QA/QC Log: Horseshoe Beach, 2002

Key to Log:

File Name: Name of excel files containing the data for that month. File names have two or three parts: 1) the two-letter site abbreviation (GJ, HB, BA, etc.), 2) the year and month (ie. -0201), and 3) the nature of the file ("-raw" contains the raw, unaltered data; "-QAQC" contains the quality controlled data set as well as all corrections; the file name that ends with the year and month is the quality controlled file containing only the corrected and finalized data—this is the file sent to the archive)

Deployments: Number of different sondes that recorded data during the month and the periods of dates/times of each deployment.

Condition of Sonde: The post-deployment condition of each sonde deployed during the month. This includes information on fouling, equipment failures and whether post-deployment checks were performed.

Removed Data: Tabulation of all data points removed from a given month. Table columns give the parameter values deleted, the reason for the deletion (see abbreviations) and the dates and times of points deleted.

Corrected data: This is a record of all data points that were corrected. This includes corrections due to instrument drift, incorrect instrument calibration, etc… Included are probe readings in the standard pre- and post-deployment and excel formulae used to calculate corrected values.

Missing data: This is a record of all missing data points not due to the QA/QC process (ie. not accounted for in "Removal of bad data". A common cause for this missing data is a lag time between the retrieval of one sonde and the deployment of the second sonde or failure of the instrument to log data at a given time.

Abnormalities in Data: This is a record of troublesome trends or data points not removed from data set, but that could prove a problem in interpretation. Examples include sudden jumps in the data when sondes are changed out (reflecting drift in retrieved sonde or a lack of standardization between the two sondes). Notes regarding reliability of data may also be found here. **ALWAYS read this section before interpreting data.**

Abbreviations:

IF	=	Instrument Failure: Data logger returned values of –6999
PF	=	Probe Failure: Probe measuring individual parameter apparently malfunctioned.
ADL	=	Above Detection Limit: data logger returned a data point that is above the detection limit of the probe
BDL	=	Below Detection Limit: data logger returned a data point that is above the detection limit of the probe
SND	=	Sonde Not Deployed: evidence indicates that sonde was not in the water on-site when data was recorded
FOUL	=	Fouled: evidence indicates sonde was not functioning properly due to severe fouling
EXP	=	Exposed: Sonde was exposed to air due to low water level or some disturbance.

General Notes on Reliability of Data:

1) In general, measurements of salinity, temperature and depth are very reliable unless otherwise noted in "Abnormalities in Data".

2) Measurements of dissolved oxygen are often not reliable. Typically, oxygen measurements taken soon after a sonde is deployed are reliable, but reliability decreases during the deployment period due to instrument drift and fouling. The most unreliable oxygen data is that collected near the time the sonde is retrieved. ALWAYS read "Abnormalities in Data" before interpreting dissolved oxygen!

3) The reliability of turbidity measurements is much like that of oxygen. Turbidity measurements are best early and worst late in the deployment period.

4) The reliability of chlorophyll measurements is unknown. We do not currently know what the measurements mean in a biological context. Confirmation studies are underway.

**If a post-deployment check was not performed, reliability of all data for that deployment period must be considered suspect.

APRIL

File Name: HB-0204-raw, HB-0204-QAQC, HB-0204

Deployments: (Unknown) 4/4-4/19 (number of deployments in this period unknown); 4/19-5/2

Condition of Sondes: 4/4-4/19 (unknown, no calibration sheets available); 4/19-5/1 (light fouling, chlorophyll wiper not parking correctly)

Removed Data:

Parameter(s)	Problem	Data Points
Turbidity	BDL	4/5 500; 4/7 2000; 4/17 400

Corrected Data:

4/4-4/19

**No corrections possible due to lack of information

4/19-5/1

Oxygen Saturation:

standard 100, probe 49.5

Formula: =(-((49.5-100)/(B1463-B893))*(B893-B893))+G893

Conversion for [oxygen]

=6.21-(0.0663*D893)-(0.0365*R893)+(0.0696*O893)

Specific Conductivity:

standard 30.3, probe 27.65

Formula: =(-((27.65-30.3)/(B1463-B893))*(B893-B893))+E893

Conversion for salinity

=(0.7036*Q893)-2.6563

Turbidity:

standard 100, probe 98.8; standard 0, probe 5.1

Formula: =(((((100/93.7)-1)*(J893))-(5.1))*((B893-B893)/(B1463-B893)))+J893

Chlorophyll:

standard 0, probe –1.7

Formula: =(-((-1.7-0)/(B1463-B893))*(B893-B893))+K893

Missing Data:

4/1 000 – 4/4 1030 – Data not yet being recorded.

4/9/2002 1330 -- No data, one empty row inserted for missing time.

Problems and Anomalies:

Salinity, Dissolved Oxygen, Turbidity and Chlorophyll 4/4-4/19: No calibration sheets available for this time period. It is unknown how many different sondes were deployed during this time or in what condition they were following retrieval. Original uncorrected data is retained but **may be faulty** due to the effects of instrument drift and biofouling. This data should be interpreted with caution.

Dissolved Oxygen 4/12 330-400: Discontinuity in data: oxygen decreased ~40%. This disconinuity **may be faulty**.

Salinity and Dissolved Oxygen 4/19 1300-1330: Discontinuity in data: salinity decreased 3.2ppt and dissolved oxygen increased 50%. Sonde may have been changed, but no calibration sheets are available to confirm this. This discontinuity is likely **faulty**.

MAY

File Name: HB-0205-raw, HB-0205-QAQC, HB-0205

Deployments: (4); 4/19-5/1, 5/1-5/6, 5/6-31, 5/31-6/26

Condition of Sondes: 4/19-5/1 (light fouling, chlorophyll wiper not parking correctly); 5/1-5/6 (light fouling); 5/6-5/31 (considerable barnacle fouling, DO membrane needs replacing, chlorophyll wiper not parking); 5/31-6/26 (moderate fouling on probes by barnacles and tubeworms)

Removed Data:

Parameter(s)	Problem	Data Points
Oxygen	PF	5/1 1130-5/6 1530

Corrected Data:

4/19-5/1

Oxygen:

This time period was continuous with April and was corrected as for that month (see above)

Specific Conductivity:

This time period was continuous with April and was corrected as for that month (see above)

Turbidity:

This time period was continuous with April and was corrected as for that month (see above)

Chlorophyll:

This time period was continuous with April and was corrected as for that month (see above)

5/1-5/6

Oxygen Saturation:

standard 100, probe
Probe failed--NOT CORRECTABLE

Specific Conductivity:

standard 1.413, probe 1.48
Formula: =(-((1.48-1.413)/(B266-B25))*(B25-B25))+E25
Conversion for salinity
=(0.7152*R25)-3.1403

Turbidity:

standard 100, probe 96.7; standard 0, probe 2.8
Formula: =(((((100/93.9)-1)*(K25))-(2.8))*((B25-B25)/(B266-B25)))+K25

Chlorophyll:

standard 0, probe 1.0
Formula: =(-((1-0)/(B266-B25))*(B25-B25))+L25

5/6-5/31

Oxygen Saturation:

standard 100, probe 38.8
Out of correctable range--NOT CORRECTABLE

Specific Conductivity:

standard 1.413, probe 1.226
Formula: =(-((1.226-1.413)/(B1466-B267))*(B267-B267))+E267
Conversion for salinity
=(0.6977*R267)-2.3625

Turbidity:

standard 100, probe 88.2; standard 0, probe 0
Formula: =(((((100/88.2)-1)*(K267))-(0))*((B267-B267)/(B1466-B267)))+K267

Chlorophyll:

standard 0, probe 0.5

Formula: =(-((0.5-0)/(B1466-B267))*(B267-B267))+L267

5/31-6/26

Oxygen Saturation:

standard 100, probe 91

Formula: =(-((91-100)/(B2712-B1467))*(B1467-B1467))+G1467

Conversion for [oxygen]

=5.57-(0.0568*D1467)-(0.0327*S1467)+(0.0672*P1467)

Specific Conductivity:

standard 1.413, probe 2.22

Formula: =(-((2.22-1.413)/(B2712-B1467))*(B1467-B1467))+E1467

Conversion for salinity

=(0.7008*R1467)-2.5425

Turbidity:

standard 100, probe 93.9; standard 0, probe 7.9

Formula: =(((((100/85.7)-1)*(K1467))-(7.9))*((B1467-B1467)/(B2712-B1467)))+K1467

Chlorophyll:

standard 0, probe 0.6

Formula: =(-((0.6-0)/(B2712-B1467))*(B1467-B1467))+L1467

Missing Data:

NONE

Abnormalities in Data:

Dissolved Oxygen 5/1-5/6: Oxygen probe malfunctioned likely due to a membrane problem (DO charge was in excess of 75 during this entire period). This data was **faulty** and was deleted.

Dissolved Oxygen 5/6 - 5/31: Sonde became heavily fouled during this very long deployment period and so data was not correctable. Suspected fouled portion of record (5/26 300 – 5/31 1230) was not deleted because drop in DO due to fouling was not very large, but data from 5/26 300 to 5/31 1230 should be considered **faulty**. Rest of oxygen data for this period is original data and so **may be faulty**. Interpret with caution.

Salinity: 5/31 : The 5/6-5/31 sonde recorded a steady decline in salinity to ~18ppt over its deployment period. When the new sonde was deployed on 5/31 salinity jumped to ~30ppt. The sonde deployed during the period 5/6-5/31 failed the pre-deployment conductivity cell constant test so the data record **may be faulty** at the very least. However, this sonde when deployed read salinities identical to the sonde that was retrieved, indicating it was function sufficiently. Curiously, the sonde deployed during the period 5/31-6/26 declined from 30ppt at the beginning of its deployment period to 18ppt at the end of its deployment period. The sonde deployed on 6/26 read 26ppt and shows no evidence of subsequent malfunction or failure. This indicates that all data within the period of 5/31-6/26 is likely **faulty**. Otherwise there is little evidence to suggest an explanation for the discrepancies. The sudden salinity jump on 5/31 should be considered **faulty**.

Turbidity: ADL on 5/1 900, 5/2 400, 5/8 530, 5/19 2230-2300. All were individual spikes (thus not indicative of a probe failure or complication in the field) so they were retained.

JUNE

File Name: HB-0206-raw, HB-0206-QAQC, HB-0206

Deployments: (2); 5/31-6/26, 6/26-7/19

Condition of Sondes: 5/31-6/26 (moderate fouling on probes by barnacles and tubeworms); 6/26-7/19 (Oxygen probe not functional after retrieval)

Removed Data:

Parameter(s)	Problem	Data Points

Corrected Data:

5/31-6/26

Oxygen Saturation:

standard 100, probe 91

Formula: =(-((91-100)/(B2712-B1467))*(B1467-B1467))+G1467

Conversion for [oxygen]

=5.57-(0.0568*D1467)-(0.0327*S1467)+(0.0672*P1467)

Specific Conductivity:

standard 1.413, probe 2.22

Formula: =(-((2.22-1.413)/(B2712-B1467))*(B1467-B1467))+E1467

Conversion for salinity

=(0.7008*R1467)-2.5425

Turbidity:

standard 100, probe 93.9; standard 0, probe 7.9

Formula: =(((((100/85.7)-1)*(K1467))-(7.9))*((B1467-B1467)/(B2712-B1467)))+K1467

Chlorophyll:

standard 0, probe 0.6

Formula: =(-((0.6-0)/(B2712-B1467))*(B1467-B1467))+L1467

6/26-7/19

Oxygen Saturation:

standard 100, probe

Probe not functional—NOT CORRECTABLE

Specific Conductivity:

standard 1.413, probe 3.13

Formula: =(-((3.13-1.413)/(B2329-B1225))*(B1225-B1225))+E1225

Conversion for salinity

=(0.695*R1225)-2.3998

Turbidity:

standard 100, probe 97.3; standard 0, probe 19.4

Formula: =(((((100/77.9)-1)*(K1225))-(19.4))*((B1225-B1225)/(B2329-B1225)))+K1225

Chlorophyll:

standard 0, probe 3.0

Formula: =(-((3-0)/(B2329-B1225))*(B1225-B1225))+L1225

Missing Data:

NONE

Abnormalities in Data:

Salinity: 5/31: The 5/6-5/31 sonde recorded a steady decline in salinity to ~18ppt over its deployment period. When the new sonde was deployed on 5/31 salinity jumped to ~30ppt. The sonde deployed during the period 5/6-5/31 failed the pre-deployment conductivity cell constant test so the data record **may be faulty** at the very least. However, this sonde when deployed read salinities identical to the sonde that was retrieved, indicating it was function sufficiently. Curiously, the sonde deployed during the period 5/31-6/26 declined from 30ppt at the beginning of its deployment period to 18ppt at the end of its deployment period. The sonde deployed on 6/26 read 26ppt and shows no evidence of subsequent malfunction or failure. This indicates that all data within the period of 5/31-6/26 is likely **faulty**. Otherwise there is little evidence to suggest an explanation for the discrepancies. The sudden increase in salinity on 6/26 is **faulty**.

Dissolved Oxygen 6/26-6/30: No post-deployment information for oxygen due to loss of probe membrane prior to post-deployment check. Original data are retained but **may be faulty** due to drift or biofouling although neither is apparent.

Turbidity: Numerous negative values due to correction factor employed. Values were all above -8 NTU and so were retained.

JULY

File Name: HB-0207-raw, HB-0207-QAQC, HB-0207

Deployments: (3); 6/26-7/19, 7/19-7/24, 7/24-8/7

Condition of Sondes: 6/26-7/19 (Oxygen probe not functional after retrieval); 7/19-7/24 (Complete instrument failure, no data); 7/24-8/7 (Oxygen probe failed)

Removed Data:

Parameter(s)	Problem	Data Points
All	IF	7/19 1200 – 7/24 1430
Dissolved Oxygen	PF	7/24 1500 – 8/7 1100

Corrected Data:

6/26-7/19

Oxygen Saturation:

standard 100, probe

Probe not functional—NOT CORRECTABLE

Specific Conductivity:

standard 1.413, probe 3.13

Formula: =(-((3.13-1.413)/(B2329-B1225))*(B1225-B1225))+E1225

Conversion for salinity

=(0.695*R1225)-2.3998

Turbidity:

standard 100, probe 97.3; standard 0, probe 19.4

Formula: =(((((100/77.9)-1)*(K1225))-(19.4))*((B1225-B1225)/(B2329-B1225)))+K1225

Chlorophyll:

standard 0, probe 3.0

Formula: =(-((3-0)/(B2329-B1225))*(B1225-B1225))+L1225

7/19-7/24

Complete instrument failure—No corrections possible

7/24-8/7

Oxygen Saturation:

Probe failed--NOT CORRECTABLE

Specific Conductivity:

standard 23.51, probe 27.00

Formula: =(-((27-23.51)/(B1800-B1136))*(B1136-B1136))+E1136

Conversion for salinity

=(0.7005*R1136)-2.5974

Turbidity:

standard 100, probe 110.8; standard 0, probe 0.3

Formula: =(((((100/110.5)-1)*(K1136))-(0.3))*((B1136-B1136)/(B1800-B1136)))+K1136

Chlorophyll:

standard 0, probe –0.6

Formula: =(-((-0.6-0)/(B18007-B1136))*(B1136-B1136))+L1136

Missing Data:

NONE

Abnormalities in Data:

Dissolved Oxygen 7/1-7/19: No post-deployment information for oxygen due to loss of probe membrane prior to post-deployment check. Original data are retained but **may be faulty** due to drift or biofouling although neither is apparent.

All parameters 7/19-7/24: Instrument failed completely, returning values of –6999. No data recorded.

Salinity 7/24-7/31: Conductivity probe failed pre-deployment check (conductivity cell constant < 4.6). Salinity data for this period **may be faulty**

Dissolved Oxygen 7/24-7/31: Oxygen probe failed: in pre-deployment check DO gain < 0.8 and DO charge was >75. DO charge was > 75 for practically entire period and did not correct. This data was **faulty** and was deleted.

Turbidity: Numerous negative values due to correction factor employed. Values were all above -8 NTU and so were retained.

AUGUST

File Name: HB-0208-raw, HB-0208-QAQC, HB-0208

Deployments: (3); 7/24-8/7, 8/7-8/26, 8/26-9/17

Condition of Sondes: 7/24-8/7 (Oxygen probe failed); 8/7-8/26(); 8/26-9/17 (Oxygen probe failed)

Removed Data:

Parameter(s)	Problem	Data Points
All	IF	8/7 1130 – 8/13 1430; 8/13 1530-1930, 2030-2130; 8/13 2300 – 8/14 030, 230-500; 8/14 800-900, 1000, 1100-1200
Oxygen	PF	8/1 000 – 8/7 1100
Oxygen	PF	8/26 1330 – 8/31 2330
Turbidity	BDL	8/14 1900; 8/15 2230; 8/16 1800, 2330; 8/19 1000; 8/23 1630

Corrected Data:

7/24-8/7

Oxygen:

Probe failed--NOT CORRECTABLE

Specific Conductivity:

This time period was continuous with July and was corrected as for that month (see above)

Turbidity:

This time period was continuous with July and was corrected as for that month (see above)

Chlorophyll:

This time period was continuous with July and was corrected as for that month (see above)

8/7-8/26

Oxygen Saturation:

standard 100, probe 72.9

Below acceptable range--NOT CORRECTABLE

Specific Conductivity:

standard 1.413, probe 2.07

Formula: =(-((2.07-1.413)/(B1226-B313))*(B608-B313))+E608

Conversion for salinity

=(0.7223*R608)-3.5106

Turbidity:

standard 100, probe 94.3; standard 0, probe –4.2

Formula: =(((((100/98.5)-1)*(K608))-(-4.2))*((B608-B313)/(B1226-B313)))+K608

Chlorophyll:

standard 0, probe 3.2

Formula: =(-((3.2-0)/(B1226-B313))*(B608-B313))+L608

8/26-9/17

Oxygen Saturation:

Probe failed--NOT CORRECTABLE

Specific Conductivity:

standard 1.413, probe 1.431

Formula: =(-((1.431-1.413)/(B2280-B1227))*(B1229-B1227))+E1229

Conversion for salinity

=(0.6952*R1229)-2.3947

Turbidity:

standard 100, probe 89.0; standard 0, probe 1.6

Formula: =(((((100/87.4)-1)*(K1229))-(1.6))*((B1229-B1227)/(B2280-B1227)))+K1229

Chlorophyll:

standard 0, probe –3.1

Formula: =(-((-3.1-0)/(B2280-B1227))*(B1229-B1227))+L1229

Missing Data:

NONE

Abnormalities in Data:

Oxygen 8/1-8/7: Probe failed (DO charge > 75 for almost entire deployment and never self-corrected). All oxygen data was **faulty** and was deleted.

Salinity 8/1-8/7: Conductivity probe failed pre-deployment check (conductivity cell constant < 4.6). Salinity data for this period **may be faulty**.

All parameters 8/7-8/26: Instrument failed repeatedly, returning many values of –6999. Pervasive instrument failure means all remaining data **may be faulty**.

Oxygen 8/26-8/31: Probe failed (DO charge > 75 for almost entire deployment and never self-corrected). All oxygen data was **faulty** and was deleted.

SEPTEMBER
File Name: HB-020-raw, HB-020-QAQC, HB-020

Deployments: ();

Condition of Sondes: ()

Removed Data:

Parameter(s)	Problem	Data Points

Corrected Data:

Oxygen Saturation:
standard 100, probe 49.5
Formula:
Conversion for [oxygen]

Specific Conductivity:
standard, probe
Formula:
Conversion for salinity

Turbidity:
standard 100, probe; standard 0, probe
Formula:

Chlorophyll:
standard 0, probe
Formula:

Missing Data:

Abnormalities in Data:

File Name: HB-020-raw, HB-020-QAQC, HB-020

Deployments: ();

Condition of Sondes: ()

Removed Data:

Parameter(s)	Problem	Data Points

Corrected Data:

Oxygen Saturation:
standard 100, probe 49.5
Formula:
Conversion for [oxygen]

Specific Conductivity:
standard, probe
Formula:
Conversion for salinity

Turbidity:
standard 100, probe; standard 0, probe
Formula:

Chlorophyll:
standard 0, probe
Formula:

Missing Data:

Abnormalities in Data:

File Name: HB-020-raw, HB-020-QAQC, HB-020

Deployments: ();

Condition of Sondes: ()

Removed Data:

Parameter(s)	Problem	Data Points

Corrected Data:

Oxygen Saturation:
standard 100, probe 49.5
Formula:
Conversion for [oxygen]

Specific Conductivity:
standard, probe
Formula:
Conversion for salinity

Turbidity:
standard 100, probe; standard 0, probe
Formula:

Chlorophyll:
standard 0, probe
Formula:

Missing Data:

Abnormalities in Data:

File Name: HB-020-raw, HB-020-QAQC, HB-020

Deployments: ();

Condition of Sondes: ()

Removed Data:

Parameter(s)	Problem	Data Points

Corrected Data:

Oxygen Saturation:
standard 100, probe 49.5
Formula:
Conversion for [oxygen]

Specific Conductivity:
standard, probe
Formula:
Conversion for salinity

Turbidity:
standard 100, probe; standard 0, probe
Formula:

Chlorophyll:
standard 0, probe
Formula:

Missing Data:

Abnormalities in Data: