MEMORANDUM

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FRESNO, CALIF.

TO: Clay Rodgers, Assistant Executive Officer
Central Valley Regional Water Quality Control Board

FROM: Dr. David Cehrs

DATE: August 29, 2012

SUBJECT: Comments on Irrigated Lands Regulatory Program
Tulare Lake Basin Area Draft General Order

Attached is an analysis of nitrate data from the Geotracker Gamma database for the Upper Kings River Basin. Please include the analysis and this memorandum as my public comment in the administrative record for the August 2012 Board Meeting.

NO_3 Data from Geotracker Gamma (CDPH) for Upper Kings Basin

The data set consists of 320 locations (Lat, Long coordinates) and 37,043 individual analyses for NO_3. Of the 320 locations 67 locations have some analyses of 45 mg/l or better NO_3 (MCL or better). The 67 locations with high NO_3 make up 21% of all locations and the 1857 analyses with NO_3 data at or above the MCL total 5% of all analyses.

The 67 high nitrate locations can be split into three groups. 27 locations are residential/urban locations, 40% of the 67 locations. Fifteen locations (22%) are agricultural/residential, these locations are in close proximity to either a city, an unincorporated disadvantaged community, or a rural residential area with lot sizes of 2.5 acres or less. The final 23 locations (34%) are agricultural locations. Two of the 67 locations account for almost 1200 of the 1800 nitrate analyses at MCL or better; these locations are on Clovis Ave either south of Sunnyside or at the air terminal.

Statistically, locations, as a percent of total locations, with analyses above nitrate MCL's are 7% agricultural, 5% ag/residential, and 8% residential. The number of total nitrate analyses above MCL's are 0.5% ag, 0.7% ag/residential, and 3.8% residential.

When looking at a time series at single location some interesting things are apparent: 1) there can be some spurious (?) or anomalous (?) high values that do not match the rest of the data set, 2) at two of the three single point data sets a case can be made for at least three individual wells making up the single point data set (due to the delocalization of the wells to the nearest ½ mile location), and 3) that when multiple wells are at one delocalized location nitrate values for individual wells can be either above or below the MCL. This last fact indicates how neighboring wells can have much different nitrate levels and must be evaluated on an individual well by well basis (well depth, perforations, pump setting, well construction, geology) and not on a location by location basis.

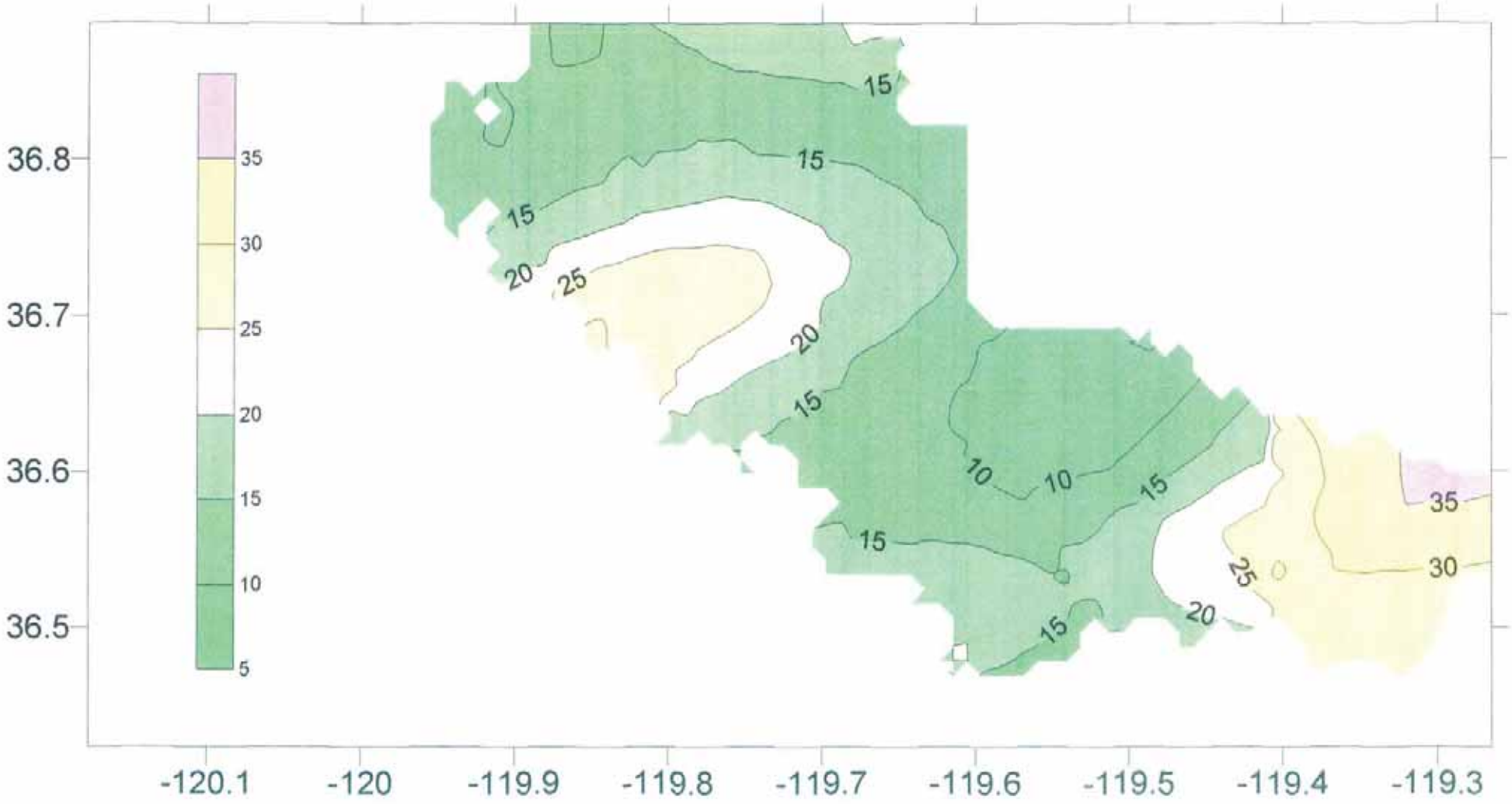
When looking at the averaged nitrate data spatially one hot spot persists through time, the Orange Cove area. During the 1980's and 1990's a second hot spot is found in SW Fresno, possibly associated with old septic systems in the area that disappears during the 21 Century data as the area went onto the sewer system? Another hot spot in the 2000 to 2005 average data is bounded by Tulare and Church Aves, north to south, and Temperance to Leonard Aves, west to east. Curiously, this area is, hydraulically, down gradient of an old super fund site at McKinley and Temperance, which I believe did some kind of wood treatment/preservation. In the 2006 to 2012 average data, the hot spots are associated with Cutler/Orosi, Orange Cove, and the Navelencia area along the edge of the valley.

The maximum nitrate data when plotted spatially through time shows an increase in the number of high values and an increase in the maximum value of nitrate found. This is in part due to the increase in the number of analyses through time. The 1980's show 620 analyses while the 1990's had 3,703 analyses. From 2000 to 2005 there were 13,028 analyses and during 2006 to 2012 there are 19,695 analyses.

NO3 @ MCL OR BETTER

Lat	Long	location	ag/urban/residential	NO3 range	# of entries		
36.452	-119.78	Harland & East Aves. 4 mi ENE of Riverdale	ag	56-57	2		
36.56399	-119.286	gravel pit 1 mi N of Orosi on Road 128	ag	49	1		
36.72	-119.657	1/2 i N of chruch ave @ Locan ave	ag	46	1		
36.719	-119.648	1/2 mi N of church @ deWolf aves	ag	154	1		
36.713	-119.899	Church @ hayes Aves, just N of Fresno sewer farm	ag	88-107	3		
36.568	-119.88	Rose Ave @ Brawley Ave	ag	53-88	8		
36.56625	-119.284	gravel pit 1 mi N of Orosi on Road 128	ag	58-61	2		
36.626	-119.939	1/2 mi N of South Ave, 1/2 W of Henderson Road (N of Raisin City)	ag	49-57	6		
36.568	-119.384	Ave 428 1/2 mi W of Road 86, 1 mi N of Dinuba	ag	45-54	19		
36.568	-119.345	E of Smith Mtn, Road 104 1/2 mi S of Ave 432	ag	61-115	24		
36.568	-119.269	Ave 428 @ Road 136, 1 mi N of East Orosi	ag	50	1		
36.539	-119.463	1/2 mi S of Ave 416 @ Road 48	ag	53	1		
36.733	-119.588	Kings Canyon Blvd @ Del Rey ave	ag	57	1		
36.697	-119.503	Smith Ave 1/2 mi S of manning Ave, Kearney Field Station	ag	124-167	6		
36.771	-119.978	Church ave 1/2m W of Dickenson ave	ag	45-61	11		
36.8	-119.899	gettysberg @ hayes aves	ag	45	1		
36.771	-119.543	clinton @ mendocino aves	ag	45	1		
36.452	-119.306	Elkhorn Ave @ Hwy 63	ag	45-48	3		
36.51	-119.899	Hayes Ave 1/2 mi S of Conejo Ave.	ag	56-70	2		
36.771	-119.582	clinton alignment @ indianola alignment	ag	55-63	9		
36.481	-119.503	Hwy 99 @ Ave 380 alignment	ag	45-66,237	32		
36.51	-119.503	Ave 396 alignment @ Kings River	ag	45-50	7		
36.51	-119.463	Ave 396 alignment @ Road 48	ag	45-200	34	24 locations	max 237
36.56564	-119.286	1/4 mi S of American Ave @ Road 128	rangeland	48-63	4	180 entries	
36.771	-119.86	church @ brawley aves	ag residential	47-58	3		
36.856	-119.622	thompson 1/2 mi S of Shepard aves	ag residential	45-62	14		
36.72	-119.633	leonard 1/2 mi n of church aves, Ivesta	ag,industrial?	116	1		
36.742	-119.661	Tulare @ Temperance Aves - Belmont CC	ag/residential	45-49	72		
36.655	-119.78	Jefferson @ Cherry Aves, Easton, CA	ag? residential?	45-56,400	8		
36.684	-119.78	Cherry Ave 1/2 mi N of Central Ave	ag? residential?	49	1		
36.684	-119.82	Fruit Ave 1/2 mi N of Central Ave, 1.5 mi SW of West Fresno	ag? residential?	46-79	14		
36.481	-119.265	1/2 mi SW of Yettem, CA	ag? residential?	45-67	32		
36.539	-119.305	1 mi WSW of Orosi, CA	ag? residential?	45-90	25		
36.481	-119.345	1 mi SW of Monson, CA	ag? residential?	56-79	34		
36.51	-119.306	1 mi SW of Cutler, CA	ag? residential?	47-57	5		
36.539	-119.86	1 mi W of Caruthers, CA	ag?residential?	47-57	6		
36.51	-119.265	1 mi SE of Cutler, CA	ag?residential?	45-54	18		
36.539	-119.424	Sewage disposal ponds 1.25 mi W of Dinuba	ag?residential?	47-78	19	15 locations	max 116, 40
36.539	-119.82	1/2 mi E of Caruthers, CA	ag?residential?	50	1	253 entries	
36.51	-119.543	Kingsburg, CA	residential	50-73	4		
36.8	-119.82	gettysberg @ fruit aves, Fresno	residential	46-55	6		
36.481	-119.226	Seville, CA	residential	45-46	3		
36.8	-120.018	gettysberg @ biola aves, Biola, CA	residential	95-98	2		
36.8	-119.701	gettysberg @ clovis aves, Tarpey -Fresno, CA	residential	45-82	8		
36.829	-119.82	Sierra @ Fruit aves, Fresno, CA	residential	48-50	2		
36.829	-119.741	Sierra @ Chestnut,, Fresno CA	residential	45-57	3		
36.829	-119.701	Sierra @ Clovis Aves, Clovis CA	residential	45-46	6		
36.697	-119.463	1/4 mi W of Reed Ave, 1/2 mi S of Manning, Reedley, CA	residential	51	3		
36.742	-119.741	Tulare@ chestnut, Fresno, CA	residential	45-75	16		
36.742	-119.701	Tulare @ Clovis Ave, Sunnyside	residential	45-110	44		
36.626	-119.305	E edge of Orange Cove, CA	residential	46-140	40		
36.452	-119.503	Traver, CA	residential	45-68	10		
36.539	-119.265	between Orosi & E. Orosi, CA	residential	45-198	27		
36.702	-119.805	Annadale Ave @ Walnut Ave, S Fresno, CA	residential	46	1		
36.713	-119.82	Church @ Fruit Aves, SW Fresno, CA	residential	56-75	13		
36.713	-119.78	Hwy99 @ Church Ave, Fresno, CA	residential	45-46,178	3		
36.713	-119.741	chruch @ chestnut aves, Fresno	residential	46-88	2		
36.713	-119.701	clovis ave 1/2 mi N of Jensen ave, Sunnyside	residential	45-82	895		
36.713	-119.543	church ave 1/2 mi E of Academy Ave, Sanger CA	residential	49	1		
36.715	-119.711	1/2mi N of jensen, 1/2mi W of Clovis, Sunnyside	residential	54	1	22 location	max 198
36.539	-119.384	Dinuba, CA	residential	46-79	13	1100 entries	
36.887	-119.78	Rice road 1/2 mi S of Copper Ave	residential ag?	45-54	6		max 67
36.887	-119.741	1/2 mi N of Behymer 1/2 mi E of maple	residential ag?	45-67	12	18 entries	2 locations
36.771	-119.701	clinton @ clovis aves, Fresno	residential industrial	45-95	293		
36.771	-119.741	church @ chestnut, Calwa	residential industrial	45-96	3		
36.684	-119.741	Muscat ave @ Golden State Blvd, Malaga, CA	residential, industrial	45-52	7		max 96
36.539	-119.582	Hwy 99 @ Caruthers Ave	industrial	76	1	304 entries	4 locations

1980'S AVG NO3



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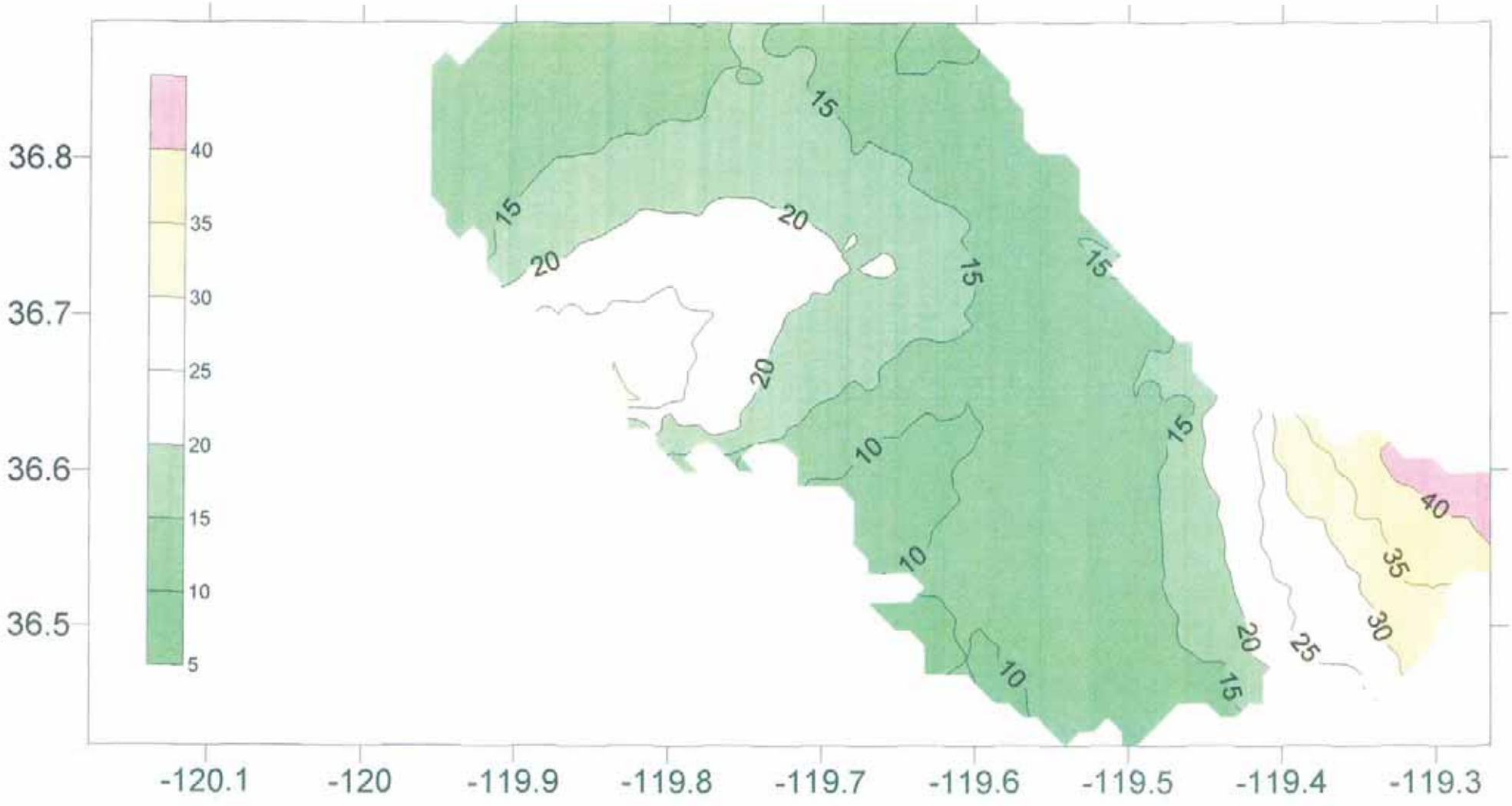
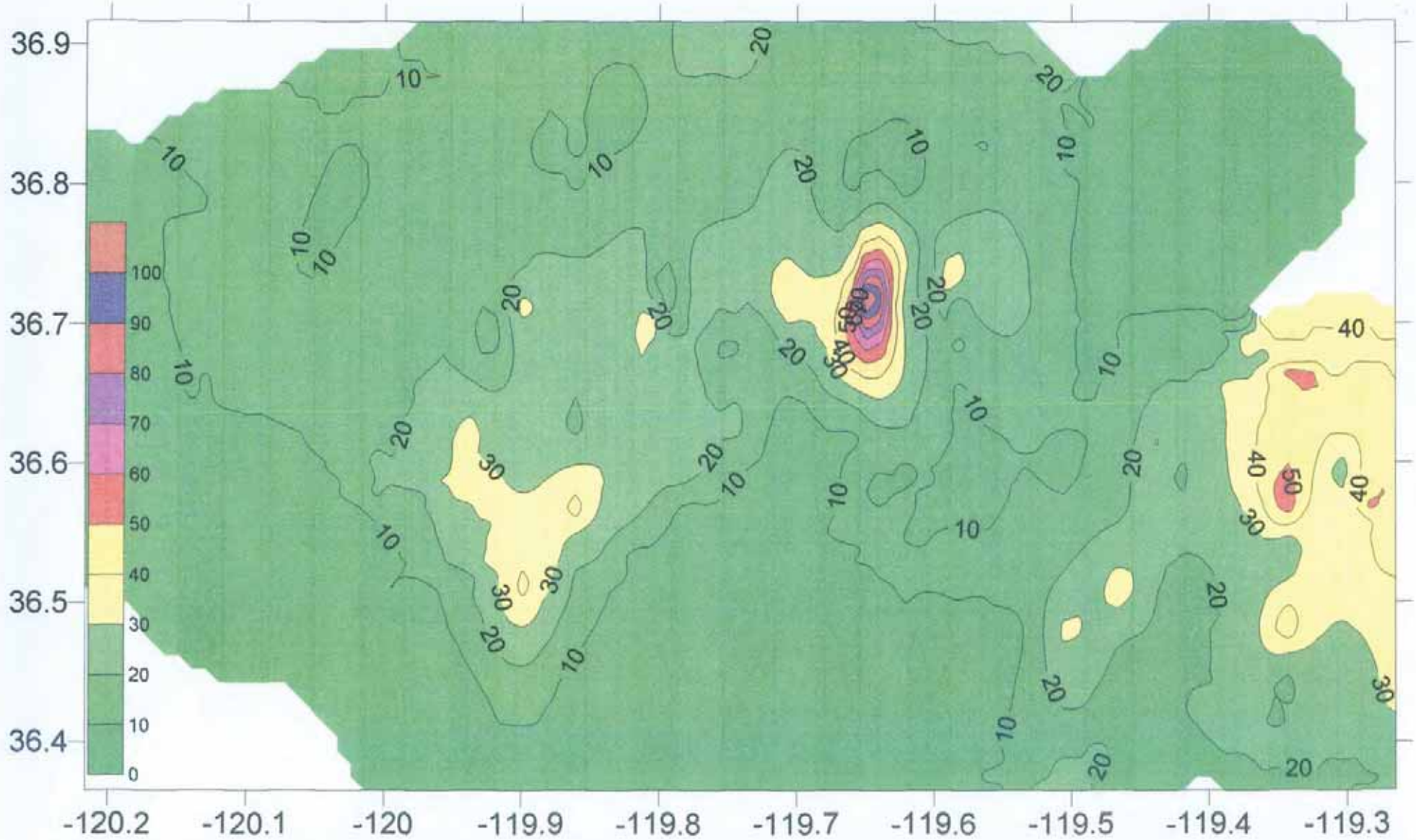


2000 TO 2005 AVG NO3



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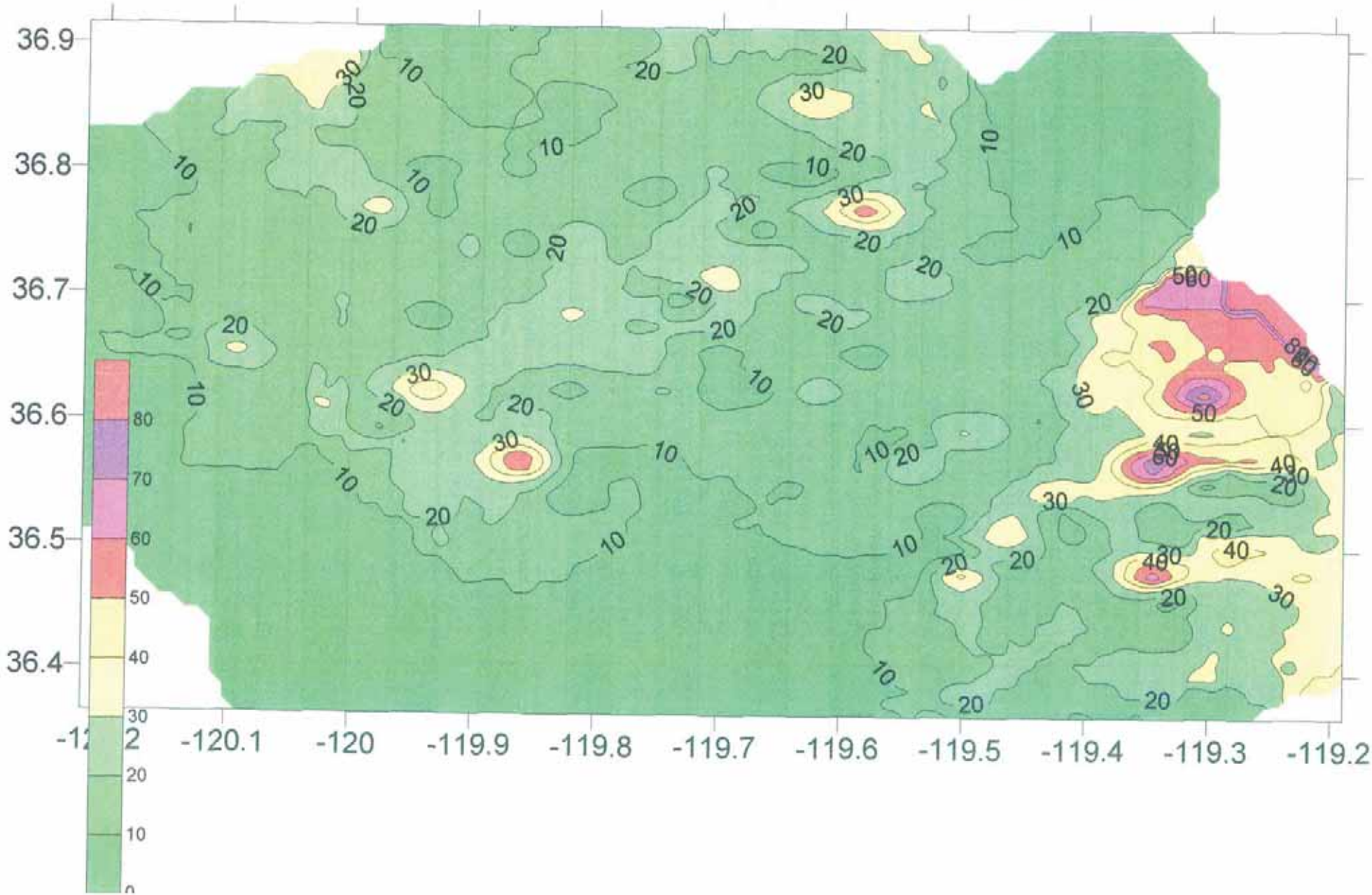
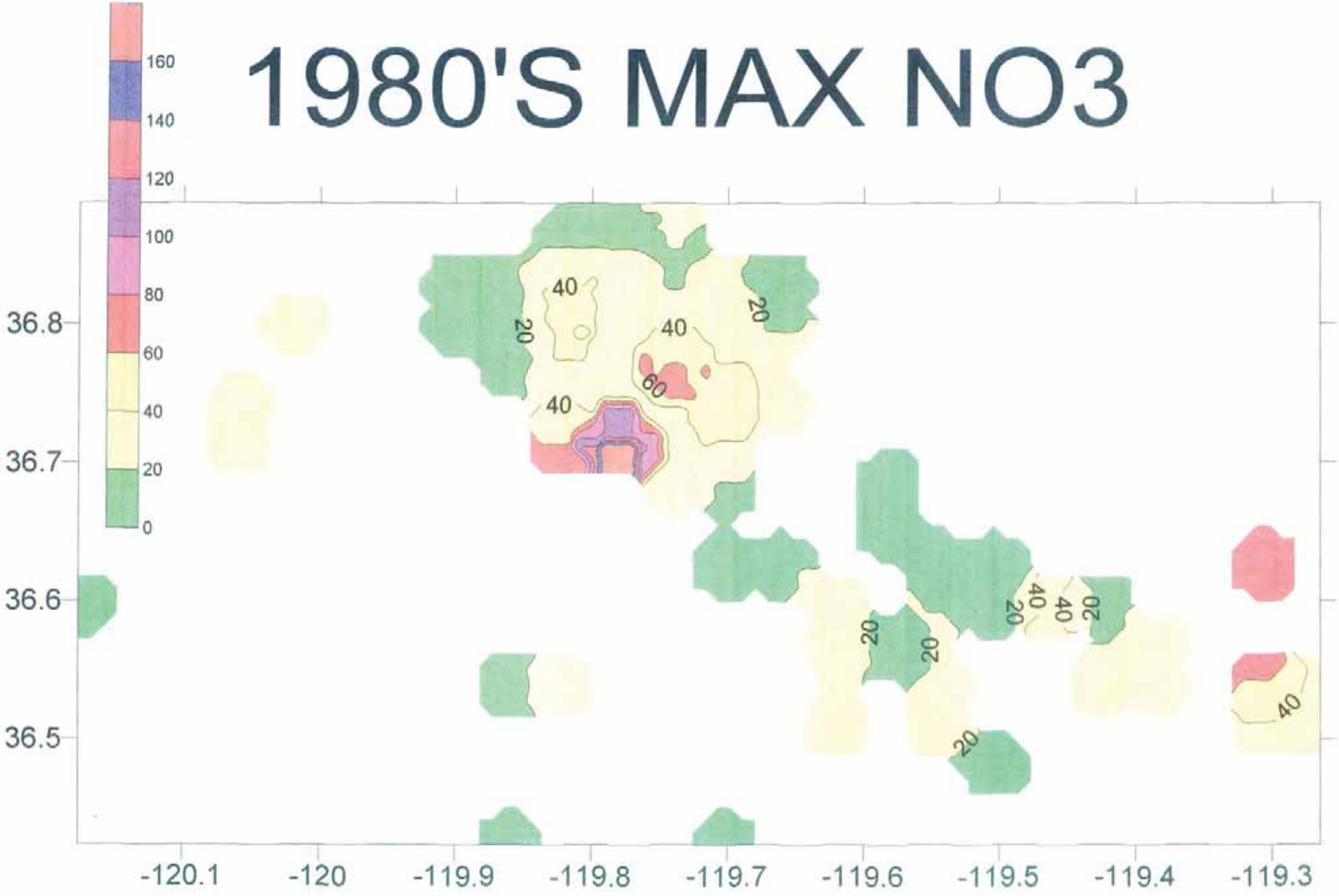


1980'S MAX NO3



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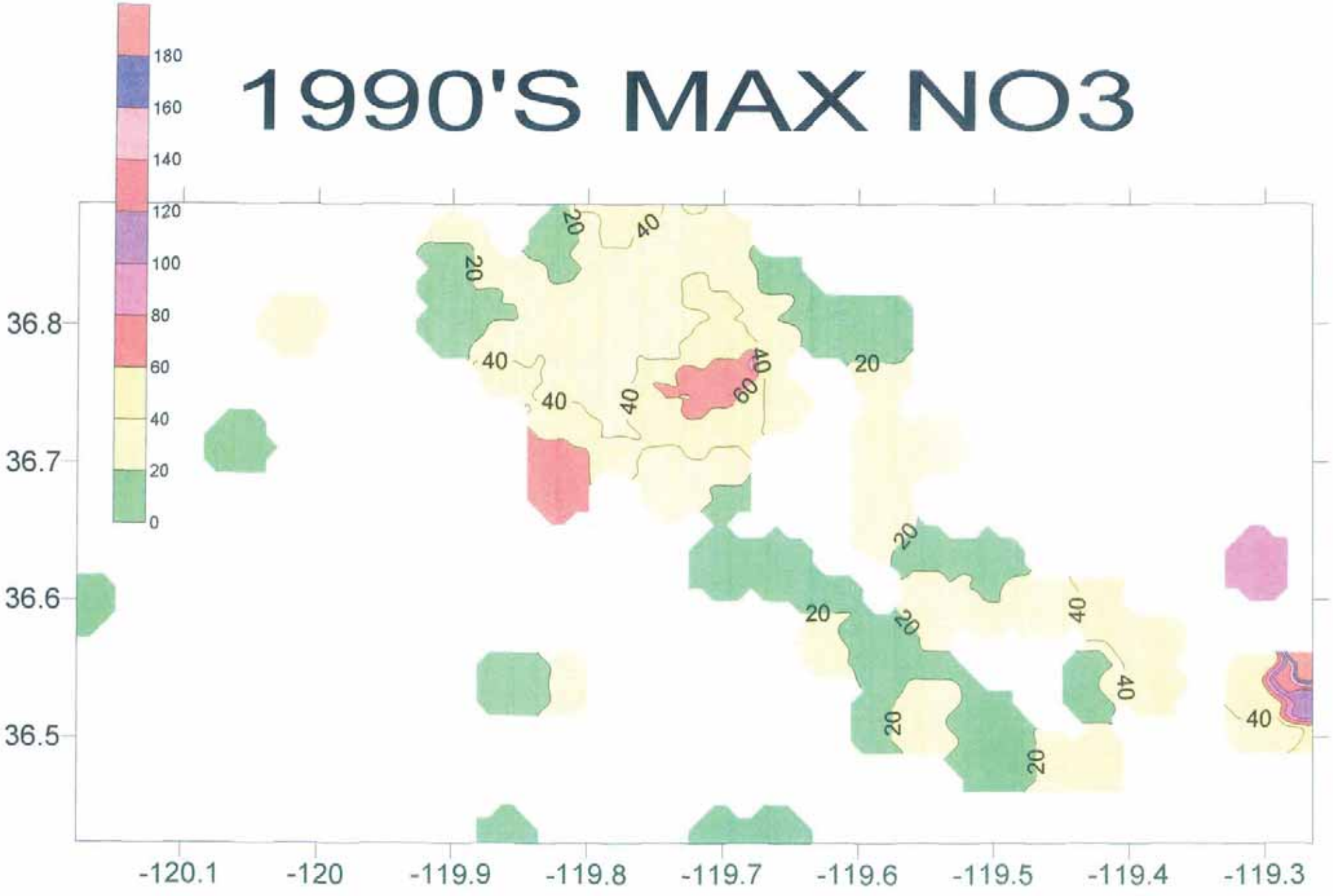

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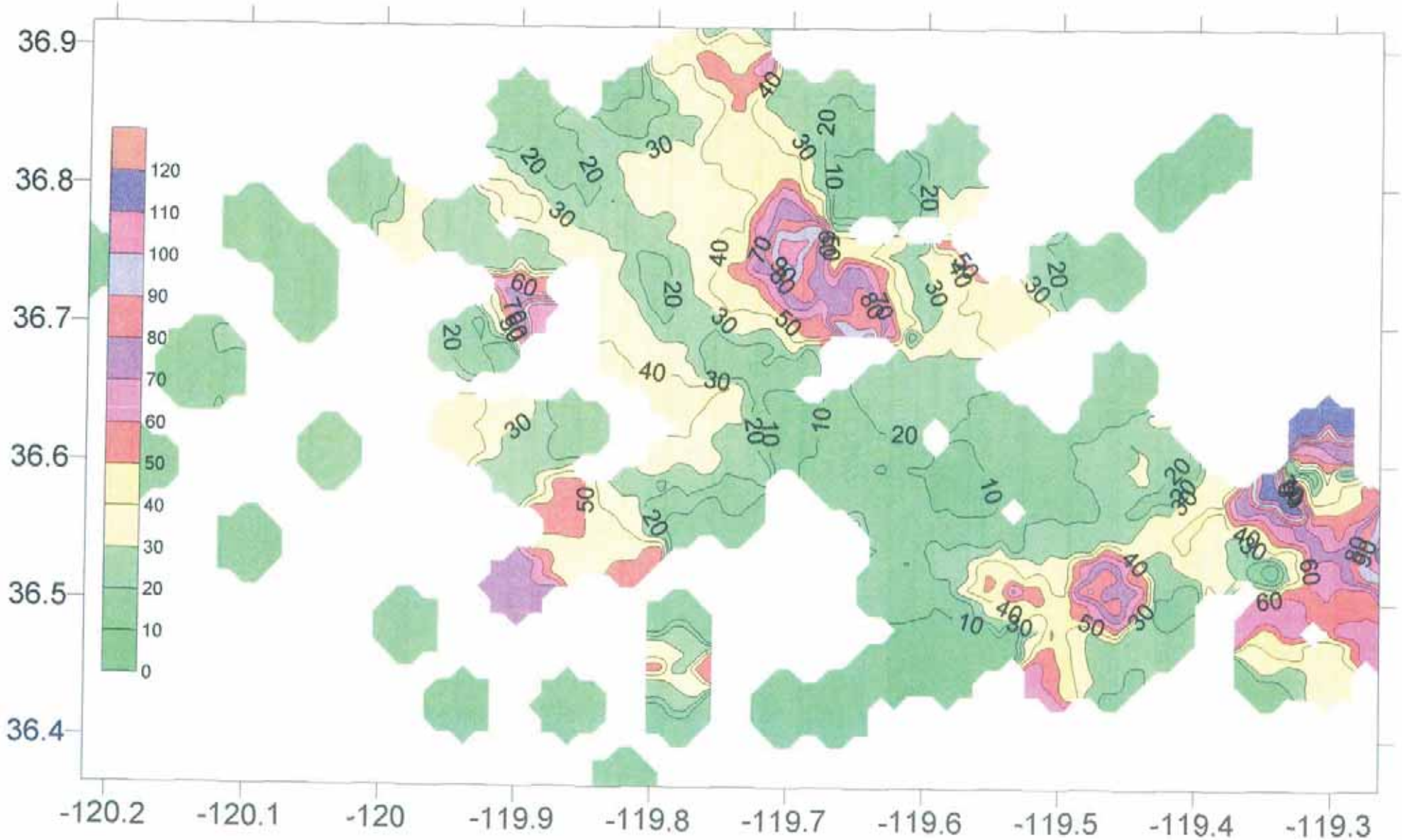

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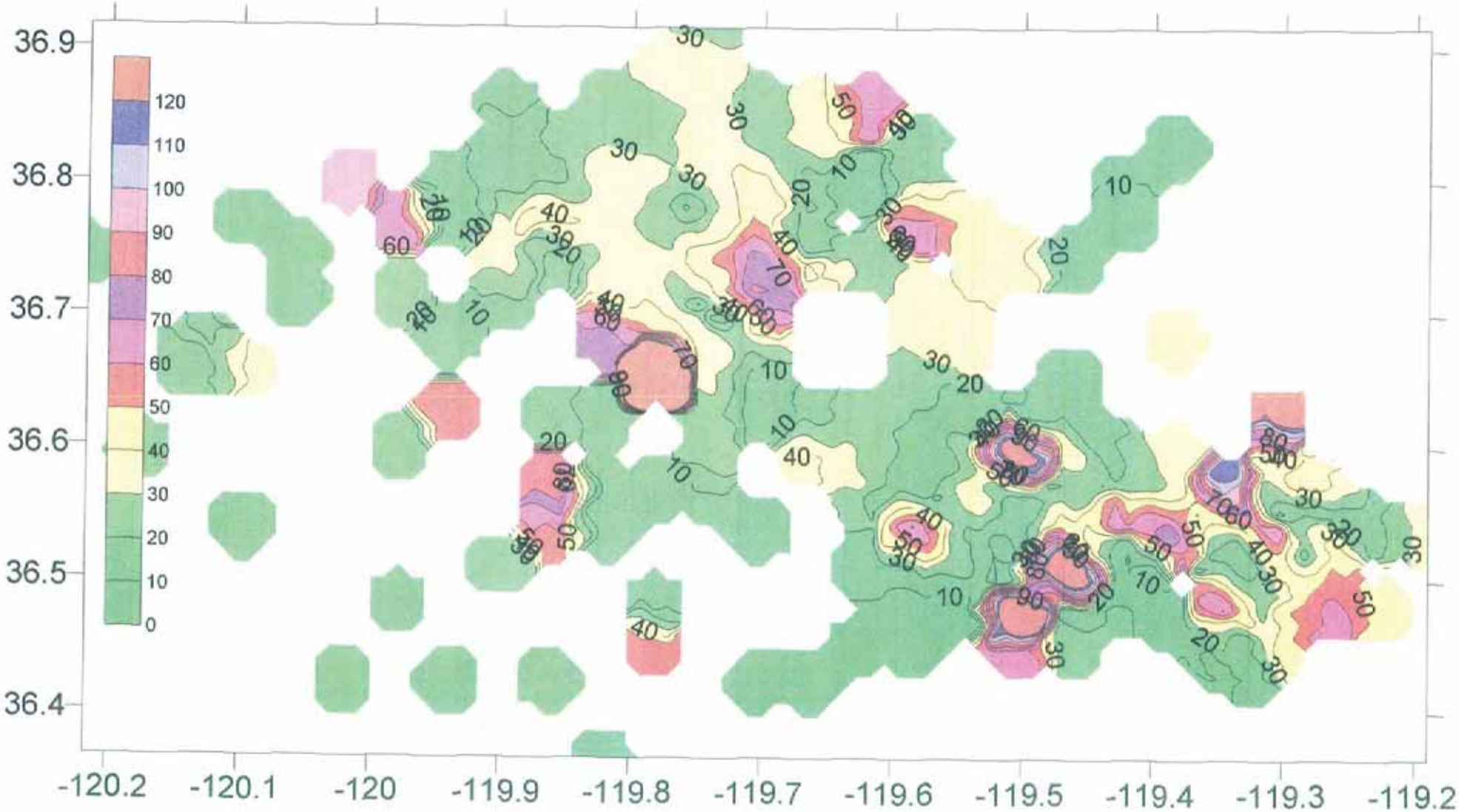
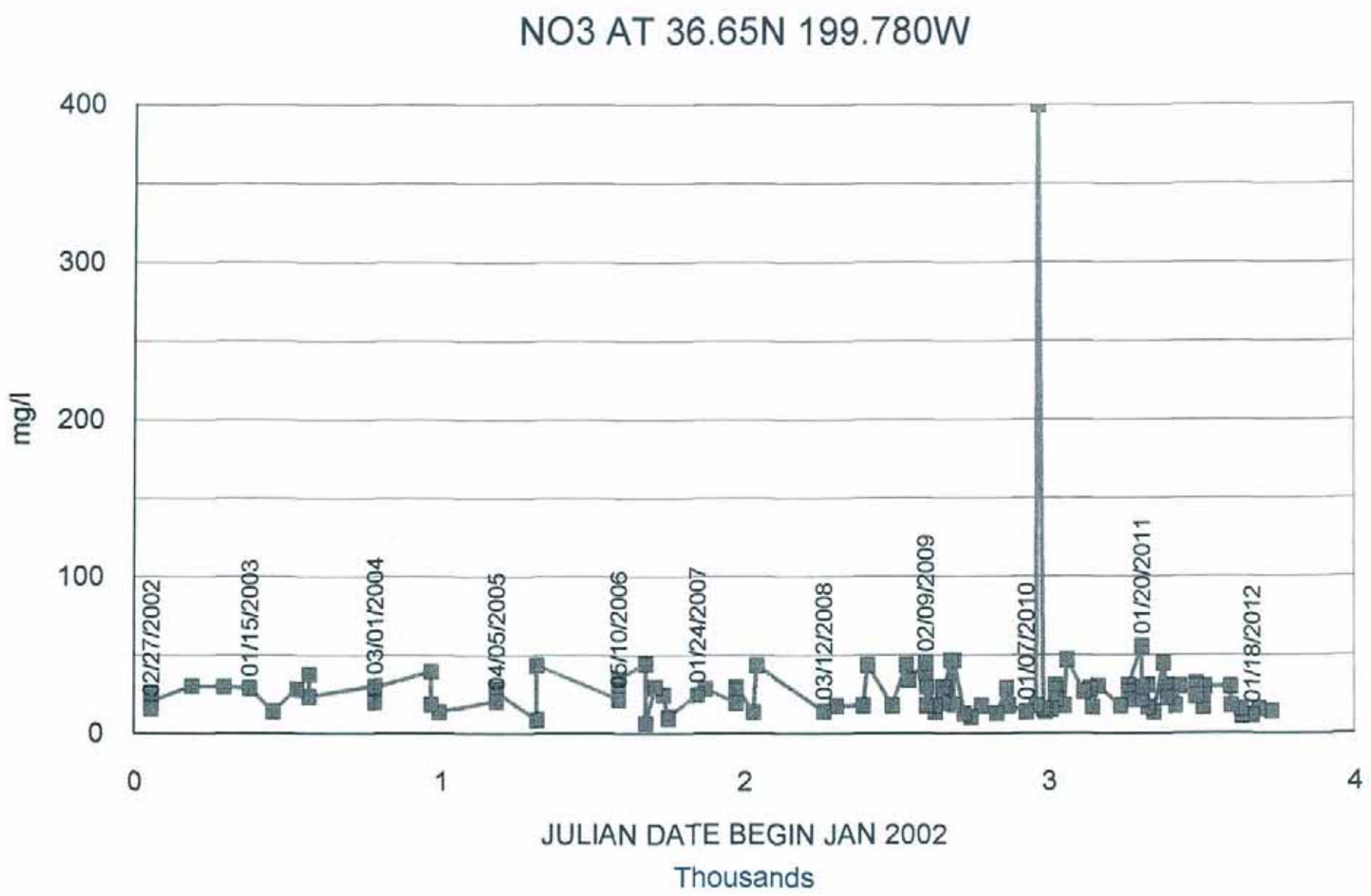
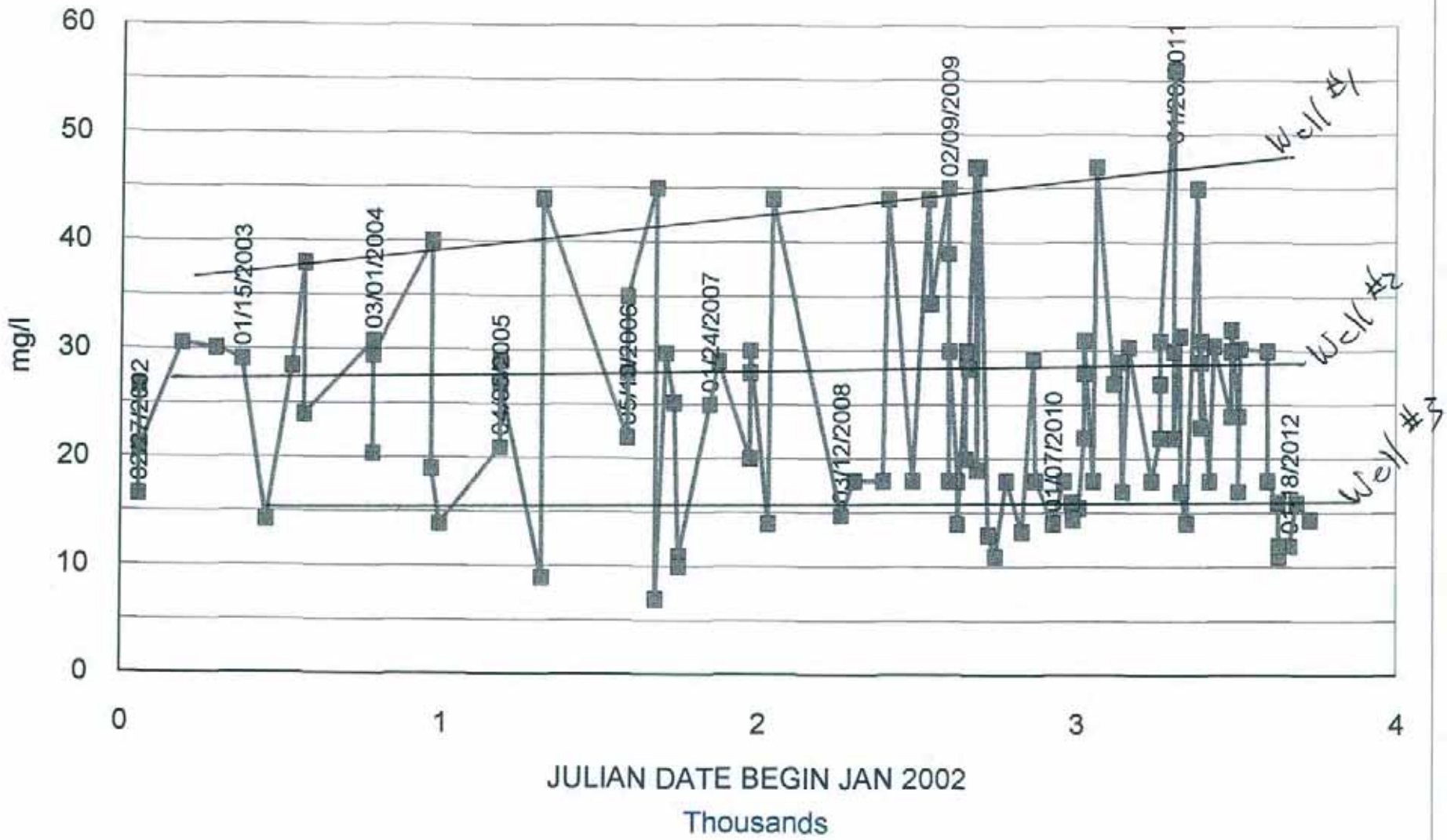




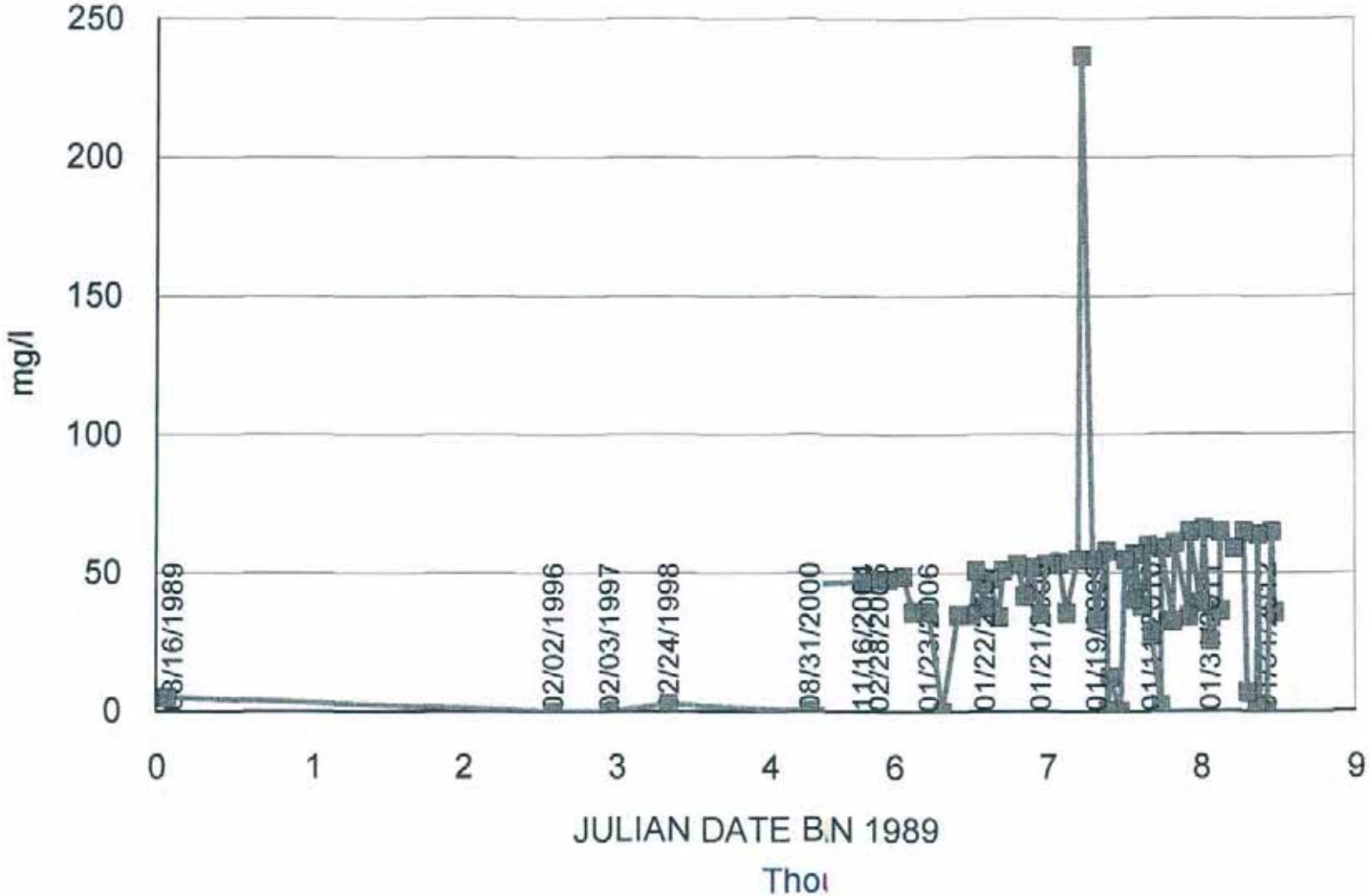
AVG = 28.02, MEDIAN = 24, MODE = 18, STD =36.58
WITHOUT SINGLE HIGH DATA POINT - AVG = 24.70, MEDIAN = 24, MODE = 18, STD = 10.16,
NE OF EASTON - JEFFERSON & CHERRY

NO3 AT 36.65N 199.780W



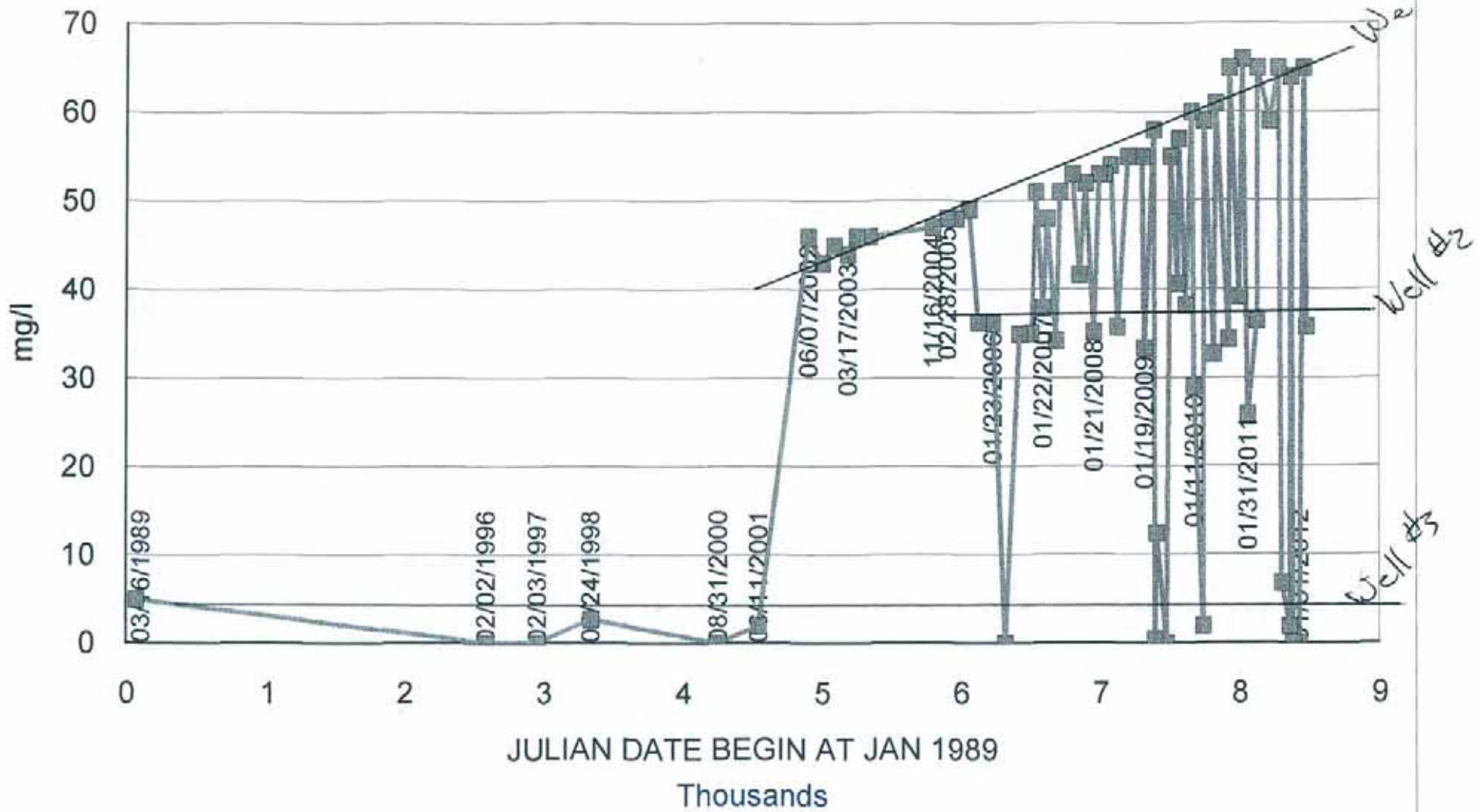
AVG = 28.02, MEDIAN = 24, MODE = 18, STD =36.58
WITHOUT SINGLE HIGH DATA POINT - AVG = 24.70, MEDIAN = 24, MODE = 18, STD = 10.16,
NE OF EASTON - JEFFERSON & CHERRY

NO3 AT 36.48119.503W

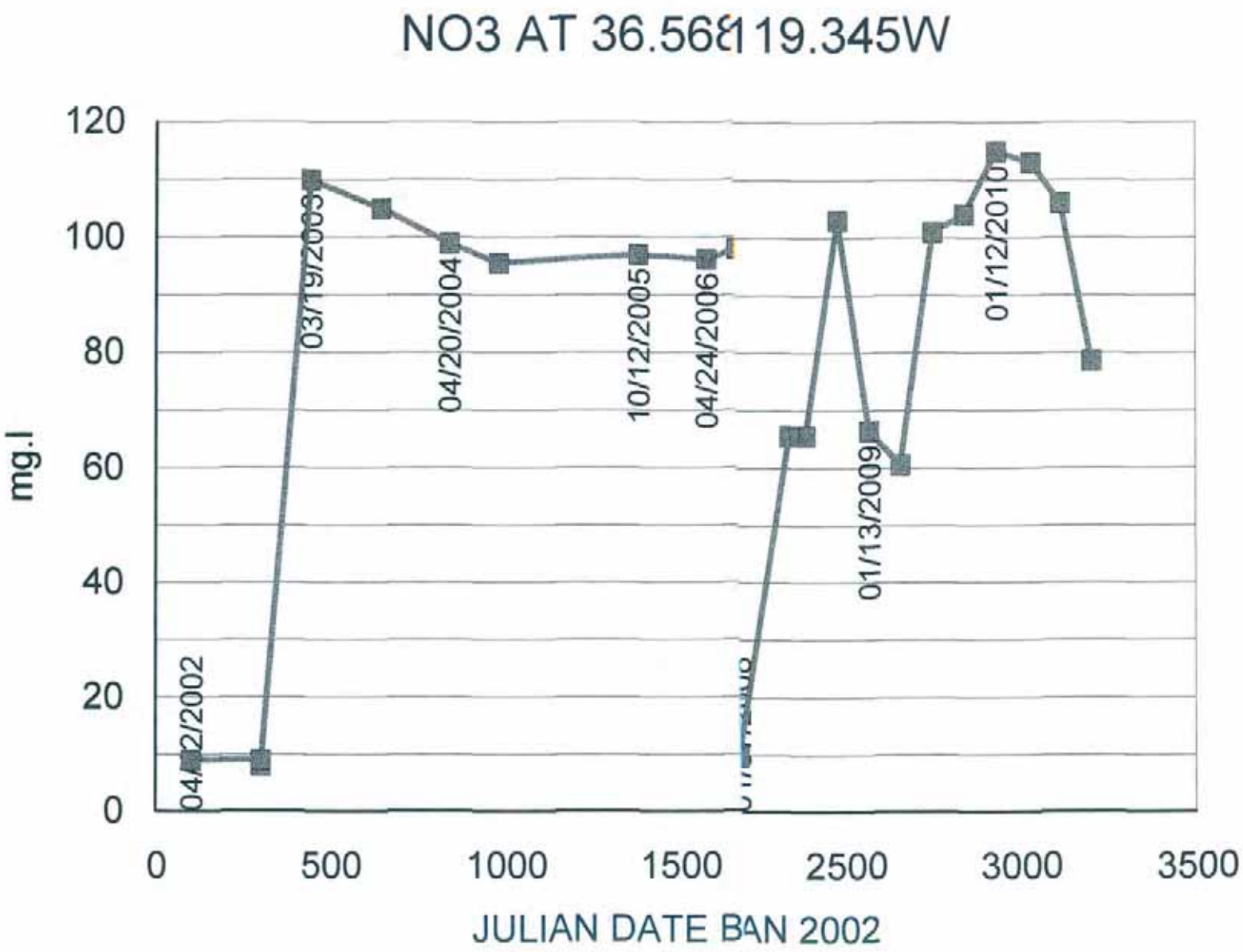


AVG = 40.14, MEDIAN = 42.35, MODE = 0, STD = 31.90
WITHOUT SINGLE DATA POINT - AVG = 37.20, MEDIAN = 41, STD = 21.11
2 MI NNW OF TRAVER

NO3 AT 36.481N AND 119.503W



AVG = 40.14, MEDIAN = 42.35, MODE = 0, STD = 31.90
WITHOUT SINGLE DATA POINT - AVG = 37.20, MEDIAN = 41.7, MODE = 0, STD = 21.11
2 MI NNW OF TRAVER



AVG = 82.15, MEDIAN = 97, MODE = 9, STD = 33.79
JUST E OF SMITH MTN, 2 MI NE OF DINUBA