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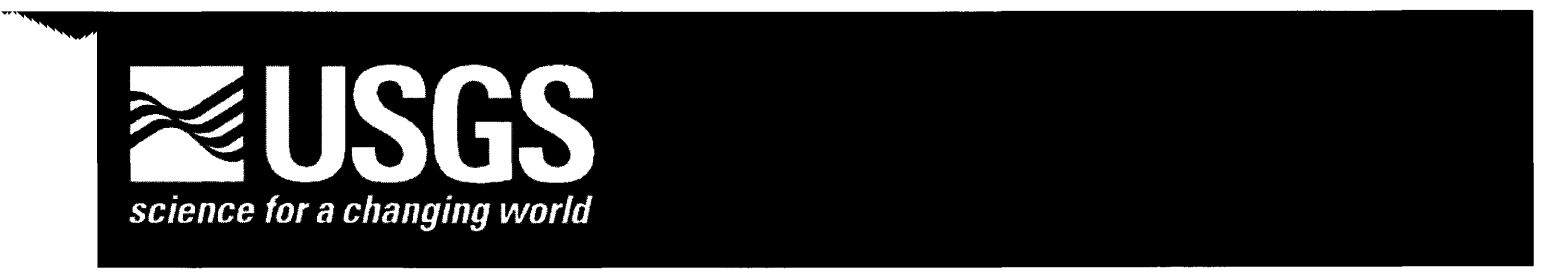
WATER QUALITY AND DEPTH TO WATER, 2001-02, AND GRAPHS OF SELECTED CONSTITUENTS AND DEPTH TO WATER, PERIOD OF RECORD THROUGH 2002, IN SELECTED WELLS, EASTERN BERNALILLO COUNTY, NEW MEXICO

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Open-File Report 03-81

Prepared in cooperation with

BERNALILLO COUNTY



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By Paul J. Blanchard

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Albuquerque, New Mexico
2003

U.S. DEPARTMENT OF THE INTERIOR
GALE A. NORTON, Secretary

U.S. GEOLOGICAL SURVEY
Charles G. Groat, Director

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CONVERSION FACTORS, DATUMS, AND ABBREVIATED WATER-QUALITY UNITS

Multiply	By	To obtain
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
square mile (mi^2)	259.0	hectare (ha)
square mile (mi^2)	2.590	square kilometer (km^2)

Vertical coordinate information is referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29).

Horizontal coordinate information is referenced to the North American Datum of 1927 (NAD 27).

Temperature in degrees Fahrenheit (°F) can be converted to degrees Celsius (°C) as follows:

$$°C = (°F - 32) / 1.8$$

$$°F = (1.8 \times °C) + 32$$

Altitude, as used in this report, refers to distance above or below sea level.

Specific conductance is given in microsiemens per centimeter at 25 degrees Celsius (µS/cm at 25 °C).

Concentrations of chemical constituents in water are given either in milligrams per liter (mg/L) or micrograms per liter (µg/L).

WATER QUALITY AND DEPTH TO WATER, 2001-02, AND GRAPHS OF SELECTED CONSTITUENTS AND DEPTH TO WATER, PERIOD OF RECORD THROUGH 2002, IN SELECTED WELLS, EASTERN BERNALILLO COUNTY, NEW MEXICO

By Paul J. Blanchard

ABSTRACT

Since 1990, the U.S. Geological Survey, in cooperation with the Bernalillo County Environmental Health Department, has periodically collected water samples for laboratory chemical analysis from a network of 20 wells in eastern Bernalillo County to monitor the effects of domestic wastewater disposal. The depth to water also has been measured in these wells to monitor the effects of ground-water withdrawals. From September 2001 through June 2002, water samples were again collected from and depth to water was measured in these wells where access was available. Two wells were removed from the network because water-level measurement and sample collection were no longer feasible, and 13 wells were added to the network. Of the 31 wells in the network, water samples were collected from 8 wells, depth to water was measured in 5 wells, and both activities were conducted at 18 wells. Sample analyses included determination of concentrations of dissolved nitrite plus nitrate, dissolved chloride, and total organic carbon, which frequently are used as indicators of contamination from domestic wastewater disposal. Concentrations of dissolved nitrite plus nitrate ranged from 0.050 to 20.0 milligrams per liter, and concentrations in two samples exceeded the U.S. Environmental Protection Agency primary drinking water standard of 10 milligrams per liter. Concentrations of dissolved chloride ranged from 8.2 to 400 milligrams per liter and concentrations in four samples exceeded the U.S. Environmental Protection Agency secondary drinking water standard of 250 milligrams per liter. The concentration of total organic carbon in one sample was 9.4 milligrams per liter; concentrations in all other samples were 4.3 milligrams per liter or smaller. No U.S. Environmental Protection Agency drinking water standards have been established for organic carbon. Primary and secondary drinking water standards pertain to human health concerns and esthetics, respectively.

INTRODUCTION

Unincorporated areas of eastern Bernalillo County, New Mexico, have undergone rapid development and attendant population increases in recent years, and the demand for water and the potential for contamination of ground water have increased accordingly. Water for most homes in these unincorporated areas is supplied by individual domestic wells, and most homes use septic systems for the disposal of wastewater. Bernalillo County officials recognize the importance of monitoring the effects of increased ground-water use on ground-water levels and the effects of domestic wastewater disposal on ground-water quality in the east mountain area.

Accordingly, the U.S. Geological Survey (USGS), in cooperation with the Bernalillo County Environmental Health Department, entered into a cooperative agreement to collect and interpret ground-water data in eastern Bernalillo County (fig. 1). From January 1990 through June 1993, the USGS collected and analyzed monthly ground-water samples and measured monthly depths to ground water in 20 domestic supply wells throughout eastern Bernalillo County (Kues and Garcia, 1995). These wells were established as the monitoring-well network, and data have been collected from them periodically since June 1993 (Rankin, 1996; 2000).

Purpose and Scope

This report presents ground-water-level and ground-water-quality data collected in the eastern Bernalillo County area during 2001-02. Data were collected from 18 of the 20 wells in the previously established monitoring-well network and from 13 wells that were added to the network in 2001-02 (fig. 1). Graphs showing concentrations of total and dissolved nitrite plus nitrate, dissolved chloride, and total organic carbon and hydrographs showing depths to ground water are presented for the period of record

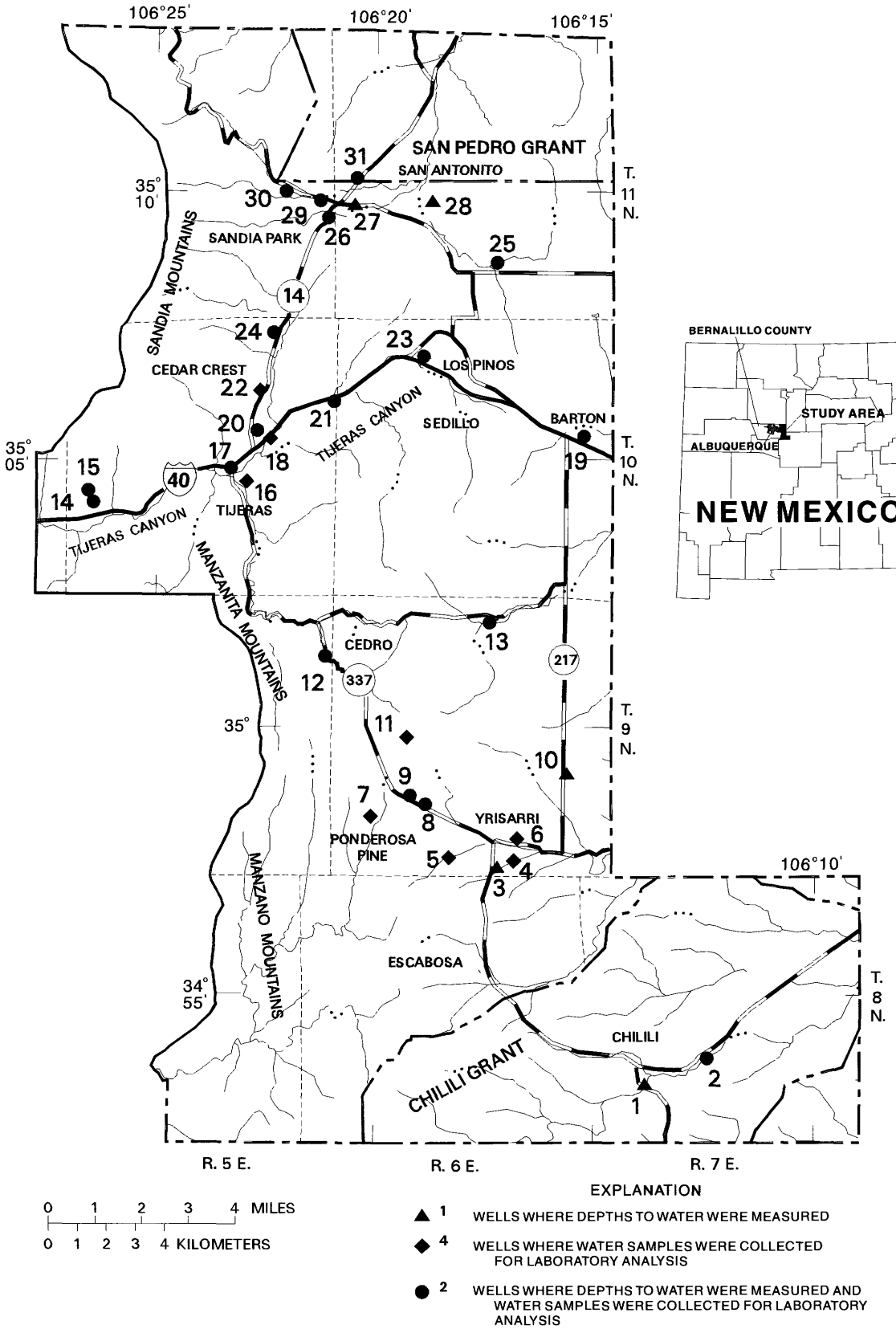


Figure 1. Location of study area and monitoring wells, eastern Bernalillo County, New Mexico.

of each well in the network where water samples had been collected and analyzed and (or) depth to water had been measured before 2001. The period of record includes data collected prior to 1990 for seven wells.

Description of Study Area

The eastern Bernalillo County study area comprises about 150 square miles and extends to the county boundaries on the north, east, and south (fig. 1). The study area is bounded on the west by the crests of the Sandia, Manzanita, and Manzano Mountains. The land surface slopes away from the mountains toward the east, and these slopes are cut by drainages flowing eastward out of the mountains.

Soil and unconsolidated alluvial deposits overlie fractured limestone in most of the study area. In the central part of the area, primarily north of Interstate Highway 40 and east of New Mexico Highway 14, the uppermost consolidated geologic units consist of fractured sandstone and shale. Igneous and metamorphic rocks crop out in Tijeras Canyon, which separates the southern terminus of the Sandia Mountains from the northern terminus of the Manzanita Mountains.

Monitoring-Well Network and Data Collection during 2001-02

Currently (2002), the network consists of 31 wells at which either water samples were collected to be analyzed (8 wells), depth to water was measured (5 wells), or both (18 wells) (fig. 1). Selected records for the 31 wells are listed in table 1. Eighteen wells were included from the previous network of 20 wells, and 13 wells were added to the network. Data were collected prior to 2001 at 9 of the 13 wells added to the network.

Water samples could not be collected at five wells because of nonoperating pumps, inaccessibility to water before it entered a holding tank, or water softener. In addition, water-level measurements were not feasible at eight wells because water levels had not fully recovered between pumping cycles (four wells), condensation was present in the casing (one well), the well head was not accessible (one well), the water level was higher than land surface and the well was under pressure (one well), or the well owner did not grant permission to measure the depth to water (one well).

Methods of Data Collection and Laboratory Analysis

Depths to water in wells were measured using a steel tape. Temperature, specific conductance, and pH were measured in the field according to standard USGS procedures (Wilde and Radtke, 1998), and groundwater samples were collected, processed, and shipped according to established USGS procedures (Wilde and others, 1998; 1999). Water samples were collected using the pumps installed in the wells for water supply. Samples were collected as close to the well as access would allow and prior to any water treatment.

Water samples were analyzed for concentrations of major ions, selected species of nitrogen and phosphorus, total organic carbon, acid neutralizing capacity, and the trace elements arsenic, boron, iron, and manganese. Hardness and concentrations of dissolved solids were calculated from analytical results. The USGS National Water Quality Laboratory in Lakewood, Colorado, conducted all analyses according to standard procedures (Fishman and Friedman, 1989).

Acknowledgments

The cooperation of private well owners, whose permission facilitated collection of water samples from and measurement of depths to water in their wells, is gratefully acknowledged. The cooperation and assistance of employees of the U.S. Forest Service and the U.S. Postal Service also are gratefully acknowledged.

WATER-QUALITY AND DEPTH-TO-WATER DATA

Results of depth-to-water measurements conducted during 2001-02 are listed in table 1. Field measurements and chemical analyses of samples conducted during 2001-02 are listed in table 2.

Graphs showing concentrations of total and dissolved nitrite plus nitrate, dissolved chloride, total organic carbon (chemical constituents that are common indicators of contamination by sewage effluent), and hydrographs showing depths to water in wells 2, 8, 12-15, 17, 19-21, 23-26, and 29-31 are shown in figures 2-

18. Graphs showing concentrations of these chemical constituents in wells 4-7, 11, 16, 18, and 22 are shown in figures 19-26, and hydrographs of depths to water in wells 1 and 28 are shown in figure 27. Data for the entire period of record are shown on each graph or hydrograph.

For samples collected during 2001-02, concentrations of dissolved nitrite were estimated or confirmed to be less than 0.01 milligram per liter (mg/L) in all samples (table 2). Concentrations of dissolved nitrite plus nitrate ranged from 0.050 to 20.0 mg/L and were less than 1 mg/L in 10 samples. Concentrations in nine samples ranged from 1.34 to 3.96 mg/L and in five samples ranged from 7.58 to 9.61 mg/L. Concentrations in two samples were 16.5 mg/L in well 14 and 20.0 mg/L in well 26, which exceed the current (2002) U.S. Environmental Protection Agency (USEPA) primary drinking water standard of 10 mg/L. Primary drinking water standards pertain to human health concerns.

Concentrations of dissolved chloride ranged from 8.2 to 400 mg/L and were less than 100 mg/L in 11 samples. Concentrations in eight samples ranged from 109 to 184 mg/L and in three samples ranged from 213 to 244 mg/L. Concentrations in four samples, 266 mg/L in well 14, 328 mg/L in well 21, 365 mg/L in well 23, and 400 mg/L in well 19, exceed the current (2002) USEPA secondary drinking water standard for chloride of 250 mg/L. Secondary drinking water standards pertain to esthetics.

The concentration of total organic carbon in one sample was 9.4 mg/L. Concentrations in all other samples were 4.3 mg/L or smaller. No USEPA drinking water standards have been established for organic carbon.

The concentration of dissolved arsenic was less than 2 micrograms per liter (µg/L) in all wells except well 4 (7.6 µg/L), well 7 (5.2 µg/L), and well 8 (69.6 µg/L). Dissolved-arsenic concentrations in all wells except well 8 were less than the current (2002) USEPA primary drinking water standard of 10 µg/L.

REFERENCES CITED

Fishman, M.J., and Friedman, L.C., eds., 1989, Methods for the determination of inorganic substances in water and fluvial sediments: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. A1, 545 p.

Kues, G.E., and Garcia, B.M., 1995, Ground-water quality and ground-water-level data, Bernalillo County, central New Mexico, 1990-93: U.S. Geological Survey Open-File Report 95-385, 76 p.

Rankin, D.R., 1996, Water-quality and ground-water-level data, Bernalillo County, central New Mexico, 1995: U.S. Geological Survey Open-File Report 96-578, 14 p.

———2000, Water-quality and ground-water-level trends, 1990-99, and data collected from 1995 through 1999, east mountain area, Bernalillo County, central New Mexico: U.S. Geological Survey Open-File Report 00-476, 41 p.

Wilde, F.D., and Radtke, D.B., eds., 1998, National field manual for the collection of water-quality data: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A6, 220 p.

Wilde, F.D., Radtke, D.B., Gibs, J., and Iwatsubo, R.T., eds., 1998, National field manual for the collection of water-quality data: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A1-A3, 185 p.

———1999, National field manual for the collection of water-quality data: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A4-A5, 231 p.

Table 1. Selected records of wells in the monitoring network

[Altitude of land surface in feet above NGVD 29; depth of well and water level in feet below land surface; --, no data]

Monitoring network well number (fig. 1)	Well site identifier	Altitude of land surface	Date well constructed	Depth of well	Water level	Date water level measured	Well sampled in 2001-02
1	345319106135101	6,790	--	100	19.88	5/29/2002	No
2	345348106122601	6,660	8/24/1974	45	18.62	6/10/2002	Yes
3	345723106171301	7,260	--	--	96.55	6/28/2002	No
4	345726106170401	7,230	--	--	--	--	Yes
5	345733106181901	7,280	--	128	--	--	Yes
6	345754106164601	7,220	--	--	--	--	Yes
7	345819106200601	7,420	--	--	--	--	Yes
8	345833106185101	7,420	10/19/1979	315	173.44	5/3/2002	Yes
9	345843106191201	7,510	--	--	269.95	5/13/2002	Yes
10	345908106153901	7,290	--	--	194.30	5/22/2002	No
11	345948106191701	7,680	--	--	--	--	Yes
12	350119106210901	7,060	--	--	32.31	4/19/2002	Yes
13	350157106172501	7,080	--	--	178.86	6/11/2002	Yes
14	350410106262601	6,030	1/1/1957	120	71.63	6/28/2002	Yes
15	350423106263301	6,255	1/1/1960	146	44.27	7/2/2002	Yes
16	350434106225701	6,350	3/18/1969	253	--	--	Yes
17	350449106231901	6,355	--	--	28.50	7/2/2002	Yes
18	350522106222501	6,400	--	73	--	--	Yes
19	350525106151701	6,775	7/28/1980	275	142.09	5/10/2002	Yes
20	350531106224301	6,540	--	160	41.92	4/19/2002	Yes
21	350604106205801	6,520	--	85	34.48	5/31/2002	Yes
22	350615106223301	6,580	10/11/1967	80	--	--	Yes
23	350655106185601	6,880	--	300	209.83	5/23/2002	Yes
24	350721106222101	6,765	1/1/1965	200	9.96	6/22/2002	Yes
25	350840106171601	6,780	2/16/1977	320	108.09	6/6/2002	Yes
26	350930106210701	6,860	--	120	54.50	5/28/2002	Yes
27	350945106203101	6,790	--	--	60.53	5/17/2002	No
28	350949106184501	6,700	--	280	180.10	5/17/2002	No
29	350949106211801	6,940	--	260	191.70	7/2/2002	Yes
30	351011106220401	7,100	--	--	17.87	7/2/2002	Yes
31	351014106202801	6,798	--	--	46.82	5/20/2002	Yes

Table 2. Results of field determinations and laboratory analyses of samples collected from monitoring wells, 2001-02

[uS/cm, microsiemens per centimeter at 25 degrees Celsius (deg C); mg/L, milligrams per liter; ug/L, micrograms per liter; <, less than; E, estimated value; --, not determined; M, presence verified but not quantified; bold numbers, exceedances of applicable U.S. Environmental Protection Agency drinking-water standards]

Monitoring network well number (fig. 1)	Well site identifier	Date	pH water whole, field (standard units)	pH water whole, lab (standard units)	Specific conductance, lab (uS/cm)	Specific conductance, field (uS/cm)	Temperature water (deg C)	Hardness, total (mg/L as $CaCO_3$)	Calcium, dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)
2	345348106122601	6/10/2002	7.1	7.5	669	780	12.5	350	120	12.4
4	345726106170401	6/28/2002	7.0	7.6	873	900	13.5	420	130	22.5
5	345733106181901	6/22/2002	7.1	7.5	1,510	1,510	14.5	660	214	30.4
6	345754106164601	6/26/2002	7.1	7.5	1,130	1,180	14.0	520	148	35.5
7	345819106200601	6/22/2002	7.2	7.5	1,080	1,120	15.5	470	130	35.0
8	345833106185101	6/14/2002	6.9	7.2	1,660	1,580	14.5	500	130	42.0
9	345843106191201	5/13/2002	7.2	7.5	1,100	1,140	14.4	510	152	31.9
11	345948106191701	12/21/2001	7.1	7.8	916	920	13.0	340	73.7	37.9
12	350119106210901	2/1/2002	6.5	7.6	1,250	1,250	10.6	530	161	30.1
13	350157106172501	6/18/2002	7.1	7.5	1,040	1,060	14.0	480	143	29.2
14	350410106262601	9/10/2001	--	7.7	1,620	1,590	17.0	640	187	41.4
15	350423106263301	1/28/2002	7.4	8.2	572	570	16.4	250	69.6	17.4
16	350434106225701	5/31/2002	7.2	7.7	730	750	16.0	340	73.4	38.4
17	350449106231901	9/10/2001	--	7.9	951	960	14.9	380	79.4	44.4
18	350522106222501	12/18/2001	7.2	7.8	1,540	1,670	13.0	660	191	44.1
19	350525106151701	9/14/2001	--	7.4	1,900	1,950	15.0	820	261	40.1
20	350531106224301	4/19/2002	7.2	7.7	913	1,000	14.0	460	144	24.9
21	350604106205801	2/19/2002	--	7.7	1,730	1,730	13.4	680	192	49.0

Table 2. Results of field determinations and laboratory analyses of samples collected from monitoring wells, 2001-02--Continued

Monitoring network well number (fig. 1)	Well site identifier	Date	pH water whole, field (standard units)	pH water whole, lab (standard units)	Specific conductance, lab (uS/cm)	Specific conductance, field (uS/cm)	Temperature water (deg C)	Hardness, total (mg/L as $CaCO_3$)	Calcium, dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)
22	350615106223301	9/5/2001	--	8.0	747	770	15.0	360	107	22.0
23	350655106185601	4/18/2002	7.1	7.6	1,860	1,900	15.0	770	213	57.6
24	350721106222101	9/10/2001	--	**9.3**	730	730	15.0	2	0.85	0.051
25	350840106171601	6/30/2002	7.3	7.6	1,080	1,120	14.5	490	155	26.0
26	350930106210701	9/5/2001	--	7.5	1,340	1,350	14.0	580	196	22.3
29	350949106211801	9/6/2001	--	8.1	489	500	13.1	250	87.1	7.82
30	351011106220401	2/25/2002	7.0	7.8	806	850	10.4	380	131	13.6
31	351014106202801	9/5/2001	--	8.0	942	960	14.5	400	121	24.3

Table 2. Results of field determinations and laboratory analyses of samples collected from monitoring wells, 2001-02--Continued

Monitoring network well number (fig. 1)	Well site identifier	Date	Sodium, dissolved (mg/L as Na)	Acid neutralizing capacity, unfltrd tit 4.5, lab (mg/L as $CaCO_3$)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Silica, dissolved (mg/L as SiO_2)	Sulfate, dissolved (mg/L as SO_4)	Solids, sum of constituents, dissolved (mg/L)	Nitrogen, ammonia, dissolved (mg/L as N)
2	345348106122601	6/10/2002	29.6	239	27.6	0.2	17.0	47.7	407	<0.040
4	345726106170401	6/28/2002	24.7	260	80.9	0.7	16.5	63.4	497	<0.040
5	345733106181901	6/22/2002	45.0	274	244	0.3	17.4	90.8	**849**	<0.040
6	345754106164601	6/26/2002	37.0	283	130	0.4	17.4	117	**671**	<0.040
7	345819106200601	6/22/2002	44.8	279	136	0.5	12.9	80.8	**629**	<0.040
8	345833106185101	6/14/2002	157	373	240	1.3	13.6	144	**958**	<0.020
9	345843106191201	5/13/2002	26.7	323	129	0.5	13.5	79.4	**636**	<0.040
11	345948106191701	12/21/2001	53.2	332	52.5	0.6	14.1	99.1	**540**	0.140
12	350119106210901	2/1/2002	52.3	360	167	0.3	16.1	52.3	**711**	<0.040
13	350157106172501	6/18/2002	37.5	275	109	0.4	15.1	113	**630**	<0.040
14	350410106262601	9/10/2001	73.3	133	**266**	1.5	20.0	131	**878**	<0.040
15	350423106263301	1/28/2002	22.4	210	8.2	1.9	18.5	76.5	347	<0.040
16	350434106225701	5/31/2002	25.1	266	39.4	0.5	16.4	75.5	437	<0.040
17	350449106231901	9/10/2001	49.1	180	92.8	0.3	17.2	116	**513**	<0.040
18	350522106222501	12/18/2001	92.7	198	213	0.3	20.3	**295**	**986**	E0.021
19	350525106151701	9/14/2001	59.7	137	**400**	0.2	18.7	142	**1,040**	<0.040
20	350531106224301	4/19/2002	33.1	261	64.2	0.3	18.8	146	**589**	<0.040
21	350604106205801	2/19/2002	84.6	306	**328**	0.2	20.1	70.5	**970**	<0.040

Table 2. Results of field determinations and laboratory analyses of samples collected from monitoring wells, 2001-02--Continued

Monitoring network well number (fig. 1)	Well site identifier	Date	Sodium, dissolved (mg/L as Na)	Acid neutralizing capacity, unfltrd tit 4.5, lab (mg/L as $CaCO_3$)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Silica, dissolved (mg/L as SiO_2)	Sulfate, dissolved (mg/L as SO_4)	Solids, sum of constituents, dissolved (mg/L)	Nitrogen, ammonia, dissolved (mg/L as N)
22	350615106223301	9/5/2001	26.1	187	13.4	0.2	18.5	58.0	362	<0.040
23	350655106185601	4/18/2002	69.3	224	**365**	0.1	15.4	157	**1,060**	<0.040
24	350721106222101	9/10/2001	168	318	13.3	0.9	10.9	42.0	--	<0.040
25	350840106171601	6/30/2002	26.0	173	166	0.2	18.7	101	**641**	<0.040
26	350930106210701	9/5/2001	31.5	129	184	E0.1	27.0	34.1	**662**	<0.040
29	350949106211801	9/6/2001	6.6	128	10.5	0.3	15.4	14.9	221	<0.040
30	351011106220401	2/25/2002	29.6	260	63.3	0.6	17.2	35.6	449	<0.040
31	351014106202801	9/5/2001	29.0	130	134	0.2	25.6	56.5	483	<0.040

Table 2. Results of field determinations and laboratory analyses of samples collected from monitoring wells, 2001-02--Continued

Monitoring network well number (fig. 1)	Well site identifier	Date	Nitrogen, No_2+No_3, dissolved (mg/L as N)	Nitrogen, nitrite, dissolved (mg/L as N)	Phosphorus, dissolved (mg/L as P)	Phosphorus, ortho, dissolved (mg/L as P)	Carbon, organic, total (mg/L as C)	Arsenic, dissolved (ug/L as As)	Boron, dissolved (ug/L as B)	Iron, dissolved (ug/L as Fe)
2	345348106122601	6/10/2002	2.11	<0.008	0.018	0.020	1.6	<2.0	35	<10
4	345726106170401	6/28/2002	<0.050	<0.008	<0.004	<0.020	1.4	7.6	69	20
5	345733106181901	6/22/2002	9.06	<0.008	0.008	<0.020	3.4	E1.2	55	20
6	345754106164601	6/26/2002	2.77	<0.008	E0.003	<0.020	1.4	<2.0	84	150
7	345819106200601	6/22/2002	3.96	<0.008	E0.003	<0.020	2.6	5.2	100	<10
8	345833106185101	6/14/2002	0.058	<0.010	0.008	<0.010	3.8	**69.6**	173	<10
9	345843106191201	5/13/2002	1.42	<0.008	0.019	<0.020	1.4	<2.0	61	<10
11	345948106191701	12/21/2001	0.396	<0.008	0.006	<0.020	1.3	E1.3	155	<10
12	350119106210901	2/1/2002	3.22	<0.008	0.012	E0.014	1.7	<2.0	45	20
13	350157106172501	6/18/2002	3.42	<0.008	0.014	E0.013	1.9	E1.5	53	<10
14	350410106262601	9/10/2001	**16.5**	<0.006	<0.006	<0.020	1.7	<2.0	67	10
15	350423106263301	1/28/2002	0.605	<0.008	E0.003	<0.020	E0.60	<2.0	36	50
16	350434106225701	5/31/2002	1.34	<0.008	<0.004	<0.020	E0.50	E1.0	62	M
17	350449106231901	9/10/2001	0.235	E0.004	<0.006	<0.020	1.3	E1.6	196	210
18	350522106222501	12/18/2001	2.25	<0.008	0.012	<0.020	1.0	E1.5	51	<10
19	350525106151701	9/14/2001	7.58	<0.006	0.015	E0.011	3.7	<2.0	51	50
20	350531106224301	4/19/2002	0.056	<0.008	0.006	<0.020	1.3	<2.0	32	30
21	350604106205801	2/19/2002	8.75	<0.008	0.033	0.022	2.1	<2.0	104	<10

Table 2. Results of field determinations and laboratory analyses of samples collected from monitoring wells, 2001-02--Concluded

Monitoring Network well number (fig. 1)	Well site identifier	Date	Nitrogen, No_2+No_3, dissolved (mg/L as N)	Nitrogen, nitrite, dissolved (mg/L as N)	Phosphorus, dissolved (mg/L as P)	Phosphorus, ortho, dissolved (mg/L as P)	Carbon, organic, total (mg/L as C)	Arsenic, dissolved (ug/L as As)	Boron, dissolved (ug/L as B)	Iron, dissolved (ug/L as Fe)
22	350615106223301	9/5/2001	0.892	<0.006	0.016	<0.020	9.4	<2.0	38	40
23	350655106185601	4/18/2002	9.61	<0.008	0.004	<0.020	4.3	<2.0	43	60
24	350721106222101	9/10/2001	0.843	E0.003	0.008	E0.016	E0.38	E1.8	622	<10
25	350840106171601	6/30/2002	9.36	<0.008	0.027	0.023	2.3	<2.0	57	<10
26	350930106210701	9/5/2001	**20.0**	<0.006	0.024	E0.012	1.5	E1.2	54	<10
29	350949106211801	9/6/2001	0.300	<0.006	0.013	<0.020	E0.40	<2.0	E10	<10
30	351011106220401	2/25/2002	0.168	<0.008	E0.002	<0.020	0.95	<2.0	17	<10
31	351014106202801	9/5/2001	2.99	<0.006	0.014	<0.020	2.4	E1.6	47	<10

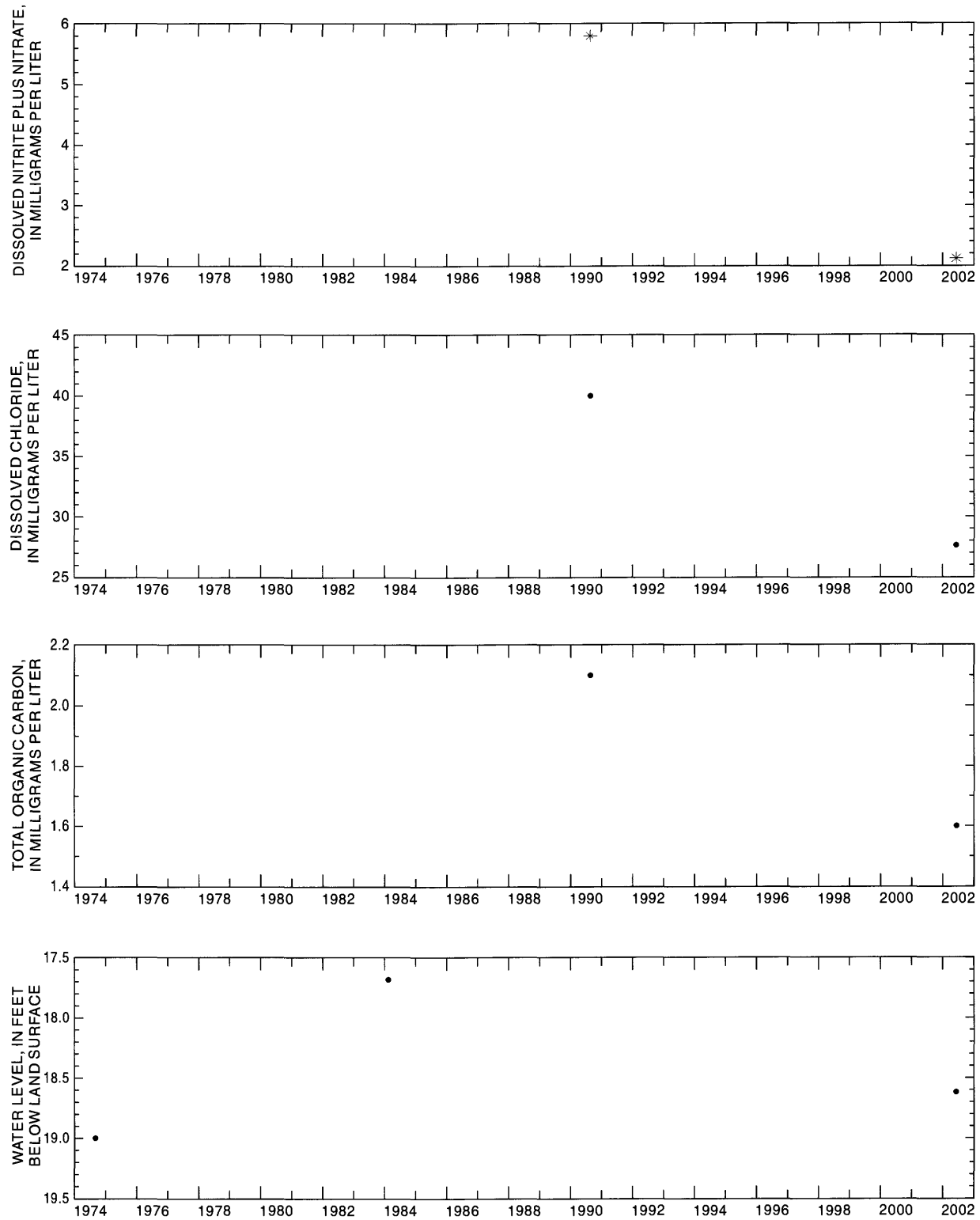


Figure 2. Concentrations of selected constituents and depth to water in well 2.

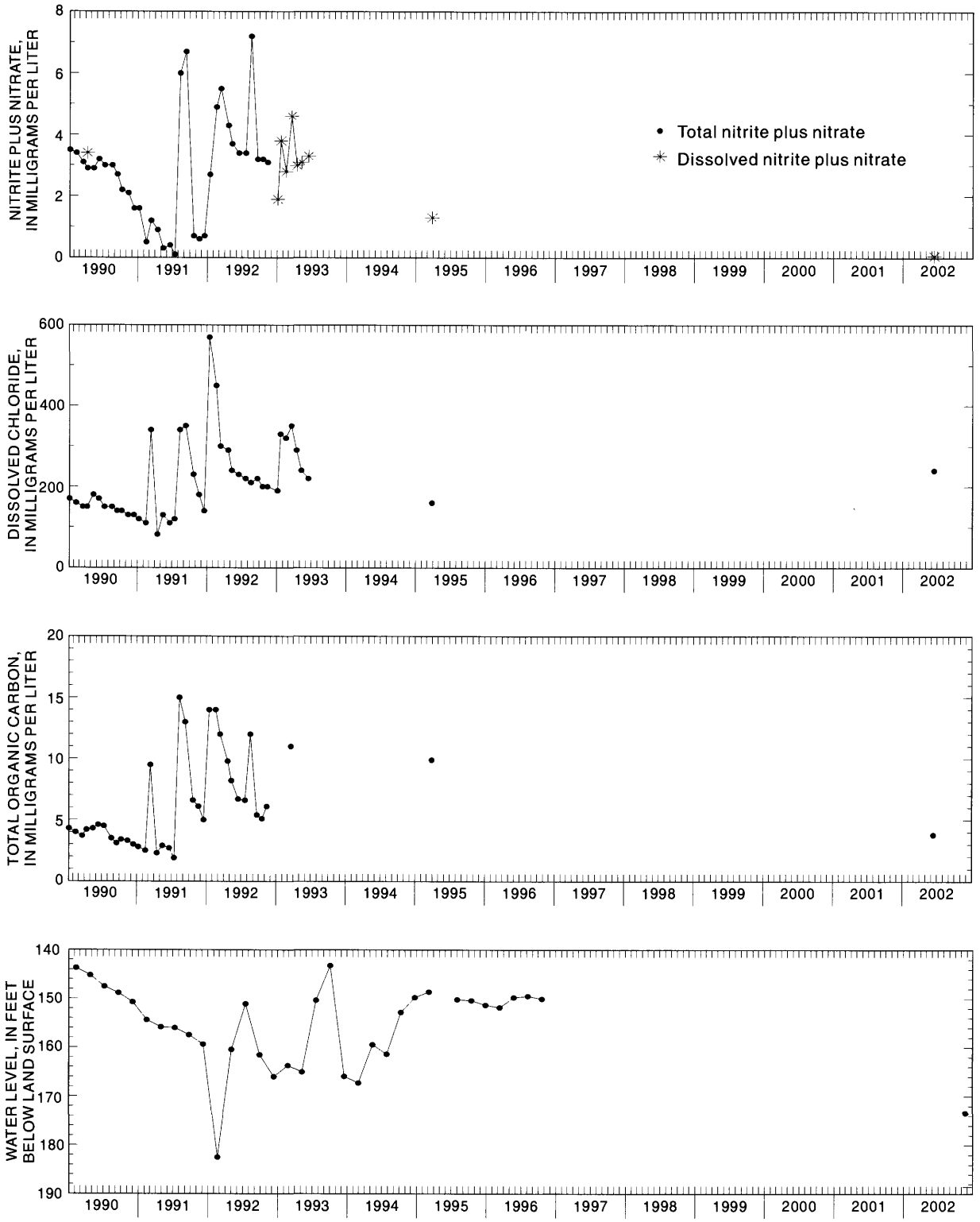


Figure 3. Concentrations of selected constituents and depth to water in well 8.

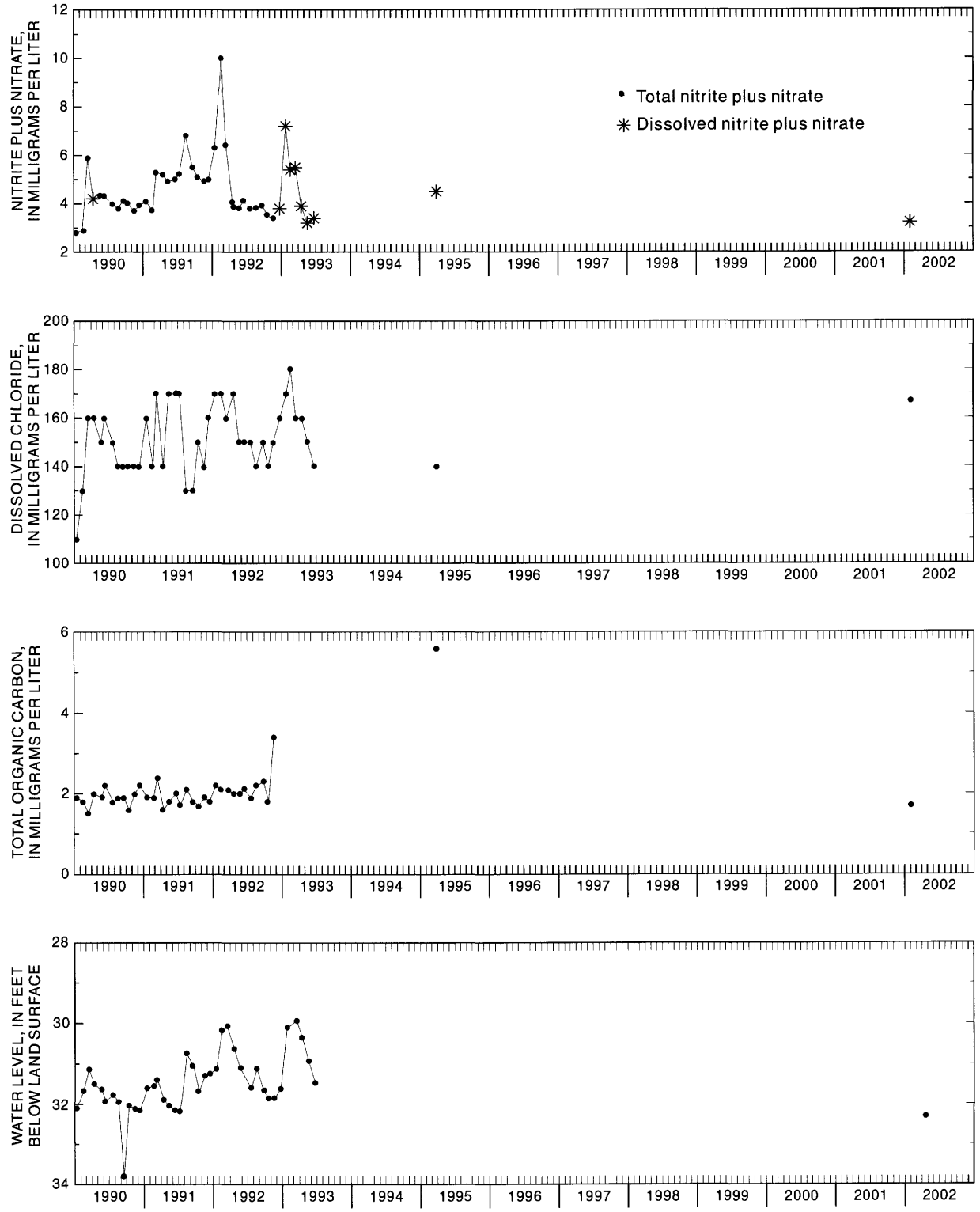


Figure 4. Concentrations of selected constituents and depth to water in well 12.

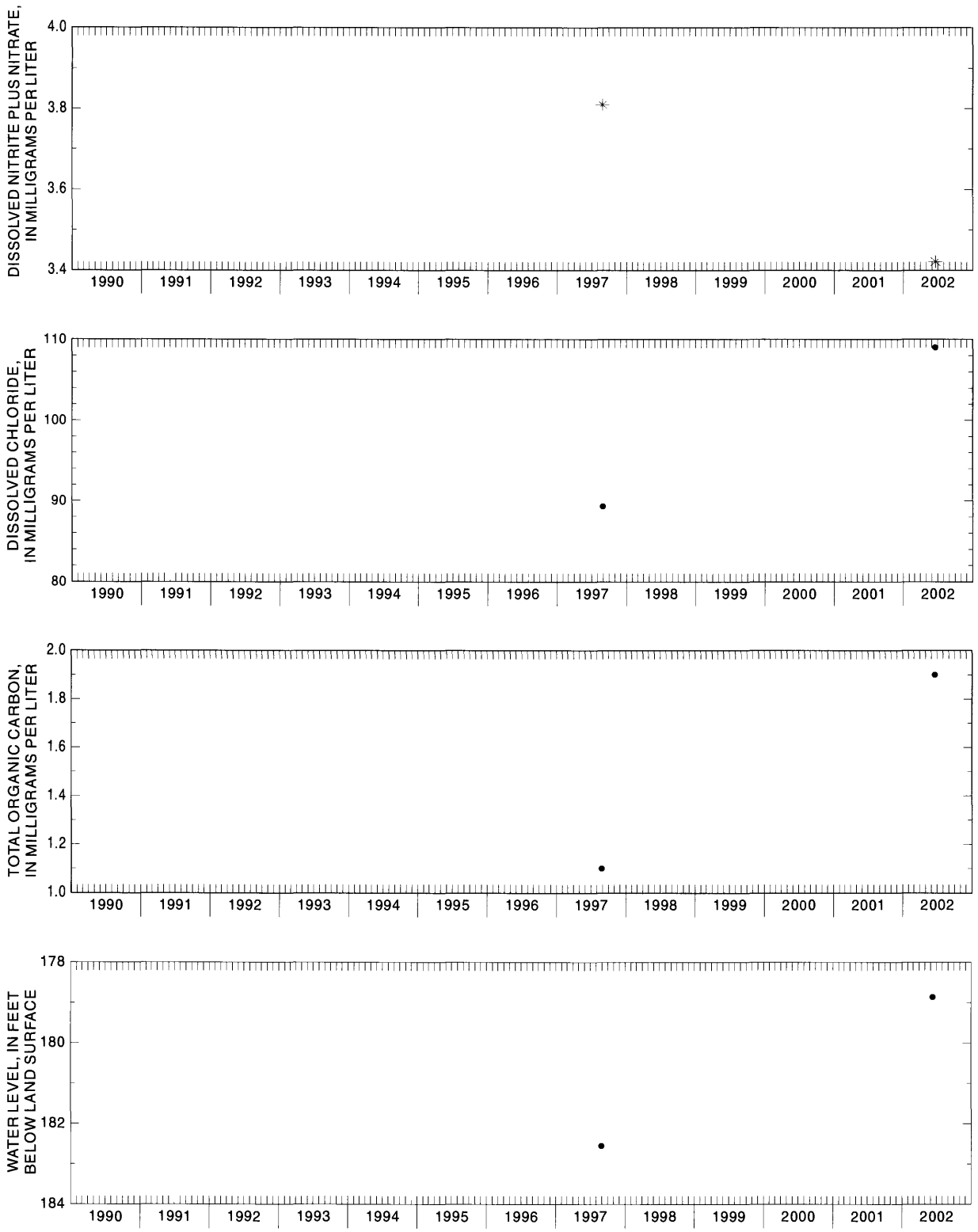


Figure 5. Concentrations of selected constituents and depth to water in well 13.

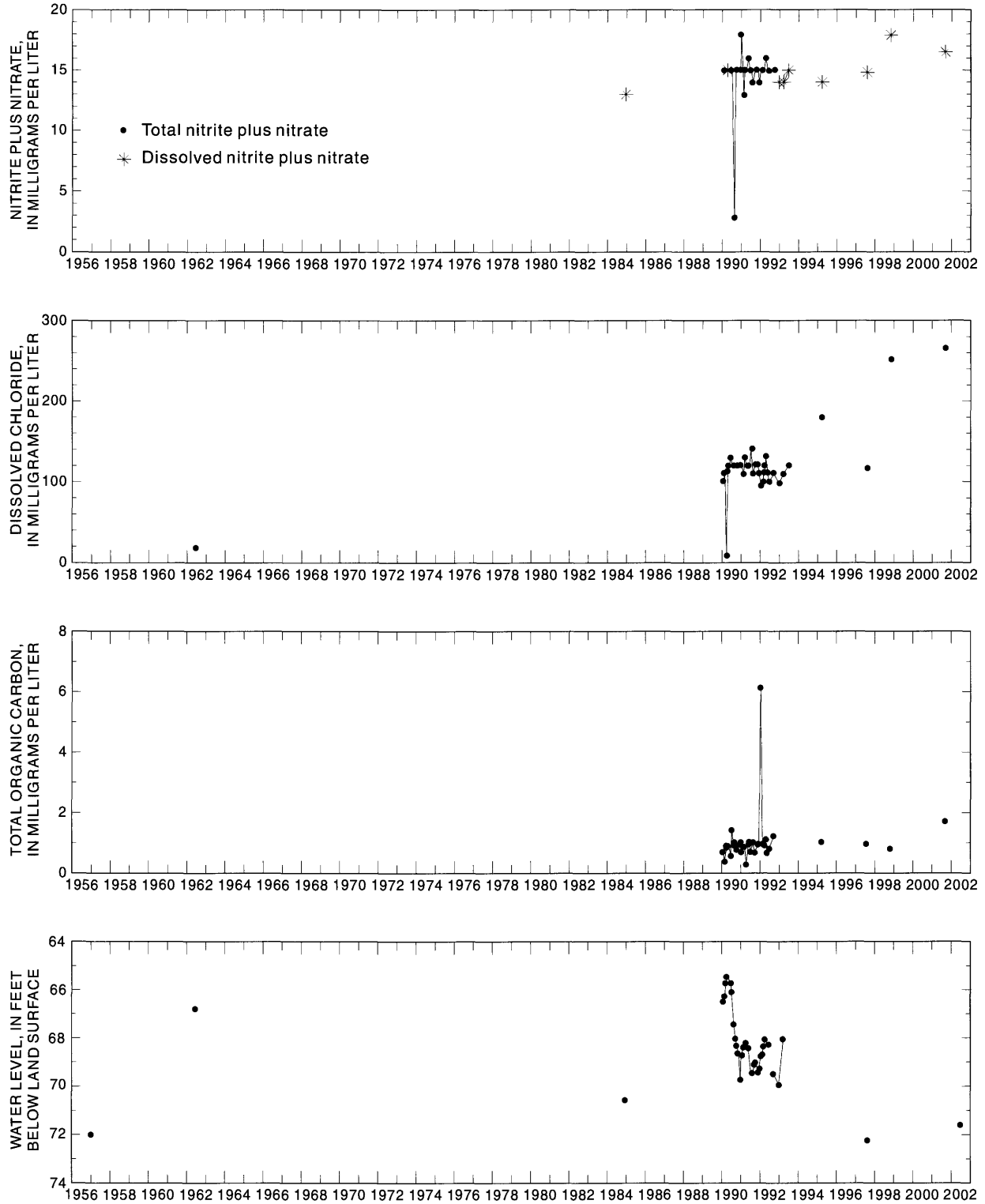


Figure 6. Concentrations of selected constituents and depth to water in well 14.

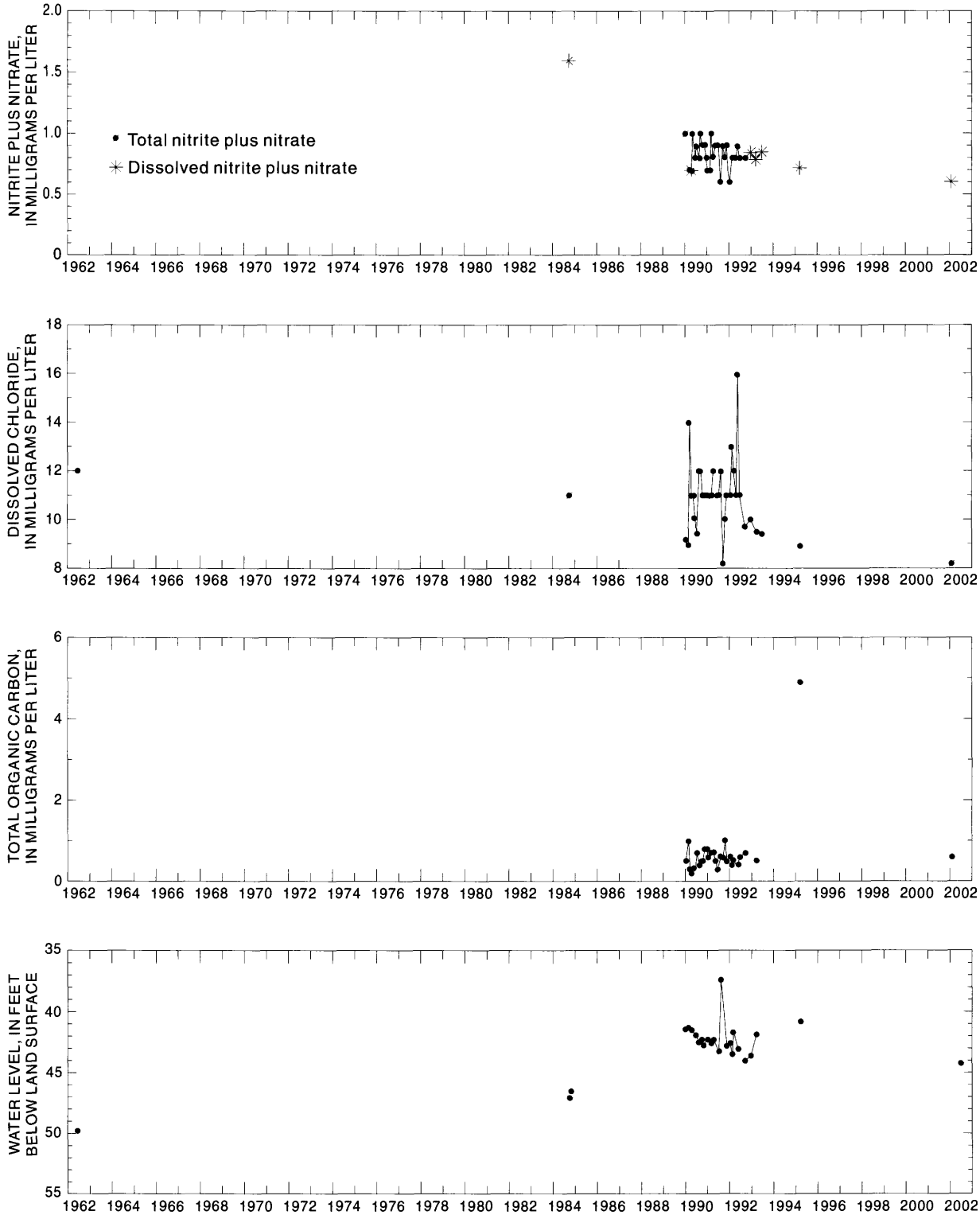


Figure 7. Concentrations of selected constituents and depth to water in well 15.

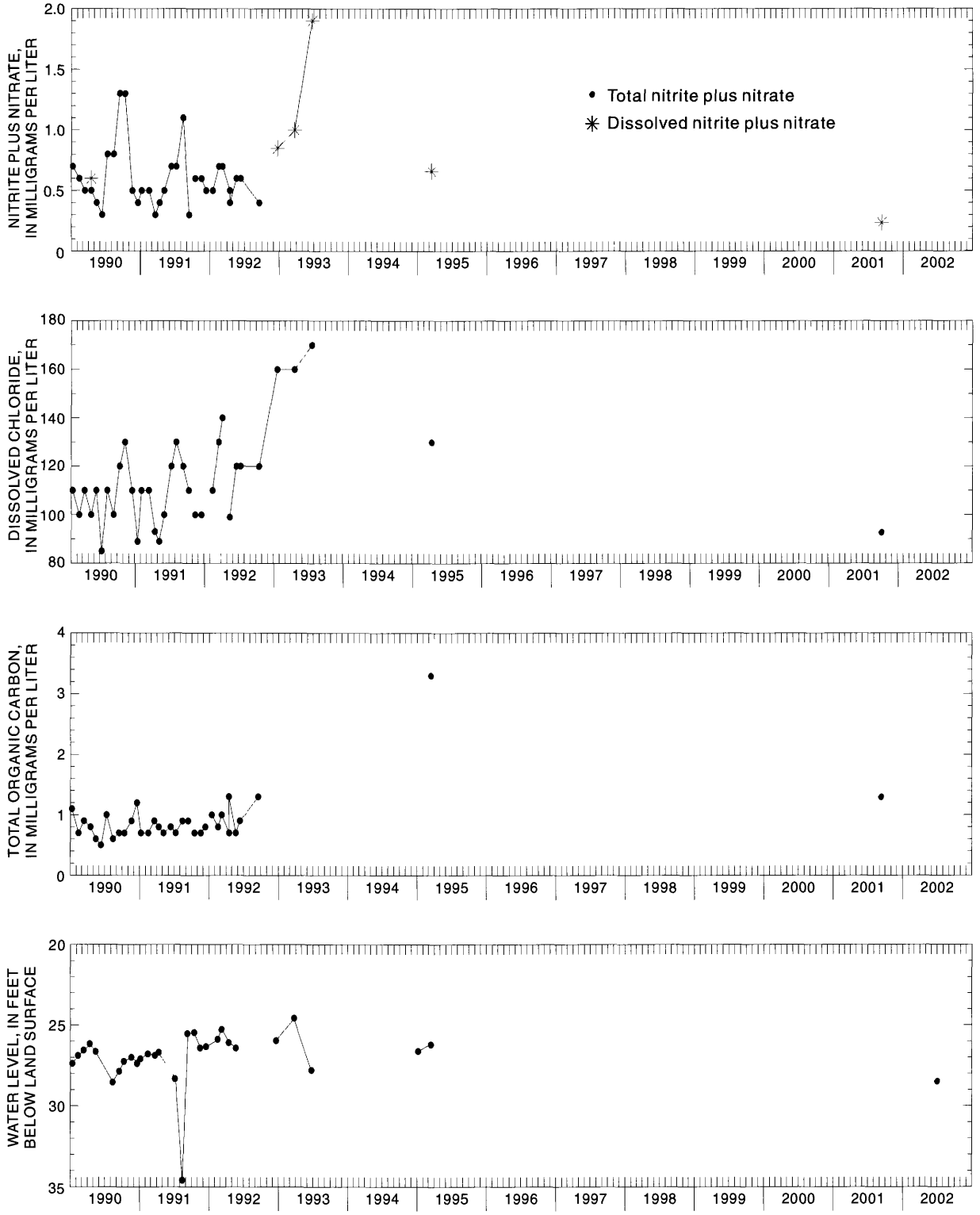


Figure 8. Concentrations of selected constituents and depth to water in well 17.

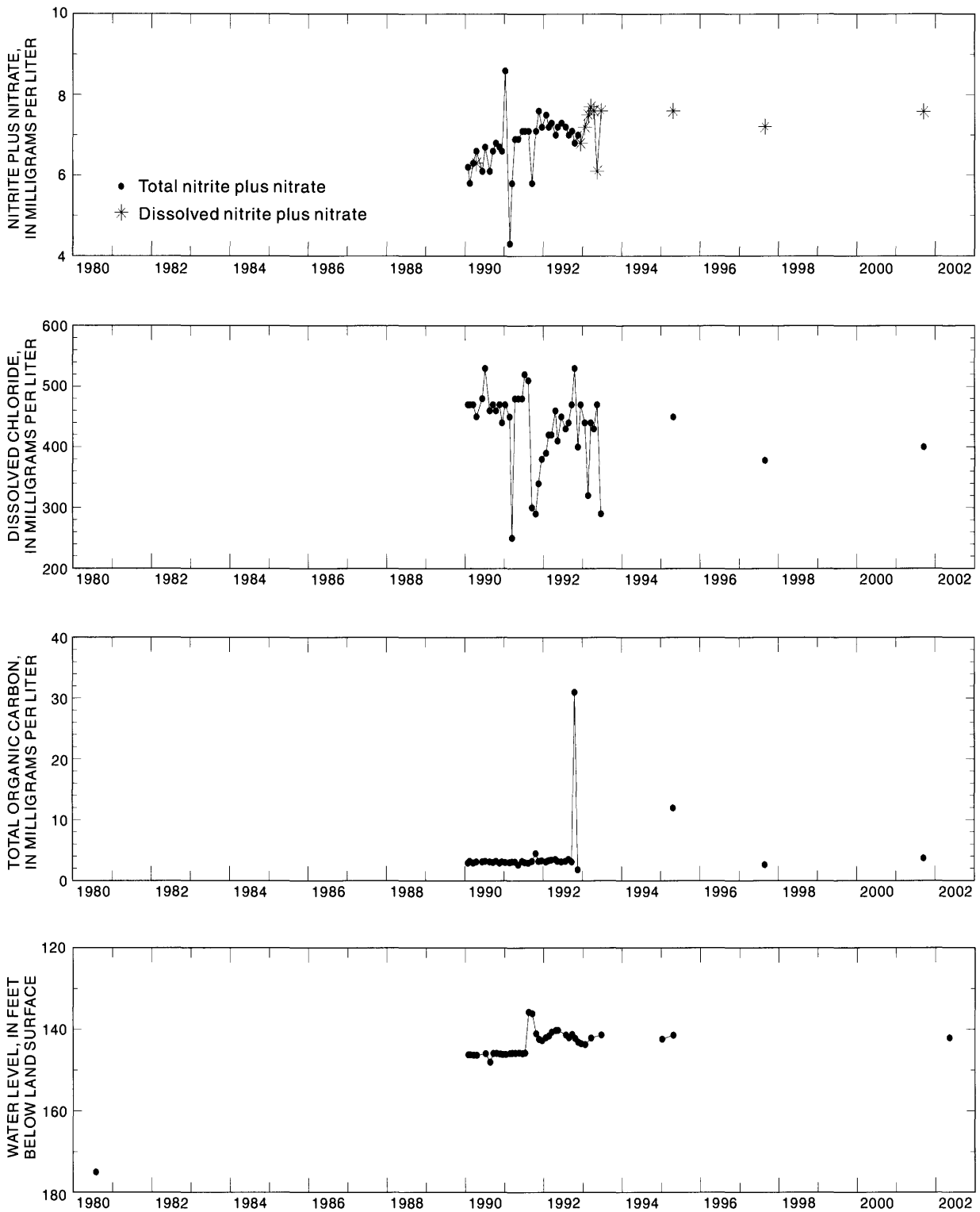


Figure 9. Concentrations of selected constituents and depth to water in well 19.

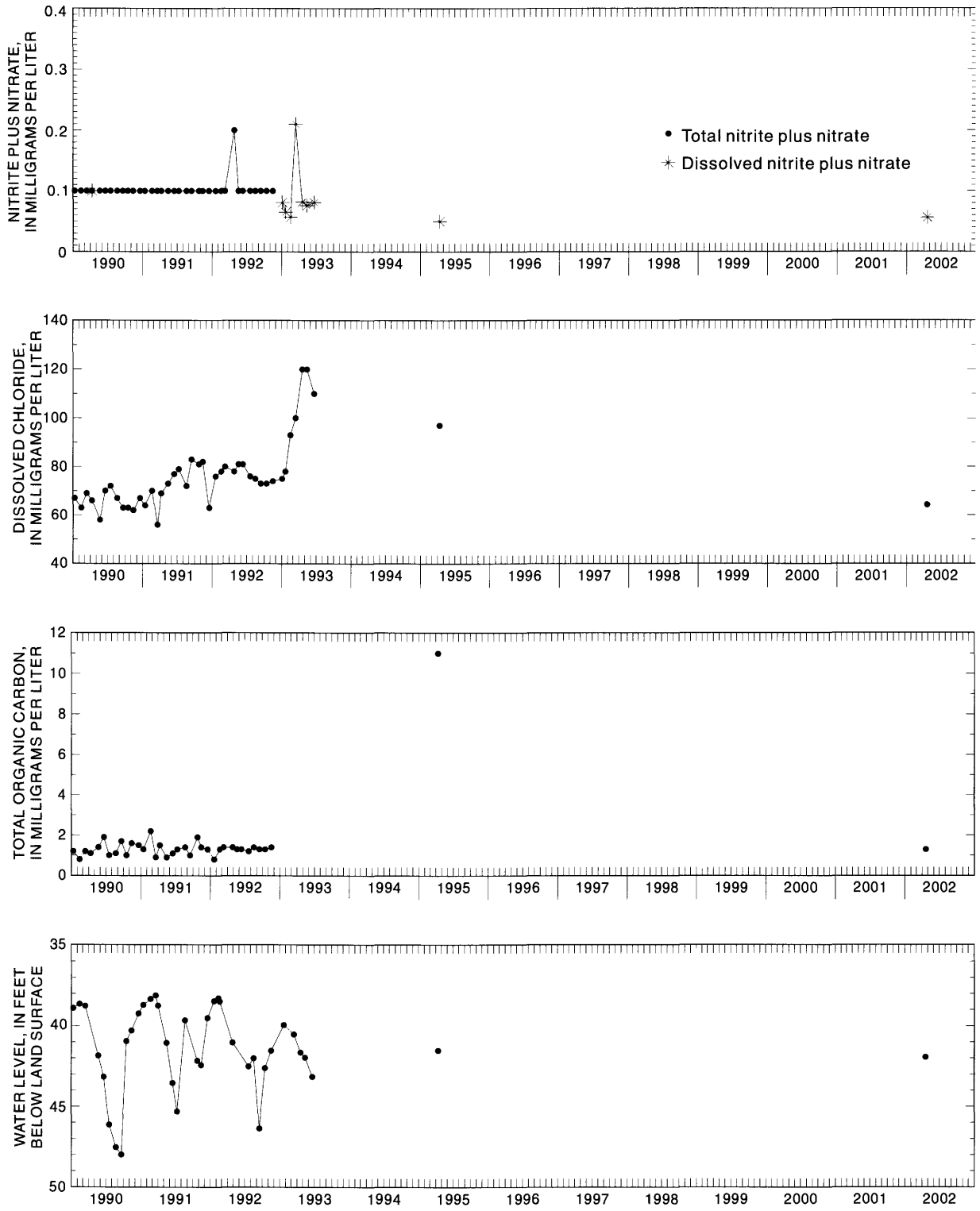


Figure 10. Concentrations of selected constituents and depth to water in well 20.

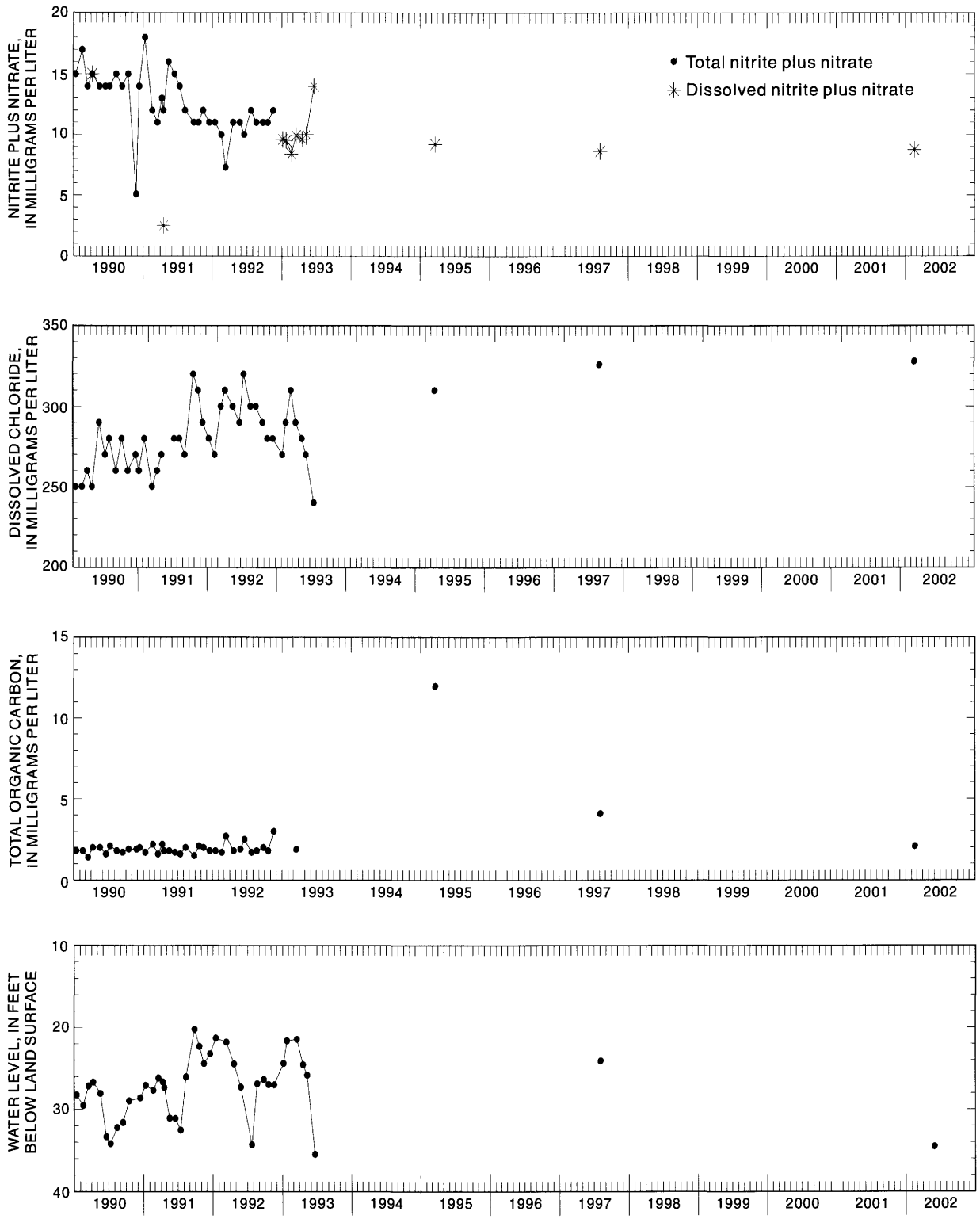


Figure 11. Concentrations of selected constituents and depth to water in well 21.

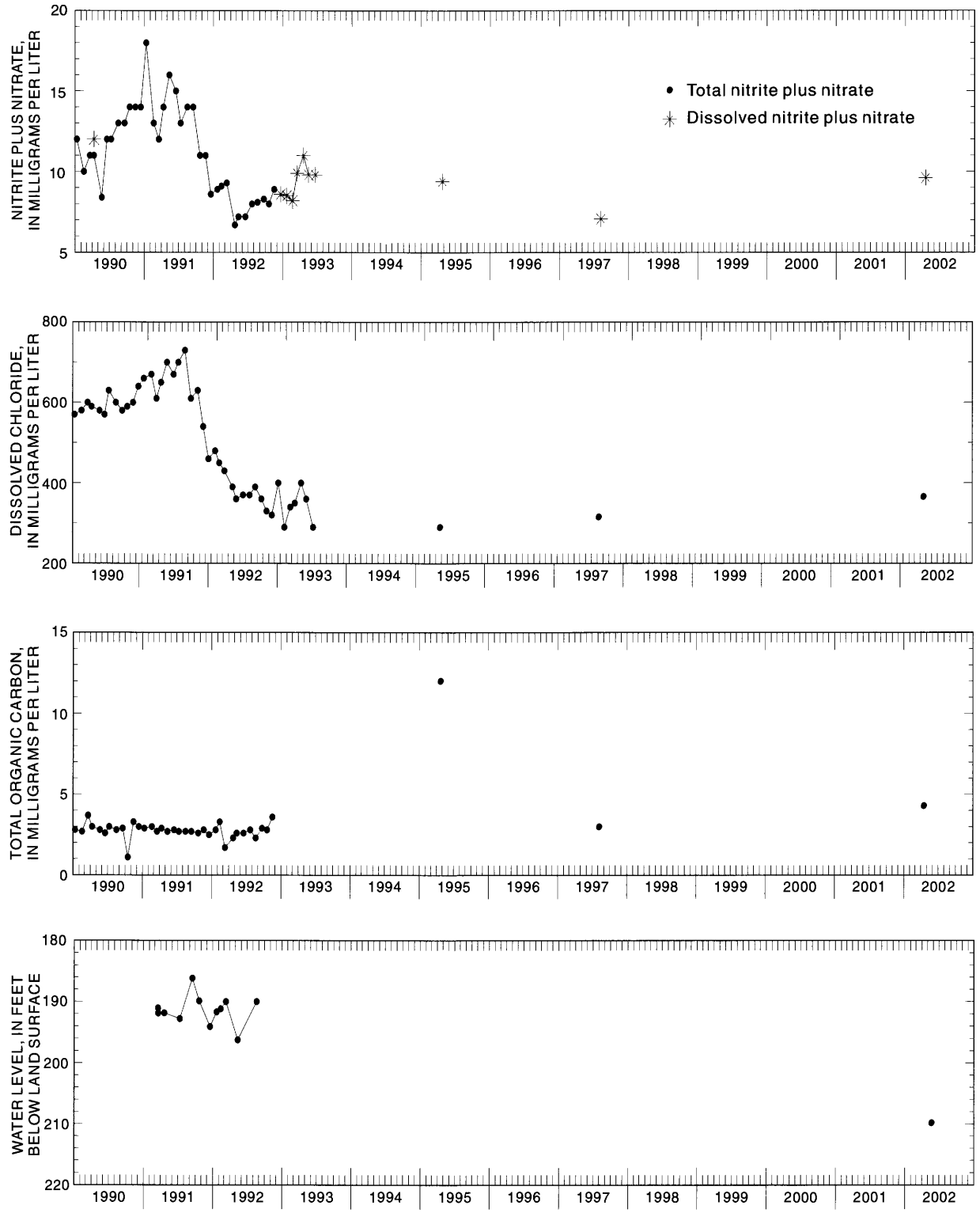


Figure 12. Concentrations of selected constituents and depth to water in well 23.

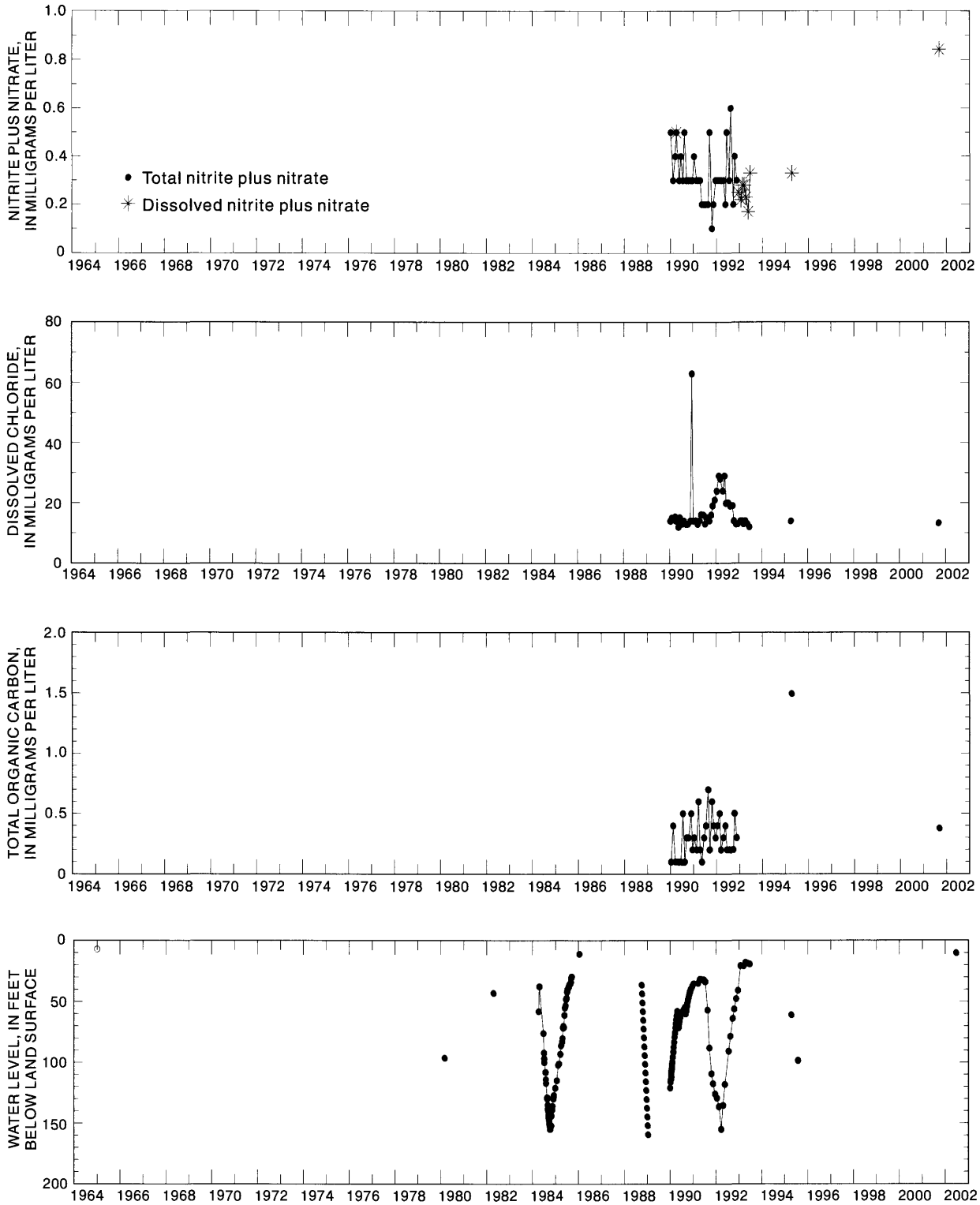


Figure 13. Concentrations of selected constituents and depth to water in well 24.

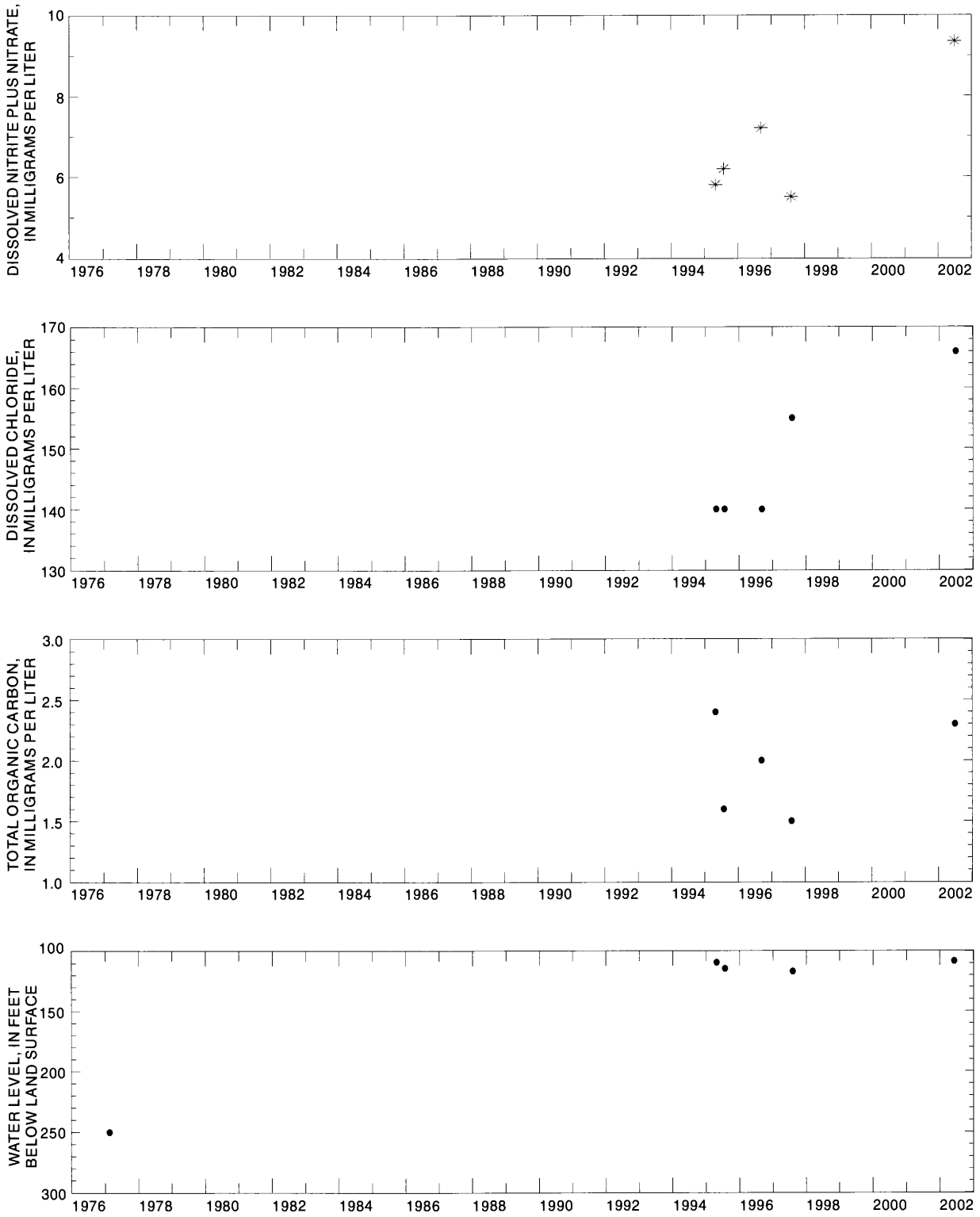


Figure 14. Concentrations of selected constituents and depth to water in well 25.

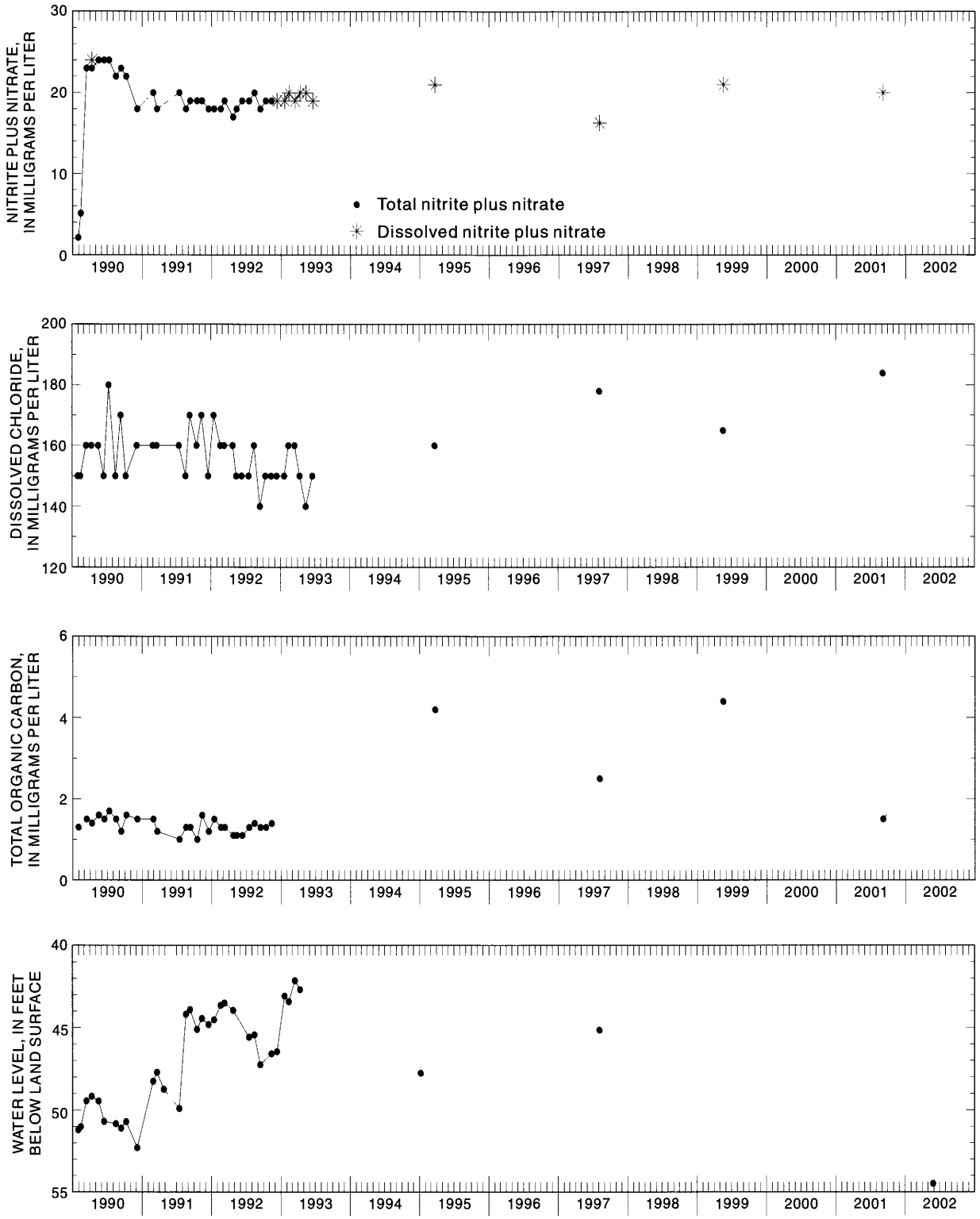


Figure 15. Concentrations of selected constituents and depth to water in well 26.

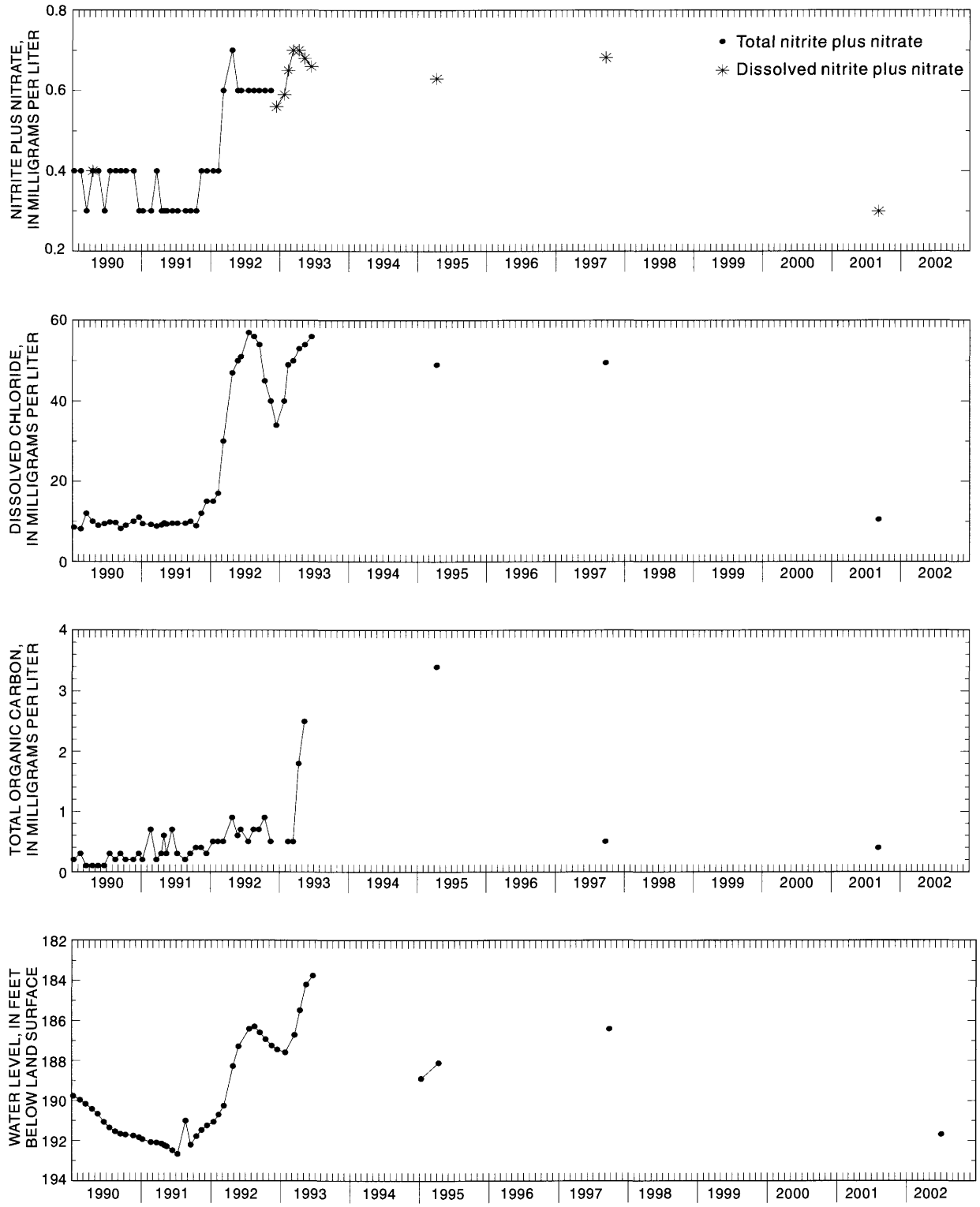


Figure 16. Concentrations of selected constituents and depth to water in well 29.

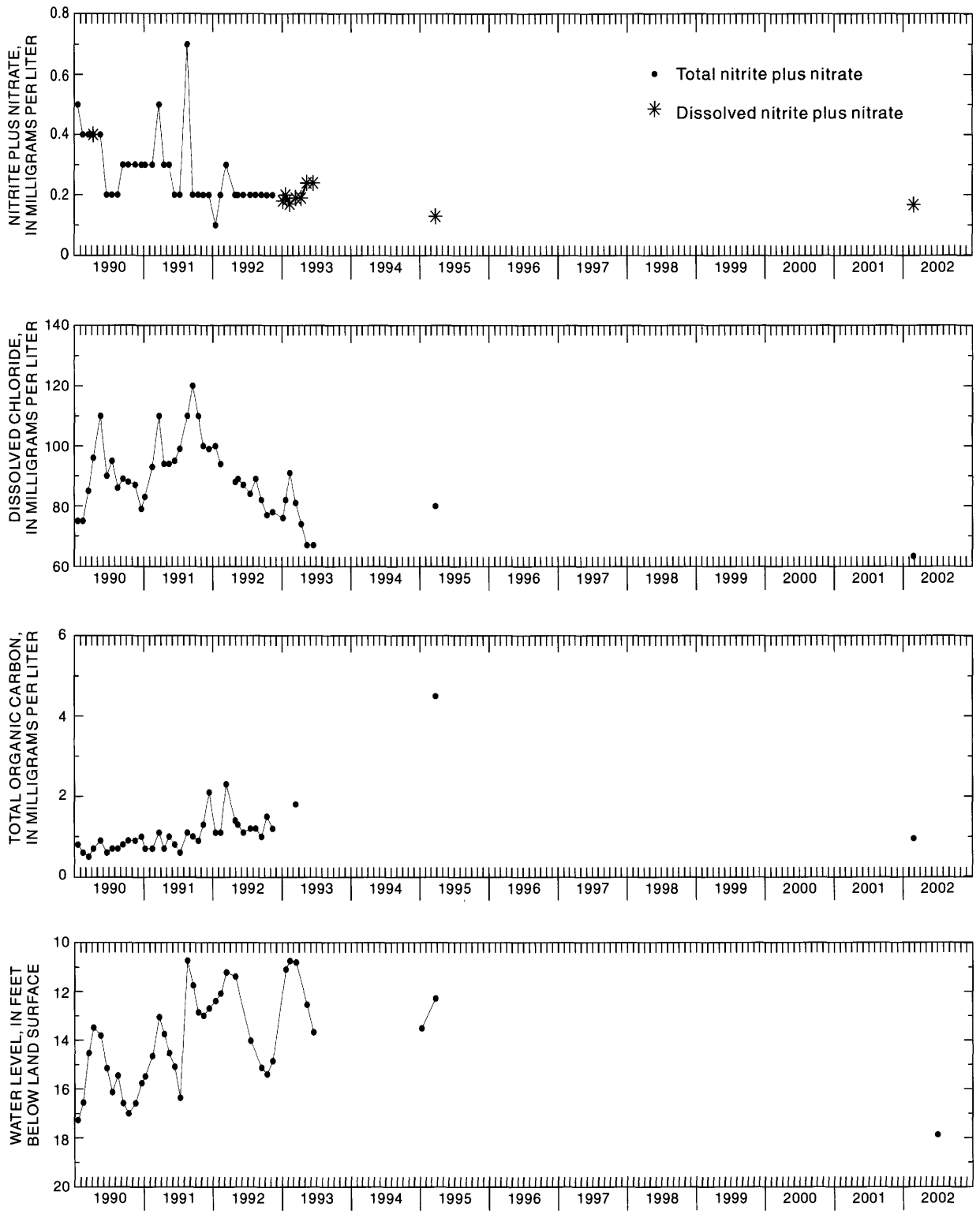


Figure 17. Concentrations of selected constituents and depth to water in well 30.

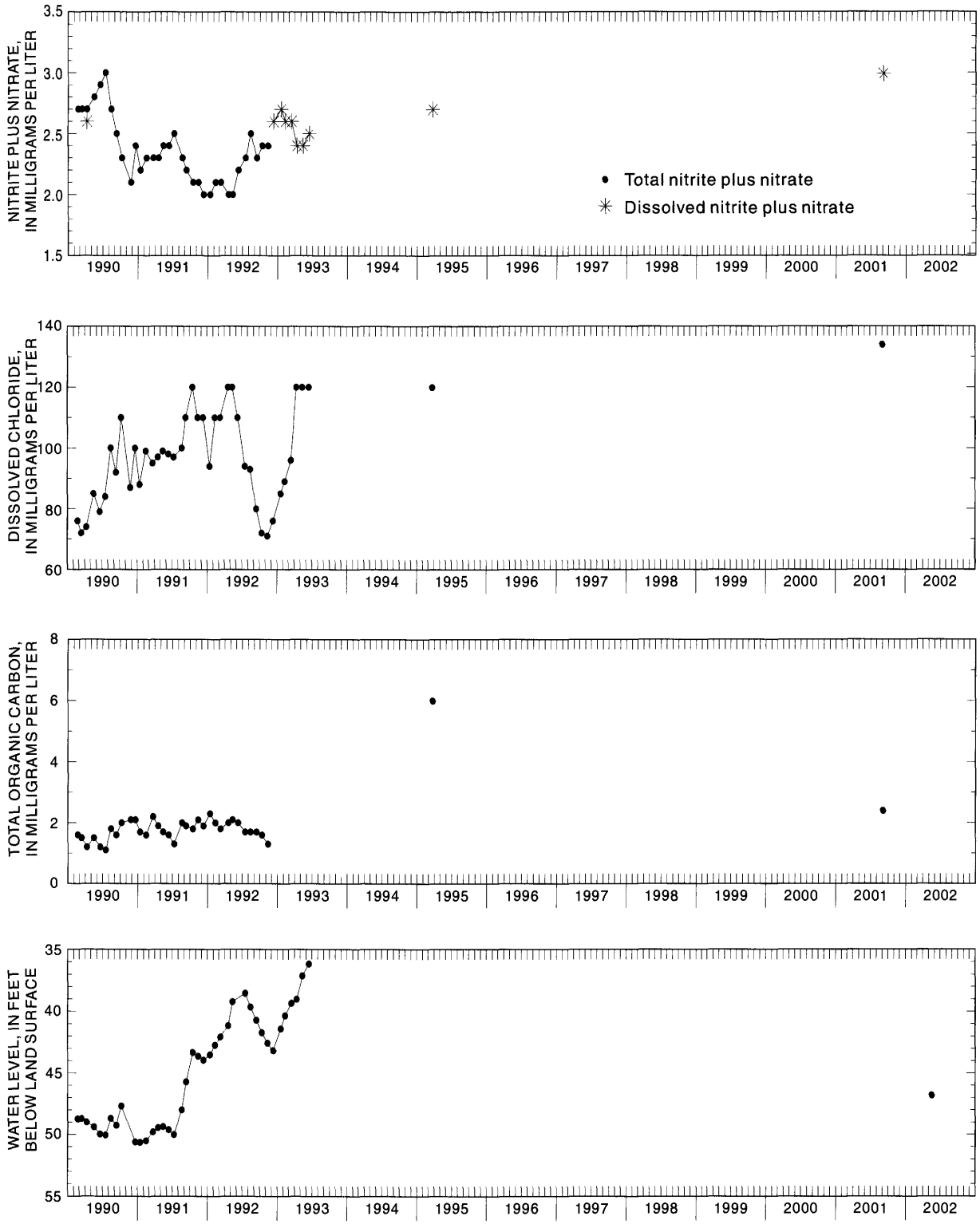


Figure 18. Concentrations of selected constituents and depth to water in well 31.

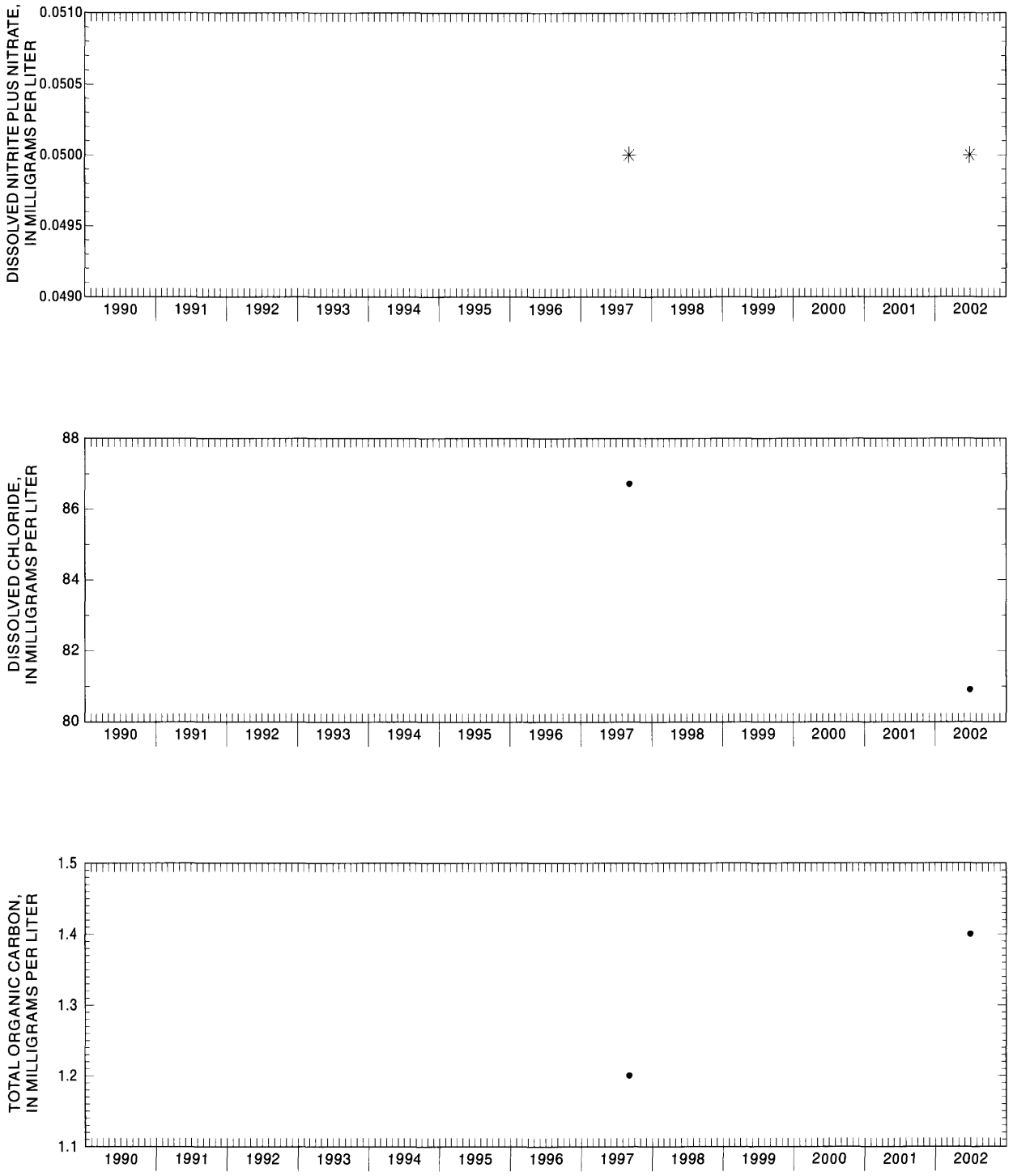


Figure 19. Concentrations of selected constituents in well 4.

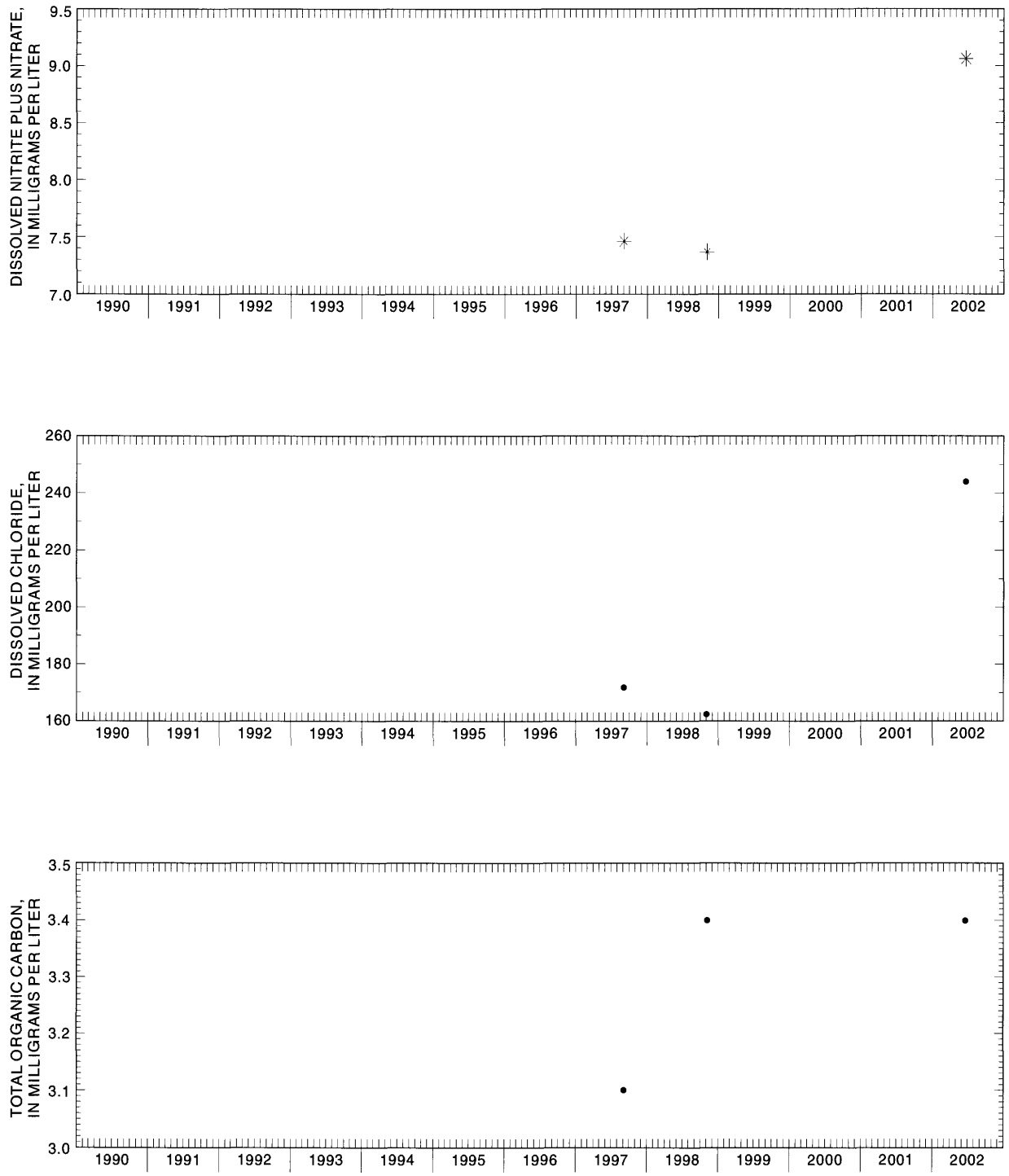


Figure 20. Concentrations of selected constituents in well 5.

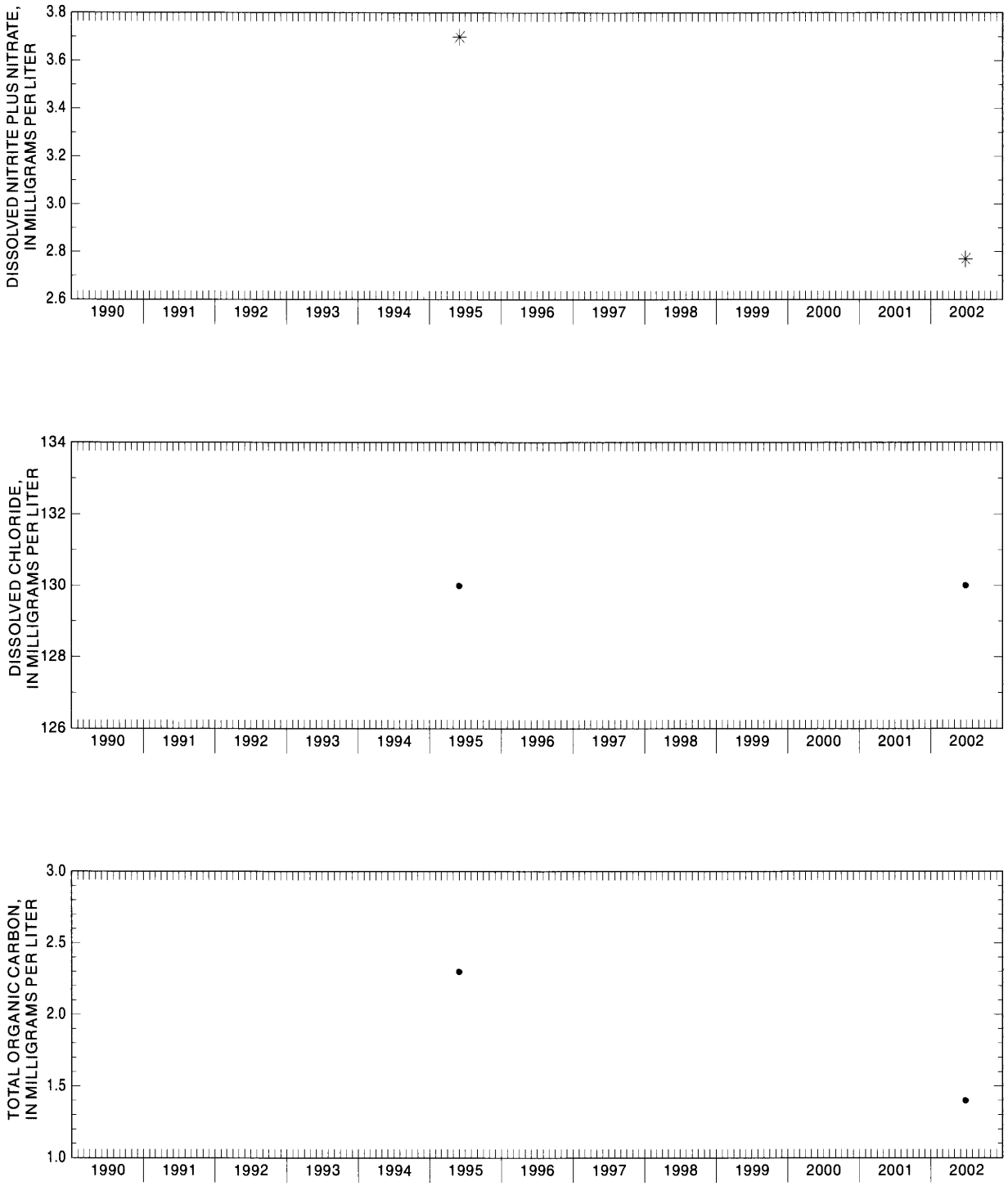


Figure 21. Concentrations of selected constituents in well 6.

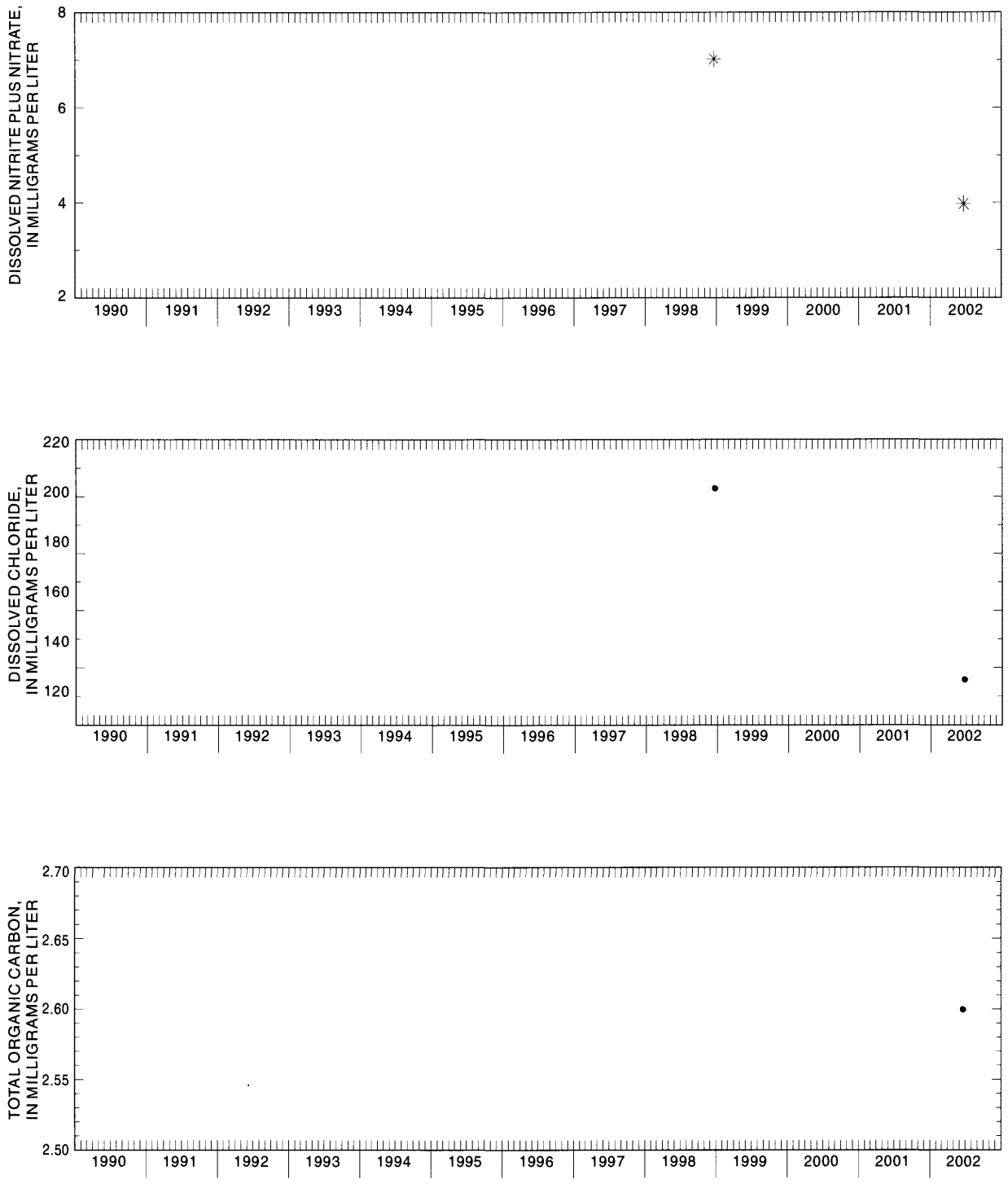
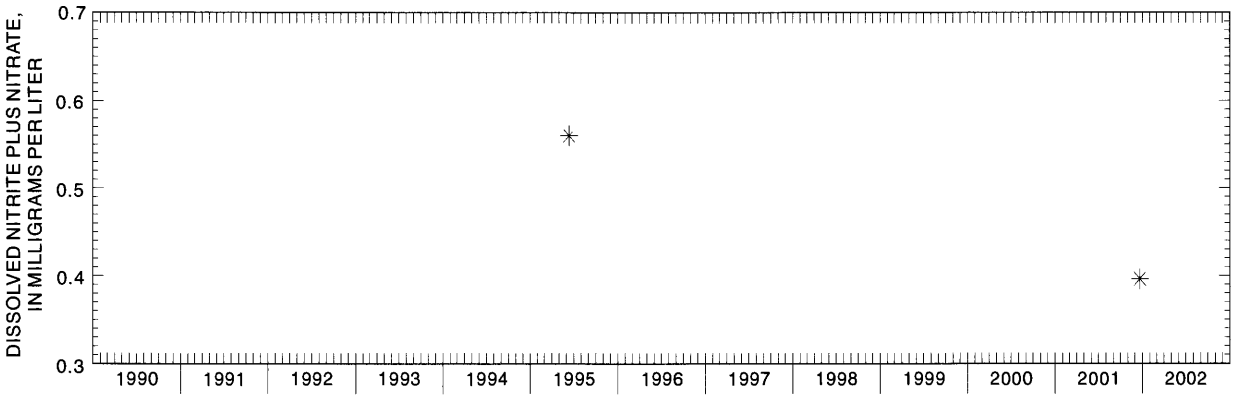
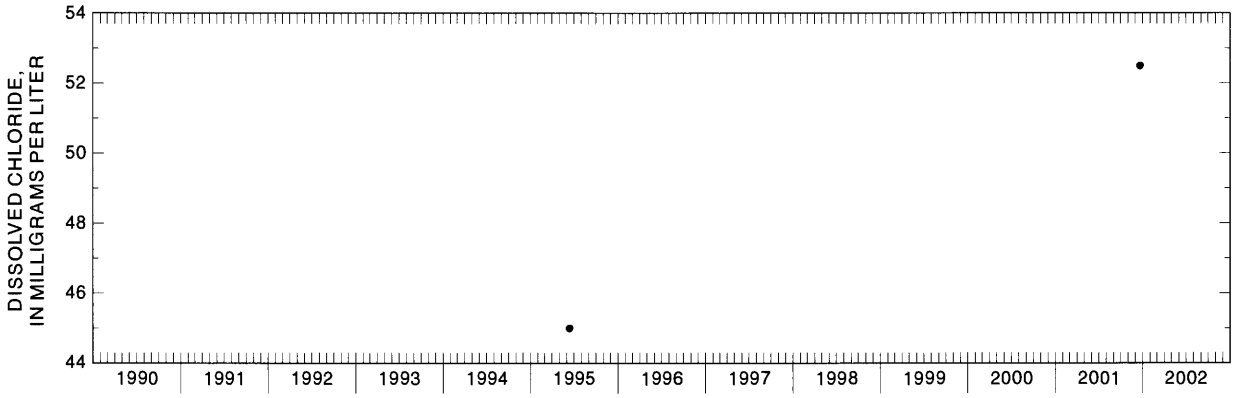


Figure 22. Concentrations of selected constituents in well 7.





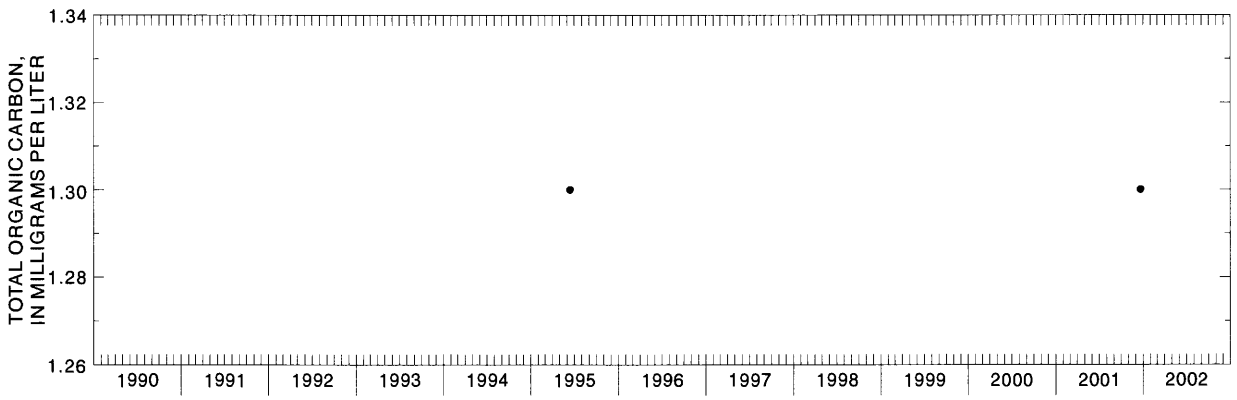


Figure 23. Concentrations of selected constituents in well 11.

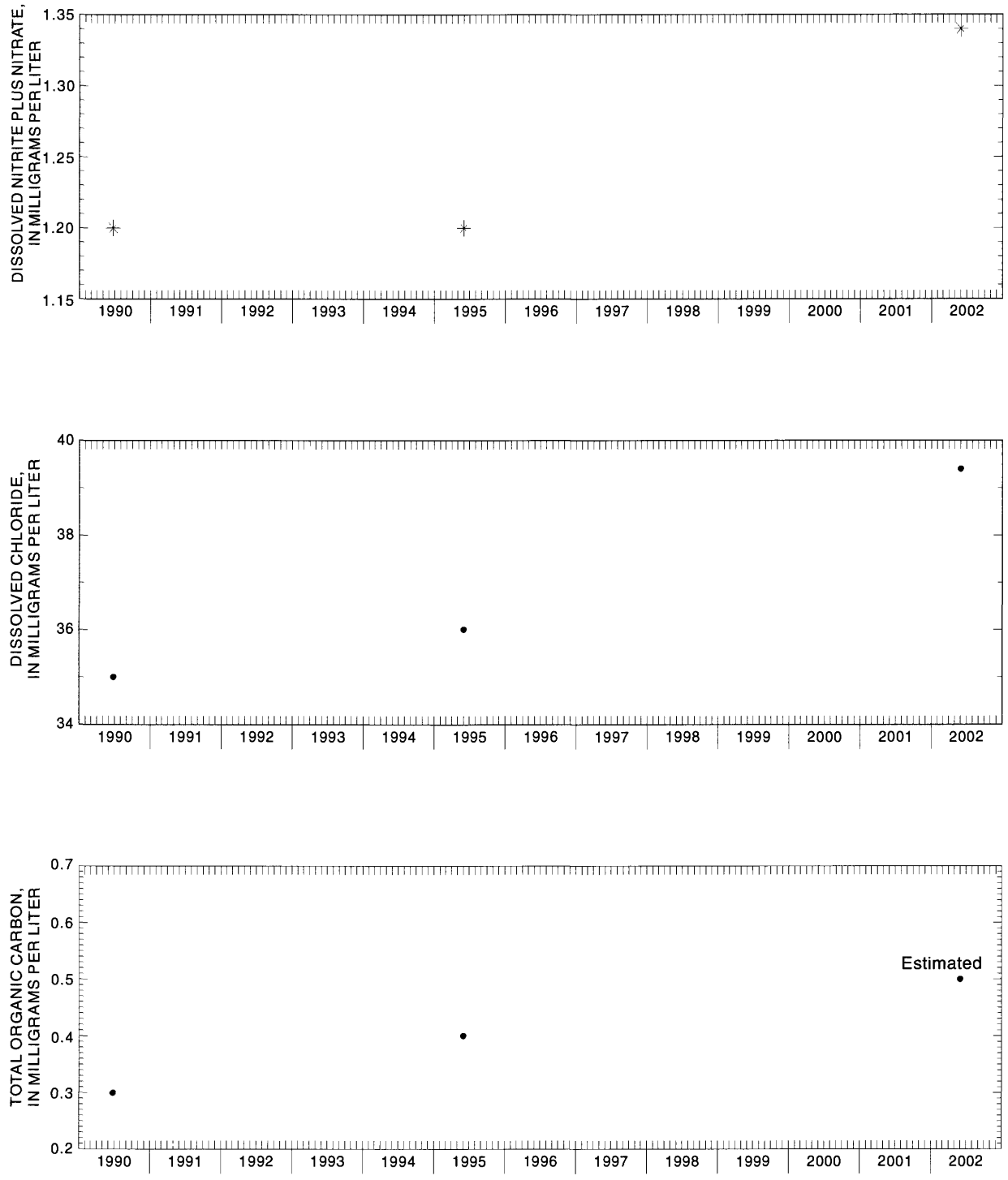


Figure 24. Concentrations of selected constituents in well 16.

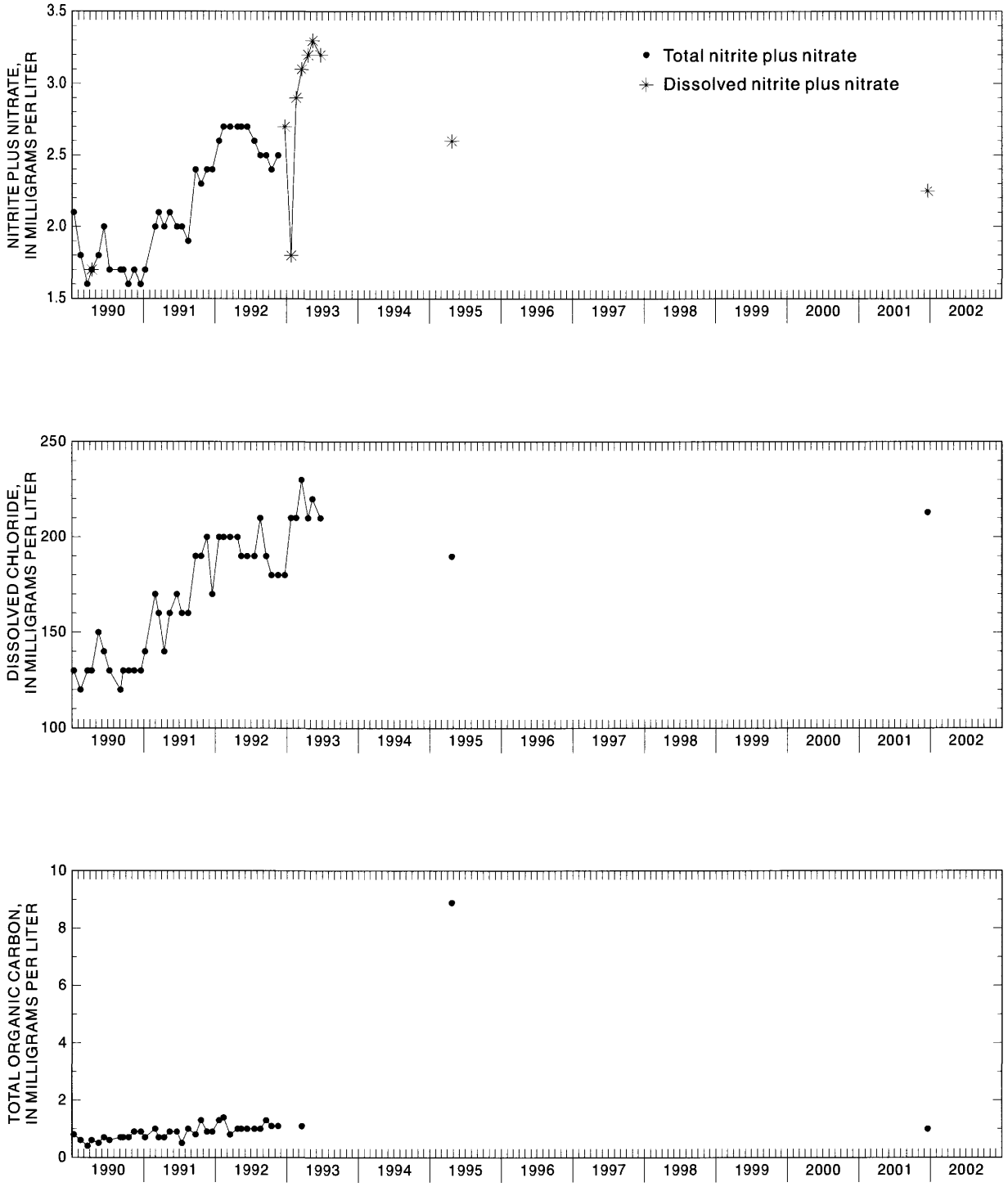


Figure 25. Concentrations of selected constituents in well 18.

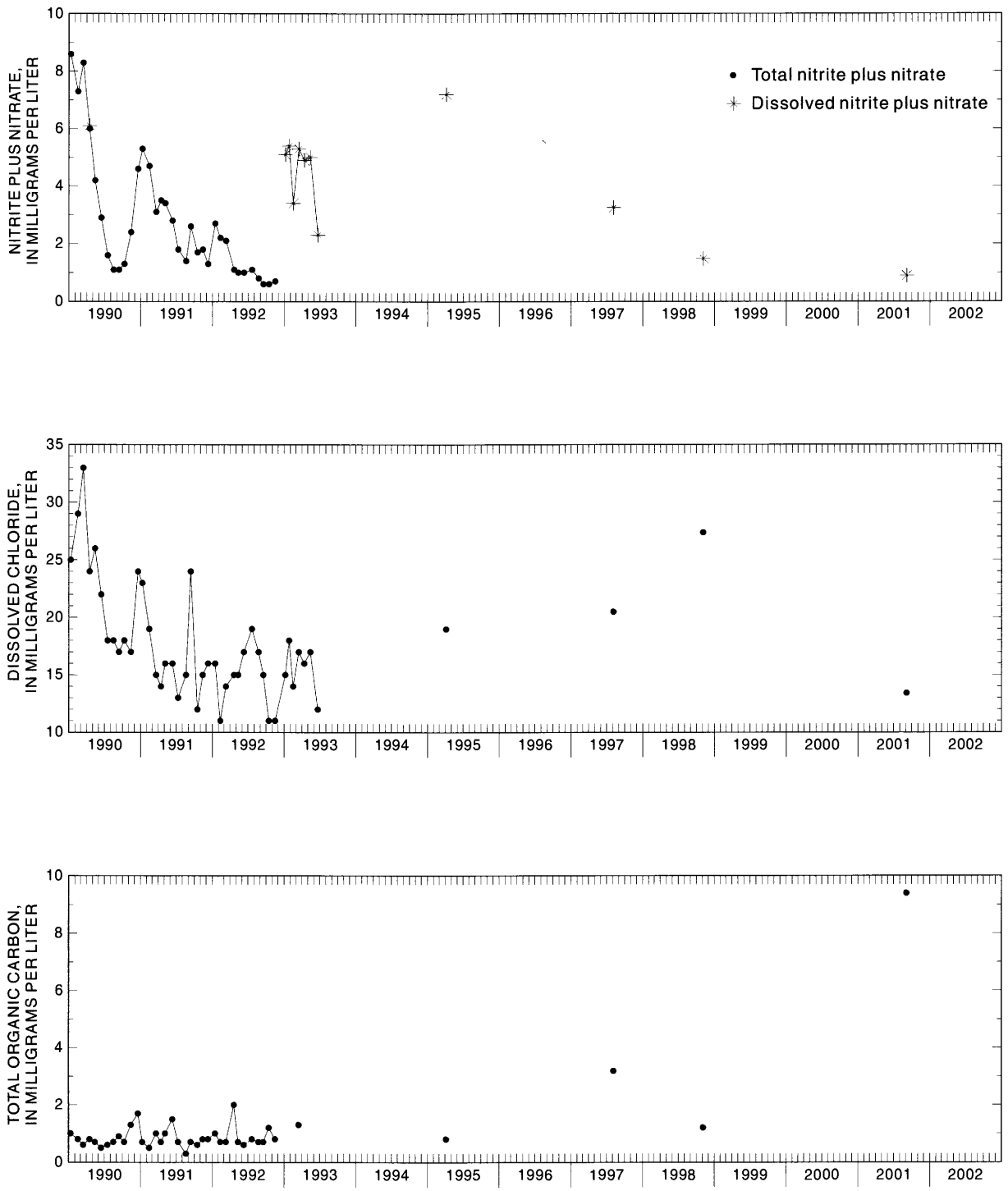


Figure 26. Concentrations of selected constituents in well 22.

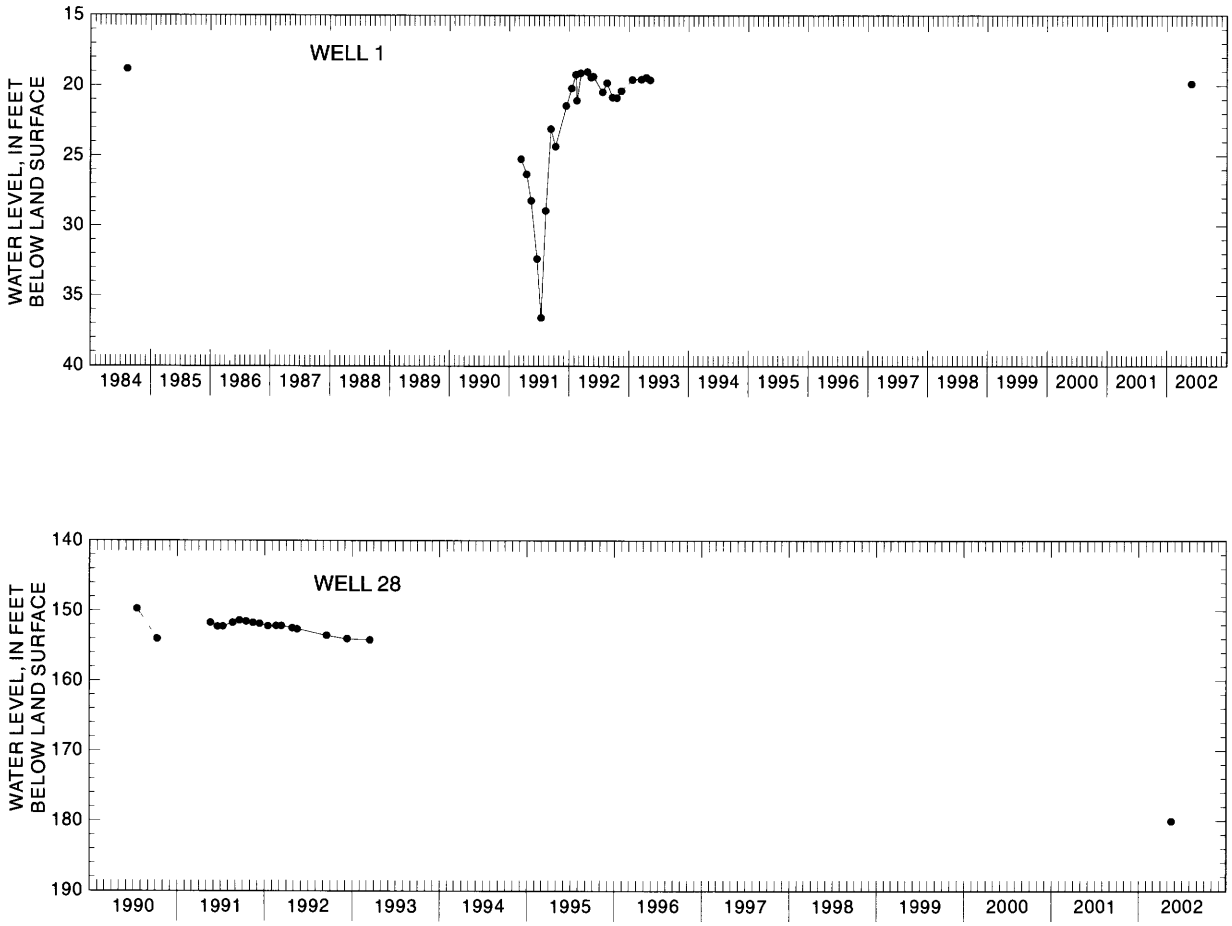


Figure 27. Depth to water in wells 1 and 28.

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