

# ASSESSMENT OF INDIRECT EFFECTS IN WETLANDS

USACE, Jacksonville District



US Army Corps of Engineers  
**BUILDING STRONG**

# Guidance Document

Includes three enclosures:

- Enclosure 1 – Scope of Effects Tool
- Enclosure 2 – Exploded view of Scope of Effects Tool
- Enclosure 3 – Section V Table



# Purpose

## Section I of the Guidance

To provide an assessment method to determine the appropriate amount of wetland compensatory mitigation to offset functional losses resulting from indirect and secondary effects and impacts in remaining adjacent wetlands for projects authorized by Department of the Army permits issued under Section 404 CWA





75

Hammel Rd

Ridgeport Dr

Yardley Way

Fairchild Dr

Wareham Dr

Stanton Ln



# Regulatory Basis

## Section II

- NEPA, 33 CFR Parts 320 thru 332, and Section 404(b)(1) Guidelines
- Terms “indirect” and “secondary”; and “impacts” and “effects” are synonymous
- Use the term “Indirect Effects” in the Local Guidance



# Regulatory Basis (con't)

Overall - Wetland functional losses resulting from indirect effects should be considered, can be assessed, and compensatory mitigation required to offset these wetland functional losses



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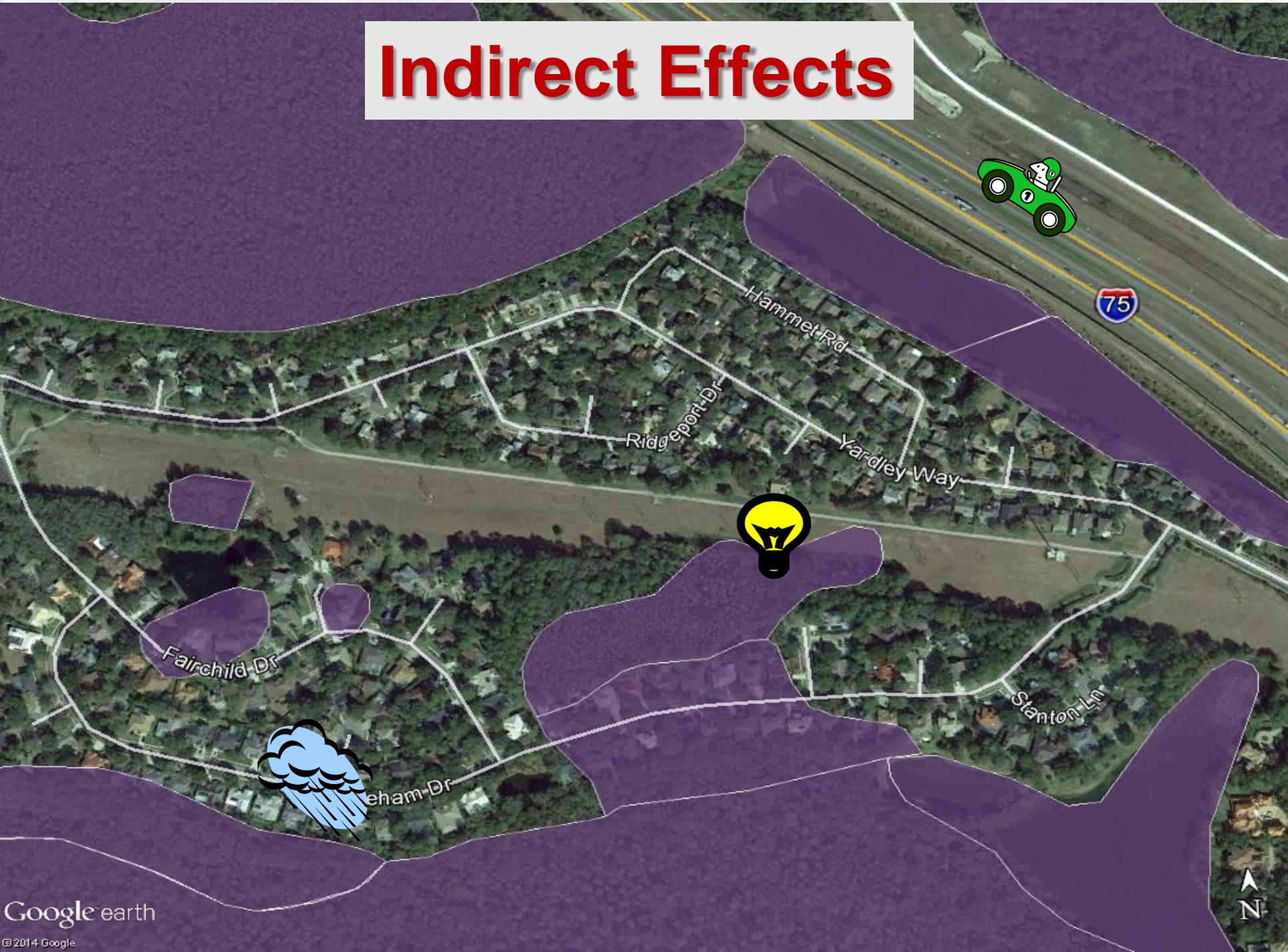
# Terms Used in the Guidance

## Section III

- Indirect Effects
- Scope of Action
- Scope of Effects
- Indirect Effects Wetland Assessment Area (WAA)
- Buffers



# Indirect Effects



# Scope of Action



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# Scope of Effects



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# Wetland Assessment Area

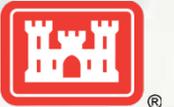


Google earth  
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# Buffers



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# Potential Indirect Effects

## Section IV

- Four lists of potential indirect effects – not all inclusive – correlated with UMAM\* three categories of wetland function
- Hydrological Effects → UMAM Water Environment
- Water Quality Effects → UMAM Water Environment
- Vegetative Community Effects → UMAM Community Structure
- Fish and Wildlife/Habitat Effects → UMAM Location and Landscape Support



\*Uniform Mitigation Assessment Method (UMAM)



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# Scope of Effects Determination

## Section V

- Suggests but does not dictate scope of effects – reliance on professional experience and judgment and on the literature
- Scope of Effects Tool (Enclosure 1)
- Scope of Effects Tool – Exploded View (Enclosure 2)
- Section V Table (Enclosure 3)



# Scope of Effects Tool

Factors

Functional Loss

Considerations

Wetlands

Scope of Effects Tool - Enclosure 1 (Version 07 May 2014)			
Wetland Number	1	2	3
<b>Factors</b>			
Habitat Type (picklist)	Forested	Herbaceous	Forested
Action Type (picklist)	Industrial 3	Industrial 3	Industrial 3
Indirect Impact Water Environment (picklist)	moderately affected 2	minimally affected 1	minimally affected 1
Indirect Impact Community Structure (picklist)	minimally affected 1	inconsequential effect 0	inconsequential effect 0
Indirect Impact Wildlife (picklist)	moderately affected 2	moderately affected 2	minimally affected 1
Scope of Effect (Feet)	200	150	125
<b>Functional Loss</b>			
Functional Value (Pre-Post delta) from Acres of wetlands within Scope of Effect	0.10	0.07	0.05
Functional Loss	3.00	3.00	2.00
	0.30	0.21	0.10
<b>Indirect effects considerations for Water Environment.</b>			
Change drainage characteristics or flow	x		
Change in water levels	x		
Change the retention time of water in the wetland	x		
Change the seasonal duration of wetland	x		
Change water velocity within the wetland			
Eliminate or reduce the association of the wetland with a watercourse or other waterbody			
Eliminate the defined or constricted outlet of the wetland	x		
Change the volume of water reaching the wetland via infiltration or surface runoff			
Change the ability of the wetland to receive floodflow from surrounding uplands or wetlands	x	x	x
Change the temperature or biochemical characteristics of water in the wetland	x	x	x
Change the water chemistry within the wetland			
Reduce water quality within the wetland			
Increase the input of sediment or toxicants to the wetland			
Increase the discharge of nutrients to the wetland			
Alter sediment load or change turbidity			
Change in timing characteristics of water saturation, flow, ponding or flooding in wetland	x		
Other:			
<b>Indirect effects considerations for Community Structure.</b>			
Change the density or type of vegetation within the wetland			
Reduce the degree of interspersion of vegetation			
Change the dominant wetland class			
Reduce wetland vegetation density			
Reduce wetland plant diversity			
Create conditions to likely to introduce invasive species	x - No exotic/ invasive control plan	on-site buffer	off-site buffer
Other:			
<b>Indirect effects considerations for Location/Landscape Support.</b>			
Reduce wildlife usage of the wetland	x	x	x
Fragment the wetland	x	x	x
Create a barrier between other wetland	x	x	x
Create a barrier to wildlife movement between wetlands	x	x	x
Reduce the availability of wildlife food sources	x	x	x
Reduce detritus development and/or transport	x	x	x
Reduce the abundance or diversity of insects	x	x	x
Introduce a new noise source with the potential to affect wildlife	x	x	x
Eliminate shading streamside vegetation	x	x	x
Adversely affects critical habitat for a listed T&E species			
Affect migration of T&E species within a wetland, or between wetland and upland			
Affect the supply of food resources for T&E species			
Increase wildlife mortality			
Introduce light as a disturbance factor	x	x	x
Other:			

1 2 3



# Scope of Effects Tool – Wetland Columns

Wetland Number	1	2	3
	Forested	Herbaceous	Forested
	Utility Lines (addition) 1	Utility Lines (addition) 1	Institutional (e.g. schools) 3
	inconsequential effect 0	inconsequential effect 0	inconsequential effect 0
	inconsequential effect 0	inconsequential effect 0	inconsequential effect 0
	inconsequential effect 0	inconsequential effect 0	inconsequential effect 0
	0	0	0
	0.00	0.00	0.00
	0.00	0.00	0.00
	0.00	0.00	0.00
ling or flooding.			
watercourse or			



# Scope of Effects Tool – Factors

## Factors

Habitat Type (picklist)

Action Type (picklist)

Indirect Impact Water Environment (picklist)

Indirect Impact Community Structure (picklist)

Indirect Impact Wildlife (picklist)

Scope of Effect (Feet)

**Four lists combined  
into three UMAM  
categories**



# Scope of Effects Tool – Factors

A	B	D
1	Scope of Effects Tool - Enclosure 1 (Version 16 June 2014)	
2	Wetland Number	1
3		
4	<b>Factors</b>	
5	✘ Habitat Type (picklist)	Forested
6	Action Type (picklist)	Forested
7	Indirect Impact Water Environment (picklist)	Herbaceous
8	Indirect Impact Community Structure (picklist)	Riparian
9	Indirect Impact Wildlife (picklist)	inconsequential effect
10	Scope of Effect (Feet)	0
11		



# Scope of Effects Tool – Factors

	A	B	D
1	<b>Scope of Effects Tool - Enclosure 1 (Version 16 June 2014)</b>		
2		Wetland Number	1
3			
4	<b>Factors</b>		
5		Habitat Type (picklist)	Forested
6	✘	Action Type (picklist)	Industrial 3
7		Indirect Impact Water Environment (picklist)	Recreational W/ open areas (e.g. golf courses) 2
8		Indirect Impact Community Structure (picklist)	Recreational - no open areas (e.g. ball parks) 3
9		Indirect Impact Wildlife (picklist)	Mixed Use 3
10		Scope of Effect (Feet)	Linear Transportation (new) 3
11			Linear Transportation (addition) 2
12	<b>Functional Loss</b>		Utility Lines (new) 2
13		Functional Value (Pre-Post delta) from assessment forms	Utility Lines (addition) 1
14		Acres of wetlands within Scope of Effect	Industrial 3
15		Functional Loss	0.00
16			0.00



# Scope of Effects Tool – Factors

	A	B	D
1	Scope of Effects Tool - Enclosure 1 (Version 16 June 2014)		
2		Wetland Number	1
3			
4	<b>Factors</b>		
5		Habitat Type (picklist)	Forested
6		Action Type (picklist)	Industrial 3
7	✘	Indirect Impact Water Environment (picklist)	moderately affected 2
8		Indirect Impact Community Structure (picklist)	Substantially affected 3 moderately affected 2
9		Indirect Impact Wildlife (picklist)	minimally affected 1
10		Scope of Effect (Feet)	inconsequential effect 0
11			
12	<b>Functional Loss</b>		
13		Functional Value (Pre-Post delta) from assessment forms	0.00
14		Acres of wetlands within Scope of Effect	0.00
15		Functional Loss	0.00
16			



# Scope of Effects Tool

Factors

Wetlands

1 2 3

Functional Loss

Considerations

**Scope of Effects Tool - Enclosure 1 (Version 07 May 2014)**

Wetland Number	1	2	3
<b>Factors</b>			
Habitat Type (picklist)	Forested	Herbaceous	Forested
Action Type (picklist)	Industrial 3	Industrial 3	Industrial 3
Indirect Impact Water Environment (picklist)	moderately affected 2	minimally affected 1	minimally affected 1
Indirect Impact Community Structure (picklist)	minimally affected 1	inconsequential effect 0	inconsequential effect 0
Indirect Impact Wildlife (picklist)	moderately affected 2	moderately affected 2	minimally affected 1
Scope of Effect (Feet)	200	150	125
<b>Functional Loss</b>			
Functional Value (Pre-Post delta) from Acres of wetlands within Scope of Effect	0.10	0.07	0.05
Functional Loss	3.00	3.00	2.00
	0.30	0.21	0.10
<b>Indirect effects considerations for Water Environment.</b>			
Change drainage characteristics or flow	x		
Change in water levels	x		
Change the retention time of water in the	x		
Change the seasonal duration of wetland	x		
Change water velocity within the wetland.			
Eliminate or reduce the association of the wetland with a watercourse or other waterbody.			
Eliminate the defined or constricted outlet of			
Change the volume of water reaching the wetland via infiltration or surface runoff.	x		
Change the ability of the wetland to receive floodflow from surrounding uplands or wetlands.	x	x	x
Change the temperature or biochemical characteristics of water in the wetland.	x	x	x
Change the water chemistry within the wetland.			
Reduce water quality in the wetland.			
Increase the input of sediment or toxicants to			
Increase the input of nutrients to			
Alter sediment dynamics			
Change in the water saturation flow within wetland.	x		
Other:			
<b>Indirect effects considerations for Community Structure.</b>			
Change the density or type of vegetation within			
Reduce the degree of interspersion of			
Change the dominant wetland class.			
Reduce wetland vegetation density.			
Reduce wetland plant diversity.			
Create conditions to likely to introduce invasive	x - No exotic/ invasive control plan	on-site buffer	off-site buffer
Other:			
<b>Indirect effects considerations for Location/Landscape Support.</b>			
Reduce wildlife usage of the wetland.	x	x	x
Fragment the wetland.	x	x	x
Create a barrier between other wetland	x	x	x
Create a barrier to wildlife movement between	x	x	x
Reduce the availability of wildlife food sources.	x	x	x
Reduce detritus development and/or transport.	x	x	x
Reduce the abundance or diversity of insects.	x	x	x
Introduce a new noise source with the potential	x	x	x
Create a canopy gap that could affect	x	x	x
Eliminate shading streamside vegetation.	x	x	x
Adversely affects critical habitat for a listed T&E			
Affect migration of T&E species within a wetland, or between wetland and upland			
Affect the supply of food resources for T&E			
Increase wildlife mortality.			
Introduce light as a disturbance factor.	x	x	x
Other:			



# Scope of Effects Tool – Considerations

A	B	D
17	<b>Indirect effects considerations for Water Environment.</b>	
18	Change drainage characteristics or flow patterns.	X
19	Change in water levels.	X
20	Change the retention time of water in the wetland.	X
21	Change the seasonal duration of wetland saturation, ponding or flooding.	X
22	Change water velocity within the wetland.	
23	Eliminate or reduce the association of the wetland with a watercourse or other waterbody.	
24	Eliminate the defined or constricted outlet of the wetland.	
25	Change the volume of water reaching the wetland via infiltration or surface runoff.	X
26	Change the ability of the wetland to receive floodflow from surrounding uplands or wetlands.	X
27	Change the temperature or biochemical characteristics of water in the	X
28	Change the water chemistry within the wetland.	
29	Reduce water quality within the wetland.	
30	Increase the input of sediment or toxicants to the wetland.	
31	Increase the discharge of nutrients to the wetland.	
32	Alter sediment load or change turbidity.	
33	Change in timing characteristics of water saturation, flow, ponding or flooding in wetland.	X
34	Other: _____	



# Scope of Effects Tool – Scope of Effect

	A	B	D
1	Scope of Effects Tool - Enclosure 1 (Version 16 June 2014)		
2		Wetland Number	1
3			
4	<b>Factors</b>		
5		Habitat Type (picklist)	Forested
6		Action Type (picklist)	Industrial 3
7		Indirect Impact Water Environment (picklist)	moderately affected 2
8		Indirect Impact Community Structure (picklist)	minimally affected 1
9		Indirect Impact Wildlife (picklist)	moderately affected 2
10	✘	Scope of Effect (Feet)	200
11			



# Scope of Effects Tool – Exploded View

## Enclosure 2

Enclosure 2 - Scope of Effects Tool - Exploded View (Version: 07 May 2014)

Wetland #	
<b>Habitat Type</b>	<b>Indirect Effects</b>
<input type="checkbox"/> Forested	<input type="checkbox"/> Water Environment
<input type="checkbox"/> Herbaceous	<input type="checkbox"/> substantially affected 3
<input type="checkbox"/> Riparian	<input type="checkbox"/> moderately affected 2
<input type="checkbox"/> Estuarine	<input type="checkbox"/> minimally affected 1
	<input type="checkbox"/> inconsequential effect 0
<b>Action Type</b>	<input type="checkbox"/> Community Structure
<input type="checkbox"/> Industrial 3	<input type="checkbox"/> substantially affected 3
<input type="checkbox"/> Mines 3	<input type="checkbox"/> moderately affected 2
<input type="checkbox"/> Large Commercial 3	<input type="checkbox"/> minimally affected 1
<input type="checkbox"/> Apartment Complexes 3	<input type="checkbox"/> inconsequential effect 0
<input type="checkbox"/> Institutional (e.g. schools) 3	<input type="checkbox"/> Location/Landscape Support
<input type="checkbox"/> Recreational - no open areas (e.g. ball parks) 3	<input type="checkbox"/> substantially affected 3
<input type="checkbox"/> Mixed Use 3	<input type="checkbox"/> moderately affected 2
<input type="checkbox"/> Linear Transportation (new) 3	<input type="checkbox"/> minimally affected 1
<input type="checkbox"/> Linear Transportation (addition) 2	<input type="checkbox"/> inconsequential effect 0
<input type="checkbox"/> Recreational W/ open areas (e.g. golf courses) 2	<input type="checkbox"/> if all 3 indirect effects "inconsequential effect" then Scope of Effects = 0 ft
<input type="checkbox"/> Single-Family Residential Subdivision 2	<input type="checkbox"/> Functional Loss
<input type="checkbox"/> Utility Lines (new) 2	<input type="checkbox"/> Fuctional Value
<input type="checkbox"/> Utility Lines (addition) 1	<input type="checkbox"/> Acres of wetlands within
<input type="checkbox"/> Single-Family Residential 1	

- Indirect effects considerations for Water Environment.**
- Change drainage characteristics or flow patterns.
  - Change in water levels.
  - Change the retention time of water in the wetland.
  - Change the seasonal duration of wetland saturation, ponding or flooding.
  - Change water velocity within the wetland.
  - Eliminate or reduce the association of the wetland with a watercourse or other waterbody.
  - Eliminate the defined or constricted outlet of the wetland.
  - Change the volume of water reaching the wetland via infiltration or surface runoff.
  - Change the ability of the wetland to receive floodflow from surrounding uplands or wetland.
  - Change the temperature or biochemical characteristics of water in the wetland.
  - Change the water chemistry within the wetland.
  - Reduce water quality within the wetland.
  - Increase the input of sediment or toxicants to the wetland.
  - Increase the discharge of nutrients to the wetland.
  - Alter sediment load or change turbidity.
  - Change in timing characteristics of water saturation, flow, ponding or flooding in wetland.
  - Other: \_\_\_\_\_

- Indirect effects considerations for Community Structure.**
- Change the density or type of vegetation within the wetland.
  - Reduce the degree of interspersion of vegetation classes or communities.
  - Change the dominant wetland class.
  - Reduce wetland vegetation density.
  - Reduce wetland plant diversity.
  - Create conditions likely to introduce invasive plants.
  - Other: \_\_\_\_\_

- Indirect effects considerations for Location/Landscape Support.**
- Reduce wildlife usage of the wetland.
  - Fragment the wetland.
  - Create a barrier between other wetland systems.
  - Create a barrier to wildlife movement between the wetland and uplands.
  - Reduce the availability of wildlife food sources.
  - Reduce detritus development and/or transport.
  - Reduce the abundance or diversity of insects.
  - Introduce a new noise source with the potential to affect adjacent areas.
  - Create a canopy gap that could affect microclimate.
  - Eliminate shading streamside vegetation.
  - Adversely affects critical habitat for a listed T&E Species within the wetland.
  - Affect migration of T&E species within a wetland, or between wetland and upland habitats.
  - Affect the supply of food resources for T&E species using the wetland.
  - Increase wildlife mortality.
  - Introduce light as a disturbance factor.
  - Other: \_\_\_\_\_

Enclosure 2 - Scope of Effects Tool - Exploded View (Version: 07 May 2014)

Wetland #	Habitat Type	Action Type	Indirect Effects	Scope of Effects (ft)
			Water environment	Sum of Action + Impact
<input type="checkbox"/>	Forested		substantially affected 3	
<input type="checkbox"/>	Herbaceous		moderately affected 2	2 50
<input type="checkbox"/>	Riparian		minimally affected 1	3 75
<input type="checkbox"/>	Estuarine		inconsequential effect 0	4 100
			Community structure	5 125
<input type="checkbox"/>	Industrial 3		substantially affected 3	6 150
<input type="checkbox"/>	Mines 3		moderately affected 2	7 175
<input type="checkbox"/>	Large Commercial 3		minimally affected 1	8 200
<input type="checkbox"/>	Apartment Complexes 3		inconsequential effect 0	9 225
<input type="checkbox"/>	Institutional (e.g. schools) 3		Wildlife	10 250
<input type="checkbox"/>	Recreational - no open areas (e.g. ball parks) 3		substantially affected 3	11 275
<input type="checkbox"/>	Mixed Use 3		moderately affected 2	12 300
<input type="checkbox"/>	Linear Transportation (new) 3		minimally affected 1	
<input type="checkbox"/>	Linear Transportation (addition) 2		inconsequential effect 0	
<input type="checkbox"/>	Recreational W/ open areas (e.g. golf courses) 2		If all 3 indirect effects "inconsequential effect", then Scope of Effects = 0 ft	
<input type="checkbox"/>	Single-Family Residential Subdivision 2			
<input type="checkbox"/>	Utility Lines (new) 2			
<input type="checkbox"/>	Utility Lines (addition) 1			
<input type="checkbox"/>	Single-Family Residential 1			
			<b>Functional Loss</b>	
			Fuctional Value (Pre-Post delta)	0.00
			Acres of wetlands within Scope of Effects	0.00
			Functional Loss	0.00

**Action Type + Sum of Indirect Effects = Scope of Effects**



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# Section V Table

## Enclosure 3

Section	Project	Reference	SubReference	Narrative	Distance	Activity	Landcover	Impact
<b>IV.A. Potential hydrological impacts in the remaining abutting/adjacent wetland (UMAM Water Environment).</b>								
				If the Project's culvert is found to have not been provided for a slope				
		27. Rheinhardt et al (2001). HGM Guidebook.	- -	The reach of the adjacent area flooded or starved can be estimated by the variable "Surface Water Flow" in the HGM Guidebook for Pine Flatwoods Mineral Soils. Page 29-30 (page 43 to 44 of the PDF)	Calculated	- -	- -	Flooding
				If the project is intercepting a wide expanse of sheet flow and then discharging as a point (end of the culvert), therefore wetlands on downstream shadow of the fill will have altered hydropatterns (those at outlet flooded and those laterally distant starved).				
		- -	- -	Will usually be localized near the outlet.				
				If the project is proximate to a stream, may reduce function of stream.				
		13. Fischer and Fischeneich (2000).	(listed in reference)	Table 4. General Riparian Buffer Strip Width Guidelines. *Functions: Flood Attenuation. Recommended Width: 20 to 150 m. Description: Riparian buffers promote floodplain storage due to backwater effects, they intercept overland flow and increase travel time, resulting in reduced flood peaks."	66 to 492	- -	Riparian	Flow Attenuation
		<future addition>						
		- -	- -		- -	- -	- -	
		<future addition>						
		- -	- -		- -	- -	- -	
<b>IV.B. Potential water quality impacts in the remaining adjacent wetland (UMAM Water Environment).</b>								
				Project whose fill is placed that runoff will flow directly into the adjacent wetland, the reach of the adjacent area affected can be estimated by referring to various literature describing the buffer width needed to treat/remove nutrients and sediment based on the source of runoff (land use) and vegetative cover and roughness of the buffer.				
		36. Corps (2013). AEIS.	(listed in reference)	The buffer width to protect a stream is measured beginning at the top of the bank or at the level of bank full discharge. Recommended widths for buffers to protect stream water quality have ranged from 30 feet to 150 feet, depending on the condition of the stream targeted for protection and the characteristics of the 28 buffer (Castelle et al., 1994; Fischer and Fischeneich, 2000; NRCS, 2012b).	30 to 150ft	- -	Riparian	Water Quality
		36. Corps (2013). AEIS.	- -	"Current phosphate mining operations in the CFPD include the use of ditch and berm systems, which are installed along the entire outer perimeter of the mine property and adjacent to streams and wetlands within the mine that are to be avoided. *** As such, the ditch and berm system itself serves as a buffer by providing water quality protection for streams and wetlands within and outside the mine property. The berm of the ditch and berm system is set back approximately 135 feet to 150 feet from the edge of a stream or wetland; the ditch is between the berm and the mining/reclamation area."	135 to 150	Phosphate Mining	- -	Water Quality
		36. Corps (2013). AEIS.	- -	"Under the mitigation framework, a buffer width in the range of 30 feet to 100 feet is proposed to be considered for the purpose of minimizing impacts to the water quality of perennial and intermittent streams. This buffer width range is considered adequate to provide a reasonable balance between water quality protection and mining. Wider buffers should be considered when the waters of the U.S. downstream of the mining area have been listed as impaired under CWA Section 303(d) for pollutants likely to be generated in the mining area."	30 to 100 (wider if impaired waterbody)	- -	- -	Water Quality
				Projects proximate to a stream, may reduce function of stream.				
		13. Fischer and Fischeneich (2000).	(listed in reference)	Table 4. General Riparian Buffer Strip Width Guidelines. *Function: Water Quality Protection. Recommended Width: 5 to 30 m. Description: Buffers, especially dense grassy or herbaceous buffers on gradual slopes, intercept overland runoff, trap sediments, remove pollutants, and promote ground water recharge. For low to moderate slopes, most filtering occurs within the first 10 m, but greater widths are necessary for steeper slopes, buffers comprised of mainly shrubs and trees, where soils have low permeability, or where NPSP loads are particularly high."	16 to 98 ft	- -	Riparian	Treat Runoff
				Project runoff with sediment and nutrients.				



# Procedure for Using This Assessment Method

## Section VI

- Step-by-step instructions are provided in Section VI
- Examples - Conceptual Industrial Site with three wetlands



# Example: Pre-project



North  
NTS

Wetland # 2

Site  
Boundary

Wetland # 3

Proposed  
Industrial  
Site

Wetland # 1

Divided Highway

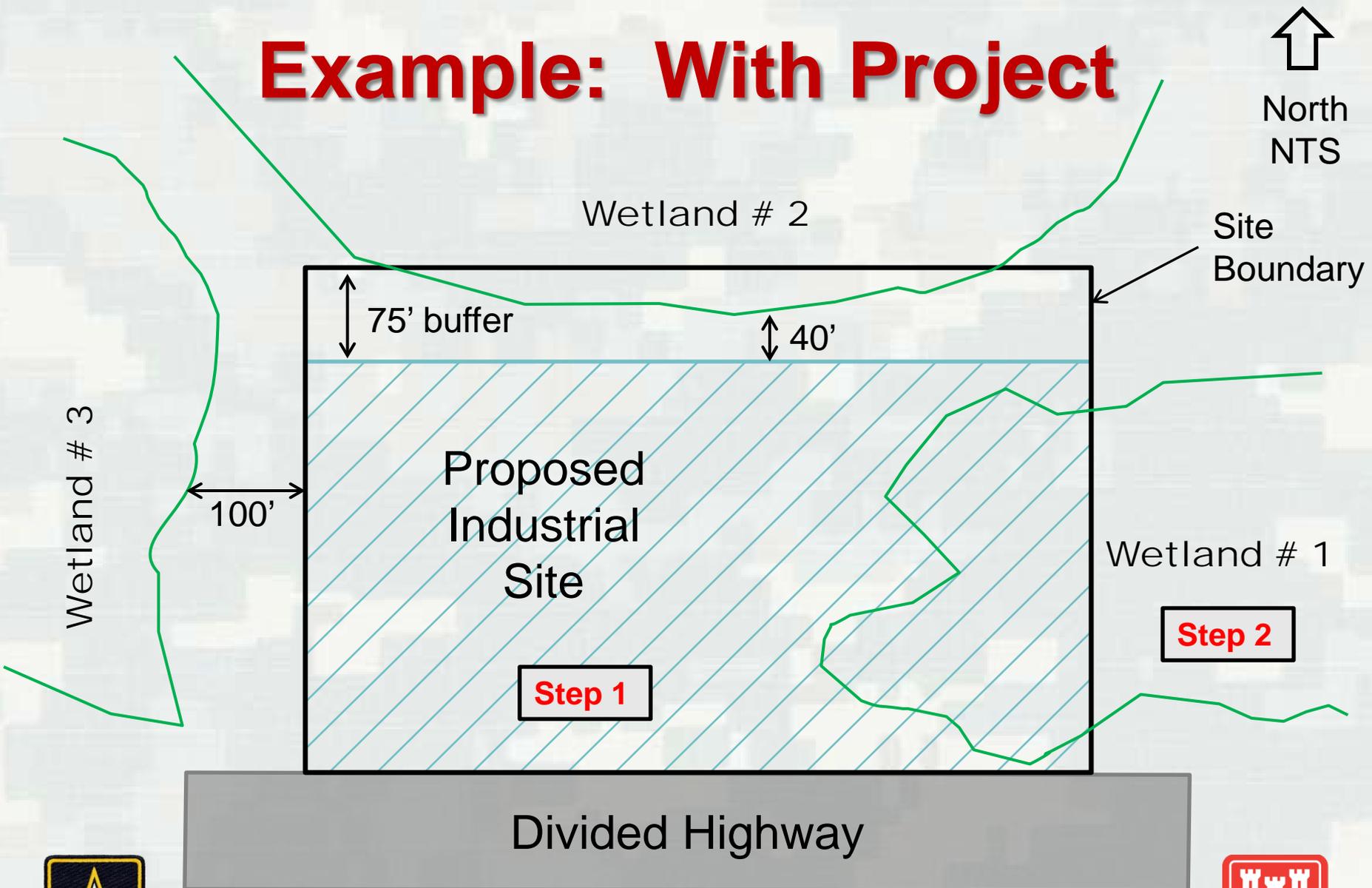


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# Example: With Project



North  
NTS



 - Proposed Development Area



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# Scope of Effects Tool

## Wetlands #1, #2 & #3

Scope of Effects Tool - Enclosure 1 (Version 07 May 2014)			
Wetland Number	1	2	3
<b>Factors</b>			
Habitat Type (picklist)	Forested	Herbaceous	Forested
Action Type (picklist)	Industrial 3	Industrial 3	Industrial 3
Indirect Impact Water Environment (picklist)	moderately affected 2	minimally affected	minimally affected 1
Indirect Impact Community Structure (picklist)	minimally affected 1	inconsequential effect 0	inconsequential effect 0
Indirect Impact Wildlife (picklist)	moderately affected 2	moderately affected 2	minimally affected 1
Scope of Effect (Feet)	200	150	125
<b>Functional Loss</b>			
Functional Value (Pre-Post delta) from assessment	0.10	0.07	0.05
Acres of wetlands within Scope of Effect	3.00	3.00	2.00
Functional Loss	0.30	0.21	0.10
<b>Indirect effects considerations for Water Environment.</b>			
Change drainage characteristics or flow patterns.	x		
Change in water levels.	x		
Change the retention time of water in the wetland.	x		
Change the seasonal duration of wetland saturation.	x		
Change water velocity within the wetland.			
Eliminate or reduce the association of the wetland with a watercourse or other waterbody.			
Eliminate the defined or constricted outlet of the			
Change the volume of water reaching the wetland via infiltration or surface runoff.	x		
Change the ability of the wetland to receive floodflow from surrounding uplands or wetlands.	x	x	x
Change the temperature or biochemical characteristics of water in the wetland.	x	x	x
Change the water chemistry within the wetland.			
Reduce water quality within the wetland.			
Increase the input of sediment or toxicants to the			
Increase the discharge of nutrients to the wetland.			
Alter sediment load or change turbidity.			
Change in timing characteristics of water saturation, flow, ponding or flooding in wetland.	x		
Other:			

**Step 3**



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# Scope of Effects Tool - Wetland #1

Scope of Effects Tool - Enclosure 1 (Version 07 May 2014)	
Wetland Number	1
<b>Factors</b>	
Habitat Type (picklist)	Forested
Action Type (picklist)	Industrial 3
Indirect Impact Water Environment (picklist)	moderately affected 2
Indirect Impact Community Structure (picklist)	minimally affected 1
Indirect Impact Wildlife (picklist)	moderately affected 2
Scope of Effect (Feet)	200
<b>Functional Loss</b>	
Functional Value (Pre-Post delta) from assessment	0.10
Acres of wetlands within Scope of Effect	3.00
Functional Loss	0.30
<b>Indirect effects considerations for Water Environment.</b>	
Change drainage characteristics or flow patterns.	x
Change in water levels.	x
Change the retention time of water in the wetland.	x
Change the seasonal duration of wetland saturation,	x
Change water velocity within the wetland.	
Eliminate or reduce the association of the wetland with a watercourse or other waterbody.	
Eliminate the defined or constricted outlet of the	
Change the volume of water reaching the wetland via infiltration or surface runoff.	x
Change the ability of the wetland to receive floodflow from surrounding uplands or wetlands.	x
Change the temperature or biochemical characteristics of water in the wetland.	x

Indirect effects considerations for Community Structure.	
Change the density or type of vegetation within the	
Reduce the degree of interspersion of vegetation	
Change the dominant wetland class.	
Reduce wetland vegetation density.	
Reduce wetland plant diversity.	
Create conditions to likely to introduce invasive	x - No exotic / invasive control plan
Other: _____	
Indirect effects considerations for Location/Landscape Support.	
Reduce wildlife usage of the wetland.	x
Fragment the wetland.	
Create a barrier between other wetland systems.	x
Create a barrier to wildlife movement between the	x
Reduce the availability of wildlife food sources.	x
Reduce detritus development and/or transport.	x
Reduce the abundance or diversity of insects.	x
Introduce a new noise source with the potential to	x
Create a canopy gap that could affect microclimate	x
Eliminate shading streamside vegetation.	
Adversely affects critical habitat for a listed T&E	
Affect migration of T&E species within a wetland, or between wetland and upland habitats.	
Affect the supply of food resources for T&E species	
Increase wildlife mortality.	
Introduce light as a disturbance factor.	x
Other: _____	

Note the anticipated effects.



# Scope of Effects Tool - Wetland #1

Scope of Effects Tool - Enclosure 1 (Version 07 May 2014)	
Wetland Number	1
<b>Factors</b>	
Habitat Type (picklist)	Forested
Action Type (picklist)	Industrial 3
Indirect Impact Water Environment (picklist)	moderately affected 2
Indirect Impact Community Structure (picklist)	minimally affected 1
Indirect Impact Wildlife (picklist)	moderately affected 2
Scope of Effect (Feet)	200
<b>Functional Loss</b>	
Functional Value (Pre-Post delta) from assessment	0.10
Acres of wetlands within Scope of Effect	3.00
Functional Loss	0.30
<b>Indirect effects considerations for Water Environment.</b>	
Change drainage characteristics or flow patterns.	x
Change in water levels.	x
Change the retention time of water in the wetland.	x
Change the seasonal duration of wetland saturation,	x
Change water velocity within the wetland.	
Eliminate or reduce the association of the wetland with a watercourse or other waterbody.	
Eliminate the defined or constricted outlet of the	
Change the volume of water reaching the wetland via infiltration or surface runoff.	x
Change the ability of the wetland to receive floodflow from surrounding uplands or wetlands.	x
Change the temperature or biochemical characteristics of water in the wetland.	x



By selecting the appropriate anticipated effect the tool provides the recommended assessment area



# Example: Wetland #1



North  
NTS

Wetland # 2

Site  
Boundary

75' buffer

40'

Wetland # 3

100'

Proposed  
Industrial  
Site

Step 4

200'

Wetland # 1

3 Acres

Divided Highway



- Indirect Impact Assessment Area



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# Scope of Effects Tool - Wetland #1

Scope of Effects Tool - Enclosure 1 (Version 07 May 2014)	
Wetland Number	1
<b>Factors</b>	
Habitat Type (picklist)	Forested
Action Type (picklist)	Industrial 3
Indirect Impact Water Environment (picklist)	moderately affected 2
Indirect Impact Community Structure (picklist)	minimally affected 1
Indirect Impact Wildlife (picklist)	moderately affected 2
Scope of Effect (Feet)	200
<b>Functional Loss</b>	
Functional Value (Pre-Post delta) from assessment	0.10
Acres of wetlands within Scope of Effect	3.00
Functional Loss	0.30
<b>Indirect effects considerations for Water Environment.</b>	
Change drainage characteristics or flow patterns.	x
Change in water levels.	x
Change the retention time of water in the wetland.	x
Change the seasonal duration of wetland saturation,	x
Change water velocity within the wetland.	
Eliminate or reduce the association of the wetland with a watercourse or other waterbody.	
Eliminate the defined or constricted outlet of the	
Change the volume of water reaching the wetland via infiltration or surface runoff.	x
Change the ability of the wetland to receive floodflow from surrounding uplands or wetlands.	x
Change the temperature or biochemical characteristics of water in the wetland.	x

**Step 5**



By entering the size of the WAA and the pre-post functional value delta the form calculates the functional loss for the WAA



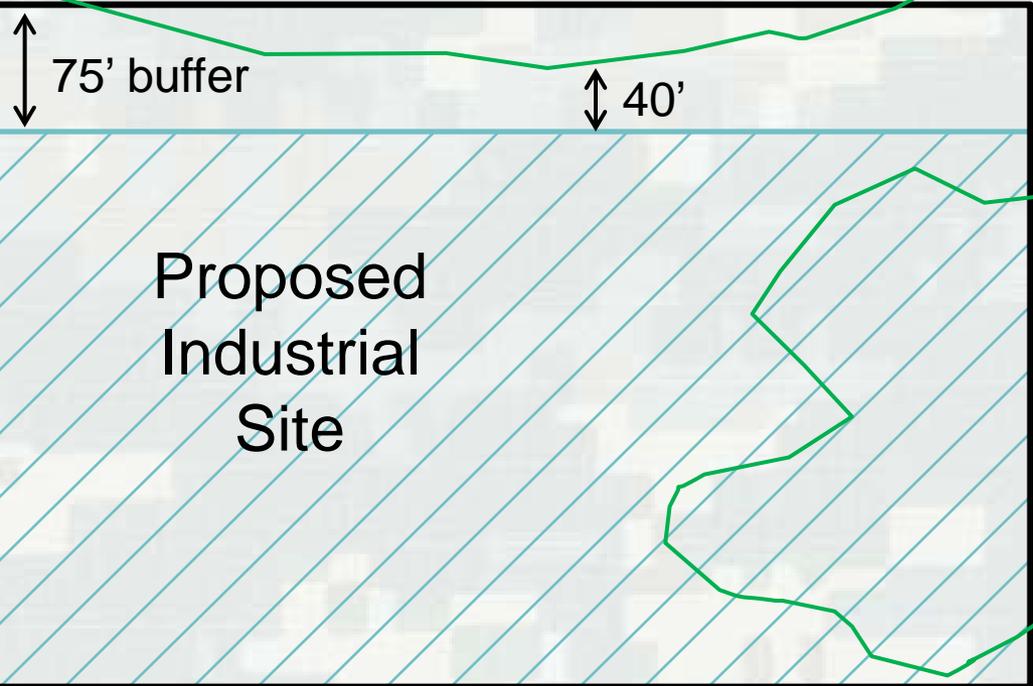
# Example - Wetland #2



North  
NTS

Wetland # 2

Site  
Boundary



Wetland # 3

100'

75' buffer

40'

Proposed  
Industrial  
Site

Wetland # 1



Divided Highway

 - Proposed Development Area



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# Scope of Effects Tool - Wetland #2

Scope of Effects Tool - Enclosure 1 (Version 07 May 2014)	
Wetland Number	
	2
<b>Factors</b>	
Habitat Type (picklist)	Herbaceous
Action Type (picklist)	Industrial 3
Indirect Impact Water Environment (picklist)	minimally affected 1
Indirect Impact Community Structure (picklist)	inconsequential effect 0
Indirect Impact Wildlife (picklist)	moderately affected 2
Scope of Effect (Feet)	150
<b>Functional Loss</b>	
Functional Value (Pre-Post delta) from assessment	0.07
Acres of wetlands within Scope of Effect	3.00
Functional Loss	0.21
<b>Indirect effects considerations for Water Environment.</b>	
Change drainage characteristics or flow patterns	
Change in water levels.	
Change the retention time of water in the wetland.	
Change the seasonal duration of wetland saturation.	
Change water velocity within the wetland.	
Eliminate or reduce the association of the wetland with a watercourse or other waterbody.	
Eliminate the defined or constricted outlet of the wetland.	
Change the volume of water reaching the wetland via infiltration or surface runoff.	
Change the ability of the wetland to receive flood flow from surrounding uplands or wetlands.	x
Change the temperature or biochemical characteristics of water in the wetland.	x

## Indirect effects considerations for Community Structure.

Change the density or type of vegetation within the wetland.	
Reduce the degree of interspersion of vegetation.	
Change the dominant wetland class.	
Reduce wetland vegetation density.	
Reduce wetland plant diversity.	
Create conditions to likely to introduce invasive species.	on-site buffer
Other: _____	

## Indirect effects considerations for Location/Landscape Support.

Reduce wildlife usage of the wetland.	x
Fragment the wetland.	
Create a barrier between other wetland systems.	x
Create a barrier to wildlife movement between the wetland and upland habitats.	x
Reduce the availability of wildlife food sources.	x
Reduce detritus development and/or transport.	x
Reduce the abundance or diversity of insects.	x
Introduce a new noise source with the potential to affect wildlife.	x
Create a canopy gap that could affect microclimate.	x
Eliminate shading streamside vegetation.	
Adversely affects critical habitat for a listed T&E species.	
Affect migration of T&E species within a wetland, or between wetland and upland habitats.	
Affect the supply of food resources for T&E species.	
Increase wildlife mortality.	
Introduce light as a disturbance factor.	x
Other: _____	

Note the difference in anticipated effects.



# Scope of Effects Tool - Wetland #2

	Wetland Number	2
<b>Factors</b>		
Habitat Type (picklist)		Herbaceous
Action Type (picklist)		Industrial 3
Indirect Impact Water Environment (picklist)		minimally affected 1
Indirect Impact Community Structure (picklist)		inconsequential effect 0
Indirect Impact Wildlife (picklist)		moderately affected 2
Scope of Effect (Feet)		150



Note the difference in anticipated effects.

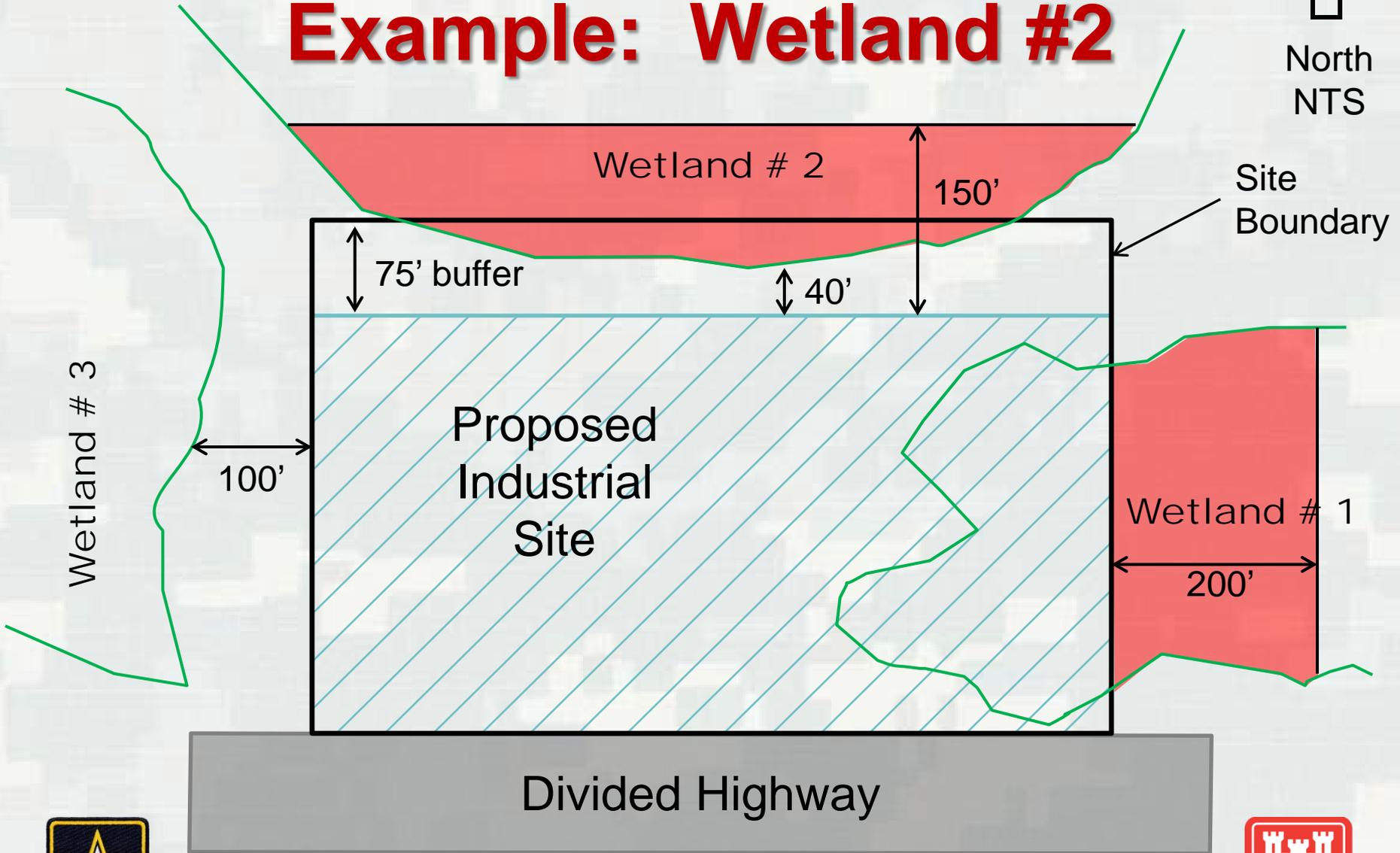


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# Example: Wetland #2



North  
NTS



 - Indirect Impact Assessment Area



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# Scope of Effects Tool - Wetland #2

## Scope of Effects Tool - Enclosure 1 (Version 07 May 2014)

Wetland Number	
2	
<b>Factors</b>	
Habitat Type (picklist)	Herbaceous
Action Type (picklist)	Industrial 3
Indirect Impact Water Environment (picklist)	minimally affected 1
Indirect Impact Community Structure (picklist)	inconsequential effect 0
Indirect Impact Wildlife (picklist)	moderately affected 2
Scope of Effect (Feet)	150
<b>Functional Loss</b>	
Functional Value (Pre-Post delta) from assessment	0.07
Acres of wetlands within Scope of Effect	3.00
Functional Loss	0.21
<b>Indirect effects considerations for Water Environment.</b>	
Change drainage characteristics or flow patterns	
Change in water levels.	
Change the retention time of water in the wetland.	
Change the seasonal duration of wetland saturation	
Change water velocity within the wetland.	
Eliminate or reduce the association of the wetland with a watercourse or other waterbody.	
Eliminate the defined or constricted outlet of the wetland.	
Change the volume of water reaching the wetland via infiltration or surface runoff.	
Change the ability of the wetland to receive flood flow from surrounding uplands or wetlands.	x
Change the temperature or biochemical characteristics of water in the wetland.	x

### Indirect effects considerations for Community Structure.

Change the density or type of vegetation within the	
Reduce the degree of interspersion of vegetation	
Change the dominant wetland class.	
Reduce wetland vegetation density.	
Reduce wetland plant diversity.	
Create conditions to likely to introduce invasive	on-site buffer
Other: _____	

### Indirect effects considerations for Location/Landscape Support.

Reduce wildlife usage of the wetland.	x
Fragment the wetland.	
Create a barrier between other wetland systems.	x
Create a barrier to wildlife movement between the	x
Reduce the availability of wildlife food sources.	x
Reduce detritus development and/or transport.	x
Reduce the abundance or diversity of insects.	x
Introduce a new noise source with the potential to	x
Create a canopy gap that could affect microclimate	x
Eliminate shading streamside vegetation.	
Adversely affects critical habitat for a listed T&E	
Affect migration of T&E species within a wetland, or between wetland and upland habitats.	
Affect the supply of food resources for T&E species	
Increase wildlife mortality.	
Introduce light as a disturbance factor.	x
Other: _____	

Enter the size of the WAA and the pre-post functional value delta for the form to calculate the functional loss for the WAA



# Example - Wetland #3



North  
NTS

Wetland # 2

Site  
Boundary



75' buffer



40'

Wetland # 3

100'

Proposed  
Industrial  
Site

Wetland # 1

Divided Highway



- Proposed Development Area



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# Scope of Effects Tool - Wetland #3

Scope of Effects Tool - Enclosure 1 (Version 07 May 2014)	
Wetland Number	3
<b>Factors</b>	
Habitat Type (picklist)	Forested
Action Type (picklist)	Industrial 3
Indirect Impact Water Environment (picklist)	minimally affected 1
Indirect Impact Community Structure (picklist)	inconsequential effect 0
Indirect Impact Wildlife (picklist)	minimally affected 1
Scope of Effect (Feet)	125
<b>Functional Loss</b>	
Functional Value (Pre-Post delta) from assessment	0.05
Acres of wetlands within Scope of Effect	2.00
Functional Loss	0.10
<b>Indirect effects considerations for Water Environment.</b>	
Change drainage characteristics or flow patterns.	
Change in water levels.	
Change the retention time of water in the wetland.	
Change the seasonal duration of wetland saturation,	
Change water velocity within the wetland.	
Eliminate or reduce the association of the wetland with a watercourse or other waterbody.	
Eliminate the defined or constricted outlet of the	
Change the volume of water reaching the wetland via infiltration or surface runoff.	
Change the ability of the wetland to receive floodflow from surrounding uplands or wetlands.	x
Change the temperature or biochemical characteristics of water in the wetland.	x

Indirect effects considerations for Community Structure.	
Change the density or type of vegetation within the	
Reduce the degree of interspersion of vegetation	
Change the dominant wetland class.	
Reduce wetland vegetation density.	
Reduce wetland plant diversity.	
Create conditions to likely to introduce invasive	off-site buffer
Other: _____	
Indirect effects considerations for Location/Landscape Support.	
Reduce wildlife usage of the wetland.	x
Fragment the wetland.	
Create a barrier between other wetland systems.	x
Create a barrier to wildlife movement between the	x
Reduce the availability of wildlife food sources.	x
Reduce detritus development and/or transport.	
Reduce the abundance or diversity of insects.	
Introduce a new noise source with the potential to	
Create a canopy gap that could affect microclimate	
Eliminate shading streamside vegetation.	
Adversely affects critical habitat for a listed T&E	
Affect migration of T&E species within a wetland, or between wetland and upland habitats.	
Affect the supply of food resources for T&E species	
Increase wildlife mortality.	
Introduce light as a disturbance factor.	x
Other: _____	

Note the difference in anticipated effects.



# Scope of Effects Tool - Wetland #3

	Wetland Number	3
<b>Factors</b>		
Habitat Type (picklist)		Forested
Action Type (picklist)		Industrial 3
Indirect Impact Water Environment (picklist)		minimally affected 1
Indirect Impact Community Structure (picklist)		inconsequential effect 0
Indirect Impact Wildlife (picklist)		minimally affected 1
Scope of Effect (Feet)		125

Note the difference in anticipated effects.

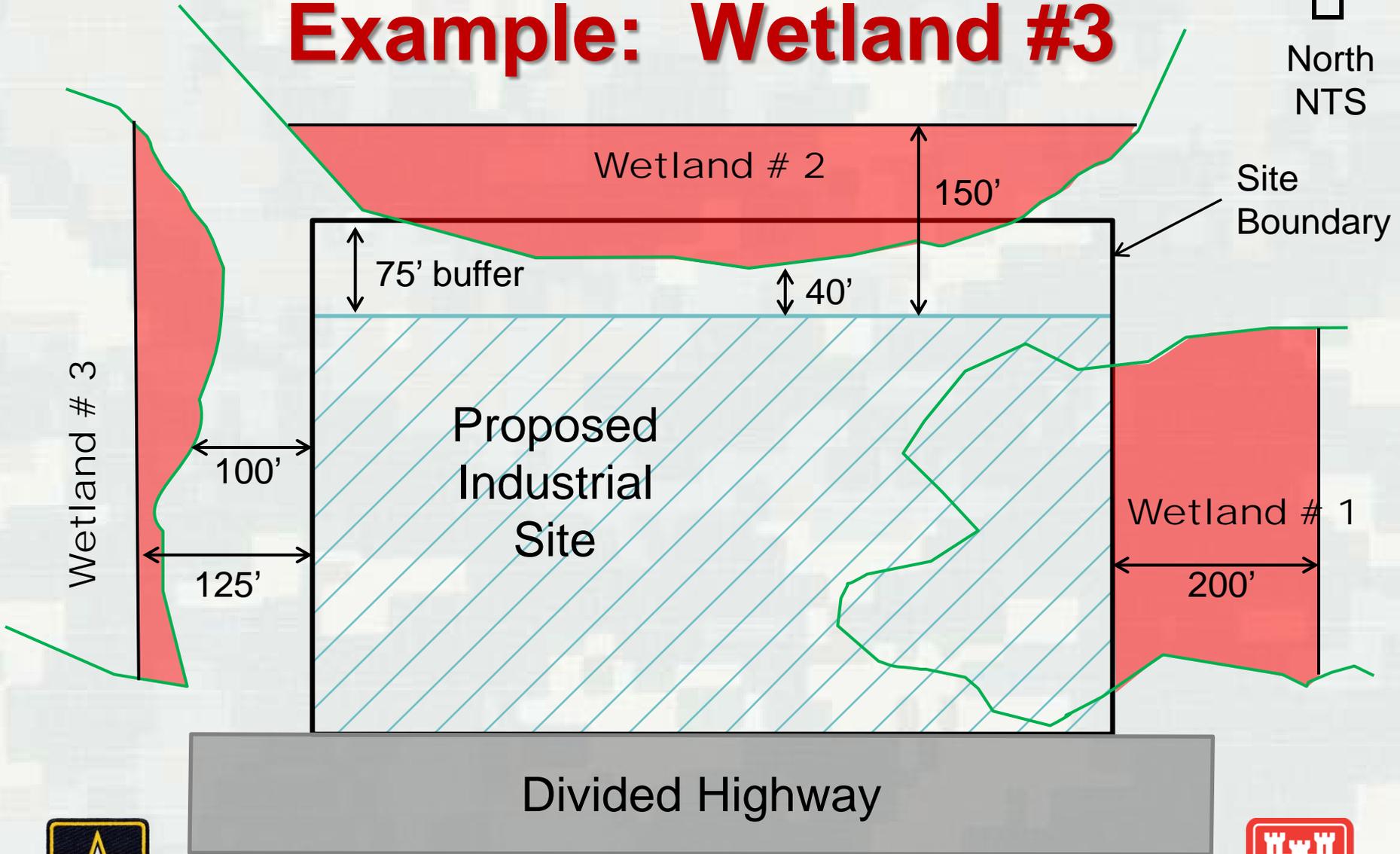


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# Example: Wetland #3



North  
NTS



 - Indirect Impact Assessment Area



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# Scope of Effects Tool - Wetland #3

Scope of Effects Tool - Enclosure 1 (Version 07 May 2014)	
Wetland Number	3
<b>Factors</b>	
Habitat Type (picklist)	Forested
Action Type (picklist)	Industrial 3
Indirect Impact Water Environment (picklist)	minimally affected 1
Indirect Impact Community Structure (picklist)	inconsequential effect 0
Indirect Impact Wildlife (picklist)	minimally affected 1
Scope of Effect (Feet)	125
<b>Functional Loss</b>	
Functional Value (Pre-Post delta) from assessment	0.05
Acres of wetlands within Scope of Effect	2.00
Functional Loss	0.10
<b>Indirect effects considerations for Water Environment.</b>	
Change drainage characteristics or flow patterns.	
Change in water levels.	
Change the retention time of water in the wetland.	
Change the seasonal duration of wetland saturation,	
Change water velocity within the wetland.	
Eliminate or reduce the association of the wetland with a watercourse or other waterbody.	
Eliminate the defined or constricted outlet of the	
Change the volume of water reaching the wetland via infiltration or surface runoff.	
Change the ability of the wetland to receive floodflow from surrounding uplands or wetlands.	x
Change the temperature or biochemical characteristics of water in the wetland.	x

Indirect effects considerations for Community Structure.	
Change the density or type of vegetation within the	
Reduce the degree of interspersion of vegetation	
Change the dominant wetland class.	
Reduce wetland vegetation density.	
Reduce wetland plant diversity.	
Create conditions to likely to introduce invasive	off-site buffer
Other: _____	
Indirect effects considerations for Location/Landscape Support.	
Reduce wildlife usage of the wetland.	x
Fragment the wetland.	
Create a barrier between other wetland systems.	x
Create a barrier to wildlife movement between the	x
Reduce the availability of wildlife food sources.	x
Reduce detritus development and/or transport.	
Reduce the abundance or diversity of insects.	
Introduce a new noise source with the potential to	
Create a canopy gap that could affect microclimate	
Eliminate shading streamside vegetation.	
Adversely affects critical habitat for a listed T&E	
Affect migration of T&E species within a wetland, or between wetland and upland habitats.	
Affect the supply of food resources for T&E species	
Increase wildlife mortality.	
Introduce light as a disturbance factor.	x
Other: _____	

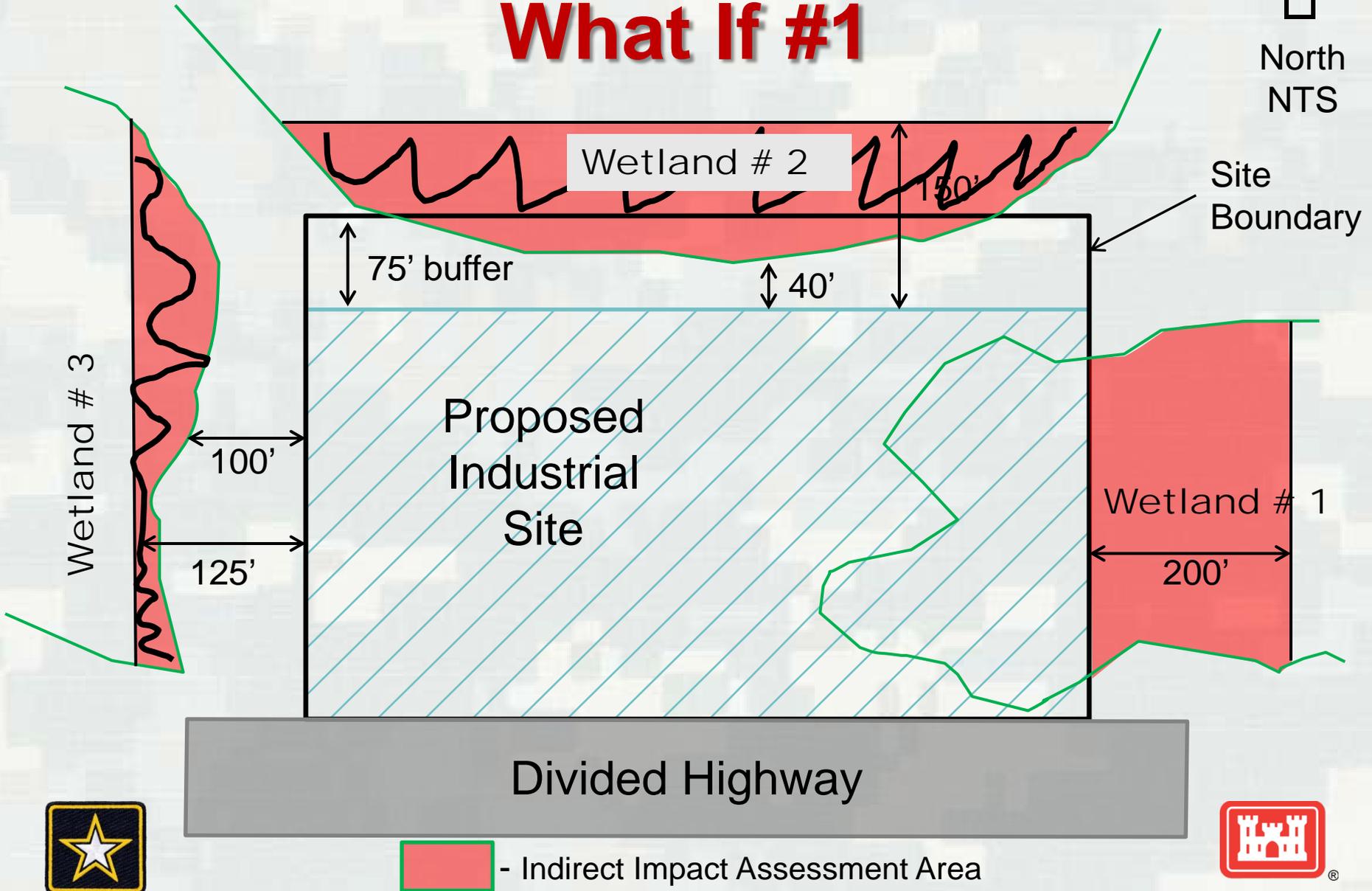
Enter the size of the WAA and the pre-post functional value delta for the form to calculate the functional loss for the WAA



# What If #1



North  
NTS

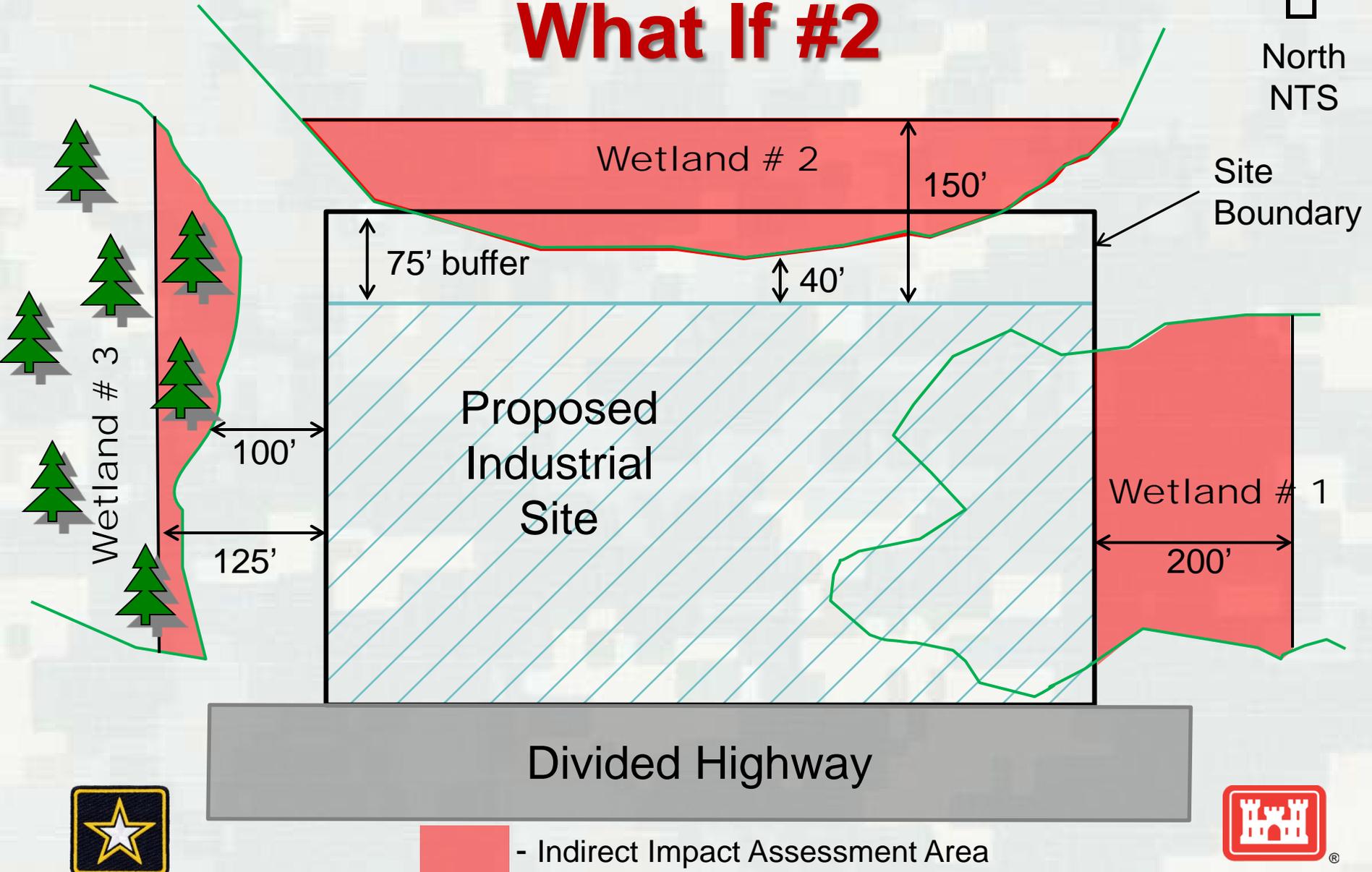


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# What If #2



North  
NTS



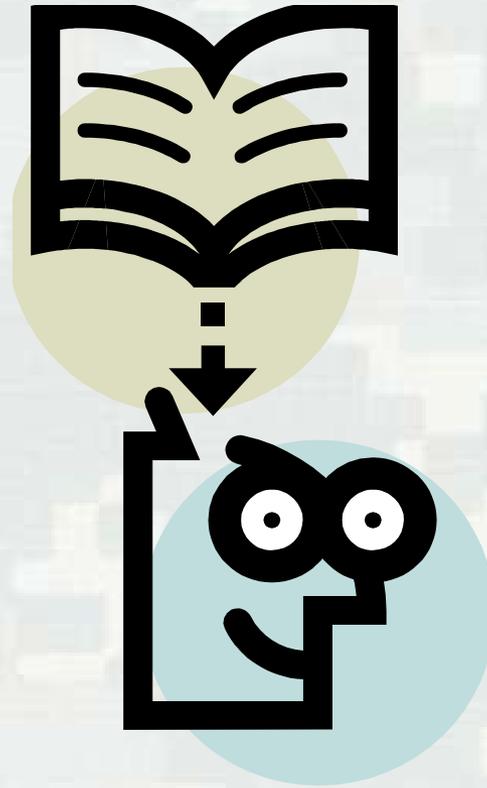
- Indirect Impact Assessment Area



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# References and Background Literature

## Section VIII



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# Conclusion

## Section VII

- Relatively simple for use within regulatory timeframes
- Increase consistency
- Based on consideration of the literature
- Allows flexibility and best professional judgment
- Requires a functional assessment to accurately document the anticipated functional loss





**Questions?**



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