

4.4 HEC-GeoEFM Workshop

Solution: Using HEC-RAS and HEC-EFM Data for Ecosystem Analysis

Part 3: Compute Habitat Areas

Habitat Areas for All Relationships				
	Natural	Gaged		
Relationship	Area, Acres	Area, Acres	Change, %	Change, Acres
Splittail Spawning	69.74	36.43	-47.8	-33.3
Shad & Striped Bass	57.21	67.95	18.8	10.7
Benthic Biodiversity	239.11	180.54	-24.5	-58.6
Shoals Spider Lily	40.3	49.21	22.1	8.9
Water Exchange for Wetland Health	73.7	91.92	24.7	18.2

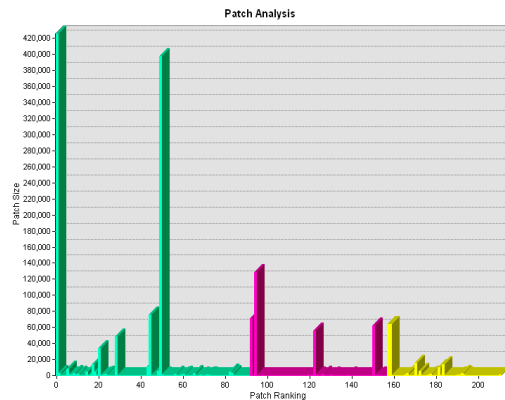
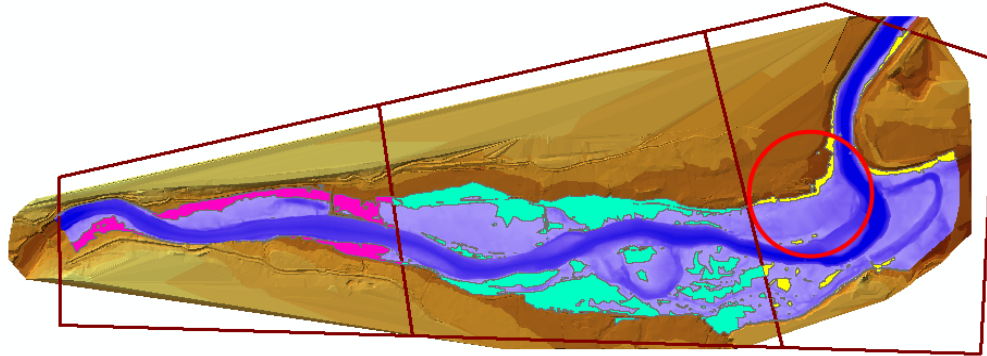
- ◇ *Based on change in area, which ecological communities or processes gained and lost the most habitat area?*

The Benthic Biodiversity relationship lost the most habitat area with a value of -58.6 acres while the Water Exchange for Wetland Health relationship gained the most area with a value of 18.2 acres.

- ◇ *Based on percent change, which ecological community or process is predicted to be the most enhanced under the gaged flow regime (as compared to the reference flow regime - Sav Natural)? Which is predicted to be the most impacted?*

The Water Exchange for Wetland Health relationship is predicted to be the most enhanced under the gaged flow regime with a percent change in area of 24.7%. The relationship predicted to be the most impacted is the Splittail Spawning with a percent change in area of -47.8%.

Part 4: Analyze Habitat Connectivity (GAGED FLOW REGIME)



❖ You have analyzed three regions of interest. Which area would you recommend as a conservation zone for splittail spawning?

The middle area, shown in aqua, would be the best location to perform conservation activities for Splittail Spawning because it contains the largest patches and the most habitat area.

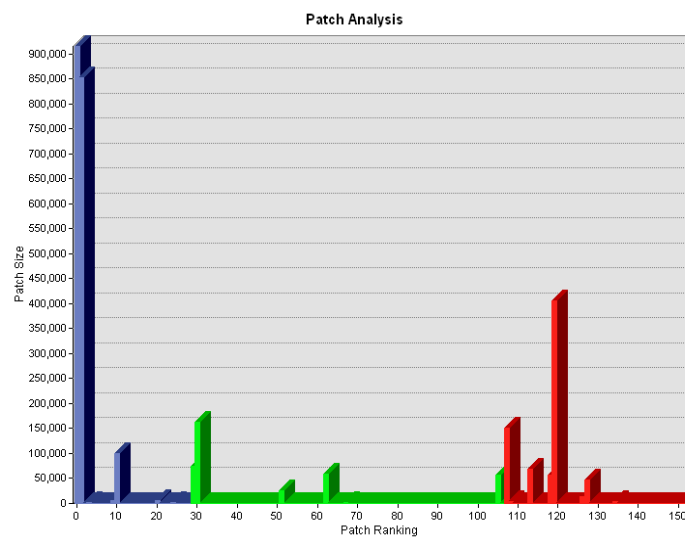
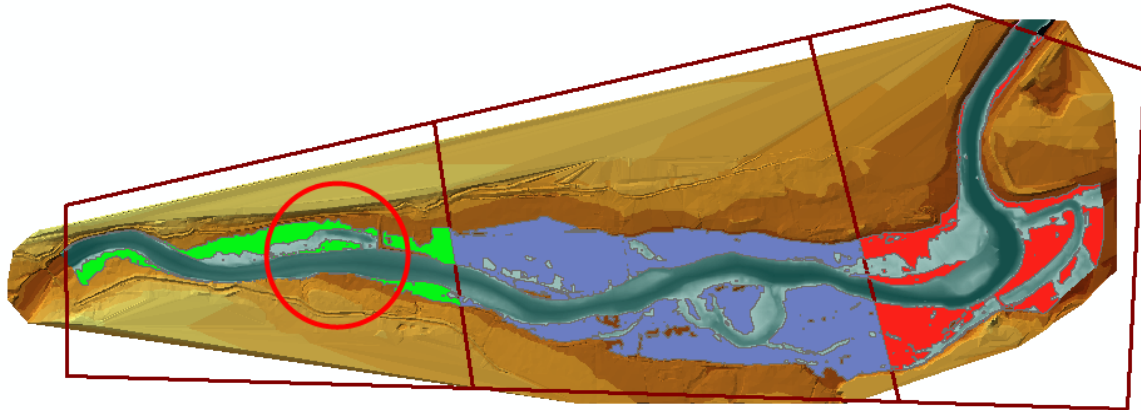
❖ Which area would you recommend for the recreation area and boat access?

Remember, an ideal site would:

- Minimize disturbance to Splittail Spawning, which is a threatened species
- Provide boat access to deeper areas and proximity to open water
- For safety purposes, have a gentle slope in the land to water transition zone
- Be located on the North bank of the river to minimize travel time for visitors
- Avoid the North/South reach due to other development plans

The red circled location in the rightmost area, shown in yellow, would be the best place to build a recreation and boat access area. It would meet all of the criteria and disturb the least amount of habitat area.

Part 4: Analyze Habitat Connectivity (NATURAL FLOW REGIME)



❓ *Has the natural flow regime analysis changed your mind about where you would locate the conservation zone? Why?*

The best location for the conservation area has not changed. The middle area still has the largest patches and the most habitat area.

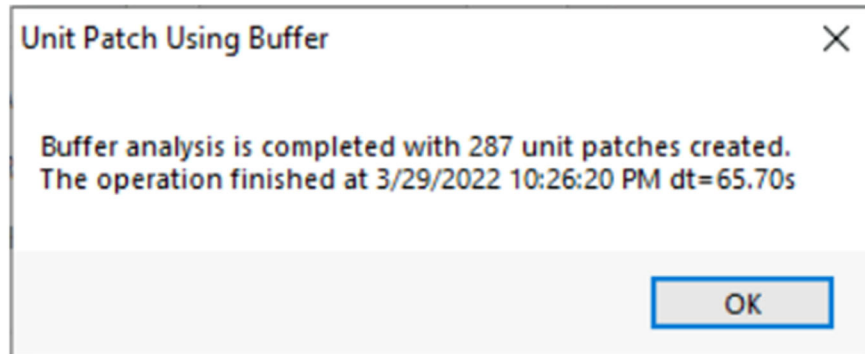
❓ *What about the recreation area and boat access? Why?*

The best location for the boat access area has changed. The rightmost area, which was best for the gaged flow regime, is now providing more habitat area with the natural flow regime in the originally proposed construction site. The red circled location in the leftmost area, shown in green, is now the best location for building a boat access area. It meets all of the criteria and would disturb the least amount of Splittail Spawning habitat area.

Part 5: Incorporating Fisheries Monitoring Data

◇ How many nest sites were identified in the study area?

287

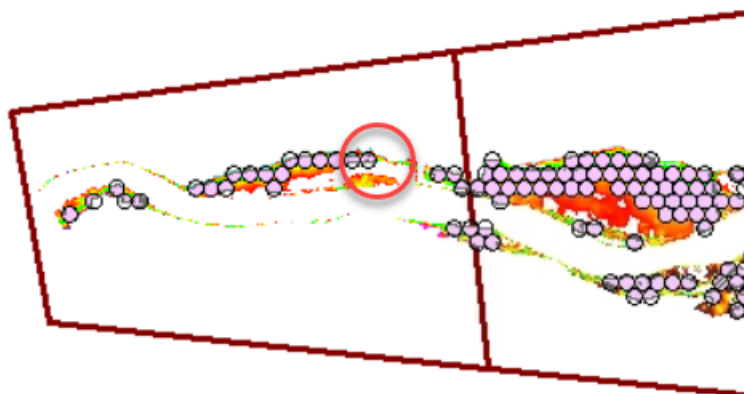


◇ Does the distribution of nesting sites change your suggestions about locating the conservation zone or the recreation area and boat access? Why?

No. The middle section had been chosen as the conservation zone, and it has the most nesting sites. The area selected for boat access has only a few viable nesting sites.

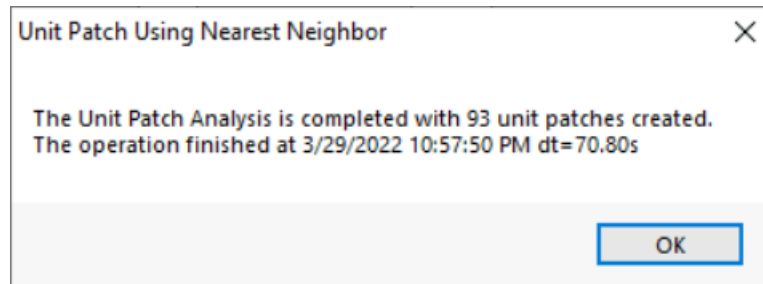
◇ How many nests are likely to be disturbed and likely lost due to construction?

Very few nests are likely to be disturbed or lost due to the construction. Assuming a construction site with an impact zone spanning 400 ft, only 2-4 nesting sites would be lost or disturbed.



◇ How many adults can overwinter in the study area?

93



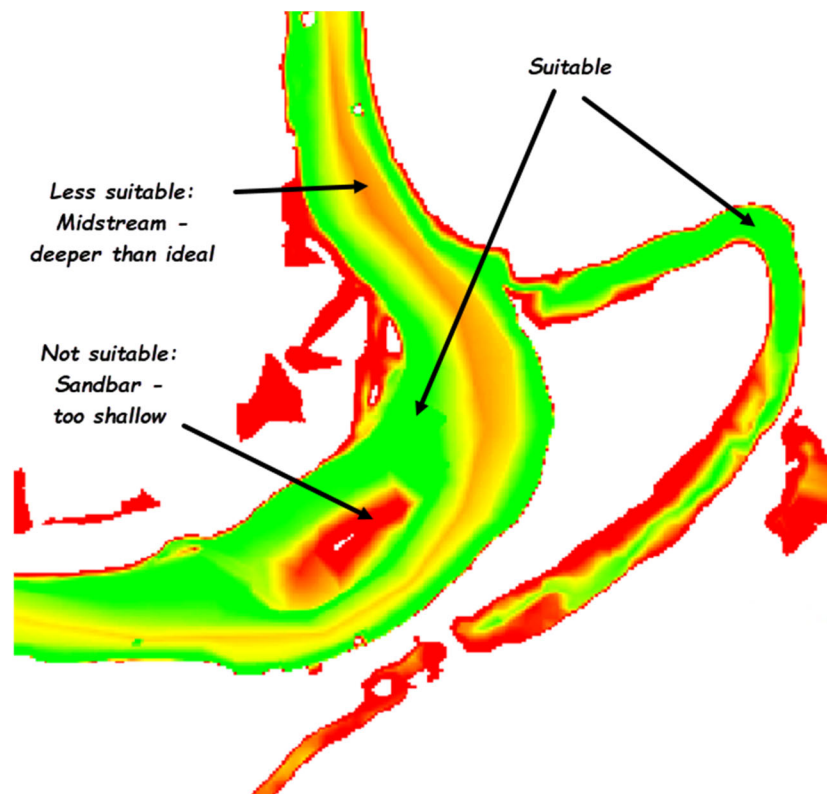
◇ Does the suitable habitat map make sense based on the hydraulics and HSI?

Yes.

The areas with depth ≤ 1 ft are shown as not at all suitable (red, e.g. very edges of stream & sandbar area). (There are no areas with a depth ≥ 10 ft, which would also be not suitable.)

Areas with depths from 3-5 feet show as perfectly suitable (green).

The range between depths of 1-3 ft show improving suitability, and as depths get greater than 5 ft (e.g. mid-stream), their suitability declines.



◇ What parts of the process that you just completed (application of HSI, Nearest Neighbor patch analysis) can exclude pieces of habitat as not viable for adults?

1. Application of the HSI can render some habitat wholly unsuitable (depths ≤ 1 or ≥ 10 ft).
2. Application of the minimum chunk area removes any chunk of habitat that is less than 5000 sf of suitable habitat.
3. Remaining habitat chunks (ie, chunks with more area than the minimum chunk area criterion) are grouped into neighborhoods. Chunks within 100 feet of each other are grouped into a single neighborhood. Individual chunks with no other chunks within 100 feet are treated as their own neighborhood. Though not encountered in this example, since the minimum patch size is 15,000 square feet, neighborhoods with less suitable habitat than required to make a single patch would also be excluded as not viable for adults.