Regional Supplements to Corps of Engineers Wetland Delineation Manual – Development and Field Testing

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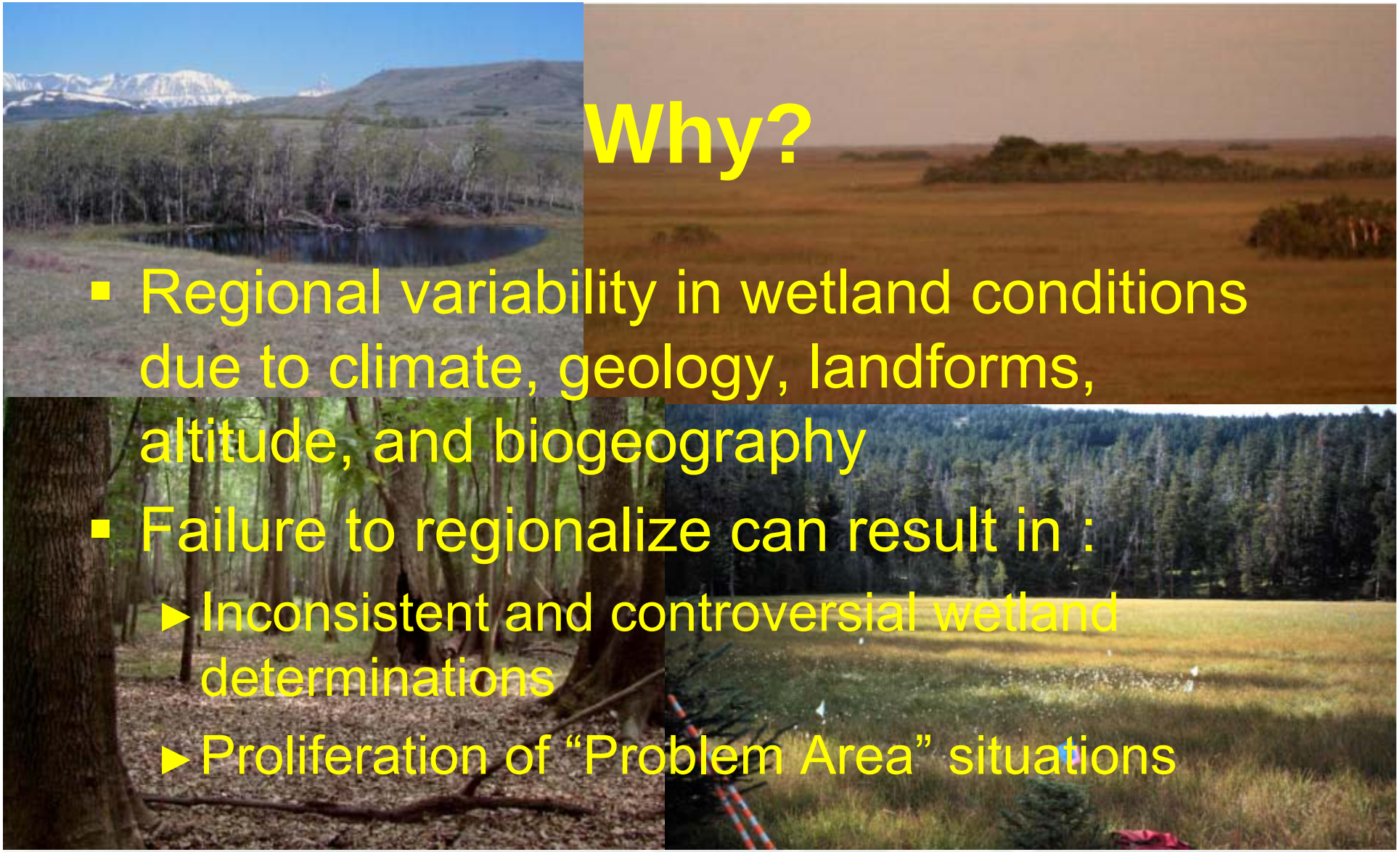
Applying the Regional Supplement



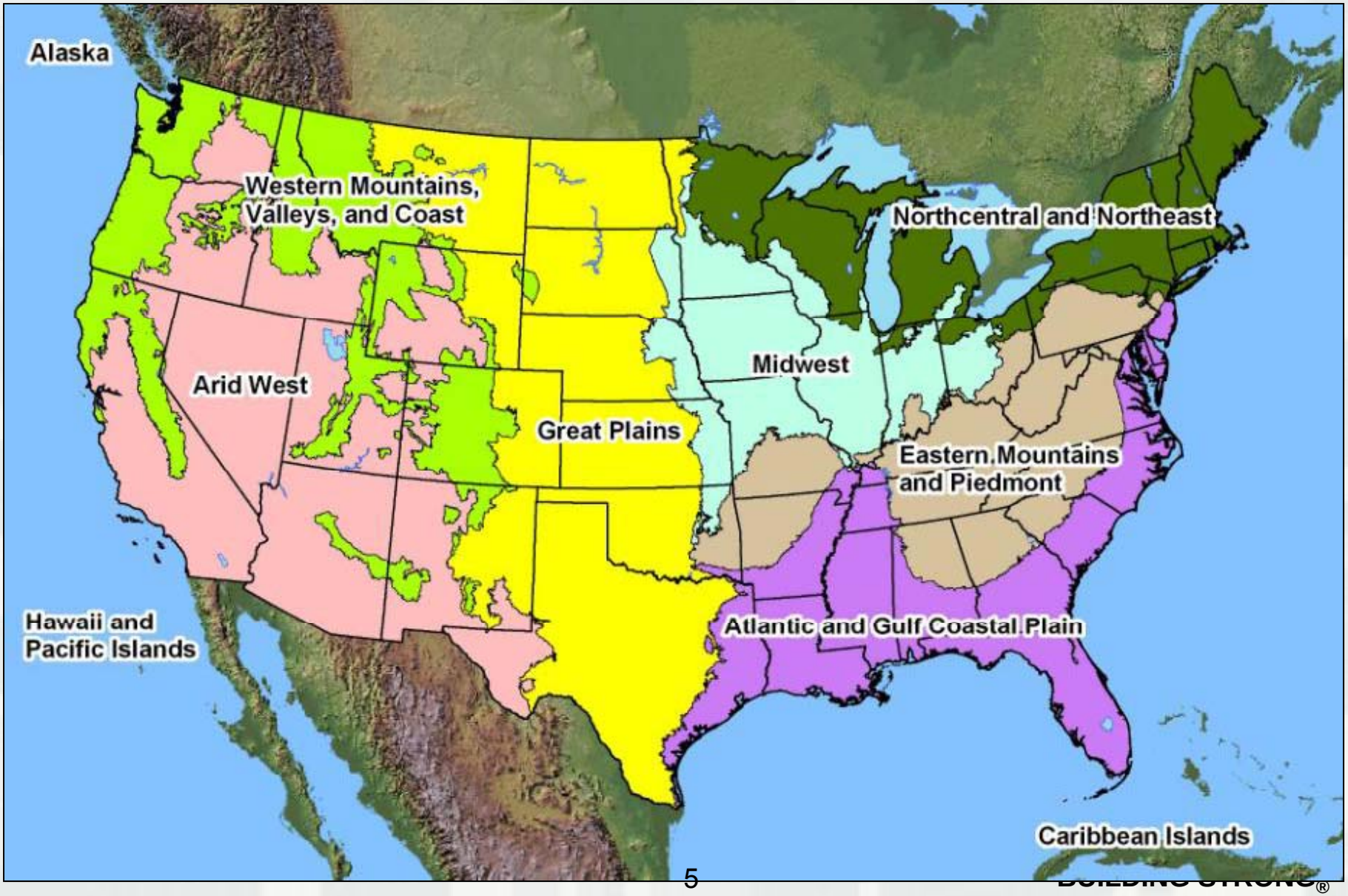
Why?

- Regional variability in wetland conditions due to climate, geology, landforms, altitude, and biogeography
- Failure to regionalize can result in :
  - Inconsistent and controversial wetland determinations
  - Proliferation of “Problem Area” situations

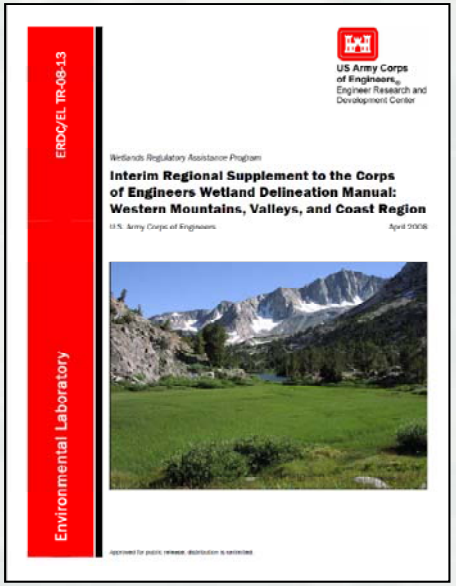
Why?

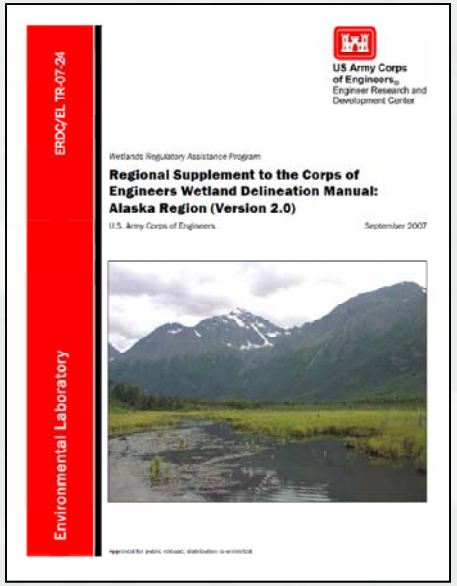
- To be technically and legally defensible, the manuals should reflect the state-of-the-science
- In a 1995 report, the National Academy of Sciences recommended that the 1987 Manual be updated and regionalized

Regional Supplements



Regional Supplements





Actual or anticipated release dates for Regional Supplements.

Region	Release Date Interim Supplement	Version 2.0
Alaska	March 2006	October 2007
Arid West	December 2006	November 2008
Great Plains	April 2008	April 2010
Western Mountains, Valleys & Coast	May 2008	June 2010
Midwest	October 2008	September 2010
Atlantic & Gulf Coastal Plain	December 2008	November 2010
Caribbean Islands	October 2009	March 2011
Northcentral and Northeast	February 2010	August 2011
Hawaii and Pacific Islands	July 2010	March 2012
Eastern Mountains & Piedmont	September 2010	May 2012

Steps in the development and implementation of a Regional Supplement

- Form a Regional Working Group of wetland experts
- Draft the Regional Supplement
- Review of the draft supplement by the interagency National Advisory Team (NAT)
- Review by an Independent Peer-Review Team
- Field test the draft supplement
- Release the draft supplement for public comment
- Finalize and publish
- Corps Districts in the region release Public Notices implementing the “interim” supplement for a 1-year trial
- Revise and publish Version 2.0
- Release Public Notices for final Regional Supplement implementation

Table 1. Sections of the Corps Manual replaced by this Regional Supplement for applications in the Atlantic and Gulf Coastal Plain Region.

Item	Replaced Portions of the Corps Manual (Environmental Laboratory 1987)	Replacement Guidance (this Supplement)
Hydrophytic Vegetation Indicators	Paragraph 35, all subparts, and all references to specific indicators in Part IV	Chapter 2
Hydric Soil Indicators	Paragraphs 44 and 45, all subparts, and all references to specific indicators in Part IV	Chapter 3
Wetland Hydrology Indicators	Paragraph 49(b), all subparts, and all references to specific indicators in Part IV	Chapter 4
Growing Season Definition	Glossary	Chapter 4, Growing Season; Glossary
Hydrology Standard for Highly Disturbed or Problematic Wetland Situations	Paragraph 48, including Table 5 and the accompanying User Note in the online version of the Manual	Chapter 5, Wetlands that Periodically Lack Indicators of Wetland Hydrology, Procedure item 3(h)

Contents of a Regional Supplement

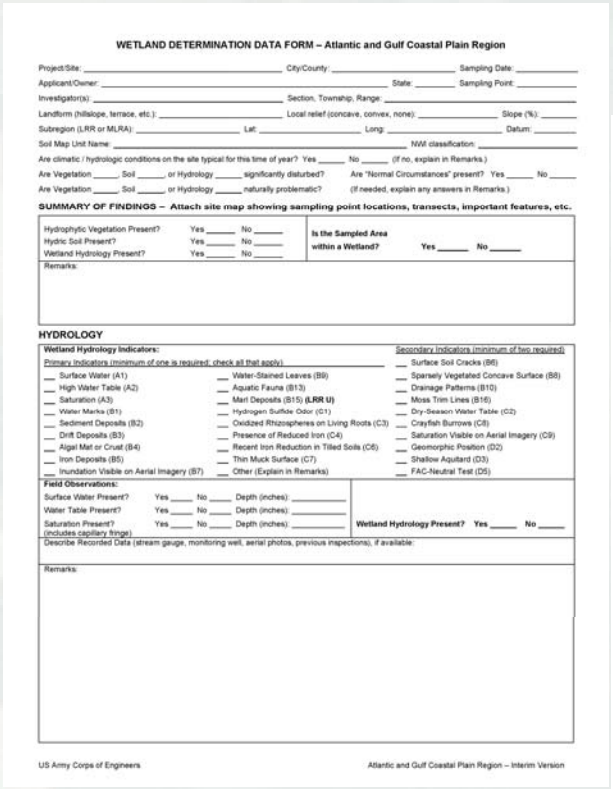
1. Description of the region
2. Hydrophytic vegetation indicators
3. Hydric soil indicators
4. Wetland hydrology indicators
5. Guidance for “difficult wetland situations” in the region
6. Data form, Glossary, References, Appendices

Ch1. Description of the region

- Purpose
- Applicable region
- Regional boundary
- Physical and biological characteristics
- Wetland types


t of LRR P)
Florida Peninsula
(LRR U)
Tampa
ain
Miles
100
200
300
400

Supplement Datasheet



WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: _____ City/County: _____ Sampling Date: _____

Applicant/Owner: _____ State: _____ Sampling Point: _____

Investigator(s): _____ Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR or MLRA): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No _____

Hydric Soil Present? Yes _____ No _____

Wetland Hydrology Present? Yes _____ No _____

Is the Sampled Area within a Wetland? Yes _____ No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply):

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required):

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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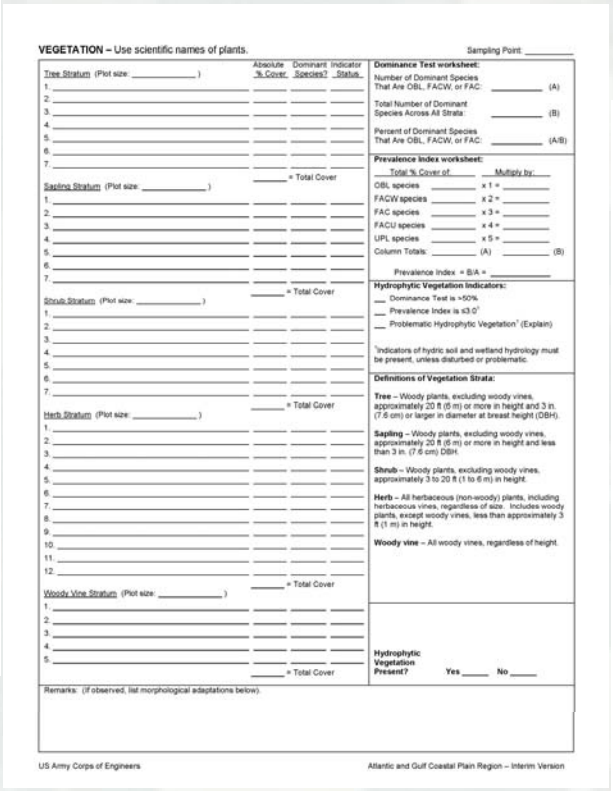

VEGETATION – Use scientific names of plants. Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	_____ = Total Cover		
Sapling Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	_____ = Total Cover		
Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes _____ No _____

Remarks: (If observed, list morphological adaptations below).

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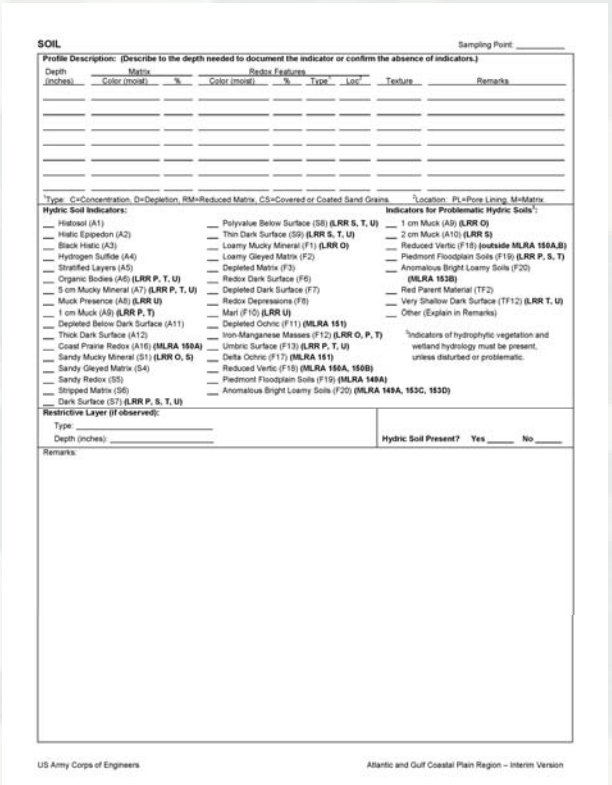

SOIL Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12) **(LRR T, U)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No _____

Remarks:

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Relationship to SWANCC and Rapanos

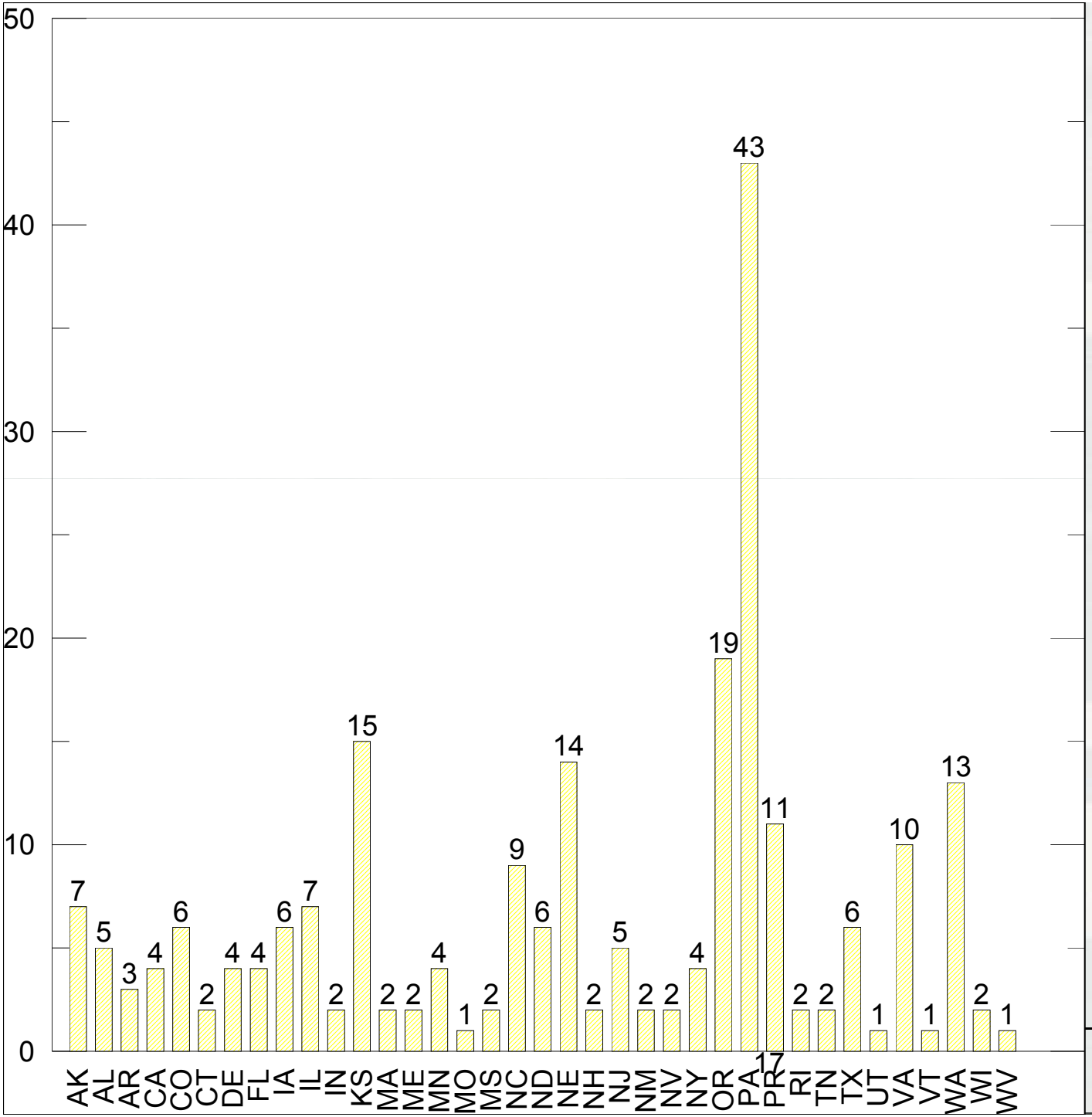
- Will have no effect on questions regarding Section 404 jurisdiction.
- Purpose of regionalizing the 1987 Manual is to provide the most current scientific and technical information for identifying wetlands and determining their boundaries.
- Whether or not a wetland is regulated under Section 404 is an entirely different and separate issue.

Field Testing

- 232 sites examined during field testing
- Evaluations used 1987 Manual guidance and Regional Supplement guidance at all sites

Field Test Reporting

- Location, wetland type, habitat type, landscape position
- Problematic situations
- Boundary determination
- Three parameter approach
- General comments



Site location by state

37 states in survey

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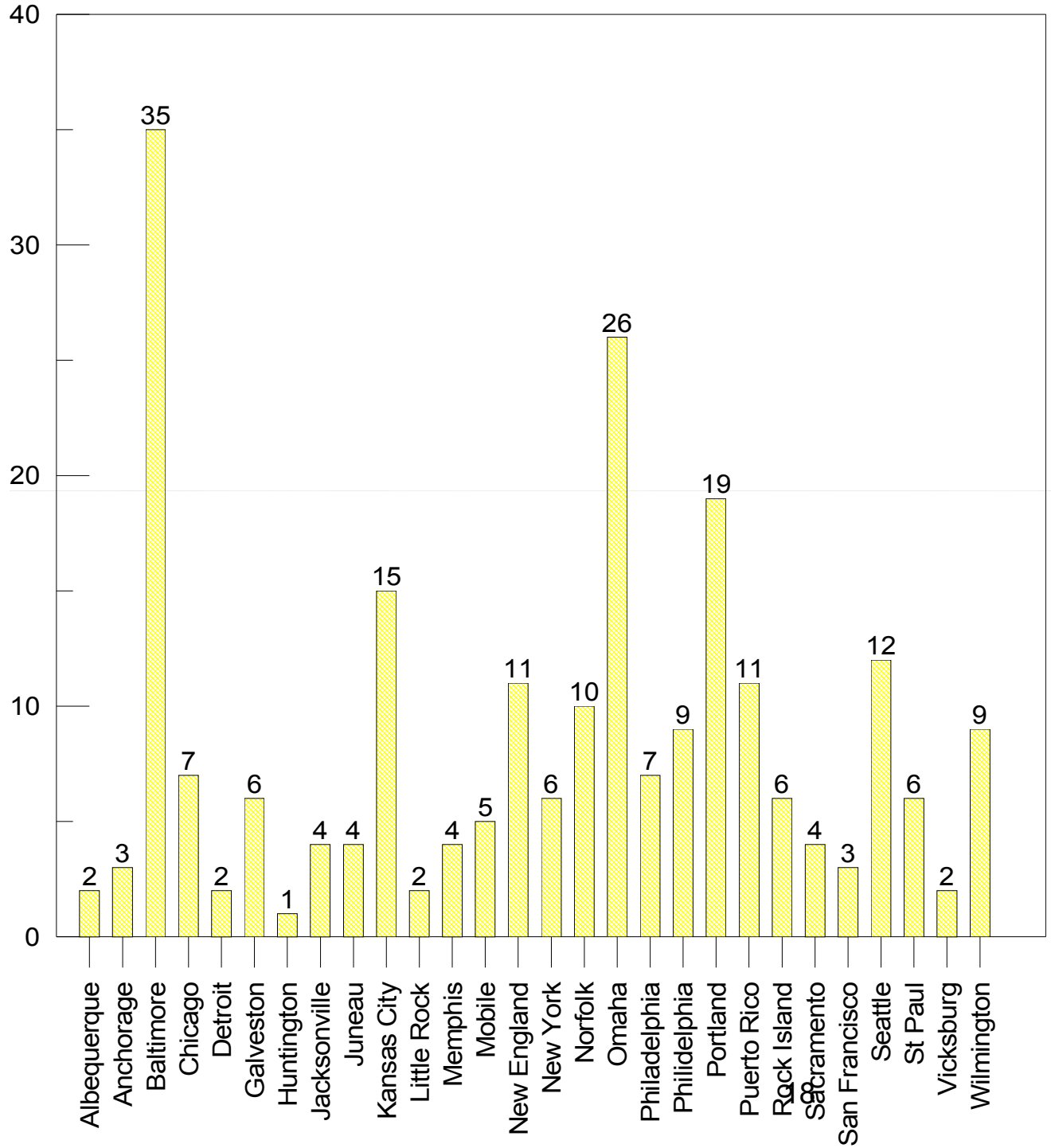

Site location by Corps District and Field Office

28 Districts in survey

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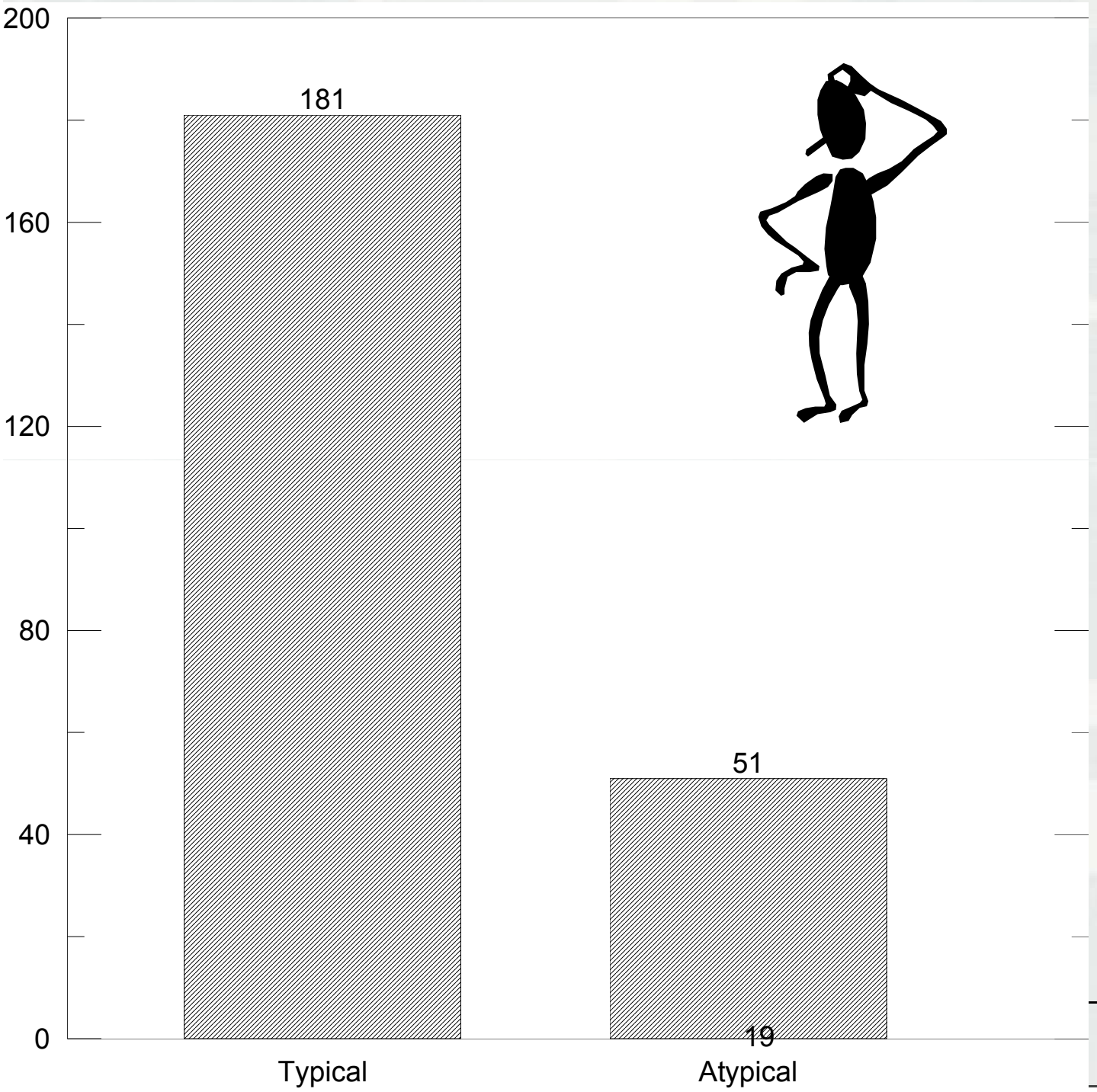
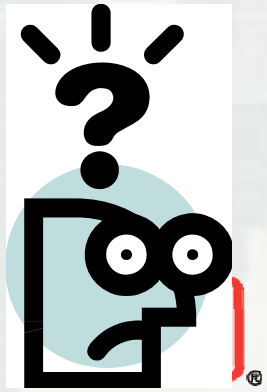


Typical and problematic sites

21% problematic



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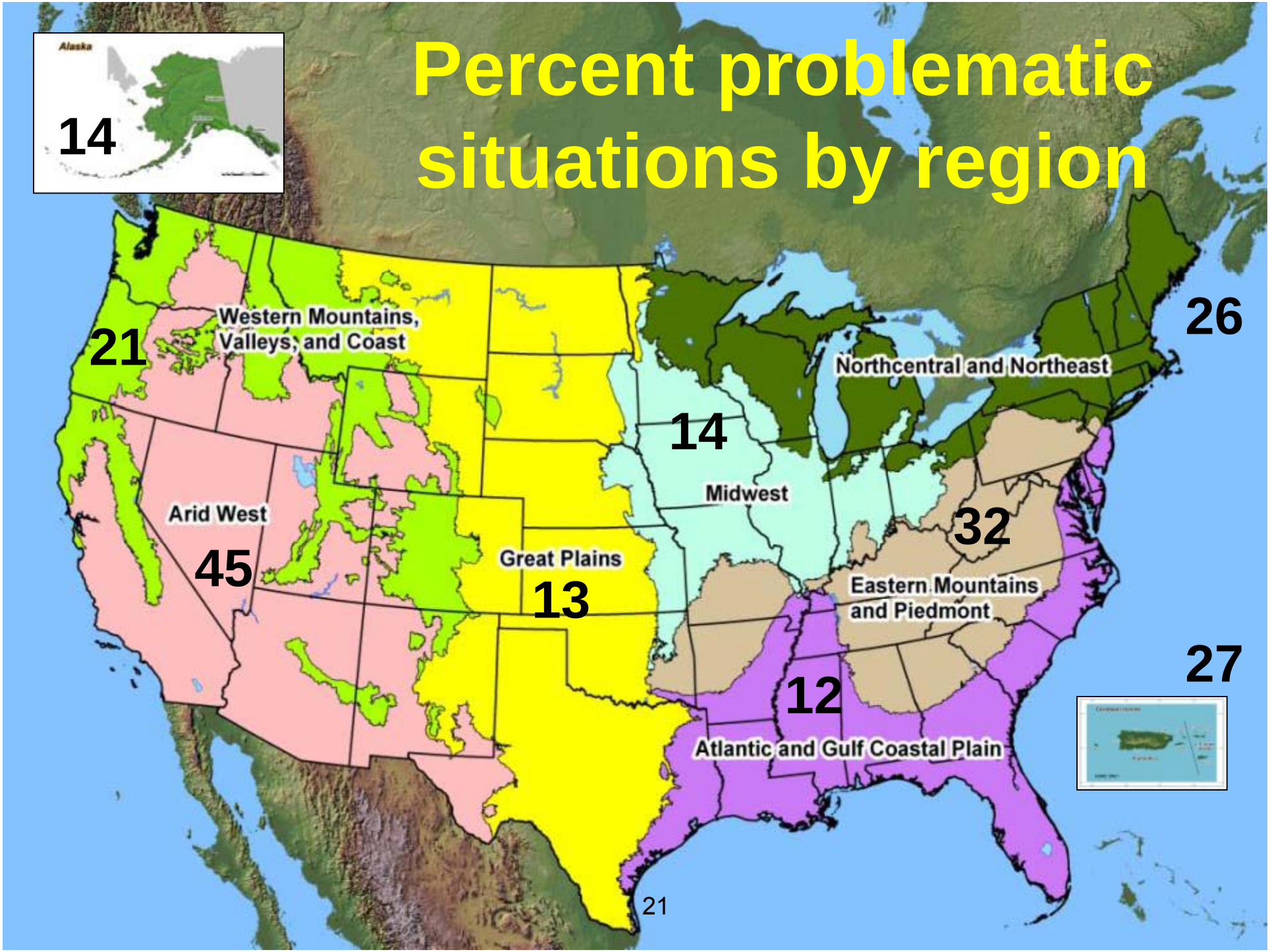
Problematic Situations

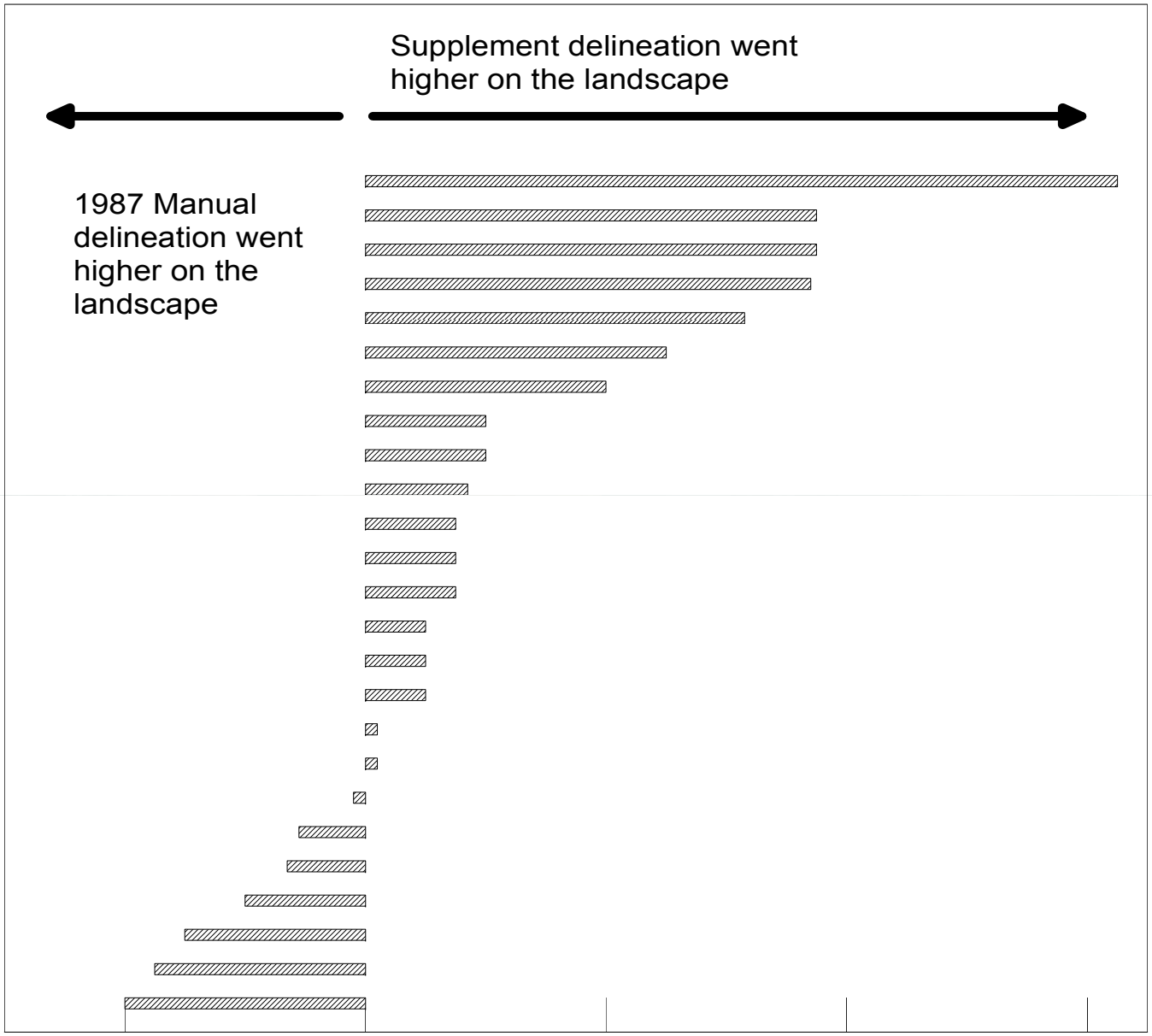
- Landscape position (4%)
- Hydrology (17%)
- Managed plant community / FACU (32%)
- Soil / Parent materials (25%)
- Disturbance history (19%)

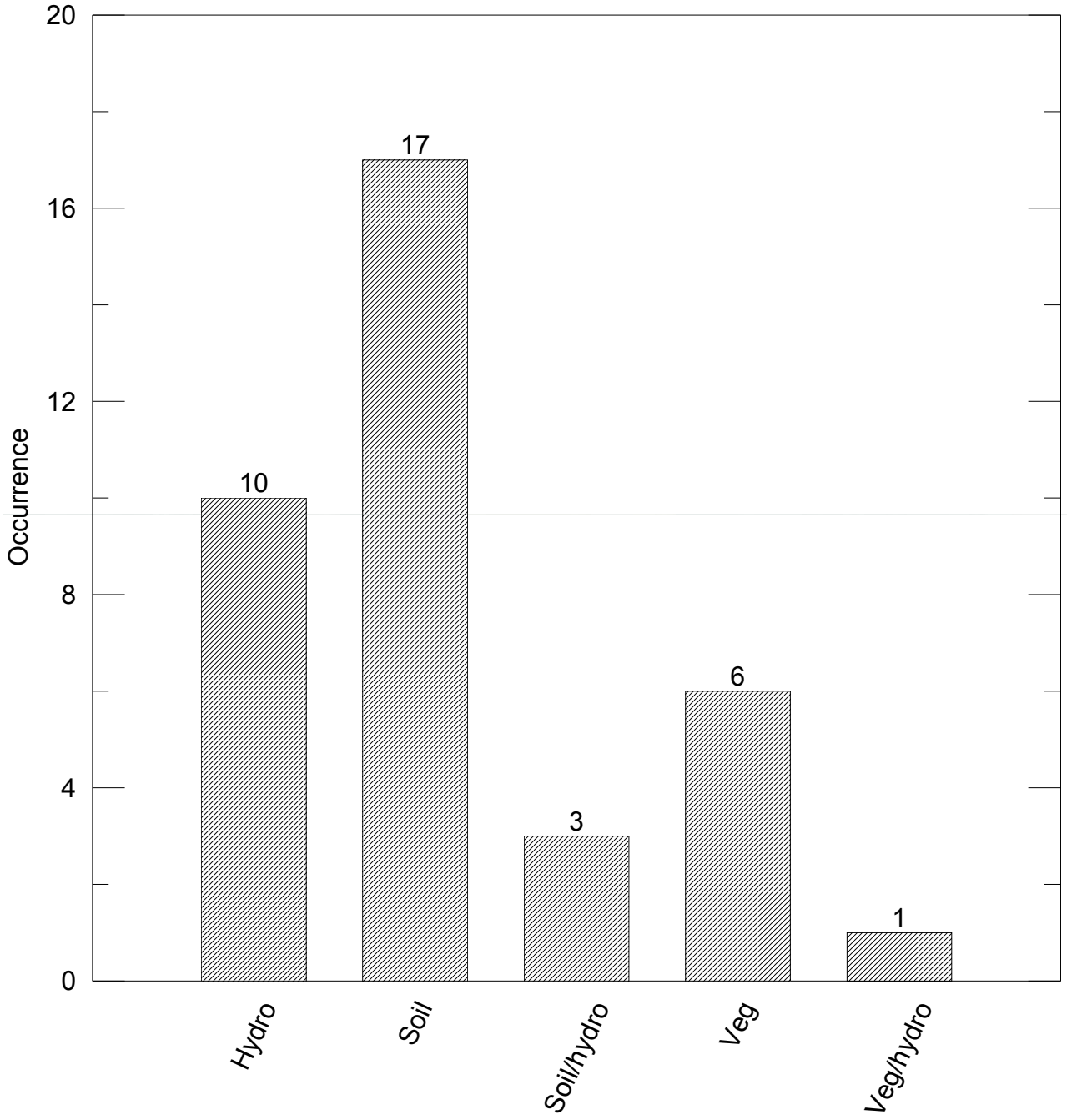

Percent problematic situations by region
Alaska
14
Western Mountains, Valleys, and Coast
21
Arid West
45
Great Plains
13
14
Midwest
Northcentral and Northeast
26
32
Eastern Mountains and Piedmont
12
Atlantic and Gulf Coastal Plain
27
21

Problem situation	25%= soil
Active floodplain	2
Agricultural	5
Alkaline soils	2
Altered hydrology	6
Fill/Dredge material	4
Cleared land	1
Exotic vegetation	1
FACU dominated plants	5
Mollisol	1
Mowed	4
Problem soil (unspecified)	5
Red parent material	5
Seasonal wetland/watertable	9
Timber management area	2

Wetland/Upland Boundary Determinations

- 83% - No change in boundary
- 5% - 1987 Manual line was higher
- 12% - Regional Supplement was higher
- Average change = 19 ft; median = 15 ft.





Parameters leading to the difference

Three parameter approach

- Hydric Soils
  - ▶ Impact of additional indicators
- Hydrology
  - ▶ Impact of additional indicators
- Vegetation
  - ▶ Impact of removal of “+” and “-” modifiers

Table 7: Distribution of 1987 Delineation Manual Hydric Soil indicators in nine national regions

	Alaska	Arid West	Carribean	Coastal Plain	Eastern Mountains	Great Plains	Midwest	Northcentral-Northeast	Western Mountains
Aquic moisture regime				7	1		2		1
Concretions				2				1	1
High organic content				7		1		6	
Histic Epipedon	1			1	1	1	1	4	
Histosol	1			1		1	3	2	
Hydrogen sulfide		1	5			1		4	1
Low chroma colors	5	12	8	34	28	32	27	22	22
Reducing conditions		3	3		2	1	4	3	
Soil survey	1			9	2		3	1	3
Streaking			1	4		1		2	
Other		6			1			2	

63% of 1987 Manual soil determinations were based on Low Chroma Colors

Soil survey data was used at 8% of sites

Table 8: Distribution of Supplement Hydric Soil indicators in nine national regions

	Alaska	Arid West	Carribean	Coastal Plain	Eastern Mountains	Great Plains	Midwest	Northcentral-Northeast	Western Mountains
A1 - Histosol	1			2		1	2	2	
A2 - Histic Epipedon	1			1	2		1	3	
A4 - Hydrogen Sulfide			4	1		1		4	1
A5 - Stratified Layers		2							
A6 - Organic Bodies				1					
A7 - 5 cm Mucky Mineral				4					
A8 - Muck Presence				3					
A9 - 1 cm Muck				3		1			
A10 - 2cm Muck					1		2		
A11 - Depleted Below Dark Surface		1	2	4	1		1	8	1
A12 - Thick Dark Surface	1		1				2	1	1
A13 - Alaska Gleyed	2								
A14 - Alaska Redox	1								
F1 - Loamy Mucky Mineral									1
F2 - Loamy Gleyed Matrix			1		1			1	
F3 - Depleted Matrix		4	1	15	22	6	4	6	
F6 - Redox Dark Surface		2		1		13	12	1	5
F7 - Depleted Below Dark Surface							1	1	8
F8 - Redox Depressions					2				
F13 - Umbric Surface				1					
F16 - High Plains Depressions						1			
F18 - Reduced Vartic				1					
S1 - Sand Mucky Mineral				2				1	1
S4 - Sandy Gleyed Matrix			1			1		1	
S5 - Sandy Redox			1	2	1	3	1		3
S6 - Stripped Matrix							1	1	
S7 - Dark Surface				2					
TF2 - Red Parent Material					1			2	
Other		4				2		1	

All soils = 71

Loamy/clayey soils = 111

Sandy soils = 32

Organics
= 7%

Depleted
Matrix
= 14%

Depleted below
dark surface =
5%

Redox
Dark
Surface =
8%

Addition of Soil Indicators

1987 Manual	Regional Supplement
11	Alaska = 7 Coastal Plain = 33

*Indicators for testing or problematic soils are not included

Hydrophytic Vegetation

- Dominance test
  - Below wetland boundary (94%)
  - Above wetland boundary (39% - 1987 Manual; 44% - Supplement
- Removal of “+” and “-” designations
- Changes in Vegetative Strata determination

Problematic Vegetation

Wetland Hydrology

- Addition of more hydrology indicators
- Most common indicators (high water table)
- Removal of “Soil Survey Data” from secondary indicator status

Addition of Hydrology Indicators

Indicator type	1987 Manual	Regional Supplement
Primary	6	13 - 19
Secondary	4	6 - 11

* Total of 38 hydrology indicators included in the Supplements*

Problematic Hydrology

Distribution of problematic wetland hydrology situations	
Wetland hydrology problem	Occurrence
Depressional/Flat area subject to ponding	2
Drought	1
Dry season	3
Best professional judgment was difficult to apply	1
Irrigated farmland	1
Local knowledge was required to make a determination	1
No hydrology using 1987 manual guidance	2
Only 1 secondary indicator using 1987 manual guidance	2
Seasonal water table	12
Secondary indicators only	4
Sedimentation occurring on site	1
Well measurements required to reach a determination	2

Comments

- Supplement guidance was clear and easily applied at 84% of sites
- 79% reported that Supplement determinations were more defensible
- 33% reported the need for additional indicators