University of Maryland – Phosphorus Management Tool (The Revised Maryland PSI)

Joshua McGrath

Frank Coale

Laboratory for Agriculture and Environmental Studies

DEPARTMENT OF ENVIRONMENTAL SCIENCE & TECHNOLOGY

UNIVERSITY OF MARYLAND EXTENSION

Solutions in your community

Major Changes Found in Current Draft

- New Name: University of Maryland – Phosphorus Management Tool (UM-PMT)
- Three interpretative categories (eliminating "Very High")
- All recommendations now based on P management
- Three major transport pathways separated arithmetically
  - Subsurface + Surface Dissolved + Particulate

Interpretive categories in the existing PSI

Score	Generalized Interpretation of P Loss Rating
0-50	·**LOW** potential for P movement from this site given current management practices and site characteristics. There is a low probability of an adverse impact to surface waters from P losses from this site. ·Nitrogen-based nutrient management planning is satisfactory for this site. ·Soil P levels and P loss potential may increase in the future due to continued nitrogen-based nutrient management.
51-75	·**MEDIUM** potential for P movement from this site given current management practices and site characteristics. Practices should be implemented to reduce P losses by surface runoff, subsurface flow, and erosion. ·Nitrogen-based nutrient management should be implemented no more than one year out of three. ·Phosphorus-based nutrient management planning should be implemented two years out of three during which time P applications should be limited to the amount expected to be removed from the field by crop harvest or soil-test based P application recommendations, whichever is greater.
76-100	·**HIGH** potential for P movement from this site given current management practices and site characteristics. ·Phosphorus-based nutrient management planning should be used for this site. Phosphorus applications should be limited to the amount expected to be removed from the field by crop harvest or soil-test based P application recommendations. ·All practical management practices for reducing P losses by surface runoff, subsurface flow, or erosion should be implemented.
> 100	·**VERY HIGH** potential for P movement from this site given current management practices and site characteristics. ·No phosphorus should be applied to this site. ·Active remediation techniques should be implemented in an effort to reduce the P loss potential from this site.

Interpretative categories in the revised PSI

Score	Generalized Interpretation of P Loss Rating
0-50	·**LOW** potential for P movement from this site given current management practices and site characteristics. ·Soil P levels and P loss potential may increase in the future due to continued nitrogen-based nutrient management. ·Total phosphorus applications should be limited to no more than a three-year crop removal rate applied over a three year period.
51-100	·**MEDIUM** potential for P movement from this site given current management practices and site characteristics. Practices should be implemented to reduce P losses by surface runoff, subsurface flow, and erosion. ·Phosphorus-based nutrient management planning should be used for this site. Phosphorus applications should be limited to the amount expected to be removed from the field by crop harvest or soil-test based P application recommendations.
> 100	· **HIGH** potential for P movement from this site given current management practices and site characteristics. ·No phosphorus should be applied to this site. ·Active remediation techniques should be implemented in an effort to reduce the P loss potential from this site.

How will this impact farmers?

Score	Old	New
0-50	N Based Planning	3-year P removal
51-75	P based 1 out of 3 years	P based planning
76 – 100	P based planning	
>100	No P application	No P application

- **Assume continuous corn with yield goal of 150 bu/acre.**
- **Poultry litter testing 60-60-40 (lbs/ton).**

Score	Old Rate (tons/acre)	New Rate (tons/acre)
0-50	5	3.5
51-75	5 + 1.5+1.5	1.5
76 – 100	1.5	
>100	0	0

Changes in the calculation

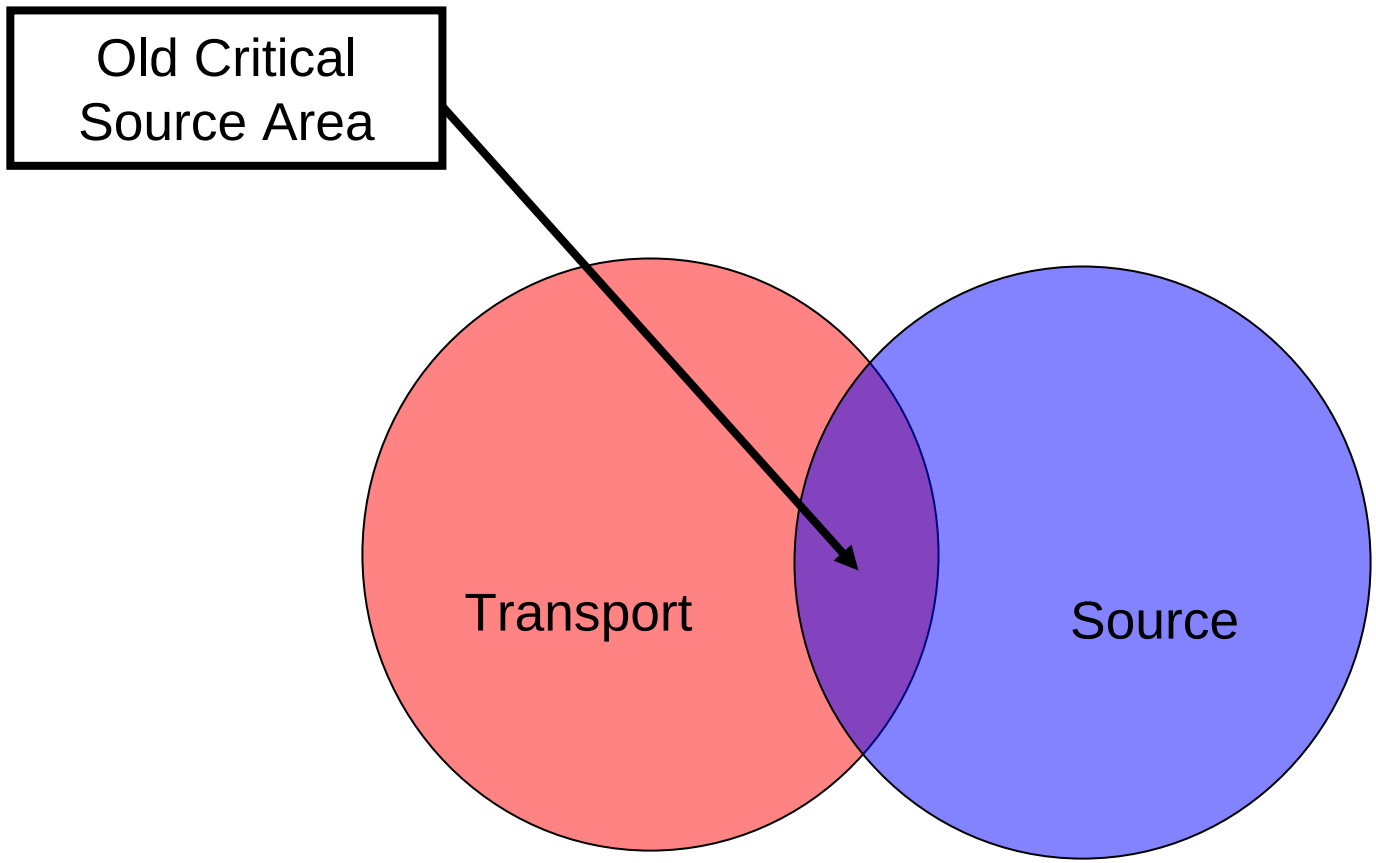
PSI = A * B

- Part A
  - RUSLE
  - Runoff
  - Leaching
  - Subsurface drainage
  - Distance to water
  - Watershed
- Part B
  - Soil test P
  - P fertilizer rate, solubility, and method
  - Organic P rate, solubility, and method

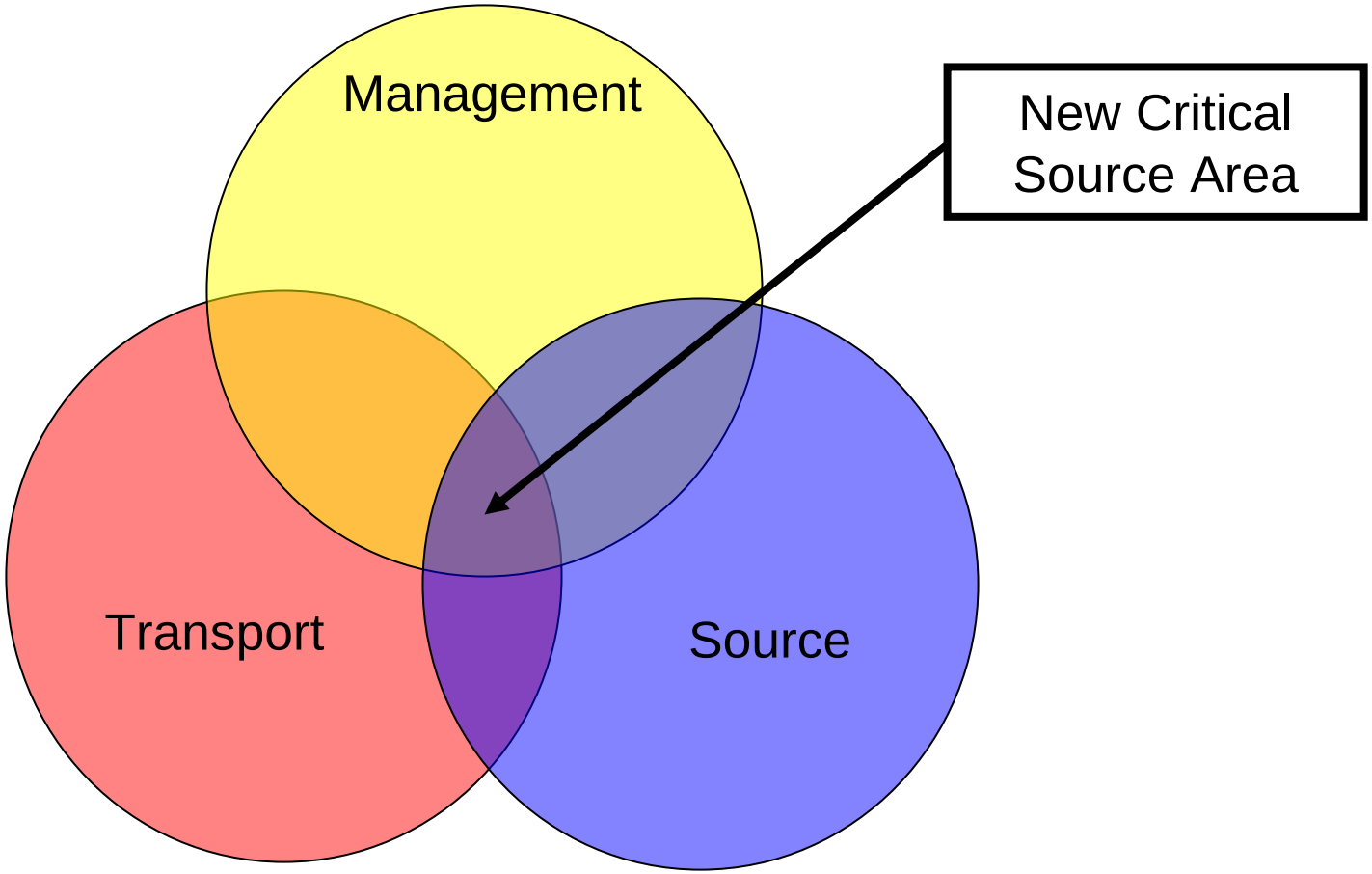
New Calculation

- UM-PMT = Subsurface + Runoff + Particulate
  - Particulate P uses RUSLE and soil test P
  - Subsurface and Runoff use assessments of potential for transport similar to old index, but use P saturation ratio (P : Fe+Al)
  - Attempted to include as many management options as possible to encourage adoption of practices to reduce P loading

Management: Critical Source Area



Management: Critical Source Area

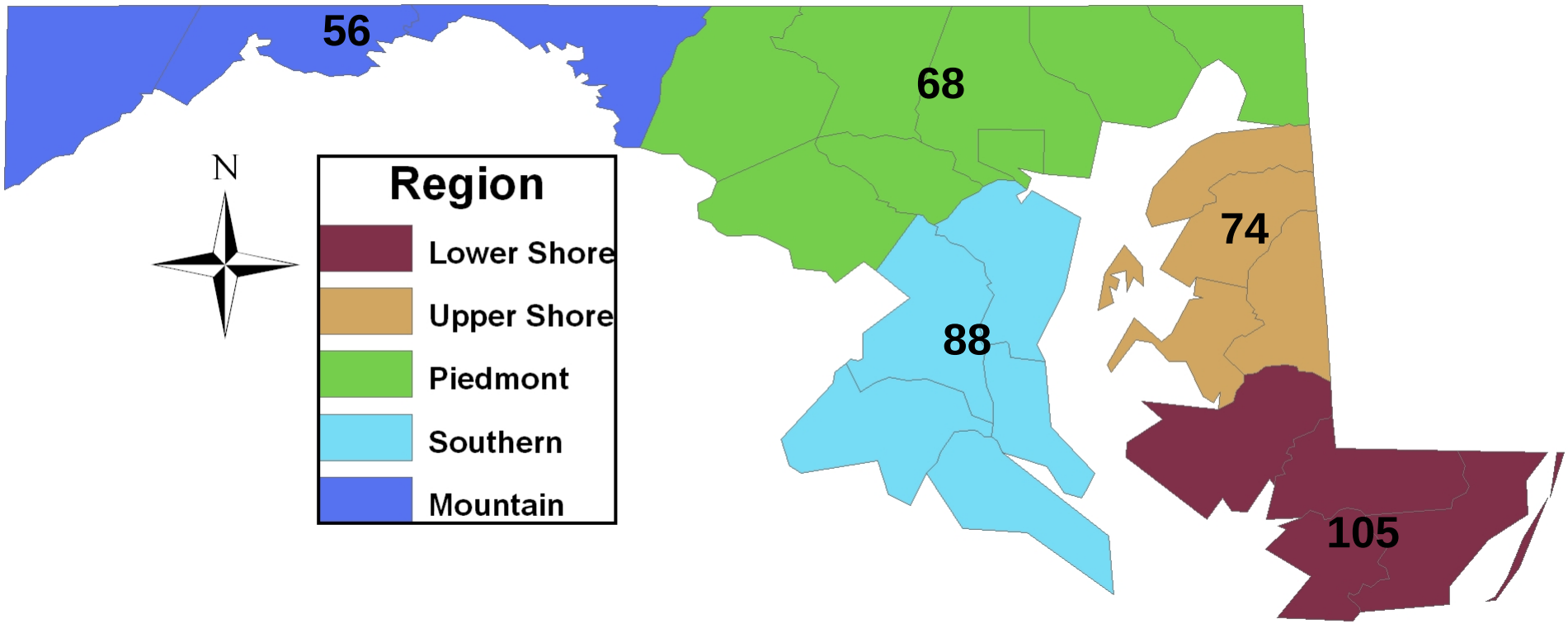


Possible Scenarios

- We cannot predict statewide trends in UM-PMT scores – only time will tell
- We are working on a web based tool so that nutrient management planners can do trial runs for individual fields and see how their old and new scores compare
- The following slides present data from 391 fields across the state
  - Soil P concentrations and P application rates were increased on some fields so this data does not reflect real-world conditions, only one possible scenario
  - We are aware that this data set is biased towards higher P index scores versus “natural” conditions

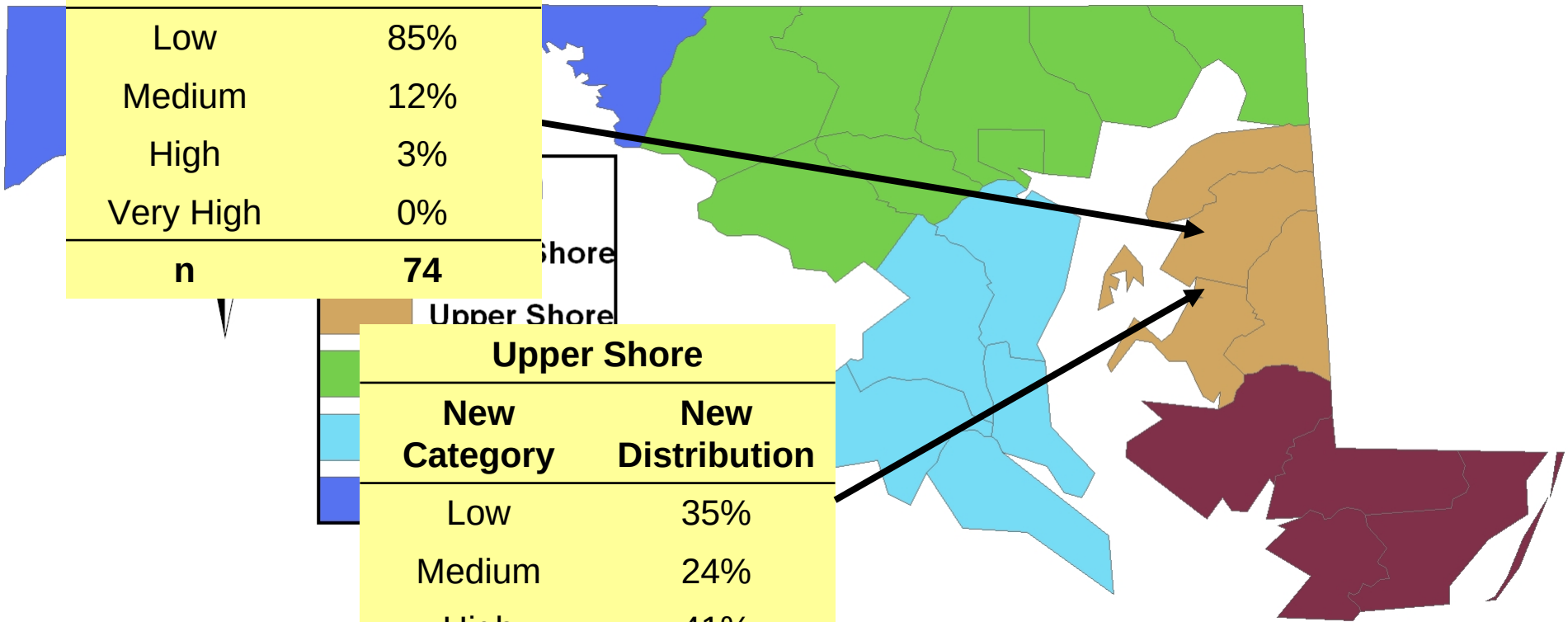
Number of Fields Sampled in Each Region

Statewide total = 391



Upper Shore Distribution of Final Scores

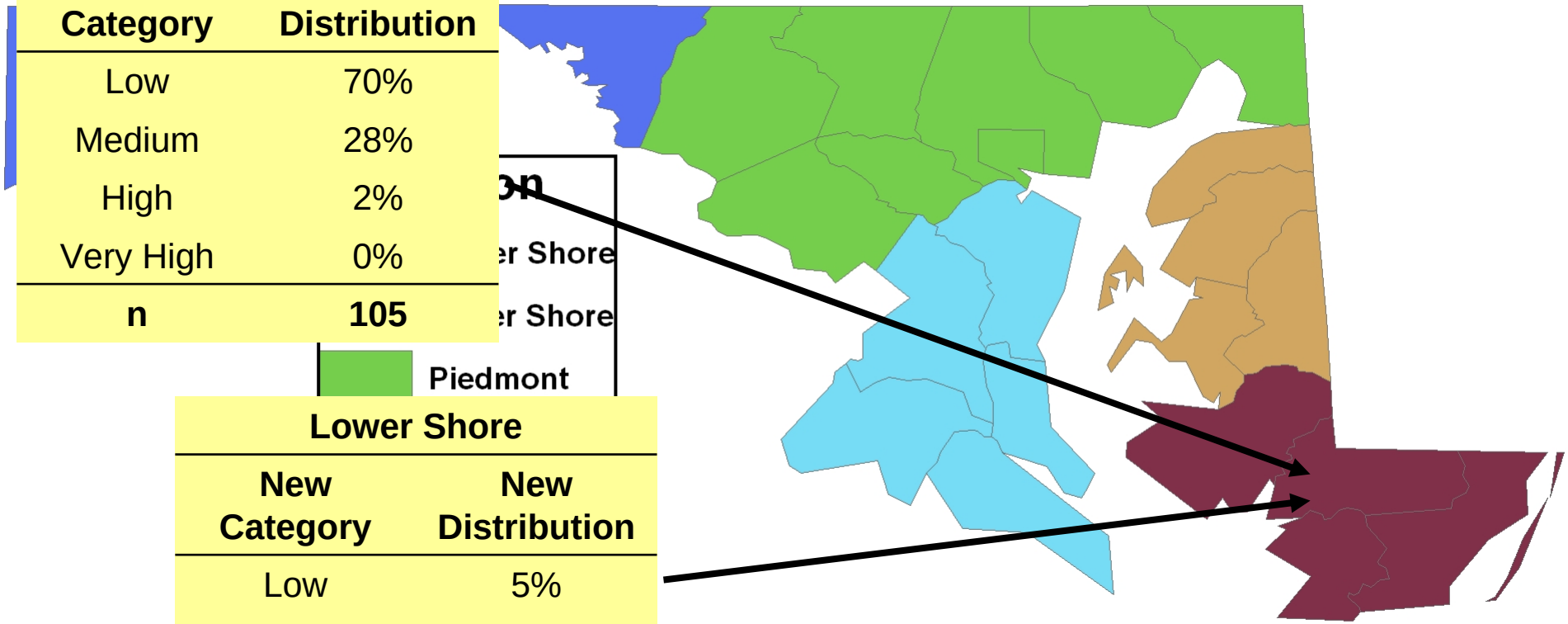
Upper Shore	
Old Category	**Old Distribution**
Low	85%
Medium	12%
High	3%
Very High	0%
n	**74**



Upper Shore	
New Category	**New Distribution**
Low	35%
Medium	24%
High	41%
n	**74**

Lower Shore Distribution of Final Scores

Lower Shore	
Old Category	**Old Distribution**
Low	70%
Medium	28%
High	2%
Very High	0%
n	**105**

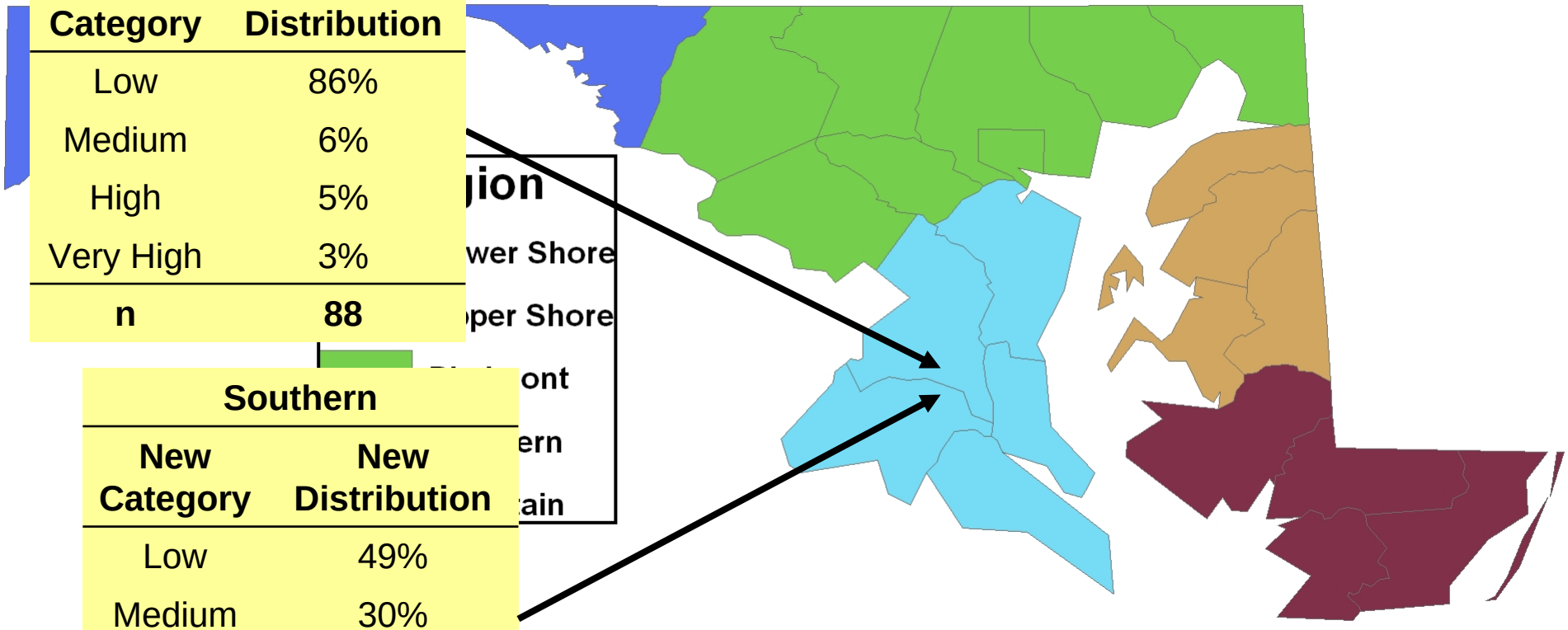


Lower Shore	
New Category	**New Distribution**
Low	5%
Medium	14%
High	81%
n	**105**

Southern Maryland Distribution of Final Scores

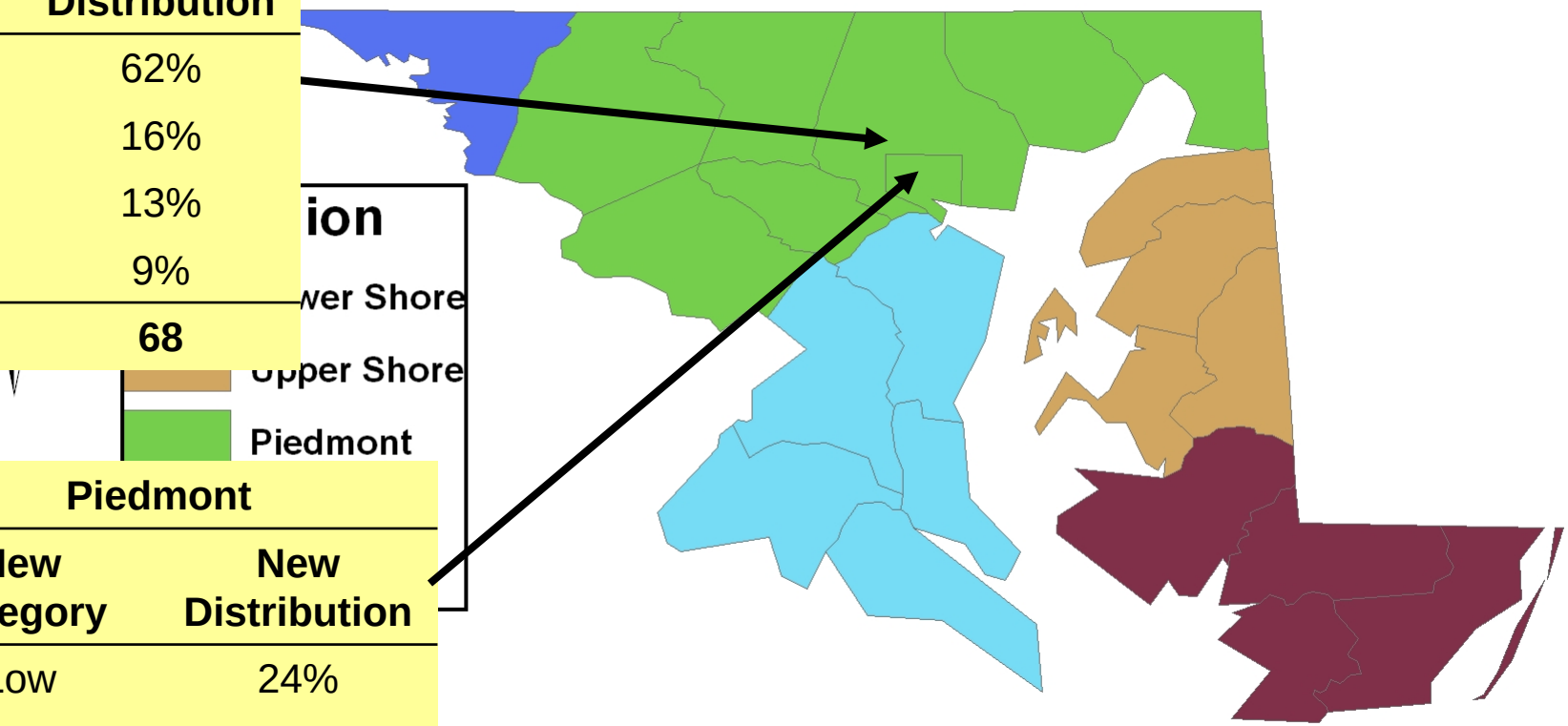
Southern	
Old Category	**Old Distribution**
Low	86%
Medium	6%
High	5%
Very High	3%
n	**88**

Southern	
New Category	**New Distribution**
Low	49%
Medium	30%
High	22%
n	**88**



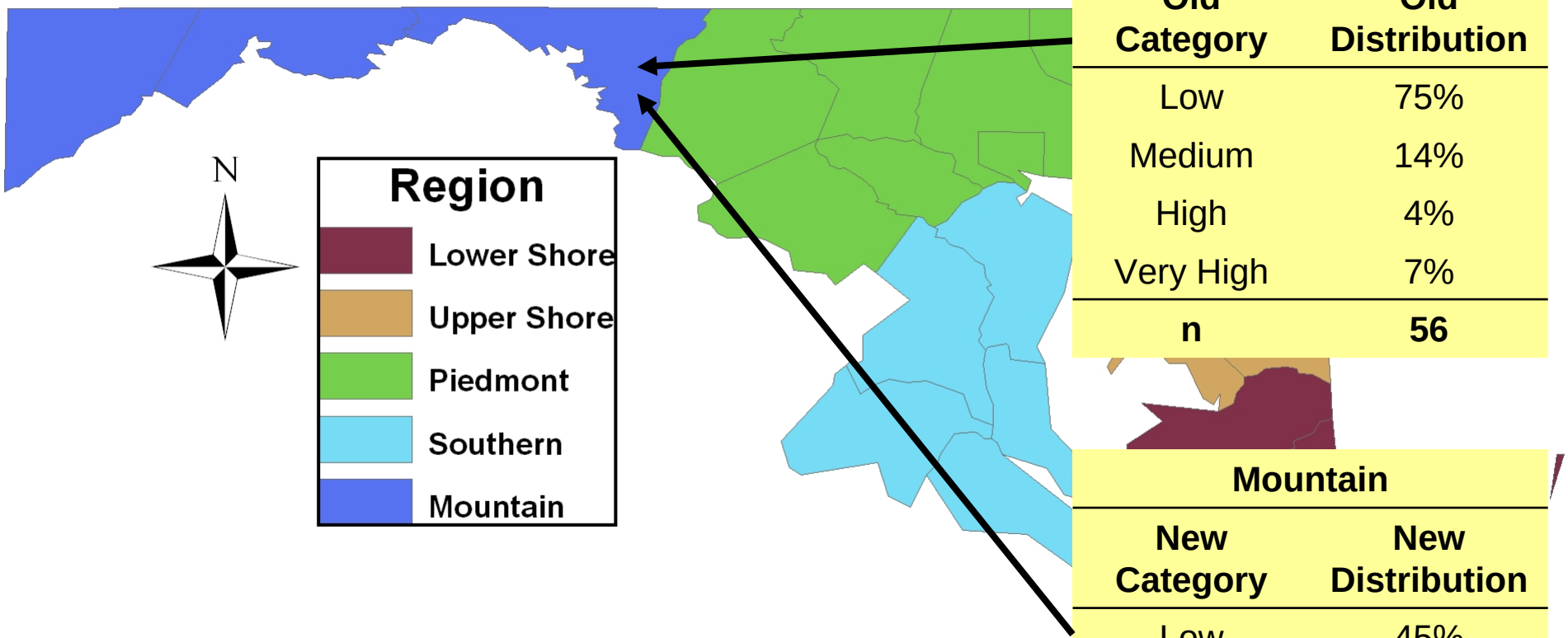
Piedmont Distribution of Final Scores

Piedmont	
Old Category	**Old Distribution**
Low	62%
Medium	16%
High	13%
Very High	9%
n	**68**



Piedmont	
New Category	**New Distribution**
Low	24%
Medium	25%
High	51%
n	**68**

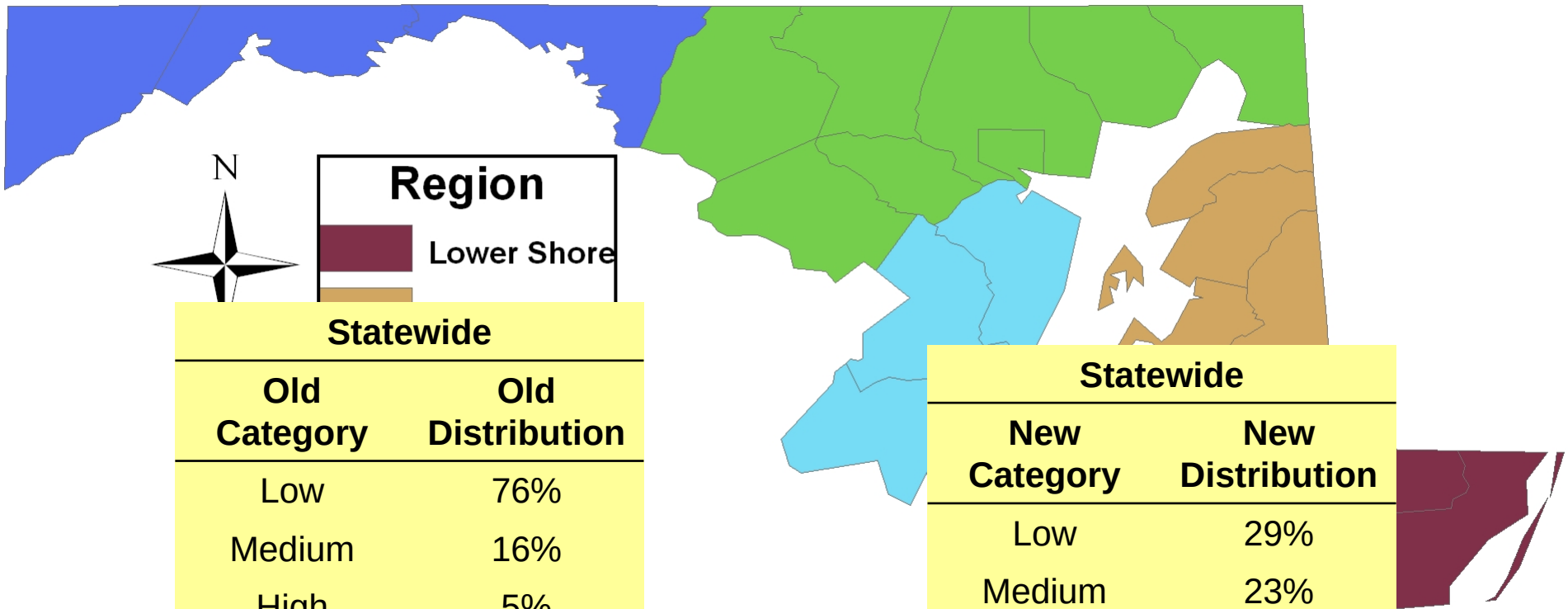
Mountain Distribution of Final Scores



Mountain	
Old Category	**Old Distribution**
Low	75%
Medium	14%
High	4%
Very High	7%
n	**56**

Mountain	
New Category	**New Distribution**
Low	45%
Medium	25%
High	30%
n	**56**

Statewide Distribution of Final Scores



Statewide	
Old Category	**Old Distribution**
Low	76%
Medium	16%
High	5%
Very High	3%
n	**391**

Statewide	
New Category	**New Distribution**
Low	29%
Medium	23%
High	48%
n	**391**

How are fields redistributed between categories?

Old Category	n	Percent Distribution to New Category
Low	107	36% Low
	75	25% Medium
	115	39% High

How are fields redistributed between categories?

Old Category	n	Percent Distribution to New Category
Medium	5	8% Low
	8	13% Medium
	49	79% High

How are fields redistributed between categories?

Old Category	n	Percent Distribution to New Category
High	3	16% Low
	4	21% Medium
	12	63% High

How are fields redistributed between categories?

Old Category	n	Percent Distribution to New Category
Very High	3	23% Medium
	10	77% High

Lab for Ag & Environmental Studies

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