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**Construction & Development Effluent Guidelines  
IECA Annual Conference  
February 11, 2009**

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USEPA  
Office of Water**



# Effluent Guidelines

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- Technology-based standards for control of wastewater and stormwater discharges from various categories of industry
- Best Available Technology (BAT) economically achievable – we look at what technologies are available, what the costs are, how well they perform and what the costs and economic impacts are
- Not risk-based, so we don't set different standards for different waterbodies – however, we can subcategorize industry
- Can be numeric standards (i.e., discharge limitations) and/or Best Management Practices (BMPs)



# Why an Effluent Guideline?

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- EPA is required to identify categories of dischargers that have not been covered by an ELG
- EPA publishes a biennial plan listing these industries
- EPA listed construction and development stormwater discharges in its 2000 effluent guidelines plan
- EPA published a proposed rule in 2002 that would establish effluent guidelines for construction site stormwater discharges
- EPA withdrew this proposal in 2004, stating that the existing program was adequate
- EPA removed construction and development from the 2004 plan
- EPA was sued by environmental groups and states over our failure to promulgate an ELG
- Court found that EPA has a mandatory duty to promulgate ELGs for categories identified in its effluent guidelines plan
- Court ordered EPA to propose regulations by December 1, 2008 and finalize rule by December 1, 2009



# Background

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- EPA regulates stormwater runoff from construction sites through National Pollutant Discharge Elimination System (NPDES) permits
- EPA issues permits in some states – most states have their own permits
- All construction sites over 1 acre are required to obtain permits
- Many states also have regulations addressing construction site stormwater runoff and other nonpoint sources
- Most permits require that erosion and sediment controls be installed and maintained, but don't contain specific performance requirements
- Some states (Washington, Oregon, Vermont) have numeric action levels for pollutants such as turbidity
- Some watersheds (Lake Tahoe) and waterbodies require dischargers to meet numeric effluent limits for turbidity or other pollutants



# Proposed Rule Requirements

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- Erosion Controls
  - Stabilize disturbed soils immediately when earth disturbing work has temporarily or permanently ceased and will not resume for a period exceeding 14 calendar days.
  - Utilize deep ripping and decompaction of soils to restore infiltrative capacity
- Sediment Controls
  - Discharge to buffers and vegetated areas
  - Sediment basins designed to provide storage for 3,600 cf/acre or runoff from 2-year/24-hour storm; skimmer outlets; additional 1,000 cf/acre sediment storage volume
- Pollution Prevention Measures
  - Trash/debris management
  - Concrete washout
  - Chemical and fuel management
- Numeric Turbidity Standard
  - Sites 30 or more acres in areas with >10% clay soils and RUSLE R-factor of 50 or more



# Turbidity Limit

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- Turbidity limit of 13 NTUs applies to sites of 30+ acres with R-factor  $\geq 50$  and  $\geq 10\%$  clay content for all discharges up to the 2-year, 24-hour storm
- Limit is a daily maximum
  - Limit is not an increase over background
  - Taking comment on allowing short-term values to be above limit
- R-factor is currently based on annual value: requesting comments on a seasonal value
- Annual precipitation threshold of 20 inches can be used instead of R-factor in areas where data is not available (such as Alaska)
- Soil clay content ( $\geq 10\%$  by mass of particles  $< 2$  microns) can be determined from soil surveys or sampling of soils on-site; requesting comment on appropriate approaches
- Technology basis is chitosan-enhanced sand filtration
  - Permittees can use any technology to meet the limit
  - Can use zero discharge (such as infiltration, discharge to buffers)



# Turbidity Limit Calculation

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- Data based on 19 ATS systems located in CA, WA and OR
  - 466 individual turbidity measurements
  - Average NTU = 3.7
  - Median NTU = 2.07
  - Minimum NTU = 0.08
  - Maximum NTU = 38.75
- Calculate a Long-Term Average based on statistical evaluation of data
  - LTA = 2.77 NTU
- Calculate variability factor, which accounts for variation in system performance
  - VF = 4.58
- Limit = LTA X VF = 13 NTU
- EPA may collect additional ATS system data prior to final rule



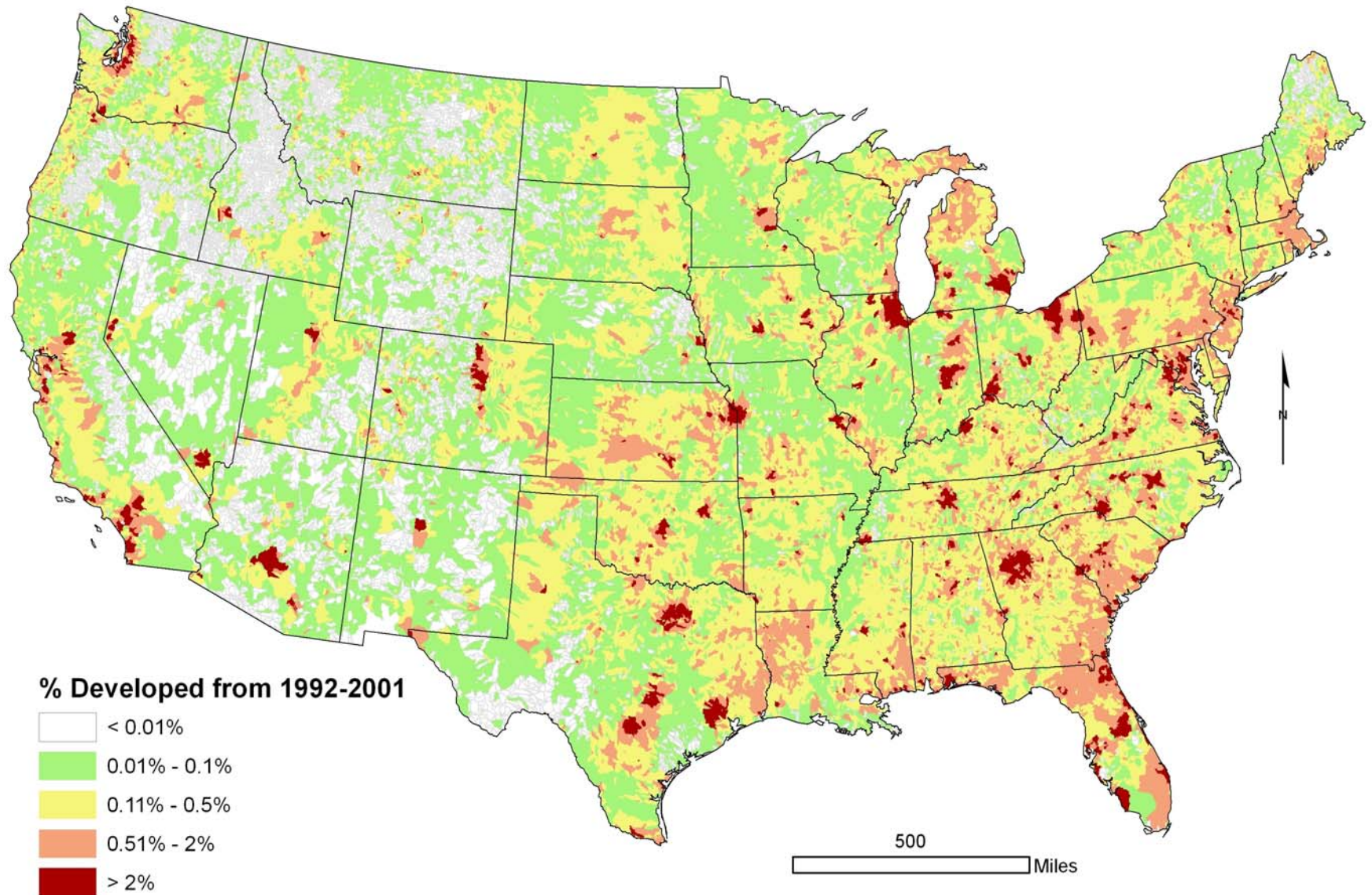
# Acres In-Scope for Various Size Cutoffs

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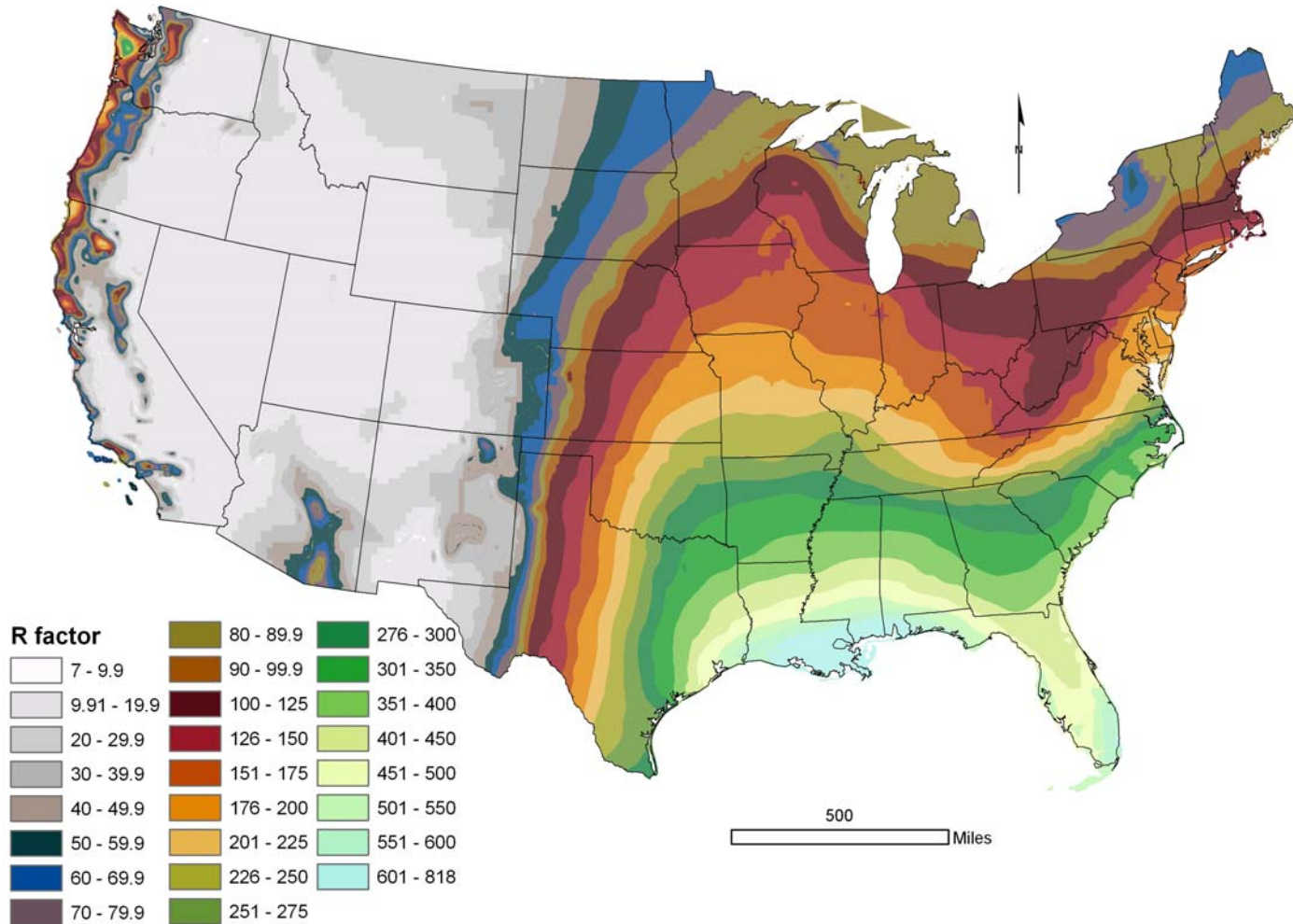
Site Size (Acres)	% Acres In-Scope
>5	94
>10	86
>15	80
>20	74
>25	69
>30	64
>35	61
>40	58



# U.S. Development Trends



# National Map of R-Factors

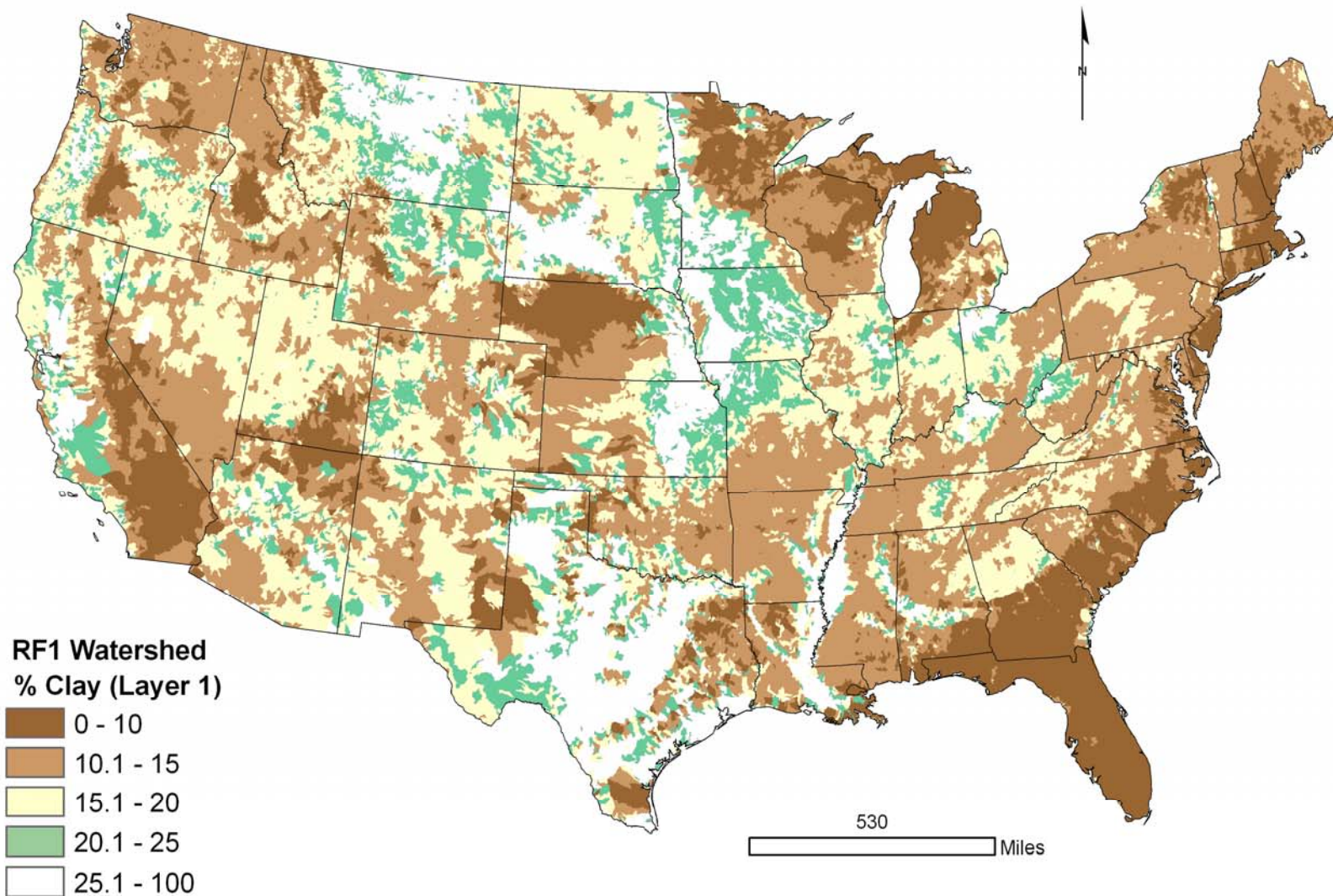


# Acres In-Scope for Various R-Factor Cutoffs

R-Factor	% Acres In-Scope
>10	95
>20	91
>30	88
>40	85
>50	83
>60	81
>70	79
>80	76
>90	73
>100	70



# National Map of Surface Soil % Clay



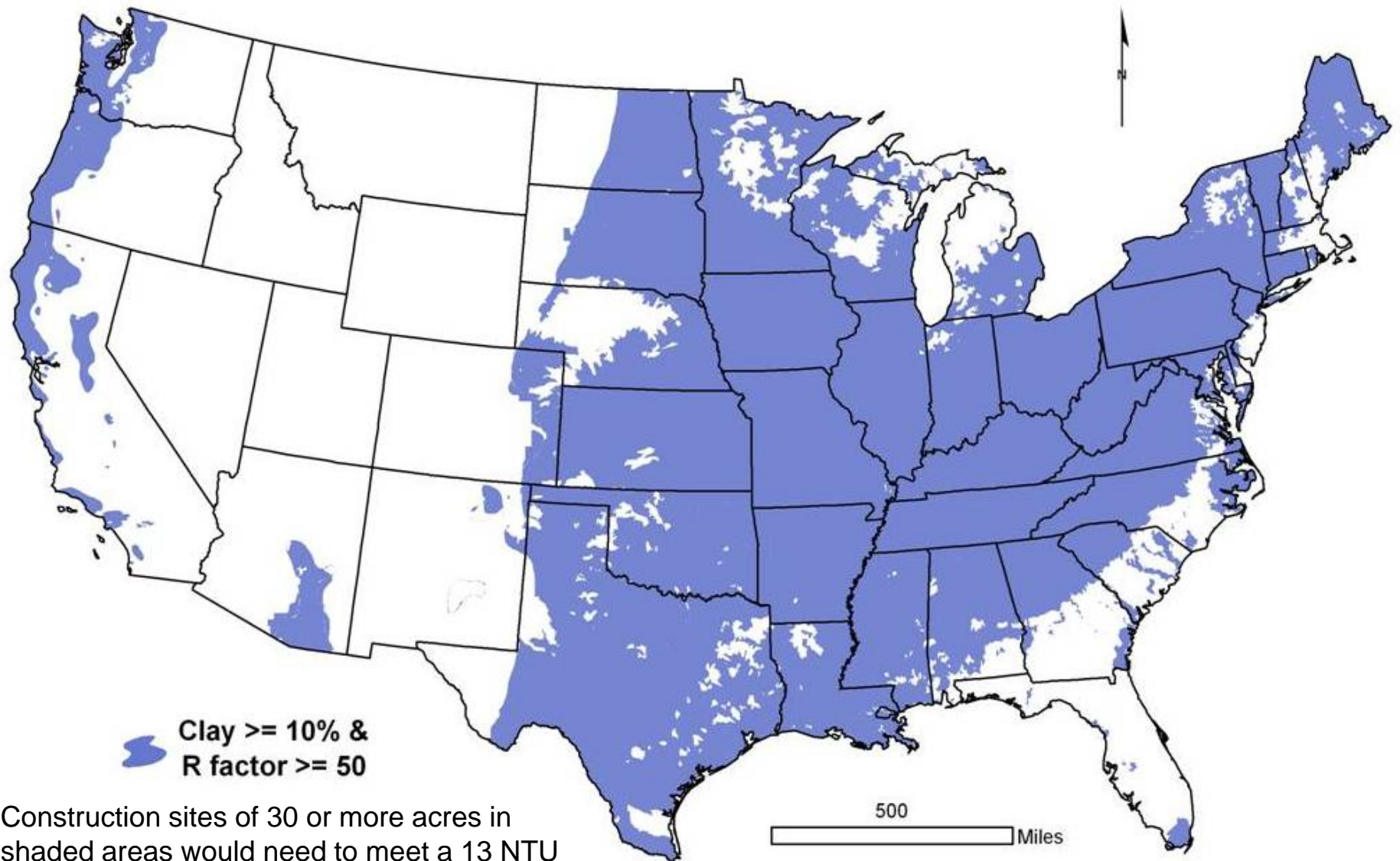
## Acres In-Scope for Various % Clay Contents (surface layer)


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Clay Content (%)	% Acres In-Scope
>5	91
>10	77
>15	43
>20	19
>25	11
>30	7



# Turbidity Limit National Coverage



 Clay  $\geq$  10% &  
R factor  $\geq$  50

Construction sites of 30 or more acres in shaded areas would need to meet a 13 NTU (daily max) turbidity limit

# Total Acres In-Scope for Proposed Option

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- Larger Sediment Basins
  - 64,300 acres
  - 11% of annual developed acres
- Skimmers and additional sediment storage volume in basins
  - Haven't quantified states that already require this
- Turbidity Limit
  - 233,800 acres
  - 40% of annual developed acres



# ATS and Basin Costs

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- Sediment basin costs
  - Construction costs = \$0.53 per cubic foot of storage
  - Maintenance costs = 25% of construction costs
- ATS costs
  - \$0.02 per gallon treated
  - Treatment volume estimated using following assumptions
    - 40% of annual precipitation is converted to runoff
    - 90% of site is contributing runoff
    - Project duration is 9 months (75% of annual runoff treated)
  - Storage required for runoff from 2-year, 24-hour storm, cost of \$0.53 per cubic foot
- Costs for skimmers, additional sediment storage volume in basins and other BMPs not included in EPA's estimates



# Example Project Costs – 33 Acre Residential Project

	Annual Precip. (inches)	Runoff Volume (million gallons)	Storage Cost	ATS Cost	Total Cost
Alabama	49	11.86	\$217,000	\$237,000	\$454,000
Florida	62	15.00	\$212,000	\$300,000	\$512,000
Wyoming*	15	3.56	\$21,000		\$21,000
Texas**	33	7.87		\$157,000	\$157,000
Pennsylvania	42	10.07	\$60,000	\$201,000	\$261,000

\*All of Wyoming has R-factor <50, so turbidity limit is not required. Instead, projects ≥10 acres would only be required to install larger sediment basins.

\*\*Texas already requires sediment basins designed for 2-year, 24-hour storms, so additional storage volume for ATS is not required.



# Proposed Rule Coverage and Economic Impacts

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- BMP requirements apply to entire country – about 590,000 acres per year
  - Larger sediment basins apply to about 64,000 acres per year located in 12 states plus territories
  - Numeric turbidity standard applies to about 234,000 acres per year, or about 40% of annual development acres
- Of the approximately 269,000 firms in the construction and development industry, we estimate that approximately 81,600 would be subject to requirements of the proposed rule
  - 53,500 in residential sector
  - 22,400 in non-residential sector
  - 5,700 in street and highway construction
- Annual costs, once fully implemented, of \$1.9 billion
- We estimate 147 firms (0.2% of in-scope firms) may incur financial stress and 103 potential firm closures (0.1% of in-scope firms)
- Potential employment impacts to 11,400 jobs (0.1% of in-scope firm employees)



# Schedule

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- Proposed rule published in the Federal Register November 28, 2008
- 90 day public comment period ends February 26, 2009
- Response to comments, re-analysis of options, update cost and economic impacts: Spring/Summer/Fall 2009
- Must publish final rule by December 1, 2009
- Effective 90 days after publication in Federal Register
- EPA and States must incorporate requirements into permits within 5 years of effective date – full implementation expected by early 2015



# Submitting Comments

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- [www.regulations.gov](http://www.regulations.gov) web site
  - Enter EPA-HQ-OW-2008-0465 in the “Search Documents” field
  - In banner on left, click on “Proposed Rules” link
  - Click on “Send a Comment or Submission”
  - Fill out form and add any attachments with your comments
- Email comments to [OW-Docket@epa.gov](mailto:OW-Docket@epa.gov)
- Mail to:
  - USEPA Docket Center
  - Environmental Protection Agency
  - Docket Number EPA-HQ-OW-2008-0465
  - Mailcode 2822T
  - 1200 Pennsylvania Ave., NW
  - Washington, DC 20460



# Areas EPA is Likely to Evaluate for Final Rule

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- Site size threshold – current turbidity limit is for sites 30+ acres
  - May evaluate different site size threshold
  - May evaluate disturbed acres vs. total site size
- R-factor threshold – current threshold is annual value of  $\geq 50$ : may evaluate other thresholds
  - Seasonal R-factor
  - Rain on snow/spring thaw effects on R-factor
- Annual Precipitation – may evaluate using annual precipitation instead of R-factor
- Linear projects (pipelines, roads/highways, sewers, utilities) – may evaluate different requirements for linear projects due to ROW concerns
- Turbidity limit – may collect additional data on ATS and passive treatment technologies, which may impact the NTU limit



# More Information

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C&D Web Page

<http://www.epa.gov/waterscience/guide/construction/>

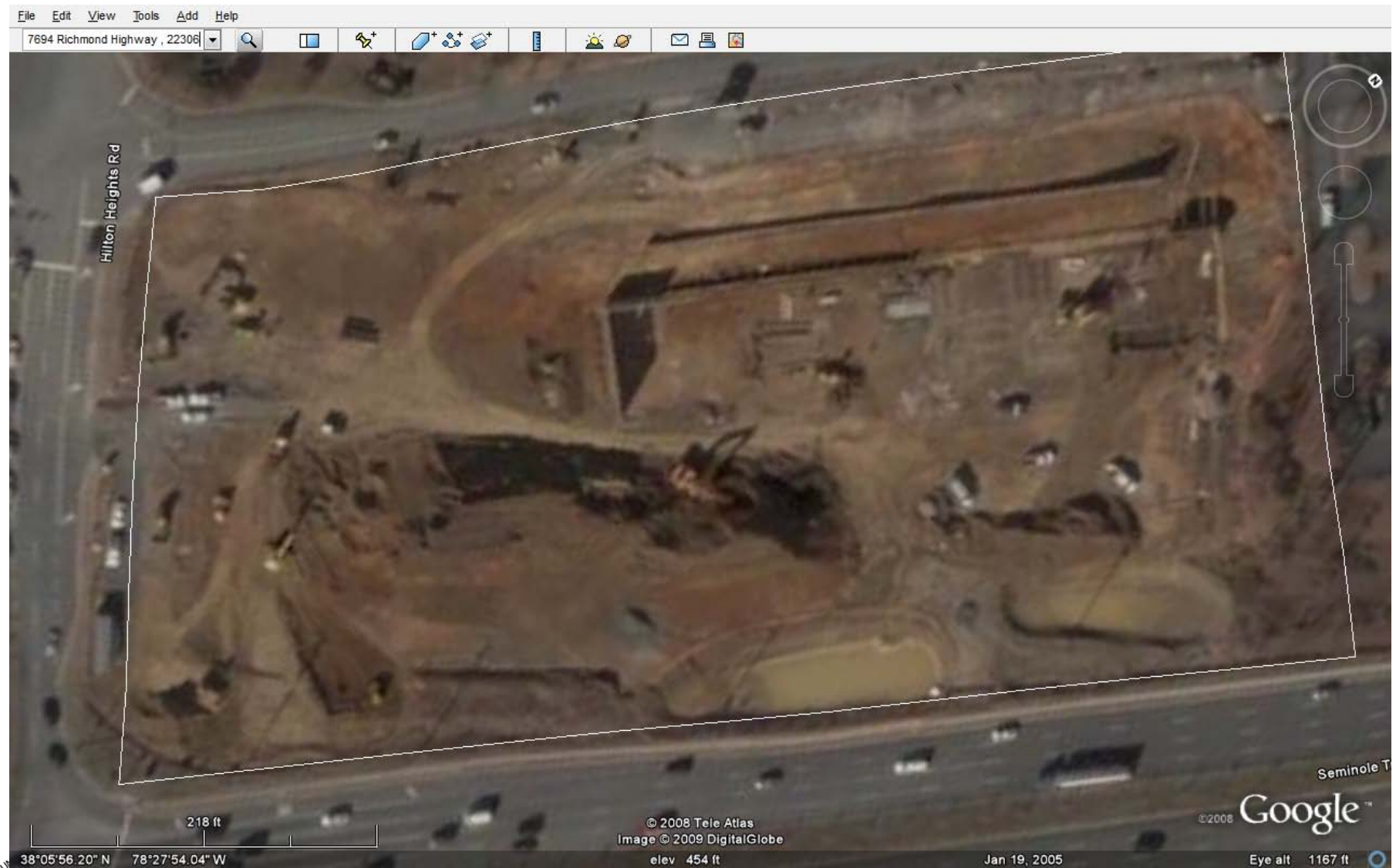
Jesse Pritts

[pritts.jesse@epa.gov](mailto:pritts.jesse@epa.gov)

202-566-1038



# Clay Content Example – 6.2 Acre Project, Charlottesville VA



# USDA Web Soil Survey – Define AOI

**USDA** United States Department of Agriculture  
Natural Resources Conservation Service

Web Soil Survey

Contact Us | Download Soils Data | Archived Soil Surveys | Glossary | Preferences | Logout | Help

Area of Interest (AOI) | Soil Map | Soil Data Explorer | Shopping Cart (Free)

**Search**

**Area of Interest Properties**

Clear AOI

**AOI Information**

Name:

Map Unit Symbols

- Use Soil Survey Area Map Unit Symbols
- Use National Map Unit Symbols

Area (acres): 6.2

**Soil Data Available from Web Soil Survey**

**Albemarle County, Virginia (VA003)**

Soil Maps: Version 1, Jul 1, 2004

Soil Data: Version 8, Dec 15, 2008

Clear AOI

**Quick Navigation**

**Navigate By...**

Address:

State and County:

Soil Survey Area:

**Latitude and Longitude**

Use Degrees/Minutes/Seconds | View

Latitude:

Decimal Degrees:

**Area of Interest Interactive Map**

View Extent: Contiguous U.S.

Scale: (not to scale)

Albemarle VA

29

0 217ft

Environmental Protection Agency

2 Fir... | 3 Wi... | Googl... | Jesse ... | Micro... | 3 Int... | 3 Mi... | 6:58 PM

# Report of Soils by Type

USDA United States Department of Agriculture  
Natural Resources Conservation Service

Web Soil Survey

Contact Us | Download Soils Data | Archived Soil Surveys | Glossary | Preferences | Logout | Help

Area of Interest (AOI) | **Soil Map** | Soil Data Explorer | Shopping Cart (Free)

Printable Version | Add to Shopping Cart

Search

Map Unit Legend

Albemarle County, Virginia (VA003)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
34B	Glenelg loam, 2 to 7 percent slopes	0.6	10.0%
34C	Glenelg loam, 7 to 15 percent slopes	1.8	29.5%
39D	Hazel loam, 15 to 25 percent slopes	1.1	17.6%
93C	Watt channery silt loam, 7 to 15 percent slopes	1.1	18.2%
93D	Watt channery silt loam, 15 to 25 percent slopes	1.5	24.7%
<b>Totals for Area of Interest</b>		<b>6.2</b>	<b>100.0%</b>

Soil Map

Scale (not to scale)

Warning: Soil Map may not be valid at this scale.

FOIA | Accessibility Statement | Privacy Policy | Non-Discrimination Statement | Information Quality | USA.gov | White House



Office of Water

# Soil Physical Properties, Including % Clay

**Percent Clay**

[View Description](#) [View Rating](#)

**View Options** ? ↕

Map

Table

Description of Rating

Rating Options

Detailed Description

**Advanced Options** ? ↕

Aggregation Method: Dominant Component

Component Percent Cutoff:

Tie-break Rule:  Lower  Higher

Interpret Nulls as Zero:  Yes  No

Layer Options:  Surface Layer  Depth Range

Top Depth:

Bottom Depth:

Inches  Centimeters

All Layers

[View Description](#) [View Rating](#)

Percent Sand

Percent Silt

Plasticity Index

Saturated Hydraulic Conductivity (Ksat)

Saturated Hydraulic Conductivity (Ksat), Standard Classes



**Warning:** Soil Ratings Map may not be valid at this scale.

## Tables — Percent Clay — Summary By Map Unit

### Summary by Map Unit — Albemarle County, Virginia

Map unit symbol	Map unit name	Rating (percent)	Acres in AOI	Percent of AOI
34B	Glenelg loam, 2 to 7 percent slopes	20.0	0.6	10.0%
34C	Glenelg loam, 7 to 15 percent slopes	20.0	1.8	29.5%
39D	Hazel loam, 15 to 25 percent slopes	12.5	1.1	17.6%
93C	Watt channery silt loam, 7 to 15 percent slopes	18.5	1.1	18.2%
93D	Watt channery silt loam, 15 to 25 percent slopes	18.5	1.5	24.7%
<b>Totals for Area of Interest</b>			<b>6.2</b>	<b>100.0%</b>

### Description — Percent Clay

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. The estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Most of the material is in one of three groups of clay minerals or a mixture of these clay minerals. The groups are kaolinite, smectite, and hydrous mica, the best known member of which is illite.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

### Rating Options — Percent Clay

**Units of Measure:** percent



# Area Weighted Clay Content

Map Unit Symbol	Percent Clay	Acres in Area	Percent of AOI	Area Weighted % Clay
34B	20	0.6	10.0%	2.00
34C	20	1.8	29.5%	5.90
39D	12.5	1.1	17.6%	2.20
93C	18.5	1.1	18.2%	3.37
93D	18.5	1.5	24.7%	4.57
Area Weighted Percent Clay				18.04

