Predicting Sediment Regimes to Inform Prioritization of River Restoration

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Goals

- Develop a tool that:
  - Estimates sediment transport regimes along river corridor reaches, statewide
  - Uses data-driven approaches
  - Identifies reaches for restoration given objectives
  - Provides spatial visualization of results with dynamic updating

Sediment Transport Regimes

- Most interested in identifying regimes, where restoration / conservation could most effectively support a return to the natural regime

Valley Confinement	Sediment Transport Regime	Slope	Valley Confinement Ratio	Incision Ratio	Entrenchment Ratio	Width/Depth Ratio
Confined	Transport	≥ 2 %	< 6	< 1.3	< 1.4 (< 2.2)	< 12 (A, G) > 12 (F, B)
Partly Confined	Confined Source & Transport		≥ 1	> 1.3		
Unconfined	Unconfined Source & Transport	< 4 %	≥ 4		> 2.2	< 30 < 12 (E)
	Fine Source & Transport and Coarse Deposition	< 2 %				> 30 (B, C) > 12 (E) > 40 (D)
	Coarse Equilibrium & Fine Deposition			< 1.3		< 30 (C) < 12 (E)
	Deposition	> 1 %	≥ 6	1.0		> 30 > 40

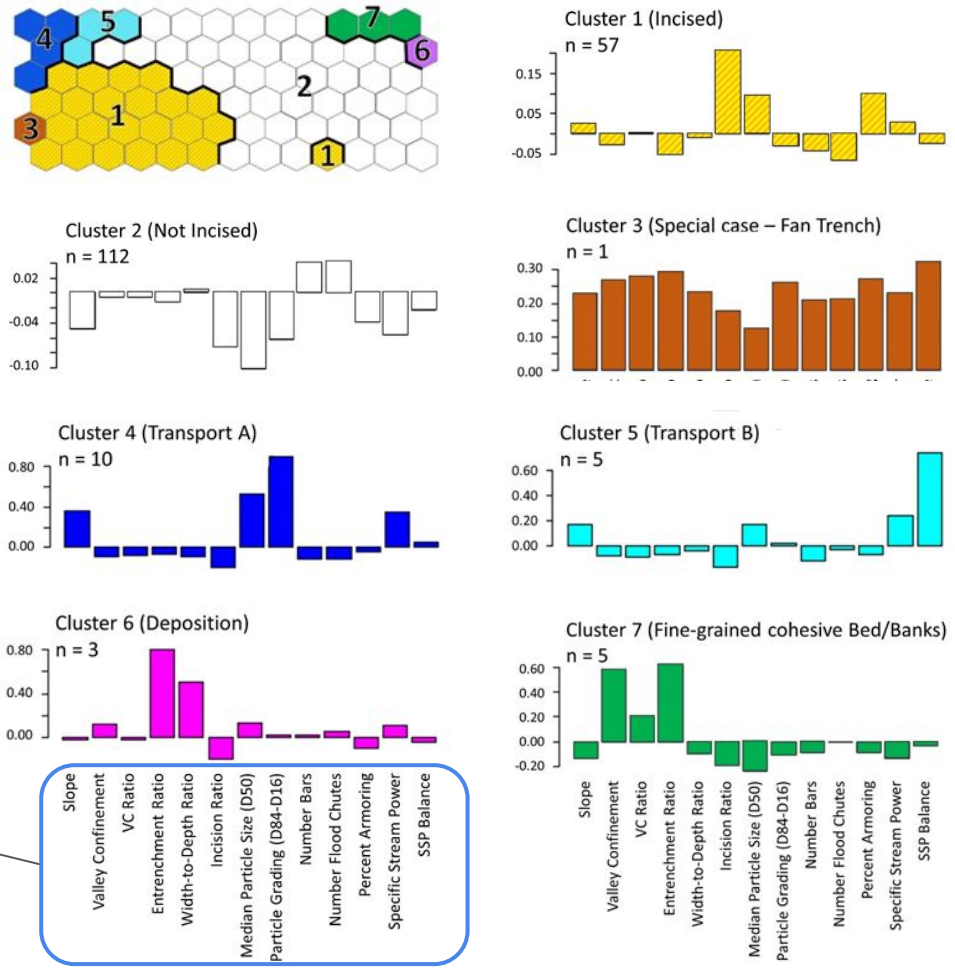
Kline, M. 2010. Vermont ANR River Corridor Planning Guide: to Identify and Develop River Corridor Protection and Restoration Projects, 2nd edition. Vermont Agency of Natural Resources. Waterbury, Vermont.

Self Organizing Map

- Type of Artificial Neural Network
- Unsupervised learning
- Reduces dimensionality to 2D
- Used to cluster or to classify

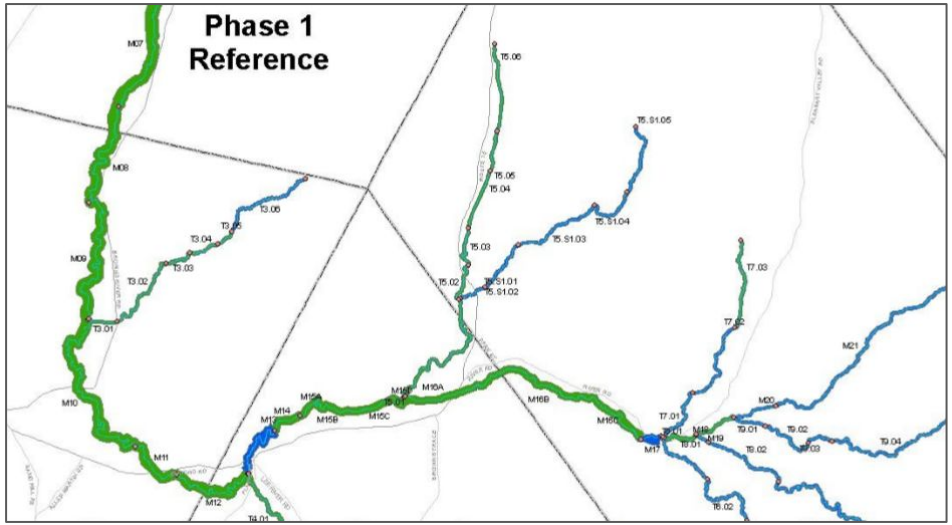
Data Inputs (13):

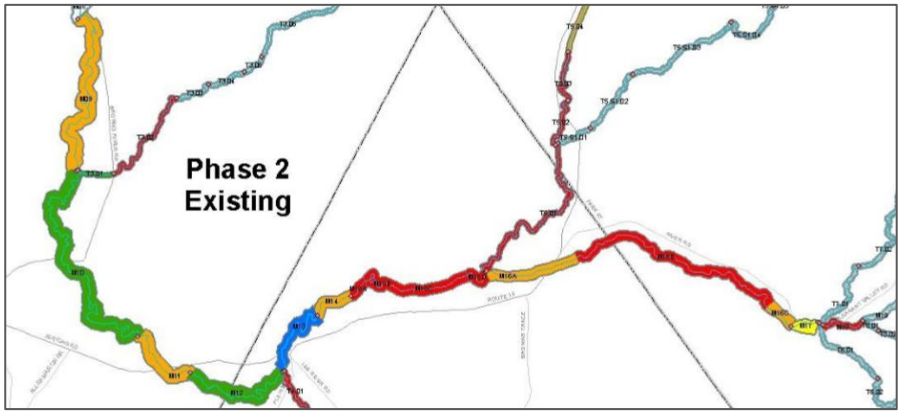
- Slope
- Valley Confinement
- Width-to-Depth Ratio
- Incision Ratio
- etc...



Underwood, et al, 2018 (in preparation)

SOM Regime Prediction





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Optimizing Locations with Ecosystem Services

Objectives:

1. Cost
2. Regime Type
3. Upstream of community
4. Proximity to other restored reaches
5. Land Use: Agriculture (Corn, pasture, hay)
6. Public access (recreation)
7. etc...

Thanks!

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