

Preliminary Results from the BLM's Western Rivers and Streams Assessment: An AIM Project

Scott Miller¹, Jennifer Courtwright¹ Sarah Judson¹, Steven Paulsen², Anthony Olsen² and Philip Kauffmann²

¹BLM/USU National Aquatic Monitoring Center

²Western Ecology Division, National Health and Environmental Effects Research Laboratory, U.S. Environmental Protection Agency



UtahStateUniversity



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The need for periodic assessment

- FLPMA
 - Multiple-use mandate
 - Protect long-term health (+CWA)
 - Periodic condition assessment and reporting (+CWA)



The need for periodic assessment

BLM multi-scale data needs:

- Permit renewals
- RMP effectiveness
- State-wide reporting
- Ecoregional assessments
- Bureau-wide

Scale

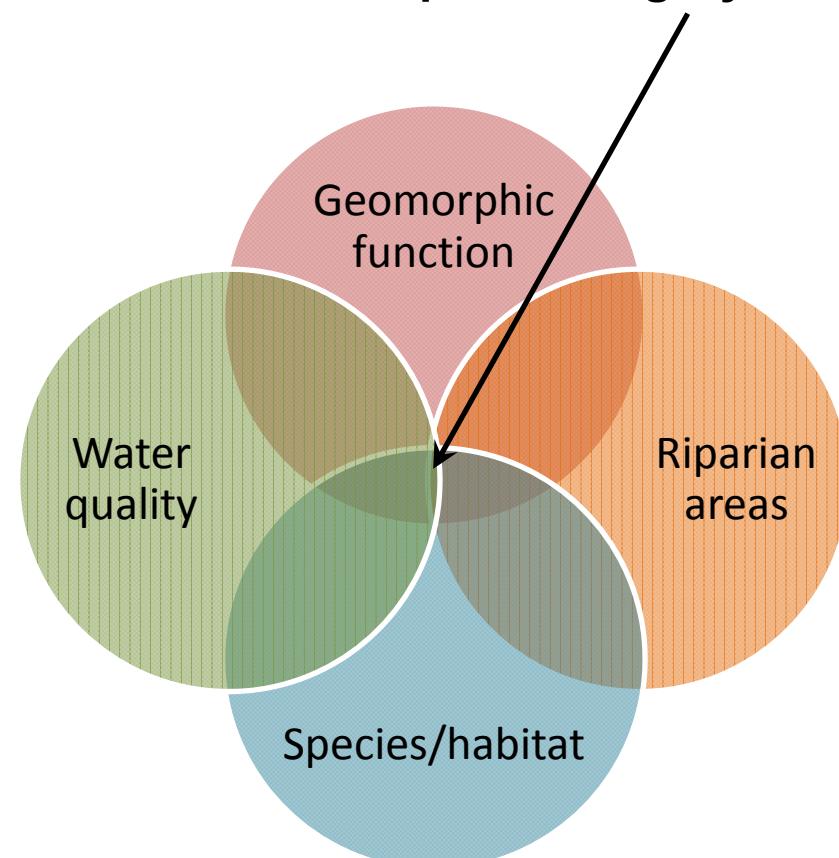


The need for periodic assessment

Fundamentals of Land Health: Aquatic Integrity

BLM multi-scale data
needs:

- Permit renewals
- RMP effectiveness
Jimenez (350) 10:40
- State-wide reporting
- Ecoregional
assessments
- Bureau-wide



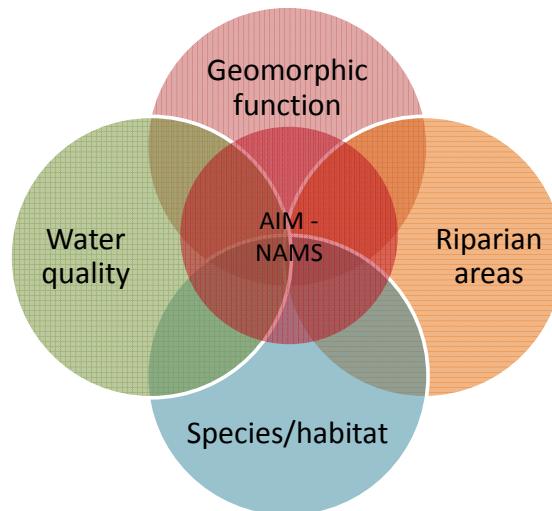
AIM – National Aquatic Monitoring Framework

BLM

AIM - Assessment, Inventory, and Monitoring

A comprehensive, multi-program approach following AIM

- Quantitative core indicators and methodologies
- Statistically valid sampling frameworks
- Data acquisition and management plans
- Analytical tools



BLM: Western, Rivers and Streams Assessment

1. What % of BLM streams/rivers have minimal, moderate or significant departure from reference condition for:
 - a. Species/habitats;
 - b. Water quality;
 - c. Geomorphic processes; and
 - d. Riparian processes?
2. What is the risk posed by observed stressors (e.g., excessive nutrient, salinity, sediment loading) to biological condition?
3. *Has stream and river condition shifted in a direction indicating improved or declining condition through time (i.e., trend)?*



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Methods: How were sites selected?

Survey design:

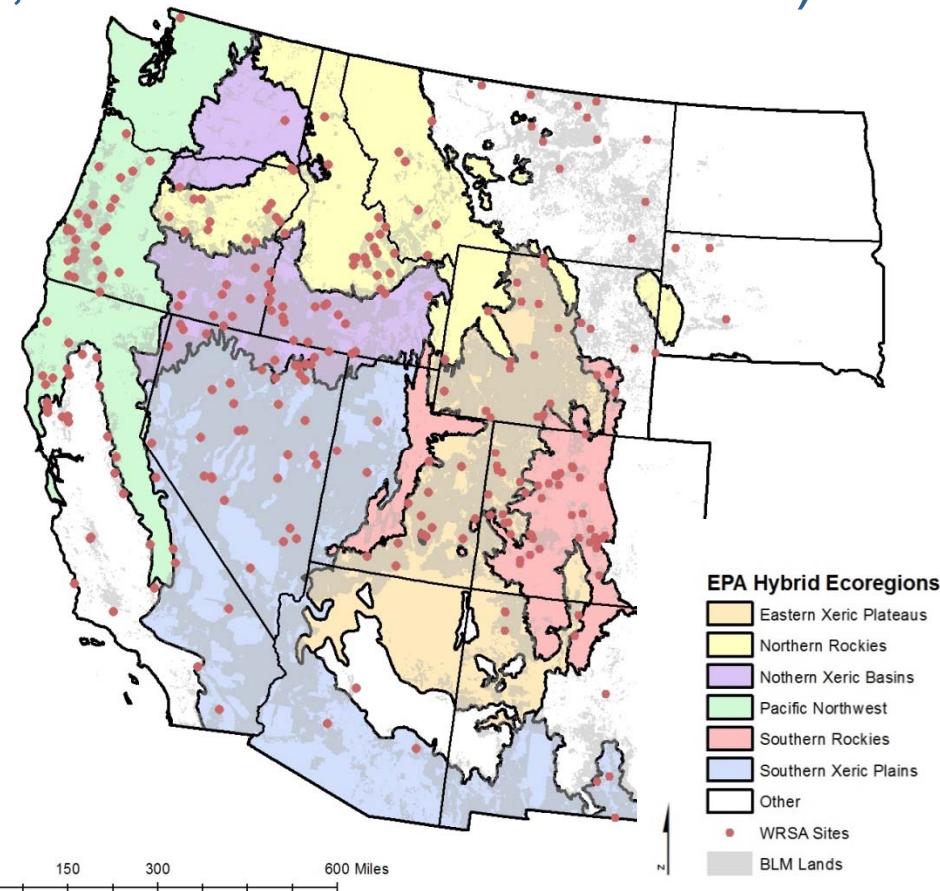
1. Target population = NHD streams and rivers on BLM lands (lower 48; wadeable + non-wadeable)



Methods: How were sites selected?

Survey design:

1. Target population = NHD streams and rivers on BLM lands (lower 48; wadeable + non-wadeable)
2. Probability-based design (GRTS):
~300 sites
 - a. Intensification of EPA NRSA (50+ BLM sites)
3. Stratified by hybrid level III ecoregions



Methods: What was measured?

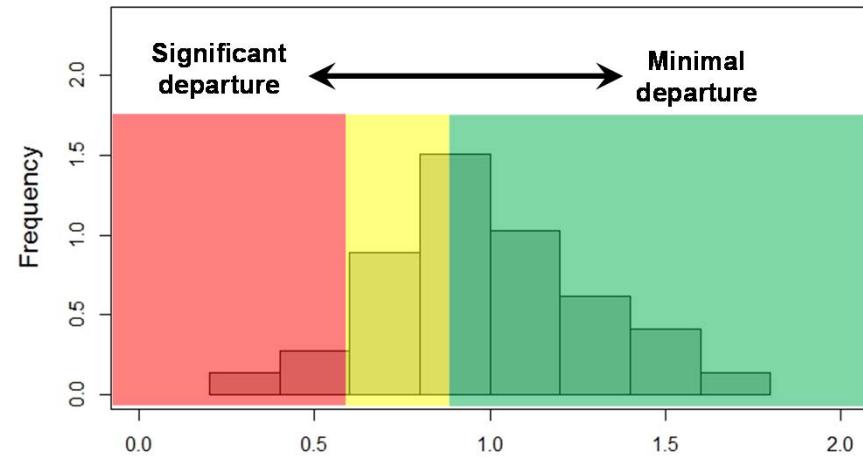
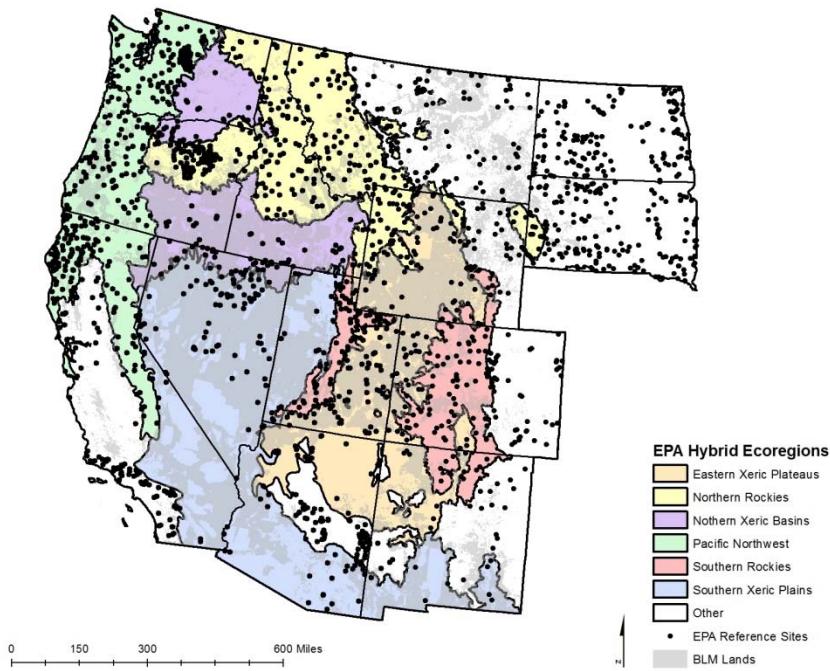
AIM-NAMF Aquatic Core Indicators

Land Health Fundamental	Indicator
Water quality	Acidity Salinity Temperature Total nitrogen and phosphorous
Watershed function and instream habitat quality	Residual pool depth, length and frequency Streambed particle sizes Bank stability and cover (+ bank angle) Floodplain connectivity Large woody debris Ocular est. of instream habitat complexity*Thalweg depth profile
Biodiversity / riparian habitat quality	Macroinvertebrate biological integrity Ocular est. of riparian vegetative cover and structure Canopy cover
Ecosystem function	See indicators from other fundamentals



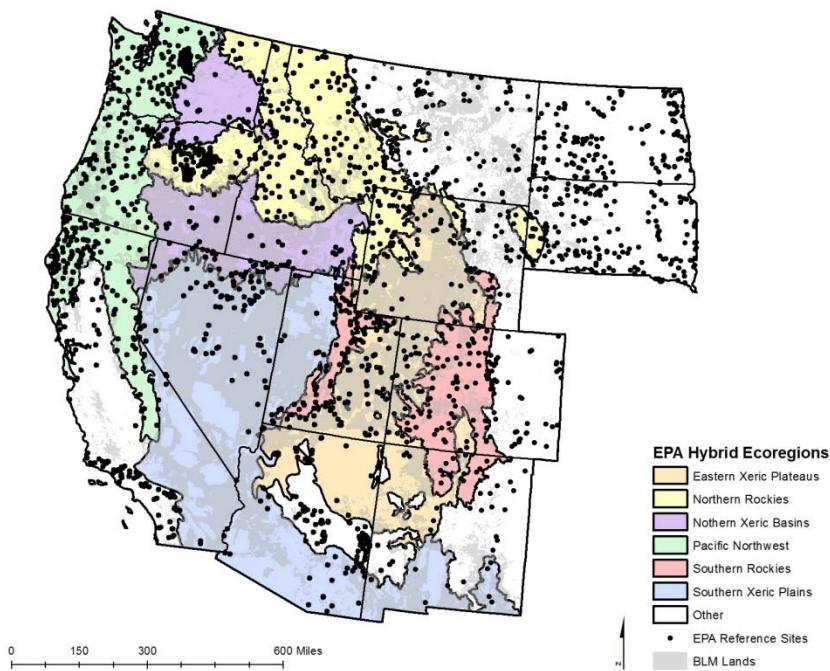
Methods: Setting expectations

- Used “Least disturbed conditions” (999 ref. sites) to establish condition classes (e.g., minimal, significant departure):
 - Condition class approaches account for natural spatial gradients**

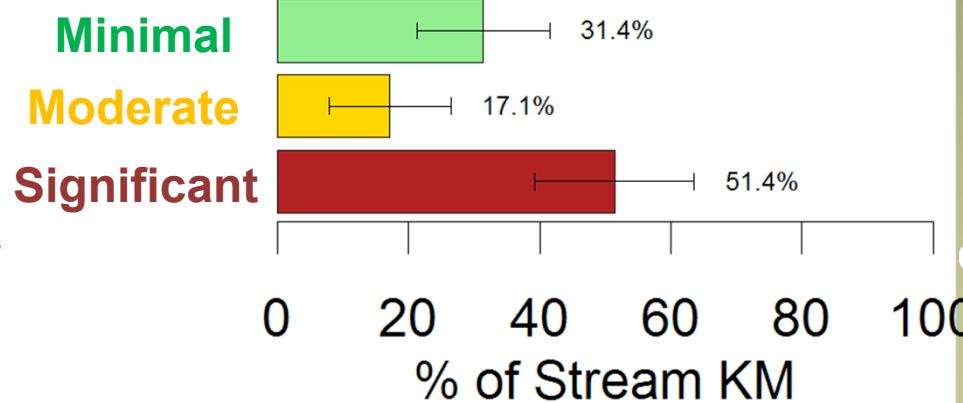


Methods: Setting expectations

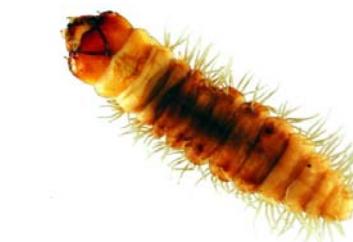
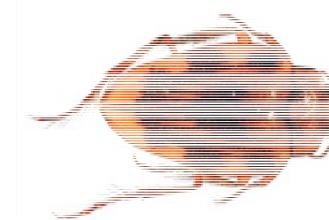
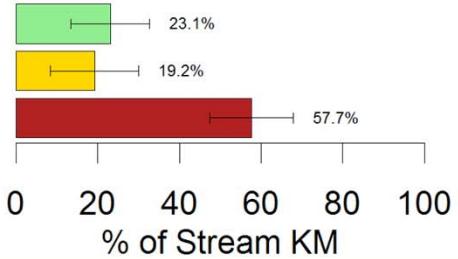
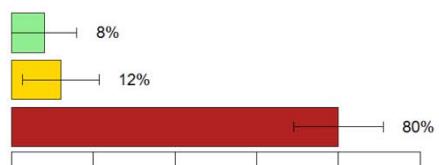
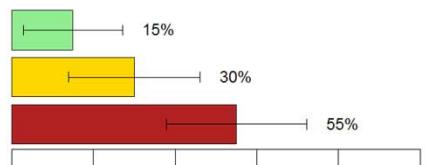
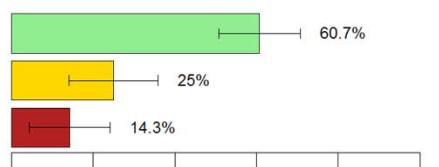
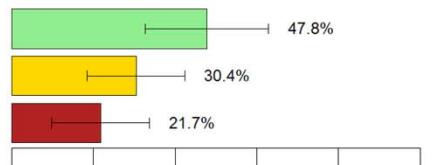
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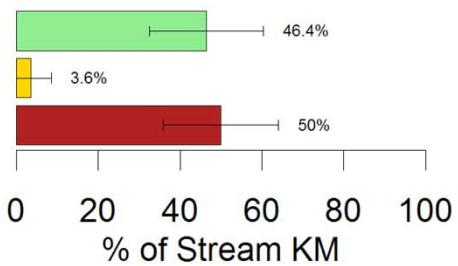
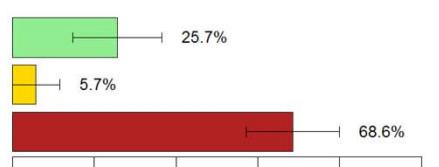
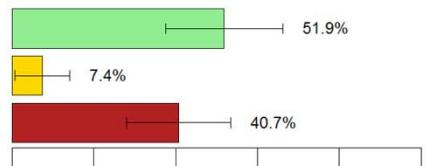
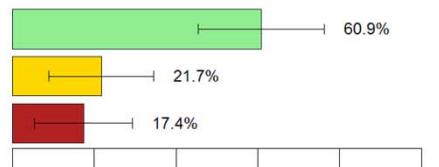
Departure from reference



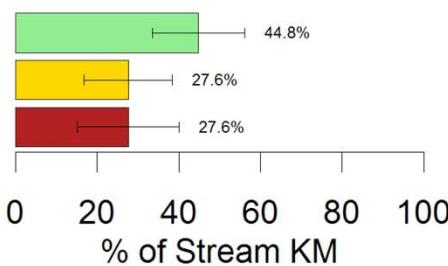
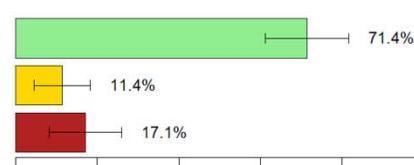
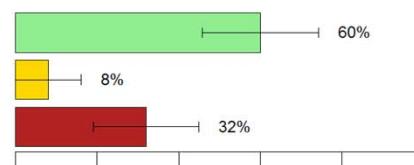
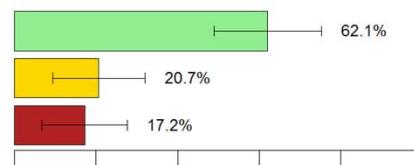
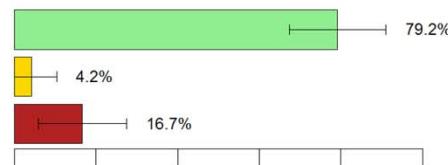
Results: Instream biological integrity



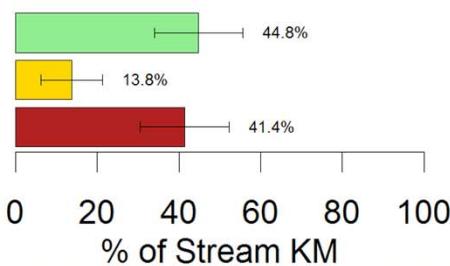
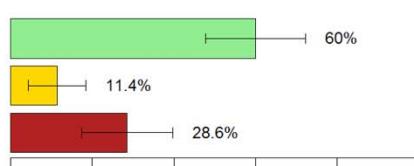
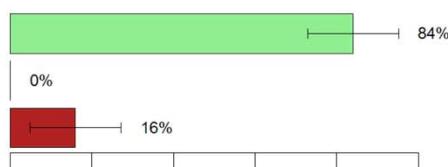
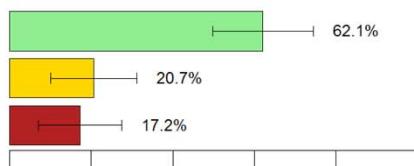
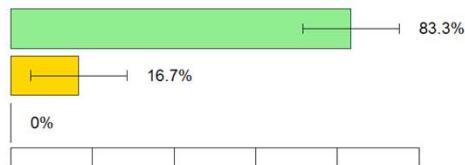
Results: Salinity



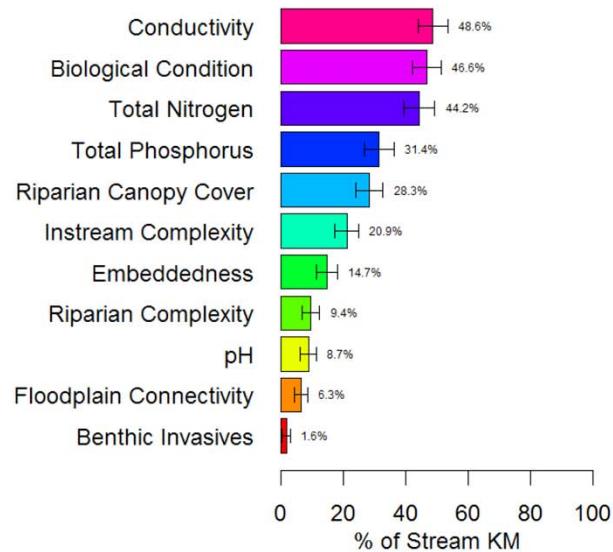
Results: Stream canopy cover



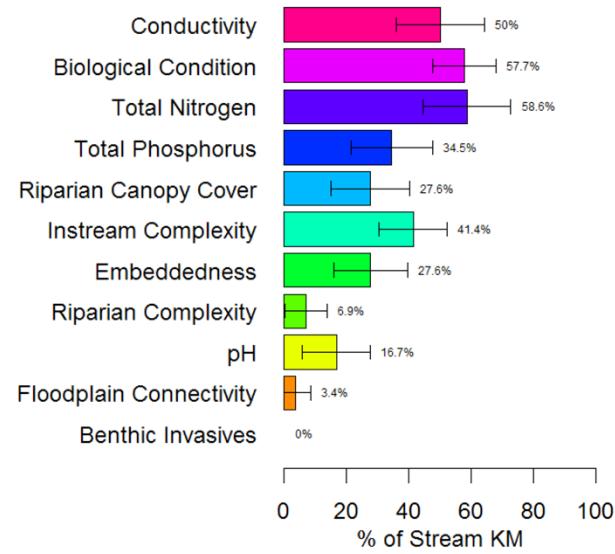
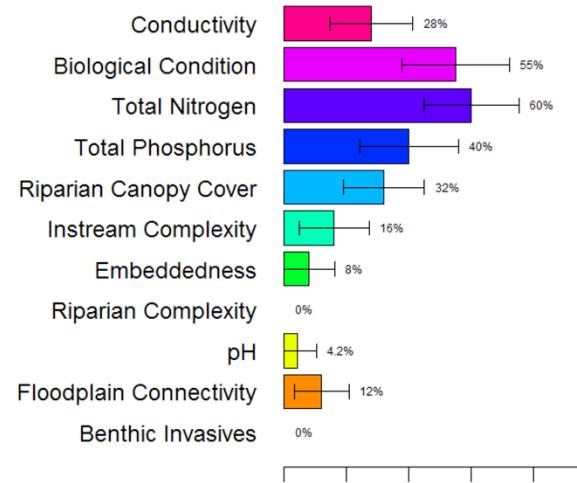
Results: Stream habitat complexity



Results: Extent of significant departure



Results: Extent of significant departure



Results: Prioritizing stressors – relative risk

Relative risk: association between macroinvertebrate condition and the condition of individual stressors:

$$RR = \frac{\text{Probability of poor biological condition given poor sediment condition}}{\text{Probability of poor biological condition given good sediment condition}}$$

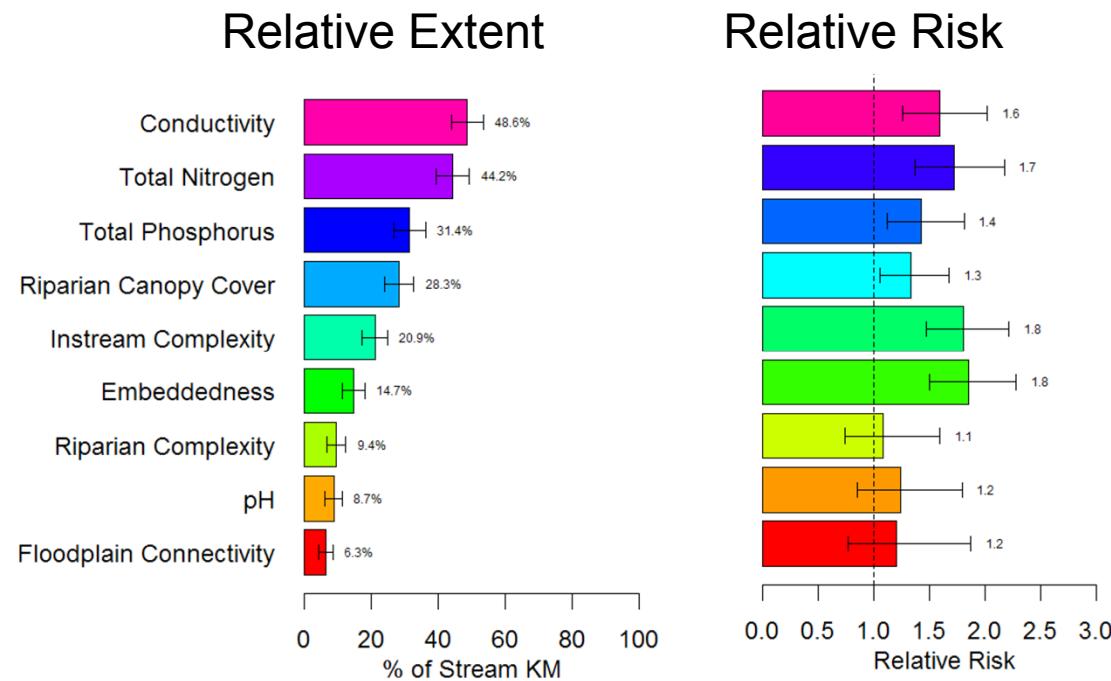
		Excessive sediment condition	
		Good	Poor
Biological condition	Good	200 km	50 km
	Poor	300 km	600 km

$$RR = \frac{600/(50+600)}{300/(200+300)} \quad \frac{0.92}{0.6} = 1.53$$

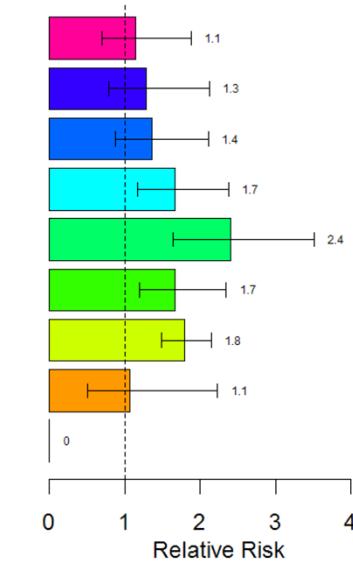
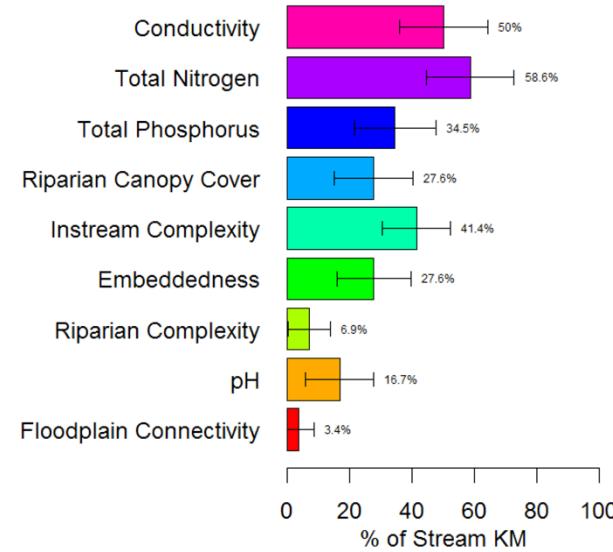
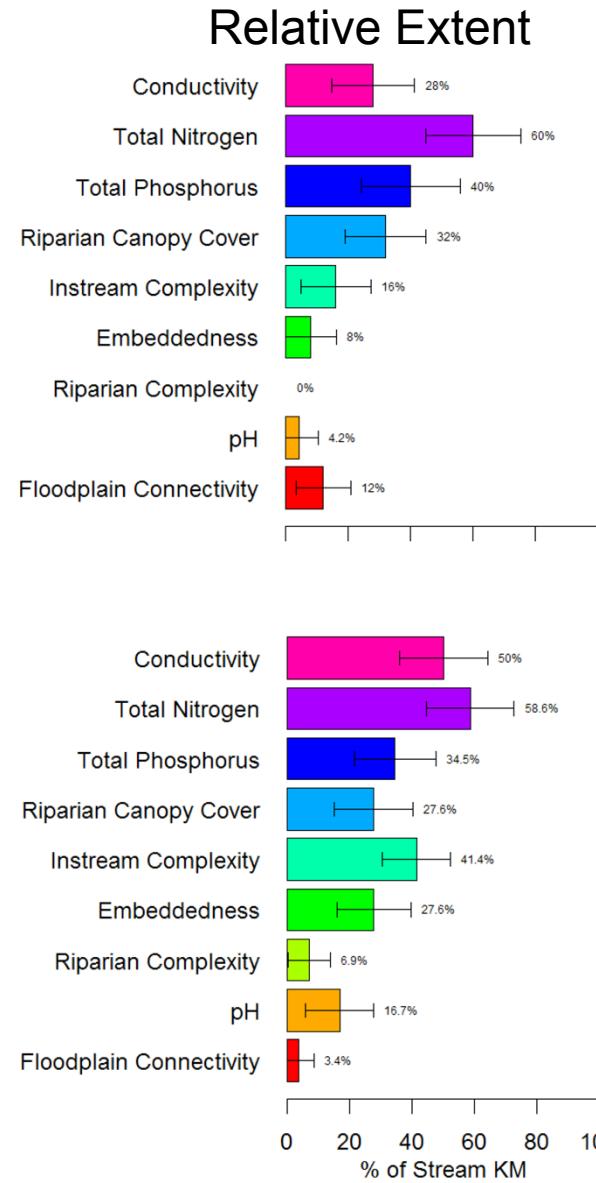
Stream is 1.53 times more likely to be in poor biological condition if sediment condition is also poor



Results: Prioritizing stressors – relative risk



Results: Prioritizing stressors – relative risk



Summary results

- Extent of potential impairment (VERY PRELIMINARY):
 - 47% degraded biological condition
 - 49% excessive salinity
 - 44% excessive nutrients
 - 28% reduced canopy cover
 - 21% reduced instream habitat complexity
 - > 27% have degraded biological condition + stressor

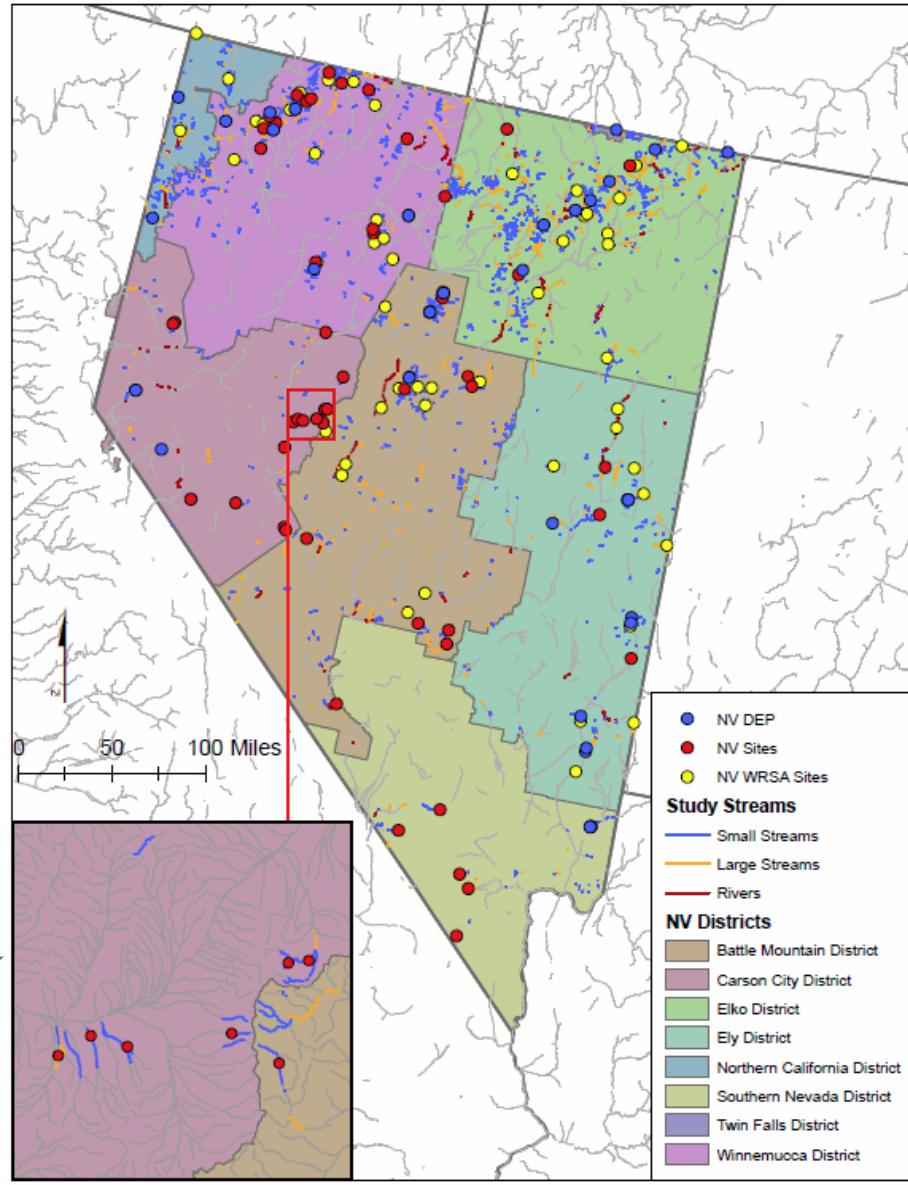


Benefits of applying the AIM principles

BLM multi-scale data needs:

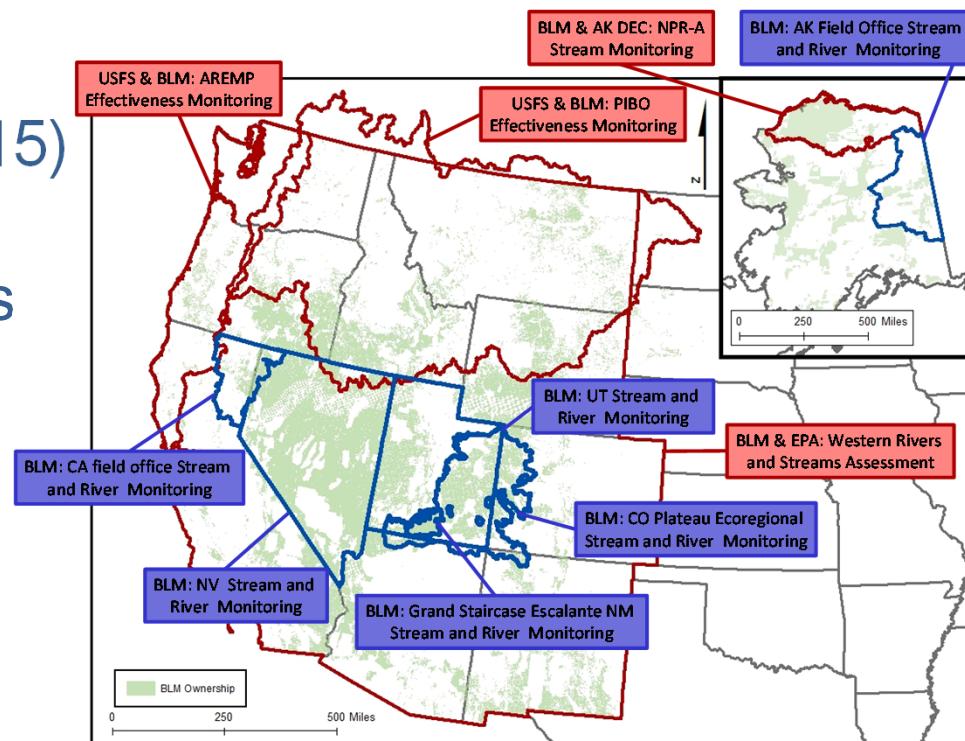
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AIM – NAMF next steps

- Complete WRSA sampling
2015
- Repeat WRSA in 3-5 years to
assess trends
- AIM-NAMF TN & TR (2015)
- State & FO-scale projects
from AK to NM



Questions...

BLM

AIM - Assessment, Inventory, and Monitoring

