Kachemak Bay Research Reserve (KAC) NERR Water Quality Metadata
January - December 2006
Latest update: 10/01/2019

I. Data Set and Research Descriptors

1) Principal Investigators & Contact Persons

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2) Entry Verification

For the Homer and Seldovia sites, the 15-minute data are uploaded to the PC from both the YSI Model 6200 Data Acquisition System via modem at 60-minute intervals, and the YSI 6600 Sonde Data Logger upon recovery. The text files are initially viewed with Ecowatch software, and graphs are produced to look for suspect data as may result from probe failure. Notes are made of any unusual data, and sensors are reconditioned as necessary.

The text data files are run through a Matlab routine created by Scott Pegau for processing. This routine is attached at the end of this report. The routine is set to output data every 15 minutes to match data collection intervals. The routine looks for data collected within 7.5 minutes of the desired output time. Data that were recorded when the instruments were out of the water are deleted from the beginning and end of each record. These data are identified by unusual depth and salinity data (usually near zero). The routine outputs a data file listing the missing data points, fills all cells that do not contain data with blanks, and finds and removes all data points that fall outside the range of what the data logger is designed to measure, or are out of realistic ranges for Kachemak Bay. The routine then processes the data through several filters to flag suspect data points that are greater than 4 standard deviations from data gathered in the 12-hour period surrounding the point. It can remove the data point or just flag it as suspicious. In addition, a graphing capability is included to produce single and multi-parameter graphs on a monthly or yearly basis. The routine outputs monthly files with column widths formatted to the correct number of decimal places based on YSI sensor specifications.

Anomalous data are evaluated to determine whether to flag or delete the suspect values. Data are flagged if they fall outside the normal values seen at the site, or outside the range of measurements and accuracy established for the sensors. Data outside the "normal" range of water quality for a particular site were investigated for validity based on weather data, field observations, QC checks, and instrument diagnostics. Data are deleted if anomalies are attributed to sensor malfunction or fouling of the sensors by aquatic organisms, debris, or sediment. In addition, sensor readings that differ significantly (>10%) from calibration standards suggest that the sensor was fouled during deployment. After corrections are made to the text files, and anomalies noted in the metadata report, the edited files are exported as tab delimited (*.txt). The monthly text files are then combined to produce the yearly data file that is sent to the CDMO. Raw (*.csv) files are also sent to the CDMO for archival. Scott Pegau is responsible for these tasks.

3) Research Objectives

The YSI electronic data loggers are programmed to measure the water temperature, specific conductivity, dissolved oxygen, depth, pH, and turbidity conditions at 15-minute intervals. There are four permanent data logger sites at two locations in Kachemak Bay. One site is located on the northeast side of the Bay at the end of the Homer Spit, and the other on the southwest side of the Bay in Seldovia. At each site a data logger is suspended 1-meter below the surface (“Surface”), and one data logger 1-meter from the bottom (“Deep”). The deep site is in the same location as the previous Homer Dolphin site. The Seldovia Deep site is at the previous Seldovia site. At both locations the surface sondes are horizontally within a couple meters of the deep sondes.

The circulation in Kachemak Bay is driven primarily by the 8-meter tidal flux. Regional circulation is characterized by generally cyclonic ocean currents in the Gulf of Alaska flowing onto the shelf off Cook Inlet. Nutrient rich bottom water is upwelled and mixed with surface water. These enriched waters may enter into Kachemak Bay, the inflow tending to stay along the southern shore flowing past the Seldovia instruments, while water flowing out of the bay stays along the Inner Bay and north shore, flowing past the Homer instruments. These trapped coastal flows separate the bay into two distinct ecosystems, and the instruments are positioned to reflect this distinction. Within each system there is vertical stratification of the water. The vertical placement of the sondes is designed to help elucidate the differences in circulation of the surface and deep waters.

As the inflowing water proceeds up the bay, fresh water runoff from the surrounding ice fields and watersheds dilute the salinity and increase the sediment load in the path of the Homer instruments. The inflowing water, in the path of the Seldovia instruments initially supports a marine system, while the north out flowing water of the Homer instruments, is more estuarine. The Kachemak Bay water quality instruments capture this difference with deployments along the north and south shores. These data will be used to supplement studies on primary productivity, larval distribution, settlement, recruitment, growth rates, community dynamics, and biodiversity in the bay.

4) Research Methods

The permanent sites of the Homer and Seldovia instruments have YSI 6600 Sonde Data Loggers connected to 6200 Data Acquisition Systems that are used for data collection. The Data Acquisition System is connected via modem to a computer at the Research Reserve. The raw data is collected in 15-minute intervals, stored on the 6200 DCP and interrogated, or downloaded, by our office computer hourly. Both instruments are normally housed in ABS pipe mounted vertically on the ferry docks of Homer and Seldovia. The pipes are positioned to ensure that the sensors are approximately 1 meter above the bottom. However, because of ongoing issues with the Seldovia deployment apparatus, the Deep site was relocated to one meter above the bottom on the Surface site's deployment cable pending repairs from 01/17/2006 to 10/16/2006 and from 12/28/2006 through the end of the year.

Calibration and deployment were performed monthly using methods outlined in the YSI Operating and Service Manual. After cleaning the data loggers, the dissolved oxygen (DO) membrane is replaced and allowed to season in water-saturated air for 12 hours before the DO sensor is calibrated. The pH, conductivity, depth, and turbidity sensors are calibrated using the following standards purchased from YSI (except depth): pH 7 and 10, conductivity standards of 50 mS/cm, respectively, and depth of 0. Turbidity standard of 123 NTU is purchased from YSI.

5) Site Location and Character

Kachemak Bay is located approximately 200 kilometers south of Anchorage, on the western shore of the Kenai Peninsula. Kachemak Bay, at 59.6º N and 151.5º W, is a temperate regional fjord with hydrographic conditions unique among the NERR system estuaries. The tidal range of 8 meters is among the largest in the world, and salinity ranges from near zero at stream mouths to 33.0 PSU at the entrance to the inner Bay. The bay is 35 kilometers wide at its mouth and approximately 57 kilometers long. The head of Kachemak Bay is located to the northeast at the Fox River Flats, and the mouth lies to the southwest, along a line between Anchor Point and Point Pogibshi. The 6 kilometer long Homer Spit that extends into the Bay from the northern shoreline splits Kachemak Bay into inner and outer bays. The Kachemak Bay NERR comprises the entire inner Bay and the outer Bay. Water flows between the inner and outer Bays through a narrow opening formed between the Spit and the southern shoreline. The Bay has an average depth of 45 meters, and a maximum of 200 m. Fresh water introduced primarily by the Fox, Bradley, and Martin Rivers and Sheep Creek at the head of the Bay, flows along the northwest shore of the inner Bay.

The Homer YSI data logger site is located on the north side of Kachemak Bay at 59.6028ºN and 151.4081ºW. The "deep" sonde is deployed at a depth 1 meter from the bottom, in water fluctuating between 8.0 and 17.0 meters. The "surface" data sonde is deployed at a nominal depth of 1 meter. The bottom habitat is predominantly sand. Pollutants in the area are from the excessive boat traffic at the entrance of the Homer

harbor, and a nearby fish waste outfall line. Throughout the year, salinity has ranged from 20.5 to 31.7 ppt, as the instrument's location in the stratified water column is dependent on tide height, with a tidal range of 8.1m. It is predominately an estuarine environment during summer months when glacial runoff is highest, and during the winter months it reverts to a more marine-like system with glacial runoff at a minimum.

The Seldovia YSI data logger site is located on the south side of Kachemak Bay at 59.4413ºN, 151.7186ºW, approximately 24 kilometers west of the Homer site. As with the Homer site, the data loggers are situated on the ferry terminal dock, with one instrument 1 meter below the surface, and one 1 meter above the bottom, in water fluctuating between 5.0 and 13.3 meters. The access to Seldovia is limited to boat or air, as the site is located off the highway system. The bottom habitat is predominantly rocky substrate. Pollutants in the area are minimal. Throughout the year, salinity has ranged from 25.0 to 32.9 ppt at this site with a tidal range of 8.0m.

6) Data Collection Period

Monitoring at the Homer Deep site was continuous throughout 2006. The remaining three sites have gaps in their datasets for various reasons (see section 13, "Missing Data," for details). Deployment and retrieval dates and times for 2006 are listed below:

Began	Ended	Sonde	Comments
a) Homer Deep			
12/07/05, 09:30	01/11/06, 11:00	Nautilus	
01/11/06, 11:30	02/09/06, 10:15	Cortez	Small octopus in guard
02/09/06, 10:30	03/09/06, 11:30	Nautilus	
03/09/06, 11:45	04/14/06, 08:15	Cortez	
04/14/06, 08:45	05/18/06, 09:15	Vitus	
05/18/06, 09:45	06/20/06, 08:45	Neptune	
06/20/06, 09:00	07/20/06, 09:15	Nautilus	
07/20/06, 09:30	08/17/06, 09:45	Neptune	
08/17/06, 10:00	09/22/06, 07:45	Nansen	
09/22/06, 08:00	10/17/06, 07:45	Neptune	
10/17/06, 08:15	10/24/06, 08:00	Nautilus	
10/24/06, 08:30	11/13/06, 10:15	Neptune	
11/13/06, 10:30	12/14/06, 09:15	Nautilus	
12/14/06, 09:30	01/17/07, 08:00	Vitus	
b) Homer Surface			
03/09/06, 11:45	04/14/06, 08:30	Amundsen	Sonde fell to the bottom early in deployment
04/14/06, 08:45	05/18/05, 09:00	Kozloff	
05/18/06, 09:30	06/20/06, 08:30	Amundsen	Heavy barnacle and algae fouling of sonde and probes
06/20/06, 09:15	07/20/06, 09:00	Zeus	Heavy barnacle fouling of

			sonde and probes
07/20/06, 09:30	08/17/06, 09:35	Amundsen	Moderate barnacle and algae fouling of sonde and probes
08/17/06, 09:45	09/22/06, 07:30	Cortez	Moderate bryozoan fouling of sonde and probes
09/22/06, 08:00	10/17/06, 07:30	Calypso	Light barnacle fouling of sonde; turbidity probe lost wiper, optics fouled
10/17/06, 08:45	11/13/06, 09:45	Cortez	Light algal fouling of sonde, probes
11/13/06, 10:15	11/15/06, 11:00	Calypso	Sonde removed due to icing
c) Seldovia Deep			
01/17/06, 15:00	02/08/06, 10:45	Nautilus	
02/08/06, 11:15	03/10/06, 10:00	Nansen	
03/10/06, 10:15	04/13/06, 09:45	Nautilus	
04/13/06, 10:15	05/19/06, 08:15	Nansen	
05/19/06, 09:45	06/19/06, 09:00	Nautilus	
06/19/06, 10:30	07/21/06, 09:45	Vitus	
07/21/06, 10:15	08/17/06, 13:45	Nautilus	
08/17/06, 14:15	09/21/06, 09:45	Vitus	
09/21/06, 10:15	10/16/06, 08:45	Nautilus	
10/16/06, 09:15	11/20/06, 10:15	Vitus	
11/20/06, 10:30	12/28/06, 13:45	Neptune	
12/28/06, 15:30	01/16/07, 10:45	Amundsen	
d) Seldovia Surface			
12/08/05, 11:00	01/12/06, 09:45	Kozloff	
01/12/06, 10:15	02/08/06, 10:45	Amundsen	Light algal fouling of sonde
02/08/06, 11:15	03/10/06, 09:30	Calypso	Light bryozoan fouling of sonde, guard
03/10/06, 10:15	04/13/06, 09:45	Kozloff	Moderate algal fouling of sonde and probes
04/13/06, 10:00	05/19/06, 09:30	Calypso	Sonde not turned on
05/19/06, 09:45	06/19/06, 09:00	Kozloff	Moderate algal/barnacle fouling of sonde and probes
06/19/06, 10:30	07/21/06, 09:45	Calypso	Light barnacle/algae fouling of sonde and probes
07/21/06, 10:15	08/17/06, 13:45	Zeus	Light algal and nudibranch egg cluster fouling of sonde and probes
08/17/06, 14:15	09/21/06, 09:45	Calypso	Sonde stopped working 9/02, started up and ran intermittently again 9/16
09/21/06, 10:15	10/16/06, 08:45	Zeus	
10/16/06, 09:15	11/20/06, 10:00	Amundsen	Light algal fouling of sonde,

		probes
11/20/06, 10:15	12/13/06, 14:15	Cortez
12/13/06, 14:45	01/16/07, 10: 45	Nansen

7) Distribution

According to the Ocean and Coastal Resource Management Data Dissemination Policy for the NERRS System-wide Monitoring Program, NOAA/ERD retains the rights to analyze, synthesize and publish summaries of the NERRS System-wide Monitoring Program data. The PI retains the right to be fully credited for having collected and processed the data. Following academic courtesy standards, the PI and NERR site where data were collected will be contacted and fully acknowledged in any subsequent publications in which any part of the data are used. Manuscripts resulting from this NOAA/OCRM supported research that are produced for publication in open literature, including refereed scientific journals, will acknowledge that the research was conducted under an award from the Estuarine Reserves Division, Office of Oceanic and Atmospheric Administration. The data set enclosed within this package/transmission is only as good as the quality assurance and quality control procedures outlined by the enclosed metadata reporting statement. The user bears all responsibility for its subsequent use/misuse in any further analyses or comparisons. The Federal government does not assume liability to the Recipient or third persons, nor will the Federal government reimburse or indemnify the Recipient for its liability due to any losses resulting in any way from the use of this data.

NERR water quality data and metadata can be obtained from the Research Coordinator at the individual NERR site, from the Data Manager at the Centralized Data Management Office (please see personnel directory under the general information link on the CDMO home page), and online at the CDMO home page http://cdmo.baruch.sc.edu. Data are available in text tab-delimited format, Microsoft Excel spreadsheet format, and comma-delimited format.

8) Associated Researchers and Projects

The USGS, in conjunction with KBBR and the City of Homer, is conducting a sediment transport monitoring program at Munson Point in Homer. This study uses an ARGUS camera array that collects hourly images of the beach area each day. To better understand the forces associated with the sediment transport, a wave gauge is moored in 3 m MLLW of water. More information about this project can be found at http://zuma.nwra.com/homer/.

The data is being combined with hydrographic survey data to examine water exchange between Kachemak Bay and Lower Cook Inlet. The sonde data provides the temporal context while the survey data provides the spatial information.

II. Physical Structure Descriptors

9) Sensor Specifications:

YSI 6600/YSI 6600EDS data logger

Parameter: Temperature
Units: Celsius (C)
Sensor Type: Thermistor
Model #: 6560
Range: -5 to 45 °C
Accuracy: +/-0.15 °C
Resolution: 0.01 °C

Parameter: Conductivity
Units: milli-Siemens per cm (mS/cm)
Sensor Type: 4-electrode cell with autoranging
Model #: 6560
Range: 0 to 100 mS/cm
Accuracy: +/-0.5% of reading + 0.001 mS/cm
Resolution: 0.001 mS/cm to 0.1 mS/cm (range dependent)

Parameter: Salinity
Units: parts per thousand (ppt)
Sensor Type: Calculated from conductivity and temperature
Range: 0 to 70 ppt
Accuracy: +/- 1.0% of reading or 0.1 ppt, whichever is greater
Resolution: 0.01 ppt

Parameter: Dissolved Oxygen % saturation
Units: percent air saturation (%)
Sensor Type: Rapid Pulse – Clark type, polarographic
Model #: 6562
Range: 0 to 500 % air saturation
Accuracy: 0-200 % air saturation, +/- 2 % of the reading or 2 % air saturation, whichever is greater; 200-500 % air saturation, +/- 6 % of the reading
Resolution: 0.1 % air saturation

Parameter: Dissolved Oxygen mg/L (Calculated from % air saturation, temperature and salinity)
Units: milligrams per Liter (mg/L)
Sensor Type: Rapid Pulse – Clark type, polarographic
Model #: 6562
Range: 0 to 50 mg/L
Accuracy: 0 to 20 mg/L, +/- 2 % of the reading or 0.2 mg/L, whichever is greater; 20 to 50 mg/L, +/- 6 % of the reading
Resolution: 0.01 mg/L

Parameter: Vented Level – Deep (Depth)

Units: feet or meters (ft or m)
Sensor Type: Stainless steel strain gauge
Range: 0 to 656 ft (200 m)
Accuracy: +/- 1 ft (0.3 m)
Resolution: 0.001 ft (0.001 m)

Parameter: pH
Units: units
Sensor Type: Glass combination electrode
Model #: 6561
Range: 0 to 14 units
Accuracy: +/- 0.2 units
Resolution: 0.01 units

Parameter: Turbidity
Units: nephelometric turbidity units (NTU)
Sensor Type: Optical, 90 ° scatter, with mechanical cleaning
Model #: 6136
Range: 0 to 1000 NTU
Accuracy: +/- 5 % reading or 2 NTU (whichever is greater)
Resolution: 0.1 NTU

The reliability of the dissolved oxygen (DO) data after 96 hours post-deployment for non-EDS (Extended Deployment System) data sondes may be problematic due to fouling which forms on the DO probe membrane during some deployments (Wenner et al. 2005). Many reserves have upgraded to YSI 6600 EDS data sondes, which increase DO accuracy and longevity by reducing the environmental effects of fouling. The user is therefore advised to consult the metadata and to exercise caution when utilizing the DO data beyond the initial 96-hour time period. However, this potential drift is not always problematic for some uses of the data (i.e., periodicity analysis). It should be noted that the amount of fouling is site specific and that not all data are affected. The Research Coordinator at the specific NERR site should be contacted concerning the reliability of the DO data because of the site and seasonal variation in the fouling of the DO sensor. A mixture of EDS and non-EDS sondes is used at KBNERR.

The NERR System-Wide Monitoring Program utilizes YSI data sondes that can be equipped with either depth or water level sensors. Both sensors measure water depth, but by convention, level sensors refer to atmospherically vented measurements and depth refers to non-vented measurements. Readings for both vented and non-vented sensors are automatically compensated for water density change due to variations in temperature and salinity; but for all non-vented depth measurements, changes in atmospheric pressure between calibrations appear as changes in water depth. The error is equal to approximately 1.03 cm for every 1 millibar change in atmospheric pressure, and is eliminated for level sensors because they are vented to the atmosphere throughout the deployment time interval.

Beginning in 2006, NERR SWMP standard calibration protocol calls for all non-vented depth sensors to read 0 meters at a (local) barometric pressure of 1013.25 mb (760 mm/hg). To achieve this, each site calibrates their depth sensor with a depth offset number, which is calculated using the actual atmospheric pressure at the time of calibration and the equation provided in the SWMP calibration sheet or Digital Calibration Log. This offset procedure standardizes each depth calibration for the entire NERR System. If accurate atmospheric pressure data are available, non-vented sensor depth measurements at any NERR site can be corrected. The Research Coordinator at the specific NERR site should be contacted in order to obtain information regarding atmospheric pressure data availability. All sensors used at KBNERR are depth sensors.

10) Coded variable indicator and variable code definitions
File name definitions: Reserve/deployment site/file definition/year
(ex: kacsswq2004 = Seldovia surface water quality data from 2004).

Sampling station:	Sampling site code:	Station code:
Homer Surface	HS	kachswq
Homer Deep	HD	kachdwq
Seldovia Surface	SS	kacsswq
Seldovia Deep	SD	kacsdwq

11) Anomalous/Suspect Data

Outliers in the data are defined to be any point greater than 4 standard deviations from the mean of the 12-hour period surrounding that point.

Although surface sondes are nominally positioned at 1m water depth, on occasion they have become temporarily caught on dock projections during deployment, and are submerged with the rising tide. This results in a short data series where water deeper than 1m has been sampled. Since the sondes are functioning normally, these data have been left in the record.

Turbidity outliers are most commonly related to fish and invertebrates within the sonde guard, and these data have been deleted from the record (see section 12, Deleted Data).

Between sonde rotations we typically encounter the following jumps in data as a result of calibration offsets and probe accuracy:

pH:	+/- 0.02
DO %:	+/- 10
DO Conc:	+/- 1 mg/l

January 1-31, 2006

Homer Deep

Dissolved Oxygen (percent and concentration) are suspect for the period of 1/1/2006 00:00 – 1/11/2006 11:00. It appears that the DO membrane was leaky, possibly through the O-ring.

The pH probe deployed at this site beginning 01/11/2006: 11:30 had low post-calibration values and mV readings that were out of range. All pH data collected during this deployment (ending 02/08/2006: 10:15) should be considered suspect.

Additionally, the following first readings for the 1/11 deployment were recorded and are suspicious:

a) DO Percent Outlier: 01/11/2006: 11:30.
b) DO Conc Outlier: 01/11/2006: 11:30.

Turbidity data are erratic and suspect for the period of 1/22/2006 12:30 – 1/23/2006 10:00.

Seldovia Surface

a) DO Percent Outlier: 01/08/2006: 14:45, 01/11/2006: 20:45.
b) DO Conc Outlier: 01/08/2006: 14:45, 01/11/2006: 20:45, 01/15/2006: 22:00.

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February 1-28, 2006

Homer Deep

The sonde deployed at this site beginning 01/11/2006: 11:30 had low pH post-calibration values and pH mV readings that were out of range. All pH data collected during this deployment (ending 02/08/2006: 10:15) should be considered suspect.

Additionally, the following were recorded and are suspicious:

a) DO Percent Outlier: 02/01/2006: 22:30.
b) DO Conc Outlier: 02/01/2006: 22:30.

Seldovia Deep

a) DO Percent Outlier: 02/10/2006: 18:30, 02/21/2006: 07:30, 09:30.
b) DO Conc Outlier: 02/10/2006: 18:30, 02/21/2006: 07:30.

DO data are suspect from 2/8/2006 11:15 – 3/10/2006 10:00. Readings for this entire deployment are markedly lower than the preceding and following deployments. Post-cal reading was 89.4.

Seldovia Surface

a) DO Percent Outlier: 02/08/2006: 11:15.
b) DO Conc Outlier: 02/08/2006: 11:15.

March 1-31, 2006

Homer Deep

The pH probe deployed at this site beginning 03/09/2006: 12:00 reported low post-calibration values and mV out of range. In addition, DO measurements are erratic and unrealistic at times throughout this deployment. All DO and pH data from this point until the end of the deployment (04/14/2006: 08:15) are suspicious.

Seldovia Deep

DO data are suspect from 2/8/2006 11:15 – 3/10/2006 10:00. Readings for this entire deployment are markedly lower than the preceding and following deployments. Post-cal reading was 89.4.

April 1-30, 2006

Homer Deep

The pH probe deployed at this site beginning 03/09/2006: 12:00 reported low post-calibration values and mV out of range. In addition, DO measurements are

erratic and unrealistic at times throughout this deployment. All DO and pH data from this point until the end of the deployment (04/14/2006: 08:15) are suspicious.

Seldovia Deep

DO data are suspect from 4/21/2006 00:00 thru 4/23/2006 at 09:30 when DO data for the rest of the deployment were deleted. Possible leaky membrane/faulty O-ring. In addition, the following DO records are considered suspicious:

a) DO Percent Outlier: 04/01/2006: 11:30.
b) DO Conc Outlier: 04/01/2006: 11:30.

May 1-31, 2006

Homer Deep

Beginning around 05/26/2006: 05:45 and continuing until the end of the deployment at 06/20/2006: 08:45, DO data drifts downward and is considered suspicious.

Homer Surface

Remaining Turbidity data from 5/18/2006 09:30 thru 06/20/2006 08:30 are suspect. Numerous negative readings were recorded (and deleted) during this time, they may be indicative of a bad calibration.

DO data are suspect from 5/18/2006 09:30 thru 6/20/2006 08:30, readings are elevated and the post-cal reading was very low (23.8).

Seldovia Deep

The following record immediately followed a maintenance event where the sonde was out of the water:

DO Conc Outlier: 05/24/2006: 11:00.

Seldovia Surface

a) DO Percent Outlier: 05/19/2006: 09:45.
b) DO Conc Outlier: 05/19/2006: 09:45.

Turbidity data beginning 5/27/2006 10:00 thru 6/11/2006 05:15 are suspect. Numerous spikes in the data occurred over this time frame and were deleted, but the cause was unknown and the remaining data should be considered suspect as a result.

June 1-30, 2006

Homer Deep

Beginning around 05/26/2006: 05:45 and continuing until the end of the deployment at 06/20/2006: 08:45, DO data drifts downward and is considered suspicious. During the deployment that began 06/20/2006: 09:00, DO values declined soon after the deployment began. Values began to be consistently unrealistic around 06/24/2006: 1:15. All DO data from the beginning of the deployment until this point should be considered suspicious, and all DO data from this point until the end of the deployment at 07/20/2006: 09:15 have been deleted.

a) DO Percent Outlier: 06/12/2006: 08:00.
b) DO Conc Outlier: 06/01/2006: 11:30, 06/12/2006: 08:00.

Seldovia Deep

Turbidity data are suspect from 6/04/2006 21:00 thru 06/19/2006 09:00 (end of deployment). Previous data were deleted due to frequent high readings, but sensor

seemed to correct itself on 6/4, the post-cal values were fine and there were no apparent fouling issues.

a) DO Percent Outlier: 06/08/2006: 17:45.
b) DO Conc Outlier: 06/08/2006: 17:45.

Homer Surface

Remaining Turbidity data from 5/18/2006 09:30 thru 06/20/2006 08:30 are suspect. Numerous negative readings were recorded (and deleted) during this time, they may be indicative of a bad calibration.

DO data are suspect from 5/18/2006 09:30 thru 6/20/2006 08:30, readings are elevated and the post-cal reading was very low (23.8).

July 1-31, 2006

Homer Deep

During the deployment that began 06/20/2006: 09:00, DO values declined soon after the deployment began. Values began to be consistently unrealistic around 06/24/2006: 1:15. All DO data from the beginning of the deployment until this point should be considered suspicious, and all DO data from this point until the end of the deployment at 07/20/2006: 09:15 have been deleted.

a) DO Percent Outlier: 07/26/2006: 08:45.
b) DO Conc Outlier: 07/26/2006: 08:45.
c) pH Outlier: 07/01/2006: 11:45, 07/23/2006: 07:15, 07/26/2006: 08:45, 19:30.

Homer Surface

a) DO Percent Outlier: 07/06/2006: 04:45.
b) DO Conc Outlier: 07/06/2006: 04:30 - 04:45.

Seldovia Deep

DO Conc Outlier: 07/10/2006: 20:15.

Seldovia Surface

Turbidity data are anomalous beginning around 7/05/2006 thru 7/21/2006 09:45 (end of deployment). Readings began drifting upward for an unknown reason and all values >400 NTU were deleted from the regard. The remaining data should be considered suspect.

August 1-31, 2006

Homer Deep

Remaining Turbidity data beginning 8/17/2006 at 20:45 thru 9/22/2006 at 07:45 are suspect. Frequent high turbidity values were reported during this time frame and all readings >400 were deleted.

Homer Surface

Beginning around 07/31/2006: 16:00, pH values begin to become markedly noisy. Although the noise begins to mellow somewhat about 08/09/2006: 19:00, the probe registered unstable values for pH and pH mV upon post-calibration. Once the probe was cleaned, however, readings stabilized and were normal. Because these noisy readings were likely caused by fouling, all pH data from 07/31/2006:16:00 until the end of the deployment at 08/17/2006: 09:30 should be considered suspicious.

Seldovia Deep

DO data are suspect from 8/9/2006 22:45 thru 8/17/2006 13:45. Readings steadily decline over this period, potentially indicating a leaky membrane or faulty O-ring. In addition the following readings are suspect:

a) DO Percent Outlier: 08/01/2006: 00:15, 08/07/2006: 06:45, 08/08/2006: 08:00.
b) DO Conc Outlier: 08/01/2006: 00:15, 08/07/2006: 06:45, 08/08/2006: 08:00.

Seldovia Surface

a) DO Percent Outlier: 08/17/2006: 14:15.
b) DO Conc Outlier: 08/17/2006: 14:15.

September 1-30, 2006

Homer Deep

Remaining Turbidity data beginning 8/17/2006 at 20:45 thru 9/22/2006 at 07:45 are suspect. Frequent high turbidity values were reported during this time frame and all readings >400 were deleted.

a) DO Percent Outlier: 09/21/2006: 08:30.
b) DO Conc Outlier: 09/21/2006: 08:30.

Seldovia Deep

Throughout the deployment beginning 09/21/2006: 10:00 and ending 10/16/2006: 09:00, DO values gradually decreased. No problems were noted with the DO membrane, but DO data collected during this time period are probably increasingly inaccurate and all should be considered suspicious.

October 1-31, 2006

Homer Deep

a) DO Percent Outlier: 10/05/2006: 05:45 - 06:00, 10/12/2006: 02:30, 10/13/2006: 04:00.
b) DO Conc Outlier: 10/05/2006: 05:45 - 06:00, 10/12/2006: 02:30, 10/13/2006: 04:00.

Seldovia Deep

Throughout the deployment beginning 09/21/2006: 10:00 and ending 10/16/2006: 09:00, DO values gradually decreased. No problems were noted with the DO membrane, but DO data collected during this time period are probably increasingly inaccurate and all should be considered suspicious.

November 1-30, 2006

Homer Deep

a) DO Percent Outlier: 11/05/2006: 19:15 - 19:30, 11/10/2006: 12:00, 11/21/2006: 20:00, 21:15.
b) DO Conc Outlier**:** 11/05/2006: 19:15 - 19:30, 11/21/2006: 21:15.

Homer Surface

a) DO Conc Outlier: 11/14/2006: 10:30.

DO data are suspect from 11/1/2006 at 00:00 thru 11/13/2006 10:15. There appears to have been a leaky membrane or faulty O-ring, readings decrease beginning on 11/1 thru the end of the deployment.

Seldovia Deep

a) DO Percent Outlier: 11/13/2006: 00:15.

b) DO Conc Outlier: 11/13/2006: 00:15.

Seldovia Surface

From 11/04/2006: 06:30 to 11/07/2006: 16:15, a drop in salinity values was recorded. These values are realistic and consistent with intrusion of a fresher water mass, although they were not accompanied by an expected coinciding change in temperature. As such, the salinity/conductivity values enclosed therein are considered suspicious, as are the following:

DO Conc Outlier: 11/03/2006: 19:15, 11/09: 23:45 - 11/10: 00:00.

December 1-31, 2006

Homer Deep

Remaining turbidity data are suspect beginning 12/14/2006 at 09:30 thru 12/16/2006 09:45. Frequent spikes occurred during this period and all reading s>400 were deleted. Data appear fine after 12/06, possibly an animal in the guard.

a) DO Percent Outlier: 12/20/2006: 20:45 - 21:00, 12/24/2006: 11:30, 12/25/2006: 00:00 - 00:15.
b) DO Conc Outlier: 12/04/2006: 19:45, 12/20/2006: 20:45 - 21:00, 12/24/2006: 11:30, 12/25/2006: 00:00 - 00:15.

Seldovia Surface

Throughout the deployment beginning 12/14/2006 13:45 frequent high turbidity spikes were present in the data. There were numerous wiper parking difficulties during this time, prior to the firmware upgrade supplied by Mike Lizotte of YSI. All readings >400 were deleted and the remaining data are suspect thru the end of the year.

a) DO Percent Outlier: 12/03/2006: 19:45.
b) DO Conc Outlier: 12/03/2006: 19:45.

Seldovia Deep

DO% data begin to drift downward at around 12/16/2006: 12:45 and probably become increasingly inaccurate beyond this point until the end of the deployment at 12/28/2006: 13:45. These data should be considered suspicious.

12) Deleted Data

January 1-31, 2006

Homer Deep

Sondes were out of the water during the swap at 01/11/2006: 11:15.

Beginning at 01/23/2006: 10:15 and persisting throughout the deployment ending 02/09/2006: 10:15, frequent turbidity spikes were reported. A small octopus was found in the guard upon retrieval of the sonde; however, anomalous values were repeatedly reported during post-calibration, and the probe was returned to YSI for repairs. All turbidity data in this time period have been deleted from the record.

Additionally, the following records have been deleted:

a) High Turbidity: 01/11/2006: 13:00, 15:15.
b) Turbidity Outlier: 01/13/2006: 20:00, 01/14/2006: 20:15, 22:15.
c) DO Percent Out of Range: 01/03/2006: 23:15, 23:45, 01/04/2006: 05:30, 01/07/2006: 14:00, 01/11/2006: 10:15.

Seldovia Surface

Sondes were out of the water during the swap at 01/12/2006: 10:00 and during site maintenance from 01/17/2006: 14:30 - 14:45. All data corresponding to these time periods have been deleted.

February 1 – 28, 2006

Homer Deep

Beginning with 01/23/2006: 10:15 and persisting throughout the deployment ending 02/09/2006: 10:15, frequent high turbidity spikes were reported. A small octopus was found in the guard upon retrieval of the sonde; however, anomalous values were repeatedly reported during post-calibration, and the probe was returned to YSI for repairs. All turbidity data in this time period have been deleted from the record.

Seldovia Deep

Sondes were out of the water during the swap at 02/08/2006: 11:00.

Seldovia Surface

Sondes were out of the water during the swap at 02/08/2006: 11:00.

March 1-31, 2006

Homer Deep

Sondes were out of the water during the swap at 03/09/2006: 11:45.

Turbidity Outlier: 03/09/2006: 12:00.

Seldovia Deep

Turbidity Outlier: 03/02/2006: 10:30, 15:45, 03/04/2006: 21:15.

Seldovia Surface

Sondes were out of the water during the swap at 03/10/2006: 09:45 - 10:00.

April 1-30, 2006

Homer Deep

Sondes were out of the water during the swap at 04/14/2006: 08:30.

Turbidity Outlier: 04/10/2006: 19:15, 04/14/2006: 08:45.

Homer Surface

a) High Turbidity: 04/25/2006: 14:45, 04/26/2006: 23:00.
b) Turbidity Outlier: 04/24/2006: 14:15, 04/26/2006: 09:15, 04/27/2006: 03:15, 15:30, 04/29/2006: 12:00, 04/30/2006: 23:15.

Seldovia Deep

DO values begin to drift downward to unrealistic values from about 04/23/2006: 09:45 until the end of the deployment at 05/19/2006: 08:15. The probe failed the hi-lo test post-calibration. All DO data within this time period have been deleted.

The sonde deployed at this site was out of the water during the swap at 04/13/2006: 10:00 and site maintenance operations at 04/14/2006: 10:45. These records have been deleted. Additionally, the following records have been deleted:

High Turbidity: 04/23/2006: 23:30, 04/24/2006: 00:30, 04/27/2006: 23:45, 04/28/2006: 10:30.

Seldovia Surface

Turbidity Outlier: 04/08/2006: 19:00.

May 1-31, 2006

Homer Deep

Sondes were out of the water during the swap at 05/18/2006: 09:30. Additionally, the following record has been deleted:

High Turbidity: 05/30/2006: 04:00.

Homer Surface

Sondes were out of the water during the swap at 05/18/2006: 09:15. Additionally, the following records have been deleted:

a) High Turbidity: 05/01/2006: 08:30, 05/03/2006: 10:45, 18:15, 19:30, 05/08/2006: 00:15, 05/10/2006: 04:30, 05/12/2006: 10:15, 05/13/2006: 05:30, 07:00, 05/14/2006: 06:00, 05/16/2006: 00:15, 07:45, 08:15, 17:00, 05/17/2006: 16:00, 05/18/2006: 05:30.
b) Turbidity Outlier: 05/02/2006: 15:00, 05/04/2006: 14:45, 05/05/2006: 09:00, 05/06/2006: 06:45, 05/08/2006: 15:00, 05/09/2006: 14:15, 05/10/2006: 15:30, 05/15/2006: 09:00.
c) Negative Turbidity was recorded repeatedly during the deployment beginning 05/18/2006: 09:30 and through the end of the deployment on 6/20/2006 at 08:30. These values have been deleted from the record.

Seldovia Deep

DO values begin to drift downward to unrealistic values from about 04/23/2006: 09:45 until the end of the deployment at 05/19/2006: 08:15. The probe failed the hi-lo test post-calibration. All DO data within this time period have been deleted.

All data collected at this site from 05/19/2006: 08:30 - 09:30 and at 05/24/2006: 10:45 have been deleted as the sonde was out of the water for the swap or site maintenance during these periods.

During the deployment beginning 05/19/2006: 09:45, frequent high turbidity spikes were reported through the end of May and into June (see June, below, for details). All turbidity data recorded from 05/19/2006: 09:45 through 05/31/2006 have been deleted. In addition to those values encompassed by the time period above, the following records have been deleted:

High Turbidity: 05/02/2006: 12:45, 05/03/2006: 06:00, 05/04/2006: 05:15, 07:00, 12:30, 05/05/2006: 00:30, 10:45, 05/07/2006: 18:30, 05/08/2006: 09:00, 12:15, 05/09/2006: 20:45, 05/11/2006: 04:00, 08:45, 05/13/2006: 06:15, 10:30, 13:00, 05/14/2006: 07:30, 09:15, 09:45, 15:30, 18:45, 23:45, 05/15/2006: 00:15, 07:30, 05/16/2006: 05:00, 07:30, 12:30, 05/17/2006: 01:45, 12:30, 05/19/2006: 07:15.

Seldovia Surface

All data collected at this site from 05/19/2006: 08:30 - 09:30 and at 05/24/2006: 10:45 have been deleted as the sonde was out of the water for site maintenance during these periods.

At 05/22/2006: 06:15, the pH probe apparently failed. All pH data collected from this point until the end of the deployment at 06/19/2006: 09:00 have been deleted from the record.

From 05/27/2006: 10:00 until 06/11/2006: 05:15, a number of high turbidity spikes were recorded. Those values >400 NTU have been deleted from the record

and, as we are unable to determine the reason for the spikes, the remainder of the turbidity data encompassed therein should be considered suspicious.

June 1-30, 2006

Homer Deep

Soon after the beginning of the deployment that began 06/20/2006: 09:00, DO values began to decline. Values began to be consistently unrealistic around 06/24/2006: 1:15. All DO data from this point until the end of the deployment at 07/20/2006: 09:15 have been deleted. Additionally, the following have been deleted:

Turbidity Outlier: 06/16/2006: 10:00, 06/20/2006: 09:00, 06/29/2006: 08:30.

Homer Surface

Sondes were out of the water during the swap at 06/20/2006: 08:45 - 09:00.

At approximately 06/14/2006: 03:15, the pH probe deployed at this site apparently failed, with noisy readings reported and problems apparent at post-calibration. All pH data from this point until the end of the deployment at 06/20/2006: 08:30 have been deleted from the record.

a) Negative Turbidity was repeatedly recorded throughout the deployment ending 06/20/2006: 08:30. This was probably due to a bad calibration, and these data have been deleted from the record.
b) Turbidity Outlier: 06/06/2006: 16:30, 19:00, 06/08/2006: 03:00, 06/12/2006: 21:45, 06/13/2006: 11:00, 13:15, 06/14/2006: 17:15, 06/15/2006: 14:30, 06/16/2006: 13:45.

Seldovia Deep

Sondes were out of the water during the swap at 06/19/2006: 09:15 - 10:15.

High turbidity readings were very frequently reported during the deployment beginning 05/19/2006 at 09:45. These readings began to be increasingly sporadic and more typical beginning 06/04/2006: 21:00. Post-calibration values were fine, and there were no fouling issues apparent; these readings may have been the result of an animal inside the guard during this time. All turbidity data within this time period (5/19/2006 09:45 – 06/04/2006 20:45) have been deleted from the record, and the remainder of the turbidity data from this deployment (06/04/2006: 21:00 – 06/19/2006: 09:00) should be considered suspicious. Additionally, the following records have also been deleted:

a) High Turbidity: 06/06/2006: 15:00, 17:45, 20:00, 06/07/2006: 06:30, 11:00, 21:15, 06/08/2006: 03:45, 07:30, 12:45, 13:30, 14:15, 19:15, 06/09/2006: 00:15, 04:00, 04:30, 05:15, 07:45, 10:15, 11:30, 14:00, 18:45, 06/10/2006: 04:15, 06/11/2006: 06:45, 07:15, 06/12/2006: 05:30, 17:15, 19:00, 06/13/2006: 04:45, 05:15, 06:45, 07:15, 08:45, 10:00, 11:15, 19:15, 06/14/2006: 05:45, 14:00, 06/15/2006: 03:45, 06/16/2006: 19:45, 06/17/2006: 11:15.
b) Turbidity Outlier: 06/28/2006: 08:00, 08:45.

Seldovia Surface

Sondes were out of the water during the swap at 06/19/2006: 09:15 - 10:15.

The pH probe apparently failed at 05/22/2006: 06:15 and all pH data have been deleted from this point until 06/19/2006:09:00, the end of the affected deployment. Additionally, the following record has been deleted:

Turbidity Outlier: 06/15/2006: 23:15.

July 1-31, 2006

Homer Deep

During the deployment that began 06/20/2006: 09:00, DO values declined soon after the deployment began. Values began to be consistently unrealistic around 06/24/2006: 1:15. All DO data from this point until the end of the deployment at 07/20/2006: 09:15 have been deleted. Additionally, the following have been deleted:

a) High Turbidity: 07/15/2006: 03:15, 06:30, 07/22/2006: 22:30, 07/24/2006: 02:15.
b) Turbidity Outlier: 07/01/2006: 13:15, 07/18/2006: 01:30, 23:00, 07/26/2006: 08:15.

Homer Surface

Sondes were out of the water during the swap at 07/20/2006: 09:15. Additionally, the following have been deleted:

a) High Turbidity: 07/03/2006: 20:45, 23:15, 07/04/2006: 00:15, 07/05/2006: 05:15, 08:45, 09:45, 15:30, 16:15, 23:30, 07/06/2006: 00:30, 02:45, 03:30, 06:30, 20:45, 07/07/2006: 08:15, 11:45, 19:30, 22:30, 07/08/2006: 01:45, 07:00, 11:15, 13:00, 07/10/2006: 03:15, 07/14/2006: 11:15.
b) Turbidity Outlier: 07/03/2006: 06:30, 07/09/2006: 08:00, 08:45, 07/25/2006: 21:00.

Seldovia Deep

Sondes were out of the water during the swap at 07/21/2006: 10:00.

Turbidity Outlier: 07/30/2006: 13:00.

Seldovia Surface

Sondes were out of the water during the swap at 07/21/2006: 10:00.

Beginning around 07/05/2006, turbidity values began to creep upwards and become anomalous. All values >400 NTU have been deleted from the record. As we were unable to determine the cause of this drift, all turbidity data from this point until the end of the deployment (07/21/2006: 09:45) should be considered suspicious. In addition to those specified above, the following records have been deleted:

Turbidity Outlier: 07/15/2006: 17:15, 07/16/2006: 10:00.

August 1-31, 2006

Homer Deep

The temperature/conductivity probe apparently failed at 08/12/2006: 09:45, and all data collected from this point until the next deployment (08/17/2006 at 10:00) have been deleted from the record.

Beginning at 08/17/2006:20:45, frequent high turbidity readings were reported through the end of the deployment on 09/22/2006: 07:45. The probe post-calibrated fine, there were no fouling issues, and the next time this sonde/probe combination was deployed there were no problems. Much of the turbidity data during this deployment have been deleted (>400 NTU), but the remainder encompassed by the date and time combinations above should be considered suspicious.

Additionally, the following records have been deleted:

a) Turbidity Outlier: 08/30/2006: 00:15, 19:15, 08/31/2006: 23:00.
b) DO Percent Out of Range: 08/06/2006: 05:00 - 07:00, 07:30.

Homer Surface

a) High Turbidity: 08/04/2006: 12:45, 13:15, 08/05/2006: 02:30, 08/23/2006: 03:15, 04:30, 08:30, 08/24/2006: 00:45, 01:30, 03:45, 04:15, 09:15, 11:45, 14:30, 20:45, 08/25/2006: 03:00, 10:30, 11:15, 13:15, 14:30, 15:15, 16:30, 18:00, 08/26/2006: 01:30, 03:15, 04:30, 05:15, 05:45, 06:15, 08:45, 12:15, 14:30, 15:00, 15:30, 17:00, 17:30, 20:15, 20:45, 22:00, 23:15, 08/27/2006: 03:45, 04:15, 06:45, 07:30, 10:15, 12:30, 14:45, 15:45, 17:15, 17:45, 08/28/2006: 00:00, 01:00, 02:30, 07:15, 08:00, 08:45, 10:45, 12:00, 19:15, 23:00, 23:45, 08/29/2006: 05:00.
b) Turbidity Outlier: 08/11/2006: 21:00.

Seldovia Deep

Sondes were out of the water during the swap at 08/17/2006: 14:00.

Beginning at 08/19/2006:10:45, frequent high turbidity readings were reported through the end of the deployment on 09/21/2006: 09:45. The probe post-calibrated fine and there were no fouling issues; the values may have resulted from an animal inside the guard during this time period. All turbidity data recorded during this deployment have been deleted.

Seldovia Surface

Sondes were out of the water during the swap at 08/17/2006: 14:00. Additionally, the following have been deleted:

a) High Turbidity: 08/06/2006: 23:30, 08/07/2006: 05:45, 09:15.
b) Turbidity Outlier: 08/03/2006: 16:15, 08/08/2006: 11:15, 08/10/2006: 07:30.
c) The sonde deployed at this site became hung up on the cable and was out of water during the following interval, and all associated data have been deleted from the record: 08/10/2006: 06:30 - 07:15.

September 1-30, 2006

Homer Deep

Beginning at 08/17/2006:20:45, frequent high turbidity readings were reported through the end of the deployment on 09/22/2006: 07:45. The probe post-calibrated fine, there were no fouling issues, and the next time this sonde/probe combination was deployed there were no problems. Much of the turbidity data during this deployment have been deleted (>400 NTU), but the remainder encompassed by the date and time combinations above should be considered suspicious. Additionally, the following records have been deleted:

a) High Turbidity: 09/27/2006: 13:30.
b) Turbidity Outlier: 09/24/2006: 01:30, 19:00.

Homer Surface

Sondes were out of the water during the swap at 09/22/2006: 07:45.

Beginning at 09/12/2006: 21:00 and persisting throughout the deployment ending 09/22/2006: 07:30, repeated high turbidity spikes were reported. The turbidity probe wiper was not parking consistently and was returned to YSI for repairs. All turbidity data within this time period have been deleted from the record.

Seldovia Deep

Sondes were out of the water during the swap at 09/21/2006: 10:00.

Beginning at 08/19/2006:10:45, frequent high turbidity readings were reported through the end of the deployment on 09/21/2006: 09:45. The probe post-calibrated

fine and there were no fouling issues; the values may have resulted from an animal inside the guard during this time period. All turbidity data recorded during this deployment have been deleted.

Seldovia Surface

Sondes were out of the water during the swap at 09/21/2006: 10:00.

October 1-31, 2006

Homer Deep

Sondes were out of the water during the swap at 10/17/2006: 08:00 and again at 10/24/2006: 08:15. Additionally, the following have been deleted from the record:

a) High Turbidity: 10/04/2006: 15:45.
b) Turbidity Outlier: 10/08/2006: 18:45, 10/14/2006: 18:30, 10/22/2006: 00:00.

Homer Surface

The sonde was out of the water during the swap at 10/17/2006: 07:45 - 08:30 and during site maintenance at 10/17/2006: 12:45 - 13:15.

Throughout the deployment beginning 10/17/2006: 08:45 and ending 11/13/2006:09:45, high turbidity spikes were frequently reported. Upon retrieval, the turbidity probe wiper would not park consistently in the proper orientation. All turbidity data from this deployment have been deleted from the record. Additionally, the following have been deleted from the record:

Turbidity Outlier: 10/05/2006: 17:15, 10/15/2006: 19:30.

Seldovia Deep

Sondes were out of the water during the swap at 10/16/2006: 09:00. Additionally, the following has been deleted:

High Turbidity: 10/26/2006: 11:45.

Seldovia Surface

Sondes were out of the water during the swap at 10/16/2006: 09:00.

November 1-30, 2006

Homer Deep

a) High Turbidity: 11/05/2006: 20:15.
b) Turbidity Outlier: 11/13/2006: 10:15, 11/16/2006: 08:00, 11/27/2006: 07:00.

Homer Surface

Sondes were out of the water during the swap at 11/13/2006: 10:00.

Throughout the deployment beginning 10/17/2006: 08:45 and ending 11/13/2006:09:45, high turbidity spikes were frequently reported. Upon retrieval, the turbidity probe wiper was not parking consistently in the proper orientation. All turbidity data from this deployment have been deleted from the record.

Seldovia Deep

Sondes were out of the water during the swap at 11/20/2006: 12:00. Additionally, the following have been deleted:

c) High Turbidity: 11/06/2006: 05:15, 11/07/2006: 16:15.
d) Turbidity Outlier: 11/06/2006: 00:15, 11/12/2006: 12:15, 11/20/2006: 14:45.

Seldovia Surface

Sondes were out of the water during the swap at 11/20/2006: 11:45.

Throughout the deployment beginning 11/20/2006: 12:00 and ending 12/13/2006:14:15, frequent high turbidity spikes and occasional negative turbidity values were reported. Upon retrieval, the turbidity probe wiper was not parking consistently in the proper orientation. All turbidity data from this deployment have been deleted from the record. In addition, the following records have been deleted:

d) High Turbidity: 11/05/2006: 03:30.
e) Turbidity Outlier: 11/17/2006: 05:15.

December 1 – 31, 2006

Homer Deep

A number of high turbidity spikes were recorded during the first few days of the deployment beginning 12/14/2006: 09:30. The frequent spikes are limited to a relatively discrete period (ending 12/16/2006: 09:45) and were likely the result of an animal in the guard. All turbidity records higher than 400NTU have been deleted from the record. Additionally, the following have been deleted:

c) High Turbidity: 12/11/2006: 13:30, 12/12/2006: 08:45, 12/21/2006: 16:30, 12/28/2006: 02:15 - 02:30.
d) Turbidity Outlier: 12/26/2006: 17:00, 12/31/2006: 19:45.

Seldovia Deep

Sondes were out of the water during the swap and site maintenance at 12/28/2006: 14:00 - 15:15.

At 12/13/2006: 14:30, the sonde deployed at this site became stuck in the deployment pipe during a scheduled sonde swap. The data was retrieved via a YSI handheld unit on 12/28/2006 and indicated that the unit remained stuck in the pipe until 12/15/2006:15:30. A review of these data collected inside the pipe indicates they are not representative of water parameters outside of the pipe, and the data for all parameters collected during this time period have therefore been deleted from the record. In addition, the following records have been deleted:

a) High Turbidity: 12/04/2006: 22:00, 23:00, 12/23/2006: 03:00.
b) Turbidity Outlier: 12/07/2006: 12:45, 12/08/2006: 08:15, 12/09/2006: 02:00, 12/16/2006: 07:45.

Seldovia Surface

Throughout the deployment beginning 11/20/2006: 10:15 and ending 12/13/2006:14:30, frequent high turbidity spikes and occasional negative turbidity values were reported. Upon retrieval, the turbidity probe wiper was not parking consistently in the proper orientation. All turbidity data from this deployment have been deleted from the record.

Throughout the deployment beginning 12/14/2006 13:45 frequent high turbidity spikes were present in the data. There were numerous wiper parking difficulties during this time, prior to the firmware upgrade supplied by Mike Lizotte of YSI. All readings >400 were deleted and the remaining data are suspect thru the end of the year.

13) Missing Data

Data are missing due to equipment failure where no probes deployed, problems with maintenance/calibration of equipment (See Section 6), or elimination of data due to

calibration (both pre- and post-) problems. For more details about missing data, contact the Research Coordinator at the Kachemak Bay Research Reserve.

January 1-31, 2006

Homer Surface: No sonde deployed this month due to icing conditions.

Seldovia Deep: 01/01/2006:00:15 – 01/17/2006: 14:45 (sonde deployed was not functioning).

February 1-28, 2006

Homer Surface: No sonde deployed this month due to icing conditions.

March 1-31, 2006

Homer Surface: No deployment between 03/01/2006: 00:00 - 03/09/2006: 11:30 due to icing conditions. Data missing from 03/09/2006: 11:45 to 04/14/2006: 08:30 because the sonde deployed at this site fell to the bottom.

April 1-30, 2006

Seldovia Surface: 04/13/2006: 10:00 - 04/30/2006: 23:45. Sonde was deployed but not turned on.

May 1-31, 2006

Seldovia Surface: 05/01/2006: 00:00 - 05/19/2006: 09:30 (sonde was not turned on).

August 1 – 31, 2006

Homer Deep: 08/12/2006: 16:45, 17:30, 18:30, 20:15, 20:45, 22:15, 22:45, 08/13/2006: 03:45, 04:30, 05:30 - 06:00, 06:30, 07:30, 08:00, 17:30, 18:45 - 19:15, 19:45 - 20:00, 20:30 - 20:45, 21:30 - 21:45, 22:30, 23:00, 23:30, 08/14/2006: 00:00 - 02:15, 02:45 - 07:00, 07:30 - 08:15, 09:00 - 10:15, 10:45 - 12:15, 12:45 - 14:00, 14:30 - 14:45, 15:15 - 17:45, 18:15 - 22:30, 23:00 - 08/15/2006: 03:30, 04:15 - 05:30, 06:00 - 06:45, 07:15, 07:45 - 08:15, 08:45, 09:15 - 10:00, 10:45 - 13:45, 14:30 - 17:00, 17:30 - 20:00, 20:30 - 08/16/2006: 03:45, 04:15 - 06:00, 06:30 - 07:15, 07:45 - 08:00, 08:30 - 09:30, 10:00 - 10:45, 11:15 - 14:15, 14:45 - 15:30, 16:00 - 16:15, 16:45, 17:15 - 08/17/2006: 05:30, 06:00 - 09:45.

September 1-30, 2006

Seldovia Surface: 09/02/2006: 04:30 – 09/16/2006:18:15, 18:45 - 20:00, 20:30 - 21:45, 22:15 - 23:30, 09/17/2006: 00:00 - 01:15, 01:45 - 02:30, 03:00 - 03:30, 04:00 - 04:30, 05:00 - 05:45, 06:15 - 07:15, 07:45 - 08:45, 09:15 - 10:00, 10:30 - 11:00, 11:30 - 12:00, 12:30 - 13:15, 13:45 - 14:30, 15:00 - 15:30, 16:00 - 16:30, 17:00 - 17:45, 18:15 - 19:00, 19:30 - 20:15, 20:45 - 21:30, 22:15 - 22:45, 23:30 - 09/18/2006: 00:00, 00:45 - 01:30, 02:15 - 04:45, 05:30 - 07:00, 07:45 - 08:45, 09:30 - 10:15, 11:00 - 11:30, 12:15 - 12:45, 13:30 - 14:15, 15:00 - 15:45, 16:30 - 17:30, 18:15 - 19:15, 20:00 - 21:00, 21:45 - 22:30, 23:00 - 23:30, 09/19/2006: 00:15 - 01:00, 01:30 - 02:00, 02:45 - 04:00, 04:45 - 06:00, 06:30 - 07:15, 07:45 -

08:45, 09:30 - 10:15, 10:45 - 11:15, 11:45 - 12:15, 12:45 - 13:15, 14:00 - 14:30, 15:00 - 15:30, 16:00 - 16:30, 17:00 - 17:30, 18:00 - 18:30, 19:00 - 19:30, 20:00 - 20:30, 21:00 - 21:30, 22:00 - 22:45, 23:15 - 23:45, 09/20/2006: 00:15 - 01:45, 02:15 - 03:00, 03:30 - 04:15, 04:45 - 05:15, 05:45 - 06:15, 06:45 - 10:00, 10:30 - 11:00, 11:30 - 12:00, 12:30 - 13:00, 13:30 - 14:00, 14:30 - 15:00, 15:30 - 18:00, 18:30 - 09/21/2006: 09:45.

October 1 – 31, 2006

Homer Deep: 10/17/2006: 08:00, 10/24/2006: 08:15.

November 1-30, 2006

Homer Surface: 11/13/2006: 02:45. No sonde deployed at this site 11/15/2006: 11:15 – 11/30/2006: 23:45 due to icing conditions.

December 1 – 31, 2006

Homer Surface: No sonde deployed at this site due to icing conditions.

14) Post Deployment Information

End of Deployment Post-Calibration Readings in Standard Solutions:
(** = *not recorded*)

Site	Retrieval Date	SpCond50 (mS/cm)	pH (7.00)	Turbidity (0 NTU)	DO (% air sat)	Depth (m)
HD	01/11/06	50.46	7.55	1.0	108.6	-0.212
	02/09/06	49.93	5.58	525.8	84.5	-0.252
	03/09/06	49.75	7.08	-0.6	100.0	-0.008
	04/14/06	49.73	5.85	6.0	99.6	-0.273
	05/18/06	49.98	7.14	0.1	104.1	-0.004
	06/20/06	50.16	7.07	0.1	100.7	0.012
	07/20/06	50.02	7.09	1.0	55.0	-0.063
	08/17/06	50.47	7.16	0.1	98.5	-0.069
	09/22/06	50.75	7.26	-0.8	66.8	-0.212
	10/17/06	50.50	7.14	0.4	99.0	-0.061
	10/24/06	50.37	7.09	-0.1	95.2	-0.300
	11/13/06	50.19	7.14	0.3	98.6	-0.171
	12/14/06	50.49	7.02	0.0	99.6	-0.229
	01/17/07	51.16	7.04	0.6	95.5	-0.103
HS	04/14/06	50.28	7.06	0.8	108.1	-0.221
	05/18/06	48.82	7.04	0.7	96.1	-0.030
	06/20/06	47.21	7.21	-12.7	23.8	0.023
	07/20/06	47.27	7.32	3.0	34.3	-0.076
	08/17/06	50.42	**	-0.3	86.0	-0.088
	09/22/06	49.12	6.99	0.0	96.3	-0.176
	10/17/06	50.08	7.10	5.5	101.7	-0.079

	11/13/06	50.05	7.07	1.1	93.2	-0.172
	11/15/06	51.33	7.02	0.9	98.5	-0.321
SD	01/25/06	51.23	6.99	0.3	93.6	-0.256
	02/08/06	50.48	7.14	1.0	103.8	0.051
	03/10/06	49.41	7.08	-0.2	89.4	0.084
	04/14/06	49.27	7.01	0.2	98.7	-0.231
	05/19/06	32.34	7.04	0.4	75.7	-0.002
	06/19/06	48.27	7.15	0.9	96.4	-0.061
	07/21/06	49.44	7.08	0.0	99.8	-0.039
	08/17/06	49.90	7.19	0.4	96.5	-0.087
	09/21/06	50.70	7.18	0.0	101.1	-0.130
	10/16/06	50.42	7.02	3.2	86.8	-0.540
	11/20/06	50.86	7.10	1.0	100.2	-0.110
	12/28/06	**	**	**	**	**
	01/16/07	50.34	7.06	0.4	93.4	-0.094
SS	01/12/06	50.05	6.68	0.5	100.4	0.313
	02/08/06	49.54	6.88	-0.9	104.3	0.064
	03/10/06	50.05	7.05	0.1	99.4	0.079
	04/13/06	50.50	7.06	0.0	99.0	-0.307
	05/19/06	**	**	**	**	**
	06/19/06	47.25	6.60	10.7	93.2	-0.070
	07/21/06	48.43	7.13	8.3	88.0	-0.034
	08/17/06	50.11	7.06	0.3	82.2	-0.083
	09/21/06	49.51	7.13	-0.3	97.9	-0.135
	10/16/06	49.38	7.07	-1.5	95.8	-0.068
	11/20/06	49.99	7.36	0.6	101.9	-0.069
	12/13/06	50.29	7.06	-2.8	104.0	-0.263
	01/16/07	50.53	7.16	0.7	106.5	-0.101

15) Other Remarks/Notes

On 10/01/2019 this dataset was updated to include embedded QAQC flags for anomalous/suspect data. System-wide monitoring data beginning in 2007 were processed to allow for QAQC flags and codes to be embedded in the data files rather than detailed in the metadata alone (as in the anomalous/suspect, deleted, and missing data sections above). Prior to 2006, rejected data were deleted from the dataset so they are unavailable to be used at all, but suspect data were only noted in the metadata document. Suspect data flags <1> were embedded retroactively in order to allow suspect data to be easily identified and filtered from the dataset if desired for analysis and reporting purposes. No other flags or codes were embedded in the dataset and users should still refer to the detailed explanations above for more information.

a) There were a few instances at this NERR site where turbidity recorded small negative values (-0001 and -0002). Because turbidity has a range of accuracy of +/-2 NTU, the technician did not delete or edit these values in any way.

b) There were no major storm/precipitation events at KAC NERR in 2006.

c) A Sutron Sat-Link2 transmitter was installed at the Homer Deep station on 12/07/2005 and transmits data to the NOAA GOES satellite, NESDIS ID #3B00077A (Where 3B00077A is the GOES ID for that particular station.) The transmissions are scheduled hourly and contain four (4) datasets reflecting fifteen minute data sampling intervals. The telemetry data is "Provisional" data and not the "Authentic" dataset used for long term monitoring and study. This data can be viewed by going to http://cdmo.baruch.sc.edu.

d) Below is the matlab routine used to process water quality data. An electronic copy is available from Scott Pegau at scott_pegau@fishgame.state.ak.us.

```
% kbsonde.m  This routine converts the sonde data into the CDMO format
% W. Scott Pegau  1/10/2003

%modifications as 1/22/04  -changed the program to  pull data within 15 minutes every
1/2 hour
%                          disabled many filters to reduce confusion at CDMO

%modification on 12/06/04  - add minimum spike size to the spike filters.
%modifications on 12/29/04  - change output format to align with the new CDMO
format, remove the access database output

clear all

%Adding some operating triggers  1= yes  0=no
print_graphs=0;
process_monthly=1;
chl_on=0;
fluor_on=0;
tmint=15;  % this is the binning time interval
tstp=15; %this is the time step
minspike=5; %what percentage of the mean does a spike need to be before being rejected
st_id='sswq'; % the letter designator for the station


%set up variables and matrix needed to parse the data
date_time=[]; temper=[]; cond=[]; sal=[]; doperc=[]; doconc=[]; pH=[]; depth=[];
turb=[]; chl=[]; fluor=[]; errcode = [];
w=',';
fignumber = 2;
```

```
% Read in all *.cdf comma delimited files

[file_list,n_file]=list_file('*.cdf'); %currently assumes that list_file.m and all *.cdf files
are in the working directory

for i=1:n_file  %Begin loop to read in the data and append into a single matrix
  file_name_current_in=file_list(i,:);

  %chl_on=1;       % to re-turn on switches, if were turned off in prior loop
  %fluor_on=1;

  % remove empty characters from each filename
  fname_length=size(file_name_current_in,2);
  j=0;
  while file_name_current_in(1,fname_length-j)==' '
    file_name_current_in=file_name_current_in(1,1:fname_length-j-1);
        j=j+1;
  end


  fname_length=size(file_name_current_in,2); %let the user know the file being
processed
  fprintf( '%s\n',file_name_current_in);

%Begin reading the data in
  fid=fopen(file_name_current_in);


%assume 2 lines of header in a .cdf file
HDR=fgetl(fid);  %DETERMINE THE NUMBER AND NAME OF VARIABLES
HERE
units=fgetl(fid);  %DETERMINE THE UNITS OF THE VARIABLES HERE

%determine the variables in the file
   ww=findstr(HDR,w); %find commas in the header
   ww=[ww length(HDR)]; %accounts for a header beyond the last comma
   fprintf(' %d Variables in the file \r\n',length(ww))
%determine the variables of interest
  %this set of routines looks through the header to determine where the desired data is
   dc=findstr(HDR,'Date'); dcc=find(ww>dc); date_col=dcc(1);
   dc=findstr(HDR,'Time'); dcc=find(ww>dc); time_col=dcc(1);
   dc=findstr(HDR,'Temp'); dcc=find(ww>dc); temp_col=dcc(1);
   dc=findstr(HDR,'SpCond'); dcc=find(ww>dc); cond_col=dcc(1);
   dc=findstr(HDR,'Salinity'); dcc=find(ww>dc); sal_col=dcc(1);
   dc=findstr(HDR,'DO%'); if ~isempty(dc); dcc=find(ww>dc); doperc_col=dcc(1); end;
```

```
   dc=findstr(HDR,'DO %'); if ~isempty(dc); dcc=find(ww>dc); doperc_col=dcc(1); end;
   dc=findstr(HDR,'DO Conc'); dcc=find(ww>dc); doconc_col=dcc(1);
   dc=findstr(HDR,'Depth'); dcc=find(ww>dc); depth_col=dcc(1);
   dc=findstr(HDR,'pH'); dcc=find(ww>dc(1)); pH_col=dcc(1);
   dc=findstr(HDR,'Turbidity'); dcc=find(ww>dc); turb_col=dcc(1);
   dc=findstr(HDR,'Chloro');
      if isempty(dc);
         no_chl=1;
         fprintf('No chlorophyll data.  Chlorophyll processing off. \r\n');
   else;
         no_chl=0;
         dcc=find(ww>dc); chl_col=dcc(1);
      end;
   dc=findstr(HDR,'Fluor');
      if isempty(dc);
         no_fluor=1;
         fprintf('No fluorescence data.  Fluor turned off \r\n');
      else;
         no_fluor=0;
         dcc=find(ww>dc); fluor_col=dcc(1);
      end;


   clear ww;

while 1; %read in each line of data and parse the data out
   a=fgetl(fid);
   if ~ischar(a), break, end;
   a=strcat(',',a,','); %add commas at the beginning and end of the string for parsing
   ww=findstr(a,w); %find commas

   %separate the date information
   if strcmp(a(ww(date_col)+1),""); %this if statement is necessary if a file was
manipulated in excel prior to being input into this routine
   d=datenum(a(ww(date_col)+2:ww(date_col+1)-
2))+datenum(a(ww(time_col)+2:ww(time_col+1)-2));  %reads in date and time columns
   date_time=[date_time;d]; %store as number in a vector
   else
   d=datenum(a(ww(date_col)+1:ww(date_col+1)-
1))+datenum(a(ww(time_col)+1:ww(time_col+1)-1));  %reads in date and time columns
   date_time=[date_time;d]; %store as number in a vector
   end

    %read in the data
    tt=str2num(a(ww(temp_col)+1:ww(temp_col+1)-1)); temper=[temper;tt];
    tt=str2num(a(ww(cond_col)+1:ww(cond_col+1)-1)); cond=[cond;tt];
```

```
    tt=str2num(a(ww(sal_col)+1:ww(sal_col+1)-1)); sal=[sal;tt];
    tt=str2num(a(ww(doperc_col)+1:ww(doperc_col+1)-1)); doperc=[doperc;tt];
    tt=str2num(a(ww(doconc_col)+1:ww(doconc_col+1)-1)); doconc=[doconc;tt];
    tt=str2num(a(ww(depth_col)+1:ww(depth_col+1)-1)); depth=[depth;tt];
    tt=str2num(a(ww(pH_col)+1:ww(pH_col+1)-1)); pH=[pH;tt];
    tt=str2num(a(ww(turb_col)+1:ww(turb_col+1)-1)); turb=[turb;tt];
    if chl_on
       if no_chl;
          tt=NaN;
          chl=[chl;tt];
       else;
          tt=str2num(a(ww(chl_col)+1:ww(chl_col+1)-1));
          chl=[chl;tt];
       end;
    end;
   if fluor_on;
      if no_fluor;
         tt=NaN;
         fluor=[fluor;tt];
      else;
          tt=str2num(a(ww(fluor_col)+1:ww(fluor_col+1)-1));
          fluor=[fluor;tt];
      end;
   end;



 end;
  fclose(fid);

end

%SORT THE DATA BY DATE

tdata=[date_time temper cond sal doperc doconc depth pH turb chl ]; % removed fluoro
ttdata=sortrows(tdata,1);
date_time=ttdata(:,1); temper=ttdata(:,2); cond=ttdata(:,3); sal=ttdata(:,4);
doperc=ttdata(:,5); doconc=ttdata(:,6); depth=ttdata(:,7); pH=ttdata(:,8);
turb=ttdata(:,9);
if chl_on; chl=ttdata(:,10); end;
if fluor_on; fluor=ttdata(:,11); end;


%BEGIN CLEANING UP THE DATA

%throw out obvious bad or missing data
```

```
%the limits are in part from CDMO absolute rejection criteria
%I trust the cals on temperature the most so if it is out the rest of the data is assumed to
be garbage
good_data=find(temper>-5&temper<40&cond>10&depth>0);  %finding "good"
temperature and conductivity data (conductivity test to ensure in water)

   date_time=date_time(good_data); %only keep "good" data
   temper=temper(good_data);
   cond=cond(good_data);
   sal=sal(good_data);
   doperc=doperc(good_data);
   doconc=doconc(good_data);
   depth=depth(good_data);
   pH=pH(good_data);
   turb=turb(good_data);
   if chl_on; chl=chl(good_data); end;
   if fluor_on; fluor=fluor(good_data); end;


%identify gaps caused by bad or missing data
  kk=find(diff(date_time)>(tstp*.0104166667/15+.001));
  fnamr=fopen('report.txt','w');
   for i=1:length(kk);
      fprintf(fnamr,'  %s %s \r\n',datestr(date_time(kk(i))),datestr(date_time(kk(i)+1)));
   end



%print the time covered by this data
   fprintf('\r\n Begining date %s \r\n',datestr(date_time(1)));
   fprintf('End date %s \r\n',datestr(date_time(end)));

%PROBABLY WANT PLOTS OF LARGE DATA SET TO IDENTIFY PROBLEMS

%process complete months of data

[Y,M,D,H,MI,S]=datevec(date_time); %separate out the date info
%begin looping over years
    for I=Y(1):Y(end);       %loop over years
      yyy=find(Y==I);
      %plot the years worth of data to look for oddities
      yjd=date_time(yyy)-datenum(I-1,12,31);
      stdate=min(yjd); endate=max(yjd);
      figure;
      subplot(7,1,1); plot(yjd,temper(yyy),'k'); axis([stdate endate -2 15]);
ylabel('Temperature');
```

```
      subplot(7,1,2); plot(yjd,sal(yyy),'k'); axis([stdate endate 22 33]); ylabel('Salinity');
      subplot(7,1,3); plot(yjd,doperc(yyy),'k'); axis([stdate endate 80 130]); ylabel('DO
percent');
      subplot(7,1,4); plot(yjd,depth(yyy),'k'); axis([stdate endate 2 17]); ylabel('Depth');
      subplot(7,1,5); plot(yjd,pH(yyy),'k'); axis([stdate endate 7.5 8.5]); ylabel('pH');
      subplot(7,1,6); plot(yjd,turb(yyy),'k'); axis([stdate endate -100
200]);ylabel('Turbidity');
      if chl_on; subplot(7,1,7); plot(yjd,chl(yyy),'k'); axis([stdate endate -10
30]);ylabel('Chlorophyll'); xlabel('Julian day'); end;
      set(gcf,'Paperposition',[.5 .5 7 10])
      year_title=num2str(Y(yyy(1))); subplot(7,1,1); title(year_title);
      pause(5);

      if print_graphs; print; end


      for J=1:12;  %loop over months
         mmm=find(M(yyy)==J); %find data within a month
         if ~isempty(mmm)&process_monthly; %continue if data in the month is available
            mmm=mmm+yyy(1)-1; %adjust month pointer to full data set

 ftemper=[]; fcond=[]; fsal=[]; fdoperc=[]; fdoconc=[]; fdepth=[]; fpH=[]; fturb=[];
fchl=[]; fjd=[]; % ffluor=[];


               mdate_time=date_time(mmm); %pull out the single month of data to work
with
               mtemper=temper(mmm);
               mcond=cond(mmm);
               msal=sal(mmm);
               mdoperc=doperc(mmm);
               mdoconc=doconc(mmm);
               mdepth=depth(mmm);
               mpH=pH(mmm);
               mturb=turb(mmm);
               if chl_on; mchl=chl(mmm); end;
               if fluor_on; mfluor=fluor(mmm); end;
               mjd=mdate_time-datenum(I-1,12,31);

               %save monthly data in matlab file
               fnm=datestr(datenum(I,J,1),2);
               fnam=strcat(st_id,fnm(1:2),fnm(7:8));
               fprintf('Year is %u and month is %u \r\n',Y(mmm(1)),M(mmm(1)));
               if chl_on; eval(['save ' fnam ' mjd mdate_time mtemper mcond msal
mdoperc mdoconc mdepth mpH mturb mchl']);
```

```
        else eval(['save ' fnam ' mjd mdate_time mtemper mcond msal mdoperc
mdoconc mdepth mpH mturb']);
        end;

        %loop through the month averaging available data into proscribed time step
intervals and filling gaps with NaN
        %also applying a filter to the data
        date_int=tstp*.0104166667/15; %interval that averages are collected
        t_int=tmint*.0104166667/15; %interval around the time step within which
data is averaged
        fnamo=strcat(fnam,'.txt');
        fido=fopen(fnamo,'w');

fprintf(fido,'STNCODE\tSMPLDATE\tUSRCODES\tSMPLTIME\tTemp\tSpCond\tSal\t
DO_pct\tDO_mgl\tDepth\tpH\tTurb\r\n');
 %          fprintf(fido,'MM/DD/YYYY \t hh:mm:ss \t C \t mS/cm \t ppt \t percent \t
mg/L \t m \t \t NTU \r\n');
 stncode = strcat('kac',st_id);
        for II=datenum(I,J,1):date_int:datenum(I,J+1,1);
           cdate=datestr(II,23); ctime=datestr(II,15);
           cjd=II-datenum(I-1,12,31);
           ll=find(mdate_time>(II-t_int/2)&mdate_time<(II+t_int/2)); %find data +-
1/2 the time interval minutes from desired output time
           lm=find(mdate_time>(II-.5)&mdate_time<(II+.5)); %find data within 12
hours for filtering purpose (should expand to allow data out of the month)
           if ~isempty(ll); %ensure there is some data
             utime=datestr(mdate_time(ll(1)),13); % pulls out the actual time for the
usrcodes column

              ctemper=nanmean(mtemper(ll)); ccond=nanmean(mcond(ll));
csal=nanmean(msal(ll)); cdoperc=nanmean(mdoperc(ll));
              cdoconc=nanmean(mdoconc(ll)); cdepth=nanmean(mdepth(ll));
cpH=nanmean(mpH(ll)); cturb=nanmean(mturb(ll));
              if chl_on; cchl=nanmean(mchl(ll)); end;
%               if fluor_on; cfluor=nanmean(mfluor(ll)); end;

              %ADDING INDIVIDUAL COMPONENT FILTERS
              %BEWARE OF ALL FILTERS
                %absolute data rejection filters as specified by CDMO or more
restrictive based on realistic values
              if ctemper<-2|ctemper>25; ctemper=NaN; errcode=[errcode; 1,II];  end;
%CDMO -5 to 45
              if ccond<0|ccond>100; ccond=NaN; errcode=[errcode; 2,II];
end;%CDMO cond 0 to 100
              if csal<10|csal>36; csal=NaN; errcode=[errcode; 3,II]; end; %CDMO
salinity 10 to 36
```

```
                    if cdoperc<0|cdoperc>199; cdoperc=NaN; cdoconc=NaN;
errcode=[errcode; 4, II]; end; %CDMO dopercent 0 to 200
                    if cpH<4|cpH>12; cpH=NaN; errcode=[errcode; 5,II]; end; %CDMO
pH 2 to 14

                    if cturb>400; cturb=NaN; errcode=[errcode;6,II]; end;
                    if cturb<-2; cturb=NaN; errcode=[errcode;7,II]; end;
                    if chl_on&cchl>50; cchl=NaN; errcode=[errcode;8 ,II]; end;
                    if chl_on&cchl<0; cchl=NaN; errcode=[errcode; 9,II]; end;
%                     if fluor_on&cfluor<0; cfluro=NaN; fprintf(fnamr,'negative
fluorescence on %s \r\n',datestr(II)); end;

                    %outlier filter; the filter looks for data within 12 hours of the data
point and removes the data point if it is
                    % more than 4 standard deviations from the mean (not applied to
temperature and salinity because of the two layer system)

                    %1/22/04  many of these filters commented out to ease getting
CDMO approval
                    %I am reporting the out data as suspicious

                    if
(cdoperc>(nanmean(mdoperc(lm))+4*nanstd(mdoperc(lm)))|cdoperc<(nanmean(mdoperc
(lm))-4*nanstd(mdoperc(lm))))&(abs(nanmean(mdoperc(lm))-
cdoperc)>(nanmean(mdoperc(lm))*minspike/100));
                    %    cdoperc=NaN;
                       errcode=[errcode; 10,II];
                    end;
                    if
(cdoconc>(nanmean(mdoconc(lm))+4*nanstd(mdoconc(lm)))|cdoconc<(nanmean(mdoco
nc(lm))-4*nanstd(mdoconc(lm))))&(abs(nanmean(mdoconc(lm))-
cdoconc)>(nanmean(mdoconc(lm))*minspike/100));
                    %    cdoconc=NaN;
                       errcode=[errcode; 11,II];
                    end;
                    if
(cpH>(nanmean(mpH(lm))+4*nanstd(mpH(lm)))|cpH<(nanmean(mpH(lm))-
4*nanstd(mpH(lm))))&(abs(nanmean(mpH(lm))-
cpH)>(nanmean(mpH(lm))*minspike/100));
                    %    cpH=NaN;
                       errcode=[errcode; 12,II];
                    end;
                    if
(cturb>(nanmean(mturb(lm))+4*nanstd(mturb(lm)))|cturb<(nanmean(mturb(lm))-
4*nanstd(mturb(lm))))&(abs(nanmean(mturb(lm))-cturb)>25); %using a different
minimum spike measure
```

```
                    cturb=NaN;
                    errcode=[errcode; 13 ,II];
                end;
                if
(chl_on&(cchl>(nanmean(mchl(lm))+4*nanstd(mchl(lm)))|cchl<(nanmean(mchl(lm))-
4*nanstd(mchl(lm)))))&(abs(nanmean(mchl(lm))-
cchl)>(nanmean(mchl(lm))*minspike/100));
                    cchl=NaN;
                    errcode=[errcode; 14,II];
                end;
%                   if
fluor_on&(cfluor>(nanmean(mfluor(lm))+4*nanstd(mfluor(lm)))|cfluor<(nanmean(mchl(
lm))-4*nanstd(mfluor(lm))));
%                      cfluor=NaN;
%                      fprintf(fnamr,'Fluorescence outlier on %s \r\n',datestr(II));
%                   end;

                %Print out the data in CDMO format

fprintf(fido,'%s\t%s\t%s\t%s\t%04.1f\t%06.2f\t%04.1f\t%05.1f\t%04.1f\t%05.2f\t%04.1f
\t%04.0f\r\n',stncode, cdate, utime, ctime, ctemper, ccond, csal, cdoperc, cdoconc,
cdepth, cpH, cturb);

                %save filtered data to compare against raw data
                ftemper=[ftemper;ctemper]; fcond=[fcond;ccond]; fsal=[fsal;csal];
fdoperc=[fdoperc;cdoperc]; fjd=[fjd;cjd];
                fdoconc=[fdoconc;cdoconc]; fdepth=[fdepth;cdepth]; fpH=[fpH;cpH];
fturb=[fturb;cturb];
                if chl_on; fchl=[fchl;cchl]; end;
 %                  if fluor_on; ffluor=[ffluor;cfluor]; end;
               end;
            end;
             fclose(fido);


            %plot the monthly data

            figure(fignumber);
            subplot(3,1,1); plot(mjd,mdepth,'-k',fjd,fdepth,'.r'); ylabel('Depth');
            subplot(3,1,2); plot(mjd,mtemper,'-k',fjd,ftemper,'.r'); ylabel('Temperature');
            subplot(3,1,3); plot(mjd,msal,'-k',fjd,fsal,'.r'); ylabel('Salinity'); xlabel('Julian
Day');
            set(gcf,'Paperposition',[.5 .5 7 10])
            subplot(3,1,1); title(fnam);
            plotfnam1= strcat(fnam, '1');
            if print_graphs; print; end;
```

```
            fignumber=fignumber+1;

            figure(fignumber);
            subplot(4,1,1); plot(mjd,mdoperc,'-k',fjd,fdoperc,'.r'); ylabel('DO percent');
            subplot(4,1,2); plot(mjd,mpH,'-k',fjd,fpH,'.r'); ylabel('pH');
            subplot(4,1,3); plot(mjd,mturb,'-k',fjd,fturb,'.r'); ylabel('Turbidity');
            if chl_on; subplot(4,1,4); plot(mjd,mchl,'-k',fjd,fchl,'.r');
ylabel('Chlorophyll'); xlabel('Julian Day'); end;
            set(gcf,'Paperposition',[.5 .5 7 10])
            subplot(4,1,1); title(fnam);
            plotfnam2= strcat(fnam, '2');
            if print_graphs; print; end;
            fignumber=fignumber+1;
            pause(5)

        end
      end
   end;
        for errloop=1:14;
          % Finds all errcodes of each number
          kk=find(errcode(:,1)==errloop);
          % Assigning messages for error codes
          if errloop==1; errprint='Temperature Out of Range';end;
          if errloop==2; errprint='Sp Cond Out of Range';end;
          if errloop==3; errprint='Salinity Out of Range';end;
          if errloop==4; errprint='DO Percent Out of Range';end;
          if errloop==5; errprint='pH  Out of Range';end;
          if errloop==6; errprint='High Turbidity';end;
          if errloop==7; errprint='Negative Turbidity';end;
          if errloop==8; errprint='High Chlorophyll';end;
          if errloop==9; errprint='Negative Chlorophyll';end;
          if errloop==10; errprint='DO Percent Outlier';end;
          if errloop==11; errprint='DO Conc Outlier';end;
          if errloop==12; errprint='pH Outlier';end;
          if errloop==13; errprint='Turbidity Outlier';end;
          if errloop==14; errprint='Chlorophyll Outlier';end;
          % Prints error code message
          fprintf(fnamr,'\r\n %s %s \r\n',errprint, ':');
          % Cycles through errors of same errcode
          for count=1:length(kk);

            if count == 1;
              fprintf(fnamr, '\r\n %s: ', datestr(errcode(kk(count),2),23));
             if length(kk)==1;
                fprintf(fnamr, '%s, ', datestr(errcode(kk(count),2),15));
             else
```

```
                if (errcode(kk(count+1),2)-errcode(kk(count),2)) >
(tstp*.0104166667/15+.001);
                  fprintf(fnamr, '%s, ', datestr(errcode(kk(count),2),15));
                else
                  begseq=errcode(kk(count),2); %start of sequence
                  begcount=count;
                end
              end

              elseif count==length(kk);
                if (errcode(kk(count),2)-errcode(kk(count-1),2)) <
(tstp*.0104166667/15+.001); %is sequential with previous
                  endseq=errcode(kk(count),2);
                    if begcount>1&(floor(begseq)-floor(errcode(kk(begcount-1),2)))<1;
                      if (floor(endseq)-floor(begseq))>=1;
                        fprintf(fnamr,'%s - %s: %s',datestr(begseq,15), datestr(endseq,23),
datestr(endseq,15));
                      else;
                        fprintf(fnamr,'%s - %s, ',datestr(begseq,15), datestr(endseq,15));
                      end;
                    else
                      if (floor(errcode(kk(count),2))-floor(errcode(kk(count-1),2)))>=1;
                        fprintf(fnamr,'\r\n %s: %s, ',datestr(errcode(kk(count),2),23),
datestr(errcode(kk(count),2),15));
                      else;
                        fprintf(fnamr,'%s, ', datestr(errcode(kk(count),2),15));
                      end;

                    end;
                elseif  (floor(errcode(kk(count),2))-floor(errcode(kk(count-1),2)))>1;
                  fprintf(fnamr,'\r\n %s: %s, ',datestr(errcode(kk(count),2),23),
datestr(errcode(kk(count),2),15));
                else;
                  fprintf(fnamr,'%s, ', datestr(errcode(kk(count),2),15));
                end;
              else;
                if (errcode(kk(count),2)-errcode(kk(count-1),2)) <
(tstp*.0104166667/15+.001); %is sequential with previous
                  if (errcode(kk(count+1),2)-errcode(kk(count),2)) >
(tstp*.0104166667/15+.001); %check if at end of sequence
                    endseq=errcode(kk(count),2);
                  if begcount>1;
                   if (floor(begseq)-floor(errcode(kk(begcount-1),2)))<1;
                    if (floor(endseq)-floor(begseq))>=1;
                      fprintf(fnamr,'%s - %s: %s, ', datestr(begseq,15),
datestr(endseq,23), datestr(endseq,15));
```

```
                        else;
                            fprintf(fnamr,'%s - %s, ', datestr(begseq,15), datestr(endseq,15));
                        end;
                      else;
                        if (floor(errcode(kk(count),2))-floor(errcode(kk(count-1),2)))>=1;
                            fprintf(fnamr,'\r\n %s: %s - %s: %s, ',datestr(begseq,6),
datestr(begseq,15),datestr(endseq,6), datestr(endseq,15));
                        else;
                            fprintf(fnamr,'\r\n %s: %s - %s, ', datestr(begseq,23),
datestr(begseq,15),datestr(endseq,15));
                        end;
                      end;
                     else;
                        if (floor(endseq)-floor(begseq))>=1;
                            fprintf(fnamr,'\r\n %s: %s - %s: %s, ',datestr(begseq,23),
datestr(begseq,15),datestr(endseq,6), datestr(endseq,15));
                        else;
                            fprintf(fnamr,'%s - %s, ', datestr(begseq,15),datestr(endseq,15));
                        end;
                     end;
                    end;
                 else; %not in sequence with previous
                    if (errcode(kk(count+1),2)-errcode(kk(count),2)) <
(tstp*.0104166667/15+.001); %check if at begining of sequence
                        begseq=errcode(kk(count),2); %start of sequence
                        begcount=count;
                    else;
                        if (floor(errcode(kk(count),2))-floor(errcode(kk(count-1),2)))>=1;
                            fprintf(fnamr,'\r\n %s: %s, ',datestr(errcode(kk(count),2),23),
datestr(errcode(kk(count),2),15));
                        else;
                            fprintf(fnamr,'%s, ', datestr(errcode(kk(count),2),15));
                        end;
                    end;
                end;
            end;
        end;
    end;

    fclose(fnamr);
```