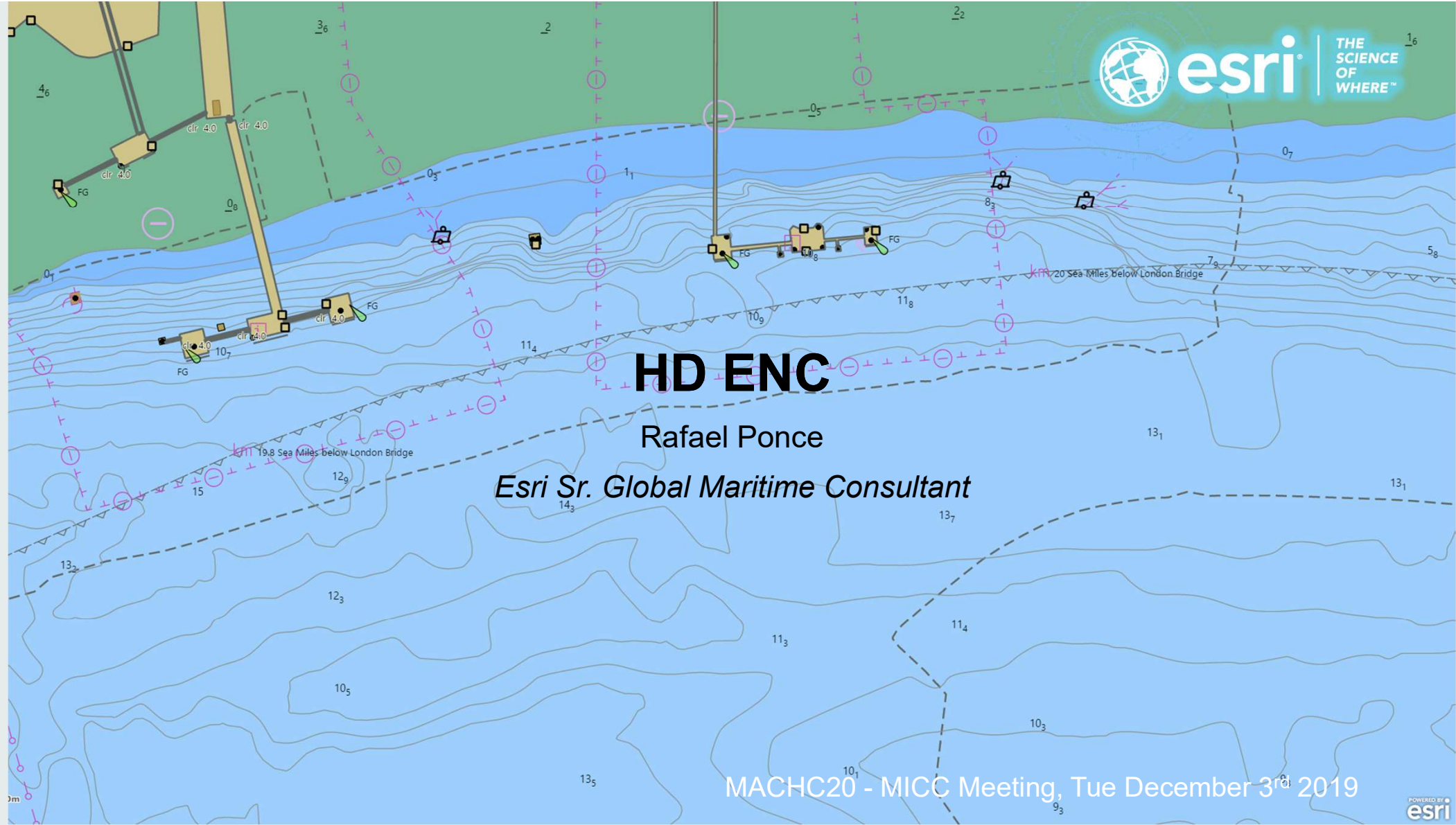


# HD ENC

Rafael Ponce

*Esri Sr. Global Maritime Consultant*

MACHC20 - MICC Meeting, Tue December 3<sup>rd</sup> 2019



## Why would you need HD ENC's?



- Enabling the “true” safety contour in ECDIS
- Legacy ENC's come from paper charts which do not have the necessary contour density
- The need of ENC's covering port areas
- Increase in vessel size in relation to ports
- Reduced under-keel depth margins as more vessel sailings are required within each tidal window
- A fundamental shift in the way these vessels are navigated and a change in user expectations

From S-65 Annex A Edition 1.0.0 2019

## HD ENC definition



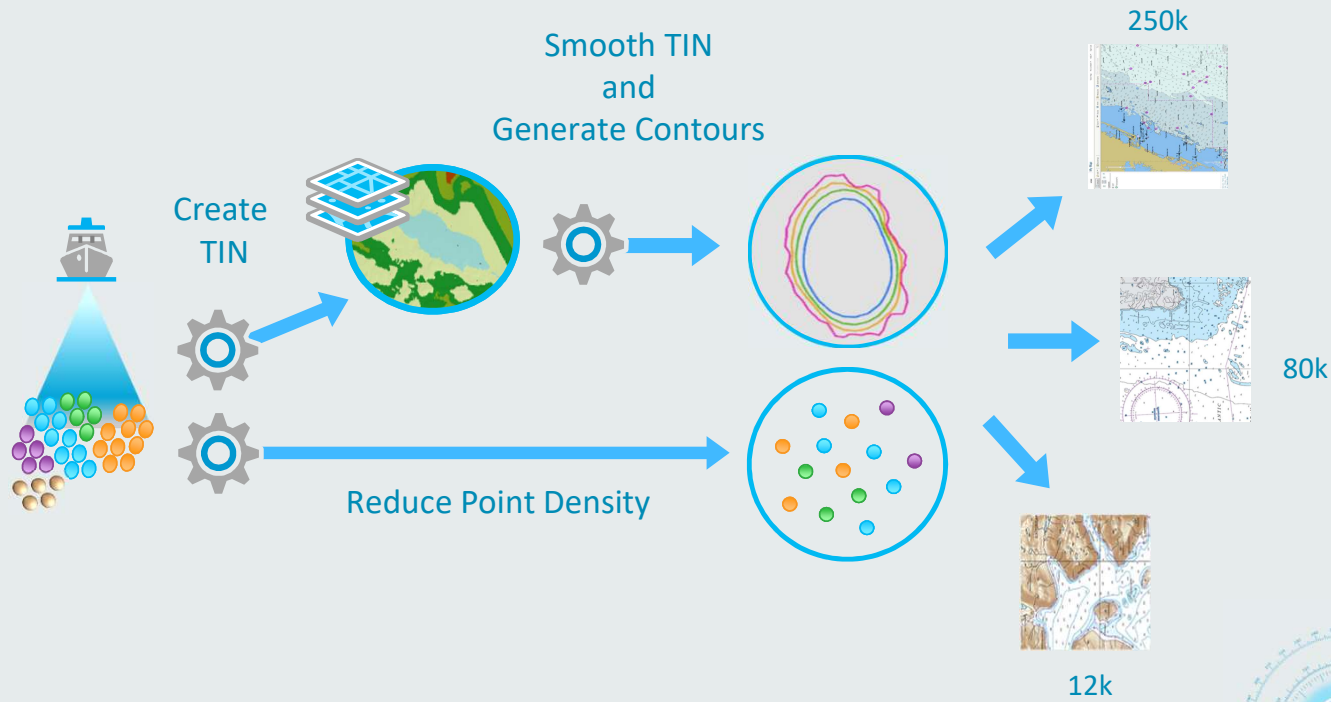
- An ENC product that includes bathymetry depicted with depth area intervals of 1 meter or closer within the depth range of relevance, focused on a physically constrained waterway.
- The additional bathymetric information is incorporated in the base ENC dataset.
- The product may also include more detailed port infrastructure. Under the current IMO ECDIS Performance Standards, this product is suitable to be displayed and operated on any type-approved ECDIS and then can be used to fulfill the IMO's chart carriage requirements.
- Hydrographic surveys to be used in the compilation of HD bathymetric areas will in the majority of cases need to meet IHO S-44 Special Order survey requirements

From S-65 Annex A Edition 1.0.0 2019

# The ArcGIS for Maritime supports HD ENC production

*Automated contours and sounding selection*

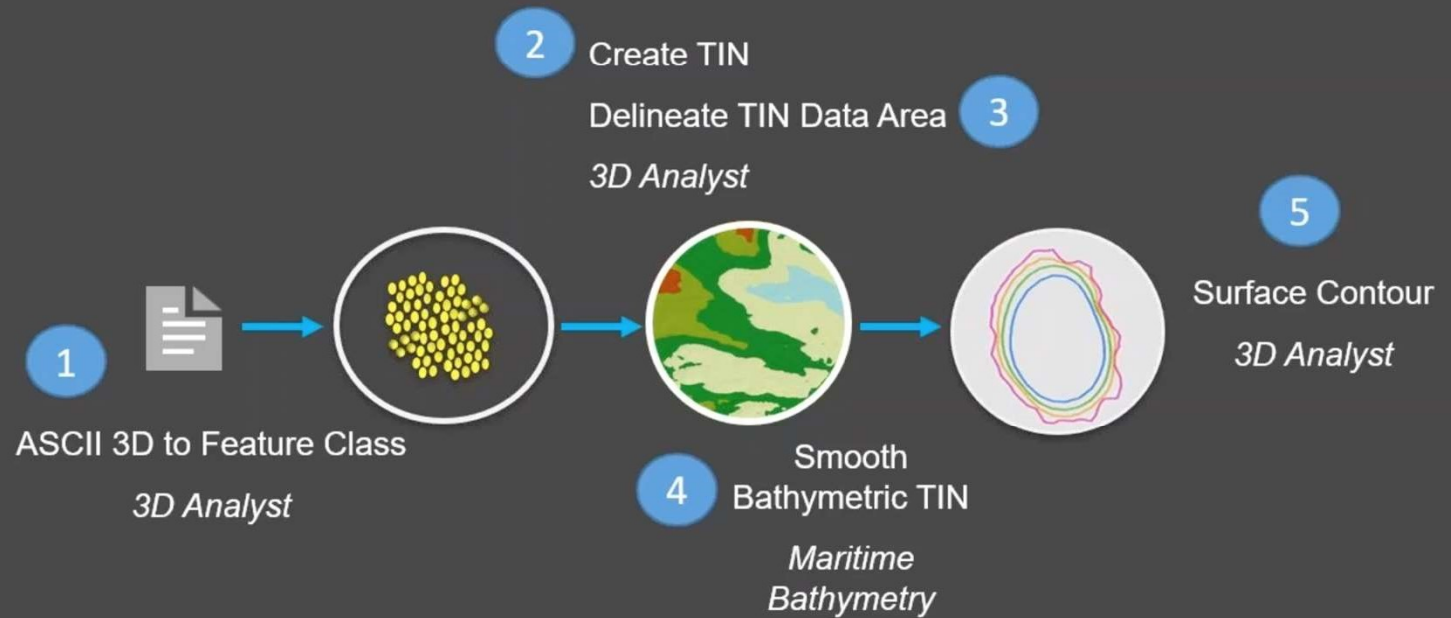
Automate the Generation of Multiple Navigational Surfaces



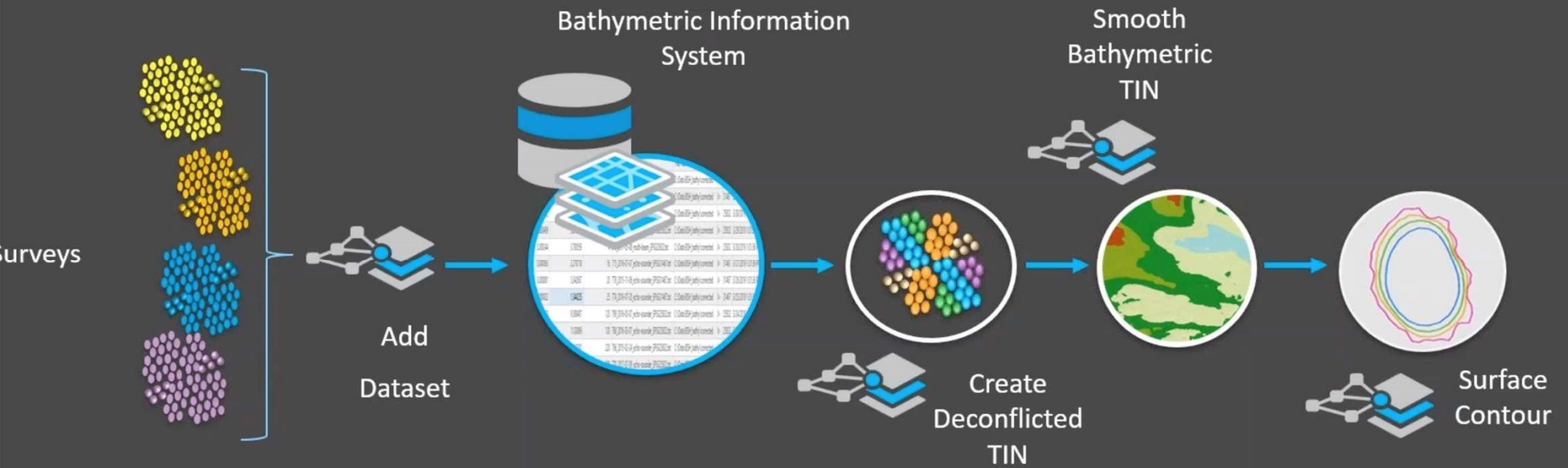
# Contouring Workflow Overview

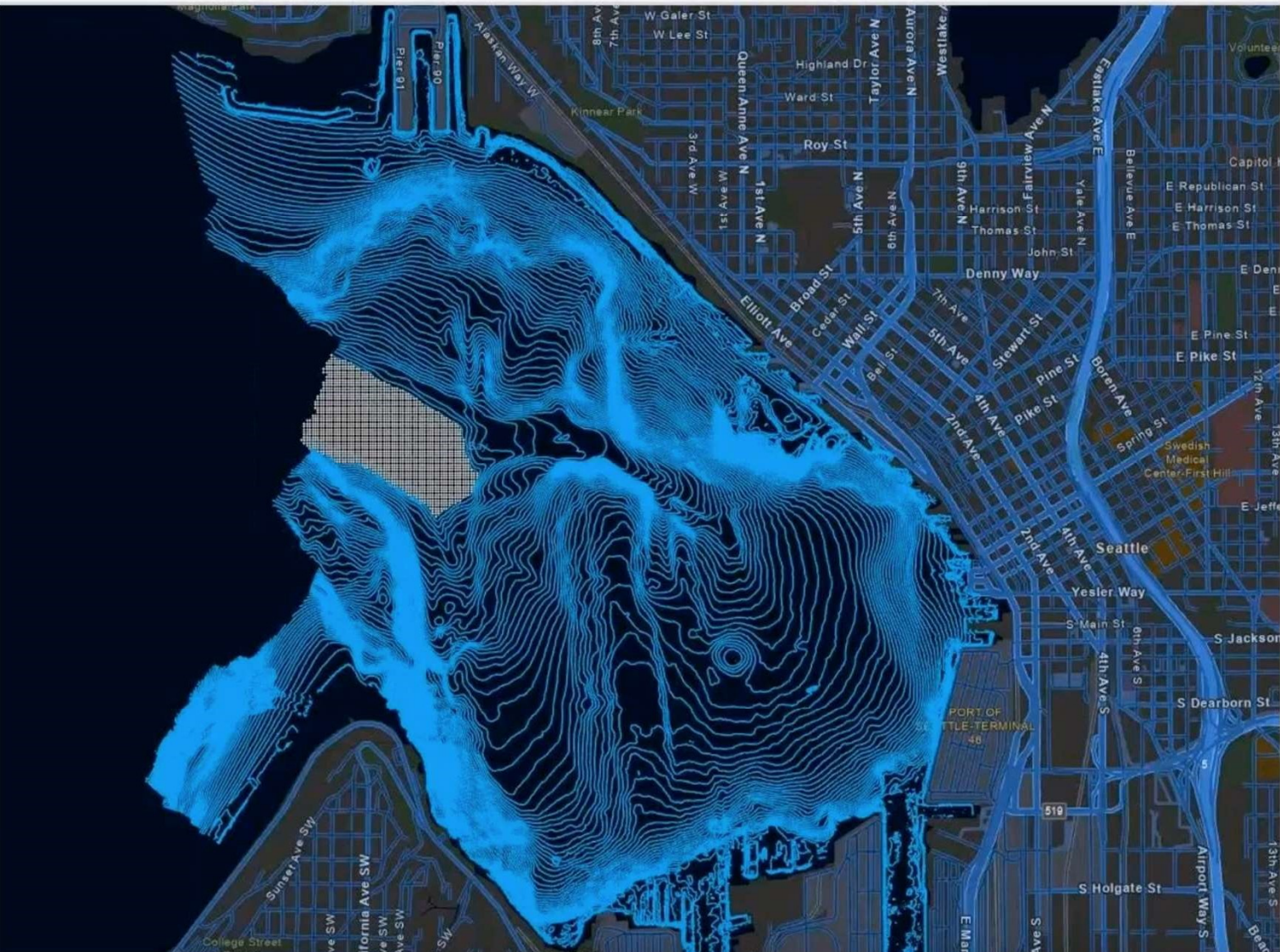


## Contouring Tools



# From the BIS to the NIS





### Geoprocessing

← Add Dataset (+)

Parameters Environments (?)

Input XYZ File  
C:\Data\Seattle\F00613\_MB\_16m\_MLLW\_EPSG26910.xyz

Coordinate System of XYZ file  
NAD\_1983\_UTM\_Zone\_10N

Point Spacing  
23

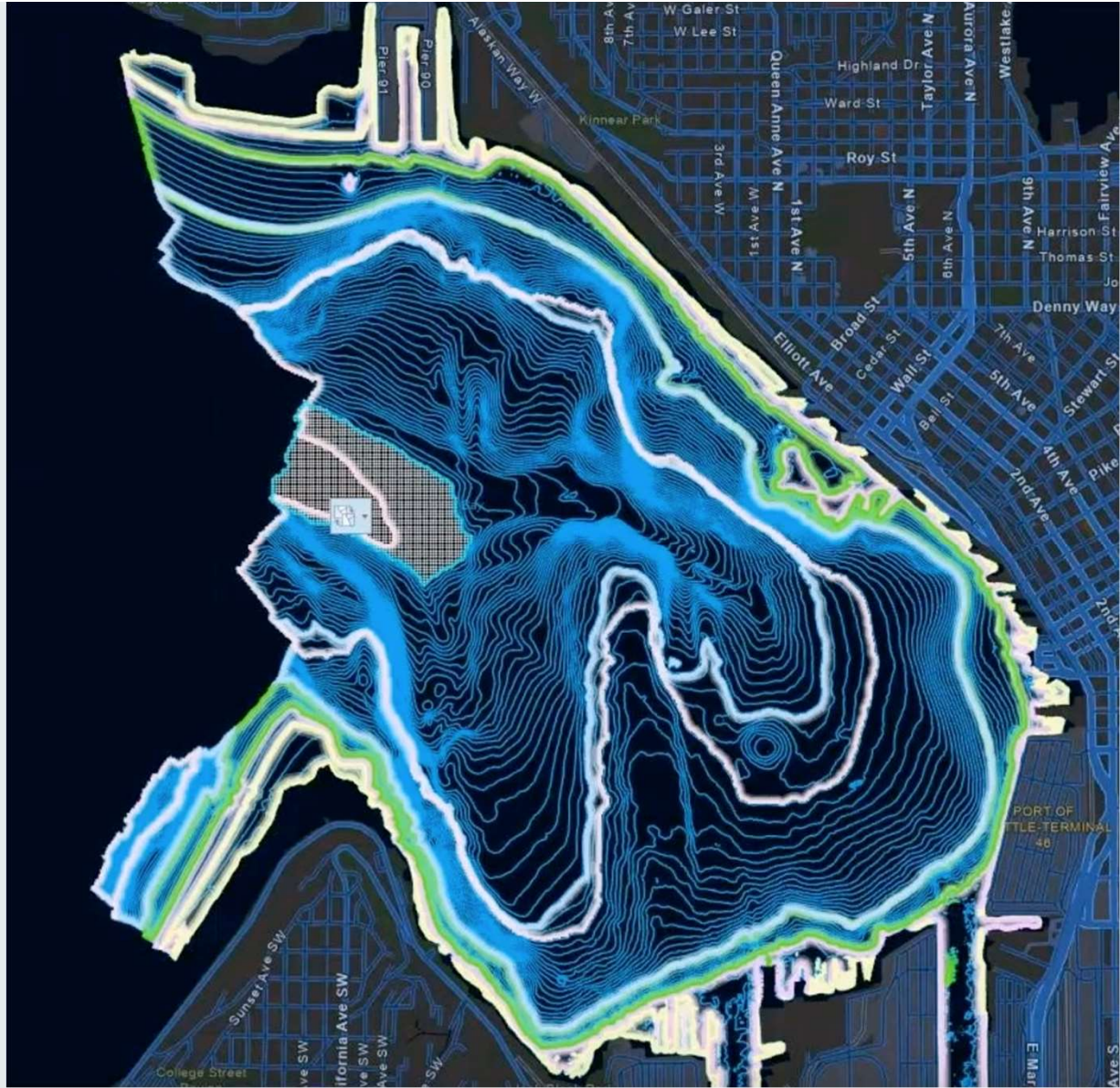
Survey Date  
6/14/2019 1:02:22 PM

Output BIS Footprint  
BIS Table

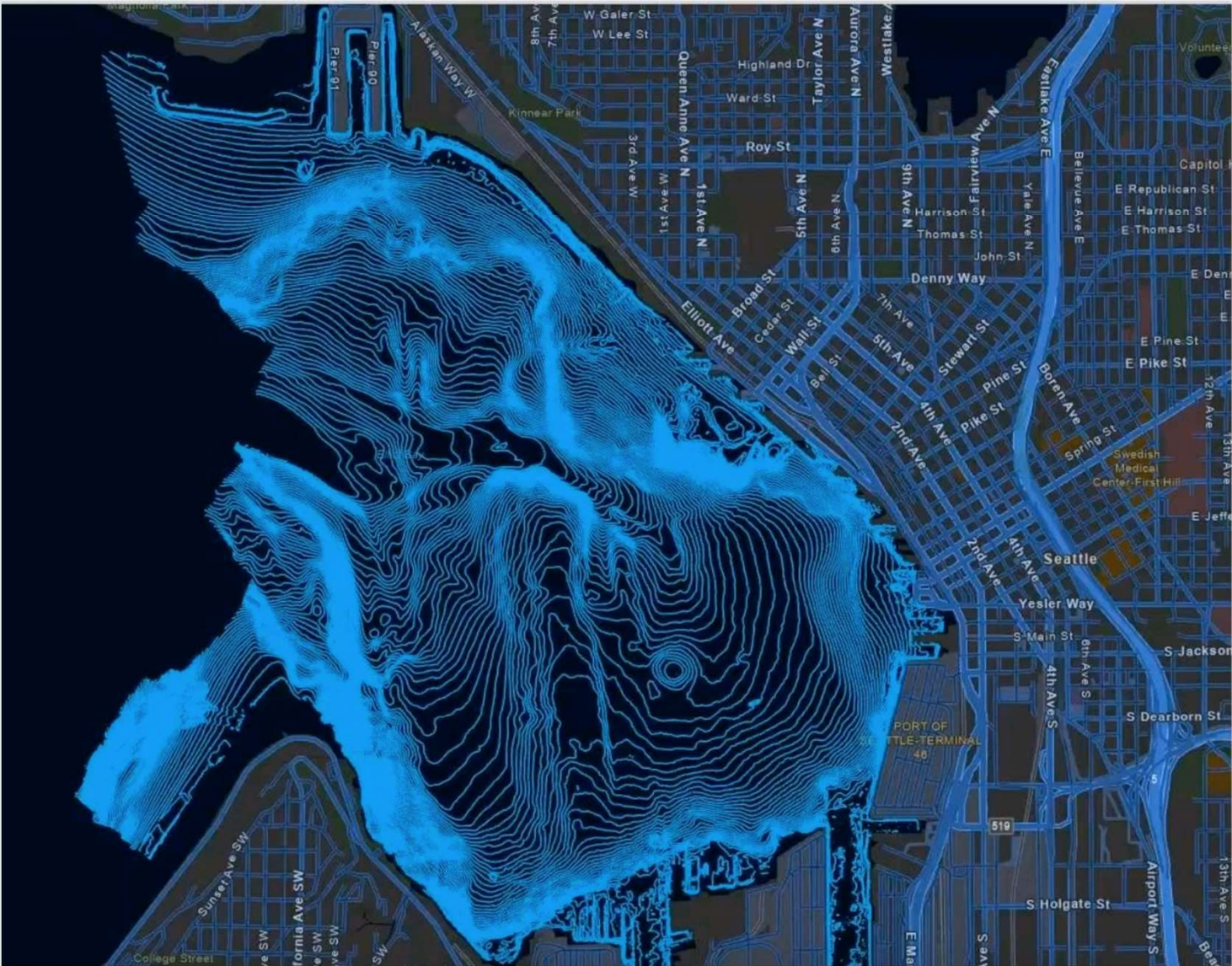
Run

Add Dataset

Running...





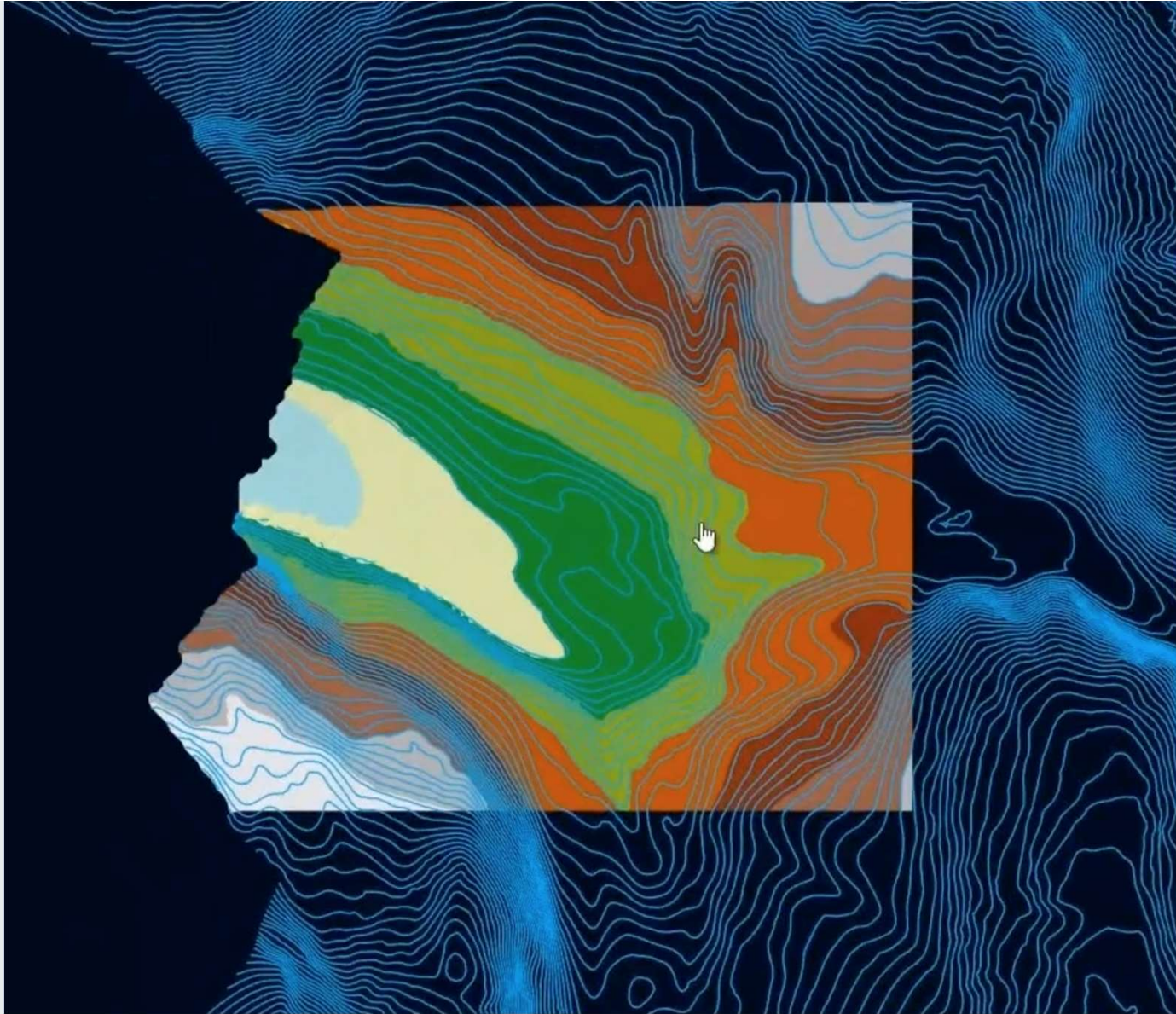


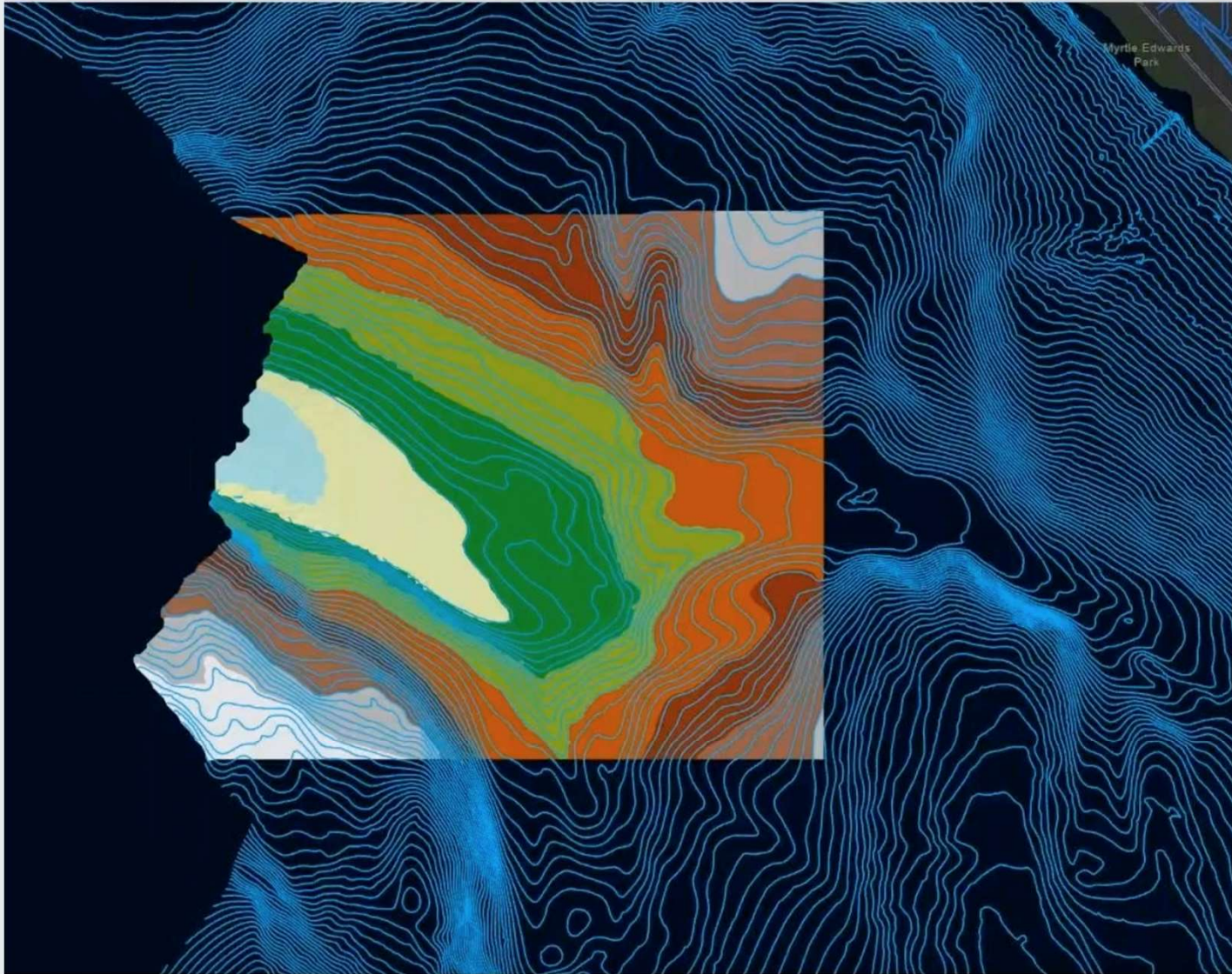
Geoprocessing

Create Deconflicted TIN

Parameters Environments

- BIS Datasets Feature Class  
BIS Table
- Target Area  
Target Area
- Output TIN  
WebinarTIN
- Output Coordinate System  
NAD\_1983\_UTM\_Zone\_10N





549,311.33E 5,273,300.74N m

### Geoprocessing

#### Smooth Bathymetric TIN

Parameters | Environments

Input TIN  
WebinarTIN

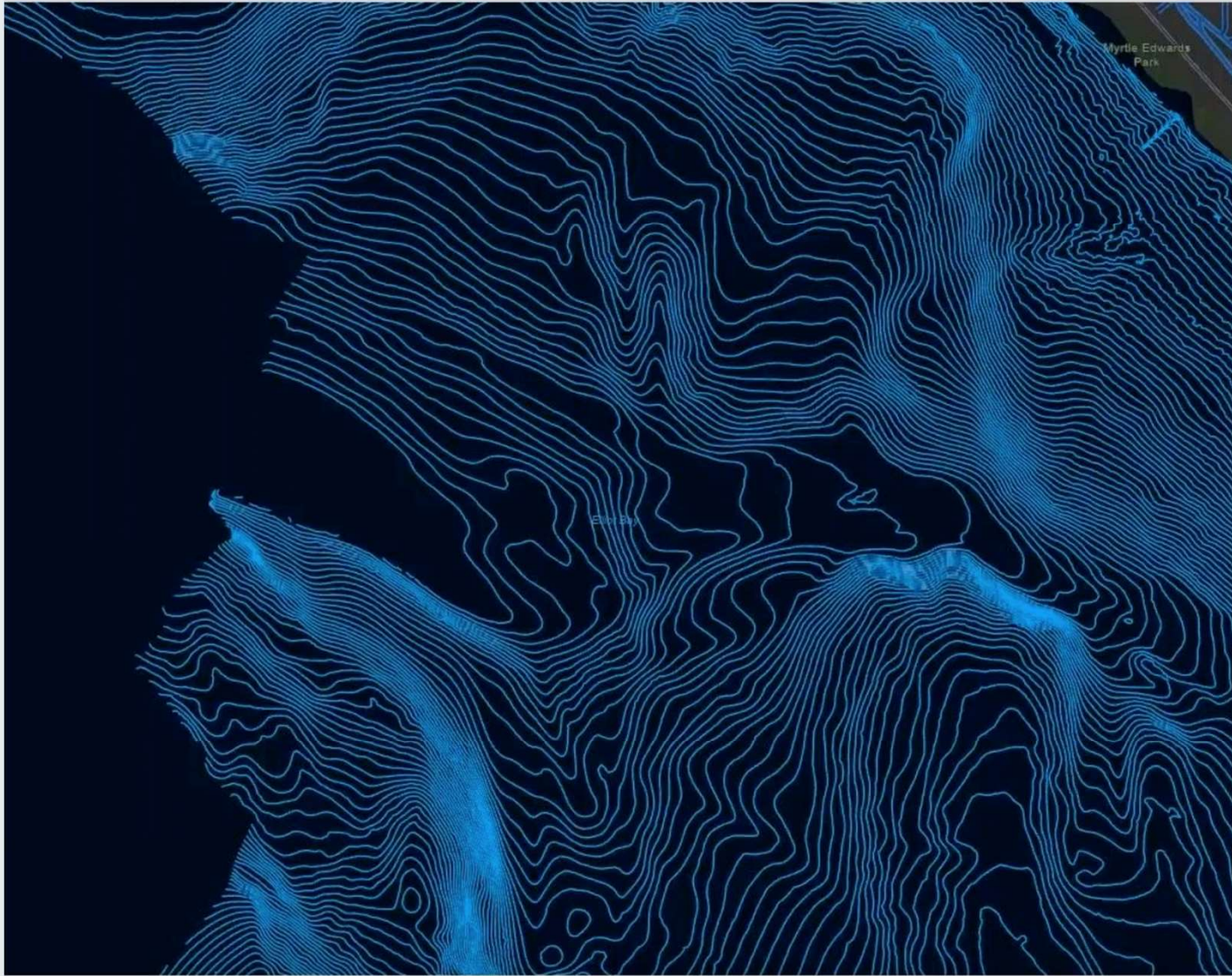
Output TIN  
WebinarTIN\_SmoothBathymetric

Depth Direction  
Positive Up

\* Smoothing Iterations  
3

Modify Features | Chart Properties | Create Features | Attributes | Geoprocessing | Catalog | Notifications | Manage Templates

esri



### Geoprocessing

#### Surface Contour

Parameters Environments

Input Surface: WebinarTIN\_SmoothBathymetric

Output Feature Class: WebinarTIN\_SmoothBathymetric

Contour Interval: 2

Base Contour: 0

Contour Field: Contour

Contour Field Precision: 0

Index Interval:

Index Interval Field: Index\_Cont

Z Factor: 1

Run

Modify Features | Chart Properties | Create Features | Attributes | Geoprocessing | Catalog | Notifications | Manage Templates

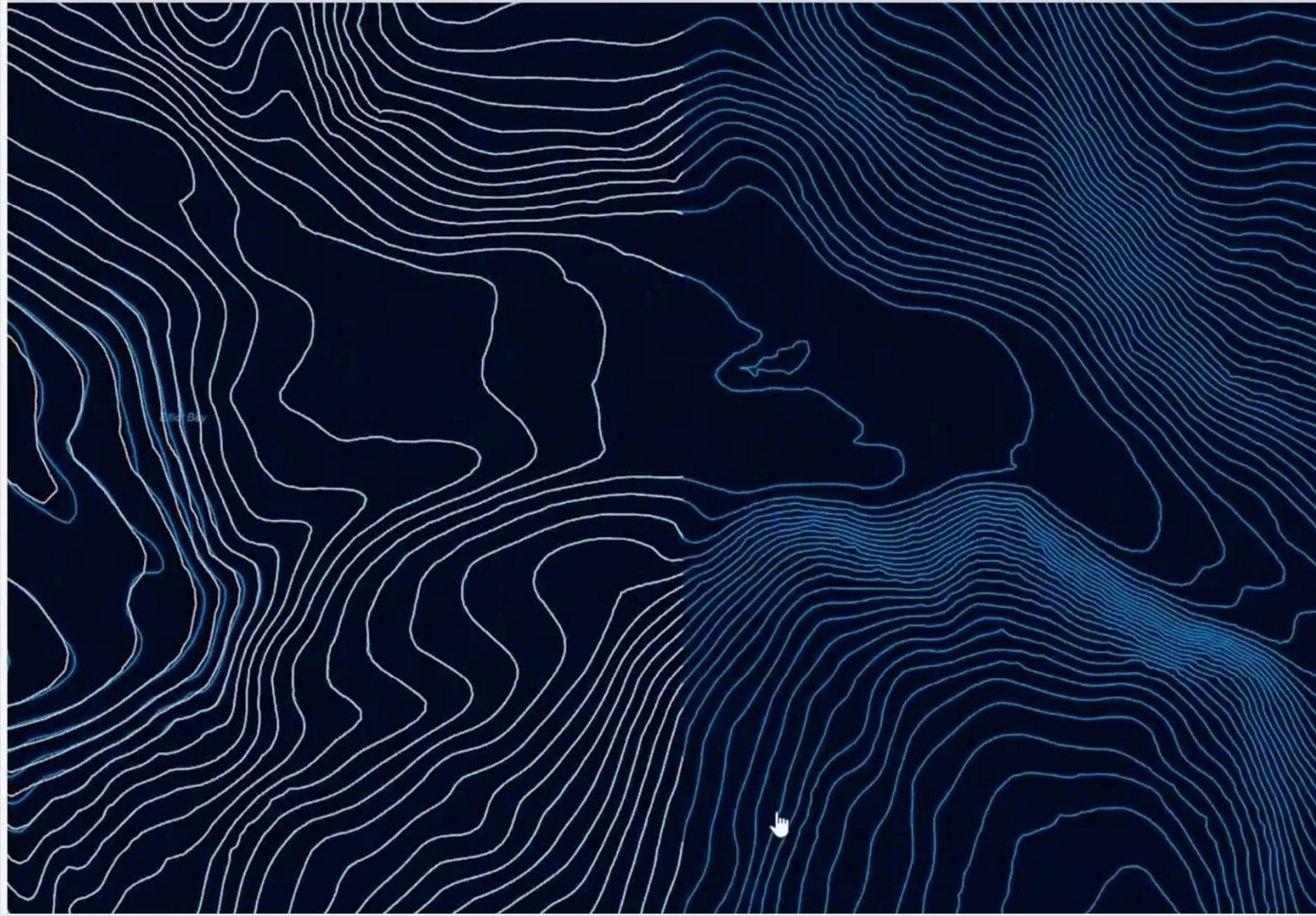
### Contents

Search

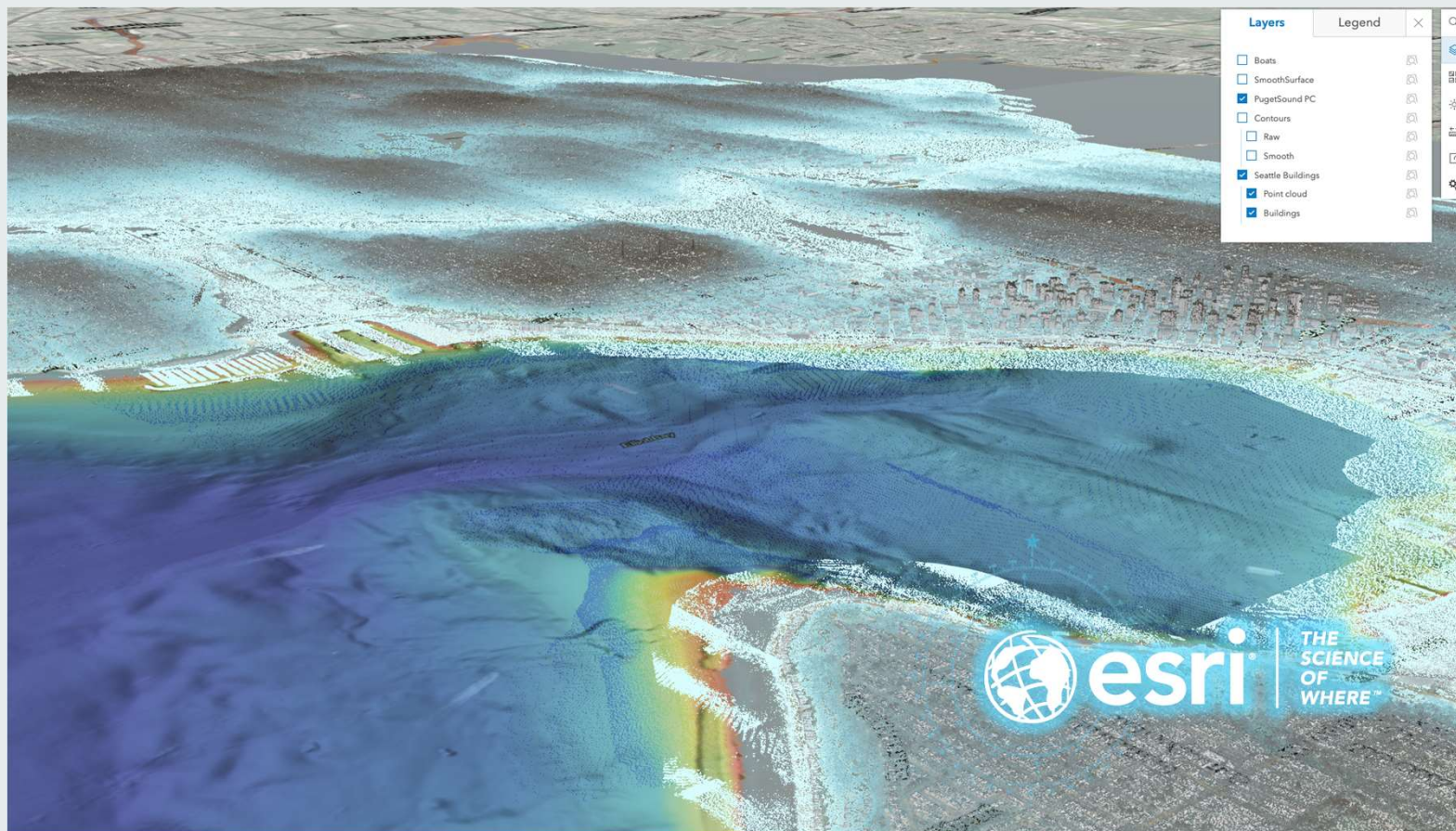


#### Drawing Order

- Map
  - WebinarTIN\_SmoothBathymetric
  - BIS Table
  - F00613\_MB\_16m\_MLLW\_EPSG26910
  - Seattle\_Smooth3\_SurfaceConto
  - Seattle\_SmoothBathymetr
  - Seattle\_SurfaceContour
  - Target Area
  - WebinarTIN\_SmoothBathymetric
  - WebinarTIN
  - Seattle\_Smooth3
  - Seattle\_SmoothBathymetricTIN
  - Seattle
  - World Street Map (Night)



## 3D Analysis and Bathymetric Services



<http://arcg.is/00Lq8T>

Watch the entire Video here: <https://youtu.be/OfqZfA493fY>



Maritime Modernization: Automated Generation of Safe,  
Smooth Depth Contours with ArcGIS



Thank you

Maritime ArcGIS Online Organization  
<http://esriho.maps.arcgis.com/home/index.html>

Maritime GeoNet Page  
<https://geonet.esri.com/groups/arcgis-for-maritime>

Contact  
[maritime@esri.com](mailto:maritime@esri.com)

