approximately 0-70 ft bgs)
Simulated Groundwater Head (ft)
80
70
60
50
40
30
20
10
0
-10
-20
1970
1971
1972
1973
1974
1975
1976
1977
1978
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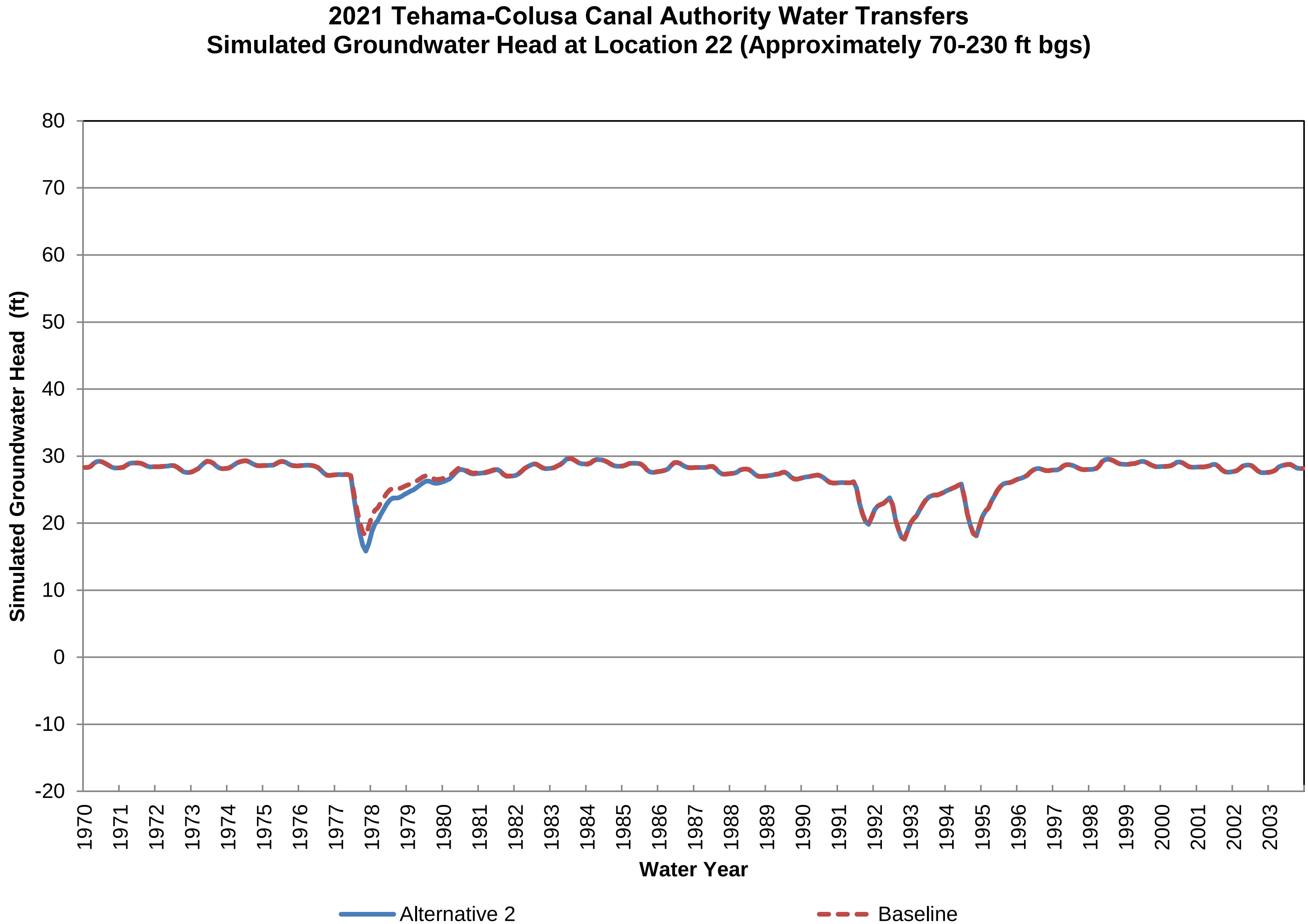
2002
2003
Water Year
Alternative 2
Baseline
Ground Surface Elevation


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 22 (Approximately 70-230 ft bgs)
Simulated Groundwater Head (ft)
80
70
60
50
40
30
20
10
0
-10
-20
1970
1971
1972
1973
1974
1975
1976
1977
1978
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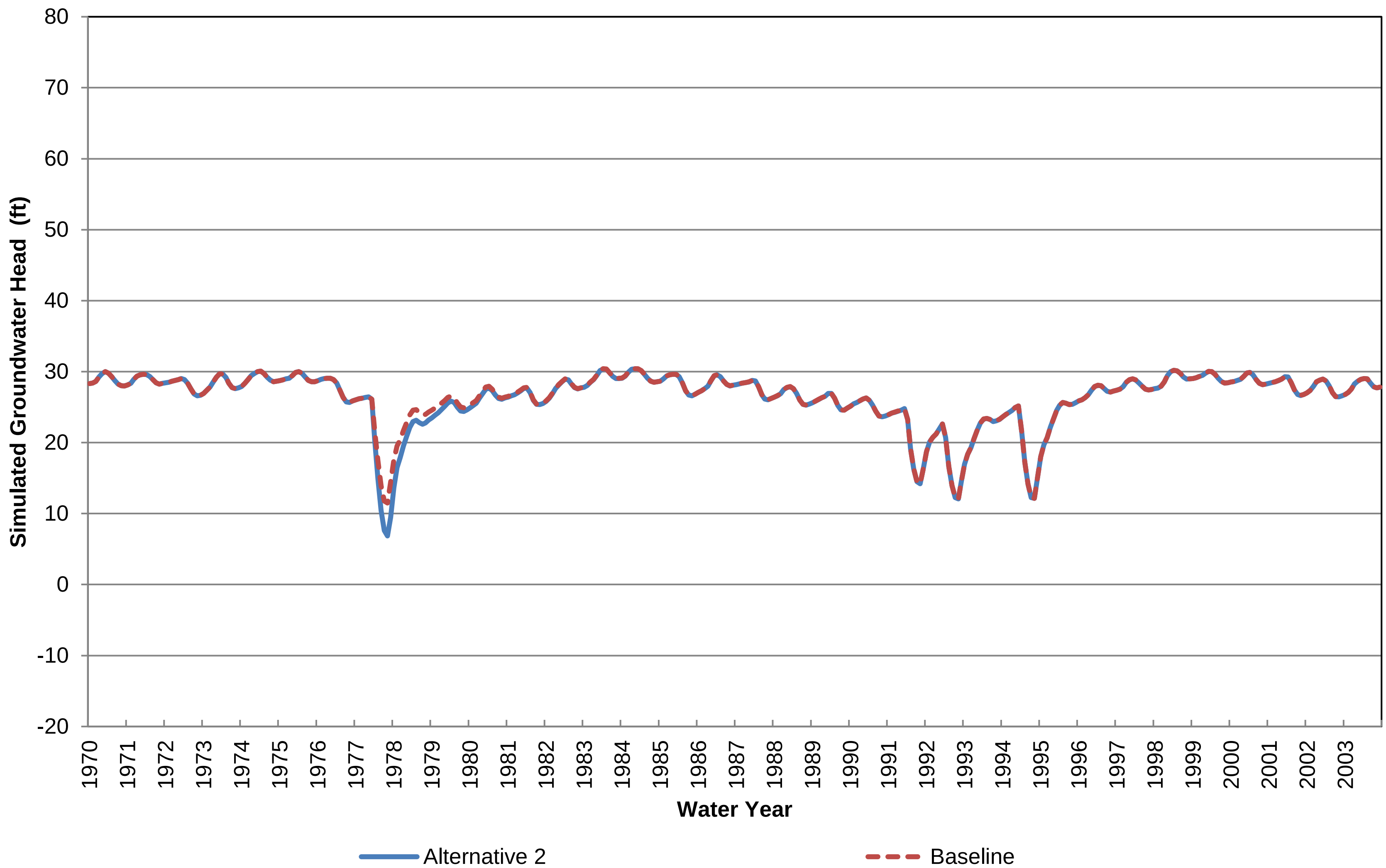
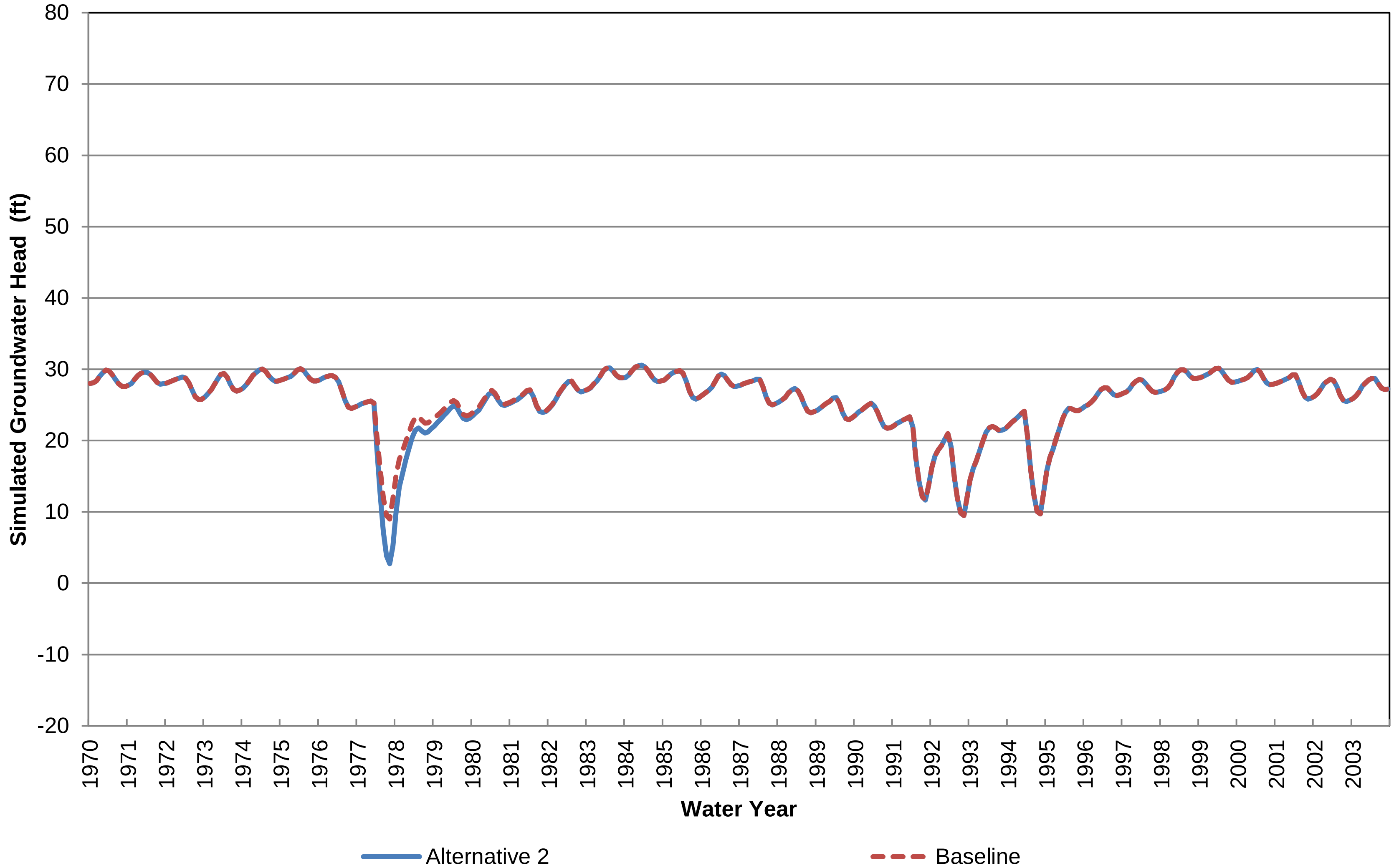
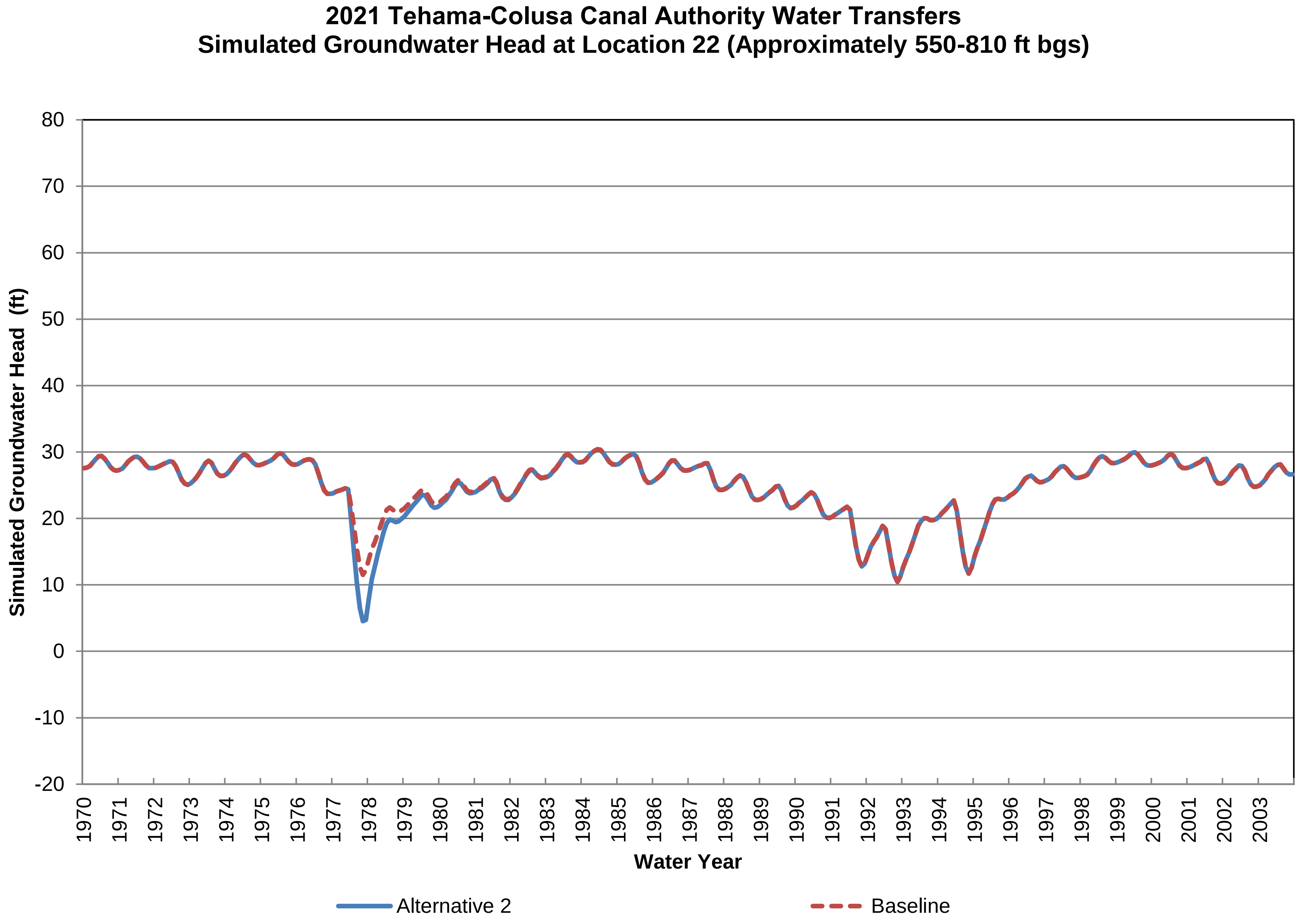
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 22 (Approximately 230-390 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 22 (Approximately 390-550 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 22 (Approximately 550-810 ft bgs)
Simulated Groundwater Head (ft)
80
70
60
50
40
30
20
10
0
-10
-20
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
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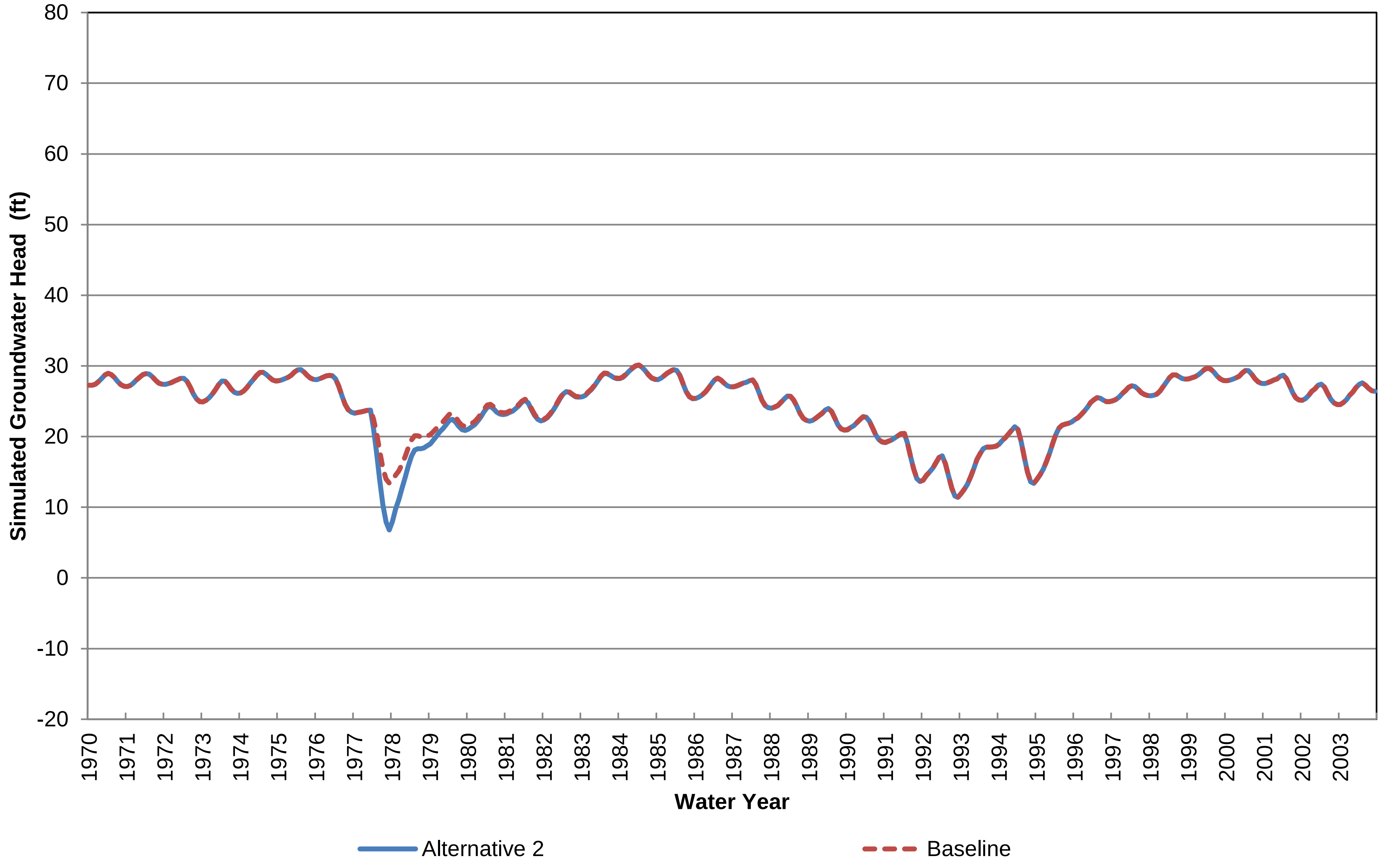
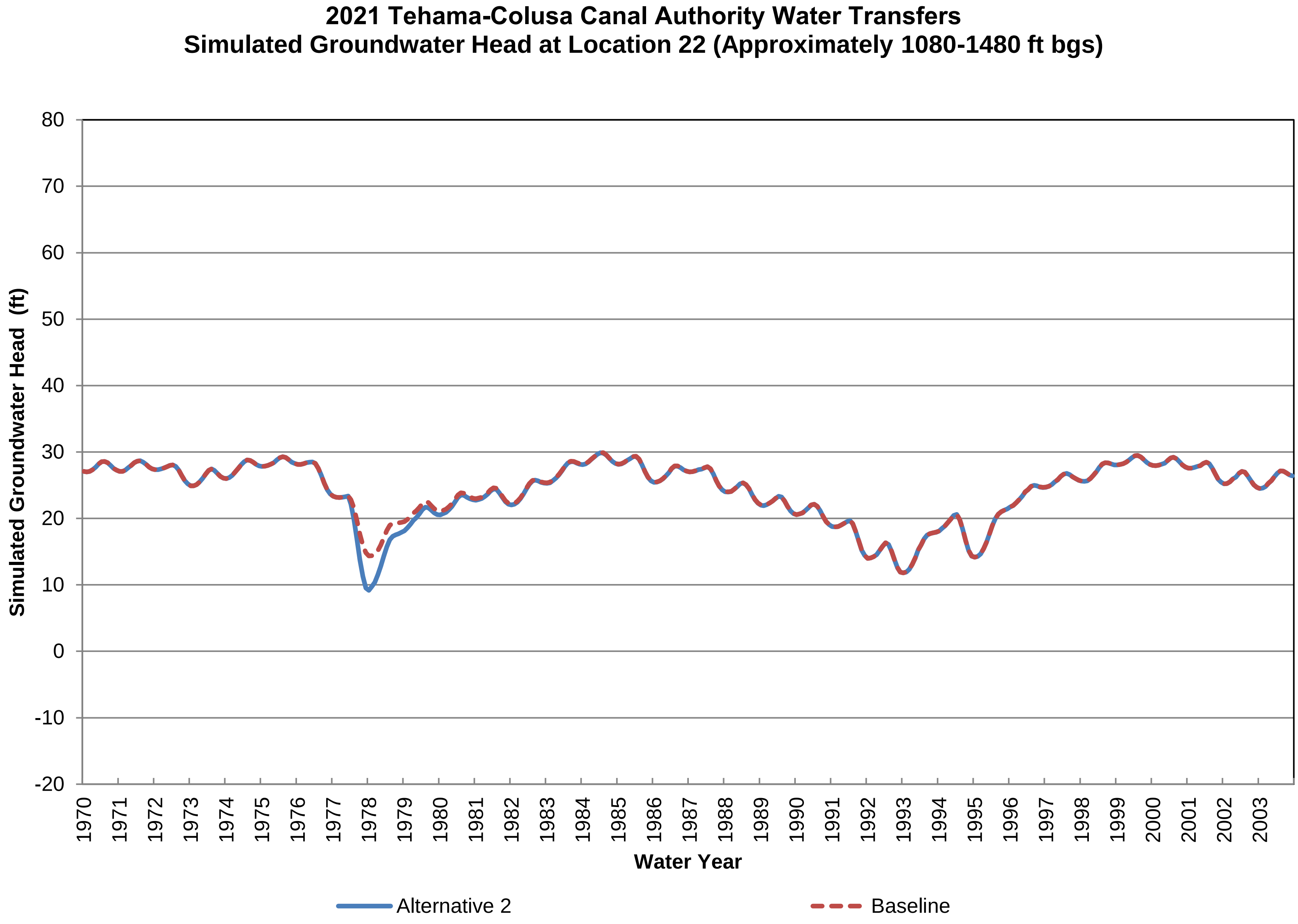
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 22 (Approximately 810-1080 ft bgs)





2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 22 (Approximately 1080-1480 ft bgs)
Simulated Groundwater Head (ft)
80
70
60
50
40
30
20
10
0
-10
-20
1970
1971
1972
1973
1974
1975
1976
1977
1978
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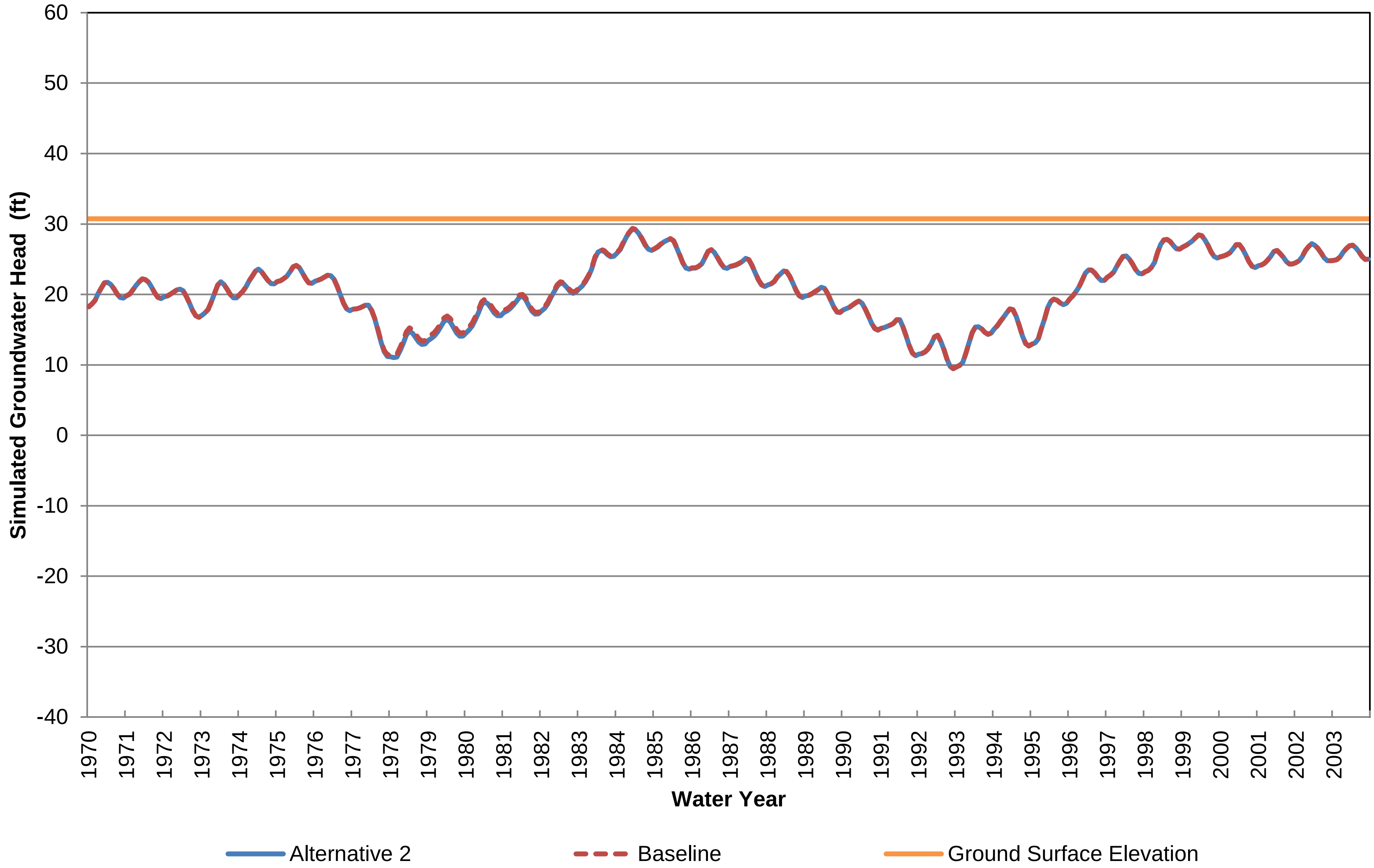
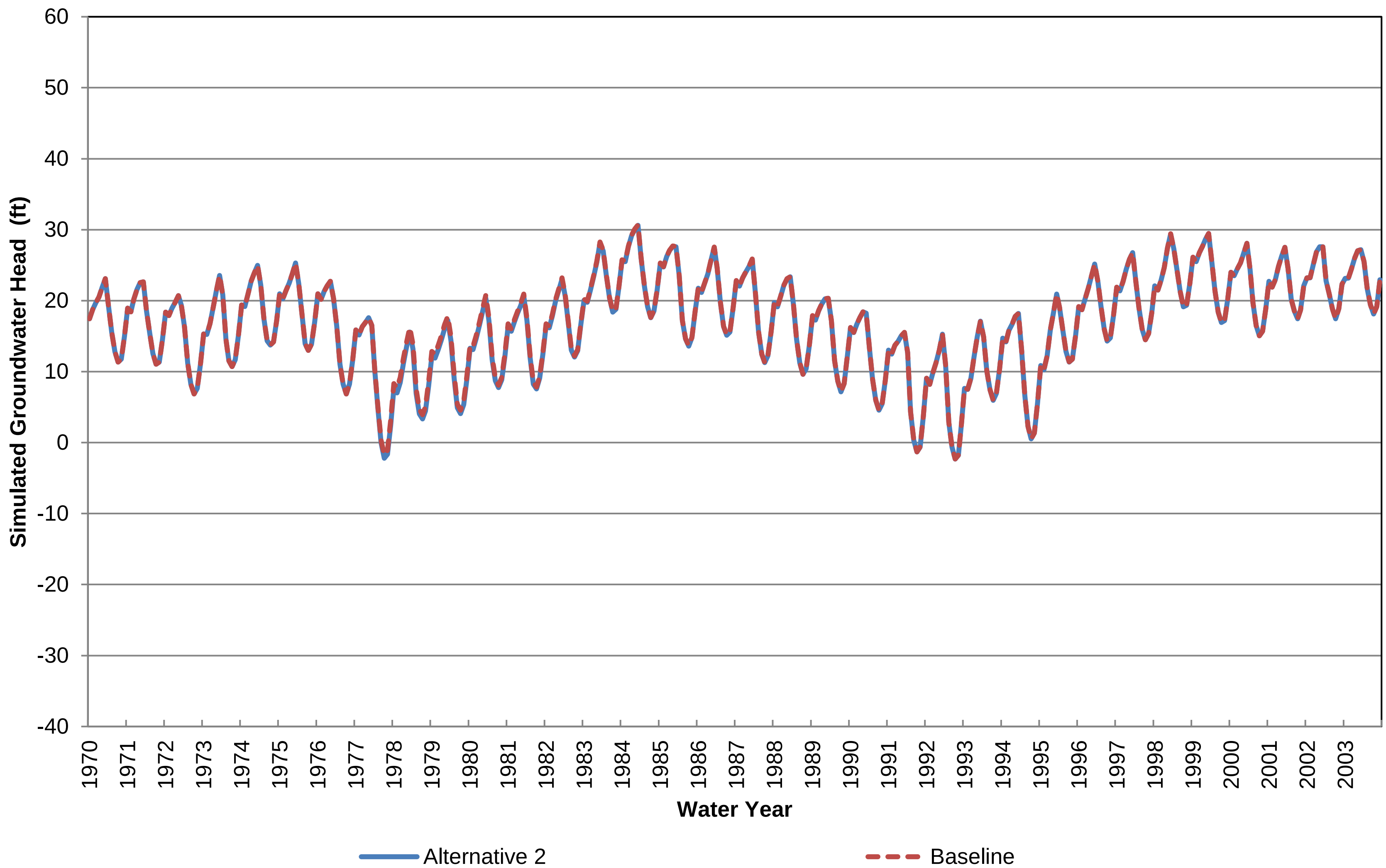
2001
2002
2003
Water Year
Alternative 2
Baseline

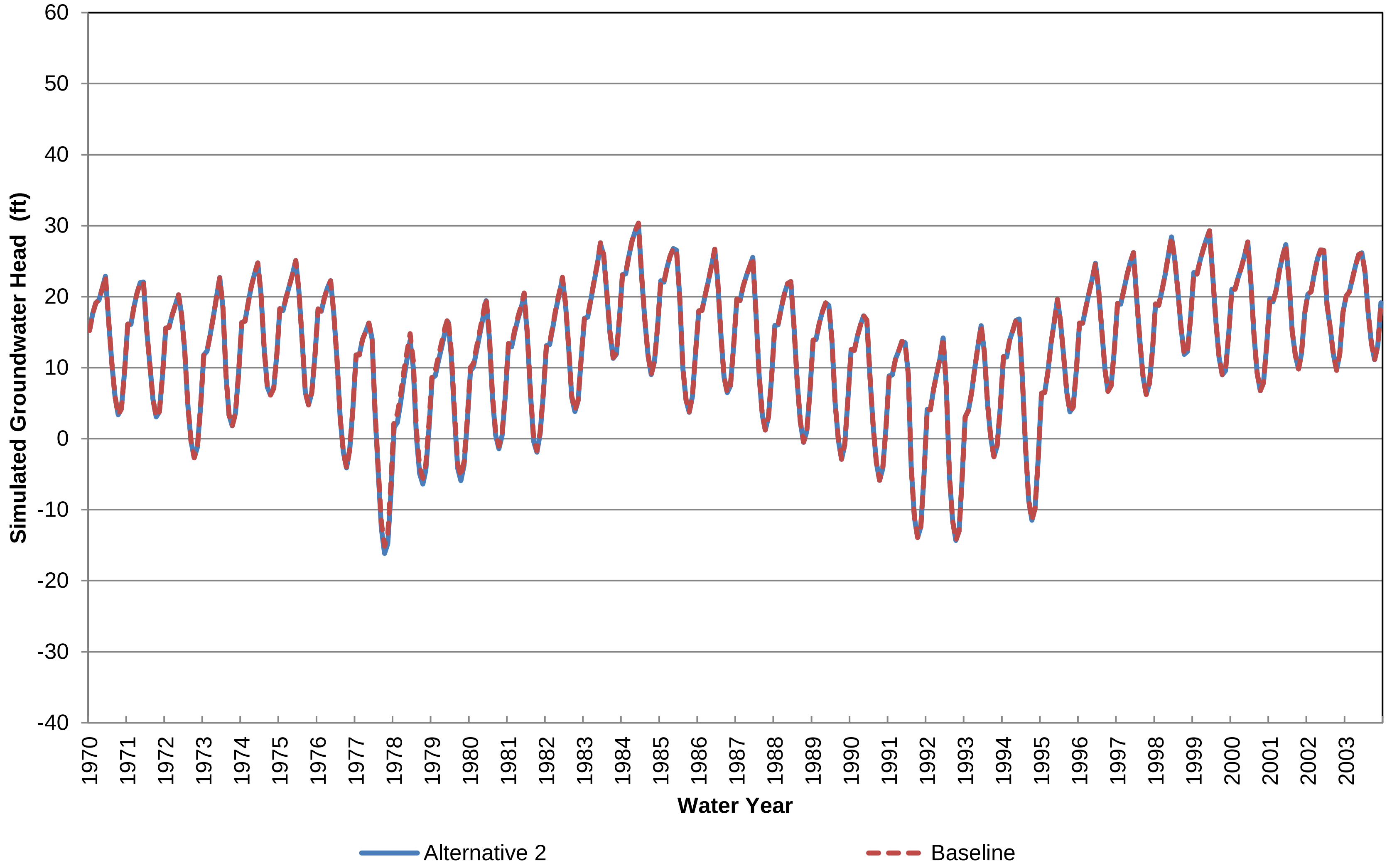
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 23 (Approximately 0-70 ft bgs)



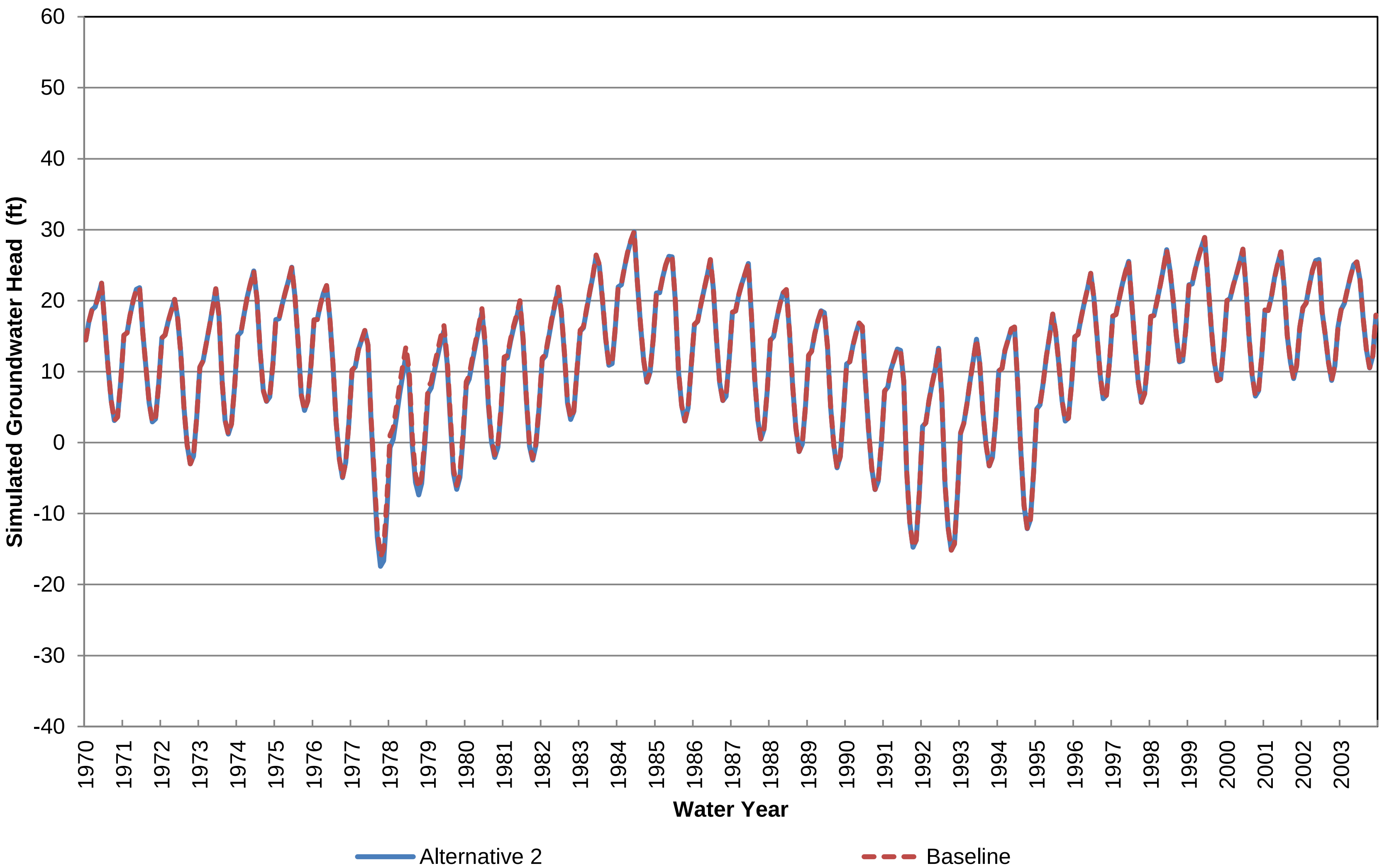
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 23 (Approximately 70-290 ft bgs)



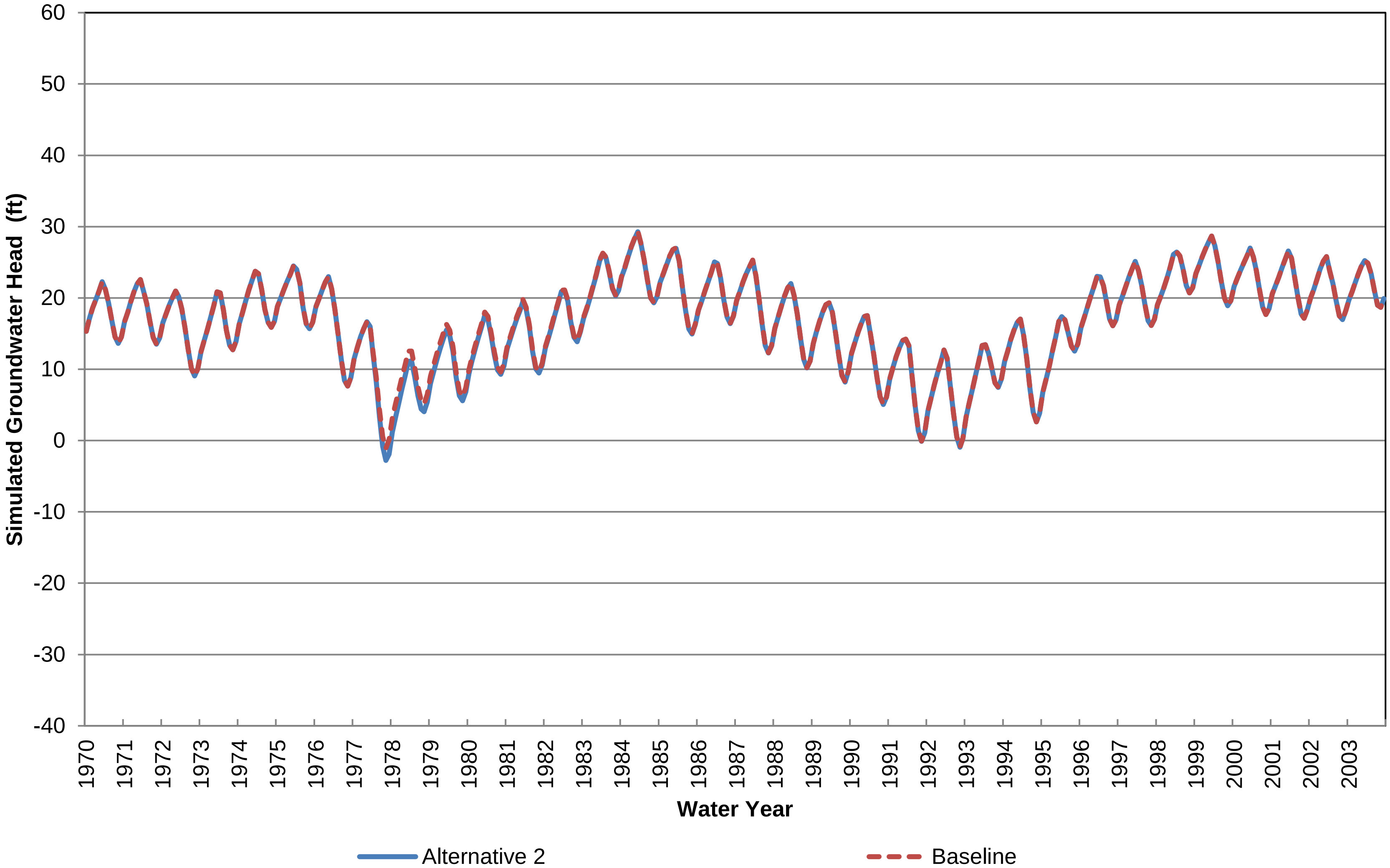
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 23 (Approximately 290-520 ft bgs)



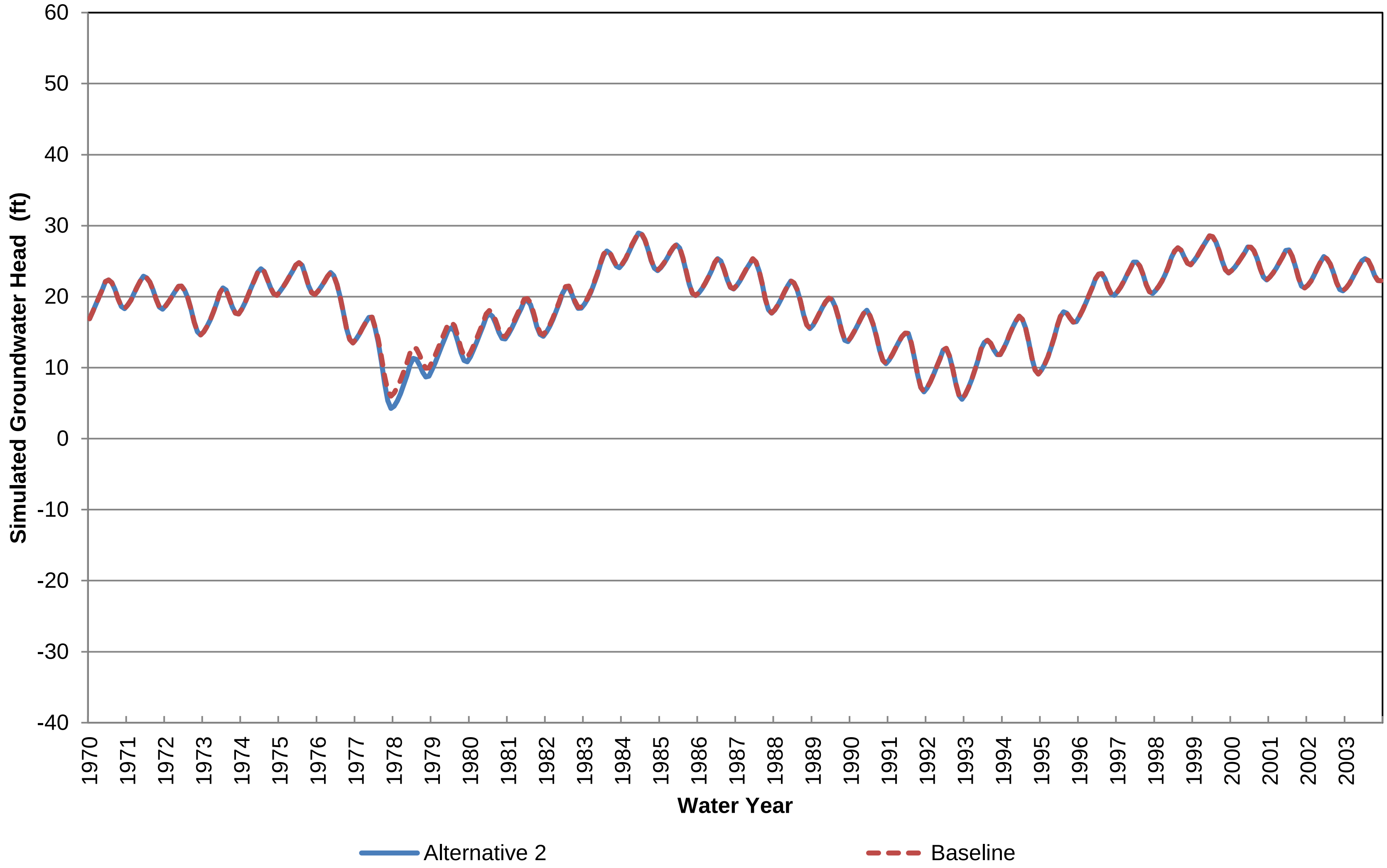
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 23 (Approximately 520-740 ft bgs)



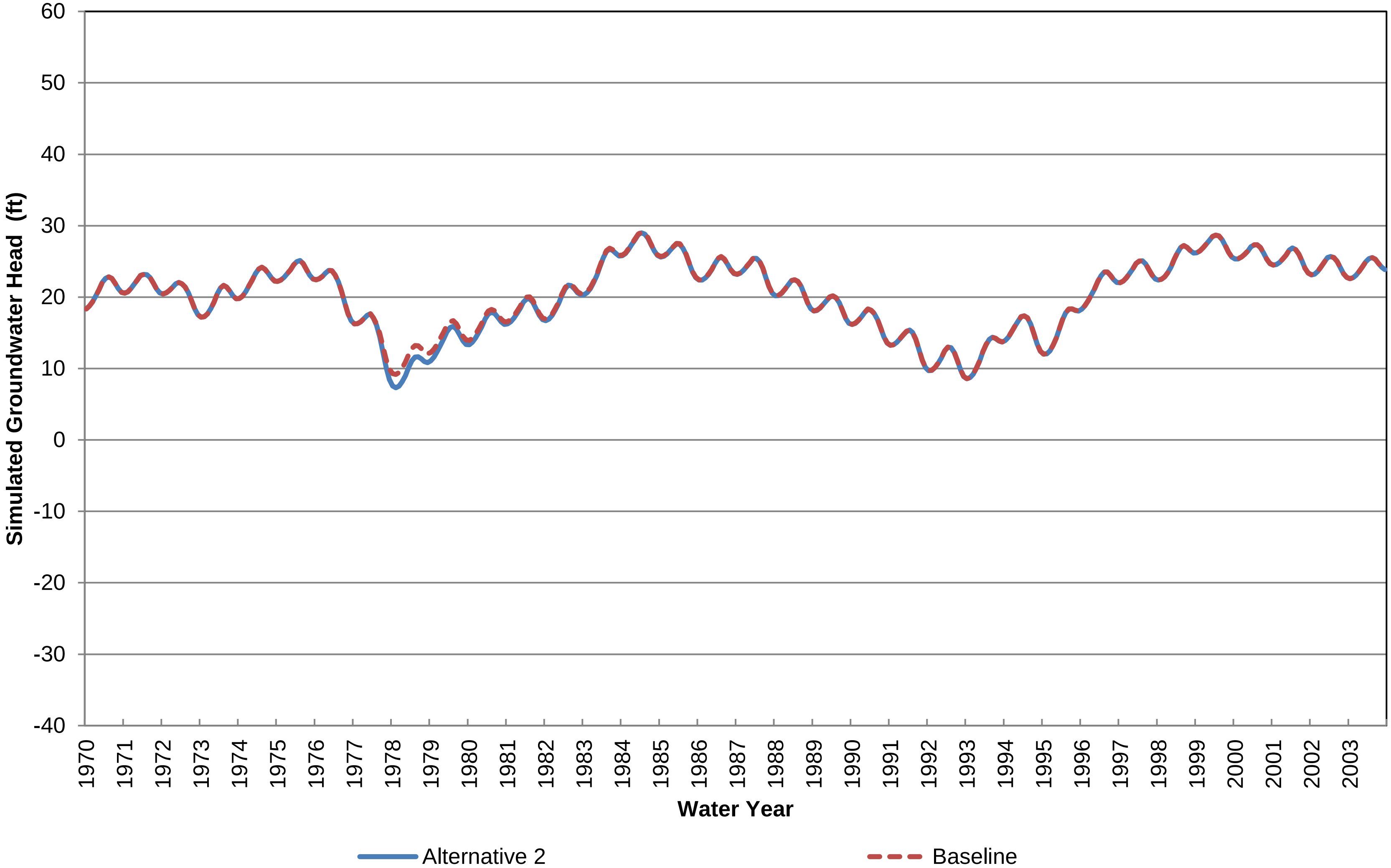
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 23 (Approximately 740-1120 ft bgs)



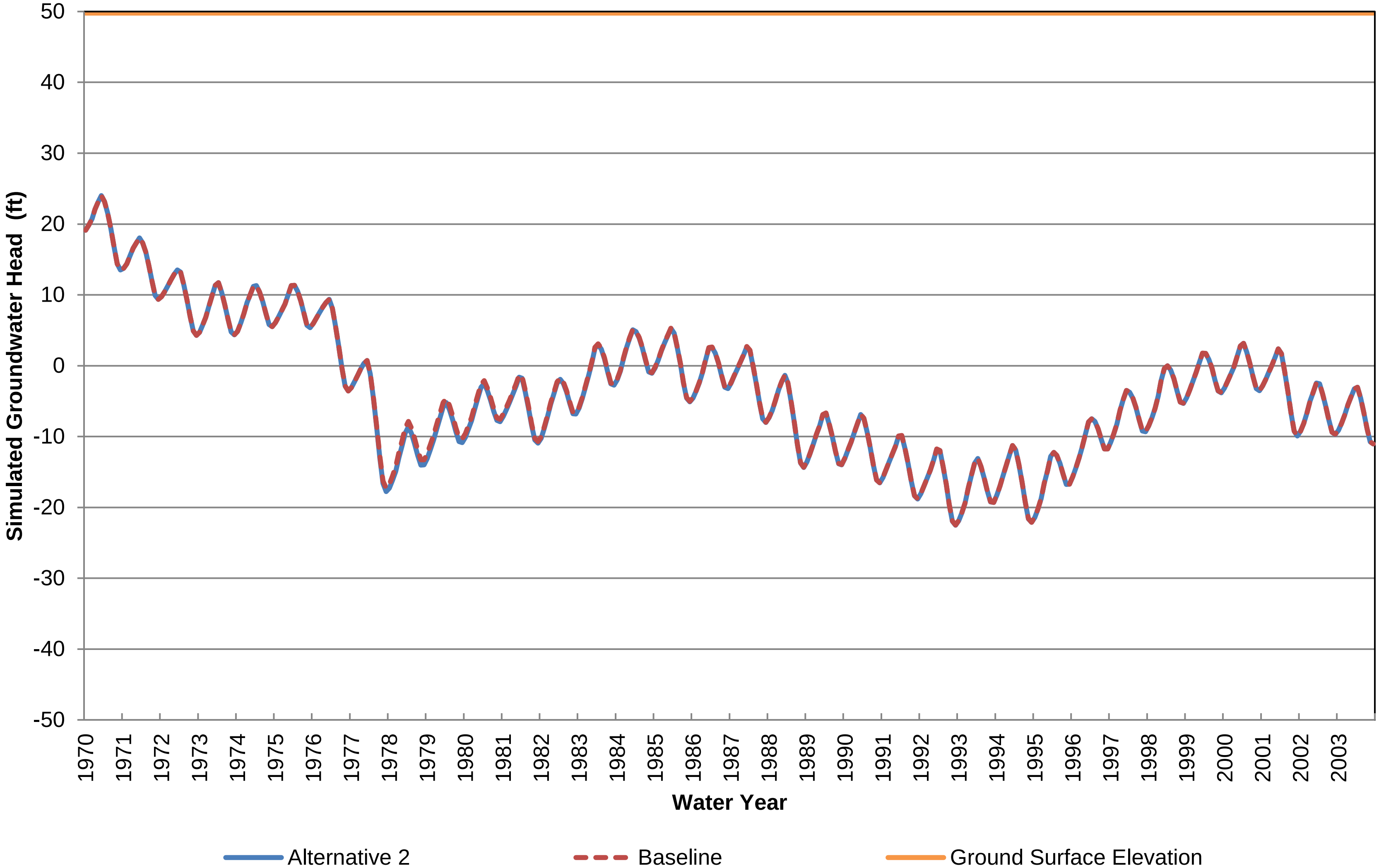
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 23 (Approximately 1120-1500 ft bgs)

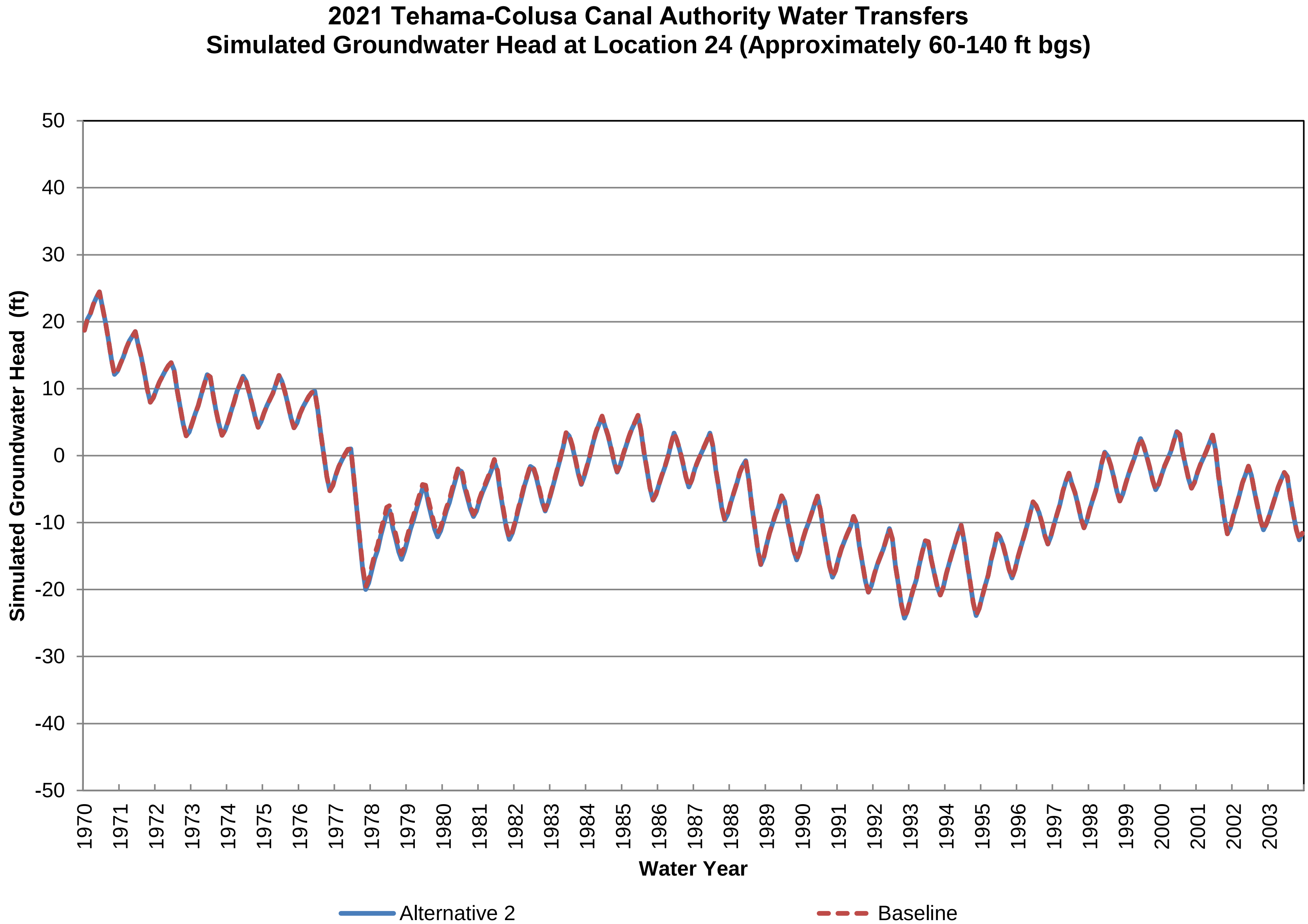


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 23 (Approximately 1500-2050 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 24 (Approximately 0-60 ft bgs)





2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 24 (Approximately 60-140 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
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1998
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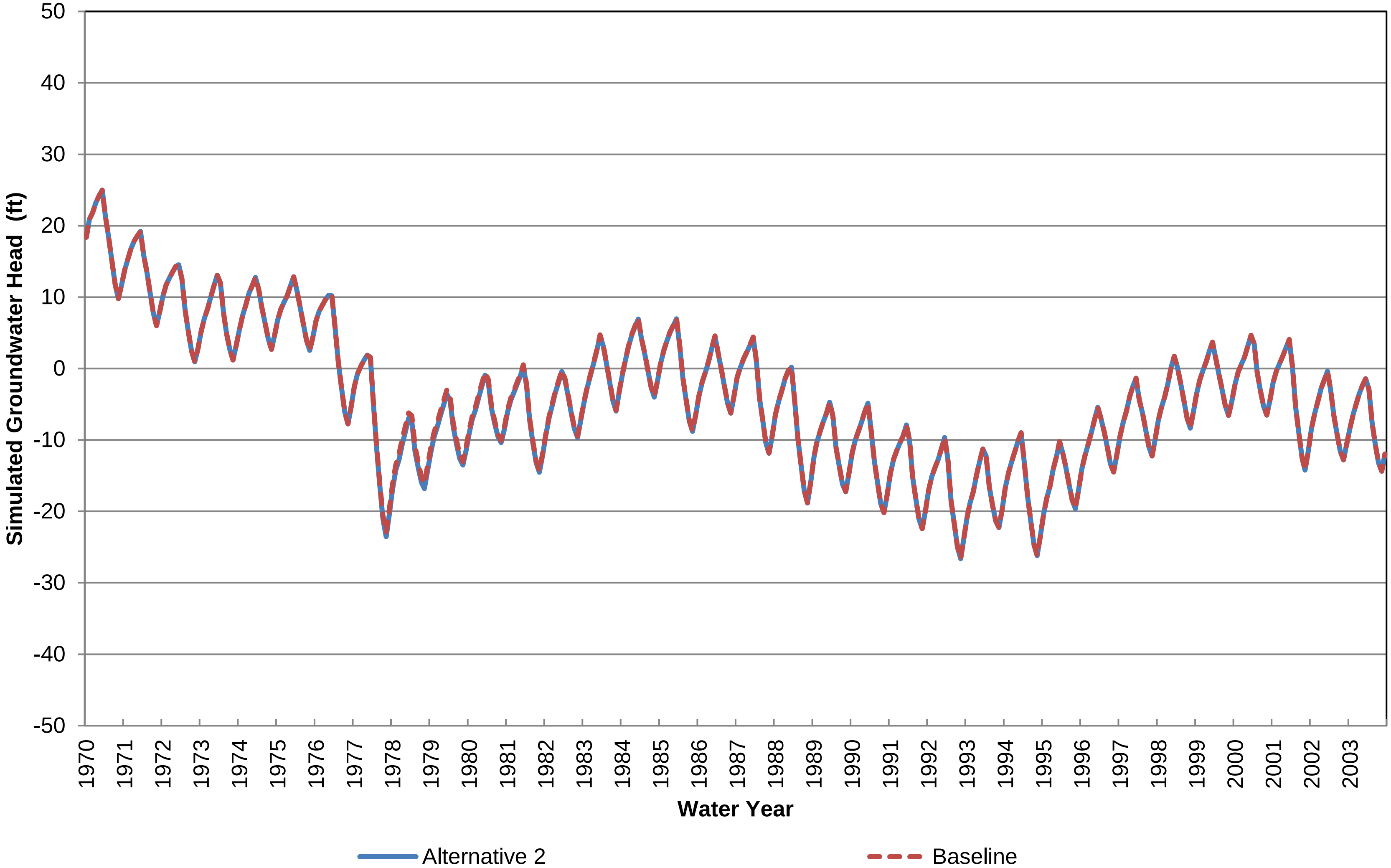
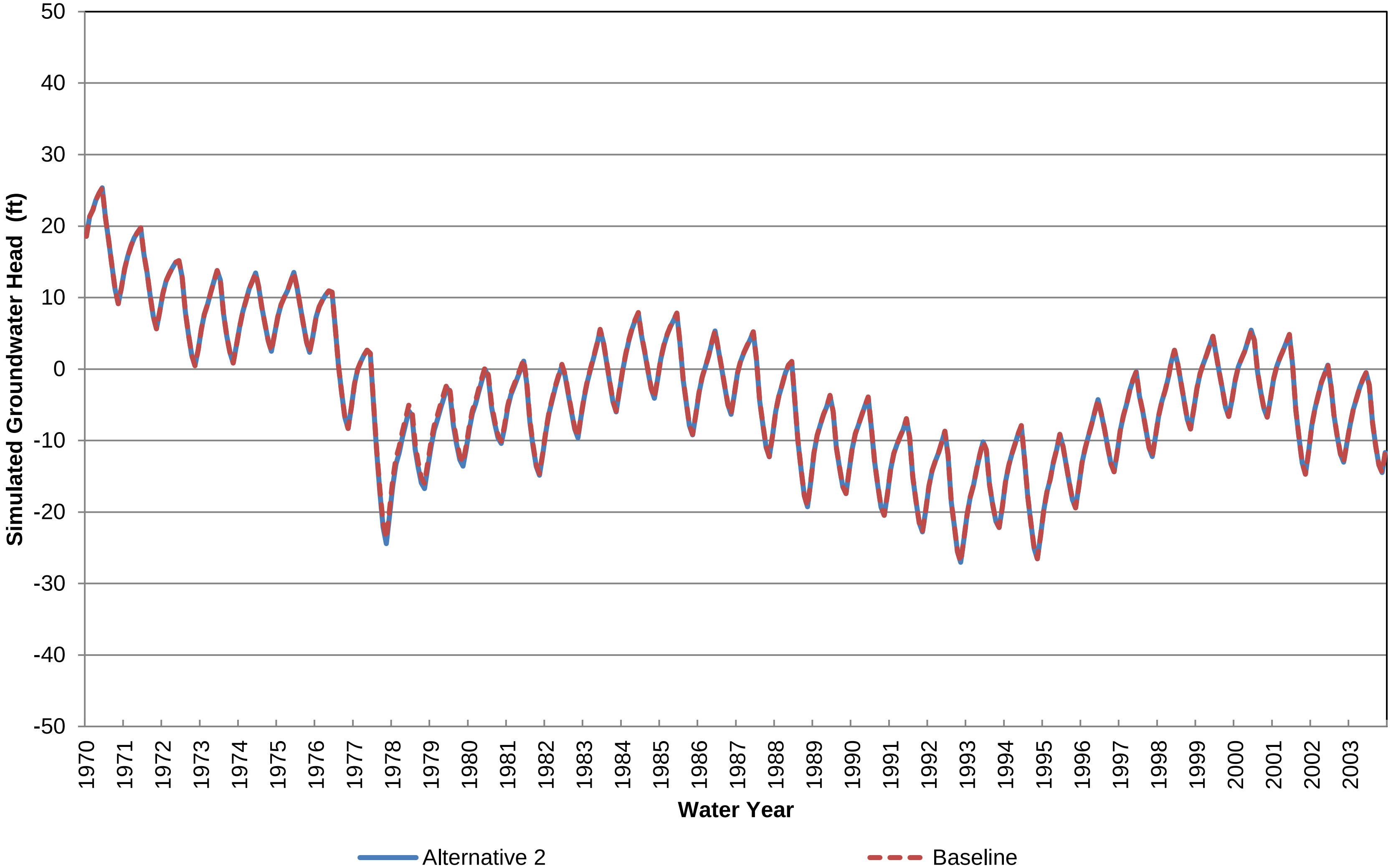
2001
2002
2003
Water Year
Alternative 2
Baseline

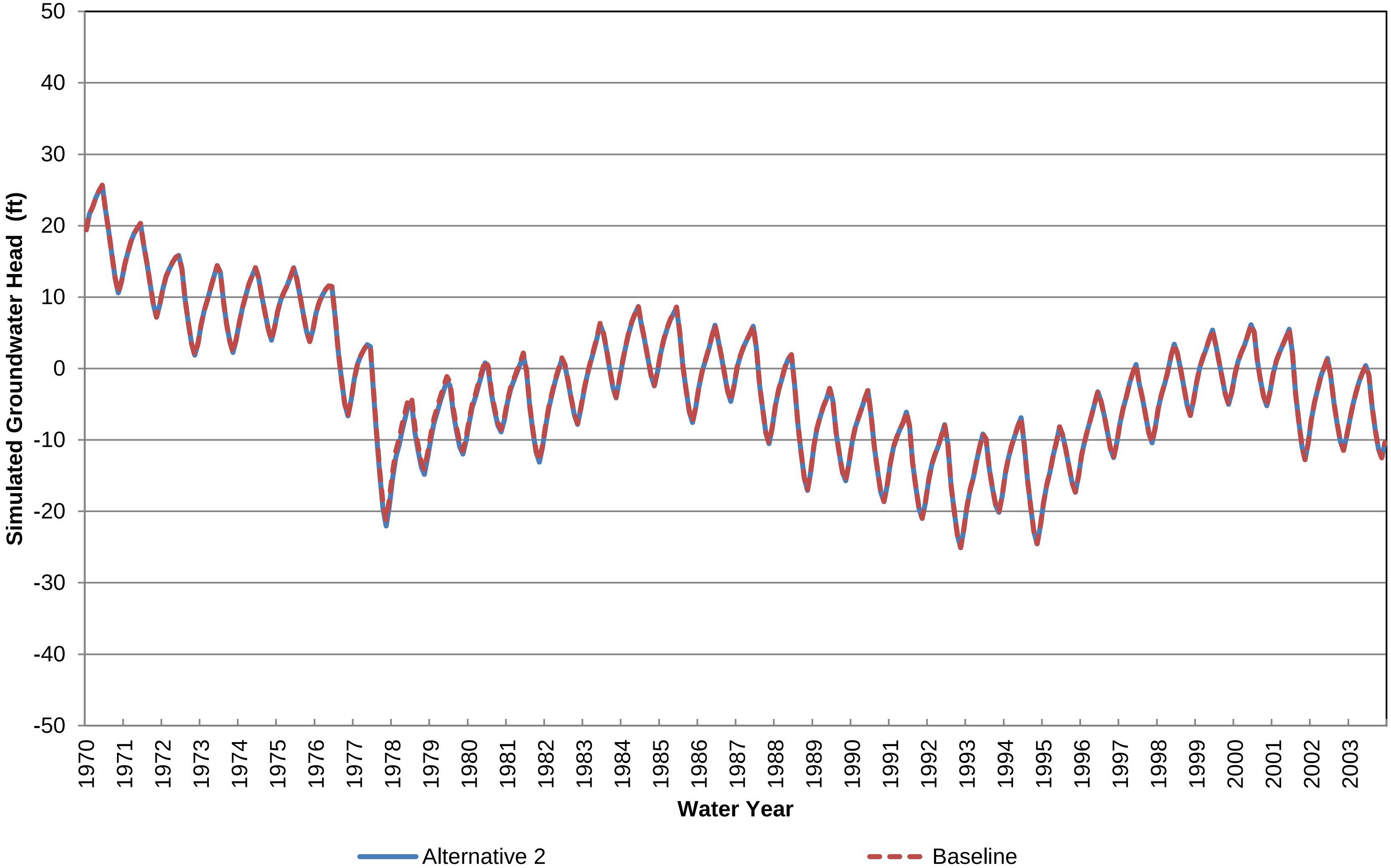
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 24 (Approximately 140-220 ft bgs)



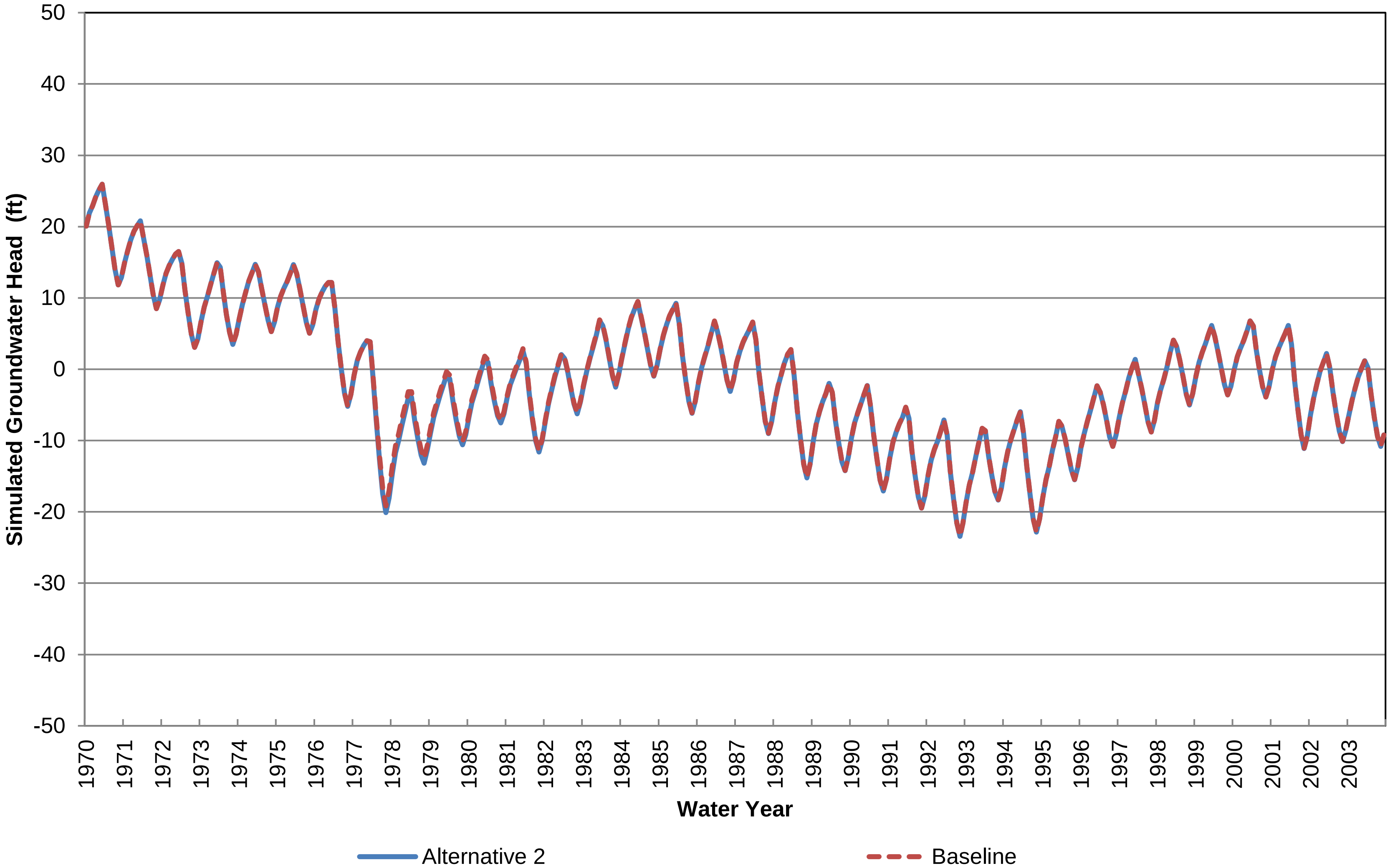
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 24 (Approximately 220-300 ft bgs)



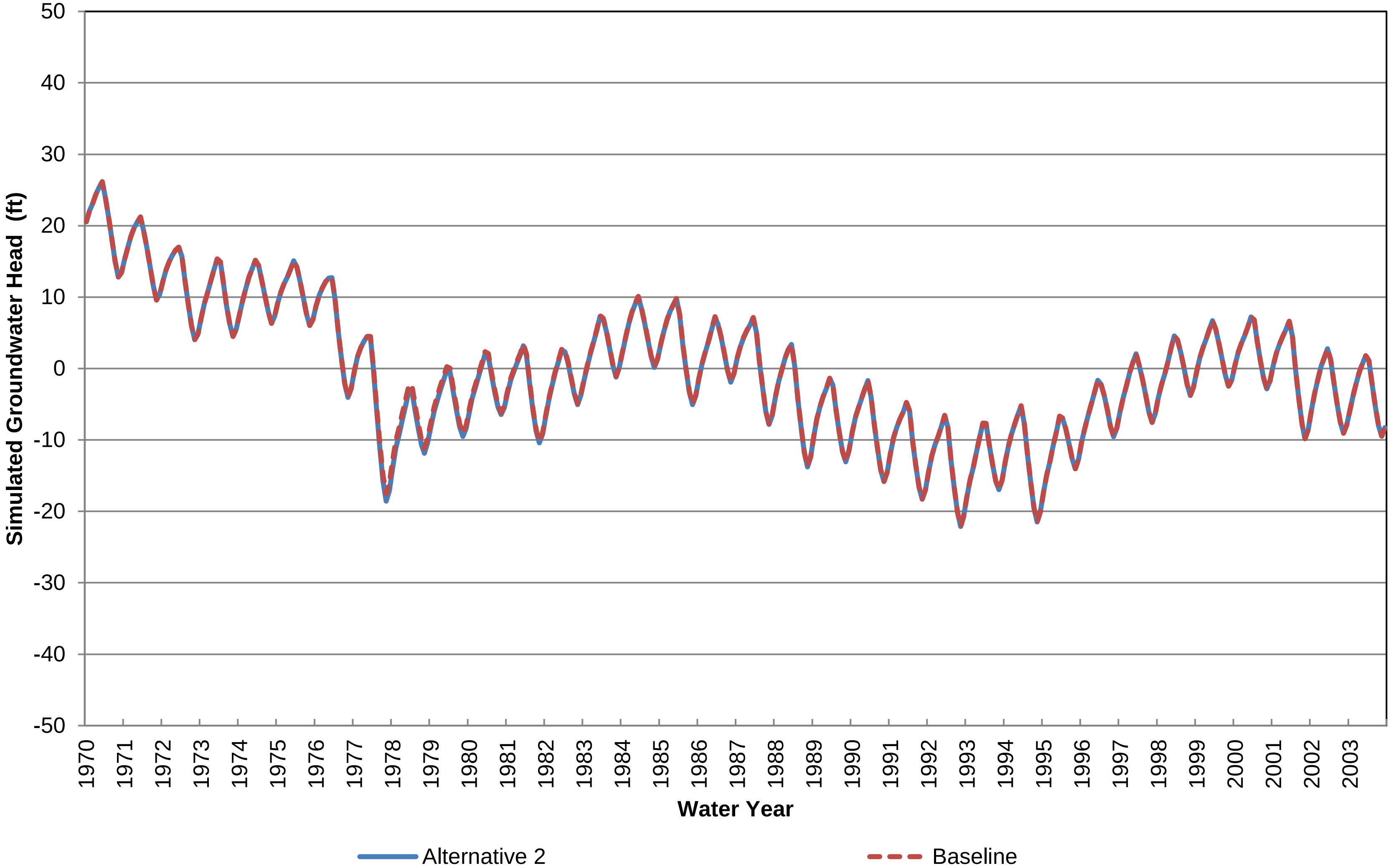
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 24 (Approximately 300-410 ft bgs)



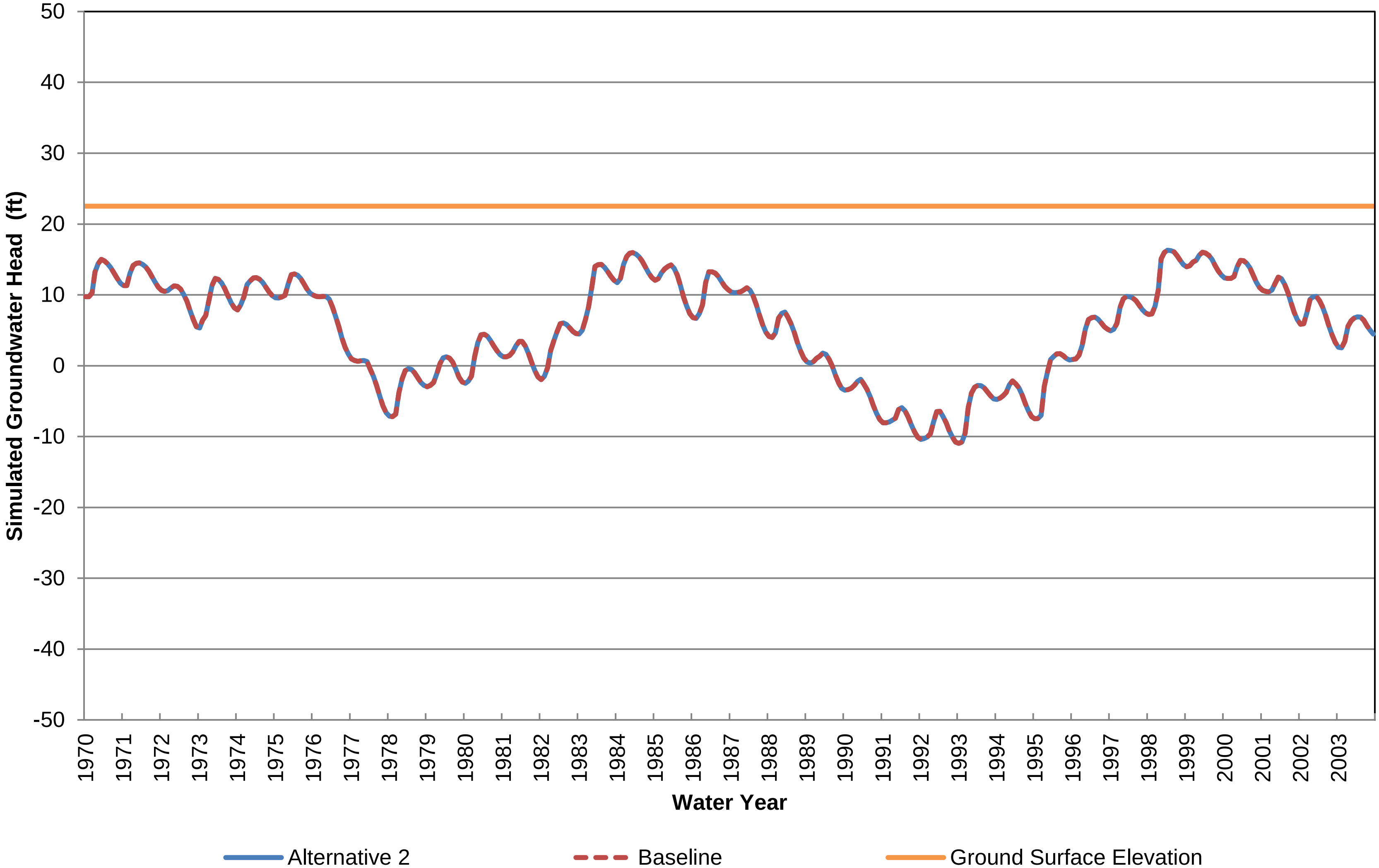
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 24 (Approximately 410-550 ft bgs)



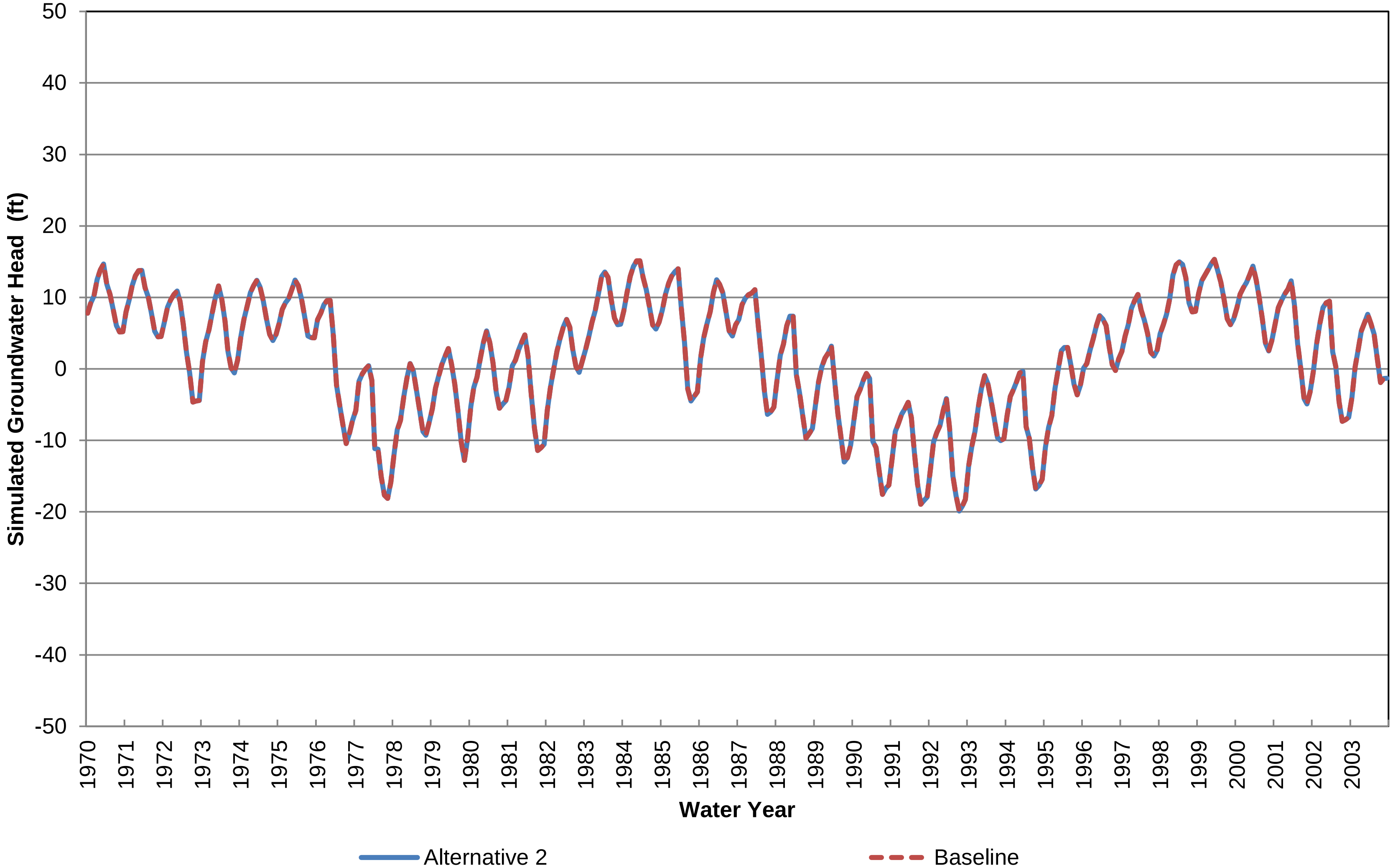
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 24 (Approximately 550-750 ft bgs)

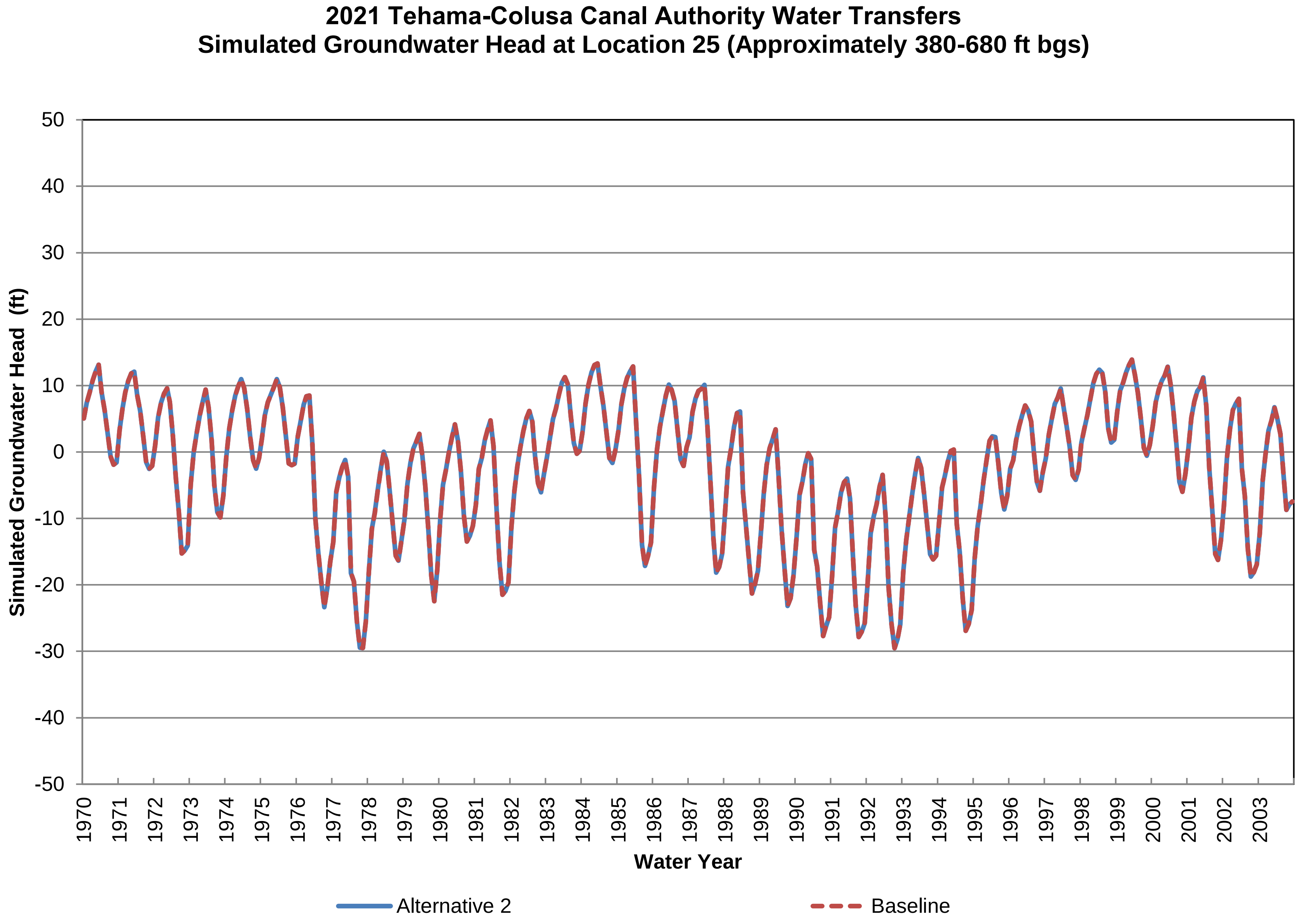


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 25 (Approximately 0-70 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 25 (Approximately 70-380 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 25 (Approximately 380-680 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
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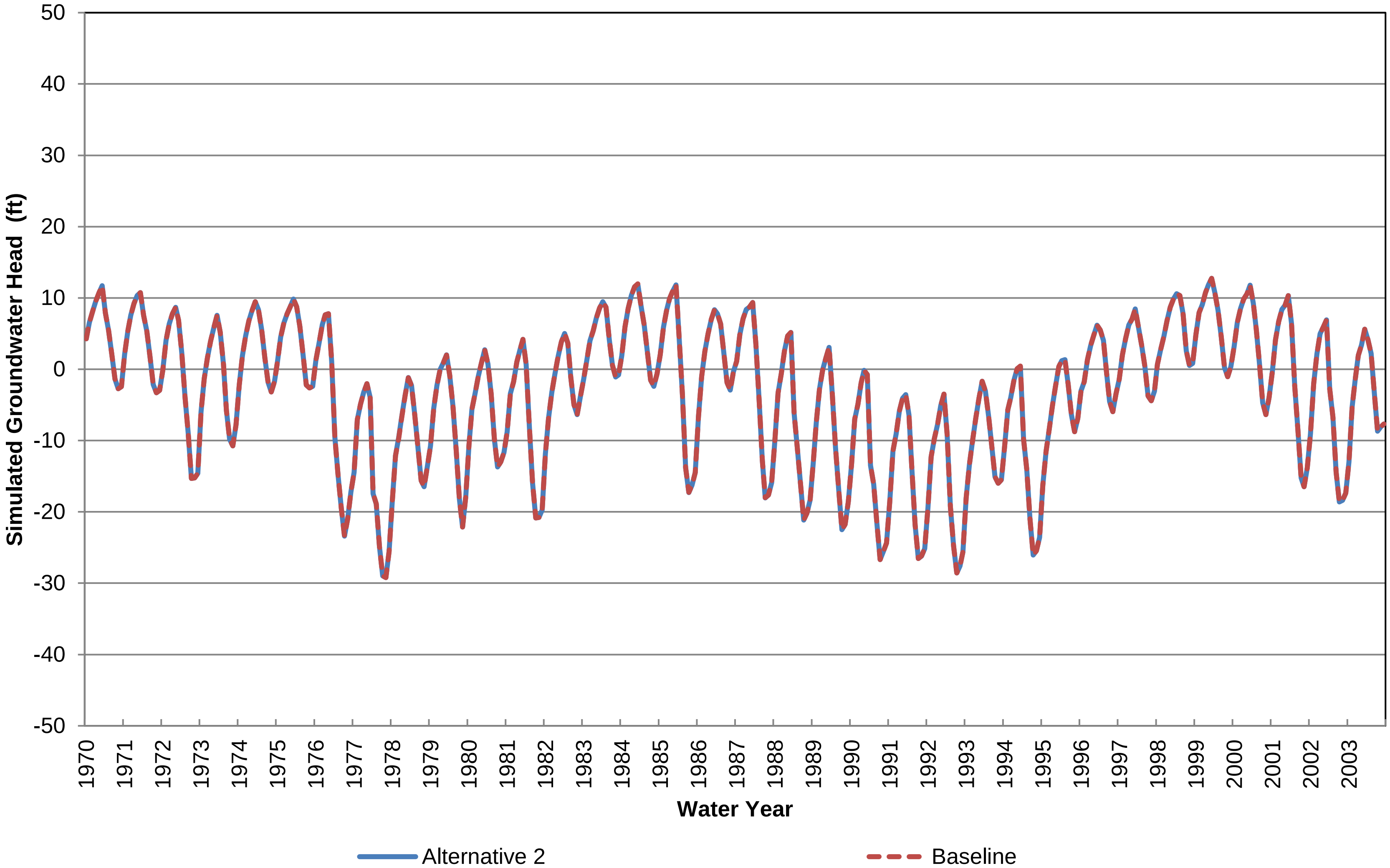
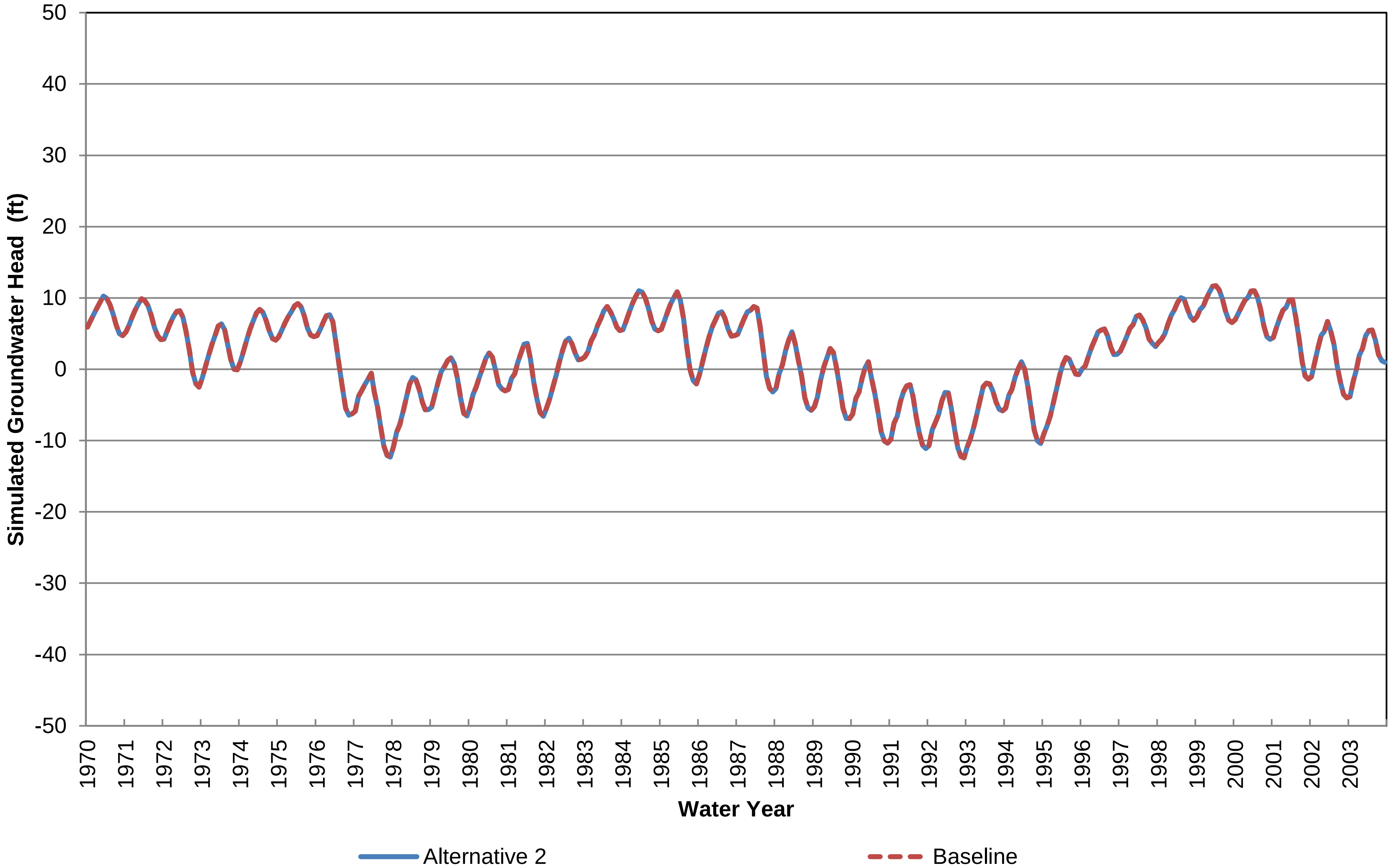
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

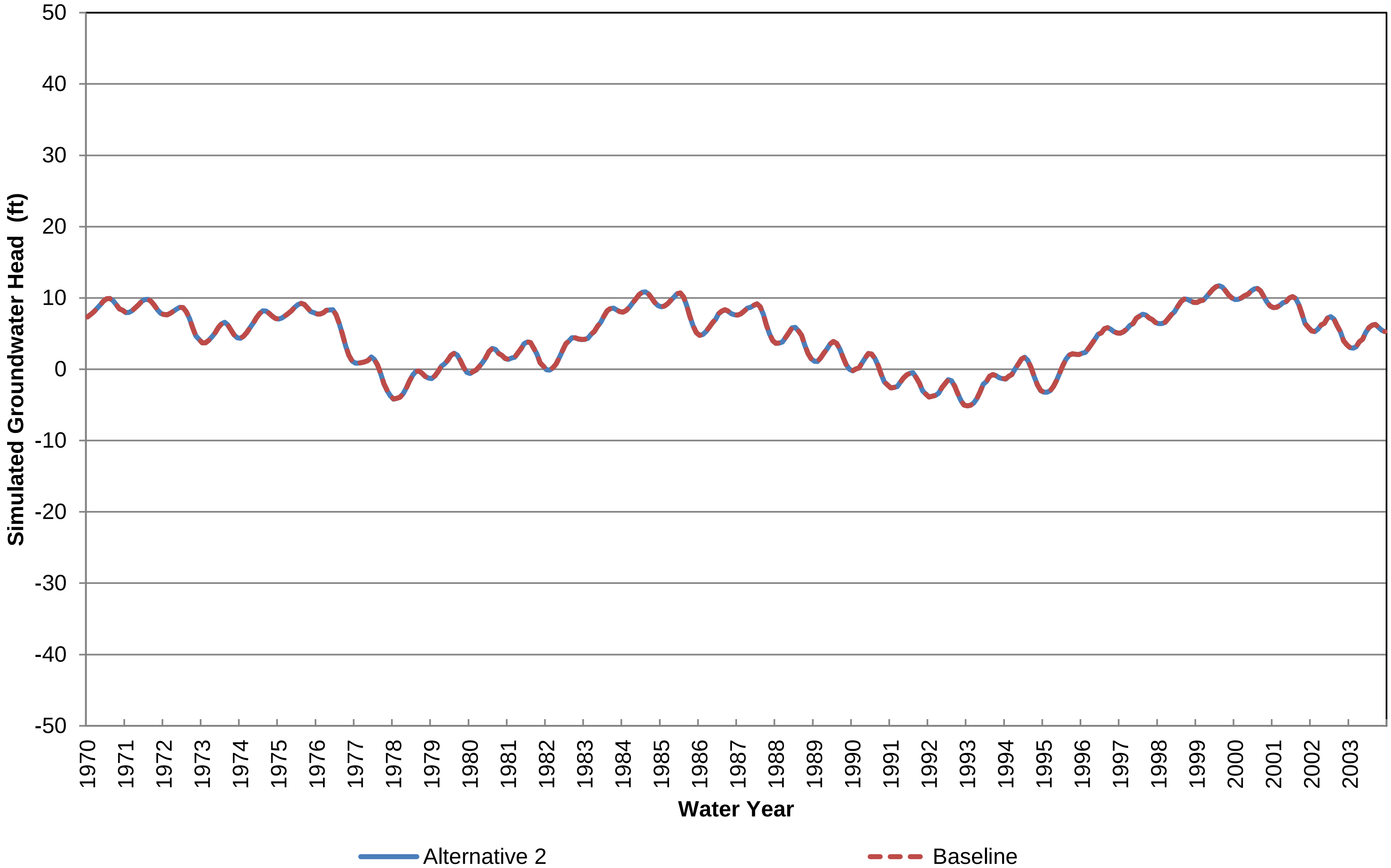
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 25 (Approximately 680-990 ft bgs)

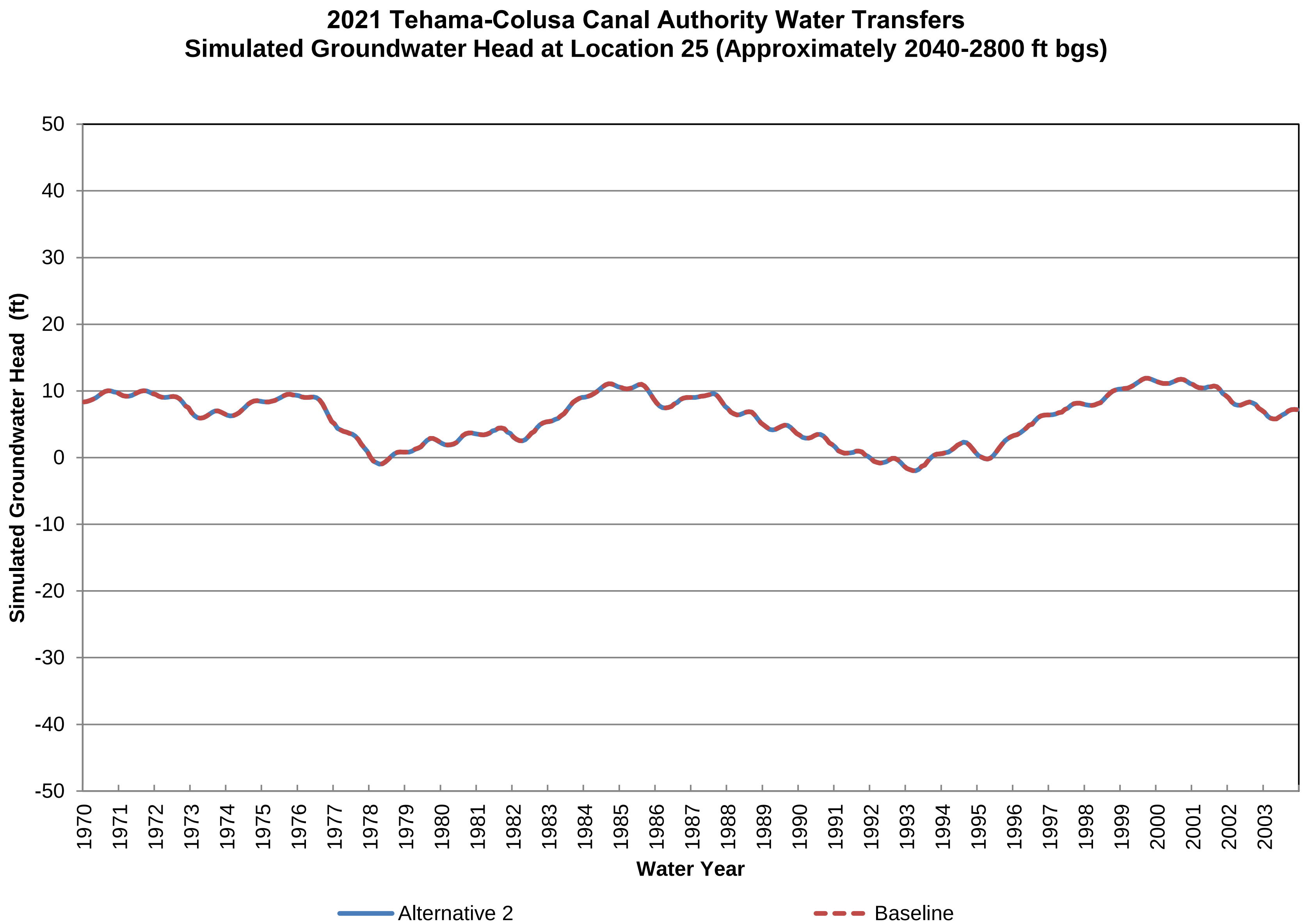


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 25 (Approximately 990-1530 ft bgs)

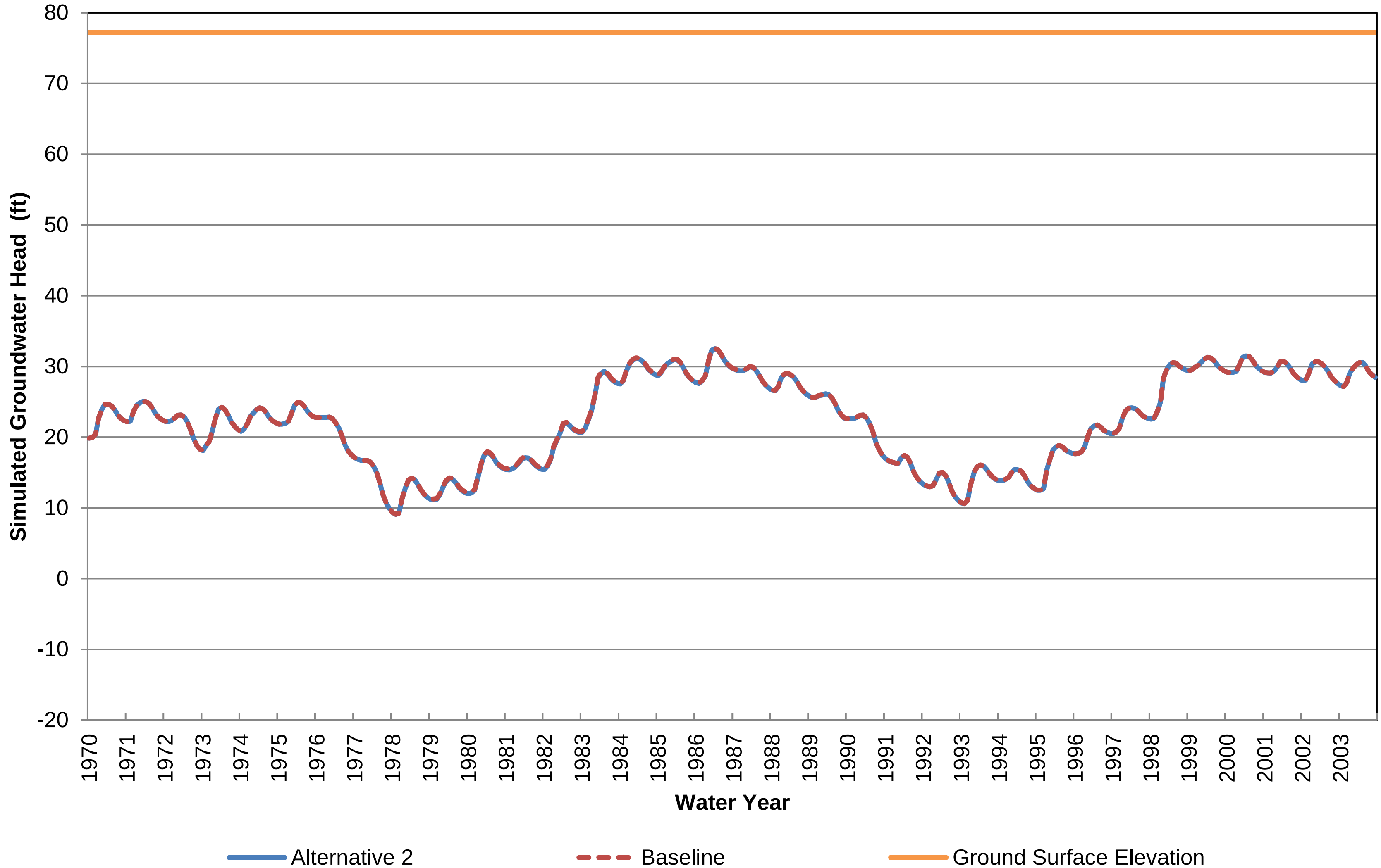


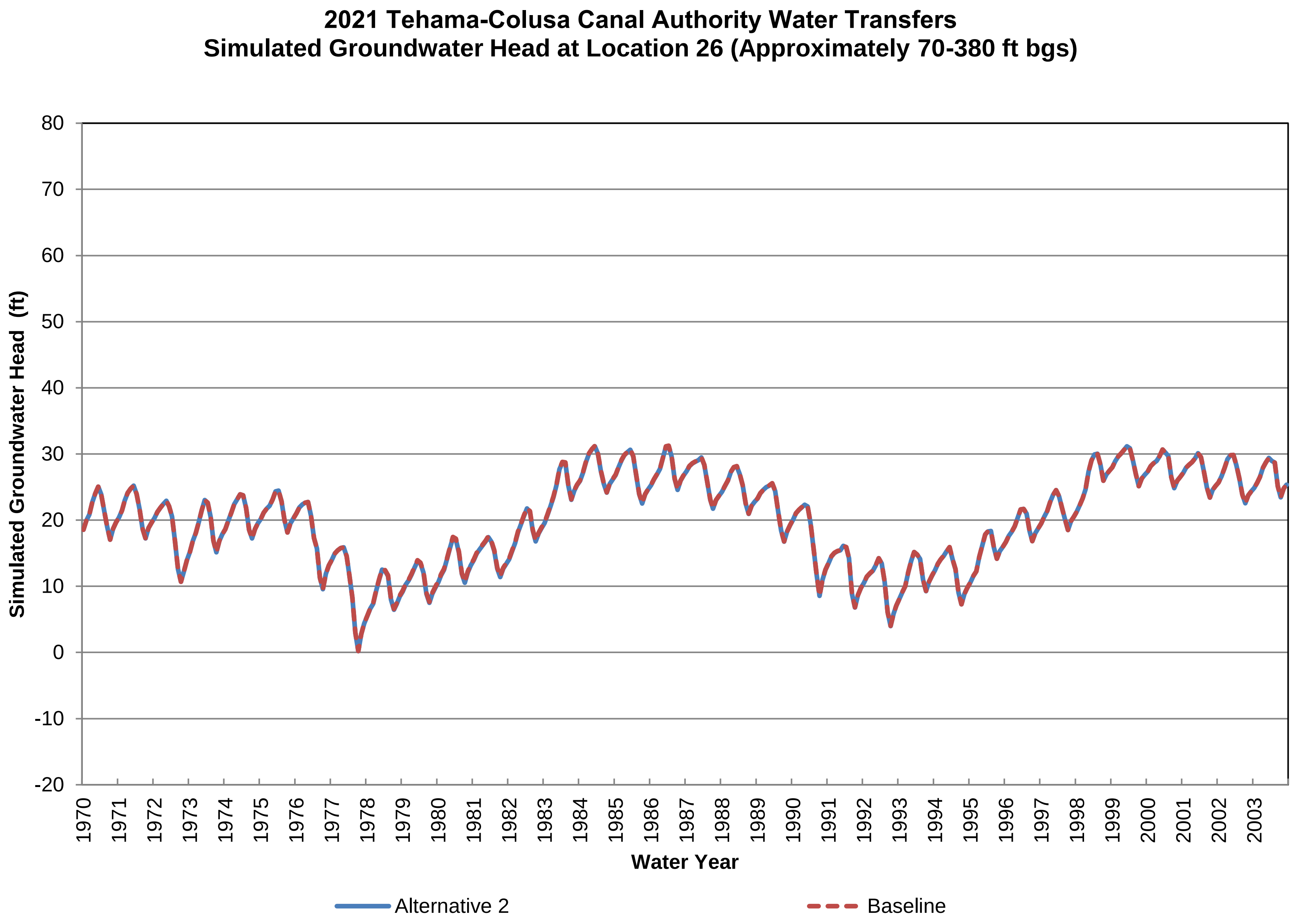
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 25 (Approximately 1530-2040 ft bgs)



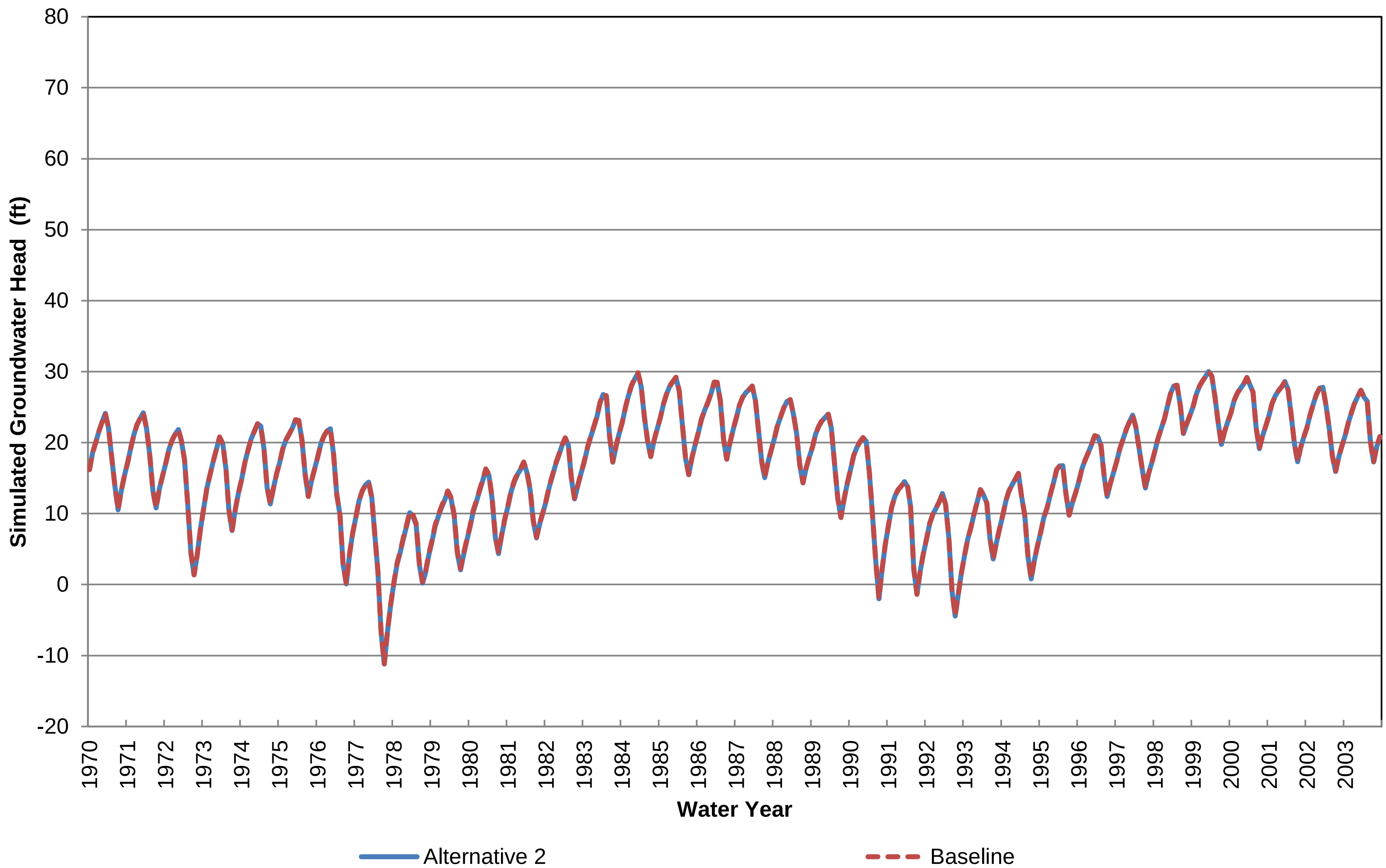

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 25 (Approximately 2040-2800 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 26 (Approximately 0-70 ft bgs)

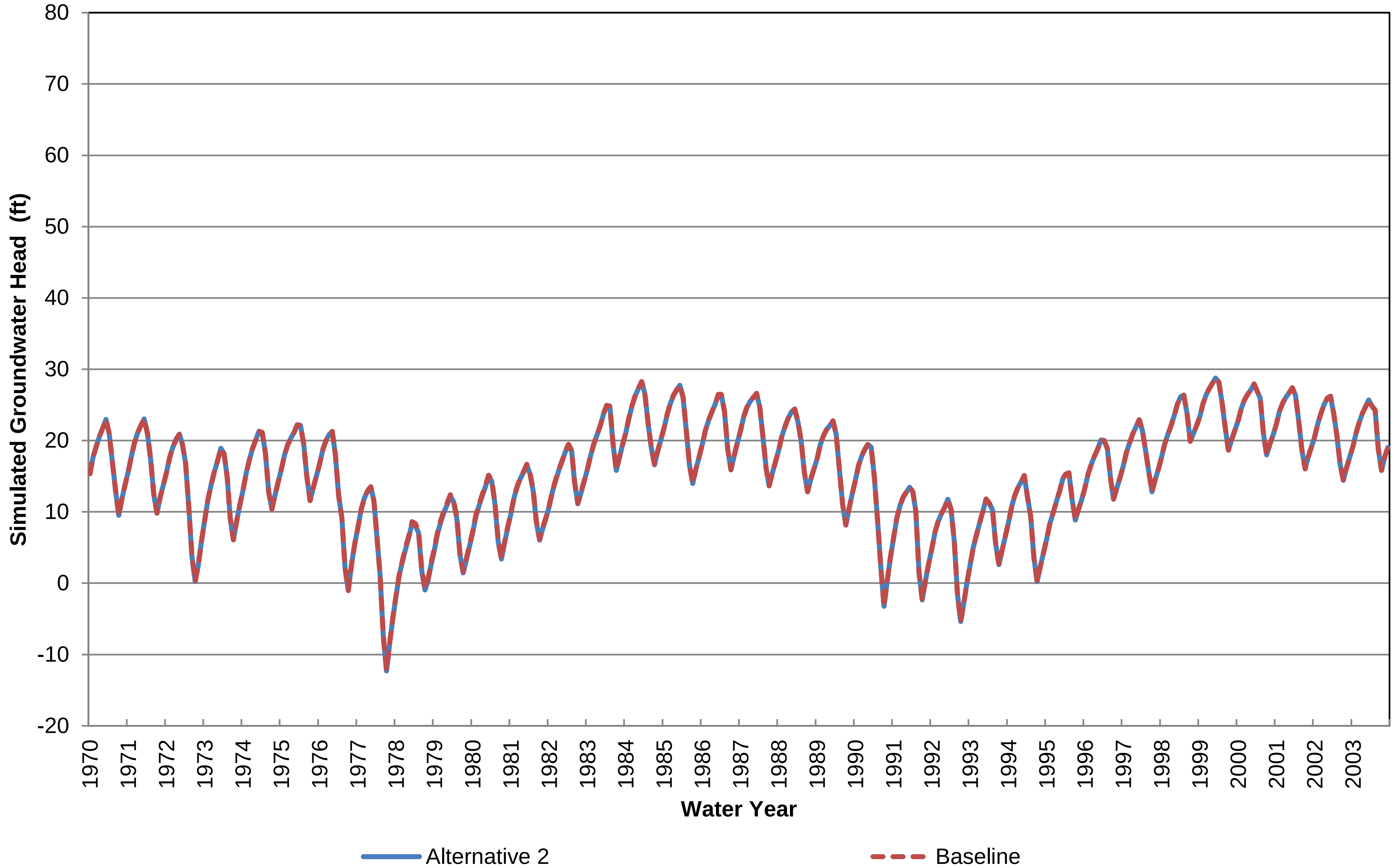



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 26 (Approximately 70-380 ft bgs)
80
70
60
50
40
30
20
10
0
-10
-20
Simulated Groundwater Head (ft)
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

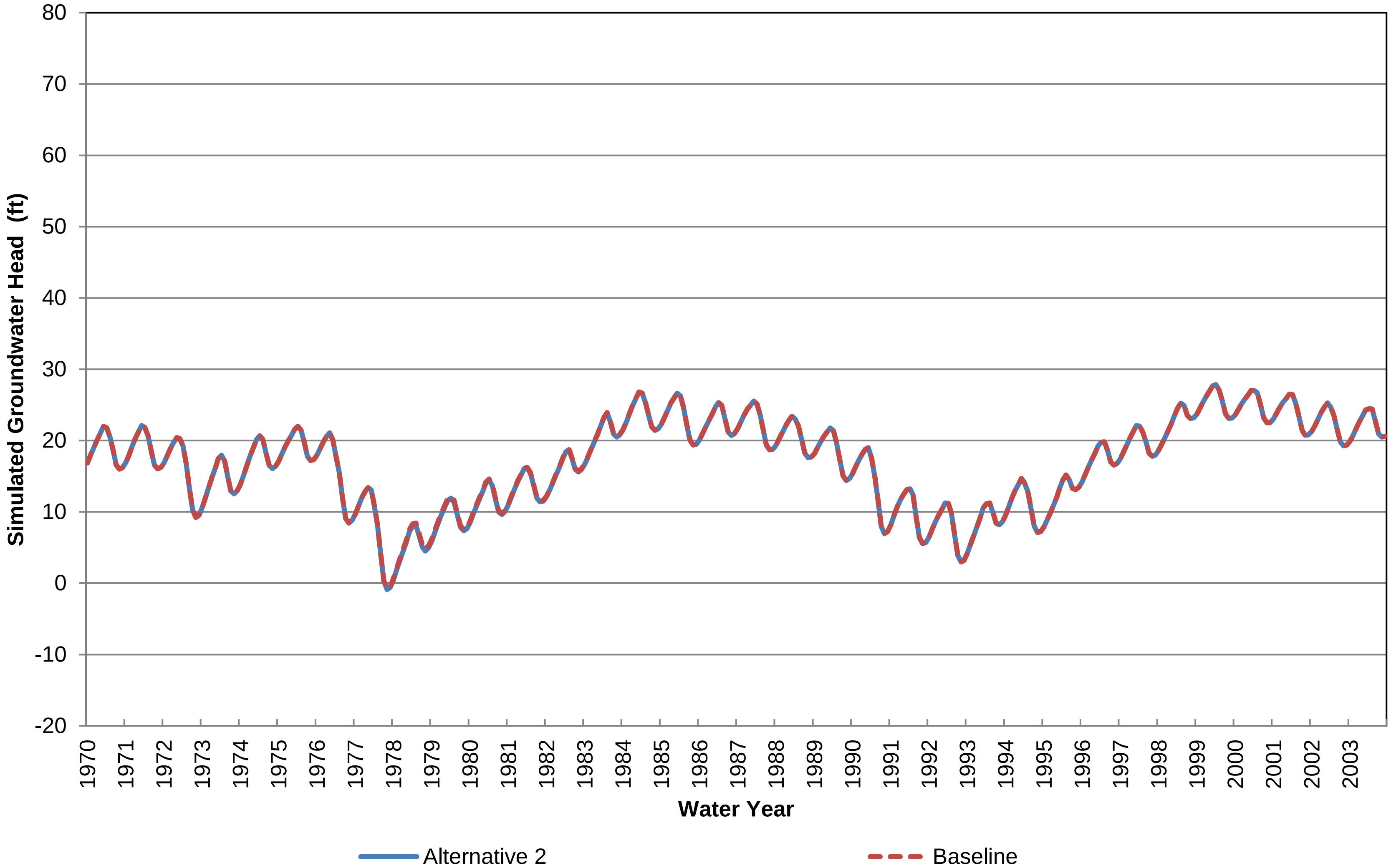
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 26 (Approximately 380-690 ft bgs)

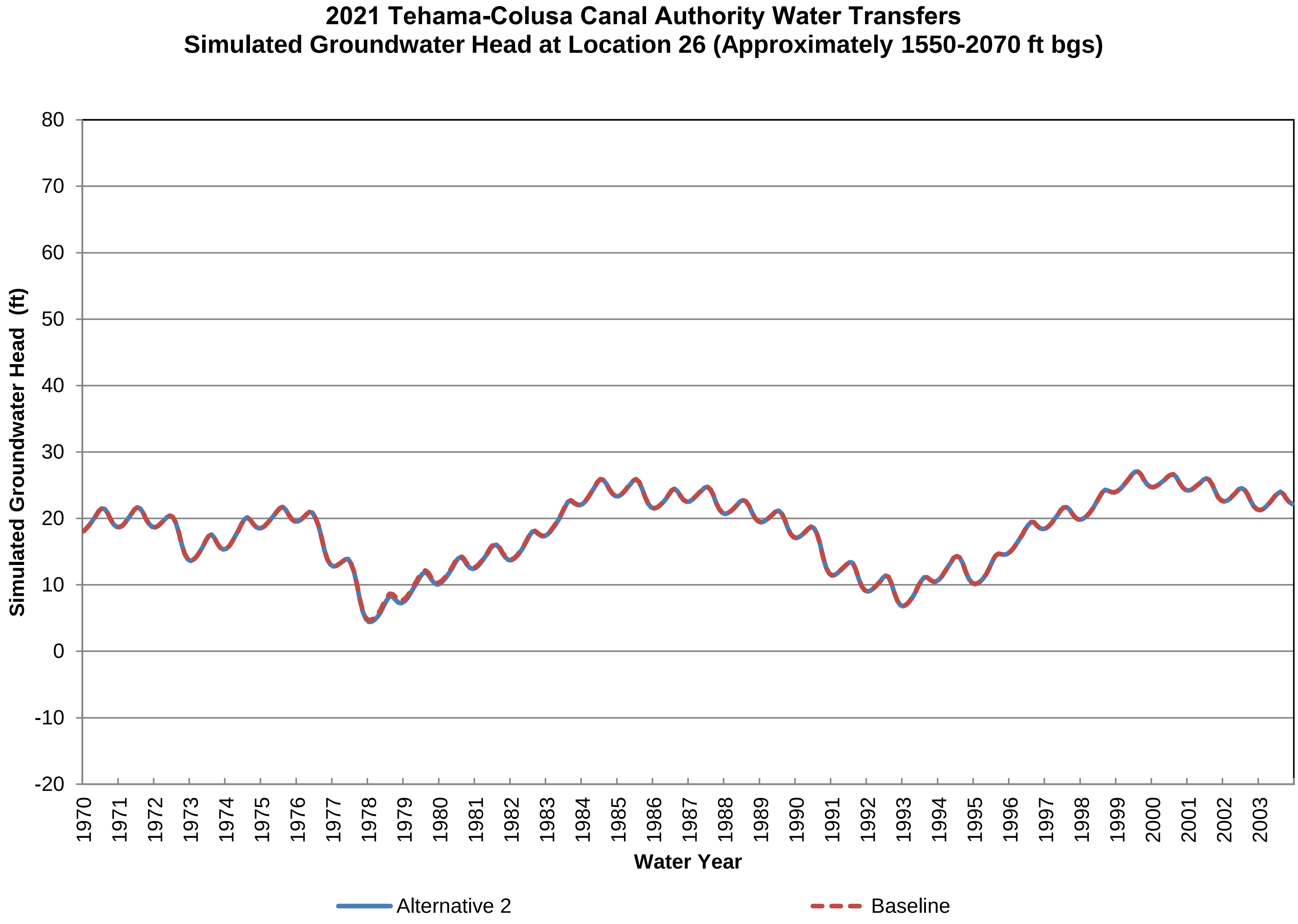


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 26 (Approximately 690-1000 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 26 (Approximately 1000-1550 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 26 (Approximately 1550-2070 ft bgs)
Simulated Groundwater Head (ft)
80
70
60
50
40
30
20
10
0
-10
-20
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
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1985
1986
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1994
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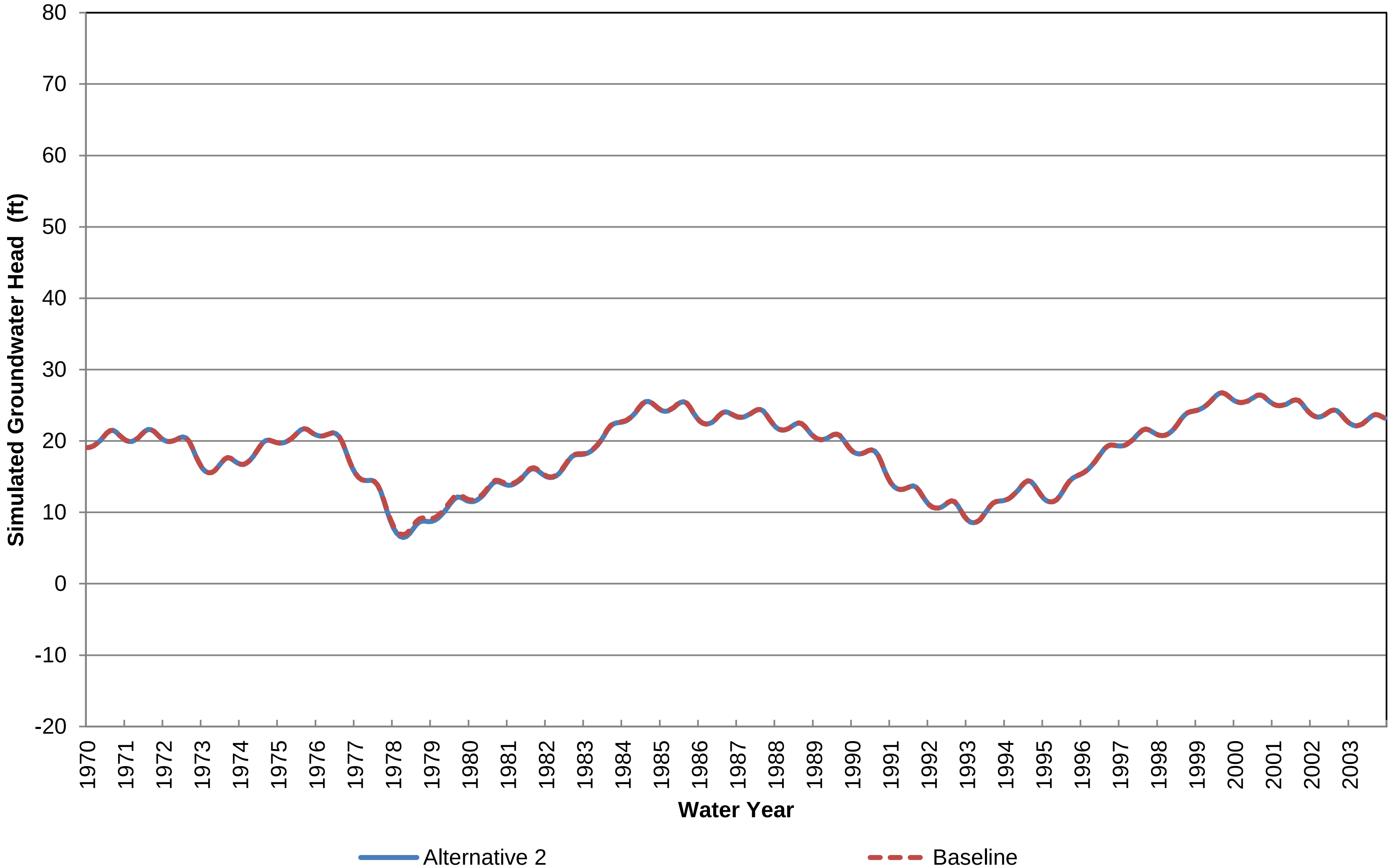
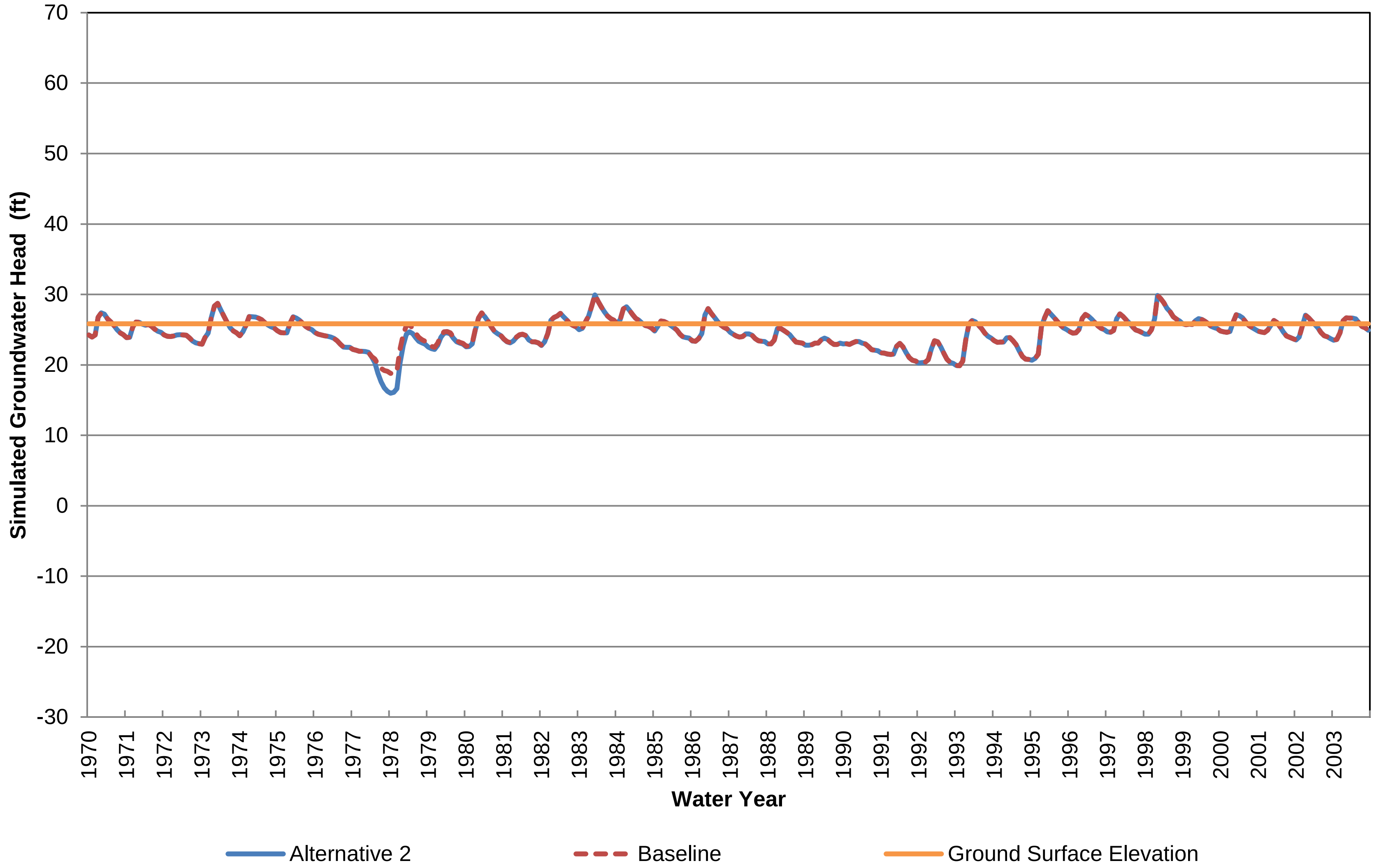
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

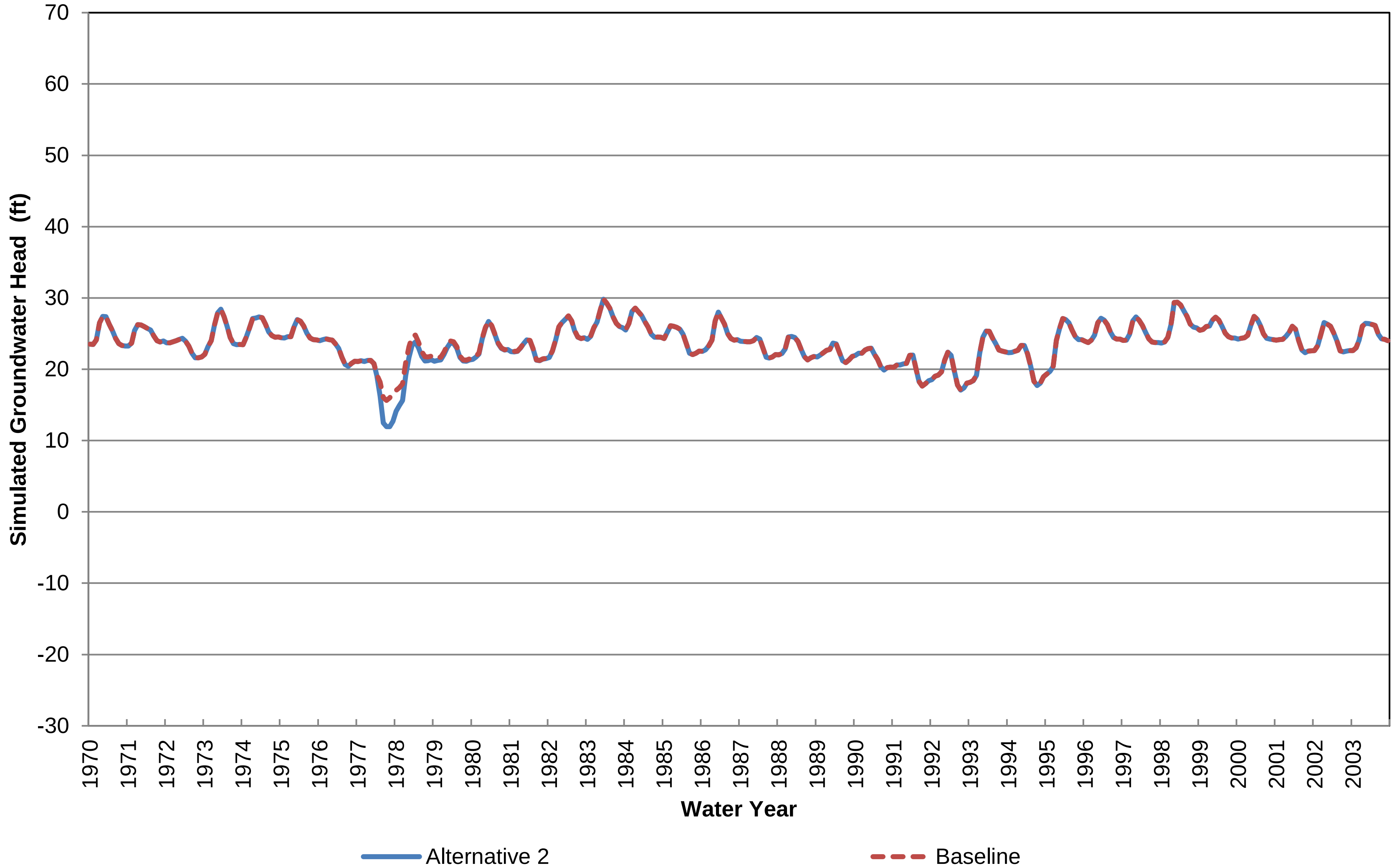
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 26 (Approximately 2070-2840 ft bgs)

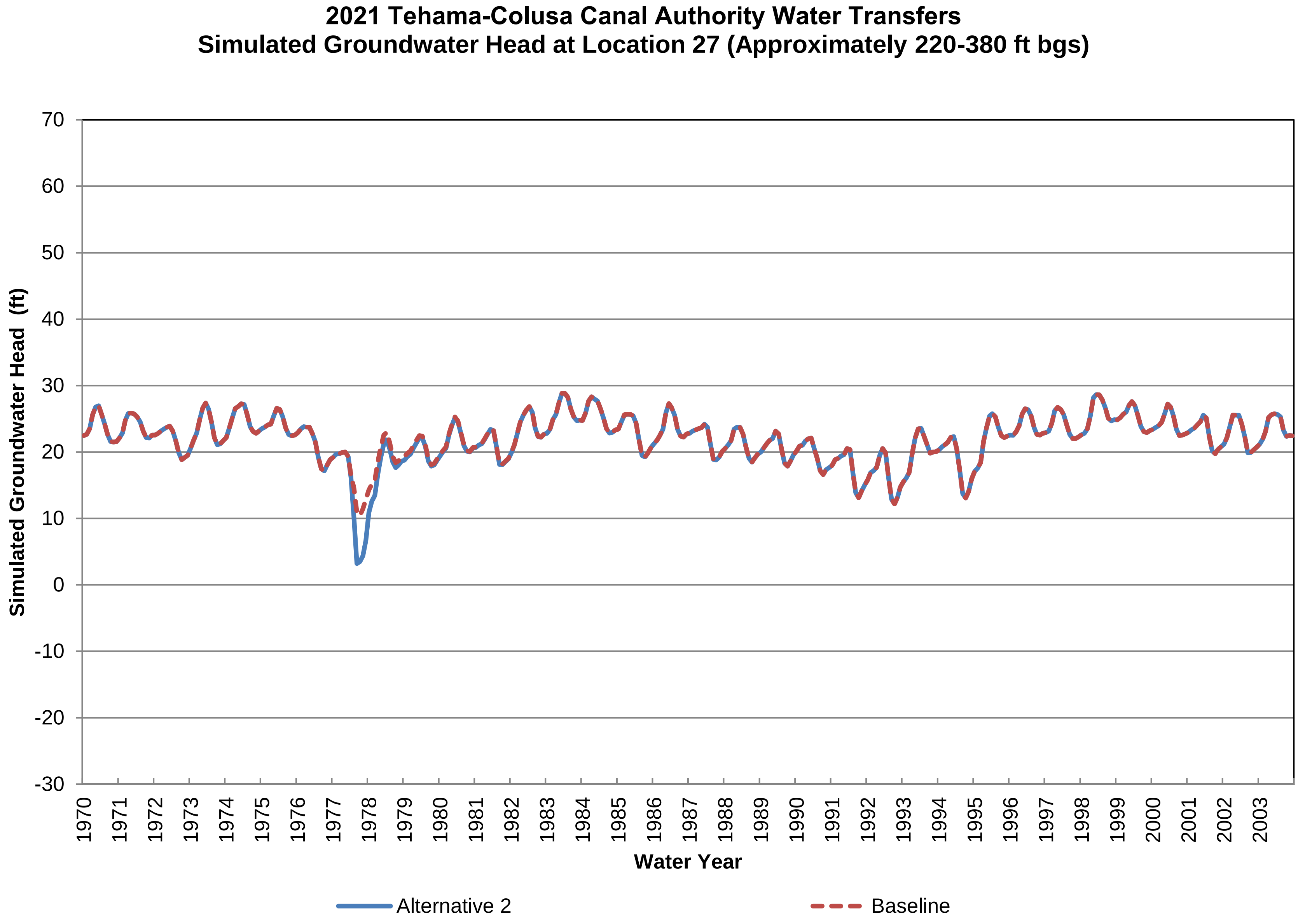


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 27 (Approximately 0-70 ft bgs)

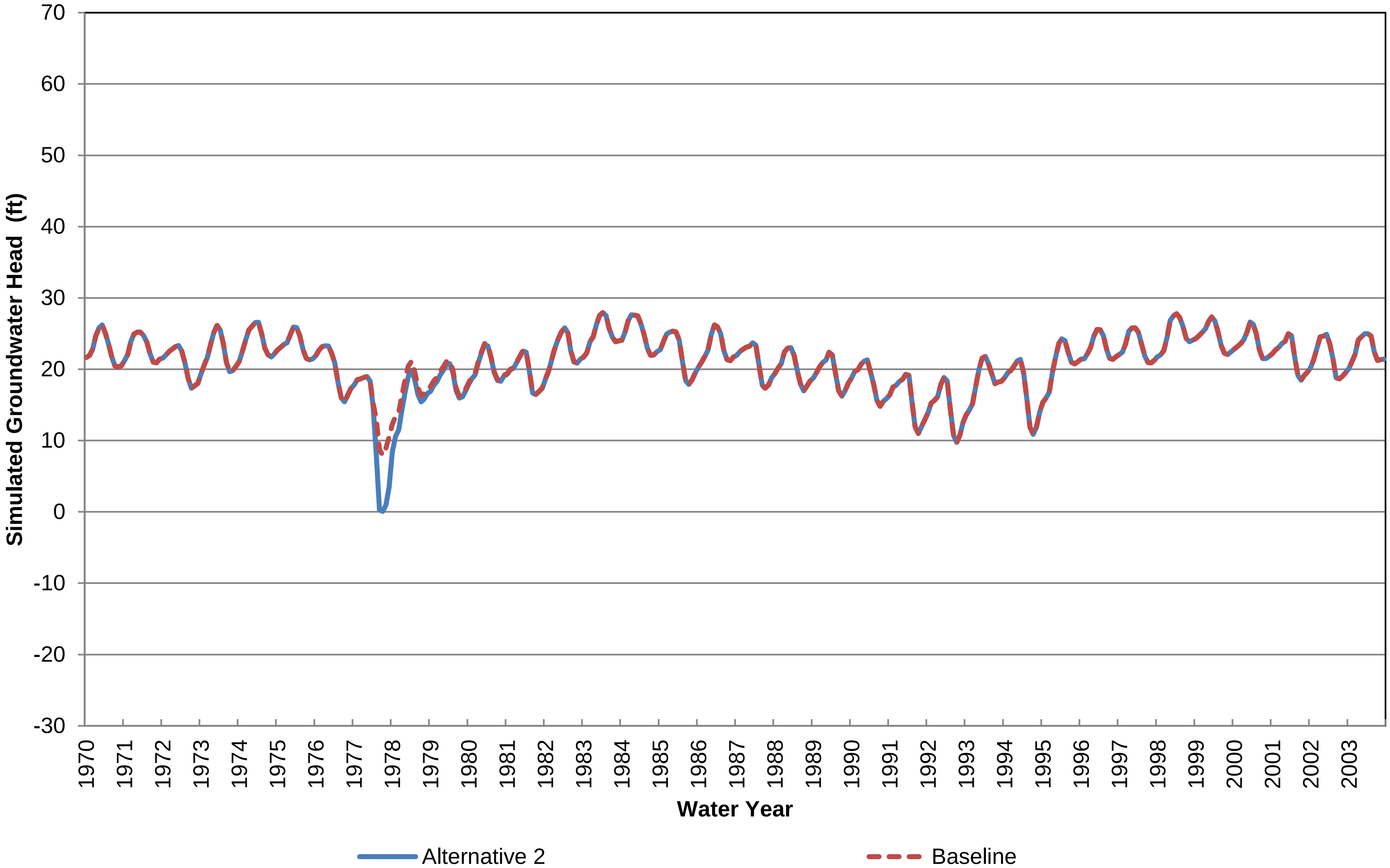


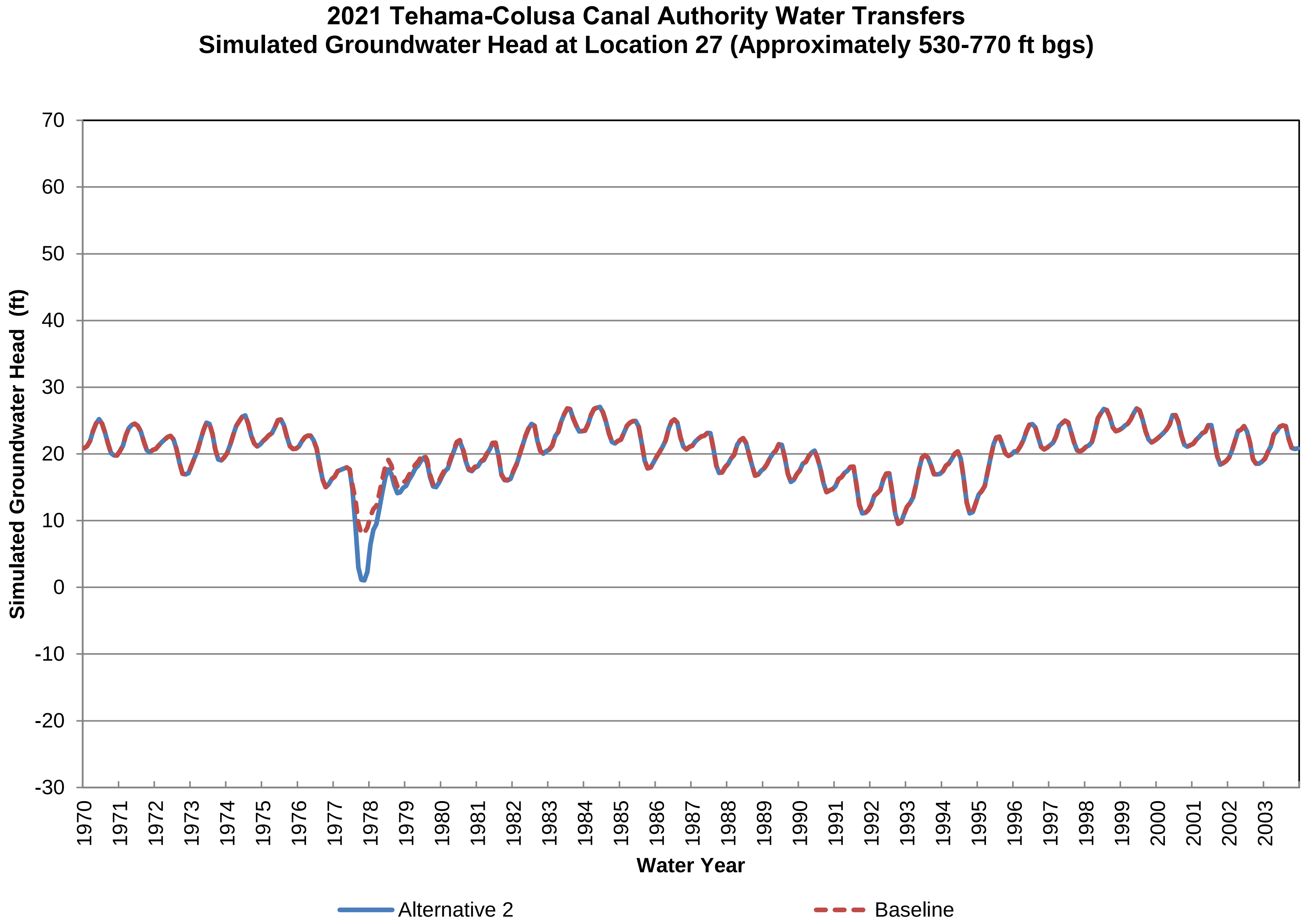
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 27 (Approximately 70-220 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 27 (Approximately 220-380 ft bgs)
Simulated Groundwater Head (ft)
70
60
50
40
30
20
10
0
-10
-20
-30
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 27 (Approximately 380-530 ft bgs)





2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 27 (Approximately 530-770 ft bgs)
Simulated Groundwater Head (ft)
70
60
50
40
30
20
10
0
-10
-20
-30
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
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1990
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1992
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1994
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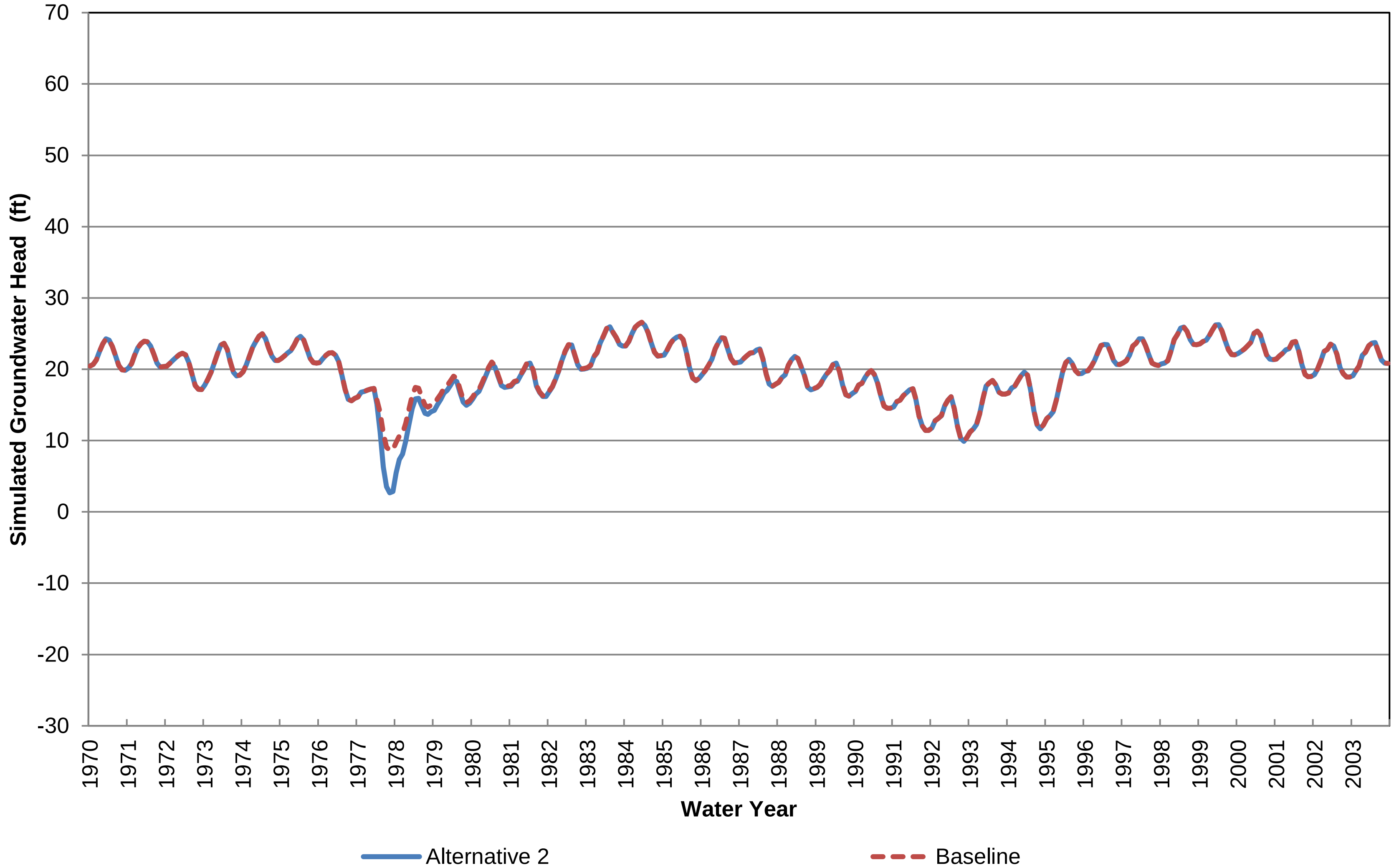
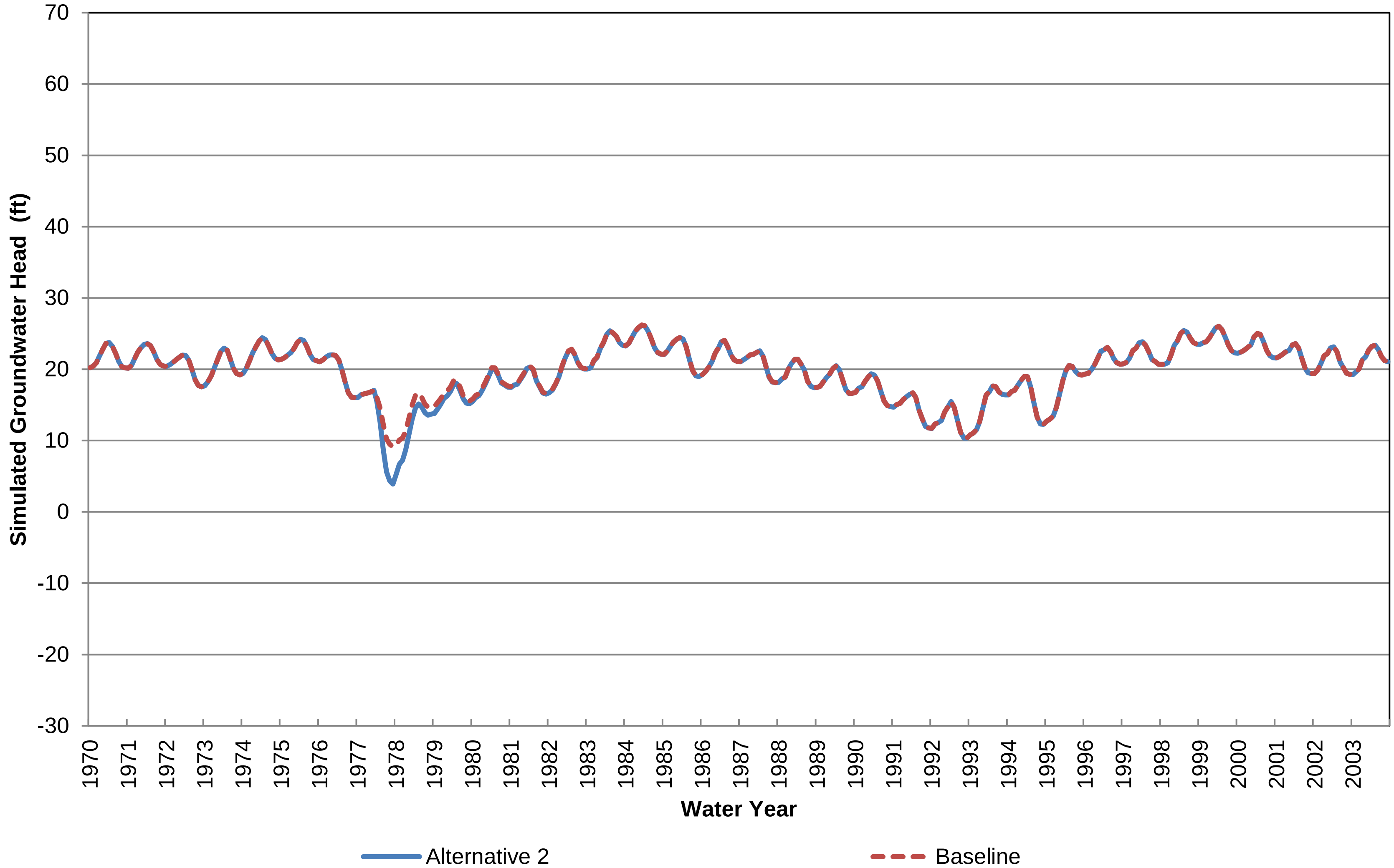
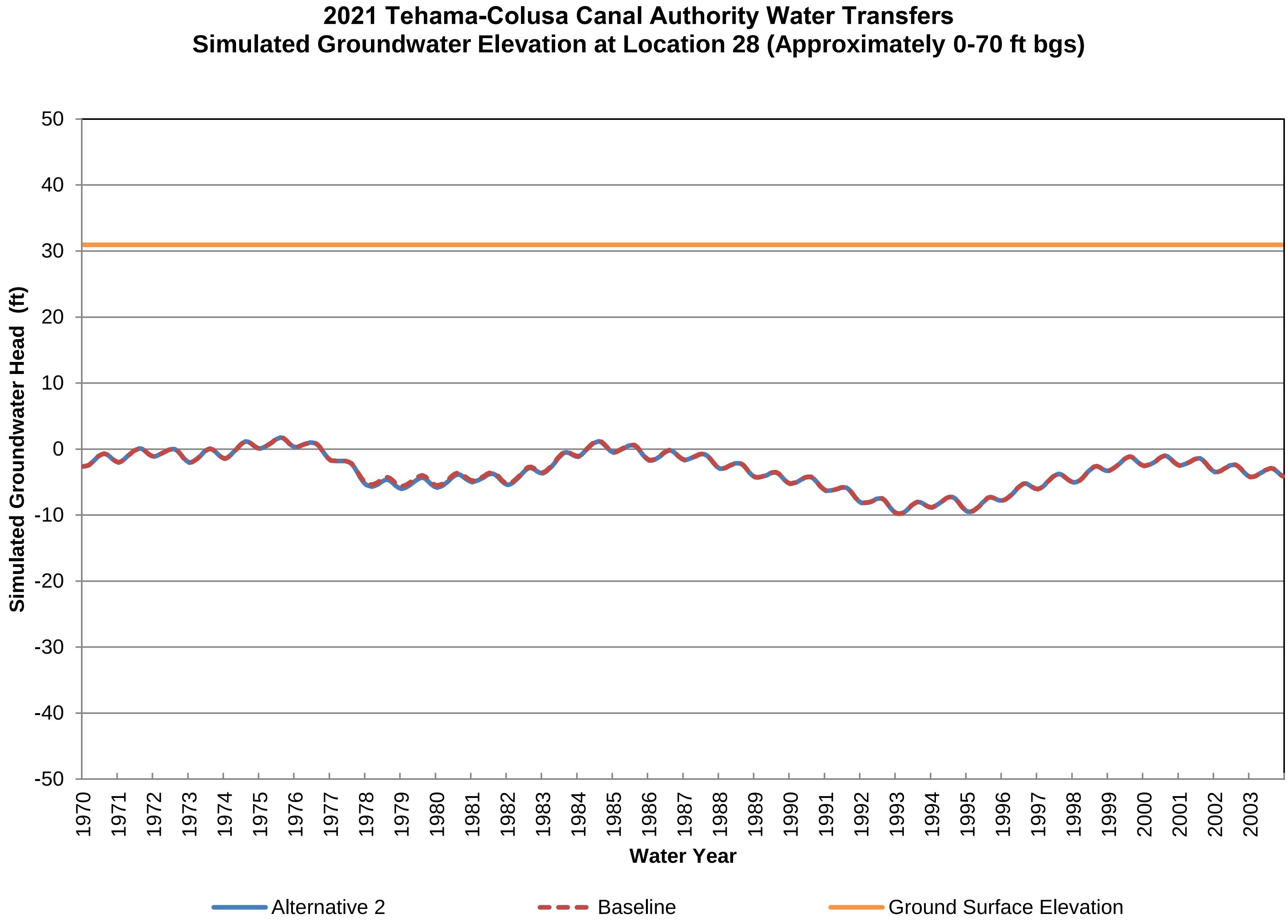
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 27 (Approximately 770-1030 ft bgs)



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 27 (Approximately 1030-1410 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 28 (Approximately 0-70 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
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1994
1995
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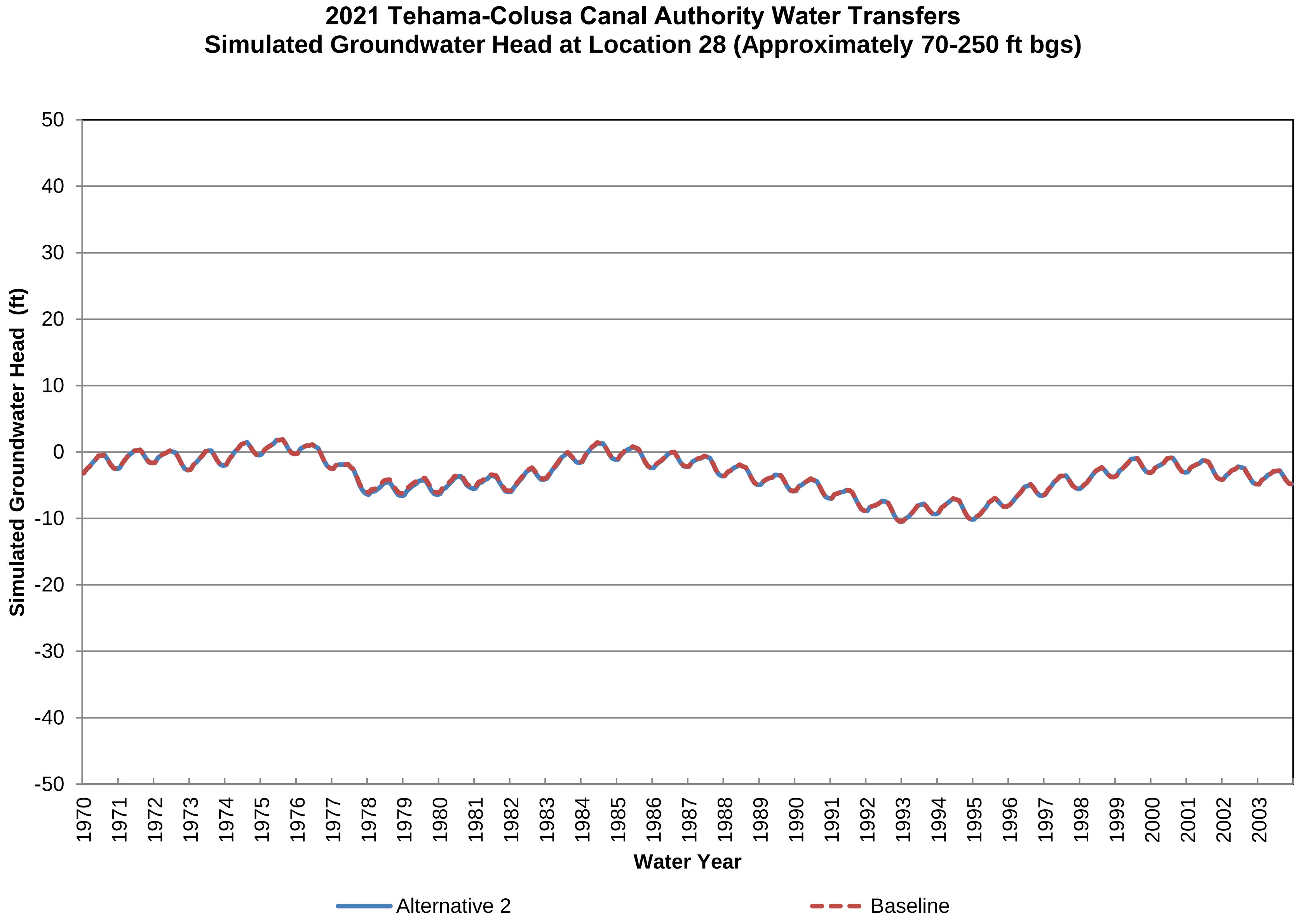
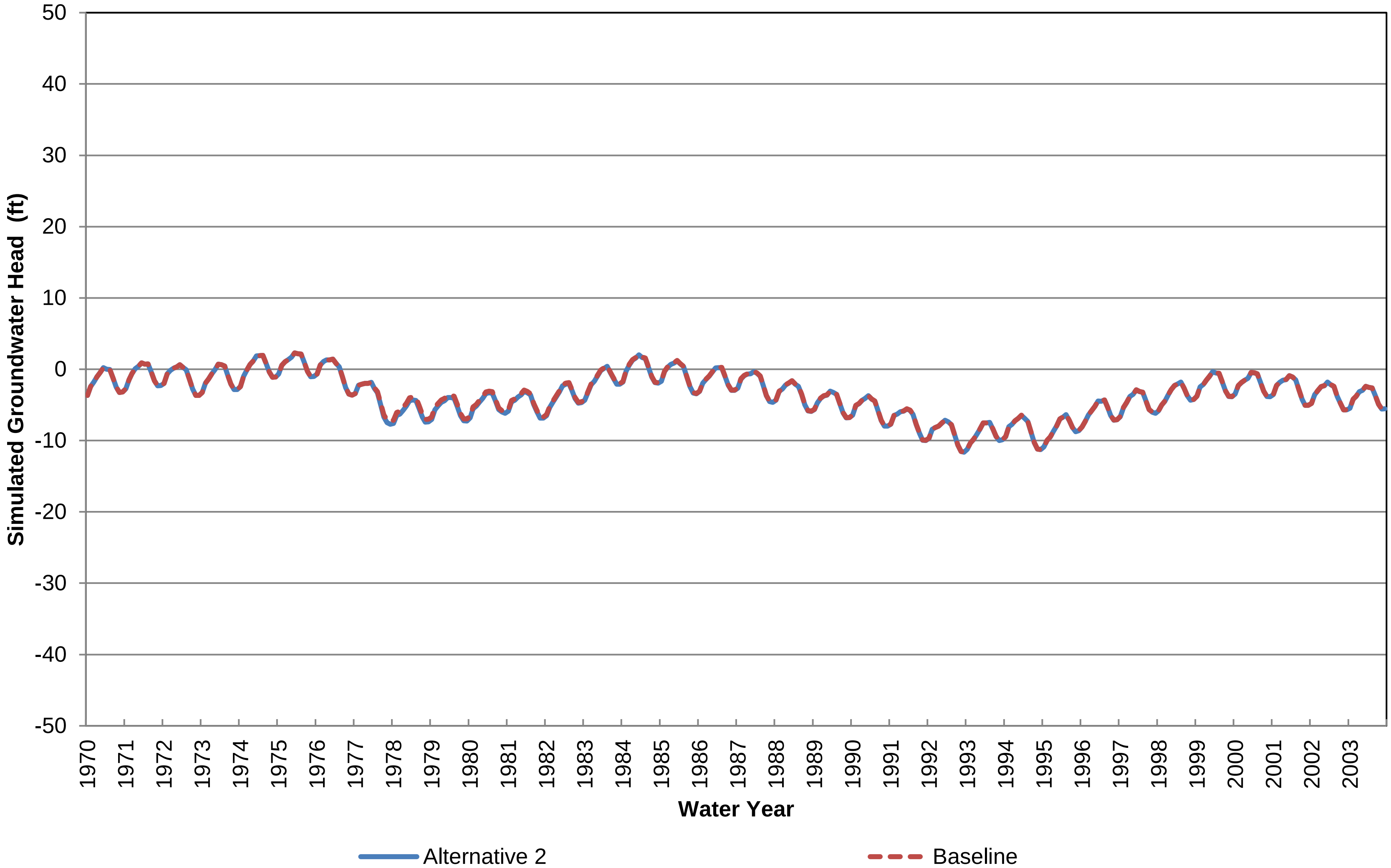
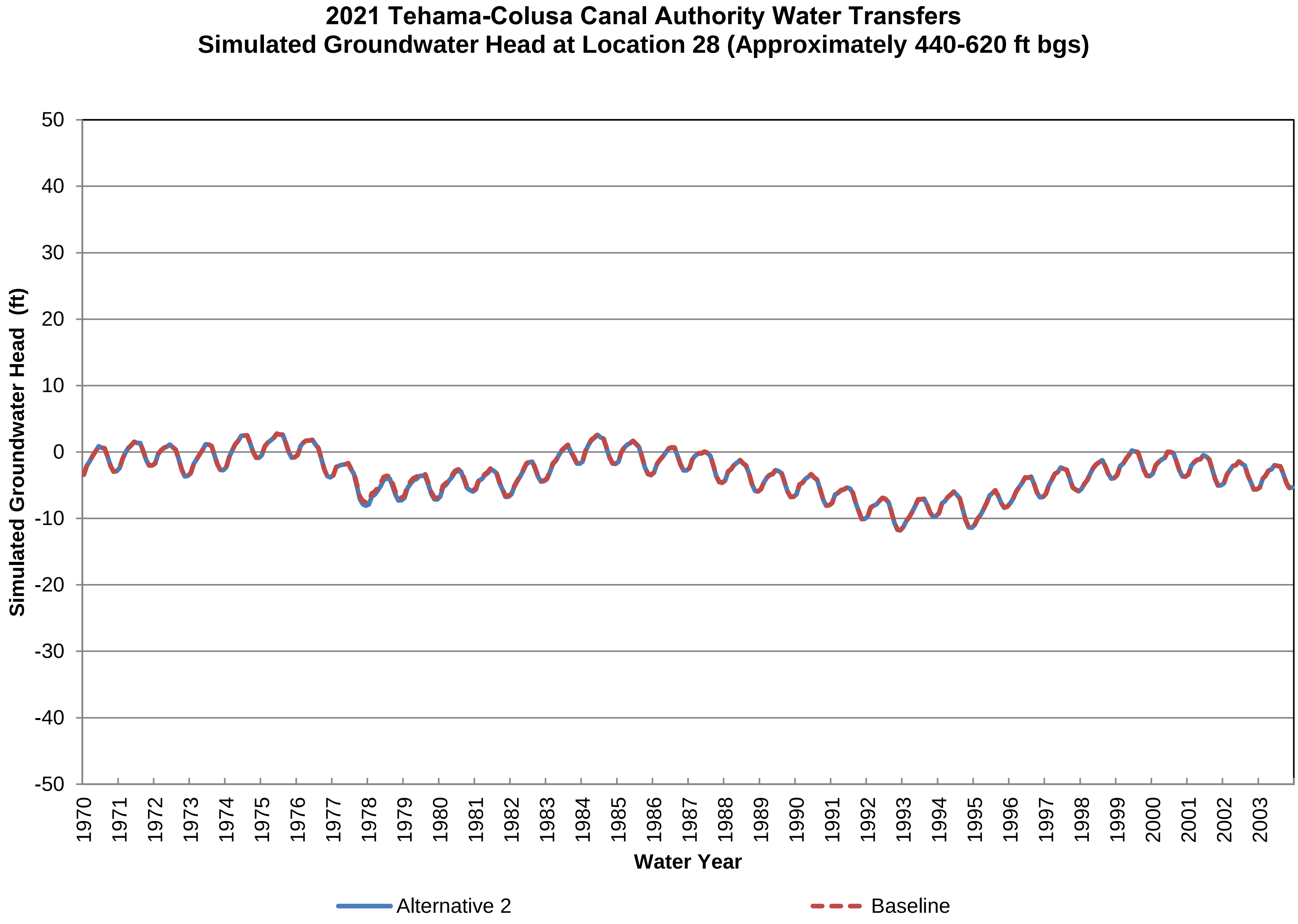
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline
Ground Surface Elevation

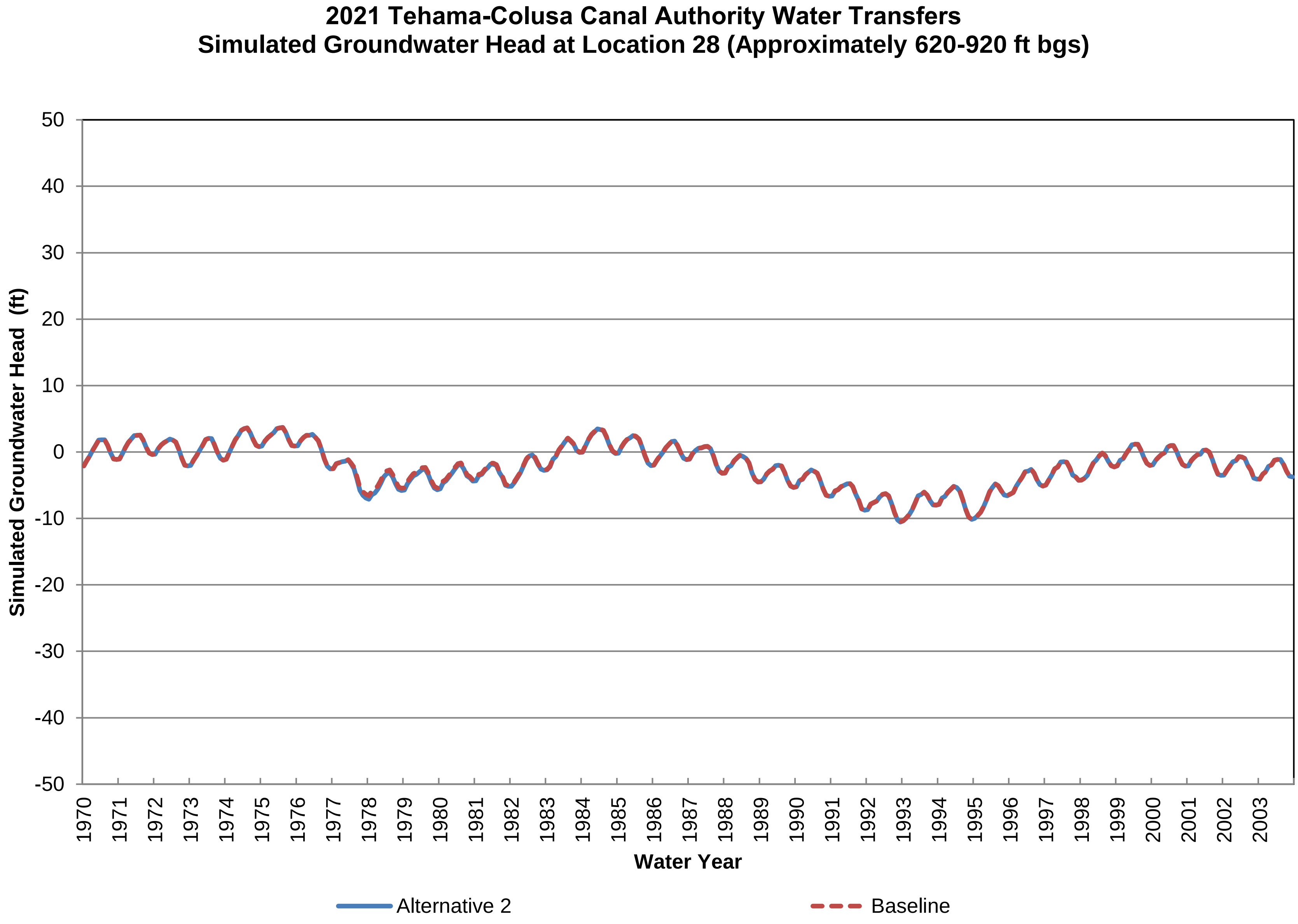

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 28 (Approximately 70-250 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 28 (Approximately 250-440 ft bgs)

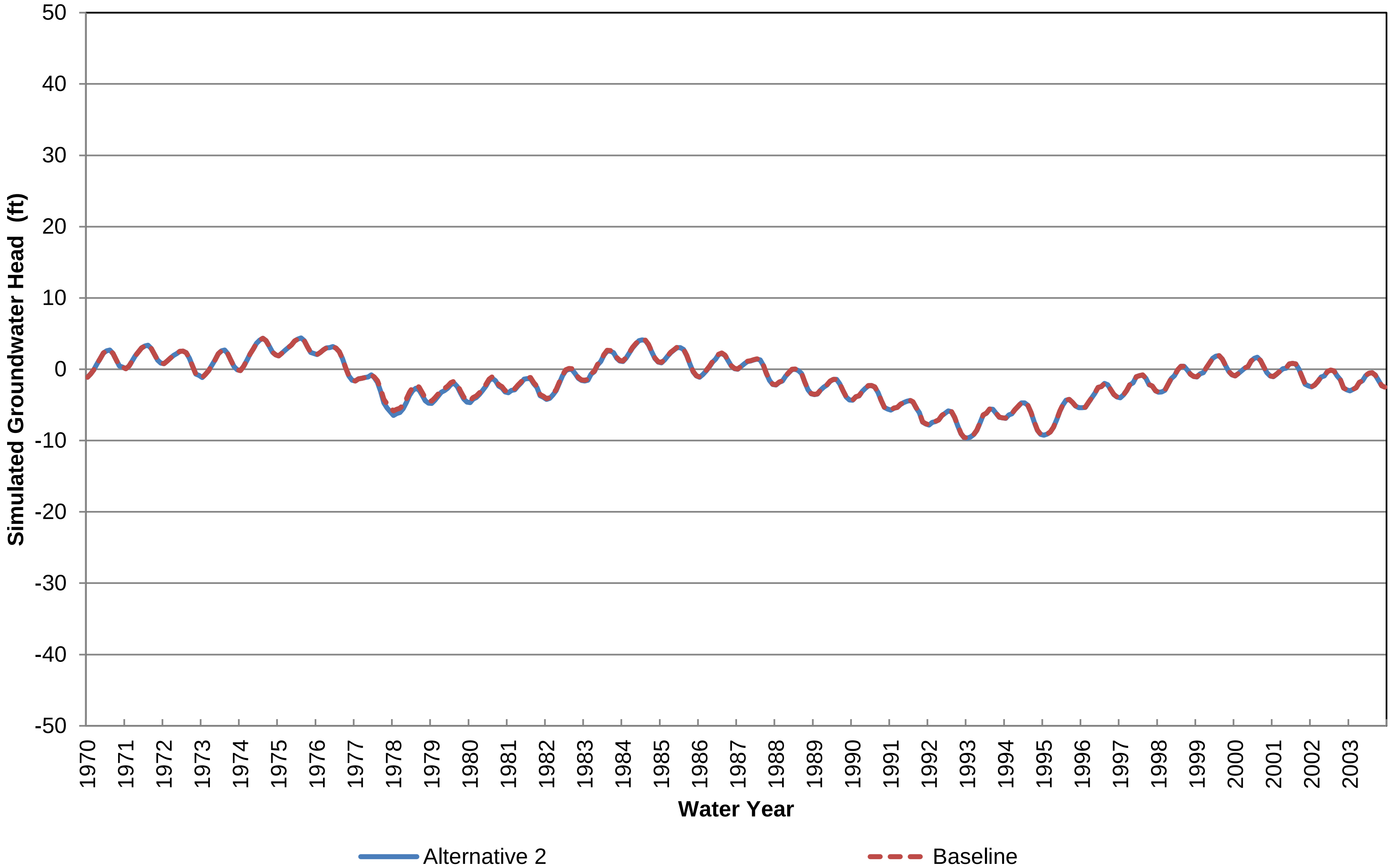




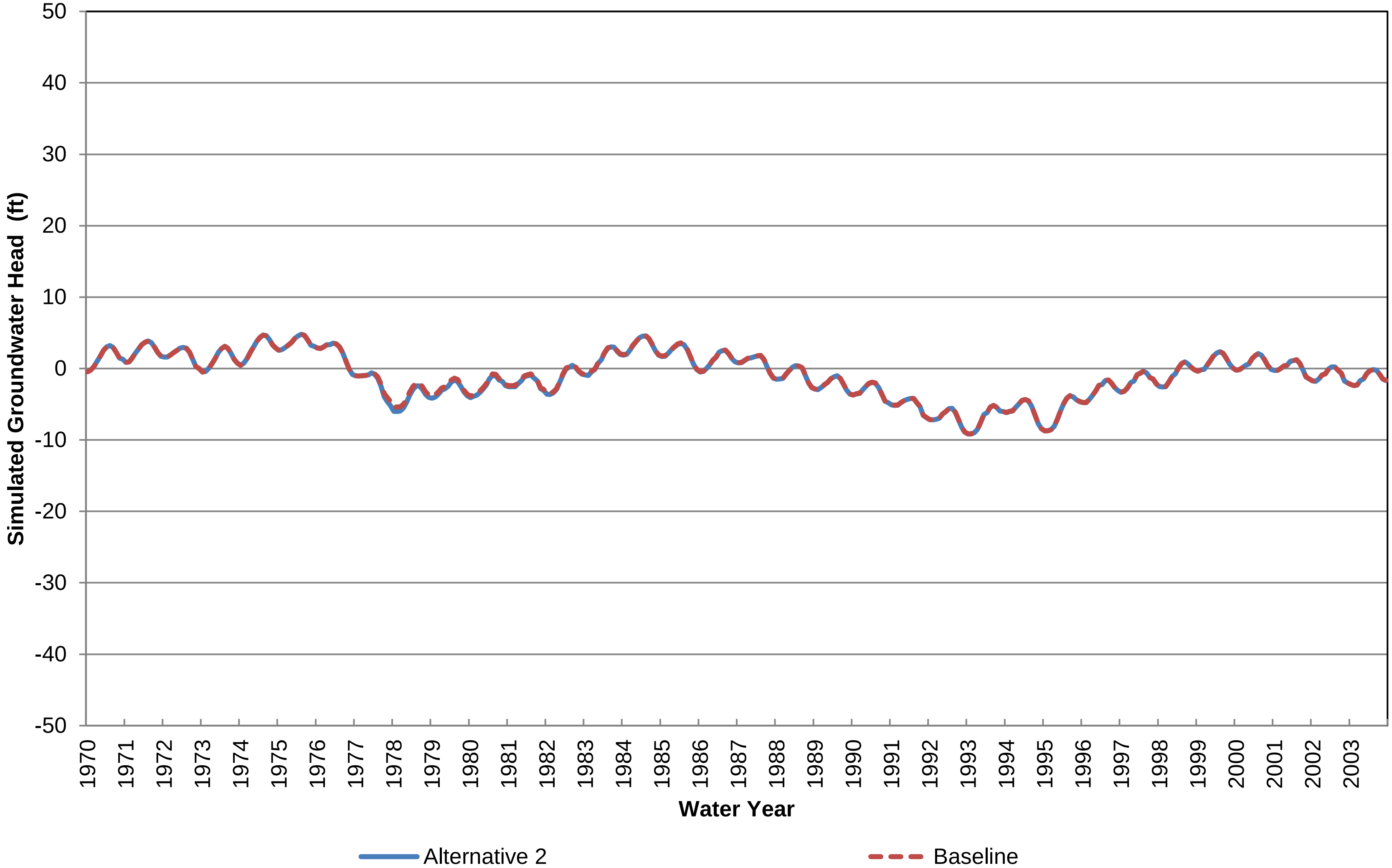
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 28 (Approximately 440-620 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

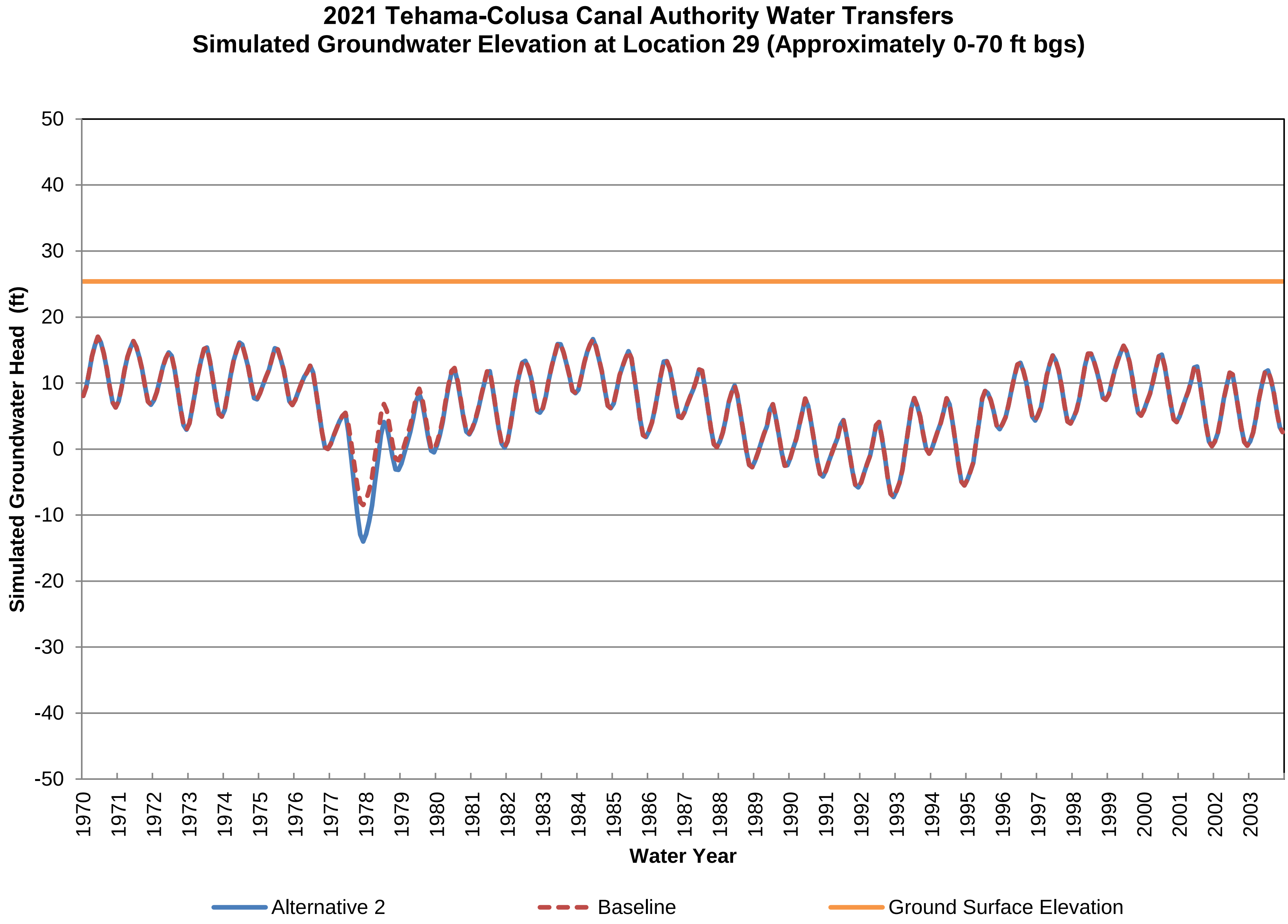

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 28 (Approximately 620-920 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 28 (Approximately 920-1220 ft bgs)

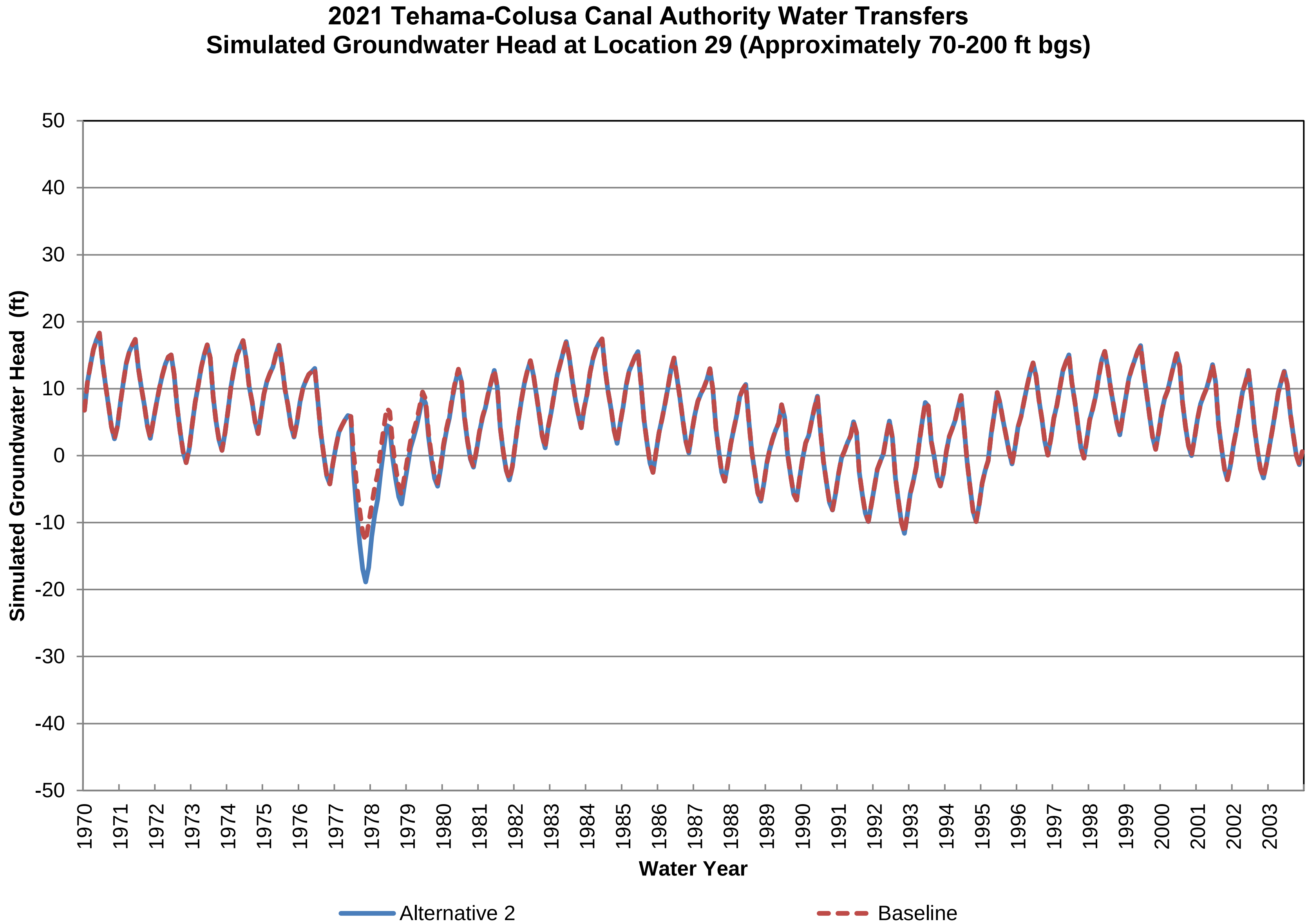


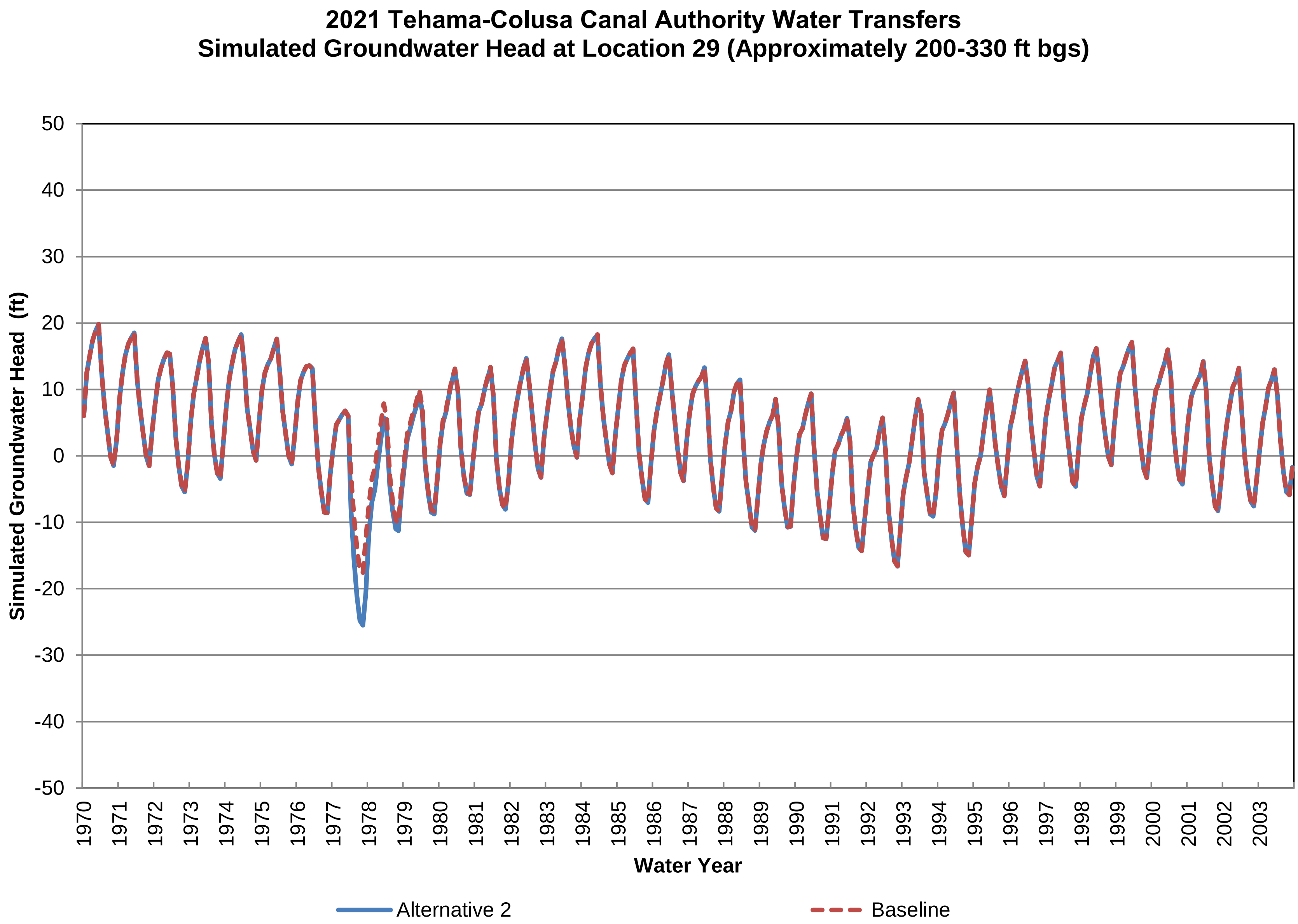
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 28 (Approximately 1220-1680 ft bgs)





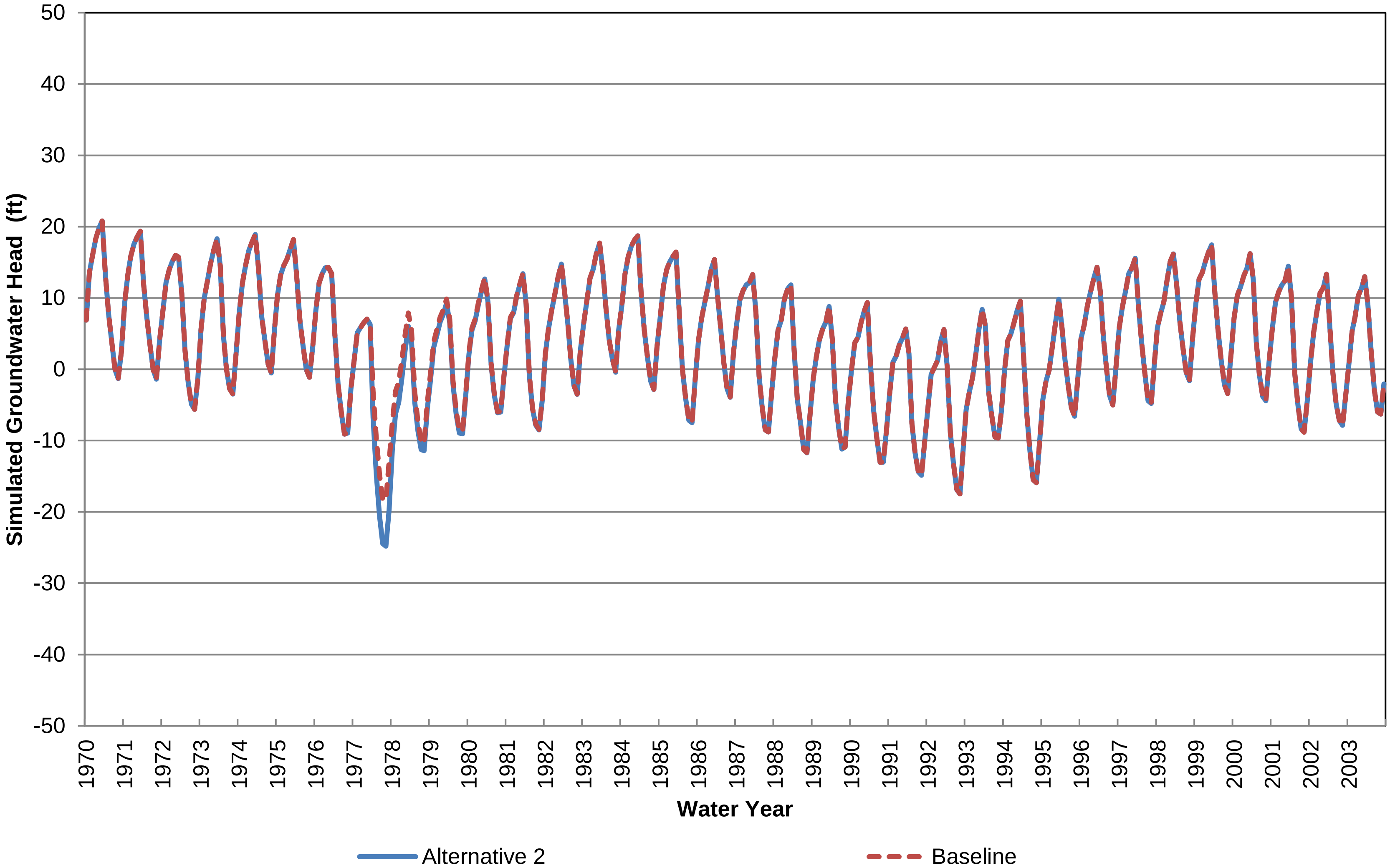
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 29 (Approximately 0-70 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline
Ground Surface Elevation

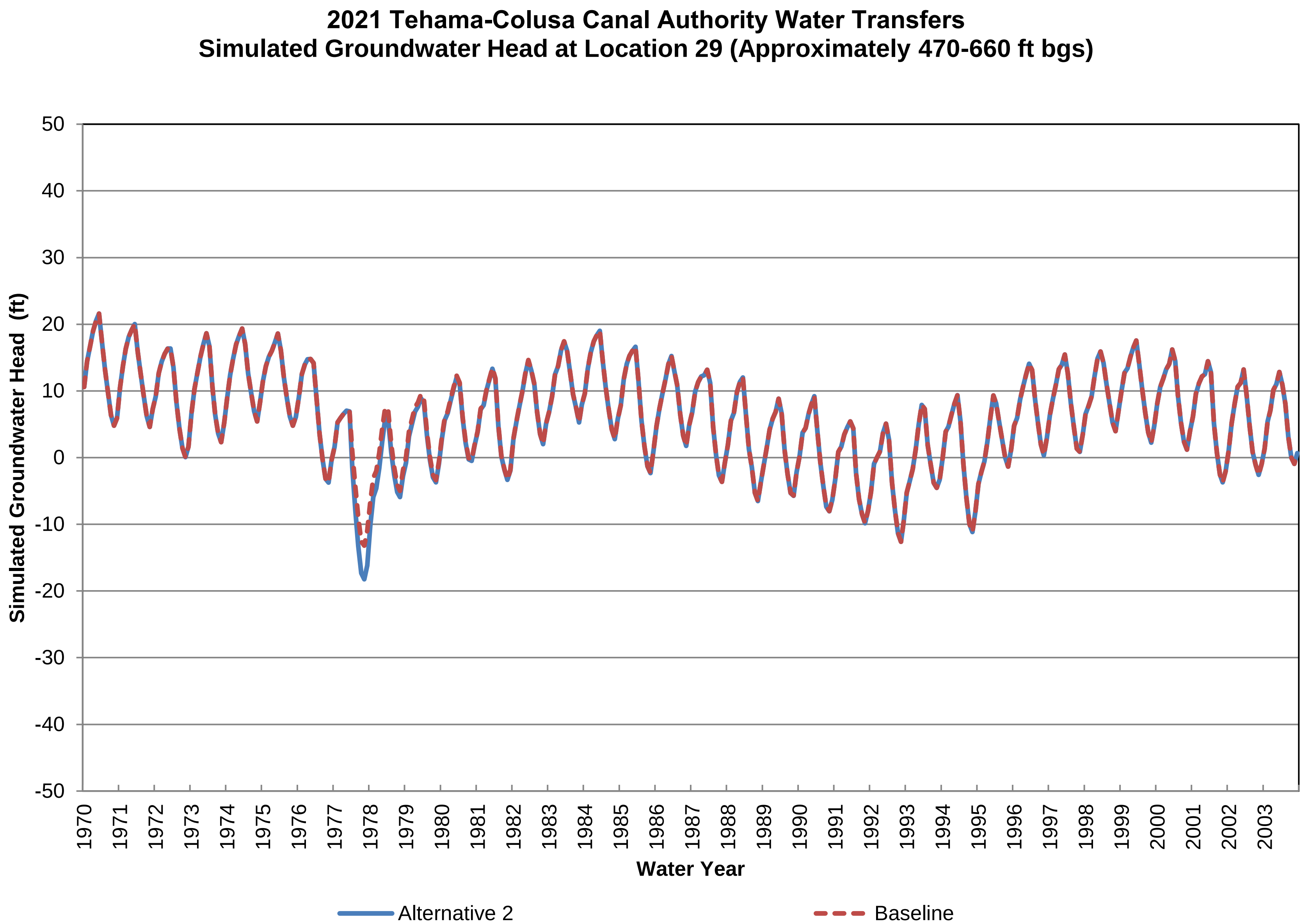

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 29 (Approximately 70-200 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

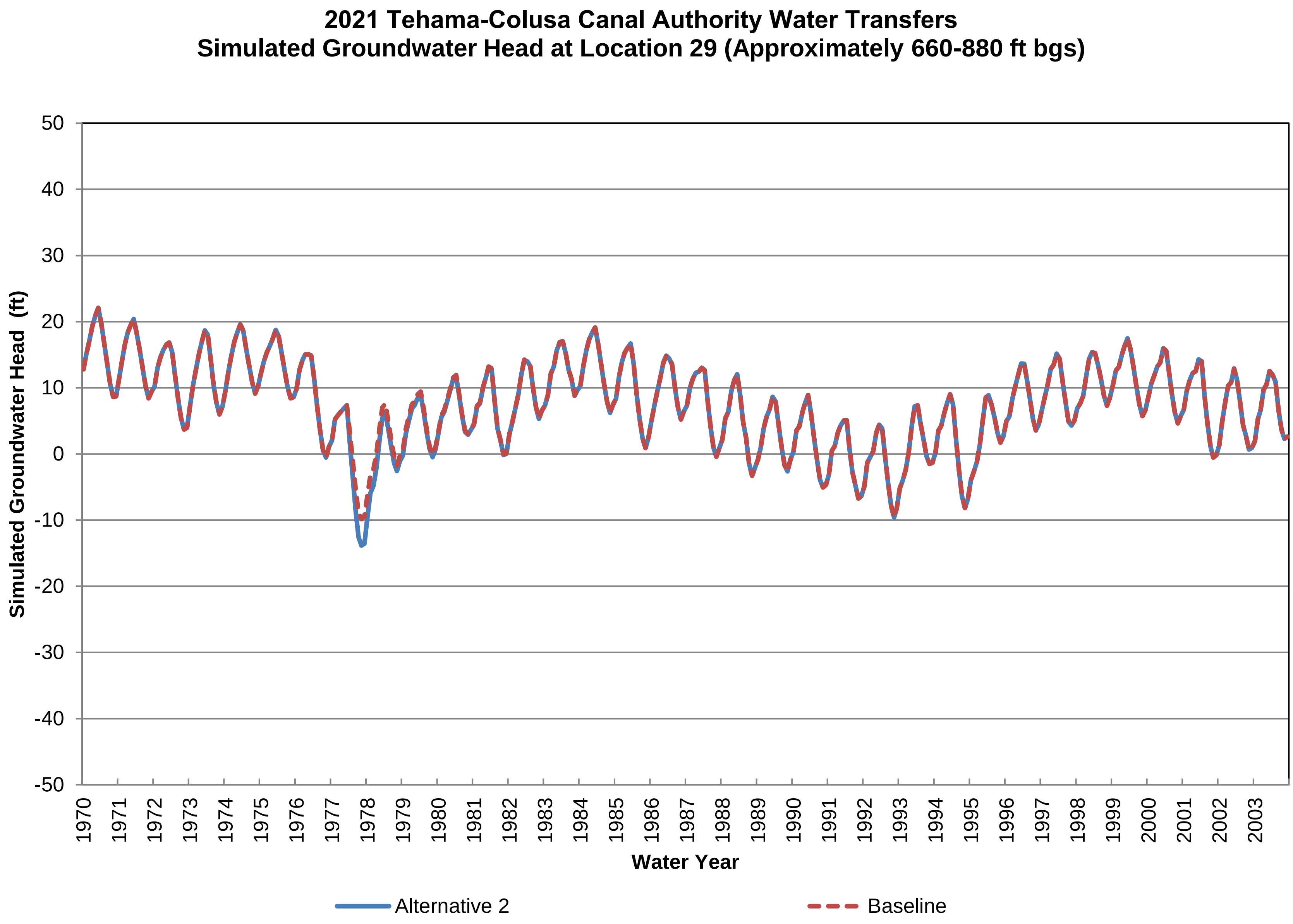


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 29 (Approximately 200-330 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

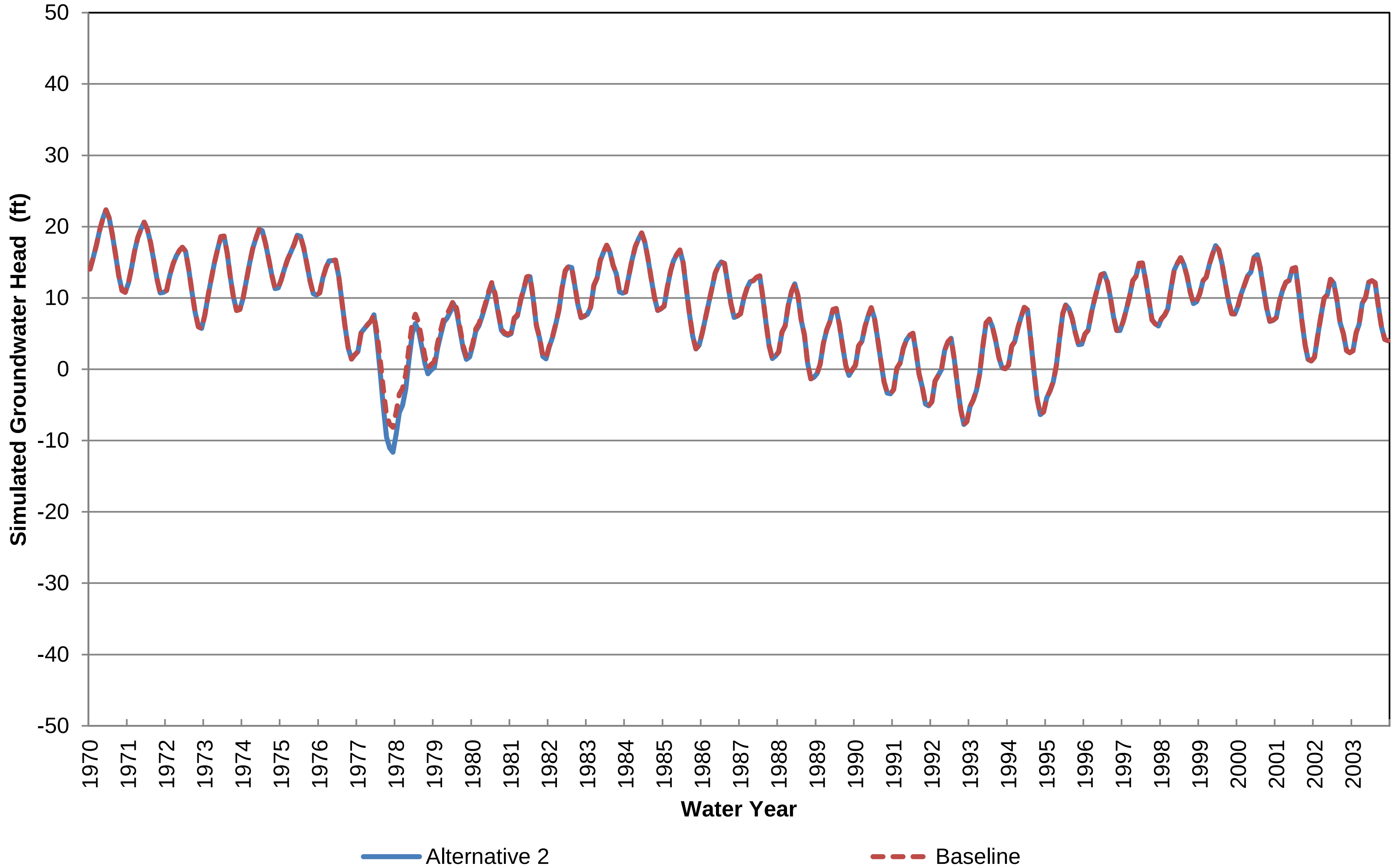
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 29 (Approximately 330-470 ft bgs)

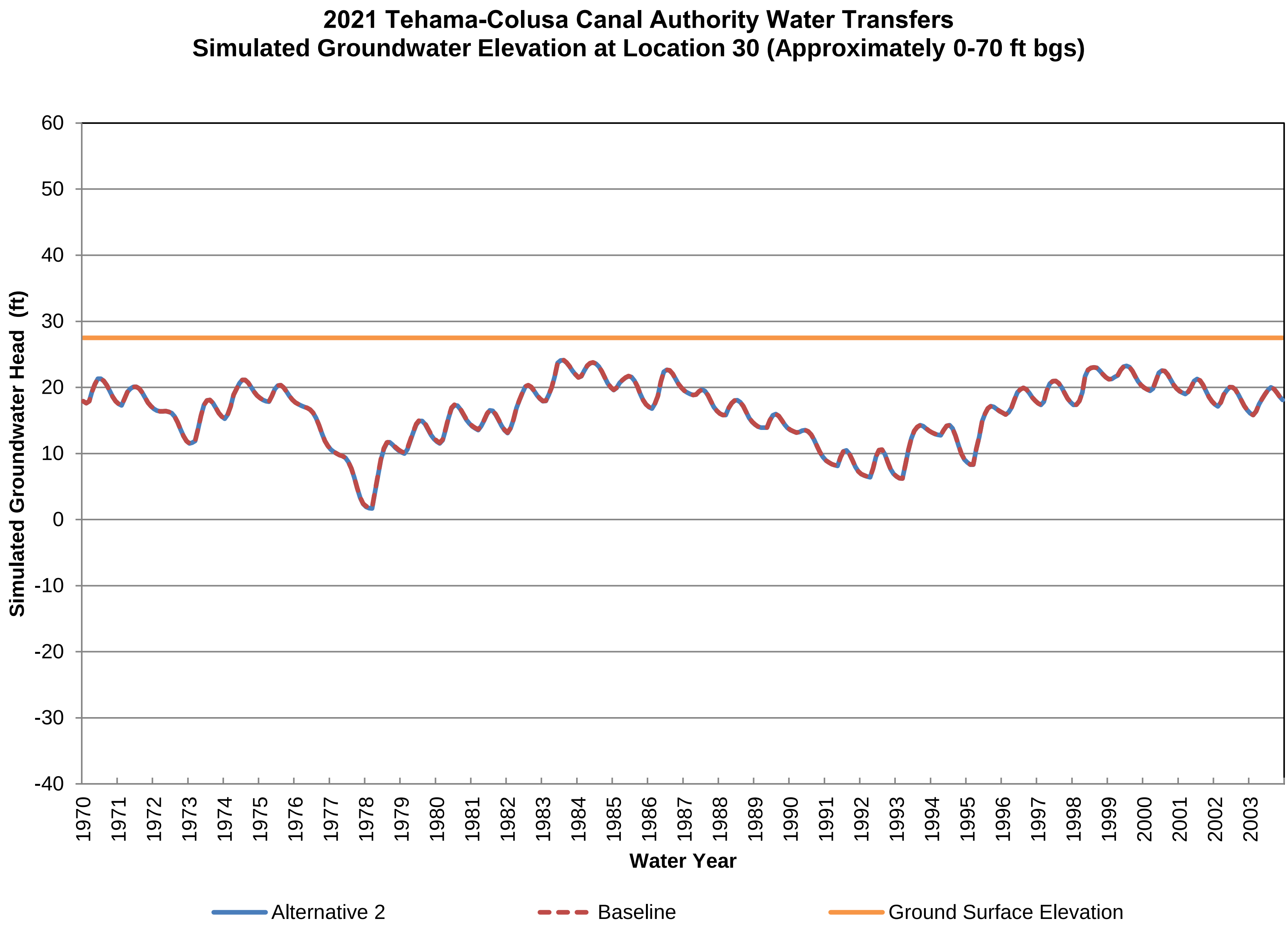



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 29 (Approximately 470-660 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

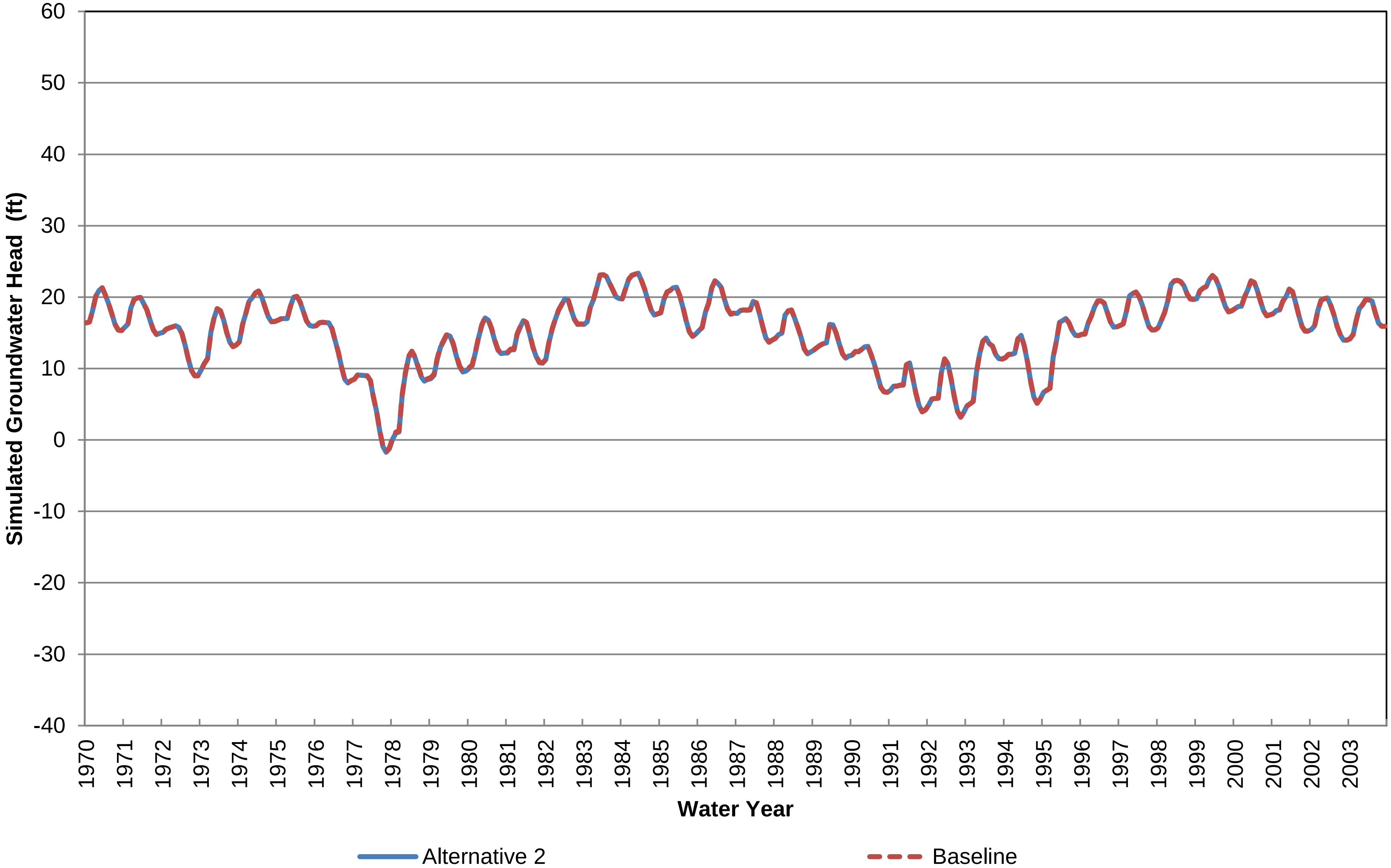

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 29 (Approximately 660-880 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 29 (Approximately 880-1210 ft bgs)

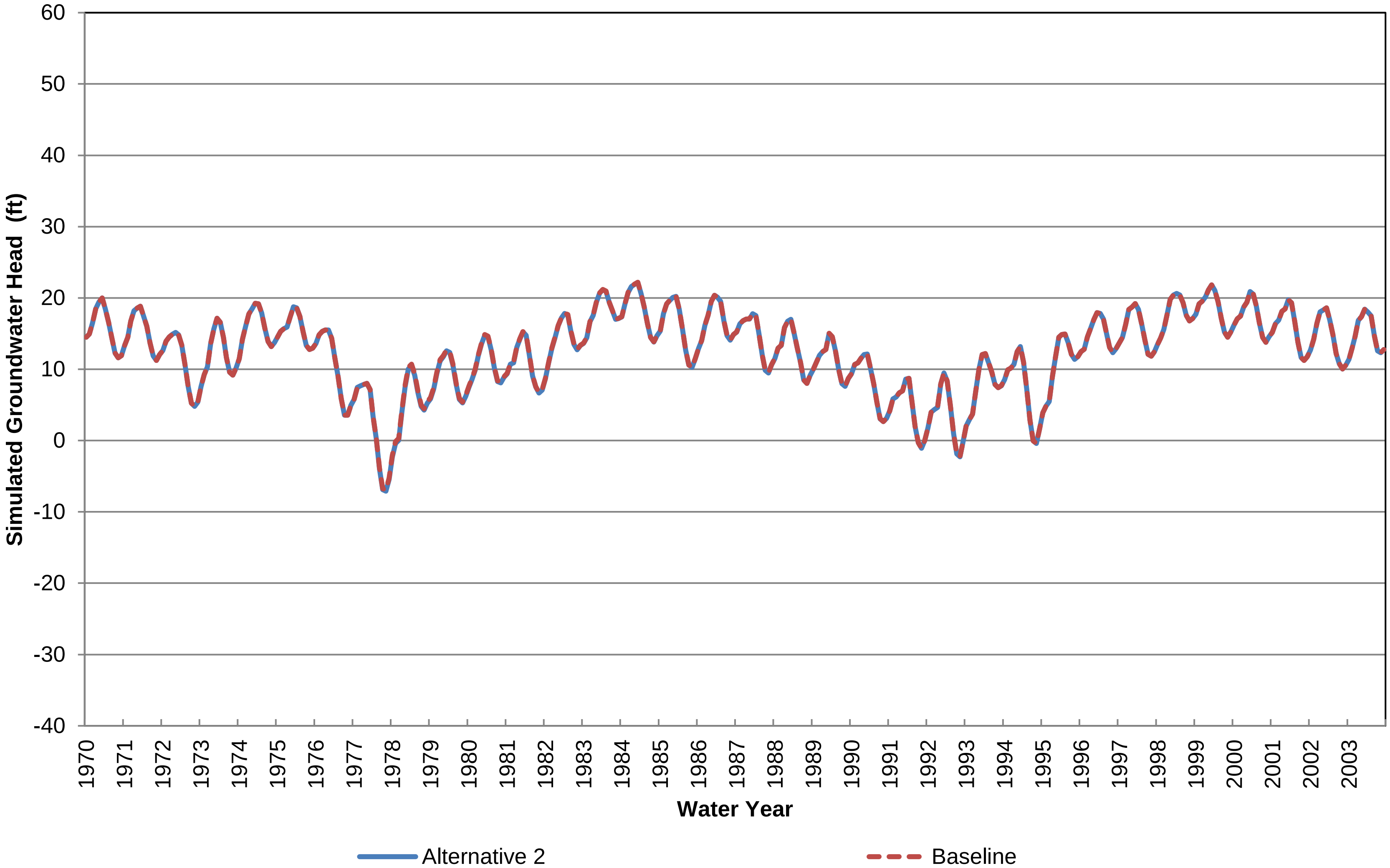


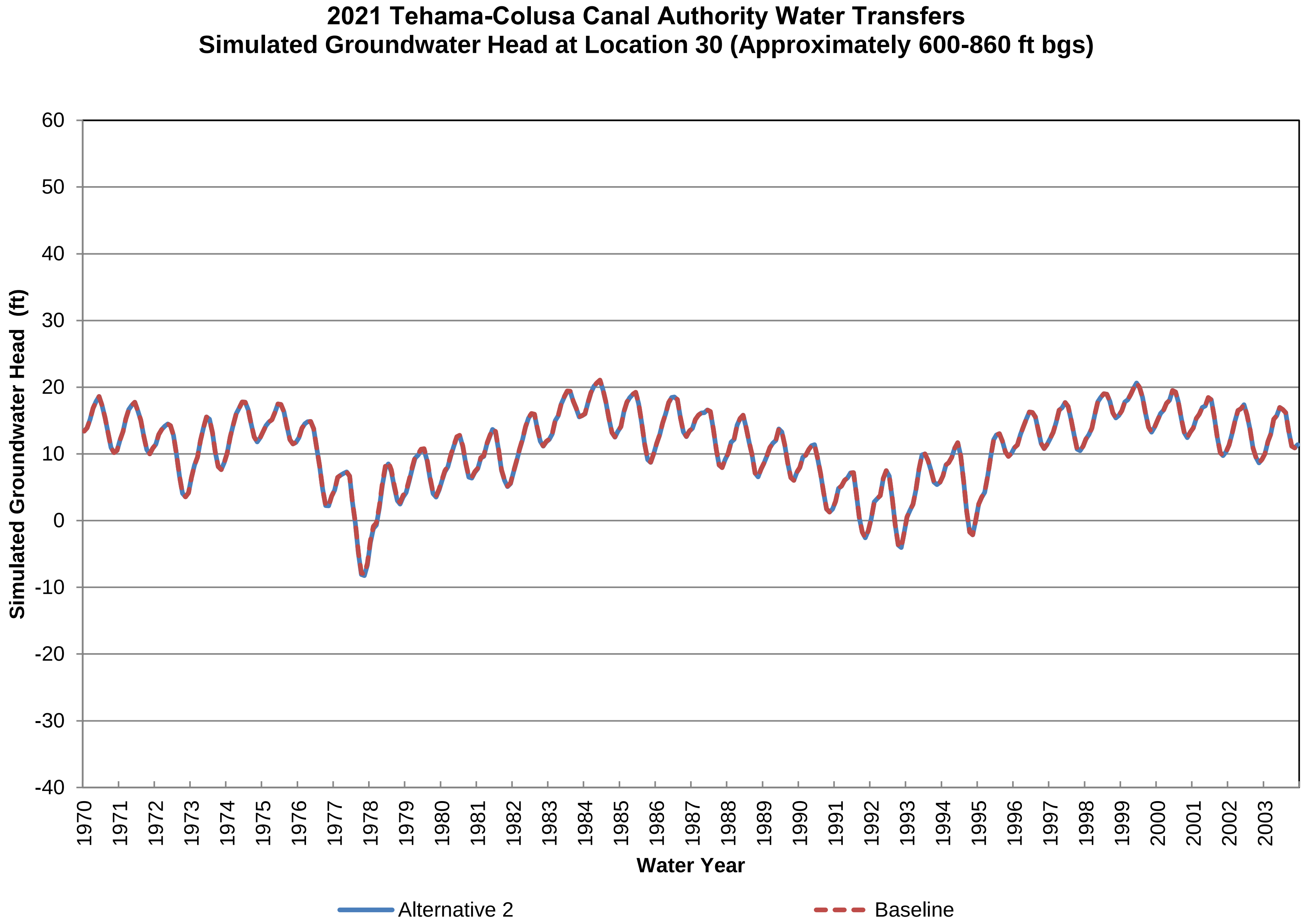

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 30 (Approximately 0-70 ft bgs)
Simulated Groundwater Head (ft)
60
50
40
30
20
10
0
-10
-20
-30
-40
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline
Ground Surface Elevation

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 30 (Approximately 70-340 ft bgs)

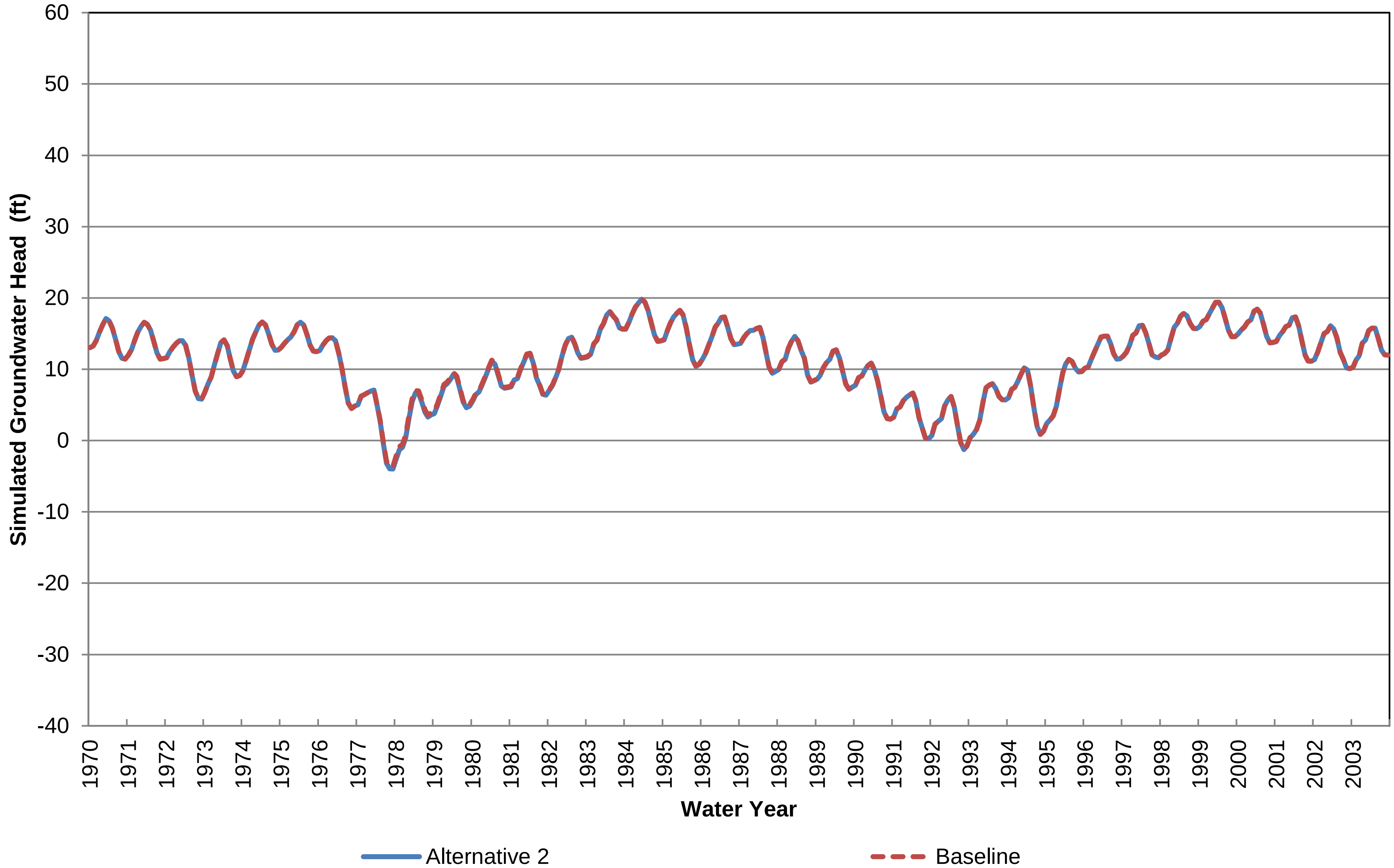


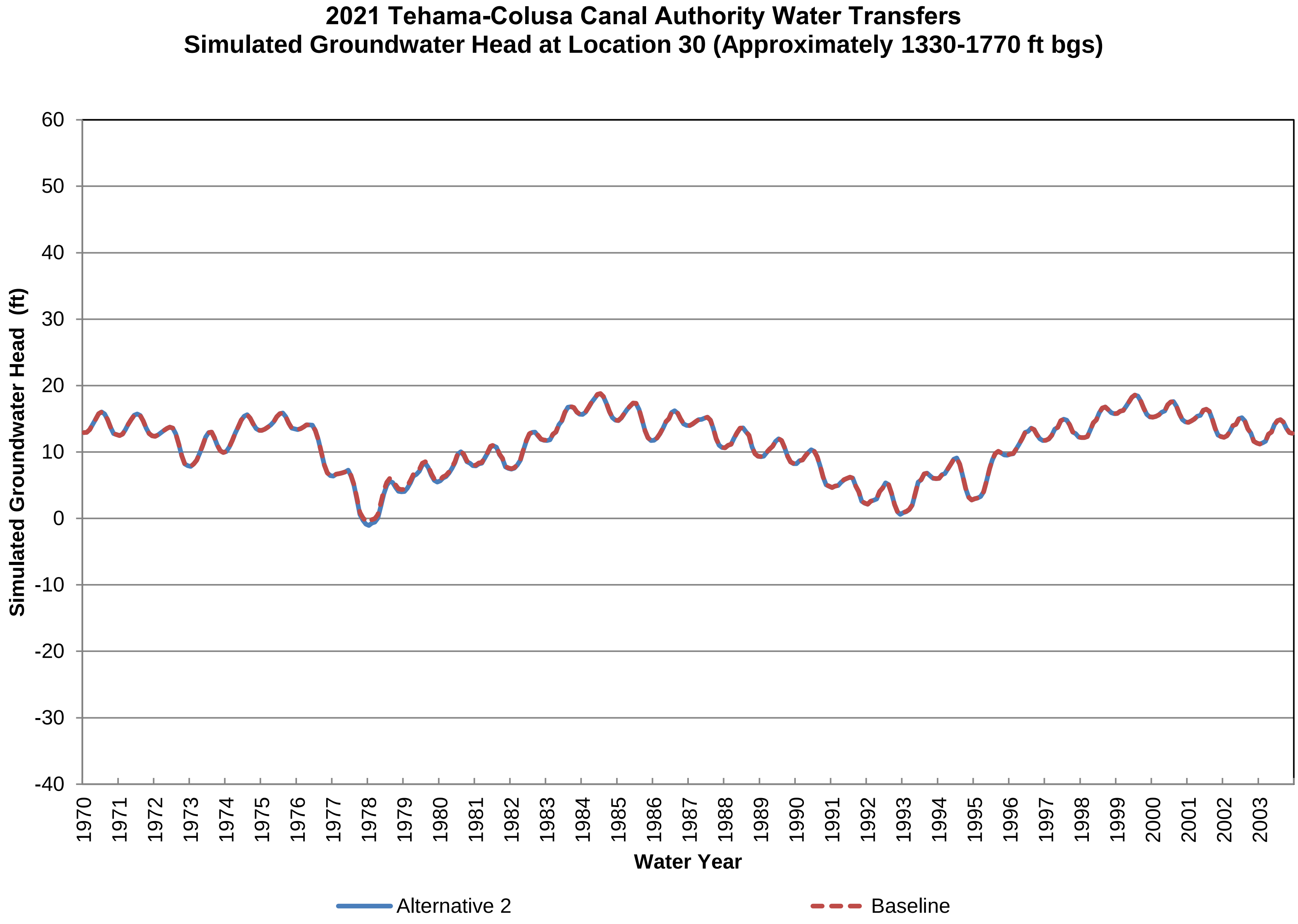
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 30 (Approximately 340-600 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 30 (Approximately 600-860 ft bgs)
Simulated Groundwater Head (ft)
60
50
40
30
20
10
0
-10
-20
-30
-40
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 30 (Approximately 860-1330 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 30 (Approximately 1330-1770 ft bgs)
Simulated Groundwater Head (ft)
60
50
40
30
20
10
0
-10
-20
-30
-40
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
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1983
1984
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1986
1987
1988
1989
1990
1991
1992
1993
1994
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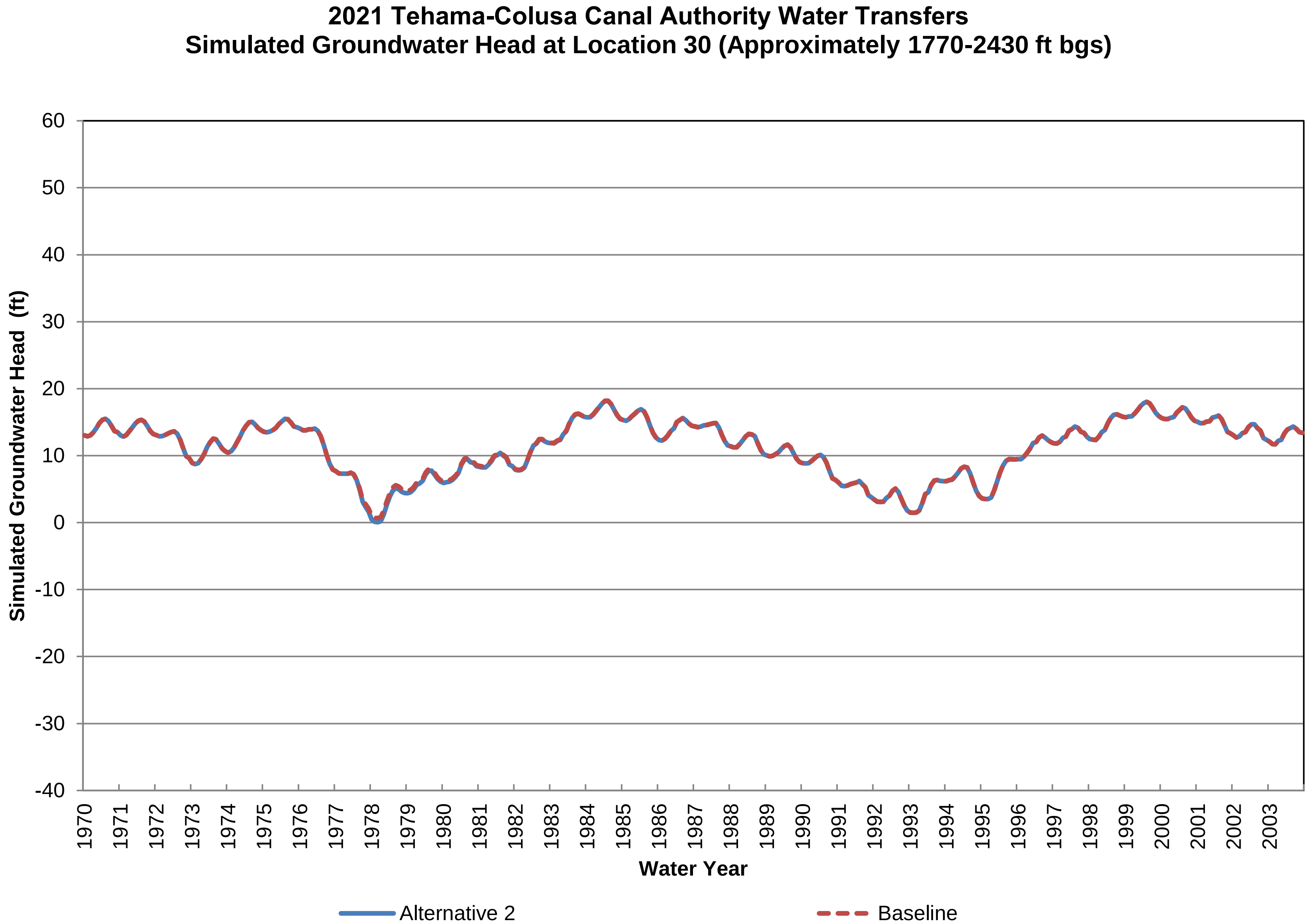
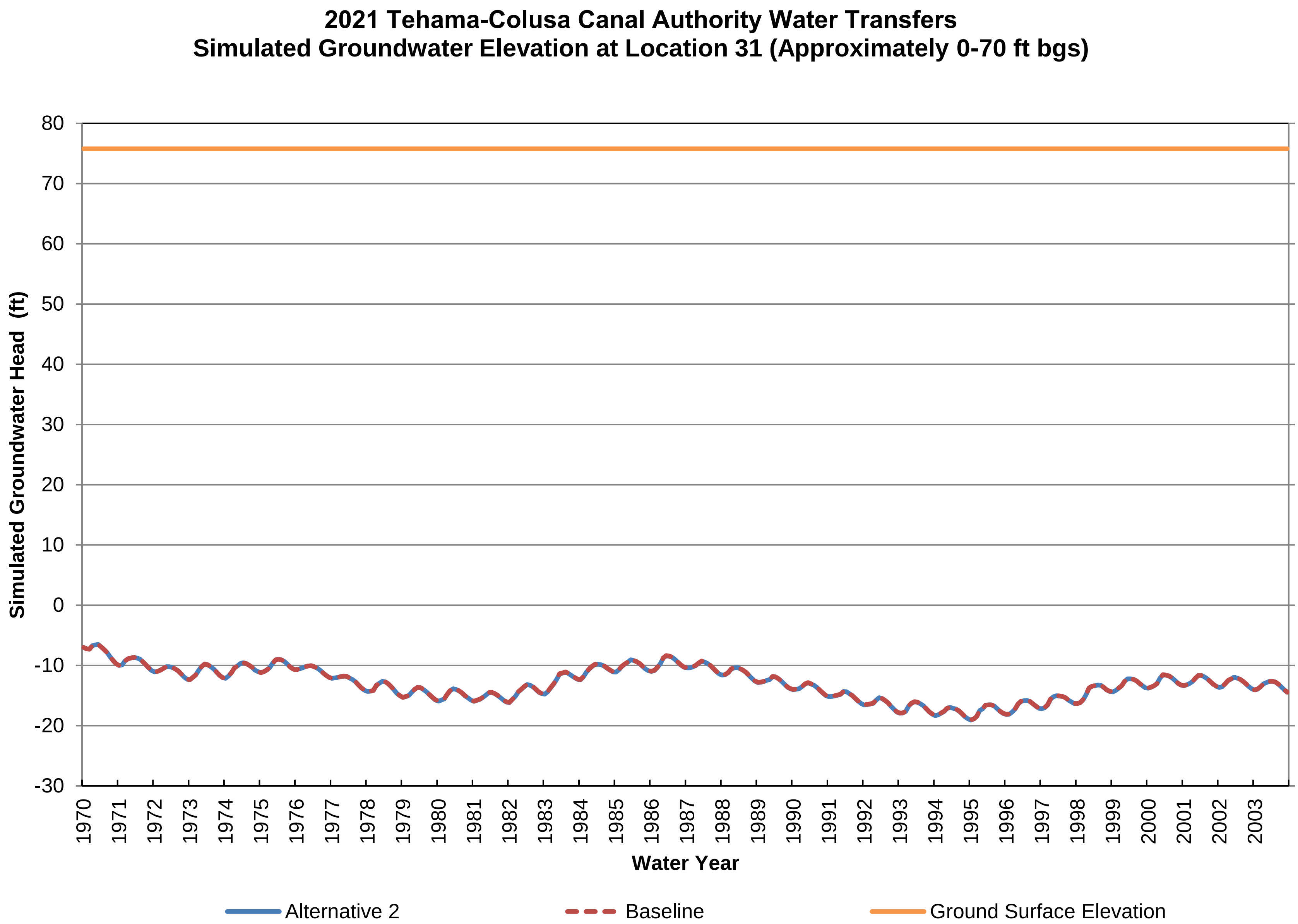
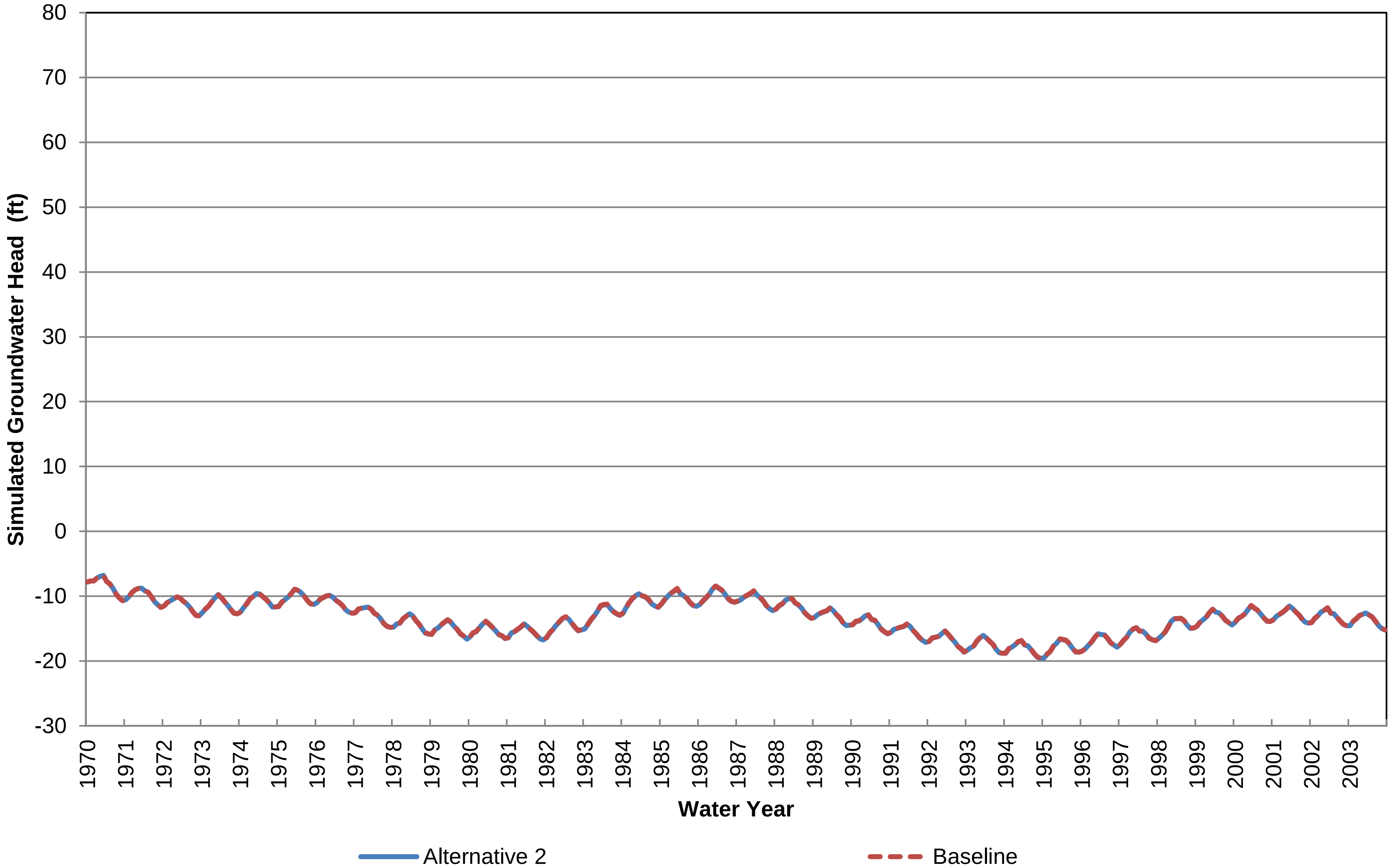
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

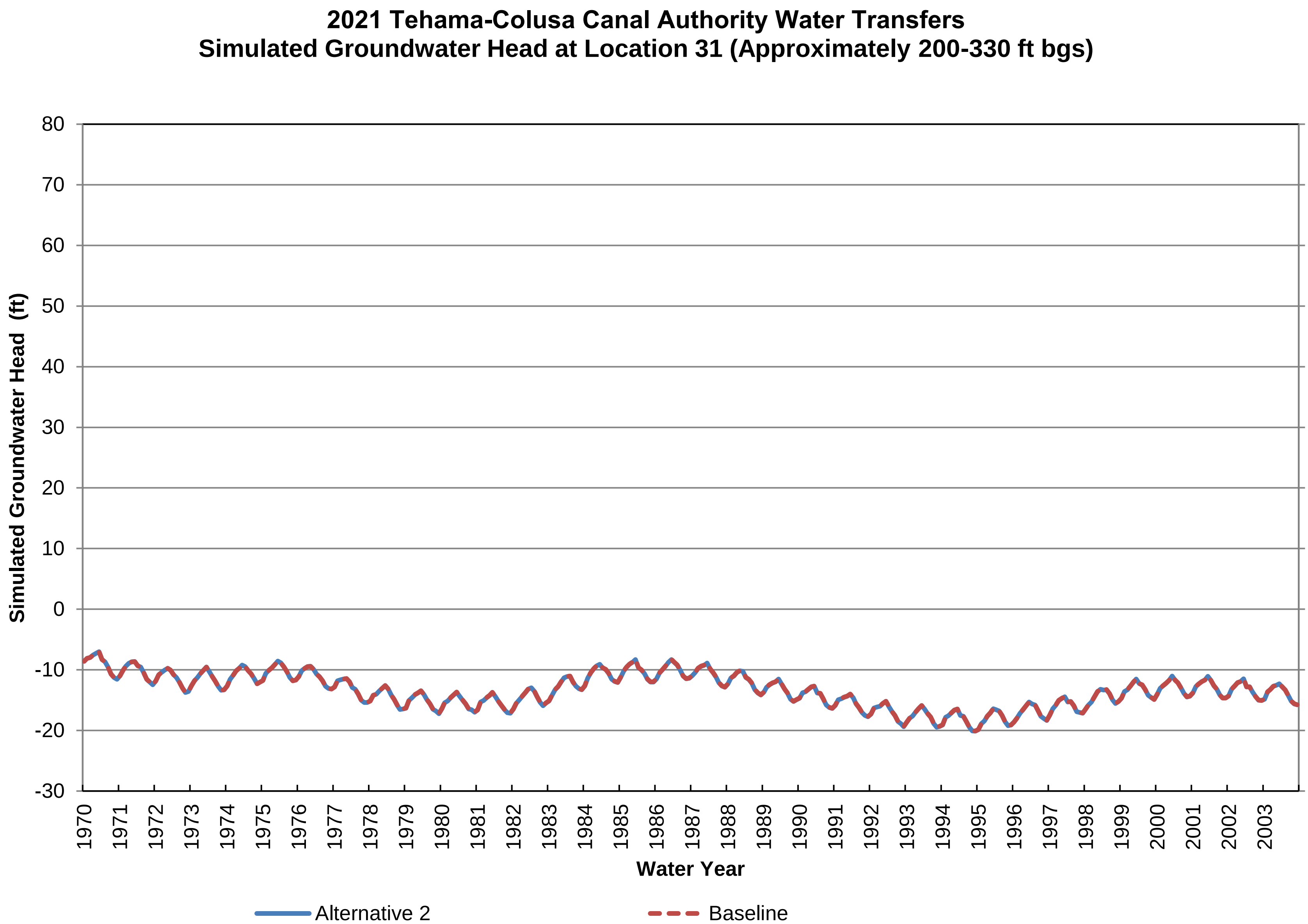

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 30 (Approximately 1770-2430 ft bgs)
Simulated Groundwater Head (ft)
60
50
40
30
20
10
0
-10
-20
-30
-40
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 31 (Approximately 0-70 ft bgs)
Simulated Groundwater Head (ft)
80
70
60
50
40
30
20
10
0
-10
-20
-30
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline
Ground Surface Elevation

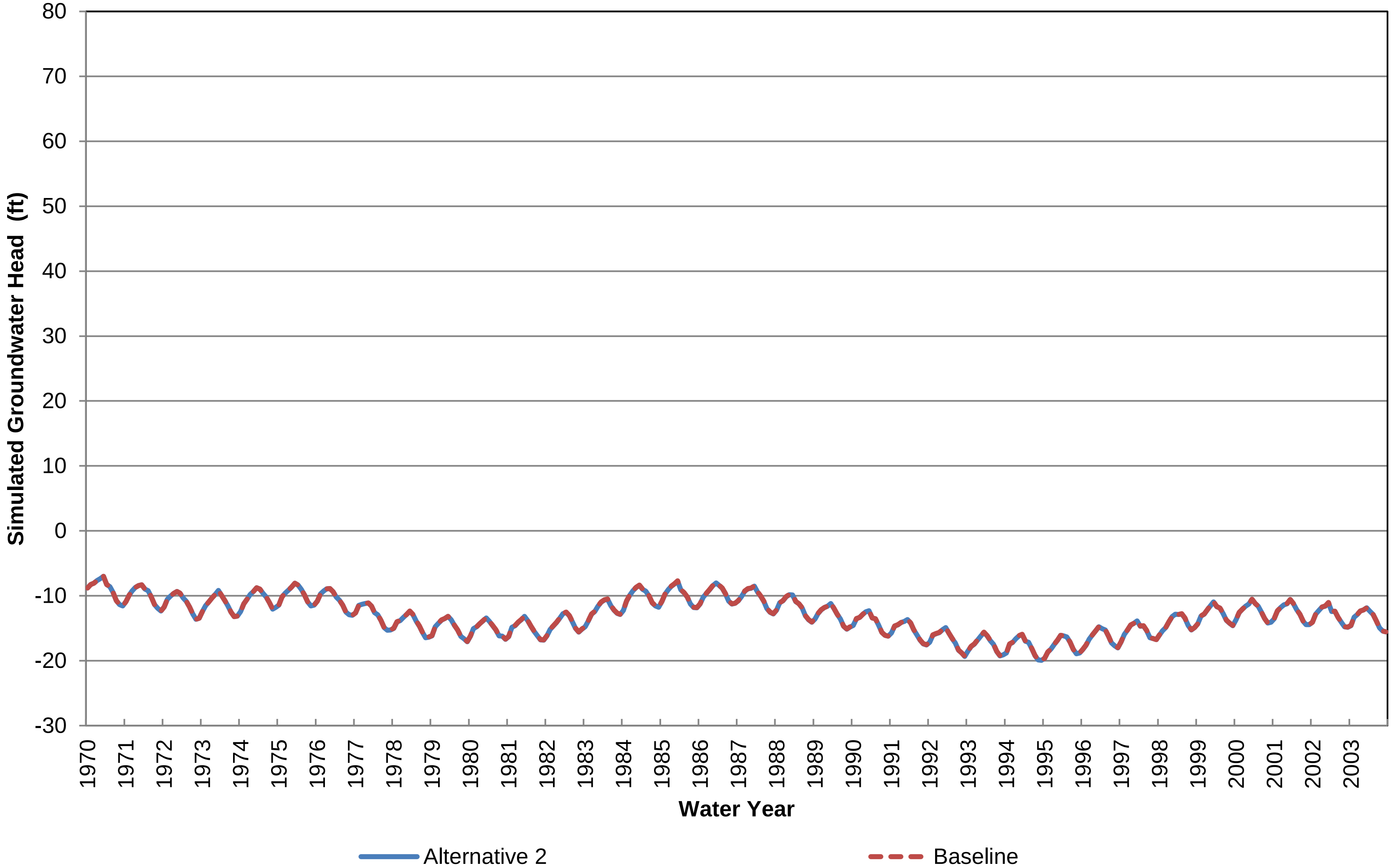
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 31 (Approximately 70-200 ft bgs)



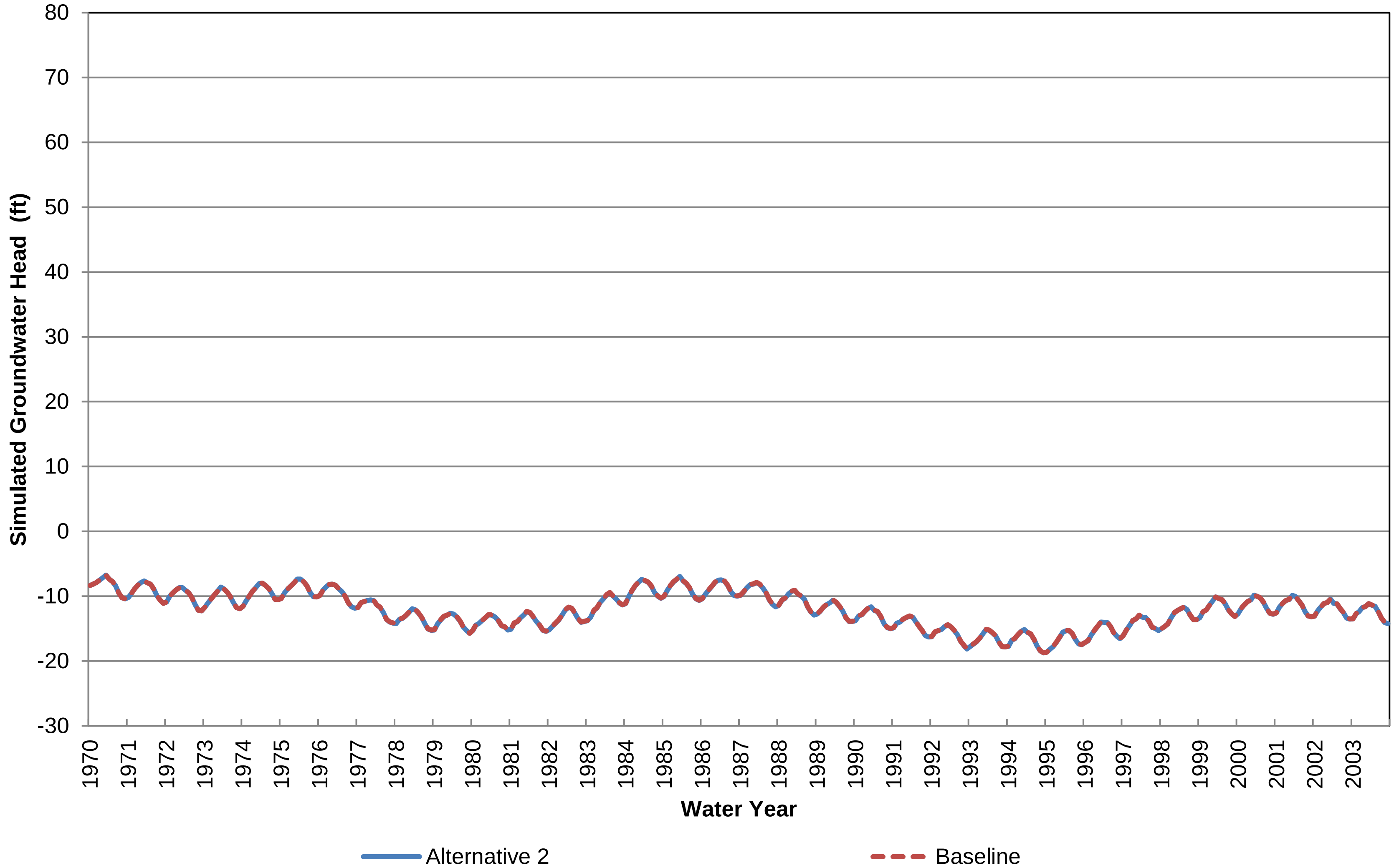


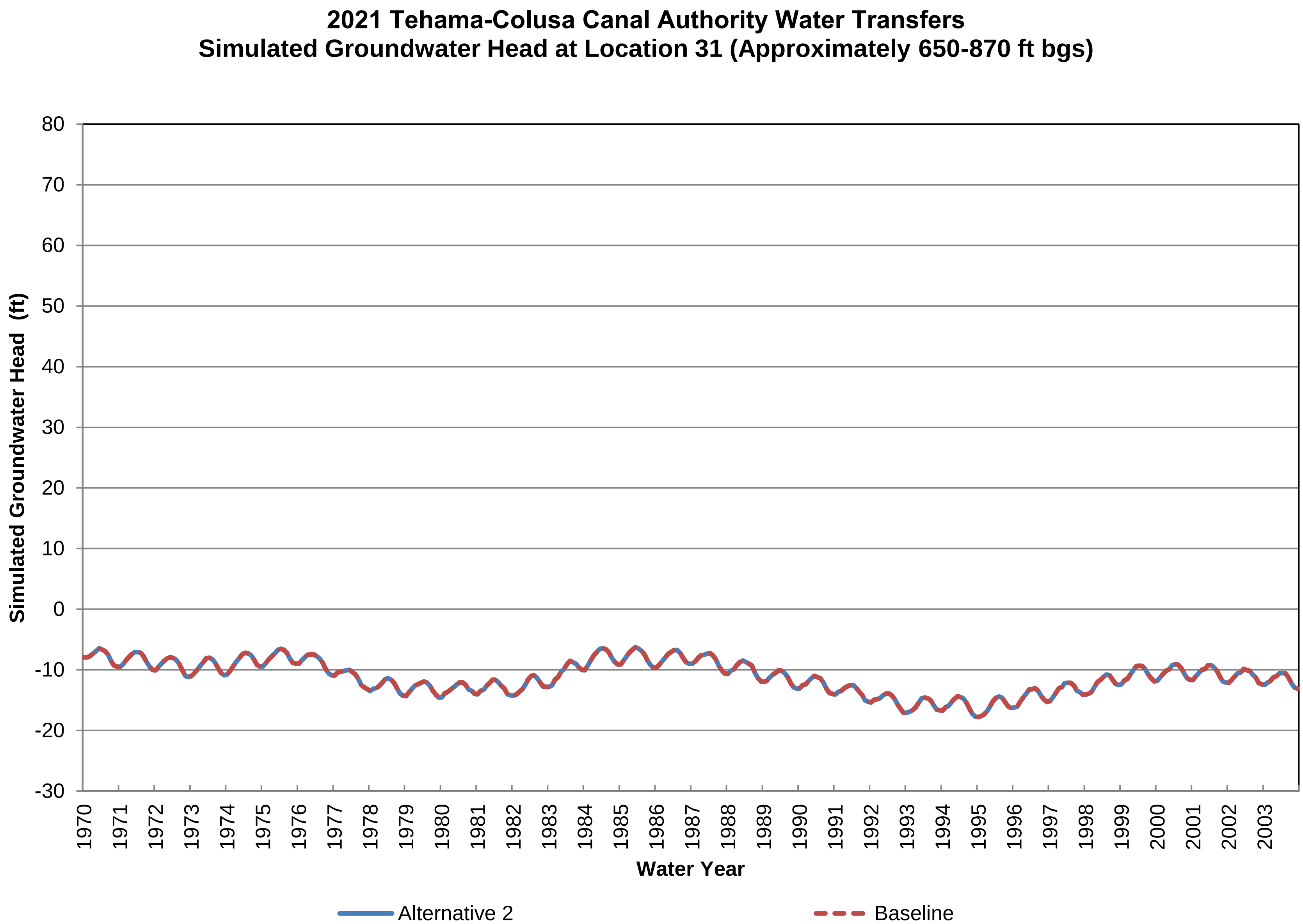
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 31 (Approximately 200-330 ft bgs)
Simulated Groundwater Head (ft)
80
70
60
50
40
30
20
10
0
-10
-20
-30
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 31 (Approximately 330-460 ft bgs)



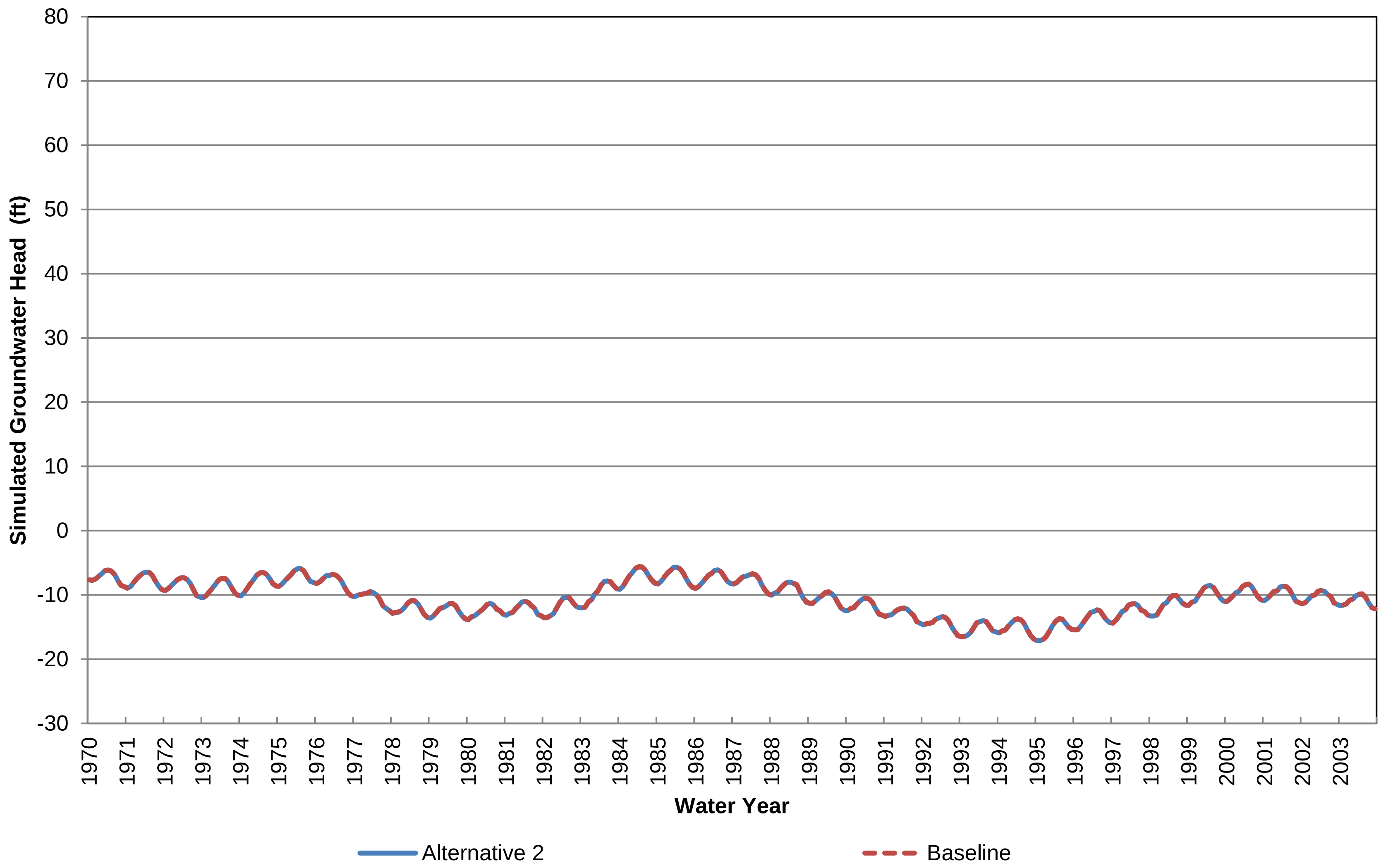
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 31 (Approximately 460-650 ft bgs)



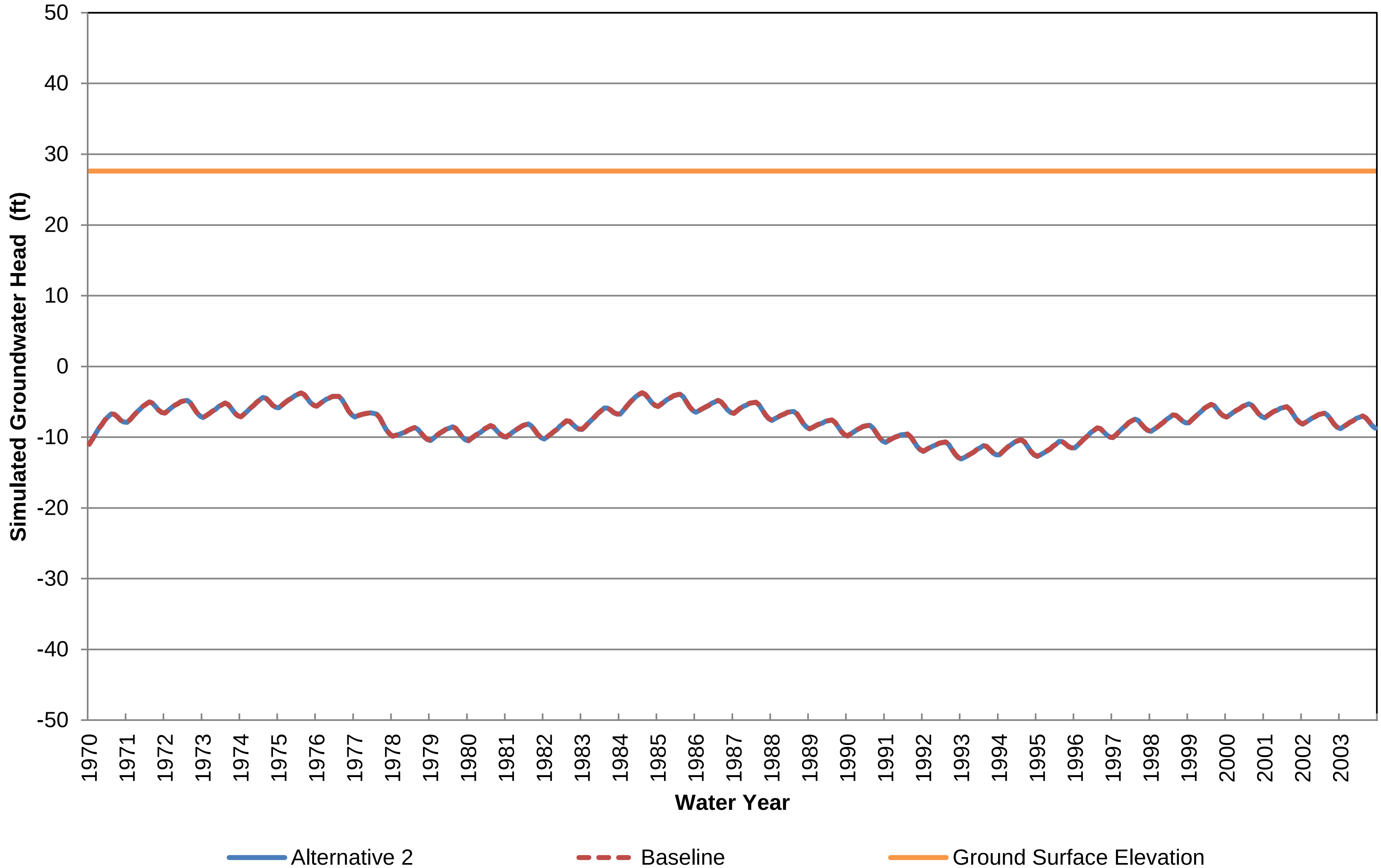


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 31 (Approximately 650-870 ft bgs)
Simulated Groundwater Head (ft)
80
70
60
50
40
30
20
10
0
-10
-20
-30
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

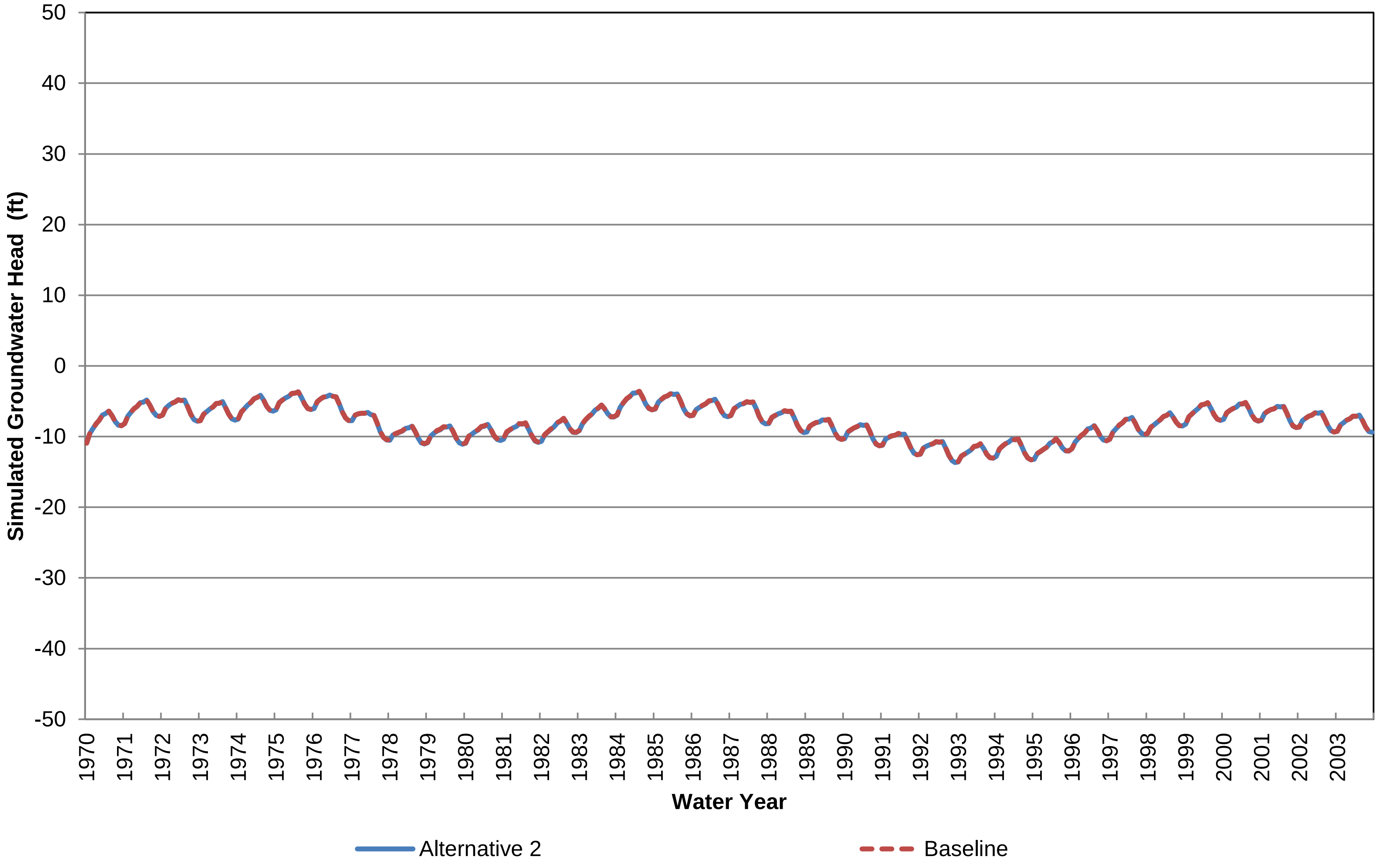
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 31 (Approximately 870-1190 ft bgs)



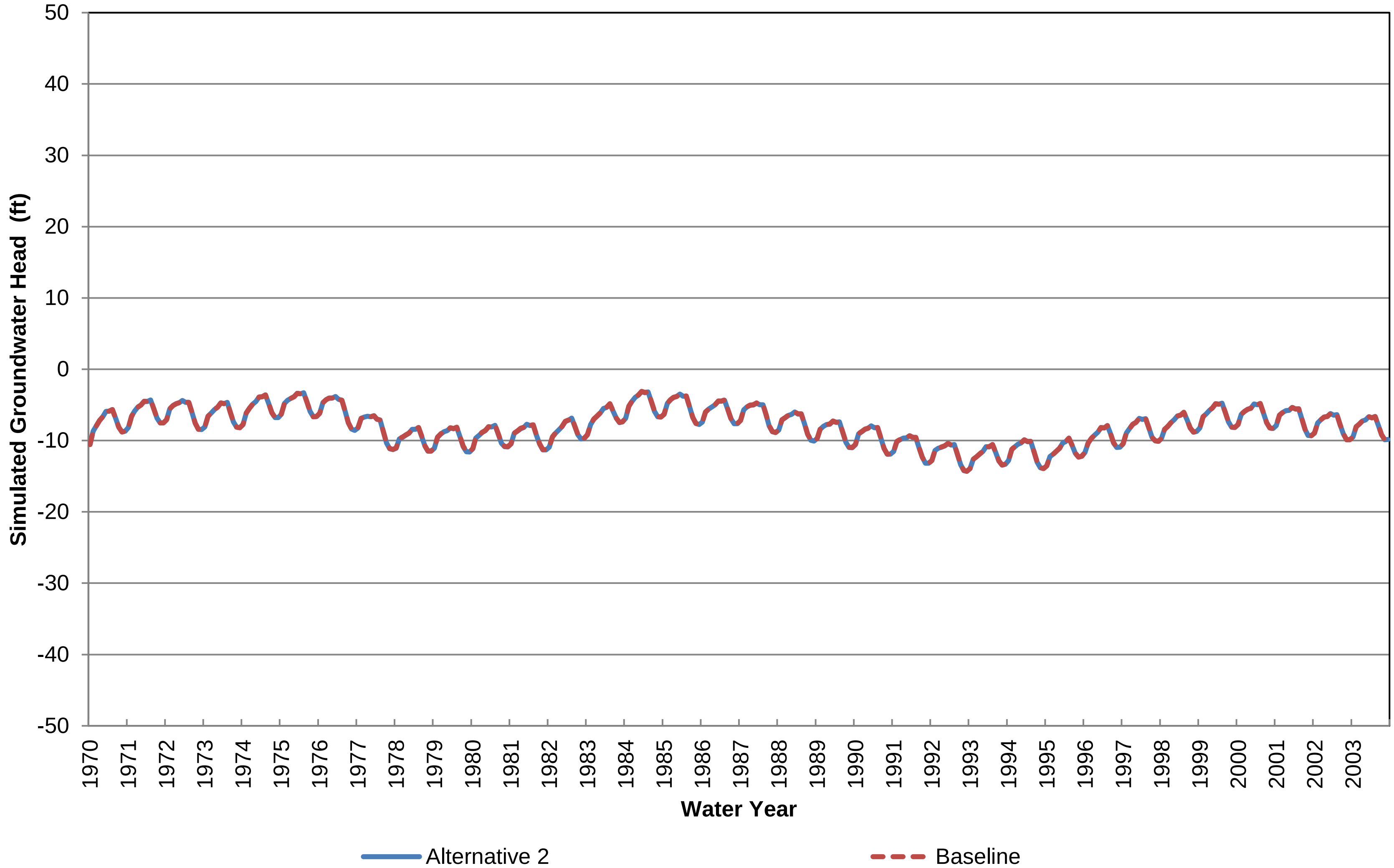
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 32 (Approximately 0-70 ft bgs)

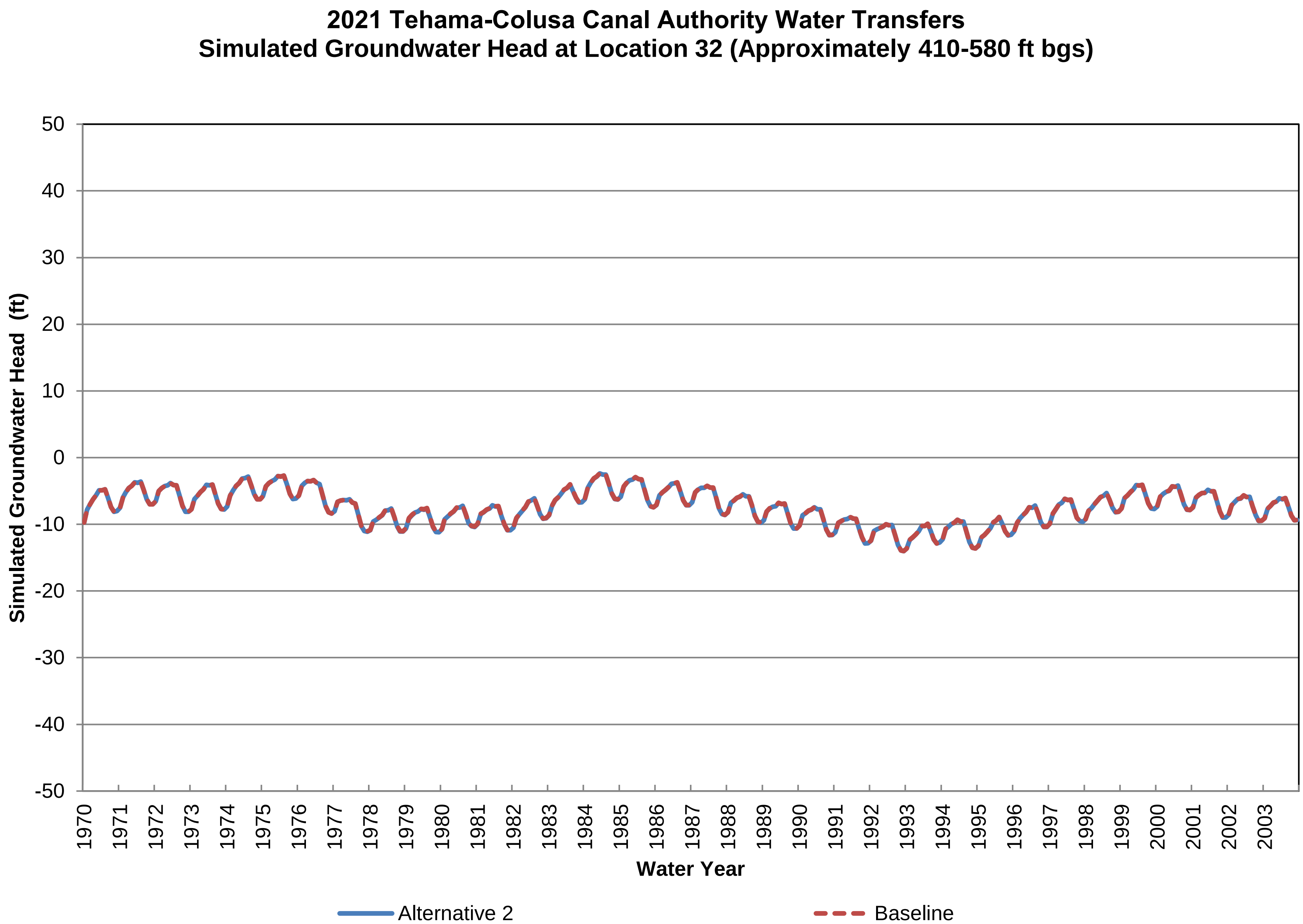


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 32 (Approximately 70-240 ft bgs)

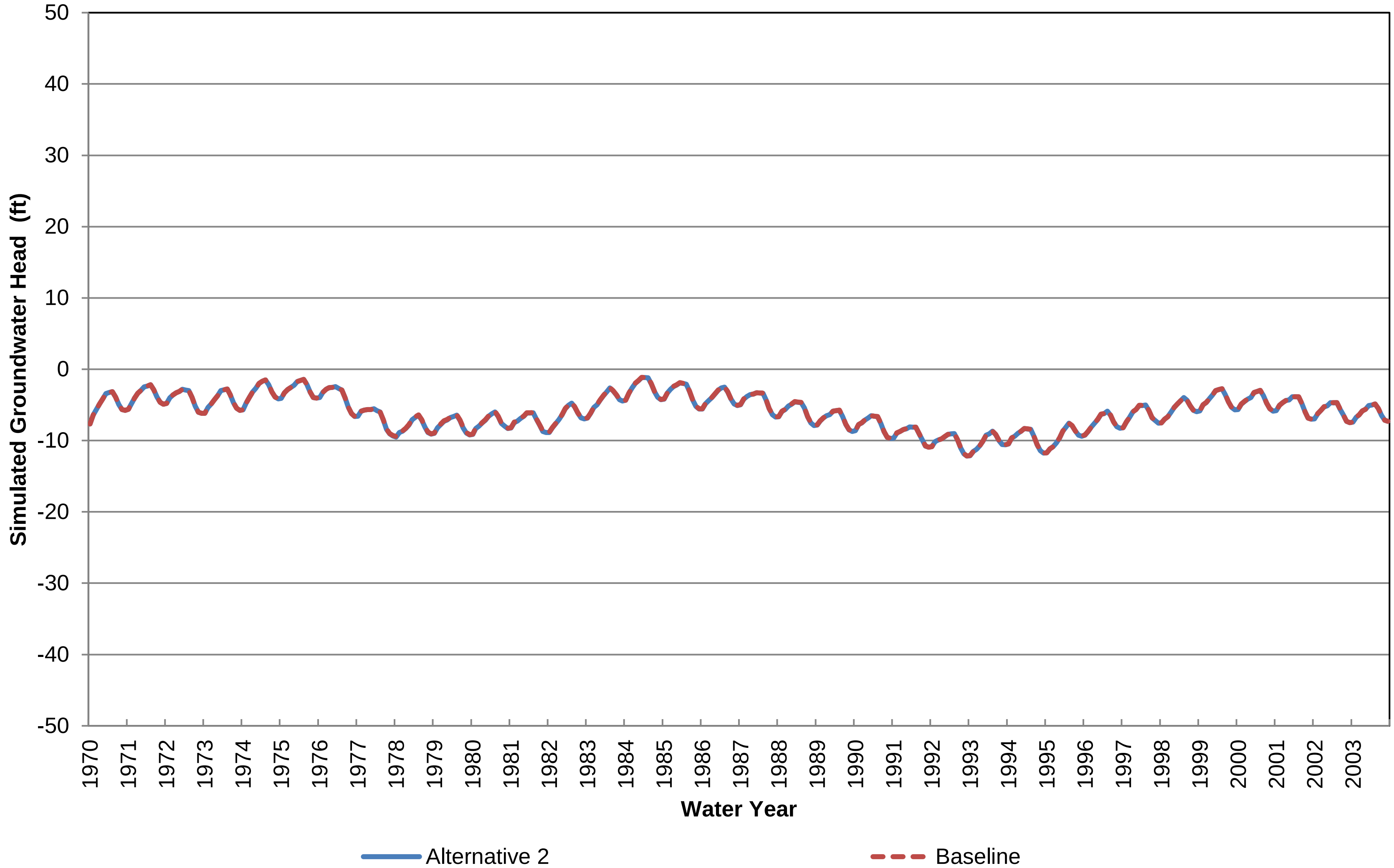


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 32 (Approximately 240-410 ft bgs)

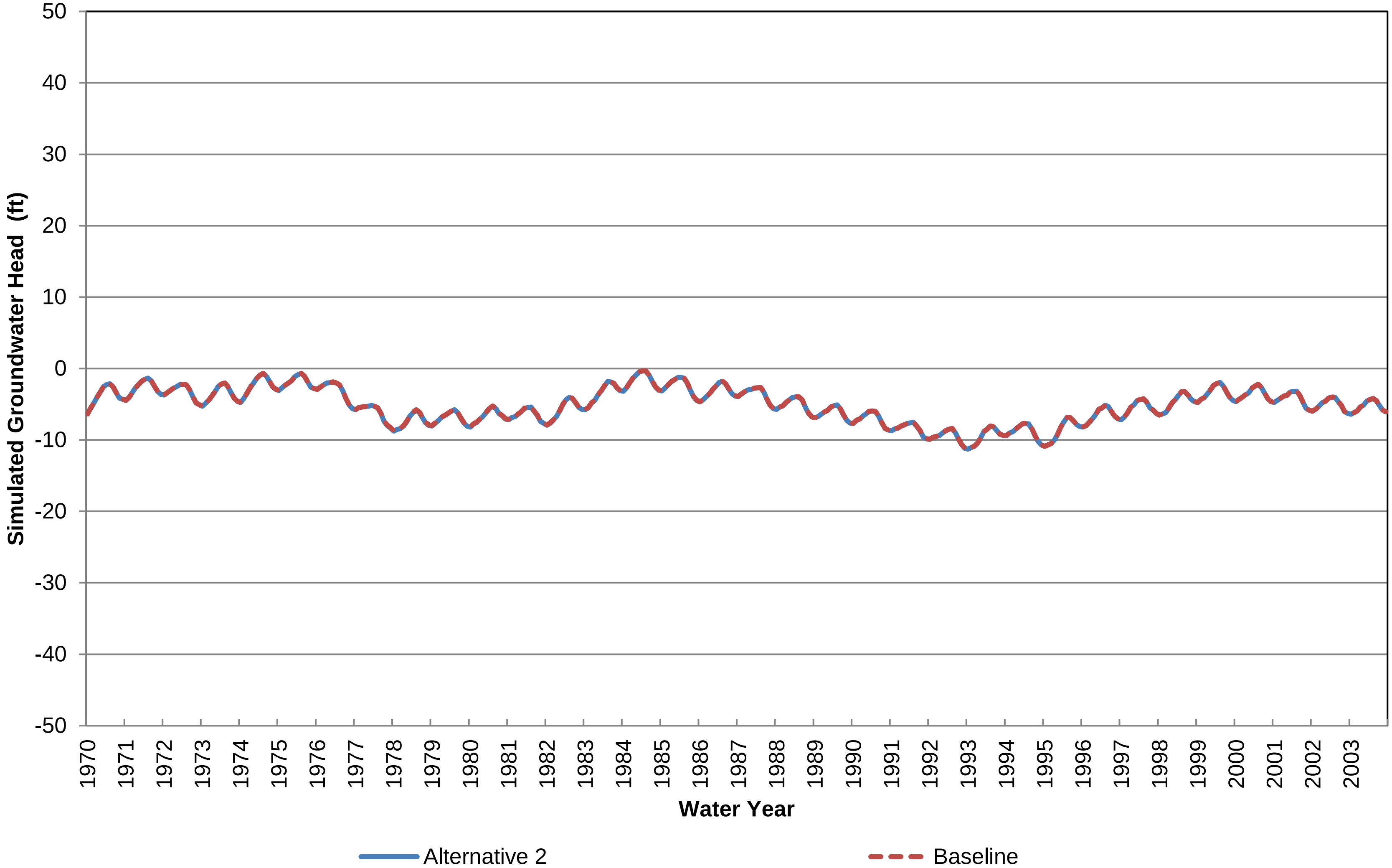


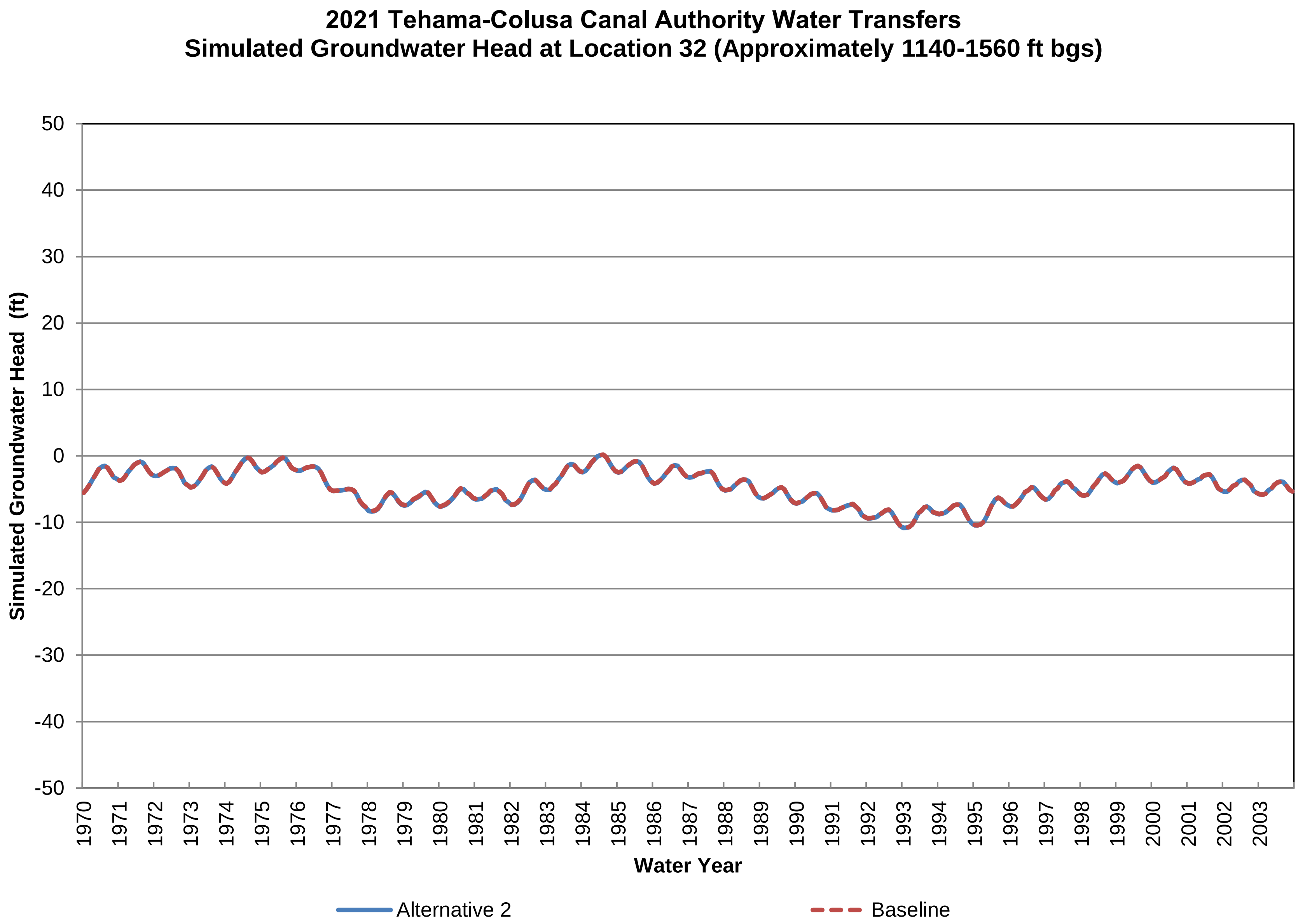

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 32 (Approximately 410-580 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

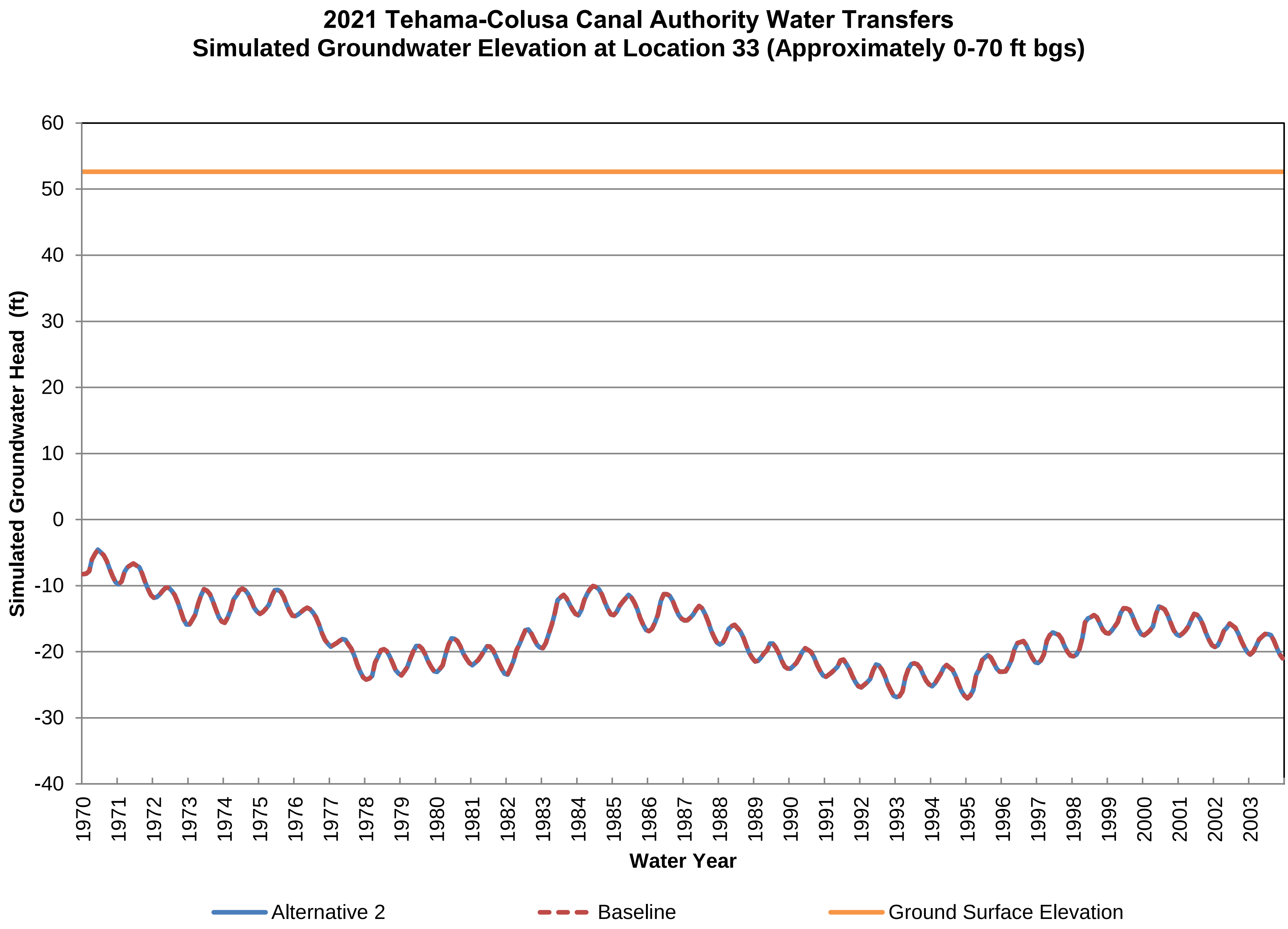
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 32 (Approximately 580-850 ft bgs)

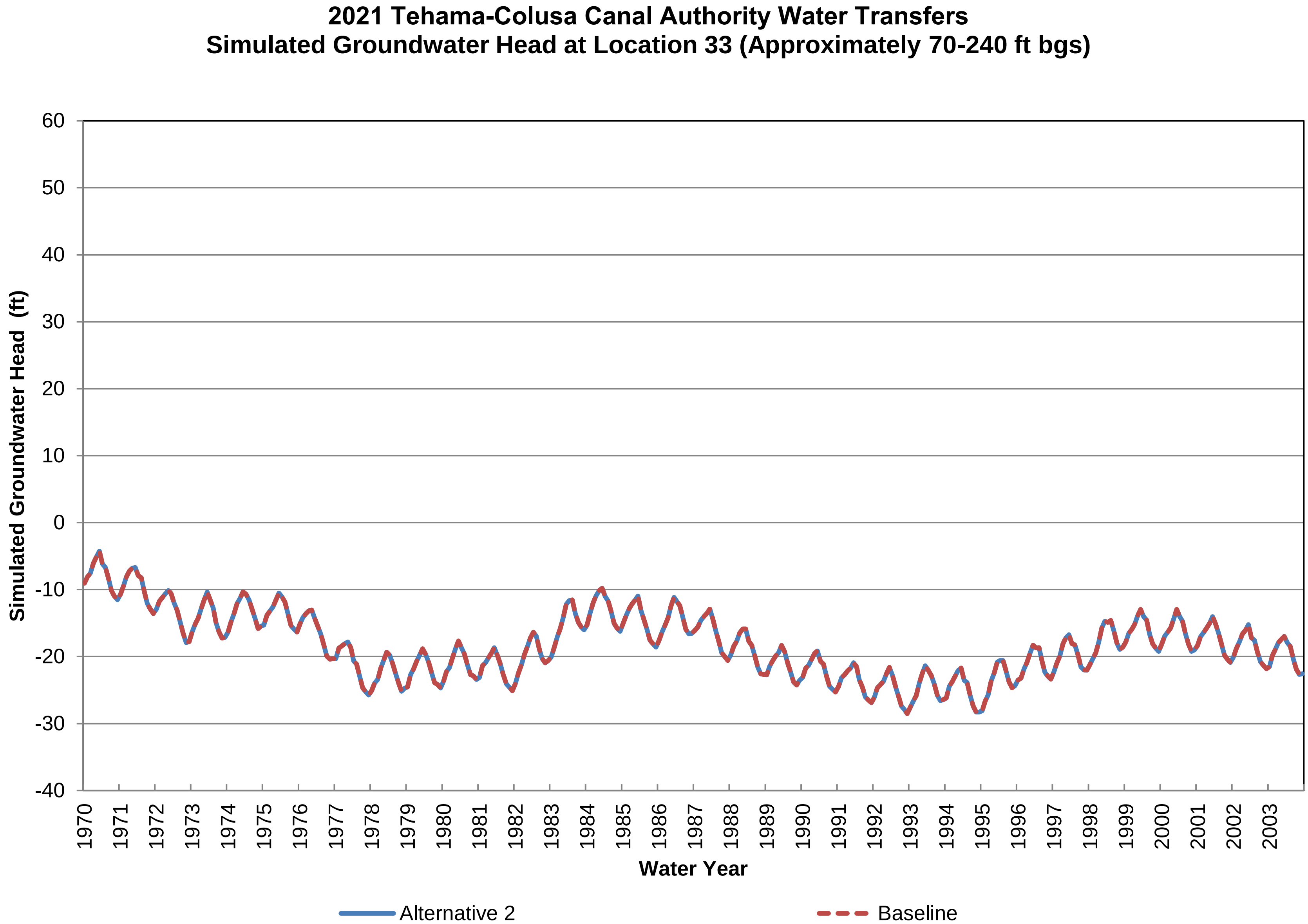


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 32 (Approximately 850-1140 ft bgs)

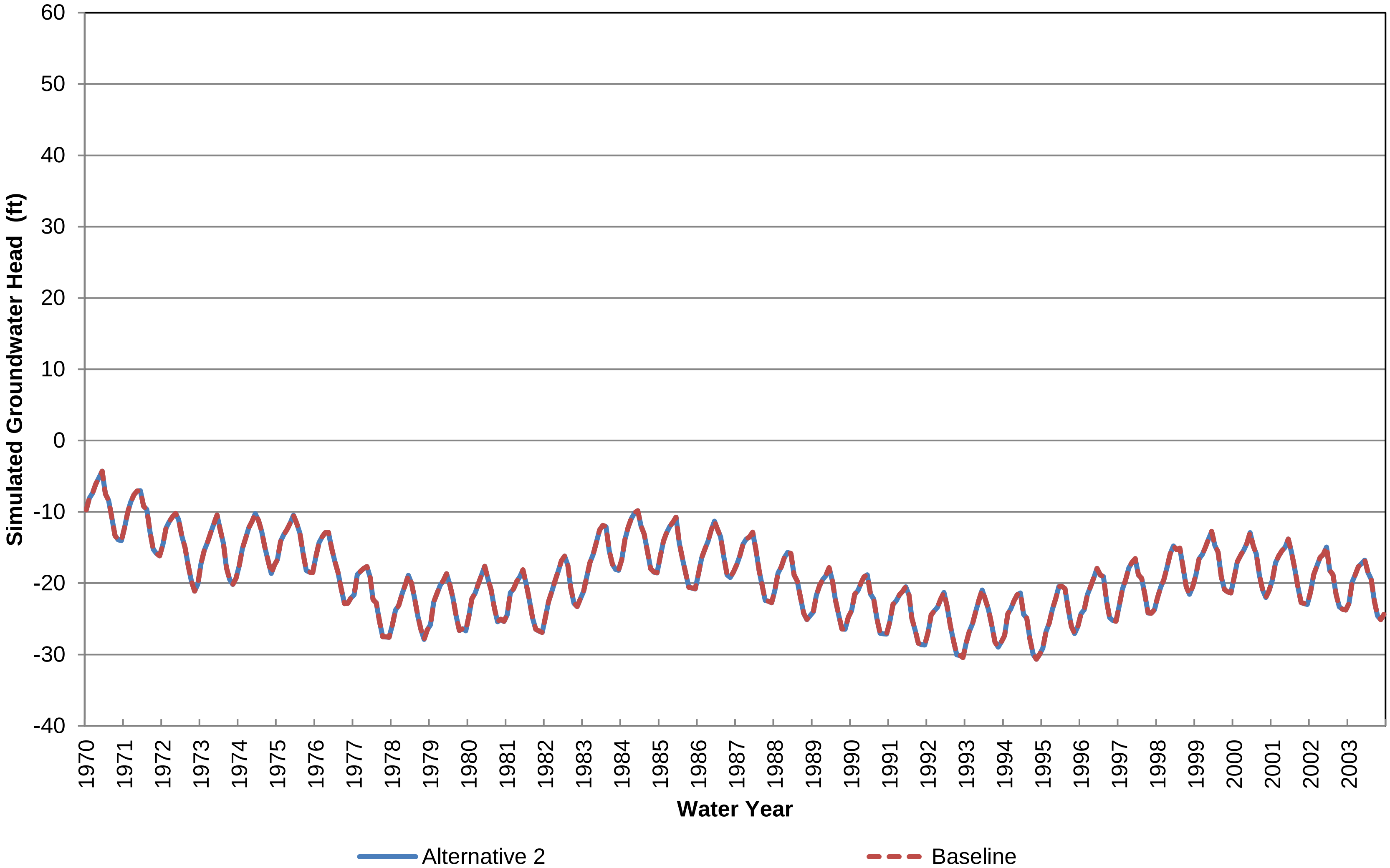



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 32 (Approximately 1140-1560 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

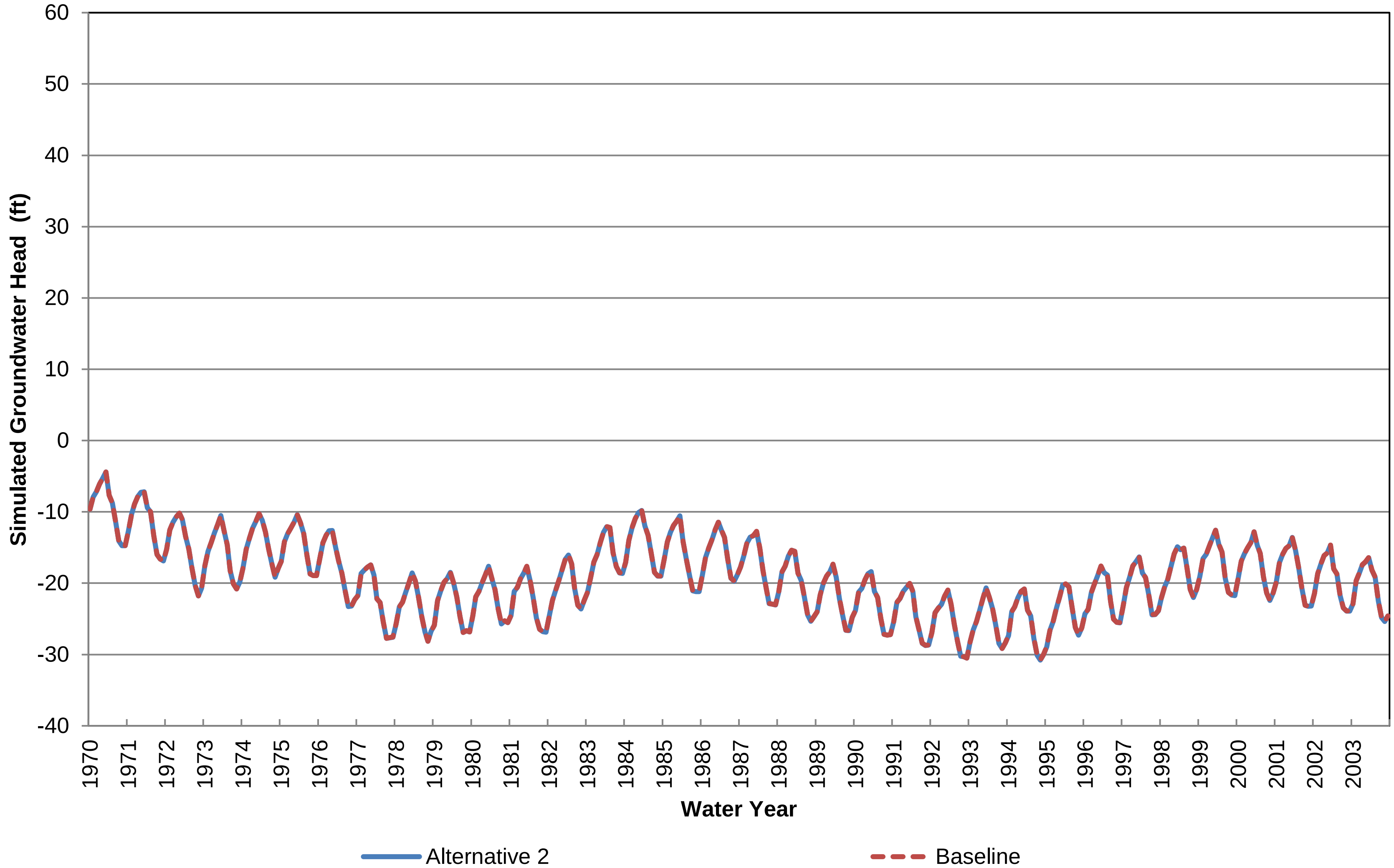

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 33 (Approximately 0-70 ft bgs)
Simulated Groundwater Head (ft)
60
50
40
30
20
10
0
-10
-20
-30
-40
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline
Ground Surface Elevation

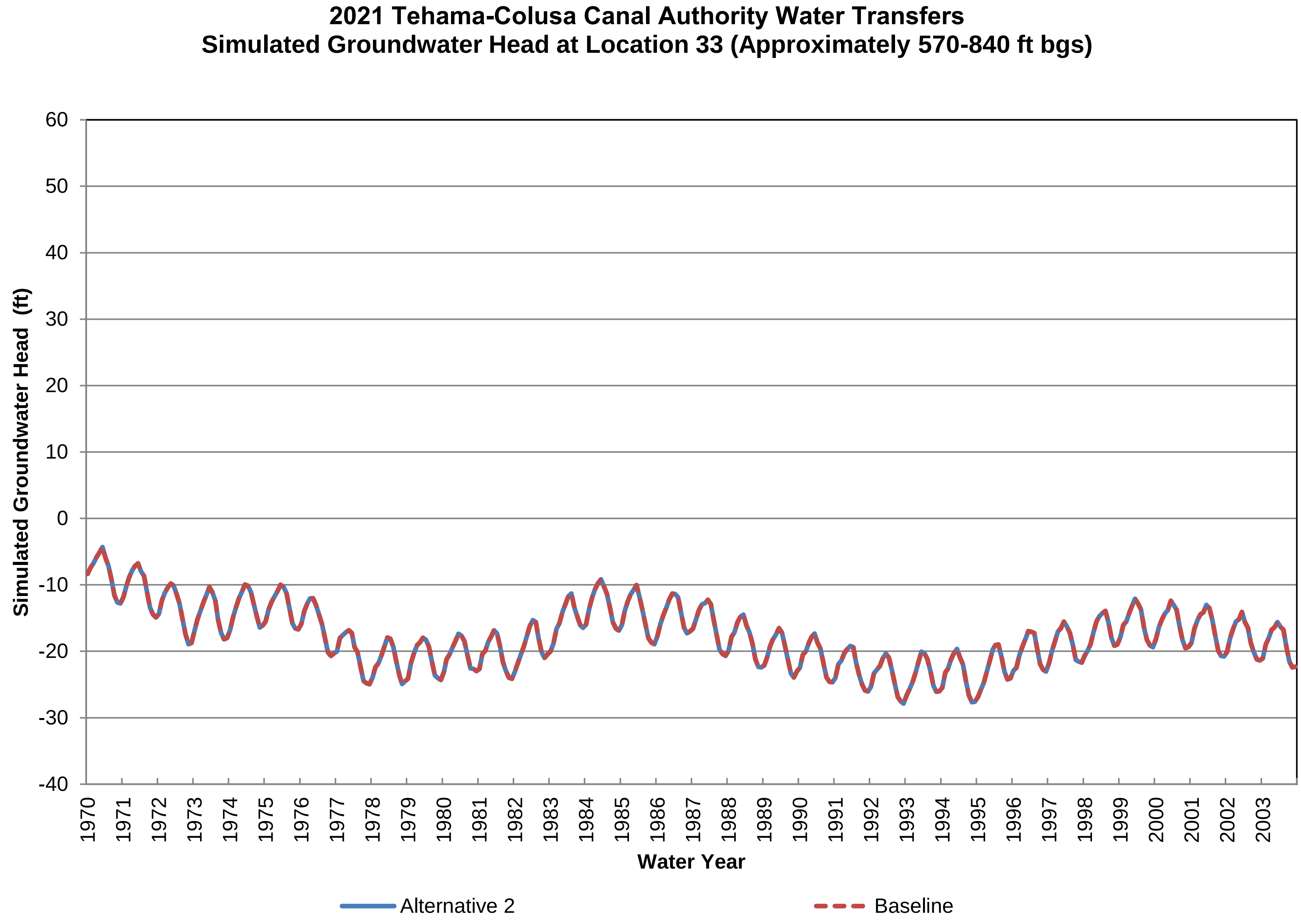

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 33 (Approximately 70-240 ft bgs)
Simulated Groundwater Head (ft)
60
50
40
30
20
10
0
-10
-20
-30
-40
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

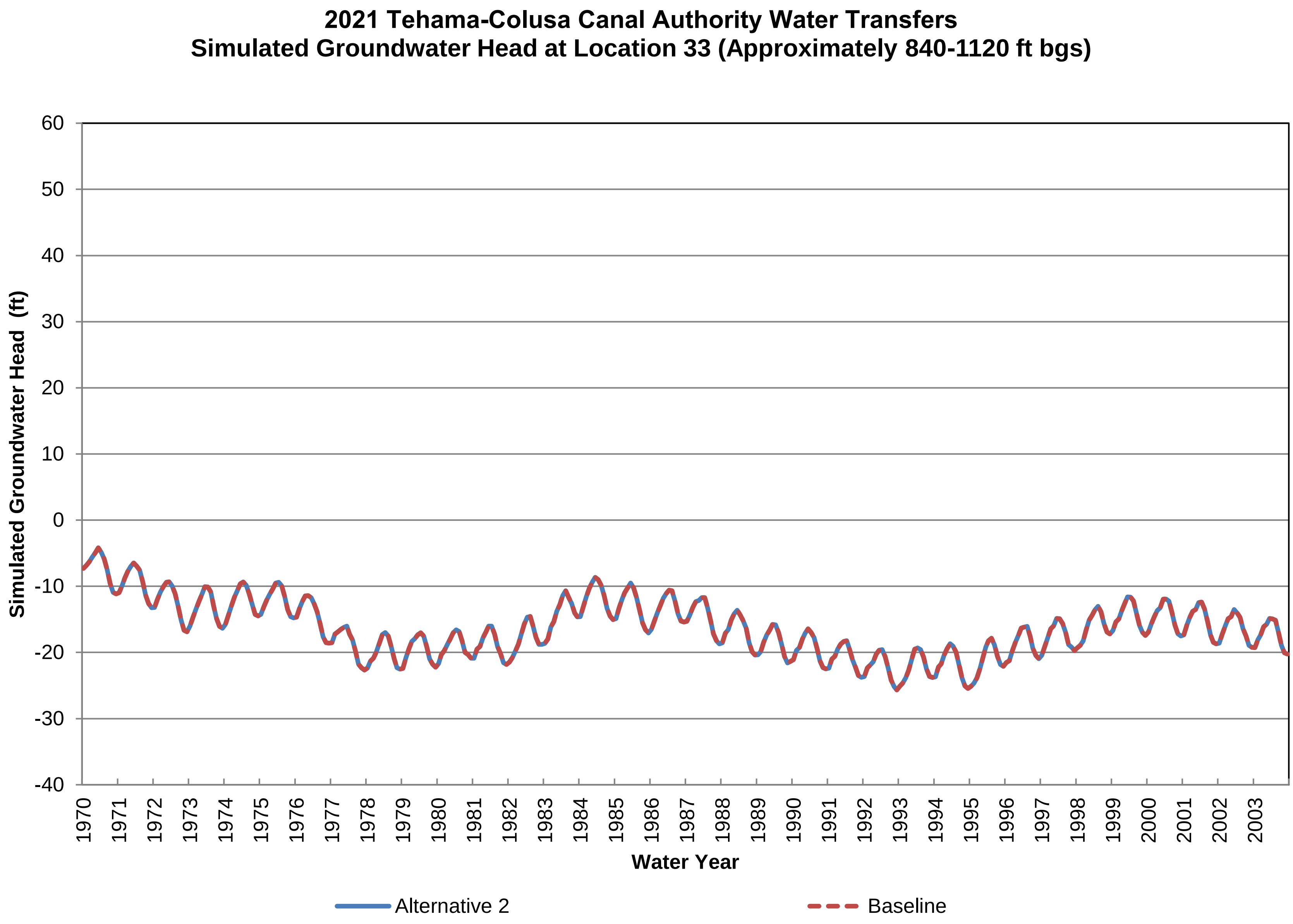
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 33 (Approximately 240-410 ft bgs)



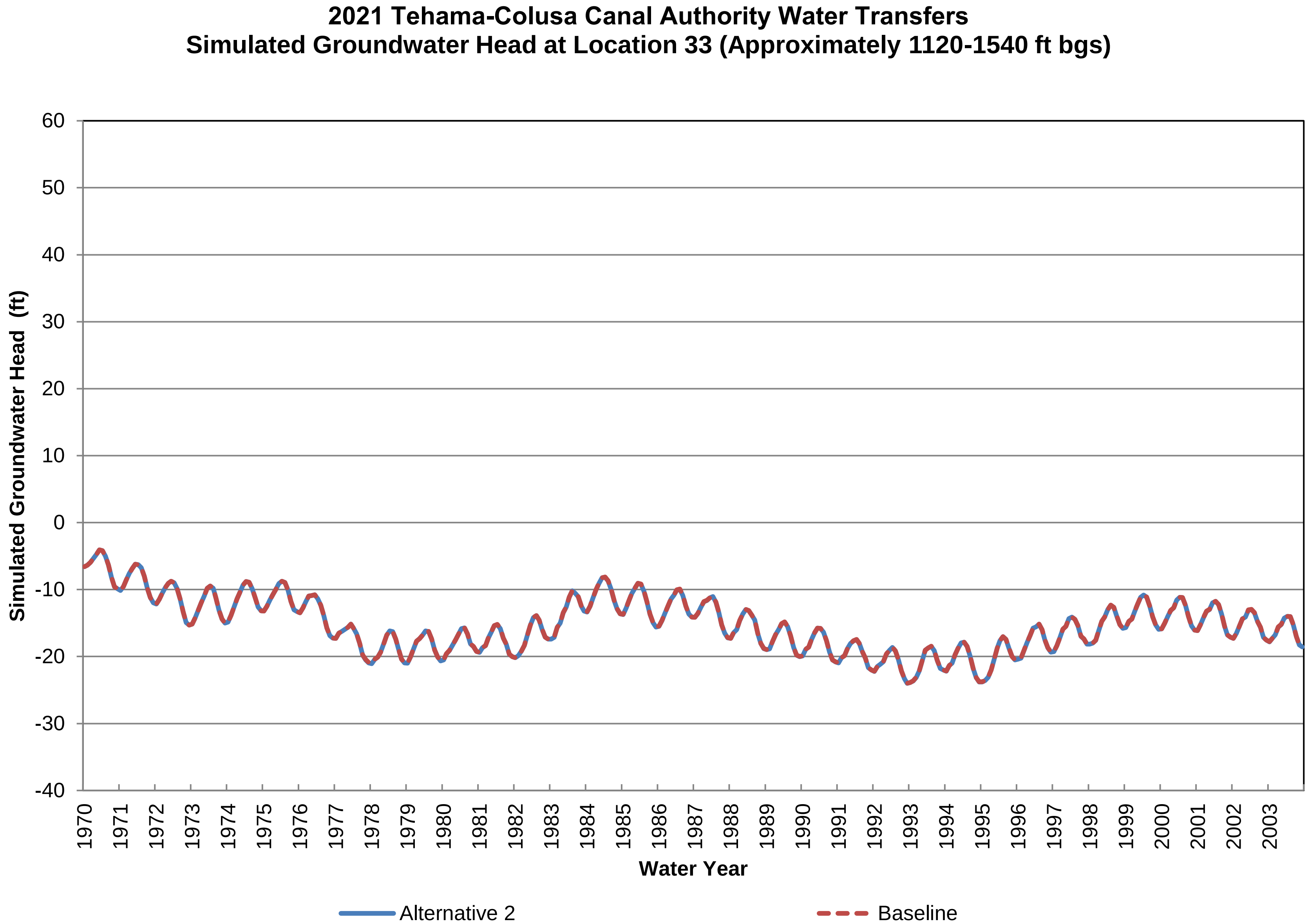
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 33 (Approximately 410-570 ft bgs)




2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 33 (Approximately 570-840 ft bgs)
Simulated Groundwater Head (ft)
60
50
40
30
20
10
0
-10
-20
-30
-40
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

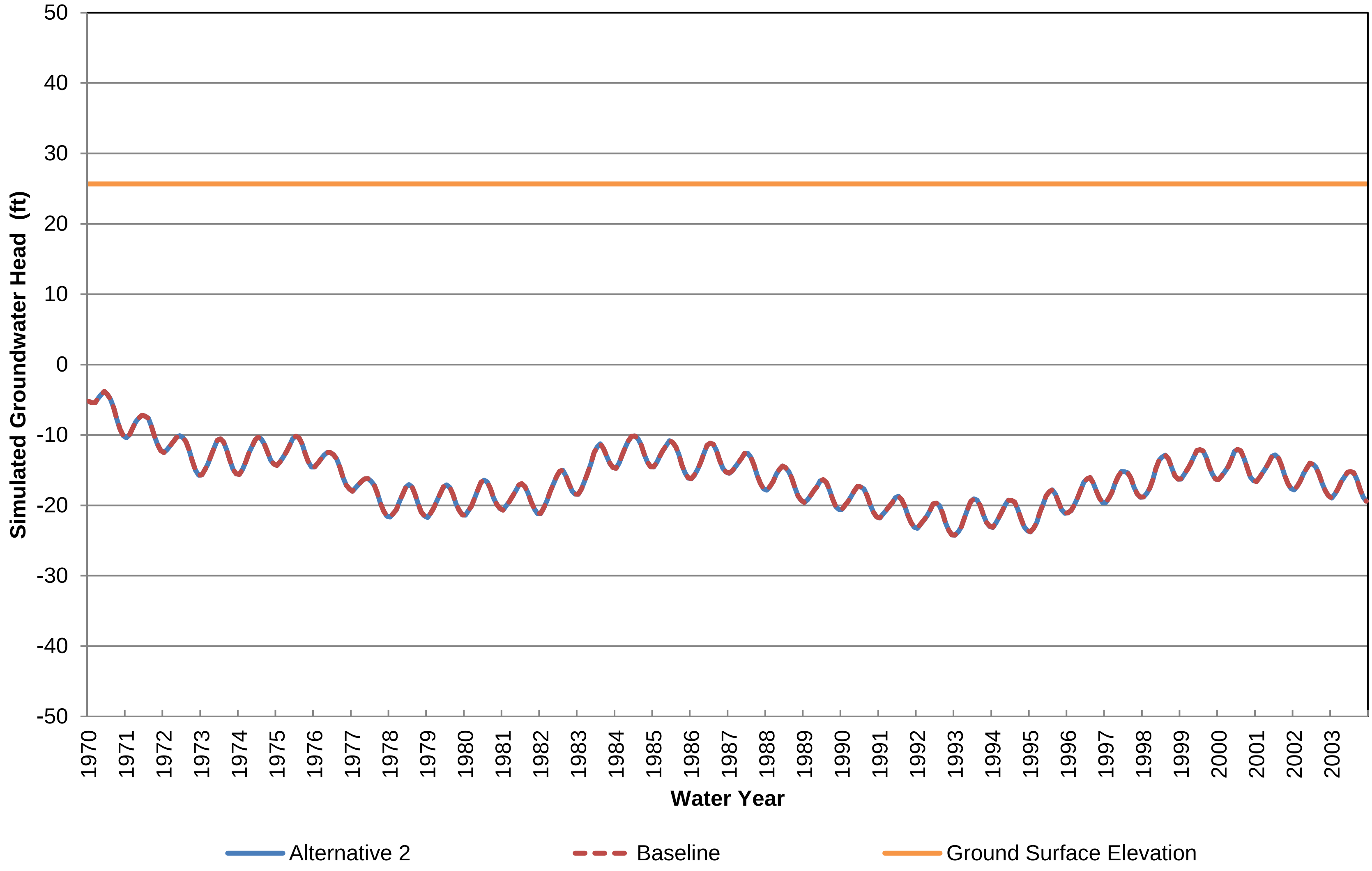


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 33 (Approximately 840-1120 ft bgs)
Simulated Groundwater Head (ft)
60
50
40
30
20
10
0
-10
-20
-30
-40
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

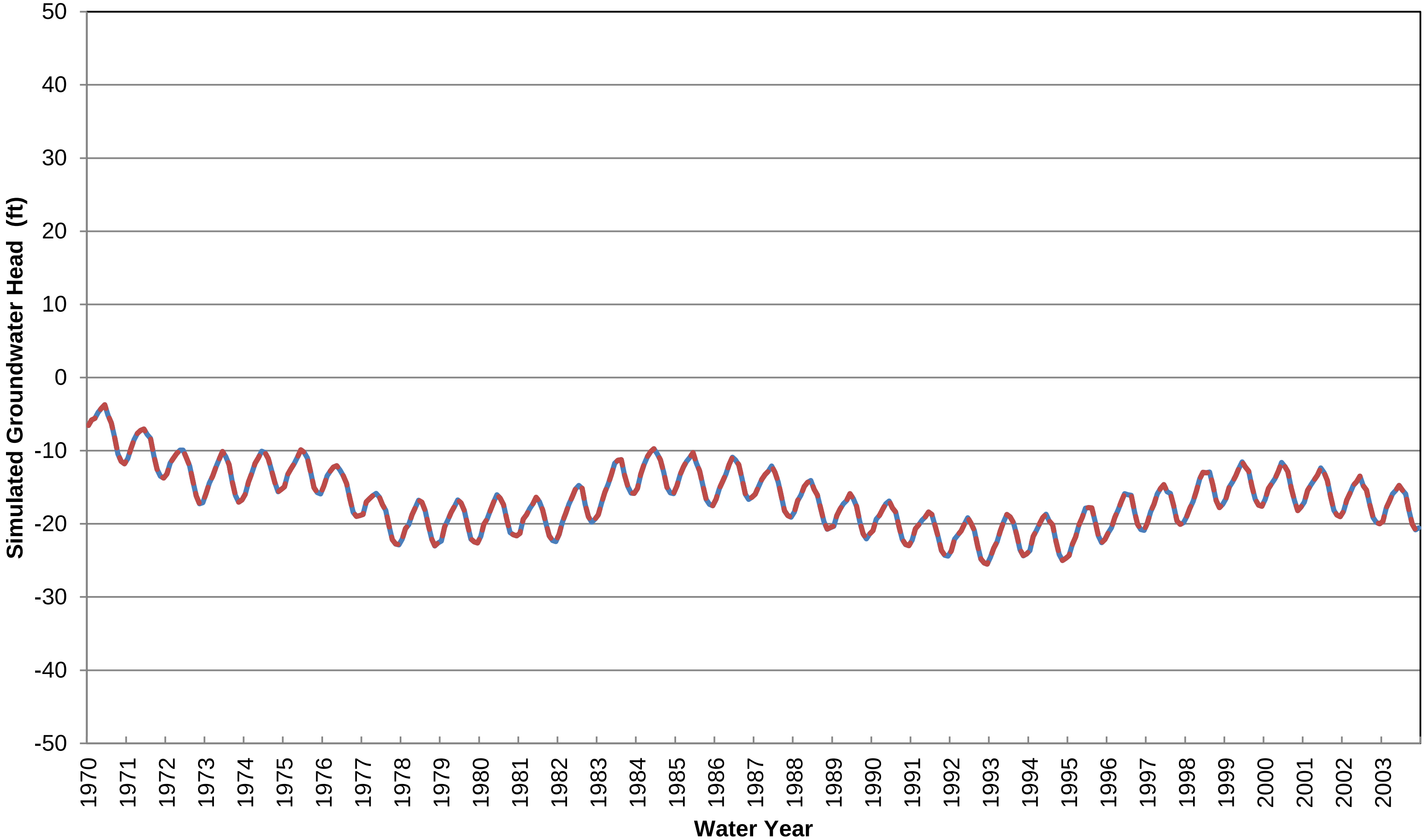


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 33 (Approximately 1120-1540 ft bgs)
Simulated Groundwater Head (ft)
60
50
40
30
20
10
0
-10
-20
-30
-40
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

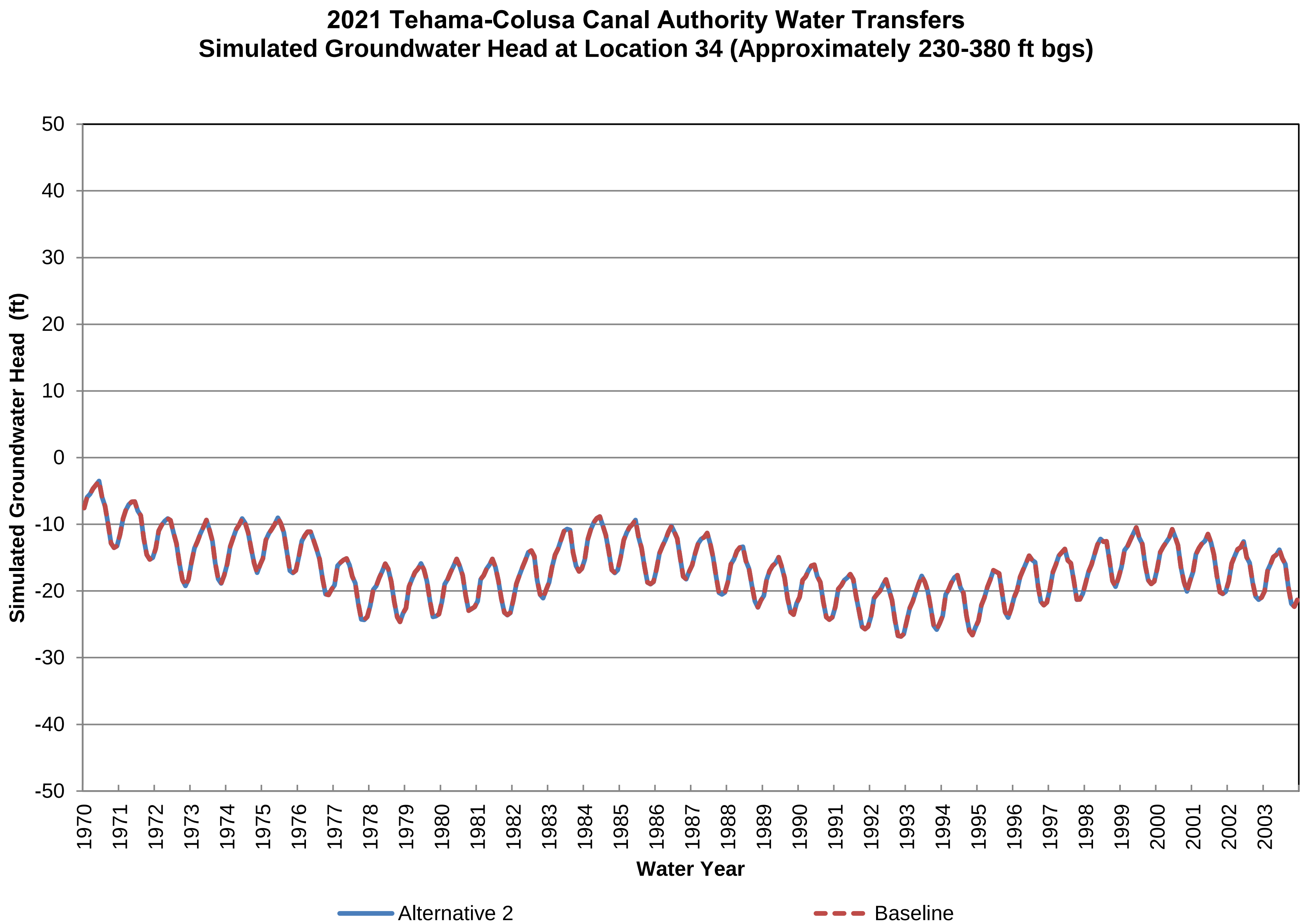
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Elevation at Location 34 (Approximately 0-70 ft bgs)



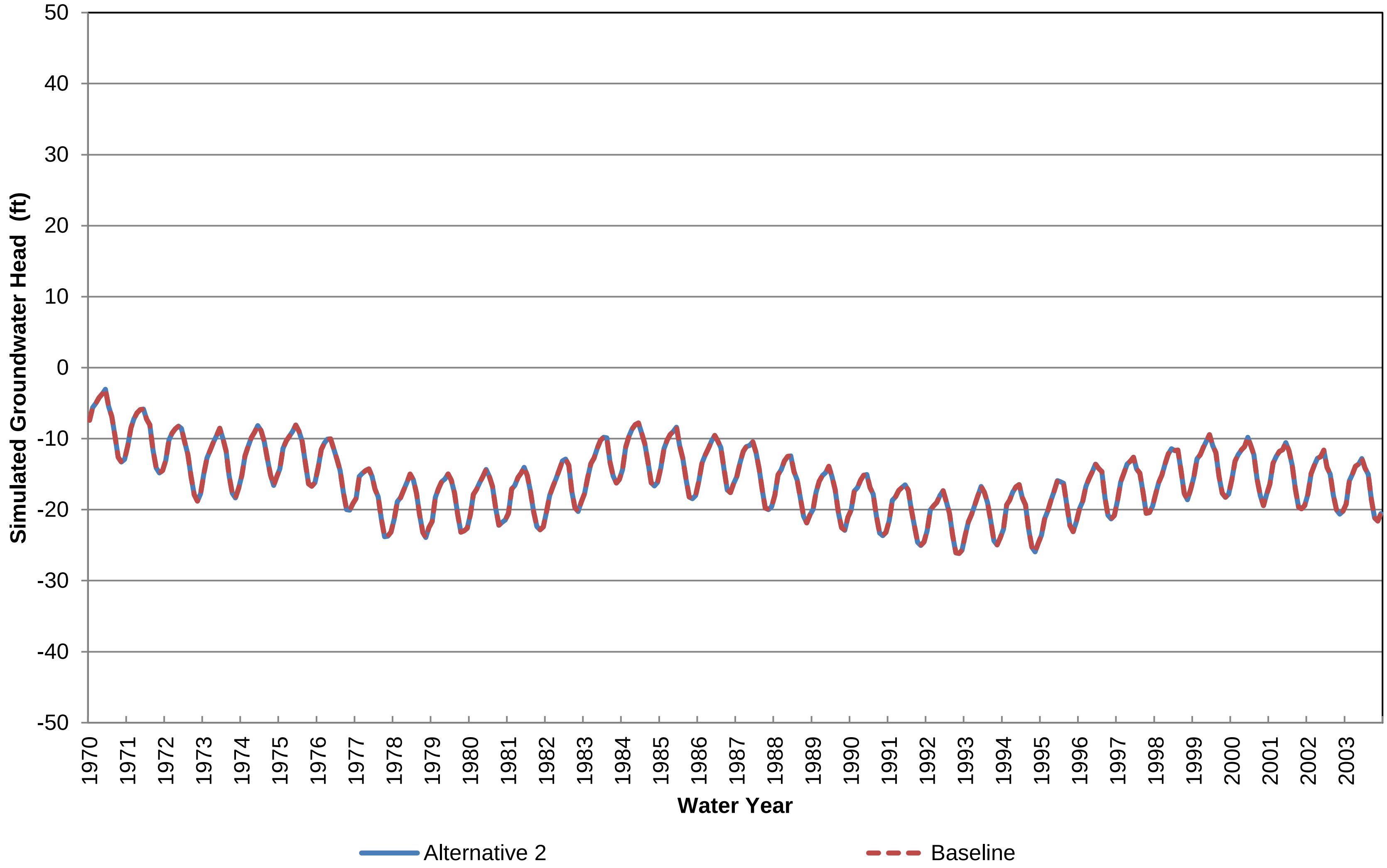
2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 34 (Approximately 70-230 ft bgs)

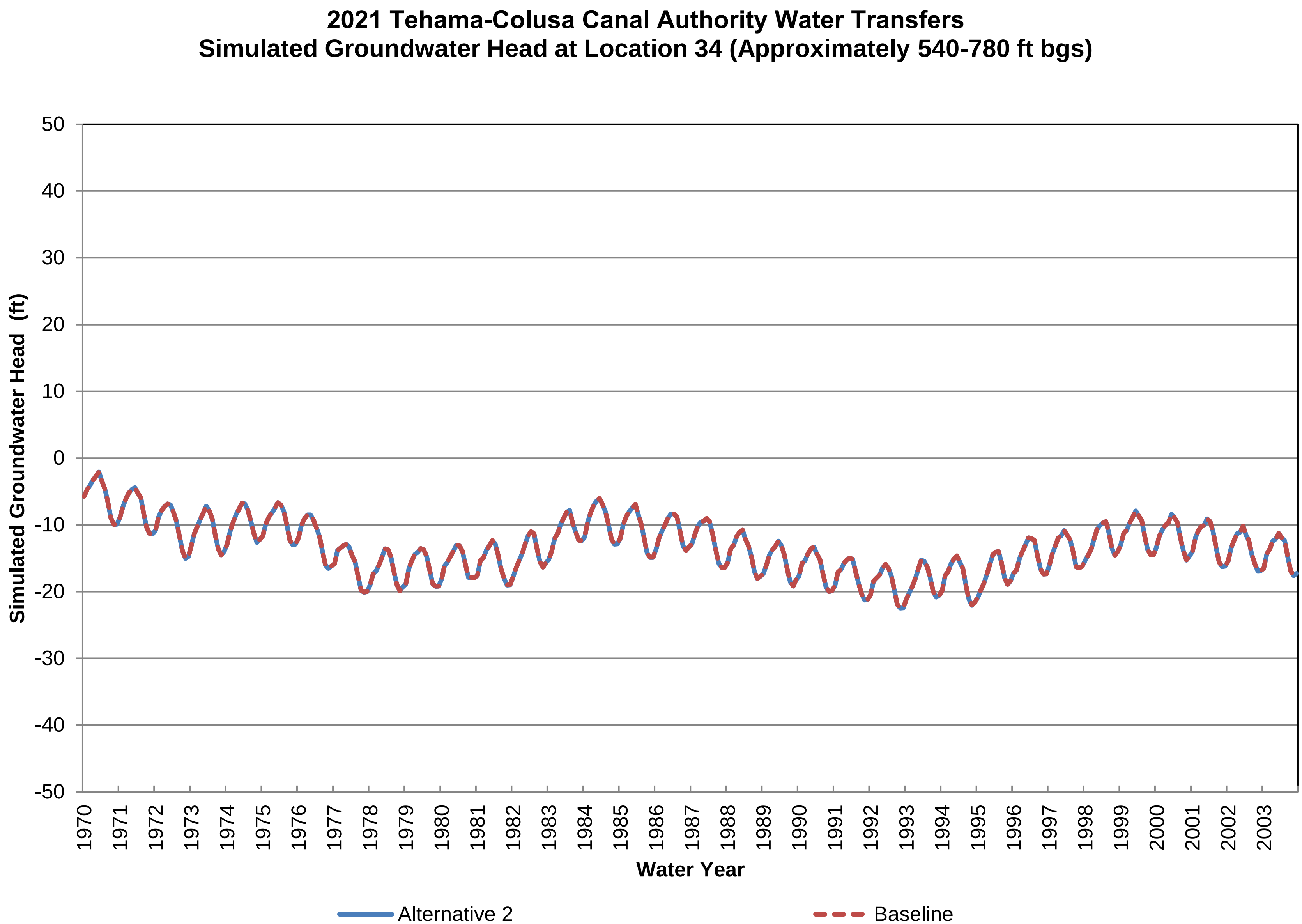


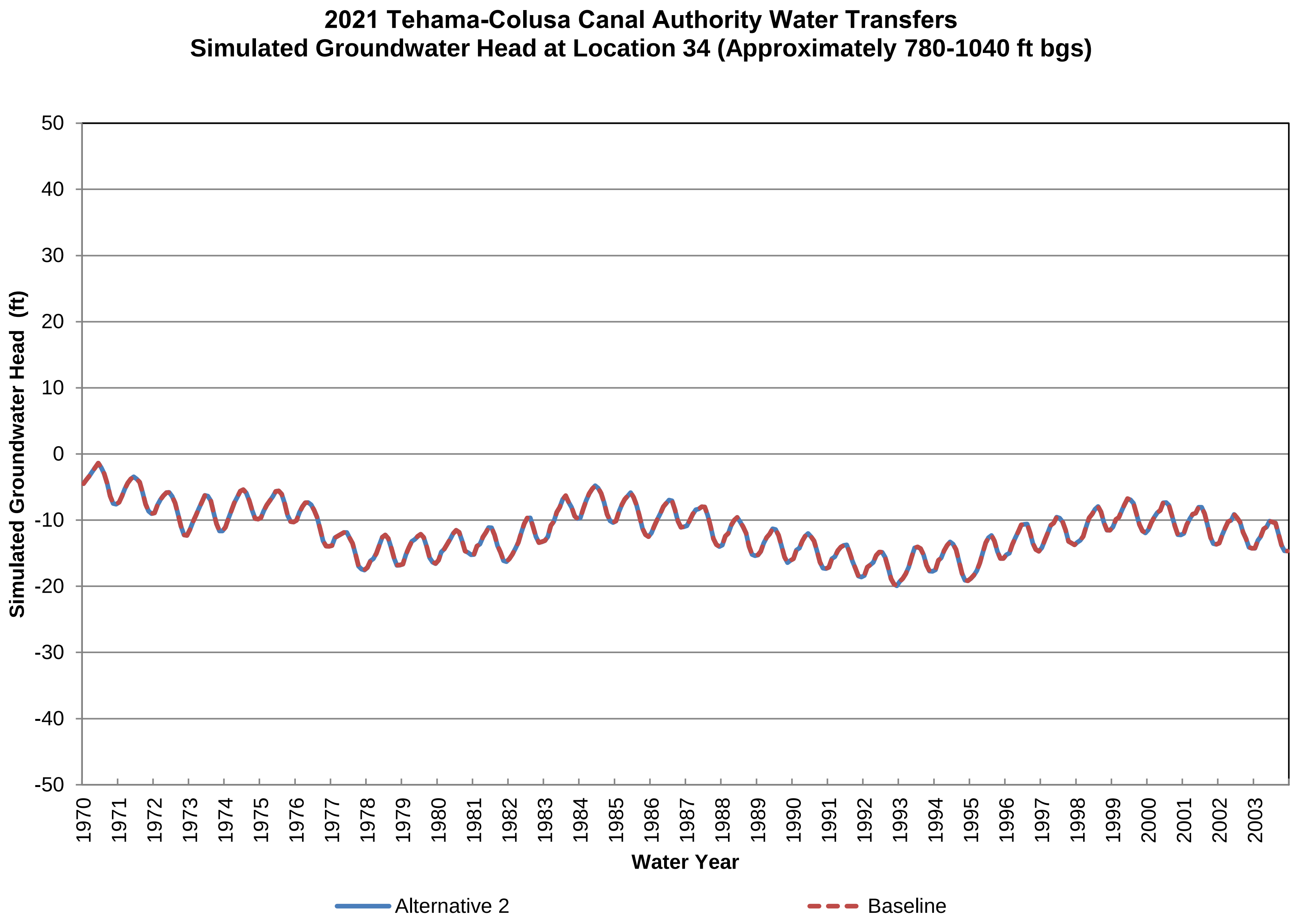
Alternative 2   Baseline


2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 34 (Approximately 230-380 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 34 (Approximately 380-540 ft bgs)

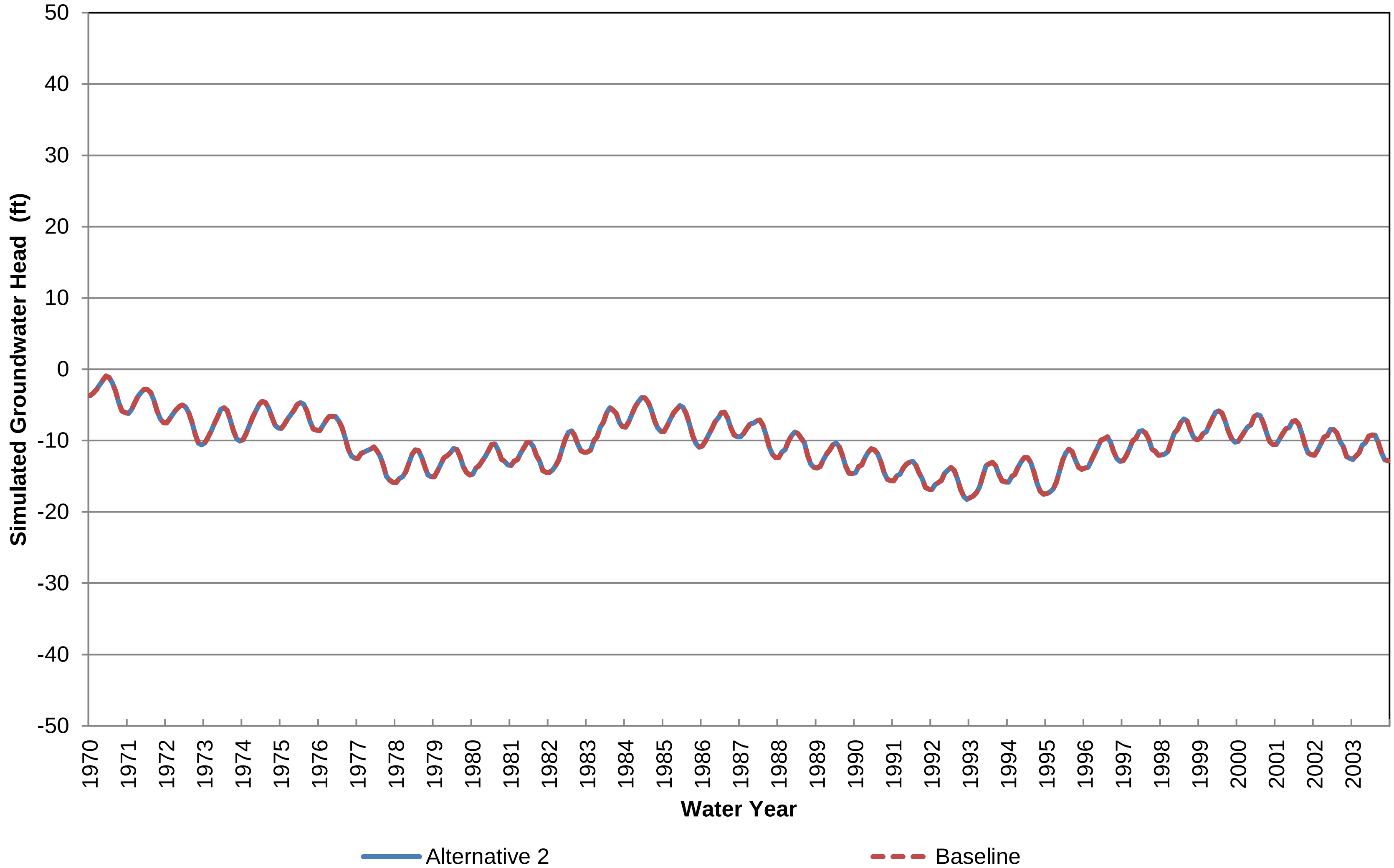



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 34 (Approximately 540-780 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline



2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 34 (Approximately 780-1040 ft bgs)
Simulated Groundwater Head (ft)
50
40
30
20
10
0
-10
-20
-30
-40
-50
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Water Year
Alternative 2
Baseline

2021 Tehama-Colusa Canal Authority Water Transfers
Simulated Groundwater Head at Location 34 (Approximately 1040-1430 ft bgs)



Appendix I

2015 Water Transfers Data Reports

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Anderson-Cottonwood Irrigation District

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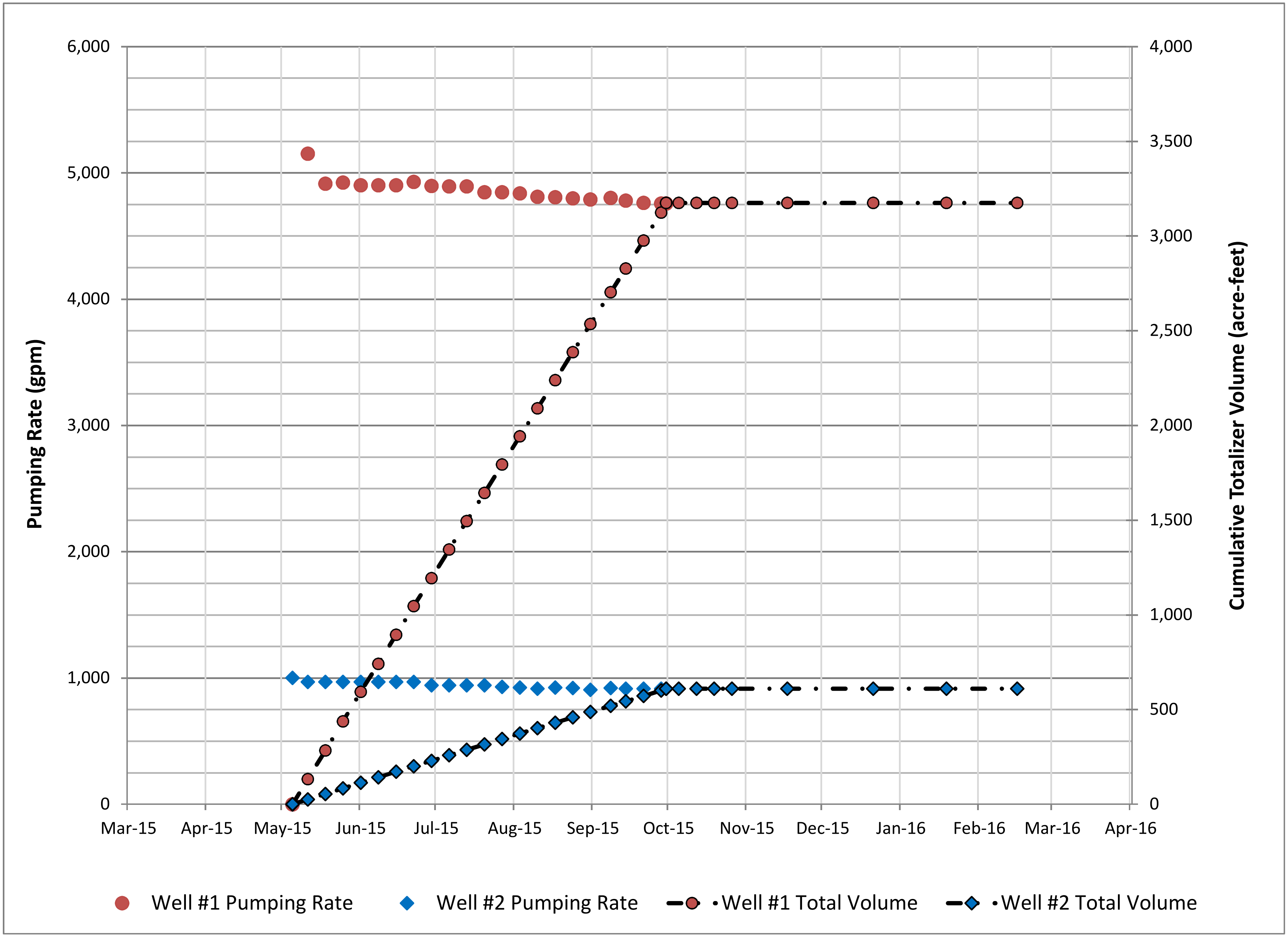
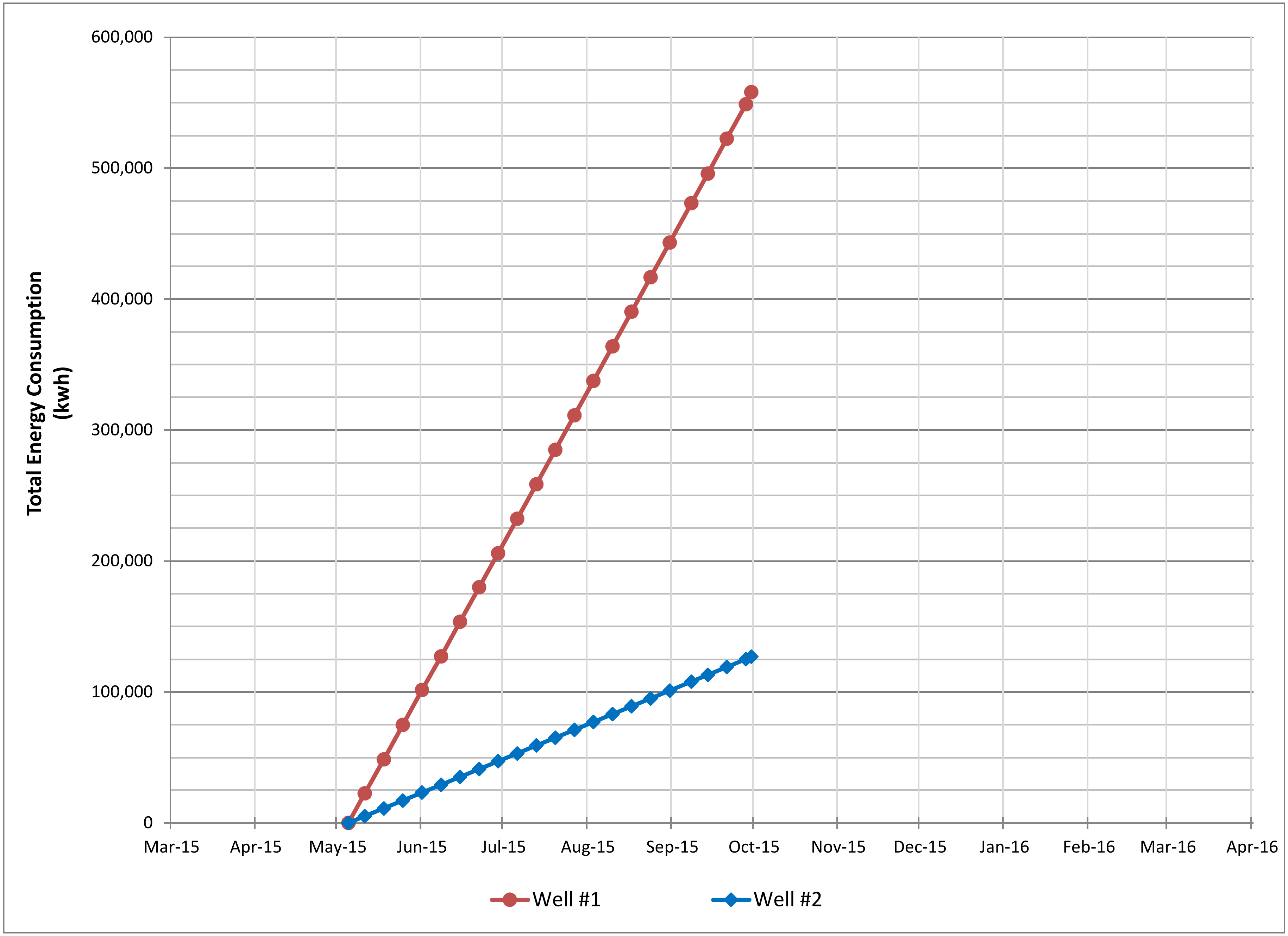
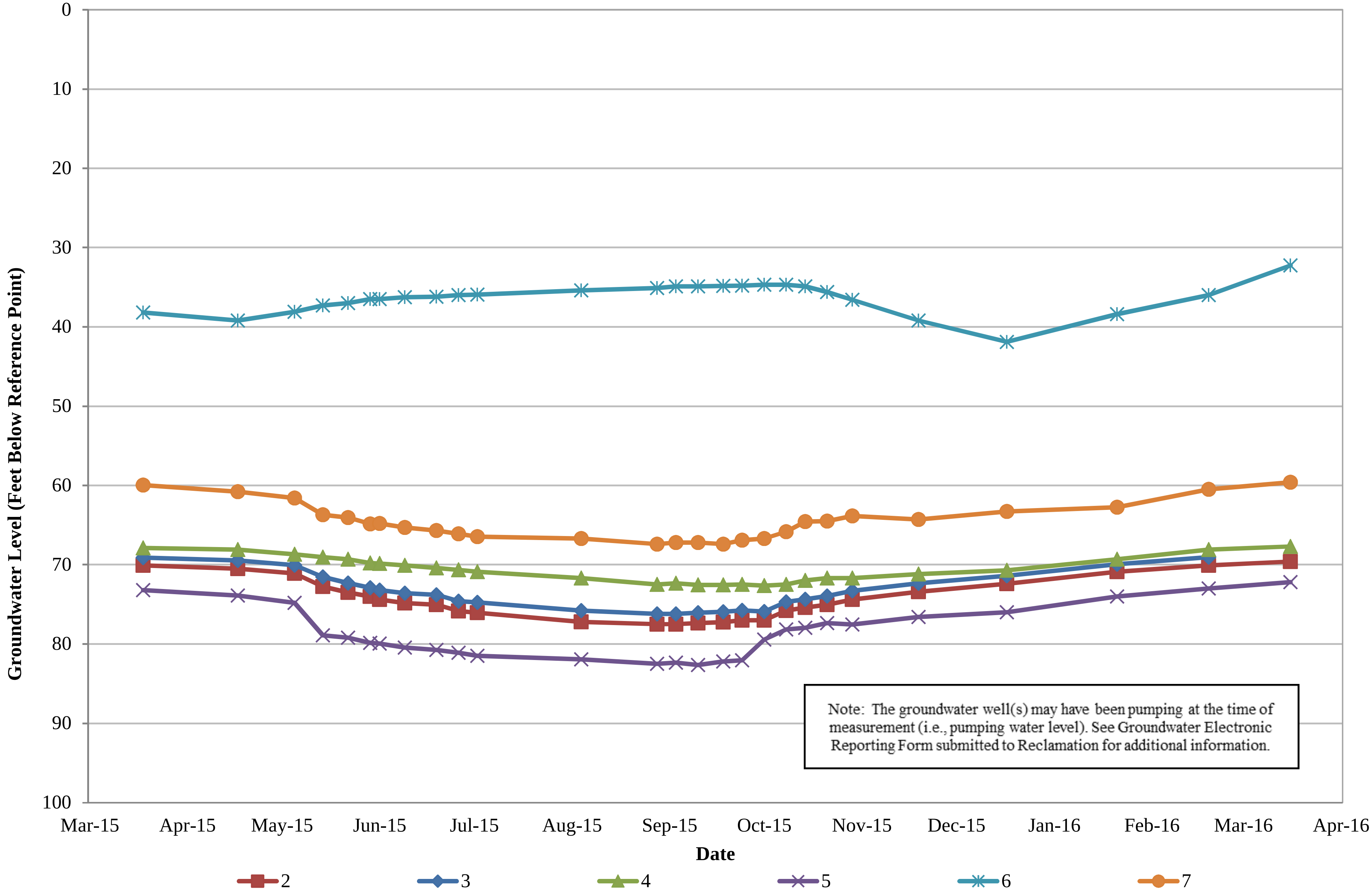


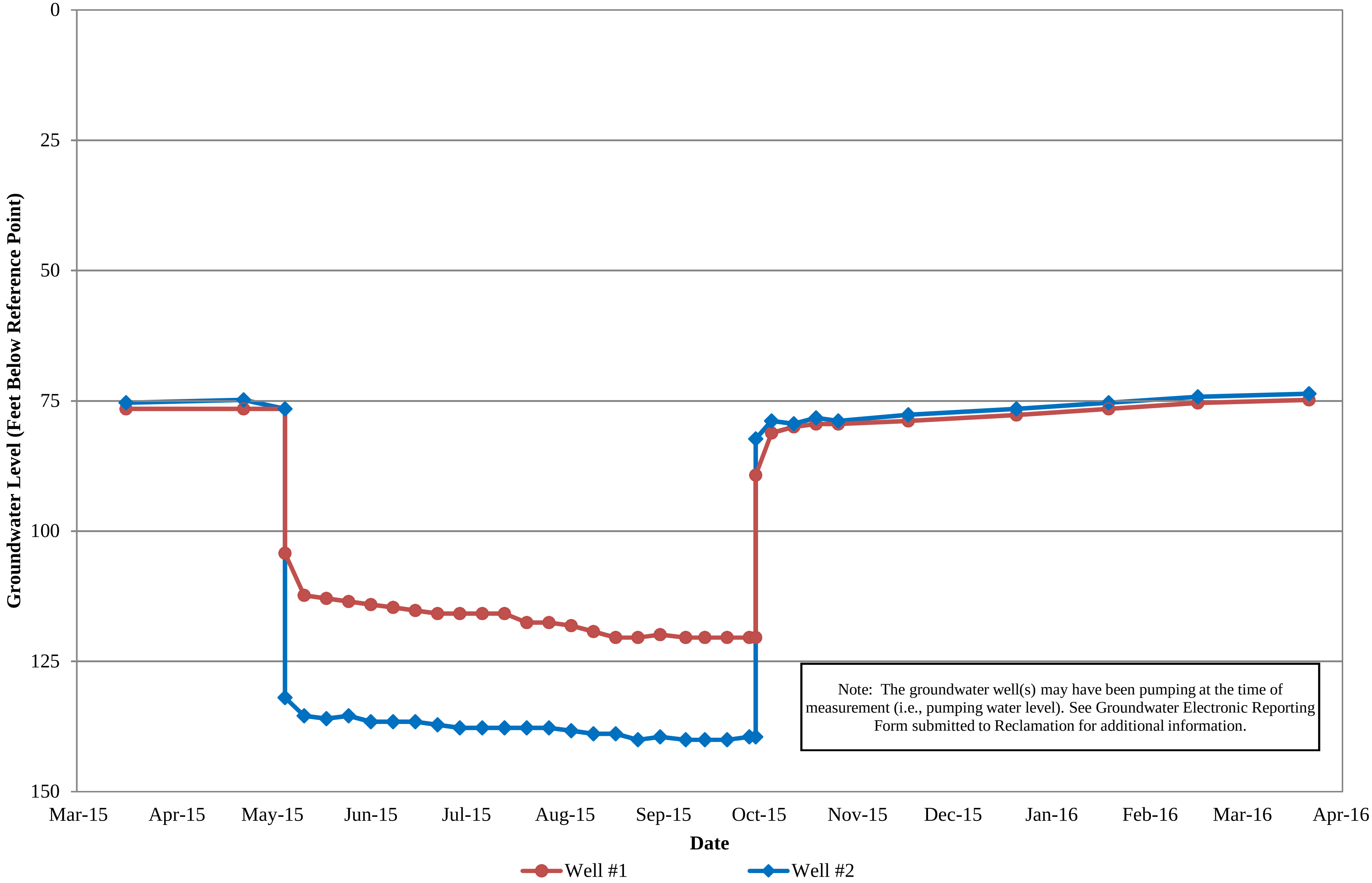
6,000
5,000
4,000
3,000
2,000
1,000
0
Pumping Rate (gpm)
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Cumulative Totalizer Volume (acre-feet)
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Well #1 Pumping Rate
Well #2 Pumping Rate
Well #1 Total Volume
Well #2 Total Volume

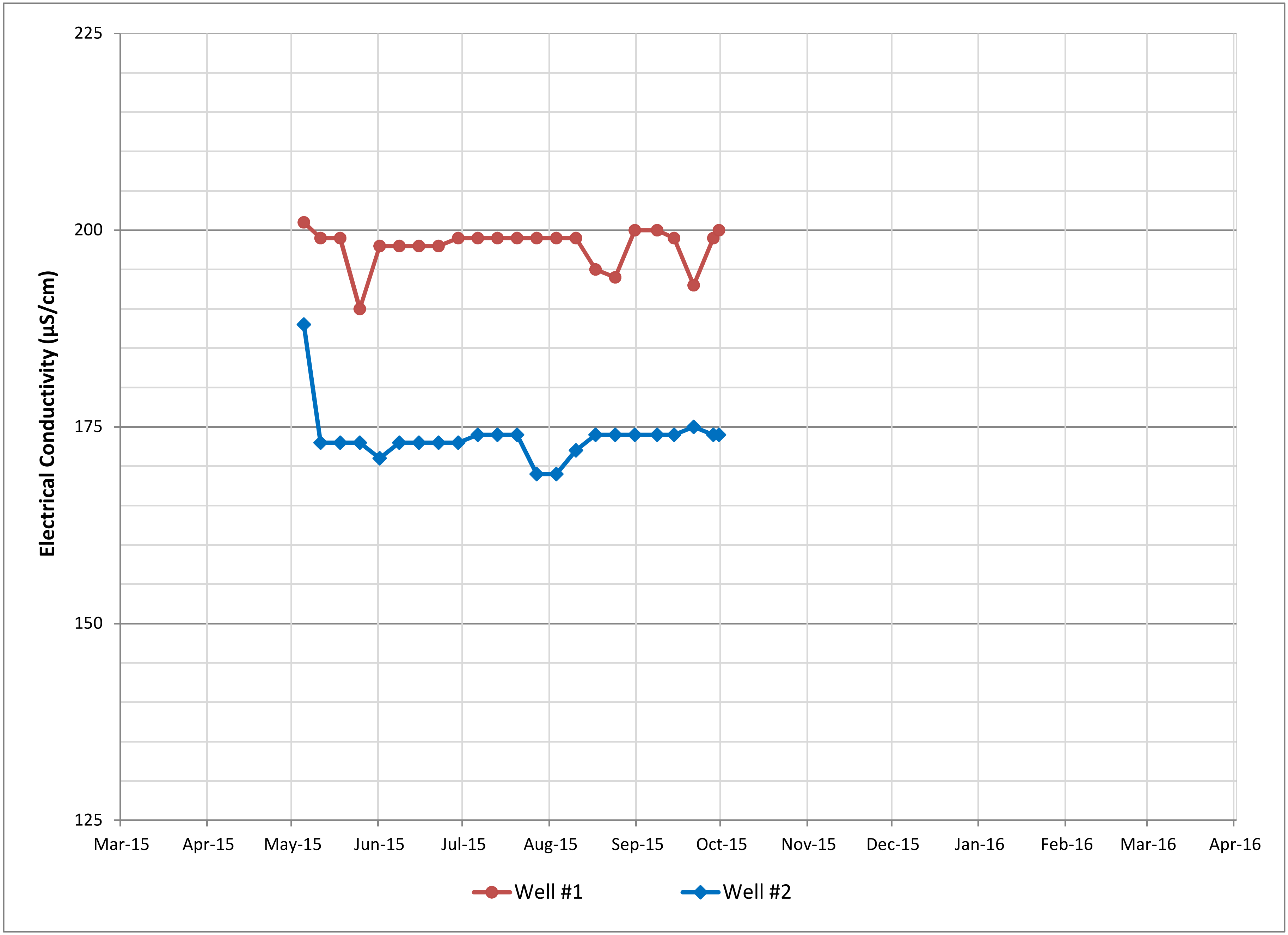

Total Energy Consumption
(kwh)
600,000
500,000
400,000
300,000
200,000
100,000
0
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Well #1
Well #2

Anderson-Cottonwood Irrigation District
Monitoring Well Groundwater Level Data



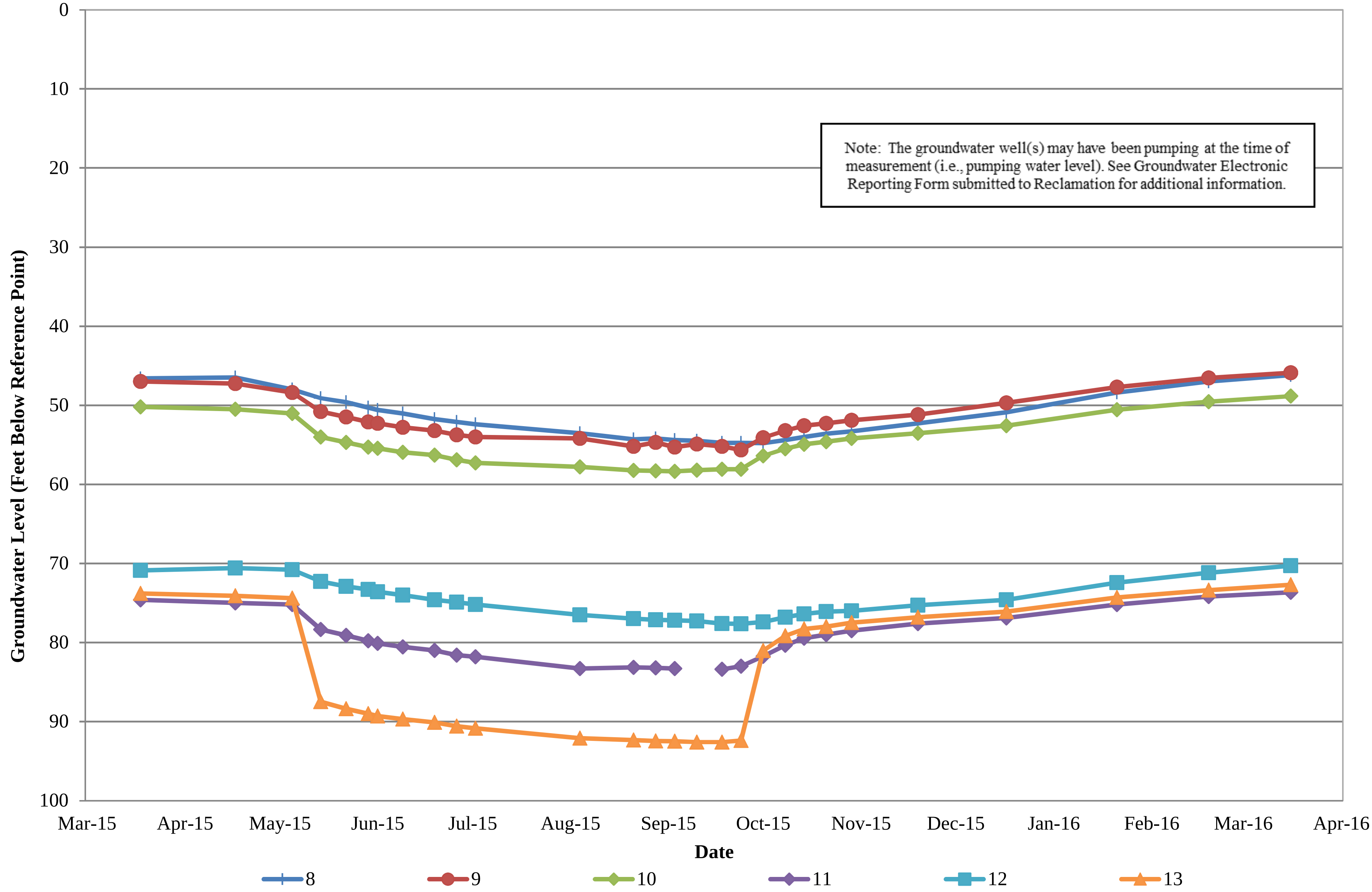
Anderson-Cottonwood Irrigation District
Production Well Groundwater Level Data

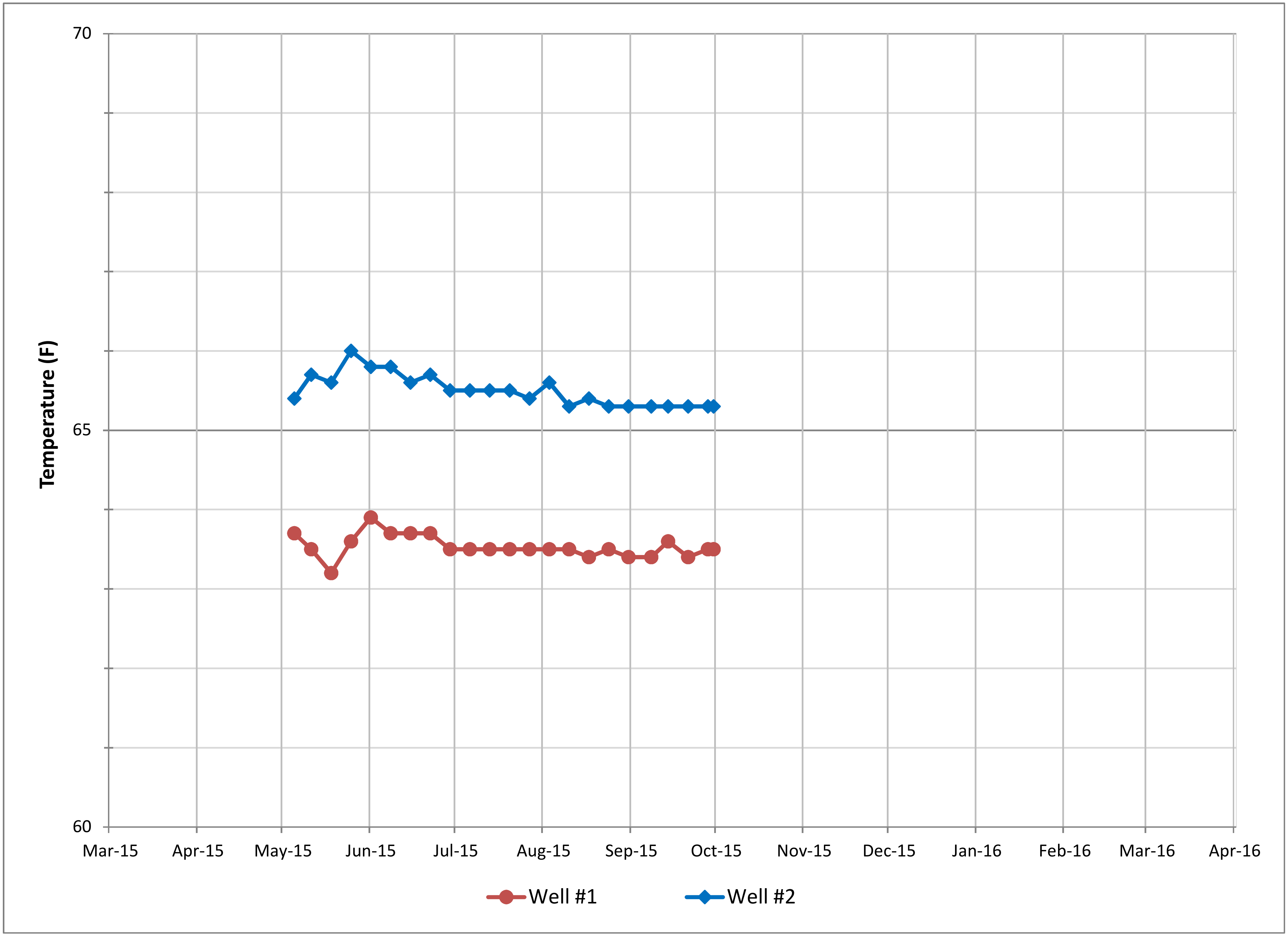




Electrical Conductivity (µS/cm)
225
200
175
150
125
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Well #1
Well #2

Anderson-Cottonwood Irrigation District
Monitoring Well Groundwater Level Data





70
65
60
Temperature (F)
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Well #1
Well #2

Canal Farms

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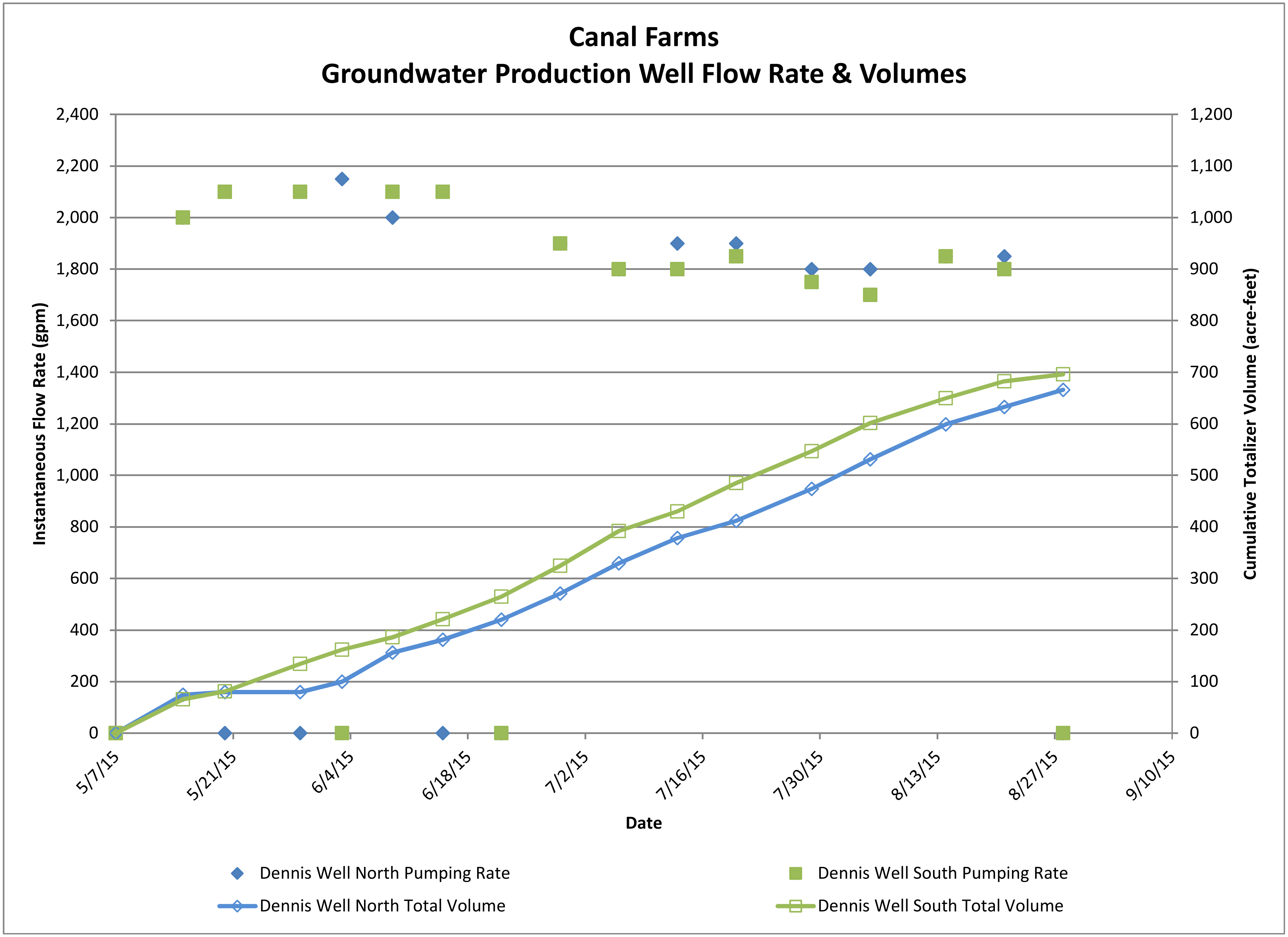
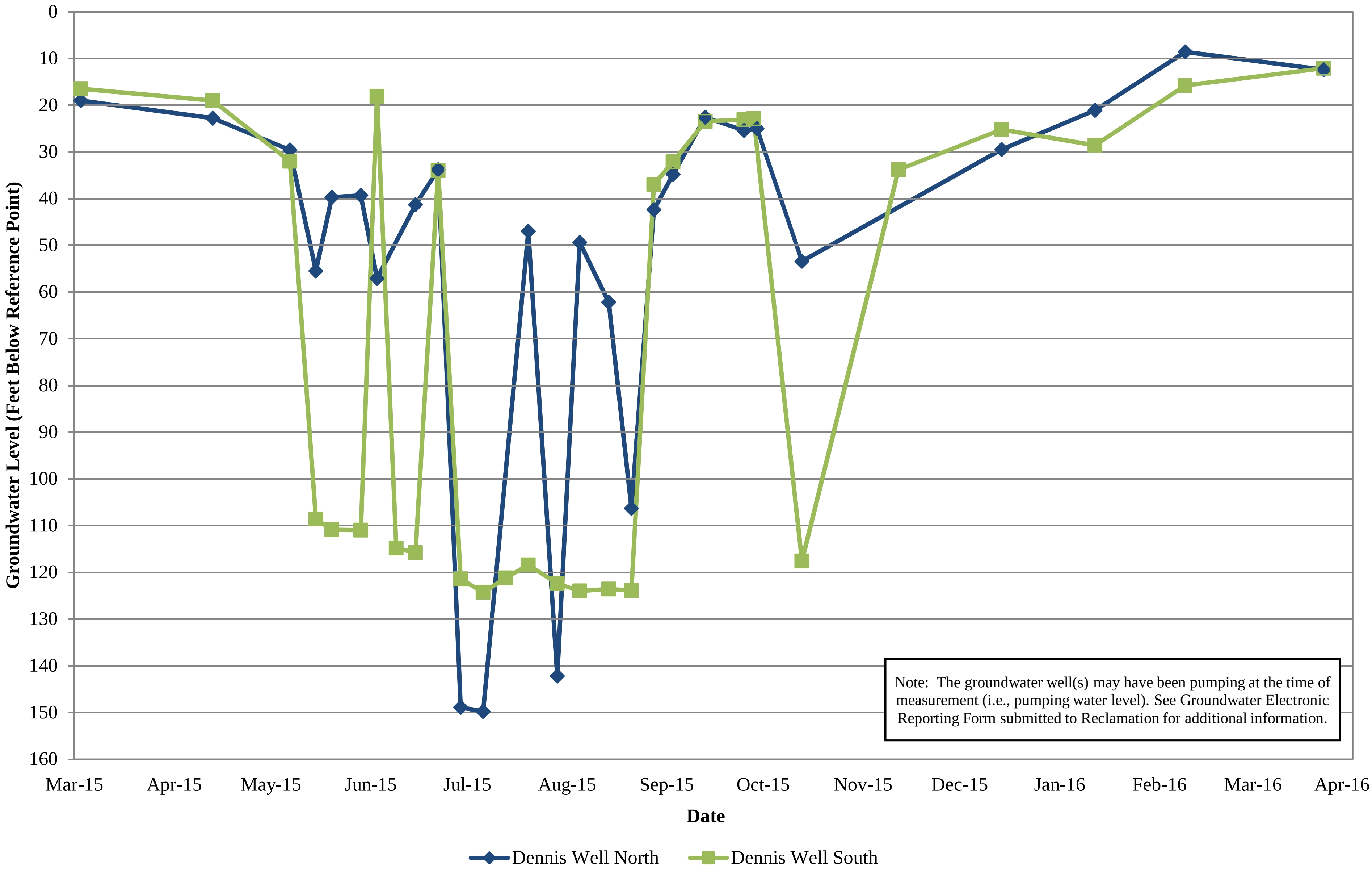
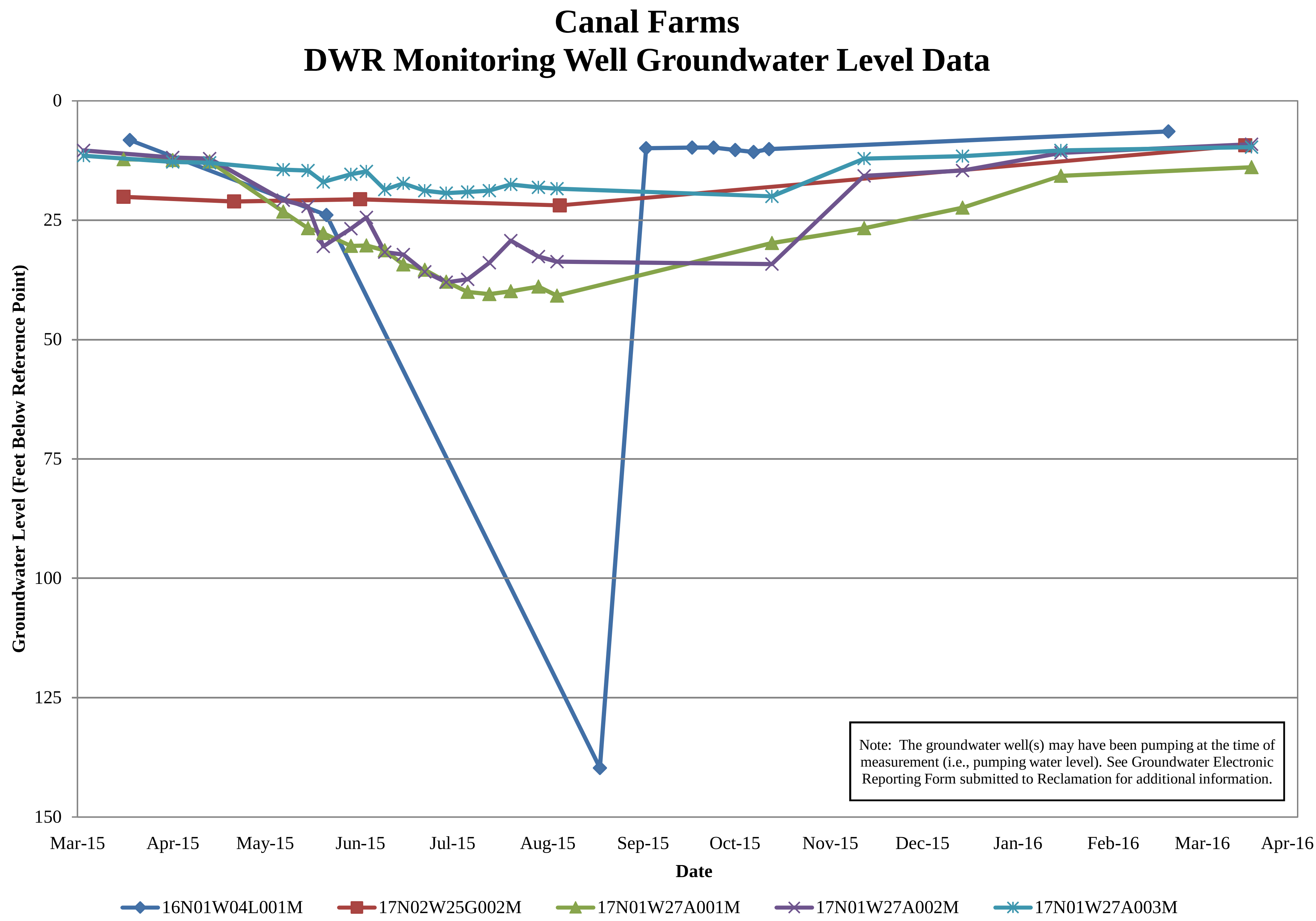


Canal Farms
Groundwater Production Well Flow Rate & Volumes
Instantaneous Flow Rate (gpm)
Cumulative Totalizer Volume (acre-feet)
2,400
2,200
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
5/7/15
5/21/15
6/4/15
6/18/15
7/2/15
7/16/15
7/30/15
8/13/15
8/27/15
9/10/15
Date
Dennis Well North Pumping Rate
Dennis Well South Pumping Rate
Dennis Well North Total Volume
Dennis Well South Total Volume

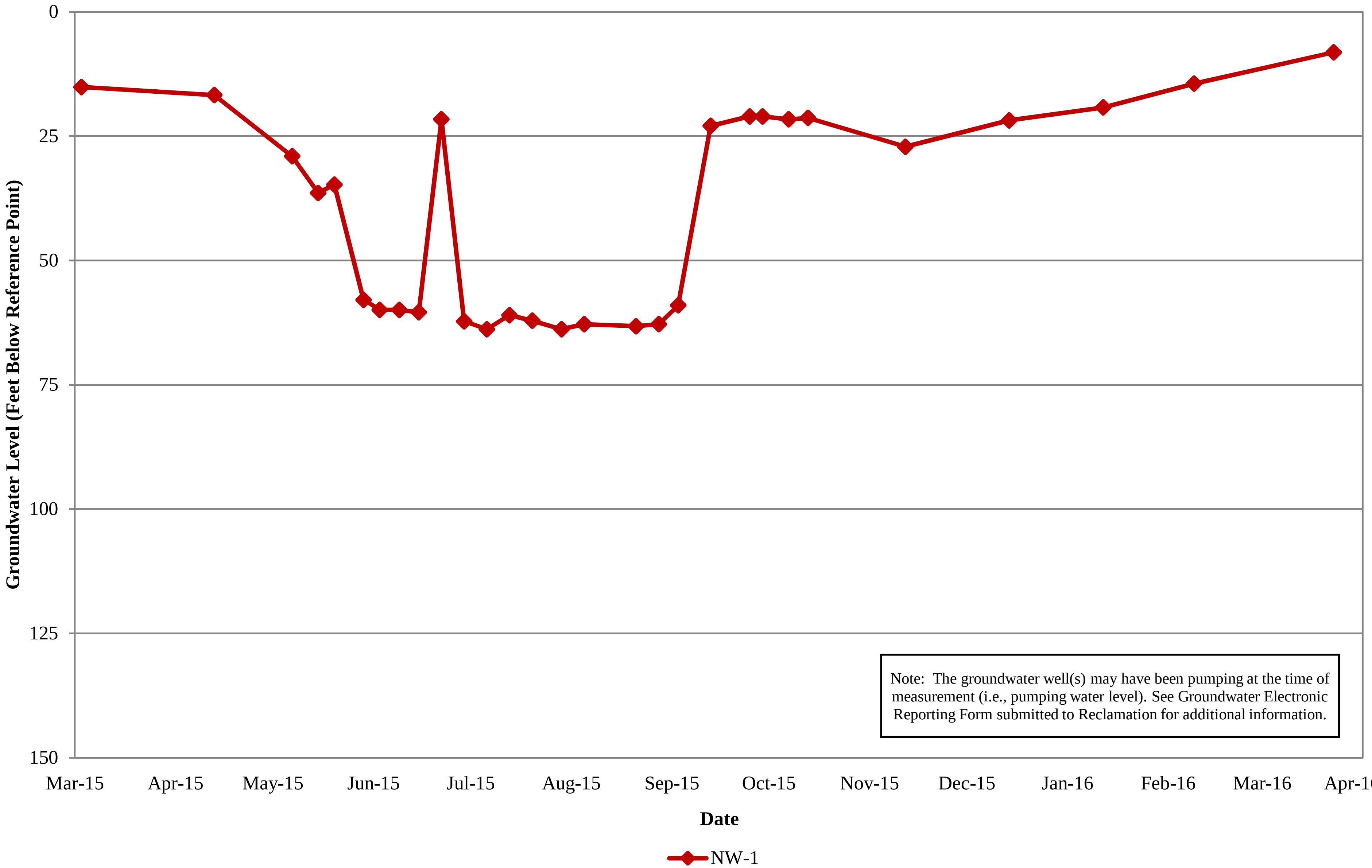
Canal Farms
Production Well Groundwater Level Data

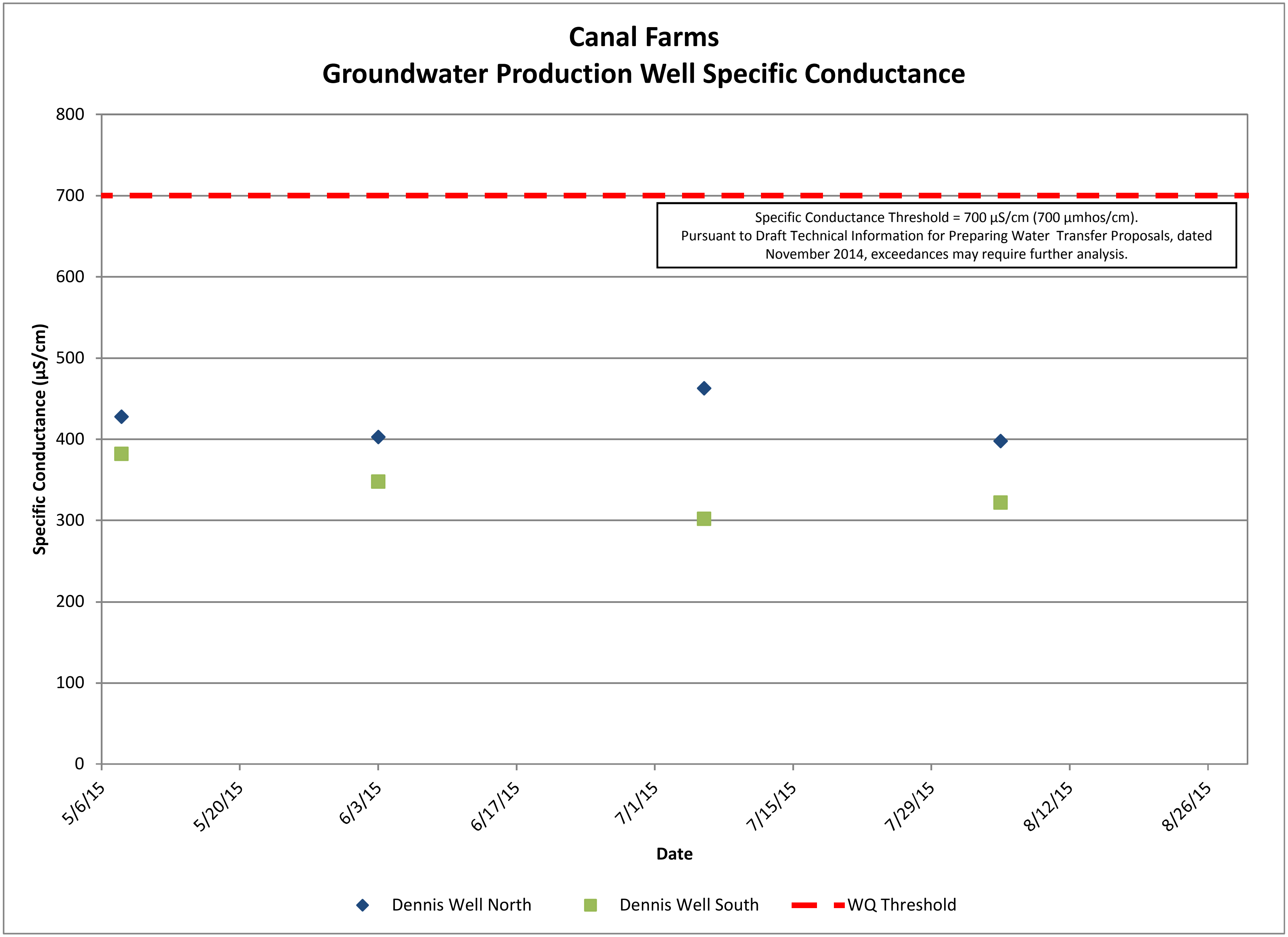




Canal Farms
DWR Monitoring Well Groundwater Level Data
Groundwater Level (Feet Below Reference Point)
0
25
50
75
100
125
150
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Date
Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.
16N01W04L001M
17N02W25G002M
17N01W27A001M
17N01W27A002M
17N01W27A003M

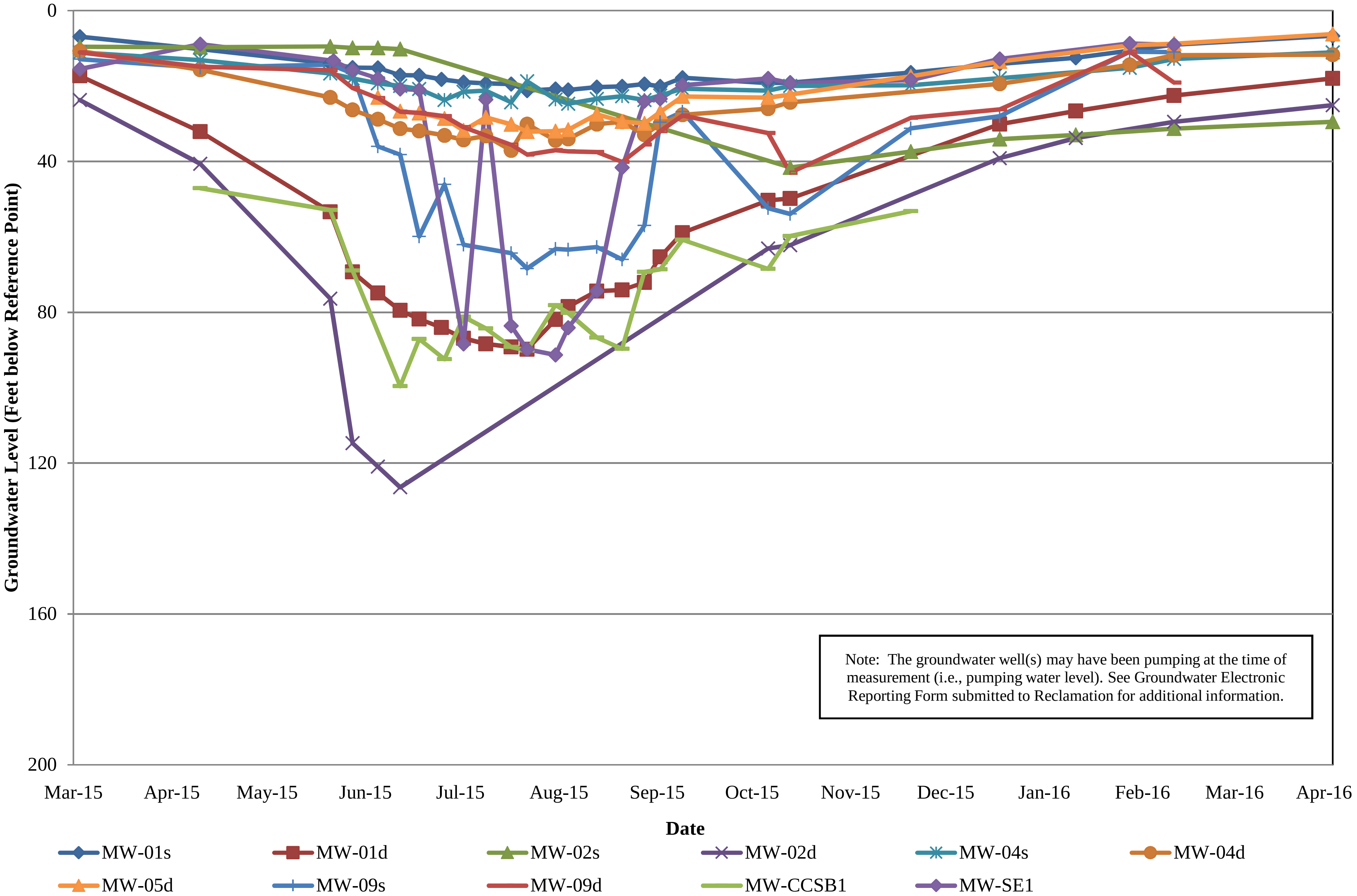
Canal Farms
Monitoring Well Groundwater Level Data

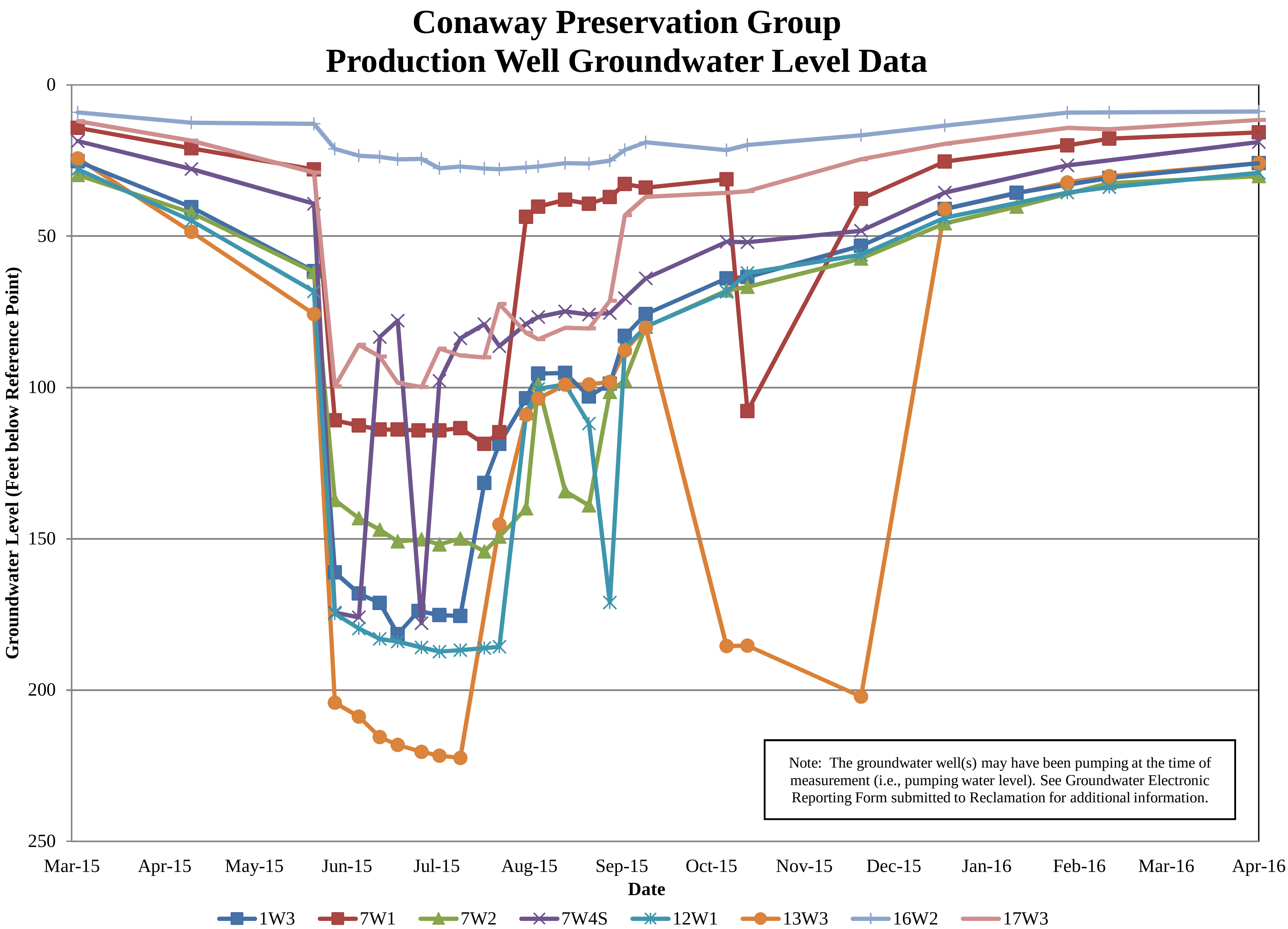


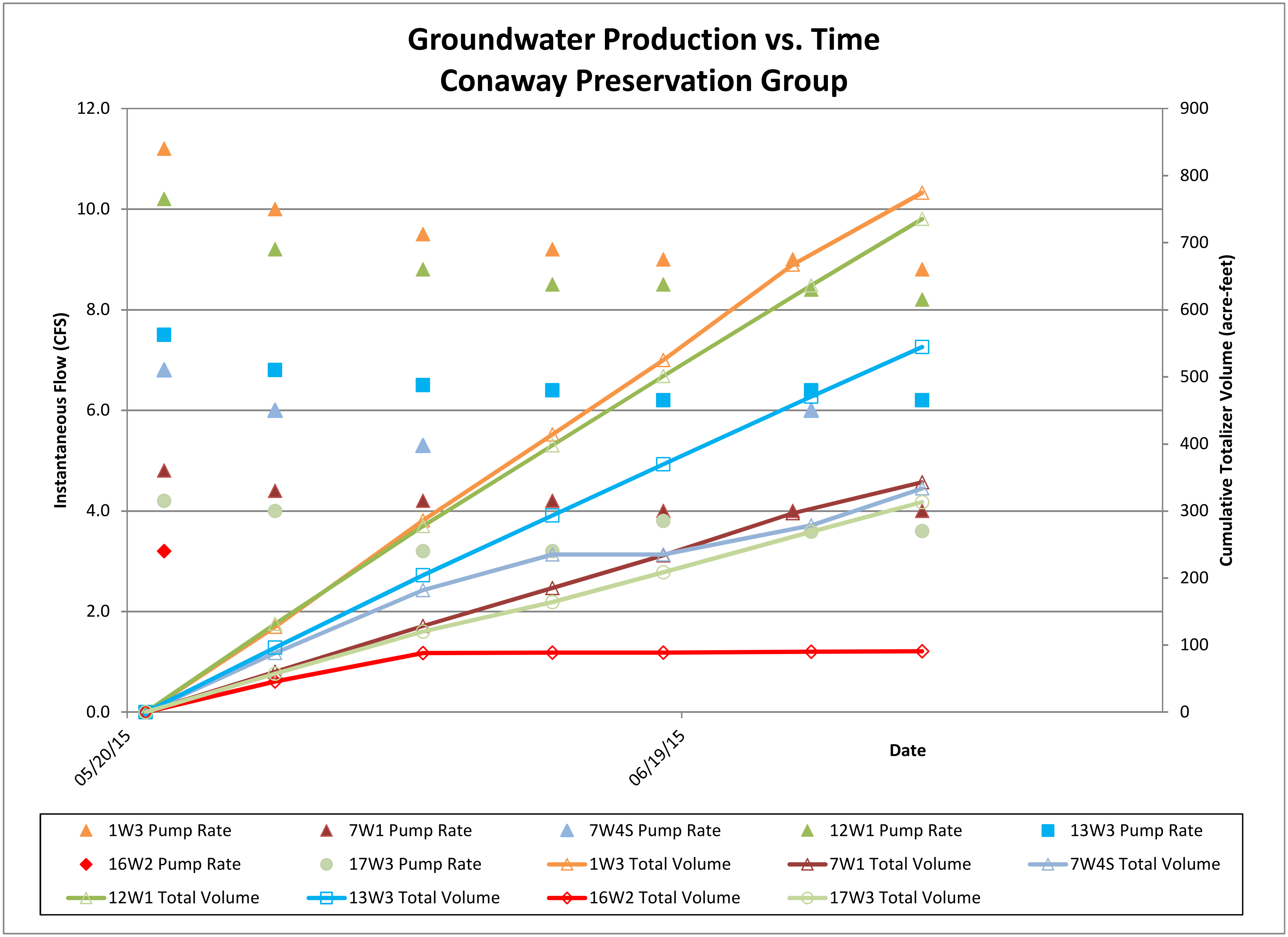

Canal Farms
Groundwater Production Well Specific Conductance
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to Draft Technical Information for Preparing Water Transfer Proposals, dated November 2014, exceedances may require further analysis.
Specific Conductance (µS/cm)
0
100
200
300
400
500
600
700
800
5/6/15
5/20/15
6/3/15
6/17/15
7/1/15
7/15/15
7/29/15
8/12/15
8/26/15
Date
Dennis Well North
Dennis Well South
WQ Threshold

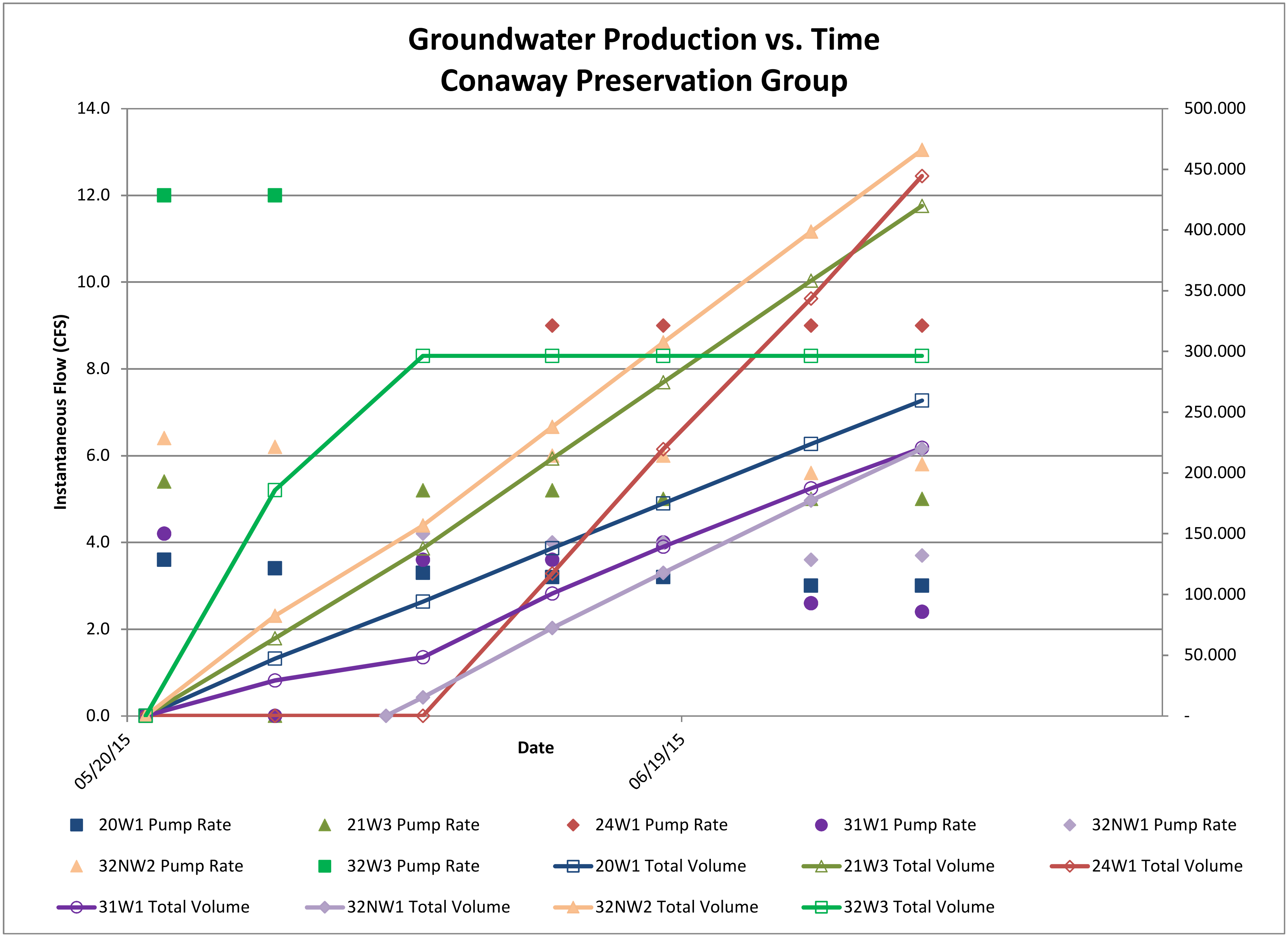
Conaway Preservation Group

Conaway Preservation Group
Monitoring Well Groundwater Level Data

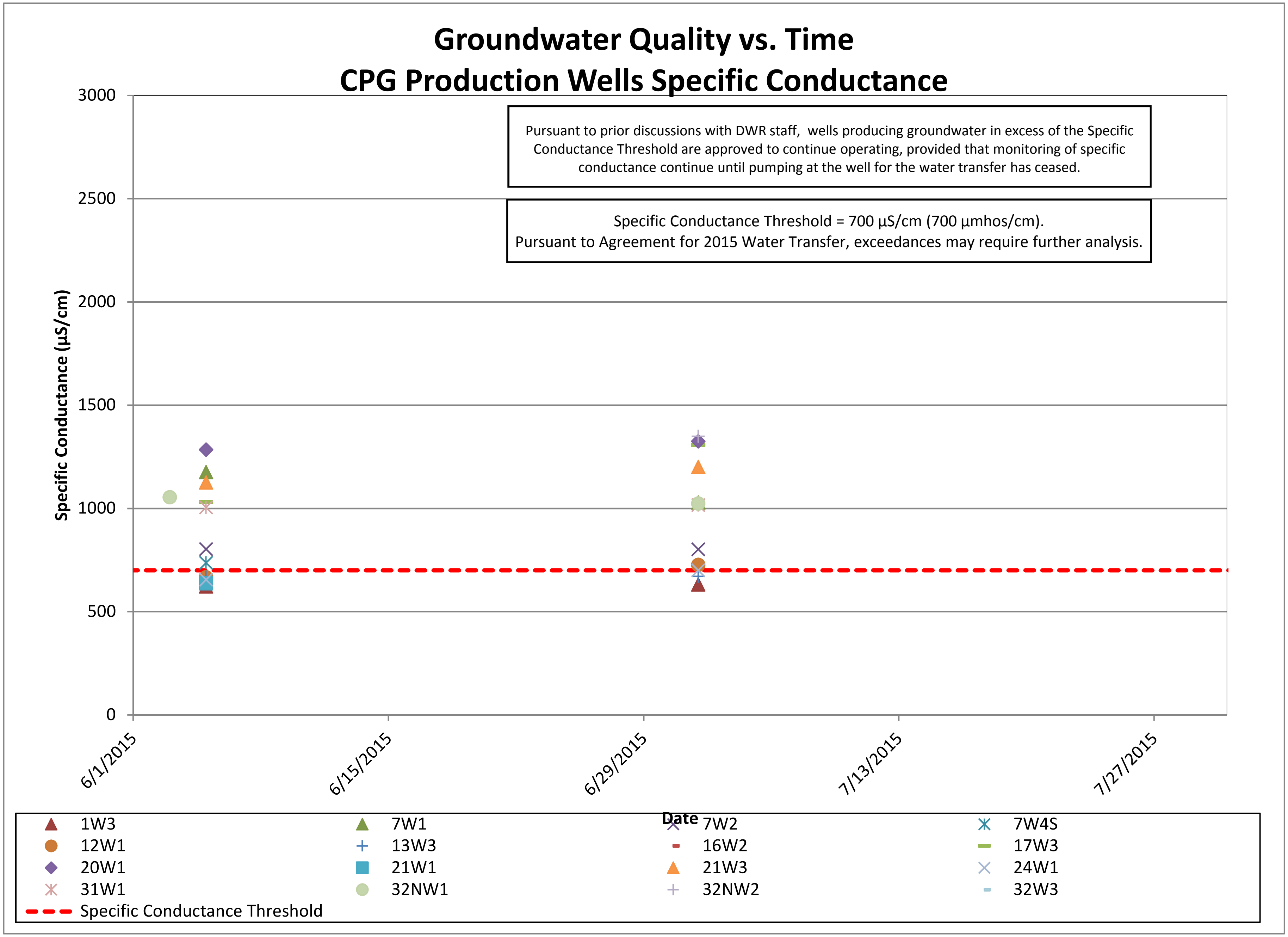



Conaway Preservation Group
Production Well Groundwater Level Data
Groundwater Level (Feet below Reference Point)
0
50
100
150
200
250
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Date
1W3
7W1
7W2
7W4S
12W1
13W3
16W2
17W3
Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.

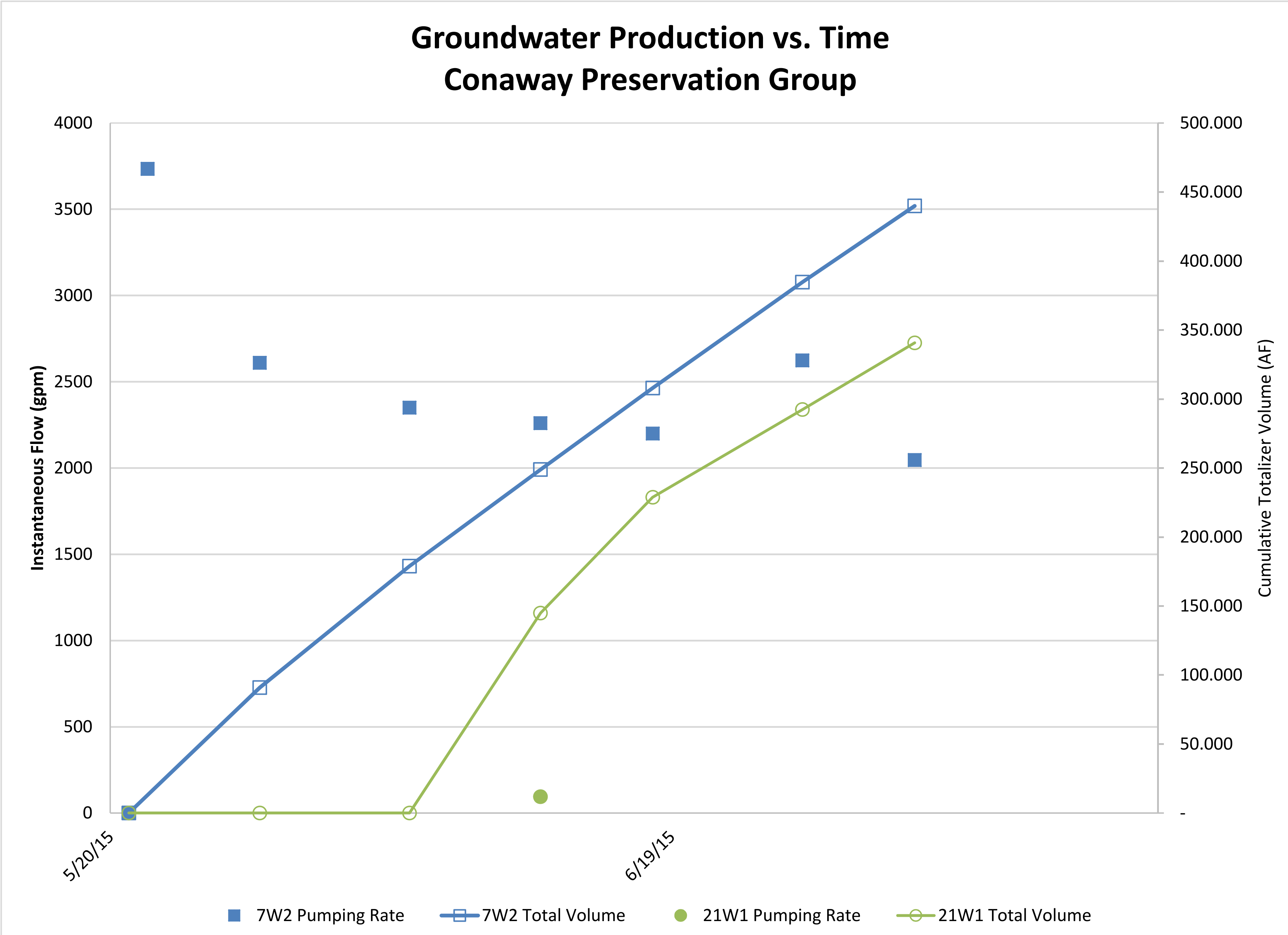

Groundwater Production vs. Time
Conaway Preservation Group
Instantaneous Flow (CFS)
Cumulative Totalizer Volume (acre-feet)
Date
05/20/15
06/19/15
12.0
10.0
8.0
6.0
4.0
2.0
0.0
900
800
700
600
500
400
300
200
100
0
1W3 Pump Rate
7W1 Pump Rate
7W4S Pump Rate
12W1 Pump Rate
13W3 Pump Rate
16W2 Pump Rate
17W3 Pump Rate
1W3 Total Volume
7W1 Total Volume
7W4S Total Volume
12W1 Total Volume
13W3 Total Volume
16W2 Total Volume
17W3 Total Volume



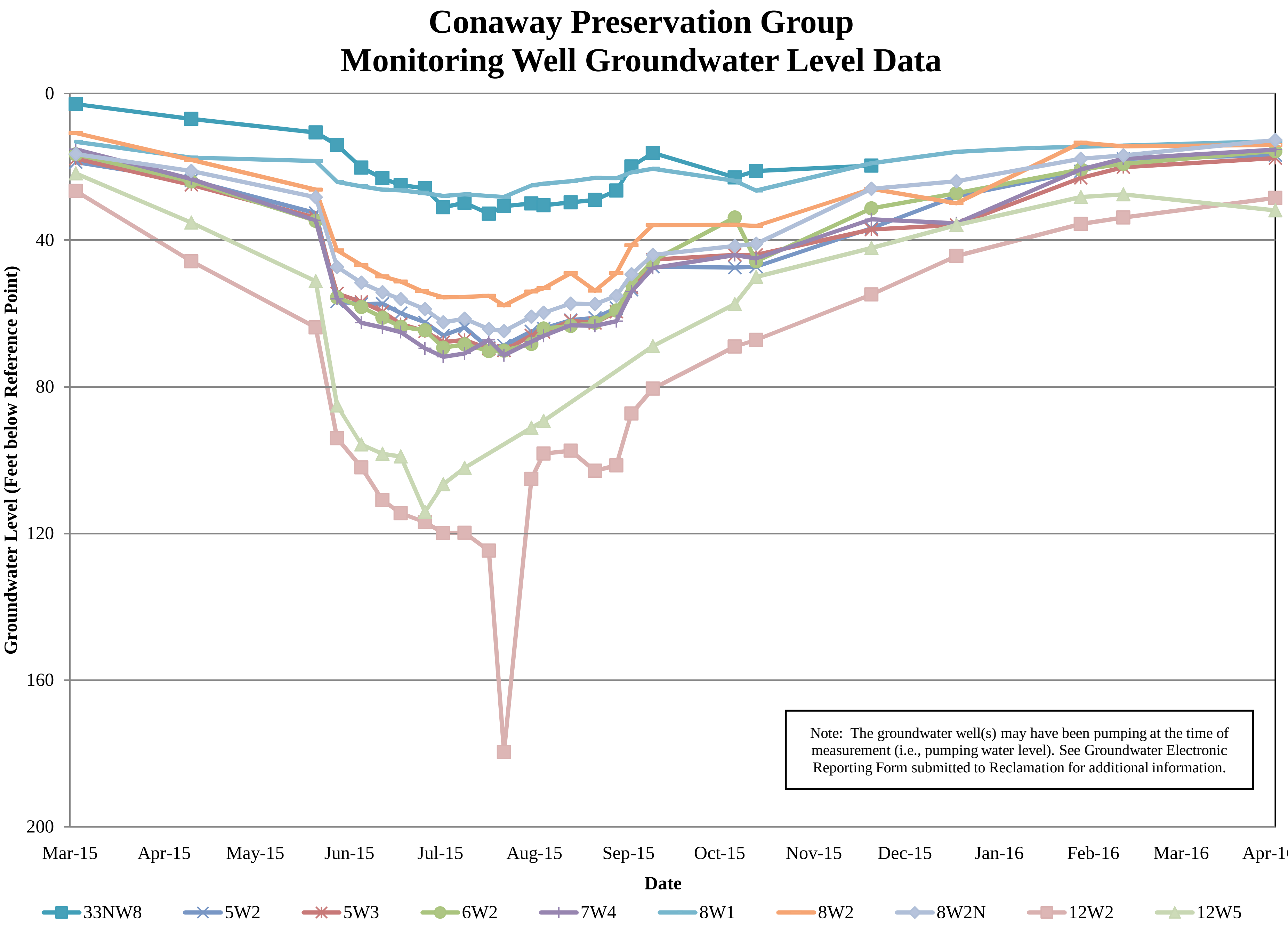
Groundwater Production vs. Time
Conaway Preservation Group
Instantaneous Flow (CFS)
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
500.000
450.000
400.000
350.000
300.000
250.000
200.000
150.000
100.000
50.000
-
05/20/15
06/19/15
Date
20W1 Pump Rate
21W3 Pump Rate
24W1 Pump Rate
31W1 Pump Rate
32NW1 Pump Rate
32NW2 Pump Rate
32W3 Pump Rate
20W1 Total Volume
21W3 Total Volume
24W1 Total Volume
31W1 Total Volume
32NW1 Total Volume
32NW2 Total Volume
32W3 Total Volume



Groundwater Quality vs. Time
CPG Production Wells Specific Conductance
Pursuant to prior discussions with DWR staff, wells producing groundwater in excess of the Specific Conductance Threshold are approved to continue operating, provided that monitoring of specific conductance continue until pumping at the well for the water transfer has ceased.
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to Agreement for 2015 Water Transfer, exceedances may require further analysis.
Specific Conductance (µS/cm)
3000
2500
2000
1500
1000
500
0
6/1/2015
6/15/2015
6/29/2015
7/13/2015
7/27/2015
Date
1W3
7W1
7W2
7W4S
12W1
13W3
16W2
17W3
20W1
21W1
21W3
24W1
31W1
32NW1
32NW2
32W3
Specific Conductance Threshold

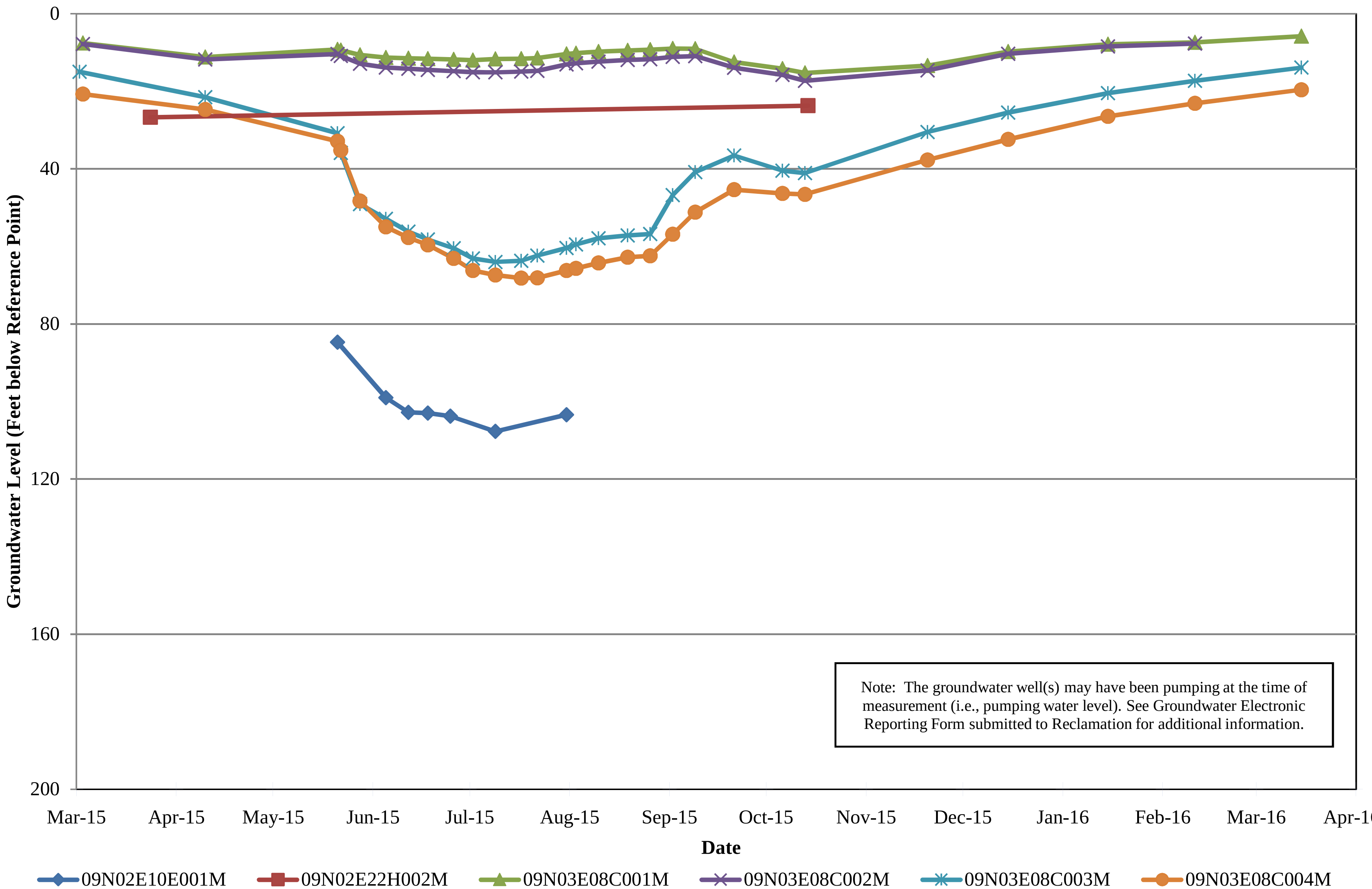


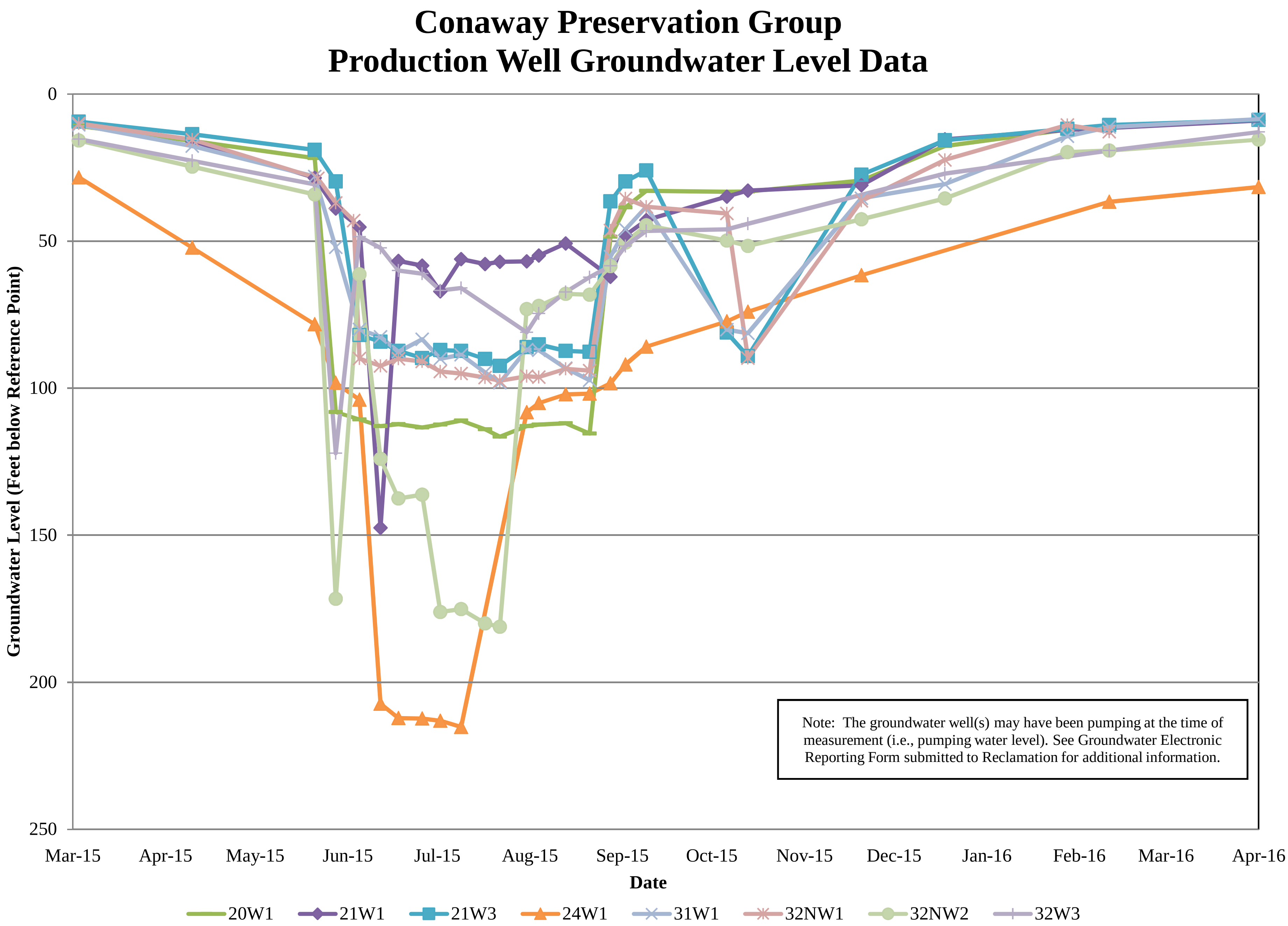
Groundwater Production vs. Time
Conaway Preservation Group
Instantaneous Flow (gpm)
Cumulative Totalizer Volume (AF)
4000
3500
3000
2500
2000
1500
1000
500
0
500.000
450.000
400.000
350.000
300.000
250.000
200.000
150.000
100.000
50.000
-
5/20/15
6/19/15
7W2 Pumping Rate
7W2 Total Volume
21W1 Pumping Rate
21W1 Total Volume



Conaway Preservation Group
Monitoring Well Groundwater Level Data
0
40
80
120
160
200
Groundwater Level (Feet below Reference Point)
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Date
33NW8
5W2
5W3
6W2
7W4
8W1
8W2
8W2N
12W2
12W5
Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.

Conaway Preservation Group
DWR and YCFFWCD Monitoring Well Groundwater Level Data




Conaway Preservation Group
Production Well Groundwater Level Data
Groundwater Level (Feet below Reference Point)
0
50
100
150
200
250
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Date
20W1
21W1
21W3
24W1
31W1
32NW1
32NW2
32W3
Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.

Eastside Mutual Water Company

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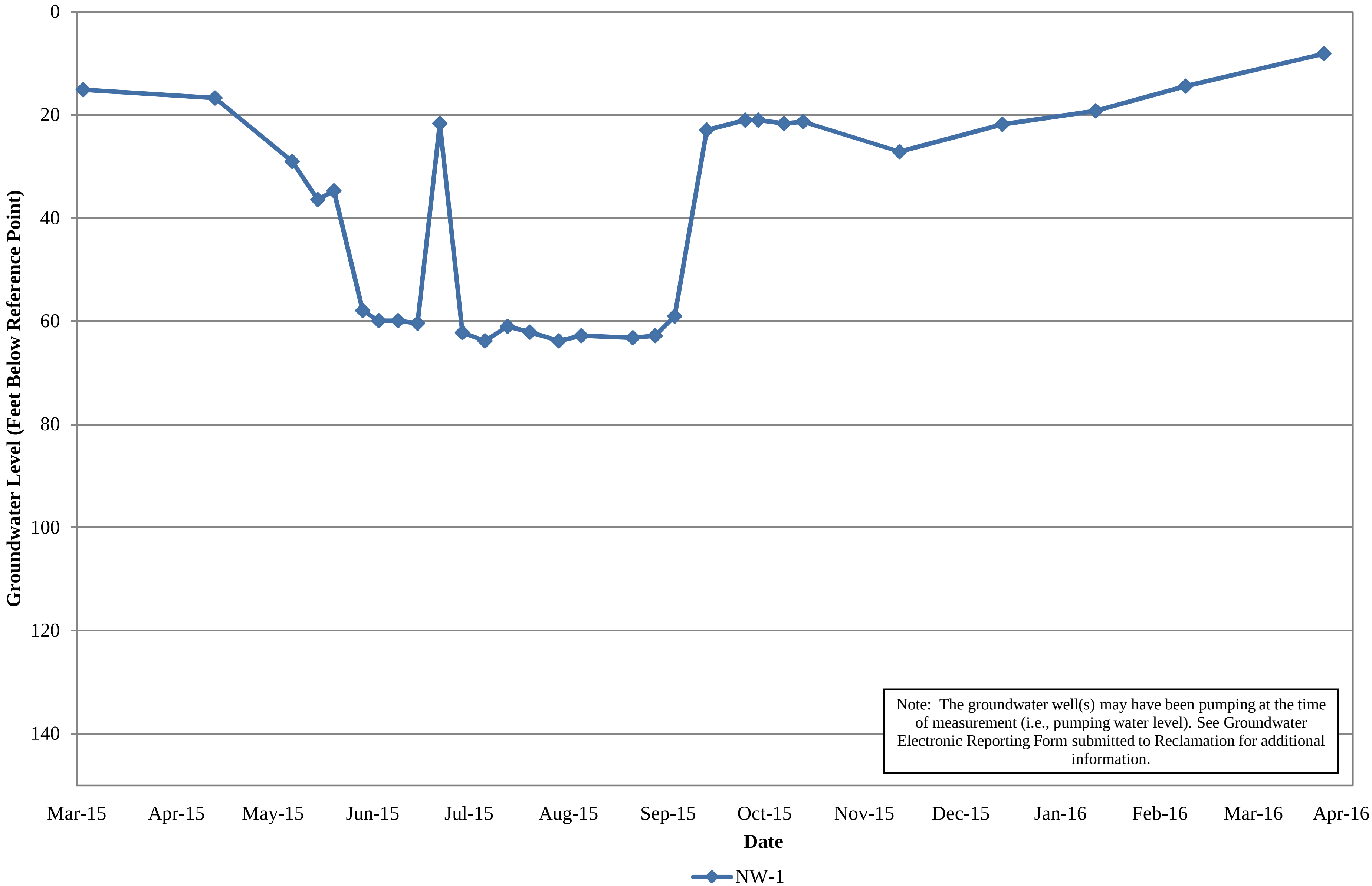
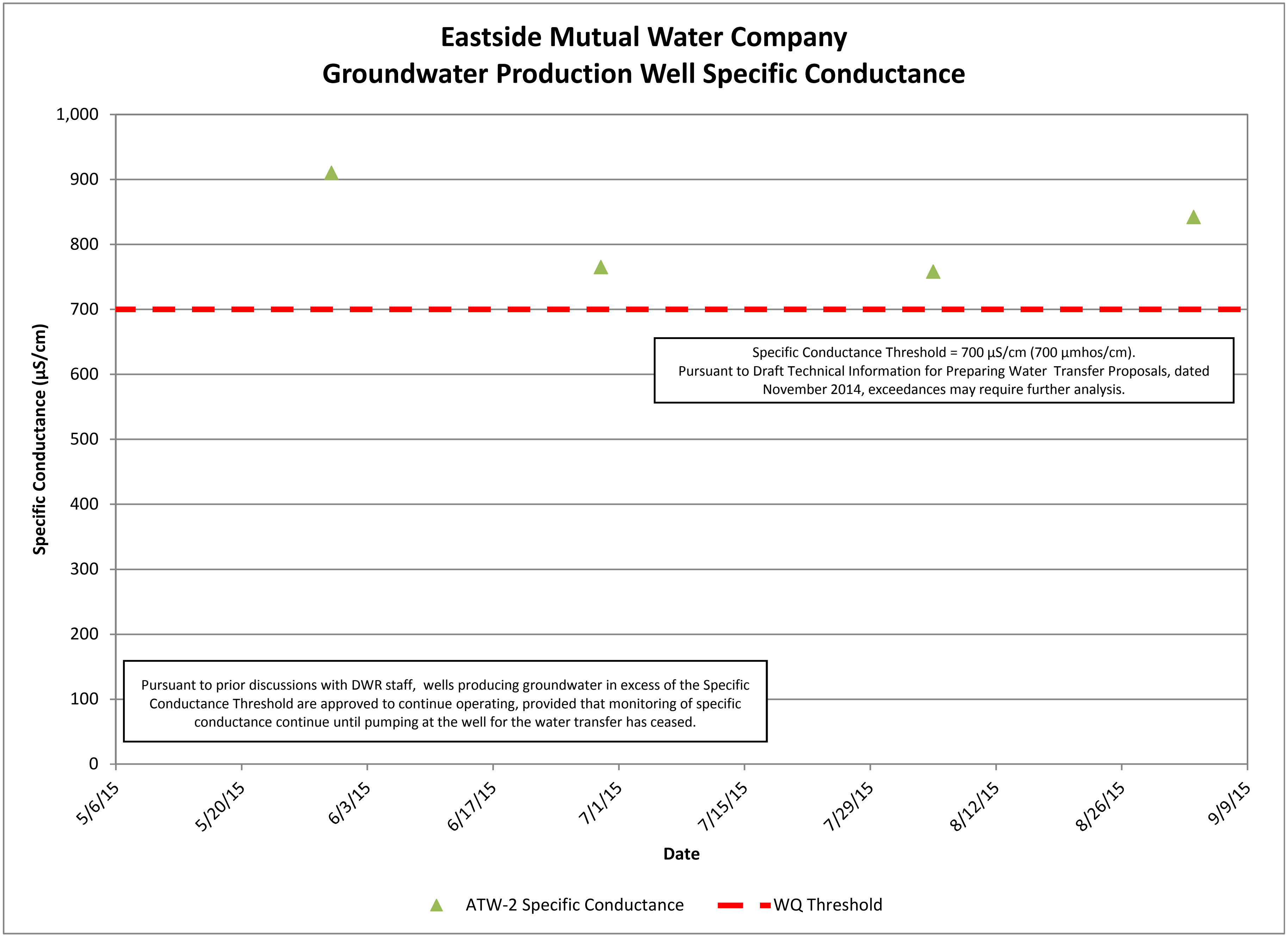
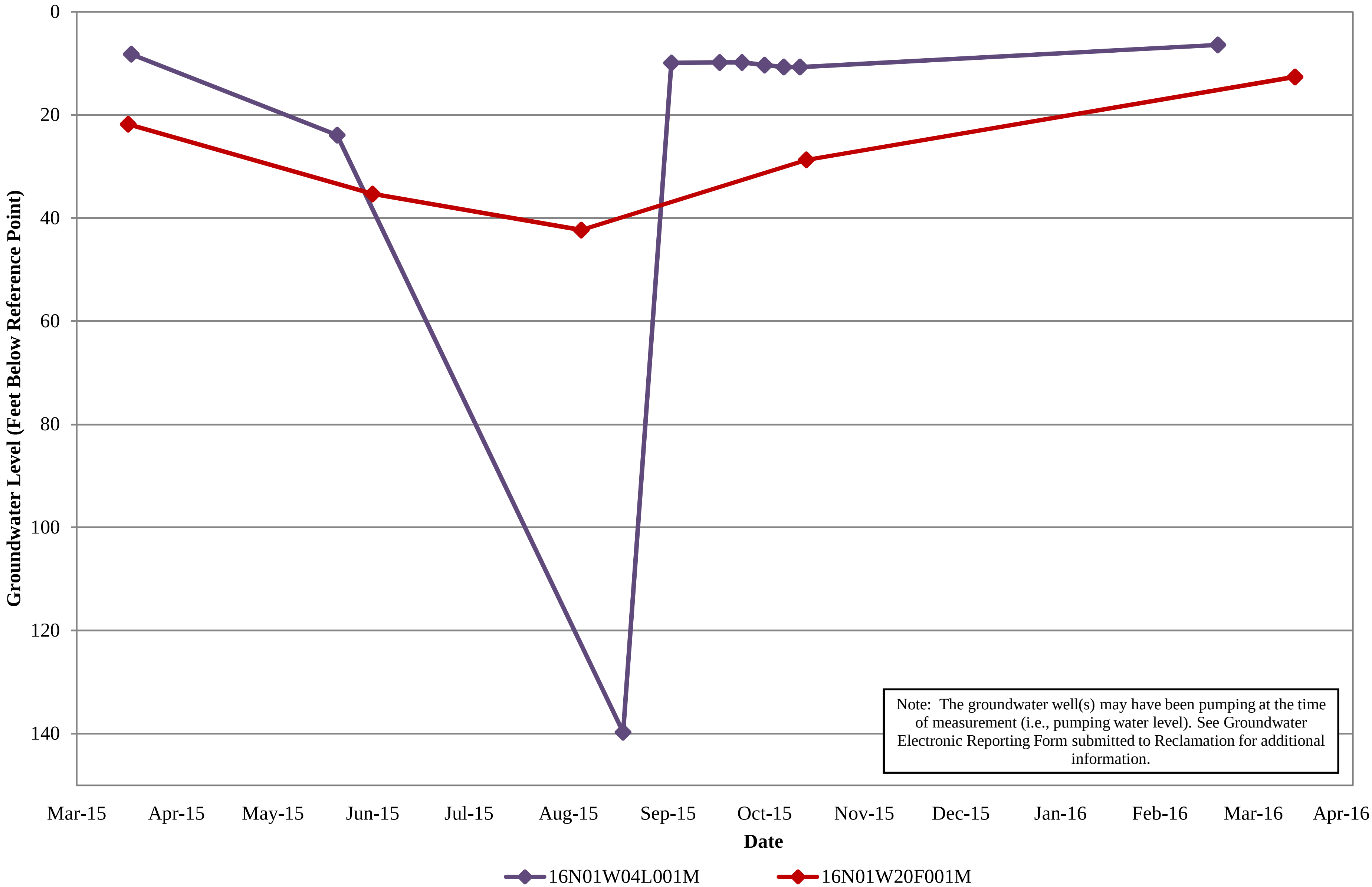
Eastside Mutual Water Company
Monitoring Well Groundwater Level Data

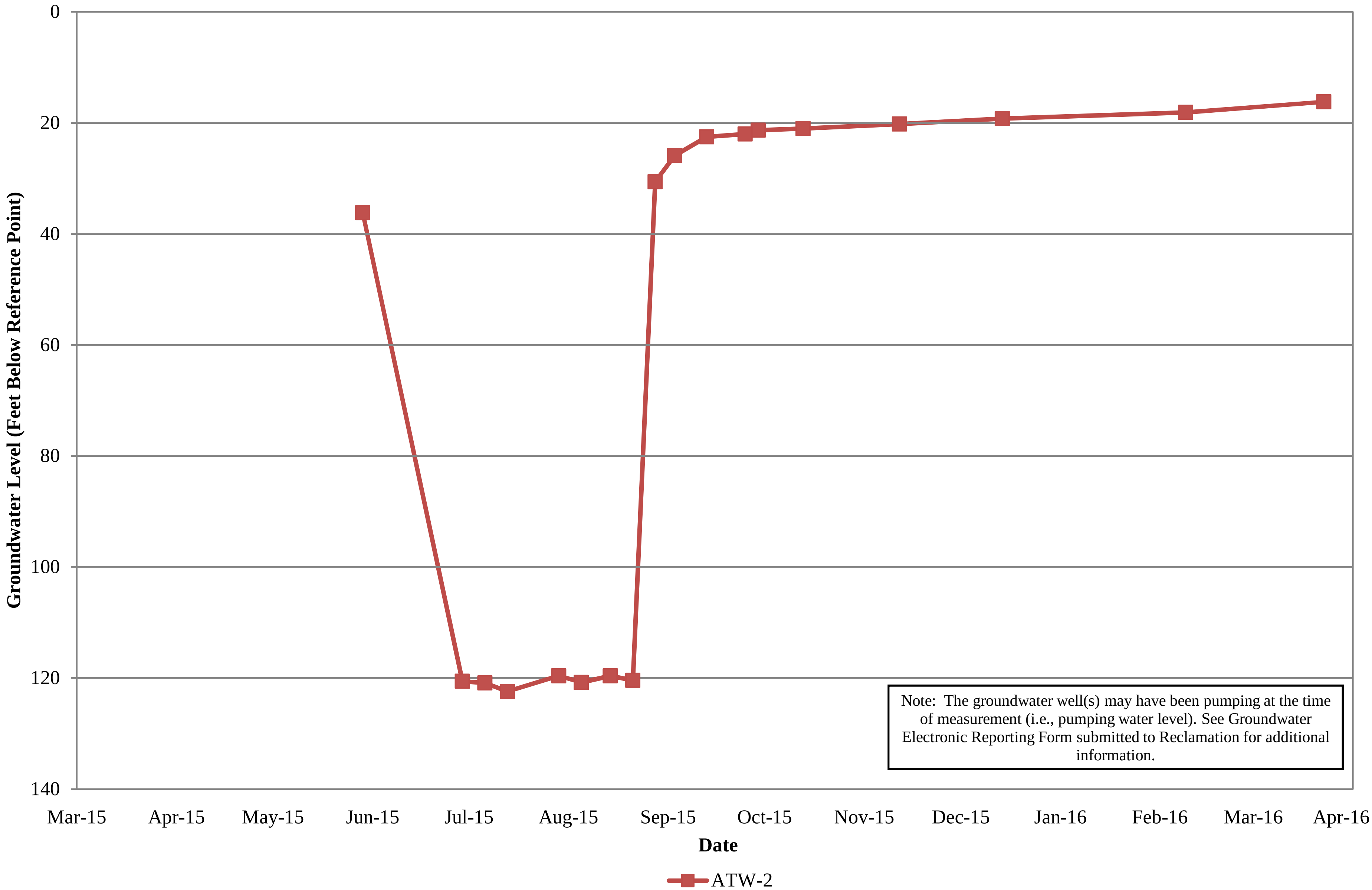


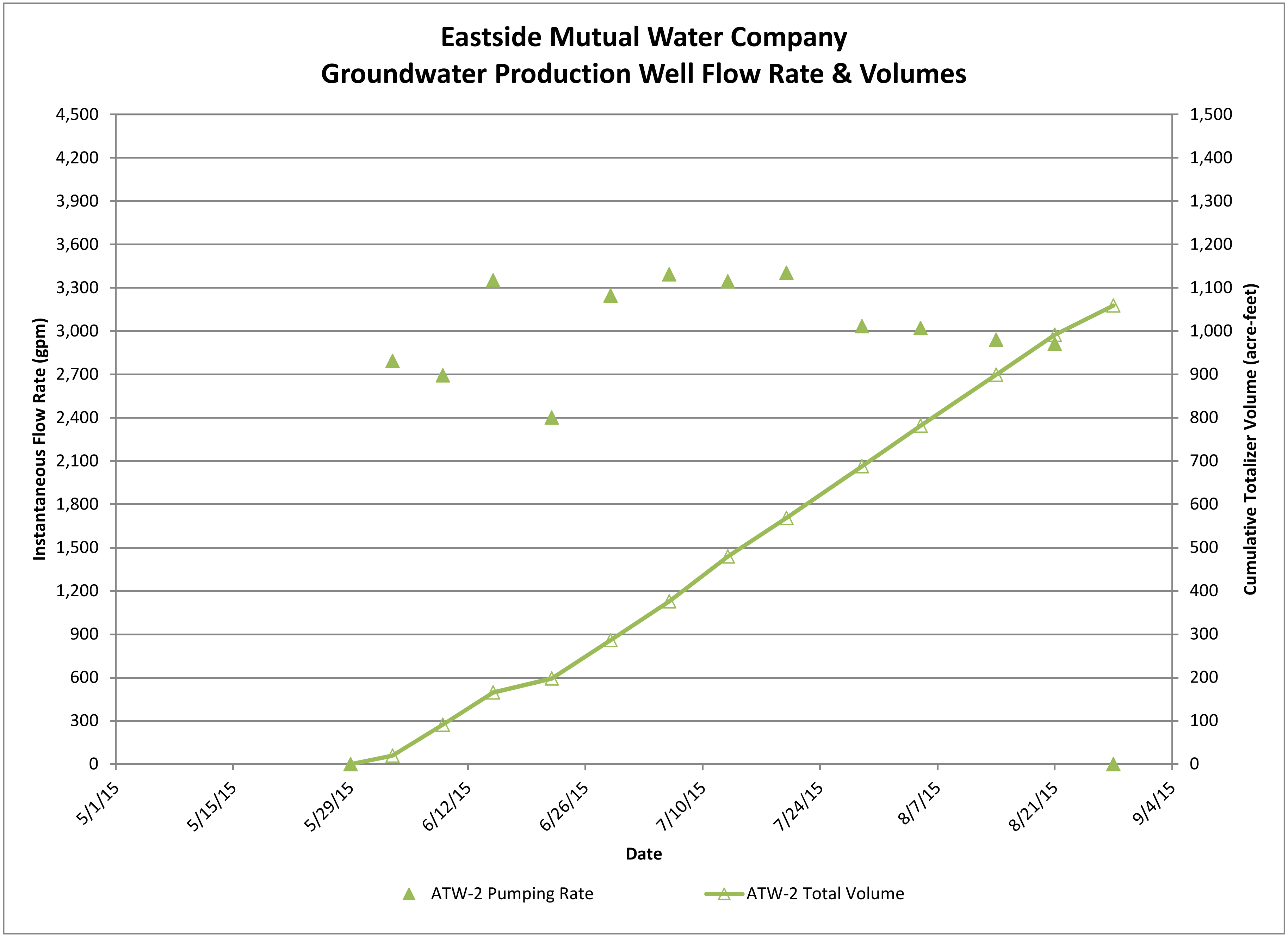

Eastside Mutual Water Company
Groundwater Production Well Specific Conductance
Specific Conductance (µS/cm)
1,000
900
800
700
600
500
400
300
200
100
0
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to Draft Technical Information for Preparing Water Transfer Proposals, dated November 2014, exceedances may require further analysis.
Pursuant to prior discussions with DWR staff, wells producing groundwater in excess of the Specific Conductance Threshold are approved to continue operating, provided that monitoring of specific conductance continue until pumping at the well for the water transfer has ceased.
5/6/15
5/20/15
6/3/15
6/17/15
7/1/15
7/15/15
7/29/15
8/12/15
8/26/15
9/9/15
Date
ATW-2 Specific Conductance
WQ Threshold

Eastside Mutual Water Company
DWR Monitoring Well Groundwater Level Data



Eastside Mutual Water Company
Production Well Groundwater Collection Data





Eastside Mutual Water Company
Groundwater Production Well Flow Rate & Volumes
Instantaneous Flow Rate (gpm)
Cumulative Totalizer Volume (acre-feet)
4,500
4,200
3,900
3,600
3,300
3,000
2,700
2,400
2,100
1,800
1,500
1,200
900
600
300
0
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
5/1/15
5/15/15
5/29/15
6/12/15
6/26/15
7/10/15
7/24/15
8/7/15
8/21/15
9/4/15
Date
ATW-2 Pumping Rate
ATW-2 Total Volume

Glenn-Colusa Irrigation District

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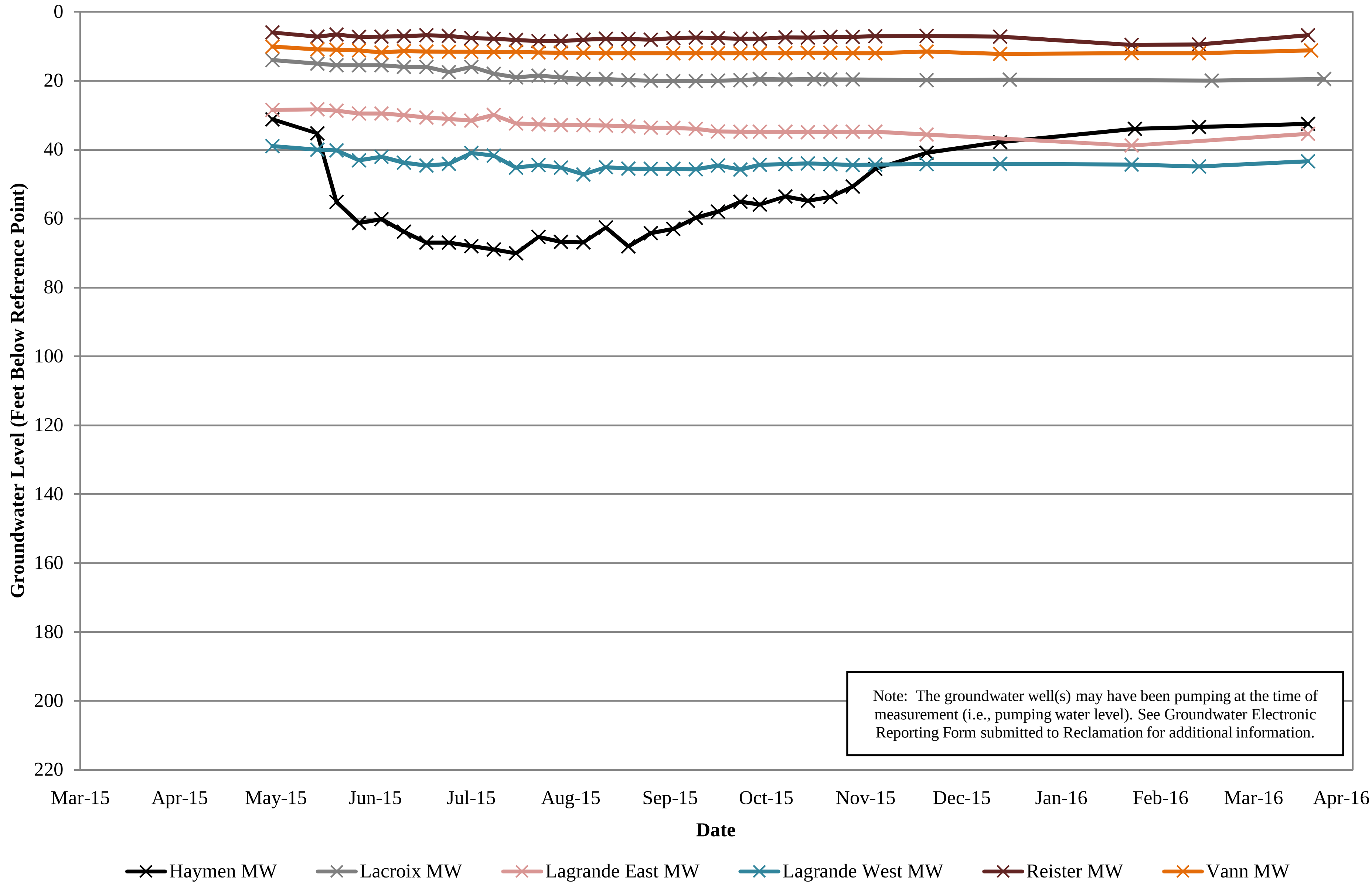
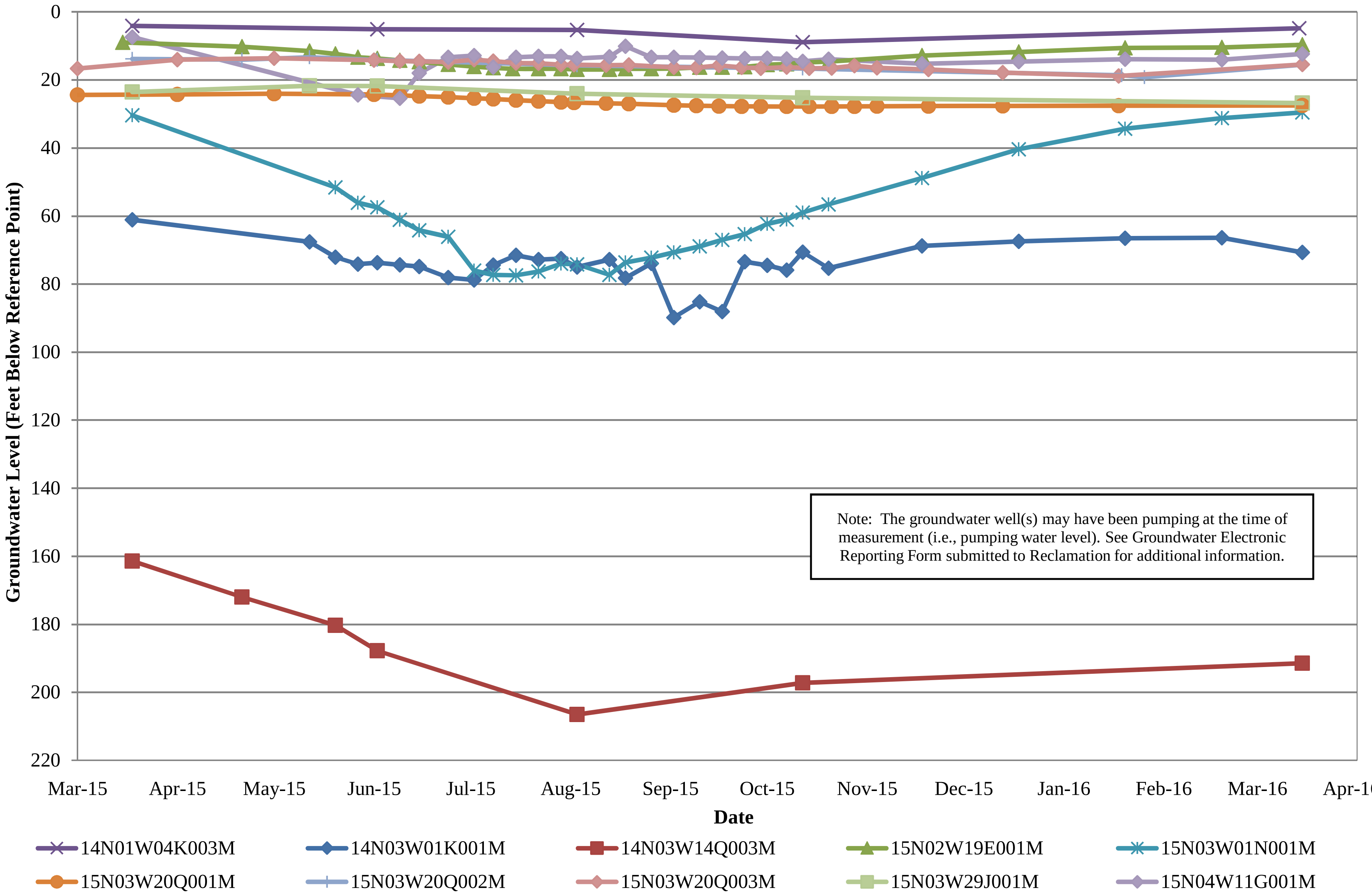
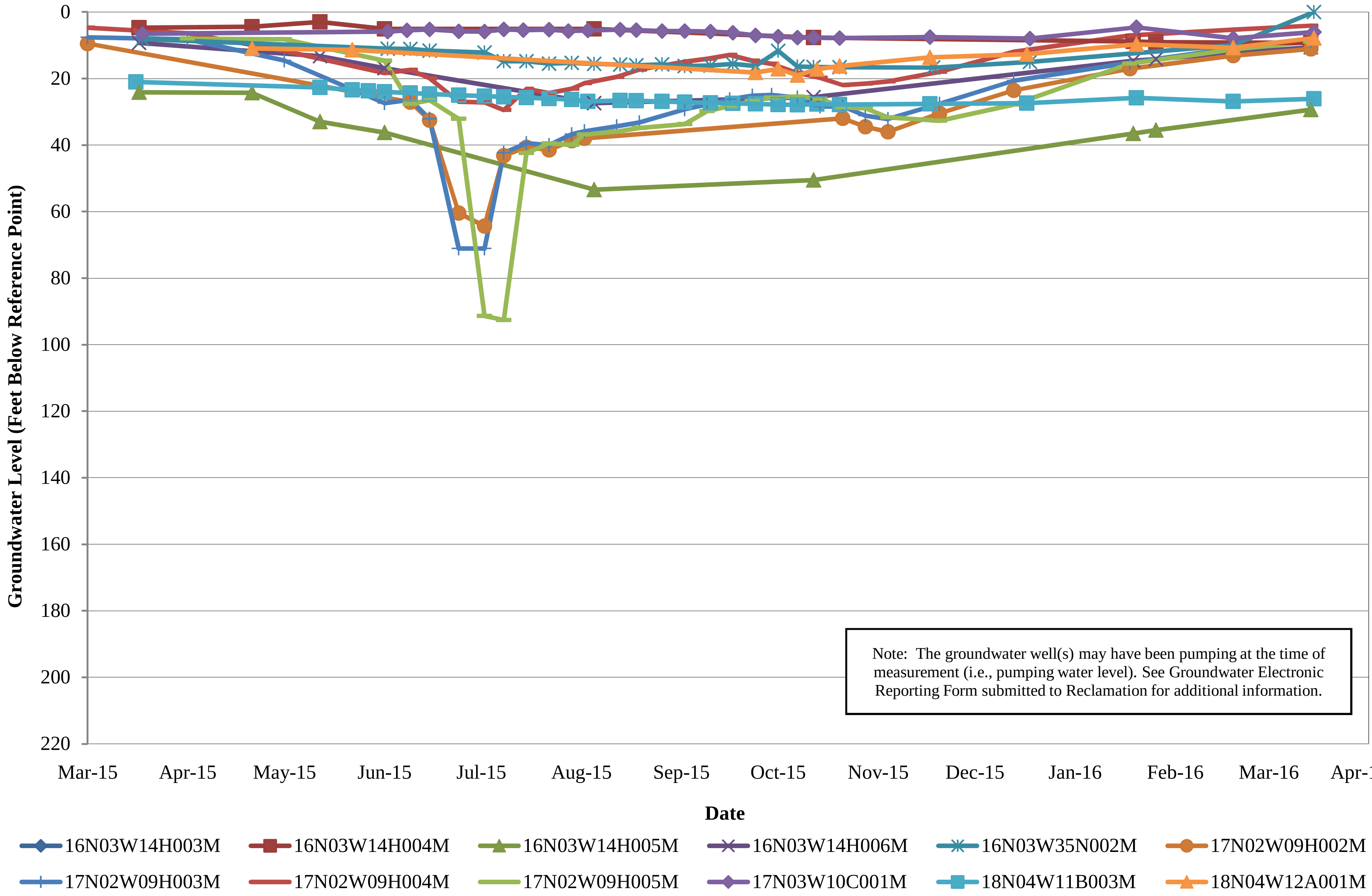
Glenn-Colusa Irrigation District
Monitoring Well Groundwater Level Data



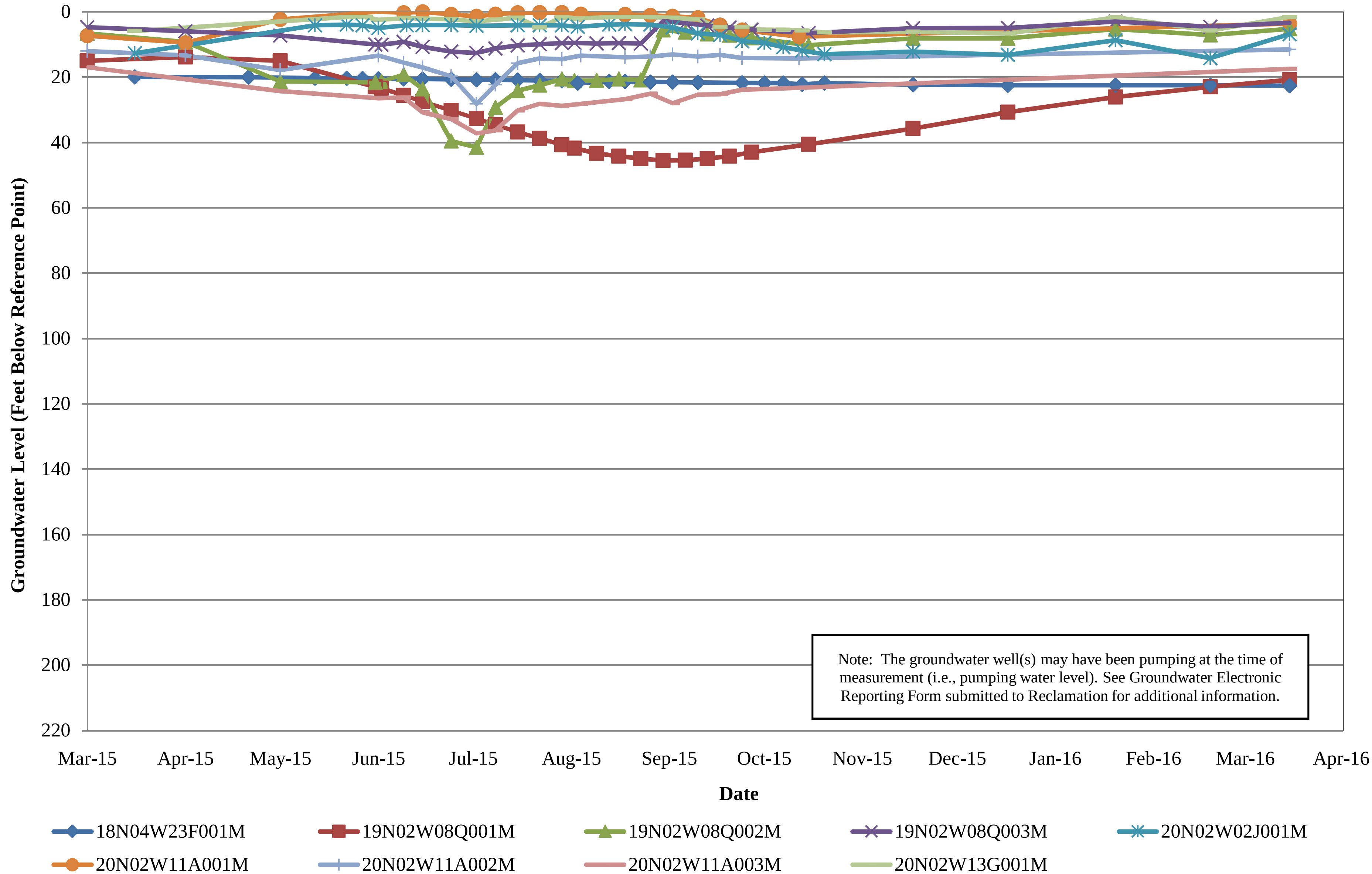
Glenn-Colusa Irrigation District
DWR Monitoring Well Groundwater Level Data



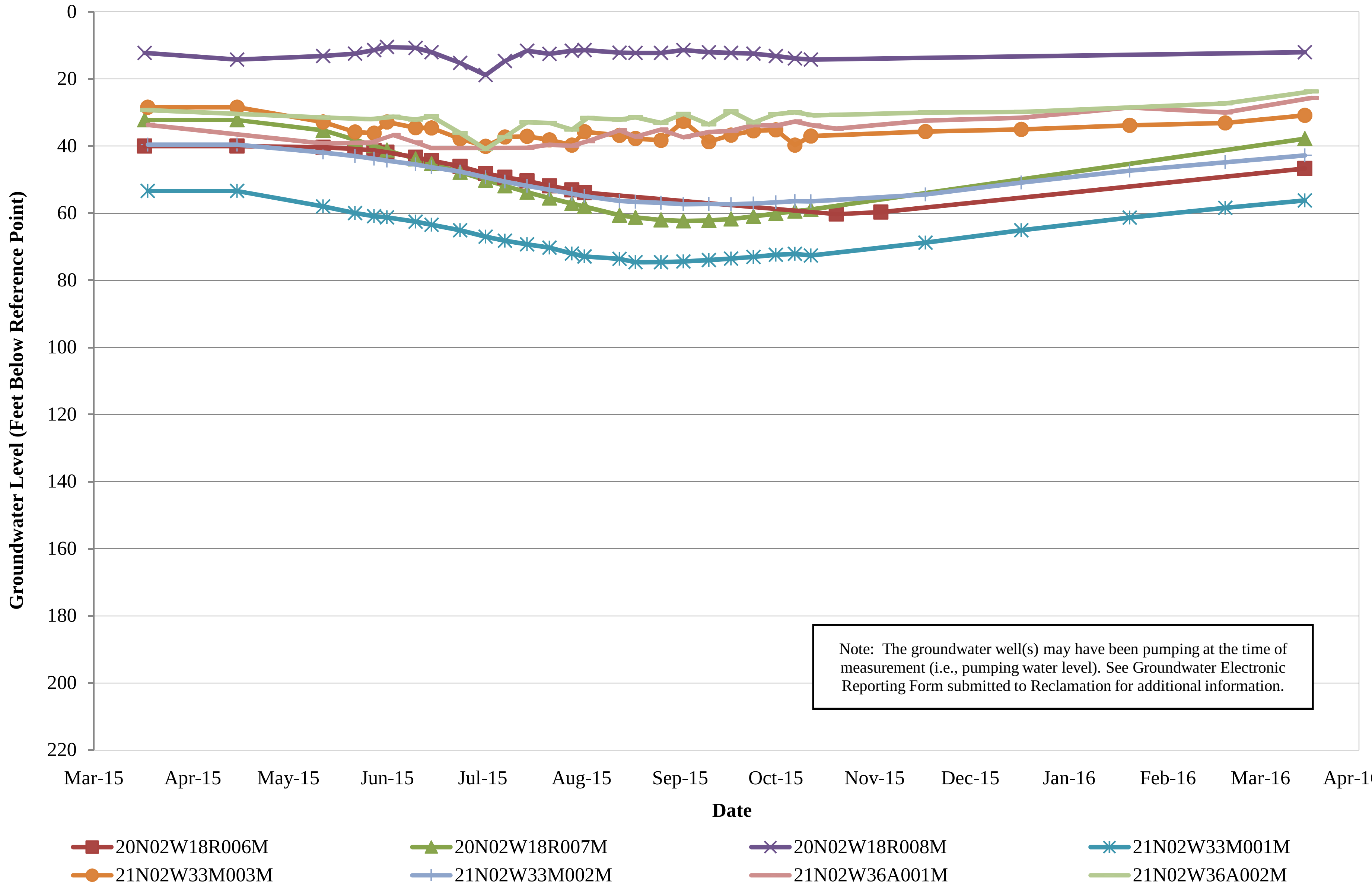
Glenn-Colusa Irrigation District
DWR Monitoring Well Groundwater Level Data

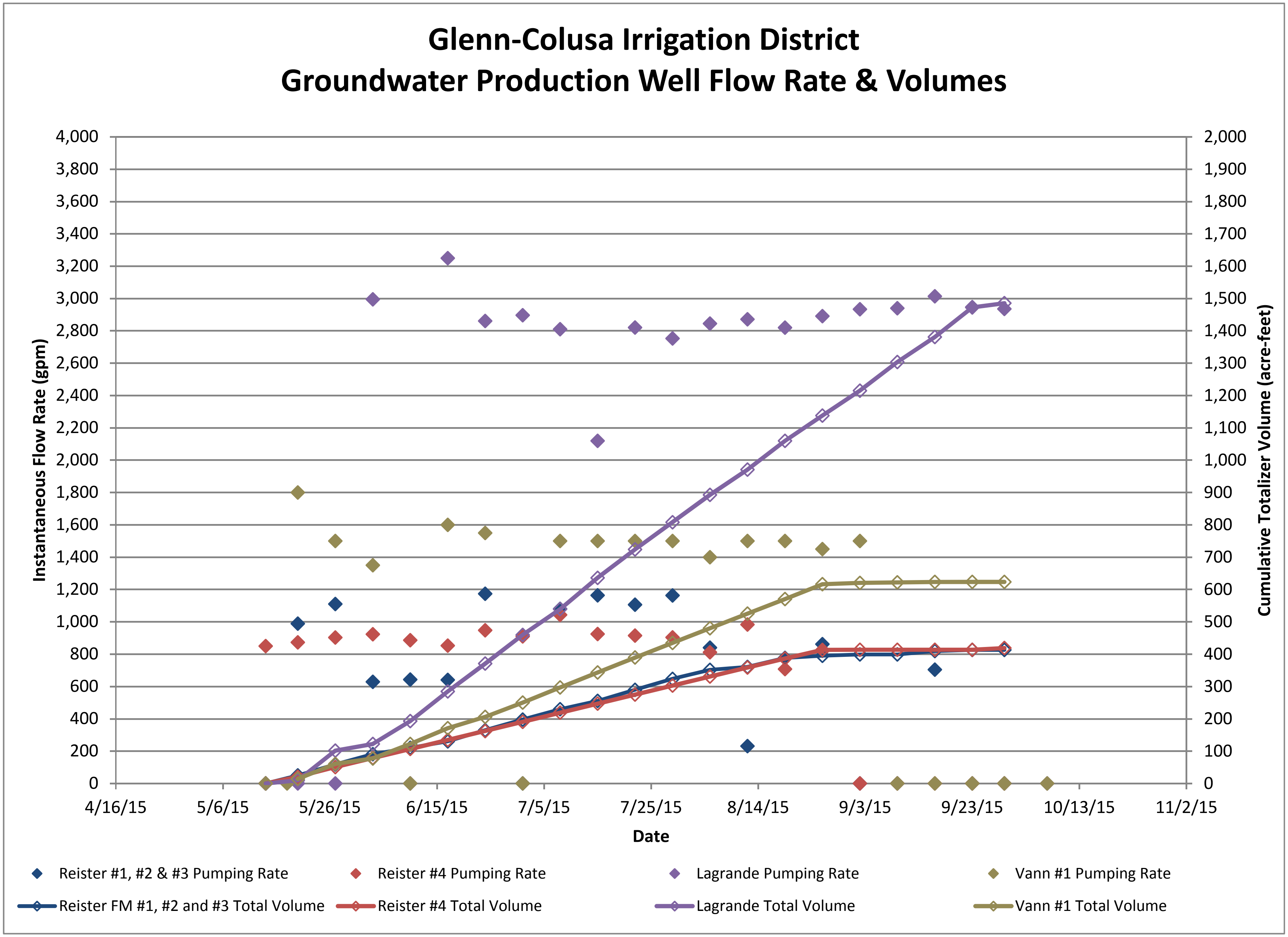


Glenn-Colusa Irrigation District
DWR Monitoring Well Groundwater Level Data

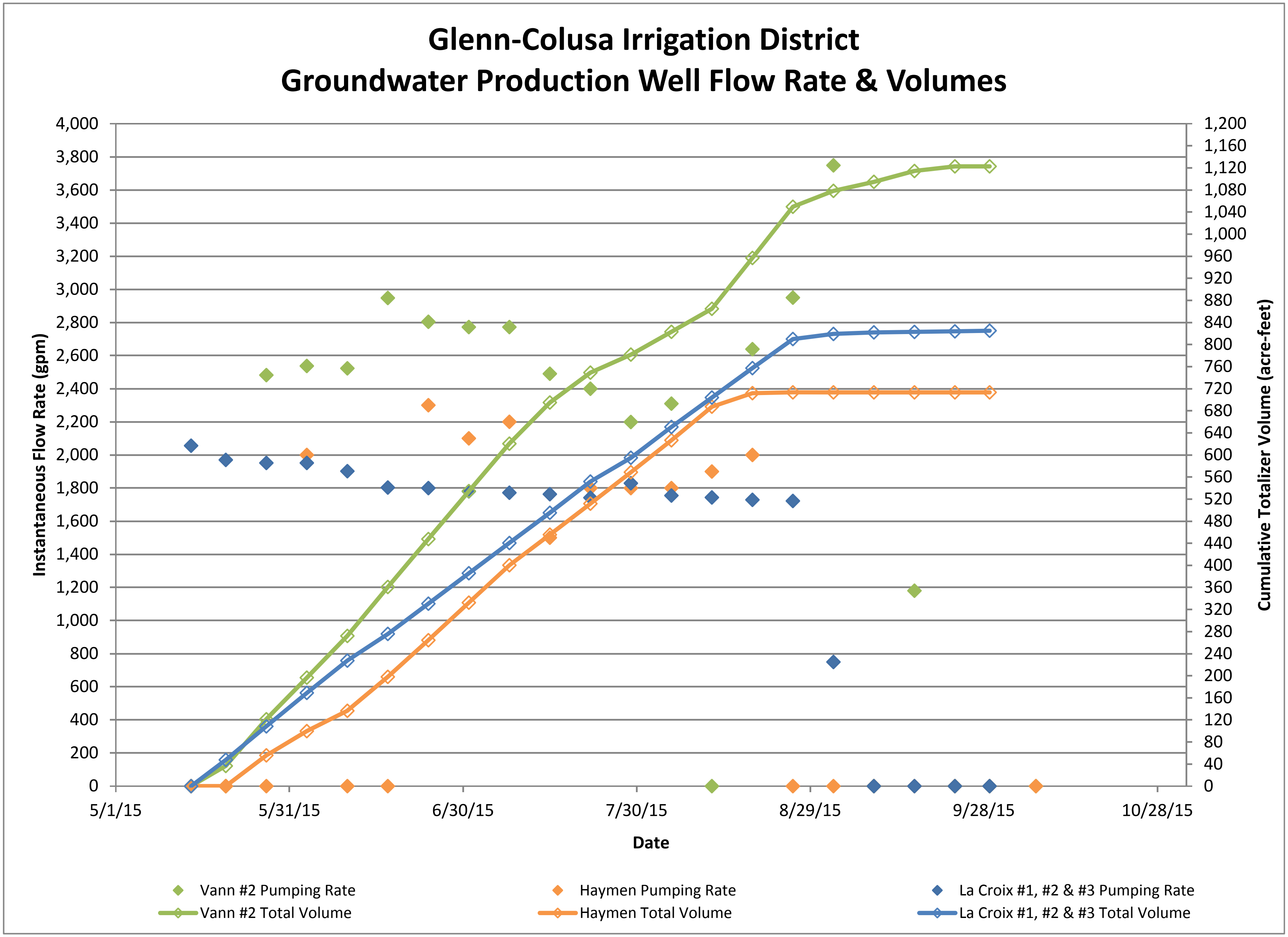


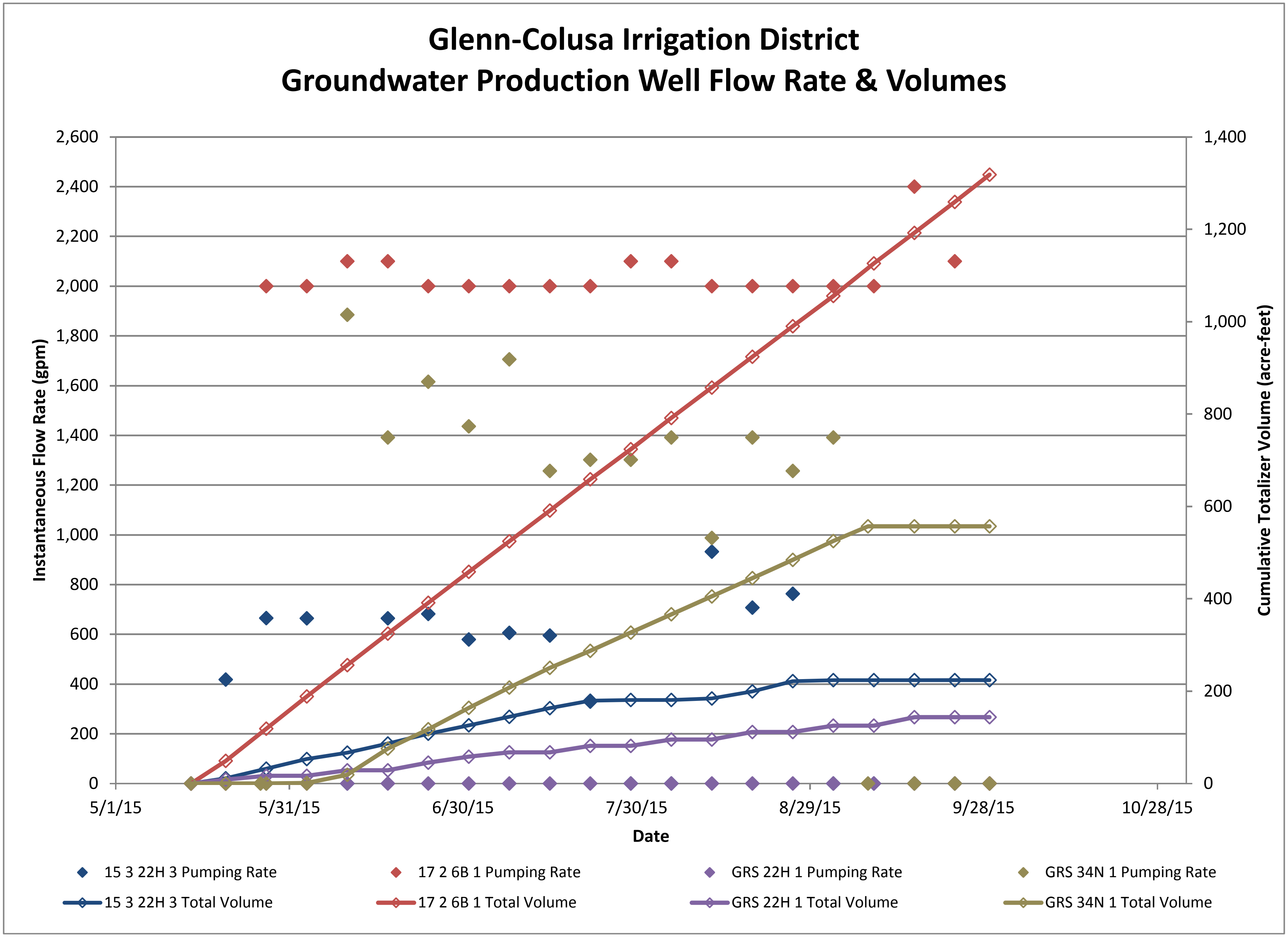
Glenn-Colusa Irrigation District
DWR Monitoring Well Groundwater Level Data



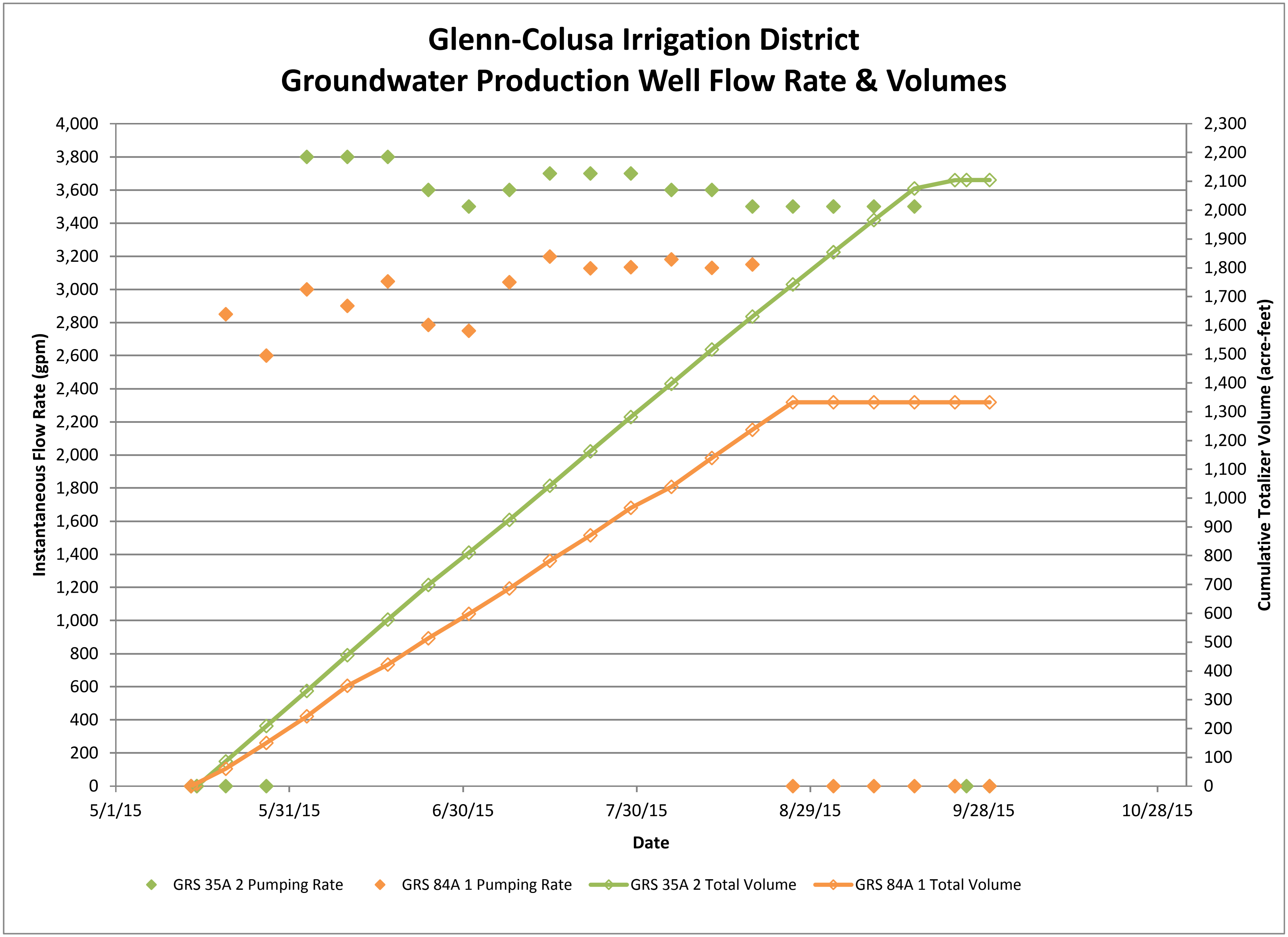


Glenn-Colusa Irrigation District
Groundwater Production Well Flow Rate & Volumes
Instantaneous Flow Rate (gpm)
Cumulative Totalizer Volume (acre-feet)
Date
4/16/15
5/6/15
5/26/15
6/15/15
7/5/15
7/25/15
8/14/15
9/3/15
9/23/15
10/13/15
11/2/15
Reister #1, #2 & #3 Pumping Rate
Reister #4 Pumping Rate
Lagrande Pumping Rate
Vann #1 Pumping Rate
Reister FM #1, #2 and #3 Total Volume
Reister #4 Total Volume
Lagrande Total Volume
Vann #1 Total Volume


Glenn-Colusa Irrigation District
Groundwater Production Well Flow Rate & Volumes
Instantaneous Flow Rate (gpm)
Cumulative Totalizer Volume (acre-feet)
Date
5/1/15
5/31/15
6/30/15
7/30/15
8/29/15
9/28/15
10/28/15
Vann #2 Pumping Rate
Haymen Pumping Rate
La Croix #1, #2 & #3 Pumping Rate
Vann #2 Total Volume
Haymen Total Volume
La Croix #1, #2 & #3 Total Volume

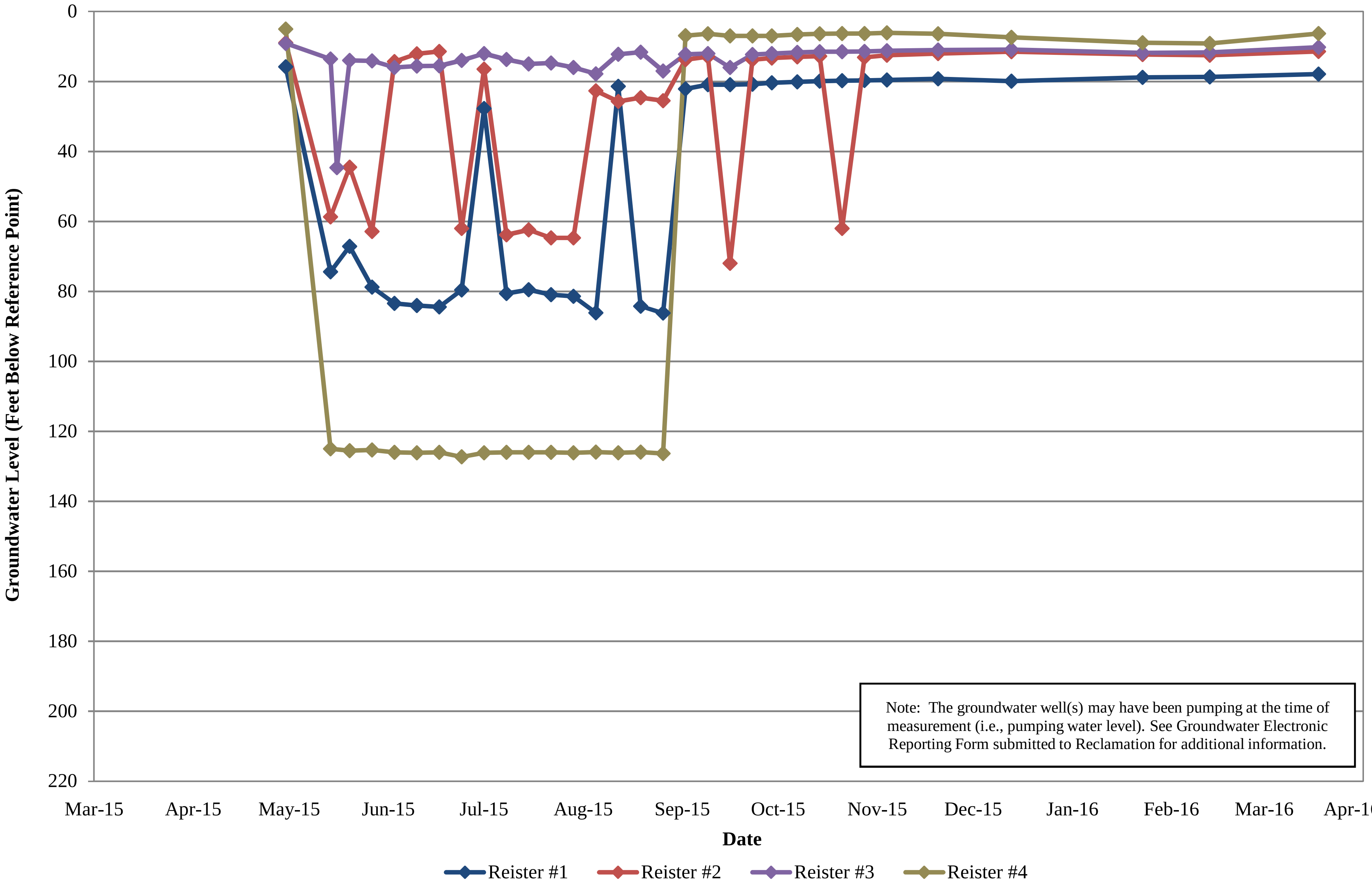


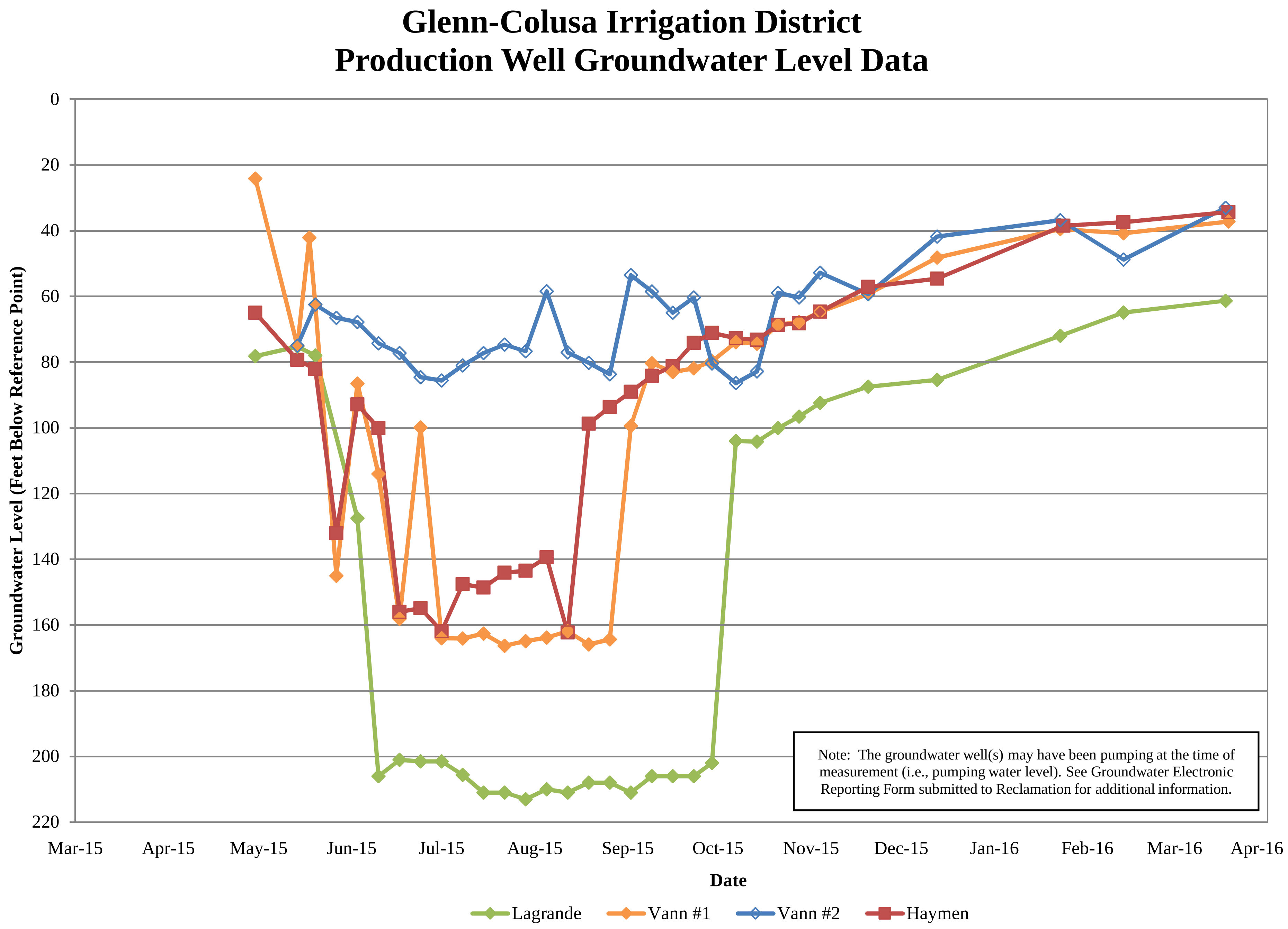
Glenn-Colusa Irrigation District
Groundwater Production Well Flow Rate & Volumes
Instantaneous Flow Rate (gpm)
Cumulative Totalizer Volume (acre-feet)
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
2,200
2,400
2,600
0
200
400
600
800
1,000
1,200
1,400
5/1/15
5/31/15
6/30/15
7/30/15
8/29/15
9/28/15
10/28/15
Date
15 3 22H 3 Pumping Rate
17 2 6B 1 Pumping Rate
GRS 22H 1 Pumping Rate
GRS 34N 1 Pumping Rate
15 3 22H 3 Total Volume
17 2 6B 1 Total Volume
GRS 22H 1 Total Volume
GRS 34N 1 Total Volume



Glenn-Colusa Irrigation District
Groundwater Production Well Flow Rate & Volumes
Instantaneous Flow Rate (gpm)
Cumulative Totalizer Volume (acre-feet)
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
2,200
2,400
2,600
2,800
3,000
3,200
3,400
3,600
3,800
4,000
100
300
500
700
900
1,100
1,300
1,500
1,700
1,900
2,100
2,300
5/1/15
5/31/15
6/30/15
7/30/15
8/29/15
9/28/15
10/28/15
Date
GRS 35A 2 Pumping Rate
GRS 84A 1 Pumping Rate
GRS 35A 2 Total Volume
GRS 84A 1 Total Volume

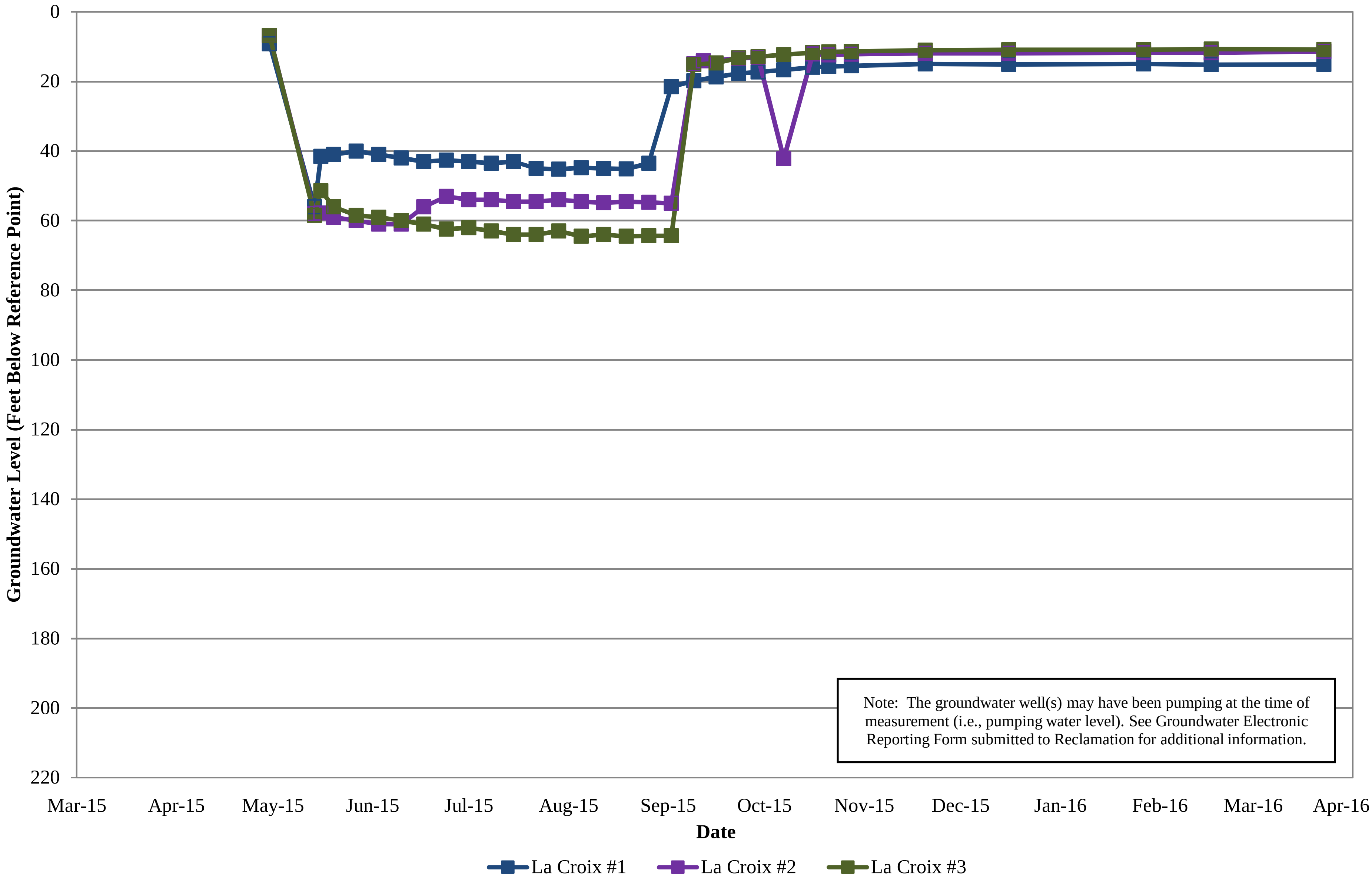
Glenn-Colusa Irrigation District
Production Well Groundwater Level Data



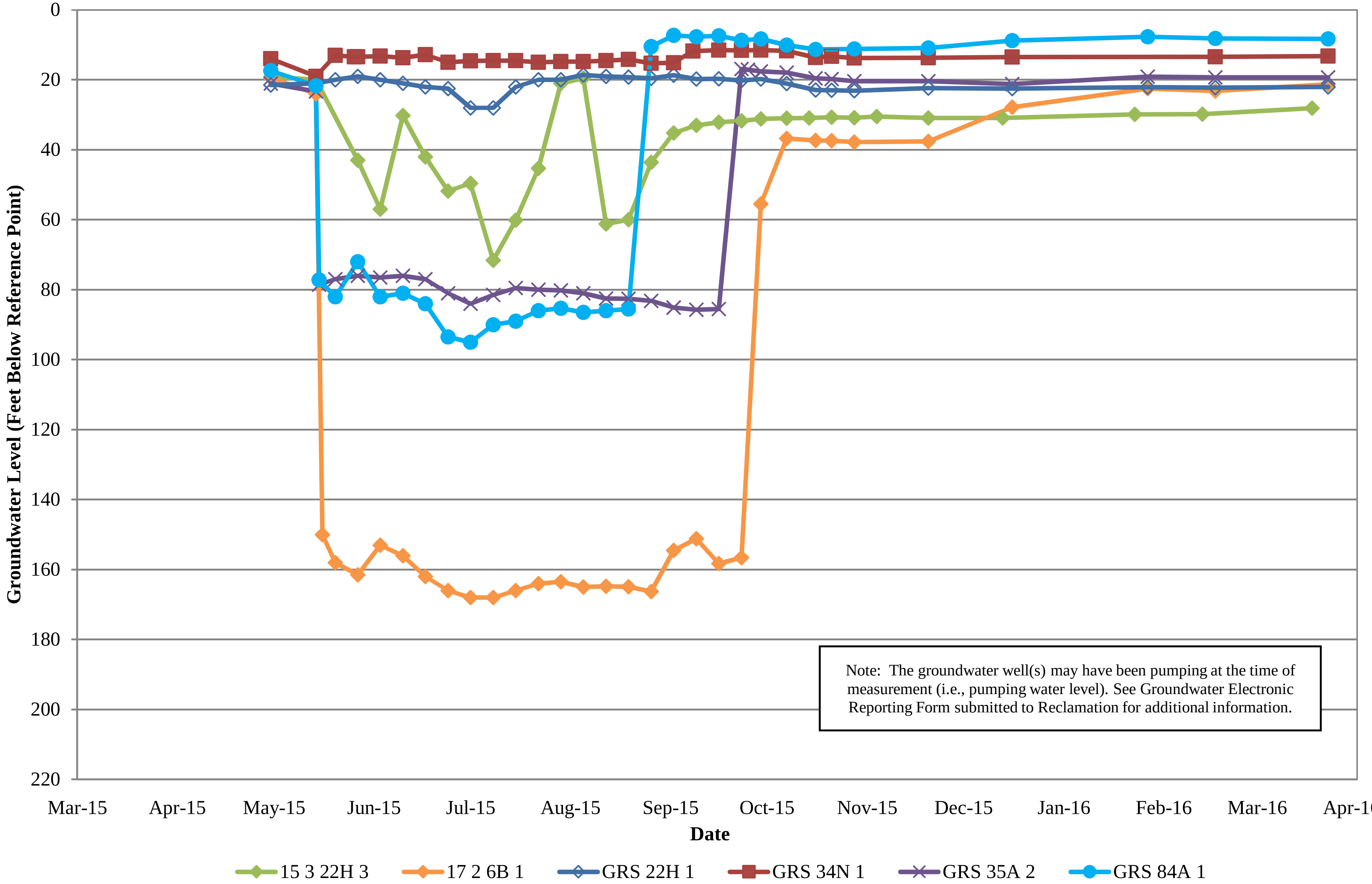


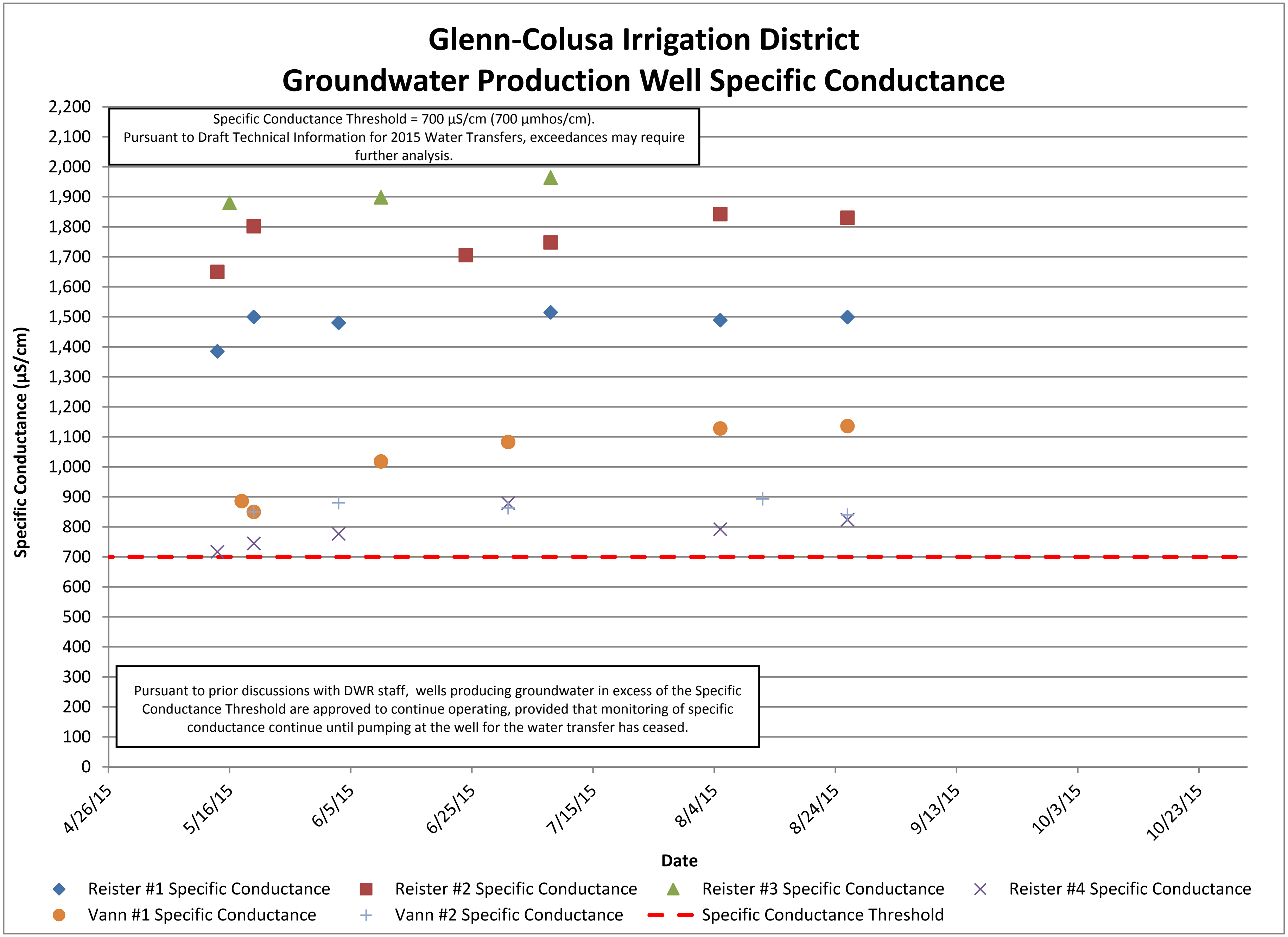
Glenn-Colusa Irrigation District
Production Well Groundwater Level Data
Groundwater Level (Feet Below Reference Point)
0
20
40
60
80
100
120
140
160
180
200
220
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Date
Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.
Lagrande
Vann #1
Vann #2
Haymen

Glenn-Colusa Irrigation District
Production Well Groundwater Level Data

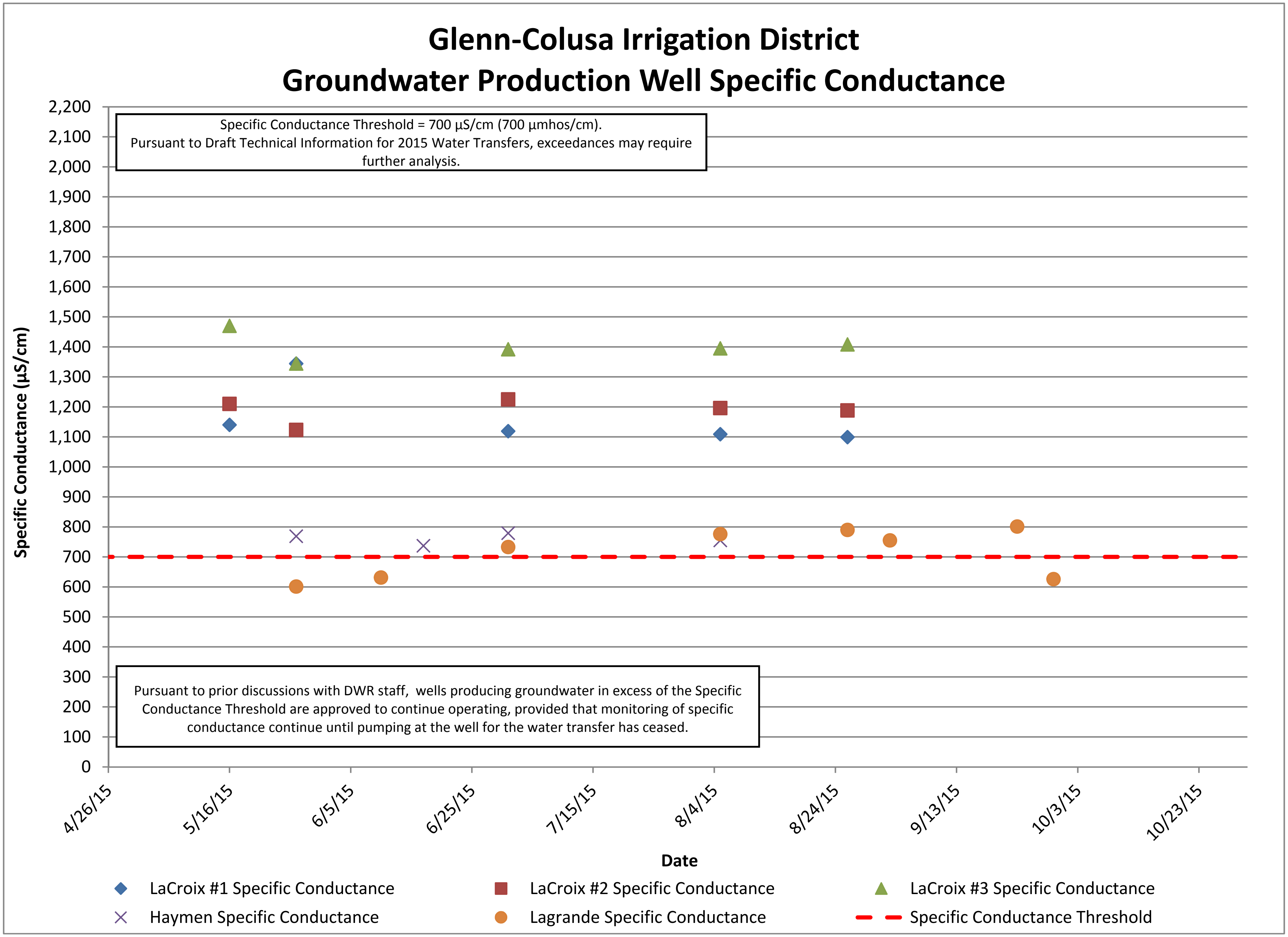


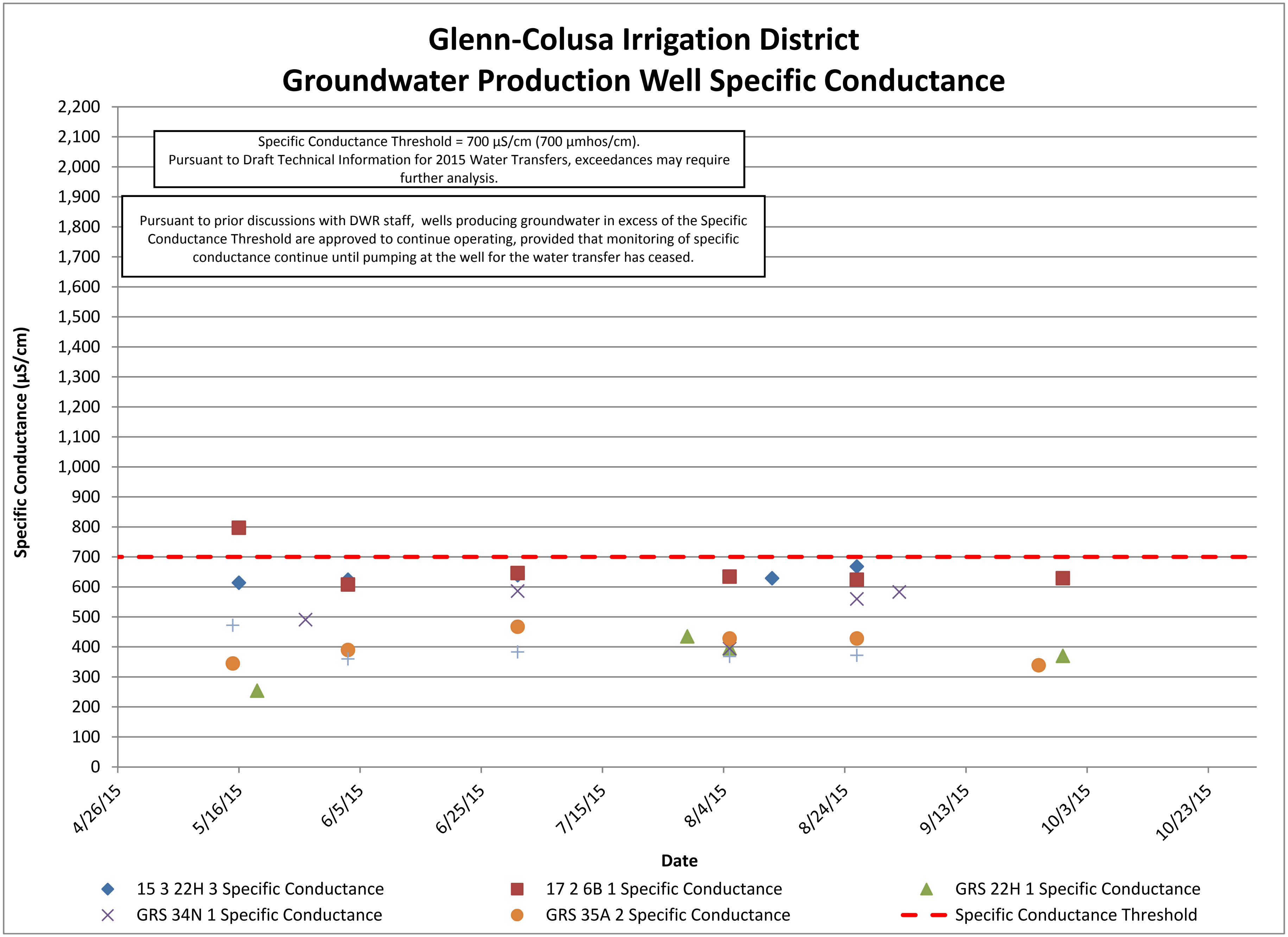
Glenn-Colusa Irrigation District
Production Well Groundwater Level Data





Glenn-Colusa Irrigation District
Groundwater Production Well Specific Conductance
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to Draft Technical Information for 2015 Water Transfers, exceedances may require further analysis.
Pursuant to prior discussions with DWR staff, wells producing groundwater in excess of the Specific Conductance Threshold are approved to continue operating, provided that monitoring of specific conductance continue until pumping at the well for the water transfer has ceased.
Specific Conductance (µS/cm)
2,200
2,100
2,000
1,900
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
4/26/15
5/16/15
6/5/15
6/25/15
7/15/15
8/4/15
8/24/15
9/13/15
10/3/15
10/23/15
Date
Reister #1 Specific Conductance
Reister #2 Specific Conductance
Reister #3 Specific Conductance
Reister #4 Specific Conductance
Vann #1 Specific Conductance
Vann #2 Specific Conductance
Specific Conductance Threshold


Glenn-Colusa Irrigation District
Groundwater Production Well Specific Conductance
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to Draft Technical Information for 2015 Water Transfers, exceedances may require further analysis.
Pursuant to prior discussions with DWR staff, wells producing groundwater in excess of the Specific Conductance Threshold are approved to continue operating, provided that monitoring of specific conductance continue until pumping at the well for the water transfer has ceased.
Specific Conductance (µS/cm)
2,200
2,100
2,000
1,900
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
4/26/15
5/16/15
6/5/15
6/25/15
7/15/15
8/4/15
8/24/15
9/13/15
10/3/15
10/23/15
Date
LaCroix #1 Specific Conductance
LaCroix #2 Specific Conductance
LaCroix #3 Specific Conductance
Haymen Specific Conductance
Lagrande Specific Conductance
Specific Conductance Threshold


Glenn-Colusa Irrigation District
Groundwater Production Well Specific Conductance
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to Draft Technical Information for 2015 Water Transfers, exceedances may require further analysis.
Pursuant to prior discussions with DWR staff, wells producing groundwater in excess of the Specific Conductance Threshold are approved to continue operating, provided that monitoring of specific conductance continue until pumping at the well for the water transfer has ceased.
Specific Conductance (µS/cm)
2,200
2,100
2,000
1,900
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
4/26/15
5/16/15
6/5/15
6/25/15
7/15/15
8/4/15
8/24/15
9/13/15
10/3/15
10/23/15
Date
15 3 22H 3 Specific Conductance
17 2 6B 1 Specific Conductance
GRS 22H 1 Specific Conductance
GRS 34N 1 Specific Conductance
GRS 35A 2 Specific Conductance
Specific Conductance Threshold

Garden Highway Mutual Water Company

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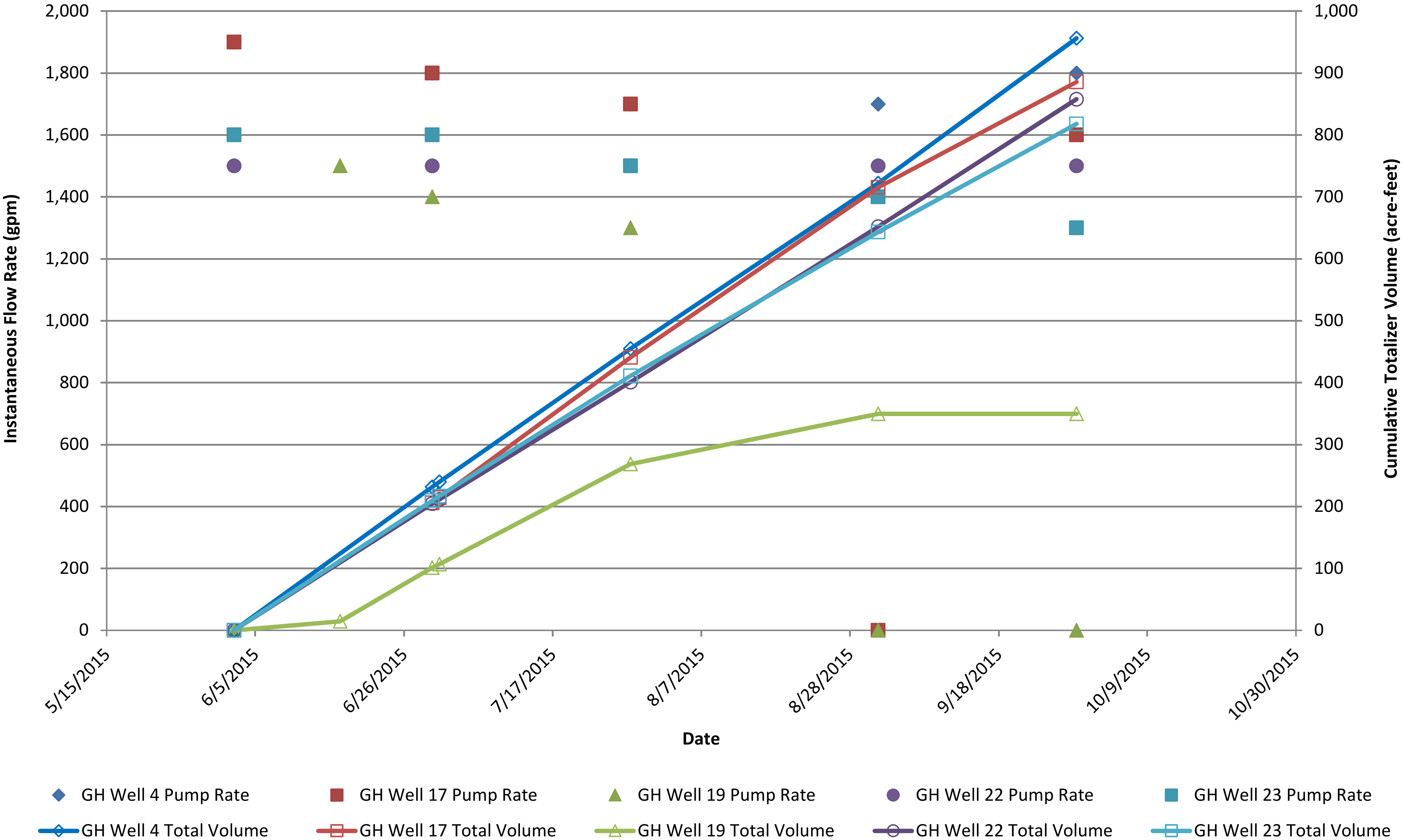
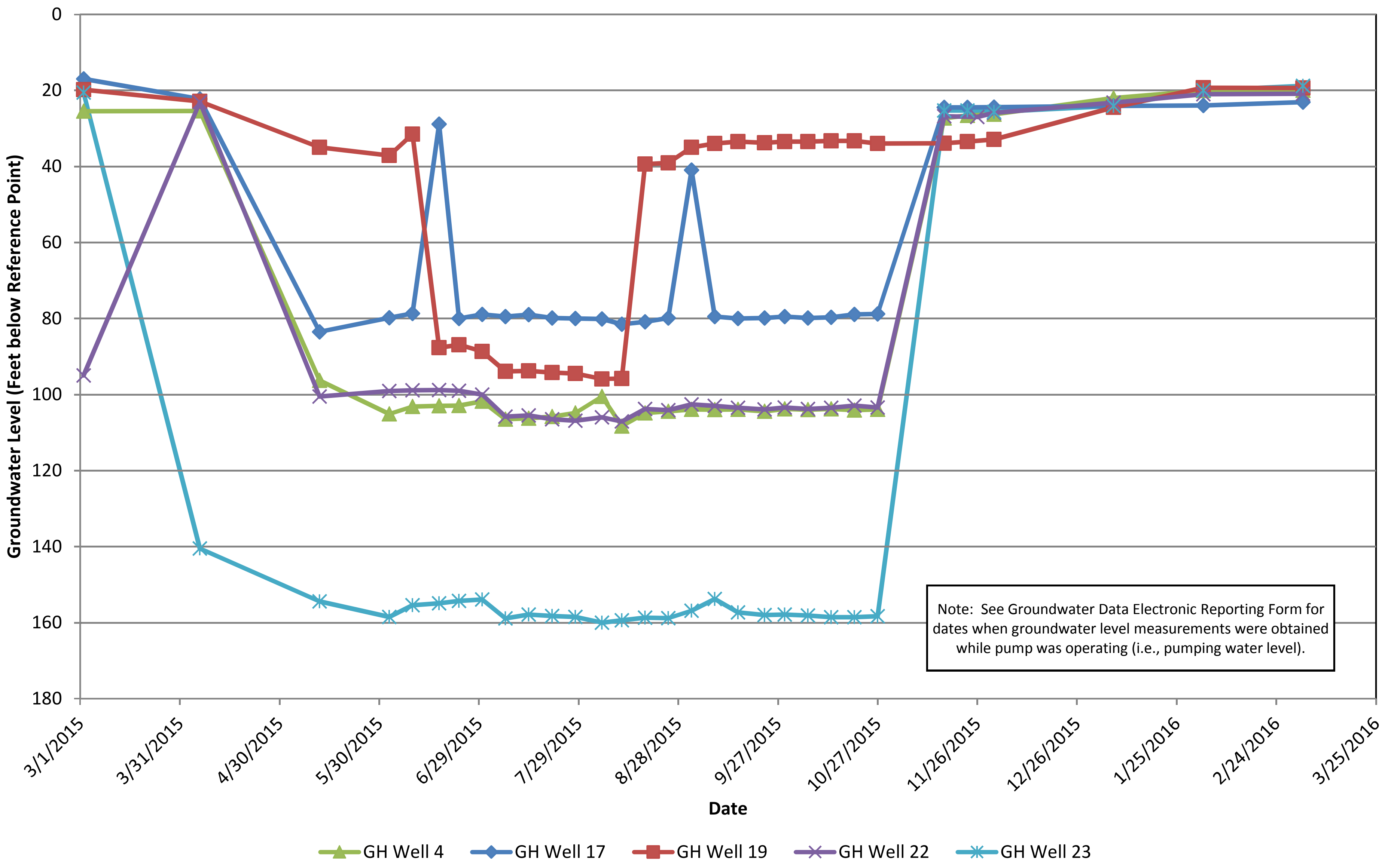
Figure 2
Garden Highway Mutual Water Company
Groundwater Production Well Flow Rates & Volumes



C:\Users\woodruffam\AppData\Local\Temp\Temp1_2015 WT Groundwater Data Electronic Reporting Forms 08.05.2016.zip\GHMWC Groundwater Data Electronic Reporting Form 05.31.2016.xlsx
Tab: Production Data

Figure 3A
Garden Highway Mutual Water Company
Production Well Groundwater Level Data



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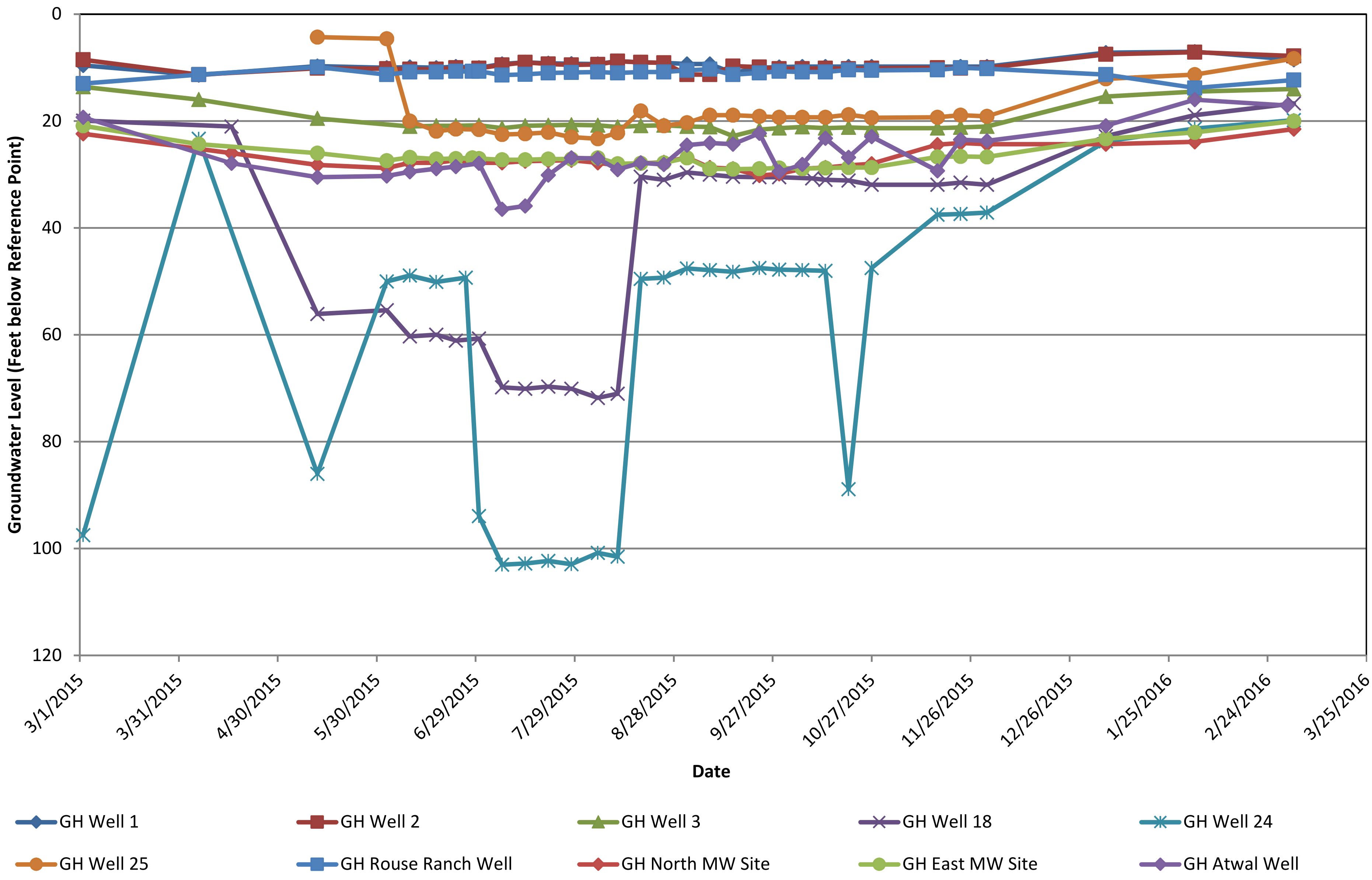
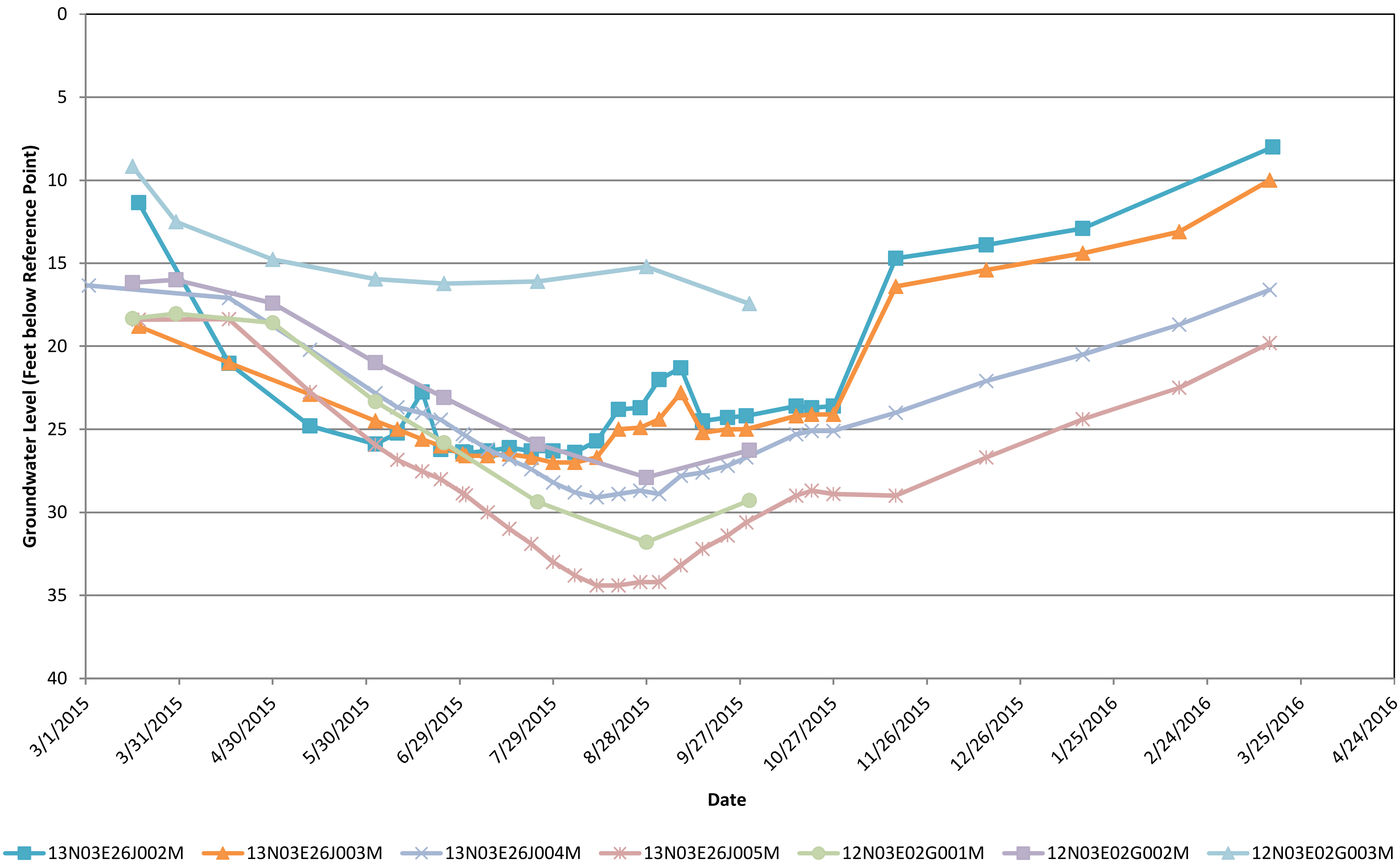
Tab: Pumping Water Levels

Figure 3B
Garden Highway Mutual Water Company
Monitoring Well Groundwater Level Data



C:\Users\woodruffam\AppData\Local\Temp\Temp1_2015 WT Groundwater Data Electronic Reporting Forms 08.05.2016.zip\GHMWC Groundwater Data Electronic Reporting Form 05.31.2016.xlsx
Tab: Monitoring Well Water Levels 1

Figure 3C
Garden Highway Mutual Water Company
Monitoring Well Groundwater Level Data



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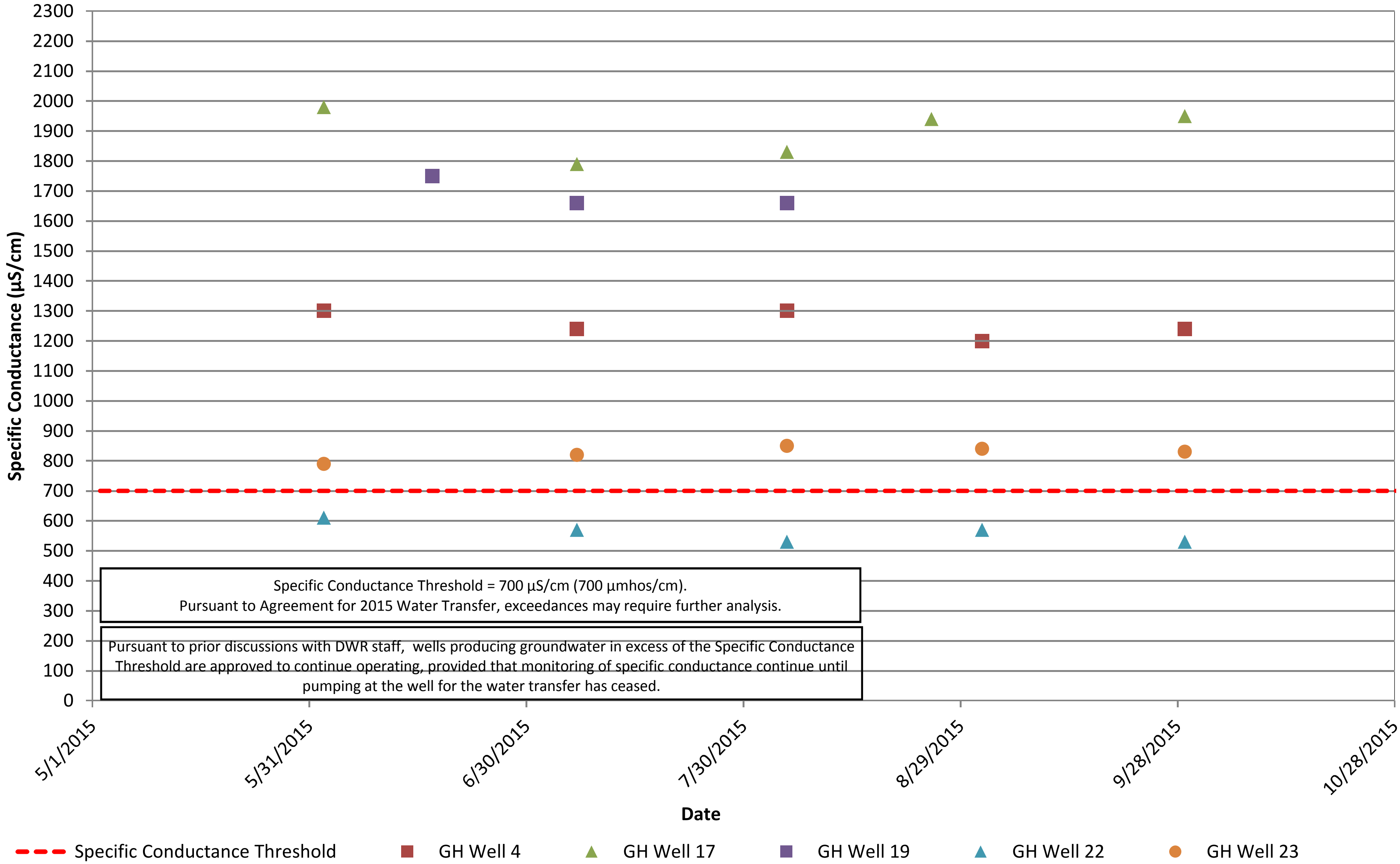
Tab: Monitoring Well Water Levels 2

Figure 7
Garden Highway Mutual Water Company
Groundwater Production Well Specific Conductance



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Tab: Water Quality Data

Natomas Central Mutual Water Company

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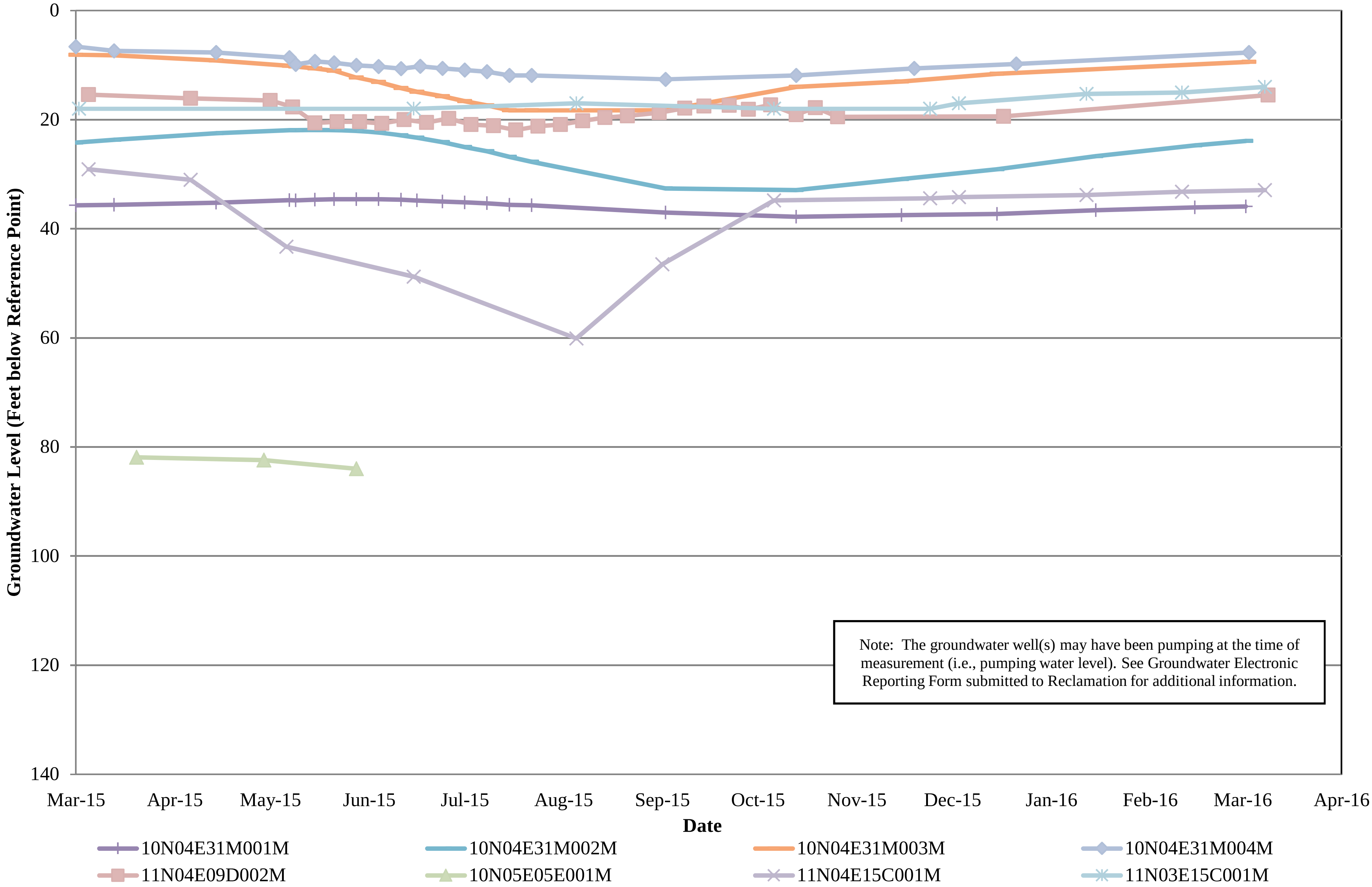
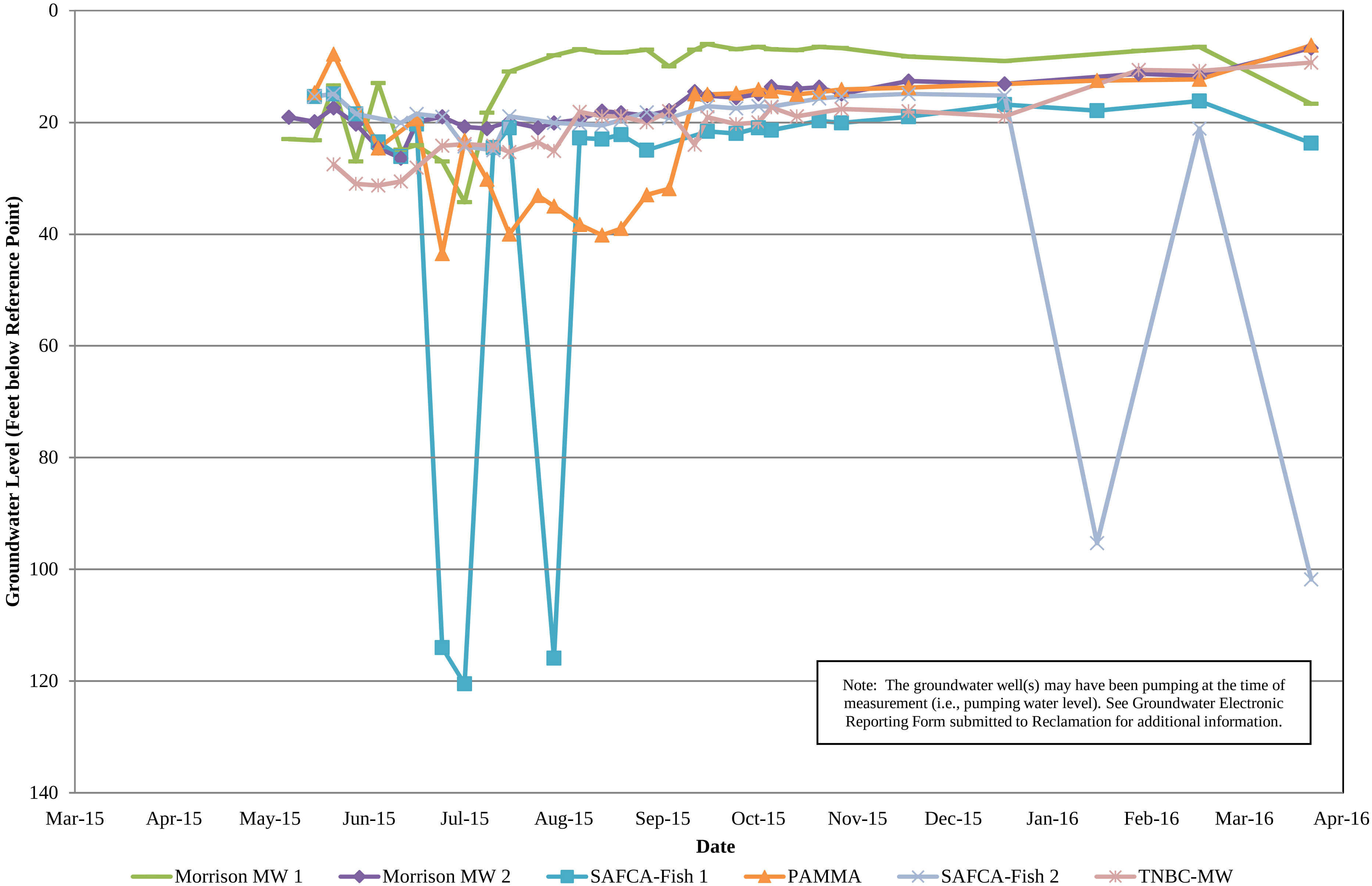
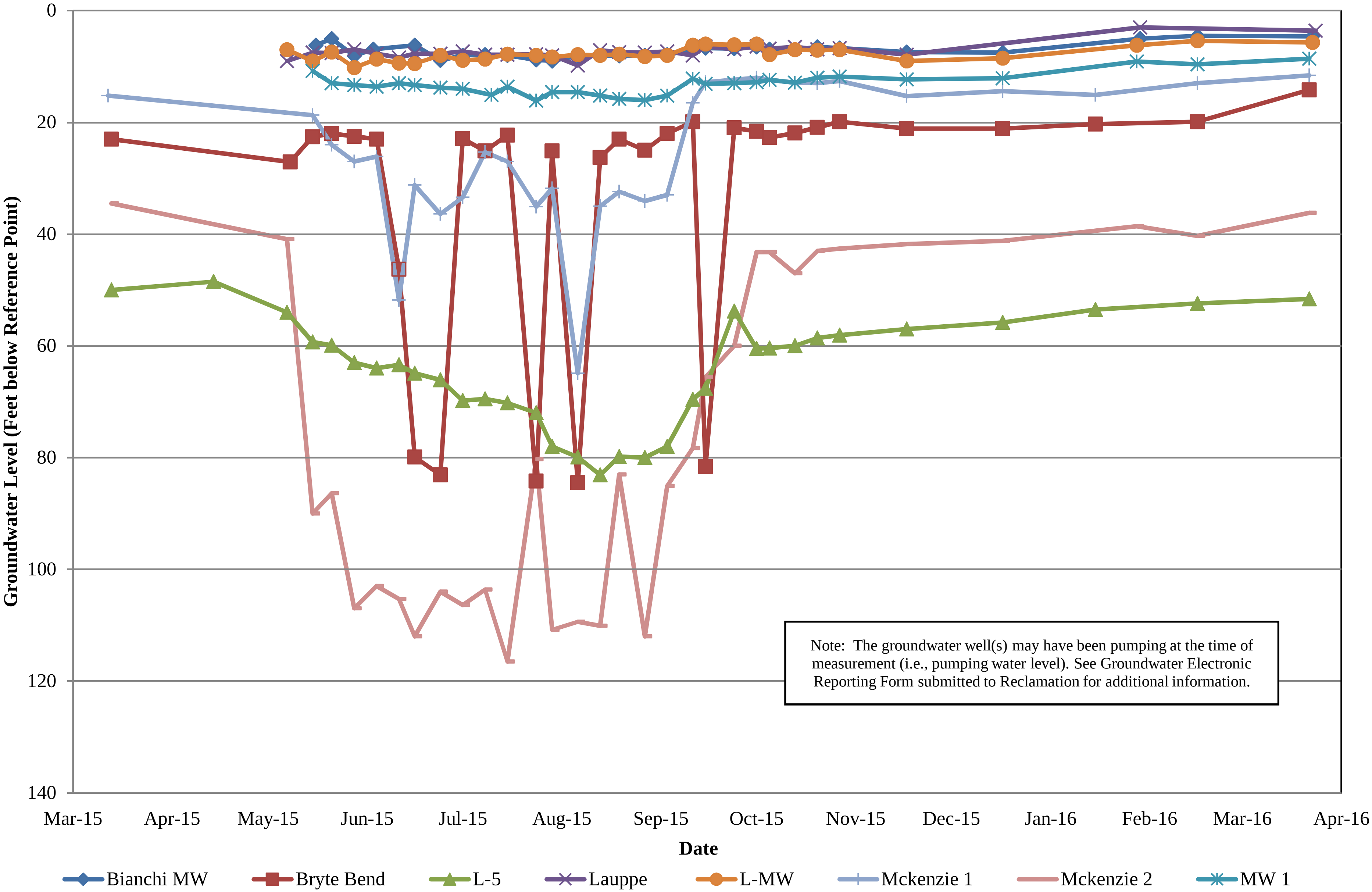
Natomas Central Mutual Water Company
DWR Monitoring Well Groundwater Level Data



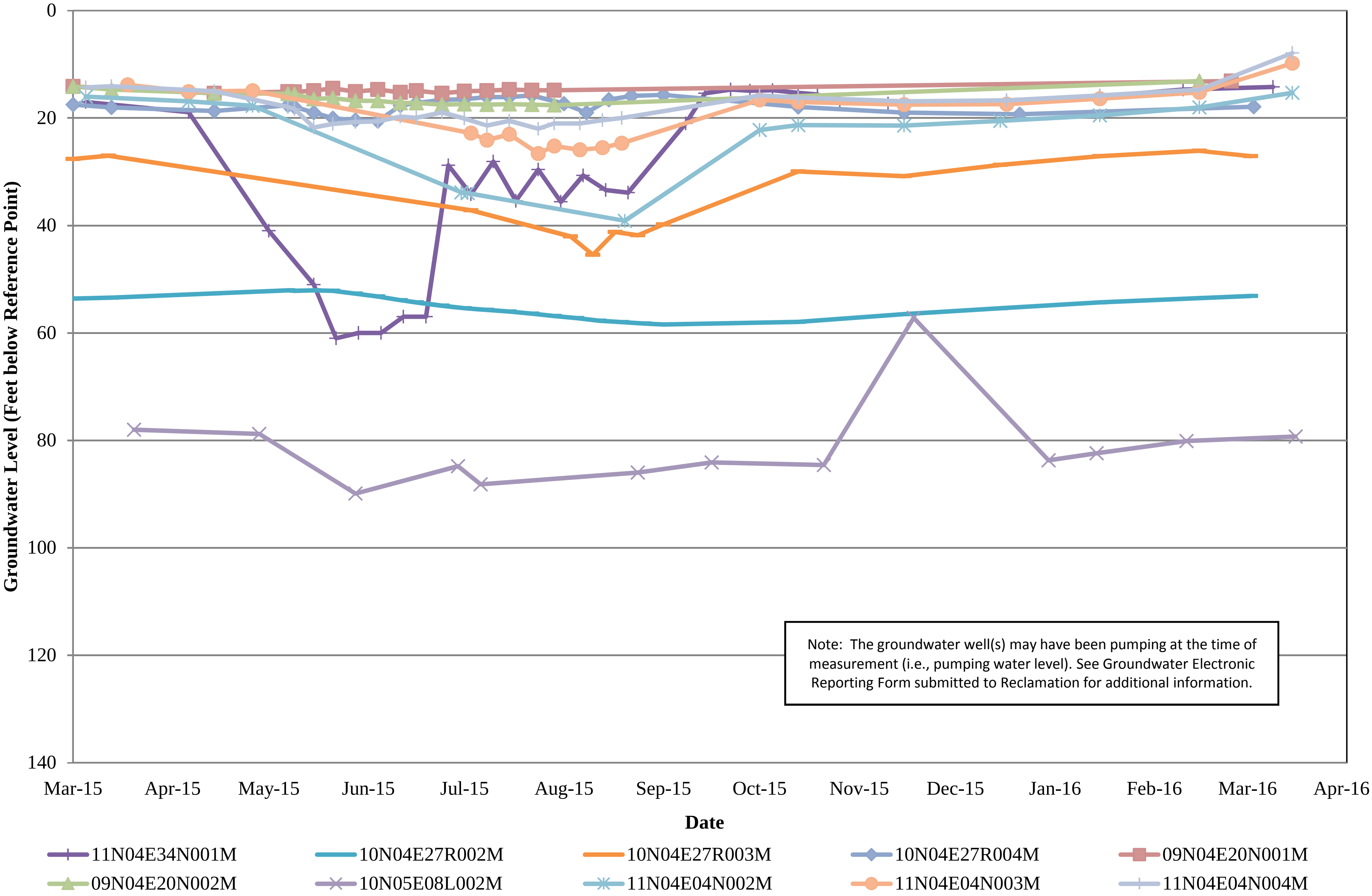
Natomas Central Mutual Water Company
Monitoring Well Groundwater Level Data

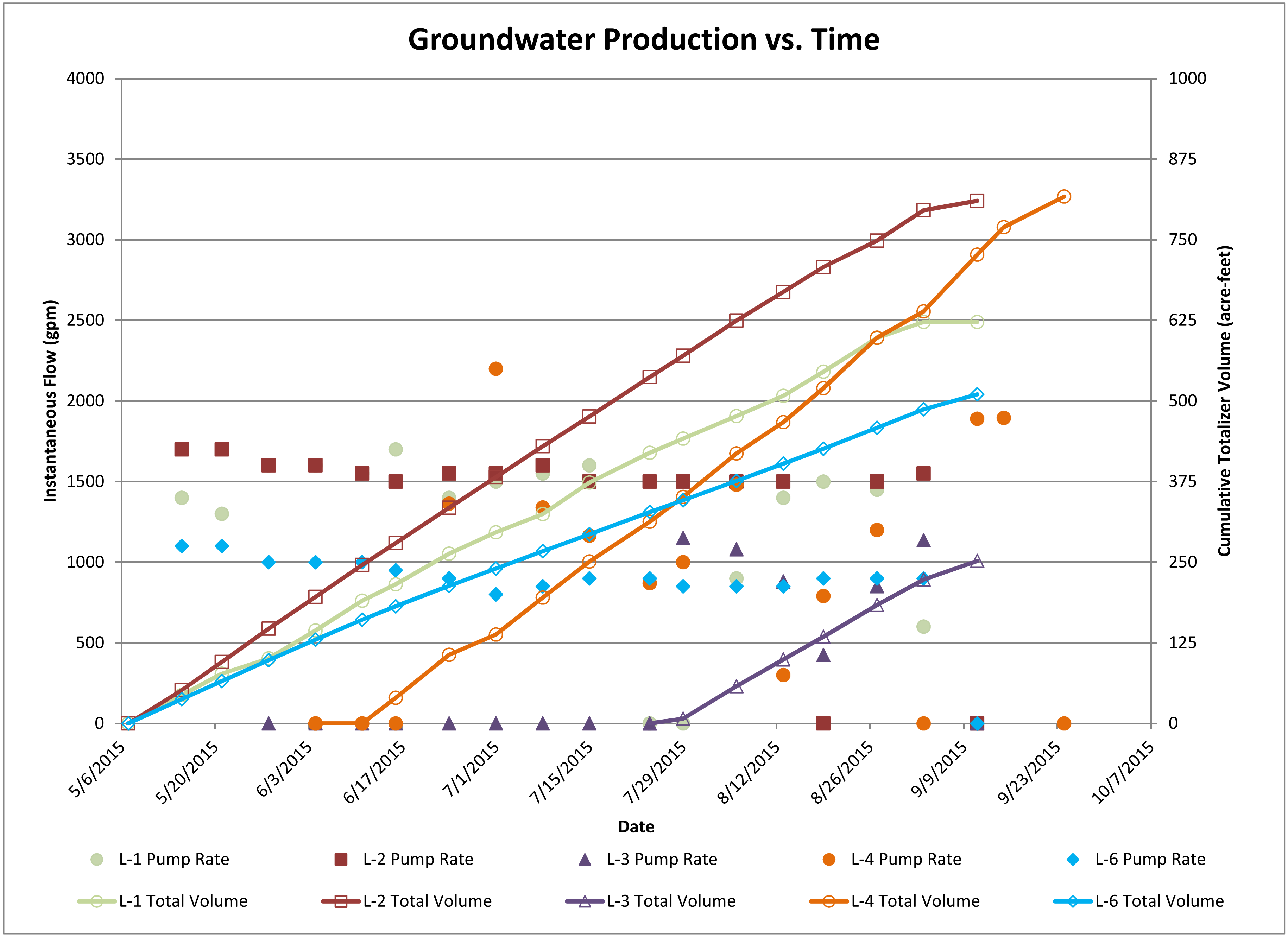


Natomas Central Mutual Water Company
Monitoring Well Groundwater Level Data

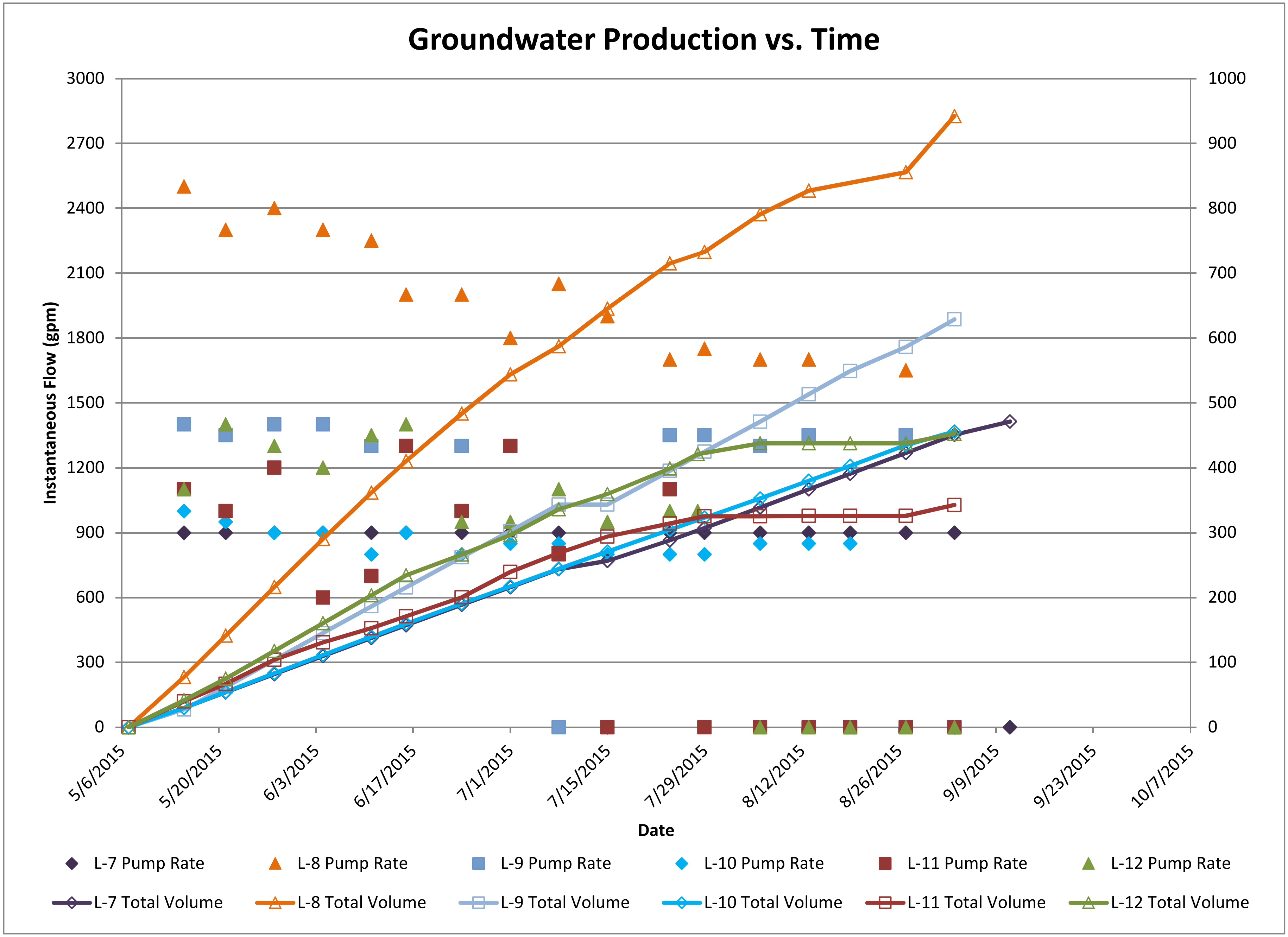


Natomas Central Mutual Water Company
DWR Monitoring Well Groundwater Level Data

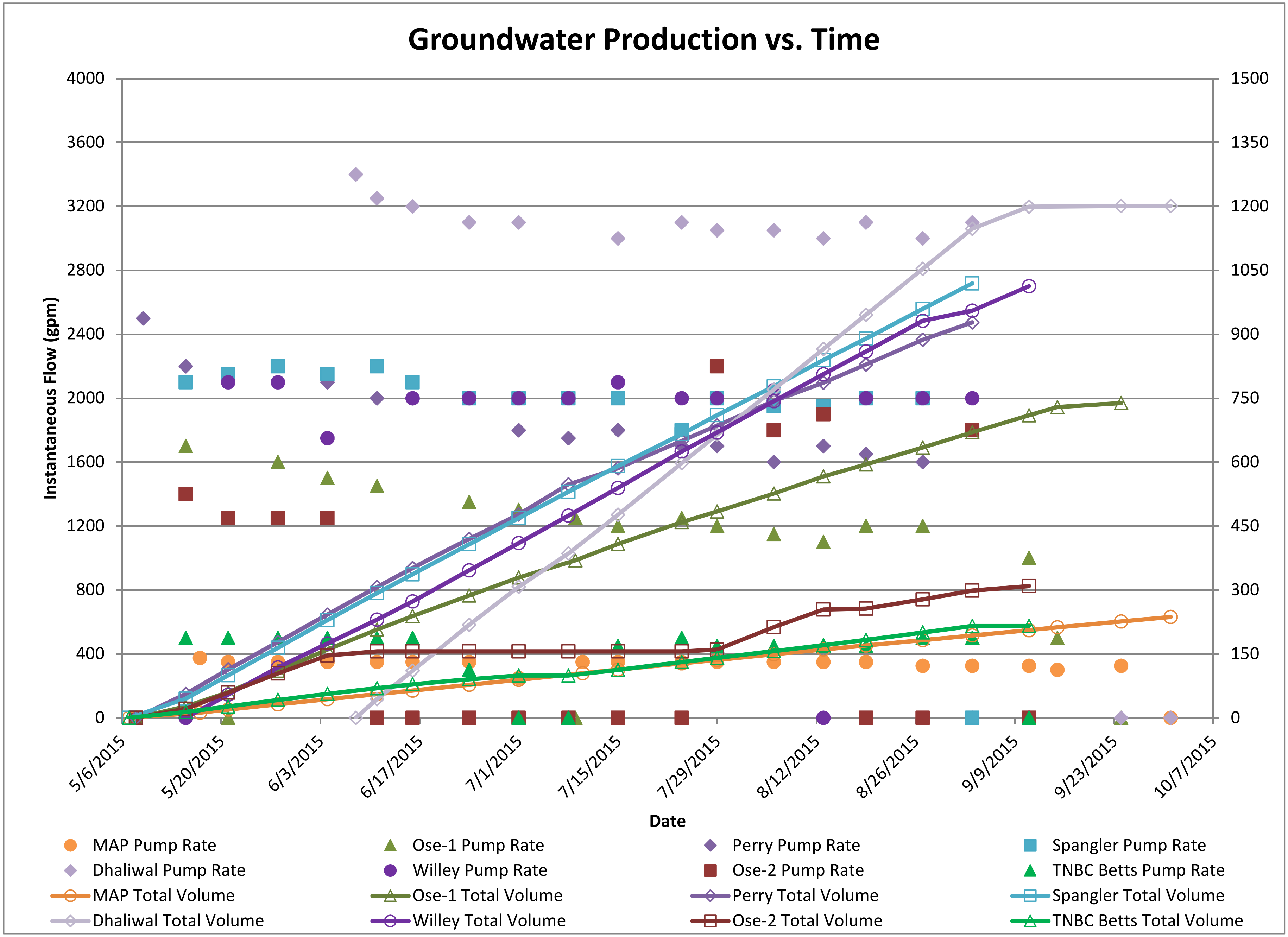




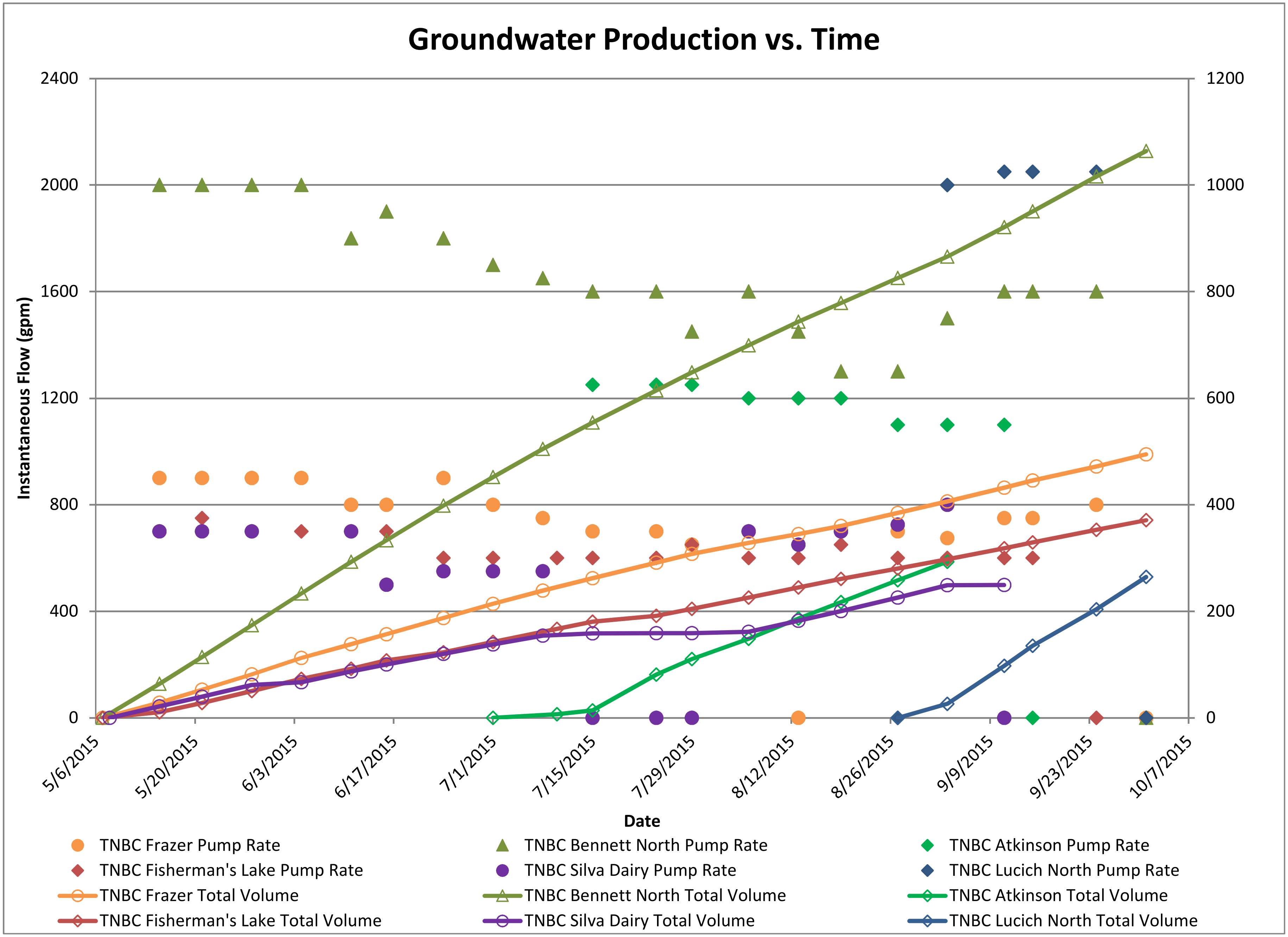
Groundwater Production vs. Time
Instantaneous Flow (gpm)
Cumulative Totalizer Volume (acre-feet)
4000
3500
3000
2500
2000
1500
1000
500
0
1000
875
750
625
500
375
250
125
0
5/6/2015
5/20/2015
6/3/2015
6/17/2015
7/1/2015
7/15/2015
7/29/2015
8/12/2015
8/26/2015
9/9/2015
9/23/2015
10/7/2015
Date
L-1 Pump Rate
L-2 Pump Rate
L-3 Pump Rate
L-4 Pump Rate
L-6 Pump Rate
L-1 Total Volume
L-2 Total Volume
L-3 Total Volume
L-4 Total Volume
L-6 Total Volume



Groundwater Production vs. Time
Instantaneous Flow (gpm)
3000
2700
2400
2100
1800
1500
1200
900
600
300
0
1000
900
800
700
600
500
400
300
200
100
0
5/6/2015
5/20/2015
6/3/2015
6/17/2015
7/1/2015
7/15/2015
7/29/2015
8/12/2015
8/26/2015
9/9/2015
9/23/2015
10/7/2015
Date
L-7 Pump Rate
L-8 Pump Rate
L-9 Pump Rate
L-10 Pump Rate
L-11 Pump Rate
L-12 Pump Rate
L-7 Total Volume
L-8 Total Volume
L-9 Total Volume
L-10 Total Volume
L-11 Total Volume
L-12 Total Volume

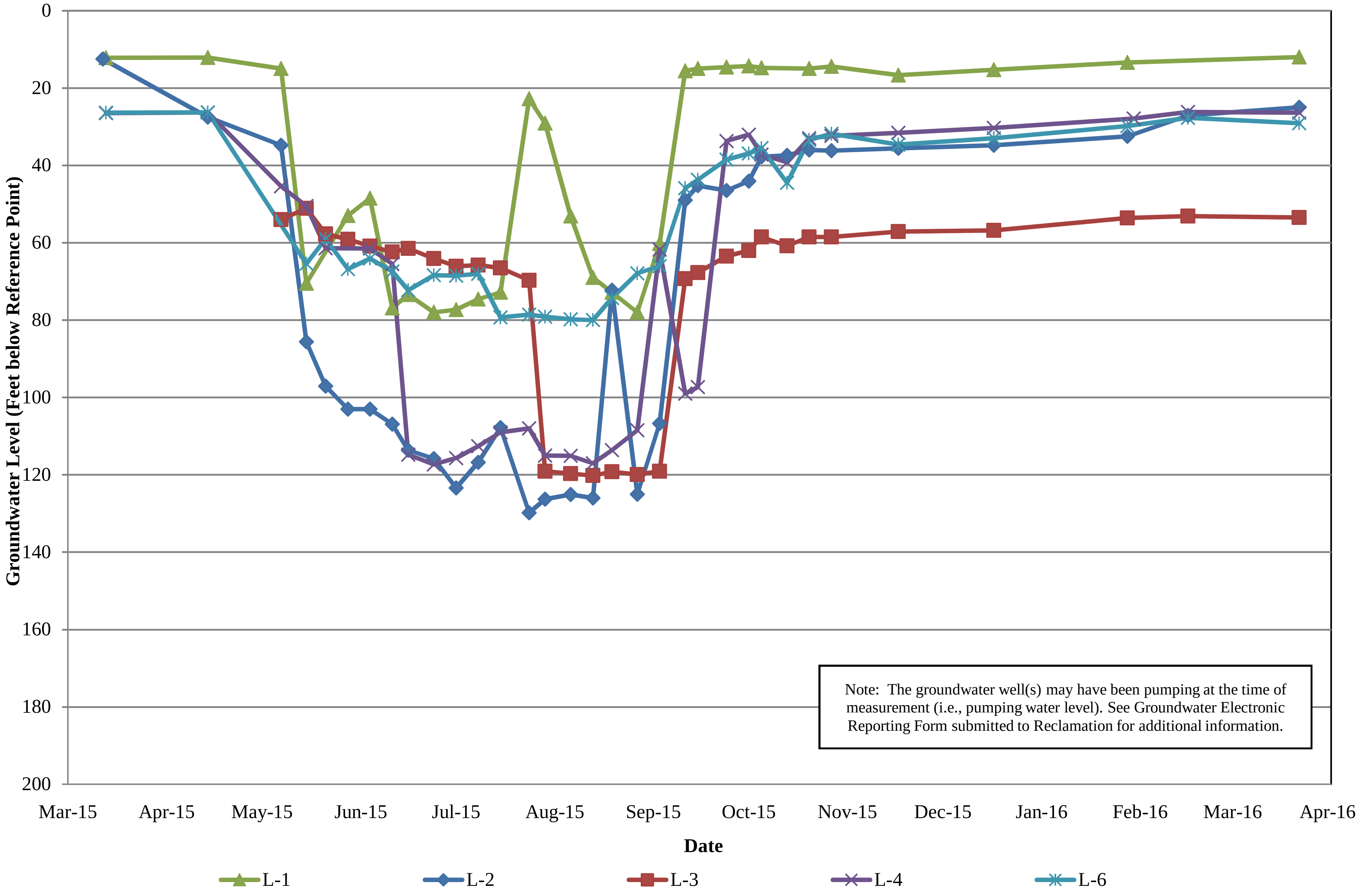


Groundwater Production vs. Time
Instantaneous Flow (gpm)
4000
3600
3200
2800
2400
2000
1600
1200
800
400
0
1500
1350
1200
1050
900
750
600
450
300
150
0
5/6/2015
5/20/2015
6/3/2015
6/17/2015
7/1/2015
7/15/2015
7/29/2015
8/12/2015
8/26/2015
9/9/2015
9/23/2015
10/7/2015
Date
MAP Pump Rate
Ose-1 Pump Rate
Perry Pump Rate
Spangler Pump Rate
Dhaliwal Pump Rate
Willey Pump Rate
Ose-2 Pump Rate
TNBC Betts Pump Rate
MAP Total Volume
Ose-1 Total Volume
Perry Total Volume
Spangler Total Volume
Dhaliwal Total Volume
Willey Total Volume
Ose-2 Total Volume
TNBC Betts Total Volume

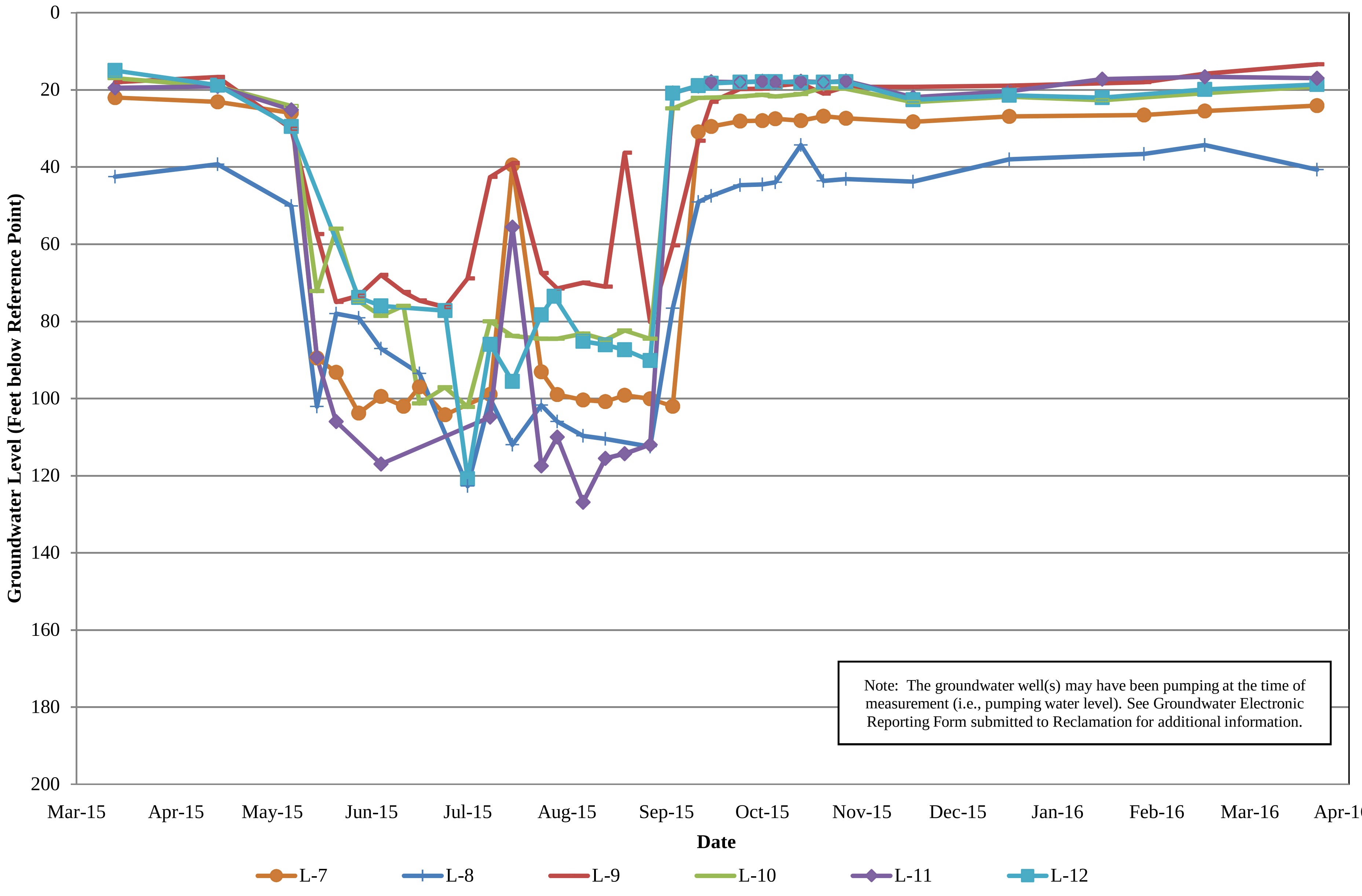


Groundwater Production vs. Time
Instantaneous Flow (gpm)
2400
2000
1600
1200
800
400
0
1200
1000
800
600
400
200
0
5/6/2015
5/20/2015
6/3/2015
6/17/2015
7/1/2015
7/15/2015
7/29/2015
8/12/2015
8/26/2015
9/9/2015
9/23/2015
10/7/2015
Date
TNBC Frazer Pump Rate
TNBC Bennett North Pump Rate
TNBC Atkinson Pump Rate
TNBC Fisherman's Lake Pump Rate
TNBC Silva Dairy Pump Rate
TNBC Lucich North Pump Rate
TNBC Frazer Total Volume
TNBC Bennett North Total Volume
TNBC Atkinson Total Volume
TNBC Fisherman's Lake Total Volume
TNBC Silva Dairy Total Volume
TNBC Lucich North Total Volume

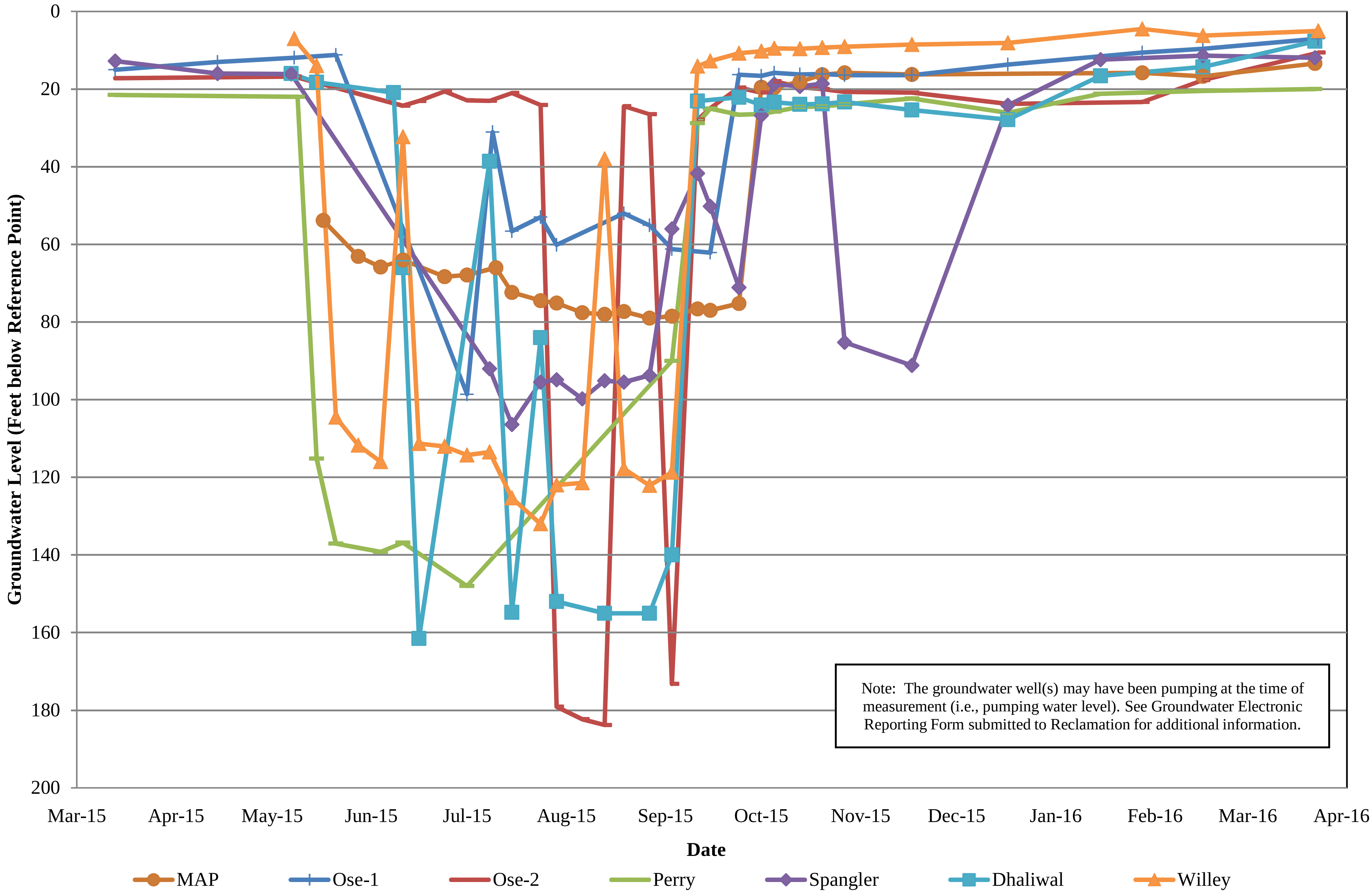
Natomas Central Mutual Water Company
Production Well Groundwater Level Data

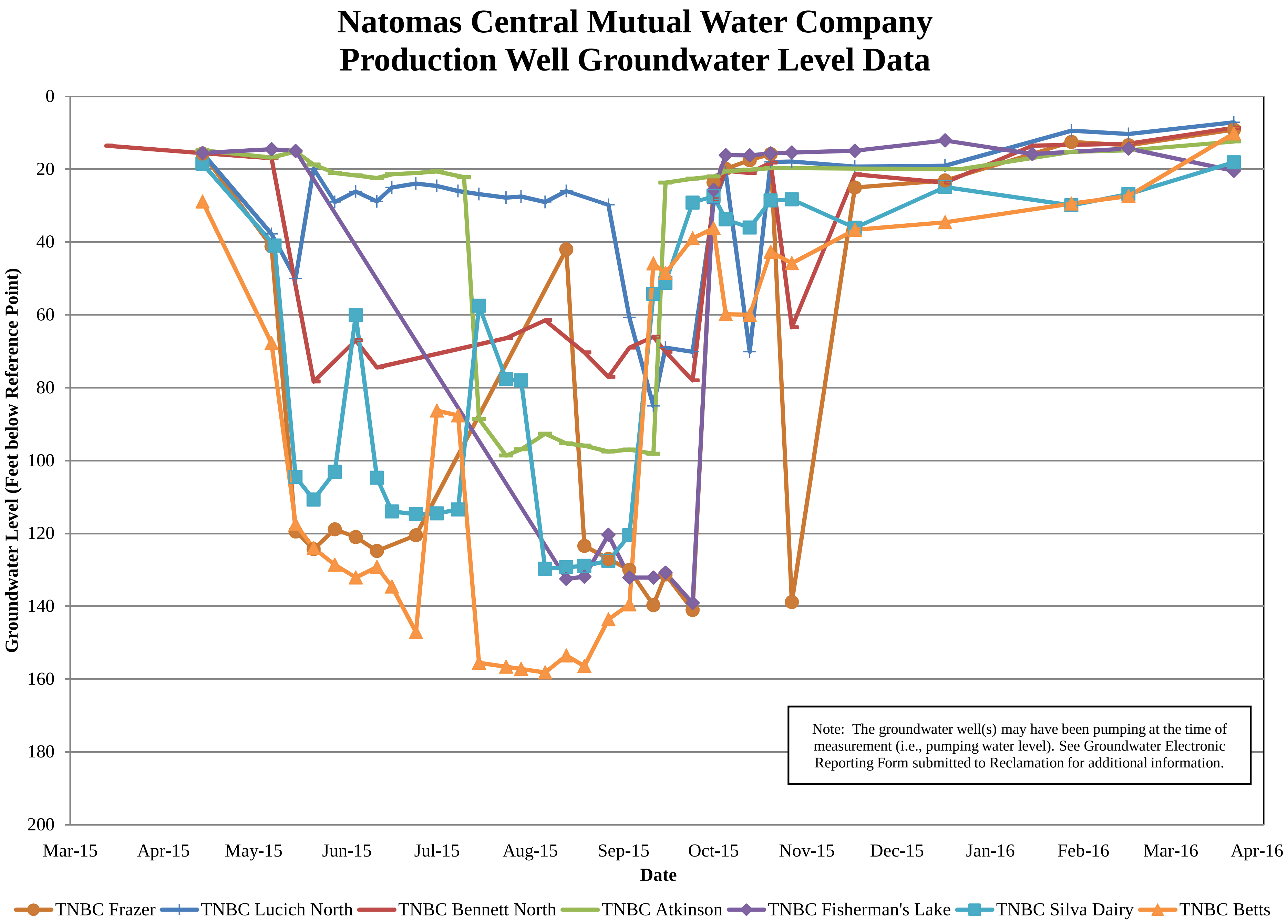


Natomas Central Mutual Water Company
Production Well Groundwater Level Data

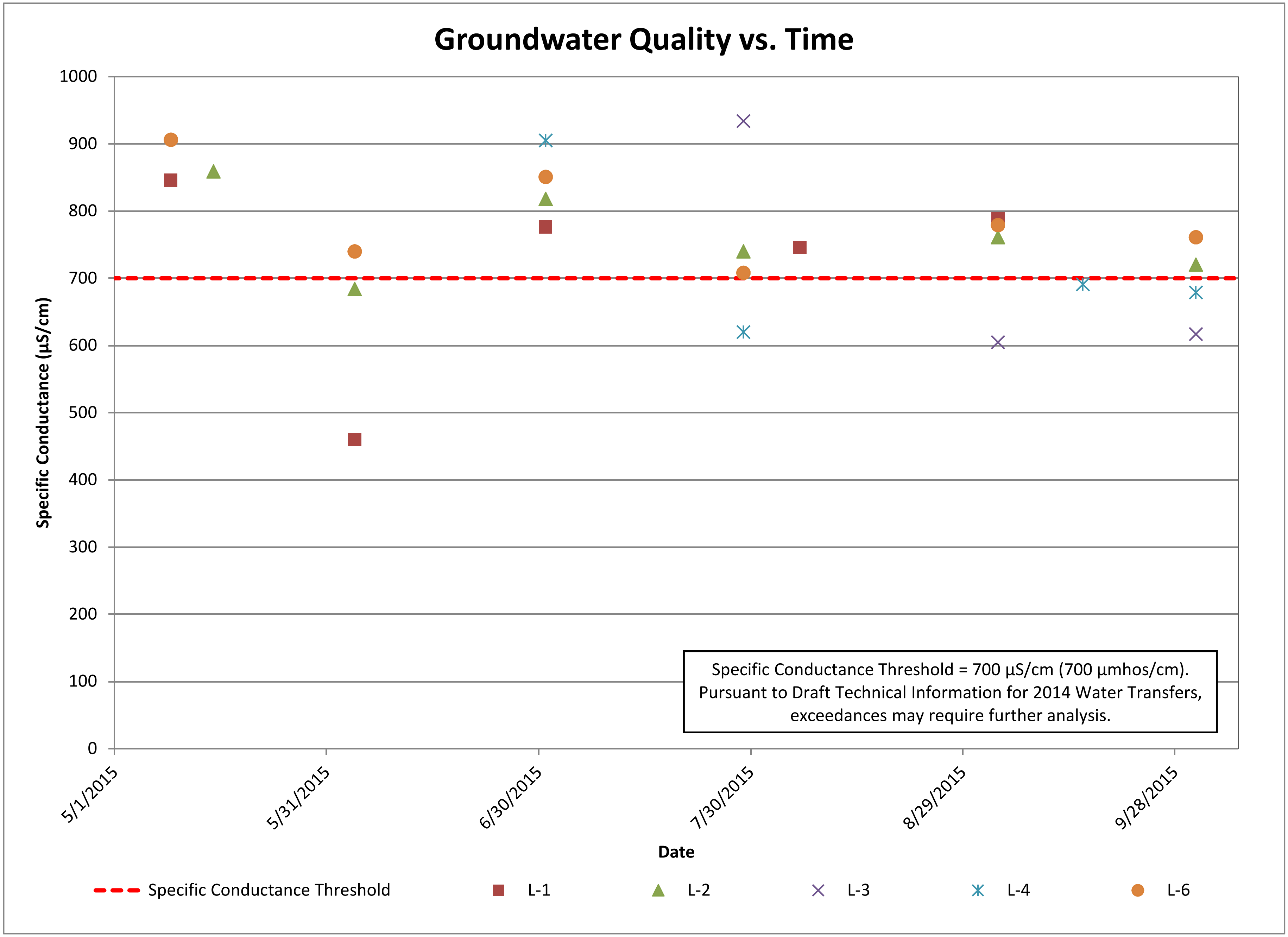


Natomas Central Mutual Water Company
Production Well Groundwater Level Data

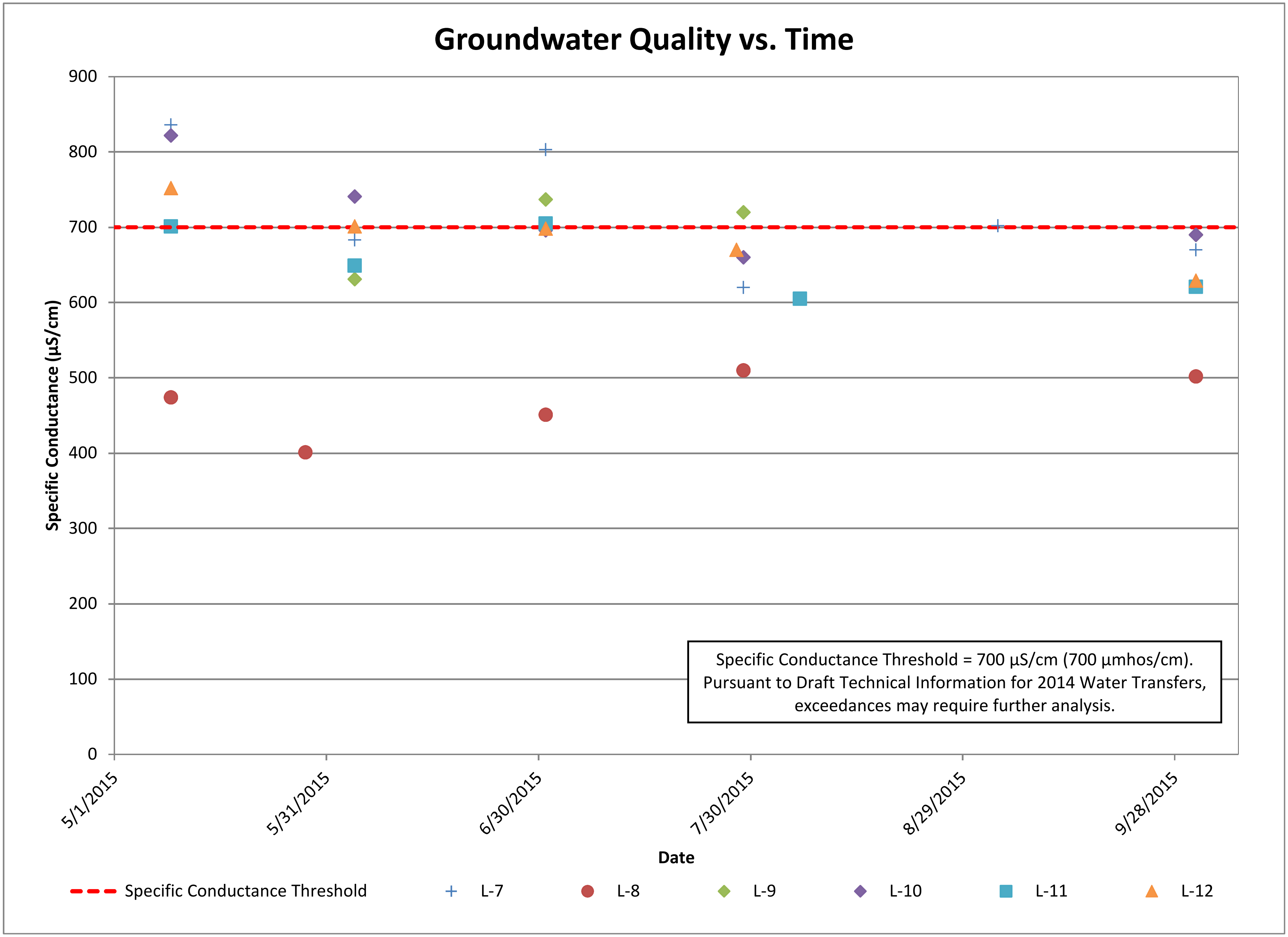




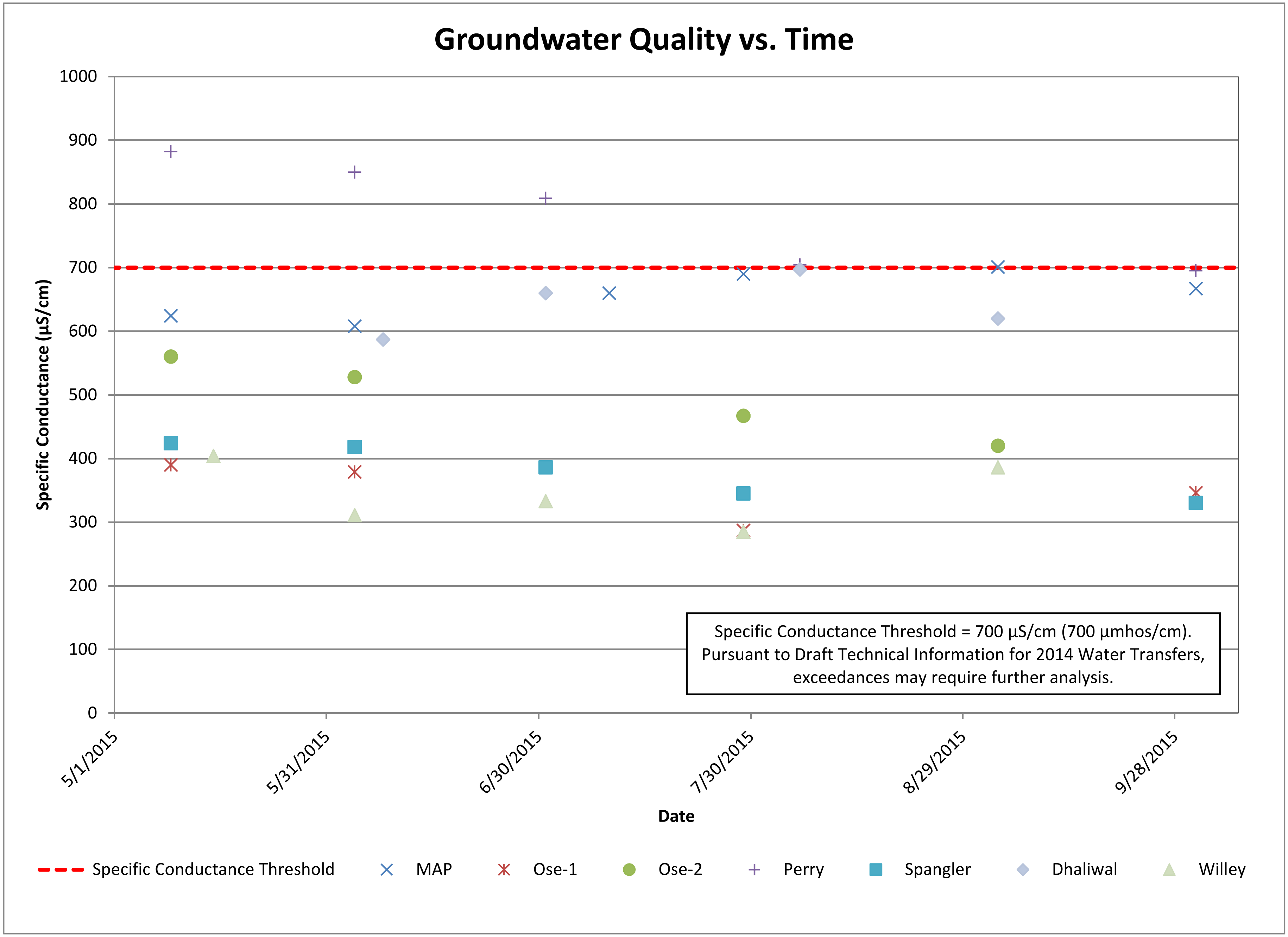
Natomas Central Mutual Water Company
Production Well Groundwater Level Data
Groundwater Level (Feet below Reference Point)
0
20
40
60
80
100
120
140
160
180
200
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Date
Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.
TNBC Frazer
TNBC Lucich North
TNBC Bennett North
TNBC Atkinson
TNBC Fisherman's Lake
TNBC Silva Dairy
TNBC Betts



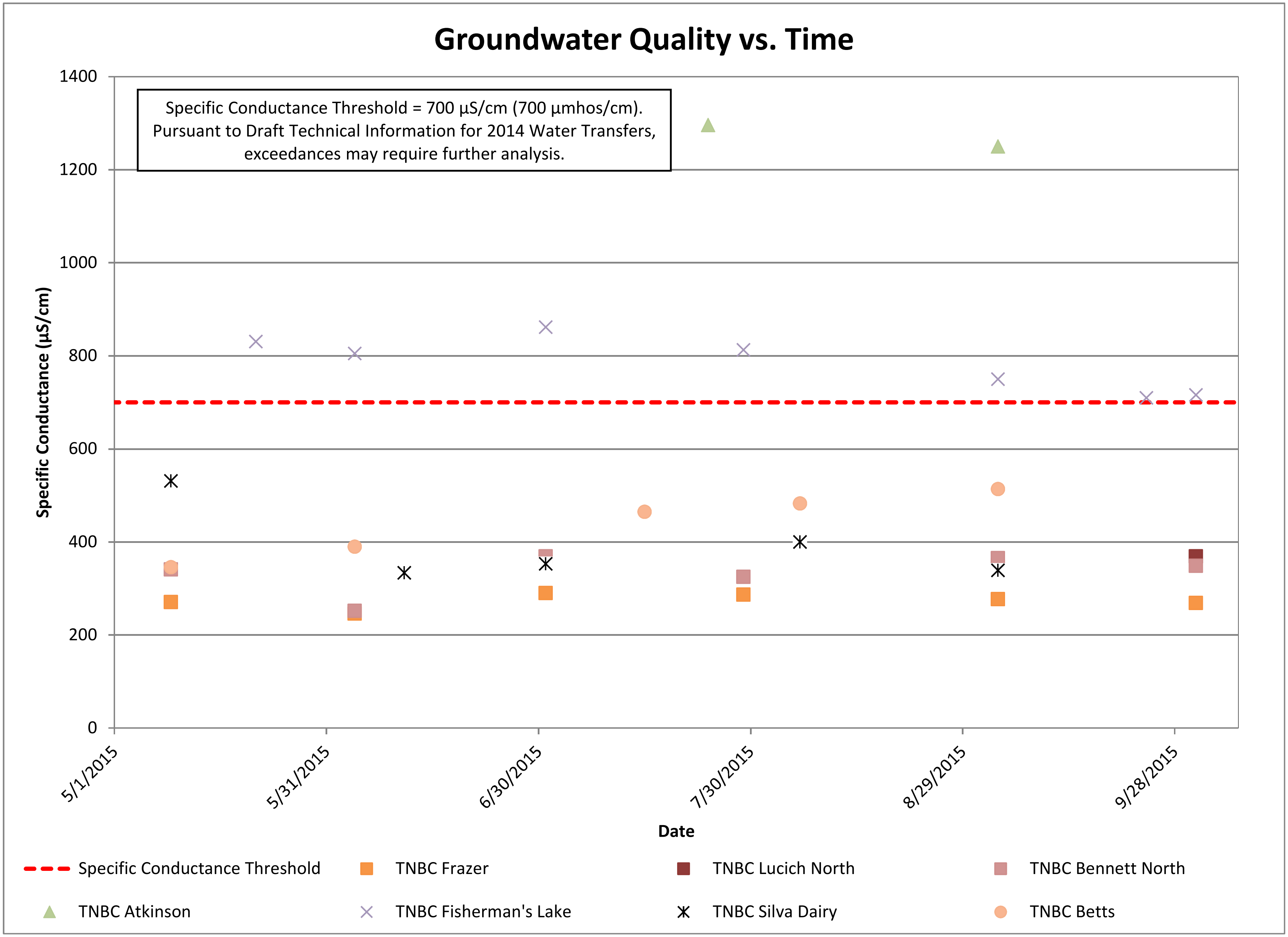
Groundwater Quality vs. Time
Specific Conductance (µS/cm)
1000
900
800
700
600
500
400
300
200
100
0
5/1/2015
5/31/2015
6/30/2015
7/30/2015
8/29/2015
9/28/2015
Date
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm). Pursuant to Draft Technical Information for 2014 Water Transfers, exceedances may require further analysis.
Specific Conductance Threshold
L-1
L-2
L-3
L-4
L-6



Groundwater Quality vs. Time
900
800
700
600
500
400
300
200
100
0
Specific Conductance (µS/cm)
5/1/2015
5/31/2015
6/30/2015
7/30/2015
8/29/2015
9/28/2015
Date
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to Draft Technical Information for 2014 Water Transfers,
exceedances may require further analysis.
Specific Conductance Threshold
L-7
L-8
L-9
L-10
L-11
L-12



Groundwater Quality vs. Time
Specific Conductance (µS/cm)
1000
900
800
700
600
500
400
300
200
100
0
5/1/2015
5/31/2015
6/30/2015
7/30/2015
8/29/2015
9/28/2015
Date
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm). Pursuant to Draft Technical Information for 2014 Water Transfers, exceedances may require further analysis.
Specific Conductance Threshold
MAP
Ose-1
Ose-2
Perry
Spangler
Dhaliwal
Willey



Groundwater Quality vs. Time
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to Draft Technical Information for 2014 Water Transfers,
exceedances may require further analysis.
Specific Conductance (µS/cm)
1400
1200
1000
800
600
400
200
0
5/1/2015
5/31/2015
6/30/2015
7/30/2015
8/29/2015
9/28/2015
Date
Specific Conductance Threshold
TNBC Frazer
TNBC Lucich North
TNBC Bennett North
TNBC Atkinson
TNBC Fisherman's Lake
TNBC Silva Dairy
TNBC Betts

Pelger Mutual Water Company

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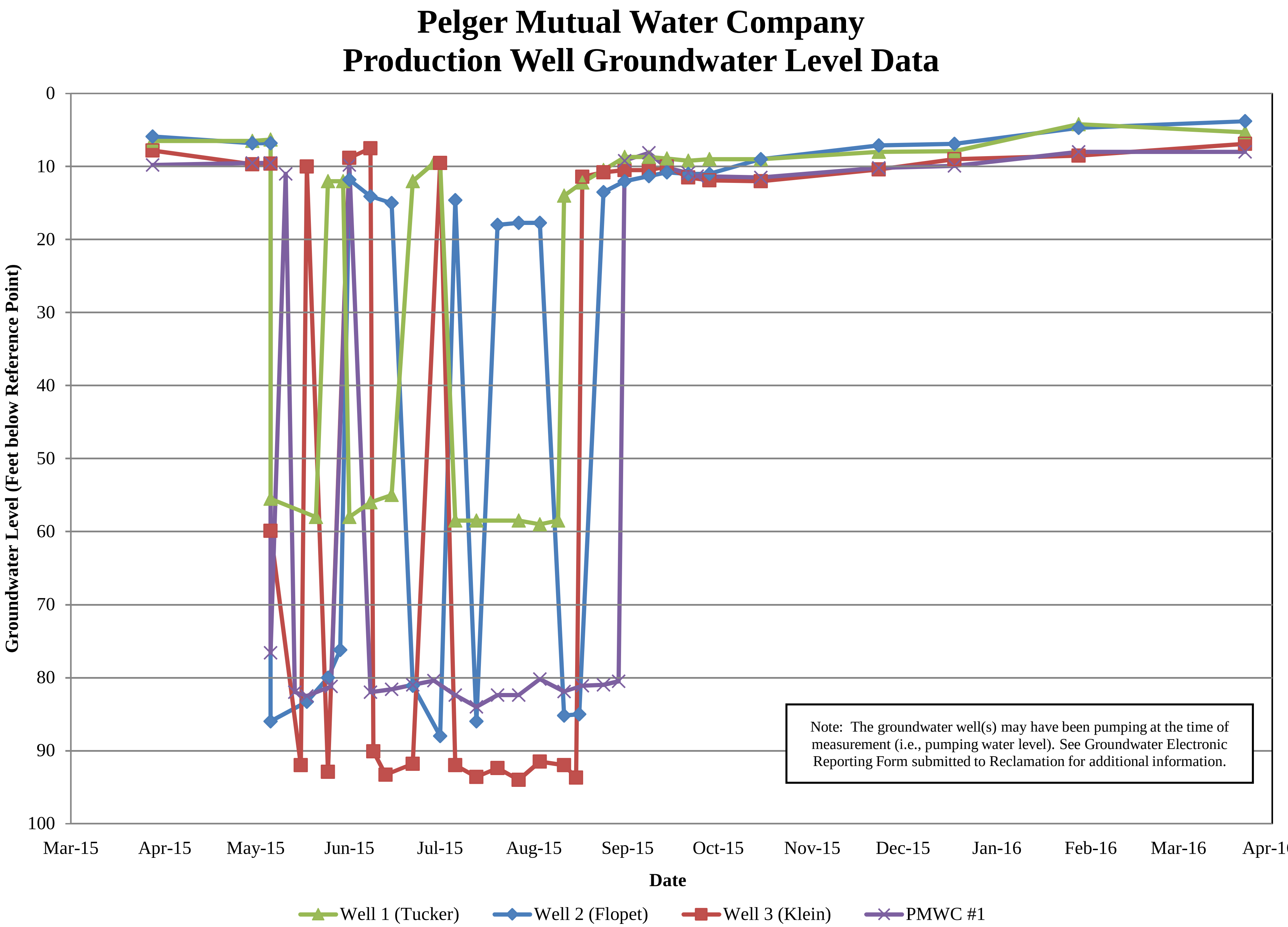
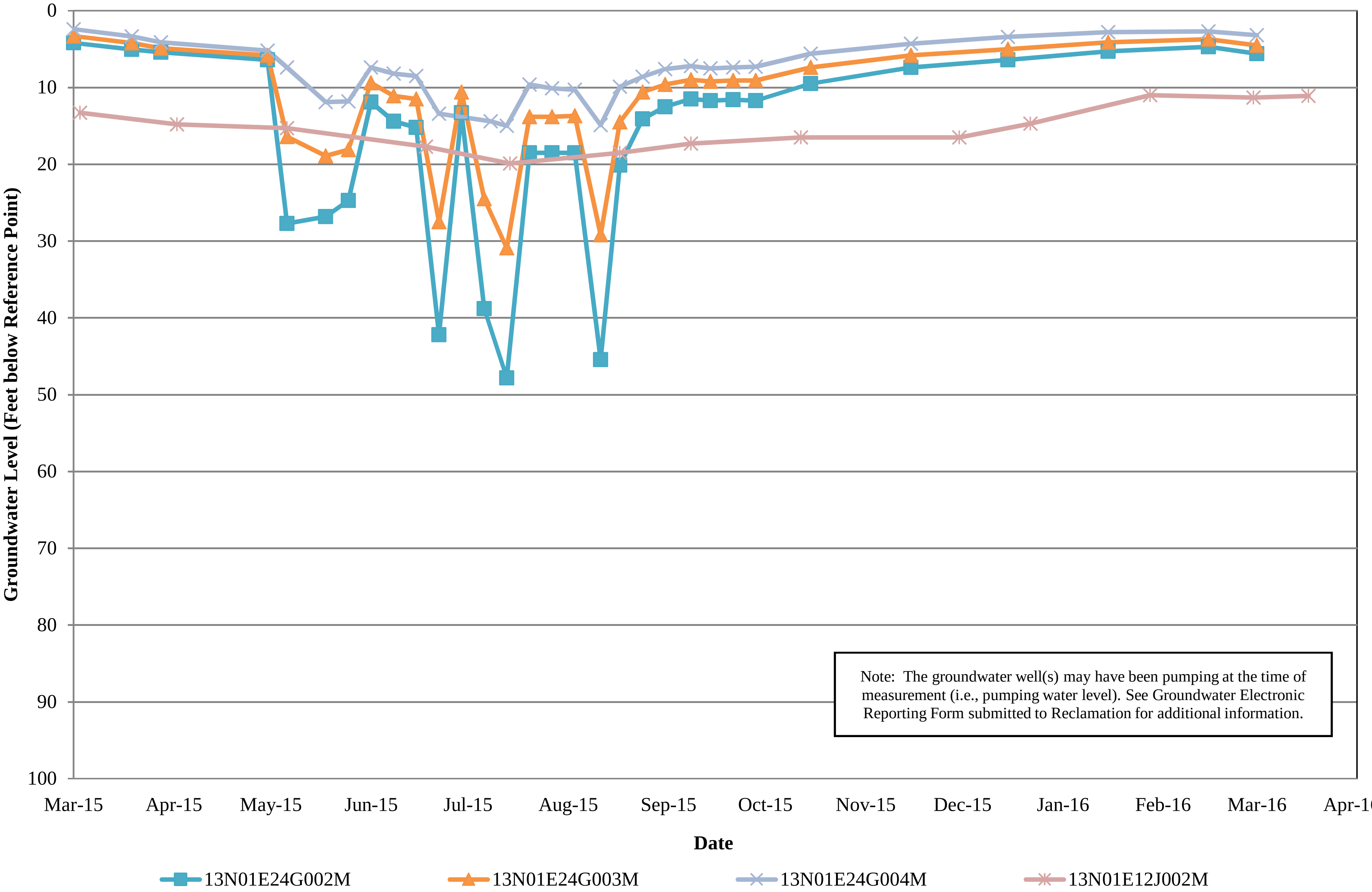
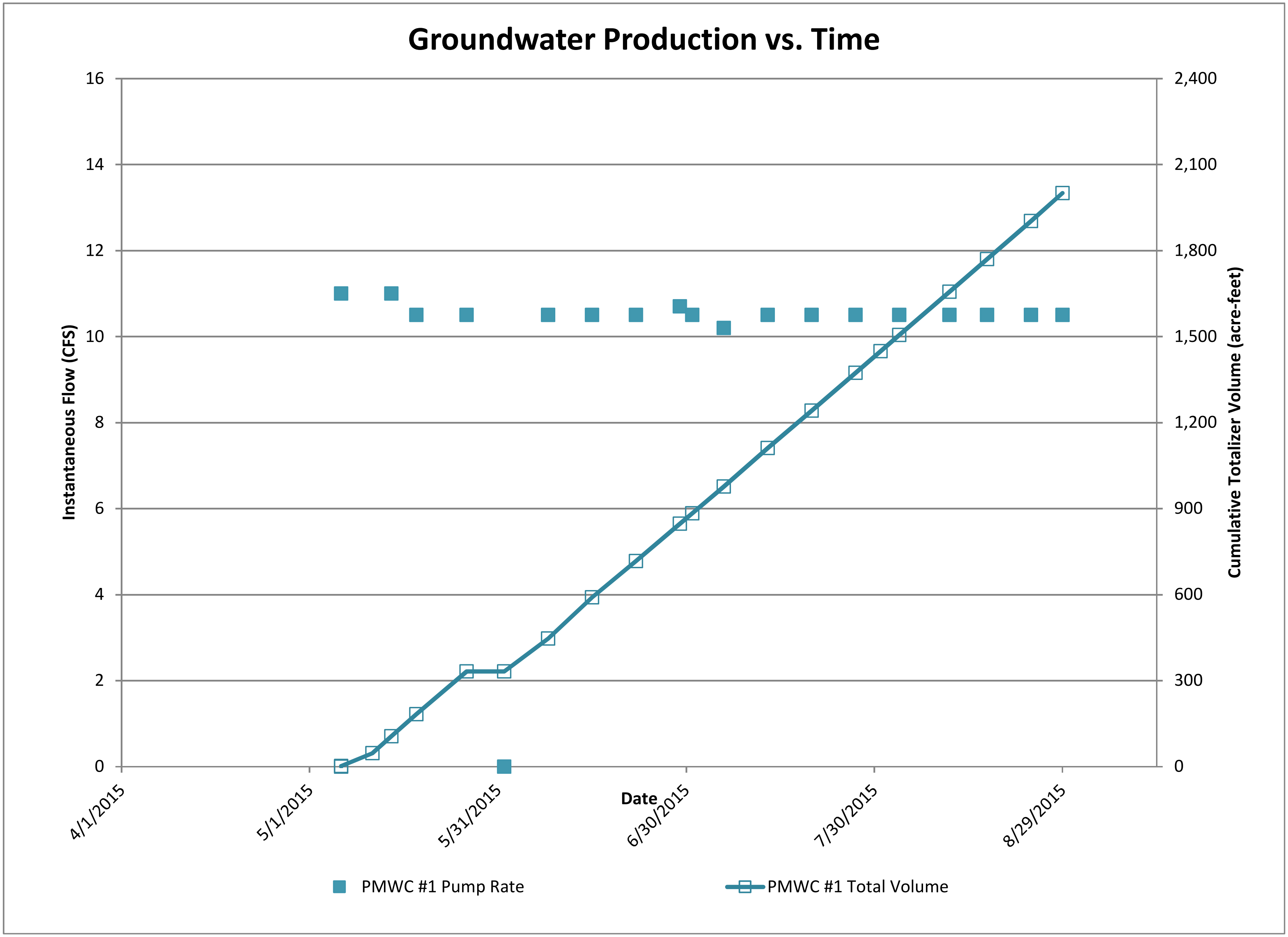
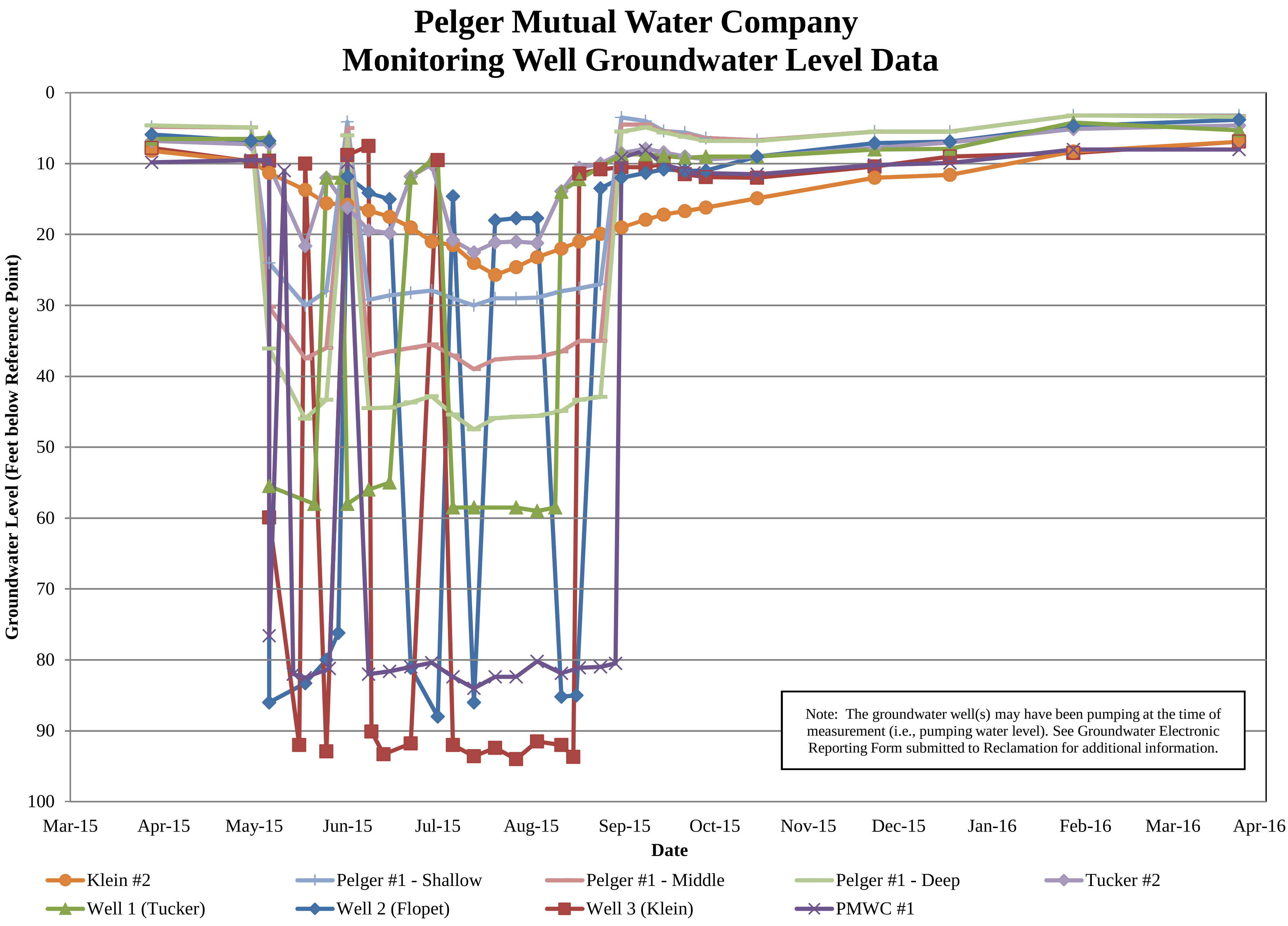

Pelger Mutual Water Company
Production Well Groundwater Level Data
Groundwater Level (Feet below Reference Point)
0
10
20
30
40
50
60
70
80
90
100
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Date
Well 1 (Tucker)
Well 2 (Flopet)
Well 3 (Klein)
PMWC #1
Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.

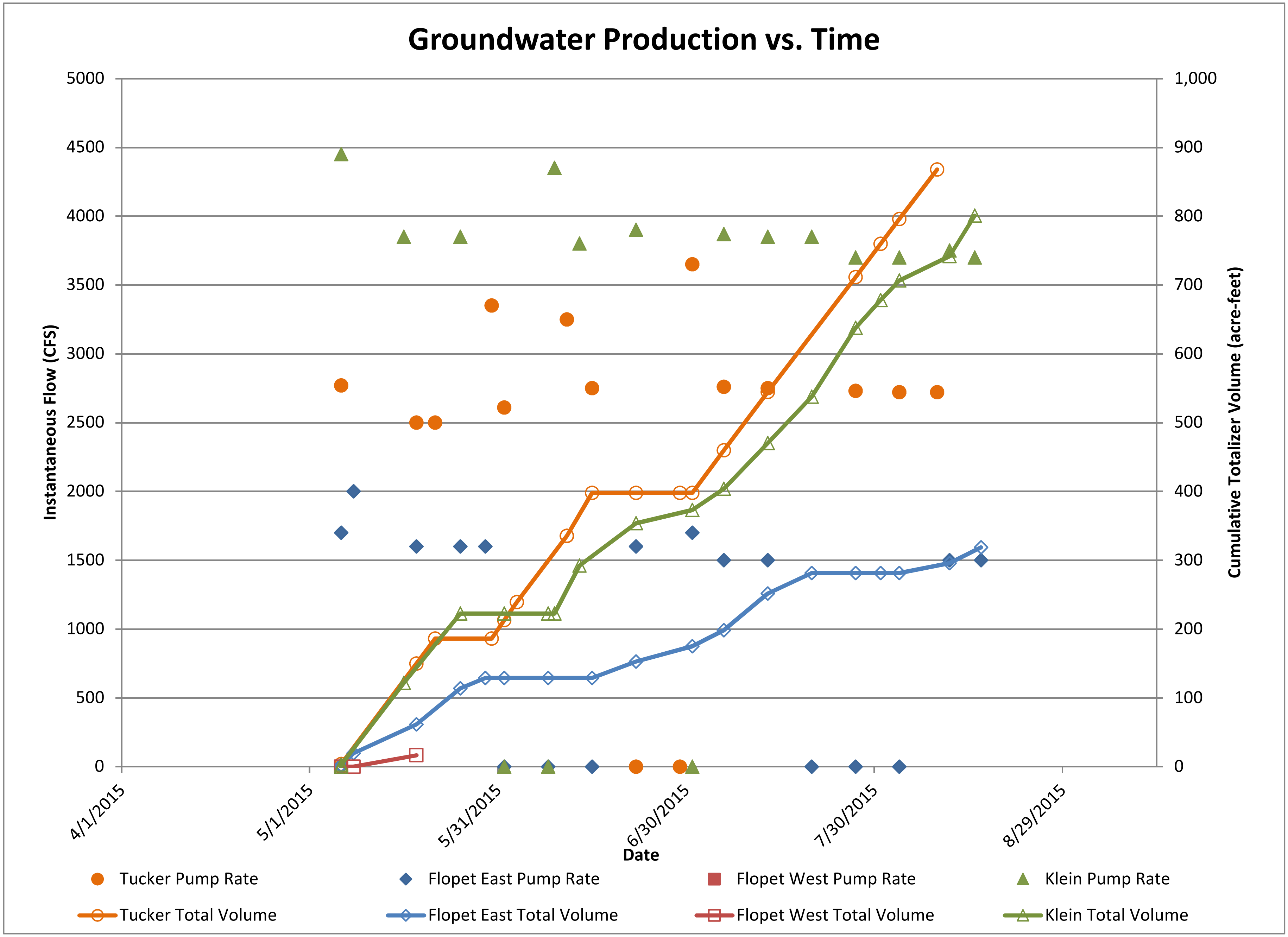
Pelger Mutual Water Company
DWR Monitoring Well Groundwater Level Data

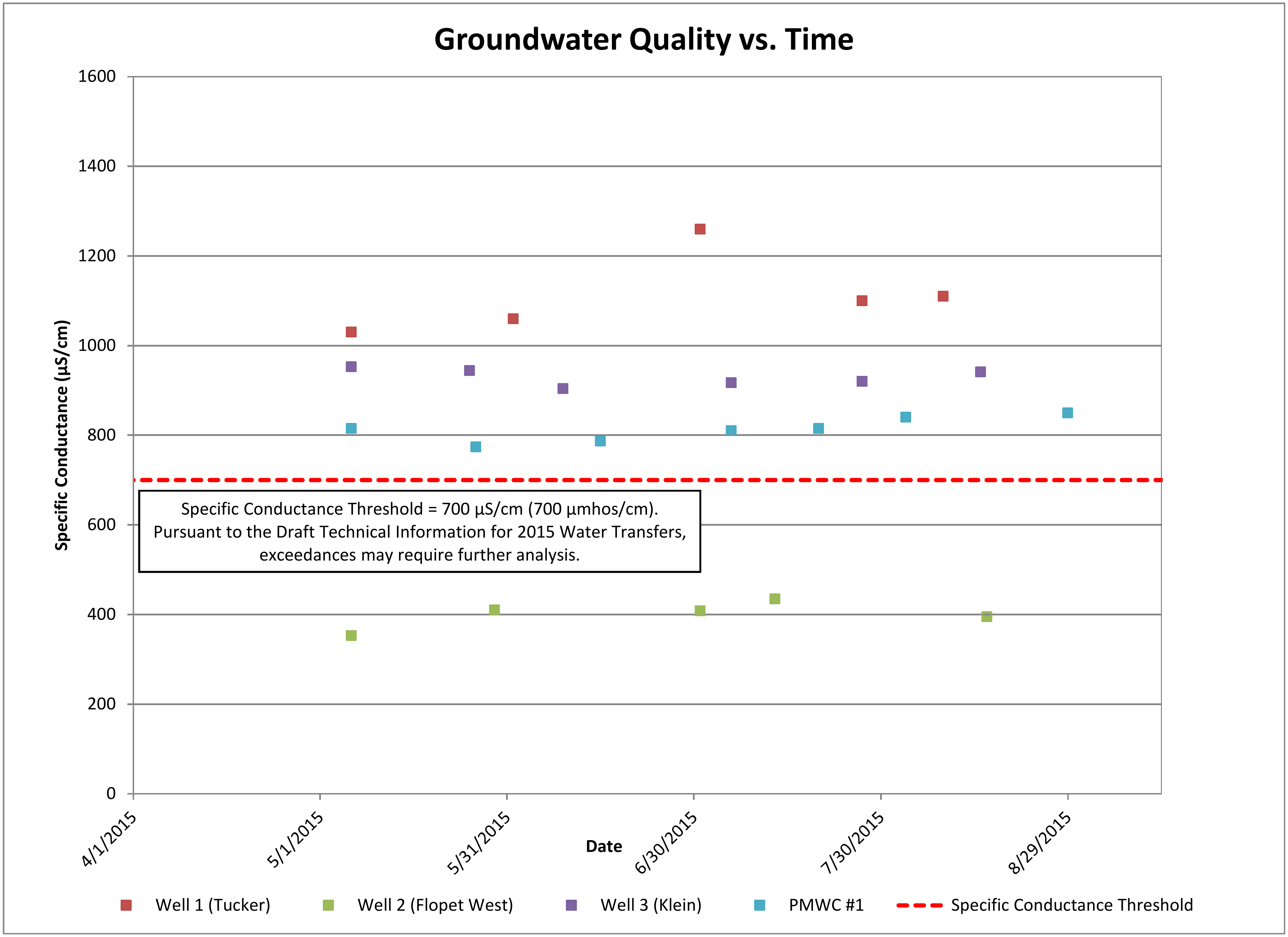




Groundwater Production vs. Time
Instantaneous Flow (CFS)
Cumulative Totalizer Volume (acre-feet)
Date
0
2
4
6
8
10
12
14
16
0
300
600
900
1,200
1,500
1,800
2,100
2,400
4/1/2015
5/1/2015
5/31/2015
6/30/2015
7/30/2015
8/29/2015
PMWC #1 Pump Rate
PMWC #1 Total Volume


Pelger Mutual Water Company
Monitoring Well Groundwater Level Data
Groundwater Level (Feet below Reference Point)
0
10
20
30
40
50
60
70
80
90
100
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Date
Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.
Klein #2
Pelger #1 - Shallow
Pelger #1 - Middle
Pelger #1 - Deep
Tucker #2
Well 1 (Tucker)
Well 2 (Flopet)
Well 3 (Klein)
PMWC #1


Groundwater Production vs. Time
Instantaneous Flow (CFS)
Cumulative Totalizer Volume (acre-feet)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1,000
900
800
700
600
500
400
300
200
100
0
4/1/2015
5/1/2015
5/31/2015
6/30/2015
7/30/2015
8/29/2015
Date
Tucker Pump Rate
Flopet East Pump Rate
Flopet West Pump Rate
Klein Pump Rate
Tucker Total Volume
Flopet East Total Volume
Flopet West Total Volume
Klein Total Volume



Groundwater Quality vs. Time
Specific Conductance (µS/cm)
1600
1400
1200
1000
800
600
400
200
0
4/1/2015
5/1/2015
5/31/2015
6/30/2015
7/30/2015
8/29/2015
Date
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to the Draft Technical Information for 2015 Water Transfers,
exceedances may require further analysis.
Well 1 (Tucker)
Well 2 (Flopet West)
Well 3 (Klein)
PMWC #1
Specific Conductance Threshold

Pelger Road 1700, LLC

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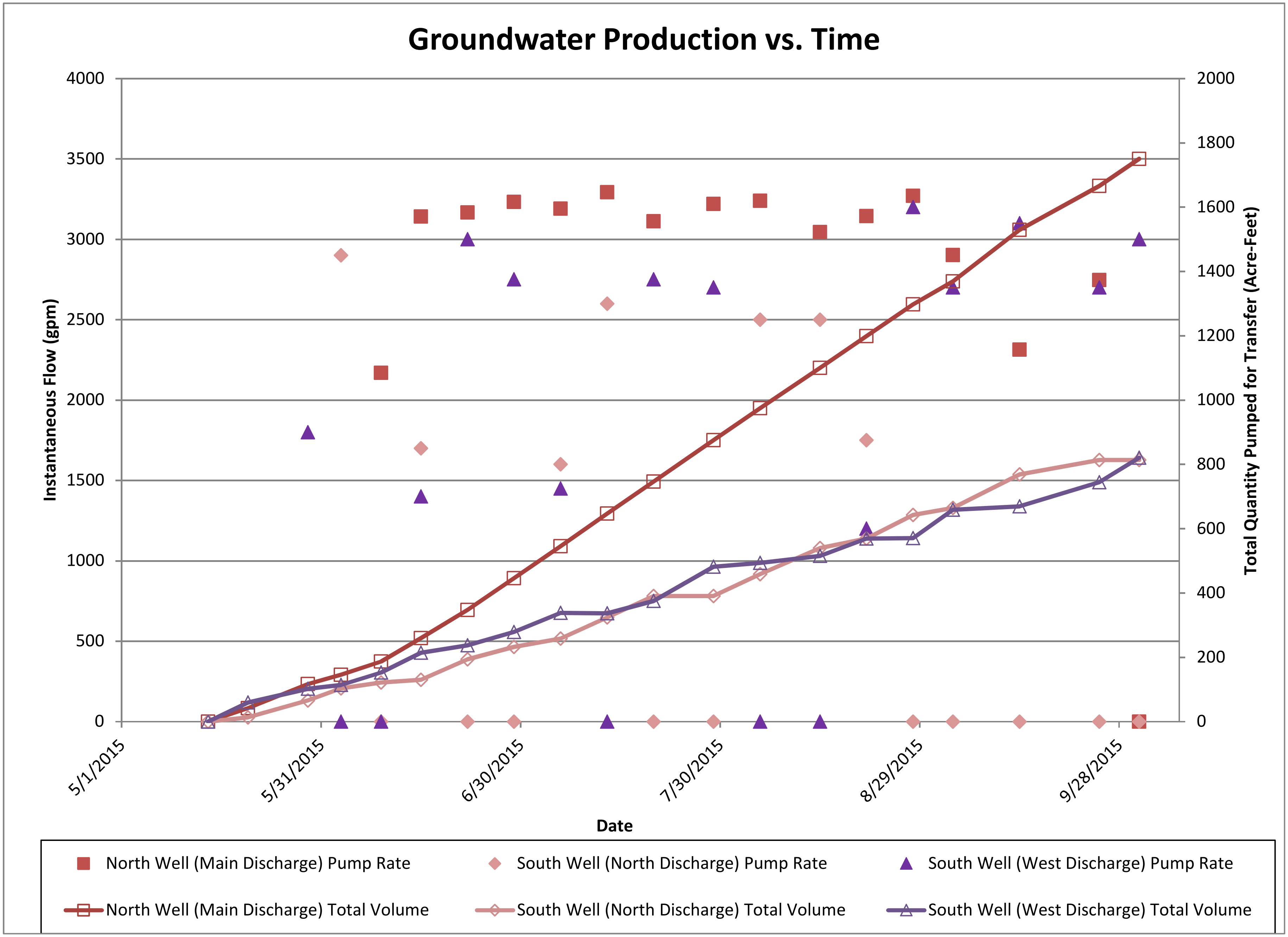
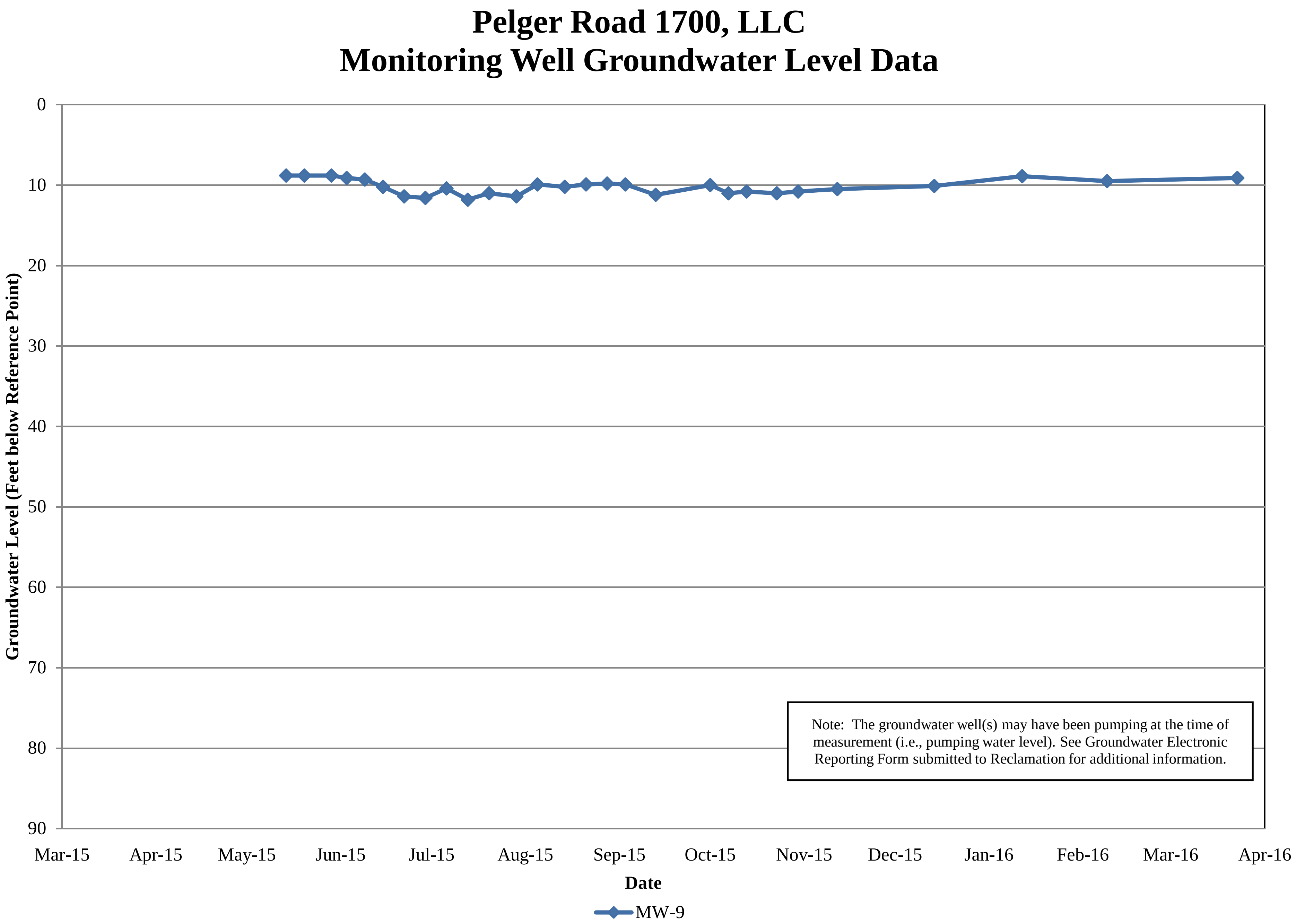
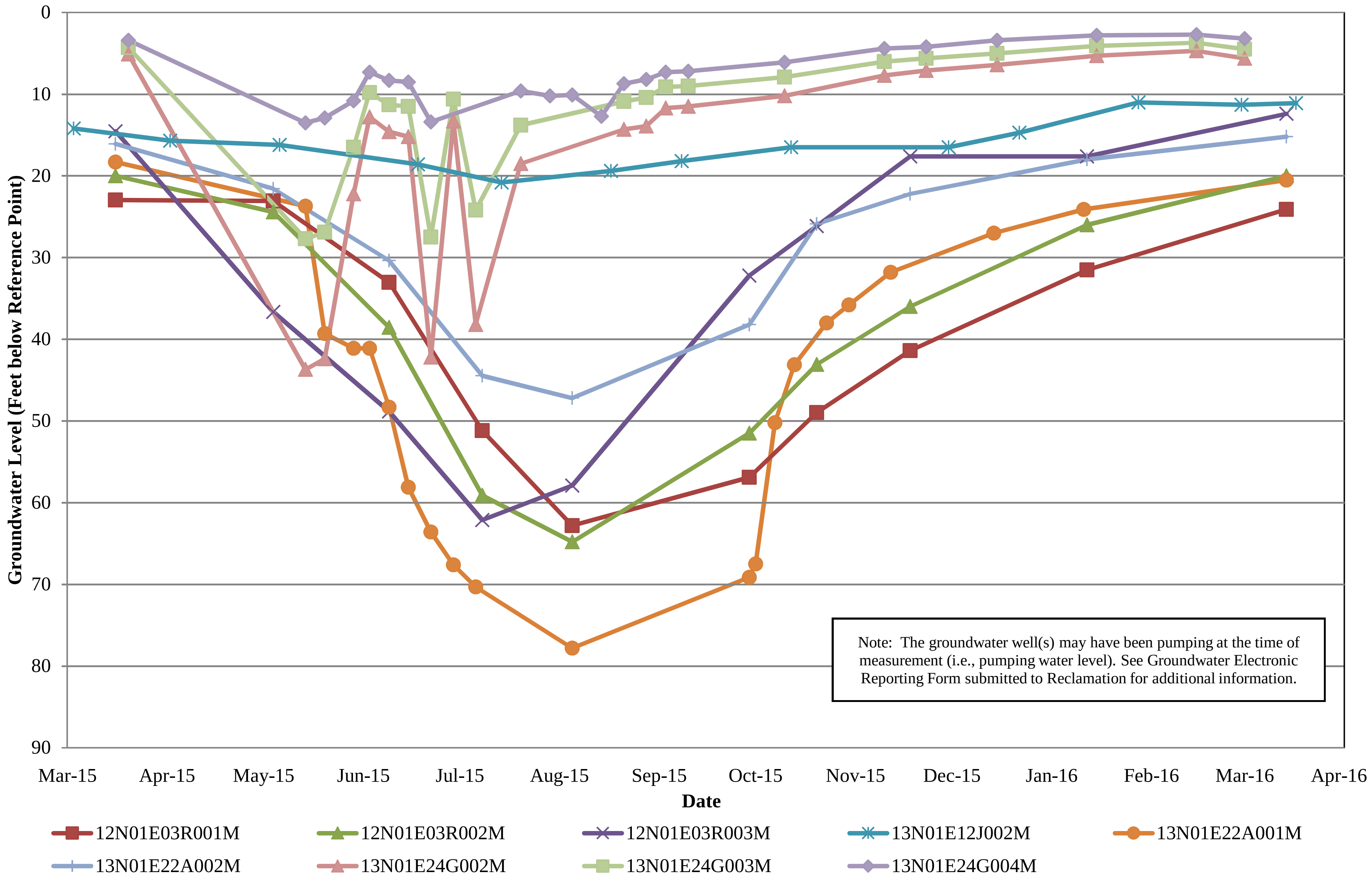
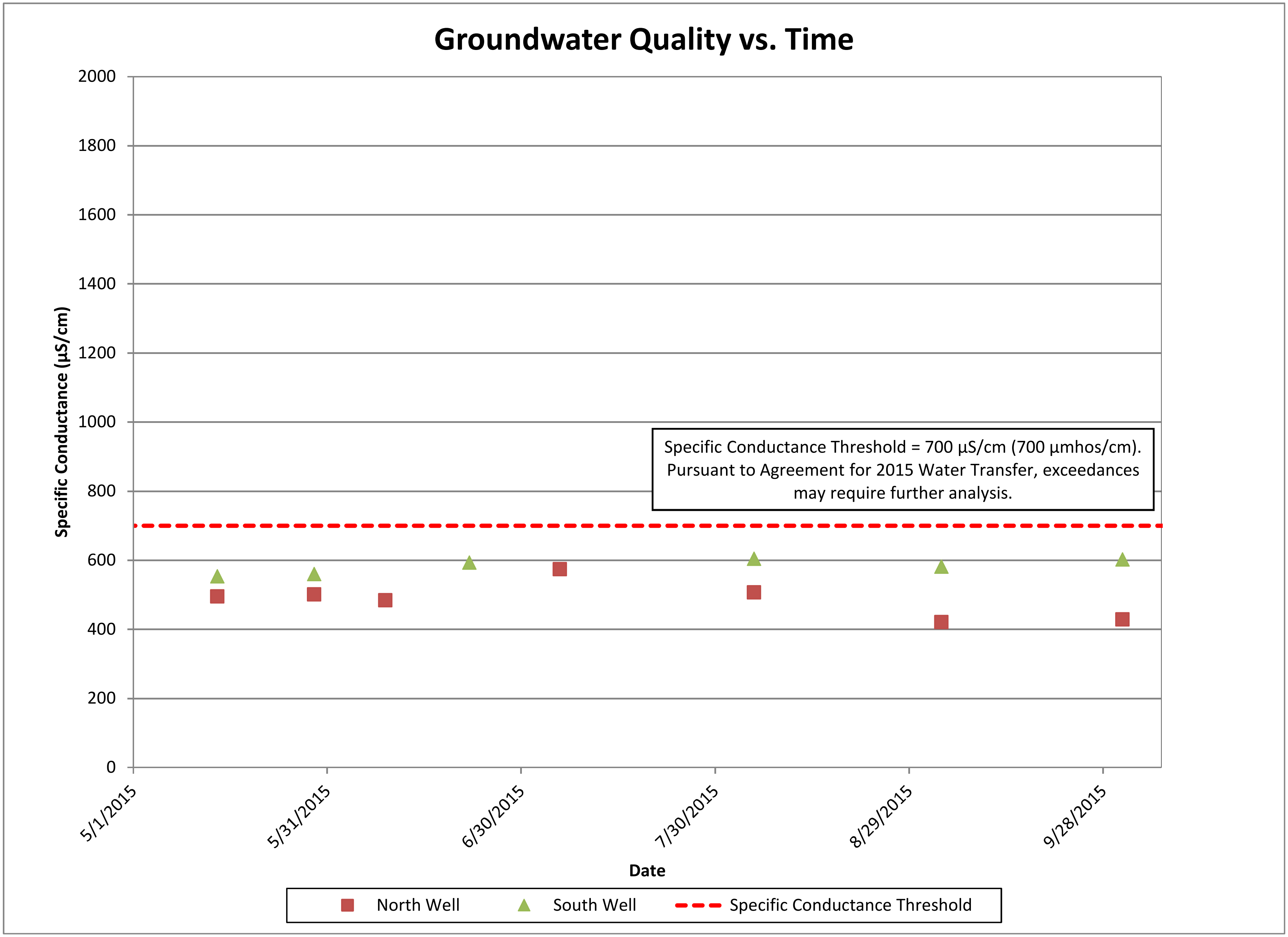

Groundwater Production vs. Time
Instantaneous Flow (gpm)
Total Quantity Pumped for Transfer (Acre-Feet)
4000
3500
3000
2500
2000
1500
1000
500
0
2000
1800
1600
1400
1200
1000
800
600
400
200
0
5/1/2015
5/31/2015
6/30/2015
7/30/2015
8/29/2015
9/28/2015
Date
North Well (Main Discharge) Pump Rate
South Well (North Discharge) Pump Rate
South Well (West Discharge) Pump Rate
North Well (Main Discharge) Total Volume
South Well (North Discharge) Total Volume
South Well (West Discharge) Total Volume


Pelger Road 1700, LLC
Monitoring Well Groundwater Level Data
Groundwater Level (Feet below Reference Point)
0
10
20
30
40
50
60
70
80
90
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Date
MW-9
Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.

Pelger Road 1700, LLC
DWR Monitoring Well Groundwater Level Data





Groundwater Quality vs. Time
Specific Conductance (µS/cm)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm). Pursuant to Agreement for 2015 Water Transfer, exceedances may require further analysis.
5/1/2015
5/31/2015
6/30/2015
7/30/2015
8/29/2015
9/28/2015
Date
North Well
South Well
Specific Conductance Threshold

Pleasant Grove-Verona Mutual Water Company

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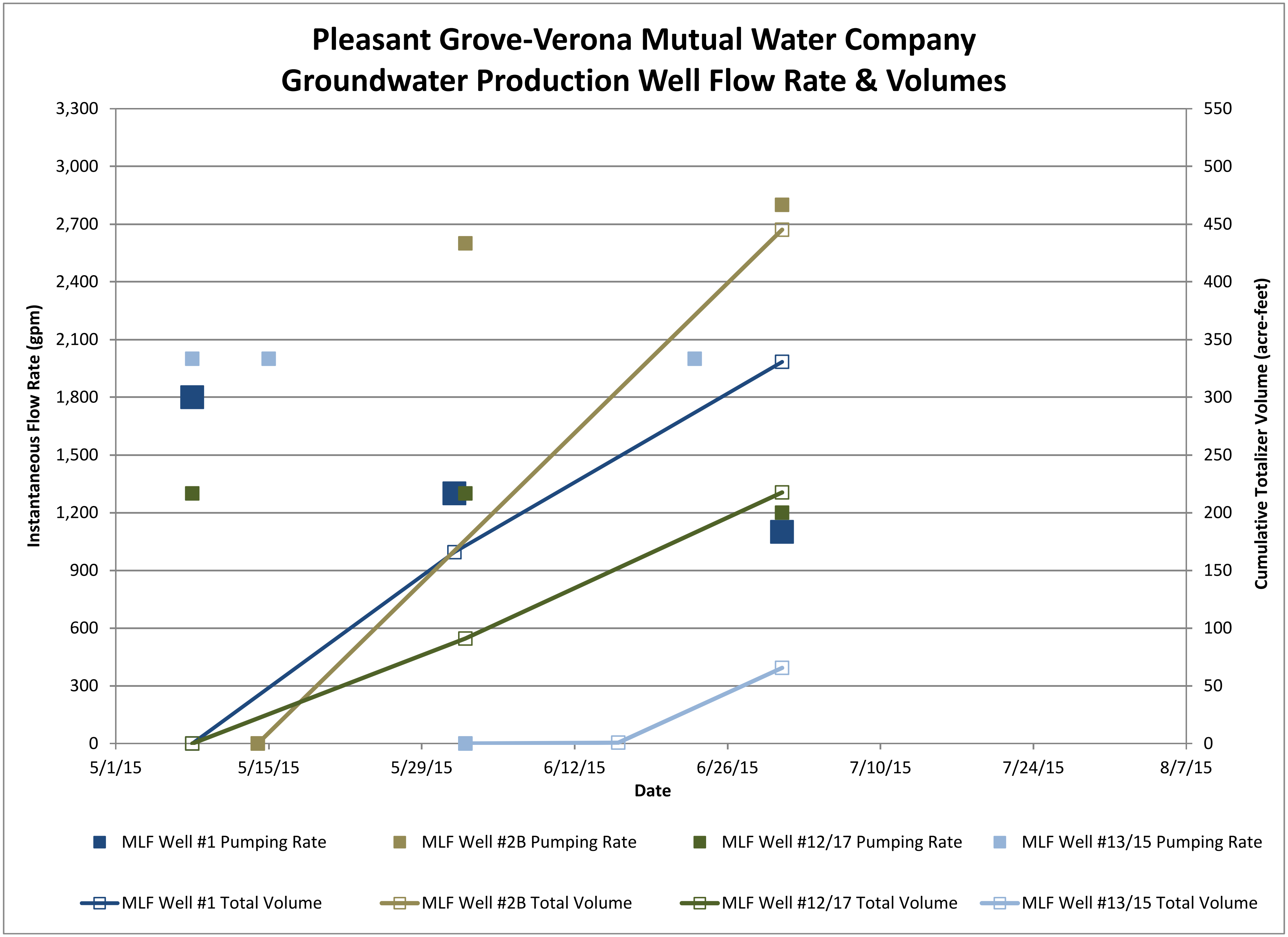
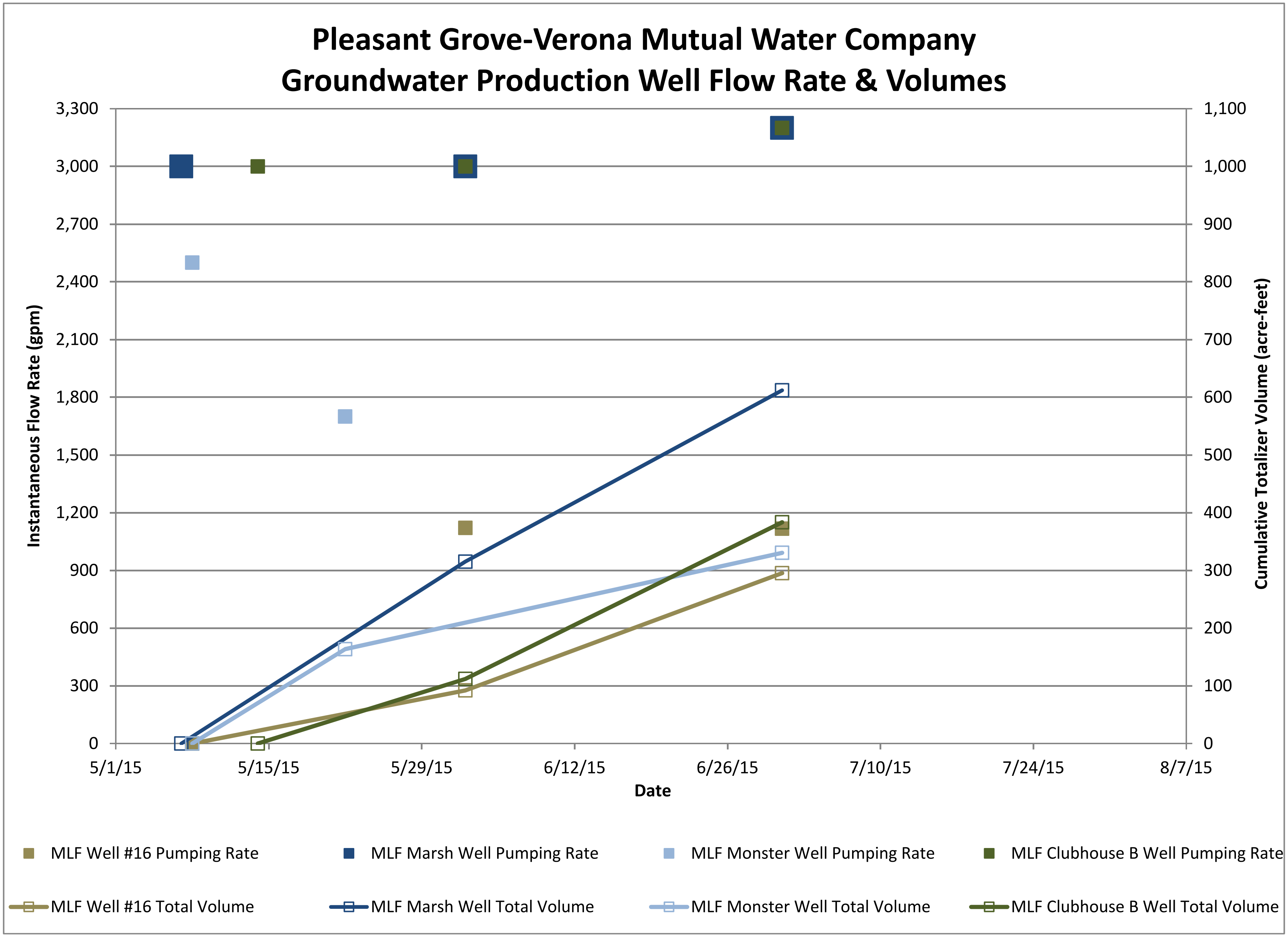
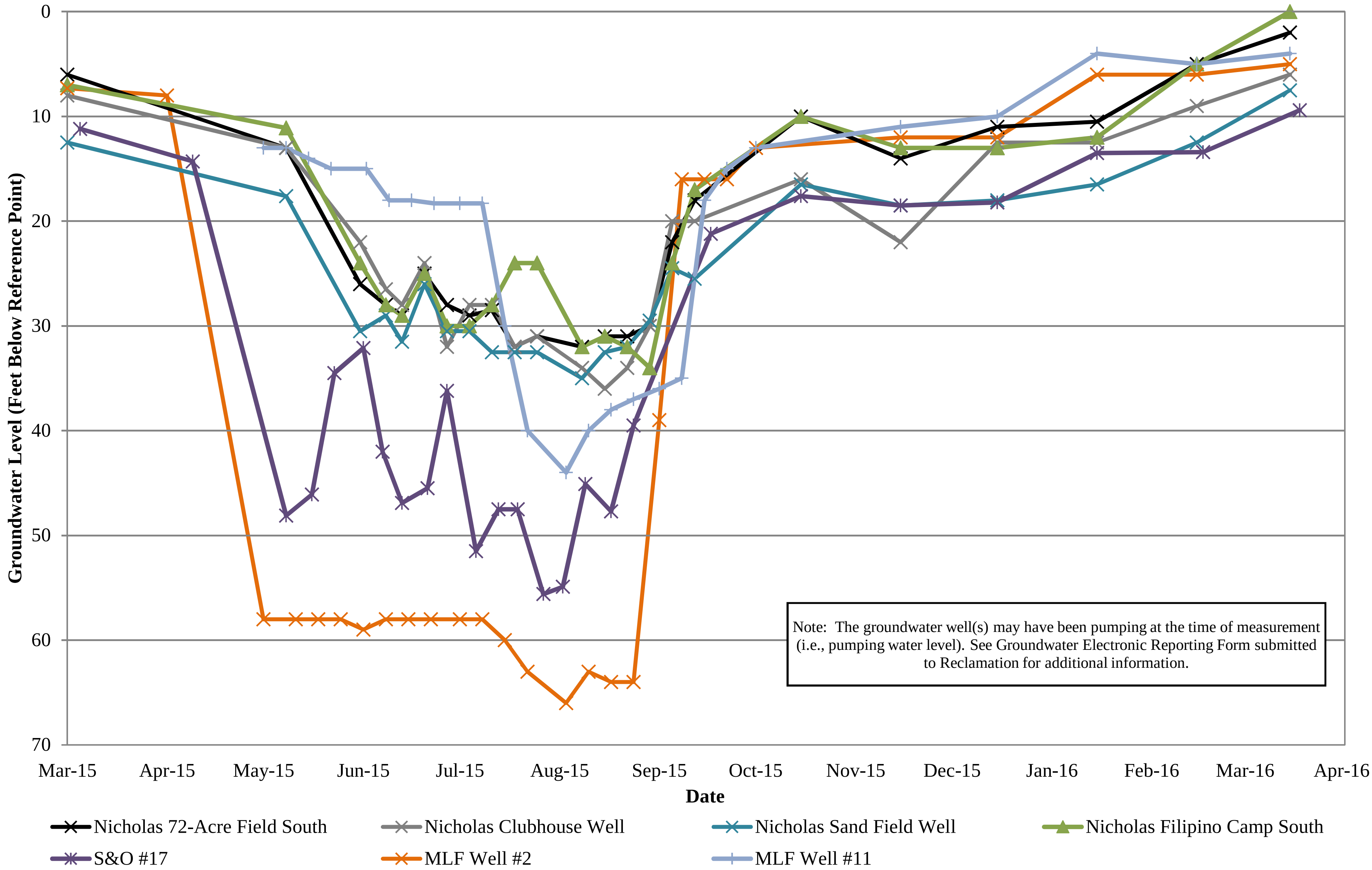


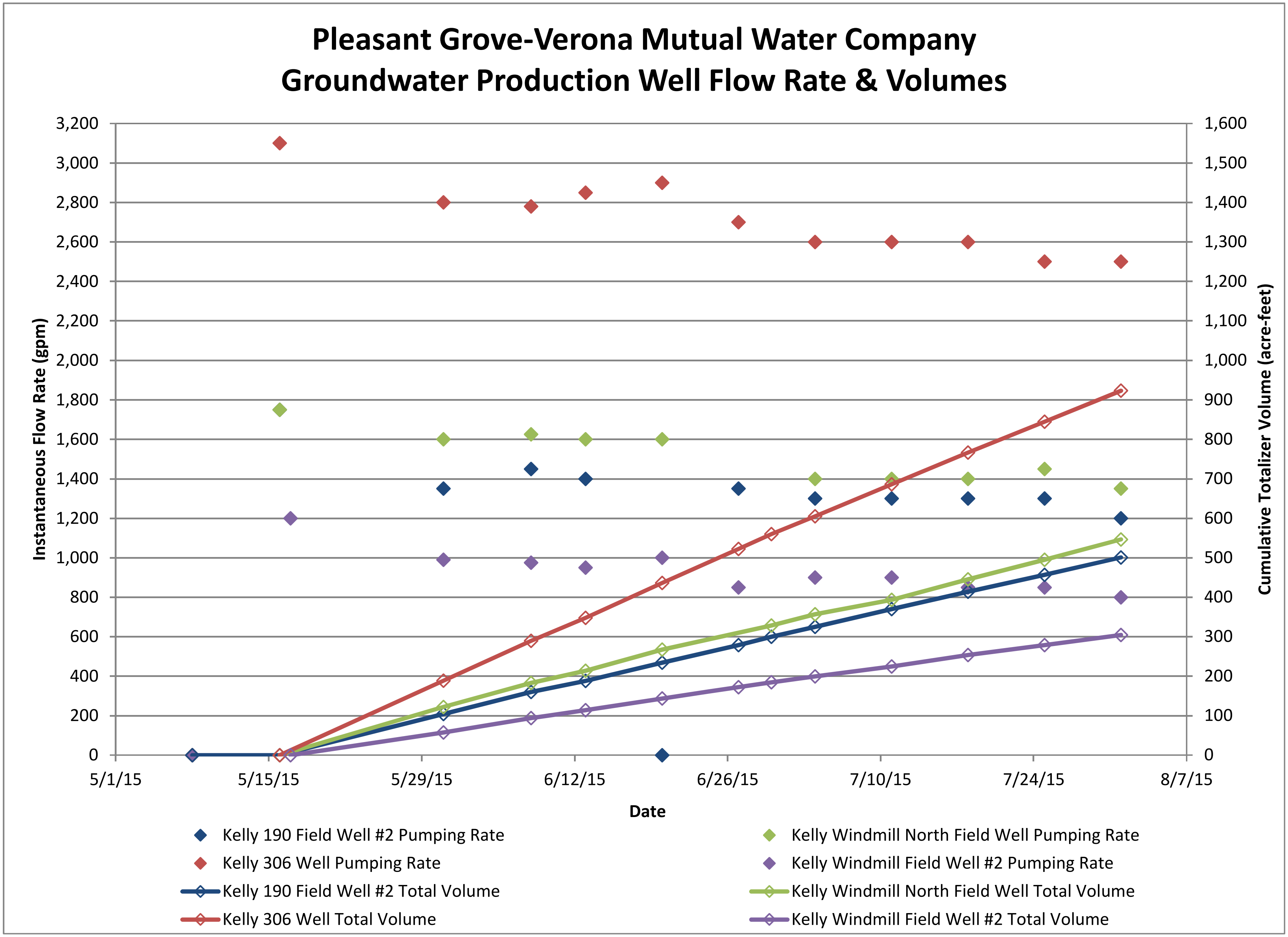
Pleasant Grove-Verona Mutual Water Company
Groundwater Production Well Flow Rate & Volumes
Instantaneous Flow Rate (gpm)
Cumulative Totalizer Volume (acre-feet)
3,300
3,000
2,700
2,400
2,100
1,800
1,500
1,200
900
600
300
0
550
500
450
400
350
300
250
200
150
100
50
0
5/1/15
5/15/15
5/29/15
6/12/15
6/26/15
7/10/15
7/24/15
8/7/15
Date
MLF Well #1 Pumping Rate
MLF Well #2B Pumping Rate
MLF Well #12/17 Pumping Rate
MLF Well #13/15 Pumping Rate
MLF Well #1 Total Volume
MLF Well #2B Total Volume
MLF Well #12/17 Total Volume
MLF Well #13/15 Total Volume



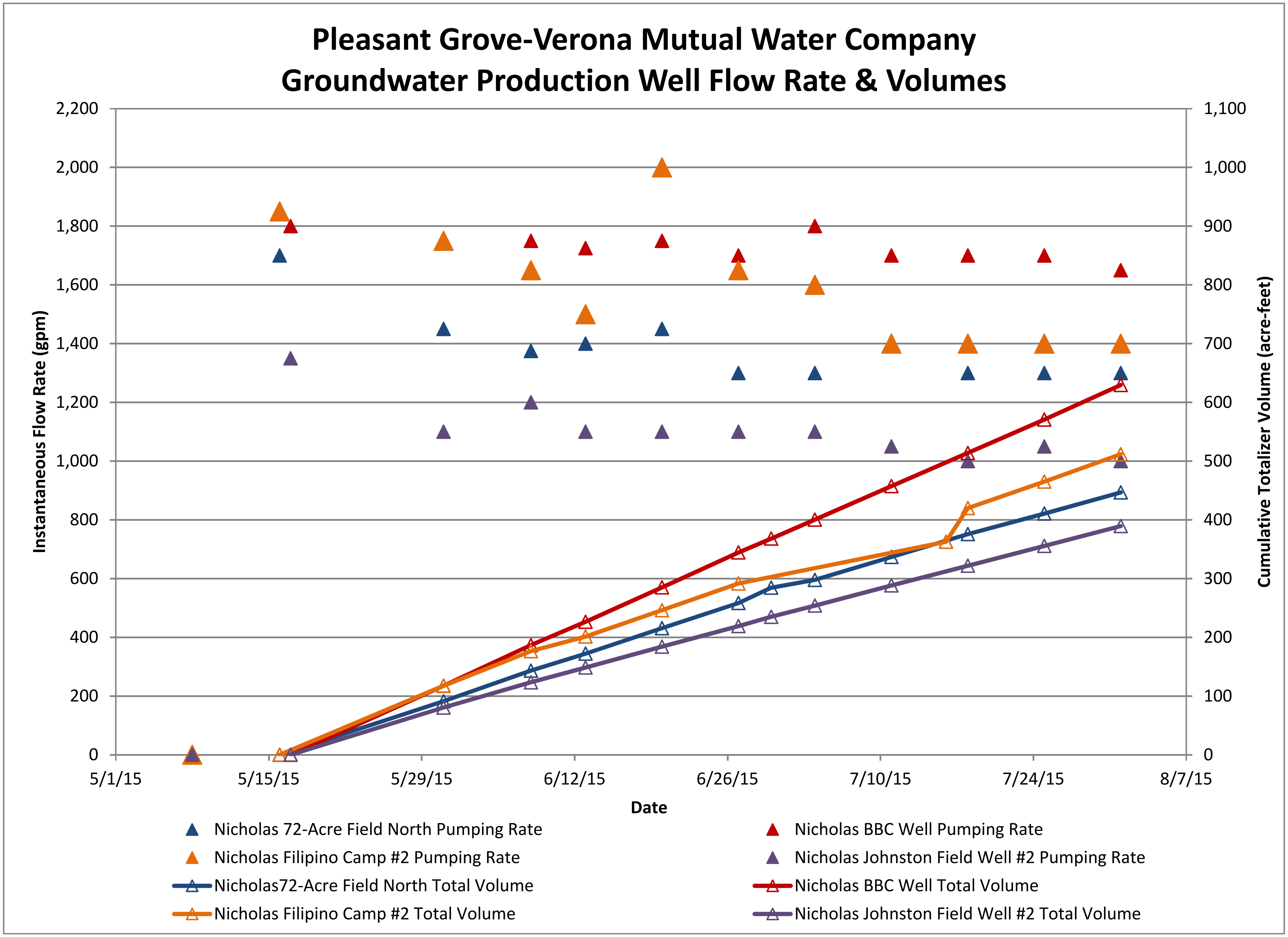
Pleasant Grove-Verona Mutual Water Company
Groundwater Production Well Flow Rate & Volumes
Instantaneous Flow Rate (gpm)
Cumulative Totalizer Volume (acre-feet)
3,300
3,000
2,700
2,400
2,100
1,800
1,500
1,200
900
600
300
0
1,100
1,000
900
800
700
600
500
400
300
200
100
0
5/1/15
5/15/15
5/29/15
6/12/15
6/26/15
7/10/15
7/24/15
8/7/15
Date
MLF Well #16 Pumping Rate
MLF Marsh Well Pumping Rate
MLF Monster Well Pumping Rate
MLF Clubhouse B Well Pumping Rate
MLF Well #16 Total Volume
MLF Marsh Well Total Volume
MLF Monster Well Total Volume
MLF Clubhouse B Well Total Volume

Pleasant Grove-Verona Mutual Water Company
Monitoring Well Groundwater Level Data



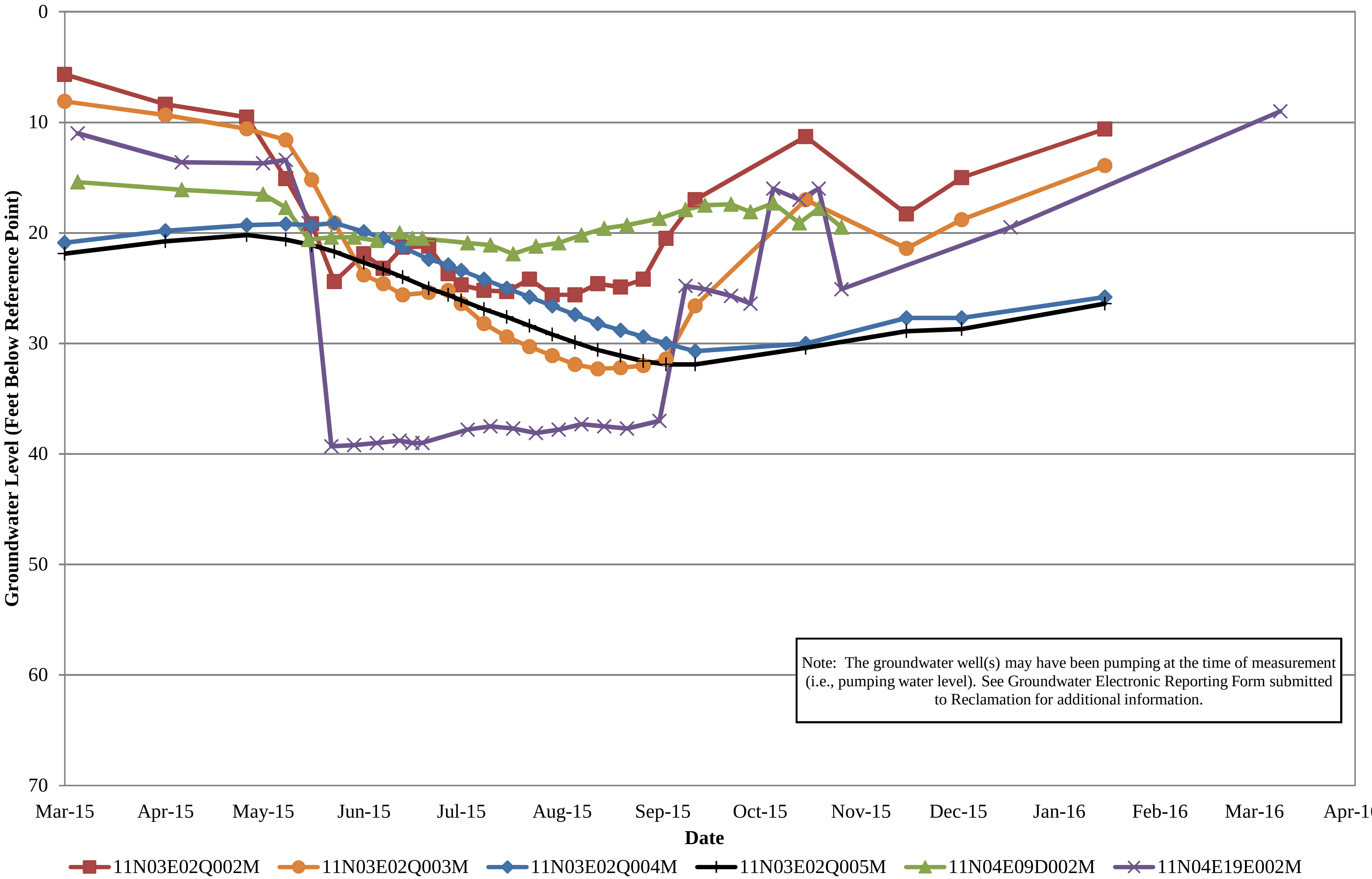


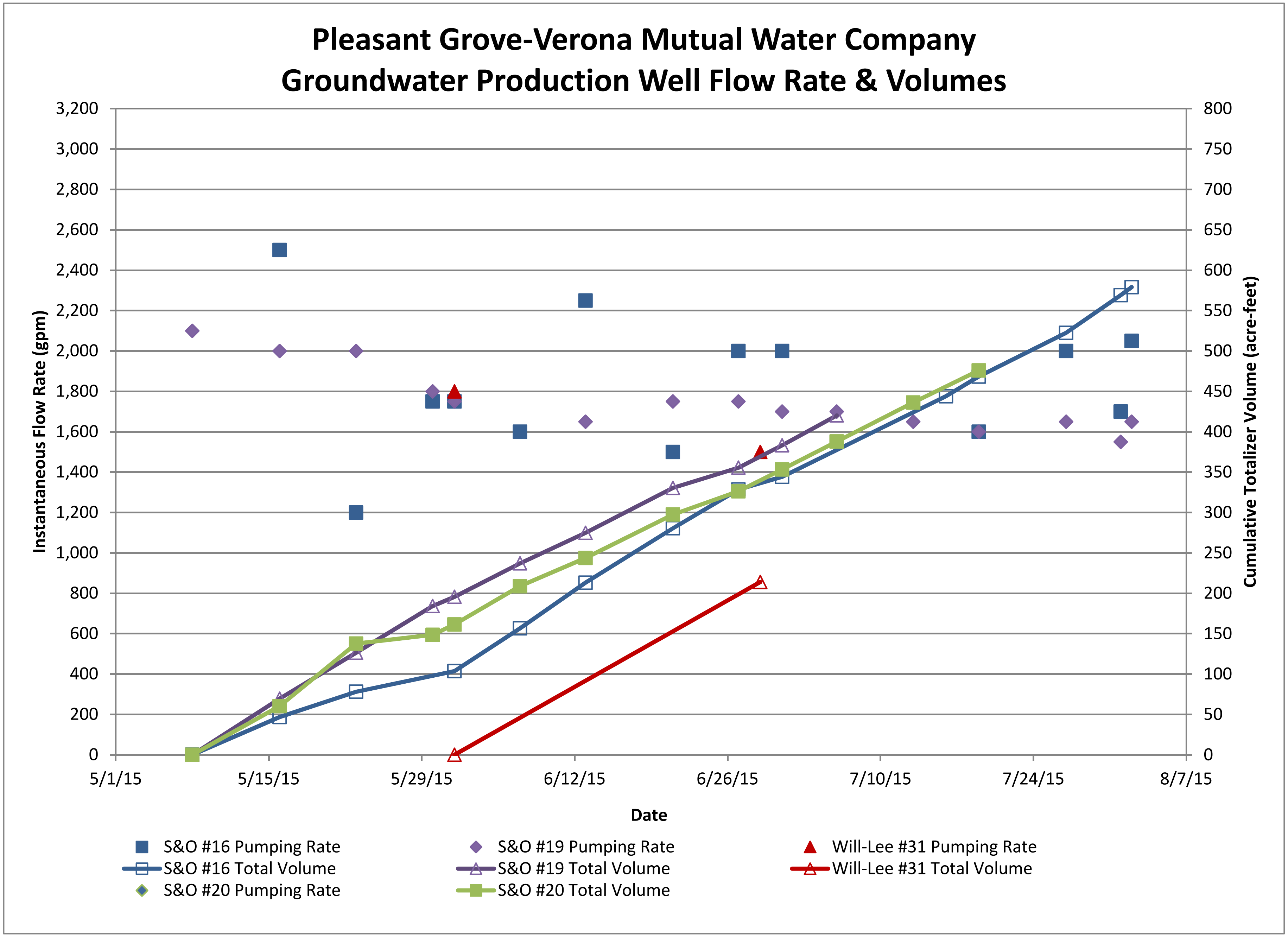
Pleasant Grove-Verona Mutual Water Company
Groundwater Production Well Flow Rate & Volumes
Instantaneous Flow Rate (gpm)
Cumulative Totalizer Volume (acre-feet)
3,200
3,000
2,800
2,600
2,400
2,200
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
5/1/15
5/15/15
5/29/15
6/12/15
6/26/15
7/10/15
7/24/15
8/7/15
Date
Kelly 190 Field Well #2 Pumping Rate
Kelly 306 Well Pumping Rate
Kelly 190 Field Well #2 Total Volume
Kelly 306 Well Total Volume
Kelly Windmill North Field Well Pumping Rate
Kelly Windmill Field Well #2 Pumping Rate
Kelly Windmill North Field Well Total Volume
Kelly Windmill Field Well #2 Total Volume



Pleasant Grove-Verona Mutual Water Company
Groundwater Production Well Flow Rate & Volumes
Instantaneous Flow Rate (gpm)
2,200
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Cumulative Totalizer Volume (acre-feet)
1,100
1,000
900
800
700
600
500
400
300
200
100
0
5/1/15
5/15/15
5/29/15
6/12/15
6/26/15
7/10/15
7/24/15
8/7/15
Date
Nicholas 72-Acre Field North Pumping Rate
Nicholas BBC Well Pumping Rate
Nicholas Filipino Camp #2 Pumping Rate
Nicholas Johnston Field Well #2 Pumping Rate
Nicholas72-Acre Field North Total Volume
Nicholas BBC Well Total Volume
Nicholas Filipino Camp #2 Total Volume
Nicholas Johnston Field Well #2 Total Volume

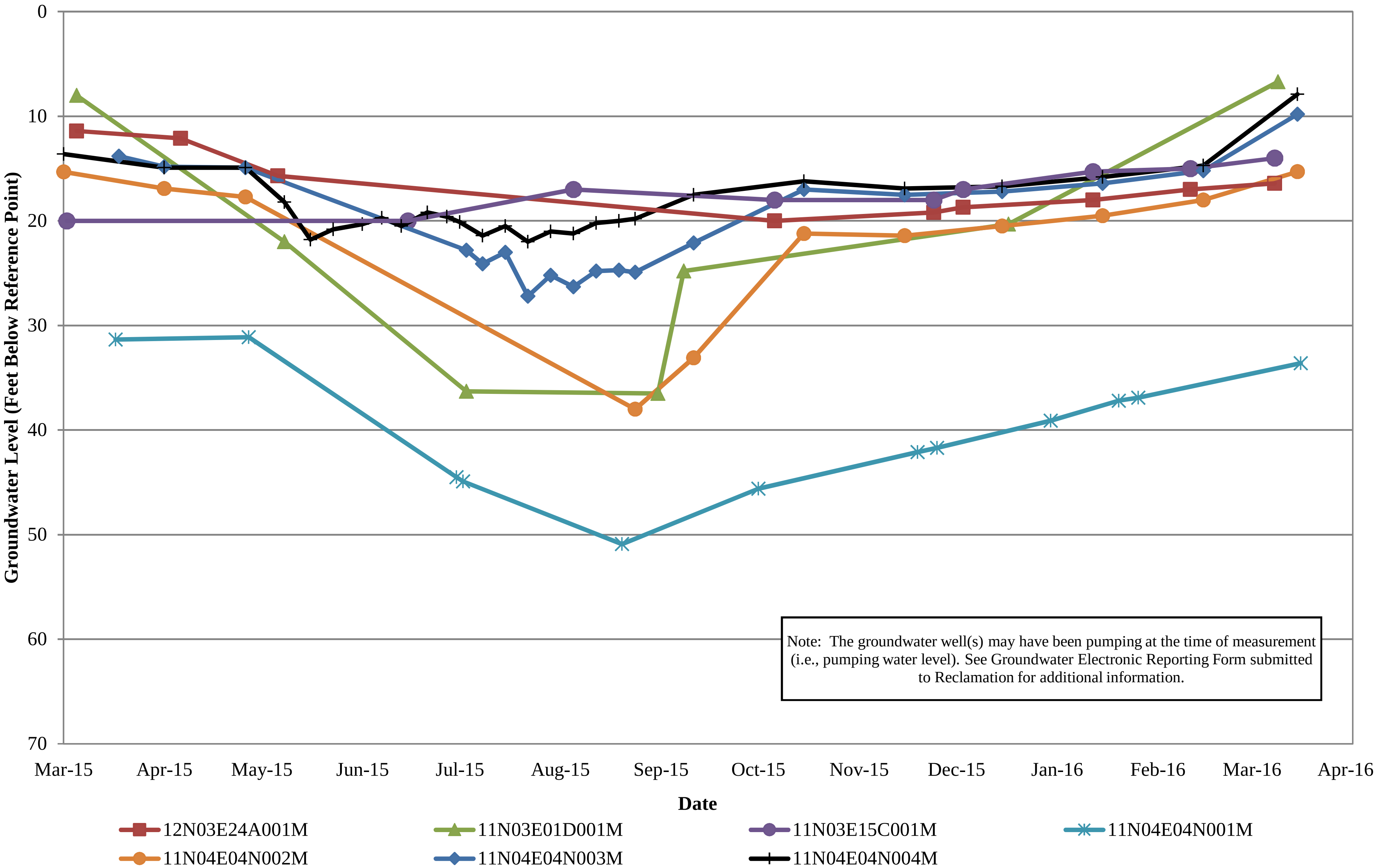
Pleasant Grove-Verona Mutual Water Company
DWR Monitoring Well Groundwater Level Data

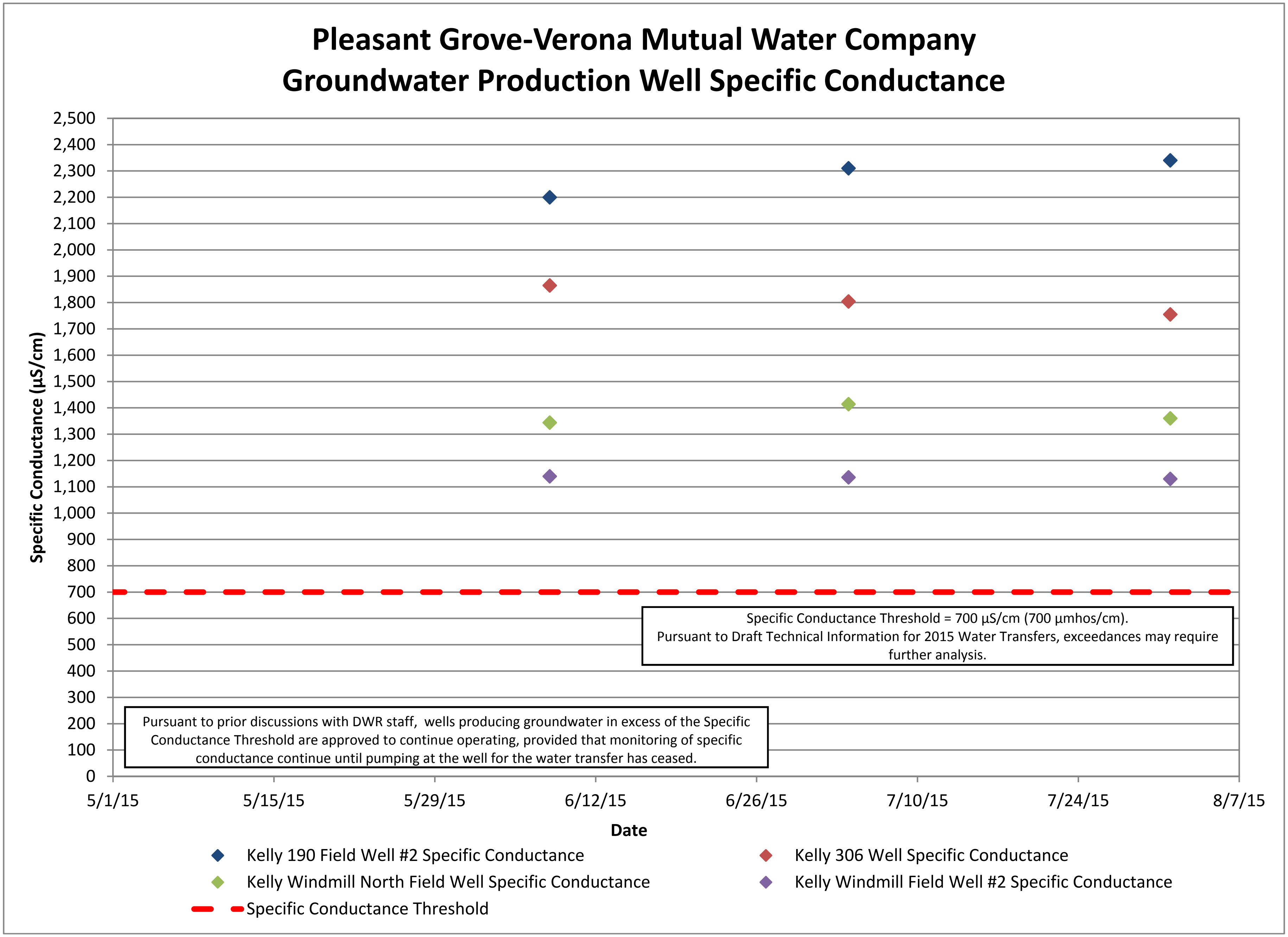




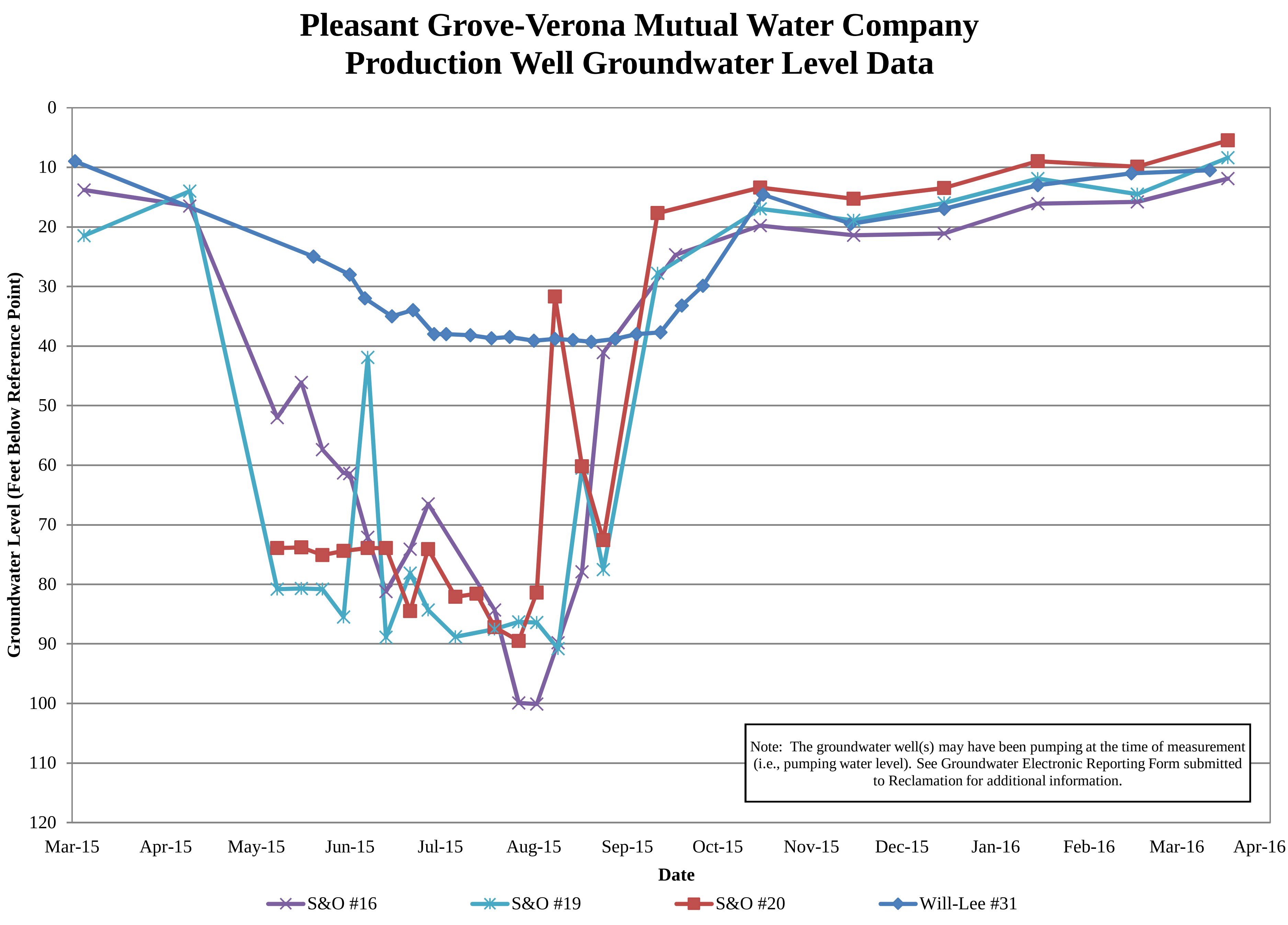
Pleasant Grove-Verona Mutual Water Company
Groundwater Production Well Flow Rate & Volumes
Instantaneous Flow Rate (gpm)
Cumulative Totalizer Volume (acre-feet)
Date
3,200
3,000
2,800
2,600
2,400
2,200
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
5/1/15
5/15/15
5/29/15
6/12/15
6/26/15
7/10/15
7/24/15
8/7/15
S&O #16 Pumping Rate
S&O #16 Total Volume
S&O #20 Pumping Rate
S&O #19 Pumping Rate
S&O #19 Total Volume
S&O #20 Total Volume
Will-Lee #31 Pumping Rate
Will-Lee #31 Total Volume

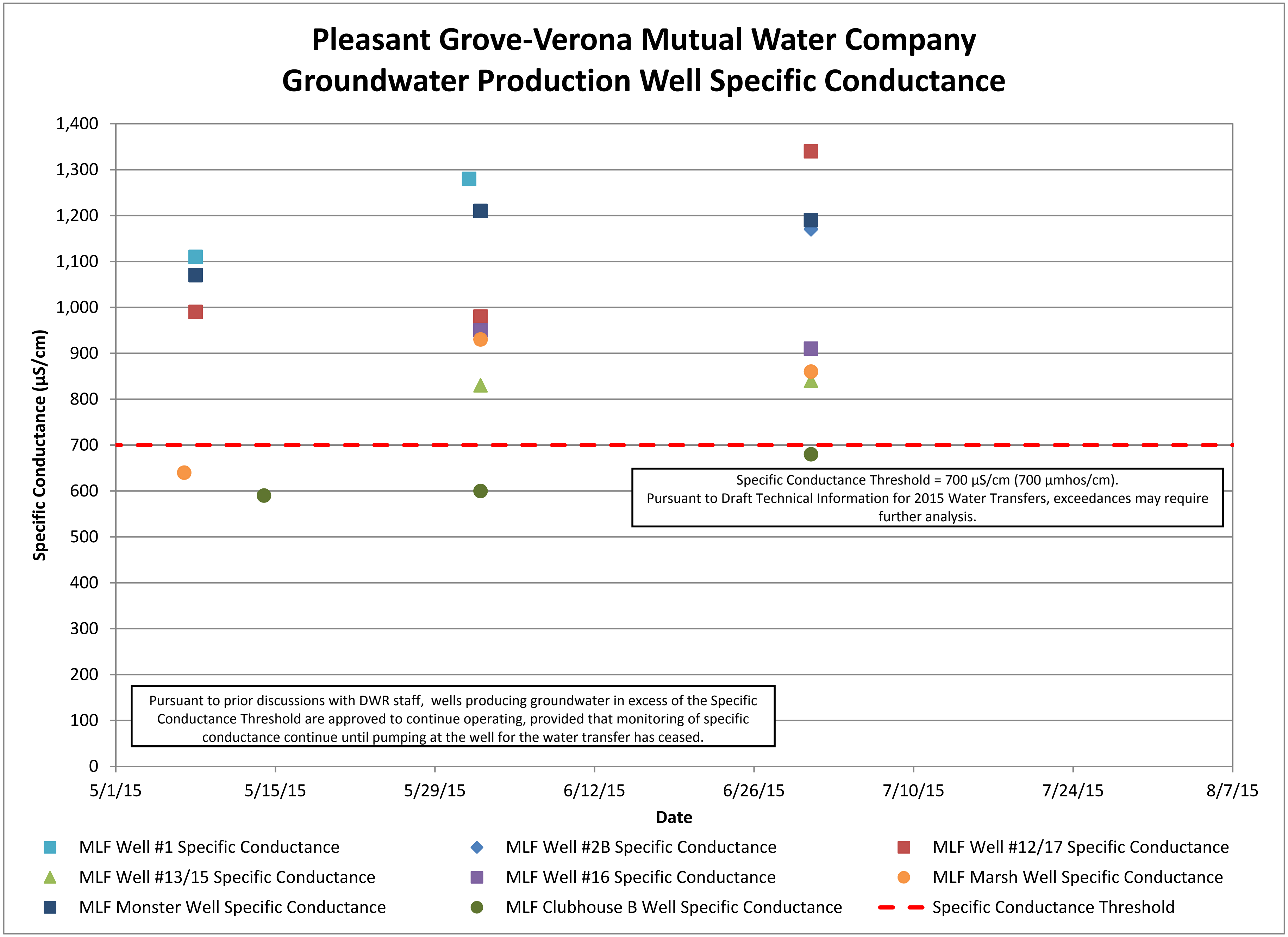
Pleasant Grove-Verona Mutual Water Company
DWR Monitoring Well Groundwater Level Data



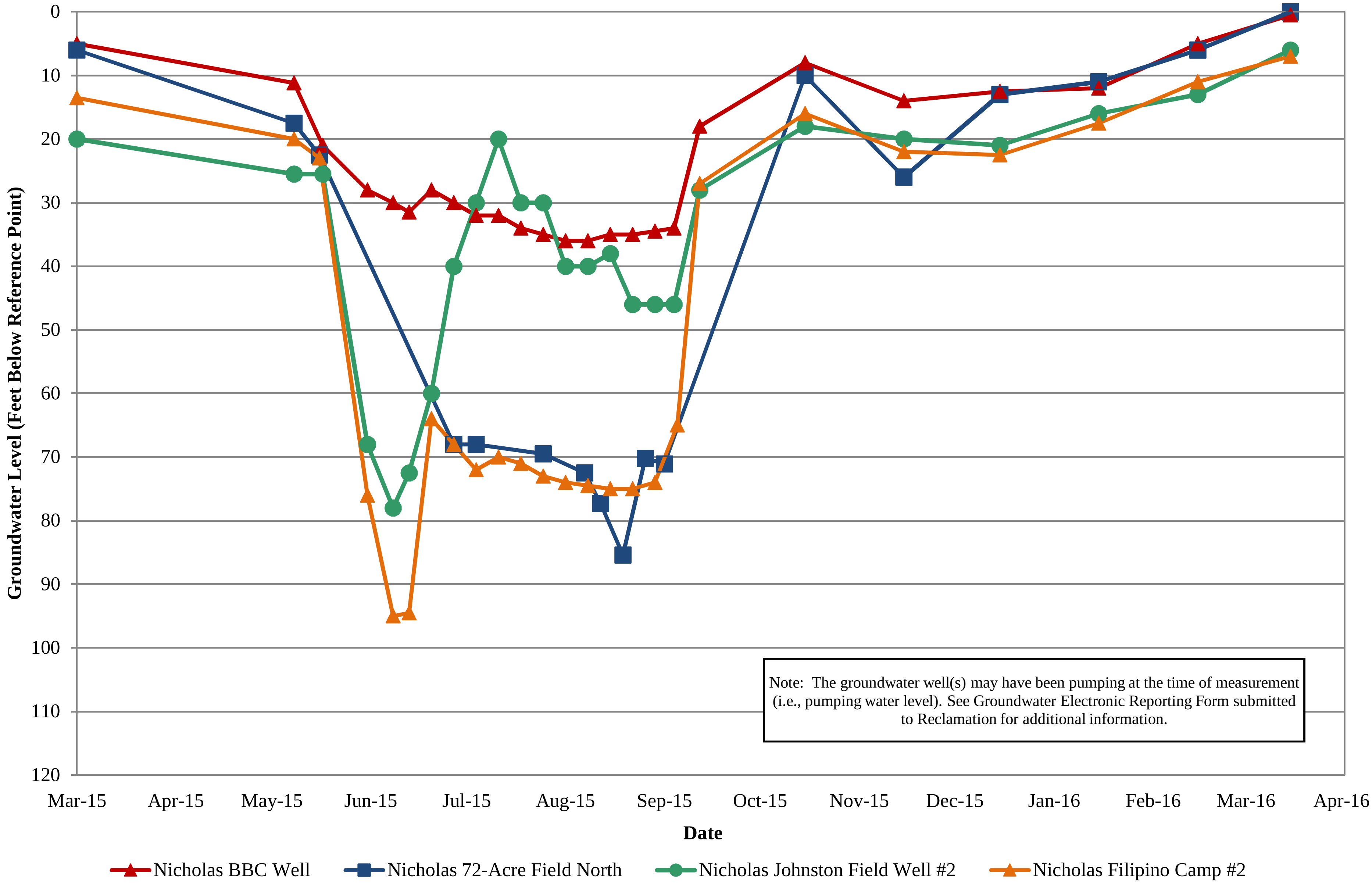


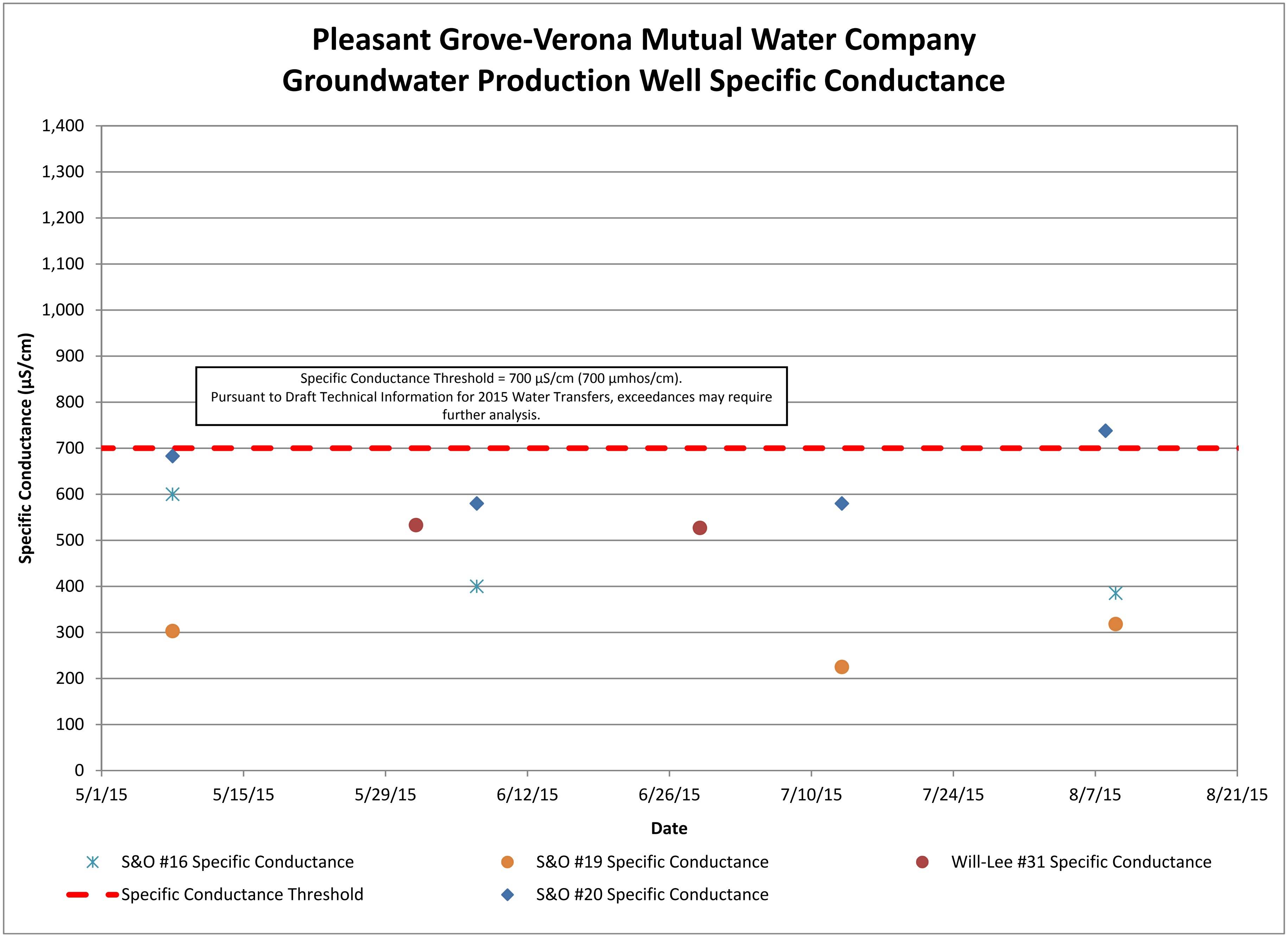
Pleasant Grove-Verona Mutual Water Company
Groundwater Production Well Specific Conductance
Specific Conductance (µS/cm)
2,500
2,400
2,300
2,200
2,100
2,000
1,900
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
5/1/15
5/15/15
5/29/15
6/12/15
6/26/15
7/10/15
7/24/15
8/7/15
Date
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to Draft Technical Information for 2015 Water Transfers, exceedances may require further analysis.
Pursuant to prior discussions with DWR staff, wells producing groundwater in excess of the Specific Conductance Threshold are approved to continue operating, provided that monitoring of specific conductance continue until pumping at the well for the water transfer has ceased.
Kelly 190 Field Well #2 Specific Conductance
Kelly 306 Well Specific Conductance
Kelly Windmill North Field Well Specific Conductance
Kelly Windmill Field Well #2 Specific Conductance
Specific Conductance Threshold


Pleasant Grove-Verona Mutual Water Company
Production Well Groundwater Level Data
Groundwater Level (Feet Below Reference Point)
0
10
20
30
40
50
60
70
80
90
100
110
120
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Date
Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.
S&O #16
S&O #19
S&O #20
Will-Lee #31

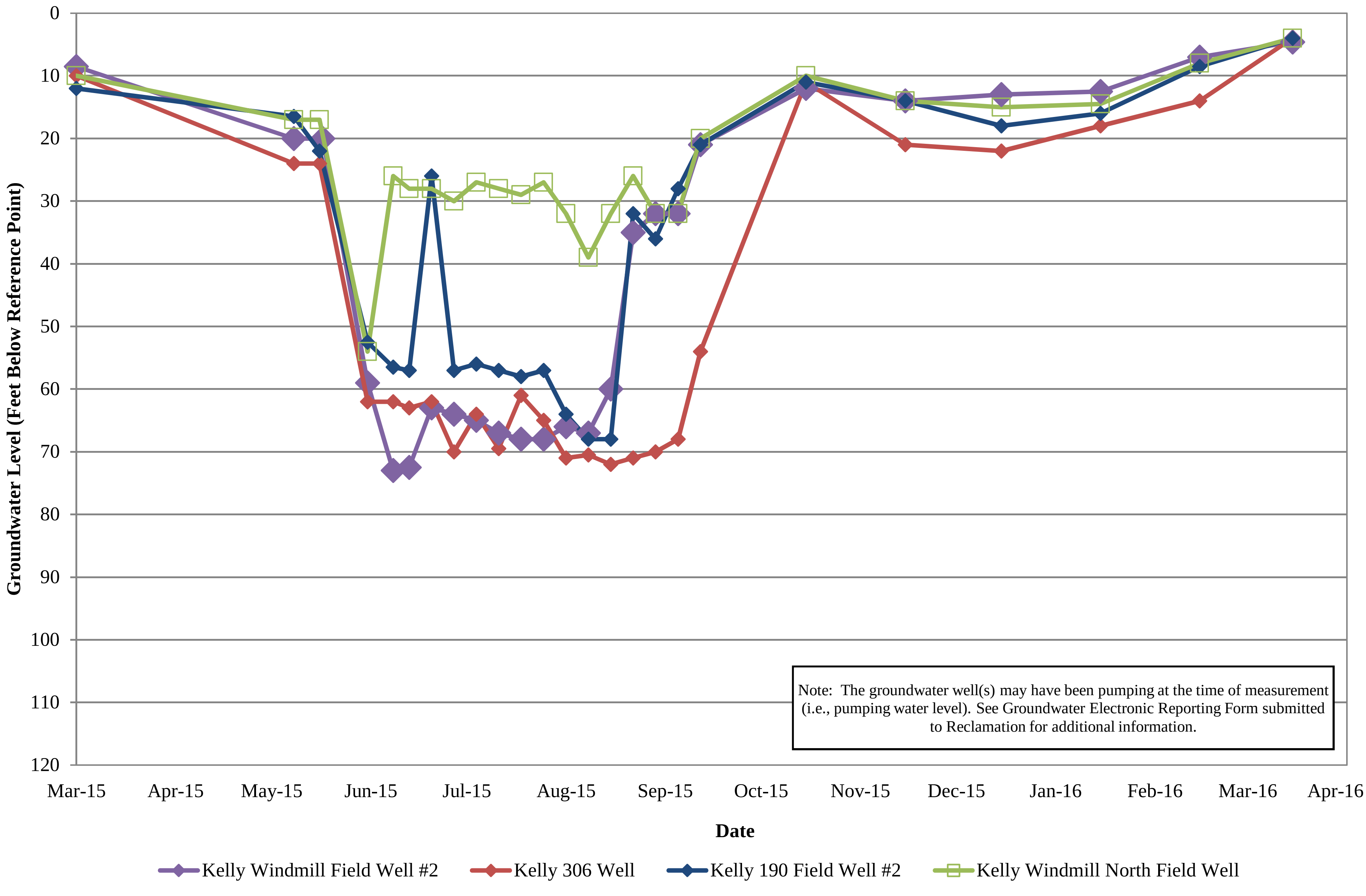

Pleasant Grove-Verona Mutual Water Company
Groundwater Production Well Specific Conductance
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
Specific Conductance (µS/cm)
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to Draft Technical Information for 2015 Water Transfers, exceedances may require further analysis.
Pursuant to prior discussions with DWR staff, wells producing groundwater in excess of the Specific Conductance Threshold are approved to continue operating, provided that monitoring of specific conductance continue until pumping at the well for the water transfer has ceased.
5/1/15
5/15/15
5/29/15
6/12/15
6/26/15
7/10/15
7/24/15
8/7/15
Date
MLF Well #1 Specific Conductance
MLF Well #2B Specific Conductance
MLF Well #12/17 Specific Conductance
MLF Well #13/15 Specific Conductance
MLF Well #16 Specific Conductance
MLF Marsh Well Specific Conductance
MLF Monster Well Specific Conductance
MLF Clubhouse B Well Specific Conductance
Specific Conductance Threshold

Pleasant Grove-Verona Mutual Water Company
Production Well Groundwater Level Data

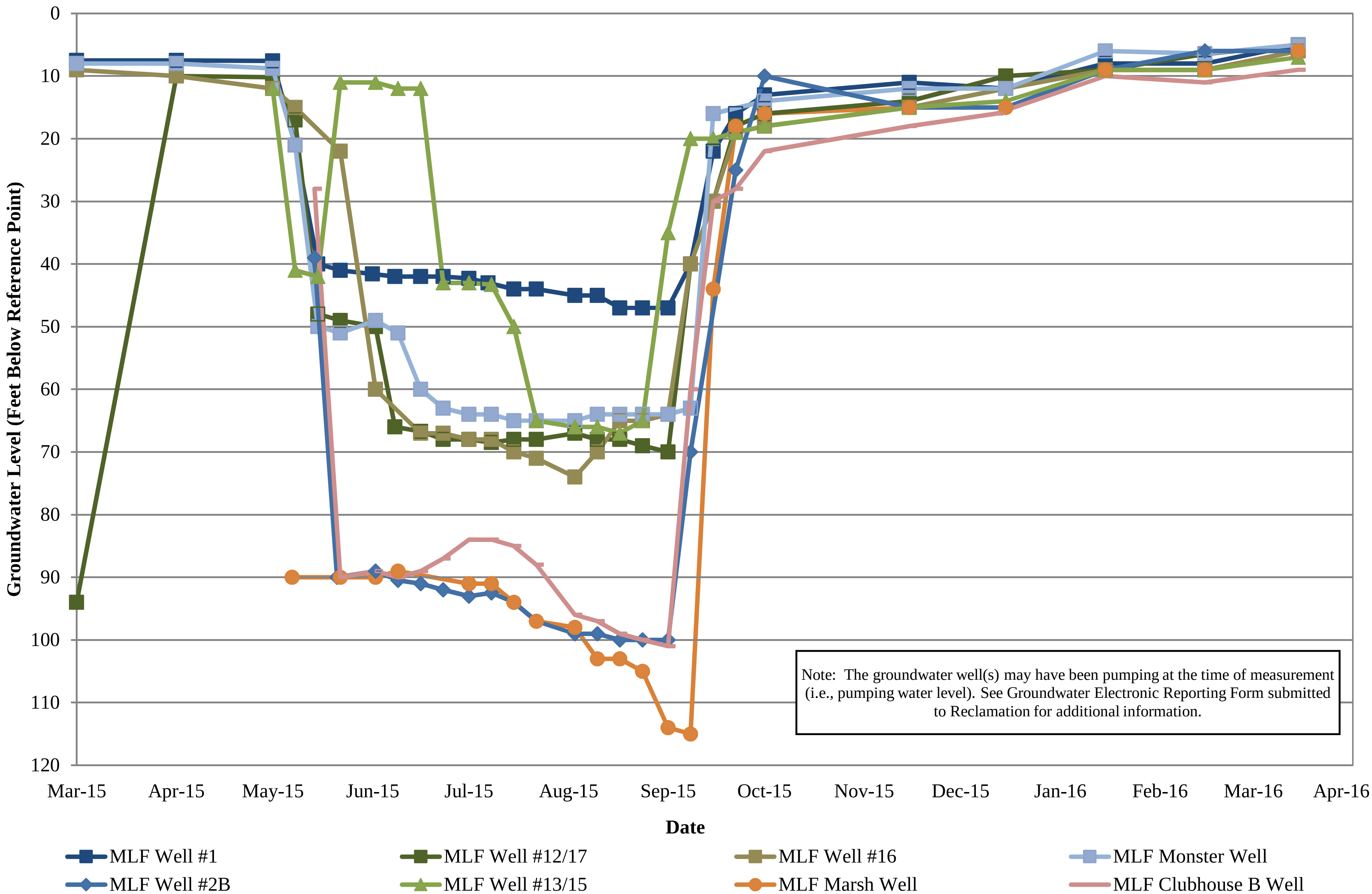


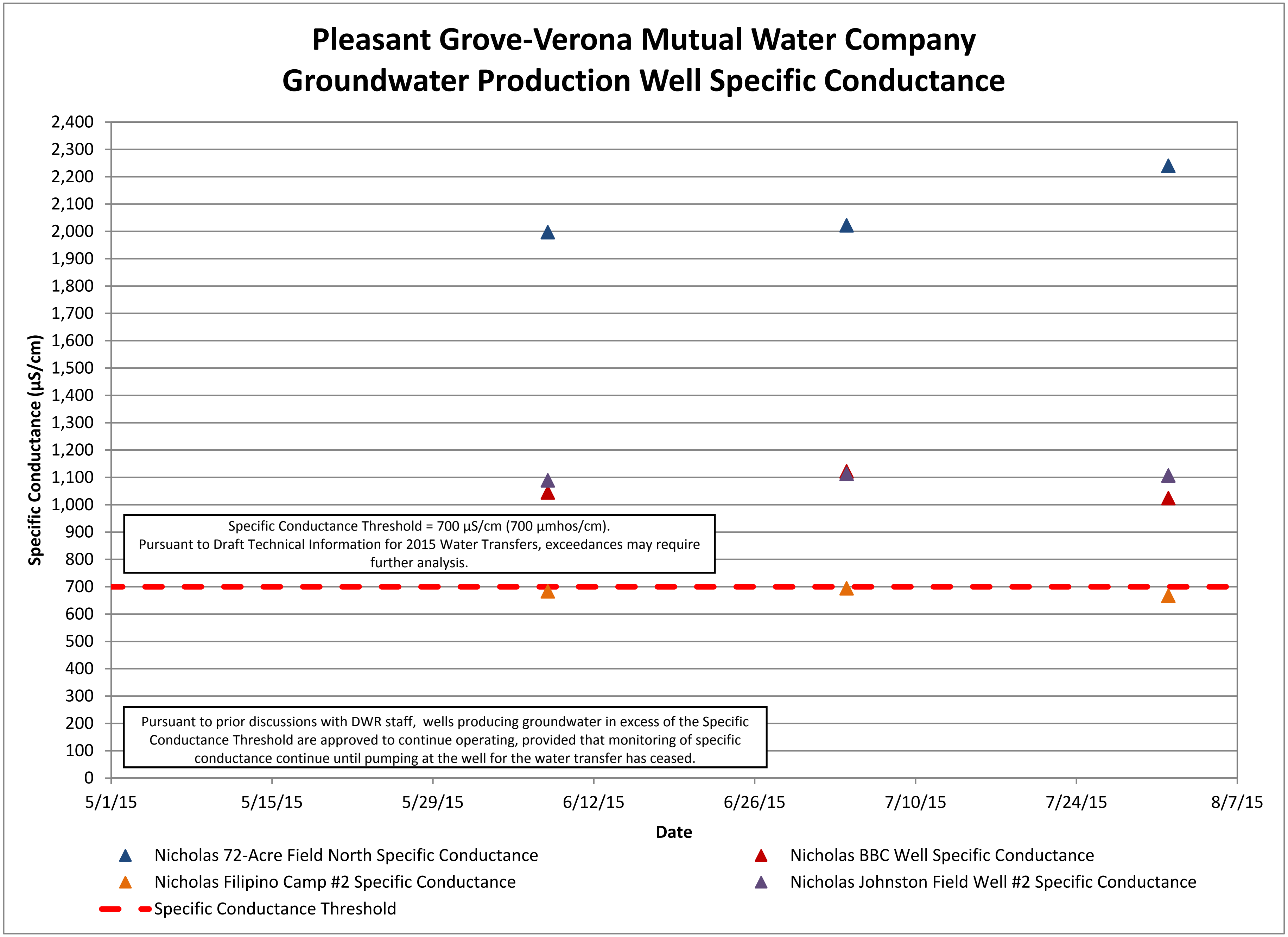

Pleasant Grove-Verona Mutual Water Company
Groundwater Production Well Specific Conductance
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
Specific Conductance (µS/cm)
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to Draft Technical Information for 2015 Water Transfers, exceedances may require further analysis.
5/1/15
5/15/15
5/29/15
6/12/15
6/26/15
7/10/15
7/24/15
8/7/15
8/21/15
Date
S&O #16 Specific Conductance
S&O #19 Specific Conductance
Will-Lee #31 Specific Conductance
Specific Conductance Threshold
S&O #20 Specific Conductance

Pleasant Grove-Verona Mutual Water Company
Production Well Groundwater Level Data



Pleasant Grove-Verona Mutual Water Company
Production Well Groundwater Level Data




Pleasant Grove-Verona Mutual Water Company
Groundwater Production Well Specific Conductance
Specific Conductance (µS/cm)
2,400
2,300
2,200
2,100
2,000
1,900
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to Draft Technical Information for 2015 Water Transfers, exceedances may require further analysis.
Pursuant to prior discussions with DWR staff, wells producing groundwater in excess of the Specific Conductance Threshold are approved to continue operating, provided that monitoring of specific conductance continue until pumping at the well for the water transfer has ceased.
5/1/15
5/15/15
5/29/15
6/12/15
6/26/15
7/10/15
7/24/15
8/7/15
Date
Nicholas 72-Acre Field North Specific Conductance
Nicholas BBC Well Specific Conductance
Nicholas Filipino Camp #2 Specific Conductance
Nicholas Johnston Field Well #2 Specific Conductance
Specific Conductance Threshold

Princeton-Codora-Glenn Irrigation District

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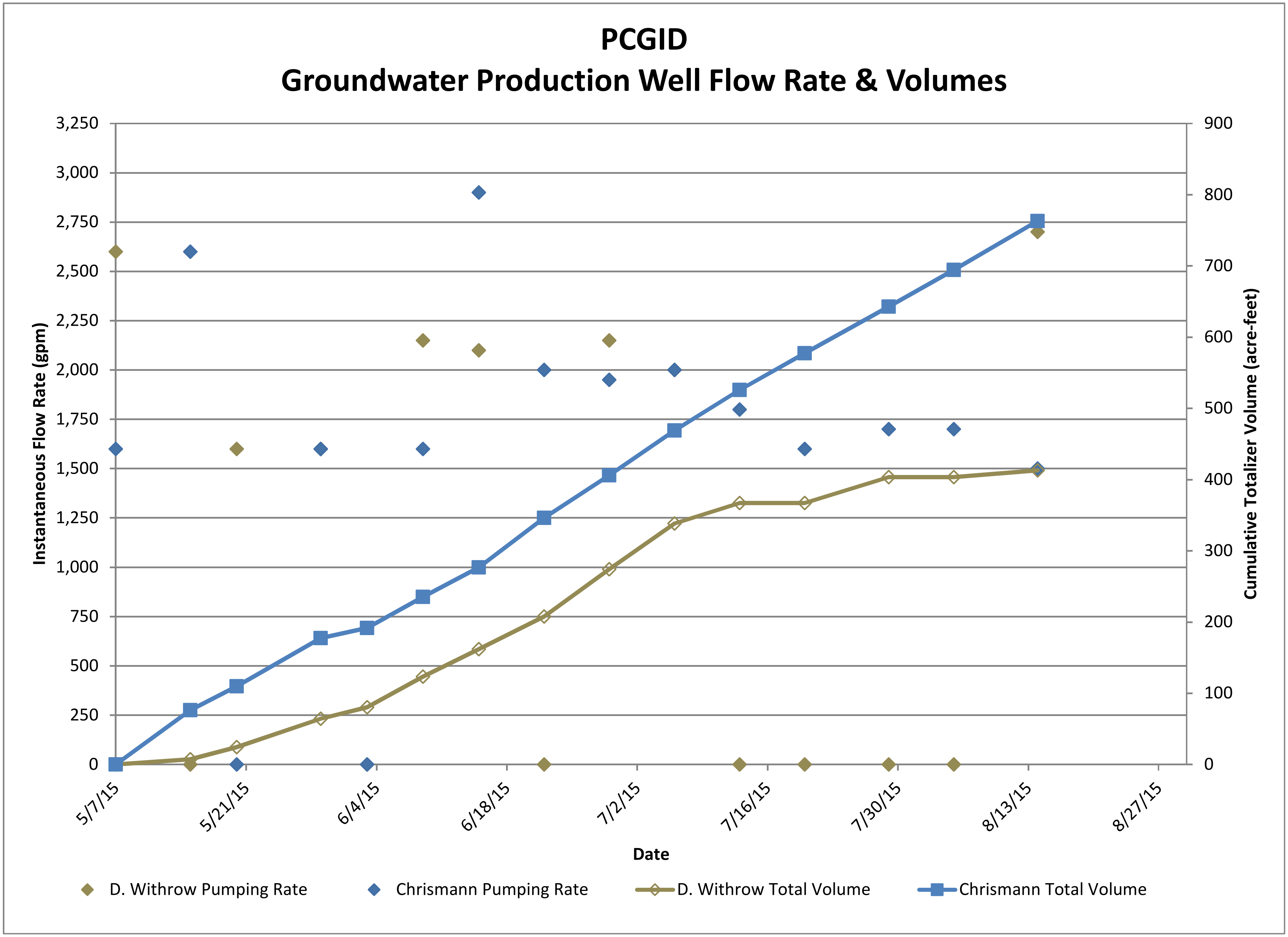
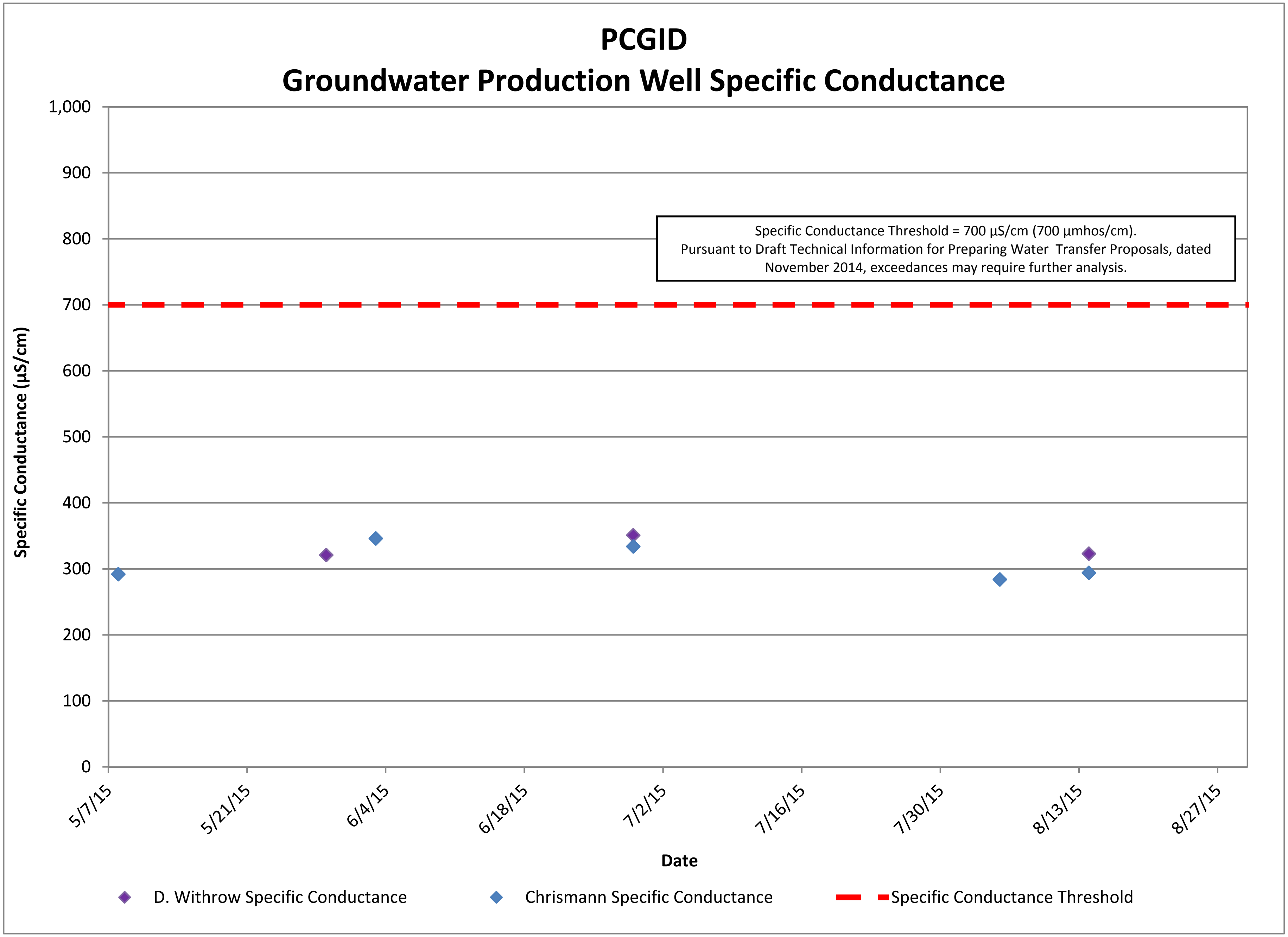
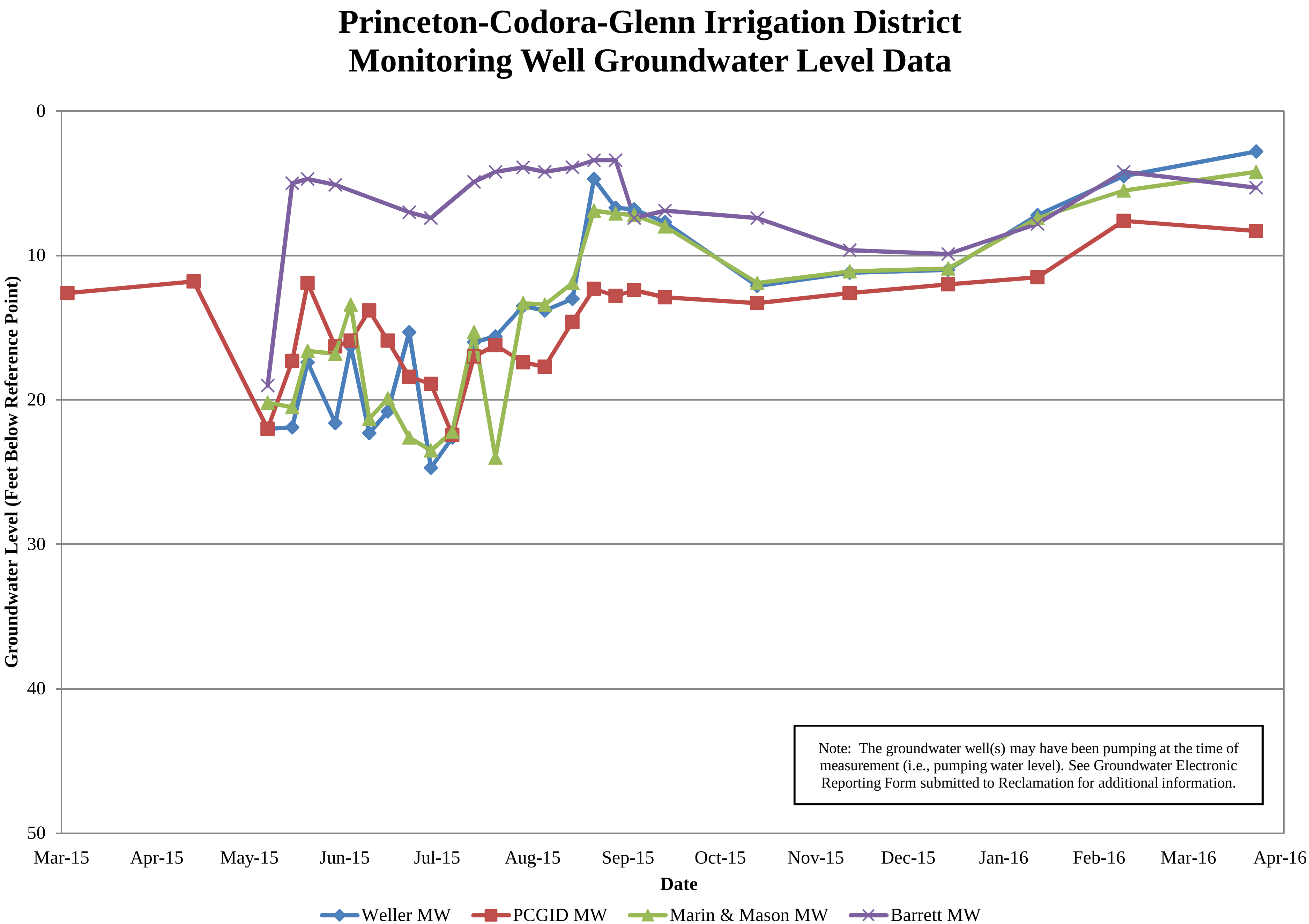
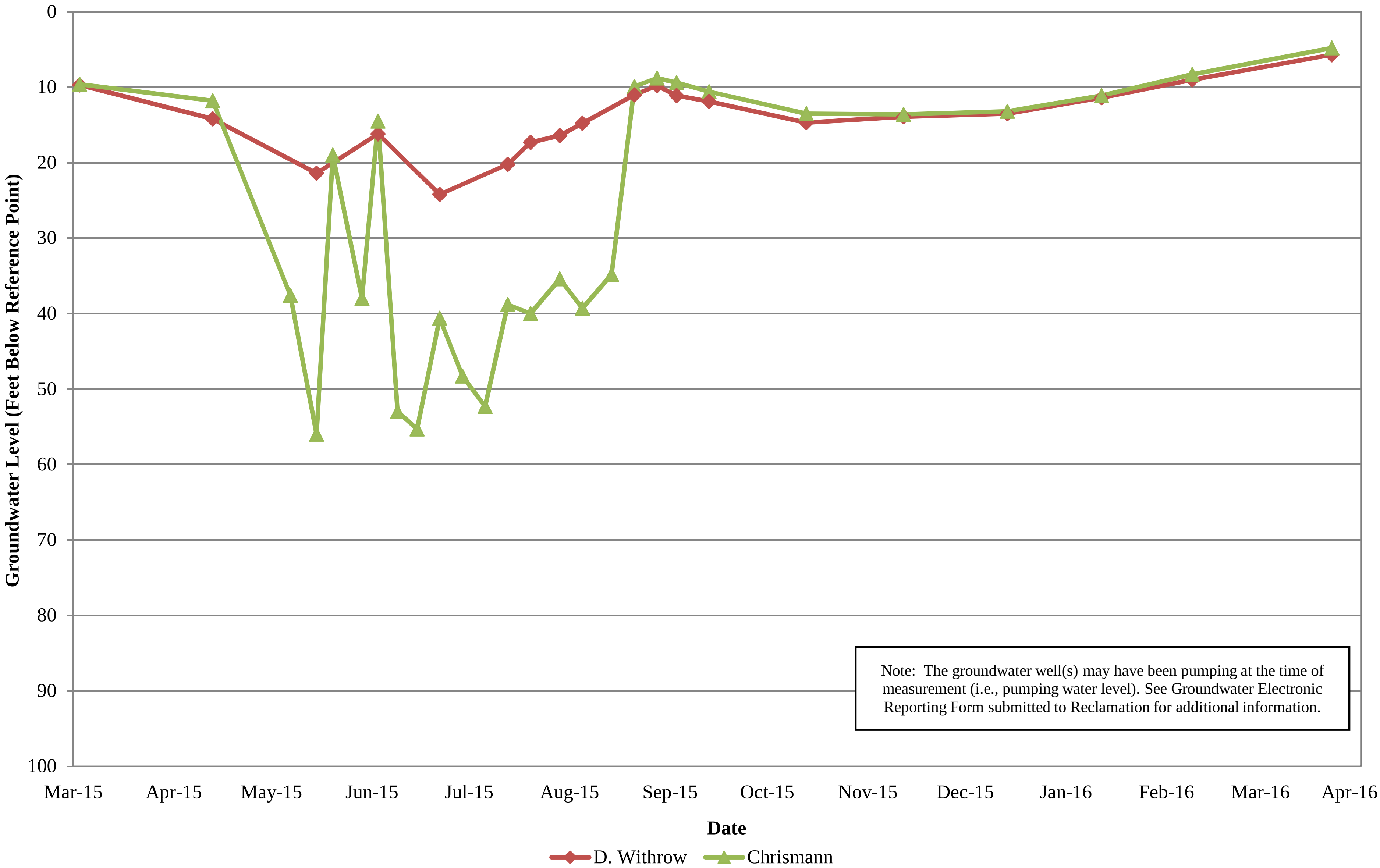

PCGID
Groundwater Production Well Flow Rate & Volumes
Instantaneous Flow Rate (gpm)
3,250
3,000
2,750
2,500
2,250
2,000
1,750
1,500
1,250
1,000
750
500
250
0
Cumulative Totalizer Volume (acre-feet)
900
800
700
600
500
400
300
200
100
0
5/7/15
5/21/15
6/4/15
6/18/15
7/2/15
7/16/15
7/30/15
8/13/15
8/27/15
Date
D. Withrow Pumping Rate
Chrismann Pumping Rate
D. Withrow Total Volume
Chrismann Total Volume

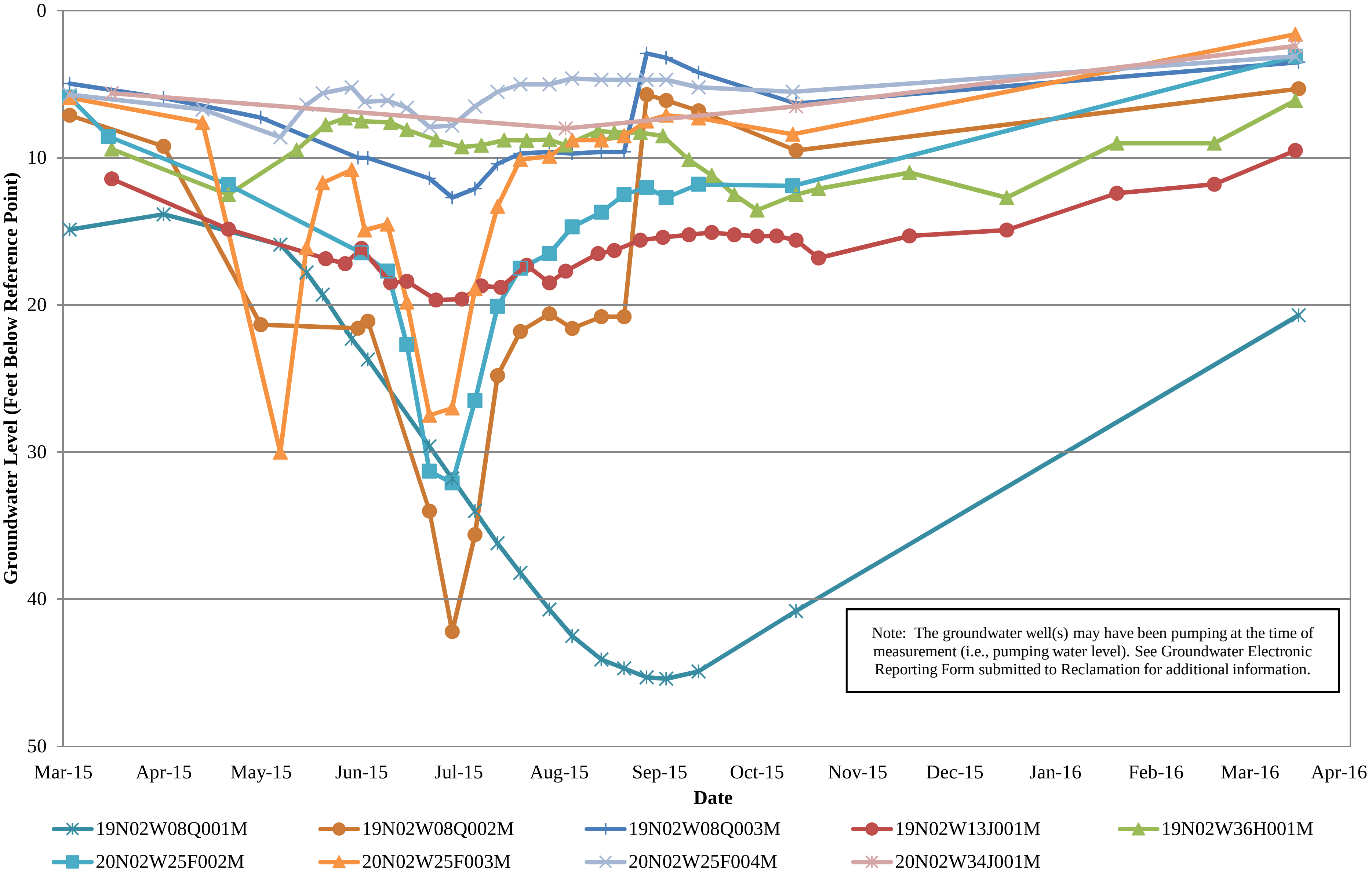

PCGID
Groundwater Production Well Specific Conductance
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to Draft Technical Information for Preparing Water Transfer Proposals, dated November 2014, exceedances may require further analysis.
Specific Conductance (µS/cm)
1,000
900
800
700
600
500
400
300
200
100
0
5/7/15
5/21/15
6/4/15
6/18/15
7/2/15
7/16/15
7/30/15
8/13/15
8/27/15
Date
D. Withrow Specific Conductance
Chrismann Specific Conductance
Specific Conductance Threshold


Princeton-Codora-Glenn Irrigation District
Monitoring Well Groundwater Level Data
Groundwater Level (Feet Below Reference Point)
0
10
20
30
40
50
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Date
Weller MW
PCGID MW
Marin & Mason MW
Barrett MW
Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.

Princeton-Codora-Glenn Irrigation District
Production Well Groundwater Level Data



Princeton-Codora-Glenn Irrigation District
DWR Monitoring Well Groundwater Level Data



Provident Irrigation District

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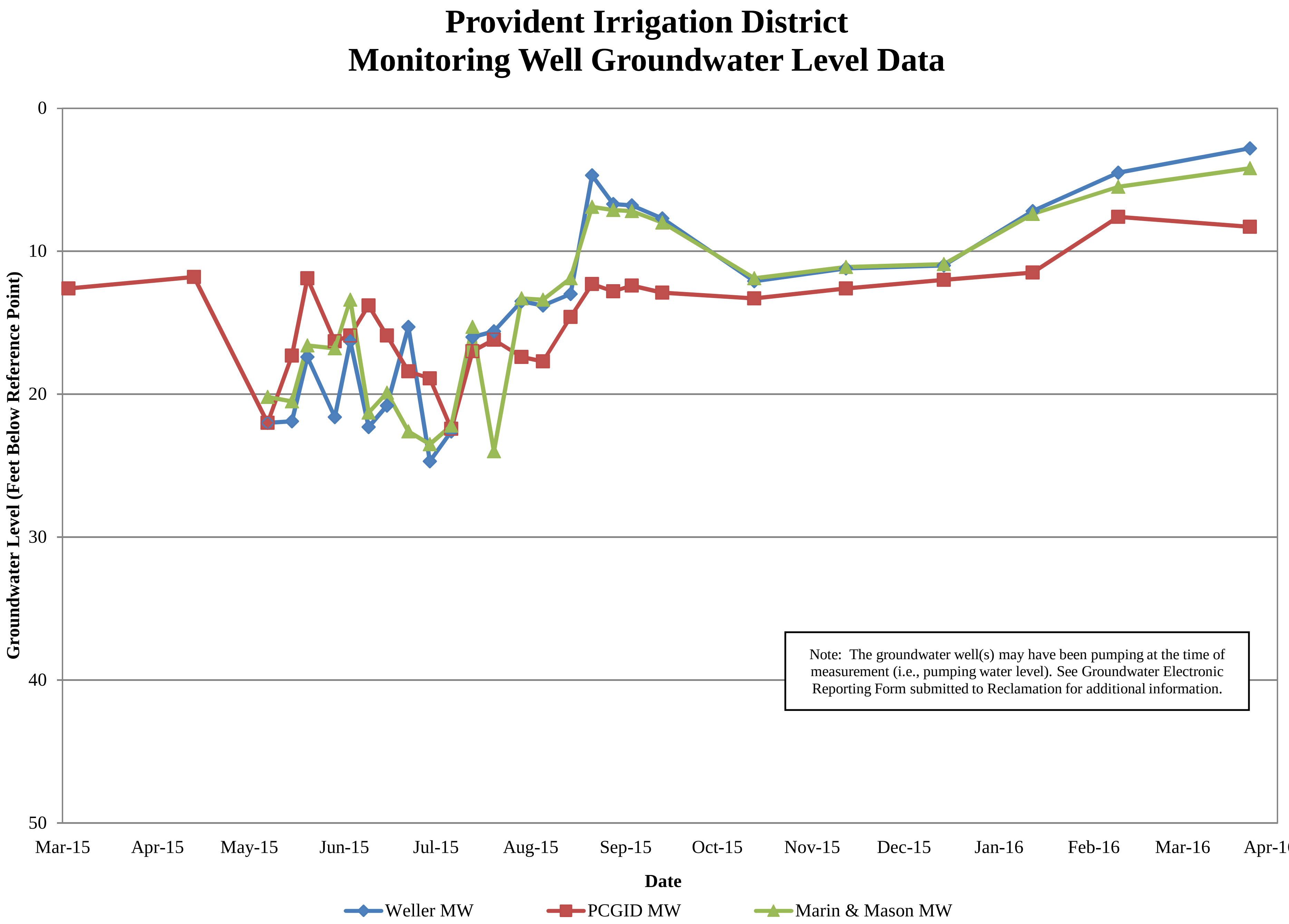
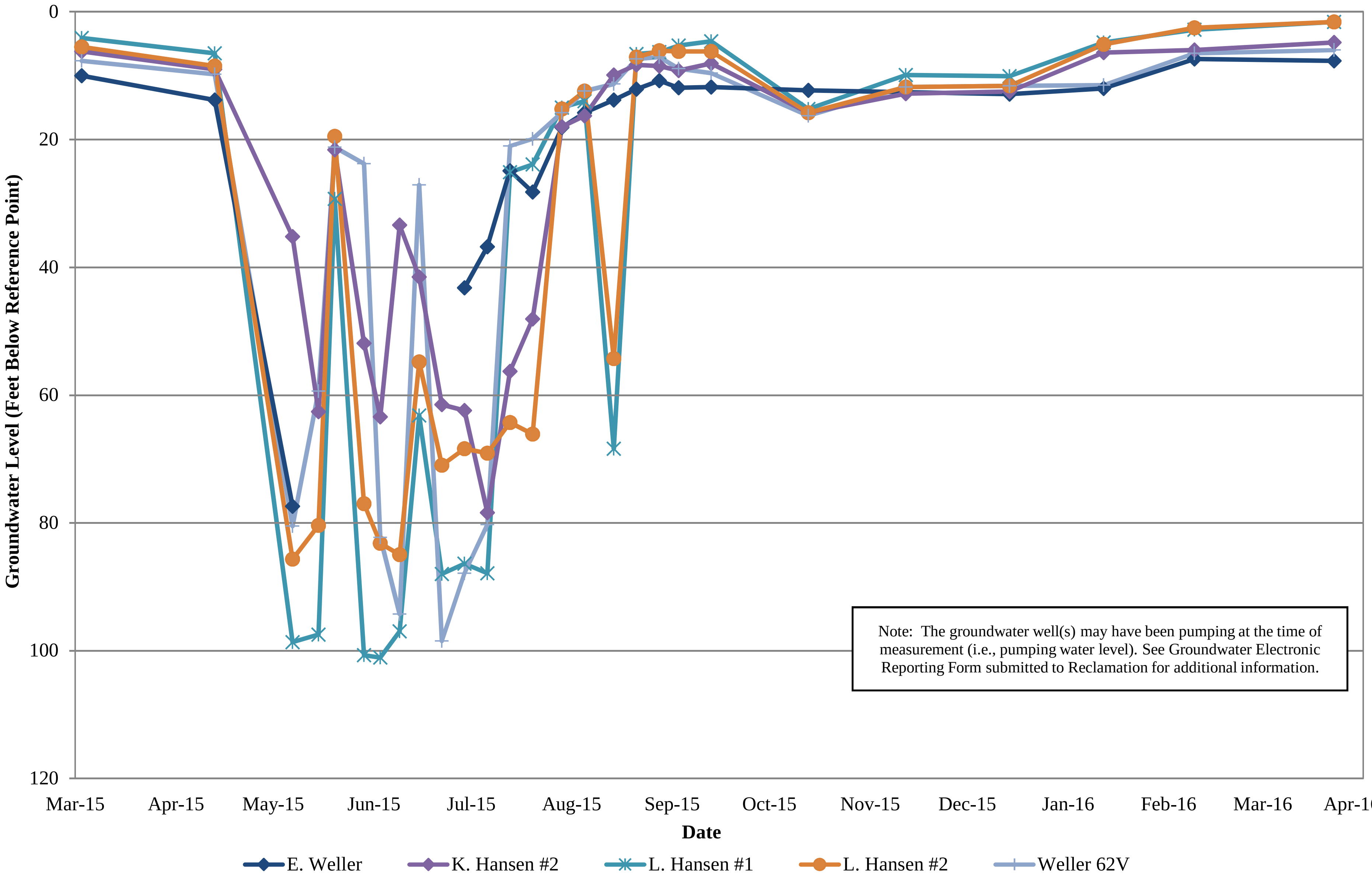
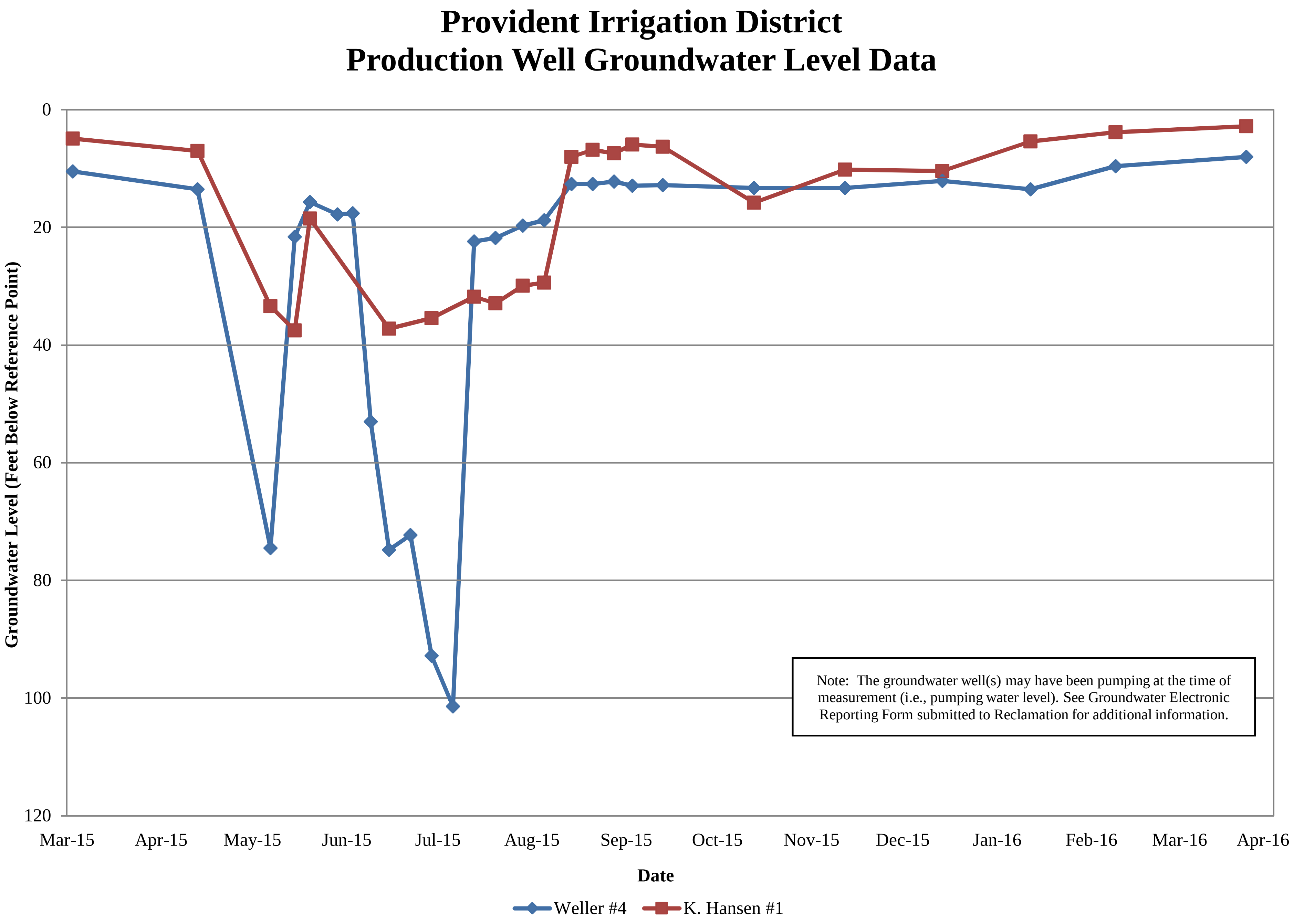
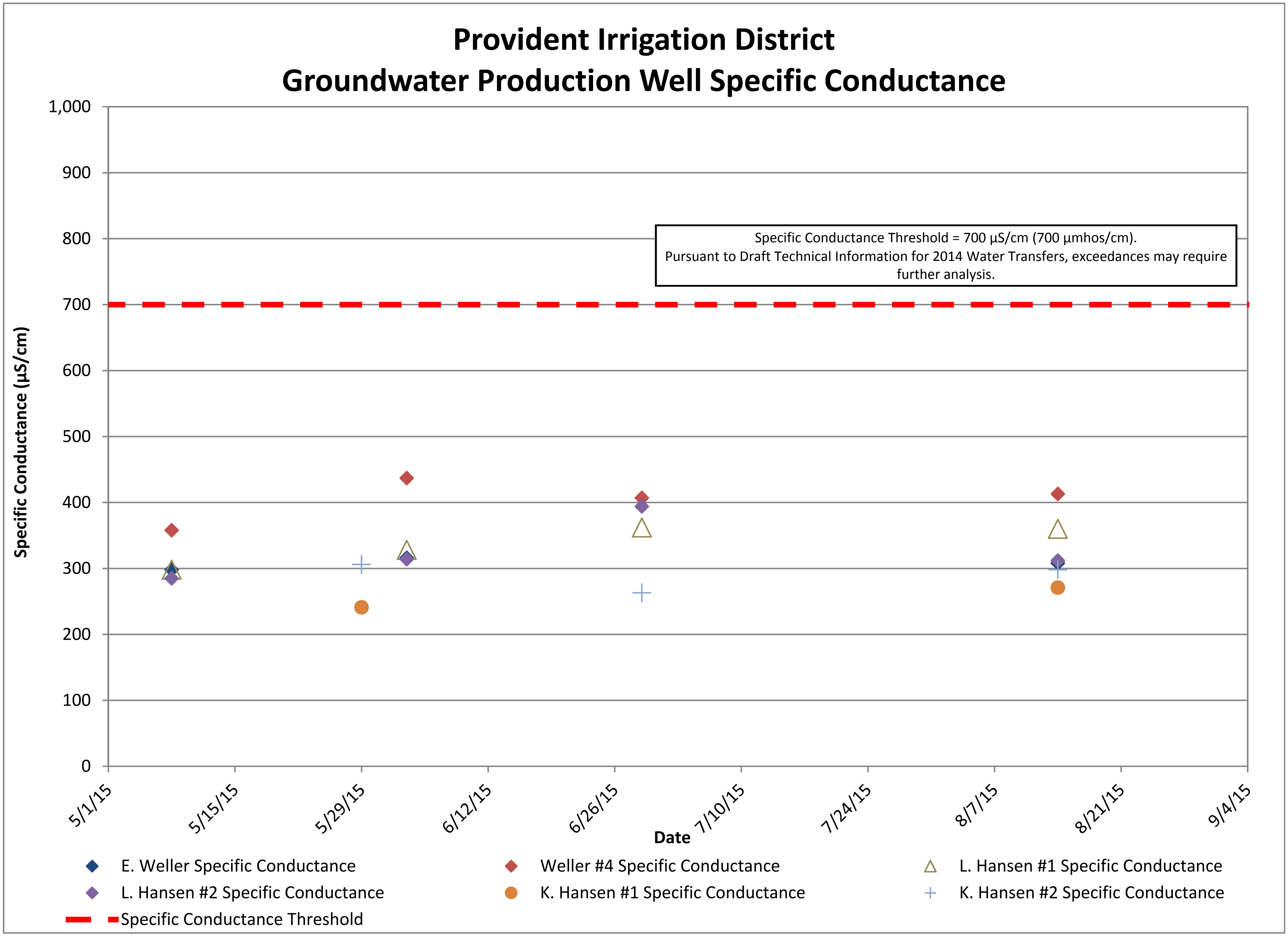


Provident Irrigation District
Monitoring Well Groundwater Level Data
Groundwater Level (Feet Below Reference Point)
0
10
20
30
40
50
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Date
Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.
Weller MW
PCGID MW
Marin & Mason MW

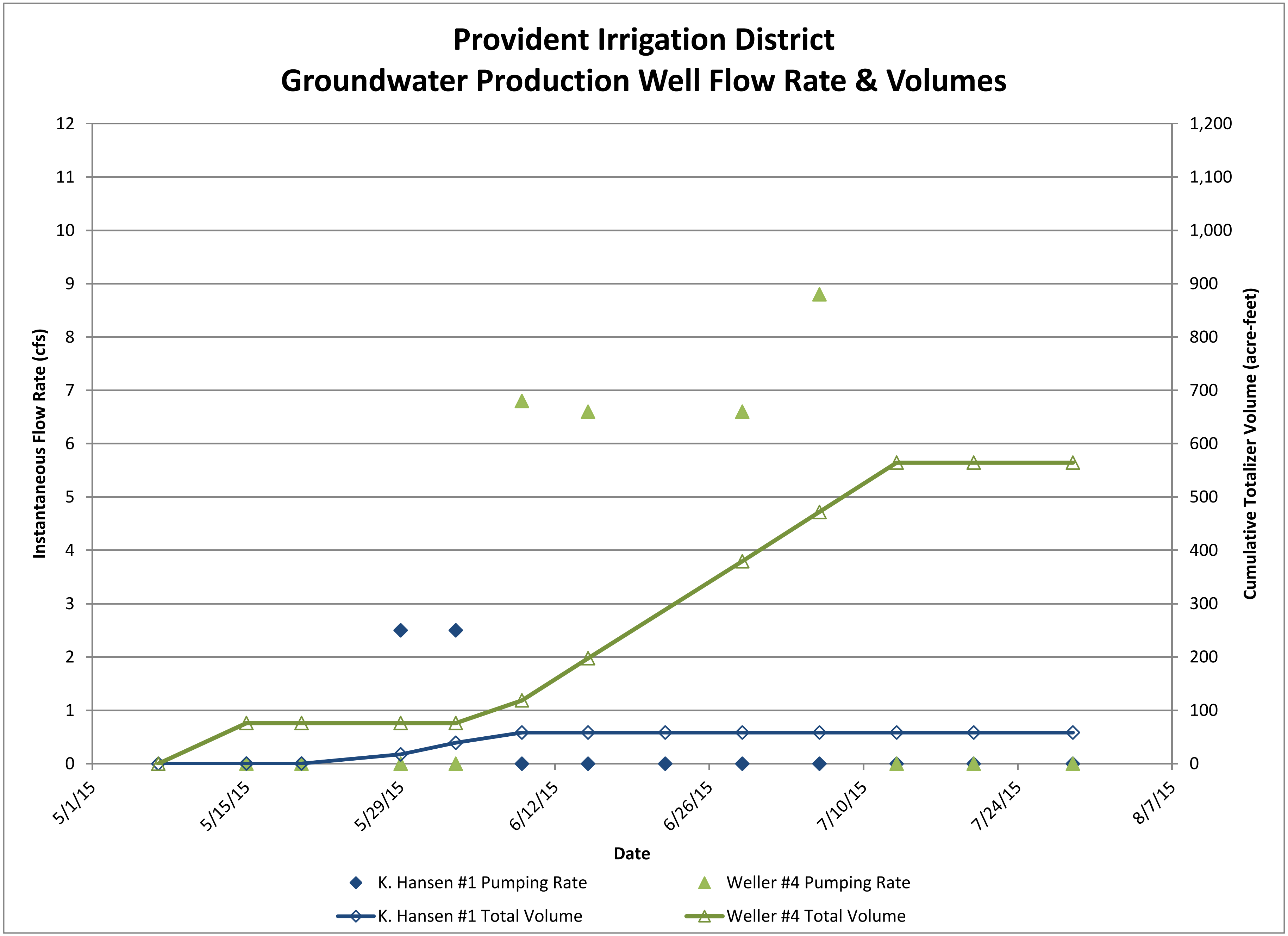
Provident Irrigation District
Production Well Groundwater Level Data



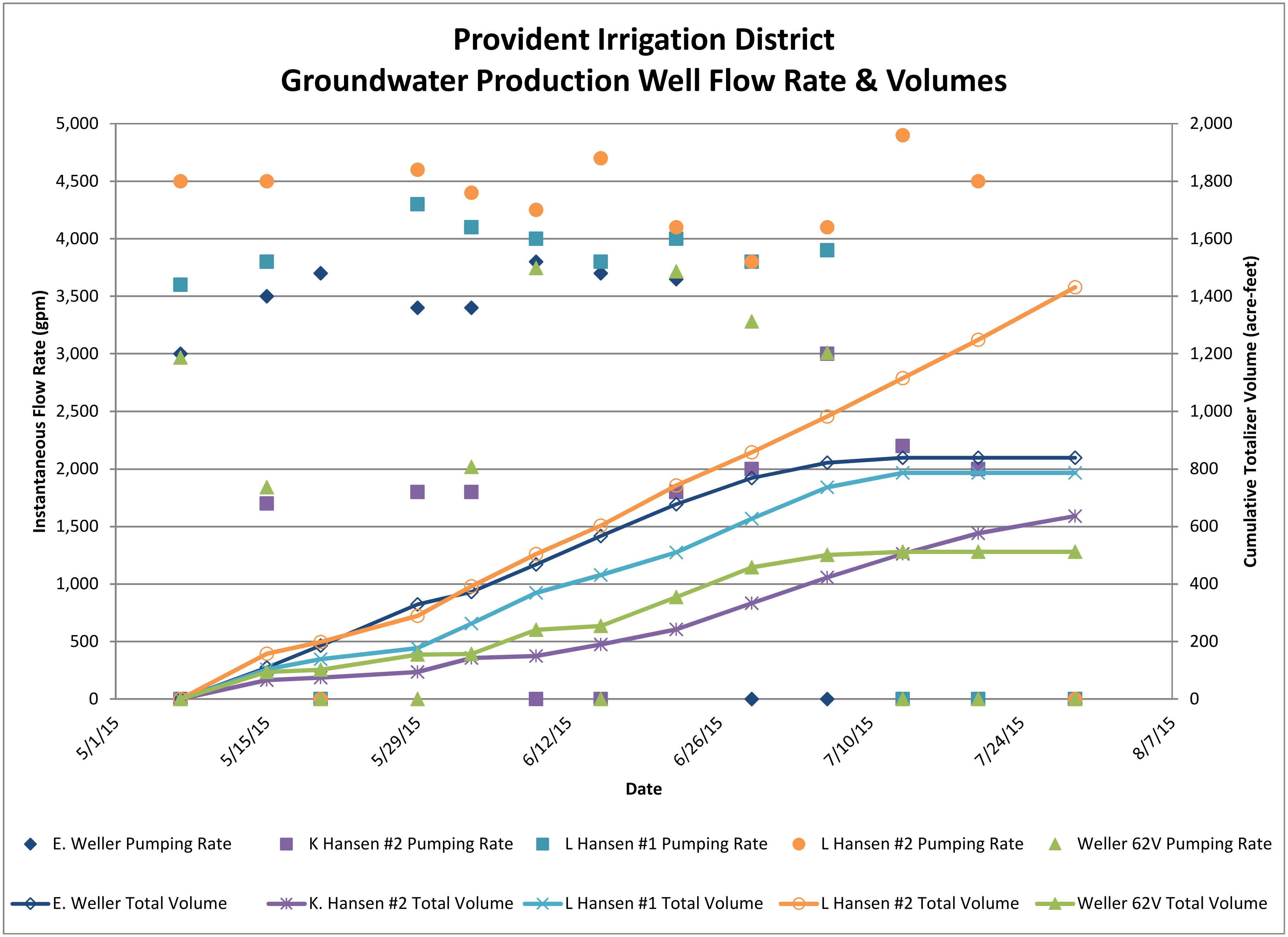

Provident Irrigation District
Production Well Groundwater Level Data
0
20
40
60
80
100
120
Groundwater Level (Feet Below Reference Point)
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Date
Weller #4
K. Hansen #1
Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.



Provident Irrigation District
Groundwater Production Well Specific Conductance
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to Draft Technical Information for 2014 Water Transfers, exceedances may require further analysis.
Specific Conductance (µS/cm)
1,000
900
800
700
600
500
400
300
200
100
0
5/1/15
5/15/15
5/29/15
6/12/15
6/26/15
7/10/15
7/24/15
8/7/15
8/21/15
9/4/15
Date
E. Weller Specific Conductance
Weller #4 Specific Conductance
L. Hansen #1 Specific Conductance
L. Hansen #2 Specific Conductance
K. Hansen #1 Specific Conductance
K. Hansen #2 Specific Conductance
Specific Conductance Threshold

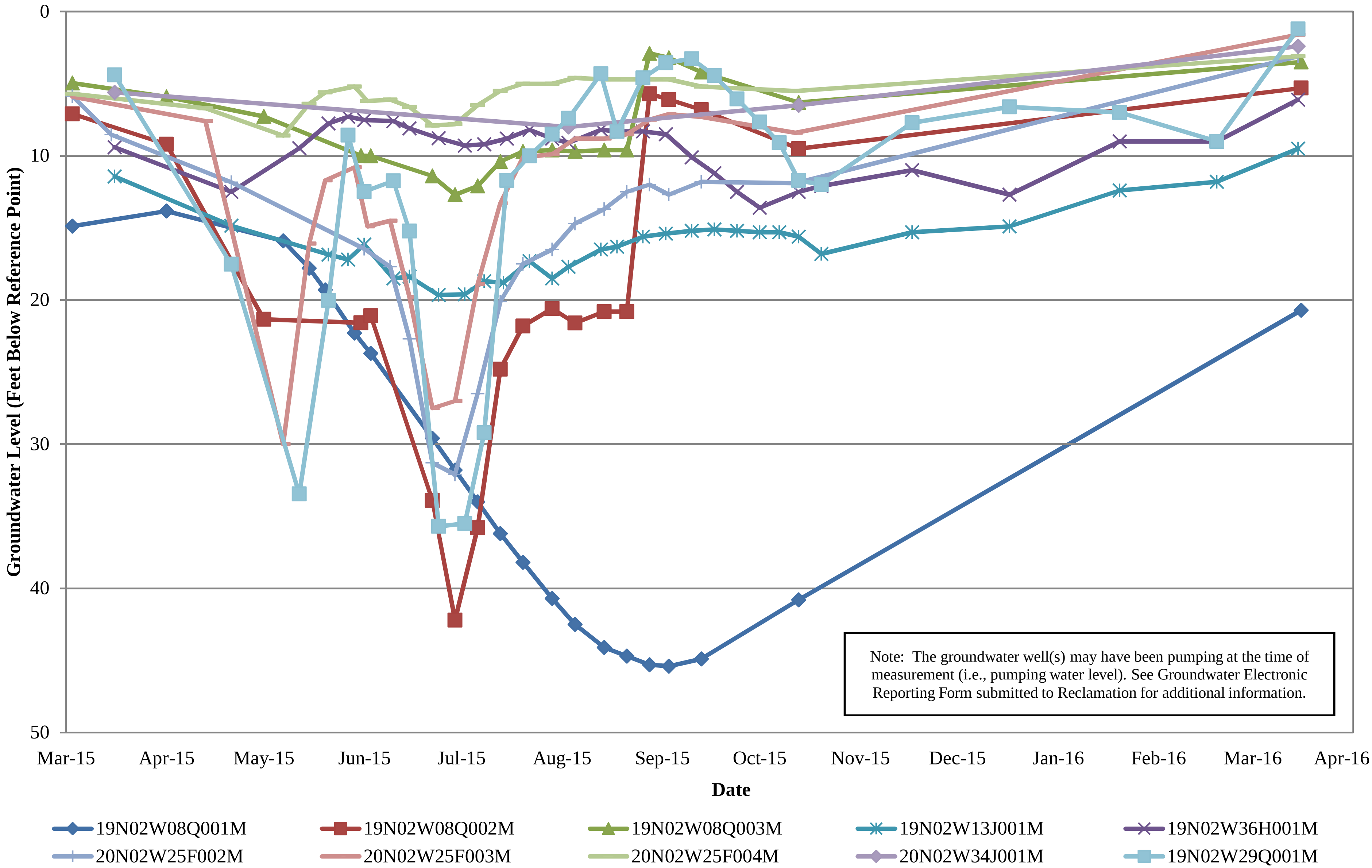


Provident Irrigation District
Groundwater Production Well Flow Rate & Volumes
Instantaneous Flow Rate (cfs)
Cumulative Totalizer Volume (acre-feet)
0
1
2
3
4
5
6
7
8
9
10
11
12
0
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
5/1/15
5/15/15
5/29/15
6/12/15
6/26/15
7/10/15
7/24/15
8/7/15
Date
K. Hansen #1 Pumping Rate
Weller #4 Pumping Rate
K. Hansen #1 Total Volume
Weller #4 Total Volume



Provident Irrigation District
Groundwater Production Well Flow Rate & Volumes
Instantaneous Flow Rate (gpm)
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Cumulative Totalizer Volume (acre-feet)
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
5/1/15
5/15/15
5/29/15
6/12/15
6/26/15
7/10/15
7/24/15
8/7/15
Date
E. Weller Pumping Rate
K Hansen #2 Pumping Rate
L Hansen #1 Pumping Rate
L Hansen #2 Pumping Rate
Weller 62V Pumping Rate
E. Weller Total Volume
K. Hansen #2 Total Volume
L Hansen #1 Total Volume
L Hansen #2 Total Volume
Weller 62V Total Volume

Provident Irrigation District
DWR Monitoring Well Groundwater Level Data



Reclamation District No. 108

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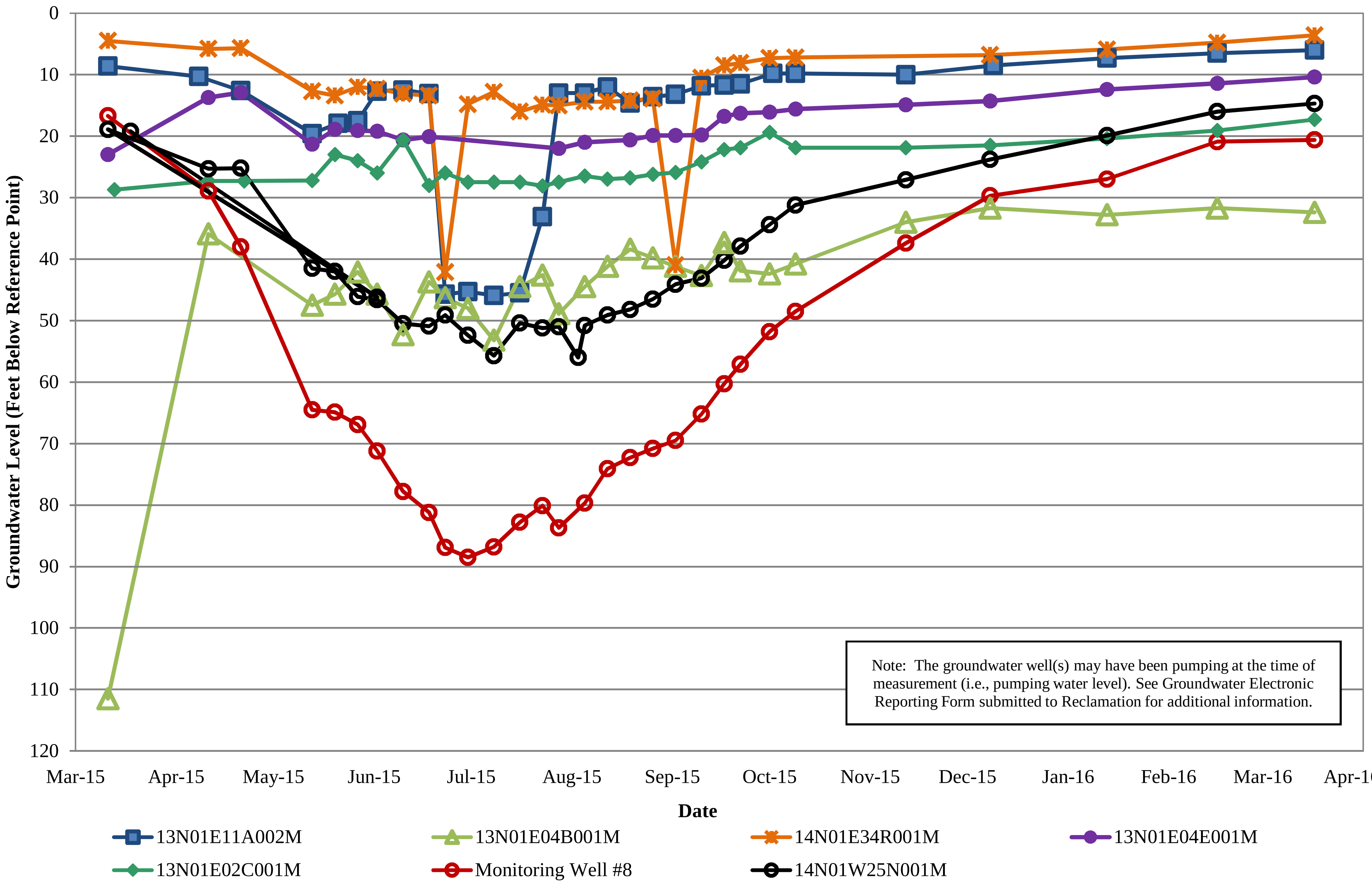
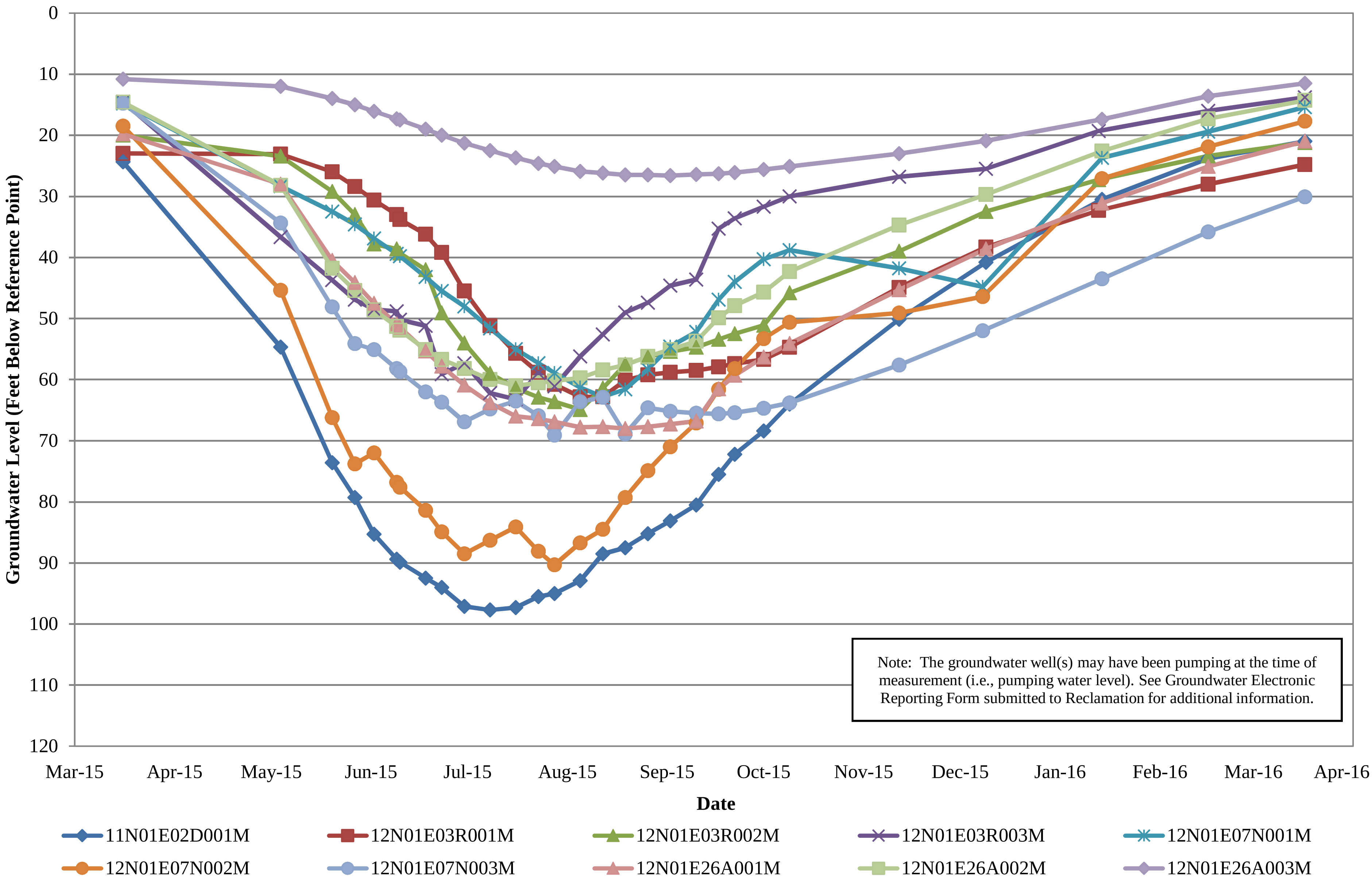
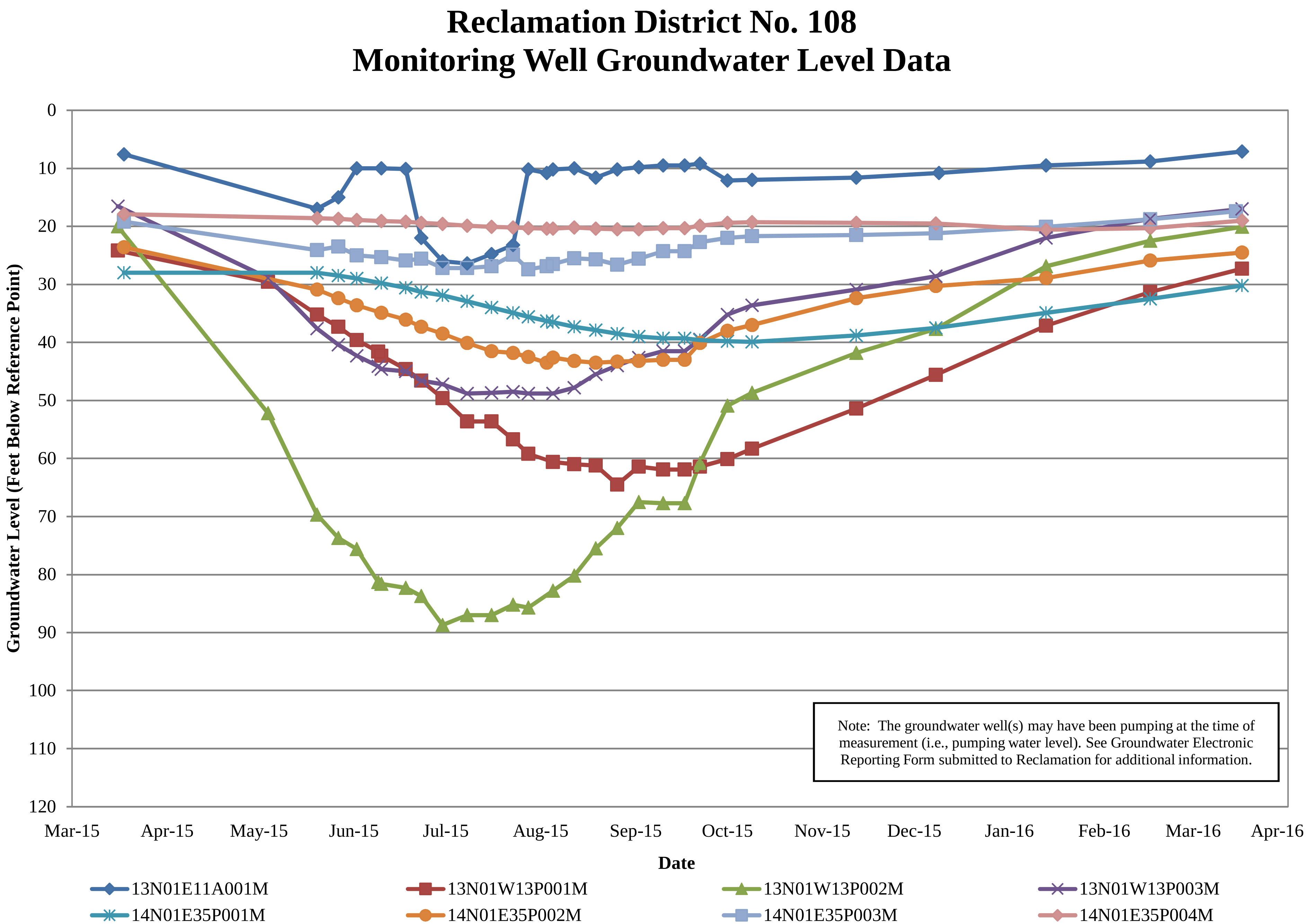
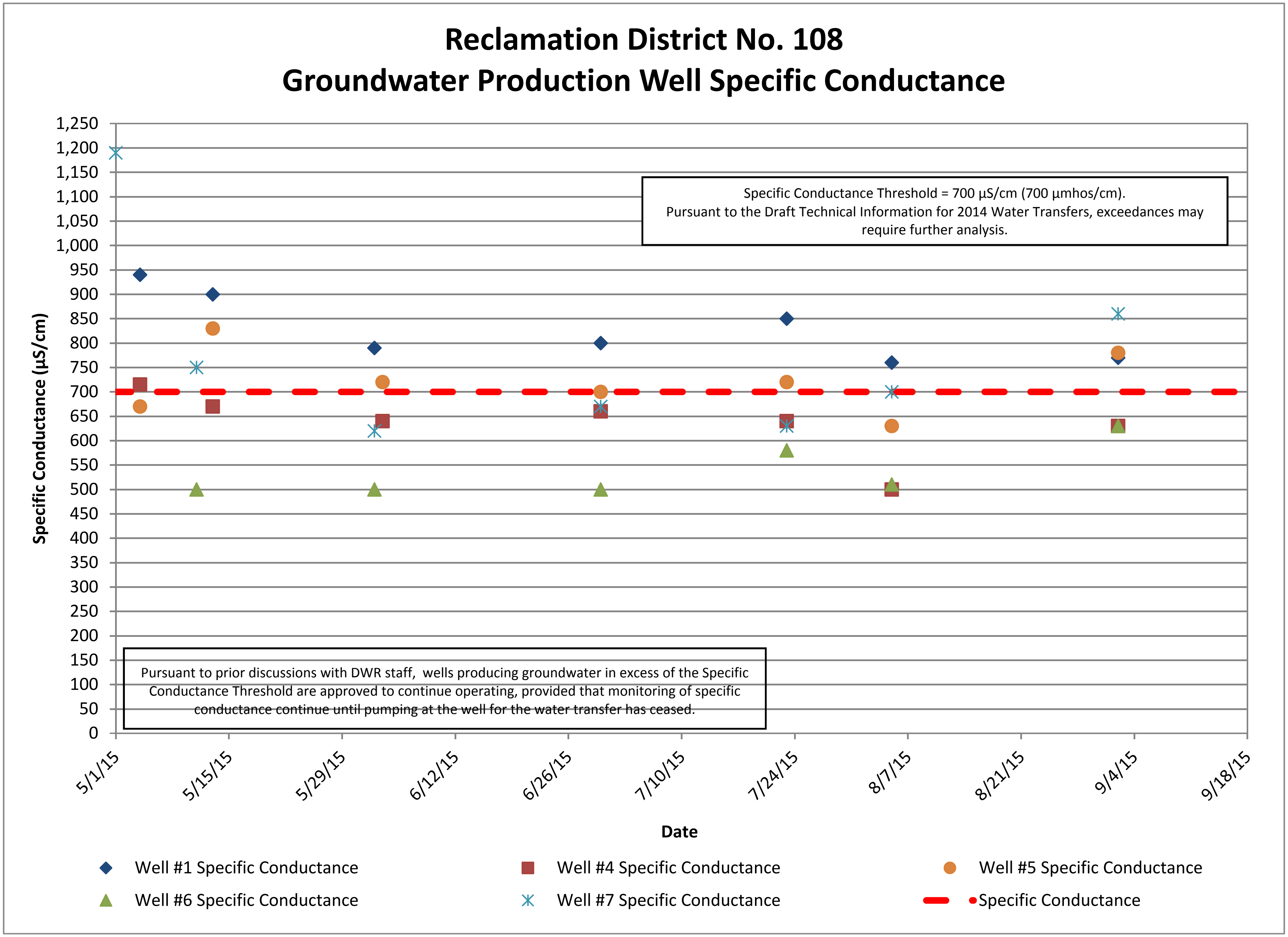
Reclamation District No. 108
Monitoring Well Groundwater Level Data



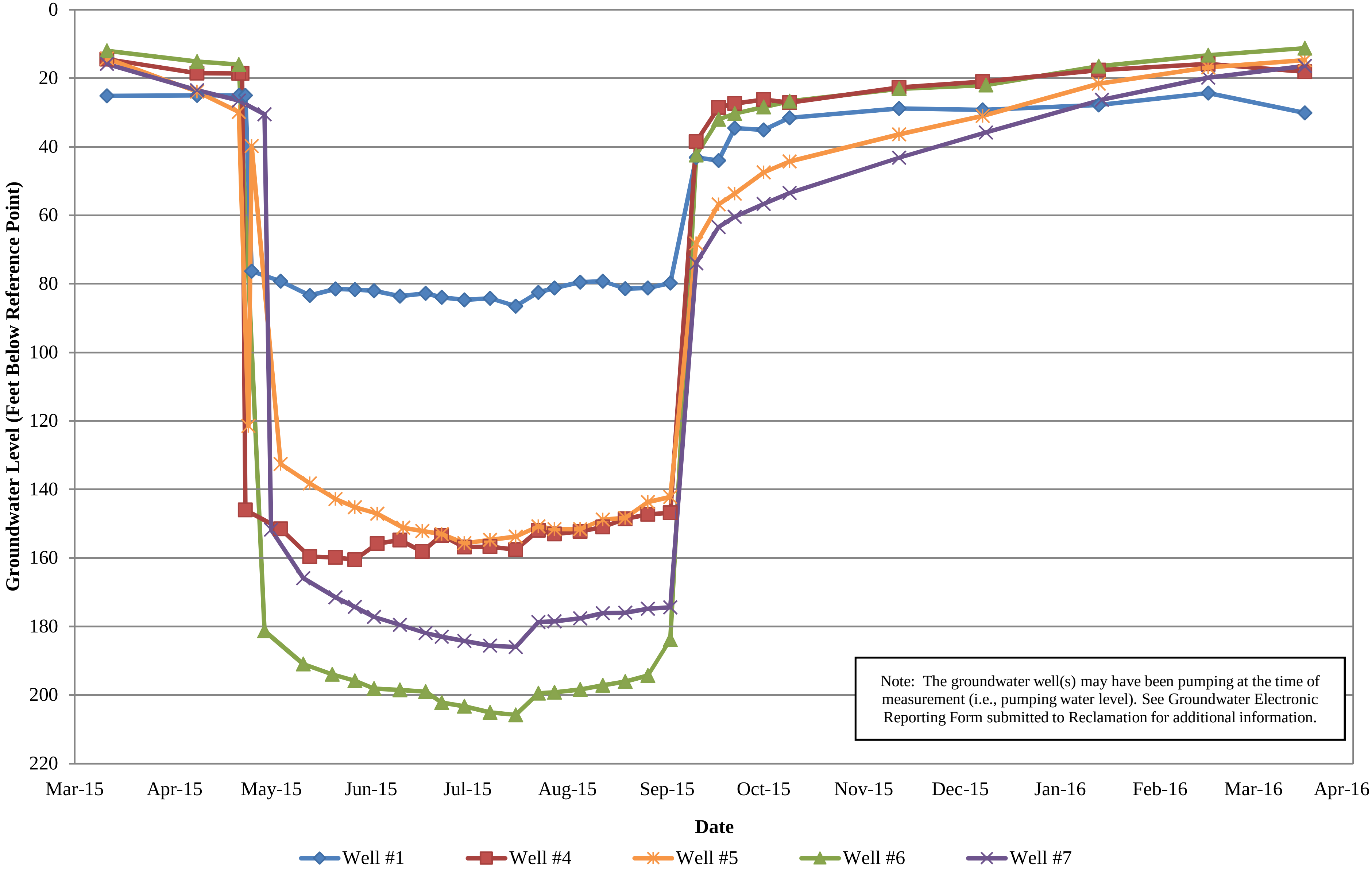
Reclamation District No. 108
Monitoring Well Groundwater Level Data

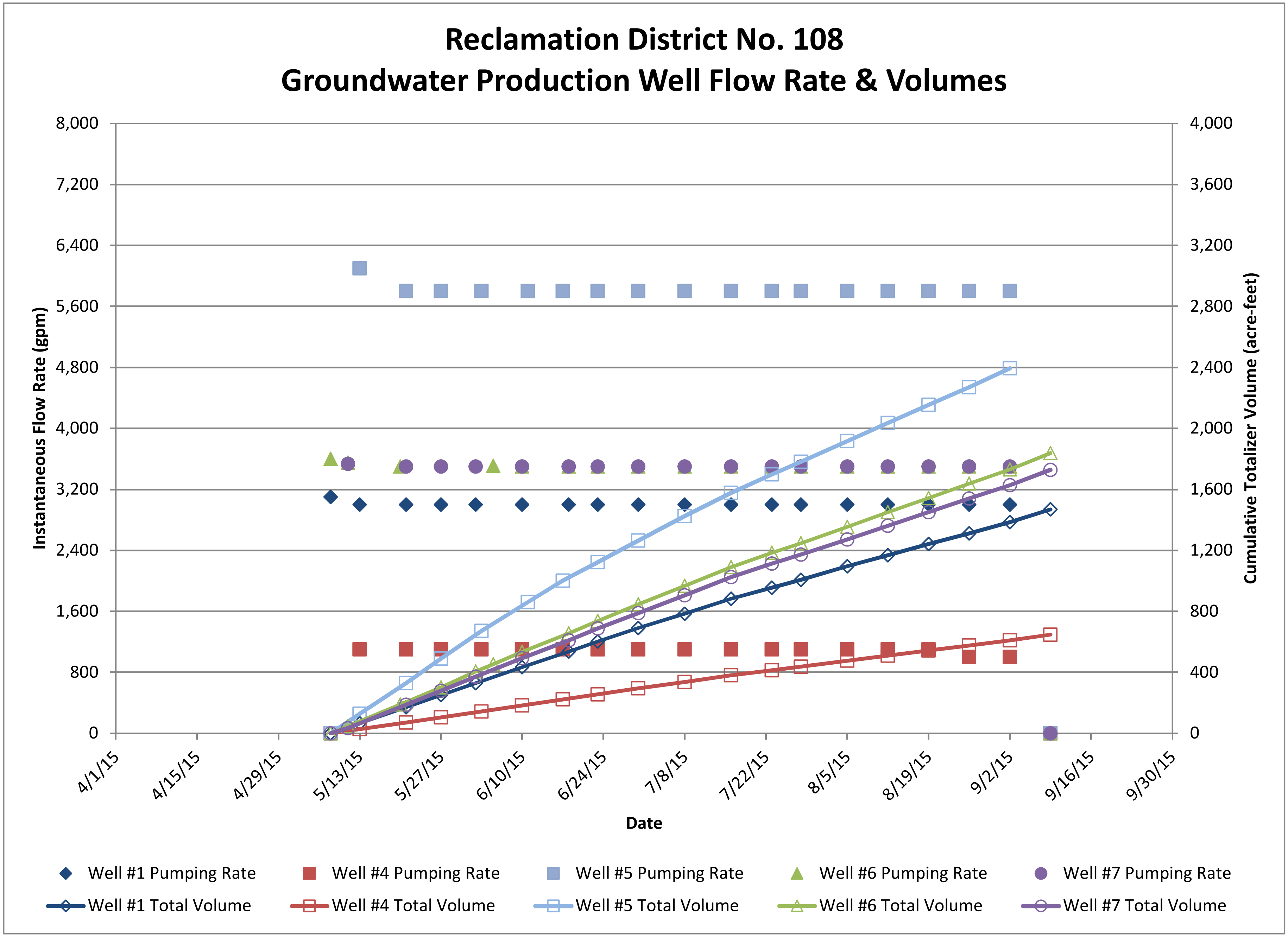



Reclamation District No. 108
Monitoring Well Groundwater Level Data
Groundwater Level (Feet Below Reference Point)
0
10
20
30
40
50
60
70
80
90
100
110
120
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Date
Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.
13N01E11A001M
13N01W13P001M
13N01W13P002M
13N01W13P003M
14N01E35P001M
14N01E35P002M
14N01E35P003M
14N01E35P004M


Reclamation District No. 108
Groundwater Production Well Specific Conductance
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to the Draft Technical Information for 2014 Water Transfers, exceedances may require further analysis.
Pursuant to prior discussions with DWR staff, wells producing groundwater in excess of the Specific Conductance Threshold are approved to continue operating, provided that monitoring of specific conductance continue until pumping at the well for the water transfer has ceased.
Specific Conductance (µS/cm)
1,250
1,200
1,150
1,100
1,050
1,000
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
5/1/15
5/15/15
5/29/15
6/12/15
6/26/15
7/10/15
7/24/15
8/7/15
8/21/15
9/4/15
9/18/15
Date
Well #1 Specific Conductance
Well #4 Specific Conductance
Well #5 Specific Conductance
Well #6 Specific Conductance
Well #7 Specific Conductance
Specific Conductance

Reclamation District No. 108
Production Well Groundwater Level Data





Reclamation District No. 108
Groundwater Production Well Flow Rate & Volumes
Instantaneous Flow Rate (gpm)
Cumulative Totalizer Volume (acre-feet)
8,000
7,200
6,400
5,600
4,800
4,000
3,200
2,400
1,600
800
0
4,000
3,600
3,200
2,800
2,400
2,000
1,600
1,200
800
400
0
4/1/15
4/15/15
4/29/15
5/13/15
5/27/15
6/10/15
6/24/15
7/8/15
7/22/15
8/5/15
8/19/15
9/2/15
9/16/15
9/30/15
Date
Well #1 Pumping Rate
Well #4 Pumping Rate
Well #5 Pumping Rate
Well #6 Pumping Rate
Well #7 Pumping Rate
Well #1 Total Volume
Well #4 Total Volume
Well #5 Total Volume
Well #6 Total Volume
Well #7 Total Volume

River Garden Farms

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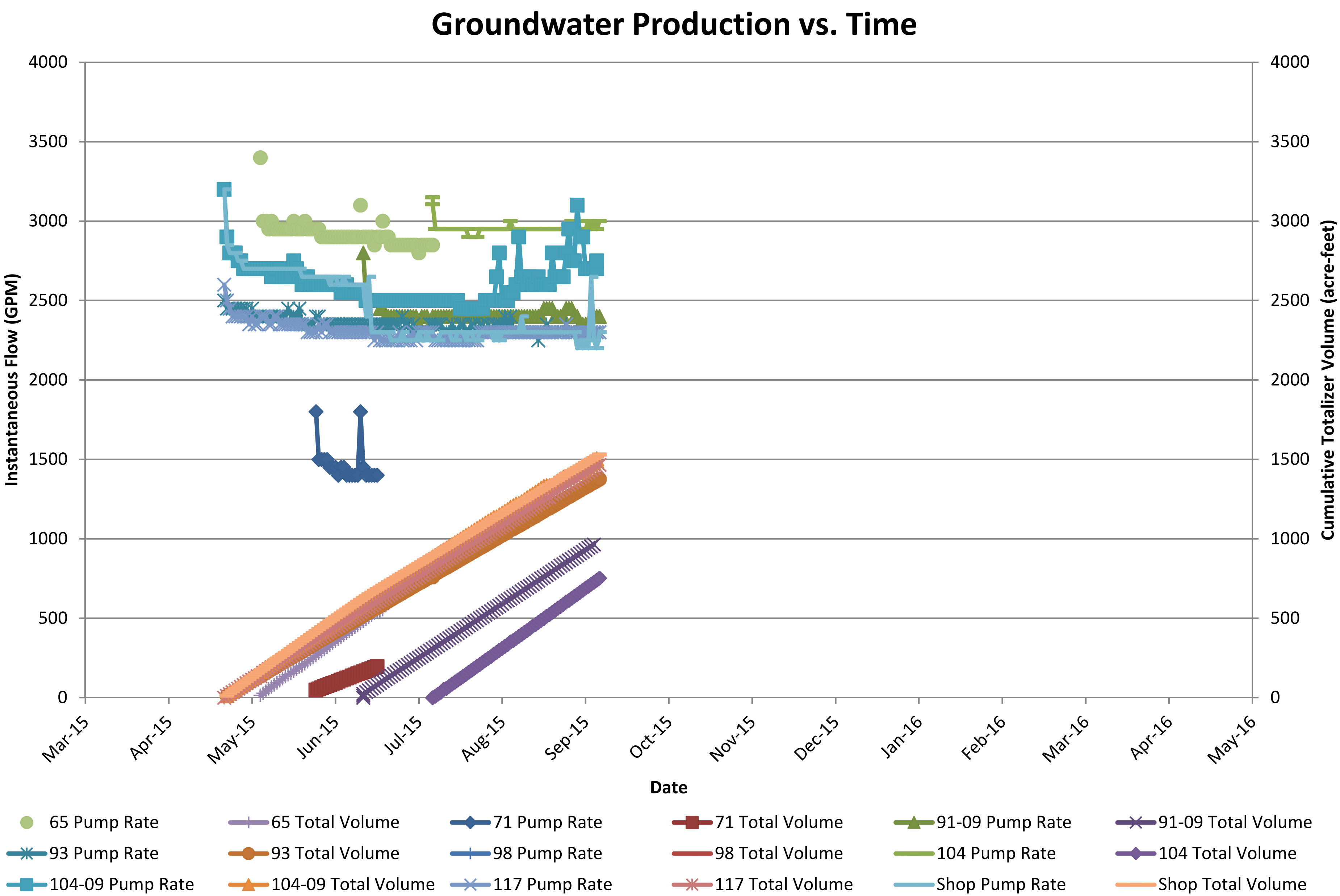
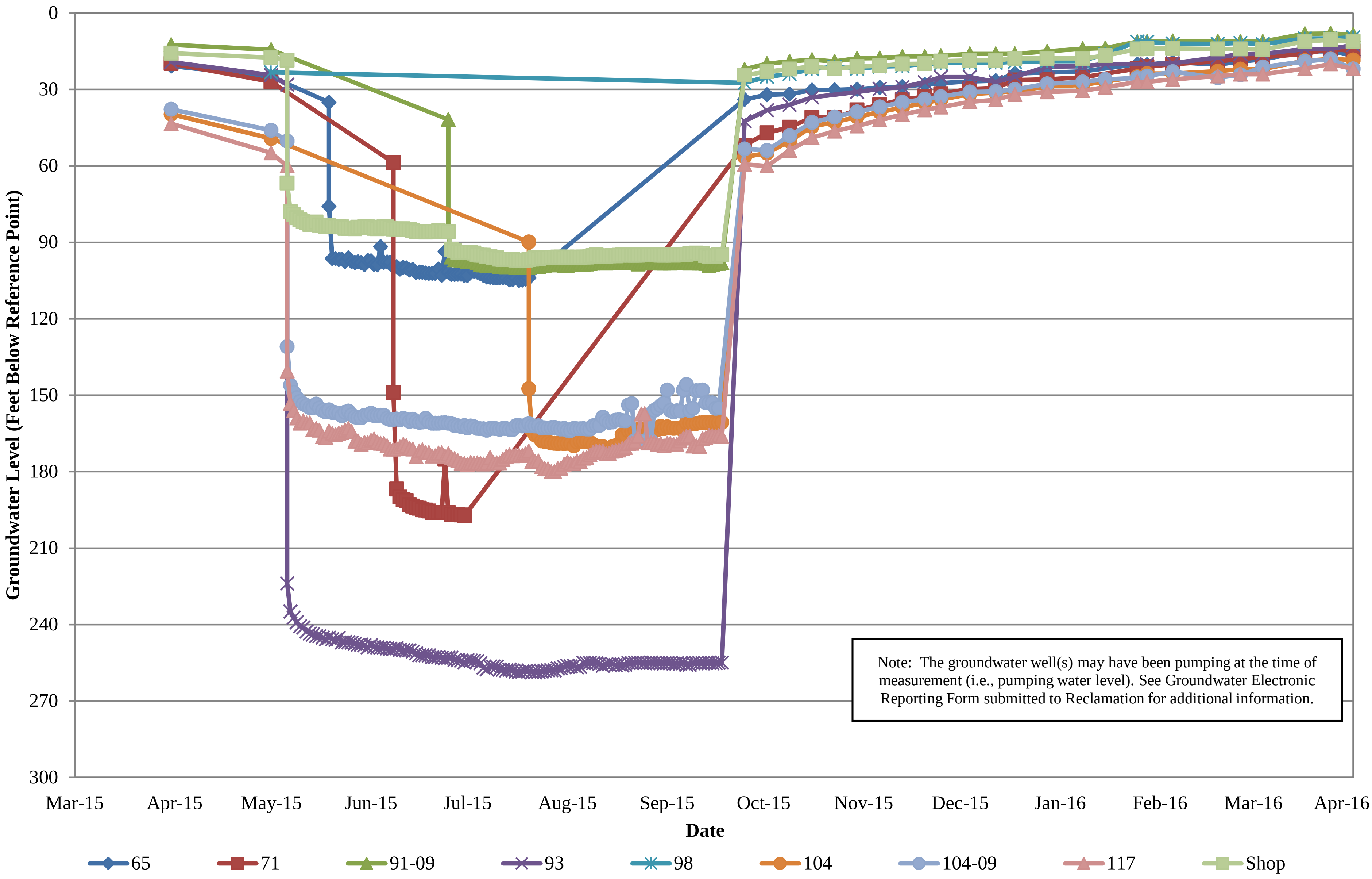
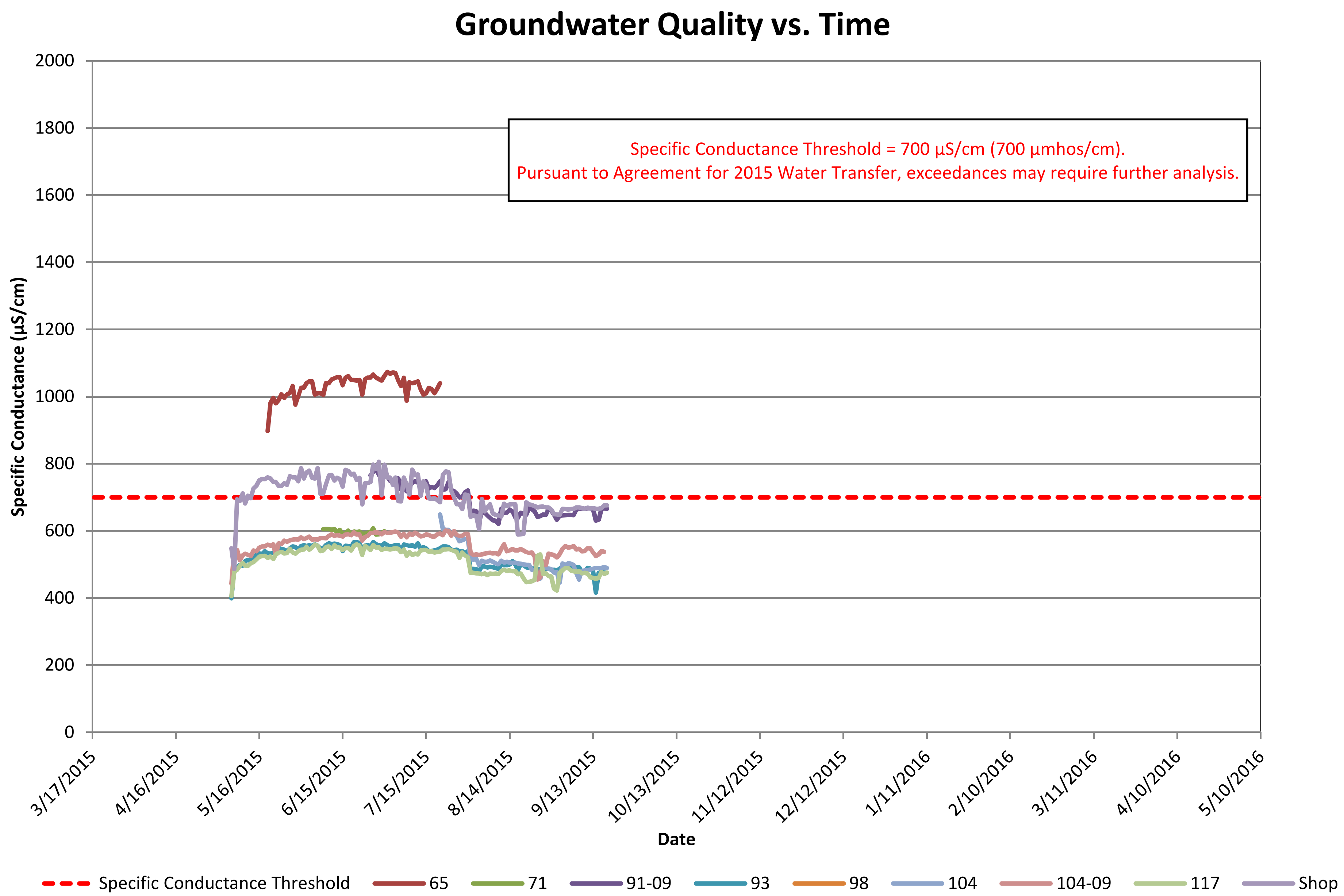


C:\Users\woodruffam\AppData\Local\Temp\Temp1_2015 WT Groundwater Data Electronic Reporting Forms 08.05.2016.zip\RGF Groundwater Data Electronic Reporting Form 08.05.2016.xlsx
Tab: Production Data

River Garden Farms
Production Well Groundwater Level Data





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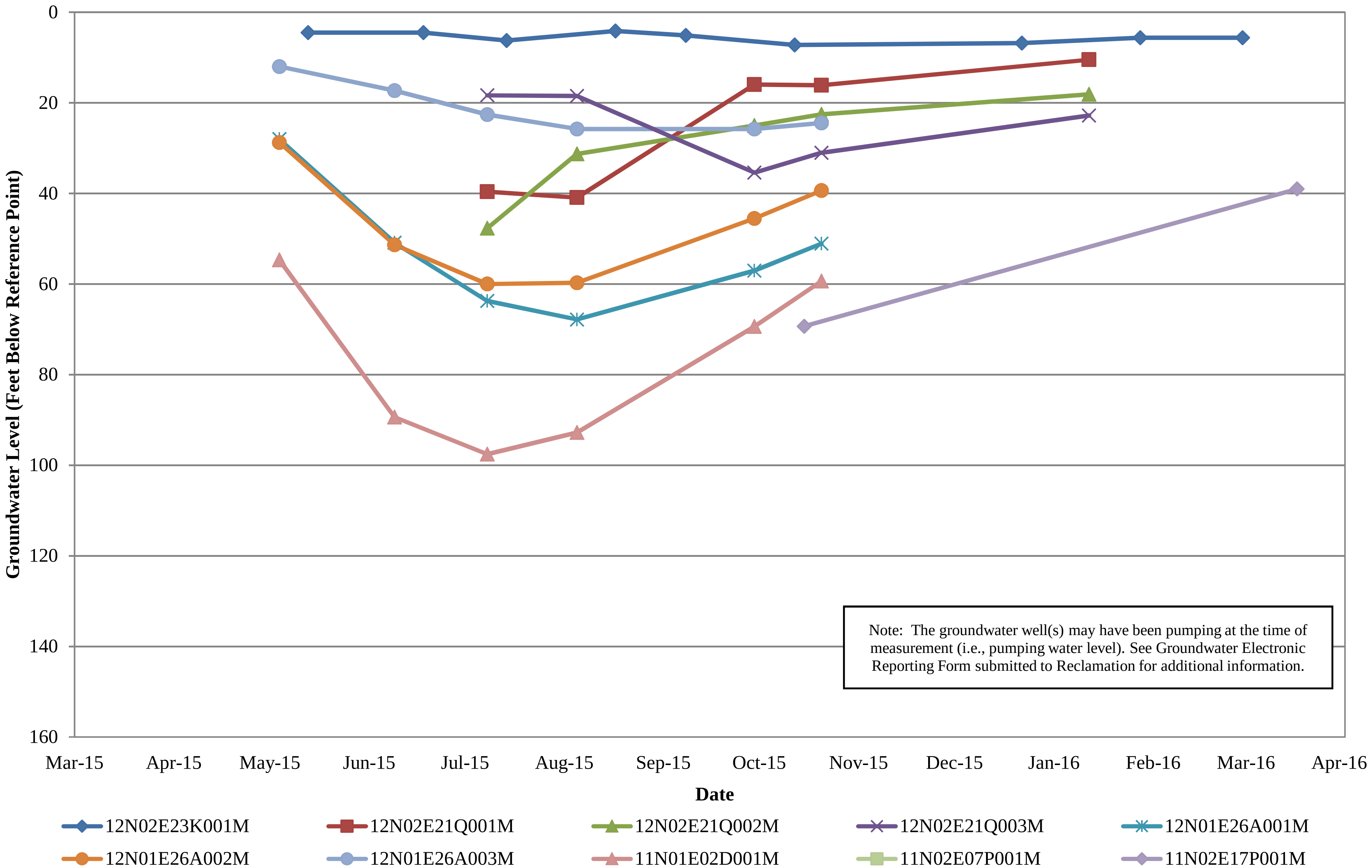
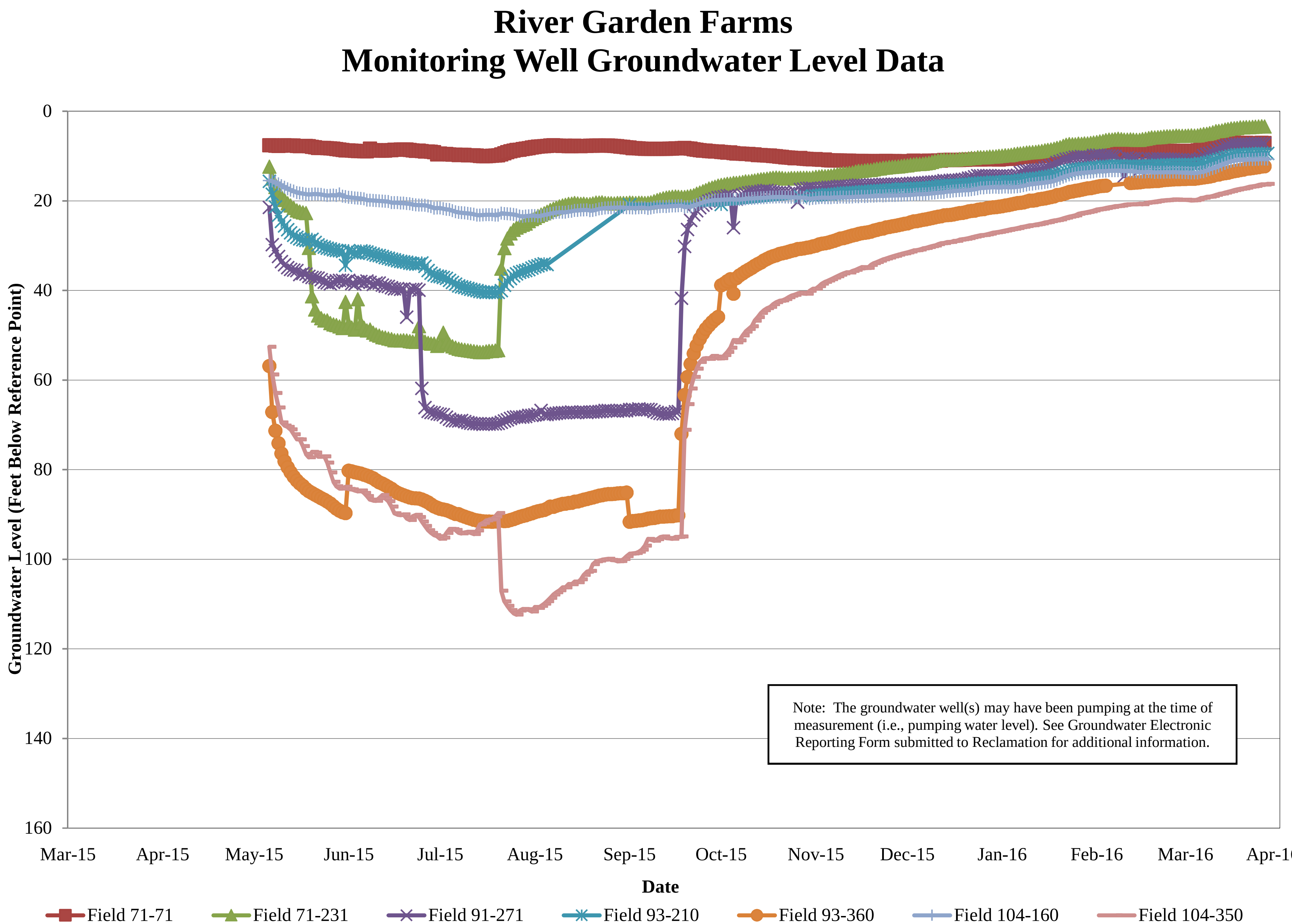
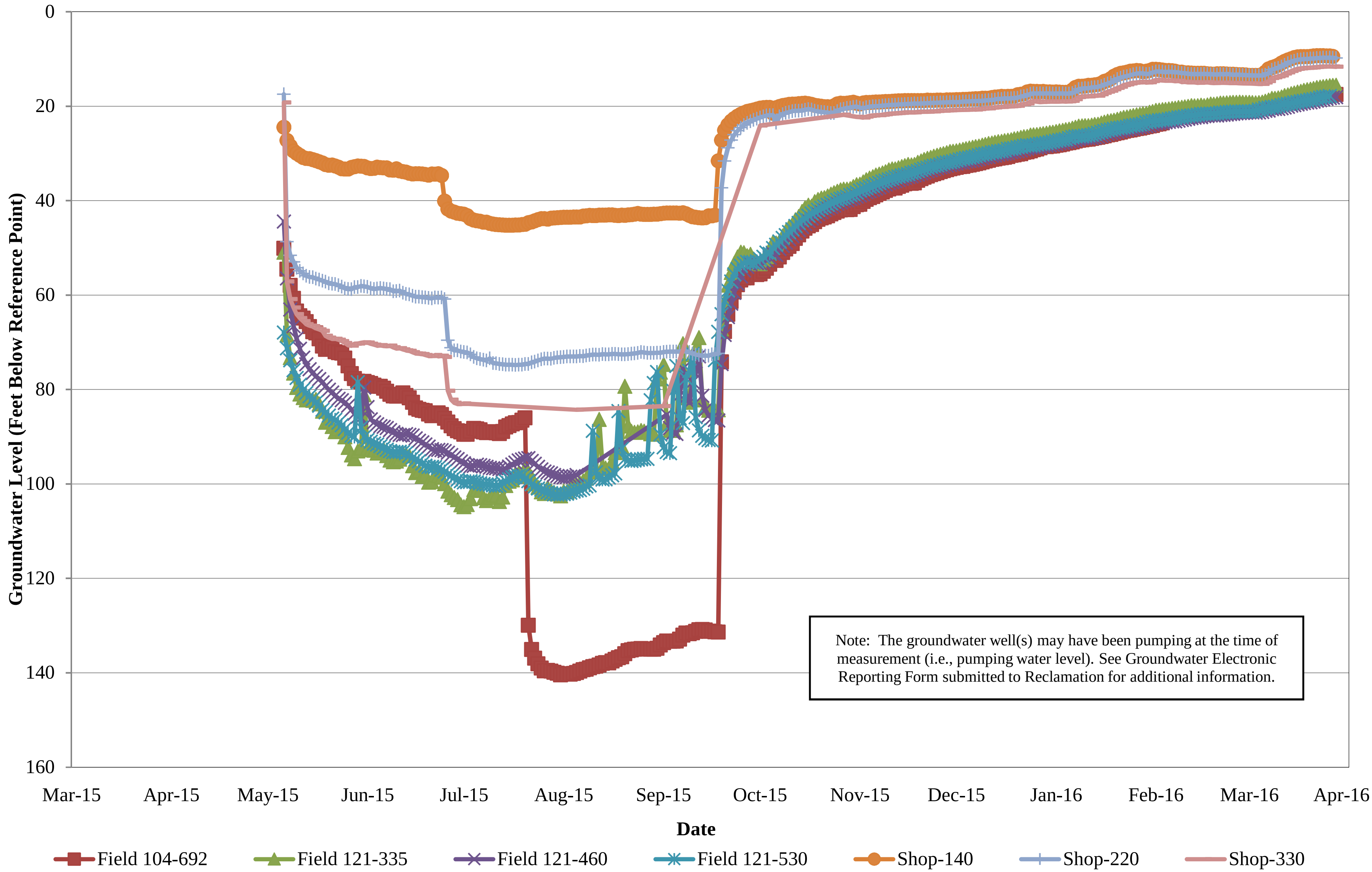
River Garden Farms
DWR Monitoring Well Groundwater Level Data





River Garden Farms
Monitoring Well Groundwater Level Data
Groundwater Level (Feet Below Reference Point)
0
20
40
60
80
100
120
140
160
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Date
Field 71-71
Field 71-231
Field 91-271
Field 93-210
Field 93-360
Field 104-160
Field 104-350
Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.

River Garden Farms
Monitoring Well Groundwater Level Data



Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.

T&P Farms

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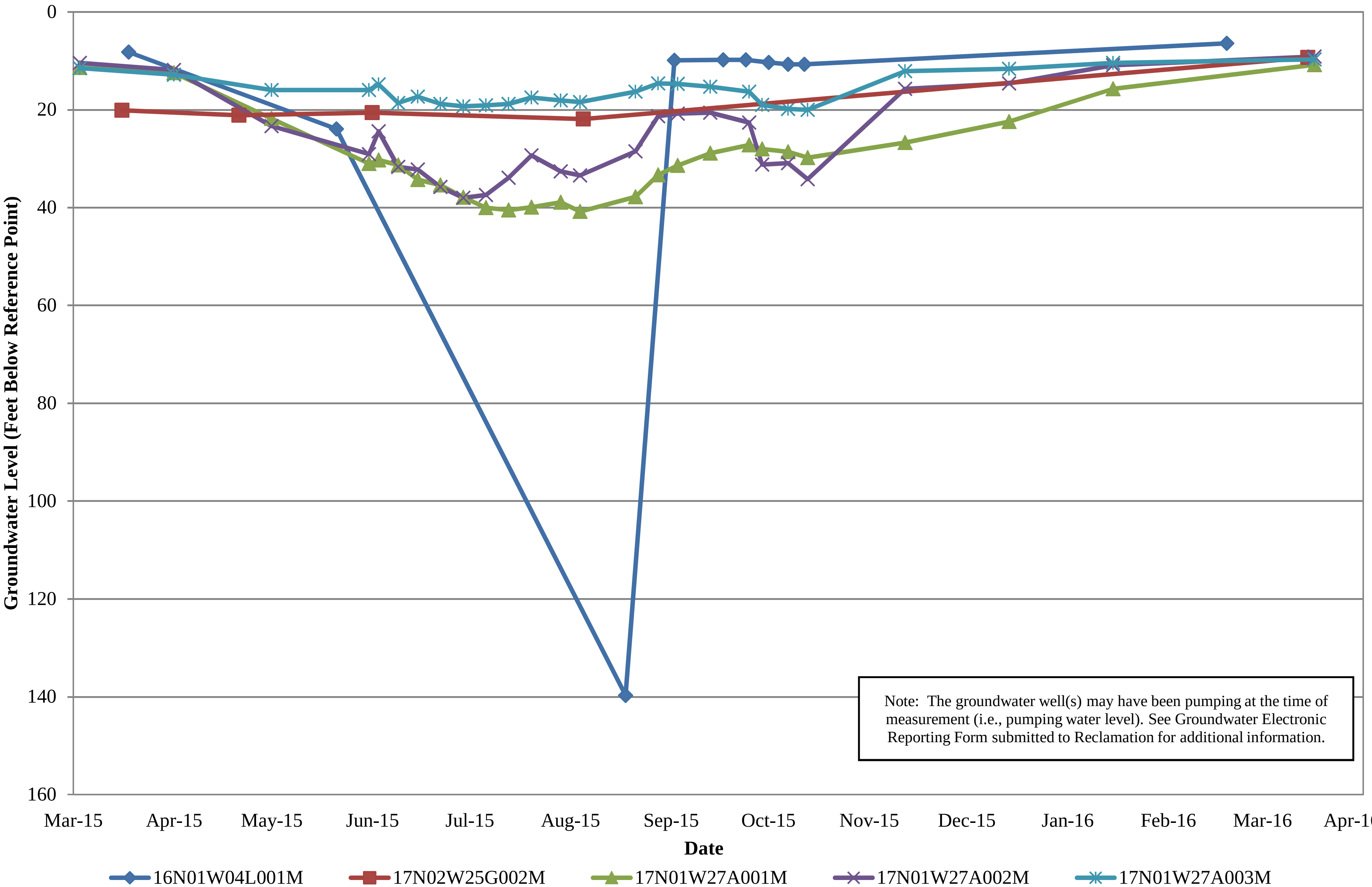
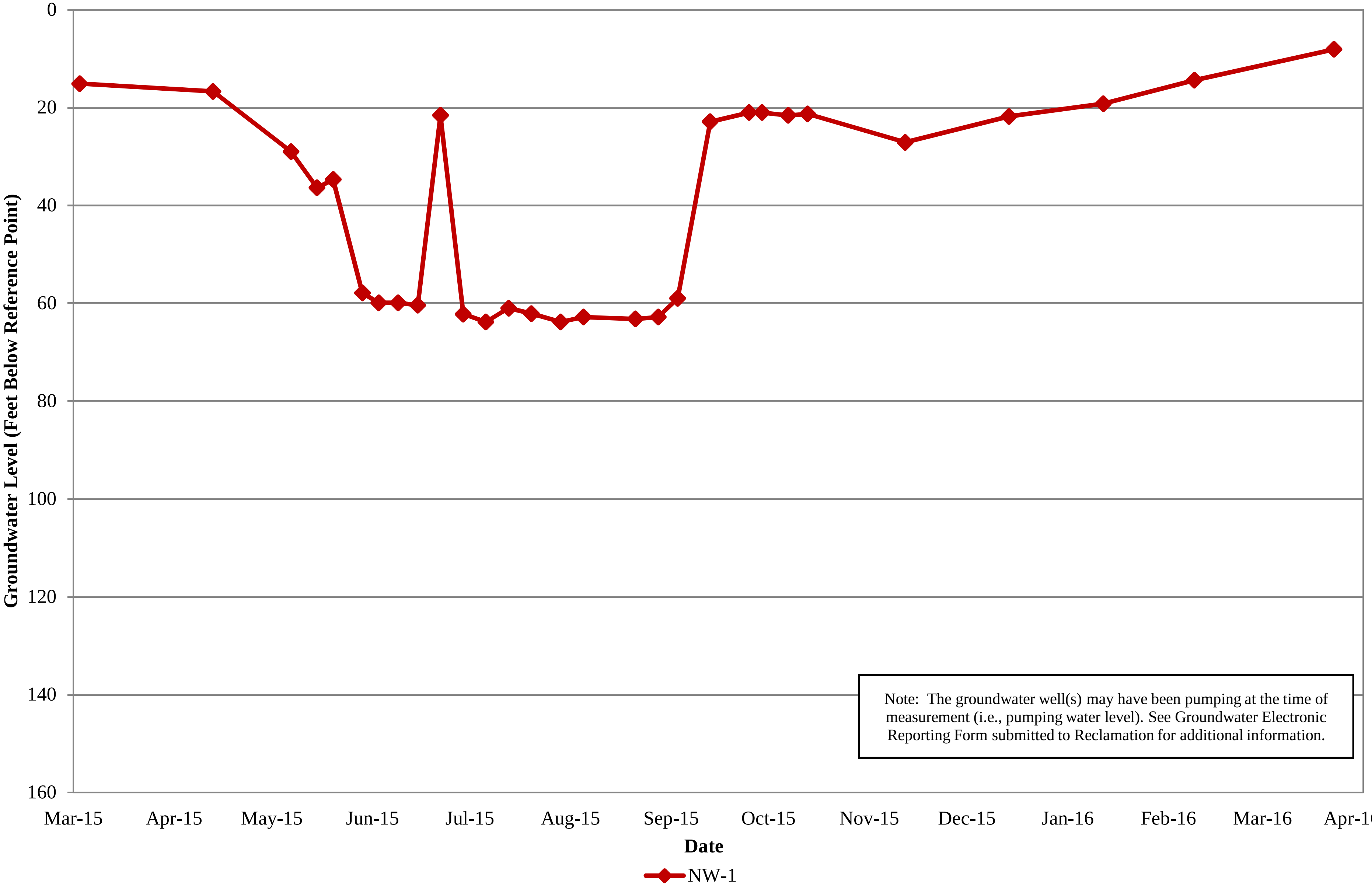
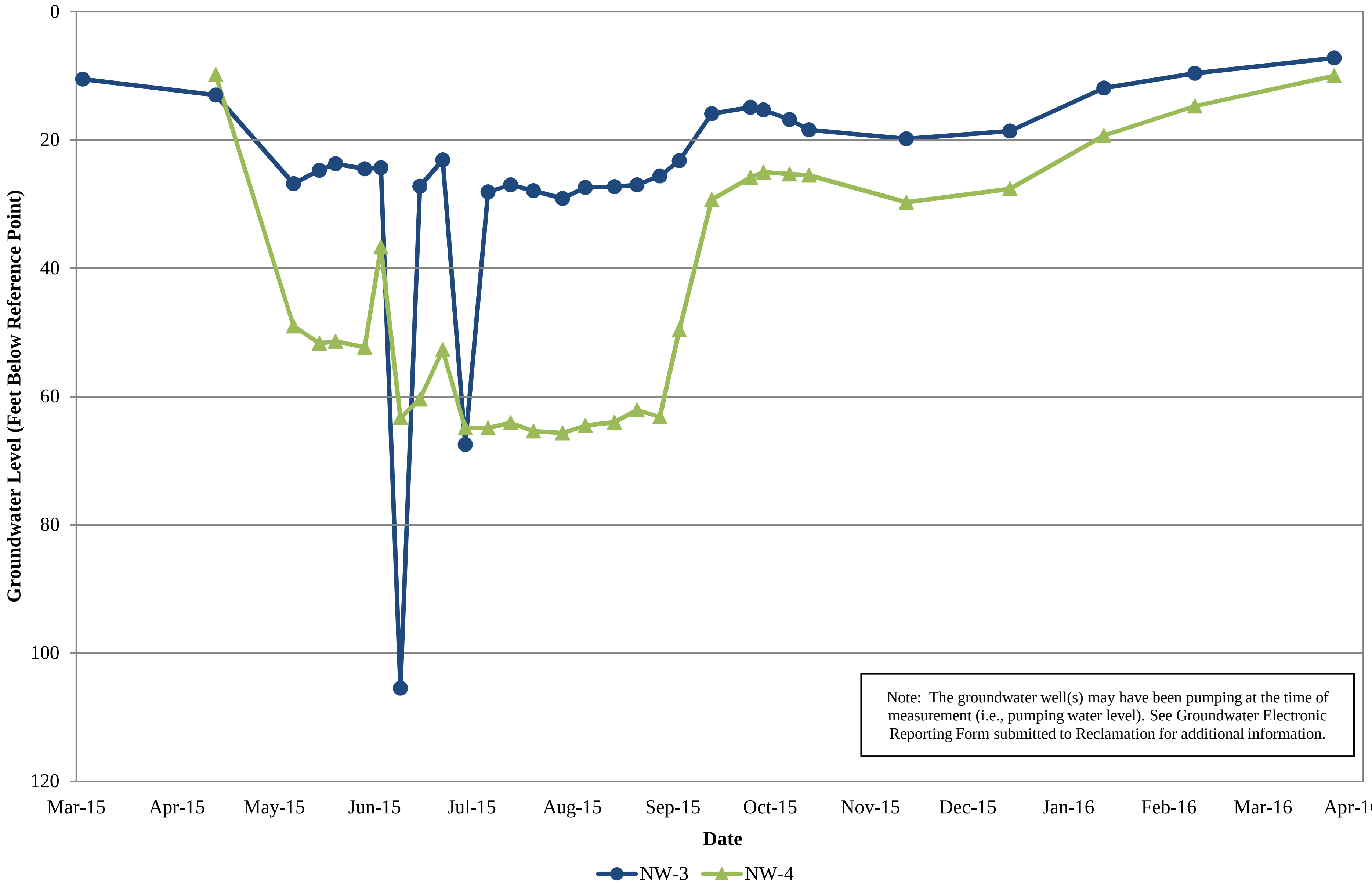
T&P Farms
DWR Monitoring Well Groundwater Level Data

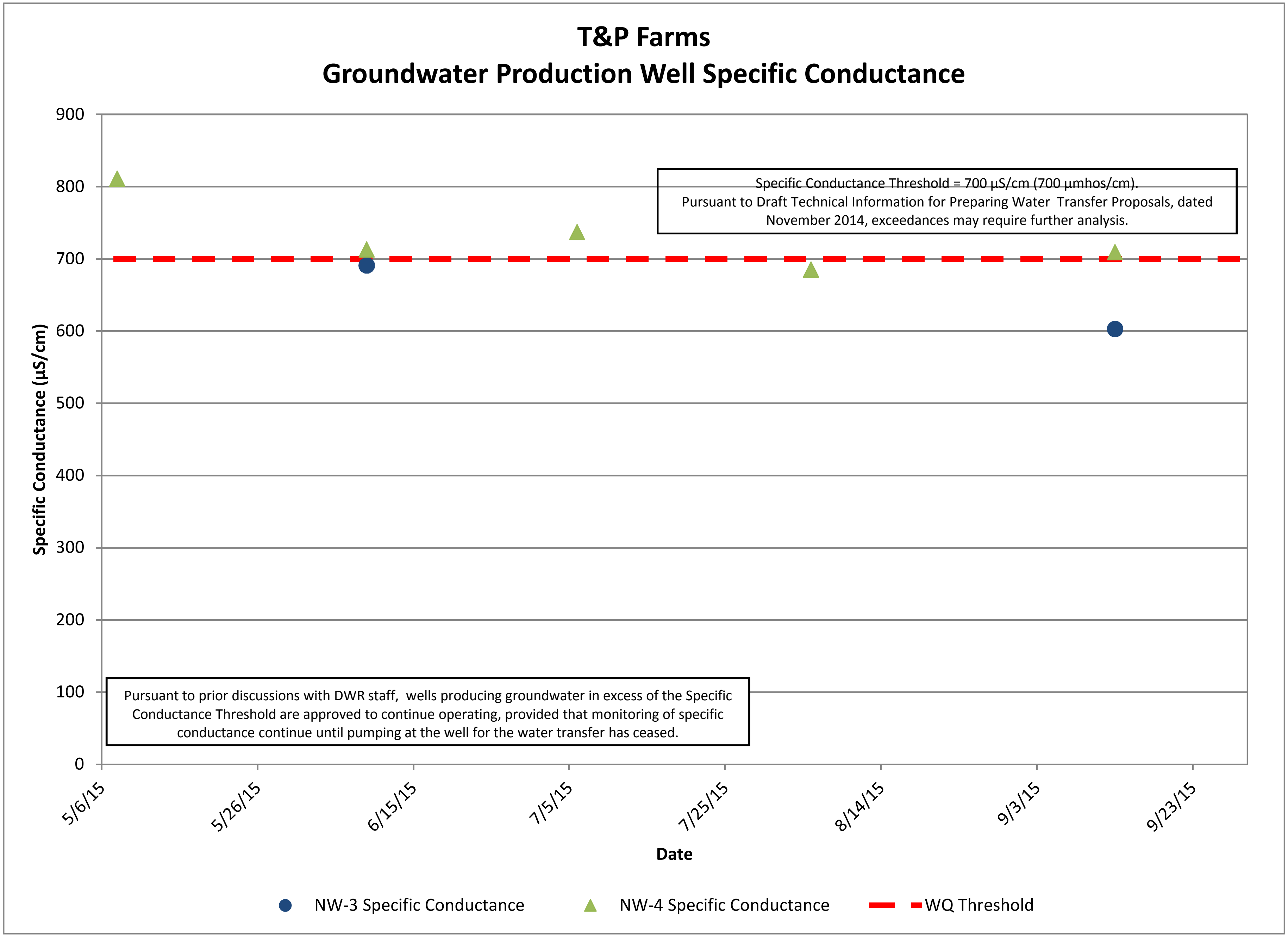


T&P Farms
Monitoring Well Groundwater Level Data

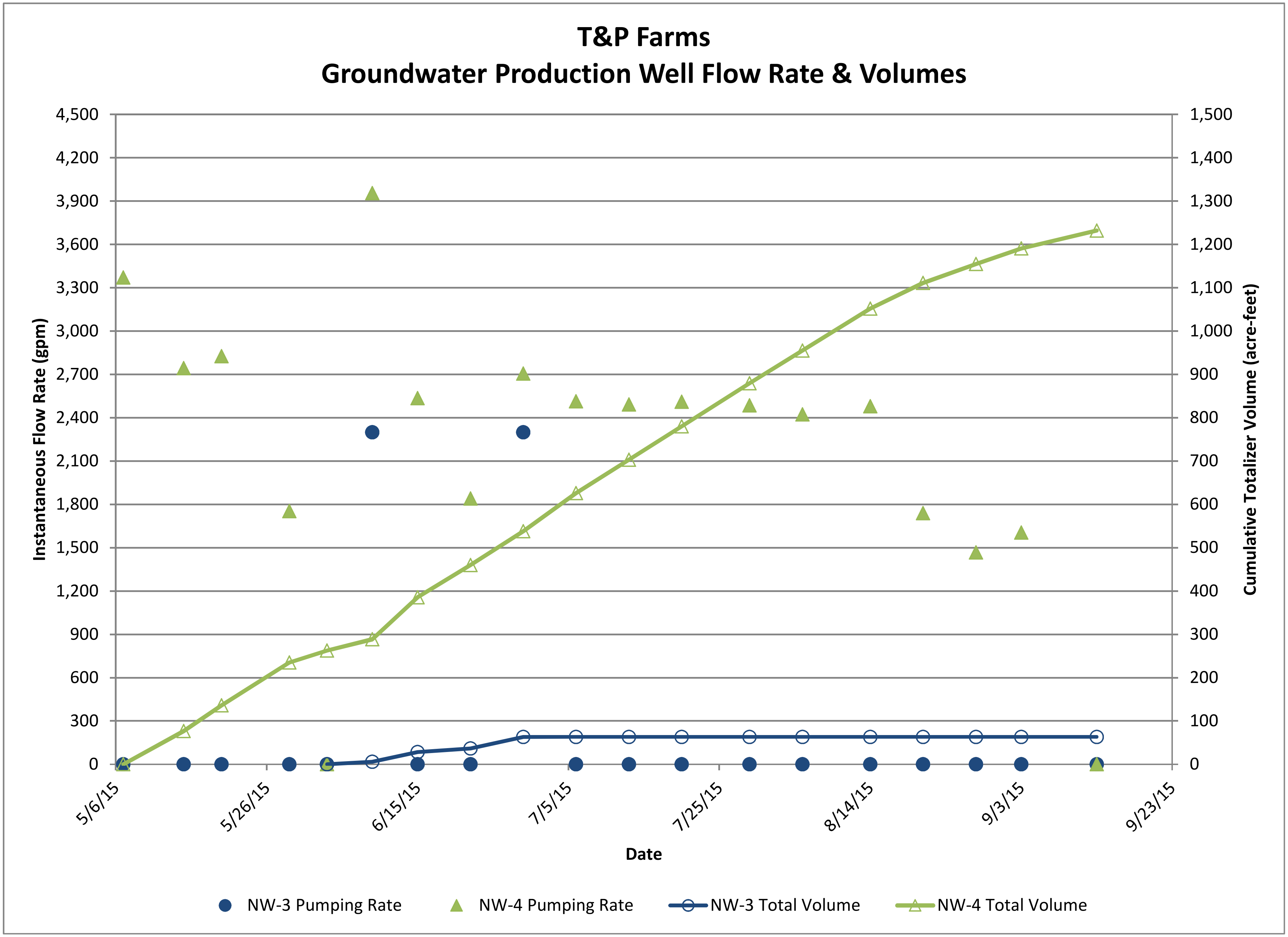


T&P Farms
Production Well Groundwater Level Data





T&P Farms
Groundwater Production Well Specific Conductance
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to Draft Technical Information for Preparing Water Transfer Proposals, dated November 2014, exceedances may require further analysis.
Pursuant to prior discussions with DWR staff, wells producing groundwater in excess of the Specific Conductance Threshold are approved to continue operating, provided that monitoring of specific conductance continue until pumping at the well for the water transfer has ceased.
Specific Conductance (µS/cm)
900
800
700
600
500
400
300
200
100
0
5/6/15
5/26/15
6/15/15
7/5/15
7/25/15
8/14/15
9/3/15
9/23/15
Date
NW-3 Specific Conductance
NW-4 Specific Conductance
WQ Threshold


T&P Farms
Groundwater Production Well Flow Rate & Volumes
Instantaneous Flow Rate (gpm)
Cumulative Totalizer Volume (acre-feet)
4,500
4,200
3,900
3,600
3,300
3,000
2,700
2,400
2,100
1,800
1,500
1,200
900
600
300
0
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
5/6/15
5/26/15
6/15/15
7/5/15
7/25/15
8/14/15
9/3/15
9/23/15
Date
NW-3 Pumping Rate
NW-4 Pumping Rate
NW-3 Total Volume
NW-4 Total Volume

Te Velde Revocable Family Trust

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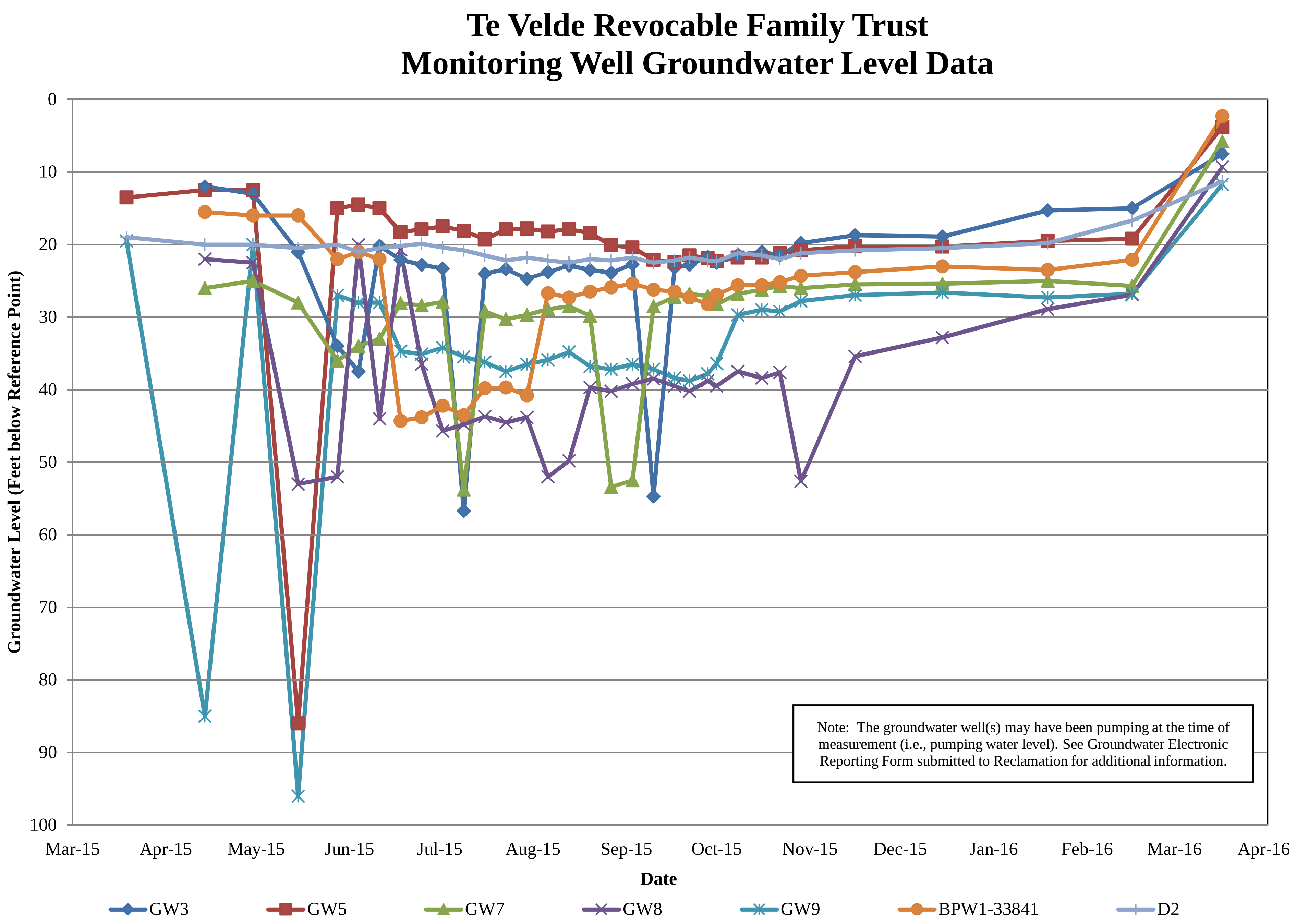
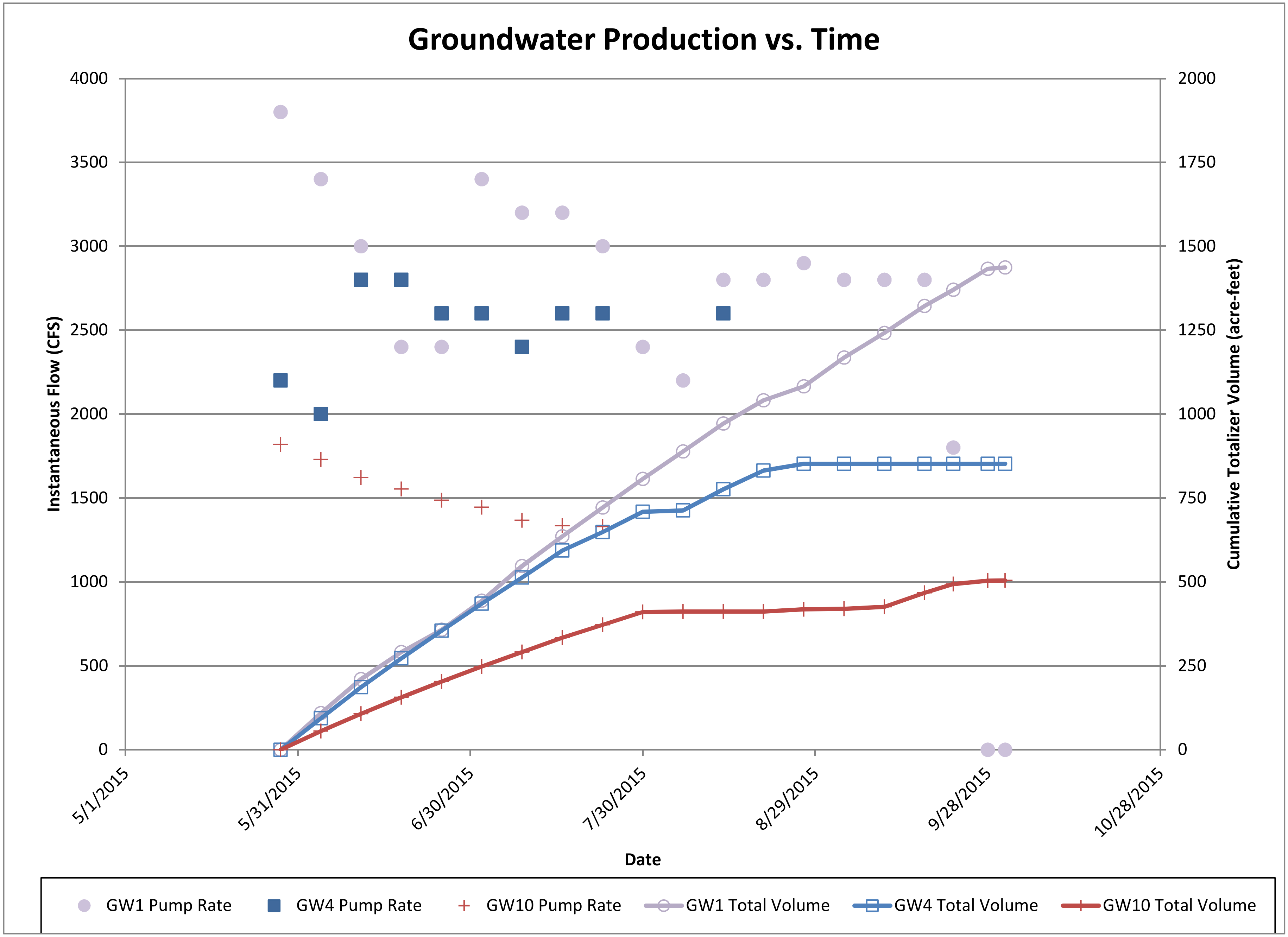
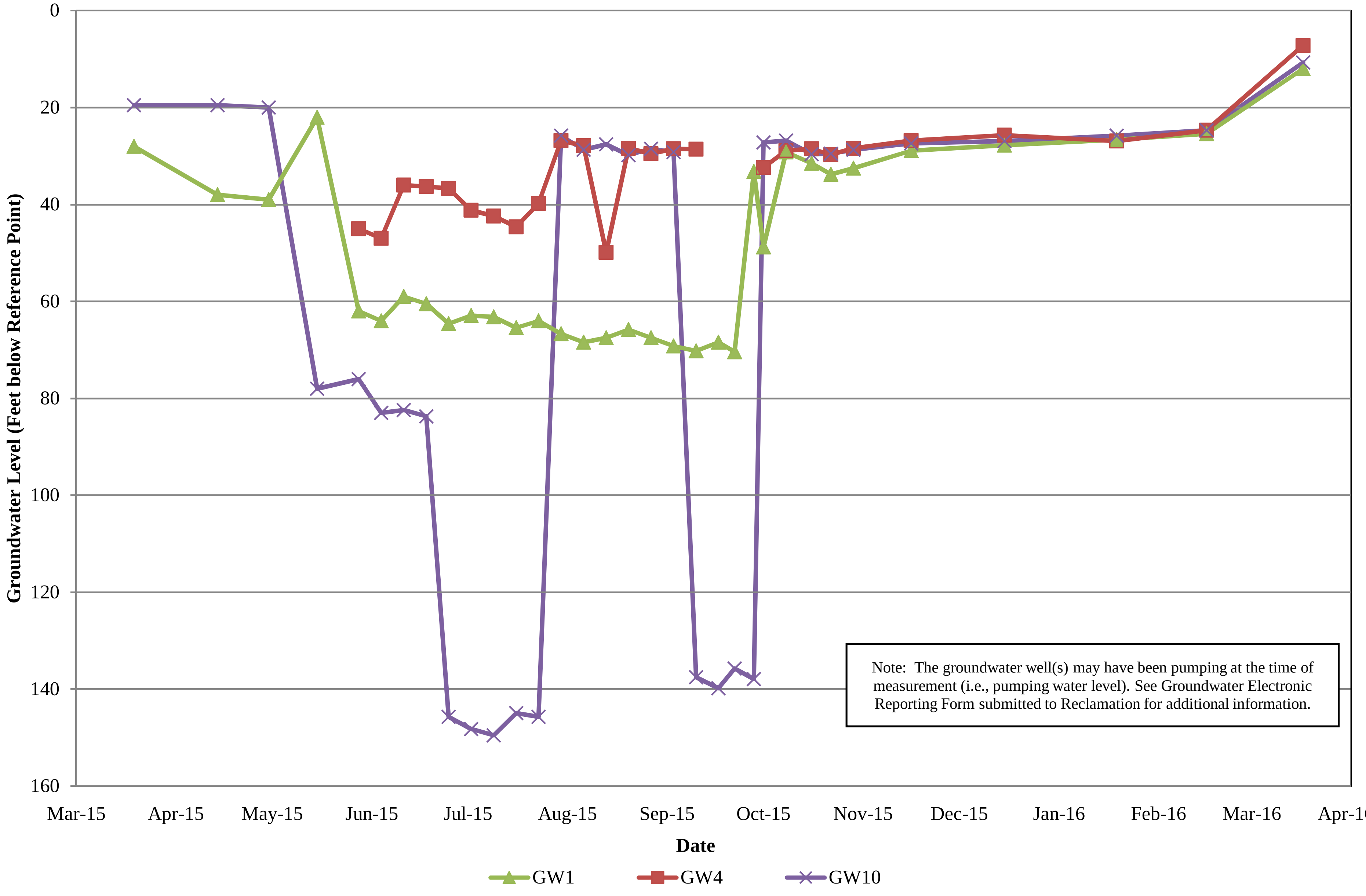

Te Velde Revocable Family Trust
Monitoring Well Groundwater Level Data
Groundwater Level (Feet below Reference Point)
0
10
20
30
40
50
60
70
80
90
100
Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
Date
Note: The groundwater well(s) may have been pumping at the time of measurement (i.e., pumping water level). See Groundwater Electronic Reporting Form submitted to Reclamation for additional information.
GW3
GW5
GW7
GW8
GW9
BPW1-33841
D2

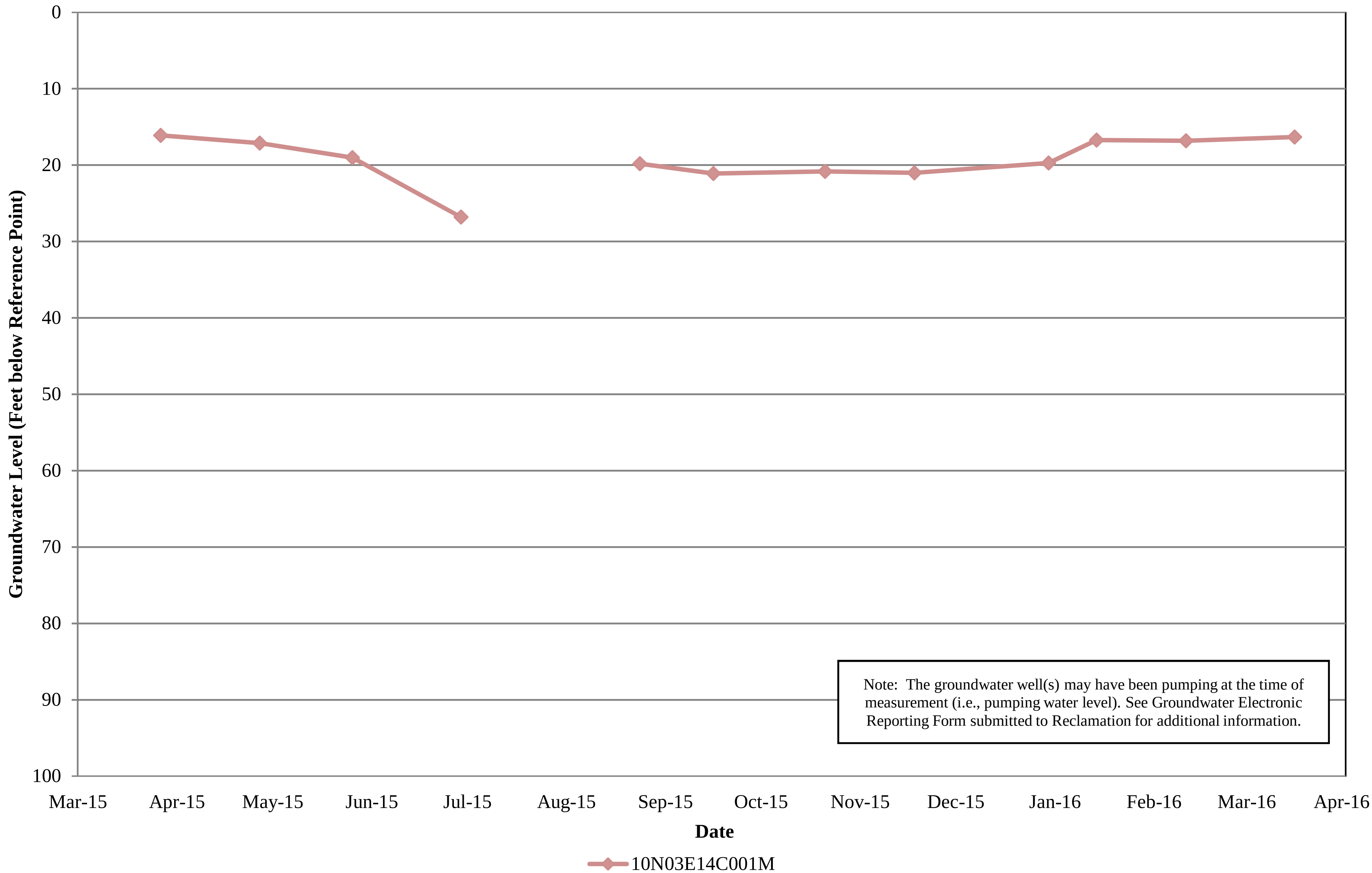


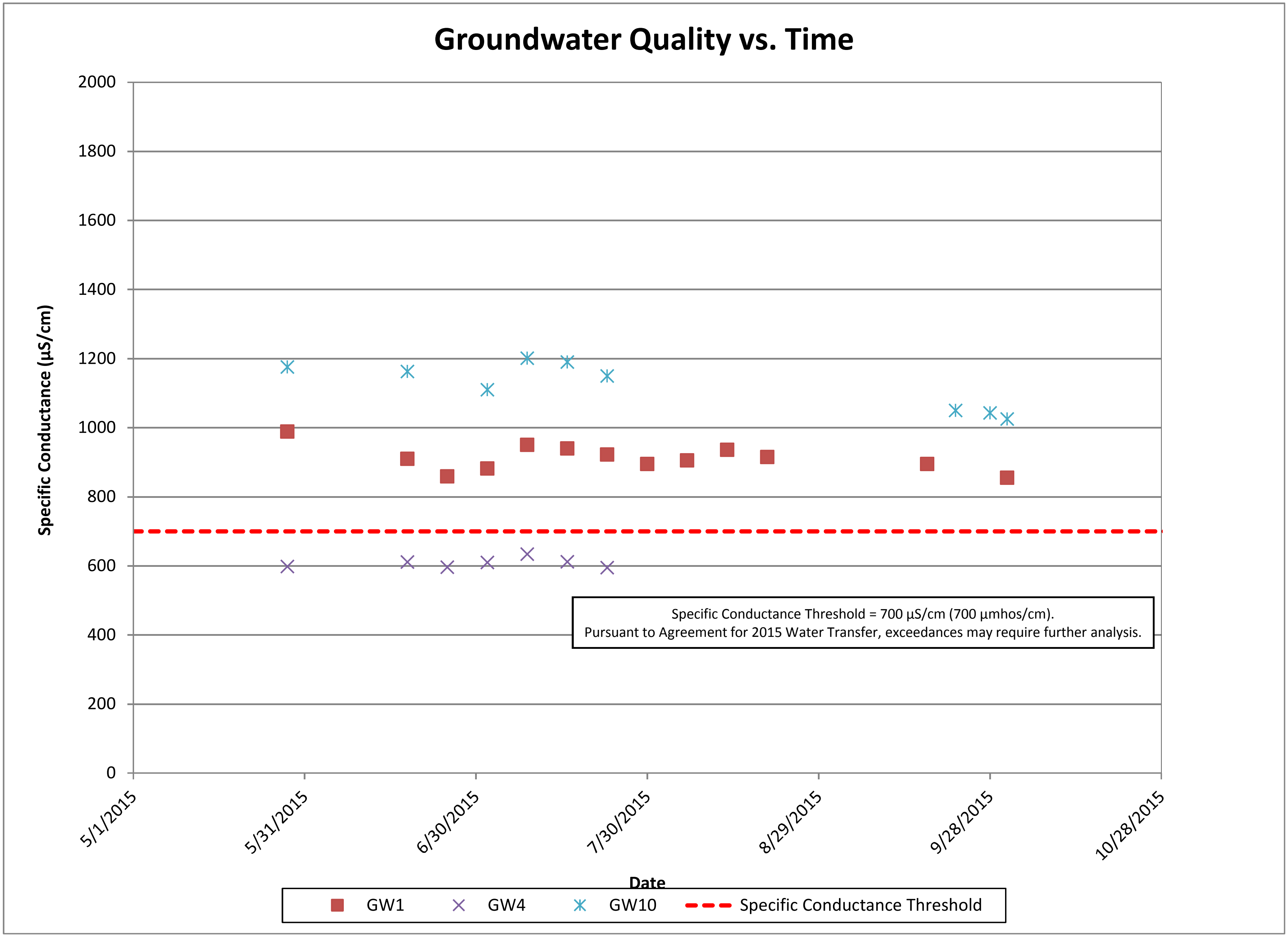
Groundwater Production vs. Time
Instantaneous Flow (CFS)
Cumulative Totalizer Volume (acre-feet)
Date
0
500
1000
1500
2000
2500
3000
3500
4000
250
750
1250
1750
5/1/2015
5/31/2015
6/30/2015
7/30/2015
8/29/2015
9/28/2015
10/28/2015
GW1 Pump Rate
GW4 Pump Rate
GW10 Pump Rate
GW1 Total Volume
GW4 Total Volume
GW10 Total Volume

Te Velde Revocable Family Trust
Production Well Groundwater Level Data



Te Velde Revocable Family Trust
DWR Monitoring Well Groundwater Level Data





Groundwater Quality vs. Time
Specific Conductance (µS/cm)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
5/1/2015
5/31/2015
6/30/2015
7/30/2015
8/29/2015
9/28/2015
10/28/2015
Date
Specific Conductance Threshold = 700 µS/cm (700 µmhos/cm).
Pursuant to Agreement for 2015 Water Transfer, exceedances may require further analysis.
GW1
GW4
GW10
Specific Conductance Threshold

Appendix J
Cumulative Projects

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Appendix J Cumulative Projects

This appendix provides an analysis of overall cumulative effects of the Proposed Action taken together with other past, present, and reasonably foreseeable probable future projects (or actions) as required by NEPA implementing regulations (40 CFR, Section 1508.7) and CEQA Guidelines (14 CFR, Section 15130). The reasonably foreseeable probable future actions considered in this cumulative effects analysis are actions located within the Seller Service Area that have been identified as potentially having an effect on resources that also may be affected by the Proposed Action. This analysis follows applicable guidance provided by the CEQ in *Considering Cumulative Effects under the National Environmental Policy Act* (1997) and *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (*2005).

J.1 Cumulative Projects

The cumulative analysis considers other potential water transfers that could occur in the 2021 transfer season, including other CVP water transfers, non-CVP water transfers, and additional water transfers. No construction projects within the Seller Service Area were analyzed. Table J-1 lists potential sellers, including those in the Proposed Action, that have indicated interest or have provided water for transfer in the past, including:

- Potential transfers from sellers in the Sacramento River, American River, Yuba River, and north-westerly Delta areas. The majority of these potential sellers, which include the sellers in the Proposed Action, were evaluated in the Long-Term Water Transfers EIS/EIR and subsequent Long-Term Water Transfers Revised DEIR/Supplemental DEIS prepared by SLDMWA and Reclamation that analyzed potential CVP-related transfers from 2019 to 2024. Additional sellers in the Sacramento River area not evaluated in the EIS/EIR have indicated interest in selling water in 2021 and are also included in Table J-1.

- Potential transfers from sellers in the Feather River Region from entities holding settlement agreements with DWR that could make surface water available for CVP or SWP contractors. These transfers would be approved and facilitated by DWR.

The Lower Yuba River Accord (Yuba Accord) transfers were not included in the cumulative condition analysis in Section 3 because water would be made available for transfer in a different geographical area than the Proposed Action. The Yuba Accord provides for both stored water and groundwater substitution transfers ranging from 60,000 AF per year and up to an additional 140,000 AF for state and federal contractors in drier years. From 2007 through 2014, Yuba Accord transfers averaged approximately 129,000 AF. Transfers under the Yuba Accord historically account for a large portion of the DWR approved water transfers and represented 73 percent of the DWR approved transfers in 2015 (DWR 2015). Water made available for transfer through groundwater substitution actions under the Yuba Accord would occur in the North Yuba and South Yuba subbasins and would not affect groundwater levels near the Proposed Action.

J.1.1 Potential transfers analyzed in the cumulative analysis

The cumulative analysis considers other CVP and non-CVP water transfers that could occur in addition to the Proposed Action. Methods of making water available for transfer under these other transfers could include cropland idling and groundwater substitution (the same as described for the Proposed Action). Other methods of making water available for transfer could also include conservation, where a seller takes a conservation action to reduce irrecoverable water losses, and stored reservoir water releases, which includes releases of water that would have remained in storage in non-CVP or SWP reservoirs absent the transfer action.

Water made available for transfer, shown in Table J-1, could be sold to multiple agencies, including, TCCA, East Bay Municipal Utility District (MUD), SWP contractors receiving water from the North Bay Aqueduct, and south of Delta buyers, including SLDMWA and Metropolitan Water District of Southern California. Unlike transfers of water to TCCA and East Bay MUD that would be diverted off the Sacramento River, transfers of water to south of Delta buyers would be exported through the Delta via Banks or Jones Pumping Plants.

Table J-1. Potential Sellers Analyzed in the Cumulative Analysis (Upper Annual Transfer Volume Limits)

Water Agency	Groundwater Substitution[1] (AF)	Cropland Idling/ Crop Shifting[1] (AF)	Stored Reservoir Release[1] (AF)	Conservation[1] (AF)	Maximum Potential Transfer (AF)
Sacramento River Area					
Anderson-Cottonwood Irrigation District	5,225				5,225
Baber, Jack, et al.		2,310			2,310
Canal Farms	1,000	635			1,635
Conaway Preservation Group	35,000	21,349			35,000
Cranmore Farms (Pelger Road 1700 LLC)	8,000	2,500			8,000
Eastside Mutual Water Company	2,230				2,230
Giusti Farms	1,000				1,000
Glenn-Colusa Irrigation District	25,000	66,000			91,000
Henle Family Limited Partnership	700				700
Maxwell Irrigation District	3,000	5,000			8,000
Natomas Central Mutual Water Company	30,000				30,000
Pelger Mutual Water Company	4,670	2,538			4,670
Pleasant Grove-Verona Mutual Water Company	18,000	9,000			18,000
Princeton-Codora-Glenn Irrigation District	6,600	6,600			12,100
Provident Irrigation District	10,000	9,900			16,900
Reclamation District 108	15,000	20,000			35,000
Reclamation District 1004	7,175	12,500			19,675

Water Agency	Groundwater Substitution[1] (AF)	Cropland Idling/ Crop Shifting[1] (AF)	Stored Reservoir Release[1] (AF)	Conservation[1] (AF)	Maximum Potential Transfer (AF)
River Garden Farms	10,000	10,000			16,000
Sutter Mutual Water Company	18,000	18,000			18,000
Sycamore Mutual Water Company	15,000	10,000			20,000
T&P Farms	1,200	890			1,200
Te Velde Revocable Family Trust	7,094	6,975			7,094
Windswept Land & Livestock	2,000				2,000
American River Area					
City of Sacramento	5,000				5,000
Placer County Water Agency			47,000		47,000
Sacramento County Water Agency	15,000				15,000
Sacramento Suburban Water District	30,000				30,000
Yuba River Area					
Browns Valley Irrigation District			5,000	3,100	8,100
Cordua Irrigation District	12,000				12,000
Feather River Area					
Butte Water District	5,500	11,500			17,000
Garden Highway Mutual Water Company	14,000				14,000
Gilsizer Slough Ranch	3,900				3,900
Goose Club Farms and Teichert Aggregates	10,000	10,000			10,000
South Sutter Water District			15,000		15,000
Tule Basin Farms	7,320				7,320
Biggs-West Gridley Water District[2]		32,190			32,190
Richvale Irrigation District[2]		22,345			22,345
Plumas Mutual Water Company[2]	5,000	1,750			4,550
South Feather Water and Power[2]			10,000		10,000
Sutter Extension Water District[2]	4,000	11,000			15,000
Western Canal Water District[2]		37,655			37,655
Total	**337,614**	**330,637**	**77,000**	**3,100**	**661,799**

Notes:

[1] These totals cannot be added together. Agencies could make water available through groundwater substitution, cropland idling, or a combination of the two; however, they will not make the full quantity available through both methods. The last column reflects the total upper limit for each agency and will not equal the sum of all the individual transfer quantities for each agency.

[2] Entity holds Settlement Agreement with DWR.

Table J-1 lists the transfer method and associated maximum annual transfer quantity potentially available from each seller. The actual quantity of water transferred in a given year, as evidenced by past dry years, is less than the totals shown in Table J-1 and depends on a number of factors, including hydrologic conditions and available conveyance capacity. Cross Delta transfers to south-of-Delta buyers require pumping at the CVP and SWP south Delta export facilities and historically account for the majority of the transfers from sellers listed in Table J-1. Table J-2 lists the total quantities of cross Delta transfers from 2009 to 2015 that ranged from zero to 414,629 AF from 2009 through 2015, or approximately zero to 55 percent of the maximum total shown in Table J-1. In 2014, Sacramento Valley sellers transferred 35,446 AF to TCCA Member Units. In 2015, TCCA Member Units used 23,997 AF of transfer water from Settlement Contractors. TCCA did not engage in water transfers in 2016 – 2020, and cross-Delta water transfers were not implemented.

Table J-2. Historic Cross Delta Water Transfers (2009 – 2015)

Year	Total Acre-Feet
2009	274,551
2010	264,165
2011	0
2012	84,781
2013[1]	351,515
2014[1]	414,629
2015[1]	262,466

Source: DWR and SWRCB 2015

Notes:

[1] Data for 2013, 2014 and 2015 are for quantities made available North of the Delta and include Streamflow Depletion losses (where applicable) but do not include carriage water losses across the Delta. Cross Delta water transfers using facilities operated by DWR in 2014 and 2015 were 305,699 AF and 104,348 AF respectively and Reclamation 73,930 AF and 157,018 AF respectively.

Transfers originating from the Sacramento Valley represent a small portion of the Sacramento Valley's overall water supply. In addition to the transfers described in Table J-1, TCCA may also engage in "Project Water" transfers under the Central Valley Project Improvement Act section 3405(a)(1)(M). Transfers or exchanges of Project Water for contract years 2021 through 2025 are expected to be covered by the Reinitiation of Consultation on the Coordinated Long-Term Operation of the Central Valley Project and State Water Project (Reclamation 2019). The EA identified no effect to biological resources and potentially small, beneficial effects to other resources. Because these transfers would not have adverse effects, they are not included in the cumulative conditions analysis in Section 3.

J.1.2 Voluntary Agreements

On December 12, 2018, the State Water Resources Control Board (Board) adopted Resolution 2018-0059, approving an update to the Bay-Delta Water Quality Control Plan (Bay-Delta Plan). The agreement included flow and non-flow measures to improve water quality in the Bay-Delta watershed to support viability of native fishes. On March 1, 2019, several parties, including the Sacramento River Settlement Contractors, entered into the "*Planning Agreement Proposing Project Description and Procedures for the Finalization of the Voluntary Agreements to Update and Implement the Bay-Delta Water Quality Control Plan* (Planning Agreement).

The flow measures discussed in the Planning Agreement provide instream flows above existing conditions and in a manner that: (a) does not conflict with the requirements of the Sustainable

Groundwater Management Act and (b) maintains reliability of water supply for other beneficial uses, including designated wildlife refuges. These flows above existing conditions will be generated through land fallowing, reservoir reoperation and/or demand reduction, and limited use of groundwater substitution. Table J-3 shows the flow contributions from the Sacramento River watershed.

Table J-3. Contribution of Flow to the Voluntary Agreement in the Sacramento River Watershed

Tributary	Season	Source	Application[2]	Flow Contributions (in TAF)				
				C	D	BN	AN	W
Sacramento	Spring or summer[1]	Land fallowing	Block		100	100	100	
Feather	Spring or summer [1]	Land fallowing	Block		50	50	50	
Yuba	Assume spring likely [1]	Reservoir storage	Block		50	50	50	
American	Spring	Groundwater substitution	Hybrid	10	10			
		Reservoir storage				10	10	
		Reservoir storage and/or groundwater substitution			10			
		Reservoir storage and/or groundwater substitution		20	20			

Key: TAF – Thousand acre-feet
Notes:
[1] Flow represents an instream target, Blocks can be scheduled within constraints, and Hybrid represents a combination.
[2] Subject to coordination with California Department of Fish and Wildlife (DFW) (Yuba) or fisheries agencies (Sacramento, Feather)

J.1.3 Coordinated Operations Agreement

Reclamation and DWR would continue to operate their respective facilities in accordance with the Agreement between the United States and the State of California for Coordinated Operation of the Central Valley Project and the State Water Project executed in 1986 (Coordinated Operations Agreement, hereinafter referred to as COA). The COA defines the project facilities and their water supplies, sets forth procedures for coordinating operations, and identifies formulas for sharing joint responsibilities for meeting Delta standards and other legal uses of water. COA further identifies how unstored flow is shared, sets up a framework for exchange of water and services between the projects, and provides for periodic review of the agreement.

Implementation of the COA principles has evolved since 1986, as changes have occurred to CVP and SWP facilities, operating criteria, and overall physical and regulatory environment. For example, updated water quality and flow standards adopted by the State Water Resource Control Board (SWRCB), CVPIA, and Endangered Species Act (ESA) responsibilities have affected both CVP and SWP operations. The 1986, COA incorporated the SWRCB Water Right Decision 1485 (D-1485) provisions regarding Delta salinity, outflow, and export restrictions. D-1485 included implementation provisions for the Bay-Delta Water Quality Control Plan (WQCP) that was current at the time, but has since been updated with Water Right Decision 1641 (D-1641). COA envisioned and provided a methodology to incorporate future regulatory changes, such as Delta salinity requirements, but did not explicitly envision or address sharing of export restrictions. D-1641 and the 2008 U.S. Fish and Wildlife Service (USFWS) Biological Opinion (BO) and 2009 National Marine Fisheries Service (NMFS) BO included various export restrictions not explicitly addressed in the 1986 COA. However, the available export capacity as a result of these export restrictions was shared between the CVP and the SWP in absence of a formal update to the COA.

In 2018, Reclamation and DWR amended four key elements of the COA to address changes since the COA was signed: (1) in-basin uses, (2) export restrictions, (3) CVP use of Banks Pumping Plant up to 195,000 acre-feet per year (AFY), and (4) periodic review. The COA sharing percentages for meeting Sacramento Valley in-basin uses now vary from 80 percent responsibility of the United States and 20 percent responsibility of the state of California in wet year types to 60 percent responsibility of the United States and 40 percent responsibility of the state of California in critical year types. In a dry or critical year following two dry or critical years, the United States and state of California will meet to discuss additional changes to the percentage sharing of responsibility to meet in-basin uses. When exports are constrained and the Delta is in balanced conditions, Reclamation may pump up to 65 percent of the allowable total exports with DWR pumping the remaining capacity. In excess conditions, these percentages change to 60/40. The COA defines balanced conditions as periods when it is agreed that releases from upstream reservoirs plus unregulated flow approximately equal the water supply needed to meet Sacramento Valley in-basin uses, plus exports. The COA defines excess conditions as periods when it is agreed that releases from upstream reservoirs plus unregulated flow exceed Sacramento Valley in-basin uses, plus exports.

J.2 References

California Department of Water Resources (DWR). 2015 Transfers Requiring Use of DWR Facilities. Updated October 5, 2015. Available at: http://www.water.ca.gov/watertransfers/docs/Transfer_Proposals.pdf [Accessed on December 10, 2020].

California Department of Water Resources (DWR) and State Water Resources Control Board (SWRCB). 2015. Background and Recent History of Water Transfers in California. July 2015. Available at: https://cawaterlibrary.net/wp-content/uploads/2018/03/Background_and_Recent_History_of_Water_Transfers.pdf [Accessed on December 13, 2020].

Council on Environmental Quality (CEQ). 1997. Considering Cumulative Effects Under the National Environmental Policy Act. January 1997. Available at: https://ceq.doe.gov/publications/cumulative_effects.html [Accessed on December 15, 2020].

_____. 2005. Guidance on the Consideration of Past Actions in Cumulative Effects Analysis. June 24, 2005. Available at: https://www.energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/G-CEQ-PastActsCumulEffects.pdf [Accessed on December 15, 2020].

United States Department of Interior, Bureau of Reclamation (Reclamation). 2019. Reinitiation of Consultation on the Coordinated Long-Term Operation of the Central Valley Project and State Water Project Final Environmental Impact Statement. December 2019. Available at: https://www.usbr.gov/mp/nepa/includes/documentShow.php?Doc_ID=41664 [Accessed on January 8, 2021].

Appendix K

Comments and Responses

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Appendix K Comments and Responses

K.1 Introduction

This appendix contains responses to comments received on the Draft Initial Study/ Environmental Assessment (IS/EA). While responding to comments on an IS/ND is not specifically required by CEQA, CEQA Guidelines Section 15074(b) requires that the lead agency consider any comments received on the IS/ND prior to approving the project. This document provides evidence that TCCA considered all comments received on this IS/EA.

Each commenter, their associated agency/group, and assigned number identification is listed in Section K.2. Section K.3 includes the comments and responses to those comments. Appendix L includes the full comment letters.

K.2 List of Commenters

Table K-1 presents commenters and associated agencies or groups that submitted comments on the 2021 TCCA In-Basin Water Transfers IS/EA.

Table K-1. List of Commenters

Commenter	Agency/Group	Letter ID
Zach Kearns	California Department of Fish and Wildlife	1

K.3 Detailed Comments and Responses

Individual responses to comments are presented in the following section.

Comment Letter 1, Zach Kearns, California Department of Fish and Wildlife

Comment 1-1

The California Department of Fish and Wildlife (CDFW) received and reviewed the Notice of Intent to Adopt an IS/MND from Tehama-Colusa Canal Authority (TCCA) for the 2021 Tehama-Colusa Canal Authority In-Basin Water Transfers (Project) pursuant the California Environmental Quality Act (CEQA) statute and guidelines.

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may need to exercise its own regulatory authority under the Fish and Game Code.

DEPARTMENT ROLE

CDFW is California's Trustee Agency for fish and wildlife resources and holds those resources in trust by statute for all the people of the State. (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a).) CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (*Id.*, § 1802.) Similarly, for purposes of CEQA, CDFW provides, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

CDFW may also act as a **Responsible Agency** under CEQA (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) If implementation of the Project may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), related authorization as provided by the Fish and Game Code may be obtained.

Response

The comment acknowledges receipt of the IS/EA and summarizes CDFW's regulatory role; no further response is required.

Comment 1-2

PROJECT DESCRIPTION SUMMARY

The Project's proposed transfers could originate from sellers in Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, and/or Yolo Counties. The transfer buyers could be in Colusa, Glenn, Tehama, and/or Yolo Counties.

The Project consists of up to 57,060 acre-feet (AF) of water proposed for transfers that would occur from sellers of Sacramento River Settlement Contract Base Supply and Central Valley Project water in the Sacramento River to buyers that receive water from the Tehama-Colusa or Corning Canals. Water proposed for transfer is typically diverted from the Sacramento River at the Red Bluff Pumping Plant. The TCCA and its Member Units are soliciting willing sellers to transfer water. The TCCA would negotiate with these sellers, on behalf of the Member Units, to identify potential transfers and the specifics of each transfer arrangement, which, collectively constitute the Project. Transfers would be from willing sellers within the Sacramento Valley to buyers within the Sacramento Valley. The water would be made available for transfer through a combination of cropland idling/shifting and groundwater substitution.

Response

The comment summarizes the project description and objectives, consistent with information presented in the IS/EA.

Comment 1-3

COMMENTS AND RECOMMENDATIONS

CDFW offers the comments and recommendations below to assist TCCA in adequately identifying and, where appropriate, mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources. CDFW is primarily concerned with the Project's potential impacts to listed and other special-status species and their habitats, including Groundwater Dependent Ecosystems.

The comments provided herein are based on the information provided in the IS/MND and Department knowledge of species and habitats that may be affected by the Project. Comments are limited to the Project and activities that are likely to result in impacts to biological resources.

Response

The comment summarizes CDFW's purpose behind providing comments on the Draft IS/EA; no further response is required.

Comment 1-4

SPECIAL STATUS SPECIES

The IS/MND analyzes environmental impacts of the proposed Project on species and habitats and proposes Mitigation Measure VEG and WILD-1: Protect Existing Habitat for Wildlife to reduce potential impacts on State-listed and other special-status species including giant garter snake *(Thamnophis gigas)* (GGS), and western pond turtle *(Emys marmorata)*. The Mitigation Measures VEG and WILD-1 include monitoring water levels in irrigation canals and ditches to maintain adequate water levels and avoid cropland idling/shifting in areas that may be suitable for GGS or are abutting or adjacent to state or federal wildlife areas. Reporting annual transfer amounts and identifying where cropland idling/shifting occurred are also part of Mitigation Measure VEG and WILD-1. CDFW acknowledges that these measures may reduce impacts on listed and special status species; however, Mitigation Measure VEG and WILD-1 consists of only avoidance and minimization of impacts and does not include mitigation for potential take of State-listed species. The IS/MND confirms that the proposed transfers and cropland idling/shifting will reduce forage and cover habitat, hinder movement, and increase predation risk to State-listed and other special-status species. CDFW recommends that the Project quantify the impacts to listed species habitat and provide appropriate mitigation alternatives, including but not limited to purchasing mitigation credits at a Department-approved conservation bank, restoration and/or enhancement of suitable habitat, and/or conservation of suitable habitat for the target species. CDFW recommends that a CESA Incidental Take Permit (ITP) be obtained if the Project has the potential to result in "take" (Fish & G. Code § 86 defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill") of State-listed CESA species, either through construction or over the life of the Project).

Response

As described in Section IV, Biological Resources, the Draft IS/EA acknowledges rice idling actions under the Proposed Action could affect GGS and their habitat. Additionally, as noted in the Draft IS/EA, if idling occurred in (or near) areas within known GGS populations or in areas that provide suitable habitat for GGS, significant effects could occur to GGS. However, implementation of Mitigation Measure VEG and WILD-1 would reduce these effects by minimizing idling of lands adjacent to natural habitats and refuges and corridors between the areas with high likelihood of GGS occurrence. In addition, Mitigation Measure VEG and WILD-1 would also protect movement corridors for GGS by maintaining at least two feet of water in major irrigation ditches and drainage canals, keeping emergent aquatic vegetation intact for GGS escape cover and foraging.

Incorporation of Mitigation Measure VEG and WILD-1 would reduce impacts of rice idling under the Proposed Action to a less than significant impact on GGS because it would avoid or reduce the potential indirect impacts associated with loss of habitat and displacement of GGS.

Mitigation Measure VEG and WILD-1 was developed consistent with CEQA guidelines §15370, which includes as mitigation avoiding impacts, minimizing impacts, rectifying impacts, reducing or eliminating impacts over time, and compensating for impact. VEG and WILD-1 measures 1 through 4, see excerpt below, include measures to avoid and minimize potential impacts.

1. *As part of the review and approval process for potential water transfers, Reclamation will have access to the land to verify how the water for transfer is being made available and to verify that actions to protect the giant garter snake are being implemented.*
2. *Movement corridors for aquatic species (including pond turtle and giant garter snake) include major irrigation and drainage canals. The water seller will keep adequate water in major irrigation and drainage canals. Canal water depths should be similar to years when transfers do not occur or, where information on existing water depths is limited, at least two feet of water will be considered sufficient.*
3. *Maintaining water in smaller drains and conveyance infrastructure supports key habitat attributes such as emergent vegetation for giant garter snake escape cover and foraging habitat. If cropland idling/shifting occurs, Reclamation will work with sellers to document that adequate water remains in drains and canals. Documentation may include flow records, photo documentation, or other means of documentation subject to approval by Reclamation and USFWS.*
4. *Fields abutting or immediately adjacent to areas with known important giant garter snake populations (Appendix G) will not be permitted to participate in cropland idling/shifting transfers. Important giant garter snake populations are defined for purposes of this mitigation measure as populations previously identified by biologists from USFWS, USGS, and possibly contract biologists. These populations of giant garter snakes were identified early on as identified in previous consultations and are in, or connected to, areas that are considered public or protected. Most of these areas have specific management plans for giant garter snakes either for mitigation or as wildlife refuges. One factor influencing the importance of these areas is that they can provide a refuge for snakes independent of rice production. Fields abutting or immediately adjacent to the following areas are considered important giant garter snake habitat:*
    - Little Butte Creek between Llano Seco and Upper Butte Basin Wildlife Area
    - Butte Creek between Upper Butte Basin and Gray Lodge Wildlife Areas
    - Colusa Basin drainage canal between Delevan and Colusa National Wildlife Refuges
    - Gilsizer Slough
    - Colusa Drainage Canal
    - Land side of the Toe Drain along the Sutter Bypass
    - Willow Slough and Willow Slough Bypass in Yolo County
    - Hunters and Logan Creeks between Sacramento and Delevan National Wildlife Refuges
    - Lands in the Natomas Basin

Additionally, VEG and WILD-1 measures 5 through 9, see excerpt below, include adaptive measures to rectify, reduce/eliminate and compensate.

5. *At the end of the water transfer year, Reclamation will prepare an annual monitoring report that contains the following:*
    a. *Maps of rice production and all cropland idling actions within the seller district that occurred within the range of potential transfer methods analyzed.*
    b. *Results of current scientific research, summary of monitoring pertinent to water transfer actions, and new giant garter snake detections.*
    c. *Discussion of conservation measure effectiveness.*
    d. *Cumulative history of crop idling and crop shifting specifically to make water available for transfers within the sellers' area.*
6. *The report will be submitted to the USFWS and CDFW no later than January 31, of the year following the year in which the transfer occurred.*
7. *Reclamation will establish annual meetings with the Service to discuss the contents and findings of the annual report. These meetings will be scheduled following the distribution of the monitoring report and prior to the last day of February.*
8. *If, upon Reclamation's review of monitoring reports or other scientific literature, it appears that the Project is having unanticipated effects on the giant garter snake, Reclamation will contact the Service to discuss the information available and effectiveness of Project conservation measures.*
9. *Reclamation will monitor the effectiveness of the conservation measures by funding giant garter snake distribution and occupancy research. The research, conducted by USGS, includes annual sampling of giant garter snake within the action area and focuses on their distribution and occupancy dynamics. The research is designed to evaluate the effectiveness of the conservation measures to maintain giant garter snake occupancy at sites making water available for transfer in accordance with this IS/EA.*

Lastly, the Proposed Action does not propose any construction actions. Implementation of the Proposed Action is not anticipated to result in "take" of any State-listed CESA species, including GGS. As such, additional mitigation alternatives are not warranted.

Comment 1-5

The IS/MND provides a list of species that may be adversely affected by the Project, including the tricolored blackbird *(Agelaius tricolor*). Tricolored blackbird is CESA state listed as Threatened. The environmental document identifies that all the basic habitat requirements for tricolored blackbird are within the Project area, including wetlands, and nesting and foraging habitat. Tricolored blackbird colonies have been identified within the Project area. The Project may result in significant impacts on tricolored blackbird due to habitat loss resulting from changes in water management affecting wetlands. The IS/MND does not provide a complete analysis of how impacts on tricolored blackbird and its habitat, resulting from cropland idling/shifting and reduced water associated with marsh and ditch vegetation, will be reduced to less than significant. CDFW recommends that the IS/MND include an analysis of the potentially significant impacts on this species and its habitat and how the impacts will be mitigated.

Response

Suitable habitat for tricolored blackbirds exists with the Project area. This includes wetlands and rice fields for foraging. As described in Section IV, Biological Resources, in the Draft IS/EA, wetlands would experience a less than significant impact under the Proposed Action. Cropland idling would only reduce agricultural diversion by the amount of water consumptively used by the crop (when planted), the remaining water that typically runs off as tailwater would still remain in canals and waterways leading into fields. As a result, wetlands would continue to receive irrigation tail water flows. In addition, the implementation of Mitigation Measure GW-1 would require monitoring of wells and application of a mitigation plan if the seller's monitoring efforts indicate that the operation of the wells for groundwater substitution pumping are causing substantial adverse impacts.

Rice fields, which are utilized by tricolored blackbirds as a source of insects and waste grain foraging would experience less than significant impacts under the Proposed Action because cropland idling would be dispersed within the Seller Service Area. With regard to potential impacts related to breeding, Mitigation Measure VEG and WILD-1 would ensure that adequate water is maintained in major irrigational canals that support insect prey and would prohibit crop idling of rice fields, a source of foraging for the tricolored blackbirds, abutting established wildlife refuges where tricolored blackbird nesting potential is greatest. As such, potential impacts related to breeding would be less than significant with mitigation.

In summary, Section IV, Biological Resources, in the Draft IS/EA addresses potential impacts to tricolored blackbird and presents the basis for concluding that impacts related to the potential loss of foraging habitat would be less than significant, and also explains how implementation of Mitigation Measure VEG and WILD-1 serves to reduce potential nesting and breeding impacts to less than significant.

Comment 1-6

The IS/MND concluded that cumulative change in flows due to transfers would not appreciatively reduce spawning habitat availability and incubation, increase redd dewatering or juvenile stranding, or reduce the suitability of habitat conditions for juvenile rearing for Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*Oncorhynchus mykiss*), or green sturgeon (*Acipenser medirostris*). However, the proposed water transfer location will be 38 miles upstream of the current point of diversion, which may result in an amplified impact to water quality downstream. CDFW is concerned that potential amplified downstream impacts may pose a risk to juveniles of the sensitive aquatic species. CDFW recommends monitoring water quality downstream, including turbidity, pH, temperature, and total dissolved solids (TDS), to determine any measurable change in quality that may be attributed to the water transfers. CDFW recommends implementing additional avoidance and minimization measures if any identified impacts are determined to be significant.

Response

As described in Section X, Hydrology, of the Draft IS/EA, Reclamation would deliver the water made available for transfer to Member Units of the TCCA on the same pattern as it would have been diverted by the seller if no transfer occurred. This operation would result in a small change in flow (250 cfs or 2.9 percent of June 2020 flows) between the Red Bluff Pumping Plant and the point where water would have been diverted by the seller absent the transfer. This change in flows is minimal and would not worsen water quality or in turn reduce habitat suitability for spawning or rearing. Additionally, as noted in the Draft IS/EA, the proposed water transfers would not affect flows downstream of the point where water would have been diverted if a transfer did not occur, therefore flows into the Delta would not be affected.

In addition, the proposed water transfers would be implemented in compliance with the updated 2020 temperature management protocol for the Sacramento River, which guides the release of water from Shasta Reservoir to maintain healthy fisheries during summer and fall.

Comment 1-7

SUSTAINABLE GROUNDWATER MANAGEMENT ACT

The IS/MND analyzes groundwater impacts of the proposed Project and proposes Mitigation Measure GW-1 to avoid significant adverse environmental effects from groundwater level declines and ensure prompt corrective action in the event unanticipated effects occur. CDFW's comments with respect to Mitigation Measure GW-1 are to express concerns associated with potential adverse and cumulative impacts associated with proposed and future water transfers that have the potential to impact Groundwater Dependent Ecosystems.

Ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface are collectively known as Groundwater Dependent Ecosystems (GDEs) (23 Cal. Code Regs. § 351(m)). These GDEs include seeps and springs; wetlands and lakes; rivers, streams, and estuaries; and terrestrial vegetation. Water transfers made available by groundwater substitution and/or crop idling/shifting have the potential to affect groundwater hydrology due to increased groundwater use and reduced groundwater recharge. Correlating effects could be temporary and/or long-term declines in groundwater levels, reduction of groundwater storage, depletions of interconnected surface water, land subsidence, and degraded water quality. These effects have the potential to adversely impact GDEs in basins where water transfers are made available by groundwater substitution and/or crop idling/shifting.

Response

As described in XXI, Mandatory Findings of Significance, with the implementation of Mitigation Measure GW-1 incremental contribution to groundwater resources impacts is insubstantial and would not be cumulatively considerable. It should also be noted that Section X, Hydrology and Water Quality and GW-1, in the Draft IS/EA includes reference to the California Sustainable Groundwater Management Act (SGMA), which requires various basins throughout the state establish Groundwater Sustainability Plans (GSPs) by set timeframes. The groundwater basins within the Seller Service area are classified as either medium or high priority and, therefore, require that the basins are managed under GSPs by January 31, 2022. Because the GSPs for these basins have not yet been developed, an updated estimate of sustainable yield for these basins are not available. As noted in Mitigation Measure GW-1, "As GSPs are developed by Groundwater Sustainability Agencies, potential sellers must confirm that the proposed pumping and the following Monitoring Program and Mitigation Plan verified by Reclamation is compatible with applicable GSP." The GSP's would provide for sustainable groundwater management, which means the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results. Undesirable results include, but are not limited to, the types of concerns identified in the comment, such as long-term declines in groundwater levels, reduction of groundwater storage, depletions of interconnected surface water, land subsidence, and degraded water quality. While implementation of Mitigation Measure GW-1 will serve to avoid significant impacts and cumulatively considerable impacts to groundwater from the Proposed Action, implementation of the SMGA would also serve to address such potential impacts associated with temporary dewatering. Please also see response to Comment 1-10 below for additional discussion of GSPs.

Comment 1-8

CDFW is concerned with the level of monitoring proposed in GW-1 for deep-rooted vegetation, including riparian when relevant, located within one-half mile of a participating pumping well, where no suitable monitoring well is identified. In addition to the pre-pumping and post-pumping vegetation assessments included in GW-1, CDFW recommends that periodic vegetation assessments by a qualified plant ecologist/certified arborist be completed during the transfer pumping. This increased frequency of monitoring enables capture of early signs of adverse impacts to GDEs, which is critical to adaptive management that avoids long term impacts (e.g., the decrease or cessation of pumping if identified GDEs are exhibiting signs of stress, as opposed to the permanent loss of vegetation that could otherwise occur absent observations of early adverse impacts). CDFW recommends determining clear and quantifiable metrics for the assessments that specify early signs of adverse impacts and associated management actions (e.g., decrease in volume of pumping; cessation of pumping). Though GW-1 includes requirements for replacement of lost vegetation, CDFW recommends the increased early monitoring to avoid vegetation loss from occurring within GDEs during the proposed transfer. Reporting on the pre-pumping, during-pumping, and post-pumping assessment and any findings of significant adverse impacts on GDEs should be made publicly accessible.

Response

The monitoring and mitigation plan for deep rooted vegetation under Mitigation Measure GW-1 includes (1) establishing baseline conditions for the health of deep-rooted vegetation by adding requirements to conduct monitoring before the start of transfer; (2) establish specific standards for trigger points for initiation of actions to protect the health of deep-rooted vegetation and (3) establish success criteria for revegetation and restoration actions.

The monitoring triggers included in Mitigation Measure GW-1 would catch the lowering of groundwater levels soon enough (i.e., 10 feet reduction in shallow groundwater areas) to allow for recharge before there is a substantial reduction in health of deep-rooted vegetation. While some species may be affected by the temporary reduction in groundwater levels, many species of deep-rooted plants in California's uplands are accustomed to periods of prolonged drought and can rebound from reductions in water availability. Consequently, pre- and post- pumping visual observation included in Mitigation Measure GW-1 would adequately capture the impacts of transfers to avoid significant impacts to deep-rooted vegetation.

Comment 1-9

Additionally, CDFW is concerned with using historical groundwater fluctuations during the transfer period as justification for allowing groundwater levels to decline by more than 10 feet near deep-rooted vegetation. CDFW recommends contextualizing historical water level fluctuations with an analysis of water year types and prior drought periods. It is possible that during those historical periods of groundwater level declines used as minimum thresholds in this mitigation measure, GDEs experienced significant adverse impacts related to the depletion of groundwater beyond the root zone. A more protective groundwater level trigger for monitoring wells near deep-rooted vegetation could include considering historical fluctuations of groundwater levels only during previous years of the same water year type as the proposed transfer. This approach of pairing minimum groundwater elevation triggers with like water years can better distinguish the marginal impacts of the transfer from naturally occurring groundwater fluctuations.

Response

In response to the commenters concerns regarding justification for greater and 10 feet fluctuations of groundwater levels during the transfer period, simulated shallow groundwater from Proposed Project was estimated to be less than 6 feet at all locations modeled in SACFEM2013 (see Figure H-2). Additionally, groundwater dependent vegetation communities, namely riparian, are more likely to rebound from a temporary drop in the groundwater levels because of the interaction of surface flows and groundwater flows in riparian systems. In upland habitats, vegetation that relies on shallow groundwater may be more sensitive to changes in groundwater levels; however, it is expected that the monitoring triggers would catch the lowering of groundwater levels soon enough (i.e., 10 feet reduction in shallow groundwater areas) to allow for recharge before there is a substantial reduction in health of deep-rooted vegetation. While some species may be affected by the temporary reduction in groundwater levels, many species of deep-rooted plants in California's uplands are accustomed to periods of prolonged drought and can rebound from reductions in water availability.

Comment 1-10

CDFW also recommends considering both seasonal and inter-annual recovery in groundwater levels when determining eligibility for a well to be used as a transfer pumping well. If a pumping well is located within one-half mile of GDEs and has been used for previous groundwater substitution transfers, CDFW recommends confirming that groundwater levels recovered to pre-transfer levels before including the well in subsequent transfers. Avoiding sustained seasonal and inter-annual depletion of groundwater levels in areas near GDEs may help to avoid adverse impacts related to the cumulative effects of repeated transfers and groundwater depletion.

Groundwater Sustainability Agencies (GSAs) are required under the Sustainable Groundwater Management Act (SGMA) to identify and consider impacts to beneficial uses and users of groundwater, including GDEs, during the development and implementation of GSPs (23 Cal. Code Regs. § 354.16 (g) and Water Code § 10727.4(l)). Therefore, Department staff believes it is essential for potential water transferors to coordinate with appropriate GSAs to ensure water transfer activities are considered in the development of relevant GSPs to avoid undesirable results to beneficial uses and users of groundwater. Early coordination with GSAs will help determine whether water transfer activities in a basin may have potential impacts on Groundwater Dependent Ecosystems and aid in the development of sustainability goals, minimum thresholds, and measurable objectives for comprehensive sustainable management criteria.

Response

In response to the comment regarding recovery of groundwater levels, Mitigation Measure GW-1 includes measurement of groundwater levels at the participating well and monitoring well prior to, during and post- transfers. If monitoring data at the monitoring well indicate that groundwater levels have dropped below root zones of deep-rooted vegetation (i.e., more than 10 feet, where groundwater was 10 to 25 feet below ground surface prior to starting the surface-water transfer), the seller must stop transfer-related pumping at the participating pumping well and cannot resume pumping until groundwater levels have recovered to levels above the root zones. However, if historic data at the location indicate shallow groundwater levels typically declined during the transfer period and remained below the root, zone then the transfer may be allowed to proceed.

In response to the comment regarding coordination with GSA's, groundwater basins within the Seller Service area are classified as either medium or high priority and, therefore, require that the basins are managed under GSPs by January 31, 2022. Because the GSPs for these basins have not yet been developed, and updated estimate of sustainable yield for these basins are not available. As noted in Mitigation Measure GW-1, "As GSPs are developed by GSAs, potential sellers must confirm that the proposed pumping and the following Monitoring Program and Mitigation Plan verified by Reclamation is compatible with applicable GSP."

Comment 1-11

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations (Pub. Resources Code, § 21003, subd. (e)). Accordingly, please report any special status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNNDB field survey form can be found at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Submitting-Data. The completed form can be mailed electronically to CNDDB at the following email address: CNDDB@wildlife.ca.gov. The types of information reported to CNDDB can be found at the following link: https://wildlife.ca.gov/Data/CNDDB/Plants-and-Animals.

Response

The Lead Agencies have not conducted surveys under this process that would result in data for submittal to the California Natural Diversity Database (CNDDB). Reporting of special status species occurrences will be in accordance to VEG and WILD-1 and will include reporting to the CNDDB when/as appropriate. Additionally, any special status surveys will be conducted by permitted personnel with reporting requirements, including CNDDB.

Comment 1-12

FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089.)

Response

TCCA will pay the applicable filing fee when filing the Notice of Determination for the Project.

Comment 1-13

CONCLUSION

Pursuant to Public Resources Code §21092 and §21092.2, CDFW requests written notification of proposed actions and pending decisions regarding the proposed project. Written notifications shall be directed to: California Department of Fish and Wildlife North Central Region, 1701 Nimbus Road, Rancho Cordova, CA 95670 or emailed to R2CEQA@wildlife.ca.gov.

CDFW appreciates the opportunity to comment on the IS/MND to assist in identifying and mitigating Project impacts on biological resources. Department personnel are available for consultation regarding biological resources and strategies to minimize and/or mitigate impacts.

Response

Thank you for providing comments on the Draft IS/EA. A copy of the Final IS/EA will be provided to CDFW, along with the Mitigated Negative Declaration that would be adopted if the Project is approved.

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Appendix L
Comment Letters

Comment ID: 1

Dear Mr. Sutton:

The California Department of Fish and Wildlife (CDFW) received and reviewed the Notice of Intent to Adopt an IS/MND from Tehama-Colusa Canal Authority (TCCA) for the 2021 Tehama-Colusa Canal Authority In-Basin Water Transfers (Project) pursuant the California Environmental Quality Act (CEQA) statute and guidelines.

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may need to exercise its own regulatory authority under the Fish and Game Code.

DEPARTMENT ROLE

CDFW is California's **Trustee Agency** for fish and wildlife resources and holds those resources in trust by statute for all the people of the State. (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a).) CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (*Id.*, § 1802.) Similarly, for purposes of CEQA, CDFW provides, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources. 1-1

CDFW may also act as a **Responsible Agency** under CEQA (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) If implementation of the Project may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), related authorization as provided by the Fish and Game Code may be obtained.

PROJECT DESCRIPTION SUMMARY

The Project's proposed transfers could originate from sellers in Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, and/or Yolo Counties. The transfer buyers could be in Colusa, Glenn, Tehama, and/or Yolo Counties.

The Project consists of up to 57,060 acre-feet (AF) of water proposed for transfers that would occur from sellers of Sacramento River Settlement Contract Base Supply and Central Valley Project water in the Sacramento River to buyers that receive water from the Tehama-Colusa or Corning Canals. Water proposed for transfer is typically diverted from the Sacramento River at the Red Bluff Pumping Plant. The TCCA and its Member Units are soliciting willing sellers to transfer water. The TCCA would negotiate with these sellers, on behalf of the Member Units, to identify potential transfers and the specifics of each transfer arrangement, which, collectively constitute the Project. 1-2

Transfers would be from willing sellers within the Sacramento Valley to buyers within the Sacramento Valley. The water would be made available for transfer through a combination of cropland idling/shifting and groundwater substitution.

COMMENTS AND RECOMMENDATIONS

CDFW offers the comments and recommendations below to assist TCCA in adequately identifying and, where appropriate, mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources. CDFW is primarily concerned with the Project's potential impacts to listed and other special-status species and their habitats, including Groundwater Dependent Ecosystems.

1-3

The comments provided herein are based on the information provided in the IS/MND and Department knowledge of species and habitats that may be affected by the Project. Comments are limited to the Project and activities that are likely to result in impacts to biological resources.

SPECIAL STATUS SPECIES

The IS/MND analyzes environmental impacts of the proposed Project on species and habitats and proposes Mitigation Measure VEG and WILD-1: Protect Existing Habitat for Wildlife to reduce potential impacts on State-listed and other special-status species including giant garter snake *(Thamnophis gigas)* (GGS), and western pond turtle *(Emys marmorata)*. The Mitigation Measures VEG and WILD-1 include monitoring water levels in irrigation canals and ditches to maintain adequate water levels and avoid cropland idling/shifting in areas that may be suitable for GGS or are abutting or adjacent to state or federal wildlife areas. Reporting annual transfer amounts and identifying where cropland idling/shifting occurred are also part of Mitigation Measure VEG and WILD-1. CDFW acknowledges that these measures may reduce impacts on listed and special status species; however, Mitigation Measure VEG and WILD-1 consists of only avoidance and minimization of impacts and does not include mitigation for potential take of State-listed species. The IS/MND confirms that the proposed transfers and cropland idling/shifting will reduce forage and cover habitat, hinder movement, and increase predation risk to State-listed and other special-status species. CDFW recommends that the Project quantify the impacts to listed species habitat and provide appropriate mitigation alternatives, including but not limited to purchasing mitigation credits at a Department-approved conservation bank, restoration and/or enhancement of suitable habitat, and/or conservation of suitable habitat for the target species. CDFW recommends that a CESA Incidental Take Permit (ITP) be obtained if the Project has the potential to result in "take" (Fish & G. Code § 86 defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill") of State-listed CESA species, either through construction or over the life of the Project).

1-4

The IS/MND provides a list of species that may be adversely affected by the Project, including the tricolored blackbird (*Agelaius tricolor*). Tricolored blackbird is CESA state listed as Threatened. The environmental document identifies that all the basic habitat requirements for tricolored blackbird are within the Project area, including wetlands, and nesting and foraging habitat. Tricolored blackbird colonies have been identified within the Project area. The Project may result in significant impacts on tricolored 1-5 blackbird due to habitat loss resulting from changes in water management affecting wetlands. The IS/MND does not provide a complete analysis of how impacts on tricolored blackbird and its habitat, resulting from cropland idling/shifting and reduced water associated with marsh and ditch vegetation, will be reduced to less than significant. CDFW recommends that the IS/MND include an analysis of the potentially significant impacts on this species and its habitat and how the impacts will be mitigated.

The IS/MND concluded that cumulative change in flows due to transfers would not appreciatively reduce spawning habitat availability and incubation, increase redd dewatering or juvenile stranding, or reduce the suitability of habitat conditions for juvenile rearing for Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*Oncorhynchus mykiss*), or green sturgeon (*Acipenser medirostris*). However, the 1-6 proposed water transfer location will be 38 miles upstream of the current point of diversion, which may result in an amplified impact to water quality downstream. CDFW is concerned that potential amplified downstream impacts may pose a risk to juveniles of the sensitive aquatic species. CDFW recommends monitoring water quality downstream, including turbidity, pH, temperature, and total dissolved solids (TDS), to determine any measurable change in quality that may be attributed to the water transfers. CDFW recommends implementing additional avoidance and minimization measures if any identified impacts are determined to be significant.

SUSTAINABLE GROUNDWATER MANAGEMENT ACT

The IS/MND analyzes groundwater impacts of the proposed Project and proposes Mitigation Measure GW-1 to avoid significant adverse environmental effects from groundwater level declines and ensure prompt corrective action in the event unanticipated effects occur. CDFW's comments with respect to Mitigation Measure GW-1 are to express concerns associated with potential adverse and cumulative impacts associated with proposed and future water transfers that have the potential to impact Groundwater Dependent Ecosystems.

Ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface are collectively known 1-7 as Groundwater Dependent Ecosystems (GDEs) (23 Cal. Code Regs. § 351(m)). These GDEs include seeps and springs; wetlands and lakes; rivers, streams, and estuaries; and terrestrial vegetation. Water transfers made available by groundwater substitution and/or crop idling/shifting have the potential to affect groundwater hydrology due to increased groundwater use and reduced groundwater recharge. Correlating effects could be temporary and/or long-term declines in groundwater levels, reduction of groundwater storage, depletions of interconnected surface water, land subsidence, and degraded water quality. These effects have the potential to adversely impact GDEs in basins where water transfers are made available by groundwater substitution and/or crop idling/shifting.

CDFW is concerned with the level of monitoring proposed in GW-1 for deep-rooted vegetation, including riparian when relevant, located within one-half mile of a participating pumping well, where no suitable monitoring well is identified. In addition to the pre-pumping and post-pumping vegetation assessments included in GW-1, CDFW recommends that periodic vegetation assessments by a qualified plant ecologist/certified arborist be completed during the transfer pumping. This increased frequency of monitoring enables capture of early signs of adverse impacts to GDEs, which is critical to adaptive management that avoids long term impacts (e.g., the decrease or cessation of pumping if identified GDEs are exhibiting signs of stress, as opposed to the permanent loss of vegetation that could otherwise occur absent observations of early adverse impacts). CDFW recommends determining clear and quantifiable metrics for the assessments that specify early signs of adverse impacts and associated management actions (e.g., decrease in volume of pumping; cessation of pumping). Though GW-1 includes requirements for replacement of lost vegetation, CDFW recommends the increased early monitoring to avoid vegetation loss from occurring within GDEs during the proposed transfer. Reporting on the pre-pumping, during-pumping, and post-pumping assessment and any findings of significant adverse impacts on GDEs should be made publicly accessible. 1-8

Additionally, CDFW is concerned with using historical groundwater fluctuations during the transfer period as justification for allowing groundwater levels to decline by more than 10 feet near deep-rooted vegetation. CDFW recommends contextualizing historical water level fluctuations with an analysis of water year types and prior drought periods. It is possible that during those historical periods of groundwater level declines used as minimum thresholds in this mitigation measure, GDEs experienced significant adverse impacts related to the depletion of groundwater beyond the root zone. A more protective groundwater level trigger for monitoring wells near deep-rooted vegetation could include considering historical fluctuations of groundwater levels only during previous years of the same water year type as the proposed transfer. This approach of pairing minimum groundwater elevation triggers with like water years can better distinguish the marginal impacts of the transfer from naturally occurring groundwater fluctuations. 1-9

CDFW also recommends considering both seasonal and inter-annual recovery in groundwater levels when determining eligibility for a well to be used as a transfer pumping well. If a pumping well is located within one-half mile of GDEs and has been used for previous groundwater substitution transfers, CDFW recommends confirming that groundwater levels recovered to pre-transfer levels before including the well in subsequent transfers. Avoiding sustained seasonal and inter-annual depletion of groundwater levels in areas near GDEs may help to avoid adverse impacts related to 1-10 the cumulative effects of repeated transfers and groundwater depletion.

Groundwater Sustainability Agencies (GSAs) are required under the Sustainable Groundwater Management Act (SGMA) to identify and consider impacts to beneficial uses and users of groundwater, including GDEs, during the development and implementation of GSPs (23 Cal. Code Regs. § 354.16 (g) and Water Code § 10727.4(l)). Therefore, Department staff believes it is essential for potential water transferors to coordinate with appropriate GSAs to ensure water transfer activities are considered in the development of relevant GSPs to avoid undesirable results to beneficial uses and users of groundwater. Early coordination with GSAs will help determine whether water transfer activities in a basin may have potential impacts on Groundwater Dependent Ecosystems and aid in the development of sustainability goals, minimum thresholds, and measurable objectives for comprehensive sustainable management criteria. 1-10

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations (Pub. Resources Code, § 21003, subd. (e)). Accordingly, please report any special status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNNDB field survey form can be found at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Submitting-Data. The completed form can be mailed electronically to CNDDB at the following email address: CNDDB@wildlife.ca.gov. The types of information reported to CNDDB can be found at the following link: https://wildlife.ca.gov/Data/CNDDB/Plants-and-Animals. 1-11

FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089.) 1-12

CONCLUSION

Pursuant to Public Resources Code §21092 and §21092.2, CDFW requests written notification of proposed actions and pending decisions regarding the proposed project. Written notifications shall be directed to: California Department of Fish and Wildlife North Central Region, 1701 Nimbus Road, Rancho Cordova, CA 95670 or emailed to R2CEQA@wildlife.ca.gov. 1-13

CDFW appreciates the opportunity to comment on the IS/MND to assist in identifying and mitigating Project impacts on biological resources. Department personnel are available for consultation regarding biological resources and strategies to minimize and/or mitigate impacts. Questions regarding this letter or further coordination should be directed to Zach Kearns, Environmental Scientist, at (916) 358-1134 or zachary.kearns@wildlife.ca.gov. 1-13

Sincerely,

Zach Kearns
Environmental Scientist
(916) 358-1134
1701 Nimbus Rd.
Rancho Cordova, CA 95670
CALIFORNIA DEPARTMENT OF FISH and WILDLIFE

Appendix M

Mitigation Monitoring and Reporting Program

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Appendix M Mitigation Monitoring and Reporting Program

M.1 Introduction

Section 21081.6 of the Public Resources Code (PRC) and California Environmental Quality Act (CEQA) Guidelines section 15097 require the Lead Agency for each project that is subject to CEQA to monitor performance of the mitigation measures included in any environmental document to ensure that implementation does, in fact, take place. The PRC requires the Lead Agency to adopt a monitoring and reporting program for assessing and ensuring the implementation of required mitigation measures.

In accordance with PRC Section 21081.6, Tehama-Colusa Canal Authority (TCCA) has developed this Mitigation Monitoring and Reporting Program (MMRP) for the project. Mitigation measures have been incorporated into the proposed project to reduce impacts to less than significant levels. The MMRP summarizes the monitoring and reporting plans for the mitigation measures identified in the Initial Study/ Mitigated Negative Declaration (IS/MND). The purpose of the MMRP is to ensure activities associated with transferring water comply with all applicable environmental requirements.

M.2 Mitigation and Monitoring

Table M-1 lists the mitigation measures identified in the IS/MND, the responsible parties, method of verification, and time frame for verification.

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
AQ-1	Selling agency would reduce pumping at diesel wells to reduce emissions to below the thresholds. If an agency is making water available for transfer through cropland idling and groundwater substitution actions in the same year, the reduction in vehicle emissions can partially offset groundwater substitution pumping at a rate of 4.25 AF of water produced by idling to one acre-foot of groundwater pumped (Byron & Buck 2009). Agencies may also decide to replace old diesel wells with cleaner (i.e., higher emission tier) diesel pumps or electric wells to reduce emission below the thresholds. Any selling agency with potentially significant emissions, as determined by this IS/EA, will be required to submit information, prior to making water available for transfer through groundwater substitution actions, that documents the wells that would be pumped to stay below the thresholds. The selling agency must also maintain recordkeeping logs that document the specific engine to be used for making water available for transfer through groundwater substitution actions, the power rating (hp), and applicable	Participating sellers	Reclamation	Daily recordkeeping logs specifying the engines operated by each selling agency with potentially significant emissions and calculated criteria pollutant emissions.	Monthly during transfer.		

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	emission factors. Emission calculations for daily emissions will be completed for comparison to the significance thresholds determined for each selling agency. In the annual report, the selling agencies will be required to submit documentation specifying that the wells would only be pumped in accordance with the transfer proposals.						
VEG and WILD-1	Mitigation Measure VEG and WILD-1 includes measures to avoid potentially significant impacts to terrestrial species associated with cropland idling transfers and reduce any potential impacts to less than significant: As part of the review and approval process for potential water transfers, Reclamation will have access to the land to verify how the water for transfer is being made available and to verify that actions to protect the giant garter snake are being implemented.	Participating sellers	Reclamation	Transfer package with maps of fields to be idled.	Ongoing during transfer season.		
VEG and WILD-1	Movement corridors for aquatic species (including pond turtle and giant garter snake) include major irrigation and drainage canals. The water seller will keep adequate water in major irrigation and drainage canals. Canal water depths should be similar to years when transfers do not occur or, where information on	Participating sellers	Reclamation	Transfer application package with field spot-checks.	Ongoing during transfer season.		

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	existing water depths is limited, at least two feet of water will be considered sufficient.						
VEG and WILD-1	Maintaining water in smaller drains and conveyance infrastructure supports key habitat attributes such as emergent vegetation for giant garter snake escape cover and foraging habitat. If cropland idling/shifting occurs, Reclamation will work with sellers to document that adequate water remains in drains and canals. Documentation may include flow records, photo documentation, or other means of documentation subject to approval by Reclamation and USFWS.	Participating sellers	Reclamation	Transfer application package with field spot-checks.	Ongoing during transfer season.		
VEG and WILD-1	Fields abutting or immediately adjacent to areas with known important giant garter snake populations (Appendix G) will not be permitted to participate in cropland idling/shifting transfers. Important giant garter snake populations are defined for purposes of this mitigation measure as populations previously identified by biologists from USFWS, USGS, and possibly contract biologists. These populations of giant garter snakes were identified early on as identified in previous consultations and are in, or connected to, areas that are considered public or protected. Most of	Participating sellers	Reclamation	Transfer application package, maps of fields to be idled, and field spot-checks of land idled.	Prior to and during water transfers.		

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	these areas have specific management plans for giant garter snakes either for mitigation or as wildlife refuges. One factor influencing the importance of these areas is that they can provide a refuge for snakes independent of rice production. Fields abutting or immediately adjacent to the following areas are considered important giant garter snake habitat: • Little Butte Creek between Llano Seco and Upper Butte Basin Wildlife Area • Butte Creek between Upper Butte Basin and Gray Lodge Wildlife Areas • Colusa Basin drainage canal between Delevan and Colusa National Wildlife Refuges • Gilsizer Slough • Colusa Drainage Canal • Land side of the Toe Drain along the Sutter Bypass • Willow Slough and Willow Slough Bypass in Yolo County • Hunters and Logan Creeks between Sacramento and Delevan National Wildlife Refuges • Lands in the Natomas Basin						

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
VEG and WILD-1	At the end of the water transfer year, Reclamation will prepare an annual monitoring report that contains the following: • Maps of rice production and all cropland idling actions within the seller district that occurred within the range of potential transfer methods analyzed. • Results of current scientific research, summary of monitoring pertinent to water transfer actions, and new giant garter snake detections. • Discussion of conservation measure effectiveness. • Cumulative history of crop idling and crop shifting specifically to make water available for transfers within the sellers area. The report will be submitted to the USFWS and CDFW no later than January 31, of the year following the year in which the transfer occurred.	Reclamation	Reclamation	Review of monitoring report and annual meeting with USFWS	After water transfers.		
VEG and WILD-1	Reclamation will establish annual meetings with the Service to discuss the contents and findings of the annual report. These meetings will be scheduled	Reclamation	Reclamation	Distribution of monitoring report to	Meeting occurs prior to the next		

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	following the distribution of the monitoring report and prior to the last day of February.			USFWS and occurrence of annual meeting.	transfer season		
VEG and WILD-1	If, upon Reclamation's review of monitoring reports or other scientific literature, it appears that the Project is having unanticipated effects on the giant garter snake, Reclamation will contact the Service to discuss the information available and effectiveness of Project conservation measures.	Reclamation	Reclamation	Review of monitoring report by Reclamation and occurrence of annual meeting with USFWS.	Meeting occurs prior to the next transfer season.		
VEG and WILD-1	Reclamation will monitor the effectiveness of the conservation measures by funding giant garter snake distribution and occupancy research. The research, conducted by USGS, includes annual sampling of giant garter snake within the action area and focuses on their distribution and occupancy dynamics. The research is designed to evaluate the effectiveness of the conservation measures to maintain giant garter snake occupancy at sites making water available for transfer in accordance with this IS/EA.	Reclamation	Reclamation	Reclamation funding of giant garter snake research.	Ongoing.		
GW-1	The objective of Mitigation Measure GW-1 is to avoid potentially significant adverse environmental effects from groundwater level declines such as (1) impacts to other legal users of water; (2) land subsidence; (3) adverse effects to	Participating sellers	Reclamation	Transfer application package.	Prior to water transfers.		

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	groundwater-dependent vegetation; or (4) migration of reduced quality groundwater. The mitigation measure also requires prompt corrective action so that impacts discussed previously will be reduced to less than significant in the event unanticipated effects occur. The measure accomplishes this by monitoring groundwater levels and land subsidence in the period during which groundwater is being pumped in-lieu of diverting surface water. Additionally, the mitigation plan identifies necessary preventative action measures if monitoring shows that identified trigger points are reached during transfer-related pumping. Reclamation will verify that sellers implement the monitoring program and mitigation plan to avoid potentially significant adverse effects of transfer-related groundwater extraction. In addition, each entity making surface water available for transfer through groundwater substitution actions must confirm that the proposed groundwater pumping will be compatible with state and local regulations and Groundwater Management Plans. As Groundwater Sustainability Plans are developed by						

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	Groundwater Sustainability Agencies pursuant to SGMA, potential sellers must confirm that the proposed pumping and the following Monitoring Program and Mitigation Plan, verified by Reclamation, is compatible with applicable GSPs.						
GW-1	<u>Well Review Process</u> Potential sellers must submit well data for Reclamation review as part of the transfer approval process. The *DRAFT Technical Information for Preparing Water Transfer Proposals (Water Transfer White Paper)* (Reclamation and DWR 2019) can be consulted to understand the information that is necessary for Reclamation to approve a transfer.	Participating sellers	Reclamation	Transfer application package.	Prior to water transfers.		
GW-1	<u>Monitoring Program</u> Potential sellers must complete and implement a monitoring program subject to Reclamation's approval that shall include, at a minimum, the following components:	Participating sellers	Reclamation	Transfer application package and monitoring reports.	Prior to, during, and after water transfers.		
GW-1	*Monitoring Well Network* The monitoring program shall incorporate a sufficient number of monitoring wells, as determined by Reclamation, to accurately characterize groundwater levels from the appropriate aquifers and their response in the area before, during, and after transfer-related	Participating sellers	Reclamation	Transfer application package and monitoring data.	Plan submitted prior to water transfers; monitoring information submitted during and after transfer.		

	substitution pumping takes place. Depending on local conditions, additional groundwater level monitoring may be required near ecological resource areas. It should be noted that monitoring well networks have been established for some of the participating pumping wells (those wells being used in-lieu of diverting surface water that is being made available for transfer) that have also participated in water transfers in previous years. For wells that have not participated in water transfers previously, the sellers would identify, in the transfer proposal, suitable monitoring wells as defined below for review and approval by Reclamation. If a suitable monitoring well(s) is not identified for a participating pumping well, the well will not be allowed to participate in a water transfer until a suitable monitoring well(s) is identified. The monitoring well network would include the participating pumping well and a suitable groundwater level monitoring well(s) in the vicinity of the participating pumping well(s). Suitable monitoring well(s) would: (1) be within a two-mile radius of the seller’s groundwater substitution pumping well; (2) be located within the same Bulletin 118 subbasin as the groundwater substitution pumping well; and (3) have a screen depth(s) in the same aquifer level (shallow, intermediate, or deep) as the groundwater substitution pumping well. Wells with short historic records						

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	could be considered, but short records (that do not extend to 2014 or earlier) could limit the transfer because the historic low would not reflect the persistent dry conditions from 2011 to 2015. In this situation, the lowest groundwater level for the short period of record would be used, but because the groundwater level would likely be higher than the historic low during the prior drought period, the groundwater level triggers (described below) would be more restrictive (i.e., the lowest recorded groundwater level could be reached more quickly during transfer-related groundwater substitution pumping than occurred in the short period of record when groundwater levels were higher). Monitoring requirements at the participating groundwater substitution pumping well and suitable monitoring well(s) would detect impacts to third parties and land subsidence. Monitoring and mitigation for impacts to groundwater dependent deep-rooted vegetation and migration of reduced quality groundwater are discussed below under “Other Monitoring”.						

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
GW-1	*Groundwater Level Monitoring* Sellers will collect measurements of groundwater levels in both the participating wells (those wells being used in-lieu of diverting surface water that is being made available for transfer) and monitoring wells. Groundwater level measurements will be used to identify potential concerns for both third-party impacts and inelastic (irreversible) subsidence based on the identified trigger points. Groundwater level monitoring will include measurements before, during, and after transfer-related substitution pumping. The seller will measure groundwater levels as follows: • Prior to transfer: Groundwater levels will be measured in both the participating pumping well(s) and the monitoring well(s) monthly from March in the year of the proposed transfer-related substitution pumping until the start of the transfer pumping. Monitoring will also be conducted on the day that the transfer pumping	Participating sellers	Reclamation	Transfer application package with field spot-checks and monitoring data.	Prior to, during, and after water transfers.	.	

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	begins, prior to the pump being turned on. • During transfer-related substitution pumping: Groundwater levels will be measured, in both the participating pumping well(s) and the monitoring well(s), weekly throughout the pumping period. • Post-transfer pumping: Groundwater levels will be measured, in both the participating well(s) and the monitoring well(s), weekly, for one month after the end of transfer-related pumping, after which groundwater levels will be measured monthly through March of the year following the end of the pumping.						
GW-1	*Groundwater Level Triggers* The primary criteria used to identify potentially significant impacts to groundwater levels are the basin management objectives (BMOs) set by GMPs. In the Sacramento Valley, Shasta, Tehama, Glenn, Butte, Colusa, Sutter, Yuba, Nevada, Placer, Sacramento and	Participating sellers	Reclamation	Regular inspection, monitoring data, and report if triggers are exceeded, if necessary.	Plan submitted prior to water transfers; monitoring information submitted during and after transfer.		

	Yolo counties have established GMPs to provide guidance in managing the resource. In areas where quantitative BMO groundwater level triggers exist, sellers will manage groundwater levels to these triggers and initiate the mitigation plan (discussed below) if groundwater levels reach the trigger. In areas where quantitative BMOs do not exist, sellers will manage groundwater levels to maintain them above the identified historic low groundwater level (trigger) and will initiate the mitigation plan (discussed below) if groundwater levels reach the trigger. Most of the quantitative BMOs within the Seller Service Area are tied to historic low groundwater levels. Therefore, the use of historic low groundwater levels in areas without quantitative BMOs is consistent with the approach for areas with quantitative BMOs. As part of a seller's transfer proposal subject to Reclamation's review and approval, the seller will need to identify the monitoring wells and the specific groundwater level trigger for each well (established through the local BMO or the historic low groundwater level for that well). Groundwater level declines due to pumping occur initially at the pumping well and then propagate outward from that location. The magnitude of groundwater level decline caused by pumping also decreases with increasing distance from the pumping well.						

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	Therefore, groundwater level declines caused by transfer-related substitution pumping would be measured first at the pumping well and subsequently at the monitoring well. The decline would be greatest at the participating well and lower at the monitoring well. Therefore, it is likely that groundwater levels in the participating well would decline to the historic low level sooner than at the monitoring well(s). The monitoring well(s) would provide information surrounding the participating well to avoid potential cumulative impacts.						
GW-1	*Groundwater Quality* For municipal sellers, the comprehensive water quality testing requirements of Title 22 are considered sufficient for the water transfer monitoring program. Agricultural sellers shall measure specific conductance in samples from each participating production well. Samples shall be collected when the seller first initiates pumping, monthly during the pumping period, and at the termination of transfer-related pumping.	Municipal sellers	Reclamation	Inspections during transfer period and monitoring data.	Prior to, during, and after water transfers		
GW-1	*Groundwater Pumping Measurements* All groundwater wells pumping to replace surface water made available for transfer shall be configured with a permanent instantaneous and totalizing	Participating sellers	Reclamation	Inspections during transfer period and monitoring data.	Prior to, during, and after water transfers.		

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	flow meter capable of accurately measuring well discharge rates and volumes. Flow meters will be installed and calibrated in accordance with manufacturer's recommendations and the relevant documentation will be submitted by the seller to Reclamation. Flow meter readings will be recorded just prior to initiation of transfer-related substitution pumping and no less than monthly throughout the duration of the pumping period, as close as practical to the last day of the month. Readings will also be recorded just after cessation of pumping.						
GW-1	*Shallow Groundwater Level Monitoring for Deep Rooted Vegetation* To avoid significant effects to vegetation and allow sellers to modify actions before significant effects occur, sellers will monitor groundwater level data to verify that significant adverse effects to deep-rooted vegetation are avoided. This monitoring is only required in areas with deep-rooted vegetation (i.e., oak trees and riparian trees that would have tap roots greater than 10 feet deep) within a one-half mile radius of the participating well and areas where groundwater levels are between 10 to 25 feet below ground surface prior to starting transfer-related pumping. This monitoring is not required in areas with	Participating sellers	Reclamation	Inspection, monitoring data, and report if deep rooted vegetation are impacted (only required in areas with deep-rooted vegetation).	Plan submitted prior to water transfers; monitoring information submitted during and after transfer.		

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	no deep-rooted vegetation (i.e., oak trees and riparian trees that would not have tap roots greater than 10 feet deep) within one-half mile of the participating wells or in areas where vegetation is located along waterways or irrigated fields that will continue to have water during the period of transfer. In their transfer proposal to Reclamation, the seller would be required to identify if monitoring for deep-rooted vegetation is a requirement. Existing resources such as DWR's groundwater dependent ecosystem maps (https://gis.water.ca.gov/app/NCDatasetViewer/) or any existing biological survey data in the area, and aerial imagery (e.g. Google Maps) could be used to identify deep-rooted vegetation near the participating pumping well. If deep-rooted vegetation is identified near the participating well, a groundwater level monitoring well with the following requirements would need to be identified and monitored: (1) monitoring well is within a one-half mile radius of the deep-rooted vegetation; and (2) monitoring well would measure shallow groundwater level changes (within the interval between 10 to 25 feet below ground surface). The participating pumping well can function as the monitoring well if the previously						

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	mentioned requirements are met. If monitoring data at the monitoring well indicate that groundwater levels have dropped below root zones of deep-rooted vegetation (i.e., more than 10 feet, where groundwater was 10 to 25 feet below ground surface prior to starting the surface-water transfer), the seller must implement actions set forth in the mitigation plan. However, if historic data show that groundwater levels in the area have typically fluctuated by more than this amount annually during the proposed transfer period, then the transfer may be allowed to proceed. Prior to transfer pumping, the seller must submit to Reclamation historic data showing groundwater fluctuations in the area of the deep-rooted vegetation. If no monitoring wells with the requirements discussed in the previous paragraph exist, monitoring would be based on visual observations by a qualified plant ecologist/certified arborist of the health of these areas of deep-rooted vegetation until it is feasible to obtain or install shallow groundwater monitoring. Monitoring of these areas would include a pre-pumping vegetation assessment within a half-mile radius of the pumping well followed by an assessment near the end						

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	of the pumping season but prior to fall/autumn leaf-drop. The assessment of post-pumping impacts on deep-rooted vegetation will be conducted by a qualified plant ecologist/arborist and will take into account the existing health conditions of the vegetation prior to pumping, species present, size-class of trees, and rainfall data from the previous water years. If the qualified plant ecologist/certified arborist determines, based on site-specific circumstances, that groundwater pumping has caused significant adverse impacts to deep-rooted vegetation (that is, any loss of the deep-rooted vegetation), the seller must implement restoration actions set forth in the mitigation plan. Findings from the pre-pumping and post pumping assessment will be reported to Reclamation.						
GW-1	*Coordination Plan* The monitoring program will include a plan to coordinate the collection and organization of monitoring data. This plan will describe how input from third-party well owners will be incorporated into the monitoring program and will include a plan for communication with Reclamation as well as other decision makers and third parties. Additionally, Reclamation, Member Units of the TCCA, and potential seller(s) will	Participating sellers	Reclamation	Transfer application package with Coordination Plan.	Prior to water transfers.		

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	coordinate closely with potentially affected third parties to collect and monitor groundwater data. If a third party expects that it may be affected by a proposed transfer, that party should contact Reclamation and the seller with its concern. The burden of collecting groundwater data will not be the responsibility of the third party. If warranted, additional groundwater level monitoring to address the third-party's concern may be incorporated into the monitoring and mitigation plans required by Mitigation Measure GW-1.						
GW-1	*Evaluation and Reporting* The monitoring program will describe the method of reporting monitoring data. At a minimum, sellers will provide data summary tables to Reclamation, both during and after transfer-related substitution pumping. Post-transfer reporting will continue through March of the year following the transfer. Sellers will provide a final summary report to Reclamation evaluating the effects of the water transfer. The final report will identify transfer-related effects on groundwater and surface water (both during and after pumping), and the extent of effects, if any, on local groundwater users. It shall include groundwater-level contour maps for the area in which the transfer-related	Participating sellers	Reclamation	Transfer application package and monitoring data and report.	Plan submitted prior to water transfers; monitoring information submitted during and after transfer.		

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	pumping is located, showing pre-transfer groundwater levels, groundwater levels at the end of the transfer period, and recovered groundwater levels in March of the year following the transfer. Groundwater level contour maps for different aquifer depths should also be included where data are available. The summary report shall also identify the extent of transfer-related effects, if any, to ecological resources such as fish, wildlife, and vegetation resources.						
GW-1	*Mitigation Plan* Potential sellers must complete and implement a mitigation plan to avoid potentially significant groundwater impacts and ensure prompt corrective action in the event unanticipated effects occur. This plan must document the planned actions if there are unanticipated impacts to groundwater resources or groundwater-dependent vegetation. This plan must be submitted to Reclamation as part of the transfer approval process.	Participating sellers	Reclamation	Mitigation plan, monitoring data for mitigation activities, and regular inspections of mitigation activities.	Submit Mitigation Plan to Reclamation prior to water transfers.		
GW-1	*Groundwater Resource Mitigation* If groundwater level triggers are reached at the participating pumping well(s) or the suitable monitoring well (s) (either BMO triggers or historic low groundwater levels), transfer-related	Participating sellers	Reclamation	Mitigation plan, monitoring data for mitigation activities, and regular inspections	Prior to, during and after water transfers		

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	pumping would stop from the participating pumping well that reached the trigger. Transfer- related pumping would be stopped when the trigger is first reached at either the participating pumping well(s) or the suitable monitoring well(s). Transfer-related pumping could not continue from this well (in the same year or a future year) until groundwater levels recovered to above the groundwater level trigger. Implementation of the mitigation plan thus avoids any potentially significant groundwater impacts. Other corrective actions could include: • Lowering of pumping bowls in non-transferring wells affected by substitution pumping. • Reimbursement to non-transferring third parties for significant increases in their groundwater pumping costs due to the groundwater substitution pumping action, as compared with their costs absent the transfer. • Reimbursement to non-transferring third parties for modifications to infrastructure that may be affected. • Other appropriate actions based on local conditions.			of mitigation activities.			

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
GW-1	*Deep-Rooted Vegetation Mitigation* If shallow groundwater level monitoring suggests that groundwater levels have dropped below root zones of deep-rooted vegetation (i.e., more than 10 feet, where groundwater was 10 to 25 feet below ground surface prior to starting the transfer-related pumping), the seller must stop transfer-related pumping at the participating pumping well and cannot resume pumping until groundwater levels have recovered to levels above the root zones. However, if historic data at the location indicate shallow groundwater levels typically declined during the transfer period and remained below the root, zone then the transfer may be allowed to proceed. In areas where visual monitoring is conducted to monitor health of deep-rooted vegetation, the seller must stop transfer-related pumping at the participating well if the qualified plant ecologist/arborist, determines a loss or substantial risk of loss of vegetation. If adverse impacts to deep-rooted vegetation occur, the seller will perform restoration activities by replanting similar vegetation at a 1:1 ratio at the location loss occurs (for every 1 inch diameter at breast height (dbh) lost, 1 inch in dbh will be planted. For example, if 12-inch dbh of oak is lost, then the	Participating sellers	Reclamation	Mitigation plan, monitoring data for mitigation activities, and regular inspections of mitigation activities.	Prior to, during and after water transfers		

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	seller would have to plant twelve 15-gallon oak saplings at around 1-inch dbh each. Therefore, the seller would plant more trees than lost.). The seller will plant, irrigate, maintain, and monitor restoration of vegetation for three years to replace the loss(es). All plantings will be fitted with exclusion cages or other suitable protection from herbivores. Plantings will be irrigated for three years or until the survival criterion is met. If 75% of the plants survive at the end of the three -year monitoring period, the revegetation will be considered successful. If the survival criterion is not met at the end of the monitoring period, planting and monitoring will be repeated after mortality causes have been identified and corrected. Annual monitoring reports, prepared by a qualified plant ecologist/arborist, will document the status of the plantings and recommendations for remediation as necessary. The monitoring reports will be provided to the seller and Reclamation by August 31 following each year of monitoring (generally July 1 through June 30) to allow time for additional planting activities, if necessary. Transfer-related pumping could not continue at the subject well while vegetation restoration activities						

Table M-1 Mitigation Measures

Measure Number	Mitigation Measure	Responsible Party	Monitoring Party	Method of Verification	Timing of Verification	Verification of Completion Initials	Dates
	consistent with the requirements above are ongoing (i.e. three years or until the survival criterion is met). Transfer-related pumping at the subject well could not resume after restoration unless the seller provides evidence that resuming pumping will not affect deep-rooted vegetation (such as data from the installation of a new shallow groundwater level monitoring well within a one-half mile radius of the deep-rooted vegetation that indicates stable shallow groundwater levels at less than ten feet).						

Appendix N

Errata Sheets

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Appendix N Errata Sheets

N.1 Introduction

This appendix contains all text changes to the Draft Initial Study/ Environmental Assessment (IS/EA). Changes in text are signified by strikeouts where text is removed and by italics where text is added.

N.2 Section 2

Page 2-7
The last sentence in the third paragraph on page 2-7 of the Draft IS/EA is revised as follows:

> For 2021, this IS/EA only analyzes cropland idling from rice crops, which have an ETAW of ~~2.9~~ *3.0* AF/acre (Reclamation and DWR ~~2019~~ *2021*).

Table 2-3 on page 2-7 of the Draft IS/EA is revised as follows:

Table 2-3. Estimated ETAW Values for Crops Suitable for Shifting

Crop	ETAW (AF/acre)
Alfalfa[1]	1.7 (July – Sept)
Bean	1.5
Corn	1.8
Cotton	2.3
Melon	1.1
Milo	1.6
Onion	1.1
Pumpkin	1.1
Sugar Beets	2.5
Sunflower	1.4
Tomato	1.8
Vine Seed/ Cucurbits	1.1
Wild Rice Rice	2.0 ~~2.9~~ *3.0* [2]

Source: Reclamation and DWR 2019; *Reclamation and DWR 2021*

Notes:

[1] Only alfalfa grown in the Sacramento Valley floor north of the American River will be allowed to be a crop which is eligible to make water available for transfer based on crop shifting. Fields must be disced on, or prior to, the start of the transfer period. Alfalfa acreage in the foothills or mountain areas is not eligible for transfer.

[2] Transfer Factor for Rice is based on 2021 Transfer Factor for Rice Field Idling (Reclamation and DWR 2021)

Page 2-8

The last sentence in the first paragraph on page 2-8 of the Draft IS/EA is revised as follows:

> While the IS/EA analyzes cropland idling transfers from multiple sources, the total amount of water made available through cropland idling actions would not be more than 57,060 AF, which equates to 19,~~676~~ *020* acres of rice land idled.

N.3 Section 3

Page 3-13

The last paragraph on page 3-13 of the Draft IS/EA is revised as follows:

> Rice idling could affect special-status species that use rice fields for forage, cover, nesting, breeding, or resting. Under the Proposed Action, a maximum of 19,~~676~~ *020* acres of rice could be idled in Colusa, Glenn, Sutter, and Yolo counties based on the potential transfer volumes in Table 2-3 and an ETAW of ~~2.9~~ *3.0* acre-feet per acre for rice. Table 3-3 shows the annual harvested rice acreages in each county from 2009 to 2019.

Page 3-16

The fourth sentence in the fourth paragraph on page 3-16 of the Draft IS/EA is revised as follows:

> The maximum amount of rice idling would be 19,~~676~~ *020* acres, which is approximately 5.~~6~~ *5* percent of the average acreage (346,477 acres) of rice harvested in the project vicinity.

Page 3-17

The second sentence in the fourth paragraph on page 3-17 of the Draft IS/EA is revised as follows:

> The maximum amount of rice idling would be 19,~~676~~ *020* acres, which is approximately 5.~~6~~ *5* percent of the average acreage (346,477 acres) of rice harvested in the project vicinity.

Page 3-51

The first sentence in the second paragraph on page 3-51 of the Draft IS/EA is revised as follows:

> The Proposed Action includes up to 19,~~676~~ *020* acres of rice idling in Glenn, Colusa, Yolo, and Sutter counties.

N.4 Appendix A

Page A-5

The reference on page A-5 of the Draft IS/EA is revised as follows:

Bureau of Reclamation and California Department of Water Resources (Reclamation and DWR). 2021. 2021 Transfer Factor for Rice Field Idling dated March 24, 2021.