

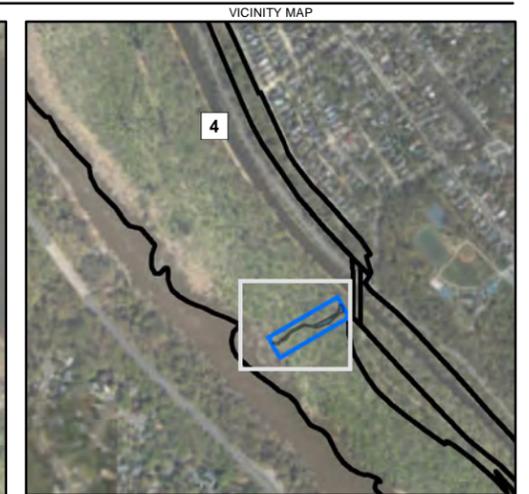
\\lovetorgis\GIS\data\Federal\Northeast\NCR_WRAP\CHOH\XDS\SurveyResults\CHOH_Figure33_CHOH-12.mxd

Site ID	CHOH-12
Potential Restoration (linear feet)	600
Date	4/28/2016
Existing Land Use	Forested parkland-Upland previously disturbed
Adjacent Land Use	Forested parkland; huge wetland complex at downstream end of reach
Distance to Nearest Road	along tow path
Stream Hydrology	Perennial
RTE Species Present?	No
Known Cultural Concern?	No
Wetland Restoration Opportunity?	Yes
Existing Wetlands Present	No
Evidence of Disturbance	Yes
Can Restoration be Completed in NPS Area?	Yes
Estimated Bank Erosion Score	6
Degree of Channel Incision Score	9
Existing Floodplain Access Score	10
Opportunity for Floodplain Development Score	10
Threat of Impact to Resources Score	5
Surrounding Vegetation Score	6
Land Use Score	3
Opportunity for Ecological Lift Score	8
Ease of Access	6
Surrounding Land Use Score	6
Total Score	69
Invasives Species Control?	Yes
Riparian Buffer Enhancement?	Yes
Restore Natural Hydrology?	Yes
Livestock Agricultural Exclusion	No
Fish Passage?	No
Channel Restoration?	Yes
Increase Aesthetic or Educational Value?	Yes

Other No

Banks are steep and high but not severely eroding, vegetated with Ficaria which is likely reducing erosion. At upstream portion of reach, erosion is extreme at over 20 feet; at downstream portion of reach, channel has recovered and is completely connected to the floodplain. Out of bank flooding does not occur at upstream portion of reach due to bank height. Channel disconnected to floodplain. Forest is young in age and dominated by Chinese wisteris, pawpaw, silver maple, elm, and box elder (new mature trees). No immediate threat but potential future threat of erosion continues. Could reconnect floodplain to improve habitat. May require equipment under pedestrian bridge; would have to cross canal. Stream appears straightened. Surrounding area is upland and dominated by invasive species at upstream end. Downstream most portion of the reach is stable, connected to floodplain but with Japanese knotweed. Stream and floodplain restoration proposed at upstream portion of reach to reconnect stream to floodplain and treat for invasives. Tie in to downstream point and do not disturb wetland at downstream end. Add meander bends and in stream habitat.

Notes



- Legend**
- 1 Mile Marker
 - ▭ Park Boundary
 - ▭ Study Area
 - ▭ Waters of the US (WUS)
- Proposed Conditions**
- ▭ Bank Armoring
 - ▭ Channel Cross Vane
 - ▭ Invasive Species Control and Native Plantings

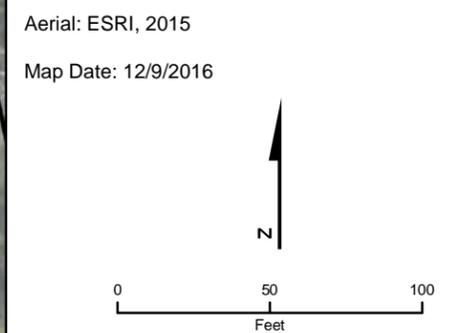
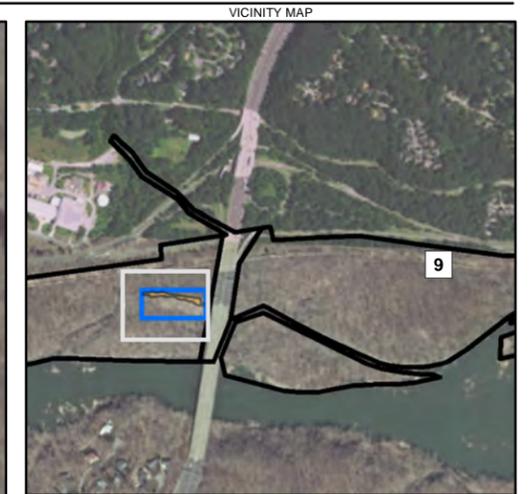


Figure 33
CHOH-12
C&O Canal
NPS/NCR Wetland Restoration Action Plan
Washington, D.C.

\\lovetorgis\GIS\data\Federal\Northeast\NCR_WRAP\CHOHMXD\SURVEYRESULTS\CHOH_Figure34_CHOH-13.mxd

Site ID	CHOH-13
Potential Restoration Area (Acres)	1.00
Date of Field Assessment	4/27/2016
Existing Land Use	Open meadow and forested parkland
Adjacent Land Use	I 495 and Forest
Distance to Nearest Road	75 feet from towpath
RTE Species Present?	No
Known Cultural Concern?	No
Stream Restoration Opportunity?	No
Site Currently Wetland?	No
Site Formerly Wetland?	Yes
Evidence of Disturbance	Yes
Soils Score	4
Hydrology Score	4
Existing Vegetation Score	6
Geomorphic Score	8
Surrounding Land Use Score	8
Function and Value Score	5
Presence of Invasive Species	9
Score	
Site Disturbance Score	5
Ease of Access Score	4
Stormwater Influence Score	6
Total Score	59
Invasive Species Control?	Yes
Native Plantings?	Yes
Restore Hydrology?	Yes
Increase Diversity?	Yes
Convert Open Water to Vegetated?	No
Convert Emergent to Shrub/Forested	No
Increase Aesthetic or Educational Value	Yes
Other	Yes
Notes	Portion of site identified as wetland and remaining open area identified as previous wetland that appears to have been historically drained. Old abandoned channels that are dry were observed. Dominated by reed canary grass jewelweed smartweed. Some standing live and some standing dead sycamores were also observed scattered. Potential to remove invasive species from existing wetlands and improve hydrology to previously drained area.



- Legend**
- 1 Mile Marker
 - Park Boundary
 - Study Area
 - Waters of the US (WUS)
 - Wetland, Emergent
- Proposed Conditions**
- Invasive Species Control and Native Plantings
 - Restore Wetland Hydrology with Excavation

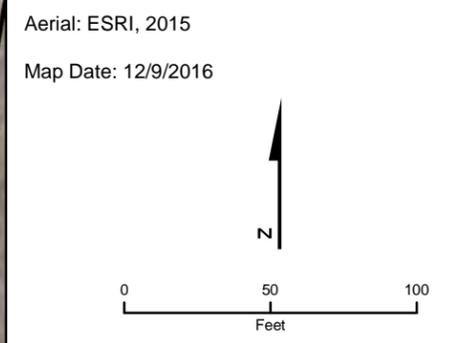
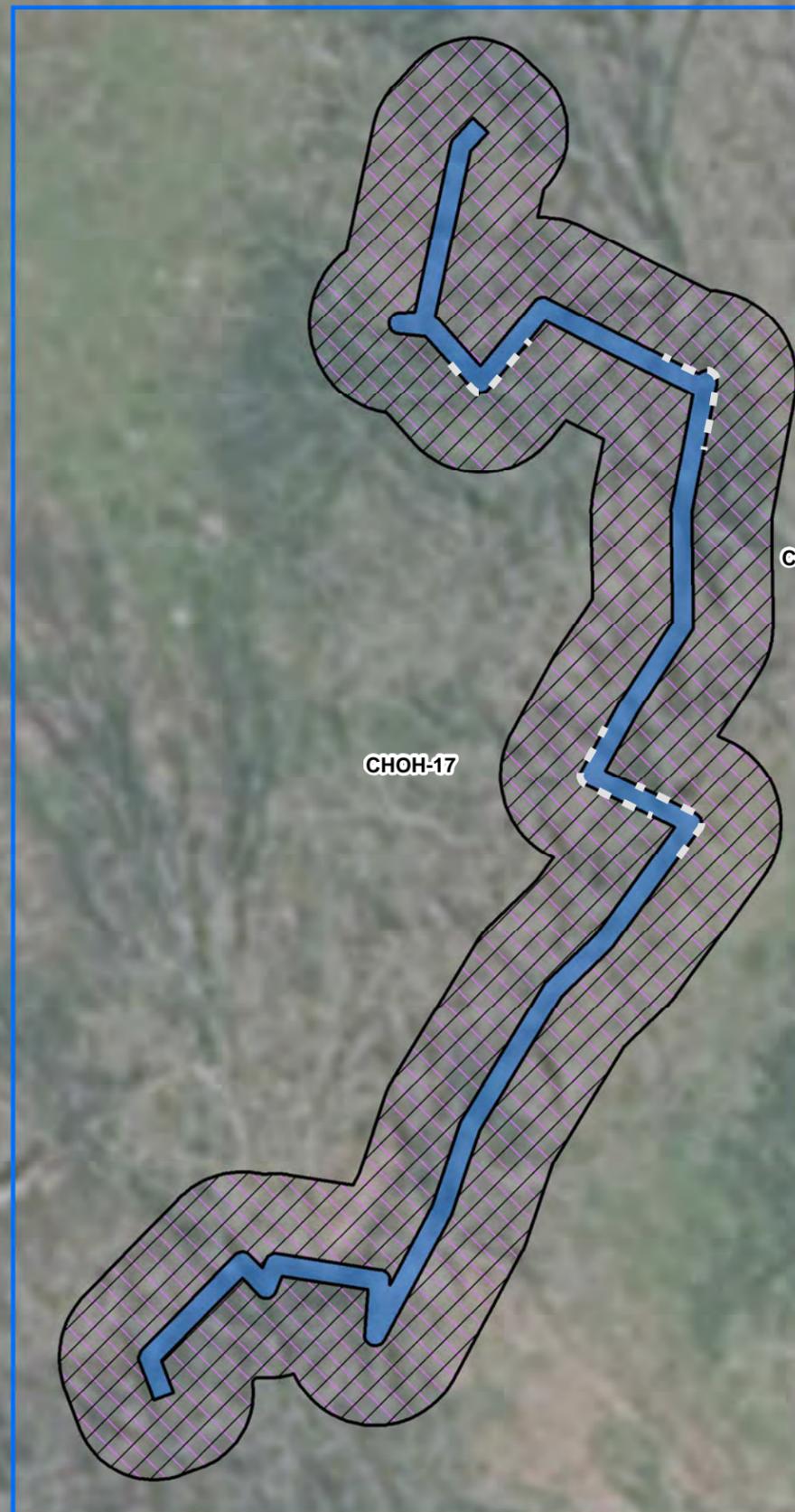


Figure 34
CHOH-13
C&O Canal
NPS/NCR Wetland Restoration Action Plan
Montgomery, Maryland

Site ID	CHOH-17
Potential Restoration (linear feet)	320
Date	4/21/16
Existing Land Use	Old field
Adjacent Land Use	Forested
Distance to Nearest Road	150 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	4
Degree of Channel Incision Score	4
Existing Floodplain Access Score	5
Opportunity for Floodplain Development Score	7
Threat of Impact to Resources Score	4
Surrounding Vegetation Score	4
Land Use Score	4
Opportunity for Ecological Lift Score	5
Ease of Access	5
Surrounding Land Use Score	5
Total Score	47
Invasives Species Control?	Yes
Riparian Buffer Enhancement?	Yes
Restore Natural Hydrology?	No
Livestock Agricultural Exclusion	No
Fish Passage?	No
Channel Restoration?	Yes
Increase Aesthetic or Educational Value?	No
Other	No
Notes	Channel lacking riparian buffer for approx 150 feet has small patchy areas of bank erosion and invasives on banks. Small bank armoring in patches and enhance riparian area and treat garlic mustard on banks.



- Legend**
- Mile Marker
 - Park Boundary
 - Study Area
 - Waters of the US (WUS)
- Proposed Conditions**
- Bank Armoring
 - Invasive Species Control and Native Plantings
 - Riparian Plantings

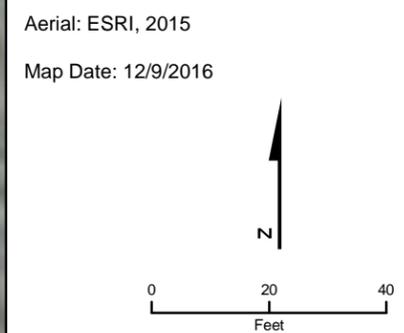


Figure 35
CHOH-17
C&O Canal
NPS/NCR Wetland Restoration Action Plan
Frederick, Maryland

\\lovetorgis\GISdata\Federal\NorthEast\NCR_WRAP\CHOHMXD\SURVEYRESULTS\CHOH_Figure35_CHOH-17.mxd

\\lovelongis\GIS\data\Federal\Northeast\NCR_WRAP\CHOH\MD\SurveyResults\CHOH_Figure36_CHOH-18.mxd

Site ID	CHOH-18
Potential Restoration Area (Acres)	1.00
Date of Field Assessment	4/20/16
Existing Land Use	Forested
Adjacent Land Use	Canal and old field
Distance to Nearest Road	75 feet to path
RTE Species Present?	No
Known Cultural Concern?	No
Stream Restoration Opportunity?	No
Site Currently Wetland?	Yes
Site Formerly Wetland?	No
Evidence of Disturbance	No
Soils Score	10
Hydrology Score	10
Existing Vegetation Score	4
Geomorphic Score	8
Surrounding Land Use Score	6
Function and Value Score	4
Presence of Invasive Species Score	9
Site Disturbance Score	3
Ease of Access Score	4
Stormwater Influence Score	8
Total Score	66
Invasive Species Control?	Yes
Native Plantings?	Yes
Restore Hydrology?	No
Increase Diversity?	No
Convert Open Water to Vegetated?	No
Convert Emergent to Shrub/Forested	No
Increase Aesthetic or Educational Value	No
Other	No
Notes	Forested wetland with large multi flora stand. Requires invasive species control.



- Legend**
- 1 Mile Marker
 - Park Boundary
 - Study Area
 - Wetland, Forested
- Proposed Conditions**
- Invasive Species Control and Native Plantings

Aerial: ESRI, 2015
Map Date: 12/9/2016

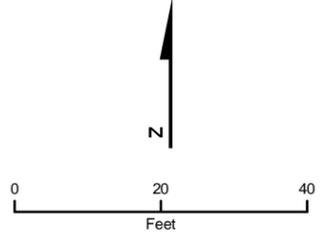
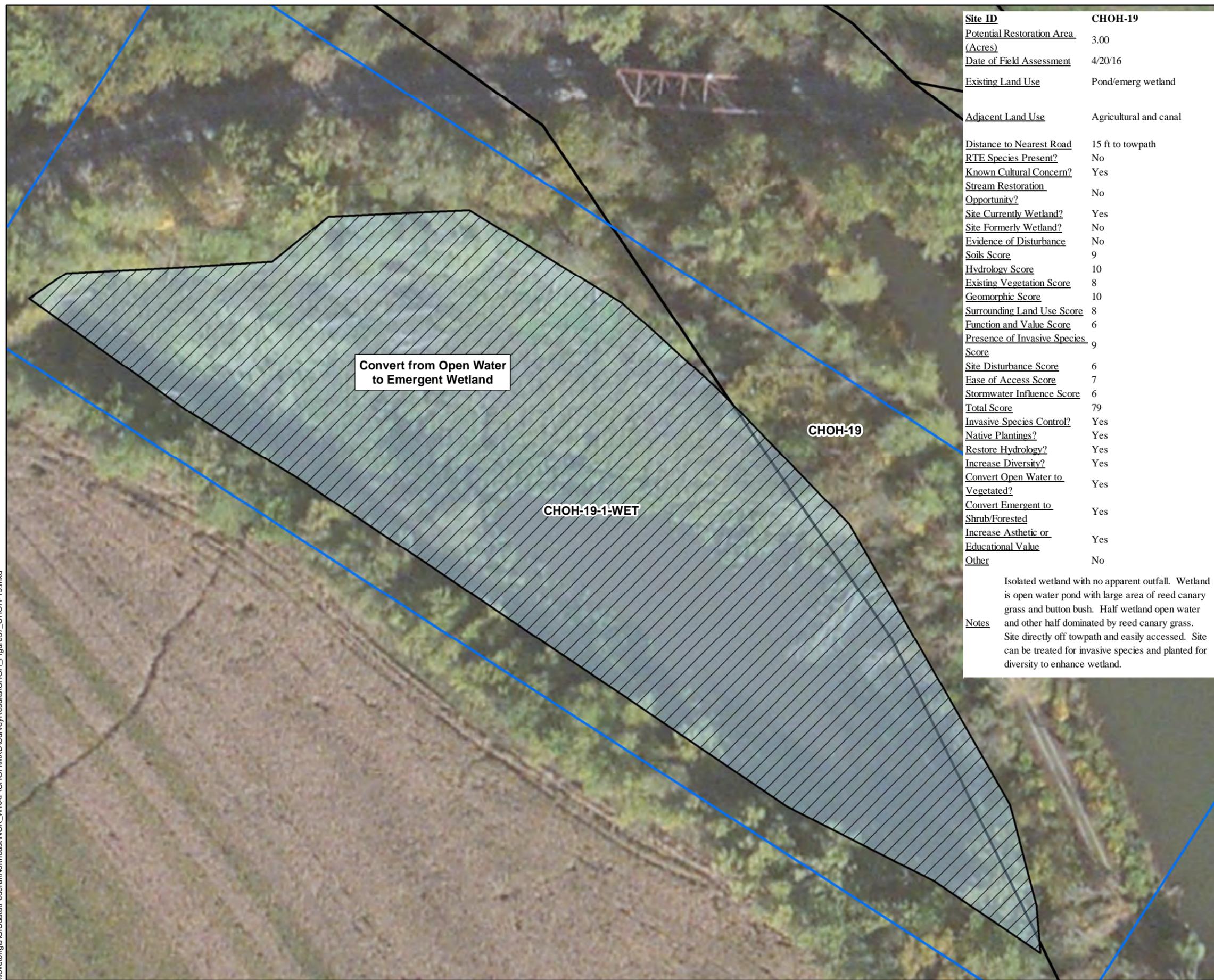


Figure 36
CHOH-18
C&O Canal
NPS/NCR Wetland Restoration Action Plan
Washington, Maryland

\\lovetorgis\GIS\data\Federal\Northeast\NCR_WRAP\CHOHMXD\SurveyResults\CHOH_Figure37_CHOH-19.mxd



Site ID	CHOH-19
<u>Potential Restoration Area (Acres)</u>	3.00
<u>Date of Field Assessment</u>	4/20/16
<u>Existing Land Use</u>	Pond/emerg wetland
<u>Adjacent Land Use</u>	Agricultural and canal
<u>Distance to Nearest Road</u>	15 ft to towpath
<u>RTE Species Present?</u>	No
<u>Known Cultural Concern?</u>	Yes
<u>Stream Restoration Opportunity?</u>	No
<u>Site Currently Wetland?</u>	Yes
<u>Site Formerly Wetland?</u>	No
<u>Evidence of Disturbance</u>	No
<u>Soils Score</u>	9
<u>Hydrology Score</u>	10
<u>Existing Vegetation Score</u>	8
<u>Geomorphic Score</u>	10
<u>Surrounding Land Use Score</u>	8
<u>Function and Value Score</u>	6
<u>Presence of Invasive Species Score</u>	9
<u>Site Disturbance Score</u>	6
<u>Ease of Access Score</u>	7
<u>Stormwater Influence Score</u>	6
<u>Total Score</u>	79
<u>Invasive Species Control?</u>	Yes
<u>Native Plantings?</u>	Yes
<u>Restore Hydrology?</u>	Yes
<u>Increase Diversity?</u>	Yes
<u>Convert Open Water to Vegetated?</u>	Yes
<u>Convert Emergent to Shrub/Forested</u>	Yes
<u>Increase Aesthetic or Educational Value</u>	Yes
<u>Other</u>	No

Notes
 Isolated wetland with no apparent outfall. Wetland is open water pond with large area of reed canary grass and button bush. Half wetland open water and other half dominated by reed canary grass. Site directly off towpath and easily accessed. Site can be treated for invasive species and planted for diversity to enhance wetland.



- Legend**
- 1 Mile Marker
 - Park Boundary
 - Study Area
 - Wetland, Open Water
- Proposed Conditions**
- Invasive Species Control and Native Plantings

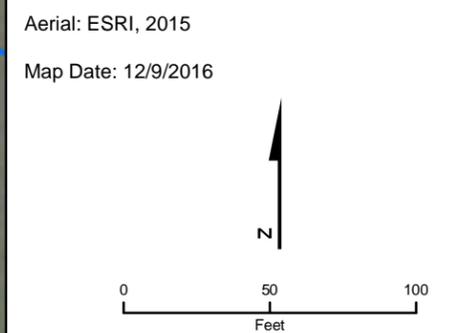
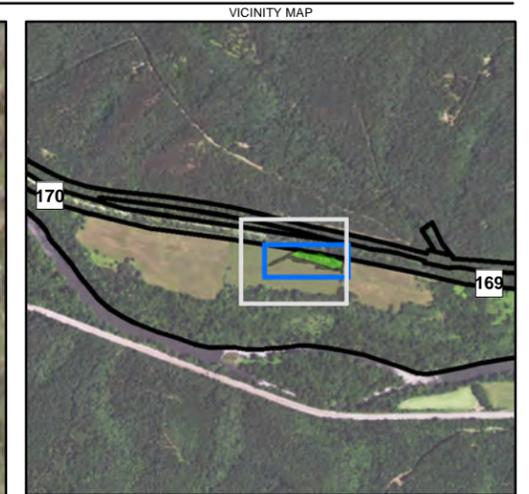
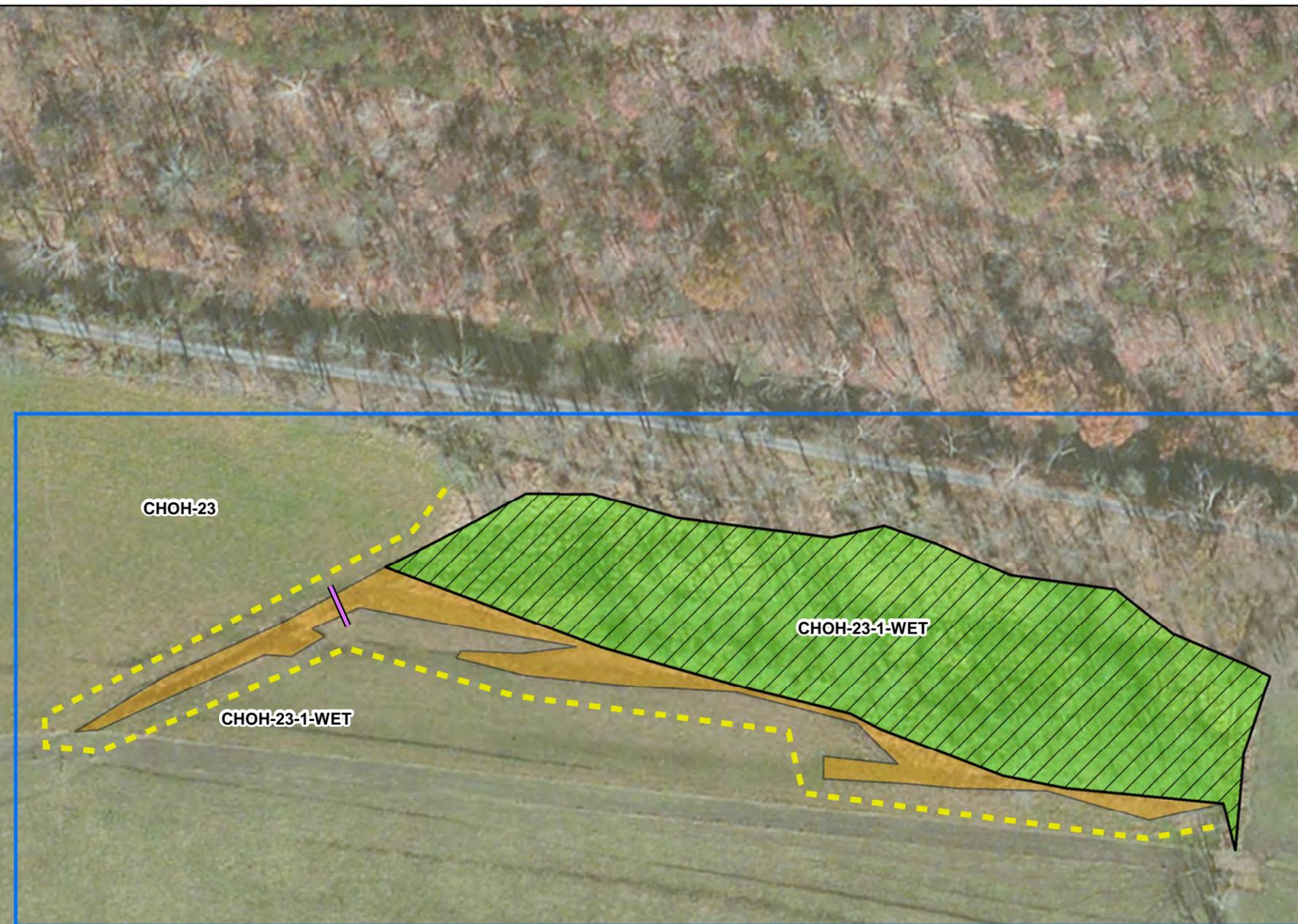


Figure 37
 CHOH-19
 C&O Canal
 NPS/NCR Wetland Restoration Action Plan
 Washington, Maryland

Site ID	CHOH-23
Potential Restoration Area (Acres)	5.00
Date of Field Assessment	4/20/16
Existing Land Use	Agricultural/forested
Adjacent Land Use	Agricultural
Distance to Nearest Road	200 feet from tow path
RTE Species Present?	No
Known Cultural Concern?	No
Stream Restoration Opportunity?	No
Site Currently Wetland?	Yes
Site Formerly Wetland?	Yes
Evidence of Disturbance	Yes
Soils Score	10
Hydrology Score	10
Existing Vegetation Score	5
Geomorphic Score	5
Surrounding Land Use Score	7
Function and Value Score	6
Presence of Invasive Species Score	6
Site Disturbance Score	6
Ease of Access Score	6
Stormwater Influence Score	9
Total Score	70
Invasive Species Control?	Yes
Native Plantings?	Yes
Restore Hydrology?	Yes
Increase Diversity?	Yes
Convert Open Water to Vegetated?	No
Convert Emergent to Shrub/Forested	No
Increase Aesthetic or Educational Value	No
Other	No
Notes	Wetland partially drained by ditch. Many invasives species identified within forested shrub area of wetland and outer edge of wetland disturbed by agricultural practices. Drained wetland still functioning and delineated as wetland but reduced hydrology and some veg changing over to invasive upland species.



- Legend**
- 1 Mile Marker
 - ▭ Park Boundary
 - ▭ Study Area
 - ▭ Wetland, Emergent
 - ▭ Wetland, Forested
- Proposed Conditions**
- Clay Fill Lens
 - - - Agricultural Exclusion Fence or Signs
 - ▨ Invasive Species Control and Native Plantings

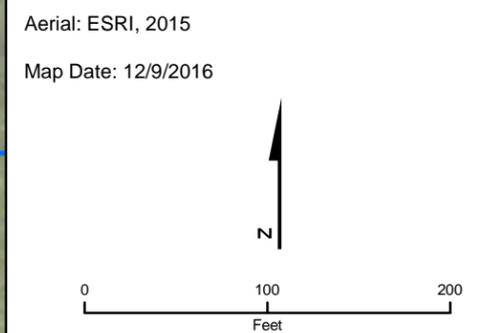
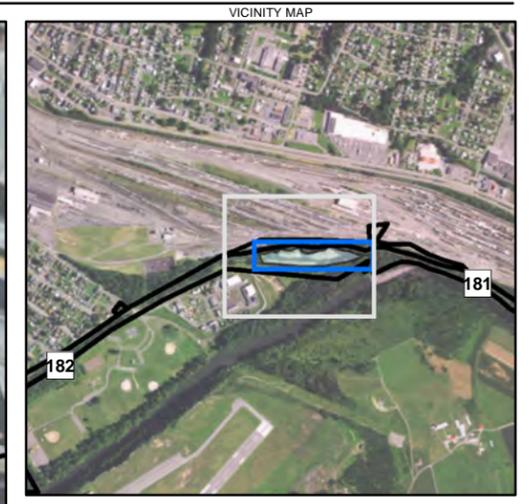
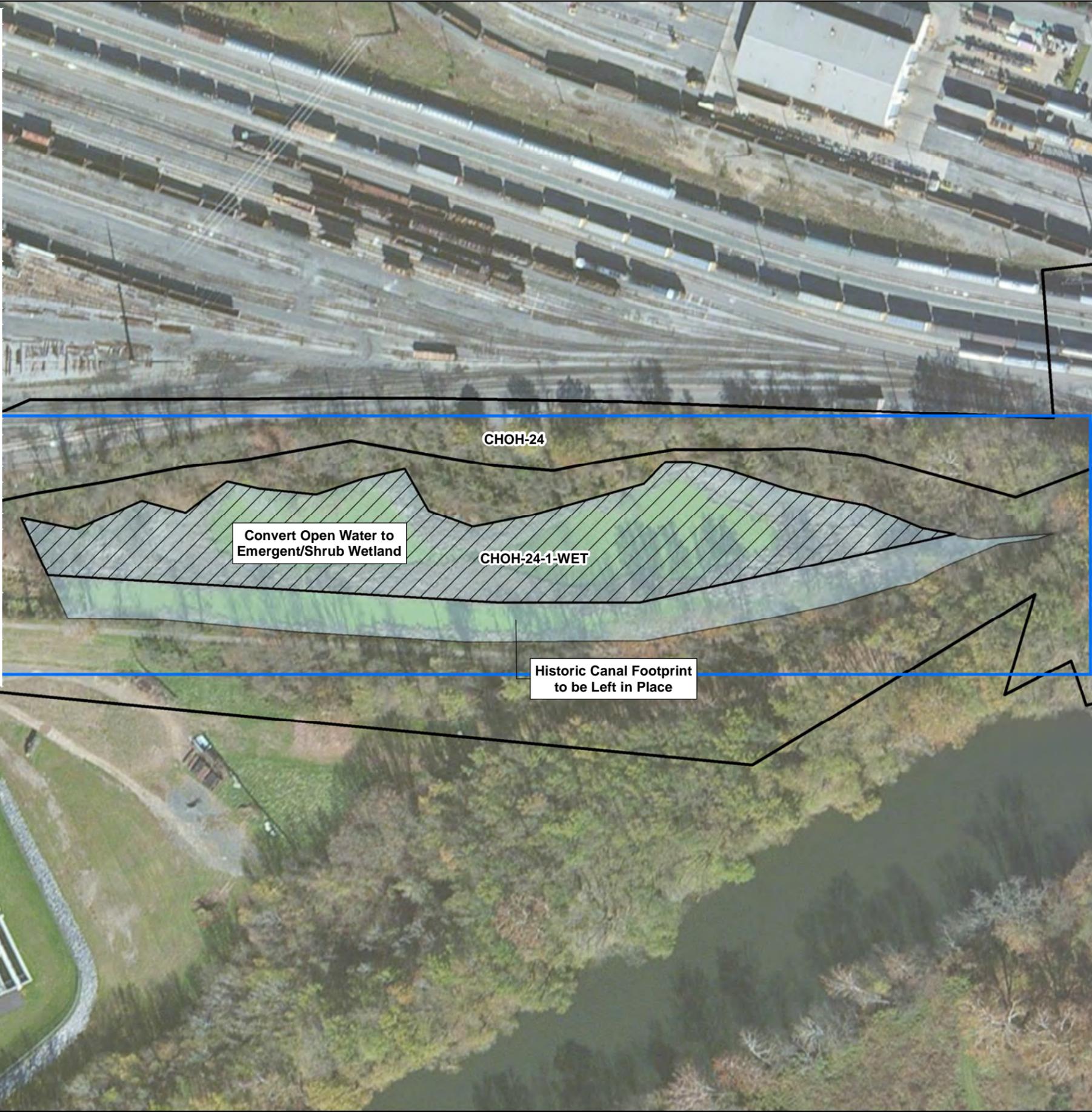


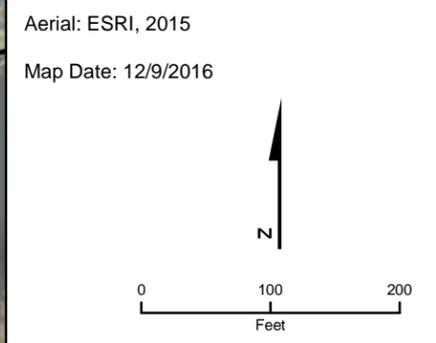
Figure 38
CHOH-23
C&O Canal
NPS/NCR Wetland Restoration Action Plan
Allegany, Maryland

\\lovetorgis\GIS\data\Federal\NorthEast\NCR_WRAP\CHOH\MXD\SurveyResults\CHOH_Figure38_CHOH-23.mxd

Site ID	CHOH-24
Potential Restoration Area (Acres)	3.00
Date of Field Assessment	4/19/16
Existing Land Use	Open water pond
Adjacent Land Use	Train yard and riparian forest to potomac
Distance to Nearest Road	Directly adjacent
RTE Species Present?	No
Known Cultural Concern?	Yes
Stream Restoration Opportunity?	No
Site Currently Wetland?	Yes
Site Formerly Wetland?	Yes
Evidence of Disturbance	Yes
Soils Score	9
Hydrology Score	10
Existing Vegetation Score	8
Geomorphic Score	8
Surrounding Land Use Score	5
Function and Value Score	6
Presence of Invasive Species Score	2
Site Disturbance Score	4
Ease of Access Score	5
Stormwater Influence Score	5
Total Score	62
Invasive Species Control?	No
Native Plantings?	Yes
Restore Hydrology?	Yes
Increase Diversity?	Yes
Convert Open Water to Vegetated?	Yes
Convert Emergent to Shrub/Forested	Yes
Increase Aesthetic or Educational Value	Yes
Other	No
Notes	Large emergent wetland/open water complex north of historic canal footprint. Not dominated by invasive but large monotypic stand of cat tails.



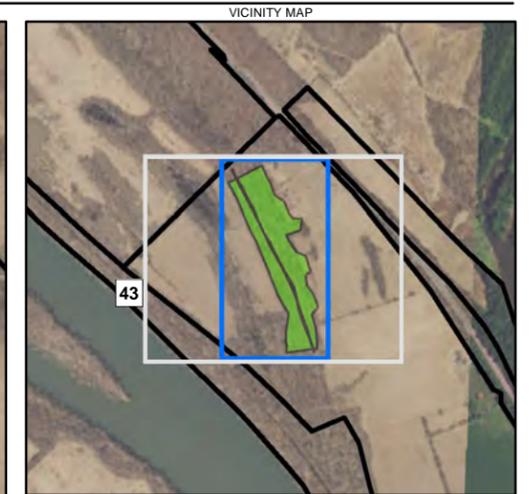
- Legend**
- Mile Marker
 - Park Boundary
 - Study Area
 - Wetland, Open Water
- Proposed Conditions**
- Invasive Species Control and Native Plantings



\\lovetorgis\GIS\data\Federal\Northeast\NCR_WRAP\CHOH\XBD\SurveyResults\CHOH_Figure39_CHOH-24.mxd

Figure 39
CHOH-24
C&O Canal
NPS/NCR Wetland Restoration Action Plan
Allegany, Maryland

\\lovetorgis\GIS\data\Federal\Northeast\NCR_WRAP\CHOHMXD\SURVEYRESULTS\CHOH_Figure40_CHOH-25.mxd



Legend

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

Aerial: ESRI, 2015

Map Date: 9/22/2016

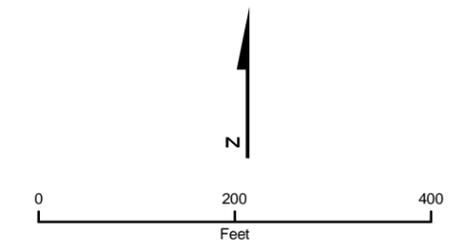
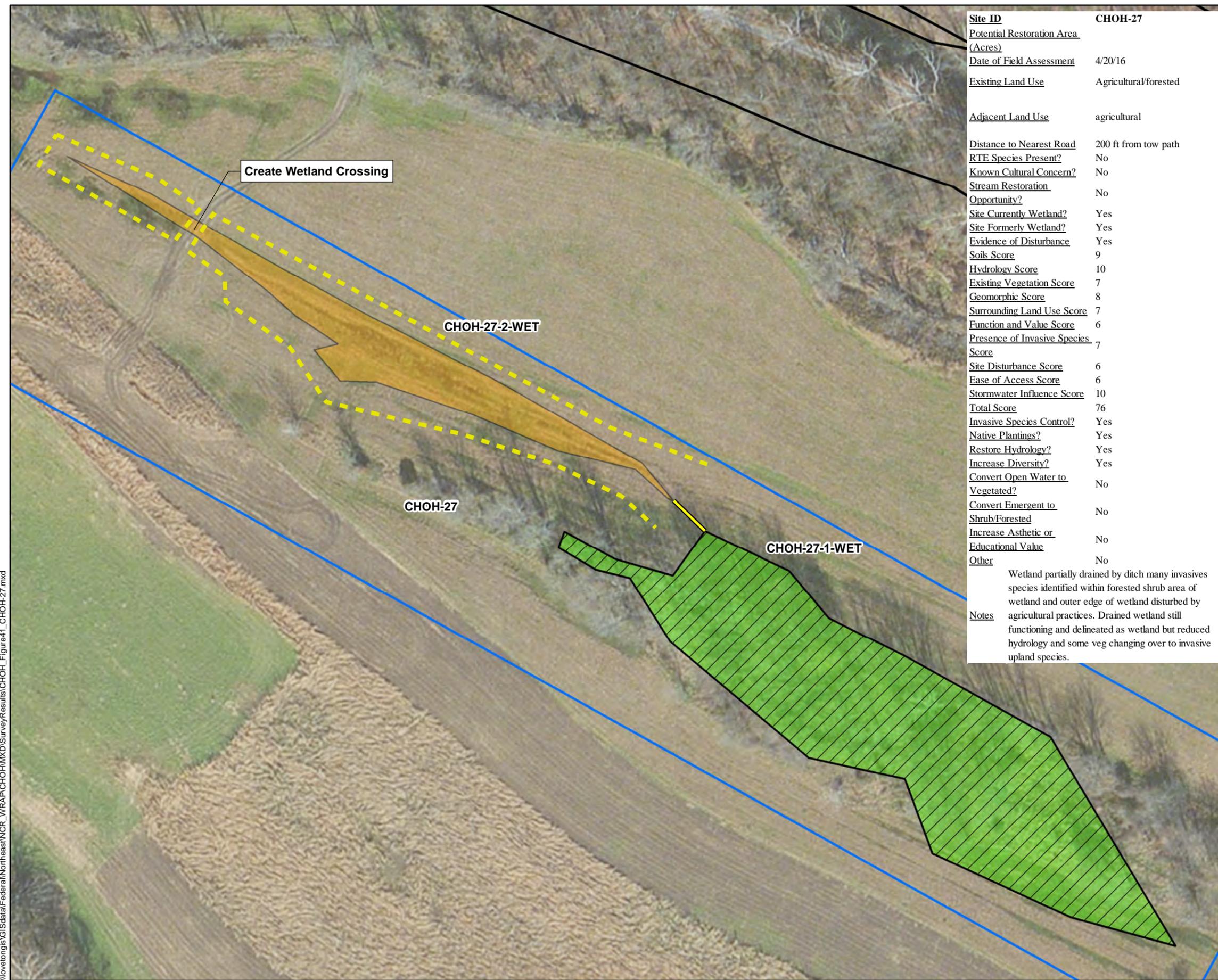


Figure 40
CHOH-25
C&O Canal
NPS/NCR Wetland Restoration Action Plan
Frederick, Maryland

<u>Site ID</u>	CHOH-25 WET-1	CHOH-25 WET 2
<u>Potential Restoration Area (Acres)</u>	12.00	1.00
<u>Date of Field Assessment</u>	4/21/16	4/21/16
<u>Existing Land Use</u>	Forested	Agricultural
<u>Adjacent Land Use</u>	Agricultural	Agricultural
<u>Distance to Nearest Road</u>	500 ft	500
<u>RTE Species Present?</u>	No	No
<u>Known Cultural Concern?</u>	No	No
<u>Stream Restoration Opportunity?</u>	Yes	No
<u>Site Currently Wetland?</u>	Yes	Yes
<u>Site Formerly Wetland?</u>	No	Yes
<u>Evidence of Disturbance</u>	Yes	Yes
<u>Soils Score</u>	7	10
<u>Hydrology Score</u>	7	7
<u>Existing Vegetation Score</u>	4	8
<u>Geomorphic Score</u>	9	6
<u>Surrounding Land Use Score</u>	9	8
<u>Function and Value Score</u>	8	6
<u>Presence of Invasive Species Score</u>	8	6
<u>Site Disturbance Score</u>	6	9
<u>Ease of Access Score</u>	3	4
<u>Stormwater Influence Score</u>	10	9
<u>Total Score</u>	71	73
<u>Invasive Species Control?</u>	Yes	Yes
<u>Native Plantings?</u>	No	Yes
<u>Restore Hydrology?</u>	Yes	No
<u>Increase Diversity?</u>	Yes	Yes
<u>Convert Open Water to Vegetated?</u>	No	No
<u>Convert Emergent to Shrub/Forested</u>	No	Yes
<u>Increase Asthetic or Educational Value</u>	No	No
<u>Other</u>	No	Yes
<u>Notes</u>	Wetland partially drained by ditch. Tree of heaven Drained wetland still functioning and delineated as wetland but reduced hydrology and some veg changing over to upland.	Wetland disturbed in agricultural field. Agricultural exclusion with signs or fence.

<u>Site ID</u>	CHOH-25
<u>Potential Restoration (linear feet)</u>	1500
<u>Date</u>	4/21/16
<u>Existing Land Use</u>	Forested
<u>Adjacent Land Use</u>	Agricultural
<u>Distance to Nearest Road</u>	500 ft
<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>	Yes
<u>Can Restoration be Completed in NPS Area?</u>	Yes
<u>Estimated Bank Erosion Score</u>	4
<u>Degree of Channel Incision Score</u>	2
<u>Existing Floodplain Access Score</u>	4
<u>Opportunity for Floodplain Development Score</u>	9
<u>Threat of Impact to Resources Score</u>	6
<u>Surrounding Vegetation Score</u>	4
<u>Land Use Score</u>	8
<u>Opportunity for Ecological Lift Score</u>	8
<u>Ease of Access</u>	5
<u>Surrounding Land Use Score</u>	9
<u>Total Score</u>	59
<u>Invasives Species Control?</u>	Yes
<u>Riparian Buffer Enhancement?</u>	No
<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>	No
<u>Other</u>	No
<u>Notes</u>	Partially drained wetland by ditching stream channel. Recommend lifting ditch elevation or completely plugging to restore wetland hydrology.

\\lovetorgis\GIS\data\Federal\Northeast\NCR_WRAP\CHOHMXD\SURVEYRESULTS\CHOH_Figure41_CHOH-27.mxd



Create Wetland Crossing

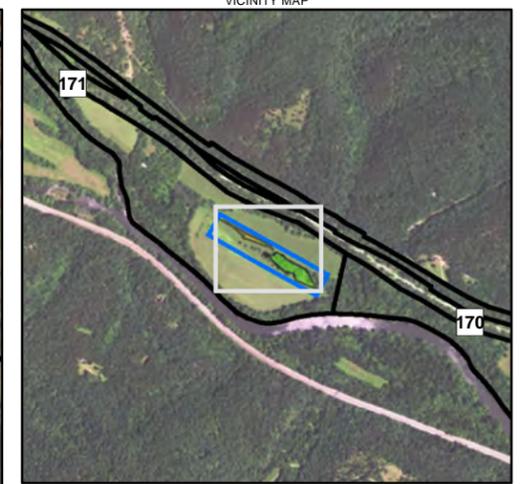
CHOH-27-2-WET

CHOH-27

CHOH-27-1-WET

Site ID	CHOH-27
<u>Potential Restoration Area (Acres)</u>	
<u>Date of Field Assessment</u>	4/20/16
<u>Existing Land Use</u>	Agricultural/forested
<u>Adjacent Land Use</u>	agricultural
<u>Distance to Nearest Road</u>	200 ft from tow path
<u>RTE Species Present?</u>	No
<u>Known Cultural Concern?</u>	No
<u>Stream Restoration Opportunity?</u>	No
<u>Site Currently Wetland?</u>	Yes
<u>Site Formerly Wetland?</u>	Yes
<u>Evidence of Disturbance</u>	Yes
<u>Soils Score</u>	9
<u>Hydrology Score</u>	10
<u>Existing Vegetation Score</u>	7
<u>Geomorphic Score</u>	8
<u>Surrounding Land Use Score</u>	7
<u>Function and Value Score</u>	6
<u>Presence of Invasive Species Score</u>	7
<u>Site Disturbance Score</u>	6
<u>Ease of Access Score</u>	6
<u>Stormwater Influence Score</u>	10
<u>Total Score</u>	76
<u>Invasive Species Control?</u>	Yes
<u>Native Plantings?</u>	Yes
<u>Restore Hydrology?</u>	Yes
<u>Increase Diversity?</u>	Yes
<u>Convert Open Water to Vegetated?</u>	No
<u>Convert Emergent to Shrub/Forested</u>	No
<u>Increase Aesthetic or Educational Value</u>	No
<u>Other</u>	No
<u>Notes</u>	Wetland partially drained by ditch many invasive species identified within forested shrub area of wetland and outer edge of wetland disturbed by agricultural practices. Drained wetland still functioning and delineated as wetland but reduced hydrology and some veg changing over to invasive upland species.

VICINITY MAP



Legend

- 1 Mile Marker
- Park Boundary
- Study Area
- Wetland, Emergent
- Wetland, Forested
- Proposed Conditions**
- Exclusion Fence or Signs
- Hydrologic Connection
- Invasive Species Control and Native Plantings

Aerial: ESRI, 2015

Map Date: 12/9/2016

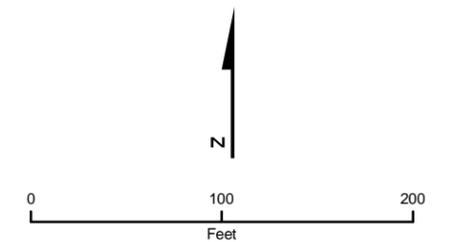
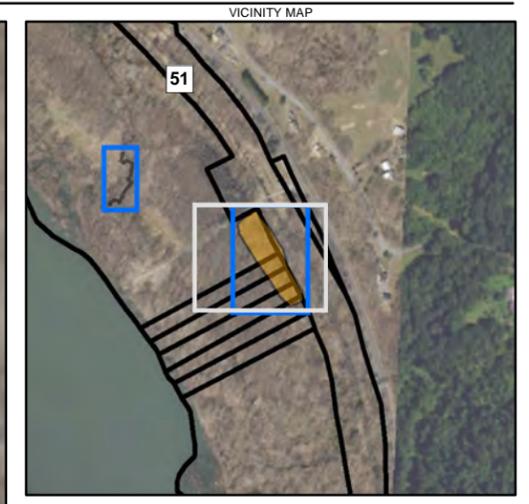
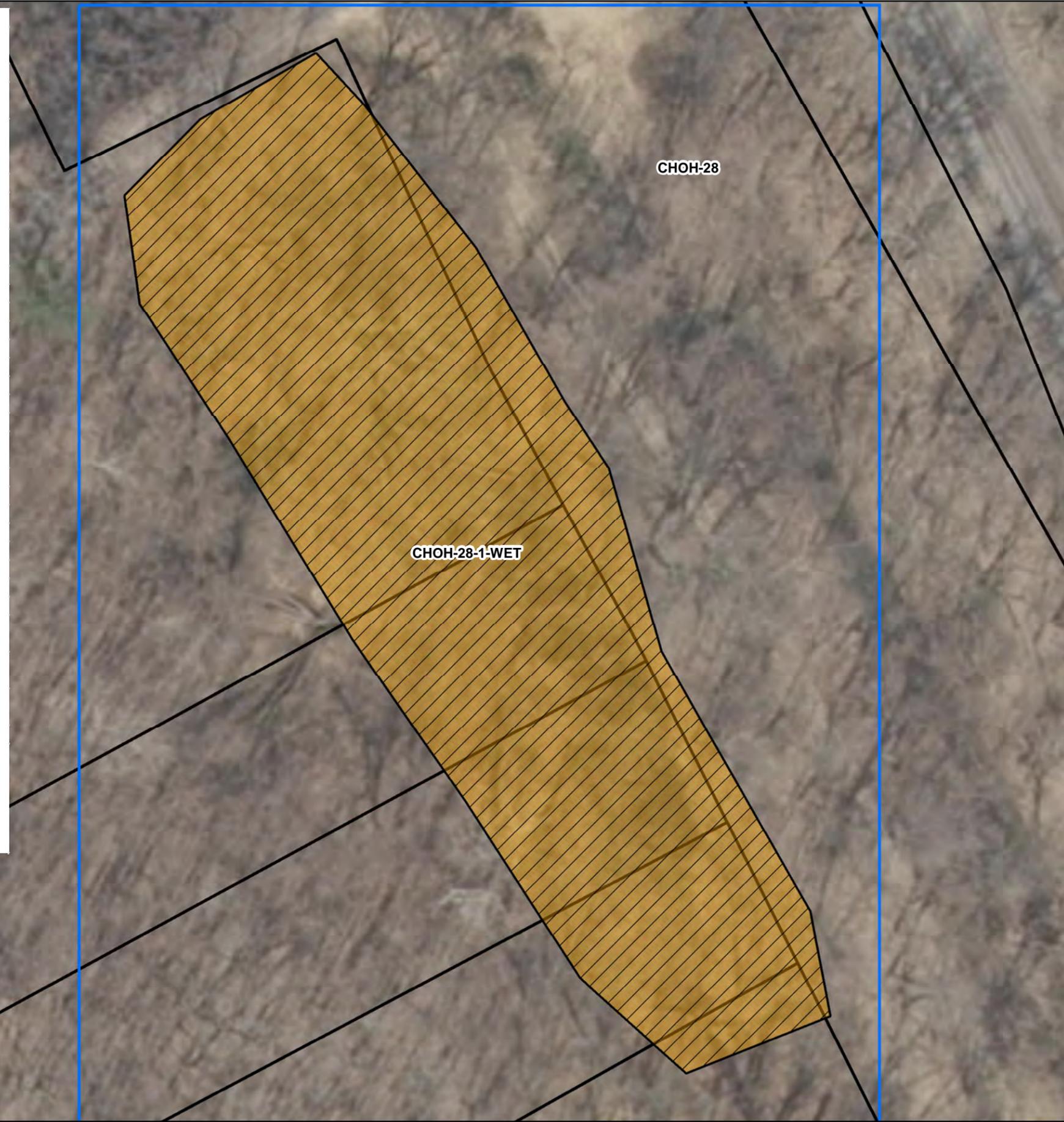


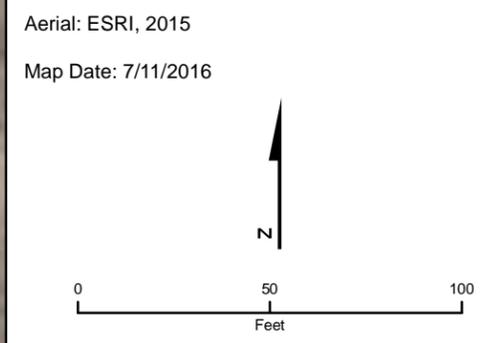
Figure 41
CHOH-27
C&O Canal
NPS/NCR Wetland Restoration Action Plan
Allegany, Maryland

Site ID	CHOH-28
Potential Restoration Area (Acres)	5.00
Date of Field Assessment	4/21/16
Existing Land Use	Forested
Adjacent Land Use	Forested and canal towpath
Distance to Nearest Road	15ft to towpath
RTE Species Present?	No
Known Cultural Concern?	Yes
Stream Restoration Opportunity?	No
Site Currently Wetland?	Yes
Site Formerly Wetland?	No
Evidence of Disturbance	Yes
Soils Score	10
Hydrology Score	10
Existing Vegetation Score	4
Geomorphic Score	10
Surrounding Land Use Score	6
Function and Value Score	6
Presence of Invasive Species Score	7
Site Disturbance Score	5
Ease of Access Score	10
Stormwater Influence Score	8
Total Score	76
Invasive Species Control?	Yes
Native Plantings?	Yes
Restore Hydrology?	No
Increase Diversity?	Yes
Convert Open Water to Vegetated?	No
Convert Emergent to Shrub/Forested	No
Increase Aesthetic or Educational Value	Yes
Other	Yes

Notes
 Forested wetland between towpath berm and old road bed. Large amount of multiflora and garlic mustard as well as old concrete walkway/foundation and concrete posts. Removal of concrete as well as debris and invasives.



- Legend**
- 1 Mile Marker
 - Park Boundary
 - Study Area
 - Wetland, Emergent
- Proposed Conditions**
- Invasive Species Control and Native Plantings



\\lovetorgis\GIS\data\Federal\NorthEast\NCR_WRAP\CHOHMXD\SURVEY\Results\CHOH_Figure42_CHOH-28.mxd

Figure 42
 CHOH-28
 C&O Canal
 NPS/NCR Wetland Restoration Action Plan
 Frederick, Maryland

\\lovetorgis\GISdata\Federal\Northeast\NCR_WRAP\CHOHMXD\SURVEYRESULTS\CHOH_Figure43_CHOH-29.mxd

Site ID	CHOH-29
Potential Restoration (linear feet)	200
Date	4/21/16
Existing Land Use	Forested
Adjacent Land Use	Towpath
Distance to Nearest Road	10ft
Stream Hydrology	Perennial
RTE Species Present?	No
Known Cultural Concern?	Yes
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	10
Existing Floodplain Access Score	10
Opportunity for Floodplain Development Score	3
Threat of Impact to Resources Score	10
Surrounding Vegetation Score	4
Land Use Score	3
Opportunity for Ecological Lift Score	7
Ease of Access	8
Surrounding Land Use Score	7
Total Score	72
Invasives Species Control?	No
Riparian Buffer Enhancement?	No
Restore Natural Hydrology?	No
Livestock Agricultural Exclusion	No
Fish Passage?	No
Channel Restoration?	Yes
Increase Aesthetic or Educational Value?	Yes
Other	No
Notes	Highly eroded stream channel causing mass bank failure and culvert collapse. Historic canal culvert collapsing into channel and mass erosion near towpath. Bank armoring required



- Legend**
- 1 Mile Marker
 - Park Boundary
 - Study Area
 - Waters of the US (WUS)

- Proposed Conditions**
- Bank Armoring

Aerial: ESRI, 2015

Map Date: 7/11/2016

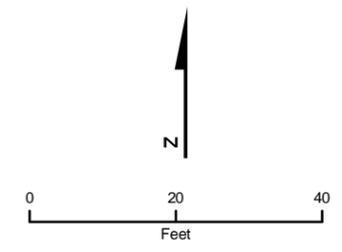
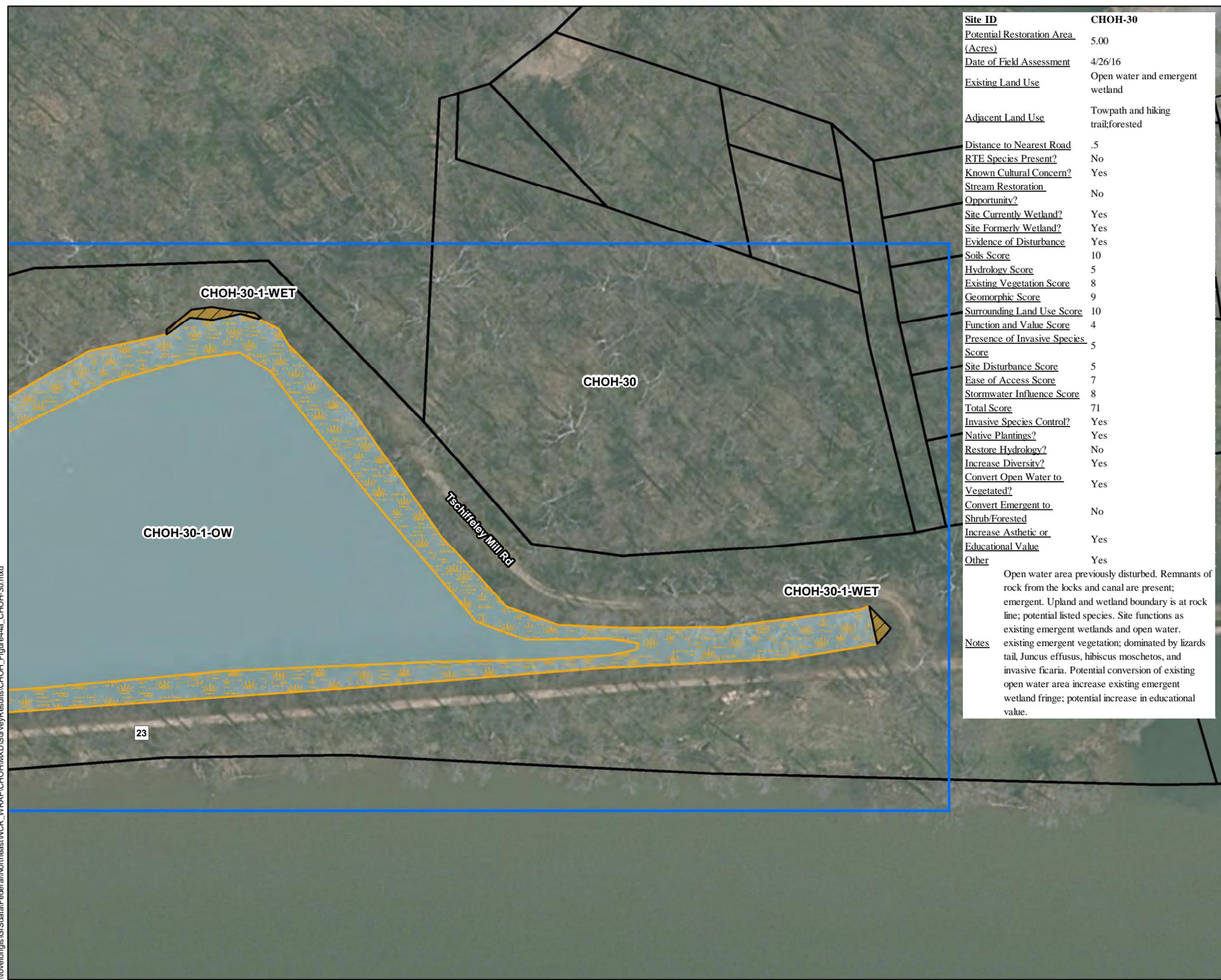
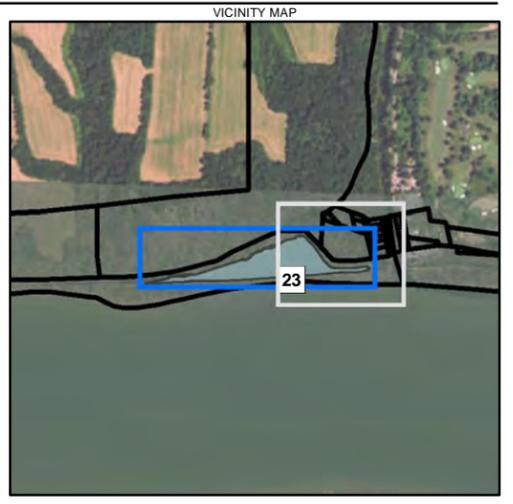


Figure 43
 CHOH-29
 C&O Canal
 NPS/NCR Wetland Restoration Action Plan
 Frederick, Maryland

\\lovetorgis\GIS\data\Federal\Northeast\NCR_WRAP\CHOHMXD\SURVEY\RESULTS\CHOH_Figure44a_CHOH-30.mxd



Site ID	CHOH-30
<u>Potential Restoration Area (Acres)</u>	5.00
<u>Date of Field Assessment</u>	4/26/16
<u>Existing Land Use</u>	Open water and emergent wetland
<u>Adjacent Land Use</u>	Towpath and hiking trail; forested
<u>Distance to Nearest Road</u>	.5
<u>RTE Species Present?</u>	No
<u>Known Cultural Concern?</u>	Yes
<u>Stream Restoration Opportunity?</u>	No
<u>Site Currently Wetland?</u>	Yes
<u>Site Formerly Wetland?</u>	Yes
<u>Evidence of Disturbance</u>	Yes
<u>Soils Score</u>	10
<u>Hydrology Score</u>	5
<u>Existing Vegetation Score</u>	8
<u>Geomorphic Score</u>	9
<u>Surrounding Land Use Score</u>	10
<u>Function and Value Score</u>	4
<u>Presence of Invasive Species Score</u>	5
<u>Site Disturbance Score</u>	5
<u>Ease of Access Score</u>	7
<u>Stormwater Influence Score</u>	8
<u>Total Score</u>	71
<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 Vegetated?</u>	Yes
<u>Convert Emergent to Shrub/Forested</u>	No
<u>Increase Aesthetic or Educational Value</u>	Yes
<u>Other</u>	Yes
<u>Notes</u>	Open water area previously disturbed. Remnants of rock from the locks and canal are present; emergent. Upland and wetland boundary is at rock line; potential listed species. Site functions as existing emergent wetlands and open water. existing emergent vegetation; dominated by lizards tail, Juncus effusus, hibiscus moschetos, and invasive ficaria. Potential conversion of existing open water area increase existing emergent wetland fringe; potential increase in educational value.



- Legend**
- 1 Mile Marker
 - Park Boundary
 - Study Area
 - Wetland, Open Water
 - Wetland, Emergent
- Proposed Conditions**
- Convert Open Water to Emergent Wetland
 - Invasive Species Control and Native Plantings

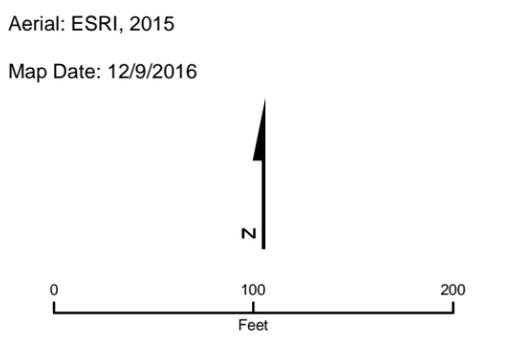
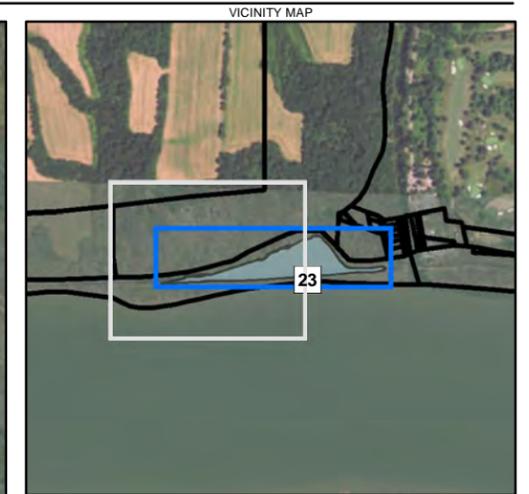


Figure 44a
CHOH-30
C&O Canal
NPS/NCR Wetland Restoration Action Plan
Montgomery, Maryland

\\lovetongis\GIS\data\Federal\Northeast\NCR_WRAP\CHOHMXD\SURVEY\RESULTS\CHOH_Figure44b_CHOH-30.mxd

Site ID	CHOH-30
Potential Restoration Area (Acres)	5.00
Date of Field Assessment	4/26/16
Existing Land Use	Open water and emergent wetland
Adjacent Land Use	Towpath and hiking trail;forested
Distance to Nearest Road	.5
RTE Species Present?	No
Known Cultural Concern?	Yes
Stream Restoration Opportunity?	No
Site Currently Wetland?	Yes
Site Formerly Wetland?	Yes
Evidence of Disturbance	Yes
Soils Score	10
Hydrology Score	5
Existing Vegetation Score	8
Geomorphic Score	9
Surrounding Land Use Score	10
Function and Value Score	4
Presence of Invasive Species Score	5
Site Disturbance Score	5
Ease of Access Score	7
Stormwater Influence Score	8
Total Score	71
Invasive Species Control?	Yes
Native Plantings?	Yes
Restore Hydrology?	No
Increase Diversity?	Yes
Convert Open Water to Vegetated?	Yes
Convert Emergent to Shrub/Forested	No
Increase Aesthetic or Educational Value	Yes
Other	Yes

Notes
 Open water area previously disturbed. Remnants of rock from the locks and canal are present; emergent. Upland and wetland boundary is at rock line; potential listed species. Site functions as existing emergent wetlands and open water. existing emergent vegetation; dominated by lizards tail, Juncus effusus, hibiscus moschetos, and invasive ficaria. Potential conversion of existing open water area increase existing emergent wetland fringe; potential increase in educational value.



- Legend**
- 1 Mile Marker
 - ▭ Park Boundary
 - ▭ Study Area
 - ▭ Wetland, Open Water
 - ▭ Wetland, Emergent
- Proposed Conditions**
- ▨ Convert Open Water to Emergent Wetland
 - ▨ Invasive Species Control and Native Plantings

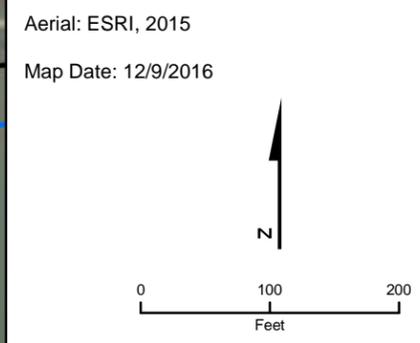
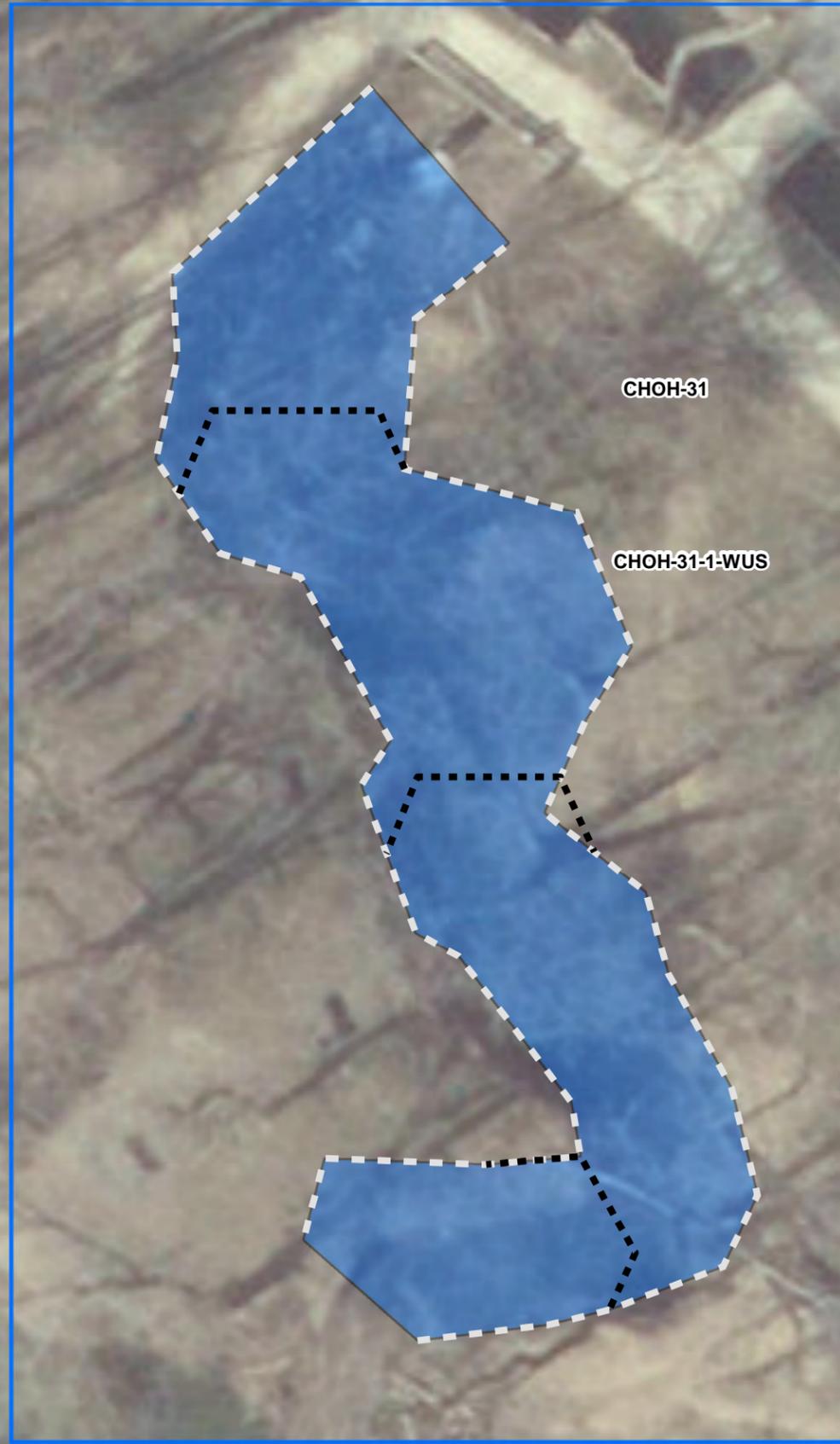


Figure 44b
 CHOH-30
 C&O Canal
 NPS/NCR Wetland Restoration Action Plan
 Montgomery, Maryland

Site ID	CHOH-31
Potential Restoration (linear feet)	100
Date	4/27/16
Existing Land Use	Parkland; camping and picnic area; mowed and maintained grass; some scattered trees
Adjacent Land Use	Parkland
Distance to Nearest Road	0.10
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	10
Degree of Channel Incision Score	10
Existing Floodplain Access Score	10
Opportunity for Floodplain Development Score	8
Threat of Impact to Resources Score	9
Surrounding Vegetation Score	8
Land Use Score	8
Opportunity for Ecological Lift Score	8
Ease of Access	9
Surrounding Land Use Score	7
Total Score	87
Invasives Species Control?	Yes
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	No

Potential relocation of stream since flow makes a tight turn or improvement of in stream resources in restoration design to make Channel and stream banks stable. Possible re-connection with Potomac River floodplain that currently does not exist. Extreme erosion on both banks. Most extreme cases 10 or more feet high. Channel likely too wide for out of bank flooding. Potential for floodplain restoration but currently a picnic and camping area.

Notes Grassy picnic area with some large box elders and silver Maples scattered throughout. Could improve surrounding vegetation and in-stream habitat. Excellent access but would have to cross canal; narrow bridge across canal. Recent large tree plantings have just occurred along stream. Construction would require closure of some park resources to the public temporarily. Hydrology not natural because source from canal. Fish passage cannot be improved upon because of canal.



- Legend**
- 1 Mile Marker
 - ▭ Park Boundary
 - ▭ Study Area
 - ▭ Waters of the US (WUS)
- Proposed Conditions**
- - - Bank Armoring
 - - - Channel Cross Vane

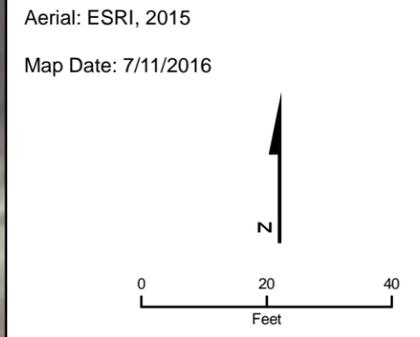
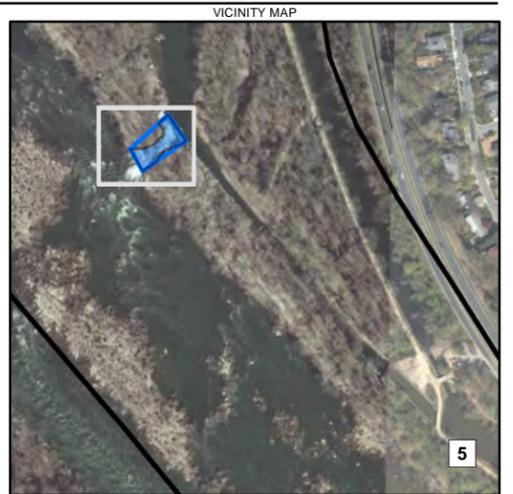


Figure 45
CHOH-31
C&O Canal
NPS/NCR Wetland Restoration Action Plan
Montgomery, Maryland

\\lovetorgis\GIS\data\Federal\Northeast\NCR_WRAP\CHOHMXD\SURVEY\Results\CHOH_Figure46_CHOH-32.mxd

Site ID	CHOH-32
Potential Restoration (linear feet)	200
Date	4/28/16
Existing Land Use	Forested park land
Adjacent Land Use	Forested park land, Canal, towpath, Clara Barton parkway
Distance to Nearest Road	along tow path
Stream Hydrology	Intermittent
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	5
Degree of Channel Incision Score	2
Existing Floodplain Access Score	1
Opportunity for Floodplain Development Score	4
Threat of Impact to Resources Score	10
Surrounding Vegetation Score	1
Land Use Score	2
Opportunity for Ecological Lift Score	6
Ease of Access	7
Surrounding Land Use Score	10
Total Score	48
Invasives Species Control?	No
Riparian Buffer Enhancement?	Yes
Restore Natural Hydrology?	Yes
Livestock Agricultural Exclusion	No
Fish Passage?	No
Channel Restoration?	Yes
Increase Aesthetic or Educational Value?	Yes
Other	No

Notes
 Breach of canal lock resulted in stream channels, woody debris accumulation, and stream erosion. Restoration could include creating defined channels flowing to the Potomac River. Overflow from canal, especially during storm events which adds to erosion and creation of channels. Minor channelization is present now but has potential to worsen and further incise given time. Channels only exist due to overflow from canal waters. Narrow floodplain width opportunity. Degrading of cultural resources currently occurring. Canal lock has potential to further degrade and lead to destabilization of canal and historic rock. Mature forest and forested riparian buffer along Potomac River. Flow velocities currently too high for sustaining aquatic community. Development of channels and floodplain could improve habitat diversity. Access good but via towpath. Surrounded by NPS land Potential restoration would require rehabilitation of cultural resources associated with canal. Lock is currently degrading and water is flowing out of the lock and canal overland into the Potomac River.



- Legend**
- 1 Mile Marker
 - Park Boundary
 - Study Area
 - Waters of the US (WUS)
- Proposed Conditions**
- Channel Cross Vane
 - ▣ Debris Removal and Canal Repair

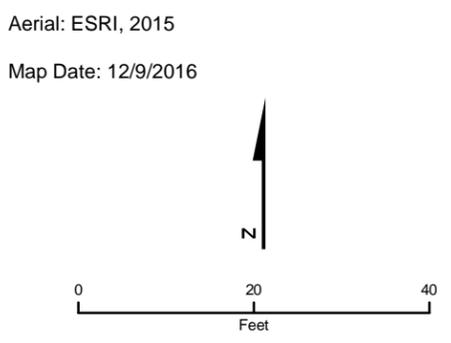
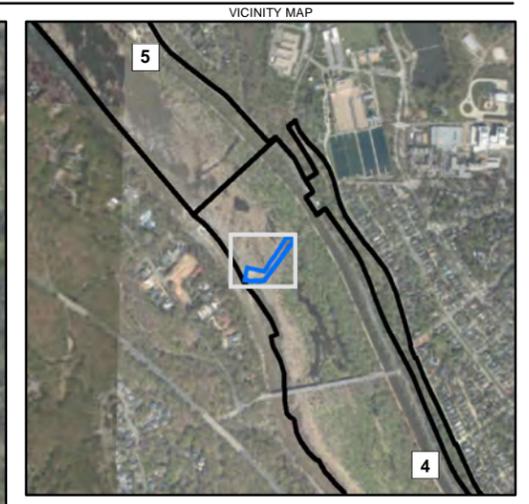


Figure 46
 CHOH-32
 C&O Canal
 NPS/NCR Wetland Restoration Action Plan
 Montgomery, Maryland

\\lovetorgis\GIS\data\Federal\Northeast\NCR_WRAP\CHOHMXD\SURVEY\Results\CHOH_Figure47_CHOH-33.mxd

Site ID	CHOH-33
Potential Restoration Area (Acres)	0.50
Date of Field Assessment	4/28/16
Existing Land Use	Abandoned paved
Adjacent Land Use	Forested park land
Distance to Nearest Road	100 feet towpath
RTE Species Present?	No
Known Cultural Concern?	No
Stream Restoration Opportunity?	No
Site Currently Wetland?	No
Site Formerly Wetland?	Yes
Evidence of Disturbance	Yes
Soils Score	0
Hydrology Score	2
Existing Vegetation Score	10
Geomorphic Score	8
Surrounding Land Use Score	10
Function and Value Score	10
Presence of Invasive Species Score	4
Site Disturbance Score	10
Ease of Access Score	7
Stormwater Influence Score	10
Total Score	71
Invasive Species Control?	No
Native Plantings?	Yes
Restore Hydrology?	Yes
Increase Diversity?	Yes
Convert Open Water to Vegetated?	No
Convert Emergent to Shrub/Forested	No
Increase Aesthetic or Educational Value	Yes
Other	No
Notes	Potential for restored RTE species. Completely paved. Historic hydrology may have been Potomac River floodplain and groundwater inflow. No vegetation on paved area but surrounding area is sycamore dominated. Upland forested park land to northeast. No stormwater influence observed. Existing pavement appears abandoned and could be removed. Flood plane and native plantings could be restored. Visitor access could be improved aesthetically. Could create fishing pier and bird viewing area.



- Legend**
- 1 Mile Marker
 - Park Boundary
 - Study Area
- Proposed Conditions**
- Concrete Removal
 - Invasive Species Control and Native Plantings

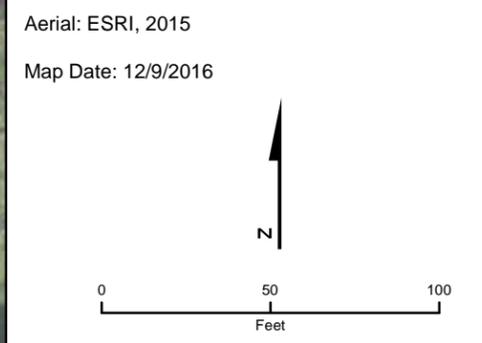


Figure 47
 CHOH-33
 C&O Canal
 NPS/NCR Wetland Restoration Action Plan
 Washington, D.C.