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<b>Site ID</b>	<b>CATO-9</b>
Potential Restoration (linear feet)	150
Date	3/24/16
Existing Land Use	Forested with road crossing
Adjacent Land Use	Parking lot
Distance to Nearest Road	O two road crossings
Stream Hydrology	Perennial
RTE Species Present?	No
Known Cultural Concern?	Yes
Wetland Restoration Opportunity?	No
Existing Wetlands Present	No
Evidence of Disturbance	Yes
Can Restoration be Completed in NPS Area?	Yes
Estimated Bank Erosion Score	7
Degree of Channel Incision Score	6
Existing Floodplain Access Score	8
Opportunity for Floodplain Development Score	6
Threat of Impact to Resources Score	4
Surrounding Vegetation Score	5
Land Use Score	4
Opportunity for Ecological Lift Score	5
Ease of Access	9
Surrounding Land Use Score	4
Total Score	58
Invasives Species Control?	No
Riparian Buffer Enhancement?	No
Restore Natural Hydrology?	No
Livestock Agricultural Exclusion	No
Fish Passage?	Yes
Channel Restoration?	Yes
Increase Aesthetic or Educational Value?	Yes
Other	No
Notes	Historic culvert on upstream portion with three to four foot high banks. Mostly forested but road access on upstream and downstream ends. Two to three foot drop at historic culvert and slightly incised eroded banks downstream of culvert, over widened channel as well. grade control structures can be implemented down stream of culvert to reduce fish blockage and also reduce bank erosion.



- Legend**
- Park Boundary
  - Study Area
  - Waters of the US (WUS)
- Proposed Conditions**
- Bank Armoring
  - Channel Cross Vane
  - Fish Passage Step Pool Complex

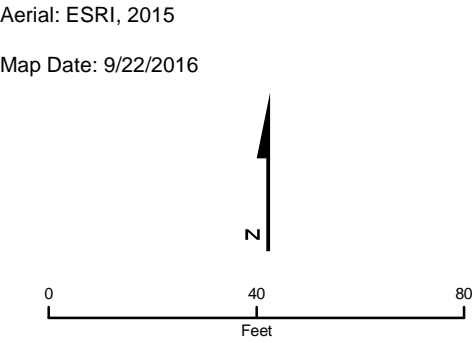
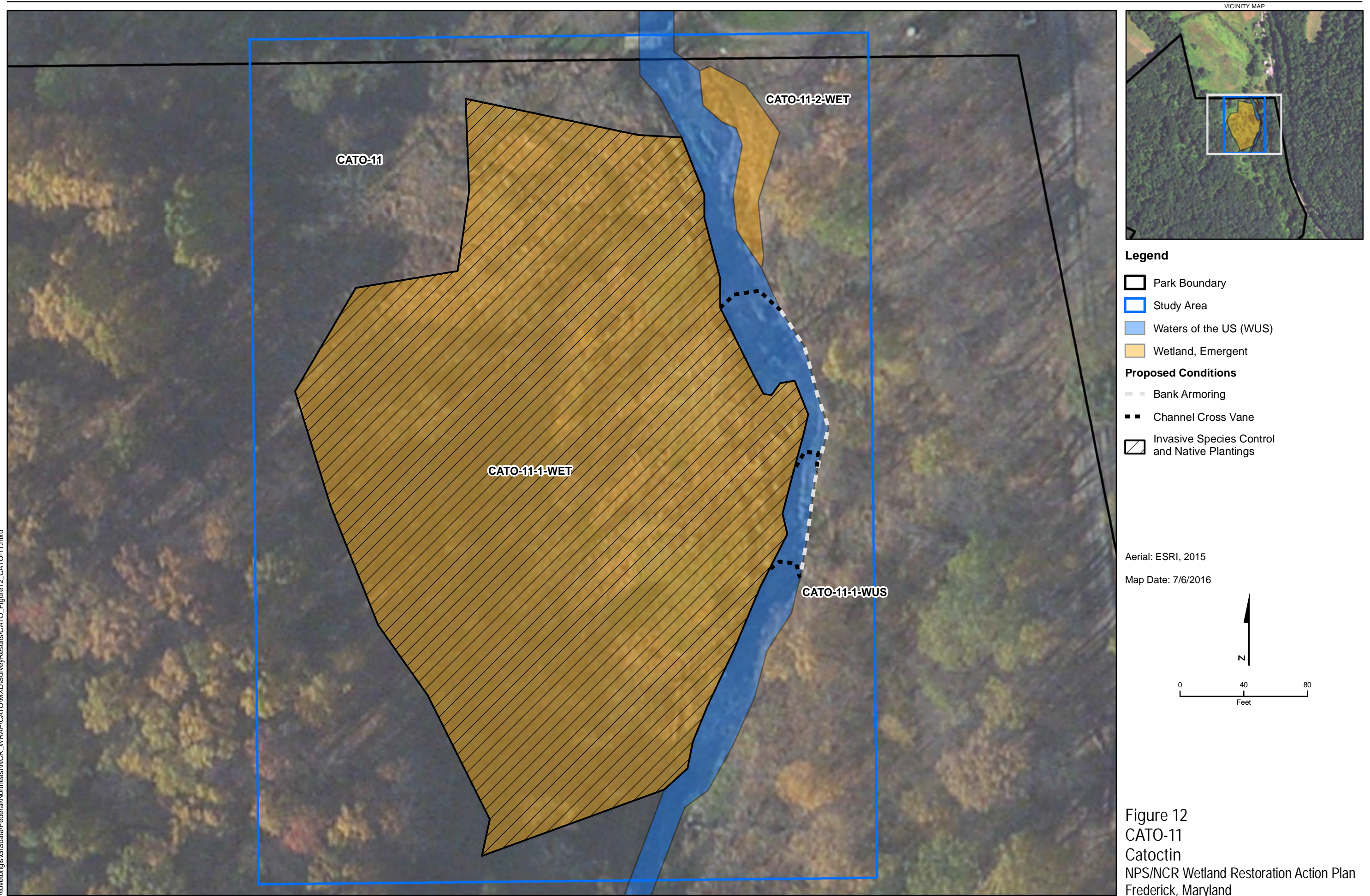


Figure 11  
CATO-09  
Catocin  
NPS/NCR Wetland Restoration Action Plan  
Frederick, Maryland



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<b><u>Site ID</u></b>	<b>CATO-11</b>
<u>Potential Restoration Area</u> (Acres)	3.00
<u>Date of Field Assessment</u>	3/31/16
<u>Existing Land Use</u>	Open floodplain

<u>Adjacent Land Use</u>	Forest
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<u>Distance to Nearest Road</u>	300 ft
<u>RTE Species Present?</u>	No
<u>Known Cultural Concern?</u>	No
<u>Stream Restoration</u> <u>Opportunity?</u>	Yes
<u>Site Currently Wetland?</u>	Yes
<u>Site Formerly Wetland?</u>	No
<u>Evidence of Disturbance</u>	No
<u>Soils Score</u>	7
<u>Hydrology Score</u>	9
<u>Existing Vegetation Score</u>	6
<u>Geomorphic Score</u>	8
<u>Surrounding Land Use Score</u>	7
<u>Function and Value Score</u>	3
<u>Presence of Invasive Species</u> <u>Score</u>	9
<u>Site Disturbance Score</u>	3
<u>Ease of Access Score</u>	3
<u>Stormwater Influence Score</u>	9
<u>Total Score</u>	64
<u>Invasive Species Control?</u>	Yes
<u>Native Plantings?</u>	Yes
<u>Restore Hydrology?</u>	No
<u>Increase Diversity?</u>	Yes
<u>Convert Open Water to</u> <u>Vegetated?</u>	No
<u>Convert Emergent to</u> <u>Shrub/Forested</u>	Yes
<u>Increase Asthetic or</u> <u>Educational Value</u>	Yes
<u>Other</u>	No

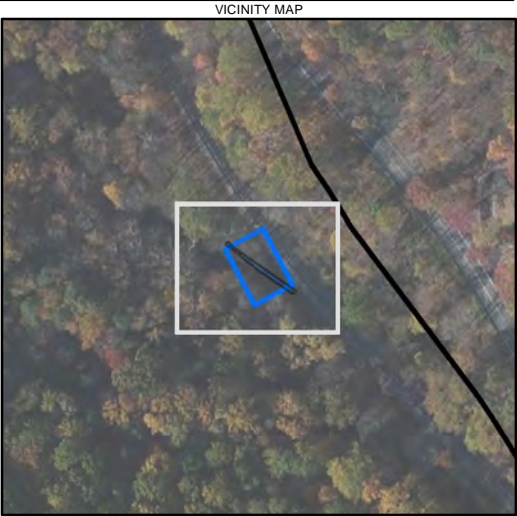
Notes

Wetland dominated by mile a minute and low species diversity. Will require private property access. Treatment of invasives and increase diversity with native plantings.

<u>Site ID</u>	<u>CATO-11</u>
<u>Potential Restoration (linear feet)</u>	600
<u>Date</u>	3/30/16
<u>Existing Land Use</u>	Open floodplain sparse trees
<u>Adjacent Land Use</u>	Forested
<u>Distance to Nearest Road</u>	300
<u>Stream Hydrology</u>	Perennial
<u>RTE Species Present?</u>	No
<u>Known Cultural Concern?</u>	No
<u>Wetland Restoration Opportunity?</u>	Yes
<u>Existing Wetlands Present</u>	Yes
<u>Evidence of Disturbance</u>	No
<u>Can Restoration be Completed in NPS Area?</u>	Yes
<u>Estimated Bank Erosion Score</u>	8
<u>Degree of Channel Incision Score</u>	7
<u>Existing Floodplain Access Score</u>	5
<u>Opportunity for Floodplain Development Score</u>	9
<u>Threat of Impact to Resources Score</u>	5
<u>Surrounding Vegetation Score</u>	8
<u>Land Use Score</u>	7
<u>Opportunity for Ecological Lift Score</u>	6
<u>Ease of Access</u>	7
<u>Surrounding Land Use Score</u>	4
<u>Total Score</u>	66
<u>Invasives Species Control?</u>	Yes
<u>Riparian Buffer Enhancement?</u>	Yes
<u>Restore Natural Hydrology?</u>	No
<u>Livestock Agricultural Exclusion</u>	No
<u>Fish Passage?</u>	No
<u>Channel Restoration?</u>	Yes
<u>Increase Aesthetic or Educational Value?</u>	No
<u>Other</u>	No
<u>Notes</u>	Stream appears to be flow cut and eroded, existing wetlands dominated by mile a minute. Upper left bank highly eroded. Open area in floodplain allows for realignment of channel. Reccommendations include bank stabilization and reconnection to floodplain as well as riparian planting through floodplain. Also has existing wetlands that can be treated for invasives.

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Site ID	CATO-13
Potential Restoration (linear feet)	50
Date	3/31/16
Existing Land Use	Forested stream
Adjacent Land Use	Railroad tracks
Distance to Nearest Road	200 ft
Stream Hydrology	Perennial
RTE Species Present?	No
Known Cultural Concern?	No
Wetland Restoration Opportunity?	No
Existing Wetlands Present	No
Evidence of Disturbance	Yes
Can Restoration be Completed in NPS Area?	No
Estimated Bank Erosion Score	10
Degree of Channel Incision Score	2
Existing Floodplain Access Score	2
Opportunity for Floodplain Development Score	2
Threat of Impact to Resources Score	8
Surrounding Vegetation Score	4
Land Use Score	5
Opportunity for Ecological Lift Score	2
Ease of Access	1
Surrounding Land Use Score	5
Total Score	41
Invasives Species Control?	No
Riparian Buffer Enhancement?	Yes
Restore Natural Hydrology?	No
Livestock Agricultural Exclusion	No
Fish Passage?	No
Channel Restoration?	Yes
Increase Aesthetic or Educational Value?	Yes
Other	Yes
Notes	Stabilize railroad embankment failure and place rock and vegetation at toe of slope along stream.



- Legend**
- Park Boundary
  - Study Area
  - Waters of the US (WUS)
- Proposed Conditions**
- Bank Armoring

Aerial: ESRI, 2015  
Map Date: 6/24/2016

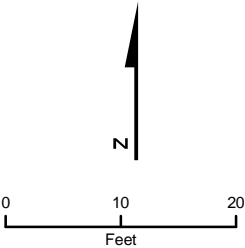


Figure 13  
CATO-13  
Catoclin  
NPS/NCR Wetland Restoration Action Plan  
Frederick, Maryland



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Site ID	CATO-14
Potential Restoration (linear feet)	20
Date	3/24/16
Existing Land Use	Forested with paved road
Adjacent Land Use	Forested
Distance to Nearest Road	0
Stream Hydrology	Perennial
RTE Species Present?	No
Known Cultural Concern?	No
Wetland Restoration Opportunity?	No
Existing Wetlands Present	Yes
Evidence of Disturbance	Yes
Can Restoration be Completed in NPS Area?	Yes
Estimated Bank Erosion Score	0
Degree of Channel Incision Score	0
Existing Floodplain Access Score	7
Opportunity for Floodplain Development Score	0
Threat of Impact to Resources Score	5
Surrounding Vegetation Score	10
Land Use Score	10
Opportunity for Ecological Lift Score	7
Ease of Access	10
Surrounding Land Use Score	10
Total Score	59
Invasives Species Control?	No
Riparian Buffer Enhancement?	No
Restore Natural Hydrology?	No
Livestock Agricultural Exclusion	No
Fish Passage?	Yes
Channel Restoration?	No
Increase Aesthetic or Educational Value?	No
Other	No
Notes	Fish passage at culvert. Two 16 inch cmp's. 15 inch drop at culvert. Fish passage can be established at site with grade control below culvert.



- Legend**
- Park Boundary
  - Study Area
  - Waters of the US (WUS)
- Proposed Conditions**
- Fish Passage Step Pool Complex

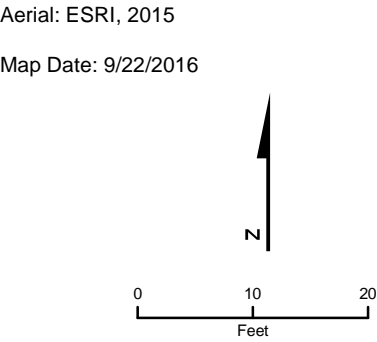


Figure 14  
CATO-14  
Catoctin  
NPS/NCR Wetland Restoration Action Plan  
Frederick, Maryland



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Site ID	CATO-15
Potential Restoration (linear feet)	150
Date	3/24/16
Existing Land Use	Forested
Adjacent Land Use	Forested
Distance to Nearest Road	300 ft
Stream Hydrology	Perennial
RTE Species Present?	No
Known Cultural Concern?	No
Wetland Restoration Opportunity?	No
Existing Wetlands Present	No
Evidence of Disturbance	No
Can Restoration be Completed in NPS Area?	Yes
Estimated Bank Erosion Score	10
Degree of Channel Incision Score	7
Existing Floodplain Access Score	7
Opportunity for Floodplain Development Score	4
Threat of Impact to Resources Score	9
Surrounding Vegetation Score	2
Land Use Score	3
Opportunity for Ecological Lift Score	6
Ease of Access	4
Surrounding Land Use Score	9
Total Score	61
Invasives Species Control?	No
Riparian Buffer Enhancement?	No
Restore Natural Hydrology?	No
Livestock Agricultural Exclusion	No
Fish Passage?	Yes
Channel Restoration?	Yes
Increase Aesthetic or Educational Value?	Yes
Other	No
Notes	Highly eroded channel at head cut near hiking trails and maintenance building parking area. Head cut is creating fish blockage and has the potential to migrate upstream impacting stream further and decreasing stream quality. Stream habitat for multiple salamander species. Good grade control upstream and downstream and little invasive and SWM influence.



- Legend**
- Park Boundary
  - Study Area
  - Waters of the US (WUS)
- Proposed Conditions**
- Bank Armoring
  - Fish Passage Step Pool Complex

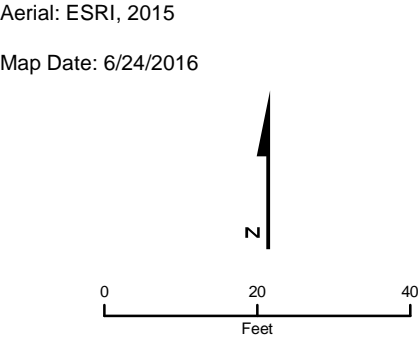


Figure 15  
CATO-15  
Catoctin  
NPS/NCR Wetland Restoration Action Plan  
Frederick, Maryland



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Site ID	CATO-17
Potential Restoration (linear feet)	150
Date	3/24/16
Existing Land Use	Forested
Adjacent Land Use	Forested
Distance to Nearest Road	120 ft
Stream Hydrology	Perennial
RTE Species Present?	No
Known Cultural Concern?	No
Wetland Restoration Opportunity?	No
Existing Wetlands Present	No
Evidence of Disturbance	No
Can Restoration be Completed in NPS Area?	Yes
Estimated Bank Erosion Score	9
Degree of Channel Incision Score	7
Existing Floodplain Access Score	7
Opportunity for Floodplain Development Score	5
Threat of Impact to Resources Score	7
Surrounding Vegetation Score	3
Land Use Score	3
Opportunity for Ecological Lift Score	5
Ease of Access	4
Surrounding Land Use Score	9
Total Score	59
Invasives Species Control?	No
Riparian Buffer Enhancement?	No
Restore Natural Hydrology?	No
Livestock Agricultural Exclusion	No
Fish Passage?	Yes
Channel Restoration?	Yes
Increase Aesthetic or Educational Value?	Yes
Other	No
Notes	Parking area nearby, but mostly forested. Highly eroded channel at head cut near parking area and buildings, has potential to migrate upstream impacting stream further. Good grade control upstream and downstream and little invasive and SWM influence. Large head cut creating fish blockage and highly eroded banks may be stabilized.



- Legend**
- Park Boundary
  - Study Area
  - Waters of the US (WUS)
- Proposed Conditions**
- Bank Armoring

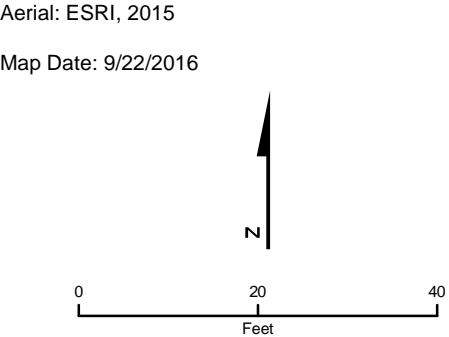
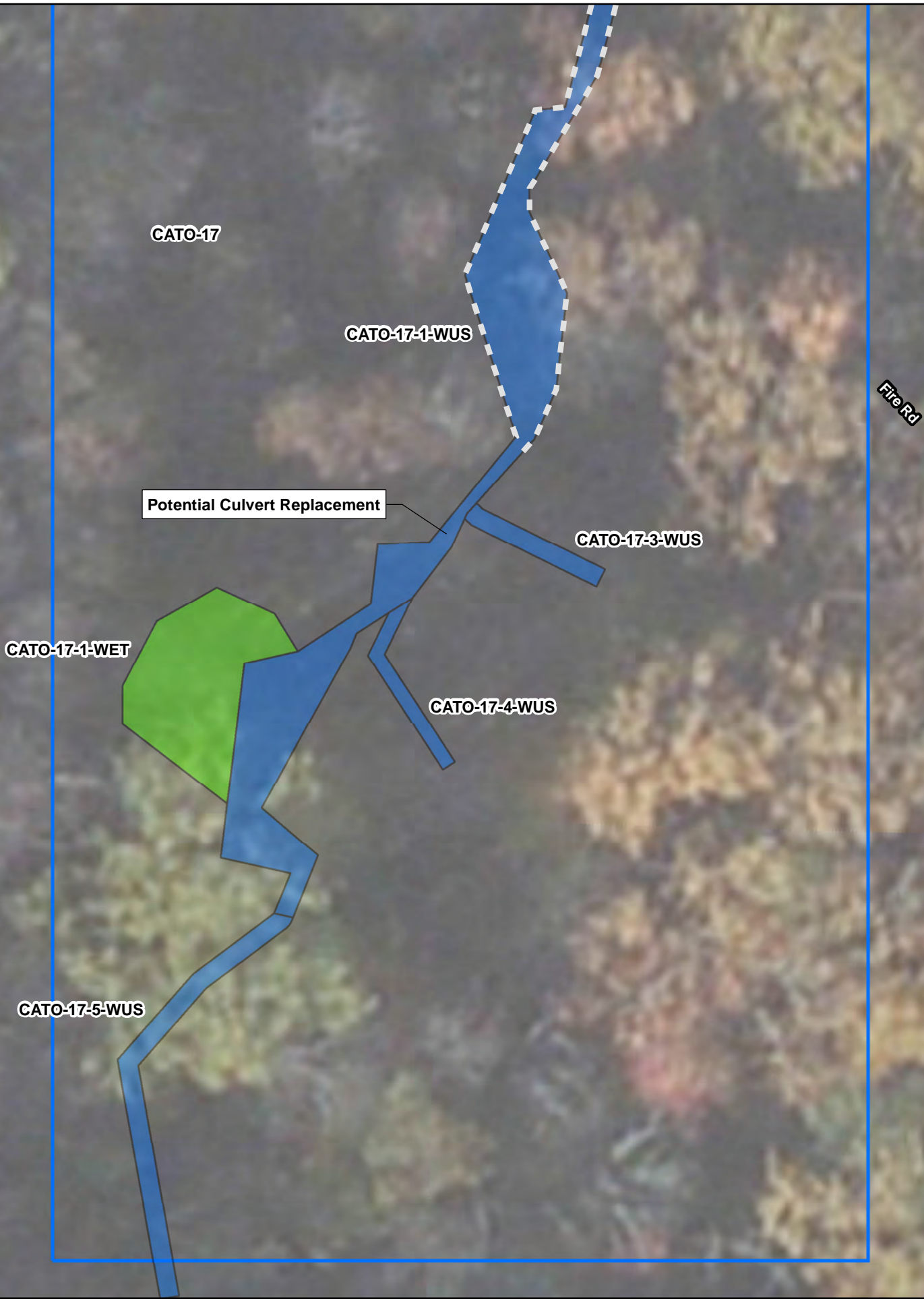


Figure 17a  
CATO-17  
Catoctin  
NPS/NCR Wetland Restoration Action Plan  
Frederick, Maryland



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Site ID	CATO-17
Potential Restoration (linear feet)	150
Date	3/24/16
Existing Land Use	Forested
Adjacent Land Use	Forested
Distance to Nearest Road	120 ft
Stream Hydrology	Perennial
RTE Species Present?	No
Known Cultural Concern?	No
Wetland Restoration Opportunity?	No
Existing Wetlands Present	No
Evidence of Disturbance	No
Can Restoration be Completed in NPS Area?	Yes
Estimated Bank Erosion Score	9
Degree of Channel Incision Score	7
Existing Floodplain Access Score	7
Opportunity for Floodplain Development Score	5
Threat of Impact to Resources Score	7
Surrounding Vegetation Score	3
Land Use Score	3
Opportunity for Ecological Lift Score	5
Ease of Access	4
Surrounding Land Use Score	9
Total Score	59
Invasives Species Control?	No
Riparian Buffer Enhancement?	No
Restore Natural Hydrology?	No
Livestock Agricultural Exclusion	No
Fish Passage?	Yes
Channel Restoration?	Yes
Increase Aesthetic or Educational Value?	Yes
Other	No
Notes	Parking area nearby, but mostly forested. Highly eroded channel at head cut near parking area and buildings, has potential to migrate upstream impacting stream further. Good grade control upstream and downstream and little invasive and SWM influence. Large head cut creating fish blockage and highly eroded banks may be stabilized.



- Legend**
- Park Boundary
  - Study Area
  - Waters of the US (WUS)
  - Wetland, Forested
- Proposed Conditions**
- Bank Armoring

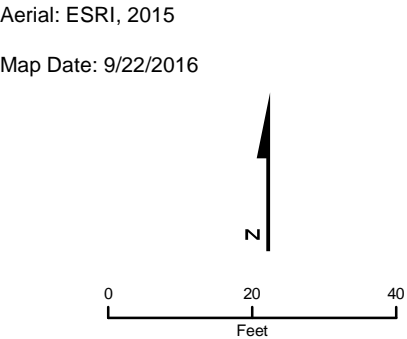


Figure 17b  
CATO-17  
Catoclin  
NPS/NCR Wetland Restoration Action Plan  
Frederick, Maryland

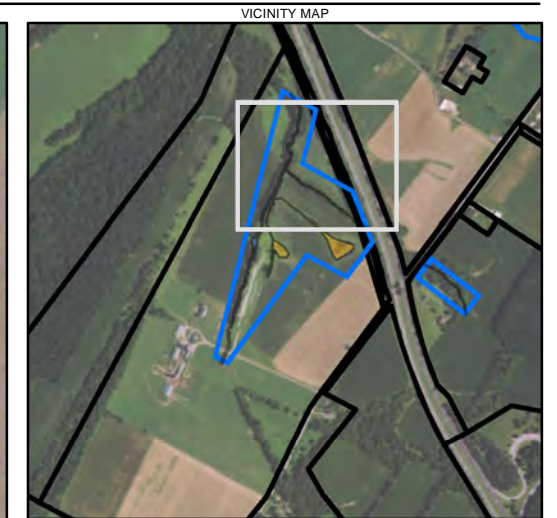
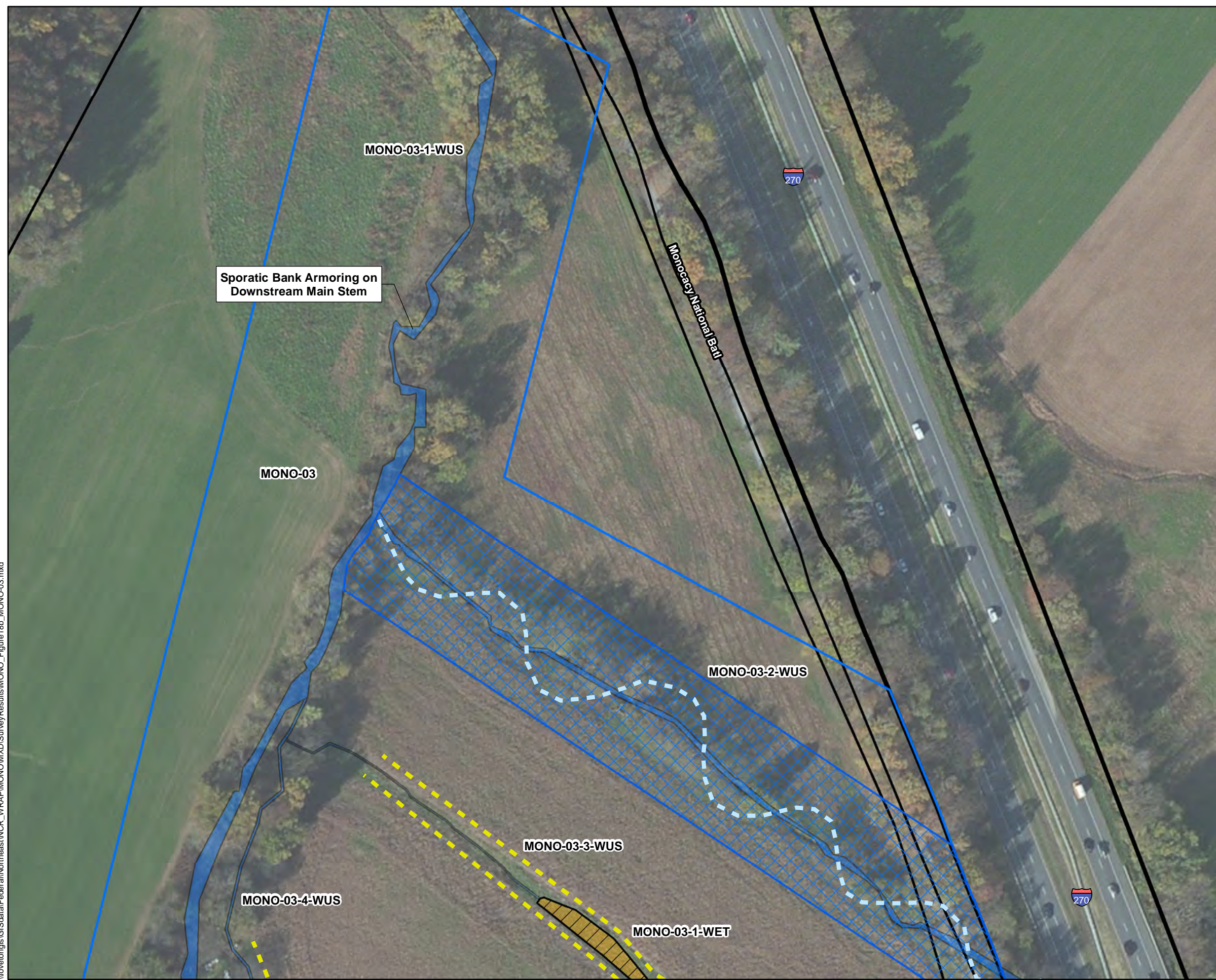




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**Legend**

- Park Boundary
- Study Area
- Waters of the US (WUS)
- Wetland, Emergent
- Proposed Conditions**
- Exclusion Fence or Signs
- Full Stream Restoration with Channel Relocation
- Floodplain Establishment
- Invasive Species Control and Native Plantings

Aerial: ESRI, 2015

Map Date: 9/22/2016

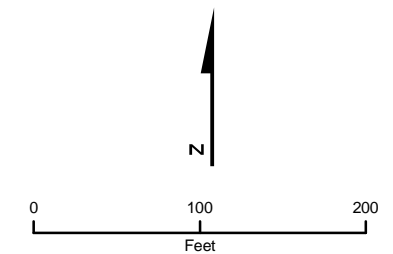
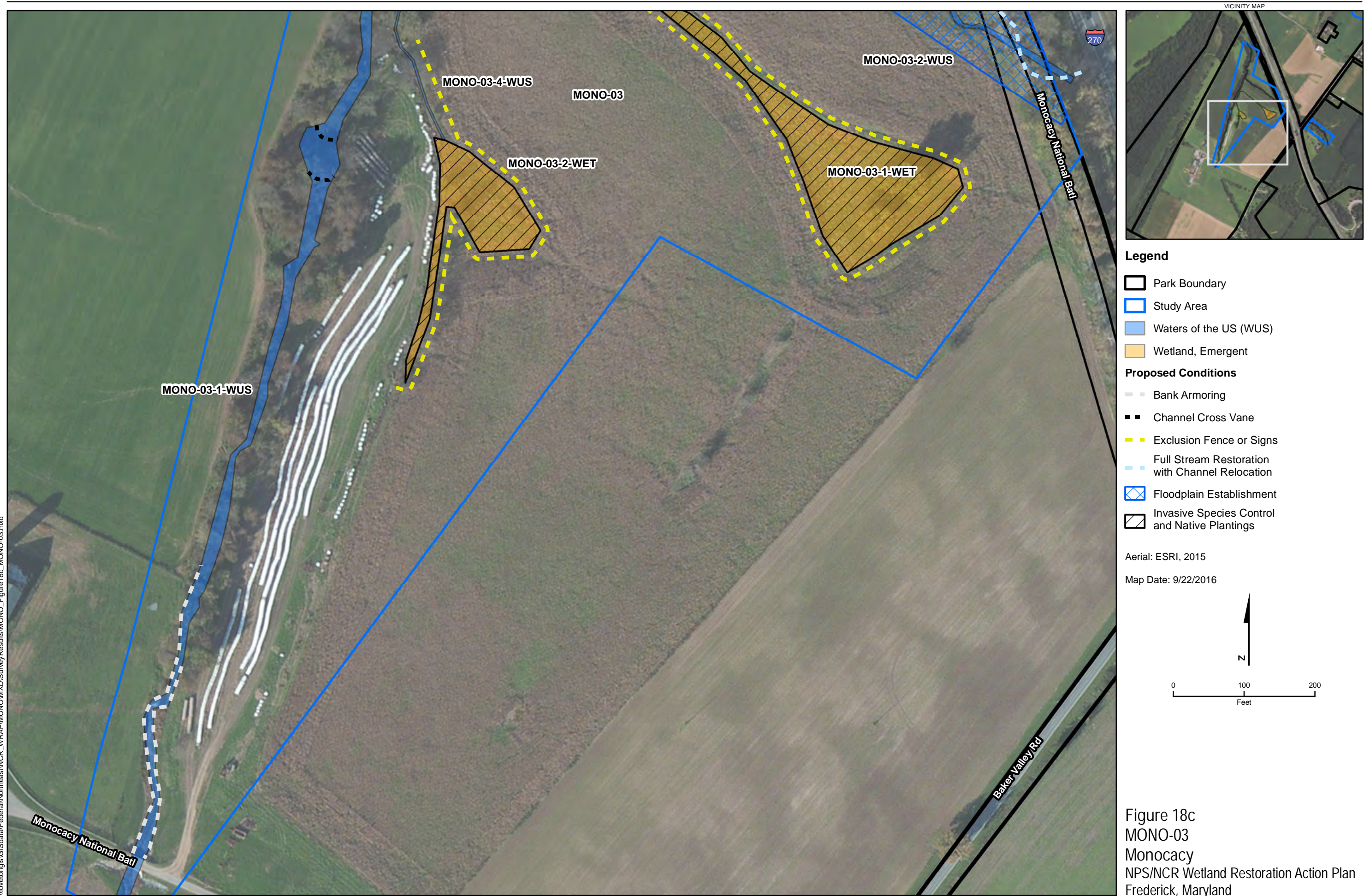


Figure 18b  
MONO-03  
Monocacy  
NPS/NCR Wetland Restoration Action Plan  
Frederick, Maryland



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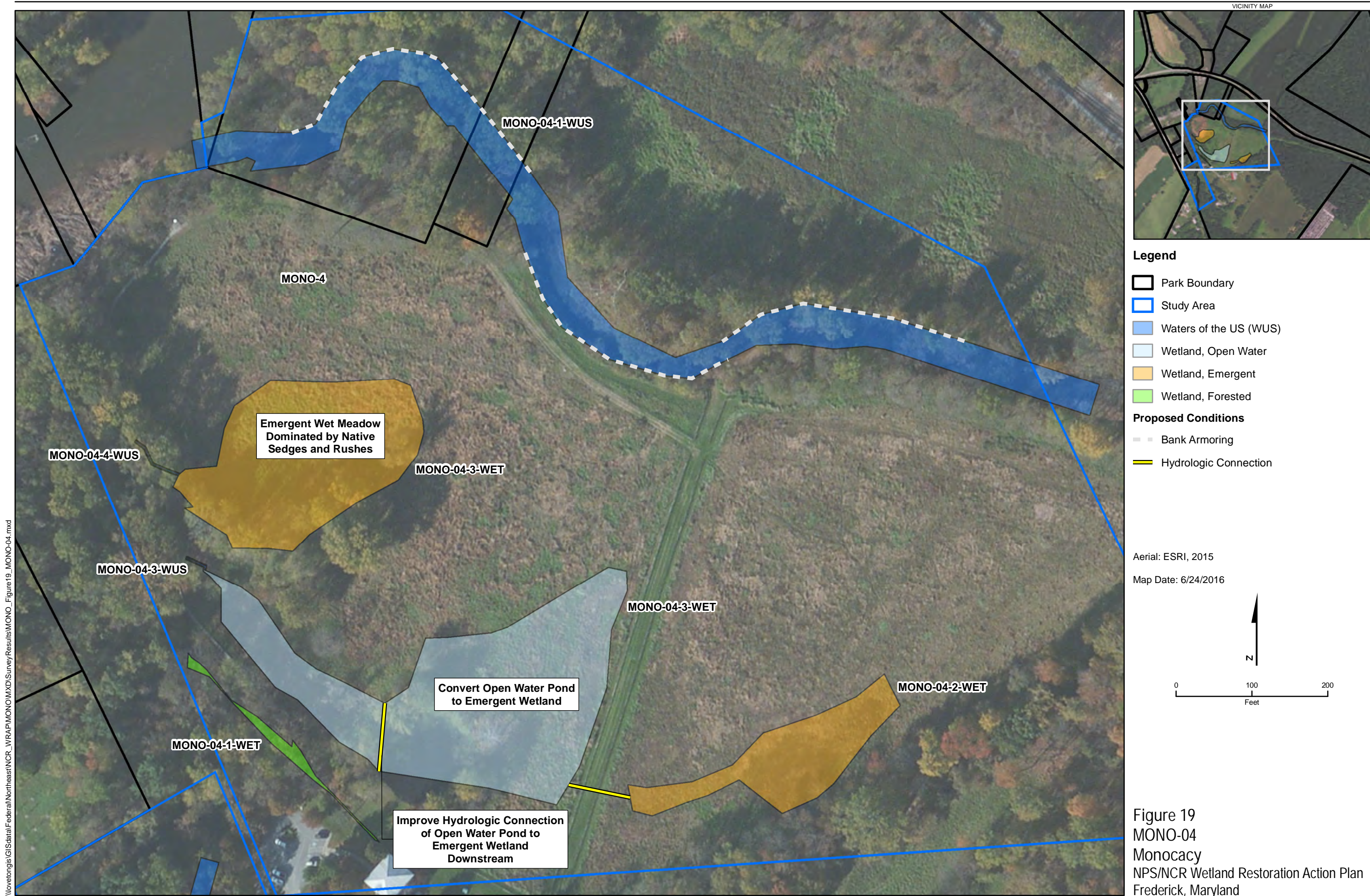
<u>Site ID</u>	<b>MONO-3 WET-1</b>	<b>MONO-3 WET-2</b>
<u>Potential Restoration Area (Acres)</u>	1.00	0.50
<u>Date of Field Assessment</u>	4/7/16	4/7/16
<u>Existing Land Use</u>	Agricultural	Agricultural
<u>Adjacent Land Use</u>	Agricultural	Agricultural
<u>Distance to Nearest Road</u>	100	200
<u>RTE Species Present?</u>	No	No
<u>Known Cultural Concern?</u>	No	No
<u>Stream Restoration Opportunity?</u>	No	Yes
<u>Site Currently Wetland?</u>	Yes	Yes
<u>Site Formerly Wetland?</u>	Yes	Yes
<u>Evidence of Disturbance</u>	Yes	Yes
<u>Soils Score</u>	10	9
<u>Hydrology Score</u>	10	10
<u>Existing Vegetation Score</u>	8	8
<u>Geomorphic Score</u>	9	9
<u>Surrounding Land Use Score</u>	8	6
<u>Function and Value Score</u>	6	6
<u>Presence of Invasive Species Score</u>	5	6
<u>Site Disturbance Score</u>	8	8
<u>Ease of Access Score</u>	8	7
<u>Stormwater Influence Score</u>	7	7
<u>Total Score</u>	79	76
<u>Invasive Species Control?</u>	Yes	Yes
<u>Native Plantings?</u>	Yes	Yes
<u>Restore Hydrology?</u>	No	No
<u>Increase Diversity?</u>	Yes	Yes
<u>Convert Open Water to Vegetated?</u>	No	No
<u>Convert Emergent to Shrub/Forested</u>	Yes	Yes
<u>Increase Aesthetic or Educational Value</u>	Yes	Yes
<u>Other</u>	No	No

<u>Notes</u>	Wetland seep in middle of agricultural field. Vegetation disturbed and dominated by thistle, fescue, and rye. Fence or agricultural exclusion and native plantings with invasive control.	Agricultural practices have degraded wetland including remains of crop vegetation present. Lack of forest species and presence of invasives.
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<u>Site ID</u>	<u>MONO-3</u>	<u>MONO-3 stream 2</u>
<u>Potential Restoration (linear feet)</u>	2300	1000
<u>Date</u>	4/7/16	4/7/16
<u>Existing Land Use</u>	Agricultural	Old field
<u>Adjacent Land Use</u>	Agricultural	Agricultural
<u>Distance to Nearest Road</u>	200	50
<u>Stream Hydrology</u>	Perennial	Perennial
<u>RTE Species Present?</u>	No	No
<u>Known Cultural Concern?</u>	No	No
<u>Wetland Restoration Opportunity?</u>	Yes	Yes
<u>Existing Wetlands Present</u>	Yes	Yes
<u>Evidence of Disturbance</u>	Yes	Yes
<u>Can Restoration be Completed in NPS Area?</u>	Yes	Yes
<u>Estimated Bank Erosion Score</u>	8	10
<u>Degree of Channel Incision Score</u>	7	10
<u>Existing Floodplain Access Score</u>	6	10
<u>Opportunity for Floodplain Development Score</u>	6	9
<u>Threat of Impact to Resources Score</u>	7	9
<u>Surrounding Vegetation Score</u>	5	8
<u>Land Use Score</u>	8	8
<u>Opportunity for Ecological Lift Score</u>	6	8
<u>Ease of Access</u>	6	8
<u>Surrounding Land Use Score</u>	5	6
<u>Total Score</u>	64	86
<u>Invasives Species Control?</u>	No	No
<u>Riparian Buffer Enhancement?</u>	Yes	Yes
<u>Restore Natural Hydrology?</u>	No	Yes
<u>Livestock Agricultural Exclusion</u>	No	No
<u>Fish Passage?</u>	No	No
<u>Channel Restoration?</u>	Yes	Yes
<u>Increase Aesthetic or Educational Value?</u>	Yes	Yes
<u>Other</u>	No	No
<u>Notes</u>	<p>Severely eroded stream in narrow riparian corridor surrounded by agricultural fields. Multiple wetlands identified and ranked on separate forms. Recommend full channel restoration including structures bank armory get increased connection to floodplain and riparian enhancements.</p> <p>Highly eroded and extremely incised stream channel with very low sinuosity and riparian buffer. Full stream restoration potential.</p>	





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<u>Site ID</u>	<b>MONO-4 WET-1</b>	<b>MONO-4 WET-2</b>
<u>Potential Restoration Area (Acres)</u>	1.50	3.00
<u>Date of Field Assessment</u>	4/6/2016	4/6/2016
<u>Existing Land Use</u>	Meadow	Meadow
<u>Adjacent Land Use</u>	Forest, meadow, park service property	Park service buildings
<u>Distance to Nearest Road</u>	250	250
<u>RTE Species Present?</u>	No	No
<u>Known Cultural Concern?</u>	No	No
<u>Stream Restoration Opportunity?</u>	No	Yes
<u>Site Currently Wetland?</u>	Yes	Yes
<u>Site Formerly Wetland?</u>	Yes	Yes
<u>Evidence of Disturbance</u>	Yes	Yes
<u>Soils Score</u>	8	8
<u>Hydrology Score</u>	8	7
<u>Existing Vegetation Score</u>	8	7
<u>Geomorphic Score</u>	8	8
<u>Surrounding Land Use Score</u>	7	7
<u>Function and Value Score</u>	7	5
<u>Presence of Invasive Species Score</u>	4	5
<u>Site Disturbance Score</u>	3	4
<u>Ease of Access Score</u>	8	7
<u>Stormwater Influence Score</u>	4	5
<u>Total Score</u>	65	63
<u>Invasive Species Control?</u>	No	No
<u>Native Plantings?</u>	Yes	Yes
<u>Restore Hydrology?</u>	Yes	Yes
<u>Increase Diversity?</u>	Yes	Yes
<u>Convert Open Water to Vegetated?</u>	No	Yes
<u>Convert Emergent to Shrub/Forested</u>	Yes	Yes
<u>Increase Aesthetic or Educational Value</u>	Yes	Yes
<u>Other</u>	No	No
<u>Notes</u>	Wetland surrounded by meadow. Separated from other wetland by raised grass path likely used to be connected and wetland area was much larger. Sparsely vegetated with grasses. Partially developed park service land. Historic wetland that is functioning at lower capacity. Raise grass path and surrounding development. Create PSS wetland, connect to other wetland.	Small open water pond likely man made impoundment. Ground water likely present. Soils saturated at approximately 10". Some trees around pond. Low, concave, disconnected flood plain. Open meadow and park service maintained grounds. Existing wetland opportunity to increase function. Believed to have been connected to WET1 historically.



<u>Site ID</u>	<b><u>MONO 4 WUS1</u></b>
<u>Potential Restoration (linear feet)</u>	1100
<u>Date</u>	4/6/2016
<u>Existing Land Use</u>	Old field, riparian forest
<u>Adjacent Land Use</u>	Meadow, CSX rail line, park service property
<u>Distance to Nearest Road</u>	1000
<u>Stream Hydrology</u>	Perennial
<u>RTE Species Present?</u>	No
<u>Known Cultural Concern?</u>	No
<u>Wetland Restoration Opportunity?</u>	Yes
<u>Existing Wetlands Present</u>	No
<u>Evidence of Disturbance</u>	No
<u>Can Restoration be Completed in NPS Area?</u>	Yes
<u>Estimated Bank Erosion Score</u>	8
<u>Degree of Channel Incision Score</u>	8
<u>Existing Floodplain Access Score</u>	7
<u>Opportunity for Floodplain Development Score</u>	9
<u>Threat of Impact to Resources Score</u>	4
<u>Surrounding Vegetation Score</u>	5
<u>Land Use Score</u>	7
<u>Opportunity for Ecological Lift Score</u>	8
<u>Ease of Access</u>	4
<u>Surrounding Land Use Score</u>	7
<u>Total Score</u>	67
<u>Invasives Species Control?</u>	No
<u>Riparian Buffer Enhancement?</u>	Yes
<u>Restore Natural Hydrology?</u>	Yes
<u>Livestock Agricultural Exclusion</u>	No
<u>Fish Passage?</u>	No
<u>Channel Restoration?</u>	Yes
<u>Increase Aesthetic or Educational Value?</u>	Yes
<u>Other</u>	No
<u>Notes</u>	Stream is disconnected from floodplain. Wet meadows were observed in open meadow adjacent to stream. Only in some small sections. Immediate surrounding is forest but beyond narrow riparian strip is meadow. Reduce erosion and sedimentation, increase habitat and forested buffer. Access over meadow. Nearest road is 1000 ft.