

BOR Antenna Discussion, 4/20/2015

Attendees: Kirstin Holfelder (CNHP), Amy Greenwell (CNHP), Dave Speas (BOR), Kevin McAbee (USFWS), Peter MacKinnon (USU)

Key: Question, Action Item

Review of Antenna Data Structure in STReaMs:

- Dave put together an outline of a potential data structure for antenna data in the database and a diagram; Kevin modified it (Fig 1). This was the starting point for our discussion on how to store antenna data in STReaMs.
- Locational information (lat/long and river or canal mile) will be collected at the array level
- **Question: Will we need to store the raw data number for each antenna in the database?** We don't need this because we can assign two digit codes to each antenna.
- Peter can program two digit codes for arrays and each antenna. We will pre-program these to facilitate the automatic upload process. **Action Item: CNHP will review the list of PIA locations and configurations and assign codes to the arrays and antennas. The PIAs will then be programmed to use these codes when collecting data.**
- How will using codes affect queries? We need to think this through. Users need an intuitive, user-friendly way to search the data.
- We will use the two codes for getting data in, and we can display the intuitive, user-friendly labels on the site as an alias. This will likely be calculated on the fly instead of stored in the database.
- When reviewing/selecting PIAs, folks will be most interested in seeing the Waterbody, Array Location, and Antenna (up or downstream). Kirstin can allow you to select by these categories, regardless of how it is stored in the databases.
- You can program the file name downloaded from the logger. The data files come in at the array level. We will program these file names so the system can associate the data to the correct array.
- Right now, the data files go to Peter and Kevin's computers. There are two files, one with fish and one with environmental data.
- It would be good to have a diagram at the array location level on the website. We should make an easy, consistent format for schematics. The flow of the river is important and confluences. The schematics can be made in MS PowerPoint and saved as .png files. Each array location will need its own diagram and these can be linked to the data on the website. **Action Item: Create a schematic template and make diagrams for each Array Location.**
- There are about 15 or 16 total PIAs, and they vary in complexity (from 1-4 or 5 arrays)
- **Question: How do we deal with portable flat plates?** It likely would not get stored with the stationary antennas. It will probably be dealt with as a sampling event and uploaded manually.

- We need to keep track of mechanical events and dates. When did it come online? What is its operational period? When is it down? We might have a location that has many active periods. Installation date (1 to 1), operational period (1 to many). **Action Item: Kirstin will create an event log to view events related to arrays. The user will be able to filter by event type.**
- Sonic technology will be considered permanent and will be stored with antenna data in STReaMs.
- Array Locations are managed by an agency or program (USFWS, or university, etc.). Would we want antenna data edited by the agency? **Question (from CNHP): How does this fit into our proposed roles?** The database manager will be responsible for reviewing the data that goes in or uploading data from other groups that might have PIAs not connected to this network. **Action Item: Add this item to the Data Manager task list.** The agency or program contact would be more appropriate for answering questions about the physical setup of the units or describing the surrounding landscape, etc.

Automatic Downloads:

- The Database Manager will review antenna data for major problems, but the data will be automatically loaded into database. Other folks collecting data outside of the network will contact the Data Manager to get their data on the site. **Action Item: In addition to automatic uploads, CNHP will set up a manual option for loading antenna data in batch from outside sources.**
- How will the automatic upload work? Peter describes the process: all sites are coming through a data logger via satellite or Verizon modem by IP address or cell phone number. There are several ways we could do this. We could pay into a monthly service or we could make a one-time purchase of Campbell Scientific's Loggernet software (about \$400). This is what the group is using now on Peter and Kevin's computers. You can control everything through Loggernet (not just data files, but also noise etc.). You just have to set up the phone numbers and IP addresses in the software. The Biomark units use an FTP site. We could set the server up to automatically retrieve files from the BioMark FTP site, using a static IP address. If we want a Biomark Manager tool, they do have a software package for about \$200. **Action Item: CNHP will purchase Loggernet and Peter will send CNHP the IP address and phone numbers for all units.**
- Some of the antennas collect environmental data like river stage and temperature. Environmental data are in a different csv file. These files come in every 10 or 15 minutes. Mostly people care about daily means. We can probably just collect one reading every hour for environmental data. Averages would only be based on the hourly data values.
- We can keep all of the environmental files archived, but we will only store data by hour in the database. We can probably have the interim files (taken every 10 minutes) downloadable from the site for those that might need that level of specificity.
- What about fish intervals? Maybe every 20 or 30 seconds is sufficient? For the fish interval, you set a delay in the reader. It scans a fish, and won't record it until another fish goes through and resets the delay, or the 30 seconds has passed. It is possible to miss which direction the fish moves if the intervals are too far apart. We really need different intervals for each PIA. Right now they are all different, based on the biology of the system. It is possible the intervals at one

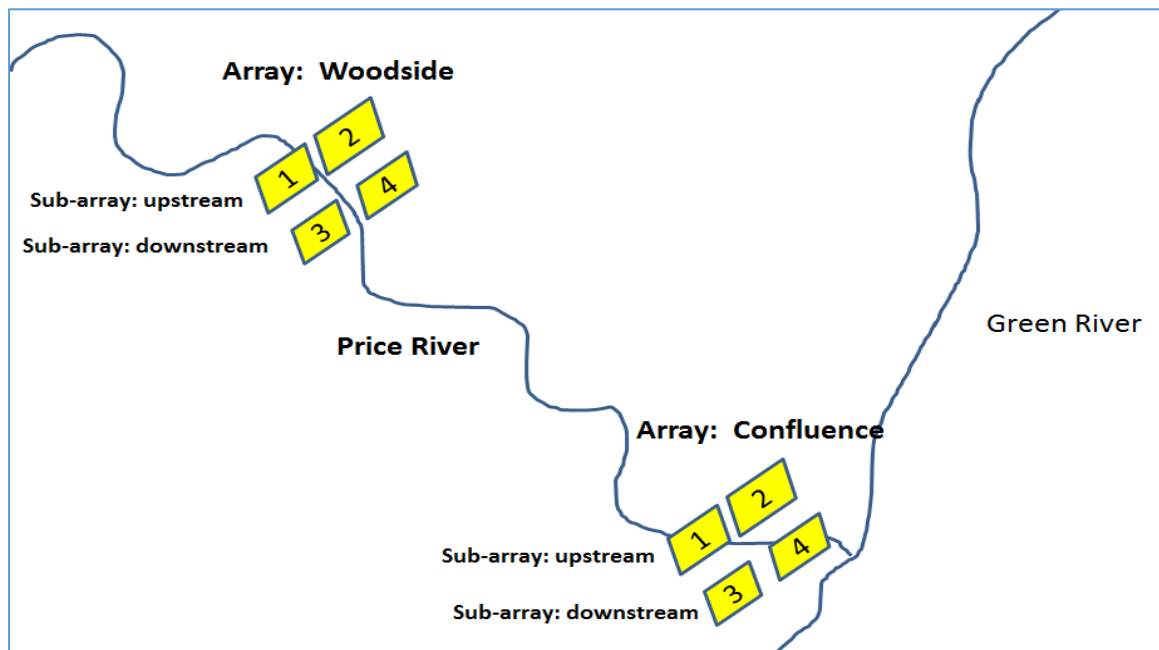
location could change. The intervals are stored in the reports. We can pull this out of the reports and store it in the database, so it can be associated with operational periods.

- Test tags are dummy tags that hit the system on a specified interval to make sure the system is working. The new instruments test each antenna. Test tag data will not be uploaded in the antenna tables, but we will use them to track events (this will track when it was up or down, etc.).
- We need to finish up the data structure for the antenna files. **Action Item: Dave will pull together the data for the array locations and send the spreadsheet to CNHP.** It might take a little work to get river miles and lat/longs for some of these locations.
- We need to finish up the data structure for collecting environmental data and the mechanics of the units. **Action Item: CNHP will draft a data structure for these items and send it out to the group for review. We will also pull in some of the look-up tables that were reviewed last week.**
- We need to check out the Loggernet software. **Action Item: CNHP will purchase Loggernet and get it installed on the server.**
- It might be easier to set up Loggernet with Peter on-site. Should we have a meeting at CNHP? The month of May might work for most folks. **Action Item: Kirstin will play around with Loggernet and let everyone know if an in-person meeting is needed to set the PIAs up in the system.**

Thanks Everyone!

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Figure 1. Diagram of Price River PIA and draft data structure for antenna data



Waterbody Name	Water body Type	Array Location	Installation Style	Stream Orientation	channel Orientation	Antenna ID (primary key)	Application	Array Orientation	Antenna Redundancy	Lat Long	River Mile	Canal mile
PIA Location	Application	Array	orientation	sub-array	Antenna #							
Price River	Tributary	Woodside	streambed	upstream	1	Price_Woodside_Up1	community monitoring	multiple arrays	multiple antennas			
Price River	Tributary	Woodside	streambed	upstream	2	Price_Woodside_Up2						
Price River	Tributary	Woodside	streambed	downstream	1	Price_Woodside_Dn1						
Price River	Tributary	Woodside	streambed	downstream	2	Price_Woodside_Dn2						
Price River	Tributary	Confluence	streambed	upstream	1	Price_Confluence_Up1						
Price River	Tributary	Confluence	streambed	upstream	2	Price_Confluence_Up2						
Price River	Tributary	Confluence	streambed	downstream	1	Price_Confluence_Dn1						
Price River	Tributary	Confluence	streambed	downstream	2	Price_Confluence_Dn2						
Green River Canal	canal	Flume	pass-through	upstream	n/a	GRC_Flume_Up	entrainment monitoring	multiple arrays	multiple antennas			
Green River Canal	canal	Flume	pass-through	downstream	n/a	GRC_Flume_Dn						
Green River Canal	canal	Below siphon	pass-through	upstream	n/a	GRC_Siphon_Up						
Green River Canal	canal	Below siphon	pass-through	downstream	n/a	GRC_Siphon_Dn						
White River	Tributary	Bonanza Bridge	streambed	n/a	1	White_Bonanza_1		single array	multiple antennas			
White River	Tributary	Bonanza Bridge	streambed	n/a	2	White_Bonanza_2						

Waterbody Name	Water body Type	Array Location	Installation Style	Stream Orientation	channel Orientation	Antenna ID (primary key)	Application	Array Orientation	Antenna Redundancy	Lat Long	River Mile	Canal mile
White River	Tributary	Bonanza Bridge	streambed	n/a	3	White_Bonanza_3						
White River	Tributary	Bonanza Bridge	streambed	n/a	4	White_Bonanza_4						
White River	Tributary	Bonanza Bridge	streambed	n/a	5	White_Bonanza_5						
Green River	Mainstem	Razorback Bar	portable flat plate	n/a	n/a	Green_RazorbackBar	Spawning monitoring	single location	single antenna			