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USACE eHydro for Multibeam

By Mike Kalmbach

Here's a basic how-to for multibeam data. Some of this has changed from previous (beta) versions, but the basics remain the same. The procedure is as follows:

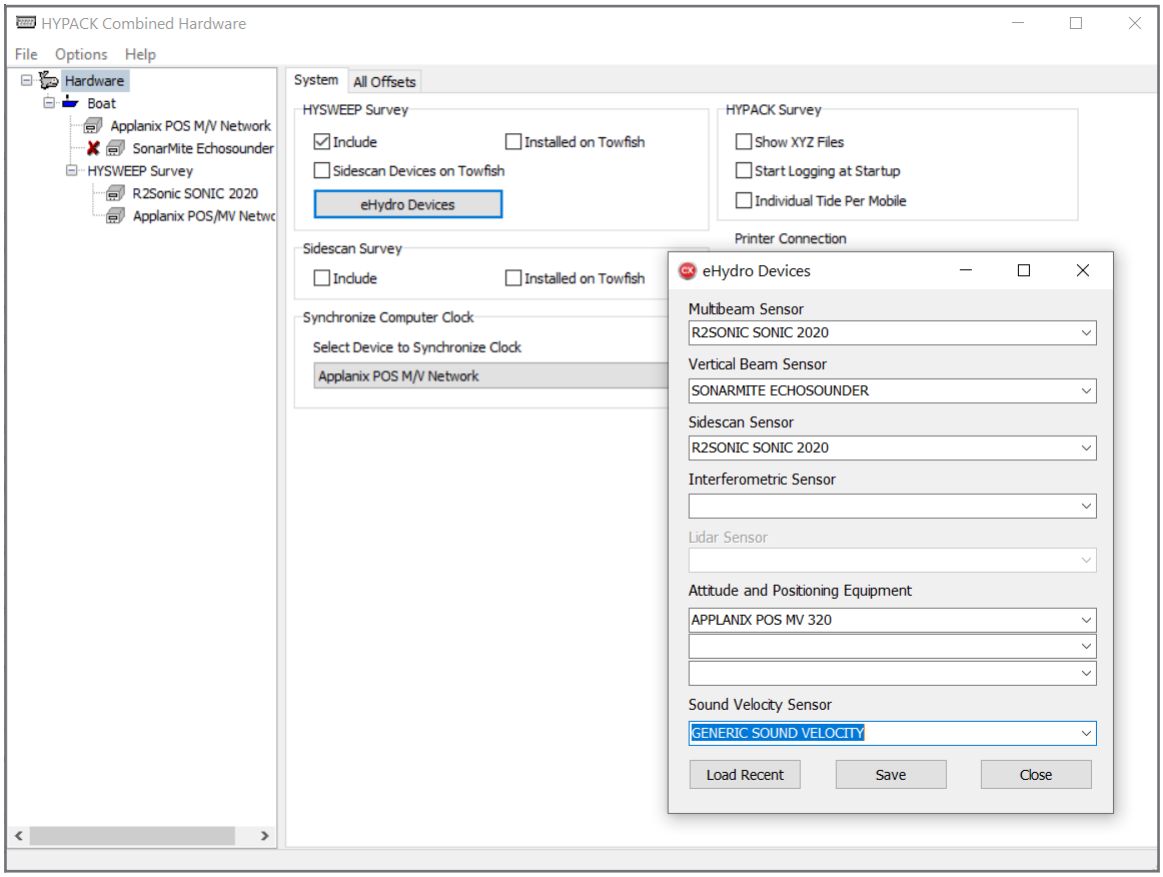
1. Boat Setup: Select devices for eHydro metadata. This should be done before surveying. There's no change in survey procedures.
2. MBMAX64 Editing: Just like you've always done. You might need to change the matrix cell size at times, depending on gridded XYZ requirements.
3. eHydro Project Naming: Believe me, we've all tried to make this painless.
4. Metadata and Target Export for the eHydro payload.
5. Final XYZ Save: Export gridded and/or full XYZ datasets with eHydro naming.

A note about survey. HYPACK® 2021 takes care to include as much metadata as possible in survey HSX files. This allows metadata to be filled automatically for export. Less room for error and less drudgery. The eHydro experience will be smoother with data collected by HYPACK® 2021 SURVEY.

BOAT SETUP

A detailed list of survey devices (sonar, positioning, etc.) is included in metadata. Pick from the list (or enter) in HYPACK® HARDWARE as shown in Figure 1. Selections are saved to survey data files (HSX) then inserted into metadata by post-processing.

Figure 1: eHydro Device Selections in HYPACK® HARDWARE.— Selections are made before surveying and carried all the way through to export.



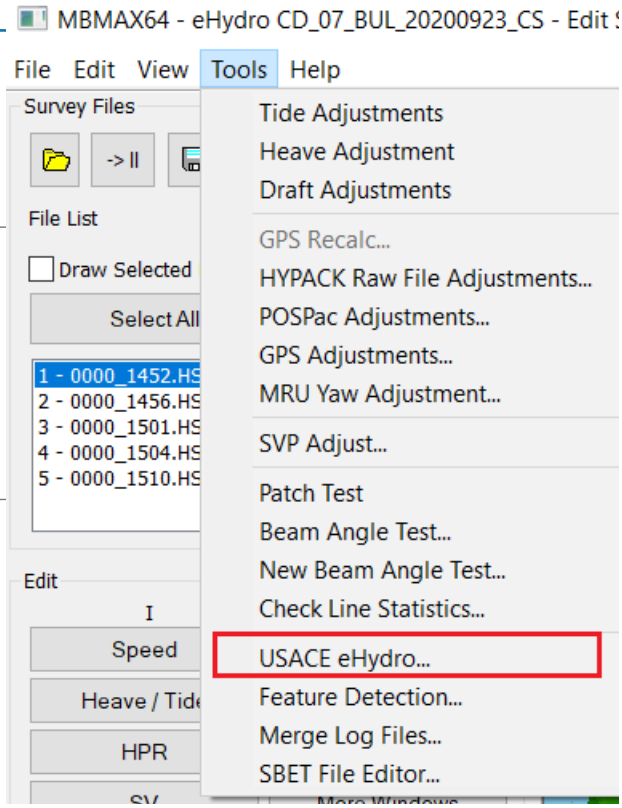
MBMAX64 EDITING

The process remains the same: edit HSX files through to saved HS2x, then the eHydro work kicks in. Editing and eHydro don't need to be in the same session; you can edit first, then come back later with HS2x files for eHydro. Neither does the eHydro work have to be completed in a single session; you can start eHydro in one session and finish in another.

EHYDRO PROJECT NAMING

Start eHydro work using the MBMAX64 tools menu (Figure 2).

Figure 2: Main Menu Selection for eHydro.



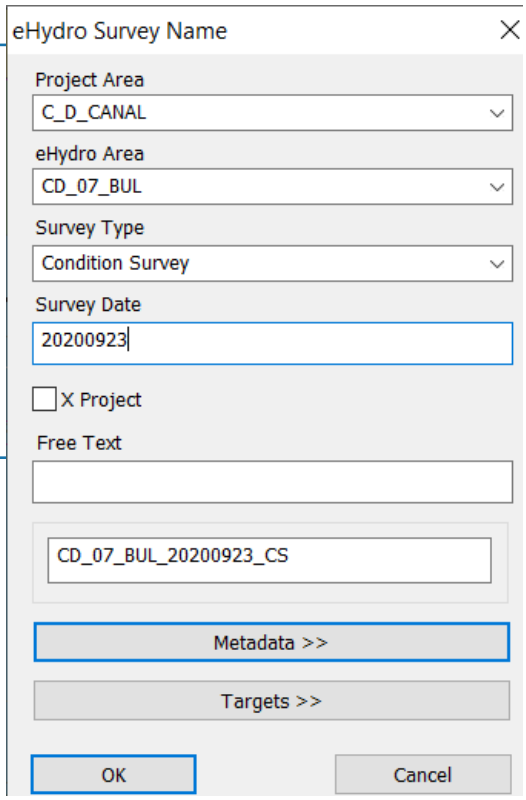
The new look is shown in Figure 3. Lists are filled using the eHydro file "eHydroProjectAreaExport.xml" in the HYPACK root folder.

NOTE: We don't supply the XML file with HYPACK®. The eHydro console (TIM) can be used to export the XML. Contact gerald.l.thornberry@usace.army.mil for details about this and other USACE-side issues.

From Gerald about eHydroProjectArea-Export.xml:

"There is an eHydro console (nick-named "TIM", The Information Manager). That console is a GUI for common eHydro operations. In it, there will be a new script that will automatically extract the district-level or office-level project names (for example, Mobile District has 4 field offices who each run eHydro) and format the XML. It will only have access to the district's information. You (HYPACK) shouldn't have to provide XML unless you merely need it as a placeholder for your code."

Figure 3: Selections for eHydro Naming..



The lists (areas and survey type) come from the eHydroProjectAreaExport.xml. Date comes from HSX survey files; it should equal the start of the earliest survey file, but can be edited if necessary. X Project is for eHydro specials; "X" becomes the 10th naming character. Free Text can be appended to eHydro names

If eHydroProjectAreaExport.xml is missing we show Figure 4 and naming becomes Figure 5.

Figure 4: Warning if naming XML is missing.

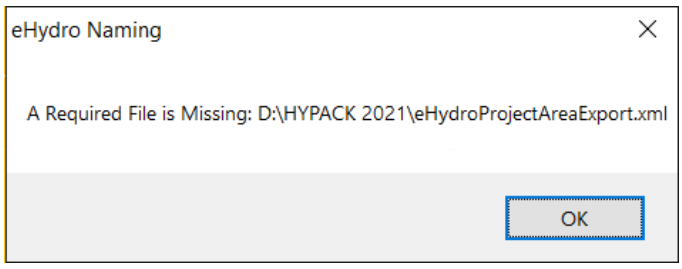
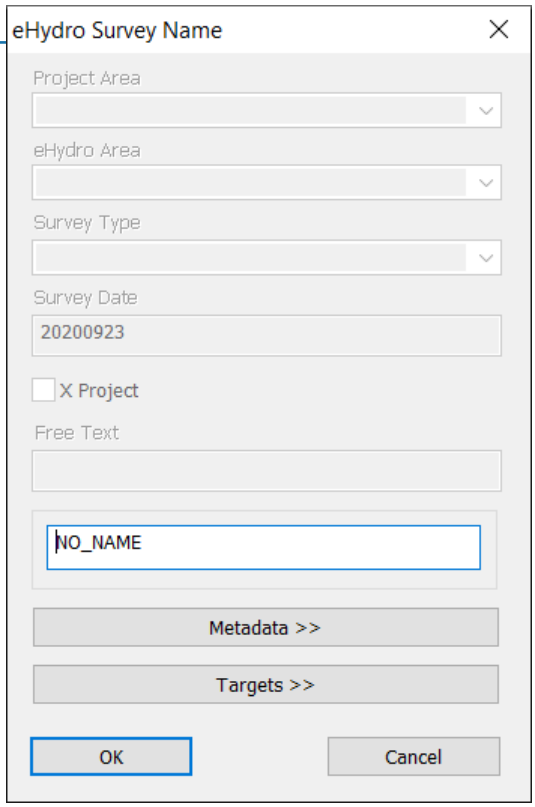


Figure 5: Survey Name Dialog when the XML is Missing.



The only option here is to enter a name yourself. This is not the way to go; it's best to shut down MBMAX64, get the XML file and start over.

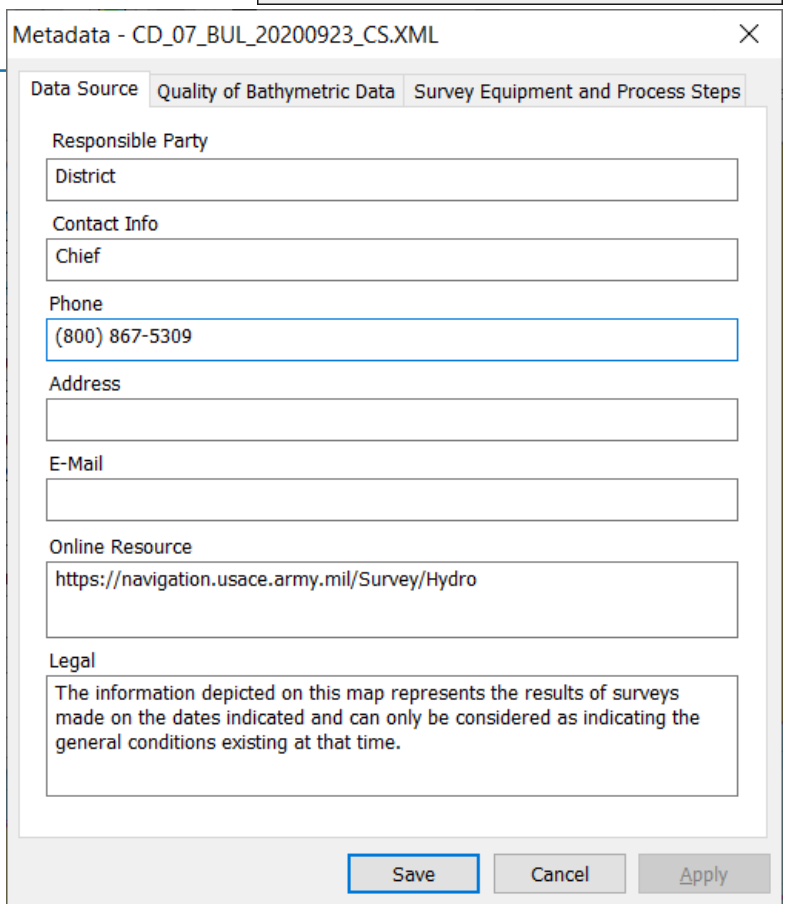
METADATA AND TARGET EXPORT

Click [Metadata] to access Figures 6, 7 and 8. You need to visit the metadata forms and, *even if nothing is changed*, click the Save button to export the data. Metadata is saved to ISO 19115 standard.

Click [Targets] for target export shown in Figure 9.

Using the eHydro project name from the example, metadata export is to file CD_07_BUL_20200923_CS.XML and targets to CD_07_BUL_20200923_CS.TGT.

Figure 6: Metadata – Source of Information.



You only need enter this once; it will be carried from one HYPACK project to the next.

Figure 7: Metadata – Quality of Data. .

Most of this comes from the HSX survey files. MBES systems provide full bathymetric coverage. Grid resolution depends of matrix cell size.

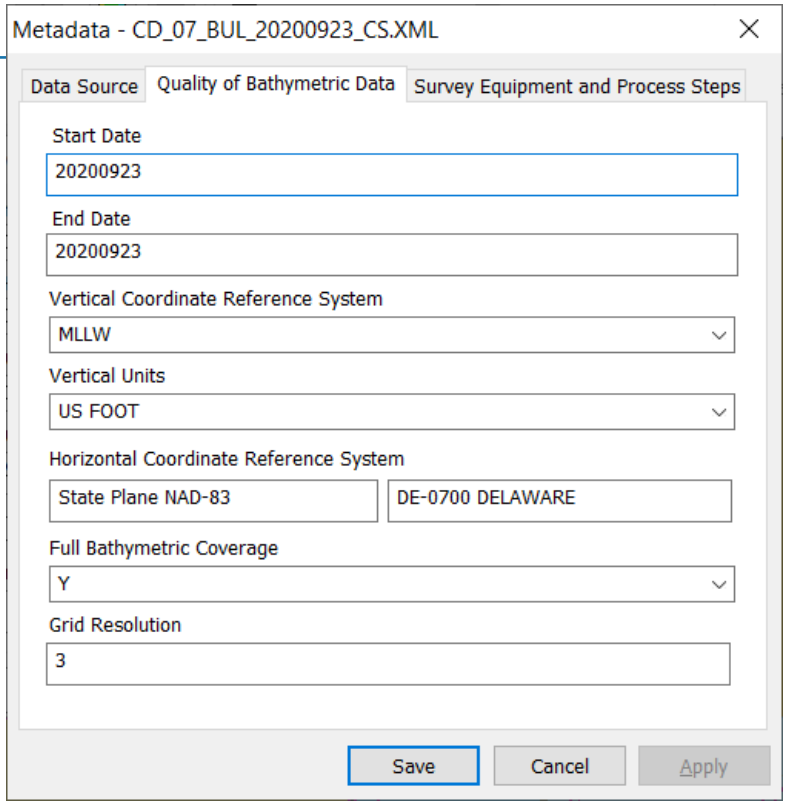


Figure 8: Survey Equipment and Process Steps.

Devices are from boat setup but can be selected here if missing. Vertical datum processing (RTK Tides) are typically from setup at survey time. If PPK (e.g. POSPac) is used the vertical datum will show geodesy applied to PPK processing

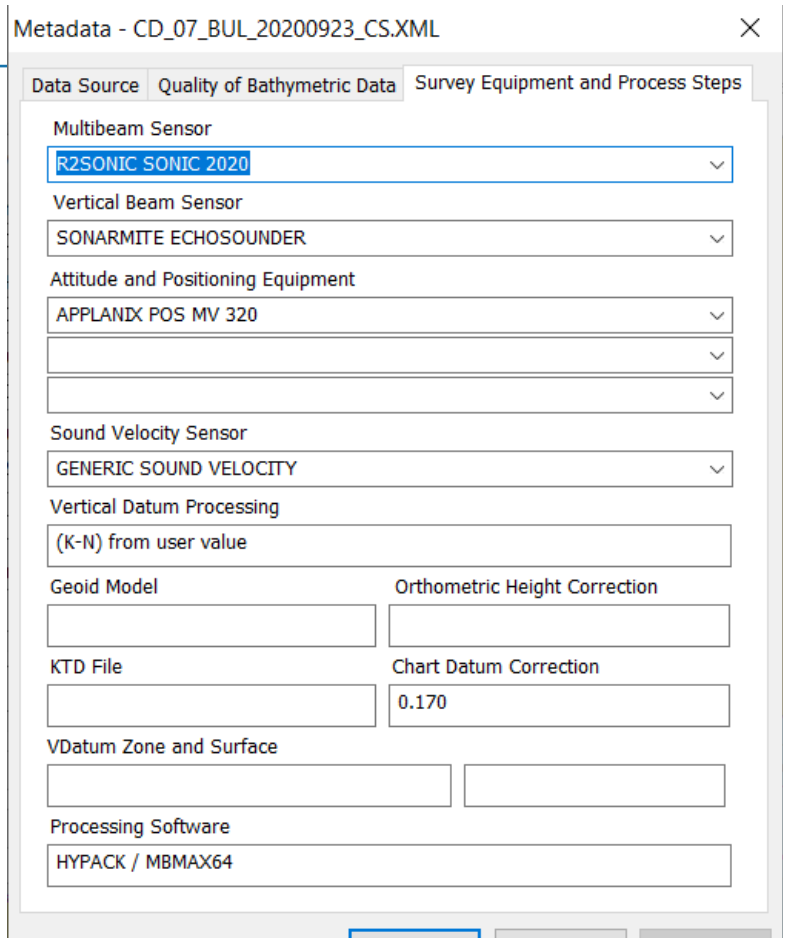
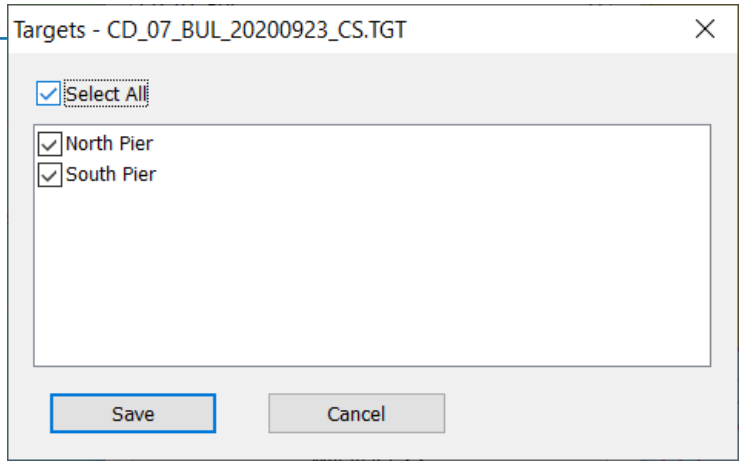


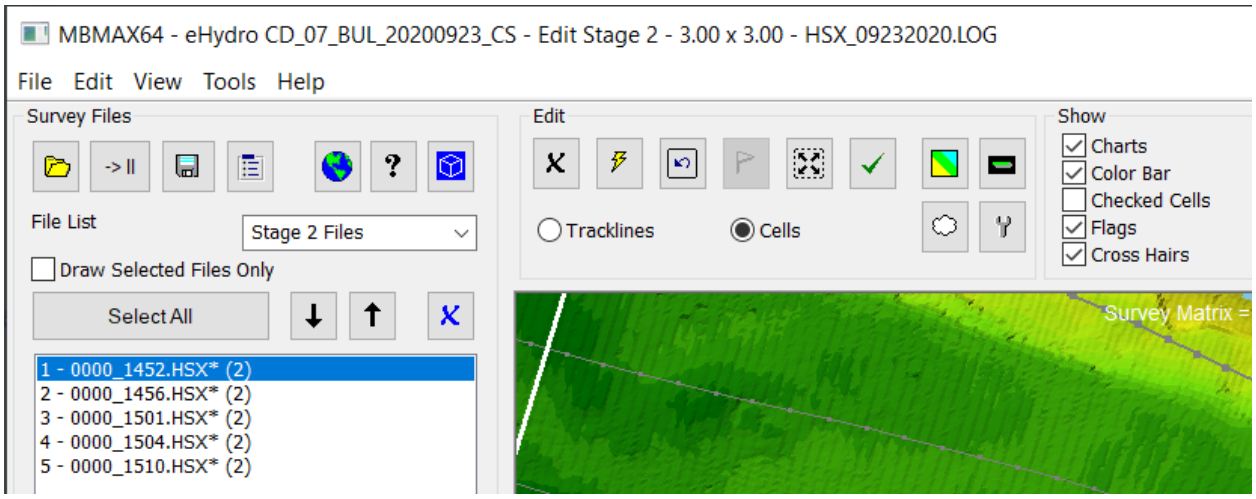
Figure 9: Target Export. .

Saves selections to HYPACK legacy format (TGT)



The eHydro name is shown in the MBMAX64 title bar as a constant reminder (Figure 10).

Figure 10: eHydro Project Name is Shown Up Top.

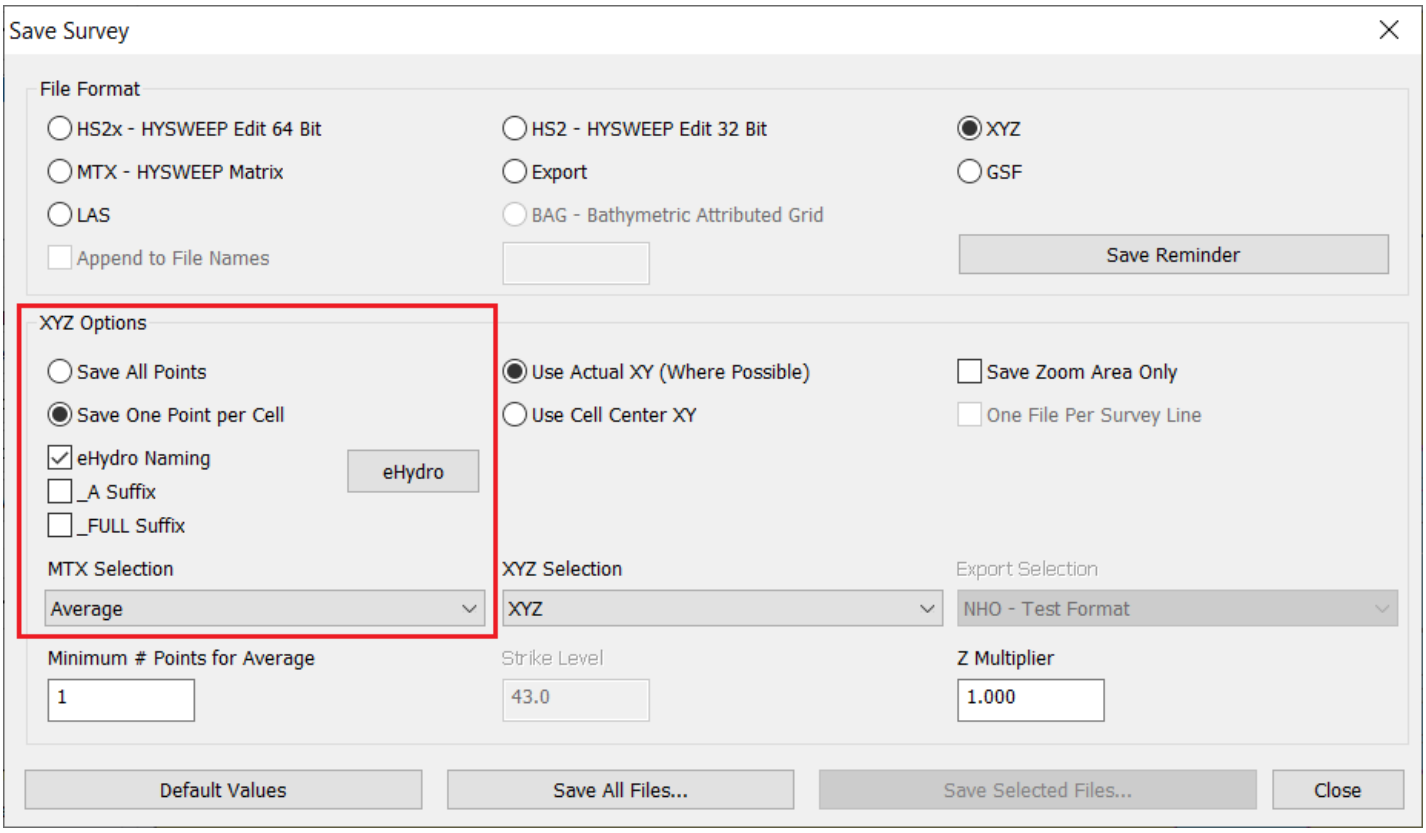


FINAL XYZ SAVE

Finally comes the hydrographic part: saving XYZ files. Figure 11 shows the eHydro options.

- **[eHydro]**: This is a backdoor into project naming.
- **eHydro Naming** (check box): If selected, XYZ names are generated automatically. If not, you enter your own names.
- **_A and _FULL Suffixes** (check boxes): Tacked on to file names as appropriate. Read on for the naming scenarios.

Figure 11: MBMAX64 Save Dialog with eHydro Options.



From Gerald again:

There are three XYZ scenarios that districts use. In each scenario, resolution of each XYZ is entirely up to the District.

- Scenario 1
  - A single high-res .xyz is submitted alone
  - .xyz only. The xyz is a high resolution dataset processed for contour lines.
- Scenario 2
  - Two files are submitted; a low-res .xyz and a high-res _A.xyz
  - .xyz is a low resolution dataset processed for use as sounding labels on PDF output.
  - _A.xyz is a high resolution dataset processed for contour lines. This is the, so-called, "ALL file".
- Scenario 3
  - Include very high-res _FULL.xyz along with either Scenario 1 or Scenario 2
  - _FULL.xyz is a very high resolution dataset (higher than _A.xyz). It is NOT used for labels, contouring, or any other eHydro process. It is included with the payload in either scenario 1 or scenario 2 and passed through the system for the benefit of customers (NOAA) that want every valid sounding.

While XYZ file naming is automatic, MBMAX64 processing required to get there is not. For example, if a district chooses 3x3 average as their high resolution dataset, MBMAX64 matrix cell size must equal 3 (Read Parameters) and save matrix selection must equal average. Selections would be different for the low resolution data set, perhaps 25 foot cells, minimum selection. Gridded data is saved, by default, to the HYPACK project \Sort folder.

If eHydro XYZ is saved outside MBMAX64 (the Sort program for example), the low resolution file is also saved with eHydro naming.

The _FULL dataset in scenario 3 is not gridded. It is, therefore, saved to the HYPACK \Edit folder.