APPENDIX C

CURRENT VECTOR PLOTS AND CURRENT SPEED FREQUENCY DISTRIBUTIONS

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This appendix presents brief descriptions of the current meter data by survey. Current velocity vectors are shown in **Figures C-1** to **C-16**, and frequency distributions of current speeds are shown in **Figures C-17** to **C-32**.

Figures C-1 and **C-2** show different current patterns in the Little Bay and Norton Basin pits with changes in the tide during the June survey. Current speed and direction in both pits were more variable in the near surface and midwater compared to near bottom. Currents in Little Bay differed at three levels through different phases of the tide (**Figure C-1**). Currents in the Little Bay pit near bottom were generally faster and flowed toward different directions compared to midwater and near surface with the change in tide. The frequency distribution of current speeds in the Little Bay pit shown in **Figure C-17** indicates that predominant current speeds in the near surface, midwater, and near bottom were 2, 4 to 5, and 7 to 8 cm/s, respectively. There were also differences in current direction between the near surface and midwater. Unlike the near surface and midwater, current speed and direction in the near bottom in Little Bay did not appear to respond to changes in the tide. In Norton Basin, current direction in the midwater and near bottom were consistent with each other but differed from the near surface (**Figure C-2**). The frequency distribution of current speeds in the Norton Basin pit shown in **Figure C-18** indicates that predominant current speeds in the near surface, midwater, and near bottom were 2 to 3, 6 to 7, and 4 cm/s, respectively. In contrast to the Norton Basin pit, there were occurrences of higher current speeds in the near bottom in the Little Bay pit.

There were more variable currents in the near surface compared to near bottom in both channels in July (**Figures C-3** and **C-4**). In the Little Bay Entrance Channel near surface, current speed fluctuated and shifted from southeast to eastward through the deployment while in the near bottom, the current speed and direction did not change much during the same period, i.e., the current direction was northeastward (**Figure C-3**). The frequency distribution of current speeds in the Little Bay Entrance Channel shown in **Figure C-19** indicates that the predominant current speeds in the near surface and near bottom were 5 and 10 cm/s, respectively, with a wider distribution of current speeds at the near surface. In the Norton Basin Entrance Channel near surface, the current shifted from southeast to northeast as the tide changed from flood to ebb, while in the near bottom, there was no major shift in current direction (**Figure C-4**). The predominant current speeds in the near surface and near bottom in the Norton Basin Entrance Channel were 6 to 7 and 4 cm/s, respectively (**Figure C-20**). There was also a wider distribution of current speeds at the near surface. The current in the Norton Basin pit near bottom usually was less than 5 cm/s, slower than in the channels. The current shifted from northeastward to eastward during the latter part of the deployment (**Figure C-4**). The predominant current speed in the Norton Basin pit near bottom was 4 cm/s (**Figure C-20**).

Figures C-5 and **C-6** respectively show currents in the Little Bay and Norton Basin pits during the September surveys. Current direction differed among the three levels in both pits. In the Little Bay pit, the current was to the southwest in the near surface, northward in the midwater, and shifted from northeast to southeast in the near bottom. Faster currents were present in the near surface and midwater than in the near bottom. There was a slight increase in current speed in the near surface and in the midwater from the slack high tide period into ebb, while there was little change in current speed in the near bottom (**Figure C-6**). The predominant current speeds in the Little Bay pit near surface, midwater, and near bottom were 11, 5 to 6, and 6 cm/s with the widest range in current speeds in the near bottom where current speeds from 1 to 8 cm/s were recorded (**Figure C-21**). In the Norton Basin pit, the current direction at the near surface shifted little from a southwest direction through the period

of deployment, while at midwater, the current changed speed but stayed at a northward direction. Current speeds at midwater were generally higher during the ebb tide compared to the slack and flood phases (**Figure C-6**). In the Norton Basin pit near surface and midwater, the predominant current speeds were 8 cm/s and 3 to 4 cm/s, respectively, while current speeds of 1 to 2 cm/s were most frequent in the near bottom (**Figure C-22**).

Currents in the Little Bay and Norton Basin Entrance Channels on 24 September are shown in **Figures C-7** and **C-8**. Current directions differed between the near surface and near bottom meters in both entrance channels. In the Little Bay Entrance Channel, the current at the near surface meter was southwestward at fluctuating speeds during the deployment, while in the near bottom, the current changed from faster currents to the southwest at the beginning during slack high to slower southward current at the midpoint of the deployment and then slightly faster speeds to the south at the latter part of the deployment (**Figure C-7**). In the near surface and near bottom, current speeds of 1 to 2 cm/s were most frequent (**Figure C-23**). In the Norton Basin Entrance Channel, currents at the near surface and near bottom fluctuated greatly during the slack low and flood phases of the tide (**Figure C-8**). The near surface and near bottom currents running toward the west and northwest were slower during the slack high period and increased during the ebb tide toward a northwest and northward direction. During the ebb tide, the near surface current was faster than at near bottom. At slack low water, the current at near surface and near bottom shifted to the southwest. The current direction changed southward with the flood tide. Current speeds of 3 to 4 and 1 to 2 cm/s were most frequent in the near surface and near bottom, respectively, in the Norton Basin Entrance Channel (**Figure C-24**).

On 25 September, current direction differed slightly between the near surface and near bottom in the Little Bay Entrance Channel while the currents in the Norton Basin Entrance Channel were more variable in the near surface and near bottom (**Figures C-9** and **C-10**). In the Little Bay Entrance Channel, currents at the near surface were southeastward during the deployment, i.e., slack high and ebb phase of the tide. The near bottom current shifted from southwestward to the south-southwest during the same period. Current speeds of 6 and 3 cm/s were most frequent in the near surface and near bottom, respectively (**Figure C-25**). The current in the Little Bay pit near bottom was slower and to the northwest during the same period with 4 cm/s and 5 cm/s as the most frequent current speeds recorded (**Figure C-25**). In the Norton Basin Entrance Channel, the current fluctuated as the tide approached slack high and then was northward at slack high. The current then slowed during the ebb tide. The most frequent current speeds in the near surface were 2 cm/s to 3 cm/s and 1 cm/s to 4 cm/s in the near bottom with a slightly flatter distribution of current speeds (**Figure C-26**).

Figures C-11 and **C-12** respectively show currents in the Little Bay and Norton Basin pits during the 22 October survey. At the near surface in the Little Bay pit, the current direction remained in the northeast direction even with the change in the tide, while at midwater, the very slow current shifted between a northward and northeast direction for the majority of the deployment. The very slow current in the midwater shifted to a southward direction as the tide approached slack high water near the end of the deployment. In the near bottom, the current remained at about the same speed in a southwestward direction for the duration of the deployment. Current speeds of 2 cm/s and 6 cm/s were most frequent in the Little Bay pit near surface and near bottom, respectively, and 1 cm/s to 2 cm/s in the midwater (**Figure C-27**). In the Norton Basin pit, the current was northward at the near surface and southwestward in the near bottom. The slow current at midwater was southwest at the beginning of the deployment and then shifted to southward toward the latter half of the

deployment. Current speeds of 6 cm/s and 7 to 8 cm/s were most frequent in the near surface and near bottom, respectively, in Norton Basin (**Figure C-28**).

Currents in the Little Bay and Norton Basin Entrance Channels during the 22 October survey are shown in **Figures C-13** and **C-14**. Currents from one tidal cycle in the Little Bay Entrance Channel and from the Norton Basin Entrance Channel during an ebb tide are shown. At near surface in the Little Bay Entrance Channel the current was slow and generally in a westward direction at the beginning of the deployment in a flood tide and then shifted to a northwest direction near slack high tide (**Figure C-13**). The current then shifted back to a westward direction at slack high tide and with the start of the ebb tide. The current shifted between a northwest and southwest direction for the remainder of the deployment through the ebb, slack low, and flood tide. At the near bottom in the Little Bay Entrance Channel, the current was even lower and was in variable directions during the initial flood tide. The current was near zero during the slack high tide and then increased to a southwestward direction with the ebb tide. Near the end of the ebb tide, the current slowed down in a southeast and eastward direction during slack low tide. The slow current then changed to a generally southward direction with the flood tide near the end of the deployment. Current direction in the Little Bay Entrance Channel near surface and near bottom differed from the near bottom in the Little Bay pit (**Figure C-11**). Current speeds of 1 cm/s to 4 cm/s were the most frequent in the Little Bay Entrance Channel near surface and near bottom, respectively (**Figure C-29**).

Currents at near surface and near bottom were faster in the Norton Basin Entrance Channel (**Figure 14**) compared to the Little Bay Entrance Channel. At the beginning of the deployment in the Norton Basin Entrance Channel on a ebb tide, currents at the near surface were toward a northwest direction then shifted to the north and back to the northwest during the middle of the deployment when the current slowed. There were brief periods when the current slowed to a southward direction before speeding up in a northwest direction. There were also periods of slow southward currents at the end of the deployment. The current in the near bottom of the Norton Basin was low in a northward direction at the beginning of the deployment and then sped up before slowing down during the middle of the deployment. The current then shifted to the south and southwest and sped up during the end of the deployment near slack low tide. Current speeds of 3 cm/s to 5 cm/s were the most frequent in the near surface and 2 cm/s to 4 cm/s in the near bottom in the Norton Basin Entrance Channel (**Figure C-30**).

Figures C-15 and **C-16**, respectively, show currents in the Little Bay and Norton Basin Entrance Channels during the 23 October survey. Currents were measured at a slack high and ebb tide. Current at the near bottom in the Little Bay pit is shown also. The current in the near surface in the Little Bay Entrance Channel was slow and to the southwest at the beginning of the deployment and then shifted to generally a northward direction but fluctuated between a northwest/northeast direction for the remainder of the deployment (**Figure C-15**). The current at the near bottom in the Little Bay Entrance Channel was slow initially and then flowed slightly faster in a northwest/northward direction at the beginning of the deployment. The current then slowed and shifted to a northeastward direction and sped up slightly and turned further eastward near the end of the deployment. **Figure C-31** shows that the most frequent current speeds in the near surface and near bottom of the Little Bay Entrance Channel were 2 cm/s and 3 cm/s, respectively. The current at the near bottom in the Little Bay pit was at similar speeds as in the entrance channel and remained at a northward direction for the entire period of deployment (**Figures C-15** and **C-31**).

Current in the near surface of the Norton Basin Entrance Channel on 23 October was slow initially in a north/northwestward direction and then flowed much faster than in the Little Bay Entrance Channel during the middle of the deployment before slowing (**Figure C-16**). The current was slow near slack low water near the end of the deployment. There were instances of much faster currents in the Norton Basin Entrance Channel compared to the Little Bay Entrance Channel. The current was faster at the near bottom in the Norton Basin Entrance Channel where it flowed in a northward to northeastward direction. The distribution of current speeds in the Norton Basin Entrance Channel was much flatter than in the Little Bay Entrance Channel. Also, there were faster currents, particularly in the near bottom in the Norton Basin Entrance Channel, where speeds of up to 15 cm/s were recorded (**Figure C-32**).

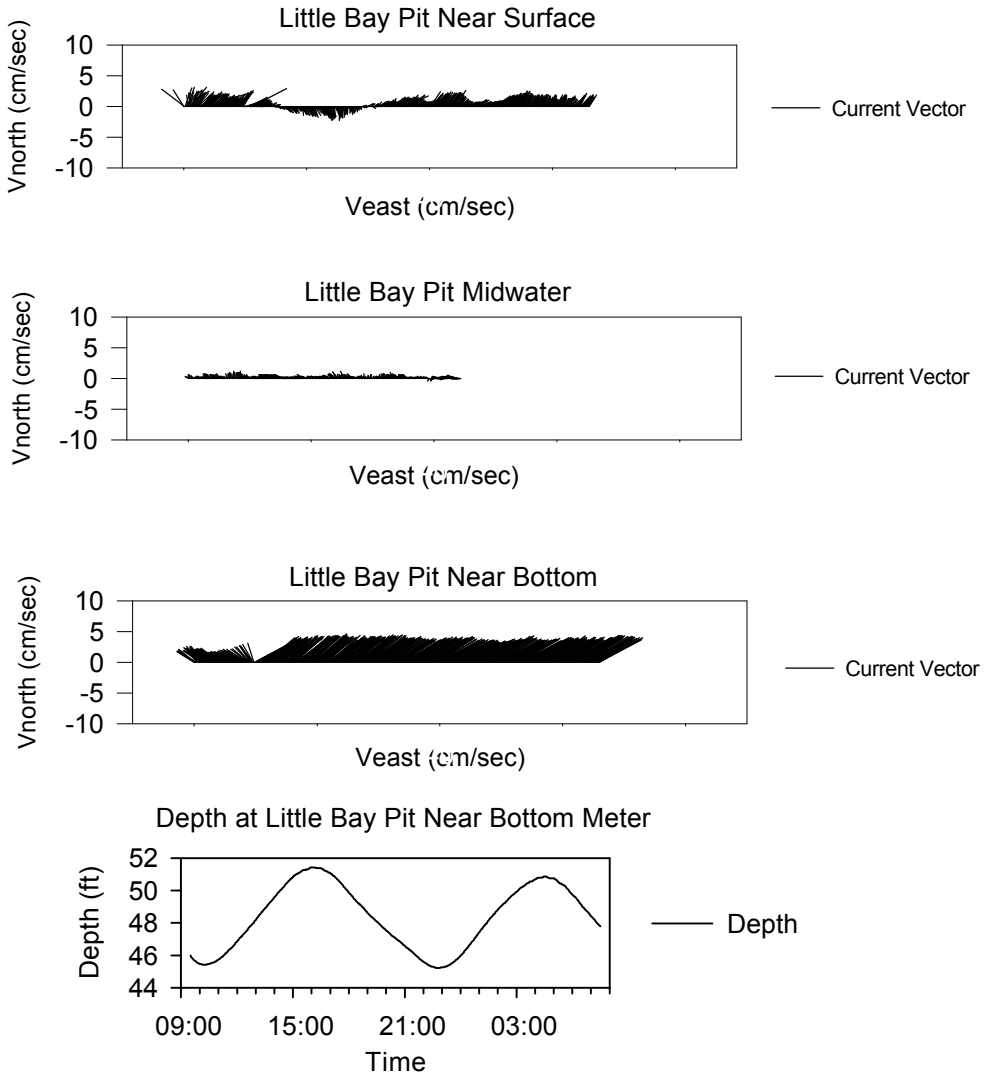


Figure C-1. Velocity vectors at near surface, midwater, and near bottom with change in water depth in the Little Bay pit on 19 June 2002.

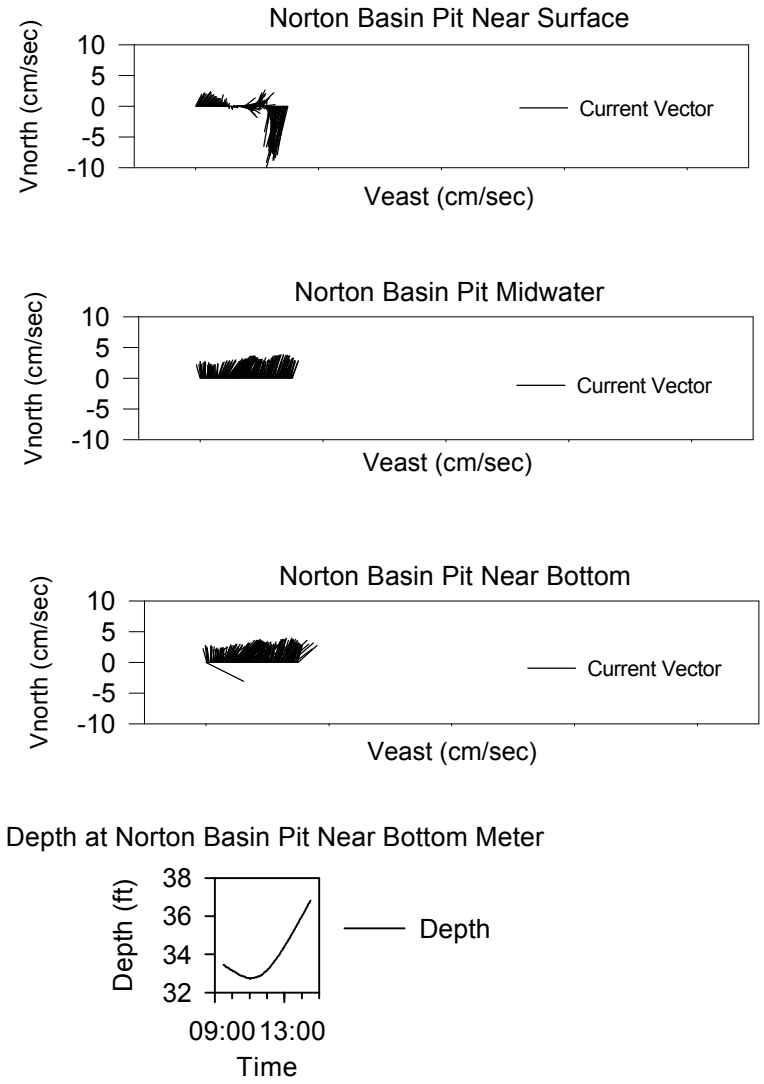


Figure C-2. Velocity vectors at near surface, midwater, and near bottom with change in water depth in the Norton Basin pit on 20 June 2002.

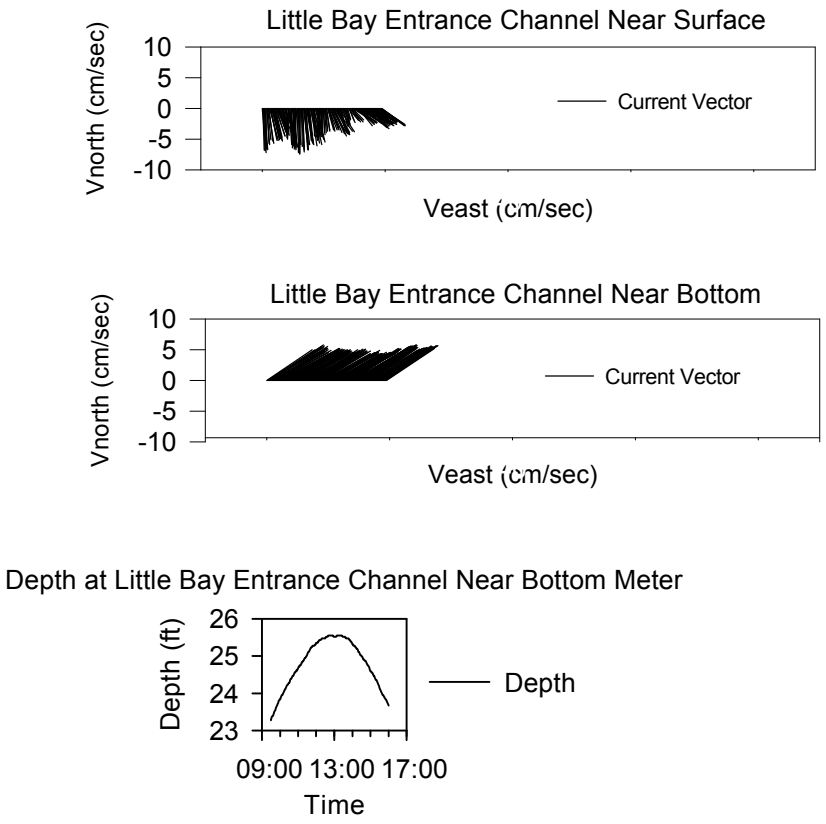


Figure C-3. Velocity vectors at near surface and near bottom with change in water depth in the Little Bay Entrance Channel on 30 July 2002.

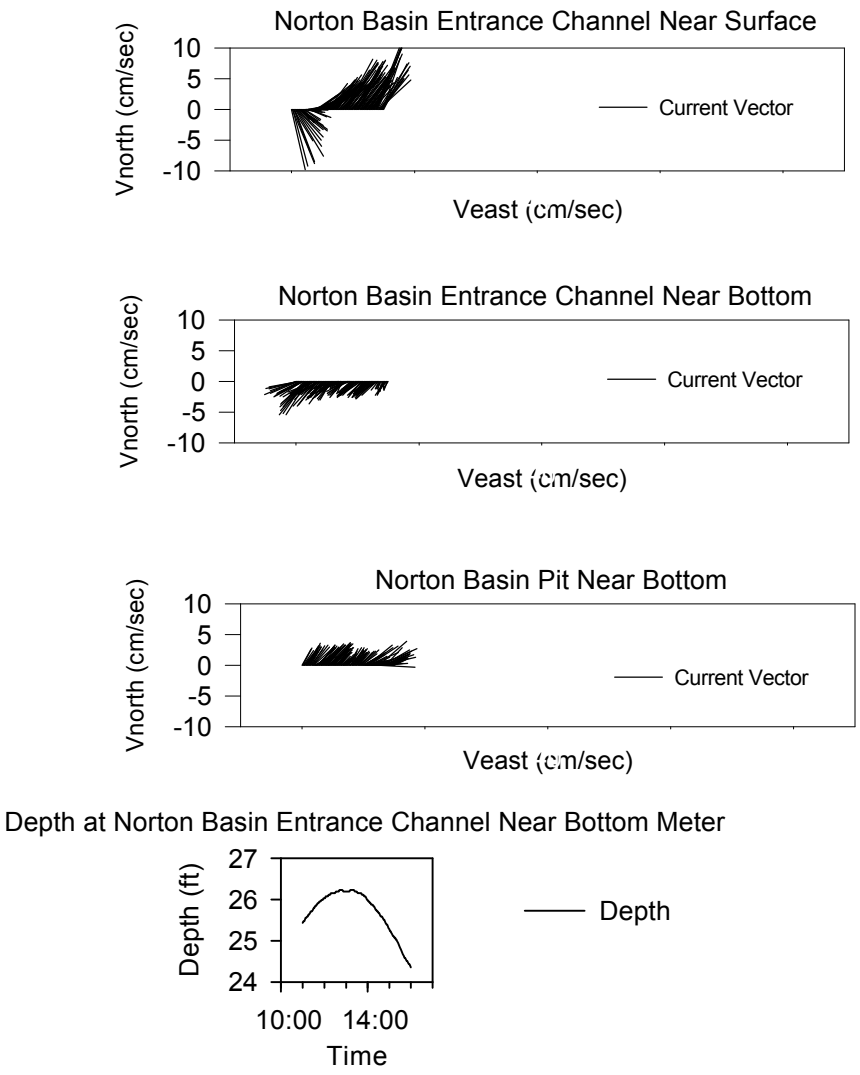


Figure C-4. Velocity vectors at near surface and near bottom with change in water depth in Norton Basin Entrance Channel on 30 July 2002. Data from a near bottom current meter at the Norton Basin pit are shown also.

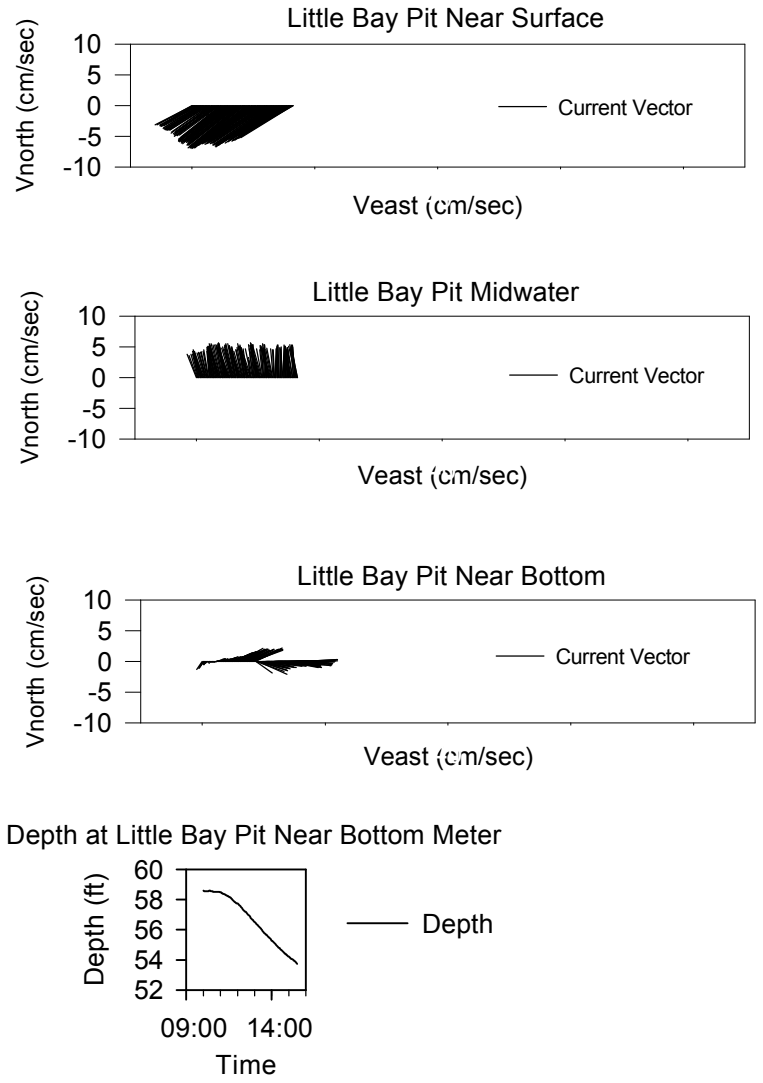


Figure C-5. Velocity vectors at near surface, midwater, and near bottom with change in water depth in the Little Bay pit on 24 September 2002.

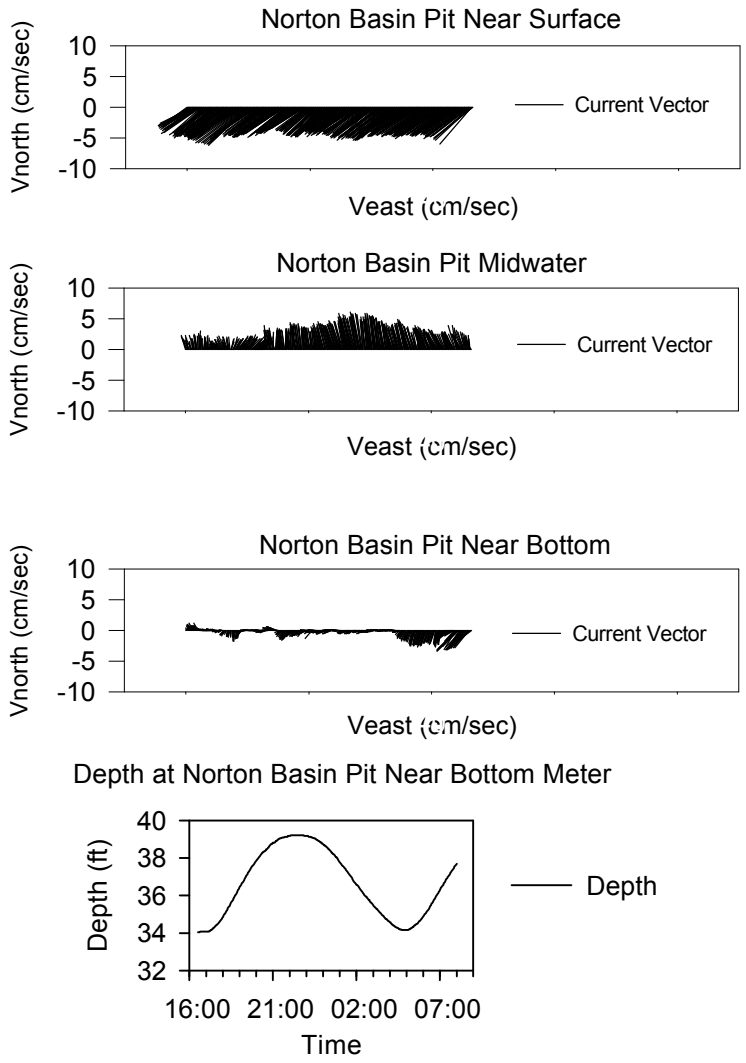


Figure C-6. Velocity vectors at near surface, midwater, and near bottom with change in water depth in the Norton Basin pit on 24 to 25 September 2002.

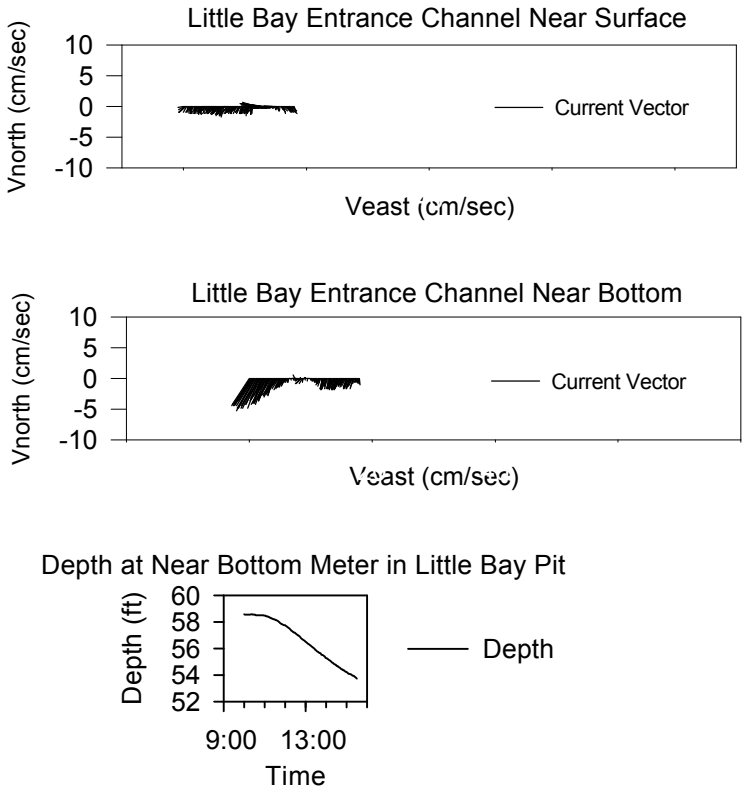


Figure C-7. Velocity vectors at near surface and near bottom in the Little Bay Entrance Channel on 24 September 2002. The change in water depth in the near bottom in the Little Bay pit is shown to indicate the tide.

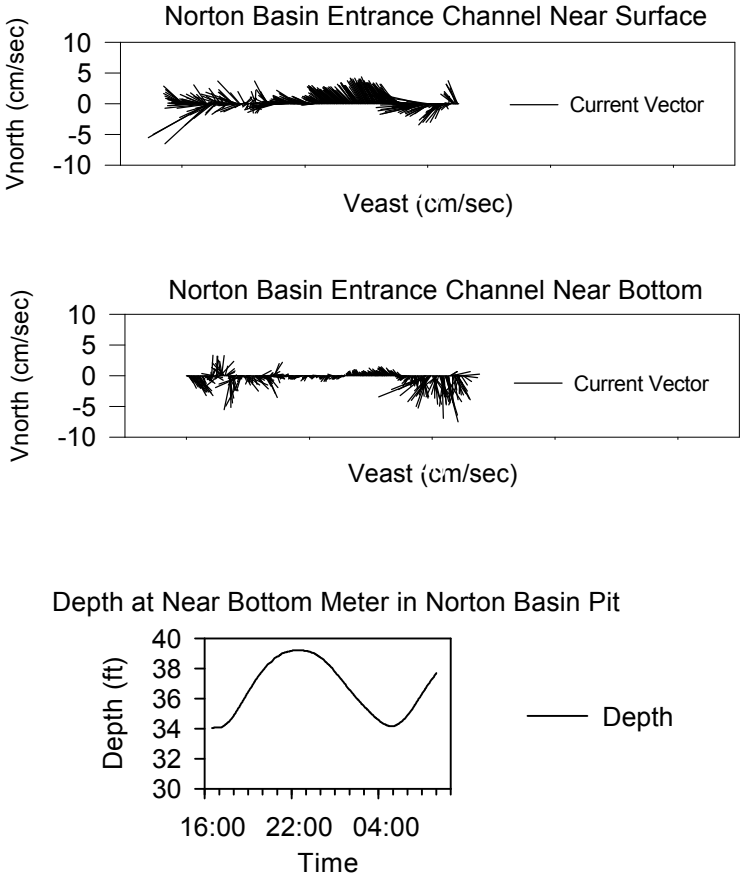


Figure C-8. Velocity vectors at near surface and near bottom in the Norton Basin Entrance Channel on 24 September 2002. The change in water depth in the near bottom in the Norton Basin pit is shown to indicate the tide.

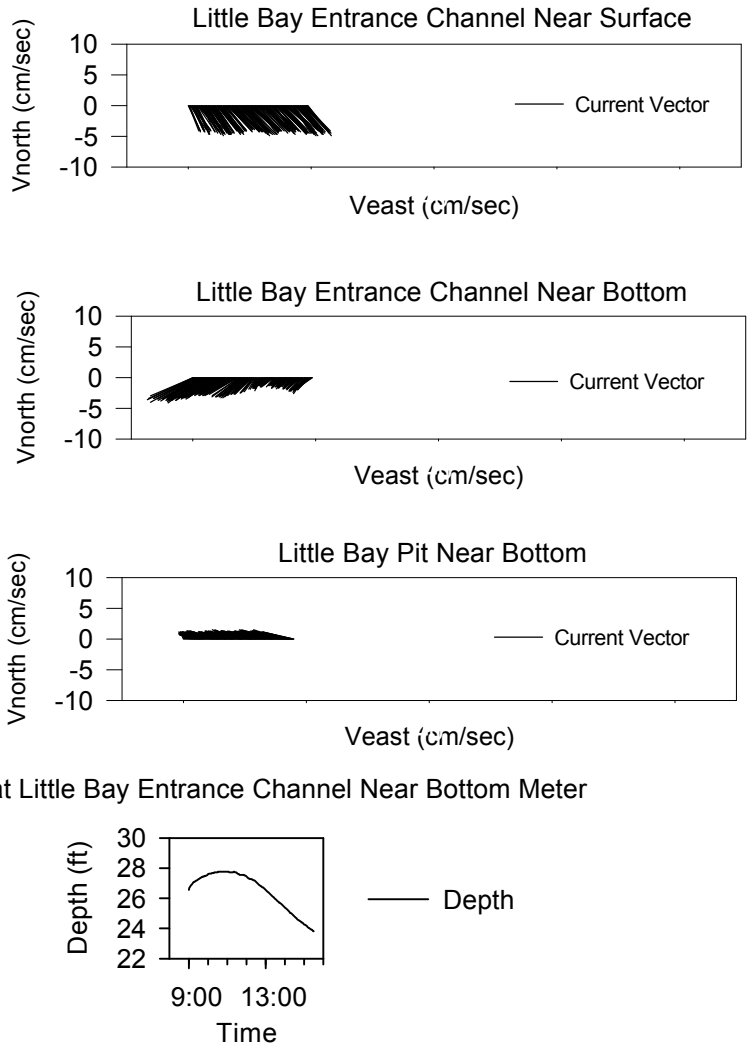


Figure C-9. Velocity vectors at near surface and near bottom current meters with change in water depth in Little Bay Entrance Channel and Little Bay pit near bottom on 25 September 2002.

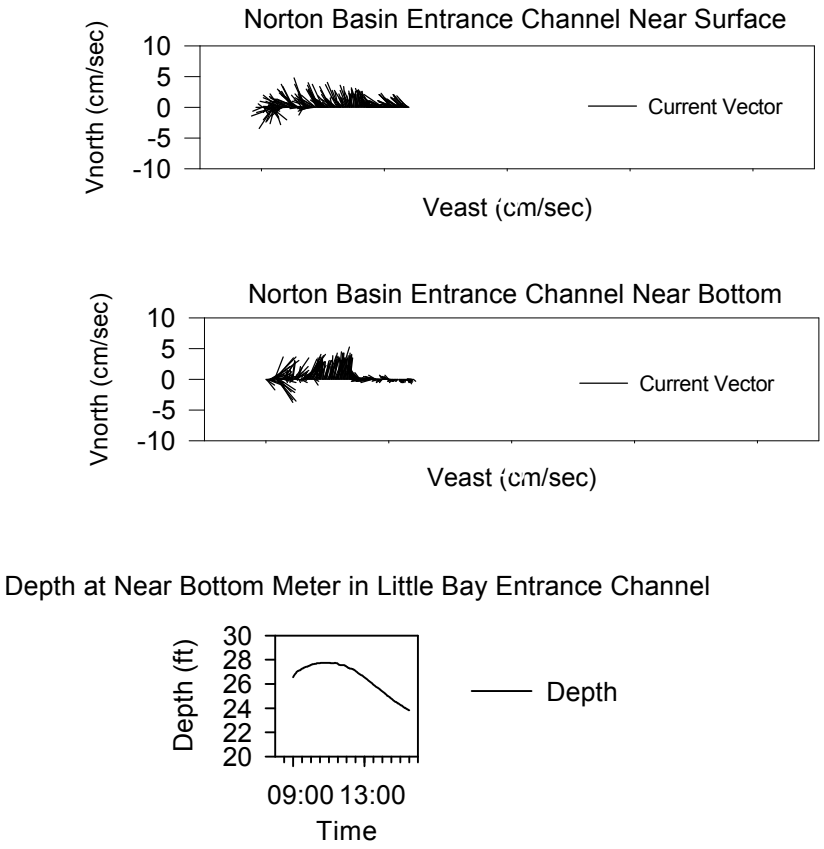


Figure C-10. Velocity vectors at near surface and near bottom with change in water depth in the Norton Basin Entrance Channel on 25 September 2002.

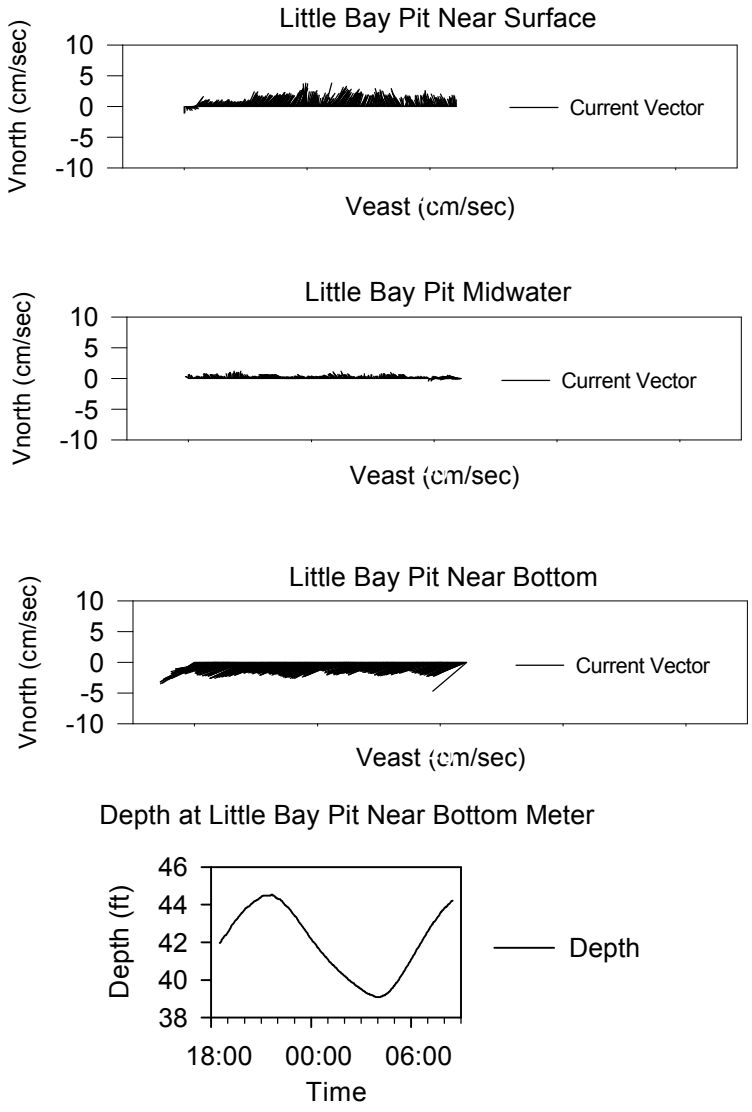


Figure C-11. Velocity vectors at near surface, midwater, and near bottom with change in water depth in Little Bay pit on 22 to 23 October 2002.

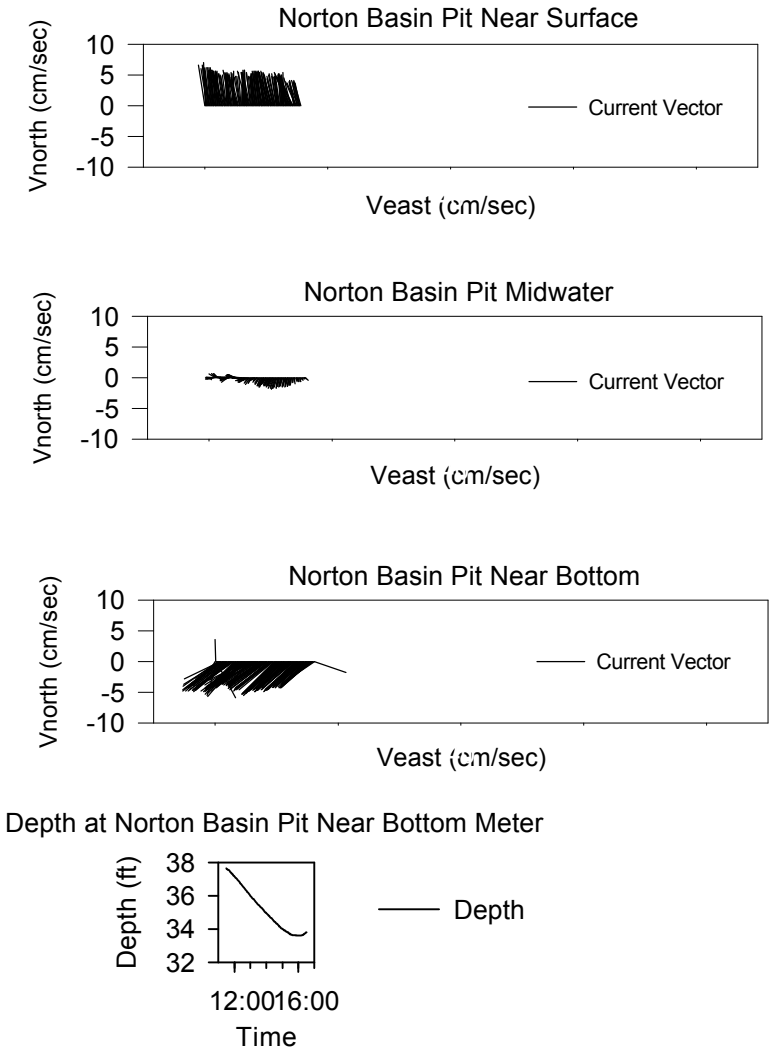


Figure C-12. Velocity vectors at near surface, midwater, and near bottom with change in water depth in the Norton Basin pit on 22 October 2002.

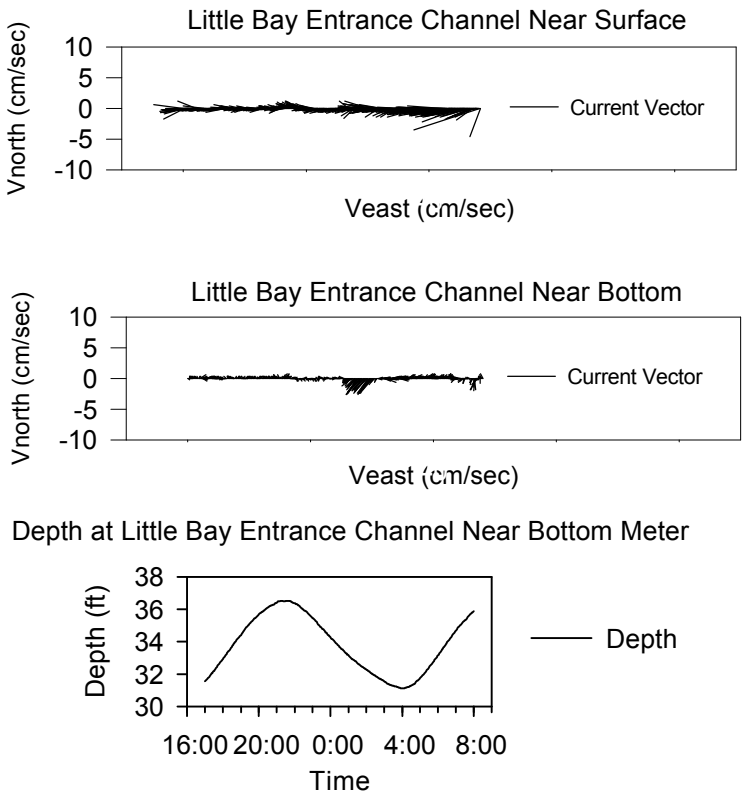


Figure C-13. Velocity vectors at near surface and near bottom with change in water depth in the Little Bay Entrance Channel on 22 October 2002.

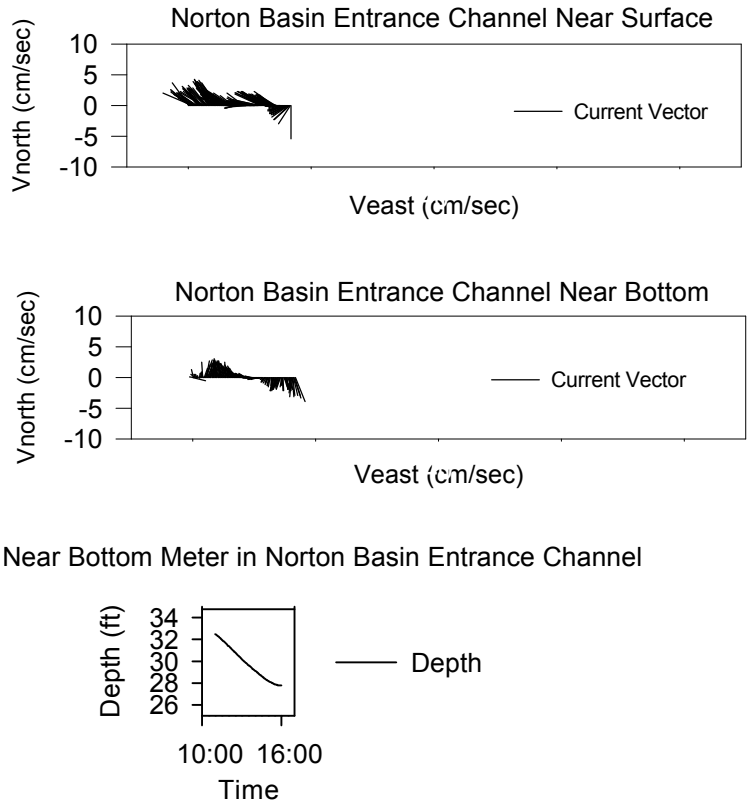


Figure C-14. Velocity vectors at near surface and near bottom with change in water depth in the Norton Basin Entrance Channel on 22 October 2002.

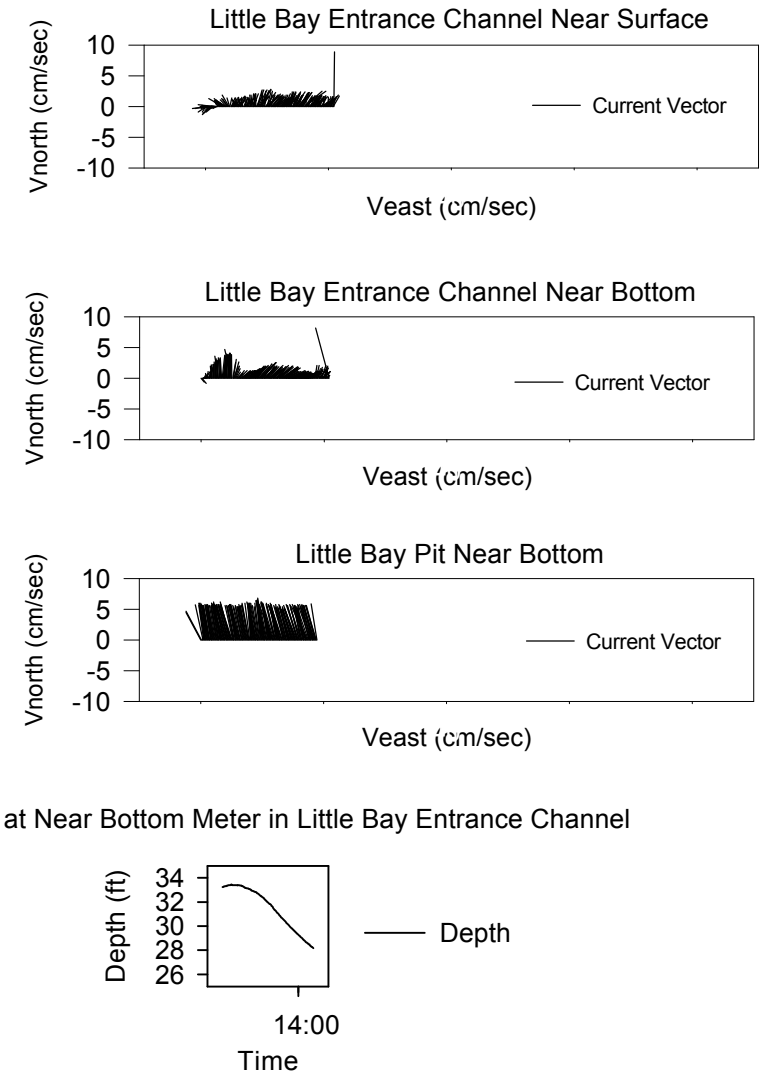
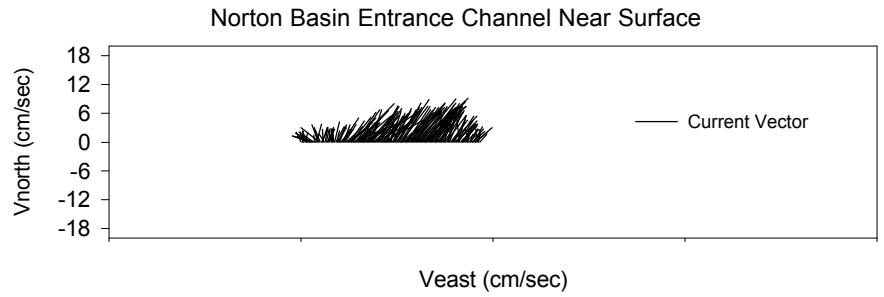
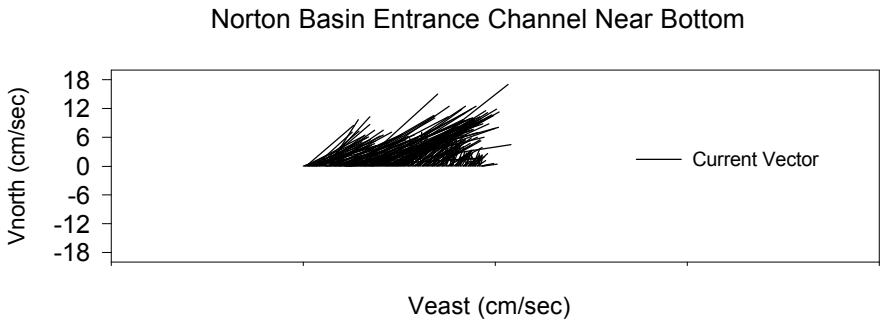
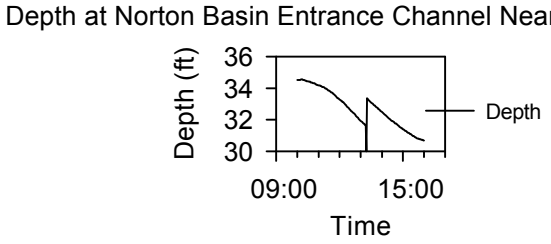


Figure C-15. Velocity vectors at near surface and near bottom with change in water depth in Little Bay Entrance Channel and Little Bay pit near bottom on 23 October 2002.







Note: Depth record indicates that mooring was lifted and moved during deployment.

Figure C-16. Velocity vectors at near surface and near bottom with change in water depth in Norton Basin Entrance Channel on 23 October 2002.

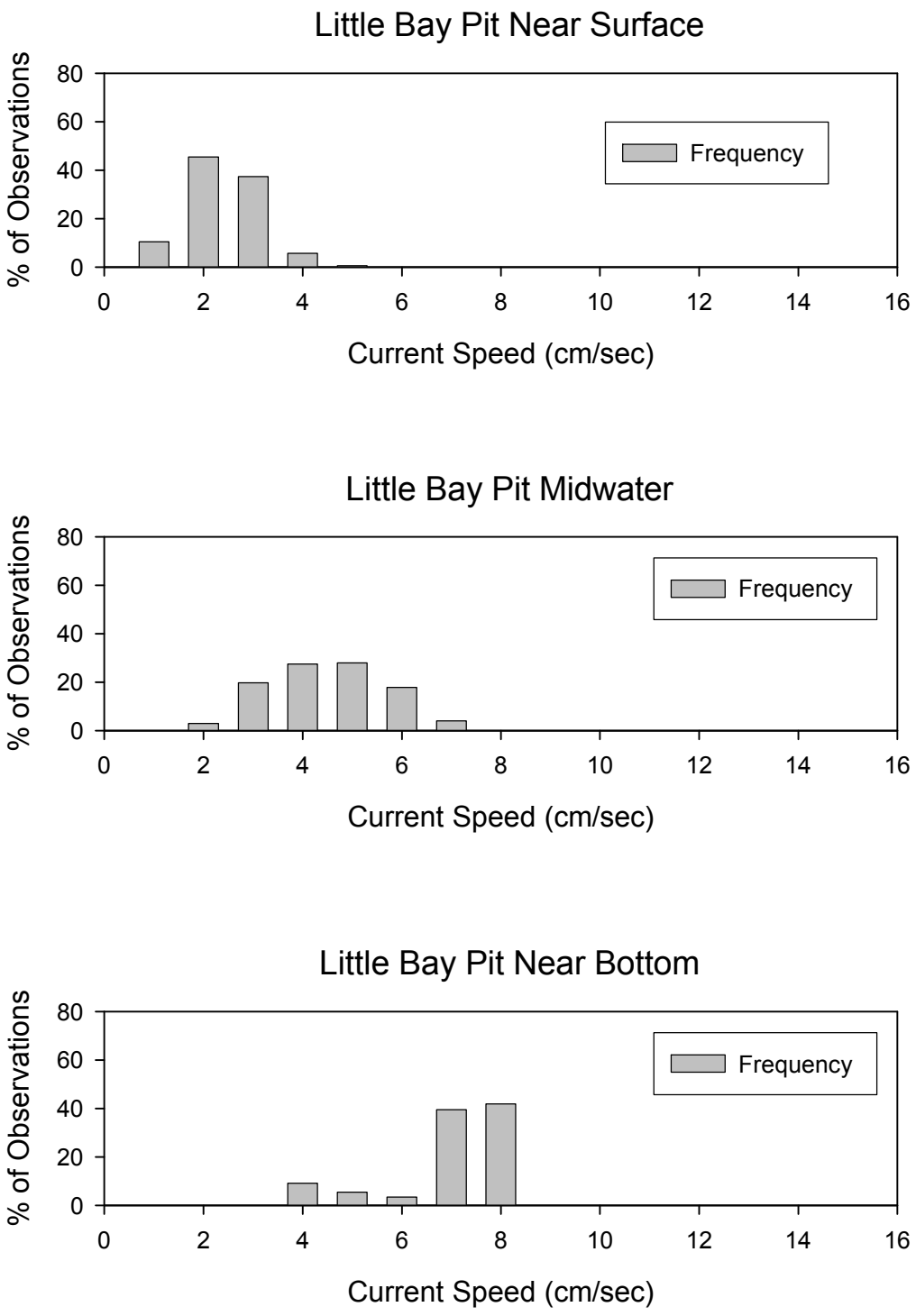


Figure C-17. Frequency distribution of current speeds in Little Bay pit on 19 June 2002.

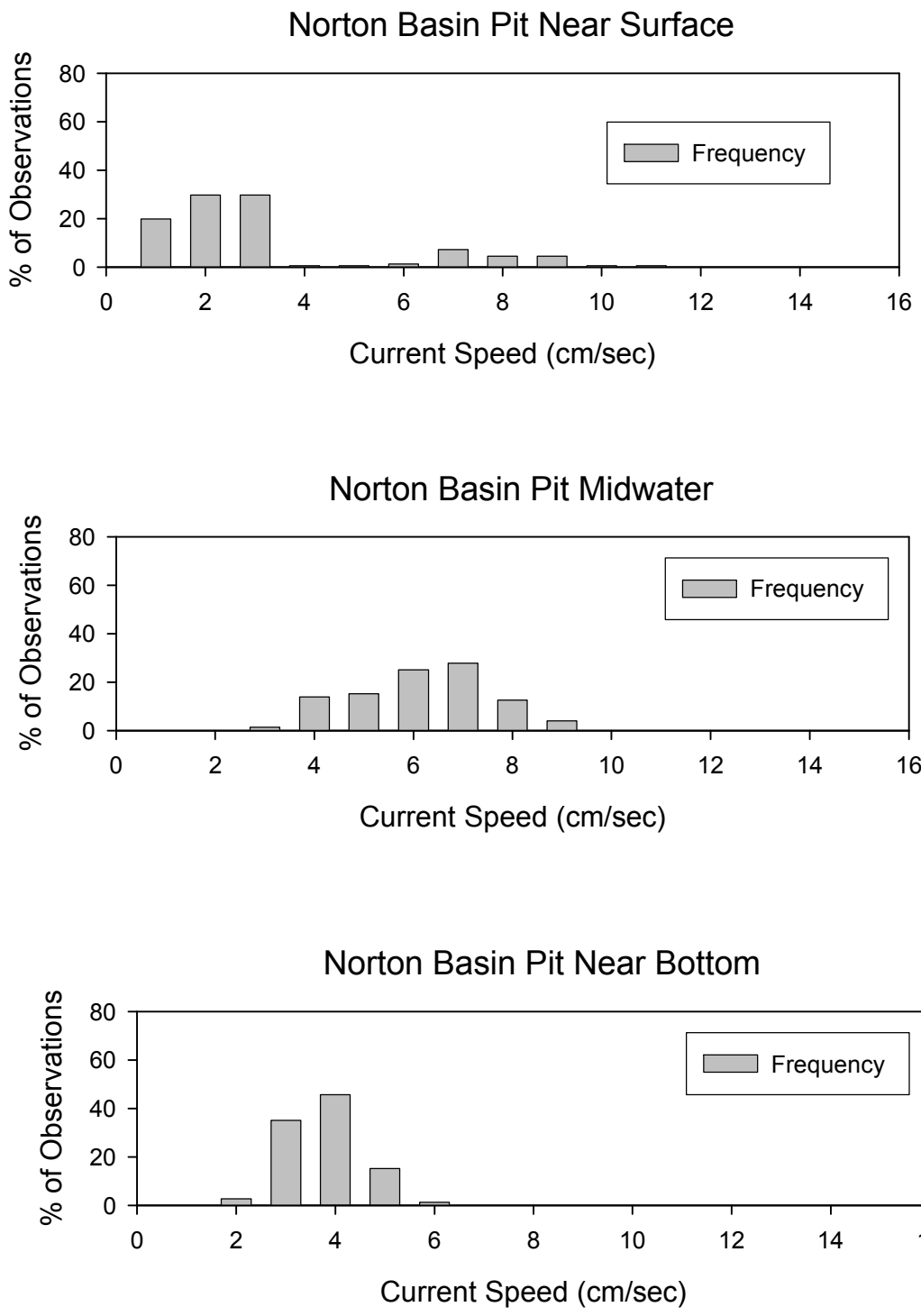
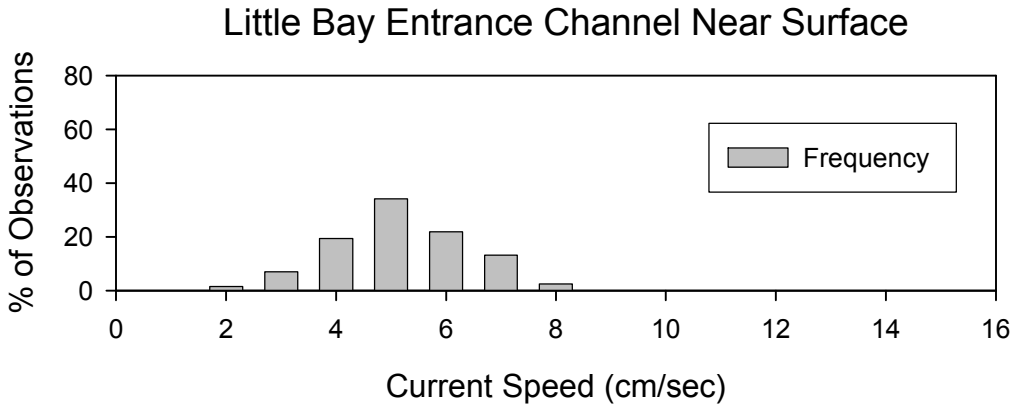


Figure C-18. Frequency distribution of current speeds in the Norton Basin pit on 20 June 2002.



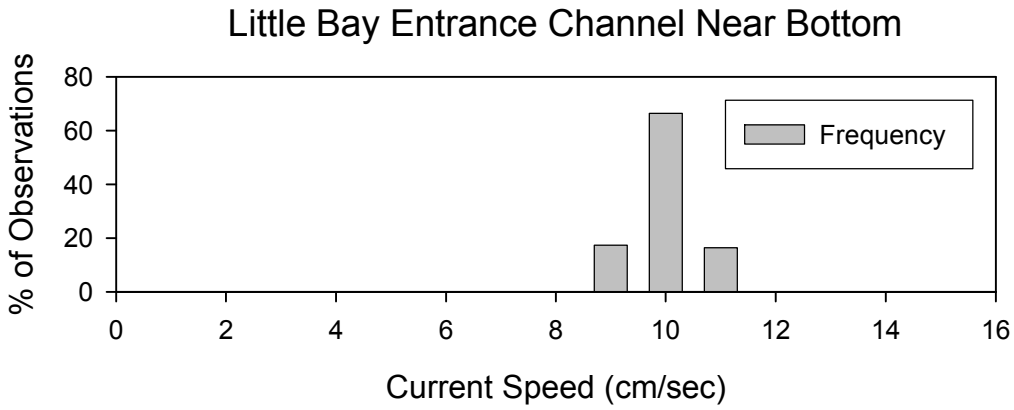


Figure C-19. Frequency distribution of current speeds in Little Bay Entrance Channel on 30 July 2002.

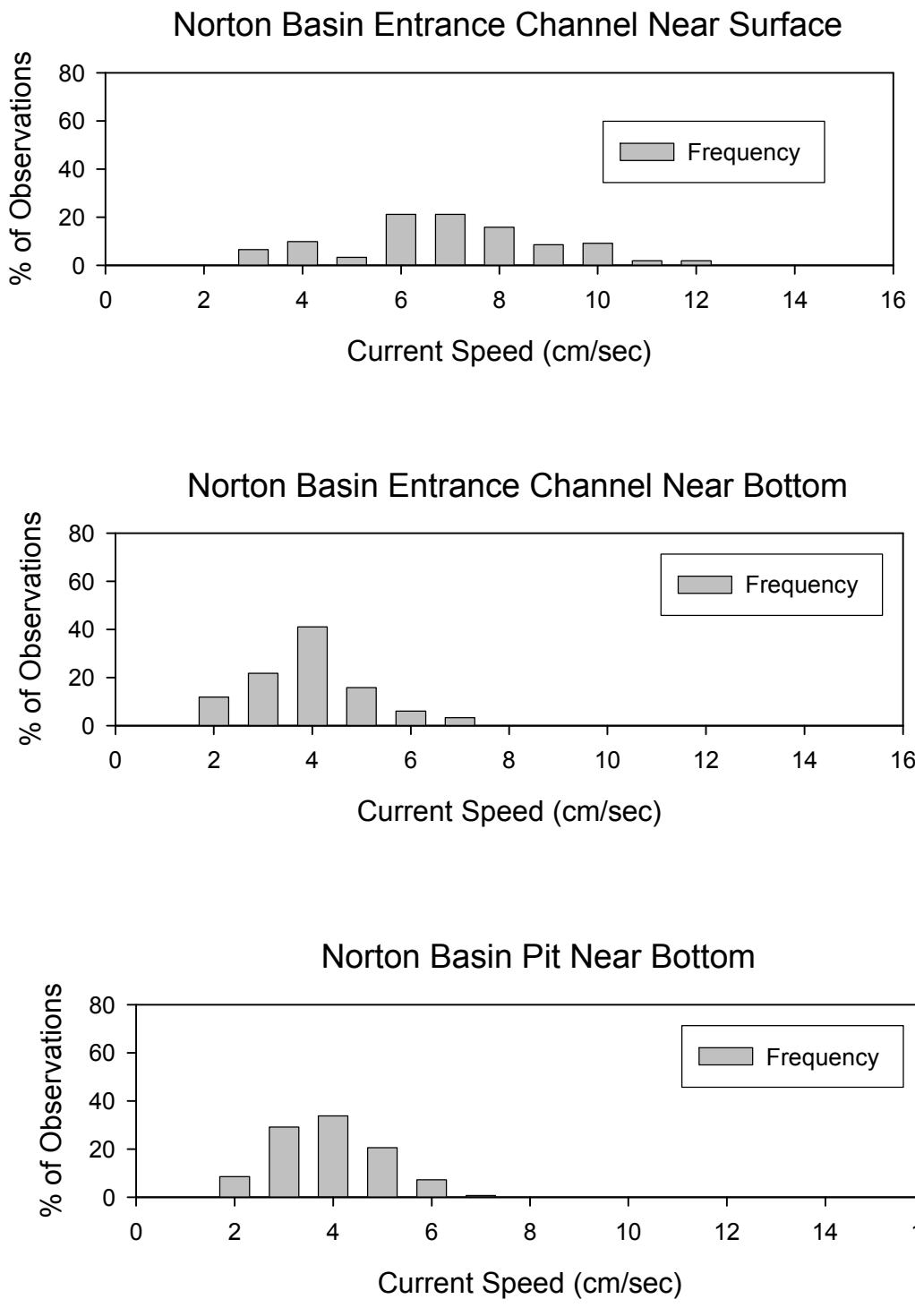
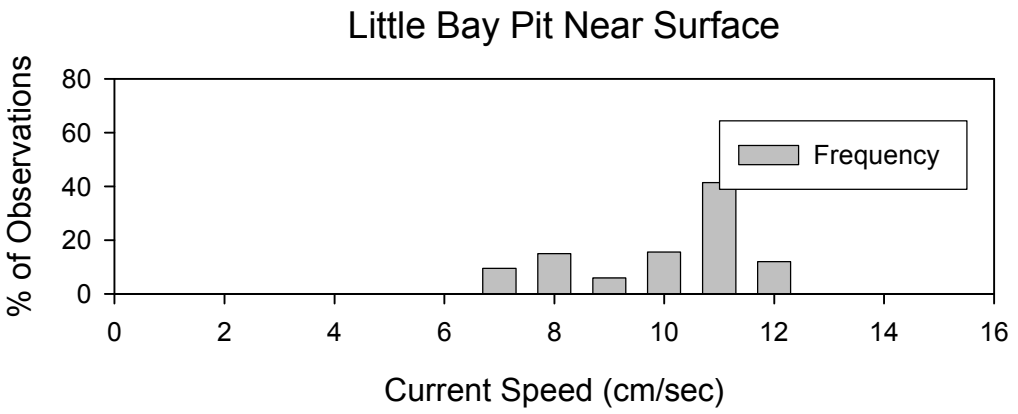
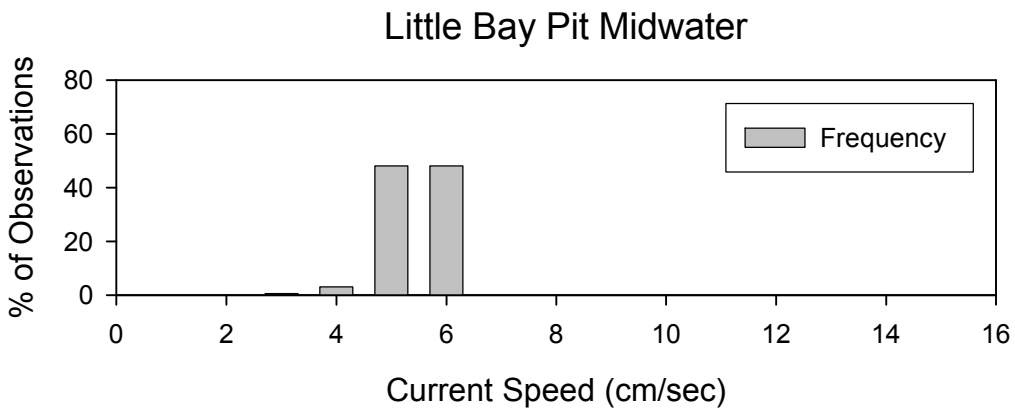


Figure C-20. Frequency distribution of current speeds in the Norton Basin Entrance Channel and pit near bottom on 30 July 2002.





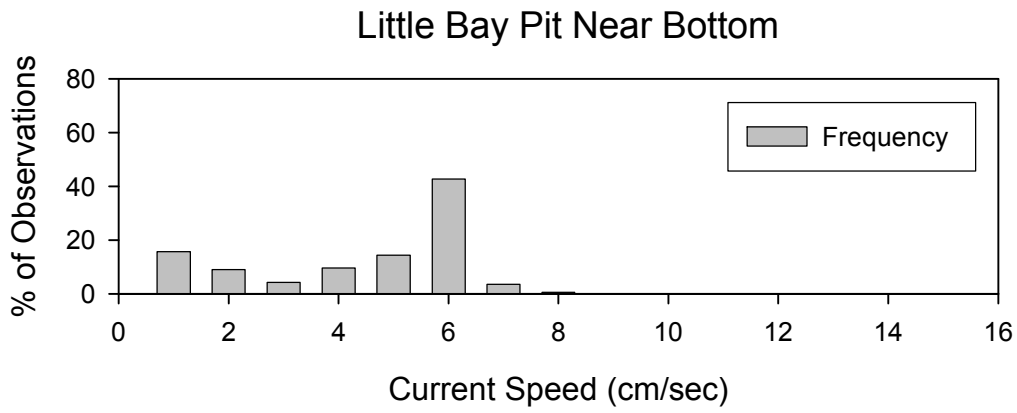


Figure C-21. Frequency distribution of current speeds in Little Bay pit on 24 September 2002.

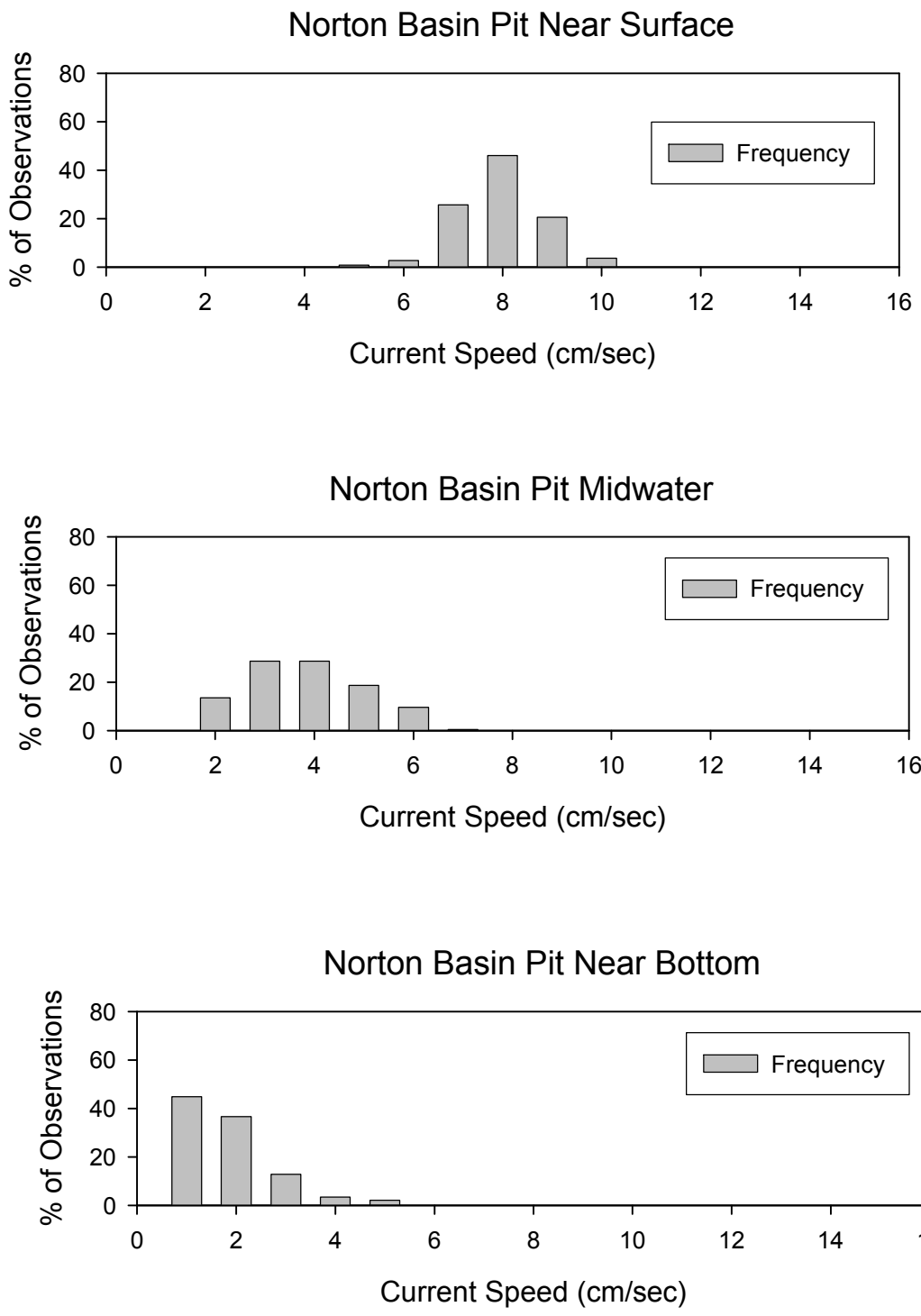
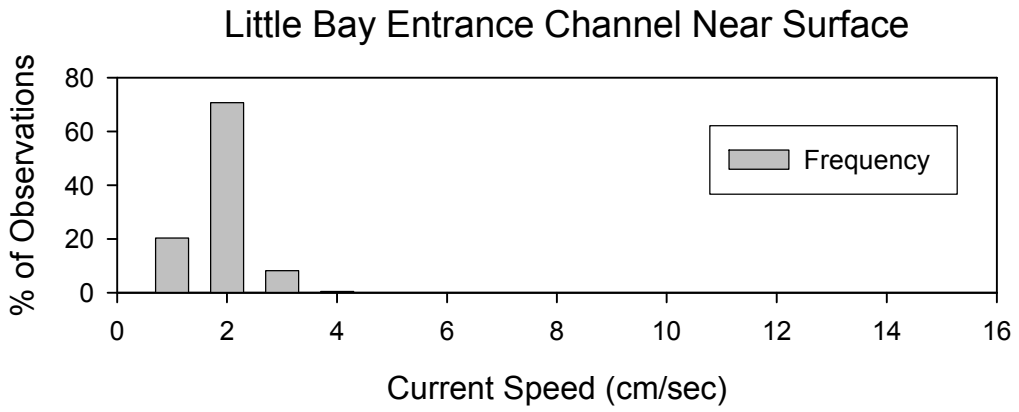


Figure C-22. Frequency distribution of current speeds in the Norton Basin pit on 24 September 2002.



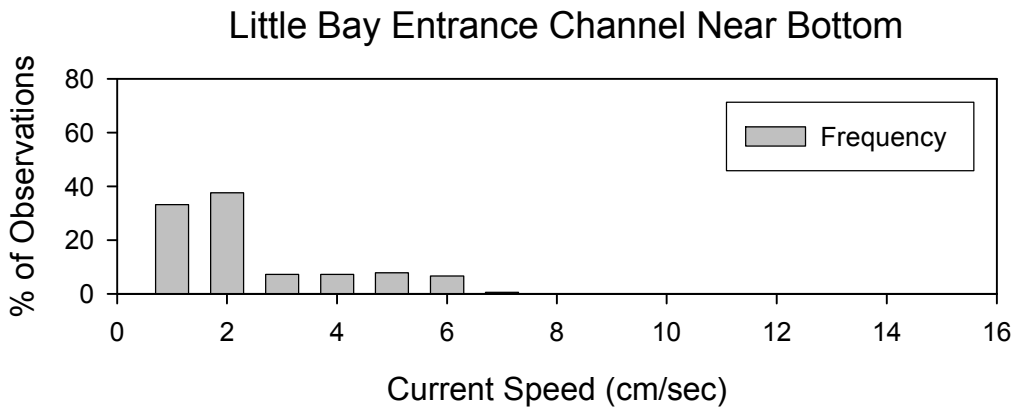
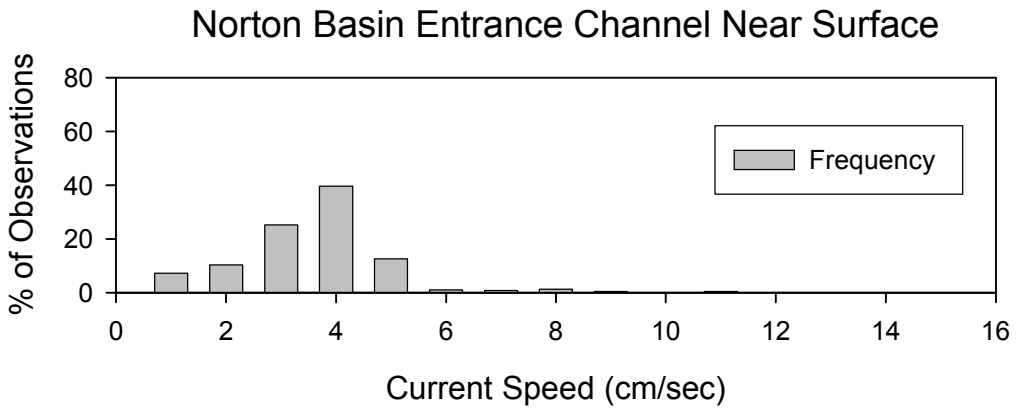


Figure C-23. Frequency distribution of current speeds in Little Bay Entrance Channel on 24 September 2002.



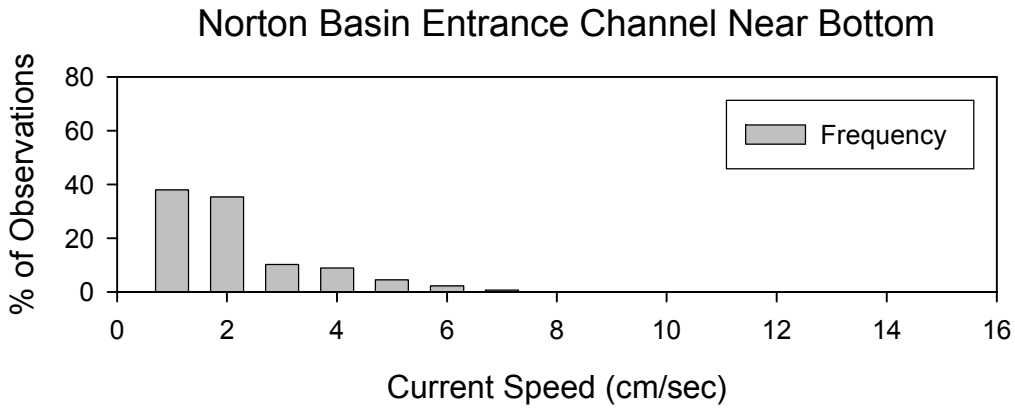


Figure C-24. Frequency distribution of current speeds in the Norton Basin Entrance Channel on 24 September 2002.

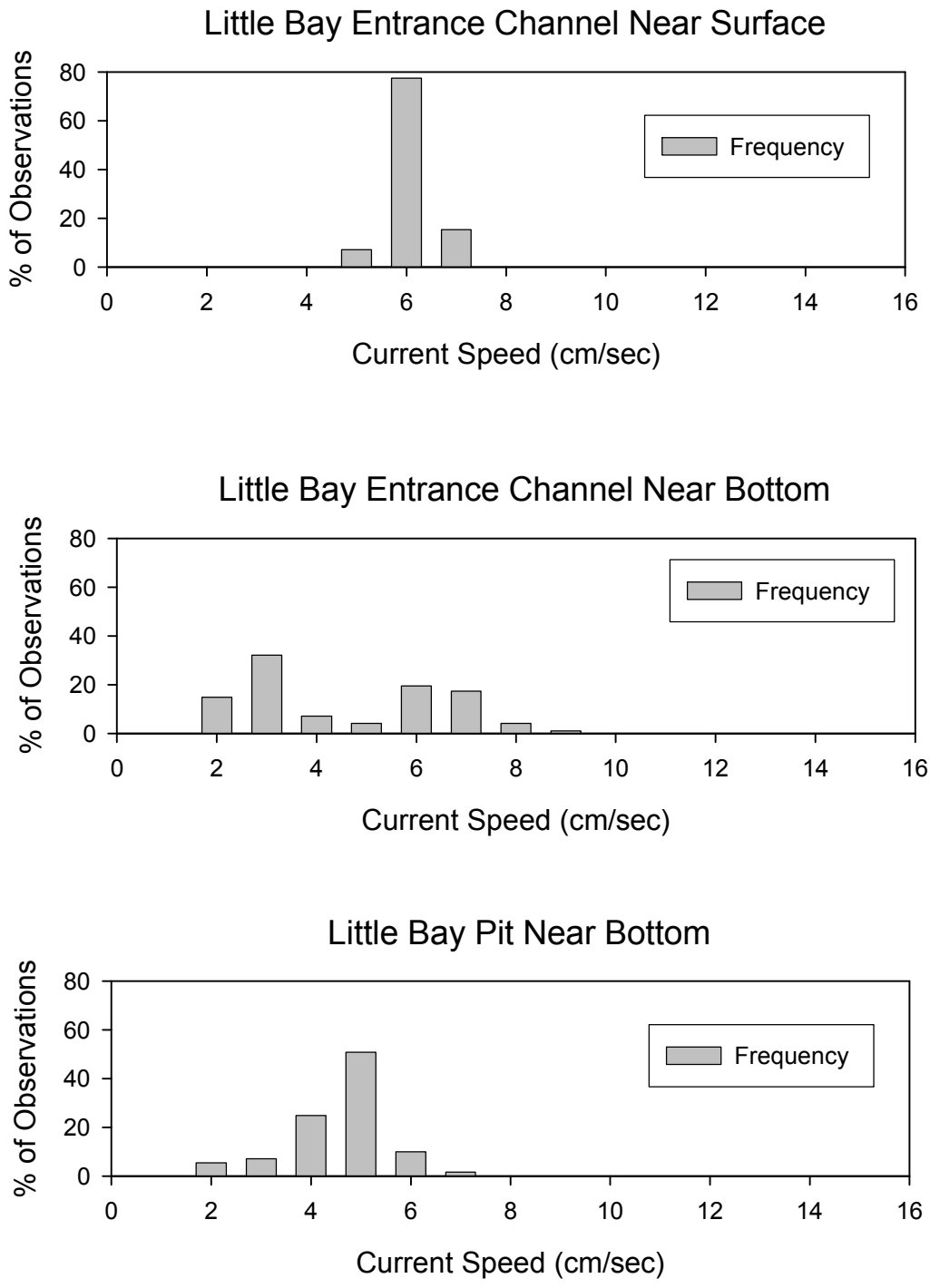


Figure C-25. Frequency distribution of current speeds in the Little Bay Entrance Channel and Little Bay pit near bottom on 25 September 2002.

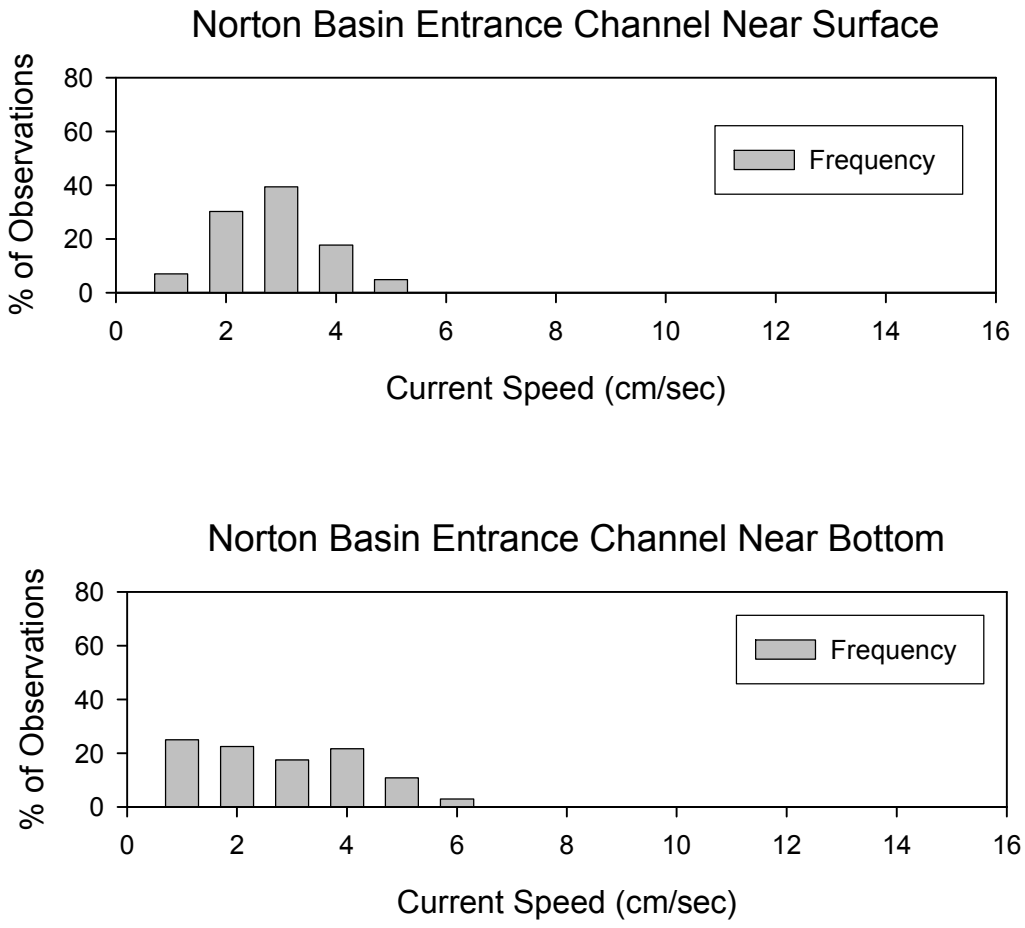
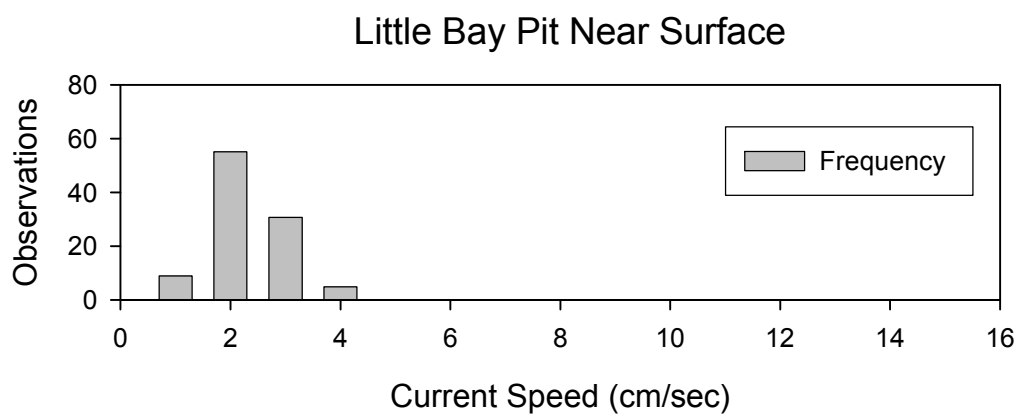
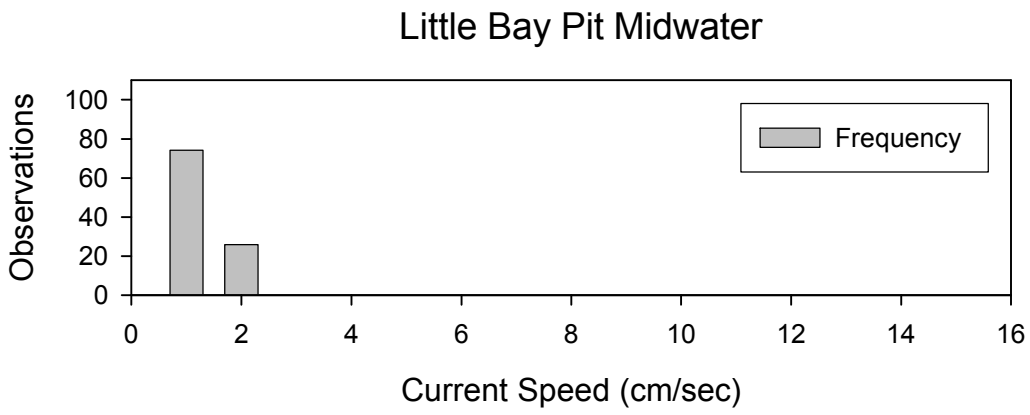


Figure C-26. Frequency distribution of current speeds in the Norton Basin Entrance Channel on 25 September 2002.





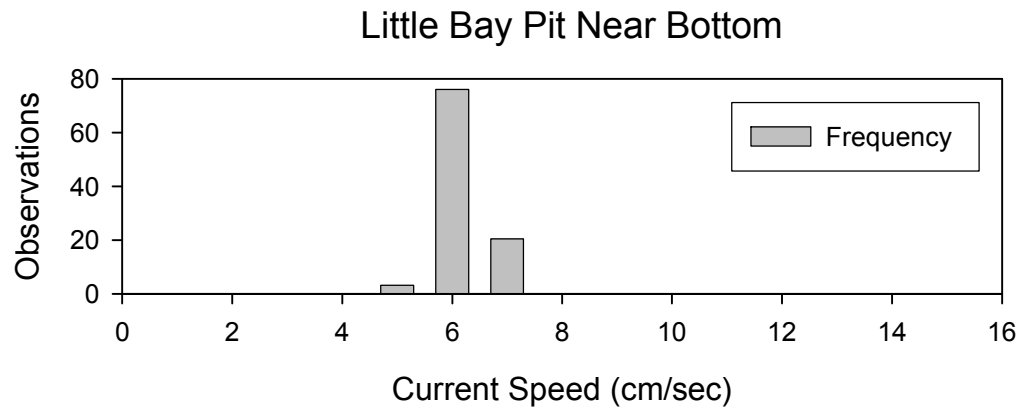


Figure C-27. Frequency distribution of current speeds in Little Bay pit on 22 to 23 October 2002.

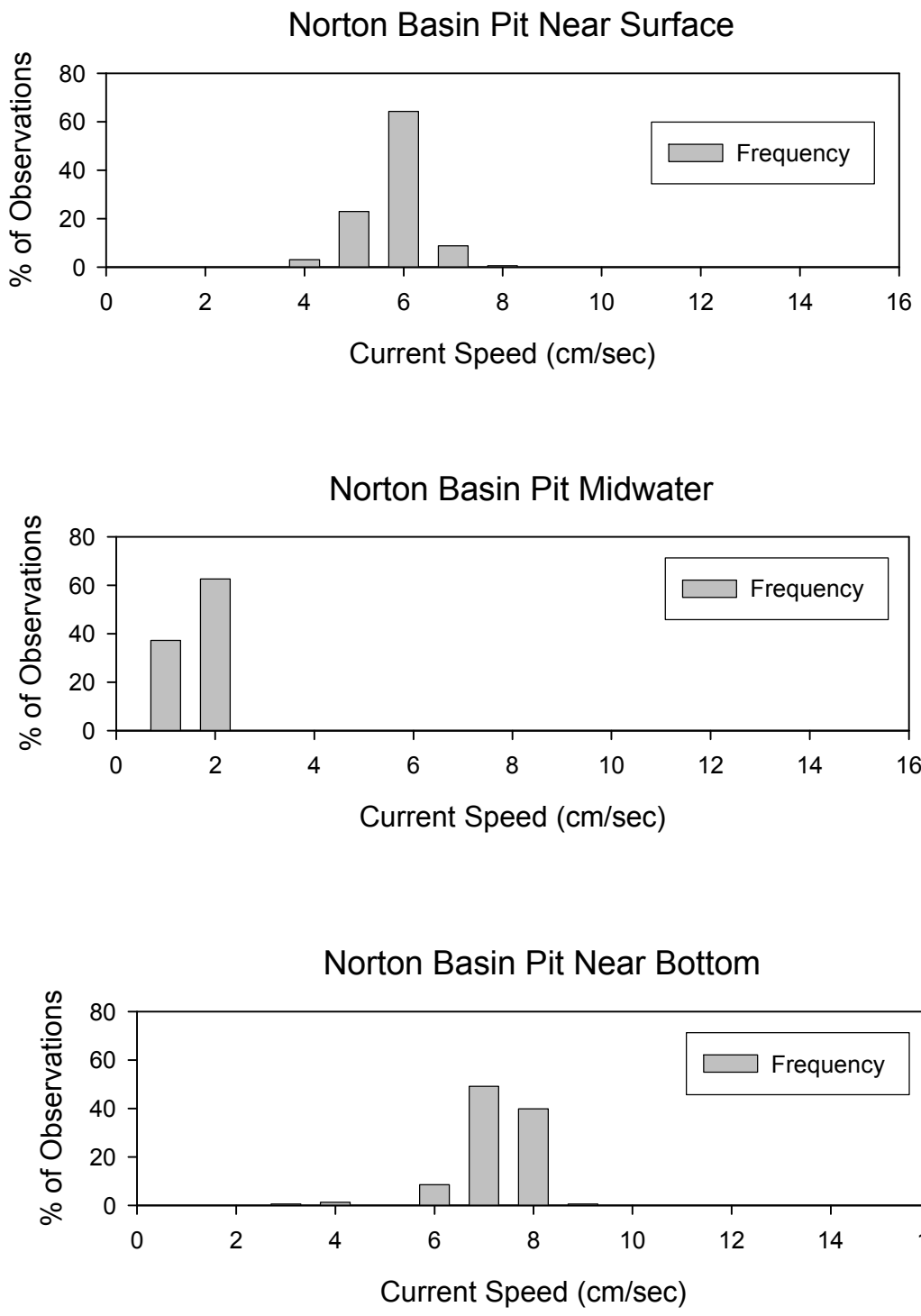
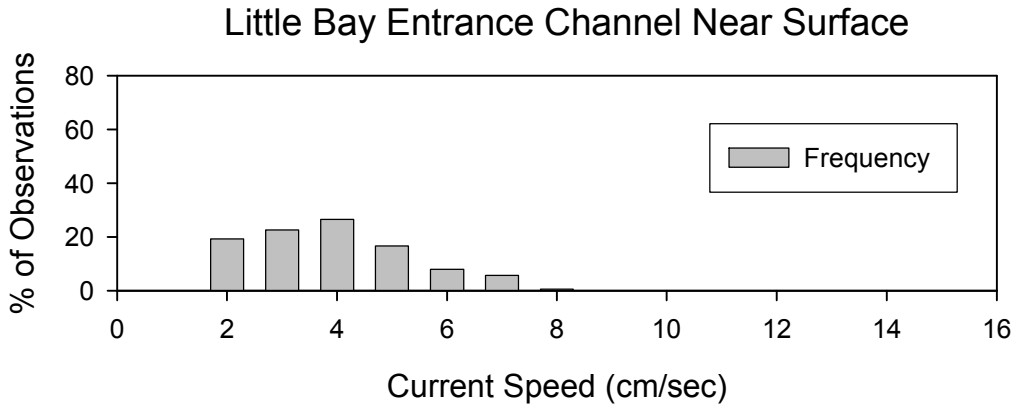


Figure C-28. Frequency distribution of current speeds in the Norton Basin pit on 22 October 2002.



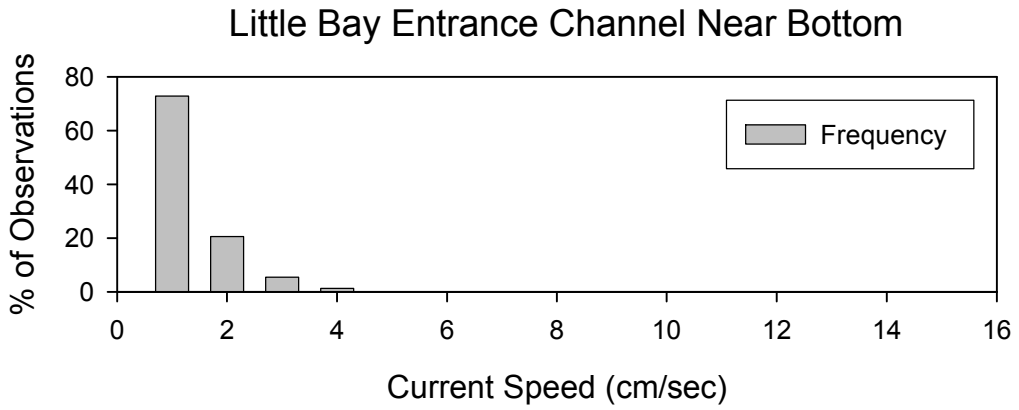


Figure C-29. Frequency distribution of current speeds in the Little Bay Entrance Channel on 22 October 2002.

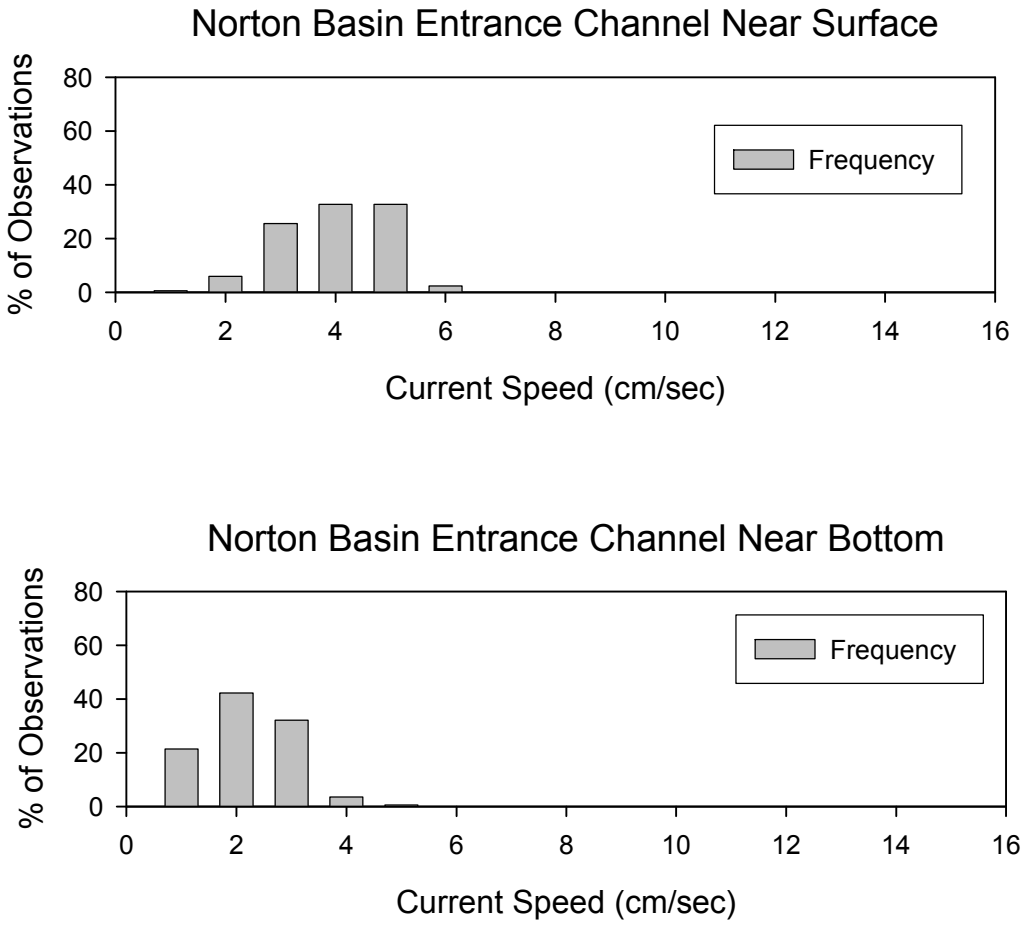
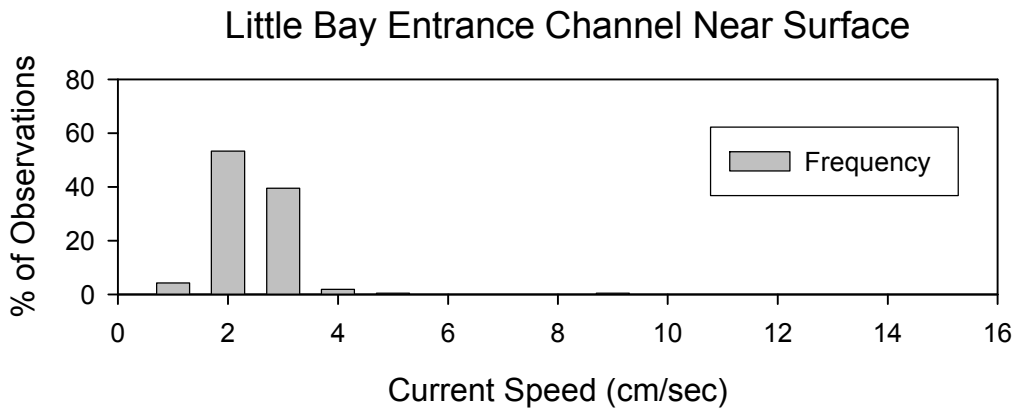
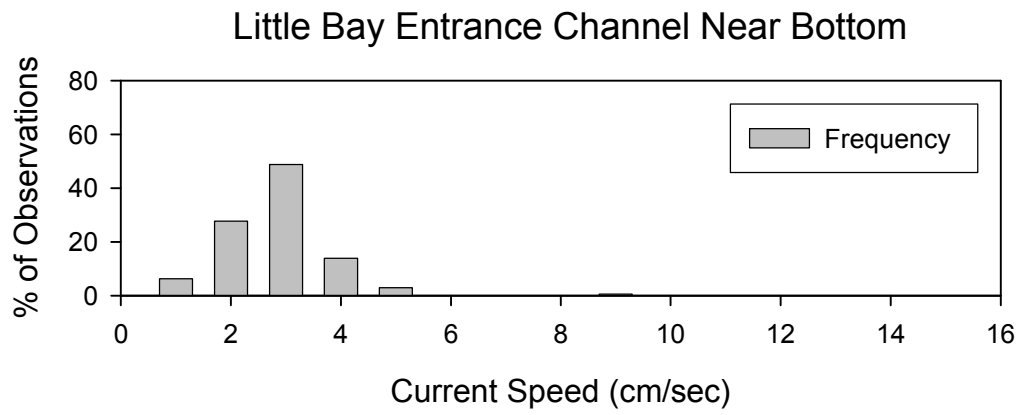


Figure C-30. Frequency distribution of current speeds in the Norton Basin Entrance Channel on 22 October 2002.





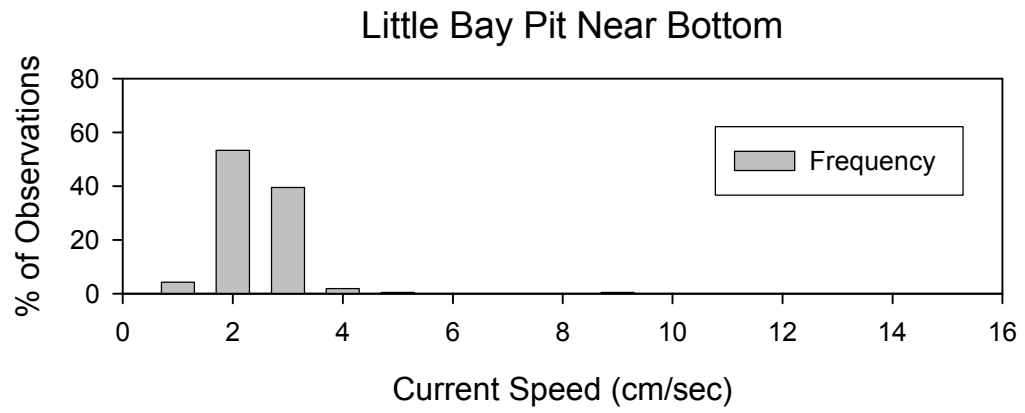
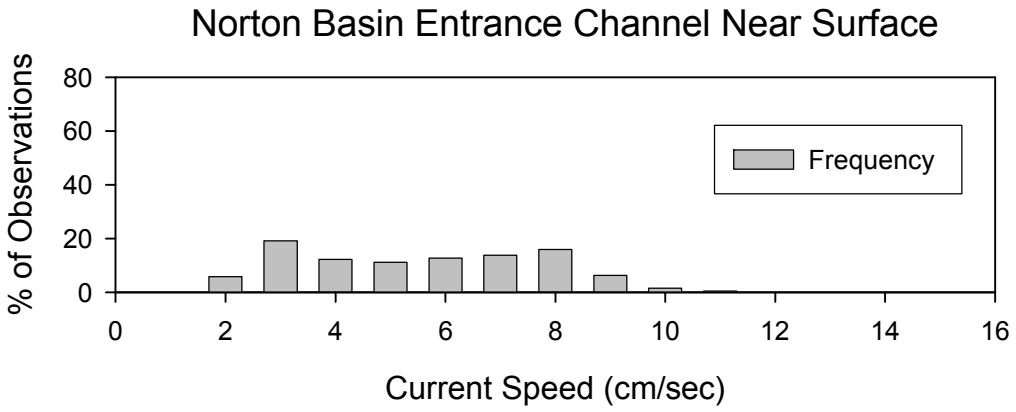


Figure C-31. Frequency distribution of current speeds in the Little Bay Entrance Channel and Little Bay pit near bottom on 23 October 2002.



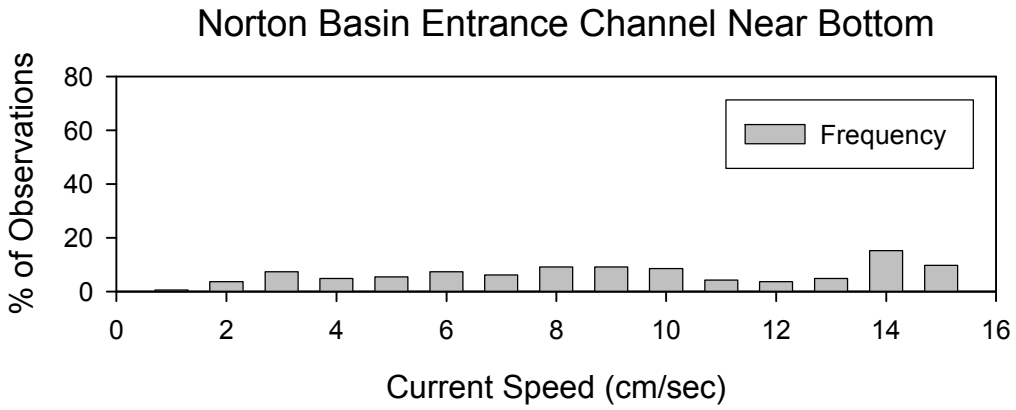


Figure C-32. Frequency distribution of current speeds in the Norton Basin Entrance Channel on 23 October 2002.

APPENDIX D

INTEROCEAN SYSTEMS
S4 CURRENT METER
CALIBRATION RECORDS

InterOcean

S4 FINAL RECORD
Document No. PRC 8182 1136

Rev K

Job Number: 2_1774_011A Customer: Continental Shelf Ass

Model Number: S4 Serial Number: 05451459

OPTIONS (Check or Describe)

MEMORY:	[ ] None	[ ] 64 K	[√] 128 K	[ ] 256 K	[ ] 500 K	[ ] 1 Meg
VELOCITY:	[√] Standard	[ ] High Intensity				
Range:	[ ] 50 cm/s	[ ] 100 cm/s	[√] 350 cm/s	[ ] 10 knots	[ ] Other	
TEMPERATURE:	[ ] None	[ ] Standard	[√] Thermistor	[ ] Platinum		
Accuracy:	[√] ±0.1°C	[ ] ±0.2°C	[ ] ±0.05°C	[ ] ±0.02°C		
Resolution:	[√] 0.05°C	[ ] 0.003°C				
Range:	[√] Standard (-5°C to +45°C)		[ ] Special			
CONDUCTIVITY:	[√] None	[ ] Conductive	[ ] Inductive			
Accuracy:	[ ] ±0.2 mS	[ ] ±0.02 mS				
Resolution:	[ ] 0.1 mS	[ ] 0.01 mS	[ ] 0.001 mS			
Range:	[ ] Standard (0 to 70 mS)		[ ] Low Range (0 to 5 mS)			
DEPTH RANGE:	[√] None	[ ] 70 M	[ ] 1,000 dBar	[ ] 6,000 dBar	[ ] Other:	
Resolution:	[ ] Standard (10 bit)	[ ] High Resolution (14 bit)				
High Resolution A/D:	[ ] Yes	[√] No				

TILT: [ ] Yes [√] No **TURBIDITY:** [ ] Yes [√] No **OBS:** [ ] Yes [√] No

FIRMWARE VERSION: 2.270 **ADAPTIVE:** [ ] Yes [√] No

PRINTED WIRING ASSEMBLIES

Name	Part Number	Serial Number	Rev Level	Insp Conformal Coat (initial)
CPU Board	8182 3103 (01)	0692021	KK	MN
Memory Bd #1	8182 3170 (04)	0696005	N	MN
Memory Bd #2	8182 31 ( )			
Hi-Res A/D Bd	8182 3213 ( )			
Compass Bd	8182 3136 (01)	700001	F	MN
Temp Bd (Std or Therm.)	8182 3211 (02)	0826002	H	MN
Temp Bd (Platinum)	8182 3214 (01)			
Driver Bd	8182 3118 (01)	075027	Z	MN
Sense Amp Bd	8182 3101 (01)	0811012	M	MN
CTD Board	8182 33 ( )			
Turbidity Board	8182 3304 ( )			
Other				

SENSORS

Name	Part Number	Serial Number	Range/Type
Compass	8182 6128 (01)	EE.63	N/A
Conductivity (Inductive)	8182 6404 ( )		
Depth	8182 6118 ( )		
OBS	8182 6420 (01)		
Temperature (Std)	8182 6120 ( )		
Temperature (Thermistor)	8182 6131 (02)	1280	-5° TO +45°C
Temperature (Platinum)	8182 6133 (01)		
Turbidity (w/TempComp)	8182 8304 (01)		
Other			

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S4 FINAL RECORD
Document No. PRC 8182 1136

Rev K

CALIBRATION DATA

CPU Battery: Volts: 3.84 Current: 15.8 µA Installation Date: 09.18.01

Memory Batteries: B1: Volts: 3.93 Current: 10.1 µA Installation Date: 09-18-01
B2: Volts: 3.93 Current: 10.1 µA Installation Date: 09.18.01
B1: Volts: | Current: | µA Installation Date: |
B2: Volts: | Current: | µA Installation Date: |

Battery Type: Lith. [ ] Alk. [ ] Voltage: N/A S/N: N/A Installation Date: N/A

System Current (SI) (mA): Calculated Value: 26
Comm. Mode: 8.73 Log Mode: 18.53 Storage Mode: .0017

High Resolution Enabled: [ ] Yes [✓] No
Conductivity (OCE): N/A Temperature (OPE): N/A Depth (ODE): N/A

Tilt Compensation Enabled (OTE): [ ] Yes [✓] No

Velocity Zero: [✓] Sea Water [ ] Fresh Water

Final Verify: [✓] Compass [ ] Cond. [✓] Temp. [ ] Depth [ ] Turbidity [ ] OBS [ ] Other

Burst Noise: V_N: .461 rms V_E: .425 rms

Velocity Tows: *Initial* [✓] X-Y MN [✓] N-E MN [ ] Tilt (OTE) N/A

Cycle Tests: *Initial* [✓] Burst MN [✓] Long MN [✓] Cold MN

CALIBRATION

X Sensitivity (Mx): 250 Y Sensitivity (My): 253

X Offset (Bx): 1766 Y Offset (By): 1742

Conductivity (CM) N/A

Time Set: 17:20:25 [✓] GMT [ ] Local [✓] Time Verified

Baud Rate Set: 4800 [✓] 4800 Standard [ ] As Received

Final RS: MN

No. of Desiccant Packs Installed: 2 No. of Humidity Indicators Installed: 1 Internal Fasteners Glpt'd: [✓] Yes [ ] No

Tamper-proof Hardware Installed: [✓] Yes [ ] No Verified By: H. V. Nguyen

Tested By: H. V. Nguyen Date: 09,25,01 Supervisor: R Baxter Date: 9/25/01

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InterOcean

S4 FINAL RECORD
Document No. PRC 8182 1136
Rev K

Job Number: 2-1774-011 B Customer: Continental Shelf Ass

Model Number: S4 Serial Number: 05451459

OPTIONS (Check or Describe)

MEMORY:	[ ] None	[ ] 64 K	[✓] 128 K	[ ] 256 K	[ ] 500 K	[ ] 1 Meg
VELOCITY:	[✓] Standard	[ ] High Intensity				
Range:	[ ] 50 cm/s	[ ] 100 cm/s	[✓] 350 cm/s	[ ] 10 knots	[ ] Other	
TEMPERATURE:	[ ] None	[ ] Standard	[✓] Thermistor	[ ] Platinum		
Accuracy:	[✓] ±0.1°C	[ ] ±0.2°C	[ ] ±0.05°C	[ ] ±0.02°C		
Resolution:	[✓] 0.05°C	[ ] 0.003°C				
Range:	[✓] Standard (-5°C to +45°C)		[ ] Special			
CONDUCTIVITY:	[✓] None	[ ] Conductive	[ ] Inductive			
Accuracy:	[ ] ±0.2 mS	[ ] ±0.02 mS				
Resolution:	[ ] 0.1 mS	[ ] 0.01 mS	[ ] 0.001 mS			
Range:	[ ] Standard (0 to 70 mS)		[ ] Low Range (0 to 5 mS)			
DEPTH RANGE:	[✓] None	[ ] 70 M	[ ] 1,000 dBar	[ ] 6,000 dBar	[ ] Other:	
Resolution:	[ ] Standard (10 bit)	[ ] High Resolution (14 bit)				
High Resolution A/D:	[ ] Yes	[✓] No				

TILT: [ ] Yes [✓] No **TURBIDITY:** [ ] Yes [✓] No **OBS:** [ ] Yes [✓] No

FIRMWARE VERSION: 2.270 **ADAPTIVE:** [ ] Yes [✓] No

PRINTED WIRING ASSEMBLIES

Name	Part Number	Serial Number	Rev Level	Insp Conformal Coat (Initial)
CPU Board	8182 3103 (01)	0692022	KK	MN
Memory Bd #1	8182 3120 (04)	176 96085	N	MN
Memory Bd #2	8182 31 ( )			
Hi-Res A/D Bd	8182 3213 ( )			
Compass Bd	8182 31 36 (01)	700002	B	MN
Temp Bd (Std or Therm.)	8182 3211 (02)	082601U	H	MN
Temp Bd (Platinum)	8182 3214 (01)			
Driver Bd	8182 3118 (01)	0811002	Z	MN
Sense Amp Bd	8182 3101 (01)	0582009	M	MN
CTD Board	8182 33 ( )			
Turbidity Board	8182 3304 ( )			
Other				

SENSORS

Name	Part Number	Serial Number	Range/Type
Compass	8182 6126 (01)	N-76	N/A
Conductivity (Inductive)	8182 6404 ( )		
Depth	8182 6118 ( )		
OBS	8182 6420 (01)		
Temperature (Std)	8182 6120 ( )		
Temperature (Thermistor)	8182 6131 (02)	1286	-5°C TO +45°C
Temperature (Platinum)	8182 6133 (01)		
Turbidity (w/TempComp)	8182 8304 (01)		
Other			

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InterOcean

S4 FINAL RECORD
Document No. PRC 8182 1136

Rev K

CALIBRATION DATA

CPU Battery: Volts: 3.94 Current: 16.37 µA Installation Date: 09-19-01

Memory Batteries: B1: Volts: 3.92 Current: 11.6 µA Installation Date: 09-19-01
B2: Volts: 3.92 Current: 11.7 µA Installation Date: 09-19-01
B1: Volts: | Current: | µA Installation Date: |
B2: Volts: | Current: | µA Installation Date: |

Battery Type: Lith. [ ] Alk. [ ] Voltage: N/A S/N: N/A Installation Date: N/A

System Current (SI) (mA): Calculated Value: 26
Comm. Mode: 7.76 Log Mode: 17.54 Storage Mode: 0005

High Resolution Enabled: [ ] Yes [✓] No
Conductivity (OCE): N/A Temperature (OPE): N/A Depth (ODE): N/A

Tilt Compensation Enabled (OTE): [ ] Yes [✓] No

Velocity Zero: [✓] Sea Water [ ] Fresh Water

Final Verify: [✓] Compass [ ] Cond. [✓] Temp. [ ] Depth [ ] Turbidity [ ] OBS [ ] Other

Burst Noise: V_N: .480 rms V_E: .478 rms

Velocity Tows: *initial* [✓] X-Y MN [✓] N-E MN [ ] Tilt (OTE) N/A

Cycle Tests: *initial* [✓] Burst MN [✓] Long MN [✓] Cold MN

CALIBRATION

X Sensitivity (Mx): 243 Y Sensitivity (My): 240

X Offset (Bx): 1753 Y Offset (By): 1758

Conductivity (CM) N/A

Time Set: 18:00:42 [✓] GMT [ ] Local [✓] Time Verified

Baud Rate Set: 4800 [ ] 4800 Standard [✓] As Received

Final RS: MN

No. of Desiccant Packs Installed: 2 No. of Humidity Indicators Installed: 1 Internal Fasteners Glpt'd: [✓] Yes [ ] No

Tamper-proof Hardware Installed: [✓] Yes [ ] No Verified By: M. V. Nguyen

Tested By: M. V. Nguyen Date: 09/26/01 Supervisor: [signature] Date: 9/26/01

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1879

InterOcean

S4 FINAL RECORD
Document No. PRC 8182 1136

Rev K

Job Number: 8.1370-012 Customer: CONTINENTAL SHELF ASSOCIATES, INC.

Model Number: S4 Serial Number: 08291826

OPTIONS (Check or Describe)

MEMORY:	[ ] None	[ ] 64 K	[✓] 128 K	[ ] 256 K	[ ] 500 K	[ ] 1 Meg
VELOCITY:	[✓] Standard	[ ] High intensity				
Range:	[ ] 50 cm/s	[ ] 100 cm/s	[✓] 350 cm/s	[ ] 10 knots	[ ] Other	
TEMPERATURE:	[ ] None	[ ] Standard	[✓] Thermistor	[ ] Platinum		
Accuracy:	[✓] ±0.1°C	[ ] ±0.2°C	[ ] ±0.05°C	[ ] ±0.02°C		
Resolution:	[✓] 0.05°C	[ ] 0.003°C				
Range:	[✓] Standard (-5°C to +45°C)		[ ] Special			
CONDUCTIVITY:	[✓] None	[ ] Conductive	[ ] Inductive			
Accuracy:	[ ] ±0.2 mS	[ ] ±0.02 mS				
Resolution:	[ ] 0.1 mS	[ ] 0.01 mS	[ ] 0.001 mS			
Range:	[ ] Standard (0 to 70 mS)		[ ] Low Range (0 to 5 mS)			
DEPTH RANGE:	[✓] None	[ ] 70 M	[ ] 1,000 dBar	[ ] 6,000 dBar	[ ] Other:	
Resolution:	[ ] Standard (10 bit)	[ ] High Resolution (14 bit)				
High Resolution A/D:	[ ] Yes	[✓] No				
TILT: [ ] Yes	[✓] No	**TURBIDITY:**	[ ] Yes	[✓] No	**OBS:** [ ] Yes	[✓] No
FIRMWARE VERSION: 2.399			**ADAPTIVE:**		[ ] Yes	[✓] No

PRINTED WIRING ASSEMBLIES

Name	Part Number	Serial Number	Rev Level	Insp Conformal Coat (Initial)
CPU Board	8182 3103 (01)	08290015	KK	ef
Memory Bd #1	8182 31[illegible] (04)	08160015	M	ef
Memory Bd #2	8182 31 (-)	-	-	-
Hi-Res A/D Bd	8182 3213 (-)	-	-	-
Compass Bd	8182 31[illegible] (01)	08290002	F	ef
Temp Bd (Std or Therm.)	8182 3211 (02)	08260016	H	ef
Temp Bd (Platinum)	8182 3214 (01)	-	-	-
Driver Bd	8182 3118 (01)	07510002	F	ef
Sense Amp Bd	8182 3101 (01)	08260002	N	ef
CTD Board	8182 33 (-)	-	-	-
Turbidity Board	8182 3304 ( )	-	-	-
Other		-	-	-

SENSORS

Name	Part Number	Serial Number	Range/Type
Compass	8182 6128 (01)	T-04	N/A
Conductivity (Inductive)	8182 6404 ( )	-	-
Depth	8182 6118 ( )	-	-
OBS	8182 6420 (01)	-	-
Temperature (Std)	8182 6120 ( )	-	-
Temperature (Thermistor)	8182 6131 (02)	1287	-5C° TO +45C°
Temperature (Platinum)	8182 6133 (01)	-	-
Turbidity (w/TempComp)	8182 6304 (01)	-	-
Other		-	-

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S4 FINAL RECORD
Document No. PRC 8182 1136

Rev K

CALIBRATION DATA

CPU Battery: Volts: 3.91 Current: 13.65 µA Installation Date: 09/18/01

Memory Batteries: B1: Volts: 3.94 Current: 4.8 µA Installation Date: 09/18/01
B2: Volts: 3.93 Current: 4.9 µA Installation Date: 09/18/01
B1: Volts: – Current: – µA Installation Date: –
B2: Volts: – Current: – µA Installation Date: –

Battery Type: Lith. [ ] Alk. [ ] Voltage: NONE S/N: NONE Installation Date: NONE

System Current (SI) (mA): Calculated Value: 9.0
Comm. Mode: 8.86 Log Mode: 18.87 Storage Mode: 0.001

High Resolution Enabled: [ ] Yes [✓] No
Conductivity (OCE): N/A Temperature (OPE): N/A Depth (ODE): N/A

Tilt Compensation Enabled (OTE): [ ] Yes [✓] No

Velocity Zero: [✓] Sea Water [ ] Fresh Water

Final Verify: [✓] Compass [ ] Cond. [✓] Temp. [ ] Depth [ ] Turbidity [ ] OBS [ ] Other

Burst Noise: V_N: .531 rms V_E: .584 rms

Velocity Tows: *Initial* [✓] X-Y CS [✓] N-E CS [ ] Tilt (OTE) N/A

Cycle Tests: *Initial* [✓] Burst CS [✓] Long CS [✓] Cold CS

CALIBRATION

X Sensitivity (Mx): 251 Y Sensitivity (My): 253

X Offset (Bx): 1750 Y Offset (By): 1762

Conductivity (CM) N/A

Time Set: 16:51:44 [✓] GMT [ ] Local [✓] Time Verified

Baud Rate Set: 4800 [✓] 4800 Standard [ ] As Received

Final RS: YES

No. of Desiccant Packs Installed: 2 No. of Humidity Indicators Installed: 1 Internal Fasteners Glpt'd: [✓] Yes [ ] No

Tamper-proof Hardware Installed: [✓] Yes [ ] No Verified By: John Cao

Tested By: John Cao Date: 09/25/01 Supervisor: P Bonta Date: 9/26/01

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18 12

InterOcean

S4 FINAL RECORD
Document No. PRC 8182 1136

Rev J

Job Number: 8-1370-010A Customer: Continental Shelf Assoc Inc

Model Number: S4 Serial Number: 0818127

OPTIONS (Check or Describe)

MEMORY:	[ ] None	[ ] 64 K	[ ] 128 K	[X] 256 K	[ ] 500 K	[ ] 1 Meg
VELOCITY:	[X] Standard	[ ] High Intensity				
Range:	[ ] 50 cm/s	[ ] 100 cm/s	[X] 350 cm/s	[ ] 10 knots	[ ] Other	
TEMPERATURE:	[ ] None	[ ] Standard	[X] Thermistor	[ ] Platinum		
Accuracy:	[ ] ±0.1°C	[ ] ±0.2°C	[X] ±0.05°C	[ ] ±0.02°C		
Resolution:	[ ] 0.05°C	[X] 0.003°C				
Range:	[X] Standard (-5°C to +45°C)		[ ] Special			
CONDUCTIVITY:	[ ] None	[X] Conductive	[ ] Inductive			
Accuracy:	[X] ±0.2 mS	[ ] ±0.02 mS				
Resolution:	[ ] 0.1 mS	[X] 0.01 mS	[ ] 0.001 mS			
Range:	[X] Standard (5 to 65 mS)		[ ] Low Range (0 to 5 mS)			
DEPTH RANGE:	[ ] None	[ ] 70 M	[ ] 1,000 dBar	[ ] 6,000 dBar	[X] Other: 200 m	
Resolution:	[ ] Standard (10 bit)	[X] High Resolution (14 bit)				
High Resolution A/D:	[X] Yes	[ ] No				

TILT: [ ] Yes [X] No **TURBIDITY:** [ ] Yes [X] No **OBS:** [ ] Yes [X] No

FIRMWARE VERSION: 2.399 **ADAPTIVE:** [ ] Yes [X] No

PRINTED WIRING ASSEMBLIES

Name	Part Number	Serial Number	Rev Level	Insp Conformal Coat (Initial)
CPU Board	8182 3103 (01)	0829024	KK	MN
Memory Bd #1	8182 3135 (05)	0758012	L	MN
Memory Bd #2	8182 3135 ( )			
Hi-Res A/D Bd	8182 3213 (01)	0769012	J	MN
Compass Bd	8182 3136 (01)	0829003	F	MN
Temp Bd (Std or Therm.)	8182 3211 (02)	0826018	H	MN
Temp Bd (Platinum)	8182 3214 (01)			
Driver Bd	8182 3118 (04)	0756002	Z	MN
Sense Amp Bd	8182 3101 (01)	0793031	E	MN
CTD Board	8182 3306 ( )			
Turbidity Board	8182 3304 ( )			

SENSORS

Name	Part Number	Serial Number	Range/Type
Compass	8182 6128 (01)	T-34	N/A
Conductivity (Inductive)	8182 6404 ( )	N/A	
Depth	8182 6118 ( )	25029	0-200m
OBS	8182 6420 (01)		
Temperature (Std)	8182 6120 ( )		
Temperature (Thermistor)	8182 6131 (02)	1272	-5° TO +45°
Temperature (Platinum)	8182 6133 (01)		
Turbidity (w/TempComp)	8182 8304 (01)	N/A	
Other			

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InterOcean

S4 FINAL RECORD
Document No. PRC 8182 1136

Rev J

CALIBRATION DATA

CPU Battery: Volts: 3.91 Current: 14.05 µA Installation Date: 05-08-01

Memory Batteries:
- B1: Volts: 3.92 Current: 6.76 µA Installation Date: 05-08-01
- B2: Volts: 3.93 Current: 6.76 µA Installation Date: 05-08-01
- B1: Volts: | Current: | µA Installation Date: |
- B2: Volts: | Current: | µA Installation Date: |

Battery Type: NOT INSTALLED S/N: N/A Installation Date: N/A
Voltage:

System Current (SI) (mA): Calculated Value: 45
Comm. Mode: 33.56 Log Mode: 41.22 Storage Mode: .0010

High Resolution Enabled: [✓] Yes [ ] No
Conductivity (OCE): MN Temperature (OPE): MN Depth (ODE): MN

Tilt Compensation Enabled (OTE): [ ] Yes [✓] No

Velocity Zero: [✓] Sea Water [ ] Fresh Water

Final Verify: [✓] Compass [✓] Cond. [✓] Temp. [✓] Depth [ ] Turbidity

Burst Noise: V_N: .449 rms V_E: .412 rms

Velocity Tows: Initial [✓] X-Y MN [✓] N-E MN [ ] Tilt (OTE) N/A

Cycle Tests: Initial [✓] Burst MN [✓] Long MN [✓] Cold MN

CALIBRATION

X Sensitivity (Mx): 244 Y Sensitivity (My): 242
X Offset (Bx): 1731 Y Offset (By): 1771
Conductivity (CM) 29156

Time Set: 18:01:12 [✓] GMT [ ] Local [✓] Time Verified

Baud Rate Set: 4800 (4800 baud Standard)

RS: MN

By: Thanh Van Nguyen @ 5/16/01 Date: 05-16-01

* ALL Internal Screw Used GLPT, Two Desicant pack and One Humidity Indicator Card Installed.

Tamper-proof Hardware Installed: [✓] Yes [ ] No Verified By: Thanh Van Nguyen

InterOcean systems, inc. / 3540 aero court, san diego, ca usa 92123-1799 / tel (858)565-8400 / fax (858)268-9695
e-mail: service@interoceansystems.com www.interoceansystems.com

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S4 FINAL RECORD
Document No. PRC 8182 1136

Rev J

Job Number: 8-1370-010B Customer: Continental Shelf Ass. Inc

Model Number: S4 Serial Number: 08181828

OPTIONS (Check or Describe)

MEMORY:	[ ] None	[ ] 64 K	[ ] 128 K	[X] 256 K	[ ] 500 K	[ ] 1 Meg
VELOCITY:	[X] Standard	[ ] High Intensity				
Range:	[ ] 50 cm/s	[ ] 100 cm/s	[X] 350 cm/s	[ ] 10 knots	[ ] Other	
TEMPERATURE:	[ ] None	[ ] Standard	[X] Thermistor	[ ] Platinum		
Accuracy:	[ ] ±0.1°C	[ ] ±0.2°C	[X] ±0.05°C	[ ] ±0.02°C		
Resolution:	[ ] 0.05°C	[X] 0.003°C				
Range:	[X] Standard (-5°C to +45°C)		[ ] Special			
CONDUCTIVITY:	[ ] None	[X] Conductive	[ ] Inductive			
Accuracy:	[X] ±0.2 mS	[ ] ±0.02 mS				
Resolution:	[ ] 0.1 mS	[X] 0.01 mS	[ ] 0.001 mS			
Range:	[X] Standard (5 to 65 mS)		[ ] Low Range (0 to 5 mS)			
DEPTH RANGE:	[ ] None	[ ] 70 M	[ ] 1,000 dBar	[ ] 6,000 dBar	[X] Other:	200 m
Resolution:	[ ] Standard (10 bit)	[X] High Resolution (14 bit)				
High Resolution A/D:	[X] Yes	[ ] No				
TILT:	[ ] Yes	[X] No	**TURBIDITY:**	[ ] Yes	[X] No	**OBS:** [ ] Yes [X] No
FIRMWARE VERSION:	2.399		**ADAPTIVE:**	[ ] Yes	[X] No	

PRINTED WIRING ASSEMBLIES

Name	Part Number	Serial Number	Rev Level	Insp Conformal Coat (Initial)
CPU Board	8182 3103 (01)	0820021	KK	MN
Memory Bd #1	8182 3136 (05)	0758002	L	MN
Memory Bd #2	8182 3136 ( )			
Hi-Res A/D Bd	8182 3213 (01)	758025	J	MN
Compass Bd	8182 3136 (01)	0829015	F	MN
Temp Bd (Std or Therm.)	8182 3211 (02)	0826010	H	MN
Temp Bd (Platinum)	8182 3214 (01)			
Driver Bd	8182 3118 (04)	758028	Z	MN
Sense Amp Bd	8182 3101 (01)	793021	E	MN
CTD Board	8182 3305 ( )			
Turbidity Board	8182 3304 ( )			

SENSORS

Name	Part Number	Serial Number	Range/Type
Compass	8182 6128 (01)	361	N/A
Conductivity (Inductive)	8182 6404 ( )	N/A	
Depth	8182 6118 ( )	2E028	0 - 200 m
OBS	8182 6420 (01)		
Temperature (Std)	8182 6120 ( )		
Temperature (Thermistor)	8182 6131 (02)	1285	-5°C TO +45°C
Temperature (Platinum)	8182 6133 (01)		
Turbidity (w/TempComp)	8182 6304 (01)	N/A	
Other			

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e-mail: service@interoceansystems.com www.interoceansystems.com

InterOcean

S4 FINAL RECORD
Document No. PRC 8182 1136

Rev J

CALIBRATION DATA

CPU Battery: Volts: 3.92 Current: 14.02 µA Installation Date: 4-25-01

Memory Batteries:
- B1: Volts: 3.93 Current: 7.86 µA Installation Date: 04-25-01
- B2: Volts: 3.92 Current: 8.05 µA Installation Date: 04-25-01
- B1: Volts: | Current: | µA Installation Date: |
- B2: Volts: | Current: | µA Installation Date: |

Battery Type: NOT INSTALLED S/N: N/A Installation Date: N/A
Voltage:

System Current (SI) (mA): Calculated Value: 45
Comm. Mode: 33.84 Log Mode: 41.93 Storage Mode: .0006

High Resolution Enabled: [X] Yes [ ] No
Conductivity (OCE): MN Temperature (OPE): MN Depth (ODE): MN

Tilt Compensation Enabled (OTE): [ ] Yes [X] No

Velocity Zero: [X] Sea Water [ ] Fresh Water

Final Verify: [X] Compass [X] Cond. [X] Temp. [X] Depth [ ] Turbidity

Burst Noise: V_N: .479 rms V_E: .492 rms

Velocity Tows: Initial [X] X-Y MN [X] N-E MN [ ] Tilt (OTE) N/A

Cycle Tests: Initial [X] Burst MN [X] Long MN [X] Cold MN

CALIBRATION

X Sensitivity (Mx):	247	Y Sensitivity (My):	243
X Offset (Bx):	1724	Y Offset (By):	1778
Conductivity (CM)	29555		

Time Set: 20:56:26 [X] GMT [ ] Local [X] Time Verified

Baud Rate Set: 4800 (4800 baud Standard)

RS: MN

All Internal Screws Used GLPT. Two desicant pack + one Humidity Indicator Card Installed.

By: [signature] Date: 05-15-01

5/15/01

Tamper-proof Hardware Installed: [X] Yes [ ] No Verified By: [signature]

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