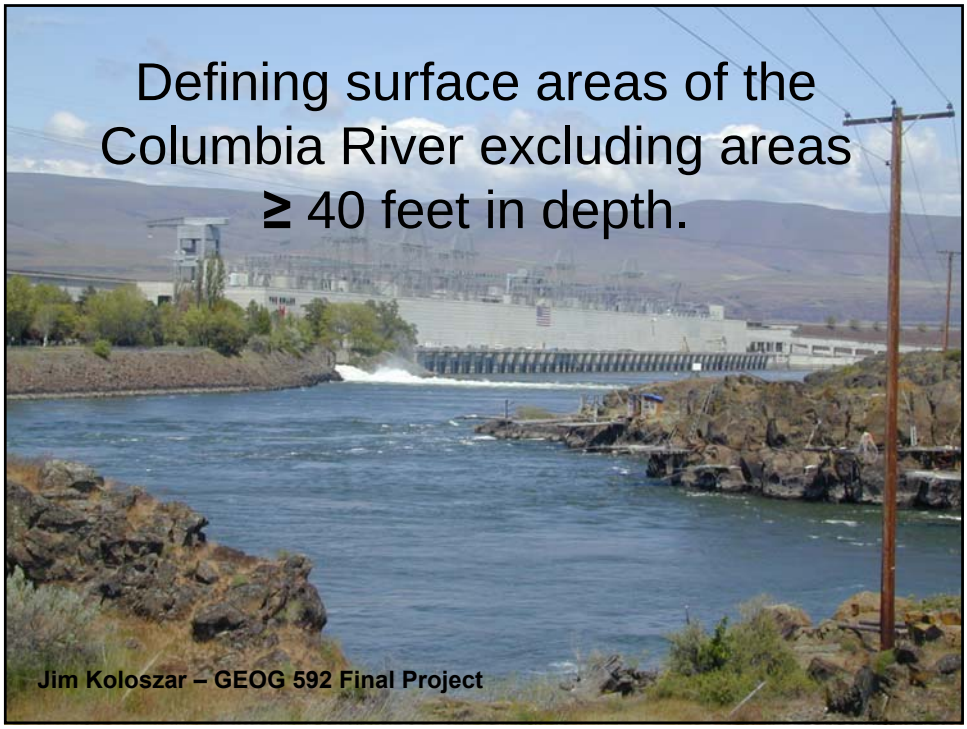
Defining surface areas of the Columbia River excluding areas ≥ 40 feet in depth.



Jim Koloszar – GEOG 592 Final Project

Northern Pikeminnow Sport-Reward Program 1990 – 2004

•Control pikeminnow numbers

•Reduce predation of salmonid species

Northern Pikeminnow

Chinook Salmon Smolt

Program Monitoring

•Mark/Recapture (annual)

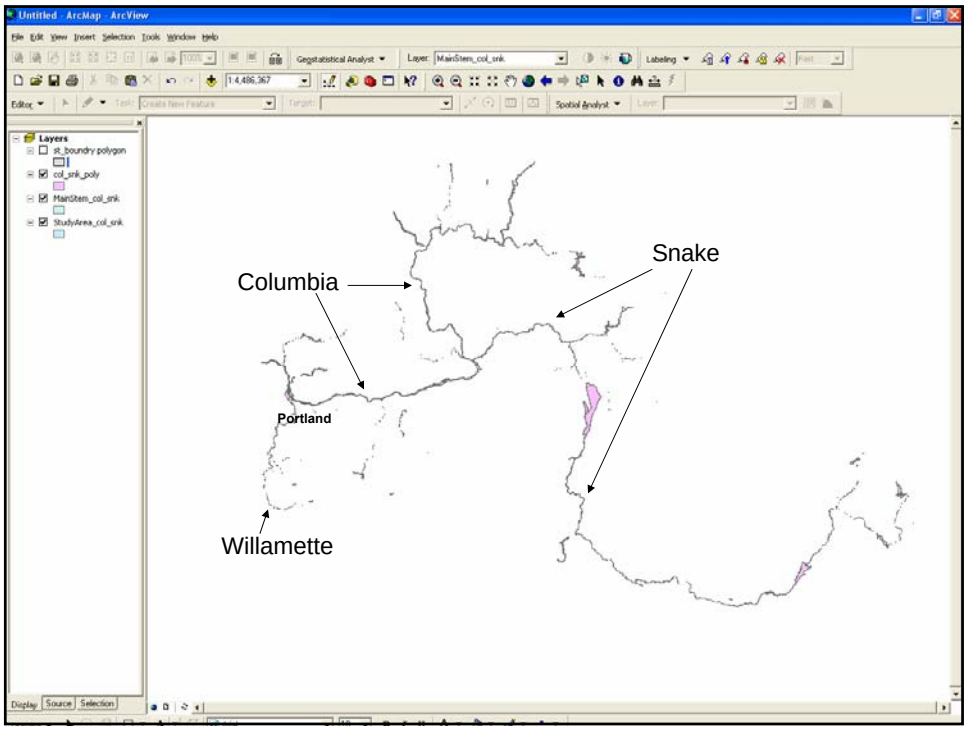
•Indexing Surveys (5-year cycles)

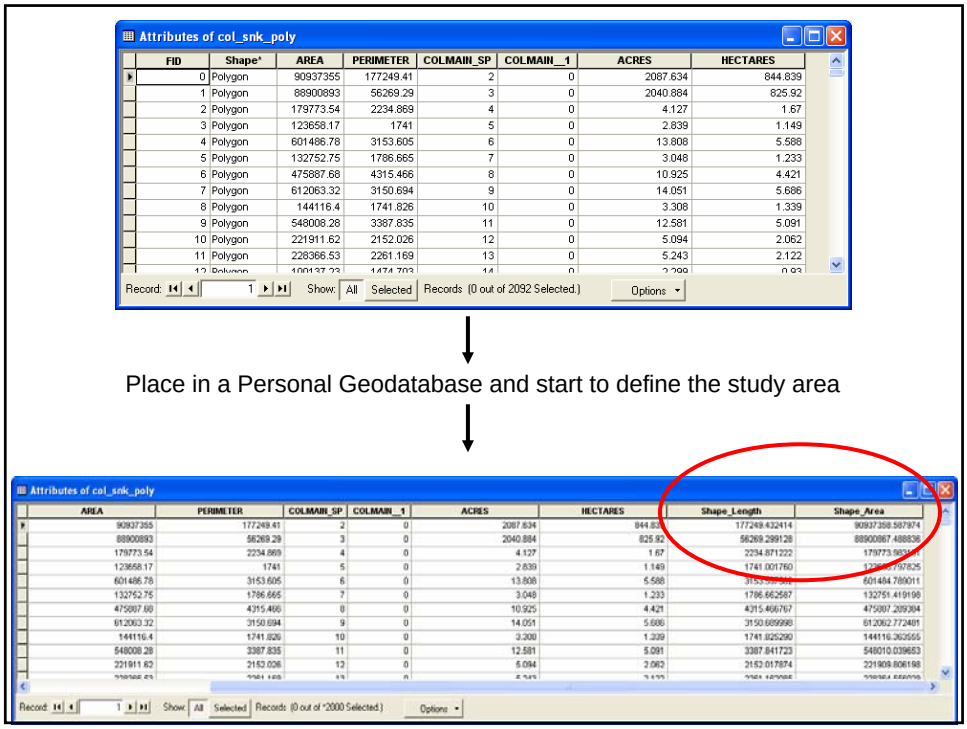
- Determine predator dietary habits
- Number of predators per unit area

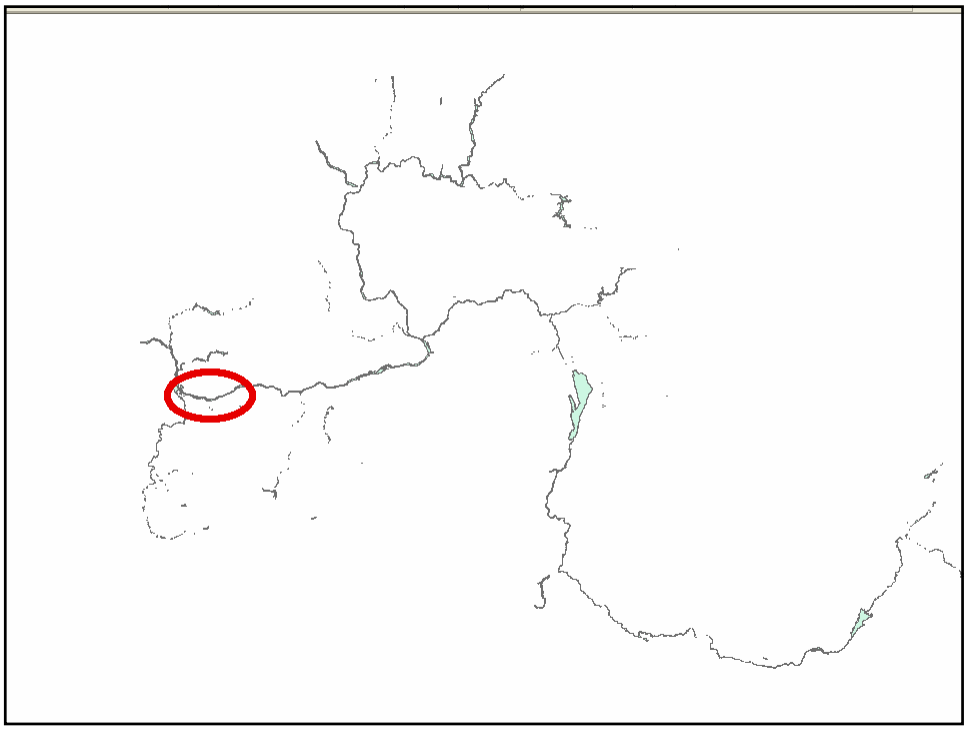
1. Define surface areas

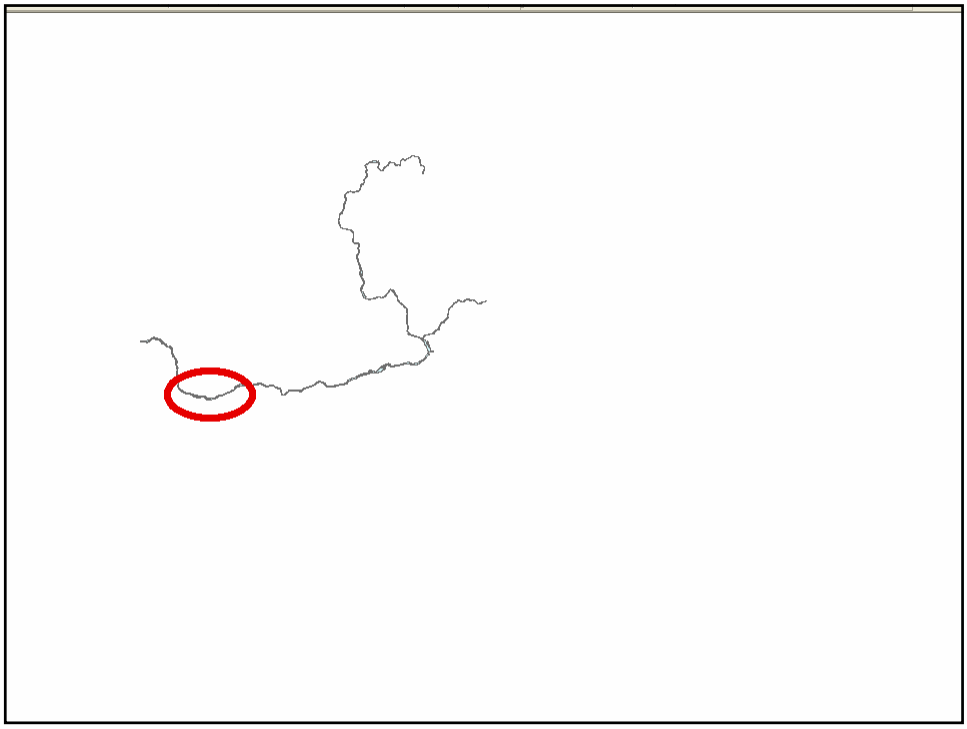
2. Create surface estimating depth

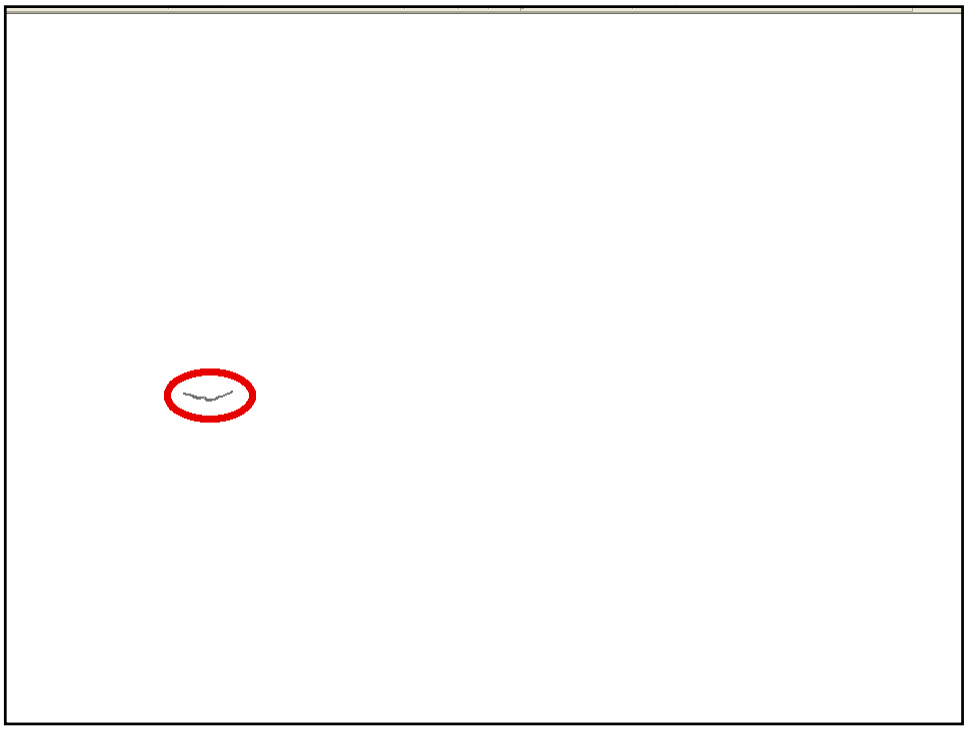
3. Select areas by depth and recalculate area

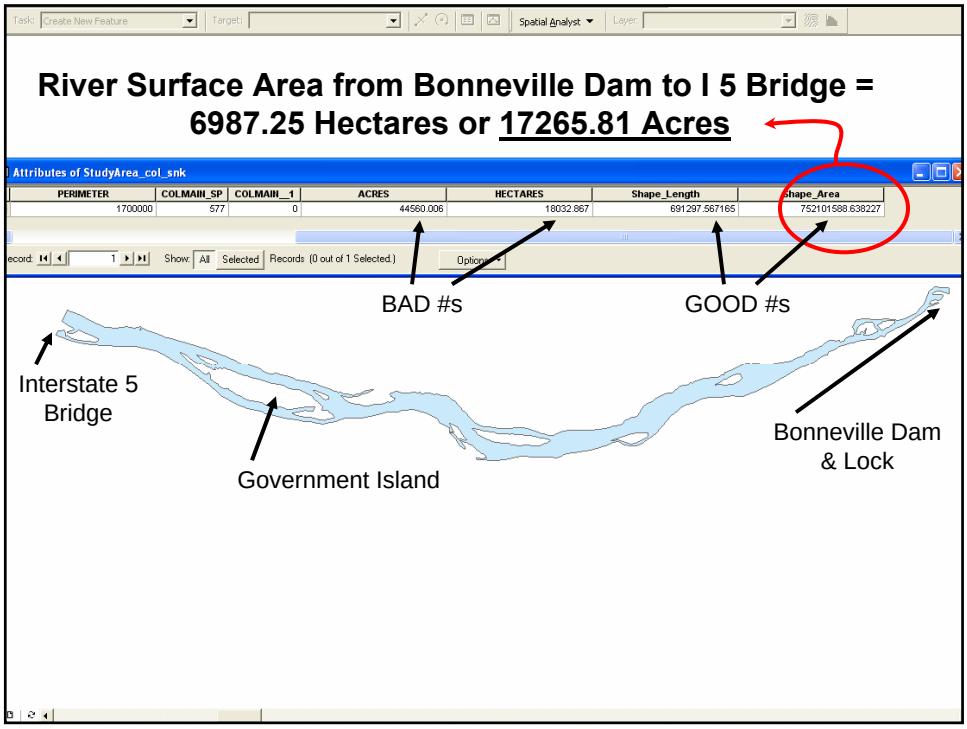



Attributes of col_snk_poly
FID Shape* AREA PERIMETER COLMAIN_SP COLMAIN_1 ACRES HECTARES
0 Polygon 90937355 177249.41 2 0 2087.634 844.839
1 Polygon 88900893 56269.29 3 0 2040.884 825.92
2 Polygon 179773.54 2234.869 4 0 4.127 1.67
3 Polygon 123658.17 1741 5 0 2.839 1.149
4 Polygon 601486.78 3153.605 6 0 13.808 5.588
5 Polygon 132752.75 1786.665 7 0 3.048 1.233
6 Polygon 475887.68 4315.466 8 0 10.925 4.421
7 Polygon 612063.32 3150.694 9 0 14.051 5.686
8 Polygon 144116.4 1741.826 10 0 3.308 1.339
9 Polygon 548008.28 3387.835 11 0 12.581 5.091
10 Polygon 221911.62 2152.026 12 0 5.094 2.062
11 Polygon 228366.53 2261.169 13 0 5.243 2.122
Record: 1 Show: All Selected Records (0 out of 2092 Selected.) Options
Place in a Personal Geodatabase and start to define the study area
Attributes of col_snk_poly
AREA PERIMETER COLMAIN_SP COLMAIN_1 ACRES HECTARES Shape_Length Shape_Area
Record: 1 Show: All Selected Records (0 out of *2000 Selected.) Options









1.Define surface areas

<<<DONE>>>

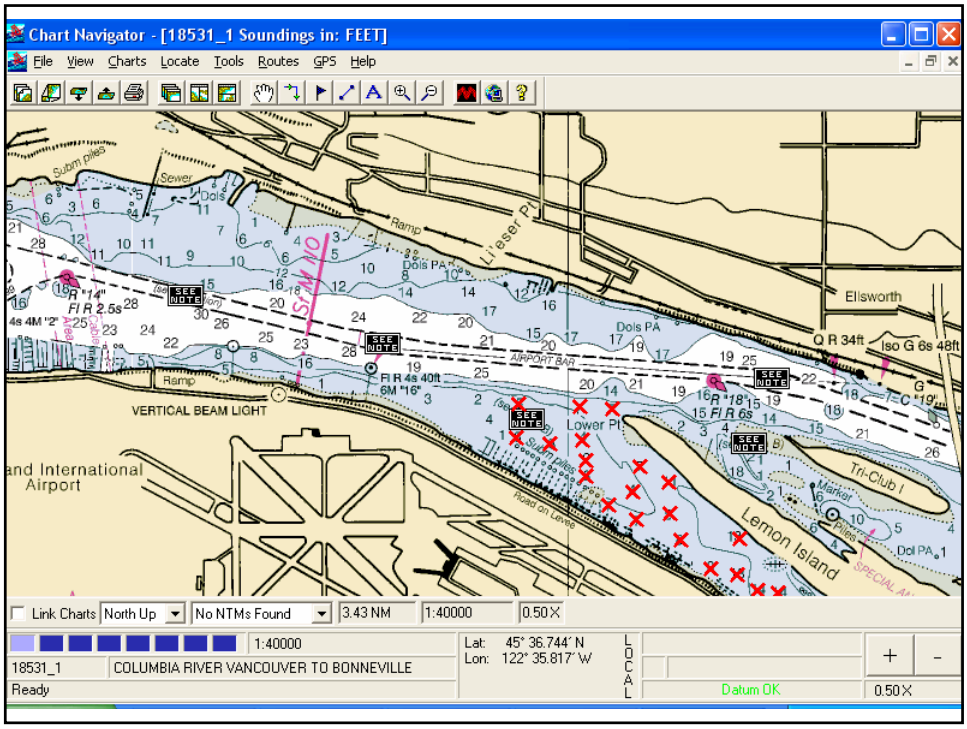
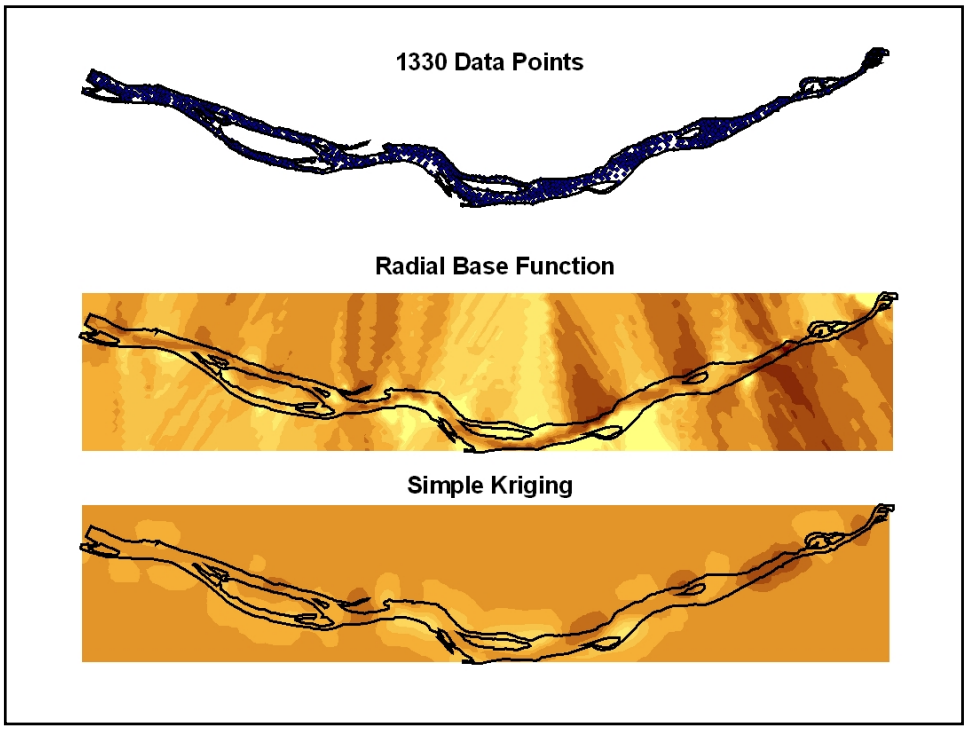
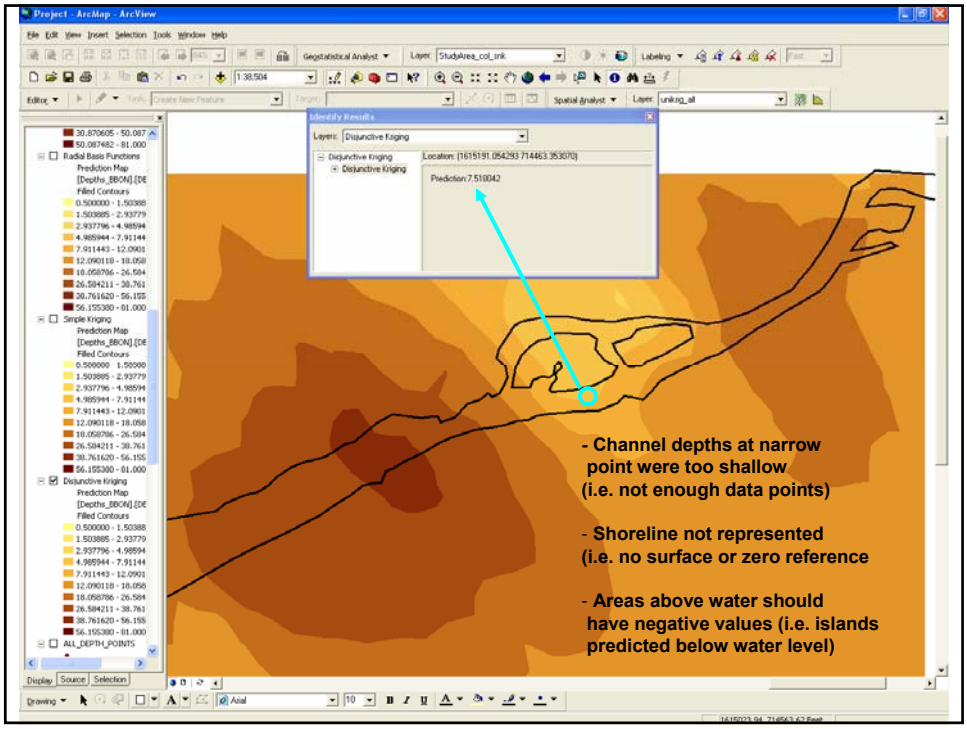
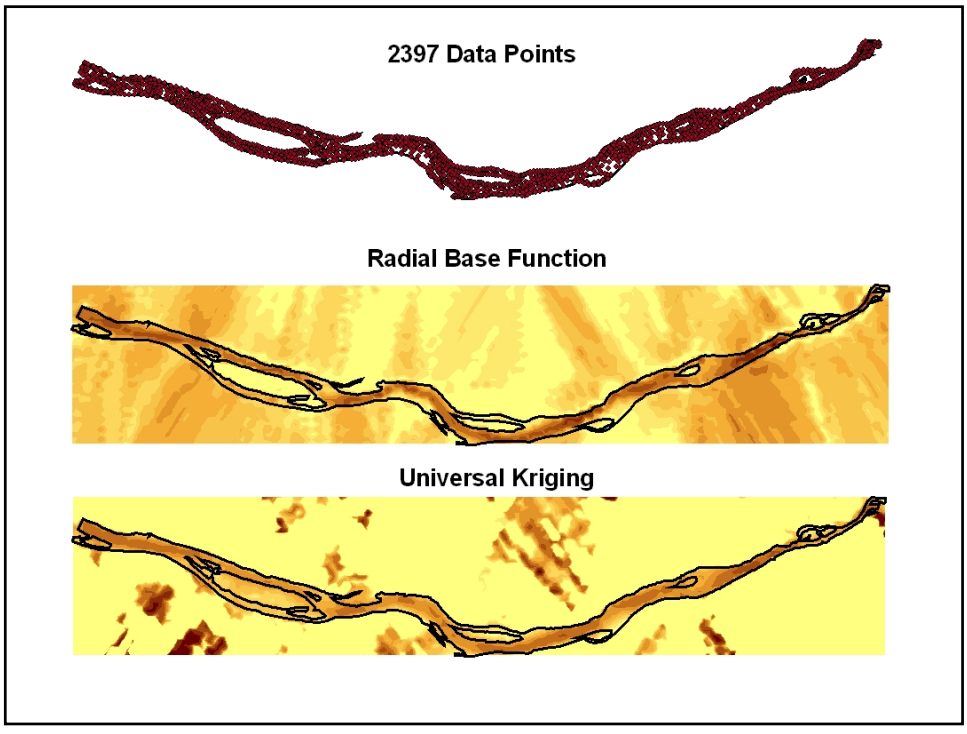


Chart Navigator - [18531_1 Soundings in: FEET]
File View Charts Locate Tools Routes GPS Help
Ellsworth
VERTICAL BEAM LIGHT
Lower Pt
Lemon Island
Tri-Club I
Link Charts
North Up
No NTMs Found
3.43 NM
1:40000
0.50X
18531_1
COLUMBIA RIVER VANCOUVER TO BONNEVILLE
Ready
Lat: 45° 36.744' N
Lon: 122° 35.817' W
LOCAL
Datum OK


1330 Data Points
Radial Base Function
Simple Kriging

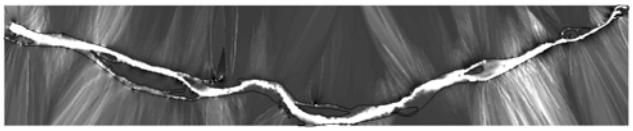

- Channel depths at narrow point were too shallow (i.e. not enough data points)
- Shoreline not represented (i.e. no surface or zero reference
- Areas above water should have negative values (i.e. islands predicted below water level)

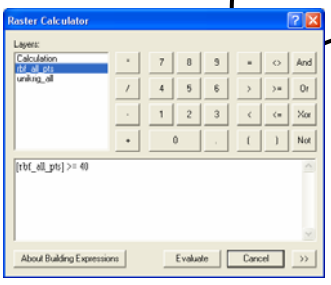

2397 Data Points
Radial Base Function
Universal Kriging

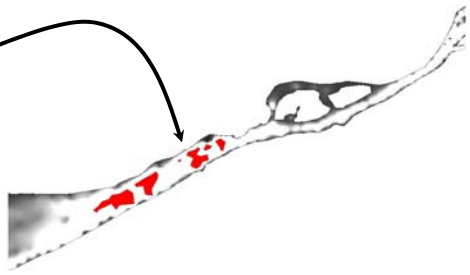
2. Create surface estimating depth

<<<DONE>>>

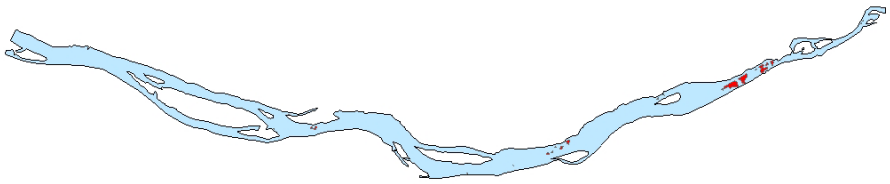
Radial Base Function - Raster







raster converted to polygon for areas ≥ 40 ft.



Area determined in Step 1 – Area determined in Step 2 = Area Step 3

Or

752,101,588.638227 - 8,667,039.672320 = 743,434,548.965907 ft²

Or

17,066.84057 acres

Conclusions

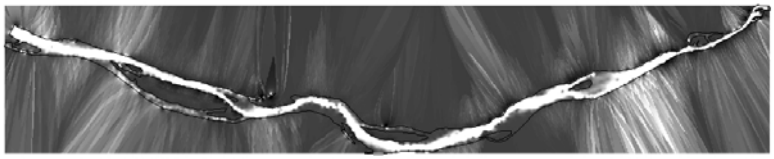
1. Define surface areas…relatively simple with geodatabase

   Acreage of test area from below Bonneville to I5 Bridge = **17265.81 Acres**

   Limitations: Polygons created at what water level…10 year mean? …annual mean?
   Not certain on the evolution of the polygons.
   Metadata not available!!??!!

Conclusions…cont.

2. Create surface estimating depth…more complex and time consuming but feasible.



Limitations: Second generation data. Where is the point that the label represents? 25

Cell size/resolution

Explore kriging in greater detail for statistical validity

Conclusions…cont.

3. Select areas by depth and recalculate area…

Acreage of test area from below Bonneville to I5 Bridge minus areas with depths ≥ 40 ft. =

17,066.84057 acres.