CHaMP | Columbia Habitat Monitoring Program

CHaMP Topo Toolbar Workflow

1 Survey Data Evaluation & Loading Into GDB

The objective is to import topographic data into a survey geodatabase, derive several additional datasets needed for CHaMP metrics, and then quality control the results using visual & automated validation checks.

The final product is a survey geodatabase that is then published, ready to be uploaded to the CHaMP server.

Start

Create Survey GDB
Create a new, empty GDB template.

Was the Survey Conducted With Either a TopCon or Nikon Total Station?
- Yes → Evaluate Survey Data Uncertainty
- No → Load Survey Data Into GDB

Evaluate Survey Data Uncertainty
Create survey points geometry and calculate the vertical and horizontal uncertainty for each point. This tool also creates a report describing each station setup and its effectiveness.

Load Survey Data Into GDB
Import the raw survey data into GDB and separate it in the appropriate layers.

Data from another Total Station or RtkGPS

Initial or Repeat Survey?
- Initial → Transformation Tool
- Repeat → Survey Extent Polygon

Transformation Tool
Shift & rotate the survey points and breaklines so that they overlay the site location in projected coordinate space.

2 Generating Topographic Surfaces

Survey Extent Polygon
Create a polygon outline around the survey points that can be used to clip the TIN surface in the next step.

Create Topo TIN
Create a 3D representation of the survey points using a triangular irregular network (TIN).

TIN Review & Editing (Manual)
Visual review of the TIN surface & fixing busts & dams. The objective is to refine the surface to improve its 3D representation of the topography.

Convert Topo TIN to DEM
Convert the TIN to a DEM raster, ensuring correct corners for the DEM.

Detrend the DEM
Flatten the original, raw DEM by removing the downhill slope, to produce a DEM with no downstream elevation loss. This "detrended" DEM can be used to simulate different water stages.

3 Generating Channel Features

Wetted Extent
Use the stage slider to raise & lower the water stage & find the polygon that fits the edge of water points.

Bankfull Water Extent
Use the stage slider to raise & lower the water surface & find the polygon that fits the bankfull points.

Digitize Channel Units (Manual)
Draw polygons around the surveyed channel unit points to produce a separate polygon for each channel unit.

Stream Surface TIN, DEM & Depth
Create a water surface TIN & use it to create a water surface DEM. Then subtract the topo TIN from the water surface TIN to produce a water depth raster.

Wetted Centerline & Islands
Create a line down the middle of the wetted extent polygon. The centerline passes over top of non-qualifying islands. Qualifying islands have separate side channel centerlines.

Bankfull Centerline & Islands
Create a line down the middle of the bankfull water extent polygon. The centerline passes over top of non-qualifying islands. Qualifying islands have separate side channel centerlines.

Wetted Cross Sections
Create transects perpendicular to the wetted and centerline and around qualifying islands.

Bankfull Cross Sections
Create transects perpendicular to the bankfull centerline, passing over top of non-qualifying islands. All dry patches are considered qualifying at bankfull.

4 Checks And Validation

Survey Data Check
Runs a number of calculations on the feature classes in the survey geodatabase and writes the results to a series of tables in the geodatabase.

Breaklines Contain Elevations?
- Yes → Check TIN Integrity
- No → Add Breakline Elevations

Add Breakline Elevations
Add elevation values to breakline vertices from the topo and edge of water points.

Check TIN Integrity
Runs a number of calculations on the components of the TIN surface and writes the results to a table in the survey geodatabase.

Validate Survey
Reviews all survey data layers, rasters and TINs. Reports errors, missing or problematic issues. Data processing cannot continue until all errors are handled.

5 Finalization And Publish

Generate Map Images
Produces several JPG map image files for upload and review on the CHaMP web site.

Publish
Final survey GDB checks. The official contents of the survey GDB are then copied to a new, clean geodatabase ready for upload to the CHaMP web site by the data broker. Publishing the GDB as "final" is only permitted if all validation checks have passed.

Finish

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