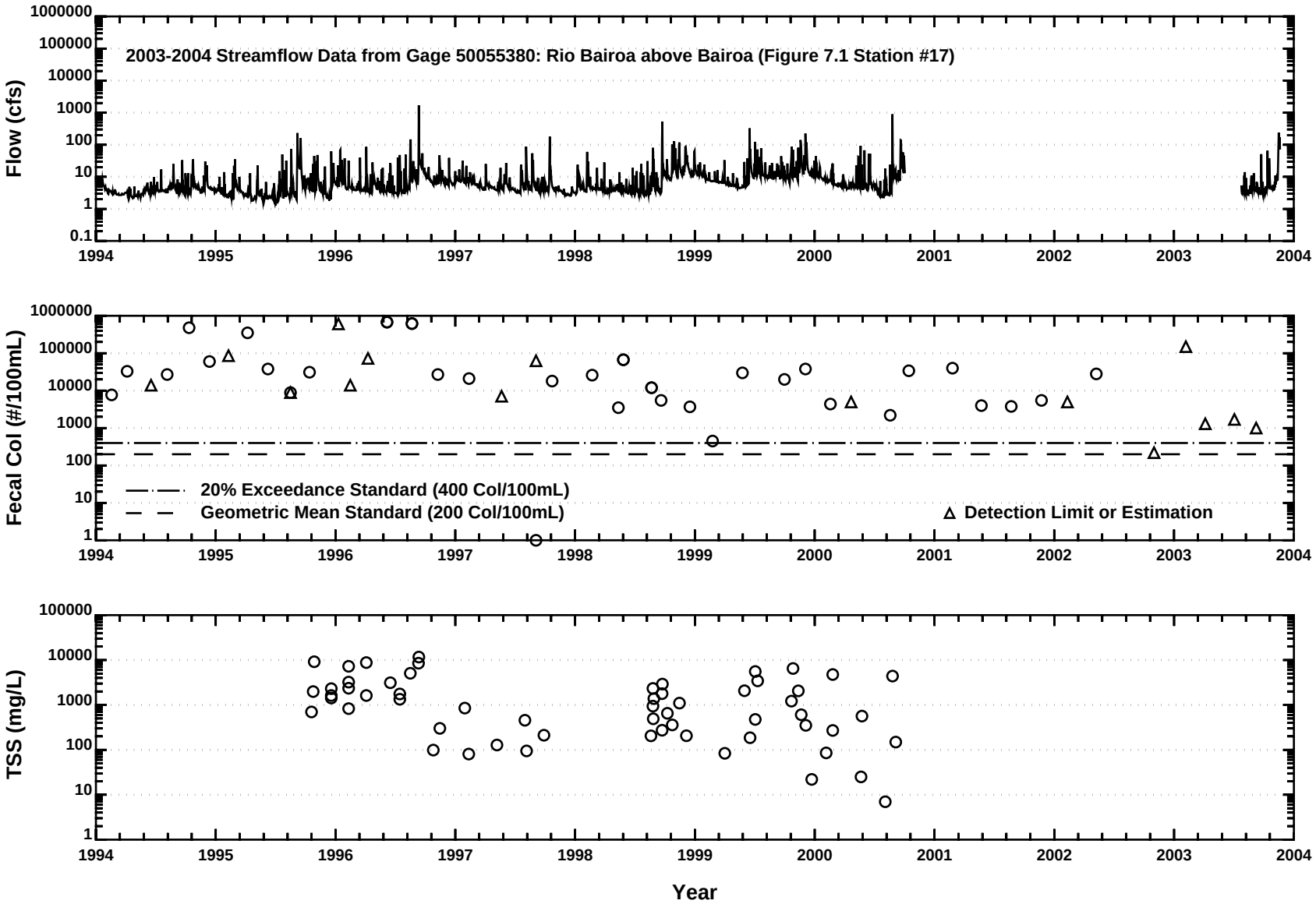
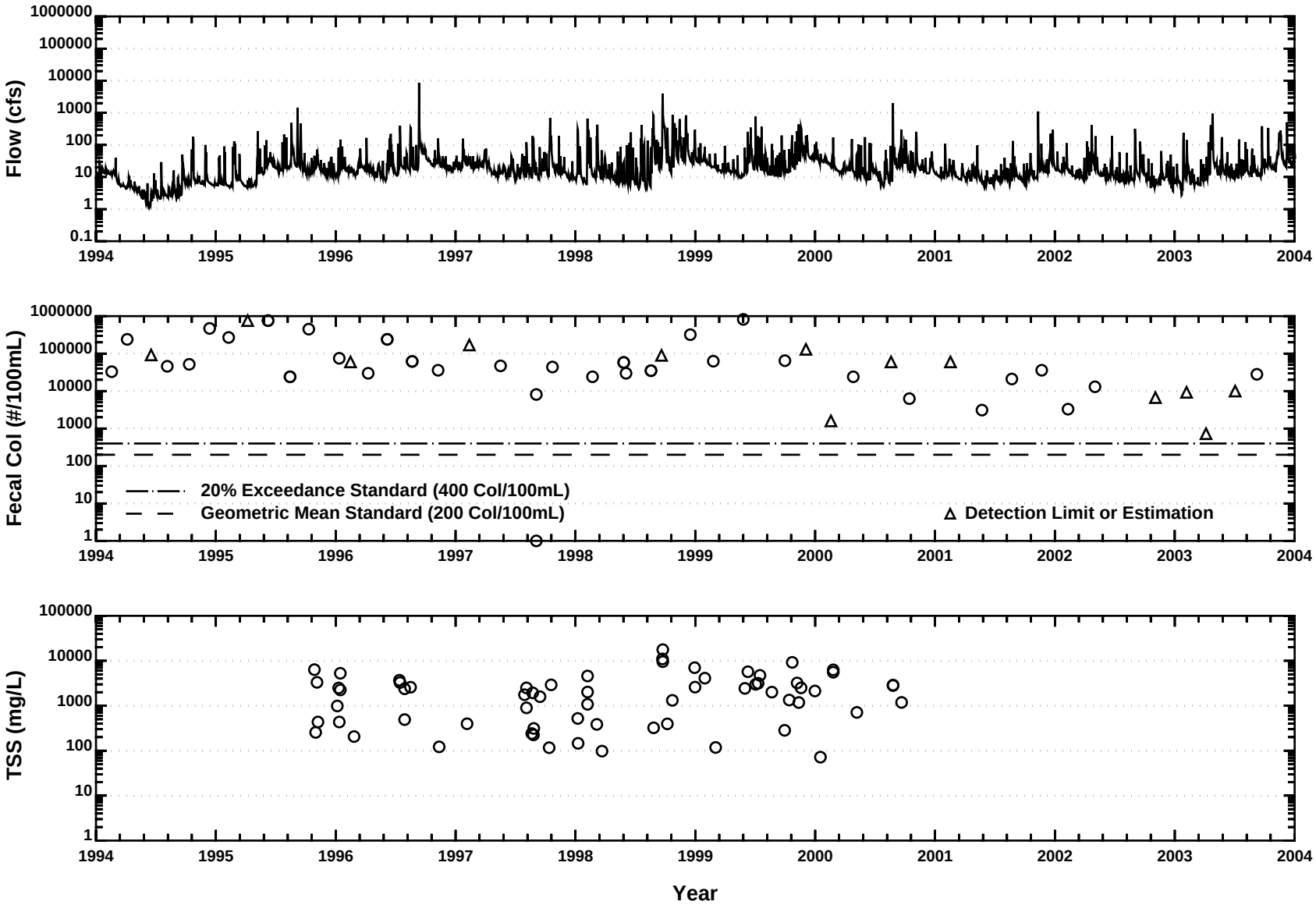
APPENDIX A

WATER QUALITY DATA



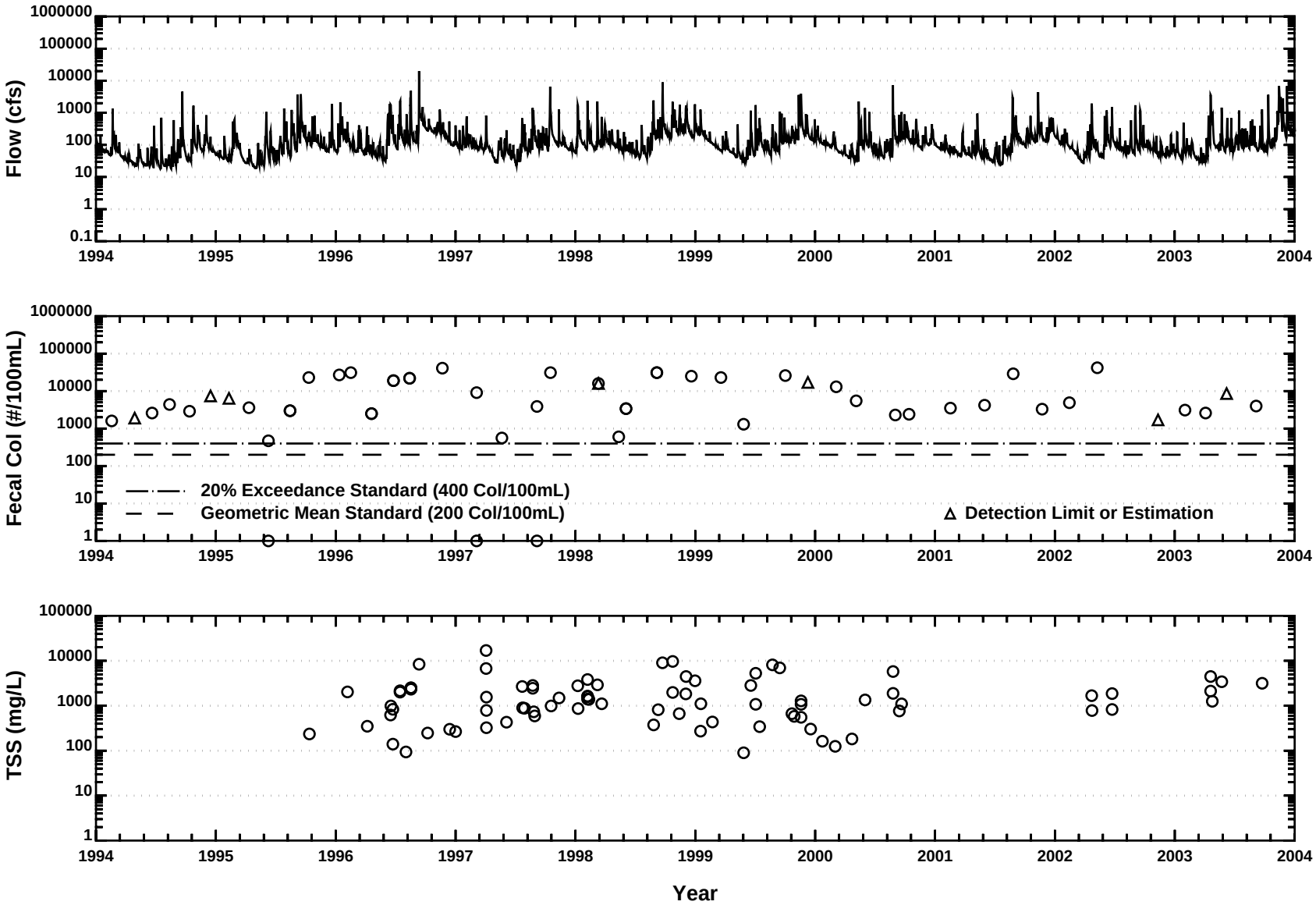
USGS Flow and TSS Gage 50055390: Rio Bairoa at Bairoa (Figure 4.1 Station #16)
USGS Fecal Coliform Bacteria Gage 50055400: Rio Bairoa near Caguas (Figure 4.1 Station #3)

Figure A.1: Flow, Fecal Coliform Bacteria, TSS (1994-2003)
Rio Bairoa, Loiza Watershed



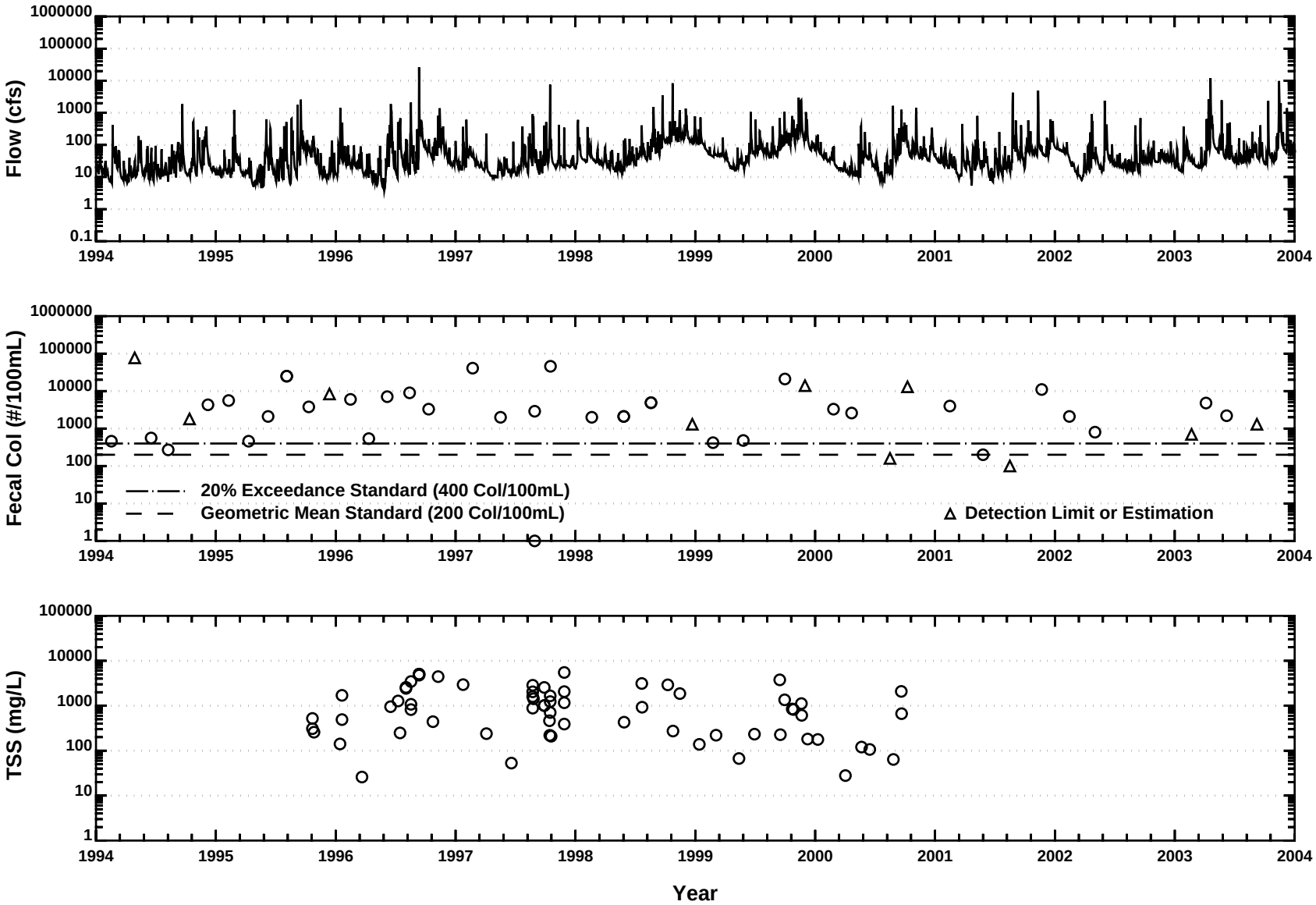
USGS Flow and TSS Gage 50055225: Rio Caguitas at Villa Blanca at Caguas (Figure 4.1 Station #15)
USGS Fecal Coliform Bacteria Gage 50055250: Rio Caguitas at HWY 30 at Caguas (Figure 4.1 Station #2)

Figure A.2: Flow, Fecal Coliform Bacteria, TSS (1994-2003)
Rio Caguitas, Loiza Watershed



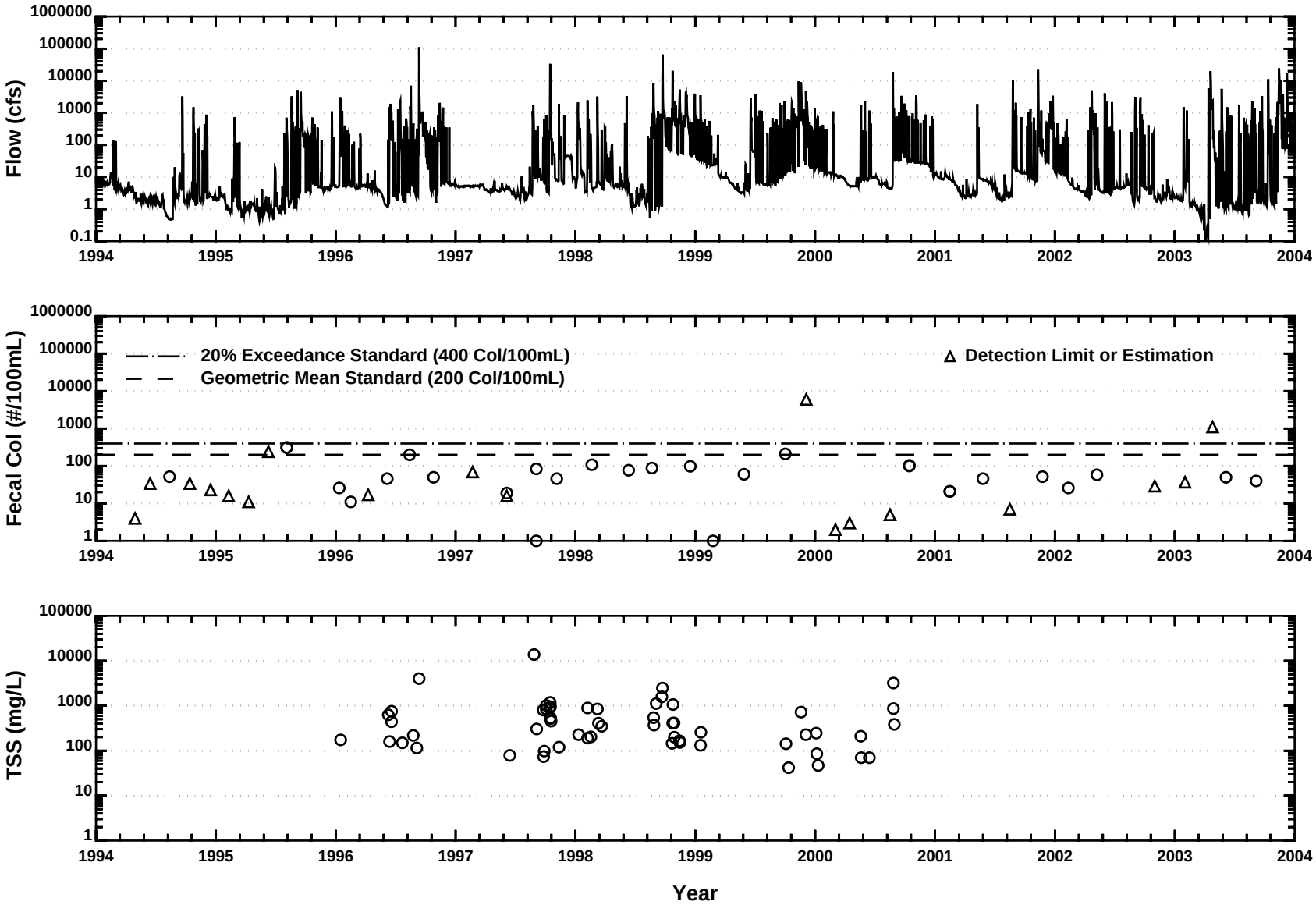
USGS Flow and TSS Gage 50055000: Rio Grande de Loiza at Caguas (Figure 4.1 Station #1)
USGS Fecal Coliform Bacteria Gage 50055000: Rio Grande de Loiza at Caguas (Figure 4.1 Station #1)

Figure A.3: Flow, Fecal Coliform Bacteria, TSS (1994-2003)
Rio Grande de Loiza at Caguas, Loiza Watershed



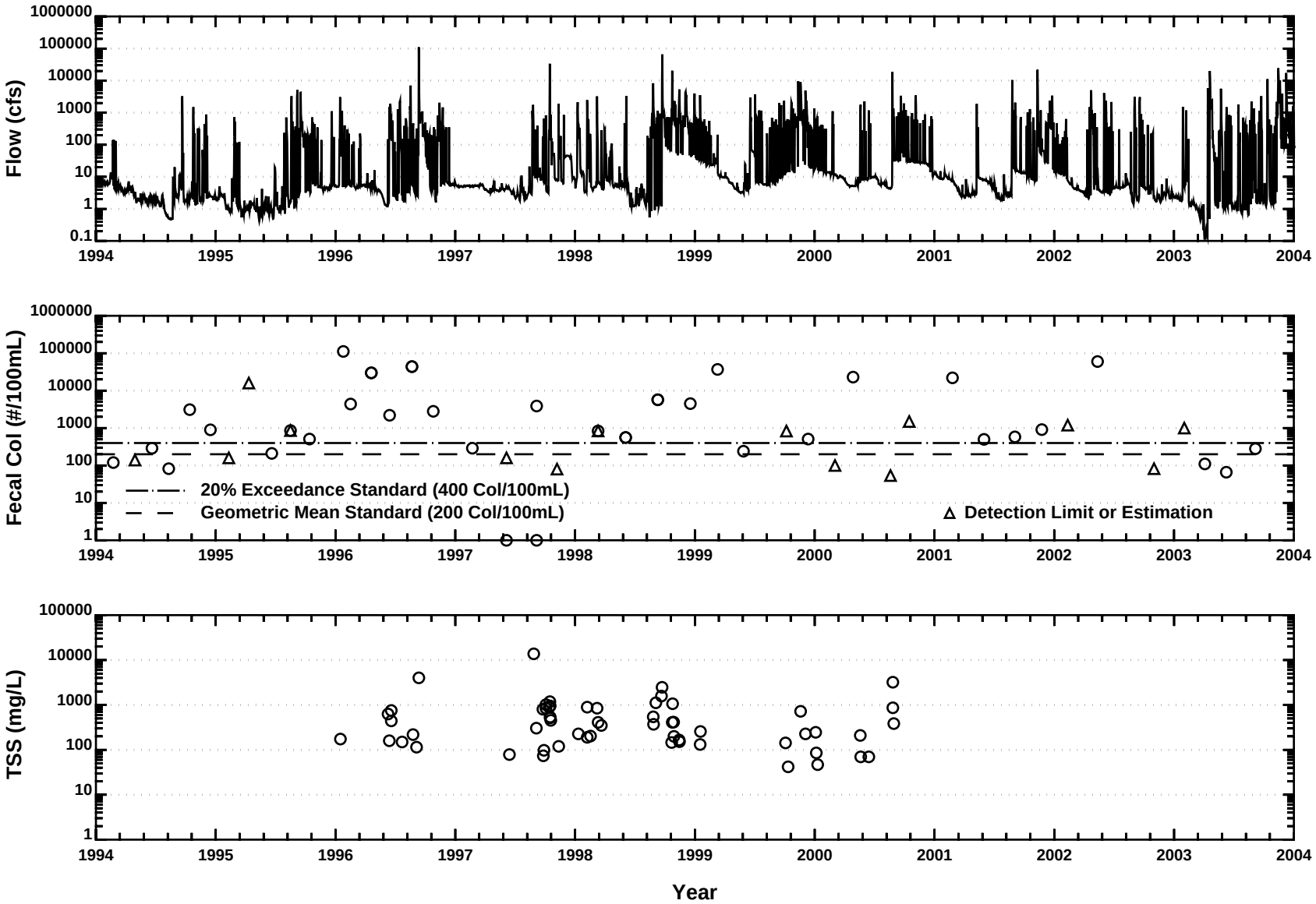
USGS Flow and TSS Gage 50057000: Rio Gurabo at Gurabo (Figure 4.1 Station #20)
USGS Fecal Coliform Bacteria Gage 50057025: Rio Gurabo near Gurabo (Figure 4.1 Station #4)

Figure A.4: Flow, Fecal Coliform Bacteria, TSS (1994-2003)
Rio Gurabo, Loiza Watershed



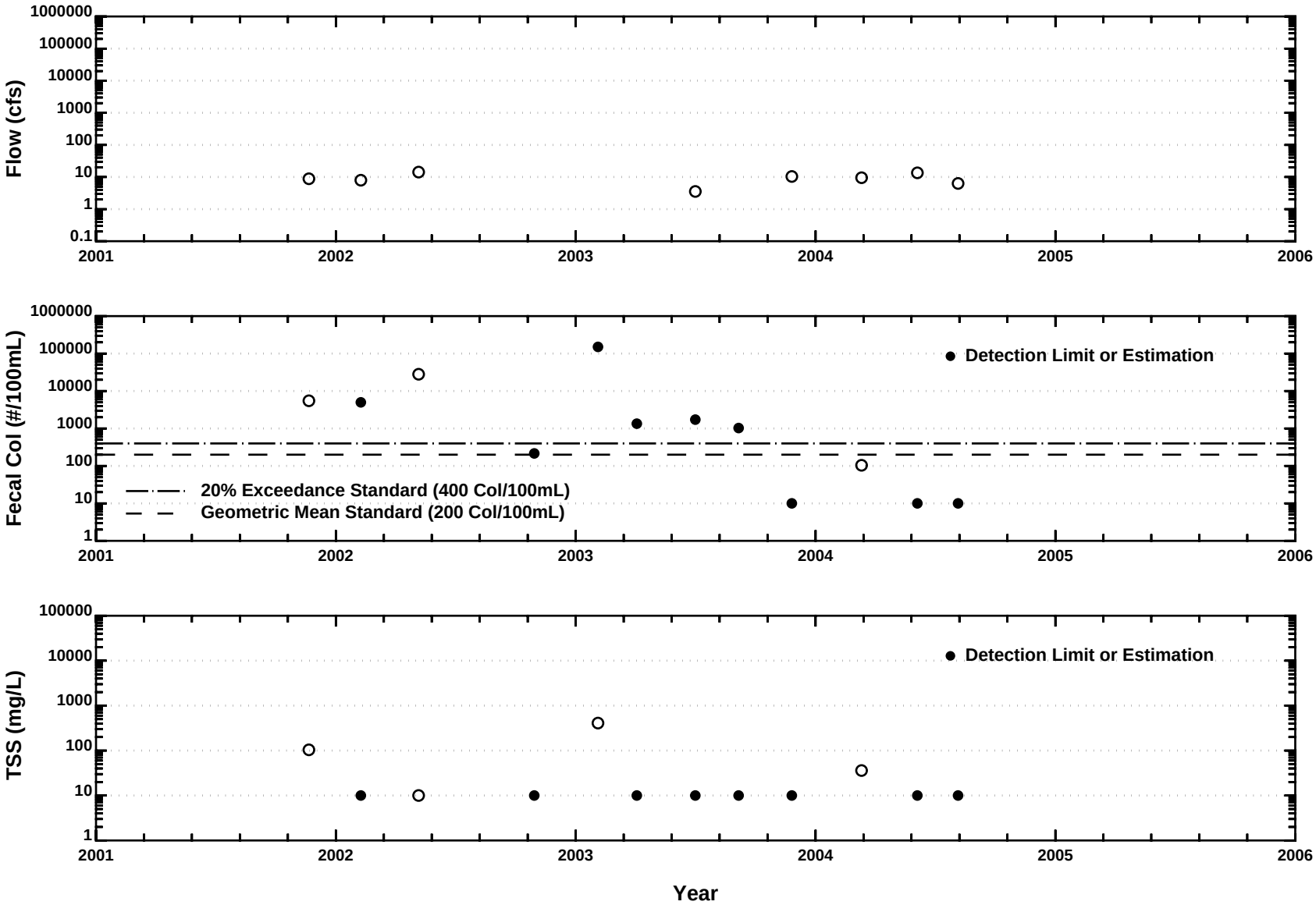
USGS Flow and TSS Gage 50059050: Rio Grande de Loiza below Damsite Loiza (Figure 4.1 Station #22)
USGS Fecal Coliform Bacteria Gage 50059000: Lago Loiza at Damsite near Trujillo Alto (Figure 4.1 Station #5)

Figure A.5: Flow, Fecal Coliform Bacteria, TSS (1994-2003)
Lago Loiza, Loiza Watershed



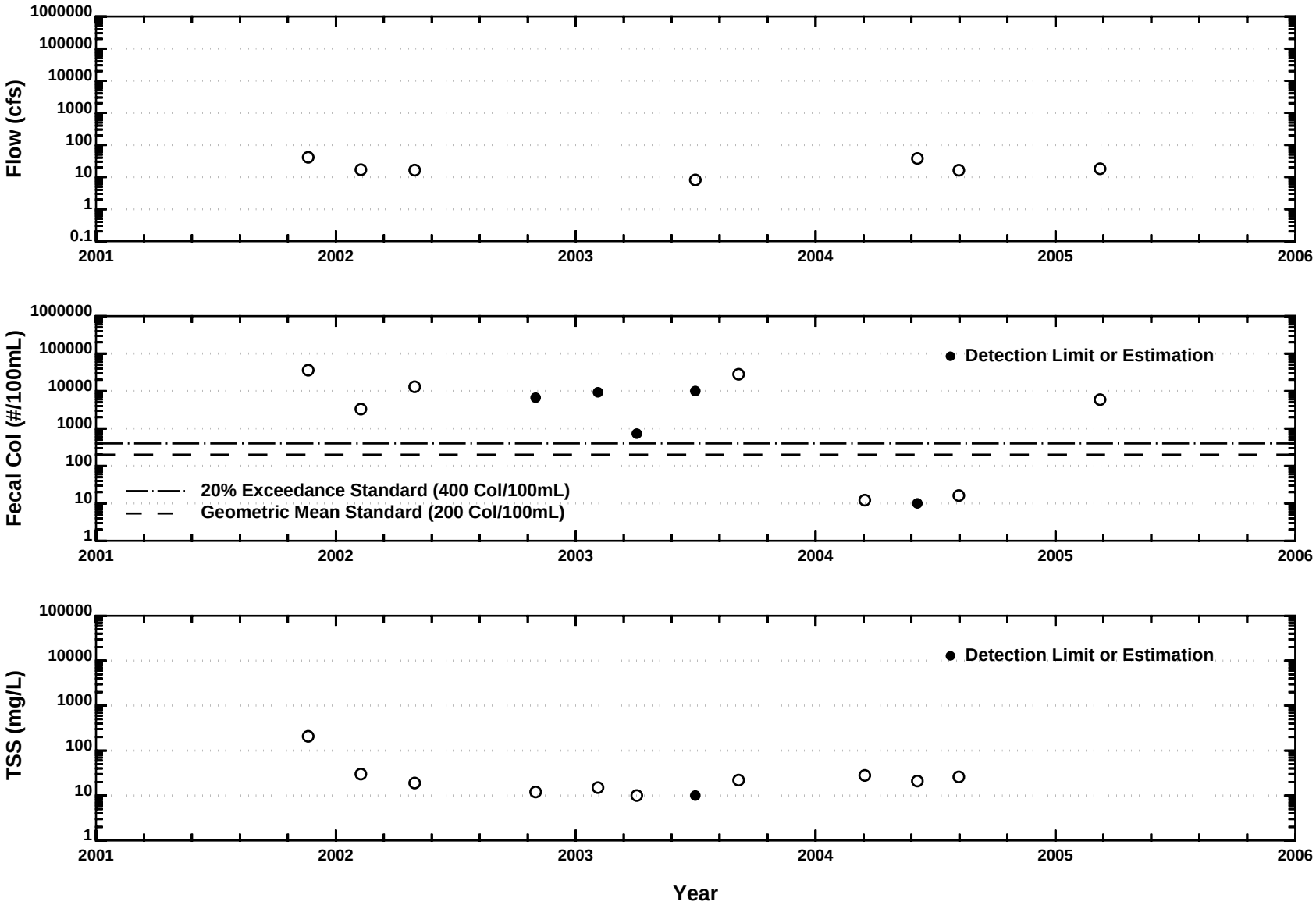
USGS Flow and TSS Gage 50059050: Rio Grande de Loiza below Damsite Loiza (Figure 4.1 Station #22)
USGS Fecal Coliform Bacteria Gage 50059100: Rio Grande de Loiza below Trujillo Alto (Figure 4.1 Station #6)

Figure A.6: Flow, Fecal Coliform Bacteria, TSS (1994-2003)
Rio Grande de Loiza below Lago Loiza, Loiza Watershed



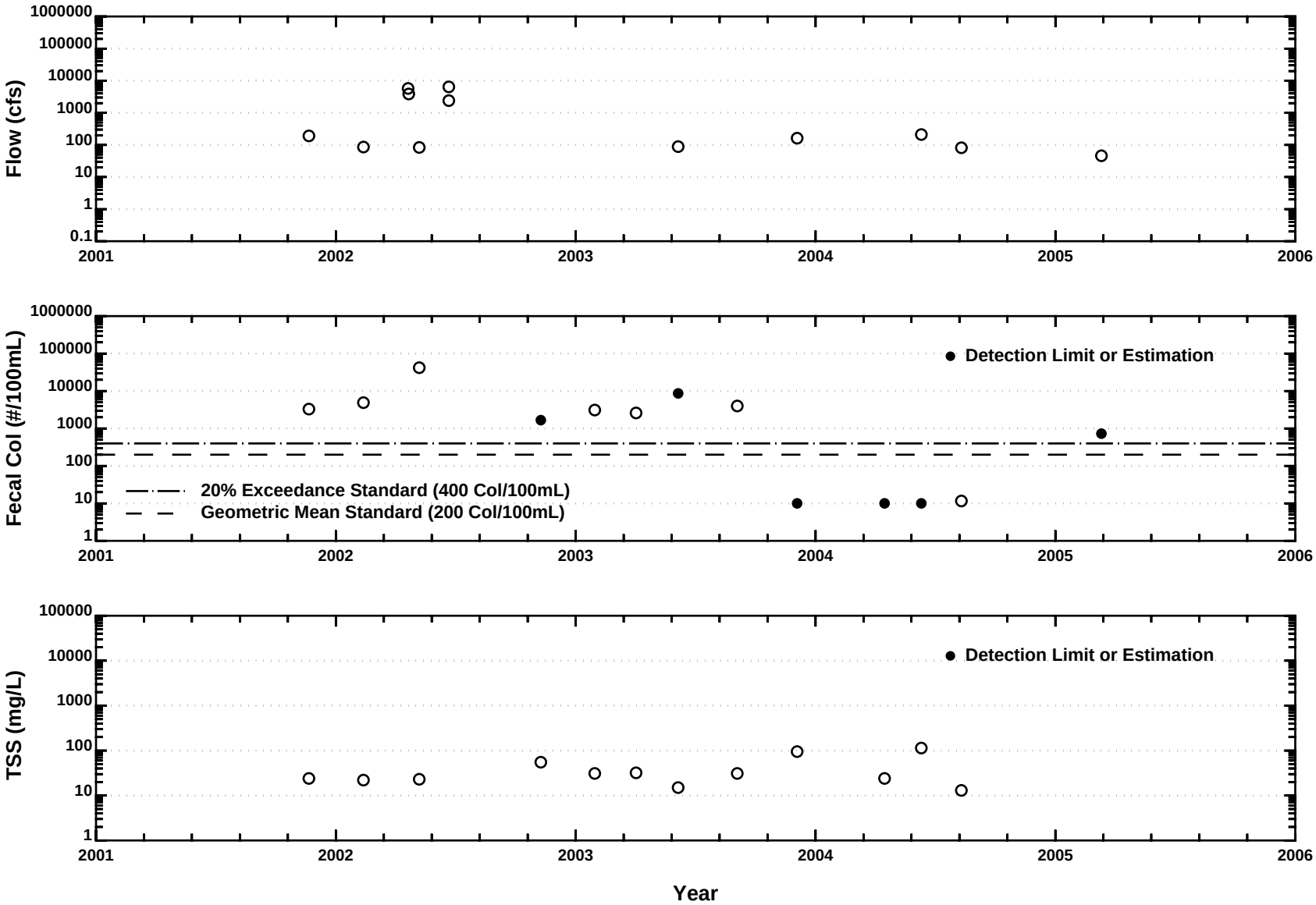
USGS Flow,TSS, and Fecal Coliform Gage 50055400: Rio Bairoa near Caguas (Figure 4.1 Station #3)

Figure A.7: Flow, Fecal Coliform Bacteria, TSS for EQB Data at USGS Stations (2001-2005)
Rio Bairoa, Loiza Watershed



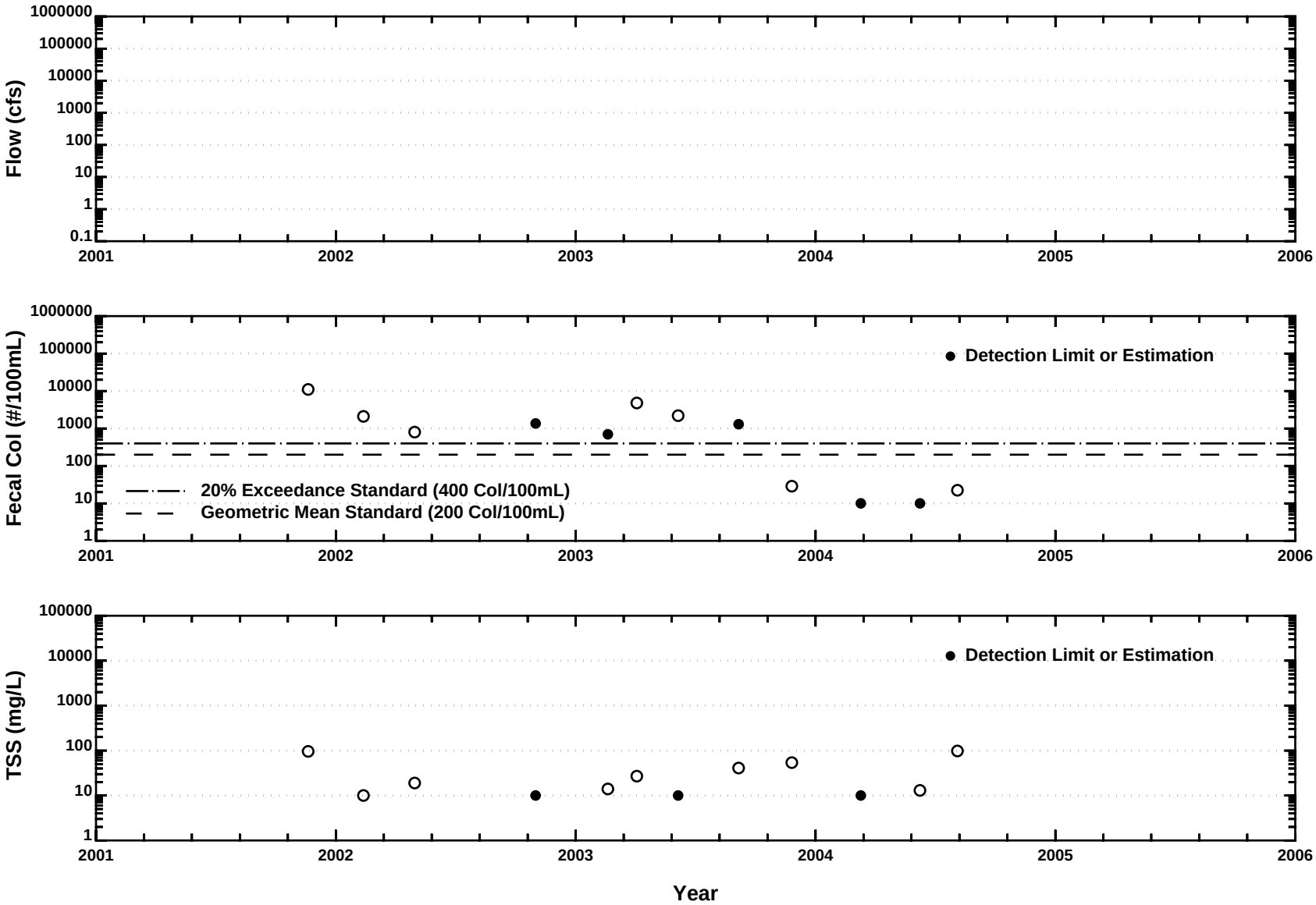
USGS Flow,TSS, and Fecal Coliform Gage 50055250: Rio Caguitas at HWY 30 at Caguas (Figure 4.1 Station #2)

Figure A.8: Flow, Fecal Coliform Bacteria, TSS for EQB Data at USGS Stations (2001-2005)
Rio Caguitas, Loiza Watershed



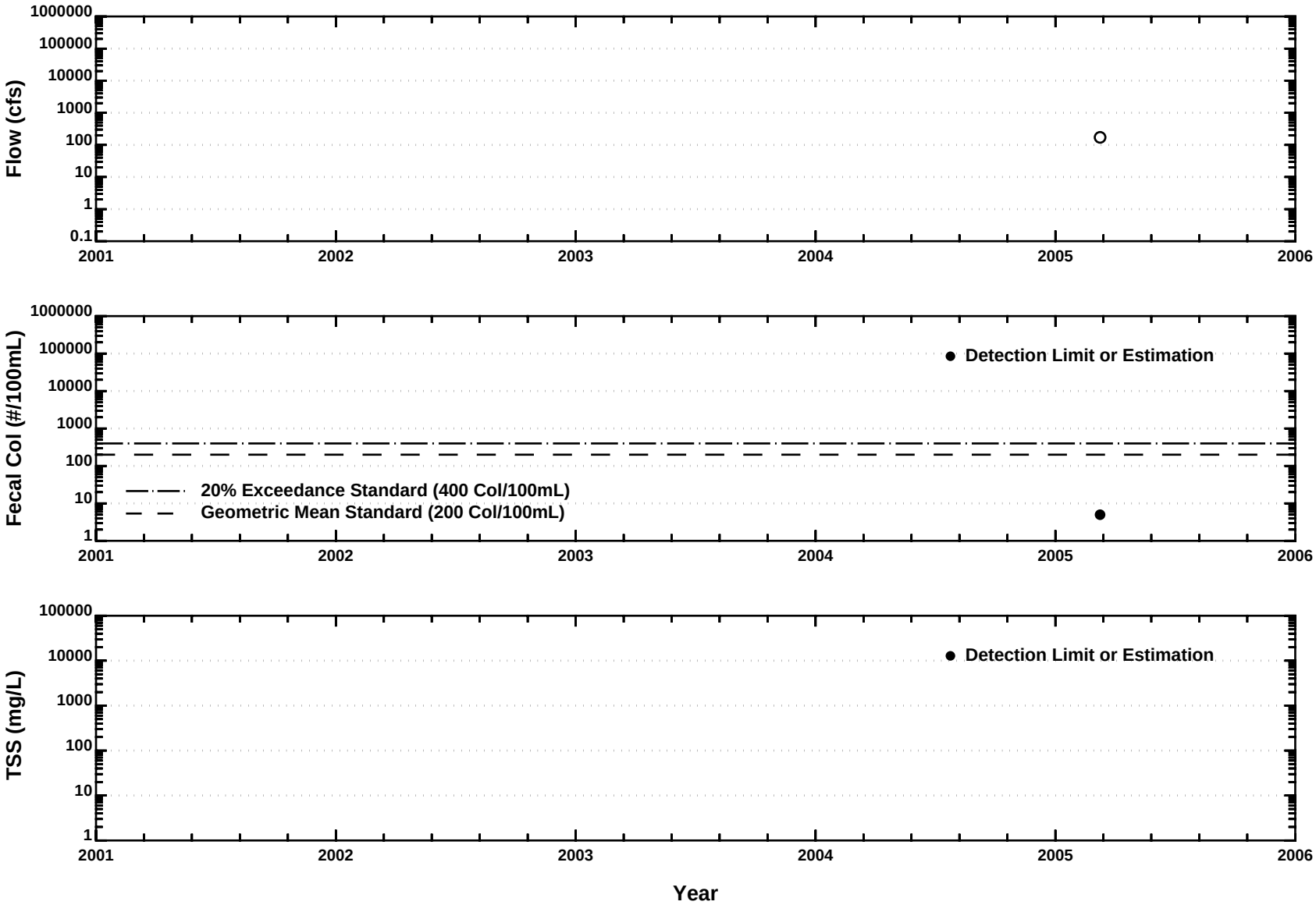
USGS Flow,TSS, and Fecal Coliform Gage 50055000: Rio Grande de Loiza at Caguas (Figure 4.1 Station #1)

Figure A.9a: Flow, Fecal Coliform Bacteria, TSS for EQB Data at USGS Stations (2001-2005)
Rio Grande de Loiza at Caguas, Loiza Watershed



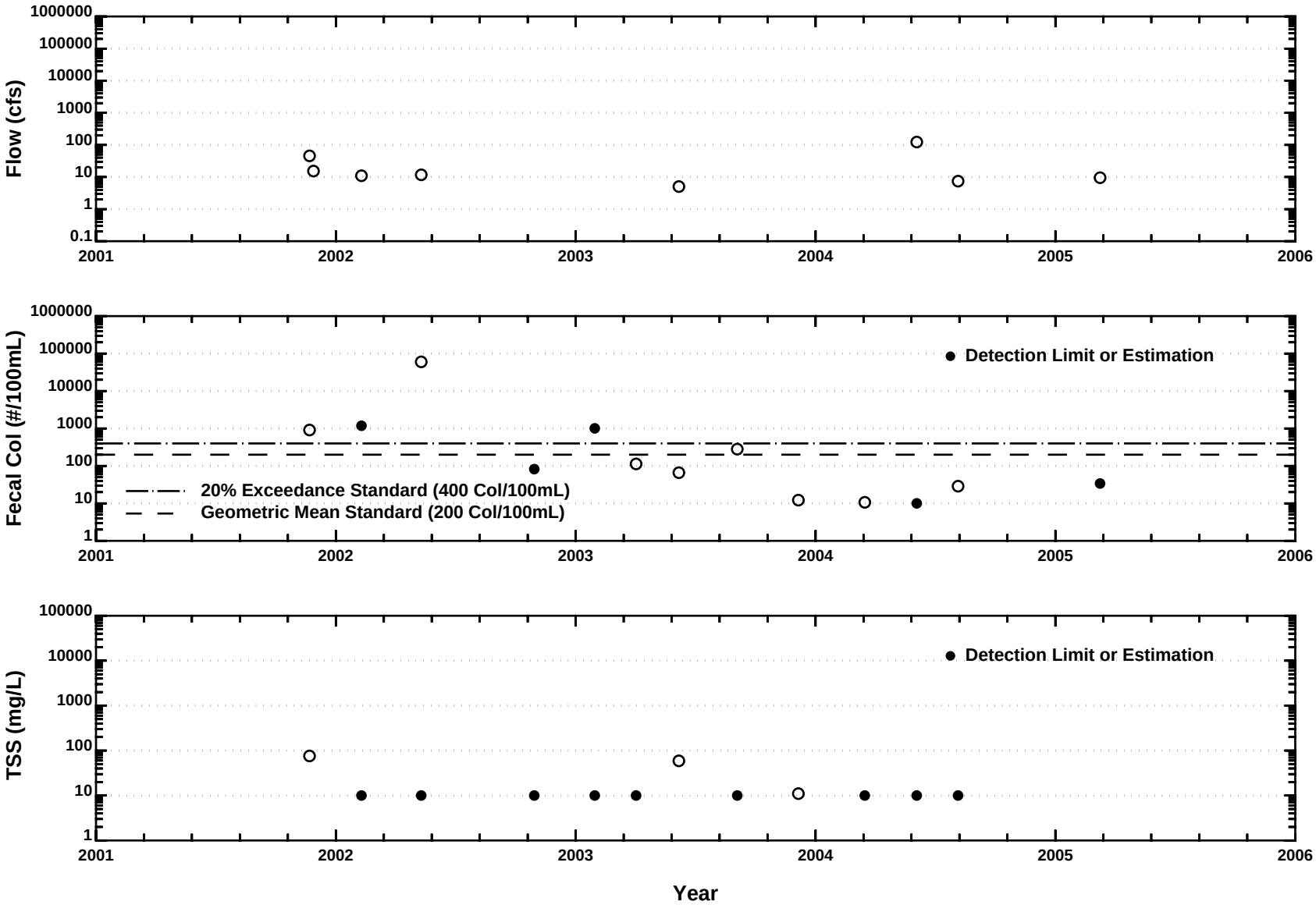
USGS Flow,TSS, and Fecal Coliform Gage 50057025: Rio Gurabo near Gurabo (Figure 4.1 Station #4)

Figure A.9b: Flow, Fecal Coliform Bacteria, TSS for EQB Data at USGS Stations (2001-2005)
Rio Gurabo, Loiza Watershed



USGS Flow,TSS, and Fecal Coliform Gage 50059000: Lago Loiza at Damsite near Trujillo Alto (Figure 4.1 Station #5)

Figure A.10: Flow, Fecal Coliform Bacteria, TSS for EQB Data at USGS Stations (2001-2005)
Lago Loiza, Loiza Watershed



USGS Flow,TSS, and Fecal Coliform Gage 50059100: Rio Grande de Loiza below Trujillo Alto (Figure 4.1 Station #6)

Figure A.11: Flow, Fecal Coliform Bacteria, TSS for EQB Data at USGS Stations (2001-2005)
Rio Grande de Loiza below Lago Loiza, Loiza Watershed

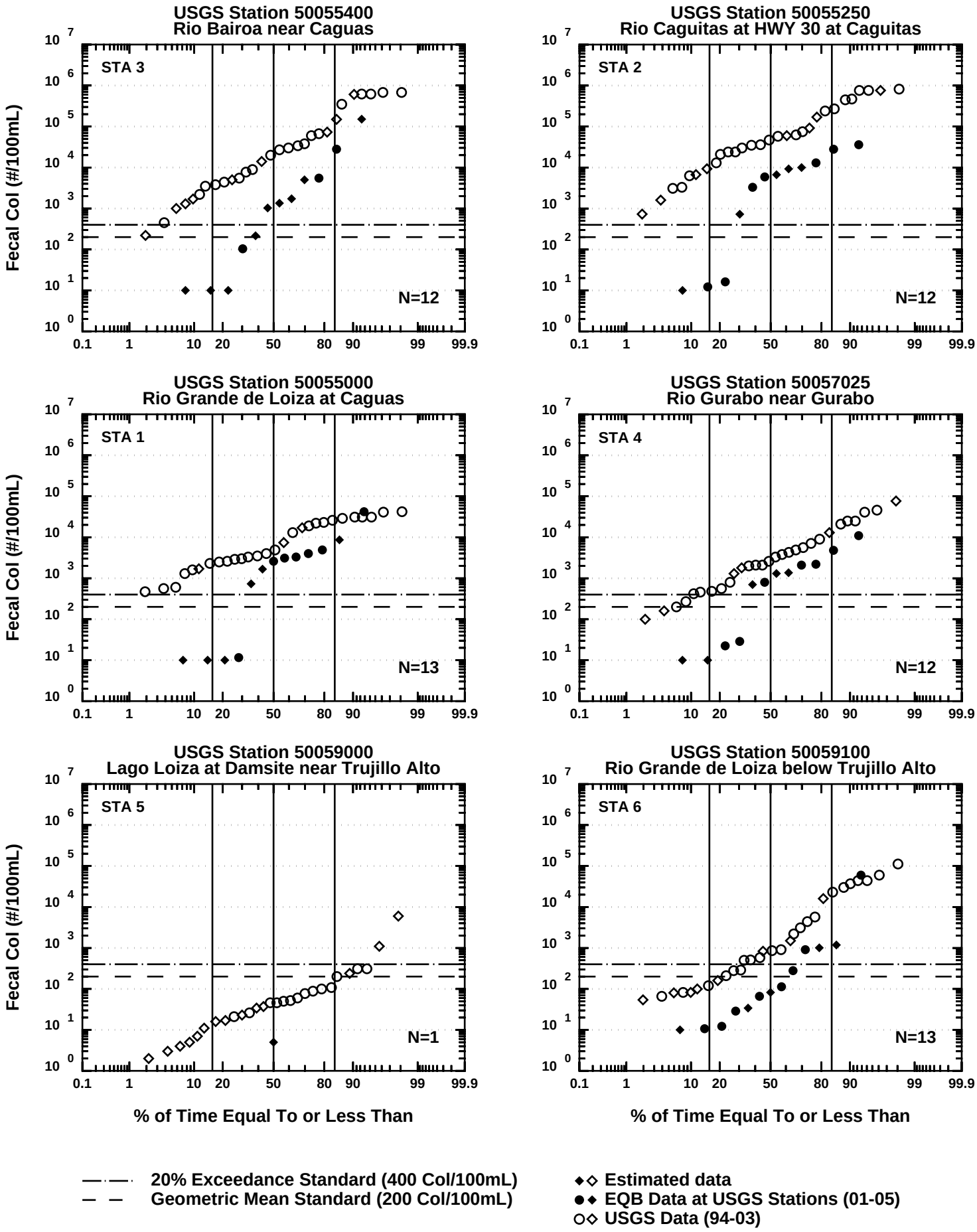


Figure A.12: Fecal Coliform Probability Plots for USGS/EQB Data at USGS Stations Loiza Watershed

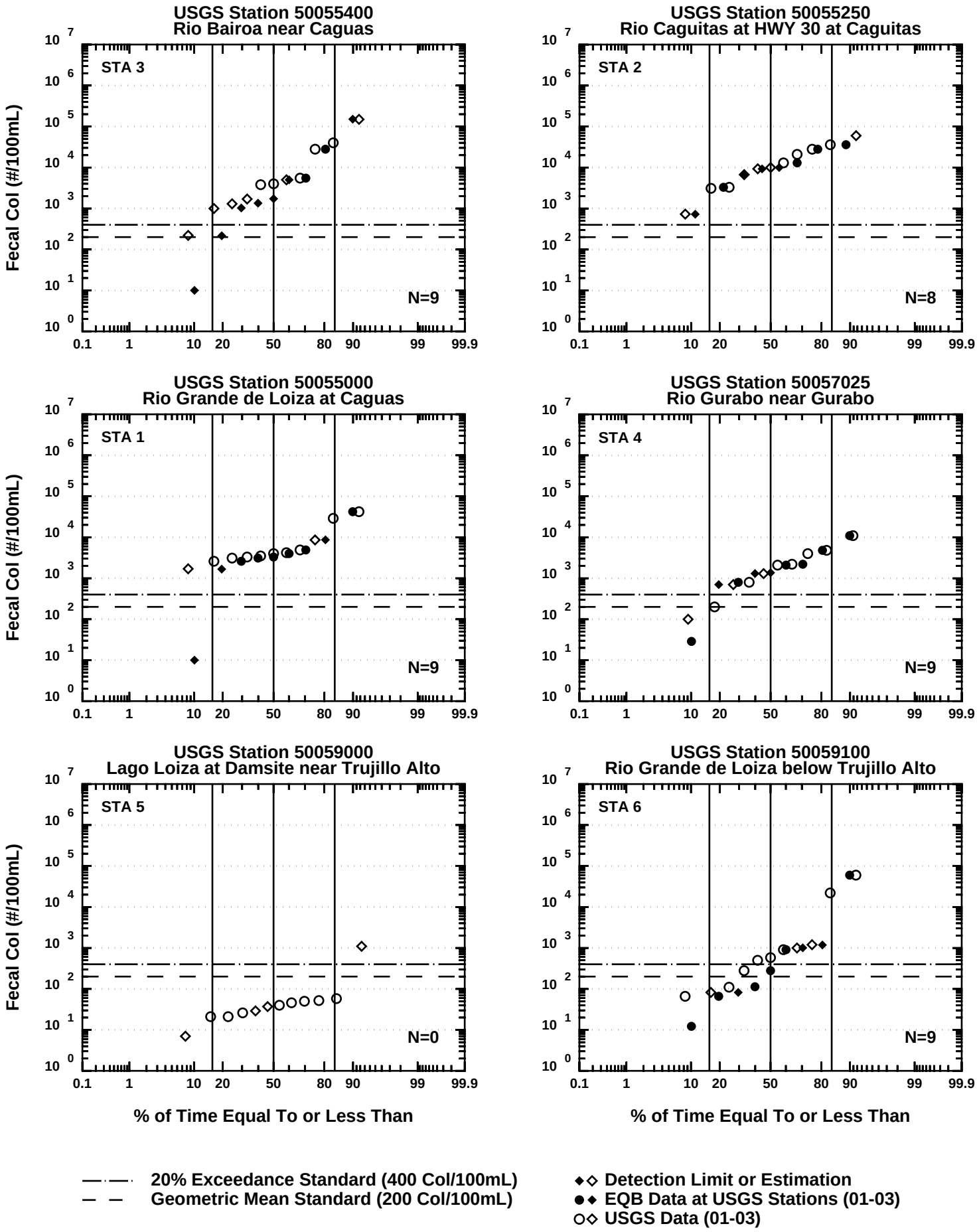


Figure A.13: Fecal Coliform Probability Plots for USGS/EQB Data at USGS Stations Loiza Watershed

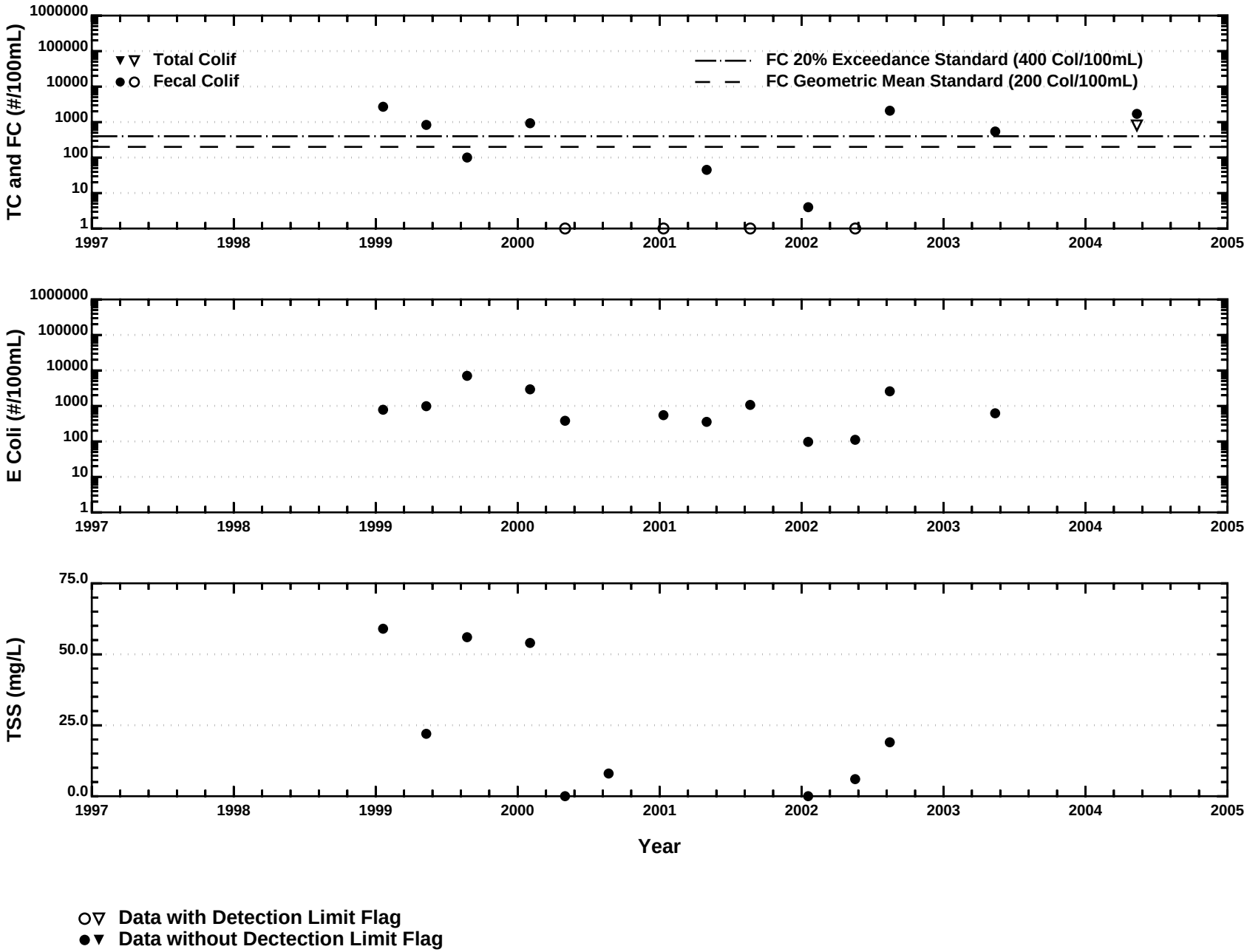


Figure A.14: Total Coliform and Fecal Coliform, E Coli, TSS (1997-2004)
Rio Valenciano: PREQB Station L-1, Loiza Watershed

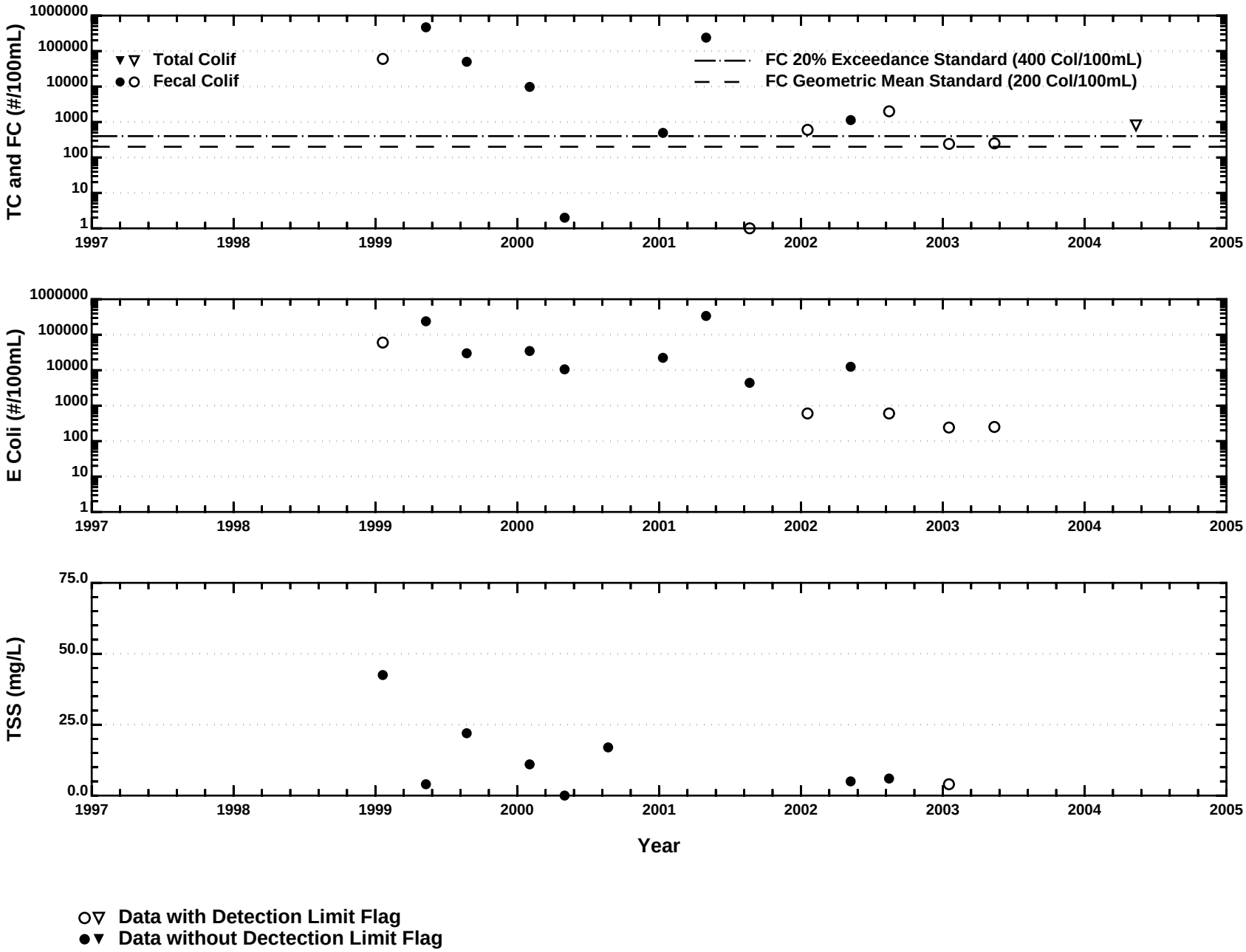


Figure A.15: Total Coliform and Fecal Coliform, E Coli, TSS (1997-2004)
Quebrada Sin Nombre: PREQB Station L-2, Loiza Watershed

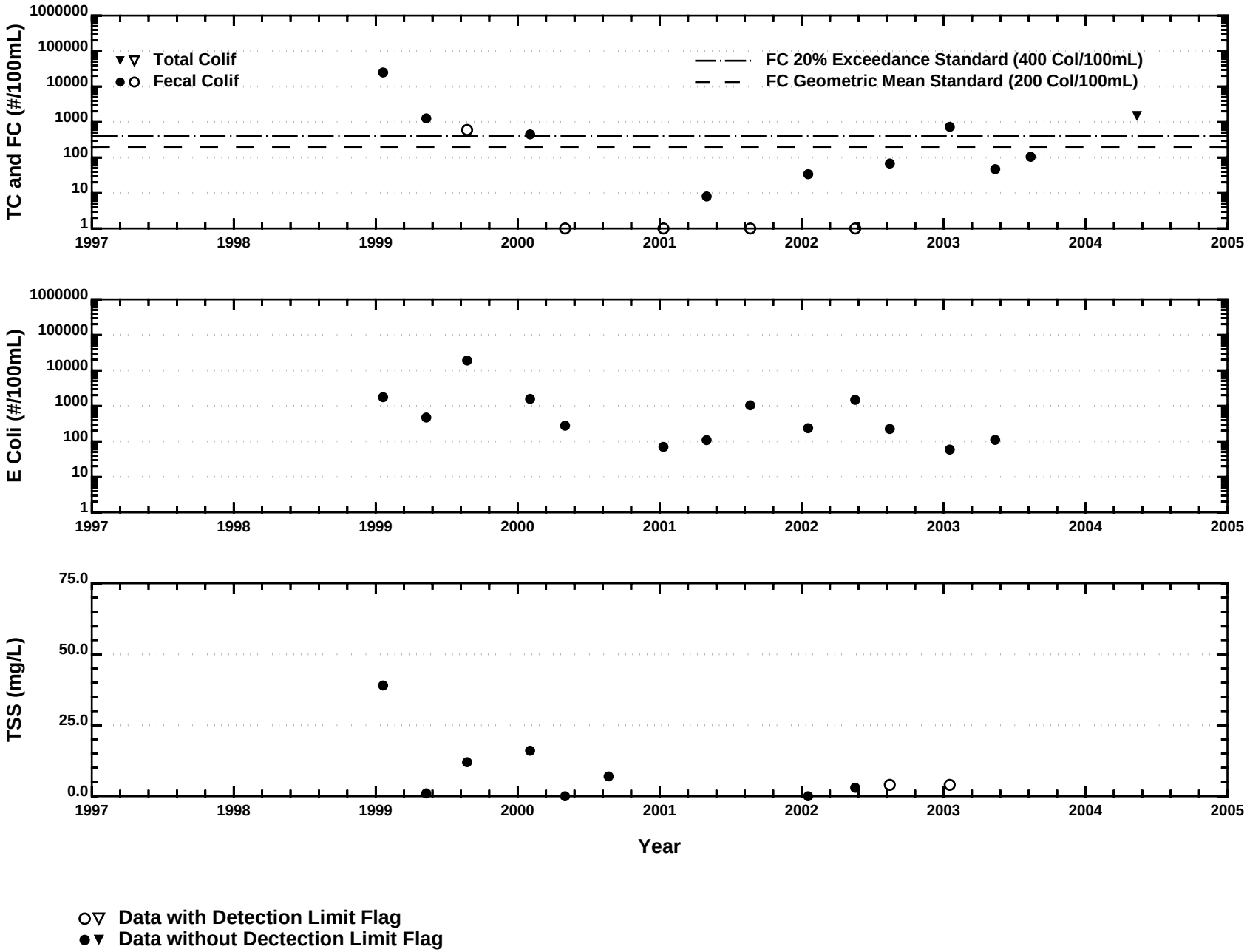


Figure A.16: Total Coliform and Fecal Coliform, E Coli, TSS (1997-2004)
Rio Grande de Loiza near San Lorenzo: PREQB Station L-3, Loiza Watershed

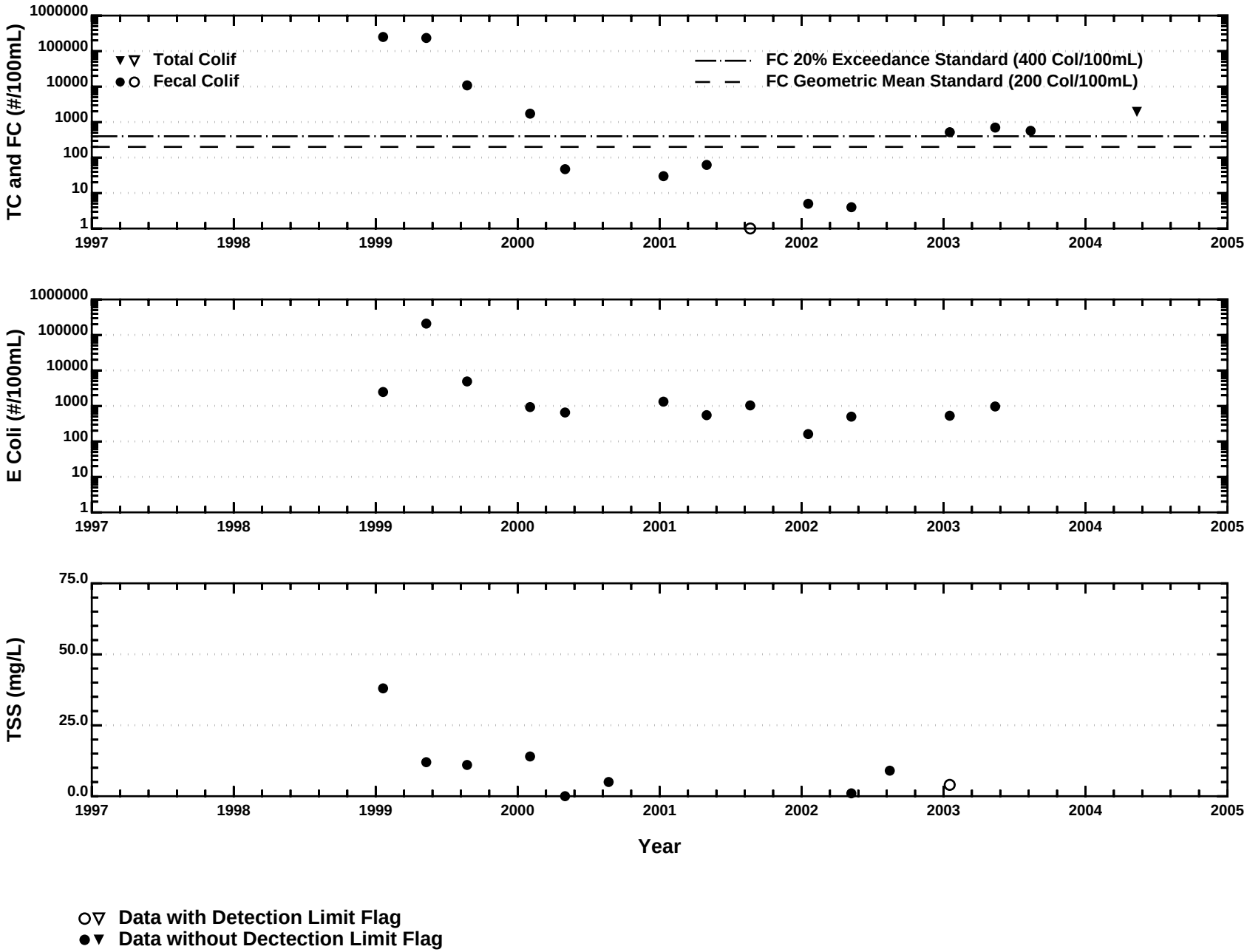


Figure A.17: Total Coliform and Fecal Coliform, E Coli, TSS (1997-2004)
Rio Cygus near San Lorenzo: PREQB Station L-4, Loiza Watershed

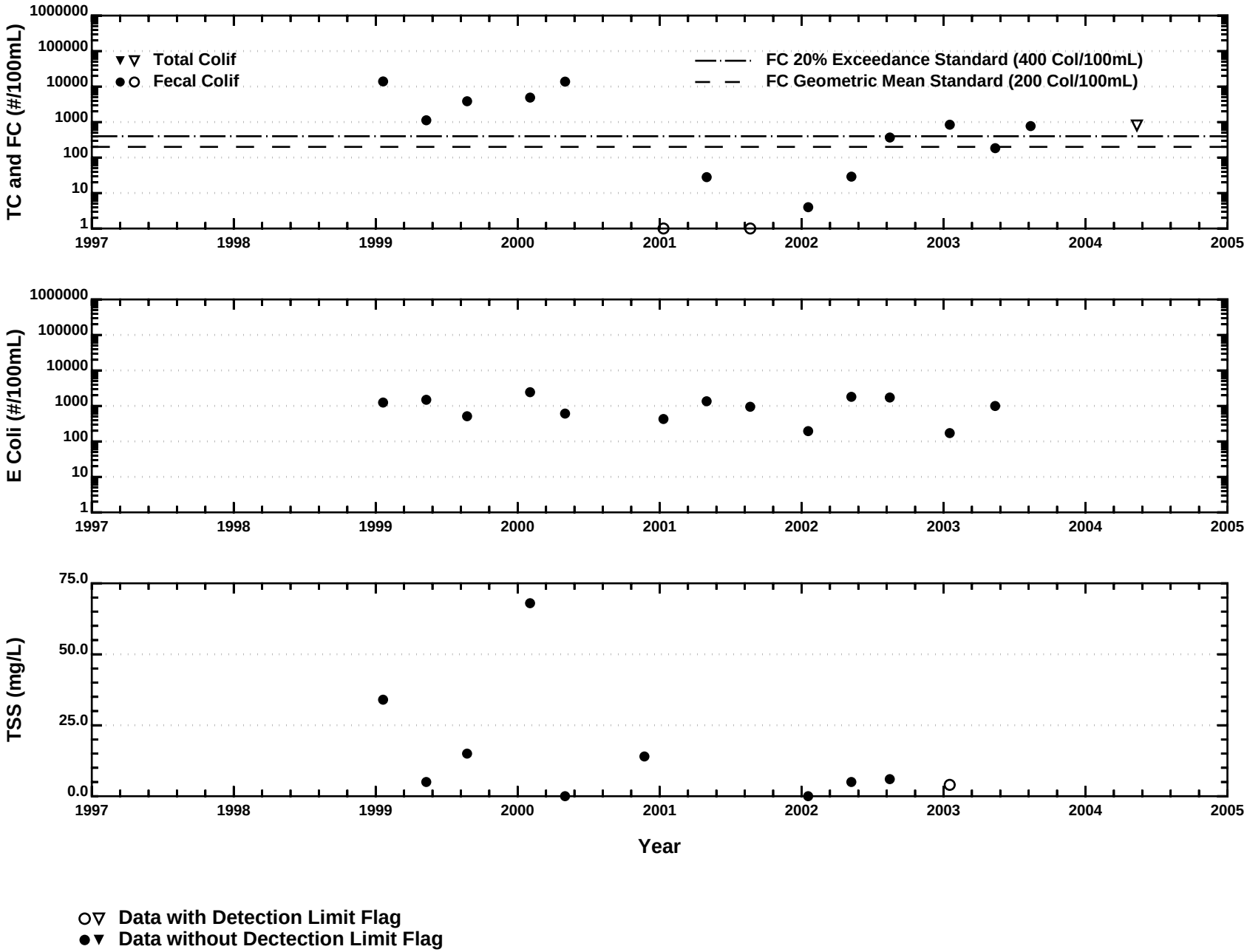


Figure A.18: Total Coliform and Fecal Coliform, E Coli, TSS (1997-2004)
Rio Turabo: PREQB Station L-5, Loiza Watershed

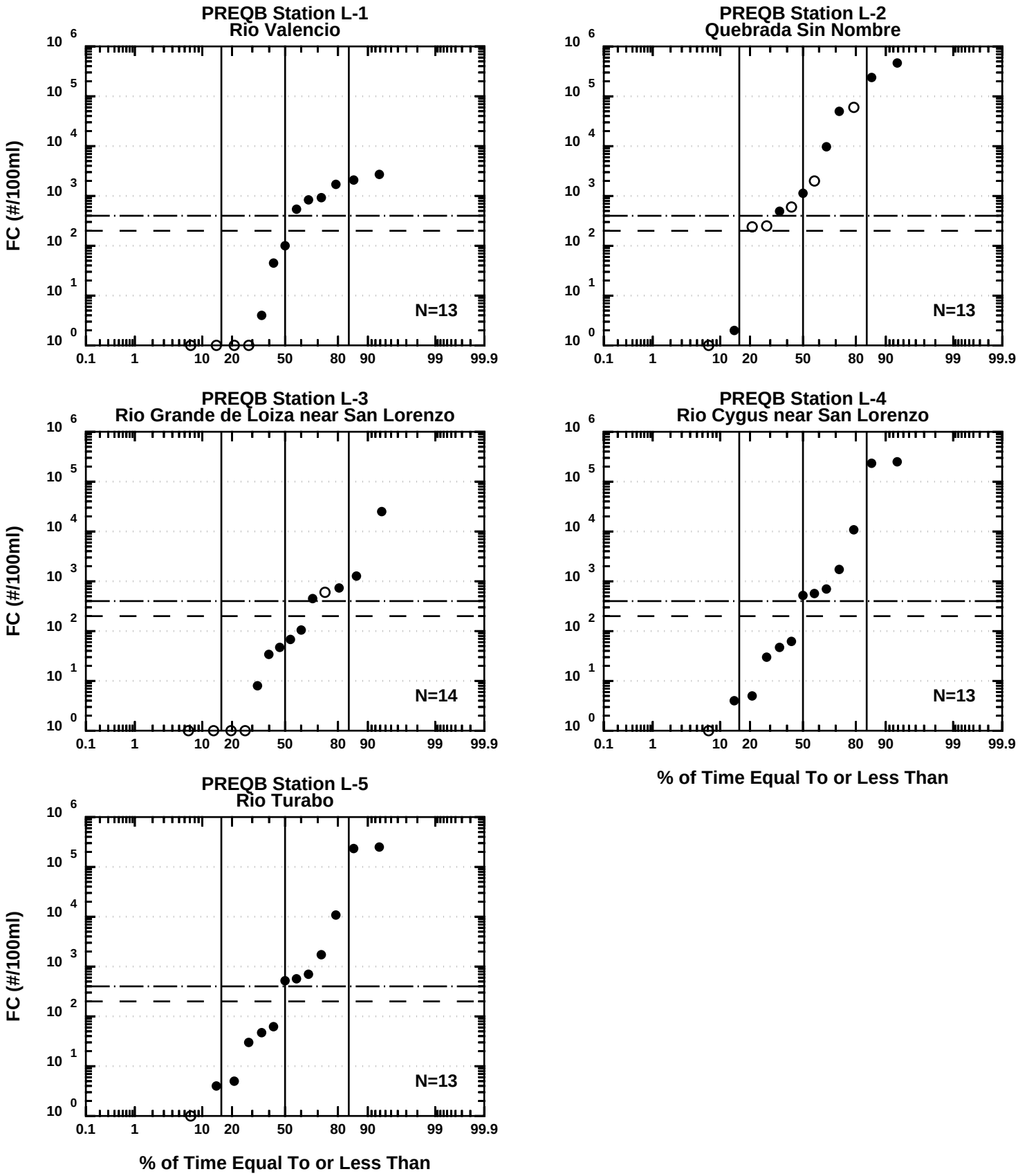


Figure A.19: Fecal Coliform Probability Plots (1997-2004)
Loiza Watershed

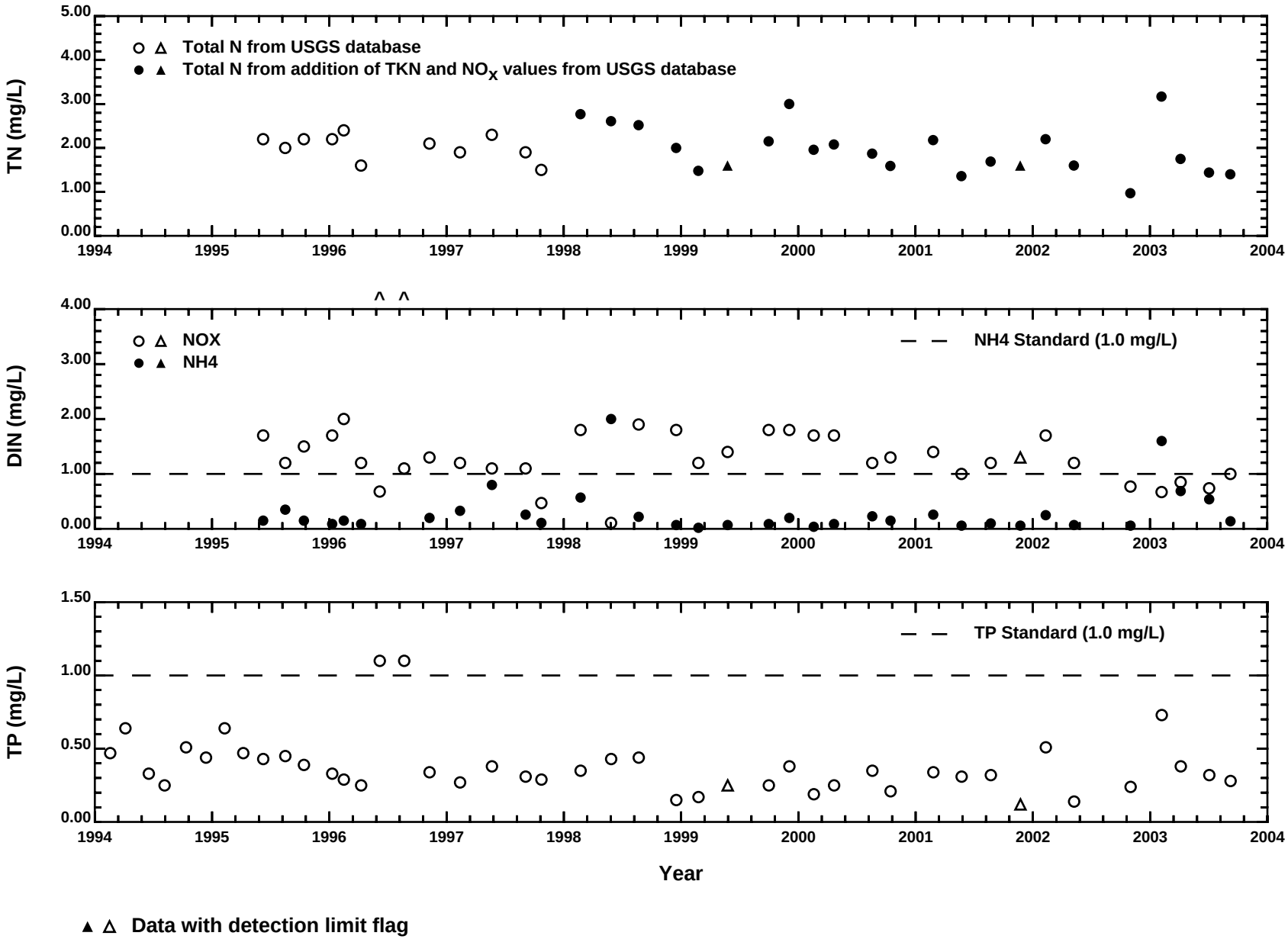


Figure A.20: Total Nitrogen, Dissolved Inorganic Nitrogen, Total Phosphorus (1994-2003)
Rio Bairoa near Caguas: USGS Gage 50055400, Loiza Watershed (Figure 4.1 Station #3)

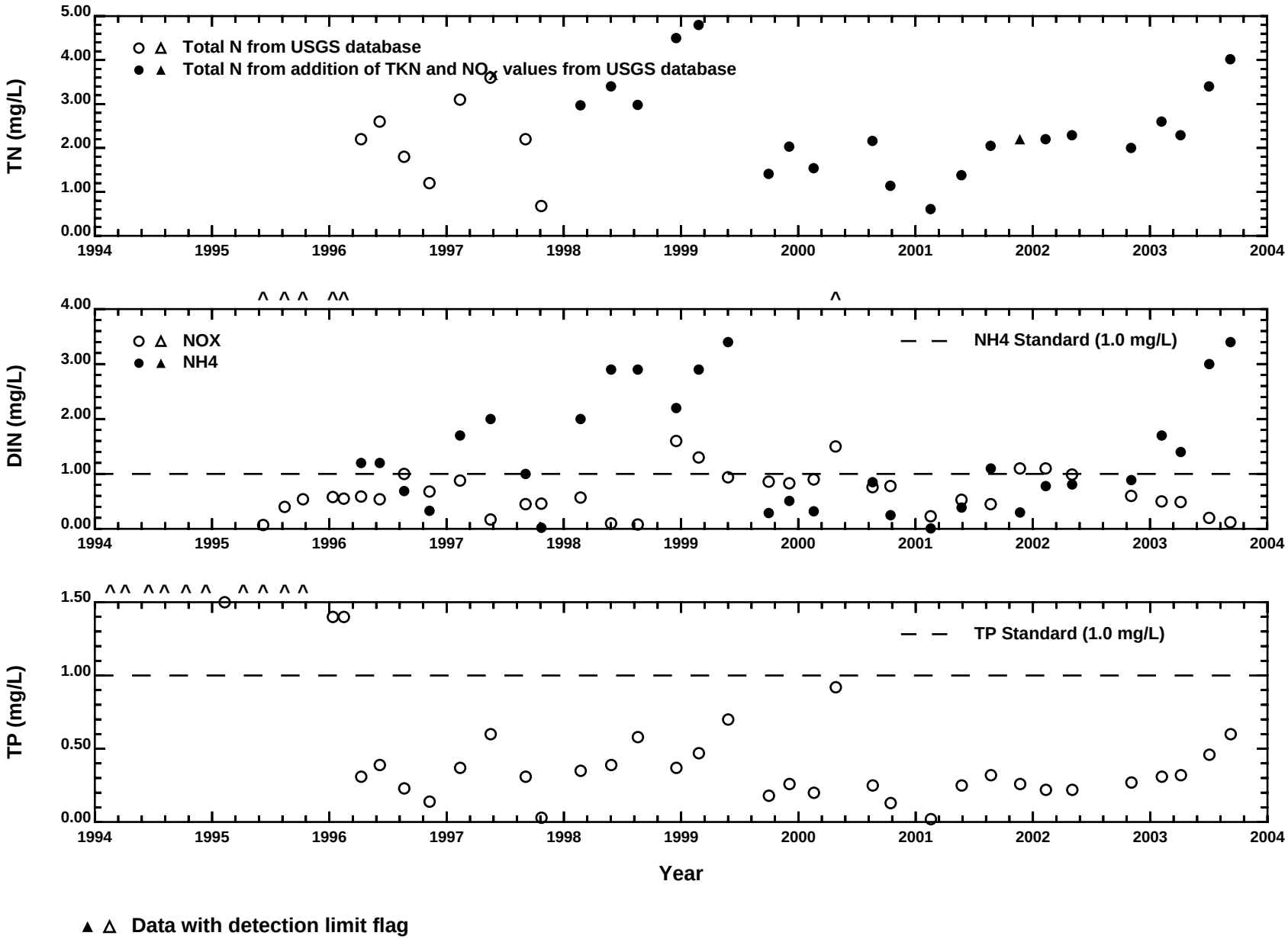


Figure A.21: Total Nitrogen, Dissolved Inorganic Nitrogen, Total Phosphorus (1994-2003)
Rio Caguitas at HWY 30 at Caguas: USGS Gage 50055250, Loiza Watershed (Figure 4.1 Station #2)

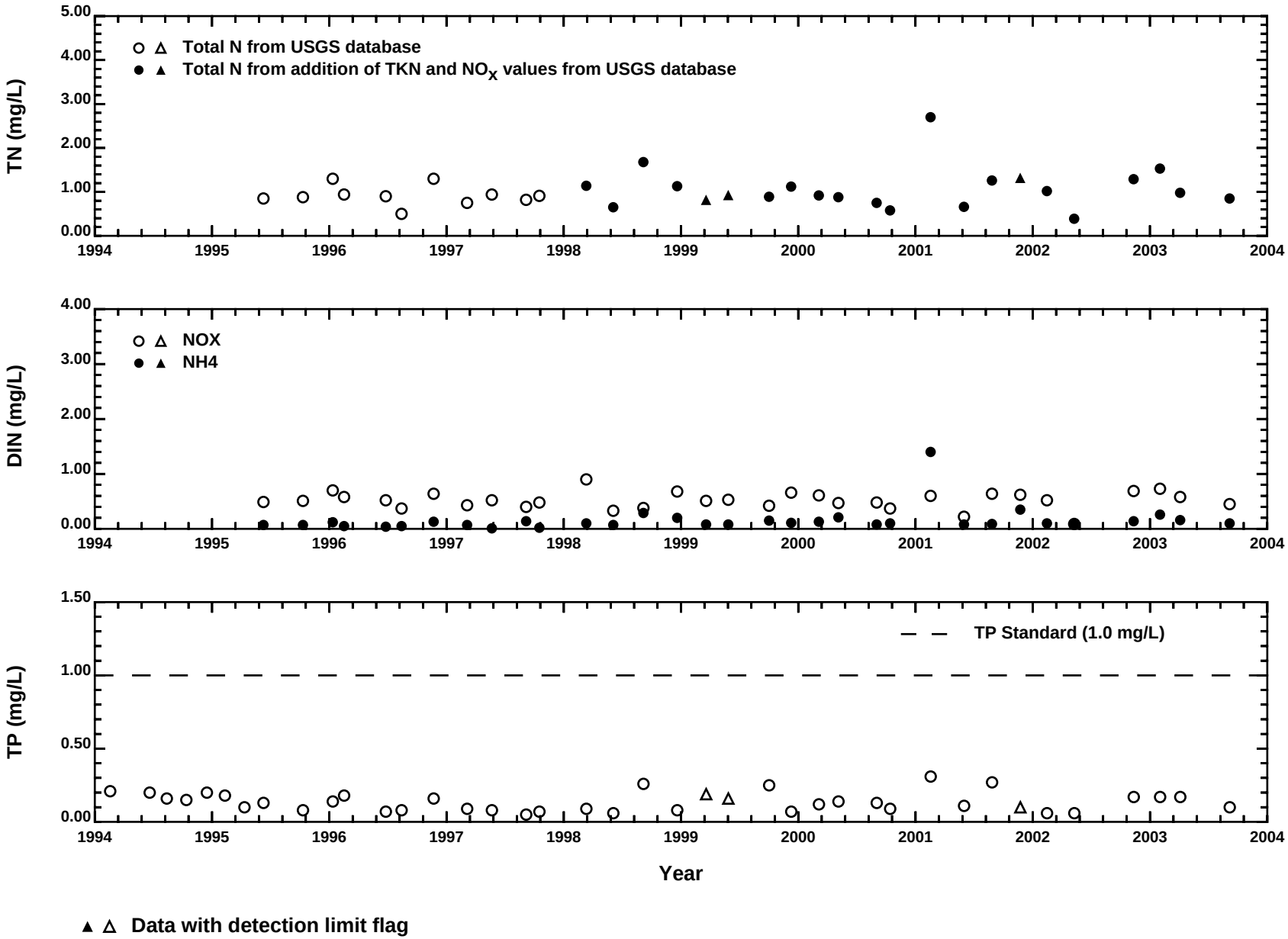


Figure A.22: Total Nitrogen, Dissolved Inorganic Nitrogen, Total Phosphorus (1994-2003)
Rio Grande de Loiza at Caguas: USGS Gage 50055000, Loiza Watershed (Figure 4.1 Station #1)

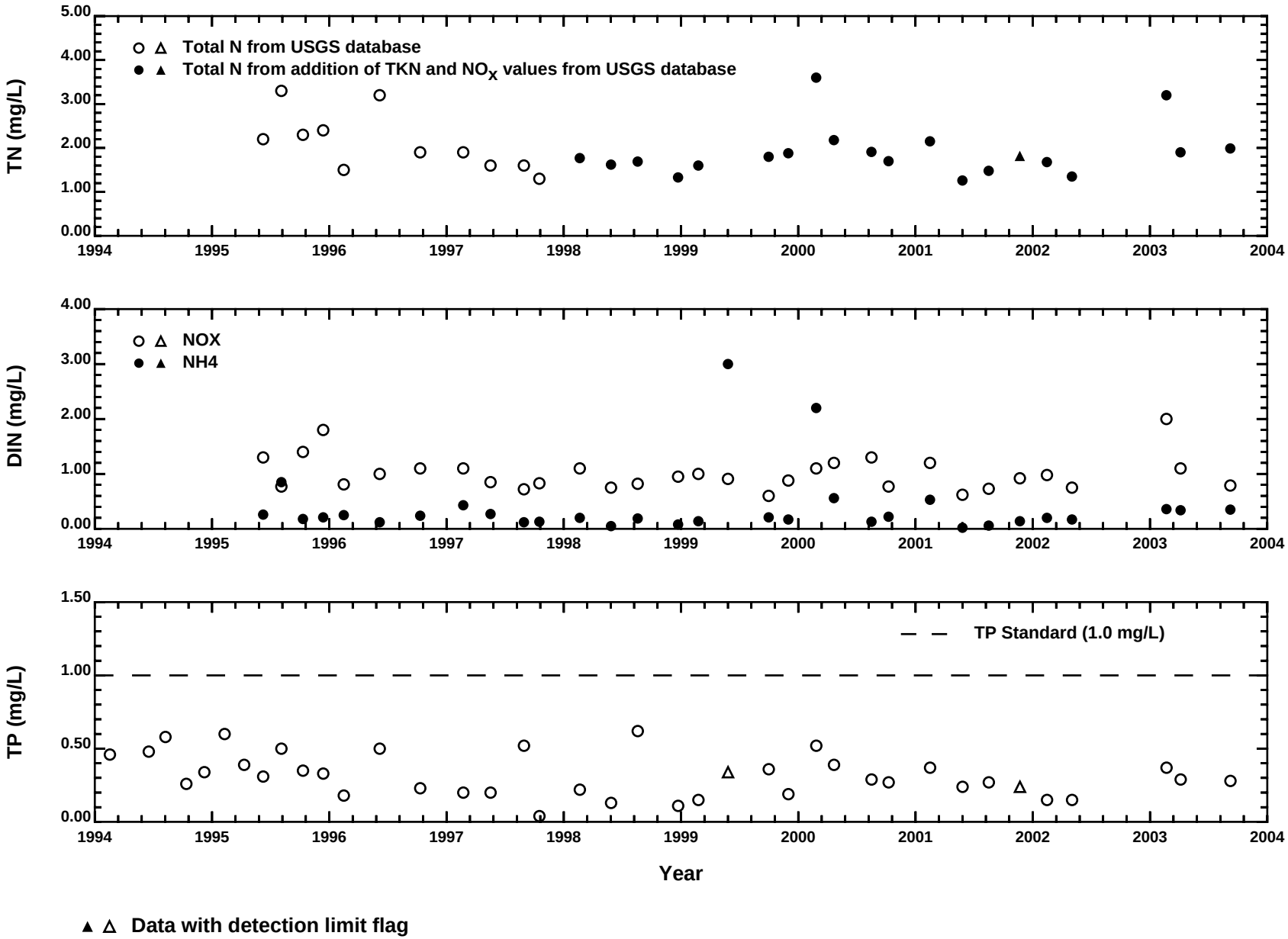


Figure A.23: Total Nitrogen, Dissolved Inorganic Nitrogen, Total Phosphorus (1994-2003)
Rio Gurabo near Gurabo: USGS Gage 50057025, Loiza Watershed (Figure 4.1 Station #4)

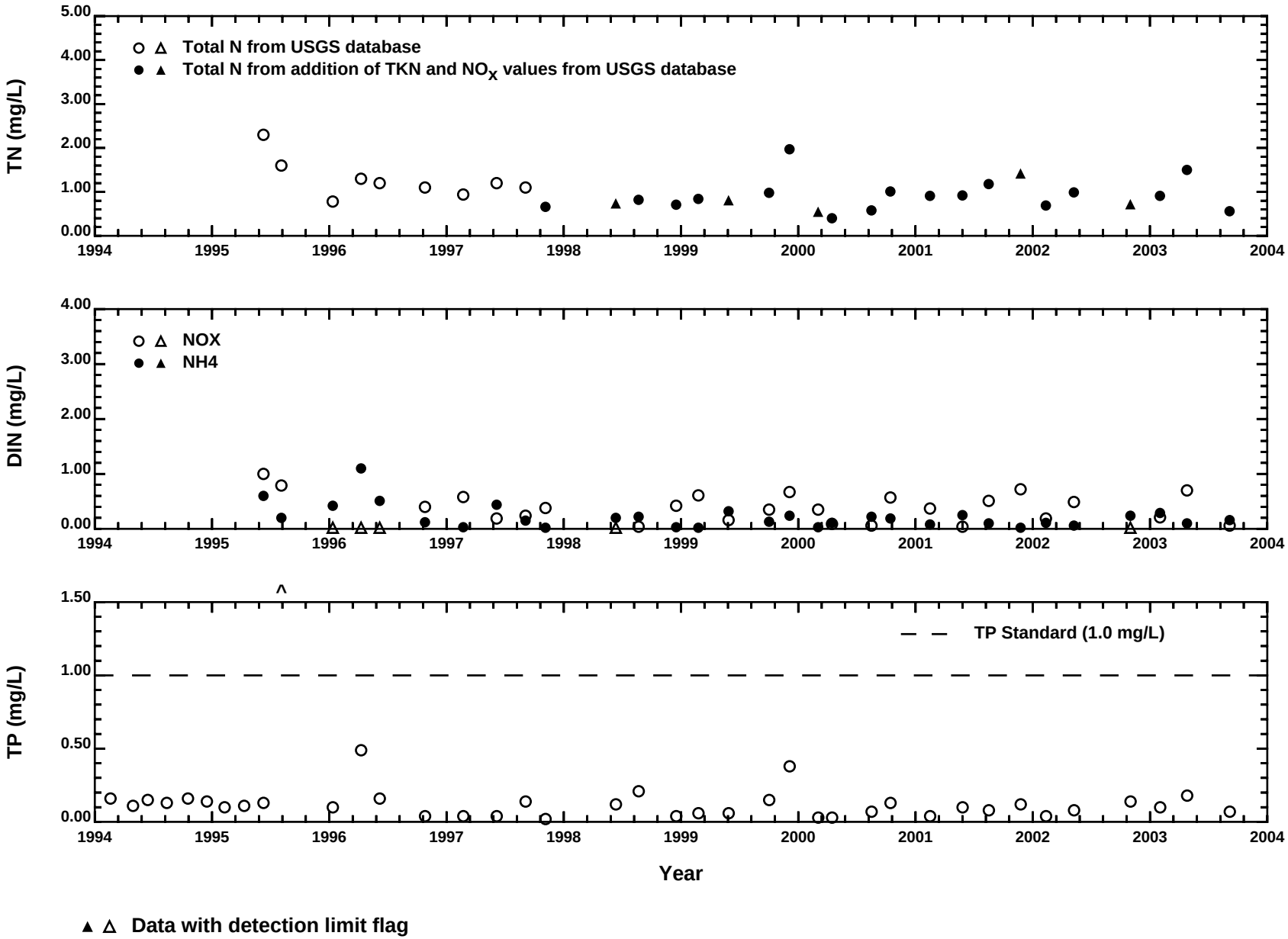


Figure A.24: Total Nitrogen, Dissolved Inorganic Nitrogen, Total Phosphorus (1994-2003)
Lago Loiza at Damsite near Trujillo Alto: USGS Gage 50059000, Loiza Watershed (Figure 4.1 Station #5)

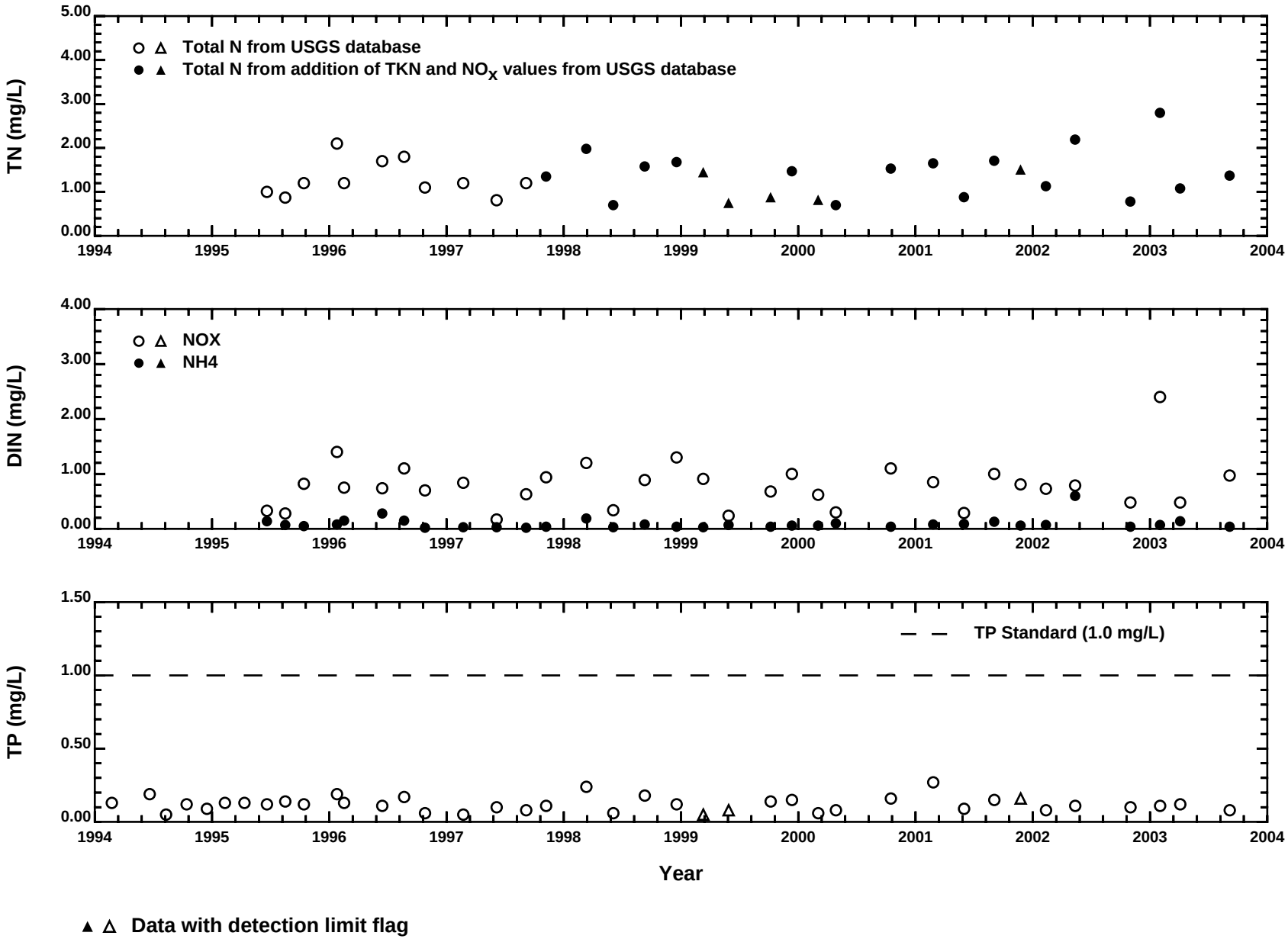


Figure A.25: Total Nitrogen, Dissolved Inorganic Nitrogen, Total Phosphorus (1994-2003)
Rio Grande de Loiza below Trujillo Alto: USGS Gage 50059100, Loiza Watershed (Figure 4.1 Station #6)

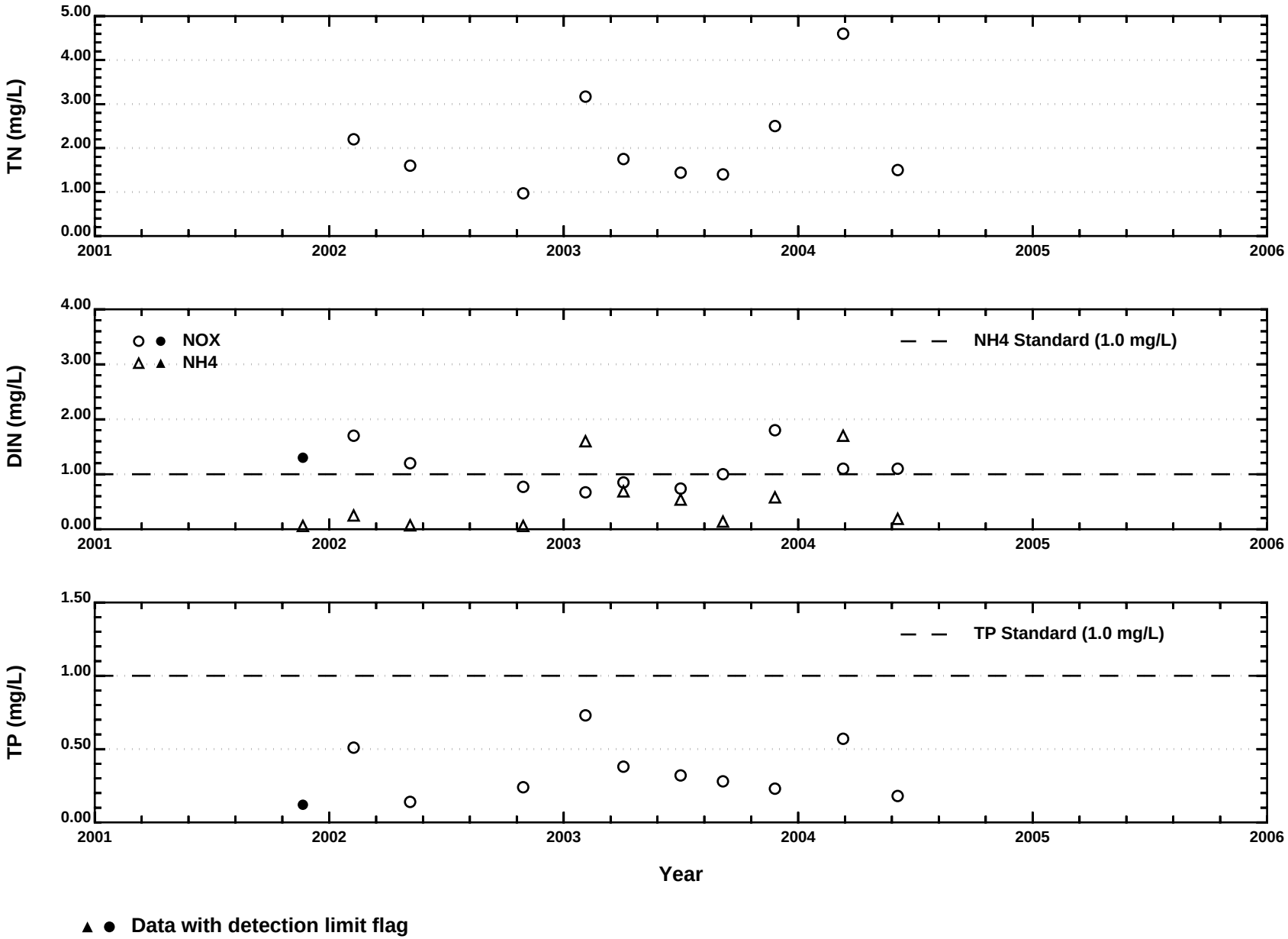


Figure A.26: Total Nitrogen, Dissolved Inorganic Nitrogen, Total Phosphorus for EQB Data at USGS Stations (2001-2005) Rio Bairoa near Caguas: USGS Gage 50055400, Loiza Watershed (Figure 4.1 Station #3)

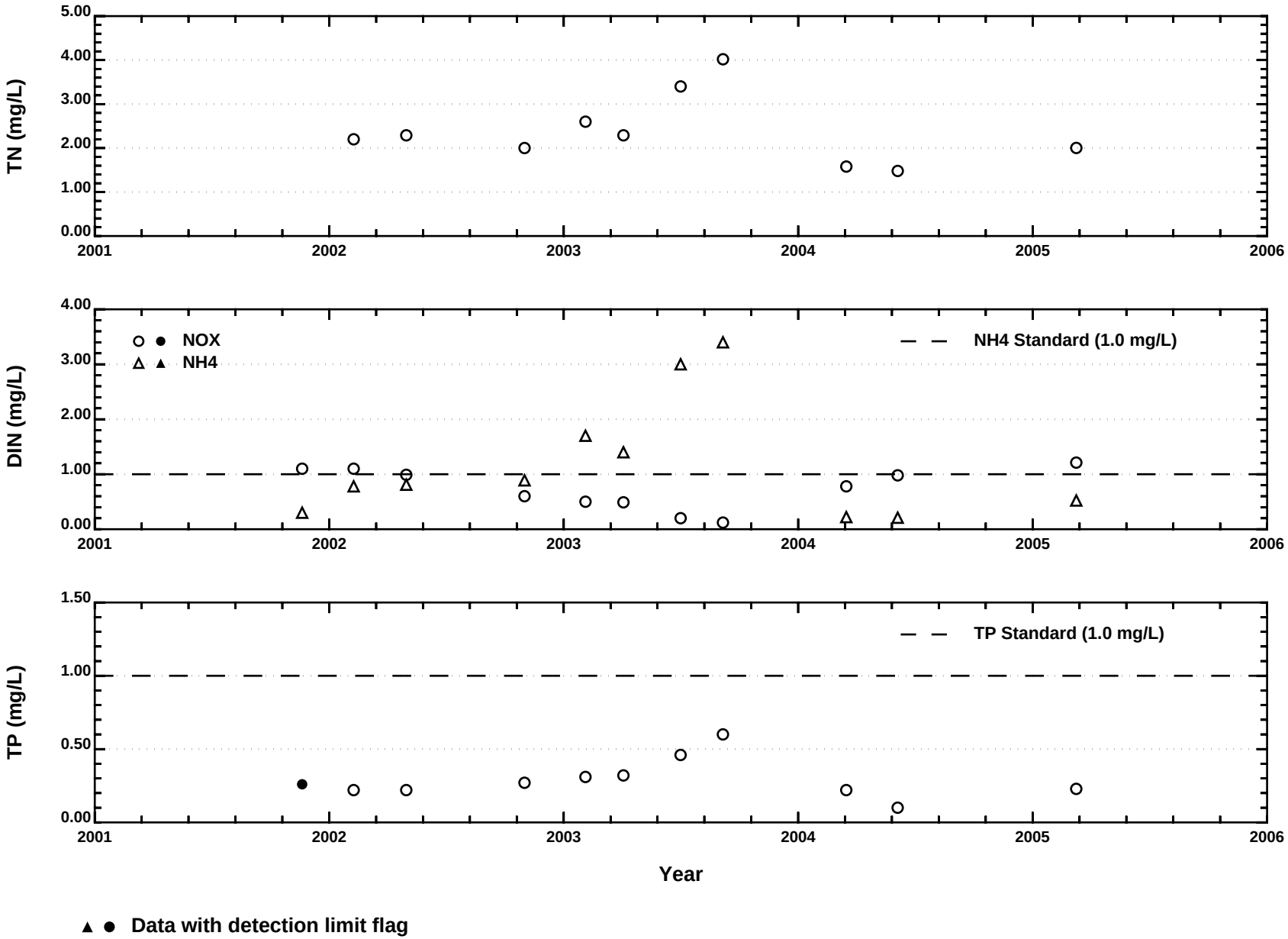


Figure A.27: Total Nitrogen, Dissolved Inorganic Nitrogen, Total Phosphorus for EQB Data at USGS Stations (2001-2005) Rio Caguitas at HWY 30 at Caguas: USGS Gage 50055250, Loiza Watershed (Figure 4.1 Station #2)

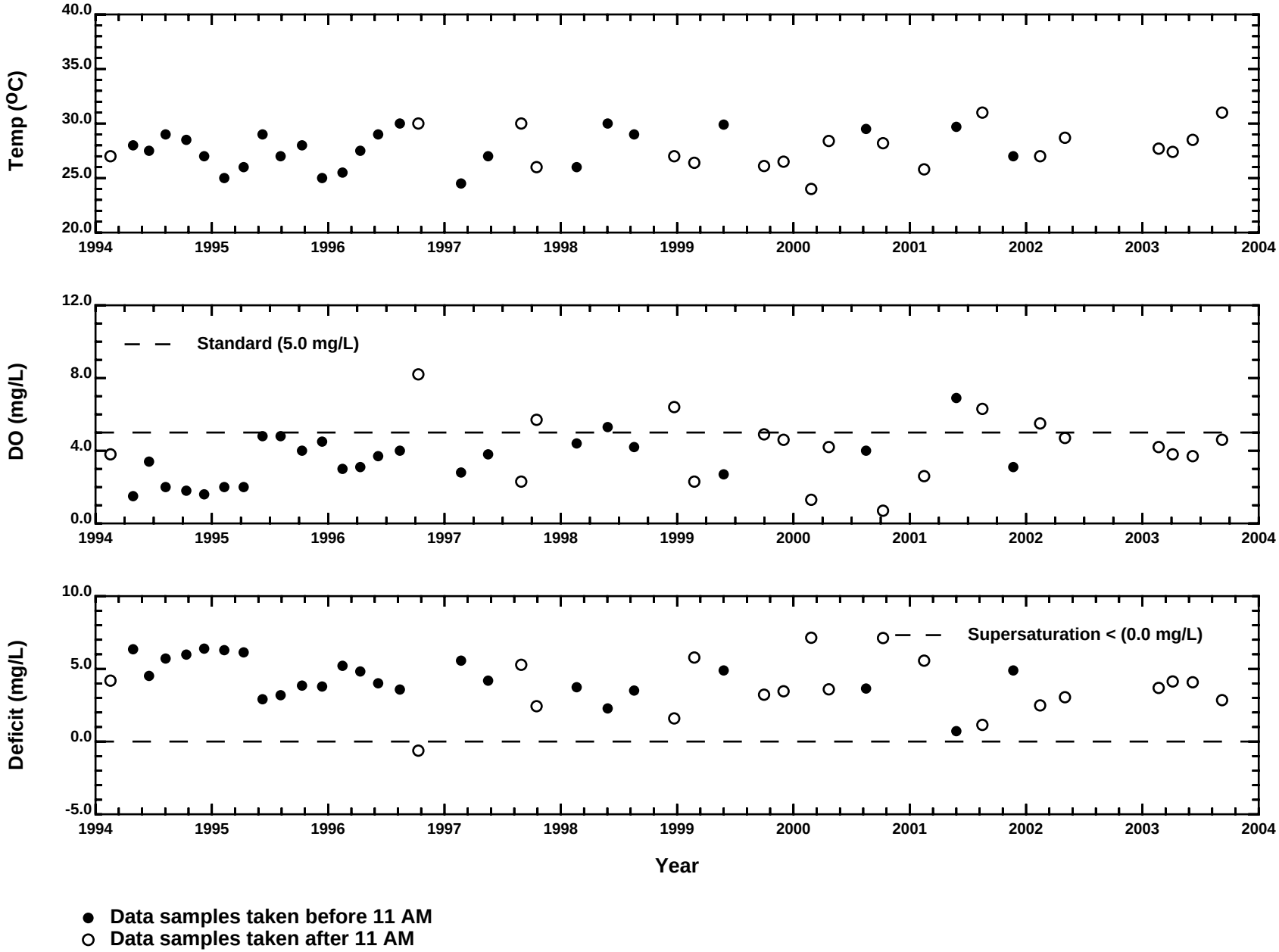


Figure A.28: Temperature, Dissolved Oxygen, Oxygen Deficit (1994-2003)
Rio Gurabo near Gurabo: USGS Gage 50057025, Loiza Watershed (Figure 7.1 Station #4)

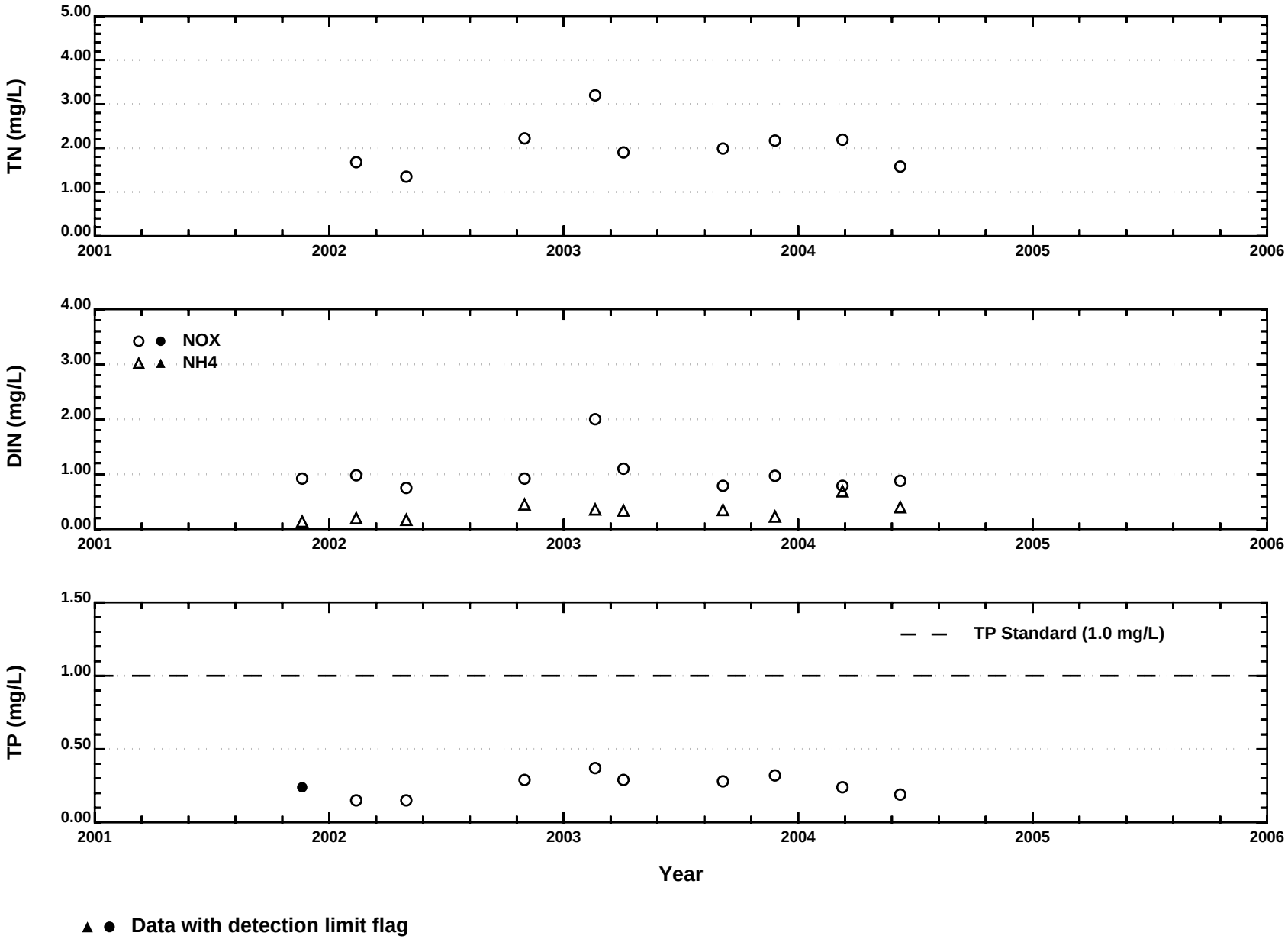


Figure A.29: Total Nitrogen, Dissolved Inorganic Nitrogen, Total Phosphorus for EQB Data at USGS Stations (2001-2005) Rio Gurabo near Gurabo: USGS Gage 50057025, Loiza Watershed (Figure 4.1 Station #4)

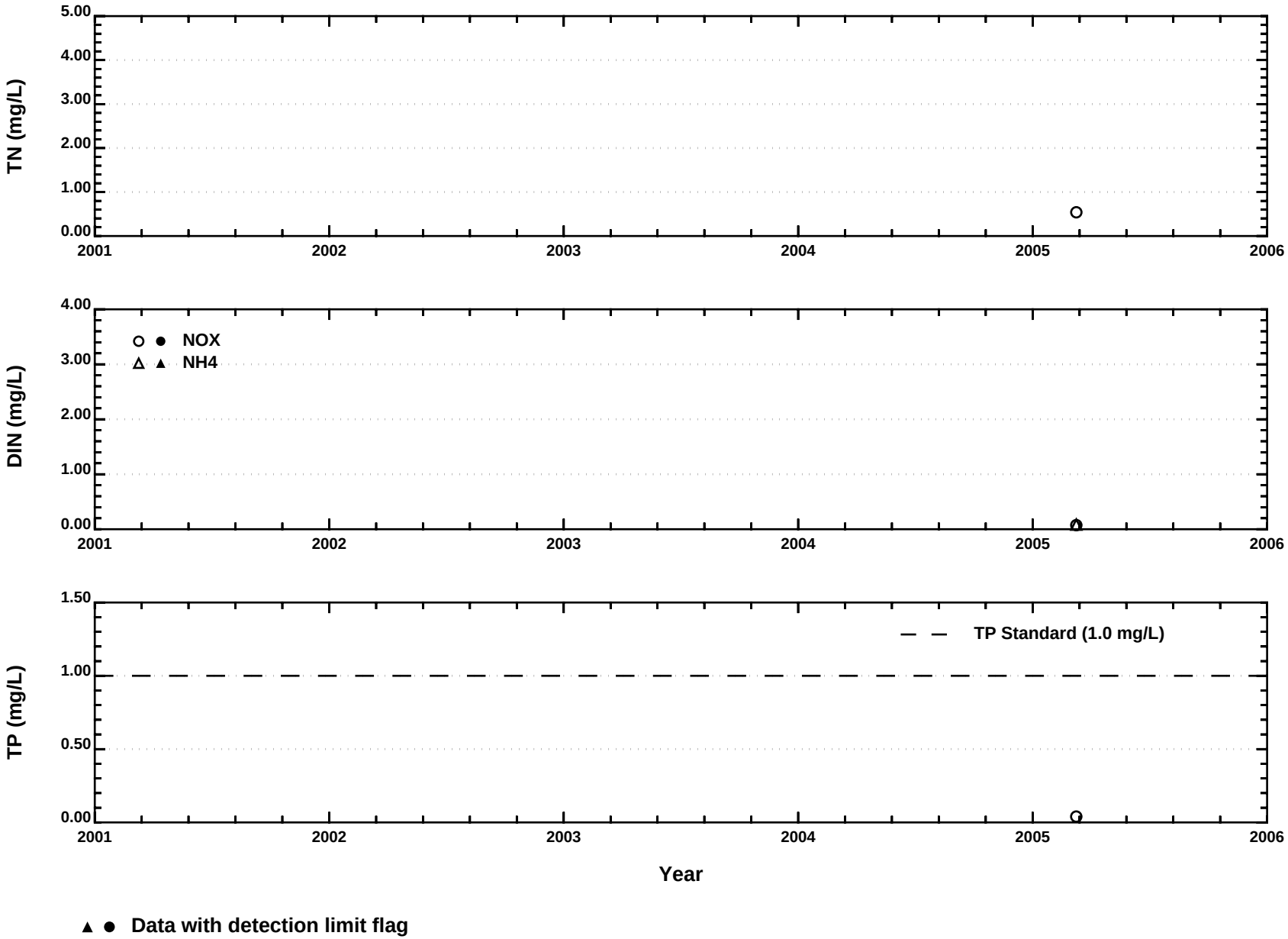


Figure A.30: Total Nitrogen, Dissolved Inorganic Nitrogen, Total Phosphorus for EQB Data at USGS Stations (2001-2005) Lago Loiza at Damsite near Trujillo Alto: USGS Gage 50059000, Loiza Watershed (Figure 4.1 Station #5)

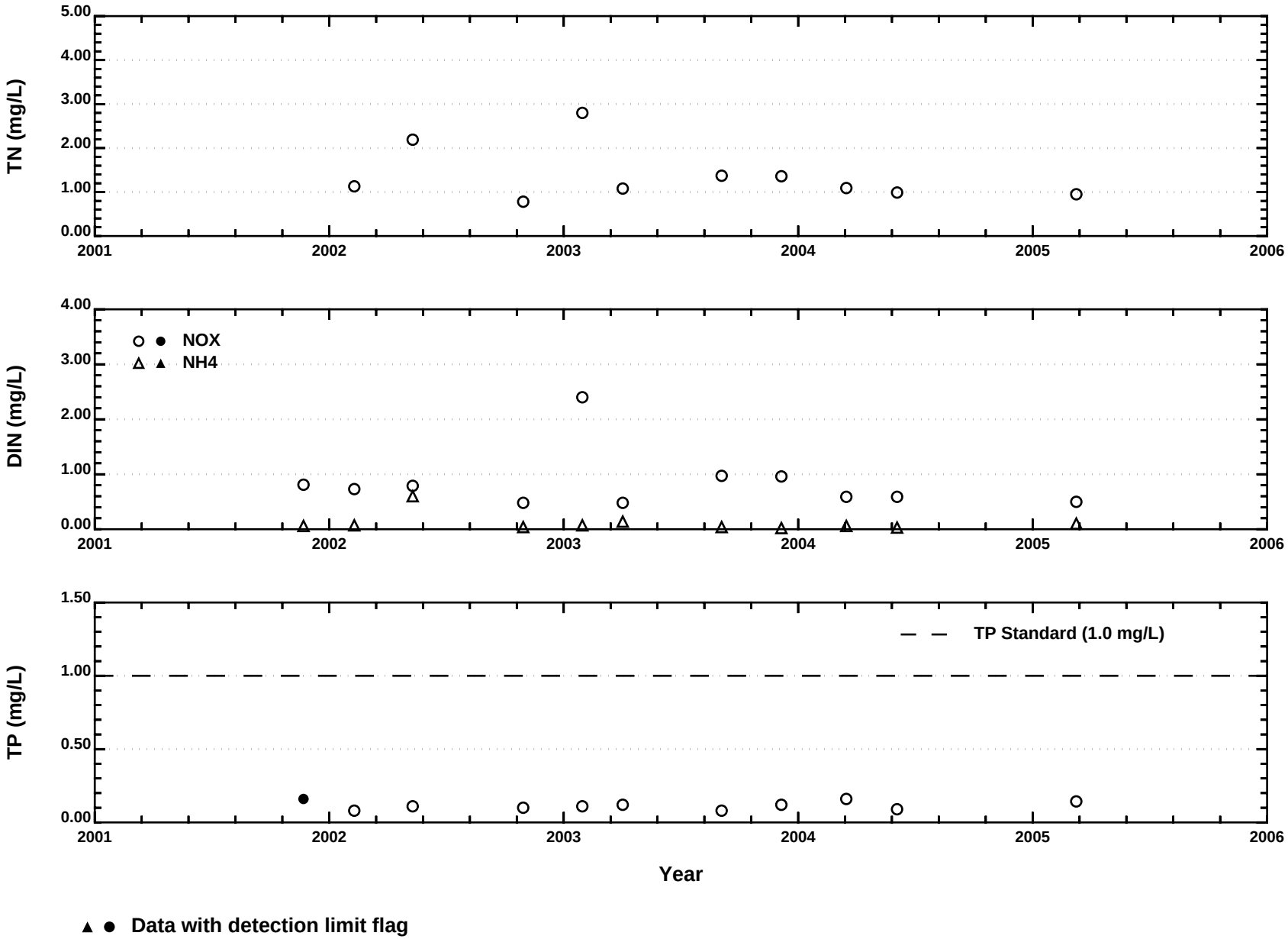


Figure A.31: Total Nitrogen, Dissolved Inorganic Nitrogen, Total Phosphorus for EQB Data at USGS Stations (2001-2005) Rio Grande de Loiza below Trujillo Alto: USGS Gage 50059100, Loiza Watershed (Figure 4.1 Station #6)

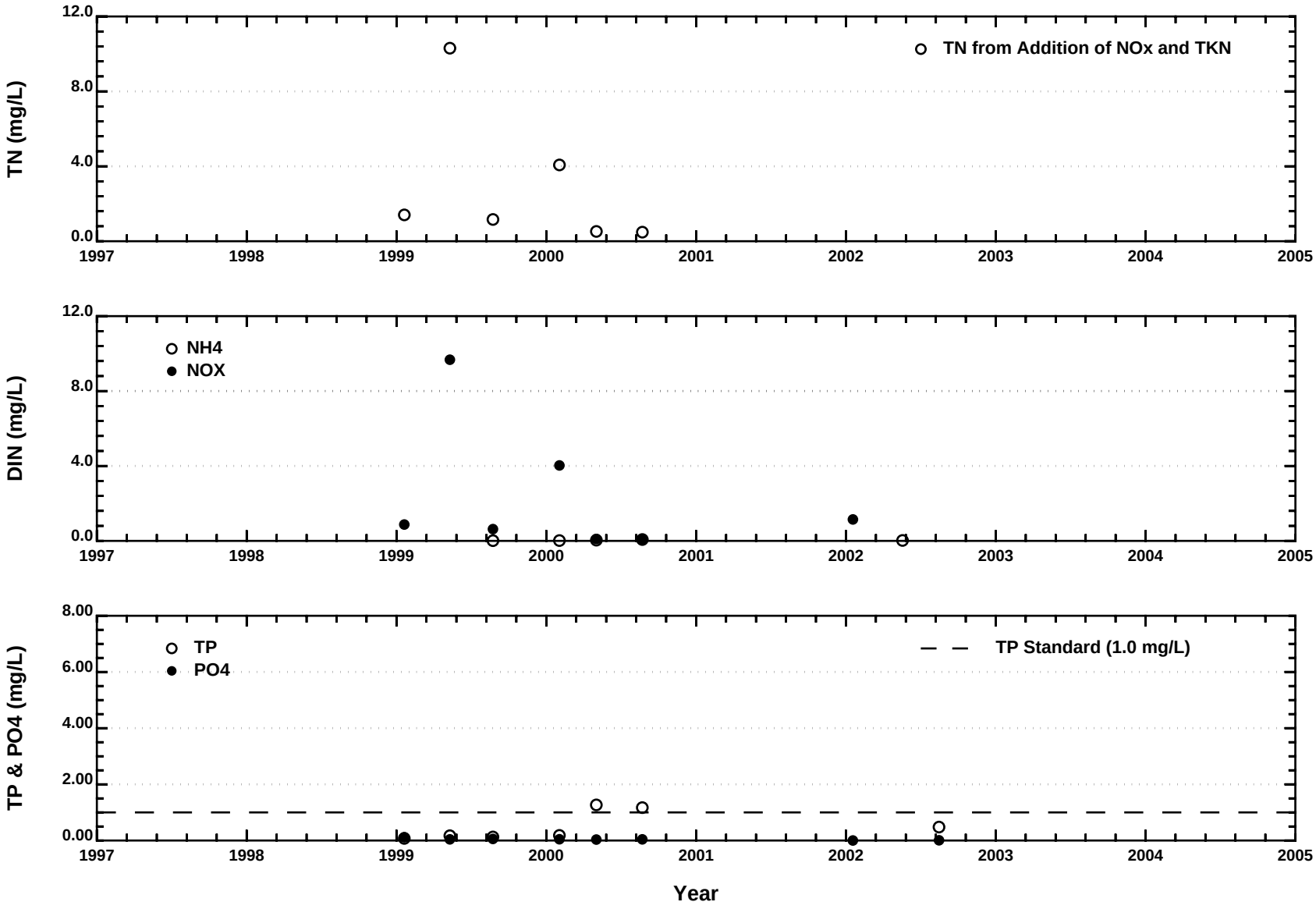


Figure A.32: Total Nitrogen, Dissolved Inorganic Nitrogen, Total Phosphorus (1997-2004)
Rio Valenciano: PREQB Station L-1, Loiza Watershed

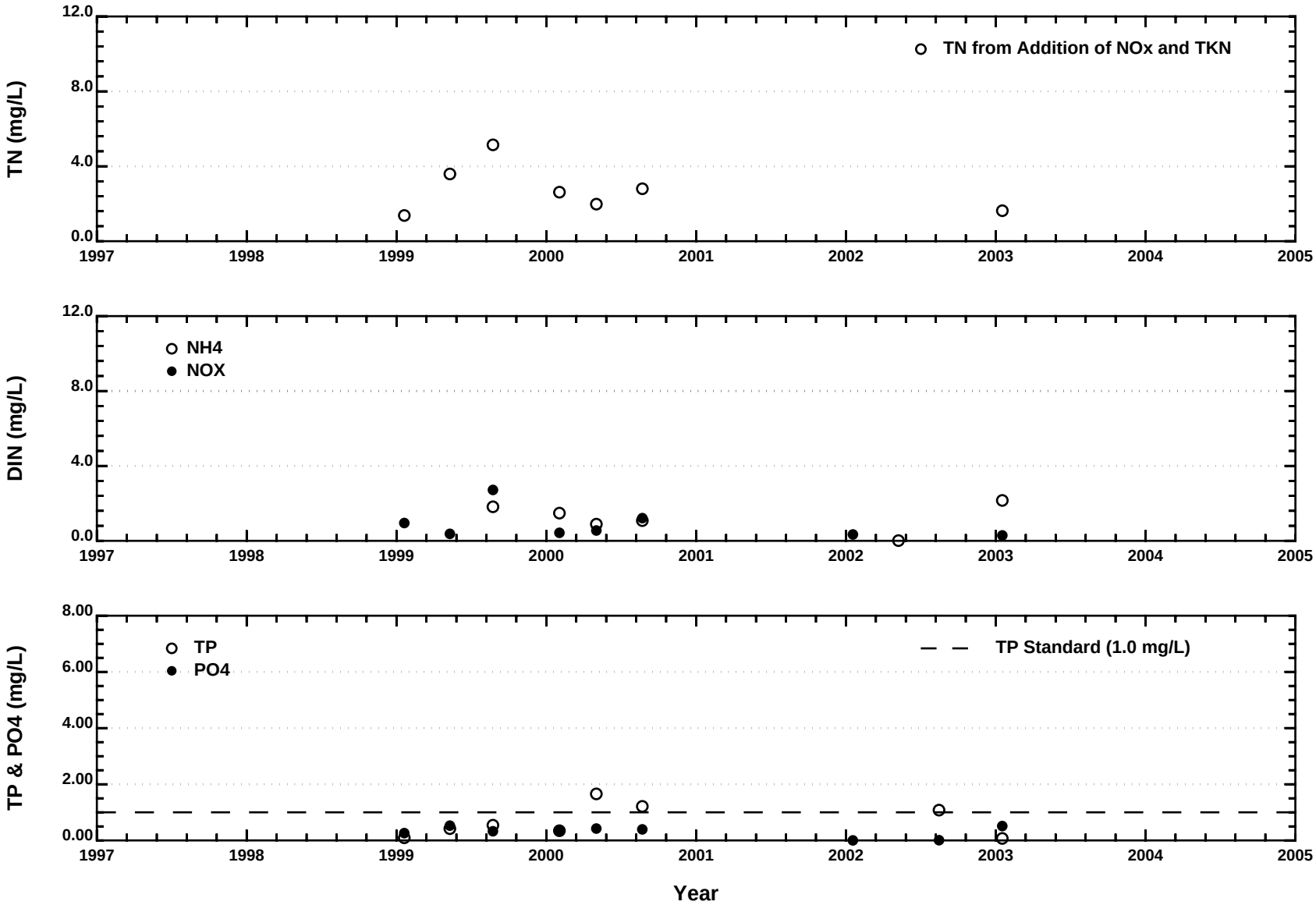


Figure A.33: Total Nitrogen, Dissolved Inorganic Nitrogen, Total Phosphorus (1997-2004)
Quebrada Sin Nombre: PREQB Station L-2, Loiza Watershed

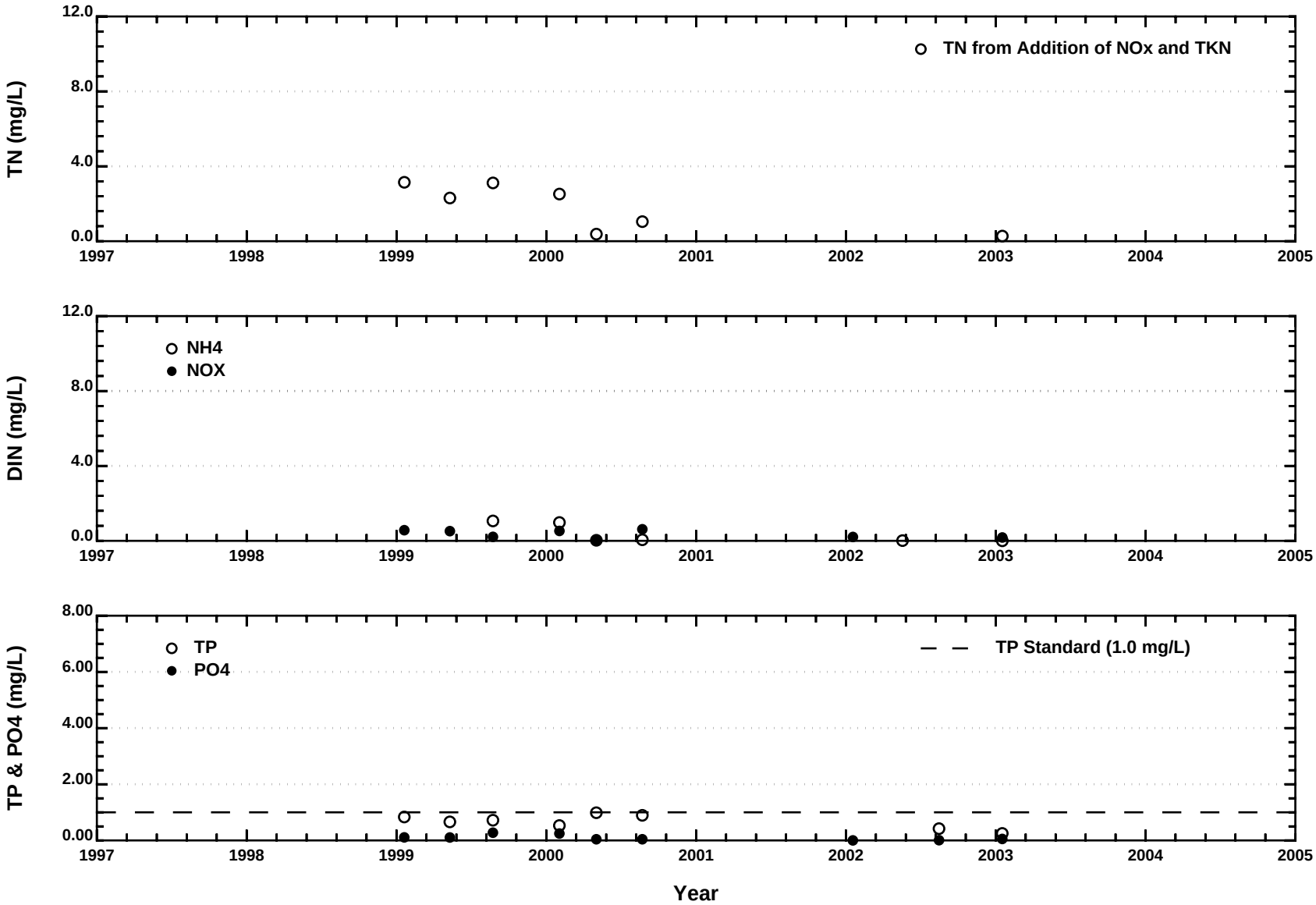


Figure A.34: Total Nitrogen, Dissolved Inorganic Nitrogen, Total Phosphorus (1997-2004)
Rio Grande de Loiza near San Lorenzo: PREQB Station L-3, Loiza Watershed

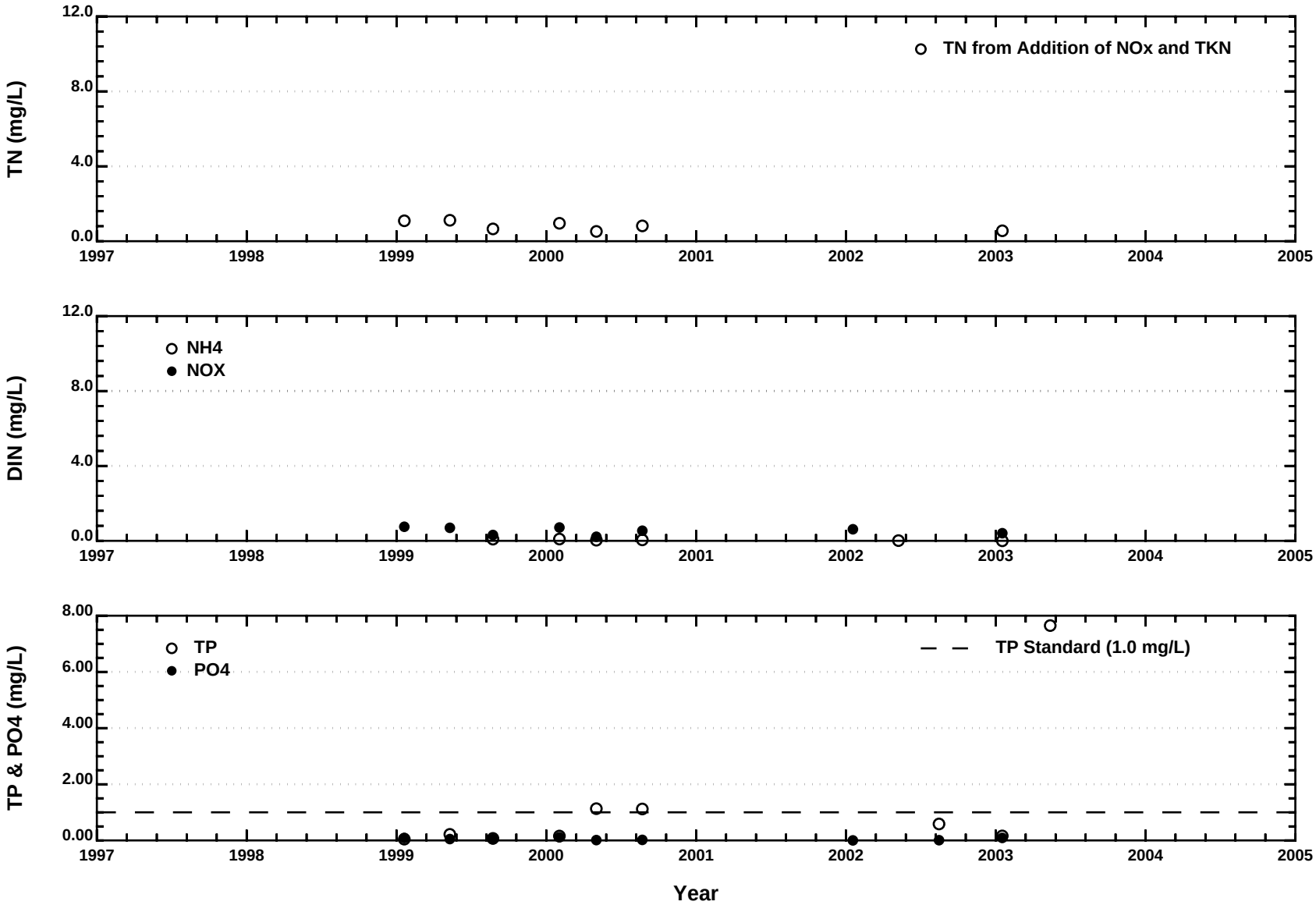


Figure A.35: Total Nitrogen, Dissolved Inorganic Nitrogen, Total Phosphorus (1997-2004)
Rio Cygus near San Lorenzo: PREQB Station L-4, Loiza Watershed

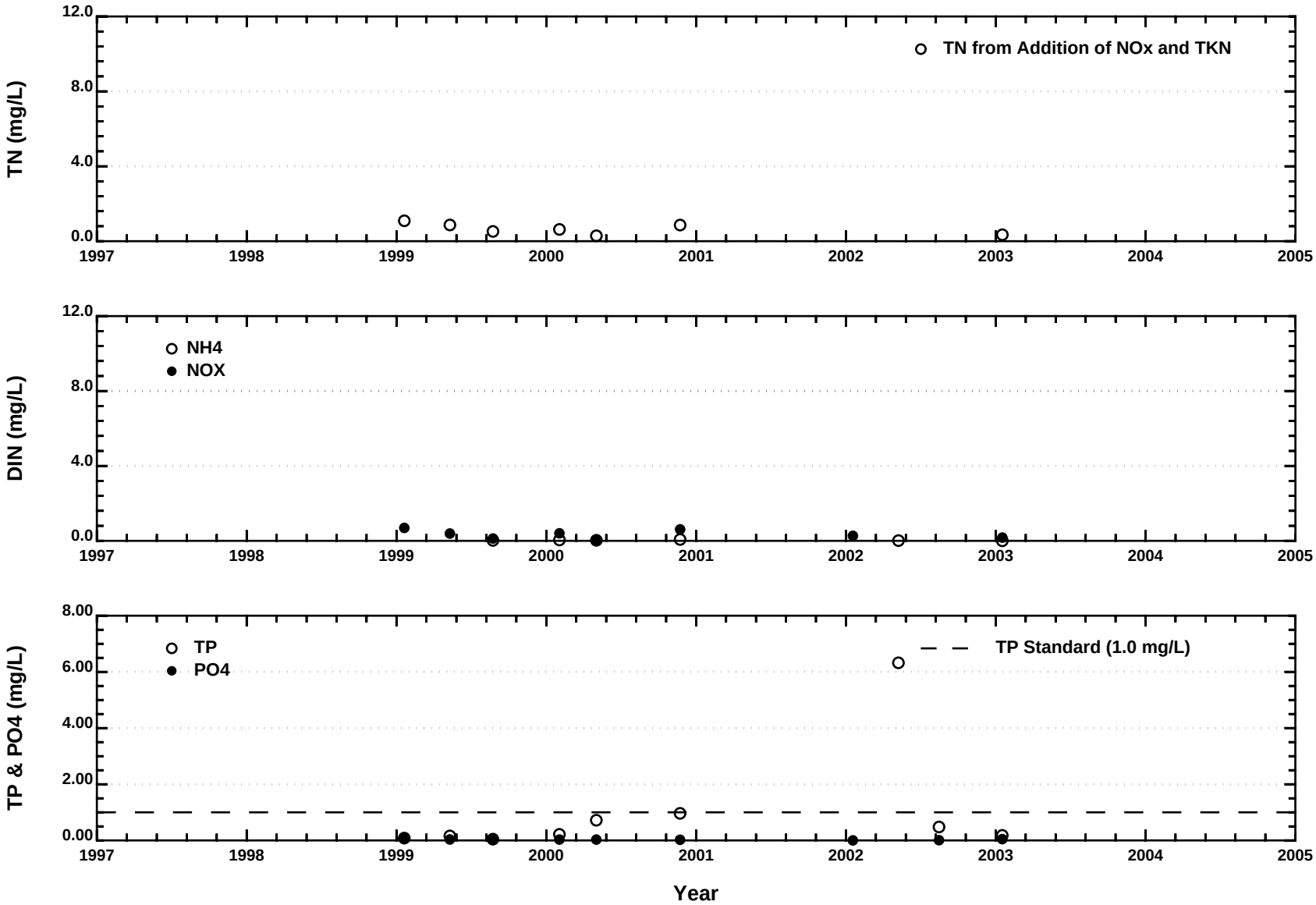


Figure A.36: Total Nitrogen, Dissolved Inorganic Nitrogen, Total Phosphorus (1997-2004)
Rio Turabo: PREQB Station L-5, Loiza Watershed

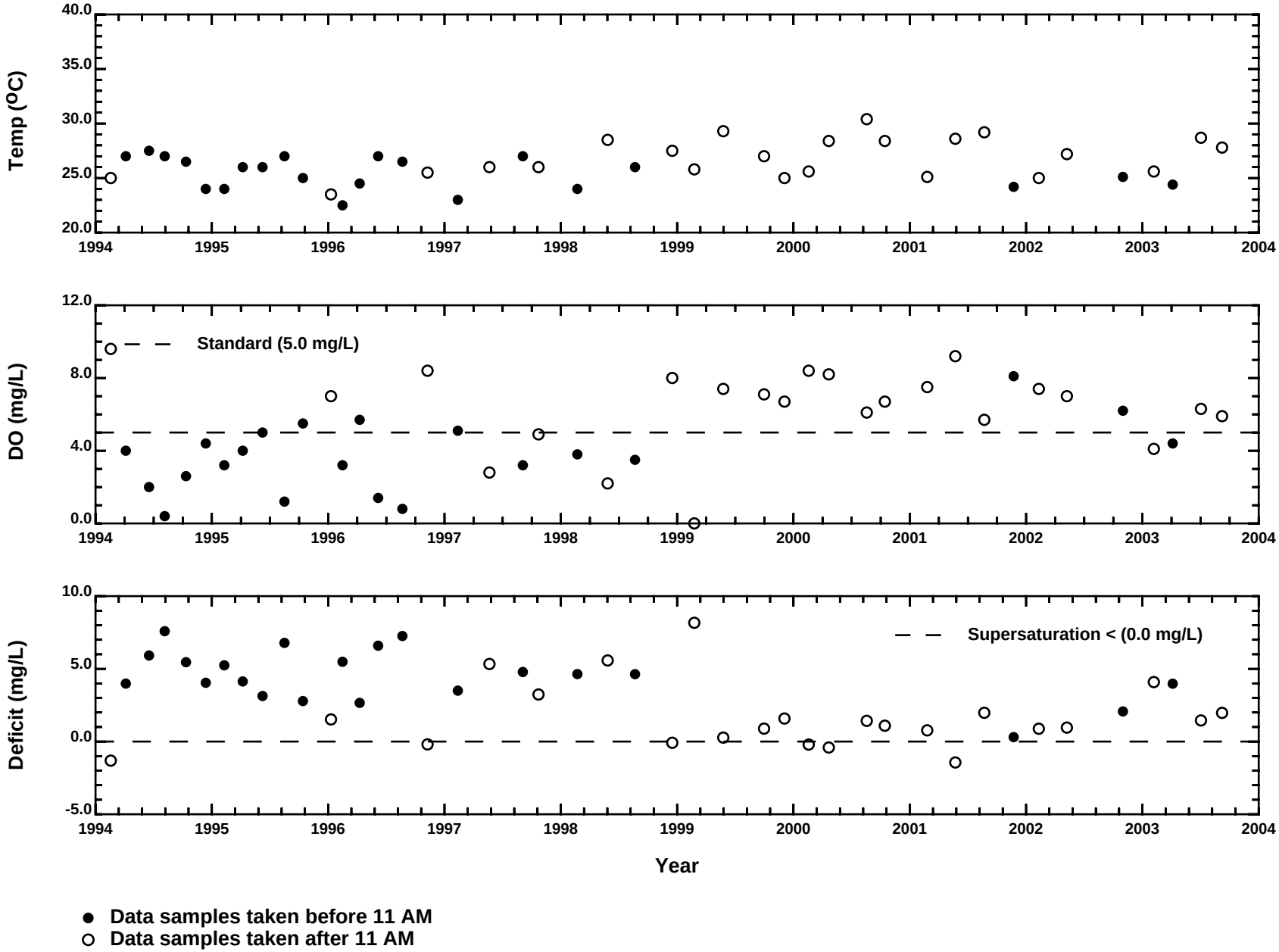


Figure A.37: Temperature, Dissolved Oxygen, Oxygen Deficit (1994-2003)
Rio Bairoa near Caguas: USGS Gage 50055400, Loiza Watershed (Figure 7.1 Station #3)

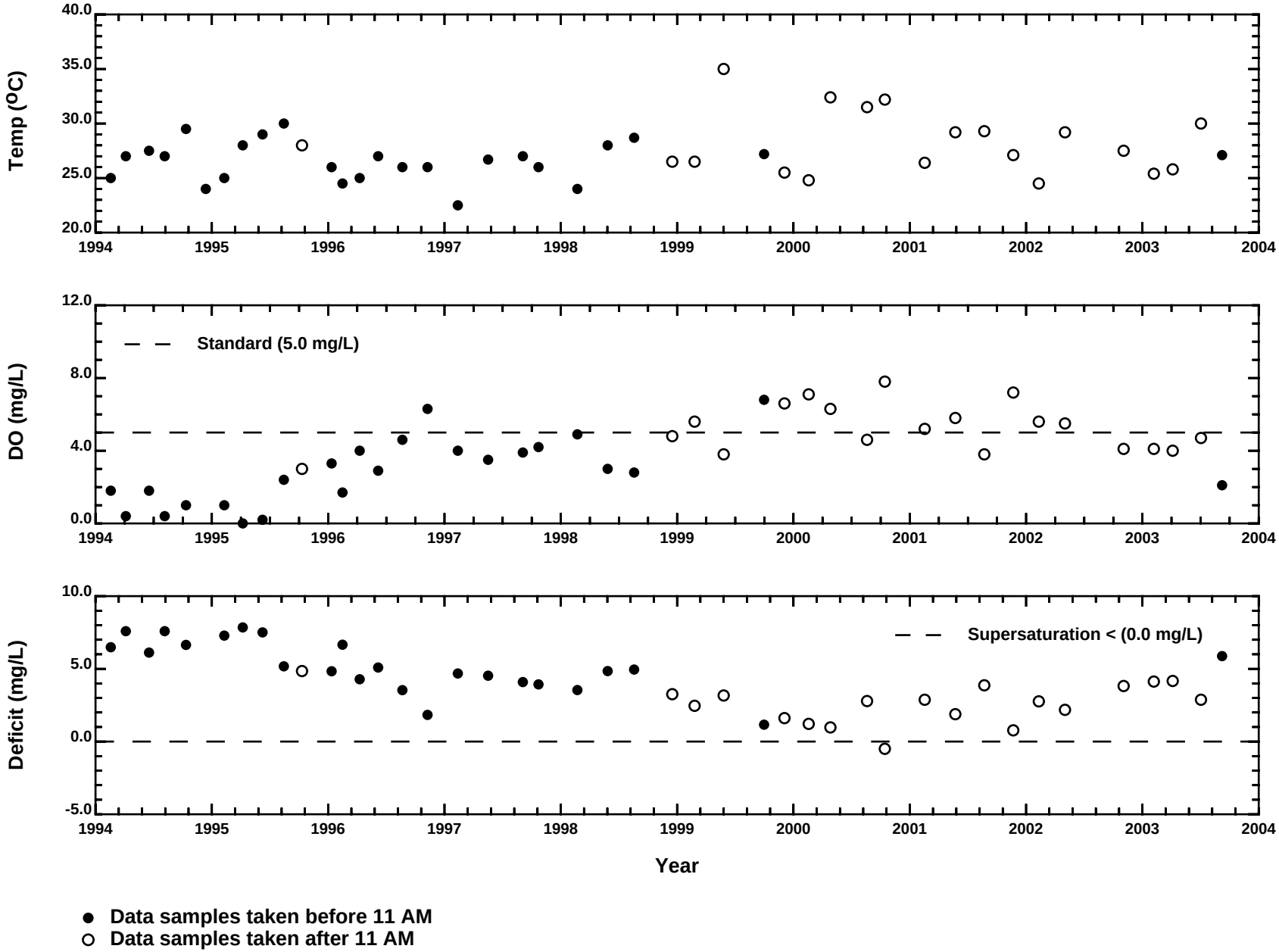


Figure A.38: Temperature, Dissolved Oxygen, Oxygen Deficit (1994-2003)
Rio Caguitas at HWY 30 at Caguas: USGS Gage 50055250, Loiza Watershed (Figure 7.1 Station #2)

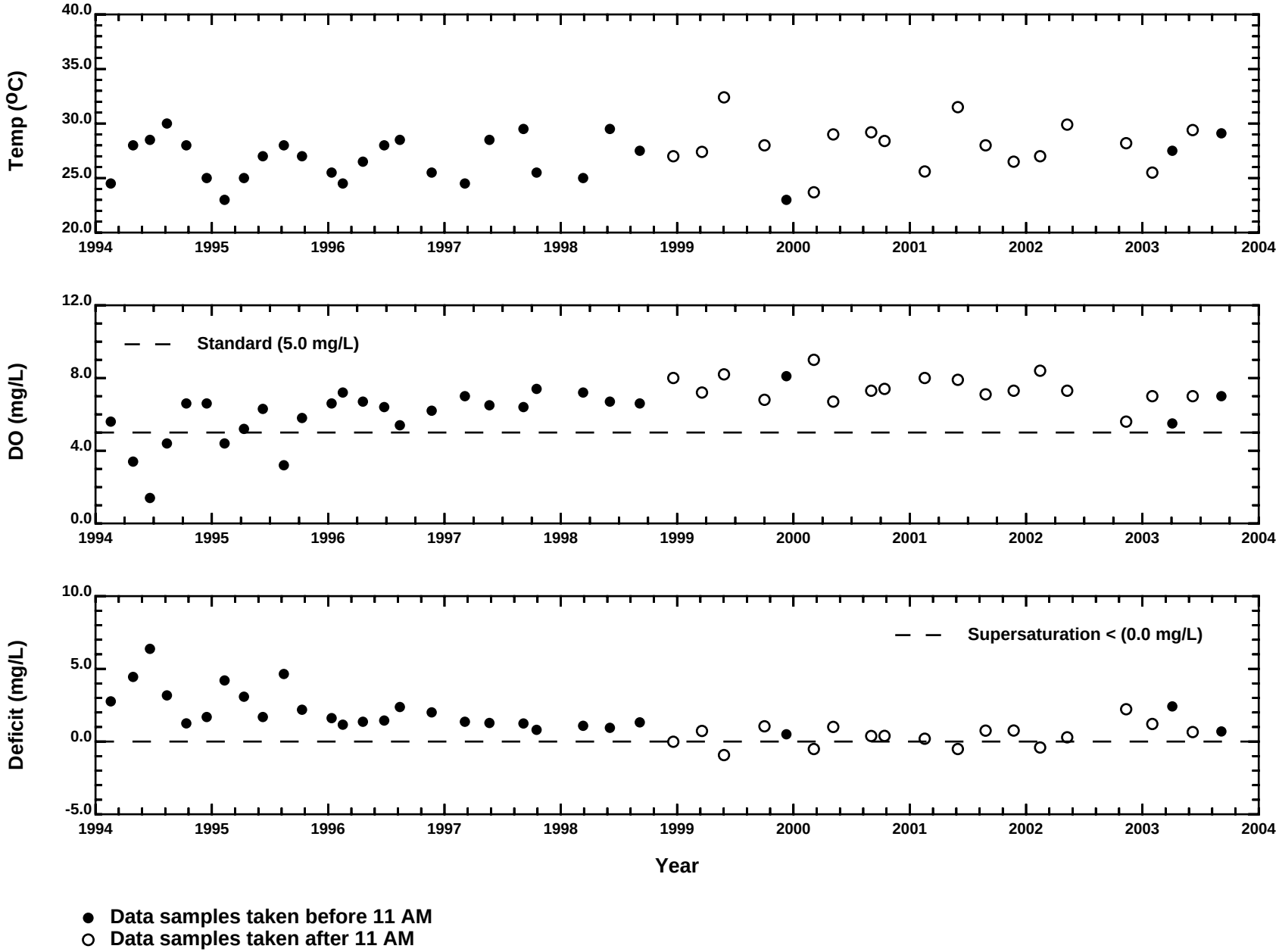


Figure A.39: Temperature, Dissolved Oxygen, Oxygen Deficit (1994-2003)
Rio Grande de Loiza at Caguas: USGS Gage 50055000, Loiza Watershed (Figure 7.1 Station #1)

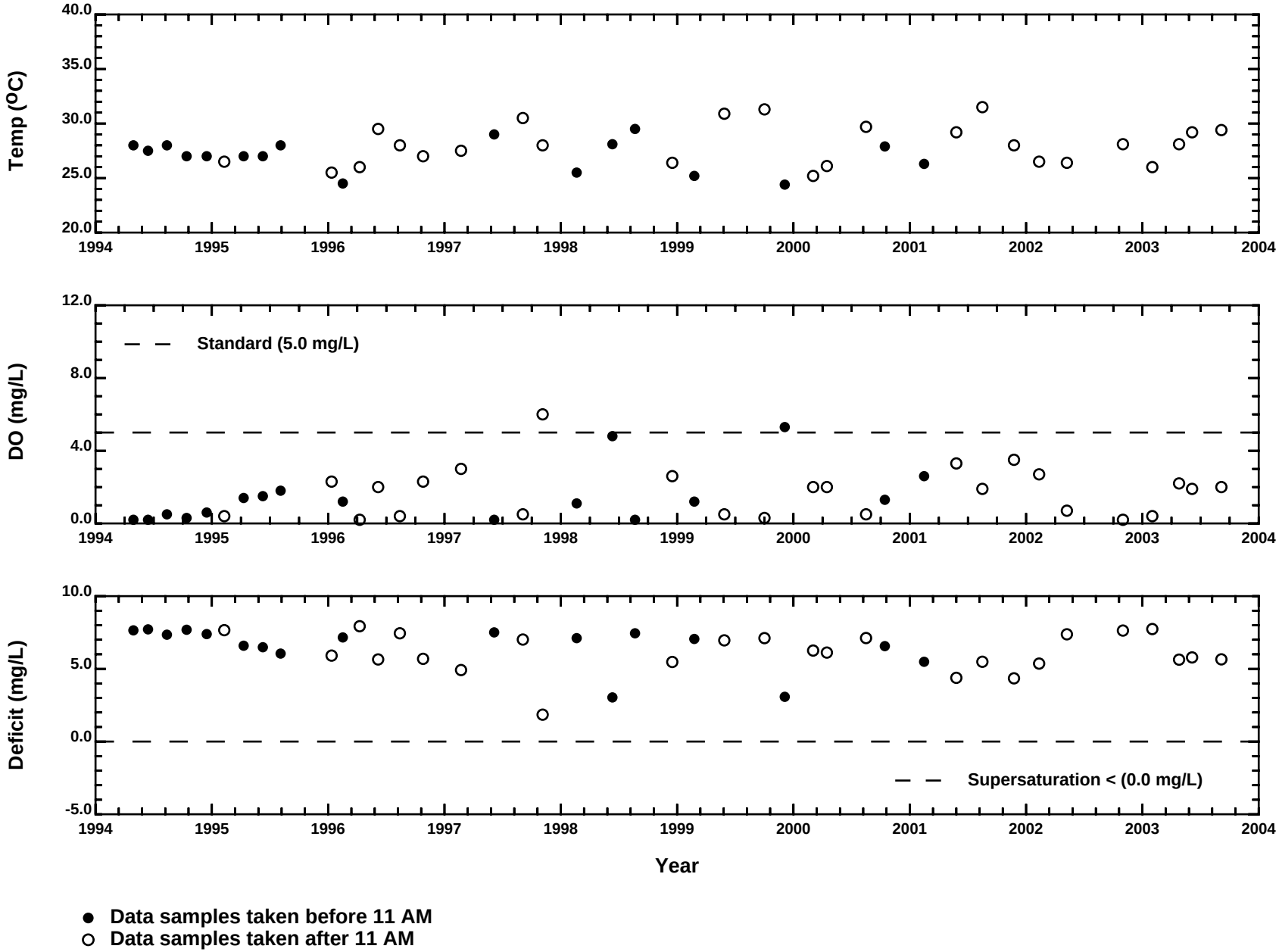


Figure A.40: Temperature, Dissolved Oxygen, Oxygen Deficit (1994-2003)
Lago Loiza at Damsite near Trujillo Alto: USGS Gage 50059000, Loiza Watershed (Figure 7.1 Station #5)

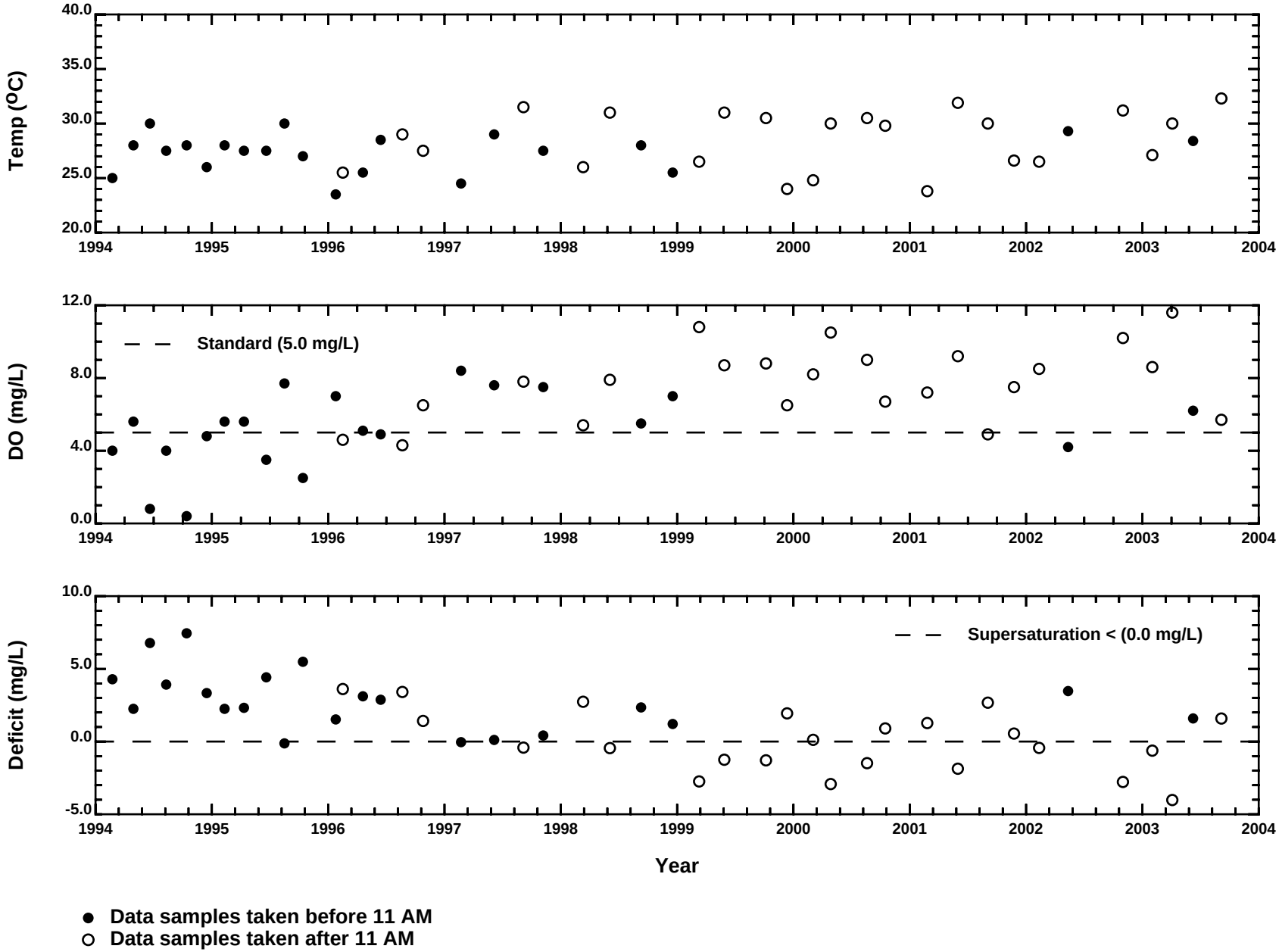


Figure A.41: Temperature, Dissolved Oxygen, Oxygen Deficit (1994-2003)
Rio Grande de Loiza below Trujillo Alto: USGS Gage 50059100, Loiza Watershed (Figure 7.1 Station #6)

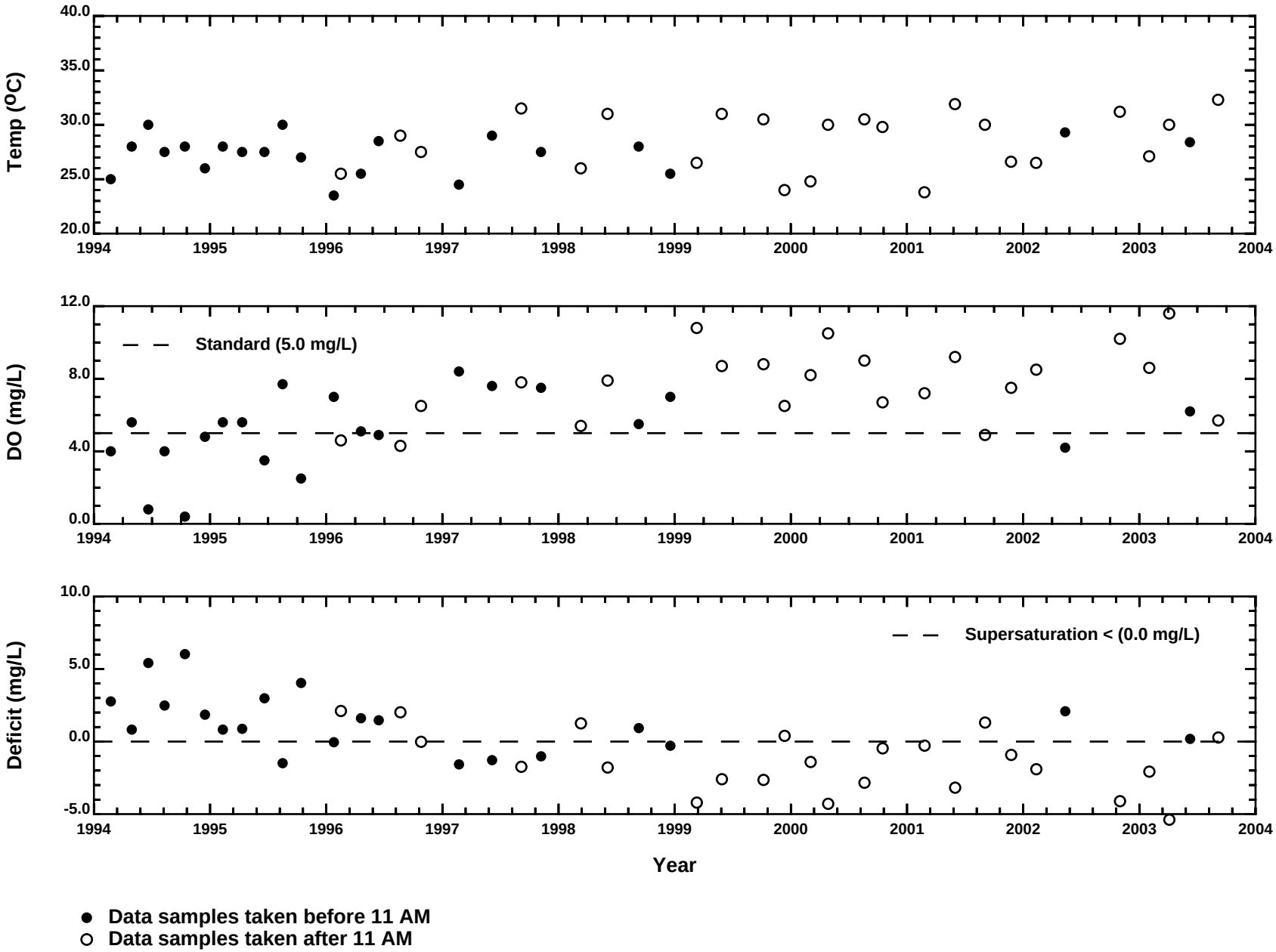


Figure A.42: Temperature, Dissolved Oxygen, Oxygen Deficit (1994-2003)
Rio Grande de Loiza below Trujillo Alto: USGS Gage 50059100, Loiza Watershed (Figure 4.1 Station #6)

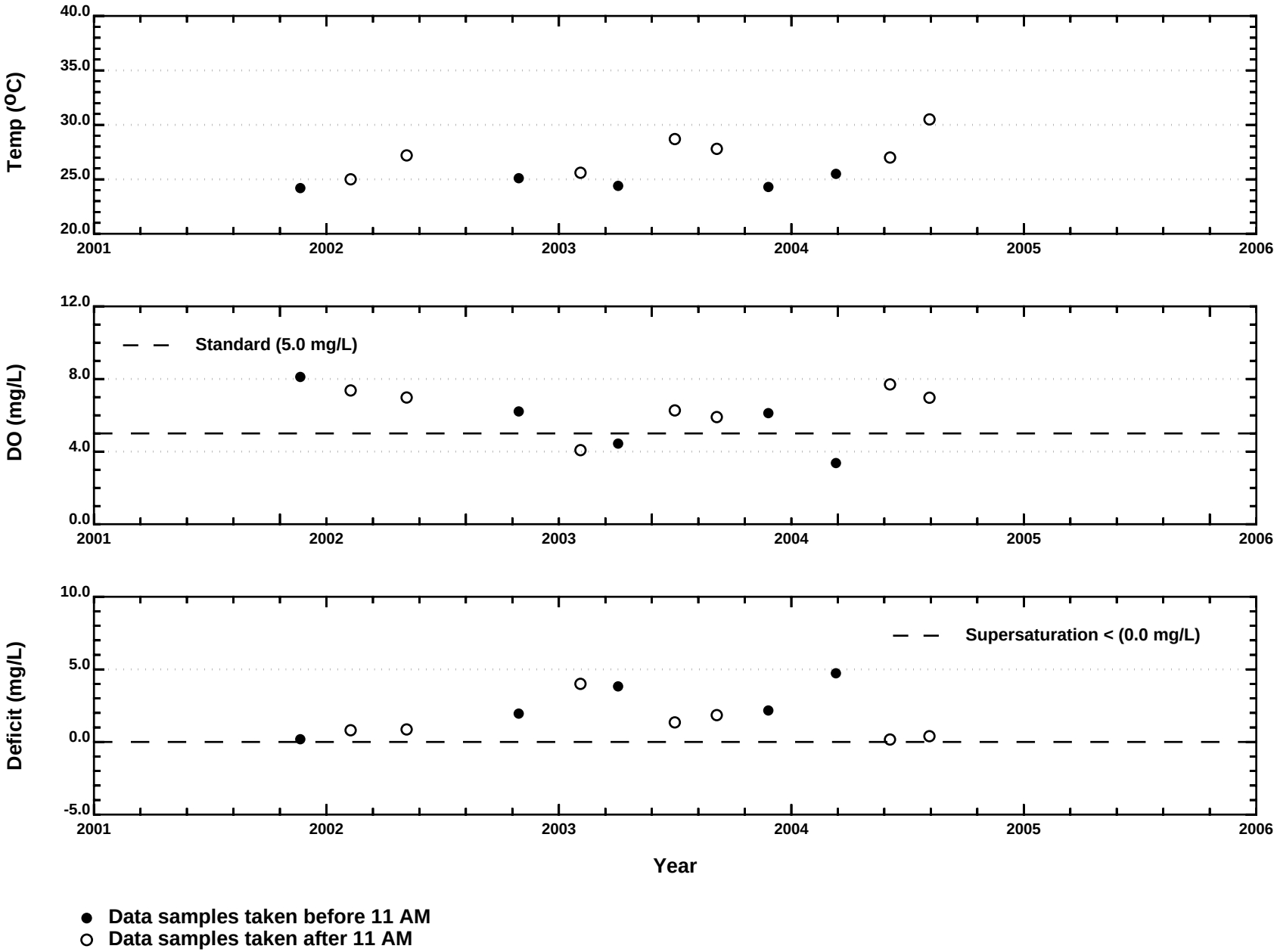


Figure A.43: Temperature, Dissolved Oxygen, Oxygen Deficit (1994-2003)
Rio Bairoa near Caguas: USGS Gage 50055400, Loiza Watershed (Figure 4.1 Station #3)

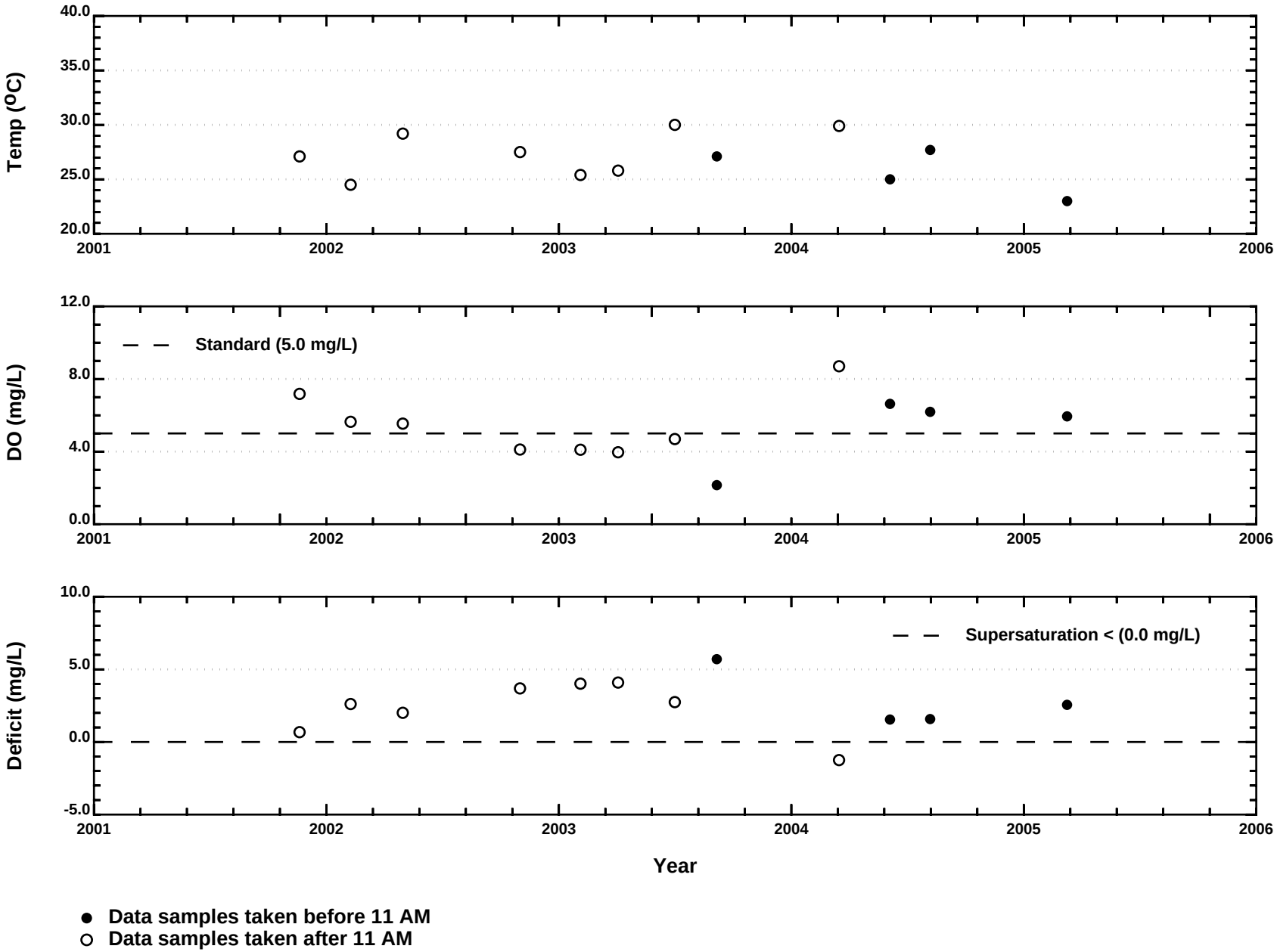


Figure A.44: Temperature, Dissolved Oxygen, Oxygen Deficit (1994-2003)
Rio Caguitas at HWY 30 at Caguas: USGS Gage 50055250, Loiza Watershed (Figure 4.1 Station #2)

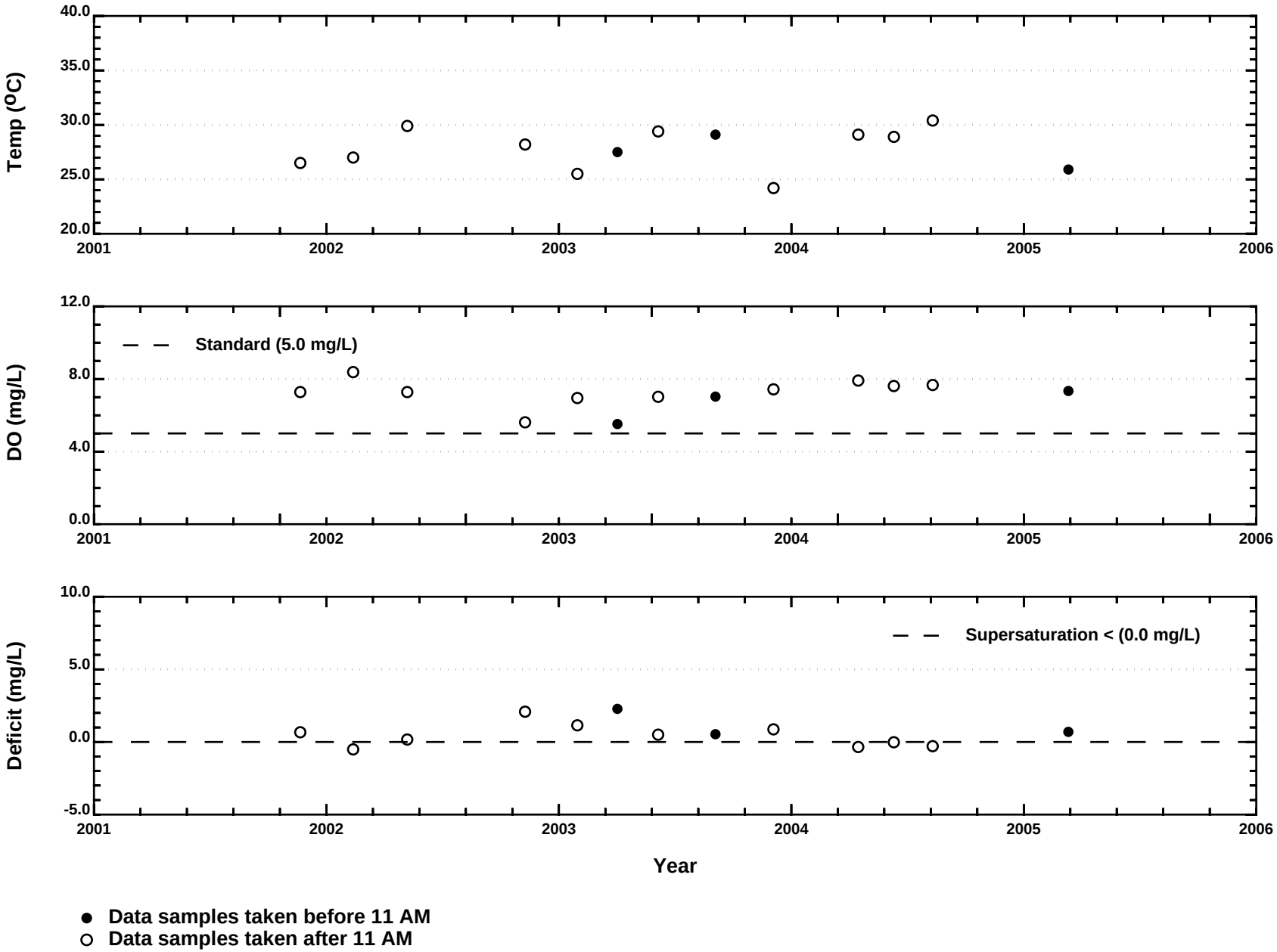


Figure A.45: Temperature, Dissolved Oxygen, Oxygen Deficit (1994-2003)
Rio Grande de Loiza at Caguas: USGS Gage 50055000, Loiza Watershed (Figure 4.1 Station #1)

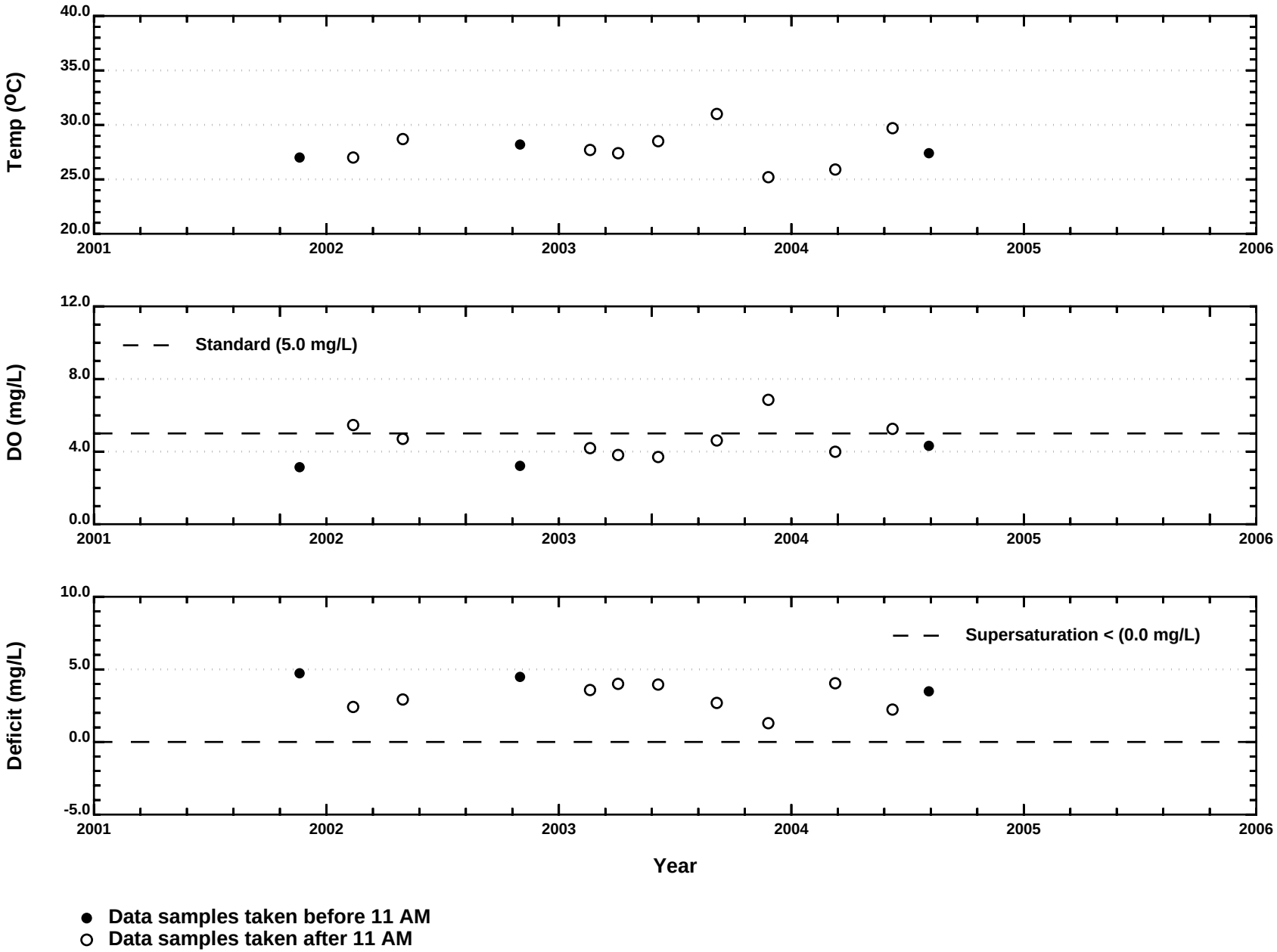


Figure A.46: Temperature, Dissolved Oxygen, Oxygen Deficit (1994-2003)
Rio Gurabo near Gurabo: USGS Gage 50057025, Loiza Watershed (Figure 4.1 Station #4)

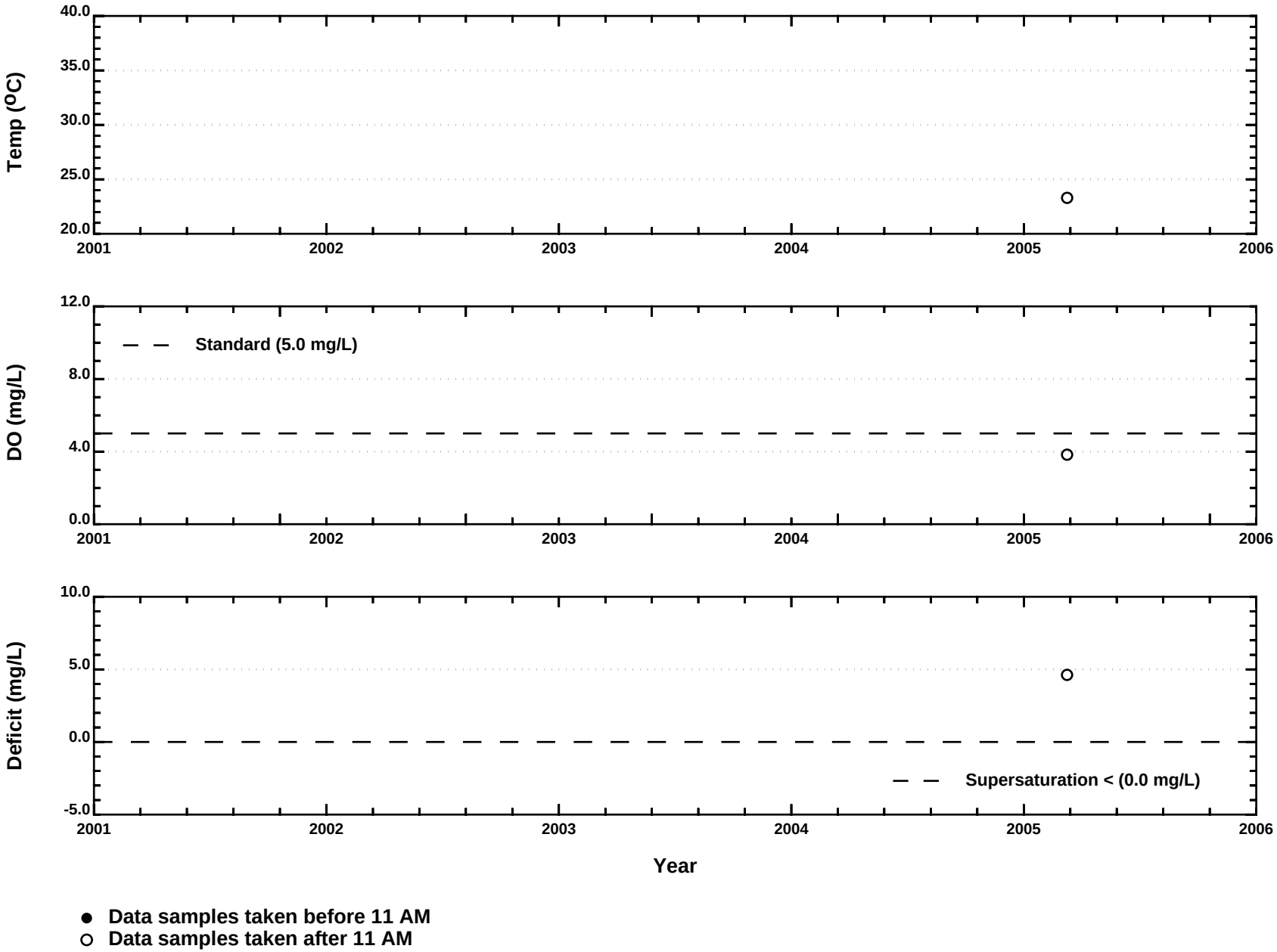


Figure A.47: Temperature, Dissolved Oxygen, Oxygen Deficit (1994-2003)
Lago Loiza at Damsite near Trujillo Alto: USGS Gage 50059000, Loiza Watershed (Figure 4.1 Station #5)

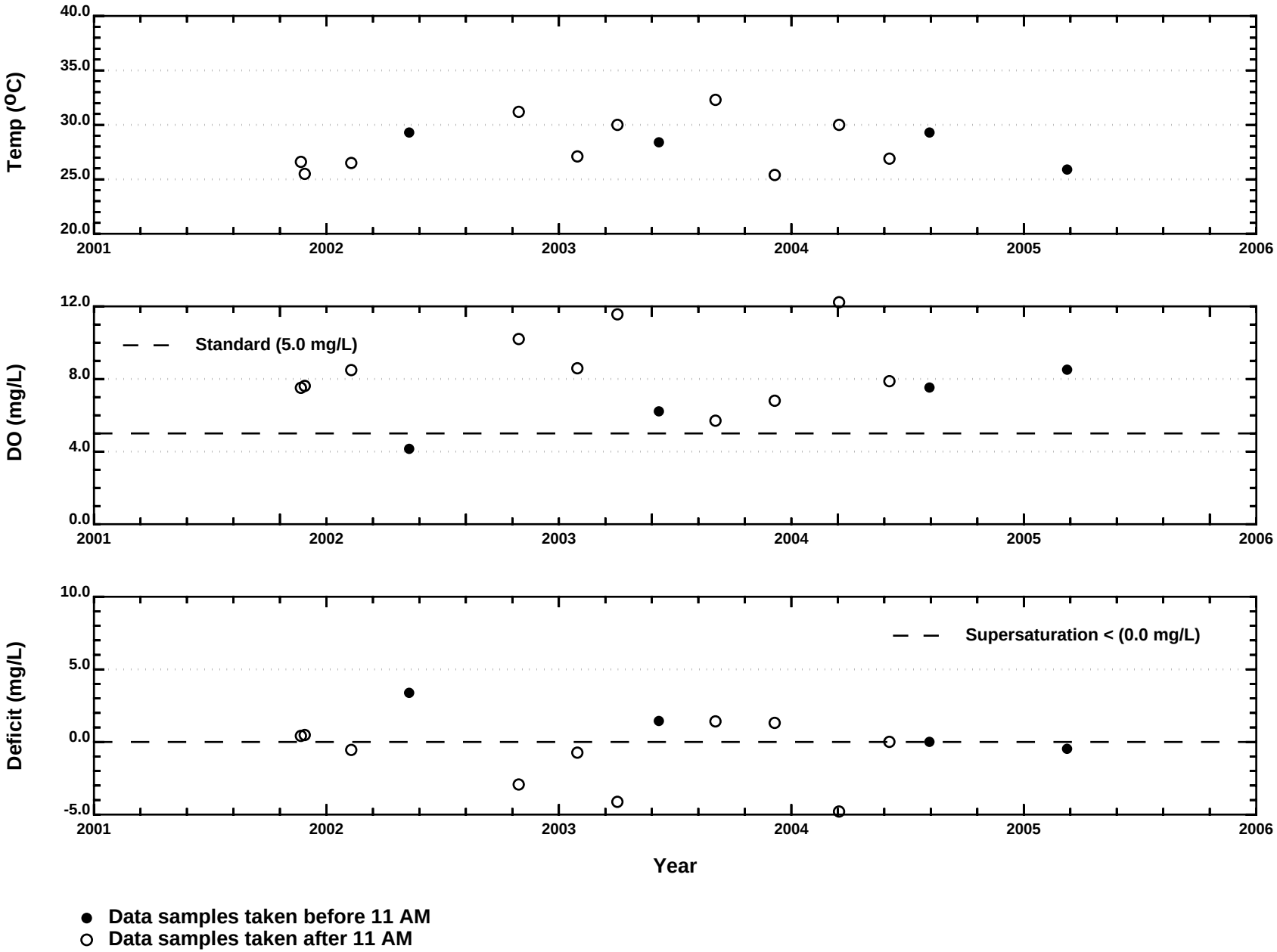
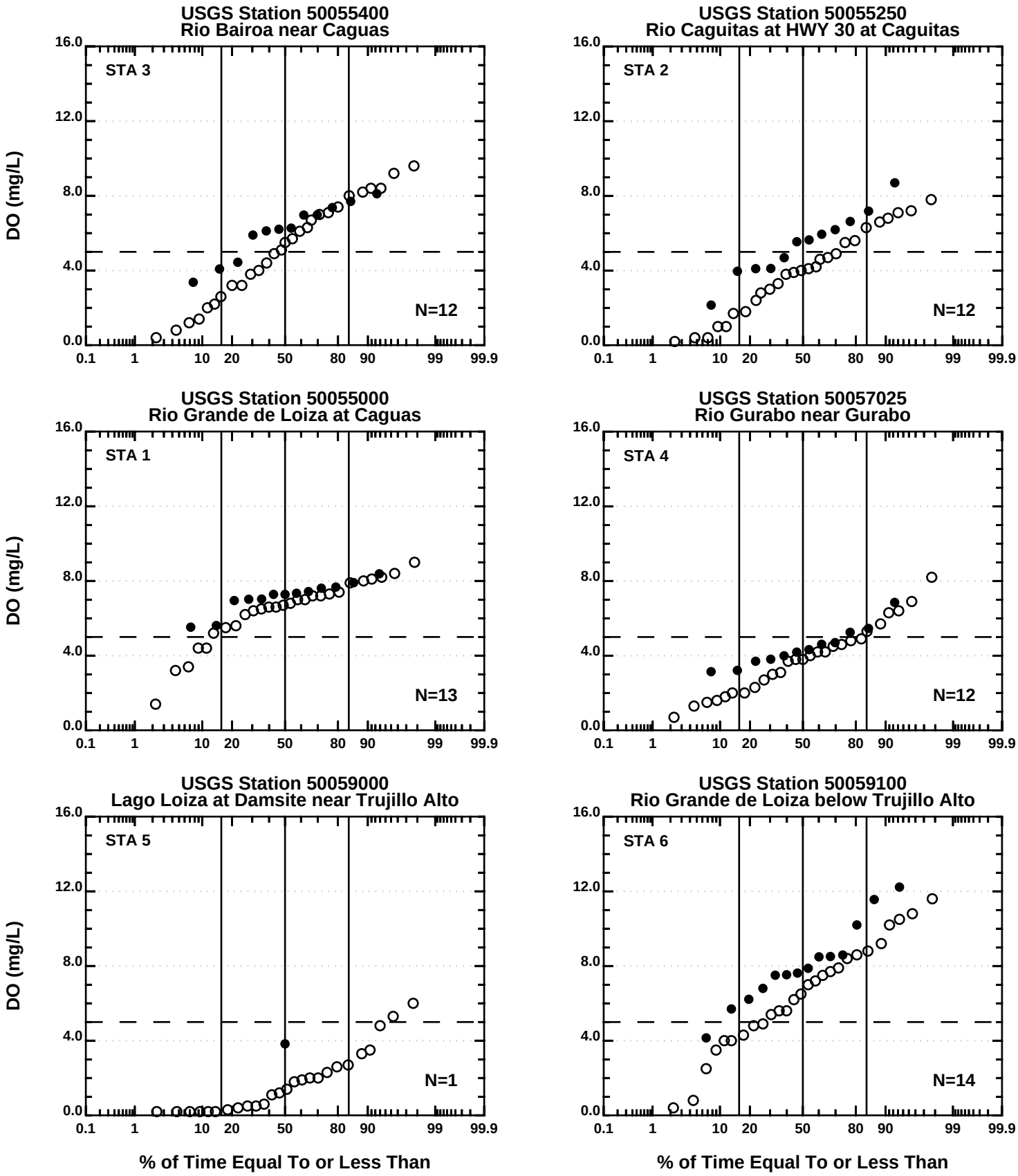
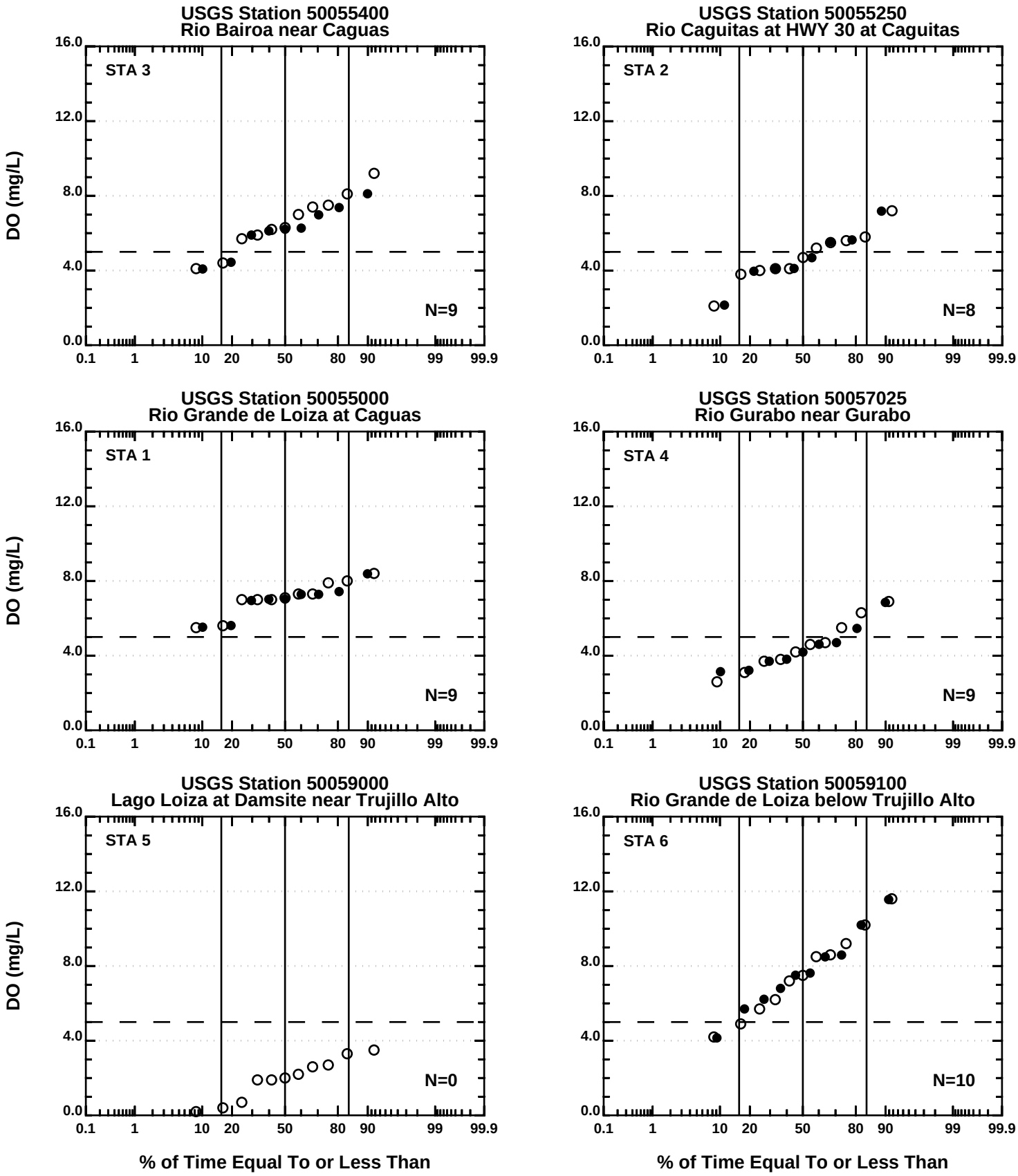


Figure A.48: Temperature, Dissolved Oxygen, Oxygen Deficit (1994-2003)
Rio Grande de Loiza below Trujillo Alto: USGS Gage 50059100, Loiza Watershed (Figure 4.1 Station #6)



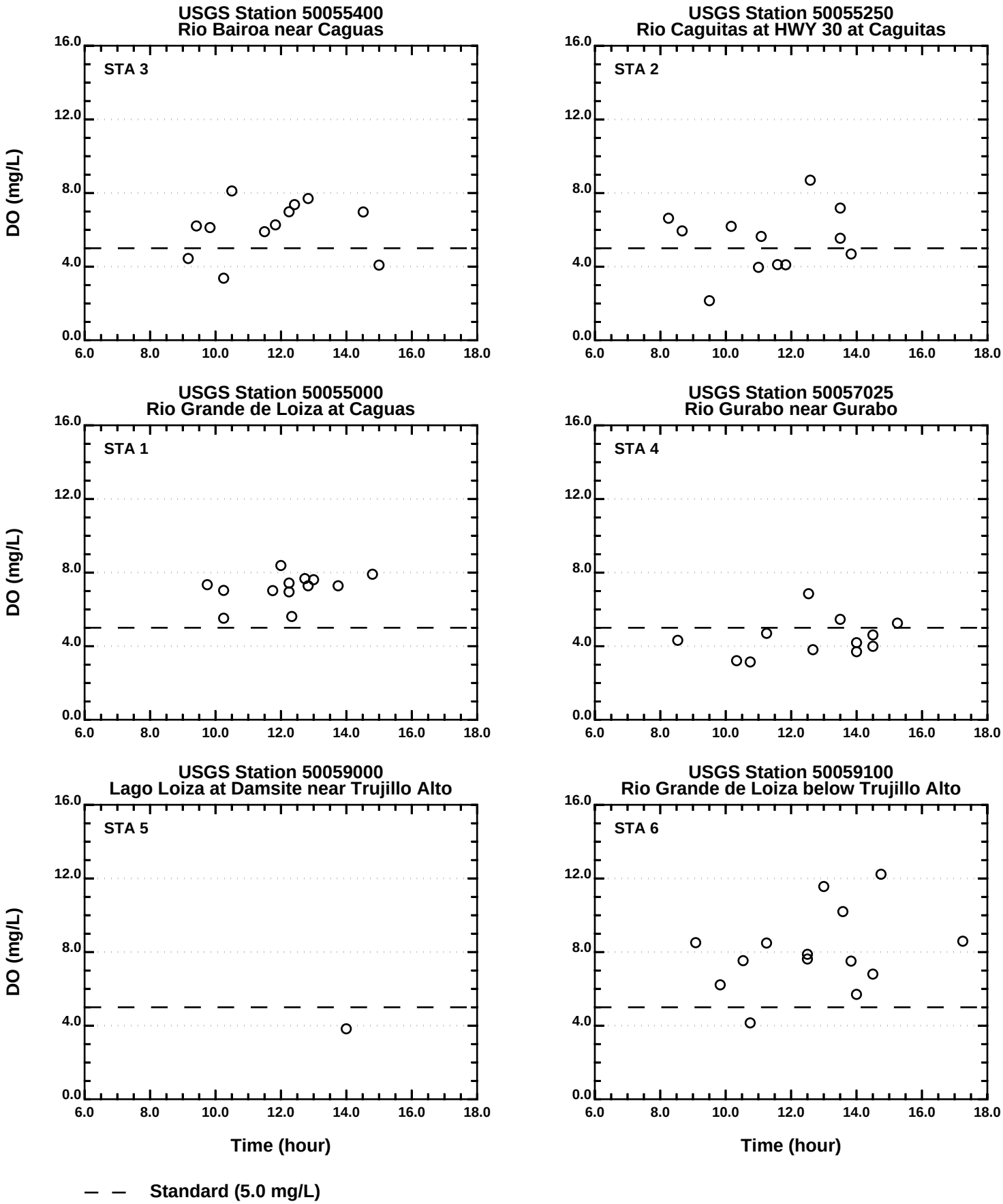
— — Standard (5.0 mg/L)
● EQB Data at USGS Stations (01-05)
○ USGS Data (94-03)

Figure A.49: Dissolved Oxygen Probability Plots for USGS/EQB Data at USGS Stations Loiza Watershed



— — Standard (5.0 mg/L)
● EQB Data at USGS Stations (01-03)
○ USGS Data (01-03)

Figure A.50: Dissolved Oxygen Probability Plots for USGS/EQB Data at USGS Stations Loiza Watershed



— — Standard (5.0 mg/L)

Figure A.51: DO Versus Time of Day for USGS/EQB Data at USGS Stations Loiza Watershed

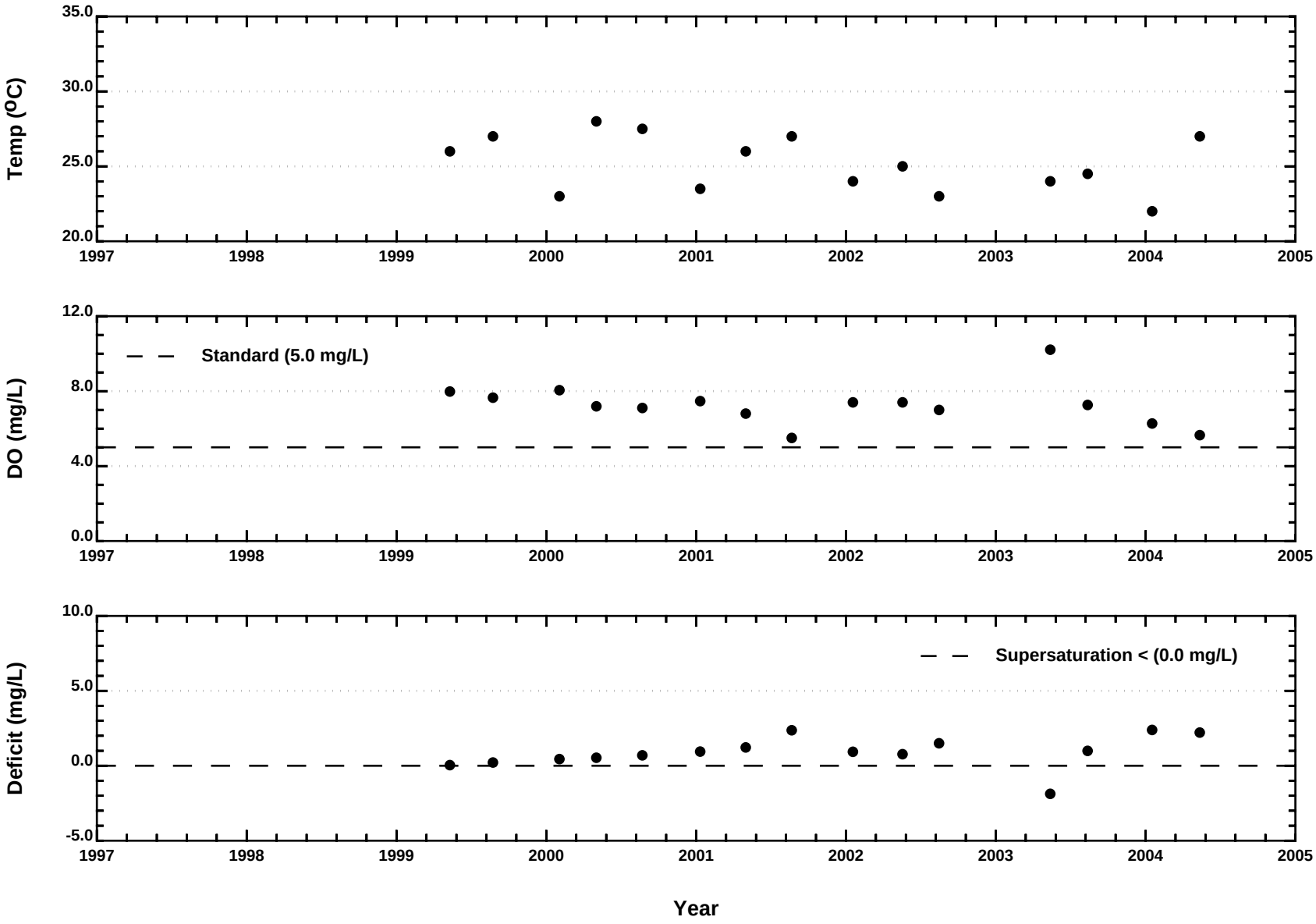


Figure A.52: Temperature, Dissolved Oxygen, Dissolved Oxygen Deficit (1997-2004)
Rio Valenciano: PREQB Station L-1, Loiza Watershed

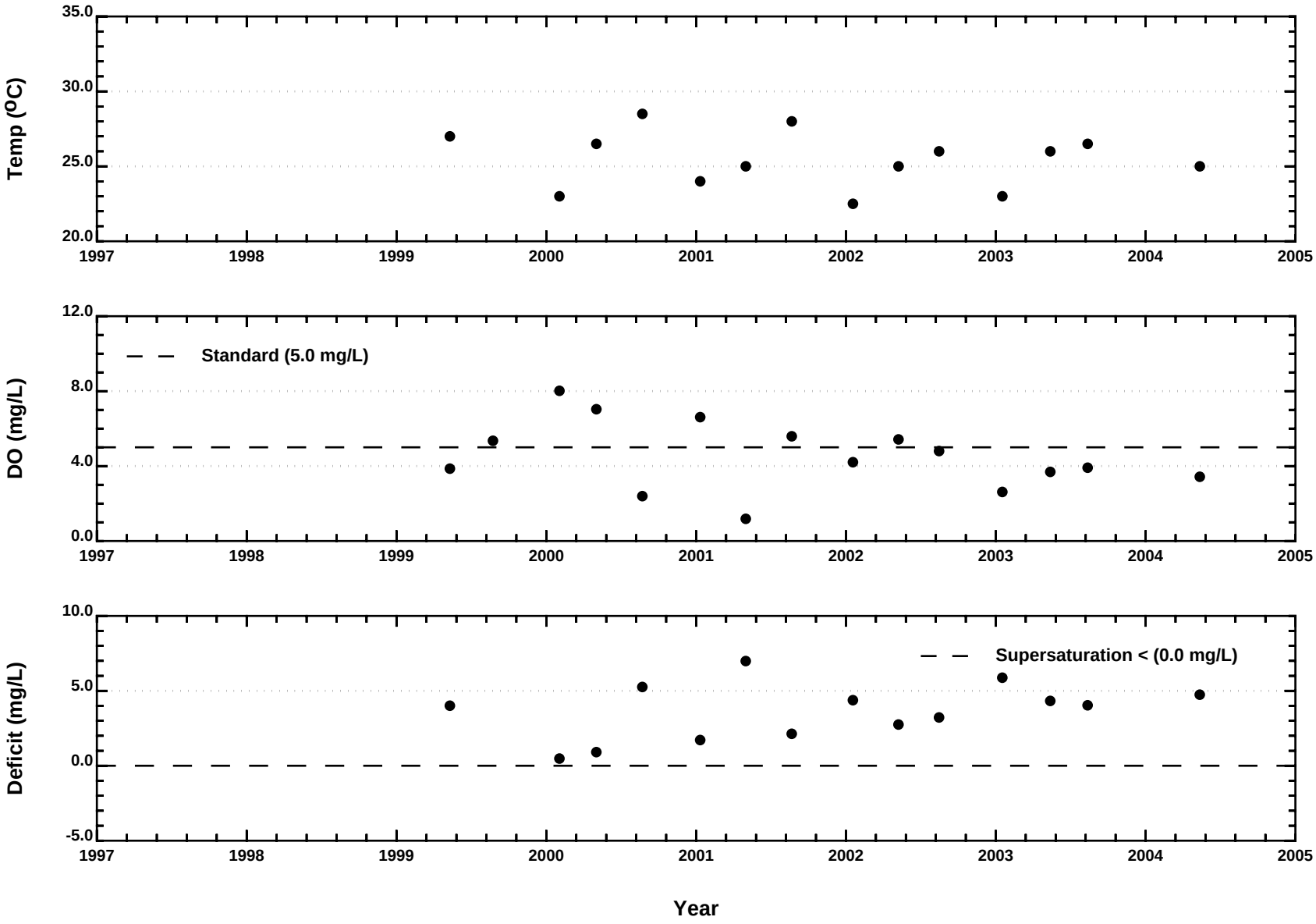


Figure A.53: Temperature, Dissolved Oxygen, Dissolved Oxygen Deficit (1997-2004)
Quebrada Sin Nombre: PREQB Station L-2, Loiza Watershed

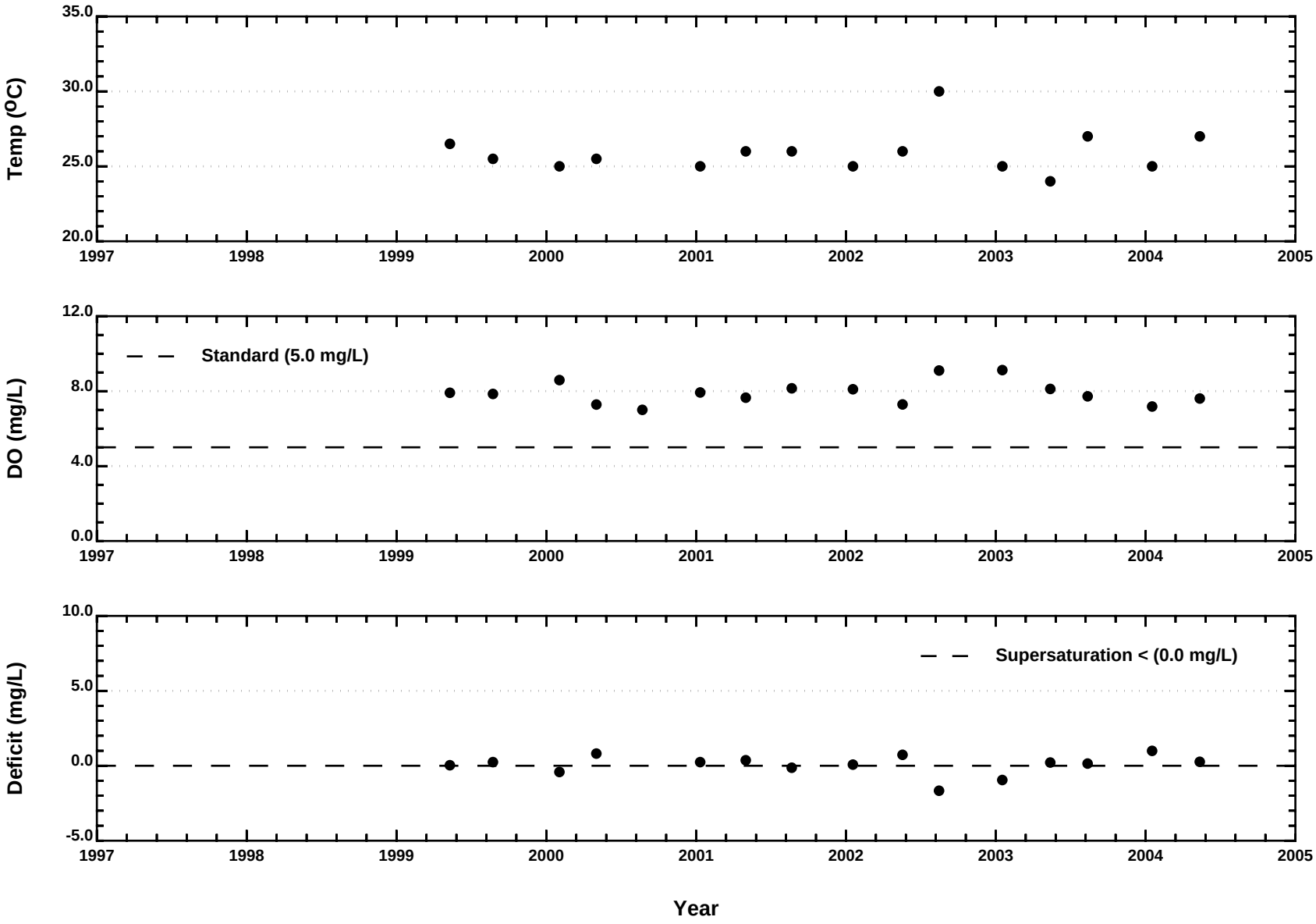


Figure A.54: Temperature, Dissolved Oxygen, Dissolved Oxygen Deficit (1997-2004)
Rio Grande de Loiza near San Lorenzo: PREQB Station L-3, Loiza Watershed

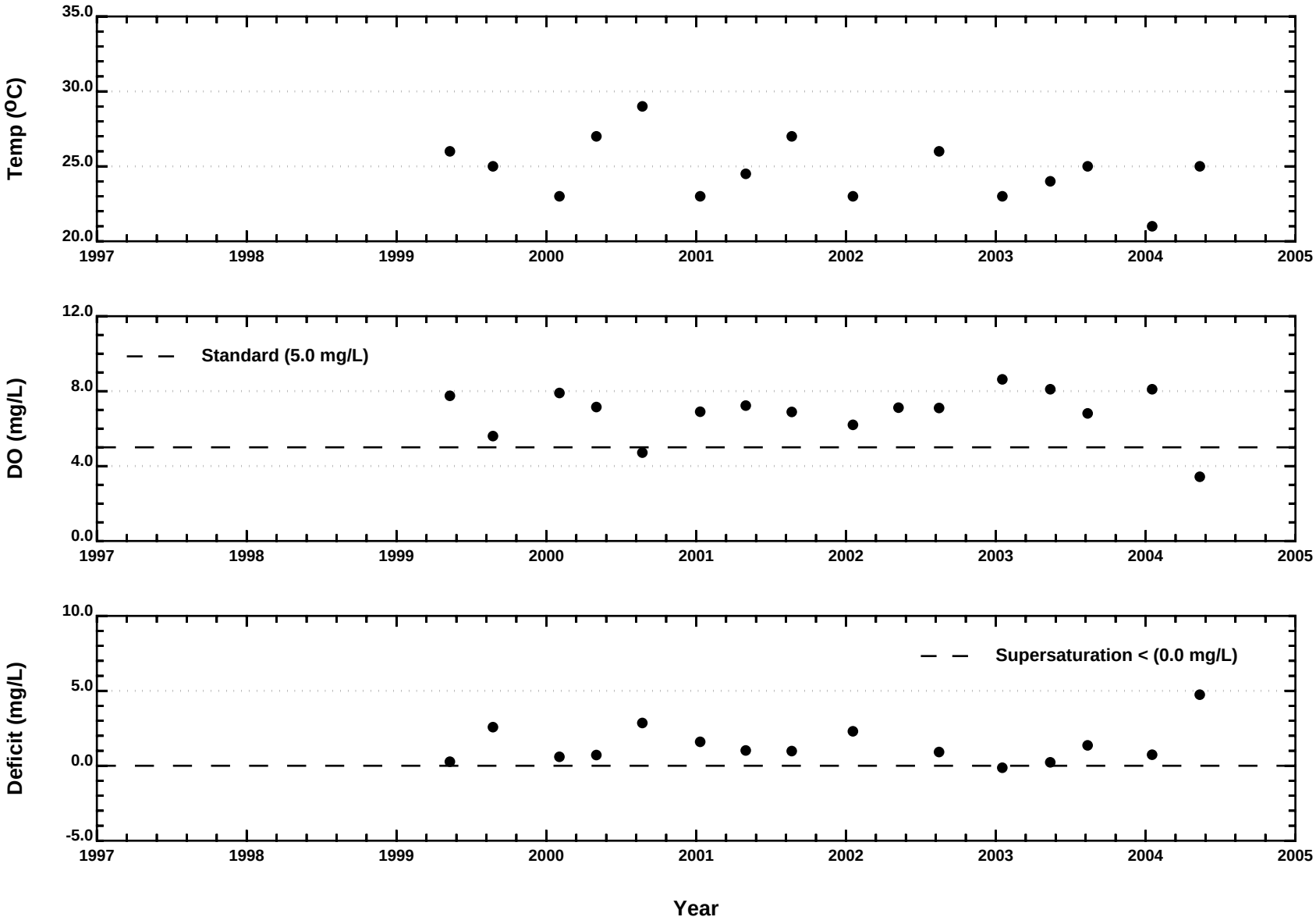


Figure A.55: Temperature, Dissolved Oxygen, Dissolved Oxygen Deficit (1997-2004)
Rio Cygus near San Lorenzo: PREQB Station L-4, Loiza Watershed

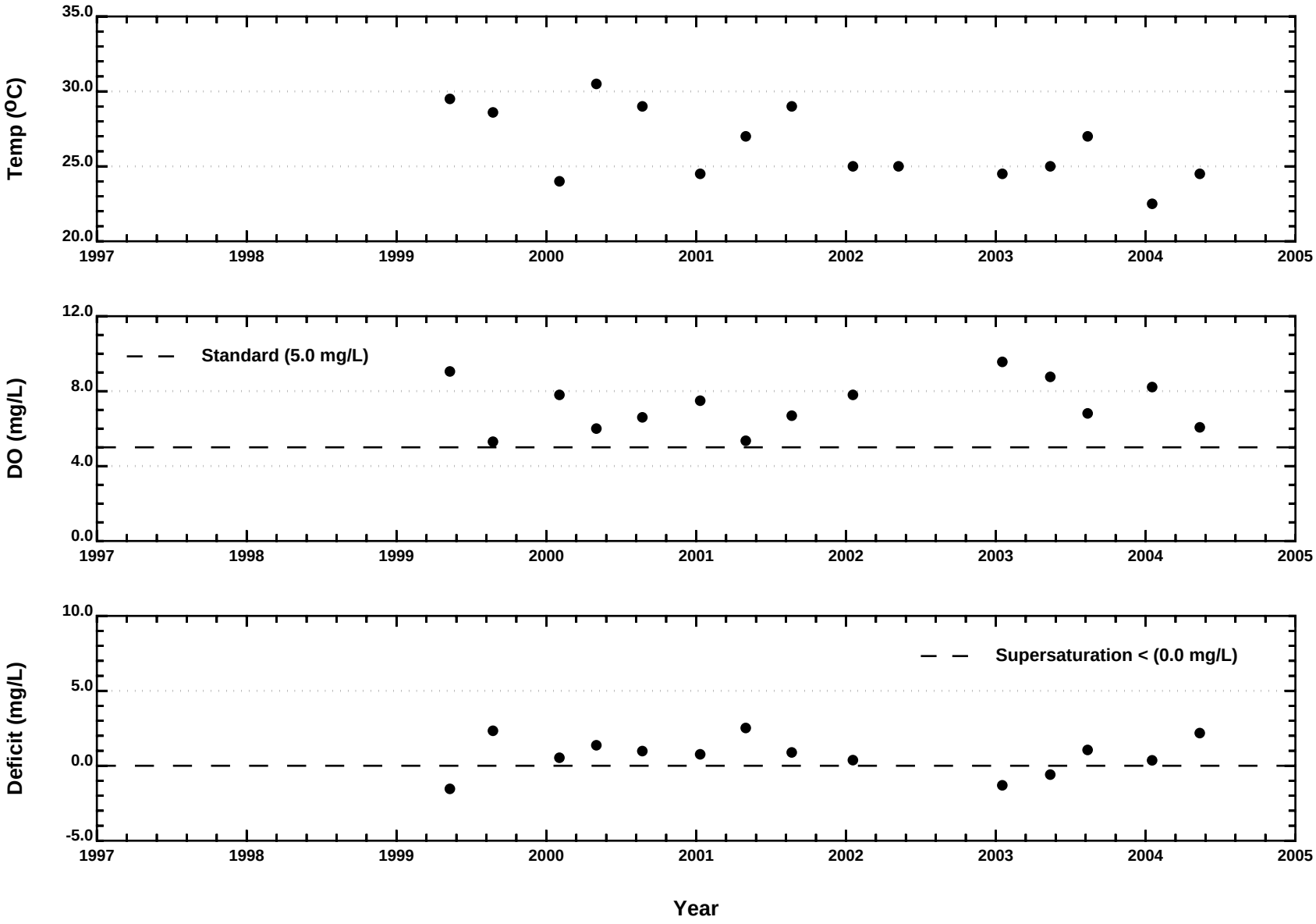
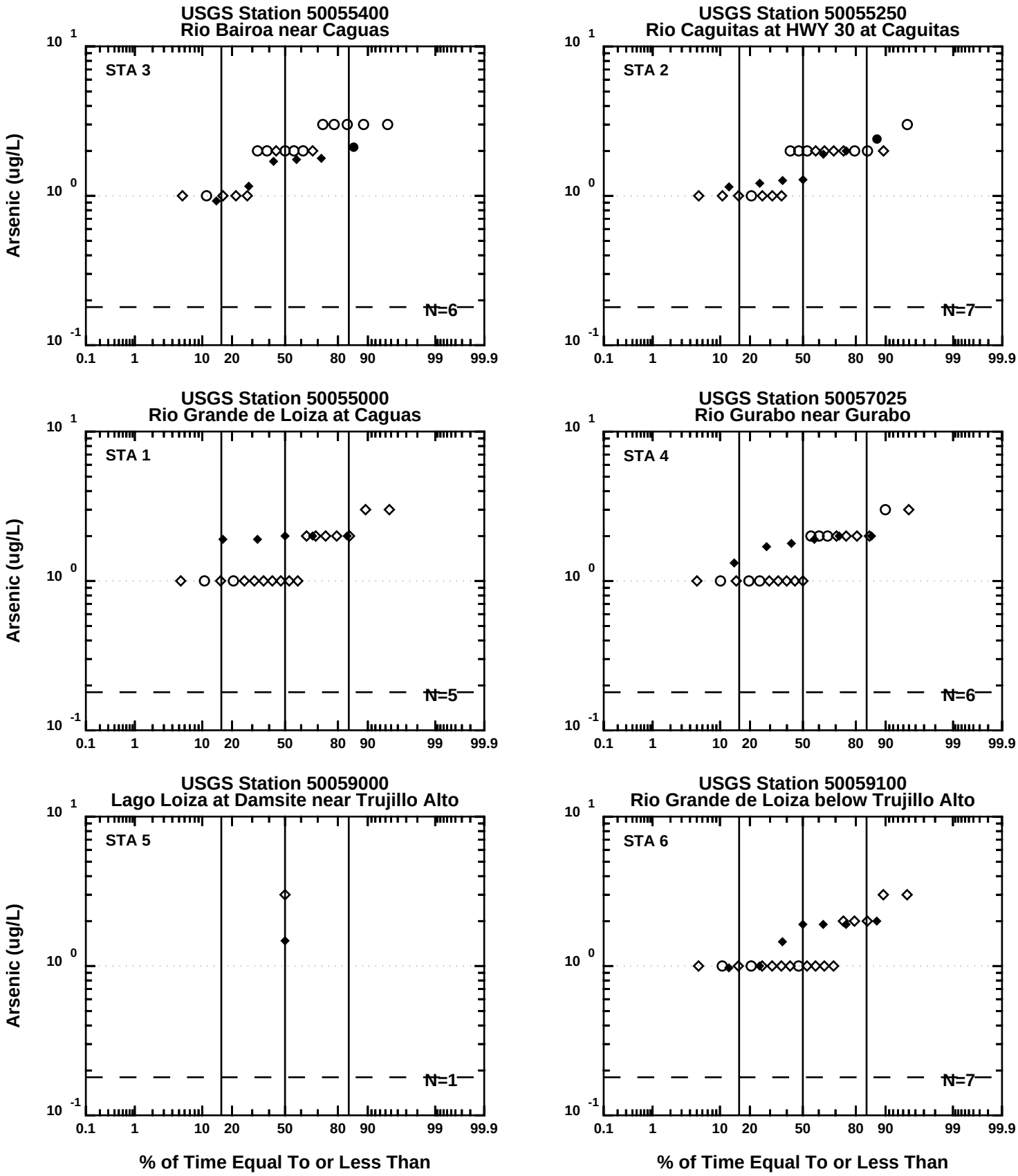
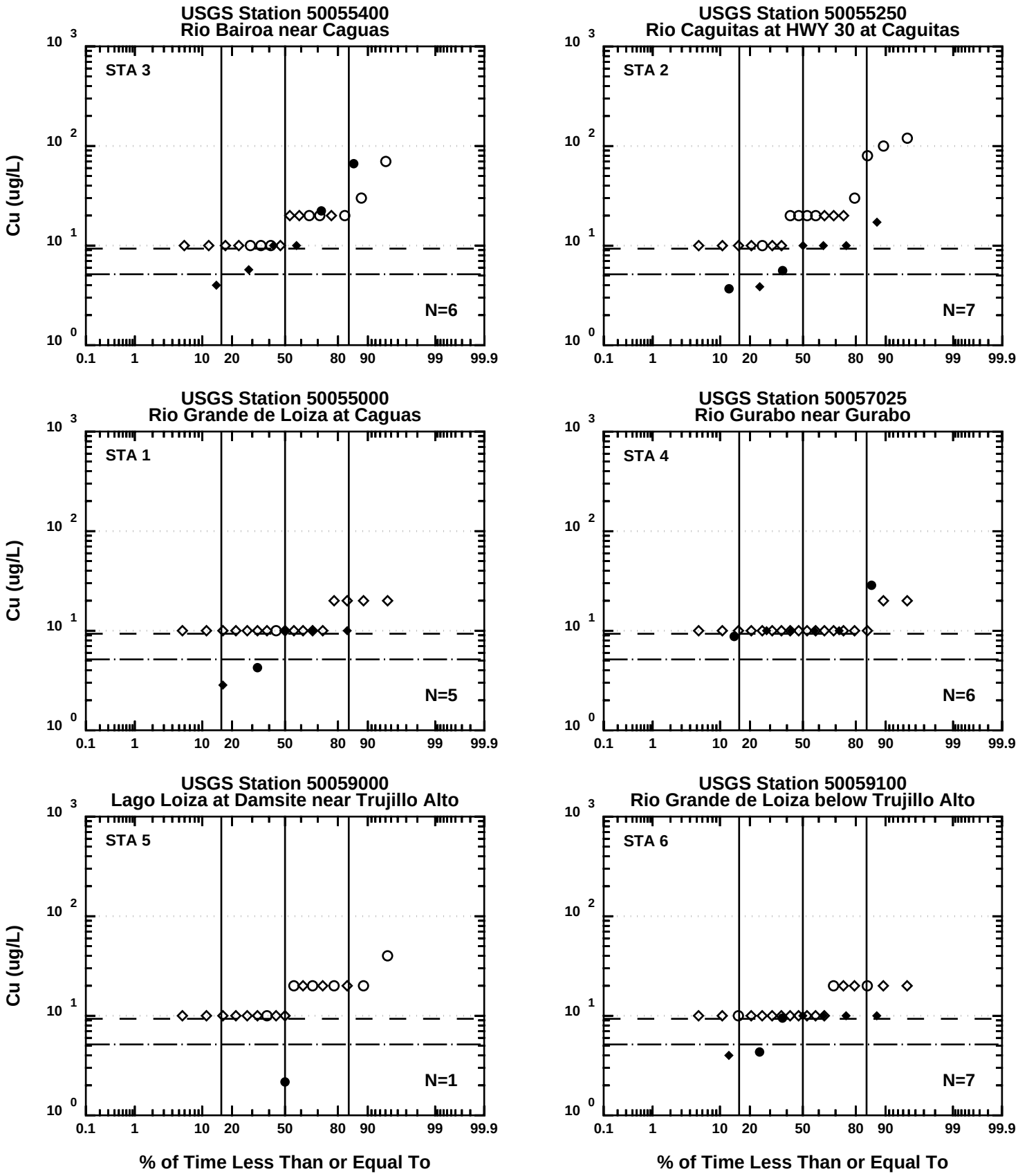


Figure A.56: Temperature, Dissolved Oxygen, Dissolved Oxygen Deficit (1997-2004)
Rio Turabo: PREQB Station L-5, Loiza Watershed



— — Standard (0.18 ug/L)
◆◇ Data with detection limit flag
○◇ USGS Data (94-03)
●◆ EQB Data at USGS Stations (01-05)

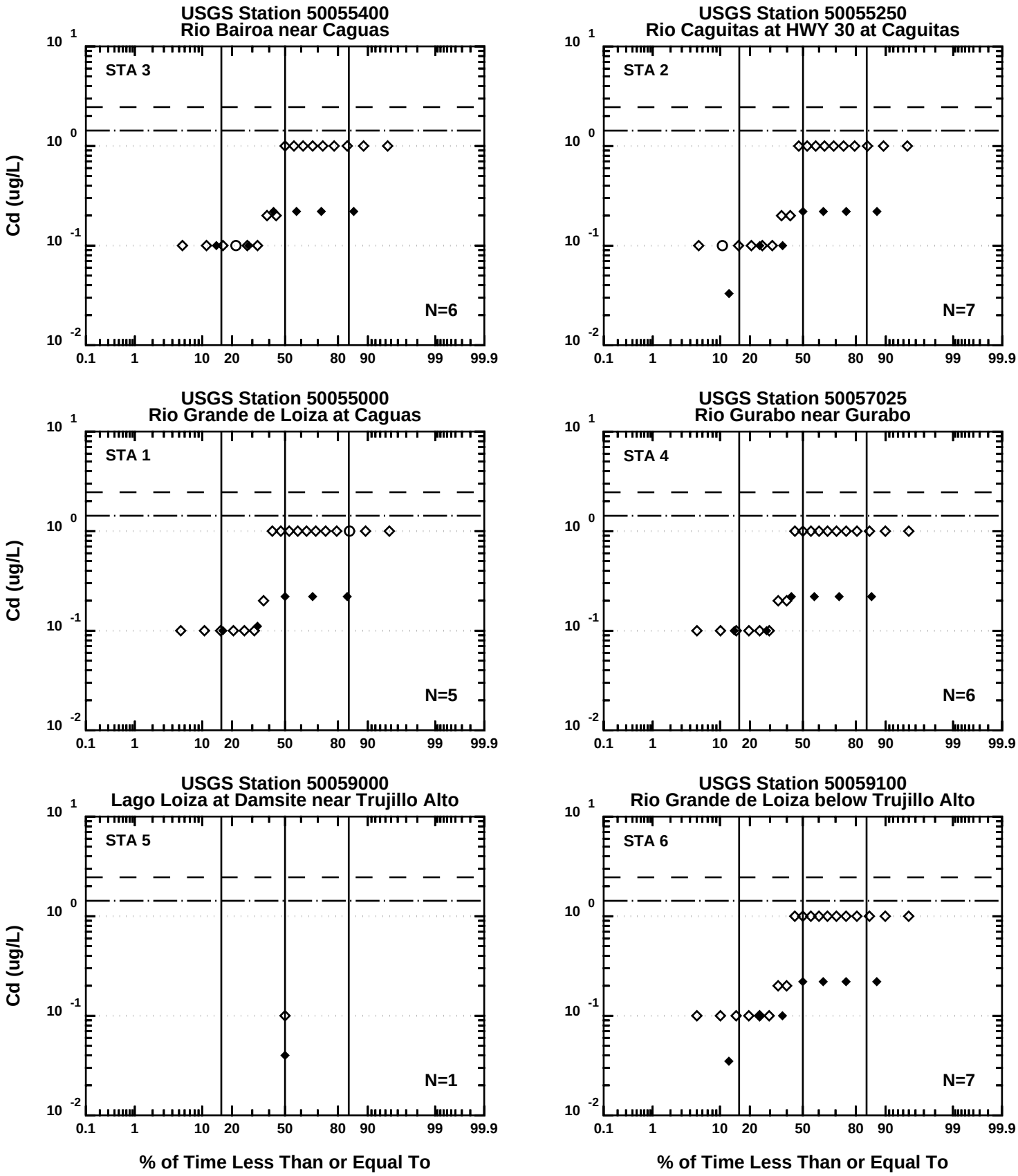
Figure A.57: Arsenic Probability Plots for USGS/EQB Data at USGS Stations Loiza Watershed



— — 9.329 ug/L (Hardness = 100 mg/L)
—·— 5.159 ug/L (Hardness = 50 mg/L)

◆◇ Data with detection limit flag
●◆ EQB Data at USGS Stations (01-05)
○◇ USGS Data (94-03)

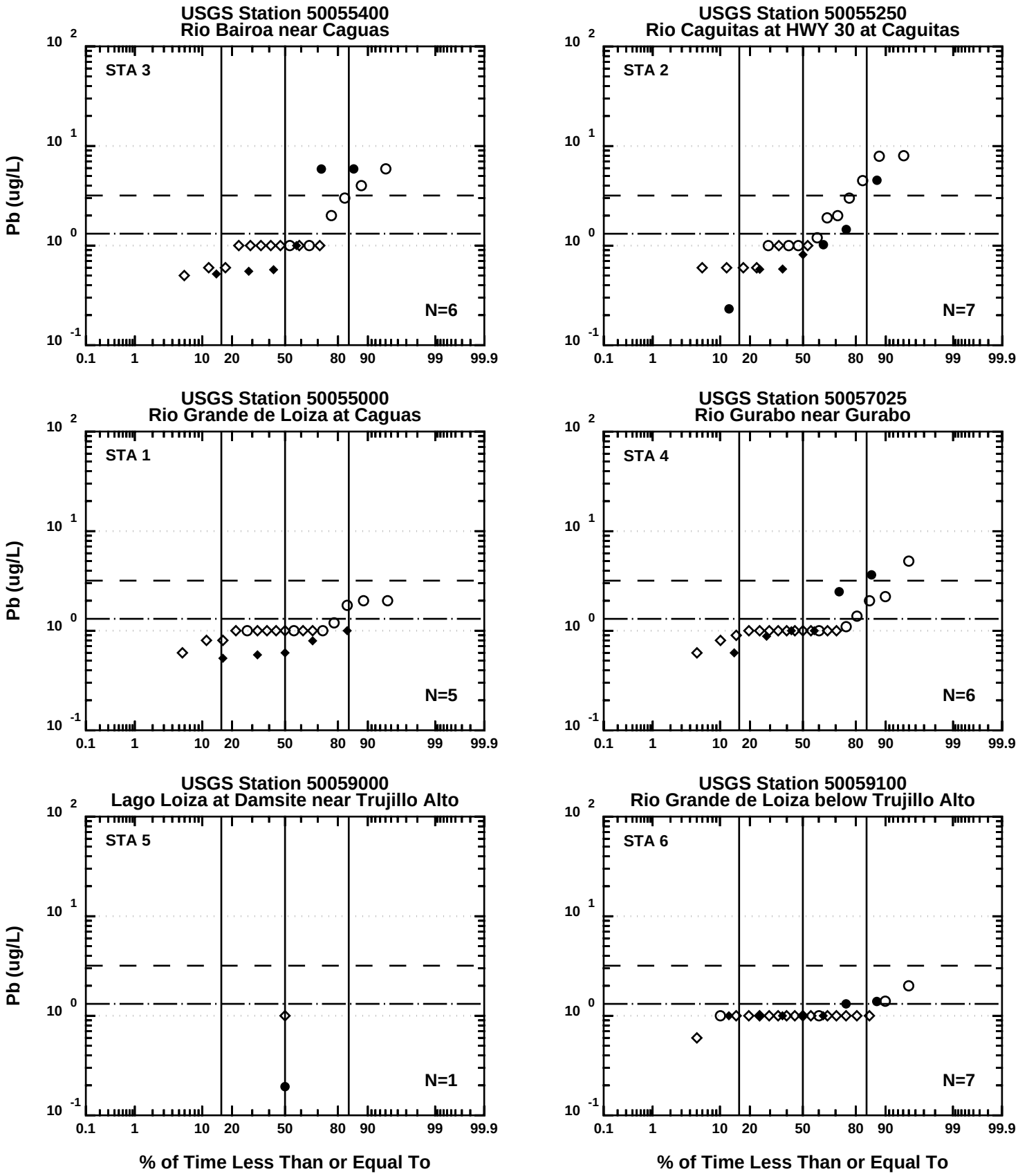
Figure A.58: Copper Probability Plots for USGS/EQB Data at USGS Stations Loiza Watershed



— — 2.462 ug/L (Hardness = 100 mg/L)
—·— 1.429 ug/L (Hardness = 50 mg/L)

◆◇ Data with detection limit flag
●◆ EQB Data at USGS Stations (01-05)
○◇ USGS Data (94-03)

Figure A.59: Cadmium Probability Plots for USGS/EQB Data at USGS Stations Loiza Watershed



— — 3.182 ug/L (Hardness = 100 mg/L)
—·— 1.317 ug/L (Hardness = 50 mg/L)

◆◇ Data with detection limit flag
●◆ EQB Data at USGS Stations (01-05)
○◇ USGS Data (94-03)

Figure A.60: Lead Probability Plots for USGS/EQB Data at USGS Stations Loiza Watershed

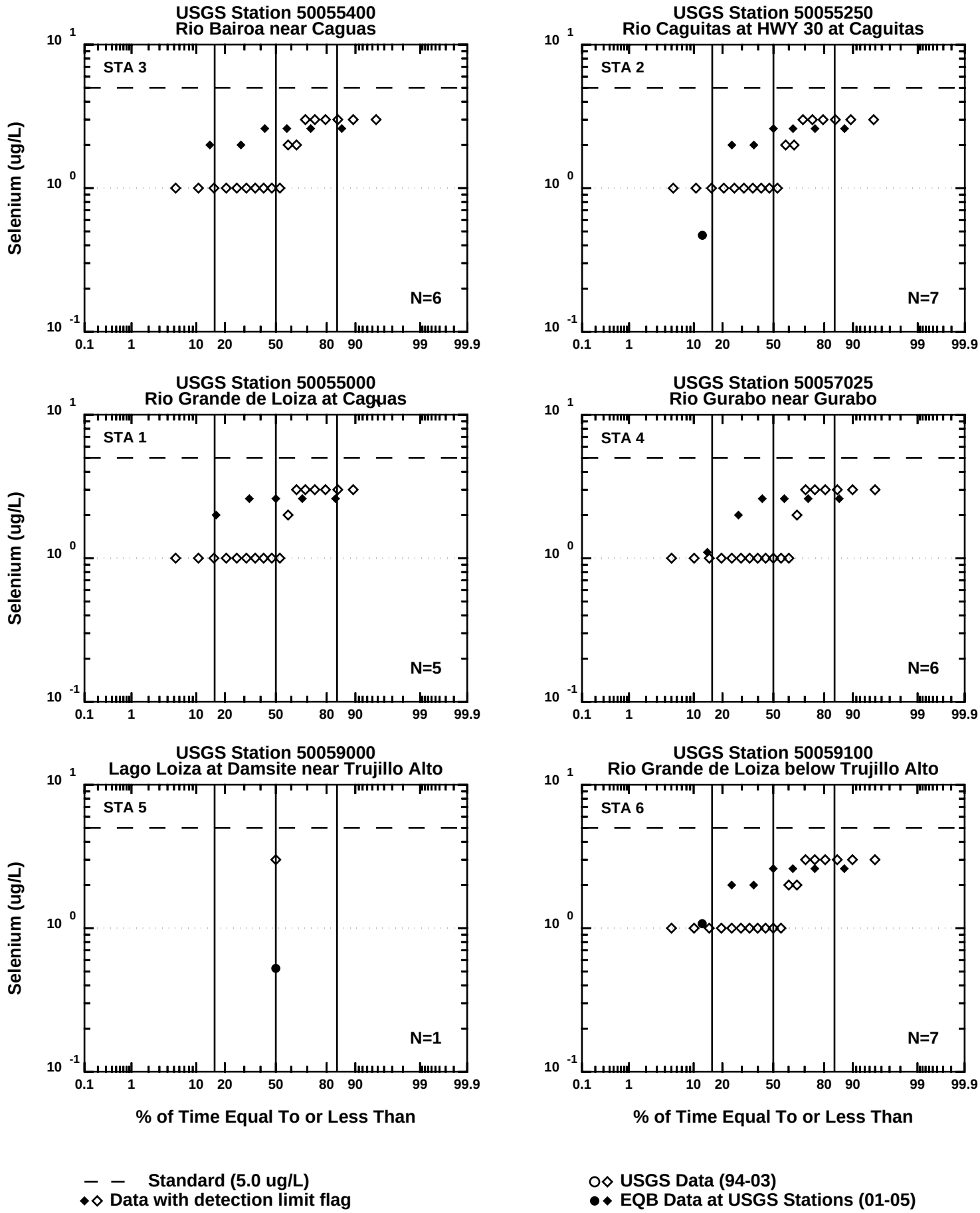
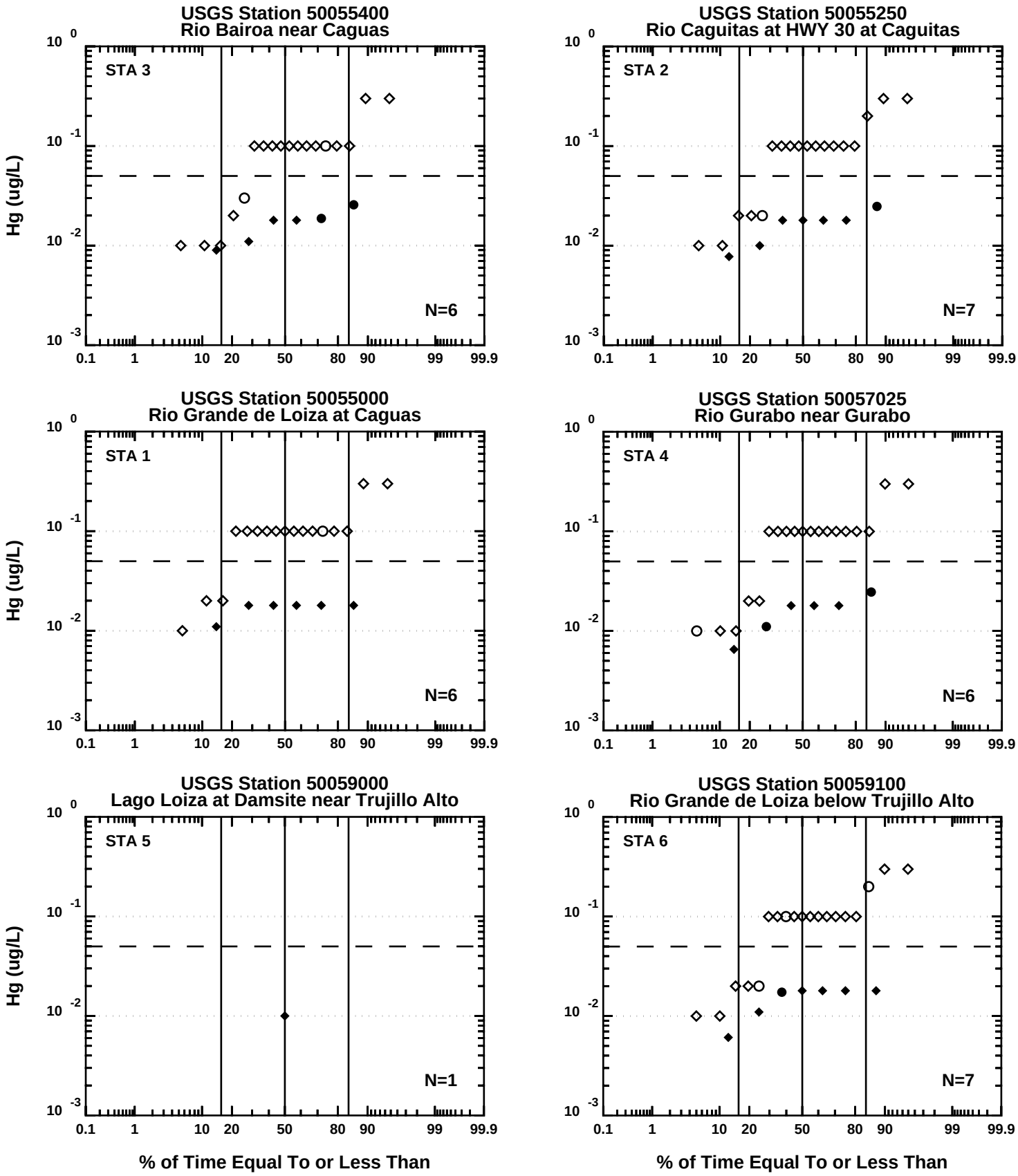
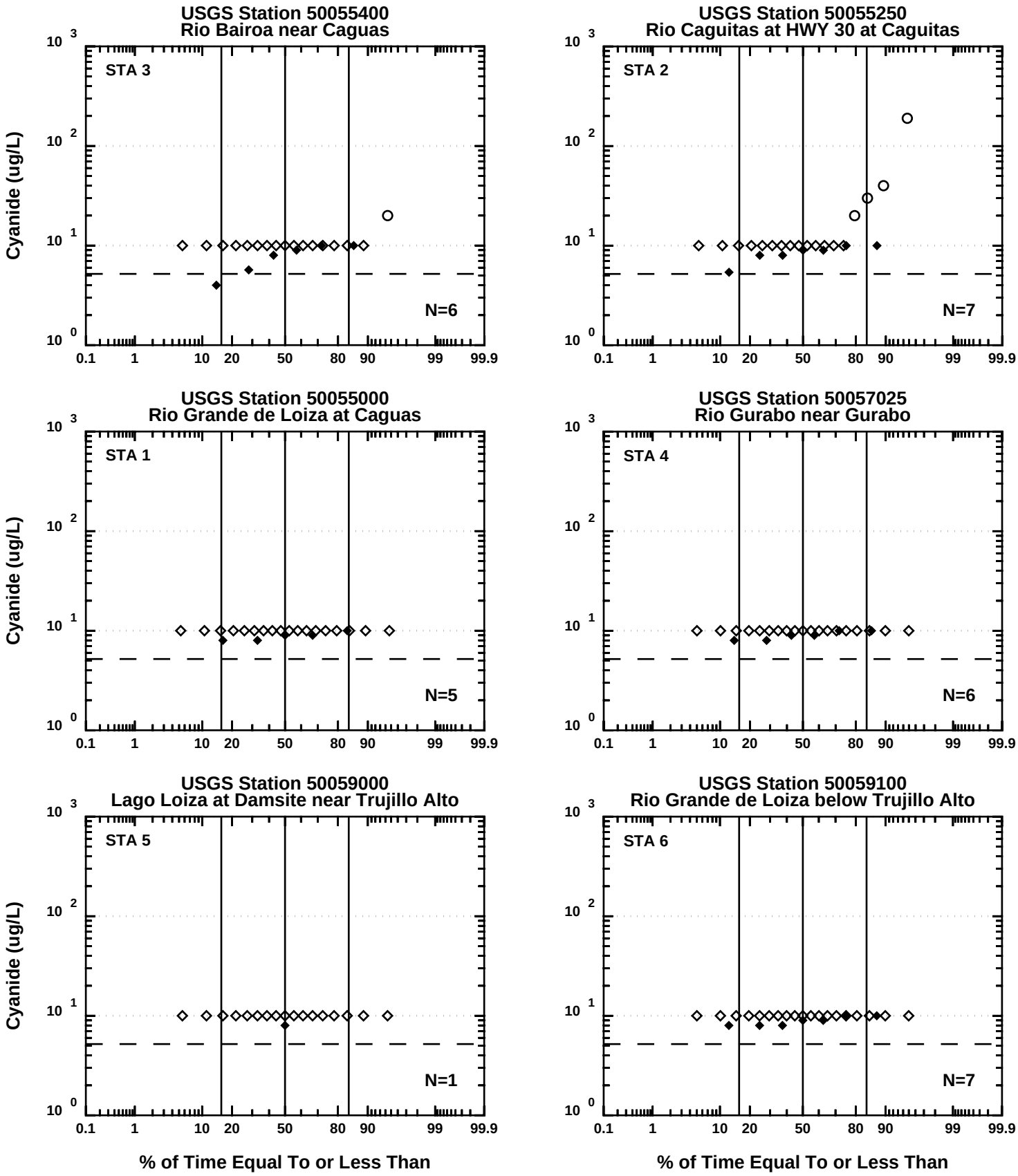


Figure A.61: Selenium Probability Plots for USGS/EQB Data at USGS Stations Loiza Watershed



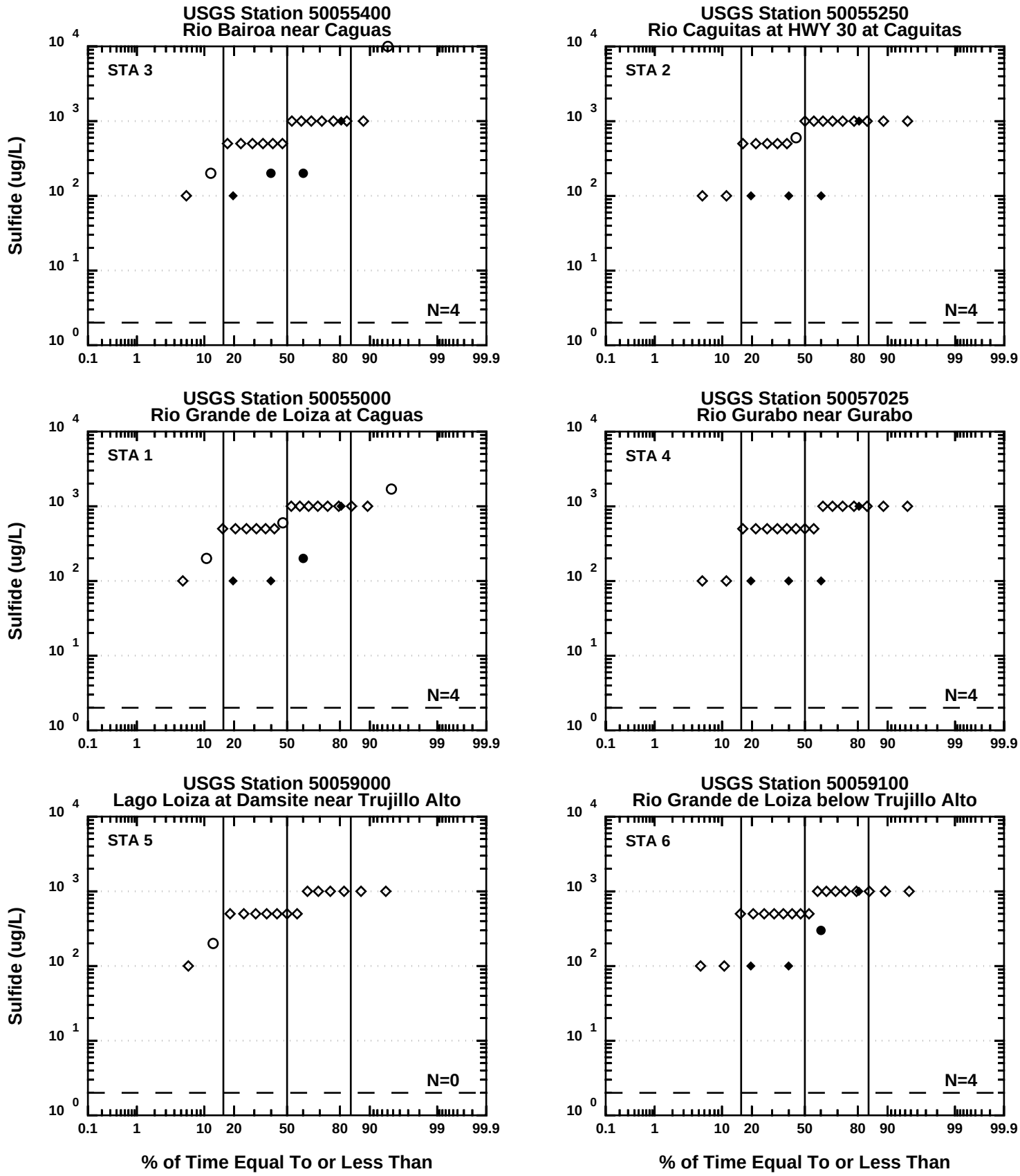
— — Standard (0.05 ug/L)
◆◇ Data with detection limit flag
○◇ USGS Data (94-03)
●◆ EQB Data at USGS Stations (01-05)

Figure A.62: Mercury Probability Plots for USGS/EQB Data at USGS Stations Loiza Watershed



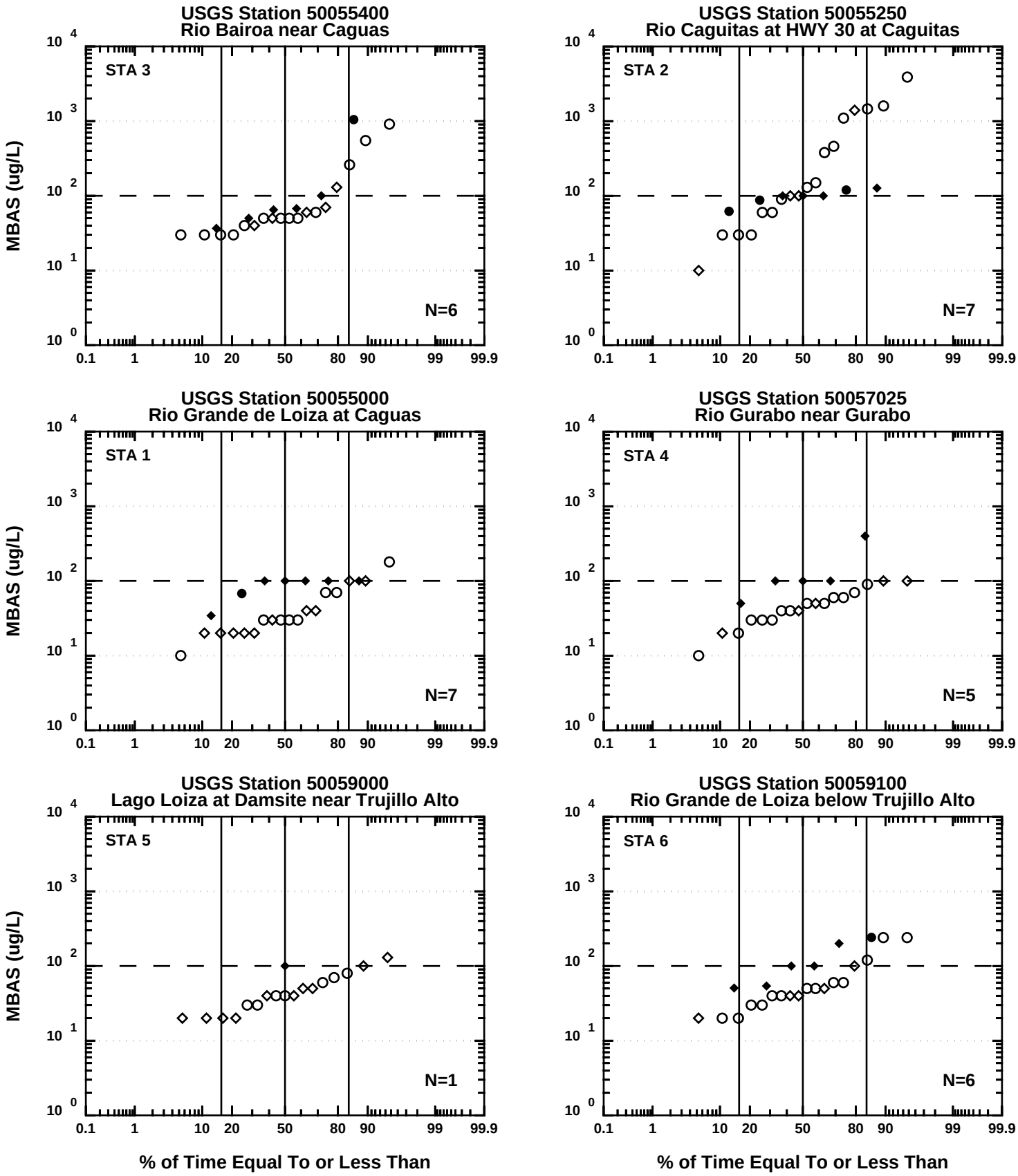
— — Standard (5.2 ug/L)
◆◇ Data with detection limit flag
○◇ USGS Data (94-03)
●◆ EQB Data at USGS Stations (01-05)

Figure A.63: Cyanide Probability Plots for USGS/EQB Data at USGS Stations Loiza Watershed



— — Standard (2.0 ug/L)
◆◇ Data with detection limit flag
○◇ USGS Data (94-03)
●◆ EQB Data at USGS Stations (01-05)

Figure A.64: Sulfide Probability Plots for USGS/EQB Data at USGS Stations Loiza Watershed



— — Standard (100 ug/L)
◆◇ Data with detection limit flag
○◇ USGS Data (94-03)
●◆ EQB Data at USGS Stations (01-05)

Figure A.65: Surfactants Probability Plots for USGS/EQB Data at USGS Stations Loiza Watershed

APPENDIX B

POLLUTANT SOURCES

Table B-1

WASTEWATER DISCHARGE LOCATIONS

Title	Permit	Name	Latitude	Longitude	Watershed	Receiving Water	Map Number
Other PT sources	PR0024872	Crown Cork Inc.	18.38060000000	-65.94280000000	Rio Grande de Loiza	Rio Grande de Loiza	NP1
Other PTsources	PR0025241	SU Cubuy Ward School	18.26770000000	-65.87500000000	Rio Grande de Loiza	Cubuy River	NP2
Other PT sources	PR0024791	Key Pharm,PR Inc.	18.18640000000	-65.88110000000	Rio Grande de Loiza		NP3
Other PT sources	PR0023248	Life Saver Manufacture	18.16890000000	-65.88500000000	Rio Grande de Loiza	Quebrada Sin Nom	NP4
Other PT sources	PR0023426	Mun. Govt CTR of Mun. Ops	18.15370000000	-66.02062000000	Rio Grande de Loiza	Rio Bairoa	NP5
Other PT sources	PR0024287	PRPBA Espino	18.07096000000	-65.07096000000	Rio Grande de Loiza	Emajagua River	NP6
Other PT sources	PR0025577	PRPBA La Gloria	18.19113000000	66.00296000000	Rio Grande de Loiza	Rio Grande de Loiza	NP7
Other PT sources	PR0024309	S.U. Rivera Molina	18.17810000000	-65.91440000000	Rio Grande de Loiza	QB Valencio	NP8
Other PT sources	PR0021997-C	SK & F-C	18.19500000000	-66.12500000000	Rio Grande de Loiza	QB Quebradillas	NP9
Other PT sources	PR0021997-D	SK & F-D	18.19690000000	-66.12500000000	Rio Grande de Loiza	QB Quebradillas	NP10
Other PT sources	PR0021997-E	SK & F-E	18.19720000000	-66.12500000000	Rio Grande de Loiza	QB Quebradillas	NP11

Table B-1 (continued)

WASTEWATER DISCHARGE LOCATIONS

Title	Permit	Name	Latitude	Longitude	Watershed	Receiving Water	Map Number
PRASA WTP	PR0022896	Aguas Buenas WTP	18.26060000000	-66.10420000000	Rio Grande de Loiza	Morena Creek	PR1
PRASA WTP	PR0022888	Caguas-WTP	18.19310000000	-66.06220000000	Rio Grande de Loiza	Los Quebradullas Creek	PR2
PRASA WTP	PR0022420	Canovanas	18.38000000000	-65.89310000000	Rio Grande de Loiza	Canovanos River	PR3
PRASA WTP	PR0025119	Ceiba Sur Filtration Plant WTP	18.21440000000	-65.92220000000	Rio Grande de Loiza	Valenciano River	PR4
PRASA WTP	PR0025470	Jagual San Lorenzo WTP	18.16220000000	-65.89310000000	Rio Grande de Loiza	Quebrada Blanca Creek	PR5
PRASA WTP	PR0022811	Juncos WTP	18.24670000000	-65.85140000000	Rio Grande de Loiza	Gurabo River	PR6
PRASA WTP	PR0022462	PRASA WTP Cubuy	18.26910000000	-65.86830000000	Rio Grande de Loiza	Cubuy River	PR7
PRASA WTP	PR0022870	San Lorenzo WTP	18.18310000000	-65.95330000000	Rio Grande de Loiza	Rio Grande de Loiza	PR8
PRASA WTP	PR0026018	San Salvador WTP	18.13550000000	-66.03560000000	Rio Grande de Loiza	Morena Creek	PR9
PRASA WWTP	PR0020273	Aguas Buenas	18.26083300000	-66.10194400000	Rio Grande de Loiza	Rio Bairoa	P1

Table B-1 (continued)

WASTEWATER DISCHARGE LOCATIONS

Title	Permit	Name	Latitude	Longitude	Watershed	Receiving Water	Map Number
PRASA WWTP	PR0025976	Caguas	18.26083300000	-66.02388900000	Rio Grande de Loiza	Rio Bairoa	P2
PRASA WWTP	PR0020567	Juncos WTP	18.23138900000	-65.91805600000	Rio Grande de Loiza	Rio Valenciano	P3
PRASA WWTP	PR0024732	Las Carolinas	18.25277800000	-66.07222200000	Rio Grande de Loiza	Rio Caguitas	P4
PRASA WWTP	PR0025101	Parcelas Borinquen	18.18833300000	-66.04833300000	Rio Grande de Loiza	Rio Turabo	P5
PRASA WWTP	PR0020834	San Lorenzo WTP	18.19527800000	-65.96416700000	Rio Grande de Loiza	Rio Grande de Loiza	P6
NONFILER		Espino WTP	18.11500000000	-66.02639000000	Rio Grande de Loiza	Rio Emajagua	NF1
NONFILER		Gurabo WTP	18.25792000000	-65.96411000000	Rio Grande de Loiza	Rio Gurabo	NF2
NONFILER		Quebrada Arena WTP	18.12542000000	-65.93689000000	Rio Grande de Loiza	Quebrada Arena	NF5
NONFILER		Quebrada Honda WTP	18.14339000000	-66.00714000000	Rio Grande de Loiza	Honda Creek	NF6
NONFILER		Caguas Norte WTP	18.24692000000	-66.02111000000	Rio Grande de Loiza	Rio Grande de Loiza	NF4

Table B-2

PUMP STATION COORDINATES

Municipality	Facility Name	Map ID	Latitude	Longitude
Aguas Buenas	Monserrate	PS53	18.25503000000	-66.10125000000
Aguas Buenas	San Antonio	PS54	18.25931000000	-66.10417000000
Aguas Buenas	Sonadora (Mulas)	PS55	18.25836000000	-66.10783000000
Aguas Buenas	Vistas de Jagueyes	PS56	18.25944000000	-66.09906000000
Caguas	Bairoa	PS16	18.25636000000	-66.03764000000
Caguas	General Electric	PS17	18.25219000000	-66.03603000000
Caguas	Caguas Norte	PS18	18.24661000000	-66.02656000000
Caguas	Jose Delgado	PS19	18.23811000000	-66.02219000000
Caguas	Santa Elvira	PS20	18.23992000000	-66.01567000000
Caguas	Quintas de San Luis	PS21	18.27903000000	-66.03647000000
Caguas	Altos de la Fuente	PS22	18.20283000000	-66.05147000000
Caguas	Villa del Rey I	PS23	18.21256000000	-66.04206000000
Caguas	Villa del Rey IV	PS24	18.21756000000	-66.04931000000
Caguas	Alturas Villa del Rey	PS25	18.21883000000	-66.06447000000
Caguas	Villa Esperanza	PS26	18.20861000000	-66.04950000000
Caguas	Jose Mercado No. 1	PS27	18.22336000000	-66.01514000000
Caguas	Jose Mercado No. 2	PS28	18.21936000000	-66.01700000000
Caguas	Villas de Castro Development	PS29	18.22069000000	-66.01136000000
Caguas	Los Tolinches	PS30	18.25689000000	-66.06619000000
Caguas	Reina de los Angeles	PS31	18.24694000000	-66.00781000000
Caguas	San Pedro	PS32	18.28967000000	-66.04714000000
Caguas	Villa Caliz I	PS33	18.21147000000	-66.04853000000
Caguas	Villa Caliz II	PS34	18.22386000000	-66.06244000000
Caguas	Idamaris Gardens	PS35	18.23864000000	-66.04264000000
Caguas	Santa Rosa	PS36	18.21603000000	-66.00414000000
Caguas	Estancias del Lago	PS37	18.28100000000	-66.01972000000
Caguas	Valle de San Luis	PS38	18.27961000000	-66.04058000000
Caguas	Alturas San Pedro	PS39	18.31469000000	-65.66247000000
Canovanas	Torrecillas	PS43	18.40133000000	-65.91117000000
Canovanas	Brisas de Loiza	PS44	18.39250000000	-65.92581000000
Canovanas	Quintas de Canovanas	PS45	18.37047000000	-65.89772000000
Canovanas	San Isidro	PS46	18.39564000000	-65.88314000000
Gurabo	Santa Barbara	PS40	18.26044000000	-66.00622000000

Table B-2 (continued)

PUMP STATION COORDINATES

Municipality	Facility Name	Map ID	Latitude	Longitude
Gurabo	Gran Vista II	PS41	18.23419000000	-66.00508000000
Gurabo	Los Robles	PS42	18.26386000000	-65.96917000000
Juncos	Los Almendros	PS01	18.22744000000	-65.91111000000
Juncos	Villa Graciela	PS02	18.23594000000	-65.92136000000
Juncos	Terminal Publico	PS03	18.22403000000	-65.92083000000
Juncos	Ceiba Norte Cementerio	PS04	18.23086000000	-65.91089000000
Juncos	Reparto Valenciano	PS05	18.24039000000	-65.93378000000
Juncos	Ensanche	PS06	18.22603000000	-65.92464000000
Juncos	Rio Valenciano (El Puente)	PS07	18.22664000000	-65.91994000000
Juncos	Valle Piedras	PS08	18.19306000000	-65.86925000000
Loiza	El Cabo	PS47	18.42558000000	-65.86606000000
Loiza	La Gallera (Mediania Baja)	PS48	18.42836000000	-65.87556000000
Loiza	Loiza C	PS49	18.43069000000	-65.86633000000
Loiza	Loiza Pueblo	PS50	18.42969000000	-65.88147000000
Loiza	Loiza E	PS51	18.42292000000	-65.83247000000
Loiza	Loiza D	PS52	18.42658000000	-65.85019000000
San Lorenzo	Industrial	PS09	18.17578000000	-65.87569000000
San Lorenzo	Industrial - San Lorenzo	PS10	18.19731000000	-65.97158000000
San Lorenzo	Barriada Roosevelt	PS11	18.19686000000	-65.96614000000
San Lorenzo	Jardines de San Lorenzo	PS12	18.18250000000	-65.96714000000
San Lorenzo	Jardines de Cerro Gordo	PS13	18.18756000000	-65.95814000000
San Lorenzo	Salvatierra I	PS14	18.17544000000	-65.97328000000
San Lorenzo	Salvatierra II	PS15	18.17769000000	-65.97211000000

Table B-3

ANIMAL FEEDING OPERATIONS

LSPC Segment	Name	Municipality	EQB PERMIT	Map Number	Type of Operation	Total Animals	Latitude	Longitude
1	Miguel de Angel	Caguas	EPO-13-0005	AF152	Horse	38	18.27655600000	-66.03280600000
1	Emilio Barbosa Velez	Caguas	EPO-13-0019	AF155	Horse	28	18.30330600000	-66.04538900000
1	Roberto Moreno	Caguas	EPO-13-0021	AF156	Horse	80	18.29955600000	-66.03716700000
2	Luis A. Rodriguez	Gurabo	EPO-33-0009	AF169	Horse	68	18.28000000000	-66.00286100000
2	Elpidio Nuñez Marin	Gurabo	EPO-33-0014	AF172	Horse	26	18.28058300000	-66.00550000000
4	Carlos Urrutia Betancourt	Gurabo	EPO-33-0001	AF165	Horse	44	18.27572200000	-65.99719400000
4	Francisco Aponte	Gurabo	EPO-33-0007	AF167	Horse	50	18.27788900000	-65.97641700000
4	Jose D.Diaz & Jose Carbonell/Gilb	Gurabo	EPO-33-0008	AF168	Horse	50	18.24947200000	-65.99188900000
4	Rogelio Ortiz-Hacienda Pura Vida	Gurabo	EPO-33-0010	AF170	Horse	40	18.28463900000	-65.98594400000
4	Carlos Urrutia Betancourt	Gurabo	EPO-33-0019	AF173	Calf	150	18.27572200000	-65.99719400000
4	German Toledo Ramos	Gurabo	EPP-33-0029	AF179	Swine	147	18.28777800000	-65.98488900000
4	Herminio Cabezudo Perez	Gurabo	EPP-33-0034	AF181	Swine	5	18.23988900000	-65.97525000000
4	William Gonzalez Quiñones	Gurabo	EPV-33-0001	AF184	Dairy	438	18.27130600000	-65.97622200000
4	Estacion Experimental Agricola	Gurabo	EPV-33-0003	AF185	Dairy	205	18.25483300000	-65.98797200000
4	Pedro J. Sanchez Melendez	Juncos	EPO-40-0001	AF186	Horse	78	18.24427800000	-65.93033300000
4	Ruben Reyes Velez	Juncos	EPO-40-0003	AF187	Horse	103	18.24450000000	-65.94222200000
4	Jesus Jimenes Morales	Juncos	EPO-40-0006	AF188	Horse	25	18.24494400000	-65.93897200000
4	Jose E. Coronas	Juncos	EPV-40-0014	AF200	Dairy	605	18.24411100000	-65.92747200000
7	Rafael Felix Gonzalez	Caguas	EPO-13-0004	AF151	Horse	35	18.21366700000	-66.07166700000
7	Juan Jose Rivera	Caguas	EPO-13-0008	AF153	Horse	50	18.24644400000	-66.06450000000

Table B-3 (continued)

ANIMAL FEEDING OPERATIONS

LSPC Segment	Name	Municipality	EQB PERMIT	Map Number	Type of Operation	Total Animals	Latitude	Longitude
7	Edwin Falcon	Aguas Buenas	EPA-0006	AF201	Hens		18.24775000000	-66.09844444000
8	Luis Maynardi	Gurabo	EPO-33-0004	AF166	Horse	46	18.23347200000	-65.99516700000
8	Victor Hernandez Miranda	Gurabo	EPO-33-0011	AF171	Horse	20	18.23266700000	-65.99891700000
9	Yolanda Vazquez Rodriguez	Juncos	EPP-40-0007	AF192	Swine	262	18.21041700000	-65.88952800000
9	David Delgado	Juncos	EPP-40-0017	AF194	Swine	0	18.21933300000	-65.89455600000
9	Luis Rosado Torres	Juncos	EPP-40-0022	AF195	Swine	20	18.22072200000	-65.88636100000
9	Javier Rivera Marín	Juncos	EPV-40-0012	AF199	Dairy	1276	18.21994400000	-65.87952800000
10	Agripino Ruiz Mujica	Juncos	EPP-40-0002	AF189	Swine	45	18.21580600000	-65.92025000000
10	Salvador Rivera Flores	Juncos	EPP-40-0004	AF190	Swine	145	18.22069400000	-65.92225000000
10	Jose Corona Rodriguez	Juncos	EPP-40-0006	AF191	Swine	392	18.20350000000	-65.93455600000
10	Luis Cruz Hernandez	Juncos	EPP-40-0014	AF193	Swine	165	18.18730600000	-65.91286100000
10	Jesus Ramos/ Lydia Rivera	Juncos	EPP-40-0029	AF196	Swine	146	18.20741700000	-65.91627800000
10	Jose Ramon Coronas Rodriguez	Juncos	EPV-40-0006	AF197	Dairy	540	18.20350000000	-65.93455600000
10	Jose Janer Velazquez	Juncos	EPV-40-0008	AF198	Dairy	450	18.19863900000	-65.89591700000
11	Julia Norte Finca La Fortuna-3	Cidra	EPV-21-0001	AF143	DAIRY	265	18.18183333000	-66.12419444000
11	Julia Norte Finca Los Santos-4	Cidra	EPV-21-0006	AF144	DAIRY	200	18.18402778000	-66.11994444000
11	Jose F. Cintron Santini	Caguas	EPA-13-0006	AF146	Chicken (egg-laying)	75000	18.19694400000	-66.02577800000
11	Esteban Dominquez Chinea	Caguas	EPA-13-0008	AF148	Chicken (replacement)	24000	18.20411100000	-66.09480600000

Table B-3 (continued)

ANIMAL FEEDING OPERATIONS

LSPC Segment	Name	Municipality	EQB PERMIT	Map Number	Type of Operation	Total Animals	Latitude	Longitude
11	Enrique Sierra Gourrie	Caguas	EPA-13-0009	AF149	Chicken (egg-laying)	30000	18.15566700000	-66.04069400000
11	Esteban Dominguez Chinea	Caguas	EPA-13-0011	AF150	Chicken (replacement)	15000	18.20397200000	-66.08986100000
11	Francisco Garcia Arroyo	Caguas	EPP-13-0001	AF157	Swine	273	18.13777800000	-66.03447200000
11	Carmelo Cotto Delgado	Caguas	EPP-13-0015	AF158	Swine	61	18.20200000000	-66.02811100000
11	Jose M. Flores Baez	Caguas	EPV-13-0007	AF164	Dairy	90	18.16944400000	-66.04269400000
12	Pedro J. Marcano Sosa	Caguas	EPA-13-0001	AF145	Chicken (broiler)	32000	18.18369400000	-66.01722200000
12	Miguel A. Alicea Torres	Caguas	EPA-13-0007	AF147	Chicken (consumer)	23000	18.18833300000	-66.01819400000
12	Angel Rodriguez	Caguas	EPO-13-0018	AF154	Horse	20	18.19261100000	-66.00475000000
12	Juan Villafañe Lopez	Caguas	EPP-13-0016	AF159	Swine	40	18.19972200000	-66.02166700000
12	Jose Villafañe Maldonado	Caguas	EPP-13-0017	AF160	Swine	115	18.20069400000	-66.01991700000
12	Tomas Roman Neris	Caguas	EPP-13-0028	AF161	Swine	320	18.18958300000	-66.00716700000
12	Jaime Claudio Martinez	Caguas	EPP-13-0055	AF162	Swine	69	18.19477800000	-66.00513900000
12	Rosa Margarita Janer	Caguas	EPV-13-0001	AF163	Dairy	491	18.18875000000	-66.01436100000
12	Arcadio Flores	San Lorenzo	EPP-66-0035	AF208	SWINE		18.18000000000	-65.93225000000
13	Heriberto De Jesus Figueroa	San Lorenzo	EPV-66-0001	AF202	DAIRY		18.12588889000	-65.97938889000
13	Jose R. Aponte Figueroa	San Lorenzo	EPV-66-0005	AF203	DAIRY		18.12111111000	-65.96455556000
13	Raul Colon	San Lorenzo	EPV-66-0010	AF204	DAIRY		18.17347222000	-65.98480556000

Table B-3 (continued)

ANIMAL FEEDING OPERATIONS

LSPC Segment	Name	Municipality	EQB PERMIT	Map Number	Type of Operation	Total Animals	Latitude	Longitude
13	Ramon Diaz Claudio	San Lorenzo	EPP-66-0012	AF205	SWINE		18.16502778000	-66.01550000000
13	Edgardo Gonzalez Alicea	San Lorenzo	EPP-66-0030	AF206	SWINE		18.16902778000	-65.98761111000
13	Ramon Diaz Claudio	San Lorenzo	EPP-66-0033	AF207	SWINE		18.16502778000	-66.01550000000
13	Nicolas Navarro	San Lorenzo	EPP-66-0040	AF209	SWINE		18.11813889000	-65.98519444000
14	Juan Crespo Acevedo	Barranquitas	EPA-10-0010	AF142	POULTRY	30,000	18.12544444000	-65.93658333000
	Juan B. Castro Benjamin	Gurabo	EPP-33-0011	AF174	Swine	172	18.30238900000	-65.99119400000
	Emilio Carrion Arroyo	Gurabo	EPP-33-0020	AF175	Swine	100	18.30261100000	-65.98105600000
	Pedro Aleman Aleman	Gurabo	EPP-33-0021	AF176	Swine	180	18.29308300000	-65.96275000000
	Orlando Viera Ruiz	Gurabo	EPP-33-0026	AF177	Swine	118	18.29505600000	-65.96594400000
	Viviana Aponte Medina Y/O Santos	Gurabo	EPP-33-0028	AF178	Swine	91	18.29788900000	-65.97783300000
	Sixto Boria Caraballo	Gurabo	EPP-33-0032	AF180	Swine	160	18.28169400000	-65.94794400000
	Rafael Roman Gonzalez	Gurabo	EPP-33-0035	AF182	Swine	107	18.29194400000	-65.98080600000
	Bernaldo Toledo Ruiz	Gurabo	EPP-33-0043	AF183	Swine	567	18.28983300000	-65.97061100000

APPENDIX C

WATER QUALITY MODEL PARAMETERS

Landuse IDs

Landuse Type	lid
Cropland (Agricultural)	2
Forest	3
Pasture	4
Urban pervious	6
Wetland	7
Urban impervious	20

Reach geometry information

rid	reach id (relational db index number)
rname	reach name (same as subwatershed name)
length	reach length (miles)
depth	bank full depth (feet)
width	bankfull width (feet)
slope	longitudinal channel slope
Mann	Manning's roughness coefficient for channel bottom
r1	ratio of bottom width to bank full width (bottom width = r1 * width)
r2	side slope of flood plane
w1	flood plane width factor (width of flood plane =w1*Width)

RID	RNAME	Length	Depth	Width	Slope	Manning	r1	r2	w1
1	1	4.53	2.92	37.02	0.033	0.04	0.2	0.5	1.5
2	10	6.51	3.42	46.32	0.005	0.04	0.2	0.5	1.5
3	11	7.36	3.91	55.96	0.006	0.04	0.2	0.5	1.5
4	12	7.16	4.62	70.72	0.003	0.04	0.2	0.5	1.5
5	13	7.08	3.75	52.76	0.015	0.04	0.2	0.5	1.5
6	14	4.66	2.77	34.41	0.035	0.04	0.2	0.5	1.5
7	15	4.20	25.00	348.00	0.004	0.04	0.2	0.5	1.5
8	2	2.24	35.00	1957.00	0.001	0.04	0.2	0.5	1.5
9	3	1.02	5.70	95.15	0.001	0.04	0.2	0.5	1.5
10	4	8.27	5.01	79.21	0.000	0.04	0.2	0.5	1.5
11	5	7.19	2.68	32.87	0.017	0.04	0.2	0.5	1.5
12	6	0.72	5.58	92.34	0.002	0.04	0.2	0.5	1.5
13	7	5.33	3.40	45.80	0.004	0.04	0.2	0.5	1.5
14	8	2.89	5.29	85.54	0.001	0.04	0.2	0.5	1.5
15	9	5.98	3.96	56.92	0.003	0.04	0.2	0.5	1.5

Water Budget

Water Budget Parameter Group 1

gid parameter group id
lid landuse id
lzsn lower zone nominal soil moisture storage (inches)
infilt index to the infiltration capacity of the soil (in/hr)
kvary variable groundwater recession (1/inches)
agwrc base groundwater recession (none)

Group ID	Landuse ID	lzsn	infilt	kvary	agwrc
4	2	5	0.07	0	0.99
4	3	7	0.07	0	0.99
4	4	5	0.07	0	0.99
4	6	7	0.07	0	0.99
4	7	7	0.07	0	0.99
4	20	7	0.00	0	0.99

Water Budget Parameter Group 2

gid parameter group id
lid landuse id
petmax air temperature below which e-t will is reduced (deg F)
petmin air temperature below which e-t is set to zero (deg F)
infexp exponent in the infiltration equation (none)
INFILD ratio between the maximum and mean infiltration capacities over the PLS (none)
deepfr fraction of groundwater inflow that will enter deep groundwater (none)
basetp fraction of remaining potential e-t that can be satisfied from baseflow (none)
agwetp fraction of remaining potential e-t that can be satisfied from active groundwater (none)

Group ID	Landuse ID	petmax	petmin	infexp	infild	deepfr	basetp	agwetp
4	2	40	35	3	2	0	0.02	0.02
4	3	40	35	3	2	0	0.02	0.02
4	4	40	35	3	2	0	0.02	0.02
4	6	40	35	3	2	0	0.02	0.02
4	7	40	35	3	2	0	0.02	0.02
4	20	40	35	3	2	0	0.02	0.02

Water Budget Parameter Group 3

Constant Parameters

gid parameter group id
lid landuse id
cepsc interception storage capacity (inches)
uzsn upper zone nominal storage (inches)
nsur Manning's n for the assumed overland flow plane (none)
intfw interflow inflow parameter (none)
irc interflow recession parameter (none)
lzetp lower zone e-t parameter (none)

Group ID	Landuse ID	cepsc	uzsn	nsur	intfw	irc	lzetp
4	2	0.1	0.2	0.2	1.5	0.6	0.5
4	3	0.1	0.2	0.2	1.5	0.6	0.5
4	4	0.1	0.2	0.2	1.5	0.6	0.5
4	6	0.1	0.2	0.2	1.5	0.6	0.5
4	7	0.1	0.2	0.2	1.5	0.6	0.5
4	20	0.1	0.2	0.2	1.5	0.6	0.5

Monthly Parameters

Interception storage capacity
mon-interception storage (cepscm)
gid parameter group id
lid landuse id
jan-dec interception storage capacity at start of each month (inches)

Group ID	Landuse ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
4	2	0.03	0.03	0.03	0.03	0.1	0.2	0.2	0.2	0.2	0.1	0.02	0.03
4	3	0.03	0.03	0.03	0.03	0.15	0.2	0.35	0.35	0.35	0.1	0.02	0.03
4	4	0.03	0.03	0.03	0.03	0.1	0.2	0.2	0.2	0.2	0.1	0.02	0.03
4	6	0.03	0.03	0.03	0.03	0.15	0.2	0.3	0.3	0.3	0.1	0.02	0.03
4	7	0.03	0.03	0.03	0.03	0.15	0.2	0.3	0.3	0.3	0.1	0.02	0.03
4	20	0.03	0.03	0.03	0.03	0.15	0.2	0.3	0.3	0.3	0.1	0.02	0.03

Upper zone nominal storage

mon-upper zone nominal storage (uzsnm)

gid parameter group id

lid landuse id

jan-dec upper zone nominal storage at start of each month (inches)

Group ID	Landuse ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
4	2	0.6	0.5	0.3	0.3	0.7	0.9	1.6	1.6	1.4	1.2	1	0.7
4	3	0.6	0.5	0.3	0.3	0.7	0.9	1.6	1.6	1.4	1.2	1	0.7
4	4	0.6	0.5	0.3	0.3	0.7	0.9	1.6	1.6	1.4	1.2	1	0.7
4	6	0.6	0.5	0.3	0.3	0.8	1	1.7	1.7	1.5	1.2	1	0.7
4	7	0.6	0.5	0.3	0.3	0.8	1	1.7	1.7	1.5	1.2	1	0.7
4	20	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1

Manning's overland coefficient

mon-Manning's roughness coefficient (nsurm)

gid parameter group id

lid landuse id

jan-dec Manning's roughness coefficient at start of each month (none)

Group ID	Landuse ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
4	2	0.15	0.15	0.15	0.2	0.3	0.3	0.3	0.3	0.28	0.25	0.2	0.15
4	3	0.2	0.2	0.25	0.3	0.35	0.35	0.4	0.35	0.35	0.25	0.25	0.2
4	4	0.15	0.15	0.15	0.2	0.3	0.3	0.3	0.3	0.28	0.25	0.2	0.15
4	6	0.12	0.12	0.15	0.15	0.15	0.15	0.2	0.15	0.15	0.15	0.15	0.2
4	7	0.2	0.2	0.25	0.3	0.35	0.35	0.4	0.35	0.35	0.25	0.25	0.2
4	20	0.12	0.12	0.15	0.15	0.15	0.15	0.2	0.15	0.15	0.15	0.15	0.2

Interflow inflow

mon-interflow inflow parameter (intfwm)

gid parameter group id

lid landuse id

jan-dec interflow inflow parameter at start of each month (none)

Group ID	Landuse ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
4	2	1.5	1.5	1.5	2.5	2.5	2.5	2.5	2.5	2.5	1.5	1.5	1.5
4	3	1.5	1.5	1.5	2.5	2.5	2.5	2.5	2.5	2.5	1.5	1.5	1.5
4	4	1.5	1.5	1.5	2.5	2.5	2.5	2.5	2.5	2.5	1.5	1.5	1.5
4	6	1.5	1.5	1.5	2.5	2.5	2.5	2.5	2.5	2.5	1.5	1.5	1.5
4	7	1.5	1.5	1.5	2.5	2.5	2.5	2.5	2.5	2.5	1.5	1.5	1.5
4	20	1.5	1.5	1.5	2.5	2.5	2.5	2.5	2.5	2.5	1.5	1.5	1.5

Interflow recession constant

mon-interflow recession constant (ircm)

gid parameter group id

lid landuse id

jan-dec interflow recession constant at start of each month (none)

Group ID	Landuse ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
4	2	0.69	0.69	0.69	0.8	0.8	0.8	0.8	0.8	0.8	0.69	0.69	0.69
4	3	0.69	0.69	0.69	0.8	0.8	0.8	0.8	0.8	0.8	0.69	0.69	0.69
4	4	0.69	0.69	0.69	0.8	0.8	0.8	0.8	0.8	0.8	0.69	0.69	0.69
4	6	0.69	0.69	0.69	0.8	0.8	0.8	0.8	0.8	0.8	0.69	0.69	0.69
4	7	0.69	0.69	0.69	0.8	0.8	0.8	0.8	0.8	0.8	0.69	0.69	0.69
4	20	0.69	0.69	0.69	0.8	0.8	0.8	0.8	0.8	0.8	0.69	0.69	0.69

Lower zone evapotranspiration

mon-lower zone evapotranspiration parameter (lzetpm)

gid parameter group id

lid landuse id

jan-dec lower zone evapotranspiration parameter at start of each month (none)

Group ID	Landuse ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
4	2	0.2	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.6	0.5	0.4	0.2
4	3	0.3	0.3	0.3	0.3	0.5	0.7	0.7	0.7	0.7	0.65	0.6	0.3
4	4	0.2	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.6	0.5	0.4	0.2
4	6	0.1	0.1	0.1	0.1	0.25	0.55	0.65	0.65	0.65	0.65	0.6	0.1
4	7	0.1	0.1	0.2	0.3	0.5	0.8	0.8	0.8	0.7	0.65	0.6	0.1
4	20	0.1	0.1	0.1	0.1	0.25	0.55	0.65	0.65	0.65	0.65	0.6	0.1

Water Budget Initial conditions

Initial conditions for the simulation

gid parameter group id

lid landuse id

ceps initial interception storage.

surs initial surface (overland flow) storage.

uzs initial upper zone storage.

ifws initial interflow storage.

lzs initial lower zone storage.

agws initial active groundwater storage.

gwvs initial index to groundwater slope.

Group ID	Landuse ID	ceps	surs	uzs	ifws	lzs	agws	gwvs
4	2	0.01	0.01	0.3	0.01	1.5	0.01	0.01
4	3	0.01	0.01	0.3	0.01	1.5	0.01	0.01
4	4	0.01	0.01	0.3	0.01	1.5	0.01	0.01
4	6	0.01	0.01	0.3	0.01	1.5	0.01	0.01
4	7	0.01	0.01	0.3	0.01	1.5	0.01	0.01
4	20	0.01	0.01	0.3	0.01	1.5	0.01	0.01

Sediment Parameter Group 1

gid	parameter group id
lid	landuse id
krer	coefficient in the soil detachment equation
jrer	exponent in the soil detachment equation
affox	fraction by which detached sediment storage decreases each day as a result of soil compaction.
cover	fraction of land surface which is shielded from rainfall erosion
nvsi	rate at which sediment enters detached storage from the atmosphere negative value may be used to simulate removal by human activity or wind
kser	coefficient in the detached sediment washoff equation
jser	exponent in the detached sediment washoff equation
kger	coefficient in the matrix soil scour equation, which simulates gully erosion
jger	exponent in the matrix soil scour equation, which simulates gully erosion
accsdp	rate at which solids accumulate on the land surface (used in impervious land)
remsdp	fraction of solids storage which is removed each day when there is no runoff, for example, because of street sweeping (used in impervious land)

gid	lid	krer	jrer	affix	cover	nvsi	kser	jser	kger	jger	accsdp	remsdp
4	2	0.45	3	0.01	0.5	1	0.5	2.5	0	1	0.02	0.01
4	3	0.45	3	0.01	0.8	1	0.5	2.5	0	1	0.02	0.01
4	4	0.45	3	0.01	0.7	1	0.5	2.5	0	1	0.02	0.01
4	6	0.45	3	0.01	0.9	1	0.5	2.5	0	1	0.02	0.01
4	7	0.45	3	0.01	1	1	0.5	2.5	0	1	0.02	0.01
4	20	0.45	3	0.01	1	1	0.5	2.5	0	1	0.02	0.01

Sediment Parameter Group 2

gid	parameter group id
lid	landuse id
clay	percent of clay
silt	percent of silt
sand	percent of sand

gid	lid	clay	silt	sand
4	2	50	40	10
4	3	50	40	10
4	4	50	40	10
4	6	50	40	10
4	7	50	40	10
4	20	50	40	10

Sediment Parameter Group 3
Cohesive suspended sediment source/sink parameters for each size class

gid	parameter group id
sedo	initial sediment conc in fluid phase (mg/liter=gm/m^3)
sedbo	initial sediment per unit area or bottom surface (gm/sq meter)
poro	porosity
wsedo	constant or reference sediment settling velocity in formula wsed=wsedo*((sed/sedsn)^sexp)
sedn	normalizing sediment conc (cohesive sed transport) (gm/m^3)
sexp	exponential (cohesive sed transport)
taud	boundary stress below which deposition takes place according to (taud-tau)/taud (m^2/s^2)
wrspo	ref resuspension rate (cohesive sed trans only) in formula wrsp=wrsp0*(((tau-taur)/taun)^tex) (gm/m^2-sec)
taur	boundary stress above which resuspension occurs (m^2/s^2)
taun	normalizing stress (equal to taur for cohesive sed trans)
tex	exponential (coh sed)

Clay parameters group

gid	SEDO	SEDBO	PORO	WSEDO	SEDN	SEXP	TAUD	WRSPO	TAUR	TAUN	TEX
4	20	1	0.6	0.00005	50	1	0	0.002	100	0.004	1

Silt parameters group

gid	SEDO	SEDBO	PORO	WSEDO	SEDN	SEXP	TAUD	WRSPO	TAUR	TAUN	TEX
4	20	1	0.6	0.0005	1	0	0	0.002	100	0.004	1

Land-based Pollutant Contributions

General Settings
General quality constituent control

gid	parameter group id
qualid	general quality id
qname	name of qual (must be a continuous string)
qunit	units for quality constituent output (mg/l), (ug/l), or (#/100ml)
qsdfg	if = 2 sediment associated in pervious/impervious land
vpfwfg)	if = 1 washoff potency factor may vary throughout the year (not yet supported)
vpfsfg	if = 1 scour potency factor may vary throughout the year (not yet supported)
qsofg	if = 1 then constituent is a QUALOF; assumed to be directly associated with overland flow
ini.cond.	initial instream concentration at start of simulation by group
decay	general first-order instream loss rate of qual by group (1/day)

GID	ID	Name	Unit	qsdfg	vpfwfg	vpfsfg	qsofg	Ini. Cond.	Decay
4	10	TP	(mg/l)	2	0	0	1	0.5	0
4	14	FECAL	(#/100ml)	0	0	0	1	1000	2

Constant Loading Parameters
Storage on surface and nonseasonal parameters

gid	parameter group id
lid	landuse id
qualid	general quality id
sqo	initial storage of QUALOF on surface
potfw	washoff potency factor (when sediment associated qsdfg > 0)
potfs	scour potency pactor (when sediment associated qsdfg > 0)
acqop	accumulation rate of QUALOF on surface
sqolim	maximum storage of QUALOF on surface
wsqop	rate of surface runoff that removes 90% of stored QUALOF per hour
ioqc	concentration of constituent in interflow outflow
aoqc	concentration of constituent in groundwater outflow

gid	lid	qualid	sqo	potfw	potfs	acqop	sqolim	wsqop	ioqc	aoqc
4	2	10	0	0.1	0	0	0	0.5	0.10	0.10
4	2	14	1E+08	0.0	0	8.91E+08	1.6E+09	0.5	1.00	1.00
4	3	10	0	0.1	0	0	0	0.5	0.10	0.10
4	3	14	1E+08	0.0	0	65859375	1.19E+08	0.5	1.00	1.00
4	4	10	0	0.2	0	0	0	0.5	0.10	0.10
4	4	14	1E+08	0.0	0	1.48E+09	2.66E+09	0.5	1.00	1.00
4	6	10	0	0.7	0	0	0	0.5	0.10	0.10
4	6	14	1E+08	0.0	0	11300000	20340000	0.5	1.00	1.00
4	7	10	0	0.1	0	0	0	0.5	0.10	0.10
4	7	14	0.01	0.0	0	0.01	0.01	0.5	1.00	1.00
4	20	10	1E+08	0.7	0	0.02317	0.04171	0.5	0.10	0.10
4	20	14	1E+08	0.0	0	2.1E+10	3.79E+10	0.5	1.00	1.00

APPENDIX D

SUPPLEMENTAL MODEL SUPPORT INFORMATION

PHOSPHOROUS MODEL CALIBRATION

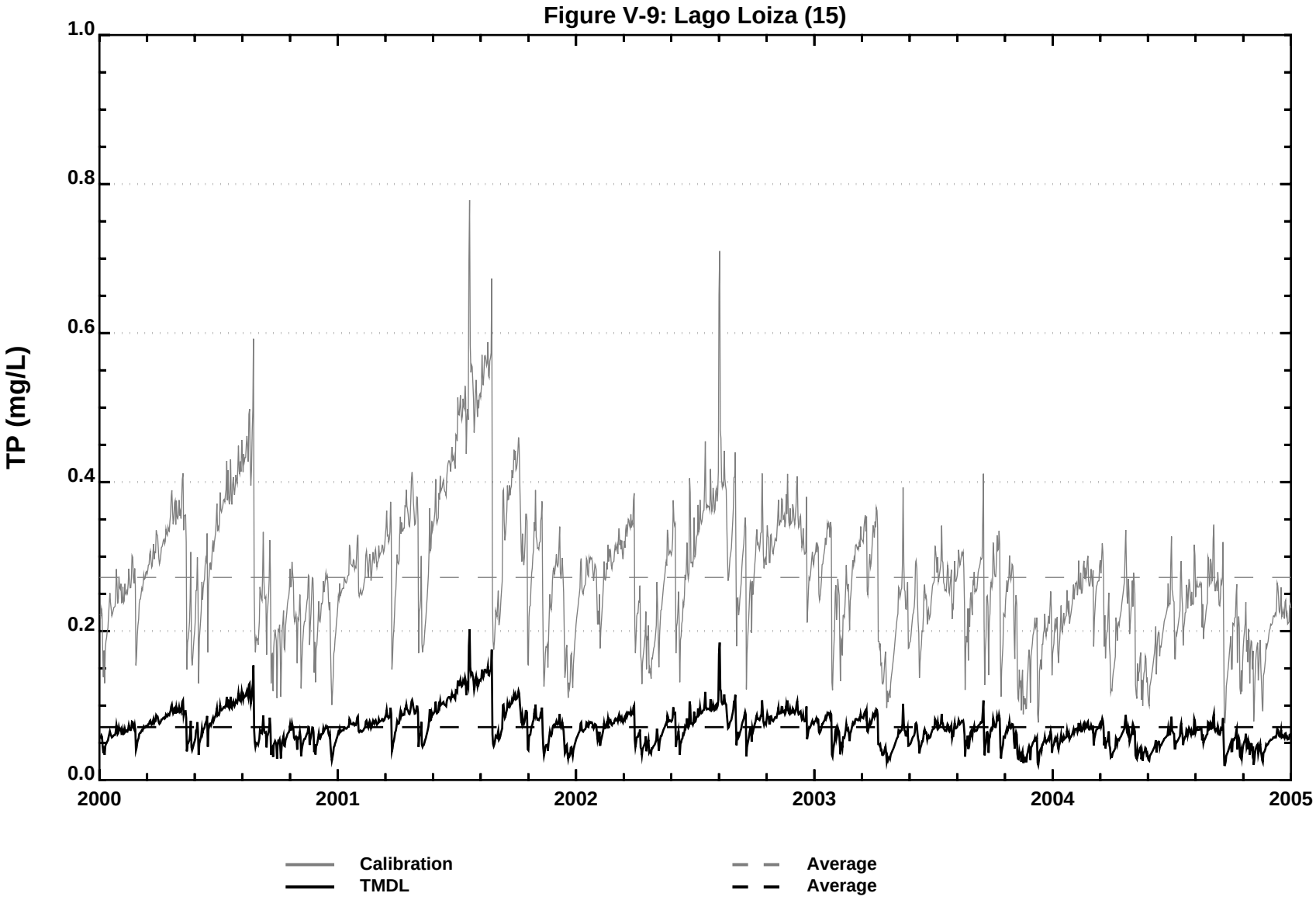


Figure V-9: Lago Loiza (15)
TP (mg/L)
1.0
0.8
0.6
0.4
0.2
0.0
2000
2001
2002
2003
2004
2005
Calibration
TMDL
Average
Average

RUNOFF COEFFICIENTS

WATERSHED MODEL RUNOFF COEFFICIENTS

LOIZA WATERSHED

	Runoff Coefficient (lb/acre/year)			
LSPC Subwatershed	**Cropland**	**Pasture**	**Forest**	**Urban**
Canas (1)	0.75	1.06	0.42	0.70
Lower Loiza (2)	0.75	1.06	0.42	0.70
Lower Loiza (3)	0.75	1.06	0.42	0.70
Gurabo (4)	0.75	1.06	0.42	0.70
Bairoa (5)	0.75	1.06	0.42	0.70
Lower Loiza (6)	0.75	1.06	0.42	0.00
Caguitas (7)	0.75	1.06	0.42	0.70
Lower Loiza (8)	0.75	1.06	0.42	0.70
Gurabo (9)	0.88	1.31	0.47	0.82
Gurabo (10)	0.88	1.31	0.47	0.82
Turabo (11)	1.22	1.59	0.70	1.03
Upper Loiza (12)	1.22	1.59	0.70	1.03
Upper Loiza (13)	1.22	1.59	0.70	1.03
Upper Loiza (14)	1.22	1.59	0.70	1.03
Lago Loiza (15)	0.00	1.06	0.42	0.70
Average	0.87	1.37	0.55	0.82

FECAL COLIFORM

PROBABILITY PLOTS

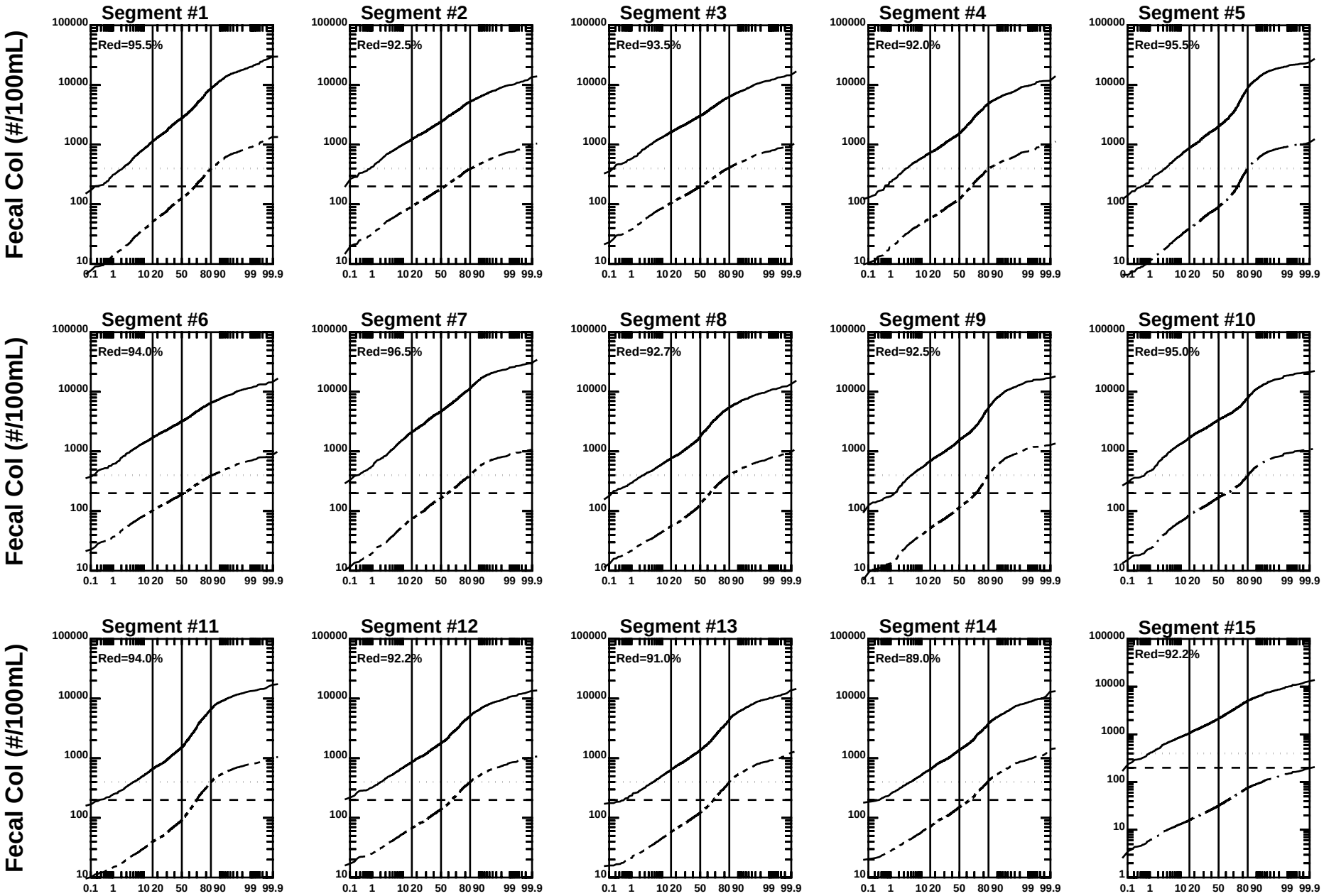


Figure 1: Fecal Coliform Probability Plots - Loiza Watershed

- - - - Geometric Mean Standard
..... 20% Exceedence Standard
——— LSPC Daily Output
—- - - — TMDL FC Load Reduction

FECAL COLIFORM

REDUCTION/RESPONSE CURVES

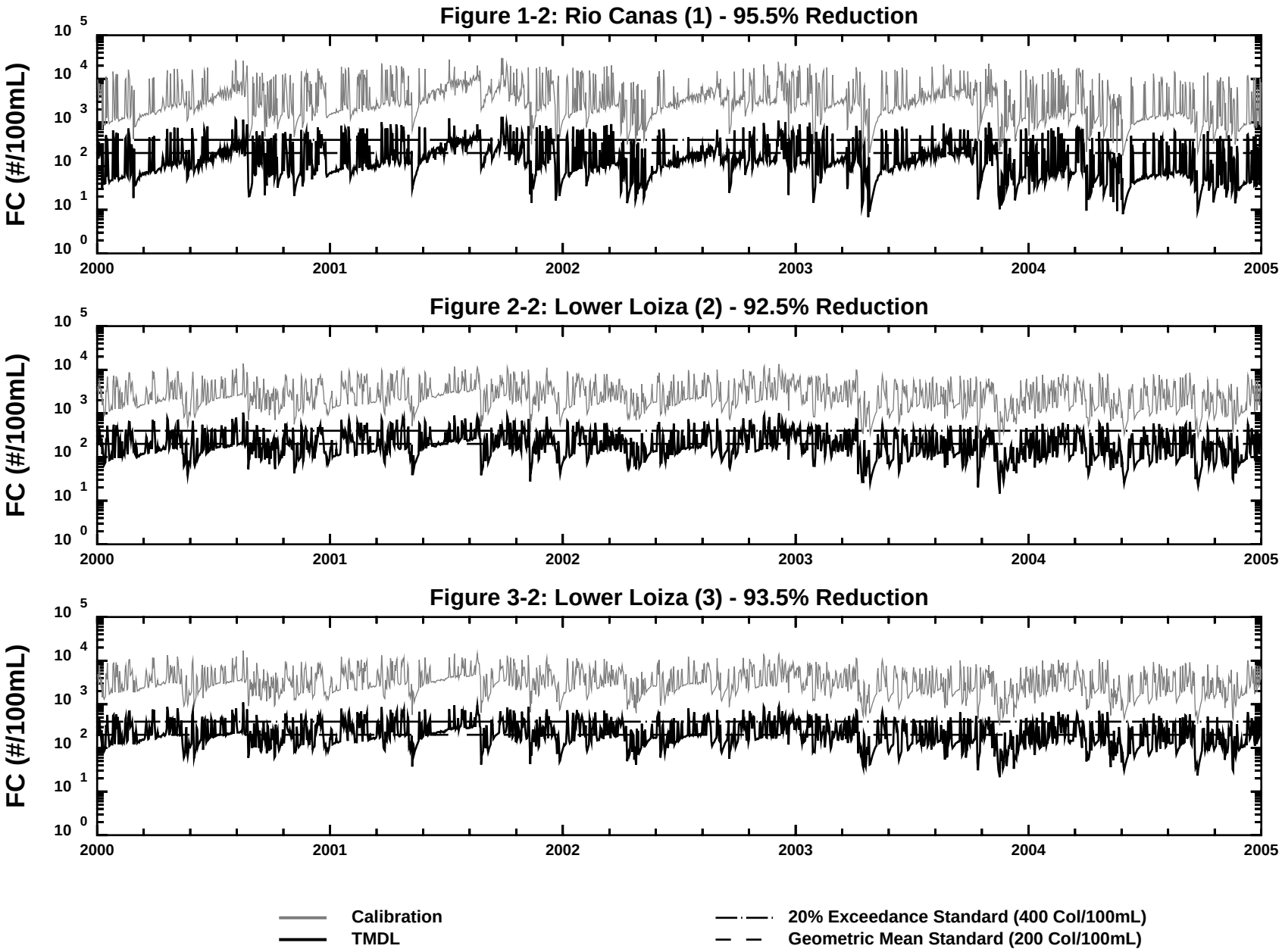
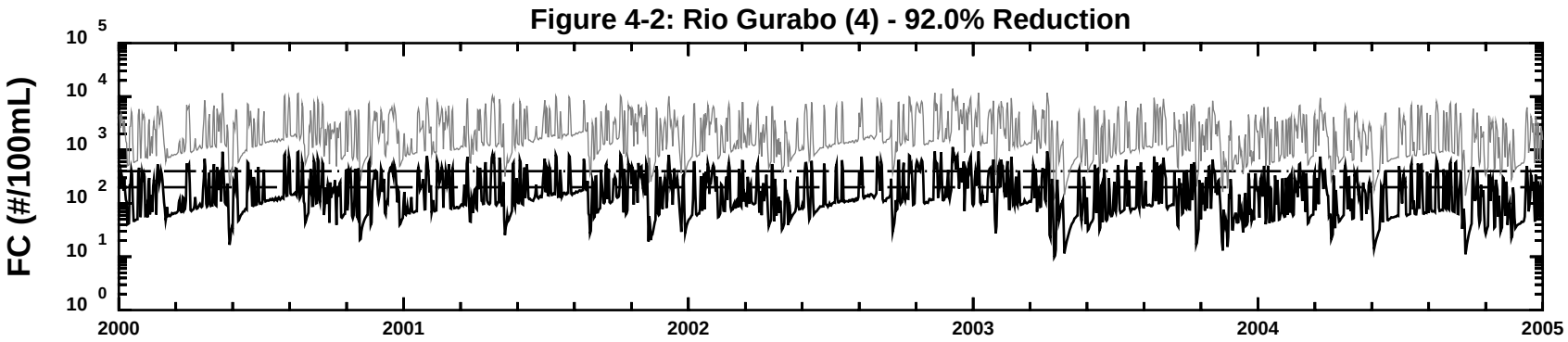
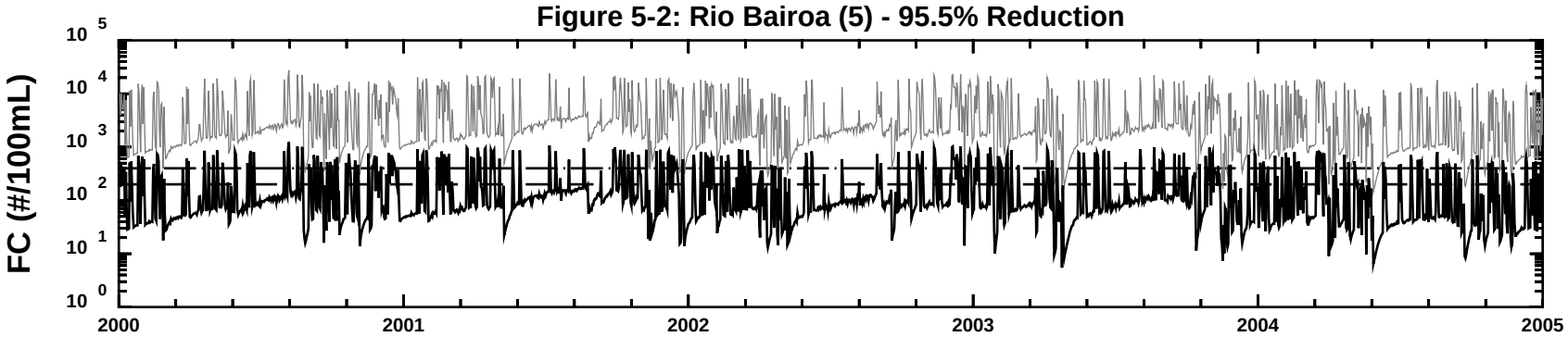
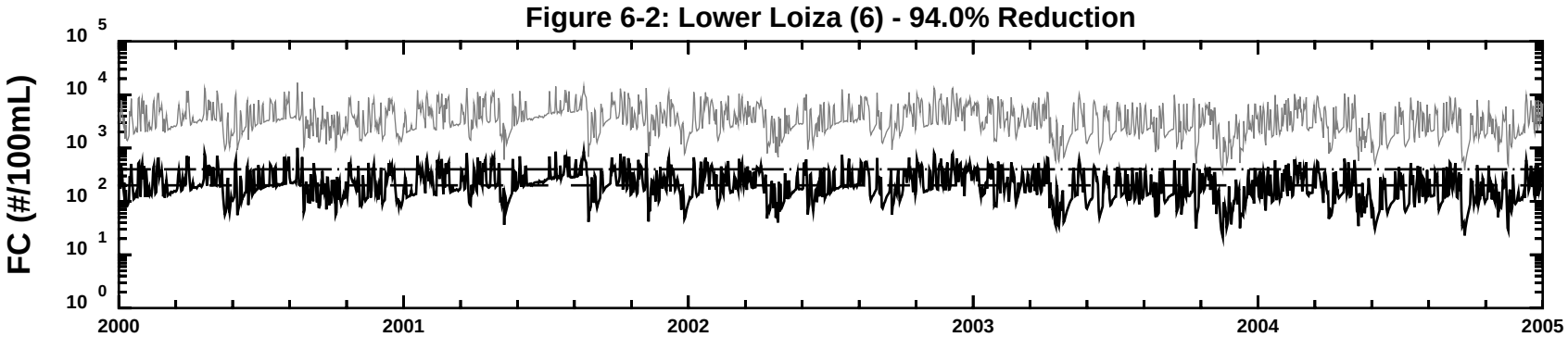


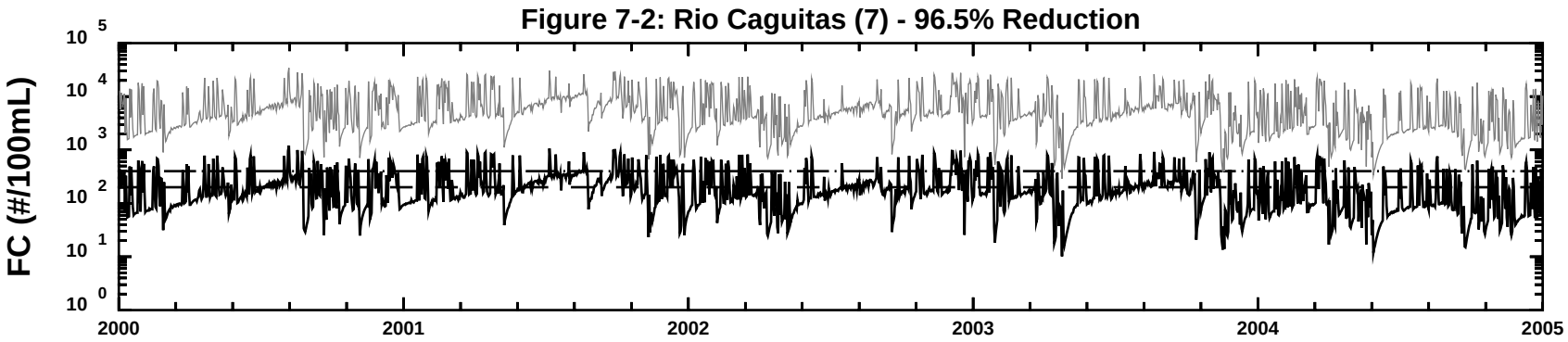
Figure 1-2: Rio Canas (1) - 95.5% Reduction
Figure 2-2: Lower Loiza (2) - 92.5% Reduction
Figure 3-2: Lower Loiza (3) - 93.5% Reduction
FC (#/100mL)
10^5
10^4
10^3
10^2
10^1
10^0
2000
2001
2002
2003
2004
2005
Calibration
TMDL
20% Exceedance Standard (400 Col/100mL)
Geometric Mean Standard (200 Col/100mL)

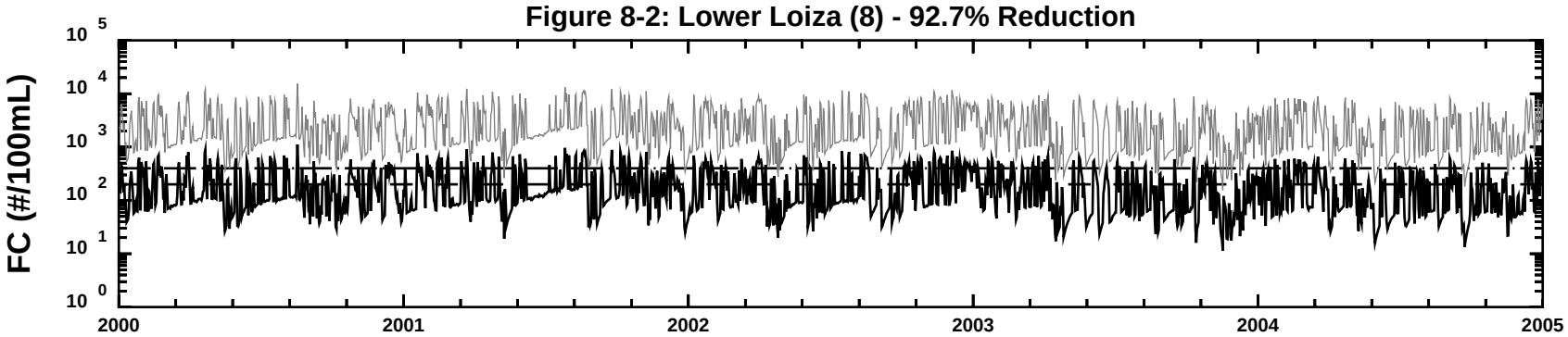


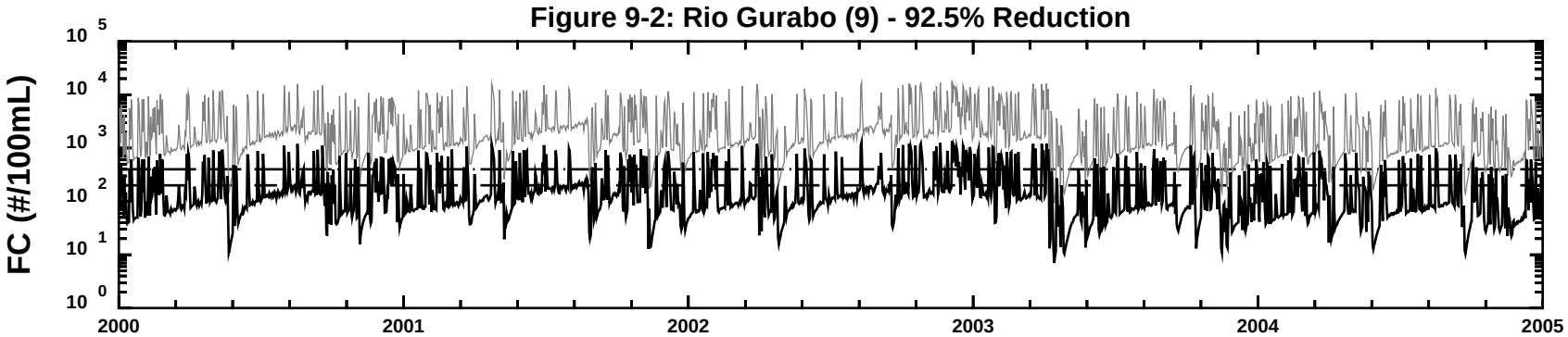




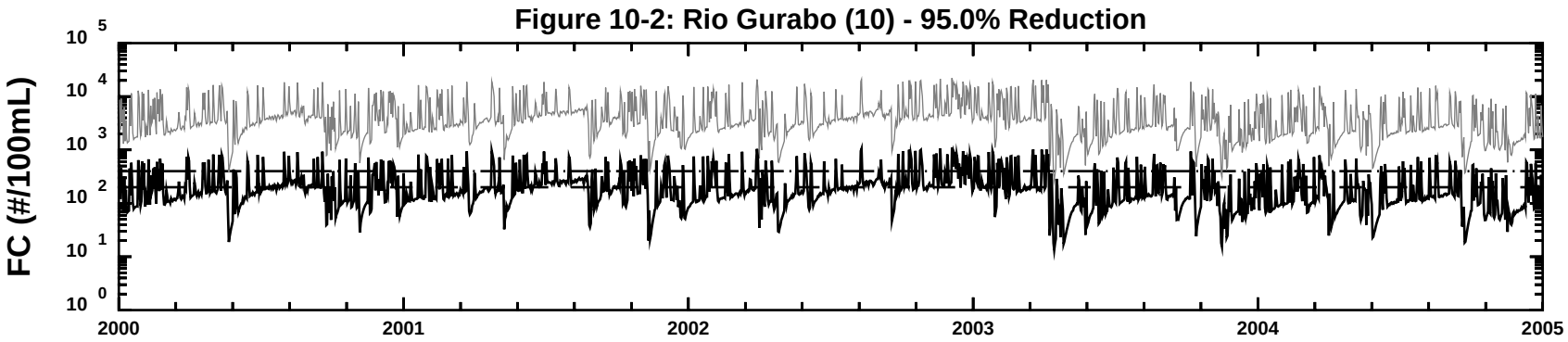
Calibration
TMDL
20% Exceedance Standard (400 Col/100mL)
Geometric Mean Standard (200 Col/100mL)

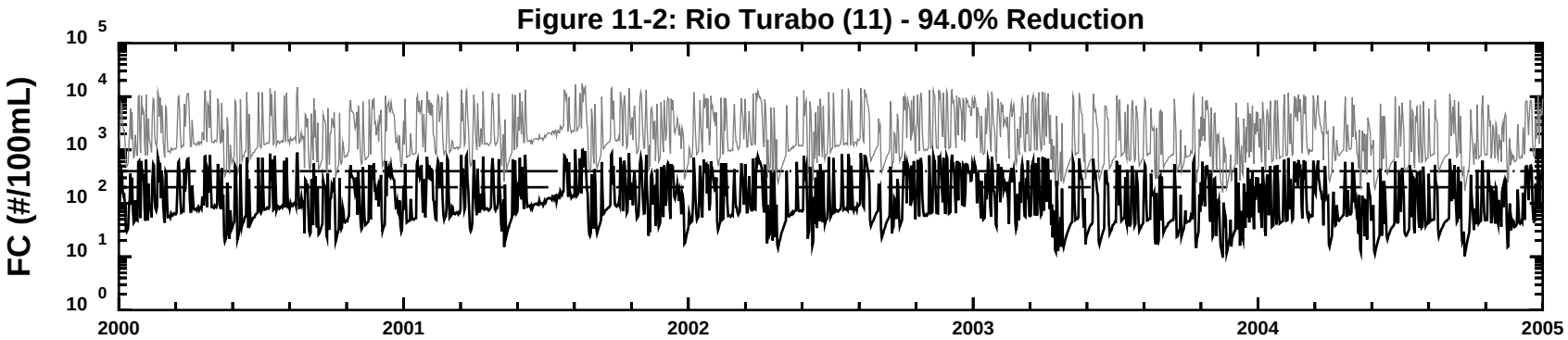


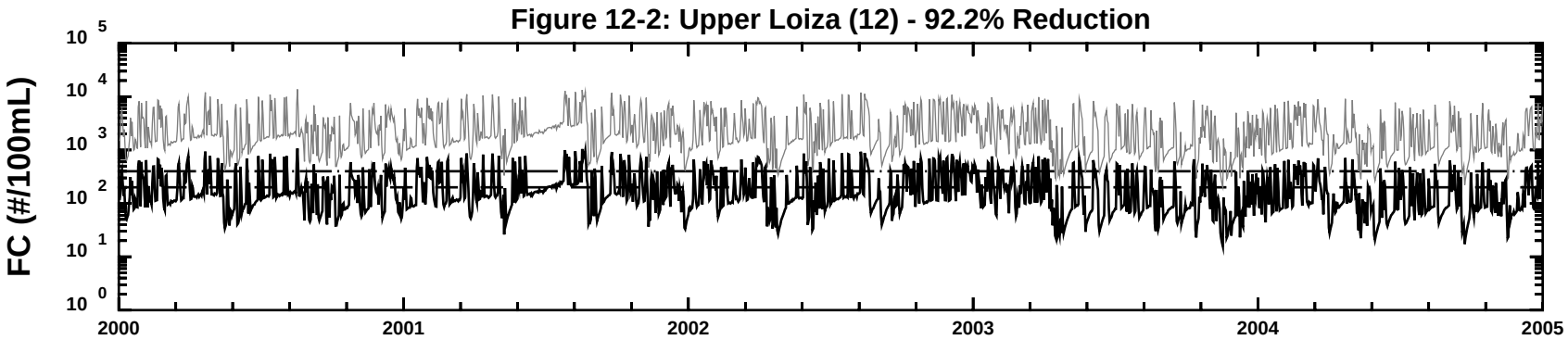




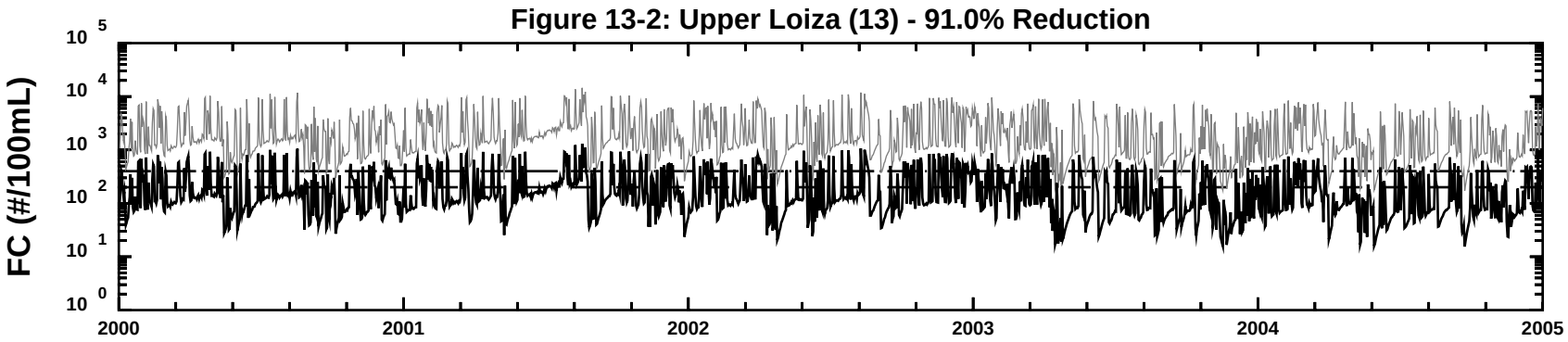
Calibration
TMDL
20% Exceedance Standard (400 Col/100mL)
Geometric Mean Standard (200 Col/100mL)

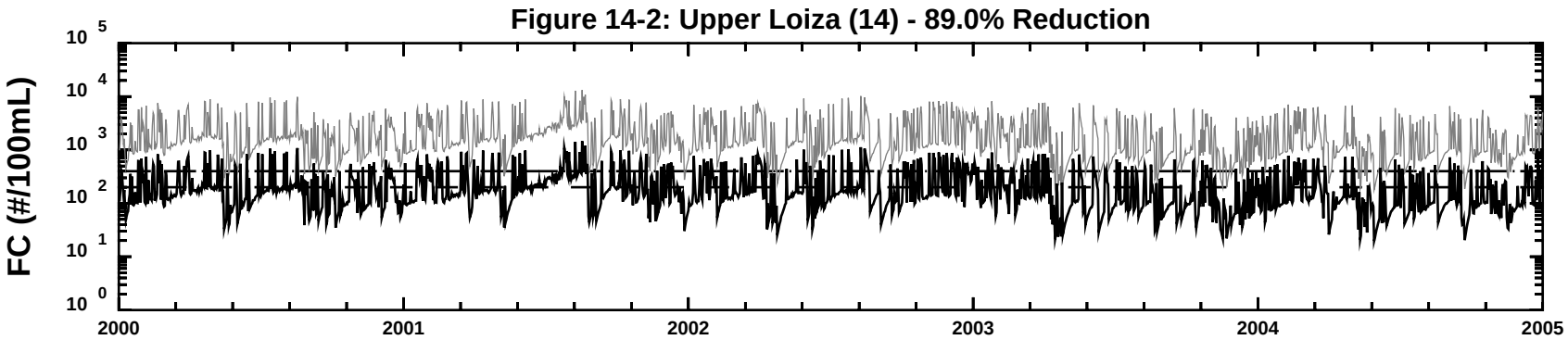


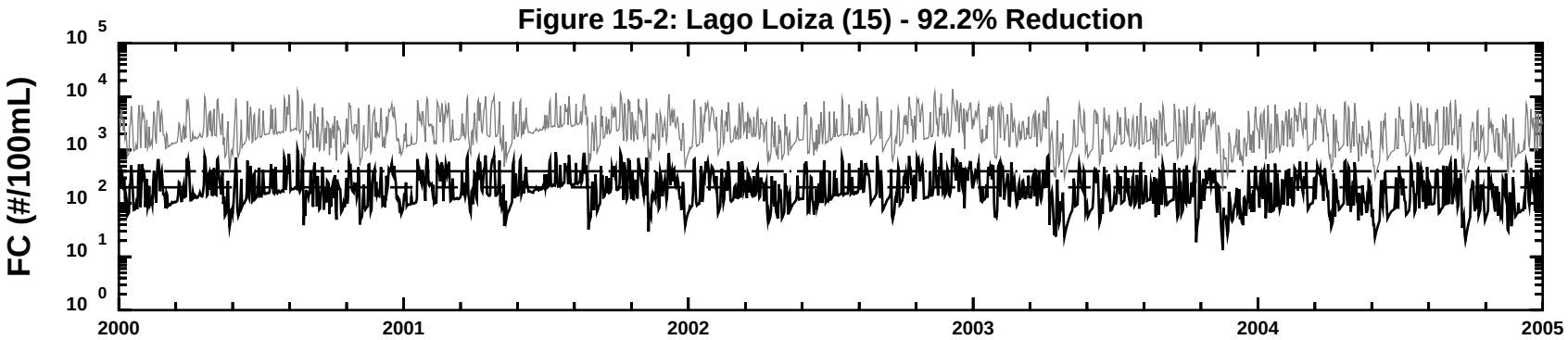




Calibration
TMDL
20% Exceedance Standard (400 Col/100mL)
Geometric Mean Standard (200 Col/100mL)







Calibration
TMDL
20% Exceedance Standard (400 Col/100mL)
Geometric Mean Standard (200 Col/100mL)