

Memorandum

Date: May 30, 2002

To: SJR DO TMDL TAC

From: Russ Brown / Steve Renehan, Jones & Stokes

Subject: Water Temperature Measurements in the DWSC

On May 10th, eight water temperature recorders were placed in the Deep Water Ship Channel at the western end of Rough & Ready Island. These recorders are deployed vertically on a cable, which is attached to the dock. A floating buoy keeps the recorders at fixed depths below the surface. These depths are 1.5, 3, 4.5, 6, 9, 12, 15 and 18 feet. Recording temperatures at these different depths will help to identify periods of thermal stratification (during the day) within the DWSC. This information will be important for evaluating the likely near surface DO patterns and evaluating aeration and oxygen diffuser performance results. Figure 1 shows a conceptual drawing of the study area.

Figure 2 shows the water temperatures in the DWSC for most of the month of May. The DWR's Rough & Ready station data is also shown on this figure (i.e. diamonds). Temperatures slowly rose through the 18th, after which a storm event caused a drop in temperatures of about 4 degrees F. The next few days resulted in rapidly rising temperatures.

Figures 3 & 4 show the temperatures for two periods in May. Figure 3 shows temperatures from May 10th - 15th. A diurnal variation of about 3 degrees can be seen, with temperatures varying with depth. Figure 4 shows temperatures from May 19th - 23rd. This period began with the DWSC initially well-mixed and cooling. By May 21st, the DWSC stratified, with a temperature difference between surface (-1.5 ft) and -18 feet of 4 degrees during the late afternoon. The DWSC is almost 35 feet deep.

Figure 5 shows the water temperatures and dissolved oxygen in the DWSC at DWR's Rough & Ready station. At all times, the dissolved oxygen remained above 7 mg/L, and rose to a maximum of about 12 mg/L. The diurnal variation in DO levels ranged from 1-3 mg/L. The diurnal DO range was greatest on days with the largest temperature variation. The surface DO may be considerably higher than the Rough & Ready Is. station (i.e. sampling with pump at 6 feet).

Figure 6 shows the river stage and flow for May at Rough & Ready Island.

These conditions represent those that would normally be expected in the DWSC during late spring. As the summer begins, it will be interesting to document, for the first time, the extent to which the DWSC stratifies, and to directly measure the DO response during these periods of diurnal thermal stratification (field surveys planned). Call us if you have any questions or comments.

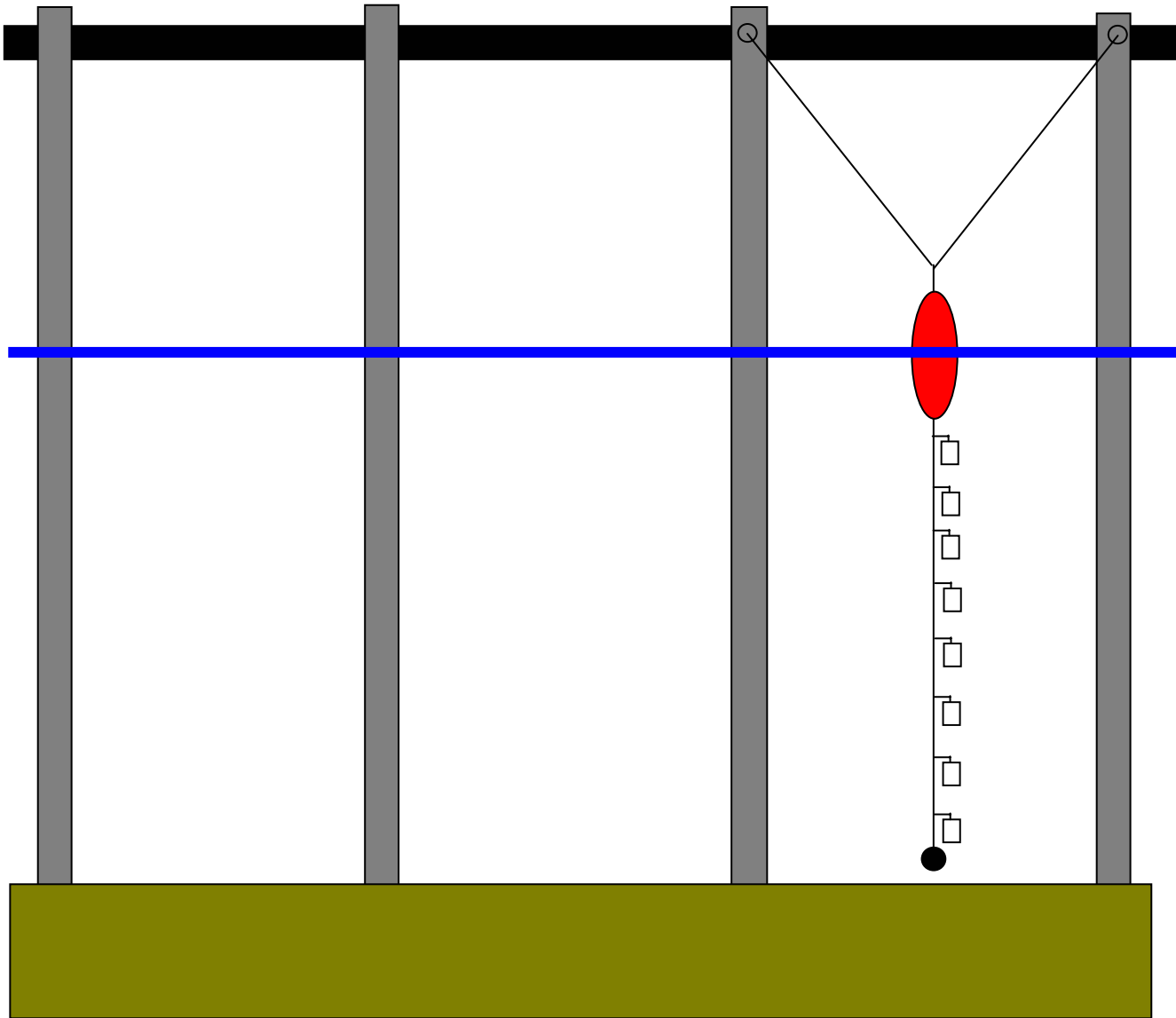


Figure 1. Conceptual drawing of the study area.

Water Temperatures in the DWSC at Rough & Ready Island

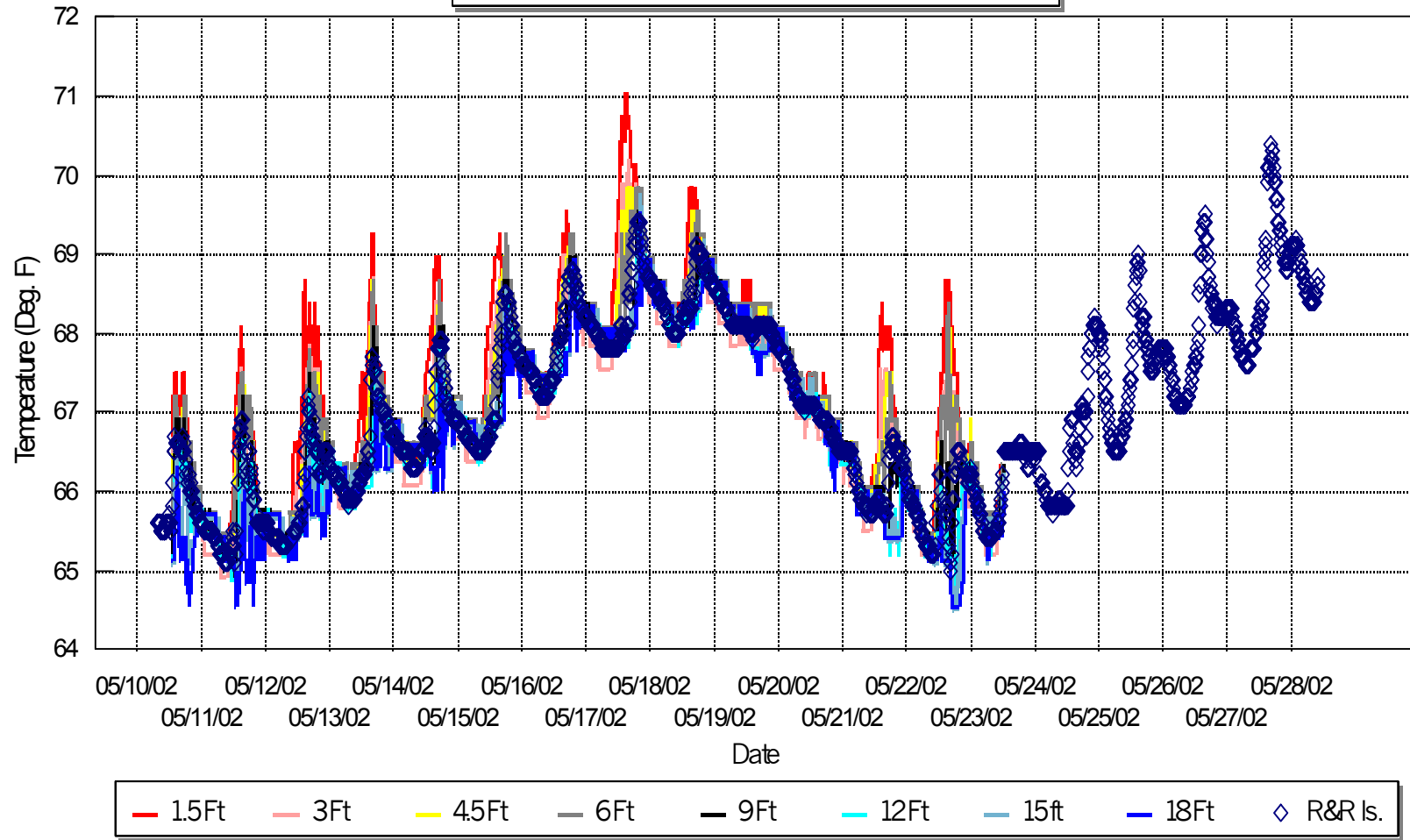


Figure 2. Water temperatures in the DWSC, May 2002.

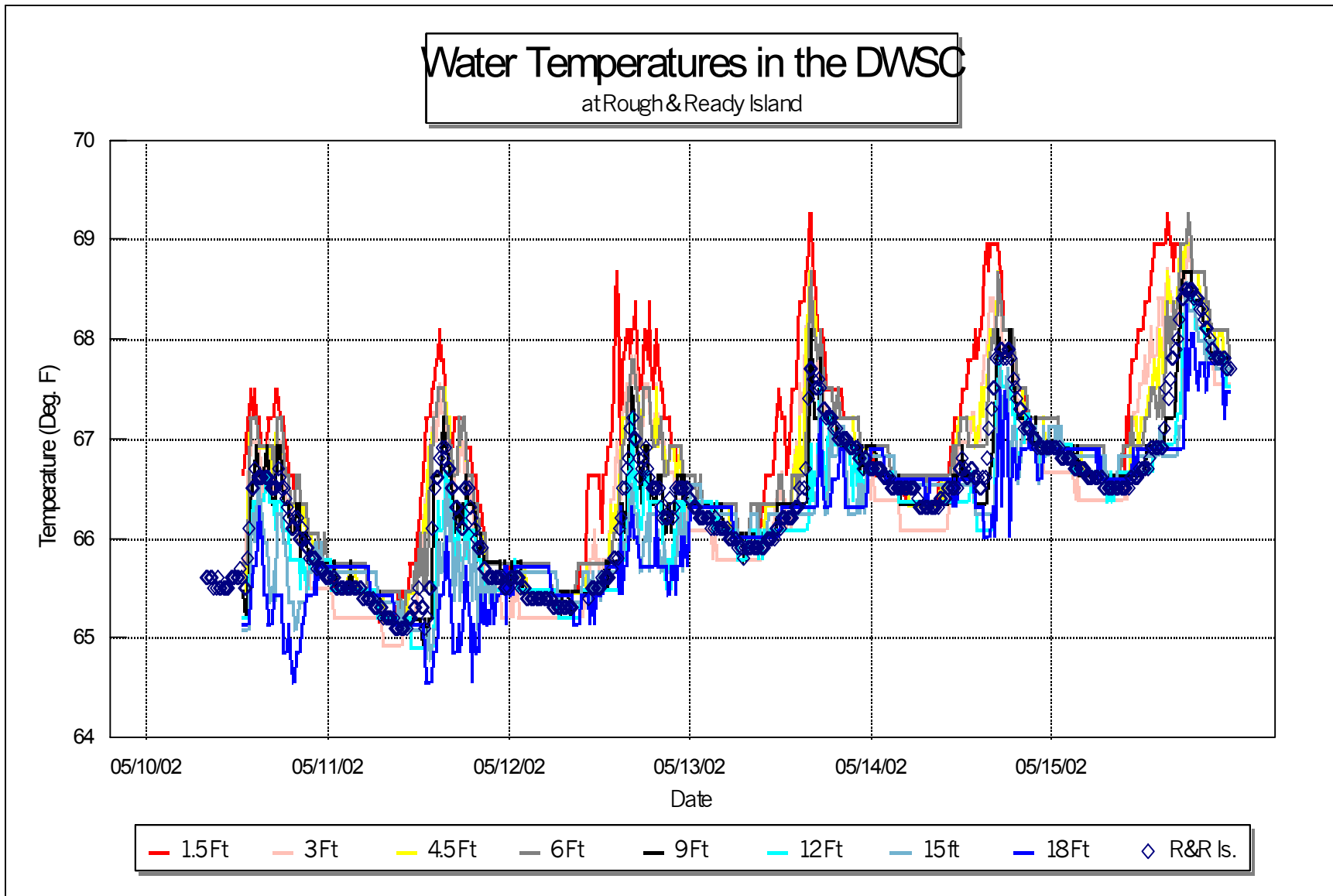


Figure 3. Water temperatures in the DWSC, May 10-15, 2002.

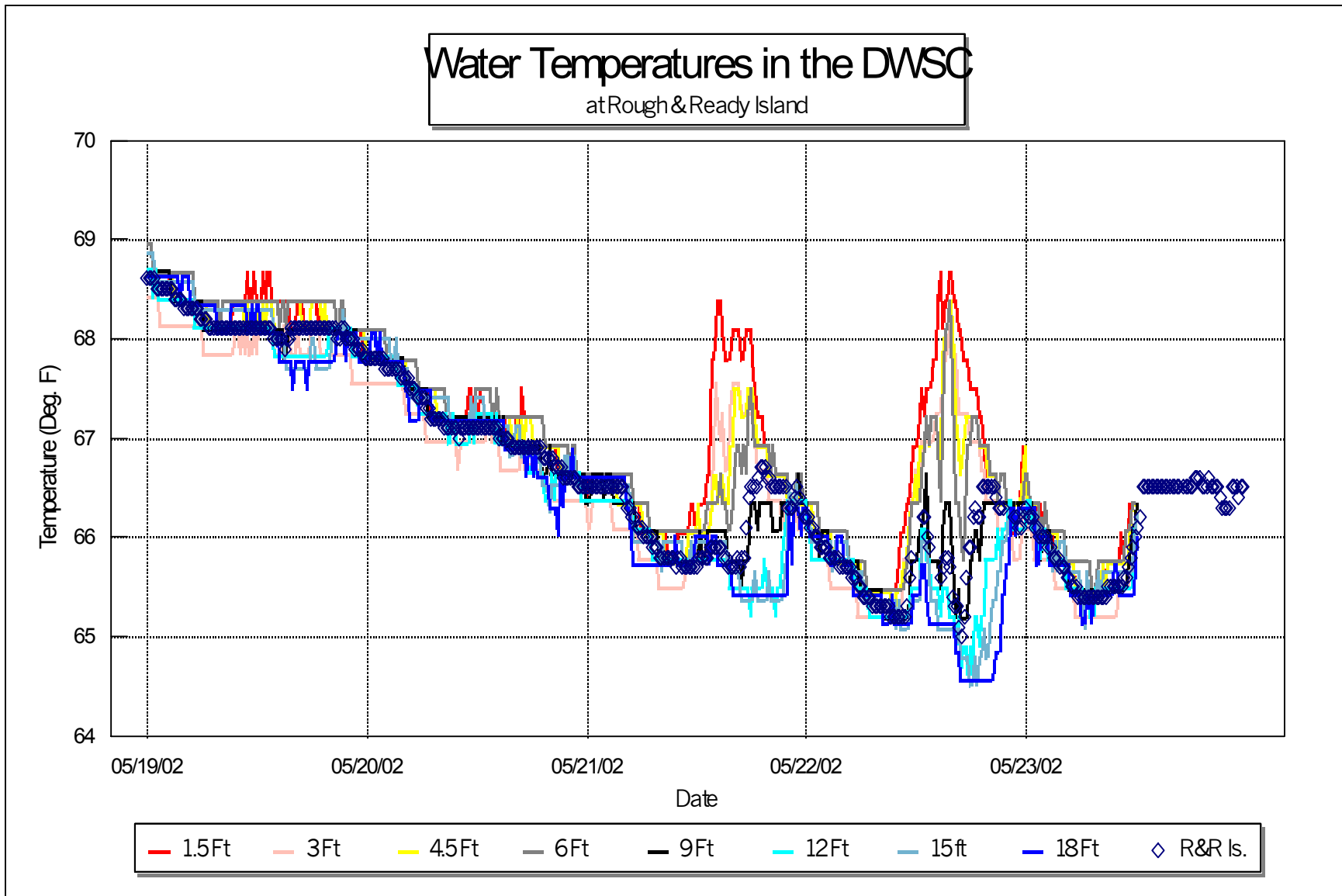


Figure 4. Water temperatures in the DWSC, May 19-23, 2002.

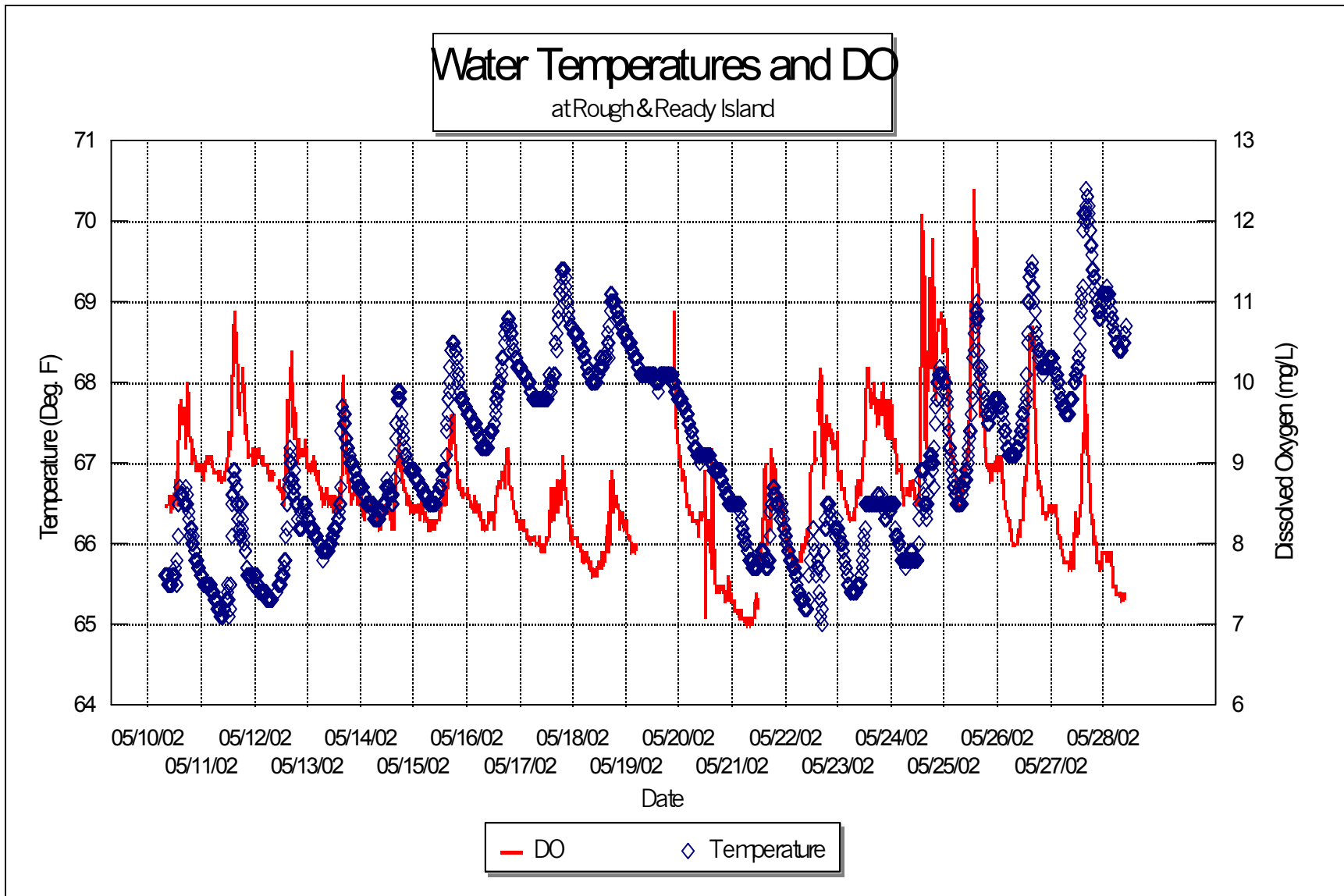


Figure 5. Water temperatures and dissolved oxygen at Rough & Ready Island, May 2002.

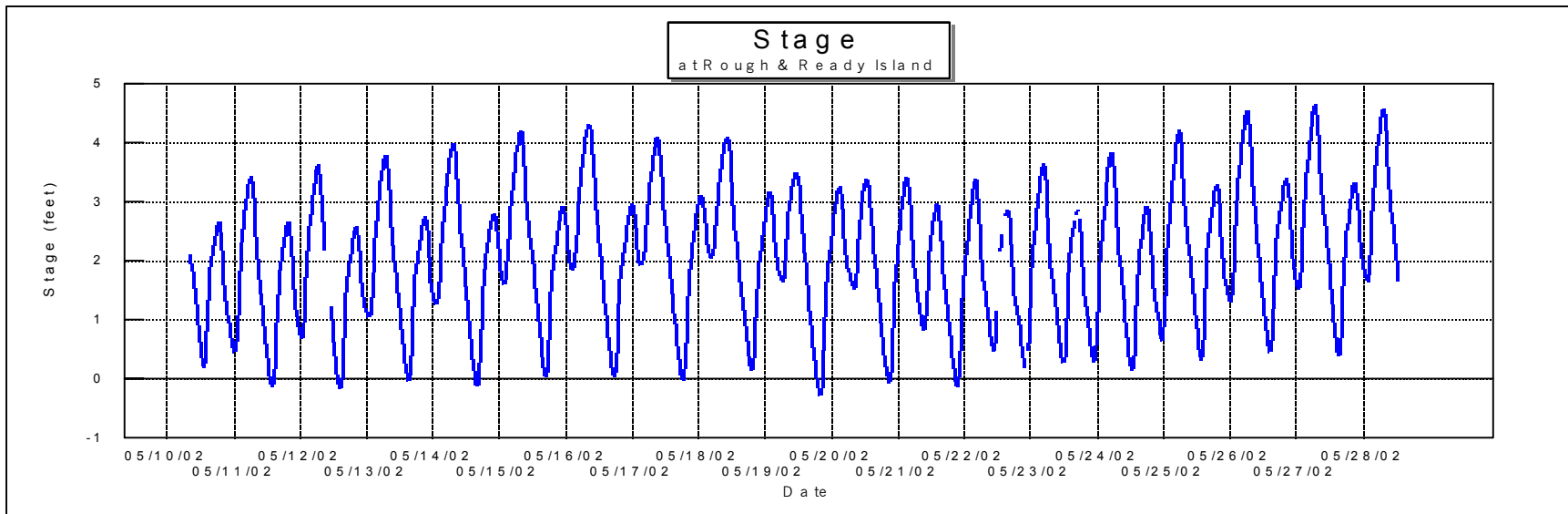
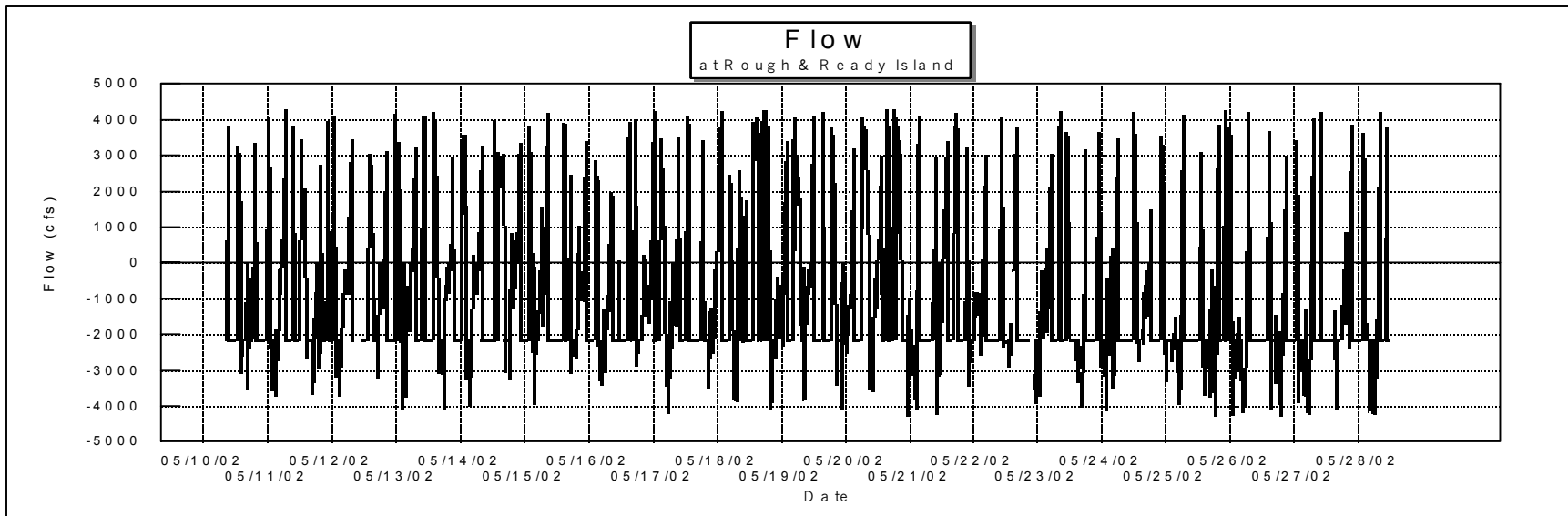


Figure 6. Flow and Stage in the DWSC at Rough & Ready island, May 2002.