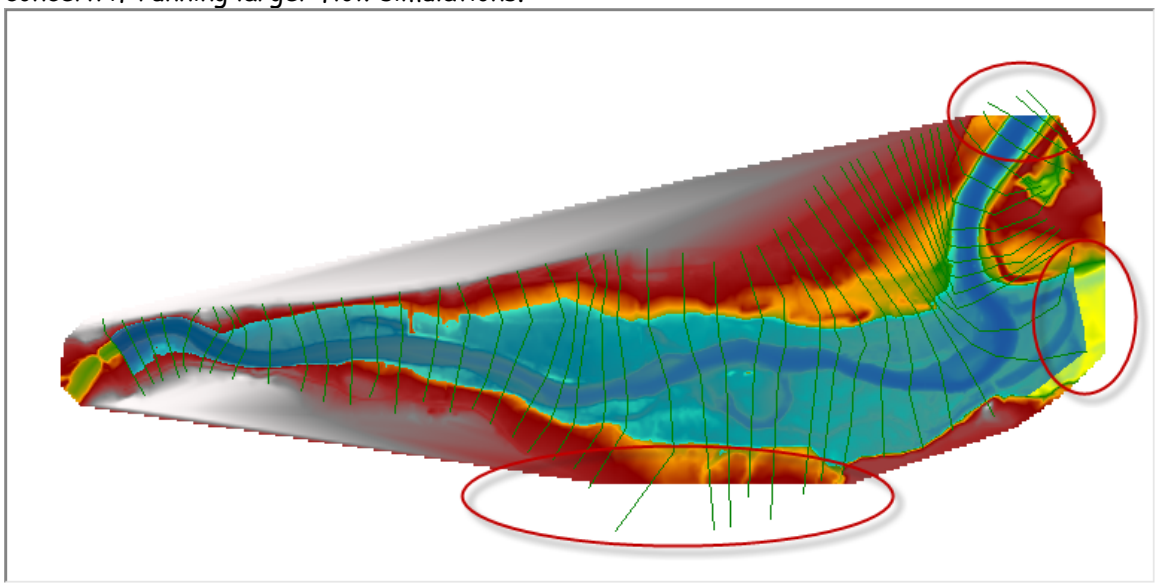
HEC-RAS/EFM Workshop
Solution: Using HEC-EFM Data for Water Surface Profile Calculations

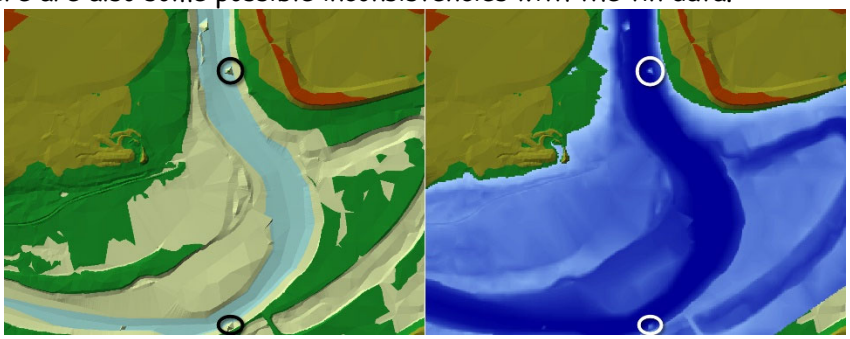
2.4 Examine Results

How do the depth grids look? Are there any areas where the inundation map bumps against the edge of the tin or bounding polygon?

Check out the Splittail Gaged depth grid. This grid was based on the highest flow so it had the biggest inundation of all the grids in the workshop and is therefore most likely to show edge issues with the mapping. There are cross sections where the map bumps against the edge of the terrain on the northern and southern side. On the northern most side of the terrain, the depth grid is cut off due to the terrain edge. The depth grid is also cut off by eastern most side due to no cross sections. This could be cause for concern if running larger flow simulations.



There are also some possible inconsistencies with the tin data.



The elevation bumps circled above are likely due to data errors – and are really only visible if you zoom in. These errors, if unchecked, may affect the areas computed for different combinations of flow regimes and relationships. Especially when using different depth criteria.

3.1 The Shoals Spider Lily

☑ Use this information to fill in the table below.

Lily Habitat Area Table					
	# of Grid Cells		Acres		Which is better?
Habitat Depth	Gaged	Natural	Gaged	Natural	
Total Coverage	86,173	70,323	49.5	40.4	Gaged

To convert grid cells to acres, multiply the number of grid cells by 25 (each grid cell is 5 ft by 5 ft) and then divide by 43,560 square feet per acre.

Which flow regime is superior for the Shoals Spider Lily habitat?

The Gaged flow regime protects a greater area from grazing and is therefore superior.

Does this agree with the conclusion reached during the statistical analysis from yesterday's workshop?

Yes, it does. The statistical analysis also predicted that the Gaged flow regime was better than the Natural for protecting the Spider Lily from grazing.

Do you have any ideas on how this relationship might be refined/improved? Can you think of other questions that might be asked regarding this analysis?

As the model is being used for this workshop, any area covered with water is protected from grazing and is therefore potential lily habitat. Several questions come to mind: Will deer feed on the lily in very shallow waters? Deer are not particularly hydrophobic critters, perhaps inundation needs to be more than a certain depth to prevent grazing. Is all of the inundated area actually habitat for the Spider Lily? Is some inundation too deep for those plants to survive? Are there soil types in the area that are unsuitable for the plants?

EFM could be used to investigate these questions. New calculations could be done on the depth grids to include a minimum and maximum depth requirement. Different relationships could be developed that look into where the plants will begin to grow, these areas could then be overlaid with the depth grids showing where the plants are protected from grazing.

3.2 Splittail Spawning

☑ Tabulate the number of grid cells with depth less than or equal to 3.0 ft. Use this information to begin filling in the table below.

Splittail Habitat Depth Table					
	# of Grid Cells		Acres		Which is
Habitat Depth	Gaged	Natural	Gaged	Natural	better?
Depth 0 to 1ft	10,184	29,885	5.8	17.2	Natural
Depth 0 to 2ft	28,743	74,659	16.5	42.8	Natural
Depth 0 to 3ft	**63,221**	**119,699**	**36.3**	**68.7**	**Natural**
Depth 0 to 4ft	109,323	138,961	62.7	79.8	Natural
Depth 0 to 5ft	139,472	149,555	80.0	85.8	Natural
Depth 0 to 6ft	157,516	157,766	90.4	90.5	Natural
Depth 0 to 7ft	168,198	166,330	96.5	95.5	Gaged

To convert grid cells to acres, multiply the number of grid cells by 25 (since each grid cell is 5 ft by 5 ft) and then divide by 43,560 square feet per acre. NOTE: Values in table are approximate – you may not get exact results.

Which flow regime is superior for Splittail Spawning?

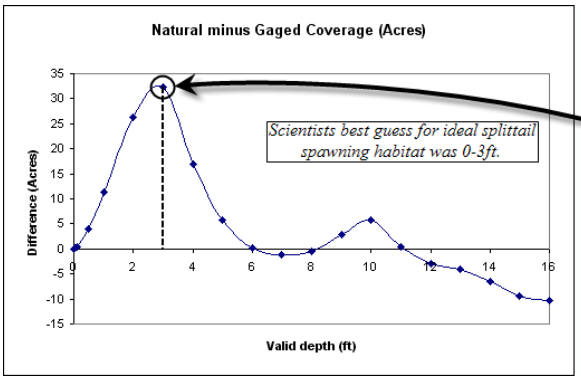
For depths of 0-1 up to 0-6 feet, the Natural flow regime is superior for Splittail Spawning habitat. For a depth of 0-7 feet, the Gaged flow regime was found to be superior.

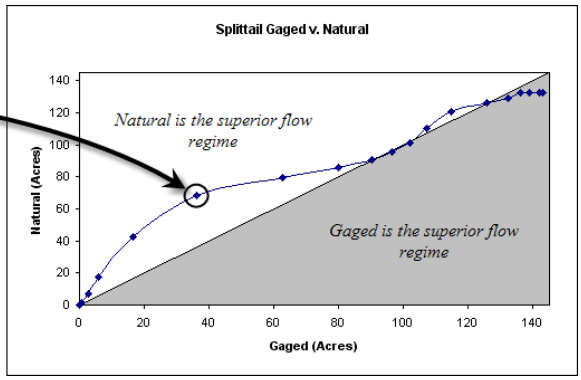
Does this agree with the conclusion reached during the statistical analysis from yesterday's workshop?

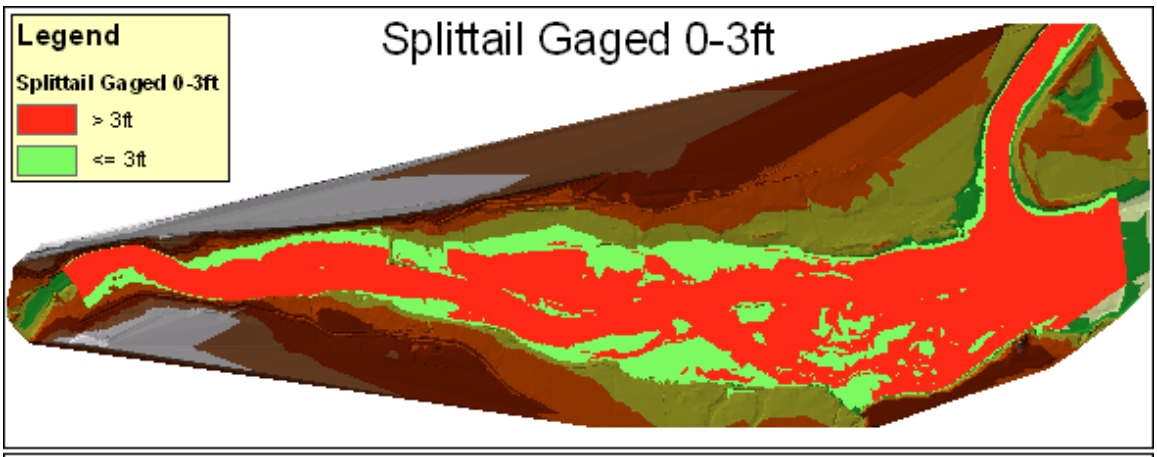
No, statistical results indicated that the Gaged flow regime was superior. This was based on the hypothesis that more flow improved conditions for Splittail Spawwning, which did not consider the shallow depth criteria for these fishes. Analyzing the depth grids showed that the higher flow for the Gaged regime (which was supposed to be a good thing) actually reduced the extent of the shallow (0-3 feet) habitat.

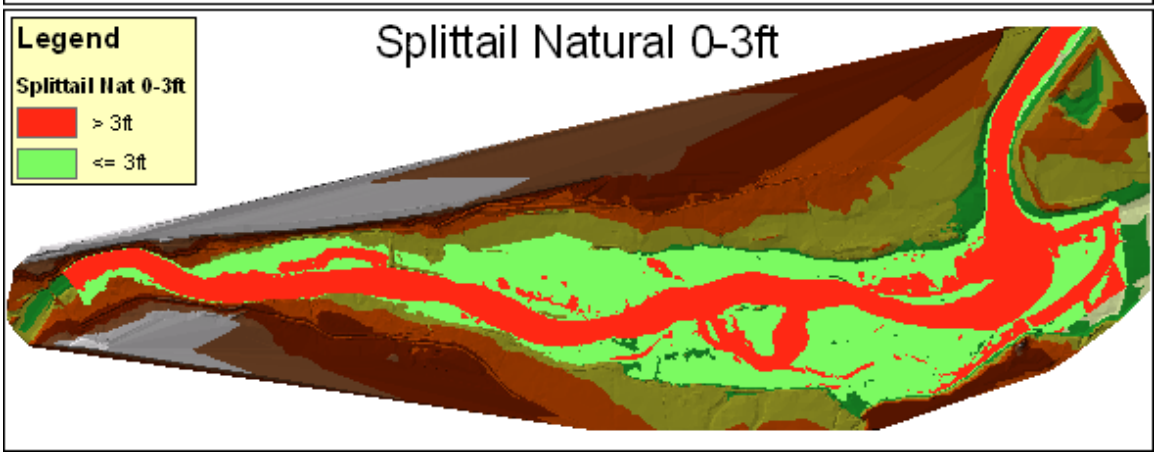
What information could you report back to the scientists regarding the uncertainty for the ideal depth range?

The conclusion reached by investigating the depth grids is that the Natural flow regime is better than the Gaged for depth ranges 0-1' to 0-6'. Check out the graphs of our results presented below. These EFM spatial results could be provided to the scientists to show that Natural is superior to Gaged for a wide range of suitable depths and is therefore not sensitive to the depth criteria until suitable depths reach about 6 feet. In addition to the graphs, GIS results could be provided. Take a look at the maps below. They clearly show that the Natural flow regime is superior for water depths of 0-3ft.


Natural minus Gaged Coverage (Acres)
Difference (Acres)
Valid depth (ft)
Scientists best guess for ideal splittail spawning habitat was 0-3ft.


Splittail Gaged v. Natural
Natural (Acres)
Gaged (Acres)
Natural is the superior flow regime
Gaged is the superior flow regime


Legend
Splittail Gaged 0-3ft
> 3ft
<= 3ft
Splittail Gaged 0-3ft


Legend
Splittail Nat 0-3ft
> 3ft
<= 3ft
Splittail Natural 0-3ft