CHaMP Workflow Tutorial

2013 Field Season

This Tutorial guides the user through the complete processing of a survey using the CHaMP Topographic Processing Toolbar in GIS. The user should have completed or already be familiar with the concepts presented in the ForeSight and GIS Tutorials before working through the material presented in this Tutorial.

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## Setting Up the Tutorial

### System Requirements

The following Software should be installed on your computer in order to complete these tutorials:

* Windows 7 or higher
* Spectra Precision (*formerly TDS*) ForeSight Version 2.2.5
* ArcGIS 10.1
  + Arc Advanced (*formerly ArcInfo*) License Level
  + Spatial Analyst Extension (Available and Enabled)
  + 3D Analyst Extension (Available and Enabled)
* CHaMP Topographic Processing Toolbar for ArcGIS 10.1 version 3.00 or higher
* CHaMP Coordinate Transformation Tool for ArcGIS 10.1 version

### CHaMP Toolbar Setup

1. Before opening GIS, install CHaMP Topo Processing Toolbar and CHaMP Transformation Tool **(**[**http://champtools.northarrowresearch.com**](http://champtools.northarrowresearch.com)**)**.
2. Open ArcGIS and begin a new map
3. Turn on CHaMP Topo Processing Toolbar (Customize/Toolbars)
4. The toolbar will now be available every time you use ArcGIS in the future.

### Preparing the Tutorial Data

Extract the contents of the ZIP folder to your computer. The tutorials refer to data contained within this folder. **Extract this zip file to your root directory (i.e. C drive) for easy access and to avoid potential GIS filename complications.**

### General GIS Tips

* If an error appears when running a tool, double check all input/output file locations, feature class names, etc. to make sure the correct inputs and outputs are listed..
* Do not use spaces, “( )”, or other special characters when naming files, folders, site names, etc.
* Do not start any file or site name with a number.
* If you cannot find a layer in the map, double check the Table of Contents. Rearrange layers (drag and drop the layer name) or change their visible status (checkbox) as need as other layers may be blocking the view of your layer of interest.
* Save all of your work in the c:\\champbroker\organization\Crew\hitch\site\topographic folder. If you must work outside of this folder, there may be issues with publishing the data and you may need additional assistance.
* ***Survey Checks (QA Tools) and TIN checks (QA Tools) can be run at any time. We recommend running these tools after major editing sessions to record ‘behind the scenes’ information about your surveys.***
* ***Validate Data (QA Tools) can be run at any time to review what products need to be created for your survey.***

### Tutorial Site Metadata

The following information is about the survey dataset used in this tutorial:

* Site Name: CBW05583-240479
* Watershed: LEMHI
* Projection: UTM Zone 12N
* Visit type: Initial Visit





# Raw Survey Data Processing Using ForeSight:

This section quickly describes the workflow in ForeSight. For more detailed instructions, refer to the ForeSight Tutorial or ForeSight Processing Guide.

1. Open ForeSight.
2. From the Startup Window, select *Create a New Project* (do not use File/Open).
   1. Select the Data Source: TDS JOB and RAW files (from Survey Pro CE). Click Next.
   2. For the input Job File, Browse and Select *CBW05583-240479-20120810.job*.
      1. The raw file input should load automatically (typically, the raw file should have the same name as the .job file).
      2. **There is no Control File, so leave that input empty.**
      3. Click Next.
   3. Modify the project name, if necessary (this should generally be the Site Name and date of survey, with no spaces).
      1. For the Project Folder, browse and select the folder where your data is currently stored (i.e. for CHaMP, use the Topo Folder for your visit). **This needs to be set for every new ForeSight project.**
      2. There is no Project Template, so leave that input empty.
      3. Click Next.
   4. Uncheck the Show the New Project Task List box.
   5. Click Finish. The survey should appear in the Map window of ForeSight.
3. In ForeSight, Check and Review the following:
   1. Use the Surface View to examine the 3D survey Data. Make note of any problems you discover.
   2. Using the Coordinate List View:
      1. Check Description codes on all points to ensure they are valid ones.
         1. Change Descriptions or Delete points as needed.
      2. Check the range of elevations for extreme or zero (0) values.
         1. Adjust elevations or Delete points as needed.
   3. Using Map/Plan View:
      1. Review all linework for crossed Breaklines.
         1. Identify and Repair any crossed Hard Breaklines (to,tb,bl,bf) .
         2. Identify and attach/repair any missing line segments as needed (Note: only connect erroneous or unintentional gaps in the linework).
      2. Review Point Relationships:
         1. Left wetted (lw) and Right Wetted (rw) are on the correct sides of the stream,
         2. Bars (br) and mid-wetted/island (mw) are correct,
         3. Thalweg (wg) is in the stream,
         4. Bank codes (to,tb) are correct,
         5. Make changes/delete points as needed.
   4. Return to Surface View to make a final check of your edits.
      1. Click the *Recalculate Surface* button to show your changes to the data.
4. Export data for use in ArcMap.
   1. Select File 🡪 Export 🡪 AutoCAD (.DFX & .DWG)…
   2. The Export AutoCAD window will appear:
   3. Select **DXF** under AutoCAD File Type.
   4. Make sure that **Export all** is selected under Objects To Export.
   5. Leave all other default settings including Label AutoCAD points.
   6. Click *Export*. Save Project to: **… \CHaMP\_Workflow\_Tutorial\Topo\** **CBW05583-240479-20120810.DXF (Do not use ‘Published’ Folder).**
   7. Close ForeSight. Save changes to the Project File (.pro) if prompted.

# CHaMP Topo Processing Toolbar

Getting started with a new ArcMap Document for your survey:

1. Open ArcGIS and click Cancel in the ArcMap Getting Started box if prompted.
2. Save the Untitled map project (File/Save) in the **Processing\_Workflow\_Tutorial\Topo** folder. Use the SiteName\_VisitDate format to name the mxd file.
3. Remember to save your map document often (every 15 min or so).

Find the Topo Processing menu on the CHaMP Topo Processing toolbar:

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**TIP**The tools in this toolbar menu are listed in the order of the workflow. Most tools will overwrite output datasets, so you can always return to a previous step in the workflow, regenerate a dataset, and continue the workflow from that step.

## Importing CHaMP Survey Data into GIS

The Import Data Tool takes the survey data contained in the DXF file (exported from ForeSight) and loads it into a new “Survey Geodatabase”.

1. Click on Import Raw Survey Data to open the Tool.
   1. The Site GDB is provided via the CHaMP Broker for Sites with Repeat Visits. It is an optional Input for this tool. Since this is an Initial Visit, we will leave it empty.
   2. Provide the site name for your survey (for this Tutorial, use *CBW05583-240479*). This tool will create a new Survey Geodatabase named *sitename\_2013.gdb* located in the Topo Folder (i.e. where your DXF file is located).
   3. Browse and select the survey points layer from the \*.dxf file you created in ForeSight (Navigate to the DXF file, double click it, then select the Points Layer in the .DXF file and click “Add”).
   4. The Description code field and the Point number field should be filled in automatically.
   5. Fill out the Breaklines box by selecting the polyline layer from your .dxf file and Click Add.
   6. This survey data is from an Initial visit to this site:
      1. The (current) Projection for the survey is: **Unprojected**
      2. The Visit Type is: **Initial Visit**
      3. The Instrument Type is: **Total Station**.

**IMPORTANT**  
Not all Survey Data is Unprojected! If your data is from a Repeat visit, you need to specify the correct UTM zone for the site in the Projection Input. This is important because ForeSight does not set the Coordinate System in the DXF file.

* 1. Click OK **ONCE** to run the Tool.
     1. If the Site.gdb input is empty, a warning message will come up – just click ok and ignore it.
     2. NOTE – The mouse pointer might not change to reflect the tool is running – this is normal. **DO NOT CLICK OK MORE THAN ONCE TO RUN THE IMPORT TOOL.** This could result in an error.
     3. This step may take a few minutes if the site is large. Be patient and go get a cup of coffee.
  2. When the processing is completed you will receive a “Successfully Processed” message.
  3. Next Step:
     1. For Unprojected Surveys (such as the one in this tutorial), use the Transformation Tool as described in the next section.
     2. For Projected (revisit) surveys, skip the transformation tool and proceed to the Steps outlined in the **Topo Processing Menu** section.

## CHaMP Transformation Tool

Since your data is not projected, you will need to project it using the CHaMP Coordinate TRANSFORMATION TOOL.

**TIP:** Add Base Imagery to your Map  
The ChaMP Transformation Tool is designed to work with aerial imagery as a base image on your map. There are two ways to do this:

Internet Connection  
Click File/Add Data/Add Basemap. Select *Imagery.*  A world-wide imagery basemap will be added to your map.

No (or Slow) Internet Connection  
Use the Add Data  button to add a base layer to the map. CHaMP Laptops have NAIP imagery preloaded in C:\\Base\_Imagery\. All imagery has been organized by County.

1. Click on the Transformation Tool Button:



1. In the first Panel of the CHaMP Transformation tool:
   1. Specify the Coordinate System (*UTM Zone 12 N* for this tutorial).
   2. Ignore the *Transformation* input (or select the first one in the list).
   3. You can enter benchmark coordinates manually, or Load the Benchmarks from the provided \*.csv file (Benchmarks.csv in the *Topo Folder*).
   4. Leave the Compass Bearing fields empty (CHaMP no longer uses these).
   5. Specify the Output Workspace (Navigate to the Survey.gdb created by the Import Tool).
   6. Click the Select Inputs button
2. In the next panel:
   1. Check to make sure *Control\_Point\_Unprojected* is set for Control Points.
   2. The tool should find and list (in the box below) all of the Feature Classes in the Unprojected Dataset in the survey Geodatabase. If only one or two feature classes are listed, you may need to restart the Transformation Tool (and double check your input data).
   3. The Attribute Field should be set to “DESCRIPTION”.
   4. In the drop down menus next to each benchmark and select the appropriate code for each benchmark.
      1. Benchmark 1: bm201
      2. Benchmark 2: bm202
      3. Benchmark 3: bm203
   5. Select (any) one of the benchmarks to be an initial Hinge Point.
   6. Select another Benchmark (any) for the initial Rotation Method.
   7. Click on Proceed to Transformation.
3. In the next panel:
   1. Cycle through the various combinations of Transformations.
   2. Visually compare each of them to the base imagery.
   3. Check the values listed in the Residual Error columns. Values closer to zero indicate a better fit and are more desirable. Try to pick a transformation with average/overall low values.
   4. When you have found the best Transformation for the data, click on the two confirmation checkboxes.
4. Save and exit the transformation tool. The survey data is now projected and is added to the map.
5. Remove the “Points” and “Polylines” layers (from the DXF file) that were loaded to the map by the Import Tool.

### Apply Symbology

Use the Apply Symbology tool to improve the visual style of the transformed features. You only need to run this tool after you transform your survey data.

1. Under the Topo Processing Menu, Select **Apply Symbology.**
   1. Select the Survey GDB that was created when you imported the data.
   2. You will get a “Success” message when you are done.
2. All of your layers should now have the CHaMP Symbology applied.
3. If the Map Extent is not centered on your survey data, you can Right Click on Bankfull Markers and Select the Zoom to Layer menu option.
4. You can now turn of the imagery (to speed up processing and navigating the map).

## Topo Processing Menu

Before you proceed with the workflow, take a few minutes to quickly review all survey points and lines for any errors that were missed or overlooked in ForeSight.

1. Review the Error Points Layer for points with Invalid codes.
   1. Open the attribute table of this layer to see if there are any records present.
2. Review lines to make sure they are coded properly.
3. Review points to make sure they are coded properly (left/right banks, top/toe banks, etc.).
4. If significant errors are discovered, you may need to return to ForeSight in order to make repairs.

### Create Survey Extent Polygon

The survey extent polygon is used to define the area of interpolation for the TIN. The **Create Survey Extent Polygon Tool** generates an initial polygon with a “Concave Hull” that generally follows the shape of the survey points. You will need to make fine-scale edits to the polygon after it is generated.

1. Under the Topo Processing Menu, Select **Create Survey Extent Polygon.**
   1. Select the Topo points from the Projected Feature Dataset in your survey Geodatabase.
   2. Select the Edge of water points from the Projected Feature Dataset in your survey Geodatabase.
   3. Set the edge Tolerance (in meters). Use larger values (15-20) for larger sites and smaller values (5 to 10).
   4. Select the Survey GDB for the Output Location.
   5. Click OK to run the Tool.
2. Review Survey Extent polygon to make sure all points and lines are within extent of survey extent polygon.
   1. You can rerun the tool and change the tolerance, if needed:
      1. If holes appear in the polygon, or significant areas seem to be excluded, you need to increase your tolerance.
      2. If a significant amount of extra space appears between points (especially around meanders or bends), you need to decrease the tolerance.
3. Once the overall shape of the Survey Extent Polygon is correct:
   1. Review the sides of the survey (i.e. banks, floodplain) for any deviations in point density where the Survey Extent should be adjusted.
      1. Edit Survey Extent polygon as needed using the Editor Toolbar. Make sure point snapping is turned on and **always snap the Polygon vertices to survey points.**
   2. Review the cross-channel transects at top/bottom of site. The point density should be much higher along the cross channel transects than along the sides of the channel. The Survey Extent should be adjusted to match this higher density.
      1. Edit Survey Extent polygon as needed using the Editor Toolbar. Make sure point snapping is turned on and **always snap the Polygon vertices to survey points.**
4. Save your edits, and end the Editing Session.

### Create a Topo TIN from Survey Points

The TIN (Triangulated Irregular Network) surface is a direct representation of the survey points and lines collected in the field and is used to interpolate the surface between the points and lines. The TIN is confined to the area of the Survey Extent.

1. Under the Topo Processing Menu, Select **Create a Topo TIN from Survey Points.**
   1. In the Create New Topo TIN box, select the Survey GDB you are working with.
   2. Click OK to run the tool.
   3. A new TIN will appear on the Map.
2. Review TIN for survey or interpolation errors:
   1. Artificial cross channel dams,
   2. Artificial dams at end of surveys,
   3. Bust and Sink points. These often show up as shadowed areas or colors unlike adjacent colors (aka anomalies),
   4. Artificial Notches or Prisms along banks,
   5. Review all breaklines
3. Edit TIN using the TIN editing Toolbar as needed (For more information, refer to the CHaMP GIS Tutorials).

### Convert a Topo TIN to a DEM

A DEM (Digital Elevation Model) is a raster dataset created by sampling the TIN elevations at a 10x10 cm cell resolution. The DEM is easier to use for different types of spatial analysis and metric generation.

1. Under the Topo Processing Menu, Select **Convert a Topo TIN to a DEM.**
   1. Select the Topo TIN Surface from your Topo Folder.
   2. We are **NOT** using a site.gdb with this tutorial, so leave this input empty.
   3. Select the Survey GDB you are working in.
   4. Click OK (Click OK on the Site GDB warning message).
   5. A “Success” message will appear when the tool has completed.
2. A DEM and Hillshade layer will be added to the Table of Contents.
   1. Quickly review the DEM to check for any errors.
   2. If any errors are discovered, return to the TIN to make any edits and then rerun the DEM tool.

### Detrend a DEM to Remove Valley Slope

Detrending is the process of taking a DEM from a stream and making it ‘level.’ The stream bed topography is retained, and changes in water stage height can be modeled over the entire DEM.

1. Under the Topo Processing Menu, Select **Detrend a DEM to Remove Valley Slope.**
   1. Select the Raw Topo DEM from your Survey GDB.
   2. Select your Edge of water points from your Survey GDB.
   3. Make sure the output Survey GDB is correct for your survey data.
   4. Click OK to run the tool.
   5. The Detrending process may take up to 10-15 minutes for very large sites—get another cup of coffee.
2. A Detrended DEM will be added to the map.

### Create Wetted and Bankfull Polygons

This step involves modeling the wetted and bankfull stage heights using the Detrended DEM. **This ‘slider tool’ will be run 2 times, once for wetted polygon and once for bankfull polygon.**

1. Under the Topo Processing Menu, Select **Create Wetted and Bankfull Polygons.**
   1. The RBT Stage Slider panel will appear next to the Table of Contents.
   2. Specify the Detrended DEM for your Survey.
   3. Turn off all layers except for the Detrended DEM.
2. Wetted Polygon:
   1. Specify the Edge of Water Points as the Reference Points.
   2. Turn on the Edge of Water Points (make sure they are visible).
   3. Use the Slider bar or the Up and Down Arrows to best fit the blue polygon to the Edge of Water Points.
   4. Click Save Polygon (bottom of the Panel) and specify Wetted Polygon from the Drop-down menu. Click ok to save the wetted polygon.
3. Bankfull Polygon:
   1. Turn off the Edge of Water Points.
   2. Turn on the Bankfull Markers Layer from the Table of Contents.
   3. Use the Slider bar or the Up and Down Arrows to best fit the blue polygon to the Bankfull Marker Points. Since Bankfull points have more uncertainty than edge of water points, you will have to use more judgment when fitting the bankfull polygon.
   4. Click Save Polygon (bottom of the Panel) and specify Bankfull Polygon from the Drop-down menu. Click ok to save the wetted polygon.
4. Use the Editor Toolbar to edit the two polygons.
   1. Remove artificially tiny holes within the polygons.
   2. Open the attribute table and remove any small polygons outside the main polygon. There should only be one large, main polygon for each.
   3. Save your edits and close the edit session.
   4. Close the RBT Stage Slider Panel.

### Digitize Channel Unit Polygons

Channel Units are identified in the field and captured by using “Unit Boundary” points in the survey. Since crew judgment is needed in determining the arrangement of these polygons, they need to be created (digitized) manually (for more information, refer to the CHaMP GIS Tutorials).

1. Turn on the Channel Unit Markers and the Water Extent and the DEM (turn off all other layers).
2. Under the Topo Processing Menu, Select **Digitize Channel Unit Polygons.**
   1. Select the Survey GDB that you are working on.
   2. Click OK to add the empty Channel Units layer to the map.
3. Roughly Digitize the Channel Unit Polygons:
   1. On the Editor toolbar Start an Edit Session and Select the Create Features tool:  
        
      
   2. Make sure the Channel Units (Field) layer is turned on in the Table of Contents.
   3. In the Create Features menu, select Channel Unit 01.
   4. Click on the u1 flag as a starting point for your polygon.
   5. Digitize the channel unit polygons LARGER than water surface extent polygon (in width across stream), but make sure they are DETAILED within the water surface polygon. Avoid creating overlapping or gaps between units. Snap them to Channel Unit flag u1.
   6. Continue clicking to digitize the polygon until you reach u2.
   7. Double Click to finish polygon.
   8. Start Channel Unit 02 by clicking on the screen and following the edge of the first channel unit polygon and going through flag u3.
   9. On the last point of unit, double click OR right click/Finish sketch to end a unit.
   10. Stop Editing after all units complete and Save Edits.

### Create Stream Surface TIN, DEM and Water Depth

This tool generates Water Surface TIN, DEM, Water Depth raster, and clips the Channel Units to the Wetted polygon.

1. Under the Topo Processing Menu, Select **Create Stream Surface TIN, DEM and Water Depth.**
   1. Select the Water Extent polygon from your Survey GDB.
   2. Select the Topo DEM from your Survey GDB.
   3. Select the Survey GDB.
   4. Leave the Optional Channel Units input empty for this tutorial.
   5. Click OK.
2. Review the Water Depth map with the channel units to make sure they are generally in agreement (i.e. pools should have a deep blue color compared to riffles, etc.).
3. Review WSETIN for bust points (pyramids of color that look out of place). If found, you will need to review and edit the Edge of Water Points and rerun the tool.

### Create a Thalweg

The Thalweg represents the deepest part of the channel, where the stream generally flows the fastest. The create Thalweg tool generates a topographically derived Thalweg line through the survey data.

1. Under the Topo Processing Menu, Select **Create a Topo TIN from Survey Points.**
   1. Select the Topo DEM from the Survey GDB.
   2. Select the Topo Points from the Survey GDB.
   3. Leave the default values for Code field, Inflow code, Outflow code, Pool weight and Smoothing tolerance.
   4. Select the Survey GDB you are working with.
   5. Click OK.
2. A “Success” message will appear when the tool has completed running.
3. If needed, you can change the symbology for the Thalweg Line to make it more visible.
4. Review the Thalweg Line:
   1. Check to make sure Thalweg Line generally follows the field-specified Thalweg points (wg). The Thalweg Line does not have to ‘hit’ every wg point collected by the crews, but should at least pass nearby.
   2. Make sure the Thalweg Line stays inside of the Water Extent Polygon and remains on the DEM.
   3. Review top/bottom of survey to make sure the Thalweg Lines is snapped to the in/out points.
5. If you discover problems with the Thalweg Line:
   1. You can re-run the Thalweg tool using different pool weight and smoothing tolerances.
      1. Increase the pool weight by increments of 10 or so if the Thalweg Line appears to ‘cut off’ meanders or avoids some of the deep pools.
      2. Increase or decrease the smoothing tolerance by 1-2m increments to adjust how ‘rough’ or jagged the line looks.
   2. You can use the Editor tools to manually adjust the Thalweg line if the pool weight reaches a value of 50-100 and you still feel the Thalweg Line is avoiding a particularly important path.

### Create a Centerline

The Centerlines represent the geometric centers of the Wetted Extent and Bankfull polygons. You need to run the tool twice, once for the Wetted Centerline and again for the Bankfull Centerline.

1. Under the Topo Processing Menu, Select **Create a Centerline.**
   1. Select Wetted Centerline (or Bankfull Centerline).
   2. Select the Water extent polygon (or Bankfull Polygon) from your survey GDB.
   3. Select the Thalweg line from your survey GDB.
   4. Select the Detrended DEM from your survey GDB.
   5. Select the output Survey GDB for your survey.
   6. Make sure the Display Draft Cross Sections checkbox is checked.
   7. Click OK to run the tool.
2. The Centerline and sample cross sections will be added to the map.
3. Review the Centerline (and cross sections):
   1. The Centerline should generally run down the center of the wetted polygon.
   2. Check to make sure the ends of the centerline do not bend. If they do, manually move the vertices of the line to the center of the wetted channel (using the Editor toolbar).
   3. Review main channel cross sections. Cross sections are for REVIEW only. Review to make sure cross sections are perpendicular to channel. If not, review centerline for sharp bends and edit them accordingly.
   4. Ignore noisy or extra-long cross sections that exit the wetted channel. These will be cleaned up later.
   5. Note that these cross sections will NOT run down side channels at this time—this will be included in the server version of cross sections run by champmonitoring.org.
4. Repeat this process for the Bankfull Polygon Centerline.

## QA Tools Menu

The tools in the QA Tools Menu can generally be run at any time during the workflow processing. They are intended to provide feedback either to the crew processing the data or to the CHaMP GIS analysis team.

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### Survey Data Check Tool

This is an OPTIONAL TOOL – This tool calculates QA metrics on the survey data and stores information in tables within the survey Geodatabase. There is no output information for the user.

1. Under the QA Tools Menu, Select **Survey Data Check.**
   1. Specify the Survey Geodatabase for your site.
   2. Click OK to run the tool.
2. A “Success” message will appear when the tool has completed running.

### Tin Check Tool

This is an OPTIONAL TOOL – This tool calculates QA metrics on the TIN and stores information in tables within the survey Geodatabase. There is no output information for the user.

1. Under the QA Tools Menu, Select **Check the Integrity of the TIN.**
   1. Specify the TIN.
   2. Specify the Survey Geodatabase for your site.
   3. Check the confirmation boxes.
   4. Click OK to run the tool.
2. A “Success” message will appear when the tool has competed running.

### Add a Note to Survey Geodatabase Tool

This is an OPTIONAL TOOL – it may be useful if there is something outstanding or special about a survey that you want to record.

1. Under the QA Tools Menu, Select **Add a Note to the Geodatabase.**
   1. Specify the Survey Geodatabase for your site.
   2. Enter a short note (1000 characters or less) to document an error or concern about the Survey data.
   3. Click OK to run the tool.
2. A success message will appear when the tool has completed running.
3. You can add as many notes as needed for the survey. The will remain inside of the Survey GDB and will be displayed on CHaMPmonitoring.org.

### Validate Data Tool

The Data Validation Panel provides warnings and errors in the survey to the user for review.

1. Under the QA Tools Menu, Select **Validate Data.**
   1. Specify the Field Season for the survey data.
   2. Specify the Survey Geodatabase for your survey data.
   3. Specify the Topo TIN.
   4. Specify the Water Surface TIN (WSETIN).
   5. Specify the Site GDB (optional).
   6. Click the green Refresh Button to activate the validation tool.
2. When the tool completes running, review all validation checks.
   1. Green means good.
   2. Yellow Messages indicate a warning (processing/publishing still possible).
   3. Red messages means error or review (processing/publishing not possible until error is fixed).
   4. Blue messages means required data is missing or a tool has not yet been run.
3. Each error/warning message will also have a suggested repair method.
4. The Validation can be run and refreshed at any time during the process. This may be useful if you can’t remember where you left off in the workflow.

## Finalize Menu

### Generate Map Images Tool

Map images are ‘quick’ maps of topographic products that may be useful for later data review or sifting through sites. Feel free to review these in the Topographic folder.

1. Under the Finalize Menu, Select **Generate Map Images.**
   1. Specify the Field Season for the survey data.
   2. Leave the Zoom input at 125%.
   3. The output folder should be the *Topo Folder* for your survey data.
   4. Click OK to run the tool.
2. You can review the images after the tool has completed running.

### Publish Final Geodatabase Tool

Use the Publish tool when you have completed processing your site. This tool makes the Topo data available to the CHaMP data broker on your laptop, which in turn will upload the data to CHaMPmonitoring.org. **If your survey geodatabase has any issues, the publish tool can submit the data to the cloud for review by a Crew Supervisor or Program GIS Analyst. The Publish tool will not publish your geodatabase as “Final” until the survey has cleared all of the data validation checks.**

1. Under the Finalize Menu, Select **Publish Final Geodatabase.**
   1. Select your Publish Action:
      1. Publish Final Version: Upload data directly to cm.org to begin metric calculations
      2. Submit draft for review: Upload data to cloud service for review by crew supervisor or CHaMP analyst (**Note: if data fails validation rules, this will be the only option available**).
   2. Specify the Site Name for your survey data.
   3. Specify the Date of your survey.
   4. Specify the Survey Geodatabase.
   5. Specify the Topo TIN.
   6. Specify the Water Surface TIN (WSETIN).
   7. Select the Survey Instrument Files for your survey (i.e. .job and .raw).
   8. Specify the Converted Survey Files for your survey (i.e. .dxf file).
   9. Click OK to run the tool.
2. Use the CHaMP Data Broker to complete the Data Upload process.

**IMPORTANT  
GEODATABASES CAN ONLY BE PUBLISHED ONCE,** either in Review or Final Publish mode. Please try to process your data as completely as possible, and only publish in Review Mode as a last resort.

You nave now completed processing the survey data! Close ArcMap and save changes to your map document if prompted.

# Resources

* Web Help for each tool is available at [http://champtools.northarrowresearch.com](http://champtools.northarrowresearch.com/)
* General Help for ArcGIS 10.1 is available at [http://resources.arcgis.com/en/help/main/10.1](http://resources.arcgis.com/en/help/main/10.1/)
* Video tutorials for each CHaMP GIS Tool are available by clicking on the ‘video’ icon in the lower right of most tools. These videos are available on and offline. If your version does not have a full set of offline videos, we recommend installing the latest update and additional videos will be added to your library.
* Tool issues. If you run across an issue with the tools, please email champtools@northarrowresearch.org
* Kelly Whitehead is the lead GIS analyst for assisting you with survey issues. He will direct your questions to others as applicable. Kelly@southforkresearch.org, ph: 206-302-1779. If Kelly cannot be reached, contact Carol Volk (carol@southforkresearch.org, ph: 206-240-0301) or champemergencies@gmail.com.