

Review OTA Liberty Trail Wetland Assessment Results

OKRAM TRAINING: DAY 3



Day 3 Agenda

Day 3: 9/19/2024:

8:00 – 11:00 AM: Independent application of OKRAM (OTA Liberty Trail)

11:00 – 12:30 PM: **LUNCH on own** and travel back to CityPlex

12:30 – 1:30 PM: Review of OTA Wetland Assessment and Site-Specific Assessment- Dan Dvoretz

1:30 – 1:45 PM: **BREAK** (course evaluations)

1:45 – 2:45 PM: OKRAM Applications- Brooks Tramell

2:45 – 3:30- Additional Questions

Outline

- ❑ Calculate OTA Liberty Trail OKRAM scores
 - ❑ AA1
 - ❑ AA2
 - ❑ AA3
- ❑ Overall wetland score
- ❑ Review AA creation for site-specific assessment

OTA OKRAM
Score: AA1-
Hydroperiod

During site recon,
we did not identify
any hydroperiod
stressors and scored
AA1 a 1.

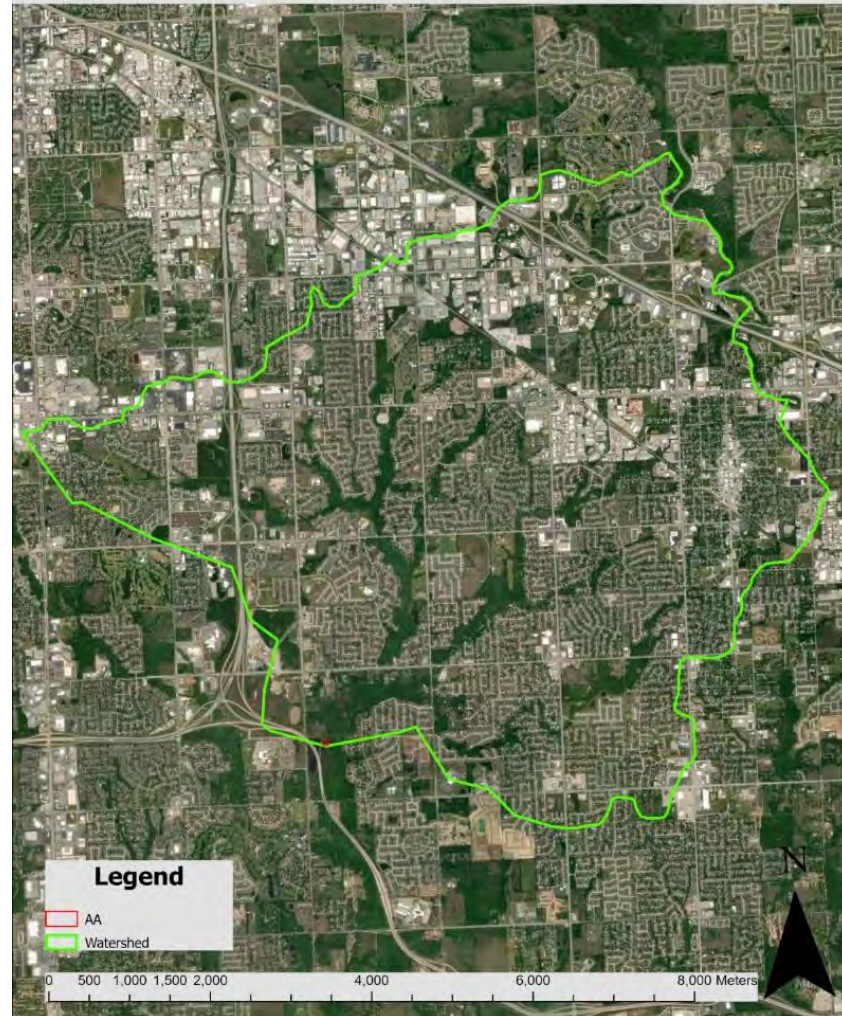
Wetland 5- AA 1: 100 meter buffer



OTA OKRAM Score: AA1- Water Source

During office preparation we found 52% impervious, 1% dryland agriculture and 1% impounded water and scored AA1 a 0.2

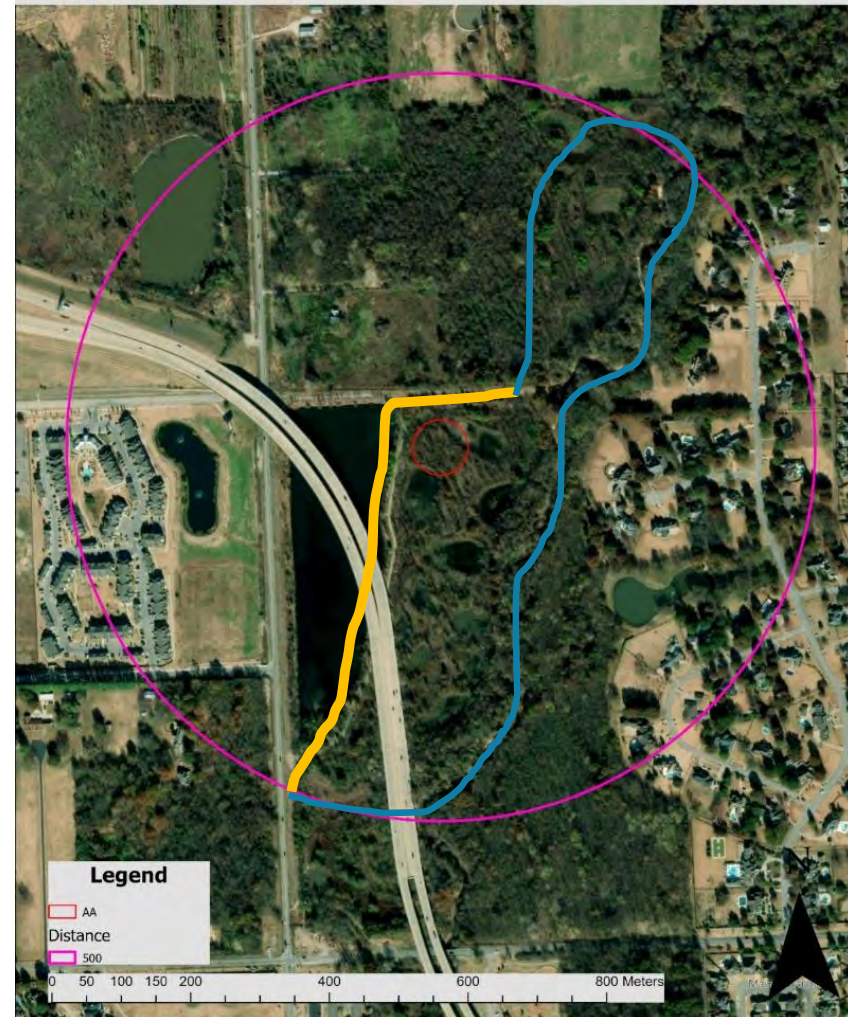
Wetland 5- AA 1: Watershed



OTA OKRAM Score: AA1- Hydrologic Connectivity

During site recon,
we found 30% of the
wetland containing
the AA was
surrounded by
berms/road grades
and scored the AA a
0.7

Wetland 5- AA 1: 500 meter buffer



OTA OKRAM Score: AA1- Nutrients/ Contaminants

During site recon,
we identified a
minor source of
nutrients from
residential areas
within 200 meters
are scored AA1 a
0.75.

Wetland 5- AA 1: 500 meter buffer



OTA OKRAM
 Score: AA1-
 Buffer Filter

250	100	30	1
250	100	30	1
180	100	30	0.72
250	100	30	1
250	100	30	1
250	100	30	1
250	100	15	0.5
250	100	25	0.83
0.88			

Wetland 5- AA 1: Buffer Lines



OTA OKRAM

Score: AA1-
Vegetation

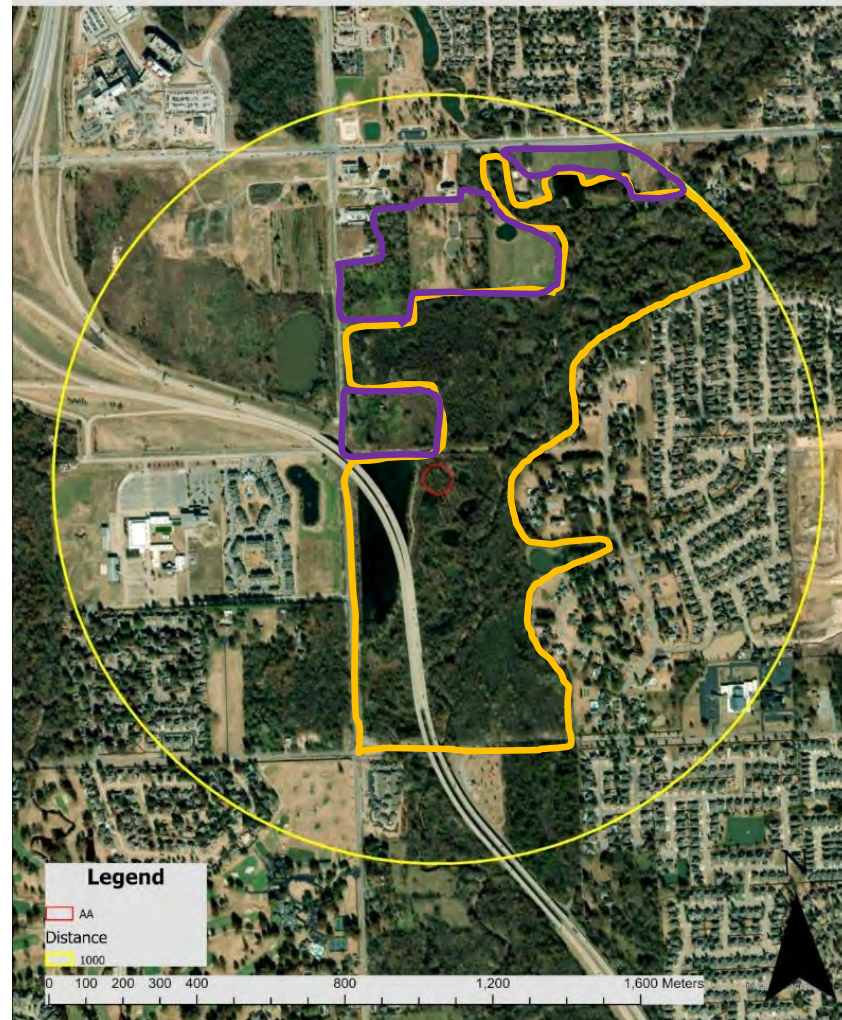
	Vegetation Layers			
	Tree	Shrub	Herb.	Sub.
Percent Cover of Layer	50	30	85	2
Indicators of Disturbance				
Invasive species and or crop/pasture *	10	30		
Percent disturbed cover	5	9		
METRIC SCORE 4a	0.92			



OTA OKRAM Score: AA1- Habitat Connectivity

Area of Natural and Marginal Connected Habitat	95
Area of Natural Connected Habitat	75
Area within 1 km buffer	339
METRIC SCORE 3b	0.25

Wetland 5- AA 1: 1000 meter buffer



OTA OKRAM
 Score: AA1-
 Overall Score

4. OKRAM Overall Condition Score- Riverine

Metric	Score
1 Hydrology	
1a. Hydroperiod	1.00
1b. Water source	0.20
1c. Hydrologic Connectivity	0.70
Hydrology Attribute	0.63
<i>(metric 1a + metric 1b + metric 1c)/3</i>	
2 Water Quality	
2a. Nutrients/Contaminants	0.75
2b. Buffer Filter	0.88
Water Quality Attribute	0.82
<i>(metric 2a + metric 2b)/2</i>	
3 Biota	
3a. Vegetation	0.92
3b. Habitat Connectivity	0.25
Biota Attribute	0.58
<i>(metric 3a + metric 3b)/2</i>	
Overall Condition Score	0.68

Outline

- ❑ Calculate OTA Liberty Trail OKRAM scores
 - ❑ AA1
 - ❑ AA2
 - ❑ AA3
- ❑ Overall wetland score
- ❑ Review AA creation for site-specific assessment

OTA OKRAM
Score: AA2-
Hydroperiod

Overhead turnpike
alters the delivery of
water to the AA, and
was considered a
minor stressor. AA
was scored 0.75

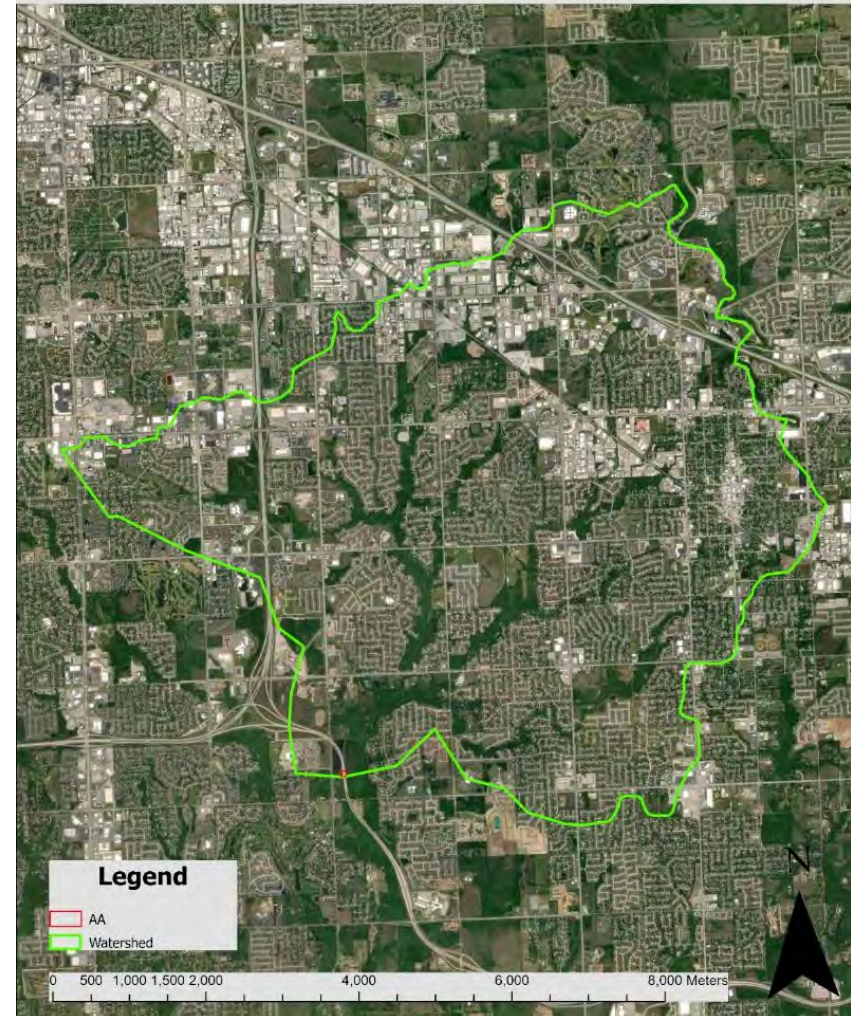
Wetland 5- AA 2: 100 meter buffer



OTA OKRAM Score: AA2- Water Source

During office preparation we found 52% impervious, 1% dryland agriculture and 1% impounded water and scored AA2 a 0.20

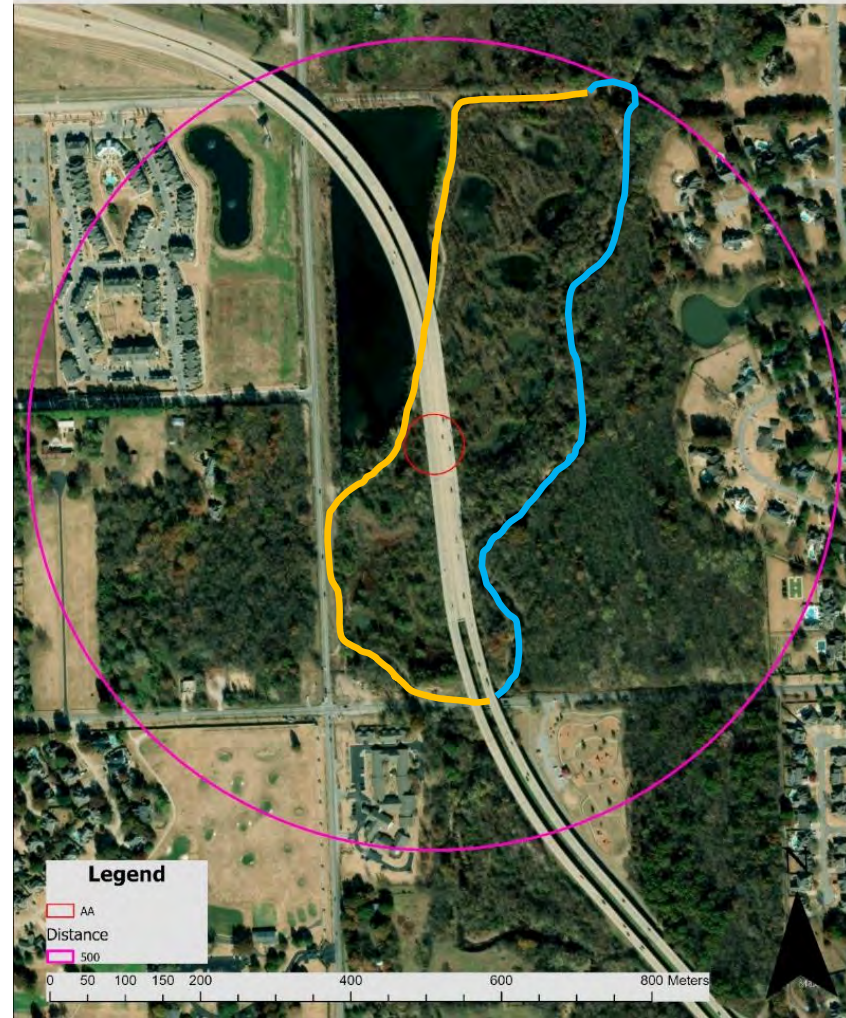
Wetland 5- AA 2: Watershed



OTA OKRAM Score: AA2- Hydrologic Connectivity

During site recon,
we found 55% of the
wetland containing
the AA was
surrounded by
berms/road grades.
So scored the AA a
0.45

Wetland 5- AA 2: 500 meter buffer



OTA OKRAM Score: AA2- Nutrients/ Contaminants

Road runs directly through AA and is a potential source of contaminants. AA was scored a 0.75



OTA OKRAM
 Score: AA2-
 Buffer Filter

250	100	0	0
250	100	30	1
250	100	30	1
250	100	0	0
250	100	0	0
250	100	30	1
250	100	5	.17
250	100	5	.17

0.42

Wetland 5- AA 2: Buffer Lines



OTA OKRAM Score: AA2- Vegetation

Did not complete a recon assessment but score speculated to be around 0.35 because of vegetation removal (turnpike) and invasive species.



OTA OKRAM Score: AA2- Habitat Connectivity

Area of Natural and Marginal Connected Habitat	70
Area of Natural Connected Habitat	60
Area within 1 km buffer	339
METRIC SCORE 3b	0.19

Wetland 5- AA 2: 1000 meter buffer



OTA OKRAM
Score: AA2-
Overall Score

4. OKRAM Overall Condition Score- Riverine

	Metric	Score
1	Hydrology	
1a.	Hydroperiod	0.75
1b.	Water source	0.20
1c.	Hydrologic Connectivity	0.45
	Hydrology Attribute	0.47
<i>(metric 1a +metric 1b + metric 1c)/3</i>		
2	Water Quality	
2a.	Nutrients/Contaminants	0.75
2b.	Buffer Filter	0.42
	Water Quality Attribute	0.58
<i>(metric 2a +metric 2b)/2</i>		
3	Biota	
3a.	Vegetation	0.35
3b.	Habitat Connectivity	0.19
	Biota Attribute	0.27
<i>(metric 3a + metric 3b)/2</i>		
Overall Condition Score		0.44

Outline

- ❑ Calculate OTA Liberty Trail OKRAM scores
 - ❑ AA1
 - ❑ AA2
 - ❑ AA3
- ❑ Overall wetland score
- ❑ Review AA creation for site-specific assessment

OTA OKRAM
Score: AA3-
Hydroperiod

During site recon,
we identified
sediment inputs
(rilling) on adjacent
uplands affecting
50% of the AA and
scored the wetland
a 0.88

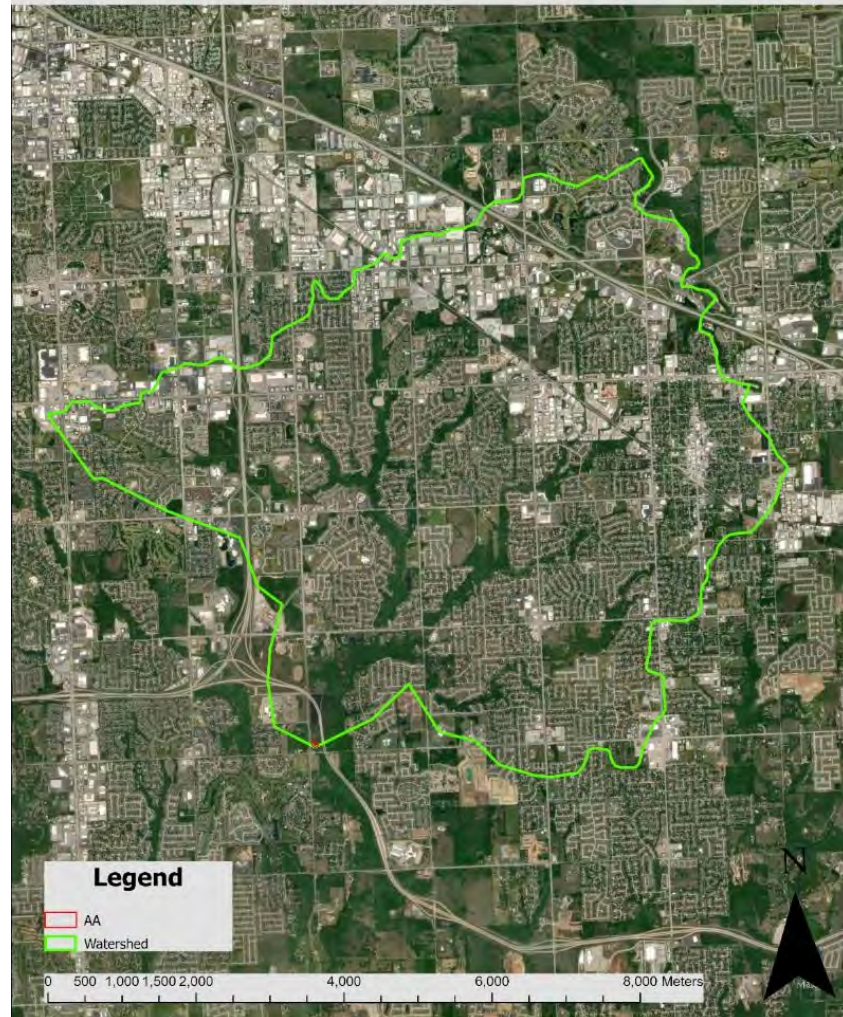
Wetland 5- AA 3: 100 meter buffer



OTA OKRAM Score: AA3- Water Source

During office preparation we found 52% impervious, 1% dryland agriculture and 1% impounded water and scored AA3 a 0.2

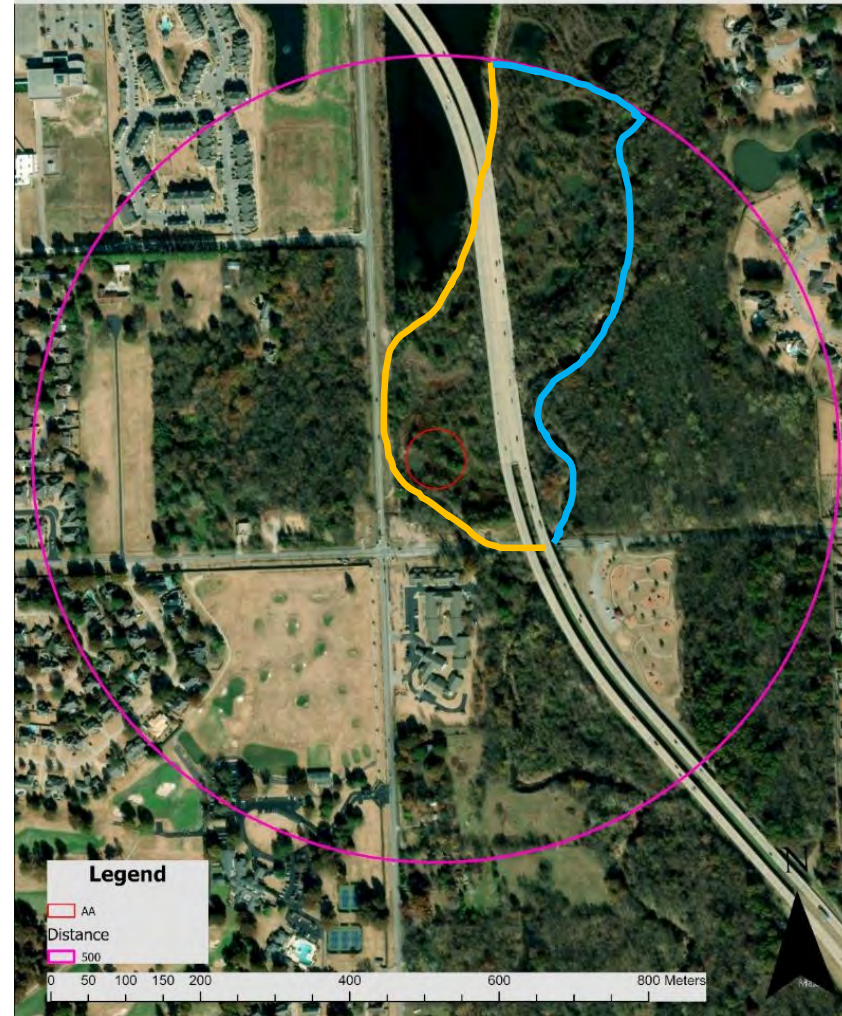
Wetland 5- AA 3: Watershed



OTA OKRAM Score: AA3- Hydrologic Connectivity

During site recon,
we found 50% of the
wetland containing
the AA was
surrounded by
berms/road grades.
So scored the AA a
0.5

Wetland 5- AA 3: 500 meter buffer



OTA OKRAM Score: AA3- Nutrients/ Contaminants

During site recon,
we identified a
minor source of
nutrients from
residential areas
within 200 meters
are scored AA3 a
0.75.

Wetland 5- AA 3: 500 meter buffer



OTA OKRAM
 Score: AA3-
 Buffer Filter

250	100	30	1
250	100	30	1
250	100	30	1
250	100	30	1
110	100	5	0.17
250	100	15	0.5
250	100	15	0.5
250	100	30	1

0.77

Wetland 5- AA 3: Buffer Lines



OTA OKRAM Score: AA3- Vegetation

Did not complete a recon assessment but score speculated to be around 0.93 because of invasive species.



OTA OKRAM Score: AA3- Habitat Connectivity

Area of Natural and Marginal Connected Habitat	60
Area of Natural Connected Habitat	50
Area within 1 km buffer	339
METRIC SCORE 3b	0.17

Wetland 5- AA 3: 1000 meter buffer



OTA OKRAM
Score: AA3-
Overall Score

4. OKRAM Overall Condition Score- Riverine

	Metric	Score
1	<i>Hydrology</i>	
1a.	Hydroperiod	0.88
1b.	Water source	0.20
1c.	Hydrologic Connectivity	0.50
	Hydrology Attribute	0.52
	<i>(metric 1a + metric 1b + metric 1c)/3</i>	
2	<i>Water Quality</i>	
2a.	Nutrients/Contaminants	0.75
2b.	Buffer Filter	0.77
	Water Quality Attribute	0.76
	<i>(metric 2a + metric 2b)/2</i>	
3	<i>Biota</i>	
3a.	Vegetation	0.93
3b.	Habitat Connectivity	0.17
	Biota Attribute	0.55
	<i>(metric 3a + metric 3b)/2</i>	
	Overall Condition Score	0.61

Outline

- ❑ Calculate OTA Liberty Trail OKRAM scores
 - ❑ AA1
 - ❑ AA2
 - ❑ AA3
- ❑ Overall wetland score
- ❑ Review AA creation for site-specific assessment

Overall Wetland Score

Site specific assessment for a large wetland requires

- At least 3 AAs, and
- The last AA is <15% different from the first two AAs

AA1 = 0.68 and AA2 = 0.44, so the average is 0.56

AA3 = 0.61, which is 9% different from the average of the first two AAs $[(0.61-0.56)/0.56]$

No additional AAs are needed



Overall Wetland Score

- ❑ Site score is an average of OKRAM scores for all completed AAs
 - ❑ $(0.68 + 0.44 + 0.61) / 3 = 0.58$

Overall Wetland
Score: Order
Matters

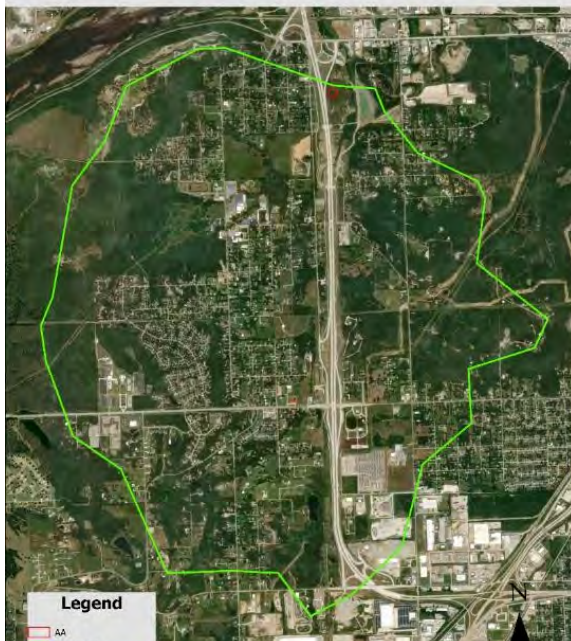
If AA2 and AA3 were switched, AA3 would be 32% different and an additional AA would be needed

$(0.65 - 0.44) / 0.65 = 32\%$ different

If an additional AA of 0.6 were added it would not impact overall score appreciably (0.59 vs. 0.58)

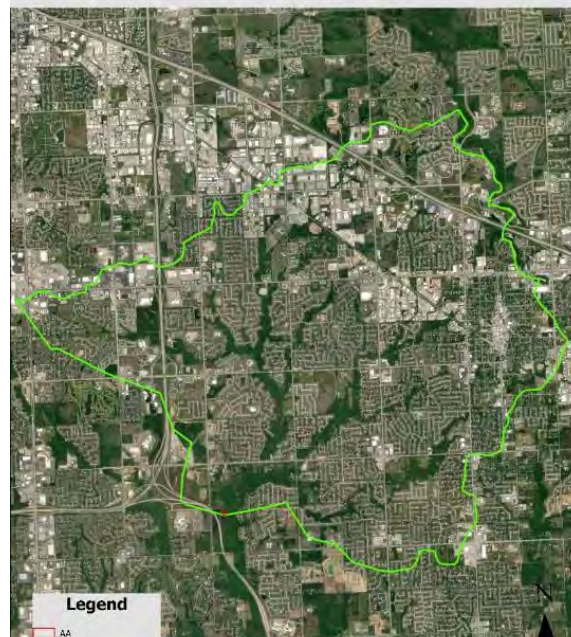
Overall Wetland Scores: Context Matters

Wetland 2: Watershed



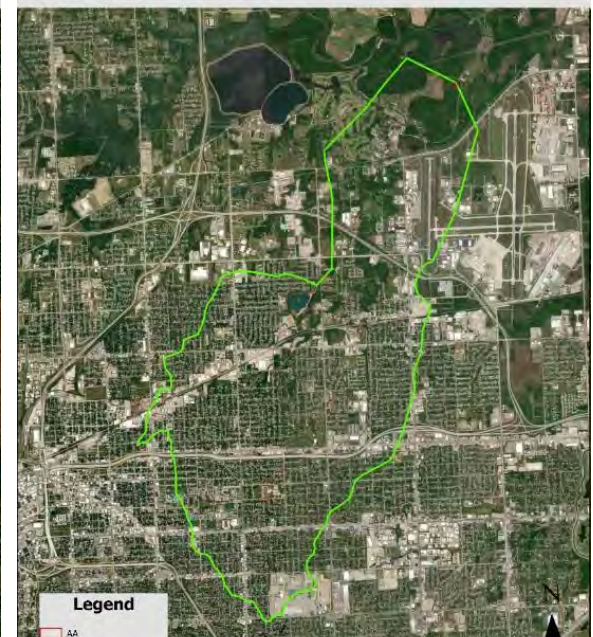
AA = 0.46

Wetland 5- AA 1: Watershed



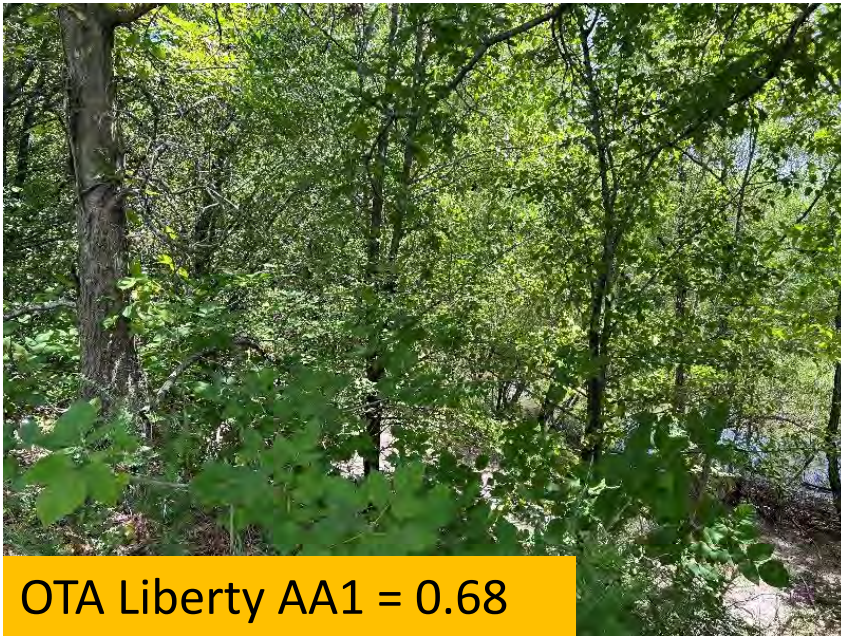
AA = 0.68

Wetland 3: Watershed



AA = 0.83

Overall Wetland Scores: Heterogeneity Matters



Overall Wetland Scores: Pre-condition matters



- ❑ Pre-restoration score estimated at 0, means a post-restoration score of 0.58 represents an opportunity for considerable uplift.
- ❑ A well-designed urban wetland restoration can still replace the loss of a 'good' urban wetland
- ❑ Wetlands in urban settings will generally score lower for OKRAM but that does not mean they do not provide key services for people and wildlife

Outline

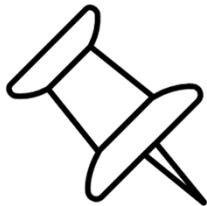
- ❑ Calculate OTA Liberty Trail OKRAM scores
 - ❑ AA1
 - ❑ AA2
 - ❑ AA3
- ❑ Overall wetland score
- ❑ Site Specific Assessment- AA creation and number

Site-Specific Assessment- AA Creation



- ❑ For Ambient Monitoring, OKRAM scores are used to derive a population level assessment of condition

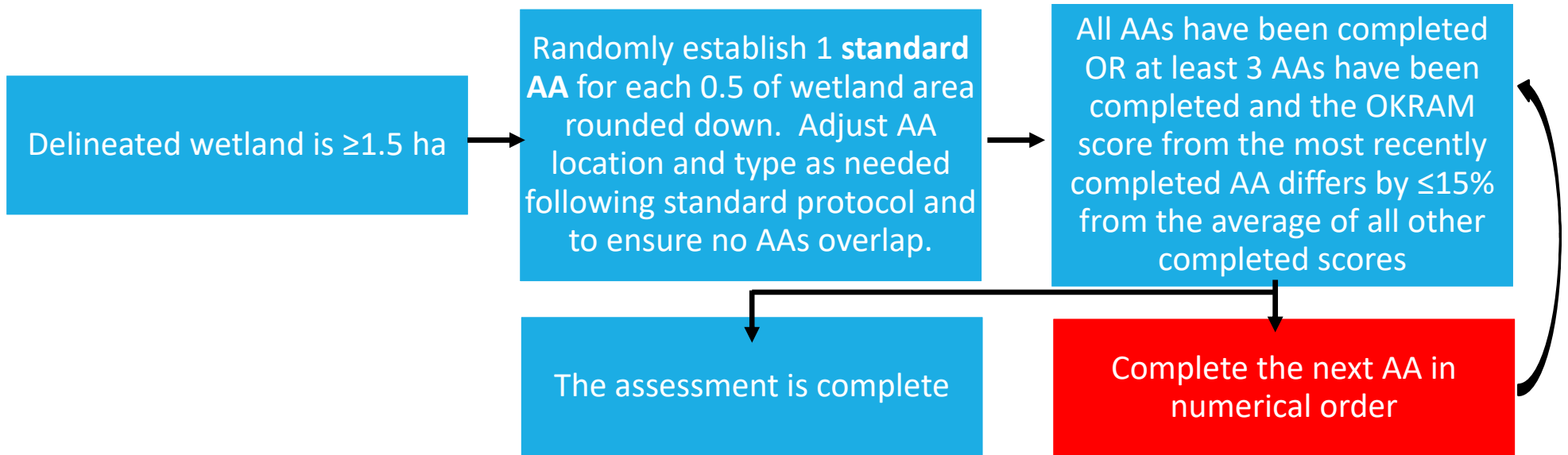
- ❑ One randomly placed AA is sufficient

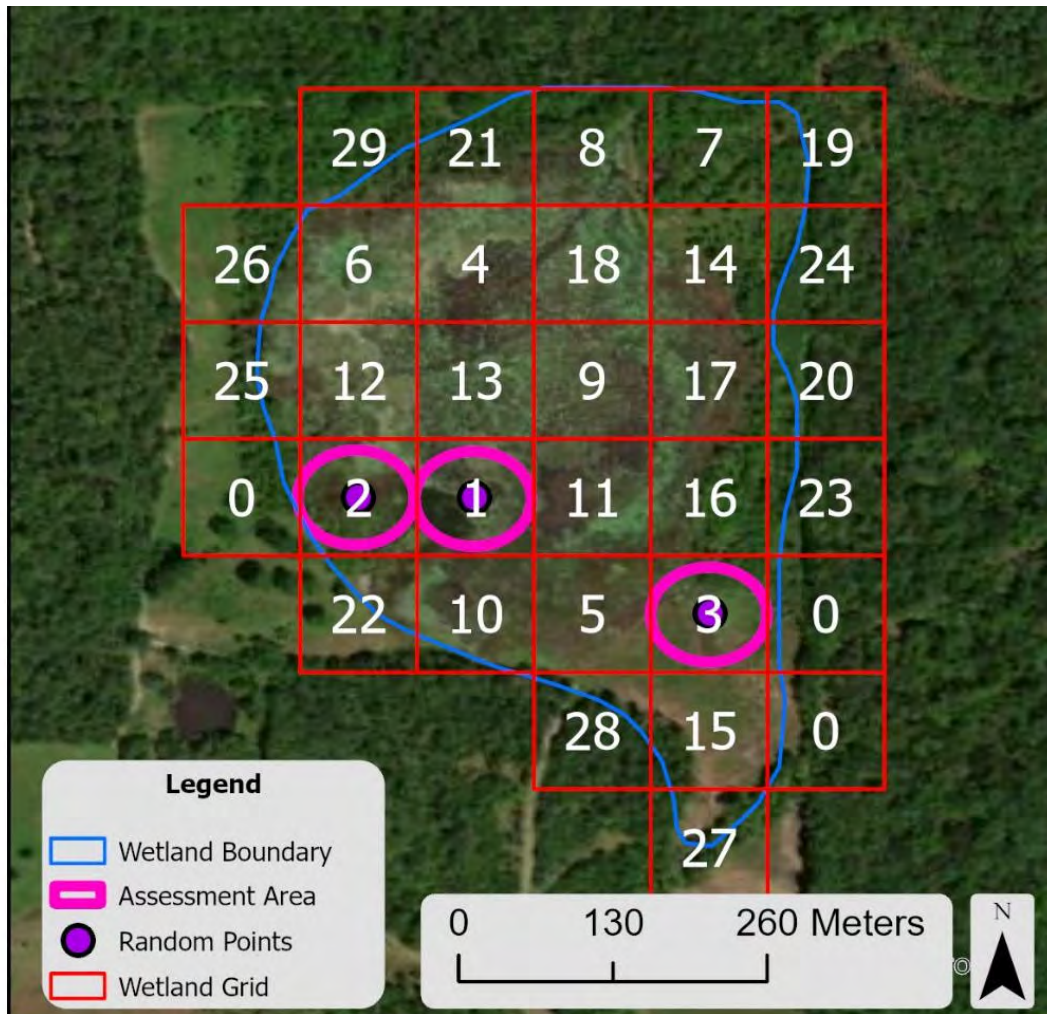


- ❑ For Site-Specific Monitoring, OKRAM scores are used to provide an accurate assessment of the condition of one wetland

- ❑ Multiple AAs are needed for large wetlands (>1.5 ha)

Site-Specific Assessment- AA Creation



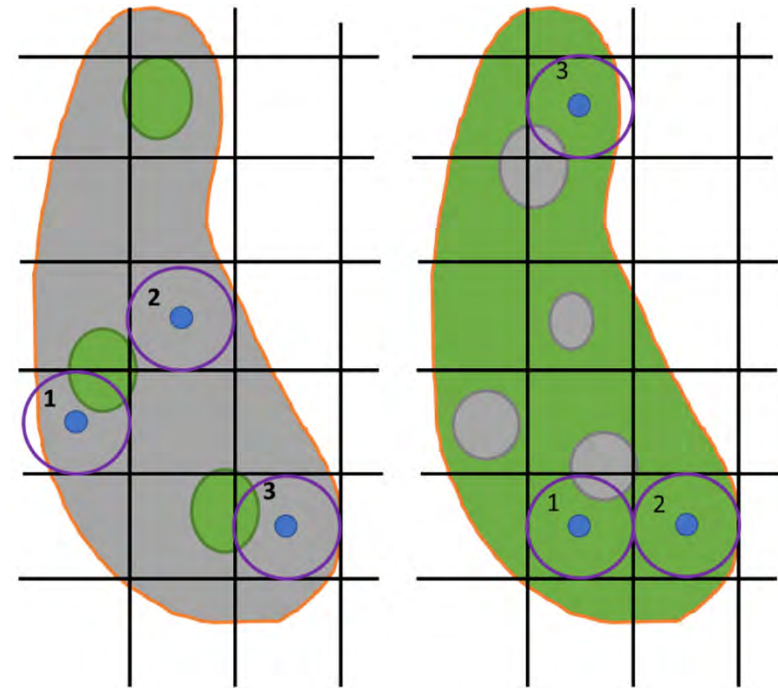


Site-Specific Assessment-AA Creation

- ❑ Large wetlands should be systematically gridded and randomly numbered
- ❑ Goal is to create one valid AA / 0.5 ha of wetland area

Site-Specific Assessment- Pre- and Post-

- ❑ OKRAM can be used to evaluate pre-restoration condition even if the location is not a wetland
- ❑ In large wetlands, AAs are randomly located for assessment, both pre- and post- restoration
- ❑ AAs are added until
 - ❑ ≥ 3 AAs have been completed and the most recent is $<15\%$ different from previous assessments, or
 - ❑ All viable AAs have been assessed



Specific OKRAM Applications



OKRAM TRAINING: DAY 3

Outline

- Why a RAM (beyond the Rapid) and Potential Uses

- Aspects of Ecological Integrity
- Guiding Restoration/Mitigation
- Pre and Post Assessment Comparisons
- Impacts from Development

- Next Steps

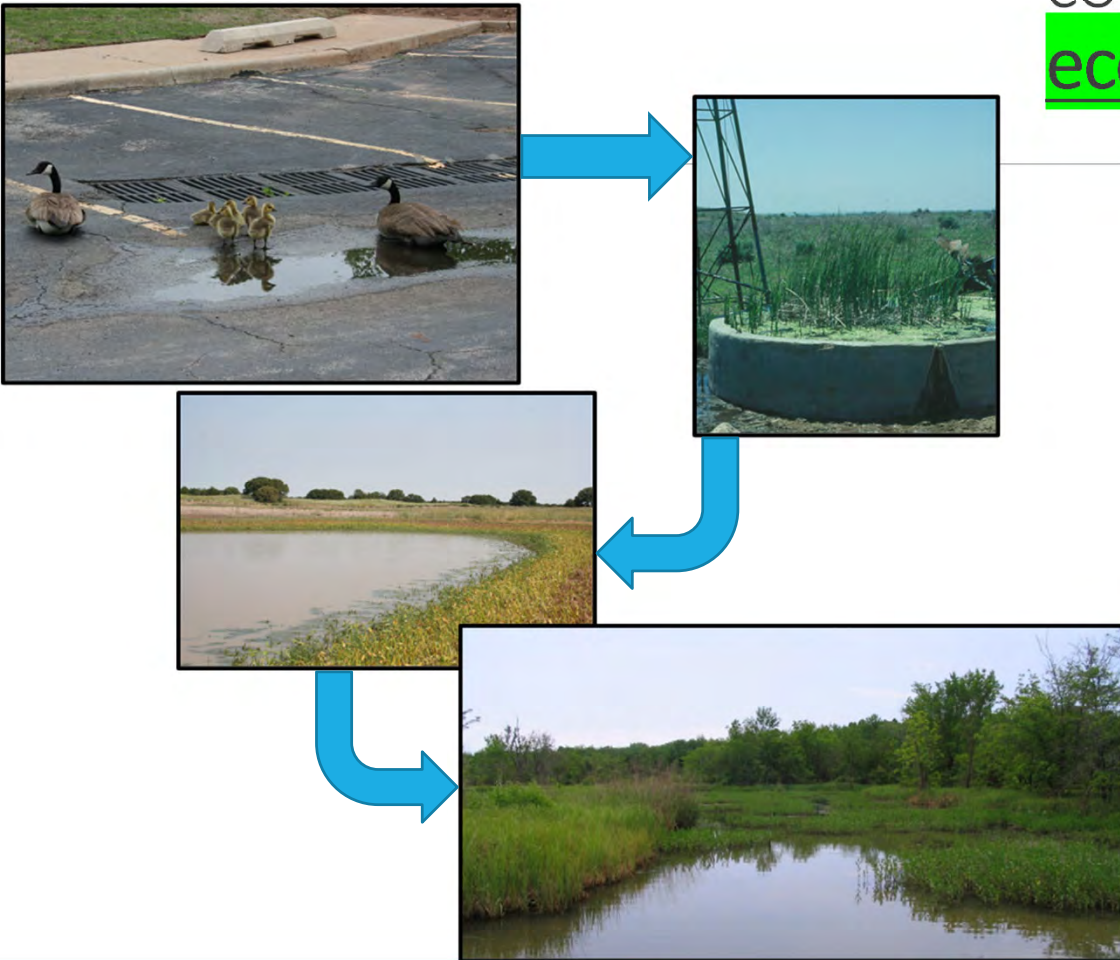
Important Reminders!

OKRAM is intended to fill a particular niche in the wide range of assessments

No one tool is likely to address needs for both quick screening and comprehensive evaluation

This is true for ambient monitoring as well as restoration or mitigation.

Everything we do as conservationists revolves around **ecological integrity** (EI)



the "ability of an ecological system to support and maintain a community of organisms and habitats with structure and composition, diversity, and functional organization similar to the system's natural habitat"

Ecological Integrity (EI)

Ecological integrity encompasses:

*Ecosystem
health*

Biodiversity

Stability

Sustainability

Naturalness

Wildness

Beauty

Ecological Integrity Frameworks

Combine biotic and abiotic aspects of ecosystems including structure, processes, and concepts of ecological resilience and ecological services.

The intent is to preserve or develop the capability to continue self-development or recovery from natural and human induced changes towards almost natural conditions and thus safeguard relevant ecosystem services.

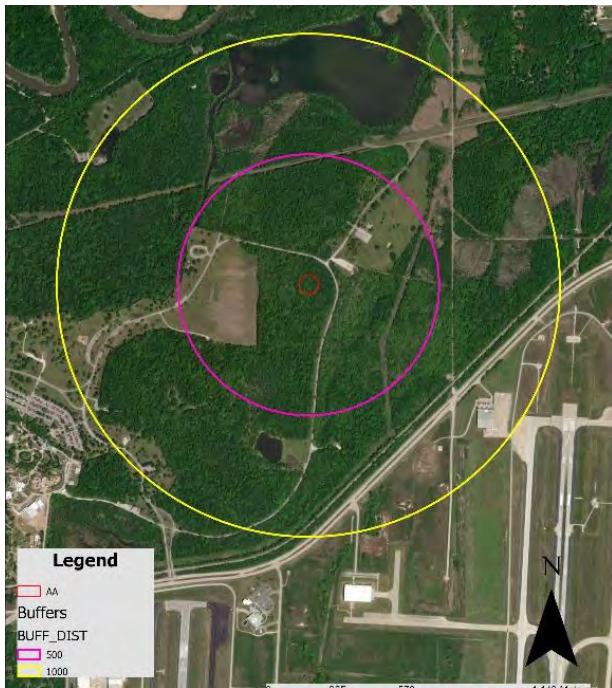


OKRAM

OKRAM is stressor based and therefore measures condition as the ability of a wetland to support and maintain its complexity and capacity for self-organization with respect to species composition, physicochemical characteristics, and functional processes, relative to ideal, historical, or existing wetlands of a similar class.



Guiding Restoration or Mitigation



Allows for the pre-assessment of potential disturbance sites

- Accounts for current site condition
 - Includes stressors within and in proximity to the wetland

Guiding Restoration or Mitigation

Allows for the comparison of potential impacted sites to mitigation site potential

- Accounts for current site condition
 - Includes stressors within and in proximity to the disturbance wetland
- Accounts for replacement potential
 - Includes stressors within and in proximity to the proposed mitigation site
- Can allow for the comparison of loss to replacement
 - Relies on actual achievement of design and performance standards

Guiding Restoration or Mitigation

Allows for the scoring of future potential mitigation sites

- ❑ Can predict future site scores based on design
- ❑ Can be used as a tool to determine and compare potential lift and thus mitigation credits in different design scenarios
 - Score will be based on achieving performance standards
 - Includes stressors within and in proximity to the wetland

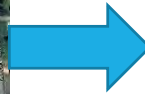
Guiding Restoration or Mitigation

Additional benefits for the scoring of future potential mitigation sites

- ❑ Should allow for more certainty in replacement
 - Should help ensure comparable replacement
 - Should allow better comparisons between loss and replacement
 - Could take some of the subjectivity out of mitigation

- ❑ Should offer certainty to responsible mitigators
 - Will allow consideration for various mitigation replacement scenarios
 - Wetland placement
 - Wetland type
 - Other scenarios that could affect Ecological Integrity and therefore lift

Landscape disturbance gradient



Guiding Restoration or Mitigation

Predicting long term benefits of potential mitigation sites

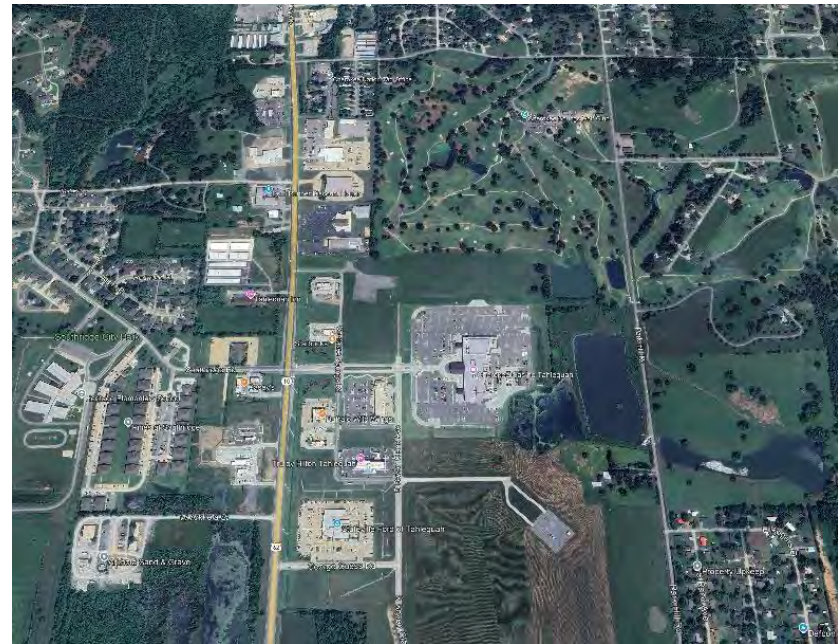
- ❑ OKRAM can be used to predict long-term scores based on different land use or management scenarios.
- ❑ Can the developed or enhanced wetland sustain the mitigated benefits in future surrounding land use scenarios?
 - Comparison of risk/benefit between disturbance wetlands and replacement wetlands

Impacts to Wetlands in Tahlequah

1995



2023



Context Can Be
Everything!

Comparisons are key!

- How “good” is the area to be impacted?
- How “good” can the mitigation site be?
- How likely will the mitigation site remain in restored condition?



Scoring Flashback

OKRAM Scoring: Condition Categories



- Good: 1 – 0.85
 - Minimal human impact at local and landscape scales
- Fair: 0.84 – 0.5
 - Some combination of local and landscape disturbance
- Poor: 0.49 – 0
 - Significantly impacted by both local and landscape stressors

OKRAM: Score Interpretation

OKRAM scores better for:

- Larger wetlands
- Buffered wetlands
- Connected wetlands
- Unmanaged hydrology



Landscape context presents a ceiling to OKRAM score but need to consider best-achievable

- For example, an urban depressional wetland with 100 m upland buffer and no local impacts will likely score between 0.6 and 0.7





Upland (non-wetland) sites score 0 for OKRAM



A well-planned restoration in a highly impacted landscape can still provide significant uplift



In-kind restoration in impacted landscapes, still provides opportunity for restoring equal/greater condition

OKRAM: Score Interpretation

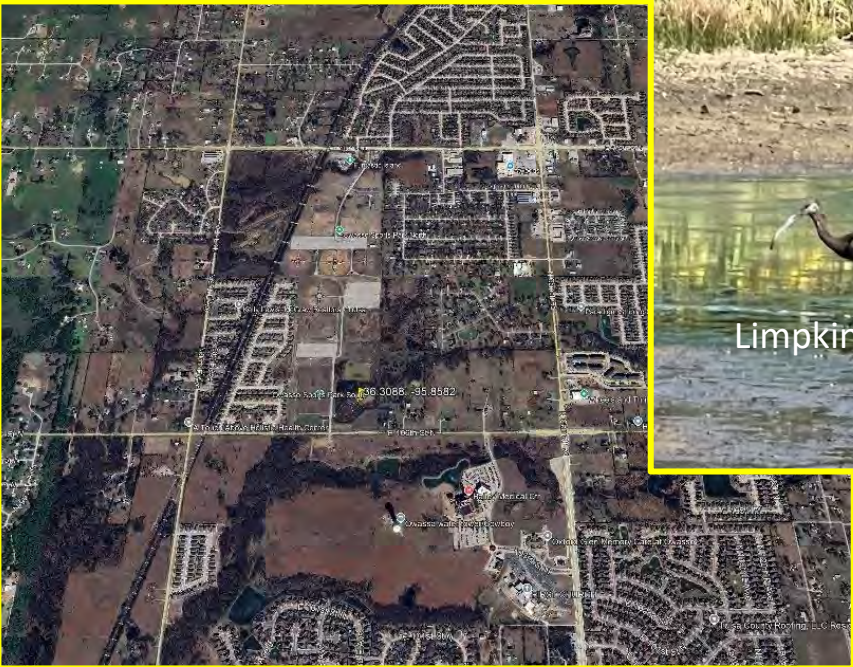


Owasso Sports Complex Mitigation Site

1986



2023



Next Steps

OCC/OSU continued activity

- ❑ “Final” riverine and depressional wetland OKRAM refinement
 - Analysis of over 250 OKRAM sites with co-collected intensive data
- ❑ Continued work to fill spatial and wetland class data gaps
 - Soon to begin seep study (OCC/OU/OSU)
- ❑ Refinement and application of the RWIP in 30 HUC 8 watersheds
 - Sites to most likely support wetland restoration (also has a stream restoration component)
 - Product already being used

Next Steps

Additional needs from the USACE?

- What can OCC provide?
 - Modifications?
 - Additional training opportunities for other groups?



Many Thanks!

OCC and OSU thanks you for the opportunity to present OKRAM for your consideration and for the opportunity to partner in the management of wetlands on behalf of the resource and citizens of Oklahoma.

