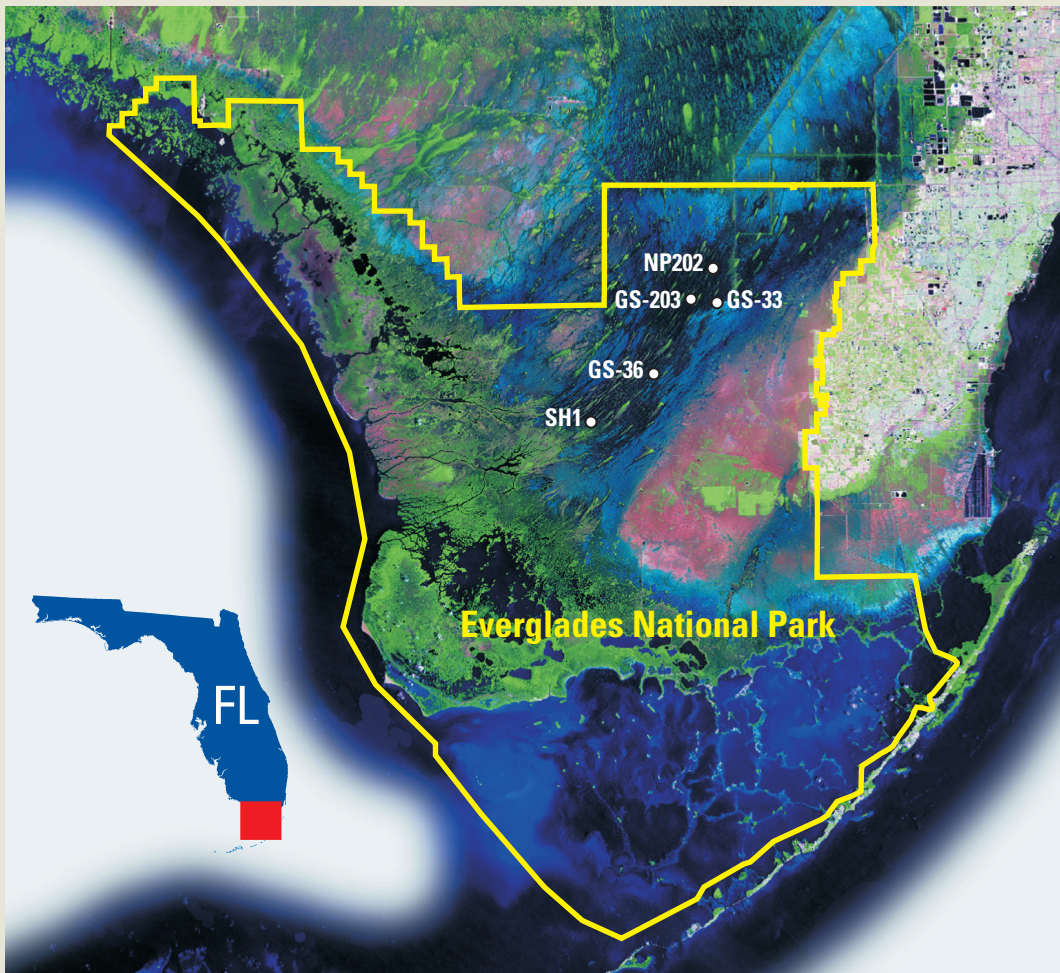


# Flow Velocity, Water Temperature, and Conductivity in Shark River Slough, Everglades National Park, Florida: June 2002–July 2003



**Open File Report 04-1233**

# **Flow Velocity, Water Temperature, and Conductivity in Shark River Slough, Everglades National Park, Florida: June 2002–July 2003**

By Ami L. Riscassi and Raymond W. Schaffranek

Open File Report 2004-1233

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## Conversion Factors, Abbreviations, and Horizontal Datum

Divide	By	To obtain
<b>Length</b>		
millimeter (mm)	25.4	inch (in.)
centimeter (cm)	2.54	inch (in.)
meter (m)	0.3048	foot (ft)
kilometer (km)	1.609	mile (mi)
<b>Velocity</b>		
centimeter per second (cm/s)	30.48	foot per second (ft/s)

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

$$^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32$$

Direction of flow is reported in degrees clockwise from magnetic north (°CW from MN).

Frequency of velocity measurements is reported in hertz (Hz).

Salinity is reported in parts per thousand (ppt).

Signal-to-noise ratio is reported in decibels (dB).

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

Horizontal coordinates are referenced to North American Datum of 1983 (NAD83).

# Flow Velocity, Water Temperature, and Conductivity in Shark River Slough, Everglades National Park, Florida: June 2002 – July 2003

Ami L. Riscassi and Raymond W. Schaffranek

## ABSTRACT

The data described in this report were collected in the U. S. Geological Survey (USGS) Priority Ecosystems Science project investigating “Forcing Effects on Flow Structure in Vegetated Wetlands of the Everglades.” Data collected at five locations in Shark River Slough, Everglades National Park, during the 2002-2003 wet season are documented in the report. Methods used to process the data are described. Daily mean flow velocities, water temperatures, and specific conductance values are presented in the appendices. The quality-checked and edited data have been compiled and stored on the USGS South Florida Information Access (SOFIA) website <http://sofia.usgs.gov>.

## INTRODUCTION

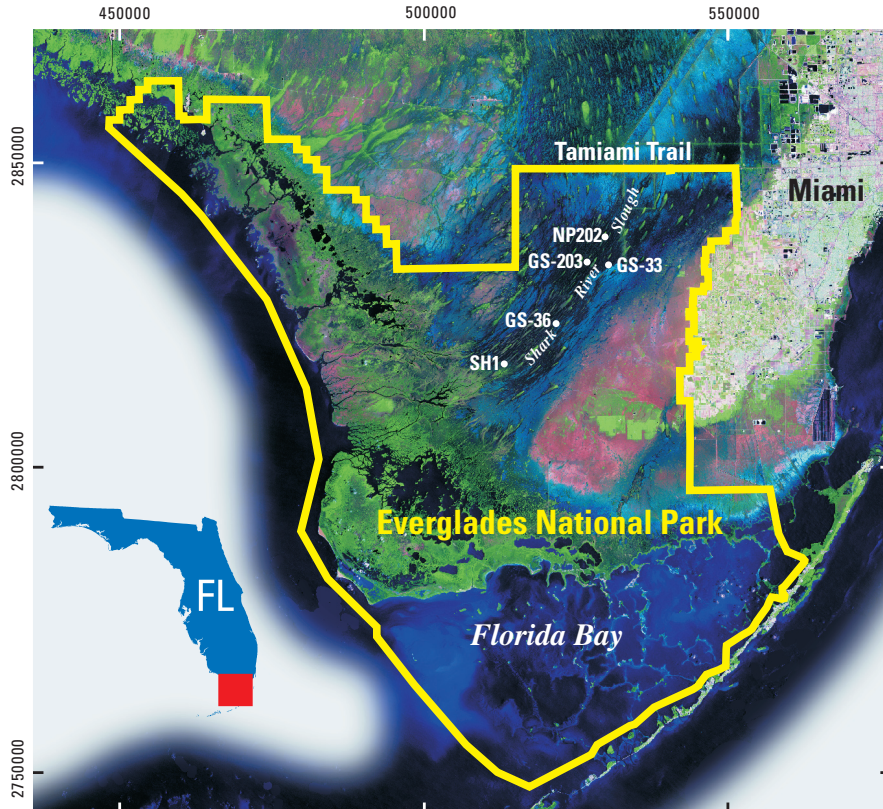
A major thrust of the Everglades restoration effort, according to the Comprehensive Everglades Restoration Plan available on the website <http://www.evergladesplan.org>, is to restore the natural functioning of the ecosystem to pre-drainage conditions. This objective requires detailed knowledge of the hydrologic and hydraulic factors that affect the natural flow of water through the Everglades wetlands. The heterogeneous vegetation, small topographic gradient, microtopography, and ridge-and-slough structure of the landscape variously affect flows through the vast mosaic of sloughs, marshes, and wet prairies that make up the Everglades. Data collected in this project document the temporal and spatial variability of the extremely low flow velocity of the shallow water in the heterogeneous wetlands and provide insight into the hydrologic processes and hydraulic factors that affect its flow through the low-gradient landscape.

Shark River Slough is the dominant pathway for surface-water flow in Everglades National Park (ENP) (fig. 1). It serves as the primary conduit for freshwater inflows discharged through culverts and hydraulic control structures along Tamiami Trail to the coastal mangrove ecotone of the southwest Gulf Coast of Florida. Flow-velocity, water-temperature, and conductivity data collected in Shark River Slough during June 2002 through July 2003 (2002–2003 wet season) are presented in this report. Data collected in the 2002–2003 wet season represent the final data-collection effort for the project. These data supplement data collected during the 1999–2000, 2000–2001, and 2001–2002 wet seasons documented previously (Riscassi and Schaffranek, 2002, 2003).

## Description of Study Area and Monitoring Program

The freshwater wetlands of Shark River Slough are a mixture of tree islands, sawgrass marshes, wet prairies, and sloughs that variously affect the conveyance of water to the coastal mangrove ecotone. Flow velocities and (or) related hydrologic parameters were monitored at five sites (SH1, GS-203, GS-33, GS-36, and NP202) with differing vegetative characteristics (fig. 1 and Table 1). At all five sites, temperatures were monitored in the plant litter, throughout the water column, on the water surface, and in the air above the water column using thermistors (thermally sensitive resistors). At four of the sites (SH1, GS-203, GS-33, and GS-36), flow velocities were monitored at a fixed point in the water column using acoustic Doppler velocity (ADV) meters. At three of the four ADV monitoring sites (GS-203, GS-33, and GS-36), water temperatures and conductivities were monitored at a fixed point in the water column using water-quality probes.





Base from U.S. Geological Survey South Florida satellite image map, 1993  
Universal Transverse Mercator, NAD 83, Zone 17 Meters

**Figure 1.** Satellite image of south Florida showing locations of monitoring stations SH1, GS-203, GS-33, GS-36, and NP202 in Everglades National Park, 1:500,000 scale.

## Purpose and Scope of Report

The flow-velocity, water-temperature, and conductivity data collected in the 2002–2003 wet season, as processed and presented in this report, are intended to supplement the data documented in Riscassi and Schaffranek (2002, 2003) for the 1999–2002 wet seasons. This report identifies the deployment and parameter specifications, describes the data-processing techniques, and presents the flow-velocity and related hydrologic data collected at five monitoring sites during the 2002–2003 wet season. Daily mean flow velocities and directions, specific conductances, and water temperatures are listed in the report appendixes. Quality checked and edited data are available for downloading from the Data Exchange page of the USGS SOFIA website <http://sofia.usgs.gov>.

## Acknowledgments

Gordon Anderson, USGS, provided ancillary stage data from the SH1 hydrologic monitoring station. Kevin Kotun, National Park Service (NPS)/ENP, provided ancillary stage

data from the NP203, NP202, P33, and P36 hydrologic monitoring stations. Edward German and Sandra Kinnaman, both of USGS, provided meteorological data from the P33 and SH1 evapotranspiration stations for flow analyses. Edward Simonds, USGS, provided logistical and technical support. Michael Duff, formerly of the USGS, developed the ADV filtering and plotting programs used to process, analyze, and display the flow-velocity data.

## SELECTION AND DESCRIPTION OF FLOW-MONITORING SITES

Locations of the flow-velocity and water-temperature monitoring stations SH1, GS-203, GS-33, GS-36, and NP202 are shown in figure 1. Thermistor strings were deployed at all five sites. ADV units were deployed at SH1, GS-203, GS-33, and GS-36. The ADV units at GS-203, GS-33, and GS-36 were equipped with integrated MicroCAT conductivity/temperature probes.

Sites SH1, GS-203, GS-33, and NP202 were established in differing vegetative communities as documented in Table 1 and previously described in Riscassi and Schaffranek (2002, 2003). In July 2002, an ADV unit and thermistor string were deployed at site GS-36 (fig. 2) to monitor flow velocities, conductivities, and temperature profiles in an area of sparse spikerush approximately midway between established flow-monitoring stations SH1 and GS-33. The GS-36 site was located near the NPS P36 hydrologic monitoring station to provide water-level data for flow analyses. Monitoring site locations, types of instrumentation deployed, and vegetative characteristics during the 2002–2003 wet seasons are identified in table 1.

## METHODS

Methods developed to measure the flow velocity, water temperature, and conductivity are identical to those defined in Riscassi and Schaffranek (2002). A brief description of the measurement techniques and a summary of the deployment techniques and critical parameter settings for the 2002–2003 wet season are provided in this section of the report.

### Measurement Techniques

Flow velocities were measured bi-hourly at a fixed point in the water column using SonTek/YSI 10 MHz ADVField units (Sontek, 2001). Conductivity and temperature data were measured bi-hourly near the top of the litter layer using MicroCAT model SBE 37-SI meters developed by Sea-Bird Electronics (Sea-Bird Electronics, 1999). Temperatures were measured at 15-minute intervals in the plant litter, typically at 5- or 10-cm-depth increments throughout the water column, on the water surface, and in the air above the water surface using glass-encapsulated thermistors manufactured by Yellow Springs Instruments (YSI) (Yellow Springs Instruments, 1998). Thermistors at the GS-36 site were fixed at variable depth increments. Riscassi and Schaffranek (2002) present detailed descriptions of the instrumentation, including accuracy and resolution specifications.

### Deployment Techniques and Parameter Settings

Deployment techniques and procedures used for the 2002-2003 wet season were the same as those documented in Riscassi and Schaffranek (2002) for the 1999-2001 wet seasons. ADV-deployment parameter settings at SH1, GS-203, GS-33, and GS-36 are provided in table 2. Velocities were measured at 10-Hz in a one minute burst yielding 600 samples. MicroCAT meters were deployed 11, 17, and 15 cm above the plant-litter layer near the ADV meters at GS-203, GS-33, and GS-36, respectively. Thermistor positions, in

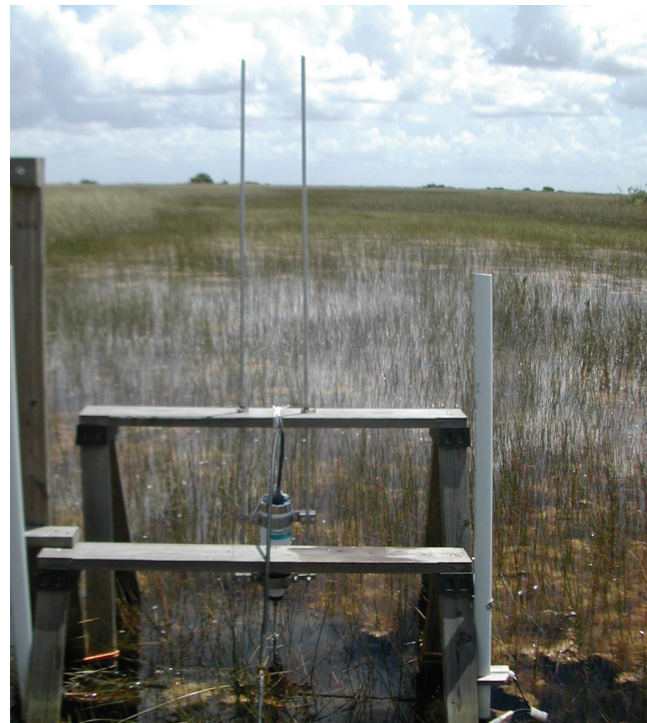
relation to the top of the plant-litter layer, and temperature recording intervals at all monitoring sites are listed in table 3. The ADV meter recording interval and sample volume location, relative to the top of the plant-litter layer, are provided in table 4 for each deployment. Approximate water depths determined from water levels recorded at nearby hydrologic stations also are listed in table 4.

## PROCESSING FLOW-VELOCITY, TEMPERATURE, AND CONDUCTIVITY DATA

In processing the flow-velocity, temperature, and conductivity data, factors such as instrument accuracies and environmental conditions associated with the wetland deployments were considered in the development of applicable processing techniques. Techniques and editing criteria used to process, quality check, and verify the data are summarized in the following report sections.

### ADV Data

The techniques used to process ADV data collected during the 2002-2003 wet season are a continuation of methods developed and documented previously in Riscassi and Schaf-



**Figure 2.** ADV probe deployed in a sparse spikerush area at GS-36.

**Table 1.** Site locations and instrumentation for flow-velocity and water-temperature monitoring stations.

[UTM, Universal Transverse Mercator; NAD, North American Datum; m, meter; ADV, Acoustic Doppler Velocity]

Site Name	UTM Coordinates NAD 83, Zone 17		Location	Instrumentation	Vegetation
	East (m)	North (m)			
GS-203	526133	2833920	160 m from NP203 hydrologic station at 22.7 degrees west of south	ADV unit, MicroCAT meter, thermistor string, data logger, solar panel	medium-dense saw-grass
GS-33	529637	2833457	440 m from P33 hydrologic station at 30.6 degrees west of north	ADV unit, MicroCAT meter, thermistor string, data logger, solar panel	medium-dense spike-rush with periphyton
SH1	515249	2817258	10 m southwest of SH1 hydrologic station	ADV unit, thermistor string, data logger, solar panel	medium-dense spike-rush
NP202	529245	2838450	co-located with NP202 hydrologic station	thermistor string, data logger, solar panel	dense cattail
GS-36	520563	2823605	136 m from P36 hydrologic station at 21 degrees east of north	ADV unit, MicroCAT meter, thermistor string, data logger, solar panel	sparse spikerush with periphyton

frank (2002). A preliminary data-inspection process, a pre-editing data-conversion process, a quantitative data-editing process, and a qualitative inspection process were used to edit, verify, and otherwise process the recorded flow-velocity data. Specific deployment parameter settings used to collect the data and post-processing corrections applied to edit the data are identified in table 5 as old and new values, respectively.

Editing and filtering criteria used to process the ADV data for the 2002-2003 wet season include those suggested by the instrument manufacturer to detect suspect data attributed to poor signal quality (SonTek, 2001) and those developed during the processing and concurrent analysis of past ADV data (Ball and Schaffranek, 2000; Riscassi and Schaffranek, 2002, 2003). The equipment manufacturer suggests minimum signal-to-noise-ratio (SNR) and statistical-correlation values of 5 dB and 70 percent, respectively, as indicative of good acoustic signal quality (SonTek, 2001). Average SNR values determined from the filtered and processed data were approximately 5, 8, 11, and 4 dB at GS-203, GS-36, GS-33, and SH1, respectively, during all deployments. Lower SNR values at the SH1 site are directly related to the higher ambient noise of the specific ADV meter deployed there and are not indicative of poorer acoustic conditions, which are similar at all sites. Although SNR values were computed for each burst for all ADV deployments, they were not used as a quantitative automated data-editing criterion. Instead, they were used in conjunction with other hydrologic and meteorologic data in the qualitative editing processes as a means to evaluate the reliability of data that passed the quantitative filter criterion, but were deemed potentially erroneous or suspect

in comparison to other flow velocities recorded during the deployment period.

Data that passed the preliminary data inspection process were first processed to correct for coordinate-system conversions and sound-speed re-calculations prior to quantitative automated data editing. The initial automated data-editing process consisted of the application of two filter criteria, one based on a minimal statistical correlation for each sample and the other on minimal number of valid samples per burst. A minimum correlation value of 70 percent was used as the statistical-filtering criterion. The minimum samples-per-burst criterion was determined by examination and assessment of plots of burst-averaged velocities generated using various minimum values of 600, 500, 400, 300, 200, 100, and 1 (1 meaning no minimum), in processing ADV data sets from the SH1, GS-203, GS-33, and GS-36 sites. As was determined in analyses of data collected during the 1999–2002 wet seasons, the 100-minimum filter criterion appeared too inclusive of suspect data and the 300-minimum criterion appeared overly exclusive of apparently valid data. Consequently, for the 10-Hz one-minute burst sampling conducted at all four ADV sites, a criterion of 200 was determined to be the most appropriate minimum samples-per-burst filter and was subsequently used to process all ADV data sets. Differences between daily mean horizontal flow velocities computed using the most liberal criterion, one minimum sample, and all others (100, 200, 300, 400, 500, and 600) were found to be small in sensitivity tests conducted with past data (Riscassi and Schaffranek, 2002, 2003) and data documented in this report. (For the August through September 2002 deployments at SH1, GS-203, GS-33, and GS-36, the averages of the maximum

**Table 2.** Deployment parameter settings for SH1, GS-203, GS-33, and GS-36 ADV units.

[min, minute; °C, degrees Celsius; ppt, parts per thousand; cm/s, centimeter per second; EDT, Eastern Daylight Time; EST, Eastern Standard Time; ENU, geodetic East North Up]

Deployment Period <sup>1</sup>	Deployment Parameters				
	Recording Interval (min)	Temperature (°C)	Salinity (ppt)	Velocity Range (cm/s)	Coordinate System
SH1 2002–2003 Wet Season					
06/26/02 1500–08/27/02 1300 EDT	30	30	0.1	+/- 10	ENU
08/28/02 1029–09/25/02 0859 <sup>2</sup> EDT	30	30	0.1	+/- 10	ENU
GS-203 2002–2003 Wet Season					
06/27/02 1200–08/27/02 1500 EDT	30	29	0.0	+/- 10	ENU
08/28/02 1300–10/29/02 1600 EDT	30	29	0.0	+/- 10	ENU
10/30/02 1200–12/03/02 1330 EDT	30	29	0.0	+/- 10	ENU
12/04/02 1200–01/21/03 1330 EST	30	29	0.0	+/- 10	ENU
01/23/03 1200–04/22/03 1400 EST	30	20	0.1	+/- 10	ENU
GS-33 2002–2003 Wet Season					
06/27/02 1200–08/27/02 1500 EDT	30	28	0.1	+/- 10	ENU
08/28/02 1400–10/29/02 1600 EDT	30	29	0.1	+/- 10	ENU
10/30/02 1400–12/03/02 1400 EDT	30	29	0.1	+/- 10	ENU
12/04/02 1400–01/21/03 1430 EST	30	29	0.1	+/- 10	ENU
01/22/03 1100–04/15/03 2130 EST	30	20	0.1	+/- 10	ENU
GS-36 2002–2003 Wet Season					
07/24/02 1400–08/27/02 1400 EDT	30	30	0.1	+/- 10	ENU
08/28/02 1200–10/29/02 1530 EDT	30	30	0.1	+/- 10	ENU
10/30/02 1000–12/03/02 1230 EDT	30	30	0.1	+/- 10	ENU
12/04/02 1000–01/21/03 1230 EST	30	20	0.1	+/- 10	ENU
01/22/03 1000–04/07/03 0000 EST	30	20	0.1	+/- 10	ENU
06/18/03 1300–07/30/03 1100 EST	30	29	0.1	+/- 10	ENU

<sup>1</sup> Excludes any invalid data segments at beginning and end of deployment record.

<sup>2</sup> Data collection inadvertently initiated at non-multiple time interval.

daily-mean velocity differences using all seven samples-per-burst filters were 0.12, 0.05, 0.01, and 0.01 cm/s, with the largest maximum differences for daily-mean values being 0.66, 0.16, 0.04, and 0.35 cm/s, respectively.)

A secondary qualitative processing technique included the generation of plots of filtered data to detect any remaining anomalous horizontal flow speeds and directions, likely due to various environmental factors such as vegetation getting caught on the probe, floating into the path of acoustic signal, or causing variable backscatter influences. The quali-

tative inspection resulted in the removal of 15 percent of velocity bursts from all deployments at SH1, which included a 9-day period. For all deployments at GS-203, 16 percent of velocity bursts were removed, which included 22- and 14-day periods. For all deployments at GS-33, 23 percent of the velocity bursts were removed in the qualitative analyses, which included a 2-month period at the end of the deployment. For all valid deployments at GS-36, 20 percent of the velocity bursts were removed in the qualitative analyses, which included a 2-month period at the end of the deploy-

**Table 3.** Deployment specifications and parameter settings for SH1, GS-203, GS-33, GS-36, and NP202 thermistor strings.

[min, minute; cm, centimeter; EDT, Eastern Daylight Time; EST, Eastern Standard Time]

Deployment Period	Recording Interval (min)	Thermistor Height <sup>1</sup> (cm)
SH1 2002–2003 Wet Season		
07/25/02 0845–08/27/02 1330 EDT	15	0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 110
08/27/02 1345–09/25/02 0930 EDT	15	0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 110
GS-203 2002–2003 Wet Season		
06/27/02 0900–08/28/02 0900 EDT	15	0, 10, 20, 25, 30, 35, 40, 45, 55, 65, water surface <sup>2</sup>
08/28/02 0915–09/24/02 0815 EDT	15	0, 10, 20, 25, 30, 35, 40, 45, 55, 65, water surface <sup>2</sup>
09/24/02 0830–12/03/02 1330 EDT	15	0, 10, 20, 25, 30, 35, 40, 45, 55, 65, water surface <sup>2</sup>
12/03/02 1345–01/21/03 1345 EST	15	0, 10, 20, 25, 30, 35, 40, 45, 55, 65, water surface <sup>2</sup>
01/21/03 1400–06/16/03 0945 EST	15	0, 10, 20, 25, 30, 35, 40, 45, 55, 65, water surface <sup>2</sup>
GS-33 2002–2003 Wet Season		
06/27/02 1130–07/25/02 0845 EDT	15	0, 10, 20, 25, 30, 35, 40, 45, 55, 65, water surface <sup>2</sup>
07/25/02 0900–08/27/02 1515 EDT	15	0, 10, 20, 25, 30, 35, 40, 45, 55, 65, water surface <sup>3</sup>
08/29/02 1530–09/24/02 1315 EDT	15	0, 10, 20, 25, 30, 35, 40, 45, 55, 65, water surface <sup>3</sup>
09/24/02 1330–10/30/02 1400 EDT	15	0, 10, 20, 25, 30, 35, 40, 45, 55, 65, water surface <sup>3</sup>
10/30/02 1315–12/03/02 1415 EST	15	0, 10, 20, 25, 30, 35, 40, 45, 55, 65, water surface <sup>3</sup>
12/03/02 1430–01/21/03 1445 EST	15	0, 10, 20, 25, 30, 35, 40, 45, 55, 65, water surface <sup>3</sup>
01/21/03 1500–06/16/03 0715 EST	15	0, 10, 20, 25, 30, 35, 40, 45, 55, 65, water surface <sup>3</sup>
NP202 2002–2003 Wet Season		
06/27/02 1415–09/24/02 1300 EDT	15	0, 10, 20, 30, 40, 50, 60, 70, 80, 90, water surface <sup>2</sup>
09/24/02 1315–10/30/02 1315 EDT	15	0, 10, 20, 30, 40, 50, 60, 70, 80, 90, water surface <sup>2</sup>
10/30/02 1330–12/04/02 1215 EST	15	0, 10, 20, 30, 40, 50, 60, 70, 80, 90, water surface <sup>2</sup>
12/04/02 1230–01/21/03 1415 EST	15	0, 10, 20, 30, 40, 50, 60, 70, 80, 90, water surface <sup>2</sup>
01/21/03 1430–06/16/03 1045 EST	15	0, 10, 20, 30, 40, 50, 60, 70, 80, 90, water surface <sup>2</sup>
GS-36 2002–2003 Wet Season		
07/25/02 0930–08/07/02 1900 EDT	15	-7, 0, 7, 12, 19, 20, 24, 27, 29, 46, water surface <sup>2</sup>
08/27/02 1930–09/17/02 1330 EDT	15	-7, 0, 7, 12, 19, 20, 24, 27, 29, 46, water surface <sup>2</sup>
09/17/02 1400–09/24/02 1015 EDT	15	-7, 0, 7, 12, 19, 20, 24, 27, 29, 46, water surface <sup>2</sup>
09/24/02 1045–10/30/02 1000 EDT	15	-7, 0, 7, 12, 19, 20, 24, 27, 29, 46, water surface <sup>2</sup>
10/30/02 1015–12/03/02 1245 EST	15	-7, 0, 7, 12, 19, 20, 24, 27, 29, 46, water surface <sup>2</sup>
12/03/02 1315–01/21/03 1245 EST	15	-7, 0, 7, 12, 19, 20, 24, 27, 29, 46, water surface <sup>2</sup>
01/21/03 1300–06/16/03 0815 EST	15	-7, 0, 7, 12, 19, 20, 24, 27, 29, 46, water surface <sup>2</sup>
06/16/03 0930–07/30/03 1145 EDT	15	-7, 0, 7, 12, 19, 20, 24, 27, 29, 46, water surface <sup>2</sup>

<sup>1</sup> Measured from 1–2 cm below top of plant-litter layer.<sup>2</sup> Thermistor measuring water-surface temperature is subject to being suspended in air or submerged by vegetation.<sup>3</sup> No data recorded for thermistor during entire deployment due to communications failure.

**Table 4.** ADV data-collection summaries for SH1, GS-203, GS-33, and GS-36.

[min, minute; cm, centimeter; avg, average; EDT, Eastern Daylight Time; EST, Eastern Standard Time]

<b>Deployment Period <sup>1</sup></b>	<b>Recording Interval (min)</b>	<b>Sample Volume Location Above Top of Litter (cm)</b>	<b>Approximate Water Depth Range (avg) (cm)</b>
SH1 2002-2003 Wet Season			
06/26/02 1500–08/27/02 1300 EDT	30	34	42–67 (52)
08/28/02 1029–09/25/02 0859 <sup>2</sup> EDT	30	34	50–57 (54)
GS-203 2002-2003 Wet Season			
06/27/02 1200–08/27/02 1500 EDT	30	19	36–51 (45)
08/28/02 1300–10/29/02 1600 EDT	30	19	51–57 (53)
10/30/02 1200–12/03/02 1330 EDT	30	19	40–53 (47)
12/04/02 1200–01/21/03 1330 EST	30	15	27–40 (34)
01/23/03 1200–04/22/03 1400 EST	30	15	19–28 (23)
GS-33 2002-2003 Wet Season			
06/27/02 1200–08/27/02 1500 EDT	30	19	33–45 (39)
08/28/02 1400–10/29/02 1600 EDT	30	19	44–50 (47)
10/30/02 1400–12/03/02 1400 EDT	30	19	35–47 (41)
12/04/02 1400–01/21/03 1430 EST	30	9	26–40 (32)
01/22/03 1100–04/15/03 2130 EST	30	9	17–48 (26)
GS-36 2002-2003 Wet Season			
07/24/02 1400–08/27/02 1400 EDT	30	20	31–40 (35)
08/28/02 1200–10/29/02 1530 EDT	30	20	40–44 (42)
10/30/02 1000–12/03/02 1230 EDT	30	20	34–41 (37)
12/04/02 1000–01/21/03 1230 EST	30	10	22–38 (30)
01/22/03 1000–04/07/03 0000 EST	30	10	13–22 (16)
06/18/03 1300–07/30/03 1100 EST	30	10	36–47 (42) <sup>3</sup>

<sup>1</sup> Excludes any invalid data segments at beginning and end of deployment record.<sup>2</sup> Data collection inadvertently initiated at non-multiple time interval.<sup>3</sup> No data available from P36 stage recorder, values are based on 2 measurements taken during site visits.

**Table 5.** Post-processing changes to deployment parameter settings for SH1, GS-203, GS-33, and GS-36 ADV units.

[old, original setting; new, calculated correction; °C, degrees Celsius; ppt, parts per thousand; EDT, Eastern Daylight Time; EST, Eastern Standard Time; ENU, geodetic East North Up].

Deployment Period <sup>1</sup>	Parameter Settings				Coordinate System	
	Temperature		Salinity		Old	New
	Old (°C)	New (°C)	Old (ppt)	New (ppt)		
SH1						
2002–2003 Wet Season						
06/26/02 1500–08/27/02 1300 EDT	30	31	0.1	-	ENU	-
08/28/02 1029–09/25/02 0859 <sup>2</sup> EDT	30	30	0.1	-	ENU	-
GS-203						
2002–2003 Wet Season						
06/27/02 1200–08/27/02 1500 EDT	29	31	0.0	0.18	ENU	-
08/28/02 1300–10/29/02 1600 EDT	29	29	0.0	0.20	ENU	-
10/30/02 1200–12/03/02 1330 EDT	29	23	0.0	0.22	ENU	-
12/04/02 1200–01/21/03 1330 EST	29	23	0.0	0.24	ENU	-
01/23/03 1200–04/22/03 1400 EST	20	22	0.1	0.26	ENU	-
GS-33						
2002–2003 Wet Season						
06/27/02 1200–08/27/02 1500 EDT	28	30	0.1	0.19	ENU	-
08/28/02 1400–10/29/02 1600 EDT	29	29	0.1	0.24	ENU	-
10/30/02 1400–12/03/02 1400 EDT	29	23	0.1	0.26	ENU	-
12/04/02 1400–01/21/03 1430 EST	29	18	0.1	0.27	ENU	-
01/22/03 1100–04/15/03 2130 EST	20	23	0.1	0.25	ENU	-
GS-36						
2002–2003 Wet Season						
07/24/02 1400–08/27/02 1400 EDT	30	32	0.1	0.17	ENU	-
08/28/02 1200–10/29/02 1530 EDT	30	30	0.1	0.21	ENU	-
10/30/02 1000–12/03/02 1230 EDT	30	24	0.1	0.22	ENU	-
12/04/02 1000–01/21/03 1230 EST	20	19	0.1	0.25	ENU	-
01/22/03 1000–04/07/03 0000 EST	20	24	0.1	0.23 <sup>3</sup>	ENU	-
06/18/03 1300–07/30/03 1100 EST	29	30	0.1	0.20 <sup>3</sup>	ENU	-

<sup>1</sup> Excludes any invalid data segments at beginning and end of deployment record.

<sup>2</sup> Data collection inadvertently initiated at non-multiple time interval.

<sup>3</sup> MicroCAT communication failure, values approximated from previously recorded data.

ment when water levels fell below the transducer of the ADV probe. Bursts that did not pass the qualitative inspection process were deleted and daily mean horizontal-flow speeds and directions were recalculated. The percentages of data that did not pass both the quantitative automated-filter and qualitative-analysis processes for each ADV deployment period are presented with daily mean flow summaries in tables in Appendixes A, B, C, and D. The subsequent removal of individual velocity bursts by qualitative analysis did not significantly change the resultant daily mean velocity magnitudes or flow directions.

### MicroCAT Temperature and Conductivity Data

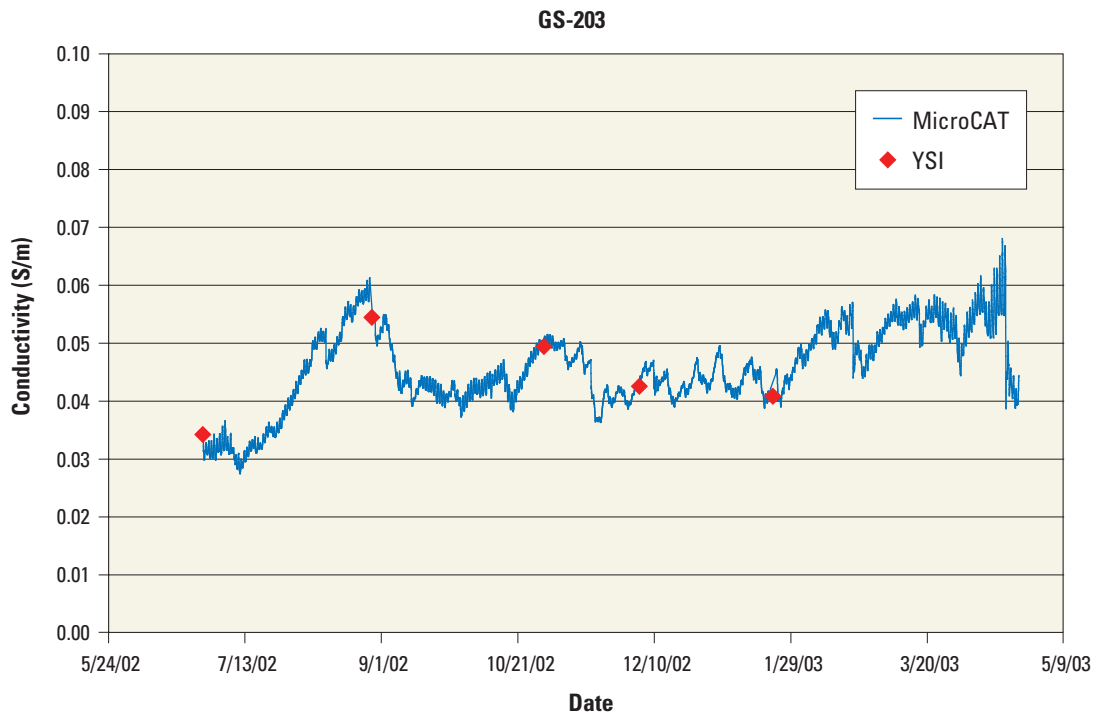
MicroCAT measured temperatures and conductivities at GS-36 were intermittently recorded from February 12 through March 25, 2003 (data recorded for 92 percent of the deployment period) and no data were recorded after March 25, 2003 due to an equipment failure.

Temperatures, measured and recorded by the MicroCAT meter near the top of the plant-litter layer at the GS-203, GS-33, and GS-36 sites, were compared to temperatures measured by the thermistor of the temperature string that was approximately at the same depth in the water

column as the MicroCAT meter. Good agreement was found between the two sets of data for all deployments. No anomalies were found in the MicroCAT temperature data. Daily mean temperatures, derived from data measured by the MicroCAT meters at GS-203, GS-33, and GS-36 are reported in Appendixes B, C, and D, respectively.

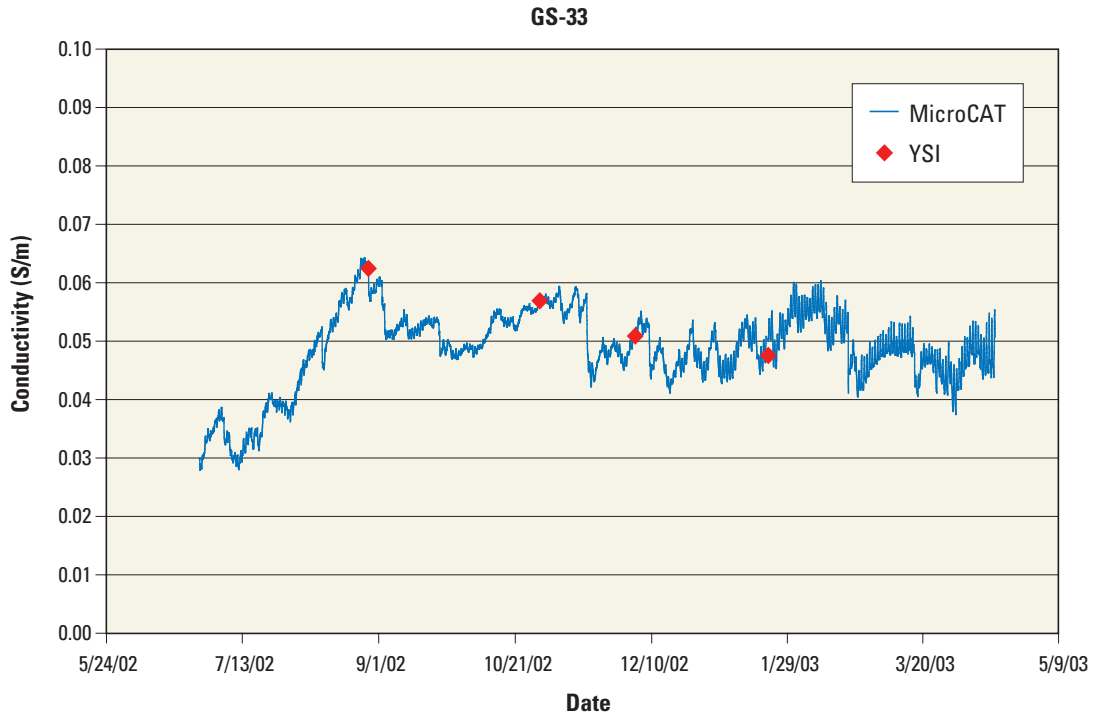
Conductivity data measured by the MicroCAT meter were compared to conductivity measurements taken with a hand-held portable YSI Model 30 meter during field visits. Good agreement was found between the YSI point measurements and MicroCAT data at GS-203, GS-33, and GS-36 (fig. 3, 4, and 5). At site GS-36, uncommonly low conductivity readings, which are indicative of a cell-contamination problem, were recorded from February 6, 2003 through the end of the deployment. All conductivity data recorded during that time period are erroneous. No anomalies were found in the remainder of the MicroCAT conductivity data.

Daily mean specific conductance values calculated from conductivities recorded at GS-203, GS-33, and GS-36 are reported in Appendixes B, C, and D, respectively. Conductivity data are recorded in seimens per meter (S/m) and converted to specific conductance in microseimens per centimeter ( $\mu\text{S}/\text{cm}$ ) at 25 degrees Celsius for reporting purposes as described in Riscassi and Schaffranek (2002).

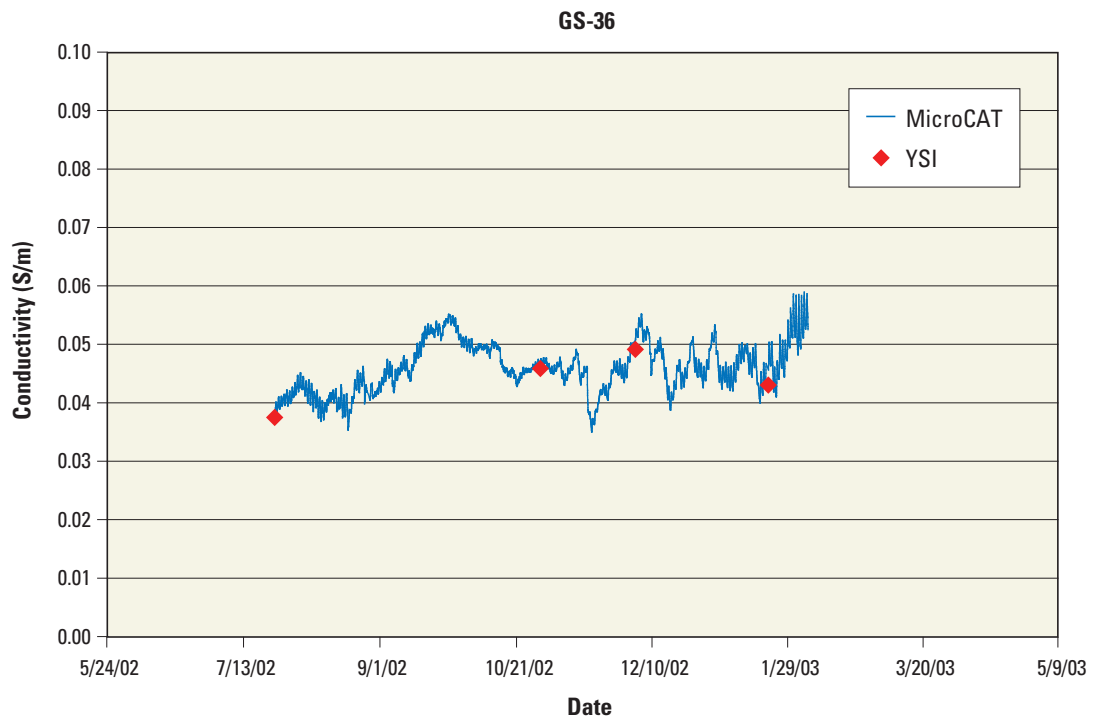


**Figure 3.** Conductivities measured continuously by MicroCAT probe and intermittently by hand-held YSI meter at GS-203 in Shark River Slough, Everglades National Park, during the 2002-2003 wet season.





**Figure 4.** Conductivities measured continuously by MicroCAT probe and intermittently by hand-held YSI meter at GS-33 in Shark River Slough, Everglades National Park, during the 2002-2003 wet season.



**Figure 5.** Conductivities measured continuously by MicroCAT probe and intermittently by hand-held YSI meter at GS-36 in Shark River Slough, Everglades National Park, during the 2002-2003 wet season.

## Thermistor String Temperature Profile Data

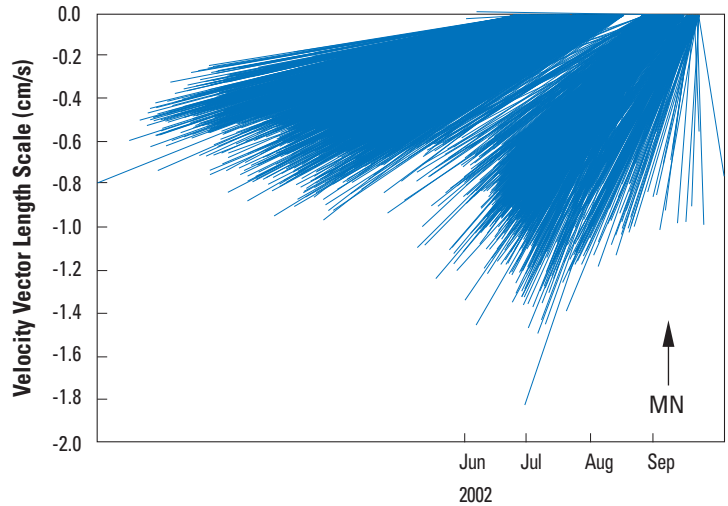
All temperature profile data from the thermistor strings were plotted and inspected for anomalies. Temperatures from the thermistor closest to the height of the MicroCAT probe above the litter layer also were compared to the MicroCAT recorded temperature. No suspect data were found in the visual inspection or in the MicroCAT comparisons.

## FLOW-VELOCITY, TEMPERATURE, AND CONDUCTIVITY DATA SUMMARY

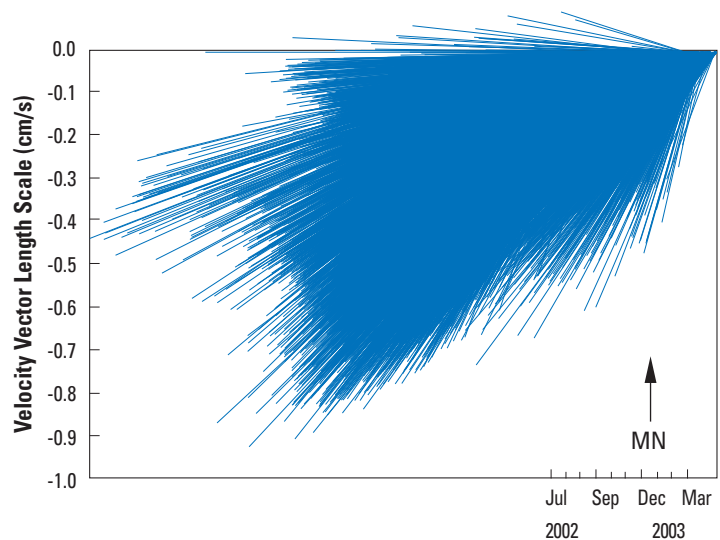
A summary of the data collected at all five monitoring sites SH1, GS-203, GS-33, GS-36, and NP202 during the 2002-2003 wet season is presented in the following report sections. Daily mean flow velocities, water temperatures, and specific conductances derived from measured conductivities are reported in Appendixes A, B, C, and D.

### Flow-Velocity Data

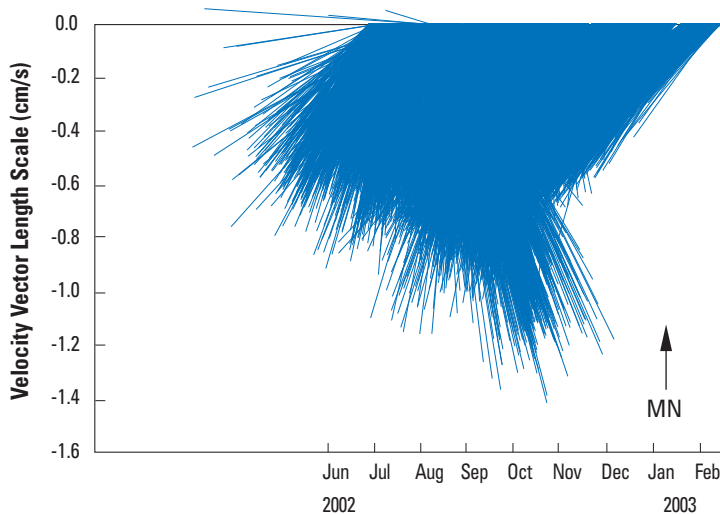
Valid flow-velocity data were obtained from all deployments at all four ADV monitoring sites during the 2002-2003 wet season. Vectors showing burst-averaged velocity magnitudes and flow directions in the horizontal plane, relative to magnetic north, measured at sites SH1, GS-203, GS-33, and GS-36 are illustrated in figures 6, 7, 8, and 9, respectively. Horizontal velocity magnitudes for all deployments generally ranged from 0.11 to 1.99 cm/s at SH1 (fig. 6), from 0.13 to 1.43 cm/s at GS-203 (fig. 7), from 0.06 to 1.46 cm/s at GS-33 (fig. 8), and from 0.01 to 2.56 cm/s at GS-36 (fig. 9). Horizontal flow directions at all locations generally ranged from 180 to 275 degrees, clockwise with respect to magnetic north (MN). (Declination corrections to Geodetic North are less than the plus or minus 2 degree accuracy of the ADV compass and, therefore, are not applied to the recorded velocity data.) Horizontal flow directions for all deployments averaged approximately 236 degrees at SH1, 240 degrees at GS-203, 203 degrees at GS-33, and 229 degrees at GS-36. Corresponding daily mean horizontal-flow velocities are reported in tabular form for the SH1, GS-203, GS-33, and GS-36 sites in Appendixes A, B, C, and D, respectively.



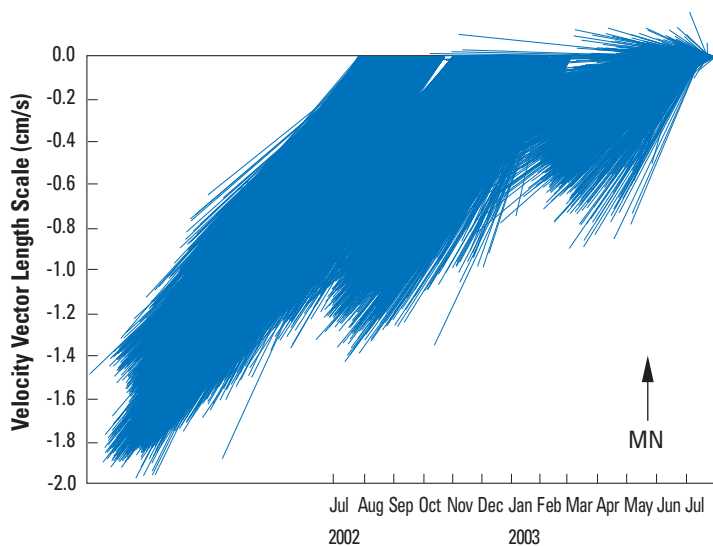
**Figure 6.** Burst-averaged flow velocities, shown as vectors relative to magnetic north, at SH1 in Shark River Sough, Everglades National Park, during the 2002–2003 wet season.



**Figure 7.** Burst-averaged flow velocities, shown as vectors relative to magnetic north, at GS-203 in Shark River Sough, Everglades National Park, during the 2002–2003 wet season.



**Figure 8.** Burst-averaged flow velocities, shown as vectors relative to magnetic north, at GS-33 in Shark River Slough, Everglades National Park, during the 2002–2003 wet season.



**Figure 9.** Burst-averaged flow velocities, shown as vectors relative to magnetic north, at GS-36 in Shark River Slough, Everglades National Park, during the 2002–2003 wet season.

## Temperature and Conductivity Data

Water temperatures recorded during all deployments by the MicroCAT meter near the top of the litter layer ranged from approximately 10 to 36 °C at GS-203, 9 to 35 °C at GS-33, and 10 to 39 °C at GS-36. During all deployments, temperatures varied several degrees in a daily cyclical pattern. Specific conductance values, calculated from measured conductivities, for all deployments ranged from approximately 263 to 637  $\mu\text{S}/\text{cm}$  at GS-203, 257 to 662  $\mu\text{S}/\text{cm}$  at GS-33, and 316 to 624  $\mu\text{S}/\text{cm}$  at GS-36. Daily mean water temperatures and specific conductances are reported in tabular form for GS-203, GS-33, and GS-36 in Appendixes B, C, and D, respectively.

## Temperature Profile Data

Water-column temperatures measured by the thermistor strings for all deployments at all sites ranged from approximately 9 to 38 °C in the 2002–2003 wet season. Daily vertical temperature gradients often approached 3 to 4 °C. A typical temperature profile pattern, recorded at SH1, is illustrated and described in Riscassi and Schaffranek (2002).

## DATA AVAILABILITY

Quality-checked and edited flow-velocity, water-temperature, and specific-conductance data, collected during the 2002–2003 wet season and summarized in this report, are available on the Data Exchange page of the USGS SOFIA website <http://sofia.usgs.gov>. Three-dimensional velocity component data (including associated statistical correlation and SNR values), water temperatures, specific conductances, and water- and air-temperature profile data are available for downloading.

## SUMMARY

The data-collection effort described in this report is in support of the U. S. Geological Survey (USGS) Priority Ecosystems Science project investigating “Forcing Effects on Flow Structure in Vegetated Wetlands of the Everglades.” The acquisition,

processing, and evaluation of flow-velocity, water-temperature, and conductivity data collected at five locations (sites SH1, GS-203, GS-33, GS-36, and NP202) in Shark River Slough, Everglades National Park, Florida, during the 2002-2003 wet season are documented. Temperatures were monitored at 15-minute intervals throughout the water column at all five sites, 3-D flow-velocity components were monitored bi-hourly at a fixed point in the water column at SH1, GS-203, GS-33, and GS-36, and conductivities and temperatures were monitored bi-hourly near the top of the plant-litter layer at GS-203, GS-33, and GS-36. Velocity vectors defining horizontal flow speeds and directions measured at sites SH1, GS-203, GS-33, and GS-36 are illustrated in the report. Daily-mean horizontal flow velocities, water temperatures, and specific conductances are listed in tabular form in the report appendixes. The quality-checked and edited data have been compiled and stored on the USGS SOFIA website <http://sofia.usgs.gov>.

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- Yellow Springs Instruments, 1998, YSI precision thermistors and probes: Yellow Springs, Ohio, 86 p.



**Appendix A. Daily mean flow velocities and water depths at station SH1, Shark River Slough, Everglades National Park, Florida during the 2002–2003 wet season.**

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**Table A-1.** Daily mean flow velocities and water depths at station SH1 during deployment period 06/26/02 1500–08/27/02 1300.

[cm/s, centimeters per second; °CW from MN, degrees clockwise from magnetic north; cm, centimeters; \*, all bursts filtered out; %, percent]

<b>Date</b>	<b>Flow velocity<sup>1</sup> (cm/s)</b>	<b>Flow direction<sup>1</sup> (° CW from MN)</b>	<b>Water depth<sup>2</sup> (cm)</b>
06/27/02	1.34	250	65
06/28/02	1.55	253	65
06/29/02	1.37	253	64
06/30/02	1.34	255	63
07/01/02	1.35	253	63
07/02/02	1.32	250	63
07/03/02	0.93	252	62
07/04/02	0.64	247	61
07/05/02	0.62	241	60
07/06/02	0.77	238	61
07/07/02	0.75	243	60
07/08/02	0.94	242	60
07/09/02	0.96	243	61
07/10/02	0.89	245	61
07/11/02	0.89	245	62
07/12/02	0.89	242	62
07/13/02	0.98	242	61
07/14/02	1.05	242	60
07/15/02	1.12	243	58
07/16/02	1.22	245	57
07/17/02	1.36	249	56
07/18/02	1.19	253	56
07/19/02	1.36	250	55
07/20/02	1.28	246	54
07/21/02	1.37	248	53
07/22/02	1.29	249	54
07/23/02	1.28	249	53
07/24/02	1.19	247	51
07/25/02	1.55	241	51
07/26/02	1.22	244	50
07/27/02	1.14	247	49
07/28/02	1.08	248	48
07/29/02	1.10	247	46

**Table A-1.** Daily mean flow velocities and water depths at station SH1 during deployment period  
06/26/02 1500–08/27/02 1300—Continued

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Water depth <sup>2</sup> (cm)
07/30/02	1.04	248	46
07/31/02	1.16	242	45
08/01/02	1.06	240	45
08/02/02	0.97	244	44
08/03/02	1.08	242	43
08/04/02	1.01	242	43
08/05/02	1.02	241	43
08/06/02	1.14	242	43
08/07/02	1.21	244	43
08/08/02	1.24	244	43
08/09/02	1.23	246	43
08/10/02	1.25	244	43
08/11/02	1.32	246	43
08/12/02	1.26	245	43
08/13/02	1.25	241	44
08/14/02	1.15	243	44
08/15/02	1.02	242	45
08/16/02	1.07	242	45
08/17/02	1.02	241	45
08/18/02	1.29	241	45
08/19/02	*	*	47
08/20/02	*	*	47
08/21/02	*	*	48
08/22/02	*	*	48
08/23/02	*	*	49
08/24/02	*	*	48
08/25/02	*	*	48
08/26/02	*	*	48
MINIMUM	0.62	238	43
MAXIMUM	1.55	255	65
AVERAGE	1.13	245	52
BURSTS FILTERED OUT (%)	18		

<sup>1</sup> Flow sample volume located 34 cm above top of litter.

<sup>2</sup> Depth variation determined from stage recorded at SH1 gage.



**Table A-2.** Daily mean flow velocities and water depths at station SH1 during deployment period 08/28/02 1029–09/25/02 0859.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; cm, centimeters; \*, all bursts filtered out; %, percent]

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Water depth <sup>2</sup> (cm)
08/29/02	0.95	219	51
08/30/02	0.94	222	51
08/31/02	1.06	212	52
09/01/02	1.09	210	53
09/02/02	1.06	212	53
09/03/02	1.13	208	53
09/04/02	1.16	210	53
09/05/02	0.99	220	54
09/06/02	1.00	221	55
09/07/02	1.11	217	55
09/08/02	1.05	221	56
09/09/02	1.06	221	56
09/10/02	1.06	223	56
09/11/02	1.15	219	56
09/12/02	1.14	220	57
09/13/02	1.07	224	57
09/14/02	1.06	225	56
09/15/02	1.06	224	56
09/16/02	1.11	224	55
09/17/02	1.10	219	54
09/18/02	*	*	53
09/19/02	1.00	212	53
09/20/02	0.91	211	52
09/21/02	0.86	213	52
09/22/02	0.78	210	51
09/23/02	1.07	209	52
09/24/02	0.97	208	52
MINIMUM	0.78	208	51
MAXIMUM	1.16	225	57
AVERAGE	1.04	217	54
BURSTS			
FILTERED	8		
OUT (%)			

<sup>1</sup> Flow sample volume located 34 cm above top of litter.

<sup>2</sup> Depth variation determined from stage recorded at SH1 gage.

**Appendix B. Daily mean flow velocities, water temperatures, specific conductances, and water depths at station GS-203, Shark River Slough, Everglades National Park, Florida during the 2002–2003 wet season.**

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**Table B - 1.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-203 during deployment period 06/27/02 1200–08/27/02 1500.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; ° C, degrees Celsius; μS/cm microsiemens per centimeter at 25 degrees Celsius; cm, centimeters; \*, all bursts filtered out; --, no data; %, percent]

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> (° C)	Specific conductance <sup>2</sup> (μS/cm)	Water depth <sup>3</sup> (cm)
06/28/02	1.14	252	28.44	295	40
06/29/02	0.86	252	29.20	293	40
06/30/02	0.64	248	29.59	286	38
07/01/02	0.65	243	29.17	294	38
07/02/02	0.53	240	29.27	292	37
07/03/02	0.61	259	30.70	291	37
07/04/02	*	*	31.59	290	37
07/05/02	*	*	31.77	295	36
07/06/02	*	*	29.96	294	37
07/07/02	*	*	29.94	292	38
07/08/02	*	*	28.66	291	39
07/09/02	*	*	27.46	284	41
07/10/02	*	*	27.25	279	42
07/11/02	*	*	27.31	274	43
07/12/02	*	*	29.39	276	44
07/13/02	*	*	31.15	274	45
07/14/02	*	*	32.50	277	45
07/15/02	*	*	33.16	278	45
07/16/02	*	*	32.47	282	45
07/17/02	*	*	32.43	281	46
07/18/02	*	*	31.78	283	46
07/19/02	*	*	31.50	293	46
07/20/02	*	*	32.30	298	46
07/21/02	*	*	32.45	305	45
07/22/02	*	*	31.43	310	45
07/23/02	0.73	245	30.96	309	45
07/24/02	0.68	236	30.72	314	45
07/25/02	0.75	235	31.20	317	45
07/26/02	0.82	231	31.64	324	44
07/27/02	0.74	232	31.95	333	44
07/28/02	0.77	232	32.00	342	44
07/29/02	0.71	231	31.67	350	44
07/30/02	0.70	232	31.65	358	44
07/31/02	0.72	233	31.98	367	44

**Table B - 1.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-203 during deployment period 06/27/02 1200–08/27/02 1500—Continued

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> (°C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
08/01/02	0.70	229	32.16	375	44
08/02/02	0.78	228	32.59	383	44
08/03/02	0.75	226	32.71	394	44
08/04/02	0.66	226	32.04	401	45
08/05/02	0.66	226	31.38	408	45
08/06/02	0.80	222	31.89	426	46
08/07/02	0.95	226	31.28	442	46
08/08/02	0.94	222	30.48	454	47
08/09/02	0.90	225	31.15	458	47
08/10/02	0.55	220	30.05	464	47
08/11/02	*	*	28.75	458	47
08/12/02	*	*	28.49	442	50
08/13/02	*	*	29.72	437	50
08/14/02	*	*	29.93	441	50
08/15/02	*	*	30.48	447	50
08/16/02	*	*	30.46	457	50
08/17/02	*	*	30.53	472	50
08/18/02	*	*	31.10	486	50
08/19/02	*	*	30.96	496	50
08/20/02	*	*	30.39	499	50
08/21/02	*	*	29.43	505	50
08/22/02	*	*	30.18	511	51
08/23/02	*	*	31.07	515	--
08/24/02	*	*	30.97	518	--
08/25/02	0.65	246	31.05	518	50
08/26/02	0.79	252	31.60	521	50
MINIMUM	0.53	220	27.25	274	36
MAXIMUM	0.95	259	33.16	521	51
AVERAGE	0.75	235	30.76	369	45
BURSTS FILTERED OUT (%)	59				

<sup>1</sup> Flow sample volume located 19 cm above top of litter.

<sup>2</sup> MicroCAT temperature and conductance measured 11 cm above top of litter.

<sup>3</sup> Depth variation determined from stage recorded at NP203 gage.

**Table B - 2.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-203 during deployment period 08/28/02 1300–10/29/02 1600.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; ° C, degrees Celsius; µS/cm microsiemens per centimeter at 25 degrees Celsius; cm, centimeters; --, no data; %, percent]

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> (° C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
08/29/02	0.87	230	29.30	489	53
08/30/02	0.86	228	28.62	471	--
08/31/02	0.85	229	28.90	480	--
09/01/02	0.90	230	29.77	487	--
09/02/02	0.93	231	30.44	486	53
09/03/02	0.99	239	30.36	471	--
09/04/02	0.95	235	30.36	446	--
09/05/02	0.96	234	30.37	427	--
09/06/02	0.96	237	29.68	408	--
09/07/02	0.95	235	29.78	392	--
09/08/02	0.88	235	29.71	387	--
09/09/02	0.89	235	30.18	395	--
09/10/02	0.78	232	30.25	398	--
09/11/02	0.73	229	28.96	395	--
09/12/02	0.66	224	27.29	381	--
09/13/02	0.67	225	27.84	390	--
09/14/02	0.69	224	28.96	392	--
09/15/02	0.75	224	29.83	396	--
09/16/02	0.79	225	30.00	392	--
09/17/02	0.77	224	30.55	387	--
09/18/02	0.72	227	30.84	384	--
09/19/02	0.65	226	30.71	383	--
09/20/02	0.72	229	30.36	381	--
09/21/02	0.76	227	29.78	378	--
09/22/02	0.77	226	29.72	377	--
09/23/02	0.84	232	28.81	376	--
09/24/02	0.88	229	28.44	376	--
09/25/02	0.85	229	29.18	376	55
09/26/02	0.82	226	29.46	385	55
09/27/02	0.79	228	30.11	384	56
09/28/02	0.63	223	30.19	371	56
09/29/02	0.43	232	30.17	362	56
09/30/02	0.41	235	29.46	358	55

**Table B - 2.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-203 during deployment period 08/28/02 1300–10/29/02 1600—Continued

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> (°C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
10/01/02	0.52	232	29.31	367	55
10/02/02	0.53	232	29.52	374	54
10/03/02	0.56	233	29.53	381	54
10/04/02	0.62	227	29.06	389	53
10/05/02	0.84	223	29.47	388	53
10/06/02	0.75	223	28.88	394	54
10/07/02	0.78	224	28.74	392	53
10/08/02	0.78	222	28.97	394	53
10/09/02	0.76	223	28.58	400	53
10/10/02	0.96	226	28.92	403	52
10/11/02	1.05	226	29.31	394	53
10/12/02	0.95	223	29.32	406	54
10/13/02	0.97	226	29.41	408	53
10/14/02	0.92	225	29.12	413	53
10/15/02	0.93	223	28.88	420	52
10/16/02	0.91	226	28.30	407	54
10/17/02	0.90	229	27.20	397	54
10/18/02	0.82	225	26.08	391	53
10/19/02	0.80	226	25.84	394	53
10/20/02	0.80	227	26.61	404	53
10/21/02	0.84	228	26.72	414	53
10/22/02	0.78	227	26.96	418	53
10/23/02	0.78	227	28.05	423	53
10/24/02	0.82	226	28.35	429	52
10/25/02	0.79	225	28.69	439	52
10/26/02	0.72	226	28.64	446	52
10/27/02	0.73	225	28.85	452	52
10/28/02	0.69	223	28.63	460	51
MINIMUM	0.41	222	25.84	358	51
MAXIMUM	1.05	239	30.84	489	56
AVERAGE	0.79	228	29.09	406	53
BURSTS FILTERED OUT (%)	0				

<sup>1</sup> Flow sample volume located 19 cm above top of litter.

<sup>2</sup> MicroCAT temperature and conductance measured 11 cm above top of litter.

<sup>3</sup> Depth variation determined from stage recorded at NP203 gage.

**Table B - 3.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-203 during deployment period 10/30/02 1200 –12/03/02 1330.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; ° C, degrees Celsius; µS/cm microsiemens per centimeter at 25 degrees Celsius; cm, centimeters; %, percent]

<b>Date</b>	<b>Flow velocity<sup>1</sup> (cm/s)</b>	<b>Flow direction<sup>1</sup> (° CW from MN)</b>	<b>Temperature<sup>2</sup> (° C)</b>	<b>Specific conductance<sup>2</sup> (µS/cm)</b>	<b>Water depth<sup>3</sup> (cm)</b>
10/31/02	0.82	235	28.59	472	50
11/01/02	0.85	235	28.43	474	50
11/02/02	0.80	235	27.44	479	49
11/03/02	0.81	236	26.50	482	49
11/04/02	0.81	237	26.24	483	48
11/05/02	0.80	238	26.36	484	48
11/06/02	0.80	237	26.69	484	48
11/07/02	0.76	234	24.42	484	48
11/08/02	0.78	235	22.82	484	47
11/09/02	0.81	236	23.33	483	47
11/10/02	0.94	235	23.94	483	47
11/11/02	1.01	234	24.63	484	47
11/12/02	1.02	234	25.87	485	47
11/13/02	0.85	237	25.05	484	47
11/14/02	0.76	245	21.82	487	46
11/15/02	0.76	247	22.29	490	45
11/16/02	0.79	246	22.90	478	46
11/17/02	0.88	250	22.25	428	52
11/18/02	0.74	248	18.92	423	51

**Table B - 3.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-203 during deployment period 10/30/02 1200 –12/03/02 1330—Continued

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> (°C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
11/19/02	0.79	249	18.72	422	50
11/20/02	0.71	249	20.04	414	49
11/21/02	0.62	251	21.83	437	48
11/22/02	0.75	256	22.68	441	48
11/23/02	0.74	253	20.98	439	47
11/24/02	0.65	252	19.60	444	46
11/25/02	0.58	256	20.49	444	45
11/26/02	0.62	254	21.59	450	44
11/27/02	0.75	255	21.36	453	44
11/28/02	0.75	252	20.82	452	43
11/29/02	0.81	255	19.40	452	42
11/30/02	0.80	254	18.31	454	41
12/01/02	0.80	254	18.62	460	41
12/02/02	0.90	250	19.62	466	45
MINIMUM	0.58	234	18.31	414	41
MAXIMUM	1.02	256	28.59	490	52
AVERAGE	0.79	245	22.80	463	47
BURSTS FILTERED OUT (%)	1				

<sup>1</sup> Flow sample volume located 19 cm above top of litter.

<sup>2</sup> MicroCAT temperature and conductance measured 11 cm above top of litter.

<sup>3</sup> Depth variation determined from stage recorded at NP203 gage.



**Table B - 4.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-203 during deployment period 12/04/02 1200–01/21/03 1330.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; ° C, degrees Celsius; µS/cm microsiemens per centimeter at 25 degrees Celsius; cm, centimeters; %, percent]

<b>Date</b>	<b>Flow velocity<sup>1</sup> (cm/s)</b>	<b>Flow direction<sup>1</sup> (° CW from MN)</b>	<b>Temperature<sup>2</sup> (°C)</b>	<b>Specific conductance<sup>2</sup> (µS/cm)</b>	<b>Water depth<sup>3</sup> (cm)</b>
12/05/02	0.90	259	22.08	474	40
12/06/02	0.89	260	23.03	479	40
12/07/02	0.92	262	21.34	487	39
12/08/02	0.94	263	21.39	494	39
12/09/02	0.85	262	21.68	490	39
12/10/02	0.88	264	22.09	457	39
12/11/02	0.84	262	22.66	448	39
12/12/02	0.82	262	23.42	449	38
12/13/02	0.78	262	23.66	453	38
12/14/02	0.78	262	22.54	469	38
12/15/02	0.76	262	19.88	468	38
12/16/02	0.70	263	17.71	472	38
12/17/02	0.70	262	16.59	478	38
12/18/02	0.71	262	17.38	480	37
12/19/02	0.75	260	18.16	481	37
12/20/02	0.76	261	19.44	482	37
12/21/02	0.76	259	17.60	489	36
12/22/02	0.80	258	17.30	496	36
12/23/02	0.81	258	17.98	500	35
12/24/02	0.79	258	19.73	501	35
12/25/02	0.72	258	21.40	504	35
12/26/02	0.71	256	18.60	510	35
12/27/02	0.68	258	17.44	515	34
12/28/02	0.72	256	17.02	518	34
12/29/02	0.77	254	15.53	523	33
12/30/02	0.77	250	15.83	525	33
12/31/02	0.81	253	17.18	527	32
01/01/03	0.83	252	19.53	529	32
01/02/03	0.79	252	20.76	530	32
01/03/03	0.77	253	21.02	519	33

**Table B - 4.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-203 during deployment period 12/04/02 1200–01/21/03 1330—Continued

<b>Date</b>	<b>Flow velocity<sup>1</sup> (cm/s)</b>	<b>Flow direction<sup>1</sup> (° CW from MN)</b>	<b>Temperature<sup>2</sup> (°C)</b>	<b>Specific conductance<sup>2</sup> (µS/cm)</b>	<b>Water depth<sup>3</sup> (cm)</b>
01/04/03	0.74	250	17.53	518	33
01/05/03	0.65	248	16.21	514	32
01/06/03	0.60	248	16.48	513	32
01/07/03	0.59	246	15.52	514	32
01/08/03	0.56	247	14.90	519	31
01/09/03	0.42	246	14.73	522	31
01/10/03	0.36	246	15.58	523	31
01/11/03	0.38	245	16.76	528	30
01/12/03	0.45	245	17.81	533	30
01/13/03	0.47	245	18.00	535	30
01/14/03	0.52	246	18.55	538	30
01/15/03	0.46	245	16.40	541	29
01/16/03	0.35	246	15.80	543	29
01/17/03	0.36	246	16.35	543	29
01/18/03	0.43	245	13.65	543	28
01/19/03	0.32	244	11.53	550	28
01/20/03	0.33	244	12.03	552	28
MINIMUM	0.32	244	11.53	448	28
MAXIMUM	0.94	264	23.66	552	40
AVERAGE	0.67	254	18.25	506	34
BURSTS FILTERED OUT (%)	0				

<sup>1</sup> Flow sample volume located 15 cm above top of litter.

<sup>2</sup> MicroCAT temperature and conductance measured 11 cm above top of litter.

<sup>3</sup> Depth variation determined from stage recorded at NP203 gage.

**Table B -5.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-203 during deployment period 01/23/03 1200–04/22/03 1400.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; ° C, degrees Celsius; µS/cm microsiemens per centimeter at 25 degrees Celsius; cm, centimeters; \*, all bursts filtered out; - -, no data; %, percent]

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> (°C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
01/24/03	0.74	246	12.09	556	27
01/25/03	0.68	246	11.15	560	26
01/26/03	0.67	245	13.14	560	26
01/27/03	0.68	243	14.23	560	26
01/28/03	0.69	243	13.52	561	25
01/29/03	0.69	245	14.88	561	25
01/30/03	0.70	246	16.16	562	25
01/31/03	0.74	245	17.59	563	25
02/01/03	0.73	247	18.19	564	25
02/02/03	0.68	249	16.80	565	24
02/03/03	0.75	248	17.20	565	24
02/04/03	0.75	247	17.98	566	24
02/05/03	0.74	250	18.94	568	24
02/06/03	0.74	248	19.09	573	24
02/07/03	0.72	247	19.77	577	24
02/08/03	0.67	245	20.92	578	23
02/09/03	0.72	246	20.75	581	23
02/10/03	0.69	247	21.53	582	23
02/11/03	0.69	245	21.37	584	23
02/12/03	0.64	248	19.68	587	22
02/13/03	0.61	250	18.05	587	22
02/14/03	0.70	251	17.89	589	22
02/15/03	0.68	256	19.01	592	22
02/16/03	0.59	262	20.73	594	22
02/17/03	0.62	256	21.48	590	22
02/18/03	0.58	256	19.76	593	22
02/19/03	0.60	259	20.27	596	22
02/20/03	0.58	254	22.07	567	22
02/21/03	0.68	255	22.65	502	22
02/22/03	0.70	250	23.78	503	22
02/23/03	0.71	254	22.92	496	22
02/24/03	0.66	257	20.89	491	22
02/25/03	0.65	254	21.44	497	22

**Table B -5.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-203 during deployment period 01/23/03 1200–04/22/03 1400—Continued

<b>Date</b>	<b>Flow velocity<sup>1</sup> (cm/s)</b>	<b>Flow direction<sup>1</sup> (° CW from MN)</b>	<b>Temperature<sup>2</sup> (°C)</b>	<b>Specific conductance<sup>2</sup> (µS/cm)</b>	<b>Water depth<sup>3</sup> (cm)</b>
02/26/03	0.71	255	22.38	504	25
02/27/03	0.67	252	23.33	503	26
02/28/03	0.60	244	24.06	493	26
03/01/03	0.58	243	24.68	505	25
03/02/03	0.62	245	24.98	509	25
03/03/03	0.62	247	25.08	514	25
03/04/03	0.56	246	25.63	522	24
03/05/03	0.58	248	25.65	531	24
03/06/03	0.56	246	25.38	537	23
03/07/03	0.49	245	25.79	542	23
03/08/03	0.53	240	25.77	545	22
03/09/03	0.45	234	26.03	536	23
03/10/03	0.44	235	25.32	538	23
03/11/03	0.44	230	25.28	536	22
03/12/03	0.44	233	25.35	539	22
03/13/03	0.46	231	25.59	544	22
03/14/03	0.49	236	25.70	548	21
03/15/03	0.45	230	25.83	552	21
03/16/03	0.47	230	25.03	557	20
03/17/03	0.39	230	24.47	525	22
03/18/03	0.40	231	24.42	524	22
03/19/03	0.40	223	26.20	531	22
03/20/03	0.43	226	26.83	536	21
03/21/03	0.42	223	26.98	526	21
03/22/03	0.47	229	27.24	533	21
03/23/03	0.45	225	26.67	539	20
03/24/03	0.49	230	25.08	545	20
03/25/03	0.49	233	23.08	556	19
03/26/03	0.57	234	23.21	566	19
03/27/03	0.61	235	23.12	556	19
03/28/03	0.64	229	23.65	538	21
03/29/03	0.64	229	24.33	536	21
03/30/03	0.65	231	23.75	533	20

**Table B -5.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-203 during deployment period 01/23/03 1200–04/22/03 1400—Continued

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> (°C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
03/31/03	0.62	231	19.21	545	20
04/01/03	0.64	232	17.16	559	19
04/02/03	0.62	231	18.98	571	19
04/03/03	0.64	234	20.54	572	19
04/04/03	0.64	236	21.85	571	--
04/05/03	0.67	237	22.53	570	--
04/06/03	0.72	239	23.86	569	--
04/07/03	0.67	240	25.11	570	--
04/08/03	0.62	243	25.46	571	--
04/09/03	0.66	242	24.62	574	--
04/10/03	0.62	247	22.15	578	--
04/11/03	*	*	20.85	585	--
04/12/03	*	*	21.10	593	--
04/13/03	*	*	21.80	598	--
04/14/03	*	*	22.14	601	--
04/15/03	*	*	23.57	602	--
04/16/03	*	*	24.16	601	--
04/17/03	0.82	239	24.99	557	--
04/18/03	0.61	235	25.09	461	--
04/19/03	0.57	236	25.40	430	--
04/20/03	0.53	237	25.33	419	--
04/21/03	0.51	237	25.39	399	22
MINIMUM	0.39	223	11.15	399	19
MAXIMUM	0.82	262	27.24	602	27
AVERAGE	0.61	242	22.08	548	23
BURSTS FILTERED OUT (%)	13				

<sup>1</sup> Flow sample volume located 15 cm above top of litter.<sup>2</sup> MicroCAT temperature and conductance measured 11 cm above top of litter.<sup>3</sup> Depth variation determined from stage recorded at NP203 gage.

**Appendix C. Daily mean flow velocities,  
water temperatures, specific conductances,  
and water depths at station GS-33, Shark River  
Slough, Everglades National Park, Florida  
during the 2002–2003 wet season.**

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**Table C - 1.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-33 during deployment period 06/27/02 1200–08/27/02 1500.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; ° C, degrees Celsius; µS/cm microsiemens per centimeter at 25 degrees Celsius; cm, centimeters; --, no data; %, percent]

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> (°C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
06/28/02	0.44	190	27.90	278	36
06/29/02	0.46	192	28.97	295	35
06/30/02	0.56	198	29.31	310	34
07/01/02	0.52	196	28.42	316	34
07/02/02	0.54	194	28.44	324	33
07/03/02	0.56	196	29.78	330	33
07/04/02	0.55	199	30.58	334	33
07/05/02	0.53	203	30.59	336	33
07/06/02	0.52	201	28.84	325	34
07/07/02	0.49	193	28.95	309	34
07/08/02	0.43	197	27.82	311	35
07/09/02	0.46	191	27.01	290	37
07/10/02	0.49	192	26.84	290	38
07/11/02	0.53	195	26.90	281	40
07/12/02	0.54	186	28.56	280	40
07/13/02	0.58	180	30.35	283	41
07/14/02	0.58	180	31.89	285	41
07/15/02	0.54	180	32.48	294	40
07/16/02	0.68	182	31.31	301	41
07/17/02	0.64	182	31.28	292	42
07/18/02	0.56	179	31.25	305	41
07/19/02	0.53	190	30.69	293	42
07/20/02	0.58	188	31.38	312	41
07/21/02	0.56	194	31.64	335	41
07/22/02	0.53	190	30.88	349	40
07/23/02	0.61	188	30.52	364	40
07/24/02	0.55	183	29.99	362	39
07/25/02	0.54	184	30.25	354	39
07/26/02	0.50	192	30.94	351	39
07/27/02	0.50	197	31.42	348	39
07/28/02	0.47	201	31.38	346	39
07/29/02	0.49	201	31.00	344	39
07/30/02	0.43	205	30.87	336	39

**Table C - 1.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-33 during deployment period 06/27/02 1200 – 08/27/02 1500—Continued

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> (°C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
07/31/02	0.46	204	31.31	343	39
08/01/02	0.42	201	31.30	354	38
08/02/02	0.49	208	31.68	370	38
08/03/02	0.51	201	31.78	385	38
08/04/02	0.44	197	31.44	402	39
08/05/02	0.49	200	31.04	409	39
08/06/02	0.42	189	31.19	422	40
08/07/02	0.43	184	30.65	431	40
08/08/02	0.67	171	29.68	445	40
08/09/02	0.76	158	30.23	451	41
08/10/02	0.82	159	29.46	468	40
08/11/02	0.87	164	28.16	466	40
08/12/02	1.11	163	27.86	445	44
08/13/02	1.11	164	29.19	463	44
08/14/02	1.04	166	29.42	481	43
08/15/02	1.04	165	29.96	481	43
08/16/02	0.49	149	29.99	487	43
08/17/02	0.59	153	30.25	496	43
08/18/02	0.71	157	30.96	509	43
08/19/02	0.84	155	30.52	519	43
08/20/02	0.71	165	29.85	528	43
08/21/02	0.26	159	28.74	525	43
08/22/02	0.30	171	29.56	529	44
08/23/02	0.37	180	30.17	542	--
08/24/02	0.81	181	29.96	555	--
08/25/02	1.03	168	30.05	564	44
08/26/02	1.03	170	30.66	571	43
MINIMUM	0.26	149	26.84	278	33
MAXIMUM	1.11	208	32.48	571	44
AVERAGE	0.60	184	30.06	385	39
BURSTS FILTERED OUT (%)	1				

<sup>1</sup> Flow sample volume located 19 cm above top of litter.<sup>2</sup> MicroCAT temperature and conductance measured 17 cm above top of litter.<sup>3</sup> Depth variation determined from stage recorded at P33 gage.



**Table C-2.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-33 during deployment period 08/28/02 1400–10/29/02 1600.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; ° C, degrees Celsius; μS/cm microsiemens per centimeter at 25 degrees Celsius; cm, centimeters; --, no data; %, percent]

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> (° C)	Specific conductance <sup>2</sup> (μS/cm)	Water depth <sup>3</sup> (cm)
08/29/02	0.67	184	28.42	542	46
08/30/02	0.75	179	28.34	550	46
08/31/02	0.76	180	28.60	554	--
09/01/02	0.73	182	29.36	554	--
09/02/02	0.76	187	29.48	537	47
09/03/02	0.82	182	29.20	497	--
09/04/02	0.80	182	29.09	471	--
09/05/02	0.80	182	29.41	472	--
09/06/02	0.73	186	29.07	472	--
09/07/02	0.68	187	29.56	473	--
09/08/02	0.58	186	29.51	480	--
09/09/02	0.62	181	29.65	485	--
09/10/02	0.65	175	29.71	491	--
09/11/02	0.55	182	28.61	498	--
09/12/02	0.60	177	27.18	491	--
09/13/02	0.60	177	27.82	486	--
09/14/02	0.58	180	28.92	476	--
09/15/02	0.57	184	29.75	474	--
09/16/02	0.64	183	29.79	475	--
09/17/02	0.64	188	30.27	477	--
09/18/02	0.59	192	30.55	479	--
09/19/02	0.82	197	30.41	483	--
09/20/02	0.49	199	30.08	482	--
09/21/02	0.53	198	29.54	485	--
09/22/02	0.51	196	29.53	491	--
09/23/02	0.48	208	28.52	482	--
09/24/02	0.50	216	28.14	455	--
09/25/02	0.70	212	29.10	452	50
09/26/02	0.78	204	29.28	453	50
09/27/02	0.81	197	29.72	449	49
09/28/02	0.78	194	29.64	435	49
09/29/02	0.76	194	29.67	435	49
09/30/02	0.73	198	29.31	438	49
10/01/02	0.74	199	29.39	442	48

**Table C - 2.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-33 during deployment period 08/28/02 1400–10/29/02 1600—Continued

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> ( °C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
10/02/02	0.69	199	29.46	447	47
10/03/02	0.62	198	29.34	451	47
10/04/02	0.61	200	28.58	455	47
10/05/02	0.65	197	28.64	454	47
10/06/02	0.69	194	28.31	452	47
10/07/02	0.68	195	28.08	457	47
10/08/02	0.72	195	28.27	460	46
10/09/02	0.79	194	27.85	467	46
10/10/02	0.75	195	28.09	474	45
10/11/02	0.82	191	28.21	483	46
10/12/02	0.89	191	28.19	495	46
10/13/02	0.81	194	28.63	503	46
10/14/02	0.67	194	28.34	512	46
10/15/02	0.62	195	28.02	518	46
10/16/02	0.68	194	27.74	514	47
10/17/02	0.68	194	26.87	514	47
10/18/02	0.70	194	25.80	523	47
10/19/02	0.65	195	25.60	526	46
10/20/02	0.72	198	26.19	522	47
10/21/02	0.85	196	26.17	510	47
10/22/02	0.65	194	26.32	514	47
10/23/02	0.50	190	27.34	520	47
10/24/02	0.41	199	27.60	528	46
10/25/02	0.44	207	27.62	528	46
10/26/02	0.47	207	27.41	532	46
10/27/02	0.58	206	27.58	524	46
10/28/02	0.60	203	27.73	523	45
MINIMUM	0.41	175	25.60	435	45
MAXIMUM	0.89	216	30.55	554	50
AVERAGE	0.67	193	28.57	489	47
BURSTS FILTERED OUT (%)	0				

<sup>1</sup> Flow sample volume located 19 cm above top of litter.

<sup>2</sup> MicroCAT temperature and conductance measured 17 cm above top of litter.

<sup>3</sup> Depth variation determined from stage recorded at P33 gage.

**Table C - 3.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-33 during deployment period 10/30/02 1400–12/03/02 1400.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; ° C, degrees Celsius; µS/cm microsiemens per centimeters at 25 degrees Celsius; cm, centimeter; \*, all bursts filtered out; %, percent]

<b>Date</b>	<b>Flow velocity<sup>1</sup> (cm/s)</b>	<b>Flow direction<sup>1</sup> (° CW from MN)</b>	<b>Temperature<sup>2</sup> (° C)</b>	<b>Specific conductance<sup>2</sup> (µS/cm)</b>	<b>Water depth<sup>3</sup> (cm)</b>
10/31/02	0.76	202	27.87	538	44
11/01/02	0.75	207	27.79	542	44
11/02/02	0.77	210	27.02	547	43
11/03/02	0.80	209	26.00	552	43
11/04/02	0.74	211	25.68	558	43
11/05/02	0.78	209	25.91	564	42
11/06/02	0.80	208	26.41	568	42
11/07/02	0.78	211	24.10	570	42
11/08/02	0.75	210	22.57	568	41
11/09/02	0.69	212	23.10	568	41
11/10/02	0.68	209	23.62	572	41
11/11/02	0.68	212	24.22	577	41
11/12/02	0.66	210	25.33	582	41
11/13/02	0.63	215	24.43	583	41
11/14/02	0.64	213	21.31	588	40
11/15/02	0.62	211	22.26	592	40
11/16/02	0.64	209	22.89	585	41
11/17/02	0.68	206	22.07	490	47
11/18/02	0.63	210	18.88	505	46
11/19/02	0.64	214	18.97	498	45
11/20/02	*	*	20.44	505	44

**Table C - 3.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-33 during deployment period 10/30/02 1400–12/03/02 1400—Continued

<b>Date</b>	<b>Flow velocity<sup>1</sup> (cm/s)</b>	<b>Flow direction<sup>1</sup> (° CW from MN)</b>	<b>Temperature<sup>2</sup> ( °C)</b>	<b>Specific conductance<sup>2</sup> (µS/cm)</b>	<b>Water depth<sup>3</sup> (cm)</b>
11/21/02	0.46	215	21.95	507	44
11/22/02	0.47	219	22.51	518	43
11/23/02	0.53	223	20.54	530	42
11/24/02	0.52	223	19.11	536	41
11/25/02	0.61	227	20.37	531	41
11/26/02	0.61	225	21.70	530	40
11/27/02	0.65	227	21.34	528	39
11/28/02	0.63	226	20.69	528	39
11/29/02	0.59	224	19.13	534	38
11/30/02	0.61	224	17.93	537	37
12/01/02	0.62	227	18.30	541	37
12/02/02	0.49	223	19.68	546	36
MINIMUM	0.46	202	17.93	490	36
MAXIMUM	0.80	227	27.87	592	47
AVERAGE	0.65	215	22.55	546	41
BURSTS FILTERED OUT (%)	6				

<sup>1</sup> Flow sample volume located 19 cm above top of litter.

<sup>2</sup> MicroCAT temperature and conductance measured 17 cm above top of litter.

<sup>3</sup> Depth variation determined from stage recorded at P33 gage.

**Table C - 4.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-33 during deployment period 12/04/02 1400–01/21/03 1430.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; ° C, degrees Celsius; µS/cm microsiemens per centimeter at 25 degrees Celsius; cm, centimeters; \*, all bursts filtered out; %, percent]

<b>Date</b>	<b>Flow velocity<sup>1</sup> (cm/s)</b>	<b>Flow direction<sup>1</sup> (° CW from MN)</b>	<b>Temperature<sup>2</sup> ( °C)</b>	<b>Specific conductance<sup>2</sup> (µS/cm)</b>	<b>Water depth<sup>3</sup> (cm)</b>
12/05/02	0.70	214	22.17	555	34
12/06/02	0.69	217	23.00	560	34
12/07/02	0.66	215	21.19	565	34
12/08/02	0.62	208	21.56	566	33
12/09/02	0.66	215	21.85	546	35
12/10/02	0.80	218	22.36	475	39
12/11/02	0.84	220	22.94	486	39
12/12/02	0.87	219	23.65	491	39
12/13/02	0.85	220	23.78	505	38
12/14/02	0.79	217	22.51	505	38
12/15/02	0.79	219	19.61	507	37
12/16/02	0.75	220	17.49	508	36
12/17/02	0.78	225	16.22	514	36
12/18/02	0.80	225	17.20	518	35
12/19/02	0.87	224	18.12	523	35
12/20/02	0.84	223	19.58	527	34
12/21/02	0.81	218	17.56	536	34
12/22/02	0.81	223	17.39	546	33
12/23/02	0.86	222	18.05	553	33
12/24/02	0.87	224	20.26	555	32
12/25/02	0.83	227	21.90	552	32
12/26/02	0.78	227	18.55	551	32
12/27/02	0.82	226	17.39	556	32
12/28/02	0.78	224	17.16	553	31
12/29/02	0.78	224	15.64	551	31
12/30/02	0.76	223	16.11	549	31
12/31/02	0.76	221	17.80	549	30
01/01/03	0.78	222	20.58	548	30

**Table C - 4.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-33 during deployment period 12/04/02 1400–01/21/03 1430—Continued

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> ( °C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
01/02/03	0.74	223	21.51	552	30
01/03/03	0.65	224	21.12	534	31
01/04/03	0.73	220	17.40	537	31
01/05/03	0.72	224	16.22	541	30
01/06/03	0.71	222	16.69	545	30
01/07/03	0.72	218	15.61	555	30
01/08/03	0.74	220	15.24	563	29
01/09/03	0.74	220	15.08	571	29
01/10/03	0.72	220	15.86	578	29
01/11/03	0.69	217	17.24	585	28
01/12/03	0.74	221	18.35	590	28
01/13/03	0.79	222	18.49	597	28
01/14/03	0.76	227	19.07	602	28
01/15/03	0.75	228	16.78	608	27
01/16/03	0.67	238	16.20	614	27
01/17/03	*	*	16.89	615	27
01/18/03	*	*	13.46	621	27
01/19/03	0.80	222	12.03	630	26
01/20/03	0.69	222	12.56	633	26
MINIMUM	0.62	208	12.03	475	26
MAXIMUM	0.87	238	23.78	633	39
AVERAGE	0.76	221	18.46	554	32
BURSTS FILTERED OUT (%)	7				

<sup>1</sup> Flow sample volume located 9 cm above top of litter.

<sup>2</sup> MicroCAT temperature and conductance measured 17 cm above top of litter.

<sup>3</sup> Depth variation determined from stage recorded at P33 gage.

**Table C - 5.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-33 during deployment period 01/22/03 1100–04/15/03 1730.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; ° C, degrees Celsius; µS/cm microsiemens per centimeter at 25 degrees Celsius; cm, centimeters; \*, all bursts filtered out; --, no data; %, percent]

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> (° C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
01/23/03	0.61	224	15.74	643	26
01/24/03	0.65	222	12.13	651	26
01/25/03	0.69	224	11.68	657	25
01/26/03	0.73	223	14.31	655	25
01/27/03	0.63	222	15.05	653	25
01/28/03	0.65	221	14.16	654	25
01/29/03	0.69	220	15.93	650	24
01/30/03	0.67	223	17.48	646	25
01/31/03	0.64	225	19.20	642	24
02/01/03	0.64	228	19.44	637	24
02/02/03	0.62	227	17.90	636	24
02/03/03	0.63	226	18.22	631	24
02/04/03	0.65	225	18.92	626	24
02/05/03	0.61	224	19.72	619	24
02/06/03	0.61	222	19.96	616	24
02/07/03	0.65	226	20.88	610	24
02/08/03	0.65	225	21.91	605	24
02/09/03	0.66	228	21.80	603	24
02/10/03	0.58	231	22.63	599	23
02/11/03	0.53	231	22.22	594	23
02/12/03	0.50	229	20.34	588	23
02/13/03	0.53	231	18.56	586	23
02/14/03	*	*	18.65	583	22
02/15/03	*	*	20.05	579	22
02/16/03	*	*	22.00	575	22
02/17/03	*	*	22.31	571	22
02/18/03	*	*	20.71	570	22
02/19/03	*	*	21.21	570	22
02/20/03	*	*	22.97	534	22
02/21/03	*	*	23.68	467	24
02/22/03	*	*	24.83	480	24
02/23/03	*	*	23.14	472	24
02/24/03	*	*	21.03	462	24
02/25/03	*	*	22.35	459	24

**Table C - 5.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-33 during deployment period 01/22/03 1100–04/15/03 1730—Continued

<b>Date</b>	<b>Flow velocity<sup>1</sup> (cm/s)</b>	<b>Flow direction<sup>1</sup> (° CW from MN)</b>	<b>Temperature<sup>2</sup> (°C)</b>	<b>Specific conductance<sup>2</sup> (µS/cm)</b>	<b>Water depth<sup>3</sup> (cm)</b>
02/26/03	*	*	23.60	450	24
02/27/03	*	*	24.23	453	24
02/28/03	*	*	25.15	457	24
03/01/03	*	*	25.57	458	24
03/02/03	*	*	25.71	463	23
03/03/03	*	*	25.69	469	23
03/04/03	*	*	26.23	470	22
03/05/03	*	*	26.42	473	22
03/06/03	*	*	26.06	475	22
03/07/03	*	*	26.45	479	22
03/08/03	*	*	26.72	477	21
03/09/03	*	*	26.96	478	21
03/10/03	*	*	25.93	478	20
03/11/03	*	*	26.45	480	20
03/12/03	*	*	26.13	480	20
03/13/03	*	*	26.13	483	20
03/14/03	*	*	26.54	482	20
03/15/03	*	*	26.91	482	19
03/16/03	*	*	25.52	486	19
03/17/03	*	*	24.89	439	20
03/18/03	*	*	25.33	420	21
03/19/03	*	*	27.24	437	21
03/20/03	*	*	27.68	450	21
03/21/03	*	*	27.95	443	20
03/22/03	*	*	28.40	443	20
03/23/03	*	*	27.15	452	20
03/24/03	*	*	25.46	459	20
03/25/03	*	*	23.70	461	20
03/26/03	*	*	24.18	464	20
03/27/03	*	*	23.59	454	20
03/28/03	*	*	24.95	436	21
03/29/03	*	*	25.88	439	21
03/30/03	*	*	24.53	445	21
03/31/03	*	*	18.96	473	21



**Table C - 5.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-33 during deployment period 01/22/03 1100–04/15/03 1730—Continued

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> ( °C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
04/01/03	*	*	17.63	485	21
04/02/03	*	*	20.32	485	20
04/03/03	*	*	22.24	478	20
04/04/03	*	*	23.94	476	--
04/05/03	*	*	24.05	485	--
04/06/03	*	*	25.52	481	--
04/07/03	*	*	26.34	481	--
04/08/03	*	*	26.39	479	--
04/09/03	*	*	25.23	488	--
04/10/03	*	*	23.00	498	--
04/11/03	*	*	21.61	502	--
04/12/03	*	*	22.40	496	--
04/13/03	*	*	23.56	490	--
04/14/03	*	*	23.77	488	--
MINIMUM	0.50	220	11.68	420	19
MAXIMUM	0.73	231	28.40	657	26
AVERAGE	0.63	225	22.68	520	22
BURSTS FILTERED OUT (%)	72				

<sup>1</sup> Flow sample volume located 9 cm above top of litter.

<sup>2</sup> MicroCAT temperature and conductance measured 17 cm above top of litter.

<sup>3</sup> Depth variation determined from stage recorded at P33 gage.

**Appendix D. Daily mean flow velocities,  
water temperatures, specific conductances,  
and water depths at station GS-36, Shark River  
Slough, Everglades National Park, Florida  
during the 2002–2003 wet season.**

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**Table D - 1.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-36 during deployment period 07/24/02 1400–08/27/02 1400.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; ° C, degrees Celsius; µS/cm microsiemens per centimeter at 25 degrees Celsius; cm, centimeters; --, no data; %, percent]

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> (°C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
07/25/02	2.08	213	32.03	345	34
07/26/02	2.03	215	32.32	347	34
07/27/02	1.94	217	32.76	350	33
07/28/02	1.99	217	32.78	353	33
07/29/02	1.97	218	31.95	357	33
07/30/02	1.92	218	31.78	359	32
07/31/02	1.91	218	32.11	366	32
08/01/02	1.91	219	32.69	370	32
08/02/02	1.82	220	33.13	372	32
08/03/02	1.74	221	33.25	372	31
08/04/02	1.72	219	32.50	373	31
08/05/02	1.73	219	31.83	370	32
08/06/02	1.59	220	31.91	368	32
08/07/02	1.70	221	31.18	366	32
08/08/02	1.56	222	31.07	364	33
08/09/02	1.50	222	30.97	356	34
08/10/02	1.54	222	29.39	358	34
08/11/02	1.51	220	29.40	356	34
08/12/02	1.64	220	29.48	361	35
08/13/02	1.70	222	30.48	365	35
08/14/02	1.61	224	30.89	368	35

**Table D - 1.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-36 during deployment period 07/24/02 1400–08/27/02 1400— Continued

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> ( °C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
08/15/02	1.67	222	31.28	366	36
08/16/02	1.45	226	30.56	361	36
08/17/02	1.49	222	31.31	355	37
08/18/02	1.76	222	31.69	354	37
08/19/02	1.75	222	31.59	348	38
08/20/02	1.72	220	30.41	345	39
08/21/02	1.62	222	29.91	352	39
08/22/02	1.58	223	31.30	363	39
08/23/02	1.70	222	32.16	377	--
08/24/02	1.80	222	32.06	382	--
08/25/02	1.67	223	32.14	385	38
08/26/02	1.63	220	31.77	384	38
MINIMUM	1.45	213	29.39	345	31
MAXIMUM	2.08	226	33.25	385	39
AVERAGE	1.73	220	31.52	363	34
BURSTS FILTERED OUT (%)	0				

<sup>1</sup> Flow sample volume located 20 cm above top of litter.

<sup>2</sup> MicroCAT temperature and conductance measured 15 cm above top of litter.

<sup>3</sup> Depth variation determined from stage recorded at P36 gage.

**Table D - 2.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-36 during deployment period 08/28/02 1200–10/29/02 1530.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; ° C, degrees Celsius; µS/cm microsiemens per centimeter at 25 degrees Celsius; cm, centimeters; \*, all bursts filtered out; --, no data; %, percent]

<b>Date</b>	<b>Flow velocity<sup>1</sup> (cm/s)</b>	<b>Flow direction<sup>1</sup> (° CW from MN)</b>	<b>Temperature<sup>2</sup> (° C)</b>	<b>Specific conductance<sup>2</sup> (µS/cm)</b>	<b>Water depth<sup>3</sup> (cm)</b>
08/29/02	1.94	217	30.06	384	40
08/30/02	1.90	218	29.33	381	40
08/31/02	2.04	219	29.58	385	--
09/01/02	2.06	220	29.95	390	--
09/02/02	2.10	221	30.18	397	42
09/03/02	2.05	219	31.26	400	42
09/04/02	2.00	219	31.65	404	--
09/05/02	1.96	219	31.27	404	--
09/06/02	1.78	218	30.02	390	--
09/07/02	1.85	218	30.02	405	--
09/08/02	1.87	217	30.08	412	--
09/09/02	1.88	218	30.97	413	--
09/10/02	1.88	217	30.94	417	--
09/11/02	1.91	217	29.33	422	--
09/12/02	1.84	218	27.61	423	--
09/13/02	1.56	223	28.69	431	--
09/14/02	1.64	220	30.28	434	--
09/15/02	2.10	219	30.80	438	--
09/16/02	2.15	219	30.80	444	--
09/17/02	2.13	219	31.31	455	--
09/18/02	2.23	219	31.46	461	--
09/19/02	2.36	220	31.12	467	--
09/20/02	2.31	220	30.64	472	--
09/21/02	2.29	219	30.23	472	--
09/22/02	2.31	220	29.88	481	--
09/23/02	2.43	221	28.97	485	--
09/24/02	2.21	225	28.90	485	--
09/25/02	2.12	228	29.81	491	43
09/26/02	2.11	228	30.21	493	42
09/27/02	2.01	227	30.52	488	42
09/28/02	2.03	226	30.72	485	43
09/29/02	2.12	226	30.71	476	44
09/30/02	2.05	227	30.13	469	44
10/01/02	1.80	227	30.02	460	44

**Table D - 2.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-36 during deployment period 08/28/02 1200–10/29/02 1530— Continued

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> (°C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
10/02/02	1.64	228	30.35	456	44
10/03/02	1.53	229	30.49	451	43
10/04/02	1.47	229	30.09	451	43
10/05/02	1.43	228	29.93	451	42
10/06/02	1.58	227	29.40	451	42
10/07/02	1.63	228	29.54	453	42
10/08/02	1.59	227	29.51	456	41
10/09/02	1.44	223	29.04	458	41
10/10/02	1.71	226	29.43	454	41
10/11/02	1.68	225	29.32	449	42
10/12/02	1.66	225	29.46	457	42
10/13/02	2.12	225	29.98	454	42
10/14/02	2.17	224	29.44	456	41
10/15/02	2.08	223	29.00	450	41
10/16/02	1.82	222	28.28	435	42
10/17/02	1.74	222	27.37	436	42
10/18/02	1.99	222	26.49	438	41
10/19/02	2.22	222	26.60	438	41
10/20/02	2.24	222	27.19	433	41
10/21/02	2.21	221	26.81	422	41
10/22/02	*	*	27.26	420	42
10/23/02	*	*	28.47	419	42
10/24/02	*	*	28.75	423	42
10/25/02	*	*	28.94	423	41
10/26/02	*	*	28.93	422	41
10/27/02	*	*	29.24	424	41
10/28/02	*	*	29.36	427	40
MINIMUM	1.43	217	26.49	381	40
MAXIMUM	2.43	229	31.65	493	44
AVERAGE	1.94	222	29.61	440	42
BURSTS FILTERED OUT (%)	12				

<sup>1</sup> Flow sample volume located 20 cm above top of litter.

<sup>2</sup> MicroCAT temperature and conductance measured 15 cm above top of litter.

<sup>3</sup> Depth variation determined from stage recorded at P36 gage.

**Table D - 3.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-36 during deployment period 10/30/02 1000–12/03/02 1230.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; ° C, degrees Celsius; µS/cm microsiemens per centimeter at 25 degrees Celsius; cm, centimeters; %, percent]

<b>Date</b>	<b>Flow velocity<sup>1</sup> (cm/s)</b>	<b>Flow direction<sup>1</sup> (° CW from MN)</b>	<b>Temperature<sup>2</sup> (°C)</b>	<b>Specific conductance<sup>2</sup> (µS/cm)</b>	<b>Water depth<sup>3</sup> (cm)</b>
10/31/02	1.90	223	29.22	435	39
11/01/02	1.99	223	28.91	436	39
11/02/02	1.94	223	27.86	437	38
11/03/02	1.98	224	26.90	438	38
11/04/02	1.96	224	26.67	441	38
11/05/02	2.02	224	27.03	443	37
11/06/02	1.94	222	27.40	447	37
11/07/02	1.79	224	24.85	451	36
11/08/02	1.85	224	23.36	454	36
11/09/02	1.83	223	24.04	456	36
11/10/02	1.92	224	24.66	460	35
11/11/02	1.84	223	25.30	464	35
11/12/02	1.91	224	26.58	467	35
11/13/02	1.75	224	25.24	466	35
11/14/02	1.55	225	22.14	468	35
11/15/02	1.46	225	23.05	470	34
11/16/02	1.46	227	23.58	458	35
11/17/02	1.41	226	22.44	401	41
11/18/02	1.47	223	19.28	410	41
11/19/02	1.49	220	19.59	420	41

**Table D - 3.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-36 during deployment period 10/30/02 1000–12/03/02 1230—Continued

<b>Date</b>	<b>Flow velocity<sup>1</sup> (cm/s)</b>	<b>Flow direction<sup>1</sup> (° CW from MN)</b>	<b>Temperature<sup>2</sup> (°C)</b>	<b>Specific conductance<sup>2</sup> (µS/cm)</b>	<b>Water depth<sup>3</sup> (cm)</b>
11/20/02	1.49	220	21.56	422	41
11/21/02	1.44	223	23.35	430	40
11/22/02	1.43	223	23.71	434	40
11/23/02	1.59	223	21.49	452	40
11/24/02	1.47	224	20.30	461	39
11/25/02	1.33	227	21.78	472	39
11/26/02	1.46	225	22.85	481	38
11/27/02	1.39	227	22.36	485	38
11/28/02	1.28	229	21.68	492	37
11/29/02	1.29	228	19.95	504	37
11/30/02	1.26	230	18.81	512	36
12/01/02	1.20	236	19.45	518	35
12/02/02	1.13	236	20.74	529	35
MINIMUM	1.13	220	18.81	401	34
MAXIMUM	2.02	236	29.22	529	41
AVERAGE	1.61	225	23.52	458	37
BURSTS FILTERED OUT (%)	0				

<sup>1</sup> Flow sample volume located 20 cm above top of litter.

<sup>2</sup> MicroCAT temperature and conductance measured 15 cm above top of litter.

<sup>3</sup> Depth variation determined from stage recorded at P36 gage.



**Table D - 4.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-36 during deployment period 12/04/02 1000–01/21/03 1230.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; ° C, degrees Celsius; µS/cm microsiemens per centimeter at 25 degrees Celsius; cm, centimeters; %, percent]

<b>Date</b>	<b>Flow velocity<sup>1</sup> (cm/s)</b>	<b>Flow direction<sup>1</sup> (° CW from MN)</b>	<b>Temperature<sup>2</sup> (°C)</b>	<b>Specific conductance<sup>2</sup> (µS/cm)</b>	<b>Water depth<sup>3</sup> (cm)</b>
12/05/02	1.00	220	23.63	541	34
12/06/02	0.94	224	24.44	544	33
12/07/02	1.02	228	22.23	547	33
12/08/02	1.04	222	22.28	549	32
12/09/02	1.03	225	22.37	537	33
12/10/02	1.06	226	23.05	483	37
12/11/02	1.05	225	23.98	490	37
12/12/02	1.00	226	24.65	497	37
12/13/02	1.07	226	24.69	499	37
12/14/02	1.05	224	23.02	501	37
12/15/02	0.98	228	19.97	501	36
12/16/02	0.97	224	17.91	487	35
12/17/02	0.94	224	17.22	477	35
12/18/02	0.90	227	18.54	481	34
12/19/02	0.97	228	19.70	495	34
12/20/02	1.02	228	21.00	503	33
12/21/02	1.03	230	18.59	505	33
12/22/02	0.98	231	18.49	509	32
12/23/02	0.91	229	19.40	514	32
12/24/02	0.91	231	21.54	521	31
12/25/02	0.91	232	22.81	526	31
12/26/02	1.09	236	19.09	528	31
12/27/02	1.00	237	18.16	531	30
12/28/02	1.00	233	17.84	533	29
12/29/02	1.09	239	16.34	536	29
12/30/02	1.13	236	17.16	538	29
12/31/02	1.12	235	19.05	540	28

**Table D - 4.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-36 during deployment period 12/04/02 1000–01/21/03 1230—Continued

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> (°C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
01/01/03	1.28	237	21.76	541	28
01/02/03	1.22	235	22.57	543	28
01/03/03	1.17	238	21.84	520	29
01/04/03	1.15	238	18.00	522	29
01/05/03	1.19	238	16.93	527	28
01/06/03	1.22	239	17.58	528	28
01/07/03	1.28	240	16.55	533	27
01/08/03	1.31	238	16.01	536	27
01/09/03	1.29	236	15.98	540	26
01/10/03	1.29	236	17.17	542	26
01/11/03	1.32	236	18.82	544	25
01/12/03	1.35	238	19.61	544	25
01/13/03	1.35	235	19.46	547	25
01/14/03	1.31	238	19.76	547	24
01/15/03	1.26	236	17.35	551	24
01/16/03	1.24	234	17.19	554	24
01/17/03	1.26	237	17.99	554	23
01/18/03	1.11	239	13.85	559	23
01/19/03	1.07	230	12.59	564	23
01/20/03	1.24	233	13.55	568	22
MINIMUM	0.90	220	12.59	477	22
MAXIMUM	1.35	240	24.69	568	37
AVERAGE	1.11	232	19.40	527	30
BURSTS FILTERED OUT (%)	0				

<sup>1</sup> Flow sample volume located 10 cm above top of litter.

<sup>2</sup> MicroCAT temperature and conductance measured 15 cm above top of litter.

<sup>3</sup> Depth variation determined from stage recorded at P36 gage.

**Table D - 5.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-36 during deployment period 01/22/03 1000–04/07/03 0000.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; ° C, degrees Celsius; µS/cm microsiemens per centimeter at 25 degrees Celsius; cm, centimeters; \*, all bursts filtered out; --, no data; %, percent]

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> (°C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
01/23/03	1.58	241	16.96	572	21
01/24/03	1.36	237	13.03	579	21
01/25/03	1.12	236	12.57	584	21
01/26/03	1.26	235	15.32	586	21
01/27/03	1.25	236	15.60	588	20
01/28/03	1.37	230	14.99	591	20
01/29/03	1.02	226	17.21	593	20
01/30/03	1.09	225	18.81	594	20
01/31/03	1.14	221	20.18	596	19
02/01/03	1.30	223	19.96	594	19
02/02/03	1.31	222	18.52	596	19
02/03/03	1.29	222	19.06	599	18
02/04/03	1.39	220	19.96	601	18
02/05/03	1.31	218	20.67	602	18
02/06/03	1.03	218	21.24	508	18
02/07/03	0.81	225	22.53	--	18
02/08/03	*	*	22.64	--	17
02/09/03	*	*	22.59	--	17
02/10/03	0.81	218	23.52	--	17
02/11/03	1.22	220	22.48	--	17
02/12/03	1.33	224	19.68	--	16
02/13/03	1.32	228	18.07	--	16
02/14/03	1.28	231	18.81	--	16
02/15/03	1.34	229	21.81	--	15
02/16/03	1.43	228	23.69	--	15
02/17/03	1.09	230	21.95	--	15
02/18/03	0.91	229	19.45	--	15
02/19/03	0.70	232	22.06	--	15
02/20/03	0.98	229	23.73	--	15
02/21/03	0.86	227	24.64	--	15
02/22/03	*	*	25.30	--	15
02/23/03	1.17	225	21.59	--	15
02/24/03	1.37	227	20.91	--	16
02/25/03	1.57	226	22.76	--	15

**Table D - 5.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-36 during deployment period 01/22/03 1000–04/07/03 0000—Continued

<b>Date</b>	<b>Flow velocity<sup>1</sup> (cm/s)</b>	<b>Flow direction<sup>1</sup> (° CW from MN)</b>	<b>Temperature<sup>2</sup> (°C)</b>	<b>Specific conductance<sup>2</sup> (µS/cm)</b>	<b>Water depth<sup>3</sup> (cm)</b>
02/26/03	1.63	225	23.78	--	15
02/27/03	1.62	224	24.97	--	15
02/28/03	1.60	222	26.02	--	15
03/01/03	1.46	222	25.95	--	15
03/02/03	*	*	25.27	--	15
03/03/03	*	*	25.71	--	14
03/04/03	*	*	26.21	--	14
03/05/03	*	*	26.12	--	14
03/06/03	*	*	26.41	--	14
03/07/03	*	*	26.28	--	14
03/08/03	*	*	25.91	--	14
03/09/03	*	*	25.76	--	14
03/10/03	*	*	27.22	--	14
03/11/03	*	*	26.08	--	14
03/12/03	*	*	25.69	--	13
03/13/03	*	*	26.41	--	13
03/14/03	*	*	26.99	--	13
03/15/03	*	*	26.84	--	13
03/16/03	*	*	25.84	--	13
03/17/03	*	*	24.14	--	15
03/18/03	*	*	26.21	--	15
03/19/03	*	*	27.59	--	15
03/20/03	*	*	27.86	--	15
03/21/03	*	*	27.71	--	15
03/22/03	*	*	28.45	--	15
03/23/03	*	*	25.34	--	14
03/24/03	*	*	21.29	--	14
03/25/03	*	*	20.03	--	14
03/26/03	*	*	--	--	14
03/27/03	*	*	--	--	14
03/28/03	*	*	--	--	17
03/29/03	*	*	--	--	16
03/30/03	*	*	--	--	16
03/31/03	*	*	--	--	16

**Table D - 5.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-36 during deployment period 01/22/03 1000–04/07/03 0000—Continued

<b>Date</b>	<b>Flow velocity<sup>1</sup> (cm/s)</b>	<b>Flow direction<sup>1</sup> (° CW from MN)</b>	<b>Temperature<sup>2</sup> (°C)</b>	<b>Specific conductance<sup>2</sup> (µS/cm)</b>	<b>Water depth<sup>3</sup> (cm)</b>
04/01/03	*	*	--	--	15
04/02/03	*	*	--	--	15
04/03/03	*	*	--	--	16
04/04/03	*	*	--	--	--
04/05/03	*	*	--	--	--
04/06/03	*	*	--	--	--
MINIMUM	0.70	218	12.57	508	15
MAXIMUM	1.63	241	28.45	602	21
AVERAGE	1.24	227	22.65	585	16
BURSTS FILTERED OUT (%)	55				

<sup>1</sup> Flow sample volume located 10 cm above top of litter.

<sup>2</sup> MicroCAT temperature and conductance measured 15 cm above top of litter.

<sup>3</sup> Depth variation determined from stage recorded at P36 gage.

**Table D - 6.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-36 during deployment period 06/18/03 1300–07/30/03 1100.

[cm/s, centimeters per second; ° CW from MN, degrees clockwise from magnetic north; ° C, degrees Celsius; µS/cm microsiemens per centimeter at 25 degrees Celsius; cm, centimeters; --, no data; %, percent]

<b>Date</b>	<b>Flow velocity<sup>1</sup> (cm/s)</b>	<b>Flow direction<sup>1</sup> (° CW from MN)</b>	<b>Temperature<sup>2</sup> (° C)</b>	<b>Specific conductance<sup>2</sup> (µS/cm)</b>	<b>Water depth<sup>3</sup> (cm)</b>
06/19/03	0.97	254	--	--	--
06/20/03	0.98	258	--	--	--
06/21/03	0.98	256	--	--	--
06/22/03	0.84	247	--	--	--
06/23/03	0.51	235	--	--	--
06/24/03	0.52	235	--	--	--
06/25/03	0.53	230	--	--	--
06/26/03	0.58	228	--	--	--
06/27/03	0.51	227	--	--	--
06/28/03	0.64	236	--	--	--
06/29/03	0.63	235	--	--	--
06/30/03	0.75	238	--	--	--
07/01/03	0.68	238	--	--	--
07/02/03	1.02	242	--	--	--
07/03/03	0.91	248	--	--	--
07/04/03	0.92	246	--	--	--
07/05/03	0.88	245	--	--	--
07/06/03	0.89	247	--	--	--
07/07/03	0.93	245	--	--	--
07/08/03	0.97	242	--	--	--
07/09/03	0.92	239	--	--	--
07/10/03	0.88	242	--	--	--
07/11/03	0.92	243	--	--	--
07/12/03	0.92	243	--	--	--
07/13/03	0.94	243	--	--	--
07/14/03	0.98	236	--	--	--
07/15/03	0.93	233	--	--	--
07/16/03	0.97	237	--	--	--
07/17/03	0.95	238	--	--	--
07/18/03	0.72	246	--	--	--
07/19/03	0.44	273	--	--	--

**Table D - 6.** Daily mean flow velocities, MicroCAT water temperatures and specific conductances, and water depths at station GS-36 during deployment period 06/18/03 1300–07/30/03 1100—Continued

Date	Flow velocity <sup>1</sup> (cm/s)	Flow direction <sup>1</sup> (° CW from MN)	Temperature <sup>2</sup> (°C)	Specific conductance <sup>2</sup> (µS/cm)	Water depth <sup>3</sup> (cm)
07/20/03	0.39	273	--	--	--
07/21/03	0.20	270	--	--	--
07/22/03	0.20	265	--	--	--
07/23/03	0.23	268	--	--	--
07/24/03	0.24	268	--	--	--
07/25/03	0.44	264	--	--	--
07/26/03	0.67	263	--	--	--
07/27/03	0.65	259	--	--	--
07/28/03	0.55	264	--	--	--
07/29/03	0.37	271	--	--	--
MINIMUM	0.20	227			
MAXIMUM	1.02	273			
AVERAGE	0.71	248			
BURSTS FILTERED OUT (%)	0				

<sup>1</sup> Flow sample volume located 20 cm above top of litter.

<sup>2</sup> MicroCAT temperature and conductance measured 15 cm above top of litter.

<sup>3</sup> Depth variation determined from stage recorded at P36 gage.

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