Potesta & Associates, Inc.
Engineers & Environmental Consultants

Charleston, West Virginia ■ Morgantown, West Virginia ■ Winchester, Virginia

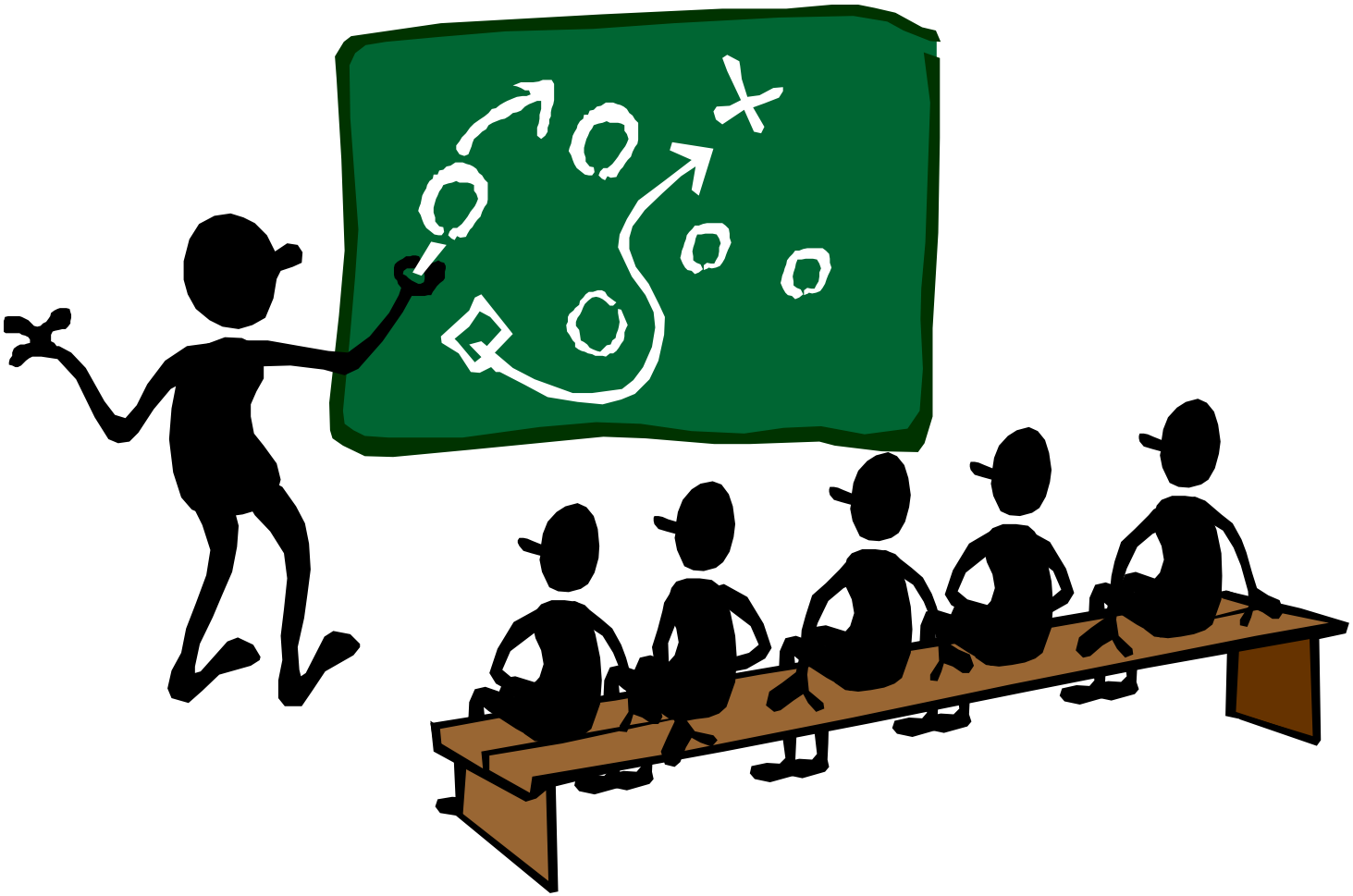
"Stream Restoration and Mitigation: Requirements of the Army Corps of Engineers"



Presenters:
Jessica Yeager

March 25, 2014

Permitting 101



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Statutory Authorities

Section 10 of the Rivers and Harbors Act of 1899

Requires approval prior to any work in, on, over or under navigable waters of the United States, or which affects the course, location, condition or capacity of such waters

Section 404 of the Clean Water Act

Requires approval prior to discharging dredged or fill material into the waters of the United States

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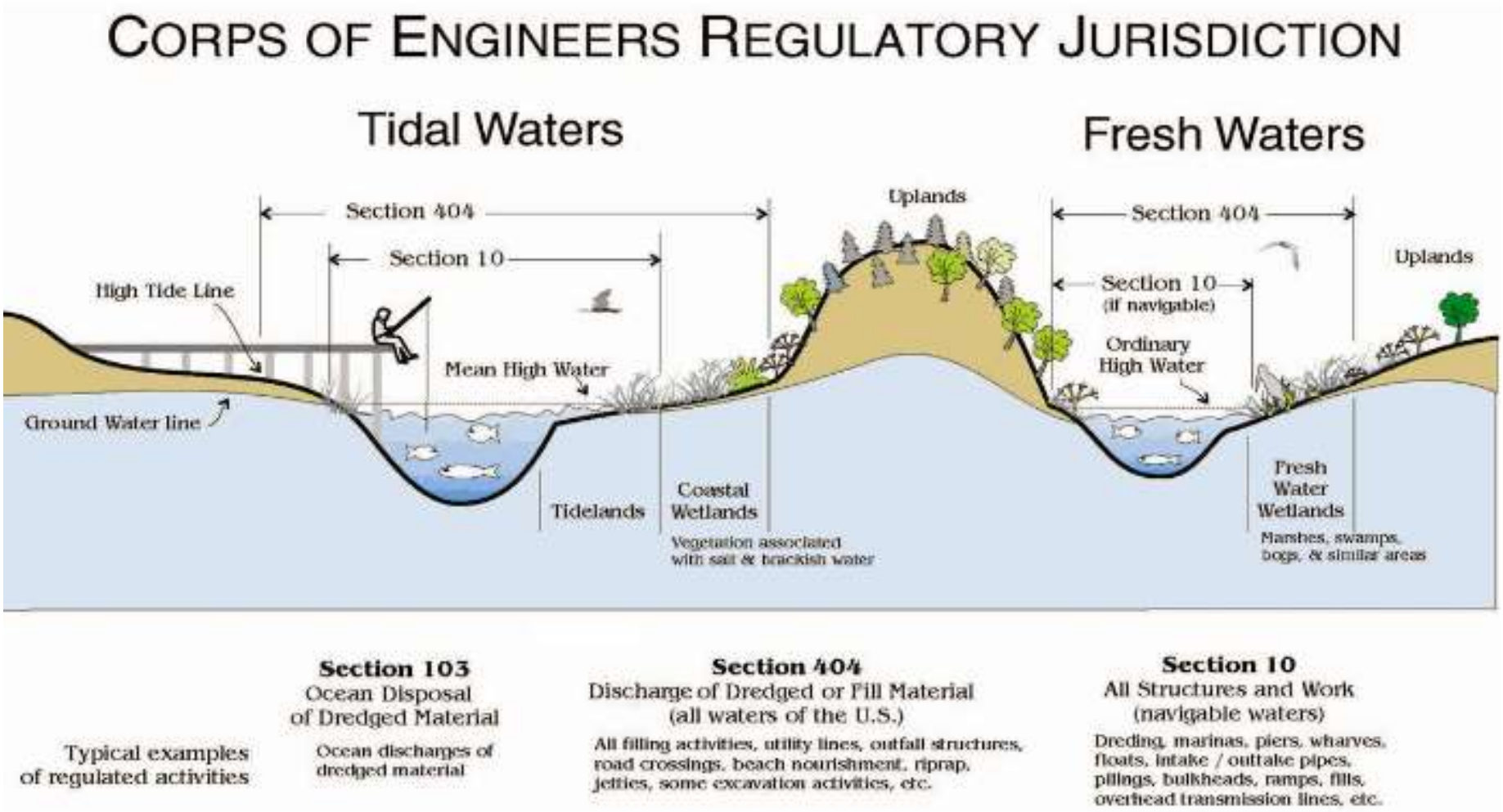
So what is Jurisdictional?



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Section 10 River
Kanawha River

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Is this a Section 10 River ?

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Section 10 River

Coal River – Normal Flow Conditions

YES

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Activities That Require Section 10

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Section 404 of the CWA Dredged and Fill Material

- Wetlands
- Channels with a Defined Bed and Bank that have an OHWM
  - Intermittent and Perennial Streams (or Relatively Permanent Waters)
  - Ephemeral Channels (that pass the significant nexus test)
- Tidal Areas, Mud Flats….(or things we don't see in WV that still fall under Section 404)



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Rapanos v. United States

Carabell v. United States

"Rapanos"

Aquatic Resources Post Rapanos

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When You Hear The Term Wetland…….

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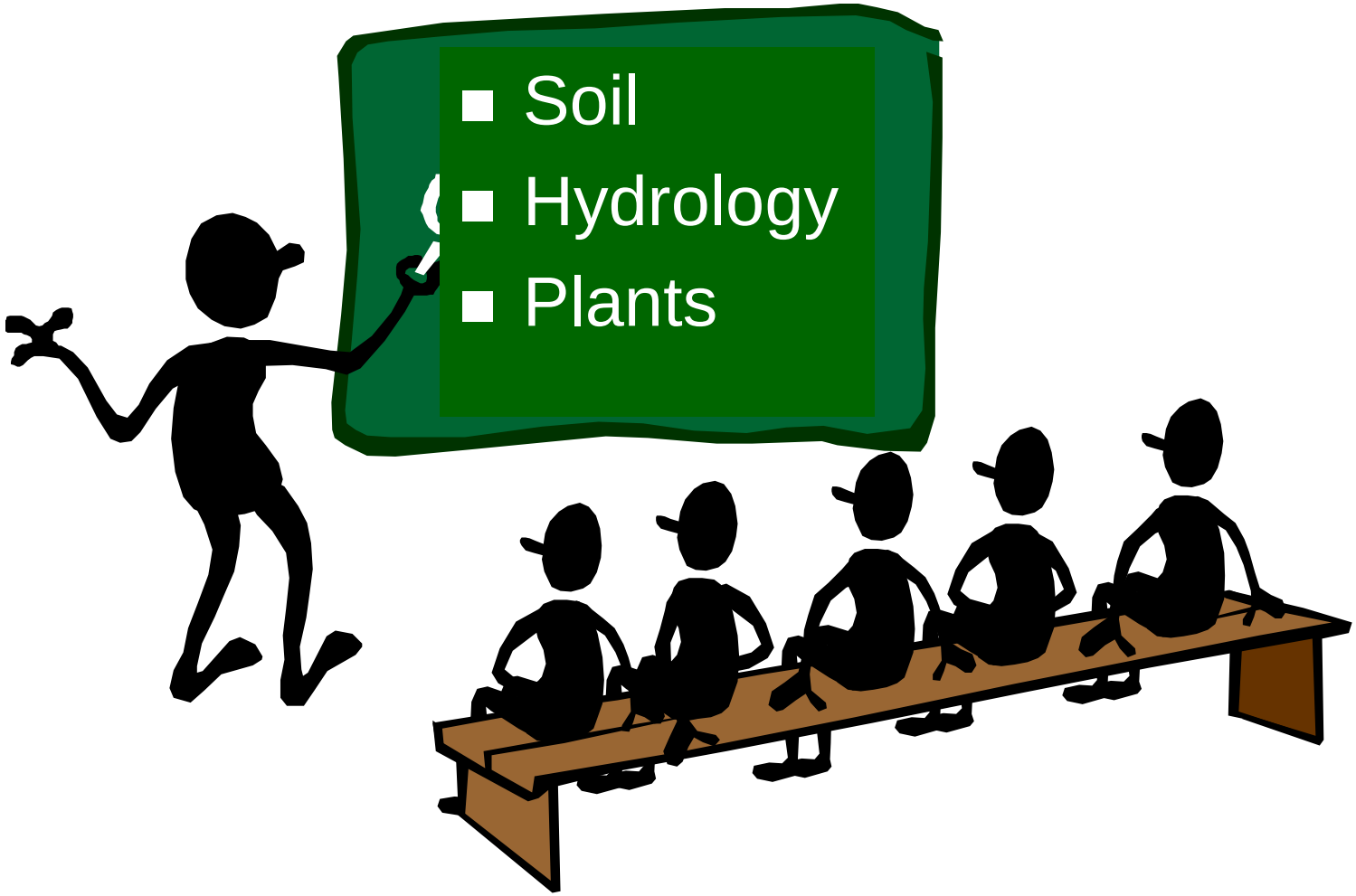
What Makes A Wetland A Wetland Are Three Features



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Is this a Wetland?

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STREAMS

E

A

S

Y!!!!!!!!

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HARDER TO DEFINE

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Significant Nexus Evaluation (SNE)

This will require an assessment of both **hydrologic** and **ecological** factors

- Hydrologic – volume duration and frequency of flow, proximity to the TNW, size of the watershed, rainfall, snowpack etc.

- Ecological – the ability of the tributary and/or adj. wetlands to carry pollutants and flood waters to TNWs, or to provide aquatic habitat that supports biota of a TNW or to trap/filter pollutants; store flood waters or maintain water quality of a TNW

Surprise!!!!!

Delineations Can be Deadly

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Why you shouldn't delineate in the Rain…….

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Was This A Stream?

- Has Bed And Bank Features
- Perennial In Nature – Originated From A Seep
- Close To A TNW

Well Look What I Did!!!!!

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Pre-Construction Delineation

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Section 404
Do I need a permit?

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Regulated Activities

Discharge of dredged or fill material into waters of the United States

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Regulated Activities

Discharge of dredged or fill material into waters of the United States

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Regulated Activities

Placement of material below the Ordinary High Water Mark

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TYPES OF PERMITS

- **GENERAL PERMITS**

  Nationwide Permit

  Regional General Permits

- **INDIVIDUAL PERMITS**

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Mitigation Rule

- **Goal** – level playing field (permittee, Mitigation Banks, ILFs) to the maximum extent practicable
- **Mitigation sequence retained**
  - avoid, minimize, compensate for unavoidable impacts and lost aquatic functions
- **Preference hierarchy for mitigation options:**
  - Mitigation bank credits
  - In-lieu fee program credits
  - Permittee-responsible mitigation under a watershed approach
    - On-site and/or in-kind permittee-responsible mitigation
    - Off-site and/or out-of-kind permittee-responsible mitigation
- **Watershed Approach**
- **Performance Standards** – ecologically-driven, equivalent/effective standards, best available science
- **Compliance** – increase compliance visits, establish enforceable success criteria, prescribed monitoring reports
- **Adaptive management** – make fixes for successful performance
- **Does not change *when* mitigation is required**
- **Does change *where* and *how***

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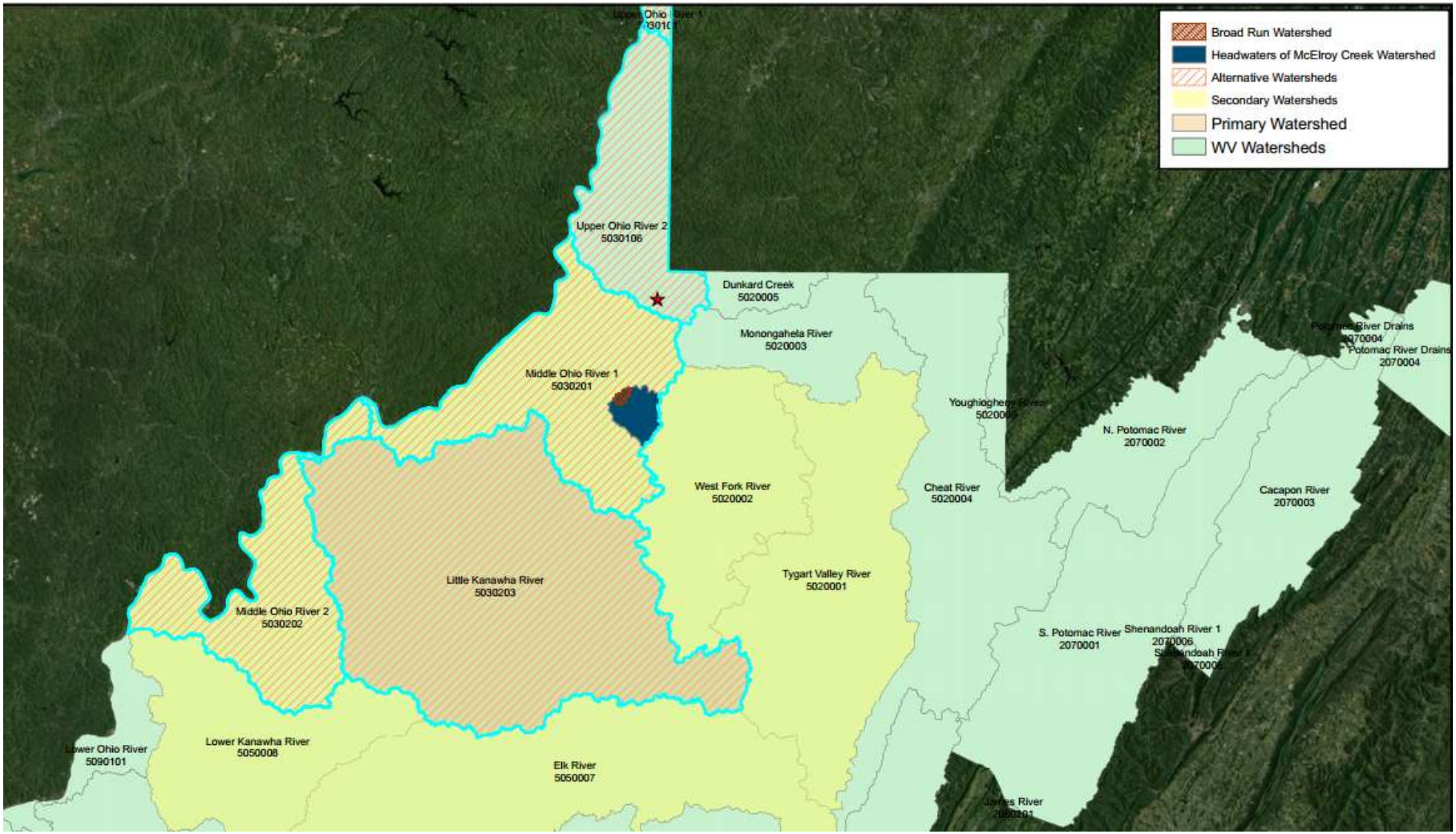
Watershed_Approach



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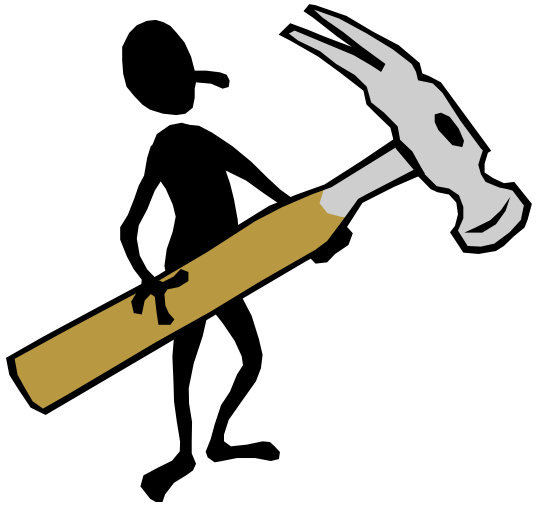

ILF

Enhancement

Rehabilitation

Restoration

Preservation

Compensation

Banking

HOW DOES IT WORK?????

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STEP 1

- Determine Your Impacts
- Determine Existing Condition of the Impact Area
  - SWVM
    - HGM – Functional Capacity Scores
    - Physical Indicators – RBP Scores
    - Chemical Indicators – Water Quality
    - Biological Indicators - WVSCI

West Virginia Stream and Wetland Valuation Metric

(Stream Valuation Metric - Worksheet 1 of 3)

USACE FILE NO./Project Name:	Reynolds Creek Development (SWVM V2.0 Example)		IMPACT COORDINATES: (in Decimal Degrees)	Lat.	-81.5346	Lon.	39.1713	WEATHER:	Cloudy, 40 degrees	DATE:	January 24, 2011
STREAM CLASSIFICATION:	Intermittent		IMPACT STREAM/SITE ID AND SITE DESCRIPTION: (X stream stage, watershed size (acreage), unaltered or impairments)		Channel Slope 4%, 70 ac Watershed, Un-impaired Forestland			MITIGATION STREAM CLASS./SITE ID AND SITE DESCRIPTION: (X stream stage, watershed size (acreage), unaltered or impairments)			Intermittent, Channel Slope 4.5%, 85 ac Watershed, minimal impairments due to gas exploration and logging
STREAM IMPACT LENGTH:	250	FORM OF MITIGATION:	Permittee Responsible-Onsite	MIT COORDINATES: (in Decimal Degrees)	Lat.	-81.5213	Lon.	39.2314	PRECIPITATION PAST 48 HRS:	0.1	Mitigation Length:	475

Column No. 1- Impact Existing Condition (Debit)				Column No. 2- Mitigation Existing Condition - Baseline (Credit)				Column No. 3- Mitigation Projected at Five Years Post Completion (Credit)				Column No. 4- Mitigation Projected at Ten Years Post Completion (Credit)				Column No. 5- Mitigation Projected At Maturity (Credit)			
HGM Score (attach data forms):			Average	HGM Score (attach data forms):			Average	HGM Score (attach data forms):			Average	HGM Score (attach data forms):			Average	HGM Score (attach data forms):			Average
Hydrology			0.824	Hydrology			0.432	Hydrology			0.715	Hydrology			0.795	Hydrology			0.798
Biogeochemical Cycling			0.753	Biogeochemical Cycling			0.389	Biogeochemical Cycling			0.692	Biogeochemical Cycling			0.723	Biogeochemical Cycling			0.765
Habitat			0.798	Habitat			0.382	Habitat			0.783	Habitat			0.862	Habitat			0.883
			0.79167				0.401				0.73				0.79333				0.8153
PART I - Physical, Chemical and Biological Indicators				PART I - Physical, Chemical and Biological Indicators				PART I - Physical, Chemical and Biological Indicators				PART I - Physical, Chemical and Biological Indicators				PART I - Physical, Chemical and Biological Indicators			
	Point	Range	Site Score		Point	Range	Site Score		Point	Range	Site Score		Point	Range	Site Score		Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all stream classifications)				PHYSICAL INDICATOR (Applies to all stream classifications)				PHYSICAL INDICATOR (Applies to all stream classifications)				PHYSICAL INDICATOR (Applies to all stream classifications)				PHYSICAL INDICATOR (Applies to all stream classifications)			
USEPA RBP (High Gradient Data Sheet)				USEPA RBP (High Gradient Data Sheet)				USEPA RBP (High Gradient Data Sheet)				USEPA RBP (High Gradient Data Sheet)				USEPA RBP (High Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20	0-1	16	1. Epifaunal Substrate/Available Cover	0-20	0-1	8	1. Epifaunal Substrate/Available Cover	0-20	0-1	14	1. Epifaunal Substrate/Available Cover	0-20	0-1	16	1. Epifaunal Substrate/Available Cover	0-20	0-1	18
2. Embeddedness	0-20		16	2. Embeddedness	0-20		8	2. Embeddedness	0-20		14	2. Embeddedness	0-20		16	2. Embeddedness	0-20		18
3. Velocity/ Depth Regime	0-20		16	3. Velocity/ Depth Regime	0-20		8	3. Velocity/ Depth Regime	0-20		14	3. Velocity/ Depth Regime	0-20		16	3. Velocity/ Depth Regime	0-20		18
4. Sediment Deposition	0-20		16	4. Sediment Deposition	0-20		8	4. Sediment Deposition	0-20		14	4. Sediment Deposition	0-20		16	4. Sediment Deposition	0-20		18
5. Channel Flow Status	0-20		16	5. Channel Flow Status	0-20		8	5. Channel Flow Status	0-20		14	5. Channel Flow Status	0-20		16	5. Channel Flow Status	0-20		18
6. Channel Alteration	0-20		16	6. Channel Alteration	0-20		12	6. Channel Alteration	0-20		14	6. Channel Alteration	0-20		14	6. Channel Alteration	0-20		15
7. Frequency of Riffles (or bends)	0-20		14	7. Frequency of Riffles (or bends)	0-20		12	7. Frequency of Riffles (or bends)	0-20		14	7. Frequency of Riffles (or bends)	0-20		14	7. Frequency of Riffles (or bends)	0-20		16
8. Bank Stability (LB & RB)	0-20		14	8. Bank Stability (LB & RB)	0-20		12	8. Bank Stability (LB & RB)	0-20		14	8. Bank Stability (LB & RB)	0-20		18	8. Bank Stability (LB & RB)	0-20		18
9. Vegetative Protection (LB & RB)	0-20		14	9. Vegetative Protection (LB & RB)	0-20		12	9. Vegetative Protection (LB & RB)	0-20		14	9. Vegetative Protection (LB & RB)	0-20		18	9. Vegetative Protection (LB & RB)	0-20		18
10. Riparian Vegetative Zone Width (LB & RB)	0-20		18	10. Riparian Vegetative Zone Width (LB & RB)	0-20		12	10. Riparian Vegetative Zone Width (LB & RB)	0-20		14	10. Riparian Vegetative Zone Width (LB & RB)	0-20		18	10. Riparian Vegetative Zone Width (LB & RB)	0-20		18
Total RBP Score	Suboptimal		156	Total RBP Score	Marginal		100	Total RBP Score	Suboptimal		140	Total RBP Score	Suboptimal		162	Total RBP Score	Optimal		175
Sub-Total			0.78	Sub-Total			0.5	Sub-Total			0.7	Sub-Total			0.81	Sub-Total			0.875
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)				WVDEP Water Quality Indicators (General)				WVDEP Water Quality Indicators (General)				WVDEP Water Quality Indicators (General)				WVDEP Water Quality Indicators (General)			
Specific Conductivity				Specific Conductivity				Specific Conductivity				Specific Conductivity				Specific Conductivity			
100-199 - 85 points	0-31	0-1	100	500-599 - 50 points	0-31	0-1	500	300-399 - 70 points	0-31	0-1	375	300-399 - 70 points	0-31	0-1	350	300-399 - 70 points	0-31	0-1	350
pH				pH				pH				pH				pH			
6.0-8.0 - 80 points	0-31		6.2	4.6-5.5 - 10 points	0-31		5.3	4.6-5.5 - 10 points	0-31		5.5	5.6-6.0 - 45 points	0-31		5.7	5.6-6.0 - 45 points	0-31		5.7
DO				DO				DO				DO				DO			
<5.0 - 10 points	10-31		12	<5.0 - 10 points	10-31		4	>5.0 - 30 points	10-31		6	>5.0 - 30 points	10-31		8	>5.0 - 30 points	10-31		8
Sub-Total			0.975	Sub-Total			0.35	Sub-Total			0.45	Sub-Total			0.725	Sub-Total			0.725
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WV Stream Conditions Index (WVSCI)				WV Stream Conditions Index (WVSCI)				WV Stream Conditions Index (WVSCI)				WV Stream Conditions Index (WVSCI)				WV Stream Conditions Index (WVSCI)			
Good	0-100	0-1	72	Grey Zone	0-100	0-1	63	Grey Zone	0-100	0-1	65	Good	0-100	0-1	70	Good	0-100	0-1	72
Sub-Total			0.72	Sub-Total			0.63	Sub-Total			0.65	Sub-Total			0.7	Sub-Total			0.72

PART II - Index and Unit Score			PART II - Index and Unit Score			PART II - Index and Unit Score			PART II - Index and Unit Score			PART II - Index and Unit Score		
Index	Linear Feet	Unit Score	Index	Linear Feet	Unit Score	Index	Linear Feet	Unit Score	Index	Linear Feet	Unit Score	Index	Linear Feet	Unit Score
0.808333333	250	202.083	0.447166667	475	212.4	0.665	475	315.88	0.769166667	475	365.354	0.794333333	475	377.31

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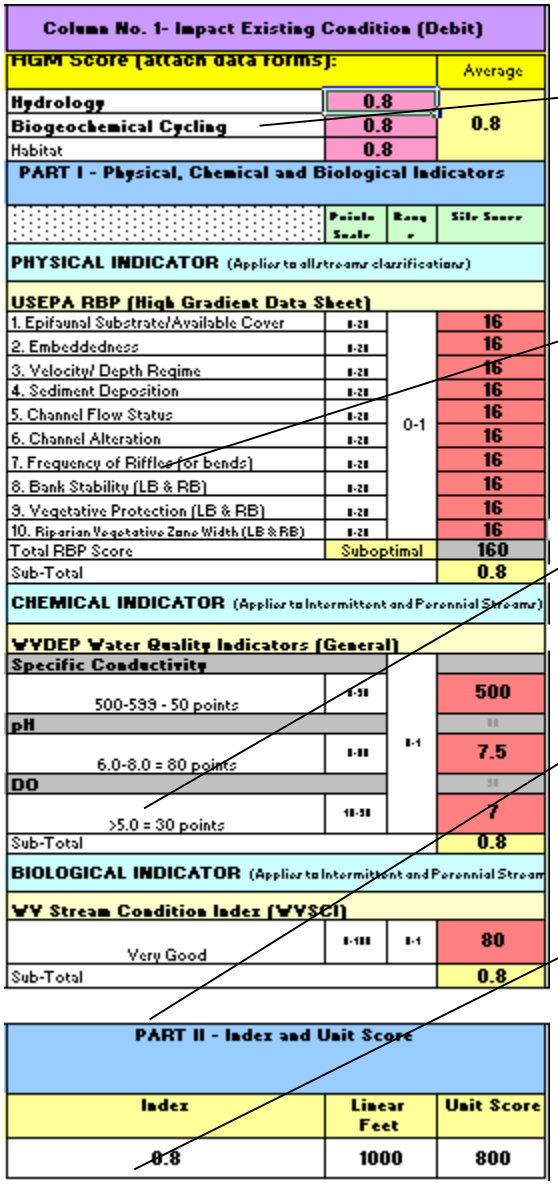

Column No. 1- Impact Existing Condition (Debit)			
HGM Score (attach data forms):			Average
Hydrology	0.8		
Biogeochemical Cycling	0.8		0.8
Habitat	0.8		
PART I - Physical, Chemical and Biological Indicators			
	Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all stream classifications)			
USEPA RBP (High Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20	0-1	16
2. Embeddedness	0-20		16
3. Velocity/ Depth Regime	0-20		16
4. Sediment Deposition	0-20		16
5. Channel Flow Status	0-20		16
6. Channel Alteration	0-20		16
7. Frequency of Riffles (or bends)	0-20		16
8. Bank Stability (LB & RB)	0-20		16
9. Vegetative Protection (LB & RB)	0-20		16
10. Riparian Vegetative Zone Width (LB & RB)	0-20		16
Total RBP Score	Suboptimal		160
Sub-Total			0.8
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity			
500-599 - 50 points	0-50	0-1	500
pH			
6.0-8.0 = 80 points	0-80		7.5
DO			
>5.0 = 30 points	10-30		7
Sub-Total			0.8
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WV Stream Condition Index (WVSCI)			
Very Good	0-100	0-1	80
Sub-Total			0.8

PART II - Index and Unit Score		
Index	Linear Feet	Unit Score
0.8	1000	800

HGM Scores

+

Physical Indicators
RBP Scores

+

Chemical Indicators

+

Biological Indicators
WVSCI Scores

=

Index Score

The Index Score multiplied by the linear footage provides a Unit Score

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STEP 2

- Determine Your Mitigation
- Determine Existing Condition of the Mitigation Area
- Predict Mitigation Site Condition at:
  - 5 years
  - 10 years
  - 20 years

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Column No. 2- Mitigation Existing Condition - Baseline (Credit)

HGM Score (attach data forms):		Average
Hydrology	0.58	
Biogeochemical Cycling	0.61	0.54
Habitat	0.43	

PART I - Physical, Chemical and Biological Indicators

	Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all stream classifications)			
USEPA RBP (High Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20	0-1	9
2. Embeddedness	0-20		9
3. Velocity/ Depth Regime	0-20		12
4. Sediment Deposition	0-20		8
5. Channel Flow Status	0-20		11
6. Channel Alteration	0-20		9
7. Frequency of Riffles (or bends)	0-20		12
8. Bank Stability (LB & RB)	0-20		10
9. Vegetative Protection (LB & RB)	0-20		10
10. Riparian Vegetative Zone Width (LB & RB)	0-20		12
Total RBP Score	Marginal		102
Sub-Total			0.51
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity			
<=33 - 30 points	0-30	0-1	52.9
pH			
6.0-8.0 = 30 points	5-30		6.92
DO			
>5.0 = 30 points	10-30		9.05
Sub-Total			1
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Stream			
WV Stream Condition Index (WVSCI)			
Very Good	0-100	0-1	89.55
Sub-Total			1

PART II - Index and Unit Score

Index	Linear Feet	Unit Score
0.688333333	571	393.04

Column No. 3- Mitigation Projected at Five Years Post Completion (Credit)

HGM Score (attach data forms):		Average
Hydrology	0.63	
Biogeochemical Cycling	0.72	0.62
Habitat	0.51	

PART I - Physical, Chemical and Biological Indicators

	Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all stream classifications)			
USEPA RBP (High Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20	0-1	14
2. Embeddedness	0-20		13
3. Velocity/ Depth Regime	0-20		14
4. Sediment Deposition	0-20		11
5. Channel Flow Status	0-20		13
6. Channel Alteration	0-20		11
7. Frequency of Riffles (or bends)	0-20		14
8. Bank Stability (LB & RB)	0-20		12
9. Vegetative Protection (LB & RB)	0-20		13
10. Riparian Vegetative Zone Width (LB & RB)	0-20		14
Total RBP Score	Suboptimal		129
Sub-Total			0.645
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity			
<=33 - 30 points	0-30	0-1	52.9
pH			
6.0-8.0 = 30 points	5-30		6.92
DO			
>5.0 = 30 points	10-30		9.05
Sub-Total			1
BIOLOGICAL INDICATOR (Applies to Intermittent and Peren			
WV Stream Condition Index (WVSCI)			
Very Good	0-100	0-1	89.55
Sub-Total			1

PART II - Index and Unit Score

Index	Linear Feet	Unit Score
0.750833333	571	428.73

Column No. 4- Mitigation Projected at Ten Years Post Completion (Credit)

HGM Score (attach data forms):		Average
Hydrology	0.78	
Biogeochemical Cycling	0.82	0.76
Habitat	0.68	

PART I - Physical, Chemical and Biological Indicators

	Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all stream classifications)			
USEPA RBP (High Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20	0-1	15
2. Embeddedness	0-20		15
3. Velocity/ Depth Regime	0-20		16
4. Sediment Deposition	0-20		16
5. Channel Flow Status	0-20		16
6. Channel Alteration	0-20		17
7. Frequency of Riffles (or bends)	0-20		15
8. Bank Stability (LB & RB)	0-20		17
9. Vegetative Protection (LB & RB)	0-20		16
10. Riparian Vegetative Zone Width (LB & RB)	0-20		16
Total RBP Score	Suboptimal		159
Sub-Total			0.795
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity			
<=33 - 30 points	0-30	0-1	52.9
pH			
6.0-8.0 = 30 points	5-30		6.92
DO			
>5.0 = 30 points	10-30		9.05
Sub-Total			1
BIOLOGICAL INDICATOR (Applies to Intermittent and Peren			
WV Stream Condition Index (WVSCI)			
Very Good	0-100	0-1	89.55
Sub-Total			1

PART II - Index and Unit Score

Index	Linear Feet	Unit Score
0.845833333	571	482.971

Column No. 5- Mitigation Projected At Maturity (Credit)

HGM Score (attach data forms):		Average
Hydrology	0.9	
Biogeochemical Cycling	0.92	0.8967
Habitat	0.87	

PART I - Physical, Chemical and Biological Indicators

	Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all stream classifications)			
USEPA RBP (High Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20	0-1	16
2. Embeddedness	0-20		16
3. Velocity/ Depth Regime	0-20		17
4. Sediment Deposition	0-20		17
5. Channel Flow Status	0-20		17
6. Channel Alteration	0-20		18
7. Frequency of Riffles (or bends)	0-20		16
8. Bank Stability (LB & RB)	0-20		18
9. Vegetative Protection (LB & RB)	0-20		17
10. Riparian Vegetative Zone Width (LB & RB)	0-20		17
Total RBP Score	Optimal		169
Sub-Total			0.845
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)			
Specific Conductivity			
<=33 - 30 points	0-30	0-1	52.9
pH			
6.0-8.0 = 30 points	5-30		6.92
DO			
>5.0 = 30 points	10-30		9.05
Sub-Total			1
BIOLOGICAL INDICATOR (Applies to Intermittent and Peren			
WV Stream Condition Index (WVSCI)			
Very Good	0-100	0-1	89.55
Sub-Total			1

PART II - Index and Unit Score

Index	Linear Feet	Unit Score
0.9225	571	526.75

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STEP 3

- Determine Temporal Loss
- Determine Long-term Protection
- Determine Buffer
- Determine Restoration Level
- Evaluate ILF

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PART III - Impact Factors
(See instruction page to insert default values for MITIGATION BANKING and ILF)

Temporal Loss-Construction

Note: Reflects duration of aquatic functional loss between the time of an impact (debit) and completion of compensatory mitigation (credit).

Years	0
Sub-Total	0

Temporal Loss-Maturity

Note: Period between completion of compensatory mitigation measures and the time required for maturity, as it relates to baseline (i.e. maturity of tree structure to provide organic matter and detritus within riparian stream or wetland buffer corridor).

% Add. Mitigation	Temporal Loss-Maturity (Years)
0%	0
Sub-Total	0

Long-term Protection

% Add. Mitigation and Monitoring Period	Long-Term Protection (Years)
0 - 5/10 Year Monitoring	101
Sub-Total	0

PART IV - Index to Unit Score Conversion

Final Index Score	Linear Feet	Unit Score (Debit)	ILF Costs (Offsetting Debit Units)
0.8	1000	800	$640,000.00

PART V- Comparison of Unit Scores and Projected Balance

Final Unit Score (Debit) [No Net Loss Value]	800	Mitigation Existing Condition - Baseline (Credit)	393.038333	Mitigation Projected at Five Years Post Completion	428.725833	Mitigation Projected at Ten Years Post Completion (Credit)	482.97083	Mitigation Projected At Maturity (Credit)	526.748
FINAL PROJECTED NET BALANCE					35.6875		89.9325		133.709

Part VI - Mitigation Considerations (Incentives)

Extent of Stream Restoration

*Note1: Reference the instructional handout to determine the correct Restoration Levels (below) for your project
*Note2: Place an "X" in the appropriate category (only select one).

Level I Restoration	
Level II Restoration	x
Level III Restoration	

Extended Upland Buffer Zone

*Note1: Reference instructional handout for the definitions of the Buffer Zone Mitigation Criteria and Types (below)
*Note2: Enter the buffer width for each channel side (Left Bank and Right Bank)
*Note3: Select the appropriate mitigation type

Buffer Width	Left Bank	
25	0-50	Preservation and Re-vegetation
	51-150	Preservation

Buffer Width	Right Bank	
25	0-50	Preservation and Re-vegetation
	51-150	Preservation
Average Buffer	25	

Site	Impact Unit Yield (Debit)	Mitigation Unit Yield (Credit)
Main Channel Dog Branch (DB 3-4)	800	257.3901

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Long-term Protection	
% Add. Mitigation and Monitoring Period	Long-Term Protection (Years)
0 - 5/10 Year Monitoring	101
Sub-Total	0

PART IV - Index to Unit Score Conversion			
Final Index Score	Linear Feet	Unit Score (Debit)	ILF Costs (Offsetting Debit Units)
0.8	1000	800	$640,000.00

Temporal Loss-Construction	
Note: Estimate duration of aquatic functional loss between the time of an impact (debit) and completion of compensatory mitigation (credit).	
Years	5
Sub-Total	0.12

Temporal Loss-Maturity	
Note: Period between completion of compensatory mitigation measures and the time required for maturity, as it relates to function (i.e. maturity of tree stratum to provide organic matter and detritus within riparian stream or wetland buffer corridor).	
% Add. Mitigation	Temporal Loss-Maturity (Years)
50%	20
Sub-Total	0.24

Long-term Protection	
% Add. Mitigation and Monitoring Period	Long-Term Protection (Years)
20% - 5/10 Year Monitoring	50
Sub-Total	0.3208

PART IV - Index to Unit Score Conversion			
Final Index Score	Linear Feet	Unit Score (Debit)	ILF Costs (Offsetting Debit Units)
1.4808	1000	1480.8	$1,184,640.00

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Temporal Loss-Construction	
Note: Reflects duration of aquatic functional loss between the time of an impact (debit) and completion of compensatory mitigation (credit).	
Years	5
Sub-Total	0.12

Temporal Loss-Maturity	
Note: Period between completion of compensatory mitigation measures and the time required for maturity, as it relates to function (i.e. maturity of tree stratum to provide aquatic matter and detritus within riparian stream or wetland habitat corridor).	
% Add. Mitigation	Temporal Loss-Maturity (Years)
50%	20
Sub-Total	0.24

Long-term Protection	
% Add. Mitigation and Monitoring Period	Long-Term Protection (Years)
20% - 5/10 Year Monitoring	50
Sub-Total	0.3200

PART IV - Index to Unit Score Conversion			
Final Index Score	Linear Feet	Unit Score (Debit)	ILF Costs (Offsetting Debit Units)
1.4800	1000	1480.0	$1,184,640.00

PART V- Comparison of Unit Scores and Projected Balance									
Final Unit Score (Debit) [No Net Loss Value]	1480.8	Mitigation Existing Condition - Baseline (Credit)	393.038333	Mitigation Projected at Five Years Post Completion	428.725833	Mitigation Projected at Ten Years Post Completion (Credit)	482.97083	Mitigation Projected At Maturity (Credit)	526.748
FINAL PROJECTED NET BALANCE					35.6875		89.9325		133.709

Part VI - Mitigation Considerations (Incentives)

Extent of Stream Restoration *Note1: Reference the Instructional handout to determine the overall Restoration Levels (below) for your project *Note2: Place an "X" in the appropriate category (only select one).	
Level I Restoration	
Level II Restoration	x
Level III Restoration	

Extended Upland Buffer Zone *Note¹: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below) *Note²: Enter the buffer width for each channel side (Left Bank and Right Bank) *Note³: Select the appropriate mitigation type		
Buffer Width	Left Bank	
25	0-50	Preservation and Re-vegetation
	51-150	Preservation
Buffer Width	Right Bank	
25	0-50	Preservation and Re-vegetation
	51-150	Preservation
Average Buffer	25	

Site	Impact Unit Yield (Debit)	Mitigation Unit Yield (Credit)
Main Channel Den Branch (DB 3-4)	1480.8	257.3901

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STEP 4

- Determine Which Mitigation Avenue to Pursue

ANY QUESTIONS??????

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