Tidal Streams Use Attainability Analyses Water Quality Data

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January 2008

Water Quality Technical Series
WQTS-2008-01

Tidal Streams Use Attainability Analyses
Water Quality Data

Prepared for
Texas General Land Office
in fulfillment of
Contract No. 04-022

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June 2005

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LIST OF ACRONYMS

ADCP	Acoustic Doppler Current Profiler
AWRL	Ambient Water Reporting Limit
CB	Cow Bayou Tidal
$CBOD_5$	Five-day carbonaceous biochemical oxygen demand
CFR	Code of Federal Regulations
COC	Chain of Custody
CRP	Clean Rivers Program
DO	Dissolved Oxygen
EPA	Environmental Protection Agency
GC	Garcitas Creek
LCS	Laboratory Control Standard
LCSD	Laboratory Control Standard Duplicate
LIMS	Laboratory Information Management System
LR	Lost River
MDL	Method Detection Limit
MDM&A	Monitoring Data Management and Analysis
OP	ortho- Phosphorus
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
RPD	Relative Percent Deviation
RWA	Receiving Water Assessment
SOP	Standard Operating Procedure
SWQM	Surface Water Quality Monitoring
SWQMP	Surface Water Quality Monitoring Procedures
TCEQ	Texas Commission on Environmental Quality, formerly the Texas Natural Resource Conservation Commission
TDS	Total Dissolved Solids
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TP	Tres Palacios Creek
TP	Total Phosphorus
TPWD	Texas Parks and Wildlife Department

TRACS	Texas Regulatory and Compliance System
TSS	Total Suspended Solids
TSWQS	Texas Surface Water Quality Standards
VSS	Volatile Suspended Solids
WC	West Carancahua Creek

ACKNOWLEDGEMENTS

Numerous staff of Texas Parks and Wildlife Department's Habitat and Water Resources Branches in the Coastal Fisheries Division have contributed to and/or participated in the fieldwork for the project. Staff of the Coastal Fisheries Division Galveston Bay Ecosystem office have also supported the project. TPWD's GIS lab has had a major role. Todd Driscoll and the crew of the Inland Fisheries Division Management District Office supported the study's upper coast electrofishing efforts. Staff of the Inland Fisheries Division also supported the acoustic Doppler flow data collection effort and mid–coast electrofishing trials. Special thanks go to Greg Conley of the Inland Fisheries Division and Mike Weeks and Kay Jenkins of the Coastal Fisheries Division who were significant participants in water quality data collection.

Additional support for the project has been contributed by the Texas Commission on Environmental Quality's Houston Laboratory, whose role in the project has been to analyze water and sediment samples. Special thanks go to Jim Busceme and Martha Panesar. The Texas Water Development Board assisted with design of the flow data collection system and is working to analyze flow data. Special thanks go to David Brock. Texas A&M Corpus Christi has contributed analysis of benthic invertebrate and aquatic insect samples. Special thanks go to Kim Withers. The Upper Coast Team thanks TCEQ headquarters staff and staff of the Houston and Beaumont regional offices, the Sabine River Authority and Joe Murphy, volunteer, for assistance with field sampling efforts.

Finally, special thanks go to Cindy Contreras, for her contributions to the text of the report and her thorough and careful review of the tables and figures.

This project was funded in part by a grant from the National Oceanic and Atmospheric Administration and this is a report of the Coastal Coordination Council pursuant to National Oceanic and Atmospheric Administration Award No. NA03NOS4190102.

EXECUTIVE SUMMARY

Texas Parks and Wildlife Department has conducted a study of three tidal streams included on the state list of impaired waters ("303(d) list") for which low dissolved oxygen levels have been reported. Two minimally-impacted ("reference") streams have also been studied as part of the project. The goal is to determine the aquatic life use of the three impaired streams and hence, the appropriate water quality standards.

In this multi-year study, staff sampled fish, benthos, aquatic insects, habitat, flow, and water quality. The three impaired tidal streams studied are Tres Palacios Creek Tidal and Garcitas Creek Tidal on the middle coast and Cow Bayou Tidal on the upper coast. West Carancahua Creek Tidal serves as a reference stream for both mid-coast streams, with Lost River as the reference stream for Cow Bayou Tidal. Field sampling began in spring 2003 and was completed in November 2004. In fiscal year 2005, TPWD staff will analyze data and prepare a methodology report. In fiscal year 2006, staff will prepare aquatic life use attainability assessment reports.

Water quality data were collected for the three study and two reference streams. Data include water chemistry and physicochemical parameters collected at seventeen stations (four stations in Cow Bayou and three in each of the other study streams). Physicochemical data collected include 24-hour dissolved oxygen, temperature, specific conductance and pH. Water chemistry data include a suite of conventional and nutrient parameters. To aid in interpreting the data, instantaneous profiles and field observations were also collected at the time of sampling at each station.

In fulfillment of requirements for General Land Office Coastal Management Program (CMP) Grant 04-022 (TPWD Contract No. 129990), this report presents results of the water quality sampling effort.

BACKGROUND

Tidal streams are components of estuaries, which provide vital habitat such as nursery grounds for many aquatic organisms, including economically important species like shrimp and game fish. Numerous tidal streams are included on the state list of impaired waters ("303(d) list"). Inclusion on the list initiates the Total Maximum Daily Load (TMDL) process, which provides a framework for the process to restore water quality. As a first step in the TMDL process, it is necessary to assess the waterbody, and determine if the impairment is genuine, and if so, whether or not it is caused by pollutants. For tidal streams there is no generally accepted methodology for performing the assessment and the Texas Commission on Environmental Quality (TCEQ) and Texas Parks and Wildlife Department (TPWD) have jointly recognized the need for developing such a methodology. Data collected as part of this project will ultimately be analyzed to make recommendations regarding appropriate aquatic life uses by preparing use attainability analysis (UAA) reports.

This study focused on three tidal streams included on the state list of impaired waters for low dissolved oxygen levels and two minimally-impacted reference streams. Data will be used to determine the aquatic life use of the three impaired streams and hence, the appropriate water quality standards.

Staff sampled fish, benthos, habitat, flow, and water quality. The three impaired tidal streams studied were Tres Palacios Creek Tidal (Segment 1501) and Garcitas Creek Tidal (Segment 2453A) on the middle coast and Cow Bayou Tidal (Segment 0511) on the upper coast. West Carancahua Creek Tidal (tributary of Segment 2456) serves as a reference stream for both mid-coast streams, with Lost River (tributary of both 0801 and 2422) as the reference stream for Cow Bayou Tidal. Field sampling began in March 2003 and was completed in November 2004. In fiscal year 2005, TPWD staff will analyze data and prepare an assessment methodology report. In fiscal year 2006, staff will prepare aquatic life use attainability assessment reports.

In fulfillment of requirements for General Land Office Coastal Management Program (CMP) Grant 04-022 (TPWD Contract No. 129990), this report presents results of the water quality sampling effort.

Funding

Major funding for the project is from the Texas Commission on Environmental Quality, TCEQ Contract Number 582-2-48657 (TPWD Contract No. 108287) in the amount of $563,560, with support through 2006. TPWD is contributing staff salaries, for a total of $360,404.80 through April 2005. Additional funding in the amount of $69,308.65 for equipment purchase was provided by General Land Office Coastal Management Program (CMP) Grant 04-022 (TPWD Contract No. 129990). These funds were used to purchase seventeen In-Situ datasondes that were used in the study. TPWD has contributed staff salaries of $55,984.12 for the CMP grant matching funds through April 2005, which is in excess of the $52,387 required.

Staffing

Key project staff for the tidal stream study are as follows:

Project manager:	Janet Nelson
QA officer:	Cindy Contreras
Data manager:	Jim Tolan

Habitat lead:	Nathan Kuhn
GIS lead:	Duane German
Interagency coordination:	Pat Radloff
Cow Bayou lead:	Cindy Contreras, Adam Whisenant
Tres Palacios lead:	Jim Tolan
Garcitas Creek lead:	Janet Nelson

STUDY AREA

Study streams are Cow Bayou Tidal (Orange County), Tres Palacios Creek Tidal (Wharton and Matagorda Counties), and Garcitas Creek Tidal (Jackson and Victoria Counties). Figure 1 depicts the location of the study and reference streams.

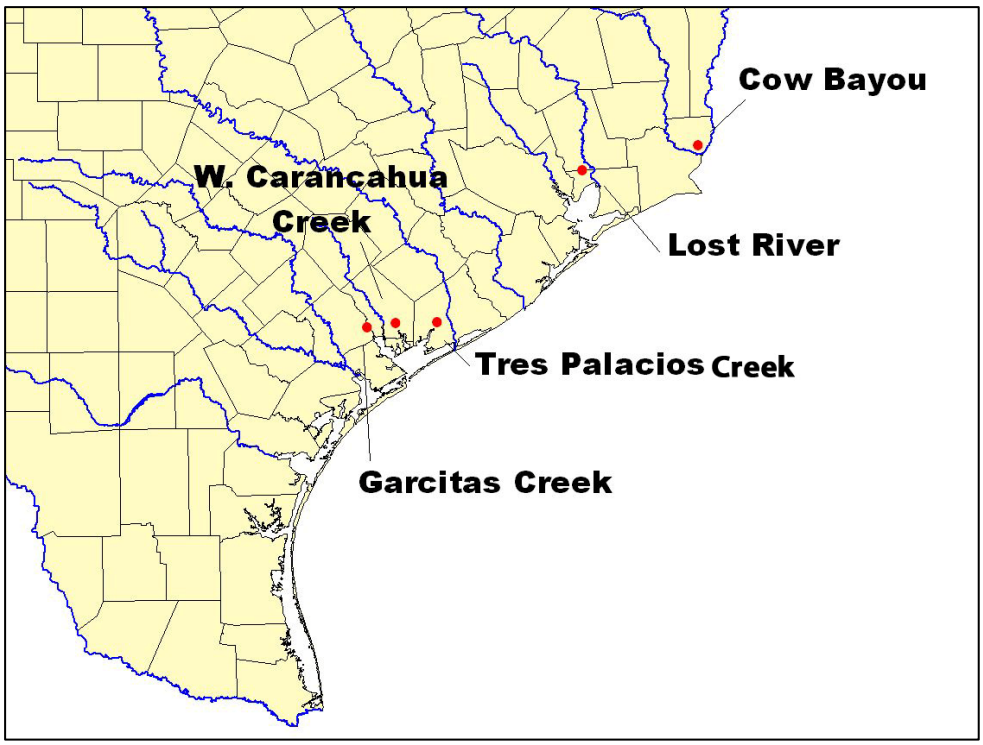

Figure 1. Location of streams along the Texas coast.

Cow Bayou

Cow Bayou originates in Jasper County and flows southeast through Jefferson County to its confluence with the Sabine River just upstream of Sabine Lake. The tidally influenced portion, Cow Bayou Tidal, is defined by the Texas Surface Water Quality Standards (TSWQS) as Segment 0511. Cow Bayou Tidal begins just upstream of IH-10 and ends at the confluence with the Sabine River. It lies mostly within the boundaries of Orange County. The lower part of Cow Bayou Tidal was channelized in the early 1950's for navigation, leaving numerous side channels and oxbows. The upper portion of its watershed is densely forested and relatively lightly populated. The lower portion includes the communities of Bridge City and Orange. According to data from the TCEQ Regulatory Activities and Compliance System (TRACS),

Segment 0511 receives wastewater at twelve industrial and eleven domestic outfalls representing fifteen facilities.

Garcitas Creek

Garcitas Creek, Segment 2453A, originates in De Witt County, flows through Victoria County, and eventually forms part of the boundary between Victoria and Jackson County before reaching Lavaca Bay. The tidally-influenced portion of the stream probably extends just upstream of its confluence with Arenosa Creek.

Twidwell and Davis (1989) described the Garcitas Creek watershed as nearly level to gently sloping. Elevation increases to the north-northwest. Most of the land in the watershed is rangeland, but some cultivation of sorghum, rice, and corn crops also occurs. Commercial production of oil and gas in the area began in the early 1930's and remains important economically. The climate is subtropical humid, and annual precipitation averages 38 inches with September being the wettest month. Rainfall is evenly distributed throughout the year, with peaks occurring in spring due to increased thunderstorm activity and in fall due to tropical disturbances. Throughout the upper reaches, Garcitas Creek is bordered by narrow wooded belts consisting chiefly of post oak and live oak trees. The canopies of these bordering trees afford substantial shading of the stream waters and limit the development of understory vegetation. The trees quickly thin to prairie areas that are utilized for grazing cattle. In tidally influenced areas of Garcitas Creek the water is more turbid than the upstream portion and the stream channel is wider and nearly straight. The stream banks are low and heavily wooded; however their canopies do not shade the water surface due to the width of the stream channel. Bottom substrates are nearly uniform, consisting of fine sand. Although the upper banks and riparian areas are heavily wooded, the lower banks are moderately vegetated by coarse grasses, vines, and weeds with many open and broken down areas. Water depth is greater in the tidal portion than upstream, but observable instream cover is sparse.

There are no point source discharges directly into Garcitas Creek. There is a small community near the mouth of Garcitas Creek that relies on septic systems for domestic wastewater treatment.

Tres Palacios Creek

Tres Palacios Creek originates in Wharton County and flows about 55 miles to Tres Palacios Bay in Matagorda County. The tidal portion of the stream, Segment 1501, is defined as extending upward from the bay about twelve miles, to one mile upstream of the confluence with Wilson Creek. Tres Palacios Creek has been characterized by the Lower Colorado River Authority (Bass and Reinmund (1999)), as follows:

> "The Tres Palacios River (stream segments 1501 and 1502) is located in south Central Texas in Wharton and Matagorda Counties. Its watershed includes the mouth of Tres Palacios Bay and ten tributaries. It encompasses an area of approximately 322 square miles and extends from the City of El Campo to the City of Palacios. Land use is predominantly agricultural (rice production and ranching). Population is densest at the headwaters and lower reaches of the river (El Campo, population 11000; and Palacios, pop. 4700, respectively), but there are several subdivisions along the length of the river.

> The Tres Palacios River has two distinct utilizations. The headwaters of the river are used as a drainage way for the City of El Campo's stormwater and municipal wastewater treatment plant. Base flow in this area is intermittent and coincides with rain events. The city's treatment plant discharge also contributes to stream flow (permitted to release 2.6 MGD). In contrast, the lower portions of the river are used for contact recreation such as swimming, waterskiing and fishing.
>
> The river discharges into Tres Palacios Bay, one of the larger secondary bays of Matagorda Bay. Tres Palacios Bay is an important nursery for fish and shellfish species and contains several oyster reefs. Many residents in the watershed make their living from the water. Occupations and businesses include shrimping, fishing and support industries such as marinas, boat repair, etc, and a growing tourist industry. In 1996 and 1999, the Texas Natural Resource Conservation Commission (TNRCC) listed Segment 1502 (above tidal) of the Tres Palacios River on the State of Texas' Clean Water Act 303(d) list as an "impaired water body" for elevated levels of fecal coliform and total dissolved solids. The tidally influenced segment of the river (Segment 1501) is listed for dissolved oxygen violations. In the past, high bacteria levels in the river, especially after storm events, have resulted in oyster bed closings in the bay."

There is one permitted wastewater discharge in Segment 1501, Markham Municipal Utility District. There is also a registered aquaculture facility, Ekstrom Enterprises, which discharges a significant volume of wastewater into Segment 1502, upstream of Tres Palacios Creek Tidal.

Reference Streams

Selection of reference streams for the study was challenging, as it is difficult to find water bodies along the Texas coast that are without human impacts. In reviewing potential reference streams, factors such as specific conductance, depth, riparian habitat, instream habitat, watershed size, land use, reported water quality and ease of access were considered. In addition to desktop comparisons, staff conducted numerous site visits. The final selection of reference streams represents what TPWD staff believes are the best choices given existing constraints.

West Carancahua Creek Tidal, located in Jackson County, was selected as the reference stream for the two mid-coast streams, Tres Palacios Creek Tidal and Garcitas Creek Tidal. It is a tributary of Carancahua Creek, which flows to Carancahua Bay, Segment 2456. West Carancahua Creek Tidal is of comparable size to the two study streams and is located between them. The "Handbook of Texas Online" describes West Carancahua Creek as follows:

> **"**West Carancahua Creek rises two miles northeast of White Hall in northeastern Jackson County (at 29°04' N, 96°23' W) and runs south for twenty-eight miles to its junction with East Carancahua Creek, at the head of Carancahua Bay in extreme southeastern Jackson County (at 28°46' N, 96°25' W). The stream is intermittent in its upper reaches. It crosses flat to rolling prairie, surfaced by dark clay that supports mesquite, grasses, and cacti; downstream, the flat and locally depressed terrain is surfaced by clay and sandy loams that support water-tolerant hardwoods, conifers, and grasses."

West Carancahua Creek above tidal is a TCEQ ecoregion reference stream. Earlier studies have shown a diverse benthic macroinvertebrate community (Bayer et al. 1992).

Lost River is a small stream that rises in Liberty County and flows southwest through Chambers County on the west side of the Trinity River, where it joins Old River Lake at the head of the Trinity delta. Lost River appears to connect to both the Trinity River, Segment 0801 and Trinity Bay, Segment 2422. An earthen dam was constructed at the head of Lost River to protect drinking water supplies upstream from saltwater contamination due to tidal influence. During high flow, Trinity River water enters Lost River at multiple points near this dam. The area surrounding the river is marshy with bald cypress as the dominant tree species. Numerous small bayous and sloughs interconnect in the low-lying area around Lost River.

Site Selection Criteria

Three monitoring stations were selected for each of the five streams (three study streams and two reference streams). Stations were chosen such that one station characterized the upper tidal reach, one characterized the middle, and one the lower tidal reach. On Cow Bayou Tidal, an additional station was added in order to compare the natural channel to dredged channel. Where possible, stations were selected to correspond to existing Surface Water Quality Monitoring (SWQM) stations. Where stations corresponding to study objectives did not exist, new stations were established by submitting station location requests to TCEQ. Table 1 gives station location descriptions and Figures 2 through 6 depict station locations for the five streams.

The mid-coast sampling sites were selected from a landscape perspective. TPWD personnel trained in landscape ecology, estuarine ecology and estuarine biology visited each of the three streams. Sample sites were selected according to vegetation types present. The lower tidal reach stations were characterized by a flat landscape and the presence of *Spartina alterniflora*. In the middle stations more brackish vegetation was present. In the upper stations fresh water vegetation, such as oak and elm trees, was present, and the banks were steeper with a deeper channel.

At Cow Bayou, the downstream station was selected to provide a station close to the mouth of the stream. This station is located in the channelized portion of Cow Bayou Tidal. The middle station was selected at the approximate mid-point of the tidally influenced reach, and is also located in the channelized portion of the stream. An advantage of this station is the large amount of historical water quality data that already exists for this site. Another station was selected to allow comparison between the original stream channel and the channelized portion. This additional station is near the middle station, but in the original natural stream channel, and is connected with the channelized portion. The upstream station is in the upper end of the reach, above the channelized portion. The station was chosen to reflect the narrower upstream end of Cow Bayou Tidal, which only rarely receives saltwater intrusion. It is in a part of Cow Bayou that has experienced historical dissolved oxygen depressions.

At Lost River, the three stations were sited by placing the downstream station near the mouth of Lost River at Old River Lake, the upstream station near the upper end of Lost River where it is blocked by an earthen dam, and middle station about halfway between.

Table 1. Station location descriptions.

Stream	TPWD Station ID	Map Label	TCEQ Station ID	TCEQ Station Descriptions (TCEQ 2005)
Cow Bayou Tidal (0511)	CB 1	Cow 1	10454	Upper station - 50 yds (45.7 m) downstream of Cole Creek confluence
	CB 2	Cow 2	10451	Middle station - at SH 87
	CB 2A	Cow 2A	17877	Natural channel station - approximately 2.2 km upstream of SH 87 in original stream channel northeast of Bridge City
	CB 3	Cow 3	10446	Lower station - 2400 ft (732 m) upstream of Sabine River confluence
Lost River (801 and 2422)	LR 1	C	17881	Upper station - at the Chambers County line and 5.4 km upstream of John Wiggins Bayou
	LR 2	B	17880	Middle station - approximately 2.6 km upstream of the confluence with John Wiggins Bayou and northeast of Lost Lake oil field
	LR 3	A	17879	Lower station - at confluence with Old River Lake approx. 1.3 km upstream of IH10
Tres Palacios Creek Tidal (1501)	TP 1	1	17887	Upper station – 1.4 km upstream from the confluence of Wilson's Creek
	TP 2	2	15321	Middle station – 3.75 km upstream from SH 521 (approximately halfway between SH 521 and confluence of Wilsons Creek)
	TP 3	3	17886	Lower station – 7.5 km downstream from SH 521
Garcitas Creek Tidal (2453A)	GC 1	1	17883	Upper station – 3.07 km upstream from SH 616
	GC 2	2	17884	Middle station – 1.8 km downstream from SH 616
	GC 3	3	17885	Lower station – 6.5 km downstream from SH 616
West Carancahua Creek Tidal (2456)	WC 1	1	17873	Upper station - 5.1 km upstream from the confluence with East Carancahua Creek
	WC 2	2	17876	Middle station - 1.9 km upstream from the confluence with East Carancahua Creek
	WC 3	3	17882	Lower station - 4.5 km downstream from the confluence with East Carancahua Creek

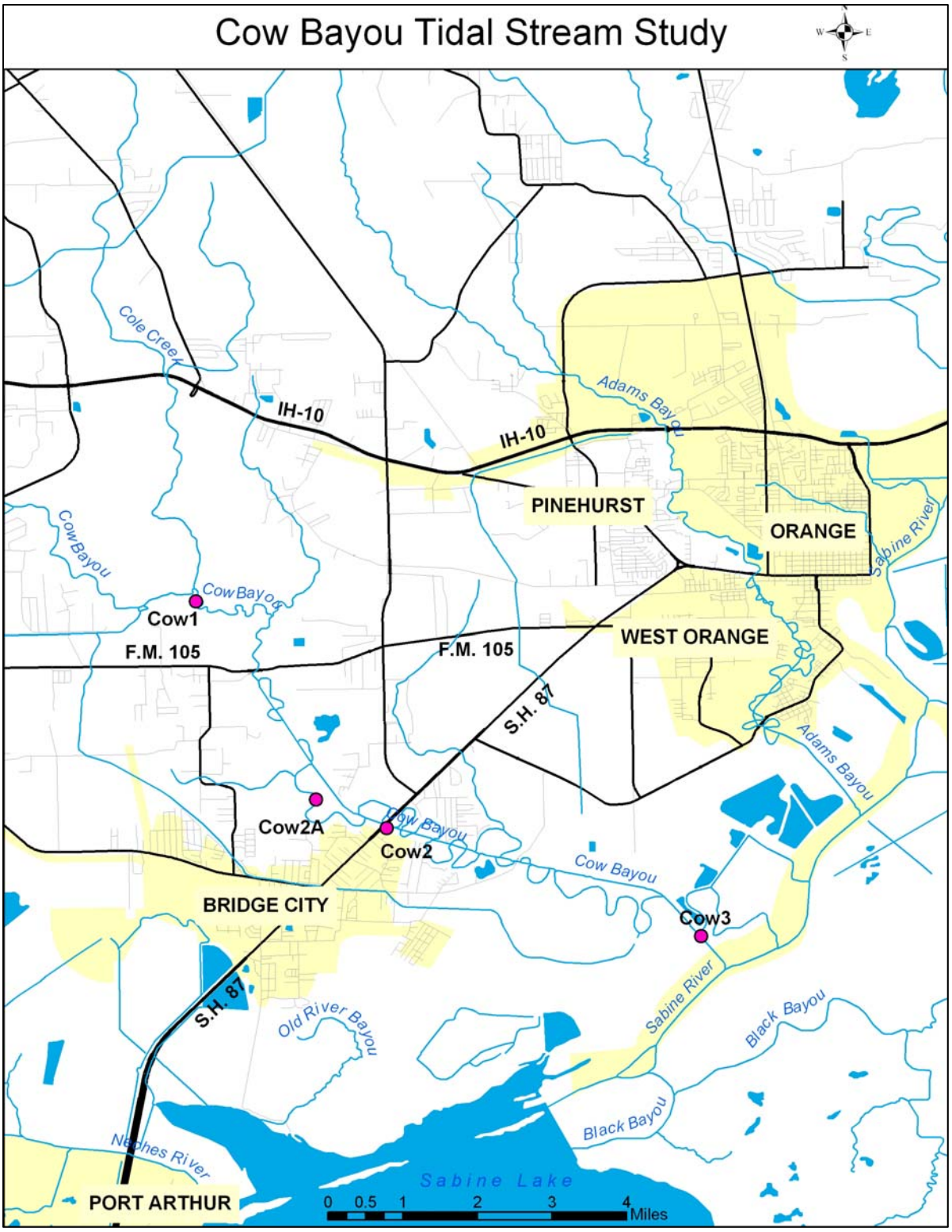

Figure 2. Station locations for Cow Bayou.

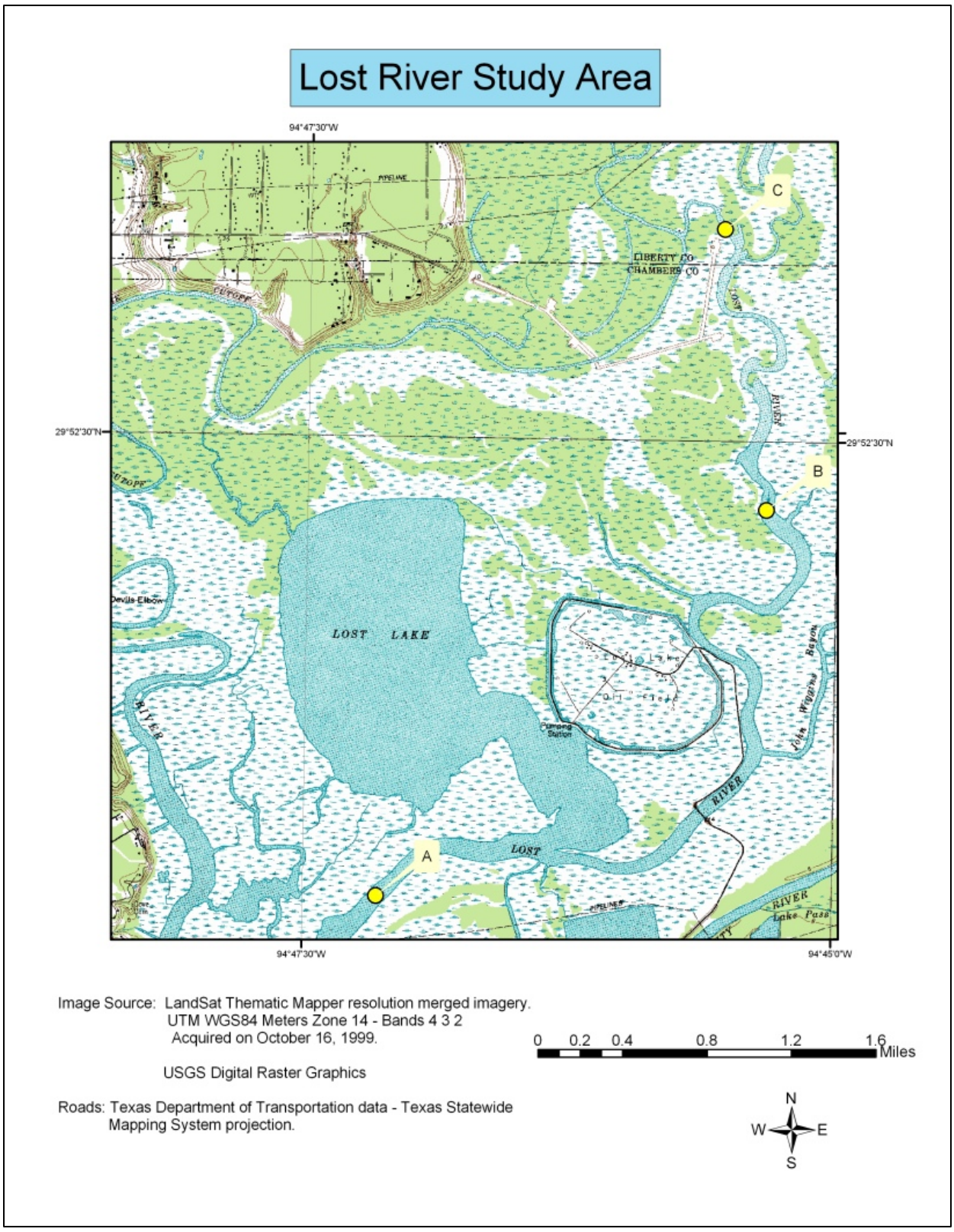

Figure 3. Station locations for Lost River.

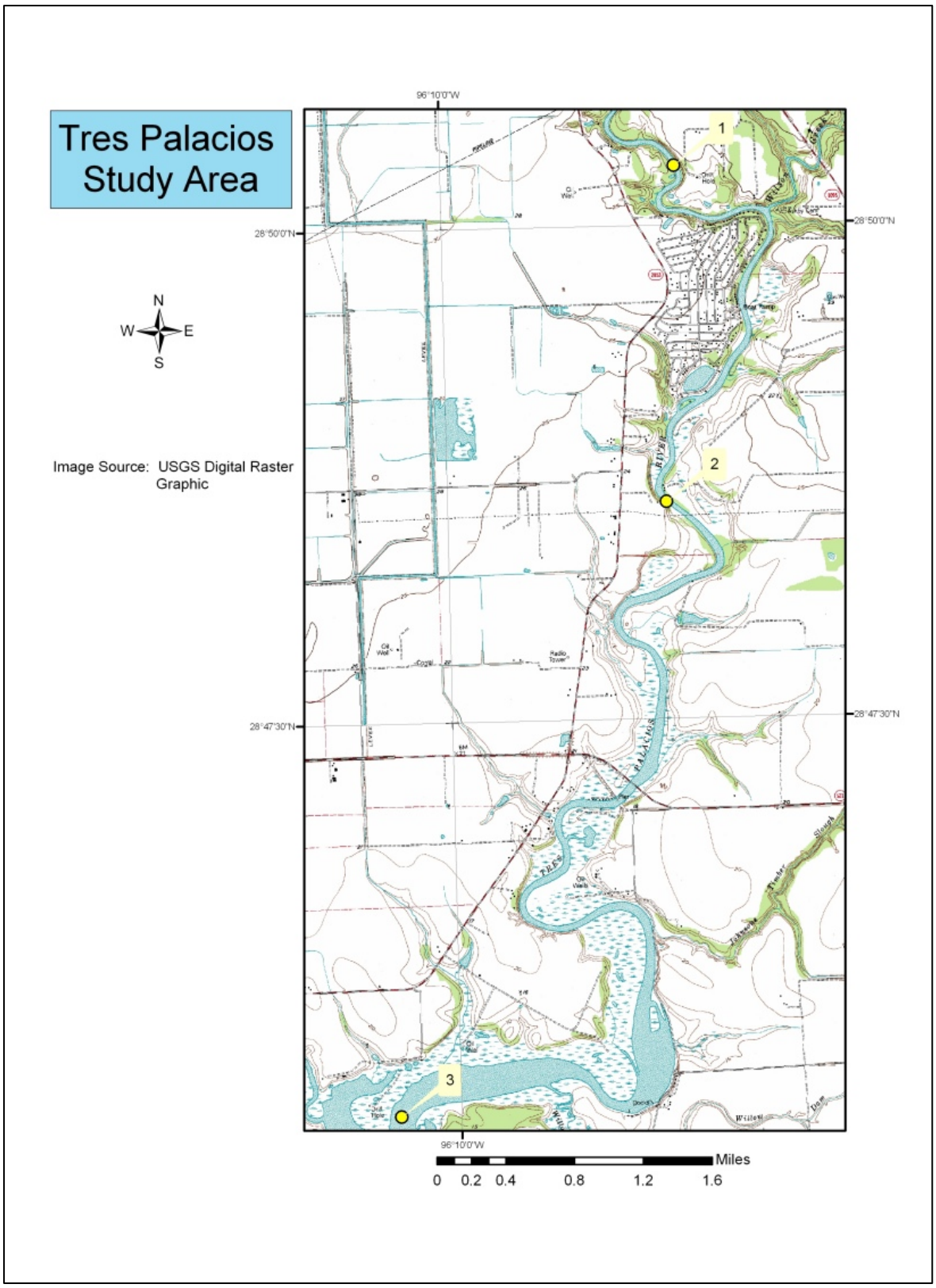

Figure 4. Station locations for Tres Palacios Creek.

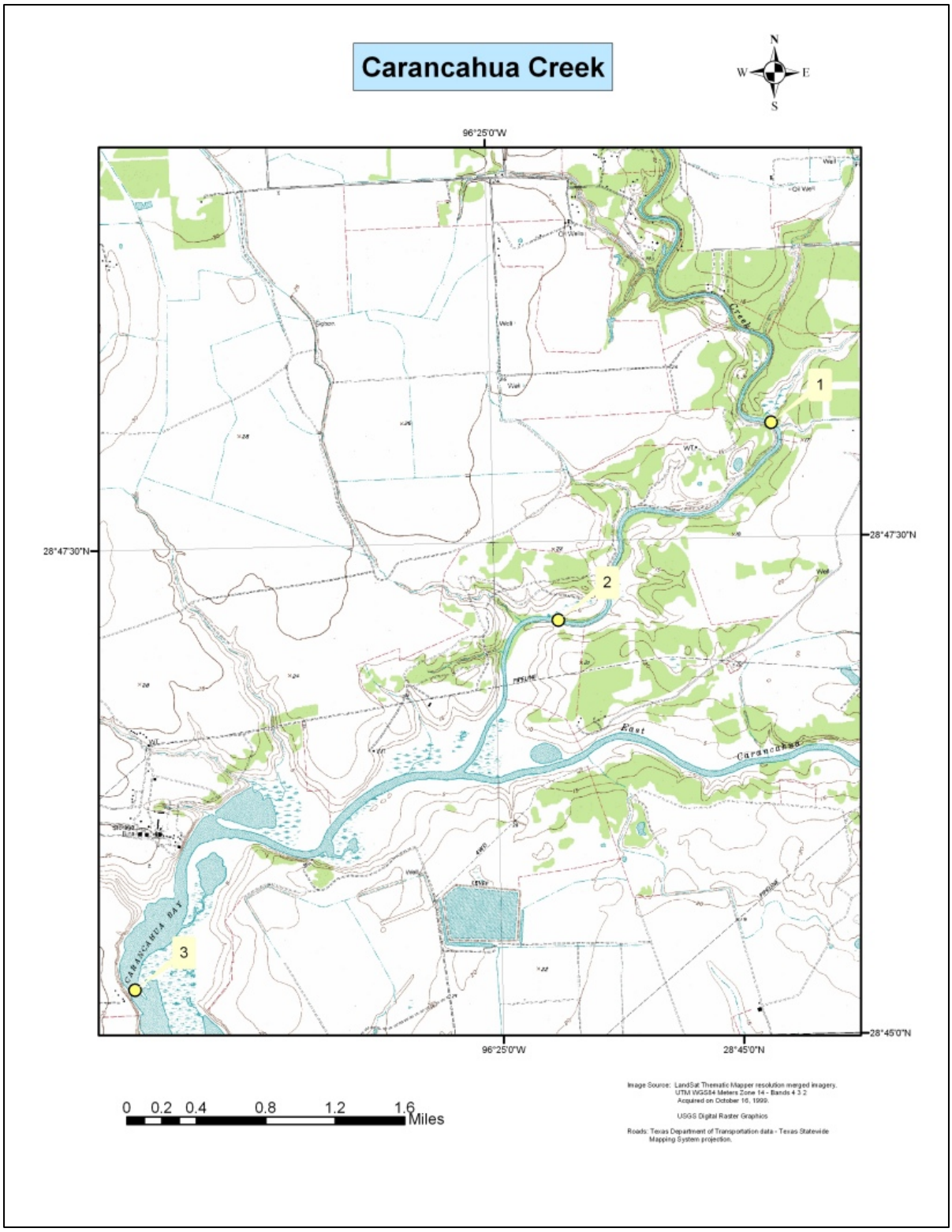

Figure 5. Station locations for West Carancahua Creek.

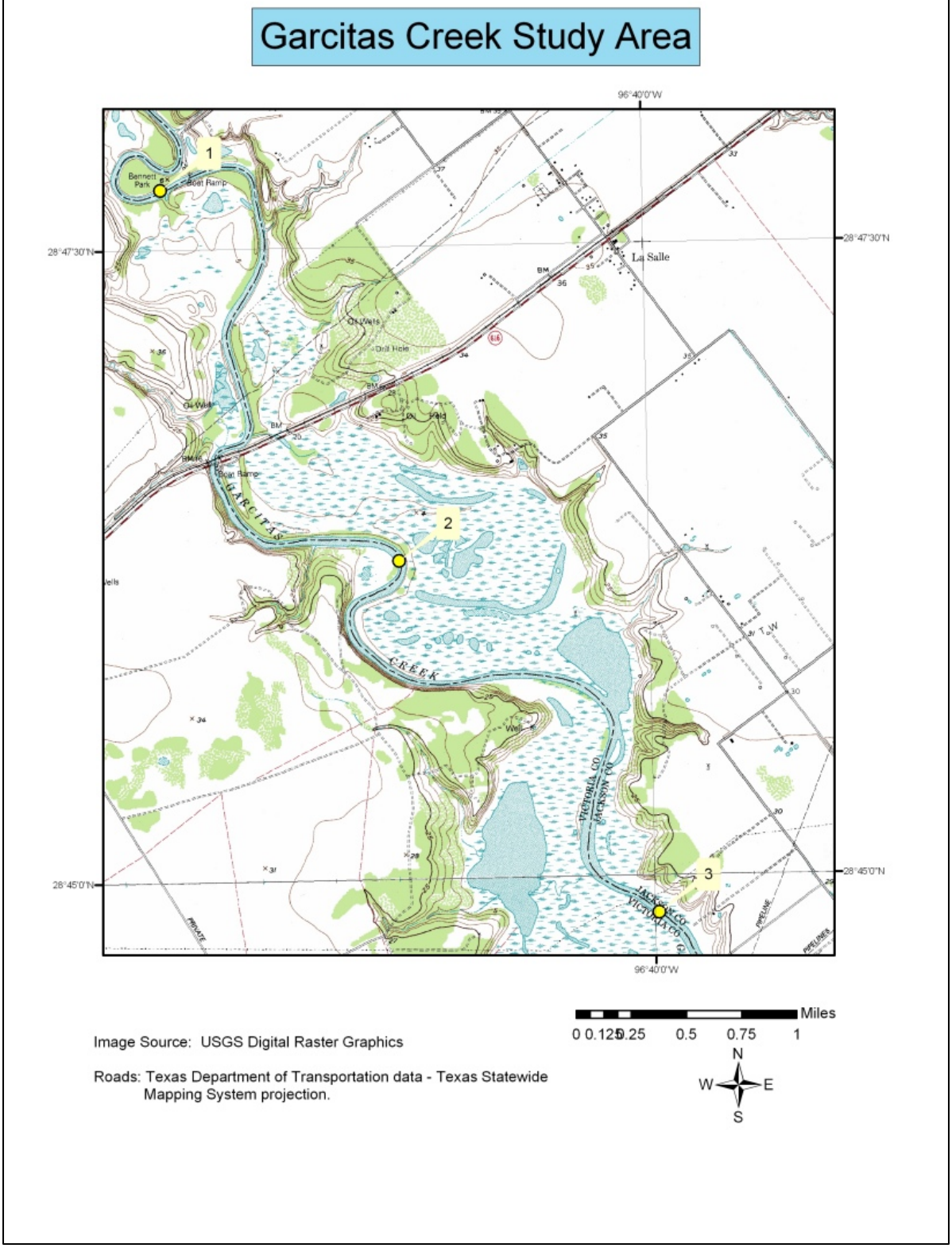

Figure 6. Station locations for Garcitas Creek.

METHODS

Frequency of Sampling

Physicochemical, water chemistry, flow, nekton and aquatic insect data were collected in Cow Bayou Tidal, Tres Palacios Creek Tidal, Garcitas Creek Tidal, West Carancahua Creek, and Lost River six times annually for two consecutive years. Sampling occurred twice each in spring, summer and fall of 2003 and 2004. Sediment and benthic data were collected three times annually for two consecutive years, once each in spring, summer and fall of 2003 and 2004.

To aid in interpretation of results efforts were made to collect data in as small a window of time as possible. For each station all biological samples, water and sediment chemistry, flow data and physicochemical measurements were collected within the same week.

Flow

TPWD staff collected instantaneous flow measurements using Sontek 1.5 MHz Acoustic Doppler Current Profile (ADCP) instruments deployed across the channel at four transects at each station. A Sontek Argonaut Doppler profiler was deployed at the middle station to log flow conditions in each of the five streams for at least 24-hours each sampling trip. The Argonauts have the capability of measuring and storing information about fluctuating, bi-directional flows in tidal streams. TPWD staff deployed the acoustic Doppler profilers and downloaded data to computers. Texas Water Development Board staff assisted in initial site installation design, collected supporting hydrographic data as needed and are analyzing the flow data using standard methods. Data to be extracted included tidal and residual components of flow, as well as summary discharge and velocity data. In cases of stratification of the streams and bi-directional flow, flows and velocities of top and bottom segments were separately reported. The flow report from TWDB is expected in 2005.

Biological Sampling

Benthic Invertebrates

Benthic fauna were sampled with a suction coring device, Petite Ponar, or Ekman dredge, depending on bottom substrates. Benthic organisms were collected from one side of the stream and mid-channel, placed in a 500-micron mesh bag, and preserved in 10% buffered formalin with Rose Bengal. Five samples from one side and five samples in the middle of the channel were taken for a total of ten per station. From trip to trip, benthic samples were not routinely collected on the same side, although there was no systematized random sampling pattern. Side samples were considered to represent both sides. On trips when benthic data were collected, sediment samples were also collected and analyzed for grain size, total organic carbon, and percent solids.

TPWD staff also sampled at each station by conducting a five-minute sweep with a 500-micron mesh D-frame net on each side of the stream. Samples were preserved in the field using the technique described above.

Benthic samples were delivered to the Center for Coastal Studies at Texas A&M University – Corpus Christi for identification and enumeration. Sample analysis is in progress.

There will be no further discussion of benthos or aquatic insects in this report.

Nekton

Sampling access and stream characteristics dictated sampling methods used at each site. Nekton was collected on the mid-coast streams with seines, gill nets and trawls. Electrofishing was not used as a sample method, as salinities frequently exceeded gear specifications at the lower stations. The upper coast used seining, gill netting, trawling and electrofishing. It was not possible to trawl the most upstream station on Cow Bayou due to the presence of numerous dead trees in the substrate. Details of nekton sampling methods are given in the project Quality Assurance Project Plan (TPWD 2003a).

There will be no further discussion of nekton in this report.

Instream and Riparian Habitat

Habitat characteristics were surveyed according to the Environmental Protection Agency's Environmental Monitoring and Assessment Program (EMAP) methods for non-wadeable streams. Habitat classification was performed a single time for each stream at 3 to 5 sampling reaches per stream during spring 2003. Variables measured included: 1) a thalweg profile along the length of each stream sampling reach, which included bottom substrate and channel habitat type; 2) channel depth and substrate type along the margin of the channel; 3) channel sinuosity; 4) coverage of large woody debris in and near the channel; 5) channel characteristics which includes channel wetted width, presence of bars or islands, bankfull width, bankfull height, channel incised height, and bank angle/degree of bank undercutting; 6) overhanging canopy cover along channel banks using a densiometer; 7) riparian vegetative structure involving separate measures of canopy, understory and groundcover vegetation; 8) fish cover and aquatic vegetation within the channel; and 9) the degree of human influence in the immediate sampling area.

There will be no further discussion of instream and riparian habitat classification in this report.

Landcover

Landcover has been developed for all five streams in the study using an area sufficient to encompass the contributing basin of the stream segments. Analysis included the amount of different landcover types contributing runoff to the streams, the amount of impervious cover in the watersheds, and human population density in the watersheds. Landcover was ground-truthed using data collected in the field with GPS for positional accuracy. Core landcover classes were grassland, shrub-land, marsh, open water, upland forest, bottomland forest, mesic forest, agricultural lands, and urban/industrial. The methodology is discussed in the Quality Assurance Project Plan (TPWD 2003a). Results are unpublished project deliverables that have been provided to TCEQ.

There will be no further discussion of landcover classification in this report.

Water Quality

Multiparameter logging sondes of various types, including YSI 600, In Situ Trolls, and Hydrolab Minisondes, Datasonde 3 and Datasonde 4 models, were deployed at each sampling station.

Temperature, dissolved oxygen, specific conductance, and pH were measured every half-hour for 24 hours.

Water samples were collected at each sampling station and analyzed for the parameters listed in Table 2.

Table 2. Water chemistry parameters.

Parameter
Ammonia-nitrogen
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)
Chloride
Chlorophyll *a*
Nitrate
Nitrite
ortho-Phosphorus
Pheophytin *a*
Sulfate
Total Dissolved Solids (TDS)
Total Kjeldahl Nitrogen (TKN)
Total Organic Carbon (TOC)
Total Phosphorus
Total Suspended Solids (TSS)
Volatile Suspended Solids (VSS)

Sediment

In conjunction with benthic sampling, sediment samples were collected at each sampling station and analyzed for total organic carbon, percent solids and grain size.

There will be no further discussion of sediment samples in this report.

Field Sampling Procedures

Sampling procedures for field and conventional chemical parameters are documented in the TCEQ *Surface Water Quality Monitoring Procedures Manual* (1999a) unless otherwise noted. Specifically, field sampling procedures followed Chapter 2, “Field Measurements and Sample Collection,” pages 2-5 through 2-16 with for field techniques for collecting samples and using multiprobe instruments. Water sampling followed Chapter 4, “Water Sample Collection,” pages 4-1 through 4-2.

Sample Characteristics

Water samples were collected before any other work was done at each sample location site to minimize potential human influence on the sample. The samples were collected at a depth of approximately 0.3 m from the surface of the water column. An additional sample was collected approximately one foot (0.3 meter) above the bottom. A Van Dorn bottle or similar sampling gear was used to collect the water sample at depth. Water collected at depth was not analyzed

for Chlorophyll *a* and Pheophytin *a*. Sample collection at depth began in April 2003 for the mid coast and May 2003 for the upper coast.

Table 3 gives sample volume, container types, minimum sample volume, preservation and holding time requirements for water chemistry samples collected in this study.

Table 3. Field sampling and handling procedures.

Parameter	**Matrix**	**Container**	**Preservation**	**Sample Volume**	**Holding Time**
TSS/VSS	water	Pre-cleaned glass or cubitainer	4º C, dark	400 mL	7 days
TDS	water	Pre-cleaned glass or cubitainer	4º C, dark	250 mL	7 days
Chloride	water	Pre-cleaned glass or cubitainer	4º C, dark	100 mL	28 days
Sulfate	water	Pre-cleaned glass or cubitainer	4º C, dark	100 mL	28 days
Total Phosphorus	water	Pre-cleaned glass or cubitainer	4º C, dark, pH<2 with H_2SO_4	150 mL	28 days
Total Kjeldahl Nitrogen	water	Pre-cleaned glass or cubitainer	4º C, dark, pH<2 with H_2SO_4	200 mL	28 days
Nitrite/Nitrate Nitrogen	water	Pre-cleaned glass or cubitainer	4º C, dark	150 mL	48 hrs
Ammonia-Nitrogen	water	Pre-cleaned glass or cubitainer	4º C, dark, pH<2 with H_2SO_4	150 mL	28 days
ortho-Phosphorus	water	Pre-cleaned glass or cubitainer	4º C, dark	150 mL	28 days
TOC	water	Pre-combusted borosilicate glass bottle	4º C, dark, pH<2 with H_2SO_4	100 mL	28 days
Chlorophyll *a*	water	Cubitainer	4º C, dark	1000 mL	lab filter < 48 hrs; filter may be stored 30 days
Pheophytin *a*	water	Cubitainer	4º C, dark	1000 mL	lab filter < 48 hrs; filter may be stored 30 days
$CBOD_5$	water	Plastic or glass	4º C	4000 ml	48 hours

Analytical Methods

Analytical methods were selected to comply with TCEQ rules for analysis methodologies pursuant to the Texas Surface Water Quality Standards (§307.1 - §307.10) in that the data generally were generated for comparison to these standards and/or criteria. The Standards state that "Procedures for laboratory analysis will be in accordance with the most recently published edition of *Standard Methods for the Examination of Water and Wastewater*, the latest version of the *TCEQ Surface Water Quality Monitoring Procedures Manual*, 40 CFR 136, or other reliable procedures acceptable to the Agency." [30 TAC §307.9(a)] Analytical methods and associated parameters are listed in Table 4.

Table 4. Analytical methods.

FIELD PARAMETERS	UNITS	METHOD TYPE	METHOD	METHOD DESCRIPTION	STORET	AWRL
24-hr. # obs. DO	# of measure-ments		SWQMP	Multiprobe	89858	NA
24-hr. avg. DO	mg/l		SWQMP	Multiprobe	89857	NA
24-hr. min. DO	mg/l		SWQMP	Multiprobe	89855	NA
24-hr. max. DO	mg/l		SWQMP	Multiprobe	89856	NA
24-hr. min. pH	pH units		SWQMP	Multiprobe	00216	NA
24-hr. max. pH	pH units		SWQMP	Multiprobe	00215	NA
24-hr # obs. pH	# of measure-ments		SWQMP	Multiprobe	00223	NA
24-hr. avg. Salinity	ppt		SWQMP	Multiprobe	00218	NA
24-hr. min. Salinity	ppt		SWQMP	Multiprobe	00219	NA
24-hr. max. Salinity	ppt		SWQMP	Multiprobe	00217	NA
24-hr. avg. Conductivity	umhos/cm		SWQMP	Multiprobe	00212	NA
24-hr. min. Conductivity	umhos/cm		SWQMP	Multiprobe	00214	NA
24-hr. max. Conductivity	umhos/cm		SWQMP	Multiprobe	00213	NA
24-hr. avg. water Temperature	°C		SWQMP	Multiprobe	00209	NA
24-hr. min. water Temperature	°C		SWQMP	Multiprobe	00211	NA
24-hr. max. water Temperature	°C		SWQMP	Multiprobe	00210	NA
Water Depth of measurement	m		SWQMP	Multiprobe	13850	NA
pH	pH units		SWQMP		00400	NA
DO	mg/L		SWQMP		00300	NA
Conductivity	umhos/cm		SWQMP		00094	NA
Temperature	°C		SWQMP		00010	NA
Secchi Depth	meters		SWQMP		00078	NA

FIELD PARAMETERS	UNITS	METHOD TYPE	METHOD	METHOD DESCRIPTION	STORET	AWRL
Days since last significant rainfall	days		SWQMP		72053	NA
Flow	cfs	recording meter	Acoustic Doppler	Sontek XR and ADCP or equivalent	00061	NA
Flow Severity	1-no flow, 2-low, 3-normal, 4-flood, 5-high, 6-dry		SWQMP		01351	NA
LABORATORY PARAMETERS	**UNITS**	**METHOD TYPE**	**METHOD**	**METHOD DESCRIPTION**	**STORET**	**AWRL**
Ammonia-N	mg/L	colorimetric	EPA 350.1 w/distillation		00610	0.05
Carbonaceous Biochemical Oxygen Demand (CBOD5)	mg/L	potentiometric	Std. Methods 5210 B	total	00314	NA
Chloride	mg/L	ion chromatography	EPA 300.0		00940	10
Chlorophyll *a*	ug/L	colorimetric	Std.Methods 10200-H		32211	5.0
Nitrate-N	mg/L	ion chromatography	EPA 300.0	total	00620	0.05
Nitrite-N	mg/L	ion chromatography	EPA 300.0	total	00615	0.05
o-phosphorus	mg/L	ion chromatography	EPA 300.0	dissolved	70507	0.06
Pheophytin *a*	ug/L	colorimetric	Std.Methods 10200-H		32218	5.0
Sulfate	mg/L	ion chromatography	EPA 300.0		00945	10
Total Dissolved Solids (TDS)	mg/L	residue gravimetric	EPA 160.1		70300	10.0
Total Kjeldahl Nitrogen (TKN)	mg/L	colorimetric, automated phenate	PAI-DK03	total	00625	0.2
Total Organic Carbon (TOC)	mg/L	oxidation	EPA 415.2		00680	2.0
Total Phosphorus	mg/L	colorimetric, automated, block digestor	365.1	total	00665	0.06
Total Suspended Solids (TSS)	mg/L	gravimetric	EPA 160.2		00530	4.0
Volatile suspended solids (VSS)	mg/L		EPA 160.4		00535	4.0

QUALITY CONTROL

Sampling done as part of this study followed quality control (QC) requirements are outlined in the *TCEQ Surface Water Quality Monitoring Procedures Manual.* See the Quality Assurance Project Plan (TPWD 2003a) for details of field and laboratory quality assurance and quality control procedures.

For the water chemistry samples, for the first three trips field duplicates were collected. Beginning with the fourth trip in August 2003, field splits were collected. One QC sample was obtained for every ten water chemistry samples or portion thereof. Precision of duplicate and split results was analyzed. If precision for a parameter was outside of the acceptable range then results for that parameter were flagged for further investigation. Individual sample results were examined for discrepancies to determine if the data should be discarded. No results were discarded based on comparison of duplicates and splits.

Equipment blanks were collected once per trip for each type of equipment (bucket, Niskin bottle, etc.) that was used to collect a water sample. No equipment contamination was observed during the study.

Data were generally reliable. Sample results for 2003 sampling trips were accompanied by comments from the laboratory. Where such comments indicated a potential problem individual results were examined. Following discussion with TCEQ staff, most results were deemed acceptable. Only about 55 of about 484 sample results taken in 2003 were discarded. In 2004, the laboratory changed their procedures and simply did not report data that they believed to be unreliable, so no additional analysis was required. In both 2003 and 2004, samples were discarded that arrived at the laboratory in leaking containers, outside of the acceptable temperature range, or for which holding times were exceeded. Additional computerized data checks were done to ensure data quality prior to submitting data to TCEQ.

Prior to deployment, multiparameter datasondes were calibrated according to manufacturers' instructions. Diurnal water quality measurements were logged electronically and later downloaded to computers. Instruments were post-calibrated and post-calibration records were checked for each deployment to verify that instruments did not exceed the criteria required by TCEQ (page 9-11 of the *TCEQ Surface Water Quality Monitoring Procedures*). Data for a given parameter were discarded when post-calibration did not meet acceptable limits for that parameter. Other QA/QC activities included verifying that data were reported in the correct units.

The goal of each deployment was to collect a complete 24-hour set of measurements, which were averaged to determine means, maxima and minima for the various parameters. In some cases the datasondes were deployed for less time than 24 hours. In those cases, mean values and other statistics were calculated from several measurements, evenly spaced throughout the deployment period (e.g. every three hours) and intervening measurements were discarded and not included in the analysis.

Original field data sheets are maintained in the TPWD Austin office under the supervision of the Project Manager. Copies of the data sheets were provided to the Data Manager, QA Officer and data entry personnel. Laboratory data were provided electronically to the Data Manager and in hard copy to the QA Officer. A Microsoft Access database was created to manage the data. Field data were entered manually and laboratory and datasonde data were uploaded.

Electronic files are stored on the TPWD network. All data is backed up on network drives and on compact disk.

Quality checks were made on all data that was keyed into electronic format. Internal checks were run to ensure consistency between TCEQ laboratory data labeling and TPWD sample identification and to verify that data could be retrieved and that units were appropriate.

Hard copies of all field data, QA/QC checklists and quarterly reports are kept on file at the TPWD office (Habitat Resources Branch) at 3000 South IH-35, Suite 320, Austin, Texas 78704. All documents will be kept for a period of 5 years or as stipulated by the TCEQ.

RESULTS

The data presented in this report has been submitted to the TCEQ for inclusion in its TRACS database.

Water chemistry data are presented in Tables 5 through 20. When the streams were sufficiently deep, depending on tide and weather conditions, samples were taken at the surface and at the bottom of the water column. Datasonde deployment results are presented in Tables 21 through 25. Datasonde profile data are given in Tables 26 through 41. For all tables, blank entries or missing data indicate either that the data were not collected due to weather conditions or instrument, laboratory or calibration failure.

Temperature, dissolved oxygen, pH, and specific conductance from 24-hour datasonde deployments are presented in Figures 7 through 11. Connecting lines drawn in these figures do not represent continuous data collection and are drawn to aid visualization. Summaries of the 24-hour dissolved oxygen and specific conductance data are shown in Figures 12 through 16. Mean values are plotted. Lower and upper bars, respectively, show minimum and maximum values for the 24-hour period. Mean dissolved oxygen by station is presented in Figures 17 through 21. In the figures flow is from upstream on the left to downstream on the right. Mean dissolved oxygen by season is depicted in Figures 22 through 26. Diurnal dissolved oxygen for 2003 and 2004 is shown in Figures 27 through 38. Water column profile physicochemical parameter data at three depths and Secchi depth are presented in Figures 39 through 59. Data from the surface, middle and bottom of the water column are depicted for each station. Water chemistry data measured for surface samples is depicted in Figures 60 through 69. Figures 60 - 64 show results for total suspended solids, volatile suspended solids, total organic carbon and total dissolved solids. Figures 65 – 69 show the results for the nutrient-related parameters total phosphorus, ortho-phosphorus, nitrate+nitrite nitrogen (as the sum of individual analyses for nitrate and nitrite), total Kjeldahl nitrogen, chlorophyll *a*, Pheophytin *a*, and the sum of chlorophyll and pheophytin. For all figures, missing data indicate either that the data were not collected due to weather conditions or instrument, laboratory or calibration failure.

To make figures 60 through 69 all data values recorded as "<X" were recorded as "X." In some cases, the conversion of "<X" values to "X" appears to cause unreasonable, non-physical results. For example, in some figures the ortho-phosphorus value appears to be larger than the total phosphorus value. This occurs because the laboratory detection limit for ortho-phosphorus was larger than the detection limit for phosphorus. This can be verified by checking the related data table. Such results can be interpreted as a reflection of laboratory limitations, and are not physically significant. For stations were there were duplicate values, only the first value was plotted.

Data for ammonia, CBOD5, nitrate and nitrite were not individually plotted as most results were below detection limits. Chloride and sulfate data have not yet been plotted. Data from bottom samples have not yet been plotted or compared with surface data.

DISCUSSION

Cow Bayou Tidal, Garcitas Creek Tidal, and Tres Palacios Creek Tidal were selected for study because of concerns about support of their aquatic life uses, based on measurements of dissolved oxygen. The water chemistry and datasonde data collected in the study and presented in this report will be used to assess whether the waterbodies are meeting the dissolved oxygen standard. Together with the biological, flow, habitat and land use data, the water quality data will be used to determine an appropriate aquatic life use for each stream. This poses a particular challenge for tidal streams, as there is no existing methodology for assessing their aquatic life use.

TCEQ assigns aquatic life uses to waterbodies based on physical, chemical and biological characteristics. Biological characteristics that describe each aquatic life use category are assessed based on fish and/or benthic macroinvertebrate data and compared to established scoring criteria. Currently, data regarding freshwater streams are collected according to methods specified in the TCEQ *Receiving Water Assessment Procedures Manual*. These freshwater stream data are used to evaluate the integrity of the fish community based on the regional Indices of Biotic Integrity (IBIs). Currently, no such protocol for sampling or data analysis exists for reservoirs or tidal streams. To further the science for analysis of the aquatic communities in tidal streams, TPWD is in the process of preparing an assessment methodology (or methodologies) for Cow Bayou Tidal, Tres Palacios Creek Tidal, and Garcitas Creek Tidal. A report on the methodologies must be provided to TCEQ by June 30, 2005. TPWD is exploring a variety of statistical techniques for use in developing an assessment methodology. The problem is challenging, as it involves a large number of independently measured variables and a relatively small number of replicates. No results are available at this time.

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Table 5. Water chemistry data from grab samples collected from Cow Bayou at station CB 1, 50 yds (45.7 m) downstream of Cole Creek confluence.

Station	Date Sampled	Depth	TDS	Chloride	Sulfate	TOC	TSS	VSS	Chlorophyll *a*	Pheophytin *a*	CBOD5	Ammonia-N	Nitrate-N	Nitrite-N	TKN	TP	ortho-P
		Meters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
CB 1	4/7/2003	0.3	242	29	20	18	8	3	1.07	8.65	<3	0.16	0.14	<0.05	1.58	0.12	<0.06
CB 1	5/7/2003	0.3	266	69	34	14	3	<1	<1	<1	<3	0.14	0.08	<0.05	1.08	0.11	<0.06
CB 1	6/24/2003	0.3	1080	476	95	10	15	5	1.07	55.4	4	<0.05	<0.05	<0.05	0.72	<0.05	<0.06
CB 1	8/6/2003	0.3	844	357	67	10	11	2	6.94	33	<3	0.08	<0.05	<0.05	0.7	0.06	<0.06
CB 1	8/6/2003	0.3	804	357	67	10	14	2	8.01	35	<3	<0.05	<0.05	<0.05	0.68	0.06	<0.06
CB 1	9/22/2003	0.3	110	3	4	19	35	6	3.4	<1	<3	0.06	<0.05	<0.05	1.43	0.09	<0.06
CB 1	11/5/2003	0.3	141	19	9	16	5	2	3.63	<1	<3	0.08	<0.05	<0.05	0.86	0.1	<0.06
CB 1	3/24/2004	0.3	199	13	6	19	28	5	<1	1.01	<3	0.14	0.05	<0.05	1.7	0.05	<0.06
CB 1	5/12/2004	0.3	105	6	5	12	58	9	1.02	<1	<3	<0.05	0.05	<0.05	0.98	0.11	<0.06
CB 1	6/23/2004	0.3	115	6	6	12	20	4	1.07	1.92	<3	<0.05	0.07	<0.05	0.96	0.1	<0.06
CB 1	8/2/2004	0.3	188	27	28	16	11	4	23	<1	4	<0.05	0.07	<0.05	1	0.13	<0.06
CB 1	9/22/2004	0.3	3860	2020	279	8	10	2	26.7	6.47	<3	<0.05	<0.15	<0.15	0.82	<0.05	<0.18
CB 1	11/8/2004	0.3	101	4	8	18	22	5	1.7	<1	<3	<0.05	<0.05	<0.05	0.79	0.09	<0.06
CB 1	5/7/2003	5.6	284	69	34	14	3	<1			<3	0.14	0.08	<0.05	1.05	0.1	<0.06
CB 1	6/24/2003	5.2	1410	656	116	10	26	4			<3	0.05	<0.05	<0.05	0.66	0.05	<0.06
CB 1	8/6/2003	5.5	840	364	67	10	25	5			<3	<0.05	<0.05	<0.05	0.82	0.07	<0.06
CB 1	9/22/2003	5	105	4	4	19	56	8			<3	0.07	<0.05	<0.05	1.17	0.11	<0.06
CB 1	11/5/2003	4	139	19	9	16	7	2			<3	0.07	<0.05	<0.05	0.99	0.15	<0.06
CB 1	3/24/2004	4.6	197	13	6	19	34	7			<3	0.16	0.05	<0.05	1.77	<0.05	<0.06
CB 1	3/24/2004	4.6	199	13	6	19	36	8			<3	0.14	0.05	<0.05	1.7	0.12	<0.06
CB 1	5/12/2004	4.4	107	7	6	12	57	8			<3	<0.05	0.06	<0.05	1.05	0.12	<0.06
CB 1	6/23/2004	4	122	7	6	12	36	6			<3	0.05	0.07	<0.05	0.93	0.1	<0.06
CB 1	8/2/2004	3.9	185	27	29	16	7	2			<3	0.08	0.08	<0.05	0.88	0.11	<0.06
CB 1	9/22/2004	4.2	3920	2030	281	8	17	2			<3	<0.05	<0.15	<0.15	0.74	<0.05	<0.18
CB 1	9/22/2004	4.2	3870	2030	280	8	19	2			<3	<0.05	<0.15	<0.15	0.73	<0.05	<0.18
CB 1	11/8/2004	15	103	4	8	18	27	4			<3	0.05	<0.05	<0.05	0.83	0.1	<0.06
CB 1	11/8/2004	15	100	4	8	18	18	2			<3	0.08	<0.05	<0.05	0.82	0.09	<0.06

Table 6. Water chemistry data from grab samples collected from Cow Bayou at station CB 2, at SH 87.

Station	Date Sampled	Depth	TDS	Chloride	Sulfate	TOC	TSS	VSS	Chlorophyll *a*	Pheophytin *a*	CBOD5	Ammonia-N	Nitrate-N	Nitrite-N	TKN	TP	ortho-P
		Meters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
CB 2	4/7/2003	0.3	238	48	13	15	11	4	<1	16.8	<3	0.25	0.12	<0.05	1.52	0.18	<0.06
CB 2	5/7/2003	0.3	1230	654	104	10	10	2	4.27	45.8	<3	0.06	<0.05	<0.05	0.91	0.11	<0.06
CB 2	6/24/2003	0.3	2590	1400	213	7	11	4	<1	29.4	<3	<0.05	<0.05	<0.05	0.73	0.09	<0.06
CB 2	6/24/2003	0.3	2720	1410	213	6	12	4	<1	16.3	<3	<0.05	<0.05	<0.05	0.82	0.1	<0.06
CB 2	8/6/2003	0.3		963	140	8	16	5	15	22.4	<3	0.06	<0.05	<0.05	0.77	0.12	<0.06
CB 2	9/22/2003	0.3	110	18	5	16	21	5	4.35	<1	<3	0.07	0.07	<0.05	1.43	0.12	<0.06
CB 2	11/5/2003	0.3	1850	952	134	12	10	4	34.2	<1	<3	<0.05	<0.10	<0.10	0.82	0.09	<0.12
CB 2	3/24/2004	0.3	203	36	10	13	26	5	1.56	<1	<3	0.16	0.08	<0.05	1.28	0.14	<0.06
CB 2	5/12/2004	0.3	129	22	6	11	57	8	1.42	<1	<3	<0.05	0.05	<0.05	0.95	0.37	<0.06
CB 2	6/23/2004	0.3	129	27	8	9	15	4	2.14	<1	<3	0.09	<0.05	<0.05	0.86	0.13	<0.06
CB 2	8/2/2004	0.3	556	236	38	14	11	6	21.9	<1	4	<0.05	<0.05	<0.05	0.92	0.11	<0.06
CB 2	8/2/2004	0.3	522	234	38	14	11	6	20.8	4.59	4	<0.05	<0.05	<0.05	0.98	0.11	<0.06
CB 2	9/22/2004	0.3	6200	3290	462	5	9	3	25.4	3.6	<3	<0.05	<0.25	<0.25	0.68	<0.05	<0.30
CB 2	11/8/2004	0.3	152	31	9	17	10	2	2.67	<1	<3	0.06	<0.05	<0.05	0.77	0.08	<0.06
CB 2	5/7/2003	4.4	1660	786	124	9	13				<3	0.14	<0.05	<0.05	0.59	0.12	0.11
CB 2	6/24/2003	4.3	2760	1450	219	7	17	5			<3	0.05	<0.05	<0.05	0.75	0.11	<0.06
CB 2	8/6/2003	4.6	1900	953	141	8	40	8			<3	0.07	<0.05	<0.05	0.95	0.15	<0.06
CB 2	9/22/2003	4.1	115	18	5	16	24	5			<3	0.1	0.07	<0.05	1.04	0.12	<0.06
CB 2	11/5/2003	2.5	4090	2240	313	8	15	3			<3	0.07	<0.20	<0.20	0.67	0.08	<0.24
CB 2	11/5/2003	2.5	4060	2230	311	8	17	3			<3	0.07	<0.20	<0.20	0.84	0.08	<0.24
CB 2	3/24/2004	3.8	202	36	10	13	34	6			<3	0.13	0.08	<0.05	1.34	0.13	<0.06
CB 2	5/12/2004	4.2	123	22	6	11	52	9			<3	0.06	0.05	<0.05	1.11	0.15	<0.06
CB 2	6/23/2004	3.6	131	28	8	9	16	4			<3	0.08	<0.05	<0.05	0.78	0.13	<0.06
CB 2	6/23/2004	3.6	129	27	8	9	13	3			<3	0.09	<0.05	<0.05	0.85	0.15	<0.06
CB 2	8/2/2004	2.9	832	424	68	12	10	2			<3	0.06	<0.05	<0.05	0.81	0.1	<0.06
CB 2	9/22/2004	4.5	7260	3870	541	4	45	6			<3	<0.05	<0.30	<0.30	0.7	0.1	<0.36
CB 2	11/8/2004	13	149	31	9	16	20	3			<3	0.09	<0.05	<0.05	0.83	0.12	<0.06

Table 7. Water chemistry data from grab samples collected from Cow Bayou at station CB 2A, approximately 2.2 km upstream of SH 87 in original stream channel northeast of Bridge City.

Station	Date Sampled	Depth	TDS	Chloride	Sulfate	TOC	TSS	VSS	Chlorophyll *a*	Pheophytin *a*	CBOD5	Ammonia-N	Nitrate-N	Nitrite-N	TKN	TP	ortho-P
		Meters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
CB 2A	4/7/2003	0.3	247	51	11	17	11	4	2.14	20.3	<3	0.17	0.1	<0.05	3.4	0.18	<0.06
CB 2A	5/7/2003	0.3	1030	474	74	12	7	3	<1	<1	<3	0.09	<0.05	<0.05	0.87	0.07	<0.06
CB 2A	6/24/2003	0.3	3030	1580	232	8	11	3	<1	14	<3	<0.05	<0.05	<0.05	0.83	0.07	<0.06
CB 2A	8/6/2003	0.3	1780	929	126	10	12	5	22.4	2.99	<3	<0.05	<0.05	<0.05	0.95	0.12	<0.06
CB 2A	9/22/2003	0.3	113	16	4	16	22	5	9.61	2.35	<3	<0.05	<0.05	<0.05	0.97	0.09	<0.06
CB 2A	11/5/2003	0.3	1780	923	131	12	11	4	43.3	<1	4	<0.05	<0.05	<0.05	0.98	0.08	<0.06
CB 2A	3/24/2004	0.3	190	34	8	14	22	4	2.14	<1	<3	0.1	<0.05	<0.05	1.28	0.14	<0.06
CB 2A	5/12/2004	0.3	118	20	8	10	42	7	1.87	<1	<3	<0.05	<0.05	<0.05	0.9	0.14	<0.06
CB 2A	5/12/2004	0.3	123	20	8	10	45	8	2.5	<1	3	<0.05	<0.05	<0.05	0.92	0.15	0.07
CB 2A	6/23/2004	0.3	125	30	8	9	12	3	5.34	1.76	<3	<0.05	<0.05	<0.05	0.82	0.1	<0.06
CB 2A	8/2/2004	0.3	452	190	34	14	9	4	18.2	7.26	3	<0.05	<0.05	<0.05	0.91	0.11	<0.06
CB 2A	9/22/2004	0.3	5290	2880	399	6	10	2	34.7	2.67	<3	<0.05	<0.25	<0.25	0.8	0.06	<0.30
CB 2A	11/8/2004	0.3	193	53	11	16	11	2	2.85	<1	<3	0.06	<0.05	<0.05	0.76	0.08	<0.06
CB 2A	5/7/2003	2.3	296	491	77	11	18	3			<3	0.07	<0.05	<0.05	0.98	0.09	<0.06
CB 2A	6/24/2003	2.1	3000	1570	231	8	15	2			<3	0.05	<0.05	<0.05	0.89	0.1	<0.06
CB 2A	8/6/2003	2.1	1780	939	127	10	16	5			<3	<0.05	<0.05	<0.05	0.97	0.12	<0.06
CB 2A	9/22/2003	2.1	107	16	4	16	24	6			<3	0.05	<0.05	<0.05	0.99	<0.05	<0.06
CB 2A	11/5/2003	2.1	2660	1360	190	11	16	4			<3	0.11	<0.15	<0.15	0.97	0.07	<0.18
CB 2A	3/24/2004	2.3	190	34	8	14	30	7			<3	0.11	<0.05	<0.05	1.35	0.14	<0.06
CB 2A	5/12/2004	2.5	109	19	8	10	42	7			3	<0.05	<0.05	<0.05	0.93	0.27	<0.06
CB 2A	6/23/2004	2	129	30	8	9	12	3			<3	<0.05	<0.05	<0.05	0.78	0.12	<0.06
CB 2A	8/2/2004	1.9	382	161	31	15	11	3			<3	0.06	<0.05	<0.05	0.92	0.12	<0.06
CB 2A	9/22/2004	2.3	5540	2910	404	6	23	4			<3	<0.05	<0.25	<0.25	0.82	0.08	<0.30
CB 2A	11/8/2004	7	177	52	11	16	12	4			<3	<0.05	<0.05	<0.05	0.84	0.07	<0.06

Table 8. Water chemistry data from grab samples collected from Cow Bayou at station CB 3, 2400 ft (732 m) upstream of Sabine River confluence.

Station	Date Sampled	Depth	TDS	Chloride	Sulfate	TOC	TSS	VSS	Chlorophyll *a*	Pheophytin *a*	CBOD5	Ammonia-N	Nitrate-N	Nitrite-N	TKN	TP	ortho-P
		Meters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
CB 3	4/7/2003	0.3	189	50	20	9	8	3	<1	15.5	<3	0.1	0.07	<0.05	0.89	0.09	<0.06
CB 3	5/7/2003	0.3	2730	1450	218	6	9	3	6.94	<1	<3	0.08	<0.05	<0.05	0.58	0.08	<0.06
CB 3	5/7/2003	0.3	2680	1460	218	6	9	3	3.08	<1	<3	0.07	<0.05	<0.05	0.77	0.05	<0.06
CB 3	6/24/2003	0.3	1480	737	128	7	11	4	<1	15.9	<3	<0.05	0.09	<0.05	0.58	0.09	<0.06
CB 3	8/6/2003	0.3	1820	951	152	6	14	4	12.8	7.37	<3	<0.05	<0.05	<0.05	0.65	0.1	<0.06
CB 3	9/22/2003	0.3	904	446	73	8	10	2	4.79	<1	<3	<0.05	<0.05	<0.05	0.55	0.07	<0.06
CB 3	9/22/2003	0.3	852	447	74	8	13	2	1.6	1.6	<3	<0.05	<0.05	<0.05	0.54	0.07	<0.06
CB 3	11/5/2003	0.3	4780	2770	387	6	6	3	13.5	<1	<3	<0.05	<0.25	<0.25	0.7	0.08	<0.30
CB 3	3/24/2004	0.3	348	146	35	6	13	2	2.67	<1	<3	<0.05	<0.05	<0.05	0.5	<0.05	<0.06
CB 3	5/12/2004	0.3	133	27	8	11	34	7	3.17	<1	<3	<0.05	<0.05	<0.05	0.91	0.12	<0.06
CB 3	6/23/2004	0.3	176	53	17	9	8	3	<1	3.36	<3	0.08	<0.05	<0.05	0.74	0.12	<0.06
CB 3	8/2/2004	0.3	1950	1040	162	6	7	2	7.12	3.35	<3	<0.05	<0.10	<0.10	0.54	<0.05	<0.12
CB 3	9/22/2004	0.3	9890	5180	718	3	7	<1	18.5	<1	<3	<0.05	<0.40	<0.40	0.57	0.05	<0.48
CB 3	11/8/2004	0.3	526	209	38	10	10	2	3.34	1.33	<3	0.07	0.06	<0.05	0.54	0.08	<0.06
CB 3	5/7/2003	5.3	5850	1540	229	6	20	3			<3	0.11	<0.05	<0.05	0.73	0.07	<0.06
CB 3	5/7/2003	5.3	3140	1540	231	6	16	2			<3	0.1	<0.05	<0.05	0.65	0.08	<0.06
CB 3	6/24/2003	5.2	1860	928	154	6	8	<1			<3	0.06	0.1	<0.05	0.58	0.08	<0.06
CB 3	8/6/2003	3.9	2230	1140	180	6	13	3			<3	0.06	<0.05	<0.05	0.67	0.1	<0.06
CB 3	9/22/2003	6	960	480	78	8	26	4			<3	0.06	<0.05	<0.05	0.69	<0.05	<0.06
CB 3	11/5/2003	4.7	8970	4480	624	3	22	4			<3	0.05	<0.35	<0.35	0.64	0.1	<0.42
CB 3	3/24/2004	4.7	414	183	40	6	27	4			<3	<0.05	<0.05	<0.05	0.48	0.06	<0.06
CB 3	5/12/2004	5.7	131	26	7	11	47	8			<3	0.05	<0.05	<0.05	1.01	0.28	<0.06
CB 3	6/23/2004	3.6	182	54	17	9	13	4			<3	0.09	<0.05	<0.05	0.73	<0.05	<0.06
CB 3	8/2/2004	4	2220	1190	182	6	11	2			<3	<0.05	<0.10	<0.10	0.46	0.07	<0.12
CB 3	9/22/2004	5.5	13000	6980	968	2	33	7			<3	<0.05	<0.50	<0.50	0.54	0.08	<0.60
CB 3	11/8/2004	18	600	269	46	10	30	7			<3	0.07	0.06	<0.05	0.67	0.1	<0.06

Table 9. Water chemistry data from grab samples collected from Lost River at station LR 1, at the Chambers County line and 5.4 km upstream of John Wiggins Bayou.

Station	Date Sampled	Depth	TDS	Chloride	Sulfate	TOC	TSS	VSS	Chlorophyll *a*	Pheophytin *a*	CBOD5	Ammonia-N	Nitrate-N	Nitrite-N	TKN	TP	ortho-P
		Meters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
LR 1	4/8/2003	0.3	254	43	30	6	37	4	<1	76.6	3	0.08	0.24	<0.05	0.81	0.11	<0.06
LR 1	5/5/2003	0.3	212	30	28	6	18	6	<1	101	4	<0.05	<0.05	<0.05	0.79	0.09	<0.06
LR 1	6/23/2003	0.3	204	25	32	6	17	4	<1	45.5	<3	<0.05	<0.05	<0.05	0.65	0.09	<0.06
LR 1	8/4/2003	0.3	322	77	37	6	16	3	10.3	<1	<3	<0.05	<0.05	<0.05	0.74	0.12	<0.06
LR 1	9/23/2003	0.3	222	38	30	7	16	4	12.3	10.9	<3	<0.05	<0.05	<0.05	0.47	0.16	0.09
LR 1	11/4/2003	0.3	228	32	28	6	30	6			<3	0.07	<0.05	<0.05	0.73	0.16	<0.06
LR 1	3/23/2004	0.3	266	53	37	7	39	6	31.2	16.2	3	<0.05	0.16	<0.05	0.94	0.08	<0.06
LR 1	5/10/2004	0.3	218	29	43	6	53	6	13.4	2.35	<3	<0.05	0.54	<0.05	0.79	0.11	0.07
LR 1	6/22/2004	0.3	205	23	34	6	50	7	9.61	<1	<3	<0.05	0.3	<0.05	0.66	0.15	0.09
LR 1	6/22/2004	0.3	202	23	34	6	52	7	9.61	3.1	<3	<0.05	0.3	<0.05	0.64	0.13	0.08
LR 1	8/2/2004	0.3	244	36	27	7	17	4	12.3	4.17	<3	<0.05	<0.05	<0.05	0.73	0.15	<0.06
LR 1	9/21/2004	0.3	228	26	28	6	20	6	18	8.61	<3	<0.05	<0.05	<0.05	0.61	0.07	<0.06
LR 1	11/8/2004	0.3	282	54	43	7	22	8	48.7	3.6	4	<0.05	0.05	<0.05	0.99	0.18	<0.06
LR 1	5/5/2003	1.8	210	31	29	6	24	7			<3	<0.05	<0.05	<0.05	<0.05	0.1	<0.06
LR 1	6/23/2003	1.8	196	25	32	6	16	2			<3	0.05	<0.05	<0.05	0.75	0.11	<0.06
LR 1	8/4/2003	1.5	308	77	37	6	28	5			<3	<0.05	<0.05	<0.05	0.6	0.1	<0.06
LR 1	9/23/2003	2.3	262	61	30	9	32	7			<3	<0.05	<0.05	<0.05	0.74	0.28	0.16
LR 1	11/4/2003	2.8	218	33	28	6	16	4	3.74	26.9	<3	<0.05	<0.05	<0.05	0.64	0.18	<0.06
LR 1	3/23/2004	2.1	290	70	40	7	78	11			3	0.07	0.06	<0.05	1.05	0.12	<0.06
LR 1	5/10/2004	2.7	220	29	43	6	61	10			<3	<0.05	0.55	<0.05	0.71	0.15	0.06
LR 1	6/22/2004	1.2	206	23	34	6	63	7			<3	<0.05	0.3	<0.05	0.66	0.13	0.06
LR 1	8/2/2004	1	240	34	26	7	19	4			<3	<0.05	<0.05	<0.05	0.73	0.16	<0.06
LR 1	9/21/2004	2.3	228	26	28	6	66	10			<3	<0.05	<0.05	<0.05	0.74	0.13	<0.06
LR 1	9/21/2004	2.3	228	26	28	6	84	12			<3	<0.05	<0.05	<0.05	0.76	0.12	<0.06
LR 1	11/8/2004	1.7	300	58	45	6	45	9			<3	0.05	0.12	<0.05	0.75	0.17	<0.06

Table 10. Water chemistry data from grab samples collected from Lost River at station LR 2, approximately 2.6 km upstream of the confluence with John Wiggins Bayou and northeast of Lost Lake oil field.

Station	Date Sampled	Depth	TDS	Chloride	Sulfate	TOC	TSS	VSS	Chlorophyll *a*	Pheophytin *a*	CBOD5	Ammonia-N	Nitrate-N	Nitrite-N	TKN	TP	ortho-P
		Meters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
LR 2	4/8/2003	0.3	222	29	26	6	34	9	3.2	61.1	<3	0.06	0.36	<0.05	0.76	0.12	<0.06
LR 2	4/8/2003	0.3	218	29	26	6	36	12	3.2	49.9	<3	0.09	0.36	<0.05	0.65	0.13	<0.06
LR 2	5/5/2003	0.3	240	52	34	7	34	10	3.2	70.8	4	<0.05	<0.05	<0.05	0.93	0.14	<0.06
LR 2	5/5/2003	0.3	254	51	34	7	30	6	1.07	76.7	4	<0.05	<0.05	<0.05	0.91	0.15	<0.06
LR 2	6/23/2003	0.3	213	22	36	5	46	6	19.5	16.2	<3	<0.05	0.42	<0.05	0.53	0.26	<0.06
LR 2	8/4/2003	0.3	502	163	46	7	22	5	<1	22.4	<3	<0.05	<0.05	<0.05	0.8	0.14	<0.06
LR 2	9/23/2003	0.3	206	27	31	6	21	4	12.8	5.13	<3	<0.05	<0.05	<0.05	0.68	0.14	0.08
LR 2	11/4/2003	0.3	202	30	28	6	14	4	<1	16.2	<3	<0.05	<0.05	<0.05	0.51	0.11	<0.06
LR 2	3/23/2004	0.3	204	32	35	6	32	6	13.4	12.8	<3	<0.05	0.44	<0.05	0.87	0.12	<0.06
LR 2	3/23/2004	0.3	204	32	35	6	32	6	32	15.3	<3	<0.05	0.44	<0.05	0.84	0.1	<0.06
LR 2	5/10/2004	0.3	210	29	43	6	51	6	10.7	4.27	<3	<0.05	0.51	<0.05	0.67	0.12	<0.06
LR 2	6/22/2004	0.3	202	24	34	6	70	9	12.3	4.54	<3	<0.05	0.27	<0.05	0.75	0.12	0.06
LR 2	8/2/2004	0.3	216	24	24	6	34	6	9.61	2.72	<3	<0.05	<0.05	<0.05	0.68	0.16	0.08
LR 2	9/21/2004	0.3	406	119	50	7	28	5	13.4	4.87	<3	<0.05	<0.05	<0.05	0.7	0.1	<0.06
LR 2	11/8/2004	0.3	232	24	32	6	34	7	34.7	5.01	<3	<0.05	0.11	<0.05	0.68	0.18	<0.06
LR 2	11/8/2004	0.3	234	24	32	6	38	9	38.9	6.48	<3	<0.05	0.1	<0.05	0.68	0.17	0.06
LR 2	5/5/2003	2.1	248	52	34	7	34	7			4	<0.05	<0.05	<0.05	0.93	0.15	<0.06
LR 2	5/5/2003	2.1	262	51	35	7	31	7			3	<0.05	<0.05	<0.05	0.93	0.16	<0.06
LR 2	6/23/2003	1.5	209	22	36	5	74	9			<3	<0.05	0.42	<0.05	0.66	0.15	<0.06
LR 2	8/4/2003	1.5	488	158	46	7	32	7			<3	<0.05	<0.05	<0.05	0.58	0.15	<0.06
LR 2	9/23/2003	2.3	214	28	31	6	32	6			<3	<0.05	<0.05	<0.05	0.54	0.17	0.08
LR 2	11/4/2003	1.6	236	31	28	6	178	24			<3	<0.05	<0.05	<0.05	0.96	0.34	<0.06
LR 2	11/4/2003	1.6	222	31	28	6	230	27			<3	<0.05	<0.05	<0.05	1.05	0.4	<0.06
LR 2	3/23/2004	1.6	210	32	35	6	40	6			3	<0.05	0.44	<0.05	0.83	0.12	<0.06
LR 2	5/10/2004	2.5	222	29	43	6	57	7			<3	<0.05	0.51	<0.05	0.7	0.12	0.06
LR 2	6/22/2004	2	203	24	34	6	62	8			<3	<0.05	0.27	<0.05	0.7	0.14	0.07
LR 2	8/2/2004	1.5	222	24	24	6	41	8			<3	<0.05	<0.05	<0.05	0.75	0.17	0.07
LR 2	9/21/2004	1.9	522	178	56	7	56	8			<3	<0.05	<0.05	<0.05	0.88	0.16	0.1
LR 2	11/8/2004	1.3	224	23	32	6	109	16			<3	<0.05	0.1	<0.05	0.83	0.22	0.06

Table 11. Water chemistry data from grab samples collected from Lost River at station LR 3, at confluence with Old River Lake approx. 1.3 km upstream of IH10.

Station	Date Sampled	Depth	TDS	Chloride	Sulfate	TOC	TSS	VSS	Chlorophyll *a*	Pheophytin *a*	CBOD5	Ammonia-N	Nitrate-N	Nitrite-N	TKN	TP	ortho-P
		Meters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
LR 3	4/8/2003	0.3	254	32	28	6	88	14	5.34	127	<3	<0.05	<0.05	<0.05	1.23	0.19	<0.06
LR 3	5/5/2003	0.3	328	81	38	7	58	11	2.14	53.2	<3	<0.05	<0.05	<0.05	0.91	0.15	<0.06
LR 3	6/23/2003	0.3	262	52	37	6	41	7	<1	24.6	<3	<0.05	<0.05	<0.05	0.82	0.13	<0.06
LR 3	6/23/2003	0.3	274	52	37	6	41	8	<1	29	<3	<0.05	<0.05	<0.05	0.84	0.13	<0.06
LR 3	8/4/2003	0.3	1480	667	113	7	33	6	<1	38.1	<3	<0.05	<0.05	<0.05	0.85	0.16	<0.06
LR 3	8/4/2003	0.3	1490	672	114	7	33	5	<1	<1	<3	<0.05	<0.05	<0.05	0.78	<0.05	<0.06
LR 3	9/23/2003	0.3	260	61	30	7	35	6	7.48	18.3	<3	<0.05	<0.05	<0.05	0.83	0.14	<0.06
LR 3	11/4/2003	0.3	592	236	54	7	20	4	3.74	18.7	<3	<0.05	<0.10	<0.10	0.63	0.12	<0.12
LR 3	3/23/2004	0.3	222	41	36	7	45	6	22.2	10.2	<3	<0.05	<0.05	<0.05	0.91	0.09	<0.06
LR 3	5/10/2004	0.3	216	29	42	6	42	7	8.01	5.07	<3	<0.05	0.4	<0.05	0.66	0.13	<0.06
LR 3	5/10/2004	0.3	214	29	42	6	39	6	5.87	2.35	<3	<0.05	0.4	<0.05	0.69	0.12	<0.06
LR 3	6/22/2004	0.3	203	24	33	7	52	8	10.7	3.9	<3	<0.05	0.15	<0.05	0.73	0.13	<0.06
LR 3	8/2/2004	0.3	236	33	31	7	44	7	7.12	<1	<3	<0.05	<0.05	<0.05	0.79	0.19	0.06
LR 3	8/2/2004	0.3	246	33	30	7	42	6	5.34	3.38	<3	<0.05	<0.05	<0.05	0.8	0.17	<0.06
LR 3	9/21/2004	0.3	3150	1610	243	6	22	4	18	8.14	<3	<0.05	<0.15	<0.15	0.79	0.1	<0.18
LR 3	11/8/2004	0.3	392	111	40	6	47	9	28.2	3.81	<3	<0.05	<0.05	<0.05	0.72	0.19	<0.06
LR 3	5/5/2003	3.4	310	76	37	6	65	11			<3	<0.05	<0.05	<0.05	0.94	0.18	<0.06
LR 3	6/23/2003	3.6	280	52	37	6	56	10			<3	<0.05	<0.05	<0.05	0.81	0.14	<0.06
LR 3	8/4/2003	3	1360	589	103	7	40	6			<3	<0.05	<0.05	<0.05	0.9	0.15	<0.06
LR 3	9/23/2003	3.5	276	66	31	7	41	8			<3	<0.05	<0.05	<0.05	0.68	0.16	<0.06
LR 3	11/4/2003	3.7	604	244	55	7	23	4			<3	<0.05	<0.05	<0.05	0.73	0.13	<0.06
LR 3	3/23/2004	3.4	228	41	36	7	70	12			3	<0.05	<0.05	<0.05	0.96	0.11	<0.06
LR 3	5/10/2004	4.5	208	29	42	6	50	7			<3	<0.05	0.4	<0.05	0.74	0.13	<0.06
LR 3	6/22/2004	3.3	207	24	33	7	54	9			<3	<0.05	0.15	<0.05	0.87	0.13	0.06
LR 3	8/2/2004	2.6	236	33	30	7	61	9			<3	<0.05	<0.05	<0.05	0.81	0.2	0.06
LR 3	9/21/2004	3.6	3970	2020	300	6	104	14			<3	<0.05	<0.15	<0.15	1.05	0.21	<0.18
LR 3	11/8/2004	4	396	119	41	6	116	19			<3	<0.05	<0.05	<0.05	0.93	0.23	<0.06

Table 12. Water chemistry data from grab samples collected from Garcitas Creek at station GC 1, 3.07 km upstream from SH 616.

Station	Date Sampled	Depth	TDS	Chloride	Sulfate	TOC	TSS	VSS	Chlorophyll *a*	Pheophytin *a*	CBOD5	Ammonia-N	Nitrate-N	Nitrite-N	TKN	TP	ortho-P
		Meters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
GC 1	4/10/2003	0.3	1870	1020	156	7	24	5	<1	51.2	<3	0.1	0.05	<0.05	1.01	0.06	
GC 1	5/5/2003	0.3	5290	2560	366	5	8	4	1.66	<1	<3	<0.05	0	0	0.74	<0.05	
GC 1	6/25/2003	0.3	9530	4820	701	4	6	2	<1	7.76	<3	<0.05	<0.15	<0.15	0.8	0.1	<0.18
GC 1	8/5/2003	0.3	298	73	13	13	20	5	9.61	52.4	<3	0.12	<0.05	<0.05	1.21	0.26	0.14
GC 1	9/22/2003	0.3	169	7	2	19	56	7	1.07	1.17	<3	0.08	<0.05	<0.05	1.99	0.27	0.16
GC 1	11/4/2003	0.3	203	21	6	11	13	4	26.7	<1	3	0.05	0.05	<0.05	1.34	0.26	0.08
GC 1	3/23/2004	0.3	248	25	7	13	26	7	40	3.68	3	0.1	0.07	<0.05	1.6	0.15	<0.06
GC 1	5/12/2004	0.3	163	4	2	11	166	24	2.67	2.94	4	<0.05	0.1	<0.05	1.46	0.25	0.08
GC 1	7/6/2004	0.3	261	38	6	13	13	6	4.98	<1	<3	0.11	0.07	<0.05	1.26	0.18	<0.06
GC 1	8/3/2004	0.3	318	68	16	6	18	3	7.48	5.61	<3	<0.05	<0.05	<0.05	0.64	0.11	<0.06
GC 1	9/22/2004	0.3	4490	2270	318	6	9	4	36.3	1.07	<3	<0.05	<0.20	<0.20	0.9	0.16	<0.24
GC 1	11/8/2004	0.3	263	17	7	14	17	4	1.19	<1	<3	0.09	0.11	<0.05	1.52	0.26	<0.06
GC 1	4/10/2003	1.5	2300	<1	187	6	29	7	2.14	84.7	<3	0.12	<0.05	<0.05	0.82	0.07	
GC 1	5/5/2003	2.9	5560	2860	408	5	14	6	1.66	<1	<3	0.05			0.86	0.05	
GC 1	6/25/2003	2.7	9480	5040	737	4	19	4			<3	<0.05	<0.15	<0.15	0.88	0.11	<0.18
GC 1	8/5/2003	1.6	302	74	14	13	20	3			<3	0.17	<0.05	<0.05	1.23	0.28	0.16
GC 1	9/22/2003	1.7	162	7	2	18	44	7			<3	0.08	<0.05	<0.05	1.7	0.25	0.16
GC 1	11/4/2003	1.5	214	21	6	11	14	3			<3	0.09	0.06	<0.05	1.11	0.16	0.07
GC 1	3/23/2004	2	251	26	7	13	32	6			<3	0.1	0.07	<0.05	1.44	0.14	<0.06
GC 1	7/6/2004	1.7	274	38	6	13	18	4			<3	0.1	0.08	<0.05	1.29	0.23	<0.06
GC 1	8/3/2004	1.7	314	69	16	6	23	5			<3	<0.05	<0.05	<0.05	0.86	0.11	<0.06
GC 1	9/22/2004	2.2	5750	2940	411	5	14	6			<3	<0.05	<0.25	<0.25	0.96	0.2	<0.30
GC 1	11/8/2004	1.5	283	19	8	14	33	6			<3	0.08	0.12	<0.05	1.48	0.23	0.07

Table 13. Water chemistry data from grab samples collected from Garcitas Creek at station GC 2, 1.8 km downstream from SH 616.

Station	Date Sampled	Depth	TDS	Chloride	Sulfate	TOC	TSS	VSS	Chlorophyll *a*	Pheophytin *a*	CBOD5	Ammonia-N	Nitrate-N	Nitrite-N	TKN	TP	ortho-P
		Meters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
GC 2	4/10/2003	0.3	4630	2570	369	6	12	3	2.67	33.6	<3	0.06	<0.05	<0.05	0.9	0.05	
GC 2	5/5/2003	0.3	9280	4990	715	4	11	3	4.81	4.91	<3	0.07	0	0	1	<0.05	
GC 2	6/25/2003	0.3	12800	6720	950	4	10	4	3.92	10.5	<3	<0.05	<0.20	<0.20	1.12	0.11	<0.24
GC 2	8/5/2003	0.3	642	261	34	16	13	6	11.8	110	6	0.06	<0.05	<0.05	1.52	0.27	0.14
GC 2	9/22/2003	0.3	180	11	3	18	42	6	3.06	<1	<3	0.07	<0.05	<0.05	1.59	0.28	0.18
GC 2	11/4/2003	0.3	344	104	17	10	9	2	6.41	<1	<3	0.08	0.08	<0.05	0.97	0.25	0.08
GC 2	3/23/2004	0.3	249	39	8	13	28	7	2.27	<1	<3	0.13	0.06	<0.05	1.56	0.16	<0.06
GC 2	3/23/2004	0.3	252	40	8	13	28	6	0	0	<3	0.11	0.06	<0.05	1.39	0.14	<0.06
GC 2	5/12/2004	0.3	190	5	2	10	246	32	3.74	<1	4	0.05	0.13	<0.05	1.52	0.28	0.08
GC 2	7/6/2004	0.3	246	34	5	13	12	3	10.5	<1	<3	0.07	0.05	<0.05	1.47	0.2	<0.06
GC 2	8/3/2004	0.3	338	86	21	6	11	4	8.54	2.3	<3	<0.05	<0.05	<0.05	0.64	0.07	<0.06
GC 2	9/22/2004	0.3	6640	3340	472	5	8	5	33.4	4.01	<3	<0.05	<0.25	<0.25	0.99	0.12	<0.30
GC 2	11/8/2004	0.3	300	36	9	14	33	7	3.56	<1	<3	0.12	0.18	<0.05	1.42	0.25	0.09
GC 2	4/10/2003	2.5	6580	3520	507	5	21	4	1.07	54.7	3	0.06	<0.10	<0.10	1.02	0.06	
GC 2	5/5/2003	2	8800	5070	722	4	12	4	<1	<1	<3	0.08			0.82	<0.05	
GC 2	6/25/2003	3.3	12600	6750	950	4	22	6			<3	<0.05	<0.20	<0.20	1.09	0.14	<0.24
GC 2	8/5/2003	2.7	298	72	13	15	18	4			<3	0.24	<0.05	<0.05	1.21	0.28	<0.06
GC 2	9/22/2003	2.2	172	10	3	18	52	9			<3	<0.05	<0.05	<0.05	1.77	0.27	0.17
GC 2	11/4/2003	2.7	1760	876	127	8	12	3			<3	0.15	<0.25	<0.25	1.06	0.29	<0.30
GC 2	7/6/2004	3.4	244	36	5	14	14	2			<3	0.08	0.05	<0.05	1.25	0.23	<0.06
GC 2	8/3/2004	3	344	87	21	6	20	4			<3	<0.05	<0.05	<0.05	0.71	0.07	<0.06
GC 2	8/3/2004	3	342	87	21	6	16	4			<3	<0.05	<0.05	<0.05	0.7	0.08	<0.06
GC 2	9/22/2004	4.1	10800	5530	776	4	38	10			<3	<0.05	<0.40	<0.40	0.87	0.17	<0.48
GC 2	11/8/2004	1.2	322	66	13	14	30	5			<3	0.1	0.19	<0.05	1.38	0.22	0.09

Table 14. Water chemistry data from grab samples collected from Garcitas Creek at station GC 3, 6.5 km downstream from SH 616.

Station	Date Sampled	Depth	TDS	Chloride	Sulfate	TOC	TSS	VSS	Chlorophyll *a*	Pheophytin *a*	CBOD5	Ammonia-N	Nitrate-N	Nitrite-N	TKN	TP	ortho-P
		Meters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
GC 3	4/10/2003	0.5	6170	3390	490	5	15	4	<1	28.2	<3	0.09	<0.10	<0.10	1.07	0.06	
GC 3	5/5/2003	0.3	12900	7050	1000	3	9	2	8.19	9.01	<3	<0.05	0	0	0.96	0.06	
GC 3	6/25/2003	0.3	21600	8000	1130	3	14	4	<1	38.4	<3	<0.05	<0.20	<0.20	1.08	0.13	<0.24
GC 3	8/5/2003	0.3	2700	1370	181	12	11	4	8.54	56.5	3	0.1	<0.05	<0.05	1.3	0.21	0.09
GC 3	9/22/2003	0.3	192	18	4	17	45	8	3.47	<1	<3	0.07	0.06	<0.05	1.6	0.28	0.21
GC 3	11/4/2003	0.3	1190	610	86	8	6	2	12.3	3.42	<3	0.06	<0.10	<0.10	0.9	0.25	<0.12
GC 3	3/23/2004	0.3	1910	954	134	10	46	8	3.2	<1	<3	0.13	0.1	<0.10	1.19	0.14	<0.12
GC 3	5/12/2004	0.3	210	6	2	10	238	30	3.66	<1	4	0.05	0.14	<0.05	1.56	0.29	0.08
GC 3	7/6/2004	0.3	244	38	5	13	16	4	6.11	<1	<3	0.08	<0.05	<0.05	1.3	0.23	<0.06
GC 3	7/6/2004	0.3	243	38	5	14	10	2	4.64	<1	<3	0.1	<0.05	<0.05	1.4	0.23	<0.06
GC 3	8/3/2004	0.3	608	228	39	8	14	5	4.45	8.01	<3	<0.05	<0.05	<0.05	0.77	0.11	<0.06
GC 3	9/22/2004	0.3	9980	5180	724	4	9	3	25.4	1.74	3	<0.05	<0.40	<0.40	0.94	0.11	<0.48
GC 3	11/8/2004	0.3	526	154	23	13	42	8	9.79	2.05	<3	0.09	0.24	<0.05	1.32	0.24	0.09
GC 3	4/10/2003	3	11000	5940	859	3	51	7	2.67	17.8	<3	0.07	<0.15	<0.15	0.93	0.07	
GC 3	5/5/2003	3.4	12700	7120	1000	3	17	4	4.27	<1	<3	0.07			0.91	0.06	
GC 3	6/25/2003	3.3	14500	7960	1130	3	20	4			<3	<0.05	<0.20	<0.20	1.04	0.13	<0.24
GC 3	8/5/2003	3	3150	1600	212	11	137	17			<3	0.22	<0.05	<0.05	1.36	0.23	0.11
GC 3	9/22/2003	3	201	19	4	17	58	8			<3	0.08	0.06	<0.05	1.6	0.27	0.18
GC 3	11/4/2003	4	5520	3150	443	5	11	2			<3	0.2	<0.75	<0.75	1.17	0.2	<0.90
GC 3	3/23/2004	2.7	1910	960	135	10	57	10			<3	0.1	0.12	<0.10	1.31	0.14	<0.12
GC 3	3/23/2004	2.7	1950	961	135	10	56	10			<3	0.11	0.11	<0.10	1.39	0.15	<0.12
GC 3	7/6/2004	3.5	244	37	5	14	15	4			<3	0.08	<0.05	<0.05	1.36	0.22	<0.06
GC 3	8/3/2004	3.3	872	364	60	9	25	5			<3	0.06	<0.05	<0.05	0.87	0.13	0.08
GC 3	9/22/2004	4.1	13000	6670	931	3	32	9			<3	<0.05	<0.50	<0.50	0.92	0.14	<0.60
GC 3	11/8/2004	2.4	5950	2940	404	6	26	4			<3	0.14	<0.25	<0.25	1.32	0.21	<0.30
GC 3	11/8/2004	2.4	6010	2970	407	6	33	5			<3	0.14	<0.25	<0.25	1	0.19	<0.30

Table 15. Water chemistry data from grab samples collected from Tres Palacios Creek at station TP 1, 1.4 km upstream from the confluence of Wilson's Creek.

Station	Date Sampled	Depth	TDS	Chloride	Sulfate	TOC	TSS	VSS	Chlorophyll *a*	Pheophytin *a*	CBOD5	Ammonia-N	Nitrate-N	Nitrite-N	TKN	TP	ortho-P
		Meters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
TP 1	4/7/2003	0.3	412	72	17	9	24	3	4.27	27.9	<3	0.06	1.34	<0.05	0.92	0.22	0.09
TP 1	5/7/2003	0.3	3040	1520	227	6	13	4	<1	49.1	<3	0.21	1.02	0.08	1.2	0.07	<0.06
TP 1	6/23/2003	0.3	1070	419	73	6	19	6	7.48	114	4	<0.05	0.52	0.33	1.36	0.09	<0.06
TP 1	8/4/2003	0.3	226	27	8	6	35	6	2.84	<1	<3	0.05	0.29	0.13	1	0.37	0.26
TP 1	9/22/2003	0.3	164	7	4	7	234	20	6.63	<1	<3	0.07	0.96	<0.05	1.41	0.55	0.34
TP 1	11/3/2003	0.3	1890	901	126	5	10	2	19.2	35.4	<3	<0.05	0.18	<0.10	0.78	0.28	0.14
TP 1	3/22/2004	0.3	450	125	26	6	33	8	13.9	2.19	<3	<0.05	3.22	0.06	1.14	0.18	0.10
TP 1	5/12/2004	0.3	225	3	2	6	500	64	3.15	<1	4	0.07	0.96	<0.05	1.68	0.56	0.15
TP 1	7/6/2004	0.3	209	15	4	9	26	6	13.4	<1	<3	<0.05	0.28	<0.05	1.18	0.34	0.14
TP 1	8/3/2004	0.3	318	62	18	6	22	6	27.2	2.67	4	<0.05	<0.05	<0.05	0.88	0.12	<0.06
TP 1	9/22/2004	0.3	4230	2180	295	5	14	7	55.5	9.51	<3	<0.05	<0.20	<0.20	0.86	0.13	<0.24
TP 1	11/8/2004	0.3	261	15	6	9	38	6	4.45	<1	<3	0.08	0.27	<0.05	0.98	0.28	0.16
TP 1	4/7/2003	2.8	400	72	17	8	36	8	8.01	25.6	<3	<0.05	1.33	<0.05	0.9	0.21	0.09
TP 1	5/7/2003	2.7	3190	1520	227	6	13	3	4.27	35.6	<3	0.16	0.99	0.08	1.18	0.06	<0.06
TP 1	6/23/2003	2.6	1110	428	74	6	71	10			<3	0.16	0.52	0.36	1.35	0.16	<0.06
TP 1	8/4/2003	3.5	215	23	7	6	39	4			<3	0.06	0.32	0.14	0.9	0.41	0.29
TP 1	9/22/2003	4.2	244	7	4	7	804	72			<3	0.08	0.92	<0.05	2.56	0.89	0.27
TP 1	9/22/2003	4.2	272	7	4	6	780	88			<3	0.1	0.92	<0.05	2.73	0.88	0.26
TP 1	11/3/2003	3.3	4740	2560	351	5	9	3			<3	0.26	<0.20	<0.20	1.24	0.32	<0.24
TP 1	3/22/2004	2.7	696	231	41	6	45	8			<3	0.13	2.95	0.08	1.12	0.16	0.11
TP 1	7/6/2004	3.3	220	16	4	9	24	4			<3	0.06	0.29	<0.05	1.07	0.33	0.13
TP 1	8/3/2004	3.3	338	62	18	6	69	11			<3	0.1	<0.05	<0.05	0.88	0.13	<0.06
TP 1	9/22/2004	3	8380	4440	603	4	25	7			<3	0.33	<0.35	<0.35	1.42	0.29	<0.42
TP 1	11/8/2004	3	286	15	6	9	133	17			<3	0.06	0.27	<0.05	1.21	0.34	0.15

Table 16. Water chemistry data from grab samples collected from Tres Palacios Creek at station TP 2, 3.75 km upstream from SH 521 (approximately halfway between SH 521 and confluence of Wilsons Creek).

Station	Date Sampled	Depth	TDS	Chloride	Sulfate	TOC	TSS	VSS	Chlorophyll *a*	Pheophytin *a*	CBOD5	Ammonia-N	Nitrate-N	Nitrite-N	TKN	TP	ortho-P
		Meters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
TP 2	4/7/2003	0.3	610	190	30	9	42	8	2.67	23.5	<3	<0.05	1.57	<0.05	1.29	0.25	0.09
TP 2	5/7/2003	0.3	4210	2030	293	5	16	3	9.08	19.3	<3	0.14	0.78	<0.10	1.27	0.06	
TP 2	6/23/2003	0.3	2380	1060	157	7	20	7	4.27	77.2	4	0.11	0.25	0.11	1.56	0.1	<0.06
TP 2	8/4/2003	0.3	257	44	9	6	31	6	31.3	<1	<3	0.06	0.12	0.09	1.1	0.29	0.18
TP 2	9/22/2003	0.3	180	7	4	7	320	36	<1	<1	<3	0.06	0.86	<0.05	1.54	0.53	0.29
TP 2	11/3/2003	0.3	2330	1370	192	6	14	3	27.8	20.4	<3	0.07	0.31	<0.15	1.09	0.3	0.26
TP 2	3/22/2004	0.3	1060	409	66	5	38	10	23.1	2.4	4	0.06	3.04	0.07	1.24	0.1	<0.06
TP 2	5/12/2004	0.3	251	4	3	6	632	72	4.77	<1	4	0.1	0.96	<0.05	2.19	0.63	0.13
TP 2	7/6/2004	0.3	208	15	4	8	27	8	8.77	<1	<3	<0.05	0.2	<0.05	1.07	0.23	0.08
TP 2	8/3/2004	0.3	318	70	17	6	21	7	18.2	3.9	4	<0.05	<0.05	<0.05	0.76	0.11	<0.06
TP 2	9/22/2004	0.3	4320	2210	300	6	15	8	44.9	5.98	4	<0.05	<0.20	<0.20	0.98	0.12	<0.24
TP 2	11/8/2004	0.3	252	15	7	8	43	8	7.12	1.6	<3	0.07	0.25	<0.05	0.96	0.27	0.14
TP 2	4/7/2003	3.5	1620	748	107	8	22	3	18.2	<1	<3	0.12	1.37	<0.05	1.16	0.2	
TP 2	5/7/2003	3.4	5780	2910	407	5	80	15	4.27	120	<3	0.25	0.23	<0.10	1.35	0.11	<0.12
TP 2	6/23/2003	3.4	2040	985	146	6	28	7			0	0.28	0.25	0.13	1.7	0.12	<0.06
TP 2	8/4/2003	3.3	266	41	9	6	110	14			<3	0.1	0.18	0.11	0.84	0.82	0.2
TP 2	9/22/2003	4	302	7	4	7	294	36			<3	0.06	0.82	<0.05	1.6	0.55	0.31
TP 2	11/3/2003	3.5	5630	2960	405	5	25	4			<3	0.24	<0.25	<0.25	1.43	0.33	<0.30
TP 2	3/22/2004	2.7	2090	941	139	5	47	7			<3	0.17	2.04	<0.10	1.06	0.09	<0.12
TP 2	7/6/2004	3	209	17	5	8	31	6			<3	0.06	0.24	<0.05	0.89	0.27	0.15
TP 2	8/3/2004	3.5	330	70	17	6	38	6			<3	<0.05	<0.05	<0.05	0.84	0.11	<0.06
TP 2	9/22/2004	3.5	9540	4820	657	5	24	8			<3	0.32	<0.35	<0.35	1.52	0.3	<0.42
TP 2	11/8/2004	3	250	14	7	8	74	12			<3	0.08	0.24	<0.05	0.95	0.27	0.13

Table 17. Water chemistry data from grab samples collected from Tres Palacios Creek at station TP 3, 7.5 km downstream from SH 521.

Station	Date Sampled	Depth	TDS	Chloride	Sulfate	TOC	TSS	VSS	Chlorophyll *a*	Pheophytin *a*	CBOD5	Ammonia-N	Nitrate-N	Nitrite-N	TKN	TP	ortho-P
		Meters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
TP 3	4/7/2003	0.3	9450	5710	809	3	72	14	2.14	56.9	<3	0.14	<0.15	<0.15	1.2	0.11	
TP 3	5/7/2003	0.3	13200	6830	947	3	68	14	<1	59.6	<3	0.06	<0.20	<0.20	1.36	0.14	
TP 3	6/23/2003	0.3	9600	5050	695	6	59	18	<1	19.6	6	0.05	<0.15	<0.15	2.01	0.24	<0.18
TP 3	8/4/2003	0.3	1740	819	98	7	22	4	26.1	<1	<3	0.05	<0.05	<0.05	1.09	0.3	0.20
TP 3	9/22/2003	0.3	212	10	4	7	390	48	9.17	<1	<3	0.08	0.86	<0.05	1.94	0.61	0.27
TP 3	11/3/2003	0.3	6480	6440	878	4	30	8	18.2	15.5	4	<0.05	<0.45	<0.45	1.42	0.26	<0.54
TP 3	3/22/2004	0.3	6700	3460	484	>4	454	80	101	25.6	8	<0.05	<0.25	<0.25	2.85	0.32	<0.30
TP 3	5/12/2004	0.3	269	6	3	6	1020	124	9.86	<1	5	0.13	1.02	<0.05	2.96	0.85	0.12
TP 3	5/12/2004	0.3	267	6	3	6	1080	128	7.73	<1	4	0.15	1.03	<0.05	3.02	0.86	0.11
TP 3	8/3/2004	0.3	1100	499	65	7	40	8	13.4	<1	<3	<0.05	<0.05	<0.05	0.93	0.28	0.10
TP 3	9/22/2004	0.3	12300	6400	867	4	61	14	21.4	3.31	4	<0.05	<0.50	<0.50	1.29	0.22	<0.60
TP 3	9/22/2004	0.3	12300	6380	873	4	104	24	29.9	2.99	4	<0.05	<0.45	<0.45	1.57	0.26	<0.54
TP 3	11/8/2004	0.3	426	124	19	7	75	12	3.56	<1	<3	0.08	0.25	<0.05	1	0.3	0.15
TP 3	4/7/2003	0.7	9240	5750	813	3	86	16	4.27	61.5	<3	0.13	<0.15	0.18	1.21	0.12	
TP 3	6/23/2003	0.5	9730	5040	694	5	66	16			5	0.06	<0.15	<0.15	1.9	0.24	<0.18
TP 3	8/4/2003	0.6	1820	882	107	8	27	6			<3	<0.05	<0.05	<0.05	1.06	0.31	0.19
TP 3	9/22/2003	1.2	198	10	4	7	292	32			<3	0.07	0.82	<0.05	1.78	0.6	0.28
TP 3	11/3/2003	0.7	11000	6840	933	4	33	8			<3	<0.05	<0.50	<0.50	1.52	0.26	<0.60
TP 3	7/6/2004	0.5	368	74	10	8	48	11	7.45	<1	<3	<0.05	0.17	<0.05	1.23	0.31	0.15

Table 18. Water chemistry data from grab samples collected from West Carancahua Creek at station WC 1, 5.1 km upstream from the confluence with East Carancahua Creek.

Station	Date Sampled	Depth	TDS	Chloride	Sulfate	TOC	TSS	VSS	Chlorophyll *a*	Pheophytin *a*	CBOD5	Ammonia-N	Nitrate-N	Nitrite-N	TKN	TP	ortho-P
		Meters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
WC 1	4/8/2003	0.5	1740			8	22	5	1.07	28.5	<3	0.19	0.24	<0.05	1.13	0.11	
WC 1	5/6/2003	0.3	4300	2430	331	6	14	6	3.56	11.4	3	0.06	<0.10	<0.10	1.13	0.08	<0.12
WC 1	6/24/2003	0.3	3390	1800	247	7	10	5	<1	36.6	4	0.07	<0.05	<0.05	1.21	0.09	<0.06
WC 1	8/4/2003	0.3	231	42	6	9	20	4	9.48	<1	<3	<0.05	<0.05	<0.05	1.14	0.4	0.29
WC 1	9/22/2003	0.3	229	9	3	11	111	15	4.42	<1	<3	0.07	0.73	<0.05	1.25	0.59	0.42
WC 1	11/3/2003	0.3	350	49	8	9	52	9	4.59	<1	<3	0.07	0.34	<0.05	0.91	0.59	0.32
WC 1	3/22/2004	0.3	1400	616	89	7	35	8	12.3	6.03	<3	0.08	1.7	0.09	1.1	0.1	<0.06
WC 1	7/6/2004	0.3	228	27	5	8	22	7	24	6.5	<3	<0.05	0.09	<0.05	1.19	0.24	0.11
WC 1	8/3/2004	0.3	302	81	10	8	10	3	16	3.79	<3	<0.05	<0.05	<0.05	0.77	0.2	0.15
WC 1	9/22/2004	0.3	208	47	9	8	18	5	35.4	9.48	<3	0.09	<0.05	<0.05	0.89	0.2	
WC 1	11/8/2004	0.3	297	21	8	10	21	6	28.5	8.9	<3	0.09	0.53	<0.05	1.2	0.4	0.23
WC 1	4/8/2003	3	4560			6	15	3	<1	30.3	<3	0.38	0.09	<0.05	1.49	0.11	
WC 1	5/6/2003	3.7	6020	3220	442	5	18	5	<1	<1	<3	0.34	<0.10	<0.10	1.49	0.22	<0.12
WC 1	6/24/2003	3.7	5990	3080	404	6	10	4			<3	0.71	<0.10	<0.10	1.68	0.33	0.21
WC 1	8/4/2003	3.7	235	42	5	9	41	7			<3	0.27	<0.05	<0.05	1.11	0.46	0.35
WC 1	9/22/2003	3.3	408	9	3	11	524	56			4	0.12	0.72	<0.05	3.07	0.88	0.4
WC 1	11/3/2003	3.7	486	93	14	9	218	27			<3	0.09	0.39	<0.05	1.72	0.58	0.32
WC 1	3/22/2004	3.7	2690	1360	191	7	49	8			<3	0.49	2.08	0.28	1.51	0.14	<0.12
WC 1	7/6/2004	3.7	246	29	5	10	27	6			<3	0.16	0.12	<0.05	1.31	0.3	0.14
WC 1	8/3/2004	3.4	296	81	10	8	23	4			<3	<0.05	<0.05	<0.05	0.84	0.23	0.15
WC 1	9/22/2004	4	228	46	9	8	20	4			<3	0.14	<0.05	<0.05	0.86	0.2	
WC 1	11/8/2004	3.3	315	23	8	10	61	8			<3	0.1	0.52	<0.05	1.2	0.38	0.22

Table 19. Water chemistry data from grab samples collected from West Carancahua Creek at station WC 2, 1.9 km upstream from the confluence with East Carancahua Creek.

Station	Date Sampled	Depth	TDS	Chloride	Sulfate	TOC	TSS	VSS	Chlorophyll *a*	Pheophytin *a*	CBOD5	Ammonia-N	Nitrate-N	Nitrite-N	TKN	TP	ortho-P
		Meters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
WC 2	4/9/2003	0.3	2040			7	36	6	<1	57.3	<3	0.15	0.27	<0.05	1.19	0.12	
WC 2	5/6/2003	0.3	5810	3080	422	6	14	4	5.34	31.7	3	0.06	<0.10	<0.10	1.22	0.08	<0.12
WC 2	6/24/2003	0.3	3860	1960	268	7	10	6	<1	28.6	4	<0.05	<0.05	<0.05	1.42	0.11	<0.06
WC 2	6/24/2003	0.3	3800	1980	269	8	8	5	<1	41.1	4	0.05	<0.05	<0.05	1.44	0.08	<0.06
WC 2	8/4/2003	0.3	202	50	6	9	17	5	<1	<1	<3	0.09	<0.05	<0.05	1.1	0.41	0.32
WC 2	9/22/2003	0.3	240	10	3	11	111	15	10.7	8.01	<3	0.07	0.77	<0.05	1.32	0.56	0.44
WC 2	11/3/2003	0.3	448	109	16	9	81	12	6.79	<1	<3	<0.05	0.37	<0.05	1.14	0.59	0.33
WC 2	3/22/2004	0.3	1640	732	106	7	34	9	20.3	6.25	3	<0.05	1.55	0.08	1.18	0.1	<0.06
WC 2	3/22/2004	0.3	1640	734	106	7	34	8	28.3	8.33	3	<0.05	1.56	0.08	1.13	0.09	<0.06
WC 2	7/6/2004	0.3	214	23	4	9	21	7	16.9	1.78	<3	<0.05	0.11	<0.05	1.16	0.26	0.11
WC 2	8/3/2004	0.3	280	80	12	8	11	2	17.6	3.68	3	<0.05	<0.05	<0.05	0.94	0.23	0.15
WC 2	9/22/2004	0.3	640	276	41	7	25	7	37.9	8.81	<3	0.06	<0.05	<0.05	0.88	0.16	0.09
WC 2	9/22/2004	0.3	628	277	41	7	24	6	39.5	8.7	<3	0.06	<0.05	<0.05	0.86	0.14	0.09
WC 2	11/8/2004	0.3	304	24	8	9	53	12	11.6	2.14	<3	0.1	0.6	<0.05	1.12	0.44	0.27
WC 2	4/9/2003	2.5	3020			7	58	10	<1	44.1	<3	0.25	0.2	<0.05	1.4	0.13	
WC 2	5/6/2003	3	6200	3480	483	5	21	6	<1	<1	<3	0.08	<0.10	<0.10	1.31	0.13	<0.12
WC 2	6/24/2003	2.7	5150	2620	343	6	10	5			3	0.47	<0.10	<0.10	1.71	0.27	<0.12
WC 2	8/4/2003	2.7	244	50	6	9	39	5			3	0.14	<0.05	<0.05	1.1	0.46	0.34
WC 2	9/22/2003	3	213	9	3	11	106	14			<3	0.11	0.73	<0.05	2	0.61	0.44
WC 2	11/3/2003	2.7	992	415	57	8	100	12			<3	0.14	0.32	<0.05	1.3	0.57	0.35
WC 2	3/22/2004	3	2830	1420	198	7	36	7			<3	0.32	1.82	0.16	1.5	0.14	<0.12
WC 2	7/6/2004	3	228	26	5	9	24	3			<3	0.15	0.1	<0.05	1.21	0.34	0.13
WC 2	7/6/2004	3	232	26	5	9	32	4			<3	0.14	0.11	<0.05	1.22	0.29	0.13
WC 2	8/3/2004	2.7	316	87	14	9	25	5			<3	<0.05	<0.05	<0.05	0.9	0.2	0.13
WC 2	9/22/2004	3.3	1120	520	72	7	42	7			<3	0.1	<0.05	<0.05	0.94	0.14	0.12
WC 2	11/8/2004	2.5	319	22	8	9	36	4			<3	0.1	0.58	<0.05	1.1	0.41	0.25

Table 20. Water chemistry data from grab samples collected from West Carancahua Creek at station WC 3, 4.5 km downstream from the confluence with East Carancahua Creek.

Station	Date Sampled	Depth	TDS	Chloride	Sulfate	TOC	TSS	VSS	Chlorophyll *a*	Pheophytin *a*	CBOD5	Ammonia-N	Nitrate-N	Nitrite-N	TKN	TP	ortho-P
		Meters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
WC 3	4/9/2003	0.3	2820			7	90	16	<1	106	3	0.07	0.33	<0.05	1.47	0.15	
WC 3	5/6/2003	0.3	10300	5210	731	4	76	16	8.54	37.8	3	<0.05	<0.15	<0.15	1.55	0.16	<0.18
WC 3	6/24/2003	0.3	8800	4720	646	6	37	9	<1	18.6	4	<0.05	<0.15	<0.15	1.74	0.3	<0.18
WC 3	8/4/2003	0.3	654	227	25	8	90	14	<1	54.2	<3	<0.05	<0.05	<0.05	1.49	0.49	0.34
WC 3	8/4/2003	0.3	636	226	25	8	43	8	36.3	8.54	<3	<0.05	<0.05	<0.05	1.27	0.5	0.33
WC 3	9/22/2003	0.3	200	9	3	9	101	13	2.67	2.94	<3	0.06	0.39	<0.05	1.33	0.42	0.31
WC 3	11/3/2003	0.3	2100	1170	156	8	27	6	39.5	33.8	3	<0.05	<0.10	<0.10	1.32	0.45	0.26
WC 3	3/22/2004	0.3	4270	2220	306	7	58	20	93.4	13.7	7	<0.05	1.12	<0.15	2.05	0.14	<0.18
WC 3	7/6/2004	0.3	275	49	7	8	43	10	16.2	<1	<3	<0.05	0.12	<0.05	1.08	0.25	0.09
WC 3	8/3/2004	0.3	572	227	32	6	18	4	1.6	4.75	<3	<0.05	<0.05	<0.05	1.06	0.25	0.12
WC 3	8/3/2004	0.3	594	229	32	9	21	5	15.1	2.31	<3	<0.05	<0.05	<0.05	1.06	0.25	0.11
WC 3	9/22/2004	0.3	4260	2050	271	6	45	11	23.5	4.17	<3	<0.05	<0.20	<0.20	0.99	0.16	<0.24
WC 3	11/8/2004	0.3	349	35	8	8	39	7	4.45	2.4	<3	0.07	0.51	<0.05	1.09	0.44	0.24
WC 3	4/9/2003	1.5	3060			7	86	15	1.07	107	3	0.06	0.32	<0.05	1.3	0.15	
WC 3	5/6/2003	1.7	10200	5420	764	4	88	17	11.8	24.1	3	<0.05	<0.15	<0.15	1.59	0.16	<0.18
WC 3	6/24/2003	2.1	9320	4770	654	6	84	18			4	<0.05	<0.15	<0.15	1.87	0.35	<0.18
WC 3	8/4/2003	2.5	640	216	23	8	323	35			<3	<0.05	<0.05	<0.05	1.46	0.53	0.34
WC 3	9/22/2003	2.3	173	9	3	9	111	15			<3	0.07	0.37	<0.05	1.54	0.42	0.3
WC 3	11/3/2003	2.2	3020	1700	228	7	134	18			<3	0.05	<0.15	<0.15	1.64	0.5	0.24
WC 3	11/3/2003	2.2	3300	1700	229	7	156	20			<3	0.05	<0.15	<0.15	1.7	0.5	0.24
WC 3	3/22/2004	1.7	4790	2350	322	7	876	152			8	<0.05	0.99	<0.20	2.2	0.16	<0.24
WC 3	7/6/2004	2.3	265	43	6	8	65	13			<3	<0.05	0.13	<0.05	1.14	0.34	0.08
WC 3	8/3/2004	2	0	207	29	8	50	6			<3	<0.05	<0.05	<0.05	1.03	0.26	0.12
WC 3	9/22/2004	2	4480	2280	303	6	58	13			<3	<0.05	<0.20	<0.20	1.18	0.18	<0.24
WC 3	11/8/2004	1.6	337	23	7	8	67	7			<3	0.11	0.52	<0.05	1.22	0.44	0.23
WC 3	11/8/2004	1.6	329	23	7	8	70	10			<3	0.08	0.52	<0.05	1.22	0.42	0.21

Table 21. Physicochemical parameter data from 24-hour datasonde deployments for Cow Bayou.

Station	Time Deployed	Time Retrieved	Depth	Avg Temp	Min Temp	Max Temp	Avg DO	Min DO	Max DO	Avg Spec Cond	Min Spec Cond	Max Spec Cond	Min pH	Max pH
			m	oC	oC	OC	mg/l	mg/l	mg/l	us/cm	us/cm	us/cm		
CB 1	4/8/03 5:45 PM	4/9/03 5:15 PM	0.3	19.73	18.80	20.90	1.70	1.50	2.00	252	241	263	6.3	6.3
CB 1	5/5/03 4:46 PM	5/6/03 5:15 PM	1.0	25.75	25.20	26.40	1.58	1.20	2.20	407	391	441		
CB 1	6/24/03 6:19 PM	6/25/03 5:55 PM	1.0	29.62	29.20	30.16	3.88	3.36	4.93	2107	1410	2897	6.8	6.9
CB 1	8/5/03 5:56 PM	8/6/03 6:55 PM	0.9	30.45	30.23	31.19	3.72	3.09	5.29	1352	1177	1539	6.9	7.07
CB 1	9/22/03 9:44 AM	9/23/03 11:57 AM	0.8	23.46	23.16	23.89	4.45	4.20	4.85	47	45	50	5.96	6.1
CB 1	11/5/03 12:15 PM	11/6/03 12:17 PM	0.3	21.18	20.97	21.58	0.86	0.63	1.16	326	127	871	6.01	6.14
CB 1	3/23/04 3:20 PM	3/24/04 3:18 PM	0.8	20.21	19.63	20.83	2.50	2.25	2.91	90	87	91	5.98	6.11
CB 1	5/11/04 4:25 PM	5/12/04 5:40 PM	0.9	22.00	21.14	23.39	5.26	3.08	6.50	66	52	116	5.94	6.62
CB 1	6/21/04 6:45 PM	6/23/04 12:42 PM	0.8	27.46	26.95	28.38	2.64	2.12	3.11	71	67	74	5.83	5.93
CB 1	8/2/04 6:25 PM	8/3/04 7:48 PM	0.8	29.55	28.95	30.89	2.74	2.48	3.94	248	235	275	6.37	6.47
CB 1	9/20/04 5:30 PM	9/22/04 9:35 AM	1.0	28.22	27.56	28.68	3.81	3.31	4.82	4841	2095	6516	6.34	6.56
CB 1	11/8/04 7:39 AM	11/9/04 4:55 PM	0.8	16.00	15.45	16.25	6.78	6.52	7.00	58	56	60	5.53	5.83
CB 2	4/7/03 5:00 PM	4/8/03 4:25 PM	0.5	20.81	19.64	22.39	5.89	5.51	6.22	261	254	274	6.65	6.8
CB 2	5/6/03 3:42 AM	5/7/03 4:20 AM	1.0	26.71	26.38	28.12	6.06	5.41	7.28	3061	2142	3862	6.78	6.96
CB 2	6/24/03 5:04 PM	6/25/03 5:21 PM	1.0	32.01	31.54	32.98	5.55	4.71	7.42	5005	4634	5332	6.91	7.28
CB 2	8/5/03 6:30 PM	8/6/03 6:25 PM	0.9	31.93	31.36	33.16	6.05	5.07	8.30	3289	3169	3386	6.97	7.75
CB 2	9/22/03 9:05 AM	9/23/03 9:40 AM	0.8	24.37	23.95	24.85	3.57	3.26	3.84	98	83	119	6.08	6.19
CB 2	11/5/03 1:35 PM	11/6/03 1:33 PM	0.3	23.95	23.28	24.68	6.25	5.58	7.25	5556	4171	6678	6.64	6.89
CB 2	3/23/04 4:23 PM	3/24/04 4:08 PM	1.0	20.09	19.79	20.48	5.07	4.50	6.09	193	166	211	6.48	6.76
CB 2	5/11/04 3:47 PM	5/12/04 3:45 PM	0.9	23.73	22.24	25.29							6.27	6.5
CB 2	6/21/04 7:45 PM	6/23/04 9:50 AM	0.8	29.43	28.85	30.22	2.66	2.29	3.17	185	151	232	5.93	6.57
CB 2	8/2/04 5:47 PM	8/3/04 8:46 PM	0.8	32.25	31.22	34.19	7.13	6.57	8.41	1560	1073	1878	6.52	6.96
CB 2	9/20/04 5:50 PM	9/22/04 3:20 PM	0.8	29.01	28.47	29.62	6.67	5.41	8.29	9762	8755	10315	6.78	7.15
CB 2	11/8/04 8:34 AM	11/9/04 5:38 PM	0.8	18.46	17.67	19.63	9.38	9.26	9.54	196	173	253	6.11	6.46
CB 2A	5/6/03 4:23 PM	5/7/03 4:30 PM	1.0	26.39	25.88	27.07	4.19	3.17	5.37	1830	1683	2049	6.5	6.72
CB 2A	8/5/03 6:18 PM	8/6/03 6:35 PM	0.9	31.92	31.28	33.76	5.84	4.22	8.61	3328	3307	3354	6.82	7.64
CB 2A	9/22/03 9:14 AM	9/23/03 11:13 AM	0.8	24.48	23.71	25.49	2.89	2.15	3.69	141	105	194	6.05	6.23
CB 2A	11/5/03 1:10 PM	11/6/03 1:15 PM	0.3	22.96	22.33	23.97	8.26	7.58	9.08	3630	3309	3991	6.36	6.57
CB 2A	3/23/04 3:50 PM	3/24/04 3:40 PM	0.9	20.77	20.02	22.02	4.61	3.76	5.53	172	161	179	6.12	6.42
CB 2A	5/11/04 4:05 PM	5/12/04 4:59 PM	0.9	23.23	21.79	25.42				133	104	159	6.31	6.51
CB 2A	6/21/04 7:22 PM	6/23/04 11:31 AM	0.8	29.68	28.95	30.58	3.07	1.67	4.14	165	160	171	6.35	6.45
CB 2A	8/2/04 6:05 PM	8/3/04 9:00 PM	0.7	31.84	30.93	33.05				695	660	732	6.33	6.55
CB 2A	9/20/04 5:37 PM	9/22/04 12:58 PM	0.8	28.80	28.47	29.52	6.03	5.13	7.84	8383	7362	9353	6.45	6.99
CB 2A	11/8/04 8:59 AM	11/9/04 5:36 PM	1.0	17.52	17.32	17.89	4.10	3.38	4.61	278	256	373	5.15	5.64

Table 21 (continued).

Station	Time Deployed	Time Retrieved	Depth	Avg Temp	Min Temp	Max Temp	Avg DO	Min DO	Max DO	Avg Spec Cond	Min Spec Cond	Max Spec Cond	Min pH	Max pH
			m	oC	oC	oC	mg/l	mg/l	mg/l	us/cm	us/cm	us/cm		
CB 3	4/7/03 4:35 PM	4/8/03 4:15 PM	0.5	19.88	18.65	21.17	6.62	6.03	7.90	326	244	415	6.59	6.87
CB 3	5/7/03 3:59 PM	5/8/03 4:07 PM	1.0	26.04	25.69	27.08	6.11	5.10	7.26	5852	4941	7166	6.75	7.19
CB 3	6/24/03 4:42 PM	6/25/03 5:08 PM	1.0	30.45	29.57	31.46	6.21	5.54	7.30	2697	1708	3438	6.94	7.26
CB 3	8/5/03 6:56 PM	8/6/03 6:10 PM	0.9	31.55	30.69	32.84	6.58	5.79	7.87	3160	1987	4035	7.09	7.88
CB 3	9/22/03 8:40 AM	9/23/03 10:20 AM	0.8	25.20	24.68	25.85	3.58	2.96	5.21	628	224	1907	6.25	6.75
CB 3	11/5/03 1:45 PM	11/6/03 1:59 PM	0.3	23.88	23.10	24.73	6.80	6.35	7.56	10852	9103	13052	6.94	7.28
CB 3	3/23/04 4:40 PM	3/24/04 4:50 PM	0.8	18.58	17.65	19.28	8.02	7.29	8.51	514	240	1024	6.76	6.96
CB 3	5/11/04 3:00 PM	5/12/04 3:34 PM	0.9	23.47	23.10	24.14				155	139	183	6.54	6.89
CB 3	6/21/04 8:07 PM	6/23/04 9:30 AM	0.8	29.43	28.40	30.21	5.28	3.74	6.61	278	181	372	6.44	6.94
CB 3	8/2/04 5:26 PM	8/3/04 8:29 PM	0.7	31.35	30.52	32.60	5.46	3.79	6.53	3746	3140	4392	6.43	7.03
CB 3	9/20/04 6:06 PM	9/22/04 3:00 PM	0.8	28.82	28.03	29.34				12286	7982	16208	6.85	7.53
CB 3	11/8/04 7:38 AM	11/9/04 5:27 PM	0.8	19.38	18.55	21.02	6.02	4.90	7.18	749	496	1158	6.4	6.76

Table 22. Physicochemical parameter data from 24-hour datasonde deployments for Lost River.

Station	Time Deployed	Time Retrieved	Depth	Avg Temp	Min Temp	Max Temp	Avg DO	Min DO	Max DO	Avg Spec Cond	Min Spec Cond	Max Spec Cond	Min pH	Max pH
			m	oC	oC	oC	mg/l	mg/l	mg/l	us/cm	us/cm	us/cm		
LR 1	4/8/03 11:57 AM	4/9/03 12:00 PM	0.3	19.48	18.54	20.32	11.39	10.26	12.31	447	417	549	8.05	8.39
LR 1	5/5/03 11:24 AM	5/6/03 11:28 AM	1.0	27.18	26.69	27.49	9.82	8.48	11.20	345	339	350	8.09	8.54
LR 1	6/23/03 11:15 AM	6/24/03 10:15 AM	0.8	31.08	30.00	32.27	8.35	5.81	10.91	352	349	356	7.6	8.5
LR 1	8/4/03 11:15 AM	8/5/03 10:35 AM	1.0	33.07	32.12	34.00	5.93	4.81	6.87	553	544	560	7.78	8.1
LR 1	9/23/03 6:15 PM	9/24/03 6:10 PM	0.3	26.45	25.75	27.79	6.12	4.03	8.38	403	376	429	6.84	7.64
LR 1	11/4/03 9:50 AM	11/5/03 4:29 PM	0.7	23.67	23.15	24.44	5.37	4.51	6.27	360	357	363	7.23	7.37
LR 1	3/22/04 3:20 PM	3/25/04 12:31 PM	0.7	20.88	19.99	21.92	10.04	8.40	11.48	466	423	498	7.45	8.01
LR 1	5/10/04 1:15 PM	5/12/04 3:51 PM	0.8	22.83	22.63	23.40	8.24	7.40	9.78	362	360	363	7.51	7.97
LR 1	6/21/04 1:50 PM	6/22/04 6:35 PM	0.8	28.60	28.23	29.56	7.81	7.53	8.53	344	340	359	7.82	8.06
LR 1	8/2/04 1:50 PM	8/4/04 8:41 AM	0.8	31.52	30.95	32.26	5.48	4.21	6.76	377	361	396	7.11	7.4
LR 1	9/20/04 1:36 PM	9/21/04 6:10 PM	1.0	28.61	27.84	29.59	5.55	4.48	6.64	370	369	372	6.95	7.32
LR 1	11/1/04 1:38 PM	11/8/04 4:30 PM	0.8	19.63	19.01	20.52	7.70	6.73	9.26	432	417	453	7.15	7.54
LR 2	4/8/03 11:47 AM	4/9/03 1:30 PM	0.3	20.30	18.66	22.50	10.85	8.98	12.83	370	345	394	7.54	8.53
LR 2	5/5/03 10:26 AM	5/6/03 11:34 AM	1.0	26.62	25.95	27.29	6.42	4.34	7.61	498	419	578	7.21	7.82
LR 2	6/23/03 10:50 AM	6/24/03 10:30 AM	0.8	29.58	29.09	30.51	7.94	7.37	8.71	332	326	335	7.95	8.32
LR 2	8/4/03 10:09 AM	8/5/03 10:44 AM	1.0	32.46	31.36	33.61	6.69	5.49	7.80	962	809	1166	7.75	8.1
LR 2	9/23/03 6:49 PM	9/24/03 6:40 PM	1.0	26.79	26.13	28.52	6.74	5.91	8.09	337	327	342	7.09	8.07
LR 2	11/4/03 10:05 AM	11/5/03 4:37 PM	0.9	22.95	22.36	23.89	6.99	5.86	7.69	363	354	383	7.42	7.65
LR 2	3/22/04 4:30 PM	3/25/04 12:41 PM	0.7	20.13	18.85	22.30	10.47	8.75	12.74	384	374	398	7.7	8.49
LR 2	5/10/04 2:10 PM	5/12/04 3:45 PM	0.8	23.10	22.83	23.55	8.03	7.44	8.91	357	354	359	7.53	7.76
LR 2	6/21/04 1:35 PM	6/22/04 6:43 PM	0.8	28.77	28.26	29.61	7.25	6.63	8.14	324	323	325	7.54	7.85
LR 2	8/2/04 1:26 PM	8/4/04 9:14 AM	0.7	32.15	31.06	33.48	4.94	4.02	6.16				6.86	7.04
LR 2	9/20/04 1:18 PM	9/21/04 6:22 PM	1.0	28.75	27.94	29.87	4.43	2.86	6.64	619	390	2270	6.83	7.55
LR 2	11/1/04 1:30 PM	11/8/04 4:40 PM	0.8	20.43	19.76	21.69	8.61	7.88	9.79	339	335	343	7.46	7.85
LR 3	4/10/03 11:26 AM	4/11/03 1:58 PM	0.5	18.53	14.90	20.60	10.04	9.10	11.60	380	345	837	8	8.7
LR 3	5/5/03 9:50 AM	5/6/03 11:49 AM	1.0	26.52	25.74	27.15	7.36	6.62	8.30	1397	572	2906	7.62	8.05
LR 3	6/23/03 10:10 AM	6/24/03 11:20 AM	0.8	32.16	30.79	34.01	7.29	5.90	8.97	405	351	429	8.11	8.61
LR 3	8/4/03 9:46 AM	8/5/03 10:55 AM	1.0	31.47	30.10	33.30	6.75	5.89	7.98				7	8.32
LR 3	9/23/03 7:20 PM	9/24/03 7:02 PM	0.8	27.07	26.22	28.90	6.97	6.31	7.97	425	398	448	7.42	8
LR 3	11/4/03 10:20 AM	11/5/03 4:56 PM	0.9	24.82	24.15	25.76							7.68	7.95
LR 3	3/22/04 3:58 PM	3/25/04 1:02 PM	0.8	20.08	18.62	21.51	9.99	8.64	11.13	388	364	400	7.88	8.17
LR 3	5/10/04 2:35 PM	5/12/04 3:34 PM	0.9	24.00	23.15	24.94	7.87	6.99	8.89	370	365	414	7.44	7.76
LR 3	6/21/04 1:06 PM	6/22/04 6:53 PM	0.8	29.30	28.02	30.96	7.34	5.97	9.41	326	323	328	7.49	8.22
LR 3	8/2/04 1:02 PM	8/4/04 9:35 AM	0.8	33.02	31.49	34.59	5.77	4.09	7.14	453	377	564	7.45	7.9
LR 3	9/20/04 12:59 PM	9/21/04 6:35 PM	1.0	29.07	27.86	30.85	6.42	5.93	7.16	3119	950	8802	7.43	7.7
LR 3	11/8/04 12:33 PM	11/9/04 11:00 AM	0.8	21.29	20.10	23.10	9.65	9.04	11.07	636	534	665	7.75	8.23

Table 23. Physicochemical parameter data from 24-hour datasonde deployments for Garcitas Creek.

Station	Time Deployed	Time Retrieved	Depth	Avg Temp	Min Temp	Max Temp	Avg DO	Min DO	Max DO	Avg Spec Cond	Min Spec Cond	Max Spec Cond	Min pH	Max pH
			m	oC	oC	oC	mg/l	mg/l	mg/l	us/cm	us/cm	us/cm		
GC 1	4/11/03 8:37 AM	4/12/03 12:00 PM	0.9	19.84	18.79	20.75	9.22	6.77	11.34					
GC 1	5/5/03 12:08 PM	5/6/03 1:41 PM	1.5	26.64	26.29	27.20	5.73	5.13	6.48	9136	7440	10340		
GC 1	6/25/03 9:10 AM	6/26/03 12:45 PM	1.2	31.25	30.52	32.34	5.20	3.82	7.08					
GC 1	8/5/03 4:25 PM	8/6/03 4:40 PM	1.5	30.77	30.24	31.10	3.25	2.80	3.81	484	445	512		
GC 1	9/23/03 2:52 PM	9/24/03 3:05 PM	0.9	25.09	24.81	25.57	5.70	5.35	6.11	121	114	128		
GC 1	3/23/04 2:03 PM	3/24/04 4:10 PM	1.4	21.52	21.22	22.17								
GC 1	5/11/04 11:21 AM	5/21/04 5:45 PM	1.1	22.88	22.14	24.70	6.21	5.78	6.56	85	10	109	6.72	7.72
GC 1	7/5/04 10:40 AM	7/6/04 12:01 PM	0.9	28.81	28.54	29.13	3.97	3.72	4.16	287	259	322	6.72	6.82
GC 1	8/2/04 10:55 AM	8/3/04 11:20 AM	1.1	30.15	29.75	30.88	4.03	3.59	4.60	508	461	572	7.97	8.15
GC 1	9/21/04 10:20 AM	9/22/04 10:45 AM	1.4	29.06	28.73	29.46	2.11	0.42	5.07	8854	5826	11332	7.62	8.04
GC 1	11/9/04 8:55 AM	11/10/04 12:20 PM	0.9	18.83	17.95	19.58				210	200	221	6.8	6.96
GC 2	5/5/03 1:00 PM	5/6/03 1:54 PM	0.9	26.78	26.41	27.55	5.02	3.86	6.11	13570	12230	14530		
GC 2	6/25/03 9:26 AM	6/26/03 1:12 PM	1.8	31.32	30.98	32.16	3.51	1.84	6.01	19075	18300	19400		
GC 2	8/5/03 4:42 PM	8/6/03 4:55 PM	1.2	31.06	30.69	31.67	3.09	1.24	4.44	1424	1128	1880		
GC 2	9/23/03 3:05 PM	9/24/03 3:46 PM	1.8	24.82	24.19	25.30	5.57	5.21	5.95					
GC 2	11/4/03 3:39 PM	11/5/03 4:00 PM	1.2	22.24	21.43	22.75	4.80	3.37	5.48	638	372	1458		
GC 2	3/23/04 2:15 PM	3/24/04 4:20 PM	1.5	21.99	21.74	22.38	5.82	5.57	6.13	225	213	252		
GC 2	5/11/04 11:44 AM	5/21/04 6:00 PM	1.5	23.05	22.20	24.52				92	74	112		
GC 2	7/5/04 11:01 AM	7/6/04 12:36 PM	1.5	29.51	29.06	29.99				232	211	257	6.75	6.86
GC 2	8/2/04 11:07 AM	8/3/04 11:50 AM	1.8	31.32	31.17	31.56	4.45	3.45	5.05	638	550	741	7.72	8.02
GC 2	11/9/04 9:05 AM	11/10/04 12:40 PM	0.9	19.54	18.79	20.16	5.06	3.62	6.12	2632	854	7215	7.5	7.88
GC 3	4/11/03 10:40 AM	4/12/03 12:00 PM	1.5	20.14	19.62	20.89				13541	10630	15600		
GC 3	5/5/03 1:33 AM	5/6/03 2:03 PM	1.8	26.59	26.22	26.88				20210	17200	22200		
GC 3	6/25/03 10:11 AM	6/26/03 1:00 PM	1.8	31.09	30.57	31.70	5.64	4.39	7.02	21602	19400	22600		
GC 3	8/5/03 5:24 PM	8/6/03 5:30 PM	1.5	30.17	29.69	31.07				4850	3010	6280		
GC 3	3/23/04 2:23 PM	3/24/04 4:35 PM	2.0	21.89	21.44	22.25	6.13	5.70	6.57	1820	520	3040		
GC 3	5/11/04 12:45 PM	5/21/04 7:24 PM	1.8	23.05	22.17	24.28	6.00	5.48	6.50	107	85	154	6.93	7.58
GC 3	7/5/04 11:55 AM	7/6/04 1:08 PM	1.8	29.82	29.47	30.28	4.96	4.83	5.07	225	208	247	6.8	6.93
GC 3	8/2/04 12:02 PM	8/3/04 12:33 PM	1.8	31.33	30.82	31.70	3.87	2.99	4.71	1318	965	1718	7.74	7.95
GC 3	9/21/04 11:29 AM	9/22/04 1:23 PM	1.8	28.67	27.03	29.52	3.71	2.01	5.86	20575	17746	22377	7.71	8.08
GC 3	11/9/04 9:34 AM	11/10/04 12:50 PM	1.8	19.93	19.63	20.56	5.42	4.76	6.09	10415	6594	11772	7.85	8.1

Table 24. Physicochemical parameter data from 24-hour datasonde deployments for Tres Palacios Creek.

Station	Time Deployed	Time Retrieved	Depth	Avg Temp	Min Temp	Max Temp	Avg DO	Min DO	Max DO	Avg Spec Cond	Min Spec Cond	Max Spec Cond	Min pH	Max pH
			m	oC	oC	oC	mg/l	mg/l	mg/l	us/cm	us/cm	us/cm		
TP 1	4/7/03 2:05 PM	4/8/03 2:20 PM	1.2	21.26	20.91	21.47	4.03	3.55	4.74	589	578	605		
TP 1	5/7/03 7:50 PM	5/9/03 11:03 AM	1.8	26.77	26.40	27.68				5968	5780	6060		
TP 1	6/23/03 11:04 AM	6/24/03 5:50 PM	3.7	30.05	29.54	30.38	5.60	3.89	6.83	2199	2150	2240		
TP 1	8/4/03 11:34 AM	8/5/03 1:42 PM	2.1	30.76	30.58	31.07				275	246	319		
TP 1	9/23/03 10:10 AM	9/24/03 12:17 PM	2.1	24.98	24.68	25.29								
TP 1	3/22/04 10:48 AM	3/23/04 11:25 AM	1.8	21.35	20.81	21.82	4.61	3.51	5.52					
TP 1	7/5/04 3:52 PM	7/6/04 6:06 PM	2.0	30.03	29.69	30.31	3.95	3.77	4.10	221	209	230	6.97	7.03
TP 1	8/2/04 5:11 PM	8/3/04 5:33 PM	1.8	31.06	30.85	31.41				592	570	615		
TP 1	9/21/04 3:12 PM	9/22/04 5:45 PM	1.8	28.52	28.06	28.85				13812	10342	17409	7.86	8.04
TP 2	4/7/03 3:31 PM	4/8/03 4:15 PM	1.5	20.97	20.52	21.20	5.02	4.44	5.55	2367	1279	3930		
TP 2	5/7/03 8:04 PM	5/9/03 1:15 AM	2.0	27.14	26.71	27.55				7685	6570	8770		
TP 2	6/23/03 11:20 AM	6/24/03 6:02 PM	1.8	31.55	30.92	32.37	5.27	3.12	7.24	3679	3320	4030		
TP 2	8/4/03 11:45 AM	8/5/03 1:52 PM	2.1	31.20	31.06	31.47	3.76	3.10	4.55	366	359	374		
TP 2	9/22/03 10:24 AM	9/23/03 12:30 PM	2.3	24.86	24.39	25.05	4.26	4.07	4.71	132	127	144		
TP 2	3/22/04 11:04 AM	3/23/04 11:39 AM	2.0	21.84	21.19	22.72	5.77	2.79	7.53	2748	1910	3890		
TP 2	5/11/04 7:50 PM	5/21/04 11:00 AM	1.8	22.34	21.97	23.11	5.77	5.23	6.68	121	90	219	7.35	7.95
TP 2	7/5/04 4:04 PM	7/6/04 6:34 PM	2.1	29.62	29.32	29.78				229	218	238	7.62	7.74
TP 2	9/21/04 3:21 PM	9/22/04 6:09 PM	1.8	28.87	27.85	29.46				14173	5176	18201	7.83	8.09
TP 2	11/8/04 4:35 PM	11/9/04 4:58 PM	1.8	17.84	17.64	18.23	6.67	6.14	7.79				7.19	7.39
TP 3	5/7/03 8:28 PM	5/9/03 11:38 AM	0.6	27.49	26.09	28.80				20877	18600	23200		
TP 3	6/23/03 12:54 PM	6/24/03 4:42 PM	0.3	30.80	29.28	32.94	6.41	5.04	8.30	15744	11750	20700		
TP 3	8/4/03 1:02 PM	8/5/03 2:15 PM	0.9	30.27	28.84	32.34	3.30	0.17	7.81	2049	1620	2480		
TP 3	9/22/03 11:53 AM	9/23/03 1:00 PM	0.8	24.94	24.37	25.37								
TP 3	11/3/03 11:40 AM	11/4/03 12:05 PM	0.9	26.16	25.08	27.03	7.48	5.88	9.51	17927	14100	21300		
TP 3	5/11/04 8:25 PM	5/12/04 5:15 PM	0.5	23.56	22.94	24.22	4.69	3.75	6.67	294	185	481	7.87	8.08
TP 3	7/5/04 4:59 PM	7/6/04 7:10 PM	0.5	29.83	28.30	31.56				456	340	709	7.41	8.46
TP 3	9/21/04 4:04 PM	9/22/04 6:47 PM	0.6	26.61	25.51	27.68				24778	8584	29664		
TP 3	11/8/04 5:27 PM	11/9/04 5:24 PM	0.9	20.80	18.98	22.91				4182	577	12666		

Table 25. Physicochemical parameter data from 24-hour datasonde deployments for West Carancahua Creek.

Station	Time Deployed	Time Retrieved	Depth	Avg Temp	Min Temp	Max Temp	Avg DO	Min DO	Max DO	Avg Spec Cond	Min Spec Cond	Max Spec Cond	Min pH	Max pH
			m	oC	oC	oC	mg/l	mg/l	mg/l	us/cm	us/cm	us/cm		
WC 1	4/9/03 8:15 AM	4/10/03 4:45 PM	1.8	19.47	18.68	20.47	6.74	5.66	7.48					
WC 1	5/6/03 4:34 PM	5/7/03 5:21 PM	1.5	25.69	25.14	26.23	2.31	0.49	4.19	9958	8670	10900		
WC 1	8/4/03 4:37 PM	8/5/03 7:23 PM	1.8	30.07	29.86	30.32	0.47	0.08	1.98					
WC 1	9/22/03 3:20 PM	9/23/03 4:55 PM	2.0	24.26	23.90	24.77	4.76	4.46	4.90	159	149	169		
WC 1	3/22/04 4:11 PM	3/23/04 6:56 PM	2.0	20.73	20.11	21.61	1.71	1.23	2.10	4498	4170	4800		
WC 1	7/5/04 1:16 PM	7/6/04 2:52 PM	2.1	29.18	28.51	29.96	3.20	2.33	4.71	260	243	272		
WC 1	8/2/04 2:35 PM	8/3/04 2:35 PM	2.1	30.20	30.02	30.39								
WC 1	9/21/04 12:37 PM	9/22/04 2:54 PM	2.1	27.22	26.90	27.61				391	361	439	7.17	7.35
WC 1	11/9/04 10:47 AM	11/10/04 1:56 PM	1.8	18.15	17.91	18.52	5.57	5.40	5.82	245	242	249	6.82	7.07
WC 2	5/6/03 4:48 PM	5/7/03 5:31 AM	1.3	25.90	25.47	26.37	1.84	1.00	3.47	11250	10590	12620		
WC 2	6/24/03 10:40 AM	6/25/03 2:40 PM	1.8	29.98	29.33	31.05				8997	8090	9430		
WC 2	8/4/03 4:43 PM	8/5/03 7:30 PM	1.2	30.09	29.82	30.53	1.73	0.50	3.23	354	336	369		
WC 2	9/22/03 3:30 PM	9/23/03 5:07 PM	1.5	24.57	24.22	24.95								
WC 2	11/3/03 3:05 PM	11/4/03 5:17 PM	1.8	23.11	22.66	23.56	3.46	2.49	5.04	1757	1047	2530		
WC 2	3/22/04 4:22 PM	3/23/04 6:47 PM	1.5	22.78	22.07	23.76	7.94	4.68	9.80	3336	2510	4410		
WC 2	5/11/04 4:15 PM	5/21/04 3:40 PM	1.8	21.92	21.57	23.00				119	46	429	7.16	8
WC 2	7/5/04 1:26 PM	7/6/04 3:21 PM	1.8	29.16	28.29	29.84	4.15	2.51	5.41	212	190	231	6.74	6.99
WC 2	8/2/04 2:42 PM	8/3/04 3:05 PM	1.8	30.23	30.10	30.46	2.22	1.12	3.49	520	505	536	7.18	7.35
WC 2	9/21/04 12:46 PM	9/22/04 3:20 PM	1.8	28.01	27.77	28.48				885	402	2240	7.03	7.6
WC 2	11/9/04 10:55 AM	11/10/04 2:17 PM	1.5	18.74	17.97	19.26	4.06	3.57	4.52	231	208	260	6.98	7.36
WC 3	5/6/03 5:03 PM	5/7/03 5:45 PM	0.9	27.07	26.32	29.21				15820	13080	18300		
WC 3	6/24/03 12:04 PM	6/25/03 3:00 PM	1.2	30.87	28.98	32.37				13883	9840	17100		
WC 3	9/22/03 4:37 PM	9/23/03 5:29 PM	1.4	25.16	24.55	25.73				122	108	142		
WC 3	11/3/03 3:50 PM	11/4/03 5:30 PM	1.2	25.12	24.53	25.88	6.60	4.61	8.22	5023	3323	6965		
WC 3	3/22/04 5:15 PM	3/23/04 6:32 PM	1.2	21.19	19.06	23.45				9878	6590	15000		
WC 3	5/11/04 4:45 PM	5/21/04 4:00 PM	1.5	22.56	22.02	23.68	5.42	5.23	5.89	116	100	162	7.05	7.59
WC 3	7/5/04 2:12 PM	7/6/04 4:03 PM	1.4	29.89	29.02	30.98	6.02	5.18	6.82	259	225	292	7.14	7.47
WC 3	8/2/04 3:12 PM	8/3/04 3:35 PM	1.2	31.49	30.44	32.82	5.70	4.93	6.45	909	759	1108	7.43	7.68
WC 3	11/9/04 11:31 AM	11/10/04 2:30 PM	1.2	21.48	20.45	22.67	7.47	6.53	7.84	311	245	471	7.06	7.55

Table 26. Water column profile physicochemical parameter data from datasonde measurements taken in Cow Bayou at station CB 1, 50 yds (45.7 m) downstream of Cole Creek confluence.

Station	Date	Arrival Time	Depth from Surface	Secchi Depth	Temp	DO	DO	Spec Cond	pH
			m	m	oC	mg/l	% sat	us/cm	
CB 1	4/7/2003	10:50 AM	0.3	0.22	20.7	2.1	22.8	210	6.4
CB 1	4/7/2003	10:50 AM	2.0		20.70	1.9	21.3	210	6.40
CB 1	4/7/2003	10:50 AM	3.7		20.60	1.8	20	210	6.40
CB 1	5/7/2003	11:00 AM	0.3	0.55	25.58	1.52	15.9	391	6.19
CB 1	5/7/2003	11:00 AM	3.0		25.50	1.27	15.2	393	6.16
CB 1	5/7/2003	11:00 AM	5.7		25.40	1.15	14.1	392	6.15
CB 1	6/24/2003	11:30 AM	0.3	0.56	29.92	4.3	53.1	1180	6.82
CB 1	6/24/2003	11:30 AM	3.0		29.34	2.77	37.2	2440	6.70
CB 1	6/24/2003	11:30 AM	5.0		29.38	2.8	36.8	2460	6.70
CB 1	8/6/2003	10:08 AM	0.3	0.40	30.35	3.65	48.2	1410	6.91
CB 1	8/6/2003	10:08 AM	2.5		30.32	3.32	41	1170	6.88
CB 1	8/6/2003	10:08 AM	5.0		30.31	3.01	39.2	1510	6.87
CB 1	9/22/2003	9:44 AM	0.3	0.24	23.47	4.16	48.9	48	5.79
CB 1	9/22/2003	9:44 AM	3.0		23.46	4.11	48.3	48	5.77
CB 1	9/22/2003	9:44 AM	5.0		23.47	4.09	48	48	5.78
CB 1	11/5/2003	11:45 AM	0.3	0.30	21.1	2.7	30.5	131	6.24
CB 1	11/5/2003	11:45 AM	2.0		20.90	2.34	26.4	132	6.19
CB 1	11/5/2003	11:45 AM	4.0		20.80	2.14	24	130	6.16
CB 1	3/24/2004	11:00 AM	0.3	0.15	20.3	2.7	28.7	88	6
CB 1	3/24/2004	11:00 AM	0.3	0.15	20.8	2.7	30.7	89	5.8
CB 1	3/24/2004	11:00 AM	2.4		20.20	2.3	25.4	88	6.00
CB 1	3/24/2004	11:00 AM	2.4		20.40	2.5	28.2	89	5.90
CB 1	3/24/2004	11:00 AM	4.6		20.30	2.4	26.8	89	5.90
CB 1	3/24/2004	11:00 AM	4.8		20.20	2.3	26.2	88	6.00
CB 1	5/12/2004	10:15 AM	0.3	0.20	21.5	5.5	62.3	59	6
CB 1	5/12/2004	10:15 AM	2.0		21.50	5.4	61.3	62.5	6.00
CB 1	5/12/2004	10:15 AM	4.2		21.50	5.4	61.2	60	6.00
CB 1	6/23/2004	12:00 PM	0.3	0.35	26.2	3.4	40.5	57	6
CB 1	6/23/2004	12:00 PM	2.0		26.10	3.4	41.5	56	6.10
CB 1	6/23/2004	12:00 PM	4.0		26.10	3.2	39.7	56	6.10
CB 1	8/2/2004	6:22 PM	0.3	0.45	31.3	2.8	35	221	7
CB 1	8/2/2004	6:22 PM	2.4		29.18	1.2	15.5	225	6.89
CB 1	8/2/2004	6:22 PM	3.9		29.10	0.9	12.9	225	6.80
CB 1	9/22/2004	9:40 AM	0.3	0.90	28.1	4	54	6843	6.5
CB 1	9/22/2004	9:40 AM	2.0		28.10	3.9	52	6850	6.50
CB 1	9/22/2004	9:40 AM	4.0		28.10	3.9	52.1	6841	6.50
CB 1	11/8/2004	7:30 AM	0.3	0.30	15.3	8.83	88.2	62	4.7
CB 1	11/8/2004	7:30 AM	2.2		15.30	7.37	73.6	60	4.44
CB 1	11/8/2004	7:30 AM	4.1		15.30	7.33	73.1	59	4.43

Table 27. Water column profile physicochemical parameter data from datasonde measurements taken in Cow Bayou at station CB 2, at SH 87.

Station	Date	Arrival Time	Depth from Surface	Secchi Depth	Temp	DO	DO	Spec Cond	pH
			m	m	oC	mg/l	% sat	us/cm	
CB 2	4/7/2003	9:55 AM	0.3	0.20	22.2	5.4	61.9	270	6.7
CB 2	4/7/2003	9:55 AM	3.0		22.10	5.3	61	265	6.70
CB 2	4/7/2003	9:55 AM	4.9		22.00	5.1	58.2	269	6.70
CB 2	5/7/2003	9:49 AM	0.3	0.52	26.45	5.52	68.6	222	6.67
CB 2	5/7/2003	9:49 AM	2.5		26.29	4.81	60.6	280	6.61
CB 2	5/7/2003	9:49 AM	4.0		26.30	4.45	55.4	343	6.57
CB 2	6/24/2003	8:24 AM	0.3	0.60	31.37	4.79	65.3	1780	6.97
CB 2	6/24/2003	8:24 AM	1.0		31.43	4.45	60.6	1630	6.95
CB 2	6/24/2003	8:24 AM	3.7		31.49	4.3	58.4	3470	6.93
CB 2	8/6/2003	9:17 AM	0.3	0.50	31.47	5.6	74.2	3340	7.19
CB 2	8/6/2003	9:17 AM	2.3		31.30	4.8	63.6	3330	7.14
CB 2	8/6/2003	9:17 AM	3.8		31.30	4.59	65	3330	7.13
CB 2	9/22/2003	9:05 AM	0.3	0.30	24.2	3.38	40.3	109	6.1
CB 2	9/22/2003	9:05 AM	2.5		24.20	3.32	39.6	109	6.10
CB 2	9/22/2003	9:05 AM	4.1		24.20	3.25	38.8	108	6.10
CB 2	11/5/2003	9:45 AM	0.3	0.50	23.1	6.2	73.8	3520	6.7
CB 2	11/5/2003	9:45 AM	1.5		23.30	5	58.9	5400	6.70
CB 2	11/5/2003	9:45 AM	2.5		23.50	4.8	58.4	7680	6.70
CB 2	3/24/2004	9:32 AM	0.3	0.20	20.1	5.3	56.8	187	6.4
CB 2	3/24/2004	9:32 AM	0.3	0.20	20.7	5.2	57.8	187	6.3
CB 2	3/24/2004	9:32 AM	1.8		20.50	4.8	55	187	6.30
CB 2	3/24/2004	9:32 AM	2.0		20.10	4.7	51.5	184	6.50
CB 2	3/24/2004	9:32 AM	3.1		20.40	4.8	53.3	190	6.40
CB 2	3/24/2004	9:32 AM	4.0		20.10	4.7	52.4	187	6.40
CB 2	5/12/2004	9:24 AM	0.3	0.30	22.2	5.1	59.4	118	6.3
CB 2	5/12/2004	9:24 AM	2.0		22.30	5	57.1	119	6.30
CB 2	5/12/2004	9:24 AM	4.0		22.10	5.1	58.7	115	6.30
CB 2	6/23/2004	9:55 AM	0.3	0.65	28.7	3.2	41.1	154	6.4
CB 2	6/23/2004	9:55 AM	1.8		28.70	3.1	40.6	153	6.40
CB 2	6/23/2004	9:55 AM	3.6		28.70	3.1	40.3	153	6.40
CB 2	8/2/2004	5:42 PM	0.3	0.50	35.1	7.85	113.6	951	7.52
CB 2	8/2/2004	5:42 PM	1.9		31.40	4.14	50	1594	6.96
CB 2	8/2/2004	5:42 PM	2.9		31.30	3.53	48.6	1840	6.90
CB 2	9/22/2004	3:23 PM	0.3	0.70	28.9	7.6	105.3	10750	7.2
CB 2	9/22/2004	3:23 PM	2.1		29.00	7.7	106.5	11260	7.30
CB 2	9/22/2004	3:23 PM	4.2		28.50	4.8	66.6	13670	7.10
CB 2	11/8/2004	8:36 AM	0.3	0.30	17.5	5.3	55.6	157.1	6.6
CB 2	11/8/2004	8:36 AM	1.5		17.40	4.8	50.1	183.8	6.30
CB 2	11/8/2004	8:36 AM	3.0		17.10	5	50.8	132.3	6.40

Table 28. Water column profile physicochemical parameter data from datasonde measurements taken in Cow Bayou at station CB 2A, approximately 2.2 km upstream of SH 87 in original stream channel northeast of Bridge City.

Station	Date	Arrival Time	Depth from Surface	Secchi Depth	Temp	DO	DO	Spec Cond	pH
			m	m	oC	mg/l	% sat	us/cm	
CB 2A	4/7/2003	10:20 AM	0.3	0.25	22.3	3.3	38	264	6.5
CB 2A	4/7/2003	10:20 AM	1.0		22.10	3	34.5	275	6.50
CB 2A	4/7/2003	10:20 AM	2.0		22.10	2.8	32.1	279	6.40
CB 2A	5/7/2003	10:22 AM	0.3	0.71	26.38	3.86	47	181	6.34
CB 2A	5/7/2003	10:22 AM	1.0		26.02	3.4	42.4	185	6.31
CB 2A	5/7/2003	10:22 AM	2.3		25.99	3.14	39.4	208	6.32
CB 2A	6/24/2003	12:11 PM	0.3	0.58	33.37	5.97	84.4	5360	7.07
CB 2A	6/24/2003	12:11 PM	1.0		31.93	4.23	57.8	5280	6.97
CB 2A	6/24/2003	12:11 PM	2.0		31.76	4.02	52.6	5350	6.91
CB 2A	8/6/2003	9:42 AM	0.3	0.50	31.34	4.5	59.8	3250	7.02
CB 2A	8/6/2003	9:42 AM	1.0		31.33	4.72	63.4	3240	6.98
CB 2A	8/6/2003	9:42 AM	2.0		31.19	4.14	56.1	3240	6.92
CB 2A	9/22/2003	9:14 AM	0.3	0.33	24.3	3.56	42.4	97	6.24
CB 2A	9/22/2003	9:14 AM	1.5		23.80	3.4	40.2	95	6.10
CB 2A	9/22/2003	9:14 AM	2.1		23.77	3.36	39.8	94	5.93
CB 2A	11/5/2003	11:00 AM	0.3	0.50	23.3	6.6	74.2	3296	6.6
CB 2A	11/5/2003	11:00 AM	1.2		22.60	4.36	51.3	3720	6.50
CB 2A	11/5/2003	11:00 AM	2.1		22.90	1.76	20.9	6053	6.30
CB 2A	3/24/2004	10:12 AM	0.3	0.20	20.3	4	44.3	173	6.3
CB 2A	3/24/2004	10:12 AM	0.3	0.20	22.1	5.8	65.5	174	6.3
CB 2A	3/24/2004	10:12 AM	1.3		20.10	3.8	41.6	174	6.30
CB 2A	3/24/2004	10:12 AM	1.4		20.30	4.5	50.9	177	6.30
CB 2A	3/24/2004	10:12 AM	2.4		20.10	4.2	46.2	178	6.30
CB 2A	3/24/2004	10:12 AM	2.5		19.90	3.5	39.1	179	6.30
CB 2A	5/12/2004	10:46 AM	0.3	0.20	22.5	4.7	52.9	112	6.2
CB 2A	5/12/2004	10:46 AM	1.2		22.20	4.2	49.8	111	6.10
CB 2A	5/12/2004	10:46 AM	2.3		22.20	4.27	49	111	6.10
CB 2A	6/23/2004	10:56 AM	0.3	0.80	28.4	3.2	42	158	6.3
CB 2A	6/23/2004	10:56 AM	1.0		28.20	2.8	36.4	157	6.30
CB 2A	6/23/2004	10:56 AM	2.0		27.80	1.6	19.8	182	6.20
CB 2A	8/2/2004	6:00 PM	0.3	0.55	34.9	6.97	94.9	755	7.26
CB 2A	8/2/2004	6:00 PM	1.0		32.30	4.3	49.8	685	6.90
CB 2A	8/2/2004	6:00 PM	1.9		30.40	0.7	9.1	651	6.70
CB 2A	9/22/2004	11:36 AM	0.3	0.60	28.6	6.9	93.5	9468	7
CB 2A	9/22/2004	11:36 AM	1.1		28.40	6.5	87.1	9488	6.90
CB 2A	9/22/2004	11:36 AM	2.0		28.20	5.8	77.7	9530	6.90
CB 2A	11/8/2004	8:30 AM	0.3	0.40	17.6	6.8	64.3	236	5.6
CB 2A	11/8/2004	8:30 AM	1.2		17.40	4.49	47.6	234	5.60
CB 2A	11/8/2004	8:30 AM	2.0		17.40	4.5	48	235	5.50

Table 29. Water column profile physicochemical parameter data from datasonde measurements taken in Cow Bayou at station CB 3, 2400 ft (732 m) upstream of Sabine River confluence.

Station	Date	Arrival Time	Depth from Surface	Secchi Depth	Temp	DO	DO	Spec Cond	pH
			m	m	oC	mg/l	% sat	us/cm	
CB 3	4/7/2003	8:56 AM	0.3	0.42	21.4	6	68	287	6.8
CB 3	4/7/2003	8:56 AM	3.0		21.10	6	67.5	277	6.80
CB 3	4/7/2003	8:56 AM	4.7		21.10	5.9	66.8	280	6.80
CB 3	5/7/2003	8:45 AM	0.3	0.61	25.97	5.33	67	517	6.6
CB 3	5/7/2003	8:45 AM	3.0		25.81	4.93	63.5	525	6.61
CB 3	5/7/2003	8:45 AM	5.0		25.86	4.72	59	539	6.57
CB 3	6/24/2003	7:34 AM	0.3		28.79	4.29	55.2	959	6.88
CB 3	6/24/2003	7:34 AM	2.0		29.34	4.09	51.7	1093	6.85
CB 3	6/24/2003	7:34 AM	3.3		29.48	4.05	45.7	1400	6.85
CB 3	8/6/2003	8:41 AM	0.3	0.60	30.93	6.14	81.4	3300	7.29
CB 3	8/6/2003	8:41 AM	2.0		30.98	5.36	72.7	3590	7.24
CB 3	8/6/2003	8:41 AM	4.0		30.91	5.33	73.3	4840	7.24
CB 3	9/22/2003	8:40 AM	0.3	0.59	25.9	5	62.4	1700	6.58
CB 3	9/22/2003	8:40 AM	3.0		25.78	4.9	60.4	1740	6.63
CB 3	9/22/2003	8:40 AM	6.0		25.78	4.83	59.6	1770	6.67
CB 3	11/5/2003	9:00 AM	0.3	0.90	23.1	6.2	73.4	9150	6.8
CB 3	11/5/2003	9:00 AM	2.5		23.60	6.02	74	12370	6.90
CB 3	11/5/2003	9:00 AM	4.7		23.70	5.93	73.5	14400	7.08
CB 3	3/24/2004	8:24 AM	0.3	0.70	17.6	7.9	83.3	695	6.6
CB 3	3/24/2004	8:24 AM	2.5		17.60	7.7	81.6	707	6.70
CB 3	3/24/2004	8:24 AM	5.0		17.60	7.6	80.9	714	6.70
CB 3	5/12/2004	8:45 AM	0.3	0.30	23.5	5.6	65	136	6.3
CB 3	5/12/2004	8:45 AM	2.5		23.50	5.1	61.1	140	7.00
CB 3	5/12/2004	8:45 AM	5.5		23.50	5.1	60.8	140	6.40
CB 3	6/23/2004	8:49 AM	0.3	0.95	28.7	4.6	58.4	272	6.3
CB 3	6/23/2004	8:49 AM	2.0		28.70	4.4	56.5	272	6.30
CB 3	6/23/2004	8:49 AM	3.6		28.70	4.4	55.3	272	6.50
CB 3	8/2/2004	5:18 PM	0.3	0.75	33.1	6.7	94.6	3630	7.3
CB 3	8/2/2004	5:18 PM	2.2		31.20	5.3	73	4080	7.20
CB 3	8/2/2004	5:18 PM	4.0		30.80	4.7	63.8	4650	7.20
CB 3	9/22/2004	1:40 PM	0.3	0.90	28.5	6.9	95.4	16670	7.4
CB 3	9/22/2004	1:40 PM	2.7		28.00	6	84.4	20300	7.60
CB 3	9/22/2004	1:40 PM	5.2		28.20	5.3	75.2	22200	7.60
CB 3	11/8/2004	7:30 AM	0.3	0.40	19	6.4	68.2	842.2	6.8
CB 3	11/8/2004	7:30 AM	2.2		19.10	6.1	65.3	918.8	6.80
CB 3	11/8/2004	7:30 AM	4.5		19.10	6	64.3	1006	6.80

Table 30. Water column profile physicochemical parameter data from datasonde measurements taken in Lost River at station LR 1, at the Chambers County line and 5.4 km upstream of John Wiggins Bayou.

Station	Date	Arrival Time	Depth from Surface	Secchi Depth	Temp	DO	DO	Spec Cond	pH
			m	m	oC	mg/l	% sat	us/cm	
LR 1	4/8/2003	11:15 AM	0.3	0.30	20.91	6.7	75.5	396	7.36
LR 1	4/8/2003	11:15 AM	0.7		20.86	6.71	74.4	398	7.35
LR 1	4/8/2003	11:15 AM	1.6		20.77	6.71	74.2	396	7.35
LR 1	5/5/2003	11:09 AM	0.3	0.38	26.73	9.27	115.6	348	7.88
LR 1	5/5/2003	11:09 AM	1.0		26.64	8.73	110.8	348	7.89
LR 1	5/5/2003	11:09 AM	1.6		26.42	7.39	92	352	7.75
LR 1	6/23/2003	10:59 AM	0.3	0.51	30.66	8.3	111.6	354	7.85
LR 1	6/23/2003	10:59 AM	1.0		29.70	5.7	72.6	347	7.47
LR 1	6/23/2003	10:59 AM	2.0		28.77	2.18	26.2	343	7.09
LR 1	8/4/2003	11:15 AM	0.3	0.50	32.7	5.04	70.2	554	7.83
LR 1	8/4/2003	11:15 AM	0.9		32.39	4.64	63.7	556	7.76
LR 1	8/4/2003	11:15 AM	1.4		32.17	3.87	53	550	7.63
LR 1	9/23/2003	6:05 PM	0.3	0.44	27.9	7.72	98.8	350	7.2
LR 1	9/23/2003	6:05 PM	1.2		26.10	5.8	75.5	392	7.00
LR 1	9/23/2003	6:05 PM	2.3		24.70	2.63	31.8	407	6.82
LR 1	11/4/2003	3:45 PM	0.3	0.50	25.1	6.8	82.4	362	7.23
LR 1	11/4/2003	3:45 PM	1.4		23.60	5.9	69.8	363	7.24
LR 1	11/4/2003	3:45 PM	2.8		22.70	3.73	40.4	364	7.06
LR 1	3/23/2004	11:16 AM	0.3	0.20	20.4	9.5	107.5	437	7.6
LR 1	3/23/2004	11:16 AM	0.3	0.20	21.95	10.77	124.6	464	7.48
LR 1	3/23/2004	11:16 AM	1.2		20.30	9.2	102.6	449	7.60
LR 1	3/23/2004	11:16 AM	1.2		21.10	10.25	116	524	7.32
LR 1	3/23/2004	11:16 AM	2.2		19.70	5.9	69	570	7.00
LR 1	3/23/2004	11:16 AM	2.4		19.80	6.8	76.5	533	7.40
LR 1	5/10/2004	1:05 PM	0.3	0.35	23.1	8		351	7.8
LR 1	5/10/2004	1:05 PM	1.0		22.90	7.9		351	7.80
LR 1	5/10/2004	1:05 PM	2.5		22.90	7.9		351	7.80
LR 1	6/22/2004	10:25 AM	0.3	0.50	28.3	6.8	89.3	322	7.7
LR 1	6/22/2004	10:25 AM	0.7		28.30	6.8	89.1	322	7.70
LR 1	6/22/2004	10:25 AM	1.2		28.30	6.7	87.8	322	7.70
LR 1	8/2/2004	1:43 PM	0.3	0.53	31.4	5.3	71.2	382	7.7
LR 1	8/2/2004	1:43 PM	1.0		31.10	4.6	62.8	377	7.70
LR 1	8/2/2004	1:43 PM							
LR 1	9/21/2004	11:35 AM	0.3	0.40	28.4	5.5	71.6	361	7.6
LR 1	9/21/2004	11:35 AM	1.0		28.10	4.9	63.4	361	7.50
LR 1	9/21/2004	11:35 AM	2.1		27.90	4.3	55.6	362	7.50
LR 1	11/8/2004	3:00 PM	0.3	0.40	20.4	9.8	109.5	413.9	8.1
LR 1	11/8/2004	3:00 PM	1.0		19.10	7.3	80.9	419.2	7.70
LR 1	11/8/2004	3:00 PM	1.5		18.80	3.9	52	437	7.70

Table 31. Water column profile physicochemical parameter data from datasonde measurements taken in Lost River at station LR 2, approximately 2.6 km upstream of the confluence with John Wiggins Bayou and northeast of Lost Lake oil field.

Station	Date	Arrival Time	Depth from Surface	Secchi Depth	Temp	DO	DO	Spec Cond	pH
			m	m	oC	mg/l	% sat	us/cm	
LR 2	4/8/2003	11:49 AM	0.3	0.30	20.57	7.5	82.5	344	7.35
LR 2	4/8/2003	11:49 AM	0.6		20.56	7.58	83.5	342	7.35
LR 2	4/8/2003	11:49 AM	1.4		20.51	7.81	87.1	342	7.43
LR 2	5/5/2003	10:10 AM	0.3	0.32	26.06	6.94	86.7	440	6.9
LR 2	5/5/2003	10:10 AM	1.0		26.01	6.41	79.2	437	7.03
LR 2	5/5/2003	10:10 AM	2.0		25.88	5.64	70	444	7.07
LR 2	6/23/2003	10:34 AM	0.3	0.50	29.43	7.37	96.7	353	7.72
LR 2	6/23/2003	10:34 AM	1.0		29.25	7.24	94.6	347	7.74
LR 2	6/23/2003	10:34 AM	1.6		29.25	7.19	94	342	7.72
LR 2	8/4/2003	11:57 AM	0.3	0.43	31.87	6.01	81.8	837	7.91
LR 2	8/4/2003	11:57 AM	1.0		31.40	5.27	71.6	814	7.78
LR 2	8/4/2003	11:57 AM	1.3		31.25	4.85	65.7	839	7.70
LR 2	9/23/2003	6:40 PM	0.3	0.41	28.1	7.94	101.6	327	8.02
LR 2	9/23/2003	6:40 PM	1.2		26.80	7.33	91.7	328	7.88
LR 2	9/23/2003	6:40 PM	2.3		26.20	0.31	5.3	329	7.26
LR 2	11/4/2003	4:25 PM	0.3	0.48	24.3	7.25	86.7	377	7.37
LR 2	11/4/2003	4:25 PM	1.0		23.40	7.62	89.6	357	7.40
LR 2	11/4/2003	4:25 PM	1.6		23.30	7.34	84.7	357	7.12
LR 2	3/23/2004	9:58 AM	0.3	0.30	19.3	9.7	104.5	356	7.6
LR 2	3/23/2004	9:58 AM	1.0		19.10	9.2	99.5	356	7.70
LR 2	3/23/2004	9:58 AM	1.9		18.90	8.6	91.5	356	7.60
LR 2	5/10/2004	2:02 PM	0.3	0.35	23	7.3		352	7.6
LR 2	5/10/2004	2:02 PM	1.0		23.00	7		352	7.60
LR 2	5/10/2004	2:02 PM	2.0		23.00	6.8		352	7.50
LR 2	6/22/2004	9:45 AM	0.3	0.50	28.2	6.2	79.4	325	7.4
LR 2	6/22/2004	9:45 AM	1.0		28.20	5.9	77.1	325	7.40
LR 2	6/22/2004	9:45 AM	2.0		28.20	6	78.3	326	7.50
LR 2	8/2/2004	1:15 PM	0.3	0.32	31.2	4.7	65	340	7.7
LR 2	8/2/2004	1:15 PM	1.5		31.10	4	54.1	341	7.60
LR 2	8/2/2004	1:15 PM							
LR 2	9/21/2004	9:56 AM	0.3	0.30	28.3	5.1	65.9	763	7.5
LR 2	9/21/2004	9:56 AM	0.9		28.20	4.8	62	746	7.40
LR 2	9/21/2004	9:56 AM	1.7		28.10	4.9	63.8	820	7.50
LR 2	11/8/2004	3:17 PM	0.3	0.20	21.9	10	112.9	330.8	8.3
LR 2	11/8/2004	3:17 PM	0.6		21.70	9.9	111.2	331.2	8.30
LR 2	11/8/2004	3:17 PM	1.0		21.70	9.9	112.1	330.3	8.30

Table 32. Water column profile physicochemical parameter data from datasonde measurements taken in Lost River at station LR 3, at confluence with Old River Lake approx. 1.3 km upstream of IH10.

Station	Date	Arrival Time	Depth from Surface	Secchi Depth	Temp	DO	DO	Spec Cond	pH
			m	m	oC	mg/l	% sat	us/cm	
LR 3	4/8/2003	12:20 PM	0.3	0.20	19.88	8.2	89.3	334	7.7
LR 3	4/8/2003	12:20 PM	1.2		19.72	8.15	88.4	332	7.69
LR 3	4/8/2003	12:20 PM	3.4		19.51	8.3	90	328	7.75
LR 3	5/5/2003	9:15 AM	0.3	0.22	25.7	7.14	87.3	545	7.36
LR 3	5/5/2003	9:15 AM	1.0		25.70	7.1	87.1	353	7.56
LR 3	5/5/2003	9:15 AM	2.5		25.60	7.16	87.8	516	7.64
LR 3	6/23/2003	9:53 AM	0.3	0.30	31.77	7.51	102.8	448	7.96
LR 3	6/23/2003	9:53 AM	2.0		31.24	6.27	84.8	436	7.90
LR 3	6/23/2003	9:53 AM	3.6		31.15	5.96	80.5	430	7.86
LR 3	8/4/2003	12:26 PM	0.3	0.25	30.5	6.1	82	2309	7.8
LR 3	8/4/2003	12:26 PM	2.0		29.96	5.5	73.2	2250	7.89
LR 3	8/4/2003	12:26 PM	2.7		29.91	5.38	71.6	2250	7.86
LR 3	9/23/2003	7:25 PM	0.3	0.32	27.62	7.82	99.3	434	7.8
LR 3	9/23/2003	7:25 PM	2.0		26.83	7.58	95	437	7.80
LR 3	9/23/2003	7:25 PM	3.5		25.72	6.29	77.2	447	7.50
LR 3	11/4/2003	4:55 PM	0.3	0.35	26.1	8.48	104.9	1093	7.92
LR 3	11/4/2003	4:55 PM	2.0		25.80	8.16	100.6	1083	7.86
LR 3	11/4/2003	4:55 PM	3.7		25.50	7.87	97	1087	7.90
LR 3	3/23/2004	8:25 AM	0.3	0.25	18.9	8.5	92.4	387	8.4
LR 3	3/23/2004	8:25 AM	0.3	0.25	21.7	10.7	122	443	8.6
LR 3	3/23/2004	8:25 AM	1.5		21.20	10.2	115	444	8.50
LR 3	3/23/2004	8:25 AM	1.8		18.90	8.4	91.1	387	8.40
LR 3	3/23/2004	8:25 AM	2.7		20.80	9.6	108	443	8.50
LR 3	3/23/2004	8:25 AM	3.7		18.90	8.3	91	387	8.40
LR 3	5/10/2004	2:30 PM	0.3	0.35	23.3	7.2		584	7.3
LR 3	5/10/2004	2:30 PM	2.0		23.20	6.5		594	7.40
LR 3	5/10/2004	2:30 PM	4.0		23.20	6.6		583	7.30
LR 3	6/22/2004	9:00 AM	0.3	0.35	28.1	6.1	80.8	324	7.5
LR 3	6/22/2004	9:00 AM	2.0		28.20	6.1	79.3	324	7.50
LR 3	6/22/2004	9:00 AM	3.3		28.10	6.1	79.9	324	7.60
LR 3	8/2/2004	12:46 PM	0.3	0.26	31.7	4.9	66.7	367	7.8
LR 3	8/2/2004	12:46 PM	1.3		31.50	4.9	66.2	365	7.90
LR 3	8/2/2004	12:46 PM	2.6		31.50	4.9	66.8	365	7.90
LR 3	9/21/2004	8:50 AM	0.3	0.50	27.9	6	76.6	5410	7.6
LR 3	9/21/2004	8:50 AM	1.7		27.90	5.4	72.2	6440	7.50
LR 3	9/21/2004	8:50 AM	3.4		27.90	5.4	71.4	6630	7.50
LR 3	11/8/2004	12:30 PM	0.3	0.20	21.2	9.1	102.6	610.4	7.8
LR 3	11/8/2004	12:30 PM	1.6		21.00	9.1	100.3	642.9	8.00
LR 3	11/8/2004	12:30 PM	3.2		21.00	9.1	100.2	649.5	7.90

Table 33. Water column profile physicochemical parameter data from datasonde measurements taken in Garcitas Creek at station GC 1, 3.07 km upstream from SH 616.

Station	Date	Arrival Time	Depth from Surface	Secchi Depth	Temp	DO	DO	Spec Cond	pH
			m	m	oC	mg/l	% sat	us/cm	
GC 1	4/10/2003	7:55 AM	0.5	0.33	18.59	7.13	76.6	3190	7.94
GC 1	4/10/2003	7:55 AM	1.0		19.33	6.84	74.7	4070	7.94
GC 1	4/10/2003	7:55 AM							
GC 1	5/5/2003	12:07 PM	0.3	0.55	26.7	5.05	67	7390	8.06
GC 1	5/5/2003	12:07 PM	1.5		26.44	4.42	56.7	7930	7.99
GC 1	5/5/2003	12:07 PM	2.9		26.36	3.75	48.7	8120	7.95
GC 1	6/25/2003	11:12 AM	0.3	0.72	32.14	5.01	72.2	13660	8.23
GC 1	6/25/2003	11:12 AM	1.5		31.67	4.4	16.9	14080	8.20
GC 1	6/25/2003	11:12 AM	2.7		31.70	2.74	38.8	14450	8.04
GC 1	8/5/2003	6:05 PM	0.3	0.30	32.96	5.82	76.1	464	8
GC 1	8/5/2003	6:05 PM	0.8		31.17	3.57	52.5	470	8.20
GC 1	8/5/2003	6:05 PM	1.6		30.93	3.46	46.7	479	8.29
GC 1	9/22/2003	7:45 PM	0.3	0.15	24.43	8.43	95	90	6.64
GC 1	9/22/2003	7:45 PM	0.9		24.43	8.23	102	91	6.64
GC 1	9/22/2003	7:45 PM	1.7		24.43	7.57	99.4	91	6.62
GC 1	11/4/2003	9:16 AM	0.3	0.20	23.56	6.81	80.5	159	7.04
GC 1	11/4/2003	9:16 AM	0.7		22.86	5.84	67.7	159	6.92
GC 1	11/4/2003	9:16 AM	1.5		22.30	4.82	55.4	163	6.81
GC 1	3/23/2004	4:27 PM	0.3	0.20	23.17	5.88	67.8	179	6.89
GC 1	3/23/2004	4:27 PM	1.0		22.13	4.9	55.5	182	6.74
GC 1	3/23/2004	4:27 PM	2.0		22.08	4.88	55.2	181	6.69
GC 1	5/12/2004	1:30 PM	0.3	0.10	22.5	6.31	72.5	63	6.36
GC 1	5/12/2004	1:30 PM	1.5		22.49	5.95	69	64	6.34
GC 1	5/12/2004	1:30 PM	2.8		22.49	8.3	73.9	64	6.45
GC 1	7/6/2004	11:43 AM	0.3	0.20	30.32	4.41	60.9	285	6.9
GC 1	7/6/2004	11:43 AM	0.8		28.95	3.75	48.6	284	6.84
GC 1	7/6/2004	11:43 AM	1.7		28.89	4.14	50.7	284	6.81
GC 1	8/3/2004	11:04 AM	0.3	0.30	30.45	4.76	67.2	522	7.45
GC 1	8/3/2004	11:04 AM	0.8		30.17	4.49	59.7	523	7.42
GC 1	8/3/2004	11:04 AM	1.7		30.08	4.41	58.5	522	7.39
GC 1	9/22/2004	10:28 AM	0.3	0.65	28.46	4.7	62.9	7710	7.85
GC 1	9/22/2004	10:28 AM	1.1		28.65	2.4	32.9	8530	7.62
GC 1	9/22/2004	10:28 AM	2.2		28.97	0.92	12.2	9880	7.48
GC 1	11/8/2004	10:20 AM	0.3	0.10	17.88	5.54	57.4	161	6.94
GC 1	11/8/2004	10:20 AM	0.7		17.35	5.72	58.8	162	6.84
GC 1	11/8/2004	10:20 AM	1.5		17.32	5.53	57	161	6.88

Table 34. Water column profile physicochemical parameter data from datasonde measurements taken in Garcitas Creek at station GC 2, 1.80 km downstream from SH 616.

Station	Date	Arrival Time	Depth from Surface	Secchi Depth	Temp	DO	DO	Spec Cond	pH
			m	m	oC	mg/l	% sat	us/cm	
GC 2	4/10/2003	8:54 AM	0.5		18.31	9.28	100.8	7640	8.2
GC 2	4/10/2003	8:54 AM	1.2		19.54	8.67	96.5	8400	8.18
GC 2	4/10/2003	8:54 AM	2.5		19.78	6.34	71.3	10180	7.89
GC 2	5/5/2003	12:54 PM	0.3	0.55	27.01	6.25	82.8	13740	8
GC 2	5/5/2003	12:54 PM	0.9		26.50	5.25	72.8	13820	7.97
GC 2	5/5/2003	12:54 PM	2.0		26.28	4.53	59.8	14120	7.86
GC 2	6/25/2003	2:40 PM	0.3	0.65	31.4	4.89	70	18000	8.25
GC 2	6/25/2003	2:40 PM	1.7		31.17	3.91	56.3	18100	8.22
GC 2	6/25/2003	2:40 PM	3.3		30.06	2.48	34.7	18300	8.02
GC 2	8/5/2003	4:40 PM	0.3	0.40	32.62	8.48	119.6	1066	7.98
GC 2	8/5/2003	4:40 PM	1.3		31.00	3.93	53.2	1146	7.83
GC 2	8/5/2003	4:40 PM	2.7		30.26	1.26	16.6	2030	7.79
GC 2	9/22/2003	7:24 PM	0.3	0.20	24.98	7.59	91.2	106	6.66
GC 2	9/22/2003	7:24 PM	1.1		24.97	7.64	93.5	105	6.64
GC 2	9/22/2003	7:24 PM	2.2		24.97	5.85	72.2	103	6.64
GC 2	11/4/2003	8:41 AM	0.3	0.25	23.15	5.78	67.2	447	7.14
GC 2	11/4/2003	8:41 AM	1.3		22.96	5.63	65.6	434	7.22
GC 2	11/4/2003	8:41 AM	2.7		21.45	2.25	26.2	9130	7.30
GC 2	3/23/2004	3:53 PM	0.3	0.20	22.48	5.43	61.7	207	6.71
GC 2	3/23/2004	3:53 PM	1.3		22.48	5.31	60.8	207	6.69
GC 2	3/23/2004	3:53 PM	2.7		22.28	5.12	57.8	217	6.61
GC 2	5/12/2004	11:25 AM	0.3	0.10	22.42	6.22	71.6	71	6.8
GC 2	5/12/2004	11:25 AM	2.0		22.41	6.14	69.5	69	6.53
GC 2	5/12/2004	11:25 AM	4.4		22.41	6.18	72.3	71	6.50
GC 2	7/6/2004	12:17 PM	0.3	0.20	30.63	4.91	66	235	6.97
GC 2	7/6/2004	12:17 PM	1.7		29.61	4.15	54.8	240	6.78
GC 2	7/6/2004	12:17 PM	3.4		29.56	4.35	56.2	241	6.76
GC 2	8/3/2004	11:40 AM	0.3	0.35	32.55	5.79	80.6	578	7.94
GC 2	8/3/2004	11:40 AM	1.5		31.43	4.65	63.1	593	7.77
GC 2	8/3/2004	11:40 AM	3.0		31.41	4.47	60.9	584	7.73
GC 2	9/22/2004	11:03 AM	0.3	0.65	28.62	6.28	85.4	11340	8.21
GC 2	9/22/2004	11:03 AM	2.0		29.18	1.72	23.3	16200	7.61
GC 2	9/22/2004	11:03 AM	4.1		29.50	1.03	14.2	17600	7.49
GC 2	11/8/2004	10:55 AM	0.3	0.10	18.77	5.09	53.7	222	6.84
GC 2	11/8/2004	10:55 AM	0.6		18.21	5.22	54.6	268	6.87
GC 2	11/8/2004	10:55 AM	1.2		18.15	5.13	53.3	315	6.91

Table 35. Water column profile physicochemical parameter data from datasonde measurements taken in Garcitas Creek at station GC 3, 6.5 km downstream from SH 616.

Station	Date	Arrival Time	Depth from Surface	Secchi Depth	Temp	DO	DO	Spec Cond	pH
			m	m	oC	mg/l	% sat	us/cm	
GC 3	4/10/2003	9:40 AM	0.5	0.51	17.73	9.37	100.4	9890	8.21
GC 3	4/10/2003	9:40 AM	1.5		19.01	7.62	86.6	13770	8.03
GC 3	4/10/2003	9:40 AM	3.0		19.29	6.95	80.3	17400	8.04
GC 3	5/5/2003	1:26 PM	0.3	0.60	26.34	6.09	82	19200	7.77
GC 3	5/5/2003	1:26 PM	1.7		26.31	5.84	78.3	19200	7.78
GC 3	5/5/2003	1:26 PM	3.4		26.25	5.63	75.8	19300	7.76
GC 3	6/25/2003	10:05 AM	0.3	0.50	30.93	5.27	76.7	21100	8.23
GC 3	6/25/2003	10:05 AM	1.7		30.81	4.47	64.2	21100	8.21
GC 3	6/25/2003	10:05 AM	3.3		30.73	3.84	55.3	21200	8.14
GC 3	8/5/2003	5:16 PM	0.3	0.40	31.26	6.7	92.3	4460	7.79
GC 3	8/5/2003	5:16 PM	1.5		31.22	6.65	91.8	4690	7.70
GC 3	8/5/2003	5:16 PM	3.0		29.92	1.29	17.6	7710	7.61
GC 3	9/22/2003	7:04 PM	0.3	0.15	25.08	7.35	90.9	132	6.69
GC 3	9/22/2003	7:04 PM	1.5		25.09	6.8	81	131	6.66
GC 3	9/22/2003	7:04 PM	3.0		25.09	6.19	73.4	132	6.67
GC 3	11/4/2003	8:06 AM	0.3	0.10	24.1	6.64	79.4	2140	7.47
GC 3	11/4/2003	8:06 AM	2.0		23.19	3.4	41.2	8970	7.40
GC 3	11/4/2003	8:06 AM	4.0		22.28	2.38	28.4	11820	7.39
GC 3	3/23/2004	2:30 PM	0.3	0.15	22.08	6.24	71.2	3170	7.35
GC 3	3/23/2004	2:30 PM	1.3		22.07	6.18	71	3170	7.32
GC 3	3/23/2004	2:30 PM	2.7		22.05	6.15	70.7	3160	7.30
GC 3	5/12/2004	12:30 PM	0.3	0.10	22.65	6.27	71.7	76	6.54
GC 3	5/12/2004	12:30 PM	2.1		22.58	6.01	69	77	6.52
GC 3	5/12/2004	12:30 PM	3.5		22.58	6.06	68.8	77	6.51
GC 3	7/6/2004	12:50 PM	0.3	0.15	30.45	4.71	62.5	237	6.91
GC 3	7/6/2004	12:50 PM	1.7		29.71	4.32	56.1	235	6.81
GC 3	7/6/2004	12:50 PM	3.5		29.44	3.98	51.3	235	6.75
GC 3	8/3/2004	12:23 PM	0.3	0.35	32.91	6.05	83.9	1078	7.93
GC 3	8/3/2004	12:23 PM	1.6		31.28	4.04	55	1229	7.62
GC 3	8/3/2004	12:23 PM	3.3		30.94	2.84	38.4	1680	7.46
GC 3	9/22/2004	1:08 PM	0.3	0.60	28.44	6.81	94.1	16200	8.03
GC 3	9/22/2004	1:08 PM	2.0		27.68	3.86	53.4	20300	7.66
GC 3	9/22/2004	1:08 PM	4.1		27.01	4.8	64.1	21700	7.90
GC 3	11/8/2004	11:27 AM	0.3	0.10	20.52	5.76	63.1	650	7.11
GC 3	11/8/2004	11:27 AM	1.2		19.40	5.37	57.8	684	7.29
GC 3	11/8/2004	11:27 AM	2.4		19.06	5.42	59.6	10990	7.75

Table 36. Water column profile physicochemical parameter data from datasonde measurements taken in Tres Palacios Creek at station TP 1, 1.4 km upstream from the confluence of Wilson's Creek.

Station	Date	Arrival Time	Depth from Surface	Secchi Depth	Temp	DO	DO	Spec Cond	pH
			m	m	oC	mg/l	% sat	us/cm	
TP 1	4/7/2003	2:42 PM	0.3	0.18	21.34	4.15	47.1	517	7.49
TP 1	4/7/2003	2:42 PM	1.6		21.33	3.96	44.8	517	7.48
TP 1	4/7/2003	2:42 PM	2.8		21.33	4	44.2	518	7.49
TP 1	5/7/2003	10:12 AM	0.3	0.60	26.19	5.46	68	5060	7.78
TP 1	5/7/2003	10:12 AM	1.3		26.19	5.21	64.8	5060	7.78
TP 1	5/7/2003	10:12 AM	2.7		26.20	5.18	65.7	5080	7.76
TP 1	6/23/2003	2:48 PM	0.3	0.35	31.89	7.47	103.3	1710	8.16
TP 1	6/23/2003	2:48 PM	1.5		30.54	4.55	61.5	1750	7.73
TP 1	6/23/2003	2:48 PM	2.6		30.31	3.97	52.9	1760	7.63
TP 1	8/4/2003	2:13 PM	0.3	0.20	32.1	3.68	50.8	268	7.3
TP 1	8/4/2003	2:13 PM	1.7		30.85	2.42	32.1	245	7.07
TP 1	8/4/2003	2:13 PM	3.5		30.64	2.44	32.1	246	7.02
TP 1	9/22/2003	1:15 PM	0.3	0.05	25.06	8.24	94	108	7.17
TP 1	9/22/2003	1:15 PM	2.1		25.01	7.5	90.8	106	7.13
TP 1	9/22/2003	1:15 PM	4.2		25.01	6.66	80	107	7.19
TP 1	11/3/2003	12:50 PM	0.3	0.40	23.83	6.39	75.1	3210	7.87
TP 1	11/3/2003	12:50 PM	1.7		22.51	2.71	32	5340	7.38
TP 1	11/3/2003	12:50 PM	3.3		21.40	1.48	17.2	9710	7.21
TP 1	3/22/2004	2:10 PM	0.3	0.30	23.33	6.58	76.4	725	7.7
TP 1	3/22/2004	2:10 PM	1.3		21.92	5.5	62.1	670	7.53
TP 1	3/22/2004	2:10 PM	2.7		21.43	4.37	49.1	1110	7.47
TP 1	5/12/2004	4:00 PM	0.3	0.10	22.25	5.92	66.7	86	7.03
TP 1	5/12/2004	4:00 PM	2.6		22.23	5.65	63.8	86	7.02
TP 1	5/12/2004	4:00 PM							
TP 1	7/6/2004	5:50 PM	0.3	0.18	32.33	5.28	71.1	204	7.38
TP 1	7/6/2004	5:50 PM	1.6		30.19	3.12	41.8	211	7.00
TP 1	7/6/2004	5:50 PM	3.3		30.04	3.09	40.1	210	6.97
TP 1	8/3/2004	5:24 PM	0.3	0.35	33.01	8.48	116.8	572	8.1
TP 1	8/3/2004	5:24 PM	1.7		31.05	3.51	49.5	580	7.49
TP 1	8/3/2004	5:24 PM	3.3		30.84	2.9	38.9	583	7.41
TP 1	9/22/2004	5:25 PM	0.3	0.55	28.53	7.18	92.8	7700	8.08
TP 1	9/22/2004	5:25 PM	1.5		28.32	5.82	80.1	7990	7.99
TP 1	9/22/2004	5:25 PM	3.0		28.44	0.16	2.2	14800	7.55
TP 1	11/8/2004	3:50 PM	0.3	0.15	19.23	6.27	67.1	193	7.21
TP 1	11/8/2004	3:50 PM	1.5		17.89	6.29	65.3	193	7.21
TP 1	11/8/2004	3:50 PM	3.0		17.89	6.16	63.9	197	7.23

Table 37. Water column profile physicochemical parameter data from datasonde measurements taken in Tres Palacios Creek at station TP 2, 3.75 km upstream from SH 521 (approximately halfway between SH 521 and confluence of Wilsons Creek).

Station	Date	Arrival Time	Depth from Surface	Secchi Depth	Temp	DO	DO	Spec Cond	pH
			m	m	oC	mg/l	% sat	us/cm	
TP 2	4/7/2003	3:18 PM	0.3	0.14	21.77	5.21	60.5	927	7.55
TP 2	4/7/2003	3:18 PM	1.7		21.43	5.2	59	1820	7.61
TP 2	4/7/2003	3:18 PM	3.5		21.07	4.61	52.6	3660	7.68
TP 2	5/7/2003	9:32 AM	0.3	0.50	26.36	6.04	76.9	6450	7.91
TP 2	5/7/2003	9:32 AM	1.7		26.20	5.42	68.6	6520	7.87
TP 2	5/7/2003	9:32 AM	3.4		26.15	3.33	42.7	8860	7.81
TP 2	6/23/2003	1:45 PM	0.3	0.38	32.18	6.29	87.8	3590	8.22
TP 2	6/23/2003	1:45 PM	1.8		31.96	4.72	65.8	3550	8.15
TP 2	6/23/2003	1:45 PM	3.4		30.74	1.55	21.1	3340	7.66
TP 2	8/4/2003	1:37 PM	0.3	0.25	33.58	6.18	85.4	350	7.87
TP 2	8/4/2003	1:37 PM	1.6		31.21	3.55	47.8	343	7.37
TP 2	8/4/2003	1:37 PM	3.3		31.16	3.58	48.1	345	7.33
TP 2	9/22/2003	12:35 PM	0.3	0.05	24.91	4.69	56.8	116	7.26
TP 2	9/22/2003	12:35 PM	2.0		24.87	4.75	57.3	116	7.24
TP 2	9/22/2003	12:35 PM	4.0		24.87	4.78	57.8	117	7.25
TP 2	11/3/2003	12:27 PM	0.3	0.45	24.62	6.98	84.9	4540	7.87
TP 2	11/3/2003	12:27 PM	1.7		22.82	2.96	35.3	8610	7.42
TP 2	11/3/2003	12:27 PM	3.5		22.02	2.17	25.6	10770	7.40
TP 2	3/22/2004	1:20 PM	0.3	0.30	23.33	8.15	95	1670	7.98
TP 2	3/22/2004	1:20 PM	1.3		22.82	7.57	86.1	1690	7.89
TP 2	3/22/2004	1:20 PM	2.7		21.17	2.06	23.4	4410	7.41
TP 2	5/12/2004	4:25 PM	0.3	0.10	22.5	5.4	62.4	93	7.12
TP 2	5/12/2004	4:25 PM	2.5		22.49	5.27	60.8	91	7.11
TP 2	5/12/2004	4:25 PM							
TP 2	7/6/2004	6:19 PM	0.3	0.15	32.58	5.74	77.4	210	7.47
TP 2	7/6/2004	6:19 PM	1.5		31.54	4.81	65.6	214	7.24
TP 2	7/6/2004	6:19 PM	3.0		29.66	3.32	42.4	235	7.01
TP 2	8/3/2004	5:51 PM	0.3	0.35	34.05	9.08	127.8	576	8.38
TP 2	8/3/2004	5:51 PM	1.7		31.47	4.14	55.7	584	7.66
TP 2	8/3/2004	5:51 PM	3.5		31.27	3.42	46.2	584	7.55
TP 2	9/22/2004	5:57 PM	0.3	0.50	28.75	7.36	97.6	7670	8.08
TP 2	9/22/2004	5:57 PM	1.7		28.60	4.74	65.2	8720	7.85
TP 2	9/22/2004	5:57 PM	3.5		29.23	0.25	3	17700	7.56
TP 2	11/8/2004	4:20 PM	0.3	0.10	21.8	6.65	74.8	187	7.3
TP 2	11/8/2004	4:20 PM	1.5		17.91	6.23	64.7	185	7.16
TP 2	11/8/2004	4:20 PM	3.0		17.65	6.2	64.1	185	7.19

Table 38. Water column profile physicochemical parameter data from datasonde measurements taken in Tres Palacios Creek at station TP 3, 7.5 km downstream from SH 521.

Station	Date	Arrival Time	Depth from Surface	Secchi Depth	Temp	DO	DO	Spec Cond	pH
			m	m	oC	mg/l	% sat	us/cm	
TP 3	4/7/2003	1:38 PM	0.3	0.28	22.97	6.08	74.7	16200	8.09
TP 3	4/7/2003	1:38 PM	0.7		22.97	6	74.3	16200	8.10
TP 3	4/7/2003	1:38 PM							
TP 3	5/7/2003	8:55 AM	0.3	0.30	25.75	6.28	83.7	18900	7.95
TP 3	5/7/2003	8:55 AM							
TP 3	5/7/2003	8:55 AM							
TP 3	6/23/2003	12:50 PM	0.3	0.25	31.14	6.04	86.3	14700	8.3
TP 3	6/23/2003	12:50 PM	0.5		31.16	5.72	80.4	14780	8.28
TP 3	6/23/2003	12:50 PM							
TP 3	8/4/2003	12:58 PM	0.3	0.20	30.45	6.76	91.3	2730	8.38
TP 3	8/4/2003	12:58 PM	0.6		30.46	6.85	92	2740	8.39
TP 3	8/4/2003	12:58 PM							
TP 3	9/22/2003	11:50 AM	0.3	0.10	24.59	4.83	58	129	7.47
TP 3	9/22/2003	11:50 AM	0.6		24.59	4.84	58.5	129	7.47
TP 3	9/22/2003	11:50 AM	1.2		24.58	4.82	58.9	129	7.49
TP 3	11/3/2003	11:40 AM	0.3	0.30	25.22	7.74	101	18000	8.31
TP 3	11/3/2003	11:40 AM	0.7		25.30	7.48	97.8	21600	8.32
TP 3	11/3/2003	11:40 AM							
TP 3	3/22/2004	12:30 PM	0.3	0.10	23.53	10.14	125.4	10710	8.69
TP 3	3/22/2004	12:30 PM							
TP 3	3/22/2004	12:30 PM							
TP 3	5/12/2004	5:15 PM	0.3	0.10	22.99	5.04	55.8	112	7.37
TP 3	5/12/2004	5:15 PM	0.6		22.99	4.79	55.8	112	7.41
TP 3	5/12/2004	5:15 PM							
TP 3	7/6/2004	7:04 PM	0.5		31.63	6.99	94.5	412	7.88
TP 3	7/6/2004	7:04 PM							
TP 3	7/6/2004	7:04 PM							
TP 3	8/3/2004	6:29 PM	0.3	0.15	32.89	7.13	99.3	2060	8.48
TP 3	8/3/2004	6:29 PM							
TP 3	8/3/2004	6:29 PM							
TP 3	9/22/2004	6:42 PM	0.3	0.20	27.44	7.24	98.6	19800	8.21
TP 3	9/22/2004	6:42 PM							
TP 3	9/22/2004	6:42 PM							
TP 3	11/8/2004	5:27 PM	0.3	0.10	24.7	6.64	78.9	557	7.5
TP 3	11/8/2004	5:27 PM							
TP 3	11/8/2004	5:27 PM							

Table 39. Water column profile physicochemical parameter data from datasonde measurements taken in West Carancahua Creek at station WC 1, 5.1 km upstream from the confluence with East Carancahua Creek.

Station	Date	Arrival Time	Depth from Surface	Secchi Depth	Temp	DO	DO	Spec Cond	pH
			m	m	oC	mg/l	% sat	us/cm	
WC 1	4/8/2003	8:15 AM	0.5		18.58	5.14	55.4	2610	7.73
WC 1	4/8/2003	8:15 AM	1.5		18.61	4.94	53.3	2650	7.79
WC 1	4/8/2003	8:15 AM	3.0		20.76	1	11.5	7780	7.43
WC 1	5/6/2003	11:55 AM	0.3	0.40	27.14	5.9	77.2	7510	7.96
WC 1	5/6/2003	11:55 AM	1.8		25.84	2.46	32.4	8370	7.60
WC 1	5/6/2003	11:55 AM	3.7		23.76	0.25	3	11140	7.29
WC 1	6/24/2003	1:26 PM	0.3	0.45	32.2	9.33	119.8	5600	8.8
WC 1	6/24/2003	1:26 PM	2.0		30.84	4.7	65	5950	8.31
WC 1	6/24/2003	1:26 PM	3.7		28.51	0.61	7.2	9340	7.56
WC 1	8/4/2003	7:00 AM	0.3	0.20	32.29	4.29	54.4	380	
WC 1	8/4/2003	7:00 AM	1.8		32.29	2.68	34.4	374	
WC 1	8/4/2003	7:00 AM	3.7		29.89	0.29	3	377	
WC 1	9/22/2003	5:39 PM	0.3	0.05	25.18	6.2	74.4	120	6.73
WC 1	9/22/2003	5:39 PM	1.7		25.07	5.73	70.6	120	6.71
WC 1	9/22/2003	5:39 PM	3.3		25.07	5.72	71.3	120	6.71
WC 1	11/3/2003	5:01 PM	0.3	0.10	23.82	2.9	34.3	321	7.06
WC 1	11/3/2003	5:01 PM	1.8		21.72	0.62	7	338	6.87
WC 1	11/3/2003	5:01 PM	3.7		21.43	1.29	14.3	561	6.92
WC 1	3/22/2004	6:14 PM	0.3	0.30	22.43	7.39	85	2260	7.92
WC 1	3/22/2004	6:14 PM	1.8		20.96	2.11	23.8	4100	7.31
WC 1	3/22/2004	6:14 PM	3.7		19.55	0.34	3.5	4980	7.12
WC 1	5/12/2004								
WC 1	5/12/2004								
WC 1	5/12/2004								
WC 1	7/6/2004	2:34 PM	0.3	0.15	33.58	6.94	96.1	221	7.48
WC 1	7/6/2004	2:34 PM	1.8		28.81	1.58	20.2	250	6.66
WC 1	7/6/2004	2:34 PM	3.7		28.15	0.83	10.3	242	6.57
WC 1	8/3/2004	1:50 PM	0.3	0.40	31.13	3.81	51.4	505	7.25
WC 1	8/3/2004	1:50 PM	1.7		30.35	1.79	24.1	498	7.05
WC 1	8/3/2004	1:50 PM	3.4		30.19	0.57	7.8	505	6.95
WC 1	9/22/2004	2:40 PM	0.3	0.30	28.42	3.27	43	335	7.07
WC 1	9/22/2004	2:40 PM	2.0		27.25	1.5	18.7	333	6.91
WC 1	9/22/2004	2:40 PM	4.0		27.16	1.31	16.6	335	6.90
WC 1	11/8/2004	1:00 PM	0.3	0.10	19.88	5.32	57	203	7.05
WC 1	11/8/2004	1:00 PM	1.7		17.51	4.37	45	211	6.95
WC 1	11/8/2004	1:00 PM	3.3		17.51	4.31	44.4	212	6.95

Table 40. Water column profile physicochemical parameter data from datasonde measurements taken in West Carancahua Creek at station WC 2, 1.9 km upstream from the confluence with East Carancahua Creek.

Station	Date	Arrival Time	Depth from Surface	Secchi Depth	Temp	DO	DO	Spec Cond	pH
			m	m	oC	mg/l	% sat	us/cm	
WC 2	4/9/2003	10:51 AM	0.5	0.27	19.18	6.46	70.6	3310	7.9
WC 2	4/9/2003	10:51 AM	1.2		18.76	5.75	62.5	3260	7.86
WC 2	4/9/2003	10:51 AM	2.5		20.59	2.35	26.7	7100	7.52
WC 2	5/6/2003	10:48 AM	0.3	0.40	26.87	5.36	69.1	9330	7.91
WC 2	5/6/2003	10:48 AM	1.3		26.62	4.97	64.9	9450	7.89
WC 2	5/6/2003	10:48 AM	2.7		26.00	3.02	40.9	10400	7.70
WC 2	6/24/2003	12:38 PM	0.3	0.45	32.53	6.2	89.3	6140	8.83
WC 2	6/24/2003	12:38 PM	1.5		31.31	2.7	37.1	6680	8.40
WC 2	6/24/2003	12:38 PM	2.7		29.36	0.35	4.6	7950	7.59
WC 2	8/4/2003	6:23 PM	0.3	0.20	31.48	4.65	61.6	330	
WC 2	8/4/2003	6:23 PM	1.3		30.82	3.31	43.6	330	
WC 2	8/4/2003	6:23 PM	2.7		30.23	2.52	31.6	332	
WC 2	9/22/2003	5:15 PM	0.3	0.05	25.31	6.08	75.9	119	6.71
WC 2	9/22/2003	5:15 PM	1.5		25.11	5.53	66.3	118	6.72
WC 2	9/22/2003	5:15 PM	3.0		25.12	4.96	57	119	6.72
WC 2	11/3/2003	4:37 PM	0.3	0.10	24.23	4.45	52.7	547	7.19
WC 2	11/3/2003	4:37 PM	1.3		23.11	4.01	46.5	734	7.14
WC 2	11/3/2003	4:37 PM	2.7		22.72	3.68	42.1	2010	7.19
WC 2	3/22/2004	5:48 PM	0.3	0.30	23.97	9.97	118.3	2620	8.34
WC 2	3/22/2004	5:48 PM	1.5		23.91	8.89	106.1	3000	8.27
WC 2	3/22/2004	5:48 PM	3.0		22.24	2.59	30.1	5120	7.58
WC 2	5/12/2004								
WC 2	5/12/2004								
WC 2	5/12/2004								
WC 2	7/6/2004	3:05 PM	0.3	0.15	32.84	5.85	84.2	202	7.25
WC 2	7/6/2004	3:05 PM	1.5		30.11	4.56	59.8	203	6.86
WC 2	7/6/2004	3:05 PM	3.0		27.94	0.97	12.2	229	6.56
WC 2	8/3/2004	2:47 PM	0.3	0.35	34.07	6.27	86	479	7.9
WC 2	8/3/2004	2:47 PM	1.3		30.93	3.71	50.2	491	7.19
WC 2	8/3/2004	2:47 PM	2.7		30.54	1.82	27.9	509	7.00
WC 2	9/22/2004	3:04 PM	0.3	0.30	28.94	5.41	69.6	1102	7.44
WC 2	9/22/2004	3:04 PM	1.7		28.27	4.3	54.7	1540	7.35
WC 2	9/22/2004	3:04 PM	3.3		27.91	3.95	50.1	2170	7.32
WC 2	11/8/2004	1:23 PM	0.3	0.10	22.65	5.49	62.7	210	7.08
WC 2	11/8/2004	1:23 PM	1.2		17.92	4.43	46	207	6.91
WC 2	11/8/2004	1:23 PM	2.5		17.58	4.34	44.9	204	6.92

Table 41. Water column profile physicochemical parameter data from datasonde measurements taken in West Carancahua Creek at station WC 3, 4.5 km downstream from the confluence with East Carancahua Creek.

Station	Date	Arrival Time	Depth from Surface	Secchi Depth	Temp	DO	DO	Spec Cond	pH
			m	m	oC	mg/l	% sat	us/cm	
WC 3	4/9/2003	9:20 AM	0.5		14.32	8.52	84.6	4720	8.19
WC 3	4/9/2003	9:20 AM	1.5		14.32	8.18	81.4	4720	8.19
WC 3	4/9/2003	9:20 AM							
WC 3	5/6/2003	9:57 AM	0.3	0.15	25.72	6.36	83.1	15300	7.97
WC 3	5/6/2003	9:57 AM	0.9		25.73	6.23	81.6	15200	7.97
WC 3	5/6/2003	9:57 AM	1.7		25.72	6.25	81.4	15300	7.97
WC 3	6/24/2003	11:54 AM	0.3	0.25	30.16	5.52	76.9	13680	8.47
WC 3	6/24/2003	11:54 AM	1.2		30.13	5.46	76.2	13680	8.48
WC 3	6/24/2003	11:54 AM	2.1		29.77	5.2	70.6	13720	8.43
WC 3	8/4/2003	5:19 PM	0.3	0.15	31.81	7.32	99.5	885	
WC 3	8/4/2003	5:19 PM	1.2		31.81	7.32	100	888	
WC 3	8/4/2003	5:19 PM	2.5		31.40	6.56	87.8	877	
WC 3	9/22/2003	4:35 PM	0.3	0.10	25.59	6.11	74.4	108	6.79
WC 3	9/22/2003	4:35 PM	1.1		25.55	6.4	78.8	107	6.81
WC 3	9/22/2003	4:35 PM	2.3		25.55	5.91	72.8	107	6.87
WC 3	11/3/2003	3:45 PM	0.3	0.20	26.08	8.75	109.2	3970	8.41
WC 3	11/3/2003	3:45 PM	1.1		25.60	7.87	97.7	4140	8.24
WC 3	11/3/2003	3:45 PM	2.2		24.47	4.96	60.9	6230	7.88
WC 3	3/22/2004	5:10 PM	0.3	0.20	23.41	11.44	136.2	6730	8.98
WC 3	3/22/2004	5:10 PM	0.8		23.42	11.24	133	6700	8.97
WC 3	3/22/2004	5:10 PM	1.7		23.13	10.34	122	7620	8.87
WC 3	5/12/2004								
WC 3	5/12/2004								
WC 3	5/12/2004								
WC 3	7/6/2004	3:44 PM	0.3	0.15	31.85	6.77	92.2	291	7.58
WC 3	7/6/2004	3:44 PM	1.3		31.18	5.84	79.6	277	7.41
WC 3	7/6/2004	3:44 PM	2.3		30.25	5.89	79.8	264	7.18
WC 3	8/3/2004	3:15 PM	0.3	0.15	35.08	7.25	105.4	972	7.8
WC 3	8/3/2004	3:15 PM	1.0		31.91	5.22	71.6	942	7.19
WC 3	8/3/2004	3:15 PM	2.0		31.34	4.93	67.1	877	7.21
WC 3	9/22/2004	3:35 PM	0.3	0.30	27.39	7.43	96.3	7070	8.17
WC 3	9/22/2004	3:35 PM	1.0		27.28	7.31	94.6	7820	8.13
WC 3	9/22/2004	3:35 PM	2.0		27.24	7.71	93.1	8000	8.13
WC 3	11/8/2004	1:46 PM	0.3	0.10	20.12	5.5	59.6	188	6.93
WC 3	11/8/2004	1:46 PM	0.8		19.52	5.31	56.7	185	6.86
WC 3	11/8/2004	1:46 PM	1.6		18.87	5.16	54.7	181	6.91

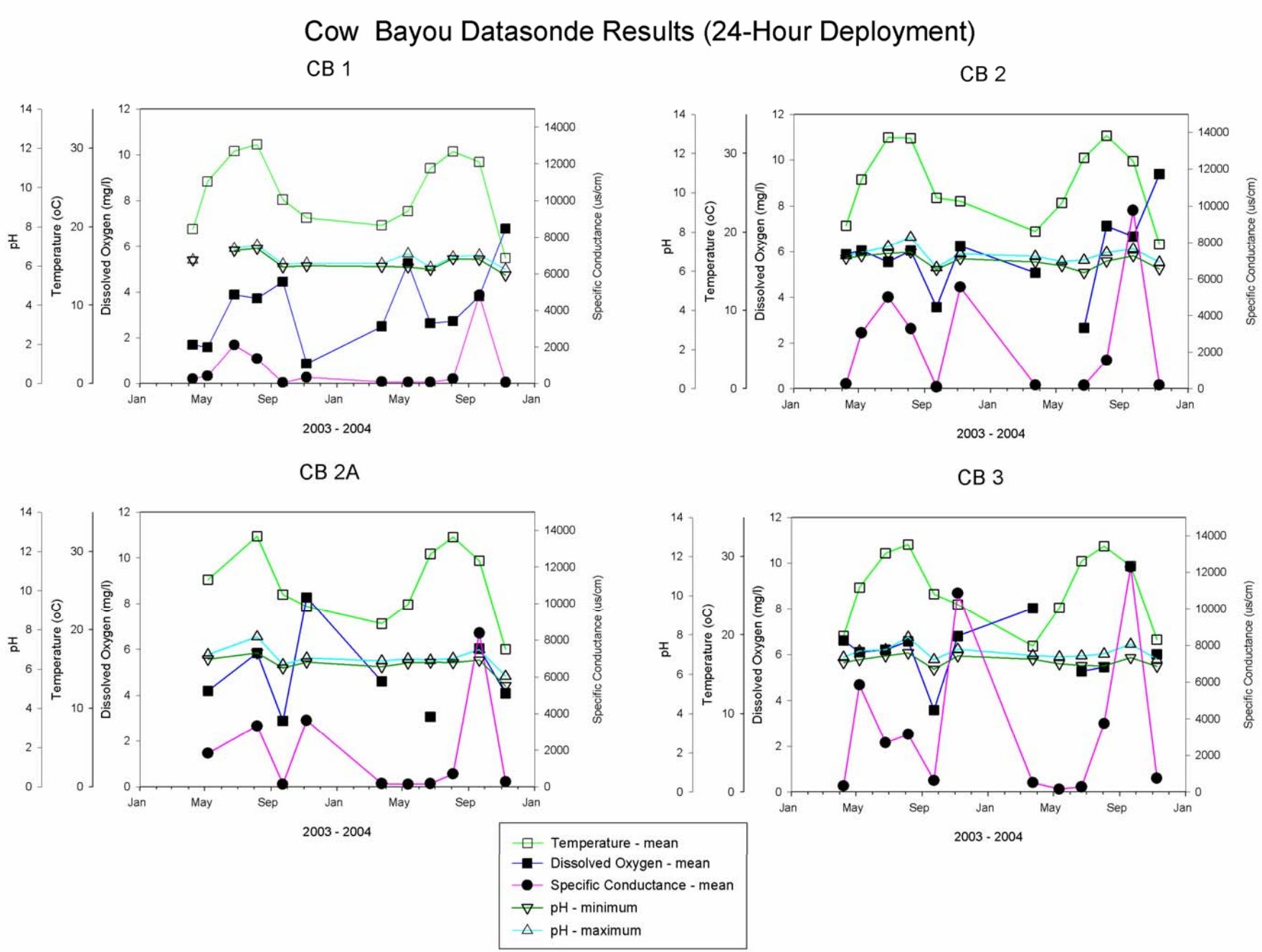

Figure 7. Temperature, dissolved oxygen, pH, and specific conductance measured in Cow Bayou (24-hour datasonde deployment). Sampling locations are described in the text. Connecting lines do not represent continuous data collection and are drawn to aid visualization.

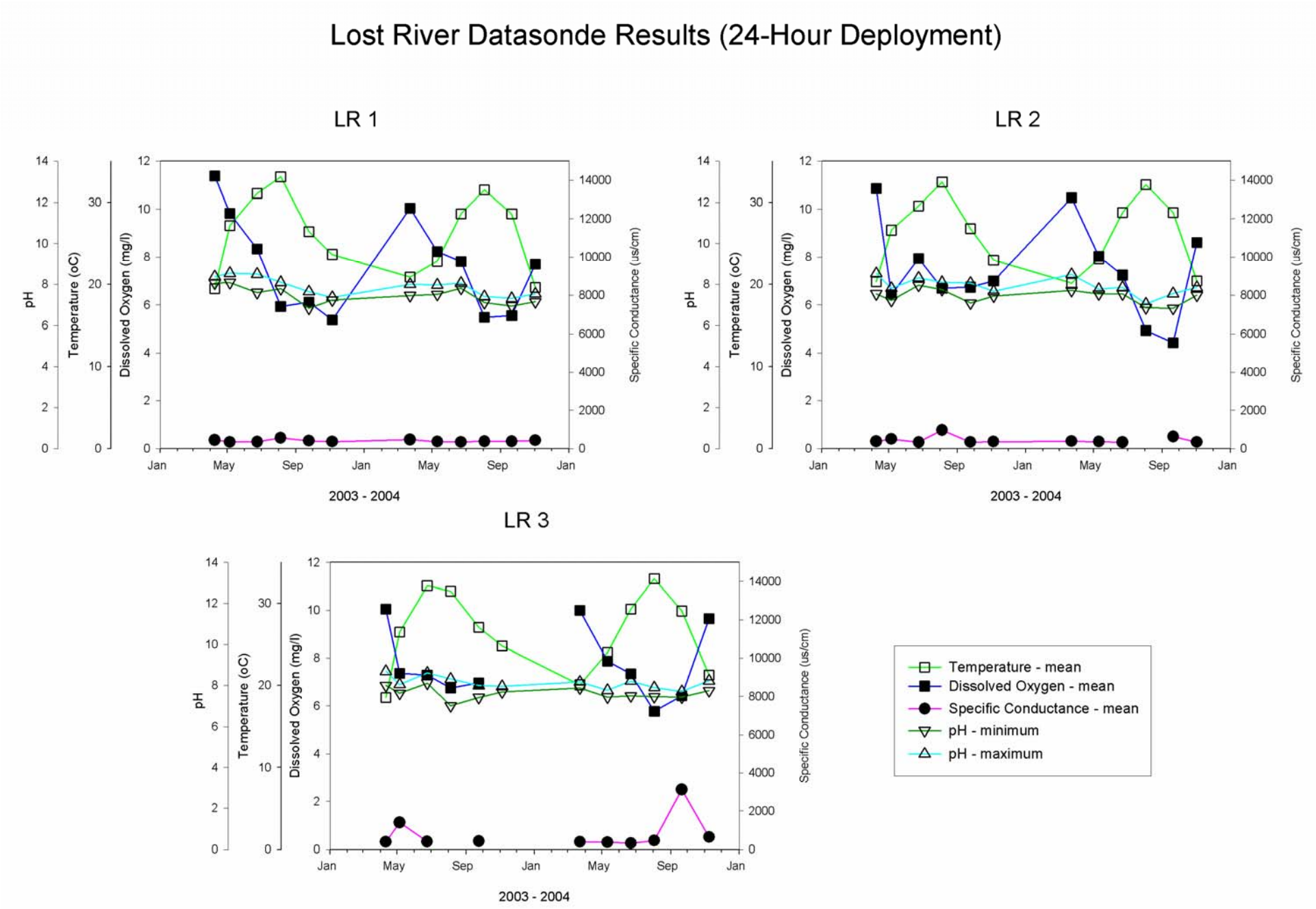

Figure 8. Temperature, dissolved oxygen, pH, and specific conductance measured in Lost River (24-hour datasonde deployment). Sampling locations are described in the text. Connecting lines do not represent continuous data collection and are drawn to aid visualization.

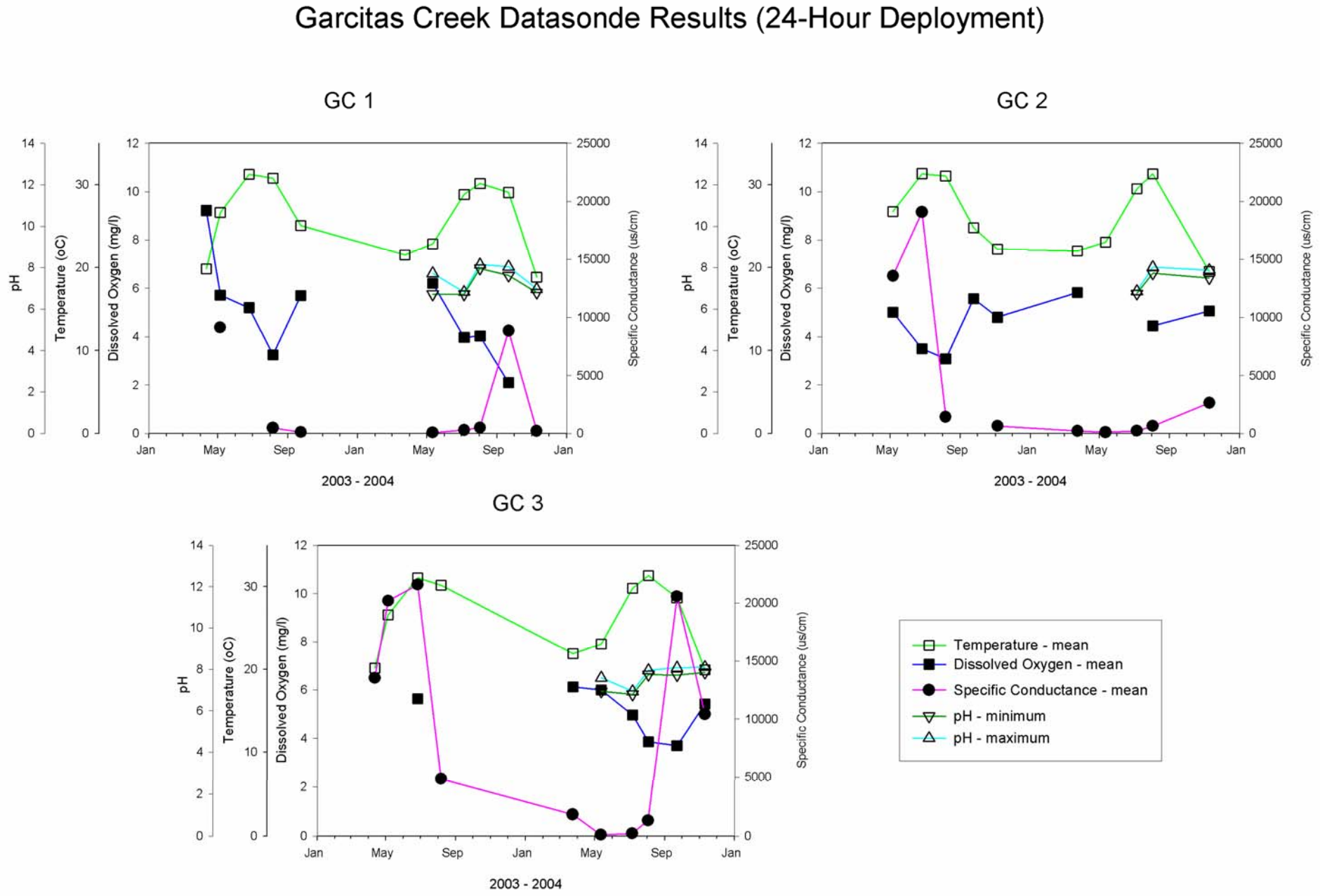

Figure 9. Temperature, dissolved oxygen, pH, and specific conductance measured in Garcitas Creek (24-hour datasonde deployment). Sampling locations are described in the text. Connecting lines do not represent continuous data collection and are drawn to aid visualization.

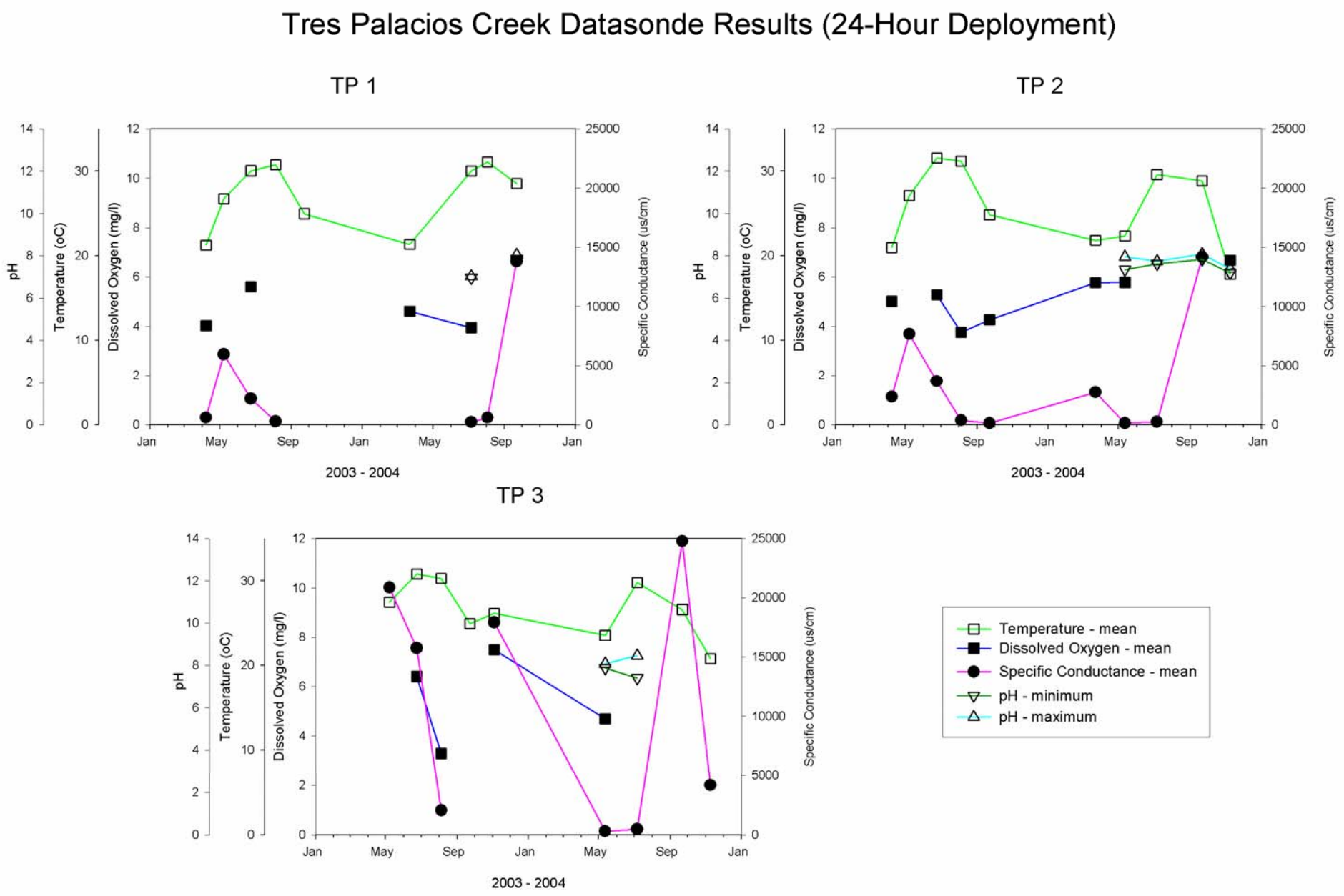

Figure 10. Temperature, dissolved oxygen, pH, and specific conductance measured in Tres Palacios Creek (24-hour datasonde deployment). Sampling locations are described in the text. Connecting lines do not represent continuous data collection and are drawn to aid visualization.

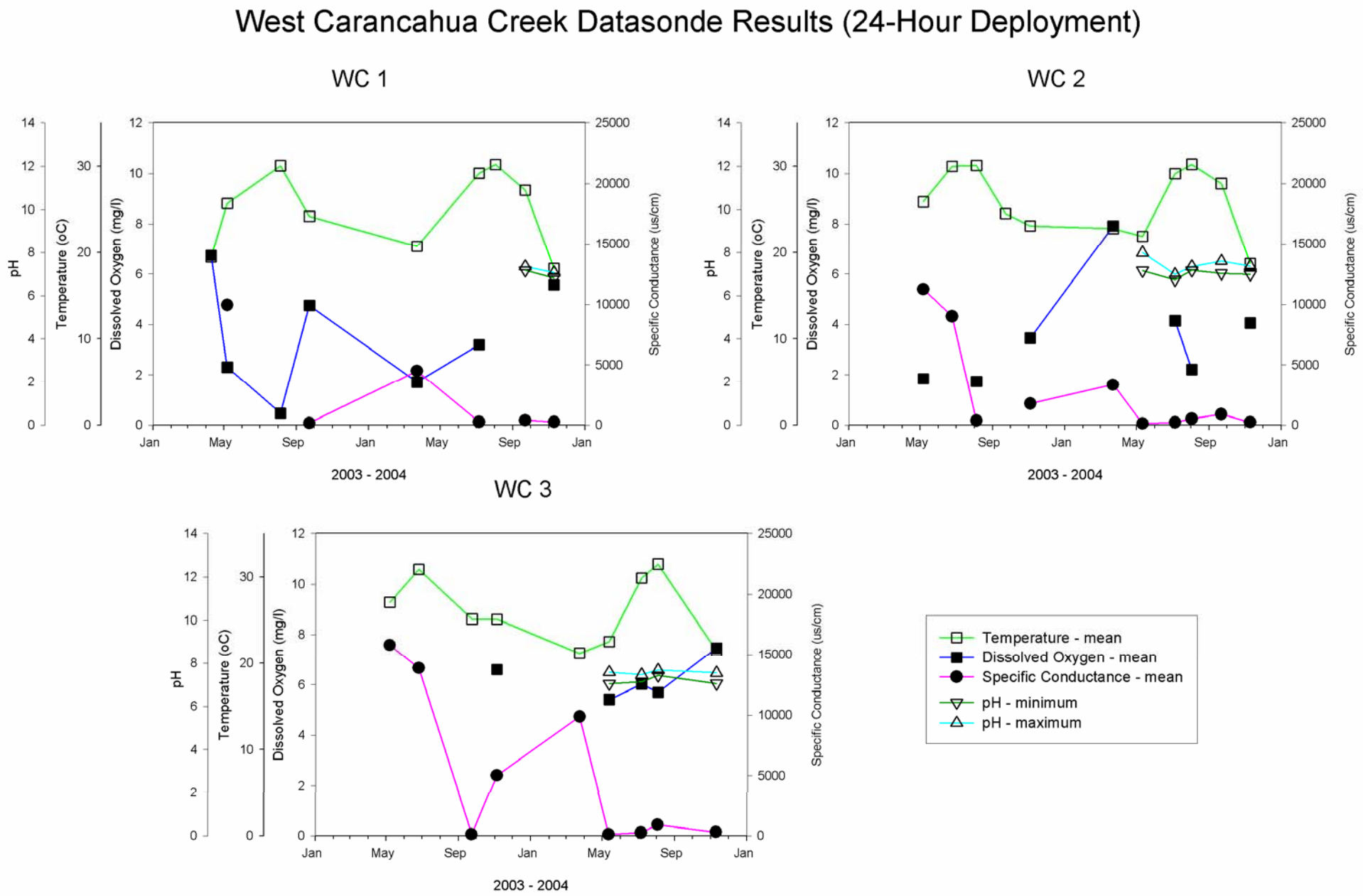

Figure 11. Temperature, dissolved oxygen, pH, and specific conductance measured in West Carancahua Creek (24-hour datasonde deployment). Sampling locations are described in the text. Connecting lines do not represent continuous data collection and are drawn to aid visualization.

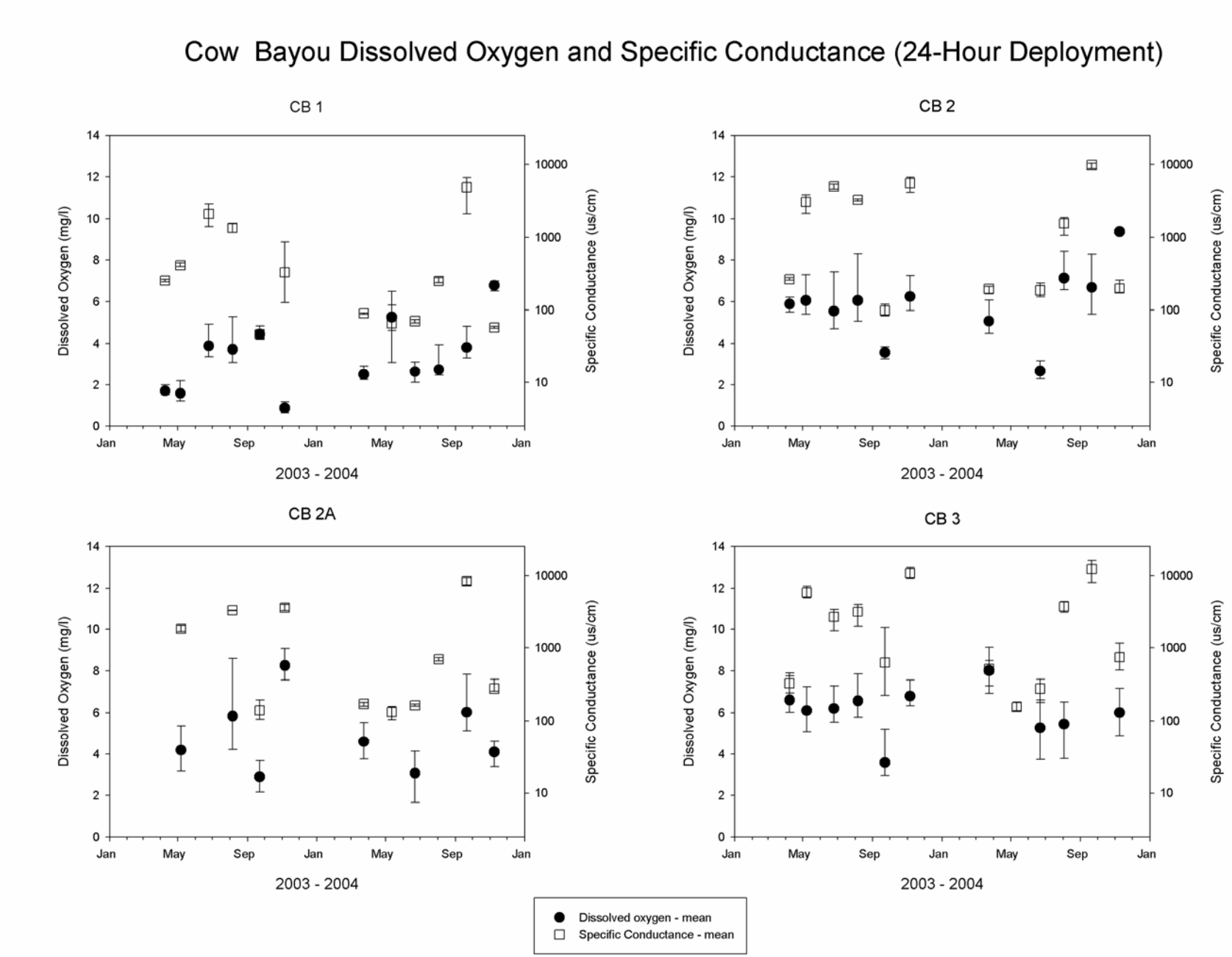

Figure 12. Dissolved oxygen and specific conductance measured in Cow Bayou (24-hour datasonde deployment). Sampling locations are described in the text. Bars show minimum and maximum values.

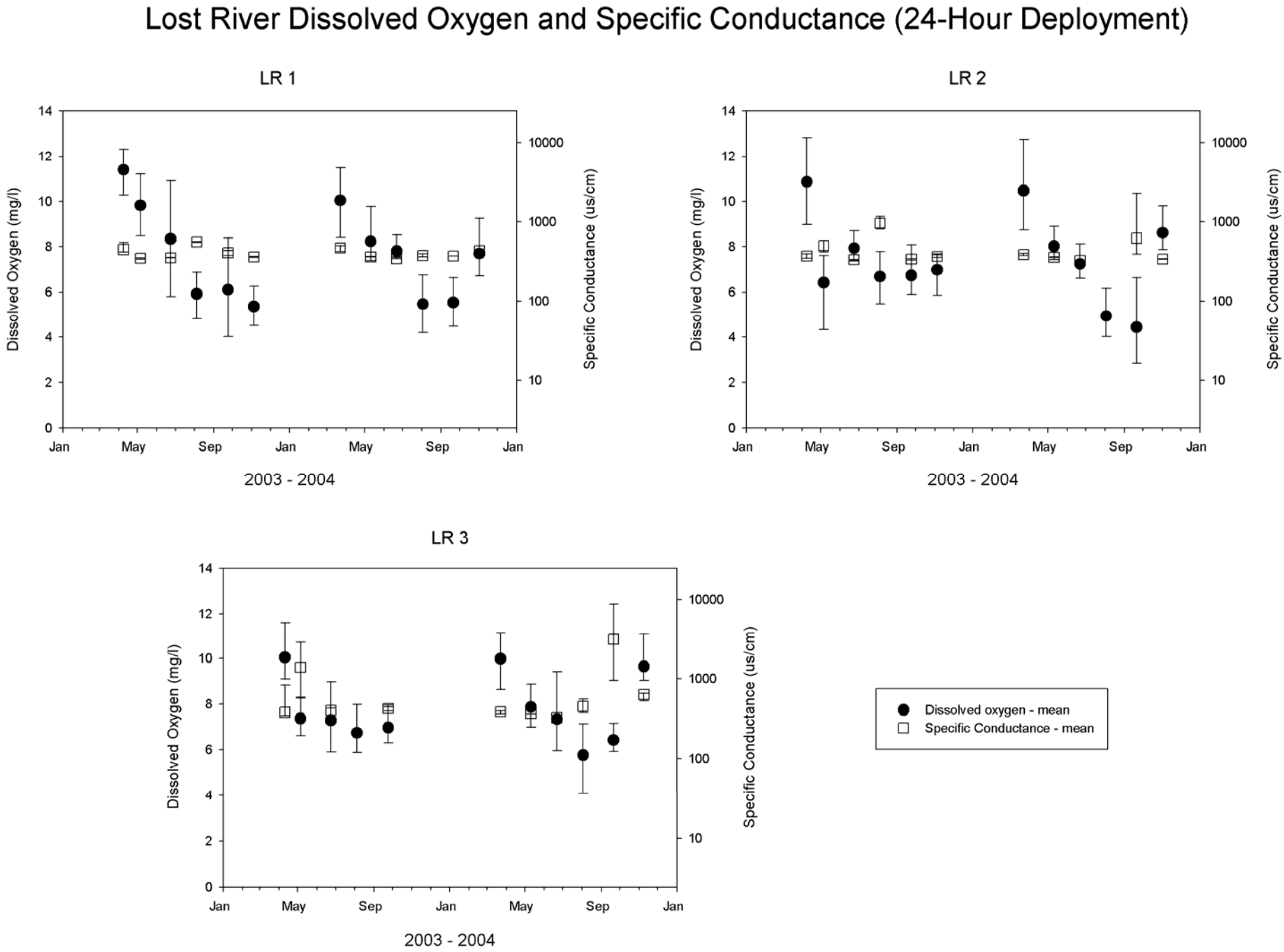

Figure 13. Dissolved oxygen and specific conductance measured in Lost River (24-hour datasonde deployment). Sampling locations are described in the text. Bars show minimum and maximum values.

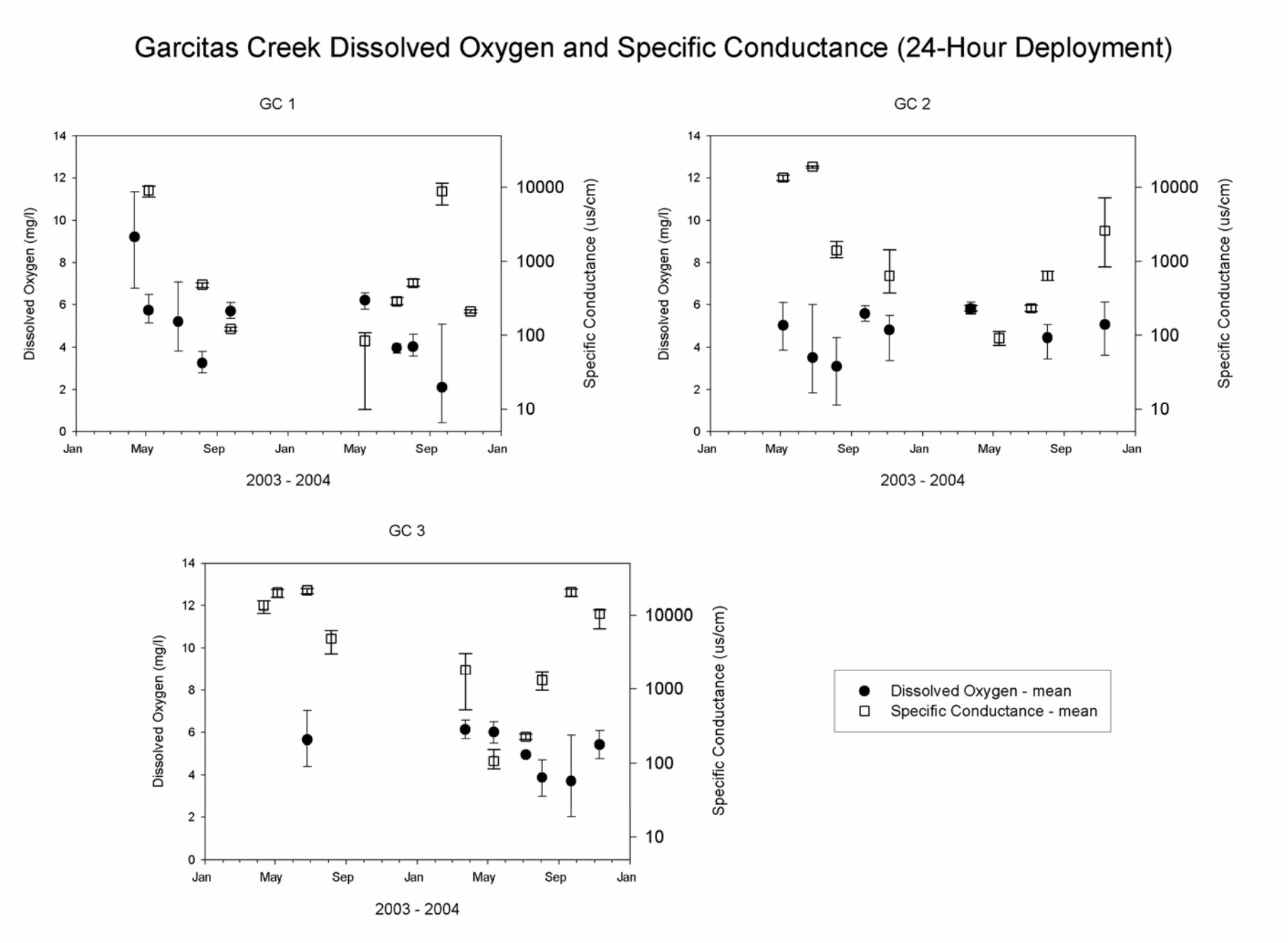

Figure 14. Dissolved oxygen and specific conductance measured in Garcitas Creek (24-hour datasonde deployment). Sampling locations are described in the text. Bars show minimum and maximum values.

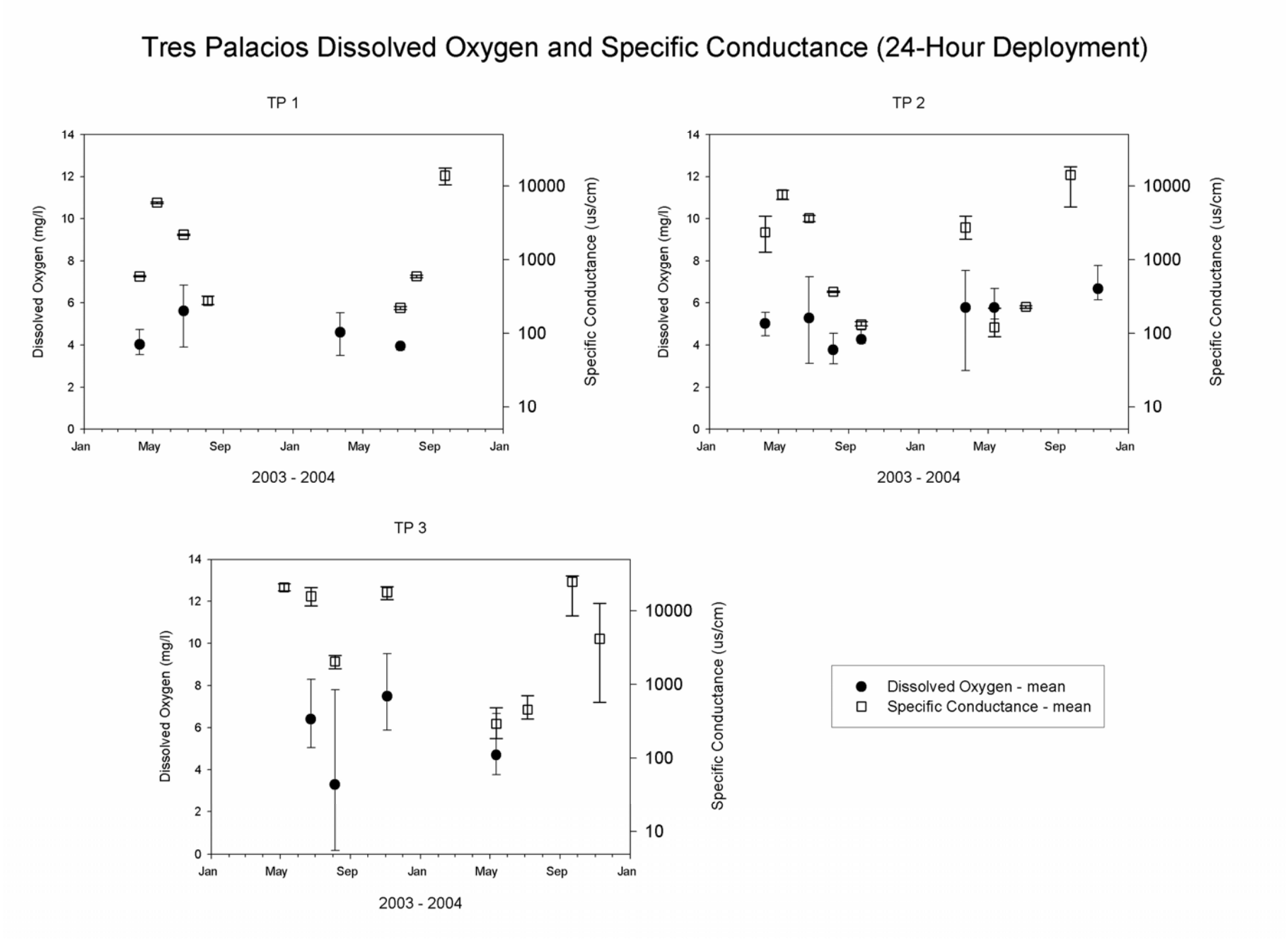

Figure 15. Dissolved oxygen and specific conductance measured in Tres Palacios Creek (24-hour datasonde deployment). Sampling locations are described in the text. Bars show minimum and maximum values.

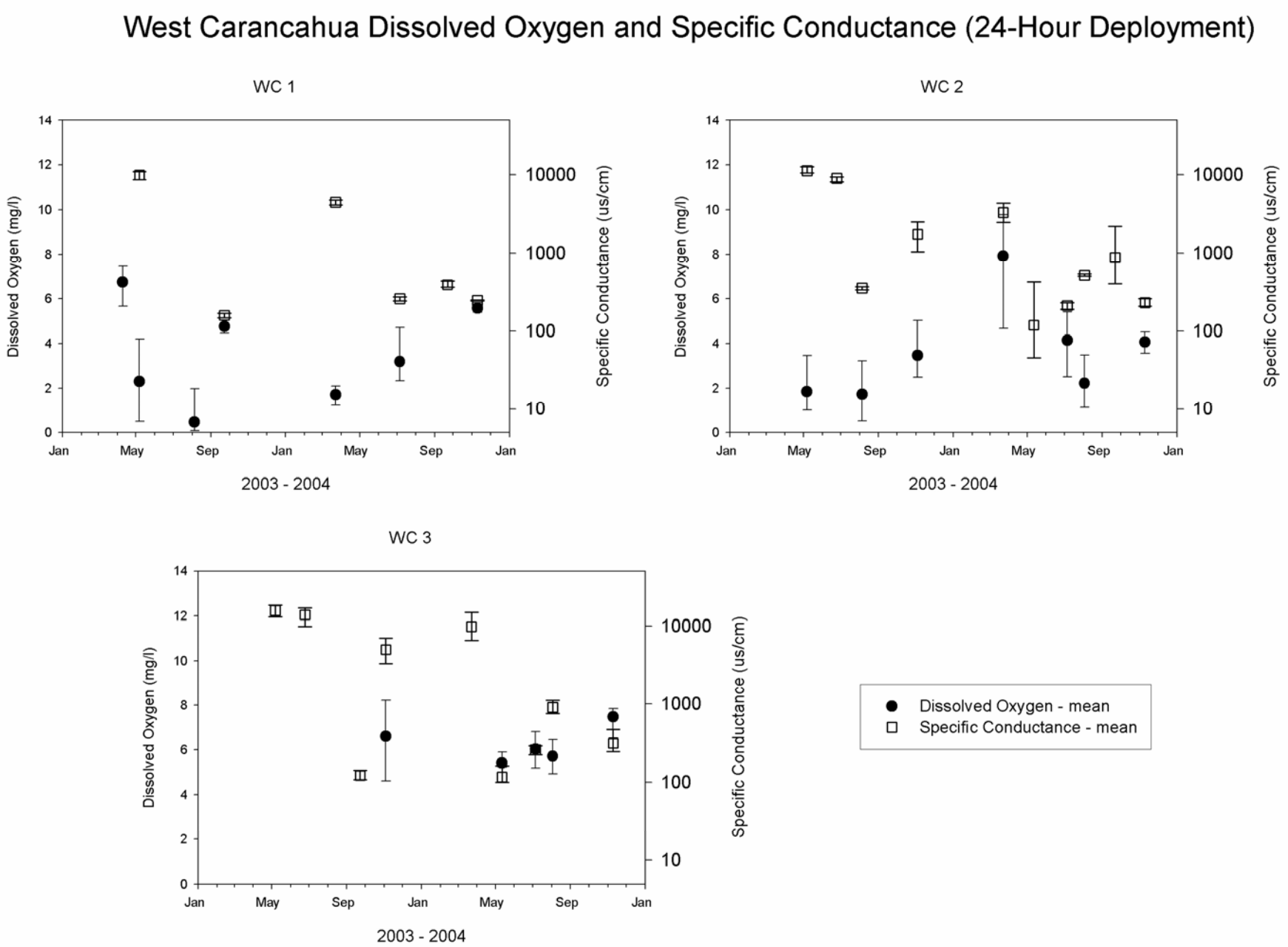

Figure 16. Dissolved oxygen and specific conductance measured in West Carancahua Creek (24-hour datasonde deployment). Sampling locations are described in the text. Bars show minimum and maximum values.

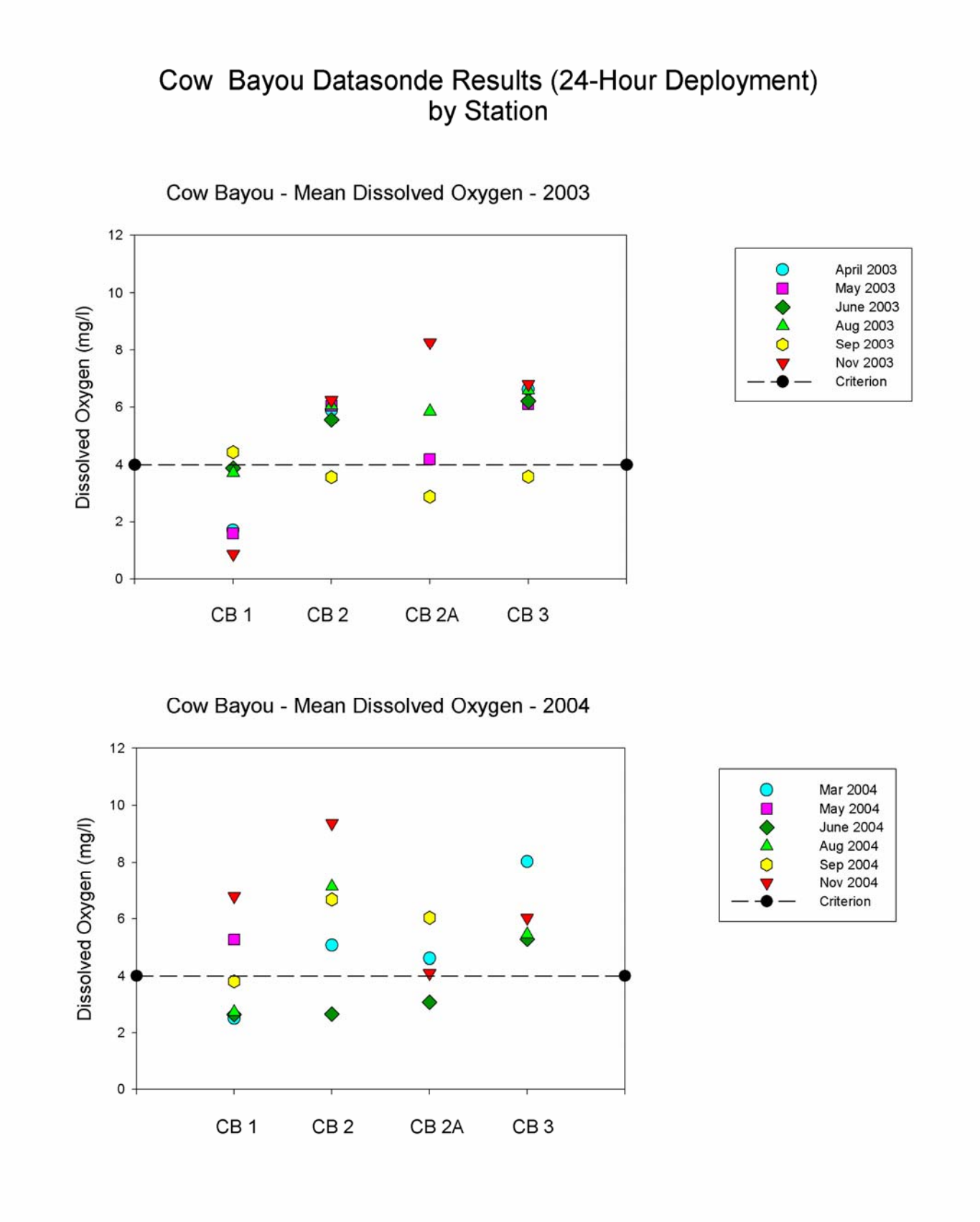

Figure 17. Mean dissolved oxygen by station measured in Cow Bayou (24-hour datasonde deployment). Sampling locations are described in the text.

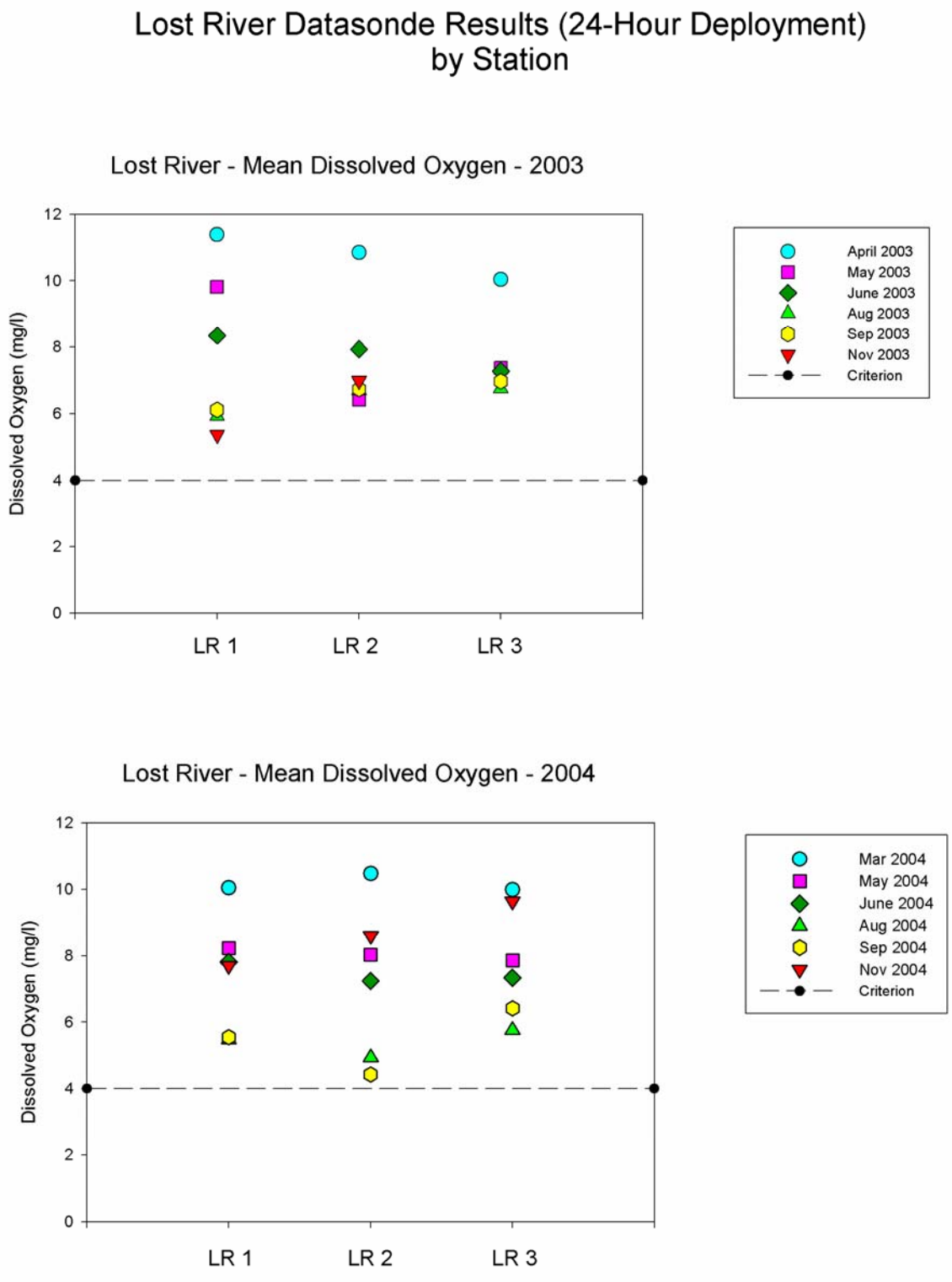

Figure 18. Mean dissolved oxygen by station measured in Lost River (24-hour datasonde deployment). Sampling locations are described in the text.

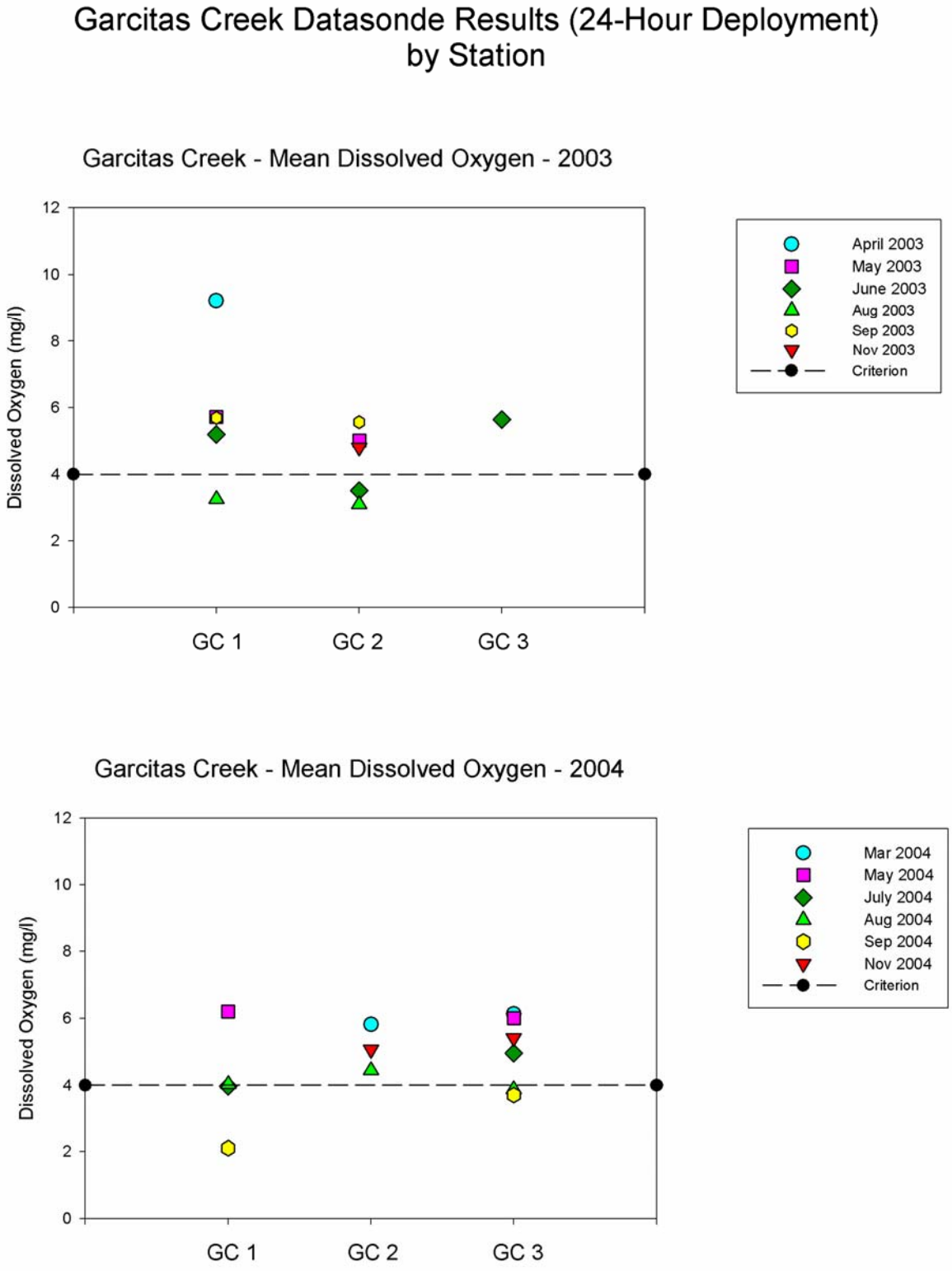

Figure 19. Mean dissolved oxygen by station measured in Garcitas Creek (24-hour datasonde deployment). Sampling locations are described in the text.

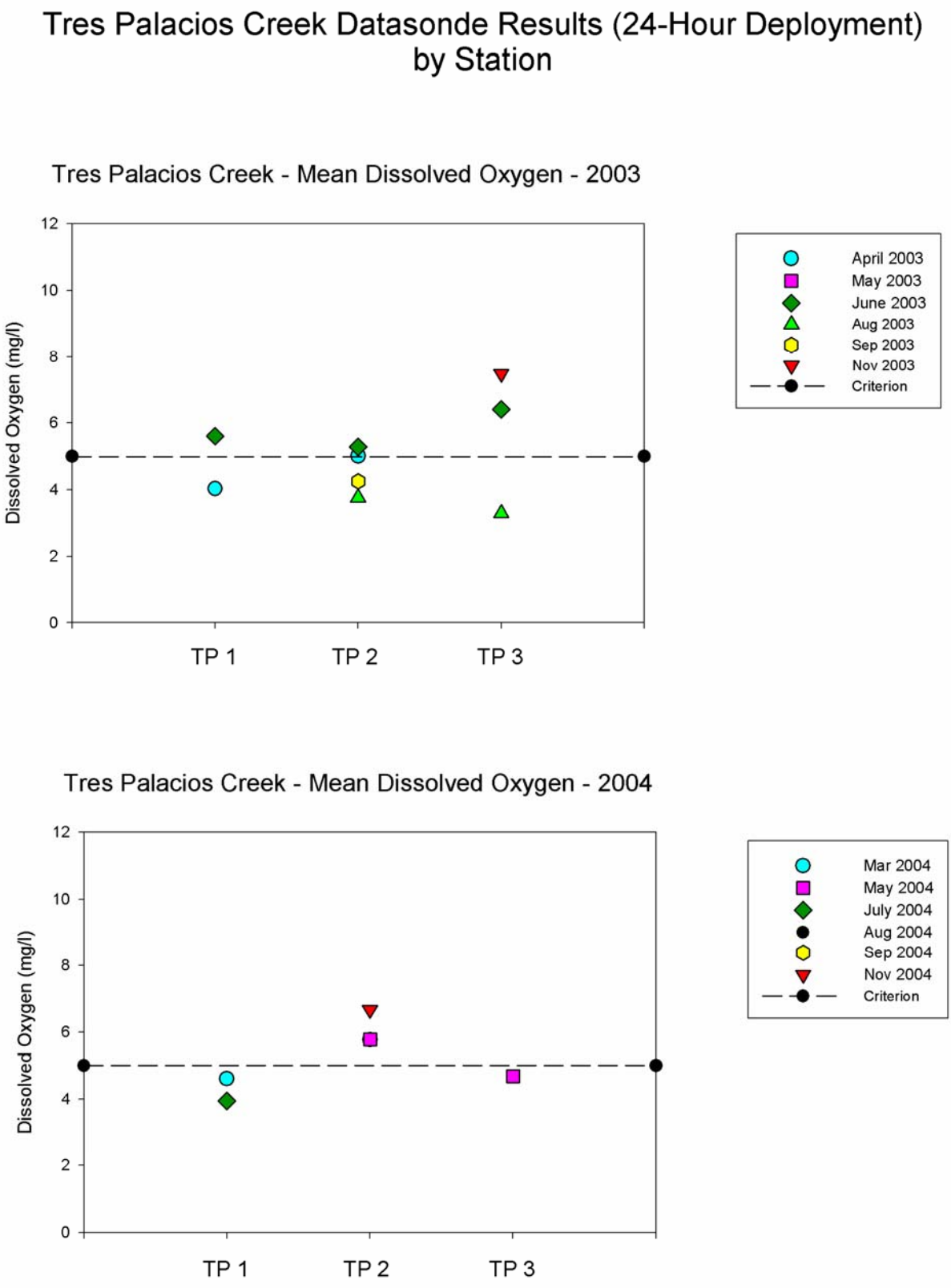

Figure 20. Mean dissolved oxygen by station measured in Tres Palacios Creek (24-hour datasonde deployment). Sampling locations are described in the text.

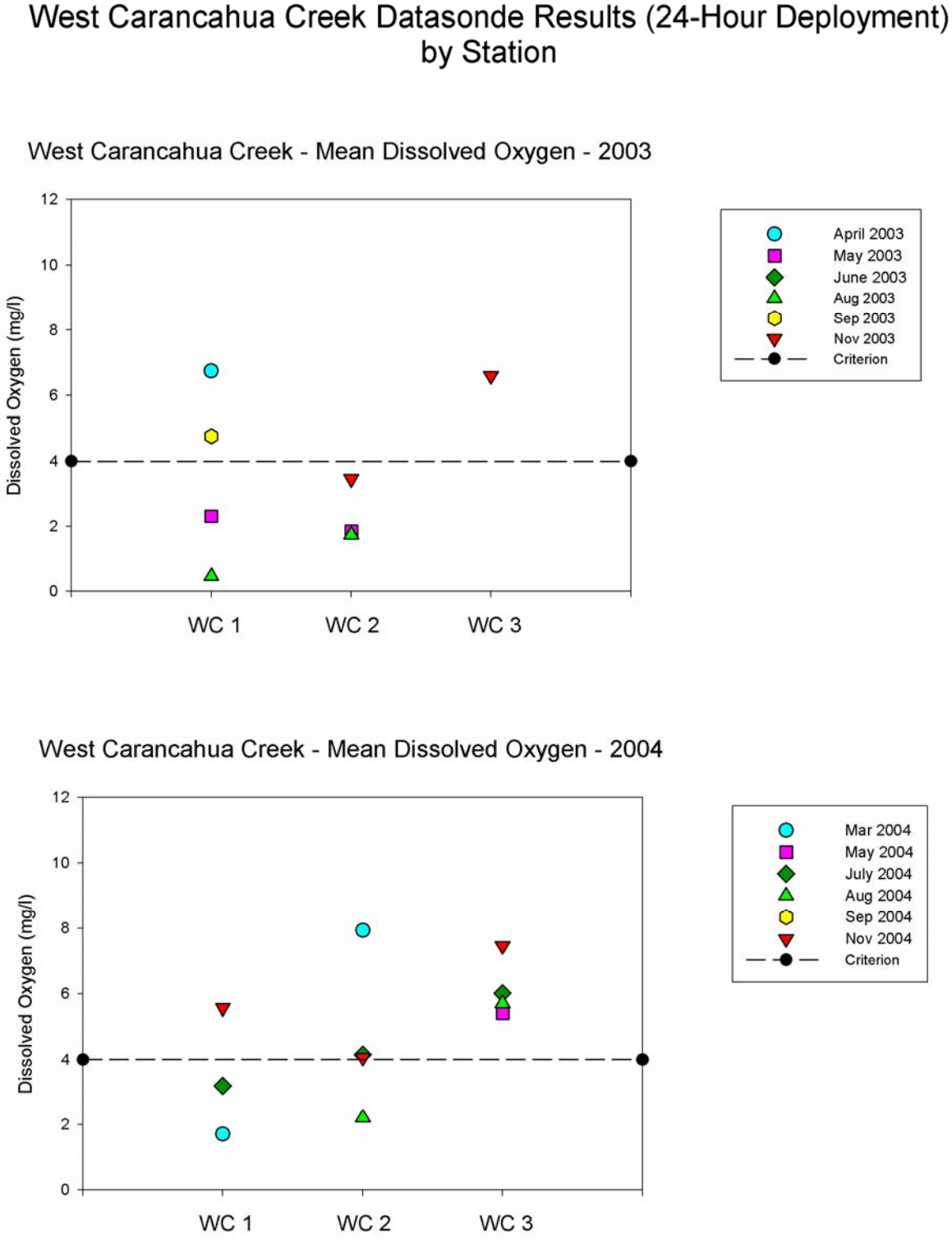

Figure 21. Mean dissolved oxygen by station measured in West Carancahua Creek (24-hour datasonde deployment). Sampling locations are described in the text.

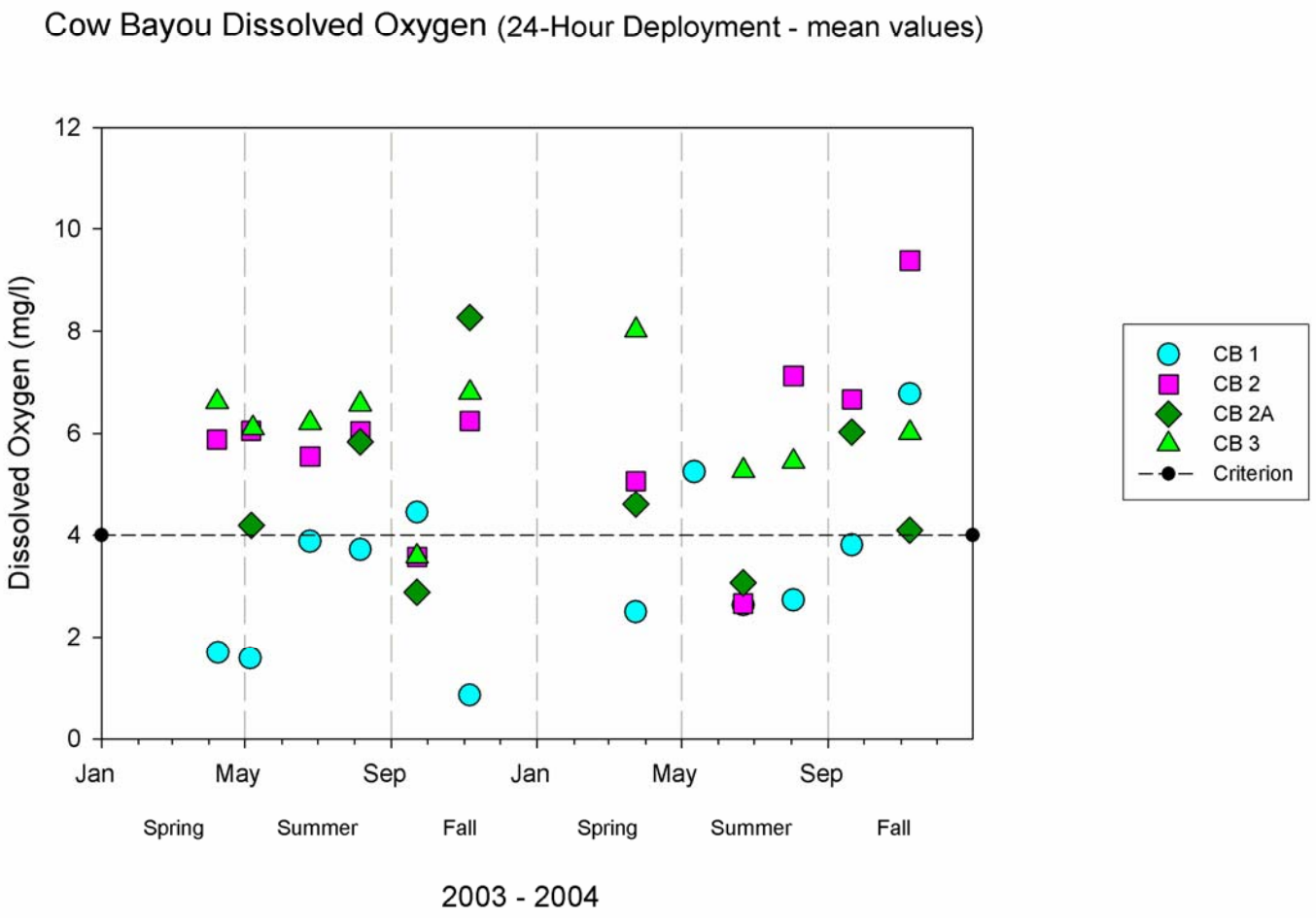

Figure 22. Mean dissolved oxygen by season measured in Cow Bayou (24-hour datasonde deployment). Sampling locations are described in the text.

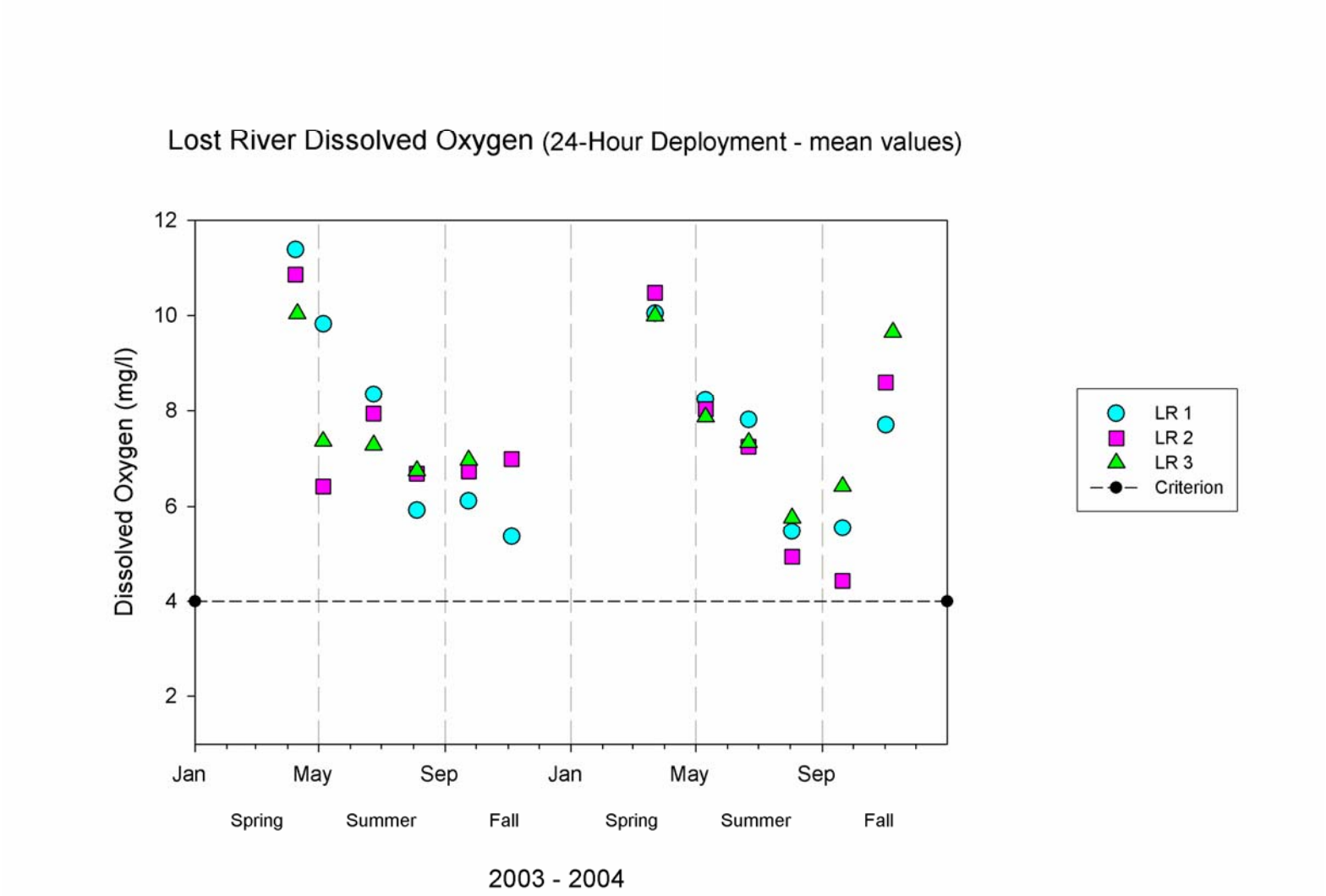

Figure 23. Mean dissolved oxygen by season measured in Lost River (24-hour datasonde deployment). Sampling locations are described in the text.

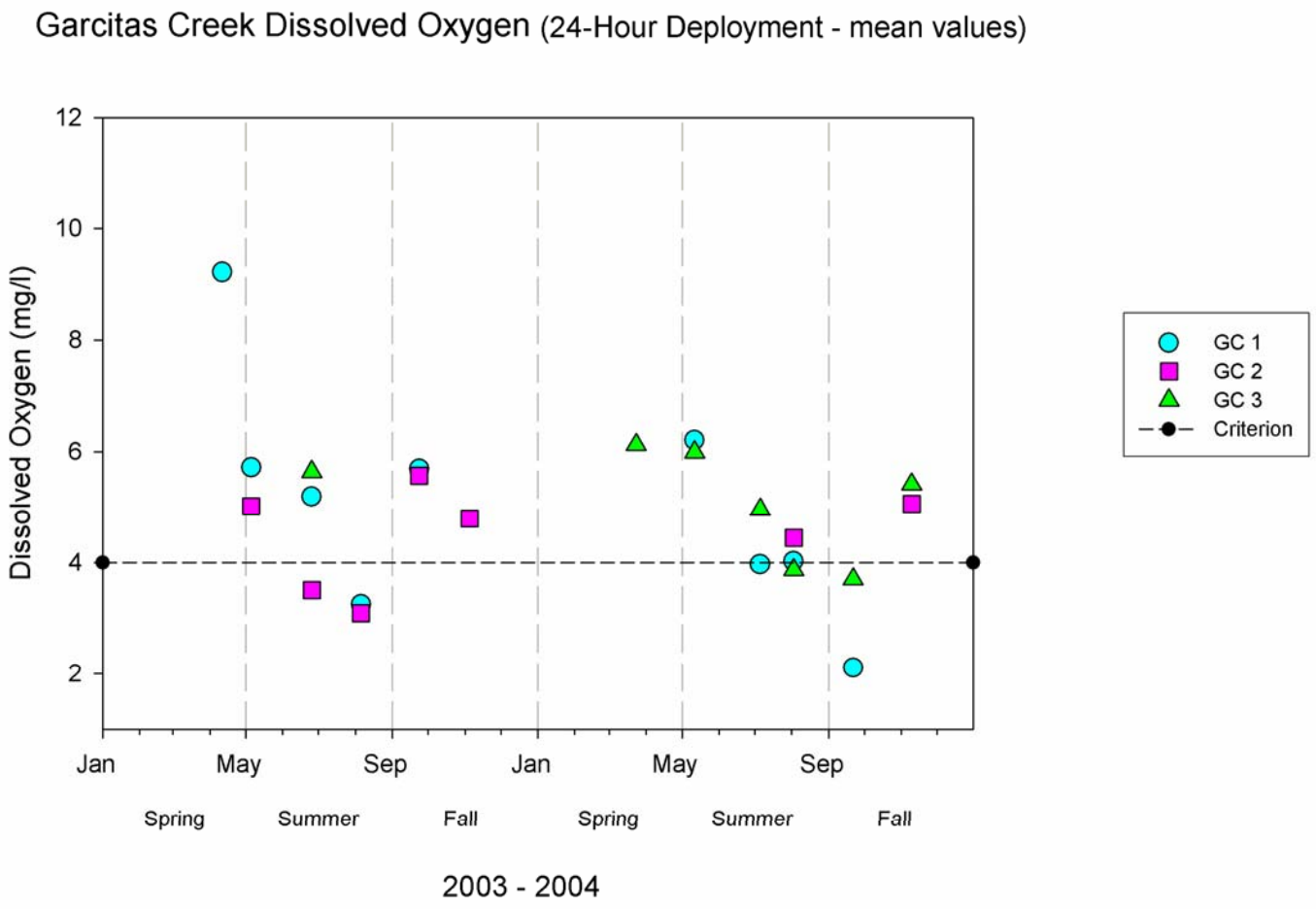

Figure 24. Mean dissolved oxygen by season measured in Garcitas Creek (24-hour datasonde deployment). Sampling locations are described in the text.

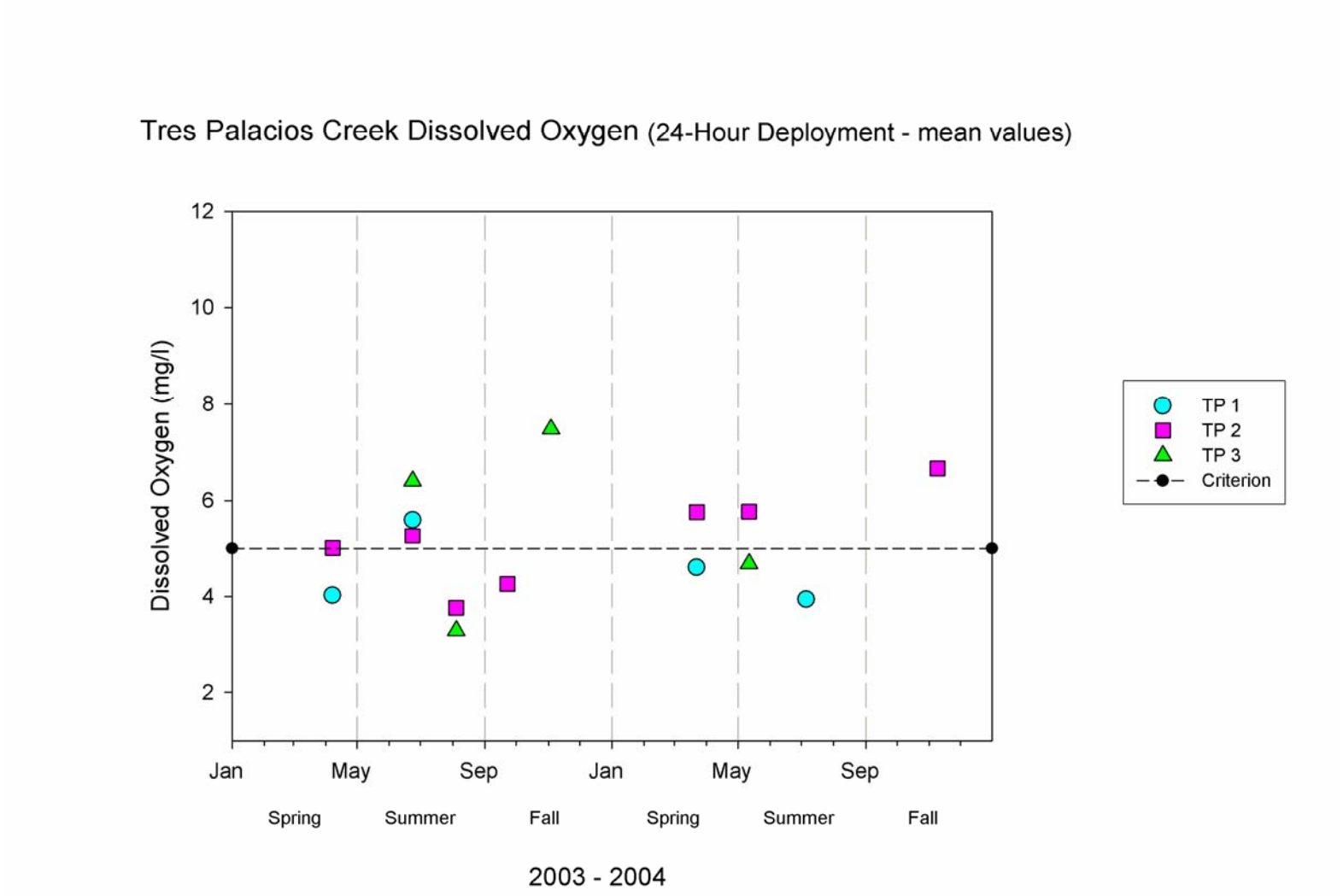

Figure 25. Mean dissolved oxygen by season measured in Tres Palacios Creek (24-hour datasonde deployment). Sampling locations are described in the text.

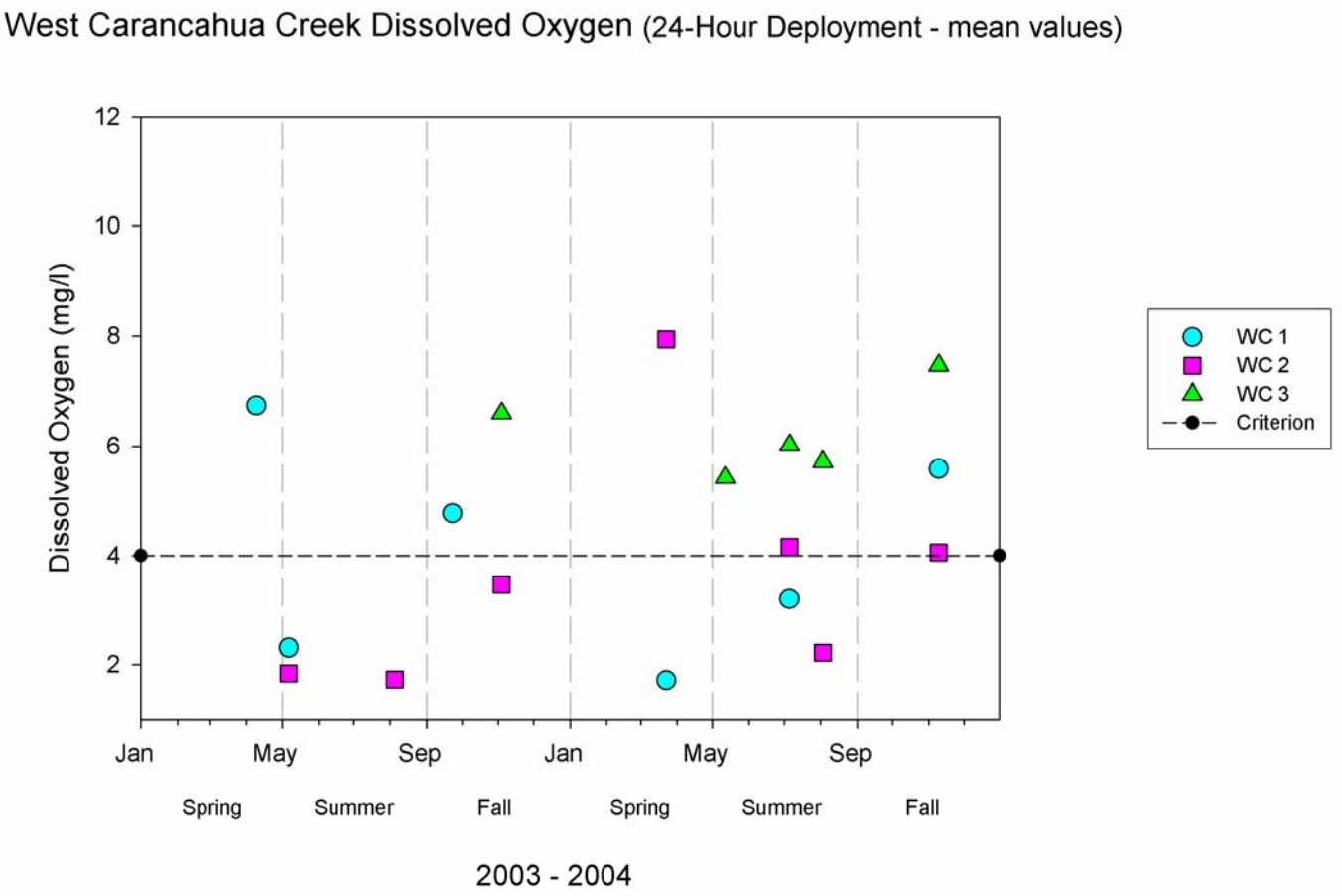

Figure 26. Mean dissolved oxygen by season measured in West Carancahua Creek (24-hour datasonde deployment). Sampling locations are described in the text.

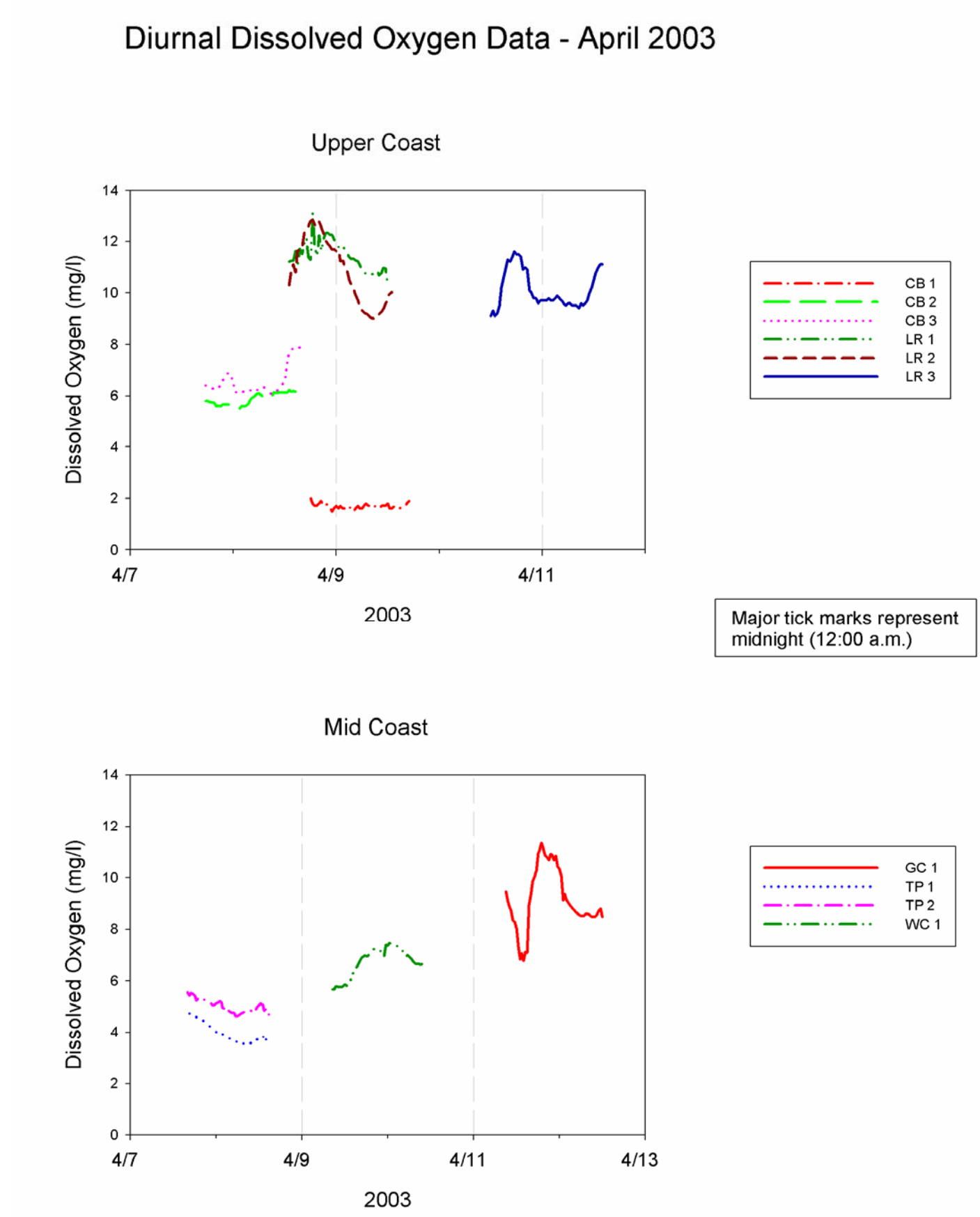

Figure 27. Diurnal dissolved oxygen measured in April 2003. Sampling locations are described in the text.

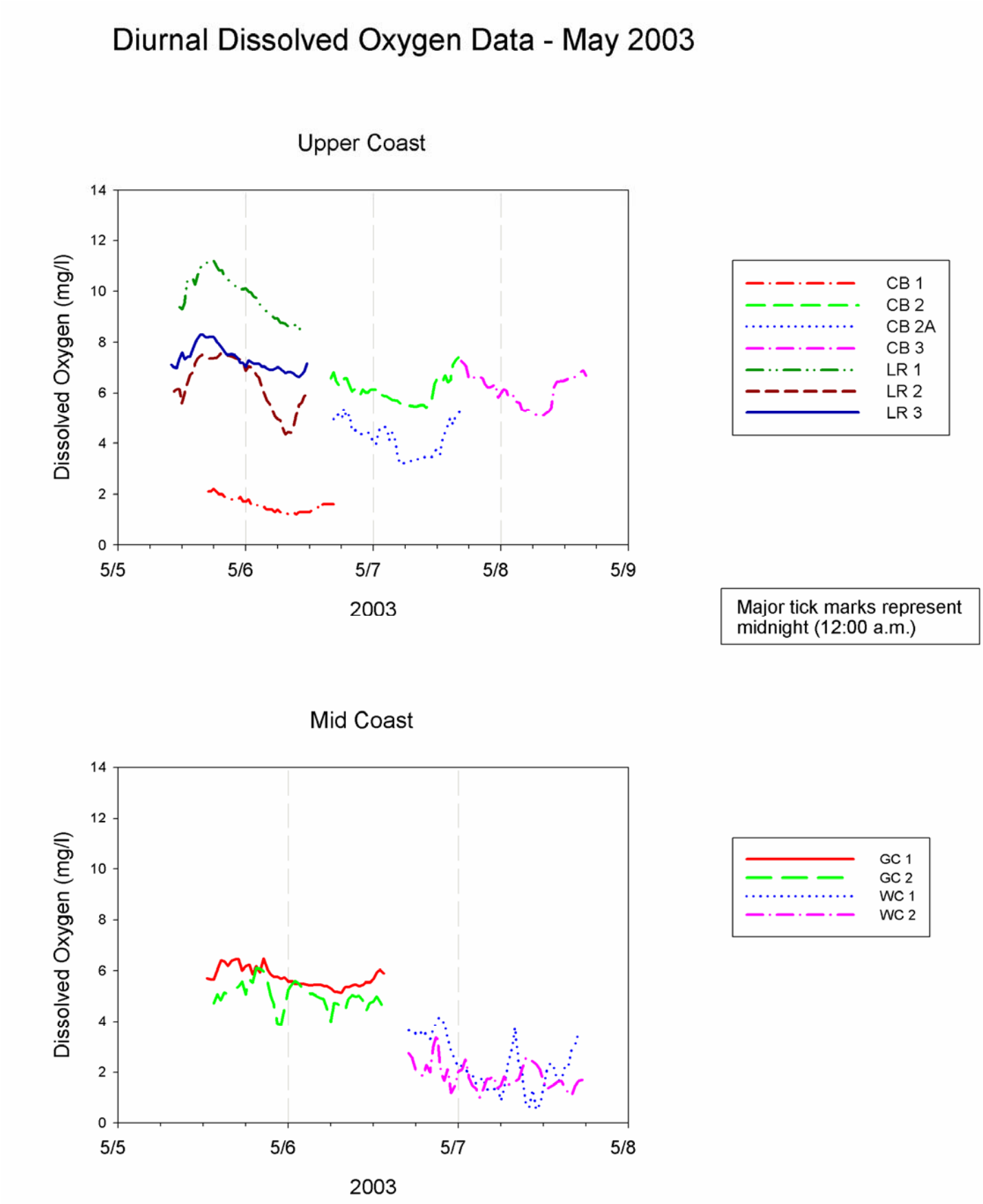

Figure 28. Diurnal dissolved oxygen measured in May 2003. Sampling locations are described in the text.

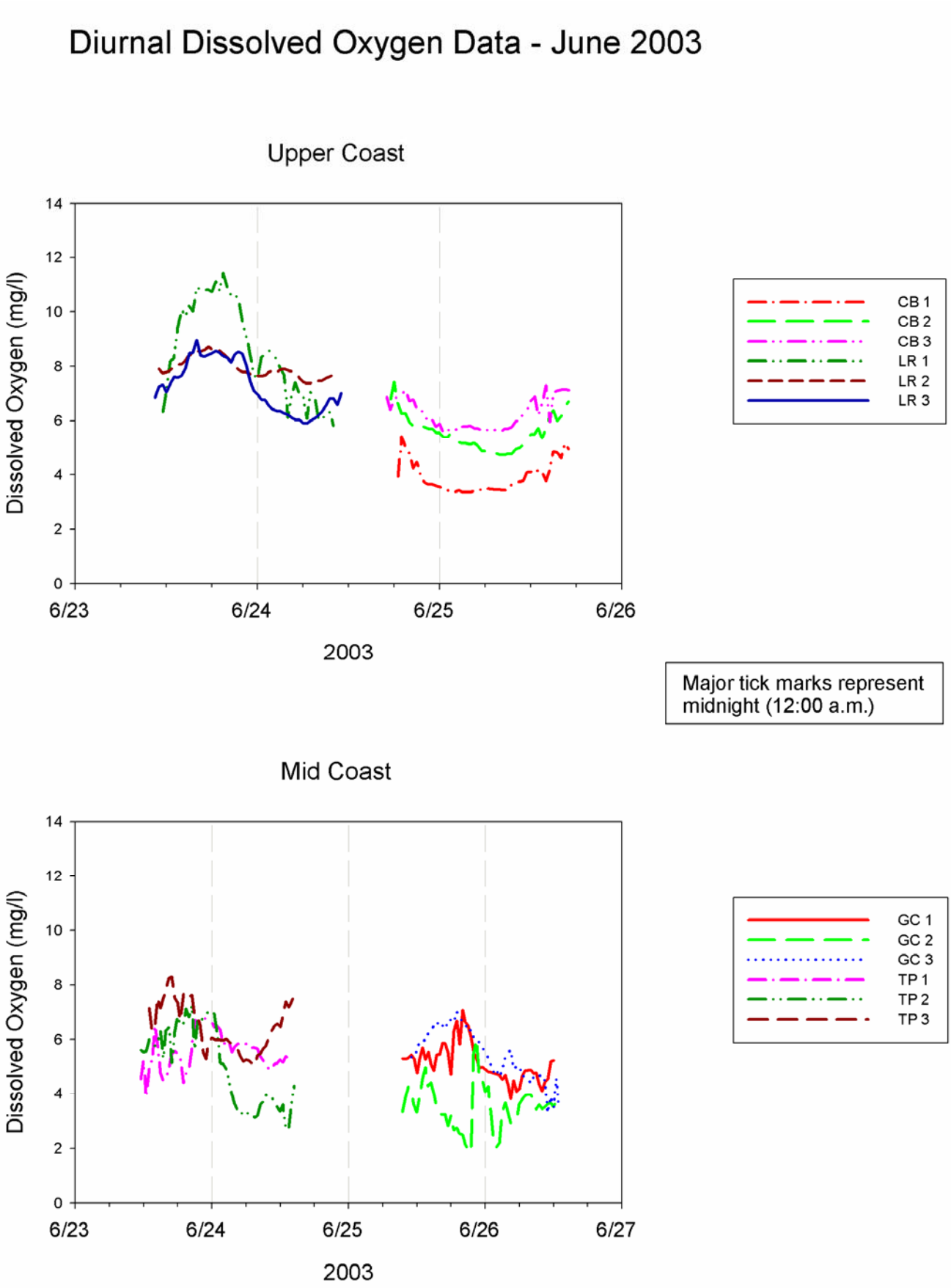

Figure 29. Diurnal dissolved oxygen measured in June 2003. Sampling locations are described in the text.

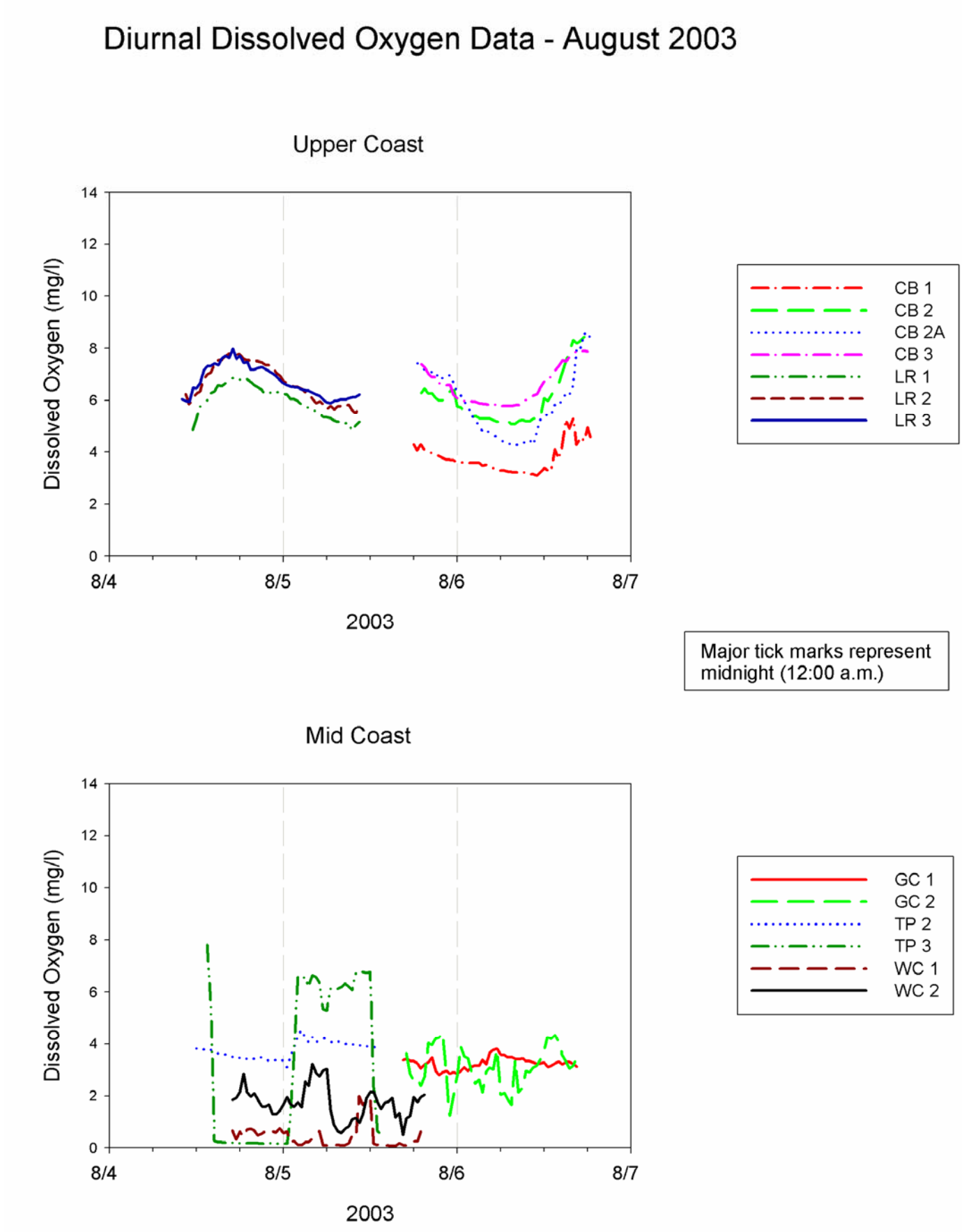

Figure 30. Diurnal dissolved oxygen measured in August 2003. Sampling locations are described in the text.

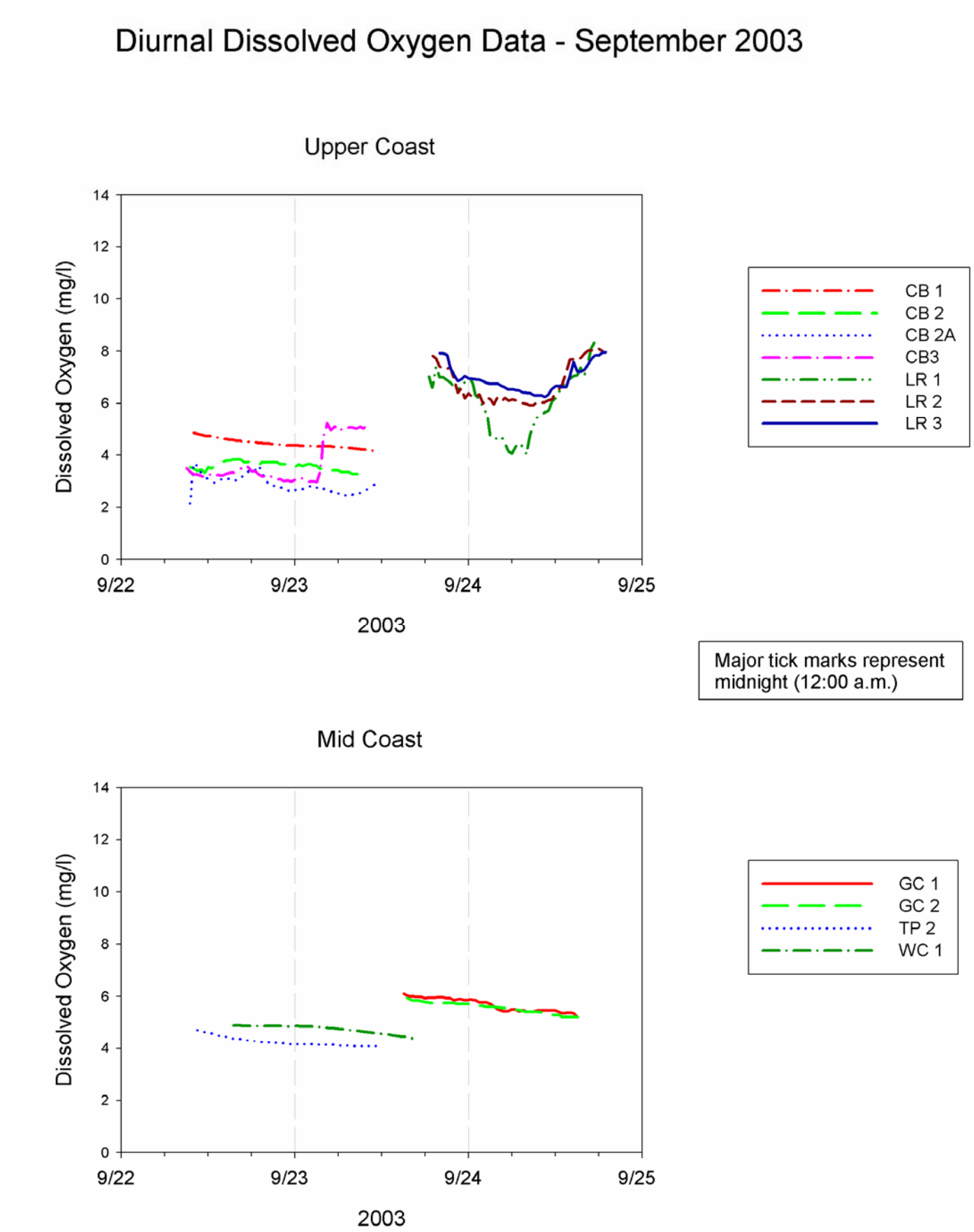

Figure 31. Diurnal dissolved oxygen measured in September 2003. Sampling locations are described in the text.

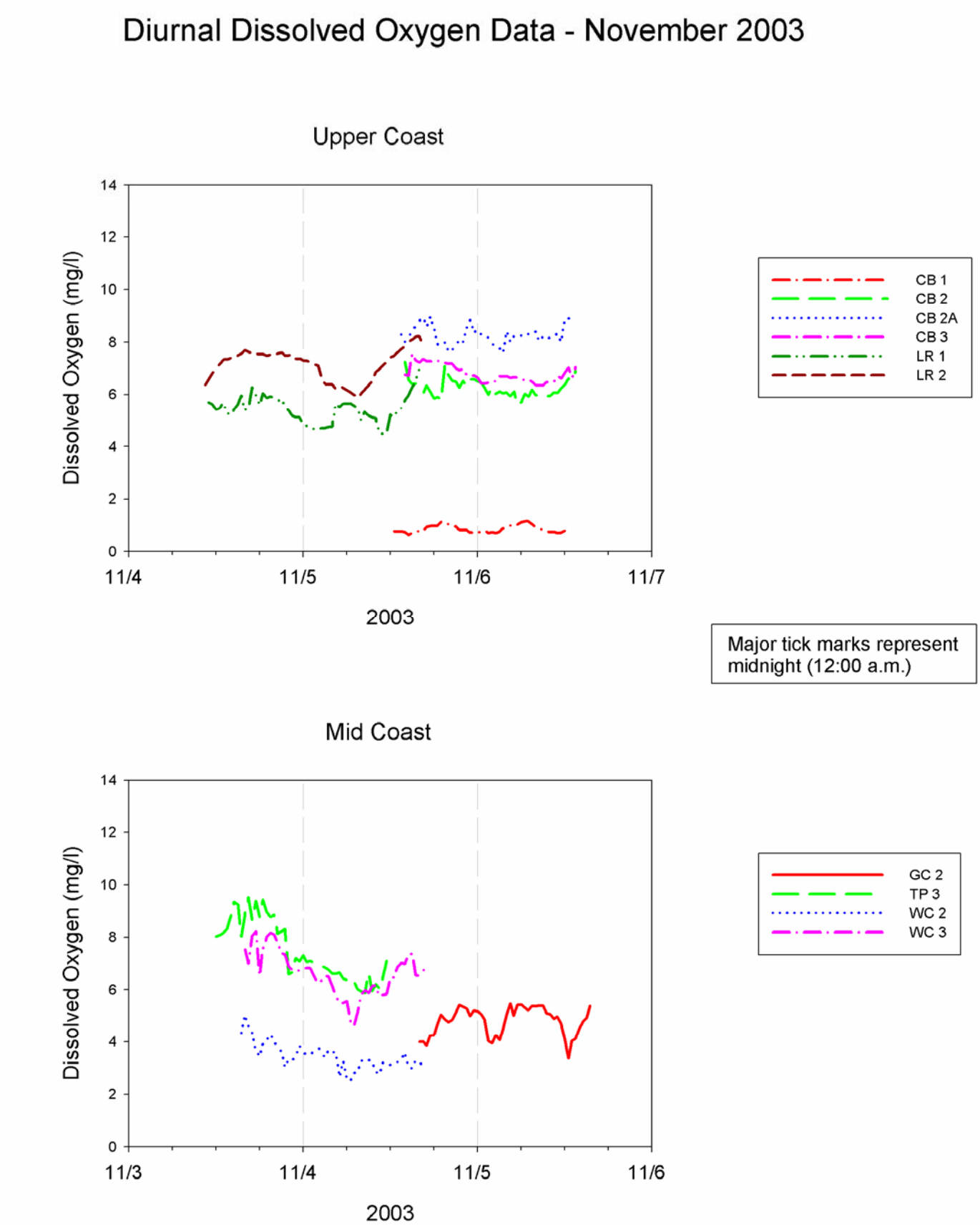

Figure 32. Diurnal dissolved oxygen measured in November 2003. Sampling locations are described in the text.

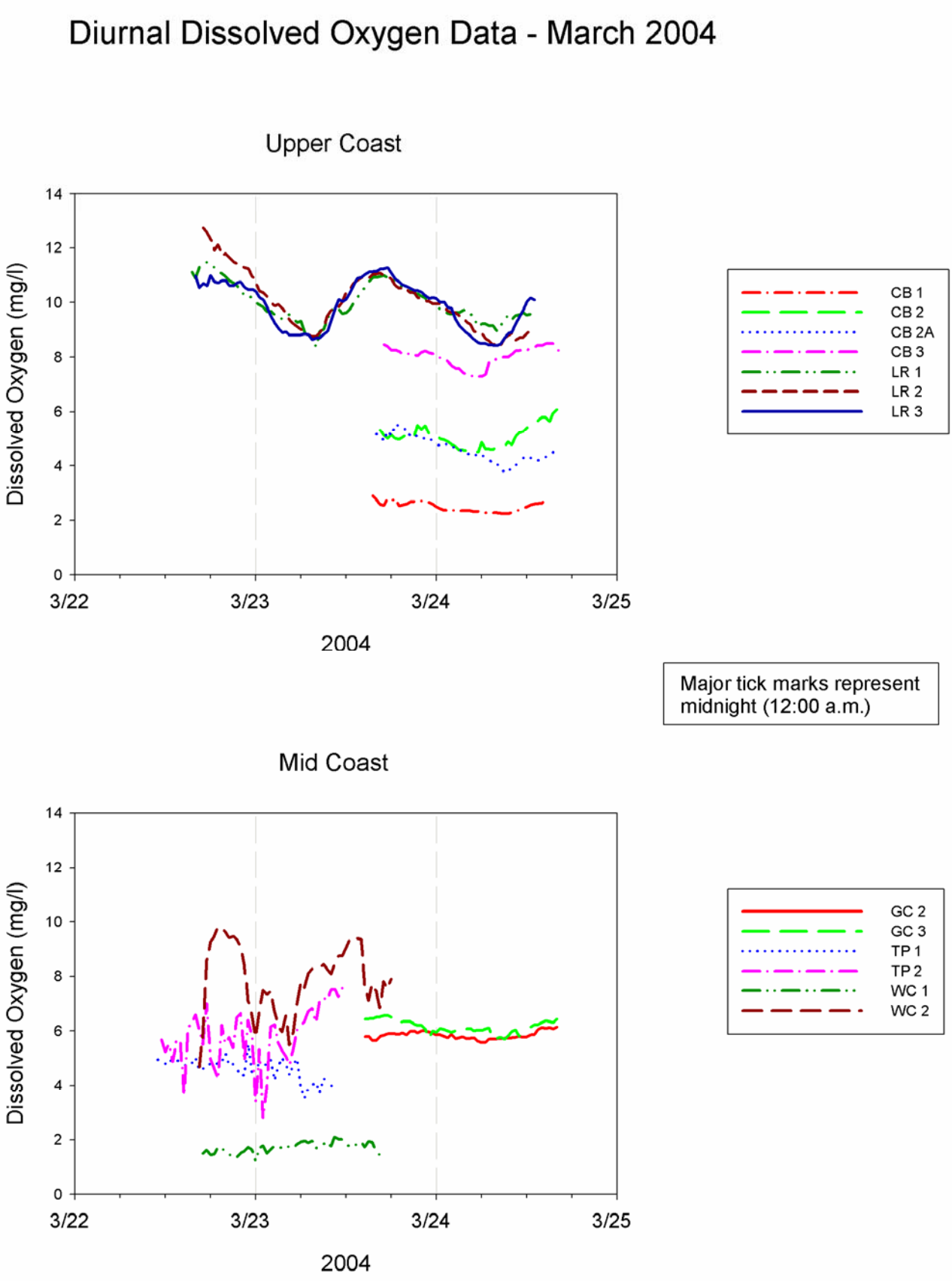

Figure 33. Diurnal dissolved oxygen measured in March 2004. Sampling locations are described in the text.

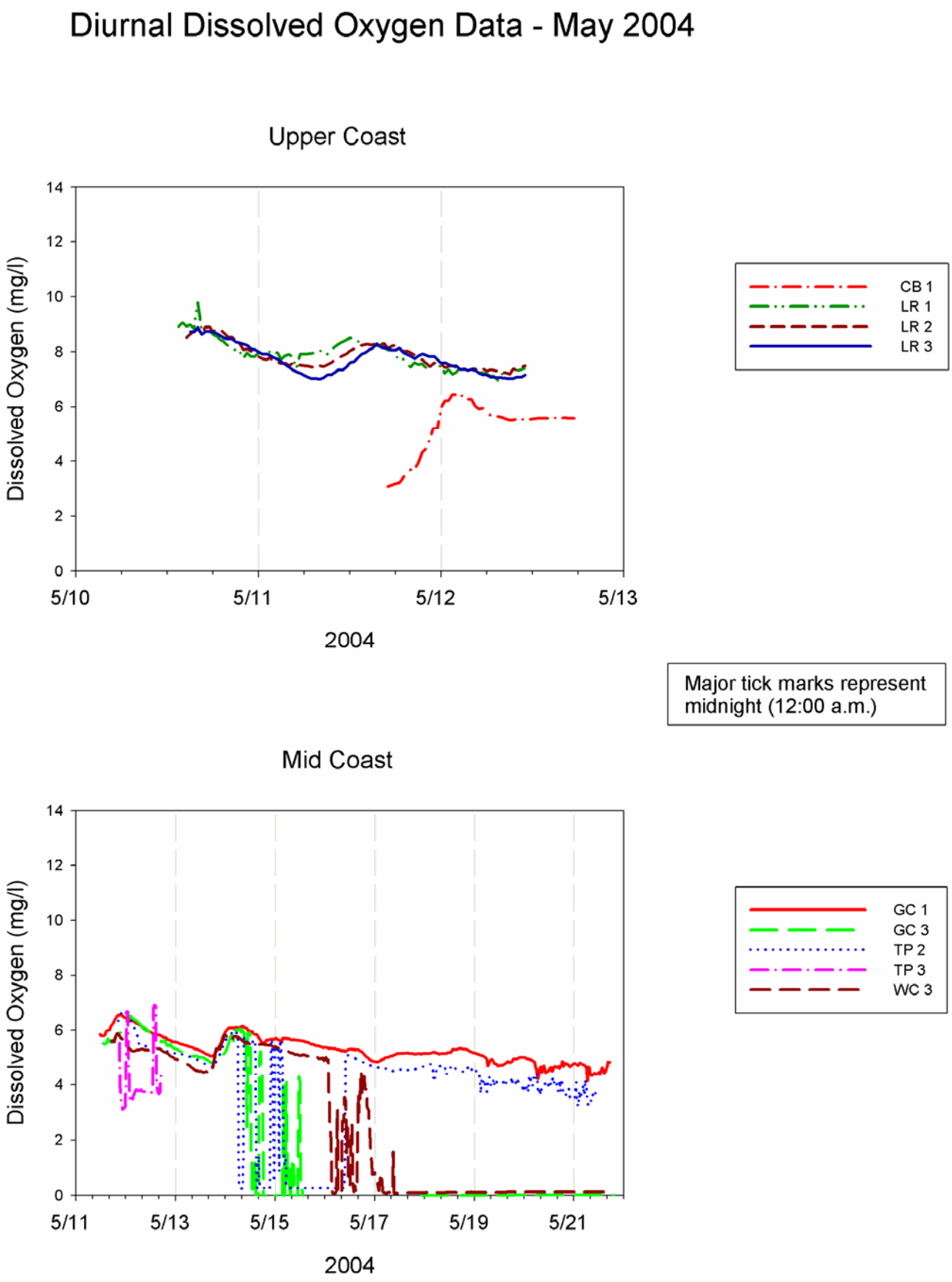

Figure 34. Diurnal dissolved oxygen measured in May 2004. Sampling locations are described in the text.

Figure 35. Diurnal dissolved oxygen measured in June/July 2004. Sampling locations are described in the text.

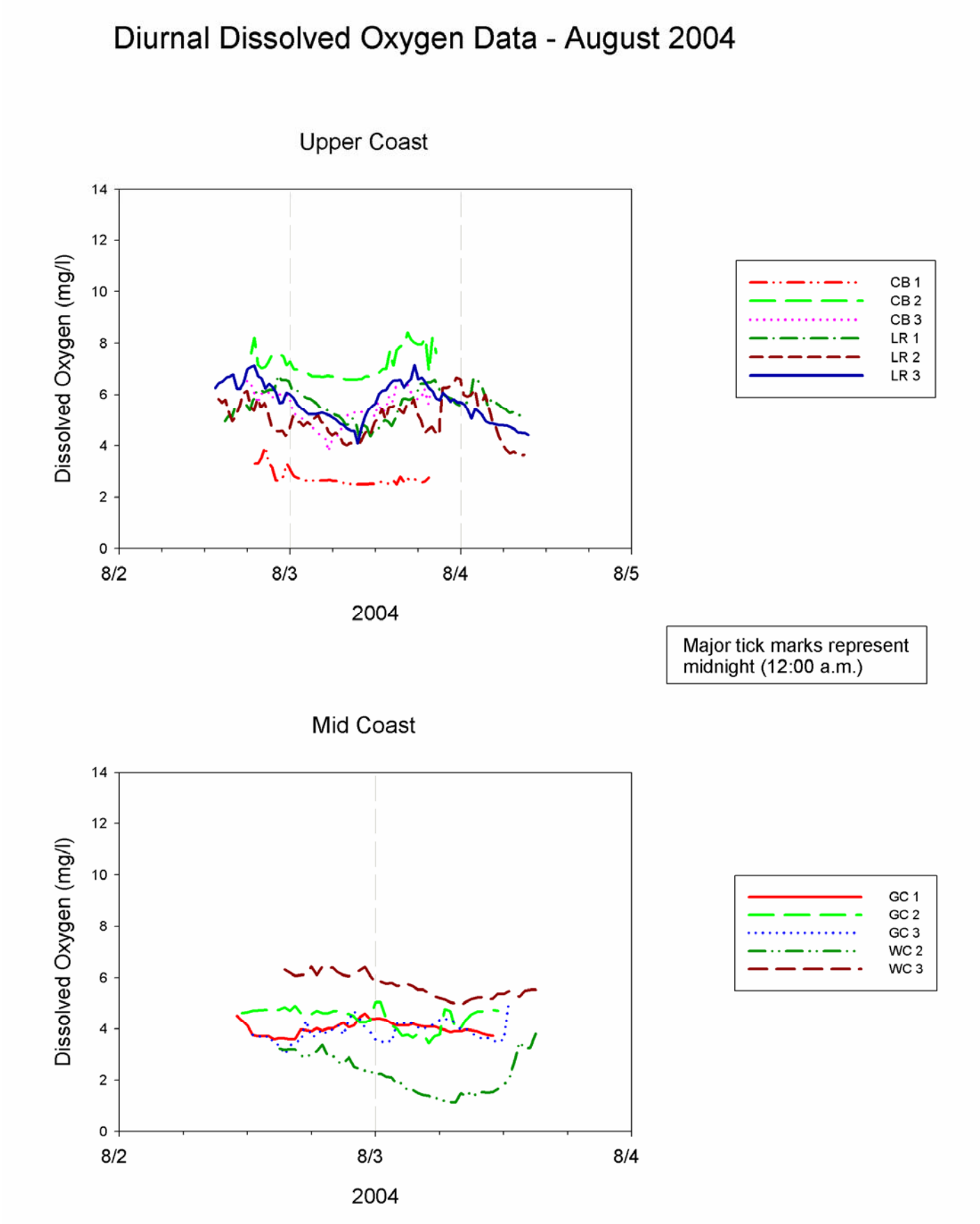

Figure 36. Diurnal dissolved oxygen measured in August 2004. Sampling locations are described in the text.

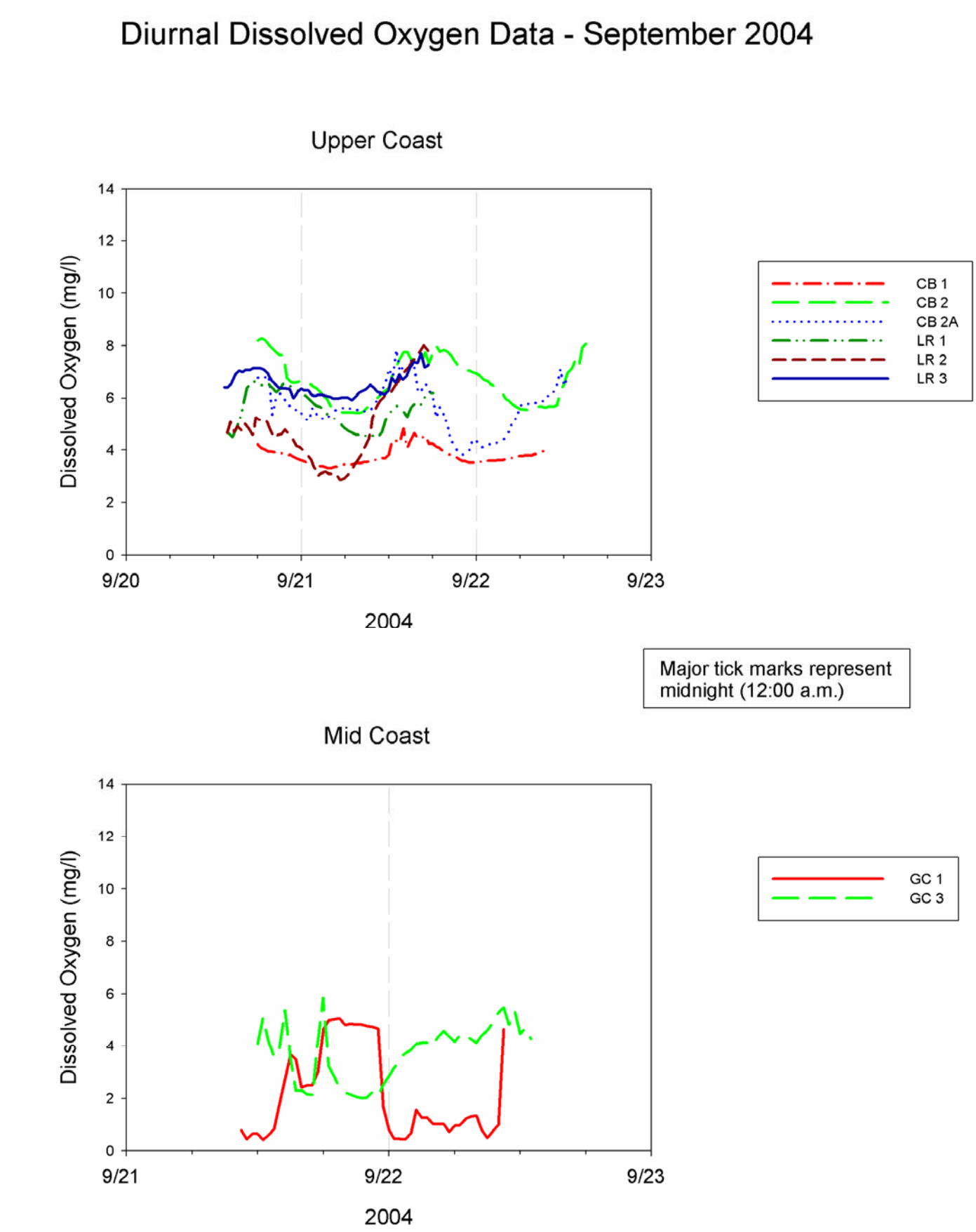

Figure 37. Diurnal dissolved oxygen measured in September 2004. Sampling locations are described in the text.

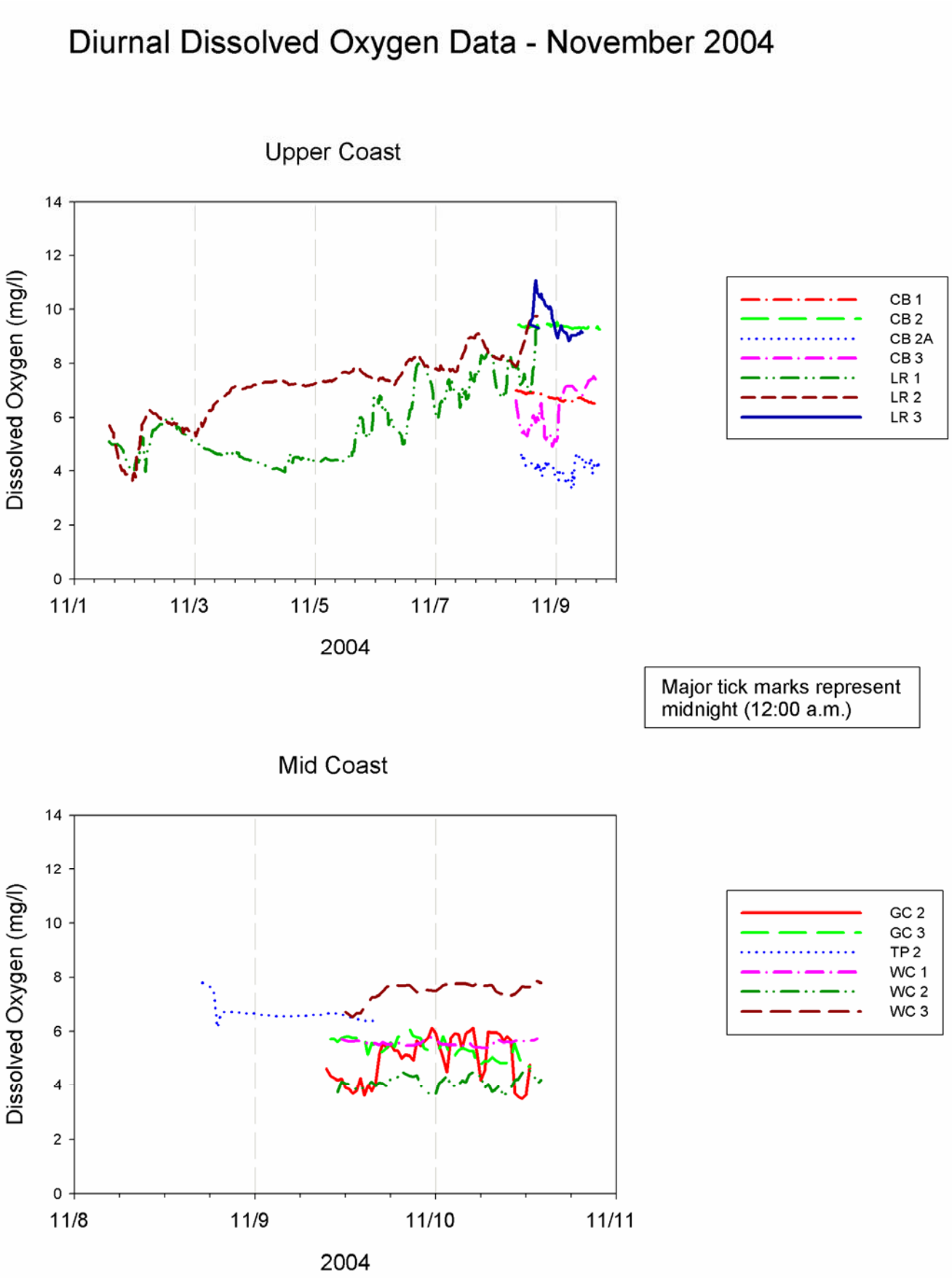

Figure 38. Diurnal dissolved oxygen measured in November 2004. Sampling locations are described in the text.

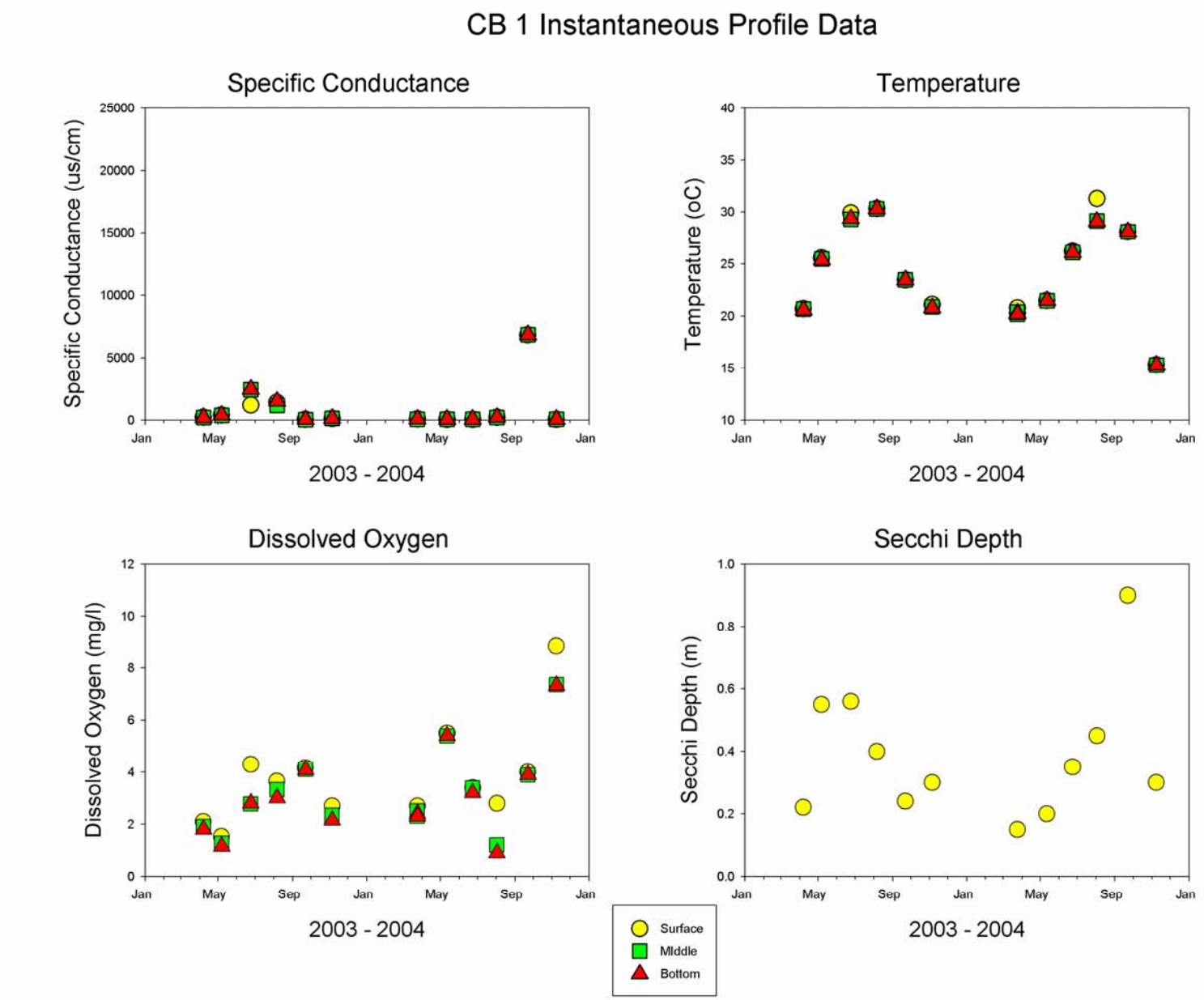

Figure 39. Water column profile physicochemical parameter data at three depths and Secchi depth in Cow Bayou at station CB 1, 50 yds (45.7 m) downstream of Cole Creek confluence.

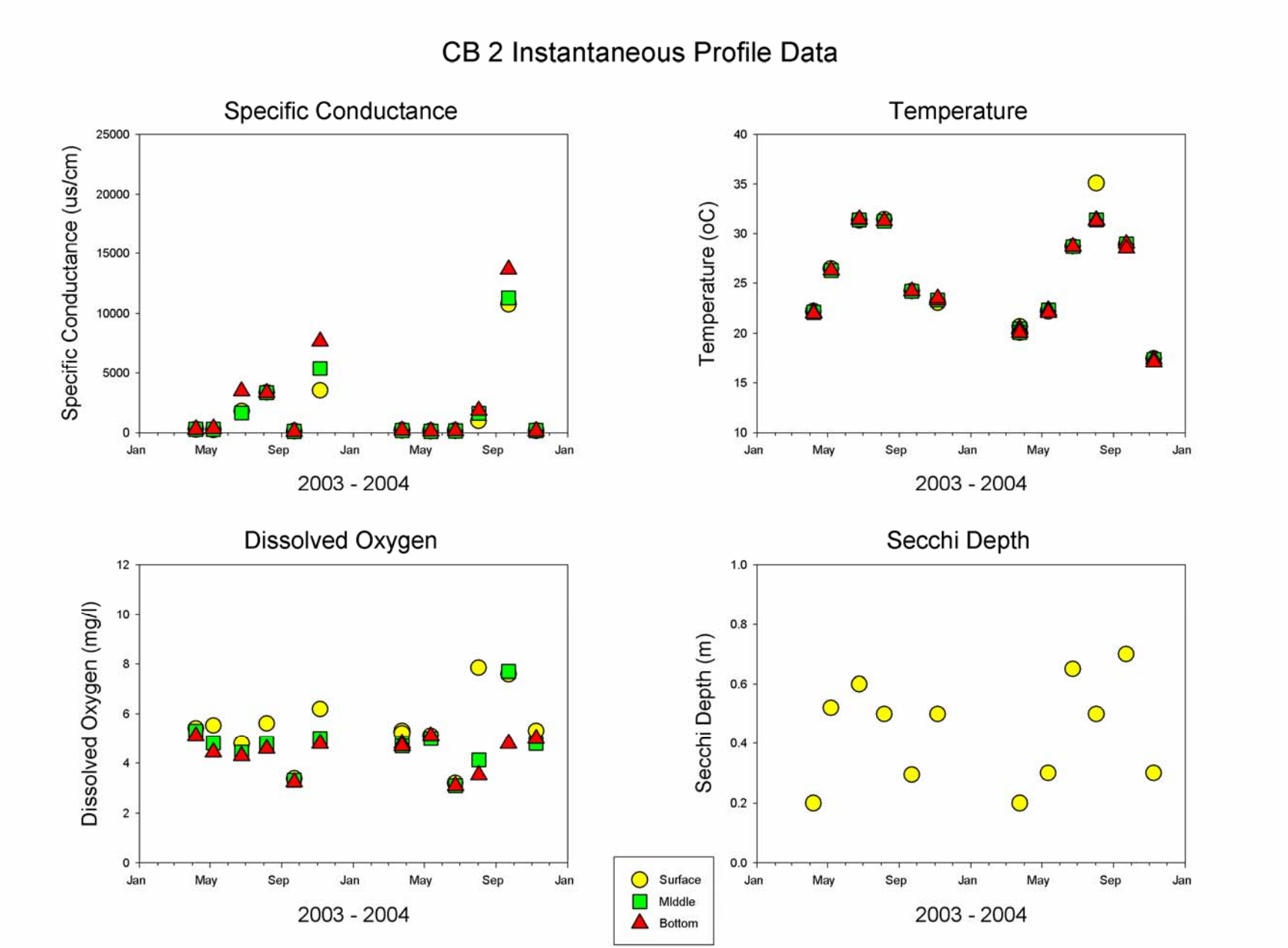

Figure 40. Water column profile physicochemical parameter data at three depths and Secchi depth in Cow Bayou at station CB 2, at SH 87.

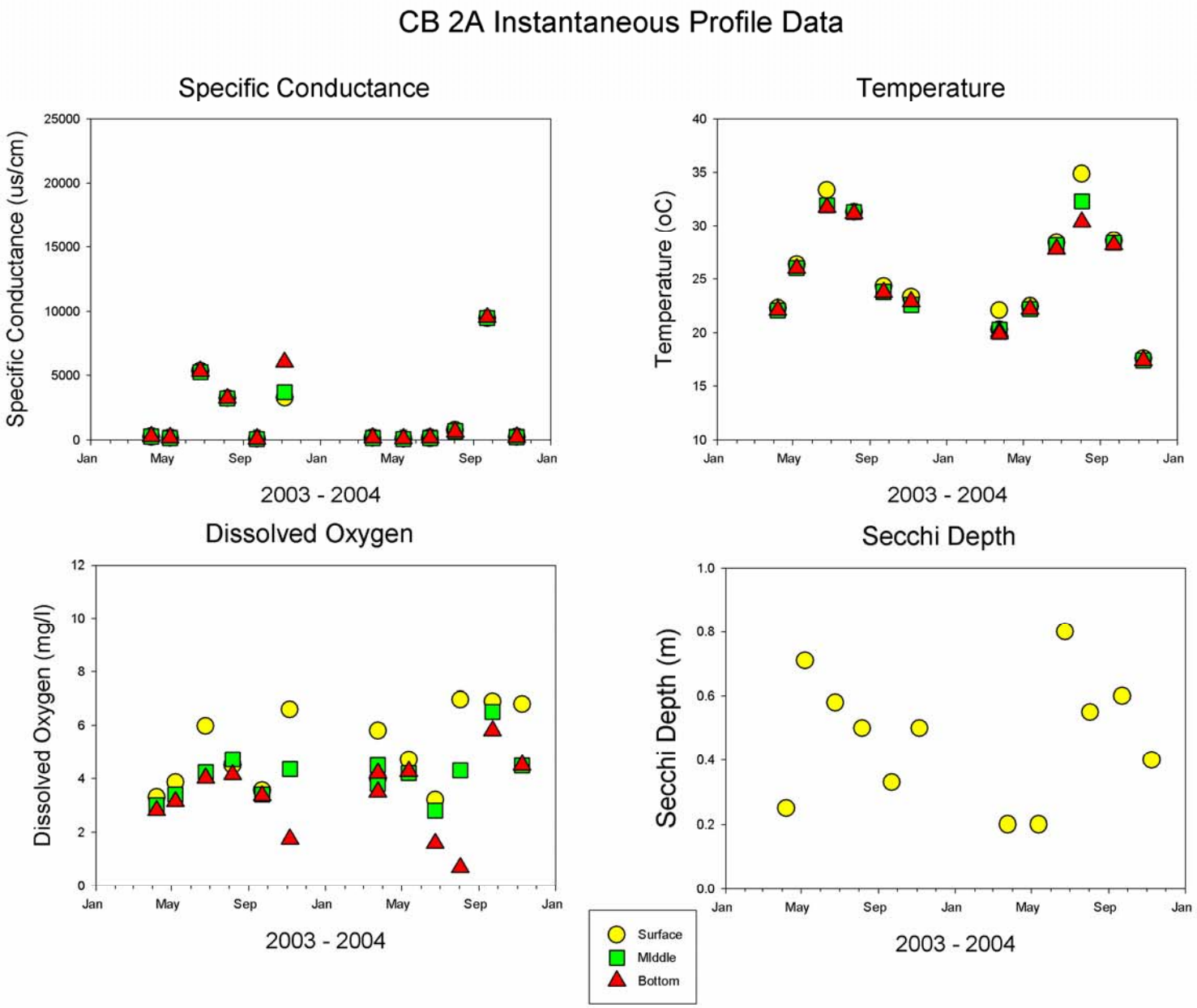

Figure 41. Water column profile physicochemical parameter data at three depths and Secchi depth in Cow Bayou at station CB 2A, approximately 2.2 km upstream of SH 87 in original stream channel northeast of Bridge City.

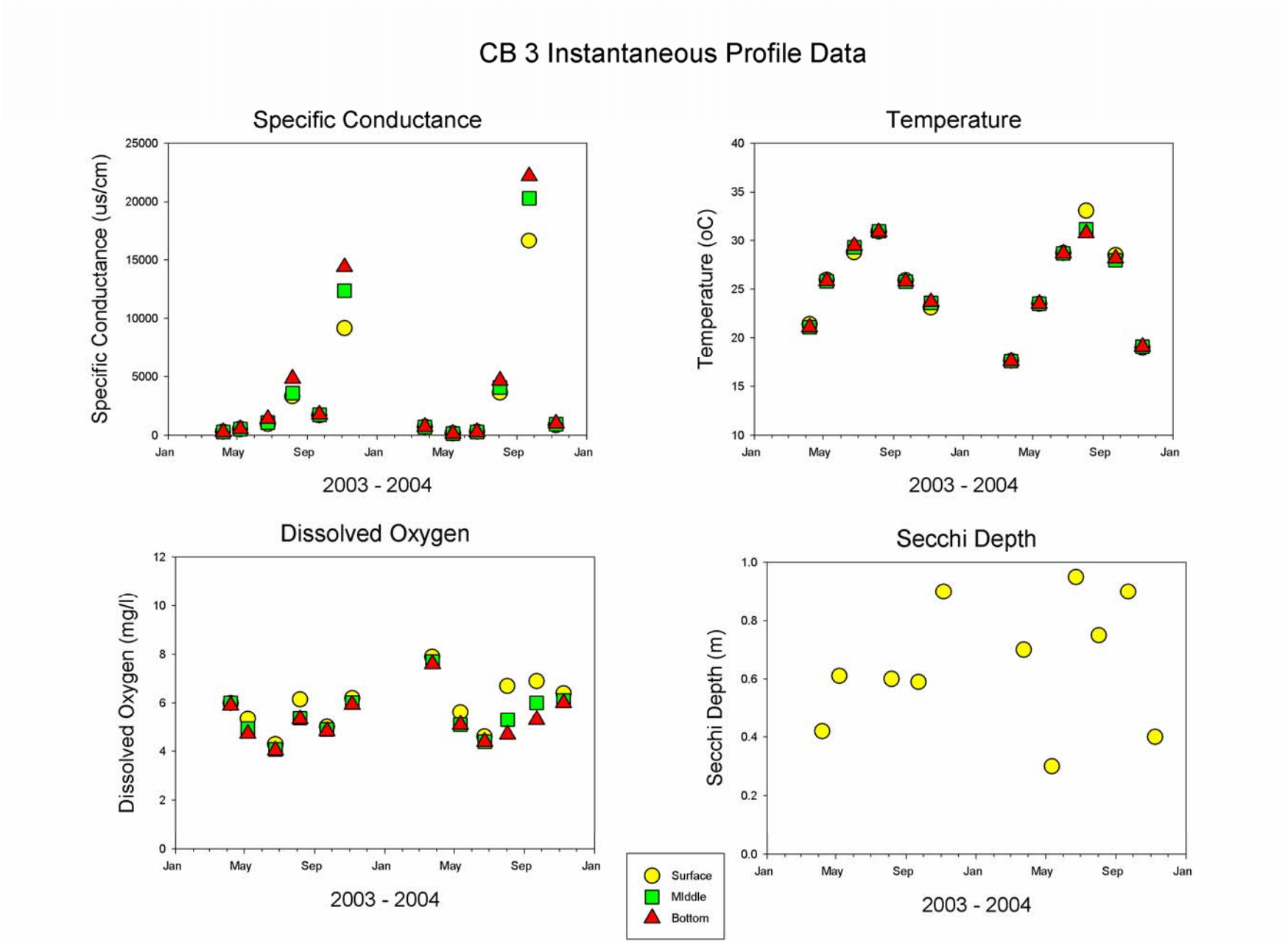

Figure 42. Water column profile physicochemical parameter data at three depths and Secchi depth in Cow Bayou at station CB 3, 2400 ft (732 m) upstream of Sabine River confluence.

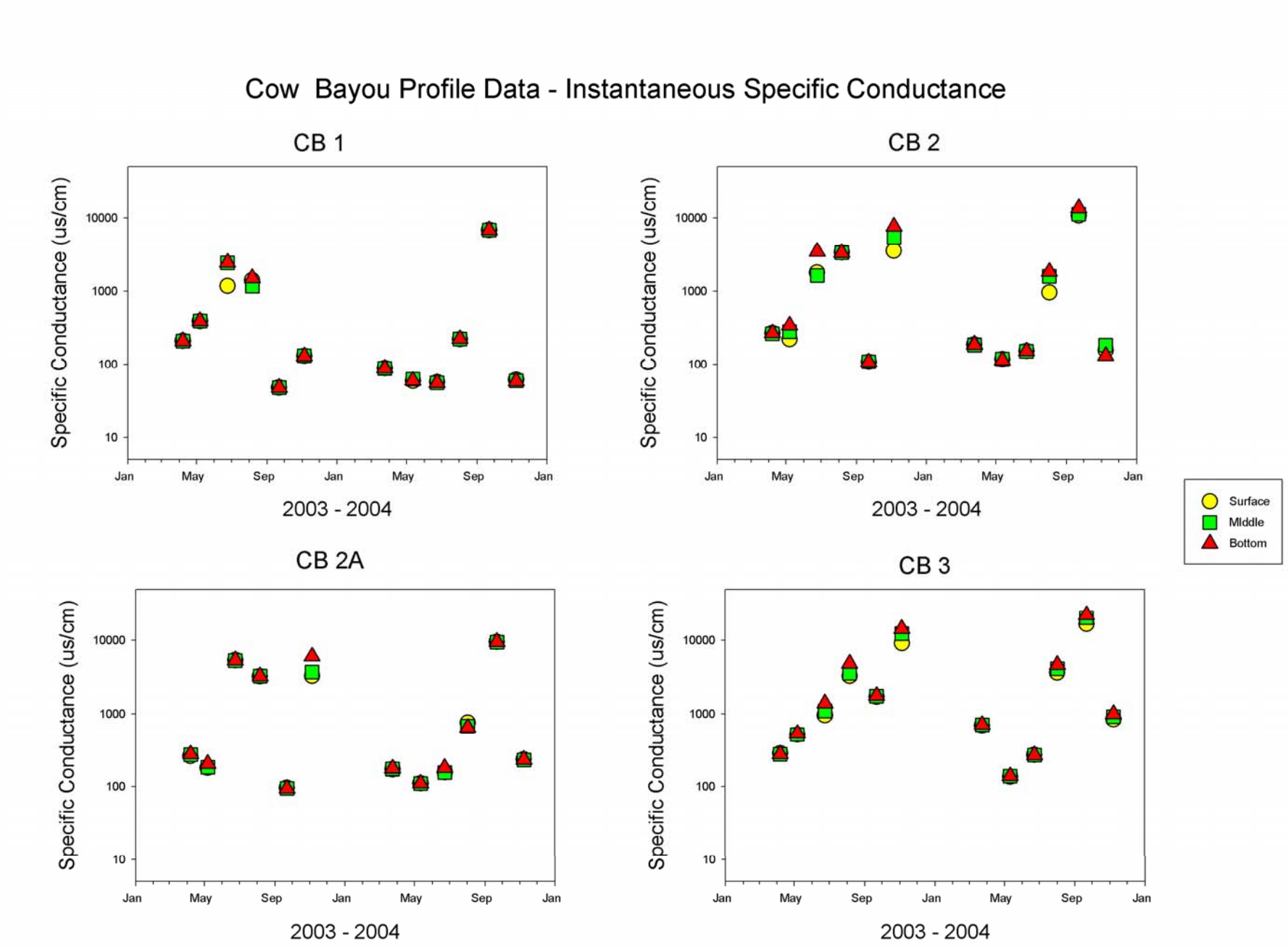

Figure 43. Water column profile specific conductance data at three depths in Cow Bayou. Sampling locations are described in the text.

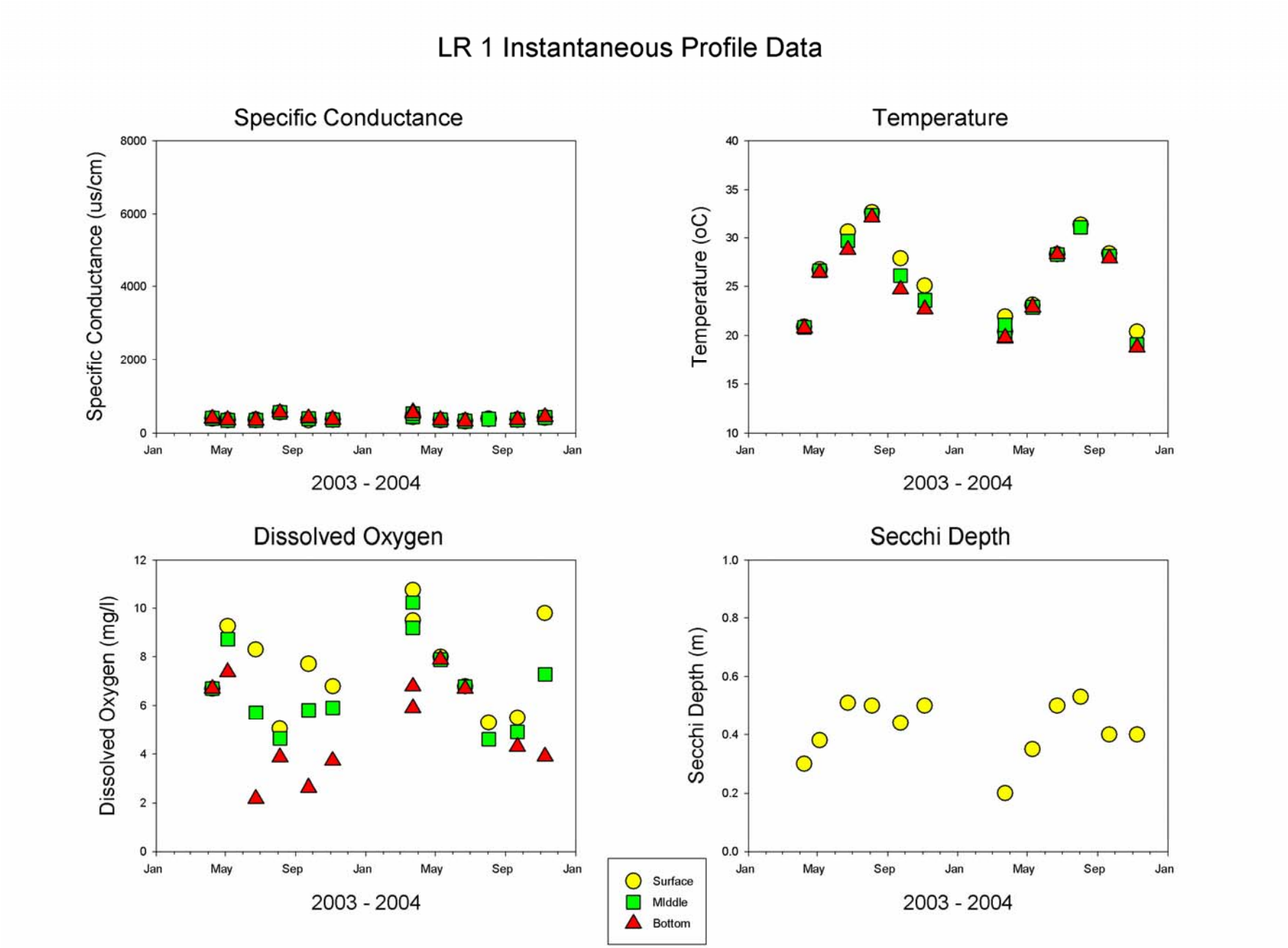

Figure 44. Water column profile physicochemical parameter data at three depths and Secchi depth in Lost River at station LR 1, at the Chambers County line and 5.4 km upstream of John Wiggins Bayou.

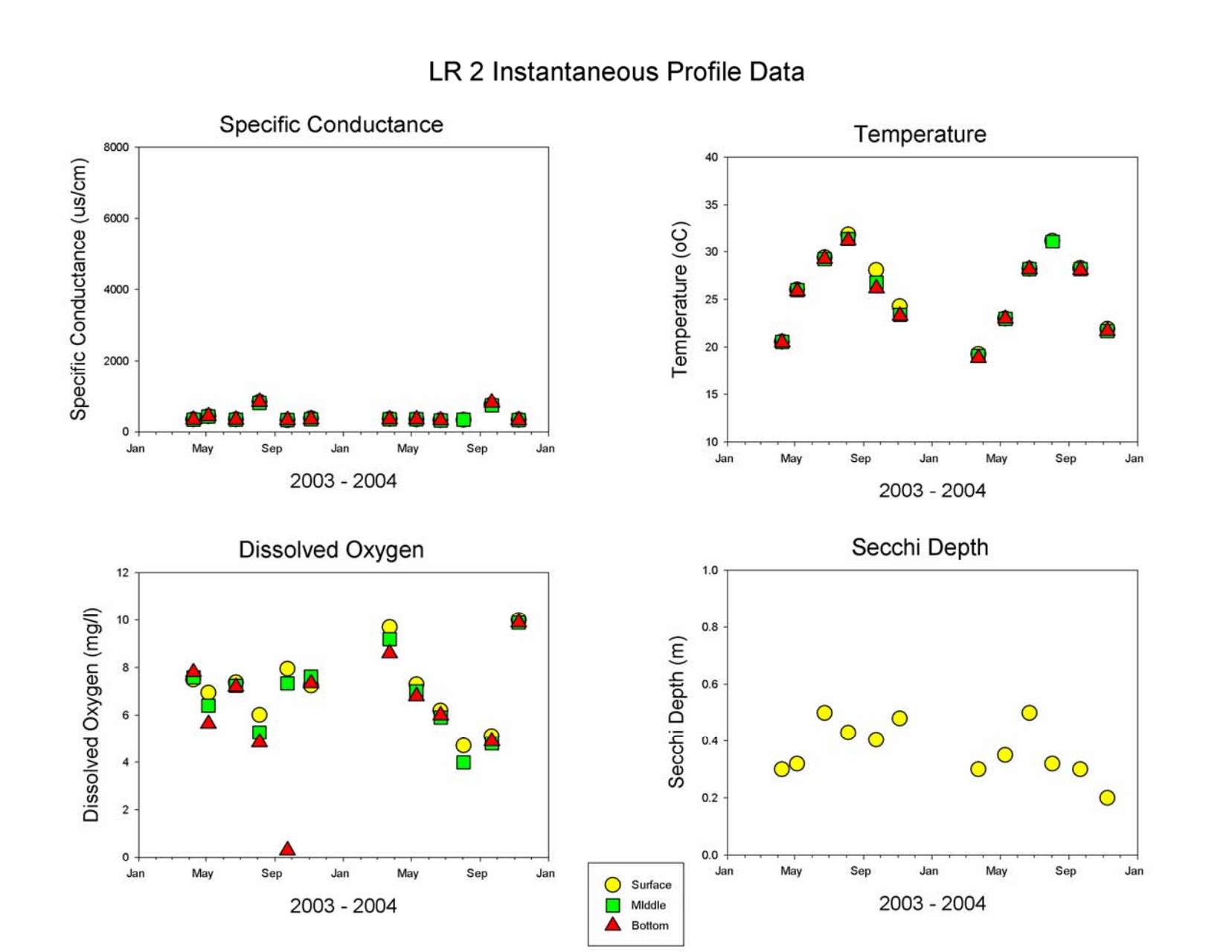

Figure 45. Water column profile physicochemical parameter data at three depths and Secchi depth in Lost River at station LR 2, approximately 2.6 km upstream of the confluence with John Wiggins Bayou and northeast of Lost Lake oil field.

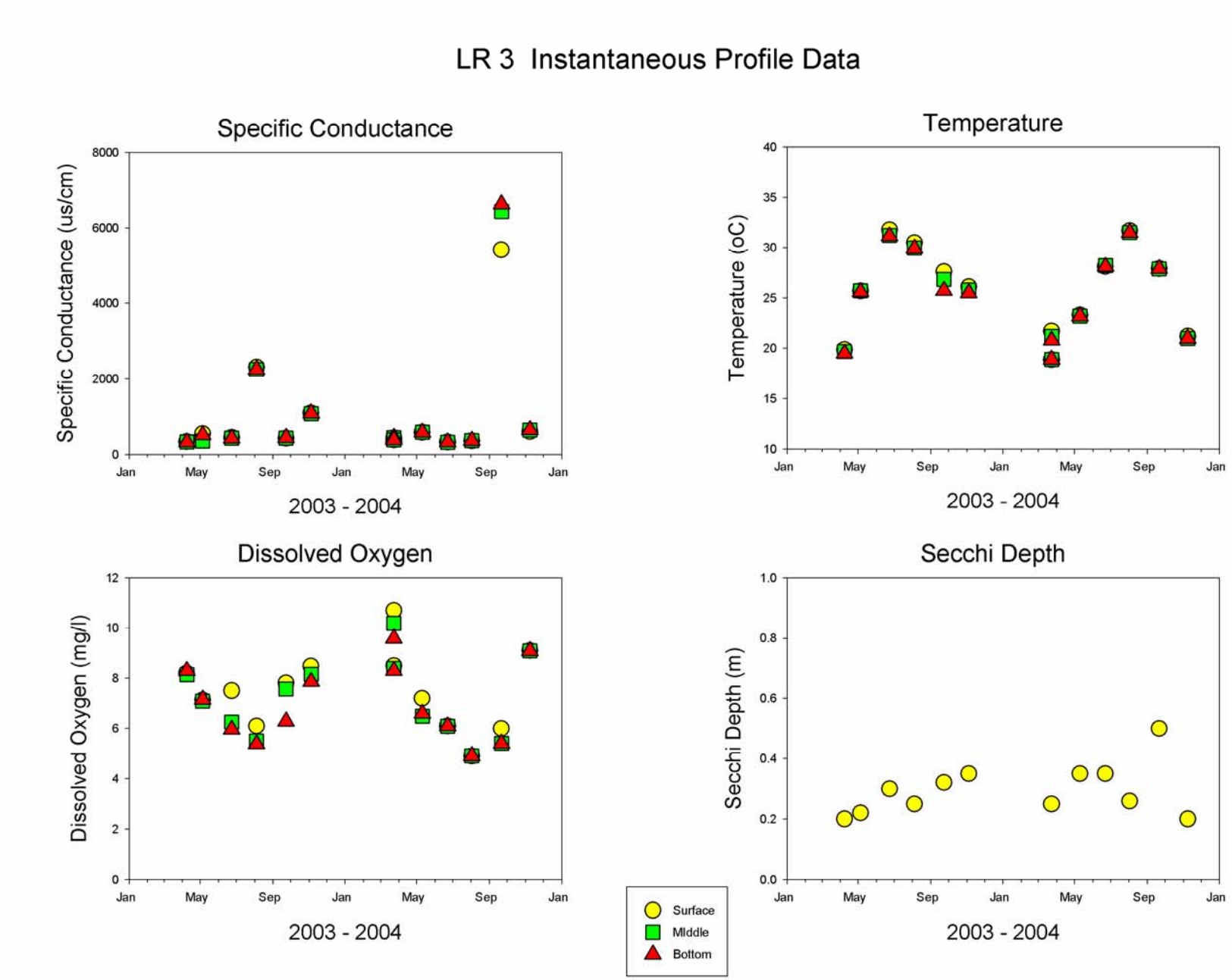

Figure 46. Water column profile physicochemical parameter data at three depths and Secchi depth in Lost River at station LR 3, at confluence with Old River Lake approx. 1.3 km upstream of IH10.

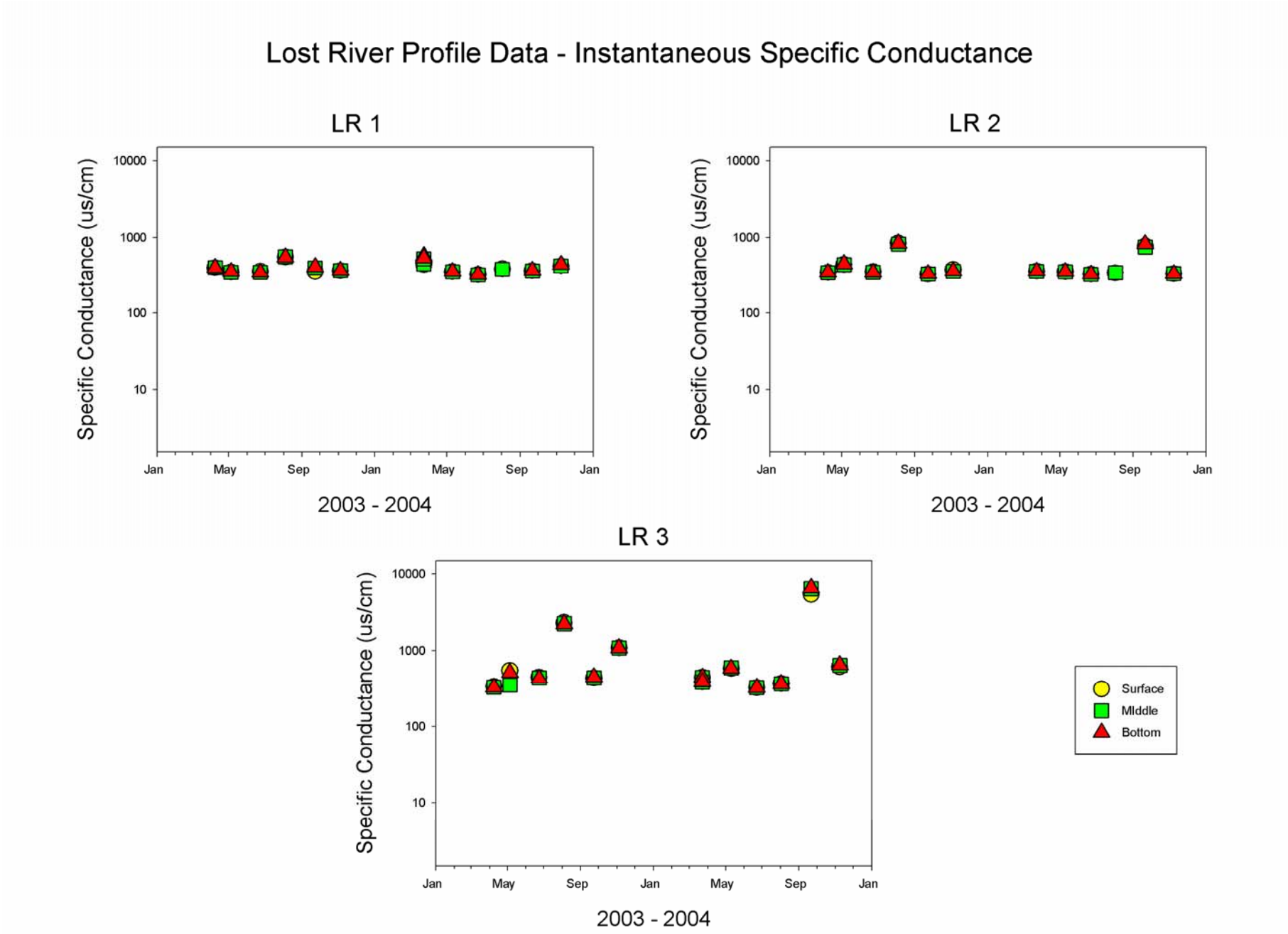

Figure 47. Water column profile specific conductance data at three depths in Lost River. Sampling locations are described in the text.

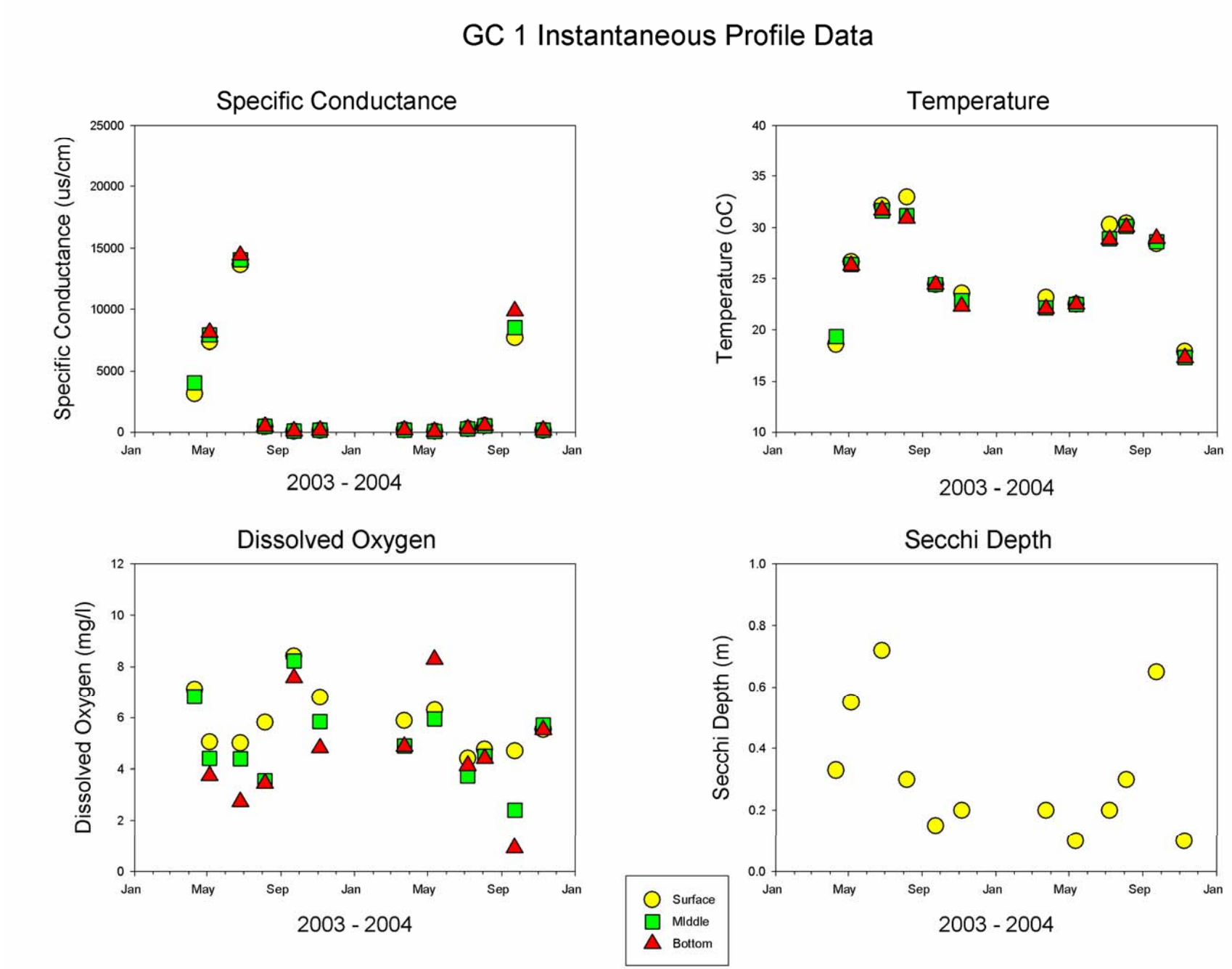

Figure 48. Water column profile physicochemical parameter data at three depths and Secchi depth in Garcitas Creek at station GC 1, 3.07 km upstream from SH 616.

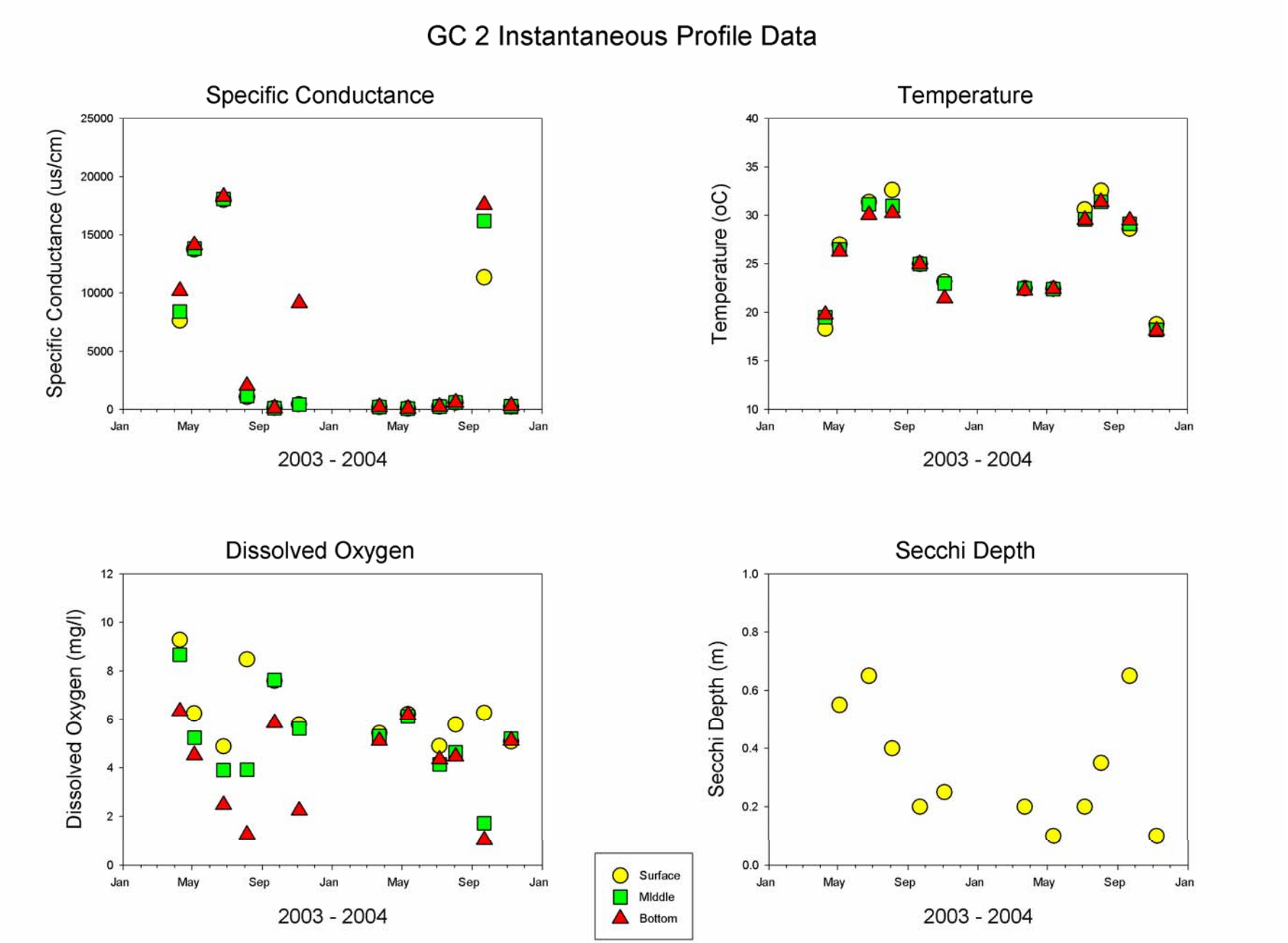

Figure 49. Water column profile physicochemical parameter data at three depths and Secchi depth in Garcitas Creek at station GC 2, 1.80 km downstream from SH 616.

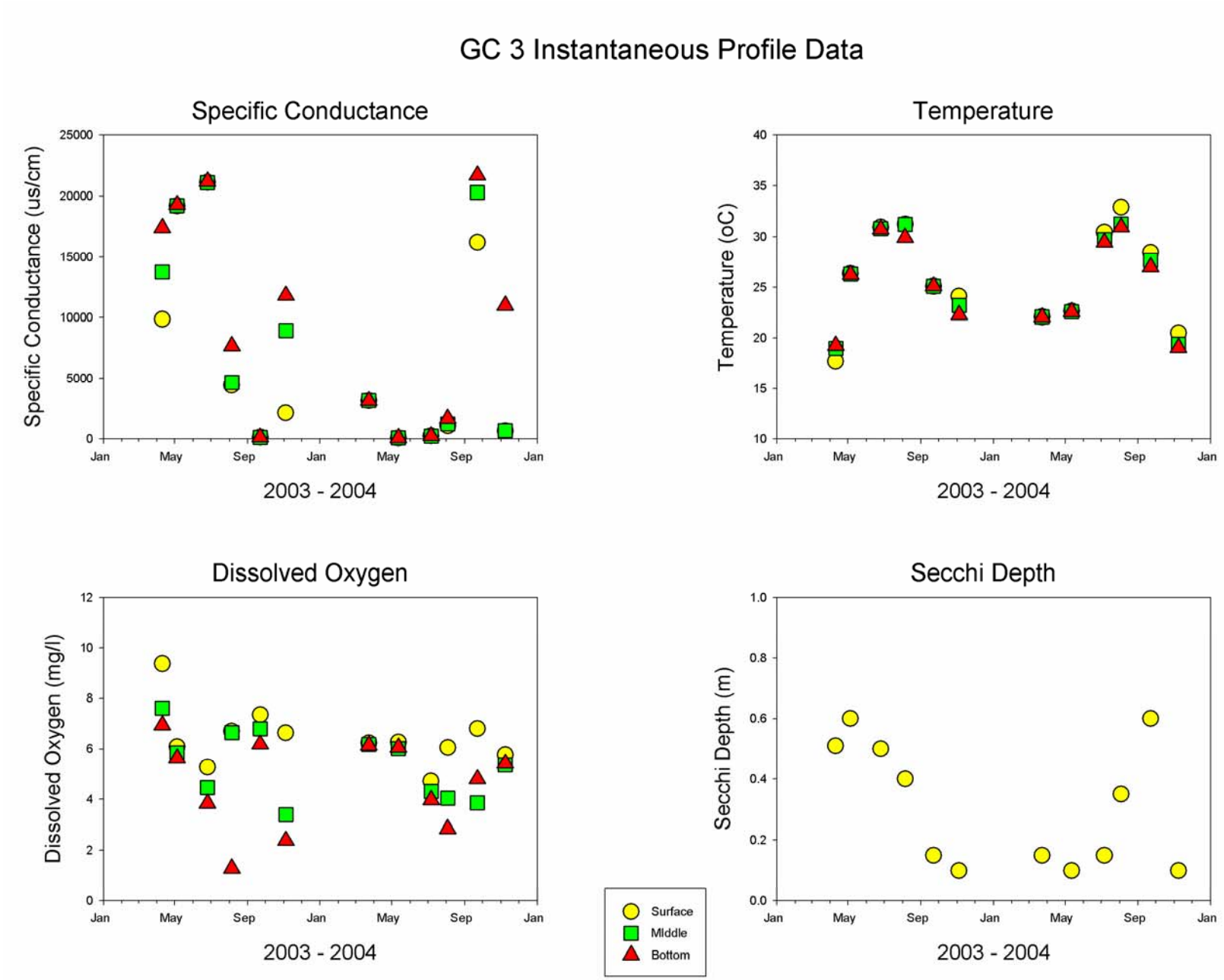

Figure 50. Water column profile physicochemical parameter data at three depths and Secchi depth in Garcitas Creek at station GC 3, 6.5 km downstream from SH 616.

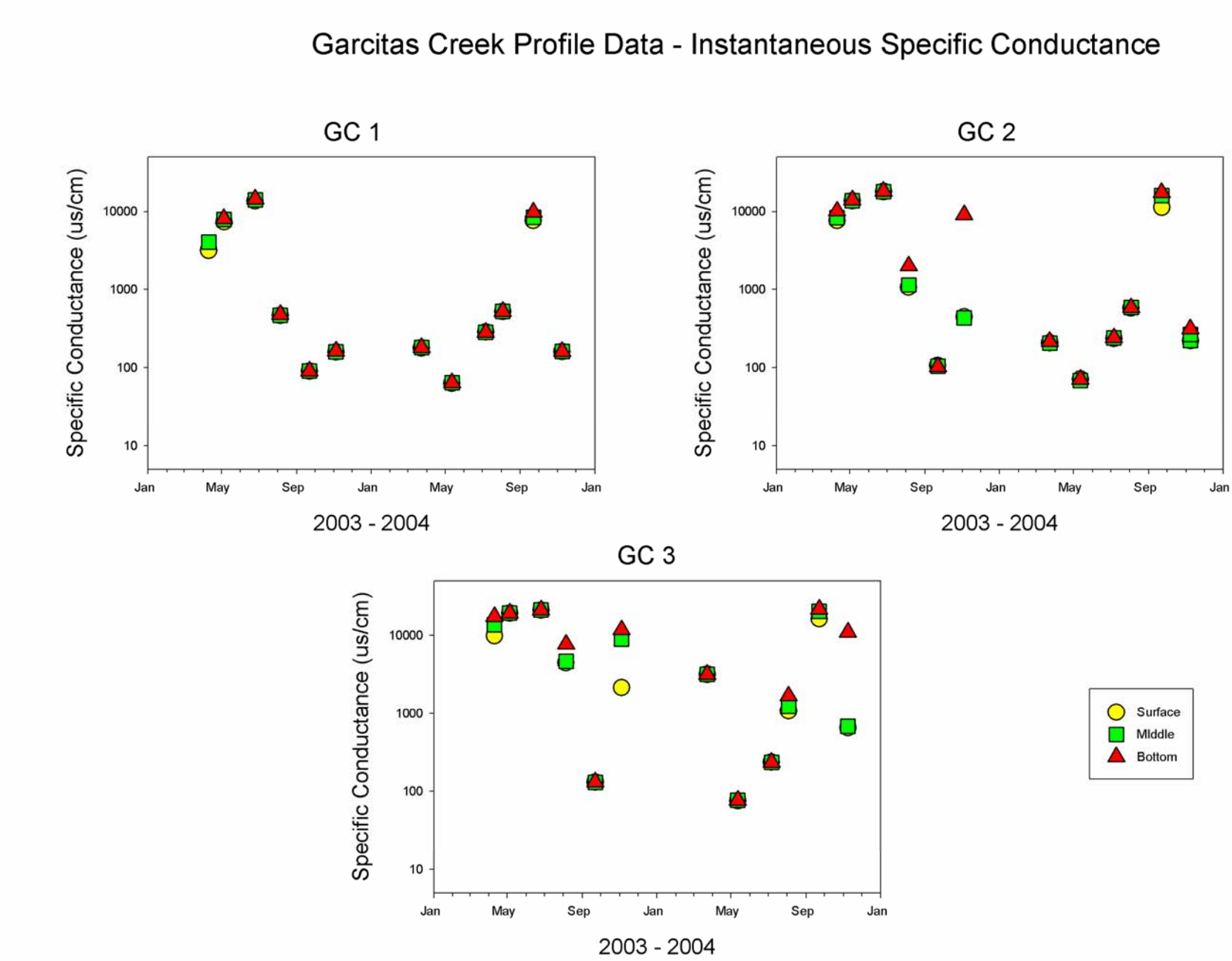

Figure 51. Water column profile specific conductance data at three depths in Garcitas Creek. Sampling locations are described in the text.

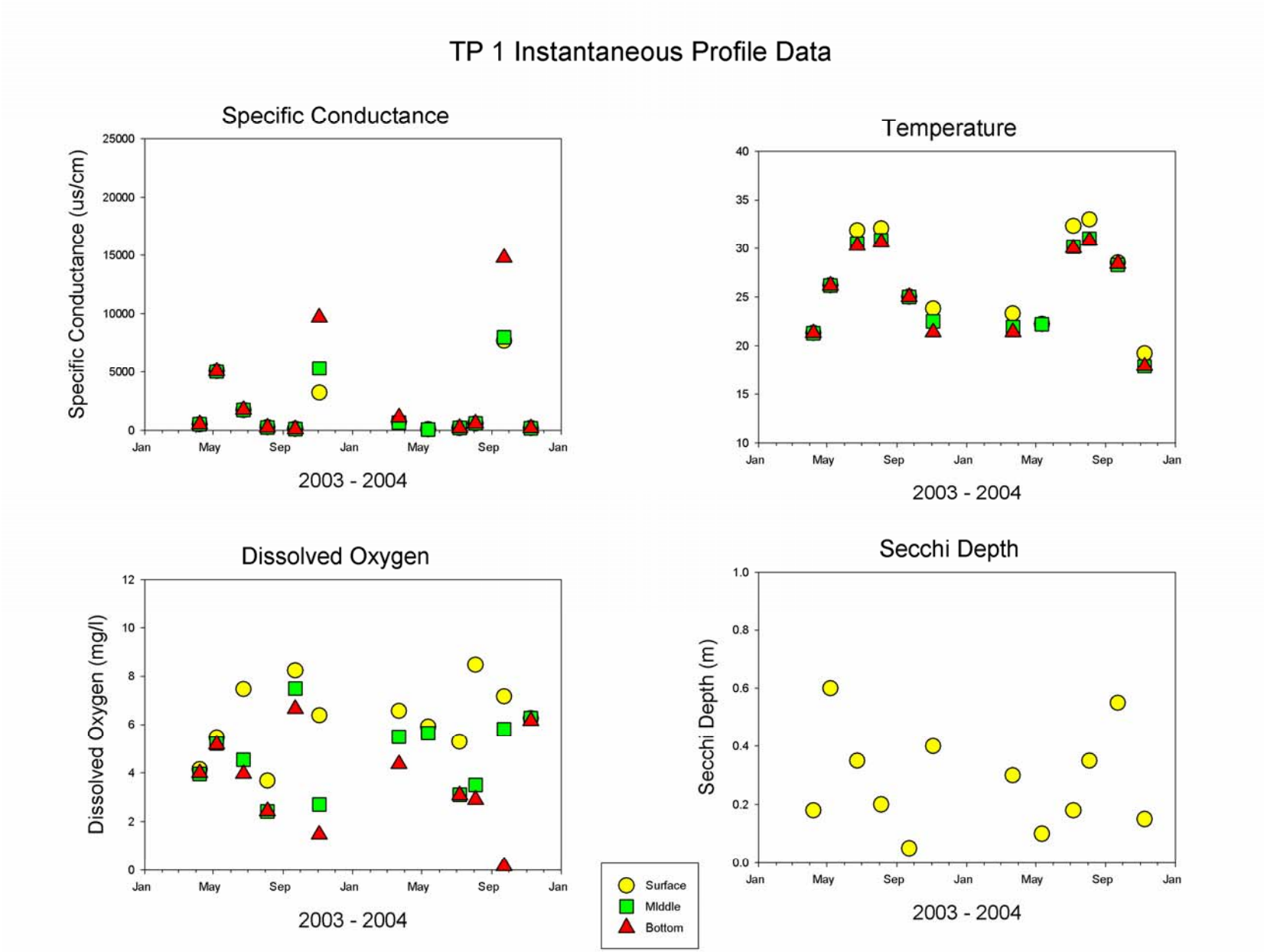

Figure 52. Water column profile physicochemical parameter data at three depths and Secchi depth in Tres Palacios Creek at station TP 1, 1.4 km upstream from the confluence of Wilson's Creek.

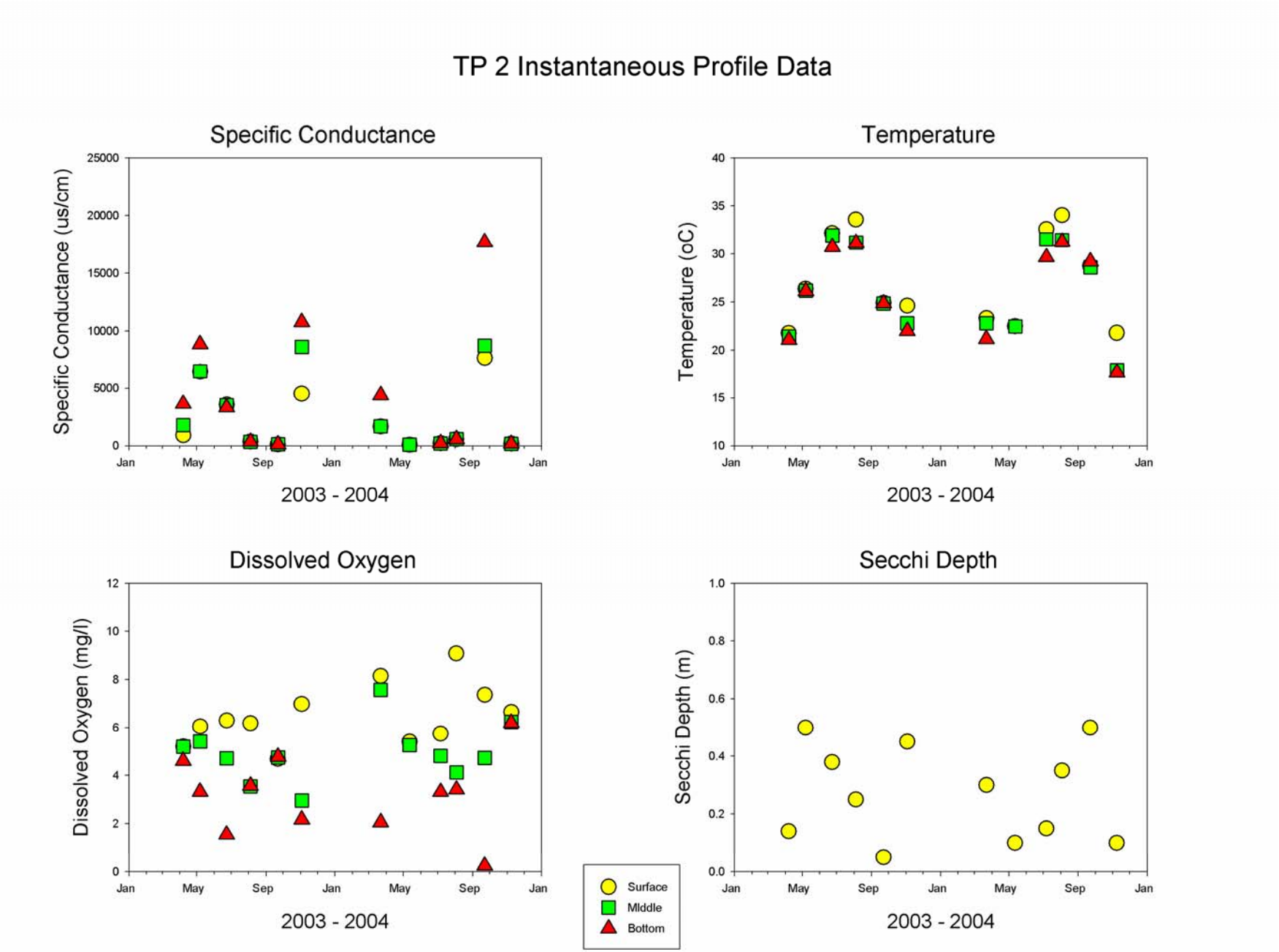

Figure 53. Water column profile physicochemical parameter data at three depths and Secchi depth in Tres Palacios Creek at station TP 2, 3.75 km upstream from SH 521 (approximately halfway between SH 521 and confluence of Wilsons Creek).

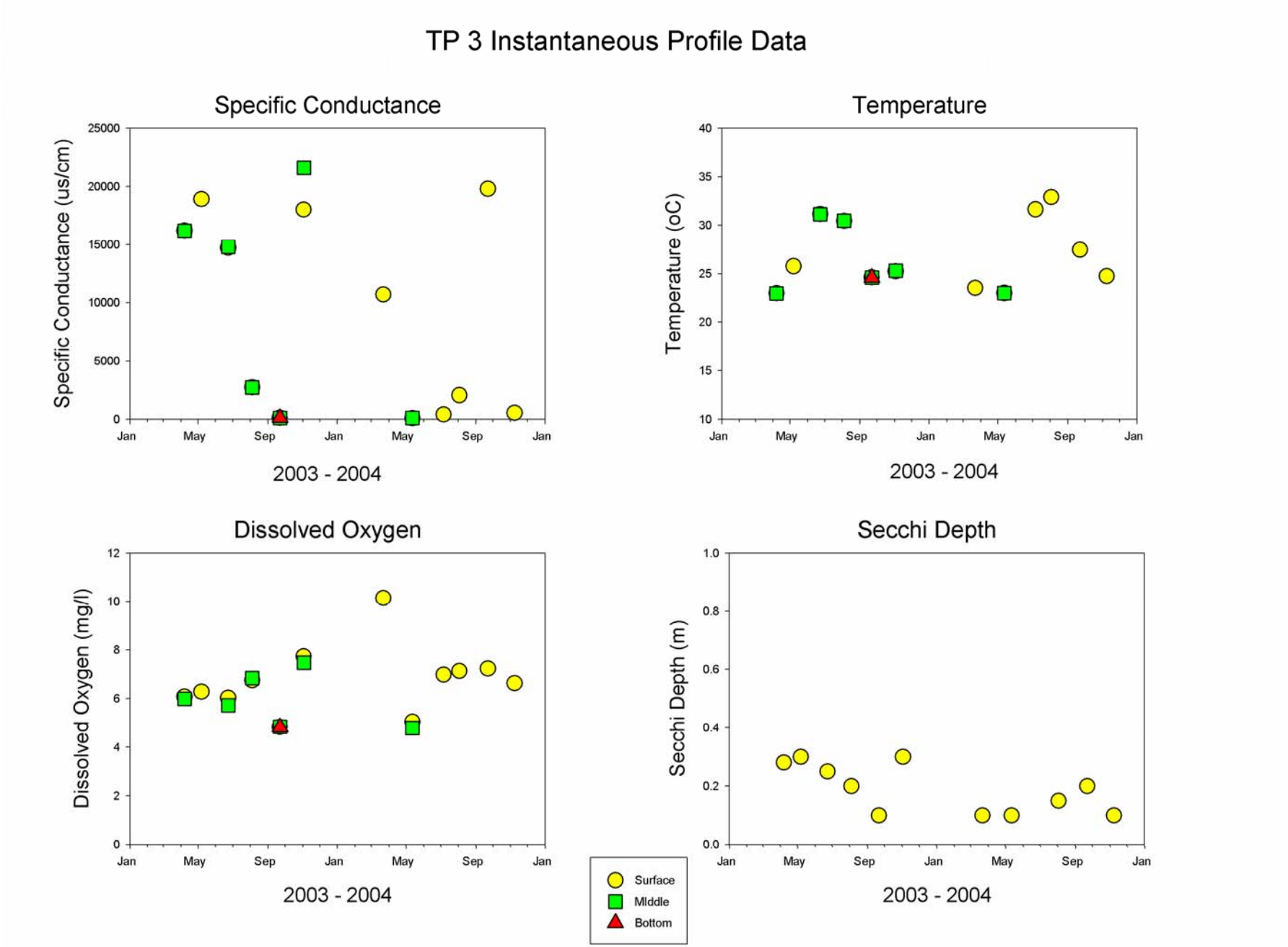

Figure 54. Water column profile physicochemical parameter data at three depths and Secchi depth in Tres Palacios Creek at station TP 3, 7.5 km downstream from SH 521.

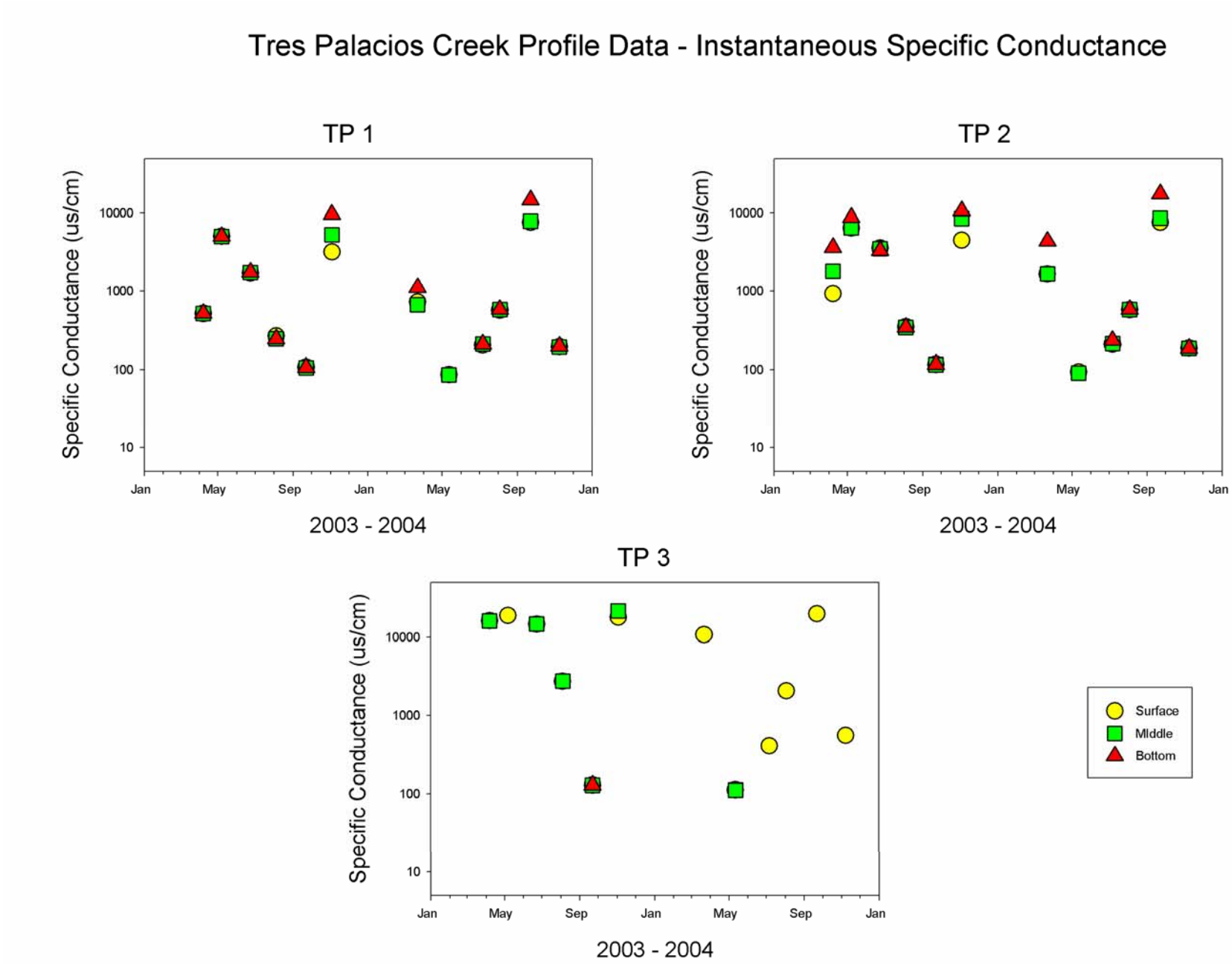

Figure 55. Water column profile specific conductance data at three depths in Tres Palacios Creek. Sampling locations are described in the text.

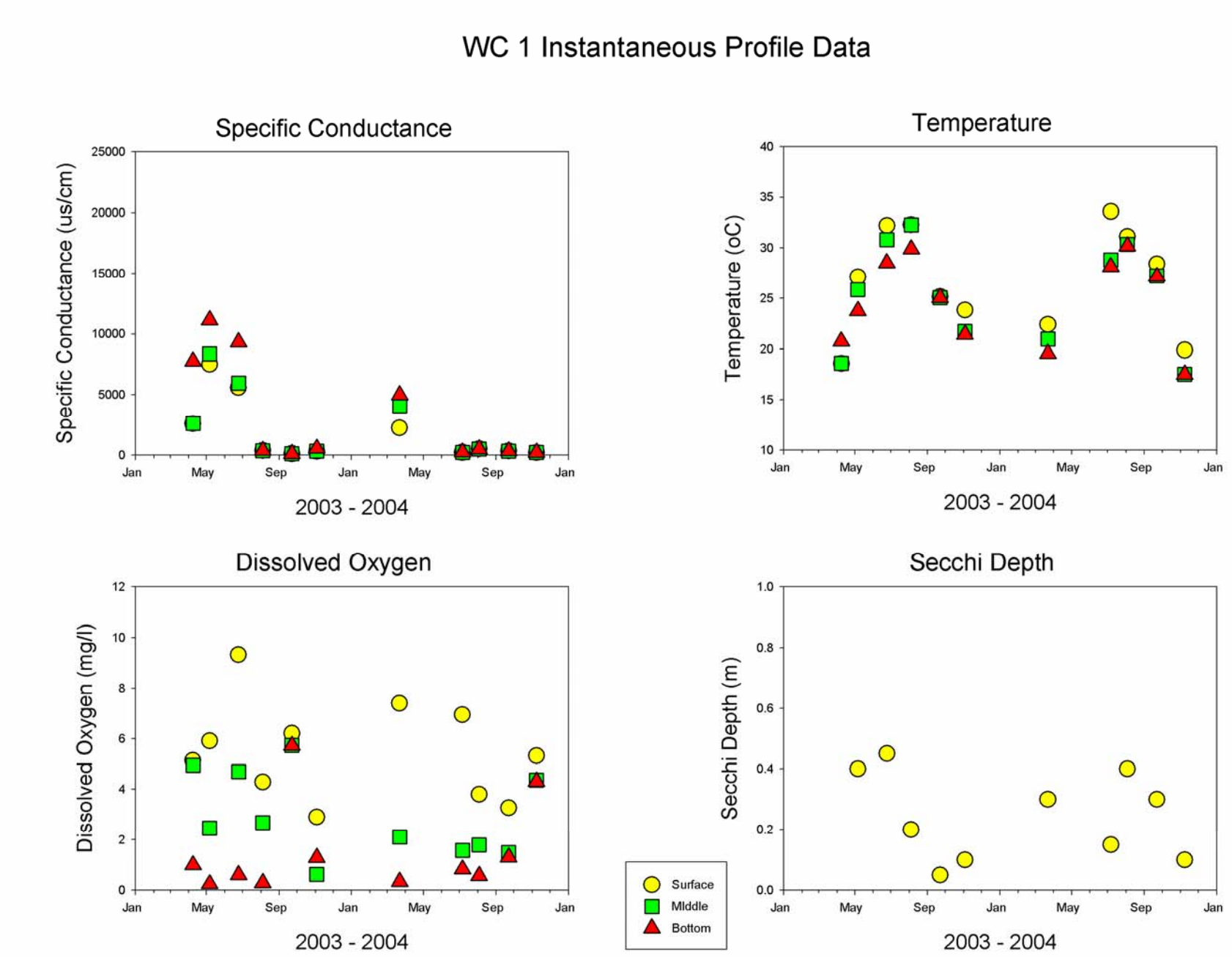

Figure 56. Water column profile physicochemical parameter data at three depths and Secchi depth in West Carancahua Creek at station WC 1, 5.1 km upstream from the confluence with East Carancahua Creek.

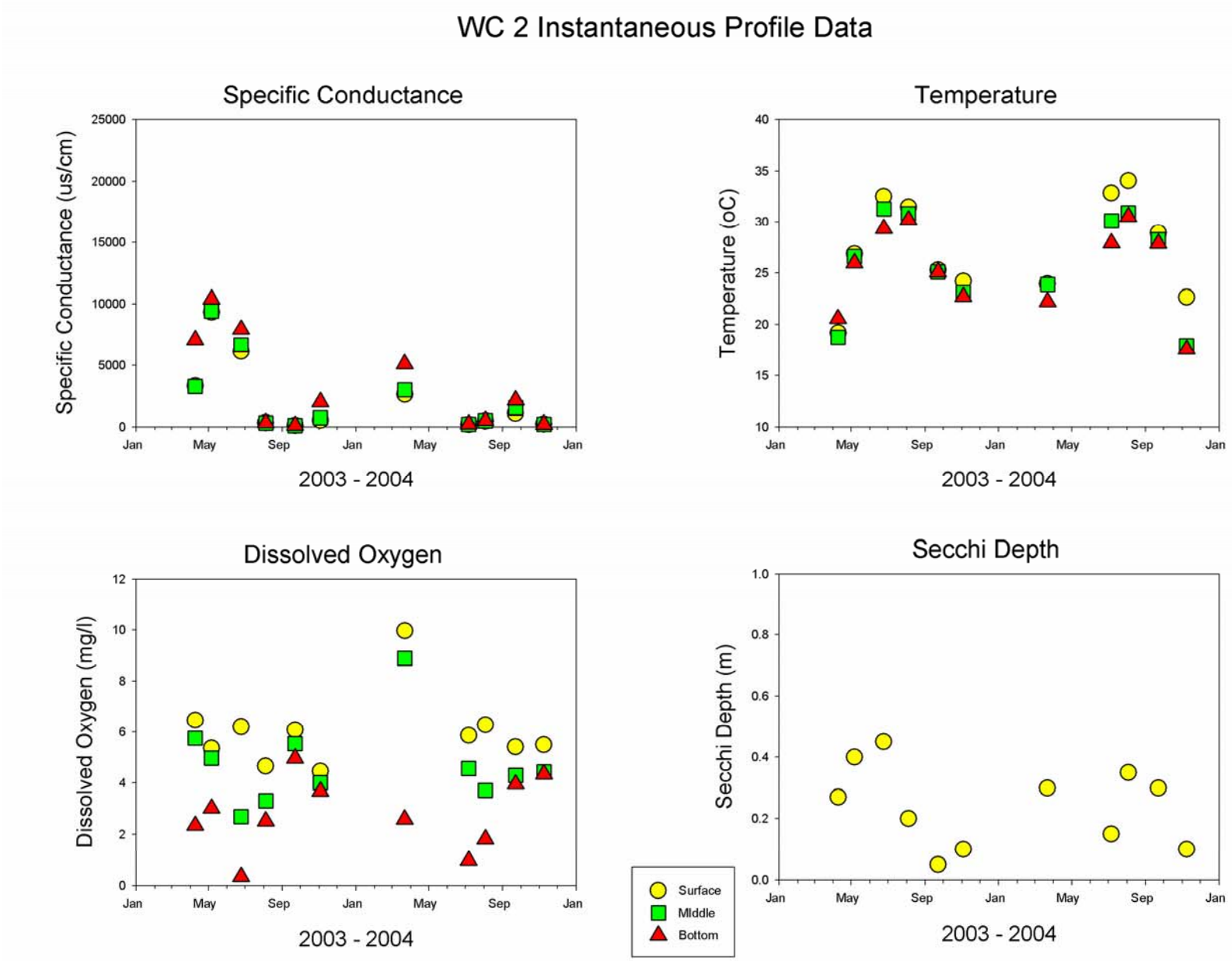

Figure 57. Water column profile physicochemical parameter data at three depths and Secchi depth in West Carancahua Creek at station WC 2, 1.9 km upstream from the confluence with East Carancahua Creek.

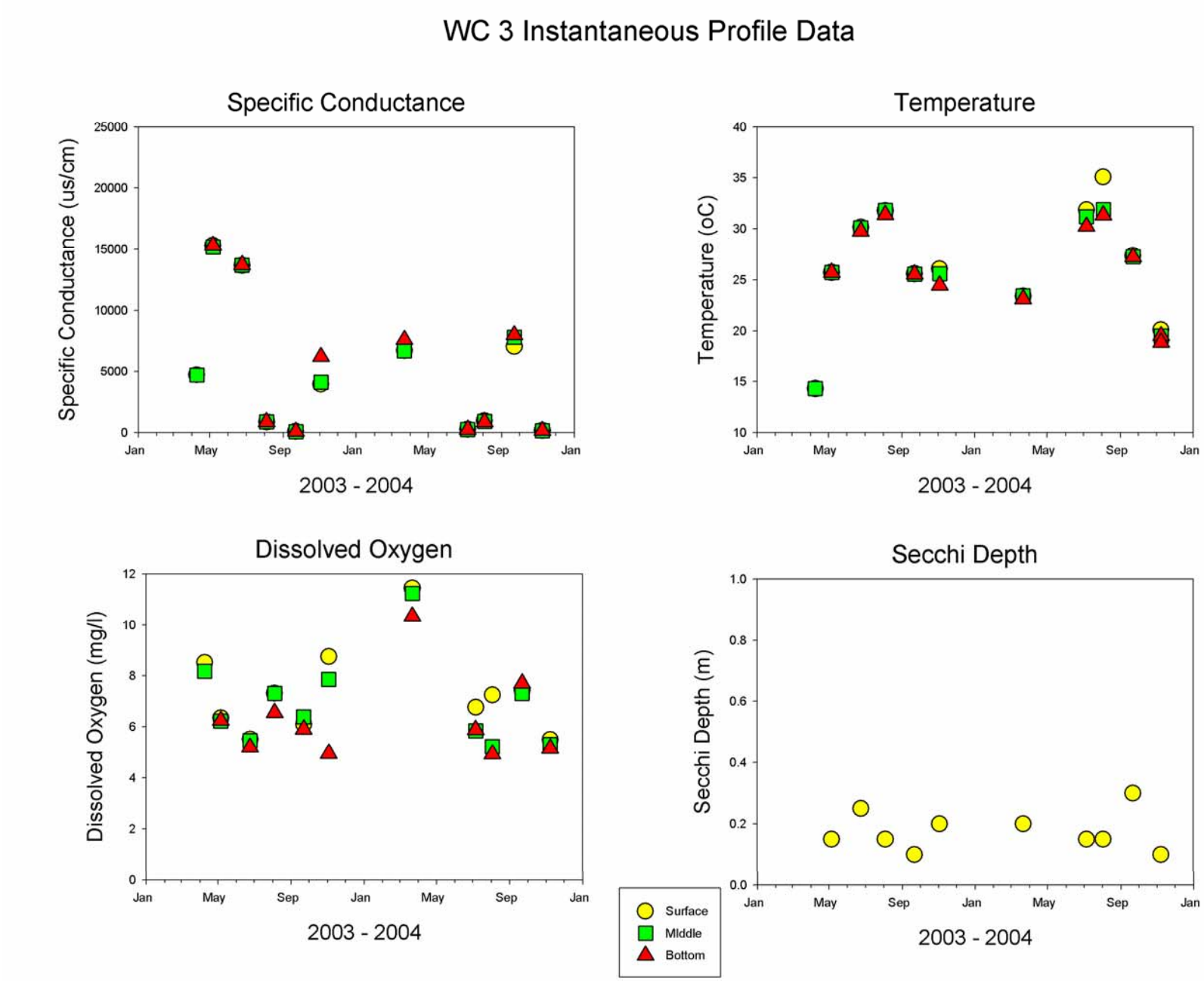

Figure 58. Water column profile physicochemical parameter data at three depths and Secchi depth in West Carancahua Creek at station WC 3, 4.5 km downstream from the confluence with East Carancahua Creek.

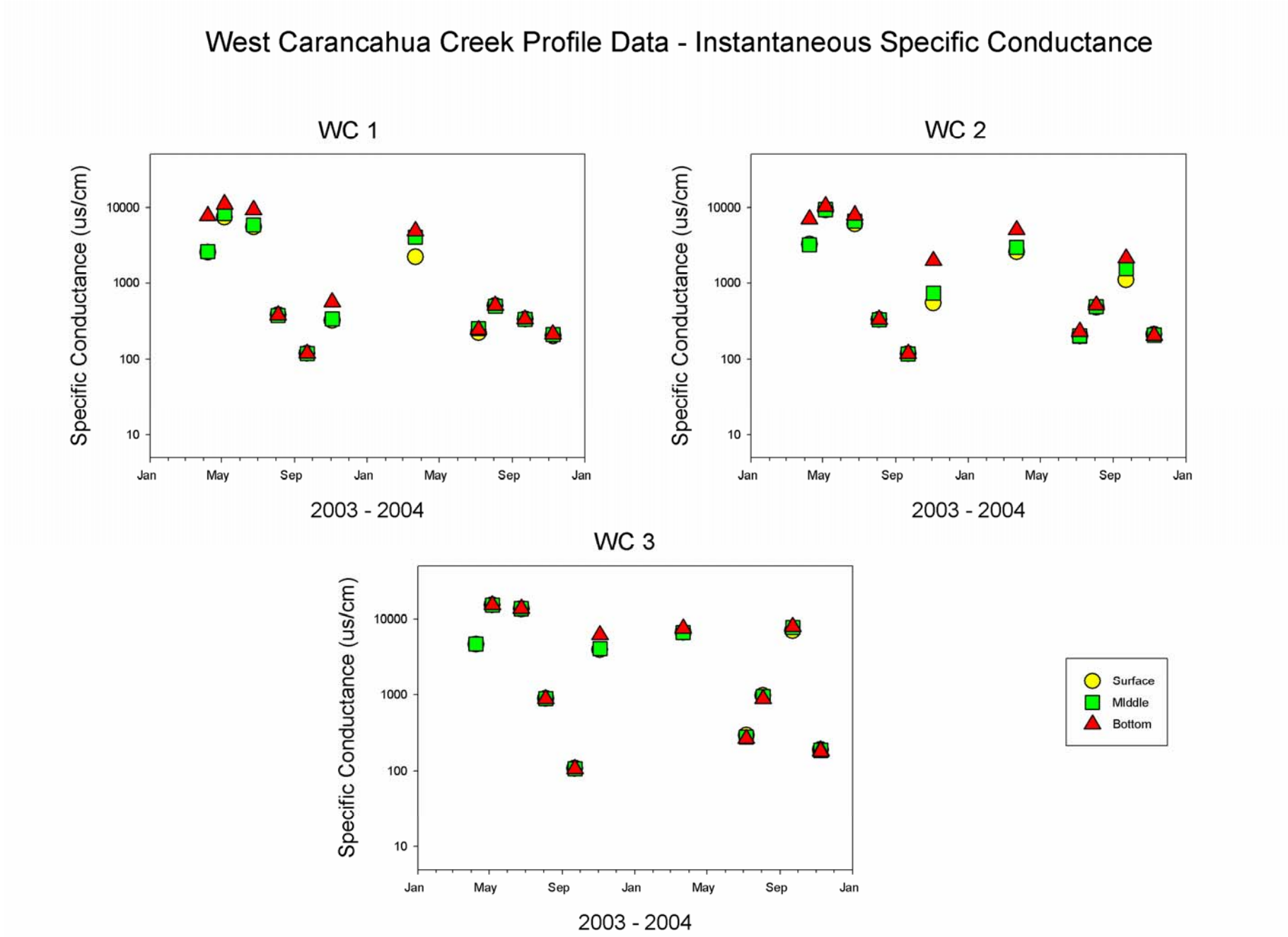

Figure 59. Water column profile specific conductance data at three depths in West Carancahua Creek. Sampling locations are described in the text.

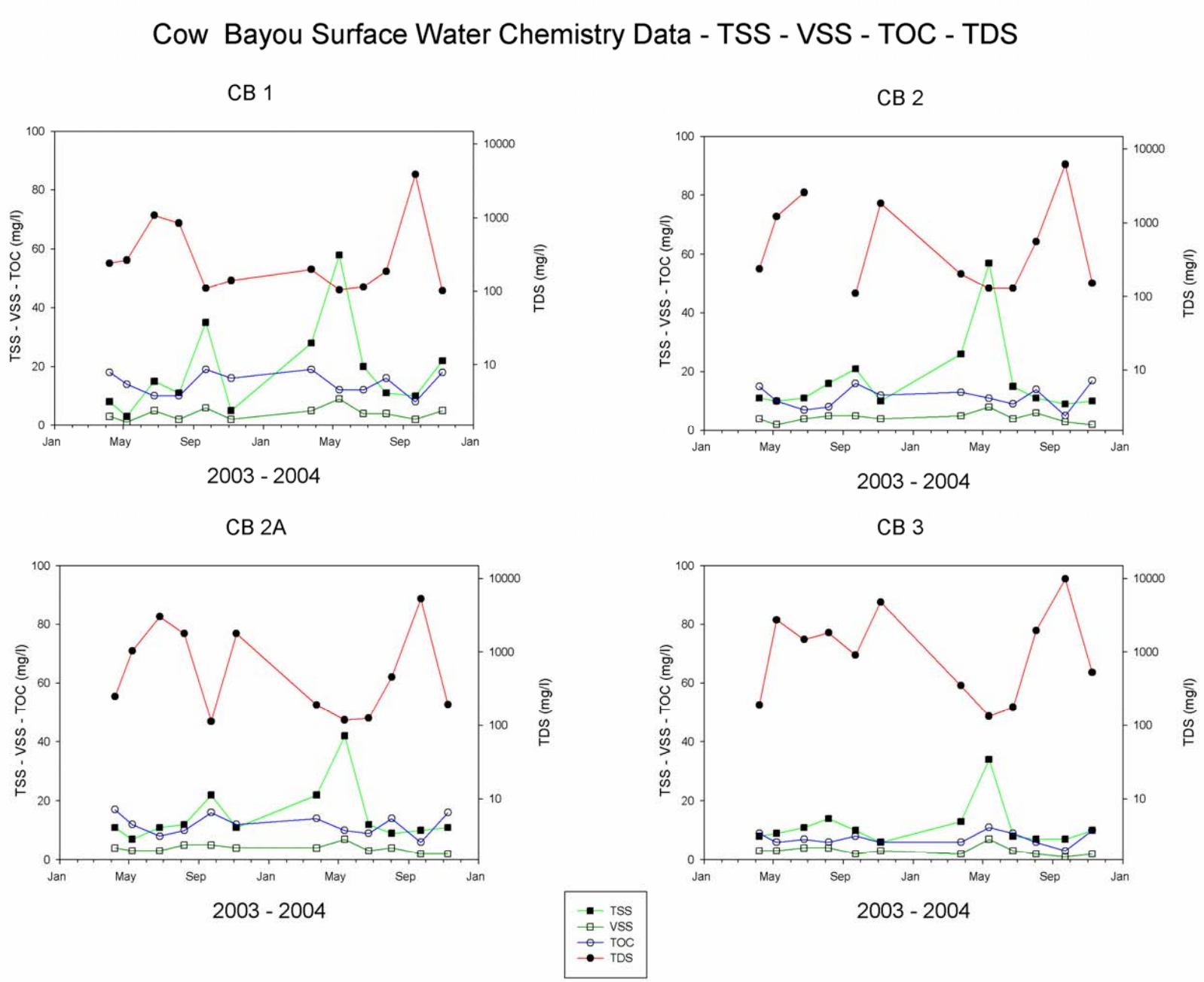

Figure 60. Water chemistry data measured for surface samples in Cow Bayou (TSS, VSS, TOC, TDS). Sampling locations are described in the text. Connecting lines do not represent continuous data collection and are drawn to aid visualization.

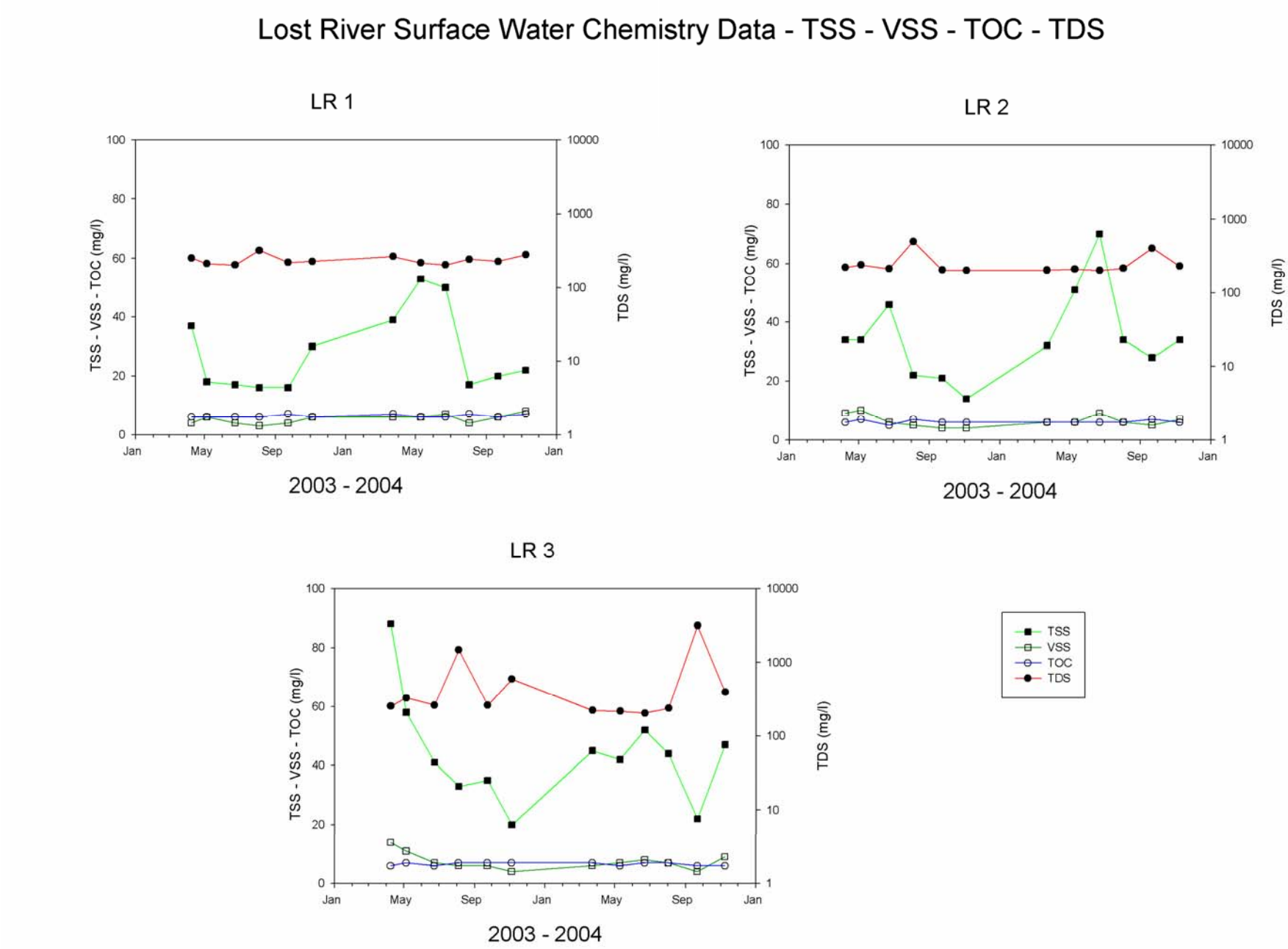

Figure 61. Water chemistry data measured for surface samples in Lost River (TSS, VSS, TOC, TDS). Sampling locations are described in the text. Connecting lines do not represent continuous data collection and are drawn to aid visualization.

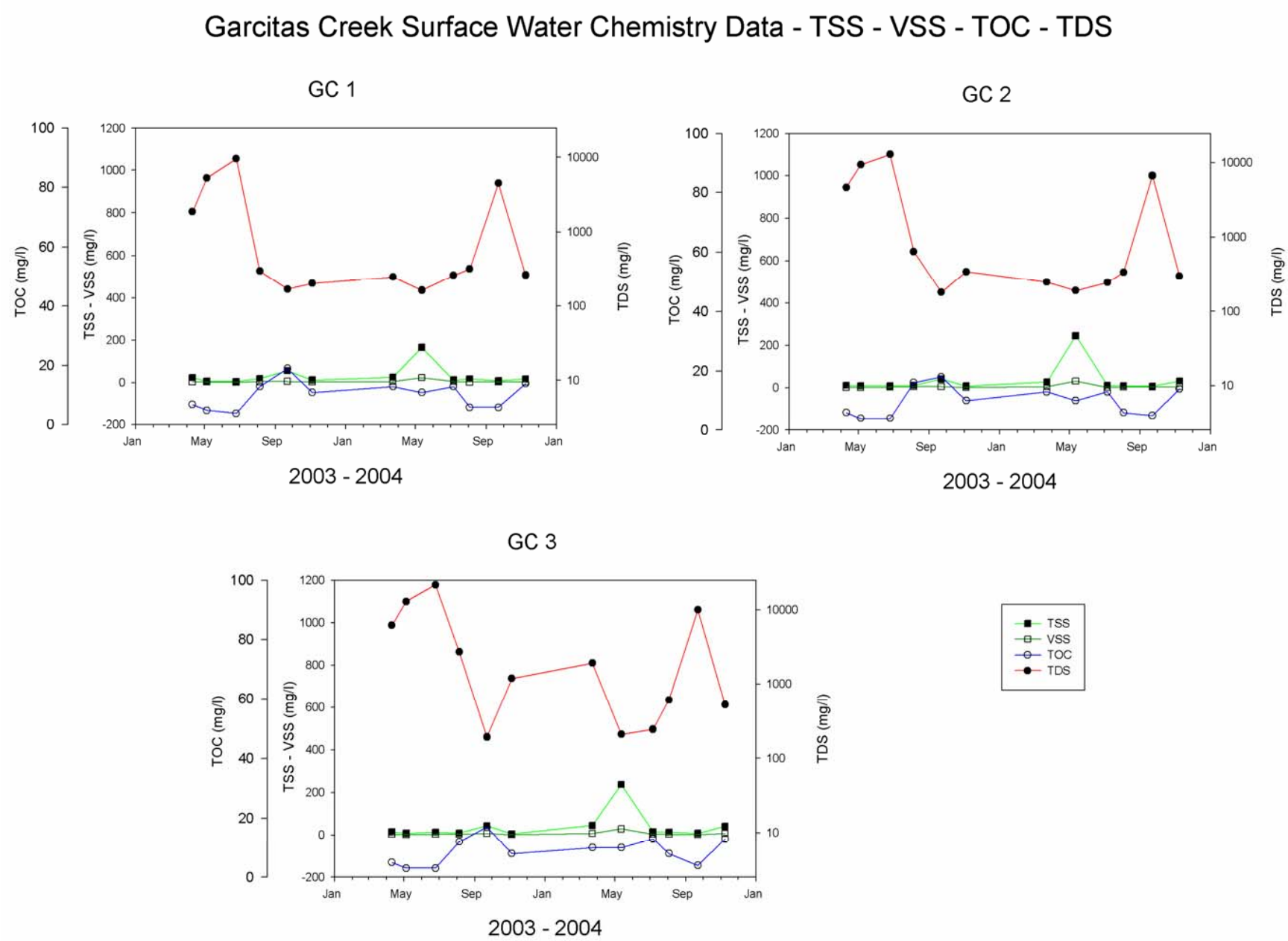

Figure 62. Water chemistry data measured for surface samples in Garcitas Creek (TSS, VSS, TOC, TDS). Sampling locations are described in the text. Connecting lines do not represent continuous data collection and are drawn to aid visualization.

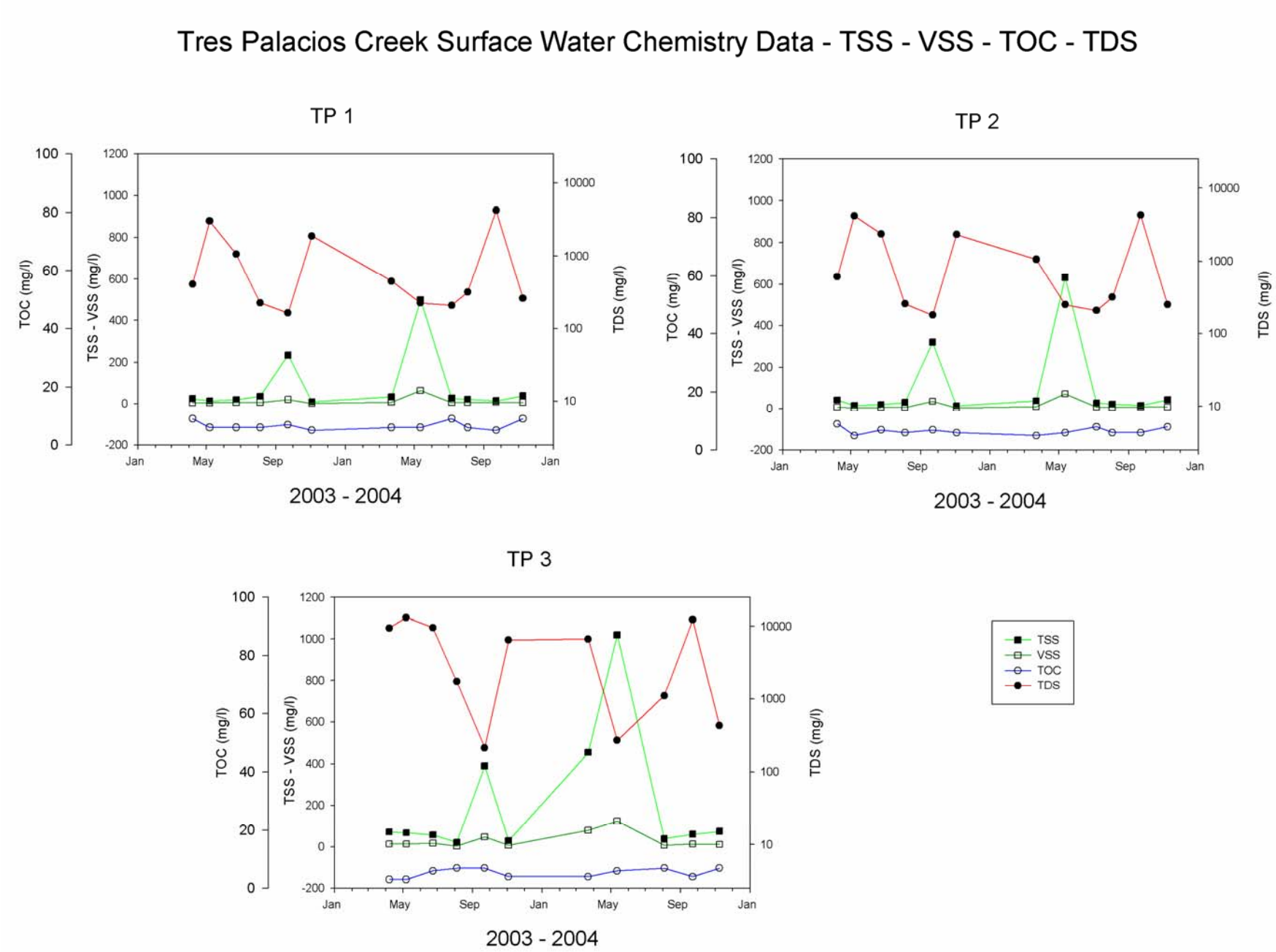

Figure 63. Water chemistry data measured for surface samples in Tres Palacios Creek (TSS, VSS, TOC, TDS). Sampling locations are described in the text. Connecting lines do not represent continuous data collection and are drawn to aid visualization.

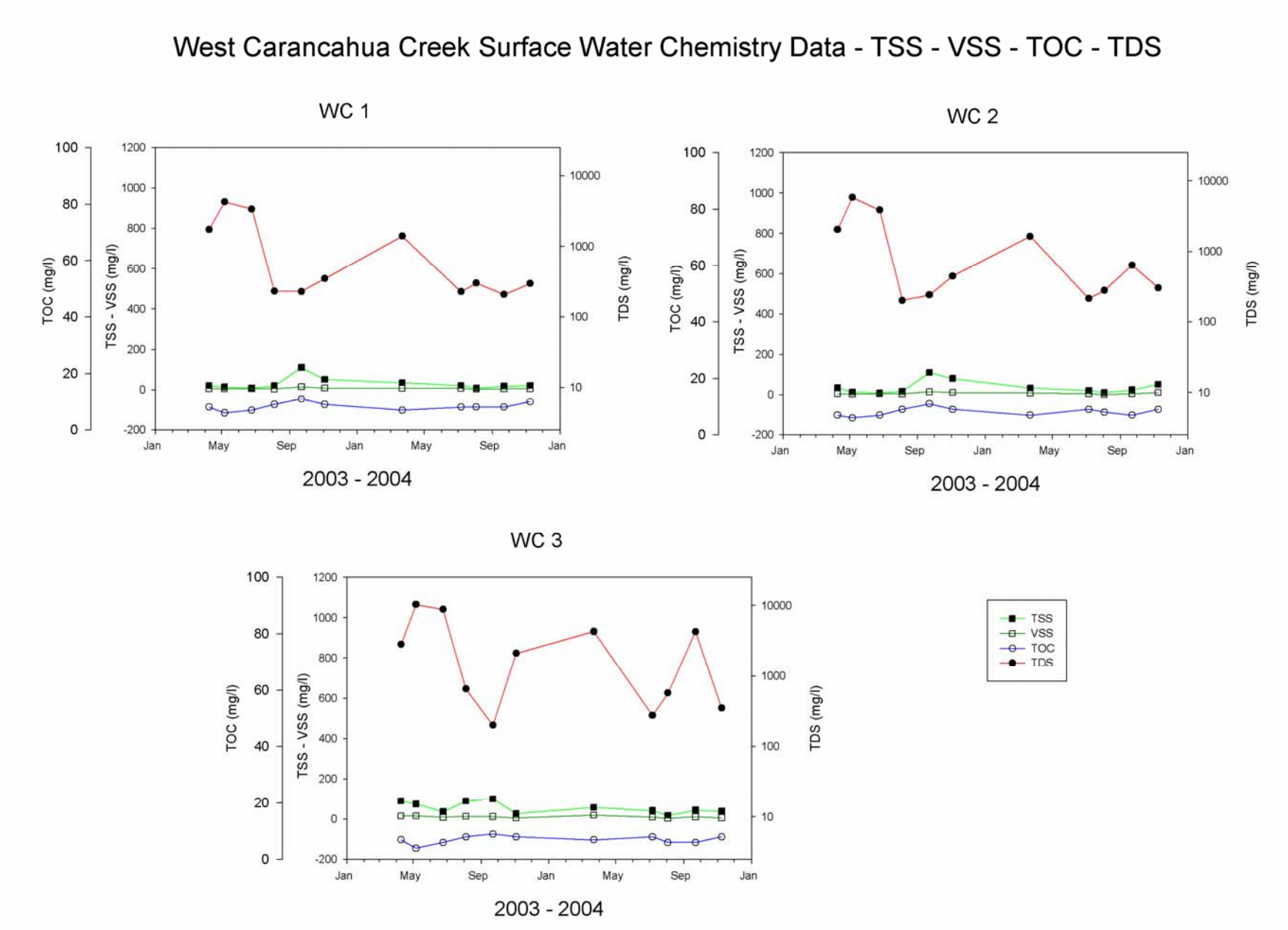

Figure 64. Water chemistry data measured for surface samples in West Carancahua Creek (TSS, VSS, TOC, TDS). Sampling locations are described in the text. Connecting lines do not represent continuous data collection and are drawn to aid visualization.

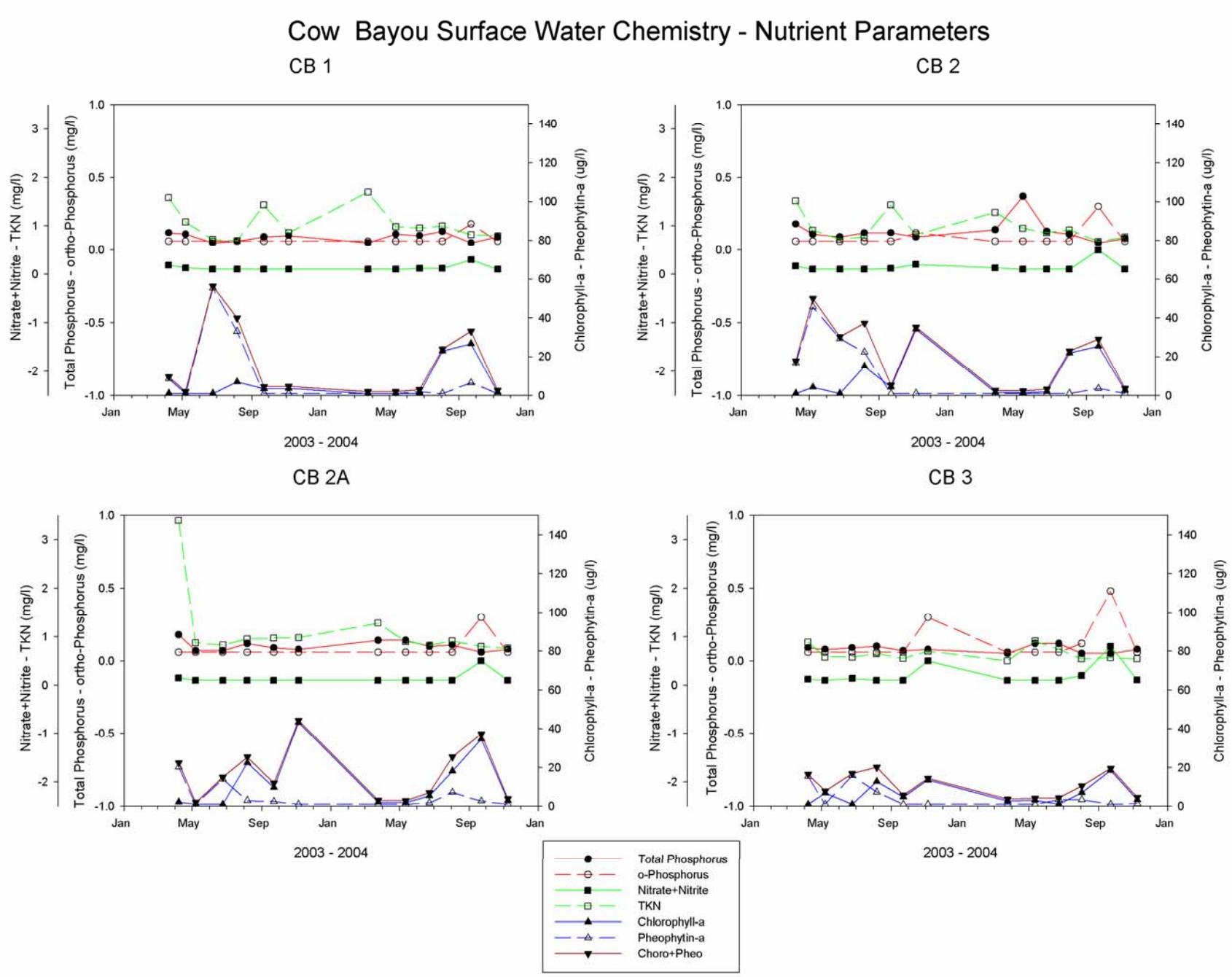

Figure 65. Water chemistry data measured for surface samples in Cow Bayou (nutrient parameters). Sampling locations are described in the text. Connecting lines do not represent continuous data collection and are drawn to aid visualization.

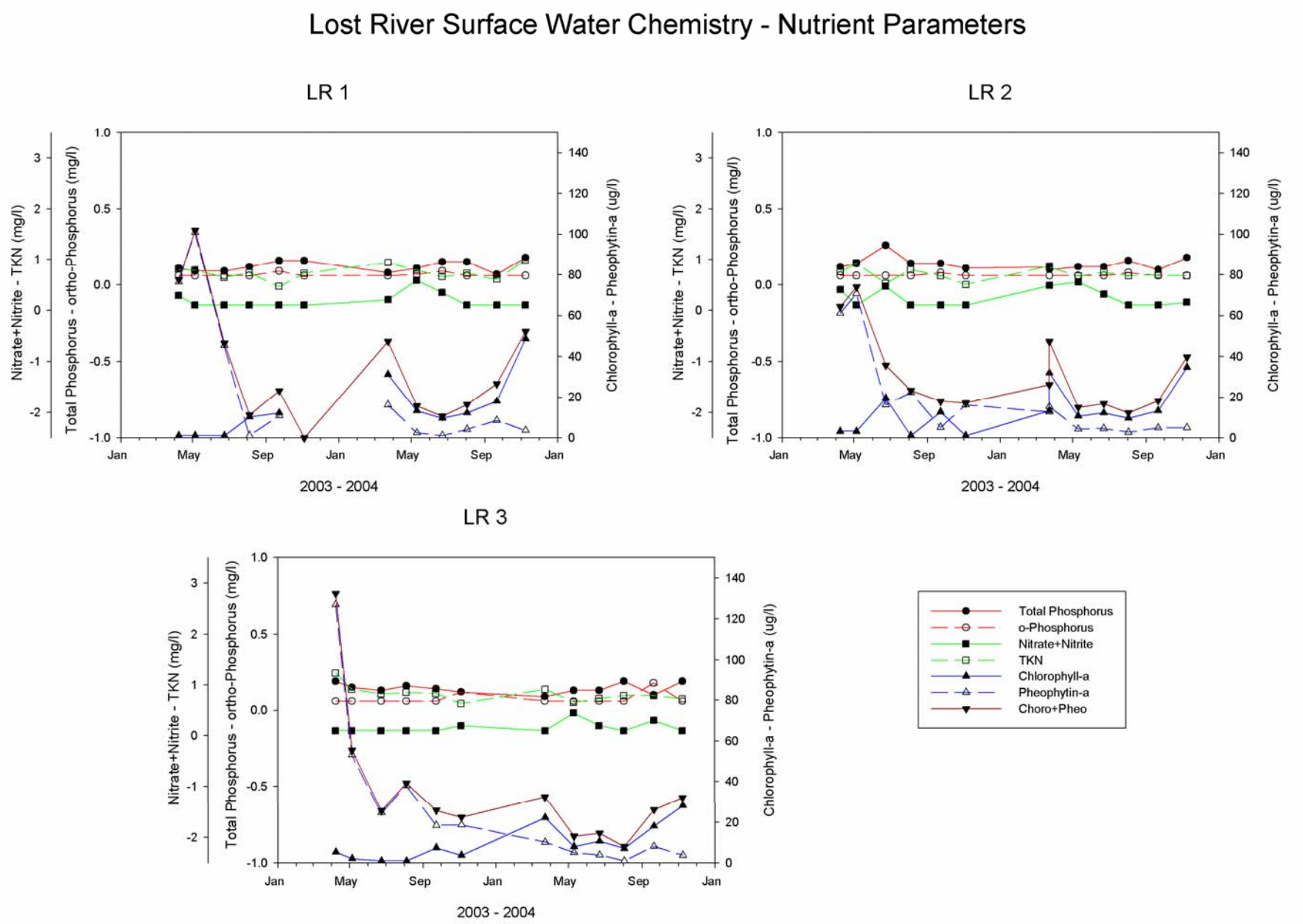

Figure 66. Water chemistry data measured for surface samples in Lost River (nutrient parameters). Sampling locations are described in the text. Connecting lines do not represent continuous data collection and are drawn to aid visualization.

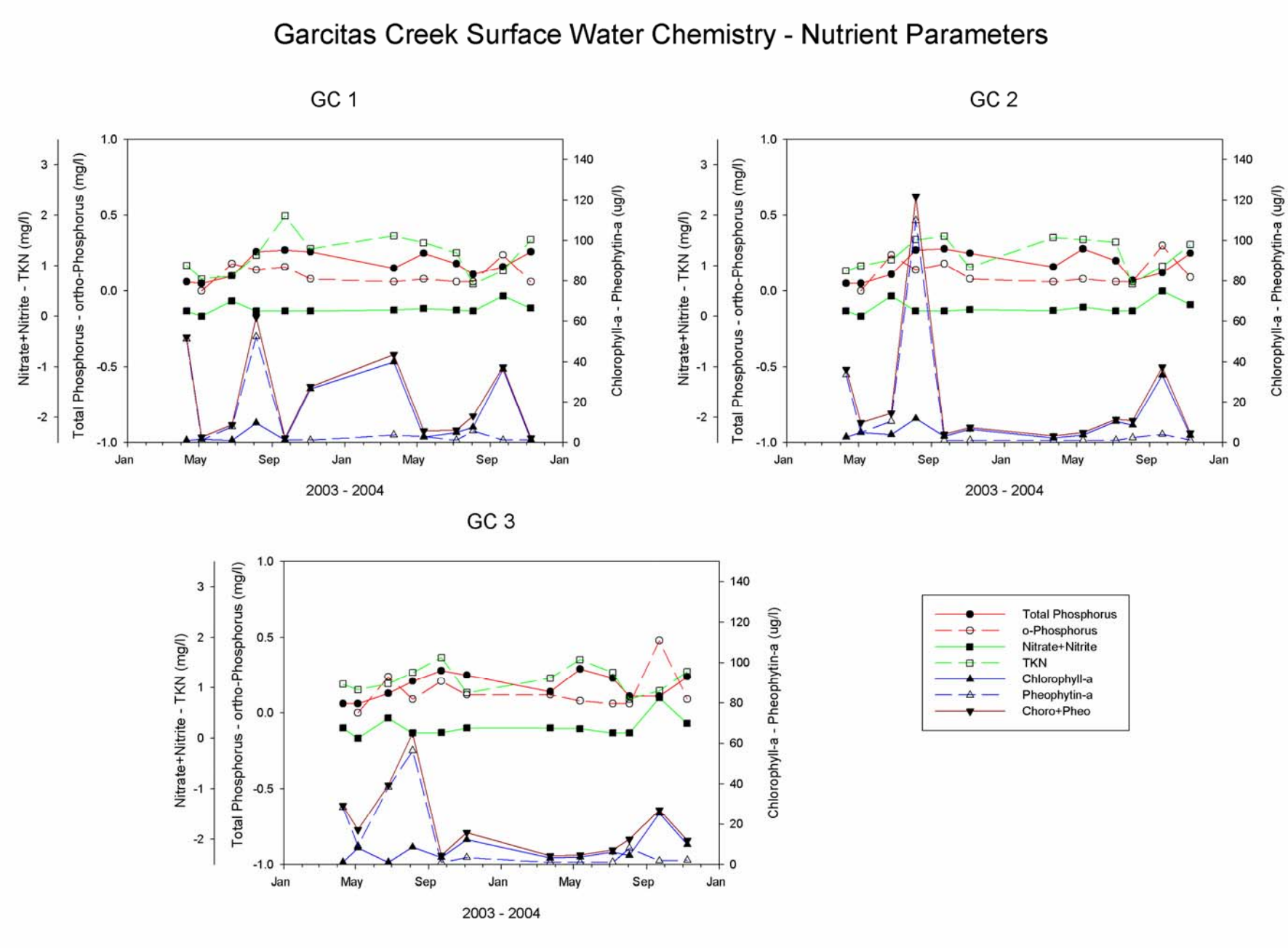

Figure 67. Water chemistry data measured for surface samples in Garcitas Creek (nutrient parameters). Sampling locations are described in the text. Connecting lines do not represent continuous data collection and are drawn to aid visualization.

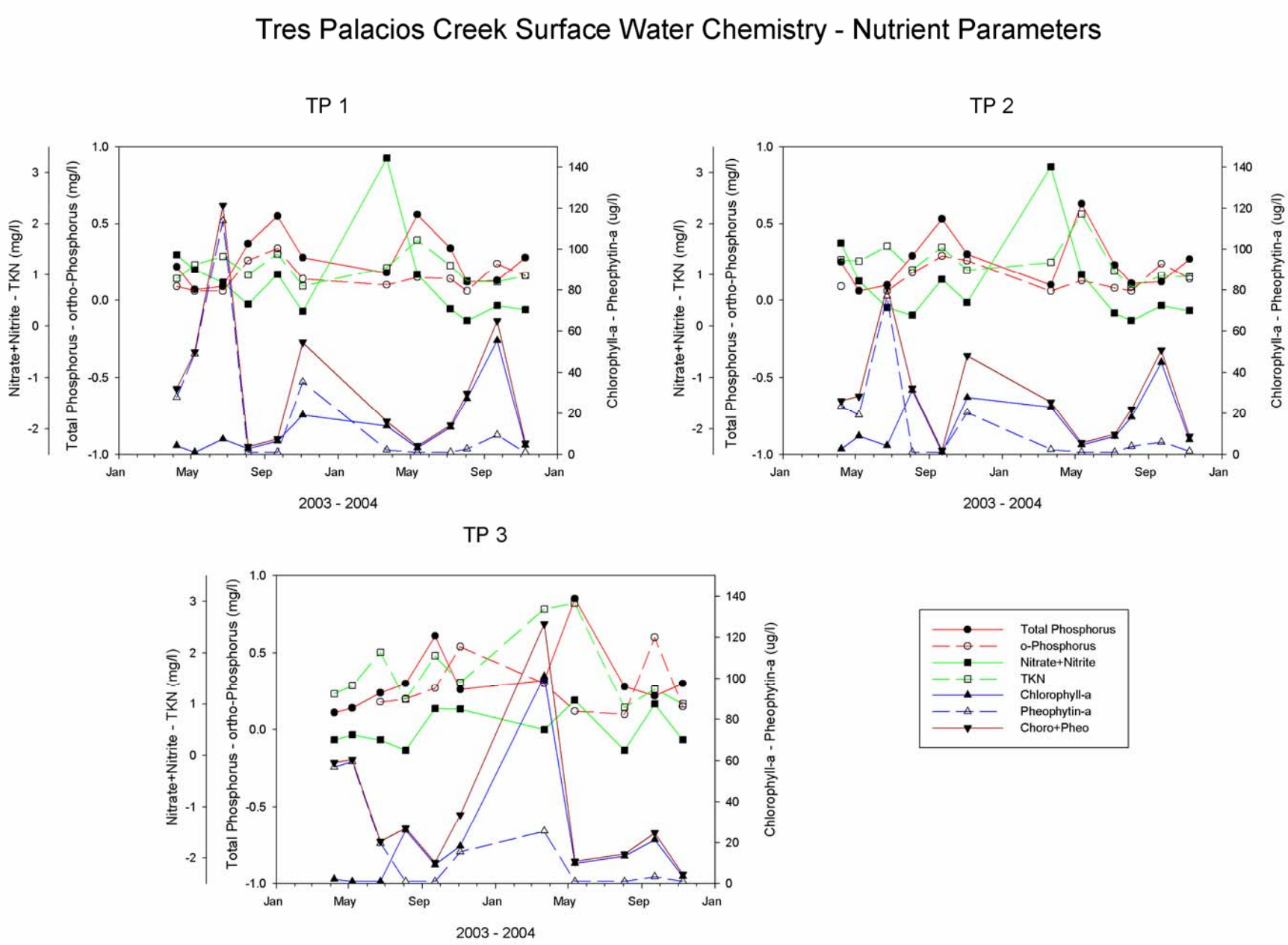

Figure 68. Water chemistry data measured for surface samples in Tres Palacios Creek (nutrient parameters). Sampling locations are described in the text. Connecting lines do not represent continuous data collection and are drawn to aid visualization.

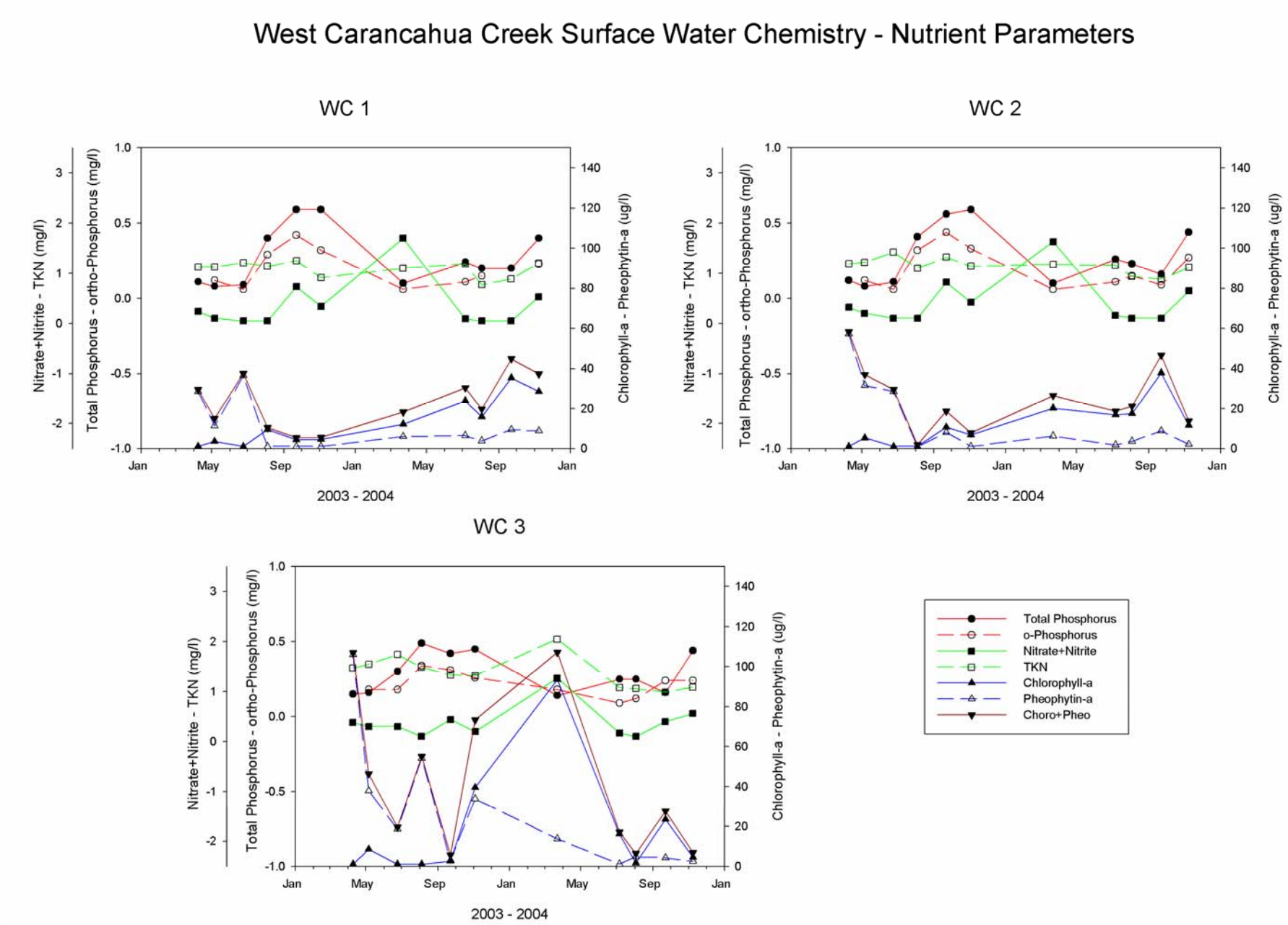

Figure 69. Water chemistry data measured for surface samples in West Carancahua Creek (nutrient parameters). Sampling locations are described in the text. Connecting lines do not represent continuous data collection and are drawn to aid visualization.