

QA of Hydroacoustic Instruments

What's My Responsibility?

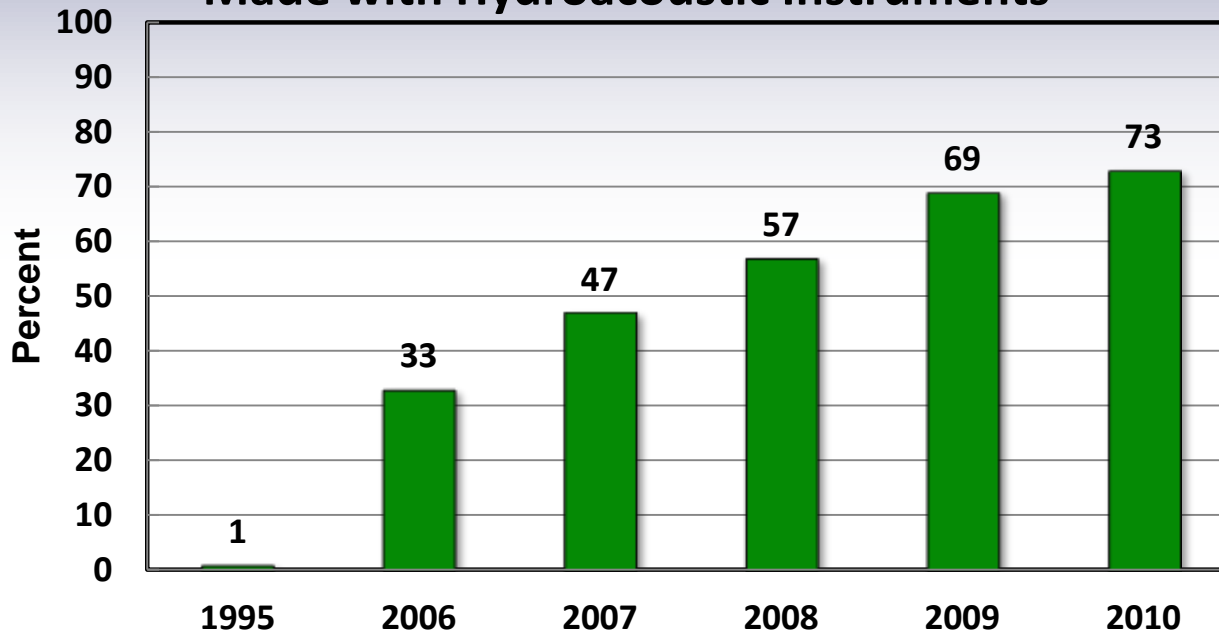


Overview of Presentation

- **Hydroacoustic Instruments – Discharge measurements and Index Velocity**
- **Instrument Quality Assurance**
 - **Acceptance Testing** [HIF + WSC]
 - **Post Factory-Repair Testing** [HIF and(or) WSC]
 - **Routine QA** [WSC]
- **QA for Instruments for which formal testing by OSW is incomplete** [WSC]
- **ADVM QA**
- **Question and Answer**

Why do we Care about QA?

Percent of Discharge Measurements
Made with Hydroacoustic Instruments



Approximately 6% of
streamflow stations
are index velocity
stations

- Many procedures exist for mechanical current meters (spin tests, checking pivots/bucket wheels/yokes, current meter exchange, etc.)
- Need have equivalent practices for acoustic instruments

What's My (Your) Responsibility?

- Objective of this presentation:
 - Create awareness of QA activities and their importance
 - Provide overview of QA activities led by OSW and others
 - Focus on QA activities you can influence or control for hydroacoustic instruments used to make discharge measurements
 - Brief overview of ADVIM QA
- QA is **EVERYONE's** responsibility! (i.e. not just OSW)



Hydroacoustics Instruments

- Discharge Measurement Instruments
 - Tested by OSW with formal policy/guidance
 - Incomplete testing with no formal policy/guidance



Hydroacoustics Instruments

■ Acoustic Doppler Velocity Meters

- Index velocity instruments
- Instrument and measurement QA are closely linked
- Details require a separate webinar



Three Kinds of Testing

- **Acceptance Testing** **[HIF + WSC]**
 - Testing conducted to determine if basic requirements instrument operation are met
 - Example: Staff sections are tested to verify that the distance indicated on the staff is accurate to within some spec
- **Post Factory-Repair Testing** **[HIF + WSC]**
 - Testing conducted after a repair. May include all or part of acceptance test procedures
- **Routine QA** **[WSC]**
 - Routine tests done to assure user that instrument is functionally normally

Advantage of HIF Purchase

- **Acceptance testing: 100% of Flowtrackers / ADCPs purchased through the HIF are tested**
- **HIF coordinates recalls/updates, etc.**
- **HIF maintains database with info on every Flowtracker purchased/repaired/tested**
- **Lower overhead means lower cost for WSCs**



HIF Acceptance Testing - Flowtrackers

- Power-up check
- Thermistor test
- Beam Check
- Automated tow tank test
- Two cart speeds
18 & 33.5 cm/s



WSC Acceptance Testing - Flowtrackers

- Check Flowtracker operation
 - Refresh batteries if necessary
 - Power up and check menus
 - Perform a bucket test
- **Best Practice: *Perform a check discharge measurement to verify that the Flowtracker is working.*** Compare to expected discharge (rating or shifted discharge) provided it is relatively accurate. Doesn't have to be a comparison to AA or ADCP

HIF Acceptance Testing - ADCPs

- Tests consist of:

- Power-up check: comms, heading, pitch/roll, ping
- Thermistor validation
- Distance test in flume – StreamPro and M9/S5s only



HIF Acceptance Testing - ADCPs

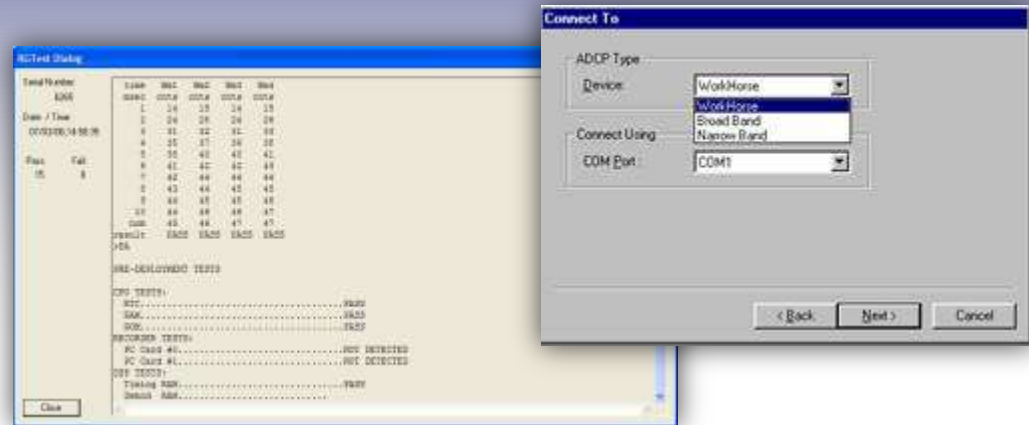
- New ADCP testing tank being constructed
- Dimensions: 80 x 4 x 4 ft.



WSC Acceptance Testing - ADCPs

- System checkout

- Apply power
- Check comms
- Run diagnostic tests
- Note transformation matrix – TRDI ADCPs



- **Best Practice: Perform at least 1 check measurement to verify that the ADCP is working.**

Compare to expected discharge (rating or shifted discharge). Comparison doesn't have to be with AA, Flowtracker, or ADCP.

```
>PS3
```

```
1.4789 -1.4747 -0.0082 0.0035  
-0.0222 0.0269 -1.4724 1.4705  
0.2673 0.2643 0.2702 0.2612  
1.0391 1.0453 -1.0403 -1.0451
```

Post Factory Repair Testing - Flowtrackers

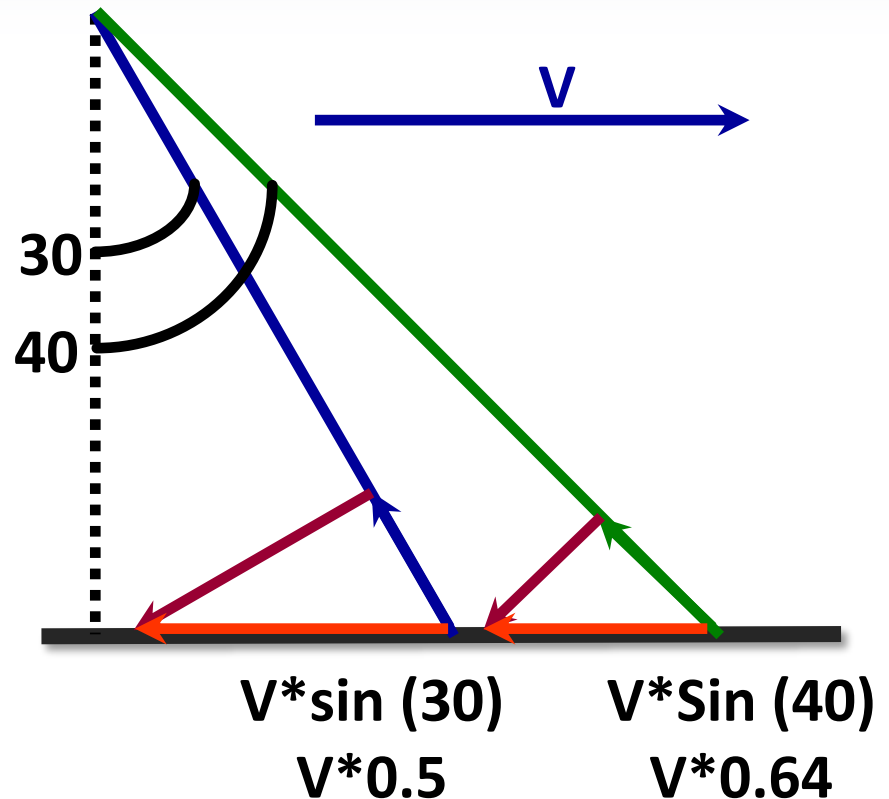
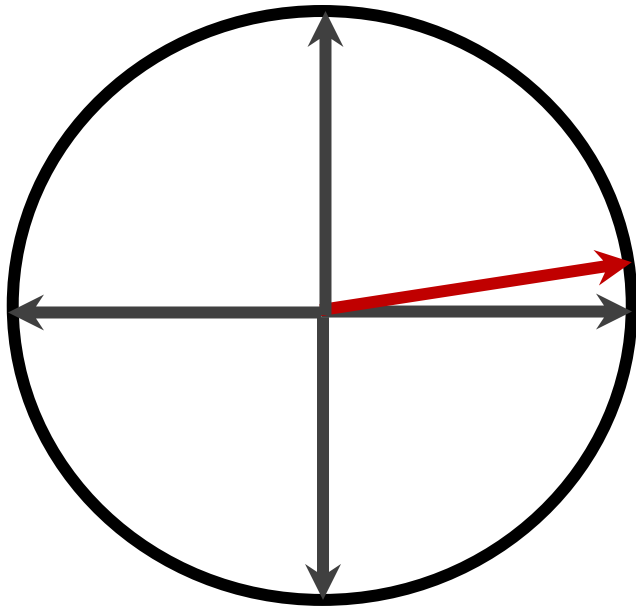
- **Must be** returned to HIF after factory repairs – regardless of who (HIF or WSC) initiated the repair
- **Best Practice:** *Arrange for repairs via HIF*
- When received by HIF they will:
 - Verify to the extent possible that repair was successful
 - Perform routine acceptance tests
- When received at WSC, hydrographer:
 - Should conduct power-up testing and bucket test
 - **Best Practice:** *Make a check QM*

Post Factory Repair Testing - ADCPs

- Not required that ADCP be returned to HIF – though HIF can assist with this
- WSC staff should perform system checkout
 - Apply power
 - Check communications (BBTalk)
 - Run diagnostic tests
 - Check values of transformation matrix and compare to values prior to repair (should be the same)
- Best Practice: *Make a check QM to verify that ADCP is functioning normally.* Not required.

Routine ADCP QA – Beam Alignment

- Testing all aspects of an ADCP is almost impossible under any circumstances. Beam alignment errors are potentially the largest source of BIAS



Routine ADCP QA – Beam Alignment

- OSW Technical Memo 2009.05 states that beam alignment test should be done for
 - All new instruments not tested by HIF
 - Any ADCP returned from factory repair or evaluation
 - Every instrument once every 3 years
 - After firmware upgrades (?)
- Checking that transformation matrix is unchanged is probably sufficient after a firmware upgrade. Make sure to store a log of matrix.

```
>PS3
```

```
  1.4789  -1.4747  -0.0082   0.0035  
-0.0222   0.0269  -1.4724   1.4705  
  0.2673   0.2643   0.2702   0.2612  
  1.0391   1.0453  -1.0403  -1.0451
```

Routine ADCP QA – Beam Alignment

■ Requires:

- Manned boat with ADCP/GPS mounts
- GPS with differential capability (WAAS) (GGA & VTG)
- Lake or water body shallow enough to reliably bottom track with no rapid changes in bed elevation
- Ability to navigate at constant heading & speed for long distance

■ Considerations:

- Test does not evaluate water tracking, though beam alignment affects both BT and WT
- Need to maintain bottom tracking
- Heading is important – NOT course!

Beam Alignment Procedure

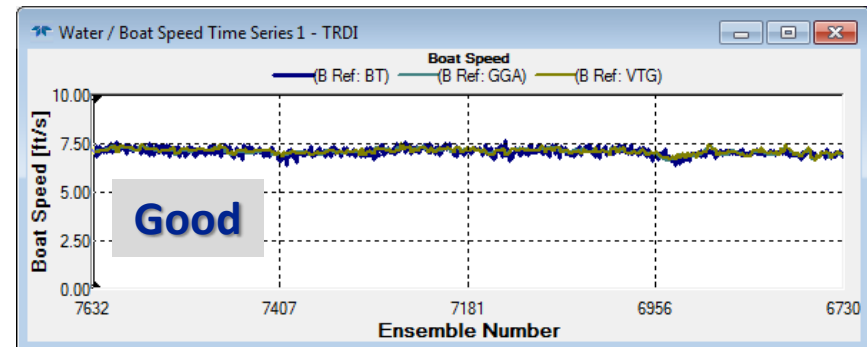
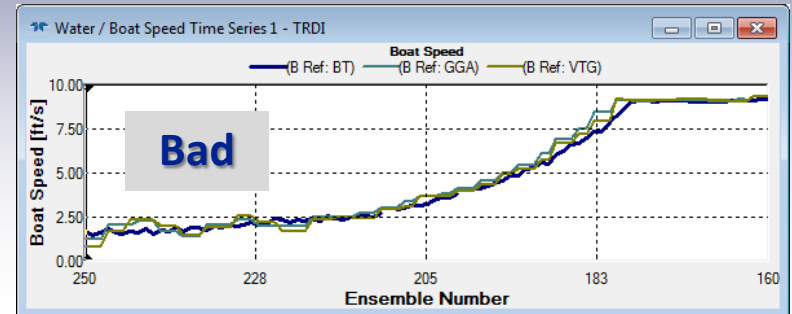
- Mount ADCP (note beam orientation)
- Conduct internal ADCP diagnostic tests
- Begin pinging – but not recording
- Configure software to view Distance Made Good (DMG) and ratio of BT and GPS DMG (known as BC/GC)
- Record GPS (GGA/VTG) and ADCP data
- When boat at desired speed, begin recording
- Maintain constant compass heading /speed

BMG-GMG mag	69.2	[ft]
BMG-GMG dir	349.4	[°]
GC-BC	1.8	[°]
BC/GC	1.0014	

System	
Process	Moving Boat
Step	End Edge (11)
Sample	179
Time	3:32:35 PM
Duration	0:02:59
Voltage (V)	14.4
Settings	
Track Reference	Bottom-Track
Depth Reference	Vertical Beam
Coordinate System	ENU
Summary	
Total Q (m3/s)	1.851
Loop Corrected Tot...	
Boat Speed (m/s)	0.009
Mean Speed (m/s)	0.177
Track (m)	11.87
DMG (m)	11.07
Depth (m)	0.51
# Cells	2
BottomTrack:	
VB Depth (m)	0.51
BT Depth (m)	0.55
GPS	
Satellites	7
GPS Quality	2
GC-BC	-0.2
D(BT)/D(GPS)	1.013

Beam Alignment Procedure

- Traverse a long (1,200–2,500 ft) course. Longer is better
- At the end of the course but before reducing speed or changing heading, stop recording
- Record BC/GC value
- Do a reciprocal traverse (a transect of the same length at a heading ~180 degrees from the previous course)



Parameter	Value	Unit
BMG-GMG mag	69.2	[ft]
BMG-GMG dir	349.4	[°]
GC-BC	1.8	[°]
BC/GC	1.0014	

Beam Alignment Procedure

- Record BC/GC value
- Average BC/GC values for reciprocal courses
- Rotate ADCP 45 degrees and repeat 4 times
- For most ADCPs: $0.995 < BC/GC < 1.003$
- If BC/GC is outside this range, arrange for return to factory for factory beam alignment test
- Alternative: *Pay for factory to perform test and report results*

Routine ADCP QA – Beam Alignment

■ Instrument-specific Considerations

- **M9/S5s:** Similar performance to Rio Grande? Can ask HIF to perform distance test for a fee
- **StreamPros:** Cannot be tested without compass & GPS. HIF/Mfgr can conduct beam alignment test.
- **RiverRay** ???
- **Policy/experience with new instruments will evolve.**
Makes comparison QMs are all the more important.

Routine QA - Flowtrackers

- Review auto-beam checks for every QM
- Document any changes/anomalies
- Run bucket test if QC Check fails

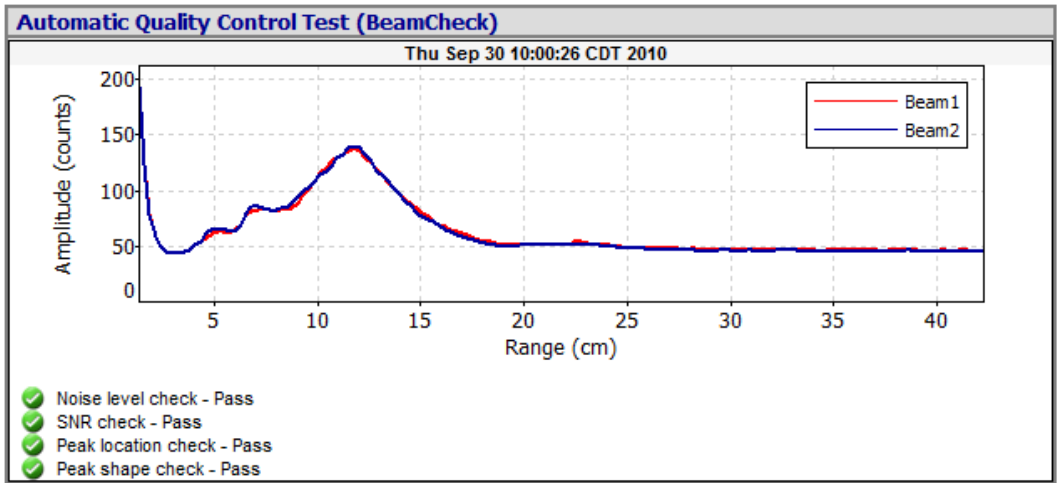
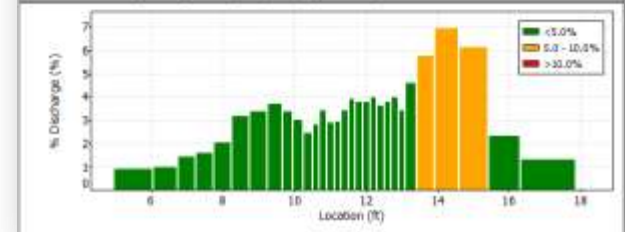
Discharge Measurement Summary Data Generated: Thu Jun 23 2011

File Information		Site Details	
File Name	12158840.WAD	Site Name	TU
Start Date and Time	2010/09/29 10:04:43	Operator(s)	PJW
System Information		Units (English units)	
Sensor Type	FlowTracker	Distance	ft
Serial #	#3447	Velocity	ft/s
CPU Firmware Version	3.7	Area	ft ²
Software Ver	2.20	Discharge	cfs
Summary		Discharge Uncertainty	
Averaging Int.	40	# Stations	52
Start Edge	REW	Total Width	14.600
Mean SNR	37.3 dB	Total Area	7.272
Mean Temp	51.81 °F	Mean Depth	0.498
Depth Equation	Mid-Section	Mean Velocity	1.1176
		Total Discharge	8.1286
		Category	ISO
		Accuracy	1.0%
		Depth	0.5%
		Velocity	0.7%
		Width	0.1%
		Method	1.5%
		# Stations	1.6%
		Overall	2.5%

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	HeadID	Vel	CorrFact	MeanV	Area	Flow	%Q
1	30:04	4.30	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.000	0.0
2	30:04	4.60	0.6	0.300	0.6	0.120	0.2236	1.00	0.2134	0.120	0.072	0.6
3	30:05	6.90	0.6	0.200	0.6	0.080	0.3925	1.00	0.3825	0.040	0.008	0.0
4	30:11	7.00	0.6	0.250	0.6	0.100	0.3613	1.00	0.3513	0.120	0.104	1.0
5	30:14	8.00	0.6	0.300	0.6	0.120	0.3490	1.00	0.3390	0.150	0.134	1.5
6	30:16	8.50	0.6	0.400	0.6	0.160	1.1598	1.00	1.1598	0.225	0.261	3.2
7	30:18	8.50	0.6	0.400	0.6	0.160	1.2203	1.00	1.2203	0.225	0.275	3.4
8	30:18	8.50	0.6	0.550	0.6	0.220	1.3628	1.00	1.3628	0.330	0.341	3.3
9	30:21	9.80	0.6	0.650	0.6	0.260	1.4301	1.00	1.4301	0.375	0.287	3.4
10	30:22	10.10	0.6	0.650	0.6	0.260	1.2768	1.00	1.2768	0.375	0.289	3.1
11	30:27	10.40	0.6	0.650	0.6	0.260	1.2430	1.00	1.2430	0.36	0.212	2.0
12	30:28	10.60	0.6	0.700	0.6	0.280	1.6518	1.00	1.6518	0.140	0.218	2.6
13	30:37	10.80	0.6	0.800	0.6	0.320	1.7066	1.00	1.7066	0.281	0.361	3.5
14	30:38	11.00	0.6	0.750	0.6	0.300	1.5830	1.00	1.5830	0.150	0.250	2.8
15	30:38	11.20	0.6	0.700	0.6	0.280	1.7188	1.00	1.7188	0.140	0.240	3.0
16	30:30	11.40	0.6	0.800	0.6	0.320	1.7477	1.00	1.7477	0.300	0.281	3.4
17	30:31	11.60	0.6	0.800	0.6	0.320	1.9879	1.00	1.9879	0.360	0.387	3.9
18	30:30	11.80	0.6	0.800	0.6	0.320	1.9462	1.00	1.9462	0.360	0.318	3.6
19	30:33	12.00	0.6	0.750	0.6	0.300	1.0613	1.00	1.0613	0.180	0.192	2.0
20	30:34	12.20	0.6	0.700	0.6	0.280	2.1790	1.00	2.1790	0.240	0.289	4.0
21	30:36	12.40	0.6	0.700	0.6	0.280	1.1381	1.00	1.1381	0.140	0.280	3.3
22	30:37	12.60	0.6	0.800	0.6	0.320	1.7448	1.00	1.7448	0.170	0.330	3.8
23	30:39	12.80	0.6	0.800	0.6	0.320	1.8514	1.00	1.8514	0.170	0.245	4.0
24	30:40	13.00	0.6	0.900	0.6	0.360	1.9239	1.00	1.9239	0.180	0.292	3.7
25	30:41	13.20	0.6	0.900	0.6	0.360	1.3812	1.00	1.3812	0.212	0.294	4.0
26	30:43	13.40	0.6	0.750	0.6	0.300	1.2534	1.00	1.2534	0.170	0.402	5.0
27	30:44	14.20	0.6	0.700	0.6	0.280	1.1575	1.00	1.1575	0.490	0.672	7.0
28	30:46	14.00	0.6	0.700	0.6	0.280	0.8807	1.00	0.8807	0.460	0.609	6.9
29	30:47	15.00	0.6	0.600	0.6	0.240	0.5094	1.00	0.5094	0.580	0.692	8.4
30	30:48	16.00	0.6	0.500	0.6	0.200	0.1889	1.00	0.1889	0.220	0.114	2.4
31	30:49	16.50	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.000	0.0

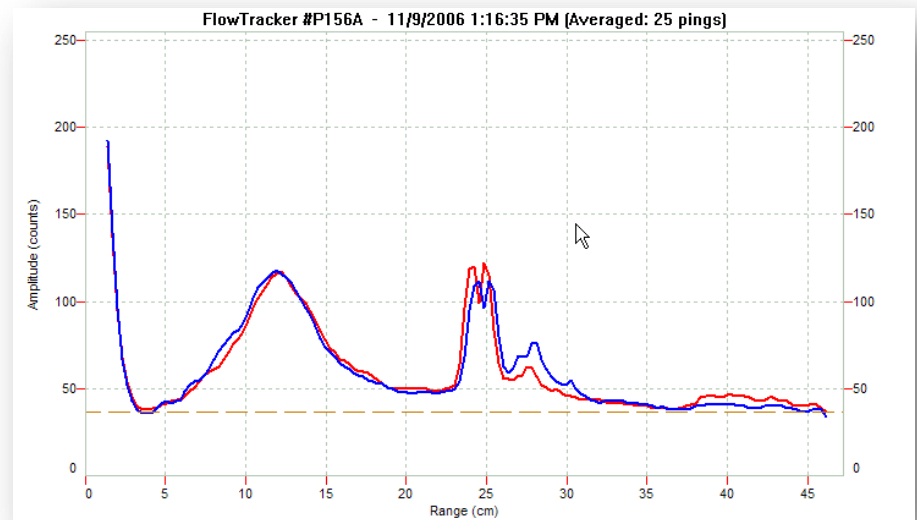
Rows in *italics* indicate a QC warning. See the Quality Control page of this report for more information.



Routine QA - Flowtrackers

■ Bucket tests

- After questionable results on auto-beam check
- After possible damage to instrument (a drop, etc.)
- Log and compare with previous log tests – should be consistent over time



Routine QA - Flowtrackers

- **Flowtracker Calibration Program**
 - **Every ADV recalled every 3 years (OSW Memo 2010.12)**
 - **Tests performed include: thermistor check, bucket test, and tow tank test at 2 speeds**
 - **Flowtracker re-calibrated if necessary**
 - **A WSC may request that a Flowtracker be tested at any time**



Routine QA - Flowtrackers

- OSW Flowtracker Calibration Program - Hydrographer Responsibilities:
 - Register all WSC Flowtrackers in HIF database
 - (<http://1stop.usgs.gov/flowtracker/>)
 - Respond in a timely manner to recall or let HIF know
 - Review results (ask questions as necessary)

The screenshot shows the USGS HIF FlowTracker Registration page. It includes a header with the USGS logo and navigation links. Below the header, there is a section titled "FlowTracker List" with instructions on how to use the list. The main content is a table with columns for Agency, Station Number, Profile, Cable Length, Date Rec'd/Inst, Primary Contact, Secondary Contact, Office, and Date Last SR.

Agency	Station Number	Profile	Cable Length	Date Rec'd/Inst	Primary Contact	Secondary Contact	Office	Date Last SR
WSC (Waters)								
WV	P792	10	10 meter	04/28/2003	Paul Terrell	Kevin Johnson	Salinas	01/23/04
WV	P793	10	10 meter	04/28/2003	Paul Terrell	Kevin Johnson	Salinas	04/24/04
WV	P794	10	10 meter	04/28/2003	John Roper	Kevin Johnson	SA, Salinas	04/24/04
WV	P888	10	10 meter	04/08/2003	Kevin Green	Kevin Johnson	Salinas	01/18/04
WV	P1093	10	10 meter	06/28/2003	Kevin Johnson	Kevin Johnson	Salinas	
WV	P1165	10	10 meter	02/15/2004	Charles Adams	Kevin Johnson	Salinas	
WV	P1235	10	10 meter	06/24/2003	Kevin Johnson	Kevin Johnson	Salinas	
WV	P1889	10	10 meter	08/18/2003	Jim Dunbar	Kevin Johnson	Salinas	
WV	P1241	10	10 meter	04/28/2003	Greg Gifford	Kevin Johnson	Salinas	
WV	P1252	10	10 meter	04/28/2003	Greg Gifford	Kevin Johnson	Salinas	
WV	P1882	10	10 meter	10/26/2003	Steve Schneider	Jim Harrison	Delphi	01/16/04
WV	P1889	10	10 meter	11/13/2003	Paul Ruddy	Kevin Johnson	Salinas	
WV	P2017	10	10 meter	03/19/2004	Kevin Johnson	Kevin Johnson	Salinas	04/23/04
WV	P2080	10	10 meter	02/24/2004	Steve Lynch	Kevin Johnson	Salinas	04/23/04
WEST								
WV	P799	10	10 meter	06/09/2003	Frank Lutz	Kevin Johnson	MS, Yreka	
WV	P833	10	10 meter	04/22/2004	Steve Lutz	Kevin Johnson	Salinas	
WV	P716	10	10 meter	08/13/2004	M Russ	Kevin Johnson	Salinas	
TRANSFERRED or NEWLY ACQUIRED								
WV	P1093	10	10 meter	04/11/2003				01/28/04
WSC (Waters) - REMOVED FROM SERVICE								
WV	P1445	10	10 meter	11/13/2003	Steve Schneider	Jim Harrison	Delphi	
WV	P1534	10	10 meter	10/04/2003	Kevin Johnson	Kevin Johnson	Salinas	

Routine QA - Flowtrackers

■ Sample Flowtracker QA Test Results

The screenshot shows the USGS HIF FlowTracker Registration website. The page title is "HIF FlowTracker Registration" and the URL is "http://1stsp.usgs.gov/flowtracker/main.cfm/151819111643021119580A3F/index.htm". The page features a navigation menu with links for "Welcome", "FlowTracker List", "Search", and "Logout". Below the navigation menu, there is a section titled "FlowTracker List" with a sub-heading "Below is a list of the FlowTrackers registered for IL." and a button "Add a FlowTracker". The main content is a table listing registered flowtrackers, categorized into "WSIC OWNED", "RENTAL", and "TRANSFERRED or NEWLY ACQUIRED". The table has columns for "Serial Number", "Probe", "Cable Length", "Date Purchased", and "Primary Contact".

	Serial Number	Probe	Cable Length	Date Purchased	Primary Contact	
WSIC OWNED						
Edit / Calibrations	P742	2D	2 meter	04/28/2005	Paul Terns	
Edit / Calibrations	P763	2D	2 meter	04/28/2005	John Goossen	
Edit / Calibrations	P801	3D	2 meter	04/28/2005	John Maurer	
Edit / Calibrations	P866	2D	2 meter	04/28/2005	Perry Draper	
Edit	P1055	2D	2 meter	09/25/2005	Kevin Johnson	
Edit	P1160	2D	2 meter	10/25/2005	Charles Bohall	
Edit	P1238	2D	2 meter	09/28/2005	Ryan Beaulin	
Edit	P1669	2D	2 meter	03/28/2007	Jim Dundker	
Edit	P1740	2D	2 meter	07/30/2007	Greg Goodwin	
Edit	P1787	2D	2 meter	07/30/2007	Shawn Meyer	
Edit / Calibrations	P1932	2D	2 meter	10/29/2007	Dave Schrader	
Edit	P1954	2D	2 meter	11/15/2008	Wick Gudyle	
Edit / Calibrations	P2977	2D	2 meter	07/21/2009	Kevin Johnson	
Edit / Calibrations	P2980	2D	2 meter	07/21/2009	Mark Lynch	
RENTAL						
Edit	P306	2D	2 meter	05/05/2003	Trent Legg	
Edit	P433	2D	2 meter	01/22/2004	Shawn Cutshaw	
Edit	P710	2D	2 meter	10/13/2004	Al Robl	
TRANSFERRED or NEWLY ACQUIRED						
Edit / Calibrations	P3400	2D	5 meter	06/11/2010		
WSIC OWNED - REMOVED FROM SERVICE						
	02/23/2010	P1246	2D	2 meter	11/22/2005	Dave Schrader
	02/23/2010	P1525	2D	2 meter	10/25/2006	Kevin Johnson

P866 (20110128) Summary.xlsx Summary Results

FlowTracker Serial Number => P866
CPU (Firmware) Version => 3.7
Date Checked => 2011-01-28

OVER ALL PERFORMANCE OF METER => **PASS**

Velocity Check Summary Data

18 cm/s (0.59 ft/s) % Error => -0.17% **PASS**
18 cm/s (0.59 ft/s) ± Error Band => 1.36% **PASS**
18 cm/s (0.59 ft/s) SonTek ± Error Band => 2.39% **PASS**

33.53 cm/s (1.12 ft/s) % Error => -0.36% **PASS**
33.53 cm/s (1.12 ft/s) ± Error Band => 1.74% **PASS**
33.53 cm/s (1.12 ft/s) SonTek ± Error Band => 1.75% **PASS**

Beam Check => **PASS**

Temperature Probe Check => **PASS**

NOTES: Overall performance of the meter being tested is set to PASS if all values in Velocity, Beam Check, and Temperature Probe Check tests are set to PASS or FAIR. Set to FAIL if any of Velocity, Beam Check, or Temperature Probe Check tests are set to FAIL.

Velocity Summary Check PASS/FAIL criteria (all meter data averaged to 1 second data).
 ^ Meter velocity % error set to PASS if the meter determined velocity % error is within SonTek Error Band for the set velocity.
 ^ Meter velocity % error set to FAIL if the meter determined velocity % error is outside SonTek Error Band for the set velocity.
 ^ Meter Error Band (2 standard deviations) set to PASS if value is less than or equal to SonTek Error Band.
 ^ Meter Error Band set to FAIR if value is greater than SonTek Error Band but less than 1.25 * SonTek Error Band.
 ^ Meter Error Band set to FAIL if value is greater than 1.25 * SonTek Error Band.

Beam Check set to PASS if the following criteria are met:
 Beam peak position is within 0.3 cm of each other; and
 Peak SNR* of beams are within 4 dB of each other.
 (* SNR = 0.43 * [peak level (counts) - noise (counts)].)

FlowTracker QA Test Results

- 23 meters (~9%) failed at least 1 of the QA tests
 - Temperature probe failures: 4 (~2%)
 - Velocity failures: 11 (~4%)
 - Remainder: beam check



Periodic Instrument Check

- **Best Practice: *Conduct periodic instrument checks.***
Not required. Conduct at regular interval, e.g. annually?
- **Individual ADCP comparison QMs**
 - Compare discharge measured with your ADCP with discharge measured with a current meter, some other accepted instrument, or stable S-Q rating
 - Don't always use the same measurement location
 - What happens when the comparison is outside an acceptable range (for example 5%)?
 - Repeat measurements – also at different sites
 - Record results in Instrument History Log

Periodic Instrument Check

■ ADCP Regattas

- Compare discharges measured by many/all WSC ADCPs
- Select site where multiple sections can be used
- Ideally have one instrument measuring continuously
- Steady – or near steady-flow conditions
- Synchronize times for ADCPs/Laptops before starting
- Maintain 5 channel depth separation for similar acoustic frequencies
- Good opportunity for review of important policies, new info regarding ADCPs, etc.

Example Regatta Summary

<http://hydroacoustics.usgs.gov/publications/CA-ADCP-Check-2007.pdf>

Summary of 2007 California District ADCP Check Measurements
Sacramento River at Colusa, CA
May 30, 2007

Introduction

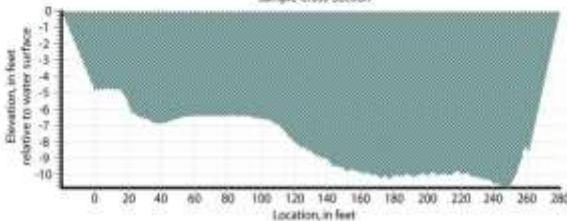
To ensure that the best possible discharge measurements are collected and that all acoustic discharge measurement equipment is properly functioning, the USGS Office of Surface Water recommends that all acoustic Doppler current profilers (ADCP) used for measuring discharge be checked at least one time per year at a stable gage. In 2007 12 units were tested; 4 from USGS hydrodynamics group, 3 from the California Department of Water Resources, and 1 each from the USGS Sacramento, Redding and Ukiah field offices, U.C. Davis, and the Yurok Tribe Environmental Program.

The 2007 ADCP check was conducted at USGS gaging station 11389500, the Sacramento River at Colusa, CA (Figure 1). This station was selected by the USGS Sacramento Field Office staff because it has a strong rating and has been very consistent over time. General information regarding this station can be obtained from the Station Information Page available through NWIS Web¹. The testing location is a wide and shallow site, the channel width is on the order of 300 feet, and the depth ranges from 5 feet to a maximum of approximately 11 feet (Figure 2). Channel characteristics at this location lend particular importance to boat operation to minimize pitch and roll variations and maintain proper transducer depth. Problems in either of these areas can produce biased measurements.



Figure 1: USGS Station 11389500, Sacramento River

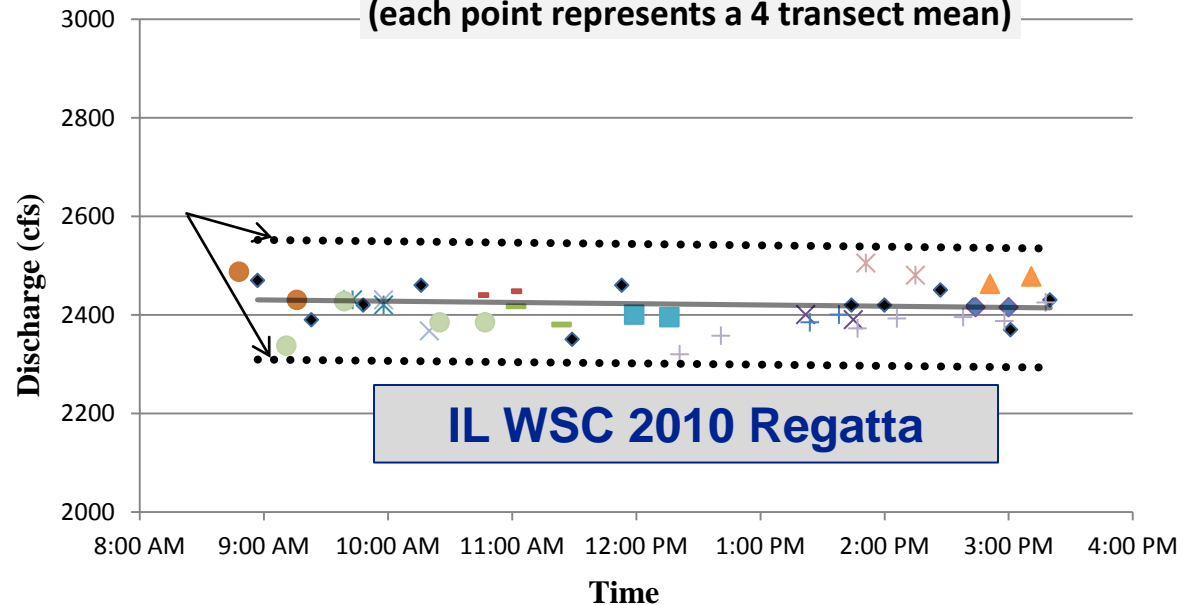
USGS Station 11389500, Sacramento River at Colusa, CA
Sample Cross-Section



ADCP Comparison Data

June 22, 2010

(each point represents a 4 transect mean)



IL WSC 2010 Regatta

- ◆ Baseline (OSW 1406 / 600 kHz)
- × IL 9521 (1200 kHz)
- × IL 8630 (1200 kHz)
- IL 8619 (600 kHz)
- + IL 8589 (1200 kHz)
- IL 8570 (600 kHz)
- IL 6223 (1200 kHz)
- ◆ IL 6222 (1200 kHz)

New Profilers

SonTek/YSI RiverSurveyor



TRDI RiverRay



New Instruments: RiverSurveyor and RiverRay

- OSW doesn't have sufficient data to find all potential issues
- Make comparison QMs for the range of conditions
 - Water velocities
 - Streambed type
 - Flow depths
 - Turbulence
 - Sediment concentration
- Use the instrument if there are no significant differences from the comparison measurements. Consistent biases are of particular concern
- Document and submit comparisons to OSW Sharepoint site <https://xcollaboration.usgs.gov/wg/OSWHA/Testing>

Sharepoint Testing Pages

WELCOME

Purpose

Welcome to the Office of Surface Water's (OSW) Hydroacoustics Testing and Evaluation SharePoint site. The purpose of this site is to provide an effective and efficient way to compile and share hydroacoustic instrument testing and comparison data. The OSW alone cannot collect enough data in a wide variety of conditions to ensure the quality of data from the variety of hydroacoustic instruments available in all conditions. Many users make comparison measurements as part of checking out a new instrument, routine quality assurance checks, and organized regattas. By compiling these data the OSW will be able to evaluate the performance of acoustic instruments in a wide variety of conditions, identify potential problems, and work to improve instrument performance where necessary.

Who

You! Everyone can participate. It is only through the participation of all USGS offices and other agencies that a sufficiently large data set can be compiled to cover the wide range of conditions in which these instruments are used. **Therefore, please submit your data!**

How This Works

Your Part:

1. Collect good quality comparison data with good documentation (include photos, if possible). For more detailed information on collecting good comparisons data [click here](#). NOTE: Data that do not meet the strict procedures outlined in the collecting good comparisons document may still be useful and you are encouraged to submit them.
2. Process your data and prepare any summary of the data you would like.
3. Scan the field notes for the comparison measurements and save as a pdf.
4. Create zip files of the data and supporting documentation and summaries.
5. Click "Add new item" in Data_Submissions on this page below.
6. Complete the form and attach your files.

Our Part: OSW staff will review your data (we may call or email to clarify questions) and add it to the national compilation. All data in the national compilation will be made available to you. **NOTE:** This is a work in progress and we haven't finalized how to efficiently share the raw data and summaries with you yet, but we will.

IMPORTANT: Files or combinations of files exceeding approximately 10MB may not upload properly. If you have problems attaching files to the Data_Submissions form, please complete the form and put your files in the ftp directory shown below below:

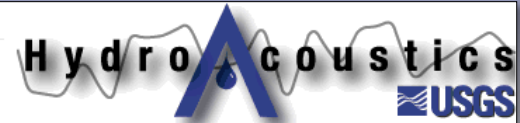
ftp://ftpint.usgs.gov/private/er/ky/louisville/OSW_Comparison

If you have problems email David S. Mueller (dmueller@usgs.gov).

Data_Submissions

[Add new item](#)

Type	Agency / Office	Contact Person	Contact Email	Contact Phone No.	Instrument Type	Description of Files
	USGS/IN	Mike Rehmel	mrehmel@usgs.gov	317-290-3333	StreamPro	SP and M0 very low velocities
	USGS - AZ	Hugh Darling	hdarling@usgs.gov	928-782-6024 x21	StreamPro; RiverSurveyor M9	09523200_020310M9.zip - M9 data 09523200_02032010.zip - StreamPro data



[Click Announcement to see full text](#)

Testing of SonTek/YSI RiverSurveyor M9/S5 and TRDI RiverRay 8/27/2010 3:17 PM
by Mueller, David S.

OSW has not completed testing of new ADCPs. Until the OSW has completed testing and issue technical memoranda or published their findings, it is necessary for WSCs to do their own QA of the new ADCPs if they intend to use them for data collection.

Links

- [OSW Hydroacoustics Web Page](#)

Questions? - Contact Us

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Office of Surface Water
dmueller@usgs.gov
(502) 493-1935

Kevin A. Oberg
Office of Surface Water
kaoberg@usgs.gov
(217) 328-9739

Mike S. Rehmel
Indiana WSC
msrehmel@usgs.gov
(317) 290-3333 x158



<https://xcollaboration.usgs.gov/wg/OSWHA/Testing>

Sharepoint Testing Pages

Recycle Bin
All Site Content

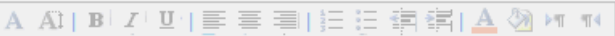
Agency / Office *
Agency or office submitting the data.


Contact Person *
Person to contact for any questions related to the data.

Contact Email *
Email address of contact person.

Contact Phone No. *
Phone number for contact person.

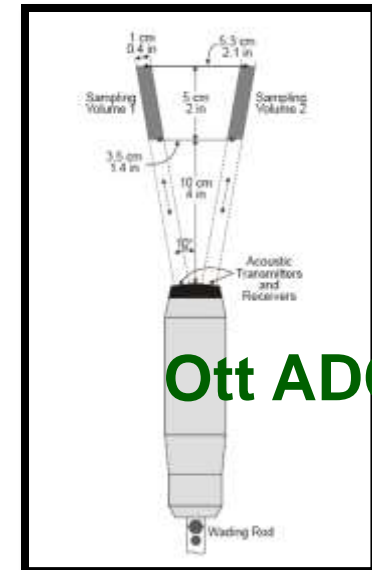
Instrument Type *
 Mechanical Meter
 Rating
 Rio Grande
 StreamPro
 RiverRay
 RiverSurveyor M9
 RiverSurveyor S5
 FlowTracker
 Ott ADC
 Other
Check all instrument types used in the comparison

Description of Files *

Enter the filename and a brief description of each file attached. Example: joecrk_M9.zip: M9 data or joecrk_1.zip

Comments

Include and comments or descriptions that would be helpful to the users of these data.

Ott ADC

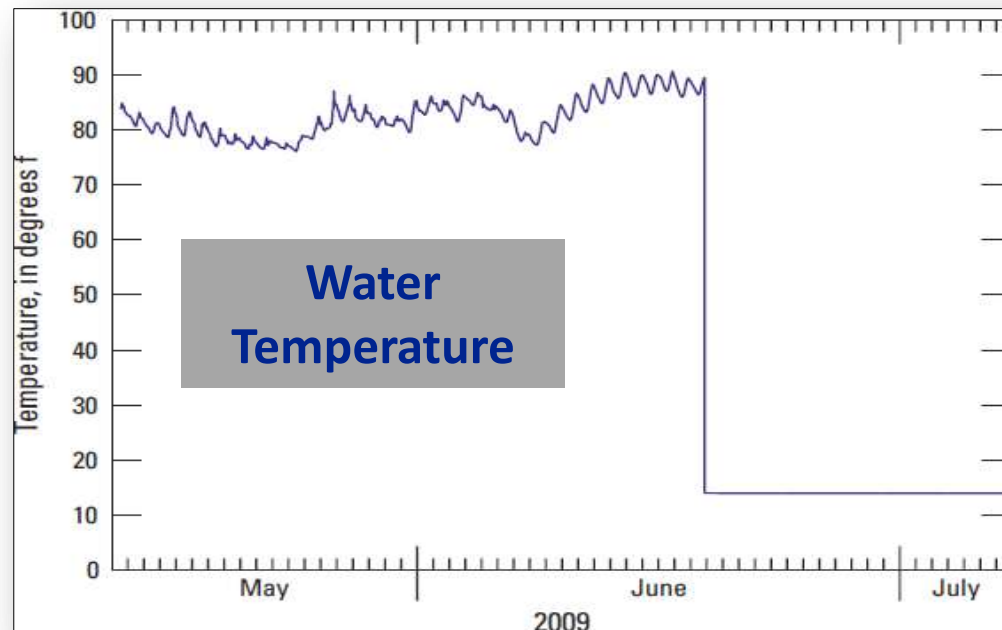
- Make comparison QMs for the range of conditions
 - Water velocities
 - Streambed type
 - Flow depths
 - Turbulence
 - Sediment concentration
- Use the instrument if there are no significant differences from the comparison measurements. Consistent biases are of particular concern



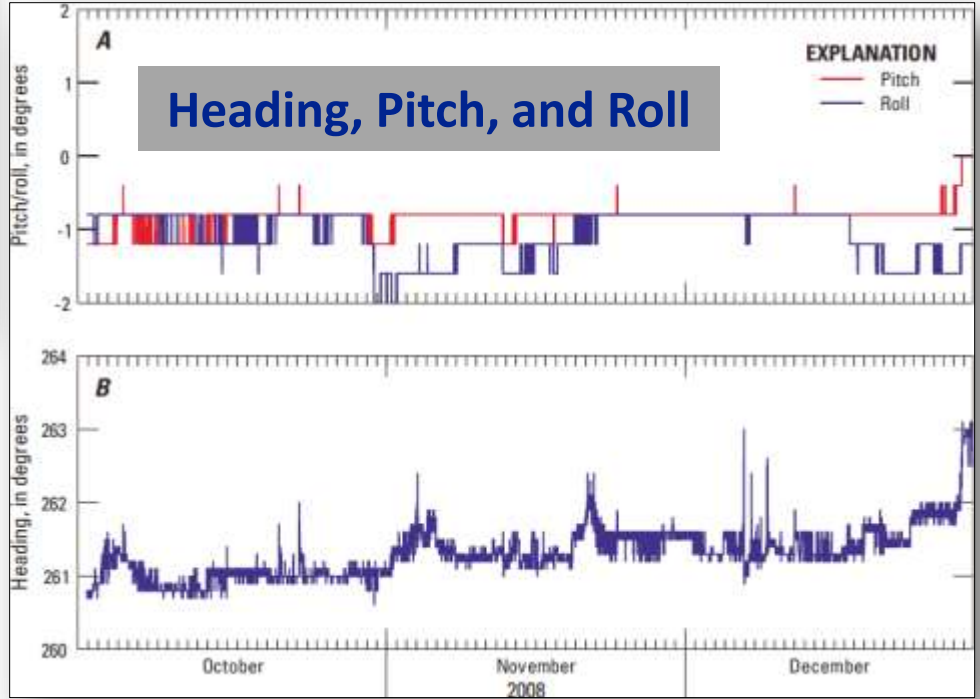
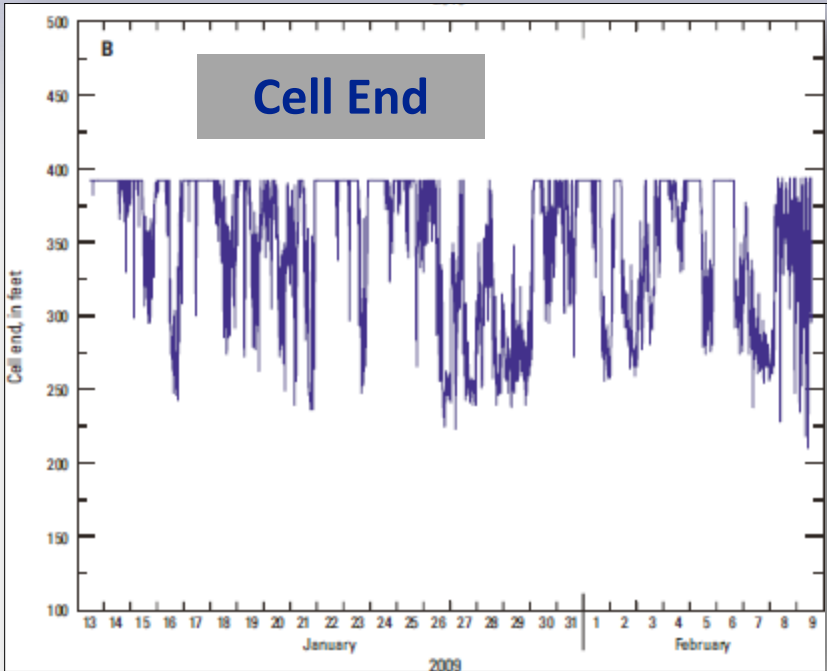
Ott ADC

ADVM QA

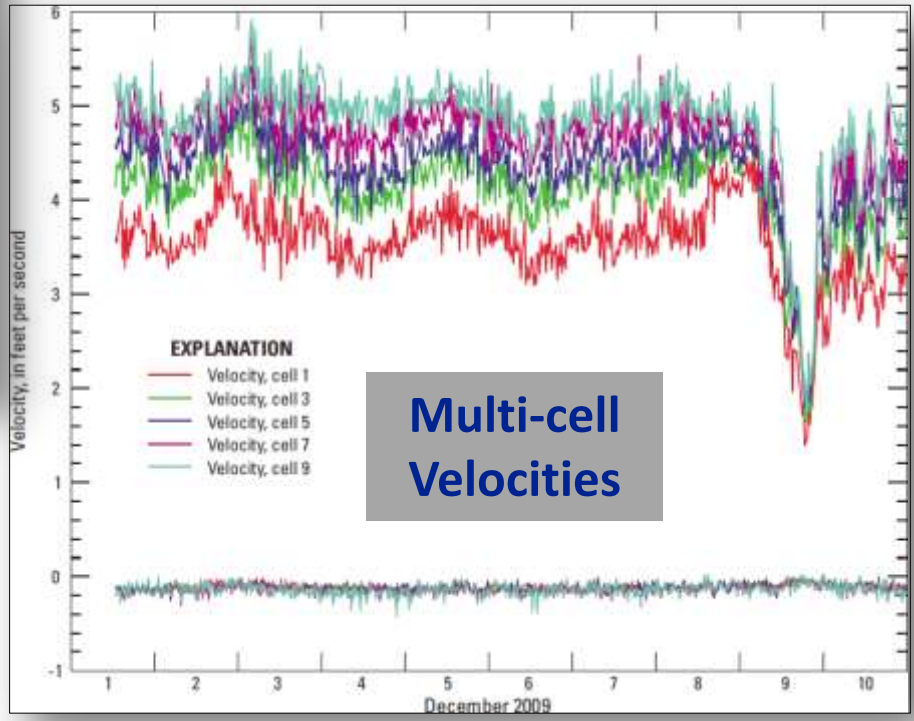
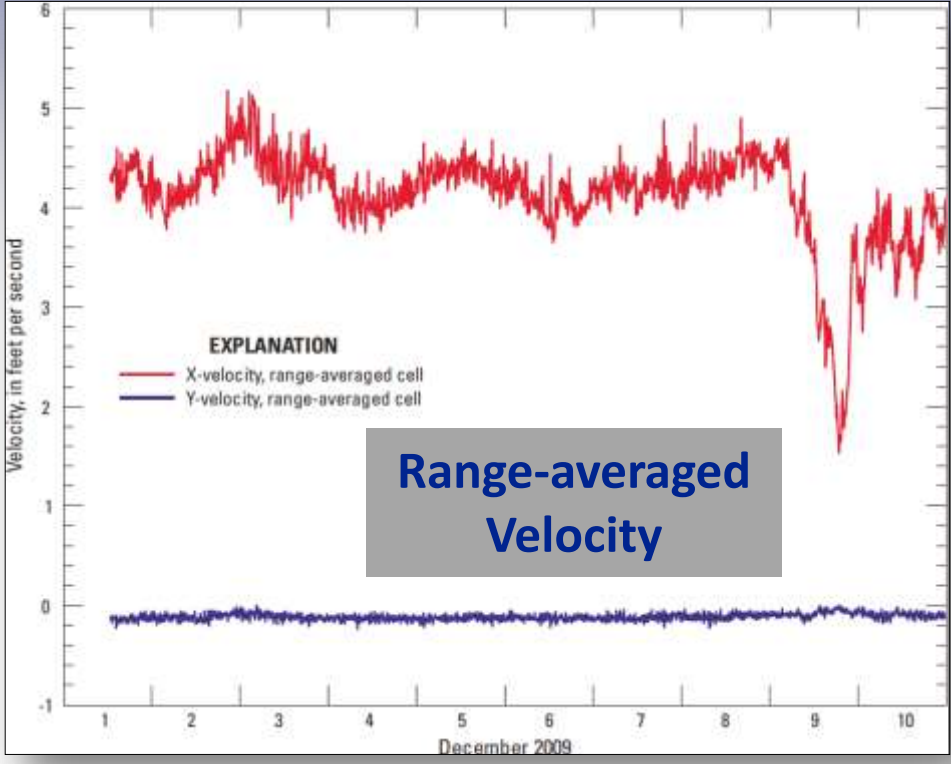
- Independent water temperature checks every site visit (at depth of & near to ADVM transducers)
- Monitor time series data for changes (SNR, temperature, velocities, pitch/roll, standard error, cell end, water depth, etc.)



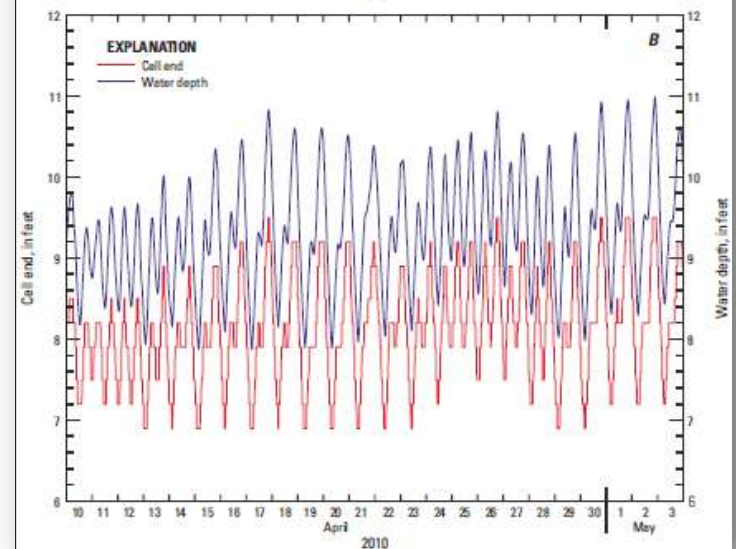
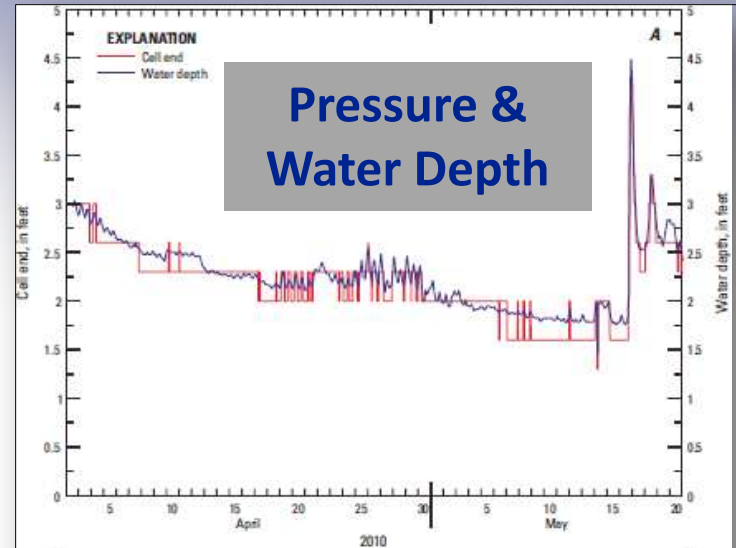
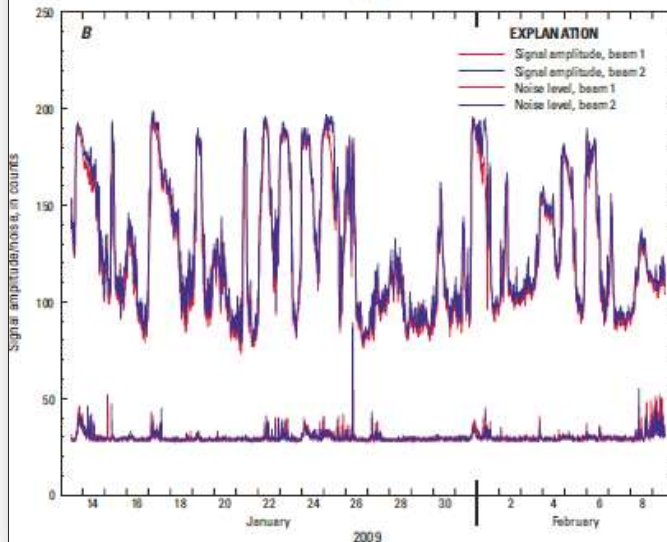
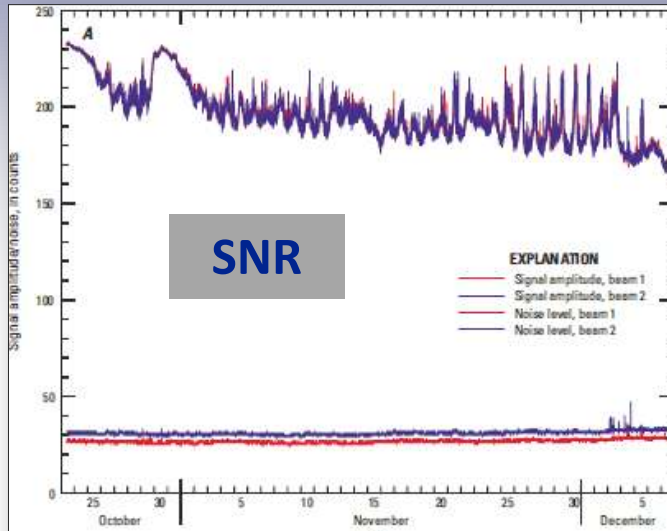
ADV M QA



ADV M QA



ADVM QA



Questions?