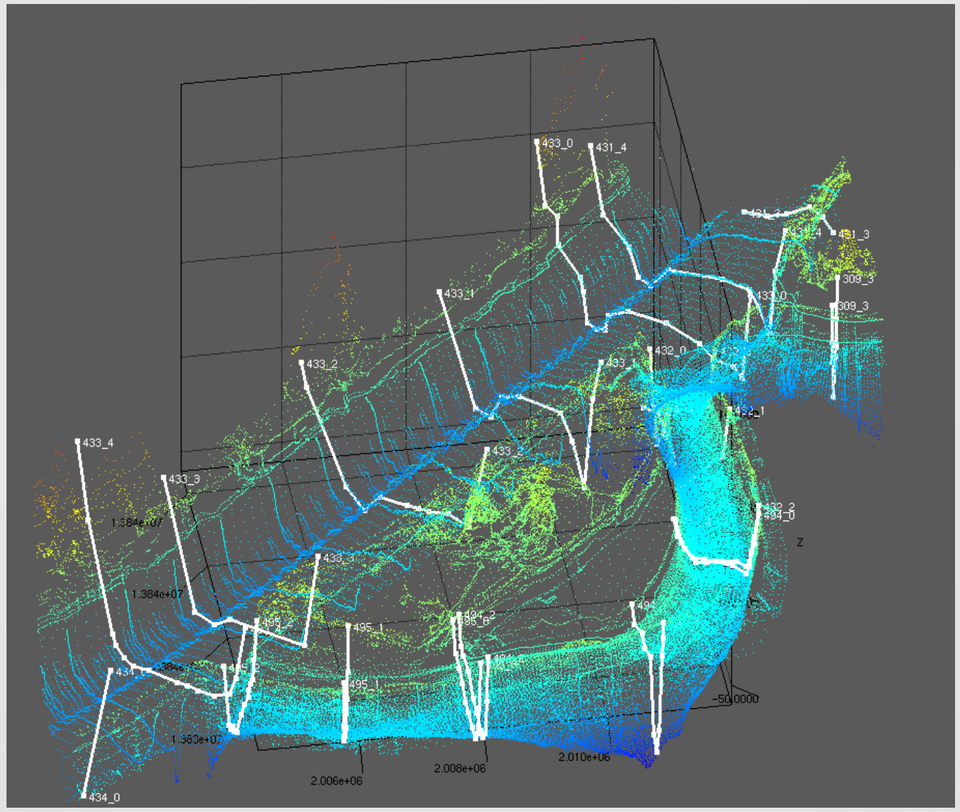
CALIFORNIA DEPARTMENT OF WATER RESOURCES

DSM2 CSDP Quick Start

December 3, 2025

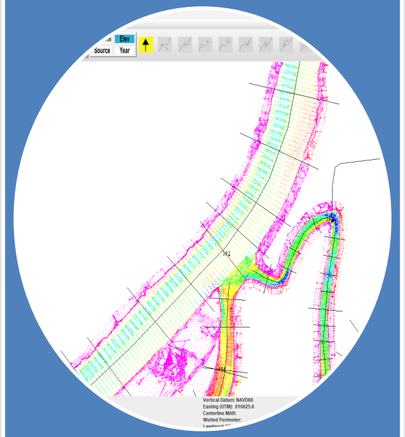


Brad Tom

Modeling Support Office, Delta Modeling Section

Overview

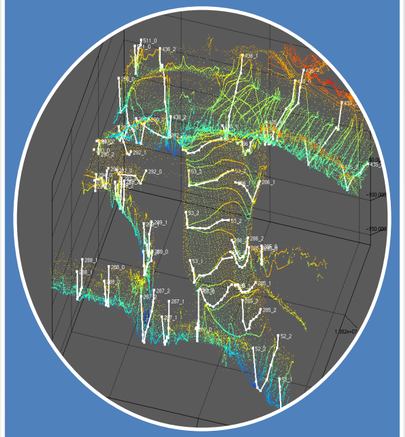
9:15-9:20
Welcome & Introduction



9:20-10:00
CSDP Introduction

- History/references
- CSDP interface
- Import DEM Data
- Create channels, nodes, and cross-sections

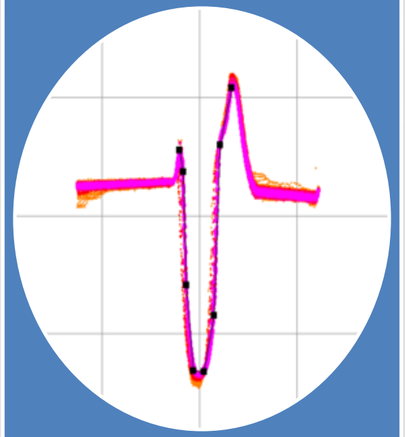
10:00-10:10
Break



10:10-10:40
Hands-on exercise:

- Load data
- view cross-section
- 3d bathymetry and cross-section plot

10:40–10:50
Break



10:50 – 12:00
Hands-on exercise:

- Clear network
- Create centerline
- Create cross-section
- Create DSM2 input
- Run Hydro

CSDP Introduction

History and references

CSDP process flow diagram

CSDP data types

Creating cross-sections

DSM2 virtual cross-sections

Cross-section best practices

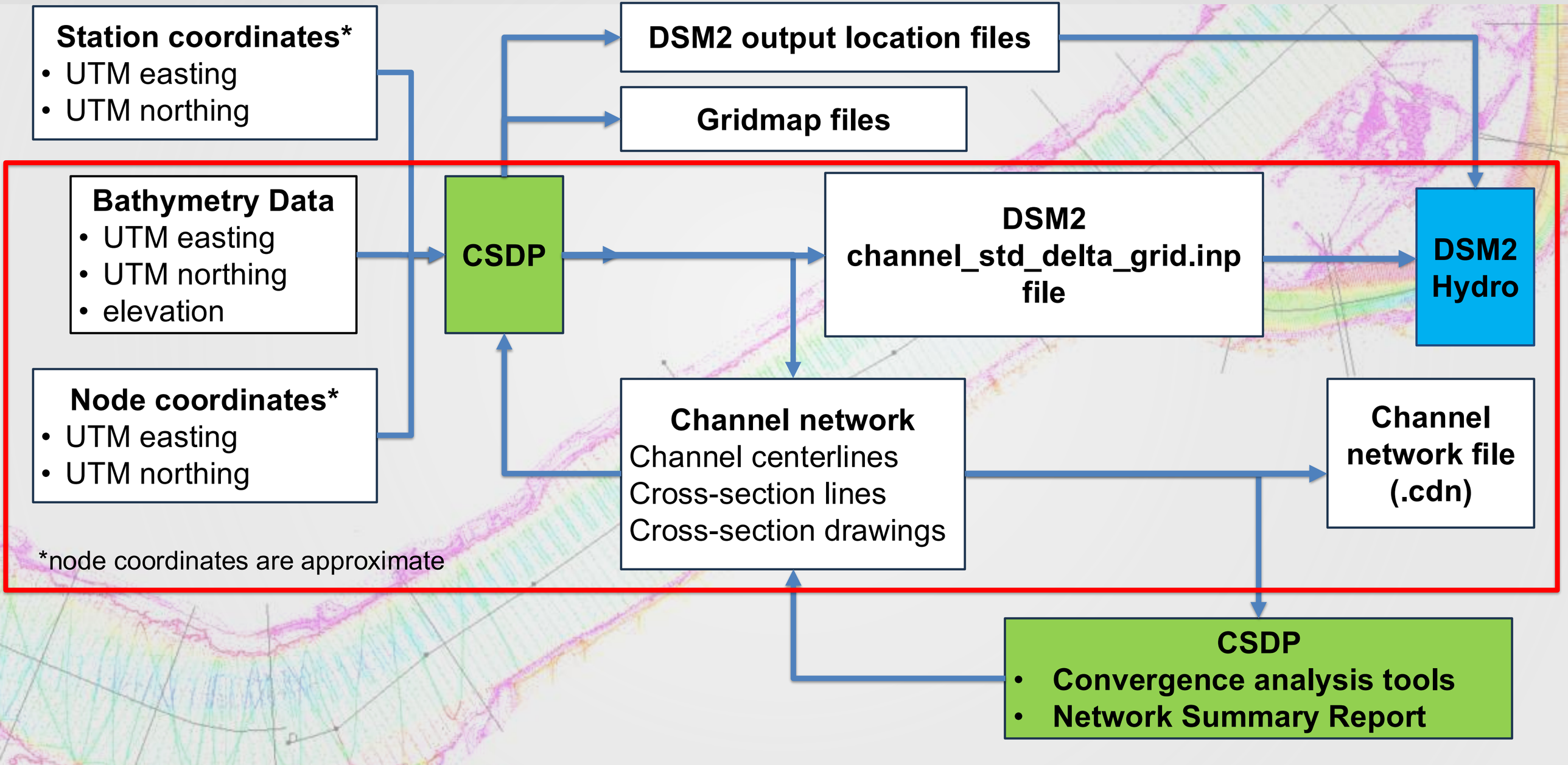
History and references

- **History**
  - Developed in the 1990's to replace the Bathymetry Data Display (**BDD**) application*
  - **CSDP** = "Cross-Section Development Program"
  - Developed in Java
  - Two attempts were made to replace it:
    - DSM2 grid Map Tool—Google Maps API**
    - ArcMap based tool***
- **References**
  - Training Video youtube playlist: https://www.youtube.com/playlist?list=PL33EJkVWqElVrUCFtst0o4cnEnVjzkV39
  - An Open-Source Cross-Section Tool for Hydrodynamic Model Geometric Input Development https://doi.org/10.3390/hydrology10110212
  - Annual reports 1998, 2000, 2001, 2005, 2011, 2016, 2020: https://data.cnra.ca.gov/dataset/methodology-for-flow-and-salinity-estimates-in-the-sacramento-san-joaquin-delta-and-suisun-marsh
  - csdp-data repo: https://github.com/CADWRDeltaModeling/csdp-data
  - csdp source repository: https://github.com/CADWRDeltaModeling/csdp

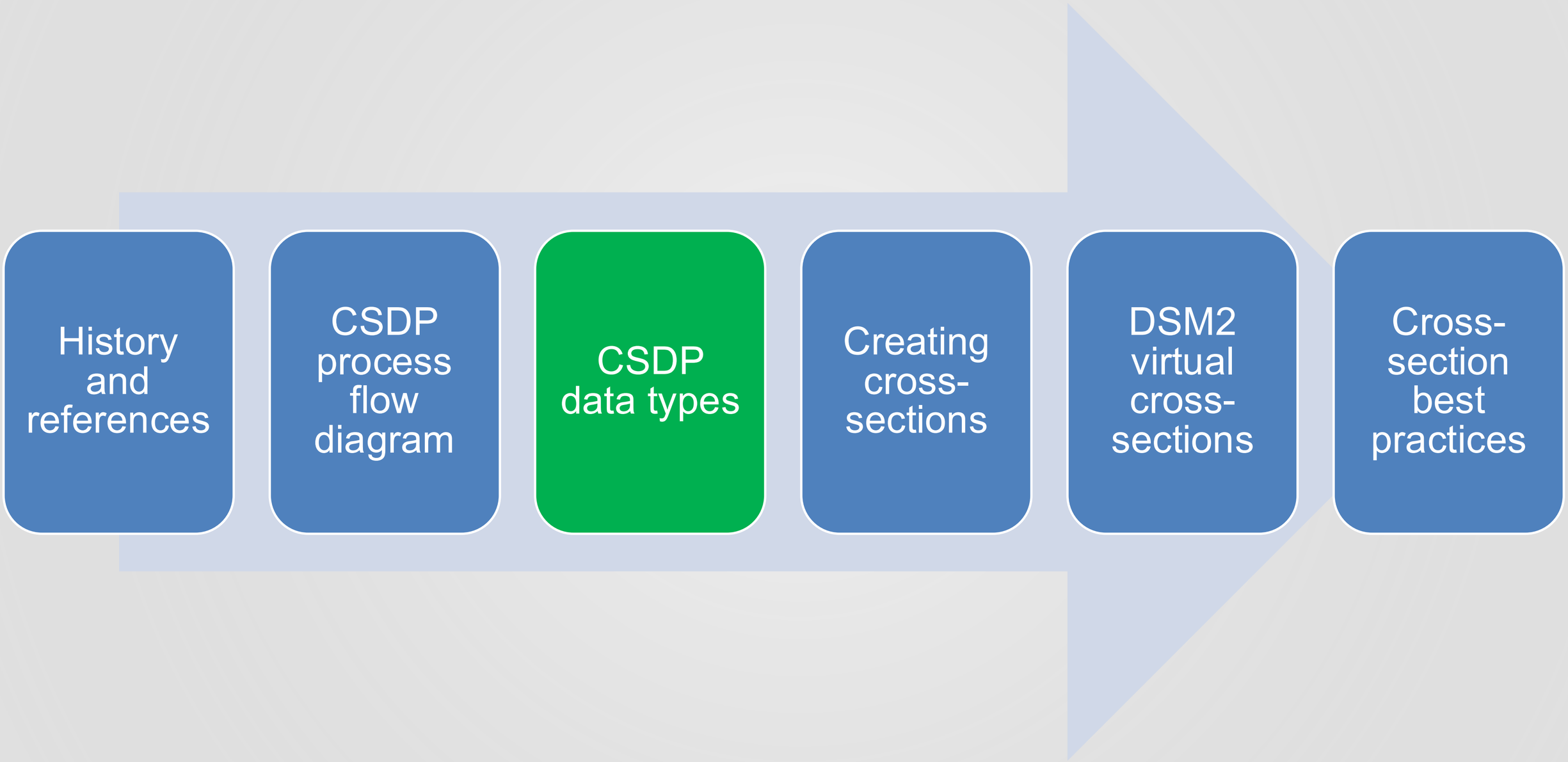
*John Crapuchettes, 1996
** Nicky Sandhu, 2011
*** Tom Heinzer, 2016

CSDP Introduction

CSDP Introduction: Creating DSM2 input



CSDP Introduction



CSDP data types

Data type	Text format	Binary format	Definition
Bathymetry	.prn	.cdp	Channel bottom elevations for specific locations
Network	.cdn		DSM2 channel centerlines and cross-section lines
Landmark	.cdl		Points representing features such as nodes, gates, monitoring stations
DSM2 input files	.inp		Files read by the DSM2 input system. The CSDP reads and/or creates some of these.
Other files	.txt, .csv		Files containing other types of data used by CSDP functions

CSDP Bathymetry Data

early 20th century: methods unknown

Late 20th century
- Depth soundings across channels or using GPS*

Single beam sonar*

Multibeam sonar*

LiDAR**

Preprocessing scripts

GIS (create DEMs*)**

CSDP Bathymetry File
- UTM easting
- UTM northing
- elevation

CSDP

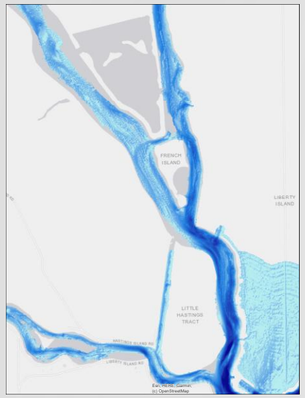
Boat with Multibeam scanner

* DWR North Central Region Office, Shawn Mayr
** Light Detection and Ranging, used for levees and land surface
*** DWR Modeling Support Office, Eli Ateljevich, Sophie Munger, Rueen-Fang Wang

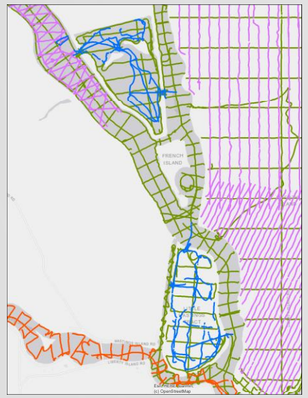
Creating DEMs from Bathymetry Data

Bathymetric soundings

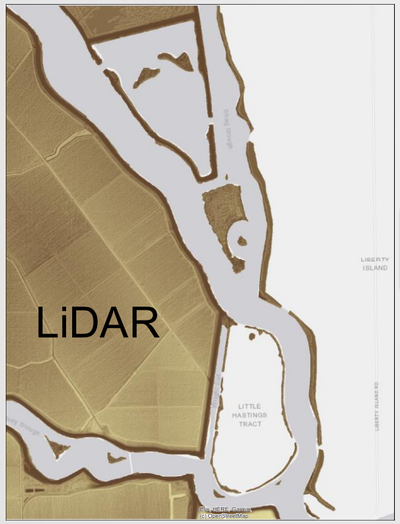
multibeam



single-beam



Terrestrial Data

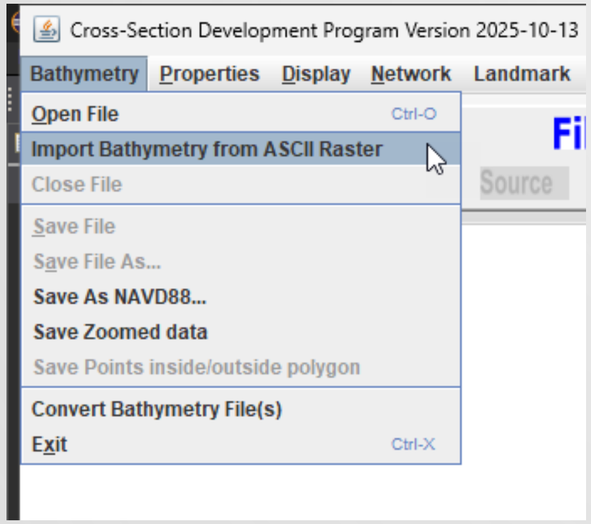


1. Gap filling
2. Contour smoothing

Digital Elevation Model

Importing DEM Bathymetry (with LiDAR)

- Download from https://data.cnra.ca.gov/dataset/san-francisco-bay-and-sacramento-san-joaquin-delta-dem-for-modeling-version-4-3#markdown
- Load into GIS application of your choice (I use ArcGIS Pro)
- Export to ASCII raster
- Import into CSDP



CSDP Bathymetry Data

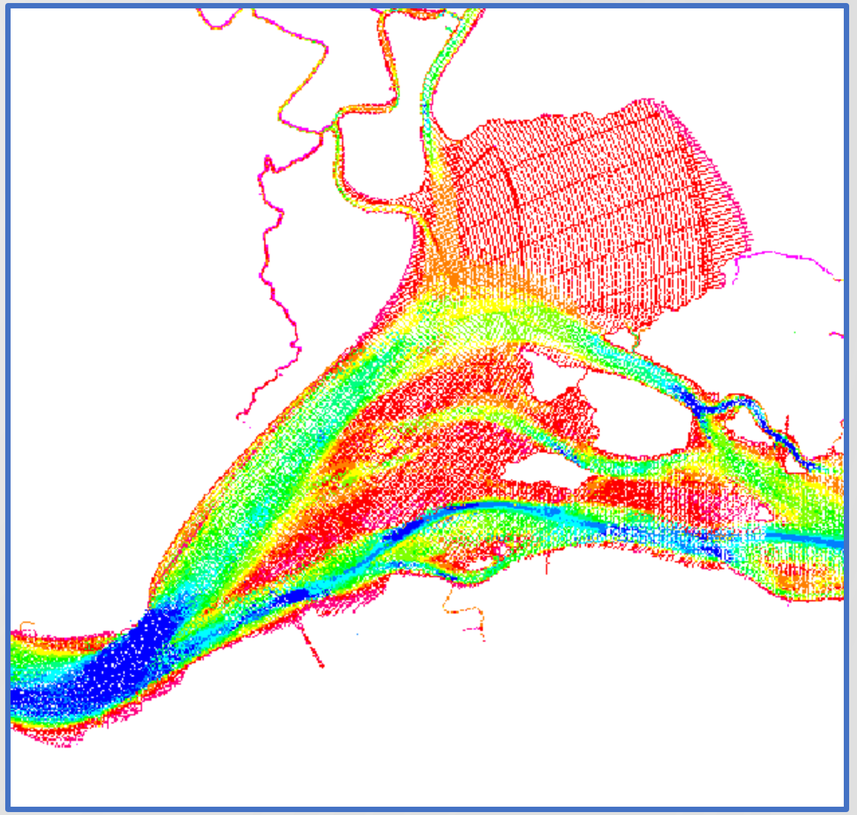
Consists of

- **Easting**
- **Northing**
- **Elevation**
- Year
- Source

Format

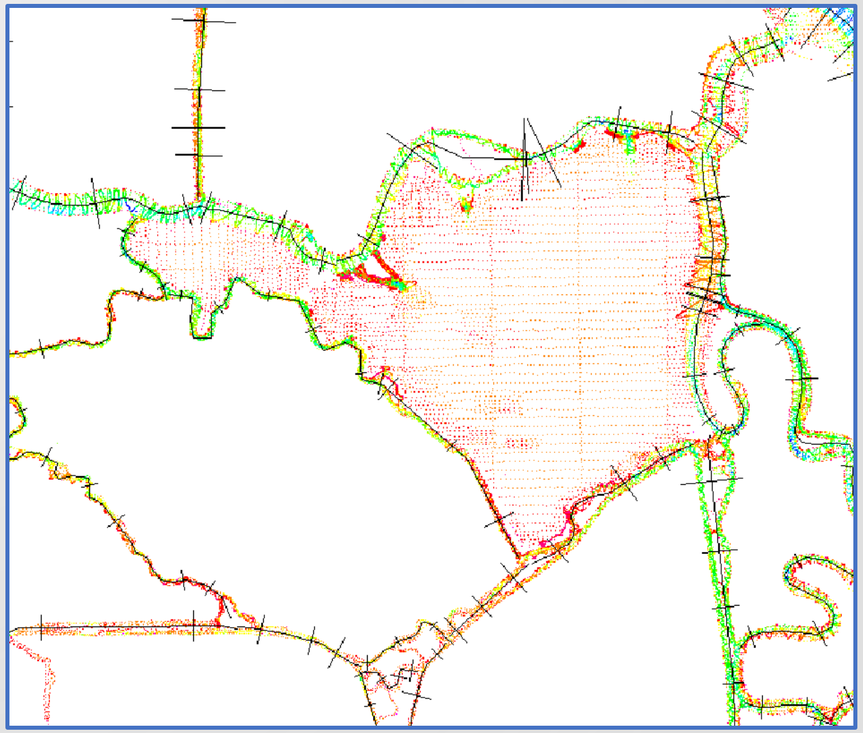
- Text (.prn)
- Binary (.cdp)

```
;HorizontalDatum:   UTMNAD83
;HorizontalZone:    10
;HorizontalUnits:   Meters
;VerticalDatum:     NAVD88
;VerticalUnits:     USSurveyFeet
;Filetype:           bathymetry
;NumElements:       6314090
584757.00000,4233401.00000,10.43,2018,DWR-DMS_2mDEM,
584759.00000,4233401.00000,10.40,2018,DWR-DMS_2mDEM,
584761.00000,4233401.00000,10.43,2018,DWR-DMS_2mDEM,
584763.00000,4233401.00000,10.39,2018,DWR-DMS_2mDEM,
584765.00000,4233401.00000,10.39,2018,DWR-DMS_2mDEM,
584767.00000,4233401.00000,10.62,2018,DWR-DMS_2mDEM,
584769.00000,4233401.00000,10.21,2018,DWR-DMS_2mDEM,
584771.00000,4233401.00000,10.38,2018,DWR-DMS_2mDEM,
```



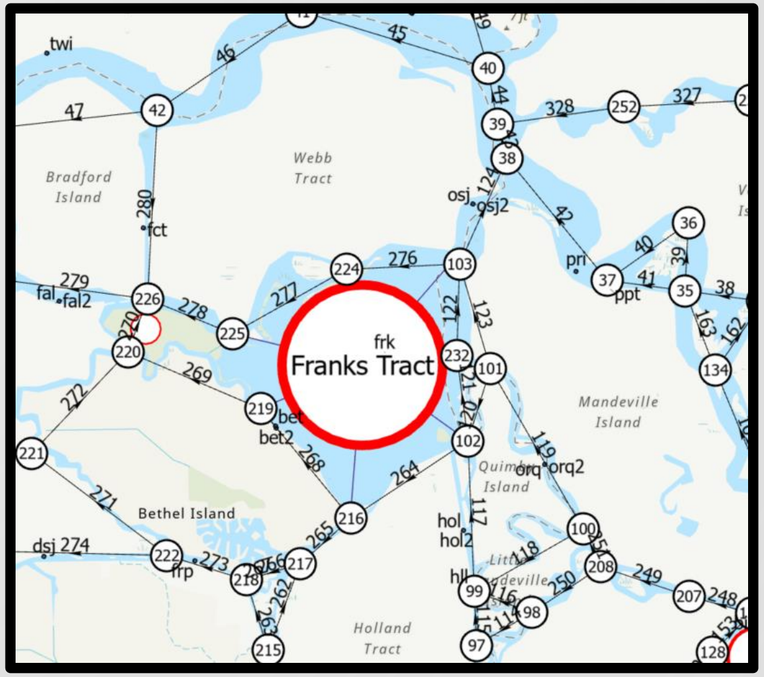
CSDP Network Data

Consists of	**Channel centerlines**	**Cross-section lines**	Cross-section drawings
Created by	CSDP		
Usage	Creating DSM2 geometry input		
Format	Text (.cdn)		



CSDP Landmarks

Consists of	Coordinates	Name/number		
Typical usage	**Nodes**	**Monitoring stations**	Gates	Reservoirs
Created by	CSDP	Text editor		
Can be used for	Other features			
Format	Text (.cdl)			



Creating CSDP Landmarks

text editor

```
;HorizontalDatum:   UTMNAD83
;HorizontalZone:    10
;HorizontalUnits:   Meters
;VerticalDatum:     NAVD88
;VerticalUnits:     USSurveyFeet
;Filetype:           landmark
;NumElements:       460
652291.3125,4172465.0,1
652401.1875000001,4174797.25,2
651800.6875,4176016.25,3
650044.0,4176792.75,4
649423.0,4179715.75,5
649669.1874999999,4182589.25,6
648443.8125,4184173.5,7
647237.0625,4185855.5,8
648354.25,4187713.0,9
647489.8125,4190138.5,10
647526.5,4192087.4999999995,11
646971.1875,4195317.5,12
647722.9375,4198306.0,13
646960.6875,4199204.5,14
646258.6875,4200263.0,15
645341.875,4200690.0,16
653984.1249999999,4170361.25,17
```

Make sure this number matches the number of landmarks in the file

CSDP context menu (right click)

DSM2 channels input file

channel_std_delta_grid.inp

Contains
- Channel number & length
- Manning's n & dispersion
- Channel connectivity (nodes)
- Cross-section input

Usage
- used by DSM2
- Previous version used by CSDP to create new centerlines
- Previous version used by CSDP to create a new file

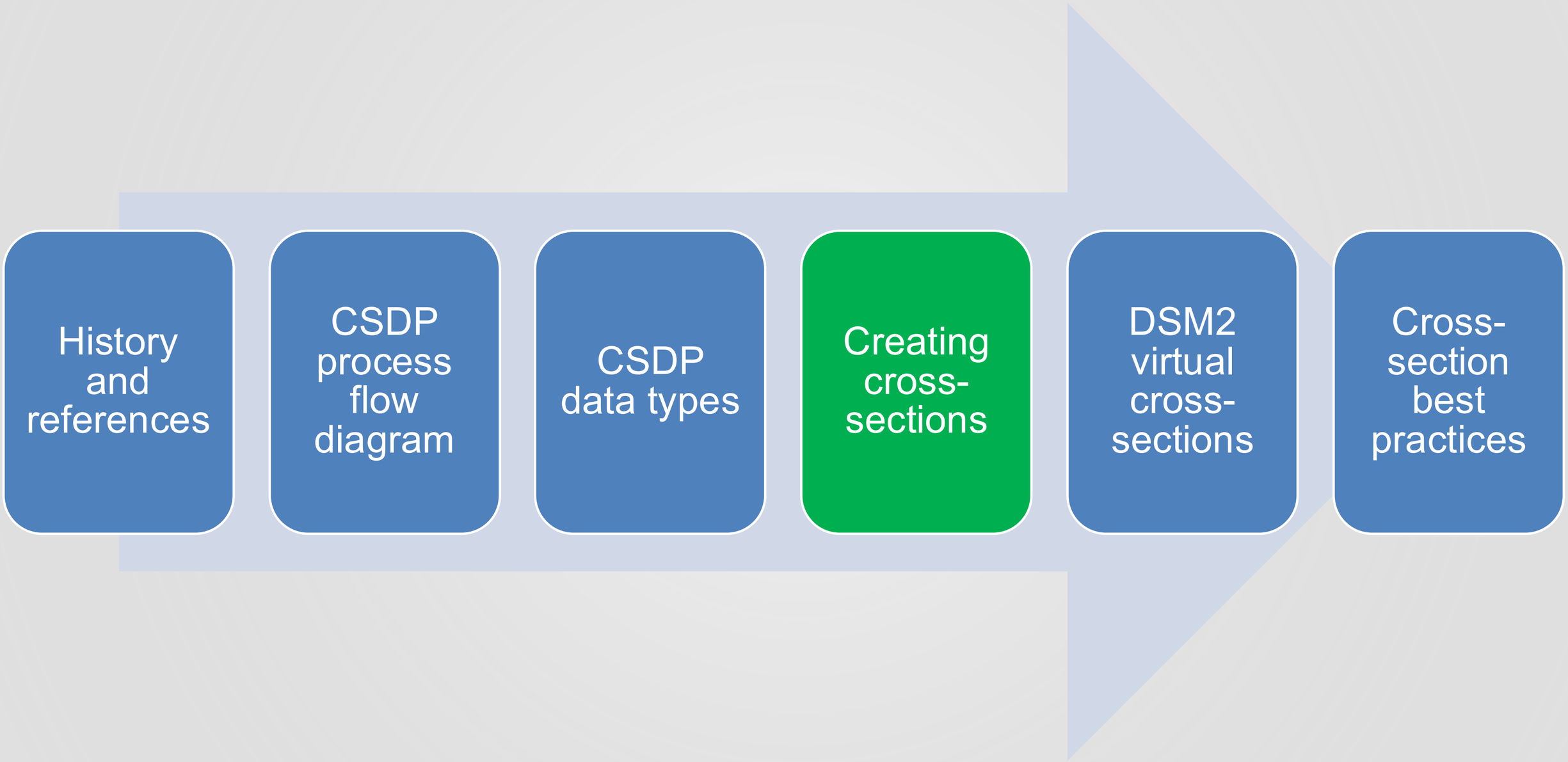
Created by
- CSDP

Format
- Text (.inp)

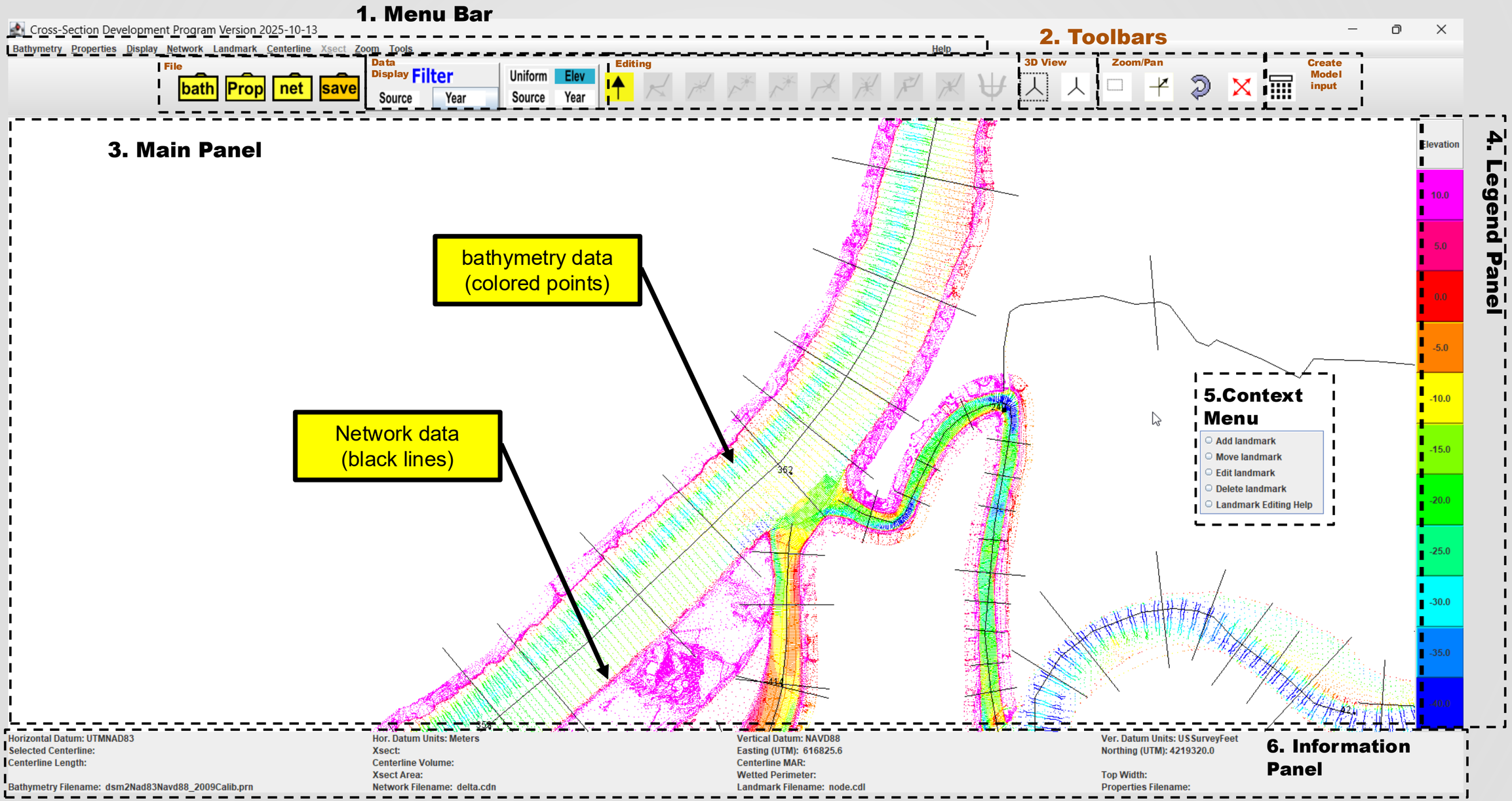
```
CHANNEL
CHAN_NO       LENGTH     MANNING     DISPERSION     UPNODE     DOWNNODE
1               9823       0.035            360          1            2
2              10941       0.028            360          2            3
3              12756       0.028            360          3            4
4              17164       0.028            360          4            5
5               8150       0.028            360          5            6
```

```
XSECT_LAYER
CHAN_NO        DIST       ELEV         AREA      WIDTH     WET_PERIM
1           0.01194     -3.205            0          0             0
1           0.01194      1.602      415.221    172.759       173.032
1           0.01194      4.247      1089.79    337.311       337.699
1           0.01194      6.409      1864.43    379.303       380.019
1           0.01194     11.737       4181.2    490.325       491.835
1           0.01194     12.606      4618.25    515.853       517.422
```

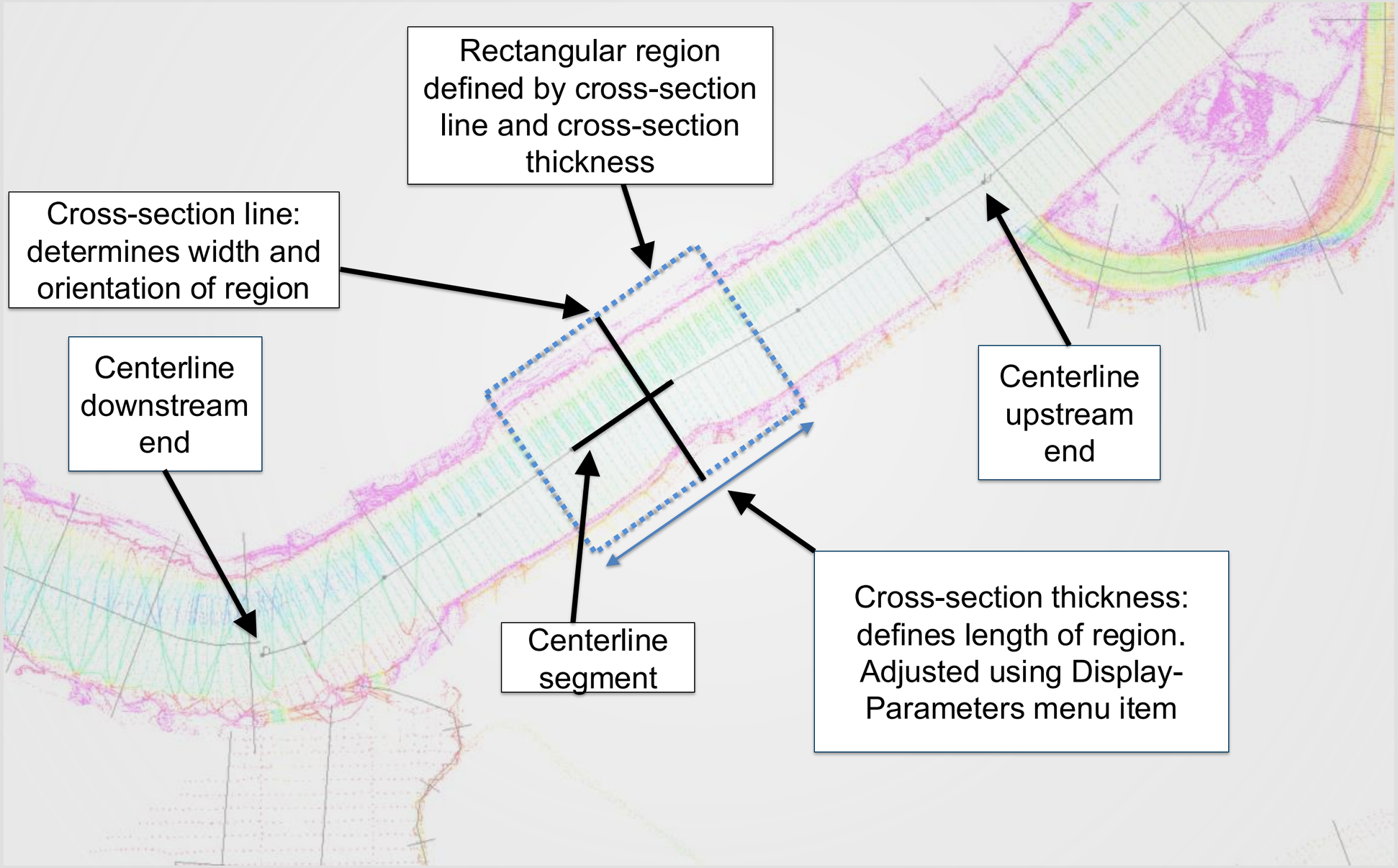
CSDP Introduction



CSDP Main Application Window



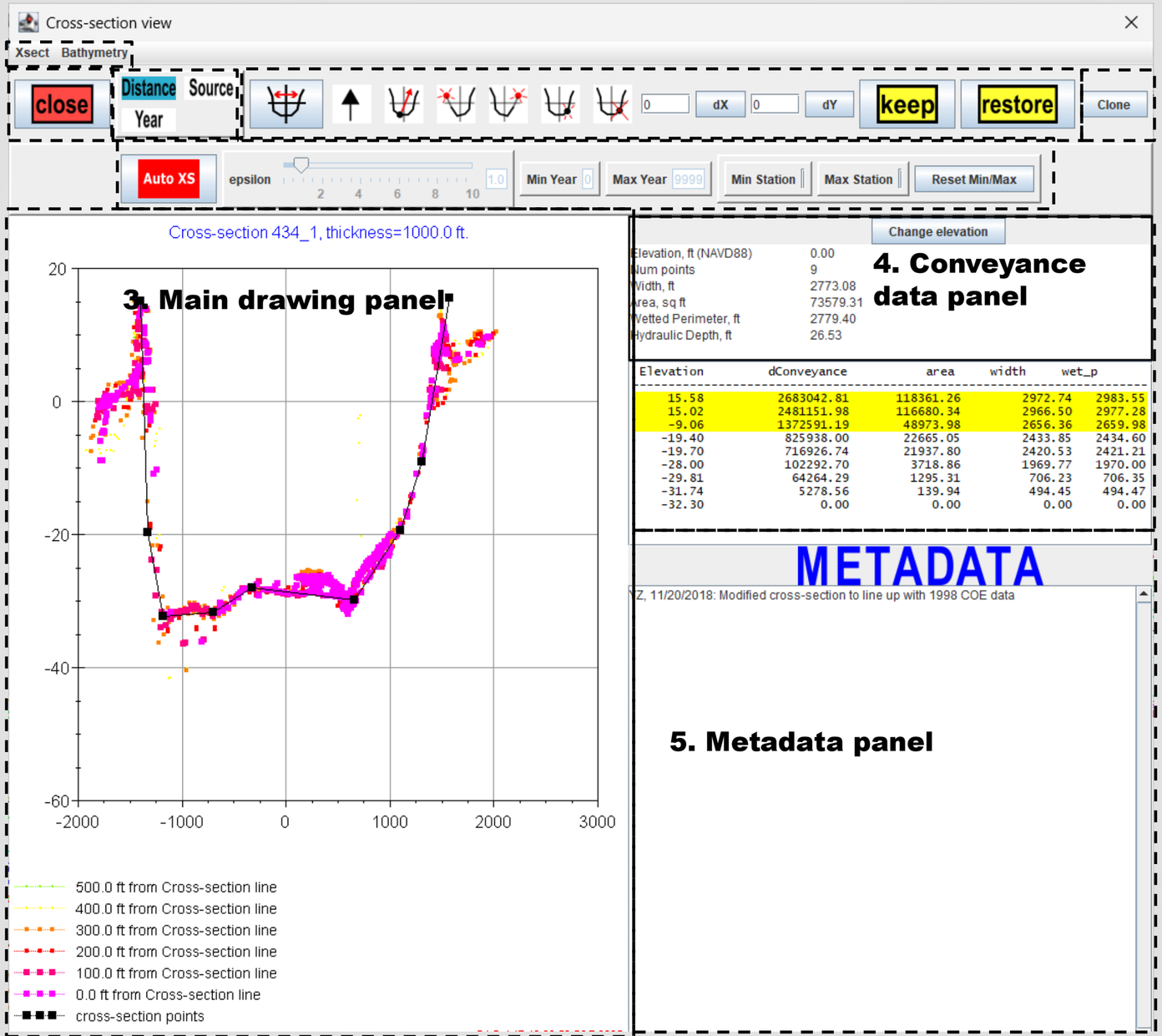
CSDP Cross-Section Data Selection



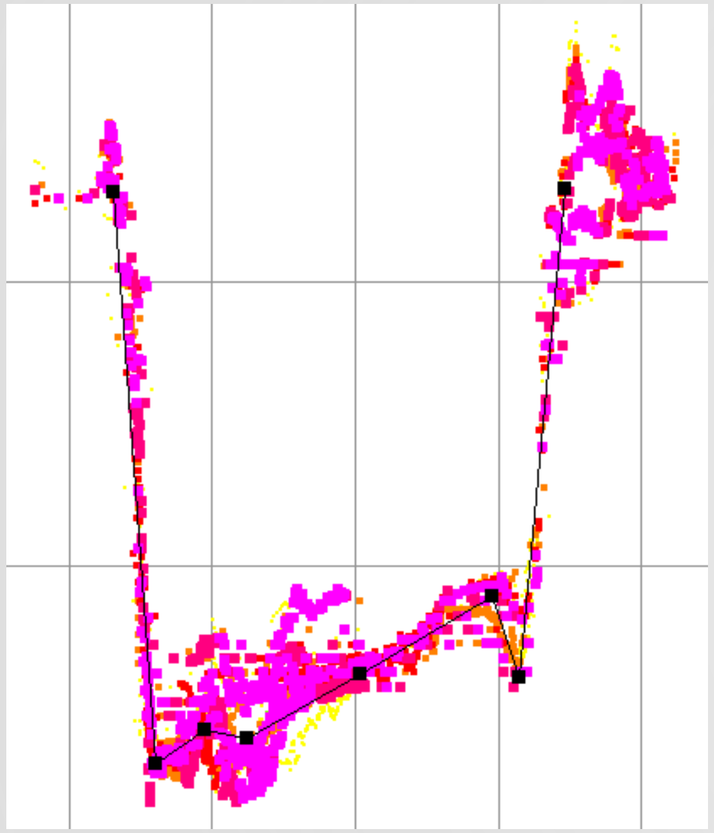
CSDP Cross-Section Window

1. Menu Bar

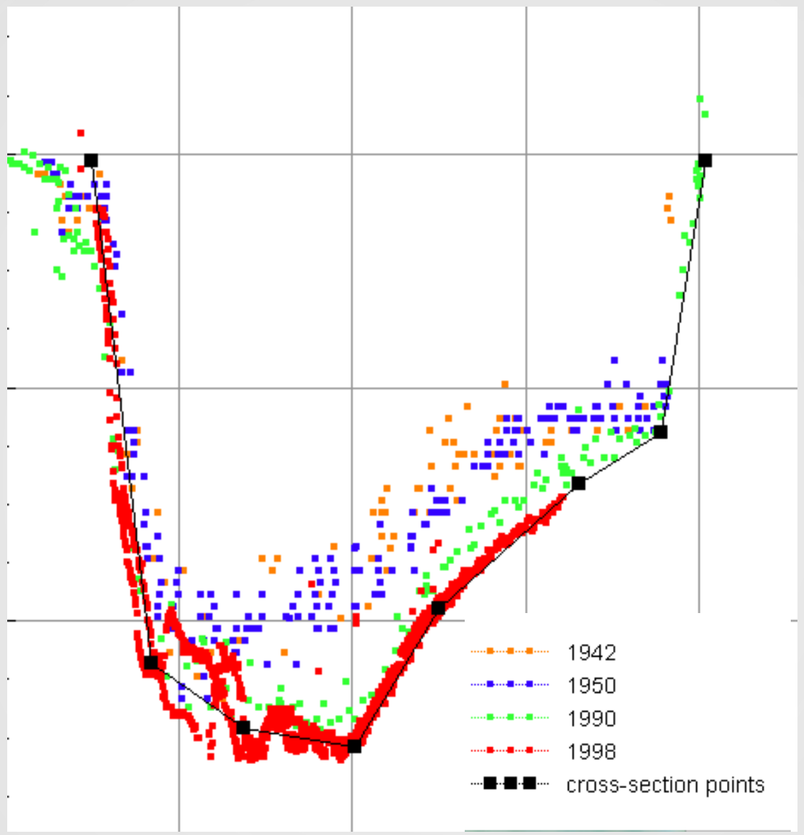
2. Toolbars



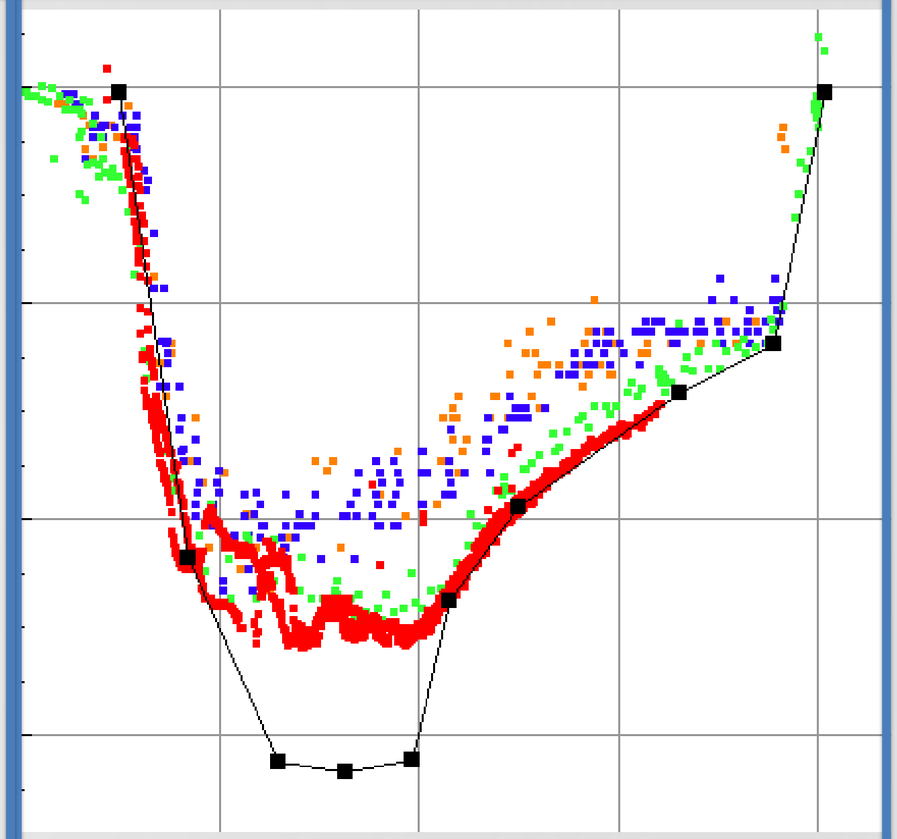
Cross-section doesn't always match bathymetry



- Bathymetry used as a guide
- Cross-sections represent channel conveyance characteristics
- Used efficiently by DSM2

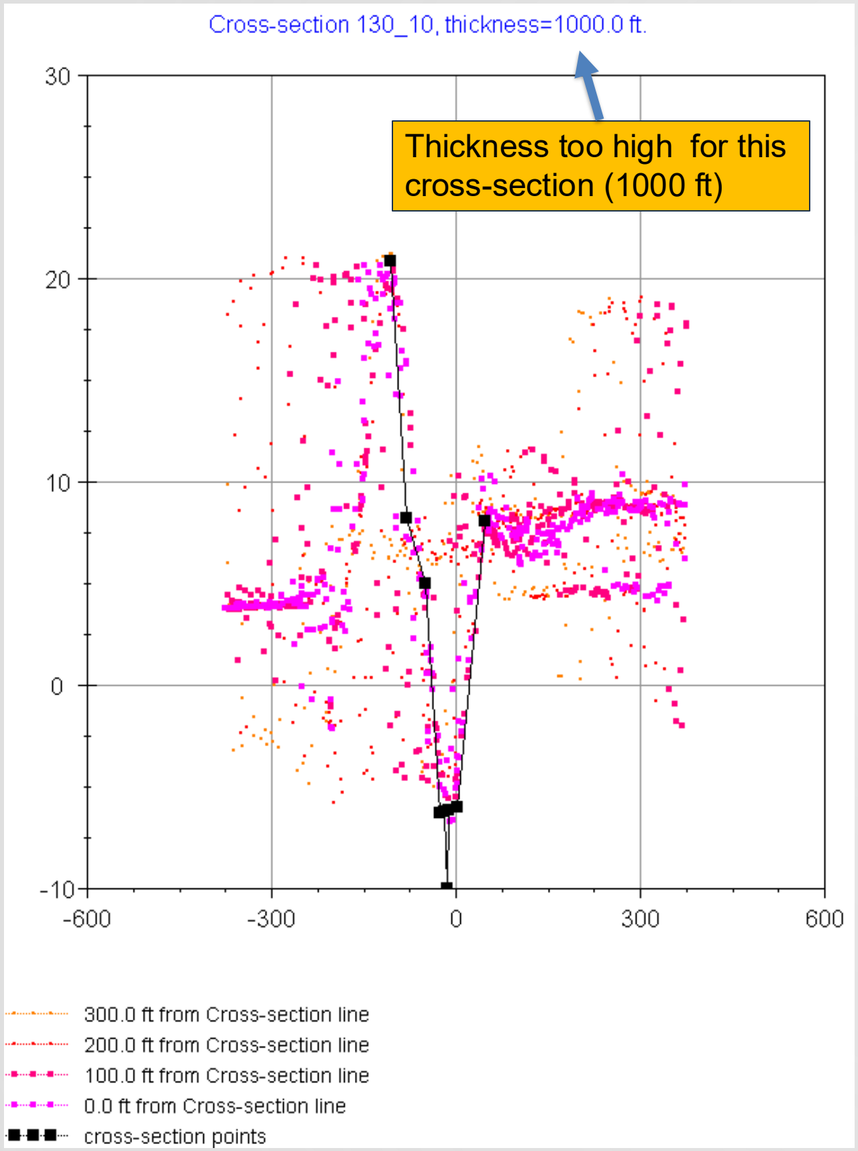


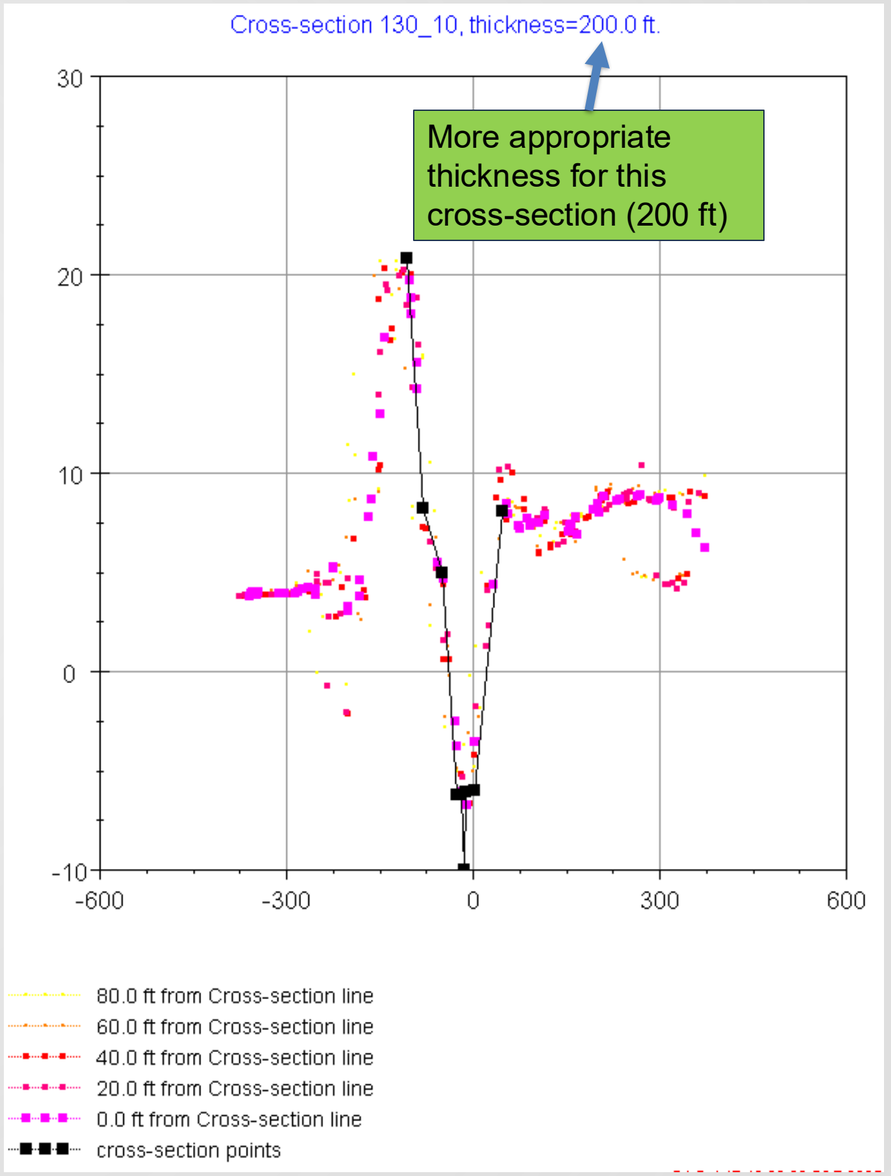
- Emphasize best data



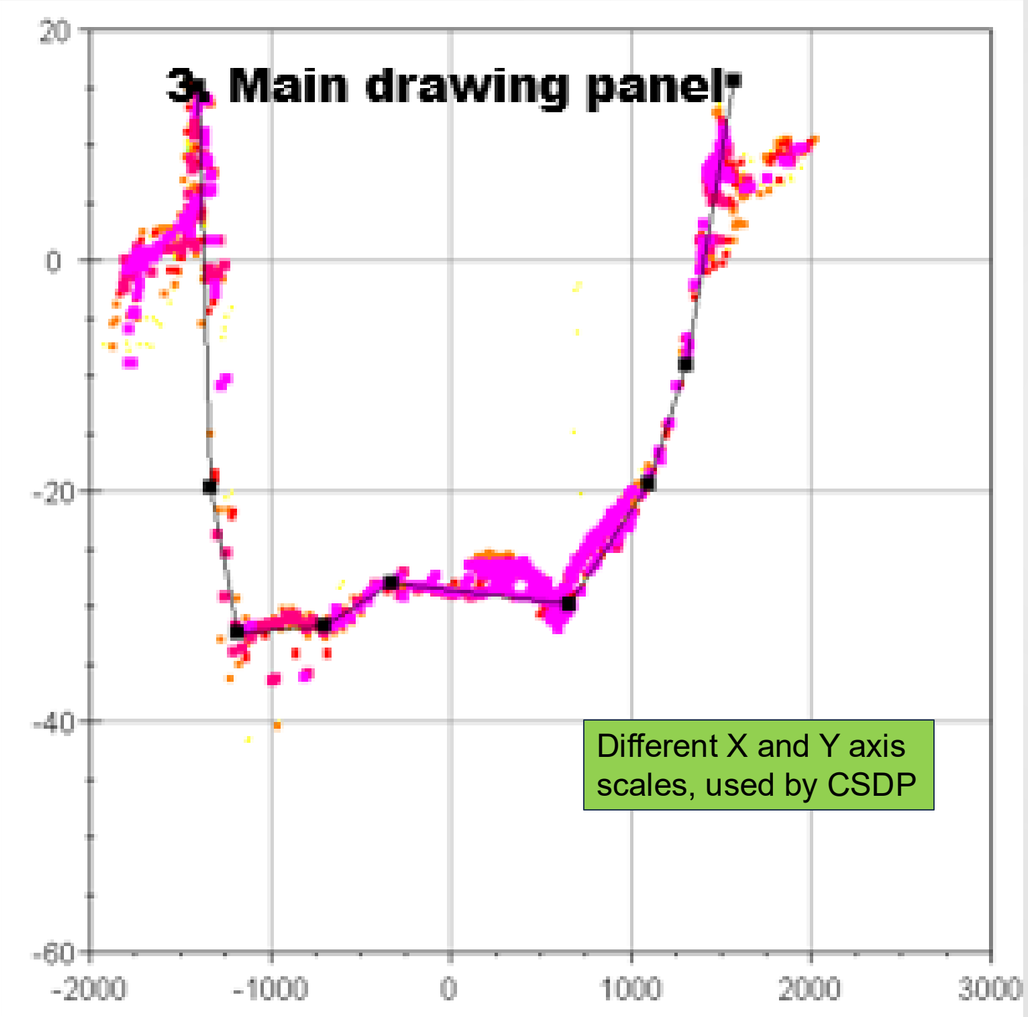
- Proposed changes

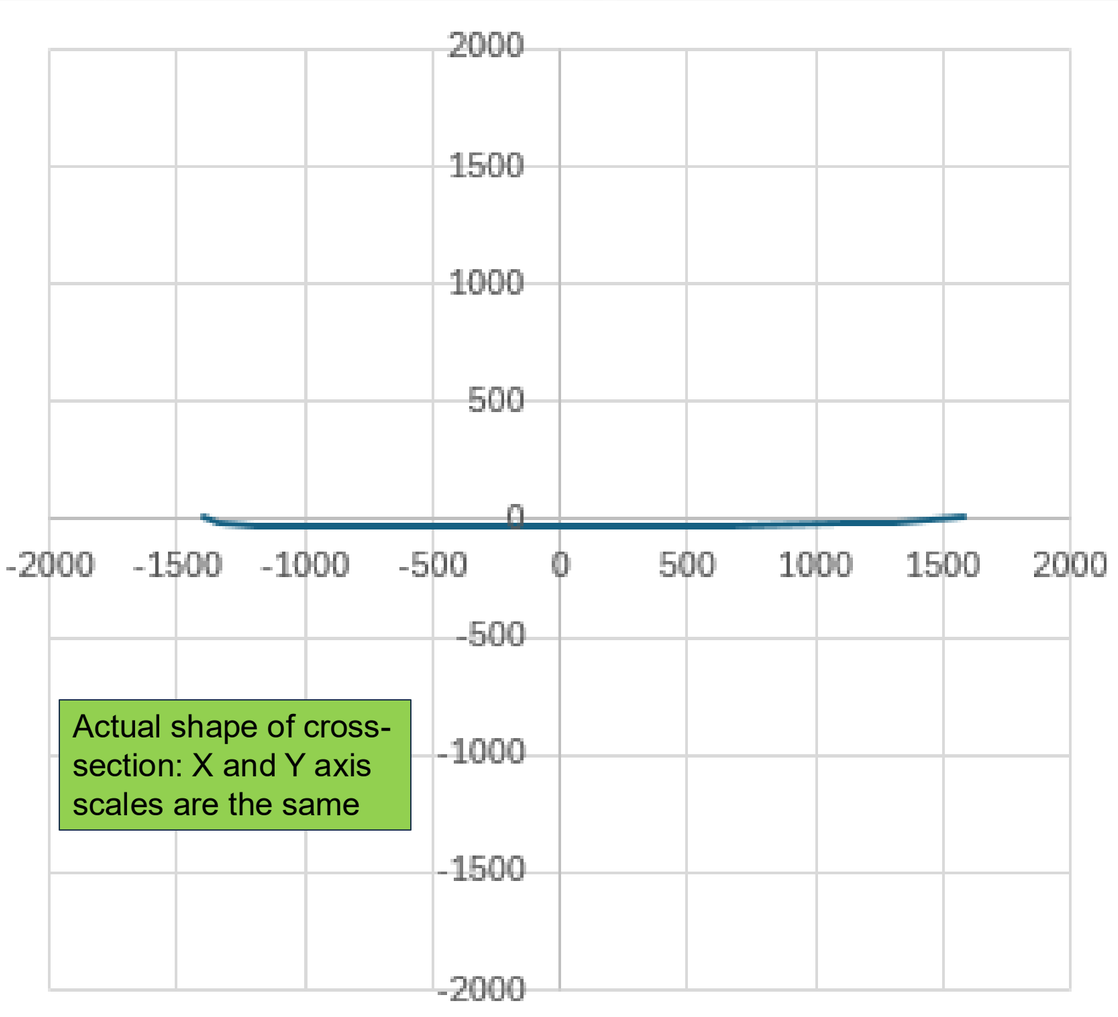
Reduce cross-section thickness in curved channels



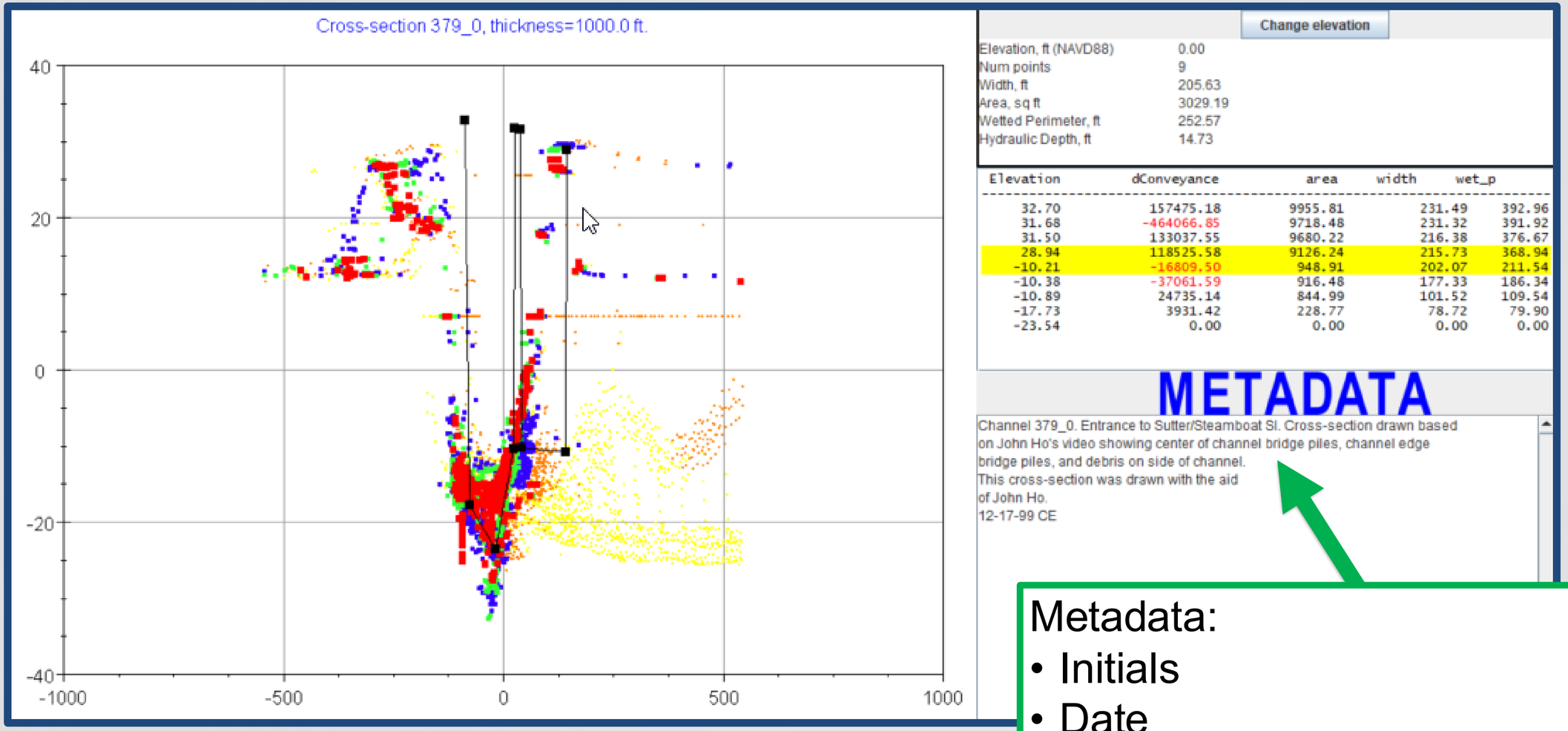


Cross-section axis scales





CSDP Cross-Section Window: Metadata



Metadata:

- Initials
- Date
- Explain your goals--What should someone think about before undoing your changes?

Metadata examples

RW-11/30/2018: modify cross-section to line up with 1991 NOAA-NOS data

KH,11/9/2018: XS lines up well with 2012 data; no changes made.

BT, 3/12/2024: Updated to line up with 2023 2m DEM data.
LL, 1/3/2019: Created the centerline and XSs to line up with 2018 data.

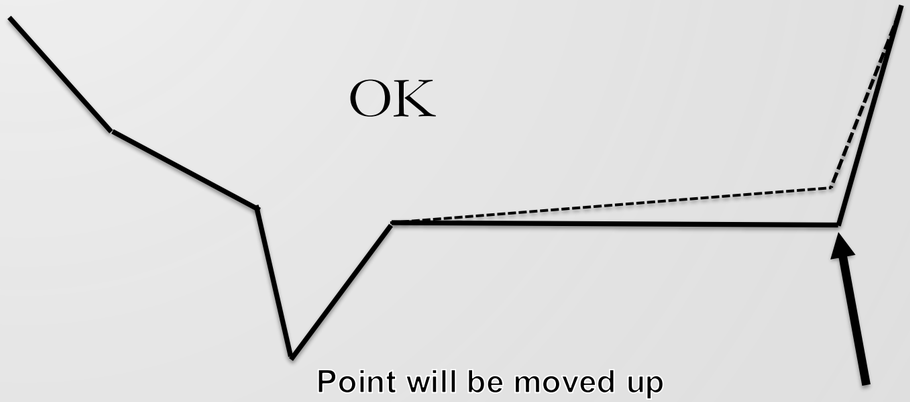
Cross-Section Variations

“W” Shaped

“J” Shaped

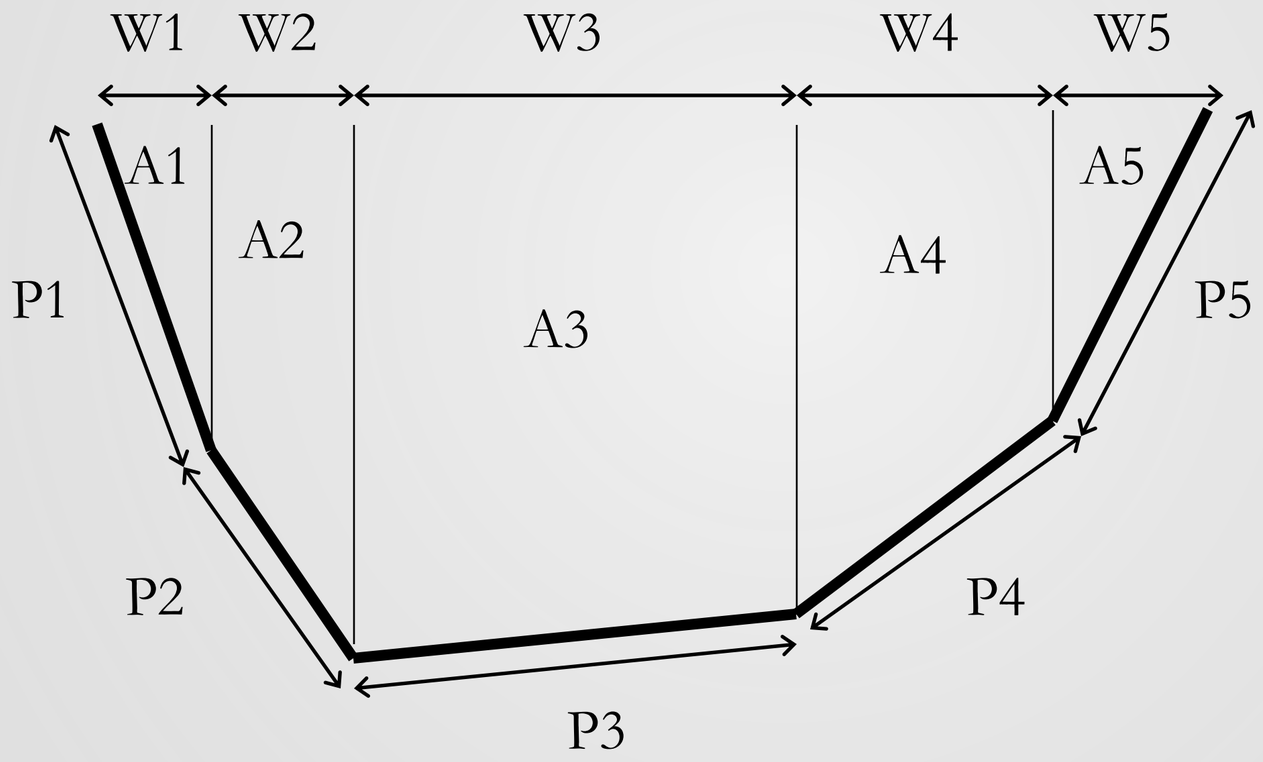
“deep v”: for low flow channels

Horizontal Line Segment



Point will be moved up
0.01 feet before calculating

CSDP Conveyance Characteristics Calculation

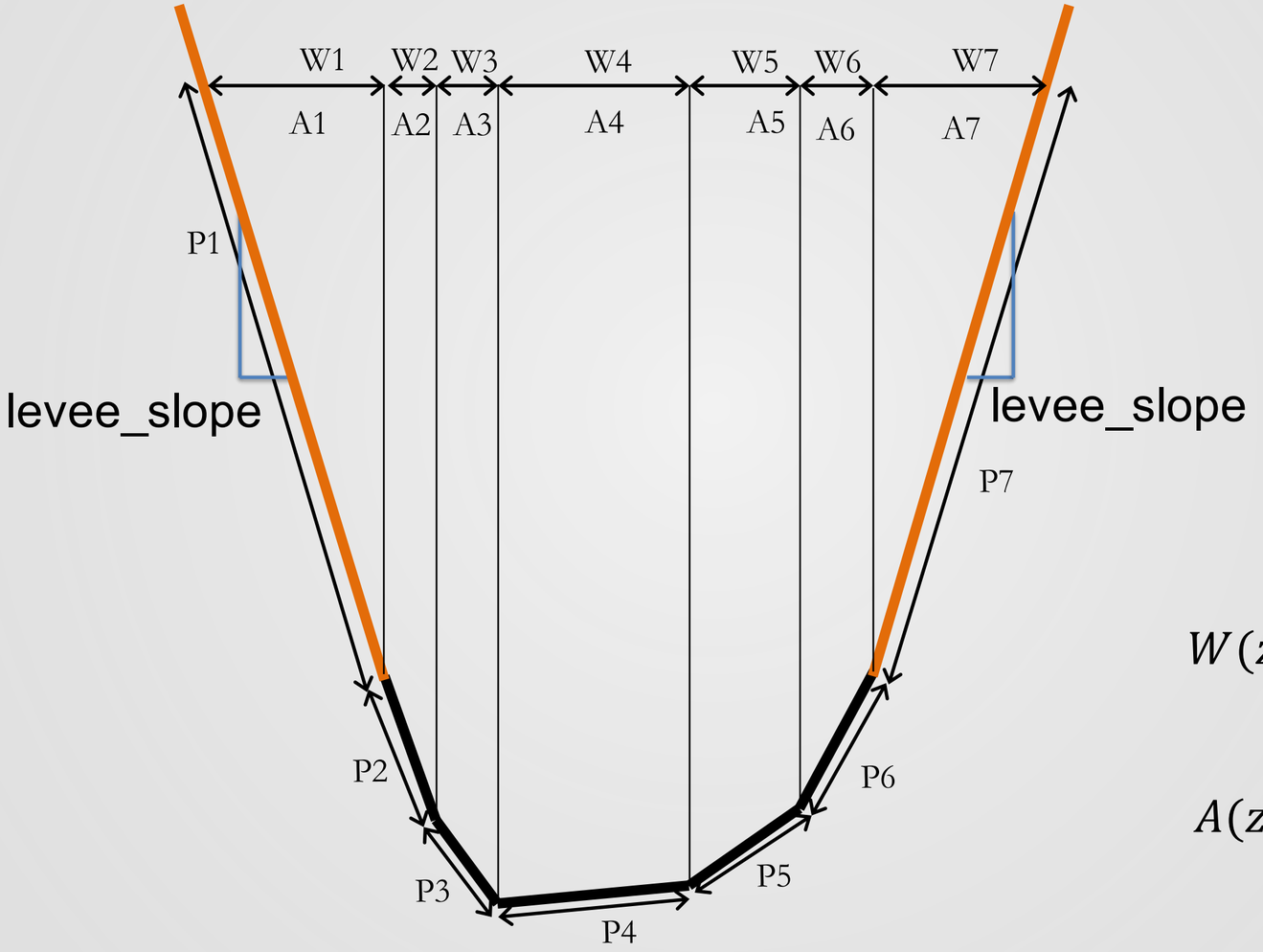


$$W(z) = \sum_{i=1}^{n} W(z)_i$$

$$A(z) = \sum_{i=1}^{n} A(z)_i$$

$$P(z) = \sum_{i=1}^{n} P(z)_i$$

CSDP Conveyance Characteristics Calculation: DSM2 Cross-Section Extrapolation

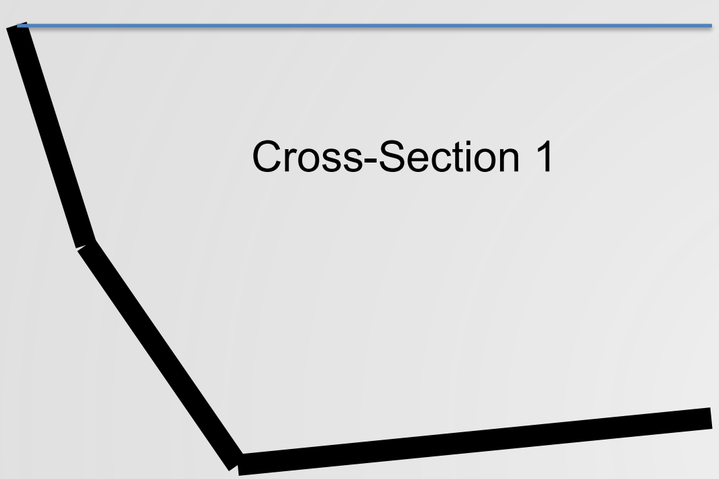


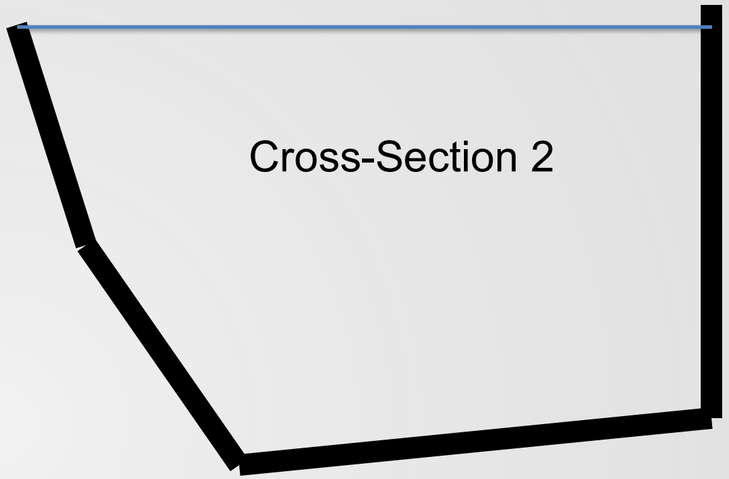
$$W(z) = \sum_{i=1}^{n} W(z)_i$$

$$A(z) = \sum_{i=1}^{n} A(z)_i$$

$$P(z) = \sum_{i=1}^{n} P(z)_i$$

How J shapes affect conveyance characteristics

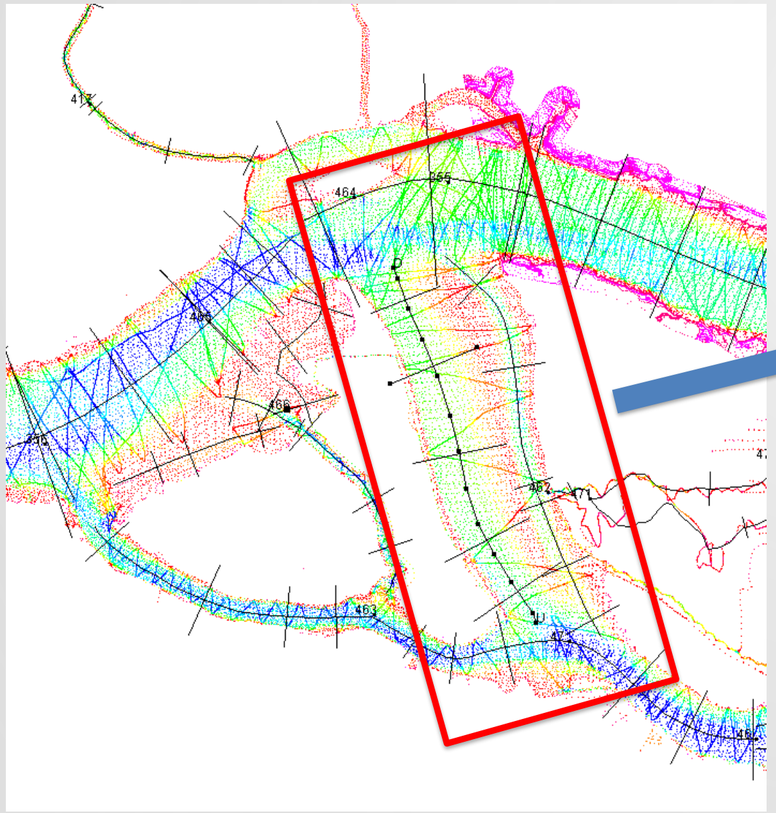


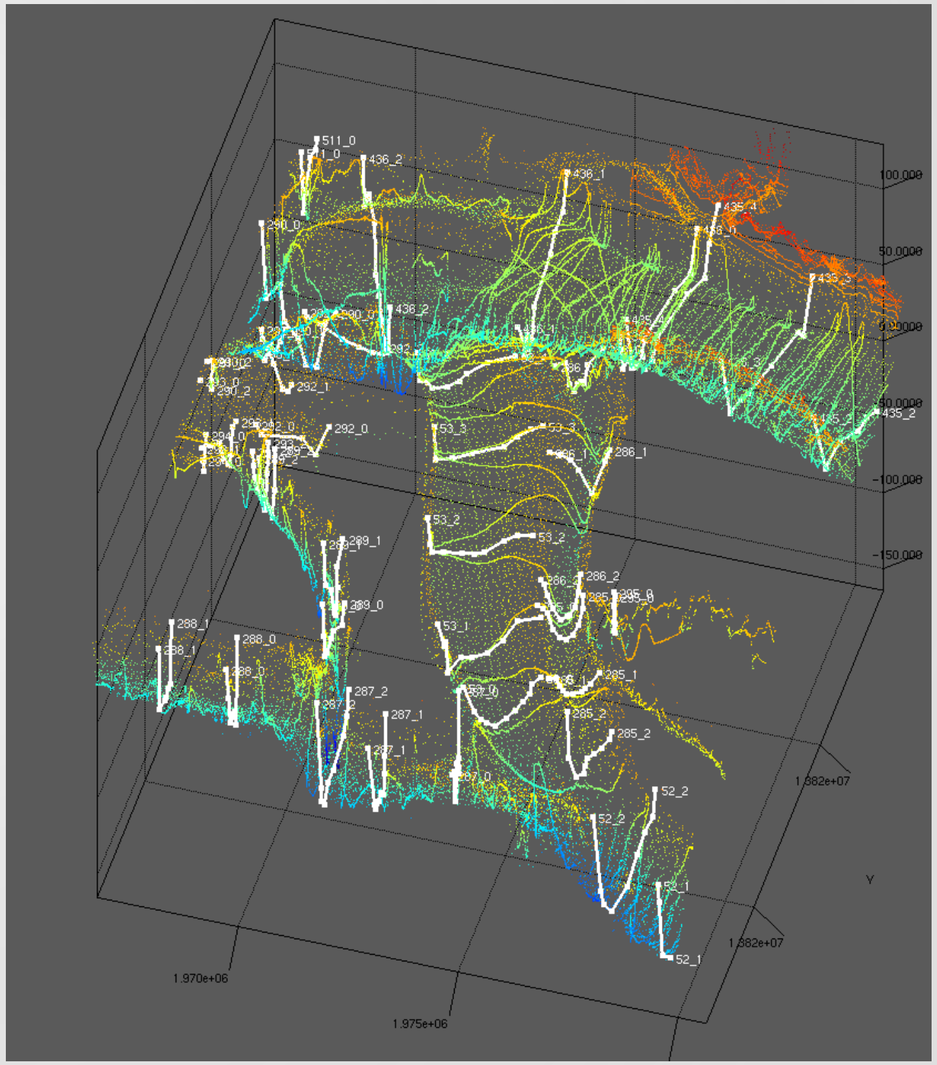


Results:
A1 = A2
W1 = W2
P1 < P2

Some cross-Sections <u>should</u> be J-shaped
Broad Slough

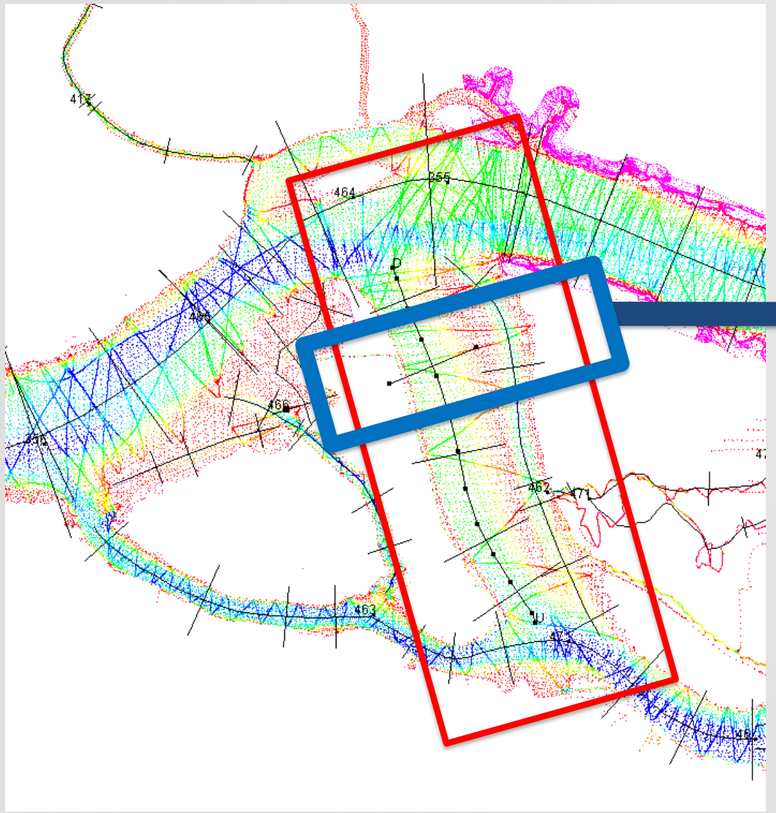
Broad Slough:
parallel channels in DSM2 with
opposite positive flow directions

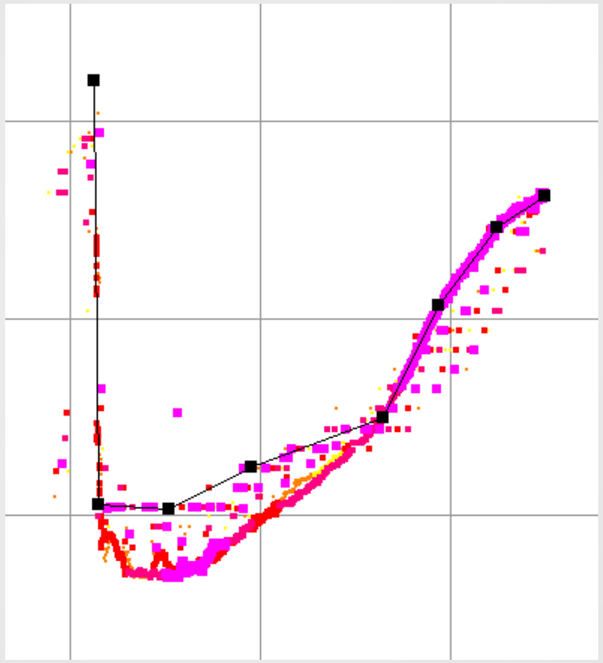




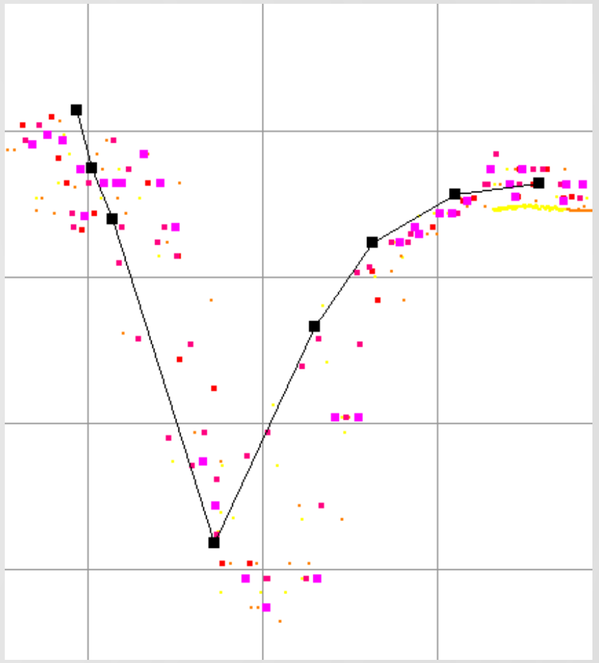
Some cross-Sections should be J-shaped
Broad Slough

Broad Slough is represented by parallel channels in DSM2



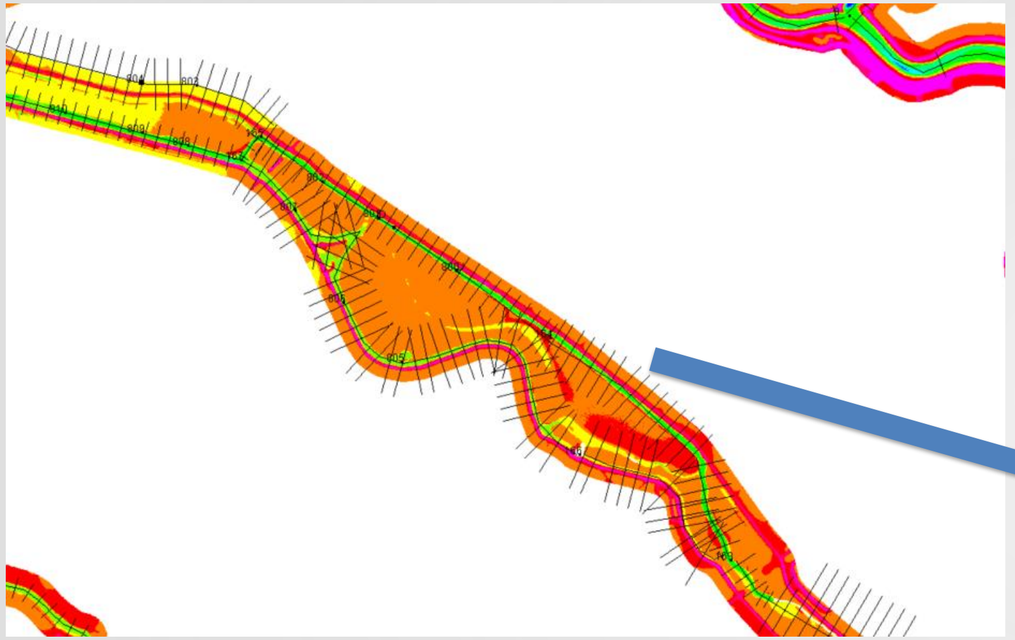


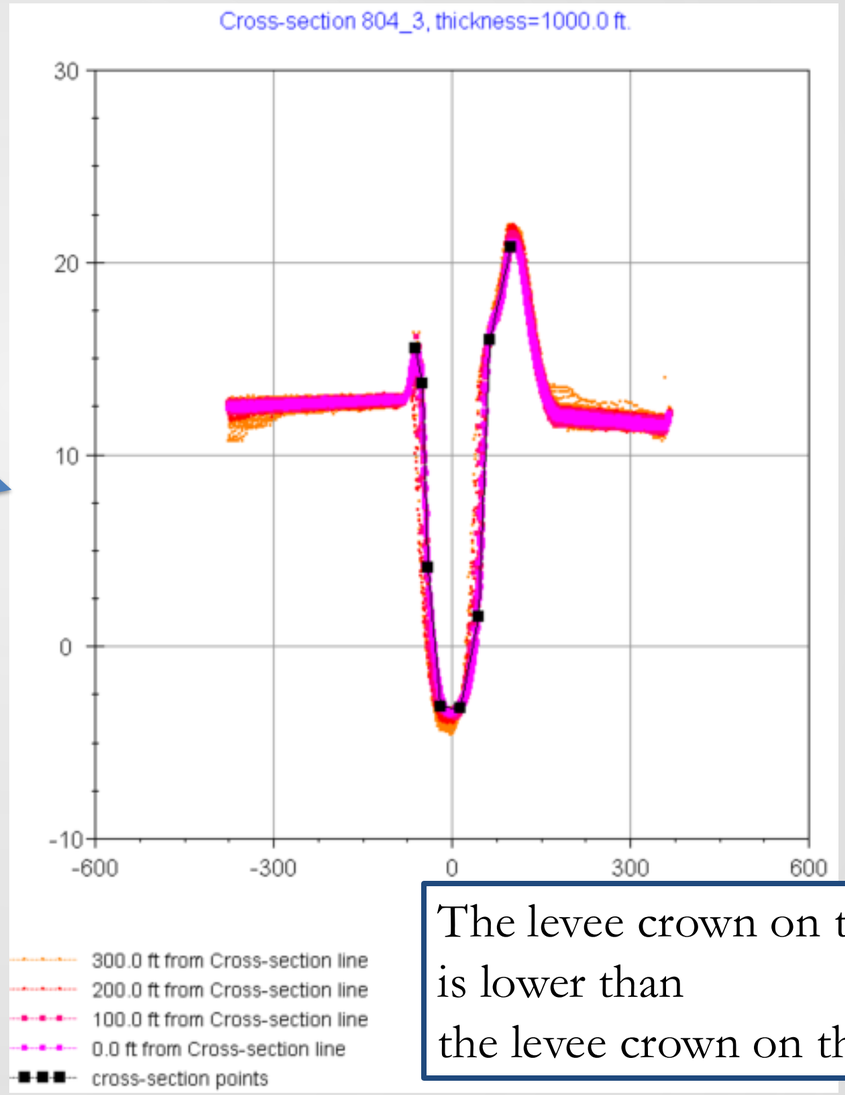
Cross-section in channel 53 (western channel, looking north)



Cross-section in channel 286 (eastern channel, looking south)

Some cross-Sections <u>should</u> be J-shaped
Paradise Cut

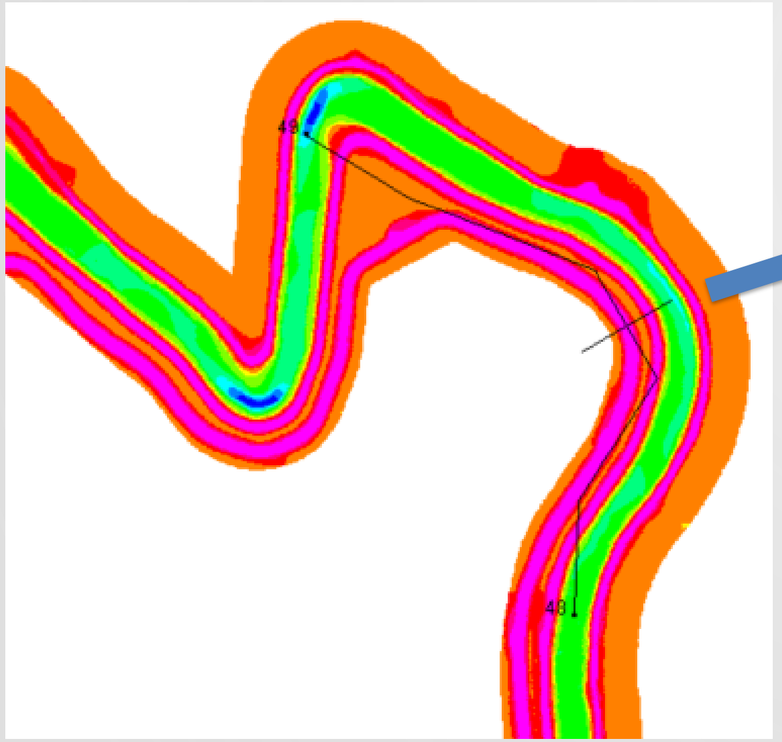


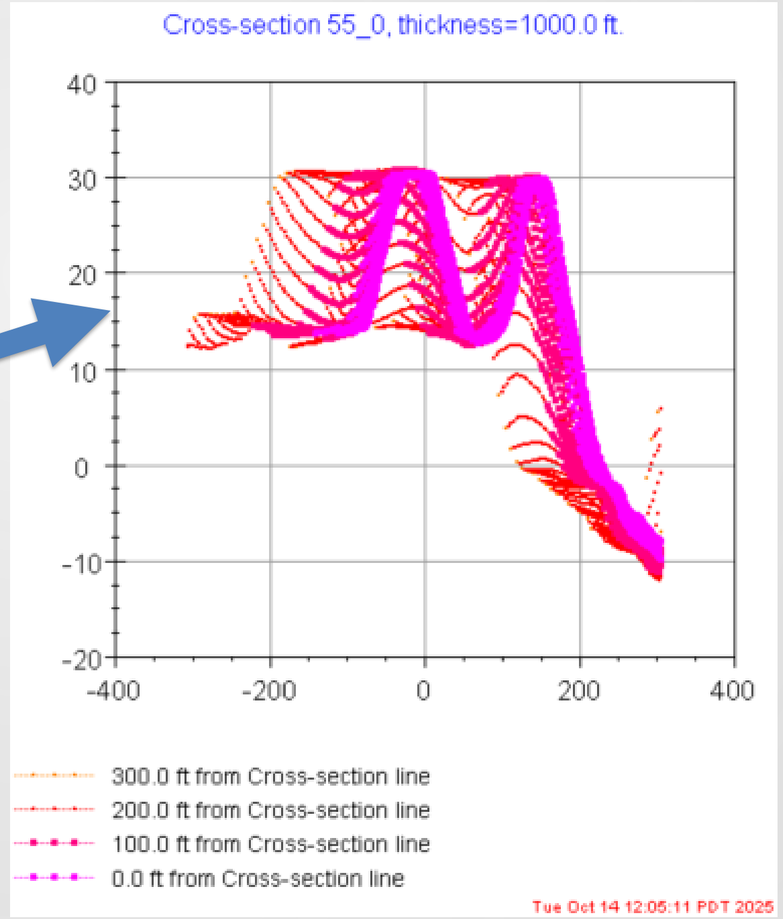


The levee crown on the southwest bank
is lower than
the levee crown on the northeast bank

Most cross-sections **should not** be J-shaped
Missing data or cross-section line too short

- cross-section line should include both levee crowns, if available
- Exclude land surface from cross-section drawing





CSDP output/DSM2 geometry input: channel_std_delta_grid file

CHANNEL input section

From CSDP network

From previous version of channel input file

```
# 20251015
#Created automatically by CSDP, using CSDP channel lengths
CHANNEL
CHAN_NO   LENGTH   MANNING   DISPERSION   UPNODE   DOWNNODE
1         9823     0.035      360          1        2
2         10941    0.028      360          2        3
3         12756    0.028      360          3        4
4         17164    0.028      360          4        5
5         8150     0.028      360          5        6
6         9437     0.028      360          6        7
7         8967     0.028      360          7        8
8         11620    0.028      360          8        9
9         10395    0.028      360          9        10
```

XSECT_LAYER input section

From CSDP network

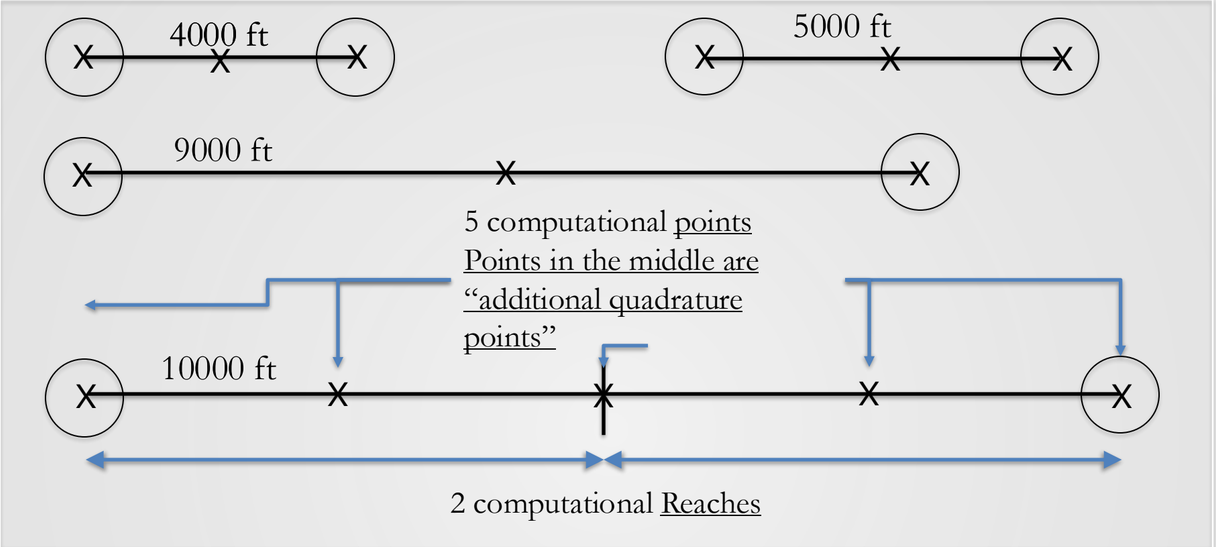
```
817       1853    0.03       360          168      811
818       2460    0.03       360          811      812
819       2328    0.03       360          812      169
820       2494    0.03       360          813      149
821       1935    0.08       360          58       814
822       3883    0.08       360          814      59
823       3677    0.03       360          815      66
# The following channels are missing from the CSDP network fil
# data are copied from the previous version of the DSM2 input
END

XSECT_LAYER
CHAN_NO  DIST   ELEV   AREA     WIDTH    WET_PERIM
1        0.01194 -3.205  0.000    0.000    0.000
1        0.01194 1.602   415.221  172.759  173.032
1        0.01194 4.247   1089.787 337.311  337.699
1        0.01194 6.409   1864.430 379.303  380.019
1        0.01194 11.737  4181.200 490.325  491.835
1        0.01194 12.606  4618.246 515.853  517.422
1        0.01194 20.428  9267.803 673.089  675.492
```

CSDP Introduction

Virtual (interpolated) cross-sections at computational points

DSM2 Computational Reaches and computational points for Δx=5000ft



$$\#Computational\ Reaches = 1 + int\left[\frac{max(0, length - \Delta x)}{\Delta x}\right]$$

$$\#Computational\ Points = 3 + 2 * int\left[\frac{max(0, length - \Delta x)}{\Delta x}\right]$$

Note: The int function truncates

Length	# Computational Reaches	# Computational Points
4000 ft	1	3
5000 ft	1	3
9000 ft	1	3
10000 ft	2	5
15000 ft	3	7

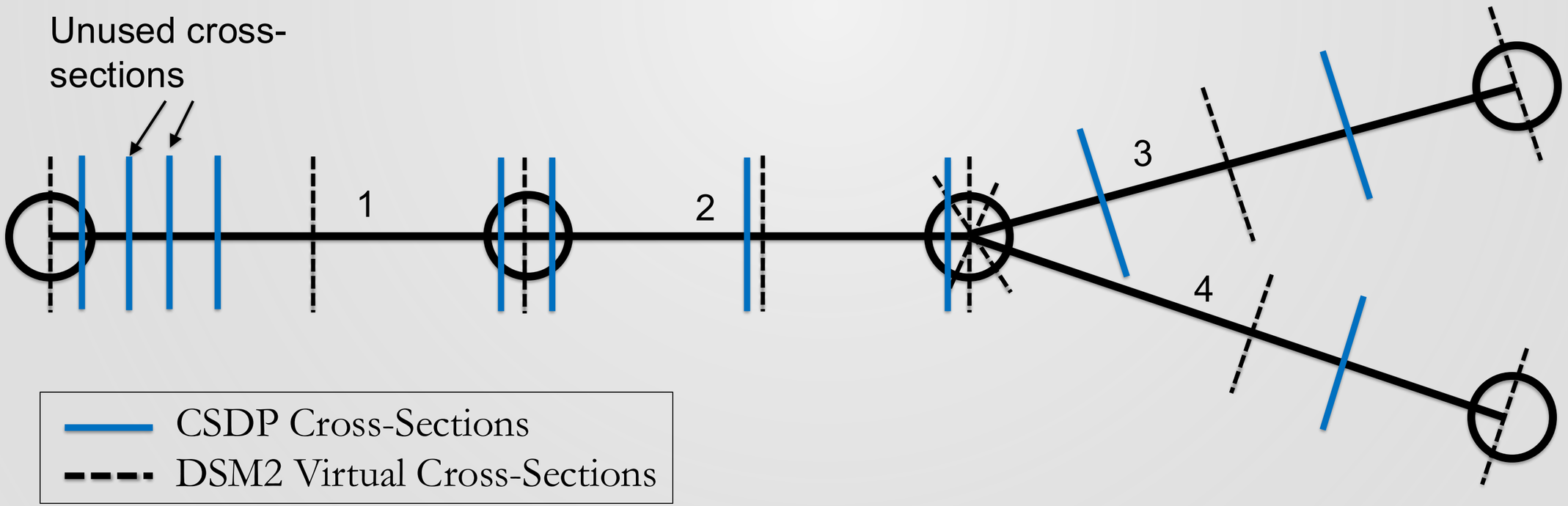
Cross-section Interpolation rules

Interpolate between nearest CSDP cross-sections

Interpolate across node allowed if 2 channel connections

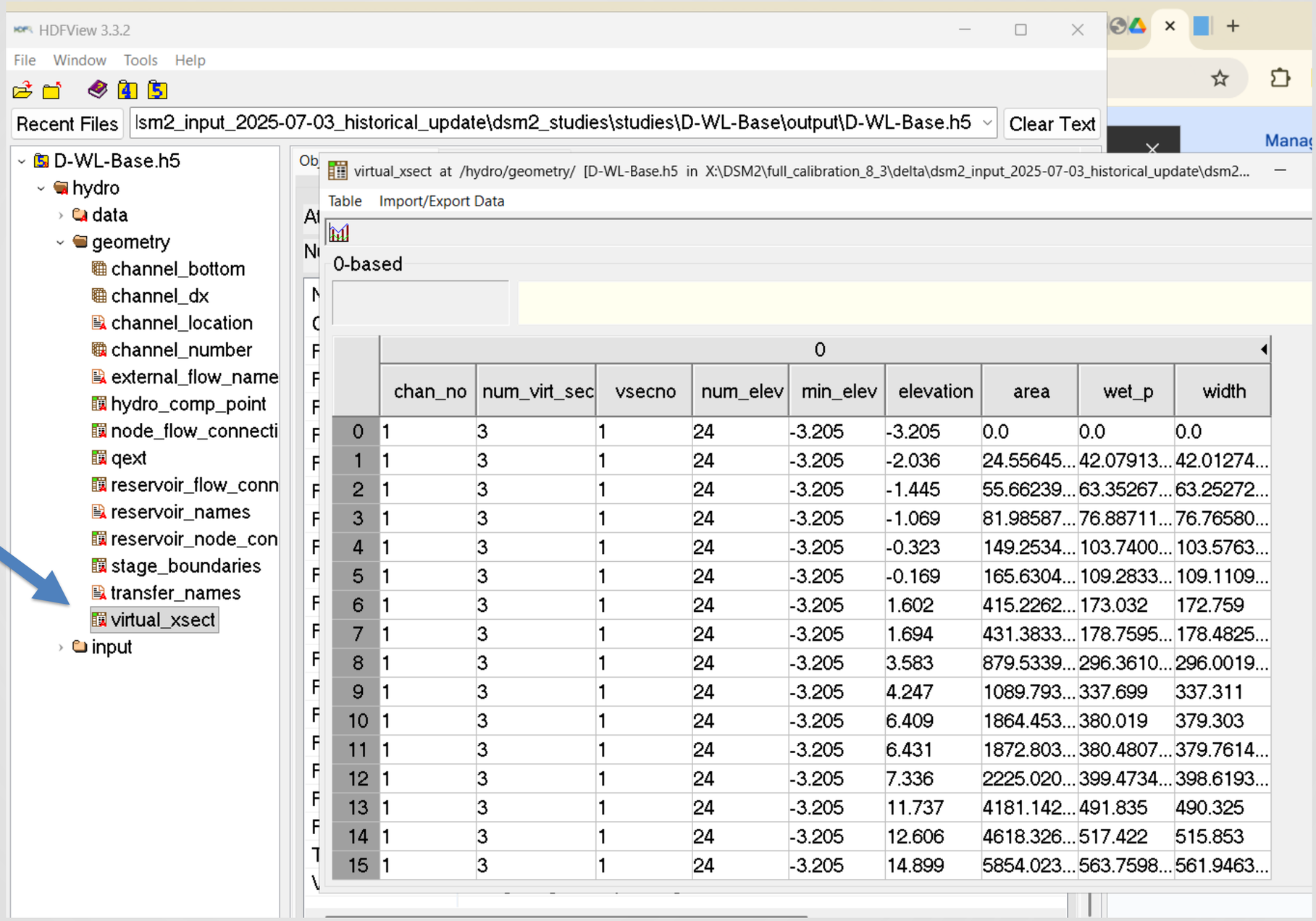
There must be at least 1 CSDP cross-section to create irregular virtual cross-sections

If interpolation not possible, CSDP cross-sections will be copied to all computational points



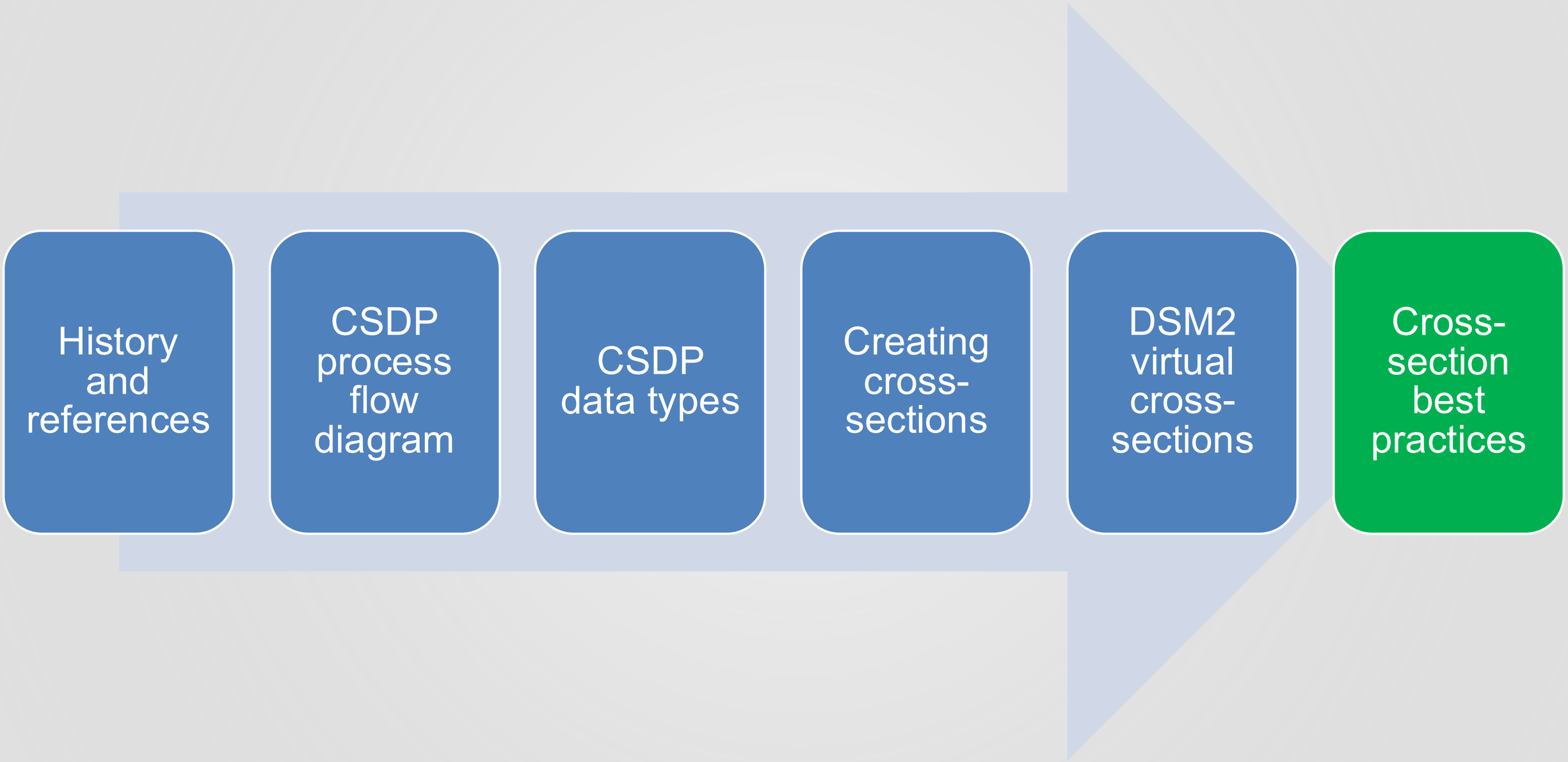
DSM2 Virtual Cross-Sections

1. Load tidefile into HDFView or similar application
2. Select “hydro-geometry-virtual_xsect” to view virtual cross-sections

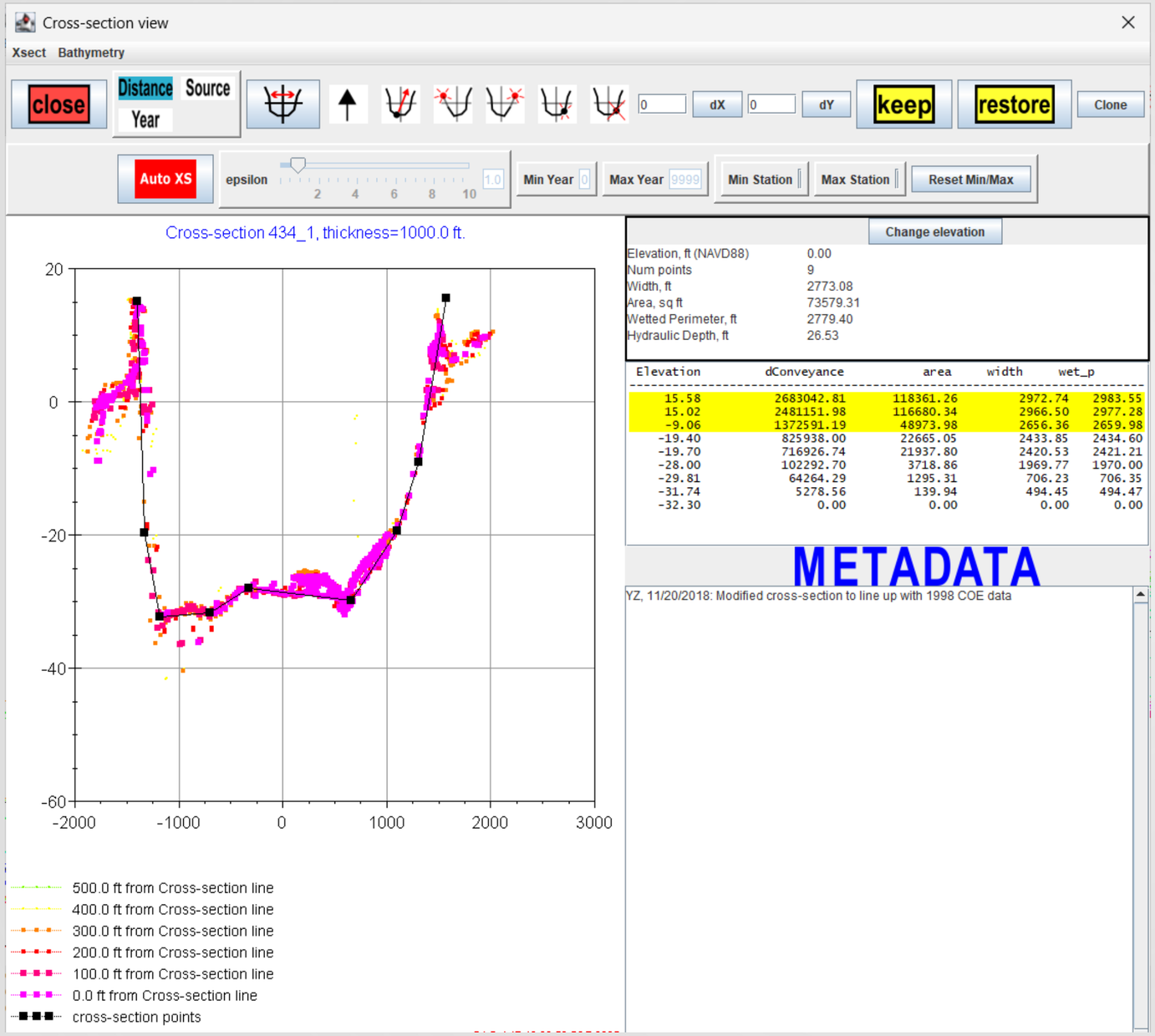


	0								
	chan_no	num_virt_sec	vsecno	num_elev	min_elev	elevation	area	wet_p	width
0	1	3	1	24	-3.205	-3.205	0.0	0.0	0.0
1	1	3	1	24	-3.205	-2.036	24.55645...	42.07913...	42.01274...
2	1	3	1	24	-3.205	-1.445	55.66239...	63.35267...	63.25272...
3	1	3	1	24	-3.205	-1.069	81.98587...	76.88711...	76.76580...
4	1	3	1	24	-3.205	-0.323	149.2534...	103.7400...	103.5763...
5	1	3	1	24	-3.205	-0.169	165.6304...	109.2833...	109.1109...
6	1	3	1	24	-3.205	1.602	415.2262...	173.032	172.759
7	1	3	1	24	-3.205	1.694	431.3833...	178.7595...	178.4825...
8	1	3	1	24	-3.205	3.583	879.5339...	296.3610...	296.0019...
9	1	3	1	24	-3.205	4.247	1089.793...	337.699	337.311
10	1	3	1	24	-3.205	6.409	1864.453...	380.019	379.303
11	1	3	1	24	-3.205	6.431	1872.803...	380.4807...	379.7614...
12	1	3	1	24	-3.205	7.336	2225.020...	399.4734...	398.6193...
13	1	3	1	24	-3.205	11.737	4181.142...	491.835	490.325
14	1	3	1	24	-3.205	12.606	4618.326...	517.422	515.853
15	1	3	1	24	-3.205	14.899	5854.023...	563.7598...	561.9463...

CSDP Introduction



CSDP Cross-Section Best Practices

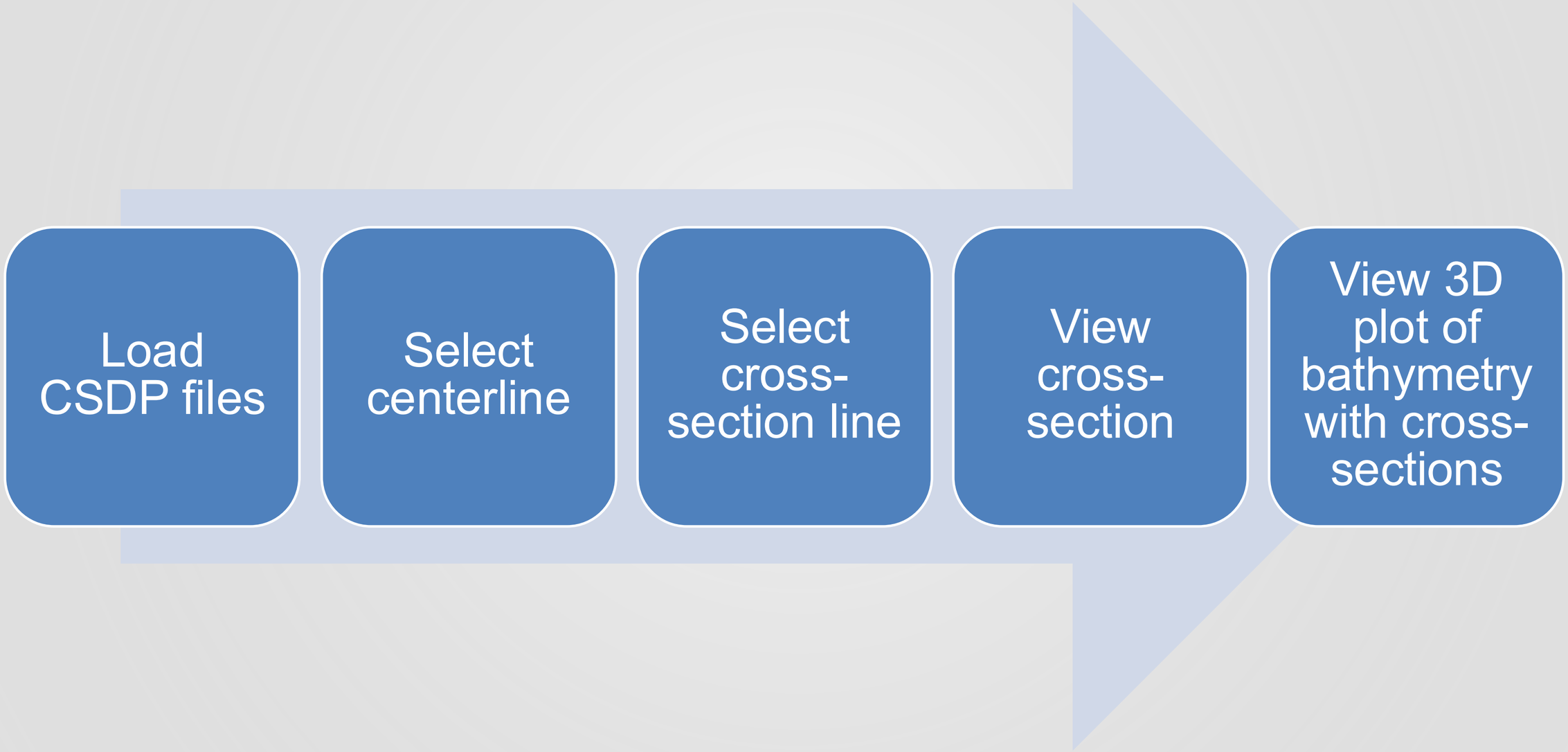


- Set thickness based on delta x (dX), density of data, and curvature of channel
- Cross-sections should represent the portions of the channel between computational points
- Don’t use excessive points
- Avoid large changes in WAP wrt elevation in the intertidal zone
- Avoid large changes in area between adjacent cross-sections
- Make sure every cross-section line has a drawing
- Try to go from levee crown to levee crown, excluding land surface
- Avoid line segments that overlap horizontally
- To adjust area, large adjustments can be made by moving points horizontally, small adjustments by moving vertically.
- Always add metadata when modifying a cross-section.
- When reviewing cross-sections with new bathymetry, adding metadata is recommended.

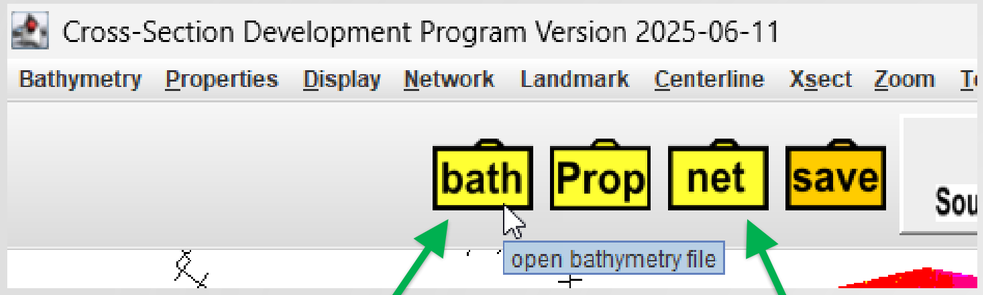
Break

10:00-10:10

Hands-on exercise: load CSDP files, view cross-sections



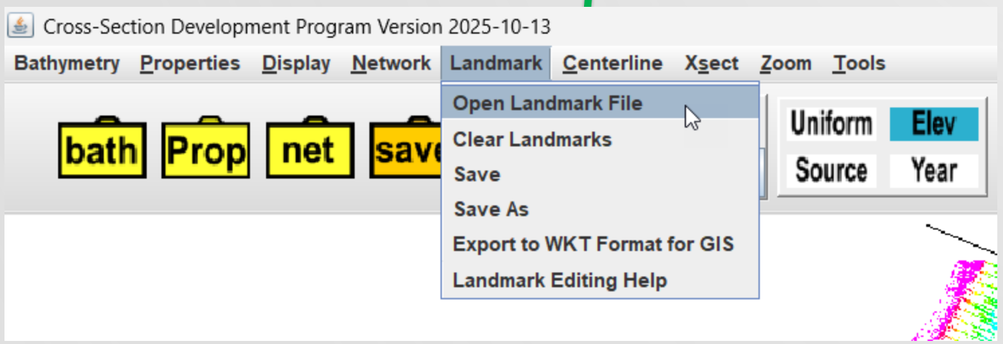
Hands-on exercise: load CSDP data



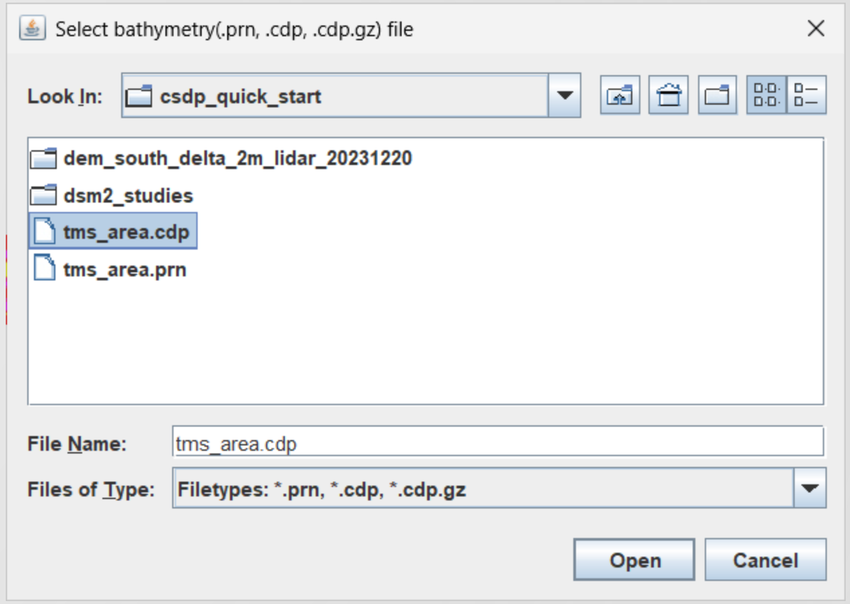
1. Load bathymetry file tms_area.cdp

3. Load network file delta_tms_horseshoe_adj.cdn

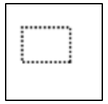
2. Load landmark file node.cdl

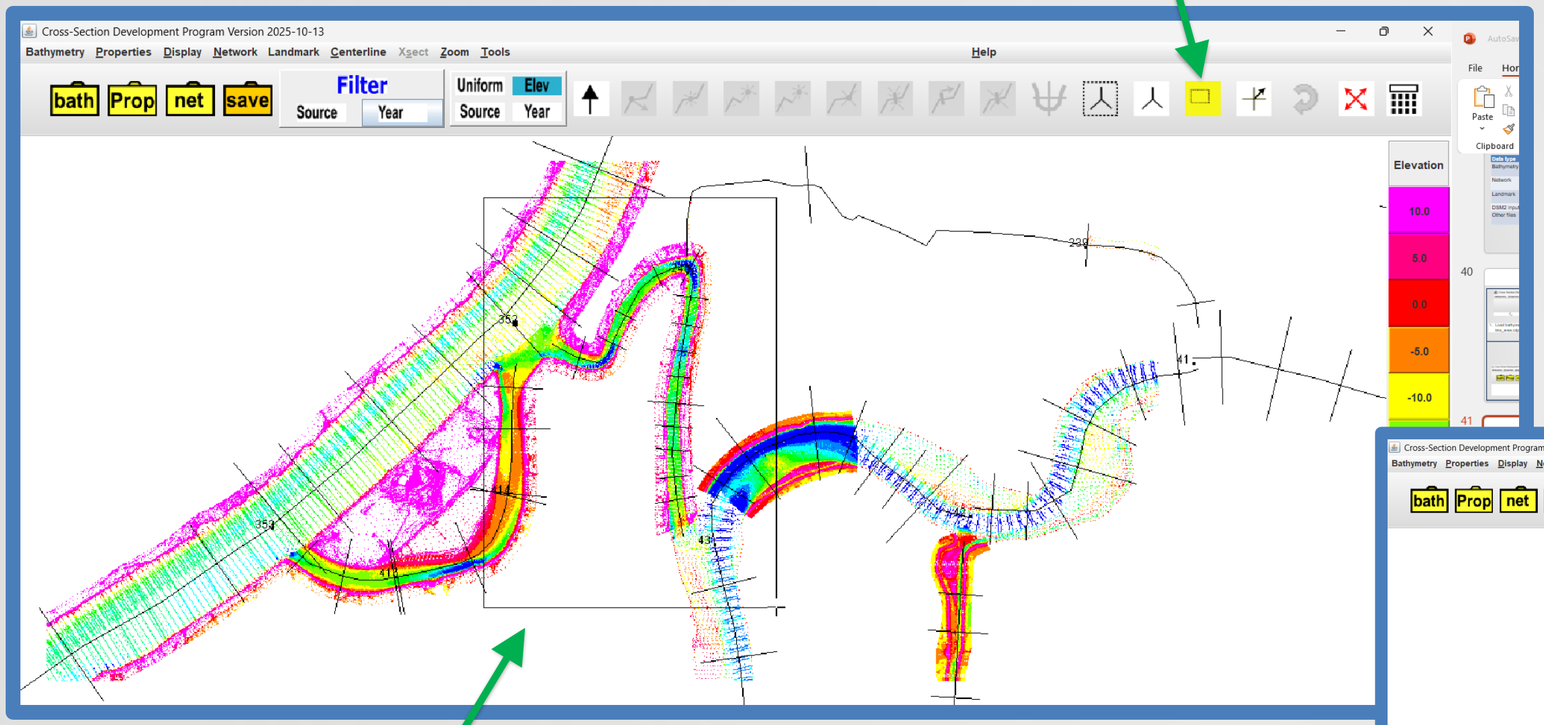


Choose each file using the file selector dialog



Hands-on exercise: Box Zoom

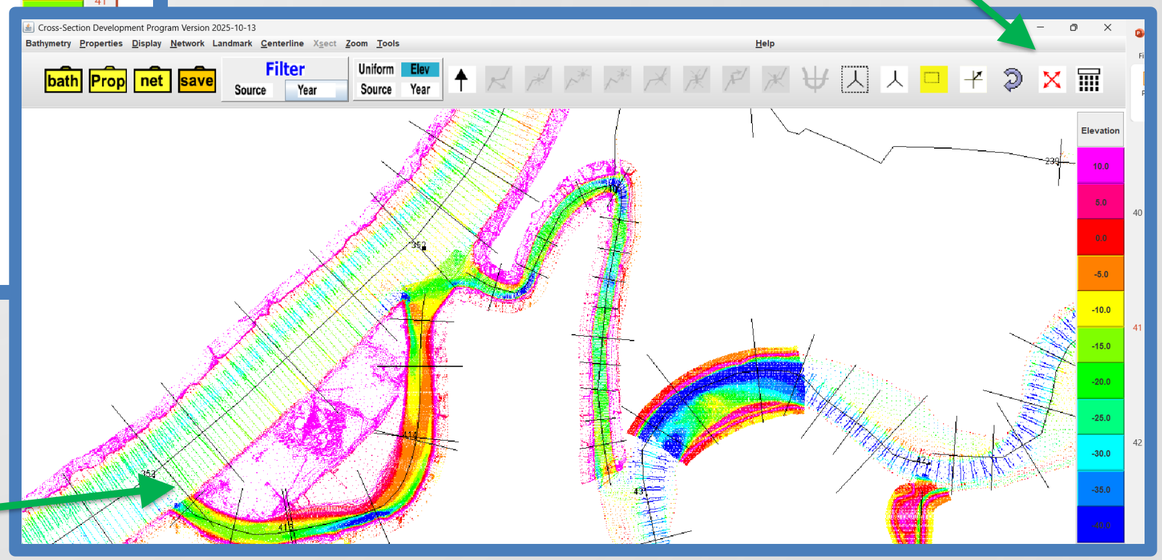
1. Turn on Box zoom mode 



2. Click and drag to draw a box around Three Mile Slough

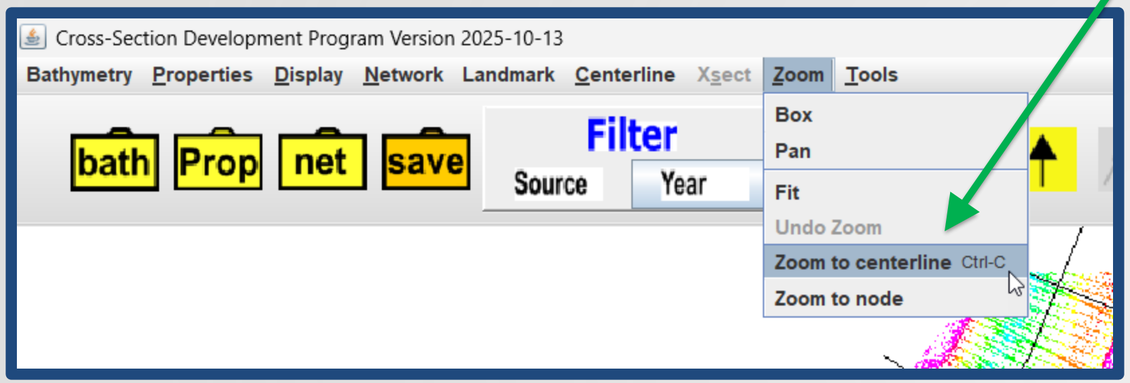
3. You will now be zoomed in to that location

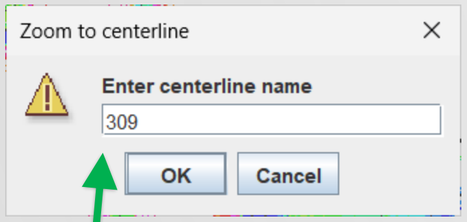
4. Click the zoom out button 



Hands-on exercise: Zoom To Centerline

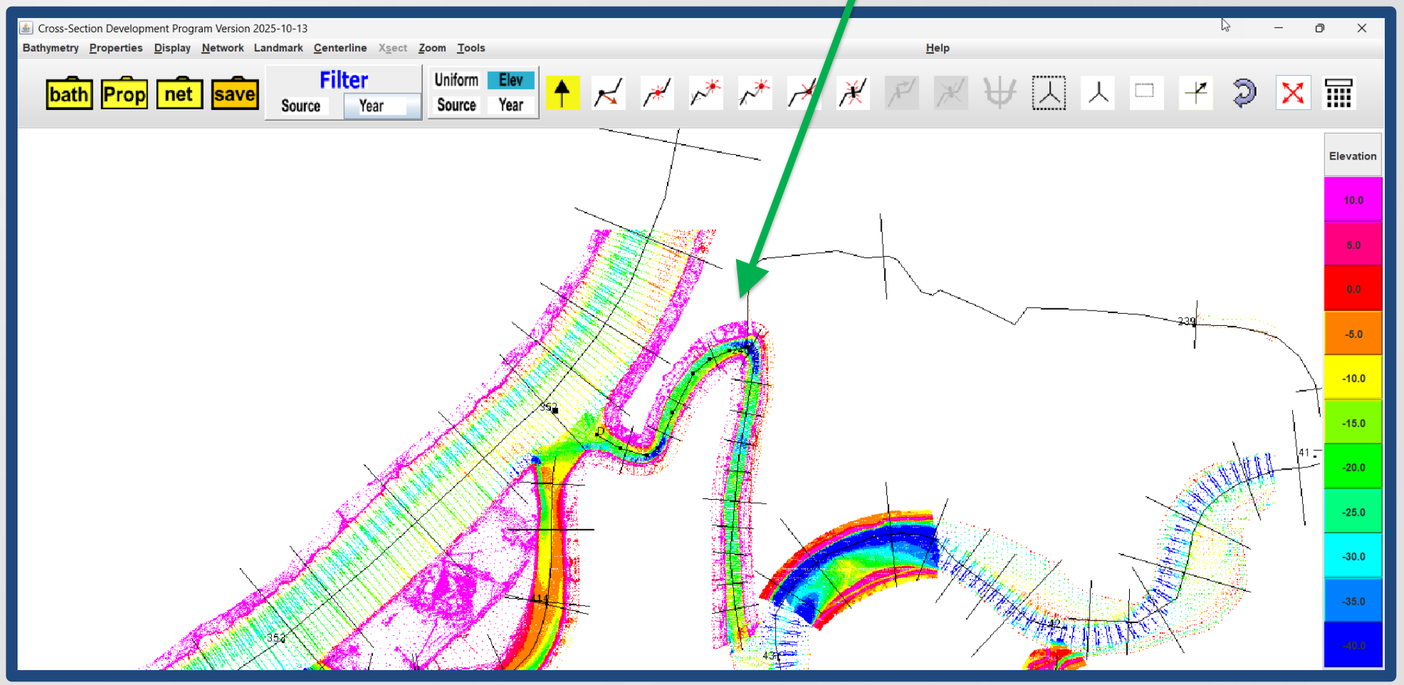
1. Select “Zoom-Zoom to centerline” **OR** Press **Ctrl-c**



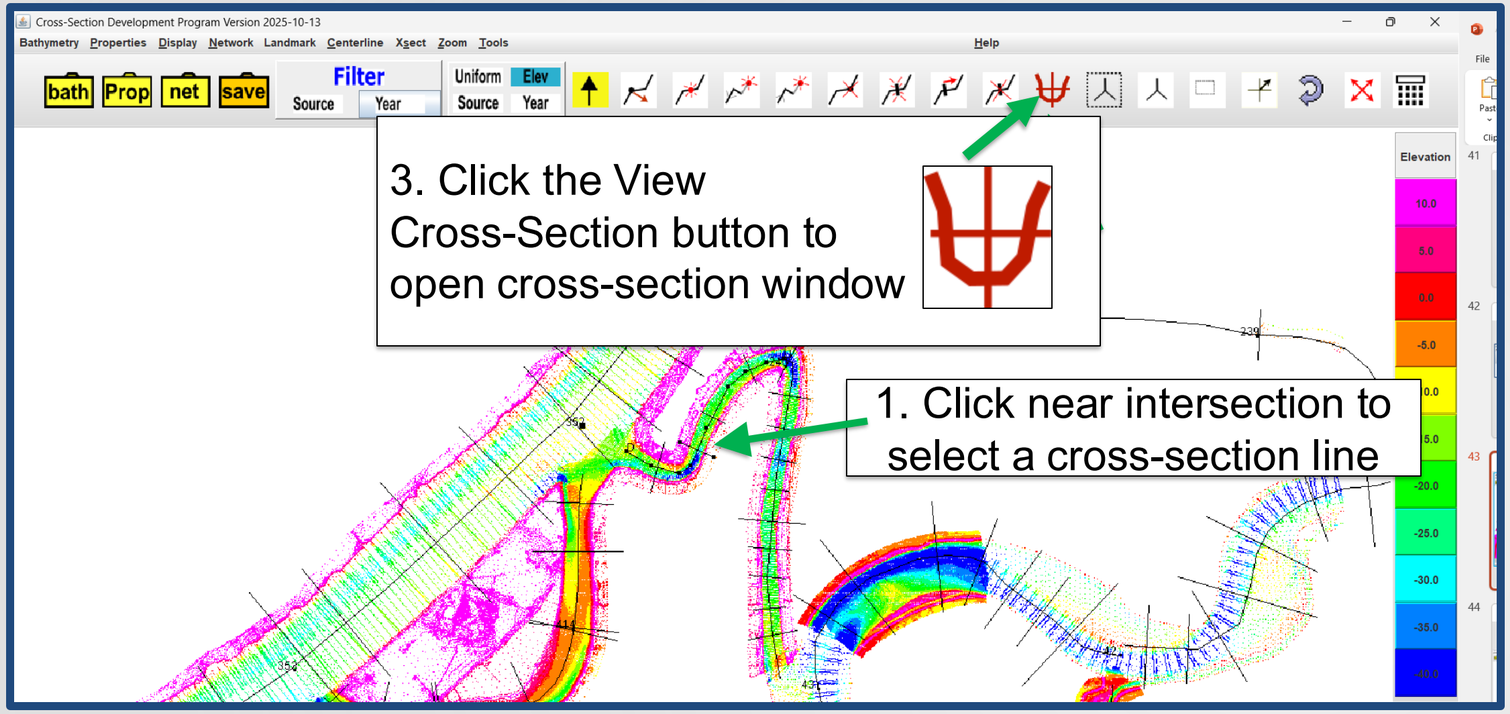


2. Enter “309” to zoom to **and** select channel 309

3. You will now be zoomed in to channel 309, and it will be selected

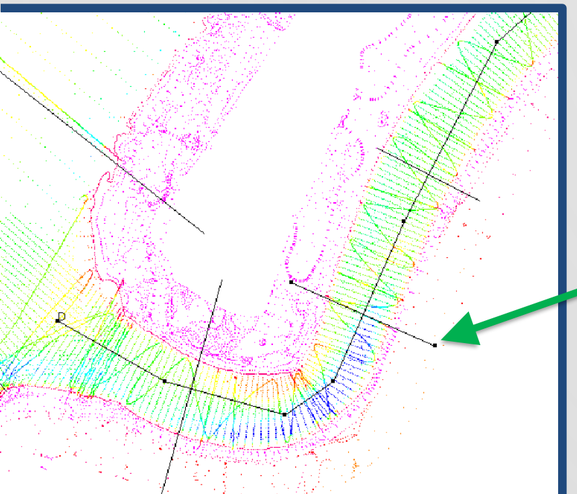


Hands-on exercise: Select & View Cross-Section



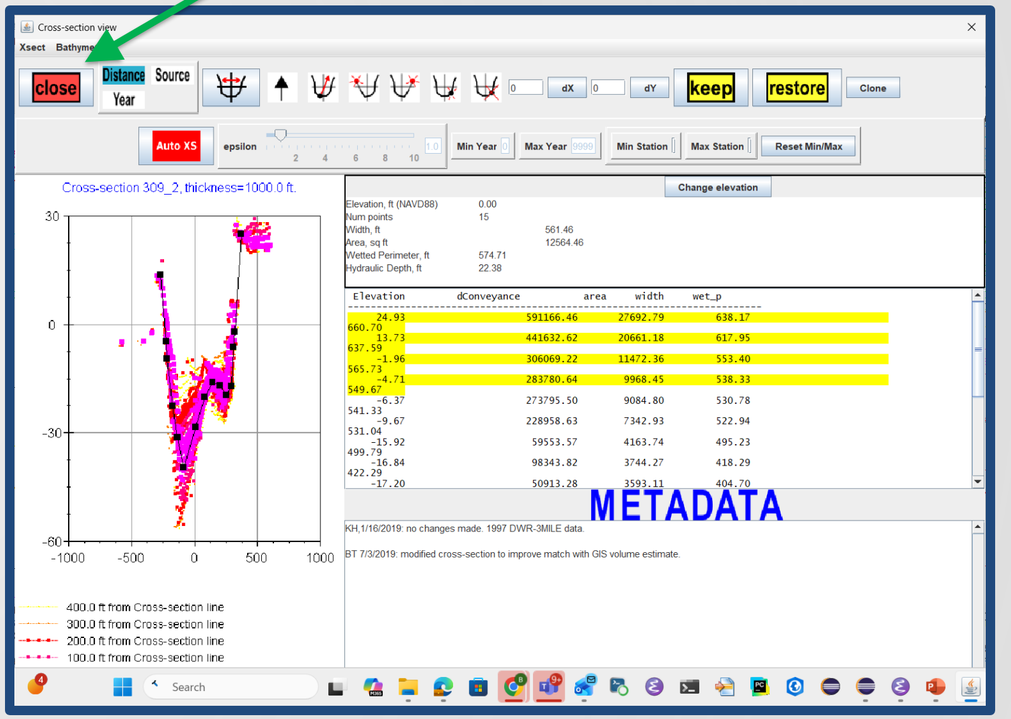
3. Click the View Cross-Section button to open cross-section window

1. Click near intersection to select a cross-section line



2. Cross-section line is now selected

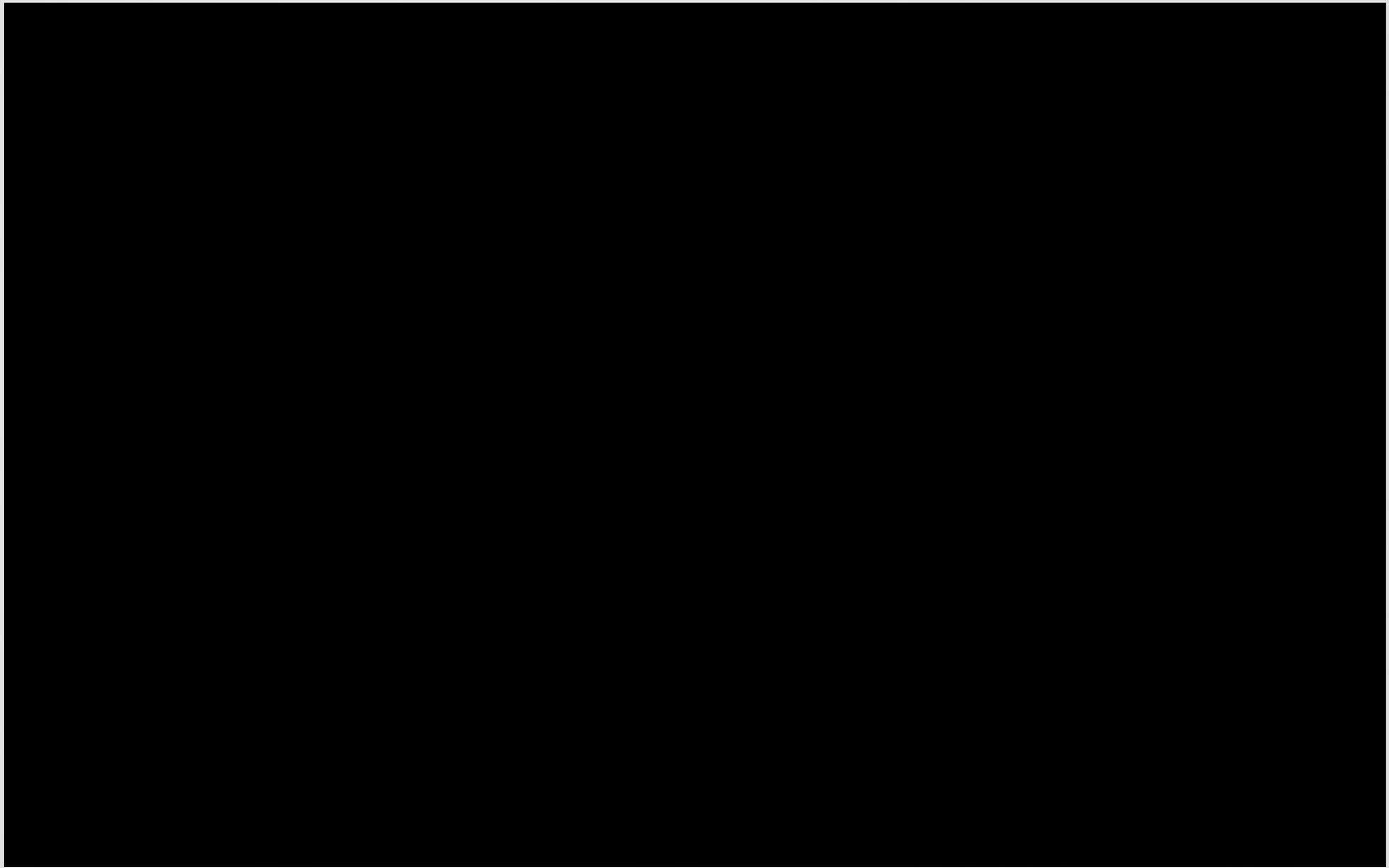
3. A cross-section window will appear. Click “close” to close the window.



4. In the main window, click the zoom out button

Channel 3D plot demo (video)

Correct distortion	Ctrl or alt mouse wheel
Rotate	Left drag
Adjust z axis scale	Mouse wheel
X and y zoom	Ctrl-alt mouse wheel
Right drag	Z axis pan
Ctrl-alt right drag	X and y pan

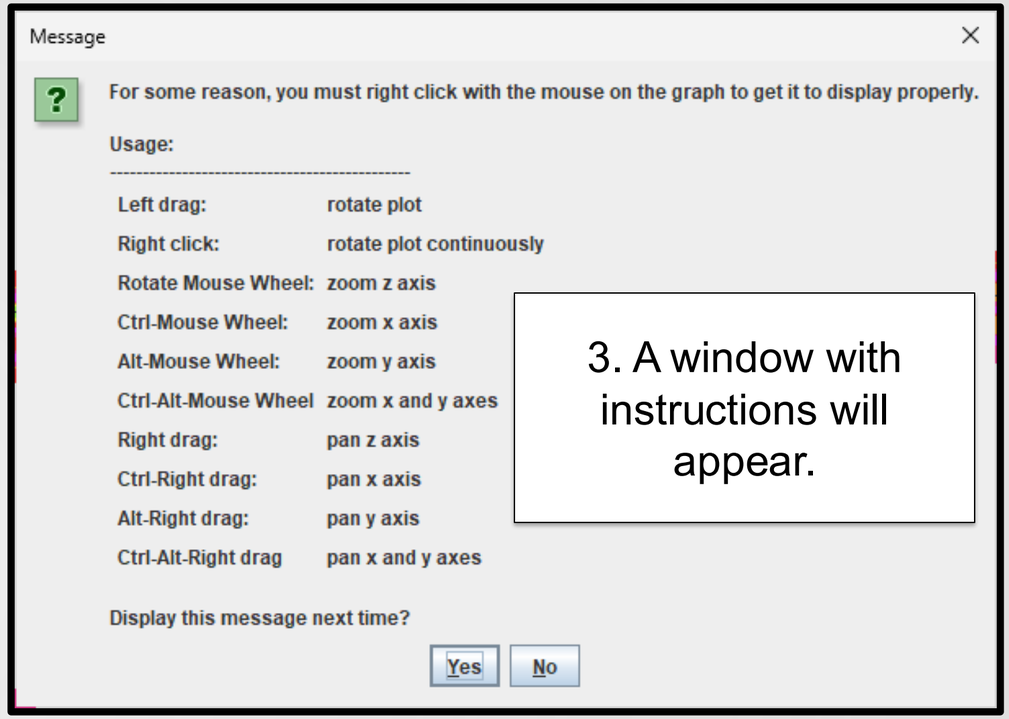


Hands-on exercise: View Channel 3D plot

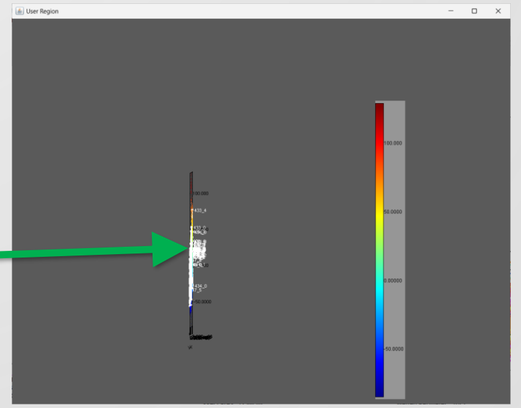
1. 3d plot button 

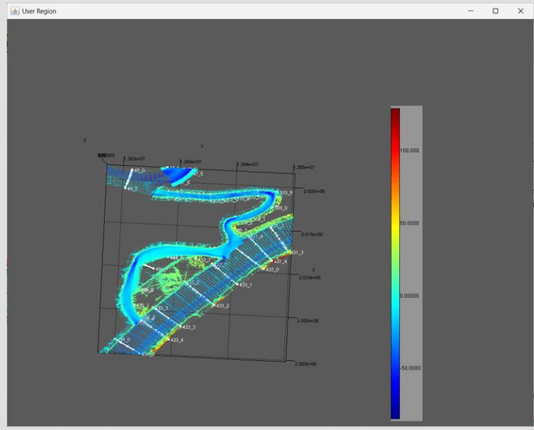
1a. You can also try this button to specify channel numbers 

2. Click and drag to draw a window around Decker Island and Three Mile Slough



3. A window with instructions will appear.



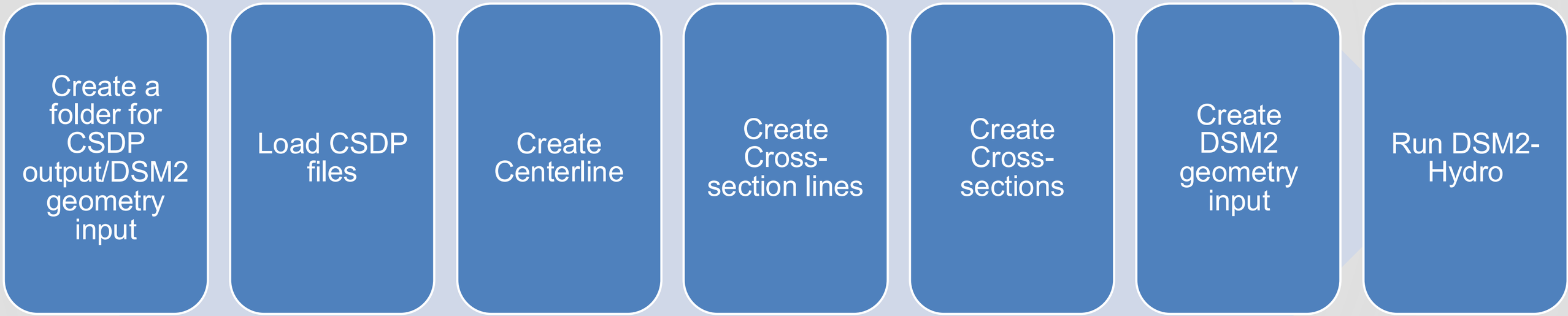


4. Close the instructions window, and a 3D plot will appear. Right click and drag on window to fix display. Ctrl- and alt- mouse wheel to adjust x and y axis scales. Right mouse wheel to adjust vertical axis scale. Left click and drag to rotate about all axes. If a command does not work, try left-clicking on the window first.

Break

11:00-11:10

Hands-on exercise: create cross-sections, run DSM2

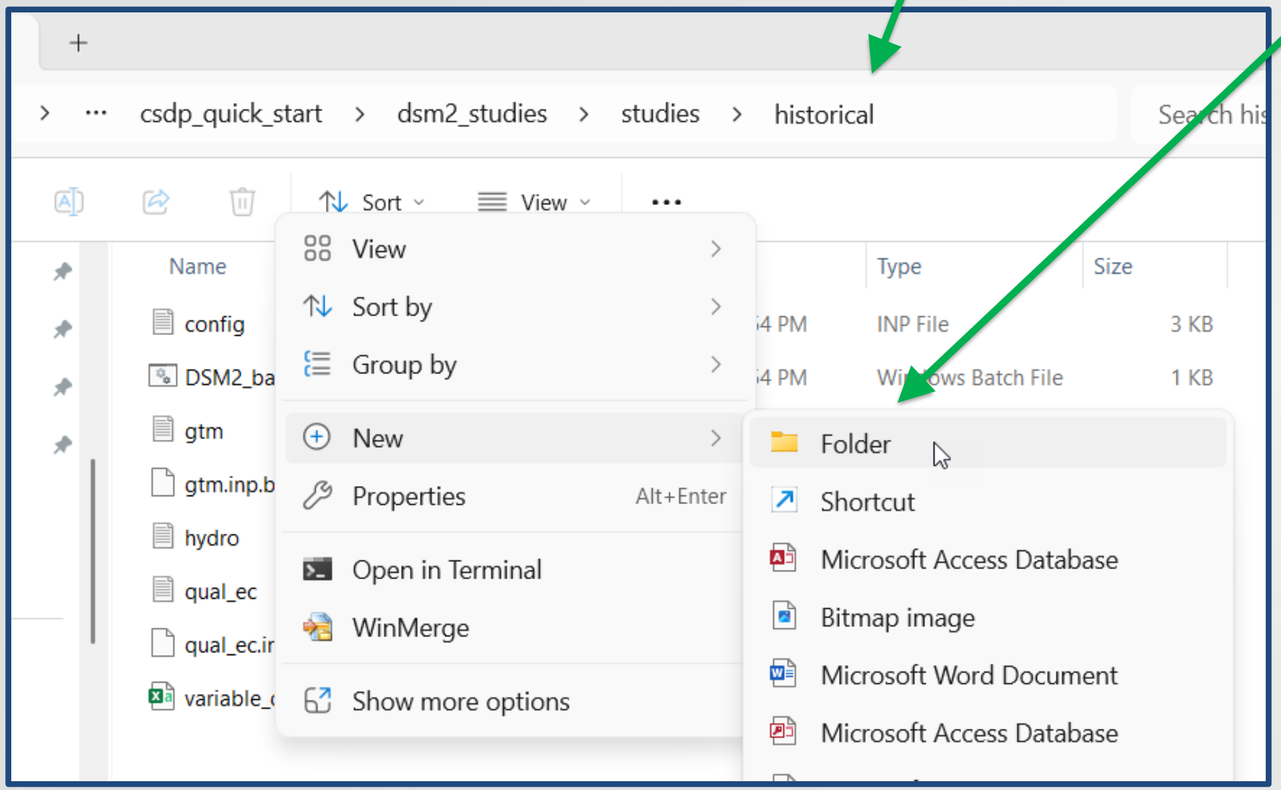


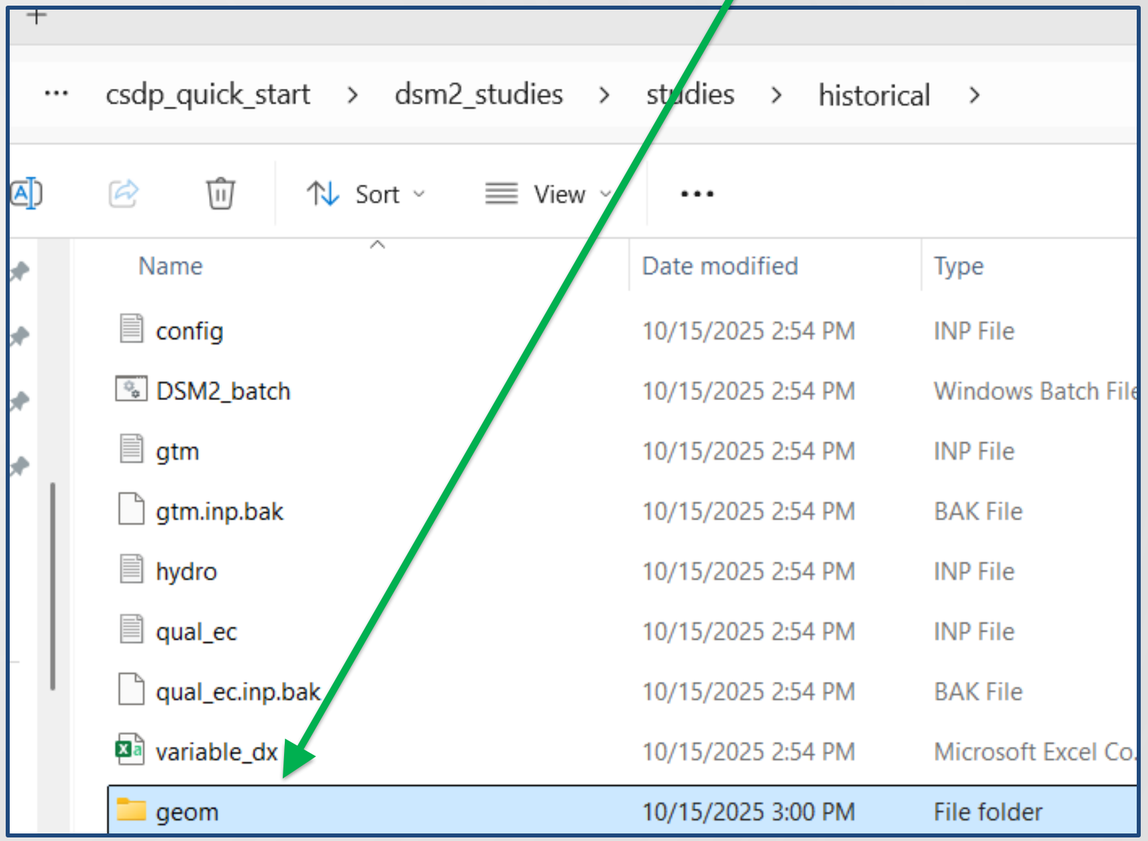
Hands-on exercise: create a geom folder

1. Open Windows explorer, and navigate to the historical folder in your DSM2 installation

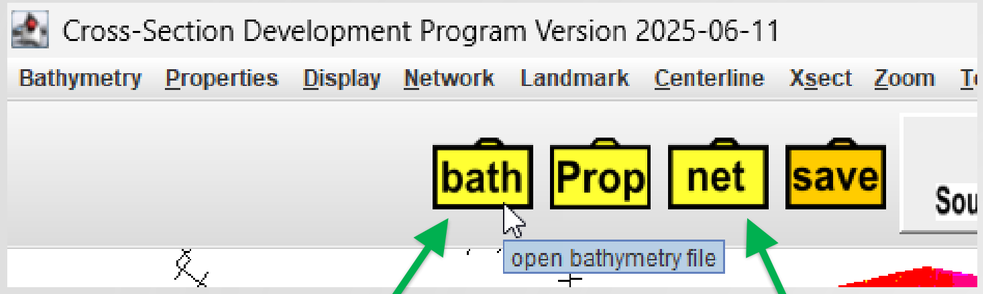
2. Right click and select New-Folder

3. Create a new folder called “geom”





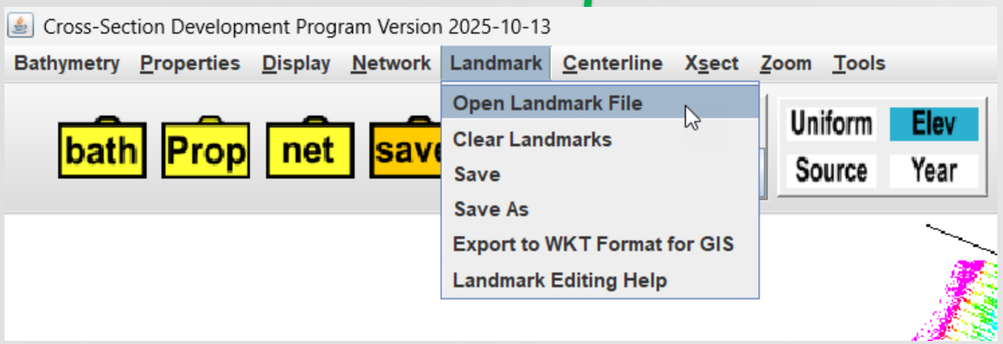
Hands-on exercise: load CSDP data



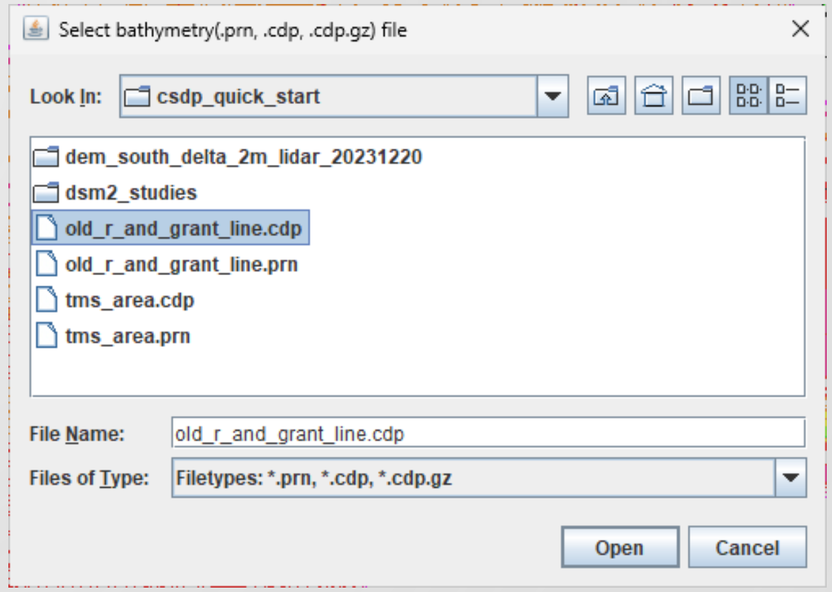
1. Load bathymetry file old_r_and_grant_line.cdp

2. Load network file delta_no_213.cdn

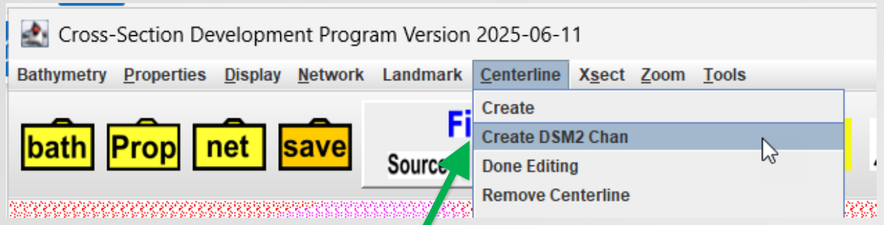
3. Load landmark file node.cdl



Choose each file using the file selector dialog

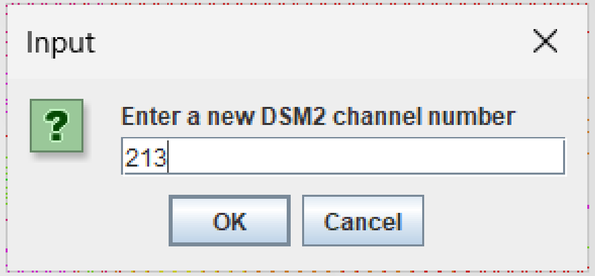


Hands-on exercise: Create Centerline

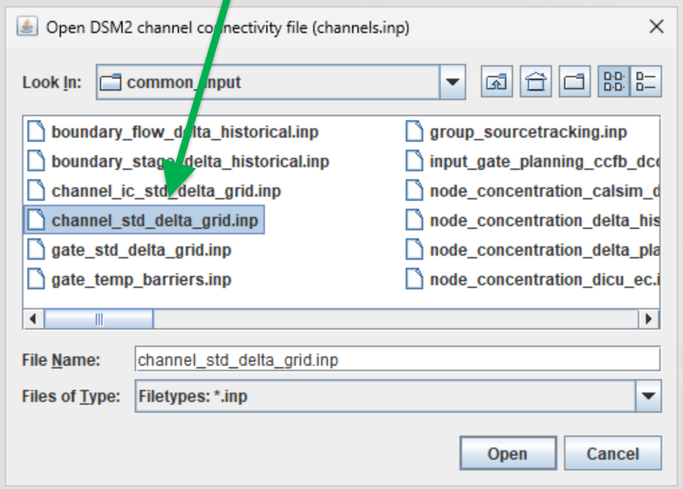


1. Select Centerline-Create DSM2 Chan

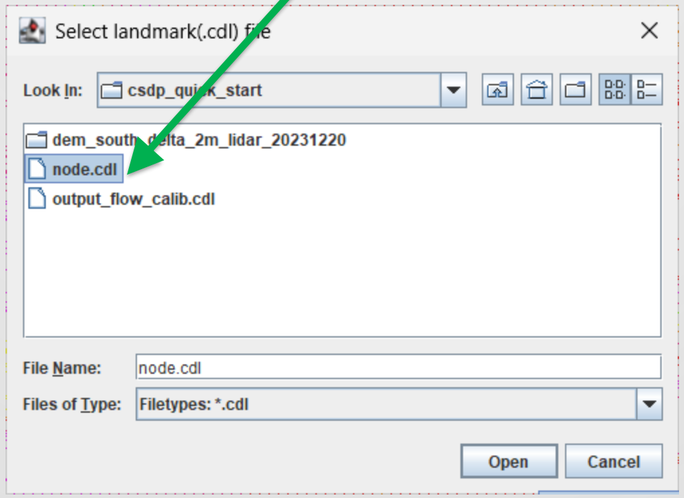
2. Enter the number 213



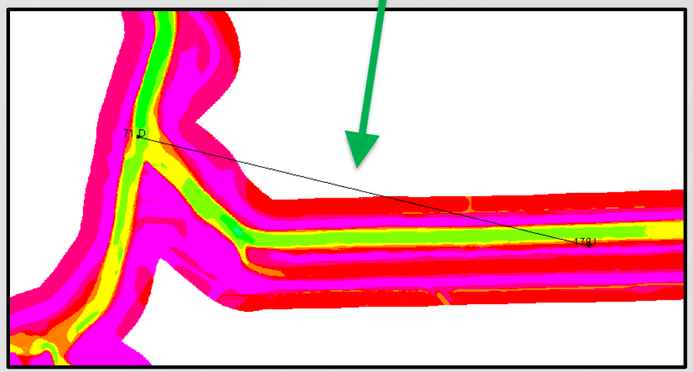
3. Select the channel_std_delta_grid.inp file



4. Select the node.cdl file

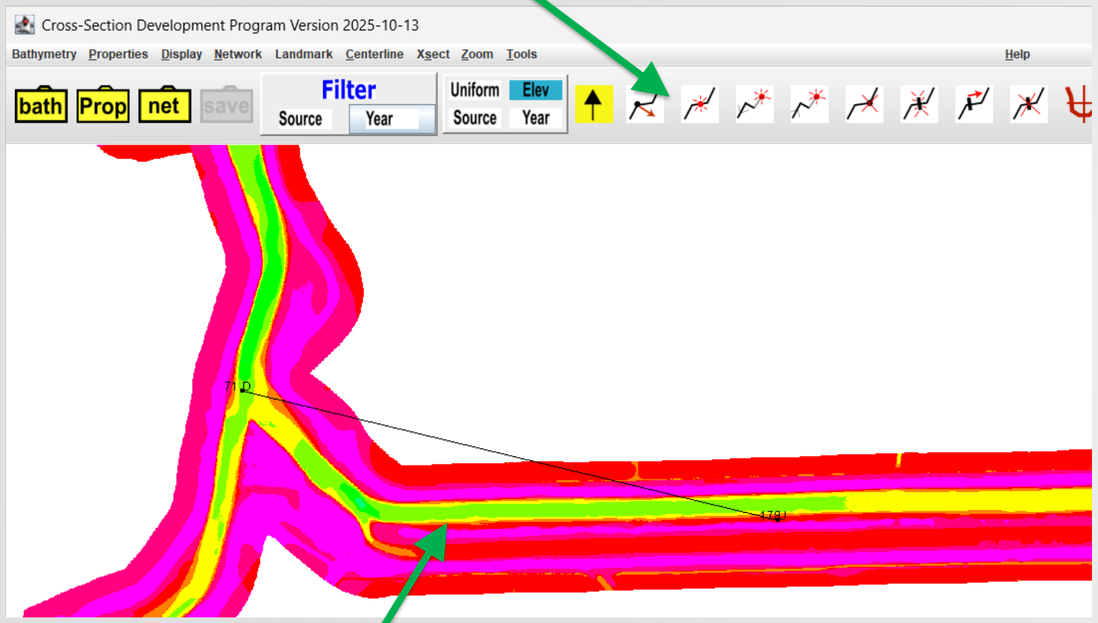


5. A new centerline appears



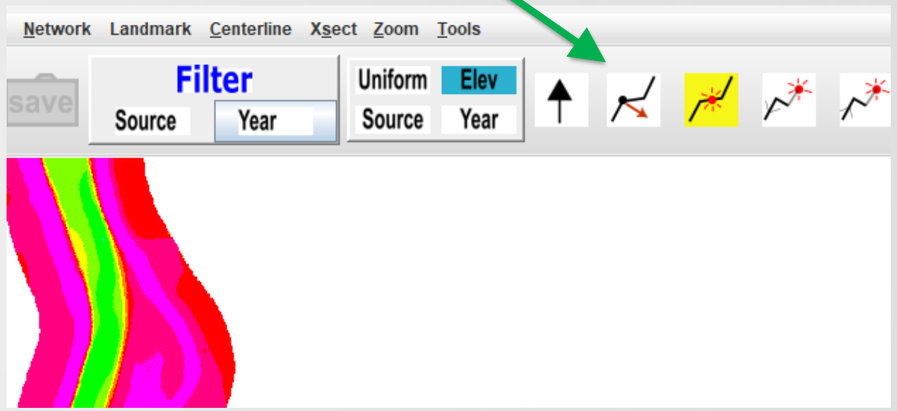
Hands-on exercise: Insert/Move Points

1. Switch to **insert centerline point** mode

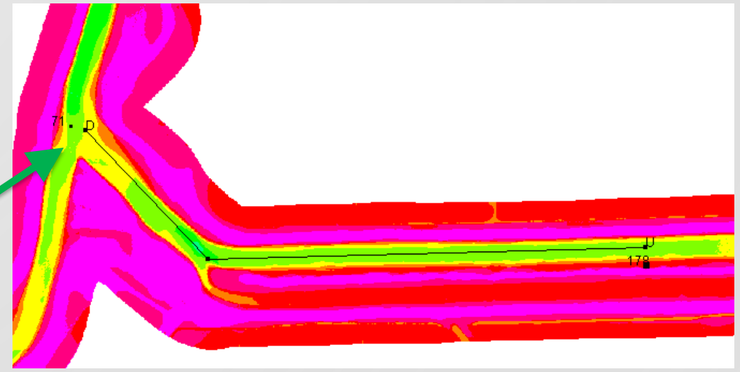


2. Click here to insert a point

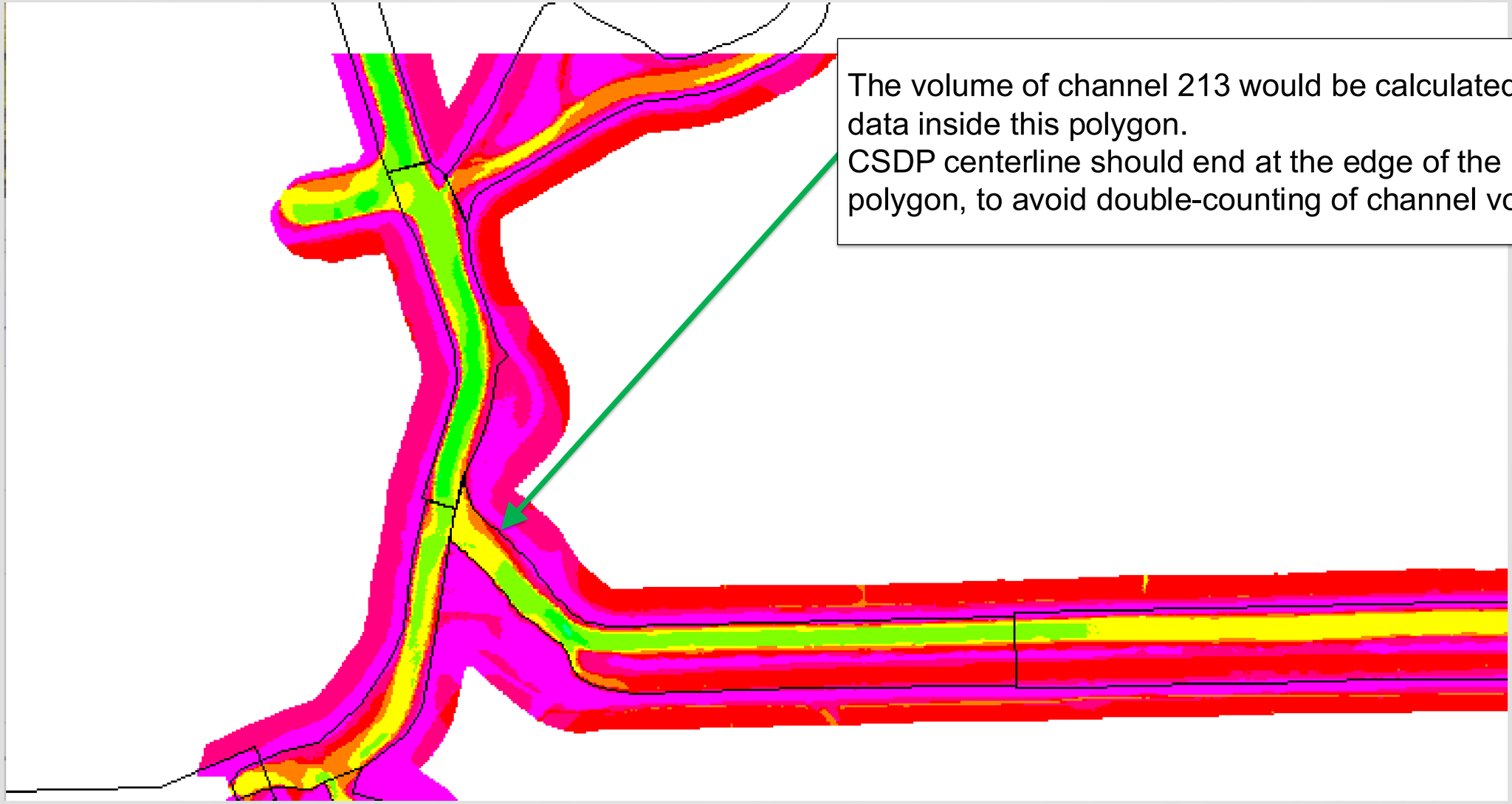
3. Switch to **move centerline point** mode



4. Click near a point to change its location

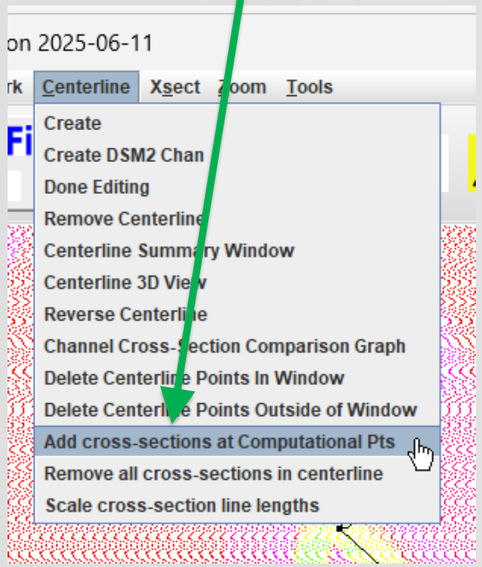


Hands-on exercise: channel boundaries

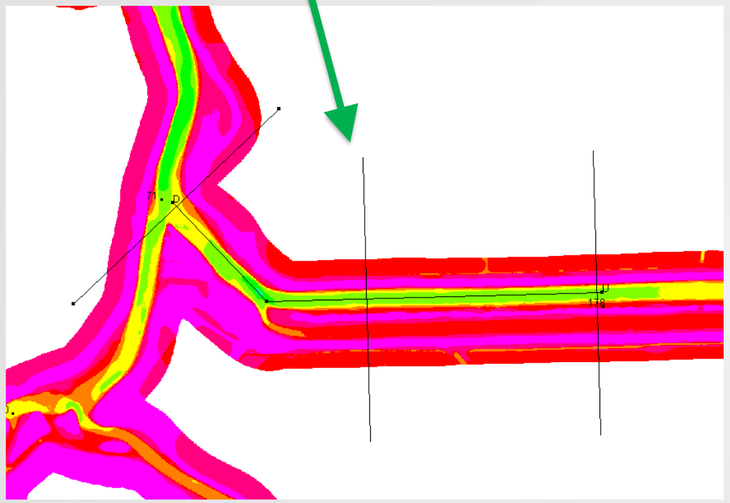


Hands-on exercise: Add cross-section lines

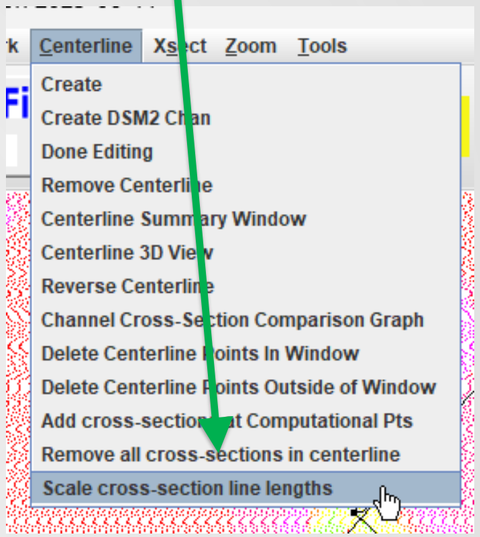
1. Select “Add cross-sections at computational points”



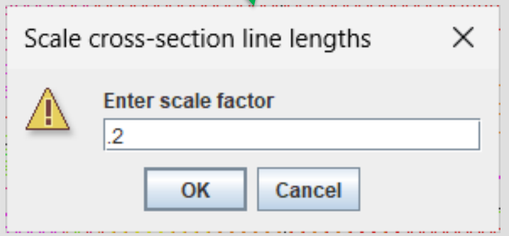
2. Cross-section lines appear



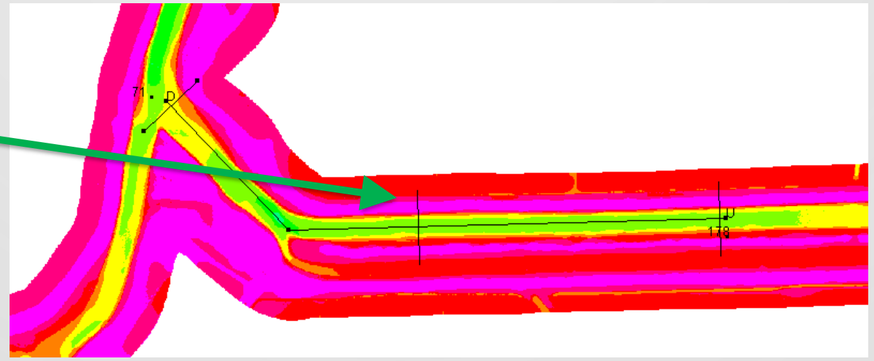
3. Scale cross-section line lengths



4. Enter a scale factor of 0.2



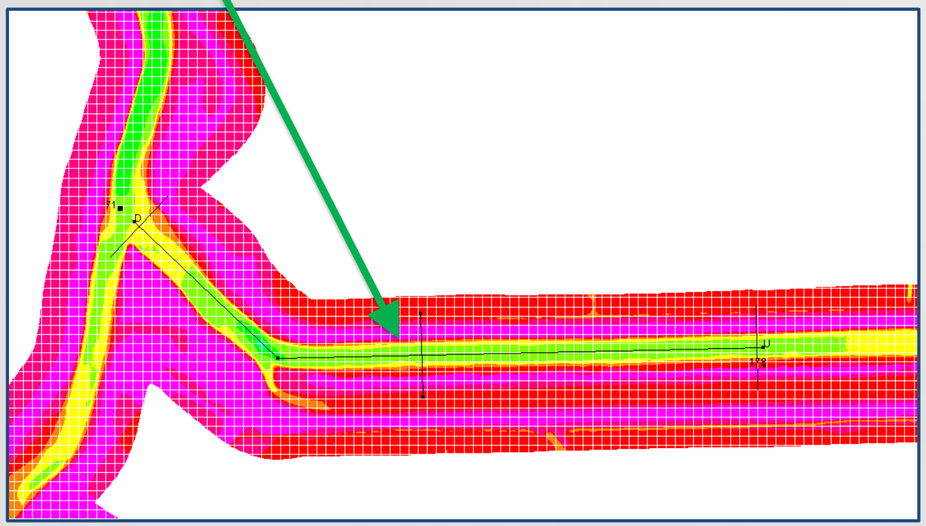
5. Cross-section lines are scaled to a more appropriate length



Hands-on exercise: View cross-section

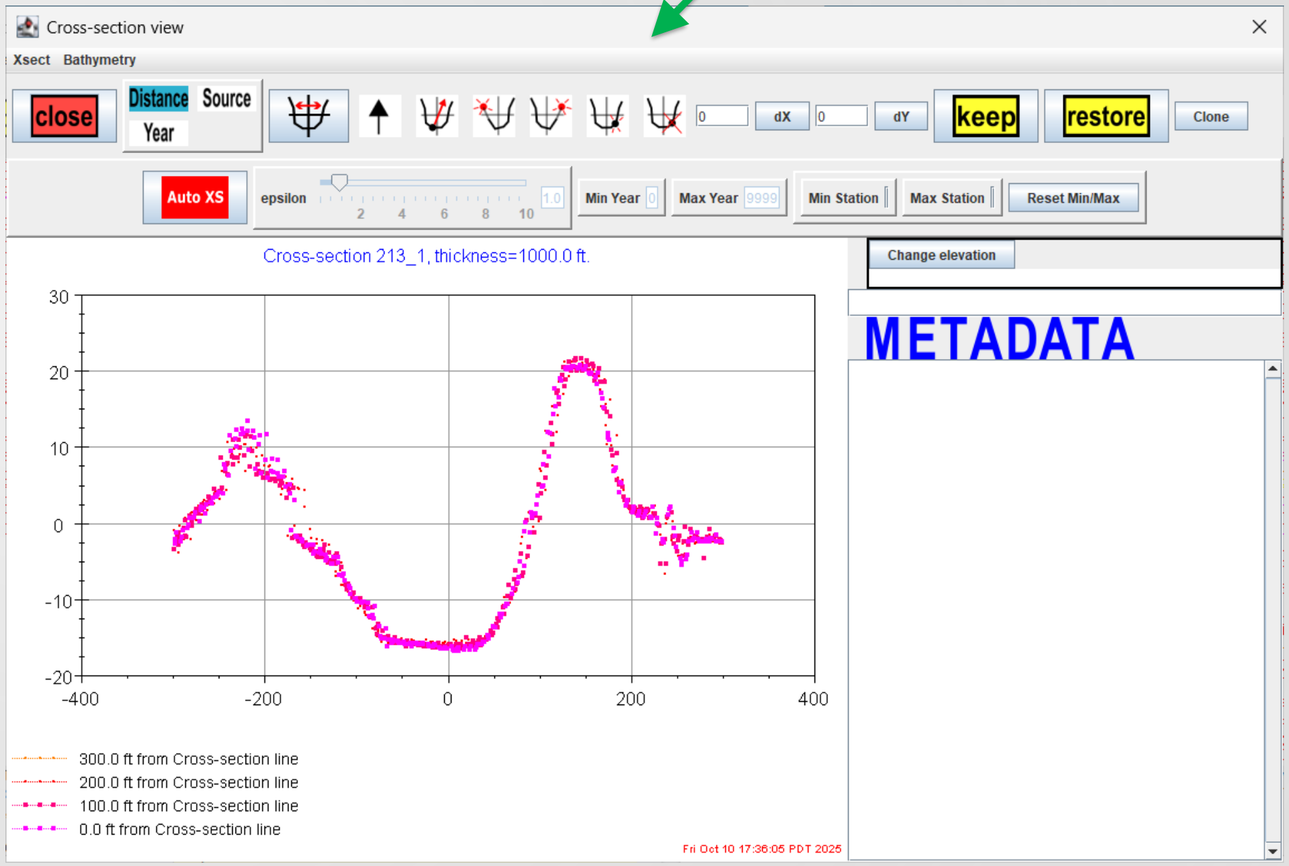
1. Switch to select mode

2. Click near intersection to select the cross-section line

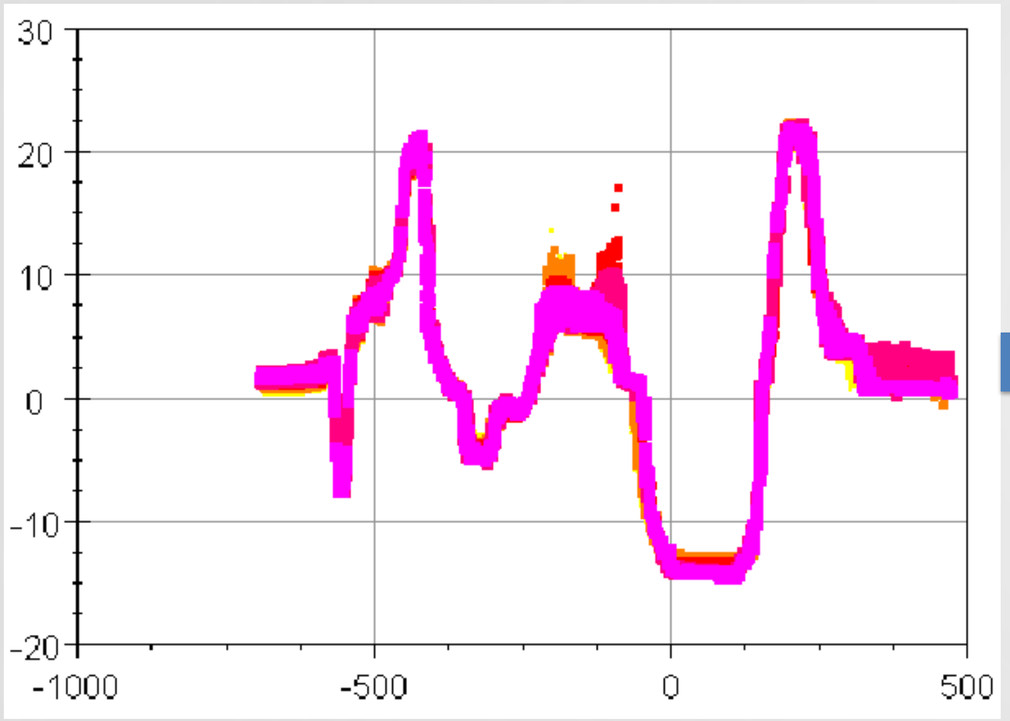


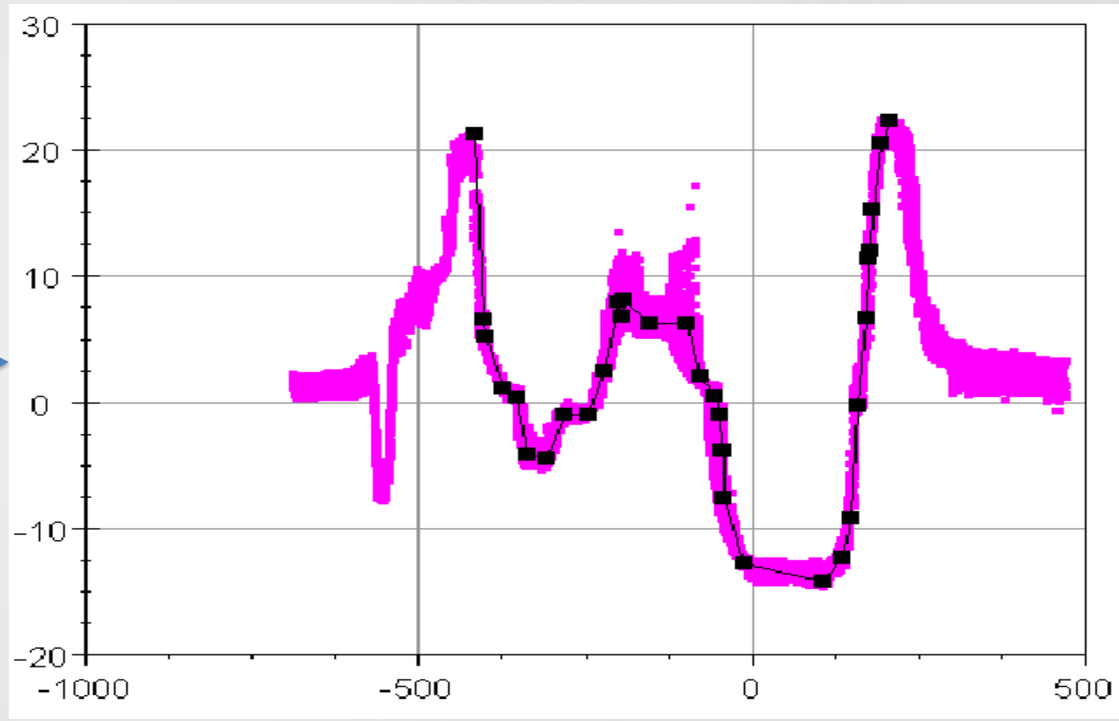
3. Click the view cross-section button

4. A cross-section window appears



Automatic Cross-Section generation





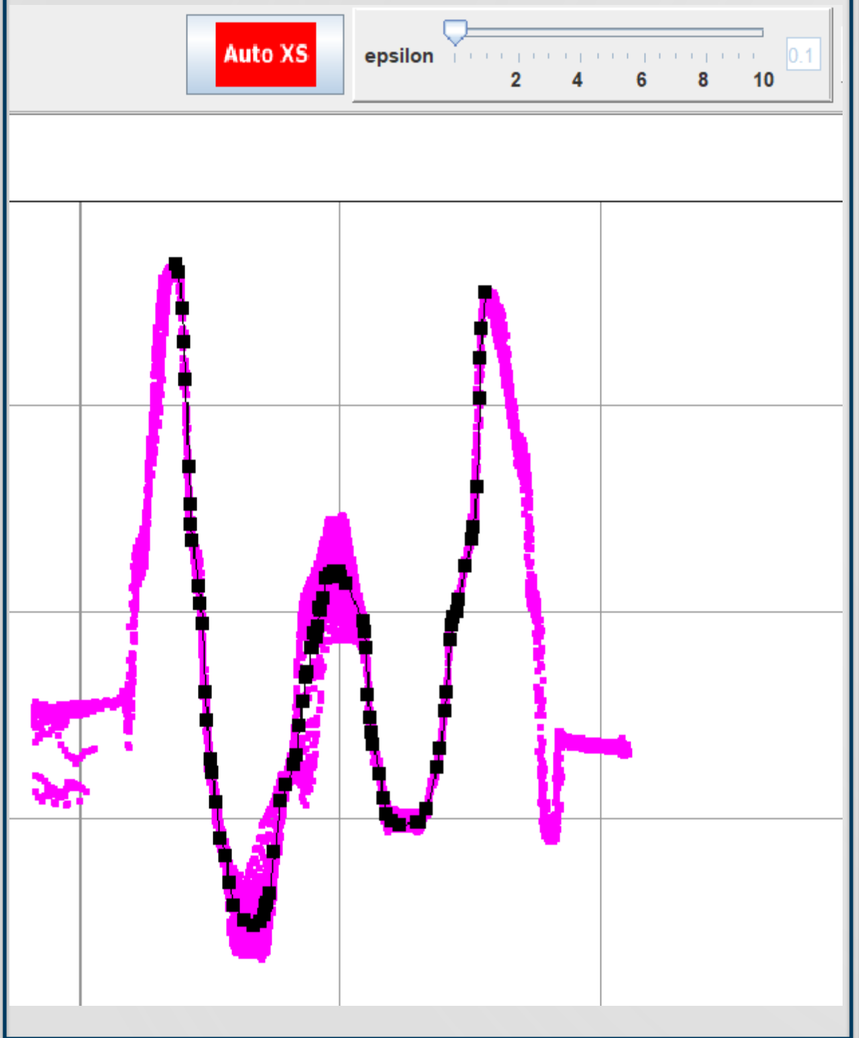
Automatic Cross-Section generation

- Can be used with, or instead of manual process
- Works better if less scatter in data
- Ramer-Douglas-Peucker (RDP) algorithm
  - Used for line simplification
  - Uses epsilon ε (Tolerance):
    - determines the maximum distance a point can deviate from the line segment connecting the end points of a curve segment before being considered for removal.

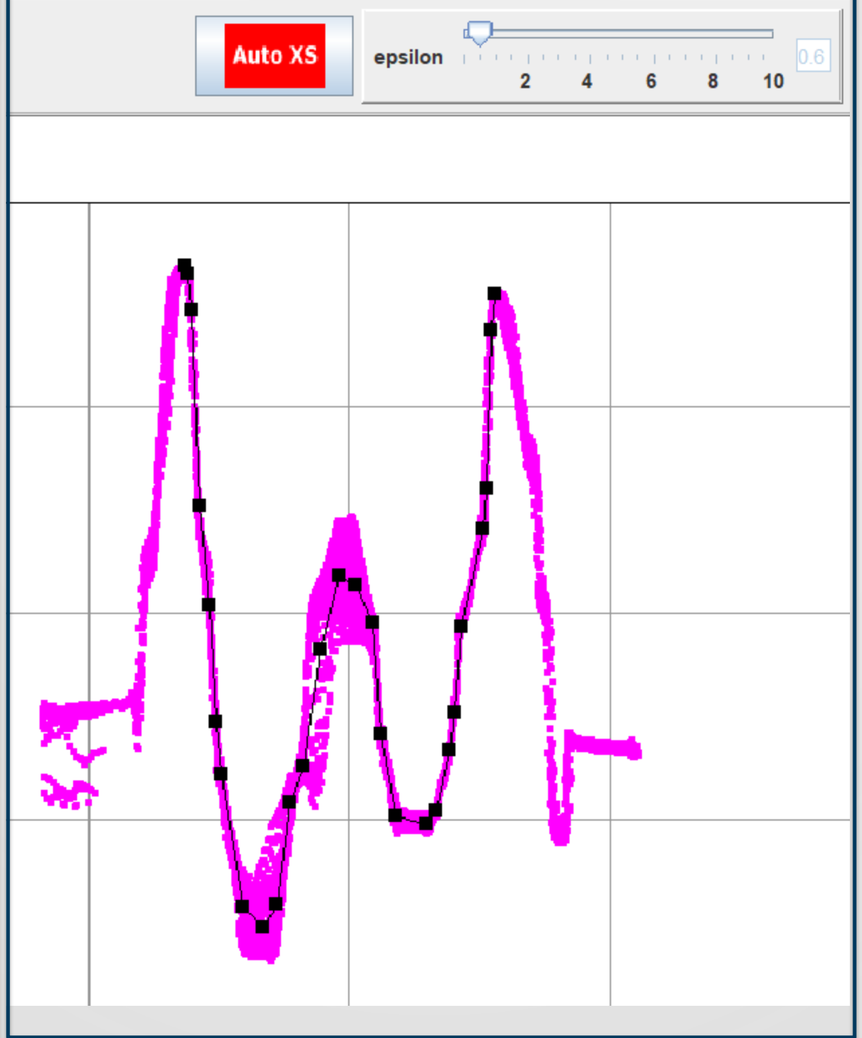
Automatic Cross-Section generation

Adjusting epsilon (ε) for best fit

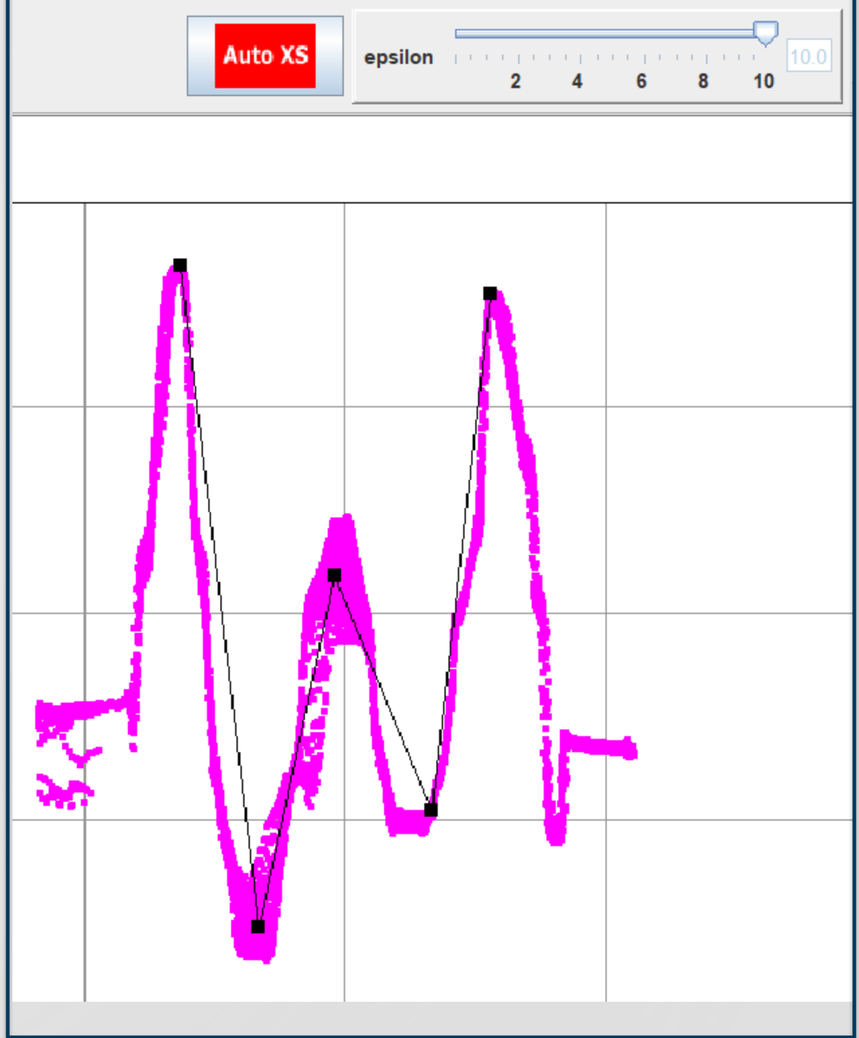
ε low: overfitting



ε optimal

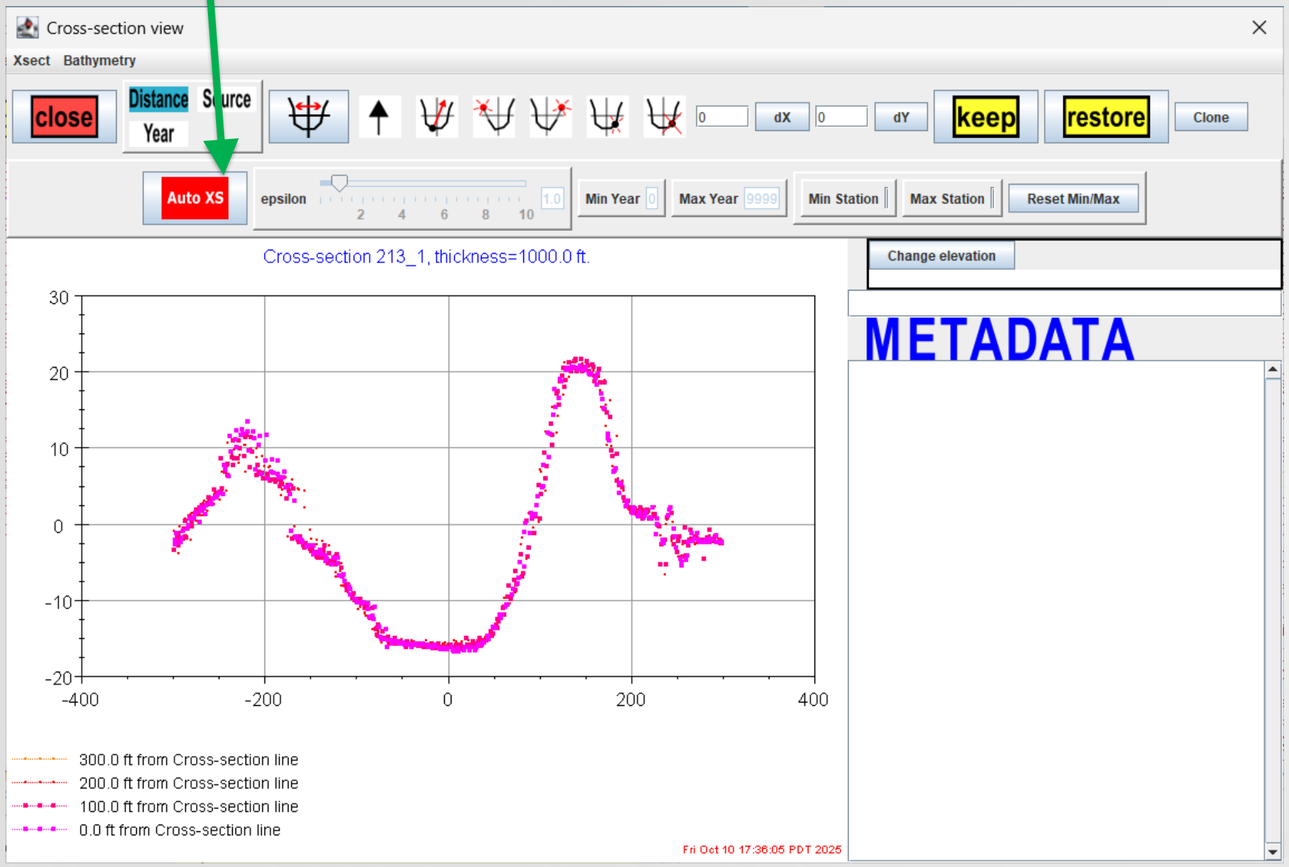


ε high: underfitting

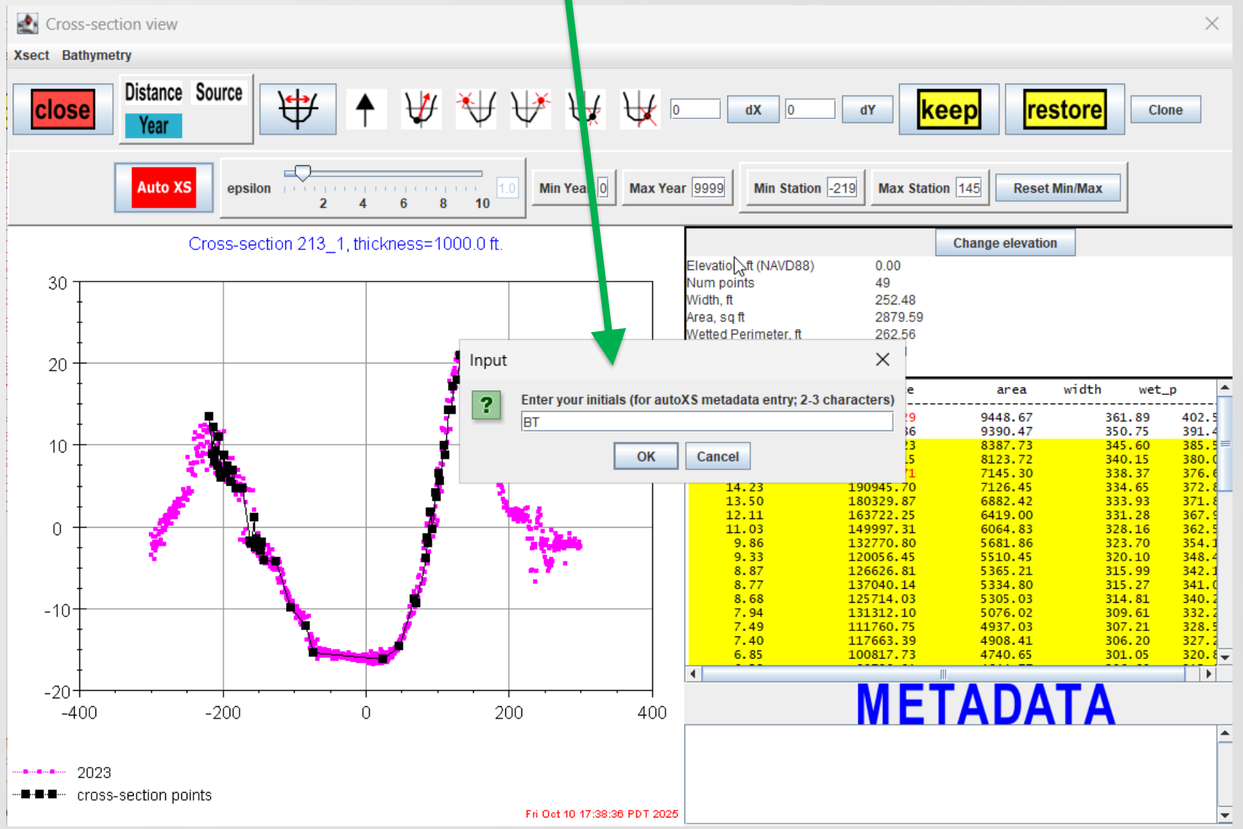


Hands-on exercise: Create cross-section drawing

1. Click the **Auto XS** button

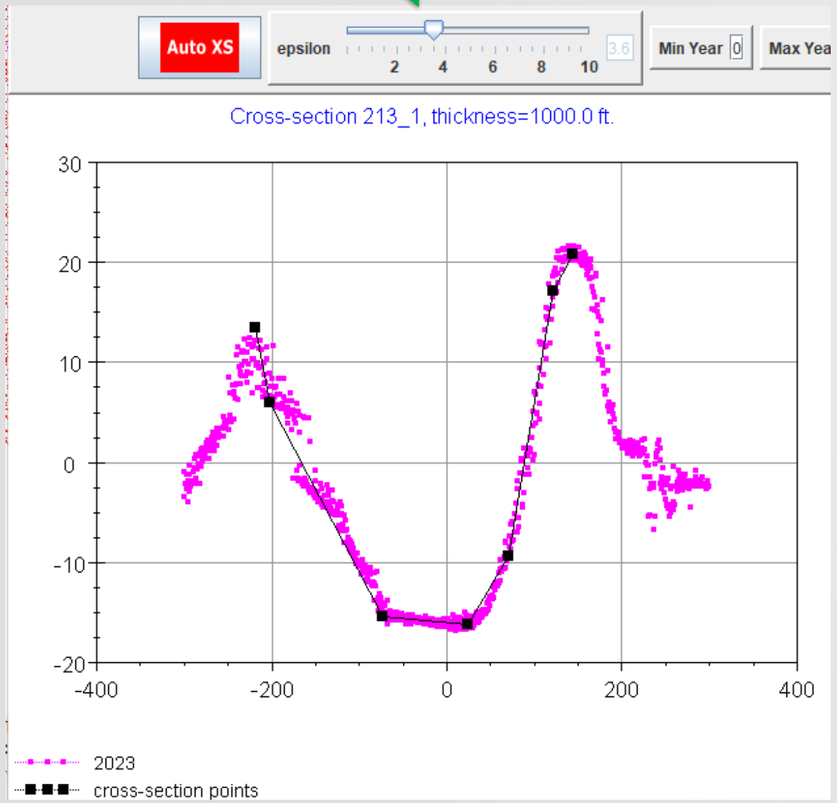


2. A cross-section drawing is automatically created. Enter your initials in the Input dialog

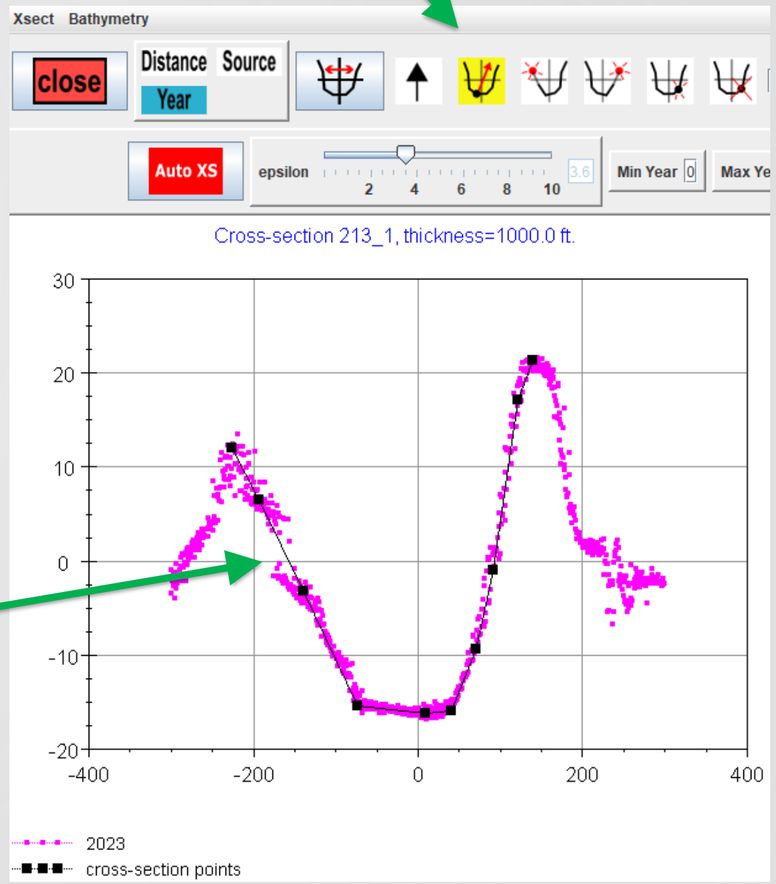


Hands-on exercise: Adjust cross-section drawing

1. Adjust the epsilon slider to reduce number of points



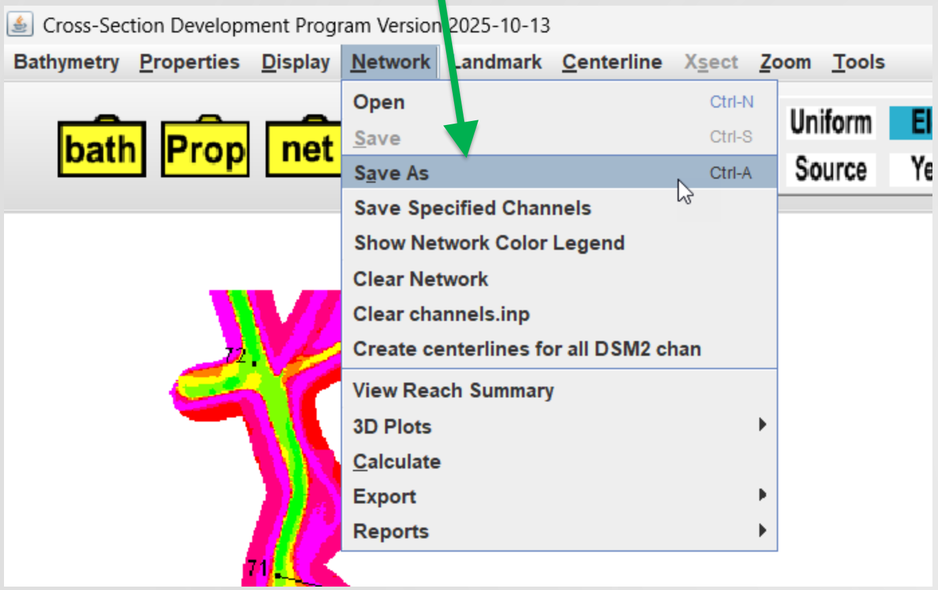
2. Hand editing: use the cross-section editing tools to add and move points to better represent the shape of the cross-section



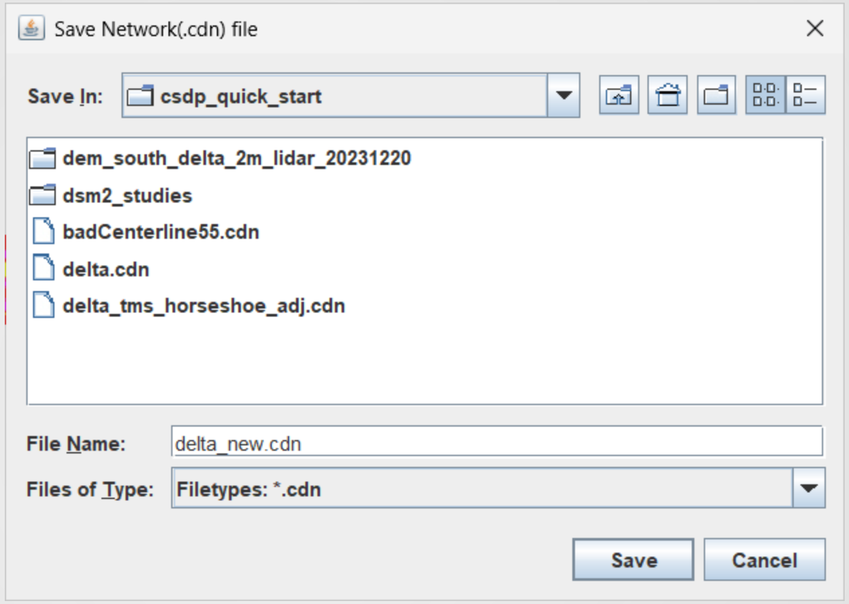
3. Result should look something like this

Hands-on exercise: Save-As network file

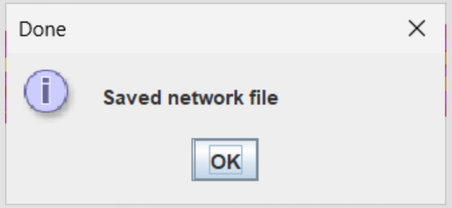
1. “Network-Save As” or **Ctrl-a**



2. Enter filename, click “Save”

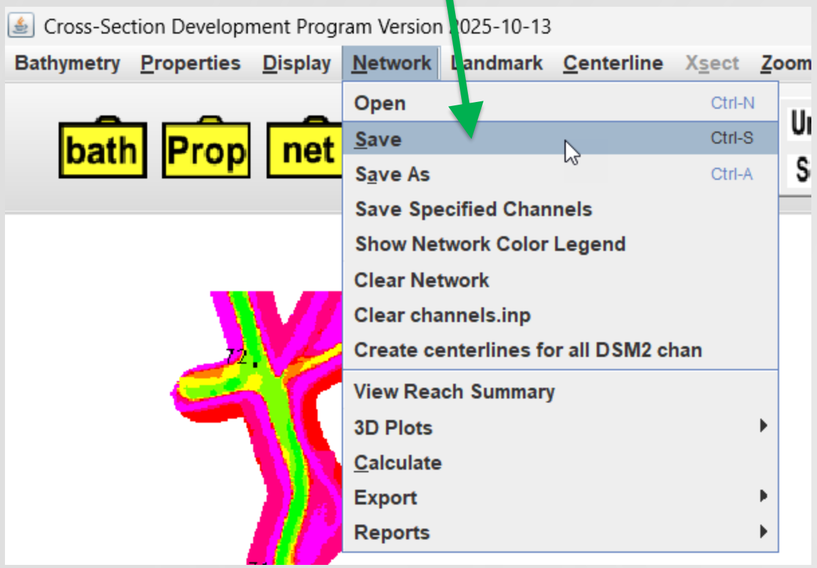


3. Wait for confirmation

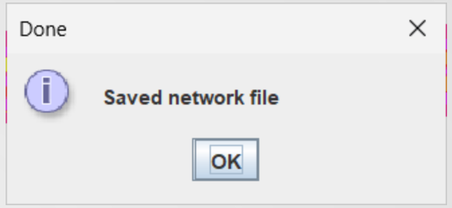


Hands-on exercise: Save network file

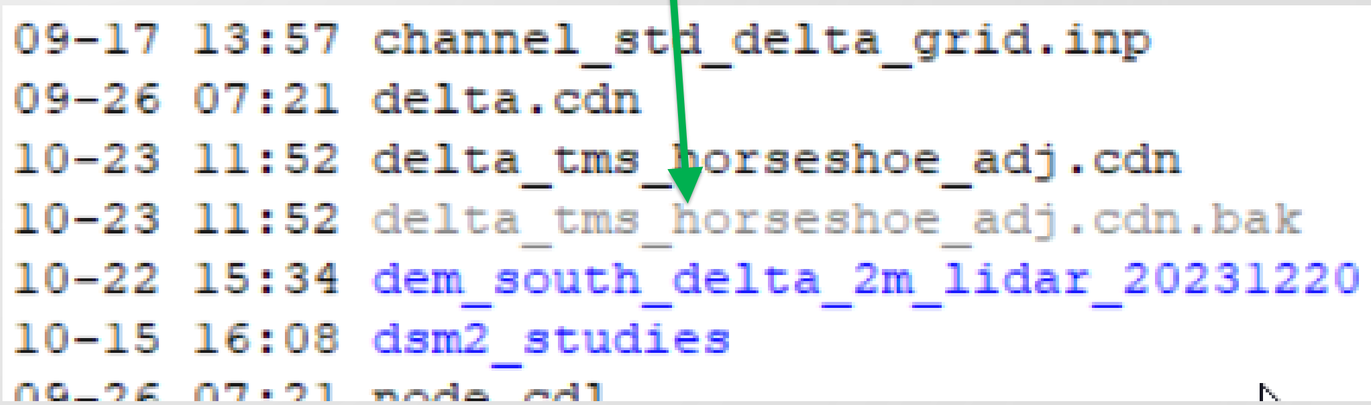
1. “Network-Save” or **Ctrl-s**



2. Wait for confirmation



3. A **.bak** file is created each time you save



Hands-on exercise: create DSM2 geometry input

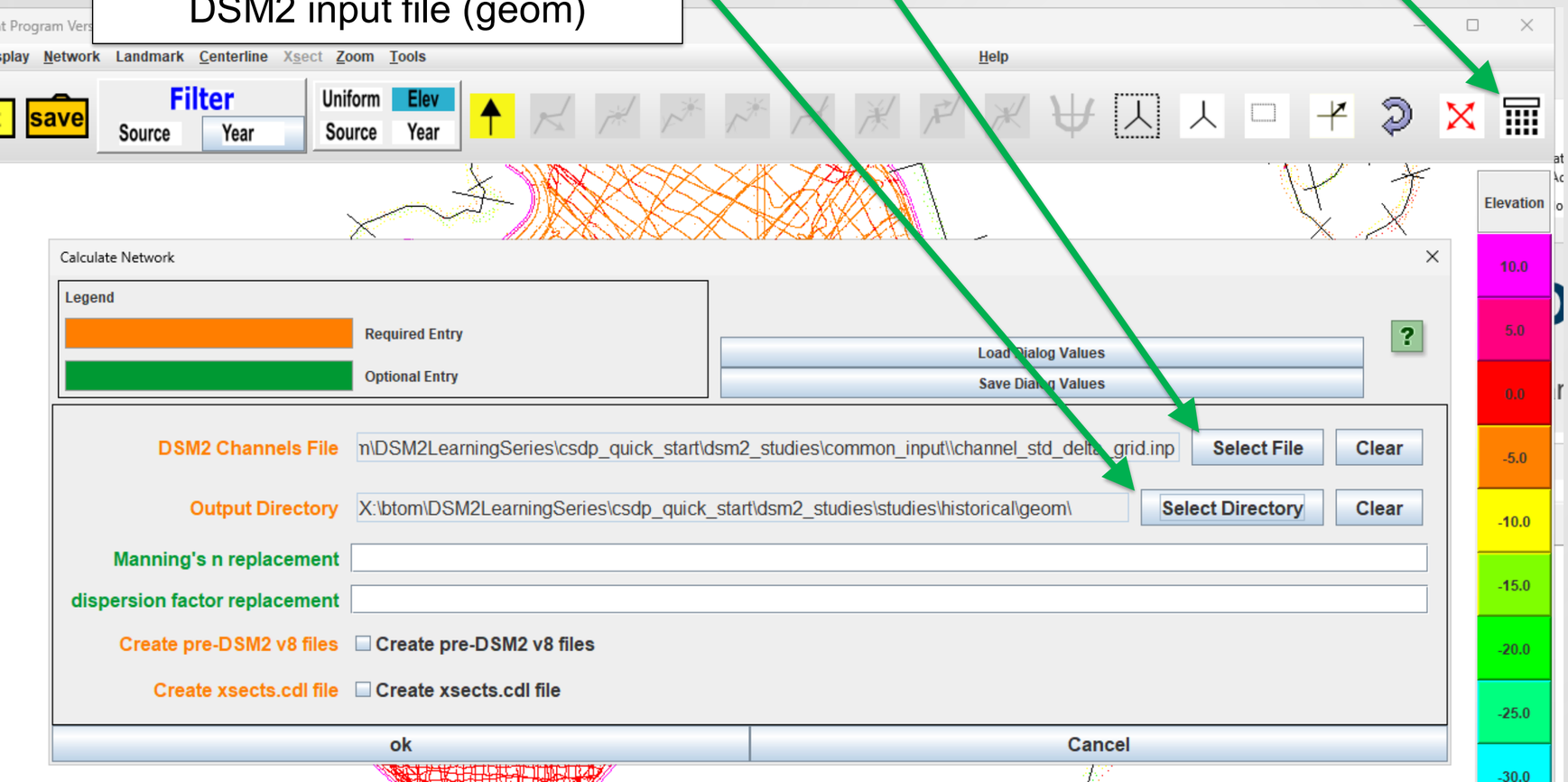
1. Click calculator icon

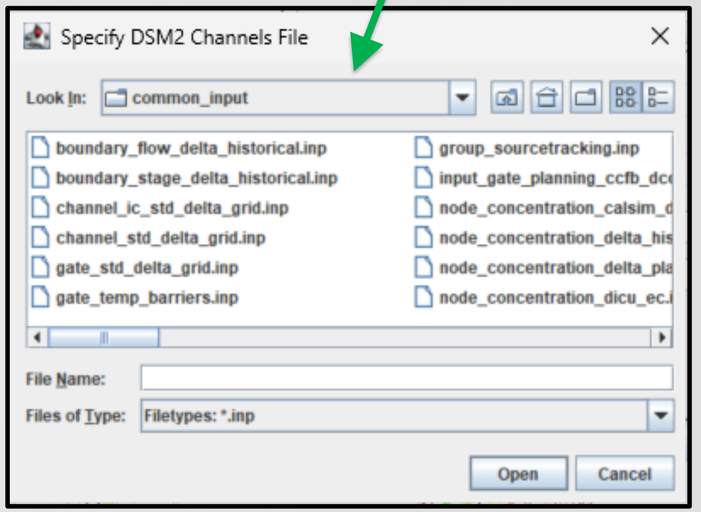
2. Click “Select File” to specify the DSM2 Channels File (in common_input)

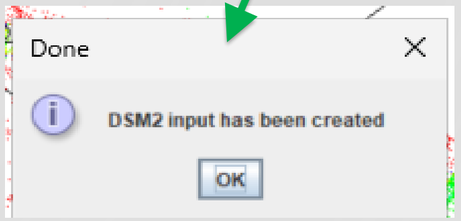
3. Click “Select Directory” to specify the directory for your DSM2 input file (geom)

4. Use the file/folder selector dialog to specify each file

5. Wait for confirmation dialog

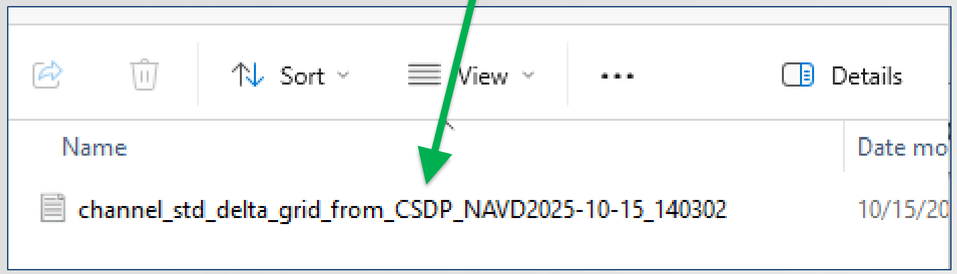




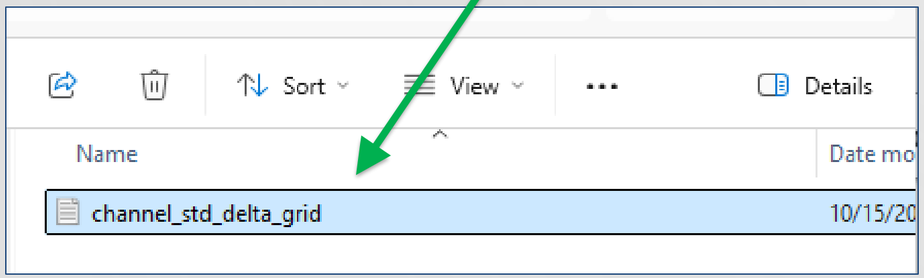


Hands-on exercise: set up Hydro with new geom

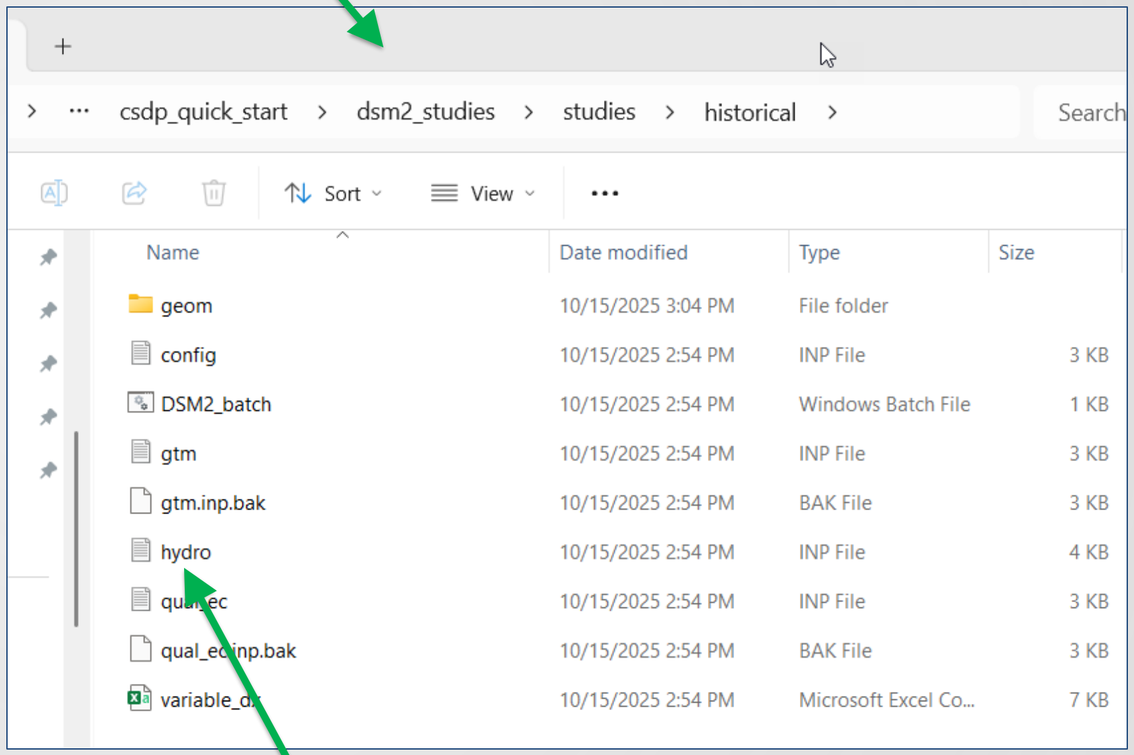
1. Open windows explorer, and navigate to your specified output folder. You should see a file with a name like this, including the date and time in milliseconds.



2. Rename the file to channel_std_delta_grid.inp



3. In windows explorer, navigate to the “historical” folder



4. Open the hydro.inp file in a text editor

Hands-on exercise: set up Hydro with new geom

1. Edit this portion of the **hydro.inp** file.

before

```
GRID
${DSM2INPUTDIR}/channel_std_delta_grid.inp              #20221213 new channels and cross-sections for FC.2023.01. A
area, Yolo Toe Drain
${DSM2INPUTDIR}/reservoir_std_delta_grid.inp            #20220114 includes reservoir profile data. Adds Yolo Flyway
restoration areas
${DSM2INPUTDIR}/gate_std_delta_grid.inp                 #20220114 add 2015 drought barrier, adds gates for restorat
END
```

after

```
GRID
#${DSM2INPUTDIR}/channel_std_delta_grid.inp             #20221213 new channels and cross-sections for FC.2023.01. Add
area, Yolo Toe Drain
geom/channel_std_delta_grid.inp
${DSM2INPUTDIR}/reservoir_std_delta_grid.inp           #20220114 includes reservoir profile data. Adds Yolo Flyway, D
restoration areas
${DSM2INPUTDIR}/gate_std_delta_grid.inp                #20220114 add 2015 drought barrier, adds gates for restoration
END
```

2. Comment out

3. new line pointing to the new file

4. Save your changes and close the file

Hands-on exercise: change end_date

1. Open the **config.inp** file.
Comment out the END_DATE line and add a new END_DATE line, which will end the run on 30SEP2014

before

```
#runtime
START_DATE              01SEP2014
QUAL_START_DATE         02SEP2014
PTM_START_DATE          ${QUAL_START_DATE}
GTM_END_DATE            31DEC2024
GTM_START_DATE          02SEP2014
END_DATE                31DEC2024
START_TIME              0000
END_TIME                0000
```

after

```
#runtime
START_DATE              01SEP2014
QUAL_START_DATE         02SEP2014
PTM_START_DATE          ${QUAL_START_DATE}
GTM_END_DATE            31DEC2024
GTM_START_DATE          02SEP2014
#END_DATE               31DEC2024
END_DATE                30SEP2014
START_TIME              0000
END_TIME                0000
```

2. Save your changes and close the file

3. Go back to windows explorer and open the **DSM2_batch.bat** file. Add a character to the beginning of the 2nd and 3rd lines in the file, to prevent running qual and GTM.

before

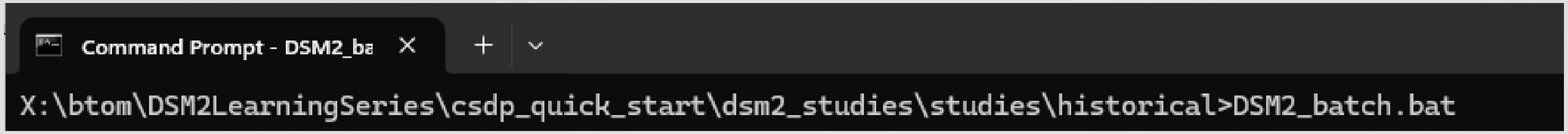
```
..\..\bin\hydro hydro.inp
..\..\bin\qual qual_ec.inp
..\..\bin\gtm gtm.inp
```

after

```
..\..\bin\hydro hydro.inp
#..\..\bin\qual qual_ec.inp
#..\..\bin\gtm gtm.inp
```

4. Save your changes and close the file

5. Open a command prompt window, and execute the batch file



Summary

You now know how to

- Load data into CSDP (bathymetry, network, landmark)
- Create and edit centerlines, cross-sections, landmarks
- Create DSM2 geometry input

You may also be interested in

- Adjusting geometry to improve convergence
- Creating DSM2 output locations with CSDP
- Creating GIS grid maps from CSDP data

Questions?

Bradley.Tom@water.ca.gov