Hydro Survey Field Notes

Prepared by M.J. Thomas

**Field Survey Date:** 4/3/18

**Survey:** Depth Averaged Velocity (DAV)

Repeated cross sections between two fixed points between river right and river left. Replicate ADP surveys were performed 6 times by boat, attempting to maintain the same course during each of the replicate transects. We utilized the M9 ADP interfaced with the Sontek differential GPS as the horizontal reference.

\* Since this transect did not have the RTK used we do not have a high precision horizontal. However, we may still be able to use this in a more course fashion as it was above the actual multi-d system/ study footprint

M9 Settings

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| M9 | Sys. Time | Y - offset | Transducer Depth | Screening  Depth | Track ref | Depth ref | Corner  Sys. |
| Value | PST | - 0.2m | 0.41 m | 0.2 m | GPS-GGA | Vertical Beam | ENU |

Files generated on M9

|  |  |  |
| --- | --- | --- |
| Transect | Sample | File Name |
| 040318\_1 | 1 | 20180403131715 |
| 040318\_1 | 2 | 20180403132012 |
| 040318\_1 | 3 | 20180403132149 |
| 040318\_1 | 4 | 20180403132636 |
| 040318\_1 | 5 | 20180403133437 |
| 040318\_1 | 6 | 20180403133901 |

**Field Survey Date:** 4/4/18

**Survey:** PassiveDrifter Tag(s) Used: 7594

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Trimble Pt ID | Start N Cord. | Start E Cord. | Fork Taken | Time In PST | Time Out PST | Date |
| 1 | 4185672.203 | 647462.45 | Right | 10:55 |  | 4/4/18 |
| 2 | 4185640.896 | 647452.601 | Left | 11:17 | 11:25 | 4/4/18 |
| 3 | 4185365.804 | 647429.237 | Left | 11:38 | 11:46 | 4/4/18 |
| 4 | 4185662.620 | 647464.821 | Right | 11:57 | 12:09 | 4/4/18 |
| 5 | 4185656.795 | 647448.502 | Right | 12:19 | 12:29 | 4/4/18 |
| 6 | 4185642.154 | 647431.858 | Left | 12:36 | 12:45 | 4/4/18 |
| 7 | 4185632.044 | 647425.740 | Left | 12:54 | 13:04 | 4/4/18 |
| 8 | 4185622.936 | 647429.178 | Left | 13:14 | 13:28 | 4/4/18 |
| 9 | 4185655.157 | 647462.137 | Right | 13:35 | 13:44 | 4/4/18 |
| 10 | 4185640.905 | 647456.727 | Right | 13:48 | 14:03 | 4/4/18 |

**Field Survey Date:** 4/5/18

**Survey:** Depth Averaged Velocity (DAV)

Repeated cross sections between two fixed points between river right and river left. Replicate ADP surveys were performed six or more times by boat, attempting to maintain the same course during each of the replicate transects. We utilized the M9 ADP interfaced with the Sontek differential GPS as the horizontal reference. Horizontal positions were also collected during this survey using the Trimble R10 which may be paired with the flow velocity data to determine the accuracy of the boat velocities subtracted out from the flow measures.

M9 Settings

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| M9 | Sys. Time | Y - offset | Transducer Depth | Screening  Depth | Track ref | Depth ref | Corner  Sys. |
| Value | PST | - 0.2m | 0.41 m | 0.2 m | GPS-GGA | Vertical Beam | ENU |

Files generated on M9

\*Data collected on 4/5/2018, files were auto named based on 04/04/2018…need to investigate files.

**R10 Points:** Start 116, end 1223

|  |  |  |
| --- | --- | --- |
| Transect | Sample | File Name |
| 040518\_2 | 1 | 20180404082313 \* not a complete file, omitted |
| 040518\_2 | 2 | 20180404083811 \* not a complete file, omitted |
| 040518\_2 | 3 | 20180404084019 |
| 040518\_2 | 4 | 20180404084327 |
| 040518\_2 | 5 | 20180404084636 |
| 040518\_2 | 6 | 20180404085023 \* GPS drop check velocities near edge |
| 040518\_2 | 7 | 20180404085311 \* GPS drop near edge |
| 040518\_2 | 8 | 20180404085638 \*GPS drop out |

**R10 Points:** start 1224, end 2452

|  |  |  |
| --- | --- | --- |
| Transect | Sample | File Name |
| 040518\_3 | 1 | 20180405105244 |
| 040518\_3 | 2 | 20180405105630 |
| 040518\_3 | 3 | 20180405110020 |
| 040518\_3 | 4 | 20180405110424 |
| 040518\_3 | 5 | 20180405110806 |
| 040518\_3 | 6 | 20180405111121 |

**R10 Points:** start 2453, end 3765

|  |  |  |
| --- | --- | --- |
| Transect | Sample | File Name |
| 040518\_4 | 1 | 20180405111835 |
| 040518\_4 | 2 | 20180405112148 |
| 040518\_4 | 3 | 20180405112606 |
| 040518\_4 | 4 | 20180405113135 |
| 040518\_4 | 5 | 20180405113501 |
| 040518\_4 | 6 | 20180405113814 |

**R10 Points:** start 3766, end 5220

|  |  |  |
| --- | --- | --- |
| Transect | Sample | File Name |
| 040518\_5 | 1 | 20180405114643 |
| 040518\_5 | 2 | 20180405115026 |
| 040518\_5 | 3 | 20180405115441 |
| 040518\_5 | 4 | 20180405115759 |
| 040518\_5 | 5 | 20180405120143 |
| 040518\_5 | 6 | 20180405120852 |
| 040518\_5 | 7 | 20180405120505 \* GPS drop, check data for outlier |

**R10 Points:** start 5221, end 6818

|  |  |  |
| --- | --- | --- |
| Transect | Sample | File Name |
| 040518\_6 | 1 | 20180405122118 |
| 040518\_6 | 2 | 20180405122504 \* GPS drop, check data for outliers |
| 040518\_6 | 3 | 20180405122922 |
| 040518\_6 | 4 | 20180405123259 |
| 040518\_6 | 5 | 20180405123658 \* GPS drop, check for outlier |
| 040518\_6 | 6 | 20180405124045 |
| 040518\_6 | 7 | 20180405124534 |

**R10 Points:** start 6819, end 8348

|  |  |  |
| --- | --- | --- |
| Transect | Sample | File Name |
| 040518\_7 | 1 | 20180405125420 |
| 040518\_7 | 2 | 20180405125837 |
| 040518\_7 | 3 | 20180405130257 |
| 040518\_7 | 4 | 20180405130724 \* GPS drop, check for outliers |
| 040518\_7 | 5 | 20180405131159 |
| 040518\_7 | 6 | 20180405131709 \* GPS drop, check for outliers |

**R10 Points:** start 8349, end 9691

|  |  |  |
| --- | --- | --- |
| Transect | Sample | File Name |
| 040518\_8 | 1 | 20180405132843 |
| 040518\_8 | 2 | 20180405133104 |
| 040518\_8 | 3 | 20180405133319 |
| 040518\_8 | 4 | 20180405133631 |
| 040518\_8 | 5 | 20180405134326 |
| 040518\_8 | 6 | 20180405134648 |

**R10 Points:** start 8349, end 9691

|  |  |  |
| --- | --- | --- |
| Transect | Sample | File Name |
| 040518\_9 | 1 | 20180405140341 \* this sample excluded from field notes, although it looks to be fine |
| 040518\_9 | 2 | 20180405140857 |
| 040518\_9 | 3 | 20180405141205 |
| 040518\_9 | 4 | 20180405141447 |
| 040518\_9 | 5 | 20180405141703 |
| 040518\_9 | 6 | 20180405141919 |
| 040518\_9 | 7 | 20180405142235 |

\* Notes for post-processing DAV. If we decide to use the GGA reference, which I think we should due to the possibility of moving bed effects, consider HDOP for identifying outlier data points associated with loss of momentary GPS precision. Any HDOP < 2 is considered of excellent quality.

**Survey:** Elevation

**R10 Points:**

EL1 – EL4 River right in the right channel of the split at HOR

EL 6 – EL8 River left on the mainstem San J.

**Field Survey Date:** 4/10/2018

**Survey:** Bathymetry

The Bathymetry file was collected using our M9 River Surveyor ADP paired with the VPN corrected RTK horizontal position. Configurations are provided below. The bathymetry measurements were performed by boat by measuring the perimeter of the study area approximately 3-4m from the shoreline. Once the initial perimeter was collected we began a series of zig-zag maneuvers across the width of the channel trying to maintain approximately 25-30 meters between transects until the full coverage of the study area was collected.

M9 Settings

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| M9 | Sys. Time | Y - offset | Transducer Depth | Screening  Depth | Track ref | Depth ref | Corner  Sys. |
| Value | PST | - 0.2m | 0.41 m | 0.2 m | GPS-GGA | Vertical Beam | ENU |

Files Generated

|  |  |  |
| --- | --- | --- |
| Transect | Sample | File Name |
| 0401018\_1 | 1 | 20180410110310 |

**R10 Points:** 156-6360

**Survey:** SurfaceElevation

|  |  |  |
| --- | --- | --- |
| Location | R10 Points | R10 File Name |
| 1 | 6361,6362 | hydro\_4\_10\_18 |
| 2 | 6363,6364 | hydro\_4\_10\_18 |
| 3 | 6365,6366 | hydro\_4\_10\_18 |
| 4 | 6367,6368 | hydro\_4\_10\_18 |
| 5 | 6369,6370 | hydro\_4\_10\_18 |
| 6 | 6371,6372 | hydro\_4\_10\_18 |
| 7 | 6373,6374 | hydro\_4\_10\_18 |

**Field Survey Date:** 4/11/2018

**Survey:** PassiveDrifter Tests

Passive Drifters were deployed at the above of the study site, from an anchored vessel. We collected a starting location using the R10 system. Starting locations varied across the width of the channel. For each starting location, three drifters each with their own JSAT transmitter, were released into the river and allowed to passively drift the length of the study site. We will need to post process these tracks via Teknologic’s position estimation algorithm before passive drifter validation is complete.

**Tags IDs:** 7594,7A59,7AB6 (5 second PRI)

|  |  |  |  |
| --- | --- | --- | --- |
| Drift | Start R10 Point | Start Time PST | R10 File Name |
| 1 | dft1,dft2 | 10:29 | hydro\_4\_10\_18 |
| 2 | dft3,dft4 | 10:44 | hydro\_4\_10\_18 |
| 3 | dft5, dft6 | 11:04 | hydro\_4\_10\_18 |
| 4 | dft7,dft8 | 11:20 | hydro\_4\_10\_18 |
| 5 | dft9,dft10 | 11:36 | hydro\_4\_10\_18 |

**Survey:** Static XY multi-d validation

The XY static validation was performed to validate the Teknologic’s positioning algorithm. We selected four locations in which the vessel was anchored at the bow and a side anchor deployed to minimize horizontal sway. A survey rod with RTK receiver was held plum off the stern of the vessel. Two transmitters were attached to the base of the survey rod, approximately .721m deep. We collected horizontal positions for a total of 200 seconds at each of the locations. At 200 seconds and a 5 second PRI, we would expect to have approximately 40 +/- acoustic detections referenced by the VPN enabled RTK GPS. For all intents and purposes the R10 positions could be treated as an absolute position given the < 1.5 cm precision observed during tests.

**Tag IDs:** 7A59,7AB6 (5 second PRI)

**Tag Depth:** 0.721 m

|  |  |  |  |
| --- | --- | --- | --- |
| Location | R10 Points ID | General Location | R10 File Name |
| 1 | 6376-6574 | Bottom Center Array | hydro\_4\_10\_18 |
| 2 | 6575-6775 | RR 1/3 Channel | hydro\_4\_10\_18 |
| 3 | 6776-6975 | RL 1/3 Channel | hydro\_4\_10\_18 |
| 4 | 6976-7175 | Top Center Array | hydro\_4\_10\_18 |

**Survey:** RTK referenced drifts from vessel

The RTK referenced drifts were performed similar to the static XY validation test, however the vessel was allowed to freely drift through the multi-d array. Drifts were started above the study reach and ended when the vessel had floated beyond the range of the multi-d system. As with the static tests, we may assume the RTK referenced position at the time of detection represents an absolute horizontal position estimate given the system precision.

\* Double check RTK file, there were a few points during the track which horizontal precision dropped off. Double check file for correction needs.

**Tag IDs:** 7A59,7AB6

**Tag Depth:** 0.721 m

|  |  |  |  |
| --- | --- | --- | --- |
| Drift | R10 Points | Start Time PST | R10 File Name |
| 1 | 7176-7749 | 12:45 | hydro\_4\_10\_18 |
| 2 | 7750-8226 | 12:59 | hydro\_4\_10\_18 |
| 3 | 8227-8560 | 13:10 | hydro\_4\_10\_18 |

**\* 4/21/18 Sent Rusty the processed files for the DAV transect 7, both BT and GPS as the reference. Will look to see which reference works best for him.**