WaterCube Use the CEE ECHO™ to Survey the Silver River, Florida with Extreme Sub-Aquatic Vegetation

Use of the CEE ECHO™ in combination with the Hemisphere AtlasLink™ GNSS allowed a successful reconnaissance survey of the Silver River in Florida. The goal was to determine whether it was possible to gather useable bathymetry in this shallow environment with almost total sub aquatic vegetation coverage. With the real time 200 kHz echo sounder effectively mapping the top of the vegetation, post processed 33 kHz and 200 kHz data identified of the real bottom beneath, allowing determination of plant height and coverage.

WaterCube LLC is a river bathymetry and velocity mapping specialist, offering field data collection, consultancy, and advanced software solutions for data visualization and interpretation. Faced with a challenge of determining accurate bathymetry for their river modeling service in the Silver River, near Silver Springs Florida USA they turned to their dual frequency CEE ECHO™ portable echo sounder.

The Silver River is characterized by extreme sub aquatic vegetation covering most of the bottom, with growth fed by elevated nutrient levels in the natural spring water source.

As a result of the thick vegetation, any basic 200 kHz echo sounder would simply map the top of the canopy, with little or no accurate bathymetry relating to the real bottom 0.5 – 2m below.

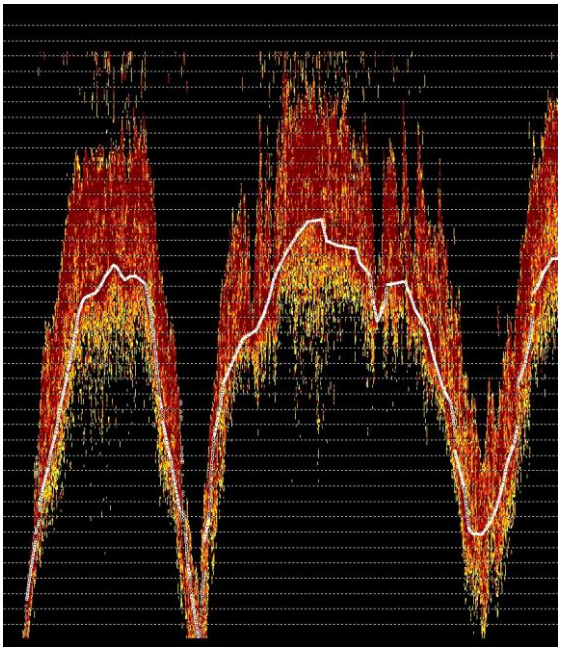
WaterCube used an inflatable boat with an over-the-side pole mounted 33/200 kHz transducer, CEE ECHO™, Hemisphere AtlasLink™ GNSS, and HYPACK® software to perform the survey.

It was immediately obvious that the canopy density was too high to allow the 200 kHz echo sounder to “see” the bottom easily. The substrate was soft, presenting no hard bottom return that could be identified against the canopy above.

The low frequency 33 kHz echo sounder channel was equally attenuated by the vegetation, and could not be used on its own to differentiate a true bottom surface.

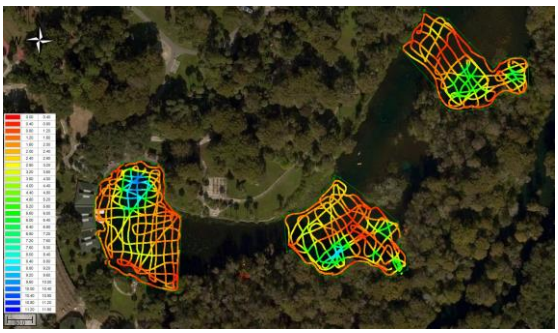
To conduct the survey, the CEE ECHO was operated in “manual mode” with fixed sonar characteristics appropriate for the conditions. The goal was to use the 200 kHz channel to map the top of the canopy and at the same time ensure that there was a secondary but still visible sonar return from the true bottom underneath. This could be achieved in real time by viewing the HYPACK® echogram window and modifying the settings until the best result was obtained. Below about 3-4m water depth, the 33 kHz and 200 kHz channels were used in combination to identify the true bottom.

During a survey, the echo sounder digitizes depth values based on its bottom tracking algorithms and these are recorded as soundings. The 200 kHz soundings followed the thick plant canopy accurately and could be used with almost no further editing. To show the real bottom underneath, the 200 kHz and 33 kHz echograms recorded by the CEE ECHO were superimposed and the 33 kHz soundings were re-digitized into a representation of the true bottom, replacing the soundings digitized during the survey. This was achieved by following the bottom echo trace that was visible on the HYPACK® echogram. With the two different frequencies now representing the two surfaces (top of canopy and true bottom), differences in plant height may be relatively easily determined.



HYPACK® re-digitized echogram showing the true bottom under tall and dense plant canopy.

The CEE ECHO’s echogram and ability to use post processing techniques allowed WaterCube to get a better understanding of the requirements to survey this river as part of future mapping projects.



To learn about WaterCube’s mapping and data processing services, visit their web site: www.watercubedata.com.