



A More Functions-Based Stream Assessment and Classification System for Oregon



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Stream Mitigation in Oregon

- Why do we need a different approach?
 - USEPA/USACE Compensatory Mitigation Rule, Oregon Removal Fill Law
- What do we need to make that approach scientifically robust yet practicable to apply?
 - tools, policy and process to develop a stream mitigation framework



MILESTONE	STATUS
Stream Classification System	Complete (internal review)
Conceptual Assessment Methodology	Complete
Draft Assessment Methodology (revisions ongoing)	Complete
Method Field Testing	Fall 2013 Spring 2014
Final Assessment Methodology (v1.0)	Summer 2014
Program Development	Ongoing
Capacity Building/Outreach (internal/external)	Ongoing



Draft Stream Assessment Tool

- Does the tool structure promote regulatory goals?
 - Consideration of stream function and services
 - Broadly applicable (statewide, watershed approach, range of project scales)
- Is the tool likely to achieve these goals?



Consideration of Functions

CATEGORY	Hydrologic	Geomorphic	Biologic	Chemical/Nutrient
FUNCTIONS	Surface Water Storage	Sediment Continuity	Maintain Biodiversity	Nutrient Cycling
	Sub/surface Transfer	Substrate Mobility	Create Habit Aquatic/Riparian	Chemical Regulation
	Flow Variation		Sustain Tropic Structure	Thermal Regulation



Consideration of Ecological Functions

- Regulatory criteria
 - ✓ Rapid
 - ✓ Repeatable
 - ✓ Science-based
- Difficult to truly assess function and meet these criteria
- Focus turned toward highly-correlated indicators



Function – Attribute - Measure

Function	Attribute	Measure
Surface Water Storage	Overbank flow	Visual analysis for presence/absence of field indicators
	Entrenchment	Ratio of height of active channel width to height of floodplain/terrace
	Exclusion	Percent of floodplain excluded from inundation due to levees, roads or railroads, channel entrenchment, other structures



One measure may inform the assessment of multiple functions

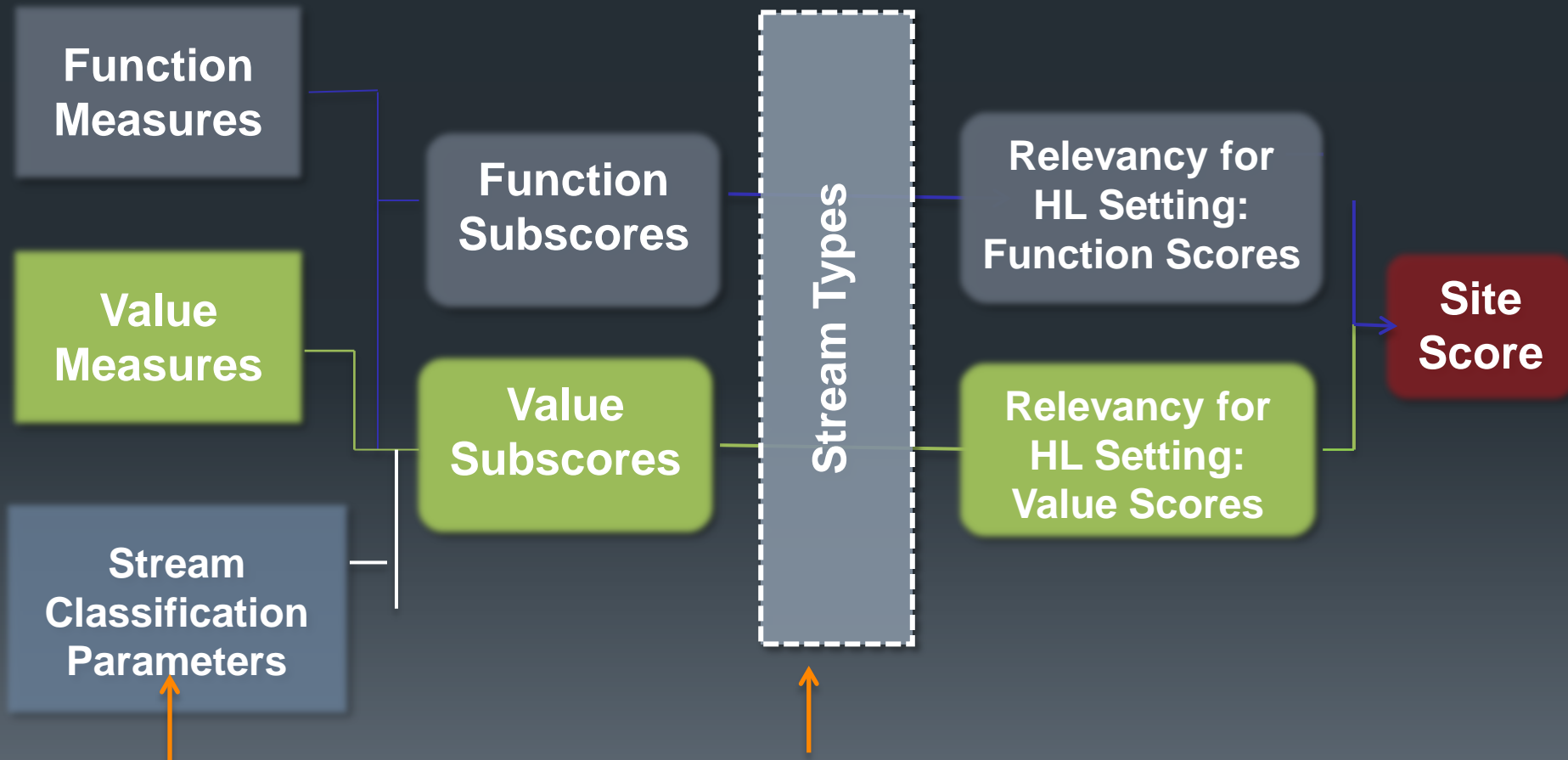
Example Measure = Exclusion

Informed Functions:

- Surface water storage
- Sub/Surface water transfer
- Maintain biodiversity
- Create & maintain habitat
- Nutrient cycling
- Chemical regulation



Statewide/Watershed approach





Stream classification system for Oregon

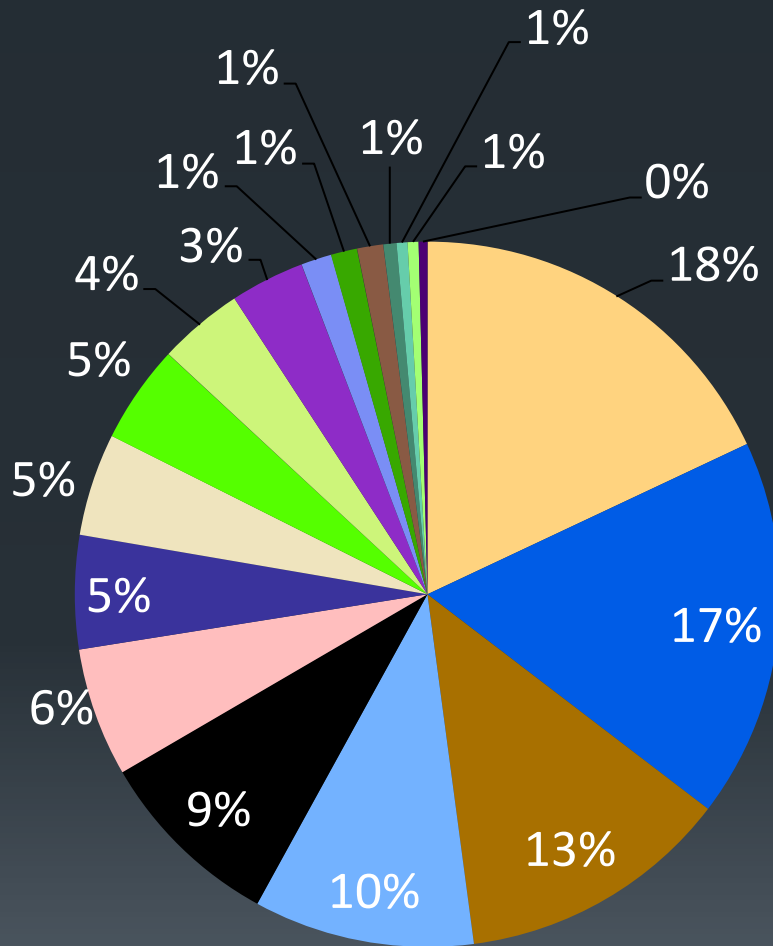
- Builds on USEPA Dualistic Stream Classification System and Oregon Hydrologic Landscapes (Wigington et al. 2012)
 - ✓ 5420 stream reaches with watershed data
- Stream types based on common parameter values
 - ✓ Used 4 watershed and 2 local scale parameters
 - ✓ 17 tier-one stream types



Stream Classification Rule Set

Watershed	Local
Terrain (Mountain, Transitional, Flat)	Terrain (Mountain, Transitional, Flat)
Surplus (<i>water availability</i>) (Wet/Dry)	Climate (Wet, Dry)
Seasonality (<i>season of water availability</i>) Fall Winter, Spring Summer)	
Aquifer Permeability (Low, Permeable)	

Stream Type Distribution: Percent of all stream segments in Oregon



- Mountain Dry
- Mountain Wet Rain Impermeable
- Transitional Dry
- Mountain Wet Rain Permeable
- Unclassified
- Mountain Wet / Locally Mountain Dry
- Mountain Wet Rain / Valley Wet
- Mountain Dry / Valley Dry
- Mountain Wet Snow Permeable
- Mountain Wet Rain / Valley Dry
- Transitional Wet Rain Permeable
- Valley Wet
- Mountain Wet Snow Impermeable
- Valley Dry
- Transitional Wet Rain Impermeable
- Mountain Wet Snow / Valley Wet
- Mountain Wet Snow / Valley Dry
- Transitional Wet Snow Permeable



Testing the Stream Assessment Tool

Is the tool likely to achieve the goals?

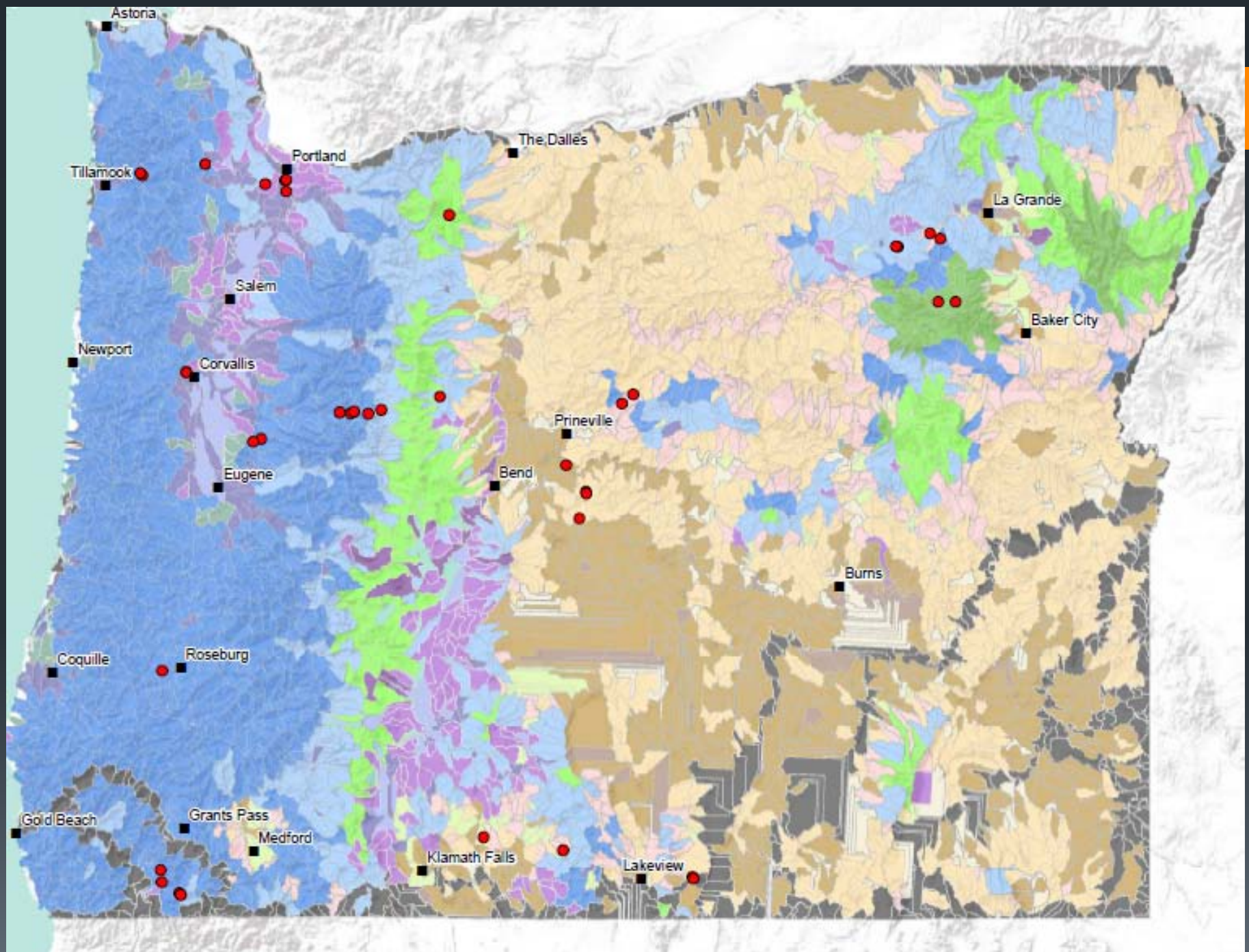
- Can the measures selected be reasonably assessed in the field?
- Do the scores reflect our expectations?
- Is the tool broadly applicable?



Testing Design—Fall 2013

Test site distribution based on:

- ✓ Climate
- ✓ Synthetic stream order
- ✓ Land use
- ✓ Stream gradient
- ✓ Flow duration
- ✓ Stream types





Findings after fall season testing

- Sampling occurred across the geography of Oregon and in different stream types
- The measures capture key features and processes of the reaches evaluated
- The measures could be evaluated at most reaches



Findings after fall season testing

- Field methods are strongest for wadeable, alluvial, 2nd-3rd order streams with distinct floodplains.
- Clarification in methods is needed for:
 - Dry streams—instream measures
 - Ephemeral streams—scale of features
 - Larger rivers—scale & instream measures



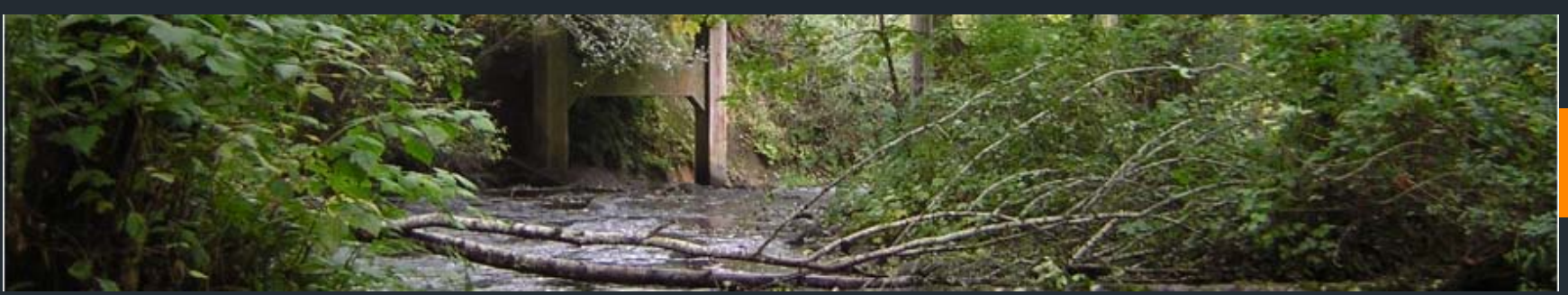
Findings after fall season testing

- Some measures were not applicable at most of the reaches tested.
- Clarity and consistency in the wording of questions is needed.



Conclusions

- Functions and values are assessed using defensible measures.
- The tool can be applied to streams statewide (with some modifications).
- A watershed approach is incorporated through the stream types and measures that consider the contributing watershed.
- The tool requires a reasonable amount of effort and experience to use.



Potential adjustments

- Reliance on BPJ or repeatable measures?

- Big picture question

“Under natural conditions, can the channel migrate?”

- Detailed method to evaluate

“What percent of the length of the sum of both sides of the reach is constrained from lateral migration by intentional structures or features?”



Next Steps

- Review function and value scores from test sites against BPJ of technical advisors
- Scoring adjustments to reflect contribution of the hydrologic landscape setting/other factors
- Clarify wording and methods
- Determine sample locations for spring season



Next steps

- Repeatability analysis
- Sensitivity analysis
- Complete spring season field testing
- Crosswalk to NMFS' Habitat Equivalency Analysis
- Revise Method; Release for beta testing



Next Steps for Program Implementation

- Regulatory Framework Development
 - ✓ Program policy elements: site selection, crediting/debiting, performance standards, etc.
 - ✓ Outreach & Training
 - ✓ All required tools, materials and data are publically available



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