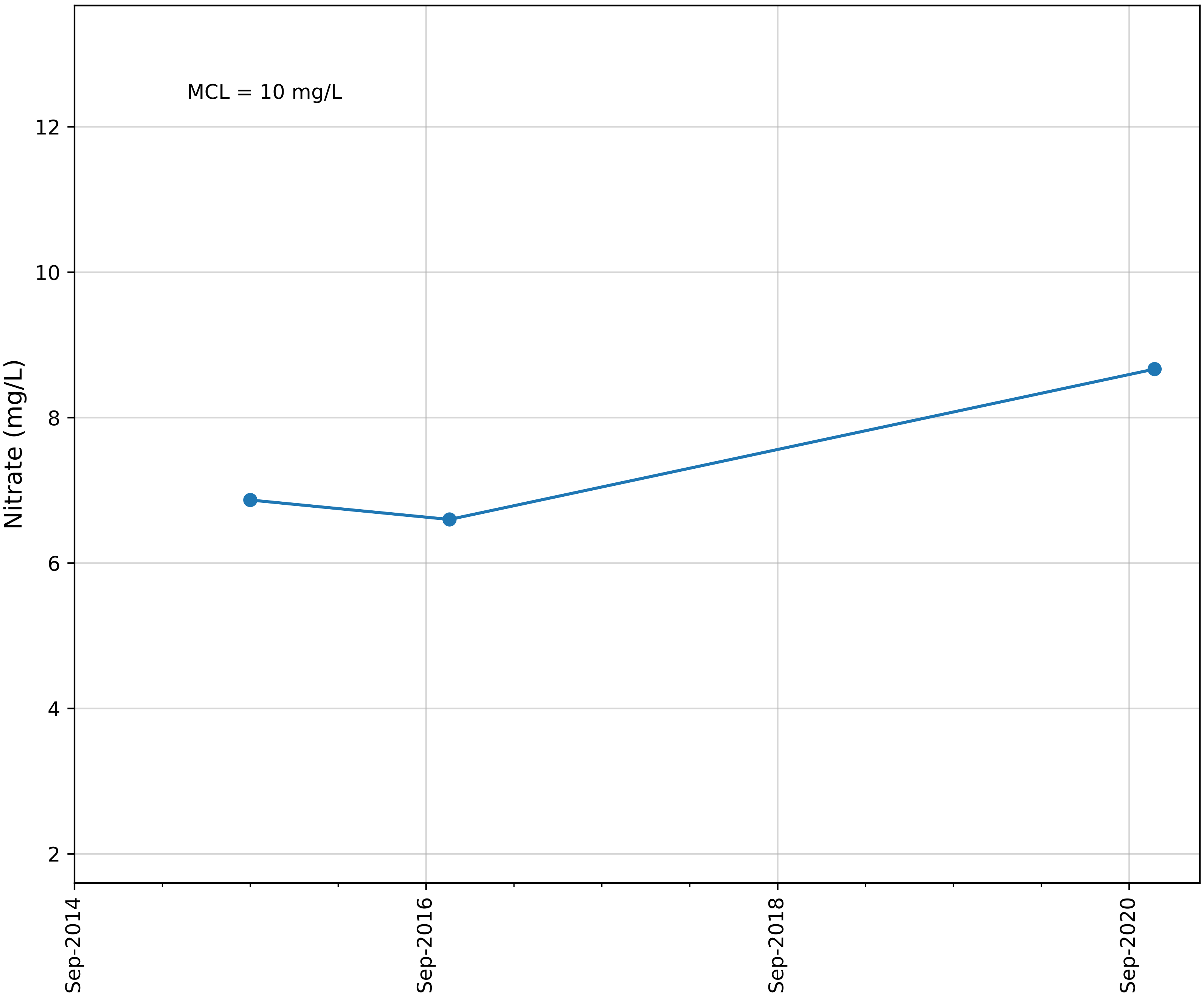
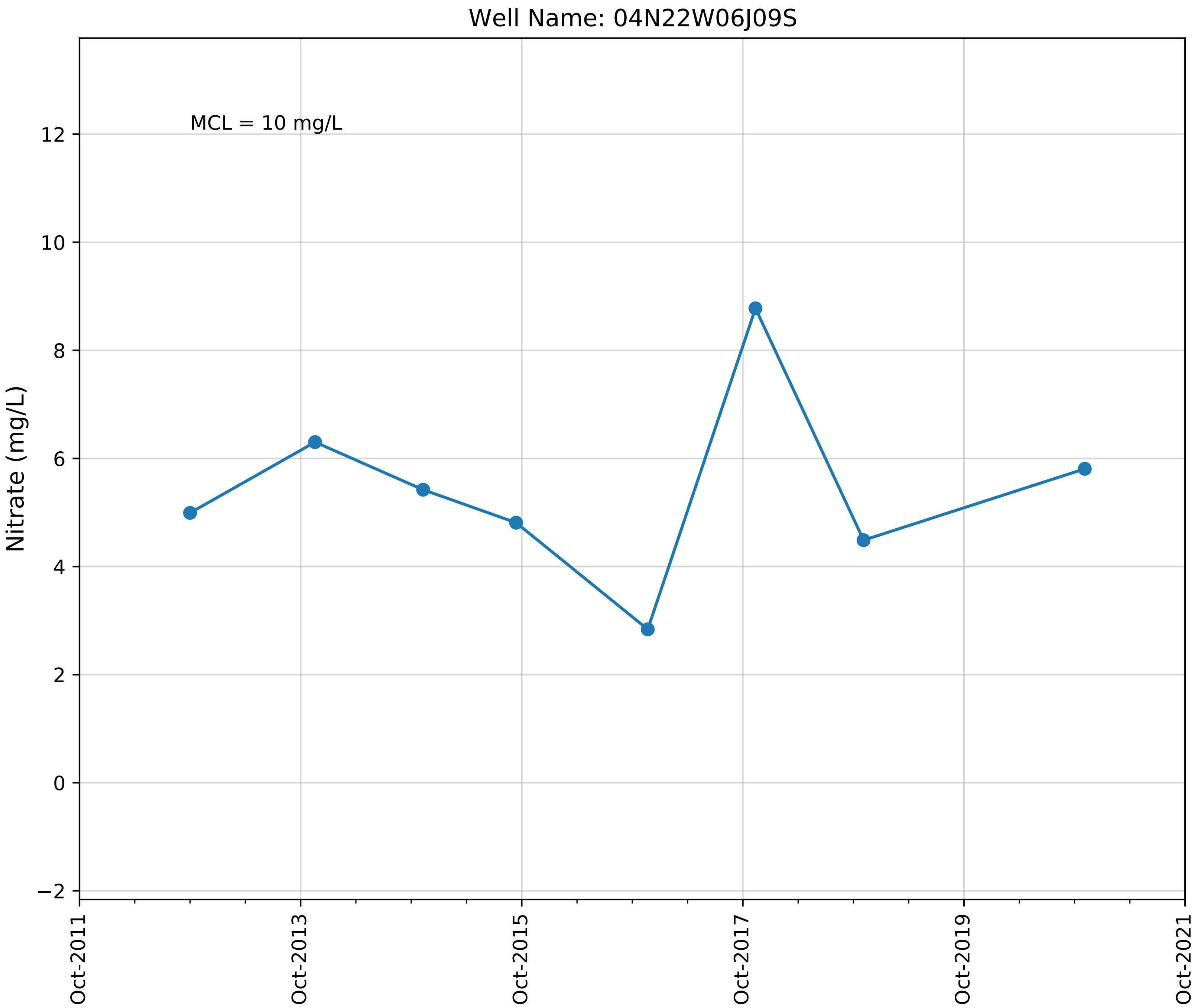
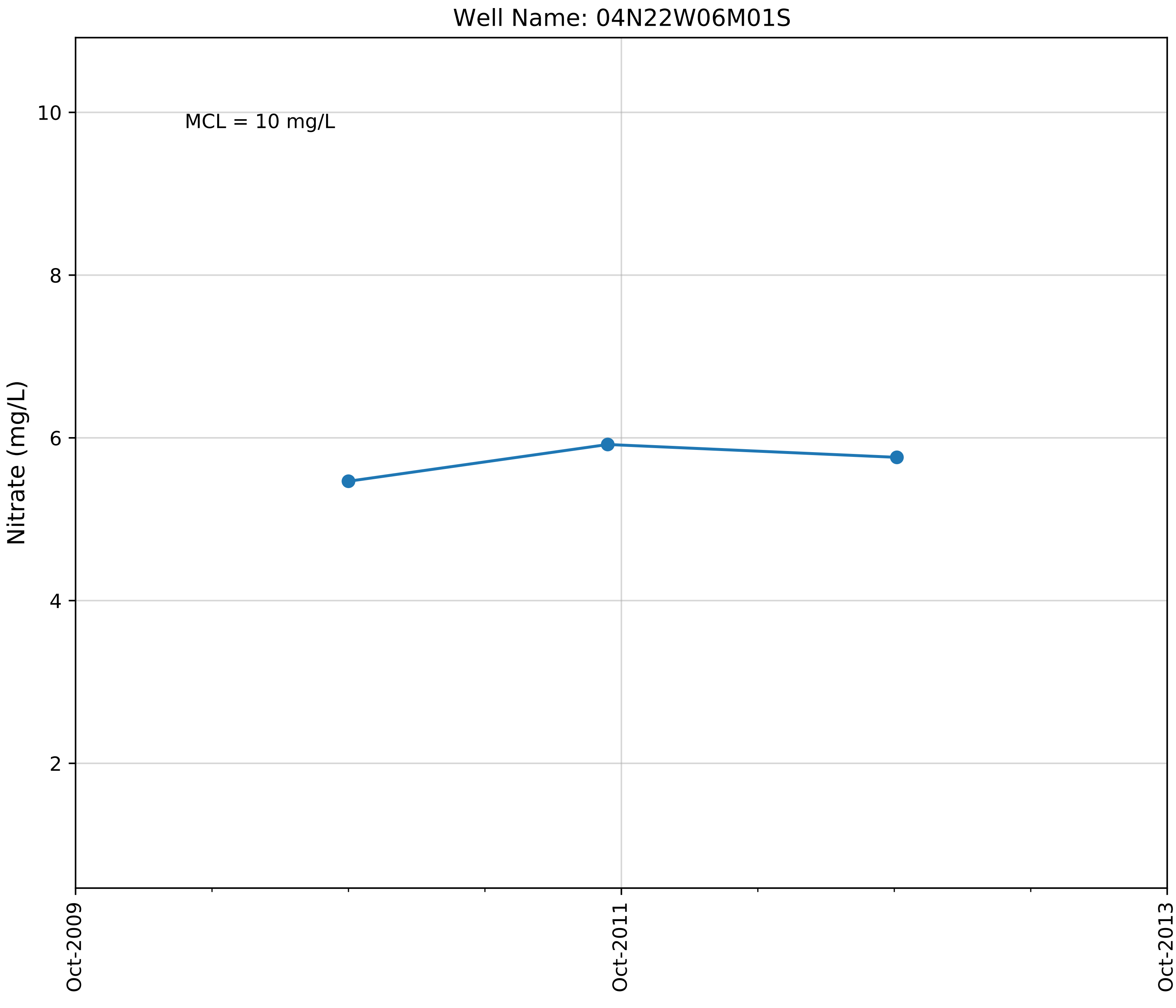
Well Name: 04N22W06E06S

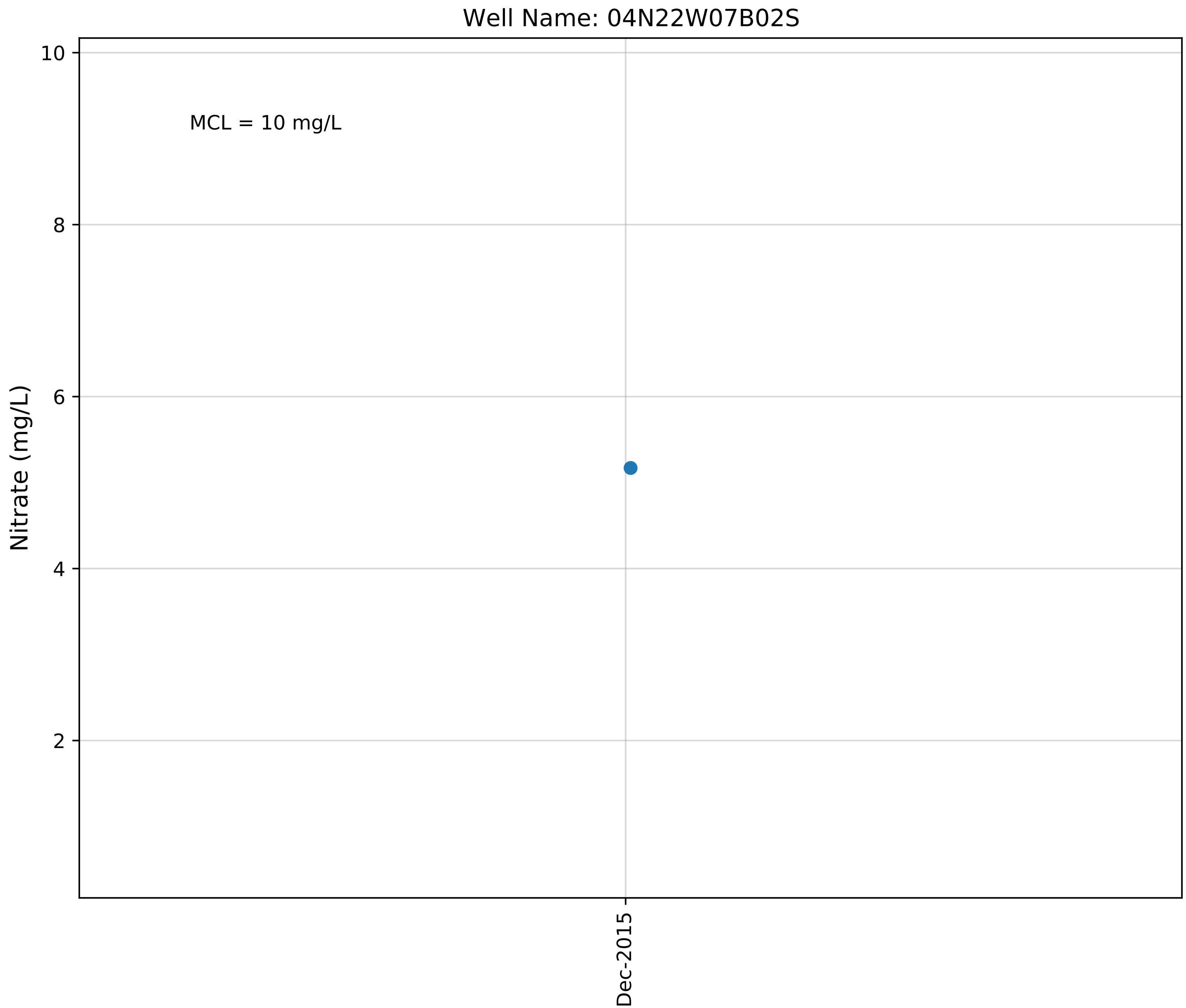


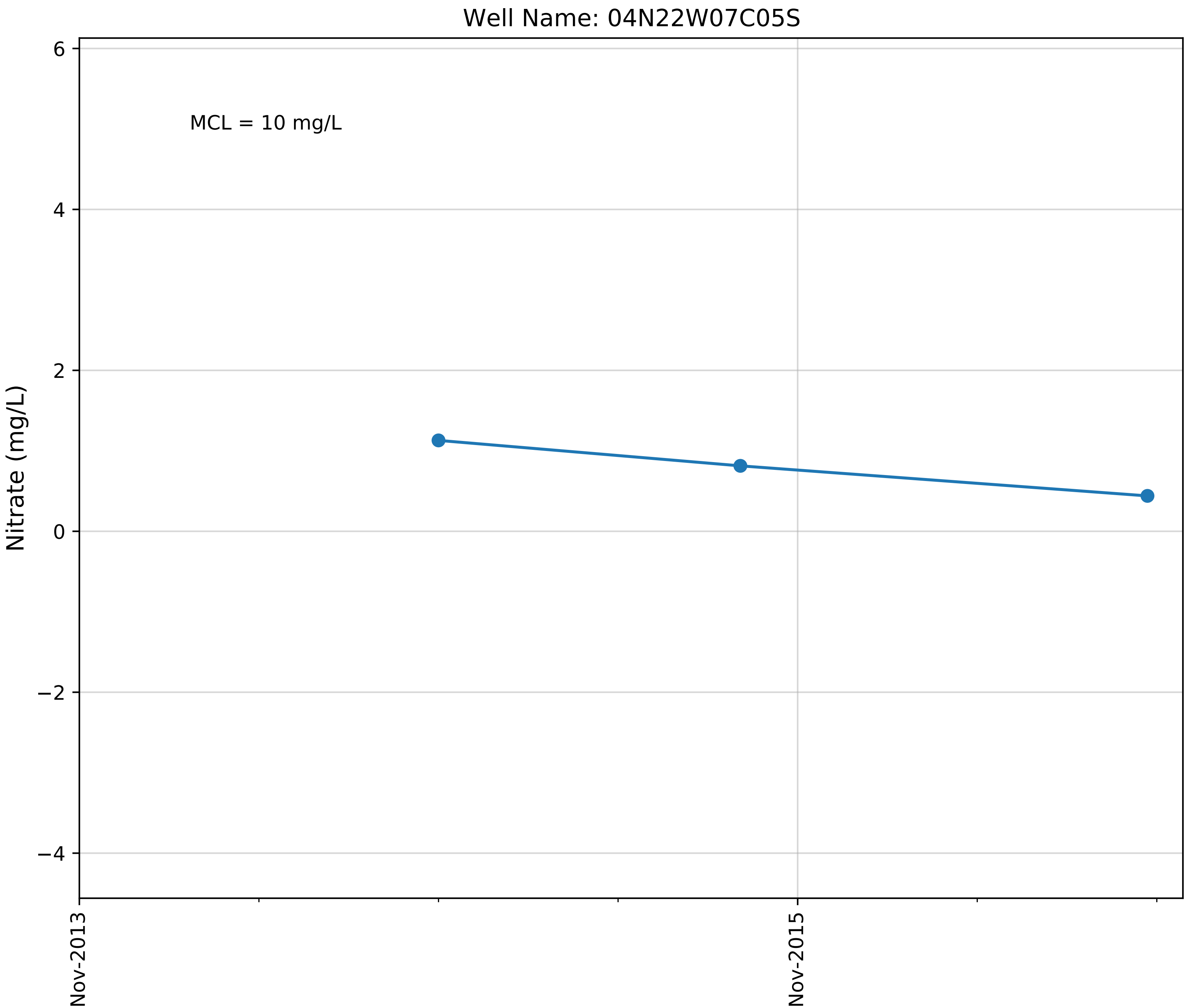


Well Name: 04N22W06J09S
MCL = 10 mg/L
Nitrate (mg/L)
12
10
8
6
4
2
0
−2
Oct-2011
Oct-2013
Oct-2015
Oct-2017
Oct-2019
Oct-2021

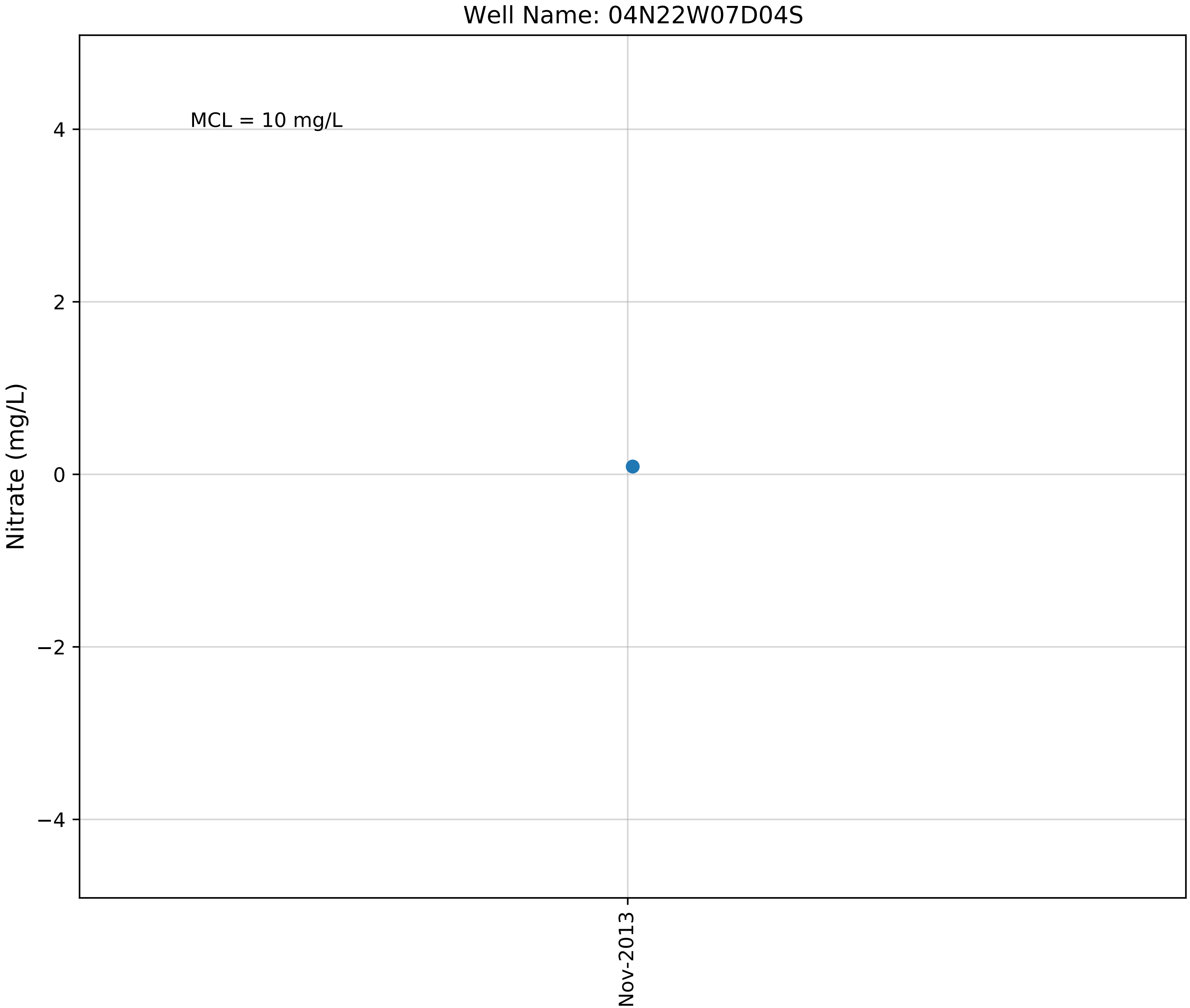


Well Name: 04N22W06M01S
MCL = 10 mg/L
Nitrate (mg/L)
10
8
6
4
2
Oct-2009
Oct-2011
Oct-2013

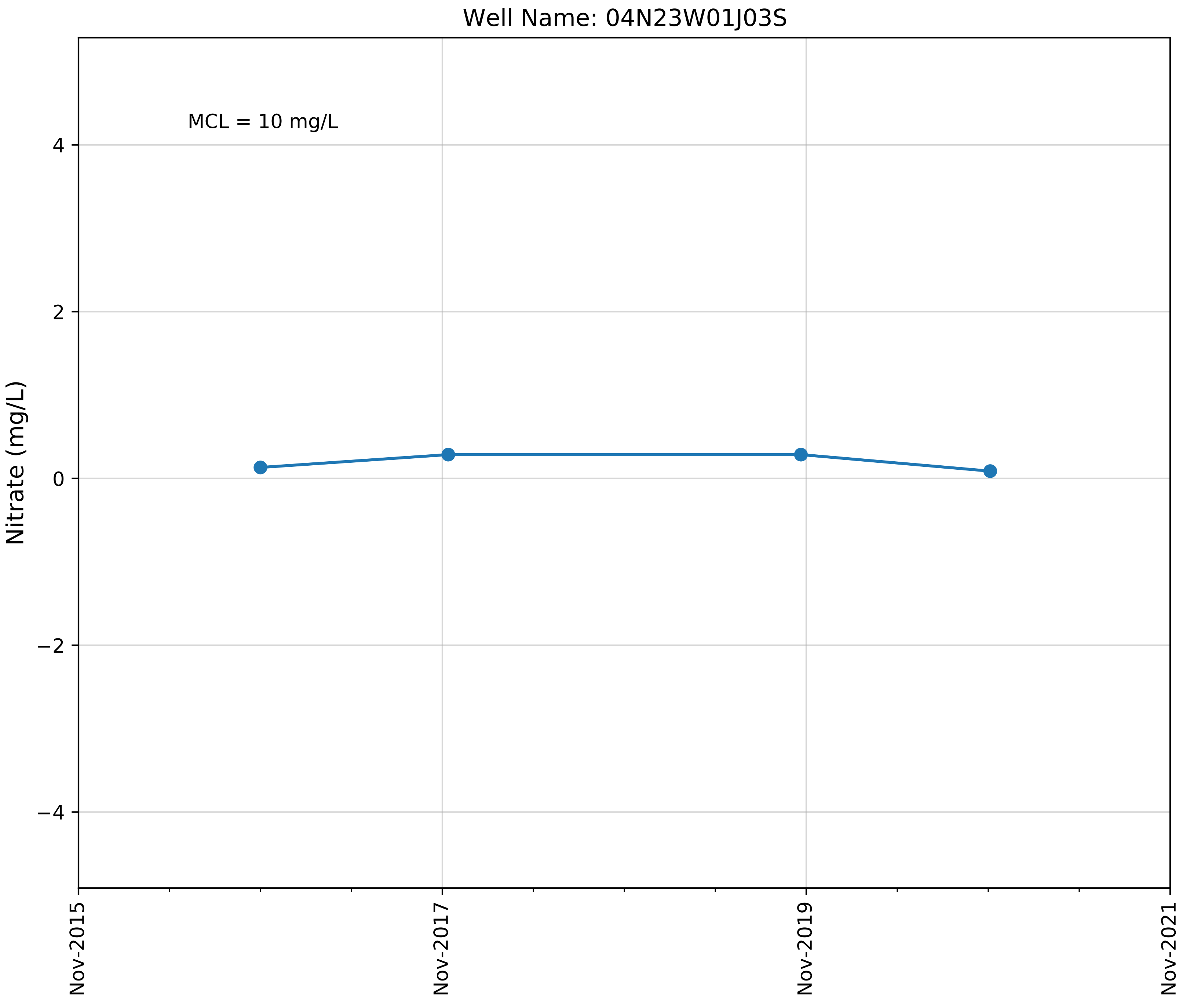

Well Name: 04N22W07B02S
MCL = 10 mg/L
Nitrate (mg/L)
10
8
6
4
2
Dec-2015

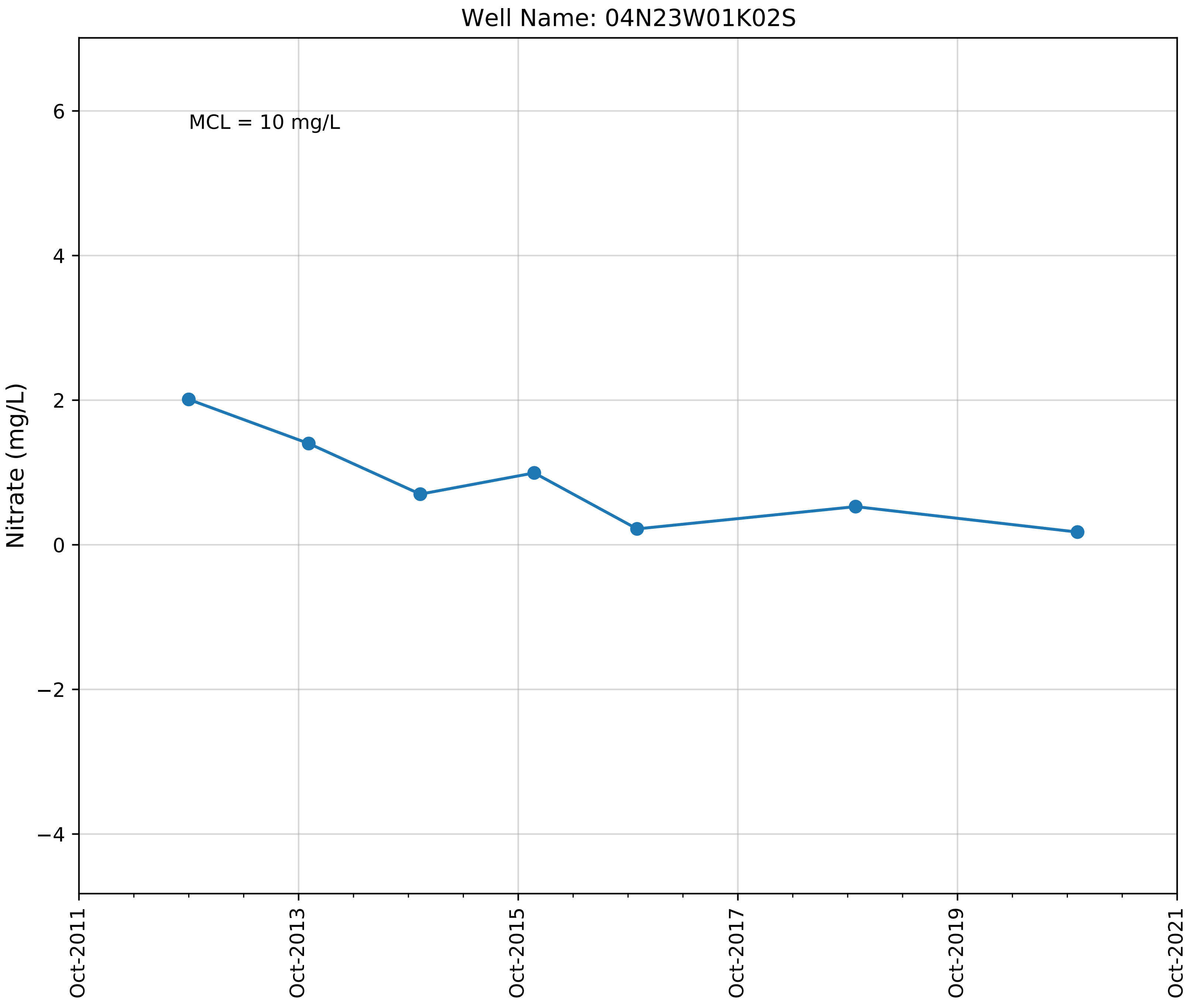


Well Name: 04N22W07C05S
MCL = 10 mg/L
Nitrate (mg/L)
6
4
2
0
−2
−4
Nov-2013
Nov-2015

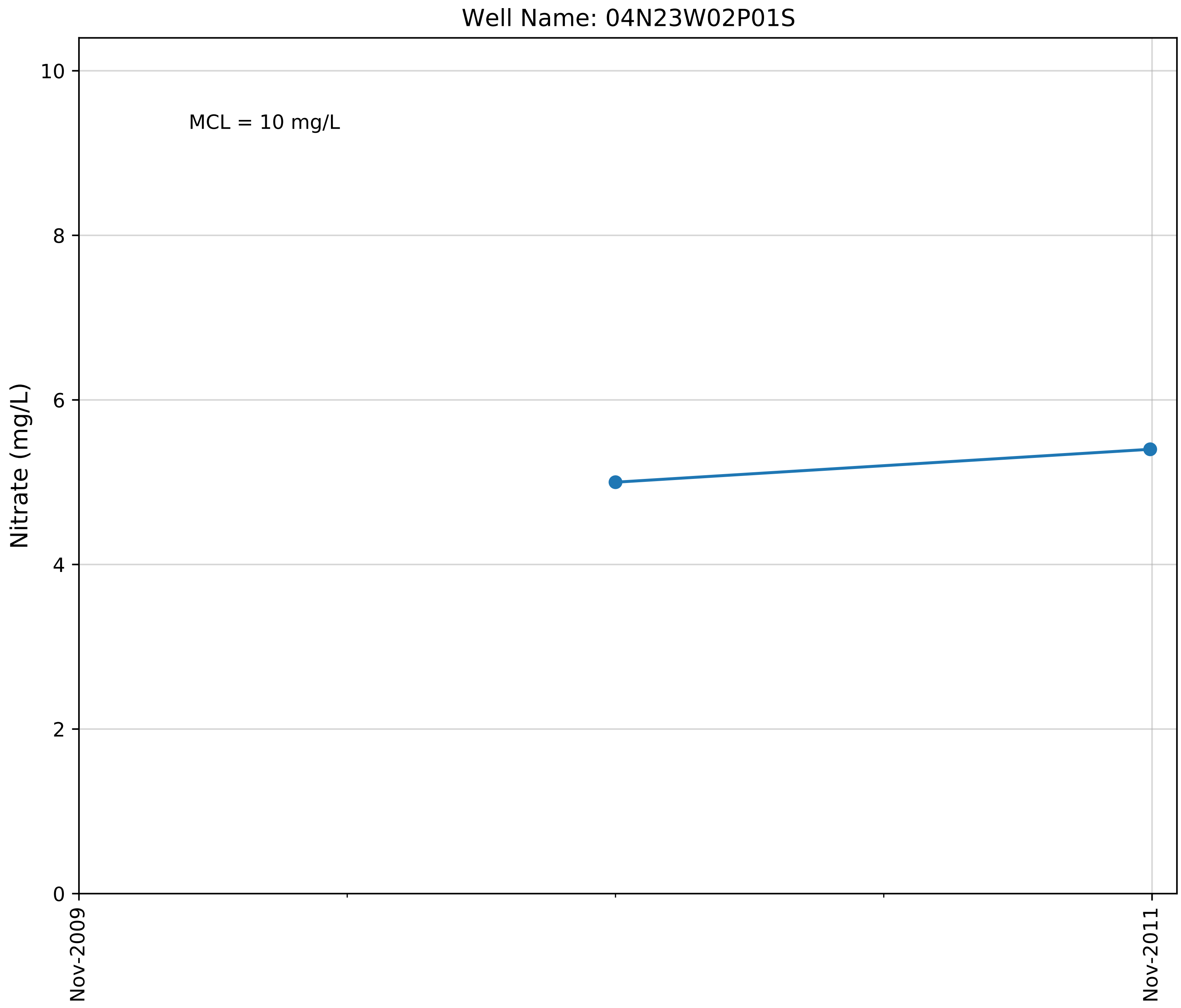


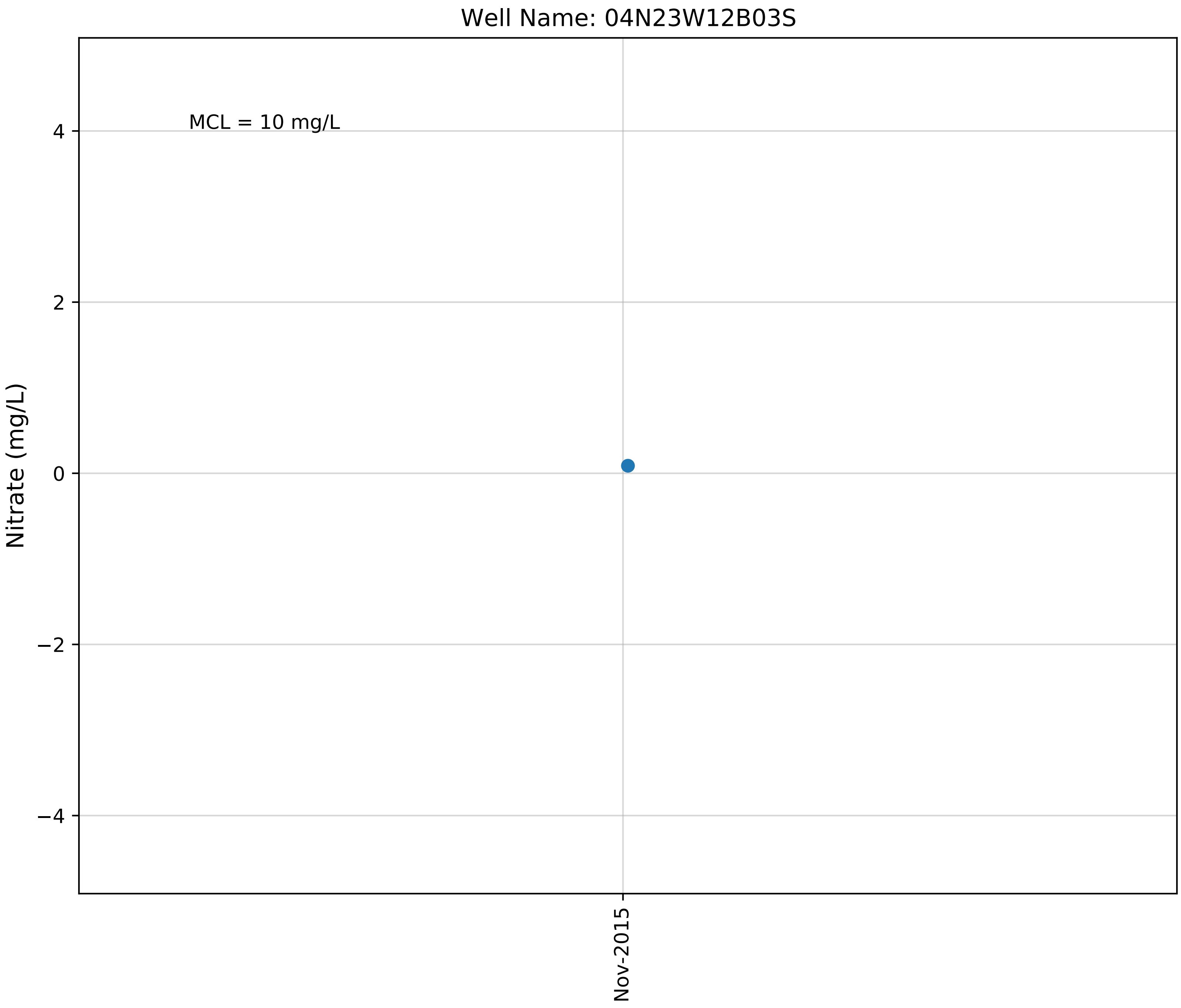
Well Name: 04N22W07D04S
MCL = 10 mg/L
Nitrate (mg/L)
4
2
0
−2
−4
Nov-2013


Well Name: 04N23W01J03S
MCL = 10 mg/L
Nitrate (mg/L)
4
2
0
−2
−4
Nov-2015
Nov-2017
Nov-2019
Nov-2021

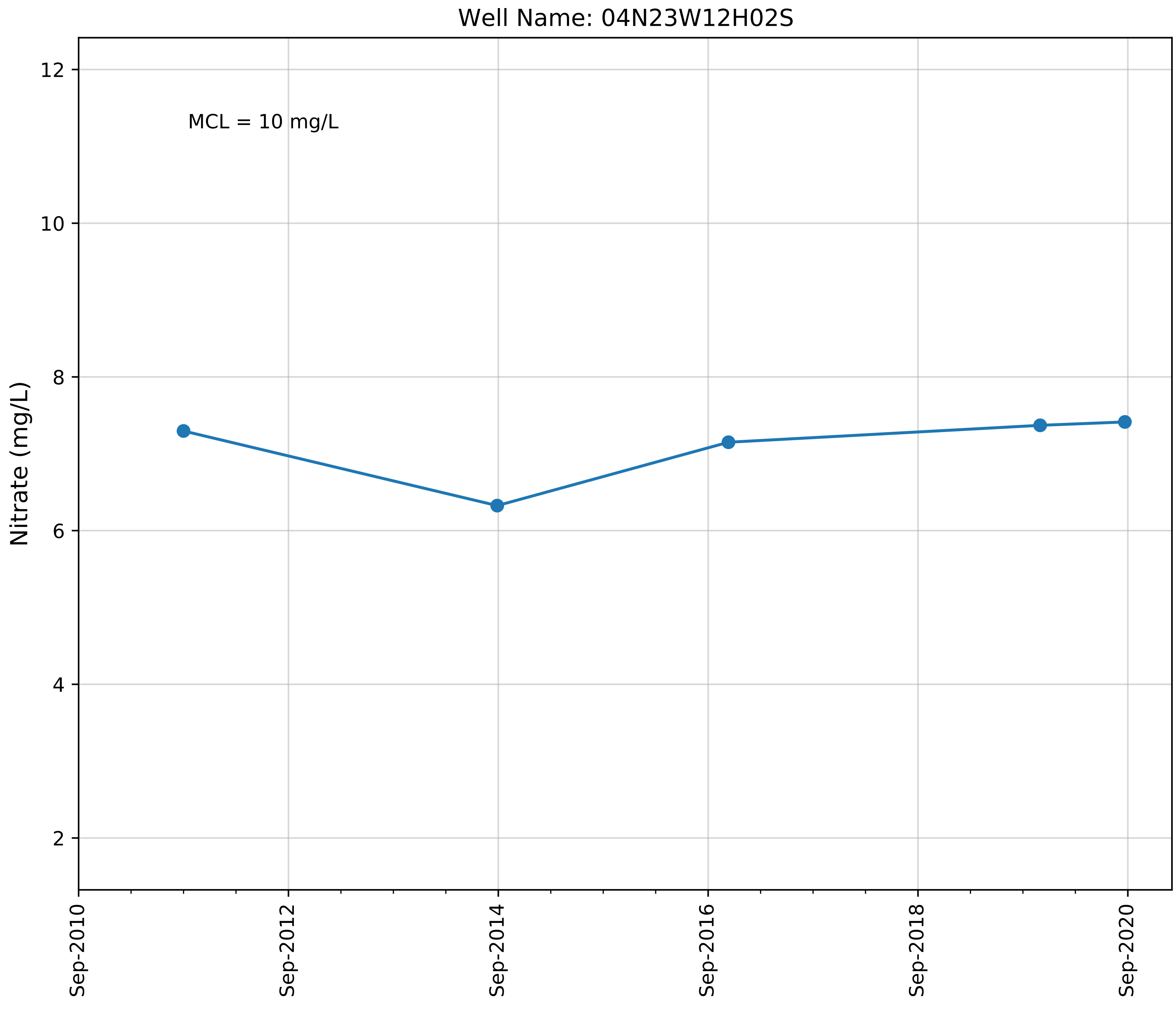


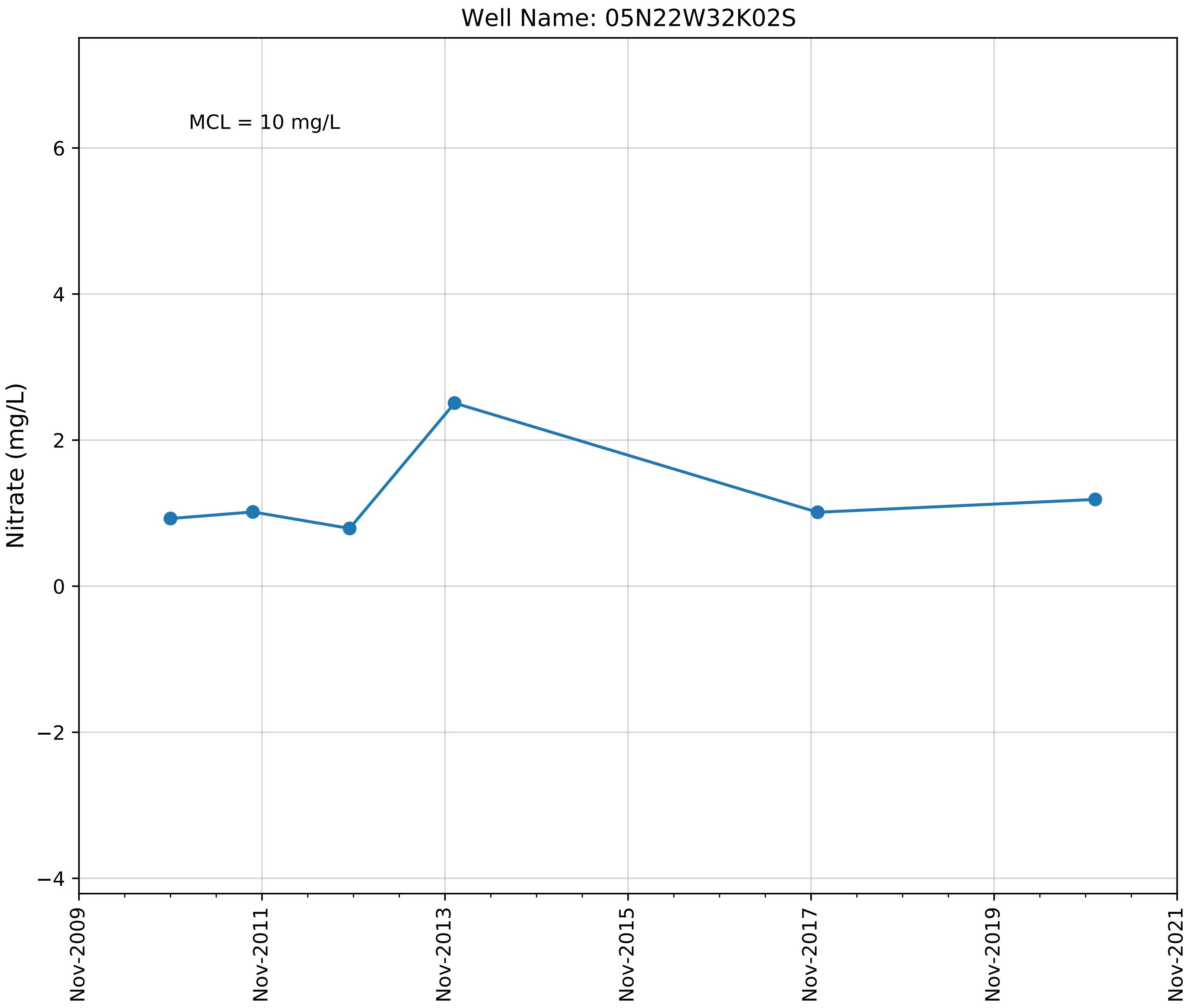
Well Name: 04N23W01K02S
MCL = 10 mg/L
Nitrate (mg/L)
6
4
2
0
−2
−4
Oct-2011
Oct-2013
Oct-2015
Oct-2017
Oct-2019
Oct-2021


Well Name: 04N23W02P01S
MCL = 10 mg/L
Nitrate (mg/L)
0
2
4
6
8
10
Nov-2009
Nov-2011

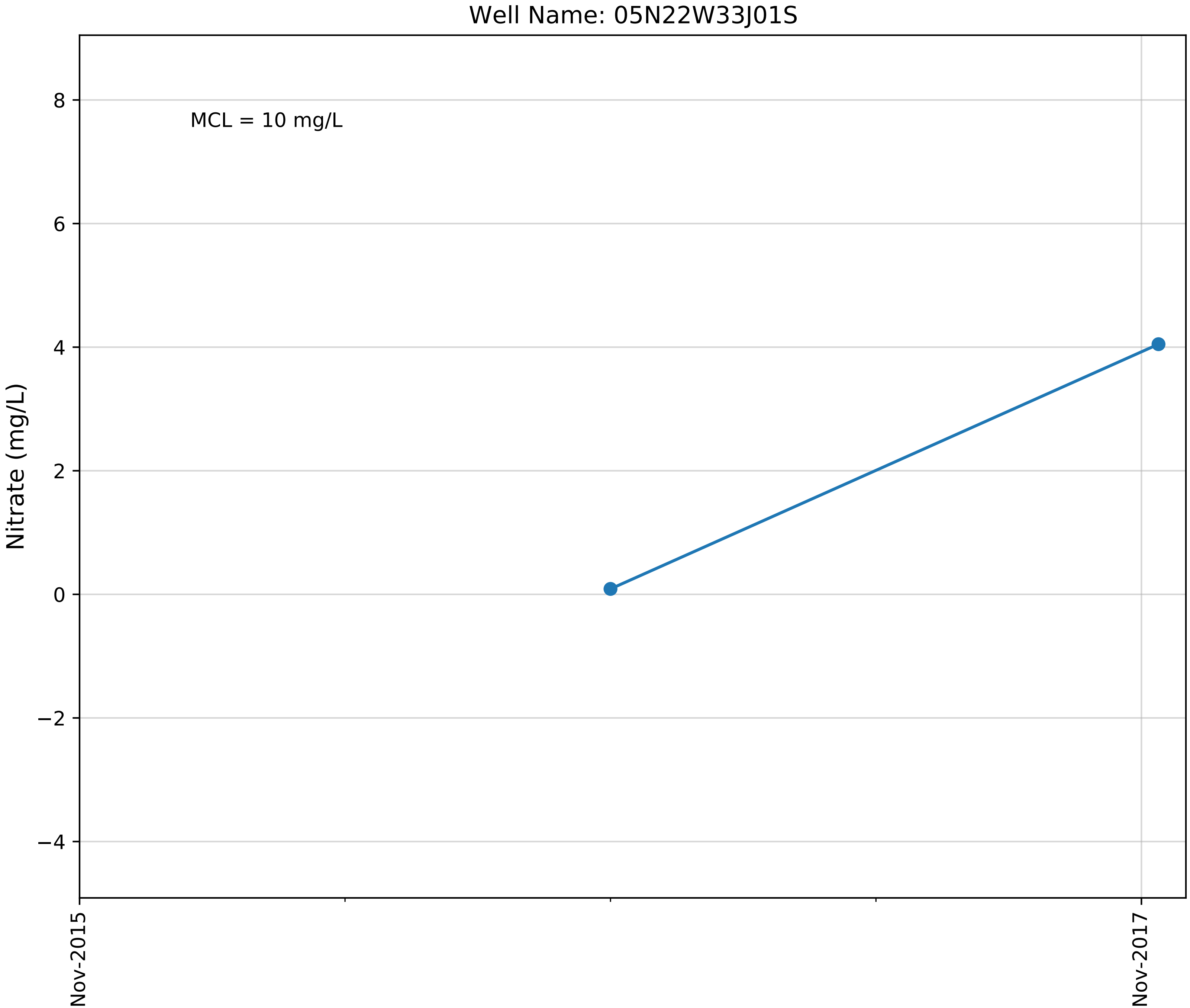


Well Name: 04N23W12B03S
MCL = 10 mg/L
Nitrate (mg/L)
4
2
0
−2
−4
Nov-2015

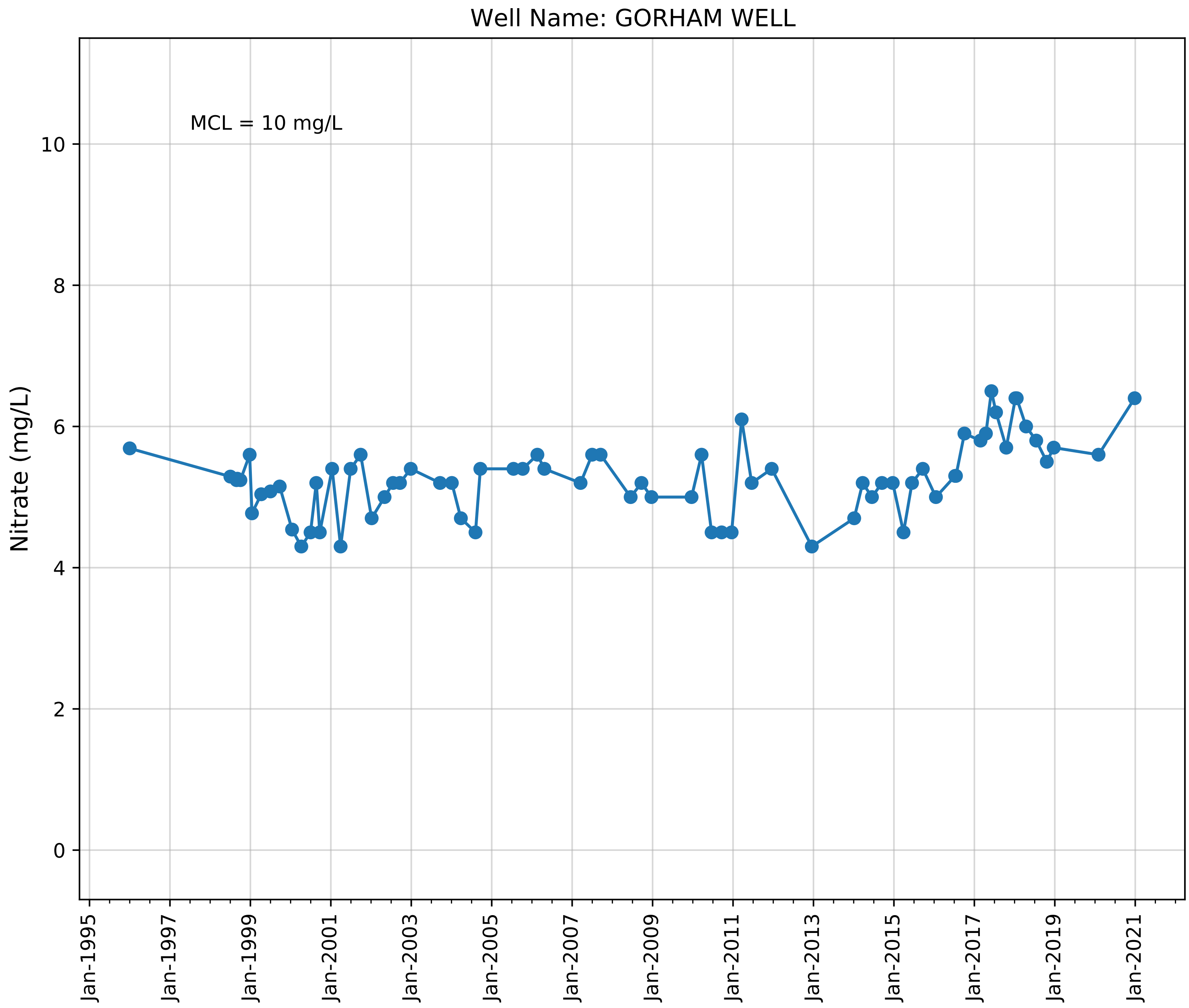

Well Name: 04N23W12H02S
MCL = 10 mg/L
Nitrate (mg/L)
12
10
8
6
4
2
Sep-2010
Sep-2012
Sep-2014
Sep-2016
Sep-2018
Sep-2020

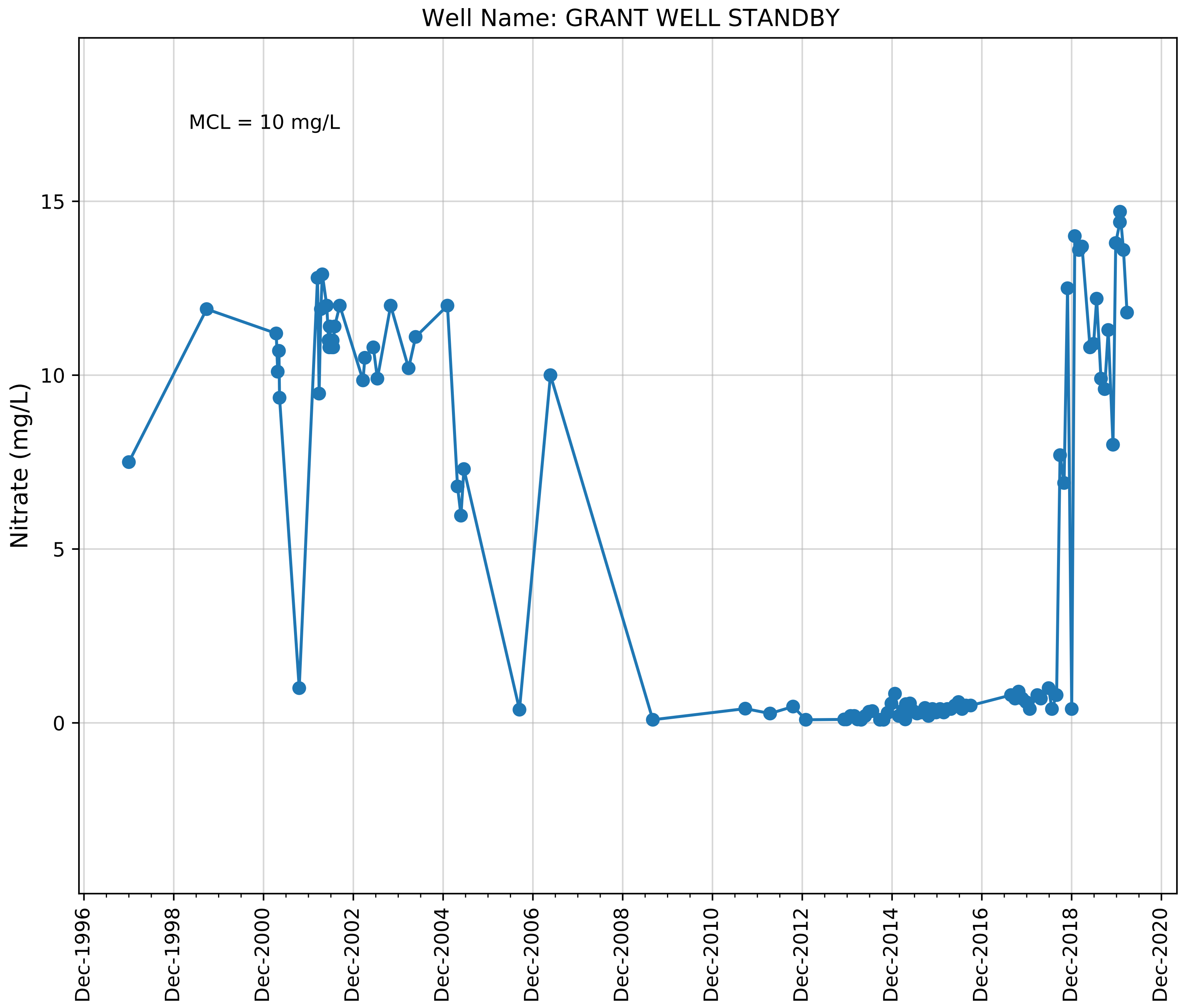


Well Name: 05N22W32K02S
MCL = 10 mg/L
Nitrate (mg/L)
6
4
2
0
−2
−4
Nov-2009
Nov-2011
Nov-2013
Nov-2015
Nov-2017
Nov-2019
Nov-2021

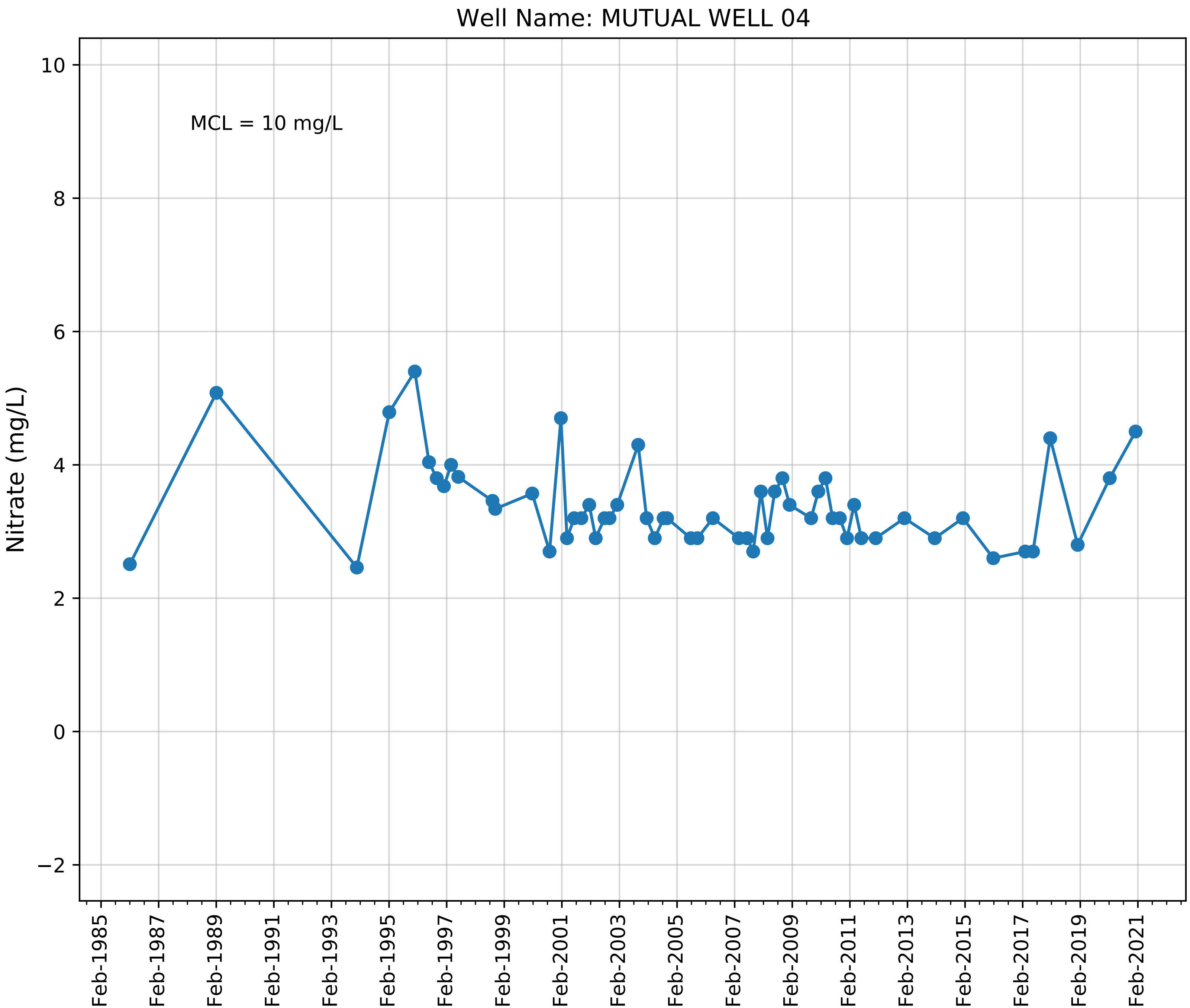


Well Name: 05N22W33J01S
MCL = 10 mg/L
Nitrate (mg/L)
8
6
4
2
0
−2
−4
Nov-2015
Nov-2017

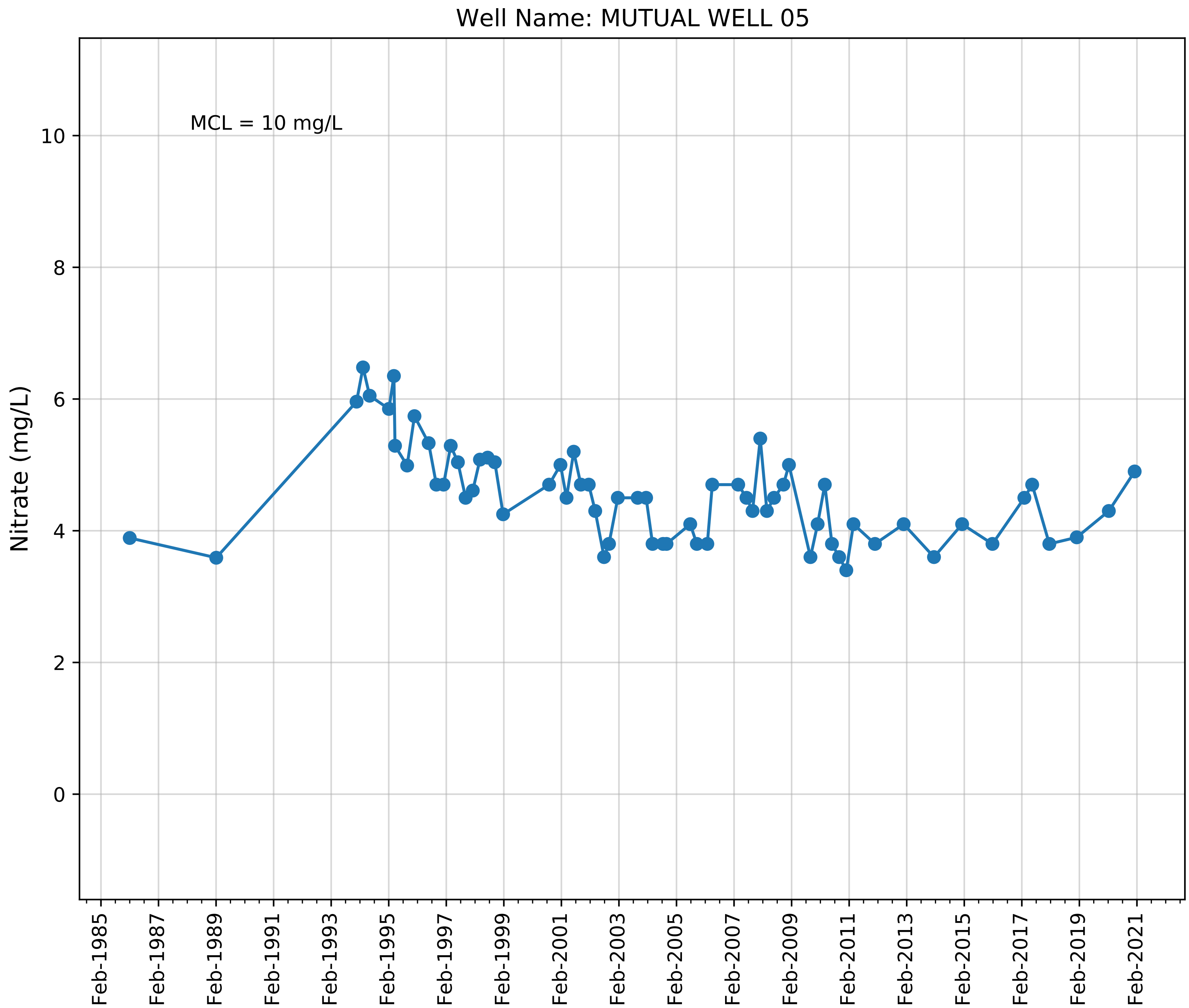

Well Name: GORHAM WELL
MCL = 10 mg/L
Nitrate (mg/L)
0
2
4
6
8
10
Jan-1995
Jan-1997
Jan-1999
Jan-2001
Jan-2003
Jan-2005
Jan-2007
Jan-2009
Jan-2011
Jan-2013
Jan-2015
Jan-2017
Jan-2019
Jan-2021

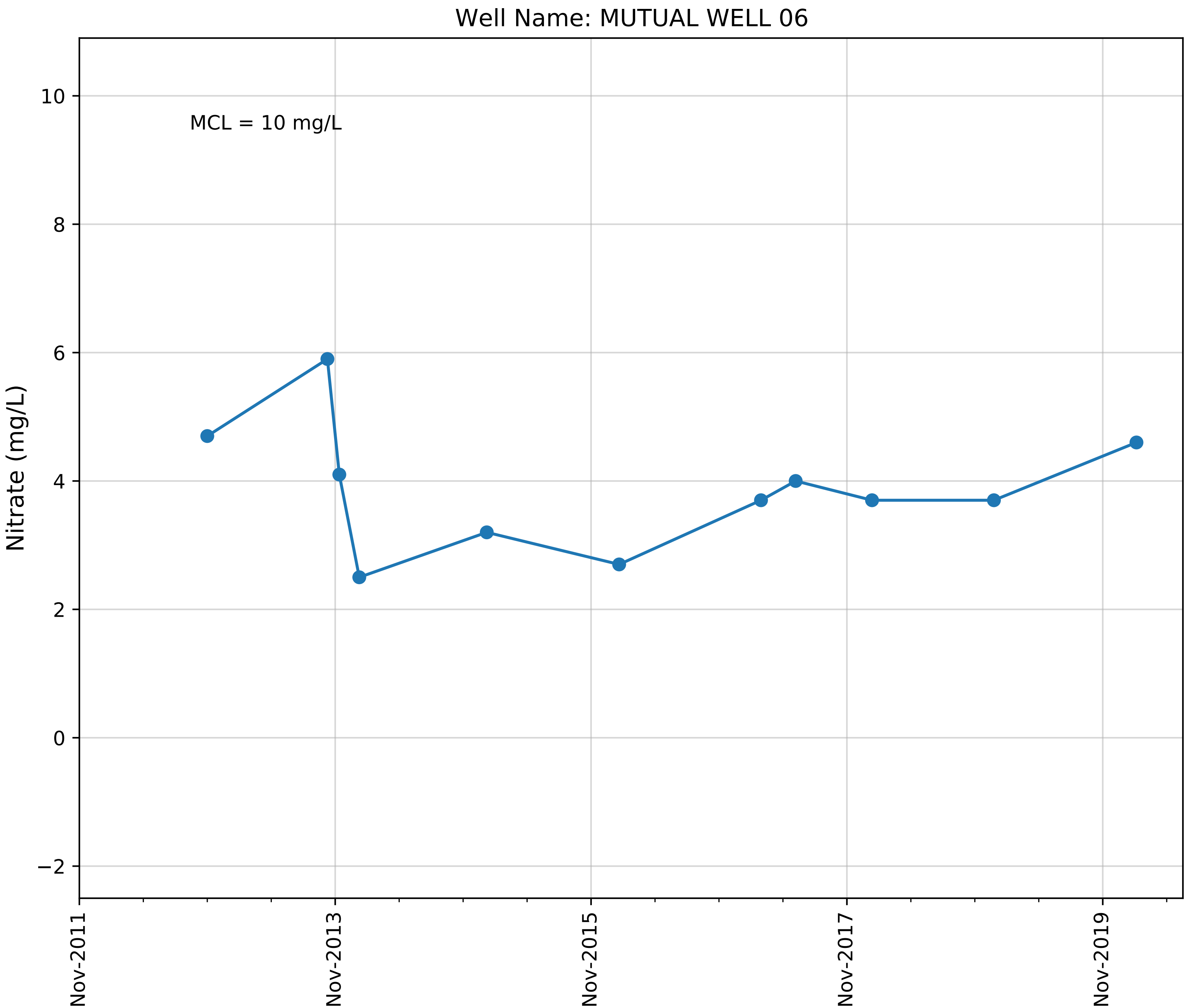


Well Name: GRANT WELL STANDBY
MCL = 10 mg/L
Nitrate (mg/L)
15
10
5
0
Dec-1996
Dec-1998
Dec-2000
Dec-2002
Dec-2004
Dec-2006
Dec-2008
Dec-2010
Dec-2012
Dec-2014
Dec-2016
Dec-2018
Dec-2020

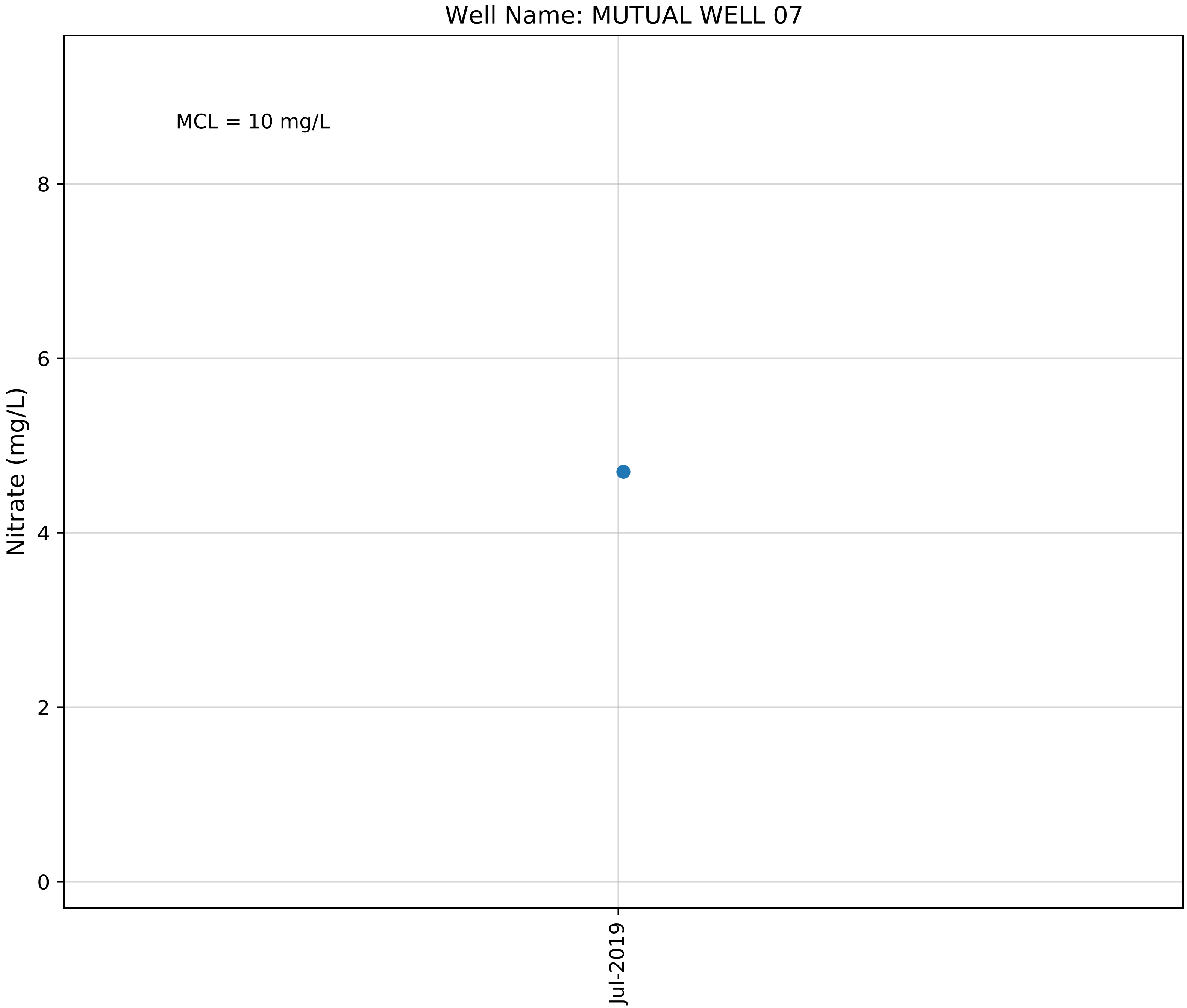


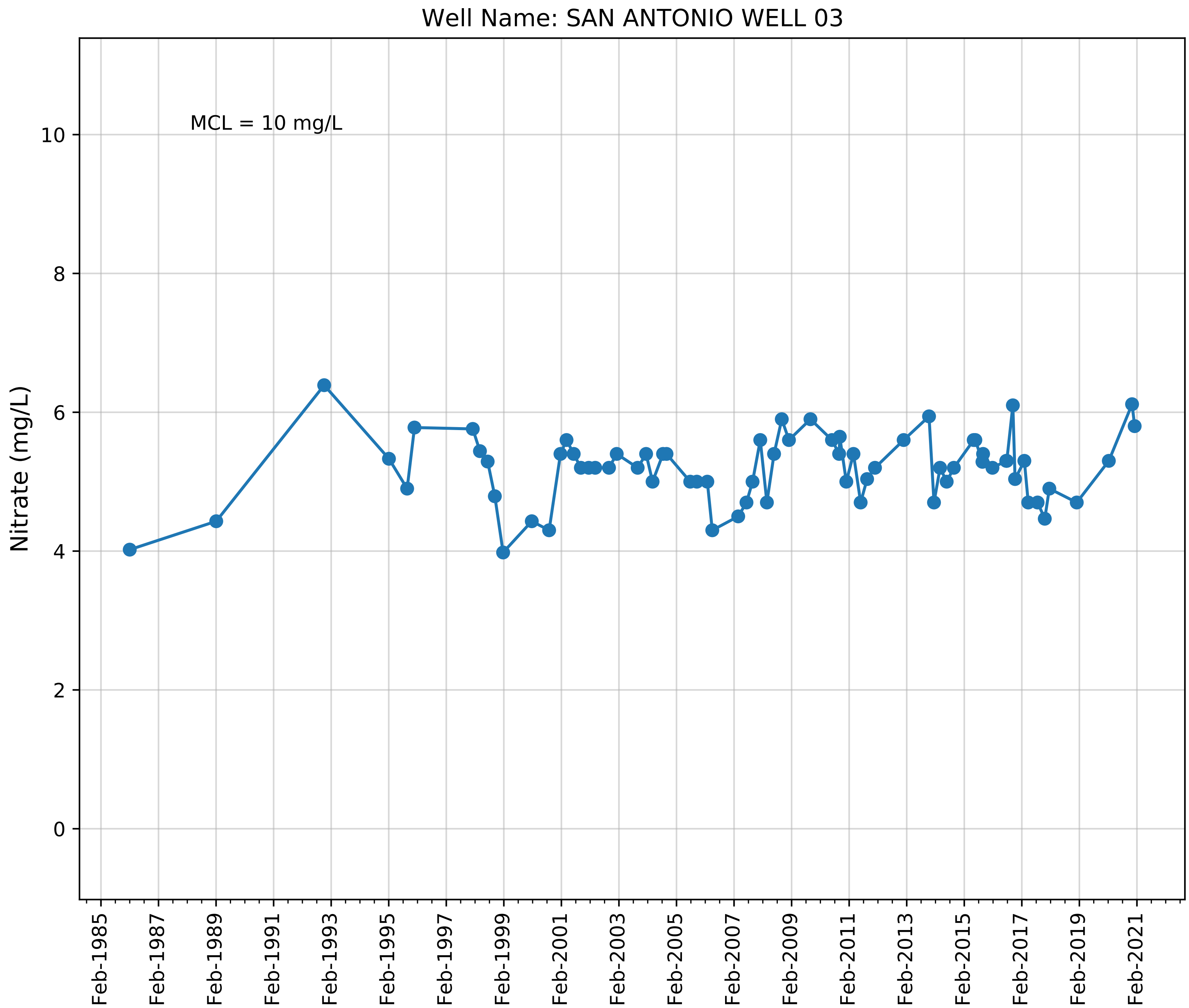
Well Name: MUTUAL WELL 04
MCL = 10 mg/L
Nitrate (mg/L)
10
8
6
4
2
0
−2
Feb-1985
Feb-1987
Feb-1989
Feb-1991
Feb-1993
Feb-1995
Feb-1997
Feb-1999
Feb-2001
Feb-2003
Feb-2005
Feb-2007
Feb-2009
Feb-2011
Feb-2013
Feb-2015
Feb-2017
Feb-2019
Feb-2021

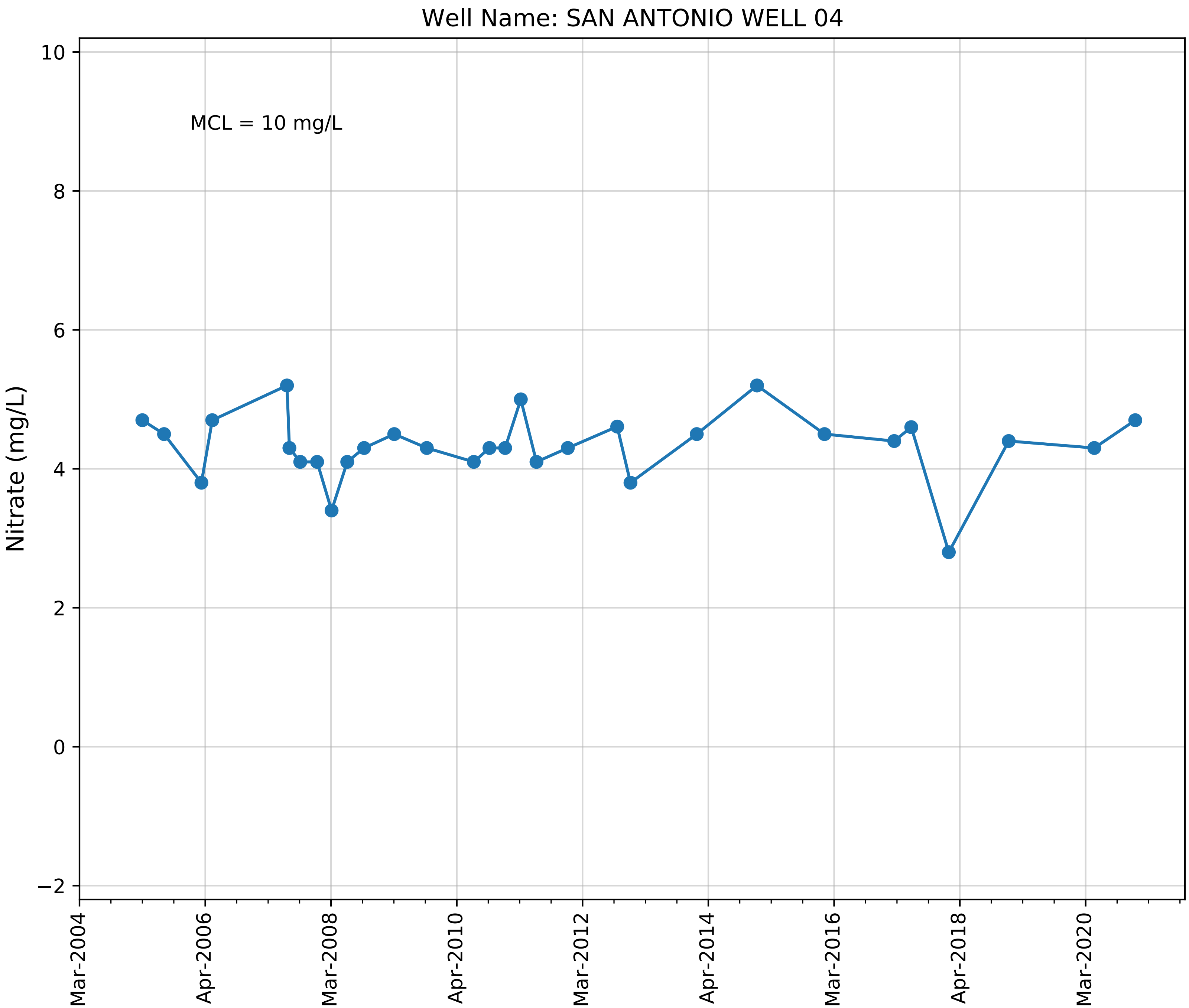

Well Name: MUTUAL WELL 05
MCL = 10 mg/L
Nitrate (mg/L)
0
2
4
6
8
10
Feb-1985
Feb-1987
Feb-1989
Feb-1991
Feb-1993
Feb-1995
Feb-1997
Feb-1999
Feb-2001
Feb-2003
Feb-2005
Feb-2007
Feb-2009
Feb-2011
Feb-2013
Feb-2015
Feb-2017
Feb-2019
Feb-2021



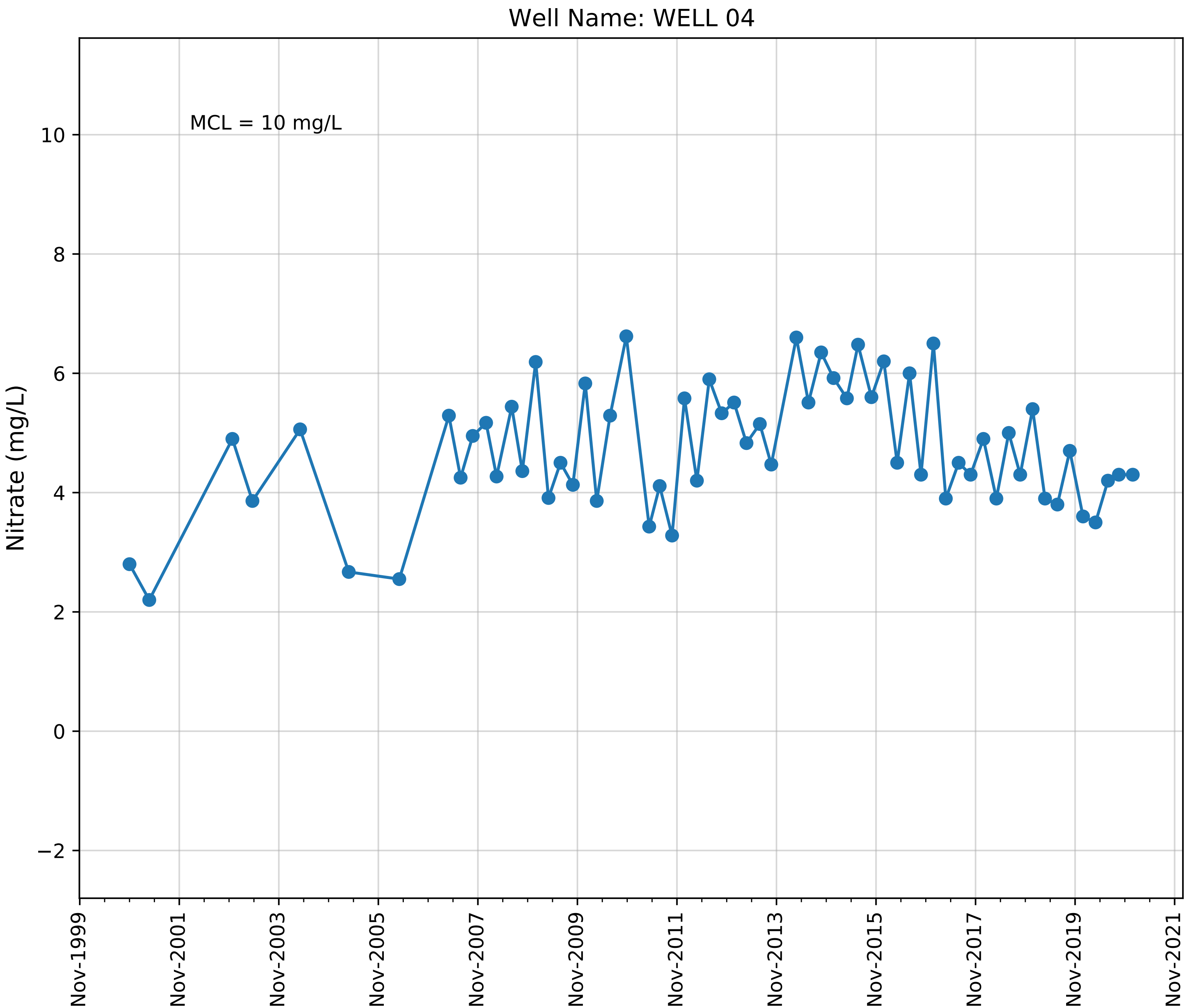
Well Name: MUTUAL WELL 06
MCL = 10 mg/L
Nitrate (mg/L)
10
8
6
4
2
0
−2
Nov-2011
Nov-2013
Nov-2015
Nov-2017
Nov-2019


Well Name: MUTUAL WELL 07
MCL = 10 mg/L
Nitrate (mg/L)
0
2
4
6
8
Jul-2019

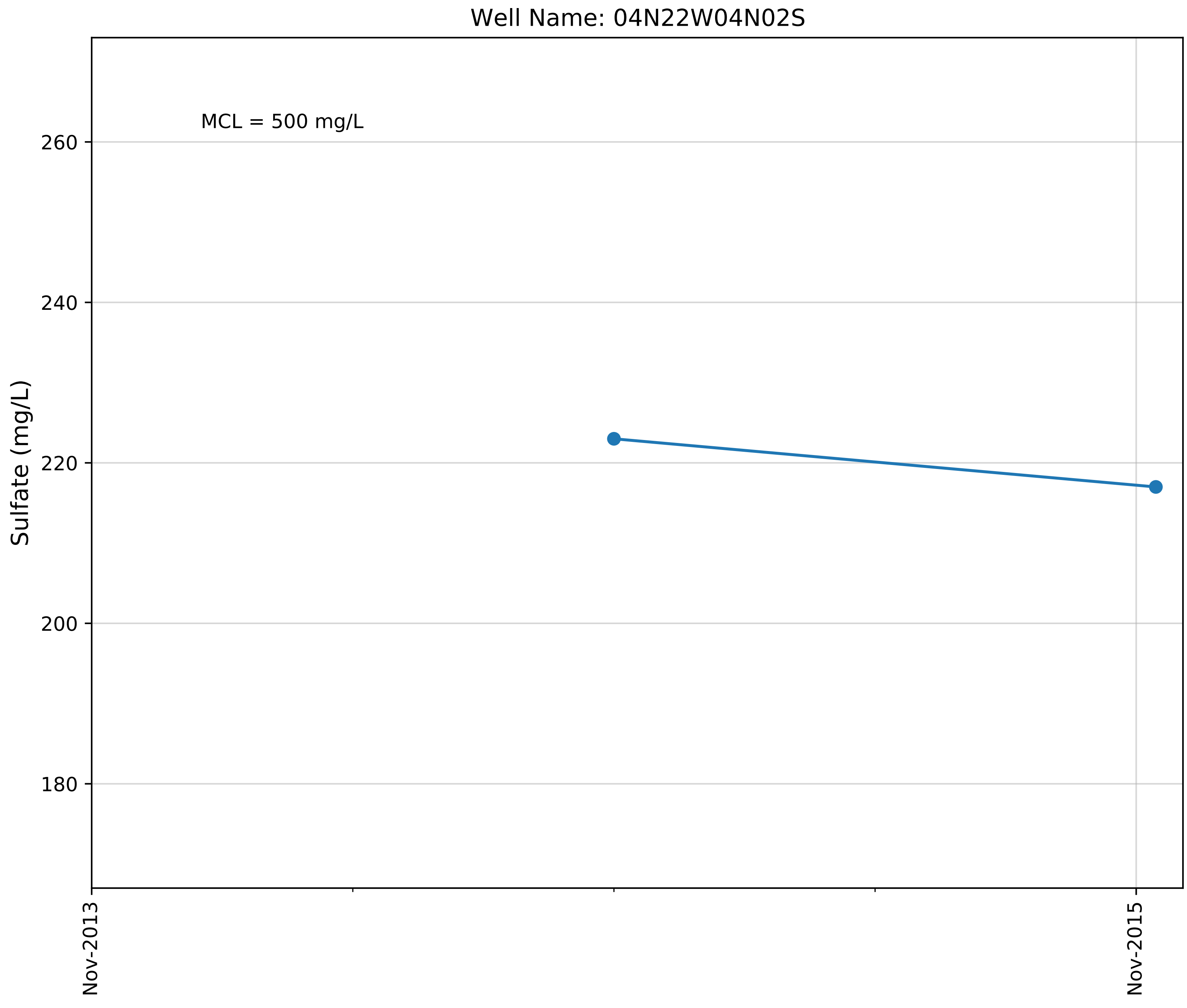

Well Name: SAN ANTONIO WELL 03
MCL = 10 mg/L
Nitrate (mg/L)
0
2
4
6
8
10
Feb-1985
Feb-1987
Feb-1989
Feb-1991
Feb-1993
Feb-1995
Feb-1997
Feb-1999
Feb-2001
Feb-2003
Feb-2005
Feb-2007
Feb-2009
Feb-2011
Feb-2013
Feb-2015
Feb-2017
Feb-2019
Feb-2021

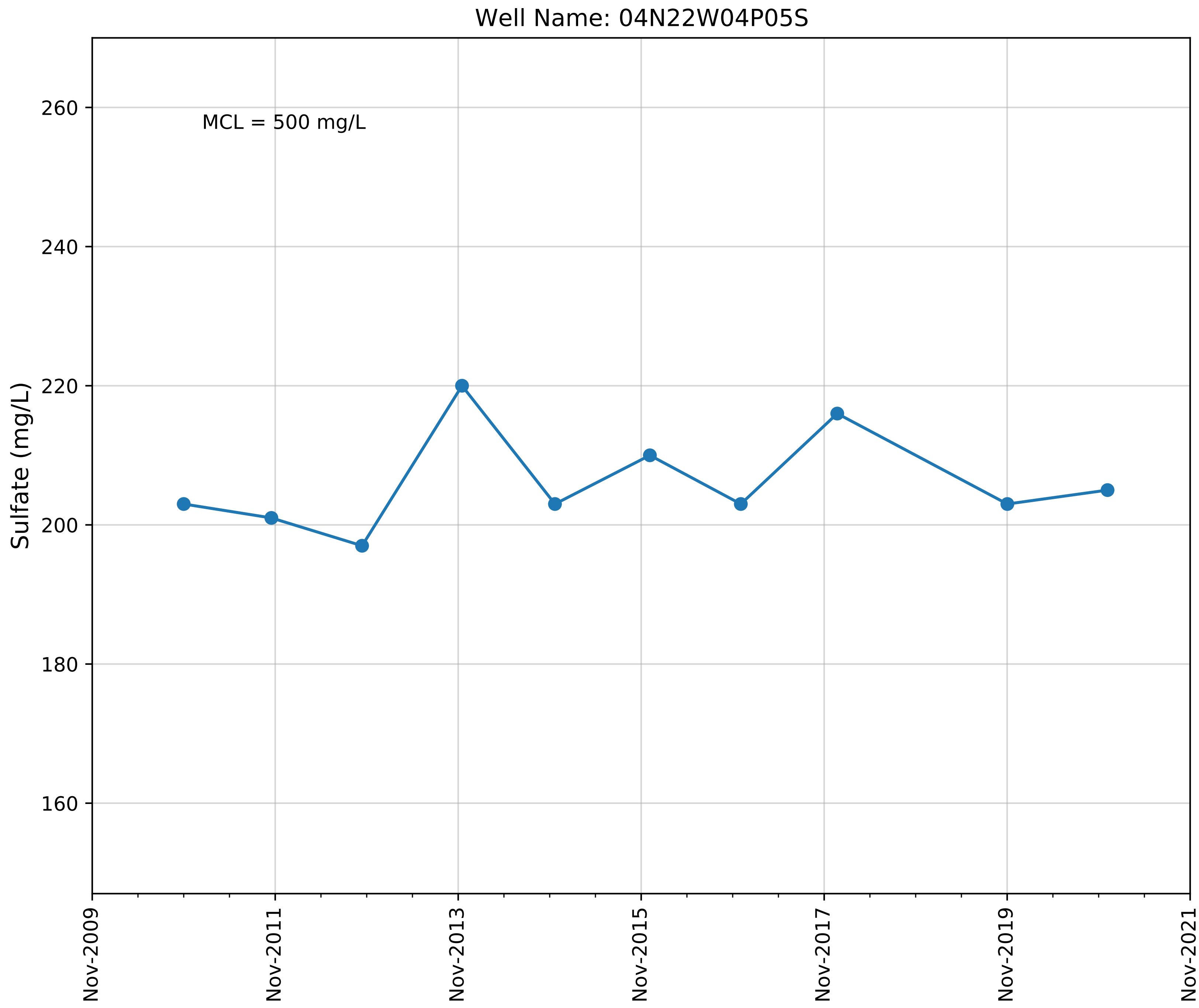


Well Name: SAN ANTONIO WELL 04
MCL = 10 mg/L
Nitrate (mg/L)
10
8
6
4
2
0
−2
Mar-2004
Apr-2006
Mar-2008
Apr-2010
Mar-2012
Apr-2014
Mar-2016
Apr-2018
Mar-2020

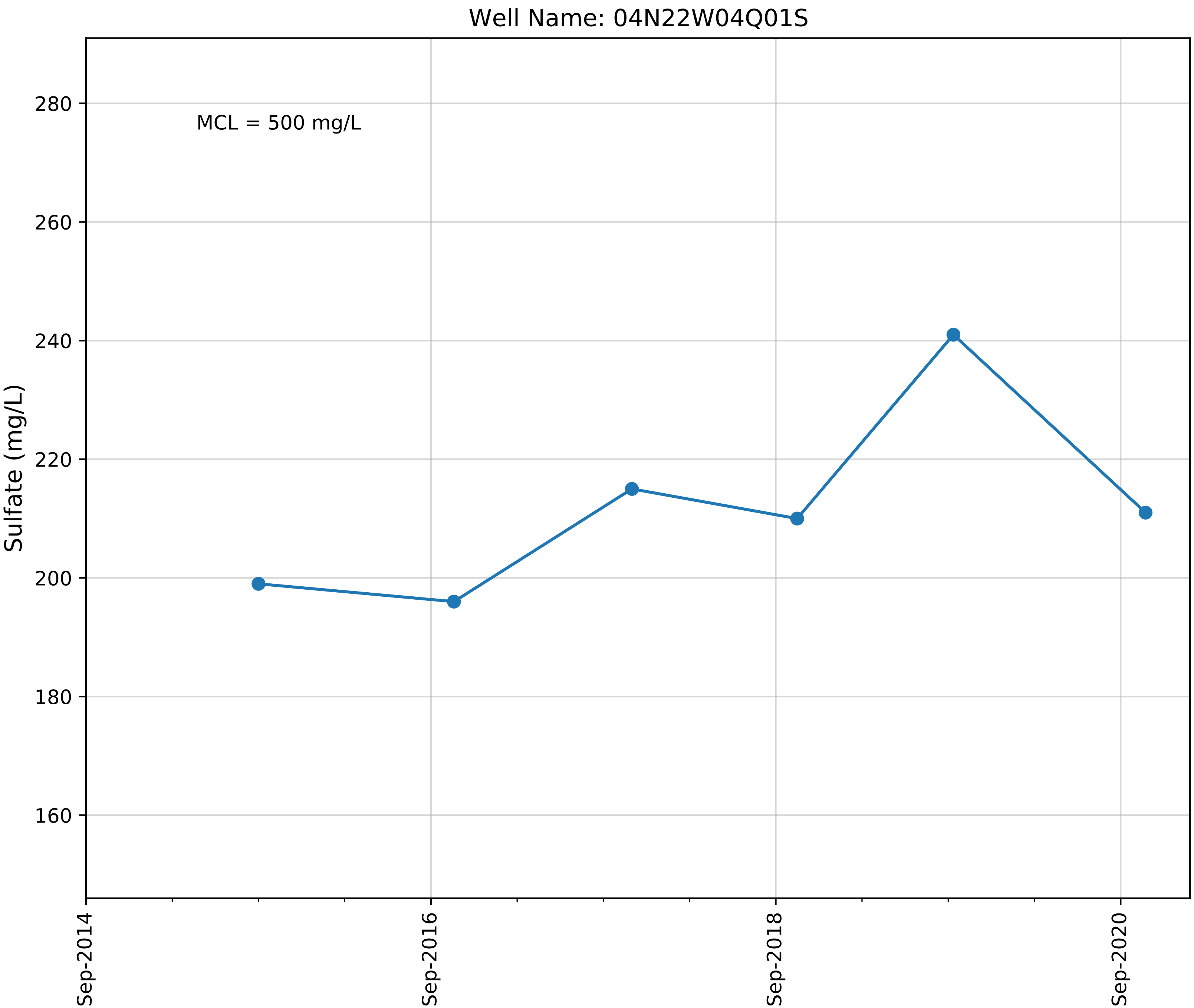


Well Name: WELL 04
MCL = 10 mg/L
Nitrate (mg/L)
10
8
6
4
2
0
−2
Nov-1999
Nov-2001
Nov-2003
Nov-2005
Nov-2007
Nov-2009
Nov-2011
Nov-2013
Nov-2015
Nov-2017
Nov-2019
Nov-2021

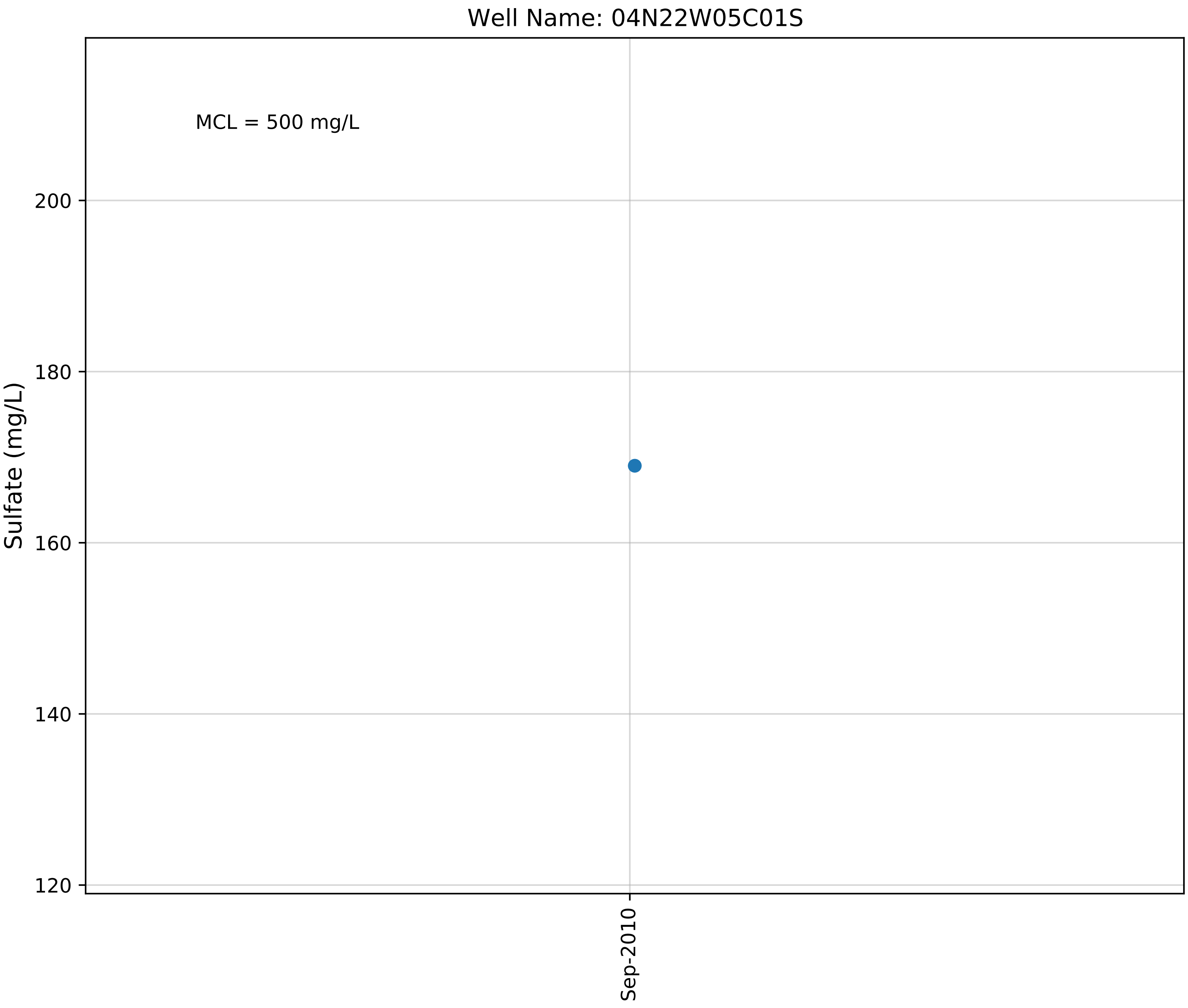

Well Name: 04N22W04N02S
MCL = 500 mg/L
Sulfate (mg/L)
260
240
220
200
180
Nov-2013
Nov-2015

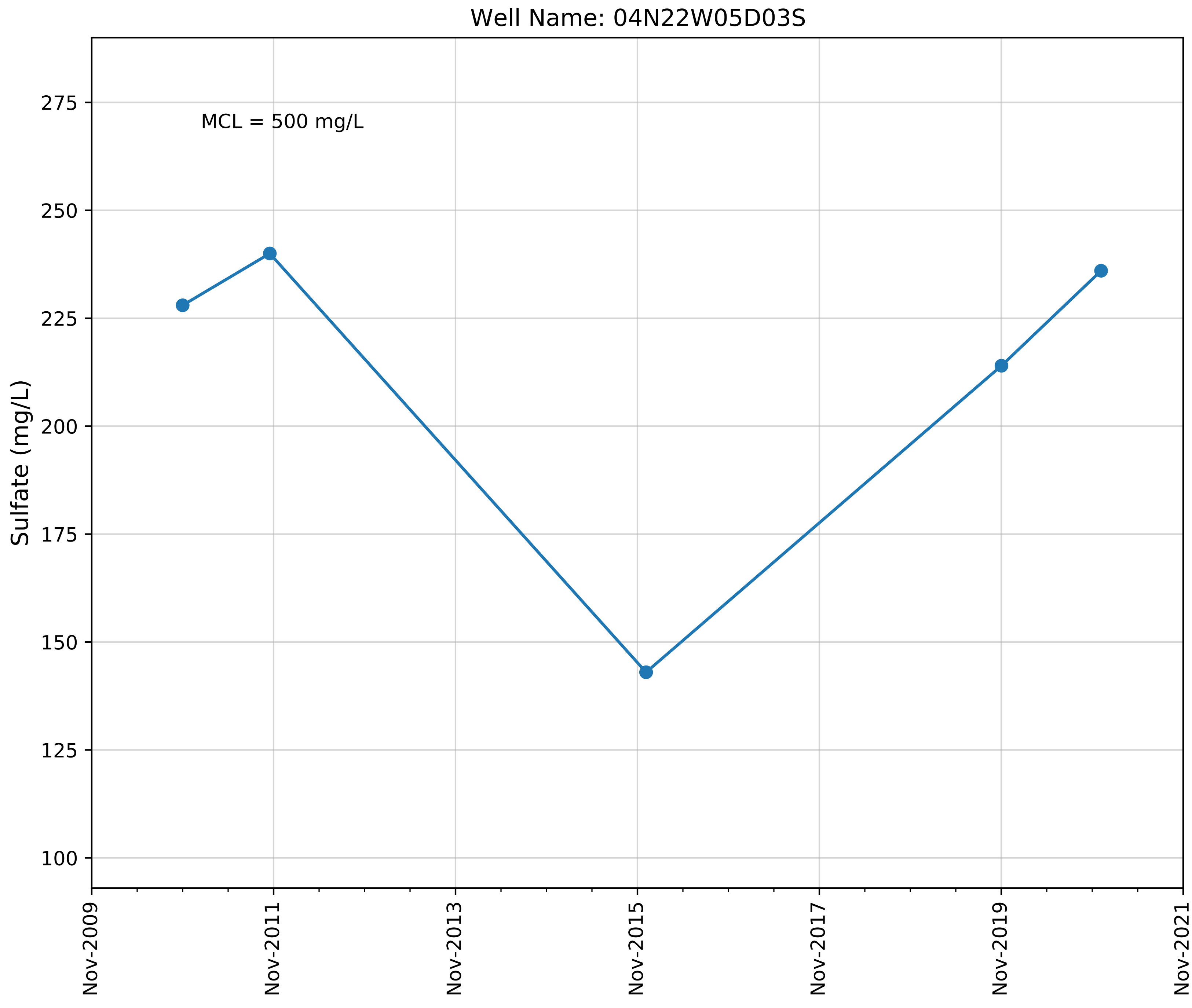


Well Name: 04N22W04P05S
MCL = 500 mg/L
Sulfate (mg/L)
260
240
220
200
180
160
Nov-2009
Nov-2011
Nov-2013
Nov-2015
Nov-2017
Nov-2019
Nov-2021

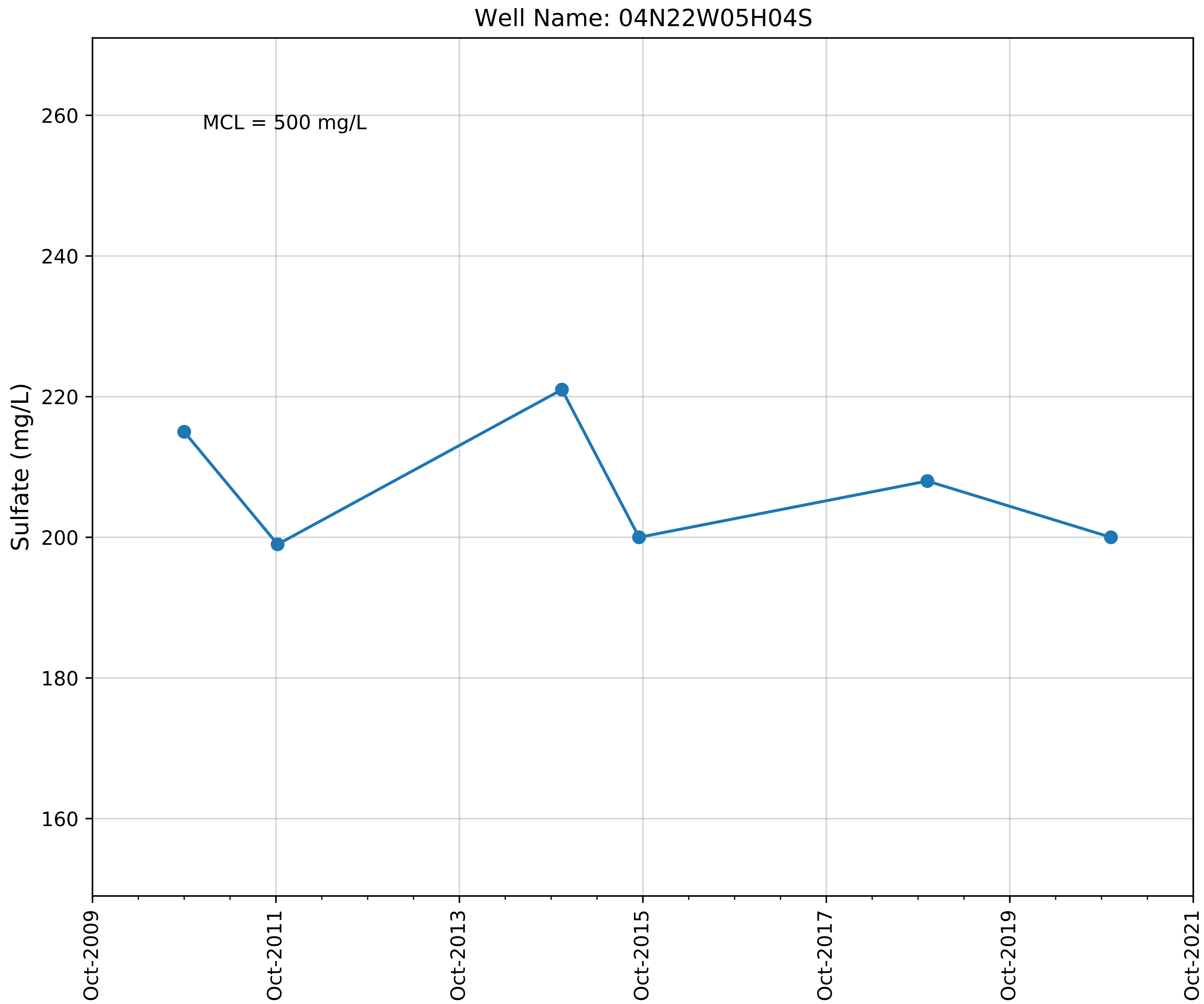


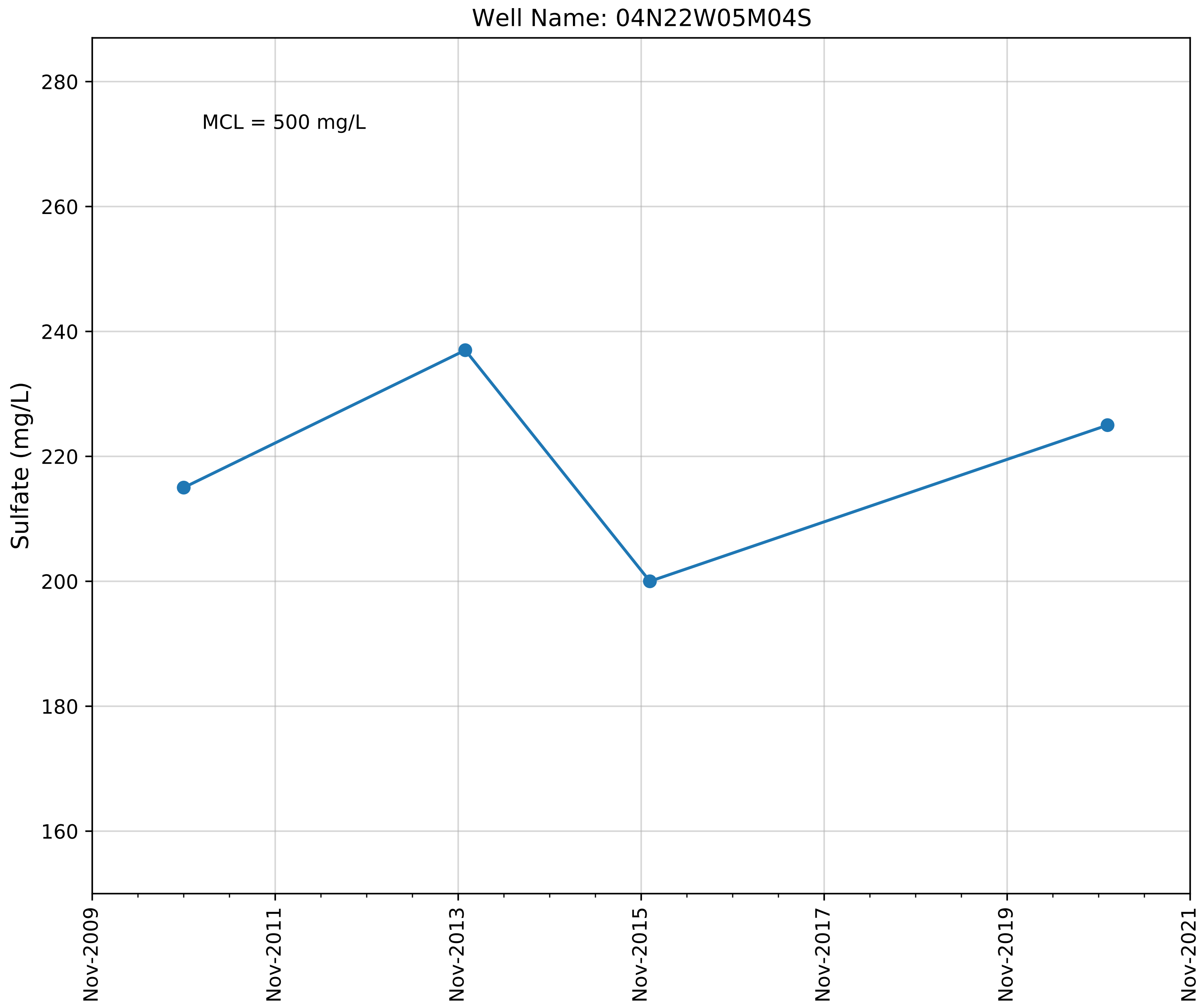
Well Name: 04N22W04Q01S
MCL = 500 mg/L
Sulfate (mg/L)
280
260
240
220
200
180
160
Sep-2014
Sep-2016
Sep-2018
Sep-2020

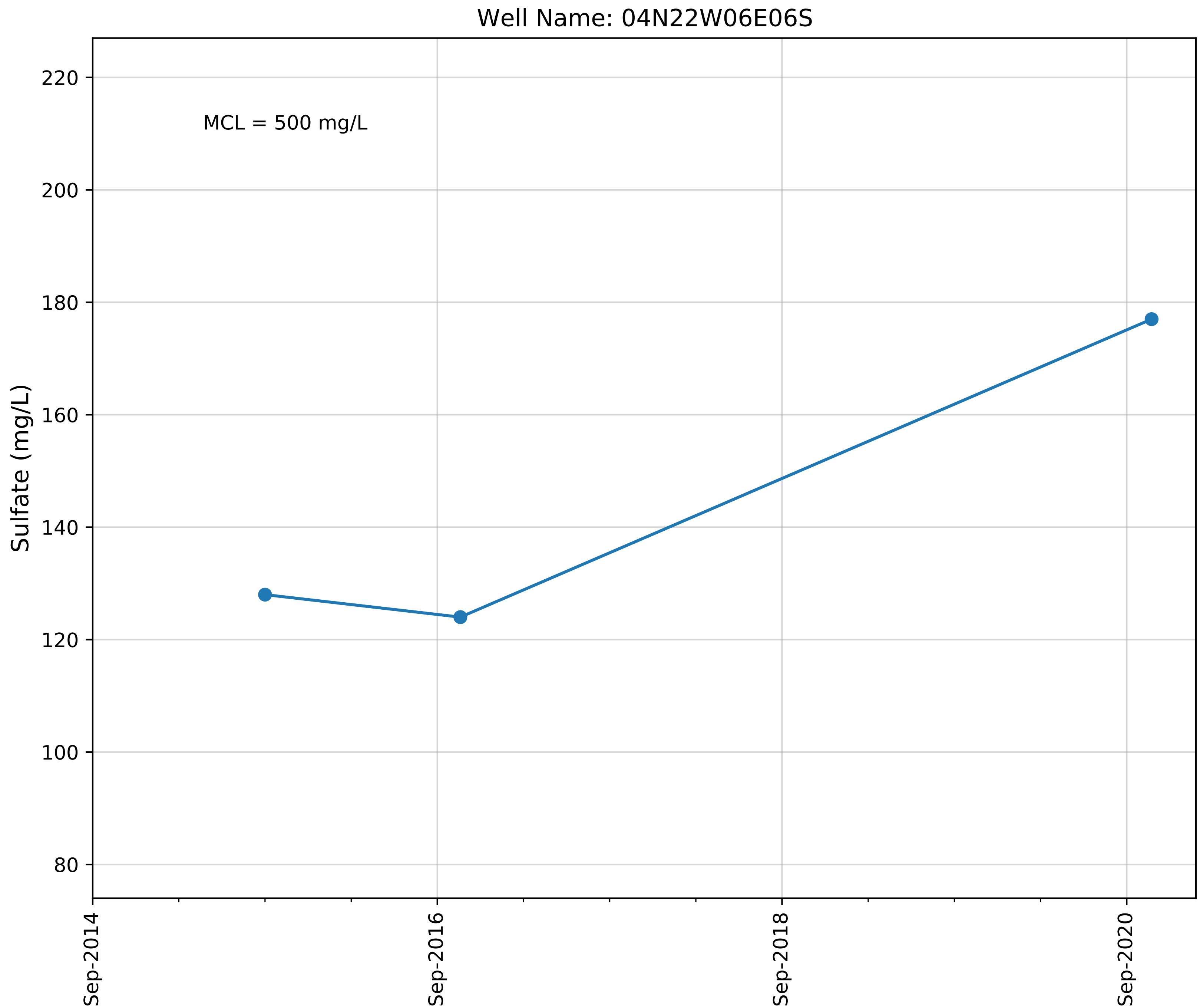

Well Name: 04N22W05C01S
MCL = 500 mg/L
Sulfate (mg/L)
200
180
160
140
120
Sep-2010

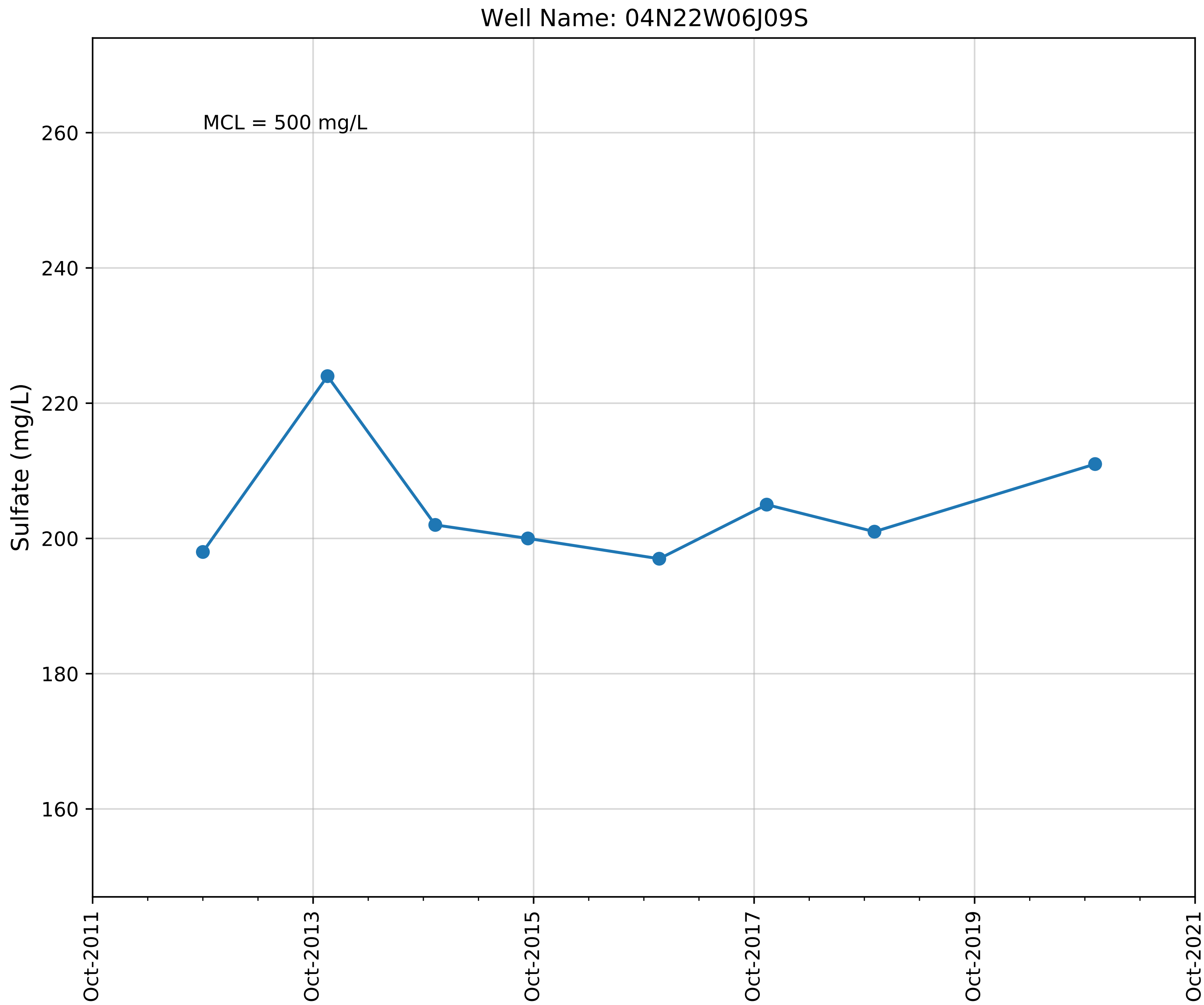


Well Name: 04N22W05D03S
MCL = 500 mg/L
Sulfate (mg/L)
275
250
225
200
175
150
125
100
Nov-2009
Nov-2011
Nov-2013
Nov-2015
Nov-2017
Nov-2019
Nov-2021

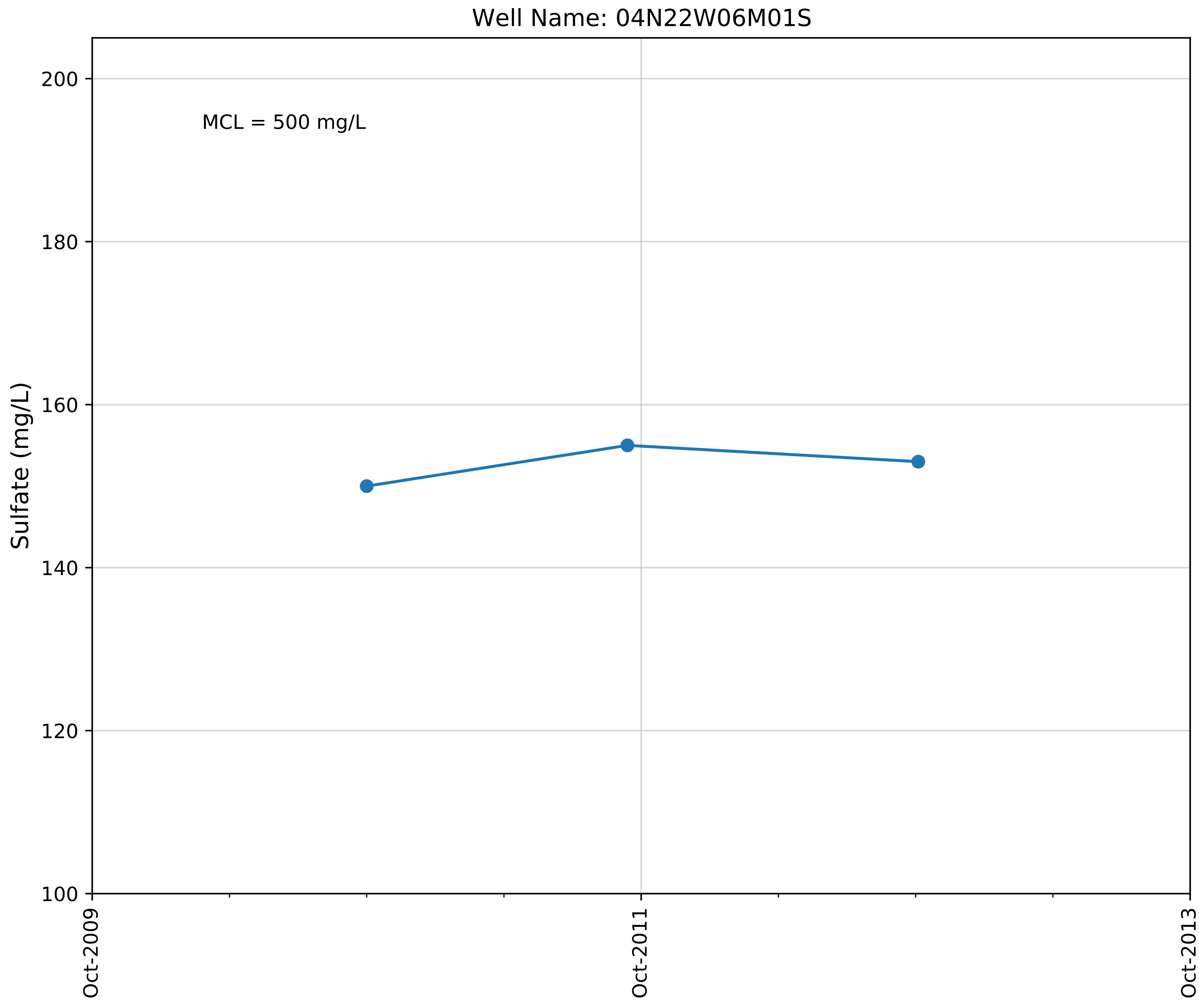

Well Name: 04N22W05H04S
MCL = 500 mg/L
Sulfate (mg/L)
260
240
220
200
180
160
Oct-2009
Oct-2011
Oct-2013
Oct-2015
Oct-2017
Oct-2019
Oct-2021


Well Name: 04N22W05M04S
MCL = 500 mg/L
Sulfate (mg/L)
280
260
240
220
200
180
160
Nov-2009
Nov-2011
Nov-2013
Nov-2015
Nov-2017
Nov-2019
Nov-2021

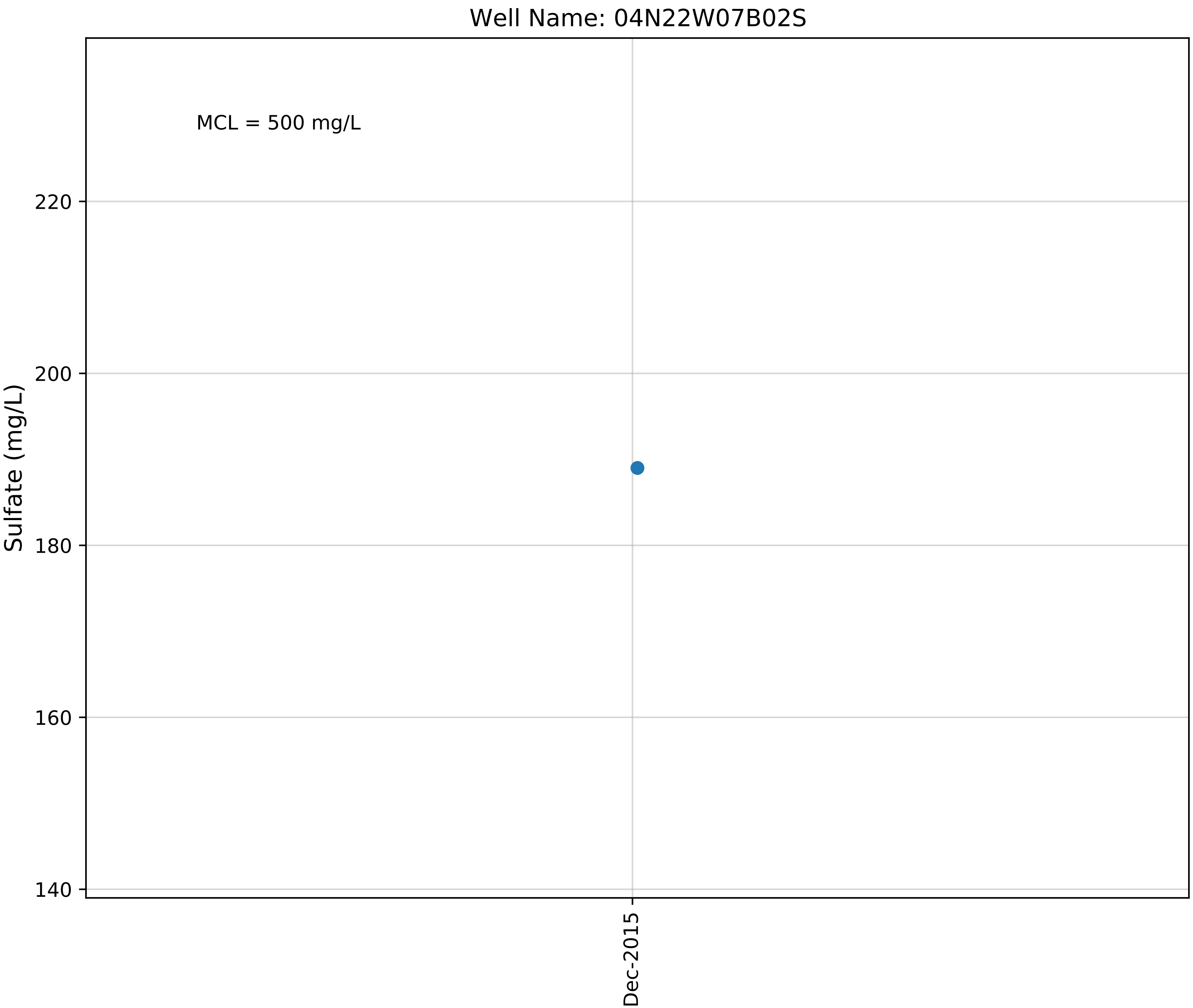

Well Name: 04N22W06E06S
MCL = 500 mg/L
Sulfate (mg/L)
220
200
180
160
140
120
100
80
Sep-2014
Sep-2016
Sep-2018
Sep-2020

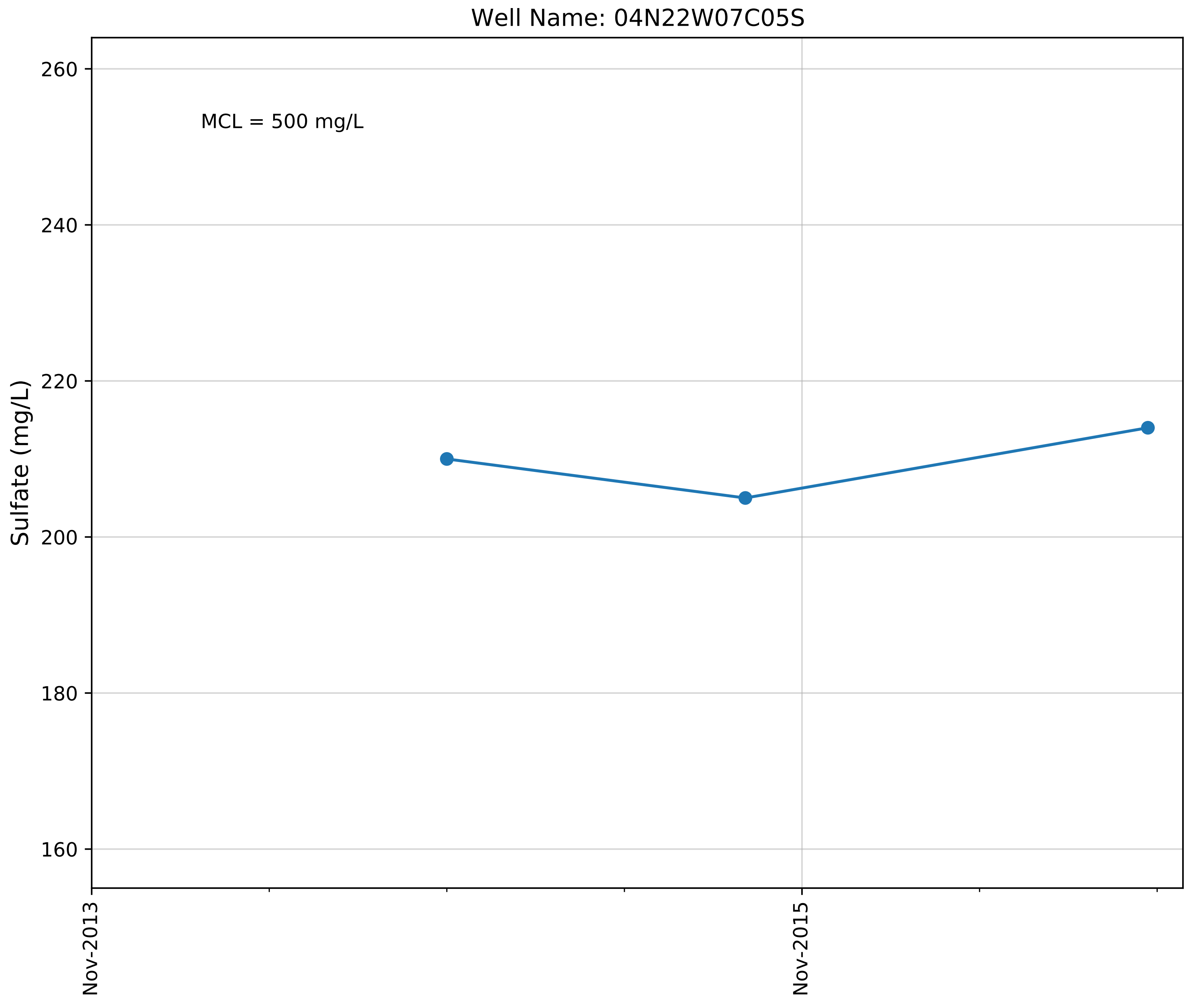


Well Name: 04N22W06J09S
MCL = 500 mg/L
Sulfate (mg/L)
260
240
220
200
180
160
Oct-2011
Oct-2013
Oct-2015
Oct-2017
Oct-2019
Oct-2021

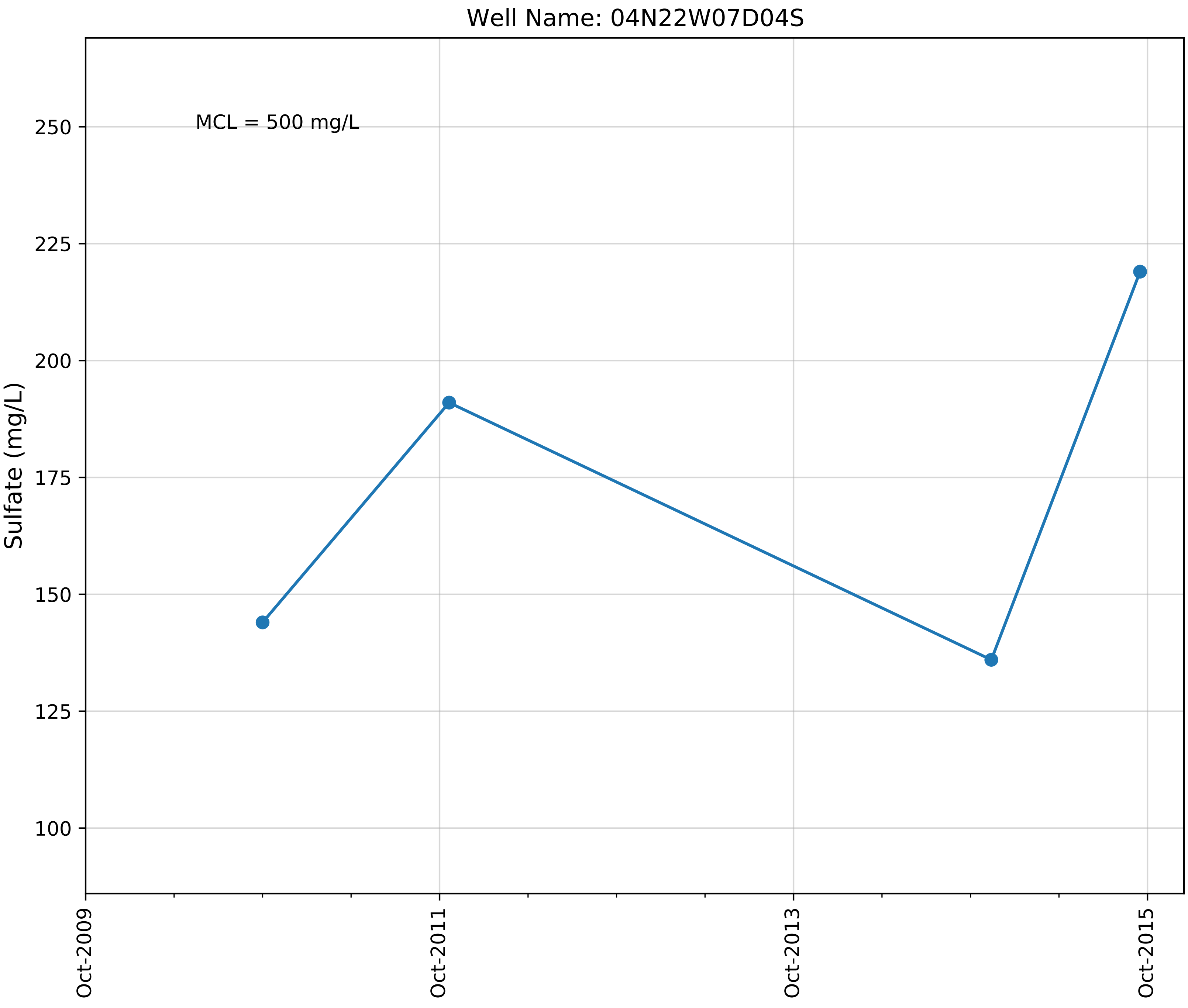


Well Name: 04N22W06M01S
MCL = 500 mg/L
Sulfate (mg/L)
200
180
160
140
120
100
Oct-2009
Oct-2011
Oct-2013

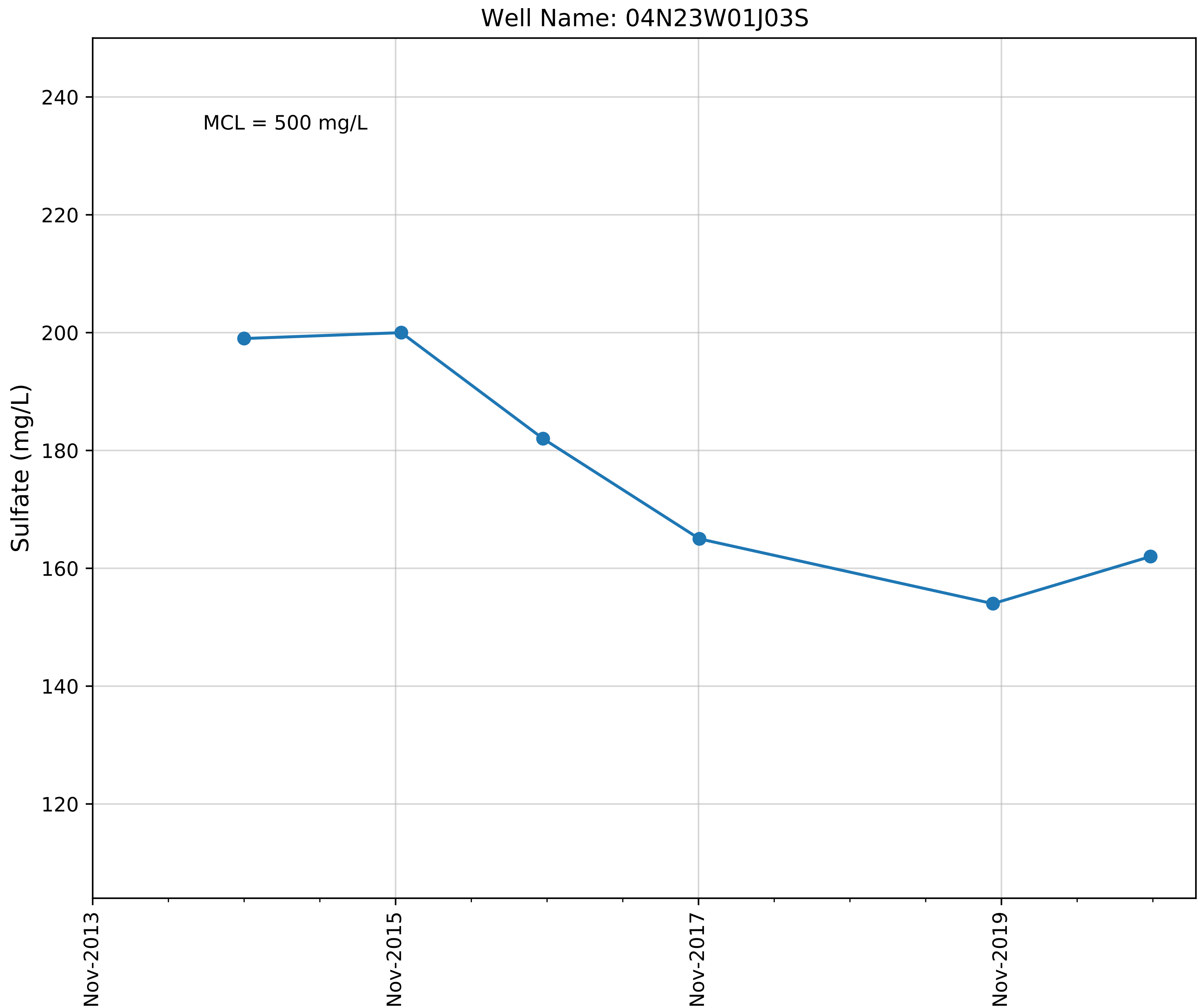

Well Name: 04N22W07B02S
MCL = 500 mg/L
Sulfate (mg/L)
220
200
180
160
140
Dec-2015



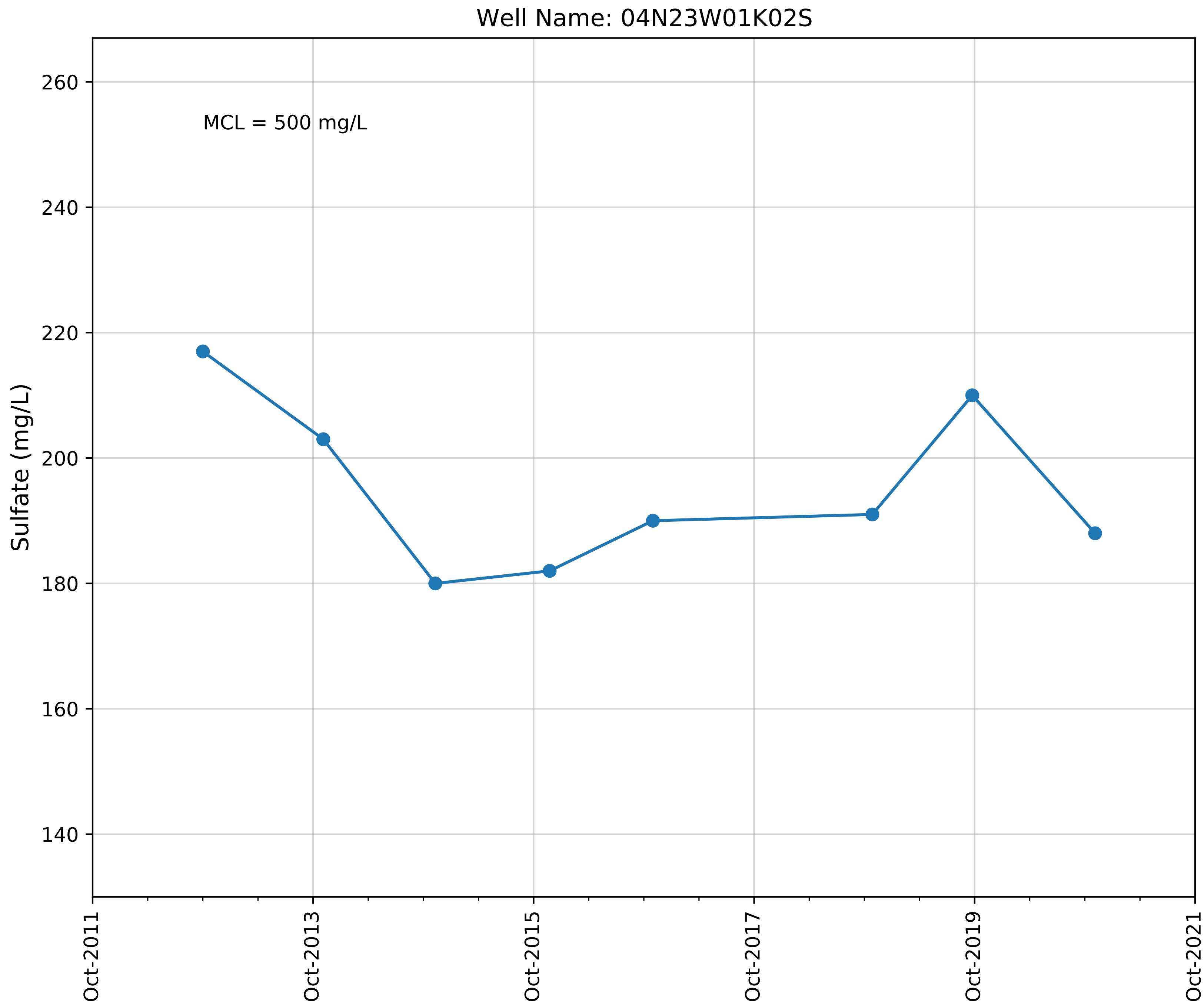
Well Name: 04N22W07C05S
MCL = 500 mg/L
Sulfate (mg/L)
260
240
220
200
180
160
Nov-2013
Nov-2015

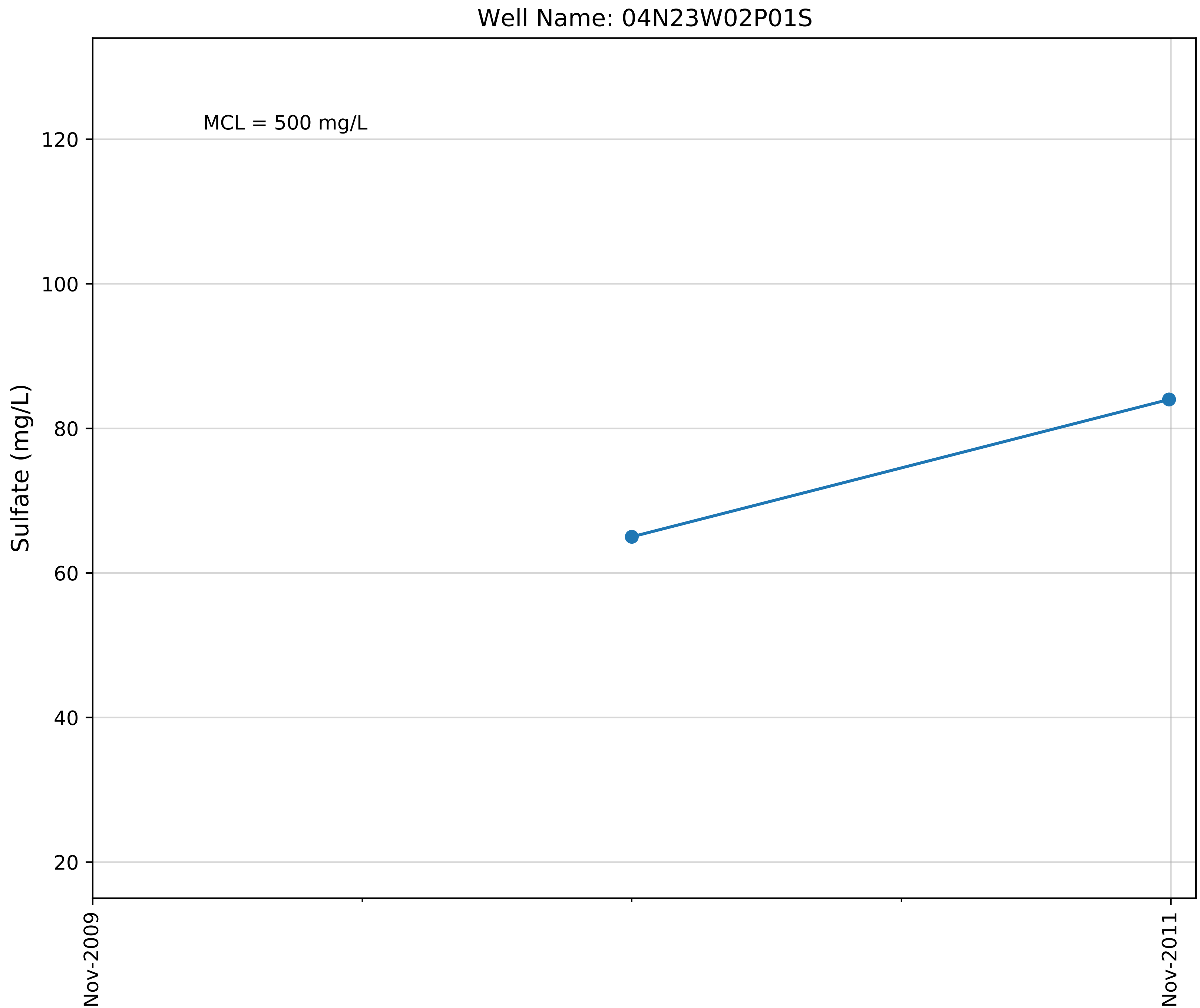


Well Name: 04N22W07D04S
MCL = 500 mg/L
Sulfate (mg/L)
250
225
200
175
150
125
100
Oct-2009
Oct-2011
Oct-2013
Oct-2015

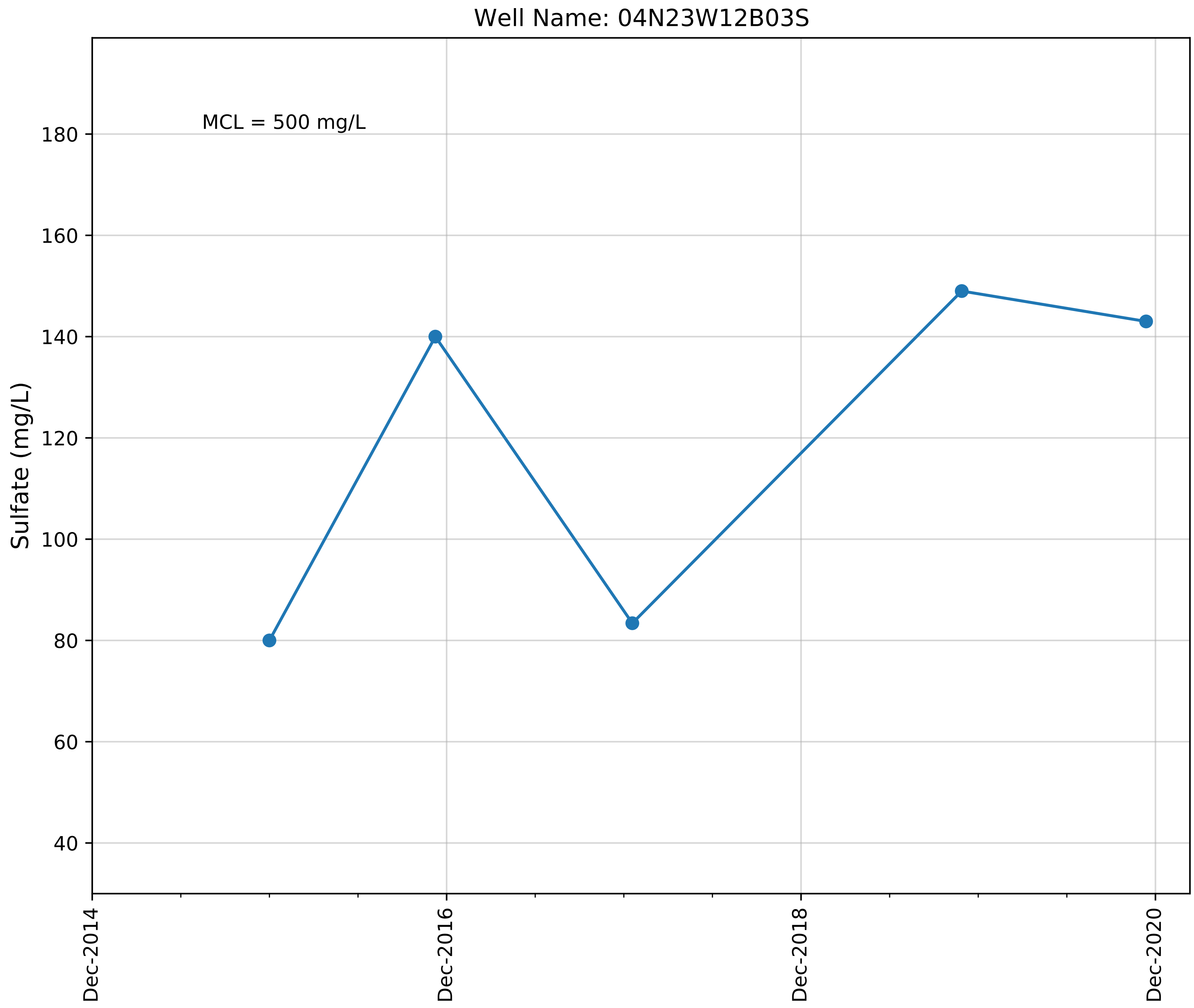


Well Name: 04N23W01J03S
MCL = 500 mg/L
Sulfate (mg/L)
240
220
200
180
160
140
120
Nov-2013
Nov-2015
Nov-2017
Nov-2019

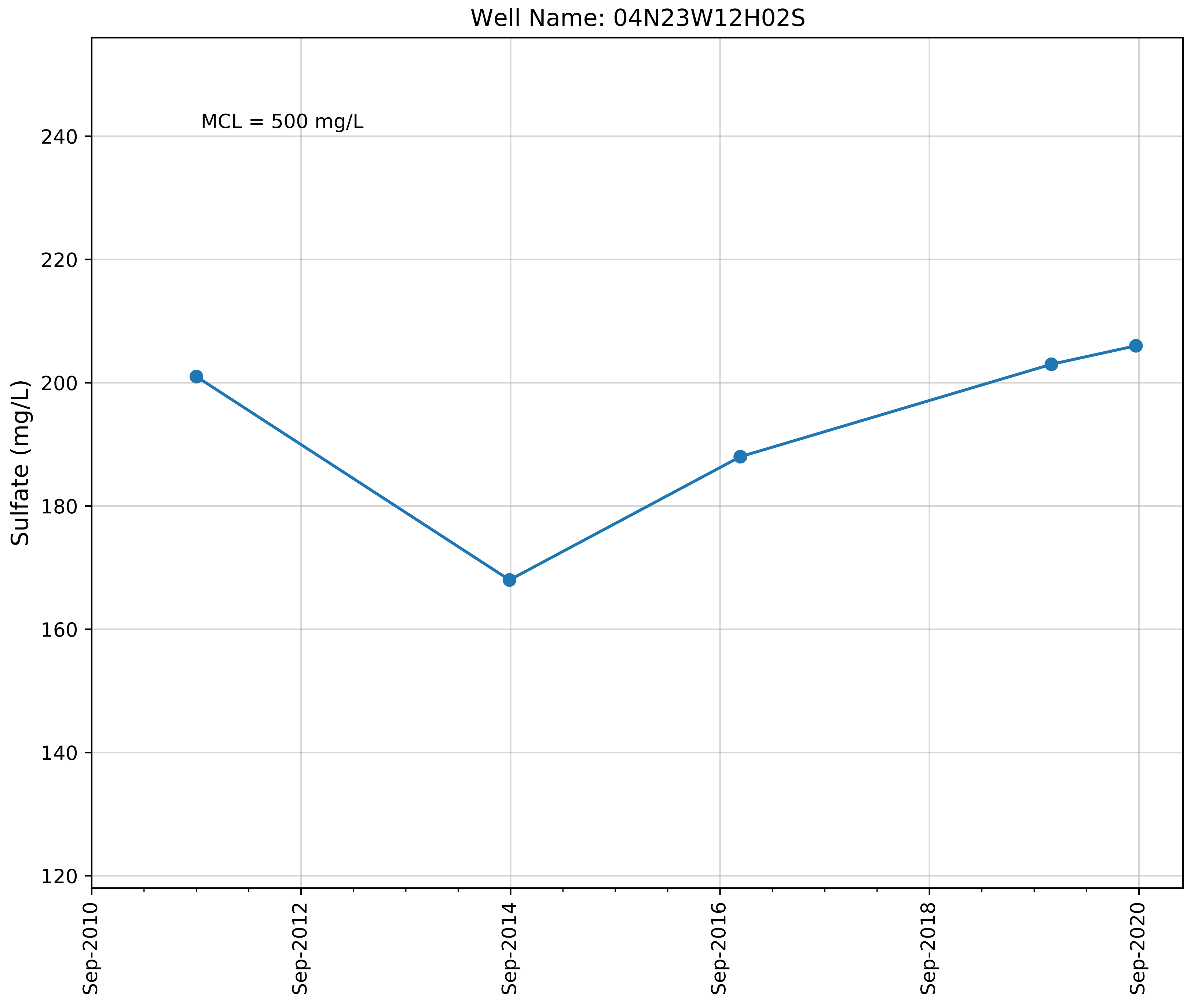

Well Name: 04N23W01K02S
MCL = 500 mg/L
Sulfate (mg/L)
260
240
220
200
180
160
140
Oct-2011
Oct-2013
Oct-2015
Oct-2017
Oct-2019
Oct-2021



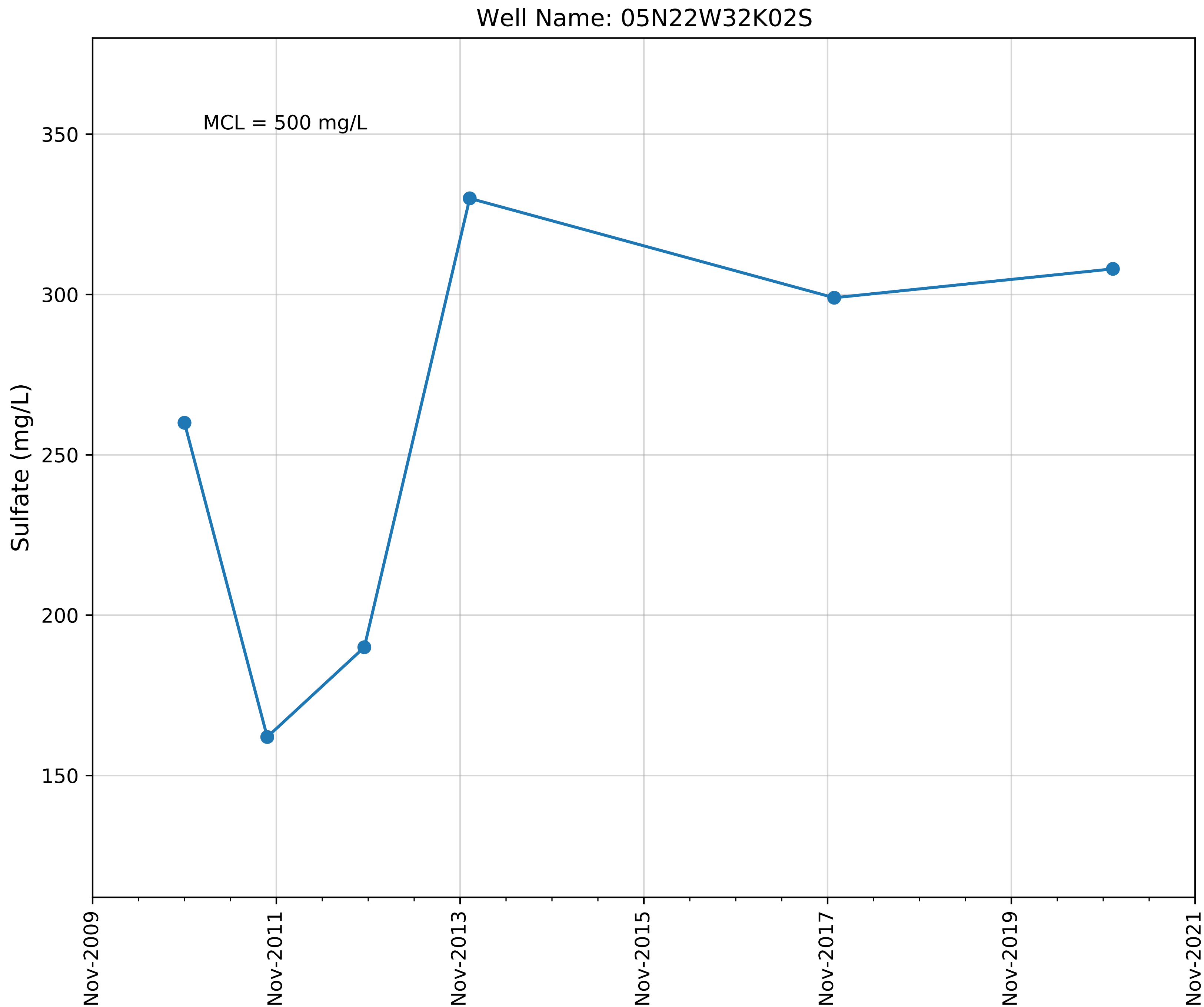
Well Name: 04N23W02P01S
MCL = 500 mg/L
Sulfate (mg/L)
120
100
80
60
40
20
Nov-2009
Nov-2011



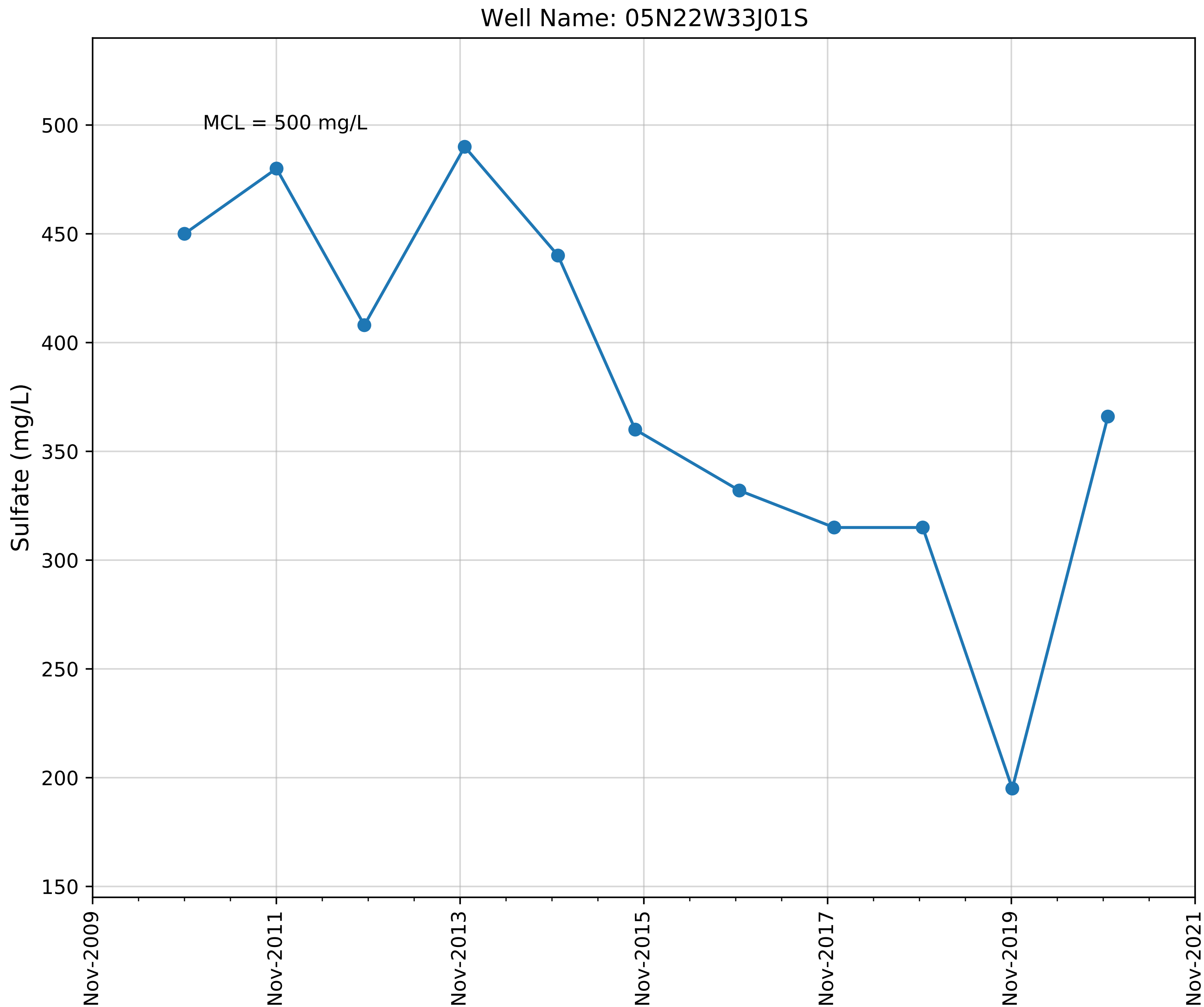
Well Name: 04N23W12B03S
MCL = 500 mg/L
Sulfate (mg/L)
180
160
140
120
100
80
60
40
Dec-2014
Dec-2016
Dec-2018
Dec-2020



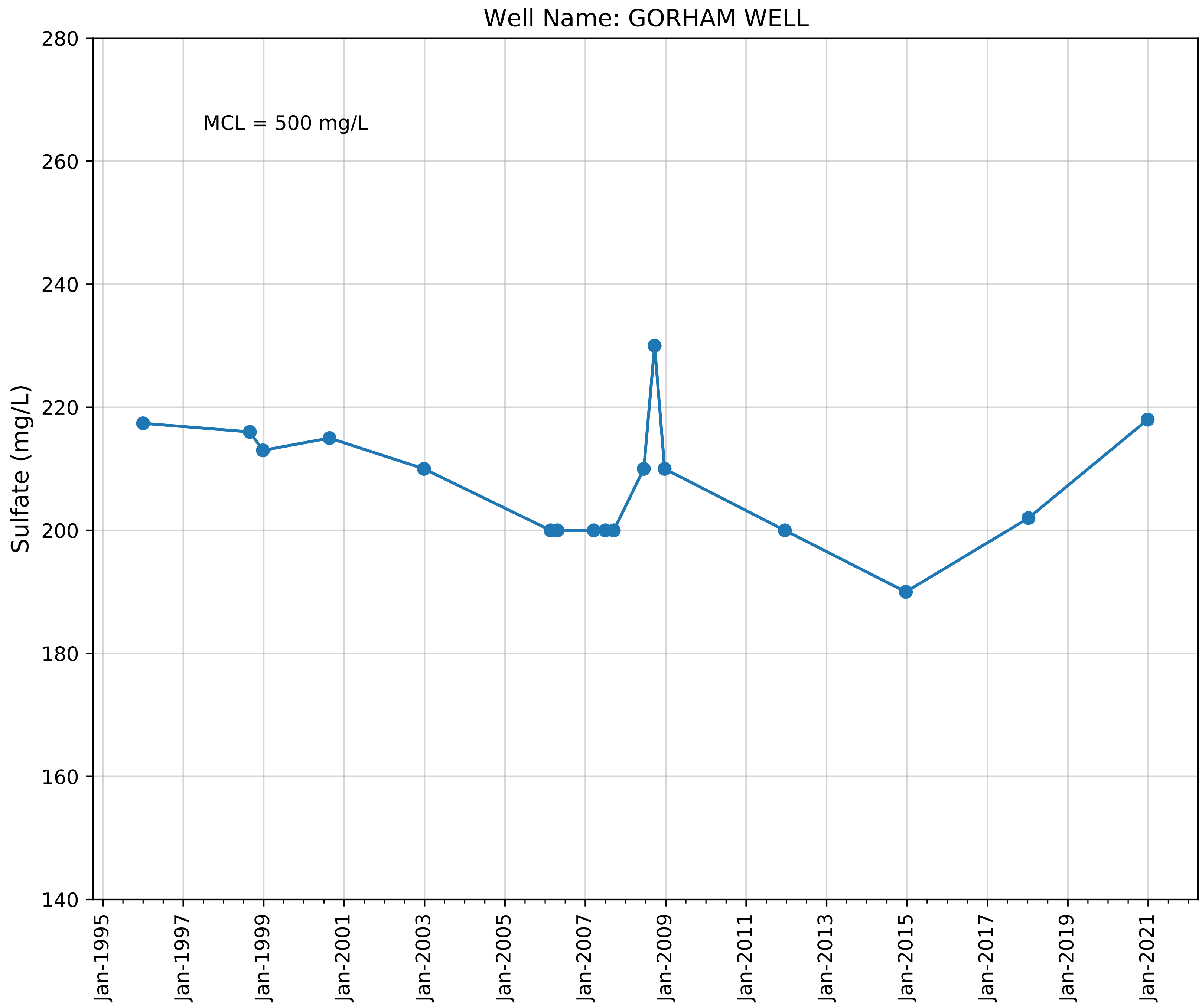
Well Name: 04N23W12H02S
MCL = 500 mg/L
Sulfate (mg/L)
240
220
200
180
160
140
120
Sep-2010
Sep-2012
Sep-2014
Sep-2016
Sep-2018
Sep-2020



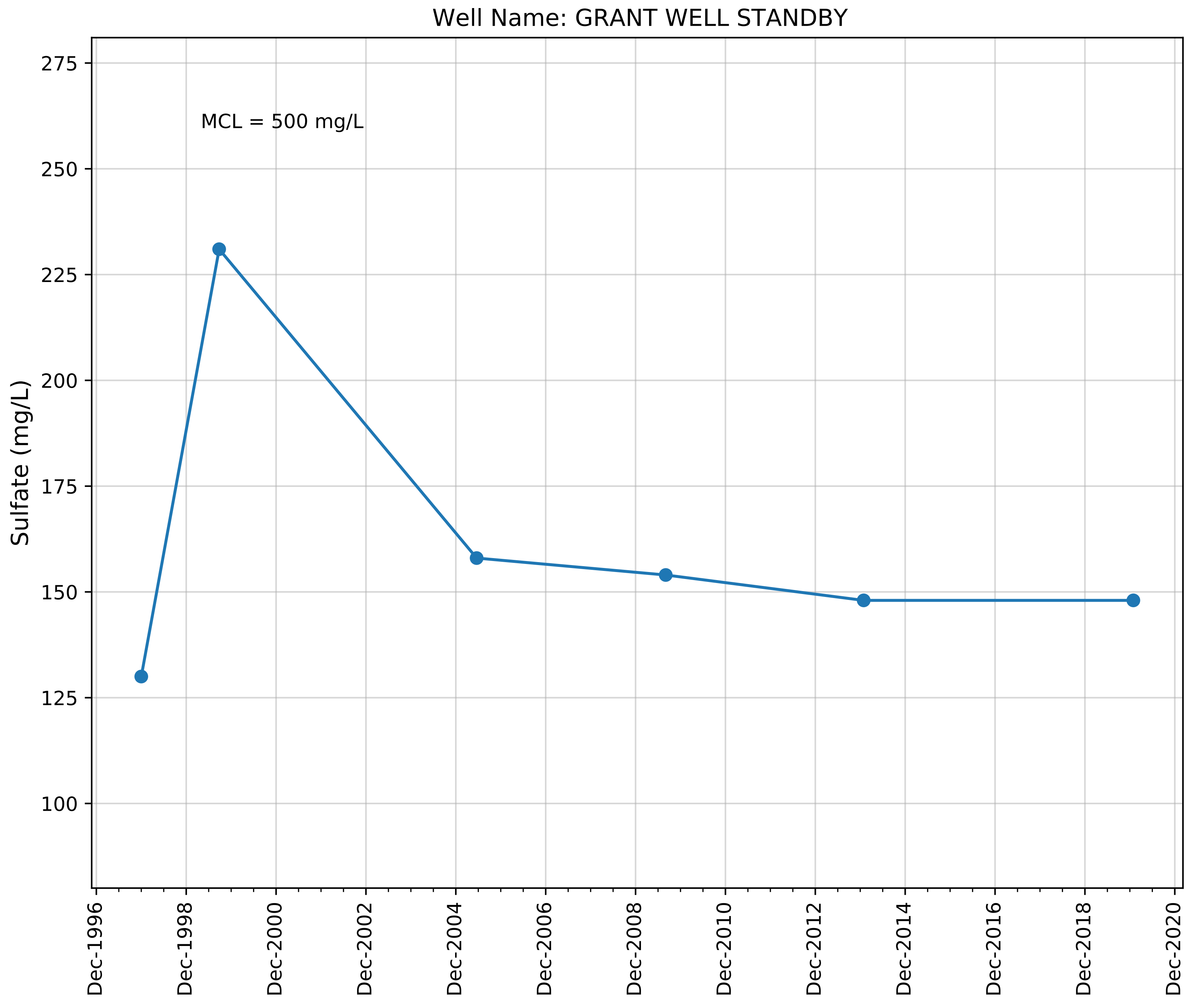
Well Name: 05N22W32K02S
MCL = 500 mg/L
Sulfate (mg/L)
350
300
250
200
150
Nov-2009
Nov-2011
Nov-2013
Nov-2015
Nov-2017
Nov-2019
Nov-2021

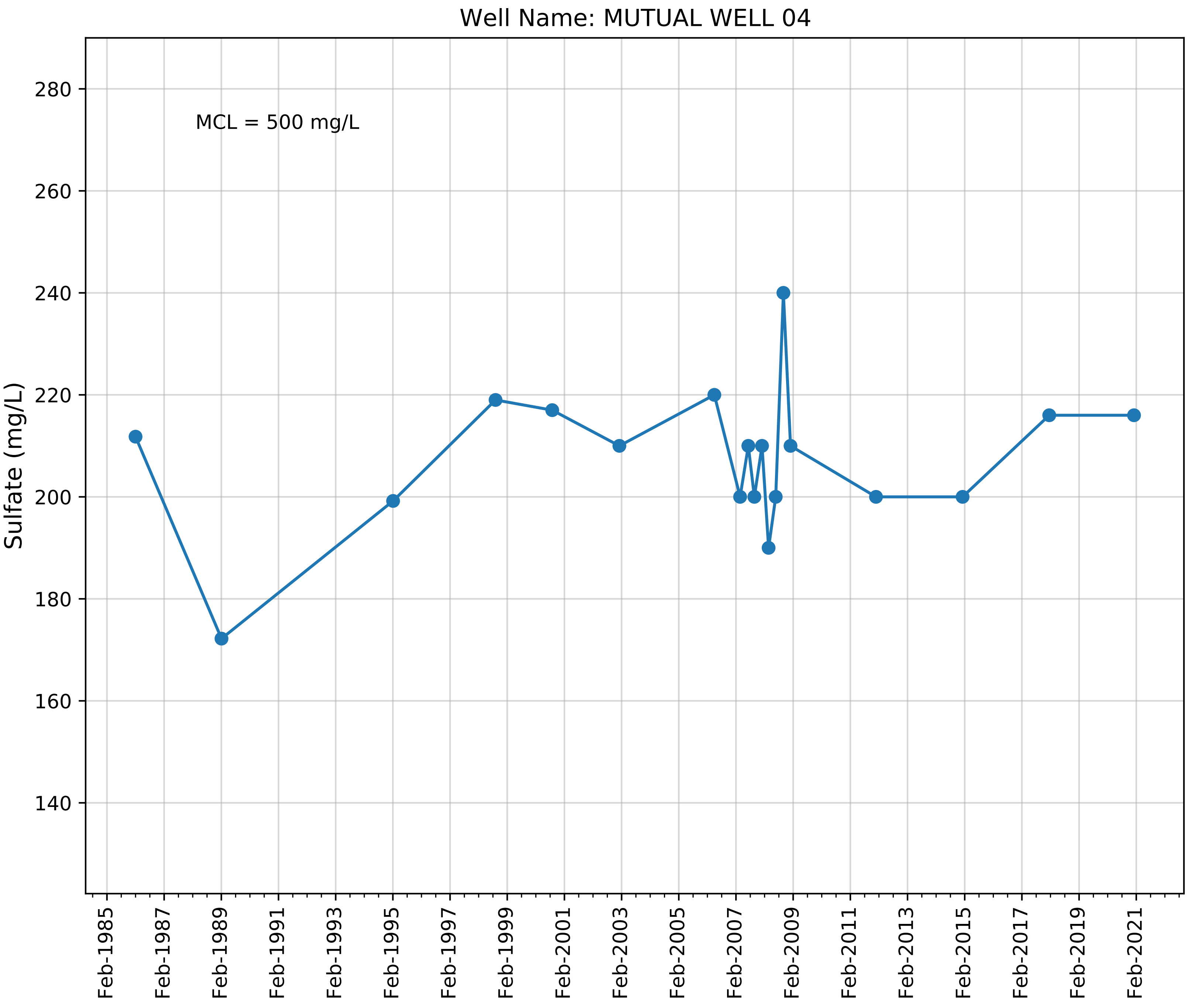


Well Name: 05N22W33J01S
MCL = 500 mg/L
Sulfate (mg/L)
150
200
250
300
350
400
450
500
Nov-2009
Nov-2011
Nov-2013
Nov-2015
Nov-2017
Nov-2019
Nov-2021

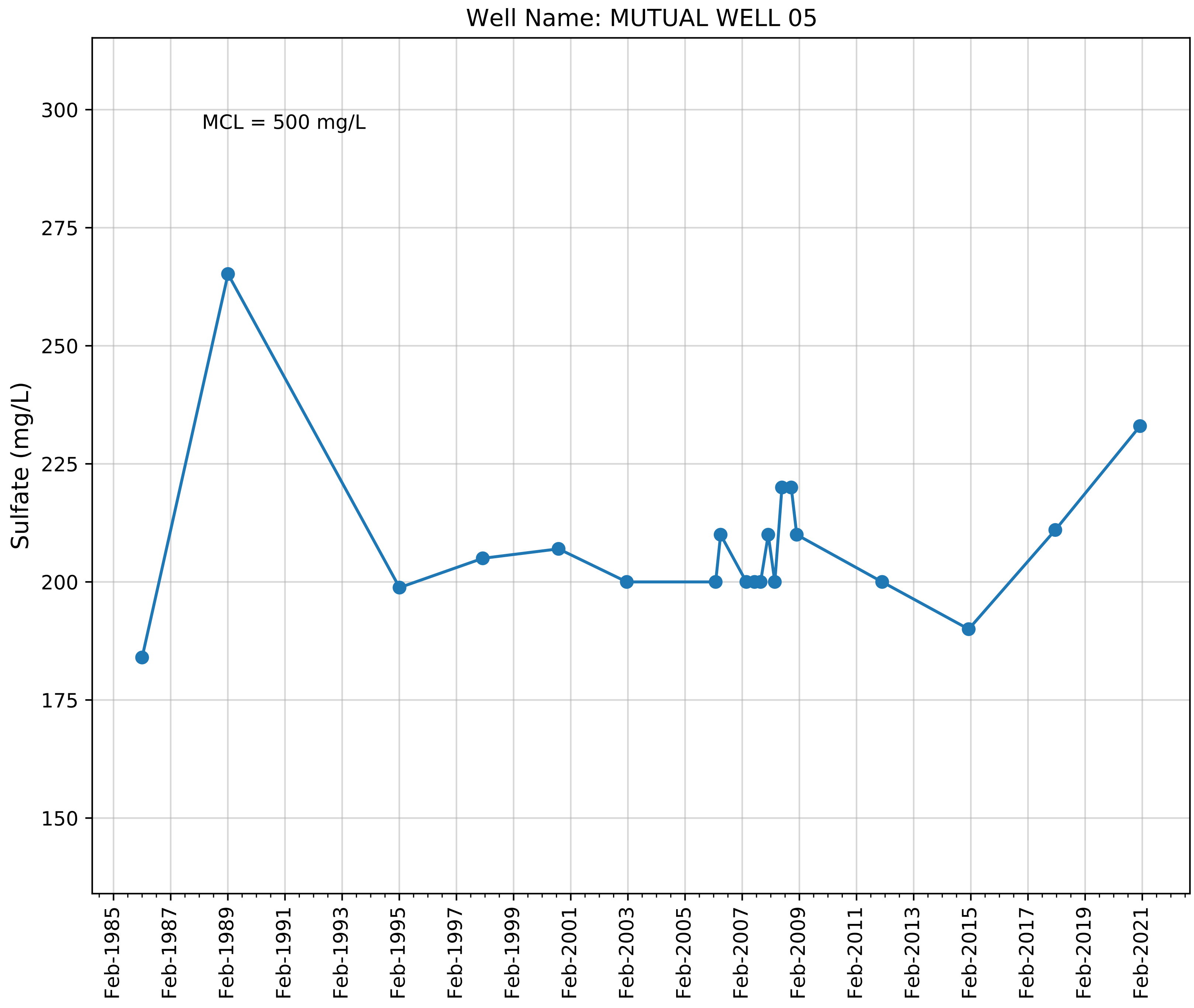


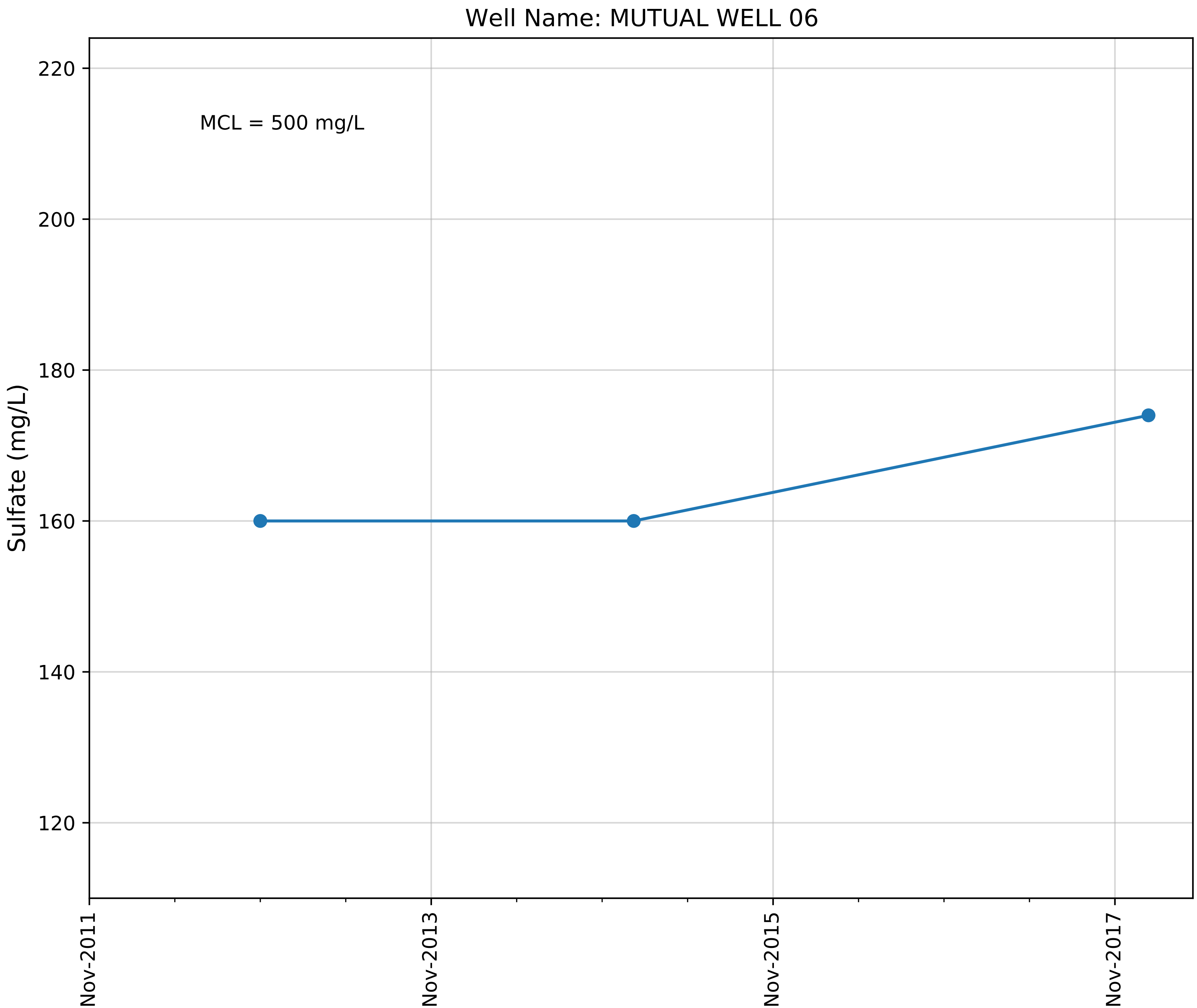
Well Name: GORHAM WELL
MCL = 500 mg/L
Sulfate (mg/L)
280
260
240
220
200
180
160
140
Jan-1995
Jan-1997
Jan-1999
Jan-2001
Jan-2003
Jan-2005
Jan-2007
Jan-2009
Jan-2011
Jan-2013
Jan-2015
Jan-2017
Jan-2019
Jan-2021

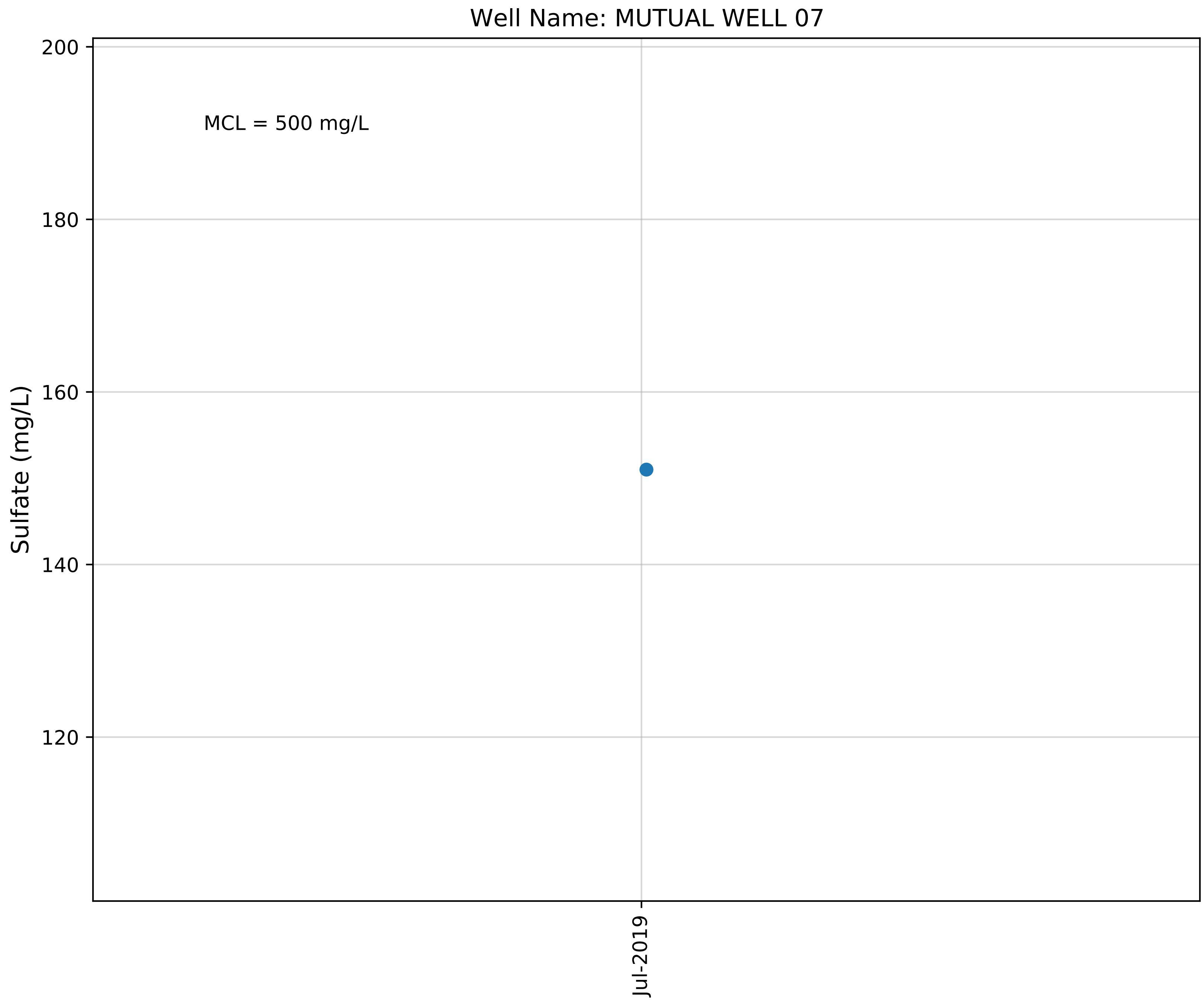

Well Name: GRANT WELL STANDBY
MCL = 500 mg/L
Sulfate (mg/L)
275
250
225
200
175
150
125
100
Dec-1996
Dec-1998
Dec-2000
Dec-2002
Dec-2004
Dec-2006
Dec-2008
Dec-2010
Dec-2012
Dec-2014
Dec-2016
Dec-2018
Dec-2020



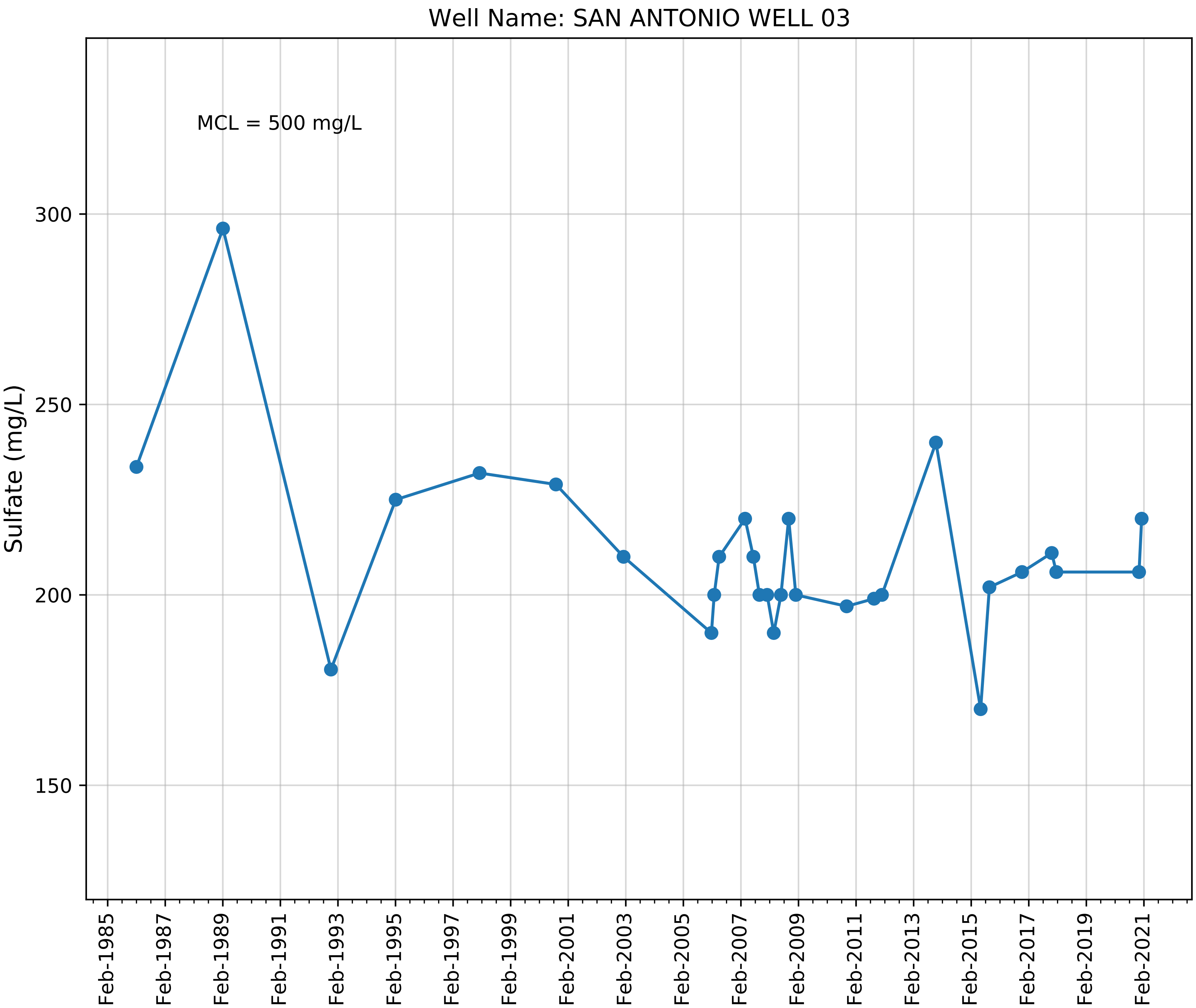
Well Name: MUTUAL WELL 04
MCL = 500 mg/L
Sulfate (mg/L)
280
260
240
220
200
180
160
140
Feb-1985
Feb-1987
Feb-1989
Feb-1991
Feb-1993
Feb-1995
Feb-1997
Feb-1999
Feb-2001
Feb-2003
Feb-2005
Feb-2007
Feb-2009
Feb-2011
Feb-2013
Feb-2015
Feb-2017
Feb-2019
Feb-2021


Well Name: MUTUAL WELL 05
MCL = 500 mg/L
Sulfate (mg/L)
300
275
250
225
200
175
150
Feb-1985
Feb-1987
Feb-1989
Feb-1991
Feb-1993
Feb-1995
Feb-1997
Feb-1999
Feb-2001
Feb-2003
Feb-2005
Feb-2007
Feb-2009
Feb-2011
Feb-2013
Feb-2015
Feb-2017
Feb-2019
Feb-2021

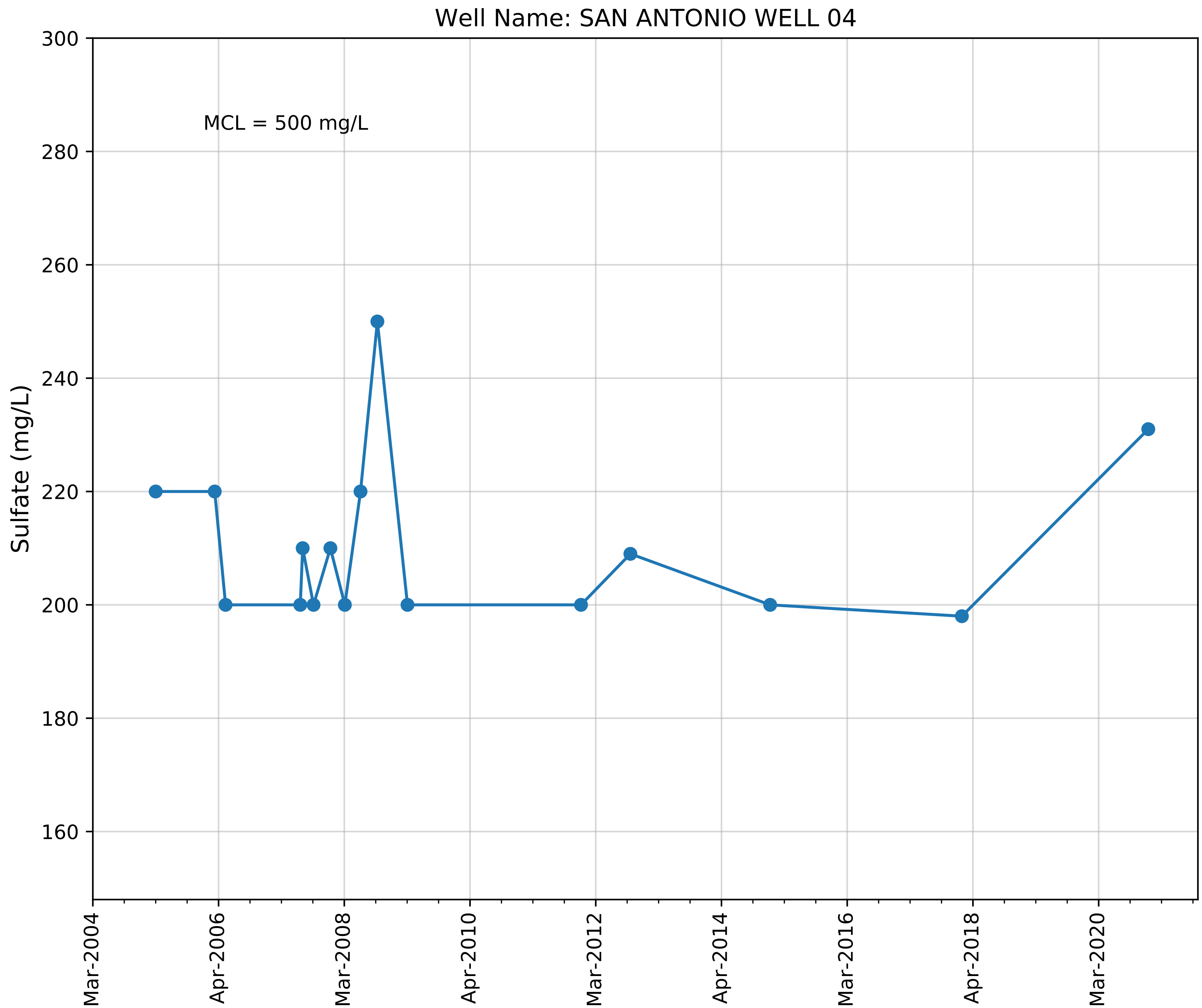

Well Name: MUTUAL WELL 06
MCL = 500 mg/L
Sulfate (mg/L)
220
200
180
160
140
120
Nov-2011
Nov-2013
Nov-2015
Nov-2017

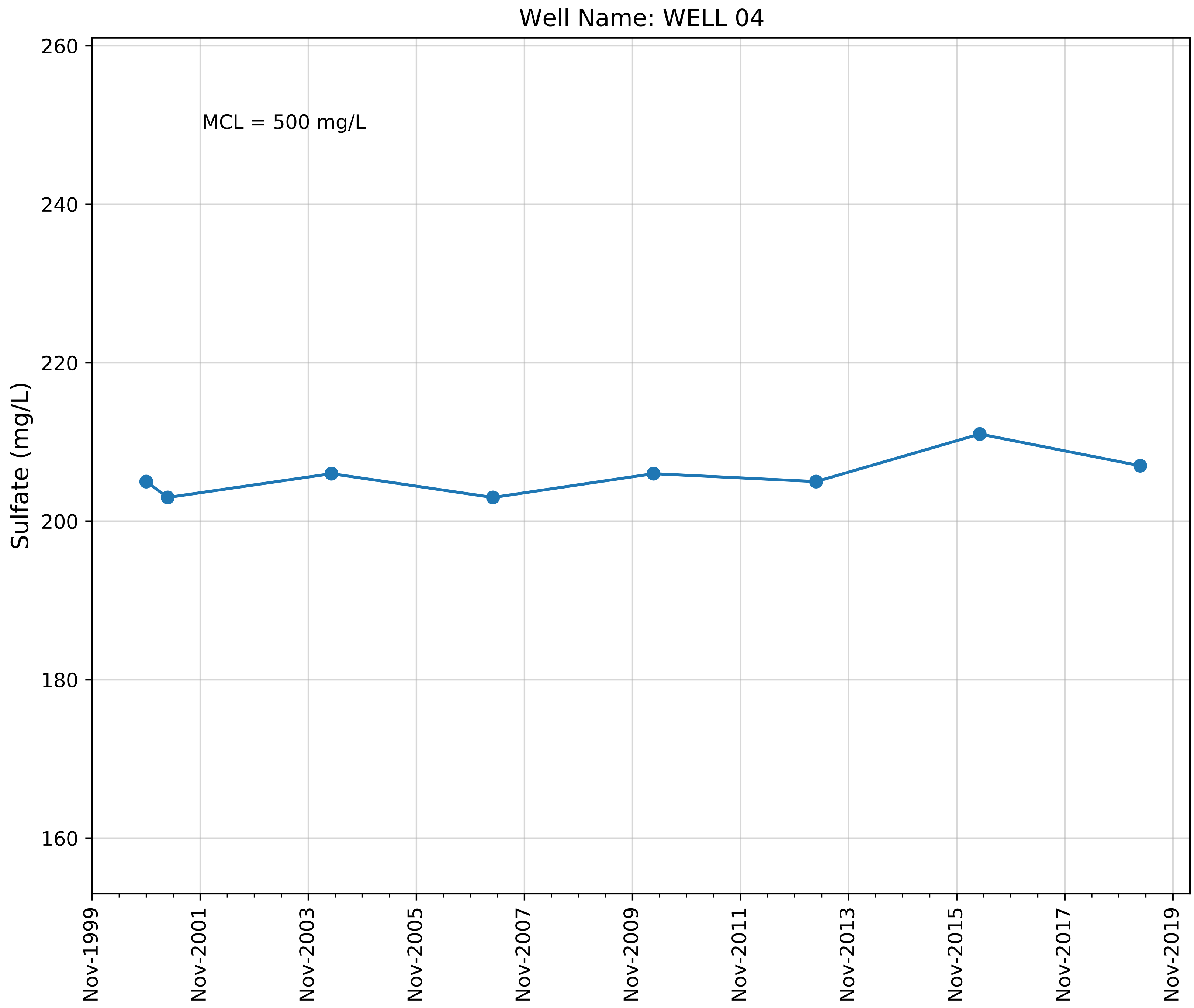


Well Name: MUTUAL WELL 07
MCL = 500 mg/L
Sulfate (mg/L)
200
180
160
140
120
Jul-2019

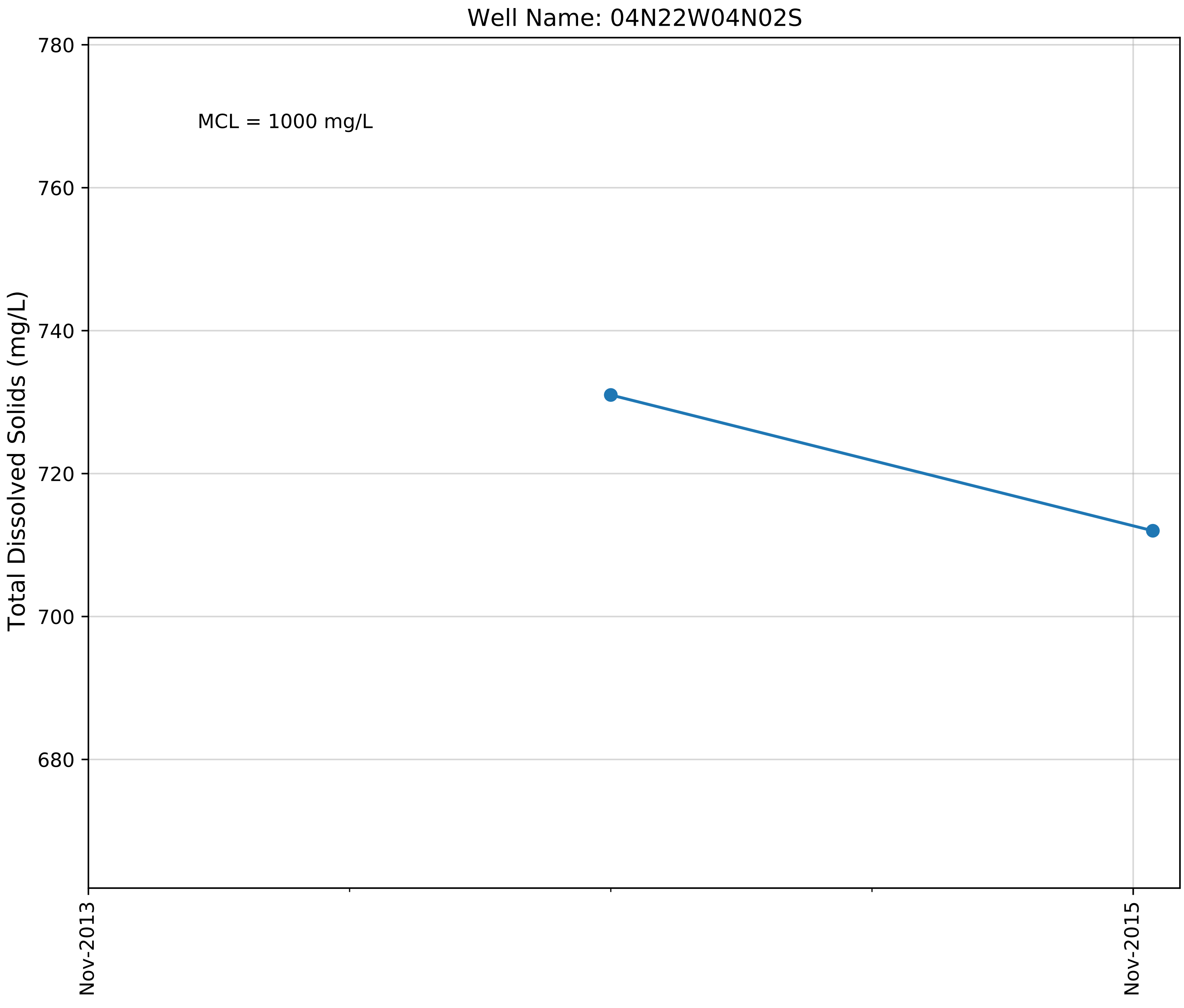


Well Name: SAN ANTONIO WELL 03
MCL = 500 mg/L
Sulfate (mg/L)
300
250
200
150
Feb-1985
Feb-1987
Feb-1989
Feb-1991
Feb-1993
Feb-1995
Feb-1997
Feb-1999
Feb-2001
Feb-2003
Feb-2005
Feb-2007
Feb-2009
Feb-2011
Feb-2013
Feb-2015
Feb-2017
Feb-2019
Feb-2021

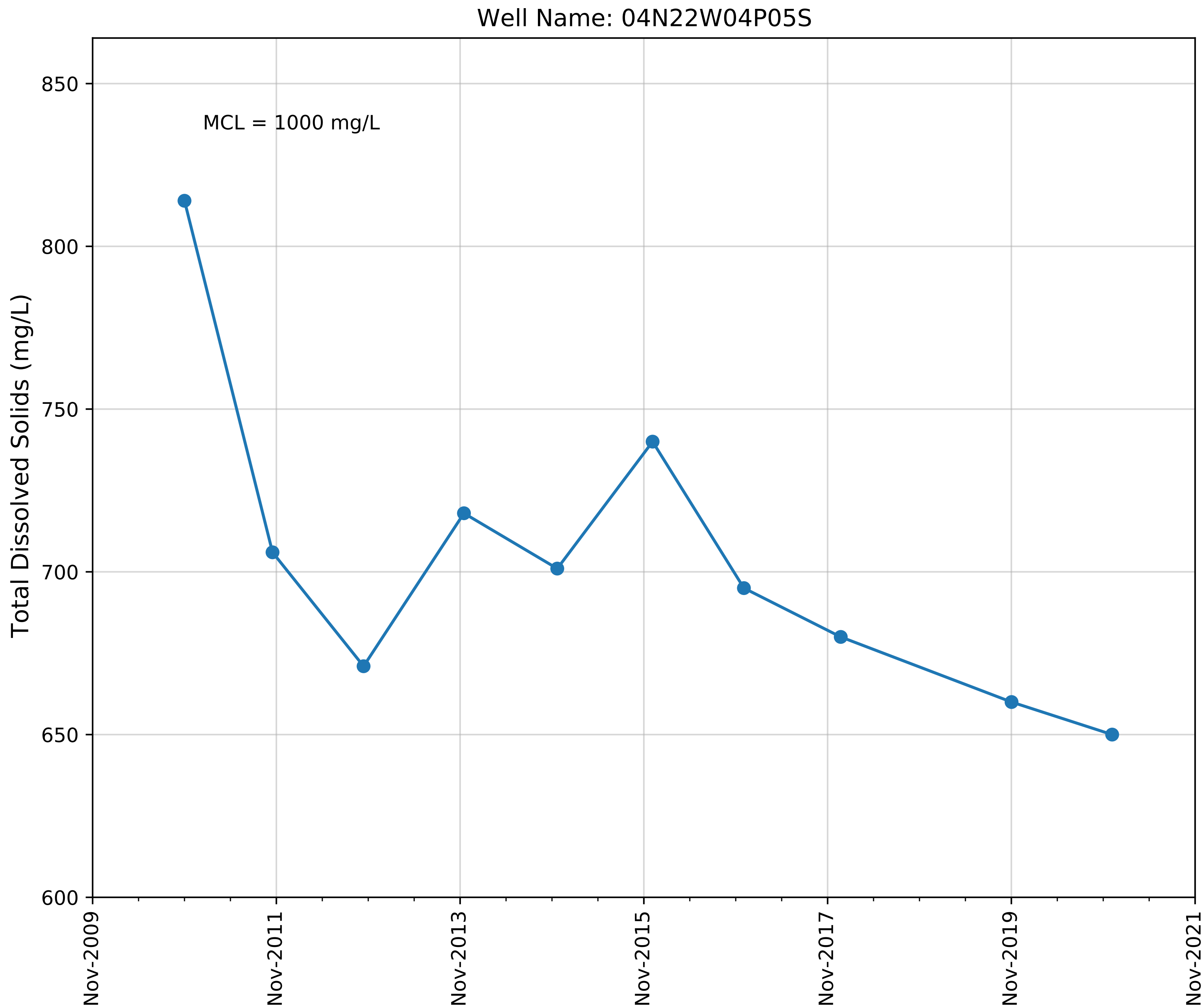

Well Name: SAN ANTONIO WELL 04
MCL = 500 mg/L
Sulfate (mg/L)
300
280
260
240
220
200
180
160
Mar-2004
Apr-2006
Mar-2008
Apr-2010
Mar-2012
Apr-2014
Mar-2016
Apr-2018
Mar-2020

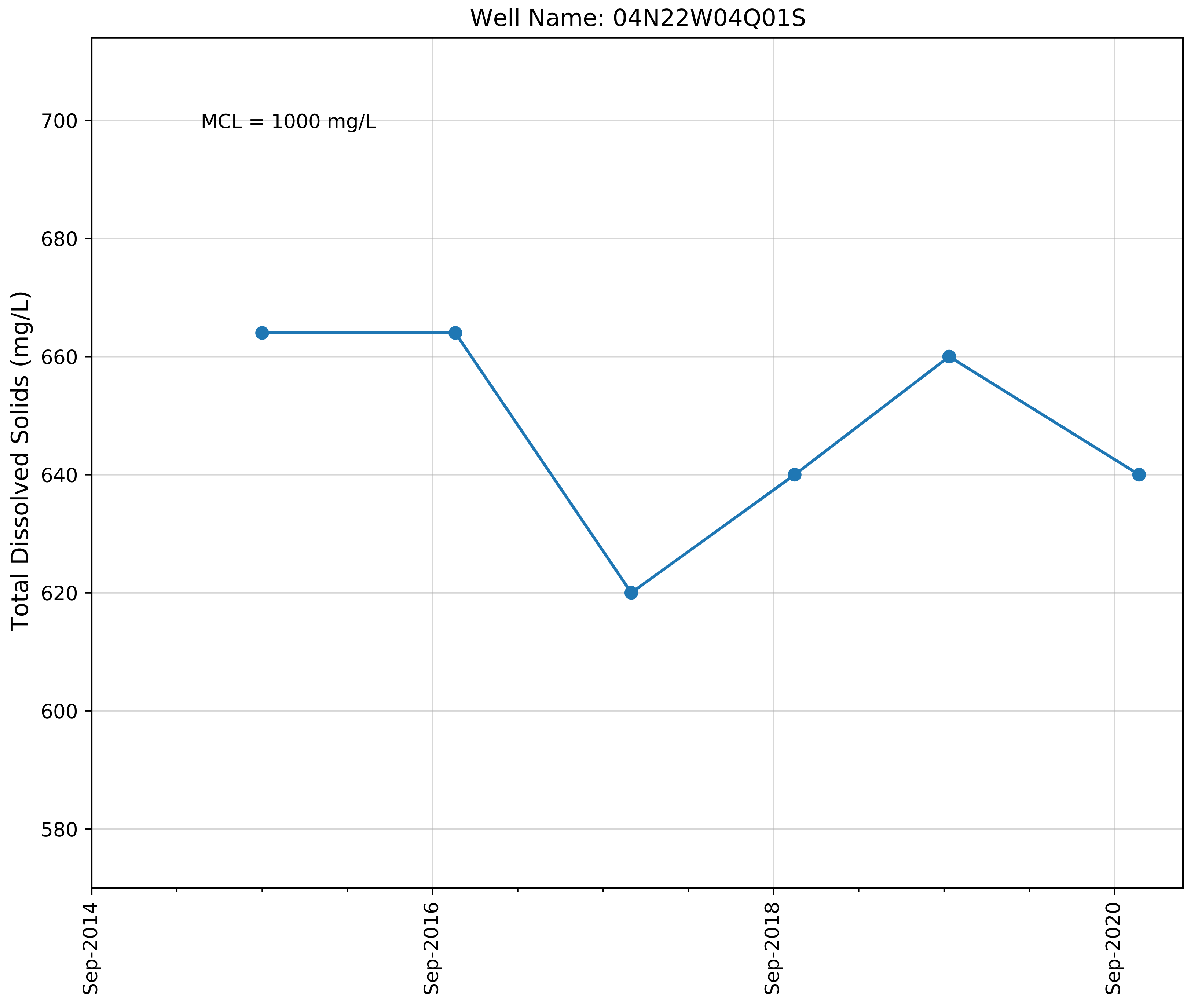


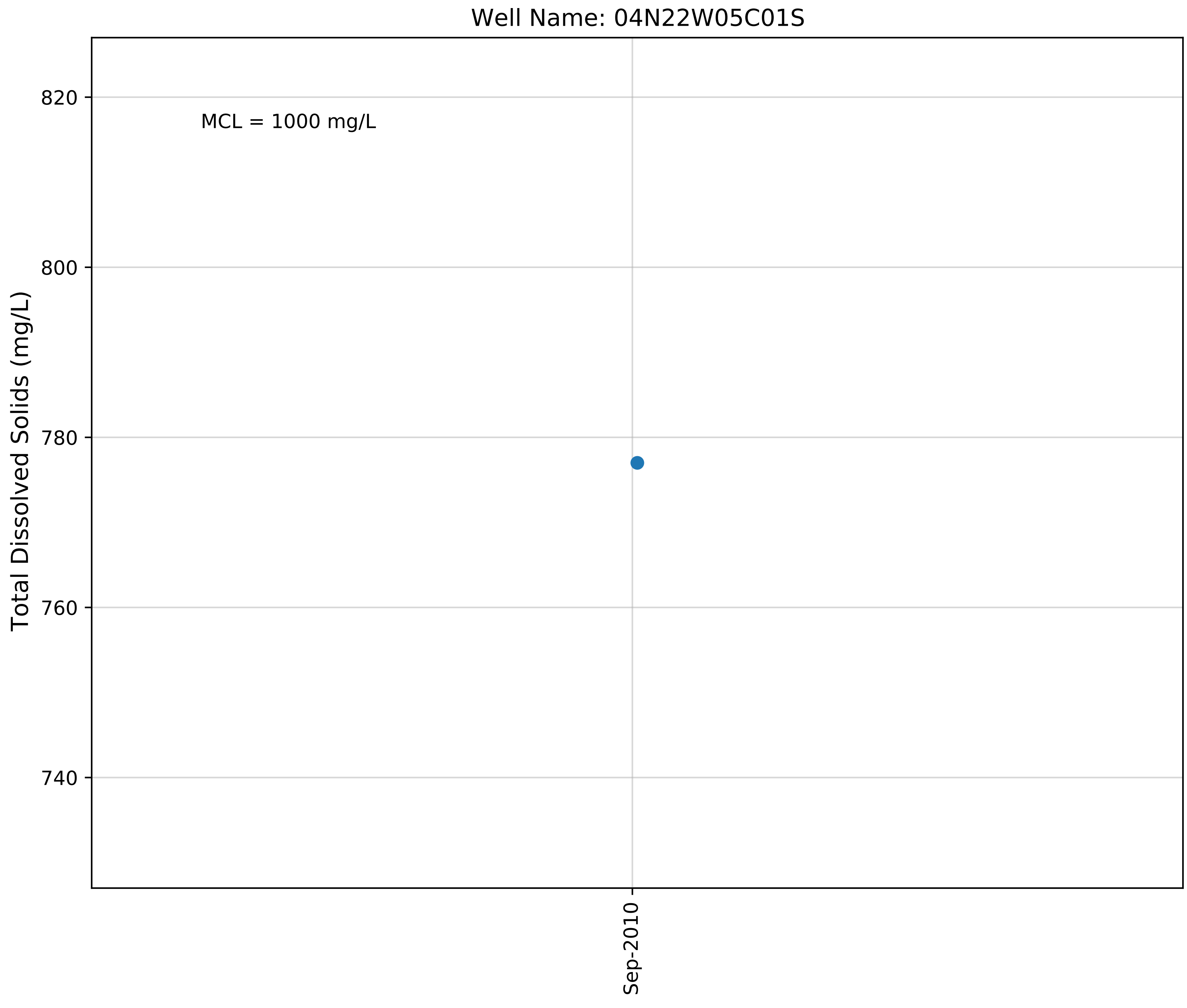
Well Name: WELL 04
MCL = 500 mg/L
Sulfate (mg/L)
260
240
220
200
180
160
Nov-1999
Nov-2001
Nov-2003
Nov-2005
Nov-2007
Nov-2009
Nov-2011
Nov-2013
Nov-2015
Nov-2017
Nov-2019



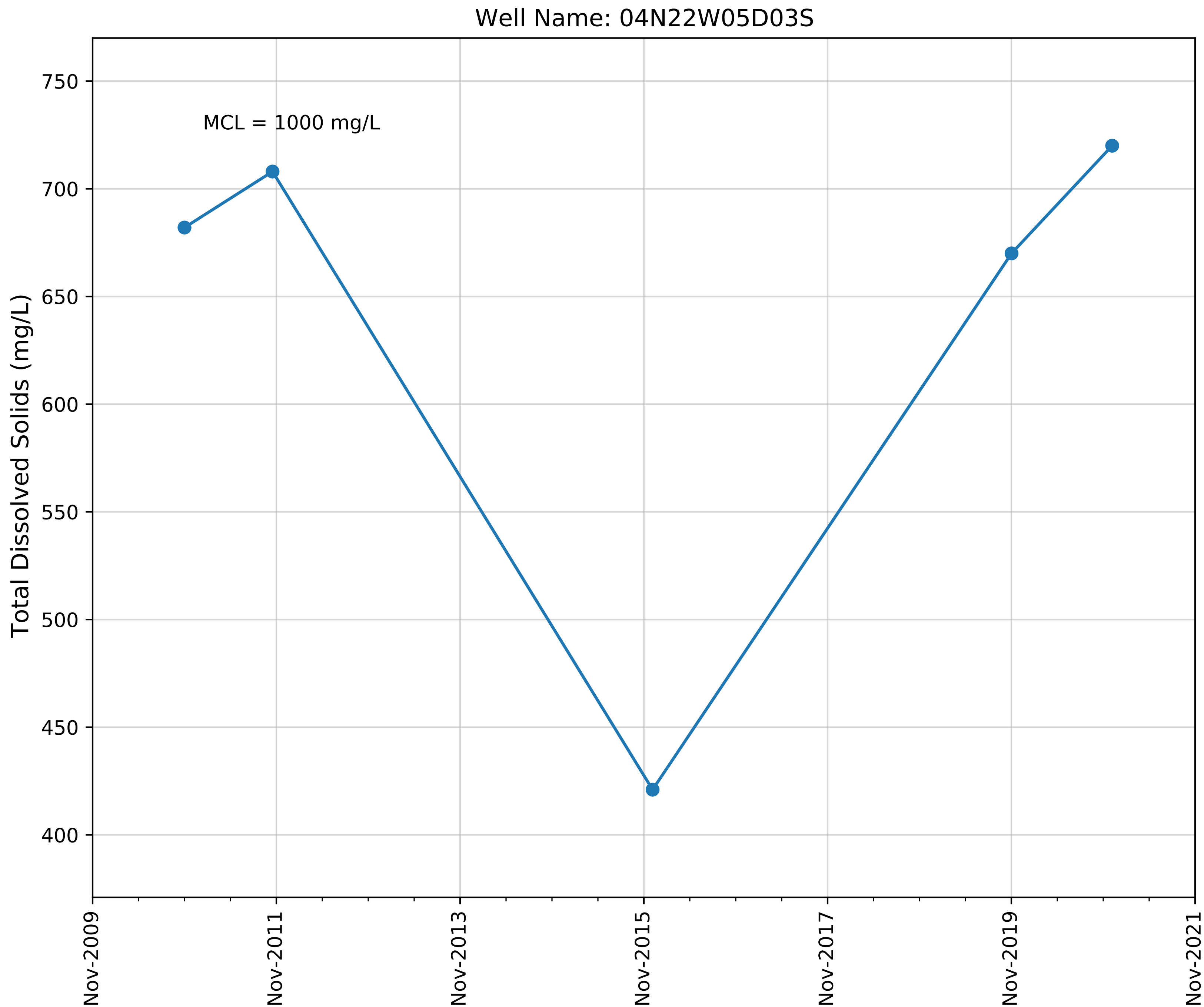
Well Name: 04N22W04N02S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
780
760
740
720
700
680
Nov-2013
Nov-2015

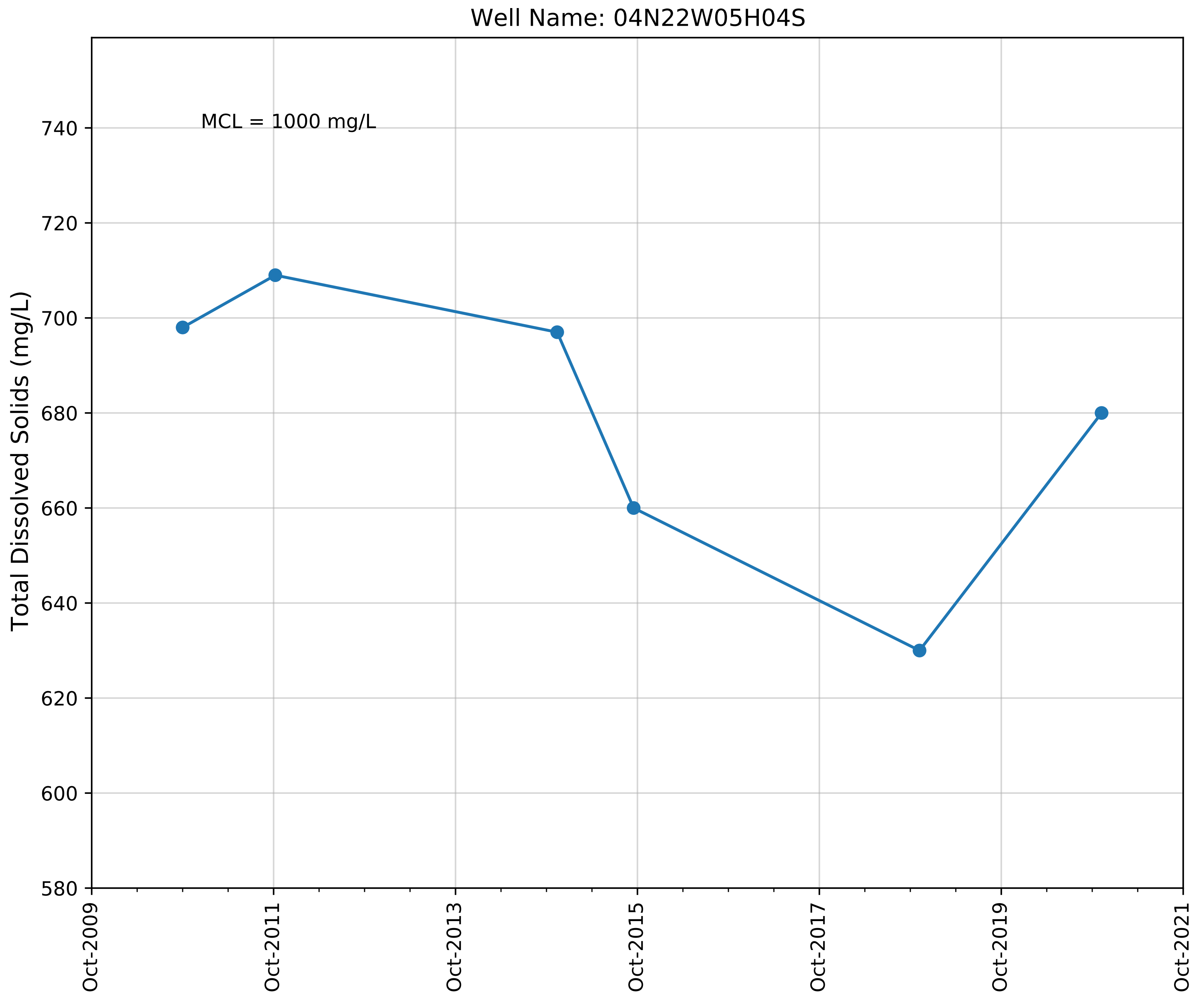

Well Name: 04N22W04P05S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
850
800
750
700
650
600
Nov-2009
Nov-2011
Nov-2013
Nov-2015
Nov-2017
Nov-2019
Nov-2021


Well Name: 04N22W04Q01S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
700
680
660
640
620
600
580
Sep-2014
Sep-2016
Sep-2018
Sep-2020

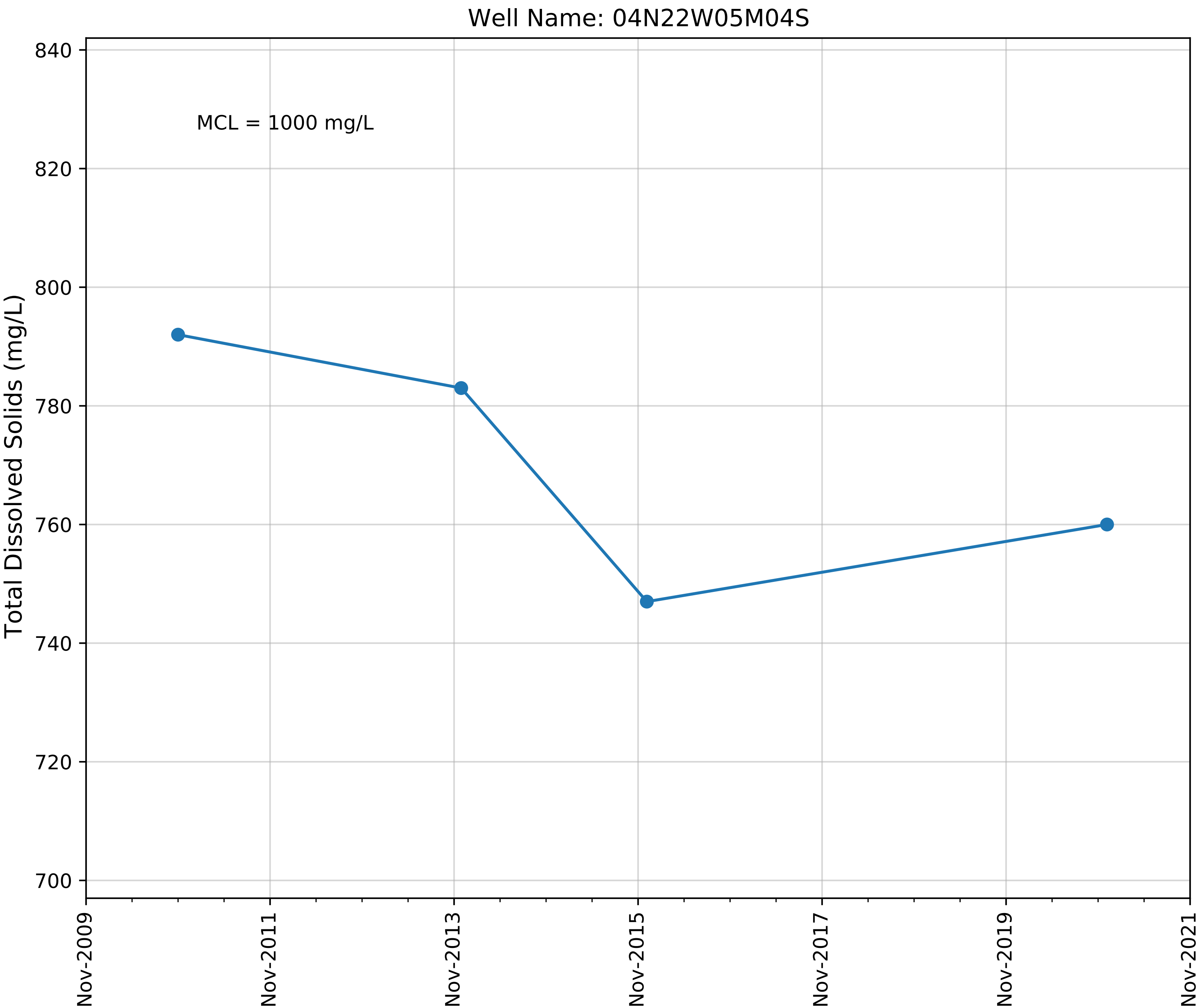


Well Name: 04N22W05C01S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
820
800
780
760
740
Sep-2010

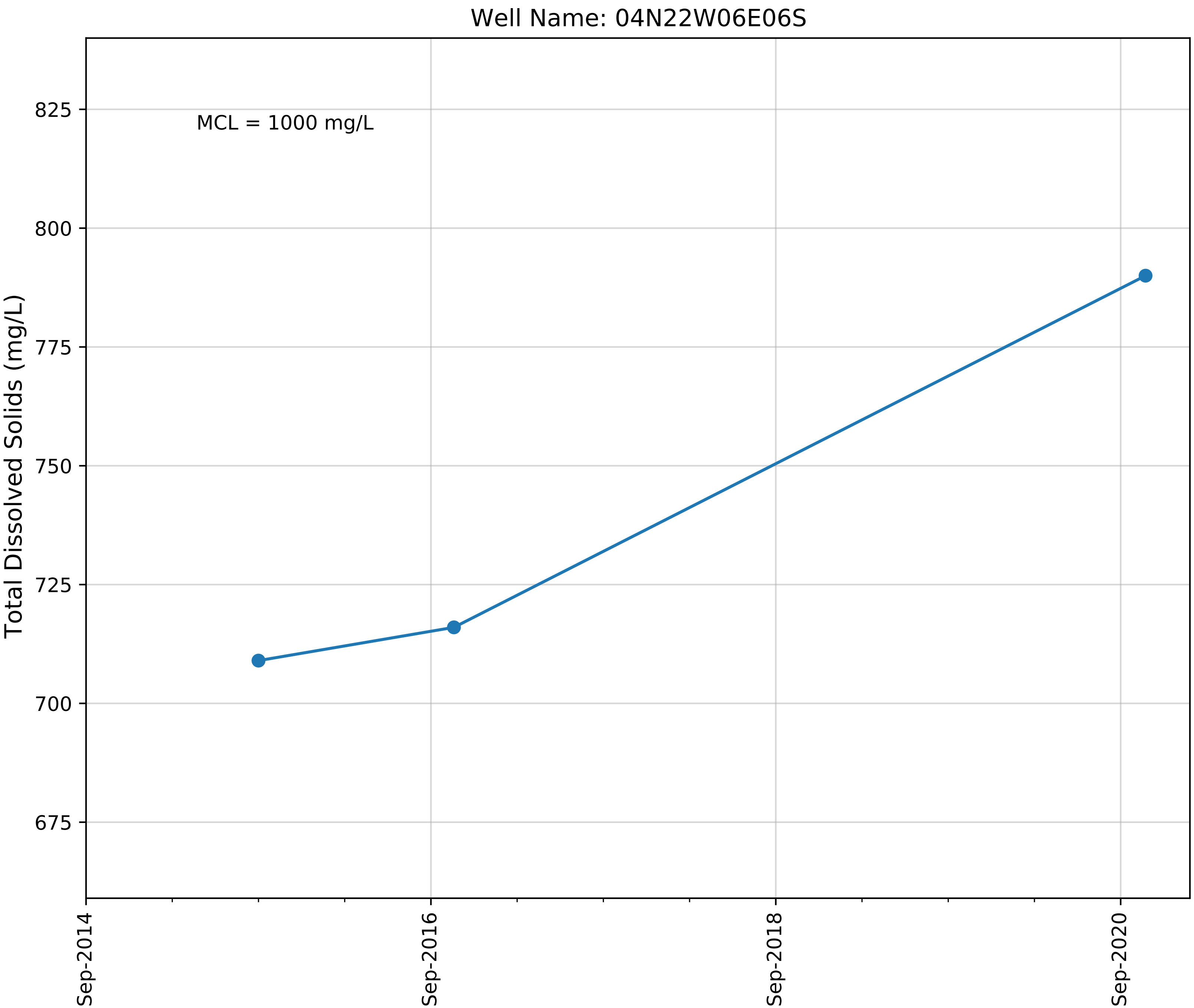

Well Name: 04N22W05D03S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
750
700
650
600
550
500
450
400
Nov-2009
Nov-2011
Nov-2013
Nov-2015
Nov-2017
Nov-2019
Nov-2021

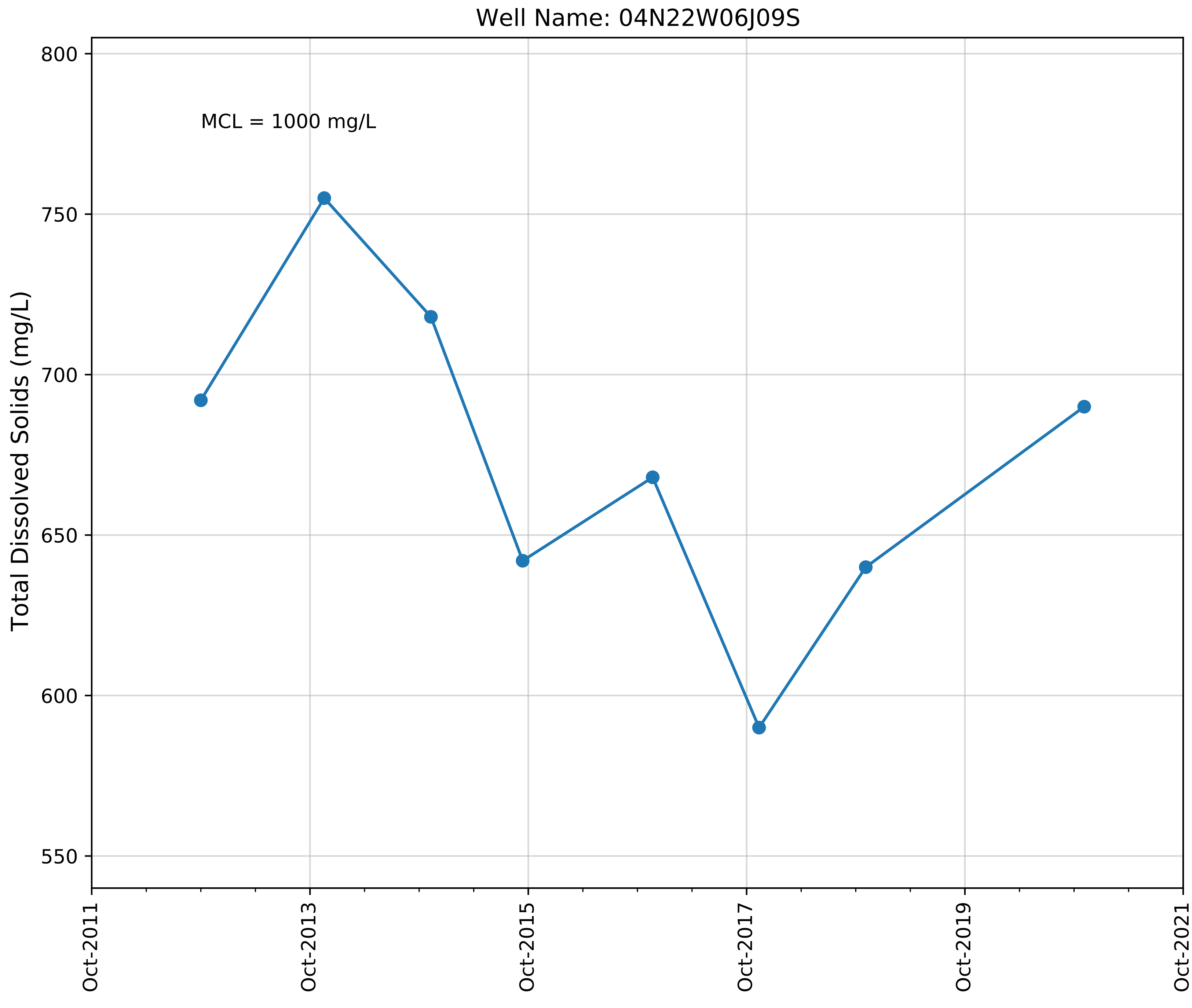


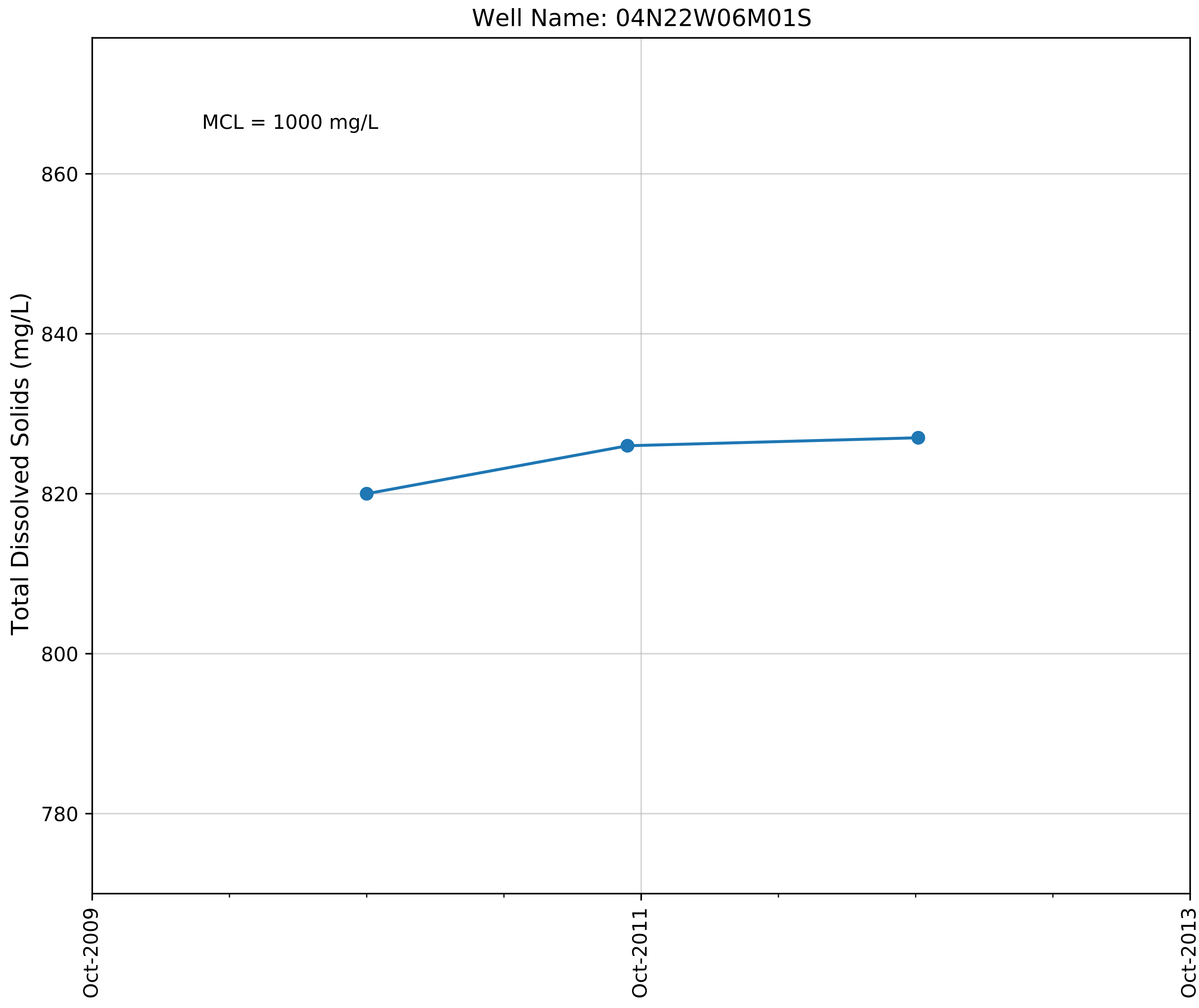
Well Name: 04N22W05H04S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
740
720
700
680
660
640
620
600
580
Oct-2009
Oct-2011
Oct-2013
Oct-2015
Oct-2017
Oct-2019
Oct-2021



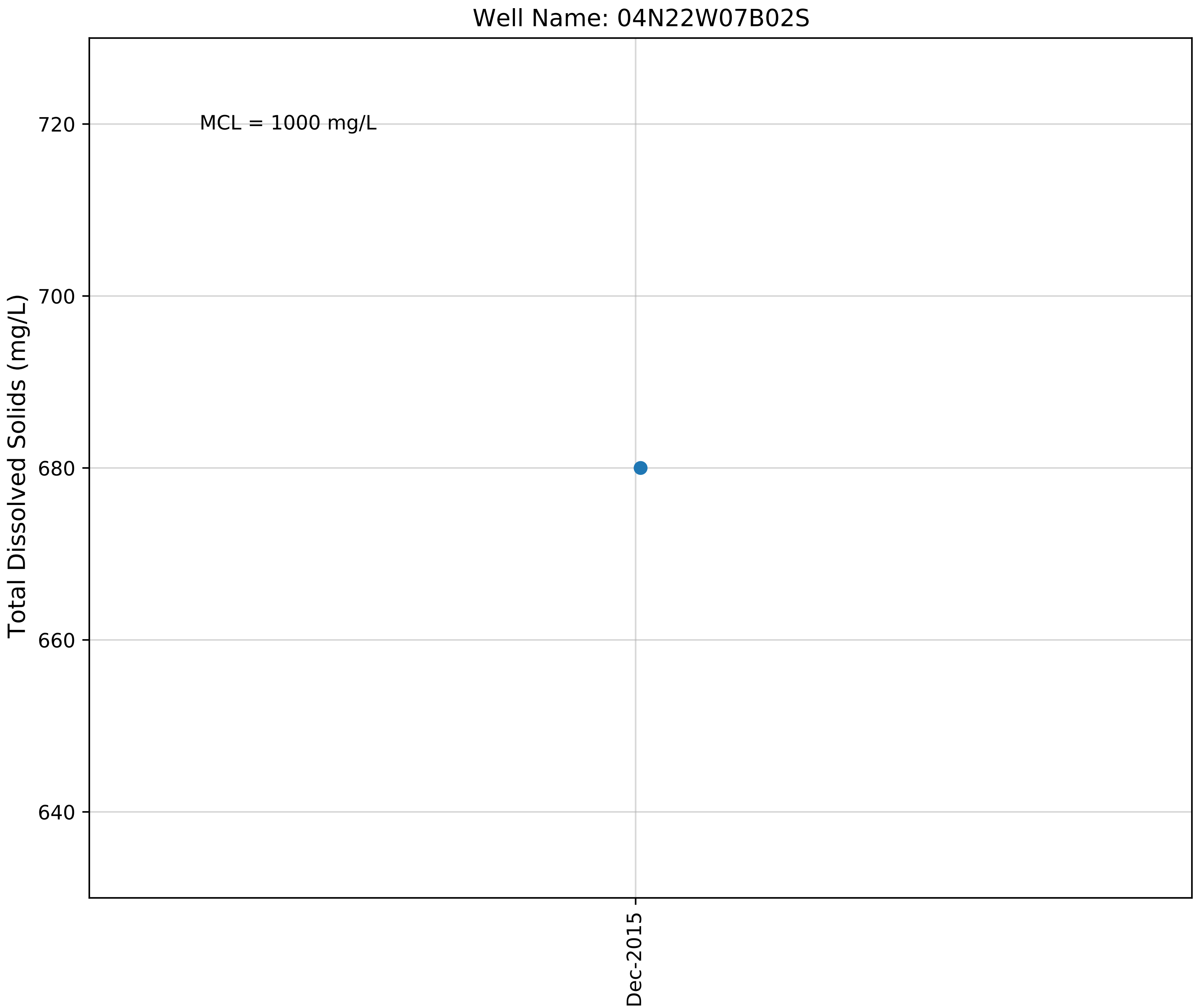
Well Name: 04N22W05M04S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
840
820
800
780
760
740
720
700
Nov-2009
Nov-2011
Nov-2013
Nov-2015
Nov-2017
Nov-2019
Nov-2021

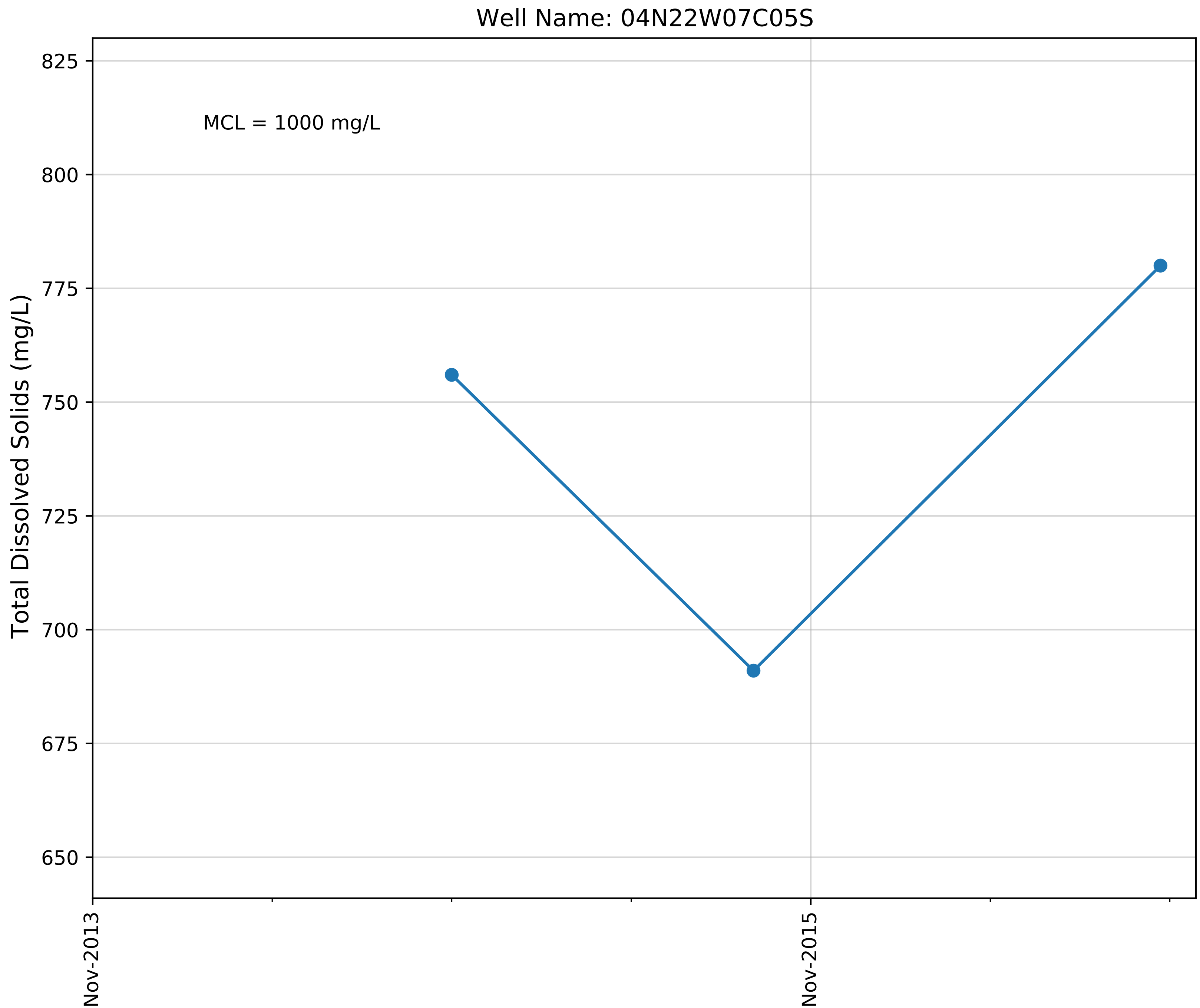

Well Name: 04N22W06E06S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
825
800
775
750
725
700
675
Sep-2014
Sep-2016
Sep-2018
Sep-2020

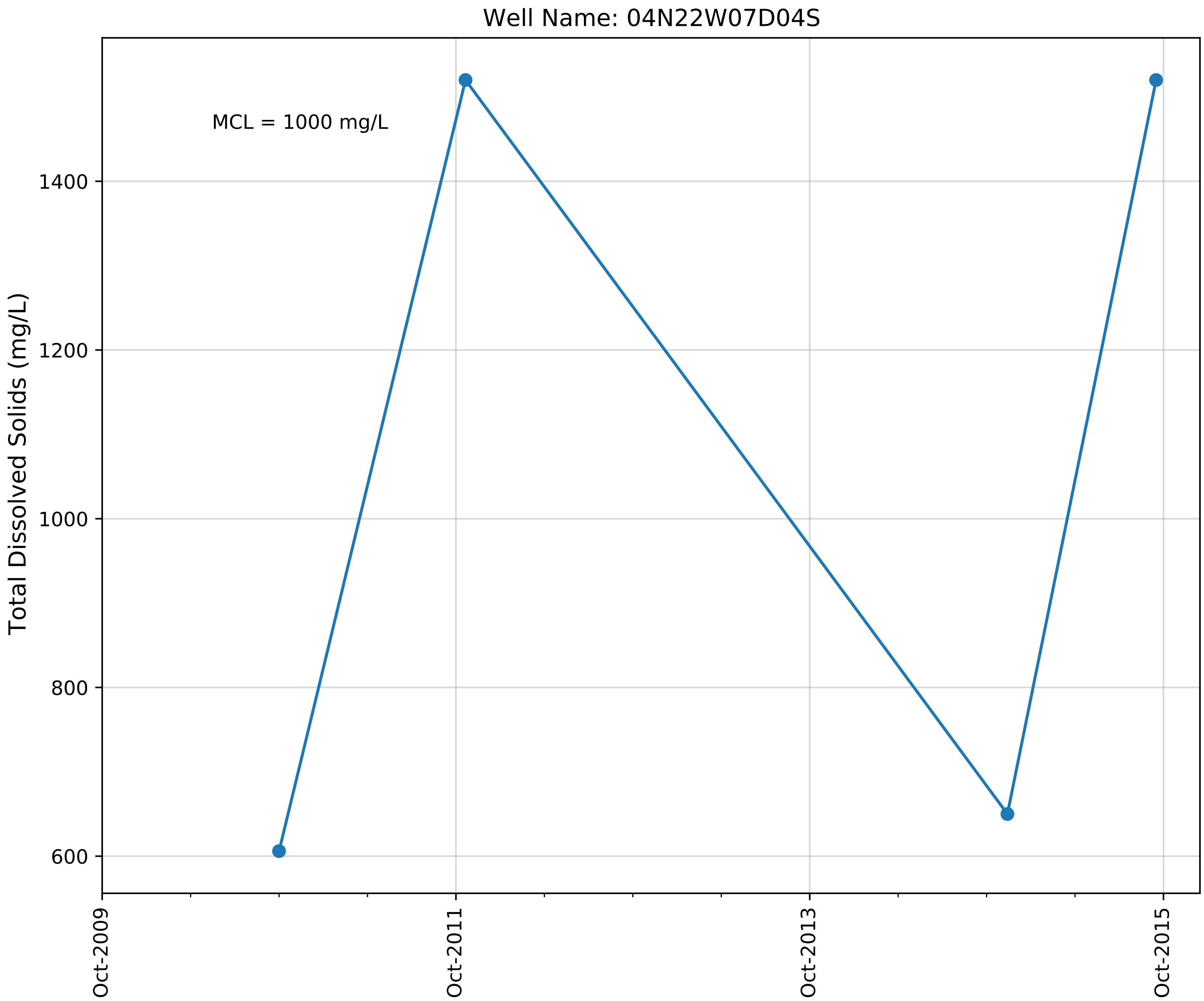

Well Name: 04N22W06J09S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
800
750
700
650
600
550
Oct-2011
Oct-2013
Oct-2015
Oct-2017
Oct-2019
Oct-2021

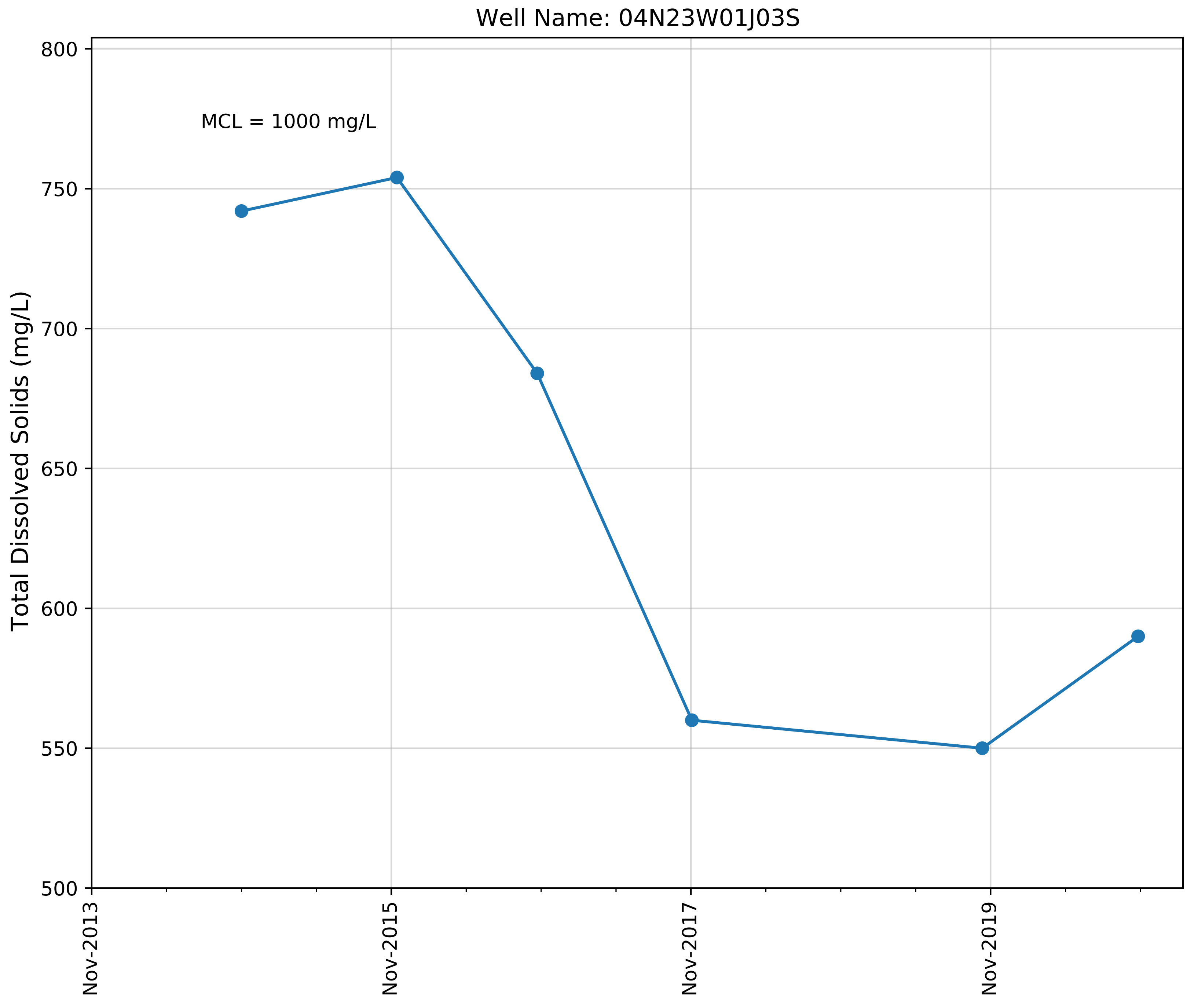


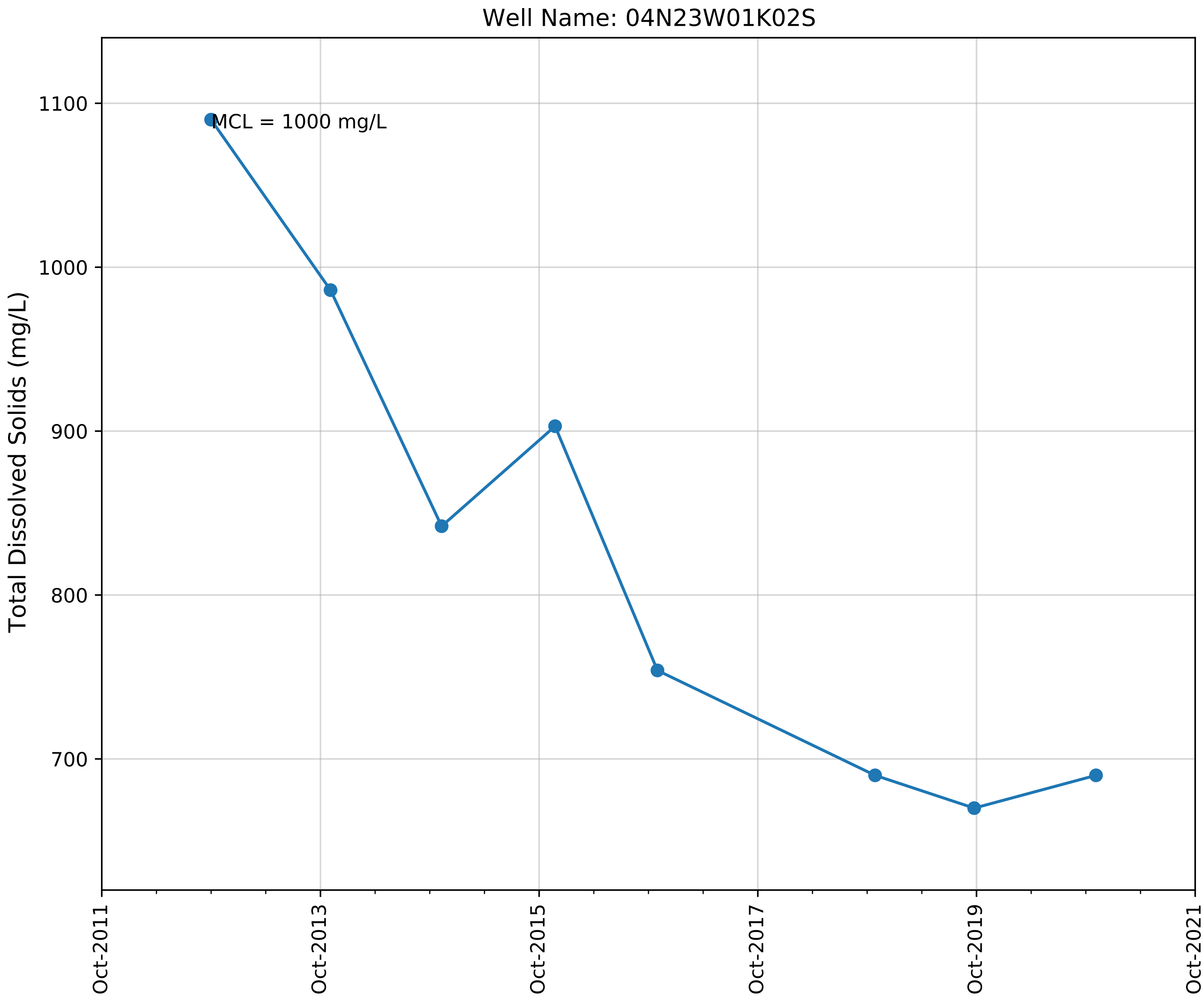
Well Name: 04N22W06M01S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
860
840
820
800
780
Oct-2009
Oct-2011
Oct-2013

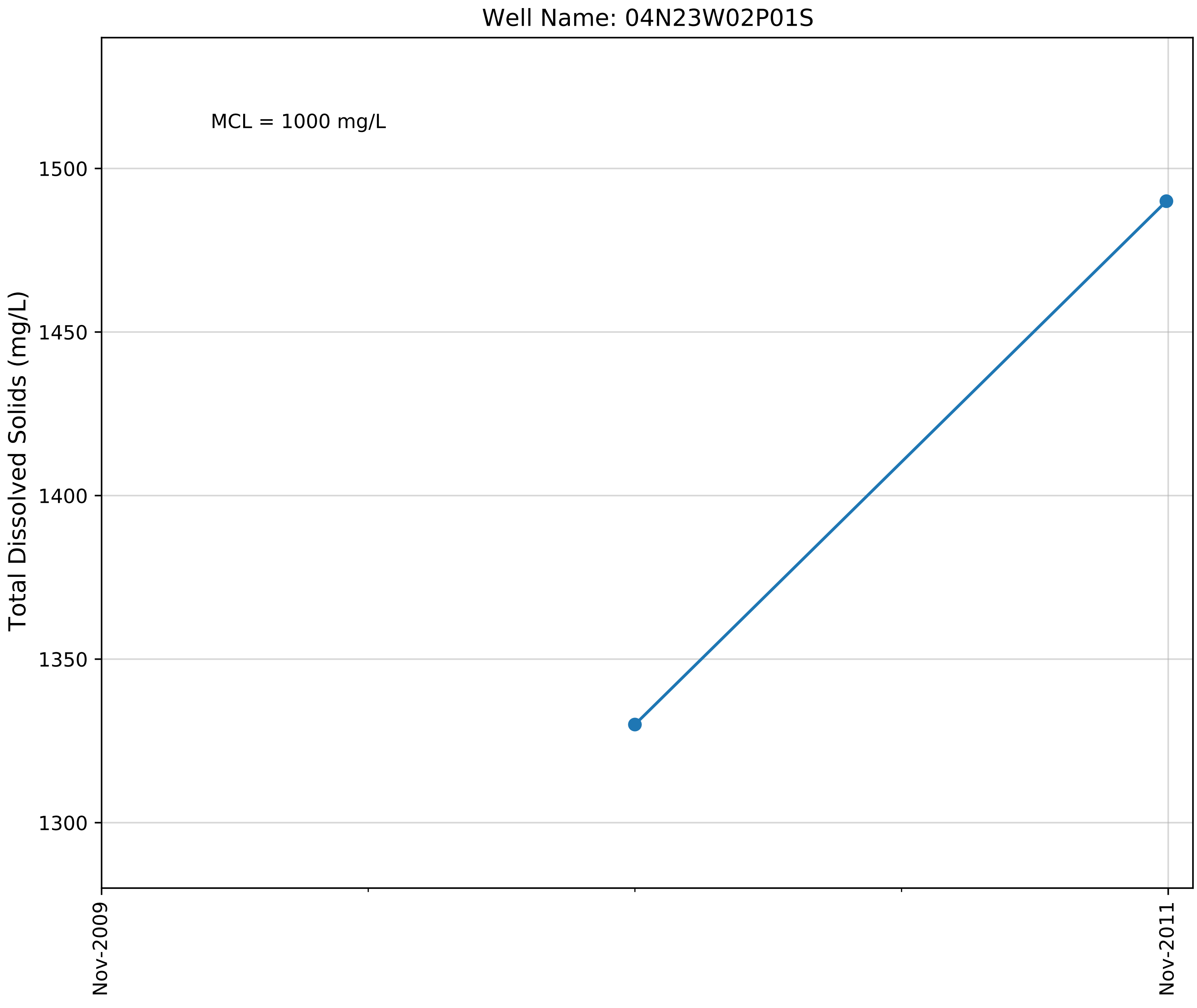

Well Name: 04N22W07B02S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
720
700
680
660
640
Dec-2015

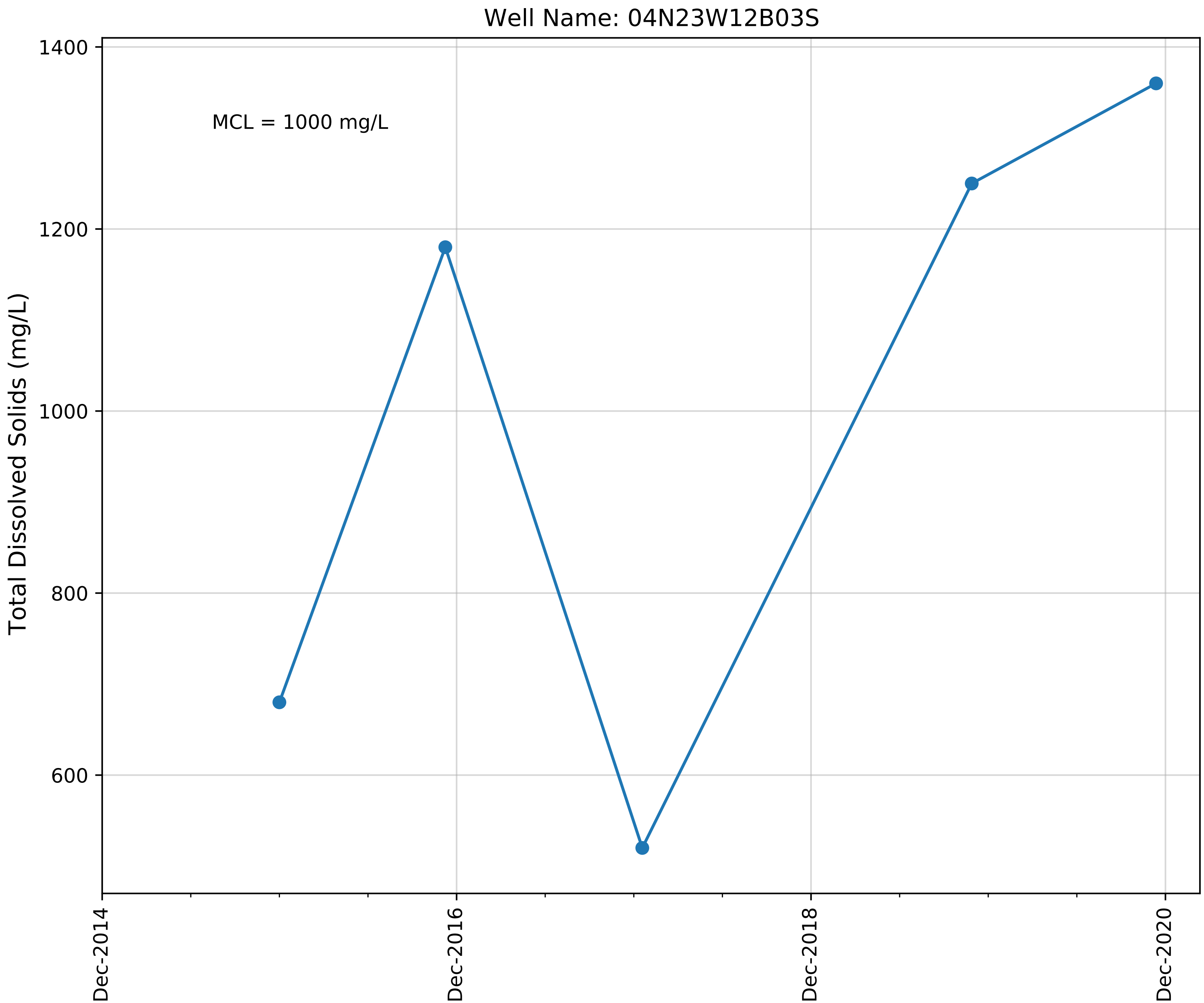

Well Name: 04N22W07C05S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
825
800
775
750
725
700
675
650
Nov-2013
Nov-2015


Well Name: 04N22W07D04S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
1400
1200
1000
800
600
Oct-2009
Oct-2011
Oct-2013
Oct-2015

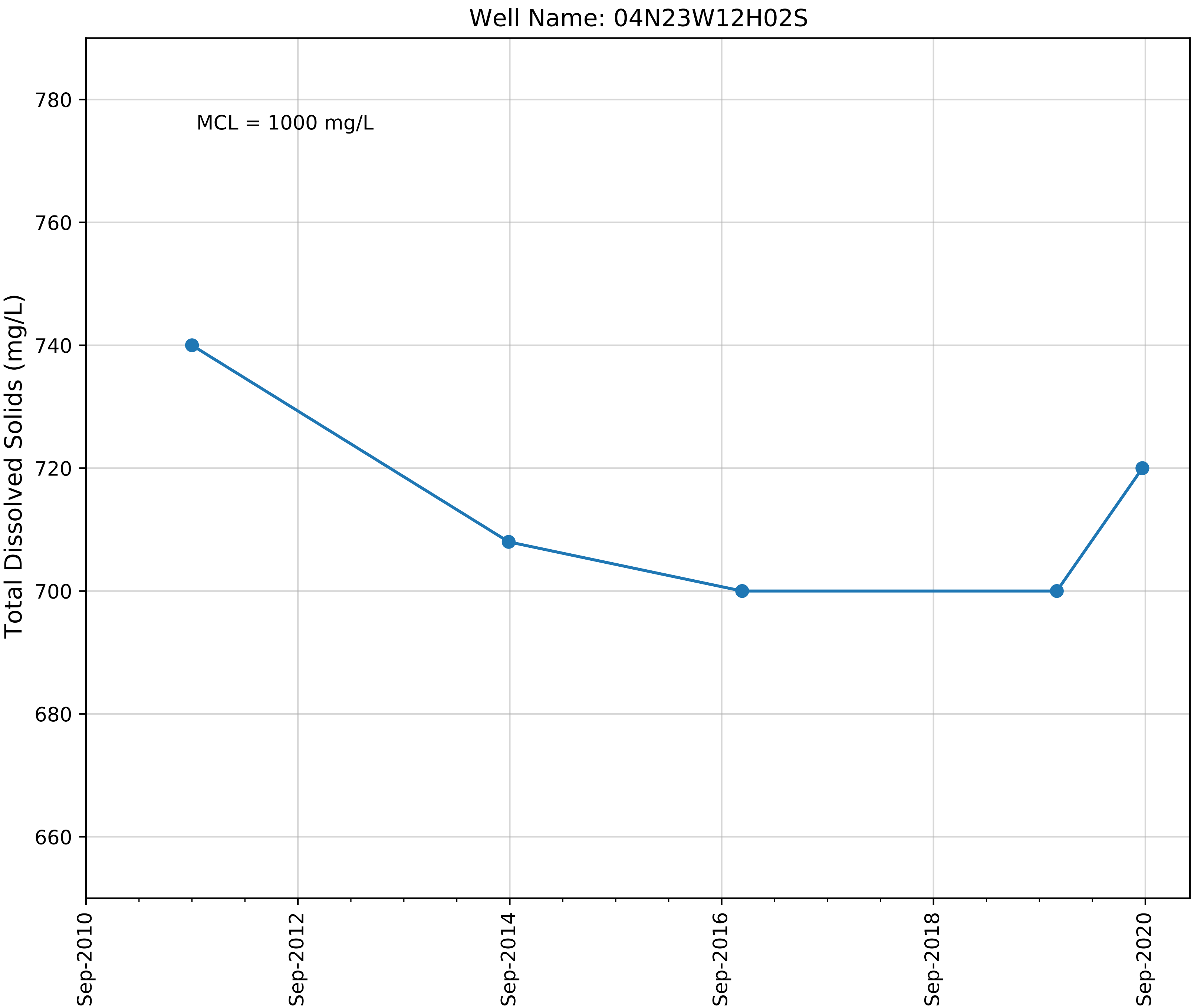

Well Name: 04N23W01J03S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
800
750
700
650
600
550
500
Nov-2013
Nov-2015
Nov-2017
Nov-2019

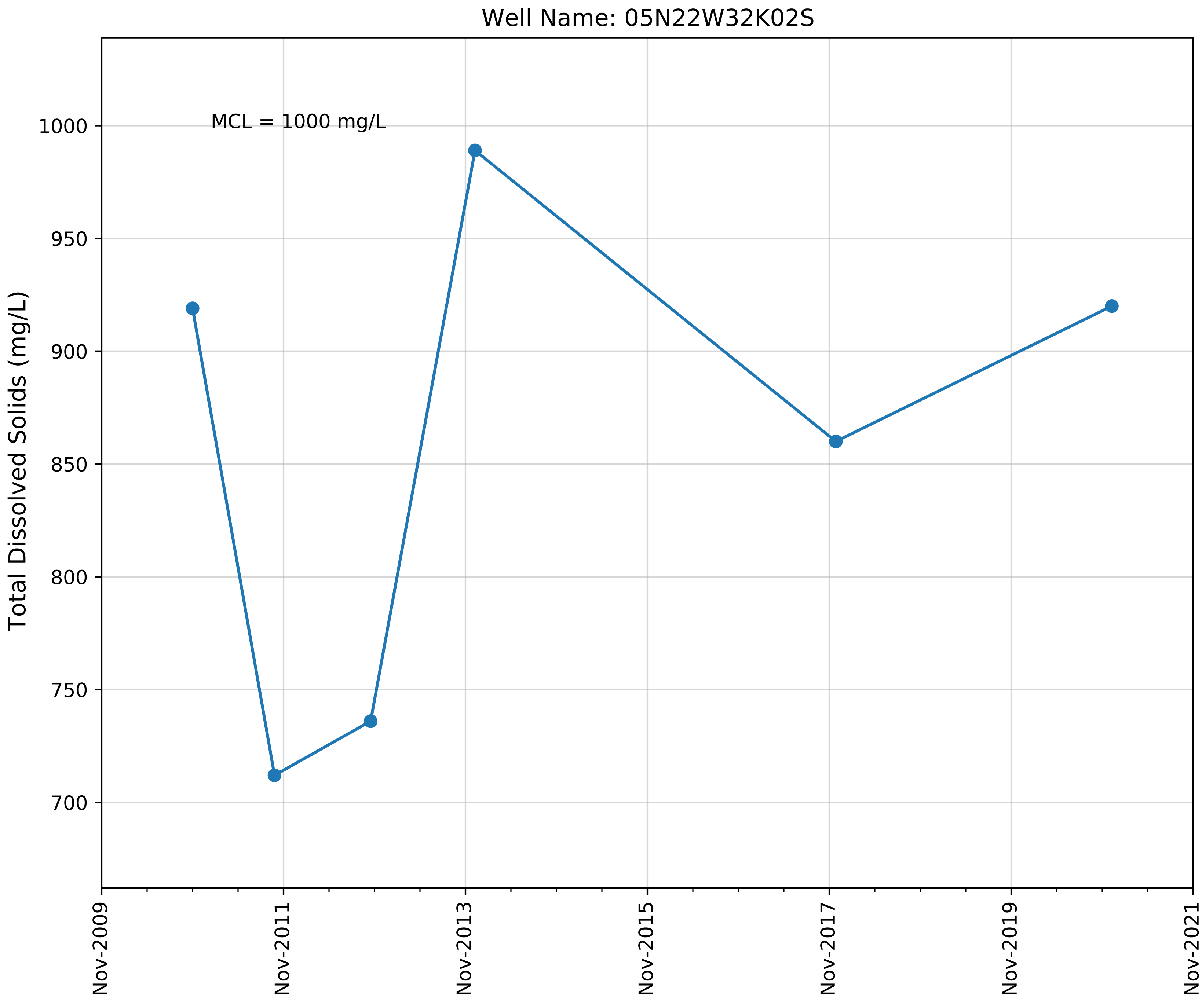

Well Name: 04N23W01K02S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
1100
1000
900
800
700
Oct-2011
Oct-2013
Oct-2015
Oct-2017
Oct-2019
Oct-2021


Well Name: 04N23W02P01S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
1500
1450
1400
1350
1300
Nov-2009
Nov-2011

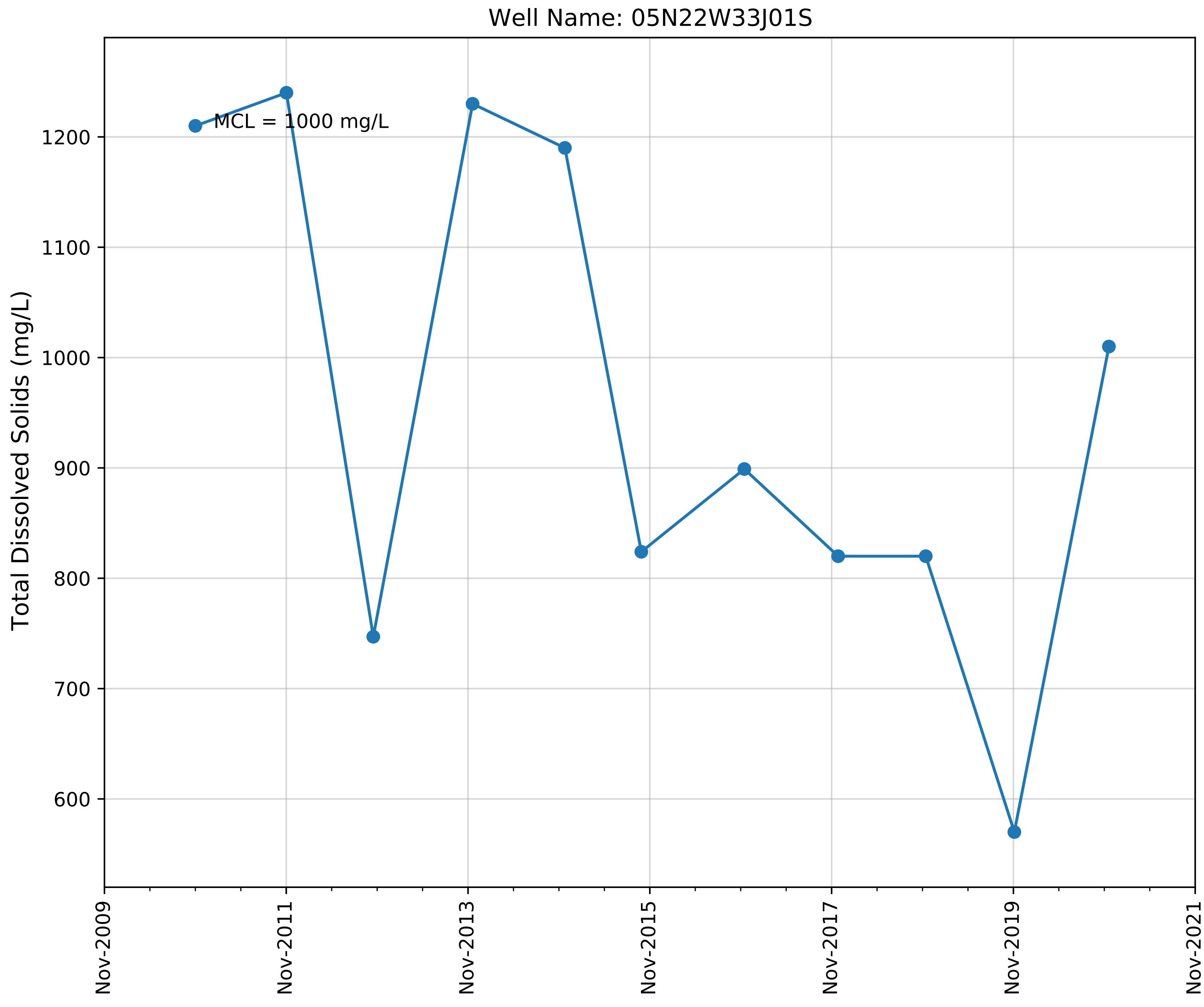


Well Name: 04N23W12B03S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
1400
1200
1000
800
600
Dec-2014
Dec-2016
Dec-2018
Dec-2020

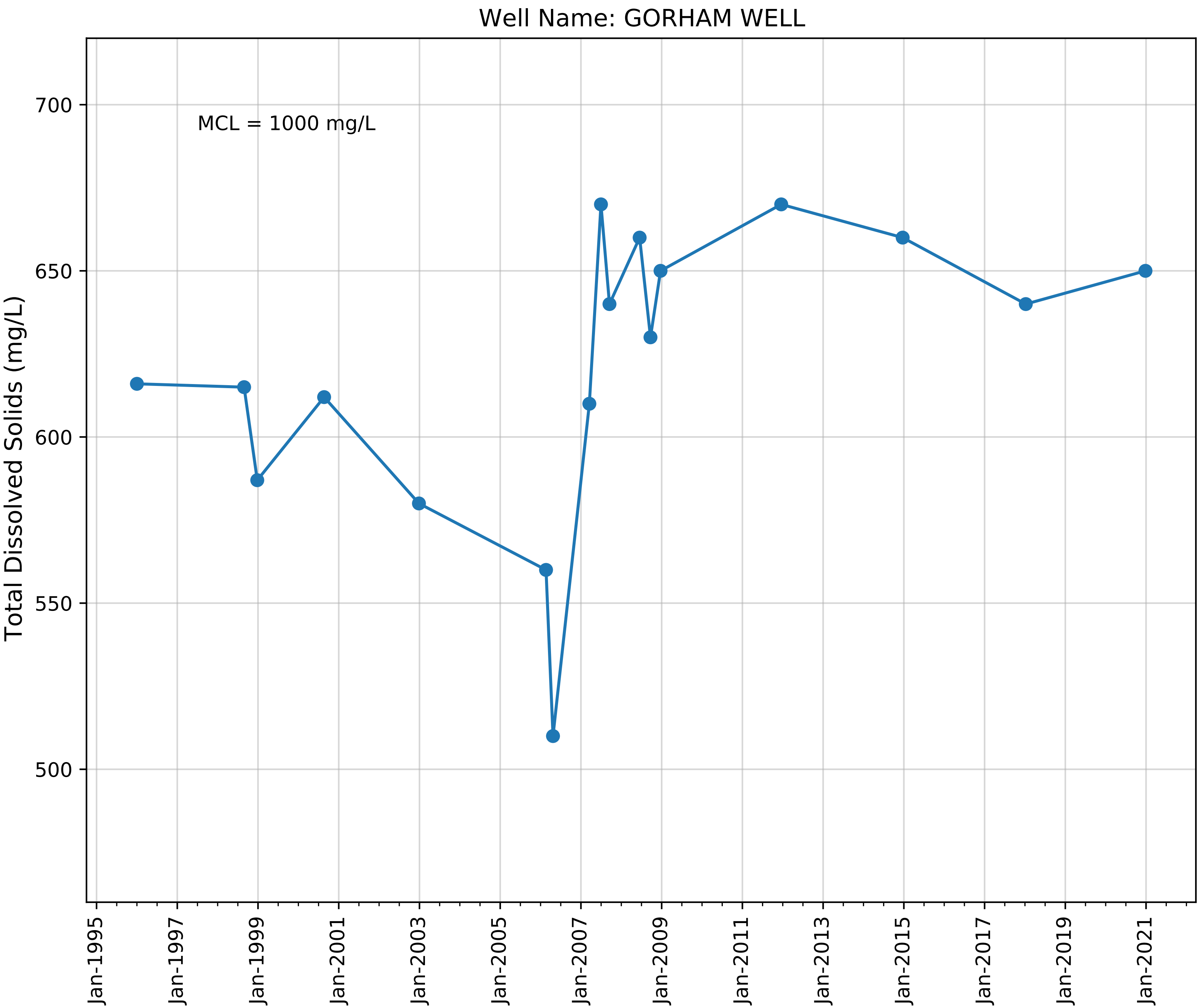

Well Name: 04N23W12H02S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
780
760
740
720
700
680
660
Sep-2010
Sep-2012
Sep-2014
Sep-2016
Sep-2018
Sep-2020

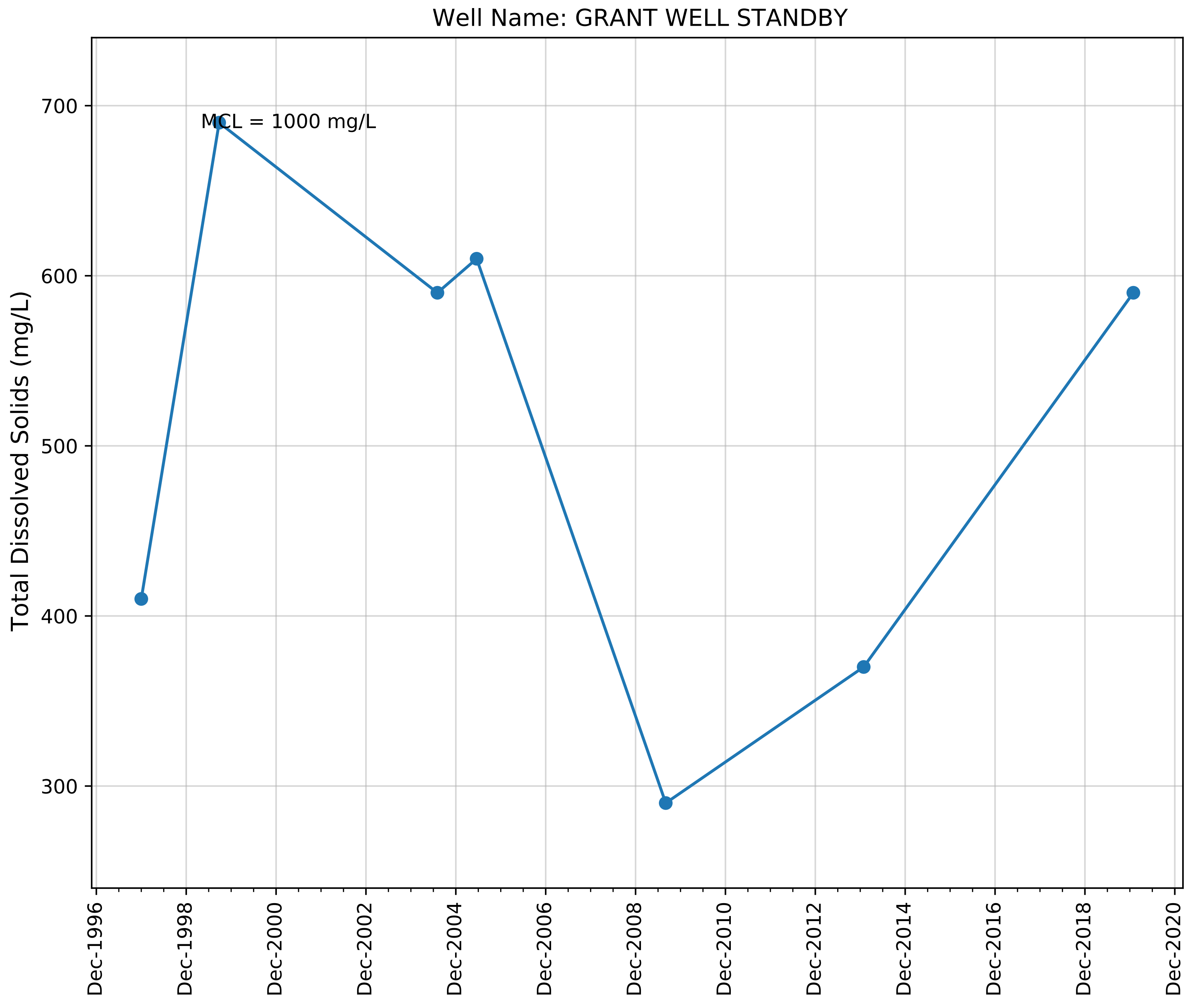


Well Name: 05N22W32K02S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
1000
950
900
850
800
750
700
Nov-2009
Nov-2011
Nov-2013
Nov-2015
Nov-2017
Nov-2019
Nov-2021

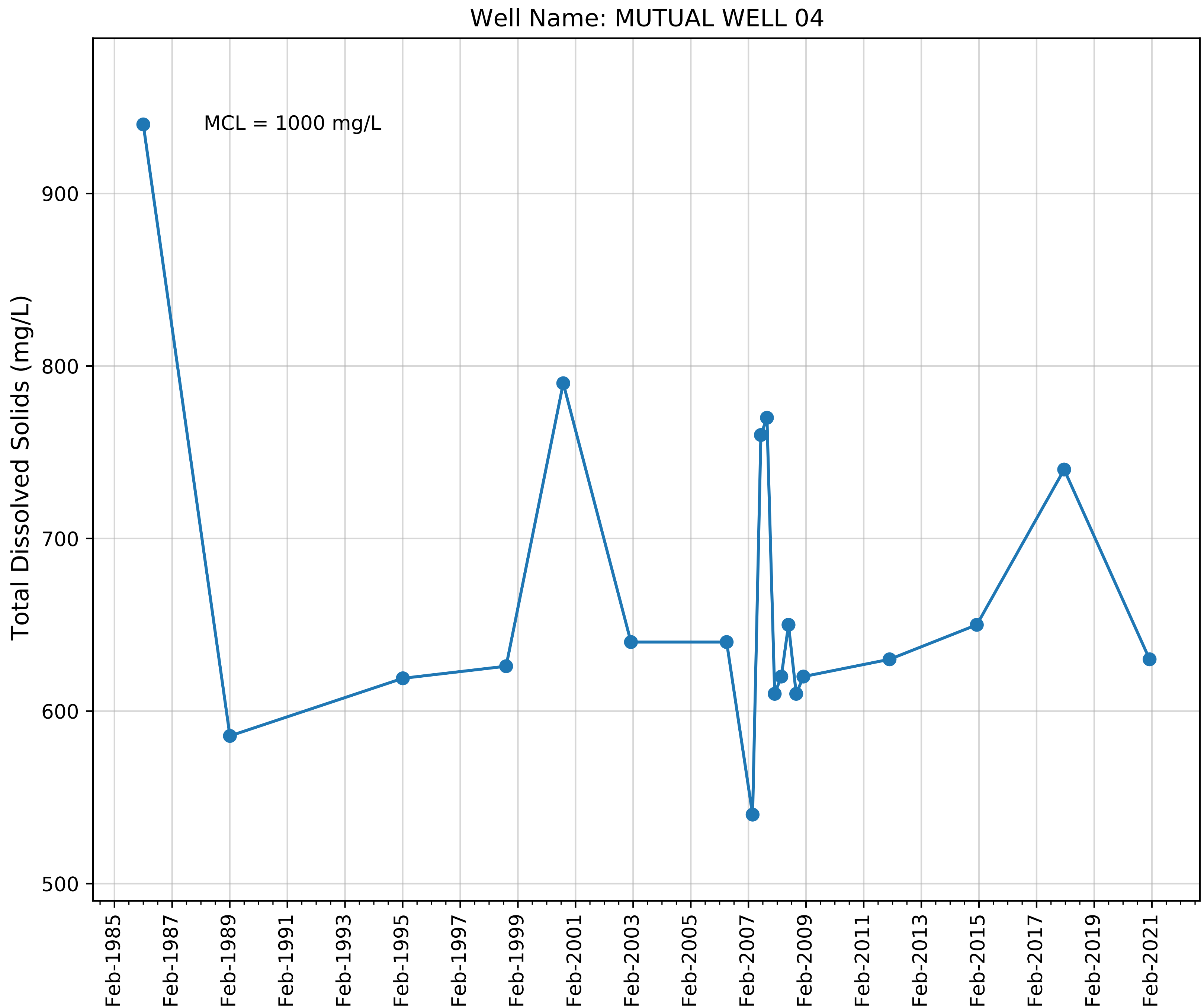


Well Name: 05N22W33J01S
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
1200
1100
1000
900
800
700
600
Nov-2009
Nov-2011
Nov-2013
Nov-2015
Nov-2017
Nov-2019
Nov-2021

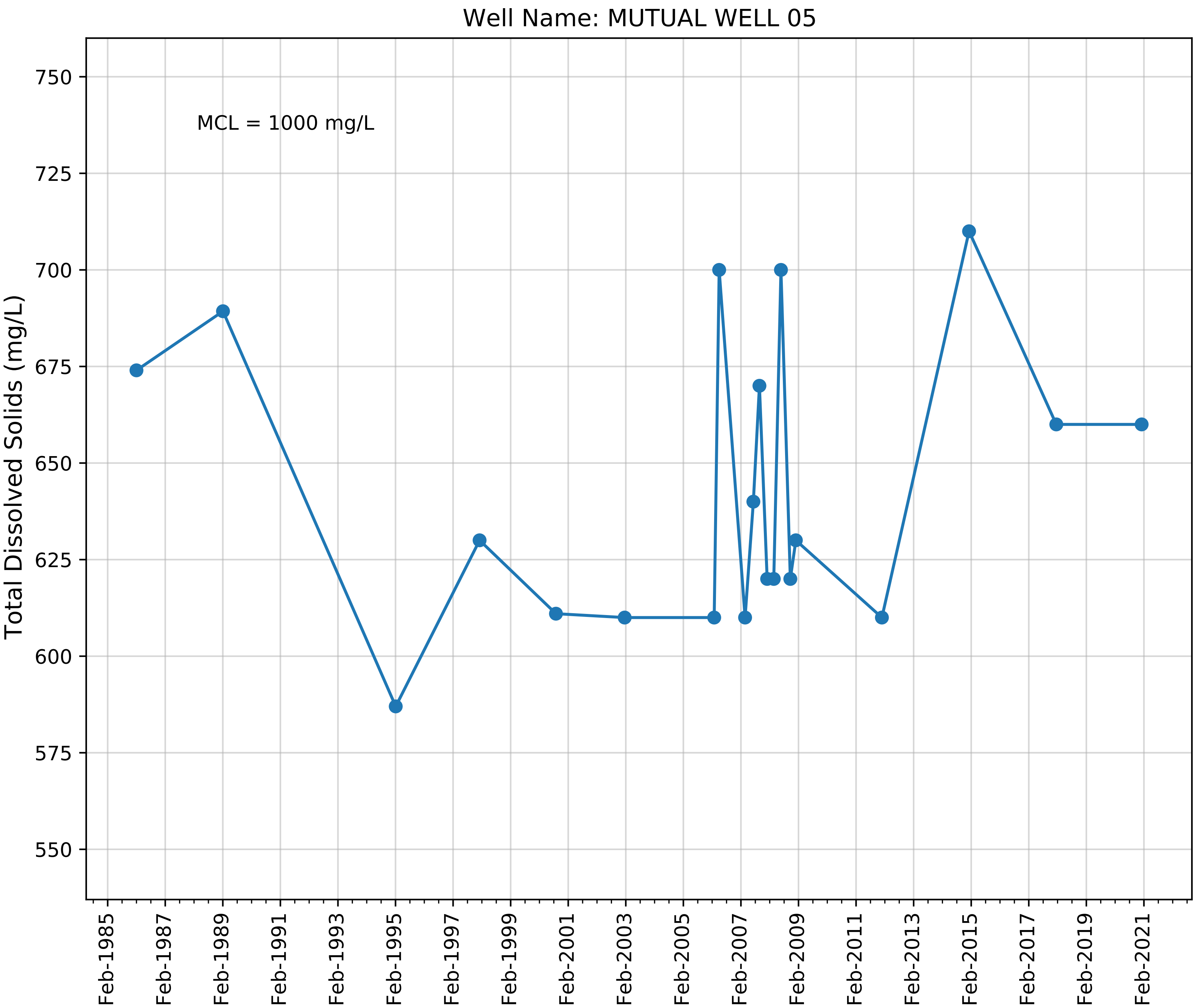

Well Name: GORHAM WELL
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
700
650
600
550
500
Jan-1995
Jan-1997
Jan-1999
Jan-2001
Jan-2003
Jan-2005
Jan-2007
Jan-2009
Jan-2011
Jan-2013
Jan-2015
Jan-2017
Jan-2019
Jan-2021



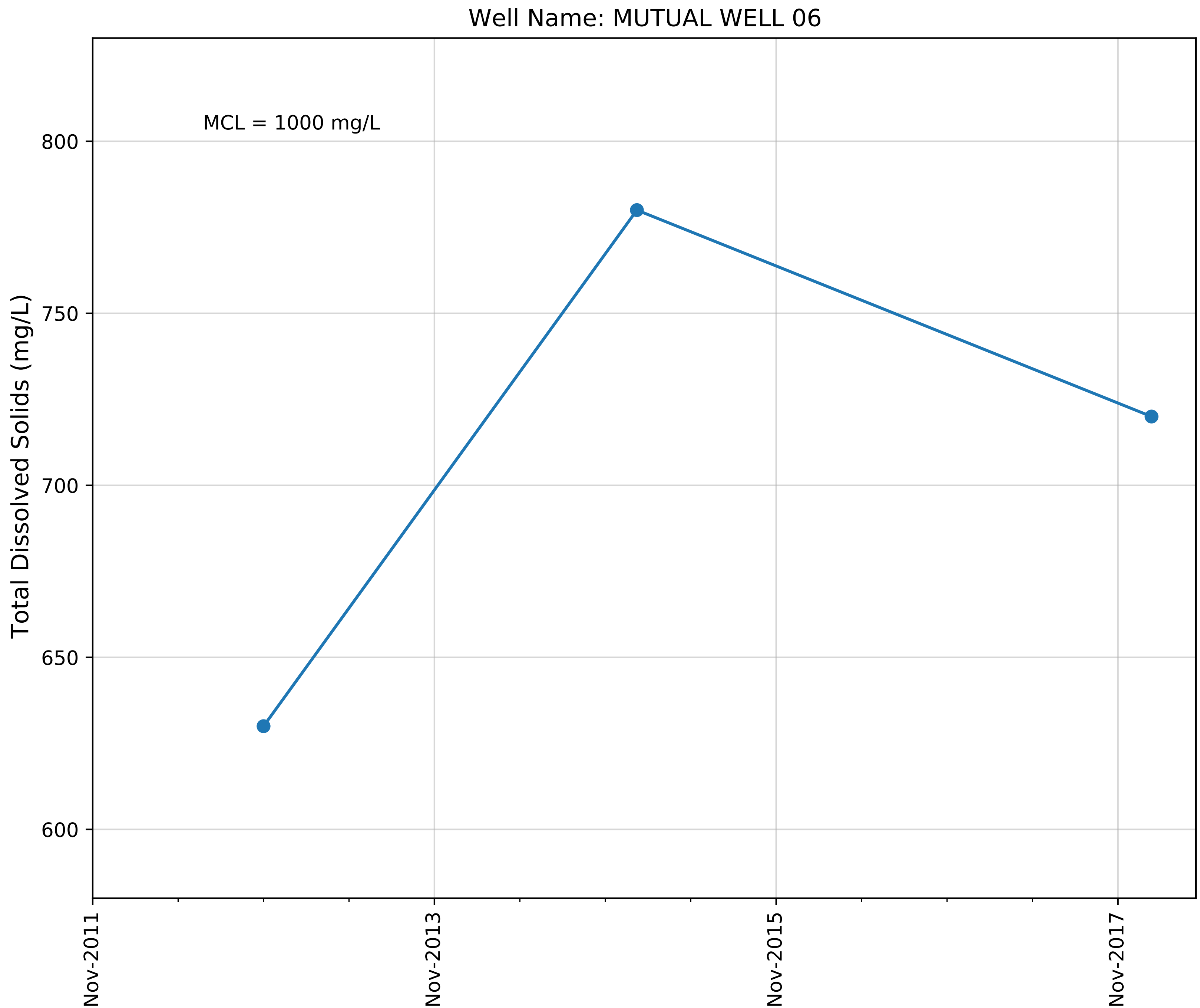
Well Name: GRANT WELL STANDBY
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
700
600
500
400
300
Dec-1996
Dec-1998
Dec-2000
Dec-2002
Dec-2004
Dec-2006
Dec-2008
Dec-2010
Dec-2012
Dec-2014
Dec-2016
Dec-2018
Dec-2020

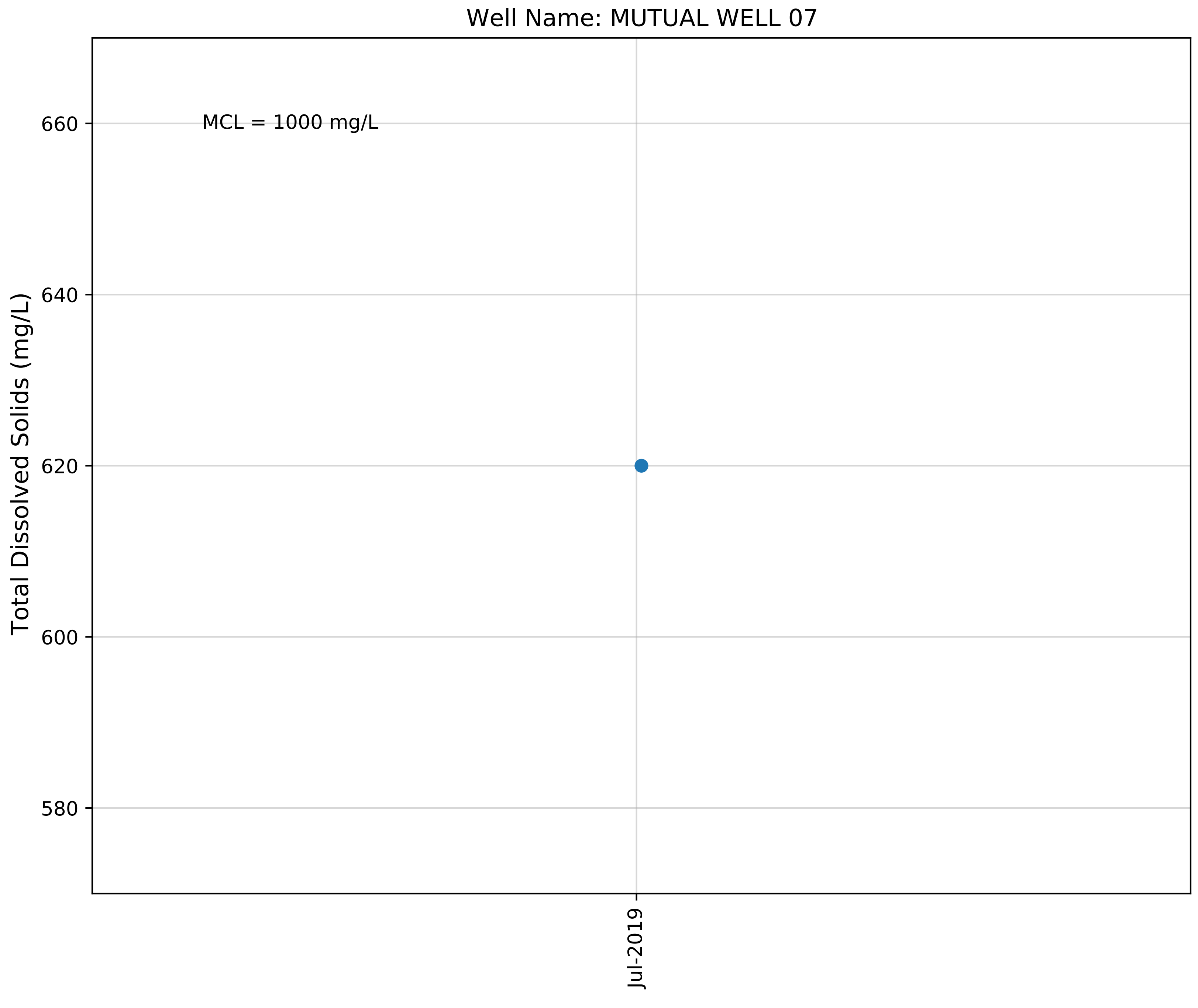


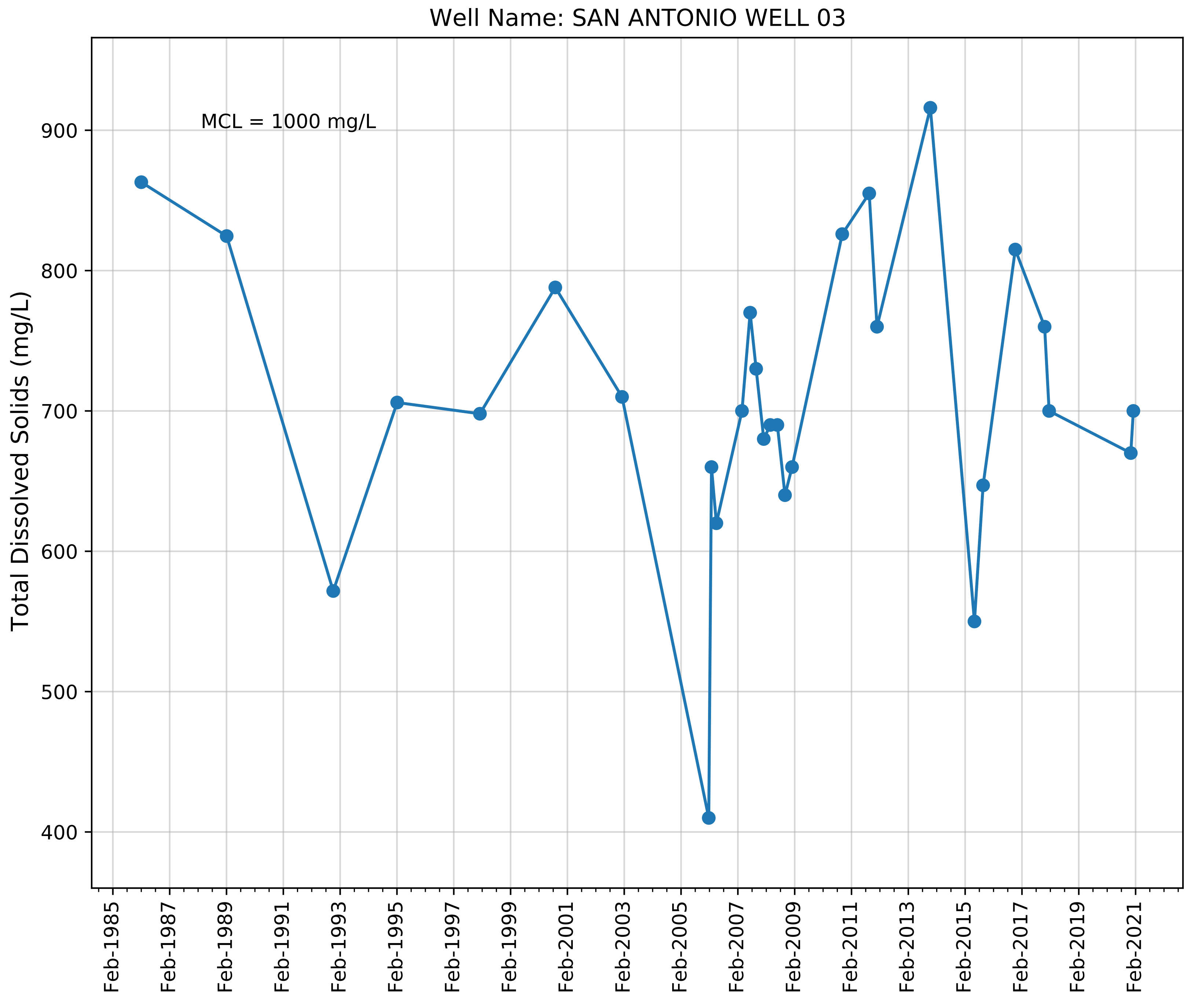
Well Name: MUTUAL WELL 04
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
500
600
700
800
900
Feb-1985
Feb-1987
Feb-1989
Feb-1991
Feb-1993
Feb-1995
Feb-1997
Feb-1999
Feb-2001
Feb-2003
Feb-2005
Feb-2007
Feb-2009
Feb-2011
Feb-2013
Feb-2015
Feb-2017
Feb-2019
Feb-2021



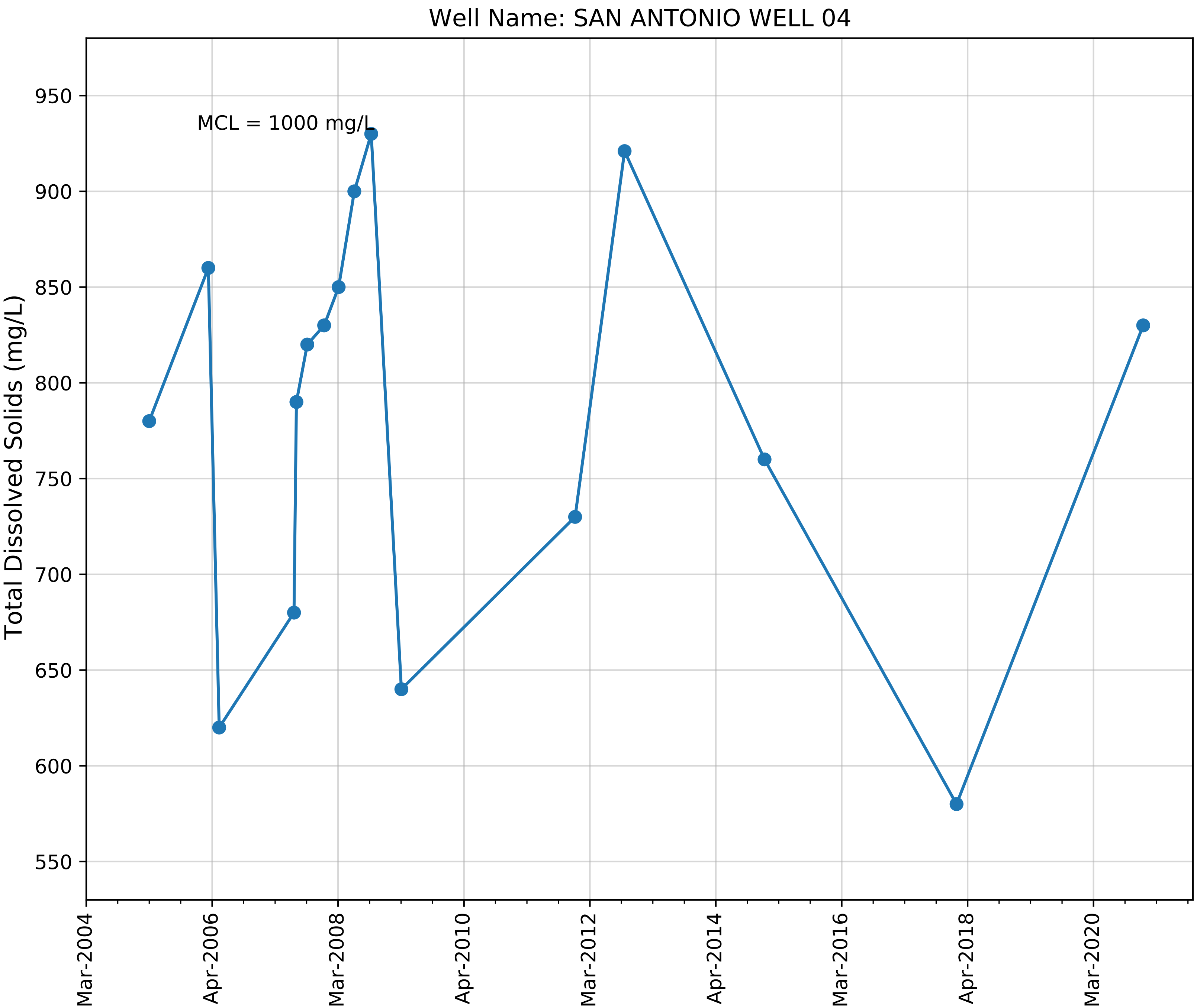
Well Name: MUTUAL WELL 05
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
750
725
700
675
650
625
600
575
550
Feb-1985
Feb-1987
Feb-1989
Feb-1991
Feb-1993
Feb-1995
Feb-1997
Feb-1999
Feb-2001
Feb-2003
Feb-2005
Feb-2007
Feb-2009
Feb-2011
Feb-2013
Feb-2015
Feb-2017
Feb-2019
Feb-2021

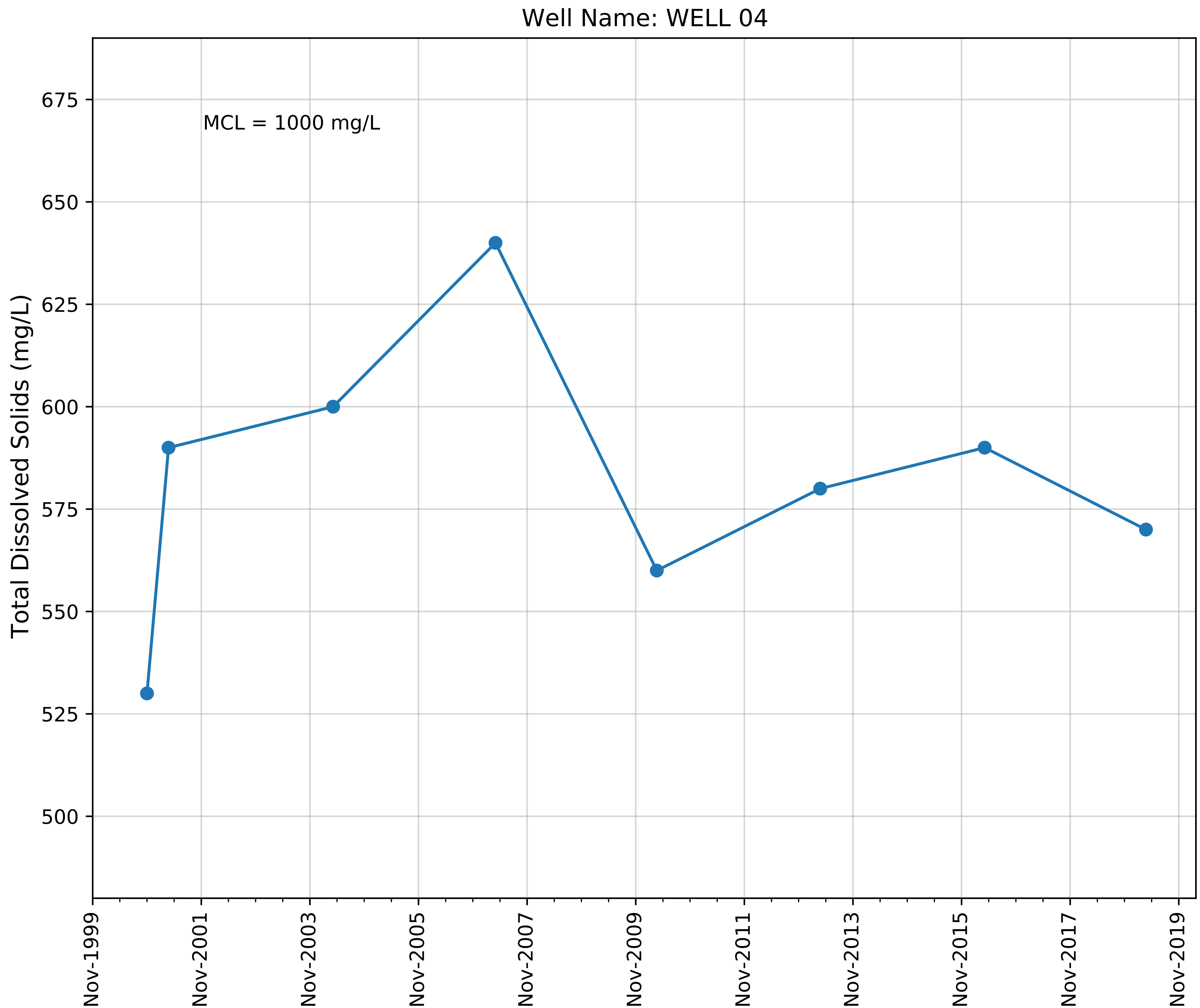

Well Name: MUTUAL WELL 06
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
800
750
700
650
600
Nov-2011
Nov-2013
Nov-2015
Nov-2017


Well Name: MUTUAL WELL 07
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
660
640
620
600
580
Jul-2019



Well Name: SAN ANTONIO WELL 03
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
400
500
600
700
800
900
Feb-1985
Feb-1987
Feb-1989
Feb-1991
Feb-1993
Feb-1995
Feb-1997
Feb-1999
Feb-2001
Feb-2003
Feb-2005
Feb-2007
Feb-2009
Feb-2011
Feb-2013
Feb-2015
Feb-2017
Feb-2019
Feb-2021


Well Name: SAN ANTONIO WELL 04
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
950
900
850
800
750
700
650
600
550
Mar-2004
Apr-2006
Mar-2008
Apr-2010
Mar-2012
Apr-2014
Mar-2016
Apr-2018
Mar-2020



Well Name: WELL 04
MCL = 1000 mg/L
Total Dissolved Solids (mg/L)
675
650
625
600
575
550
525
500
Nov-1999
Nov-2001
Nov-2003
Nov-2005
Nov-2007
Nov-2009
Nov-2011
Nov-2013
Nov-2015
Nov-2017
Nov-2019

APPENDIX E

Groundwater Dependent Ecosystems

APPENDIX E
GROUNDWTER DEPENDENT ECOSYSTEMS

Inventory of Freshwater Species

The OVGB provides habitat that supports a variety of aquatic and terrestrial freshwater species, several of which are listed as threatened, endangered, and/or species of special concern. Table 1 provides an inventory of freshwater species that reside in the San Antonio Creek watershed and may be found in the OVGB. The threatened and/or endangered species that may be found in the OVGB include the Willow Flycatcher (*Empidonax traillii*), Yuma Clapper Rail (*Rallus longirostris yumanensis*), Least Bell's Vireo (*Vireo bellii pusillus*), Southern California steelhead (*Oncorhynchus mykiss*), Arroyo Toad (*Anaxyrus californicus*), and California Red-legged Frog (Rana draytonii).

Table 1
Inventory of Freshwater Species Located in the San Antonio Creek Watershed

Scientific Name	Common Name	Legal Protected Status		
		Federal	*State*	*Other*
Birds				
Aechmophorus clarkii	Clark's Grebe	—	—	—
Aechmophorus occidentalis	Western Grebe	—	—	—
Anas americana	American Wigeon	—	—	—
Anas platyrhynchos	Mallard	—	—	—
Anas strepera	Gadwall	—	—	—
Ardea alba	Great Egret	—	—	—
Ardea herodias	Great Blue Heron	—	—	—
Butorides virescens	Green Heron	—	—	—
Cinclus mexicanus	American Dipper	—	—	—
Egretta thula	Snowy Egret	—	—	—
Empidonax traillii	Willow Flycatcher	Bird of Conservation Concern	Endangered	—
Fulica americana	American Coot	—	—	—
Icteria virens	Yellow-breasted Chat	—	Special Concern	BSSC - Third priority
Lophodytes cucullatus	Hooded Merganser	—	—	—
Megaceryle alcyon	Belted Kingfisher	—	—	—
Mergus merganser	Common Merganser	—	—	—
Nycticorax nycticorax	Black-crowned Night-Heron	—	—	—
Oxyura jamaicensis	Ruddy Duck	—	—	—
Phalacrocorax auritus	Double-crested Cormorant	—	—	—

Table 1
Inventory of Freshwater Species Located in the San Antonio Creek Watershed

Scientific Name	Common Name	Legal Protected Status		
		Federal	*State*	*Other*
Plegadis chihi	White-faced Ibis	—	Watch list	—
Podilymbus podiceps	Pied-billed Grebe	—	—	—
Rallus longirostris yumanensis	Yuma Clapper Rail	Endangered	Threatened	—
Setophaga petechia	Yellow Warbler	—	—	BSSC - Second priority
Tachycineta bicolor	Tree Swallow	—	—	—
Vireo bellii pusillus	Least Bell's Vireo	Endangered	Endangered	—
Crustaceans				
Hyalella spp.	Hyalella spp.	—	—	—
Fishes				
Gasterosteus aculeatus microcephalus	Inland threespine stickleback	—	Special	Least Concern - Moyle 2013
Gila orcutti	Arroyo chub	—	Special Concern	Vulnerable - Moyle 2013
Oncorhynchus mykiss - Southern CA	Southern California steelhead	Endangered	Special Concern	Endangered - Moyle 2013
Oncorhynchus mykiss irideus	Coastal rainbow trout	—	—	Least Concern - Moyle 2013
Amphibians and Reptiles				
Actinemys marmorata marmorata	Western Pond Turtle	—	Special Concern	ARSSC
Anaxyrus boreas boreas	Boreal Toad	—	—	—
Anaxyrus californicus	Arroyo Toad	Endangered	Special Concern	ARSSC
Pseudacris cadaverina	California Treefrog	—	—	ARSSC
Pseudacris regilla	Northern Pacific Chorus Frog	—	—	—
Rana boylii	Foothill Yellow-legged Frog	Under Review in the Candidate or Petition Process	Special Concern	ARSSC
Rana draytonii	California Red-legged Frog	Threatened	Special Concern	ARSSC
Spea hammondii	Western Spadefoot	Under Review in the Candidate or Petition Process	Special Concern	ARSSC
Thamnophis hammondii hammondii	Two-striped Gartersnake	—	Special Concern	ARSSC
Thamnophis sirtalis sirtalis	Common Gartersnake	—	—	—
Invertebrates				
Ambrysus spp.	Ambrysus spp.	—	—	—
Argia spp.	Argia spp.	—	—	—

Table 1
Inventory of Freshwater Species Located in the San Antonio Creek Watershed

Scientific Name	Common Name	Legal Protected Status		
		Federal	*State*	*Other*
Baetis tricaudatus	A Mayfly	—	—	—
Cheumatopsyche spp.	Cheumatopsyche spp.	—	—	—
Chironomidae fam.	Chironomidae fam.	—	—	—
Dixidae fam.	Dixidae fam.	—	—	—
Enallagma carunculatum	Tule Bluet	—	—	—
Erythemis collocata	Western Pondhawk	—	—	—
Fallceon quilleri	A Mayfly	—	—	—
Gumaga spp.	Gumaga spp.	—	—	—
Hetaerina americana	American Rubyspot	—	—	—
Hydroptilidae fam.	Hydroptilidae fam.	—	—	—
Libellulidae fam.	Libellulidae fam.	—	—	—
Microtendipes spp.	Microtendipes spp.	—	—	—
Oecetis disjuncta	A Caddisfly	—	—	—
Optioservus spp.	Optioservus spp.	—	—	—
Parametriocnemus spp.	Parametriocnemus spp.	—	—	—
Peltodytes spp.	Peltodytes spp.	—	—	—
Polypedilum spp.	Polypedilum spp.	—	—	—
Pseudochironomus spp.	Pseudochironomus spp.	—	—	—
Psychodidae fam.	Psychodidae fam.	—	—	—
Sialis spp.	Sialis spp.	—	—	—
Sigara mckinstryi	A Water Boatman	—	—	—
Simulium spp.	Simulium spp.	—	—	—
Sperchon spp.	Sperchon spp.	—	—	—
Tanytarsus spp.	Tanytarsus spp.	—	—	—
Tinodes spp.	Tinodes spp.	—	—	—
Tricorythodes spp.	Tricorythodes spp.	—	—	—
Mollusks				
Anodonta californiensis	California Floater	—	Special	—
Anodonta dejecta	Woebegone Floater	—	—	—
Anodonta spp.	Anodonta spp.	—	—	—
Plants				
Alnus rhombifolia	White Alder	—	—	—
Ammannia coccinea	Scarlet Ammannia	—	—	—
Arundo donax	—	—	—	—
Azolla filiculoides	—	—	—	—

Table 1
Inventory of Freshwater Species Located in the San Antonio Creek Watershed

Scientific Name	Common Name	Legal Protected Status		
		Federal	*State*	*Other*
Berula erecta	Wild Parsnip	—	—	—
Bolboschoenus maritimus paludosus	—	—	—	—
Carex alma	Sturdy Sedge	—	—	—
Carex densa	Dense Sedge	—	—	—
Cotula coronopifolia	—	—	—	—
Cyperus involucratus	—	—	—	—
Datisca glomerata	Durango Root	—	—	—
Epilobium campestre	—	—	—	—
Juncus acutus leopoldii	Spiny Rush	—	Special	CRPR - 4.2
Juncus phaeocephalus paniculatus	Brownhead Rush	—	—	—
Lemna gibba	Inflated Duckweed	—	—	—
Lemna minor	Lesser Duckweed	—	—	—
Lemna valdiviana	Pale Duckweed	—	—	—
Lobelia dunnii serrata	Dunn's Lobelia	—	—	—
Mimulus cardinalis	Scarlet Monkeyflower	—	—	—
Mimulus guttatus	Common Large Monkeyflower	—	—	—
Paspalum distichum	Joint Paspalum	—	—	—
Persicaria lapathifolia	—	—	—	—
Phacelia distans	—	—	—	—
Phyla nodiflora	Common Frog-fruit	—	—	—
Platanus racemosa	California Sycamore	—	—	—
Pluchea odorata odorata	Scented Conyza	—	—	—
Psilocarphus tenellus	—	—	—	—
Rumex conglomeratus	—	—	—	—
Ruppia cirrhosa	Widgeon-grass	—	—	—
Salix exigua exigua	Narrowleaf Willow	—	—	—
Salix laevigata	Polished Willow	—	—	—
Salix lasiolepis lasiolepis	Arroyo Willow	—	—	—
Schoenoplectus americanus	Three-square Bulrush	—	—	—
Schoenoplectus californicus	California Bulrush	—	—	—
Scirpus microcarpus	Small-fruit Bulrush	—	—	—
Sidalcea neomexicana	Rocky Mountain Checker-mallow	—	Special	CRPR - 2B.2

Table 1
Inventory of Freshwater Species Located in the San Antonio Creek Watershed

Scientific Name	Common Name	Legal Protected Status		
		Federal	*State*	*Other*
Stachys albens	White-stem Hedge-nettle	—	—	—
Typha domingensis	Southern Cattail	—	—	—
Veronica anagallis-aquatica	—	—	—	—
Veronica catenata	—	—	—	—
Zannichellia palustris	Horned Pondweed	—	—	—

Source: California Freshwater Species Database version 2.0.9.
Notes: — = not available/applicable.

Vegetation and Wetland GDE Characterization

This section describes the characterization of individual NCCAG mapped polygons by groundwater dependent ecosystem evaluation unit. Data supporting the characterization of each unit is described in detail below. The methods for identifying groundwater dependent ecosystems are outlined in Section 2.3.4.7 of the Groundwater Sustainability Plan.

Stewart Canyon GDE Evaluation Unit

The Stewart Canyon GDE Evaluation Unit consists of approximately 11.34 acres of coast live oak (*Quercus agrifolia*) vegetation and 0.15 acres of riverine, unknown perennial, unconsolidated bottom, semi-permanently flooded wetland communities. The coast live oak habitat can be divided into an upstream habitat that is entirely undeveloped land and a downstream habitat that consists of developed residential and undeveloped land. Both communities are located along the bed and bank of the natural stream channel. The Stewart Canyon drainage is not classified by the USGS. The riverine, unknown perennial, unconsolidated bottom, semi-permanently flooded wetland habitat is located within the manmade Stewart Canyon Creek Debris Basin, an earthen-filled basin constructed by the U.S. Army Corps of Engineers in 1963 to control floodwater and sediment produced during large flood events (Figure 1, Stewart Canyon GDE Evaluation Unit).

NDMI trends for the downstream coast live oak habitat (NCCAG polygons 48487 and 48667) and the wetland habitat (NCCAG polygon 102080) are positively correlated with groundwater levels, and NDMI trends for the wetland habitat are also correlated with precipitation. NDVI trends for the communities are not correlated with groundwater levels or precipitation. NDVI and NDMI trends for the upstream coast live oak habitat (NCCAG polygon 52076) are not correlated with groundwater levels or precipitation. Aerial photographs show that the habitat completely burned in 2017 but has partially regrown since that time. No NDVI or NDMI data are available for

NCCAG polygon 102081 (riverine, unknown perennial, unconsolidated bottom, semi-permanently flooded wetland).

There are five active production wells within 1 km of the mapped communities (Figure 1). A well completion report is available for well 04N23W02A04S, which indicates that in May 2016 the depth to water was approximately 40 feet bgs. Well 04N23W02A04S is 615 feet deep and screened from 40 to 600 feet. The lithology at well 04N23W02A04S consists of topsoil from 0 to 10 feet bgs and a mixture of sandstone and conglomerate rock from 10 to 620 feet bgs.

Although NDMI trends are positively correlated with groundwater levels and precipitation, because there is insufficient site-specific data to characterize groundwater conditions underlying the Stewart Canyon GDE Evaluation Unit it is characterized as a potential GDE. The unit is located at the northern edge of the OVGB in an area with few production wells and is therefore not likely to be impacted by groundwater extraction. Additionally, based on the correlation between NDMI trends for the wetland habitat and precipitation, the habitat is likely supported by intermittent surface flows emanating from the contributing watershed.

Gridley Canyon GDE Evaluation Unit

The Gridley Canyon GDE Evaluation Unit consists of approximately 9.14 acres of riparian mixed hardwood and 4.72 acres of coast live oak vegetation communities. The riparian mixed hardwood habitat is located within the Gridley Canyon drainage and the coast live oak habitat is located near the confluence of the Gridley Canyon and Senior Canyon drainages. The Gridley Canyon drainage is classified as an intermittent stream by the USGS. Both vegetation communities are located along the bed and bank of the natural stream channel on undeveloped land bordered by undeveloped to developed agricultural land (Figure 2, Gridley Canyon, Senior Canyon, and McNell Creek GDE Evaluation Units).

NDVI and NDMI trends for the communities are not correlated with precipitation or groundwater levels. During the last major drought period which began in late 2011, the NDVI for both vegetation communities slightly increased, while the NDMI for the riparian mixed hardwood habitat remained stable and the NDMI for the coast live oak habitat decreased. Aerial photographs show that both vegetation communities partially burned in 2017 but have regrown since that time.

There are four active production wells located within 1 km and downgradient of the riparian mixed hardwood habitat, and 20 production wells located within 1 km of the coast live oak habitat. Recent groundwater level data are available for one nearby well (well 05N22W32J002S; Figure 2). Since the beginning of the measurement record in November 1949, the shallowest depth to water measured in well 05N22W32J002S was 44.6 feet bgs in December 2019 and the most recent depth to water was 54.4 feet bgs, as measured in June 2020. Static groundwater levels in Well

05N22W32J002S have remained relatively stable around 55 feet bgs since the beginning of the measurement record. Well 05N22W32J002S is 500 feet deep and screened from 83 to 283 feet.

Lithologic data are available for two nearby wells (wells 05N22W32H001S and 05N22W32K003S) and indicate that sand to cobble size unconsolidated sediments extend from ground surface to depths of between 38 and 110 feet bgs (Figure 2). Depth to first water in well 05N22W32H001S was measured at 100 feet bgs in September 2004 and in well 05N22W32K003S was measured at 30 feet bgs in August 2011.

Because there is insufficient site-specific data to characterize groundwater conditions underlying the Gridley Canyon GDE Evaluation Unit, it is characterized as a potential GDE. However, based on the relatively stable static groundwater levels in nearby wells and geographic location of the habitat being at the edge of the OVGB, the unit is not likely to be impacted by groundwater extraction.

Senior Canyon GDE Evaluation Unit

The Senior Canyon GDE Evaluation Unit consists of approximately 12.8 acres of coast live oak vegetation. The coast live oak habitat is located within the Senior Canyon drainage (upper San Antonio Creek) along the bank and bed of the natural stream channel on developed residential and undeveloped land. The Senior Canyon drainage is classified as an intermittent stream by the USGS (Figure 2).

NDVI and NDMI trends for the habitat are not correlated with precipitation or groundwater levels. During the last drought period the NDVI for the vegetation increased while the NDMI remained relatively stable then slightly decreased. Aerial photographs show that the vegetation partially burned in 2017 but has regrown since that time.

There are 12 active production wells located within 1 km of the unit. Recent groundwater level data indicate that groundwater levels were 54.4 feet bgs in June 2020 (well 05N22W32J002S). Additionally, a well log for nearby well 05N22W32H001S suggests unconsolidated sediments are shallow and unconfined in the vicinity of the Senior Canyon GDE Evaluation Unit (Figure 2). Depth to first water in well 05N22W32H001S was measured at 100 feet bgs in September 2004.

Because there is insufficient site-specific data to characterize groundwater conditions underlying the Senior Canyon GDE Evaluation Unit, it is characterized as a potential GDE. However, because the unit is located upgradient of extraction wells at the northern edge of the OVGB, the vegetation is not likely to be impacted by groundwater extraction.

McNell Creek GDE Evaluation Unit

The McNell Creek GDE Evaluation Unit consists of approximately 17.5 acres of coast live oak vegetation. The unit can be divided into three separate coast live oak communities in close proximity to one another, all of which are located along the beds and banks of the drainages that comprise the upper reaches of McNell Creek. McNell Creek is classified as an intermittent stream by the USGS. Portions of the unit consist of developed residential land, but most of the habitat is undeveloped land (Figure 2).

NDVI and NDMI trends for the vegetation communities are not correlated with precipitation or groundwater levels, except for the western-most coast live oak habitat (NCCAG polygon 51773) for which NDMI and groundwater levels are positively correlated. During the last drought period the NDVI for the communities increased until about 2015 then decreased the years following, while NDMI showed a subtle steady decline starting in 2011.

There are 23 active production wells within 1 km of the unit, the majority of which are located downgradient. Three production wells are located within the western-most mapped coast live oak habitat. The closest well with recent groundwater level data is well 05N22W32J002S. In June 2020, the depth to water in well 05N22W32J002S was 54.4 feet bgs. The lithology underlying the unit is not known (Figure 2).

Because there is insufficient site-specific data to characterize groundwater conditions underlying the McNell Creek GDE Evaluation Unit and the NDMI trend for one of the coast live oak habitats is positively correlated with groundwater levels, the unit is characterized as a potential GDE. However, because the unit is located at the northern edge of the OVGB in an area with few production wells it is not likely to be impacted by groundwater extraction.

Upper Thacher Creek GDE Evaluation Unit

The Upper Thacher Creek GDE Evaluation Unit consists of approximately 6.1 acres of riparian mixed hardwood, 6 acres of riversidean alluvial scrub, and 11.2 acres of coast live oak vegetation communities, all of which are located on undeveloped land along the beds and banks of natural stream channels. The coast live oak habitat consists of three separate units, one on Thacher Creek and two on a tributary to Reeves Creek that originates near Thacher Creek. Upper Thacher Creek is classified as an intermittent stream by the USGS (Figure 3, Upper Thacher Creek and Reeves Creek GDE Evaluation Units).

NDVI and NDMI trends for the mapped communities vary across the Upper Thacher Creek GDE Evaluation Unit. NDVI and NDMI trends for the vegetation communities are not correlated with precipitation or groundwater levels, except for the northeastern-most coast live oak habitat (NCCAG polygon 48489) for which NDMI and groundwater levels are positively correlated. Aerial photographs show that much of the vegetation burned in 2017 but has regrown since that time.

There are 29 active production wells within 1 km of the unit, the majority of which are located southwest and downgradient of the mapped vegetation communities. Recent groundwater level data are available for one nearby well (well 04N22W04Q001S). Between December 2011 and December 2016, groundwater levels in well 04N22W04Q001S declined approximately 27 feet, but then recovered in the years following. The shallowest groundwater level measured was 41.5 feet bgs in February 1969. In March 2020, the depth to water in well 04N22W04Q001S was 90.1 feet bgs. Well 04N22W04Q001S is 970 feet deep and screened from 102 to 920 feet (Figure 3). A well log for nearby well 04N22W03D001S indicates unconsolidated sediments comprised of gravel, sand, and clay extend from ground surface to 110 feet bgs with no indication of an intervening confining unit. Depth to first water in well 04N22W03D001S was measured at 160.4 feet bgs in September February 2018.

Because there is insufficient site-specific data to characterize groundwater conditions underlying the Upper Thacher Creek GDE Evaluation Unit and the NDMI trend for one of the coast live oak habitats is positively correlated with groundwater levels, the unit is characterized as a potential GDE. However, because the unit is located at the northeastern edge of the OVGB in an area with few production wells it is not likely to be impacted by groundwater extraction.

Reeves Creek GDE Evaluation Unit

The Reeves Creek GDE Evaluation Unit consists of approximately 4.8 acres of riparian mixed hardwood and 15.8 acres of coast live oak vegetation communities on undeveloped to sparsely developed residential land along the bed and bank of Reeves Creek, and at the base of the mountains that delineate the southern boundary of the OVGB. Upper Reeves Creek is classified as an intermittent stream by the USGS (Figure 3).

NDVI and NDMI trends for the communities are not correlated with precipitation or groundwater levels. NDVI and NDMI for the riparian mixed hardwood habitat steadily increased from the early 2000s through the last major drought, while NDVI and NDMI for the coast live oak habitats generally increased from the early 2000s to 2015, then decreased thereafter.

There are approximately 20 active production wells within 1 km of the unit, the majority of which are located west and downgradient of the mapped vegetation communities. Three production wells are located at the western edge of the downstream coast live oak habitat. The closest well with recent groundwater level data is well 04N22W04Q001S. In March 2020, the groundwater level in well 04N22W04Q001S was 90.1 feet bgs (Figure 3). Well logs for two nearby wells (wells 04N22W04K003S and 04N22W04P005S) indicate unconsolidated sediments are up to 880 feet thick in the vicinity of the Reeves Creek GDE Evaluation Unit. The static water level in well

04N22W04K003S in August 2017 was 152 feet bgs and the water level in well 04N22W04P005S in June 2000 was 40 feet bgs.

Because there is insufficient site-specific data to characterize groundwater conditions underlying the Reeves Creek GDE Evaluation Unit, it is characterized as a potential GDE. However, because the unit is located at the southeastern edge of the OVGB upgradient of extraction wells, and static groundwater levels in the area have been relatively stable over time, the vegetation is not likely to be impacted by groundwater extraction.

Lower Thacher Creek GDE Evaluation Unit

The Lower Thacher Creek GDE Evaluation Unit consists of approximately 25.4 acres of coast live oak vegetation. The unit can be divided into two separate coast live oak habitats, an upstream habitat that is located along the bed and bank of lower Thacher Creek and a downstream habitat that is located on the left bank and floodplain of Thacher Creek. The reach of Thacher Creek adjacent to the unit is classified as an intermittent stream by the USGS. Portions of both habitats consist of developed residential land, and a portion of the downstream habitat is within Soule Park County Park (Figure 4, Lower Thacher Creek, Dron Creek, and Upper San Antonio Creek GDE Evaluation Units).

NDVI and NDMI trends for the vegetation communities are not correlated with precipitation or groundwater levels, except for the portion of the downstream coast live oak habitat closest to Thacher Creek (NCCAG polygon 48643) for which NDMI and groundwater levels are positively correlated. NDVI and NDMI trends for upstream habitat (NCCAG polygon 48646) and the southern portion of the downstream habitat (NCCAG polygon 48628) remained relatively stable through the last drought, while NDVI and NDMI for the northern portion of the downstream habitat (NCCAG polygon 48643) closest to Thacher Creek showed a decreasing trend. Aerial photographs indicate that the vegetation within Soule Park County Park (NCCAG polygon 48643) mapped as coast live oak is actually western sycamore (*Platanus racemosa*), which is a deciduous tree species that loses its foliage each year. Because a portion of the habitat is comprised of a deciduous tree species, the reliability of NDVI and NDMI trends as indicators of habitat health could be affected.

There are approximately 51 active production wells within 1 km of the unit, eight of which are located less than 100 meters from the mapped vegetation communities. Recent groundwater level data are available for one well (well 04N22W07G001S). Since October 1972, water levels in well 04N22W07G001S have ranged from 0 feet bgs (artesian) to 98.8 feet bgs. The average depth to water over the measurement record is approximately 25 feet bgs. Between June 2011 and June 2015, groundwater levels in well 04N22W07G001S declined approximately 90 feet, but then recovered to near pre-drought levels in the years following. In June 2020, the groundwater level in well 04N22W07G001S was 22.5 feet bgs (Figure 4). Well 04N22W07G001S is 116 feet deep and the screened interval is not known.

The majority of the Lower Thacher Creek GDE Evaluation Unit falls within an area of the OVGB where the primary production aquifer is considered to be semi-confined to confined and separated from the shallow perched aquifer by intervening clay layers. Well logs are available for two nearby wells (well 04N22W07L001S and 04N22W07A005S), which indicate the presence of a clay layer that extends from approximately 67 feet bgs to upwards of 131 feet bgs, and potentially additional clay units at greater depths. The static water level in well 04N22W07L001S in September 1998 was 37 feet bgs.

Based on available data, NCCAG mapped polygons 48646 and 48628 are characterized as potential GDEs not likely impacted by groundwater extraction. NDVI and NDMI trends for the mapped communities are not correlated with groundwater levels and the communities persisted during drought conditions when groundwater levels were much greater than 30 feet bgs for several consecutive years. Conversely, NCCAG mapped polygon 48643 is characterized as a potential GDE. Although there is geologic evidence of a local confining layer, NDVI and NDMI for the habitat showed a decreasing trend when groundwater levels declined during drought conditions. Therefore, there is potential for the ecosystem to be impacted by groundwater production.

Dron Creek GDE Evaluation Unit

The Dron Creek GDE Evaluation Unit consists of approximately 6.3 acres of coast live oak habitat located on the bed and bank of Dron Creek near the confluence with San Antonio Creek. The reach of San Antonio Creek adjacent to the unit is classified as an intermittent stream, while Dron Creek is not classified by the USGS. The unit is comprised of undeveloped land surrounded by agricultural land (Figure 4).

NDMI trends for the coast live oak community are positively correlated with groundwater levels. NDVI and NDMI trends indicate a general decline in vegetation health since the late 1990s, although the change in habitat health is not apparent in aerial photographs.

There are approximately 41 active production wells within 1 km of the unit, one of which is within the mapped habitat. Historical groundwater level data are available for one well (well 04N22W06G001S) in close proximity to the mapped unit. Well 04N22W06G001S is 614 feet deep and screened from 422 to 608 feet. Groundwater levels recorded in well 04N22W06G001S between December 1994 and February 1996 ranged from 205.7 feet bgs to 367.7 feet bgs. The closest well with recent groundwater level data is well 04N22W06K012S. Since December 1994, groundwater levels in well 04N22W06K012S have ranged from 0 feet bgs (artesian) to 231.9 feet bgs, and been on average approximately 111 feet bgs. In June 2020, the depth to water in well 04N22W06K012S was 116.6 feet bgs (Figure 4). Well 04N22W06K012S is 604 feet deep and screened from 100 to 600 feet. Groundwater levels measured in nearby wells are similar to those measured in well 04N22W06K012S.

Well logs are available for five nearby wells (wells 04N22W06J010S, 04N22W06K015S, 04N22W06K014S, 04N22W06L008S, 04N22W06J009S), which indicate the underlying geologic materials consist of a mixture of gravel, sand, and clay to a depth of 660 feet or greater. In several of the wells a uniform clay layer was encountered around 300 feet depth. The shallowest depth to water recorded was 67 feet bgs.

Because NDMI trends are positively correlated with groundwater levels and water levels have been measured at less than 30 feet bgs, the Dron Creek GDE Evaluation Unit is characterized as a potential GDE and there is potential for the habitat to be impacted by groundwater production.

Upper San Antonio Creek GDE Evaluation Unit

The Upper San Antonio Creek GDE Evaluation Unit consists of approximately 3.7 acres of coast live oak; 4 acres of riparian mixed hardwood; 7.8 acres of riversidean alluvial scrub; 4.4 acres of willow (*Salix spp.*); 0.08 acres of palustrine, emergent, persistent, seasonally flooded; and 0.02 acres of riverine, unknown perennial, unconsolidated bottom, semi-permanently flooded vegetation and wetland communities. The communities are mostly located along the bed and bank of San Antonio Creek, although some of the habitat extends onto the floodplain. The unit consists of undeveloped land surrounded by developed residential, agriculture, and recreational land. The reach of San Antonio Creek that bisects the unit is classified as a perennial stream by the USGS, although aerial photographs indicate that surface flows regularly cease during dry months (Figure 4).

NDVI and NDMI trends for the mapped communities vary across the Upper San Antonio Creek GDE Evaluation Unit. NDMI trends for the riparian mixed hardwood (NCCAG polygon 52204) and willow (NCCAG polygon 53178) communities are positively correlated with groundwater levels. Additionally, NDMI trends for the riversidean alluvial scrub habitat on the left bank of San Antonio Creek (NCCAG polygon 52678) is positively correlated with precipitation. The NDVI and NDMI trends for the riparian mixed hardwood and willow communities indicate a significant decrease in vegetation health between 2011 and 2018 corresponding with measured declines in annual precipitation and groundwater levels. The NDVI and NDMI trends for the coast live oak, riversidean alluvial scrub habitat, and two wetland communities remained stable or increased between 2011 and 2018. No NDVI or NDMI data are available for NCCAG polygon 52675 (riversidean alluvial scrub).

There are approximately 68 active production wells within 1 km of the unit, eight of which are located less than 100 meters from the mapped communities. Historical groundwater level data are available for one shallow well (well 04N22W06Q001S) in close proximity to the mapped units. Well 04N22W06Q001S is screened from 52 to 65 feet and the total depth is not known.

Groundwater levels recorded in well 04N22W06Q001S between June 1989 and May 2001 ranged from 0 feet bgs (artesian) to 48.8 feet bgs, and were on average approximately 18 feet bgs. The closest well with recent groundwater level data is well 04N22W07B002S. Since October 1972, groundwater levels in well 04N22W07B002S have ranged from 0 feet bgs (artesian) to 170.9 feet bgs, and been on average approximately 46 feet bgs. Between March 2011 and September 2018, groundwater levels declined by approximately 121 feet from 9.15 feet bgs to 130.1 feet bgs. In June 2020, the depth to water in well 04N22W07B002S was 64.8 feet bgs (Figure 4).

With the exception of the riversidean alluvial scrub habitat, the entire Upper San Antonio Creek GDE Evaluation Unit overlies an area of the OVGB where the perched aquifer in hydraulic connection with the stream is considered to be separated from the semi-confined to confined production aquifer. No well logs are available for wells in the immediate vicinity of the unit; however, logs for nearby wells indicate that the southwest part of the OVGB consists of a multilayered aquifer system comprised of alternating fine- and coarse-grained unconsolidated sediment layers of variable thickness. Based on lithologic information contained in well logs, approximately three to four distinct clay layers upwards of 20 to 30 feet thick each have been encountered between land surface and 150 feet bgs. Existing wells completed in the shallow perched aquifer—the coarse-grained water bearing sediments above approximately 30 feet depth—are solely monitoring wells associated with hazardous waste cleanup sites.

Based on available data, NCCAG polygons 52677 and 52678 (riversidean alluvial scrub), 91230 (palustrine, emergent, persistent, seasonally flooded), 102079 (riverine, unknown perennial, unconsolidated bottom, semi-permanently flooded), and 51726 (coast live oak) are characterized as ecosystems that are potential GDEs not likely impacted by groundwater extraction. NDVI and NDMI trends for the mapped communities are not correlated with groundwater levels and the communities persisted during drought conditions when groundwater levels were much greater than 30 feet bgs for several consecutive years. Conversely, NCCAG polygons 52204 (riparian mixed hardwood) and 53178 (willow) are characterized as potential GDEs. Although there is geologic evidence of a local confining layer, NDVI and NDMI for the communities showed a decreasing trend when groundwater levels declined during drought conditions. Therefore, there is potential for the ecosystems to be impacted by groundwater production.

Lower San Antonio Creek GDE Evaluation Unit

The Lower San Antonio Creek GDE Evaluation Unit consists of approximately 19 acres of coast live oak; 37.6 acres of riparian mixed hardwood; 5.8 acres of valley oak (*Quercus lobata*); 5.2 acres of willow; 1.6 acres of palustrine, forested, seasonally flooded; 1.8 acres of palustrine, scrub-shrub, seasonally flooded; and 0.6 acres of riverine, unknown perennial, unconsolidated bottom, semi-permanently flooded vegetation and wetland communities. The communities are located along the bed, bank, and floodplain of San Antonio Creek. The unit consists of undeveloped land surrounded by developed residential, agriculture, and recreational land. The valley oak habitat is within the Soule Park Golf Course. The reach of San Antonio Creek that bisects the unit is classified as a perennial stream by the USGS, except for an approximately 1/3-mile reach immediately upstream of the confluence with Fox Canyon Drain/Stewart Canyon which is classified as intermittent. Although the reach of San Antonio Creek is classified as a perennial stream, aerial photographs indicate that surface flows regularly cease during dry months (Figure 5, Lower San Antonio Creek and Fox Canyon Drain GDE Evaluation Units).

NDVI and NDMI trends for the mapped communities vary across the Lower San Antonio Creek GDE Evaluation Unit. NDMI trends for the coast live oak (NCCAG polygon 51703), riparian mixed hardwood (NCCAG polygon 52203), valley oak (NCCAG polygons 53063 and 53064), and willow (NCCAG polygon 53177) vegetation communities are positively correlated with groundwater levels. NDVI trends for the southern portion of the valley oak habitat (NCCAG polygon 53603) and willow habitat (NCCAG polygon 53177) are also correlated with groundwater levels. Additionally, NDMI trends for the riverine, unknown perennial, unconsolidated bottom, semi-permanently flooded wetland habitat are positively correlated with precipitation. No NDVI or NDMI data are available for NCCAG polygon 95852 (palustrine, scrub-shrub, seasonally flooded wetland).

There are approximately 48 active production wells within 1 km of the unit, nine of which are located less than 100 meters from the mapped communities. The closest well with recent groundwater level is well 04N23W12H002S. Since December 1994, groundwater levels in well 04N23W12H002S have ranged from 11.7 feet bgs to 61.8 feet bgs, and been on average approximately 28 feet bgs. Between June 2011 and December 2016, groundwater levels declined by approximately 42 feet from 19.5 feet bgs to 61.8 feet bgs. In June 2020, the depth to water in well 04N23W12H002S was 22.5 feet bgs (Figure 5). Well 04N23W12H002S is 125 feet deep and the screened interval is not known.

As previously discussed, the southwestern portion of the OVGB is characterized as a semi-confined to confined multilayered aquifer system. Lithologic data for well 04N23W12P002S located in the center of the unit near San Antonio Creek indicates five distinct clay layers upwards of 45 feet thick exist between 75 and 340 feet bgs. Well 04N23W12P002S is 265 feet deep and screened from 50 to 265 feet. In July 2014, the depth to water in well 04N23W12P002S was 11 feet bgs. The majority of production wells in the southwest part of the OVGB are completed in deeper aquifer units and screened below 50 feet depth, although there are a few wells (wells 04N23W12K005S, 04N23W12K006S, 04N23W12K008S, 04N23W12L004S), screened starting at 30 to 40 feet bgs.

Based on available data, the mapped wetland communities (NCCAG polygons 93683 and 102077) are characterized as ecosystems that are potential GDEs not likely impacted by groundwater extraction. NDVI and NDMI trends for the mapped communities are not correlated with groundwater levels and the communities persisted during drought conditions when groundwater levels were much greater than 30 feet bgs for several consecutive years. Additionally, NDVI trends for one of the wetlands is correlated with precipitation, which suggests that the habitat is likely supported by surface flows emanating from the contributing watershed. Conversely, NCCAG polygons 51703 (coast live oak), 52203 (riparian mixed hardwood), 53063 and 53064 (valley oak), and 53177 (willow) are characterized as potential GDEs. Although there is geologic evidence of a local confining layer, NDVI and NDMI for the communities showed a decreasing trend when groundwater levels declined during drought conditions. Additionally, NCCAG polygon 95852 (palustrine, scrub-shrub, seasonally flooded) is characterized as a potential GDE because NDVI and NDMI data are not available. Therefore, there is potential for the ecosystems to be impacted by groundwater production.

Fox Canyon Drain GDE Evaluation Unit

The Fox Canyon Drain GDE Evaluation Unit consists of approximately 30.6 acres of coast live oak habitat and 0.12 acres of riverine, unknown perennial, unconsolidated bottom, semi-permanently flooded habitat located on the bed and bank of Fox Canyon Drain. The coast live oak habitat can be divided into four separate units—three units located on undeveloped to developed residential land on an intermittent reach of upper Fox Canyon Drain, as classified by the USGS, and a single unit located entirely on undeveloped land on a perennial reach of lower Fox Canyon Drain. The wetland habitat is located in a small tributary drainage to Fox Canyon Creek (Figure 5).

NDVI and NDMI trends are not correlated with precipitation or groundwater levels. Of the four mapped coast live oak units, the NDVI and NDMI trends for the coast live oak habitat on lower Fox Canyon Drain have tracked the closest with precipitation and groundwater levels. The indices for the coast live oak units on upper Fox Canyon Drain follow a distinctly different trend independent of changes in precipitation and groundwater conditions. No NDVI or NDMI data are available for the riverine, unknown perennial, unconsolidated bottom, semi-permanently flooded wetland (NCCAG polygon 102078).

There are approximately 42 active production wells within 1 km of the unit, seven of which are located less than 100 meters from the mapped communities. The closest well with recent groundwater level is well 04N23W01K002S. Since December 1972, groundwater levels in well 04N23W01K002S have ranged from 1.7 feet bgs to 75.8 feet bgs, and been on average approximately 21 feet bgs. Between March 2011 and December 2016, groundwater levels declined by approximately 66 feet from 2.92 feet bgs to 69.2 feet bgs. In June 2020, the depth to water in well 04N23W01K002S was 37.4 feet bgs (Figure 5). Well 04N23W01K002S is 142 feet deep and screened from 90 to 130 feet.

As previously discussed, the southwestern portion of the OVGB is characterized as a semi-confined to confined multilayered aquifer system. A well log for nearby well 04N23W12M001S indicates clay deposits extend from land surface to 30 feet bgs, and from 55 feet bgs to 100 feet bgs. The static depth to water in well 04N23W12M001S in August 2004 was 27 feet bgs.

Based on available data, the coast live oak communities (NCCAG polygons 48621, 48642, 51750, and 51995) are characterized as ecosystems that are potential GDEs not likely impacted by groundwater extraction. NDVI and NDMI trends for the mapped communities are not correlated with groundwater levels, the vegetation persisted during periods when underlying groundwater levels were deeper than 30 feet bgs, and there is geologic evidence of a local confining layer. NCCAG polygon 102078 (riverine, unknown perennial, unconsolidated bottom, semi-permanently flooded) is characterized as a potential GDE because NDVI and NDMI data are not available.

Summary of GDE Characterization

The NCCAG dataset identified 46 individual communities within the OVGB that may depend on groundwater. Of the 46 communities, 12 were characterized as priority potential GDEs, 21 were characterized as potential GDEs, and 13 were characterized potential GDEs not likely impacted by groundwater extraction. Table 2 provides a summary of the GDE characterization results by individual NCCAG polygon.

Table 2
Characterization of NCCAG Dataset Polygons in the OVGB

NCCAG Polygon ID	GDE Evaluation Unit	Vegetation or Wetland Type	GDE Characterization	Justification	Impacted by Groundwater Extraction
48487	Stewart Canyon	Coast live oak	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
48667	Stewart Canyon	Coast live oak	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
52076	Stewart Canyon	Coast live oak	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
102080	Stewart Canyon	Riverine, unknown perennial, unconsolidated bottom, semi-permanently flooded	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
102081	Stewart Canyon	Riverine, unknown perennial, unconsolidated bottom,	Potential GDE	Insufficient data to characterize habitat health over time	Not likely to be impacted by groundwater extraction

Table 2
Characterization of NCCAG Dataset Polygons in the OVGB

NCCAG Polygon ID	GDE Evaluation Unit	Vegetation or Wetland Type	GDE Characterization	Justification	Impacted by Groundwater Extraction
		semi-permanently flooded			
51778	Gridley Canyon	Coast live oak	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
52214	Gridley Canyon	Riparian mixed hardwood	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
51784	Senior Canyon	Coast live oak	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
52073	Senior Canyon	Coast live oak	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
51770	McNell Creek	Coast live oak	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
51773	McNell Creek	Coast live oak	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
52049	McNell Creek	Coast live oak	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
48489	Upper Thacher Creek	Coast live oak	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
51761	Upper Thacher Creek	Coast live oak	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
52020	Upper Thacher Creek	Coast live oak	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
52209	Upper Thacher Creek	Riparian mixed hardwood	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
52683	Upper Thacher Creek	Riversidean alluvial scrub	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
48457	Reeves Creek	Coast live oak	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
48654	Reeves Creek	Coast live oak	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction

Table 2
Characterization of NCCAG Dataset Polygons in the OVGB

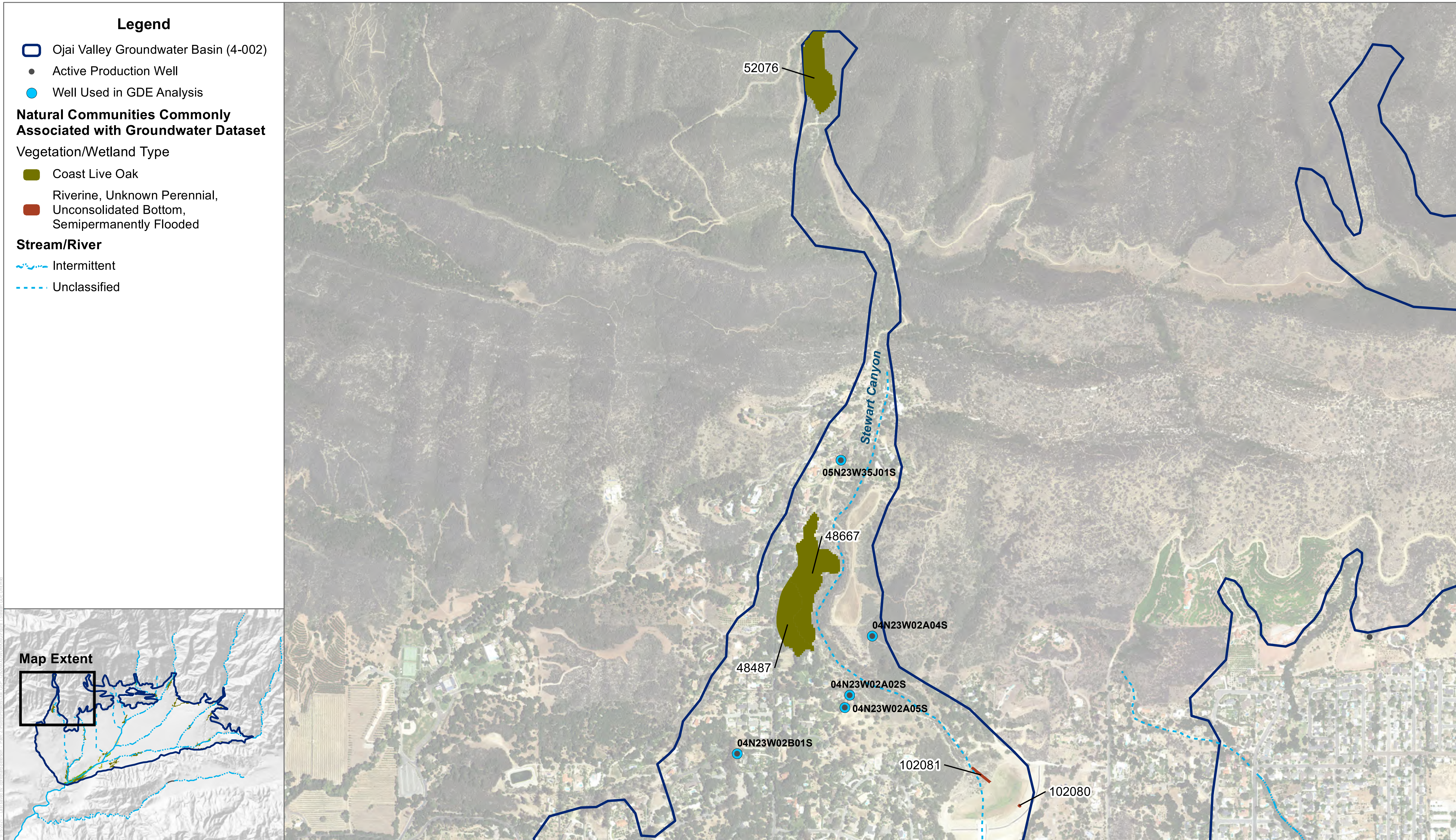
NCCAG Polygon ID	GDE Evaluation Unit	Vegetation or Wetland Type	GDE Characterization	Justification	Impacted by Groundwater Extraction
51971	Reeves Creek	Coast live oak	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
52594	Reeves Creek	Riparian mixed hardwood	Potential GDE	Insufficient site-specific data to characterize groundwater conditions	Not likely to be impacted by groundwater extraction
48628	Lower Thacher Creek	Coast live oak	Potential GDE Not Likely Impacted by Groundwater Extraction	Vegetation health not correlated with groundwater levels and geologic evidence of confining unit	Not likely to be impacted by groundwater extraction
48643	Lower Thacher Creek	Coast live oak	Priority Potential GDE	Vegetation health correlated with groundwater levels and levels shallower than 30 feet bgs	Potential to be impacted by groundwater production
48646	Lower Thacher Creek	Coast live oak	Potential GDE Not Likely Impacted by Groundwater Extraction	Vegetation health not correlated with groundwater levels and geologic evidence of confining unit	Not likely to be impacted by groundwater extraction
52035	Dron Creek	Coast live oak	Priority Potential GDE	Vegetation health correlated with groundwater levels and levels shallower than 30 feet bgs	Potential to be impacted by groundwater production
51726	Upper San Antonio Creek	Coast live oak	Potential GDE Not Likely Impacted by Groundwater Extraction	Vegetation health not correlated with groundwater levels and geologic evidence of confining unit	Not likely to be impacted by groundwater extraction
52204	Upper San Antonio Creek	Riparian mixed hardwood	Priority Potential GDE	Vegetation health correlated with groundwater levels and levels shallower than 30 feet bgs	Potential to be impacted by groundwater production
52675	Upper San Antonio Creek	Riversidean alluvial scrub	Priority Potential GDE	Insufficient data to characterize habitat health over time	Potential to be impacted by groundwater production
52677	Upper San Antonio Creek	Riversidean alluvial scrub	Potential GDE Not Likely Impacted by Groundwater Extraction	Vegetation health not correlated with groundwater levels and geologic evidence of confining unit	Not likely to be impacted by groundwater extraction

Table 2
Characterization of NCCAG Dataset Polygons in the OVGB

NCCAG Polygon ID	GDE Evaluation Unit	Vegetation or Wetland Type	GDE Characterization	Justification	Impacted by Groundwater Extraction
52678	Upper San Antonio Creek	Riversidean alluvial scrub	Potential GDE Not Likely Impacted by Groundwater Extraction	Vegetation health not correlated with groundwater levels and geologic evidence of confining unit	Not likely to be impacted by groundwater extraction
53178	Upper San Antonio Creek	Willow	Priority Potential GDE	Vegetation health correlated with groundwater levels and levels shallower than 30 feet bgs	Potential to be impacted by groundwater production
91230	Upper San Antonio Creek	Palustrine, emergent, persistent, seasonally flooded	Potential GDE Not Likely Impacted by Groundwater Extraction	Vegetation health not correlated with groundwater levels and geologic evidence of confining unit	Not likely to be impacted by groundwater extraction
102079	Upper San Antonio Creek	Riverine, unknown perennial, unconsolidated bottom, semi-permanently flooded	Potential GDE Not Likely Impacted by Groundwater Extraction	Vegetation health not correlated with groundwater levels and geologic evidence of confining unit	Not likely to be impacted by groundwater extraction
51703	Lower San Antonio Creek	Coast live oak	Priority Potential GDE	Vegetation health correlated with groundwater levels and levels shallower than 30 feet bgs	Potential to be impacted by groundwater production
52203	Lower San Antonio Creek	Riparian mixed hardwood	Priority Potential GDE	Vegetation health correlated with groundwater levels and levels shallower than 30 feet bgs	Potential to be impacted by groundwater production
53063	Lower San Antonio Creek	Valley oak	Priority Potential GDE	Vegetation health correlated with groundwater levels and levels shallower than 30 feet bgs	Potential to be impacted by groundwater production
53064	Lower San Antonio Creek	Valley oak	Priority Potential GDE	Vegetation health correlated with groundwater levels and levels shallower than 30 feet bgs	Potential to be impacted by groundwater production
53177	Lower San Antonio Creek	Willow	Priority Potential GDE	Vegetation health correlated with groundwater levels and levels shallower than 30 feet bgs	Potential to be impacted by groundwater production

Table 2
Characterization of NCCAG Dataset Polygons in the OVGB

NCCAG Polygon ID	GDE Evaluation Unit	Vegetation or Wetland Type	GDE Characterization	Justification	Impacted by Groundwater Extraction
93683	Lower San Antonio Creek	Palustrine, forested, seasonally flooded	Potential GDE Not Likely Impacted by Groundwater Extraction	Vegetation health not correlated with groundwater levels and geologic evidence of confining unit	Not likely to be impacted by groundwater extraction
95852	Lower San Antonio Creek	Palustrine, scrub-shrub, seasonally flooded	Priority Potential GDE	Insufficient data to characterize habitat health over time	Potential to be impacted by groundwater production
102077	Lower San Antonio Creek	Riverine, unknown perennial, unconsolidated bottom, semi-permanently flooded	Potential GDE Not Likely Impacted by Groundwater Extraction	Vegetation health not correlated with groundwater levels and geologic evidence of confining unit	Not likely to be impacted by groundwater extraction
48621	Fox Canyon Drain	Coast live oak	Potential GDE Not Likely Impacted by Groundwater Extraction	Vegetation health not correlated with groundwater levels and geologic evidence of confining unit	Not likely to be impacted by groundwater extraction
48642	Fox Canyon Drain	Coast live oak	Potential GDE Not Likely Impacted by Groundwater Extraction	Vegetation health not correlated with groundwater levels and geologic evidence of confining unit	Not likely to be impacted by groundwater extraction
51750	Fox Canyon Drain	Coast live oak	Potential GDE Not Likely Impacted by Groundwater Extraction	Vegetation health not correlated with groundwater levels and geologic evidence of confining unit	Not likely to be impacted by groundwater extraction
51995	Fox Canyon Drain	Coast live oak	Potential GDE Not Likely Impacted by Groundwater Extraction	Vegetation health not correlated with groundwater levels and geologic evidence of confining unit	Not likely to be impacted by groundwater extraction
102078	Fox Canyon Drain	Riverine, unknown perennial, unconsolidated bottom, semi-permanently flooded	Priority Potential GDE	Insufficient data to characterize habitat health over time	Potential to be impacted by groundwater production



DRAFT

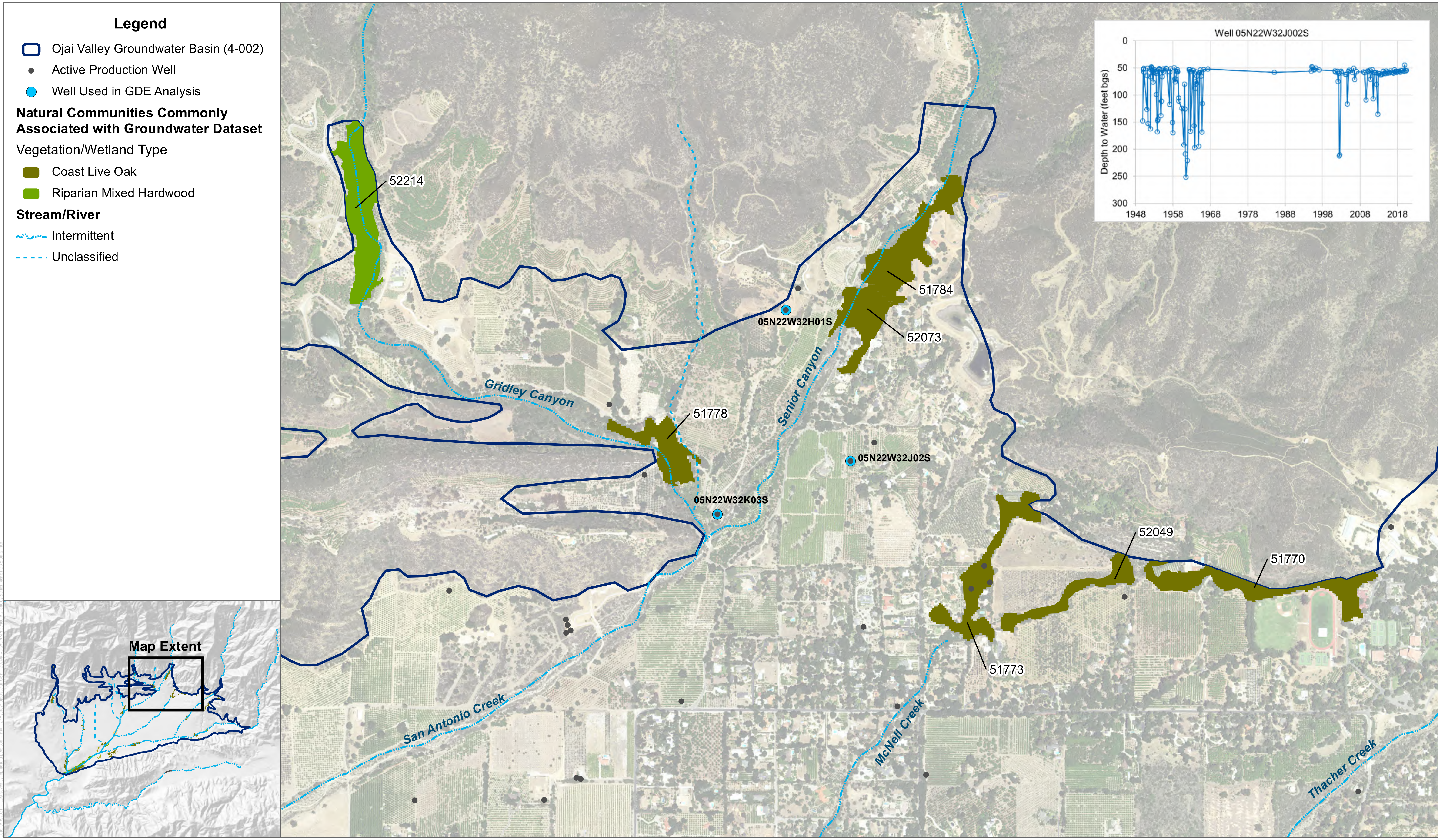
DATUM: NAD 1983 DATA SOURCE: ESRI; DWR; USGS; NCCAG; OBGMA

DUDEK 0 1,000 2,000 Feet

FIGURE 1

Stewart Canyon GDE Evaluation Unit

Groundwater Sustainability Plan for the Ojai Valley Groundwater Basin



DRAFT

DATUM: NAD 1983 DATA SOURCE: ESRI; DWR; USGS; NCCAG; OBGMA

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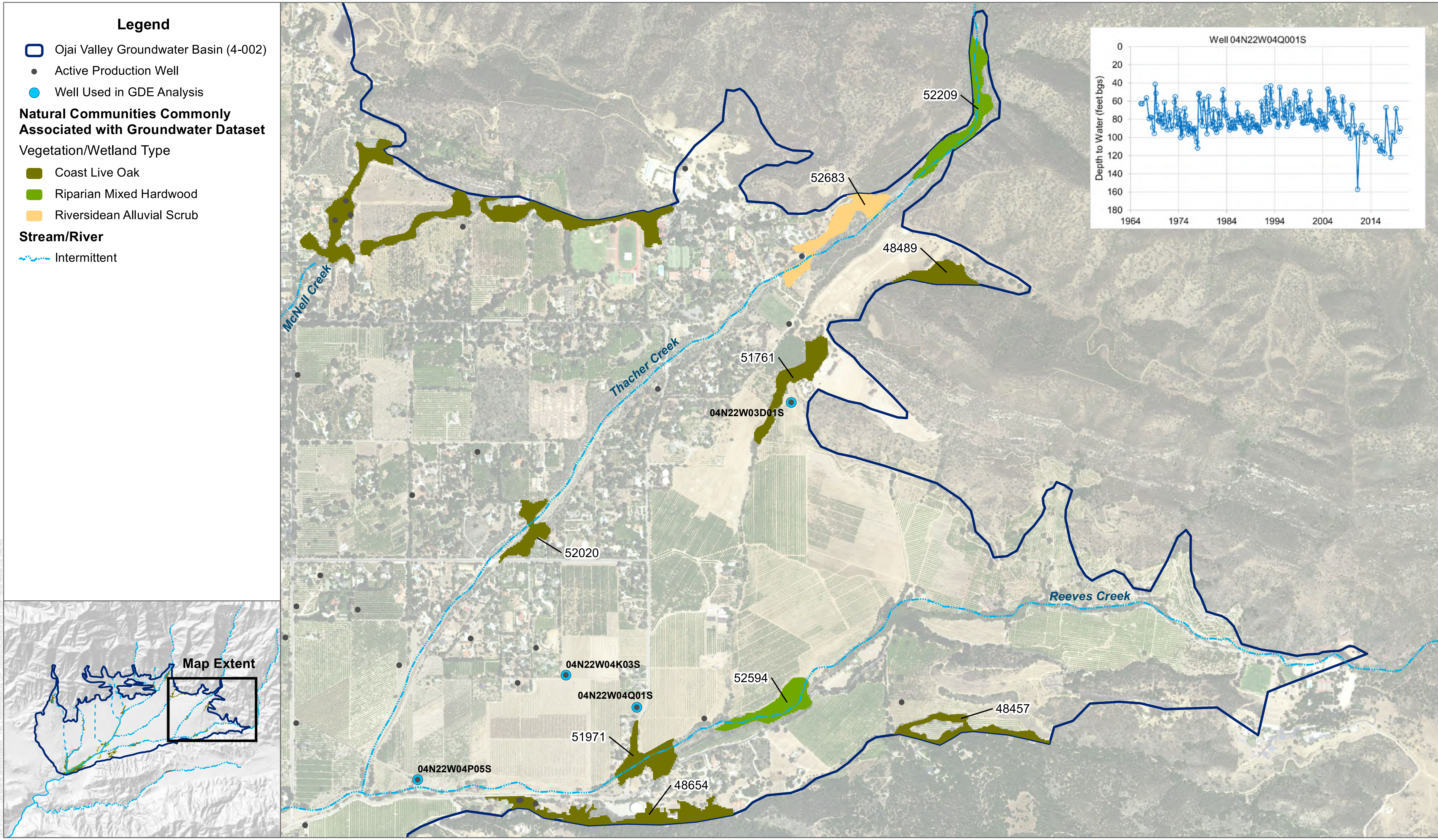
0 1,000 2,000 Feet

FIGURE 2

Gridley Canyon, Senior Canyon, and McNell Creek GDE Evaluation Units

Groundwater Sustainability Plan for the Ojai Valley Groundwater Basin



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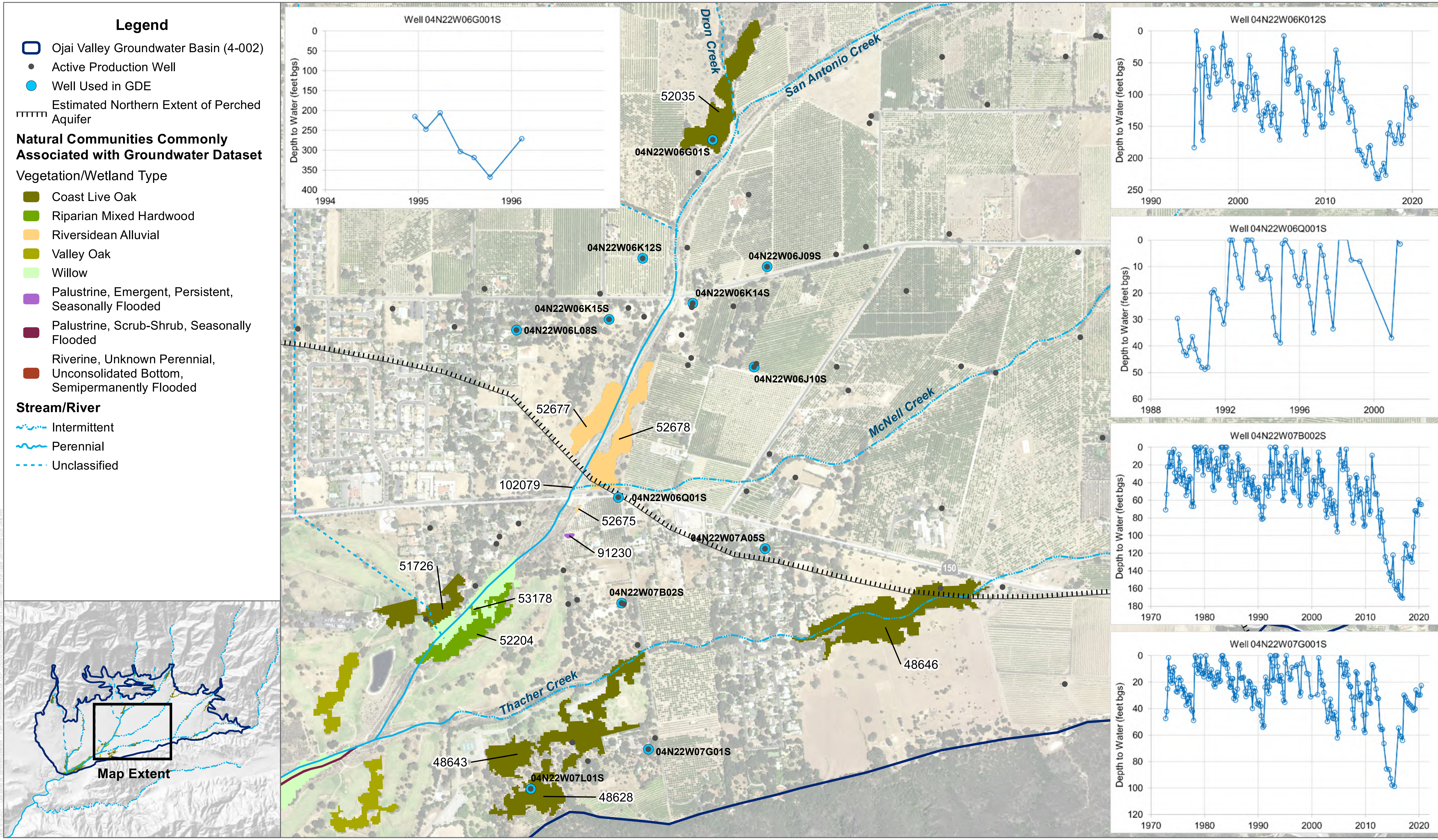
DATUM: NAD 1983 DATA SOURCE: ESRI; DWR; USGS; NCCAG; OBGMA

DUDEK

FIGURE 3

Upper Thacher Creek and Reeves Creek GDE Evaluation Units

Groundwater Sustainability Plan for the Ojai Valley Groundwater Basin



DRAFT

DATUM: NAD 1983 DATA SOURCE: ESRI; DWR; USGS; NCCAG; OBGMA

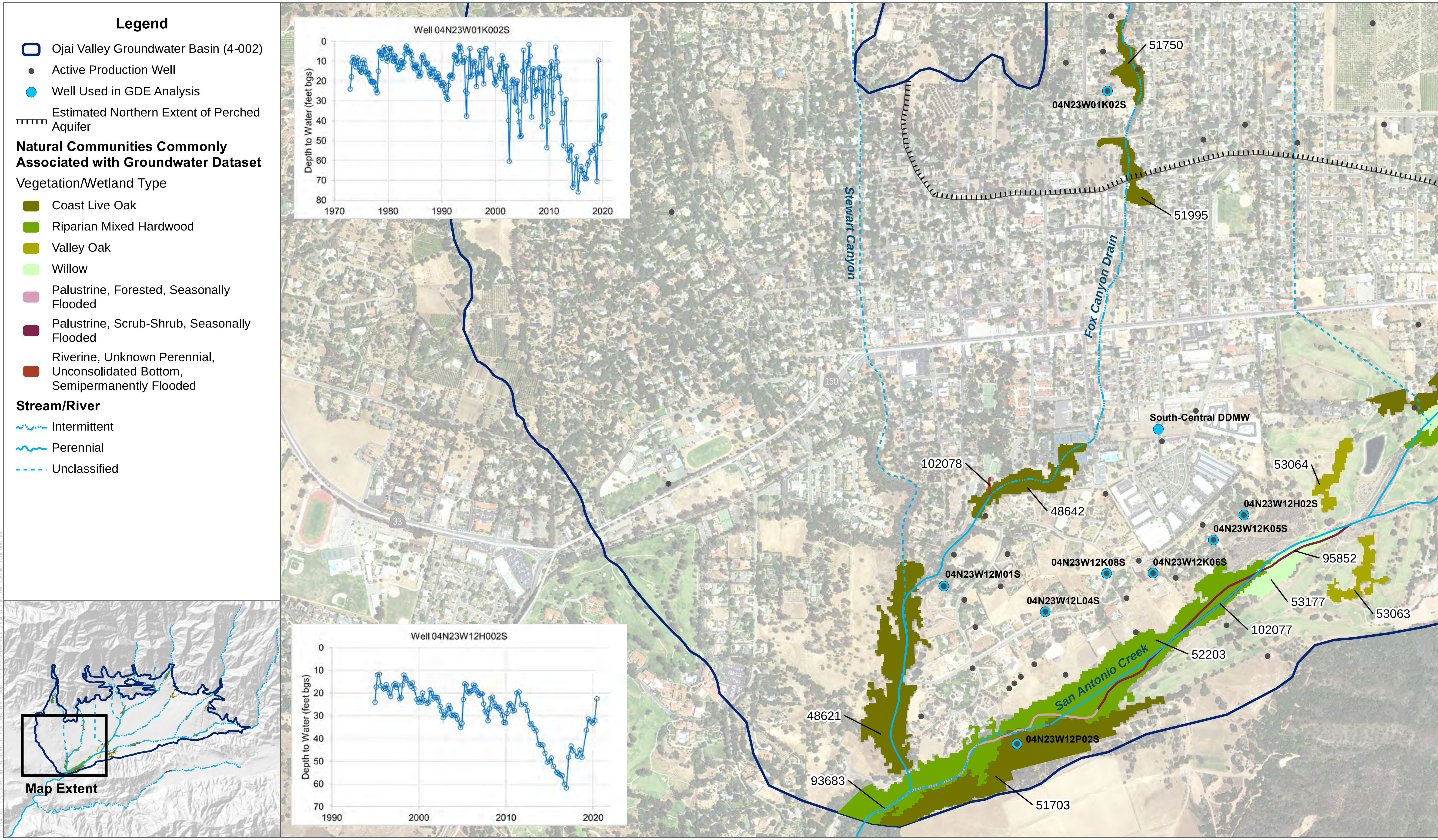
DUDEK

0 1,000 2,000 Feet

FIGURE 4

Lower Thacher Creek, Dron Creek, and Upper San Antonio Creek GDE Evaluation Units

Groundwater Sustainability Plan for the Ojai Valley Groundwater Basin



DRAFT

DATUM: NAD 1983 DATA SOURCE: ESRI; DWR; USGS; NCCAG; OBGMA

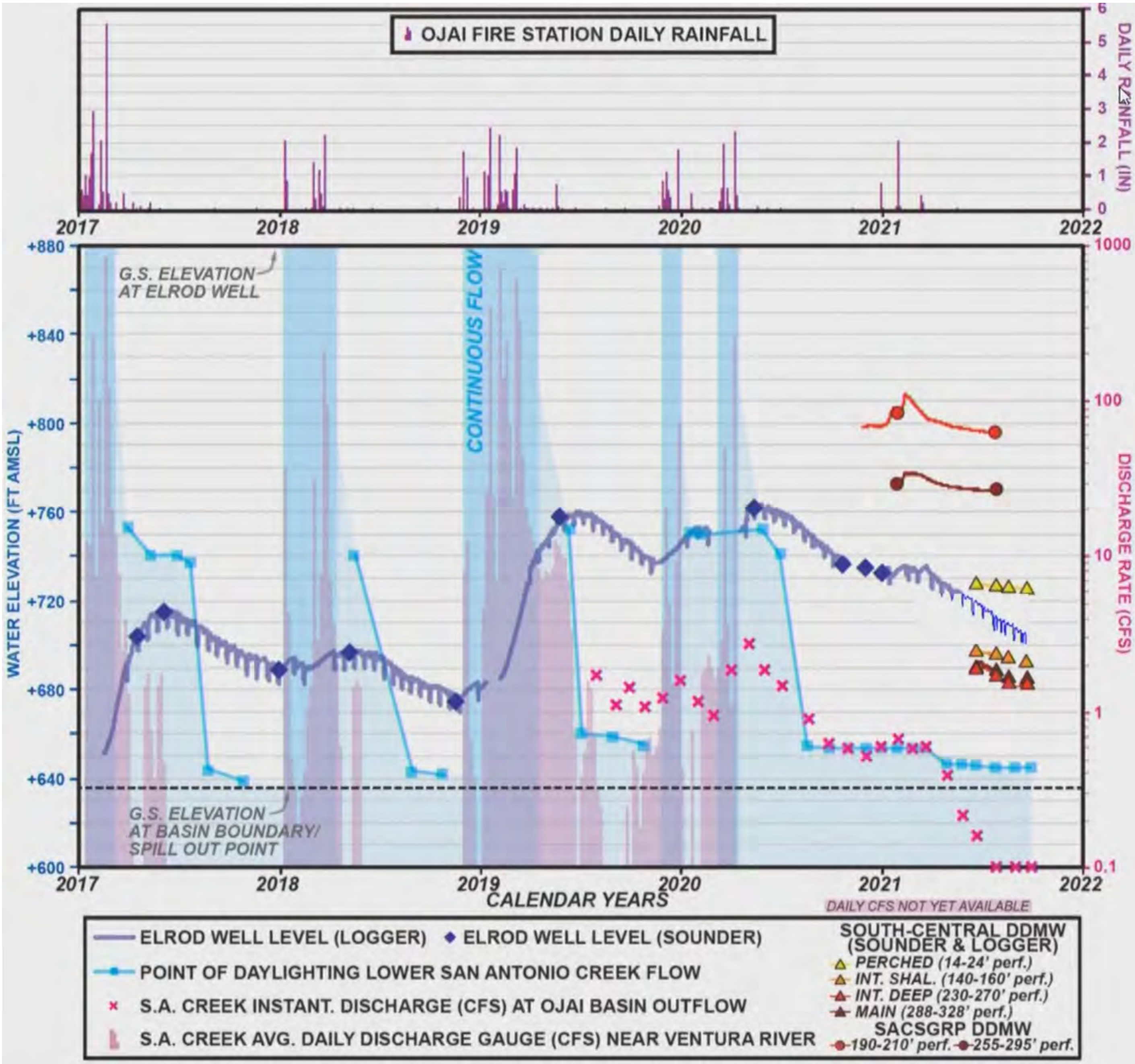
DUDEK

0 1,000 2,000 Feet

FIGURE 5

Lower San Antonio Creek and Fox Canyon Drain GDE Evaluation Units

Groundwater Sustainability Plan for the Ojai Valley Groundwater Basin



SOURCE: OBGMA; Kear

DUDEK

FIGURE 6

Groundwater-Surface Water Monitoring San Antonio Creek

APPENDIX F

Responses to Comments

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
South Coast Region
3883 Ruffin Road
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(858) 467-4201
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GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

December 7, 2021

Via Electronic Mail

Mr. John Mundy
Plan Manager
Ojai Basin Groundwater Management Agency
417 Bryant Circle, Suite 112
Ojai, CA 93023
OjaiBasinGSP@gmail.com
JMundyconsultingllc@gmail.com

Subject: California Department of Fish and Wildlife Comments on the Ojai Basin Groundwater Management Agency's Draft Groundwater Sustainability Plan

Dear Mr. Mundy:

The California Department of Fish and Wildlife (CDFW) appreciates the opportunity to provide comments on the Ojai Basin Groundwater Management Agency's (OBGMA) Ojai Basin (Basin or OVGB) Draft Groundwater Sustainability Plan (Draft GSP) prepared pursuant to the Sustainable Groundwater Management Act (SGMA). The Basin is designated as high priority under SGMA and must be managed under a GSP by January 31, 2022.

CDFW is writing to support ecosystem preservation and enhancement in compliance with SGMA and its implementing regulations based on CDFW expertise and best available information and science. As trustee agency for the State's fish and wildlife resources, CDFW has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of such species (Fish & Game Code §§ 711.7 and 1802).

Development and implementation of GSPs under SGMA represents a new era of California groundwater management. The Department has an interest in the sustainable management of groundwater, as many sensitive ecosystems, species, and public trust resources depend on groundwater and interconnected surface waters (ISWs), including ecosystems on Department-owned and managed lands within SGMA-regulated basins.

SGMA and its implementing regulations afford ecosystems and species specific statutory and regulatory consideration, including the following as pertinent to GSPs:

- GSPs must **consider impacts to groundwater dependent ecosystems** (GDEs) (Water Code § 10727.4(l); see also 23 CCR § 354.16(g));
- GSPs must consider the interests of all beneficial uses and users of groundwater, including environmental users of groundwater (Water Code § 10723.2) and GSPs must **identify and consider potential effects on all beneficial uses and users of**

groundwater (23 CCR §§ 354.10(a), 354.26(b)(3), 354.28(b)(4), 354.34(b)(2), and 354.34(f)(3));

- GSPs must **establish sustainable management criteria that avoid undesirable results** within 20 years of the applicable statutory deadline, including **depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water** (23 CCR § 354.22 *et seq*. and Water Code §§ 10721(x)(6) and 10727.2(b)) and describe monitoring networks that can identify adverse impacts to beneficial uses of interconnected surface waters (23 CCR § 354.34(c)(6)(D)); and,
- GSPs must **account for groundwater extraction for all water use sectors,** including managed wetlands, managed recharge, and native vegetation (23 CCR §§ 351(al) and 354.18(b)(3)).

Furthermore, the Public Trust Doctrine imposes a related but distinct obligation to consider how groundwater management affects public trust resources, including navigable surface waters and fisheries. Groundwater hydrologically connected to surface waters is also subject to the Public Trust Doctrine to the extent that groundwater extractions or diversions affect or may affect public trust uses. (*Environmental Law Foundation v. State Water Resources Control Board* (2018), 26 Cal. App. 5th 844; *National Audubon Society v. Superior Court* (1983), 33 Cal. 3d 419.) The groundwater sustainability agency (GSA) has "an affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect public trust uses whenever feasible." (*National Audubon Society*, *supra*, 33 Cal. 3d at 446.) Accordingly, groundwater plans should consider potential impacts to and appropriate protections for ISWs and their tributaries, and ISWs that support fisheries, including the level of groundwater contribution to those waters.

In the context of SGMA statutes and regulations, and Public Trust Doctrine considerations, groundwater planning should carefully consider and protect environmental beneficial uses and users of groundwater, including fish and wildlife and their habitats, GDEs, and ISWs.

The Basin supports both riparian and aquatic habitat. The Basin's riparian habitat supports several special status avian species, including the least Bell's vireo (*Vireo belli pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), yellow warbler *(Setophaga petechia*), yellow-breasted chat *(Icteria virens),* and Cooper's hawk *(Accipiter cooperi).* This riparian habitat also supports several special status aquatic species, including Southern California steelhead (*Oncorhynchus mykiss*), arroyo chub (*Gila orcuttii*), California red-legged frog *(Rana aurora draytonii), s*outhwestern pond turtle *(Actinemys pallida),* and two-striped garter snake *(Thamnophis hammondii)*. Pertaining to the protection of these species and their habitat, CDFW is providing comments regarding GDE monitoring and implementation of management actions to help ensure appropriate consideration and protection of GDEs and beneficial users of groundwater and ISWs. CDFW is providing additional comments and recommendations as notated in Attachment A. Editorial comments or other suggestions are included for OBGMA's consideration during development of a final GSP.

If you have any questions related to CDFW's comments and/or recommendations on the Ojai Basin Draft GSP, please contact Steve Slack, Environmental Scientist, at Steven.Slack@wildlife.ca.gov.

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Sincerely,

DocuSigned by:
Erinn Wilson
B6E58CFE24724F5...

Erinn Wilson-Olgin
Environmental Program Manager
South Coast Region

Enclosure(s): Attachment A, Attachment B

ec: California Department of Fish and Wildlife

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Attachment A

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE COMMENTS ON THE OJAI BASIN DRAFT GROUNDWATER SUSTAINABILITY PLAN

SPECIFIC COMMENTS AND RECOMMENDATIONS

CDFW's comments are as follows:

Comment #1 – Natural Recharge (Page ES-2): The Draft GSP does not accurately define natural recharge and confuses natural recharge with artificial recharge.

Issue: The OBGMA's description of natural recharge conflicts with U.S. Geological Survey's (USGS) description of natural recharge. The OBGMA states that "*Natural recharge to the OVGB occurs through percolation of surface waters through alluvial channels, infiltration of precipitation that falls directly on the valley floor, subsurface flow, and septic and irrigation return flow*" (Executive Summary 2.0, Summary of Basin Setting and Conditions, page ES-2). According to the U.S. Geological Survey (USGS 2021), septic and irrigation return flows are characterized as artificial groundwater recharge.

Recommendation #1: CDFW recommends that the OBGMA reconsider how the GSP defines natural recharge and reclassify septic, and irrigation returns as artificial recharge consistent with the USGS characterization.

Comment #2 – GDEs based on the 30-foot Depth Groundwater Criterion (Page 2-140) and Potential GDE Elimination (Page 2-137): The Draft GSP has eliminated 13 individual communities comprising 59.5 acres of habitat.

Issue # 2.1: A 30-foot depth to groundwater criterion was applied to identify potential GDEs (Section 2.3.4.7). GDE identification, required by 23 CCR § 354.16(g), is based on methods that risk exclusion of ecosystems that may depend on groundwater. According to Figures 1-5 (Appendix E: GDE's) of the Draft GSP, the groundwater depth is greater than 30 feet throughout the Basin. After applying the 30-foot criterion, certain GDEs along San Antonio Creek, Thacher Creek, Reeves Creek, McNell Creek, and throughout the Basin were excluded from consideration as potential GDEs. The Draft GSP removes potential GDEs with a depth to groundwater greater than 30 feet; however, mature valley oak (*Quercus lobata*) can access groundwater up to 80 feet below the ground surface (Howard 1992, Lewis & Burgy, 1964). The use of a 30-foot threshold may incorrectly exclude valley oak communities within the Basin from further consideration as a GDE. The Draft GSP has identified 5.8 acres of valley oak in the Basin on Table 2-12, page 2-138.

Recommendation #2.1(a): CDFW recommends the GSP update the methodology for GDE identification to reflect accurate maximum rooting depth specifically for valley oak communities. CDFW recommends use of the Natural Communities Commonly Associated with Groundwater dataset, field verification, and/or other local data to identify the locations of valley oaks within the Basin. For those areas, the GDE analysis should apply a threshold of 80 feet below the ground surface as the maximum potential depth at which the potential GDE could access groundwater. CDFW accepts the use of a 30-foot threshold as sufficiently conservative for other potential GDEs within the Basin that likely do not contain valley oaks. CDFW recommends the OBGMA identify these areas, and retain these areas as potential GDEs in the final GSP until future monitoring data can eliminate them as GDEs.

Recommendation #2.1(b): CDFW recommends that OBGMA utilize The Nature Conservancy's (TNC) GDE Pulse web-map to view vegetation identified as potential GDEs with data that identifies long term temporal trends of vegetation metrics (TNC 2021).

Recommendation #2.1(c): CDFW recommends that OBGMA utilize U.S. Fish and Wildlife Service's (USFWS)'s National Wetlands Inventory (2021) to identify potential GDEs such as riverine habitat, freshwater forested/shrub wetland, and freshwater emergent wetland.

Issue #2.2: The Draft GSP has indicated that the interaction between groundwater and surface water within the OVGB is a data gap. Page 2-137 of the Draft GSP states, "*However, available shallow monitoring well and stream gauge data are limited in temporal resolution (i.e., short length of record and/or coarse measurement interval) and additional data and analysis are needed to quantify the degree of stream-aquifer connectivity. In order to adequately characterize the interaction between groundwater and surface water within the OVGB, additional analysis and continued monitoring of groundwater levels in the shallow perched aquifer, and streamflow and stage in San Antonio Creek is required. Chapter 3, Section 3.5, Monitoring Network, explains the proposed actions to evaluate groundwater–surface water interactions*".

Hydrologic connectivity considerations include connected surface waters, disconnected surface waters, and transition surface waters. CDFW believes that shallow perched groundwater, bedrock groundwater, and surface water can still be connected to groundwater and hydrologic connectivity cannot be ruled out without further analysis. A recent publication by TNC notes that, *"If pumping is concentrated in deeper aquifers, SGMA still requires GSAs to sustainably manage groundwater resources in shallow aquifers, such as perched aquifers, that support springs, surface water, domestic wells, and GDEs…This is because vertical groundwater gradients across aquifers may result in pumping from deeper aquifers to cause adverse impacts onto beneficial users reliant on shallow aquifers or interconnected surface water."* (TNC 2019)

The Draft GSP is not clear regarding which potential GDEs will be included for further monitoring and testing in the final GSP. There are 46 individual vegetation and wetland communities identified as potential GDEs comprising a total of 253.3 acres. Out of the 46 communities,13 individual communities comprising of 59.5 acres have been characterized as potential GDEs not likely to be impacted by groundwater extraction. It is unclear how this distinction can be made if the interaction between groundwater and surface water is a data gap in this Draft GSP. The Draft GSP mentions that these 13 communities **may** be disconnected from the principal aquifer.

If hydrologic connectivity exists between a terrestrial or aquatic ecosystem and groundwater, then that ecosystem is a potential GDE and must be identified in a GSP. (23 CCR § 354.16 (g).) Therefore, hydrologic connectivity between surface water and groundwater, as well as groundwater accessibility to terrestrial vegetation, must be carefully evaluated.

Recommendation #2.2(a): CDFW recommends the final GSP provide a more detailed assessment of the 13 communities within the Basin that were mapped as "GDEs not impacted by groundwater extraction". Conclusions regarding the presence of GDEs need to be well-supported. CDFW also recommends considering best available GDEs-related data and information when conducting this analysis. Specifically, the OBGMA should consider the best scientific data on depth to groundwater in its analysis of ISWs, USGS data on mapped springs/seeps, and a comparison of recent groundwater level contours to vegetation root zones. CDFW believes the shallow perched aquifer and shallow alluvial aquifer, although rarely used for water supply, likely support GDEs and should be analyzed further in the Draft GSP. Groundwater within the shallow perched and alluvial aquifers is likely critical to supporting "ecological communities or species" within the Basin (23 CCR § 351(m)).

Recommendation #2.2(b): CDFW recommends the OBGMA utilize the digital database of indicators of groundwater dependent ecosystems (iGDEs) from the *Mapping Indicators of Groundwater Dependent Ecosystems in California: Methods Report* (Klausmeyer et al. 2018) to review each of the ecoregion/vegetation types. In Klausmeyer et al. 2018, vegetation alliance descriptions from *A Manual of California Vegetation, Second Edition* (Sawyer et al. 2009) are used to classify vegetation communities. In addition to using the iGDEs database, CDFW also recommends field assessments be conducted to further reclassify vegetation communities based on the dominant plant species (Sawyer et al. 2009).

Recommendation #2.2(c): CDFW recommends using Normalized Difference Vegetation Index (NDVI) and Normalized Difference Moisture Index (NDMI) to assess habitat health for all potential GDE areas on an annual basis. NDVI and NDMI should be used as early indicators of water stress on GDEs. NDVI and NDMI are remotely sensed color data that can be used as a refined proxy for vegetation health in the Basin. The TNC GDE Pulse tool (2021) provides both a web viewer and access to the raw data to analyze these metrics over different periods of time (Klausmeyer et al. 2019).

Recommendation #2.2(d): If the OBGMA's revised analysis indicates that additional communities qualify as GDEs under SGMA, CDFW recommends the GSP's sustainable management criteria (SMC) be revised to facilitate appropriate and timely monitoring and management response actions for all beneficial users within or supported by these GDEs. These GDEs should be monitored for groundwater levels and vegetative health to account for and mitigate potential adverse impacts to these GDEs from new production wells or expanded production from existing wells.

Recommendation #2.2(e): CDFW does not recommend relying solely on soils information to assess the presence of GDEs. For example, the presence of sandy, dry, and friable soils does not mean that existing plant species do not rely on groundwater for some portion of their life cycle. Capillary fringe associated with root networks from native plants could be accessing groundwater from deeper depths.

Recommendation #2.2(f): CDFW recommends the final GSP develop SMC for all areas of ISWs and GDEs within the OVGB.

Comment #3 – Section 4.2.4 Prepare Groundwater Dependent Ecosystem Assessment (Page 4-11): The Draft GSP does not include minimum thresholds or measurable objectives to protect ISWs and GDEs.

Issue: Terrestrial and aquatic special-status species are not sufficiently analyzed in this Draft GSP. Section 4.2.4 indicates that "*There is not sufficient information at this time to establish a minimum threshold or measurable objective for depletions of interconnected surface water or groundwater dependent ecosystems (GDEs). To fill existing data gaps and support development of minimum thresholds and measurable objectives the OBGMA will prepare a riparian and aquatic groundwater dependent ecosystems assessment for the OVGB. The*

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assessment would include a work plan for completion of biological surveys, additional stream and aquifer monitoring, and removal and identification of potential funding of non-native phreatophytes". Based on the lack of information provided in the Draft GSP, CDFW is not able to determine if all listed and special status species in the Basin are accounted for. The Basin provides habitat that supports several sensitive species such as Southern California steelhead [*Oncorhynchus mykiss* (*O. mykiss*) or southern steelhead], an endangered species under the Federal Endangered Species Act (ESA), the ESA-listed and CDFW species of special concern (SSC) California red-legged frog (*Rana draytonil*), the ESA-listed and California Endangered Species Act (CESA)-listed least Bell's vireo (*Vireo belli pusillus*), and the ESA-listed and CESA-listed southwestern willow flycatcher (*Empidonax traillii extimus*). Additional CDFW SSCs known to occur in the area include yellow warbler *(Setophaga petechia*), yellow-breasted chat *(Icteria virens),* Cooper's hawk *(Accipiter cooperi)*, arroyo chub (*Gila orcuttii*), southwestern pond turtle (*Actinemys pallida*), and two-striped garter snake *(Thamnophis hammondii)* (CNDDB 2021b; USFWS 2021).

California red-legged frog is rarely encountered far from perennial water. Tadpoles require water for at least three or four months while completing their aquatic development. Adults eat both aquatic and terrestrial invertebrates, and the tadpoles graze along rocky stream bottoms. Groundwater pumping that impairs streamflow could have negative impacts on California red-legged frog populations.

Southwestern pond turtle was designated as a California SSC in 1994. Southwestern pond turtles' preferred habitat is permanent ponds, lakes, streams, or permanent pools along intermittent streams associated with standing and slow-moving water. A potentially important limiting factor for western pond turtle is the relationship between water level and flow in off-channel water bodies, which can both be affected by groundwater pumping.

Habitats that support these species also consist of phreatophytes and other vegetation communities that are dependent on shallow aquifers that support surface water in each of these systems. Phreatophytic vegetation is a critical contributor to nesting and foraging habitat, and forage for a wide range of species. These vegetation communities can be affected by depth to groundwater threshold impacts (Froend et. al. 2010; Naumburg et.al. 2005). This sensitivity to groundwater level thresholds means that localized pumping and recharge actions altering groundwater levels can impact the health and extent of phreatophyte vegetation health. Both decreasing (drying out) or increasing (drowning) groundwater elevation have the potential to stress phreatophytes depending on the plant species and the groundwater elevation and duration (e.g., short term wetness/dryness versus prolonged wetness/dryness).

If groundwater depletion results in reduced streamflow in areas with ISWs, the nesting and foraging success of southwestern willow flycatcher, least Bell's vireo, and other bird species may be diminished due to the reduced nesting habitat and food availability.

The unsustainable use of groundwater can impact the species dependent on shallow aquifers and ISWs. This may lead to adverse impacts on fish and wildlife and the habitat they need to survive. Determining the effects that groundwater levels have on surface water flows in the Basin would provide an understanding of how the groundwater levels may be associated with the health and abundance of riparian vegetation. Poorly managed groundwater pumping, and interconnected surface water flows have the potential to reduce the abundance and quality of riparian vegetation, reducing the amount of shade provided by the vegetation, and ultimately leading to increased water temperatures in the Basin. Based on the information provided in the Draft GSP, CDFW is not able to determine all habitats that are supported by groundwater.

Recommendation #3: CDFW highly recommends that the OBGMA map out locations where there are ISWs and document aquatic habitats and other GDEs as required under SGMA. The OBGMA should then provide appropriate consideration to those habitats and the sensitive species that rely on them. Fish and wildlife resources should be considered in the water budget. Additionally, shallow groundwater levels near ISWs should be monitored to ensure that groundwater use is not depleting surface water and affecting fish and wildlife resources in the Basin.

Comment #4 – Federally Endangered Southern California Steelhead Habitat and Other Sensitive Species: The Draft GSP does not provide sufficient analysis of potential effects on public trust resources, especially on sensitive species occurring within the Basin.

Issue #4.1: San Antonio Creek contains important southern steelhead spawning and rearing habitat. Threats to southern steelhead from groundwater pumping, such as excessively high-water temperatures due to reduced surface flows or groundwater pumping in the spring, summer, and early fall, reduce available juvenile rearing habitat. Low flows in the fall and winter can delay adult passage to critical spawning areas. CDFW suggests that the OBGMA consider the impacts of the Draft GSP on the health of the southern steelhead population in the Basin, particularly in the lower perennial reach of San Antonio Creek.

Recommendation #4.1(a): To ensure meaningful consideration of beneficial users of groundwater and GDEs as required under SGMA, CDFW recommends the OBGMA provide a biological assessment identifying species known to occur within the GDEs presented in Figure 2-36 (Page 2-141), including southern steelhead, California red-legged frog, least Bell's vireo, southwestern willow flycatcher, yellow warbler, yellow-breasted chat, Cooper's hawk, arroyo chub, southwestern pond turtle, and two-striped garter snake. Given these species' dependency on GDEs, the Draft GSP must 1) accurately identify species that occur in the Basin and depend on groundwater; 2) identify species' habitats; and 3) identify potential effects on these species and their habitat from current and future groundwater pumping scenarios.

Recommendation #4.1(b): CDFW recommends the OBGMA identify potential impacts of groundwater depletions to fish and wildlife beneficial users. Furthermore, the evaluation should consider species' water needs for all life history stages when defining undesirable results and setting minimum thresholds as required by SGMA (see Recommendation #4.1(a) for list of species). For example, CDFW recommends that the evaluation describe flow conditions necessary to ensure sufficient hydrologic connectivity to support each stage of the southern steelhead life cycle (Please see Recommendation #5(a) below). Different fish and wildlife species have different water needs. Understanding the timing of water availability with respect to species needs across all life history phases will allow groundwater planners to better account for groundwater management impacts to fish and wildlife species and users of groundwater and ISWs.

Recommendation #4.1(c): CDFW recommends OBGMA map and document open water habitat in addition to GDEs in the final GSP.

Issue #4.2: The OBGMA does not have a plan or established objectives to address potential impacts to southern steelhead or other sensitive species that are dependent on groundwater and/or ISW. The OBGMA is proposing to wait for a settlement or conclusion of the Ventura

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River comprehensive groundwater and surface water adjudication (Ventura River Adjudication). According to the Draft GSP, the Proposed Physical Solution is a proposed resolution to the Ventura River Adjudication that its proponents claim addresses undesirable depletions of ISWs and protects the spawning and rearing habitat of southern steelhead. However, the Proposed Physical solution was developed by a limited group of consumptive users in the Ventura River watershed, and does not necessarily represent the best available science regarding the needs of southern steelhead and other species. There is no consensus among the Ventura River Adjudication parties (including resource agencies such as CDFW and the State Water Resources Control Board [SWRCB]) or scientific community that the Proposed Physical Solution adequately considers and protects beneficial users of ISW and groundwater and avoids undesirable results, including depletions of ISW that have significant and unreasonable adverse impacts on beneficial users. CDFW believes OBGMA needs to establish interim milestones with established objectives that will identify and address impacts to sensitive species.

Recommendation #4.2: Per SGMA statutes and regulations, the OBGMA should consider the best available science to assess the needs of species that depend on ISW or groundwater, and develop appropriate SMC and project and management actions for protection of these species. Under the Public Trust Doctrine, the OBGMA has an obligation to protect sensitives species, such as southern steelhead. The OBGMA should not wait for action by the Court or parties in the Ventura River Adjudication before proceeding to establish SMC and project and management actions.

Comment #5 – Section 3.3.6: The GSP Does Not Account for the Best Available Science for Depletions of Interconnected Surface Waters or GDEs (Page 3-26): The Draft GSP has not considered the best available science relevant to depletions of ISWs or impacts on GDEs.

Issue: In Section 3.3.6, the Draft GSP does not incorporate CDFW's Instream Flow Criteria or the SWRCB's groundwater-surface water modeling of the Ventura River Watershed. Groundwater pumping has the potential to draw down surface flows, which may lead to inadequate depths for southern steelhead passage or reduced habitat for steelhead spawning and rearing. This draw-down may constitute a significant and unreasonable adverse effect on public trust resources, including southern steelhead.

Recommendation #5(a): In May 2020, CDFW's Instream Flow Program publicly released the Instream Flow Regime Criteria on a Watershed Scale of the Ventura River (Watershed Criteria Report) (2020). CDFW's Watershed Criteria Report represents the best available science regarding flows needed to support the Basin's ecosystem within the Lower San Antonio Creek (San Antonio Creek 1), Upper San Antonio Creek (San Antonio Creek 2), and Lion Canyon Creek, a tributary to San Antonio Creek.

<u>Ecosystem Baseflows</u>
The Ecosystem Baseflows are monthly baseflows that preserve a healthy stream ecosystem. These are calculated as a percentage of monthly and annual Natural Flows and vary throughout the year.

San Antonio Creek 1 (cfs)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
22	34	20	10	8	3	1	<1	1	2	6	8

San Antonio Creek 2 (cfs)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
14	23	13	7	6	2	1	<1	1	1	4	6

Lion Canyon Creek (cfs)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
7	11	6	3	2	1	<1	<1	<1	<1	2	3

<u>Wetted Perimeter Sensitive Period Indicators</u>

Sensitive Period Indicator flows can be used to identify the sensitive low-flow period. During this period, fish and wildlife may be particularly sensitive to flow reductions. These flows can be determined using a field-based analysis.

- San Antonio Creek 1: 4 cfs
- San Antonio Creek 2: 5 cfs

When the Sensitive Period Indicator flows are not met, the ecosystem is likely to be particularly sensitive to additional flow reductions and other stressors.

<u>Steelhead Habitat Optimum Flows</u>

Steelhead Habitat Optimum Flows provide optimal access to preferred steelhead habitat.

- San Antonio Creek 1: 11 cfs
- San Antonio Creek 2: 8 cfs
- Lion Canyon Creek: 5 cfs

<u>Steelhead Passage Flows</u>

Steelhead Passage Flows provide enough water for steelhead to cross riffles, which are typically the shallowest part of the channel.

San Antonio Creek 1:

Juvenile Steelhead Passage Flows	8 cfs
Adult Steelhead Passage Flows	24 cfs

San Antonio Creek 2:

Juvenile Steelhead Passage Flows	7 cfs
Adult Steelhead Passage Flows	24 cfs

These Steelhead Passage Flows provide connectivity between mesohabitat units for steelhead.

In addition, CDFW (2021a) released an additional report for San Antonio Creek (*Instream Flow Evaluation: Southern California Steelhead Adult Spawning and Juvenile Rearing in San Antonio Creek, Ventura County*) in November 2021. This San Antonio Creek Instream Flow Evaluation Report (CDFW 2021a) represents the best available science and includes criteria for flows to support southern steelhead habitat in San Antonio Creek that should also be included in the final GSP.

Summary of Area-Weighted Suitability (AWS) from the 1D Hydraulic Modeling Analysis

Reach	Flow for Maximum Juvenile Steelhead Rearing AWS (cfs)	Flow for 50% Maximum Juvenile Steelhead Rearing AWS (cfs)	Flow for Maximum Adult Steelhead Spawning AWS (cfs)	Flow for 50% Maximum Adult Steelhead Spawning AWS (cfs)
1	20	3	25	9
2	22	5	17	7

This table identifies flows that produce the most suitable habitat for spawning and rearing of southern steelhead. It also presents flows that would produce 50% of suitable habitat based on area and southern steelhead habitat preferences (CDFW 2021a).

The Watershed Criteria Report (CDFW 2020) and the San Antonio Creek Instream Flow Evaluation Report (CDFW 2021a) are tools that should be used for consideration in water management planning. CDFW recommends that the OBGMA incorporate the data from both reports into the development of minimum thresholds in the final GSP. These reports should be used to inform the development of minimum thresholds, measurable objectives, and interim milestones. Establishment of SMC grounded in the best available science is necessary to avoid ISW depletions that have significant and unreasonable adverse effects on southern steelhead and other beneficial users, as required under SGMA.

Recommendation #5(b): On August 31, 2021, the State Water Resources Control Board (SWRCB) released a Preliminary Draft version of the Groundwater-Surface Water Model of the Ventura River Watershed. This integrated groundwater-surface water model quantifies the relationship between surface flow, subsurface flow, and instream flow requirements in the Ventura River watershed, including areas within the Basin. CDFW recommends the OBGMA incorporate the model's data and simulation results into the final GSP.

Comment #6 – Section 3.3.1 Chronic Lowering of Groundwater Levels-Minimum Thresholds (Page 3-11): Defaulting to the post-2015 low groundwater level as minimum thresholds because similar conditions have previously occurred does not account for relevant best available since, including annual cycles and seasonal variation.

Issue: The Draft GSP defaults to seasonal or historical low groundwater levels to establish minimum thresholds. The OBGMA states that:

- "*The minimum thresholds for groundwater levels are based on the record low static groundwater level that occurred in well 04N22W05L008S at approximately 312 feet below ground surface in September 1951. The minimum thresholds represent groundwater elevations in the OVGB that, if exceeded at multiple wells for a duration of greater than one year, may cause undesirable results*" (ES-3.0 Overview of Sustainability Indicators, Minimum Thresholds, and measurable objectives, Groundwater levels, page ES-3).
- "*Maintaining groundwater levels above recorded historical low static levels at RMPs during multiyear drought conditions was selected as the minimum desired threshold for groundwater elevations that would be protective of beneficial uses in the OVGB. These minimum thresholds would be protective of all potable and non-potable beneficial uses because undesirable results have not historically occurred at these levels*" (3.3.1 Chronic

Lowering of Groundwater Levels-Minimum Thresholds, 3.3.1.1 Minimum Threshold Justification, page 3-12).
- "*Assuming a repeat of historical climate conditions, the record low static groundwater levels measured at RMPs during the 2012 to 2016 drought, with a 10% buffer applied to correct for the OVGB record low groundwater level as measured in well 04N22W05L008S in September 1951, are established as the minimum thresholds to avoid the undesirable results of chronic lowering of groundwater levels*" (3.3.1 Chronic Lowering of Groundwater Levels-Minimum Thresholds, 3.3.1.1 Minimum Threshold Justification, page 3-13).

The Draft GSP establishes minimum thresholds for groundwater levels based on record low static groundwater levels. This is not likely to prevent undesirable results to beneficial users, or ISWs, including GDEs (see Comment #7). For ISWs, the Draft GSP sets the proxy groundwater elevation minimum thresholds at the highest seasonal low of a below-normal water year that occurred prior to 2015. The Draft GSP assumes that undesirable results would be avoided because any associated ISW depletions would not be worse than what occurred prior to 2015. Threshold levels for compliance should be defined in a way that reflects an annual cycle — including seasonal thresholds as well as inter-annual thresholds that reflect how levels have historically behaved during dry and wet periods—again, using the best available information (DWR 2016). The Draft GSP contends that only groundwater conditions that worsen beyond historic lows would constitute an undesirable result. However, GSPs must first evaluate potential adverse impacts to beneficial uses and users and determine at what groundwater levels those impacts would occur, and *then* set minimum thresholds accordingly. Defaulting to the post-2015 low groundwater level as minimum thresholds because similar conditions have previously occurred does not adequately consider potential adverse impacts to beneficial uses or users, and public trust resources.

Groundwater levels immediately preceding 2015 were likely unusually low due to limited surface water availability and/or heavier reliance on groundwater pumping during the drought period. Therefore, the levels during this drought period, or estimates of the levels, should be considered the low point in a wet-dry year cycle, and should be adopted as the bottom of the allowable range.

Recommendation #6: The Draft GSP should reselect minimum thresholds that would better protect environmental uses and users of groundwater, rather than defaulting to the historical low groundwater levels for the Basin. CDFW recommends OBGMA re-establish the minimum thresholds based on CDFW's Recommendation #5(a) that would protect environmental uses and users of groundwater.

Comment #7 – Section 3.3.6 Depletions of Interconnected Surface Water and Establish Minimum Thresholds and Measurable Objectives (Page 3-26): The Draft GSP indicated there is not sufficient information at this time to establish minimum thresholds, measurable objectives, or interim milestones for depletions of ISWs or GDEs.

Issue: The Draft GSP should specify how streamflow depletion minimum threshold exceedances will be identified on a timescale that is shorter than five years. The Draft GSP lacks an actionable path for identifying and addressing undesirable results caused by streamflow depletion in real-time to avoid adverse impacts to aquatic GDEs. The Draft GSP relies on long-term climate averages to measure compliance with minimum thresholds. This will not timely address undesirable results occurring on shorter climatic time scales or during periods of drought. CDFW generally comments on these concerns regarding minimum thresholds and measurable objectives as it relates to the health of fish and wildlife in their respective habitats. Based on the lack of information provided in the Draft GSP, CDFW is not able to determine if the minimum threshold is sufficient to ensure avoidance of significant and unreasonable adverse impacts (undesirable results) to southern steelhead (also see Comment #4). Hydrologic connectivity should be maintained to provide suitable habitat for southern steelhead.

Recommendation #7: CDFW recommends OBGMA establish the minimum thresholds based on the CDFW's Recommendation #5(a) to initiate the implementation of management actions and priority projects to avoid significant and unreasonable impacts to southern steelhead. A reasonable timetable is also needed to ensure projects are ready to be implemented to avoid surface water flow levels that would jeopardize the fish and wildlife resources.

Comment #8 – Section 2.3.2 Hydrogeologic Conceptual Model (HCM) (Page 2-75): The HCM does not properly identify and characterize the principal aquifers and aquitards.

Issue #8.1: The Draft GSP's hydrogeologic conceptual model (HCM) of the Basin does not accurately characterize the physical components and groundwater conditions (23 CCR §354.14. & 23 CCR § 354.16.). The Draft GSP's HCM also does not properly identify and characterize the principal aquifer systems and aquitards within the Basin (23 CCR §354.14). The Draft GSP identifies four discrete aquifer units (Section 2.3.2 page 2-75) within the Basin (separated by extensive confining layers). These are identified as the primary storage units for groundwater within the Basin. However, the Draft GSP does not provide clarification on whether these discrete aquifer units are designated as separate principal aquifers systems or as one collective principal aquifer system. Further discussion on page 2-75 indicates that these aquifers units are under semi-confined to confined conditions (except for the northern portion of the Basin where recharge occurs). This indicates the potential for different aquifer parameters and groundwater conditions from one storage unit to the next unit. The Draft GSP needs to provide clarification on whether these aquifer units should be designated as separate principal aquifer systems or as one system. The Draft GSP should also identify the aquifer specific parameters used to make this designation. In addition, the GSP does not properly identify the primary use or uses of each aquifer, such as domestic, irrigation, or municipal water supply as required by SGMA regulations.

The HCM identifies a perched aquifer within the Basin and provides an estimated northern boundary for this storage unit. For discussion purposes, a perched aquifer is defined as an aquifer that occurs above the regional water table. This occurs when there is an impermeable layer of rock or sediment or relatively impermeable layer above the main water table/aquifer, but below land surface. The HCM provides three geologic cross sections within the HCM depicting the subsurface geologic framework within the Basin. However, the Draft GSP's geologic cross sections do not show the location of and/or the lateral extent of the perched aquifer unit. It also does not show the confining layer unit associated with it. If the Draft GSP is characterizing this perched system within the HCM, then the associated geologic cross sections should indicate the location and depth of this unit and the associated confining layer to meet the requirements of applicable SGMA regulations (23 CCR §354.14). The HCM (page 2-45, Figure 2-38) provides a conceptual drawing of the Lower San Antonio Creek Hydrogeologic Unit which shows the general location and depth of the perched aquifer. However, the conceptual drawing also indicates that the perched aquifer is also connected with the principal aquifer units. Beyond a brief discussion regarding the presence of a perched aquifer, the HCM does not provide any discussion regarding the criteria used to make this designation or provide the data points (well information) used to identify its presence. CDFW would like clarification in the final GSP regarding the criteria used to designate the perched aquifer.

Recommendation #8.1(a): The Draft GSP indicates on multiple figures an estimated northern boundary of the perched aquifer. CDFW recommends the final GSP provide a discussion on what mechanisms (i.e., confining layers etc.) are present at this northern boundary to substantiate this characterization. This clarification is critical to CDFW as this designation has direct implications regarding the effects of groundwater usage within the principal aquifers and its impact on water levels within this shallow aquifer system (GSP designated perched aquifer) that may support GDEs within the Basin.

Recommendation #8.1(b): CDFW recommends revising the HCM to clarify and characterize the physical components of the Basin as required by SGMA regulations.

Issue #8.2: As mentioned above in Issue 9.1, the Draft GSP identifies four discrete aquifer units (Section 2.3.2 – page 2-75) within the Basin that are separated by lacustrine and floodplain deposits (Confining Units). These are shown in the geologic cross section (Figure 2-14 to Figure 2-16) to extend across the Basin. On page 2-75, the Draft GSP states that: "*Groundwater within the aquifer units is predominantly under unconfined conditions near the alluvial fan heads and semi-confined to mostly confined in the central, southern, and western portions of the OVGB (Kear 2005).*" As required by SGMA regulations (23 CCR §354.14. (b)(B)), the Draft GSP must provide the physical properties of the aquifers and aquitards, including the vertical and lateral extent, hydraulic conductivity, and storativity of the geologic units identified within the HCM. The Draft GSP clearly identifies multiple aquifer units within the Basin that are separated by extensive confining units of up to 100 feet in thickness. These aquifer units are characterized as being under semi-confined to confined conditions. The Draft GSP only provides a collective range of transmissivity and storativity values for the Basin. The Draft GSP does not adequately characterize or graphically identify locations and depth specific aquifer parameters (i.e., hydraulic connectivity, transmissivity, and specific yield/storativity) associated with the aquifer assemblages presented within the GSP.

Recommendation #8.2: CDFW recommends revising the HCM to clearly identify and characterize the physical components of the Basin as required under SGMA. Specifically, the OBGMA needs to provide a more adequate characterization of depth specific aquifer parameters associated with the multi-zone confined aquifer system present within the Basin. The Draft GSP indicates most of the wells within the Basin have perforated intervals that extend over multiple aquifer units and there is only one depth specific monitoring location (San Antonio Spreading Grounds) within the Basin. CDFW does not believe the current well infrastructure within the Basin can provide the specific characterizations needed to meet the requirements specified by SGMA regulations (23 CCR §354.14.). The Draft GSP also indicates this is a data gap with plans and proposed projects to install more multi-completion monitoring wells to fill this data gap. CDFW encourages expediting the installation of monitoring wells. Data from these wells will be critical to address data gaps and provide the depth specific aquifer parameters associated with each designated aquifer zone within the Basin.

Issue #8.3: SGMA requires the Draft GSP describe historic and current water level trends within the Basin for each principal aquifer (23 CCR §354.16). These trends should include a) groundwater elevation contour maps depicting current seasonal highs and lows; and b) hydrographs depicting historical highs and lows (among other information). The Draft GSP provides groundwater elevation contour maps for the spring and fall events for select years (1998, 2015, 2019, and 2020); however, the provided groundwater elevation contour maps are only representative for composite groundwater elevations. These are not specific to the groundwater elevations within the discrete confined aquifer units designated within the HCM. As discussed above, the OBGMA needs to provide clarification regarding the principal aquifers within the Basin. The OBGMA also needs to adequately describe current and historical water level trends for each designated aquifer.

Recommendation #8.3: CDFW recommends the final GSP provide groundwater level elevation contour maps that depict the groundwater table or potentiometric surface associated with current seasonal highs and seasonal lows and hydraulic gradients between principal aquifers. CDFW recommends the OBGMA provide additional discussion of vertical groundwater gradients and the interactions between principal aquifers and provide groundwater contour maps to meet the requirements of applicable SGMA regulations (23 CCR §354.16 (a)(1) and (2).).

Comment #9 – Section 2.3.4.7 Vegetation and Wetland Communities Located 0.5- Mile from Nearest Groundwater Extraction Well (Page 2-140, Plan Area and Basin Settings): The Draft GSP does not explain how a 0.5-mile radius from the nearest groundwater extraction well would protect vegetation and wetland communities from well pumping.

Issue: Vegetation and wetland communities, at a distance of greater than 0.5-mile from the nearest groundwater extraction well, were characterized as "not likely" to be impacted by current groundwater extraction within the OVGB (Page 2-140). This seems like an arbitrary distance that has not been tested by scientific method(s).

The Draft GSP does not identify the methods or methodology for this determination or what parameters were used in this hydrologic assessment. The location of the well with respect to the principal aquifer may be different than that of a perched aquifer or a stream with ISW. "*When it comes to the groundwater-surface water connection, the lateral location of wells can matter. This is because pumping of groundwater wells often creates a cone of depression around the wellhead, and this cone of depression can result in aquifers that once contributed to surface waters becoming aquifers that drain surface waters and reduce instream flows.*" (Kibel et al. 2018). The cone of depression of groundwater wells has the potential to impact vegetation and wetland communities.

Recommendation #9: CDFW recommends the final GSP explain how a 0.5-mile radius would protect vegetation and wetland communities from being impacted by well pumping. "*Near-stream pumping wells may be particularly problematic from the perspective of stream depletion management. Such wells may approach a nearly direct depletion of stream flow and may do so with relatively little drawdown. […] Such near stream wells will require special consideration by the GSAs as to their compliance with UR#6 (ISW's).*" (Hall et al. 2018). Pump testing a particular well with monitoring wells in the vicinity for drawdown measurement would be a scientific way of proving a 0.5-mile radius may not impact groundwater level elevations.

GENERAL COMMENTS AND RECOMMENDATIONS

Comment #10 – Draft GSP vs. Final GSP

Issue: The OBGMA may need to revise the GSP before it is finalized an adopted.

Recommendation #10: CDFW recommends OBGMA provide a red-lined version of the final GSP to understand the changes made between the Draft GSP and final GSP. Alternatively, CDFW recommends OBGMA provide a summary of changes made and comments addressed by OBGMA in preparation of a final GSP.

CONCLUSION

CDFW appreciates the opportunity to comment on the Draft GSP. CDFW recommends OBGMA address the comments above to avoid a potential 'incomplete' or 'inadequate' GSP determination per SGMA Regulations, as assessed by the Department of Water Resources, for the following reasons derived from regulatory criteria for GSP evaluation:

1. The assumptions, criteria, findings, and objectives, including the sustainability goal, undesirable results, minimum thresholds, measurable objectives, and interim milestones are not reasonable and/or not supported by the best available information and best available science. [CCR § 355.4(b)(1)] (See Comments # 2, 3, 4, 5, 6, 7, 8, and 9);

2. The Draft GSP does not identify reasonable measures and schedules to eliminate data gaps. [CCR § 355.4(b)(2)] (See Comments # 2, 3, 4 and 5);

3. The SMC and projects and management actions are not commensurate with the level of understanding of the basin setting, based on the level of uncertainty, as reflected in the Draft GSP. [CCR § 355.4(b)(3)] (See Comments # 3, 4, 5, 6, 7, 8 and 9);

4. The interests of the beneficial uses that are potentially affected by the use of groundwater in the Basin, have not been considered. [CCR § 355.4(b)(4)] (See Comments # 2, 3, 4, 5, 6, 7, 8, and 9)).

Attachment B

LITERATURE CITED

Bauer S, Olson J Cockrill A, van Hattem M, Miller L, Tauzer M, et al. (2015) Impacts of Surface Water Diversions for Marijuana Cultivation on Aquatic Habitat in Four Northwestern California Watersheds.

California Department of Fish and Wildlife (CDFW). 2021a. Instream Flow Evaluation: Southern California Steelhead Adult Spawning and Juvenile Rearing in San Antonio Creek, Ventura County. California Department of Fish and Wildlife, Instream Flow Program (CDFW), West Sacramento, CA.

CDFW. 2021b. California Natural Diversity Data Base (CNDDB). Accessed: November 18, 2021. Available at: https://www.wildlife.ca.gov/data/cnddb

CDFW. 2020. Instream flow regime criteria on a watershed scale: Ventura River. California Department of Fish and Wildlife, Instream Flow Program (CDFW), West Sacramento, CA. Watershed criteria report No. 2020-01.

California Department of Water Resources (DWR). 2016. Best Management Practices for the Sustainable Management of Groundwater: Water Budget. Accessed: November 18, 2021. Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-4-Water-Budget_ay_19.pdf

Froend, R., and B. Sommer. 2010. Phreatophytic vegetation response to climatic and abstraction-induced groundwater drawdown: Examples of long-term spatial and temporal variability in community response. Ecological Engineering, 36:1191:1200.

Hall, Maurice, Christina Babbitt, Anthony M. Saracino, and Stanley A. Leake. 2018. Addressing Regional Surface Water Depletions in California. Environmental Defense Fund, CA.

Howard, Janet L. 1992. *Quercus lobata*. In: Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory.

Kibel, Paul S. and Julie Gantenbein. 2018. Rivers that Depend on Aquifers: drafting SGMA groundwater plans with fisheries in mind. Center on Urban Environmental Law, Golden Gate University School of Law, San Francisco, CA

Klausmeyer, K.R., B., Rohde, M.M, Schuetzenmeister, F., Rindlaub, N., Houseman, I., and J.K. Howard. 2019. GDE Pulse: Taking the Pulse of Groundwater Dependent Ecosystems with Satellite Data. San Francisco, CA.

Klausmeyer K., J. Howard, T. Keeler-Wolf, K. Davis-Fadtke, R. Hull, A. Lyons. 2018. Mapping Indicators of Groundwater Dependent Ecosystems in California: Methods Report. San Francisco, California.

Lewis, D.C., & Burgy, R.H. 1964. The Relationship between oak tree roots and groundwater in fractured rock as determined by tritium tracing. Journal of Geophysical Research, 69, 2579-2588.

Naumburg E., Mata-Gonzalez R., Hunter R.G., McLendon T., Martin D.W. 2005. Phreatophytic vegetation and groundwater fluctuations: a review of current research and application of ecosystem response modeling with an emphasis on great basin vegetation. Environment Management. 35(6):726-40.

Sawyer JO, Keeler-Wolf T, Evens JM. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society, San Francisco, CA.

The Nature Conservancy (TNC). 2021. GDE Pulse Version 2. Accessed: November 18, 2021. Available at: https://gde.codefornature.org/

TNC. 2019. Identifying GDEs Under SGMA. Best Practices for using the NC Dataset.

United States Fish and Wildlife Service (USFWS) 2021. Information for Planning and Consultation. Accessed: November 18, 2021. Available at: https://ecos.fws.gov/ipac/

United States Geological Survey (USGS) 2021. Artificial Groundwater Recharge. Accessed: November 23, 2021. Available at: https://www.usgs.gov/mission-areas/water-resources/science/artificial-groundwater-recharge?qt-science_center_objects=0#qt-science_center_objects

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Response to Comment Letter

Organization/Agency: California Department of Fish and Wildlife (CDFW)
Commenter: Erinn Wilson-Olgin
Date: December 7, 2021

CDFW-1 Comment #1: Natural Recharge (Page ES-2): The Draft GSP does not accurately define natural recharge and confuses natural recharge with artificial recharge.

As recommended, the GSP will be revised to distinguish between natural recharge and artificial recharge.

CDFW-2 Comment #2: GDEs based on the 30-foot Depth Groundwater Criterion (Page 2-140) and Potential GDE Elimination (Page 2-137): The Draft GSP has eliminated 13 individual communities comprising 59.5 acres of habitat.

As explained in the GSP Section 2.3.4.7 and Appendix E, the GDE characterization method relied on a review and analysis of groundwater level data, aerial photographs, lithologic data, and normalized difference vegetation index (NDVI) and normalized difference moisture index (NDMI) trends to characterize each Natural Communities Commonly Associated with Groundwater (NCCAG) mapped vegetation and wetland community in the OVGB. A 30-foot groundwater depth criterion was used to inform the analysis as this criterion is identified by The Nature Conservancy as representative groundwater conditions that may sustain common phreatophytes and wetland ecosystems (Rohde et al. 2018); however, the criterion was not solely relied on to characterize a vegetation or wetland community's reliance (or lack of) on groundwater. The 13 individual communities comprising 59.5 acres have not been eliminated but instead identified as potential GDEs not likely to be impacted by groundwater extraction because vegetation health trends are not correlated with groundwater levels, the communities persisted during periods when groundwater levels were much greater than 30 feet below ground surface, and there is geologic evidence that the communities may be disconnected from the principal aquifer. The GDE characterization process described in Section 2.3.4.7 and Appendix E did not eliminate any potential GDEs but instead identified potential GDEs that may be most susceptible to impacts of groundwater extraction.

CDFW-3 Comment #3: Section 4.2.4 Prepare Groundwater Dependent Ecosystem Assessment (Page 4-11): The Draft GSP does not include minimum thresholds or measurable objectives to protect ISWs and GDEs.

As stated in the GSP, there is not sufficient information at this time to establish a minimum threshold or measurable objective for potential depletions of interconnected surface water (ISWs) or GDEs. The steps that will be taken to fill the data gaps and support development of minimum thresholds and measurable objectives as they relate to potential depletions of ISWs and GDEs are described in Section 4.2.4 Prepare Groundwater Dependent Ecosystems Assessment. The recommendations provided by CDFW will be considered when the Prepare Groundwater Dependent Ecosystems Assessment project is undertaken.

CDFW-4 Comment #4: Federally Endangered Southern California Steelhead Habitat and Other Sensitive Species: The Draft GSP does not provide sufficient analysis of potential effects on public trust resources, especially on sensitive species occurring within the Basin.

The CDFW universally implies that groundwater pumping in the spring, summer, and early fall are resulting in reduced surface flows and excessively high water temperatures that reduce available juvenile rearing habitat for southern steelhead. The OBGMA stresses that most of San Antonio Creek and its tributaries within the OVGB are typically dry "losing" reaches and groundwater aquifers and surface water channels are highly interconnected only at perennially wet reaches in the OVGB, typically near Skunk Ranch Road in the southwestern corner of the OVGB. As presented in Draft GSP figure 2-38, Lower San Antonio Creek Hydrogeological Conceptual Model, surface water is interconnected with a perched aquifer that is isolated by a clay aquitard from the deeper principal aquifers where groundwater production primarily occurs. The GSP explains that, "The impact of groundwater extraction rates on depletion of interconnected surface water is not well constrained and is a data gap in the OVGB (Section 2.3.4.7). This data gap is currently being addressed by OBGMA through the recent construction of a nested monitoring well located along the San Antonio Creek that has been designed to measure long-term trends in surface water-groundwater connection along the primary drainage channel in the OVGB." Preliminary groundwater level and water quality data from initial monitoring of the new nested monitoring well, South-Central Nested Depth-Discrete Monitoring Well, indicate that the perched aquifer encountered from 14 to 24 feet below ground surface is isolated from the principal (production) aquifers encountered from 140 feet to 328 feet below ground surface (Kear 2021, Summary of Construction Operations OBGMA New 'South-Central Nested Depth-Discrete Monitoring Well). The new South-Central Nested Depth-Discrete Monitoring Well was completed in June 2021. Additional groundwater level and water quality monitoring is ongoing and will be further evaluated when assessing ISW-groundwater interactions and the potential need to develop sustainability management criteria for depletions of interconnected surface water.

Prepare Groundwater Dependent Ecosystem Assessment PMA described in Section 4.2.4 of the GSP, will address CDFW recommendation #4.1(a) to provide a biological assessment identifying species known to occur within the GDEs presented in Figure 2-36 (Page 2-141). As described above, the Draft GSP has identified ISW-groundwater interactions as a data gap and is proactively working to fill this data gap to address recommendations provided in #4.1(b). As further described below, OBGMA has been documenting the first daylighting of surface water in San Antonio Creek since 2017. The OBGMA will work to map and document potential additional open water habitat in the OVGB as part of the Prepare Groundwater Dependent Ecosystem Assessment PMA to address CDFW Recommendation #4.1(c).

CDFW-5 Comment #5: Section 3.3.6: The GSP Does Not Account for the Best Available Science for Depletions of Interconnected Surface Waters or GDEs (Page 3-26): The Draft GSP has not considered the best available science relevant to depletions of ISWs or impacts on GDEs.

In May 2020, CDFW's Instream Flow Program publicly released the Instream Flow Regime Criteria on a Watershed Scale of the Ventura River (Watershed Criteria Report) (2020). CDFW asserts this report "represents best available science for the OVGB regarding flows needed to support the Basin's ecosystem within the Lower San Antonio Creek (San Antonio Creek 1), Upper San Antonio Creek (San Antonio Creek 2), and Lion Canyon Creek, a tributary to San Antonio Creek". The Watershed Criteria Report states, "The Department provides this document as a tool for consideration in water management planning. It presents an analytical approach that can be implemented, if appropriate, under the specific circumstances of a watershed, stream, or informational need. This report and the Overview, in and of themselves, should not be considered to provide binding guidelines, establish legal compliance, or ensure project success." The Watershed Criteria Report estimates natural flows at several river reaches that would be expected with no human influence. Based on Figure 2 of the Watershed Criteria Report, no assessed reach appears to be within the boundary of the OVGB as defined by Bulletin 118. San Antonio Creek 2 reach is likely just outside of the boundary of the OVGB but could be used as an approximate proxy for surface water outflows from the OVGB. Estimated modeled natural flows for San Antonio Creek 2 are presented in Watershed Criteria Report Table 1 and are excerpted as follows:

11) San Antonio Creek 2 33.9 mi^2

	Month Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Natural Flows (cfs)	Wet	15	41	49	28	10	4	2	1	1	1	1	4
	Moderate	3	6	7	5	2	1	<1	<1	<1	<1	1	2
	Dry	2	3	2	1	1	<1	<1	<1	<1	<1	1	1

As explained in CDFW's Overview of Watershed-Wide Instream Flow Criteria Report Methodology (2021), "Arid watersheds are underrepresented in the reference gage network, and frequently have complex, groundwater-dominated hydrology (Lane et al. 2017). As a result, *estimates for arid regions should be interpreted with caution* (Zimmerman et al. 2020). (CDFW 2021).

Watershed Criteria Report Table 4 presents Ecosystem Baseflows for San Antonio Creek 2 and are excerpted as follows:

11) San Antonio Creek 2 33.9 mi^2

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ecosystem Baseflows (cfs)	14	23	13	7	6	2	1	<1	1	1	4	6

The OBGMA also notes that the Watershed Criteria Report defined a Sensitive Period Indicators of 5 cfs for San Antonio Creek 2 (Table 5), a steelhead habitat optimum flows by drainage area of 8 cfs for San Antonio Creek 2 (Table 6) and Steelhead passage flows of 7 cfs for juveniles and 24 cfs for adult fish for San Antonio Creek (Table 7). The OBGMA points out that prescribed Ecosystem Baseflows, Sensitive Period Indicators and steelhead habitat optimum flows are likely only to occur under wet natural flow conditions as defined by CDFW's own analsyis reflecting the high variation of precipitation and resulting flow in San Antonio Creek. While these instream flows may provide beneficial conditions for steelhead, they do not represent the minimum threshold below which significant and unreasonable impacts to steelhead would occur due to the potential depletion of ISW due to pumping in the OVGB, as is required by SGMA.

In December 2021, the SWRCB released a numerical analysis to help better define in-stream flows, *Draft Model Documentation Report for the Groundwater-Surface Water Model of the Ventura River Watershed*. This report provides unimpaired flow and calibration/validation flow for Gage 605A located on San Antonio Creek at Old Creek Road/Highway 33 near the confluence of San Antonio Creek with the Ventura River approximately 5 miles downstream of the OVGB. The OBGMA recommends that this numerical model be used to evaluate unimpaired flow at the surface discharge point in San Antonio Creek from the OVGB (approximately at San Antonio Creek 2) and compared to the analytical estimates provided by CDFW (2020). The numerical model should take particular care to differentiate the potentiometric surface that occurs in the perched aquifer from the potentiometric surfaces that occur in the principal (production) aquifers. While artesian wells are documented to occur in the OVGB, the perched aquifer is separated from the principal (production) aquifers by an extensive clay aquitard that acts as a vertical barrier to flow in the southwestern potion of the OVGB meaning that the principal (production) aquifers do not discharge to surface water in the area of the perched aquifer. Differences between calibration/validation flows and unimpaired flows should take into account evapotranspiration by invasive plants at different densities that especially impact dry season low-flow periods as the difference in instream flow between the two scenarios during the dry season may be explained entirely by changes in densities of invasive phreatophytes or native riparian vegetation over time.

The OBGMA has been measuring the first point of daylighting of surface water since 2017 and actual instantaneous discharge of stream flow since 2019 of San Antonio Creek near Skunk Ranch Road. Since 2019, stream flow discharge has varied from 0.07 cfs in September 2021 to 2.8 cfs in April 2020 (Kear 2021, Ojai Basin Conditions presented at the September 30, 2021 Regular OBGMA Board Meeting). These actual measured flows are generally within the range of the modeled estimated dry natural flows presented in Watershed Criteria Report Table 1. However, stream flow discharge measured in San Antonio Creek near Skunk Ranch Road within the 2 to 3 cfs range is correlated with precipitation events as measured at the Ojai Fire Station and discharge of groundwater from the perched aquifer as baseflow alone is not expected to sustain stream flow during exceptionally dry periods.

The OBGMA notes that CDFW released Instream Flow Evaluation: Southern California Steelhead Adult Spawning and Juvenile Rearing in San Antonio Creek, Ventura County in November 2021. Thank you for brining to the attention of the OBGMA of this new report. This report was released *after* the preparation of the Draft GSP completed in October 2021. The GSP is due to DWR on January 31, 2022. Sufficient time is not available to review and incorporate potentially relevant findings from CDFW's November 2021 report in the Draft Final GSP. This report will be reviewed and considered as part of the Prepare Groundwater Dependent Ecosystem Assessment PMA described in Section 4.2.4 of the GSP.

Overall, it is the OBGMA's initial position, based on review of the Instream Flow Regime Criteria on a Watershed Scale of the Ventura River, that the in-stream flows developed for San Antonio Creek 2 by the CDFW do not currently provide best available science to potentially develop sustainability management criteria for ISW-groundwater interactions and that in-depth instream flow studies including more intensive field work and/or modeling (as described in CDFW's own guidance) are required that takes into account specific hydrology, hydrostratigraphy, groundwater elevations of discrete aquifers and other site-specific conditions of the OVGB.

The OBGMA notes that on August 31, 2021, the SWRCB released a Preliminary Draft version of the Groundwater-Surface Water Model of the Ventura River Watershed and that as of December 2021 a Draft Model Documentation Report of the Groundwater-Surface Water Model of the Ventura River Watershed is now available. This new body of work developed by the SWRCB was not available in a state to review or incorporate pertinent findings into the Draft GSP (October 2021) or the Draft Final GSP to be completed by January 2022. This report will be reviewed and considered as part of the Prepare Groundwater Dependent Ecosystem Assessment PMA described in Section 4.2.4 of the GSP.

CDFW-6 Comment #6: Section 3.3.1 Chronic Lowering of Groundwater Levels-Minimum Thresholds (Page 3-11): Defaulting to the post-2015 low groundwater level as minimum thresholds because similar conditions have previously occurred does not account for relevant best available data since, including annual cycles and seasonal variation.

As stated in Section 3.3.1 Chronic Lowering of Groundwater Levels – Minimum Thresholds, the record low static groundwater levels measured at RMPs during the 2012 to 2016 drought, with a 10% buffer applied to correct for the OVGB record low groundwater level as measured in well 04N22W05L008S in September 1951, are established as the minimum thresholds to avoid potential undesirable results resulting from chronic lowering of groundwater levels. As data gaps are filled and additional groundwater level monitoring data become available the information will be used to reevaluate and update, if needed, the minimum thresholds and measurable objectives for groundwater levels.

The GSP makes no assertion regarding the minimum thresholds developed for groundwater levels and groundwater in storage as being protective of ISW depletions or GDEs as suggested by this comment. The GSP clearly indicates that potential depletions of interconnected surface water and impacts to GDEs have been identified as a data gap that requires further evaluation as described in Prepare Groundwater Dependent Ecosystem Assessment PMA described in Section 4.2.4 of the GSP. As indicated above, it is OBGMA position that in-stream flows developed for San Antonio Creek 2 (downstream of the boundary of the OVGB) by the CDFW do not currently provide best available science to potentially develop sustainability management criteria for ISW-groundwater interactions and that in-depth instream flow studies including more intensive field work and/or modeling (as described in CDFW's own guidance) are required that takes into account specific hydrology, hydrostratigraphy, groundwater elevations of discrete aquifers and other site-specific conditions of the OVGB.

CDFW-7 Comment #7: Section 3.3.6 Depletions of Interconnected Surface Water and Establish Minimum Thresholds and Measurable Objectives (Page 3-26): The Draft GSP indicated there is not sufficient information at this time to establish minimum thresholds, measurable objectives, or interim milestones for depletions of ISWs or GDEs.

As previously described, most of San Antonio Creek and its tributaries within the OVGB are typically dry "losing" reaches and groundwater aquifers and surface water channels are highly interconnected only at perennially wet reaches in the OVGB, typically near Skunk Ranch Road in the southwestern corner of the OVGB. As presented in Draft GSP figure 2-38, Lower San Antonio Creek Hydrogeological Conceptual Model, surface water is interconnected with a perched aquifer that is isolated by a clay aquitard from the deeper principal aquifers where groundwater production primarily occurs. Available information compiled in the GSP suggests that a nexus between groundwater extraction from the principal (production) aquifers and in-stream flows in San Antonio Creek is lacking whereas CDFW based on limited site-specific information consisting of an analytical model not applicable to arid environments implies that it is a forgone conclusion that minimum thresholds are required to address undesirable results caused by streamflow depletion to avoid adverse impacts to aquatic GDEs. CDFW wrongly concludes that the minimum threshold developed in the GSP for undesirable results of lowering of groundwater levels and reduction of groundwater in storage is somehow also developed for depletions of interconnected surface water and GDEs. This is not the case. As stated in the GSP, there is not sufficient information at this time to establish a minimum threshold or measurable objective for potential depletions of ISWs or GDEs. The steps that will be taken to fill the data gaps and support development of minimum thresholds and measurable objectives as they relate to potential depletions of ISWs and GDEs are described in Section 4.2.4 Prepare Groundwater Dependent Ecosystems

Assessment. The recommendations provided by CDFW and SWRCB will be considered when the Prepare Groundwater Dependent Ecosystems Assessment project is undertaken.

CDFW-8 Comment #8: Section 2.3.2 Hydrogeologic Conceptual Model (HCM) (Page 2-75): The HCM does not properly identify and characterize the principal aquifers and aquitards.

As indicated in revised Section 2.3.2, Principal Aquifers and Aquitards, "Water-bearing units of the OVGB include alluvial deposits and fractures and interstices of underlying Tertiary rocks. The alluvium is composed of 50 to 100 feet thick units of sand, gravel, and clay that pinch out toward the lateral edges of the OVGB (Kear 2005; DBS&A 2011, 2020a). The alluvial deposits are the most productive units in the OVGB, with well yields that range from 100 to 600 GPM (DWR 2004). The weathered Tertiary rocks are typically consolidated and yield minor amounts of poor-quality water, with well yields typically around 2 to 5 GPM, but reaching a maximum of about 50 GPM (DWR 2004). The contact of the alluvial unconsolidated deposits of Pleistocene to Holocene age with the Tertiary rocks define the base of the OVGB. The primary storage units for groundwater are approximately four discrete sand and gravel units on the order of up to 100 feet thick each, which are sourced near the alluvial fan heads in the northeast side of the Ojai Valley (Kear 2005; OBGMA 2018). The individual coarse grained sand and gravel aquifer units that together comprise the principal aquifer are thickest in the northern and eastern areas of the OVGB and thinnest in the southern and western areas of the OVGB where fine grained lacustrine and floodplain deposits of up to approximately 100 feet thick predominate as confining layers creating a multi-layered aquifer system (DBS&A 2011; Kear 2005; OBGMA 2018). The uppermost confining clay unit, which generally extends from approximately 30 to 130 feet below ground surface (bgs), is the thickest and most extensive aquitard and separates the principal aquifer from a shallow perched aquifer (Kear 2005, 2021; OBGMA 2018). The approximate extent of the shallow perched, based on well geophysical and lithologic logs, is shown in Figure 2-13A (Kear 2005, 2021). The shallow perched aquifer generally extends from approximately 15 to 30 feet bgs (Kear 2005, 2021). Groundwater within the principal aquifer is predominantly under unconfined conditions near the alluvial fan heads and semi-confined to mostly confined in the central, southern, and western portions of the OVGB (Kear 2005; 2021). The alluvial deposits are deepest in the central and southern areas of the OVGB (Kear 2005; DBS&A 2011, 2020a). The maximum total thickness of the alluvial deposits is approximately 900 feet (DBS&A 2011, 2020a).

The hydraulic properties of the principal aquifer vary spatially. Results of field pumping tests indicate aquifer transmissivity ranges from 1×10-5 to 6.20 square feet per minute (ft^2/min) for an average of approximately 2.0 ft^2/min (Kear 2005). Aquifer storativity ranges from 1×10-8 to 0.024 for an average of approximately 0.003 (Kear 2005). Hydraulic conductivity and specific yield and storage values used in the Ojai Basin Groundwater Model (OBGM) developed by DBS&A also provide an estimate of the hydraulic properties of the principal aquifer and aquitards. Values for aquifer hydraulic conductivity used in the OBGM range from 7 to 150 feet per day (ft/d). Values for aquifer specific yield used in the OBGM range from 0.03 to 0.1. The specific storage of all aquifer layers in the OBGM is 1×10-6 per foot (ft-1) and of all aquitard layers is 1×10-7 ft-1. The specific yield of all aquitard layers in the OBGM is 0.03. The hydraulic conductivity of all aquitard layers in the OBGM is 0.1 ft/d (DBS&A 2011, 2020a). Cross-sectional interpretations of the multi-layered OVGB aquifer system are shown in cross-sections A-A' (west-east), B-B' (south-north), and C-C' (southwest-northeast) (Figures 2-14 to 2-16, Cross Sections AA', BB', and CC', respectively) at the locations shown on Figure 2-13A". Most well screen intervals for wells completed in the OVGB intercept multiple aquifers, and the lack of depth-discrete monitoring wells precludes management of multiple aquifer systems. The information provided in the

GSP represents best available data for the OVGB. As additional data is collected during GSP implementation, the hydrogeological conceptual model including description of the principal aquifers and aquitards will be updated.

The extent of the perched aquifer as depicted on GSP Figure 2-18 has been generally determined based on historical groundwater levels and interpolation of well logs. GSP Figure 2-37, Shallow Perched and Depp Production Aquifer Groundwater Level Trends provides depth discrete groundwater levels for several wells in the southwestern portion of the OVGB that clearly demonstrates distinct groundwater level trend where the shallow perched aquifer exhibit a stable trend with little seasonal fluctuation or response to groundwater extraction while groundwater levels in the principal aquifer show the effects of groundwater extraction. As described above, the OBGMA recently installed a new nested monitoring well, South-Central Nested Depth-Discrete Monitoring Well, which indicates the perched aquifer encountered from 14 to 24 feet below ground surface is isolated from the principal (production) aquifers encountered from 140 feet to 328 feet below ground surface at this location. Additional monitoring wells may need to be drilled and completed as multi-completion wells in order to verify the spatial extent of the perched aquifer.

As described in the GSP and shown Draft Final GSP Figures 2-14 through 2-16 most wells are cross-screened over multiple aquifer units and depth-discrete groundwater levels by aquifer are not available for the OVGB. As such the four principal aquifers described in the GSP are currently combined into a single principal aquifer in order to prepare groundwater level contour maps.

CDFW-9 Comment #9: Section 2.3.4.7 Vegetation and Wetland Communities Located 0.5- Mile from Nearest Groundwater Extraction Well (Page 2-140, Plan Area and Basin Settings): The Draft GSP does not explain how a 0.5-mile radius from the nearest groundwater extraction well would protect vegetation and wetland communities from well pumping.

The GSP GDE characterization process used a 0.5-mile radius in order to quantify the number of wells in the vicinity of each NCCAG mapped vegetation or wetland community. The 0.5-mile radius was selected based on The Nature Conservancy's use of a 1 kilometer buffer (approximately 0.5 miles) to associate wells with groundwater level data with polygons in the NCCAG dataset (Klausmeyer et al. 2019). The statement in the GSP regarding communities at a distance of greater than one-half mile from the nearest groundwater extraction well only applies to 3.36 acres of coast live oak (*Quercus agrifolia*) vegetation (NCCAG polygon 52076) located in the Stewart Canyon drainage at the northern edge of the OVGB (Appendix E, Figure 1). NDMI and NDVI trends for the vegetation are not correlated with groundwater levels and the vegetation is located upgradient at a great distance from the nearest groundwater production wells. Groundwater level data are not available for any nearby wells. Aerial photographs show that the vegetation completely burned in 2017 but has partially regrown since that time. The closest well with a well log (well 04N23W02A04S) indicates that the alluvial aquifer is no more than 10 feet thick in the vicinity of the vegetation. The closest active production wells are fractured bedrock wells. The vegetation is characterized as a potential GDE not likely to be impacted by groundwater extraction because the vegetation is located a great distance from production wells, vegetation health is not correlated with groundwater levels, and the aquifer is very thin in this part of the OVGB. The GSP will be revised by removing the statement regarding the 0.5-mile radius criterion since in fact the GDE characterization process did not rely on the criterion to characterize a vegetation or wetland community's reliance (or lack of) on groundwater, but rather was used to help quantify the number of wells in the vicinity of each vegetation or wetland community.

CDFW-10 Comment #10: Draft GSP vs. Final GSP

A red-lined version of the draft GSP in addition to responses to comments will be included with the Draft Final GSP adopted by the OBGMA.

Casitas Municipal Water District

November 24, 2021

John Mundy, Executive Director
Ojai Basin Groundwater Management Agency

Sent via email to OjaiBasinGSP@gmail.com and jmundyconsultingllc@gmail.com

Subject: Comments on the OBGMA Draft Groundwater Sustainability Plan

Dear Mr. Mundy:

Casitas Municipal Water District (Casitas) has the following comments on the OBGMA's Draft Groundwater Sustainability Plan (Draft GSP) published October 2021.

Comment #1: Page ES-2
Please revise the language as follows:

> *The Casitas Municipal Water District distributes Lake Casitas stored water to wholesale accounts, retail municipal and industrial accounts, and retail agricultural accounts ~~agricultural accounts, wholesale municipal accounts, and retail accounts~~. A portion of Lake Casitas storage is distributed to wholesale ~~agricultural~~ and retail accounts inside the boundaries of the OBGMA. Conjunctive use of surface water and groundwater is key to meeting the total water demand of the OVGB.*

Comment #2: Page 2-6 & 2-11
Please revise the language as follows:

> *Current Draft GSP Language:*
> *CMWD administers the Ojai potable water system, which serves approximately 2,953 residences and businesses within Community Facilities District (CFD) No. 2013-1 (Ojai). CFD No. 2013-1 encompasses approximately 2,150 acres of land in the City of Ojai and unincorporated Ventura County (Figure 2-3; CMWD 2021).*
>
> *Community Facilities District No. 2013-1 was formed by CMWD at the request of members of the community in March 2013 pursuant to the Mello-Roos Community Facilities Act of 1982, as amended (Sections 53311 et seq. of the Government Code of the State of California), to finance the acquisition of the Ojai Water System facilities from Golden State Water Company (David Taussig & Associates 2013). In June 2017, CMWD acquired the Ojai Water System.*

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Revised Language:
CMWD owns and operates the Ojai potable water system, which serves approximately 2,953 residences and businesses within Community Facilities District (CFD) No. 2013-1 (Ojai). CFD No. 2013-1 encompasses approximately 2,150 acres of land in the City of Ojai and unincorporated Ventura County (Figure 2-3; CMWD 2021).

Community Facilities District No. 2013-1 was formed by CMWD at the request of members of the community in March 2013 pursuant to the Mello-Roos Community Facilities Act of 1982, as amended (Sections 53311 et seq. of the Government Code of the State of California), to finance the acquisition of the Ojai Water System facilities from Golden State Water Company (David Taussig & Associates 2013). In June 2017, CMWD acquired the Ojai Water System.

Comment #3: Page 2-27
Please revise the language as follows. The numbers referenced in the draft GSP reflect the CMWD 2020 UWMP Table 3, which only goes back to Fiscal Year 2013-14 and does not reflect the historical high water demand:

Current Draft GSP Language:
CMWD's water demand from Lake Casitas reached a high of 20,415 AF in fiscal year 2013–2014, but has since continued to decline to 8,802 AF in fiscal year 2019–2020 in response to water resource changes by large customers, heightened customer awareness of water resource conditions, and CMWD's Water Efficiency and Allocation Program (CMWD 2021).

Revised Language:
CMWD's water demand from Lake Casitas reached a high of 26,180 AF in calendar year 1989, but has since remained consistently lower with a decline to 7,668 AF in calendar year 2019 in response to water resource changes by large customers, heightened customer awareness of water resource conditions, and CMWD's Water Efficiency and Allocation Program.

Comment #4: Page 2-27
Since the Casitas Water System supplies the Ojai Water System, the surface supplies were double-counted in the draft GSP evaluation. In addition, the assessment of Casitas' supplies should be reworded since there is not a surplus supply for multi-year droughts extending beyond the 5-year drought period required for analysis in the 2020 UWMP. Please revise the language as follows:

Current Draft GSP Language:
As part of the 2020 UWMP update, CMWD's future water supplies and demands were assessed. For the period from 2020 to 2040, CMWD's projected water supply is 19,771 AFY. This estimate assumes that 15,326 AFY of surface water will be sourced from Lake Casitas, 145 AFY of groundwater will be pumped from Mira Monte Well, 2,000 AFY of State Water Project (SWP) water will be delivered via the Ventura-Santa Barbara Counites Intertie (discussed below), and up to 2,300 AFY will be pumped from the Ojai wellfield .

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Based on CMWD's water supply reliability assessment, it is predicted that for average, single-dry, and multiple-dry water years (up to the second consecutive dry year) there will be a surplus of approximately 3,396 AFY (CMWD 2021). For multiple-dry water years after the second consecutive dry year, there will be a minimum surplus of 1,054 AFY (CMWD 2021)

Revised Language:
As part of the 2020 UWMP update, CMWD's future water supplies and demands were assessed. For the period from 2020 to 2040, CMWD's projected water supply is 19,310 AFY. This estimate assumes that 14,865 AFY of surface water will be sourced from Lake Casitas, 145 AFY of groundwater will be pumped from Mira Monte Well, 2,000 AFY of State Water Project (SWP) water will be delivered via the Ventura-Santa Barbara Counties Intertie (discussed below), and up to 2,300 AFY will be pumped from the Ojai wellfield . Based on CMWD's water supply reliability assessment, no water shortages are predicted based on average and single-dry years planning evaluations. Given that Lake Casitas and groundwater basin storage can sustain extended drought periods, a few dry years have little effect on Casitas' supply availability. However, supplies can become limited during extended drought periods and Casitas implements its WEAP as a demand management tool as Lake Casitas storage declines. This demand management helps to stretch supplies longer than the five year drought period evaluated in the 2020 UWMP. (CMWD 2021)

Comment #5: Page 2-27
Please revise the language as follows:

Funding is currently being pursued for construction of a 1.5-mile pipeline between CMWD and Carpinteria Valley Water District, referred to as the Ventura-Santa Barbara Counties Intertie, which would increase the size of a current Intertie connection as well as build pump stations to enable the ability to move ~~up to~~ 2,000 AFY on average of Casitas' SWP supplies to the Casitas system (CMWD 2021).

Comment #6: Page 2-83 (Figure 2-17) and Page 2-158 (Table 2-14)
Casitas staff are unclear how the data provided for Casitas Water Deliveries in Figure 2-17 and Table 2-14 were derived. Casitas' current reporting systems are not set up to report aggregate Casitas water use within the Ojai groundwater basin. However, staff are currently working on a billing system and GIS project that will make this type of reporting easier in the future.

Comment #7: Page 2-84 (Figure 2-18)
It would be helpful for the GSP to explain whether the recharge areas shown in Figure 2-18 make it into the water supply aquifers, or if the recharge areas are only recharging the perched aquifer.

Comment #8: Page 2-119 (Figure 2-31) and Page 2-104
Figure 2-31 is showing Casitas' well exceeding the MCLs for manganese. Please add language to Page 2-104 explaining that Casitas MWD operates a groundwater treatment plant to remove iron and manganese prior to distribution to customers.

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Comment #9: Page 2-181
Please update the Lake Casitas capacity to reflect 238,000 acre-feet based on the 2017 bathymetric survey (which is a reduced capacity from the original estimated 254,000 acre-feet).

Comment #10: Page 3-28
Please revise the language as follows. The resolution was approved by OBGMA representatives. However, the resolution has yet to be considered by the full board of the Casitas Municipal Water District.

> *Current Draft GSP Language:*
> In August 2017, the OBGMA and CMWD approved adoption of Resolution No. 2017-4 to work cooperatively on the development of an agreement for the integrated use of surface water and groundwater.
>
> *Revised Language:*
> In August 2017, the OBGMA approved adoption of Resolution No. 2017-4 to work cooperatively on the development of an agreement for the integrated use of surface water and groundwater.

Comment #11: Page 3-32 and Page 4-17
Please revise the language as follows.

> *Currently, groundwater levels are monitored by VCWPD and OBGMA, groundwater quality is monitored by VCWPD and operators of drinking water systems, namely the Ojai Water System ~~Community Facilities District~~ operated by CMWD, who reports groundwater quality data to the SWRCB DDW, and groundwater extraction from all active production wells is monitored by individual operators who self-report extraction volumes to the OBGMA.*

Comment #12: Page 4-26 – Explore Opportunity to Implement Focused Recharge

Refer to the Draft GSP language provided in Attachment 1.

Casitas has the following comments:

1. In the description of "Measurable Objectives Expected to Benefit" and "Expected Benefits and Evaluation", please clarify whether the proposed recharge projects would benefit the shallow perched aquifer or the lower producing zones, given the clay layers that separate the shallow aquifer from the lower water supply producing zones.
2. Please also clarify if measurable objectives were established for the shallow perched aquifer, which seems to be the portion of the basin that would benefit from stormwater capture and recharge projects.

Comment #13: Page 4-28 Explore State Water Project Water Delivery Options

Refer to the Draft GSP language provided in Attachment 1.

Casitas has the following comments:

1. Please revise the language in the third paragraph as follows:

   Currently, CMWD is exploring two SWP water alternatives: 1) connection with Carpinteria Valley Water District for ~~up to~~ 2,000 AFY on average and 2) connection between Calleguas Municipal Water District and the City of Ventura which ~~would~~ could offset the City of Ventura's demands from Lake Casitas by ~~approximately 1,300~~ as much as 5,000 AFY.

2. The statement that "any use of SWP water in the OVGB would be in-lieu of groundwater in most cases" is not accurate, since an "in-lieu" arrangement has yet to be established. Imported water via the State Water Project infrastructure is considered a backup supply to mitigate impacts of extended local drought periods on Lake Casitas. Groundwater will remain the most cost-effective water source for Ojai Basin pumpers, who may either implement demand reduction strategies or purchase Casitas water in the event that groundwater supply is not available. If it is OBGMA's intent to explore an "in-lieu" arrangement related to State Water supply, this should be made clearer in the project description.
3. Regarding public noticing of State Water Project delivery options, Casitas strongly recommends that OBGMA coordinates with Casitas.

Comment #14: Page 2-54 and 2-55, and Page 4-29 and 4-30

Refer to the Draft GSP language provided in Attachment 1. This description of the "Settlement Management Plan from Physical Solution" in Sections 2 and 4 must be re-written to reflect the following:

1. No settlement agreement has been reached. The current terms of the Proposed Physical Solution have not been resolved, nor are they required, as implied in committal tone of the language. The adjudication process is ongoing, and will likely take several years to resolve.
2. The "Measurable Objective Expected to Benefit" and "Expected Benefits and Evaluation" language must be re-written to reflect that measureable benefits are still to be determined.

If there are any questions in this regard, please do not hesitate to contact me at mflood@casitaswater.com or 805.649.2251, Ext. 111.

Sincerely,

Michael Flood

Michael Flood
General Manager

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Response to Comment Letter

Organization/Agency: Casitas Municipal Water District (CMWD)
Commenter: Michael Flood
Date: November 24, 2021

CMWD-1 Comment #1: page ES-2 of the Draft GSP clarifies CMWD customer types. The GSP will be revised based on the provided edits.

CMWD-2 Comment #2: Page 2-6 and 2-11 provides revised language regarding the ownership and operation of the Ojai potable water system. The GSP will be revised based on the provided edits.

CMWD-3 Comment #3: Page 2-27 provides additional historical data to reflect Lake Casita's highest historical water demand of 26,180 acre-feet in calendar year 1989. The GSP will be revised based on the provided edits.

CMWD-4 Comment #4: Page 2-27 provides clarifying language regarding the 2020 UWMP update. The GSP will be revised based on the provided edits.

CMWD-5 Comment #5: Page 2-27 provides clarifying language regarding CMWD's SWP supplies. The GSP will be revised based on the provided edits.

CMWD-6 Comment #6: Page 2-83 (Figure 2-17) and Page 2-158 (Table 2-14) points out that that historically aggregate Casitas water use has not been available for the OVGB. These data have previously been estimated in order to develop a water budget for the basin. The GSP will be updated to indicate that these values are estimated and not measured values. CMWD surface water imports in the Ojai Basin Groundwater Model (OBGM) are accounted for at the model cell level based on irrigation demand for the different land uses across the OVGB. The OBGM assumes irrigation demands are constant from year-to-year. The imported volume of CMWD water impacts total pumpage in the OVGB which is reflected in the model pumping rates (DBS&A 2011).

CMWD-7 Comment #7: Page 2-84 (Figure 2-18) asks about the spatial distribution of recharge to the principal and perched aquifers in the OVGB. The GSP explains that, "The San Antonio Creek watershed, which drains the mountains surrounding the OVGB, provides recharge to the OVGB through infiltration of streamflow into the shallow alluvial sediments. Mountain front recharge that occurs at the interface between surrounding bedrock and unconsolidated sediments is a source of recharge along the creeks that enter the OVGB (Figure 2- 18). Focused areas of recharge also include areas of the OVGB occupied by soils with high saturated hydraulic conductivity (Figure 2-18). DBS&A (2020b) estimated average annual recharge from precipitation for the revised Ojai Basin Groundwater Model (OBGM) calibration period (1970 to 2019) to be approximately 6,970 AFY. The amount of groundwater recharge to the OVGB is considered to vary significantly from year to year. Daniel B. Stephens & Associates (DBS&A 2011) estimated annual recharge from precipitation for the original OBGM calibration period (1970 to 2009) to range from approximately 1,700 AFY to 20,000 AFY." Figure 2-18 shows the estimated northern extent of the perched aquifer. Recharge that occurs north and east of the perched aquifer readily migrates vertically to recharge the principal aquifers. Infiltration of precipitation, runoff and irrigation return flows that occurs in the area of the perched aquifer likely precludes vertical migration to the principal aquifers because a continuous clay aquitard acts as a barrier to vertical flow in the southwestern area of the OVGB (see Figure 2-38 for Lower San Antonio Creek Hydrogeologic Conceptual Model).

CMWD-8 Comment #8: Page 2-119 (Figure 2-31) and Page 2-104 indicates that Casita's well exceeds the drinking water standard for manganese. As recommended, the GSP will be revised to include explanation that CMWD operates a groundwater treatment plant to remove iron and manganese prior to distribution to its customers.

CMWD-9 Comment #9: Page 2-181 requests that the Lake Casitas capacity be updated to 238,000 acre-feet from 254,000 acre-feet to reflect the estimate from the 2017 bathymetric survey. The GSP will be revised to incorporate this information.

CMWD-10 Comment #10: Page 3-28 requests that the text of the GSP be revised to clarify that only the OBGMA has adopted resolution 2017-4 and that the resolution has yet to be considered by the full board of the CMWD. The GSP will be revised to clarify this information.

CMWD-11 Comment #11: Page 3-31 and Page 4-17 recommends slight modifications to the text. The GSP will be revised to incorporate the suggested revisions.

CMWD-12 Comment #12: Page 4-26. Casitas requests clarification regarding the expected benefit of proposed recharge projects in terms of whether the recharge projects would benefit the perched aquifer or the principal aquifers. In addition, the comment questions whether measurable objectives have been established for the perched aquifer. As explained in response to comment #7, a portion of the southwestern area of the OVGB is underlain by a continuous clay aquitard that acts as a vertical barrier to flow. Recharge projects located in the northeastern part of the OVGB—such as the San Antonio Creek Spreading Grounds—will result in recharge to the principal aquifers. Recharge projects located in the southwestern areas of the OVGB will likely only provide recharge to the perched aquifer; however, additional data may be required to determine the benefit of a particular recharge project. At this point, no minimum threshold or measurable objective has been established for the perched aquifer. Study is ongoing to document the potential effect of pumping in the OVGB on groundwater levels in the perched aquifer (see Management Action #1 Understand the Basin, Prepare Groundwater Dependent Ecosystems Assessment as described in Section 4.2.4).

CMWD-13 Comment #13: Page 4-28 provides clarifying language regarding the effect of importing SWP water. The GSP will be revised to incorporate these edits.

CMWD-14 Comment #14: Page 2-54 and 2-55, and Page 4-29 and 4-30 provides clarifying remarks in regard to the ongoing Ventura watershed adjudication. The GSP will be revised to incorporate these edits. In particular, the "Measurable Objective Expected to Benefit" and "Expected Benefits and Evaluation" language will be revised to indicate that these benefits are yet to be determined pending outcome of the ongoing litigation.

The Nature Conservancy | Audubon CALIFORNIA | Local Government Commission — Leaders for Livable Communities
Union of Concerned Scientists — Science for a healthy planet and safer world | CLEAN WATER ACTION | CLEAN WATER FUND

December 9, 2021

Ojai Basin Groundwater Management Agency
P.O. Box 1779
Ojai, CA 93024

Submitted via email: OjaiBasinGSP@gmail.com

Re: Public Comment Letter for Ojai Valley Groundwater Basin Draft GSP

Dear John Mundy,

On behalf of the above-listed organizations, we appreciate the opportunity to comment on the Draft Groundwater Sustainability Plan (GSP) for the Ojai Valley Groundwater Basin being prepared under the Sustainable Groundwater Management Act (SGMA). Our organizations are deeply engaged in and committed to the successful implementation of SGMA because we understand that groundwater is critical for the resilience of California's water portfolio, particularly in light of changing climate. Under the requirements of SGMA, Groundwater Sustainability Agencies (GSAs) must consider the interests of all beneficial uses and users of groundwater, such as domestic well owners, environmental users, surface water users, federal government, California Native American tribes and disadvantaged communities (Water Code 10723.2).

As stakeholder representatives for beneficial users of groundwater, our GSP review focuses on how well disadvantaged communities, drinking water users, tribes, climate change, and the environment were addressed in the GSP. While we appreciate that some basins have consulted us directly via focus groups, workshops, and working groups, we are providing public comment letters to all GSAs as a means to engage in the development of 2022 GSPs across the state. Recognizing that GSPs are complicated and resource intensive to develop, the intention of this letter is to provide constructive stakeholder feedback that can improve the GSP prior to submission to the State.

Based on our review, we have significant concerns regarding the treatment of key beneficial users in the Draft GSP and consider the GSP to be **insufficient** under SGMA. We highlight the following findings:

1. Beneficial uses and users **are not sufficiently** considered in GSP development.
    a. Human Right to Water considerations **are not sufficiently** incorporated.
    b. Public trust resources **are not sufficiently** considered.
    c. Impacts of Minimum Thresholds, Measurable Objectives and Undesirable Results on beneficial uses and users **are not sufficiently** analyzed.

2. Climate change **is not sufficiently** considered.
3. Data gaps **are sufficiently** identified and the GSP **has a plan** to eliminate them.
4. Projects and Management Actions **do not sufficiently consider** potential impacts or benefits to beneficial uses and users.

Our specific comments related to the deficiencies of the Ojai Valley Groundwater Basin Draft GSP along with recommendations on how to reconcile them, are provided in detail in **Attachment A.**

Please refer to the enclosed list of attachments for additional technical recommendations:

Attachment A	GSP Specific Comments
Attachment B	SGMA Tools to address DAC, drinking water, and environmental beneficial uses and users
Attachment C	Freshwater species located in the basin
Attachment D	The Nature Conservancy's "Identifying GDEs under SGMA: Best Practices for using the NC Dataset"

Thank you for fully considering our comments as you finalize your GSP.

Best Regards,

Ngodoo Atume
Water Policy Analyst
Clean Water Action/Clean Water Fund

J. Pablo Ortiz-Partida, Ph.D.
Western States Climate and Water Scientist
Union of Concerned Scientists

Samantha Arthur
Working Lands Program Director
Audubon California

Danielle V. Dolan
Water Program Director
Local Government Commission

E.J. Remson
Senior Project Director, California Water Program
The Nature Conservancy

Melissa M. Rohde
Groundwater Scientist
The Nature Conservancy

Attachment A

Specific Comments on the Ojai Valley Groundwater Basin Draft Groundwater Sustainability Plan

1. Consideration of Beneficial Uses and Users in GSP development

Consideration of beneficial uses and users in GSP development is contingent upon adequate identification and engagement of the appropriate stakeholders. The (A) identification, (B) engagement, and (C) consideration of disadvantaged communities, drinking water users, tribes,[1] groundwater dependent ecosystems, streams, wetlands, and freshwater species are essential for ensuring the GSP integrates existing state policies on the Human Right to Water and the Public Trust Doctrine.

A. Identification of Key Beneficial Uses and Users

Disadvantaged Communities and Drinking Water Users

The identification of Disadvantaged Communities (DACs) and drinking water users is **insufficient**. The GSP identifies the Barbareño/Ventureño Band of Mission Indians as a stakeholder within the basin but does not provide a map of the tribal lands or tribal interests in the basin.

The GSP maps domestic wells in the basin by density per square mile (Figure 2-5). However, the plan fails to provide depth of these wells (such as minimum well depth, average well depth, or depth range) within the basin. This information is necessary to understand the distribution of shallow and vulnerable drinking water wells within the basin.

These missing elements are required for the GSAs to fully understand the specific interests and water demands of these beneficial users, and to support the consideration of beneficial users in the development of sustainable management criteria and selection of projects and management actions.

RECOMMENDATIONS
• Include a map showing domestic well locations and average well depth across the basin. • Provide a map of tribal lands and describe tribal interests in the basin.

Interconnected Surface Waters

The identification of Interconnected Surface Waters (ISWs) is **insufficient**, due to lack of supporting information provided for the ISW analysis.

The GSP maps streams in the basin using the USGS National Hydrography Dataset on Figure 2-36, which shows the stream reaches labeled as intermittent, perennial, and unclassified. The

[1] Our letter provides a review of the identification and consideration of federally recognized tribes (Data source: SGMA Data viewer) within the GSP from non-tribal members and NGOs. Based on the likely incomplete information available to our organizations for this review, we recommend that the GSA utilize the California Department of Water Resources' "Engagement with Tribal Governments" Guidance Document (https://water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents) to comprehensively address these important beneficial users in their GSP.

GSP states (p. 2-137): "*According to the USGS National Hydrography Dataset (NHD), nearly the entire length of every creek that transects the OVGB is classified as intermittent within the OVGB, with the exception of the lowermost reaches of San Antonio Creek, Thacher Creek, and the Fox Canyon Drain/Stewart Canyon drainage which are classified as perennial.*" Note the regulations [23 CCR §351(o)] define ISW as "surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted." "At any point" has both a spatial and temporal component. Even short durations of interconnections of groundwater and surface water can be crucial for surface water flow and supporting environmental users of groundwater and surface water.

The GSP implies that surface water reaches connected to the shallow perched aquifer should not be considered ISWs. The GSP states (p. 2-137): *"Based on available lithologic, streamflow, and groundwater level data, there is a shallow perched aquifer in the southern and western portion of the OVGB that is in hydraulic connection with surface water of San Antonio Creek and its tributaries. The shallow perched aquifer is separated from the deeper confined production aquifers by an extensive clay aquitard (OBGMA 2018). Groundwater levels in the shallow perched aquifer exhibit a stable trend with little seasonal fluctuation or response to groundwater extraction while groundwater levels in the principal aquifer show the effects of groundwater extraction."* However, shallow aquifers that provide significant quantities of groundwater to springs or surface water systems, must by definition be considered a principal aquifer, regardless of pumping.[2] This is especially the case if the shallow aquifer is supporting ecosystems, providing baseflow to streams, and has the potential to support future well development, even if the majority of the basin's pumping is currently occurring in deeper principal aquifers. If areas of shallow or perched groundwater are discounted as ISWs, the GSP should provide more supporting evidence of 1) vertical groundwater gradients between the perched system and deeper principal aquifers, and 2) whether perched groundwater is providing significant or economic quantities of water to springs (e.g., GDEs), wells (e.g., domestic wells), and surface water systems (e.g., GDEs/ISWs).

The GSP acknowledges the gaps in data needed to adequately characterize the interaction between groundwater and surface water within the basin. We recommend that any segments with data gaps are considered potential ISWs and clearly marked as such on maps provided in the GSP.

RECOMMENDATIONS

- On the map of streams in the basin, clearly label reaches as interconnected (gaining/losing) or disconnected. Consider any segments with data gaps as potential ISWs and clearly mark them as such on maps provided in the GSP.
- Use seasonal data over multiple water year types to capture the variability in environmental conditions inherent in California's climate, when mapping ISWs. We recommend the 10-year pre-SGMA baseline period of 2005 to 2015.
- Overlay the basin's stream reaches on depth-to-groundwater contour maps to illustrate groundwater depths and the groundwater gradient near the stream reaches. Show the location of groundwater wells used in the analysis.

[2] "'Principal aquifers' refer to aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems." [23 CCR §351(aa)]

- For the depth-to-groundwater contour maps, use the best practices presented in Attachment D. Specifically, ensure that the first step is contouring groundwater elevations, and then subtracting this layer from land surface elevations from a Digital Elevation Model (DEM) to estimate depth-to-groundwater contours across the landscape. This will provide accurate contours of depth to groundwater along streams and other land surface depressions where GDEs are commonly found.

Groundwater Dependent Ecosystems

The identification of Groundwater Dependent Ecosystems (GDEs) is **insufficient**. The GSP took initial steps to identify and map GDEs using the Natural Communities Commonly Associated with Groundwater dataset (NC dataset). However, we found that some mapped features in the NC dataset were improperly disregarded.

- NC dataset polygons were incorrectly removed if Normalized Difference Vegetation Index (NDVI) and Normalized Difference Moisture Index (NDMI) data did not correlate with groundwater level trends. This is an incorrect method, since a lack of a relationship does not preclude that groundwater is providing some of the ecosystem's water needs. If the ecosystem is accessing groundwater then the ecosystem should be categorized as a GDE. If there are no data to characterize groundwater conditions underlying the GDE, then the GDE should be retained as a potential GDE and data gaps reconciled in the Monitoring Network section of the GSP.

- NC dataset polygons were incorrectly removed if they were determined to not be impacted by groundwater extraction from the deeper principal aquifer. However, shallow aquifers that have the potential to support well development, springs, or surface water systems are principal aquifers, even if the majority of the basin's pumping is occurring in deeper principal aquifers. If there are no data to characterize groundwater conditions in the shallow principal aquifer, then the GDE should be retained as a potential GDE and data gaps reconciled in the Monitoring Network section of the GSP.

The GSP states (p. 2-147): *"Of the 46 individual vegetation and wetland communities (253.3 acres) identified in the NCCAG dataset, 12 communities (94.3 acres) are characterized as priority potential groundwater dependent ecosystems, 21 communities (99.5 acres) are characterized as potential groundwater dependent ecosystems, and 13 communities (59.5 acres) are characterized as potential GDEs not likely impacted by groundwater extraction."* The GSP should clarify which potential GDEs are retained for consideration and inclusion in the monitoring network and sustainable management criteria. If insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons as "Potential GDEs" in the GSP until data gaps are reconciled in the monitoring network.

The GSP lists Valley Oak (*Quercus lobata*) as one of the vegetation types in the basin. We recommend that an 80-foot depth-to-groundwater threshold be used when inferring whether Valley Oak polygons in the NC dataset are likely reliant on groundwater. This recommendation is based on a recent correction in TNC's rooting depth database,[3] after finding a typo in the max rooting depth units for Valley Oak. This resulted in a specific change in the max rooting depth of Valley Oak from 24 feet to 24 meters (80 feet). For all other phreatophytes, we continue to recommend that a 30-foot depth-to-groundwater threshold be used when inferring whether all other NC dataset polygons are likely reliant on groundwater.

[3] TNC. 2021. Plant Rooting Depth Database. Available at: https://groundwaterresourcehub.org/sgma-tools/gde-rooting-depths-database-for-gdes/

The GSP provides a summary of the communities in the NC Dataset by vegetation and wetland type in Table 2-12. However, the GSP does not provide a description or inventory of the basin's fauna or discuss endangered, threatened, or special status species.

RECOMMENDATIONS

- Re-evaluate the NC dataset polygons that were incorrectly removed based on NDVI and NDMI trends or based on impact by groundwater extraction from the deeper principal aquifer. Refer to Attachment D of this letter for best practices for using local groundwater data to verify whether polygons in the NC Dataset are supported by groundwater in an aquifer.
- Provide depth-to-groundwater contour maps, noting the best practices presented in Attachment D. Specifically, ensure that the first step is contouring groundwater elevations, and then subtracting this layer from land surface elevations from a DEM to estimate depth-to-groundwater contours across the landscape.
- Refer to Attachment B for more information on TNC's plant rooting depth database. Deeper thresholds are necessary for plants that have reported maximum root depths that exceed the averaged 30-ft threshold, such as Valley Oak (*Quercus lobata*). We recommend that the reported max rooting depth for these deeper-rooted plants be used. For example, a depth-to-groundwater threshold of 80 feet should be used instead of the 30-ft threshold, when verifying whether Valley Oak polygons from the NC Dataset are connected to groundwater. It is important to emphasize that actual rooting depth data are limited and will depend on the plant species and site-specific conditions such as soil and aquifer types, and proximity to other water sources.
- If insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons as "Potential GDEs" in the GSP until data gaps are reconciled in the monitoring network.
- Provide a complete inventory, map, or description of fauna (e.g., birds, fish, amphibian) and flora (e.g., plants) species in the basin and note any threatened or endangered species (see Attachment C in this letter for a list of freshwater species located in the Ojai Valley Basin).

Native Vegetation and Managed Wetlands

Native vegetation and managed wetlands are water use sectors that are required to be included in the water budget.[4,5] The integration of native vegetation into the water budget is **insufficient**. The GSP text discusses evapotranspiration from riparian habitats for the historic period, but native vegetation appears to be grouped into a category with all evapotranspiration in the water budget tables. The omission of explicit water demands for native vegetation is problematic

[4] "'Water use sector' refers to categories of water demand based on the general land uses to which the water is applied, including urban, industrial, agricultural, managed wetlands, managed recharge, and native vegetation." [23 CCR §351(al)]

[5] "The water budget shall quantify the following, either through direct measurements or estimates based on data: (3) Outflows from the groundwater system by water use sector, including evapotranspiration, groundwater extraction, groundwater discharge to surface water sources, and subsurface groundwater outflow." [23 CCR §354.18]

because key environmental uses of groundwater are not being accounted for as water supply decisions are made using this budget, nor will they likely be considered in project and management actions. Managed wetlands are not mentioned in the GSP, so it is not known whether or not they are present in the basin.

RECOMMENDATIONS
• Quantify and present all water use sector demands in the historical, current, and projected water budgets with individual line items for each water use sector, including native vegetation. • State whether or not there are managed wetlands in the basin. If there are, ensure that their groundwater demands are included as separate line items in the historical, current, and projected water budgets.

B. Engaging Stakeholders

Stakeholder Engagement During GSP Development

Stakeholder engagement during GSP development is **insufficient**. SGMA's requirement for public notice and engagement of stakeholders is not fully met by the description in the Public Outreach and Engagement Plan (Appendix C).[6]

We note the following deficiencies with the overall stakeholder engagement process:

- The GSP documents opportunities for public involvement and engagement in very general terms for listed stakeholders. Public notice and engagement activities include media releases and announcements through the Ventura River Watershed Council and agricultural industry organizations, communications via email to the interested parties list, agency website posts, and physical postings at Ojai City Hall, and attendance at public meetings with opportunities for questions and comments. The GSP does not state whether there was direct engagement with drinking water users, environmental stakeholders or representatives, or whether tribal and environmental stakeholders are represented on a GSP Advisory Committee.
- The plan does not include documentation on how stakeholder input from the above-mentioned outreach and engagement was solicited, considered, and incorporated into the GSP development process.
- While the plan states: "*The local Chumash Barbareño/Ventureño Band of Mission Indians is on the list of interested parties and is invited to participate,*" there is no documentation of how outreach and engagement to the Chumash Barbareño/Ventureño Band of Mission Indians was conducted and the input from the tribe to GSP development.

[6] "A communication section of the Plan shall include a requirement that the GSP identify how it encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin." [23 CCR §354.10(d)(3)]

- The GSP states *"the OBGMA may adjust the engagement strategy and/or provide additional outreach opportunities as needed throughout the GSP development and implementation process,"* suggesting that plans for outreach to all identified stakeholders will continue during the implementation phase of the GSP. However, the GSP does not include a detailed plan for continual opportunities for outreach and engagement through the implementation phase of the GSP that is specifically directed to domestic well owners, tribes, and environmental stakeholders within the basin.

RECOMMENDATIONS

- In the Public Outreach and Engagement Plan, describe active and targeted outreach to engage drinking water users, tribes, and environmental stakeholders throughout the GSP development and implementation phases. Refer to Attachment B for specific recommendations on how to actively engage stakeholders during all phases of the GSP process.
- Regarding the interests of tribes, the plan states that *"the OBGMA is currently working to locate the nearest contact in the Ojai Valley and expects to send information soon after the time of print of this Outreach and Engagement Plan."* Provide this information in the final plan.
- Utilize DWR's tribal engagement guidance to comprehensively identify, involve, and address all tribes and tribal interests that may be present in the basin.[7]

C. Considering Beneficial Uses and Users When Establishing Sustainable Management Criteria and Analyzing Impacts on Beneficial Uses and Users

The consideration of beneficial uses and users when establishing sustainable management criteria (SMC) is **insufficient**. The consideration of potential impacts on all beneficial users of groundwater in the basin are required when defining undesirable results and establishing minimum thresholds.[8,9,10]

Disadvantaged Communities and Drinking Water Users

For chronic lowering of groundwater levels, the GSP establishes minimum thresholds as follows (p. 3-12): *"Maintaining groundwater levels above recorded historical low static levels at RMPs during multi year drought conditions was selected as the minimum desired threshold for groundwater elevations that would be protective of beneficial uses in the OVGB. These minimum thresholds would be protective of all potable and non-potable beneficial uses because*

[7] Engagement with Tribal Governments Guidance Document. Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Guidance-Doc-for-SGM-Engagement-with-Tribal-Govt_ay_19.pdf

[8] "The description of undesirable results shall include [...] potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results." [23 CCR §354.26(b)(3)]

[9] "The description of minimum thresholds shall include [...] how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests." [23 CCR §354.28(b)(4)]

[10] "The description of minimum thresholds shall include [...] how state, federal, or local standards relate to the relevant sustainability indicator. If the minimum threshold differs from other regulatory standards, the agency shall explain the nature of and the basis for the difference." [23 CCR §354.28(b)(5)]

undesirable results have not historically occurred at these levels." The GSP does not quantify the number of domestic wells that could go dry, or otherwise consider or analyze the impact of minimum thresholds on domestic wells. Therefore, the GSP does not sufficiently describe whether minimum thresholds will avoid significant and unreasonable loss of drinking water to domestic well users, especially given the absence of a domestic well impact mitigation plan in the GSP. In addition, the GSP does not sufficiently describe or analyze direct or indirect impacts on drinking water users or tribes when defining undesirable results, nor does it describe how the groundwater level minimum thresholds are consistent with Human Right to Water policy and will avoid significant and unreasonable impacts on these beneficial users.[11]

For degraded water quality, constituents of concern (COCs) in the basin include total dissolved solids (TDS), sulfate, chloride, boron, nitrate, iron, and manganese. Minimum thresholds are established for each COC as the relevant drinking water standards specified in Title 22 of the California Code of Regulations (CCR). Measurable objectives are established for COCs that have groundwater quality objectives in the Los Angeles Basin Plan (i.e., TDS, sulfate, chloride, and boron).

The GSP only includes a very general discussion of impacts on drinking water users when defining undesirable results and evaluating the impacts of proposed minimum thresholds for degraded water quality. The GSP does not, however, mention or discuss direct and indirect impacts on tribes when defining undesirable results for degraded water quality, nor does it evaluate the cumulative or indirect impacts of proposed minimum thresholds on these stakeholders.

RECOMMENDATIONS

Chronic Lowering of Groundwater Levels

- Describe direct and indirect impacts on drinking water users and tribes when describing undesirable results and defining minimum thresholds for chronic lowering of groundwater levels. Include information on the impacts during prolonged periods of below average water years.
- Consider and evaluate the impacts of selected minimum thresholds and measurable objectives on drinking water users and tribes within the basin. Further describe the impact of passing the minimum threshold for these users. For example, provide the number of domestic wells that would be fully or partially de-watered at the minimum threshold.

Degraded Water Quality

- Describe direct and indirect impacts on drinking water users and tribes when defining undesirable results for degraded water quality.[12] For specific guidance on how to consider these users, refer to "Guide to Protecting Water Quality Under the Sustainable Groundwater Management Act."[13]

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[11] California Water Code §106.3. Available at: https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=WAT&sectionNum=106.3

[12] "Degraded Water Quality [...] collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues." [23 CCR §354.34(c)(4)]

[13] Guide to Protecting Water Quality under the Sustainable Groundwater Management Act https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/293/attachments/original/1559328858/Guide_to_Protecting_Drinking_Water_Quality_Under_the_Sustainable_Groundwater_Management_Act.pdf?1559328858.

- Evaluate the cumulative or indirect impacts of proposed minimum thresholds for degraded water quality on drinking water users and tribes.

Groundwater Dependent Ecosystems and Interconnected Surface Waters

The GSP states (p. 3-26): *"As described in Section 3.2.6, Depletions of Interconnected Surface Water, there is not sufficient information at this time to establish minimum thresholds, measurable objectives, or interim milestones for depletions of interconnected surface water or GDEs."*
The GSP discusses data gaps for GDEs and ISWs, and provides specific plans to fill these data gaps in the monitoring network and projects and management actions sections of the GSP. Despite these data gaps, the GSP could be improved by including further discussion of significant and unreasonable effects for GDEs and ISWs in the basin, including surface water beneficial users (see Attachment C for a list of environmental users in the basin), such as increased mortality and inability to perform key life processes (e.g., reproduction, migration). In the future as SMC are established for GDEs and ISWs, note our further recommendations below.

RECOMMENDATIONS

- When establishing SMC for the basin, consider that the SGMA statute [Water Code §10727.4(l)] specifically calls out that GSPs shall include "impacts on groundwater dependent ecosystems."
- Evaluate impacts on GDEs when establishing SMC for chronic lowering of groundwater levels. When defining undesirable results, provide specifics on what biological responses (e.g., extent of habitat, growth, recruitment rates) would best characterize a significant and unreasonable impact to GDEs. Undesirable results to environmental users occur when 'significant and unreasonable' effects on beneficial users are caused by one of the sustainability indicators (i.e., chronic lowering of groundwater levels, degraded water quality, or depletion of interconnected surface water). Thus, potential impacts on environmental beneficial uses and users need to be considered when defining undesirable results in the basin.[14] Defining undesirable results is the crucial first step before the minimum thresholds can be determined.[15]
- When defining undesirable results for depletion of interconnected surface water, include a description of potential impacts on instream habitats within ISWs when minimum thresholds in the basin are reached.[16] The GSP should confirm that minimum thresholds for ISWs avoid adverse impacts on environmental beneficial users of interconnected surface waters as these environmental users could be left unprotected

[14] "The description of undesirable results shall include [...] potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results". [23 CCR §354.26(b)(3)]
[15] The description of minimum thresholds shall include [...] how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests." [23 CCR §354.28(b)(4)]
[16] "The minimum threshold for depletions of interconnected surface water shall be the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results." [23 CCR §354.28(c)(6)]

by the GSP. These recommendations apply especially to environmental beneficial users that are already protected under pre-existing state or federal law.[8,17]

2. Climate Change

The SGMA statute identifies climate change as a significant threat to groundwater resources and one that must be examined and incorporated in the GSPs. The GSP Regulations require integration of climate change into the projected water budget to ensure that projects and management actions sufficiently account for the range of potential climate futures.[18] The effects of climate change will intensify the impacts of water stress on GDEs, making available shallow groundwater resources especially critical to their survival. Condon *et al.* (2020) shows that GDEs are more likely to succumb to water stress and rely more on groundwater during times of drought.[19] When shallow groundwater is unavailable, riparian forests can die off and key life processes (e.g., migration and spawning) for aquatic organisms, such as steelhead, can be impeded.

The integration of climate change into the projected water budget is **insufficient**. The GSP incorporates climate change into the projected water budget using DWR change factors for both 2030 and 2070. However, the plan does not consider multiple climate scenarios (e.g., the 2070 extremely wet and extremely dry climate scenarios) in the projected water budget. The GSP would benefit from clearly and transparently incorporating the extremely wet and dry scenarios provided by DWR into projected water budgets or select more appropriate extreme scenarios for the basin. While these extreme scenarios may have a lower likelihood of occurring and their consideration is not required by DWR (only suggested), their consequences could be significant and their inclusion can help identify important vulnerabilities in the basin's approach to groundwater management.

The GSP integrates climate change into key inputs (e.g., changes in precipitation and evapotranspiration) of the projected water budget. However, the plan fails to include surface water flow inputs (inclusive of imported water) for the projected water budget and incorporate the effects of climate change on these flows. The sustainable yield is calculated based on the projected water budget with climate change incorporated. However, if the water budgets are incomplete, including the omission of extremely wet and dry scenarios and the projected climate change effects on surface water flow inputs, then there is increased uncertainty in virtually every subsequent calculation used to plan for projects, derive measurable objectives, and set minimum thresholds. Plans that do not adequately include climate change projections may underestimate future impacts on vulnerable beneficial users of groundwater such as ecosystems, tribes, and domestic well owners.

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[17] Rohde MM, Seapy B, Rogers R, Castañeda X, editors. 2019. Critical Species LookBook: A compendium of California's threatened and endangered species for sustainable groundwater management. The Nature Conservancy, San Francisco, California. Available at: https://groundwaterresourcehub.org/public/uploads/pdfs/Critical_Species_LookBook_91819.pdf

[18] "Each Plan shall rely on the best available information and best available science to quantify the water budget for the basin in order to provide an understanding of historical and projected hydrology, water demand, water supply, land use, population, climate change, sea level rise, groundwater and surface water interaction, and subsurface groundwater flow." [23 CCR §354.18(e)]

[19] Condon et al. 2020. Evapotranspiration depletes groundwater under warming over the contiguous United States. Nature Communications. Available at: https://www.nature.com/articles/s41467-020-14688-0

RECOMMENDATIONS

- Integrate climate change, including extreme climate scenarios, into all elements of the projected water budget to form the basis for development of sustainable management criteria and projects and management actions
- Include surface water flow inputs, inclusive of imported water, in the projected water budget and incorporate climate change effects on these flows.
- Incorporate climate change scenarios into projects and management actions.

3. Data Gaps

The consideration of beneficial users when establishing monitoring networks is **sufficient**, due to the inclusion of specific plans to increase the Representative Monitoring Wells (RMWs) in the monitoring network that represent water quality conditions and shallow groundwater elevations around domestic wells, tribes, GDEs, and ISWs in the basin.[20]

We commend the GSA for establishing a representative monitoring network for ISW and GDEs, and for including plans to fill existing data gaps with stream monitoring and a GDE assessment to plan for additional monitoring wells and stream gauges in the future (Section 3.5.7.2).

4. Addressing Beneficial Users in Projects and Management Actions

The consideration of beneficial users when developing projects and management actions is **incomplete**. The GSP identifies the benefits or impacts of identified projects and management actions, including water quality impacts, to key beneficial users of groundwater such as GDEs. However, projects and management actions (e.g., Develop Salt and Nutrient Management Plan) are described without a known timeline for implementation.

The GSP also fails to include a domestic well impact mitigation program to avoid significant and unreasonable loss of drinking water. We strongly recommend inclusion of a drinking water well impact mitigation program to proactively monitor and protect drinking water wells through GSP implementation.

RECOMMENDATIONS

- Describe the projected timeline for implementing the Salt and Nutrient Management Plan project in Chapter 4 of the GSP.
- For DACs and domestic well owners, provide specific plans for implementation of a drinking water well impact mitigation program to proactively monitor and protect drinking water wells through GSP implementation. Refer to Attachment B for specific recommendations on how to implement a drinking water well mitigation program.

[20] "The monitoring network objectives shall be implemented to accomplish the following: [...] (2) Monitor impacts to the beneficial uses or users of groundwater." [23 CCR §354.34(b)(2)]

- Recharge ponds, reservoirs, and facilities for managed aquifer recharge can be designed as multiple-benefit projects to include elements that act functionally as wetlands and provide a benefit for wildlife and aquatic species. For guidance on how to integrate multi-benefit recharge projects into your GSP, refer to the "Multi-Benefit Recharge Project Methodology Guidance Document."[21]

- Develop management actions that incorporate climate and water delivery uncertainties to address future water demand and prevent future undesirable results.

[21] The Nature Conservancy. 2021. Multi-Benefit Recharge Project Methodology for Inclusion in Groundwater Sustainability Plans. Sacramento. Available at: https://groundwaterresourcehub.org/sgma-tools/multi-benefit-recharge-project-methodology-guidance/

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Response to Comment Letter

Organization/Agency: Non-Governmental Organizations
Commenter: Ngodoo Atume et al.
Date: December 9, 2021

NGO-1 Comment #1: The identification of Disadvantaged Communities (DACs) and drinking water users is insufficient.

As discussed in Section 2.1.3.1 Land Use and Population, there are no disadvantaged communities (DACs) in the Ojai Valley Groundwater Basin (OVGB). The local Chumash Barbareño/Ventureño Band of Mission Indians are a stakeholder group in the OVGB. Julie Tumamait-Stenslie, Tribal Chair of the The Barbareño/Ventureño Band of Mission Indians, attended and spoke at the Ojai Basin Groundwater Management Agency (OBGMA) meeting held on June 9, 2021. The Barbareño/Ventureño Band of Mission Indians do not have a federally recognized tribal land boundary.

As stated in Section 2.1.2.1 Groundwater Monitoring and Section 4.2.2 Conduct Groundwater Extraction Monitoring, since 1993 and the adoption of Ordinance No. 1, the OBGMA has monitored groundwater extractions from all active water supply wells in the OVGB, including *de minimis* pumpers. Each well operator submits a Groundwater Extraction Statement to the OBGMA on a quarterly basis. The OBGMA encourages well operators to communicate any potential well production issues users may be experiencing to inform basin management moving forward. Figure 2-5 Groundwater Well Locations and Density per Square Mile shows domestic well locations in the OVGB. The OBGMA disagrees with the comment that identification of DACs and drinking water users in the OVGB is insufficient.

NGO-2 Comment #2: The identification of Interconnected Surface Waters (ISWs) is insufficient, due to lack of supporting information provided for the ISW analysis.

As described in Section 2.3.4.6 Groundwater-Surface Water Connections, and shown in Figures 2-36 NCCAG Listed Communities and 2-39 Potential Groundwater Dependent Ecosystems, nearly the entire length of every creek that transects the OVGB is classified by the United States Geological Survey (USGS) National Hydrography Dataset (NHD) as intermittent, with the exception of the lowermost reaches of San Antonio Creek, Thacher Creek, and Fox Canyon Drain/Stewart Canyon which are classified as perennial. As stated in Section 2.1.2.2 Precipitation and Streamflow Monitoring, the OBGMA conducts monthly manual stream discharge monitoring and continuous stream stage monitoring on lower San Antonio Creek at the location identified in Figure 2-7 Weather Stations and Average Annual Precipitation in the Plan Area to monitor perennial baseflows and document the location of daylighting groundwater. A figure summarizing the data collected to date is included in Appendix E. As described in Section 4.2.1 Conduct Groundwater Level, Groundwater Quality, and Streamflow Monitoring and Section 4.2.4 Prepare Groundwater Dependent Ecosystems Assessment, the OBGMA plans to monitor stream flows and map stream reaches to fill data gaps associated with groundwater-surface water interactions and groundwater dependent ecosystems (GDEs). The information will be used to establish minimum thresholds or measurable objectives for depletions of interconnected surface water and GDEs, if appropriate.

The GSP does not suggest or imply that “surface water reaches connected to the shallow perched aquifer should not be considered ISWs” as asserted by the commentor. In fact, the GSP clearly indicates, "…that the perched aquifer is shallow perched aquifer in the southern and western portion of the OVGB that is in *hydraulic connection* with surface water of San Antonio Creek and its tributaries." While the perched aquifer is by definition a "principal aquifer" as defined by California Code of Regulations (CCR) Title 23 Section 351(aa) based on its ability to store, transmit, and yield significant quantities of water to surface water systems, it is not an aquifer that is typically targeted for groundwater extraction to yield significant or economic quantities of groundwater to wells, which is an important distinction in the OVGB. As shown in Figure 2-37, Shallow Perched Aquifer and Deep Production Aquifer Groundwater Level Trends, groundwater levels in the shallow perched aquifer exhibit a stable trend with little seasonal fluctuation or response to groundwater extraction while groundwater levels in the principal "production" aquifers show the effects of groundwater extraction (emphasis on distinction between the perched aquifer and production aquifers). Preliminary groundwater levels and water quality data from the OBGMA's new nested monitoring well, South-Central Nested Depth-Discrete Monitoring Well, indicate that the perched aquifer encountered from 14 to 24 feet below ground surface is isolated from the principal "production" aquifers encountered from 140 feet to 328 feet below ground surface (Kear 2021, Summary of Construction Operations OBGMA New 'South-Central Nested Depth-Discrete Monitoring Well). The new South-Central Nested Depth-Discrete Monitoring Well was completed in June 2021. Additional groundwater level and water quality monitoring is ongoing and will be further evaluated when assessing ISW-groundwater interactions and the potential need to develop sustainability management criteria for depletions of interconnected surface water. The OBGMA will consider recommendations provided by the commentor as part of Prepare Groundwater Dependent Ecosystem Assessment PMA described in Section 4.2.4 of the GSP.

NGO-3 Comment #3: The identification of Groundwater Dependent Ecosystems (GDEs) is insufficient.

As discussed in Section 2.3.4.7 Groundwater Dependent Ecosystems and Appendix E, vegetation and wetland communities identified in the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset were characterized using the methods outlined by The Nature Conservancy (TNC) (Rohde et al. 2018). NCCAG polygons were characterized as: (1) priority potential groundwater dependent ecosystems, (2) potential groundwater dependent ecosystems or (3) potential GDEs not likely impacted by groundwater extraction. None of the vegetation or wetland communities were removed if Normalized Difference Vegetation Index (NDVI) and Normalized Difference Moisture Index (NDMI) data did not correlate with groundwater level trends as claimed. All of the vegetation and wetland communities in the NCCAG were retained as "potential GDEs" and characterized to identify which communities have the greatest potential to be impacted by groundwater extraction, based on available data, in order to prioritize where additional study should be focused. Because there is limited groundwater level data from shallow and depth-discrete monitoring wells in the OVGB there is not sufficient data at this time to generate depth-to-groundwater contour maps as recommended. Hydrographs for wells nearby each NCCAG polygon were used to determine local depths-to-groundwater and evaluate groundwater level trends over time but were not solely relied upon to characterize an ecosystem's potential dependence on groundwater. Furthermore, field surveys have not been completed to verify the presence of and map the extent of the NCCAG identified vegetation and wetland communities. As discussed in Appendix E, many of the NCCAG polygons contain developed land and aerial photographs indicate that some of the vegetation species may be incorrectly identified (e.g., western sycamore is mapped as coast live oak). As described above and in Chapter 4, the OBGMA plans to monitor stream flows and groundwater levels and complete a groundwater dependent ecosystems assessment in order to fill data gaps. The information will be used to establish minimum thresholds or measurable objectives for depletions of interconnected surface water and GDEs, if appropriate.

A complete inventory and description of threatened and endangered species in the OVGB is included in Appendix E. The GSP will be revised to state that the maximum rooting depth of Valley Oak is 80 feet. The OBGMA will further consider recommendations provided by the commentor as part of Prepare Groundwater Dependent Ecosystem Assessment PMA described in Section 4.2.4 of the GSP.

NGO-4 Comment #4: The integration of native vegetation into the water budget is insufficient.

In accordance with Groundwater Sustainability Plan (GSP) Regulations (23 CCR Section 354.18(b) 3), the water budget for the OVGB considered evapotranspiration from irrigated crops and native vegetation (including riparian habitats). As described in Section 2.4.2.3 Evapotranspiration, crop evapotranspiration was calculated using the Penman-Monteith equation and evapotranspiration from riparian vegetation was estimated using the MODFLOW evapotranspiration (EVT1) package. Between water years 1971 and 2014, the average annual evapotranspiration by riparian habitats, calculated by the Ojai Basin Groundwater Model (OBGM), was 266 acre-feet per year (AFY). Evapotranspiration was simulated in the projected water budget for the OVGB by applying the California Department of Water Resources (DWR) 2030 and 2070 central tendency evapotranspiration change factors to measured data.

No managed wetlands are known to occur in the OVGB. The GSP will be revised to indicate as such.

NGO-5 Comment #5: Stakeholder engagement during GSP development is insufficient.

In accordance with GSP Regulations (23 CCR Section 354.10), the OBGMA developed a Public Outreach and Engagement Plan (included as Appendix C) and held seventeen public meetings where presentations on the GSP were made and stakeholders and the public were provided opportunity to comment. In addition, the OBGMA conducted public outreach at a booth during Ojai Day held on October 16, 2021. In regards to interests of tribes, as described above, Julie Tumamait-Stenslie, Tribal Chair of the The Barbareño/Ventureño Band of Mission Indians, attended and spoke at the OBGMA meeting held on June 9, 2021. The OBGMA did not receive formal comments from stakeholders and the public on the draft GSP until November 24, 2021, and did not receive this comment letter until December 9, 2021, which does not provide the OBGMA sufficient time to incorporate all comments and suggested revisions in the GSP by the final statutory submittal deadline of January 31, 2022.

NGO-6 Comment #6: The consideration of beneficial uses and users when establishing sustainable management criteria (SMC) is insufficient.

A description of the beneficial uses and users of groundwater in the OVGB is included in Section 2.1.4 Beneficial Uses and Users. As described in Chapter 3, all beneficial uses and users of groundwater were considered when establishing sustainable management criteria for the applicable sustainability indicators. As stated in Section 3.2.1 Chronic Lowering of Groundwater Levels – Undesirable Results, lowering of groundwater levels is significant and unreasonable if sufficient in magnitude to lower the rate of production of existing groundwater wells below that necessary to meet the minimum required to support the overlying beneficial uses, where alternative means of obtaining sufficient groundwater resources or local surface water resources from Lake Casitas are not technically or financially feasible for the well owner to absorb, either independently or with assistance from the OBGMA, or other available assistance/grant program(s). Although limited available information indicates that a number of shallow groundwater production wells located near the edge of the OVGB have experienced production issues during periods of prolonged drought, the OBGMA and local groundwater users have determined that the conditions do not constitute an undesirable result because other sources of water have been available. The OBGMA will continue to monitor groundwater levels in wells located throughout the OVGB and collect information from private well owners to reevaluate and update, if needed, the minimum thresholds and measurable objectives for groundwater levels. As described in Section 3.2.4 Degraded Water Quality – Undesirable Results, Degraded groundwater quality is significant and unreasonable if the magnitude of degradation precludes the use of groundwater for existing beneficial uses, including through migration of contaminant plumes that impair water supplies, where alternative means of treating or otherwise obtaining sufficient alternative water resources are not technically or financially feasible. Degradation of groundwater quality is an undesirable result that is not occurring and will not occur within the framework of existing regulations and adherence to state and local OVGB plans. adherence to existing regulations and to state and local OVGB plans (which are used as the minimum thresholds and measurable objectives for this sustainability indicator), as well as implementation of sustainability criteria for chronic lowering of groundwater levels and reduction of groundwater in storage, in combination, is sufficient to ensure adverse effects related to groundwater quality would continue to be neither significant nor unreasonable.

As discussed above and in Chapters 2 and 3, the interaction between groundwater-surface water interactions and GDEs are currently a data gap. As described above and in Chapter 4, the OBGMA plans to monitor stream flows and groundwater levels and complete a groundwater dependent ecosystems assessment in order to fill data gaps. The information will be used to establish minimum thresholds or measurable objectives for depletions of interconnected surface water and GDEs, if appropriate.

NGO-7 Comment #7: The integration of climate change into the projected water budget is insufficient.

In accordance with GSP Regulations (23 CCR Section 354.18(c) 3), the projected water budget for the OVGB utilized a 50-year projection horizon that incorporated the most recent land use and population data, projected water demands, and surface water availability. As described in Section 2.4.4 Quantification of Current, Historical, and Projected Water Budget, the DWR 2030 and 2070 central tendency precipitation and evapotranspiration change factors were applied to measured precipitation and temperature data recorded at the National Oceanic and Atmospheric Administration (NOAA) Ojai weather station from 1944 to 1993 to simulate the effects of climate change on groundwater resources in the OVGB under various climate scenarios. Groundwater extraction was set at a constant extraction rate of 4,000 AFY for all future scenario conditions and surface water supplies were assumed to remain available to the OVGB throughout the 50-year projection horizon based on Casitas Municipal Water District's (CMWD's) surface water supply and demand projections presented in the 2020 Urban Water Management Plan (CMWD 2021).

As described in Section 4.2.6 Simulate Extreme Climate Scenarios, the OBGMA has proposed to simulate extreme climate scenarios as a component of the first 5-year GSP update. The analysis will utilize monthly adjustment factors representing wetter milder warming (WMW) and drier extreme warming (DEW) conditions provided by DWR to assess groundwater conditions under extreme climate conditions. Additionally, the OBGMA will reevaluate projected water budgets and groundwater elevations to further characterize uncertainty in groundwater conditions. Measured groundwater elevations, groundwater extraction data, and climatological data will be incorporated into the Ojai Basin Groundwater Model updates to assess current and projected basin demands and management strategies.

NGO-8 Comment #8: The consideration of beneficial users when establishing monitoring networks is sufficient, due to the inclusion of specific plans to increase the Representative Monitoring Wells (RMWs) in the monitoring network that represent water quality conditions and shallow groundwater elevations around domestic wells, tribes, GDEs, and ISWs in the basin.

The OBGMA appreciates the recognition.

NGO-9 Comment #9: The consideration of beneficial users when developing projects and management actions is incomplete.

As stated in Section 4.4.1 Develop Salt and Nutrient Management Plan (SNMP), the OBGMA will develop a SNMP if required by the Regional Water Quality Control Board (RWQCB), or if undesirable results are determined to be occurring or likely to occur.

As described above and in Chapter 3, the OBGMA and local groundwater users have determined that if alternative means of obtaining sufficient groundwater resources or local surface water resources from Lake Casitas are feasible conditions do not constitute an undesirable result. The OBGMA will continue to monitor groundwater levels in wells located throughout the OVGB and collect information from private well owners to reevaluate and update, if needed, the minimum thresholds and measurable objectives for groundwater levels.

As discussed in Chapter 4, the OBGMA has proposed several projects and management actions that incorporate climate and water delivery uncertainties including simulate of extreme climate scenarios, develop of a comprehensive conjunctive management plan, and explore state water project delivery options, among others.

Verbal Comment at Ojai Board Meeting on December 9, 2021 – Kevin DeLano, Geologist (GIT) at State Water Resources Control Board

Mr. DeLano provided comment at the December 9, 2021 Ojai Board Meeting. Mr. Delano stated, "Just wanted to draw your attention to some information on flow that was recently published by CDFW on November 22, of 2021. CDFW published what they are calling a tech report for San Antonio Creek where they looked at instream flow needs for steelhead adult spawning and juvenile rearing. That is some new information that the GSA could consider. CDFW is in the process of developing more formal instream flow recommendations for San Antonio Creek and other parts of the Ventura River watershed. The tech reports are available online." Mr. DeLano agreed to sending tech report to OBGMA email.

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Response to Comment

Organization/Agency: State Water Resources Control Board
Commenter: Kevin Delano
Date: December 9, 2021

SWRCB-1 Kevin Dealno of the SWRCB provided general comment regarding the availability of California Department of Fish and Wildlife's (CDFW) Instream Flow Regime Criteria on a Watershed Scale of the Ventura River (Watershed Criteria Report) (May 2020), Southern California Steelhead Adult Spawning and Juvenile Rearing in San Antonio Creek, Ventura County (November 2021) and SWRCB's Draft Model Documentation Report for the Groundwater-Surface Water Model of the Ventura River Watershed (December 2021).

As provided in response to comment CDFW-5, In May 2020, CDFW's Instream Flow Program publicly released the Watershed Criteria Report. CDFW asserts this report "represents best available science for the OVGB regarding flows needed to support the Basin's ecosystem within the Lower San Antonio Creek (San Antonio Creek 1), Upper San Antonio Creek (San Antonio Creek 2), and Lion Canyon Creek, a tributary to San Antonio Creek". The Watershed Criteria Report states, "The Department provides this document as a tool for consideration in water management planning. It presents an analytical approach that can be implemented, if appropriate, under the specific circumstances of a watershed, stream, or informational need. This report and the Overview, in and of themselves, should not be considered to provide binding guidelines, establish legal compliance, or ensure project success." The Watershed Criteria Report estimates natural flows at several river reaches that would be expected with no human influence. Based on Figure 2 of the Watershed Criteria Report, no assessed reach appears to be within the boundary of the OVGB as defined by Bulletin 118. San Antonio Creek 2 reach is likely just outside of the boundary of the OVGB but could be used as an approximate proxy for surface water outflows from the OVGB. Estimated modeled natural flows for San Antonio Creek 2 are presented in Watershed Criteria Report Table 1 and are excerpted as follows:

11) San Antonio Creek 2 33.9 mi^2

	Month Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Natural Flows (cfs)	Wet	15	41	49	28	10	4	2	1	1	1	1	4
	Moderate	3	6	7	5	2	1	<1	<1	<1	<1	1	2
	Dry	2	3	2	1	1	<1	<1	<1	<1	<1	1	1

As explained in CDFW's Overview of Watershed-Wide Instream Flow Criteria Report Methodology (2021), "Arid watersheds are underrepresented in the reference gage network, and frequently have complex, groundwater-dominated hydrology (Lane et al. 2017). As a result*, estimates for arid regions should be interpreted with caution* (Zimmerman et al. 2020). (CDFW 2021).

Watershed Criteria Report Table 4 presents Ecosystem Baseflows for San Antonio Creek 2 and are excerpted as follows:

11) San Antonio Creek 2 33.9 mi^2

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ecosystem Baseflows (cfs)	14	23	13	7	6	2	1	<1	1	1	4	6

The OBGMA also notes that the Watershed Criteria Report defined a Sensitive Period Indicators of 5 cfs for San Antonio Creek 2 (Table 5), a steelhead habitat optimum flows by drainage area of 8 cfs for San Antonio Creek 2 (Table 6) and Steelhead passage flows of 7 cfs for juveniles and 24 cfs for adult fish for San Antonio Creek (Table 7). The OBGMA points out that prescribed Ecosystem Baseflows, Sensitive Period Indicators and steelhead habitat optimum flows are likely only to occur under wet natural flow conditions as defined by CDFW's own analsyis reflecting the high variation of precipitation and resulting flow in San Antonio Creek. While these instream flows may provide beneficial conditions for steelhead, they do not represent the minimum threshold below which significant and unreasonable impacts to steelhead would occur due to the potential depletion of Interconnected surface waters (ISWs) due to pumping in the OVGB, as is required by SGMA.

In November 2021 CDFW released Instream Flow Evaluation: Southern California Steelhead Adult Spawning and Juvenile Rearing in San Antonio Creek, Ventura County. This report was released after the preparation of the Draft GSP completed in October 2021. The GSP is due to DWR on January 31, 2022. Sufficient time is not available to review and incorporate potentially relevant findings from CDFW's November 2021 report in the Draft Final GSP. This report will be reviewed and considered as part of the Prepare Groundwater Dependent Ecosystem Assessment PMA described in Section 4.2.4 of the GSP.

In December 2021, the SWRCB released a numerical analysis to help better define in-stream flows, Draft Model Documentation Report for the Groundwater-Surface Water Model of the Ventura River Watershed. This report provides unimpaired flow and calibration/validation flow for Gage 605A located on San Antonio Creek at Old Creek Road/Highway 33 near the confluence of San Antonio Creek with the Ventura River approximately 5 miles downstream of the OVGB. The OBGMA recommends that this numerical model be used to potentially evaluate unimpaired flow at the surface discharge point in San Antonio Creek from the OVGB (approximately at San Antonio Creek 2) and compared to the analytical estimates provided by CDFW (2020). The numerical model should take particular care to differentiate the potentiometric surface that occurs in the perched aquifer from the potentiometric surfaces that occur in the principal (production) aquifers. While artesian wells are documented to occur in the OVGB, the perched aquifer is separated from the principal (production) aquifers by an extensive clay aquitard that acts as a vertical barrier to flow in the southwestern potion of the OVGB meaning that the principal (production) aquifers do not discharge to surface water in the area of the perched aquifer. Differences between calibration/validation flows and unimpaired flows should take into account evapotranspiration by invasive plants at different densities that especially impact dry season low-flow periods as the difference in instream flow between the two scenarios during the dry season may be explained entirely by changes in densities of invasive phreatophytes or native riparian vegetation over time.

The OBGMA has been measuring the first point of daylighting of surface water since 2017 and actual instantaneous discharge of stream flow since 2019 of San Antonio Creek near Skunk Ranch Road. Since 2019, stream flow discharge has varied from 0.07 cfs in September 2021 to 2.8 cfs in April 2020 (Kear 2021, Ojai Basin Conditions presented at the September 30, 2021 Regular OBGMA Board Meeting). These actual measured flows are generally within the range of the modeled estimated dry natural flows presented in Watershed Criteria Report Table 1. However, stream flow discharge measured in San Antonio Creek near Skunk Ranch Road within the 2 to 3 cfs range is correlated with precipitation events as measured at the Ojai Fire Station and discharge of groundwater from the perched aquifer as baseflow alone is not expected to sustain stream flow during exceptionally dry periods.

Overall, it is the OBGMA's initial position, based on review of the Instream Flow Regime Criteria on a Watershed Scale of the Ventura River, that the in-stream flows developed for San Antonio Creek 2 by the CDFW do not currently provide best available science to potentially develop sustainability management criteria for ISW-groundwater interactions and that in-depth instream flow studies including more intensive field work and/or modeling (as described in CDFW's own guidance) are required that takes into account specific hydrology, hydrostratigraphy, groundwater elevations of discrete aquifers and other site-specific conditions of the OVGB.

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Central Services **Joan Araujo**, Director | Engineering Services **Christopher Cooper**, Director | Roads & Transportation **Christopher Kurgan**, Director | Water & Sanitation **Joseph Pope**, Director | Watershed Protection **Glenn Shephard**, Director

December 9, 2021

Ojai Basin Groundwater Management Agency
Attn: Ms. Roberta Barbee, Administrative Assistant/Clerk of the Board
417 Bryant Circle, Suite 112
Ojai, CA 93023

Subject: Draft Groundwater Sustainability Plan for the Ojai Valley Groundwater Basin

Dear Ms. Barbee:

Ventura County Public Works Agency, Watershed Protection (VCPWA-WP), appreciates the opportunity to review the Ojai Basin Groundwater Management Agency (OBGMA) *Draft Groundwater Sustainability Plan for the Ojai Valley Groundwater Basin* (Draft) dated October 2021. Following are our comments:

In ES 2.0, the primary storage units for groundwater in the Basin are four discrete sand and gravel aquifer units. How are these units identified according to the Hydrogeologic Conceptual Model developed for the Draft? Were these discrete aquifer units modeled as separate layers in the MODFLOW model?

ES 2.0 states that groundwater level trends in the Ojai Valley Groundwater Basin (OVGB) are correlated with recharge from precipitation, return flows, and groundwater extraction. Mountain front recharge is identified as a component of groundwater recharge in Section 2.4 and should be mentioned here.

Section 2.1 states that there is no known groundwater extraction in certain areas of the OVGB (alluvial filled stream channels along the southern flank of the Topatopa Mountains and a strip of land along the western margin of the OVGB). According to County records there are several wells outside of the OBGMA boundary on the southern flank of the Topatopas.

Section 2.1 states that the eastern and western boundaries of the OVGB correspond to recognized bedrock highs that limit groundwater exchange flow between the OVGB and adjacent basins. There is limited discussion regarding any hydrogeologic connection

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between the OVGB and the Upper Ventura River Valley Subbasin, in terms of the transmissivity of groundwater through the Ojai Conglomerate Formation.

Section 2.1.2.1 states that VCWPD monitors groundwater levels in 18 wells located throughout the OVGB on a quarterly basis. Suggest including a note stating the number of wells monitored is based on accessibility.

Section 2.1.2.1 states that the State Water Resources Control Board's (SWRCB's) Groundwater Ambient Monitoring and Assessment (GAMA) Program conducts comprehensive monitoring of California's groundwater quality. What quality components are monitored in the OVGB and are they evenly assessed throughout the Basin? Is there sufficient historical data to report trends?

Section 2.1.2.4 states that the County of Ventura Resource Management Agency issues groundwater well permits in the OVGB. Groundwater well permits are administered by the Ventura County Public Works Agency.

Section 2.1.3.2 discusses the 2040 General Plan update adopted in 2020 and the new water resources element. Suggest expanding on the relevant element sections as pertains to water supply, water quality and long-term availability.

The Ojai Valley Area Plan is discussed in Section 2.1.3.2. Area Plan Policy OV-64.2 states that new discretionary development will not add any net increased demand on the existing groundwater supply. Was this policy along with Programs UU through BBB considered during development of the Basin water budget? Will the Draft satisfy the goals outlined by these programs?

Section 2.1.3.3 outlines the County's CEQA significant thresholds based on the Ventura County Initial Study Assessment Guidelines adopted in 2011. The Ventura County 2040 General Plan Update was adopted in 2020 and contains the Water Resource Element containing additional policies and programs that are considered for planning and land use and discretionary development.

Section 2.3 describes the hydrogeological conceptual model including the principal aquifers and aquitards. It would be helpful to identify how these aquifers and aquitards correlate with model layers in the MODFLOW model.

Figures 2-14 through 2-16 are geologic cross sections that show the locations and depths of wells including some completed in the underlying Sespe Formation. It would be helpful if the perforated intervals of the wells were shown on the cross sections to indicate which aquifer units the wells are pumping from.

Figure 2-19 shows hydrographs for select wells plotted with the cumulative departure form mean precipitation. Well 04N23W02K001S displays virtually no seasonal variation and has a flat-line trend some other than a number of seemly anomalous low-water measurements, with seemingly no relationship to precipitation. Similarly, well 04N22W04Q001S does not show a relationship to precipitation. This well was selected as a key well with an assigned minimum threshold. And well 05N22W32J002S displays high variability in the 1950s through the 1960s and in the first part of the 2000s, but has been essentially flat-line from about 2013 to present. Analysis these hydrographs should be discussed in text.

A chart or graph accompanying Section 2.3.3 depicting annual estimated recharge from precipitation would more clearly illustrate the importance of rainfall for Basin recharge.

Section 2.4.3.2 lists the estimated groundwater in storage in 2018. There have been consecutive dry years since 2018, so an updated estimate closer to the current date would be beneficial. Generally, has a basin-wide storage reduction contributed to inelastic or elastic subsidence? The TRE Altamira InSAR dataset from January 2015 through September 2019 showed that 41% of the OVGB experienced negative vertical displacement (subsidence) along the boundaries of the Basin. Also, the Draft states that subsidence has been largely unmonitored until recently and the OVGB is estimated to currently be at a high risk for future subsidence. It appears that these factors could significantly affect future monitoring and pumping regulation programs.

Figure 2-41 displays the cumulative change in groundwater in storage from 1971 through 2019. It's noted that the decrease in groundwater in storage in 2016 was nearly three times greater than the drought of 1990.

The TDS discussion of Section 2.4.4.4 shows that wells in the western end of the Basin tend to have higher TDS concentrations. Does this indicate a loading of solids due to a decreased hydraulic conductivity or natural geologic barrier (i.e. consolidated formation/bedrock)? Would this be an indicator of a discontinuity between the OVGB and the Upper Ventura River Valley Subbasin?

On page 2-125, the review of historic oilfields includes a cluster of active, inactive, idle, plugged and/or abandoned wells along the southern boundary of the OVGB. There should be a brief discussion of naturally occurring oil and gas seeps that are commonly found in the fractured Monterrey Formation of this area.

Section 2.4.7 includes discussion of "safe yield" and concludes based on projected water budgets that the "sustainable yield" is the same as the "safe yield." However, the analysis that pumping at the safe yield will avoid undesirable results and therefore is the same as the sustainable yield is not well supported.

Section 2.4.7 states that recharge to the San Antonio Spreading Grounds could be limited by water rights of downstream users. This would appear to be negligible, especially given the number of recent dry years of less than average rainfall.

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Section 3.2 discussion of undesirable results essentially states that there have been no undesirable results from past declines in water levels because the water levels later recovered. The discussion does not contain analysis of wells that are known to have gone dry during these historical periods of low water levels and resultant potential undesirable results.

Section 3.3 sets the minimum thresholds for water levels at the lowest historical levels measured in 1951. However, there is no analysis if there were resulting undesirable results during this period of record low water levels.

Section 3.5.2.1 outlines the proposed groundwater monitoring network and states in Section 3.5.3.3 that the network of existing wells is capable of providing an adequate assessment of groundwater quality trends. Groundwater quality wells are heavily concentrated in the center of the Basin. It would be beneficial to add or reassign water quality monitoring sites to the lower/downgradient (western) portion of the Basin.

The Draft states in Section 3.5.7.2 that data gaps associated with relevant agencies are not known to currently exist. What is the confidence level of this assessment and how does the Draft arrive at this conclusion?

There are no proposed infrastructure projects or physical improvements in Section 4 of the Draft. Does the OBGMA have any potential projects to add to the Draft? Are there any opportunities for collaboration with other agencies, entities or stakeholders?

In Section 4.2.5, does the OBGMA plan to be able to share information from their proposed data management system with Ventura County Watershed Protection? The County would be able to incorporate the data into annual groundwater reporting.

In Section 4.3.2, there are no thresholds to determine if groundwater allocations need to be developed. Can the quarterly metering started in 2015 serve to establish these along with an ongoing metering program? Determining action items are vaguely spelled out. Suggest expanding this section.

Section 4.3.3 does not mention the water conservation measures of the Ojai Valley Area Plan.

What are the determining circumstances for implementation of a salt and nutrient management plan? What are the action item thresholds? (Section 4.4.1) Also, Section 4.4.2 might be an alternative mitigation measure tied to the necessity to implement a salt and nutrient management plan.

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If you should have any questions, please contact me at james.maxwell@ventura.org or (805) 654-5164.

Sincerely,

James Maxwell

James Maxwell, PG, CEG
Groundwater Specialist, Groundwater Resources Section
Water Resources Division

C: Jeff Pratt, Director, Ventura County Public Works
Glenn Shephard, Director, Ventura County Public Works, Watershed Protection
Arne Anselm, Deputy Director, Ventura County Public Works, Water Resources
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Response to Comment Letter TBD

Organization/Agency: Ventura County Public Works Agency (VCPWA)
Commenter: James Maxwell
Date: December 9, 2021

VCPWA-1 Comment #1: In ES 2.0, the primary storage units for groundwater in the Basin are four discrete sand and gravel aquifer units. How are these units identified according to the Hydrogeologic Conceptual Model developed for the Draft? Were these discrete aquifer units modeled as separate layers in the MODFLOW model?

Section 2.3.2 Principal Aquifers and Aquitards describes the hydrostratigraphy of the OVGB and Section 2.4 Water Budget describes the specifics of the numerical groundwater model. The Ojai Basin Groundwater Model is divided vertically into 10 layers, with layers 1, 2, 4, 6, 8, and 10 representing aquifer units and layers 3, 5, 7, and 9 representing semi-confining units as shown in Final Draft GSP figures 2-14 through 2-16.

VCPWA-2 Comment #2: ES 2.0 states that groundwater level trends in the Ojai Valley Groundwater Basin (OVGB) are correlated with recharge from precipitation, return flows, and groundwater extraction. Mountain front recharge is identified as a component of groundwater recharge in Section 2.4 and should be mentioned here.

The GSP will be revised to incorporate this information.

VCPWA-3 Comment #3: Section 2.1 states that there is no known groundwater extraction in certain areas of the OVGB (alluvial filled stream channels along the southern flank of the Topatopa Mountains and a strip of land along the western margin of the OVGB). According to County records there are several wells outside of the OBGMA boundary on the southern flank of the Topatopas.

Figure 2-5 Groundwater Well Locations and Density per Square Miles shows the location of wells in the OVGB. As shown in Figure 2-5, there areas of the OVGB, including the southern flank of the Topatopa Mountains and a strip of land along the western margin of the OVGB, where there are no groundwater wells.

VCPWA-4 Comment #4: Section 2.1 states that the eastern and western boundaries of the OVGB correspond to recognized bedrock highs that limit groundwater exchange flow between the OVGB and adjacent basins. There is limited discussion regarding any hydrogeologic connection between the OVGB and the Upper Ventura River Valley Subbasin, in terms of the transmissivity of groundwater through the Ojai Conglomerate Formation.

As described in Section 2.4 Water Budget, underflow from the OVGB to the Upper Ventura River Groundwater Subbasin is estimated to be approximately 70 to 90 AFY.

VCPWA-5 Comment #5: Section 2.1.2.1 states that VCWPD monitors groundwater levels in 18 wells located throughout the OVGB on a quarterly basis. Suggest including a note stating the number of wells monitored is based on accessibility.

The GSP will be revised to incorporate this information.

VCPWA-6 Comment #6: Section 2.1.2.1 states that the State Water Resources Control Board's (SWRCB's) Groundwater Ambient Monitoring and Assessment (GAMA) Program conducts comprehensive monitoring of California's groundwater quality. What quality components are monitored in the OVGB and are they evenly assessed throughout the Basin? Is there sufficient historical data to report trends?

As discussed in Section 2.3.4.4 Groundwater Quality, water quality data for several municipal supply wells in the OVGB are reported to the State Water Resources Control Board Division of Drinking Water. The water quality parameters measured and reported include the primary constituents of concern in the OVGB (i.e., TDS, nitrate, chloride, sulfate, boron, iron, and manganese), in addition to other organic and inorganic chemicals included in Title 22 of the California Code of Regulations. The municipal supply wells are largely located in the central part of the OVGB as shown in Figure 2-5, and Figures 2-25 through 2-31. Sufficient historical data to report trends are available for 8 municipal supply wells in the OVGB. Water quality time series plots and results of a Mann Kendall trend analysis for the 8 municipal supply wells are included in Appendix D Groundwater Level and Quality Data and summarized in Section 2.3.4.4 Groundwater Quality.

VCPWA-7 Comment #7: Section 2.1.2.4 states that the County of Ventura Resource Management Agency issues groundwater well permits in the OVGB. Groundwater well permits are administered by the Ventura County Public Works Agency.

The GSP will be revised to clarify this information.

VCPWA-8 Comment #8: Section 2.1.3.2 discusses the 2040 General Plan update adopted in 2020 and the new water resources element. Suggest expanding on the relevant element sections as pertains to water supply, water quality and long-term availability.

Table 2-7 Summary of General Plan Policies Relevant to Groundwater Sustainability in the OVGB contains all of the relevant 2040 General Plan elements, goals, and policies that pertain to water supply, water quality, and long-term availability.

VCPWA-9 Comment #9: The Ojai Valley Area Plan is discussed in Section 2.1.3.2. Area Plan Policy OV-64.2 states that new discretionary development will not add any net increased demand on the existing groundwater supply. Was this policy along with Programs UU through BBB considered during development of the Basin water budget? Will the Draft satisfy the goals outlined by these programs?

As discussed in Section 2.4.4.3 Quantification of Projected Water Budgets, three future scenarios were simulated as part of the GSP development. For all three future scenario conditions, groundwater extraction from the OVGB was set at a constant extraction rate of approximately 4,000 AFY. The constant 4,000 AFY basin-wide extraction rate was distributed across each production well using the average groundwater extraction distribution from the current condition simulation. Therefore, the water budget is in agreement with Goal OV-64 of the Ojai Valley Area Plan in that it is assumed there will be no net increase in demand on the existing groundwater supply.

VCPWA-10 Comment #10: Section 2.1.3.3 outlines the County's CEQA significant thresholds based on the Ventura County Initial Study Assessment Guidelines adopted in 2011. The Ventura County 2040 General Plan Update was adopted in 2020 and contains the Water Resource Element containing additional policies and programs that are considered for planning and land use and discretionary development.

Section 2.1.3.2 General Plans and Section 2.1.3.3 Other Planning/Land Use Considerations together cover all of the policies and programs that pertain to planning, land use, and discretionary development in the OVGB.

VCPWA-11 Comment #11: Section 2.3 describes the hydrogeological conceptual model including the principal aquifers and aquitards. It would be helpful to identify how these aquifers and aquitards correlate with model layers in the MODFLOW model.

The GSP will be revised to incorporate this information in Figures 2-14 through 2-16. The Ojai Basin Groundwater Model is divided vertically into 10 layers, with layers 1, 2, 4, 6, 8, and 10 representing aquifer units and layers 3, 5, 7, and 9 representing semi-confining units.

VCPWA-12 Comment #12: Figures 2-14 through 2-16 are geologic cross sections that show the locations and depths of wells including some completed in the underlying Sespe Formation. It would be helpful if the perforated intervals of the wells were shown on the cross sections to indicate which aquifer units the wells are pumping from.

The geologic cross sections were adopted from work completed by Daniel B. Stephens & Associates on the Ojai Basin Groundwater Model and work completed by Kear Groundwater. The purpose of the cross sections is to show the hydrostratigraphy of the OVGB. The wells shown on the cross sections were used to identify the location and extent of aquifer and aquitard units. Ten of the seventeen wells depicted on the cross-sections have known screen intervals. OBGMA can provide this information to Public Works for their use and OBGMA will add the well screen intervals to the cross-sections.

VCPWA-13 Comment #13: Figure 2-19 shows hydrographs for select wells plotted with the cumulative departure form mean precipitation. Well 04N23W02K001S displays virtually no seasonal variation and has a flat-line trend some other than a number of seemly anomalous low-water measurements, with seemingly no relationship to precipitation. Similarly, well 04N22W04Q001S does not show a relationship to precipitation. This well was selected as a key well with an assigned minimum threshold. And well 05N22W32J002S displays high variability in the 1950s through the 1960s and in the first part of the 2000s, but has been essentially flat-line from about 2013 to present. Analysis these hydrographs should be discussed in text.

Section 2.3.4.1 Groundwater Elevation Data describes the data presented in Figure 2-19 Hydrographs for Select Wells, including trends in groundwater levels, groundwater extraction, and precipitation. The purpose of Figure 2-19 is to show how trends in groundwater levels vary in different geographic areas of the OVGB. As discussed in the GSP and shown in Figure 2-19, wells in the central part of the OVGB show a clear response to precipitation and groundwater extraction while wells in the peripheral northern, eastern, and western areas exhibit little or no response. Well 04N22W04Q001S was selected as representative monitoring point because the well has a long and continuous groundwater level record dating back to the 1960s, known screened interval and completion depth, and is currently the best available well to monitor conditions in the eastern part of the OVGB. Groundwater levels in well 04N22W04Q001S fluctuate by approximately 50 feet on a seasonal basis in response to recharge from precipitation and groundwater extraction.

VCPWA-14 Comment #14: A chart or graph accompanying Section 2.3.3 depicting annual estimated recharge from precipitation would more clearly illustrate the importance of rainfall for Basin recharge.

As described in Section 2.4.1.1 Precipitation Recharge and Irrigation Return Flows, approximately 6,500 AF of precipitation and irrigation return flows recharged the OVGB annually between water years 1971 and 2014. Of the 6,500 AFY, approximately 77% of the recharge was from precipitation and the remaining 23% is attributed to irrigation return flows. Figure 2-42 Historical and Current Conditions Water Budget shows annual estimated recharge form precipitation and irrigation return flows.

VCPWA-15 Comment #15: Section 2.4.3.2 lists the estimated groundwater in storage in 2018. There have been consecutive dry years since 2018, so an updated estimate closer to the current date would be beneficial. Generally, has a basin-wide storage reduction contributed to inelastic or elastic subsidence? The TRE Altamira InSAR dataset from January 2015 through September 2019 showed that 41% of the OVGB experienced negative vertical displacement (subsidence) along the boundaries of the Basin. Also, the Draft states that subsidence has been largely unmonitored until recently and the OVGB is estimated to currently be at a high risk for future subsidence. It appears that these factors could significantly affect future monitoring and pumping regulation programs.

As described in Section 2.3.4.5 Land Subsidence, although subsidence has been largely unmonitored until recently, the OVGB is estimated to currently be at a high risk for land subsidence based on groundwater level trends, but at a medium to low overall risk for future subsidence (DWR 2014). In addition, there is no documentation of physical evidence of subsidence such as well casing failure, infrastructure disruption, or earth fissures within the OVGB. As noted, variations in land surface elevation may result from temporary elastic or tectonic deformation and fluctuating groundwater levels. Available data indicates insignificant subsidence, likely from causes other than inelastic deformation.

VCPWA-16 Comment #16: Figure 2-41 displays the cumulative change in groundwater in storage from 1971 through 2019. It's noted that the decrease in groundwater in storage in 2016 was nearly three times greater than the drought of 1990.

Noted.

VCPWA-17 Comment #17: The TDS discussion of Section 2.4.4.4 shows that wells in the western end of the Basin tend to have higher TDS concentrations. Does this indicate a loading of solids due to a decreased hydraulic conductivity or natural geologic barrier (i.e. consolidated formation/bedrock)? Would this be an indicator of a discontinuity between the OVGB and the Upper Ventura River Valley Subbasin?

Recharge to the OVGB primarily occurs in the northern and eastern parts of the basin which may naturally result in lower TDS levels in those areas. Additionally, anthropogenic activities may contribute to higher TDS levels in the southern and western parts of the OVGB. The Los Angeles Basin Plan groundwater quality objectives for identified constituents of concern including TDS, sulfate, chloride, and boron are higher for the portion of the OVGB west of San Antonio-Senior Canyon than the portion east of San Antonio-Senior Canyon. In addition to variable water quality laterally across the OVGB, vertical differences in water quality between aquifer types has been recently documented in the OBGMA's new nested monitoring well, South-Central Nested Depth-Discrete Monitoring Well (Kear 2021). "Analyses by AGQ revealed a dynamic range of water character with electrical conductivities between 936 μS/cm (Main Aquifer) and 1740 μS/cm (Perched Aquifer). The initial Perched Aquifer and the Deep Intermediate samples have a similar calcium-bicarbonate water character, with elevated sulfate also in the Perched Aquifer. The initial Shallow Intermediate and Main Aquifer have a sodium-bicarbonate/chloride water character" (Kear 2021).

As indicated in Section 2.1, The eastern and western boundaries of the OVGB correspond to recognized bedrock highs that limit groundwater exchange flow between the OVGB and adjacent basins (DWR 2004; Kear 2005). As described in Section 2.4 Water Budget, underflow from the OVGB to the Upper Ventura River Groundwater Subbasin is estimated to be approximately 70 to 90 AFY.

VCPWA-18 Comment #18: On page 2-125, the review of historic oilfields includes a cluster of active, inactive, idle, plugged and/or abandoned wells along the southern boundary of the OVGB. There should be a brief discussion of naturally occurring oil and gas seeps that are commonly found in the fractured Monterrey Formation of this area.

As described in Section 2.3.4.4 Groundwater Quality, there is a cluster of active, idle, inactive, plugged and/or abandoned oil and gas wells adjacent to the southern edge of the OVGB. One well within the cluster falls within the OVGB and it is an idle oil and gas well. Lion Mountain Ranch immediately south of the OVGB has historically supported oil and gas development since the 1860's when shallow oil wells were drilled in the vicinity of historical oil seeps (County of Ventura 2016). Subsequent oil wells were drilled in the 1940s, 1950s, 1960s, and 1980s that supplied oil and gas. There are 3 active wells at Lion Mountain Ranch, all located outside of the OVGB, that continue to produce oil and gas. Oil is transported off-site to Santa Paula by truck and gas is currently flared on-site.

VCPWA-19 Comment #19: Section 2.4.7 includes discussion of "safe yield" and concludes based on projected water budgets that the "sustainable yield" is the same as the "safe yield." However, the analysis that pumping at the safe yield will avoid undesirable results and therefore is the same as the sustainable yield is not well supported.

As described in Section 2.4.7 Sustainable Yield Estimate, based on the projected water budgets and work completed to date to develop sustainable management criteria, the provisional estimate of the sustainable yield of the OVGB is approximately equivalent to the safe yield of 4,100 AFY. It should be noted that 4,100 AFY is a provisional estimate of the sustainable yield and that the sustainability strategy, as described in Chapter 3, is to ensure that the OVGB continues to operate within its sustainable yield and does not exhibit undesirable results within the planning and implementation horizon of this GSP (50 years). As described in Chapters 3 and 4, this will be accomplished through establishment of minimum thresholds and measurable objectives for each sustainability indicator, monitoring of groundwater conditions, and implementation of projects and management actions.

VCPWA-20 Comment #20: Section 2.4.7 states that recharge to the San Antonio Spreading Grounds could be limited by water rights of downstream users. This would appear to be negligible, especially given the number of recent dry years of less than average rainfall.

Noted. The San Antonio Creek Spreading Grounds is discussed in Sections 2.1.1.2 Water Agencies Relevant to the Plan Area, 2.3.3 Recharge and Water Deliveries, 2.4.1.3 San Antonio Creek Spreading Grounds, 2.4.8 Surface Water Available for Groundwater Recharge or In-Lieu Use, and 4.4.3 Explore Opportunity to Implement Focused Recharge.

VCPWA-21 Comment #21: Section 3.2 discussion of undesirable results essentially states that there have been no undesirable results from past declines in water levels because the water levels later recovered. The discussion does not contain analysis of wells that are known to have gone dry during these historical periods of low water levels and resultant potential undesirable results.

As stated in Section 3.2.1 Chronic Lowering of Groundwater Levels – Undesirable Results, lowering of groundwater levels is significant and unreasonable if sufficient in magnitude to lower the rate of production of existing groundwater wells below that necessary to meet the minimum required to support the overlying beneficial uses, where alternative means of obtaining sufficient groundwater resources or local surface water resources from Lake Casitas are not technically or financially feasible for the well owner to absorb, either independently or with assistance from the OBGMA, or other available assistance/grant program(s). Although limited available information indicates that a number of shallow groundwater production wells located near the edge of the OVGB have experienced production issues during periods of prolonged drought, the OBGMA and local groundwater users have determined that the conditions do not constitute an undesirable result because other sources of water have been available. The OBGMA will continue to monitor groundwater levels in wells located throughout the OVGB and collect information from private well owners to reevaluate and update, if needed, the minimum thresholds and measurable objectives for groundwater levels.

VCPWA-22 Comment #22: Section 3.3 sets the minimum thresholds for water levels at the lowest historical levels measured in 1951. However, there is no analysis if there were resulting undesirable results during this period of record low water levels.

As stated in Chapter 3, undesirable results have not historically occurred in the OVGB, including during the period of record low groundwater levels in 1951. The OBGMA and local groundwater users have determined that conditions constitute an undesirable result only if alternative means of obtaining sufficient groundwater resources or local surface water resources from Lake Casitas are not technically or financially feasible for the well owner to absorb, either independently or with assistance from the OBGMA, or other available assistance/grant program(s).

VCPWA-23 Comment #23: Section 3.5.2.1 outlines the proposed groundwater monitoring network and states in Section 3.5.3.3 that the network of existing wells is capable of providing an adequate assessment of groundwater quality trends. Groundwater quality wells are heavily concentrated in the center of the Basin. It would be beneficial to add or reassign water quality monitoring sites to the lower/downgradient (western) portion of the Basin.

As described in Chapter 2, groundwater extraction is greatest in the central part of the OVGB. As described in Section 3.5.2 Description of Existing Monitoring Network and shown in Figure 3-3 Groundwater Monitoring Network, several wells located in the western part of the OVGB are monitored for groundwater quality including wells 04N23W12B003S, 04N23W12H002S, and 04N23W01K002S. Additional existing wells or new monitoring wells may be identified and included in the groundwater monitoring network during GSP implementation if accessible.

VCPWA-24 Comment #24: The Draft states in Section 3.5.7.2 that data gaps associated with relevant agencies are not known to currently exist. What is the confidence level of this assessment and how does the Draft arrive at this conclusion?

As described in Section 2.1 Description of the Plan Area, there are a number of existing programs and plans currently in place to protect public health and safety and the natural environment including the Porter-Cologne Water Quality Control Act, Clean Water Act, a number of Senate Bills, California Well Standards, Ventura County Ordinances, Ventura County 2040 General Plan, City of Ojai General Plan, CEQA Guidelines, and others. The only known data gaps are surrounding instream flows, groundwater-surface water connections, and GDEs. Certainty regarding the identified data gaps are based on availability of data/information and comments received from agencies on the Draft GSP. The GSP will be revised to clarify the statement regarding data gaps associated with relevant agencies.

VCPWA-25 Comment #25: There are no proposed infrastructure projects or physical improvements in Section 4 of the Draft. Does the OBGMA have any potential projects to add to the Draft? Are there any opportunities for collaboration with other agencies, entities or stakeholders?

Chapter 4 Projects and Management Actions describes all of the projects and management actions that are proposed at this time. As described in Section 4.4.3 Explore Opportunity to Implement Focused Recharge, the OBGMA is interested in working collaboratively with Ventura County to bring the San Antonio Creek Spreading Grounds back online as well as work with the City of Ojai and Ventura County to implement projects that would enhance shallow and deep aquifer recharge. The OBGMA will continue to explore opportunities for collaboration with other agencies, entities, and stakeholders throughout the GSP implementation period.

VCPWA-26 Comment #26: In Section 4.2.5, does the OBGMA plan to be able to share information from their proposed data management system with Ventura County Watershed Protection? The County would be able to incorporate the data into annual groundwater reporting.

The OBGMA will work collaboratively with VCWPD to develop and share data from the data management system.

VCPWA-27 Comment #27: In Section 4.3.2, there are no thresholds to determine if groundwater allocations need to be developed. Can the quarterly metering started in 2015 serve to establish these along with an ongoing metering program? Determining action items are vaguely spelled out. Suggest expanding this section.

The OBGMA does not plan to develop a groundwater allocation at this time. As discussed in Section 4.3.2 Develop Groundwater Allocation, a groundwater allocation would potentially by developed by OBGMA in the event that groundwater extraction rates regularly exceed the sustainable yield of the OVGB and undesirable results are determined to be occurring or likely to occur.

VCPWA-28 Comment #28: Section 4.3.3 does not mention the water conservation measures of the Ojai Valley Area Plan.

Goal OV-64 of the Ojai Valley Area Plan is “To ensure the employment of water conservation measures in new construction and encourage water conservation practices in agricultural, municipal, industrial, and recreational uses and in existing development.” Section 4.3.3 Develop Water Conservation Program will be revised to include reference to the Ojai Valley Area Plan.

VCPWA-29 Comment #29: What are the determining circumstances for implementation of a salt and nutrient management plan? What are the action item thresholds? (Section 4.4.1) Also, Section 4.4.2 might be an alternative mitigation measure tied to the necessity to implement a salt and nutrient management plan.

As described in Section 4.4.1 Develop Salt and Nutrient Management Plan, development of a SNMP will occur if required by the RWQCB, or if undesirable results are determined to be occurring or likely to occur.