PENNTRAILS PTBA MEMBER

June 6th, 2016

9 Dogwood Drive
Newville, PA 17214

Mary Hundt
Director of Parks and Recreation
Willistown Township
688 Sugartown Rd.
Malvern PA, 19355

Dear Mary,

Please find the attached Okehocking Preserve Trail Assessment Report and the Conceptual Alignment. The foot-by-foot results of Penn Trails field recorded and observed trail conditions are detailed in twenty-four tables. Segmenting the system into these sections provided greater clarity for further discussion of issues and potential options for their resolution.

The field-based data and observations, along with Penn Trails recommended prescriptions, should assist Willistown Township in making specific decisions concerning the Okehocking Preserve Trail's ongoing use, management and maintenance. Penn Trails is willing to continue our efforts with your organization and you toward increasing the trail system's stability and sustainability as it is increasingly utilized by the public.

I look forward to discussing this report with you and walking through the Okehocking Preserve Trail system with it in hand.

Sincerely yours,

Amy Lutsko

Senior Project Manager

LK/al

(attached)

OKEHOCKING PRESERVE TRAIL SYSTEM

TRAIL ASSESSMENT AND PRESCRIPTIONS REPORT

JUNE 2, 2016

PREPARED FOR:

MARY HUNDT
DIRECTOR OF PARKS AND RECREATION
WILLISTOWN TOWNSHIP
688 SUGARTOWN RD.
MALVERN, PA 19355

PREPARED BY:

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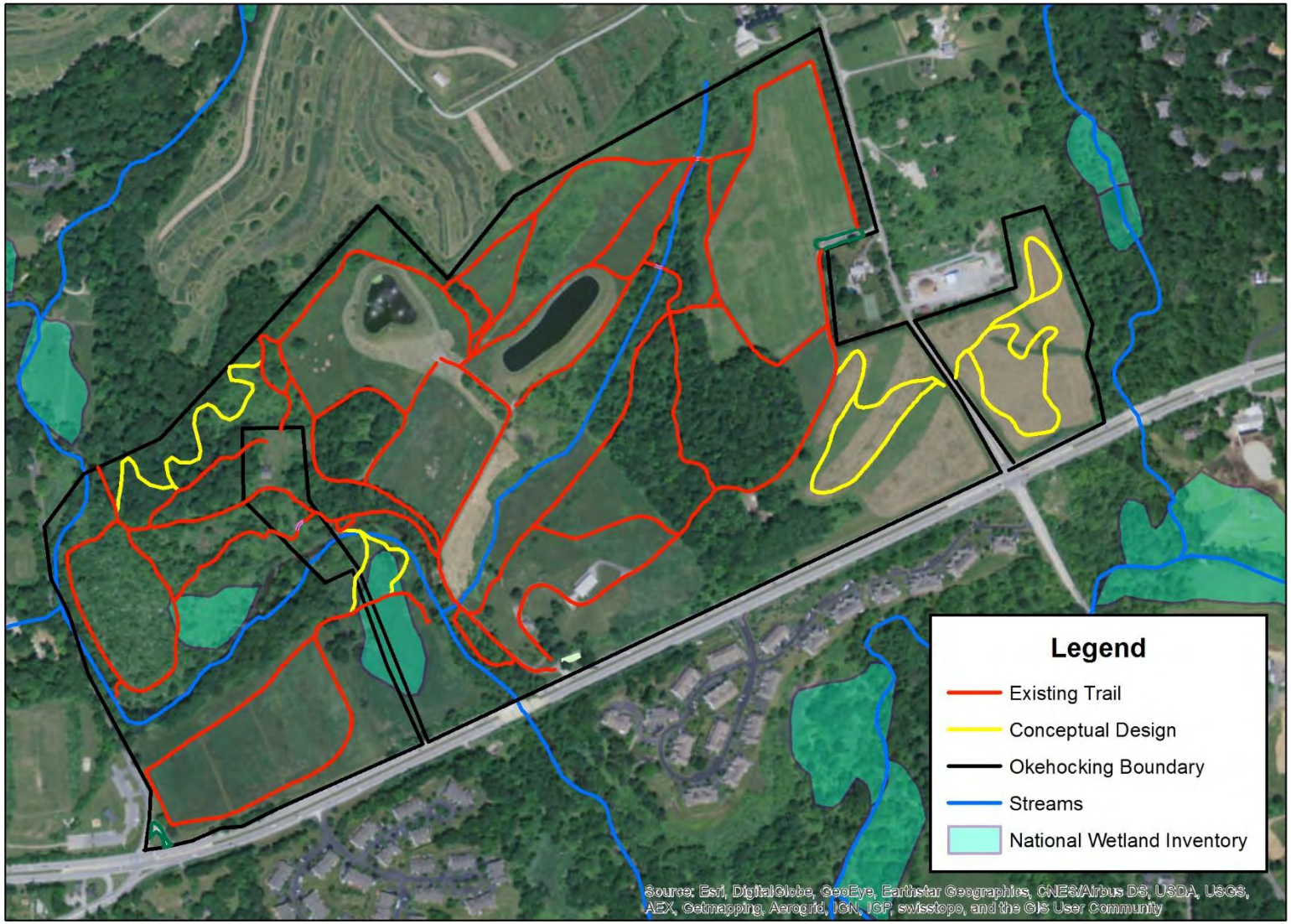
PTBA
MEMBER

Okehocking Preserve Trail System



PENNTRAILS

1 inch = 583 feet

I. TRAIL ASSESSMENT LOCATION

Penn Trails LLC assessed 30,323 linear feet of the Okehocking Preserve Trail System located in Willistown Township, between Westchester Pike (Rt.3) and Delchester Rd.

II. TRAIL ASSESSMENT PROCESS

Penn Trails conducted a professional, ground-truth trail assessment for the Okehocking Preserve Trail System on May 16 – 17 2016. The weather conditions were cloudy with rain showers and 58 degrees Fahrenheit. The trail system was slightly wet.

The Okehocking Preserve Trail System assessment consisted of;

- Conducting a foot-by-foot (station-to-station) assessment and (sub-meter) gps line/point data for 30,000+ feet of developed trail;
- Assessing a 20' trail corridor, as related to a range of 12" to 80"+ wide trail tread (path of travel).

The trail assessment process utilized by Penn Trails is based upon the USDA Forest Service TRACS process, providing objective, field collected data as to the current corridor and trail conditions, as well as structure inventory and features contained within the corridor. This data, including point, line and area data as shown on the maps, resulted in the linear assessment report shown in the twenty-four tables herein, within Okehocking Preserve.

This information is needed to determine potential prescriptions to rehabilitate the trail corridor and tread, as it currently exists, to the extent that is practicable. Prescriptions serve as initial options to address issues of trail stability and long term sustainability. While prescriptions may provide important guidance for technical solutions to trail related issues, in and of themselves, these prescriptions do not serve as formal management, planning, design or maintenance documentation.

A. Trail Management Objectives

Formal management, planning, design and maintenance documentation should begin with established Trail Management Objectives for the Okehocking Preserve Trail system. These objectives consist of four interrelated components that are critical for determining future usage, maintenance and construction practices, as well as, the resources needed execute them.

1. Level of Development: This is determined by the desired user volume and traffic flow, constructed features and trail elements such as signage and amenities, and the recreation, programmatic and environmental experience desired for the user.

2. Managed Use: This reflects to management intent and decision as to the user(s) and mode(s) of travel that will be actively managed and maintained by the land management entity.
3. Designed Use: The intentional Managed Use of a trail that requires the most demanding design, construction, and maintenance parameters that, in conjunction with the applicable Level of Development, determines which Design Parameters will apply to a trail.

4. Design Parameters: These technical specifications for trail construction and maintenance, based on the Level of Development and Designed Use, should be identified for each trail, and sometimes, for individual segments.

III. TRAIL ASSESSMENT SCOPE

The physical evaluation of the path of travel, otherwise referred herein as "the trail," included a 20-foot-wide corridor consisting of 10 feet from the center line of the discernible trail tread surface. The tread width ranged from 12" to 80+" depending on level of use and canopy coverage. The assessed trail consists of what is described herein as;

a. Trails 1 – 24

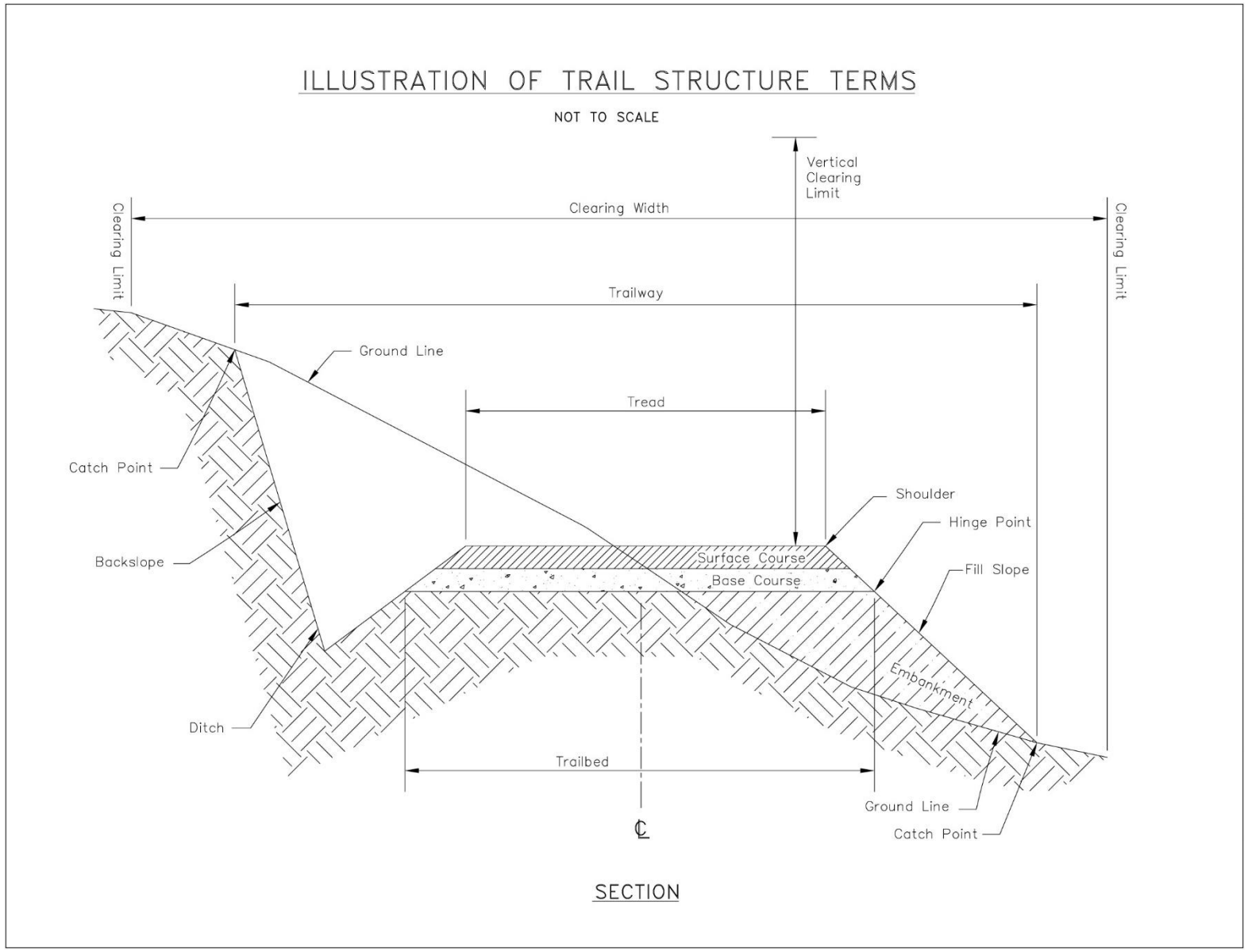
A. <u>Productivity Factors</u>

The Penn Trails assessment process observes and records the physical conditions of the trail's structural components (see Trail Structural Terminology diagram below). These observations are then related to Productivity Factors, which determine the trail's structural stability and sustainability. The assessed productivity factors for the Okehocking Preserve Trail system are:

1. Linear Grade
    a. Grade is expressed herein as a percent or an angle.
    b. *Percent* grade equals the *rise* (elevation change) divided by the run (horizontal distance) multiplied by 100.
    c. Example: rise of 10 feet/run of 100 feet x 100 = 10 percent
2. Cross Slope
    a. The percentage of rise to length when measuring the trail tread from edge to edge perpendicular to the direction of travel.
3. Side Slope
    a. The natural slope of the ground, usually expressed as a percentage.
4. Trail Tread Surface
    a. material type

5. Trail Tread Width
    a. The width of the defined surface providing the path of travel.
6. Trail Corridor (Clearing Width and Height)
    a. The clearing limit that contains the trail and related structures.

B. Trail Structural Terminology



IV. Okehocking Preserve Trail System Assessments

The Okehocking Preserve Trail System trail assessments are each contained within a specific section of this document. There are twenty-four trail assessment sections, which contain the following maps and tables;

A. A narrative of the assessment for the trail or segment;
B. A table providing all field data, observations, coordinates and tasks for the above;
C. A map showing Trail Tread Conditions (Task 1) and direction of travel.
D. A map showing recommended Prescriptions (Tasks 2) for the above.
E. A separate map of specific point data with corresponding tables containing field data.
F. A map of each Conceptual Design.

In addition, Penn Trails has developed a KML file of all line, point and area data, of the Okehocking Trail System, for your viewing in Google Earth.

A KML is a file format used to display geographic data in an Earth browser such as Google Earth, Google Maps, and Google Maps for mobile. KML uses a tag-based structure with nested elements and attributes and is based on the XML standard.

Depending on your computer operating system, you can either click on the KML file and it will automatically open in Google Earth or you can open Google Earth and import the KML file through the file tab. Once the KML is loaded in your "MY Places" you are able to zoom in on the line, point and area data. To see the attributes associated with line, point and area data, simple click on your chosen selection and a box will appear with the associated attributes.

Google Earth does not share your KML file unless you allow it. If you chose to share through Google Earth it will share it with all users. You can keep your KML file in "MY Places" in Google Earth without sharing it with all users. To allow others to view the KML file they will need to perform the same process through their own Google Earth software.

Photography

As part of the assessment, Penn Trails visually documents particular line, point and area data through photography. These photos' capture line, point and area conditions as discussed in the tables above.

Each photo is labeled by specific trail and station of trail.

A hyperlink is provided by the station for each station that is visually captured by a photo. To access the photo, click on the hyperlink.

TRAIL 1 ASSESSMENT NARRATIVE

1. **Designed Use = Hiker/Pedestrian and Equestrian**

2. **Recommended Design Parameters, based upon what can be inferred from the current trail:**

   - Tread Width: 60" natural surface, grass turf, mowed path; actual tread 12” and below.
   - Target Running Grade: 5-10%
   - Target Cross Slope: 2%
   - Corridor Clearing Width: 80+"
   - Corridor Clearing Height: 97”- 144”
   - Short Pitch Maximum (%) up to 100': 16-20%

3. **General Condition Assessment Notes:**

   Trail 1 begins at the Delchester Rd. parking lot and creates a loop around a fenced field. The trail is underutilized until it intersects with Trail 9. The trail tread north/west of the Leash Free Field exceeds the short pitch max, showing significant erosion with tree root exposure.

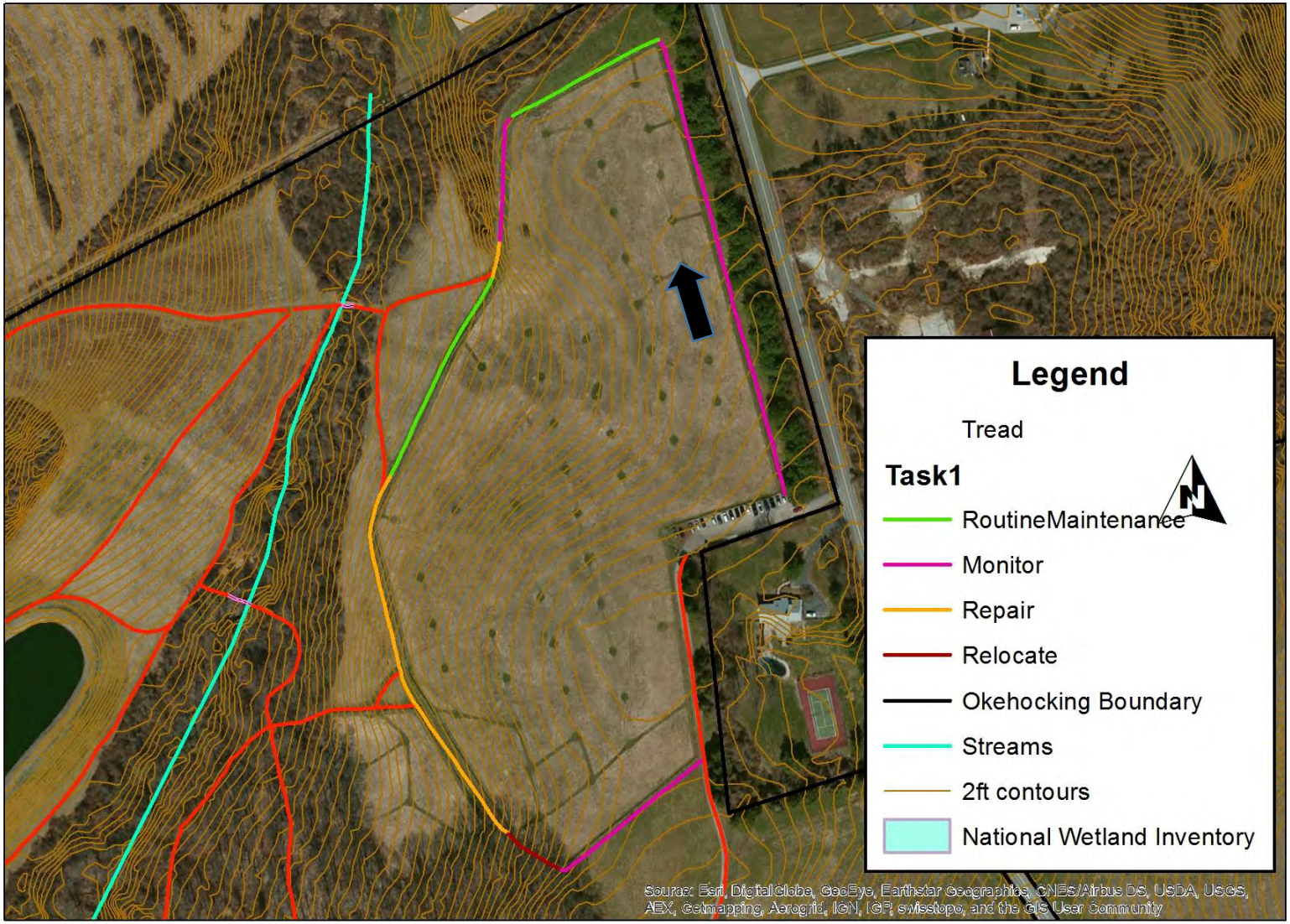
4. **Prescription(s):**

   Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 1

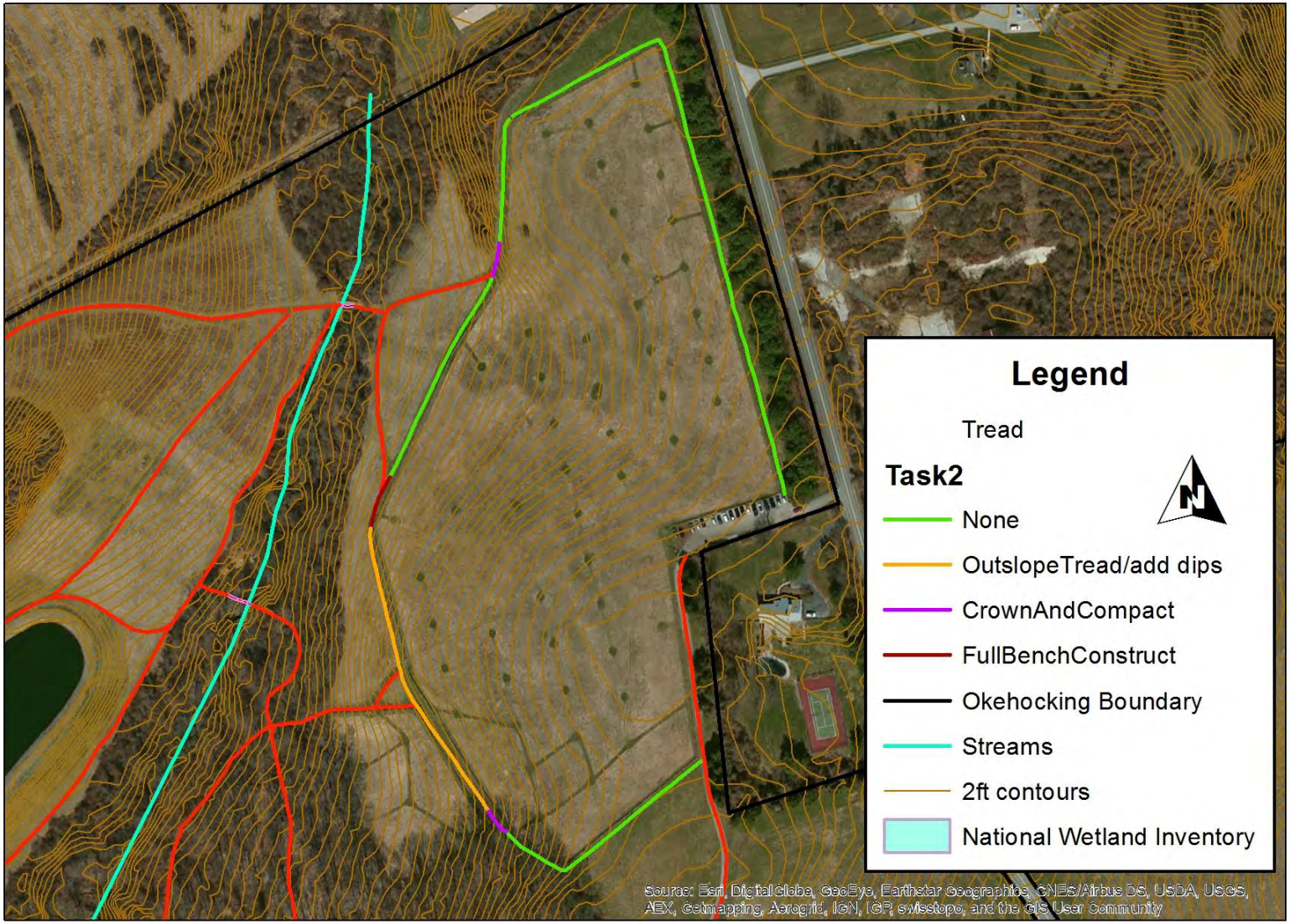
FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Grass	Grass	<12	<5	>-1	<5	Monitor	None	97-144	80+	RoutineMaintenance	763
1	Grass	Grass	<12	5-10	<5	<5	RoutineMaintenance	None	97-144	80+	RoutineMaintenance	266
2	Grass	Grass	<12	5-10	0	5-10	Monitor	None	97-144	80+	RoutineMaintenance	64
3	Grass	Grass	<12	16-20	0	<5	Monitor	None	97-144	80+	RoutineMaintenance	137
4	Grass	Grass	<12	>20	0	<5	Repair	CrownAndCompact	97-144	80+	RoutineMaintenance	58
5	Grass	Grass	<12	5-10	<5	<5	RoutineMaintenance	None	97-144	80+	RoutineMaintenance	358
6	Grass	Grass	<12	5-10	>5	5-10	Repair	FullBenchConstruction	97-144	80+	RoutineMaintenance	88
7	Dirt	Grass	<12	11-15	>-1	11-15	Repair	OutslopeTread/add dips	97-144	80+	RoutineMaintenance	177
8	Dirt	Grass	<12	<5	>-1	<5	Repair	OutslopeTread/add dips	97-144	80+	RoutineMaintenance	329
9	Dirt	Grass	13-25	16-20	0	16-20	Repair	CrownAndCompact	97-144	80+	RoutineMaintenance	47
10	Dirt	Grass	>60	>20	0	16-20	Relocate	None	97-144	80+	RoutineMaintenance	106
11	Grass	Grass	<12	5-10	<5	5-10	Monitor	None	97-144	80+	RoutineMaintenance	288
											Total (ft)	2681

Trail 1 Tread Task 1



1 inch = 213 feet

Trail 1 Tread Task 2



1 inch = 213 feet

TRAIL 2 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian, Equestrian and Vehicle

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: aggregate surface with 80+" width
- Target Running Grade: 10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80+"
- Corridor Clearing Height: open"
- Short Pitch Maximum (%) up to 100': >20%

3.General Condition Assessment Notes:

Trail 2 begins at the Delchester Rd. parking lot at the gate and Information Kiosk. The trail is an access road for employees to travel internally through the Preserve with equipment for maintenance duties. Trail 2 ends at the Westchester Pike parking lot. The trail tread is loose aggregate that is well maintained by staff. Sections of the trail that exceed the short pitch max show some erosion and compaction.

4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 2												
FID	SurfaceType	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Aggregate	gravel	Grass	80+	5-10	0	<5	RoutineMaintenance	Open	80+	RoutineMaintenance	506
1	Aggregate	gravel	Grass	80+	<5	0	<5	RoutineMaintenance	Open	80+	RoutineMaintenance	766
2	Aggregate	gravel	MatureForest	80+	11-15	0	11-15	RoutineMaintenance	97-144	80+	RoutineMaintenance	102
3	Aggregate	gravel	MatureForest	80+	5-10	0	11-15	RoutineMaintenance	97-144	80+	RoutineMaintenance	261
4	Aggregate	gravel	Grass	80+	16-20	>1	<5	Monitor	97-144	80+	RoutineMaintenance	292
5	Aggregate	gravel	Grass	80+	5-10	0	5-10	RoutineMaintenance	Open	80+	RoutineMaintenance	898
											Total (ft)	2825

TRAIL 3 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: grass turf (mowed path) with 12”-25” width
- Target Running Grade: 5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80+"
- Corridor Clearing Height: open
- Short Pitch Maximum (%) up to 100': 15%

3.General Condition Assessment Notes:

Trail 3 offers a connection between Trailhead 1 (Delchester Rd) and Trailhead 2 (Westchester Pike) with a turf surface. The trail is fall line and steep with a fair amount of use from all user groups. Signs of trail widening and cupping are seen within these sections. Although erosion is present this trail offers the user a more stable surface then the loose aggregate of Trail 2.

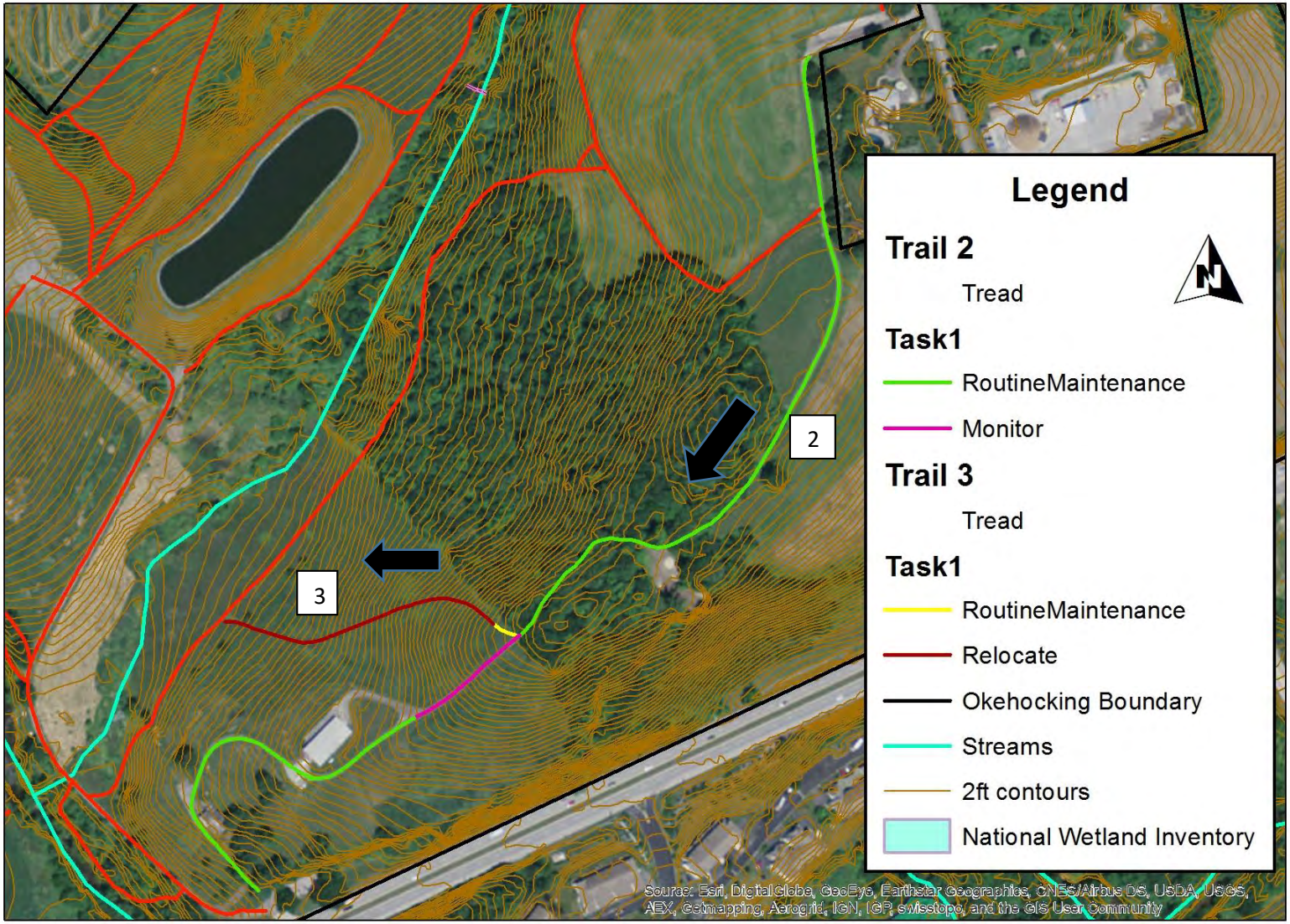
4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 3

FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Grass	Grass	<12	<5	0	<5	RoutineMaintenance	Open	61-80	RoutineMaintenance	53
1	Grass	Grass	13-25	16-20	>-1	<5	Relocate	Open	80+	RoutineMaintenance	196
2	Grass	Grass	13-25	11-15	<5	16-20	Relocate	Open	80+	RoutineMaintenance	426
										Total (ft)	675

Trail 2 & 3Tread Task 1



1 inch = 286 feet

TRAIL 4 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 12”-60” grass turf (mowed path) and natural surface, dirt.
- Target Running Grade: 5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80"
- Corridor Clearing Height: open
- Short Pitch Maximum (%) up to 100': 15%

3.General Condition Assessment Notes:

Trail 4 traverses through the meadow and woodlands, it is the south/east section of a larger loop advertised in the Okehocking Preserve Brochure. The trail is highly used with almost two apparent treads through the meadow area. The beginning of the trial (starting at trail 2) is choked by a small stream to the west and an old retaining wall to the east. This choking point has limited sight lines and may instigate user conflict. My recommendation would be to open the corridor on the east side to allow for better sight lines.

Once the tread turns from grass turf to dirt and the tread grade exceeds 8% erosion (compaction and cupping) is present.

4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 4

FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Grass	Grass	13-25	<5	0	<5	RoutineMaintenance	None	Open	80+	RoutineMaintenance	85
1	Grass	Grass	<12	<5	>-1	5-10	Repair	OutslopeTread/add dips	Open	80+	RoutineMaintenance	134
2	Dirt	Grass	<12	<5	>5	11-15	Repair	FullBenchConstruction	Open	80+	RoutineMaintenance	252
3	Grass	Grass	<12	<5	<5	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	474
4	Dirt	MatureForest	13-25	5-10	0	5-10	RoutineMaintenance	None	73-96	61-80	RoutineMaintenance	344
5	Dirt	MatureForest	13-25	5-10	>-1	5-10	Repair	CrownAndCompact	73-96	61-80	RoutineMaintenance	119
6	Dirt	MatureForest	13-25	<5	>-1	5-10	Repair	OutslopeTread/add dips	73-96	61-80	RoutineMaintenance	164
7	Dirt	MatureForest	41-60	11-15	>-5	11-15	Repair	CrownAndCompact or relocate	73-96	61-80	RoutineMaintenance	149
8	Grass	Grass	25-40	16-20	>-1	16-20	Relocate	CrownAndCompact	Open	61-80	RoutineMaintenance	152
9	Grass	Grass	<12	16-20	<5	5-10	RoutineMaintenance	None/low use	Open	61-80	RoutineMaintenance	68
											Total (ft)	1941

TRAIL 5 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 13”-25” natural surface, dirt.
- Target Running Grade: 5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80"
- Corridor Clearing Height: open
- Short Pitch Maximum (%) up to 100': 15%

3.General Condition Assessment Notes:

Trail 5 provides the user with a more intimate experience with the mature forest with in Okehocking Preserve. The bridge crossing is highly used with fall line approaches, steps could be added to stabilize the tread or the tread could be relocated to a sustainable contour. Trail 5’s approach to Trail 2 is eroded due to steep grades. This section could also be relocated to a sustainable contour for a more enjoyable experience.

Old deer fencing near the intersection of Trail 5 and 2 needs repair or removal.

4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

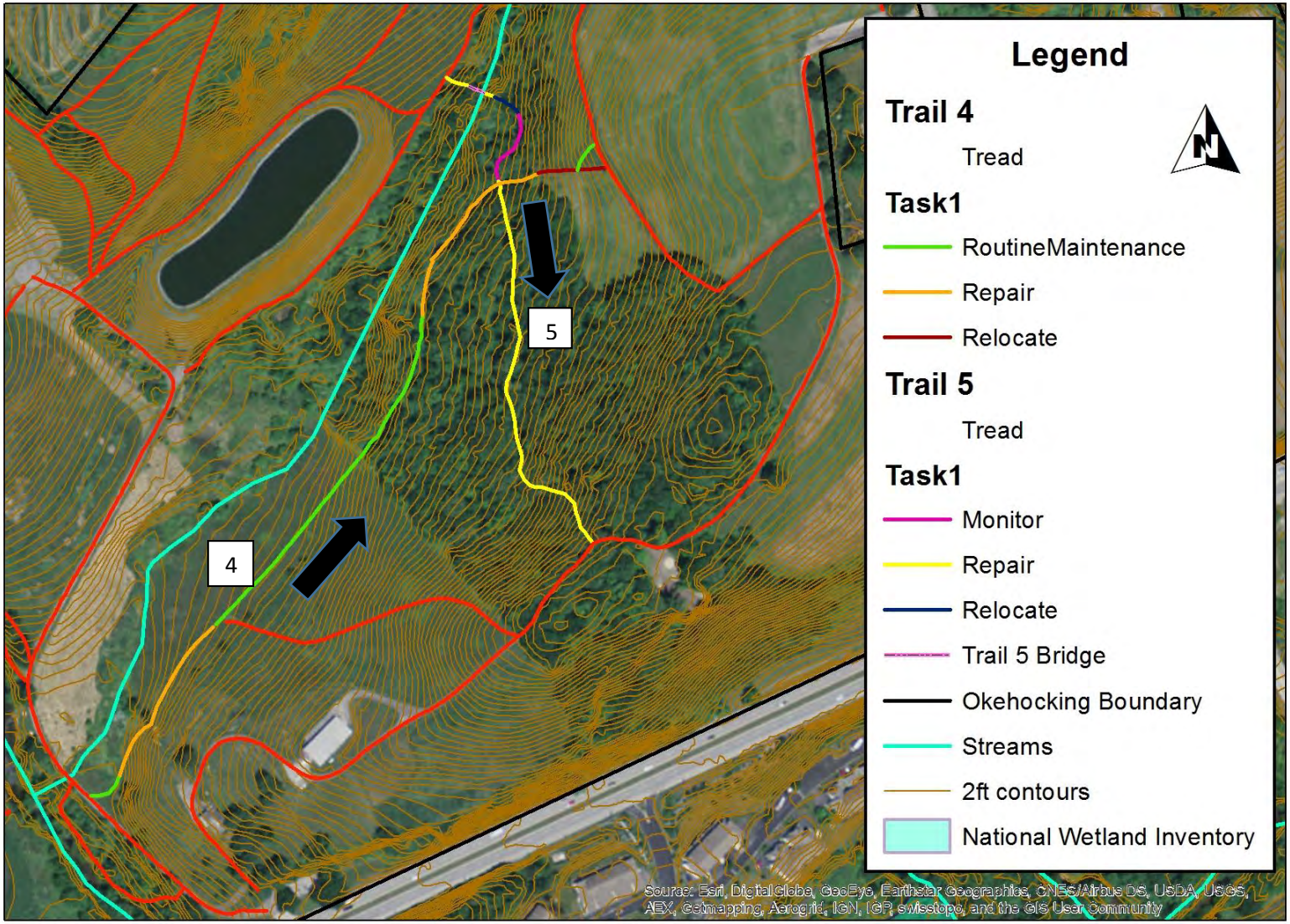
Trail 5

FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Dirt	MatureForest	13-25	11-15	>-1	11-15	Repair	add steps	73-96	25-40	RoutineMaintenance	48
1	Dirt	MatureForest	13-25	11-15	>-1	11-15	Repair	add steps	73-96	25-40	RoutineMaintenance	19
2	Dirt	MatureForest	13-25	11-15	>-1	11-15	Relocate	fall line to bridge	73-96	25-40	RoutineMaintenance	68
3	Dirt	MatureForest	<12	11-15	0	5-10	Monitor	None	73-96	25-40	RoutineMaintenance	168
4	Dirt	MatureForest	13-25	5-10	0	11-15	Repair	CrownAndCompact	73-96	25-40	RoutineMaintenance	263
5	Dirt	MatureForest	13-25	<5	>-1	5-10	Repair	OutslopeTread/add dips	73-96	25-40	RoutineMaintenance	81
6	Dirt	MatureForest	13-25	5-10	>-5	5-10	Repair	CrownAndCompact	61-72	25-40	RoutineMaintenance	312
7	Dirt	MatureForest	13-25	11-15	0	11-15	Repair	CrownAndCompact	61-72	25-40	RoutineMaintenance	234
											Total (ft)	1193

Trail 5 Bridge

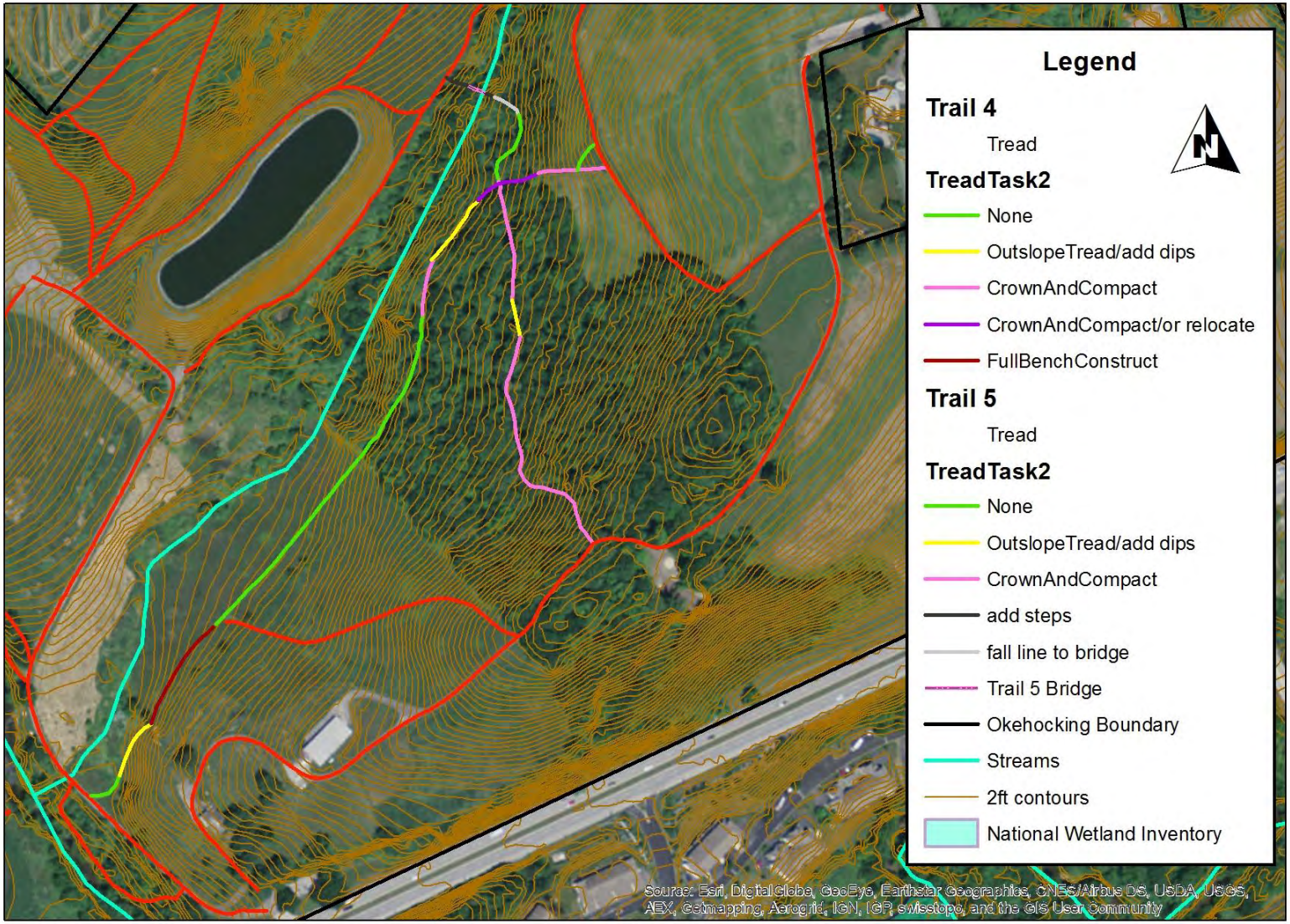
FID	Type	Handrail	TreadGrade	TreadCrossSlope	Length(ft)	Width(in)	HtAboveGround(in)	FrameMaterial	TreadMaterial	Footers	FooterMaterial	FeatureTask
0	Single Unit	Yes	<5	0	47	42	50	TreatedLumber	TreatedLumber	Yes	Concrete	RoutineMaintenance

Trail 4 & 5 Tread Task 1



1 inch = 286 feet

Trail 4 & 5 Tread Task 2



1 inch = 286 feet

TRAIL 6 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 80+" grass turf mowed path,
- Target Running Grade: 5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80+"
- Corridor Clearing Height: open
- Short Pitch Maximum (%) up to 100': 16-20%

3.General Condition Assessment Notes:

Trail 6 is located at the corner of Westchester Pike and Garrett Mill Road. Parking is also at the same location at a pull off or across Garrett Mill Rd at a separate county Park. This is a loop trail through a hay field with an option to view a wetland area and stream. I did observe users parking and walking their dogs for a short hike in this area. Generally, the area seems underutilized. The area does not provide any amenities or destination areas.

The section of Trail 6 that traverses the wetland area needs to be relocated or elevated to preserve the resource.

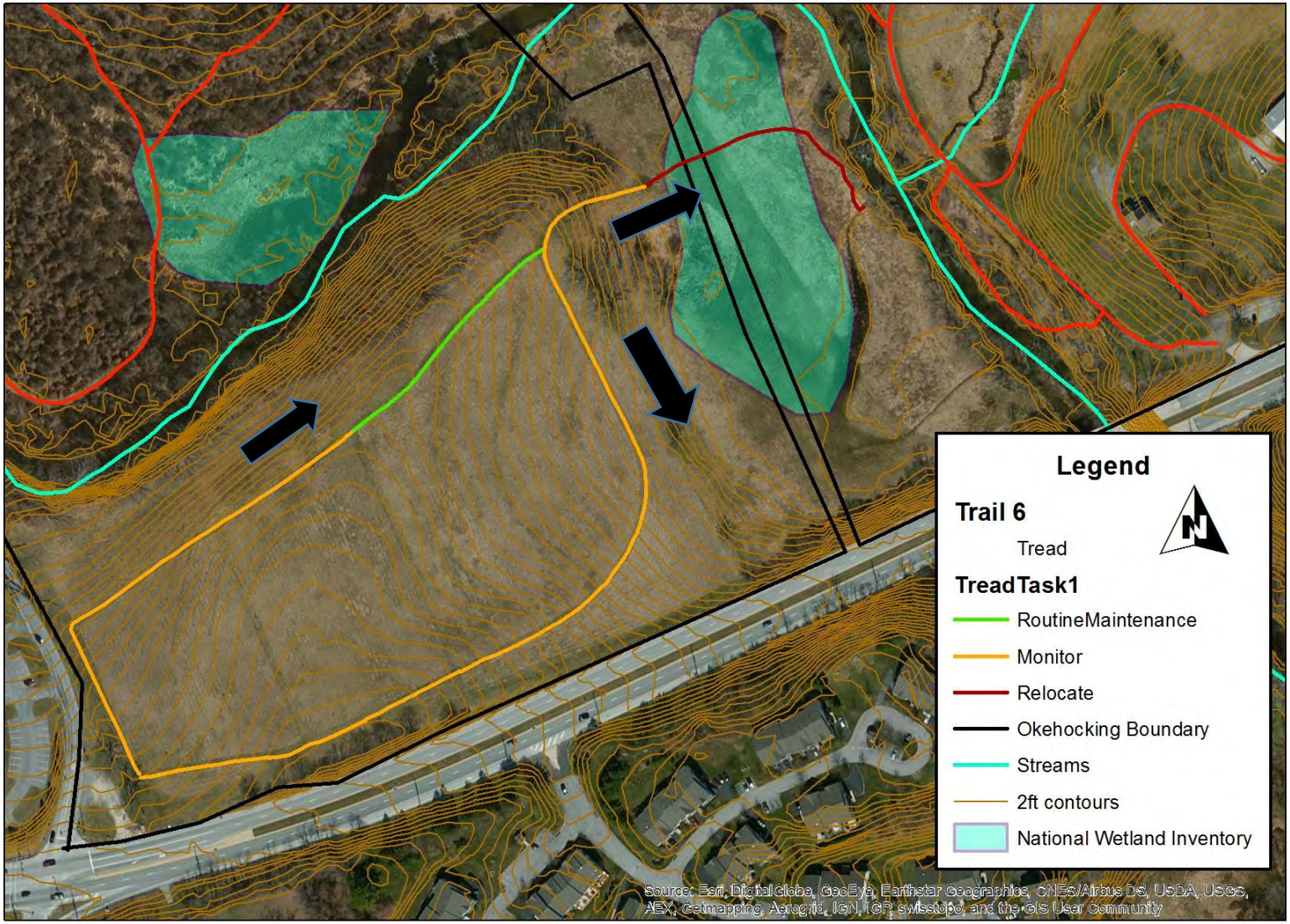
4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.
There is no Task 2 Map for this trail as there is no Task 2 for this trail.

Trail 6

FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Grass	Grass	80+	5-10	>5	5-10	Monitor	None	Open	80+	RoutineMaintenance	537
1	Grass	Grass	80+	<5	0	<5	RoutineMaintenance	None	Open	80+	RoutineMaintenance	419
2	Grass	Grass	<12	<5	>-10	<5	Relocate	None	Open	<24	RoutineMaintenance	16
3	Grass	Grass	<12	<5	>-1	<5	Relocate	None	Open	<24	RoutineMaintenance	426
4	Grass	Grass	80+	16-20	<5	16-20	Monitor	None	Open	80+	RoutineMaintenance	173
5	Grass	Grass	80+	5-10	0	5-10	Monitor	None	Open	80+	RoutineMaintenance	514
6	Grass	Grass	80+	11-15	0	11-15	Monitor	None	Open	80+	RoutineMaintenance	370
7	Grass	Grass	80+	5-10	0	5-10	Monitor	None	Open	80+	RoutineMaintenance	165
8	Grass	Grass	80+	<5	0	<5	Monitor	None	Open	80+	RoutineMaintenance	168
9	Grass	Grass	80+	5-10	0	5-10	Monitor	None	Open	80+	RoutineMaintenance	205
10	Grass	Grass	80+	5-10	0	5-10	Monitor	None	Open	80+	RoutineMaintenance	260
											Total (ft)	3253

Trail 6 Tread Task 1



1 inch = 208 feet

TRAIL 7 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian, Equestrian and Vehicle

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 80+" aggregates bed & tread
- Target Running Grade: 5-10%
- Target Cross Slope: 1%
- Corridor Clearing Width: 80+"
- Corridor Clearing Height: open
- Short Pitch Maximum (%) up to 100': 11-15%

3.General Condition Assessment Notes:

Trail 7 is an access road for general maintenance of the Preserve; including the Pump House and Ponds. It has a loose aggregate tread that is maintained. One section North/West of the Pump House is showing erosion due to its steep grade. Users can access many trail and amenities from Trail 7.

4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 7

FID	SurfaceType	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Aggregate	gravel	Grass	80+	11-15	0	<5	RoutineMaintenance	None	Open	80+	RoutineMaintenance	87
1	Aggregate	gravel	Grass	80+	<5	<5	<5	RoutineMaintenance	None	Open	80+	RoutineMaintenance	692
2	Aggregate	gravel	Grass	80+	11-15	>-1	11-15	Repair	CrownAndCompact	Open	80+	RoutineMaintenance	184
3	Aggregate	gravel	Grass	80+	5-10	0	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	120
4	Aggregate	gravel	Grass	80+	<5	0	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	460
5	Aggregate	gravel	Grass	80+	5-10	0	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	95
6	Aggregate	gravel	Grass	80+	11-15	0	11-15	Monitor	None	Open	80+	RoutineMaintenance	252
												Total (ft)	1890

TRAIL 24 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 13-25" natural surface bed & tread
- Target Running Grade: 5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 50"
- Corridor Clearing Height: open = 72”
- Short Pitch Maximum (%) up to 100': 11-15%

3.General Condition Assessment Notes:

Trail 24 is a user made trail for stream access.

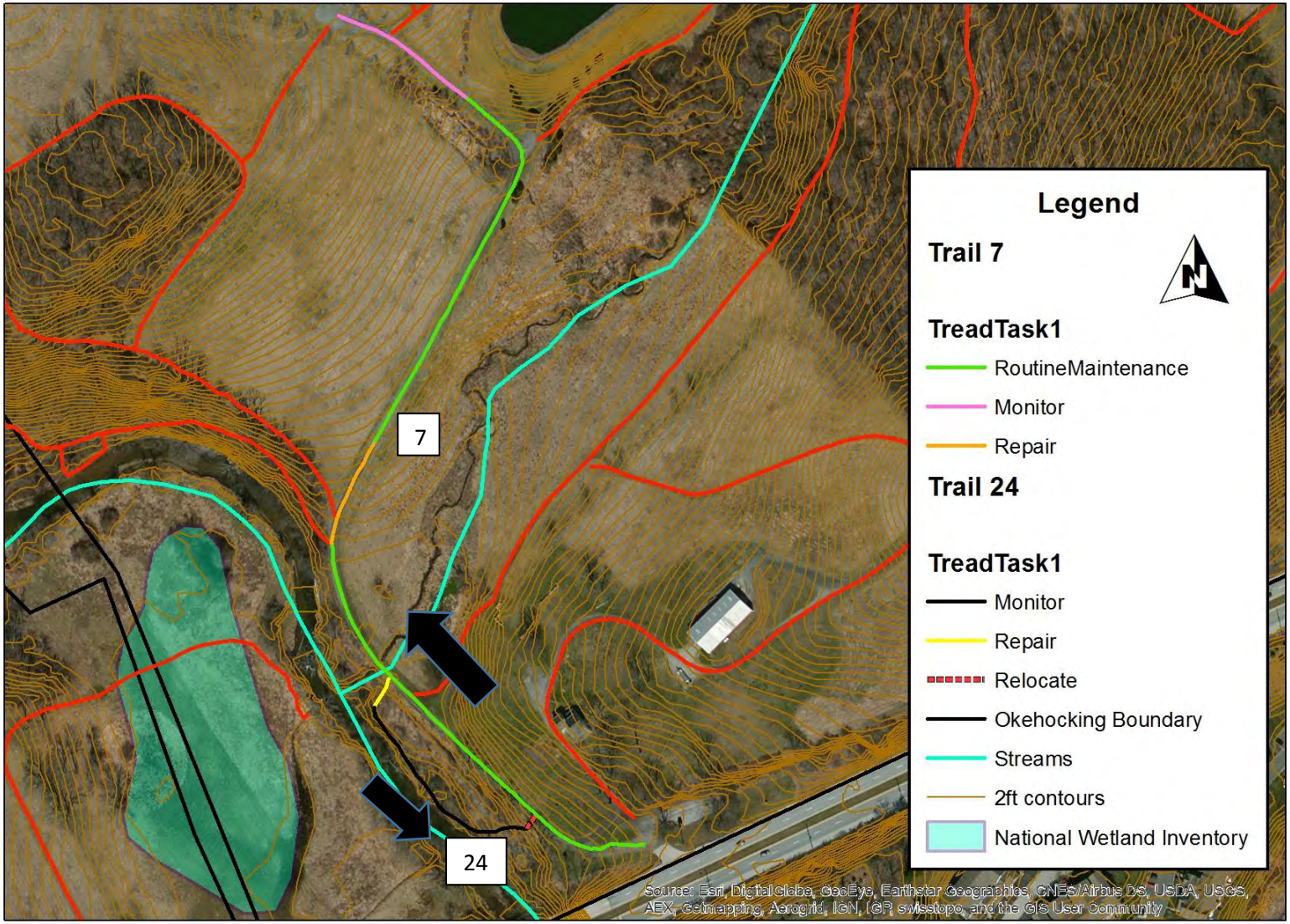
4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 24

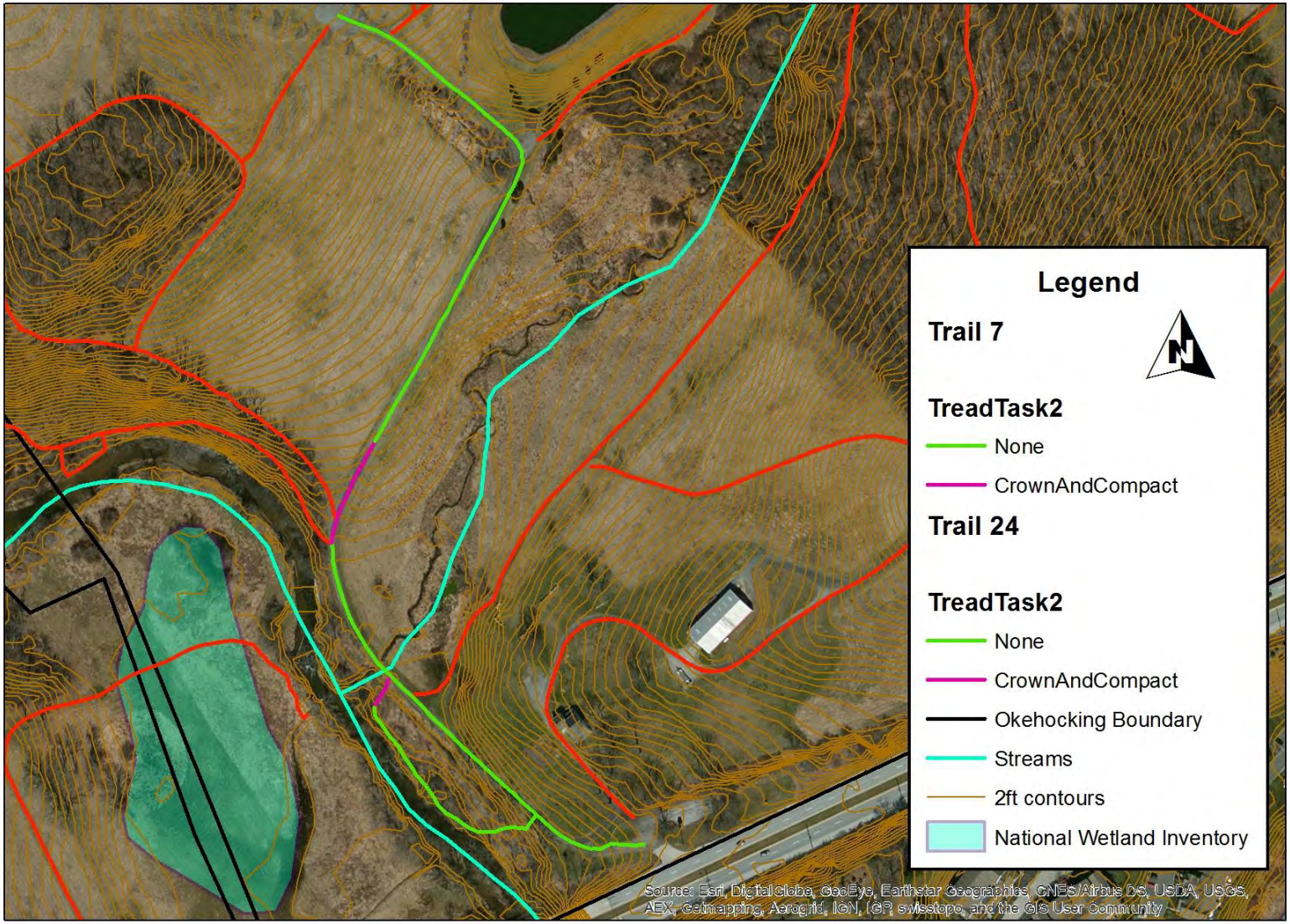
FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Dirt	YoungForest	13-25	5-10	0	5-10	Repair	CrownAndCompact	61-72	25-40	RoutineMaintenance	53
1	Dirt	YoungForest	13-25	<5	0	5-10	Monitor	None	61-72	25-40	RoutineMaintenance	46
2	Dirt	YoungForest	<12	<5	0	5-10	Monitor	None	<60	25-40	RoutineMaintenance	230
3	Dirt	YoungForest	13-25	11-15	0	11-15	Monitor	None	73-96	61-80	RoutineMaintenance	83
4	Dirt	YoungForest	13-25	>20	0	>20	Relocate	None	73-96	61-80	RoutineMaintenance	29
											Total (ft)	441

Trail 7 & 24 Tread Task 1



1 inch = 219 feet

Trail 7 & 24 Tread Task 2



1 inch = 219 feet

TRAIL 8 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 12” tread with 80+ grass turf, mowed path.
- Target Running Grade: 5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80"
- Corridor Clearing Height: 72”
- Short Pitch Maximum (%) up to 100': 11-15%

3.General Condition Assessment Notes:

The entrance to Trail 8 is hidden next to the Pump House; almost missed it myself. The trail traverses the tree line and stream connecting with both bridge crossings. The trails cross slope, in sections, well exceeded 5% and was uncomfortable to traverse.

4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 8

FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Dirt	Grass	<12	<5	<5	5-10	RoutineMaintenance	None	61-72	41-60	RoutineMaintenance	90
1	Grass	Grass	<12	5-10	>5	5-10	Repair	FullBenchConstruction	61-72	25-40	Repair/SideClearance	136
2	Grass	Grass	<12	5-10	>5	5-10	Repair	FullBenchConstruction	61-72	61-80	RoutineMaintenance	68
3	Grass	Grass	<12	<5	>5	5-10	Repair	FullBenchConstruction	61-72	61-80	RoutineMaintenance	328
4	Grass	Grass	<12	<5	0	5-10	RoutineMaintenance	None	61-72	61-80	RoutineMaintenance	369
5	Grass	Grass	<12	5-10	0	5-10	RoutineMaintenance	None	61-72	61-80	RoutineMaintenance	205
6	Grass	Grass	<12	<5	0	5-10	RoutineMaintenance	None	61-72	61-80	RoutineMaintenance	173
											Total (ft)	1369

TRAIL 9 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 80+" grass turf and dirt, mowed path.
- Target Running Grade:5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80+"
- Corridor Clearing Height: open
- Short Pitch Maximum (%) up to 100': 11-15%

3.General Condition Assessment Notes:

Trail 9 intersects with Trail 1 and Trail 14. The Trail is a section of the large loop advertised in the Okehocking Preserve brochure. The trail is highly used by all user groups. Its intersection with Trail 1 is shaped in a Y configuration to accommodate users from two directions. The approach from the east side of the bridge is showing cupped erosion due to its fall line location. The approach from the west side of the bridge is showing tread displacement due to the fall line location of the trail uphill from it. The trail exceeds 30% grade for more than 400 ft, erosion consists of trail widening and cupping.

Trail 9 approach with Trail 14 is fall line through a hedgerow with rock and tree root obstructions in the tread. Sight lines at the intersection are short and abrupt.

4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

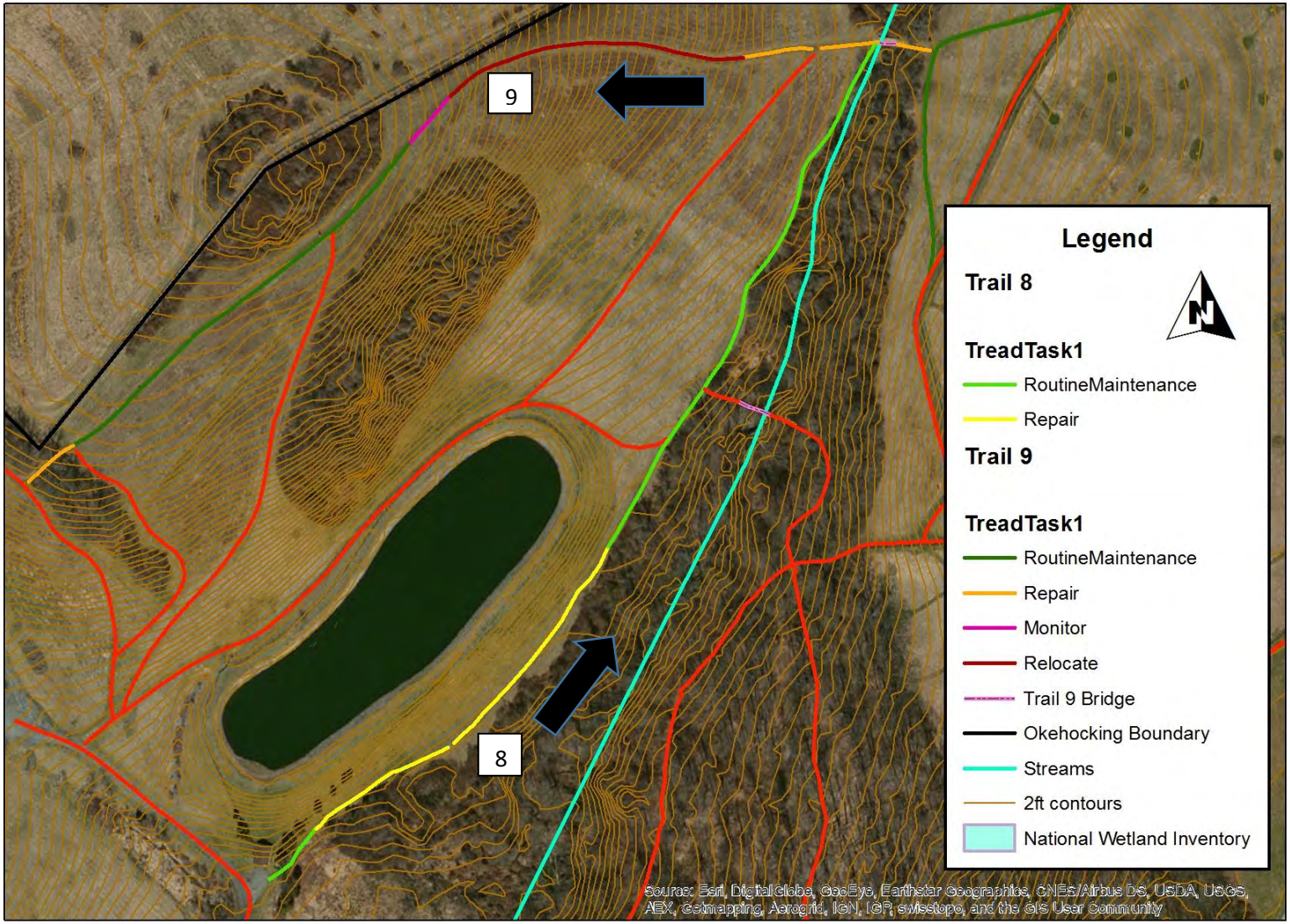
Trail 9

FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Grass	Grass	80+	11-15	0	11-15	RoutineMaintenance	None	Open	80+	RoutineMaintenance	52
1	Grass	Grass	80+	5-10	0	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	94
2	Grass	Grass	80+	<5	0	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	145
3	Grass	Grass	80+	5-10	<5	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	187
4	Dirt	Shrub/Sapling	80+	11-15	>-5	11-15	Repair	CrownAndCompact	Open	80+	RoutineMaintenance	43
5	Grass	Grass	80+	5-10	0	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	74
6	Grass	Grass	80+	11-15	>5	11-15	Repair	CrownAndCompact	Open	80+	RoutineMaintenance	90
7	Grass	Grass	80+	>20	0	>20	Relocate	None	Open	80+	RoutineMaintenance	156
8	Grass	Grass	80+	>30	0	>30	Relocate	None	Open	80+	RoutineMaintenance	251
9	Grass	Grass	80+	11-15	>-1	11-15	Monitor	None	Open	80+	RoutineMaintenance	79
10	Grass	Grass	80+	5-10	<5	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	148
11	Grass	Grass	80+	<5	<5	<5	RoutineMaintenance	None	Open	80+	RoutineMaintenance	445
12	Dirt	MatureForest	25-40	11-15	>-1	11-15	Repair	CrownAndCompact	61-72	61-80	Repair/Vertical Clearance	75
											Total (ft)	1839

Trail 9 Bridge

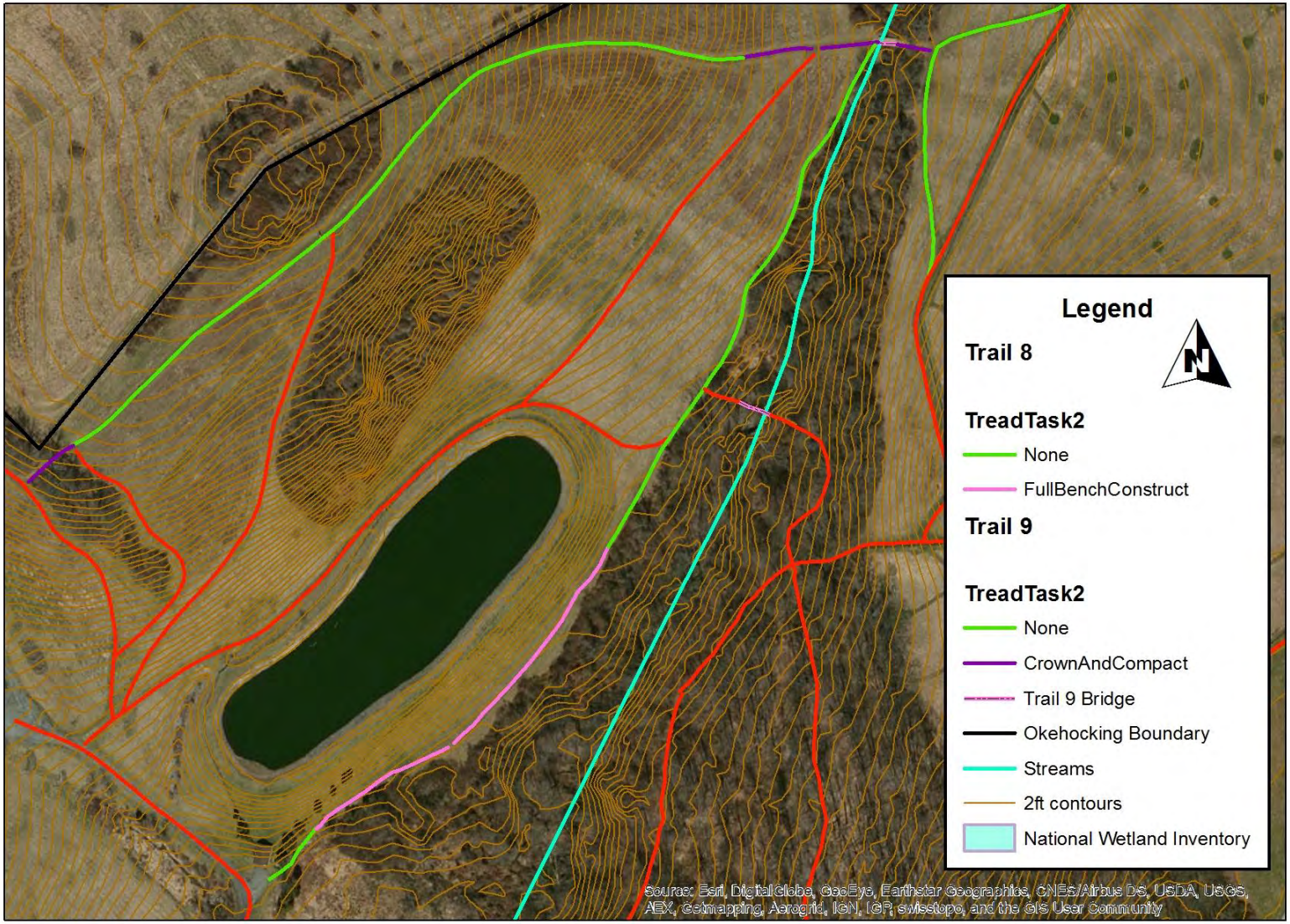
FID	Type	Handrail	TreadGrade	TreadCrossSlope	Length(ft)	Width(in)	HtAboveGround(in)	FrameMaterial	TreadMaterial	Footers	FooterMaterial	FeatureTask
0	Single Unit	No	<5	0	23	100	48	Metal	Treated Lumber	Yes	Concrete	RoutineMaintenance

Trails 8 & 9 Tread Task 1



1 inch = 172 feet

Trails 8 & 9 Tread Task 2



1 inch = 172 feet

TRAIL 10 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 80+" grass turf, mowed path.
- Target Running Grade: 5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80+"
- Corridor Clearing Height: open
- Short Pitch Maximum (%) up to 100': 11-15%

3.General Condition Assessment Notes:

Trail 10 is utilized by bird watchers as it is located in close proximity to a large pond. The trail section on the north/west side of the pond lies in a low area between two rising slopes. If the trail sees more use I recommend that the trail be moved uphill on the west slope for better drainage.

4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 10

FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Grass	Grass	80+	<5	>-5	5-10	Monitor/LowArea	None	Open	80+	RoutineMaintenance	728
1	Grass	Grass	80+	5-10	<5	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	209
											Total (ft)	937

TRAIL 11 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 80+" grass turf, mowed path.
- Target Running Grade: 5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80+"
- Corridor Clearing Height: open
- Short Pitch Maximum (%) up to 100': 11-15%

3.General Condition Assessment Notes:

Trail 11 offers a quick connection between Trail 9 and 10. Trail 11 is underutilized and may not be needed in the trail system.

4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 11

FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Grass	Grass	80+	5-10	<5	11-15	RoutineMaintenance	None	Open	80+	RoutineMaintenance	596

TRAIL 12 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 80+" grass turf, mowed path.
- Target Running Grade: 5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80+"
- Corridor Clearing Height: open
- Short Pitch Maximum (%) up to 100':16-20%

3.General Condition Assessment Notes:

Trail 12 is another connection between Trail 9 and 10. The trail is underutilized due to it steep grades and cross slopes

4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 12

FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Grass	Grass	80+	5-10	0	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	48
1	Grass	Grass	80+	11-15	>5	5-10	Repair	FullBenchConstruction	Open	80+	RoutineMaintenance	40
2	Grass	Grass	80+	11-15	<5	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	207
3	Grass	Grass	80+	>20	>10	>20	Relocate	None	Open	80+	RoutineMaintenance	116
4	Grass	Grass	80+	5-10	>5	16-20	Repair	FullBenchConstruction	Open	80+	RoutineMaintenance	145
5	Grass	Grass	80+	11-15	<5	16-20	Repair	FullBenchConstruction	Open	80+	RoutineMaintenance	124
											Total (ft)	680

TRAIL 13 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 80+" grass turf, mowed path.
- Target Running Grade: 5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80+"
- Corridor Clearing Height: open
- Short Pitch Maximum (%) up to 100': 11-15%

3.General Condition Assessment Notes:

Trail 13 has little to no use. I believe it exists for mower access. Could be removed from the system.

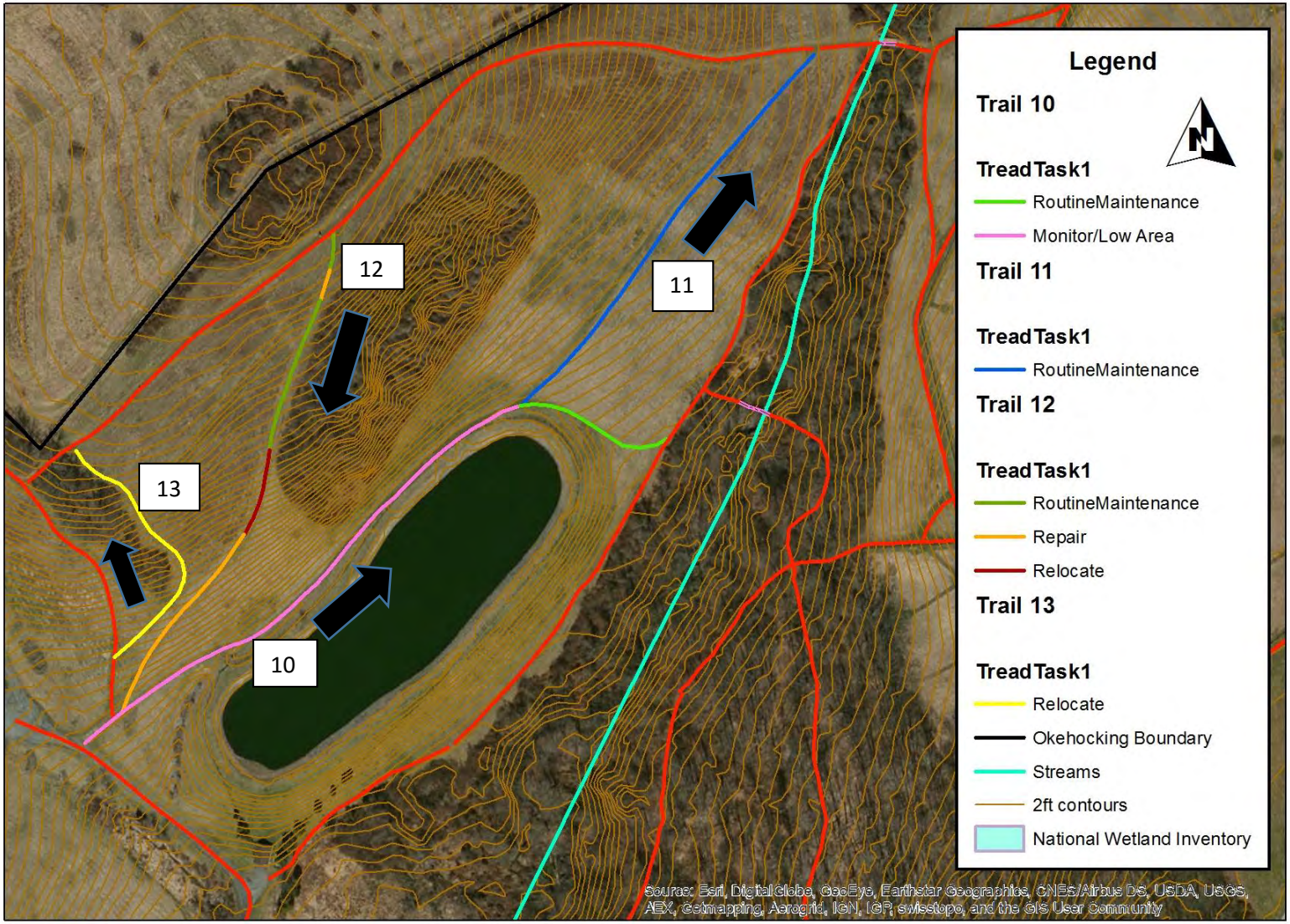
4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 13

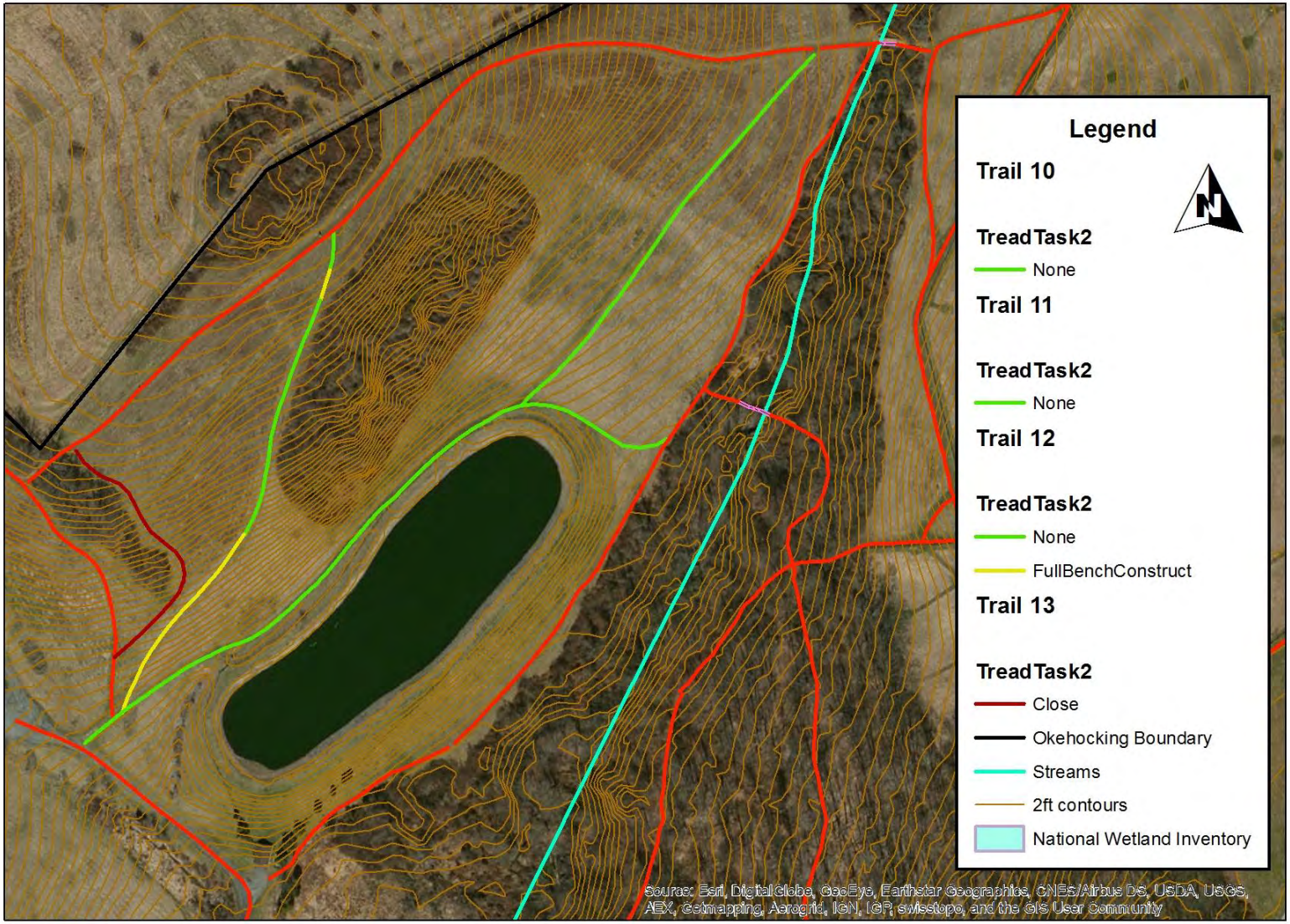
FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Grass	Grass	80+	16-20	>5	>20	Relocate	None	Open	80+	RoutineMaintenance	125
1	Grass	Grass	80+	>30	>5	>30	Relocate	None	Open	80+	RoutineMaintenance	180
2	Grass	Grass	80+	11-15	>5	11-15	Relocate	None	Open	80+	RoutineMaintenance	52
											Total(ft)	357

Trails 10-13 Tread Task 1



1 inch = 172 feet

Trails 10-13 Tread Task 2



1 inch = 172 feet

TRAIL 14 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 13-80+" grass turf, mowed path.
- Target Running Grade: 5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80+"
- Corridor Clearing Height: open - 144”
- Short Pitch Maximum (%) up to 100': 11-15%

3.General Condition Assessment Notes:

Trail 14 is a section of a larger loop advertised in the Okehocking Preserve brochure. This trail offers stunning views of the whole Preserve and one of the ponds. Trial 14 is highly used and could benefit from more amenities (benches) for its users. Sections that exceed 11-15 % grade show signs of erosion, cupping and displacement. I recommend crowing and compacting the tread due to the slope constraints of the area.

4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 14

FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Grass	Grass	80+	11-15	<5	11-15	RoutineMaintenance	None	Open	80+	RoutineMaintenance	83
1	Grass	Grass	80+	>20	<5	16-20	Monitor	None	Open	80+	RoutineMaintenance	63
2	Grass	Grass	80+	>30	<5	>30	Monitor	None	Open	80+	RoutineMaintenance	170
3	Grass	Grass	80+	11-15	<5	16-20	RoutineMaintenance	None	Open	80+	RoutineMaintenance	34
4	Dirt	Grass	13-25	<5	>-1	5-10	Repair	OutslopeTread	Open	80+	RoutineMaintenance	83
5	Dirt	Grass	41-60	16-20	>-1	16-20	Repair	CrownAndCompact	Open	80+	RoutineMaintenance	132
6	Grass	Grass	25-40	5-10	>-1	5-10	Repair	CrownAndCompact	Open	80+	RoutineMaintenance	126
7	Grass	Grass	41-60	16-20	<5	16-20	Repair	CrownAndCompact	Open	80+	RoutineMaintenance	126
8	Grass	Grass	13-25	11-15	0	16-20	Repair	CrownAndCompact	Open	80+	RoutineMaintenance	61
9	Grass	Grass	13-25	16-20	0	16-20	Repair	CrownAndCompact	Open	80+	RoutineMaintenance	147
10	Grass	Grass	13-25	<5	<5	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	301
11	Grass	Grass	25-40	16-20	0	16-20	Repair	CrownAndCompact	Open	80+	RoutineMaintenance	117
12	Grass	Grass	13-25	5-10	0	5-10	Repair	CrownAndCompact	Open	80+	RoutineMaintenance	297
13	Grass	Grass	13-25	<5	<5	11-15	RoutineMaintenance	None	Open	80+	RoutineMaintenance	90
14	Grass	MatureForest	80+	5-10	<5	16-20	RoutineMaintenance	None	97-144	80+	RoutineMaintenance	85
15	Grass	MatureForest	80+	11-15	<5	16-20	Monitor	None	97-144	80+	RoutineMaintenance	128
16	Grass	Grass	13-25	5-10	<5	16-20	RoutineMaintenance	None	97-144	80+	RoutineMaintenance	96
17	Grass	Grass	25-40	11-15	0	11-15	Repair	CrownAndCompact	97-144	80+	RoutineMaintenance	427
											Total (ft)	2566

TRAIL 15 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 12"tread with 80+ grass turf, mowed path.
- Target Running Grade: 5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80+"
- Corridor Clearing Height: open”
- Short Pitch Maximum (%) up to 100': 11-15%

3.General Condition Assessment Notes:

Trail 15 is a short loop that starts and ends on Trail 14. It is tree lined on one side and meadow on the other. The trail exceeds grades over 15% but does not show much erosion. I recommend routine maintenance until erosion becomes more prevalent.

4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 15

FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Grass	Grass	<12	16-20	>5	16-20	Relocate	None	Open	80+	RoutineMaintenance	114
1	Grass	Grass	<12	5-10	>5	11-15	Repair	FullBenchConstruct	Open	80+	RoutineMaintenance	51
2	Grass	Grass	<12	<5	>5	11-15	Repair	FullBenchConstruct	Open	80+	RoutineMaintenance	167
3	Grass	Grass	<12	16-20	<5	16-20	Relocate	None	Open	80+	RoutineMaintenance	69
4	Grass	Grass	<12	5-10	<5	5-10	Monitor	None	Open	80+	RoutineMaintenance	217
5	Grass	Grass	<12	<5	0	<5	RoutineMaintenance	None	Open	80+	RoutineMaintenance	198
											Total (ft)	816

TRAIL 23 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 12"tread with 80+ grass turf, mowed path.
- Target Running Grade: 5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80+"
- Corridor Clearing Height: open
- Short Pitch Maximum (%) up to 100': 11-15%

3.General Condition Assessment Notes:

Trail 23 is a short spur connection between Trail 15 and Trail 7.

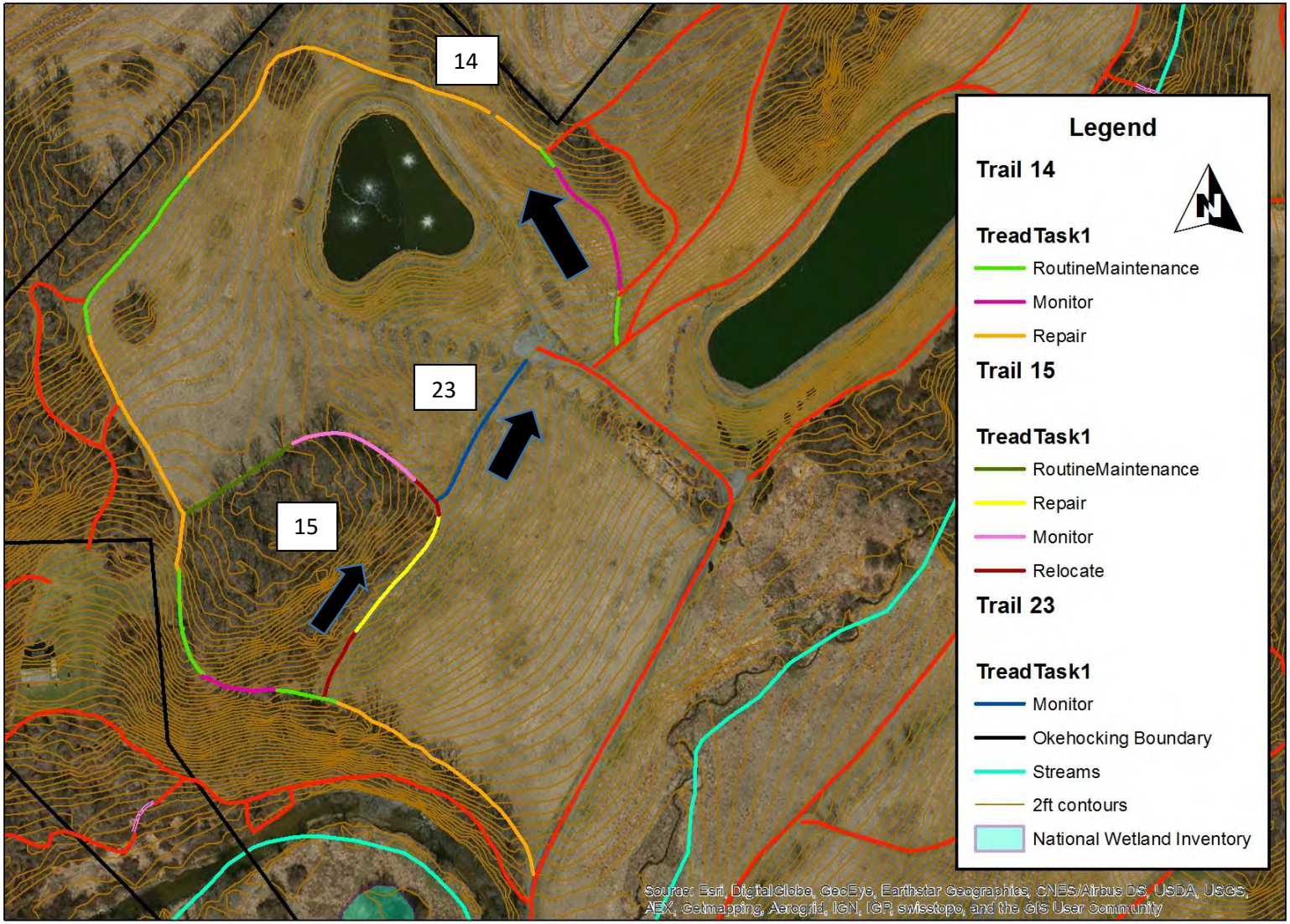
4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 23

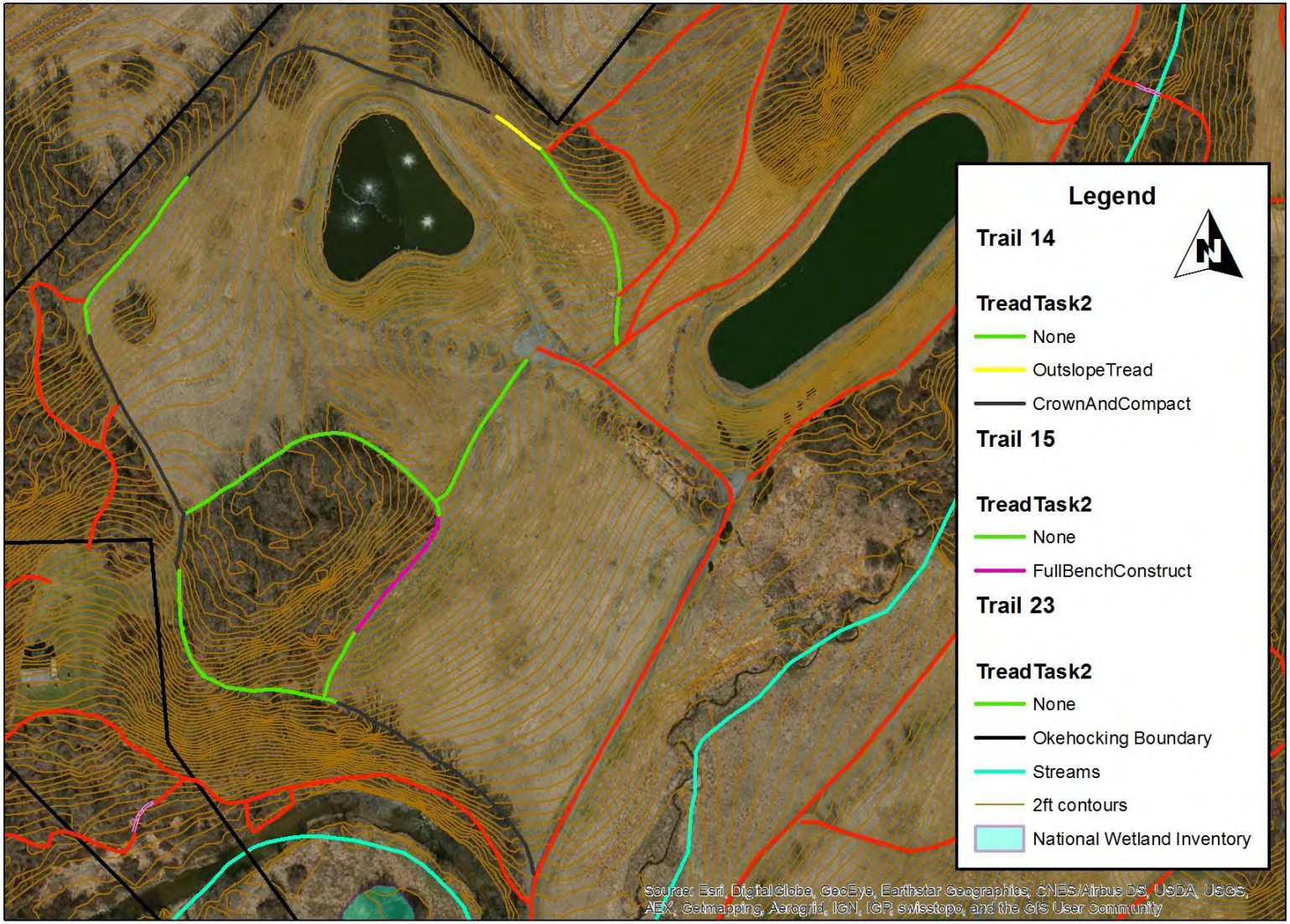
FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Grass	Grass	<12	5-10	<5	5-10	Monitor	None	Open	80+	RoutineMaintenance	265

Trails 14, 15 & 23 Tread Task 1



1 inch = 208 feet

Trails 14, 15 & 23 Tread Task 2



1 inch = 208 feet

TRAIL 16 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 13-25 tread with 80+" grass turf, mowed path
- Target Running Grade: 5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80+"
- Corridor Clearing Height: 80”
- Short Pitch Maximum (%) up to 100': 11-15%

3.General Condition Assessment Notes:

Trail 16 moves out of the meadow and into the forest; nice of a sunny hot day. The trail connects the pond area to the historic Goulders Barn. The entire trail is fall line and shows signs of erosion when the tread grades exceed 15%. Relocation will benefit the users and the resource.

4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 16

FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Grass	Grass	<12	5-10	0	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	47
1	Grass	MatureForest	13-25	5-10	>-1	5-10	Monitor	None	<60	61-80	Repair/Vertical Clearance	57
2	Grass	MatureForest	13-25	<5	0	<5	Monitor	None	97-144	80+	RoutineMaintenance	74
3	Grass	MatureForest	13-25	16-20	0	16-20	Relocate	None	97-144	80+	RoutineMaintenance	189
											Total (ft)	367

TRAIL 17 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 80+" grass turf, mowed path
- Target Running Grade: 4%
- Target Cross Slope: 2%
- Corridor Clearing Width: 120"
- Corridor Clearing Height: open = 144”
- Short Pitch Maximum (%) up to 100': 8.33%

3.General Condition Assessment Notes:

Trail 17, like Trail 16 offers a forest experience and the connection to the Historic Goulders Barn. Its intersection with Trail 14, at the meadow, offers the user a connection to avoid a steep section of Trail 14 that connects with Trail 16. The majority of the trail is fall line with high grades and erosion. Relocation will benefit the user and the resource.

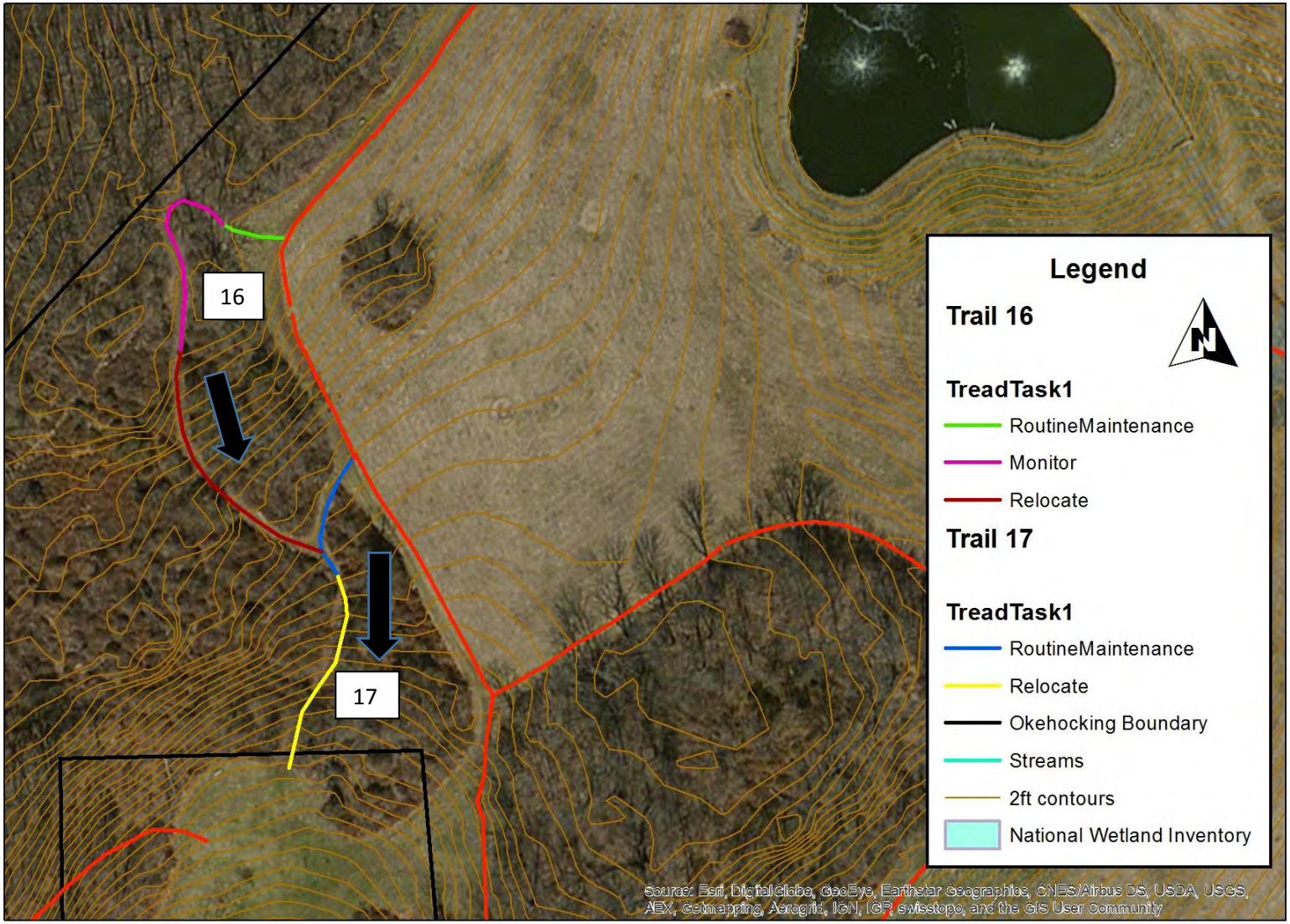
4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 17

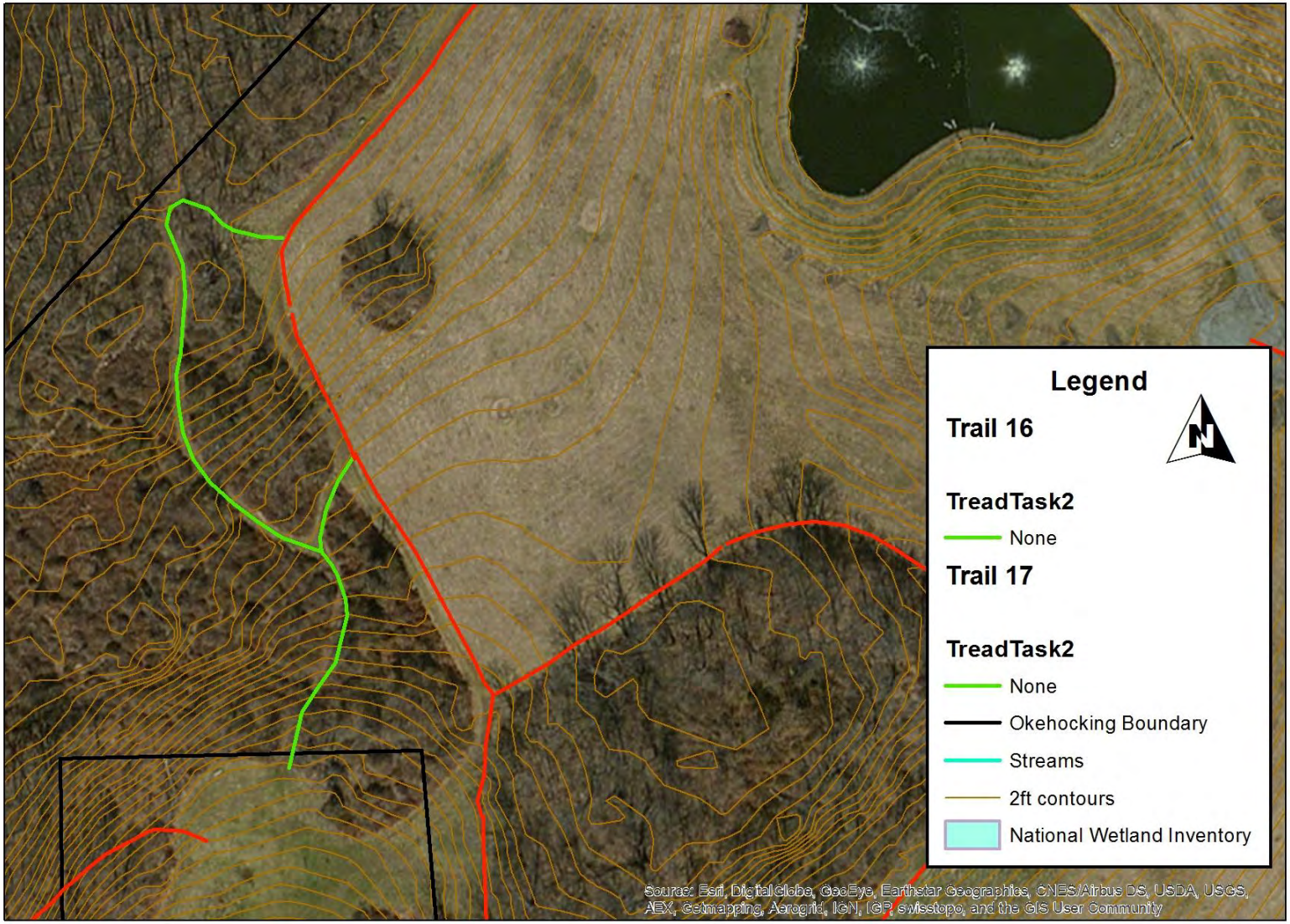
FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Grass	YoungForest	13-25	<5	<5	5-10	RoutineMaintenance	None	97-144	80+	RoutineMaintenance	94
1	Grass	MatureForest	25-40	>20	0	>20	Relocate	None	73-96	41-60	Repair	152
											Total (ft)	246

Trails 16 & 17 Tread Task 1



1 inch = 97 feet

Trails 16 & 17 Tread Task 2



1 inch = 97 feet

TRAIL 18 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 80+" natural surface, mowed path, mineral soils and/or aggregates bed & tread
- Target Running Grade: 5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80+"
- Corridor Clearing Height: open
- Short Pitch Maximum (%) up to 100': 11-15%
-

3.General Condition Assessment Notes:

Trail 18 connects to Trail 7, users experience mature forest, historic sites, stream views and access, and wetland ecology. The trail is highly used by all groups with a strong presence of equestrian's. The trail traverses contoured slopes and flat land areas, both need some maintenance to ensure sustainability (see chart). My main concern is a large seep above the trail before the Barn area. The seep runs down the trail, exposing large rock. Relocation of the tread above the seep will allow for a better experience for the user and protect the resource.

The low areas near the stream and wetlands should be elevated or closed for short periods after rain events.

4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 18

FID	SurfaceMaterial	Vegetation	TreadWidt	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Dirt	MatureForest	13-25	<5	0	5-10	RoutineMaintenance	None	73-96	61-80	RoutineMaintenance	90
1	Dirt	MatureForest	41-60	11-15	>-1	>20	Repair	OutslopeTread/add dips	73-96	61-80	RoutineMaintenance	125
2	Dirt	MatureForest	25-40	5-10	<5	16-20	RoutineMaintenance	None	73-96	61-80	RoutineMaintenance	101
3	Dirt	MatureForest	41-60	5-10	<5	16-20	RoutineMaintenance	None	73-96	61-80	RoutineMaintenance	66
4	Dirt	MatureForest	13-25	<5	0	11-15	RoutineMaintenance	None	73-96	61-80	RoutineMaintenance	204
5	Dirt	MatureForest	13-25	16-20	>-1	16-20	Repair	FullBenchConstruct	73-96	61-80	RoutineMaintenance	150
6	Dirt	MatureForest	13-25	<5	0	5-10	RoutineMaintenance	None	61-72	25-40	RoutineMaintenance	31
7	Dirt	Shrub/Sapling	13-25	16-20	>-1	16-20	Repair	AddRetainers/Steps	97-144	61-80	RoutineMaintenance	34
8	Dirt	Shrub/Sapling	13-25	5-10	>-1	11-15	Repair	CrownAndCompact	97-144	61-80	RoutineMaintenance	43
9	Dirt	Grass	80+	<5	>5	5-10	Repair	FullBenchConstruct	Open	80+	RoutineMaintenance	84
10	Dirt	Grass	80+	5-10	<5	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	42
11	Dirt	Grass	13-25	<5	0	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	442
12	Dirt	Grass	25-40	11-15	>-1	11-15	Repair	CrownAndCompact	Open	80+	RoutineMaintenance	131
13	Dirt	Grass	25-40	<5	0	5-10	RoutineMaintenance	None	Open	80+	RoutineMaintenance	108
14	Dirt	MatureForest	80+	<5	>-1	<5	Repair	Add Turnpike	97-144	80+	RoutineMaintenance	120
15	Grass	Shrub/Sapling	41-60	<5	>-1	<5	Repair	CrownAndCompact or Turnpike	97-144	80+	RoutineMaintenance	217
16	Grass	Shrub/Sapling	41-60	5-10	0	5-10	Monitor	None	97-144	80+	RoutineMaintenance	1485
17	Grass	Shrub/Sapling	25-40	5-10	0	5-10	Monitor	None	97-144	80+	RoutineMaintenance	100
											Total (ft)	3573

TRAIL 19 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 12" natural surface, mineral soils bed & tread
- Target Running Grade: 4%
- Target Cross Slope: 2%
- Corridor Clearing Width: 50"
- Corridor Clearing Height: 48”
- Short Pitch Maximum (%) up to 100': 10%
-

3.General Condition Assessment Notes:

Trail 19 is a user created stream access trail.

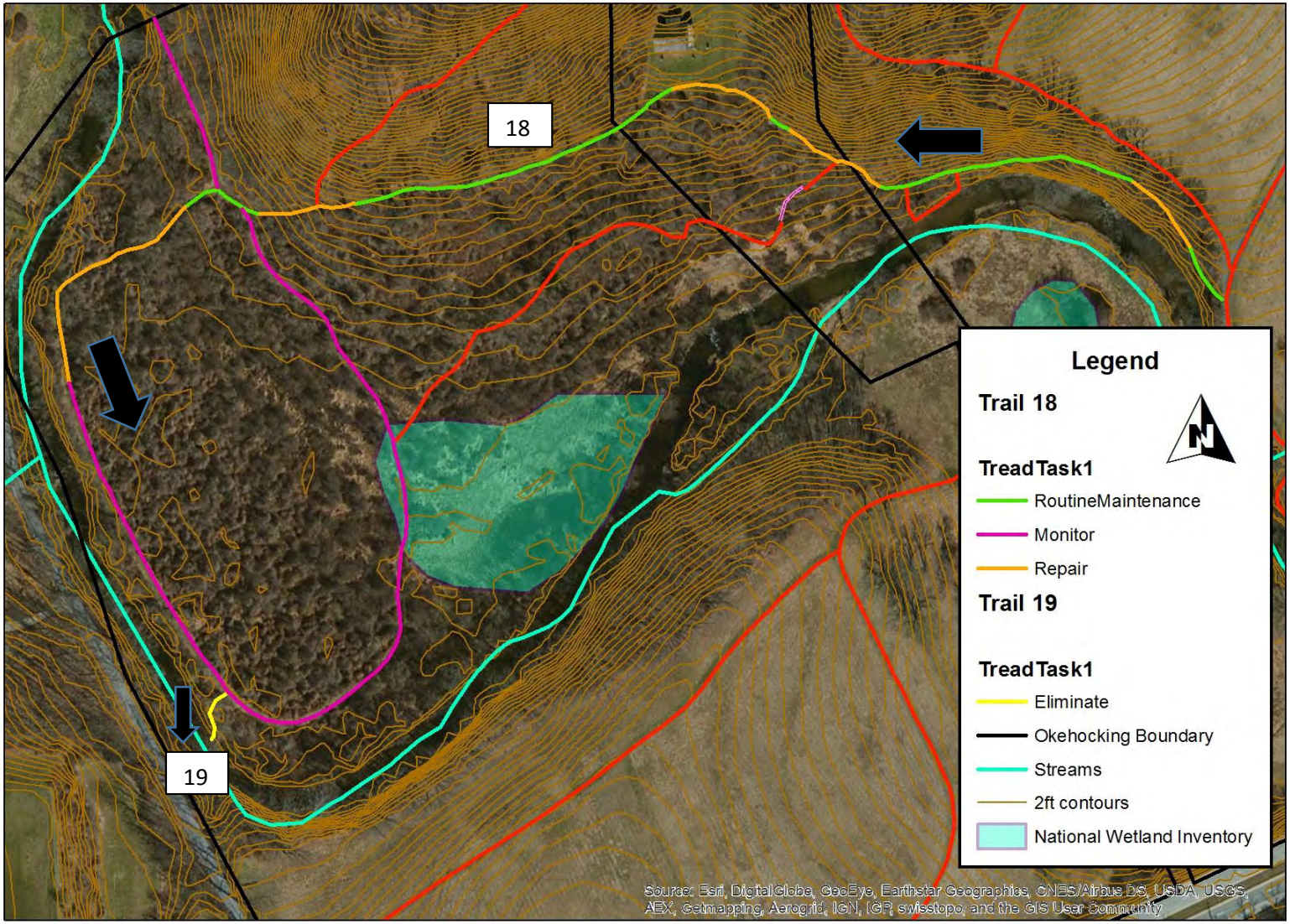
4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 19

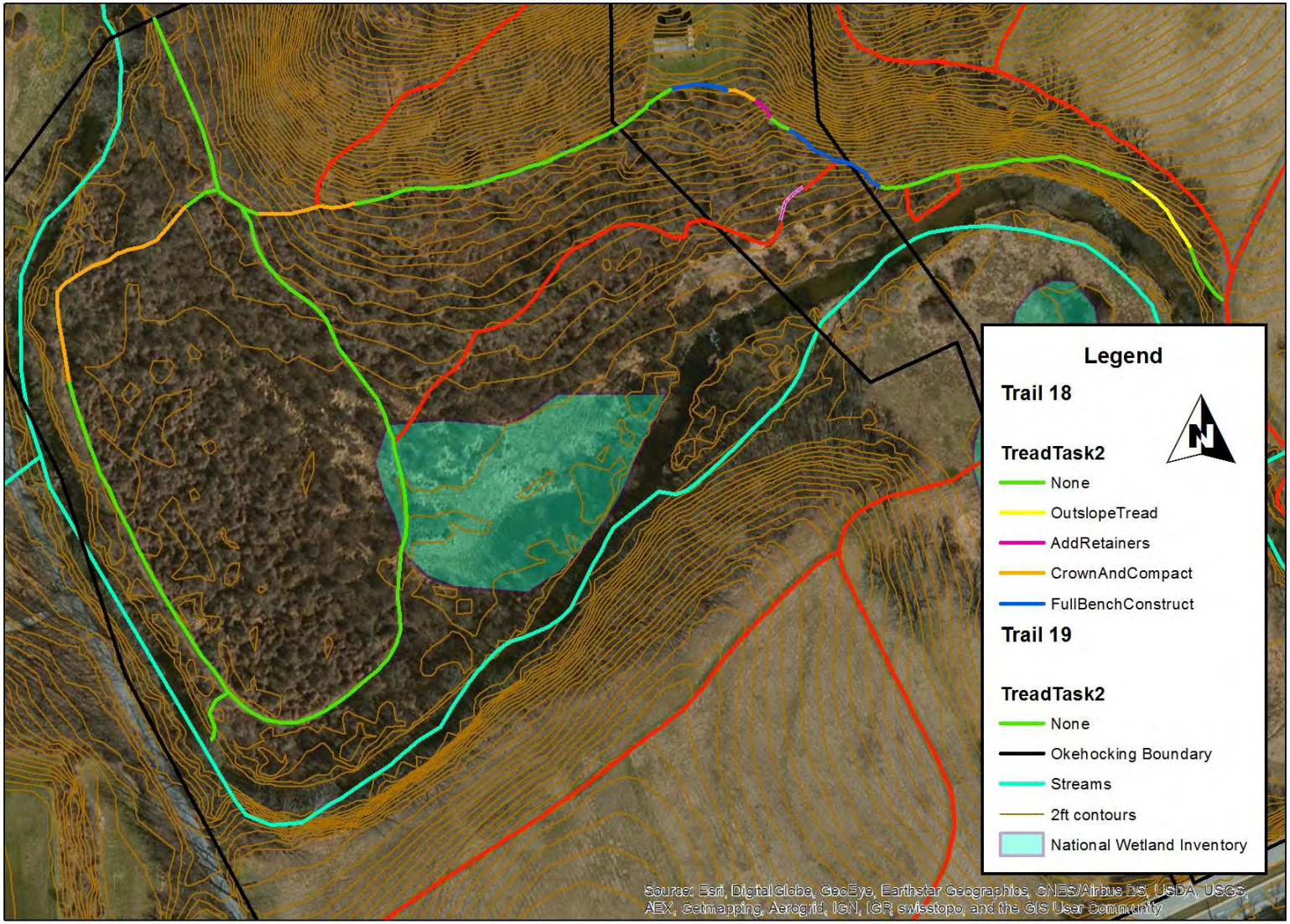
FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Dirt	MatureForest	<12	<5	0	<5	Eliminate	None	<60	41-60	RoutineMaintenance	68

Trails 18 & 19 Tread Task 1



1 inch = 186 feet

Trails 18 & 19 Tread Task 2



1 inch = 186 feet

TRAIL 20 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 13-60" grass turf, mowed surface
- Target Running Grade: 5%
- Target Cross Slope: 2%
- Corridor Clearing Width: 80+"
- Corridor Clearing Height: open
- Short Pitch Maximum (%) up to 100': 8%

3.General Condition Assessment Notes:

Trail 20 is an internal connection for Trail 18. The existing turnpike near the east connection to Trail 18 has been damaged by equestrian use. I recommend either rebuilding for equestrian use or relocating the trail away from the wet area the turnpike traverses.

4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Turnpike

FID	Ditch	Comment	TreadGrade	TreadCrossSlope	Length(ft)	Width(in)	TreadMaterial	MaterialTask	RetainerMaterial	MaterialTask	FeatureTask
0	No	needs culvert	5-10	>-1	60	48	Aggregate	add more Agg	Treated Lumber	needs rebar	Repair or eliminate

Trail 20

FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Grass	YoungForest	13-25	<5	>-1	<5	Monitor	None	73-96	80+	RoutineMaintenance	606
1	Grass	Shrub/Sapling	13-25	<5	>-1	<5	Monitor	None	Open	80+	RoutineMaintenance	91
2	Grass	Shrub/Sapling	41-60	5-10	>-5	5-10	Repair	Turnpike	Open	80+	RoutineMaintenance	29
3	Grass	MatureForest	13-25	5-10	>-1	5-10	Repair	CrownAndCompact	73-96	61-80	RoutineMaintenance	58
											Total (ft)	784

TRAIL 21 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 13-25" natural surface, mineral soils bed & tread
- Target Running Grade: 5-10%
- Target Cross Slope: 2%
- Corridor Clearing Width: 60"
- Corridor Clearing Height: 70”
- Short Pitch Maximum (%) up to 100': 11%

3.General Condition Assessment Notes:

Trail 21 connect the historic Goulders Barn and Trail 18. It offers and intimate experience with mature forest. The trail is mostly fall line and exceed 20% grade. I recommend relocation for an overall better experience.

4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 21

FID	SurfaceMaterial	Vegetation	TreadWidth	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Dirt	MatureForest	13-25	11-15	0	11-15	Repair	CrownAndCompact	61-72	41-60	RoutineMaintenance	45
1	Dirt	MatureForest	13-25	5-10	<5	16-20	RoutineMaintenance	None	61-72	41-60	RoutineMaintenance	76
2	Dirt	MatureForest	13-25	>20	>5	>20	Relocate	None	61-72	41-60	RoutineMaintenance	286
3	Dirt	MatureForest	13-25	5-10	0	11-15	RoutineMaintenance	None	61-72	41-60	RoutineMaintenance	83
4	Dirt	MatureForest	13-25	>20	>-1	>20	Relocate	None	61-72	41-60	RoutineMaintenance	57
5	Dirt	MatureForest	13-25	11-15	>-1	16-20	Relocate	None	61-72	41-60	RoutineMaintenance	50
6	Dirt	MatureForest	13-25	>20	>-1	>20	Relocate	None	<60	41-60	Repair	81
											Total (ft)	678

TRAIL 22 ASSESSMENT NARRATIVE

1.Designed Use = Hiker/Pedestrian and Equestrian

2.Recommended Design Parameters, based upon what can be inferred from the current trail:

- Tread Width: 12-40" natural surface, mineral soils and/or aggregates bed & tread
- Target Running Grade: 5-8%

- Target Cross Slope: 2%
- Corridor Clearing Width: 80"
- Corridor Clearing Height: 144”
- Short Pitch Maximum (%) up to 100': 10%

3.General Condition Assessment Notes:

Trail 22 is a user made stream access trail off of Trail 18.

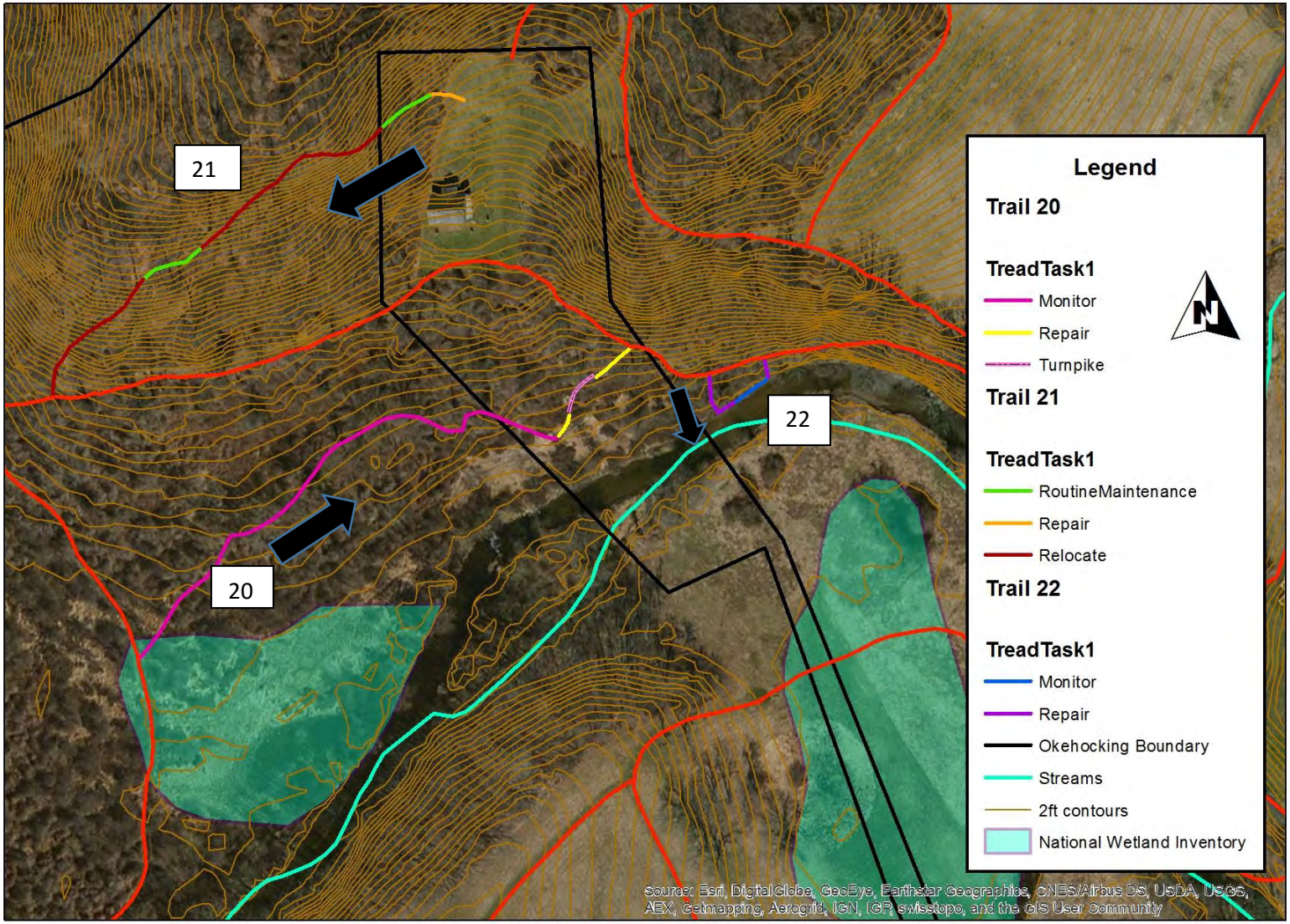
4. Prescription(s):

Description of the recommended prescriptions are shown as Tasks in the following table(s) and further defined in Section V.

Trail 22

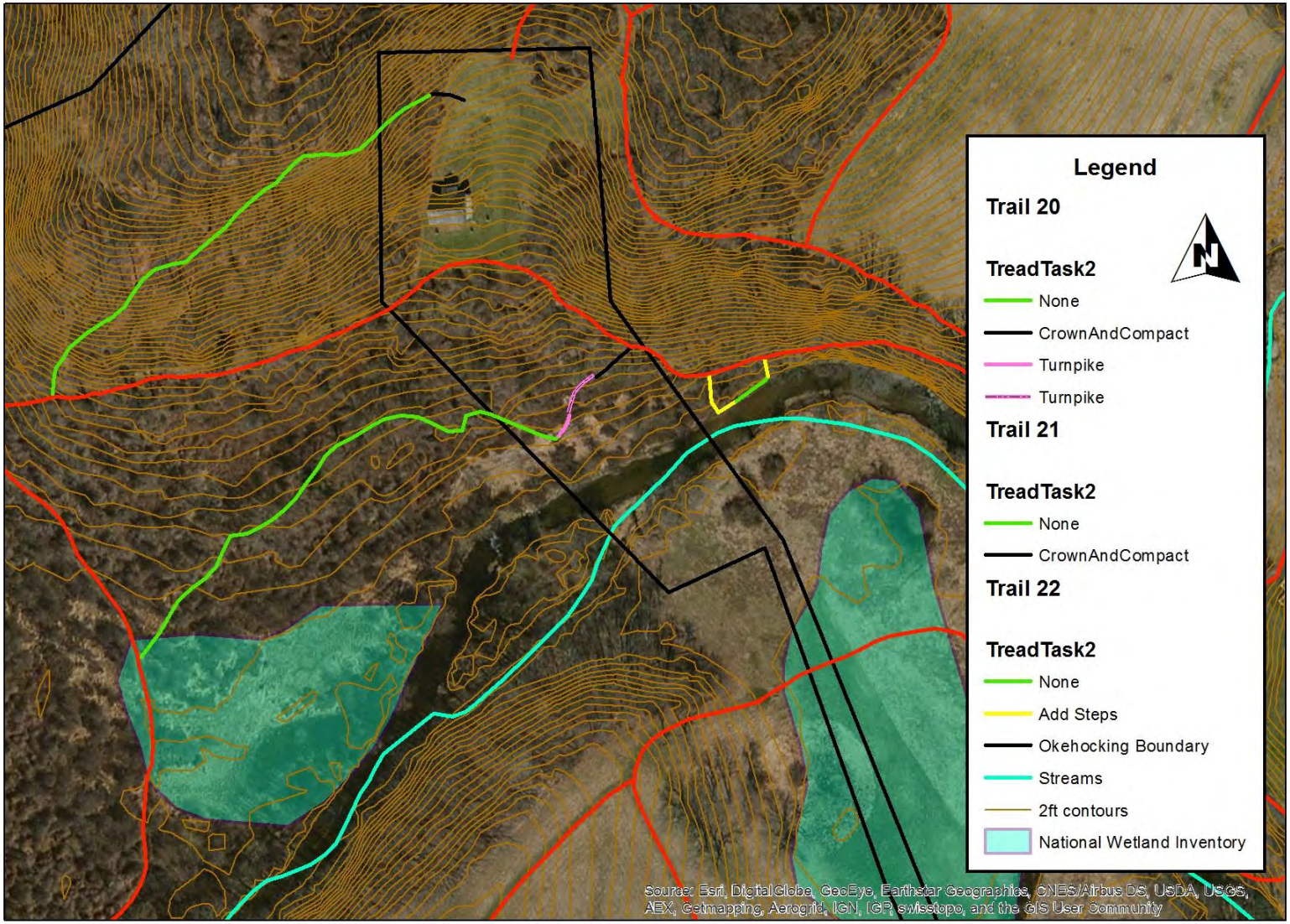
FID	SurfaceMaterial	Vegetation	TreadWidt	TrailGrade	CrossSlope	SideSlope	TreadTask1	TreadTask2	ClearingHeight	ClearingWidth	ClearingTask	Length
0	Dirt	MatureForest	25-40	5-10	0	5-10	Repair	Add steps or eliminate	97-144	61-80	RoutineMaintenance	73
1	Dirt	MatureForest	<12	<5	0	5-10	Monitor	None	97-144	61-80	RoutineMaintenance	51
2	Dirt	MatureForest	13-25	11-15	0	11-15	Repair	Add steps	97-144	61-80	RoutineMaintenance	29
											Total (ft)	153

Trails 20 - 22 Tread Task 1



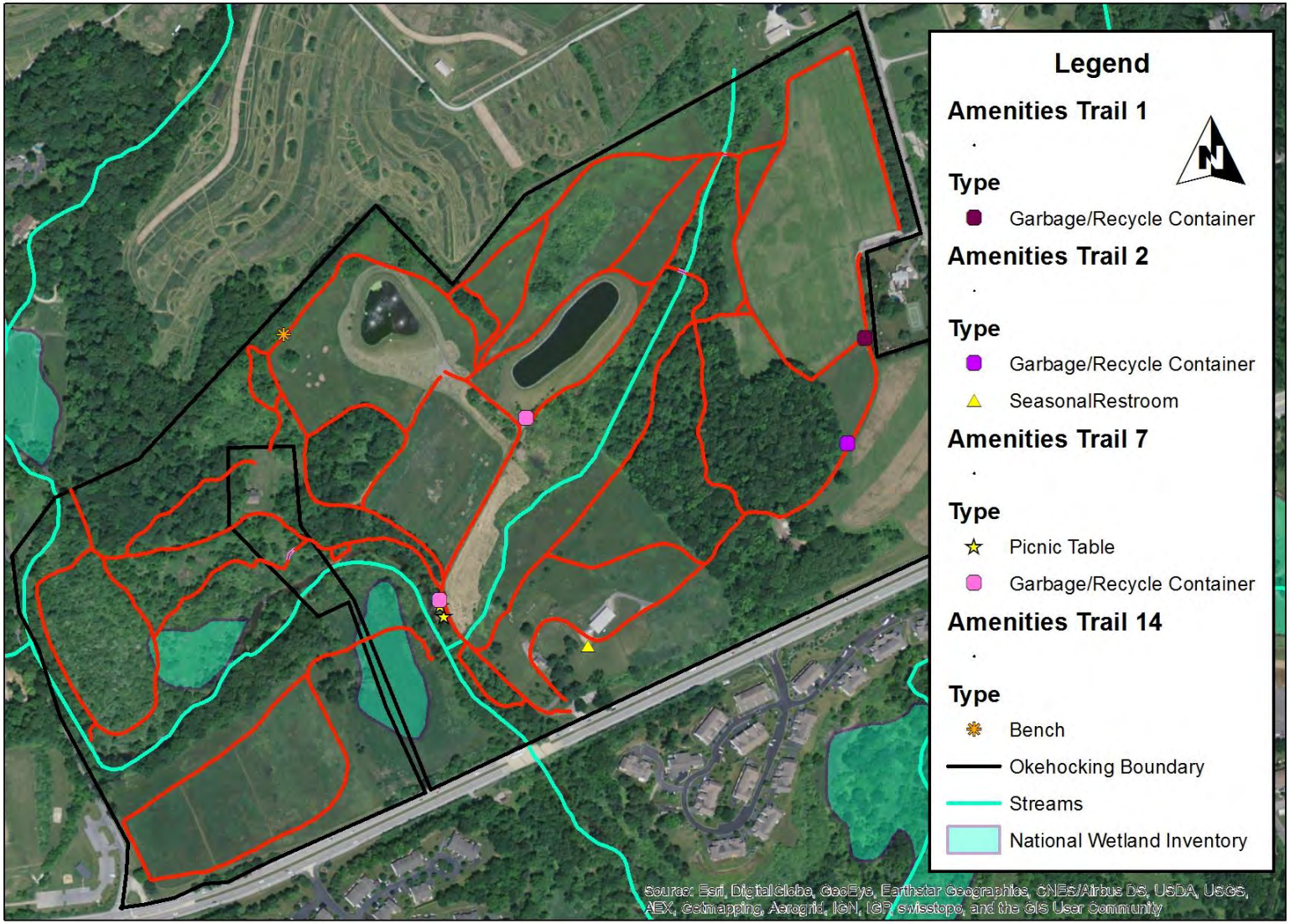
1 inch = 167 feet

Trails 20 - 22 Tread Task 2



1 inch = 167 feet

Amenities



1 inch = 535 feet

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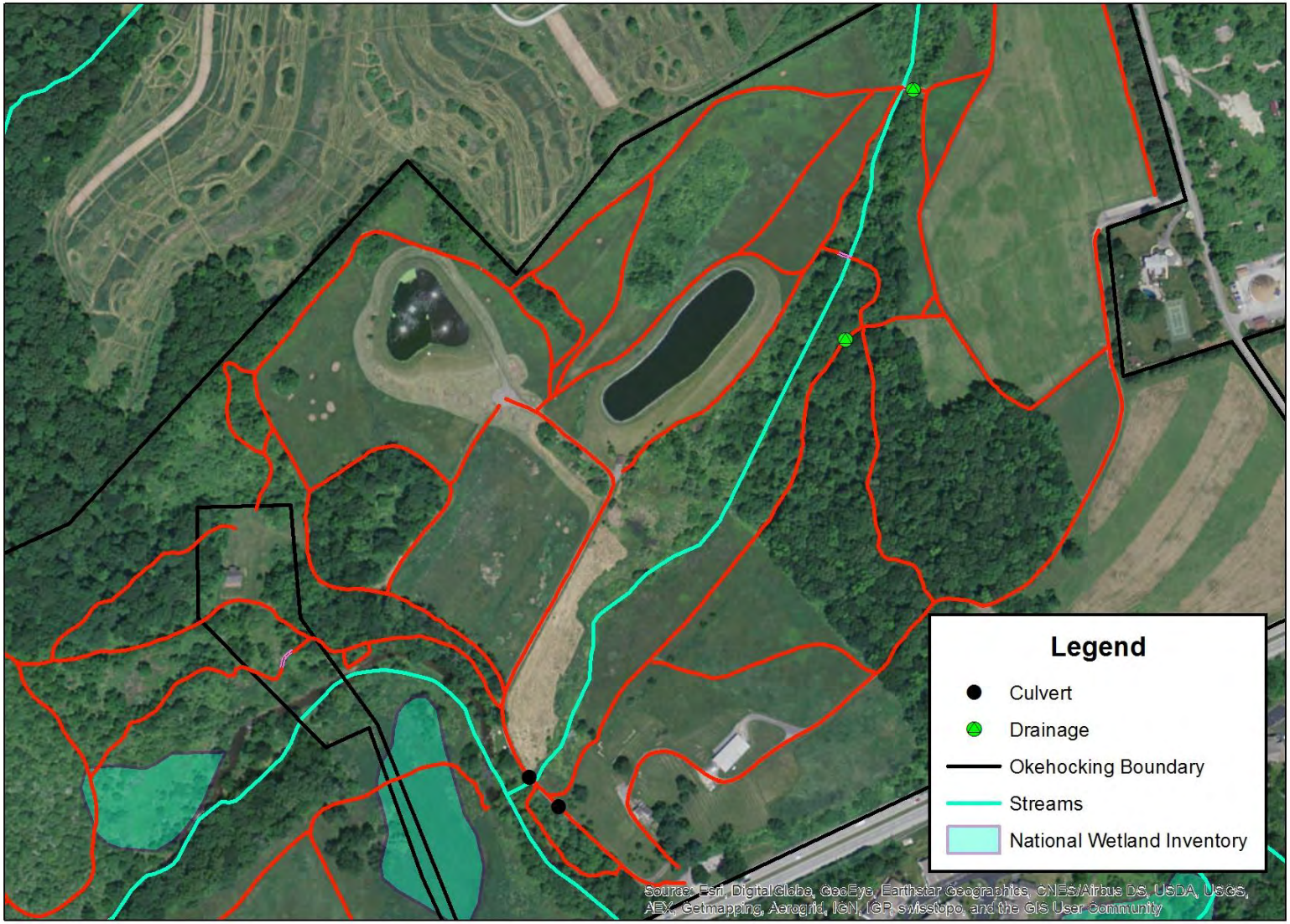
Amenities

	FID	Type	ADAAccessible	Removable	Vandalism	Length(ft)	Width(in)	Height(in)	Diameter(in)	MaterialType	FeatureTask	X	Y
Trail 1	0	Garbage/Recycle Container	Unspecified	Yes	No	0	21	24	0	Metal	RoutineMaintenance	-75.477694	39.971299
Trail 2	0	Garbage/Recycle Container	Unspecified	Yes	No	0	0	25	21	Metal	RoutineMaintenance	-75.477986	39.970128
	1	SeasonalRestroom	Yes	Yes	No	5	60	72	0	Composite	RoutineMaintenance	-75.481822	39.967952
Trail 7	0	Picnic Table	No	Yes	No	8	42	31	0	Treated Lumber	RoutineMain	-75.483891	39.968321
	1	Picnic Table	No	Yes	Yes	8	42	31	0	Treated Lumber	Repair/sand off graffiti	-75.483942	39.968441
	2	Garbage/Recycle Container	No	Yes	No	0	0	25	21	Metal	RoutineMaintenance	-75.483949	39.968489
	3	Garbage/Recycle Container	No	Yes	No	0	0	25	21	Metal	RoutineMaintenance	-75.482632	39.970498
	0	Bench	No	Yes	No	5	18	21	0	Treated Lumber	Replace seating boards	-75.48611	39.971506

Culverts and Drainage



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1 inch = 375 feet

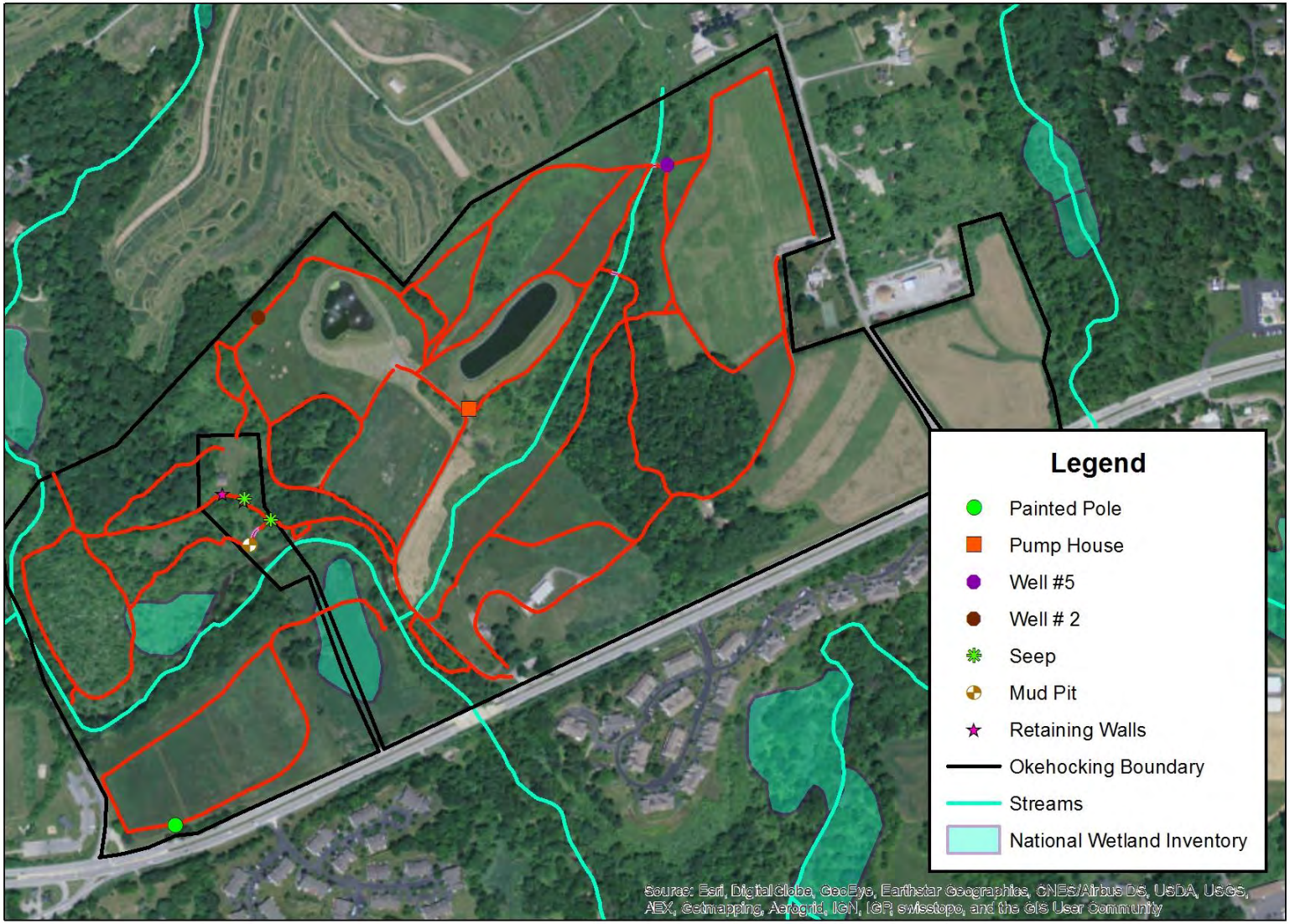
Culvert Trail 7

FID	Type	Quantity	Length(ft)	Diameter(in)	MaterialType	FeatureTask	TaskComments	X	Y
0	Standard	1	18	18	Metal	Repair	remove rocks from uphill entrance	-75.48337	39.967849
1	Unspecified	1	10	32	Concrete	Unspecified	need guard rails	-75.483657	39.968081

Drainage

	FID	Type	Length_f	Width_i	Depth_i	Height_i	TrailwayMaterial	OutletMaterial	FeatureTask	TaskComments	X	Y
Trail 4	0	Drainage Dip	4	12	6	0	Native Soil	Native Soil	Repair	widen drain on downhill side	-75.480336	39.971434
Trail 9	0	Drainage Dip	9	18	8	0	Native Soil	Native Soil	Repair	undercuting abutment	-75.47958	39.973373

Points of Interest



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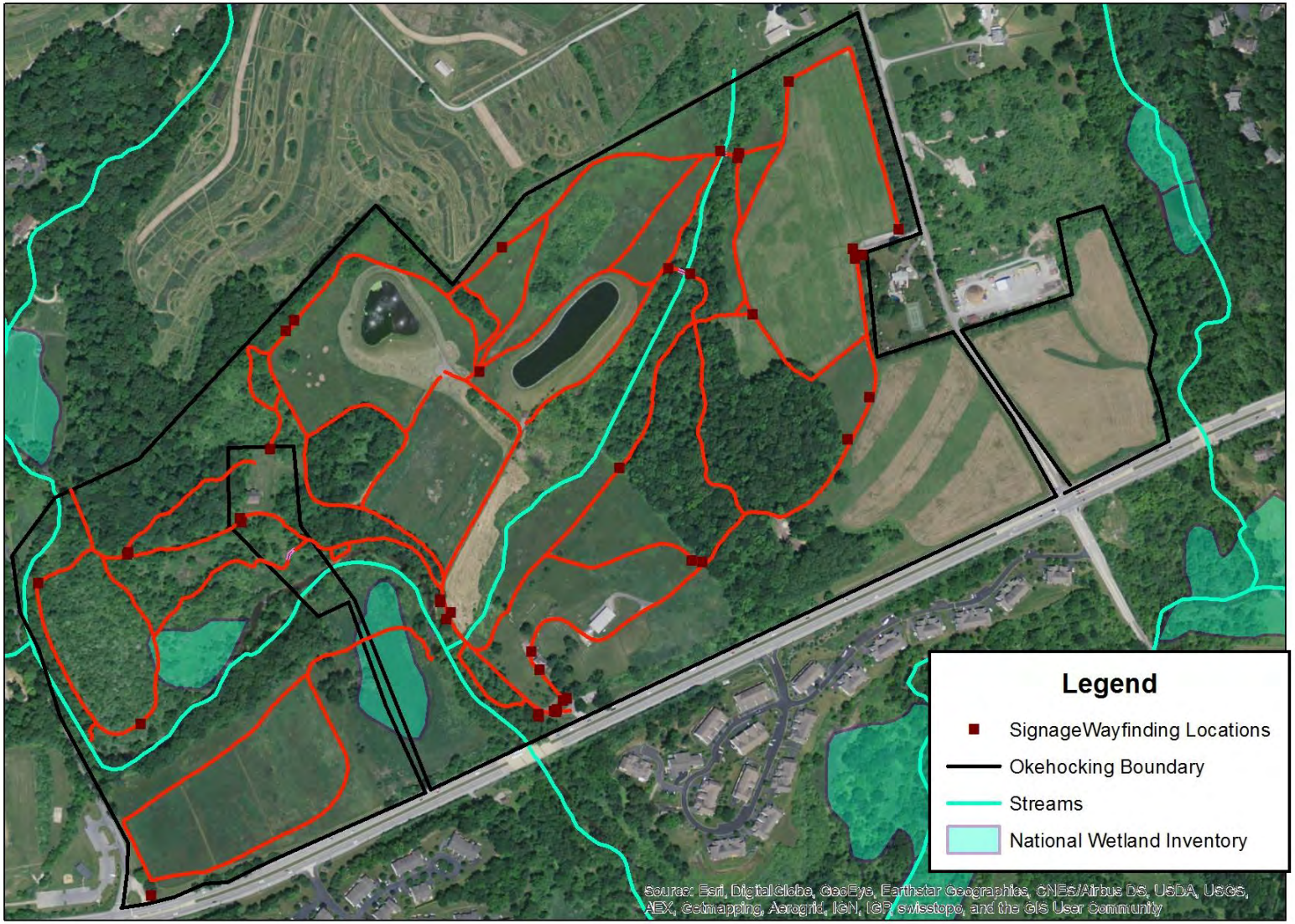
1 inch = 583 feet

Point Of Interest

	FID	Type	TypeComments	MaterialType	GeneralComments	X	Y
Trail 6	0	Other	post	Treated Log	art	-75.487481	39.965519
Trail 7	0	Building	Pump House	Rock	combo lock on door	-75.48267	39.970489
Trail 9	0	Other	well 5	Metal	N/A	-75.479437	39.973399
Trail 14	0	Other	well 2	Metal	N/A	-75.485958	39.971669
Trail 18	0	Other	hole in tread	Native Soil	N/A	-75.48584	39.96921
	1	Other	seep	Native Soil	N/A	-75.486254	39.96947
Trail 20	0	Other	mudpitt	Native Soil	N/A	-75.48619	39.968907

Signage and Wayfinding



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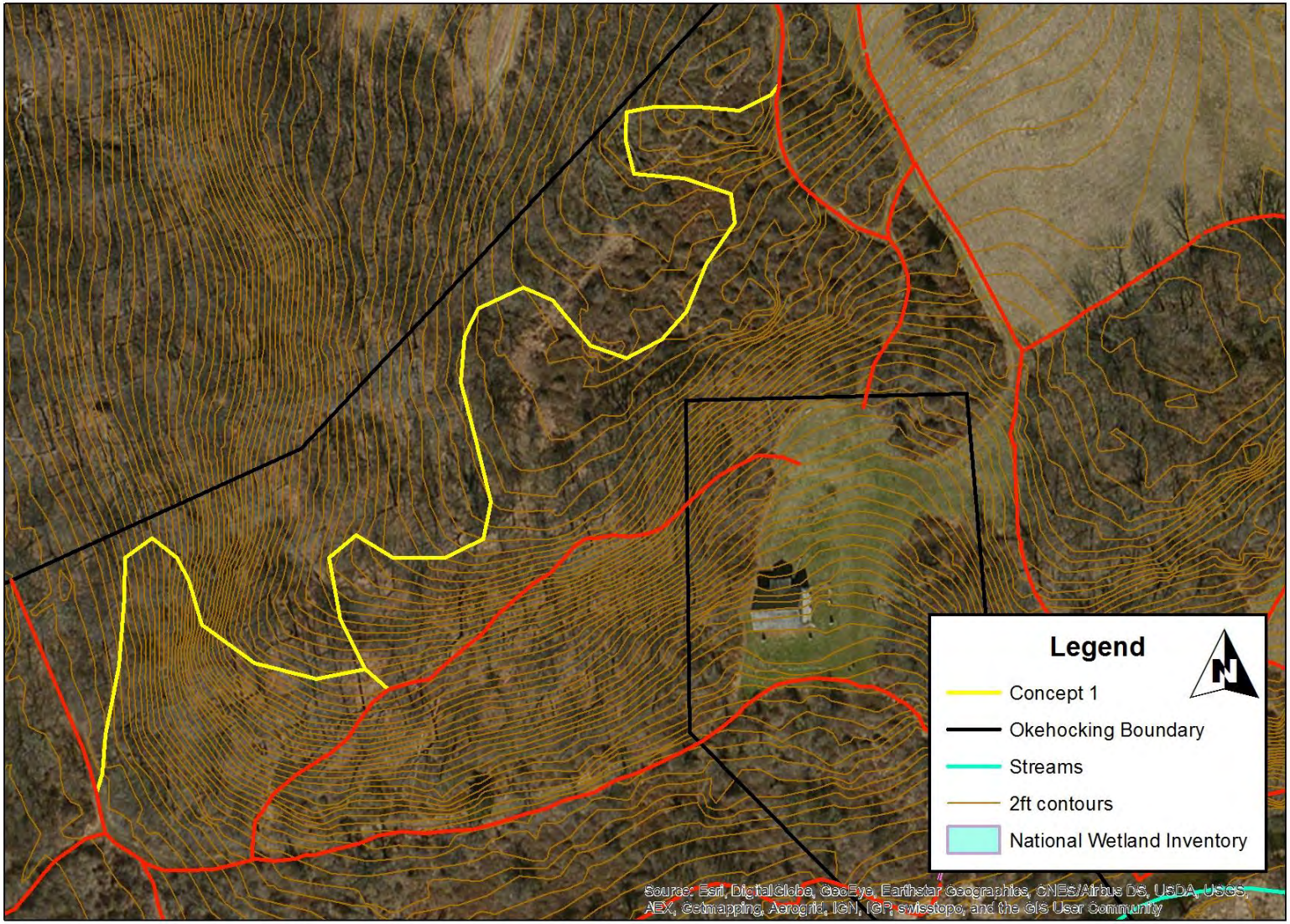
1 inch = 535 feet

SignageWayfinding

	FID	Type	Mounting	SignType	Vandalism	Length(in)	Width(in)	MountingHeight(in)	SignMaterial	FeatureTask	X	Y
Trail 1	0	Sign	MetalPost	Regulatory	No	24	12	60	Metal	RoutineMaintenance	-75.477161	39.972504
	1	Sign	MetalPost	Regulatory	No	24	12	60	Metal	RoutineMaintenance	-75.475704	39.974177
	2	Other	WoodPost	Wayfinding	No	4	4	60	Composite	Repair/Staighten	-75.479311	39.971597
Trail 2	0	Sign	MetalPost	Regulatory	No	12	10	48	Metal	RoutineMaintenance	-75.477648	39.970636
	1	Sign	MetalPost	Regulatory	No	24	18	96	Metal	RoutineMaintenance	-75.477987	39.970173
	2	Sign	MetalPost	Regulatory	No	24	18	96	Metal	RoutineMaintenance	-75.48013	39.968847
	3	Sign	WoodPost	Informational	No	24	18	62	Metal	RoutineMaintenance	-75.482527	39.967695
	4	Sign	WoodPost	Informational	No	12	6	62	Composite	RoutineMaintenance	-75.482646	39.967895
Trail 3	0	Sign	MetalPost	Informational	No	36	24	60	Metal	RoutineMaintenance	-75.480286	39.968873
Trail 4	0	Sign	WoodPost	Informational	No	13	6	48	Composite	RoutineMaintenance	-75.481296	39.969923
Trail 5	0	Sign	WoodPost	Regulatory	No	24	18	42	Plastic/cardboard	RoutineMaintenance	-75.480517	39.972133
	1	Sign	WoodPost	Regulatory	No	24	18	42	Plastic/cardboard	Replace	-75.480201	39.972068
Trail 7	0	InformationKiosk	WoodPost	Informational	No	6	48	60	Paper	RoutineMaintenance	-75.482562	39.967174
	1	Sign	MetalPost	Regulatory	No	24	18	64	Plastic	Replace	-75.482573	39.9672
	2	Sign	MetalPost	Regulatory	No	24	12	40	Metal	RoutineMaintenance	-75483863	39.968285
	3	Sign	MetalPost	Regulatory	No	24	12	120	Metal	RoutineMaintenance	-75483796	39.968357
	4	Sign	WoodPost	Informational	No	4	4	60	Composite	RoutineMaintenance	-75483945	39.968482
	5	Sign	MetalPost	Regulatory	No	24	18	48	Metal	RoutineMaintenance	-75.483945	39.968506
Trail 9	0	Sign	WoodPost	Informational	No	4	4	60	Composite	Repair/Straighten	-75.479722	39.973424
	1	Sign	WoodPost	Regulatory	Yes	24	12	60	Metal	Replace	-75.479467	39.973343
	2	Sign	WoodPost	Informational	No	10	12	72	Metal	RoutineMaintenance	-75.479442	39.973399
	3	Sign	WoodPost	Interpretive	No	4	4	42	Composite	RoutineMaintenance	-75.482918	39.972416
Trail 10	0	Sign	MetalPost	Regulatory	No	18	12	125	Metal	Repair/Clean	-75.483294	39.97104

Trail 17	0	Sign	MetalPost	Wayfinding	No	8	6	48	Metal	Repair/redirect	-75.486355	39.970234
Trail 18	0	Sign	WoodPost	Informational	No	4	4	60	Composite	RoutineMaintenance	-75.486815	39.96947
	1	Sign	WoodPost	Wayfinding	No	6	18	48	Lumber	RoutineMaintenance	-75.486798	39.969428
	2	Sign	WoodPost	Wayfinding	No	6	18	48	Lumber	RoutineMaintenance	-75.488465	39.969101
	3	Sign	WoodPost	Informational	No	4	4	55	Composite	RoutineMaintenance	-75.489762	39.968802
	4	Sign	WoodPost	Interpretive	No	4	4	43	Composite	RoutineMaintenance	-75.488331	39.967207
Trail 21	0	Sign	WoodPost	Informational	No	4	4	62	Composite	RoutineMaintenance	-75.488442	39.969118
Trailhead 1	0	Sign	Other	Informational	No	12	18	42	Metal	RoutineMaintenance	-75.477835	39.9723
	1	Sign	Other	Informational	No	18	18	60	Metal	RoutineMaintenance	-75.47771	39.972228
	2	Sign	Other	Informational	Yes	24	24	36	Metal	Repair	-75.477711	39.972232
	3	Sign	MetalPost	Regulatory	No	36	36	72	Metal	RoutineMaintenance	-75.477805	39.972186
	4	InformationKiosk	WoodPost	Informational	No	6	47	72	Unspecified	RoutineMaintenance	-75.477803	39.97221
	5	Sign	WoodPost	Identificationl	No	4	72	96	Unspecified	Repair/New Paint	-75.488345	39.96529
Trailhead 2	0	Sign	WoodPost	Regulatory	No	2	12	48	Metal	RoutineMaintenance	-75.482206	39.967346
	1	Sign	WoodPost	Informational	No	2	6	36	Lumber	RoutineMaintenance	-75.482148	39.967367
	2	Sign	WoodPost	Regulatory	No	2	12	42	Metal	RoutineMaintenance	-75.482305	39.967224
	3	Sign	WoodPost	Informational	No	2	6	48	Lumber	RoutineMaintenance	-75.482297	39.967246
	4	Sign	WoodPost	Regulatory	No	2	18	52	Metal	RoutineMaintenance	-75.48234	39.967233

Conceptual Alignment 1



1 inch = 125 feet

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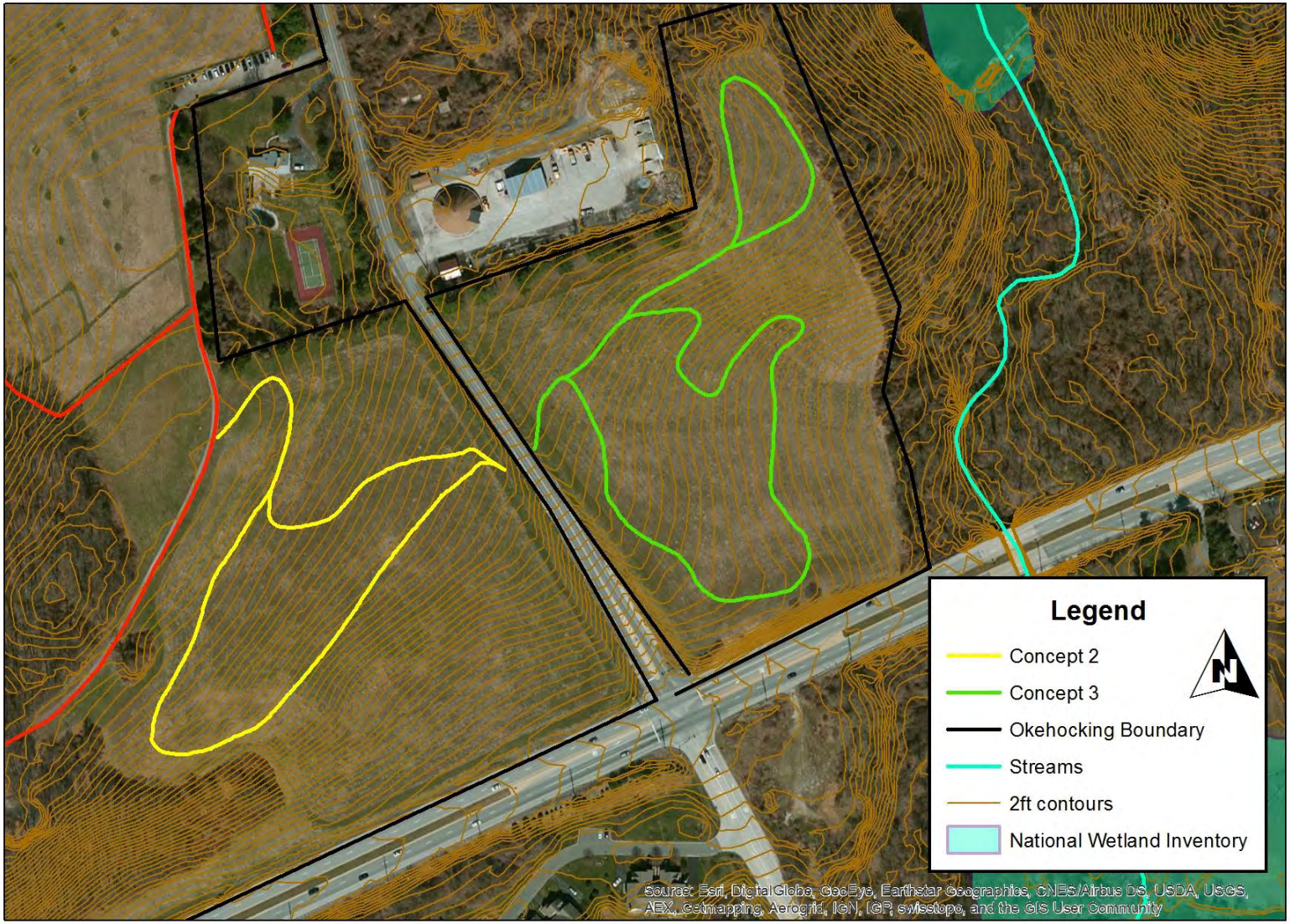
Conceptual Alignment 2 & 3



1 inch = 220 feet

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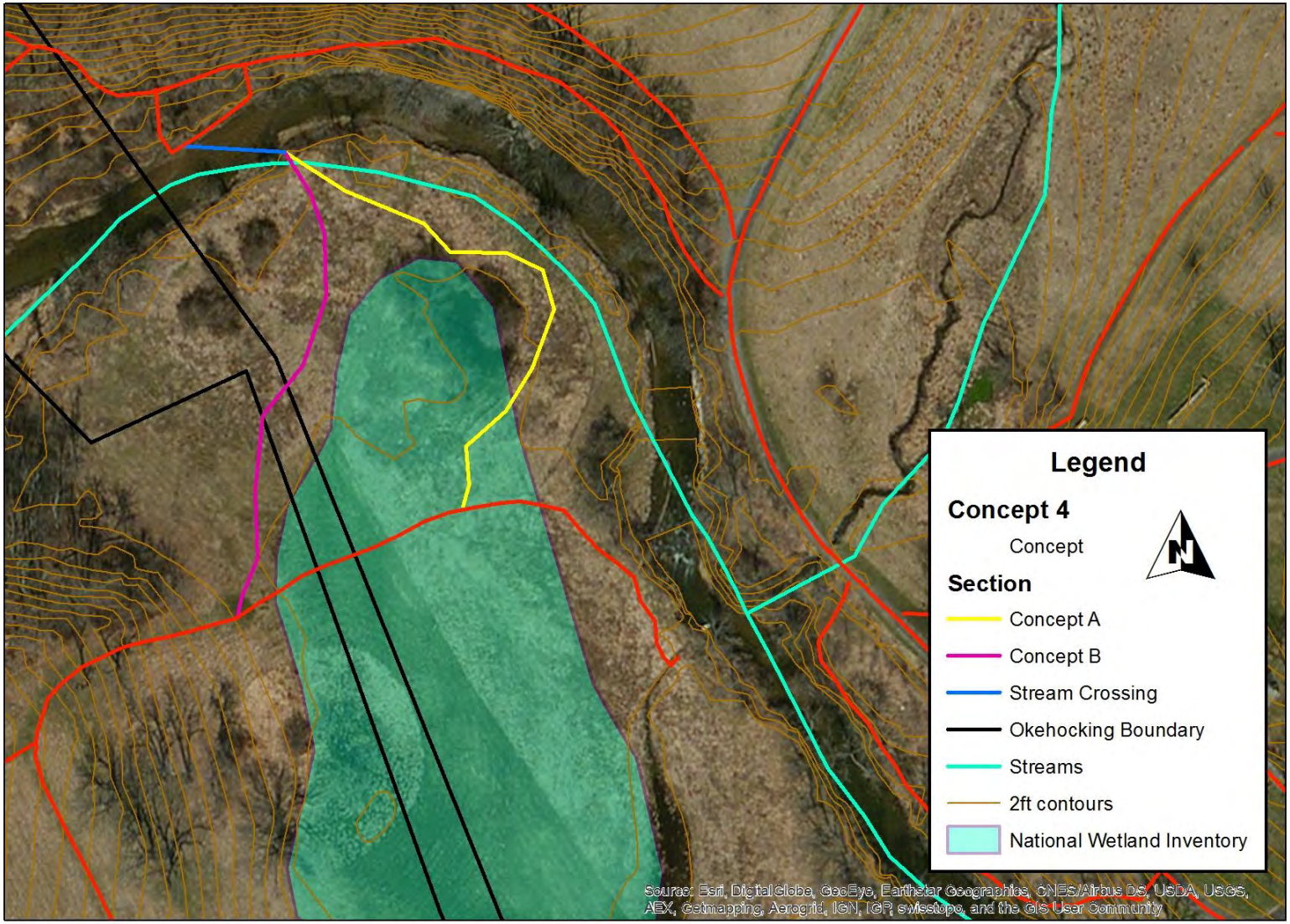
Conceptual Alignment 4



1 inch = 104 feet

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V. Recurring Conditions and Issues

As previously outlined, Trail Management Objectives (TMOs) must be clearly defined and adhered to, in order to effectively address trail conditions and issues that normally arise with the use of any trail system or segment.

The following trail conditions were observed frequently throughout the Okehocking Preserve Trail system. The issues these cause are cumulative, intensify over time and thus greatly affect the system's stability and long term sustainability. The prescriptions that may be elected to address these issues must be tied to the TMOs for the Okehocking Preserve Trail system.

1. Fall line – a trail or section of trail that goes straight up/down a slope (fall line is perpendicular to contour line), further directing the flow of water along the trails path of travel rather than away from it. A trail alignment that cuts across a slope, following the contour, is the desirable alternative.

2. Cupped Tread or Compaction- Tendency for soil to loose pore space and become compressed and impermeable to water when repeatedly traveled on. This condition contributes to trail degradation through accelerated erosion and further loss of tread.

3. Cross slope - – the cross slope is the slope of the trail tread perpendicular to the linear route of travel. If the cross slope exceeds 5%, the tread becomes difficult for user's to traverse the trail or section of trail.

4. Erosion – While a natural process by which soils move downhill or downwind, erosion can be greatly accelerated on trails due to improper alignment (gravity, water, wind), design or construction. Occurring more frequently when water becomes trapped on the trail, scouring and displaced material thus causes further degradation of the trail's structural integrity.

5. Trail Creep – When lose soil of the trail tread moves downhill due to one or more of the above factors

6. Widening - The process of numerous paths of travel being created by users, either to avoid a trail segment's deteriorated condition or to travel to a desired feature that is not within the path of travel.

7. Tread – The travel Surface of the trail (see Trail Design Parameters) should consist of natural or manmade materials that are appropriate for the intentional managed use and designed use of the trail.

8. Berming – This A berm is the raised edge on the downslope side of the trail tread, shoulder and/or hinge point.

VI. SUMMARY OF PRESCRIPTIONS

Prescriptions are practices, selected and scheduled for application in a specific trail segment, to attain the desired trail management goals and objectives determined by a land manager. Penn Trails' *recommended* Prescriptions, indicated as a Task in the second-to-last column of each segment report, are comprised of the following practices:

A. Realignment of Trail Corridor (Relocate)

Linear grades above 10% are not desirable and will continue to deteriorate. Even linear grades below this may have the same issue if soil conditions or designed use may dictate. These segments of the trail require realignment to create better linear grades and cross slopes, thereby reducing erosion, increasing stability, and reducing maintenance and repair tasks.

B. De-berm, re-grade and define trail tread, shoulder, and hinge

De-berming removes the material, occurring on the downslope edge of the tread, which obstructs sheet flow across the trail and increases erosion along the linear grade of the trail. Scouring, the soil erosion through the force of moving water, is further intensified. In de-berming, the trail tread's outer edges should be well defined as related to both the trail corridor, the trail's shoulder and hinge points.

C. Full bench construction

Contemporary trail construction should utilize a full bench (side-hill) excavation cut whenever possible, cutting into the side slope (side hilling), usually at a 2:1 ratio. This further defines the trail tread, stabilizes the tread, promotes proper drainage across the trail tread and thus decreases maintenance.

D. Stone aggregate and geo-textile for drainage

While the desire may be to maintain a natural dirt surface for the trail, some sections will require aggregate stone and geotextile fabric to stabilize and strengthen the tread. Aggregates that are utilized for the trail should be closed aggregates, of the proper sieve and dimension matrix, to insure proper compaction, stability and drainage.

E. Grade Dips, Grade Reversals, Swales and Nicks

Along with de-berming, these three contemporary trail construction techniques, used in conjunction with proper trail corridor and tread alignments, promote proper drainage and erosion control, thus helping to ensure long term sustainably. All three should be enhanced and further incorporated into the Okehocking Preserve Trail system.

1. Dip - A reverse change in linear grade or gradual dip in the linear grade of the trail, which also incorporates an outslope that promotes the flow of water off and away from the trail.
2. Swale - A usually shallow trough running parallel to the trail that is intended to collect water and transport it to a suitable outlet away from the trail corridor.
3. Nick - A shaved-downed section of trail, about 10 feet in diameter, with an exaggerated outslope. It is used to shed water off a trail and is a useful remedy for wet spots on relatively flat trails.

F. Crown and Compact

Crowning and compacting are used to provide a stable path of travel in areas subject to water collecting or stabilizing short sections of fall line trail. Crowning and compacting use fill material from parallel side ditches to build the trail base higher than potentially surrounding storm water. However, this would be short term solution and constant maintenance for some segments of the Okehocking Preserve Trail System given the amount of hiker/equestrian and motorized vehicle traffic it sees annually.

G. Outslope

A trail tread/shoulder/hinge cross section that is sloped towards the downhill side of the corridor will facilitate movement of water runoff across and off the trail.

H. Routine Maintenance

Maintenance already defined by the property manager. Examples; mow trail tread once a week with 60" mower and check signs weekly for wear, stability and other damage.

I. Monitor

Trail Tread has proper design parameters and shows no sign of issues stated above. Trail segments that are monitored should be field observed, in the same manner as the assessment process, at least once a year. Any changes that are noted in such monitoring should be field recorded and the appropriate prescription(s) applied, based upon the trail's managed/designed use and design parameters.

VII. TRAIL MANAGEMENT AND DESIGN PARAMETERS TERMINOLOGY

- **Clearing Limit:** The area over and beside the trail tread that is cleared of trees, limbs, and
  other obstructions.

- **Clearing Height:** The height of the clearing limit measured vertically from the trail tread.

- **Clearing Width:** The width of the clearing limit measured perpendicular to the trail.

- **Cross Slope:** The percentage of rise to length when measuring the trail tread from edge to
  edge perpendicular to the direction of travel.

- **Grade:** Percent Grade
  - Grade can be expressed as a percent or an angle. Percent is easier to understand.
  - *Percent* grade equals the *rise* (elevation change) divided by the run (horizontal distance) multiplied by 100.
  - Example: rise of 10 feet/run of 100 feet x 100 = 10 percent
  - Elevation change, up or down, is always a positive number.
- **Design Clearing:** The clearing limit determined to be appropriate to accommodate the Managed Uses of a trail.

- **Design Clearing Height:** The minimum clearing height determined to be appropriate to accommodate the Managed Uses of a trail.

- **Design Clearing Width:** The minimum clearing width determined to be appropriate to accommodate the Managed Uses of a trail.

- **Design Shoulder Clearance:** The minimum horizontal and vertical clearance of obstructions (for example, removal of bicycle pedal or motorcycle peg

bumpers) immediately adjacent to the trail tread that is determined to be appropriate to accommodate the Manages Uses of a trail.

- **Design Cross Slope:** The cross slope determined to be appropriate to accommodate the Managed Uses of a trail.

- **Target Cross Slope:** The cross slope that is determined to be appropriate over most of a trail to accommodate its Managed Uses.

- **Maximum Cross Slope:** The steepest cross slope that is determined to be appropriate based on the Managed Uses of a trail and that exceeds the target cross slope of the trail.

- **Design Grade:** The trail grade determined to be appropriate to accommodate the Managed Uses of a trail.

- **Target Grade:** The trail grade that is determined to be appropriate over most of a trail to accommodate its Managed Uses.

- **Short Pitch Maximum:** The steepest grade that is determined to be appropriate based on the Managed Uses of a trail, that generally occurs for a distance of no more than 200 feet, and that does not exceed the maximum pitch density.

- **Maximum Pitch Density:** The maximum percentage of a trail with grades that exceed the Target Grade and that are less than or equal to the short pitch maximum, which is determined to be appropriate based on the Managed Uses of the trail

- **Design Surface:** The trail Tread surface, defined in terms of surface type, surface protrusions, and surface obstacles, that is determined to be appropriate to accommodate the Managed Uses of a trail

- **Surface Type:** A characteristic of the design surface expressed in terms of material type, grading, compaction, and roughness of the trail tread.

  - **Native:** A surface composed of soil, rock or other naturally occurring materials found on or near the trail.
  - **Firm:** A surface that is not noticeably distorted or compressed during the seasons for which it is managed, under normally occurring weather conditions, by the passage of a device that simulates a trail user in a wheelchair.
  - **Stable:** A surface that is not permanently affected by normally occurring weather conditions and able to sustain normal wear and tear caused by the uses for which the trail is managed between planned maintenance cycles.

- **Surface Protrusions:** Trail tread imperfections, such as rock, roots, holes, stumps, steps, and structures, that are within the acceptable range of tread roughness and challenge level for the trail and that do not obstruct the Managed Uses of the trail.

- **Surface Obstacles:** Trail tread imperfections, such as rocks, roots, holes, stumps, steps, downed logs, and structures, that are beyond the acceptable range of tread roughness and challenge level for the trail and that obstruct one or more Managed Uses of the trail

- **Design Tread Width:** The tread width determined to be appropriate to accommodate the Managed Uses of a trail.

- **Design Turn Radius:** The minimum horizontal radius required for a Managed Use to negotiate a curve (for example, a switchback, climbing turn, or horizontal turn) in a single maneuver.