



Coeur d'Alene, Idaho
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The Path to Biocriteria in Oregon

Presented by

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Path to Biocriteria in Oregon



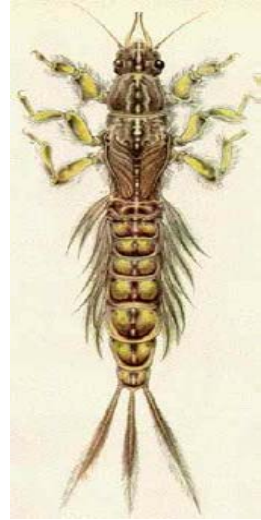
A Brief History of Time

- **1970's – 1980's:**
 - Bioassessments at point sources
 - Upstream/downstream studies
- **Late 80's and early 90's**
 - Begin to evaluate non-point source problems
 - Start using and refining EPA's RBP methods



A Brief History of Time cont.

- 1991 DEQ adopts narrative biocriteria:
 - Improve point source protection of beneficial uses
 - Clarify standards for aquatic life protection
 - No toxics in toxic amounts
 - No detrimental changes outside mixing zone
 - Push bioassessment work forward by formally adopting a narrative standard



Oregon's Narrative Standard

Waters of the State shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.

Without detrimental changes in the resident biological community
means no loss of ecological integrity when compared to natural conditions at an appropriate reference site or region.

Ecological integrity *means the summation of chemical, physical, and biological integrity capable of supporting and maintaining a balanced, integrated adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of natural habitat in the region.*

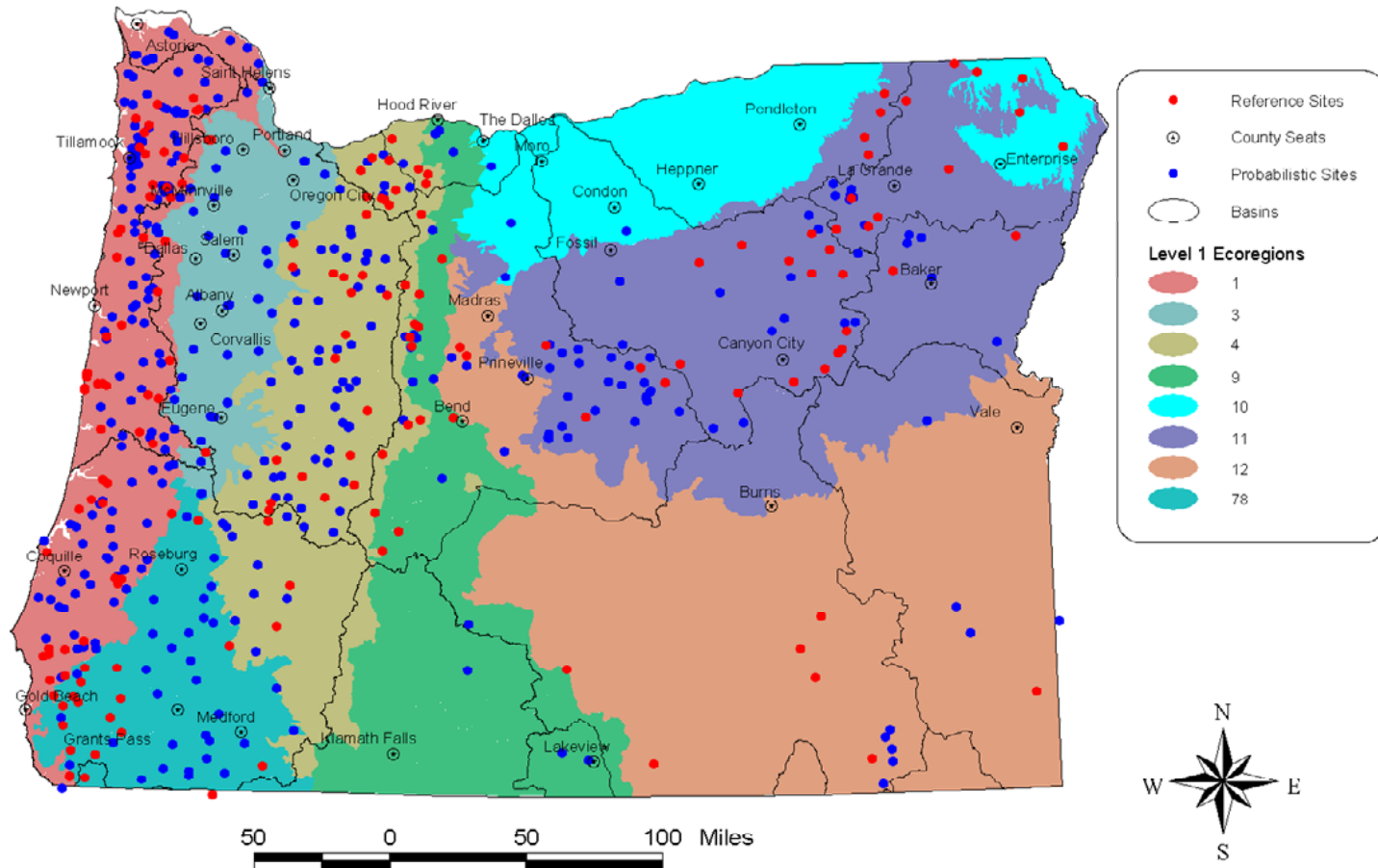
A Brief History of Time cont.

- **Late 1990's to Present:**
 - Regional probabilistic monitoring studies
 - Reference site selection and sampling
 - Sampling and analysis method refinement
 - Currently in middle of triennial standards review process for numeric biocriteria



Biological Data in Oregon

Oregon DEQ Biomonitoring Sites



Are Numeric Biocriteria Necessary?

- Oregon DEQ isn't forced to develop **numeric** biocriteria. We could continue to apply the narrative standard. However, to apply the narrative standard one must develop evaluation methods that rely on consistent, accurate and appropriate assessment and analysis techniques - i.e. numeric criteria.
- We decided to pursue numeric biocriteria through the triennial standards review process to allow technical input and review, and public comment.

Technical Issues

- Field Sampling Methods
- Data Analysis Methods
- Site Assessment Methods
- Implementation Issues
 - What waters of the state?
 - Reference site selection and use
 - Beneficial Use categories



Implementation Issues

- Numeric criteria will first be implemented for wadeable streams. Narrative criteria will continue to apply to other waters - ex. large rivers, lakes, estuaries.
- Numeric criteria will be developed first for Western Oregon streams and then implemented in other regions of the state as sufficient data becomes available.
- Process for establishing numeric criteria (data requirements, analysis and assessment techniques) in other regions will be described in the new rule.

Data Analysis and Site Assessment Methods

Metric and Multivariate Models

Genus/species level metrics and scoring criteria.

Metric	Raw Value	Scoring Criteria			Score (Circle)
		5	3	1	
Taxa Richness		>35	19-35	<19	5 3 1
Mayfly Richness		>8	4-8	<4	5 3 1
Stonefly Richness		>5	3-5	3	5 3 1
Caddisfly Richness		>8	4-8	<2	5 3 1
Sensitive Taxa		>4	2-4	<2	5 3 1
Sediment sens. Taxa		>2	1	0	5 3 1
Modified HBI		<4.0	4-5	>5.0	5 3 1
% Tolerant Taxa		<15	15-45	>45	5 3 1
% Sed Tol Taxa		<10	10-25	>25	5 3 1
% Dominant (single taxa)		<20	20-40	>40	5 3 1

Score Range

>39

30-39

20-29

<20

Stream Condition

No Impairment: passes level 3 assessment. Indicates good diversity of invertebrates and stream conditions with little or no disturbance.

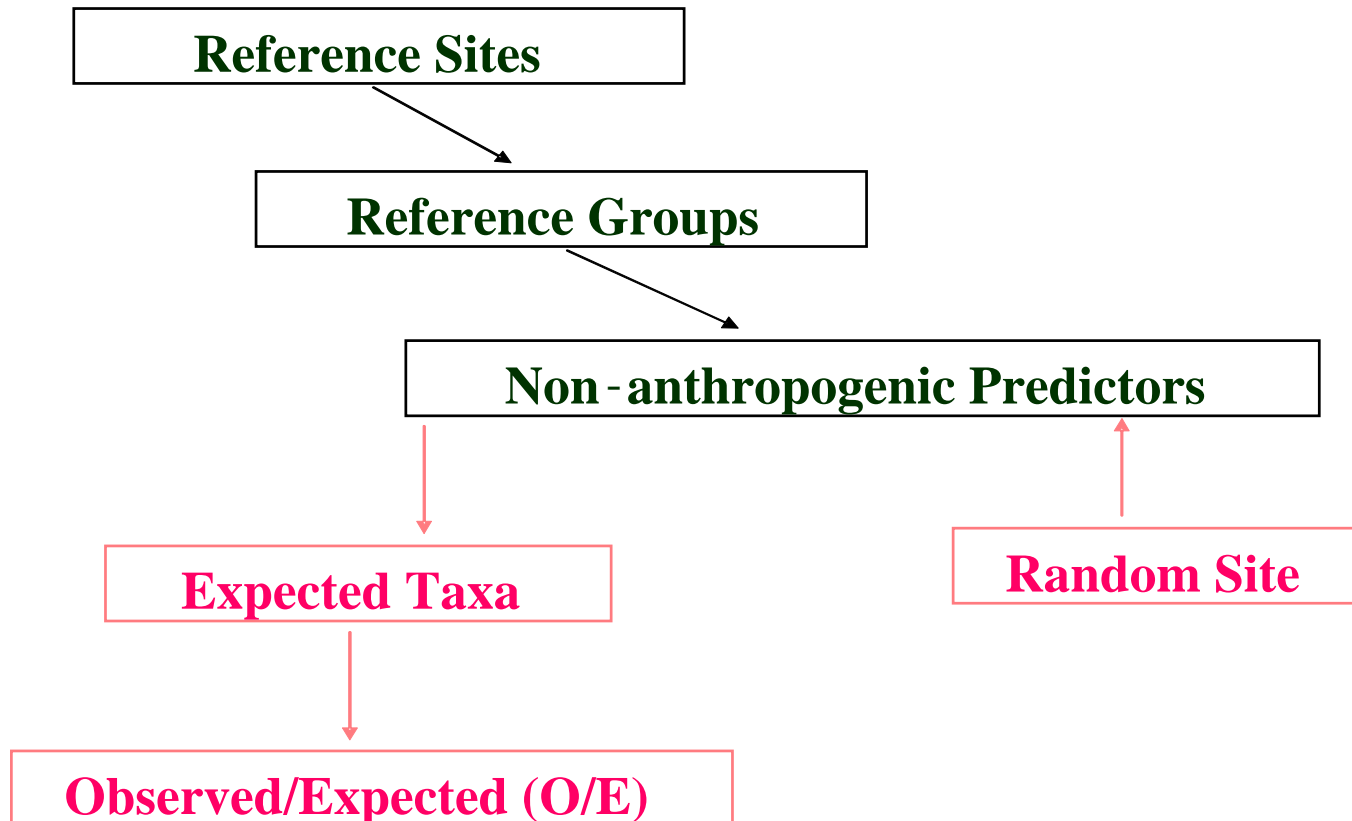
Slight Impairment: evidence of some impairment exists.

Moderate Impairment. clear evidence of disturbance exists.

Severe Impairment. conditions indicate a high level of disturbance.

Data Analysis and Site Assessment Methods

River Invertebrate Prediction And Classification System “RIVPACS”



Reference Site Selection & Use

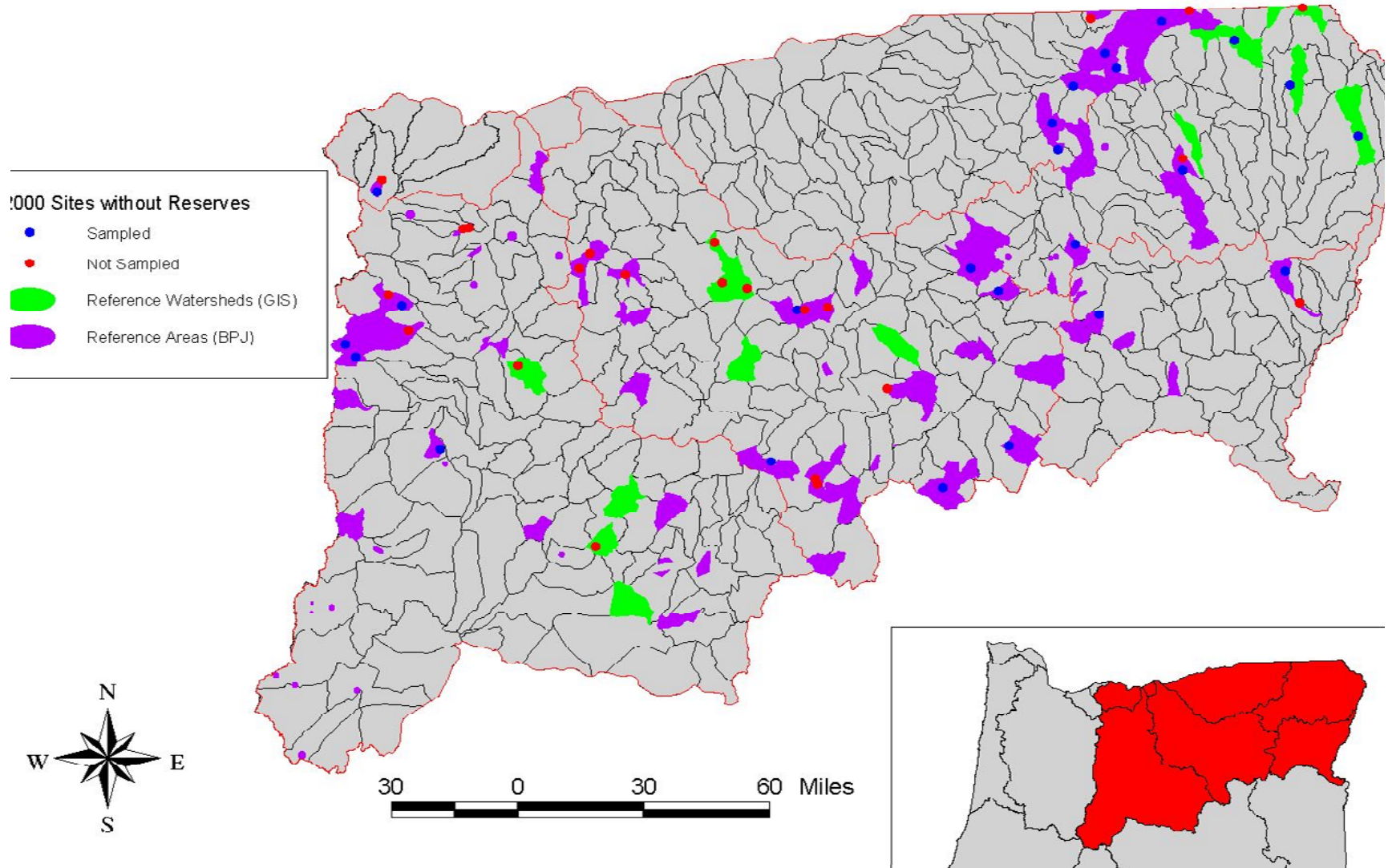
Reference Sites - Sites with no or minimal human disturbance that represent the habitat, water quality, and biological community conditions attainable within the region, basin or water body.

Northeast Oregon Reference Site Project

- NE Oregon basins broken into 5th field watersheds, Strata: 2nd-4th order, 3 elevation classes
- Examined 10 GIS coverages
- BPJ survey of resource managers
- GIS & BPJ folded together, EPA selected random sites

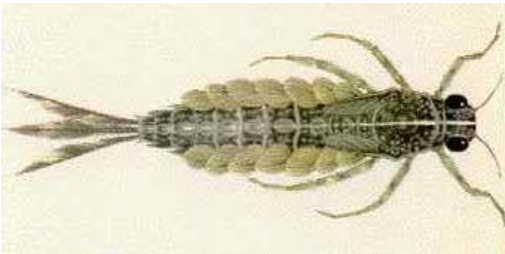
Reference Site Selection & Use cont.

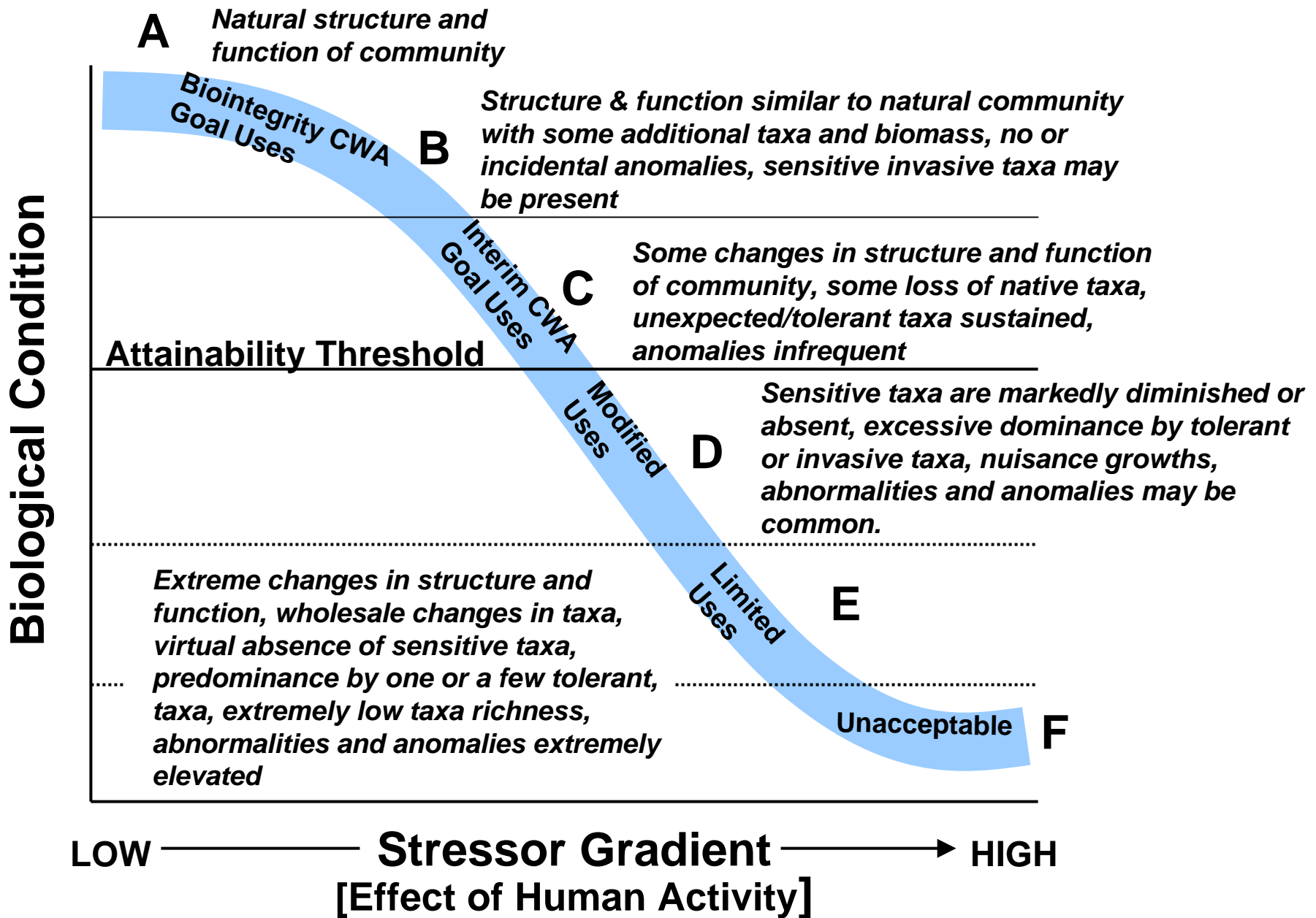
Fifth Field Basins in the Study Area



Reference Site Categories

- A - Ideal watershed and stream condition, a watershed with virtually no human disturbance.
- B - Good watershed and stream condition, some limited human disturbance and/or BMPs are well implemented.
- C - Marginal watershed and stream condition. Human disturbance present. Best available. Replace if better quality reference sites are located.





Beneficial Use Categories

Oregon's beneficial uses for aquatic life:

- Salmonid passage
- Salmonid spawning
- Salmonid rearing
- Protection of fish and aquatic life



Beneficial Uses and Biocriteria

Biocriteria: Beneficial Uses and Tiered Aquatic Life Uses

CWA Goals Tiered Use Categories	Bio Integrity		Interim Goal	Unacceptable----->	
	A	B	C	D	E
	Natural Conditions	Minimal Changes	Conspicuous Changes	Major Changes	Severe Changes
Beneficial Uses	Salmonid Fish Spawning Salmonid Fish Rearing Anadromous Fish Passage Resident Fish & Aquatic Life		Anadromous Fish Passage Resident Fish & Aquatic Life	Anadromous Fish Passage	
Biology	All expected Taxa present will appropriate community relationships	Expected taxa present with minor but measurable changes in community	Most expected taxa present, measurable changes in community	Some to few expected taxa present; major changes in community	Few to no expected taxa present; severe changes in community
Chemistry	Low Temperature Dissolved Oxygen at Sat. pH 6.0 to 8.5 Low Nutrients Low Turbidity Low BOD No Toxins				
Physical Habitat	Good Shade Low Sediment Good Habitat Complexity Good LWD Good Bank/Chan. Stability Good Riparian Good Substrate/Cover				
Landscape	None of Landscape altered by Humans	Minimal Proportion (<10%) of Watershed Landscape altered by Humans	Conspicuous Proportion (10-30%) of Watershed Landscape altered by Humans	Major Proportion (30-50%) of Watershed Landscape altered by Humans	Severe Proportion (50-70%) of Watershed Landscape altered by Humans

Uses of Biocriteria

- NPDES Permits
- 401 Permit Certifications
- 303d List
- 305b Reports
- Oregon Benchmarks
- Oregon Plan Stream Assessment
 - Status & Trends
 - Restoration Effectiveness
 - TMDL Effectiveness



Lessons Learned

- Develop sufficient data base to adequately evaluate sampling and analysis techniques.
- Reference site selection methods and criteria critical to developing defensible biocriteria.
- Need to integrate biological data and assessments into other water quality programs – TMDLs, permits, 401 etc.
- Reporting and data management often not adequately budgeted.

