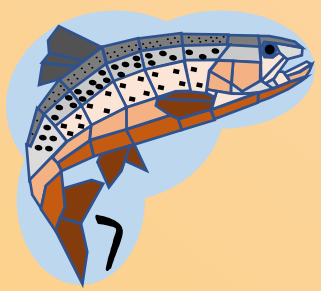
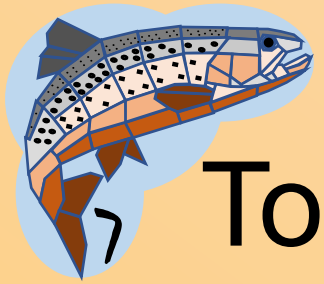
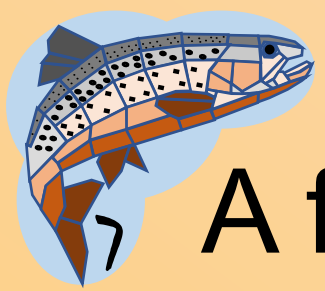


Field Methods and Input Preparation



Topics

- Spatial scales and cell size
- Hydraulic modeling
- Methods for delineating cells
- Estimation of cell habitat parameters



A few words about cell size

- “Spatial resolution” is important—it can strongly affect model results (and execution speed)
- InSTREAM and InSALMO were specifically designed to use cells:
  - No smaller than the feeding area of one adult (or: one juvenile superindividual)
  - Large enough to capture areas of relatively uniform:
    - Depth
    - Velocity
    - % area providing velocity shelter for drift feeding
    - Distance to escape cover

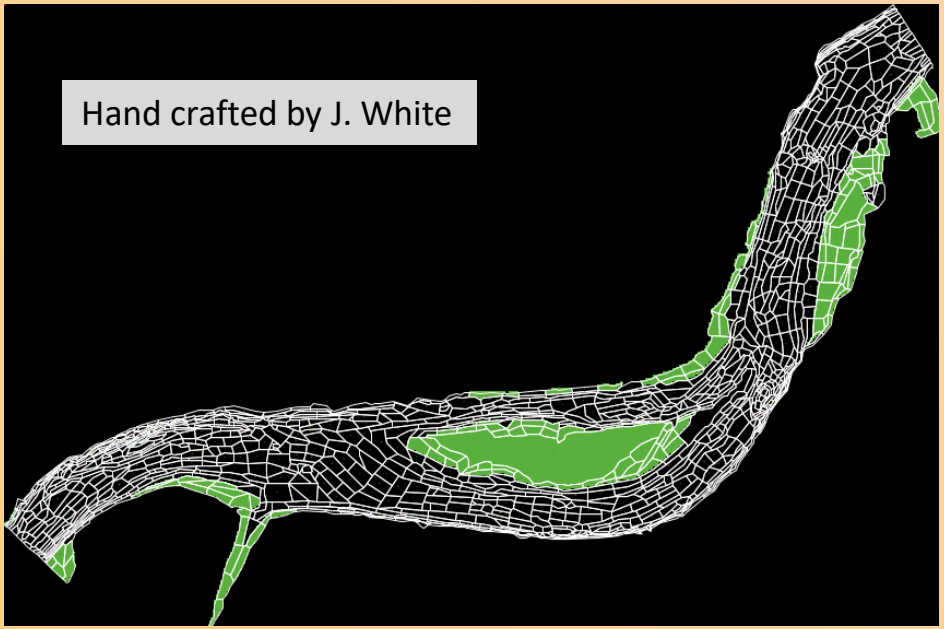
Because of InSTREAM's design resolution

- Capture velocity shelter as a characteristic within cells, not as separate cells

Because of InSTREAM's design resolution

- Smaller is not necessarily better!
  - ➢More cells → slower execution

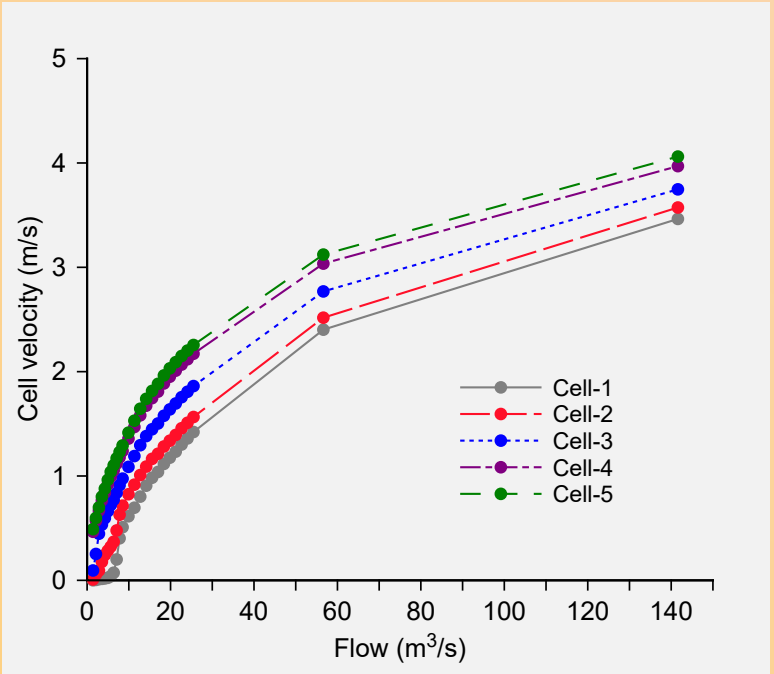
- Cell sizes usually should vary, with smaller cells in areas where habitat changes over short distances (margins)



Hydraulic input and modeling

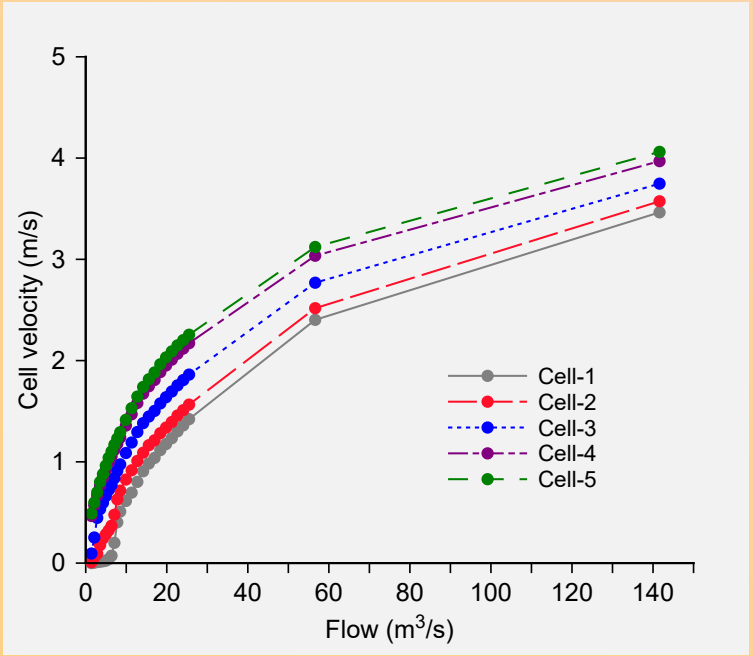
- InSTREAM calculates cell depth and velocity from flow using lookup tables

	A	B	C	D	E	F	G
1	Example velocity input file						
2	From hydraulic simulations						
3	28	Number of flows in table					
4		0.991	1.42	1.98	2.41	2.83	3.54
5	OSD-1	0.024	0.04	0.056	0.068	0.08	0.1
6	OSD-2	0	0	0	0	0	0
7	OSD-3	0	0	0	0	0	0
8	OSD-4	0	0	0	0	0	0
9	OSD-5	0	0	0	0	0	0
10	OSD-6	0	0	0	0	0	0
11	OSD-7	0	0	0	0	0	0
12	OSD-8	0	0	0	0	0	0
13	OSD-9	0	0	0	0	0	0
14	OSD-10	0	0	0	0	0	0
15	OSD-11	0	0	0	0.002289	0.006189	0.009497
16	OSD-12	0	0	0	0	0	0
17	OSD-13	0	0	0	0	0	0
18	OSD-14	0	0	0	0	0	0
19	OSD-15	0	0	0	0	0	0
20	OSD-16	0	0	0	0	0	0
21	OSD-17	0	0	0	0	0	0



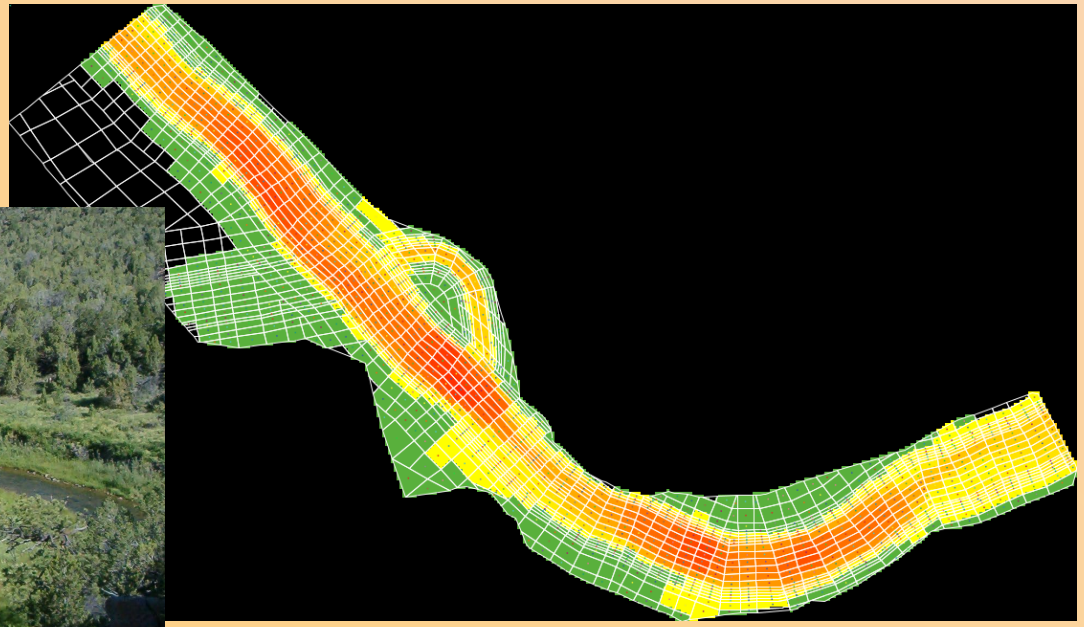
Hydraulic input and modeling

- InSTREAM's depth and velocity input could be provided by:
  - ➢Field measurements
  - ➢PHABSIM models
  - ➢Any 2-D hydrodynamic model
- Input needs to span the whole range of flows!



Hydraulic model mesh vs. InSTREAM cells

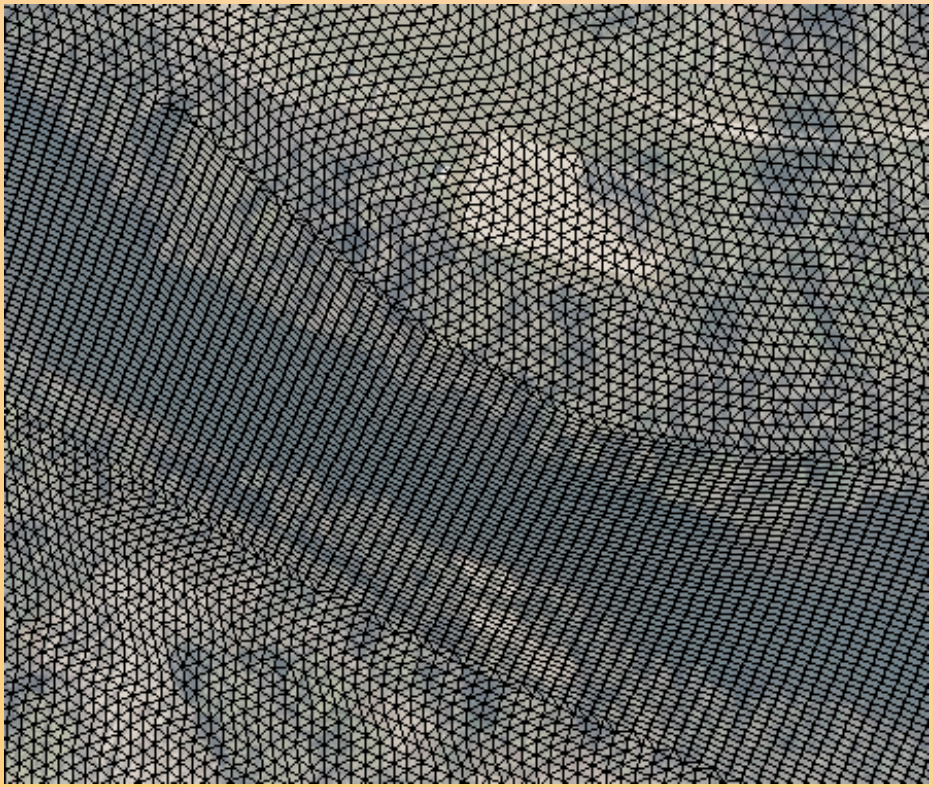
- With some hydraulic models, you can use InSTREAM's cells as the hydraulic mesh

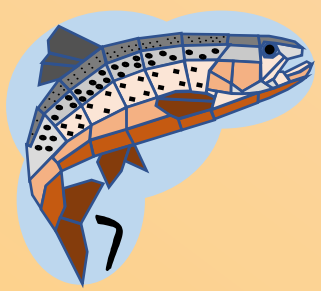


Green River below Flaming Gorge Dam

Hydraulic model mesh vs. InSTREAM cells

- Often, the hydraulic model uses finer resolution than InSTREAM – we'll provide examples below





Model-specific cell habitat parameters

- Distance to Cover
  - Why? Risk matters
- Concealment spaces
  - Why? Shelter availability influences density and growth
- Velocity shelter
  - Why? NEI
- Spawning gravel

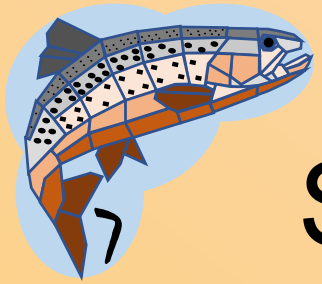
Model-specific cell habitat parameters (aka Magic Numbers)

- Distance to cover, Number of concealment spaces, Velocity shelter, Spawning gravel

Summary of options for cell delineation and magic number assignments

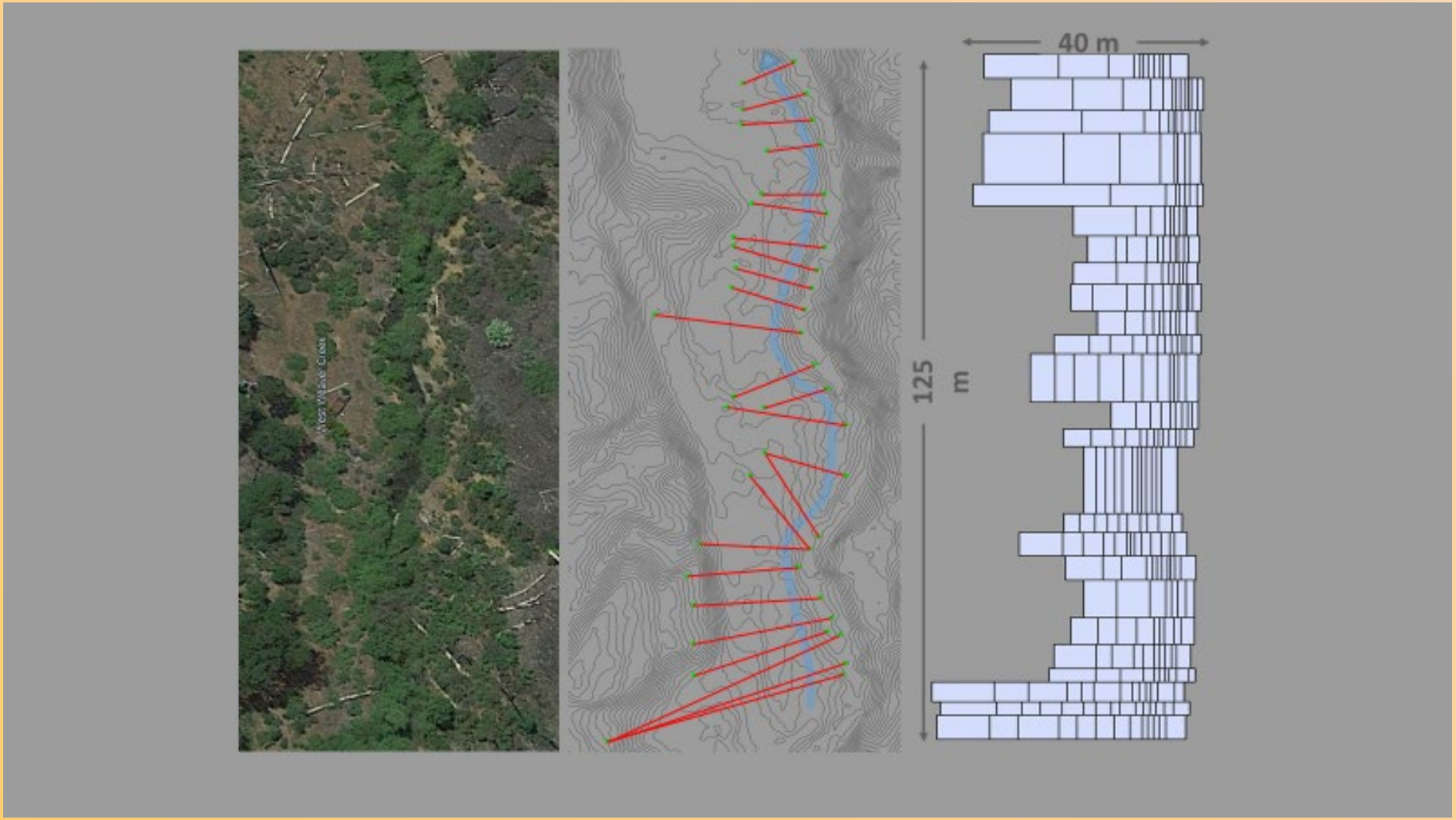
- Options for cell delineation:
  - Identify cells in the field
  - Use cells from hydraulic model
  - Aggregate cells from hydraulic model
    - (automated or artisanal)

- Options for magic number assignment:
  - Field
  - Photos
  - Automated in GIS (e.g. fine-grained hydraulic model data can yield velocity shelter estimates)

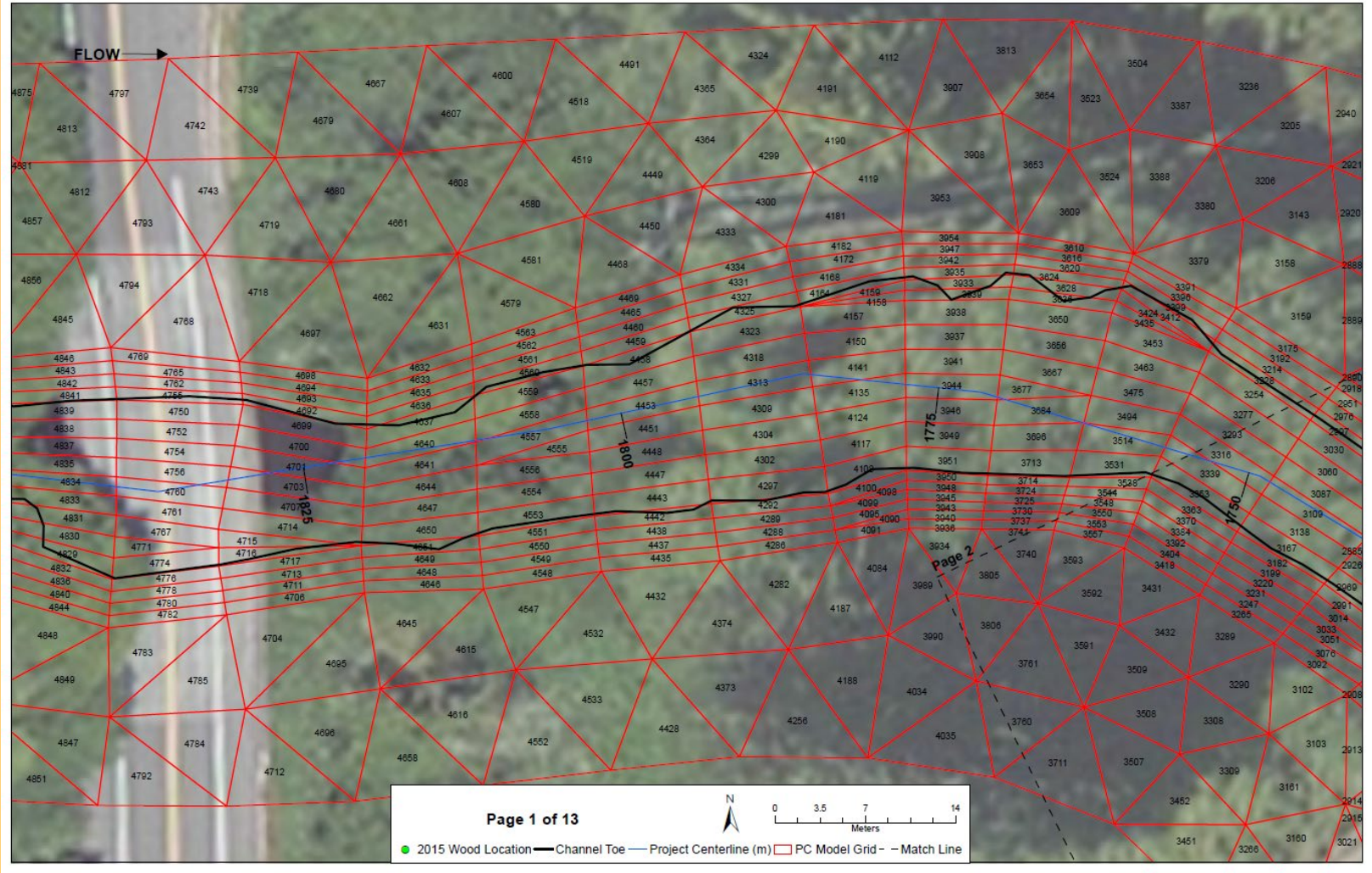


Some examples

West Weaver Creek (all field)



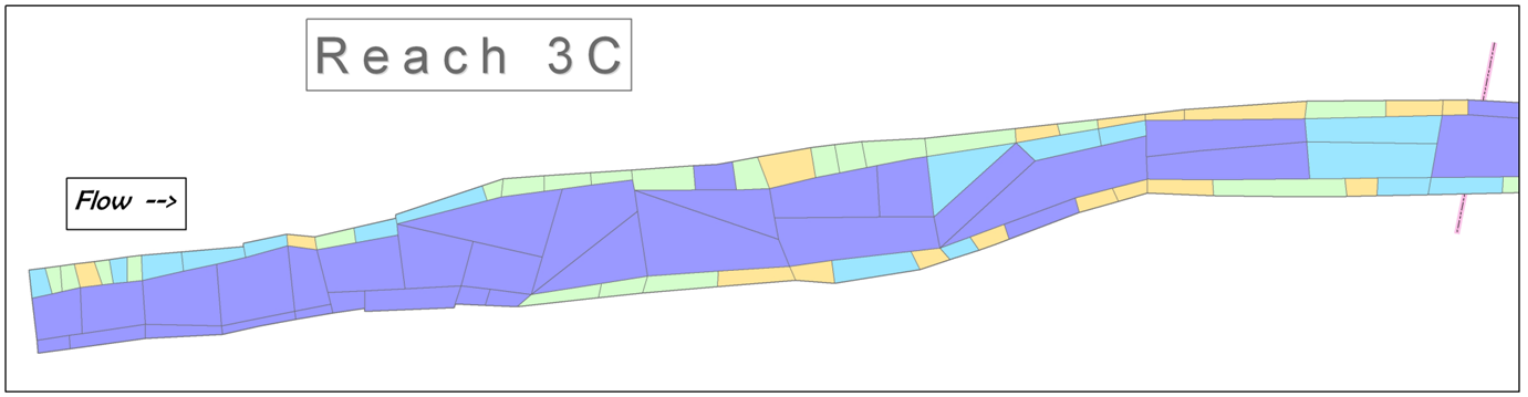
Prairie Creek (hybrid)



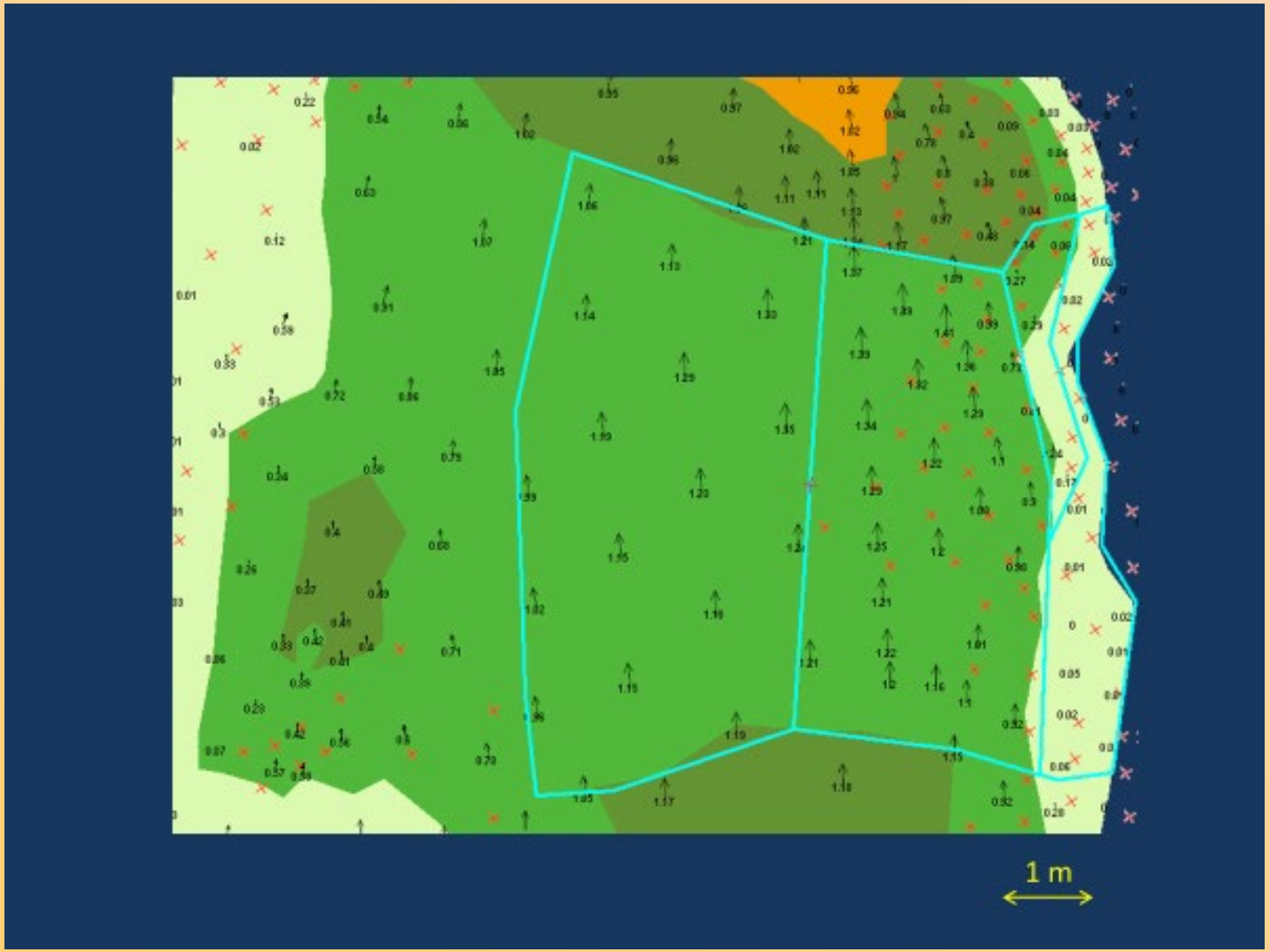
Clear Creek I
(an alternative hybrid)

Clear Creek I
(an alternative hybrid)

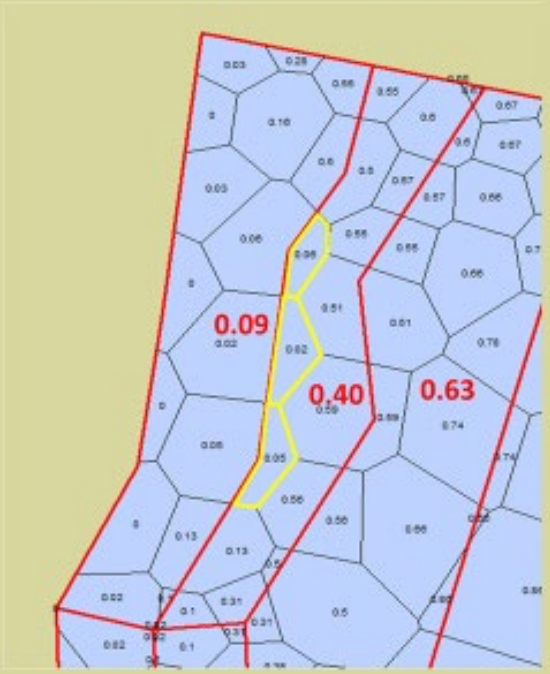
Clear Creek I
(an alternative hybrid)

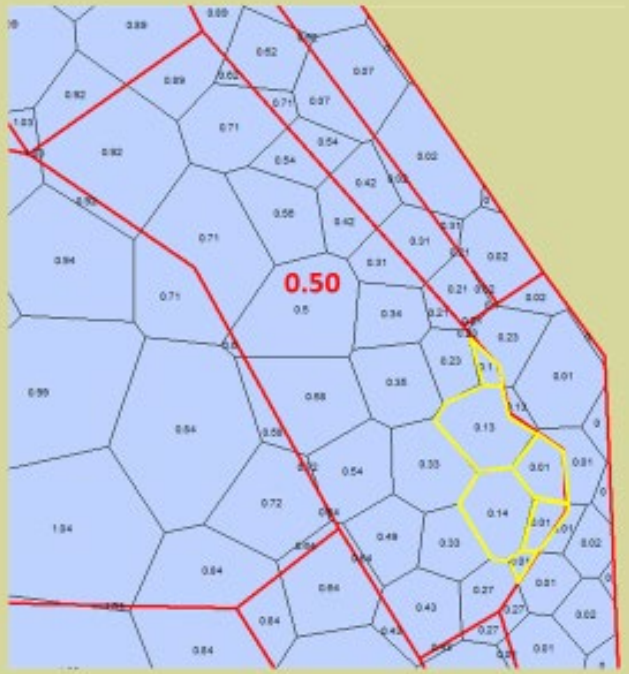


Clear Creek II (all-remote)

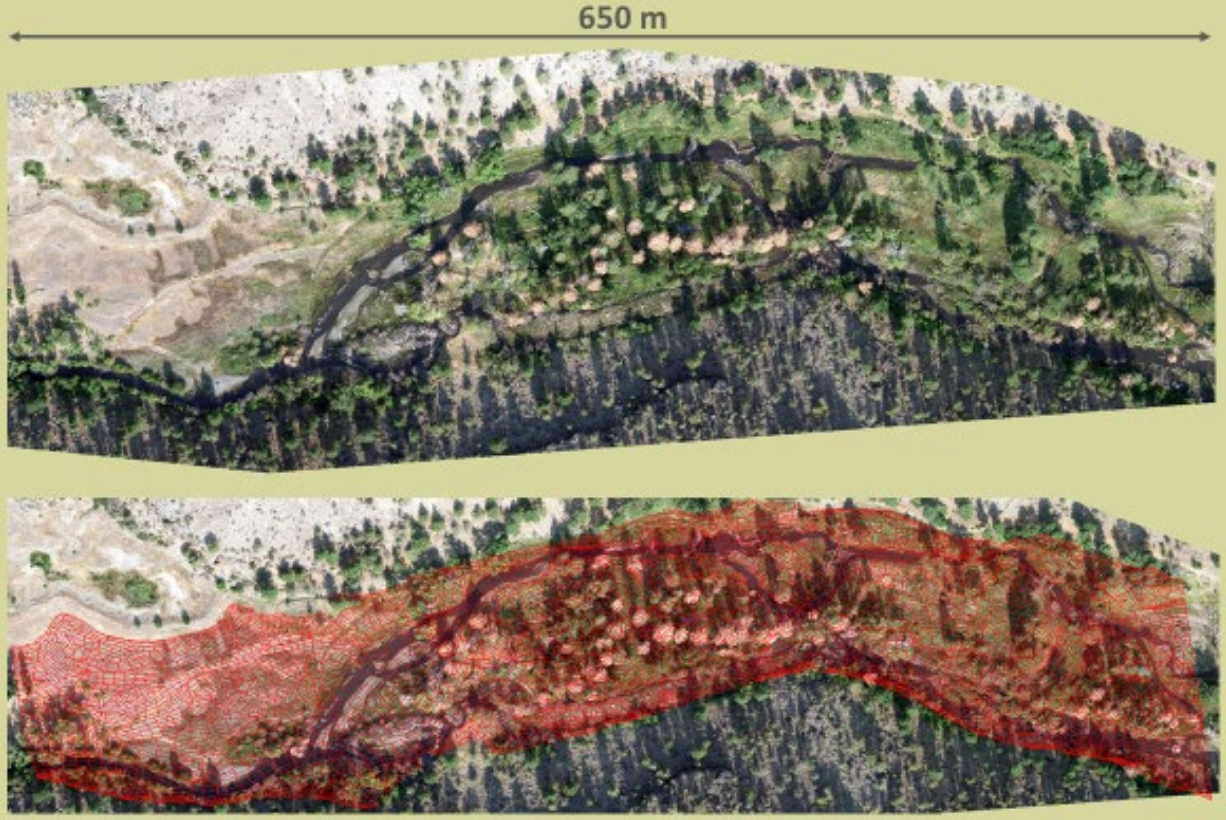


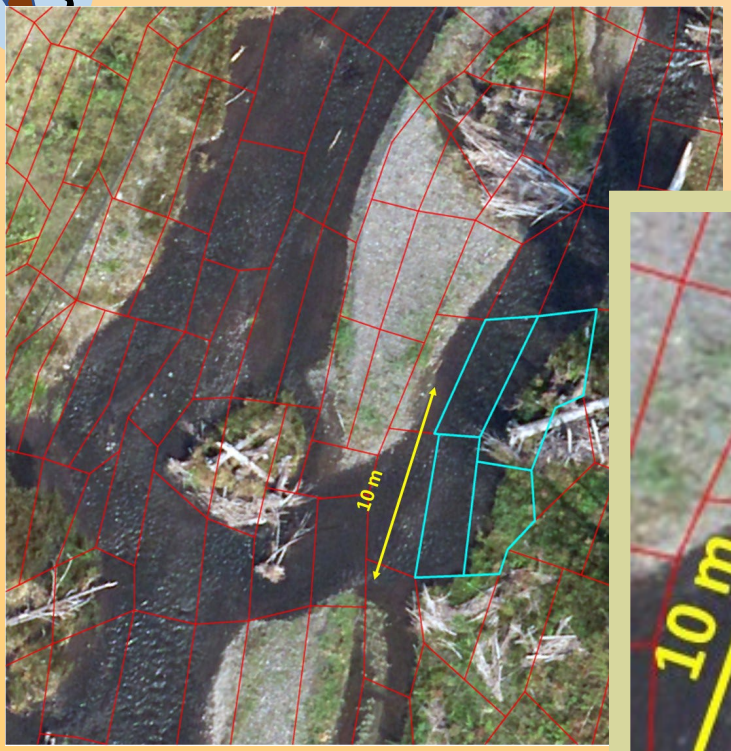
Clear Creek II (all-remote)





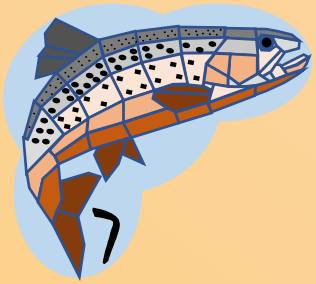
Whychus (alternative all-remote)



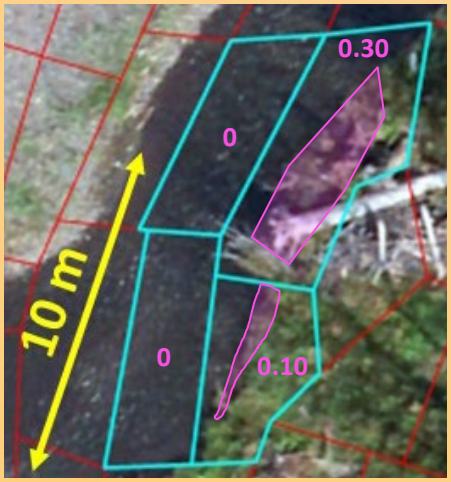


Flow direction

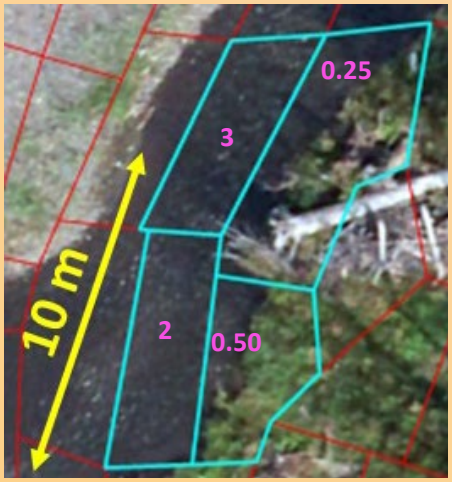
Photo taken two years later at lower discharge



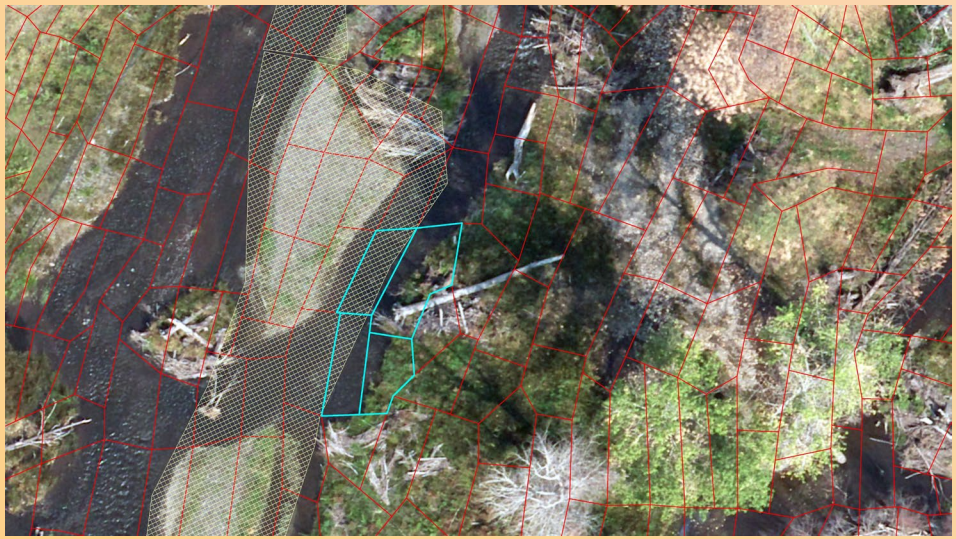
Velocity shelter
(proportion of area)



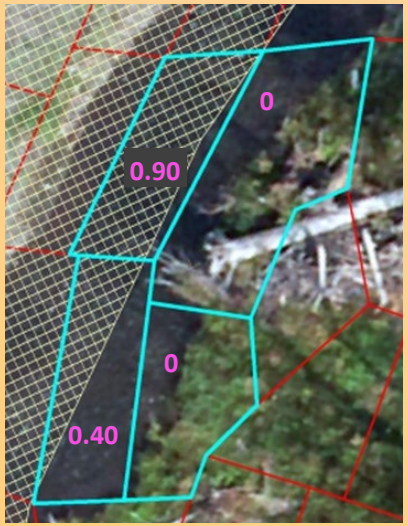
Distance to cover (m)



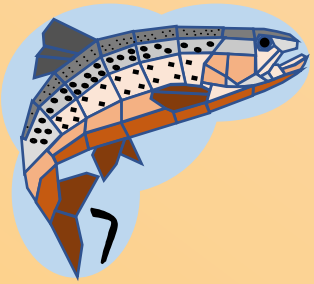
Hiding cover (count)

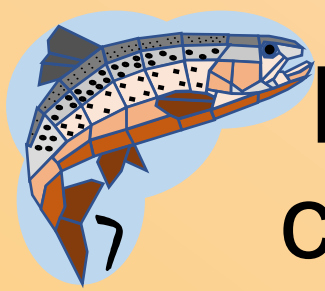


Spawning gravel
(proportion of area)



Calculated in ArcMap from
field-surveyed spawning beds





Finally: Generating habitat-cell characteristics for alternative habitat scenarios, some possibilities

- For the active channel, use habitat values for existing conditions where cells match up
- Assigning habitat values for new channel cells:
  - Categorize “New” channel cells to edge, near-edge and mid-channel zones
  - New wet cells assigned values via a random draw from cells in the appropriate zone (in the real channel)
- Assign habitat values to “bands” of new bank cells, based on real observations
- Assign habitat values to flood plain cells based on vegetation zone
- Adjust for any specific features of each scenario, e.g. adjust habitat variables for added wood