

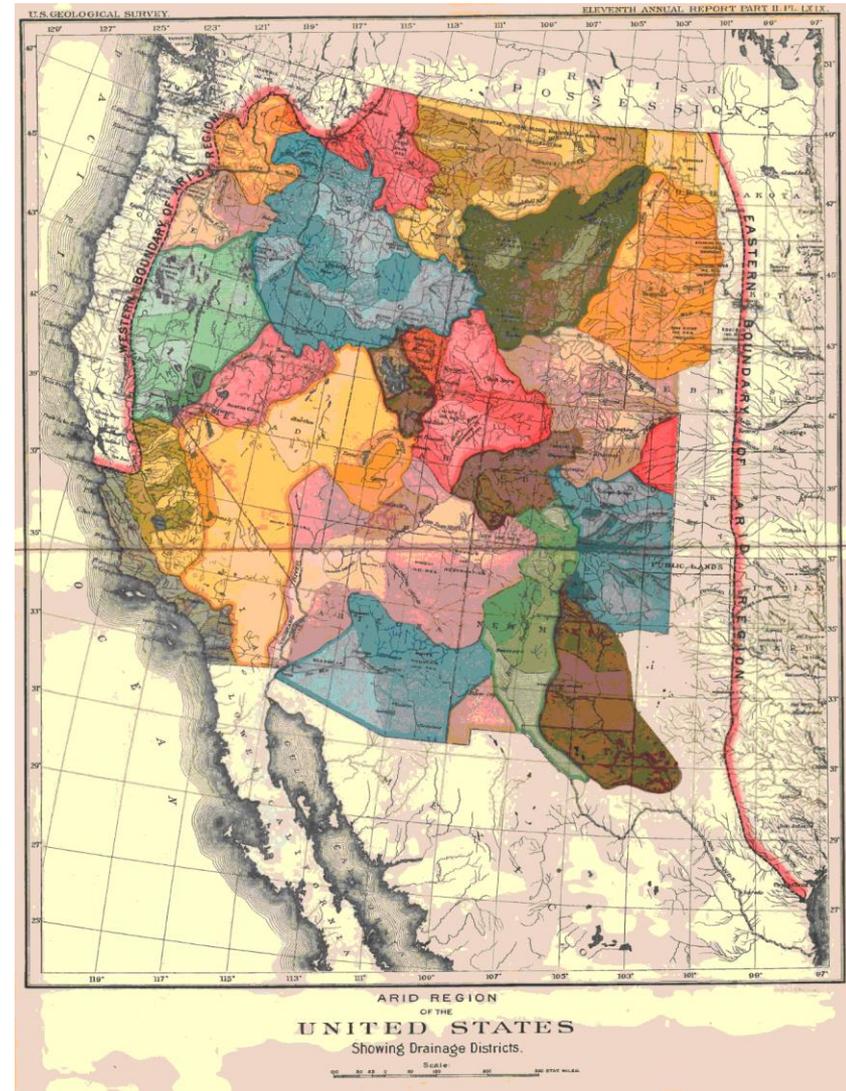


Integrated data and tools for WCA scoping – Fort Collins, CO Sept 6-7, 2017

Bottom-up: scaling, sampling and lessons learned

David M. Theobald, PhD
Ian Leinwand
Conservation Science Partners, Inc.

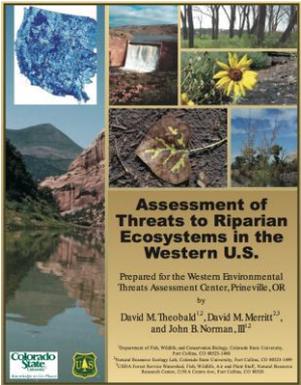
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davet@csp-inc.org

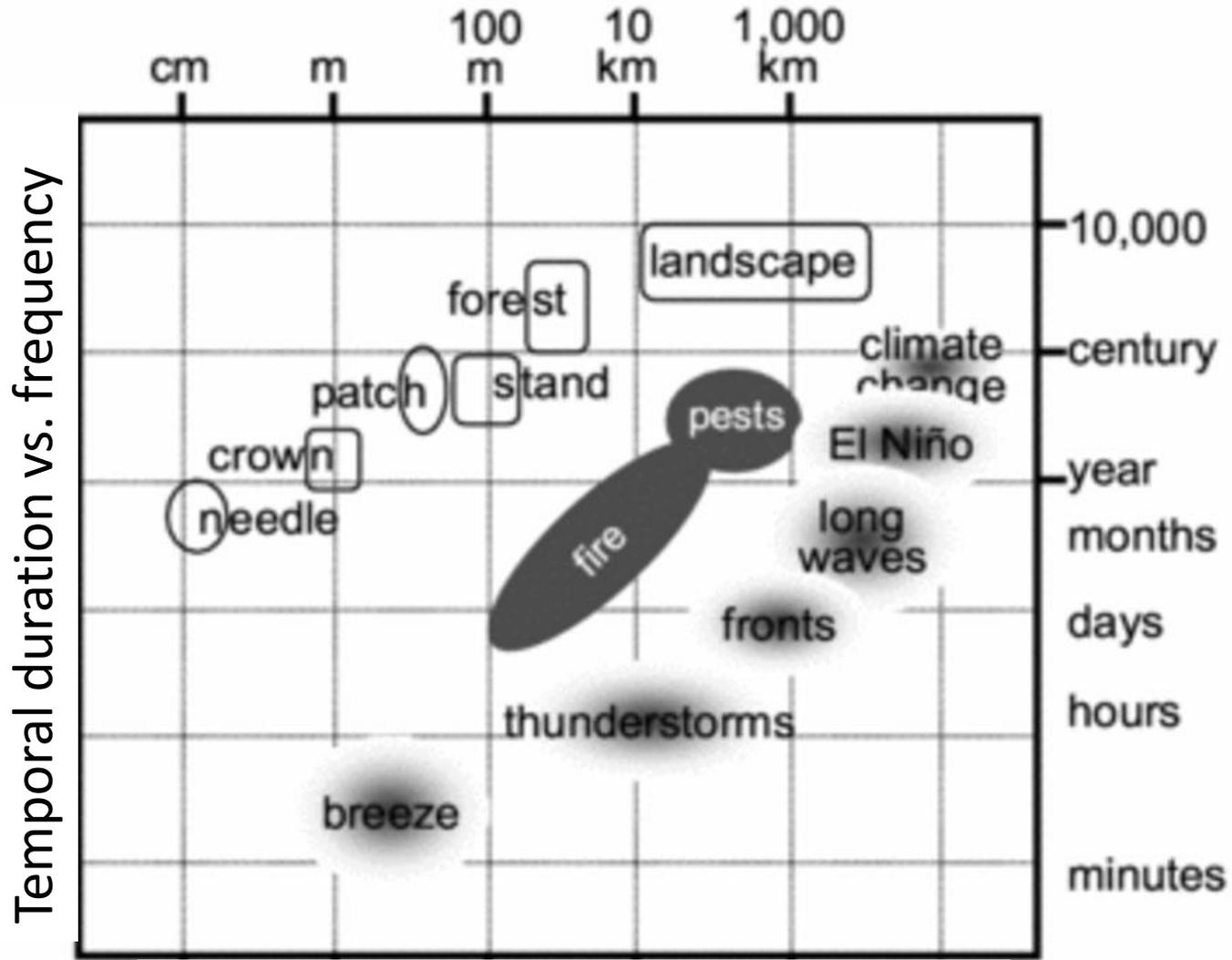




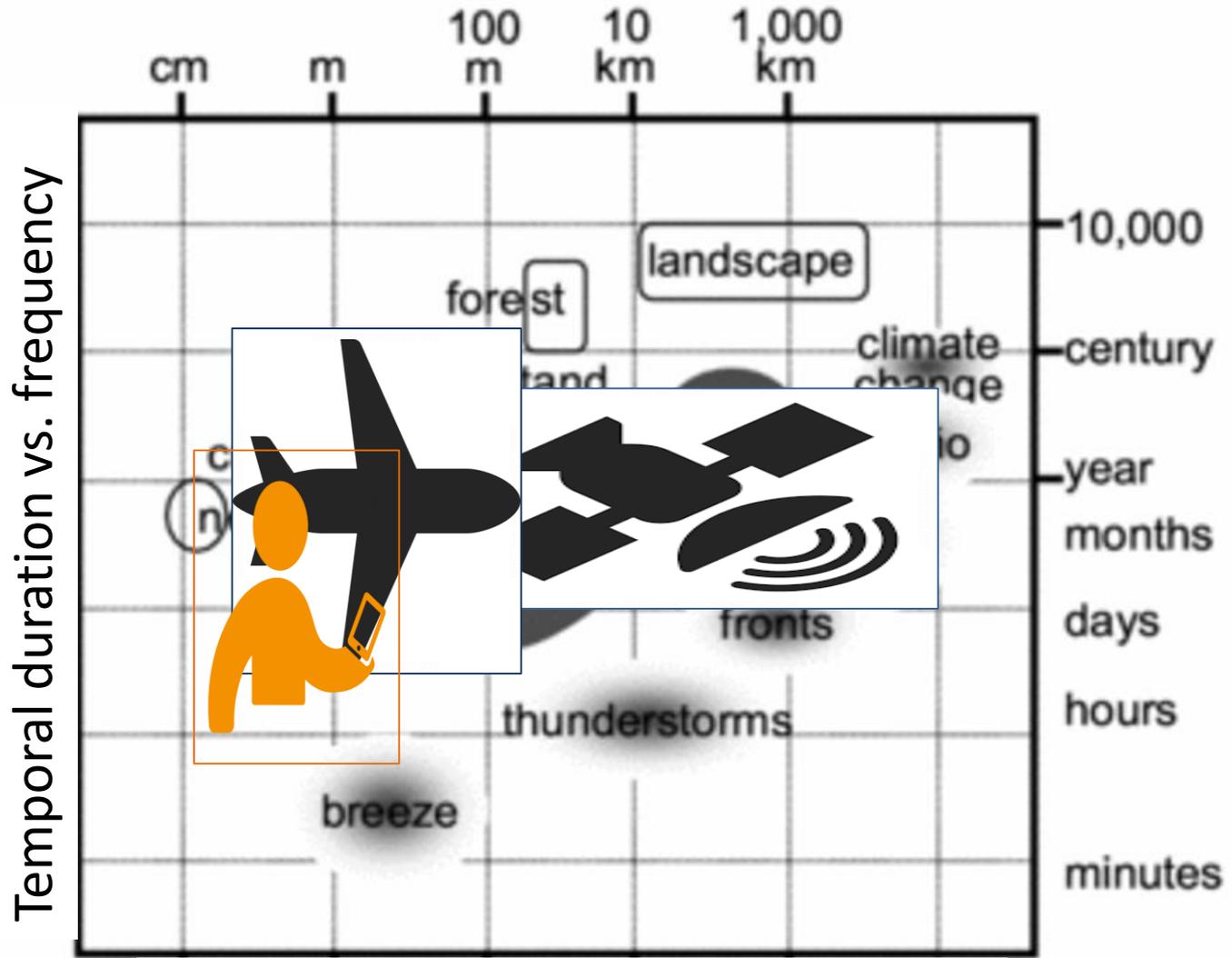
Process → mechanism → measurement

Hydrological process	Mechanism of ecological influence (Allan 2004)	Variable
Upland	<i>Sedimentation due to human modification</i>	Slope-weighted human modification
?	<i>Nutrient enrichment</i>	Nitrogen and phosphorus
?	<i>Contaminant pollution</i>	Biological impairment
?	<i>Oil & gas exposure</i>	Vulnerability to potential breaches by wells and holding ponds
Lateral	<i>Riparian clearing/canopy opening</i>	Human modification
Longitudinal	<i>Hydrological alteration</i>	Flow Modification Index
?	<i>Accumulated road-stream crossings</i>	Accumulated road-stream crossings density
?	<i>Timing of snowmelt discharge*</i>	Timing of snowmelt discharge*
<i>Thermal alteration</i>	<i>Stream temperature warming*</i>	Stream temperature warming*



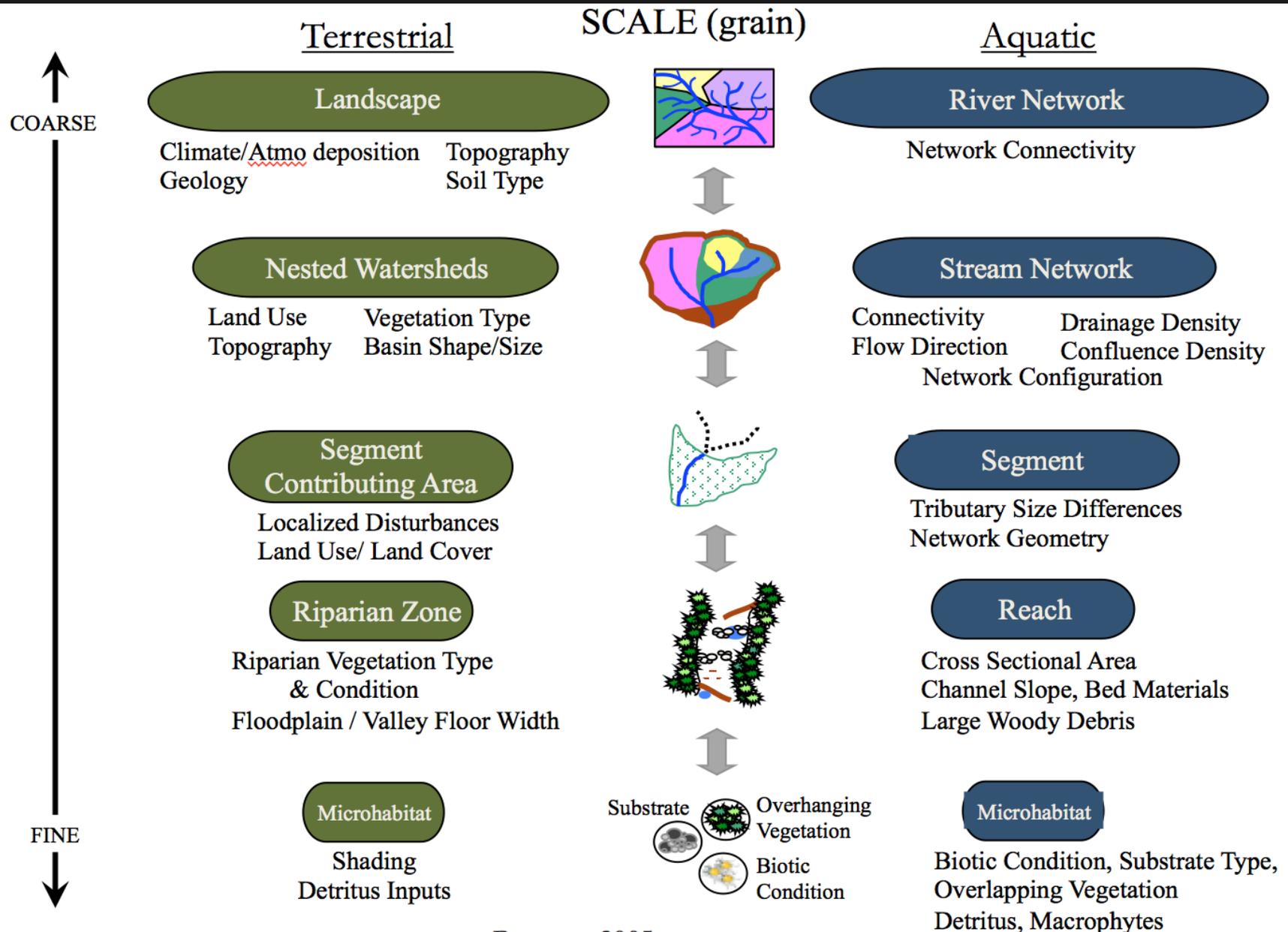


Spatial extent vs. grain (resolution)



Spatial extent vs. grain (resolution)

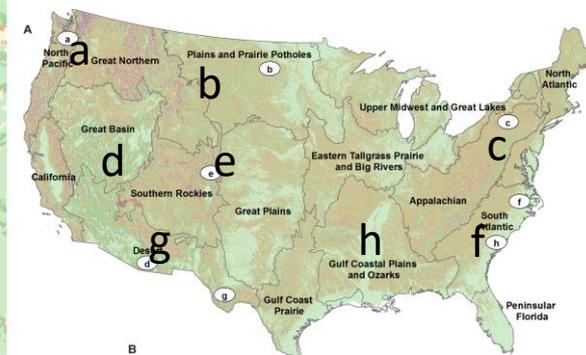
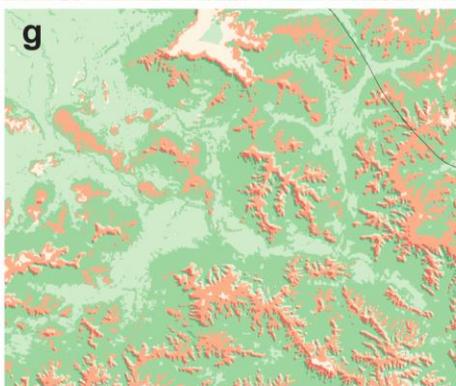
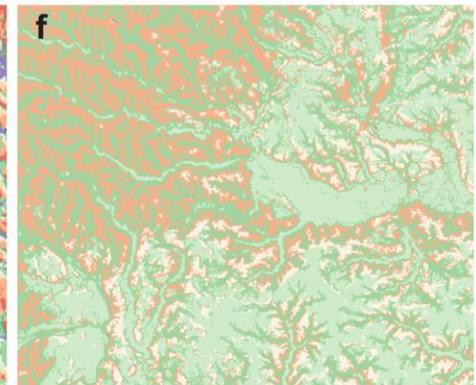
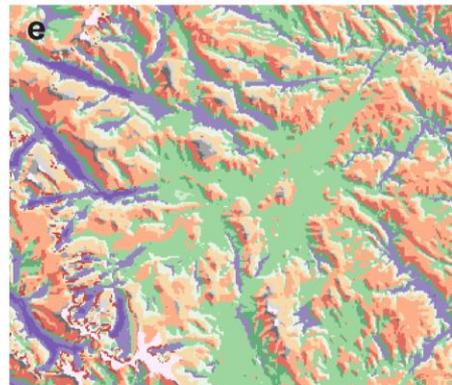
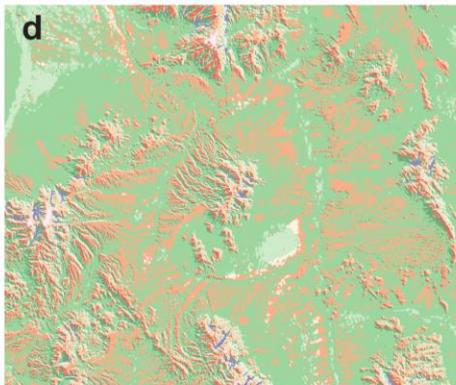
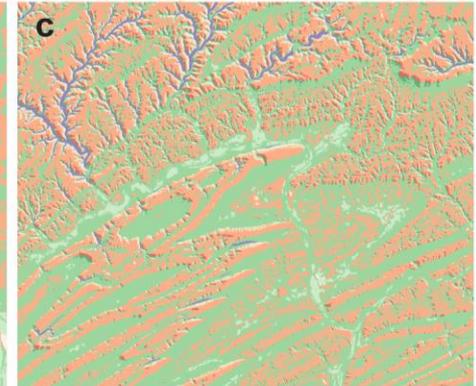
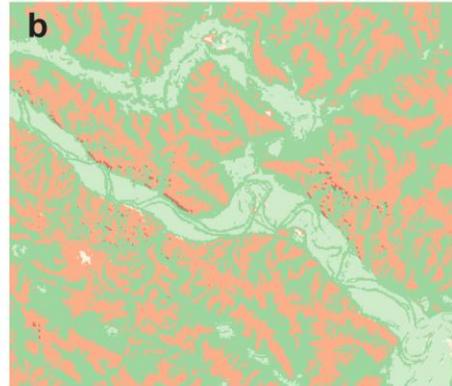
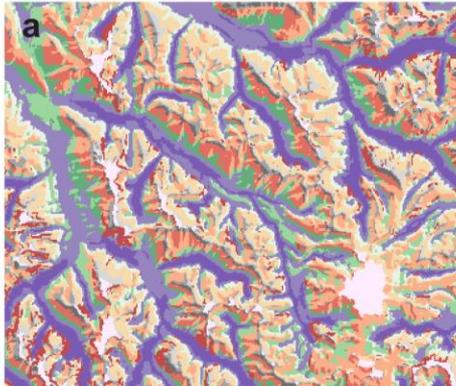
Scale up using hierarchical analytical units





Ecologically-relevant Geophysical (ERGo) Landforms

-  Mountain/divide
-  Peak/ridge (cool)
-  Peak/ridge
-  Peak/ridge (warm)
-  Cliff
-  Upper slope (flat)
-  Upper slope (cool)
-  Upper slope
-  Upper slope (warm)
-  Lower slope (flat)
-  Lower slope (cool)
-  Lower slope
-  Lower slope (warm)
-  Valley
-  Valley (narrow)



Test and validate using rigorous sample design



GLUED gRRQRRv1_US_5k prob 1-500

Imported at Mon Aug 03 11:51:14 PDT 2015 from GLUED gRRQRRv1_US_5k prob 1-500.

Edited at 8:51 PM

File Edit Tools Help

Rows 1

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Map of Latitude

Filter No filters applied

Configure map

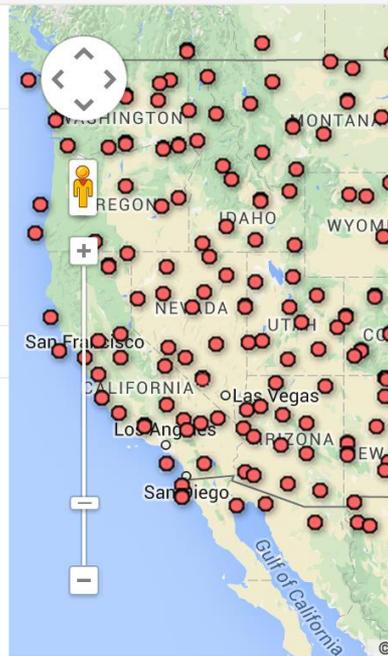
Location Latitude

Feature map

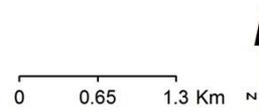
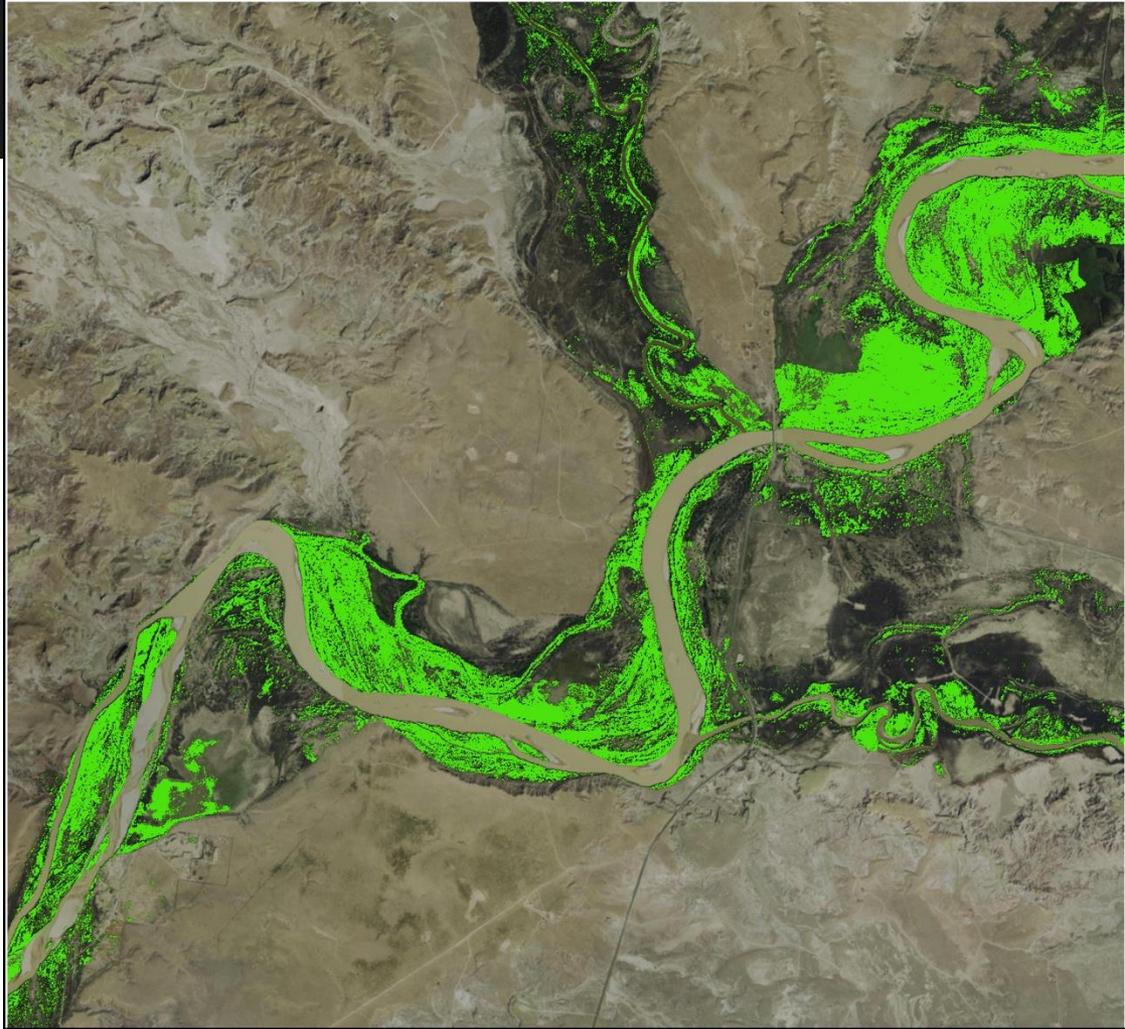
Change feature styles...

Change info window...

Heatmap



All lands



Legend

 Riparian vegetation

Freshwater Integrity

Green River Basin
Landscape Conservation Design





Analytical framework to identify *Conservation Opportunity Areas*

