IPTDS Site Diagram Instructions

To better represent instream arrays for data consumers, the Instream PIT Tag Detection System (IPTDS) Subcommittee has developed this document to assist in producing consistent, relevant, and comprehensive site surveys for all sites registered to PTAGIS. This document provides an outline for site stewards to produce site diagrams, so that they can capture the necessary information for researchers utilizing the site data for any purpose.

The final file submitted to PTAGIS will be a JPG image file created from PowerPoint slide(s) or equivalent (Open Office Impress, Mac Keynote etc.) which will allow a standard format for inclusion into the PTAGIS Interrogation Site Metadata page. The PowerPoint template (Figure 1) is available on the PTAGIS website and provides a standard size and a Title Block to provide relevant information for each site.
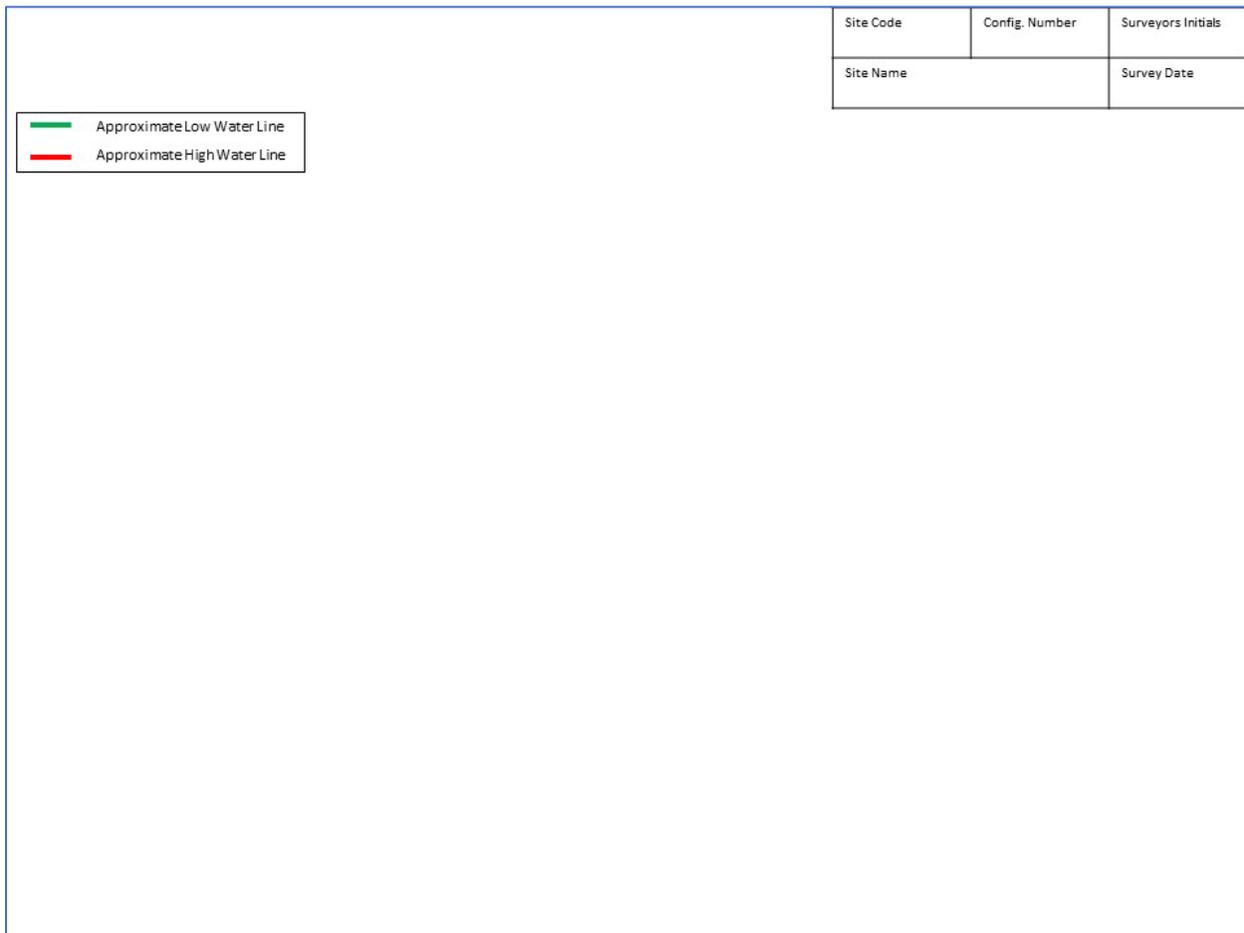

Site Code	Config. Number	Surveyors Initials
Site Name		Survey Date

Approximate Low Water Line
Approximate High Water Line

Figure 1. PowerPoint slide template for site diagram.

Basic Site Diagram Instructions

To complete a basic PTAGIS Site Diagram, the following will be needed:
- Microsoft PowerPoint or equivalent
- Google Earth
- Coordinates (Latitude and Longitude) for the site location
- PTAGIS Site Name, Code, and Configuration Number
- Understanding of the stream dimensions at the site including the high and low water-stages, and how water-stage relates to antenna placement.

Steps for completing Site Diagram:
1. Download Site Diagram Template
2. Download and install Google Earth
3. Capture a standard image of the site from Google Earth
4. Insert the Google Earth image into the PowerPoint template
5. Overlay important features on the PowerPoint slide (e.g. antennas, stream width at high and low water levels, equipment location and flow direction)
6. Save the slide as a JPG image file
7. Submit JPG to PTAGIS

After downloading and installing Google Earth, the first step will be to capture an image from Google Earth using the latitude and longitude coordinates of the site location as recorded in PTAGIS (or the coordinates that will be used to register the site in PTAGIS). For sites that have already been registered in PTAGIS, this information can be found under the **Location** section of the interrogation site metadata page on the PTAGIS website (Figure 2). For this example, site JD1 was used.
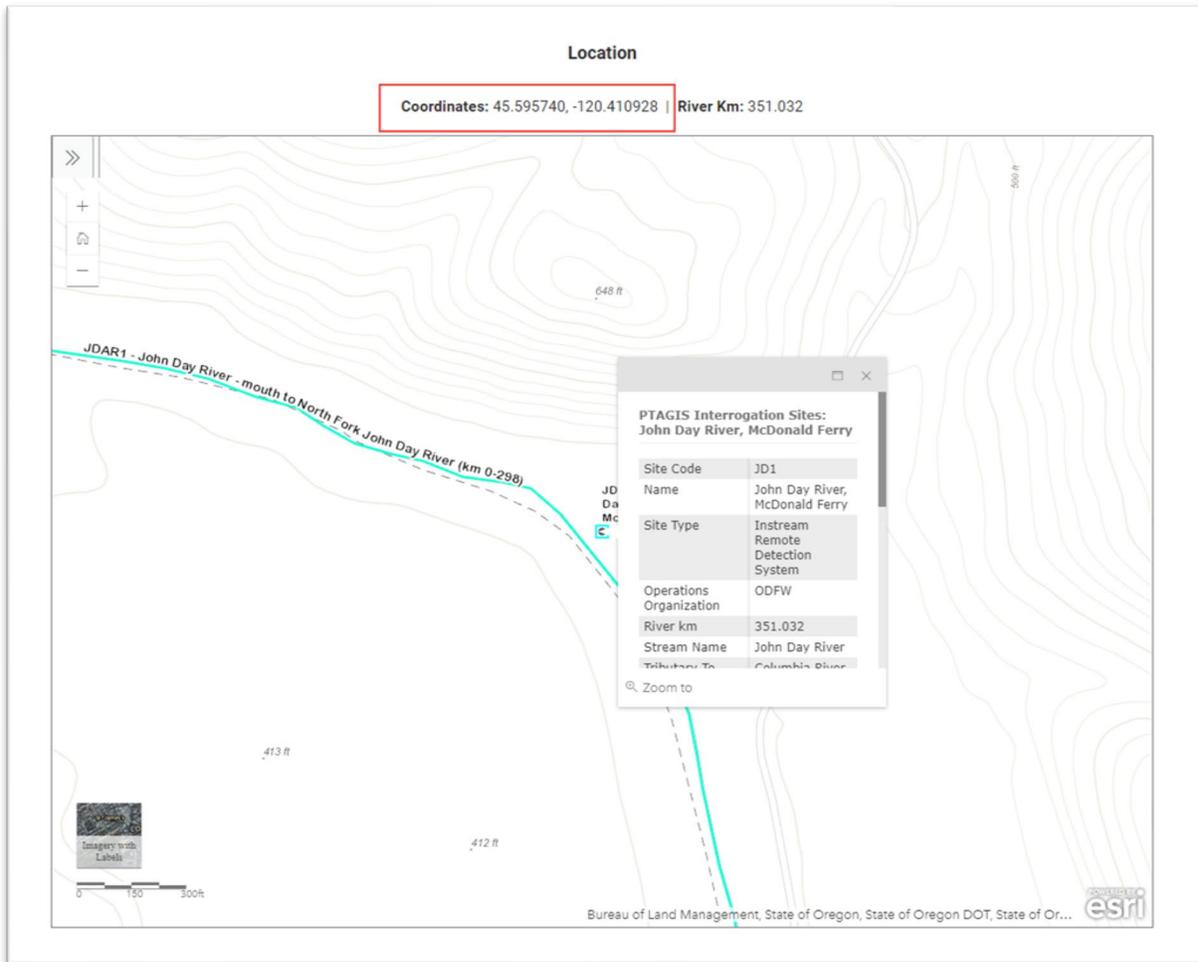

Figure 2. Latitude and longitude from the PTAGIS interrogation site metadata page.

With Google Earth open, input the latitude and longitude for the site into the **Search** bar at the top left and click the Search button to zoom into the site location.
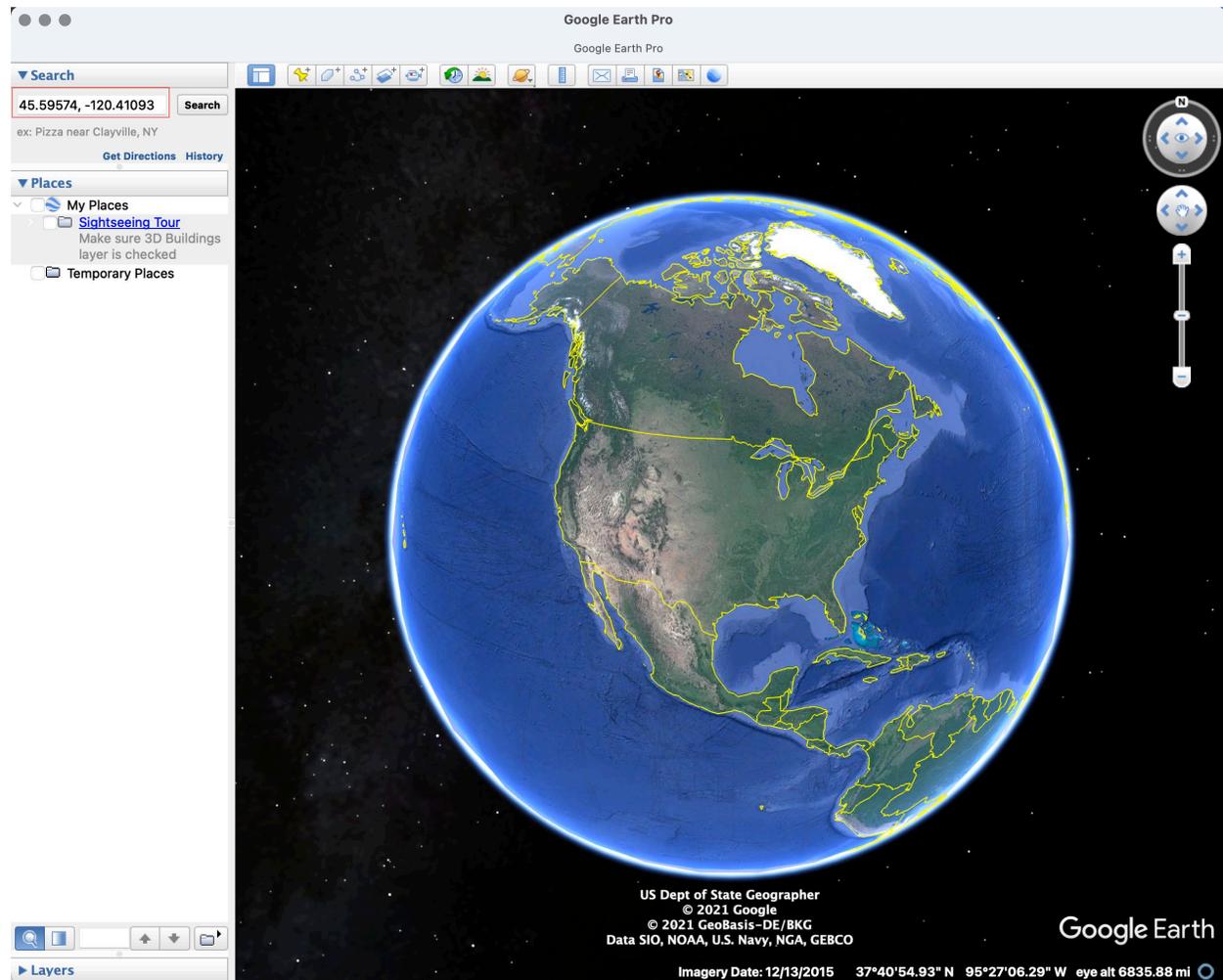

Figure 3. Search for the site location in Google Earth using the latitude and longitude coordinates.

To produce a standard map of each site, a similar eye altitude of ~300 ft above the site elevation is requested. The site elevation is listed on the bottom right as *elev*, and the *eye alt* represents the level above mean sea level. Zoom into the site until the eye altitude minus the elevation is equal to 300 ft. In the example of JD1, the site elevation is 380 ft, so the eye altitude should be 680 ft. If the entirety of the site will not fit into the 300 ft eye altitude map, please use 600 ft instead.

Note: If the elevation shows as 0, you may need to enable the Terrain layer in the Layers panel.

You can zoom in and out by using the mouse wheel for larger increments and the + and - keys on your keyboard for smaller increments. Here is a handy link to keyboard shortcuts for adjusting the view in Google Earth: Use keyboard shortcuts to navigate in Google Earth - Google Earth Help.
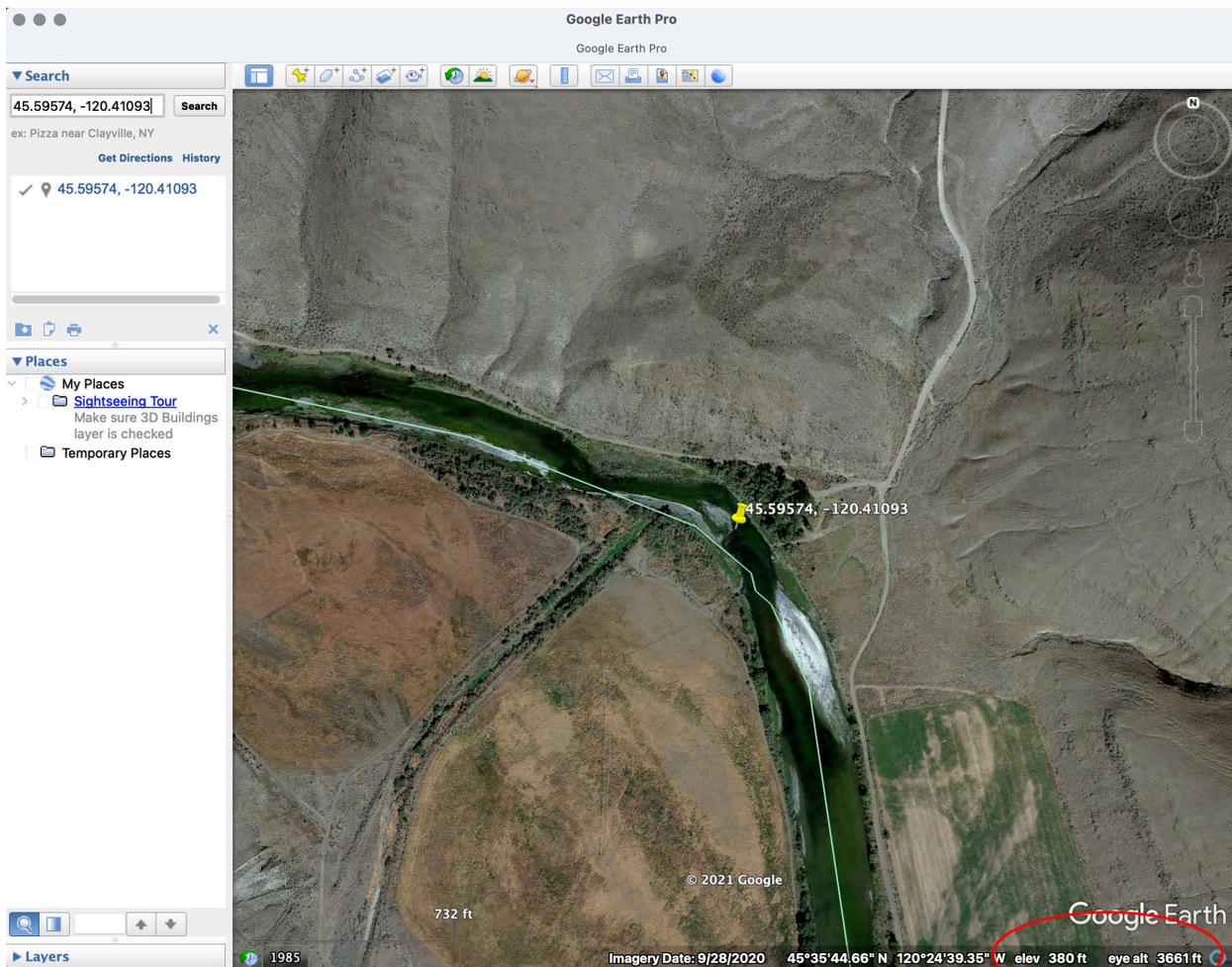

Figure 4. Google Earth showing JD1 with a site elevation of 380ft and eye altitude of 3,661 ft.

In the case of the JD1 example, the 300 ft eye elevation captures the entire site. It is important to include the shoreline in the image, as this will be used to outline the high and low water lines for the site.

After adjusting the map to the appropriate eye altitude, and verifying that the latitude and longitude marker is still centered, uncheck the Latitude/Longitude on the left side (Figure 5 circled in red) to hide the marker.
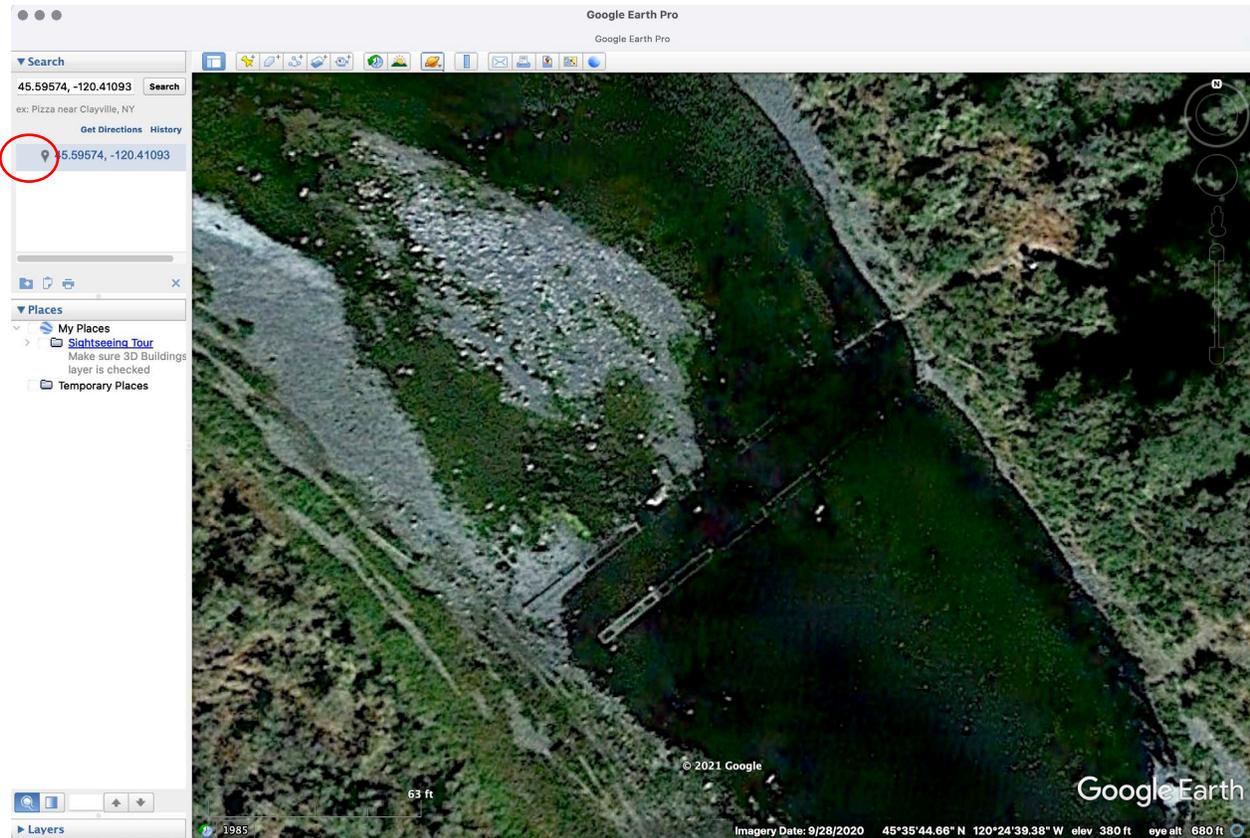
Figure 5. Google Earth showing JD1 with an eye altitude of 300 ft and the marker turned off.

Once the site location is at the correct eye altitude and the marker is turned off, save the view as an image file by clicking **File > Save > Save Image**. When saving the image, edit the Title and Description to set the site code as the title and the eye altitude as the description (Figure 6). For uniformity, save the image at a resolution of **1024 x 768**. This size will fit onto a standard width PowerPoint slide.

Figure 6. Saved image of the view of JD1 from Google Earth with the Title and Description set.

In some instances, the site will be entirely covered by trees as is the case for site JOC (Figure 7). In this case, it is up to the site steward to illustrate the site to the best of their ability, keeping in mind that the important features are to detail the antenna placement in the stream, coverage area of each antenna and the high and low water level of the channel.

Figure 7. Google Earth view of site JOC with tree coverage.

The saved image can now be inserted into the PowerPoint slide template. Once the image has been inserted, right-click the image and select **Send to back** from the context menu. This will expose the Title Block, which can now be completed with the Site Code (JD1 in this example), Configuration number (110), Surveyors initials (GTB), Site Name (Lower John Day) and Survey date (1/1/21). The Title Block text should be set to size 8 bold Calibri font.

Once the Title Block has been completed, use the **Shapes > Scribble** tool to draw the approximate *low water* and *high-water* bank lines for each side of the array. These lines should be 3 pt. solid green for low water and red for high water. This is an important step which allows data consumers to understand where the bank is relative to the antennas for all water levels. This step should be performed by the person most familiar with the site during all water stages.

The next step will be to draw and label the antennas, equipment side and water flow direction at the site in size 18 Calibri font. For existing sites, the Antenna IDs can be found on the interrogation site metadata page under the **Configuration** section (JD1 Configuration). Label the side of the river that contains the reader or data logger with **Equipment Side**. Finally, label the flow direction with a blue arrow (size 4 pt.) and **Flow** label showing the direction of water flow.

Figure 8. JD1 with direction of flow, antennas, and approximate high and low water lines completed.

Once complete, the slide should look like the above example (Figure 8). First save the PowerPoint as a PPTX, then click Save As and save the slide as a JPG image file. The JPG image file is what will be submitted to PTAGIS.

Bottom Profile Site Diagram (Optional)

To give researchers a more complete picture of the site performance and expectations on the capabilities of detection, an optional bottom profile with corresponding read ranges can be completed. To accomplish this, measurements need to be taken at the site to capture the depth of each antenna and provide read-ranges across the river for a visual indication of the extent of detections on a properly oriented tag.

To provide the necessary measurements, a line should be struck (i.e., parachute cord, rope or wire) from assumed high water line from bank to bank directly above the center of the antenna(s). Across this line, a measurement should be recorded every 12 - 48 inches (depending on the distance across and variability of the river bottom) from the taught line to the ground, river bottom or antenna. If the river bottom is uniform, you can increase the distance between measurements as needed. The low water point on each bank should also be recorded relative to the high-water line. These measurements should be noted as a negative value in the Excel spreadsheet.

At points above the antenna, read-ranges should also be taken. In addition to capturing read ranges, performance data should also be captured. Every effort should be taken to ensure the site performance is optimized before these measurements are taken.

The measurements should be entered into the spreadsheet which will allow for visualization of the bottom profile, the antenna placement along the bottom, and the corresponding read ranges (Figure 9). You can download an example Excel worksheet here.

Figure 9. Spreadsheet to Capture Bottom Profile and Read Ranges

Distance from left bank	Bottom Profile	Est. High Water	Est. Low Water	Water Lvl 10/15/19 @0938	Ant 01	Ant 01 RR	Ant 02	Ant 02 RR	Ant 03	Ant 03 RR	Ant 04	Ant 05	Ant 06	Ant 07	Ant 08	Ant 09	Ant 10	Ant 11	Ant 12
1	0	0	-18	-15															
2	-5	0	-18	-15															
3	-11	0	-18	-15															
4	-12	0	-18	-15															
5	-15	0	-18	-15	-12	4													
6	-18	0	-18	-15	-14	2													
7	-22	0	-18	-15	-17	-1													
8	-28	0	-18	-15	-21	-5													
9	-30	0	-18	-15	-25	-9													
10	-33	0	-18	-15	-26	-10													
11	-30	0	-18	-15	-27	-11													
12	-31	0	-18	-15	-29	-13													
13	-35	0	-18	-15	-30	-14													
14	-36	0	-18	-15	-31	-15													
15	-37	0	-18	-15	-32	-16													
16	-36	0	-18	-15															
17	-35	0	-18	-15			-35	-15											
18	-36	0	-18	-15			-35	-15											
19	-37	0	-18	-15			-34	-14											
20	-36	0	-18	-15			-33	-13											
21	-33	0	-18	-15			-31	-11											
22	-30	0	-18	-15			-29	-9											
23	-28	0	-18	-15			-28	-8											
24	-30	0	-18	-15			-27	-7											
25	-30	0	-18	-15			-26	-6											
26	-30	0	-18	-15			-26	-6											
27	-28	0	-18	-15			-25	-5											
28	-26	0	-18	-15					-24	-16									
29	-25	0	-18	-15					-23	-15									
30	-23	0	-18	-15					-22	-14									
31	-22	0	-18	-15					-21	-13									
32	-21	0	-18	-15					-20	-12									
33	-18	0	-18	-15					-18	-10									
34	-17	0	-18	-15					-16	-8									
35	-16	0	-18	-15					-14	-6									
36	-15	0	-18	-15					-13	-5									
37	-12	0	-18	-15					-12	-4									
38	-12	0	-18	-15					-11	-3									
39	-12	0	-18	-15															
40	-11	0	-18	-15															
41	-10	0	-18	-15															
42	-9	0	-18	-15															
43	-8	0	-18	-15															
44	-7	0	-18	-15															
45	-6	0	-18	-15															
46	-5	0	-18	-15															
47	-4	0	-18	-15															
48	-3	0	-18	-15															
49	-2	0	-18	-15															
50	-1	0	-18	-15															
51	-1	0	-18	-15															
52	-1	0	-18	-15															
53	0	0	-18	-15															

Once a complete spreadsheet has been generated, a line graph can be used to produce a visual representation of the cross-section profile for each antenna array and the corresponding read ranges (Figure 10). To submit the bottom profile to PTAGIS for inclusion on the metadata page, save the chart as a JPG.
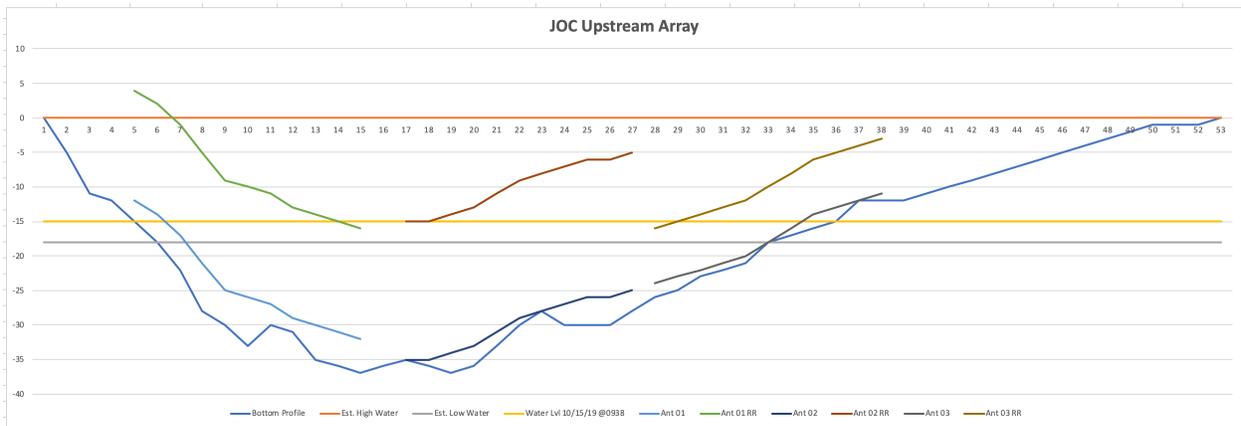

Figure 10. Line Chart to Represent Cross-Section

The cross-section profile of each site will help researchers and data consumers better understand the ability of each site to detect tags throughout varying water stages.