

Brevard County - Wetland Assessment Method Toolbox

Wetland Assessment Toolbox

Developed by

B.K.I., Inc. and Ecospatial Analysts

For

Brevard County
Natural Resource Management Office

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Brevard County - Wetland Assessment Method Toolbox

The toolbox has been developed in order to help end-users utilize the wetland assessment tool. The toolbox follows the assessment of a wetland throughout the process.

Wetlands are assessed on two criteria. The two criteria are whether the wetlands are “landscape level” or they are considered “high-functioning.”

First determine if the wetland is or part of a landscape level wetland system. This is done by analyzing a combination of parameters that include location, hydrologic connectivity and size of the wetland system. If the wetland system is located within the landscape level polygon **AND** is defined as hydrologically connected to the St. Johns River or the Indian River watersheds **OR** five (5) acres or greater in size the system is determined to be a landscape level system. Potential impacts to the wetland will have to be evaluated by the County Commission.

Then the wetland will be assessed to determine if it is a high-functioning wetland system. If the system is determined to be high-functioning, impacts to the system will have to be evaluated by the County Commission.

The high-functioning wetland assessment method is composed of three components: landscape, water environment, and vegetative community.

The steps of high-functioning wetland assessment are as follows::

1. Calculate the acreage of the surrounding land uses within a 100m buffer.
2. Start landscape component, input the acreage of each land use, the tool calculates LSI.
3. Estimate the water quality treatment category score – estimate the percentage of each category.
4. Determine the hydrologic indicator score based on the indicators observed within the wetland.
5. Determine the percentage of appropriate wetland vegetation coverage.
6. Determine the percentage of exotic or invasive plant species coverage.
7. Determine the final score.
8. If the score is 0.70 or greater the wetland is considered High-Functioning.

A spreadsheet has been developed to facilitate the calculations. The toolbox will utilize the spreadsheet for the calculations.

Landscape Level Analysis

IS the wetland five (5) acres or larger?

YES the wetland is considered
Landscape Level

NO Continue to location analysis

IS the wetland located within the Landscape Level Polygon and determined to be hydrologically connected to the St. Johns River or Indian River Lagoon watershed?

YES the wetland is considered
Landscape Level

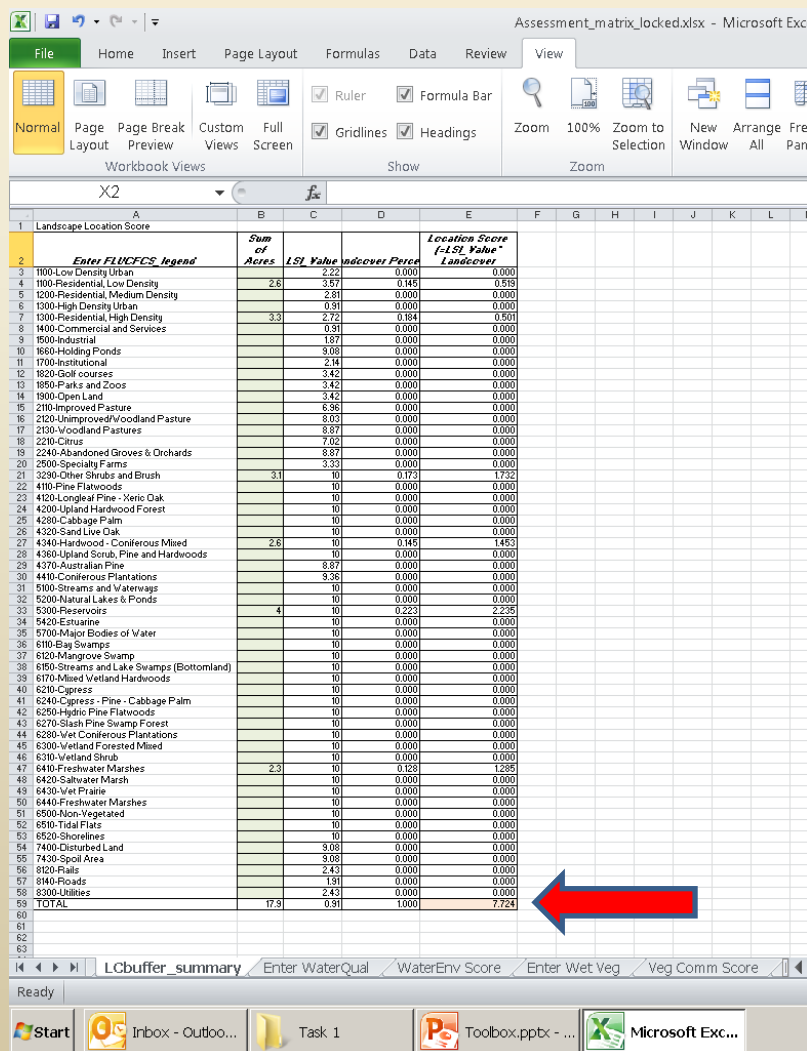
NO Continue to evaluate if the wetland is High-Functioning

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Landscape Assessment

The table calculates the percentage and multiplies the coefficient and percentage, then all the products of the calculations are summed, resulting in a score from 1-10.

If an exact FLUCFCS code is not included, the next closest code should be used for the calculations.



Assessment_matrix_locked.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View

Normal Page Layout Page Break Custom Full Ruler Formula Bar Gridlines Headings Zoom 100% Zoom to Selection New Arrange Freeze

Workbook Views Show Zoom

X2

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Landscape Location Score												
2	Enter FLUCFCS Legend	Sum of Acres	LSI Value	Indoover Percent	Location Score (LSI Value * Landcover)								
3	1100-Low Density Urban	2.22	0.000	0.000	0.000								
4	1100-Residential, Low Density	2.8	0.357	0.145	0.379								
5	1200-Residential, Medium Density	2.81	0.000	0.000	0.000								
6	1300-High Density Urban	0.91	0.000	0.000	0.000								
7	1300-Residential, High Density	3.3	2.72	0.184	0.501								
8	1400-Commercial and Services	0.91	0.000	0.000	0.000								
9	1500-Industrial	1.87	0.000	0.000	0.000								
10	1600-Holding Ponds	9.08	0.000	0.000	0.000								
11	1700-Institutional	2.14	0.000	0.000	0.000								
12	1820-Golf courses	3.42	0.000	0.000	0.000								
13	1850-Parks and Zoos	3.42	0.000	0.000	0.000								
14	1900-Open Land	3.42	0.000	0.000	0.000								
15	210-Improved Pasture	8.38	0.000	0.000	0.000								
16	2120-Unimproved/Woodland Pasture	8.03	0.000	0.000	0.000								
17	2130-Woodland Pastures	8.87	0.000	0.000	0.000								
18	2210-Citrus	7.02	0.000	0.000	0.000								
19	2240-Abandoned Groves & Orchards	8.87	0.000	0.000	0.000								
20	2500-Specialty Farms	3.33	0.000	0.000	0.000								
21	3230-Other Shrub and Brush	3.1	0.173	0.173	0.173								
22	410-Pine Flatwoods	10	0.000	0.000	0.000								
23	4120-Longleaf Pine - Xeric Oak	10	0.000	0.000	0.000								
24	4200-Upland Hardwood Forest	10	0.000	0.000	0.000								
25	4260-Cabbage Palm	10	0.000	0.000	0.000								
26	4320-Sand Live Oak	10	0.000	0.000	0.000								
27	4340-Hardwood - Coniferous Mixed	2.6	10	0.145	1453								
28	4360-Upland Scrub, Pine and Hardwoods	10	0.000	0.000	0.000								
29	4370-Australian Pine	8.87	0.000	0.000	0.000								
30	4410-Coniferous Plantations	9.36	0.000	0.000	0.000								
31	5100-Streams and Waterways	10	0.000	0.000	0.000								
32	5200-Natural Lakes & Ponds	10	0.000	0.000	0.000								
33	5300-Reservoirs	4	10	0.223	2.236								
34	5420-Estuarine	10	0.000	0.000	0.000								
35	6100-Major Bodies of Water	10	0.000	0.000	0.000								
36	6110-Bay Swamps	10	0.000	0.000	0.000								
37	6120-Mangrove Swamp	10	0.000	0.000	0.000								
38	6150-Streams and Lake Swamps (Bottomland)	10	0.000	0.000	0.000								
39	6170-Mixed Wetland Hardwoods	10	0.000	0.000	0.000								
40	6210-Cypress	10	0.000	0.000	0.000								
41	6240-Cypress - Pine - Cabbage Palm	10	0.000	0.000	0.000								
42	6260-Hydro Pine Flatwoods	10	0.000	0.000	0.000								
43	6270-Slash Pine Swamp Forest	10	0.000	0.000	0.000								
44	6280-Vet Coniferous Plantations	10	0.000	0.000	0.000								
45	6300-Wetland Forested Mixed	10	0.000	0.000	0.000								
46	6310-Wetland Shrub	10	0.000	0.000	0.000								
47	6410-Freshwater Marshes	2.3	10	0.128	1.288								
48	6420-Saltwater Marsh	10	0.000	0.000	0.000								
49	6430-Vet Prairie	10	0.000	0.000	0.000								
50	6440-Freshwater Marshes	10	0.000	0.000	0.000								
51	6500-Non-Vegetated	10	0.000	0.000	0.000								
52	6510-Tidal Flats	10	0.000	0.000	0.000								
53	6520-Shorelines	10	0.000	0.000	0.000								
54	7400-Disturbed Land	8.08	0.000	0.000	0.000								
55	7420-Spoil Area	8.08	0.000	0.000	0.000								
56	8120-Rails	2.43	0.000	0.000	0.000								
57	8140-Floods	1.91	0.000	0.000	0.000								
58	9300-Ultimates	2.43	0.000	0.000	0.000								
59	TOTAL	17.9	0.91	1.000	7.724								

LCbuffer_summary Enter WaterQual WaterEnv Score Enter Wet Veg Veg Comm Score

Ready

Start Inbox - Outloo... Task 1 Toolbox.pptx - ... Microsoft Exc...

This score is forwarded to the Wetland Score tab.

Brevard County - Wetland Assessment Method Toolbox

Landscape Assessment

The landscape assessment is evaluated using a Landscape Support Index

1. Input the acreage of each surrounding landscape type in a 100m buffer surrounding the wetland
2. Coefficients for each landscape type are identified in the table, by typing the FLUCFCS_Legend the table populates the LSI_Value

The screenshot displays two Microsoft Excel spreadsheets. The top spreadsheet, titled 'Assessment_matrix_locked.xlsx', shows a table with columns for 'Landscape Location Score', 'Enter FLUCFCS_Legend', 'LSI Value Indirect Pct', and 'Landscape Score (LSI Value)'. A red arrow points to the 'Enter FLUCFCS_Legend' column. The bottom spreadsheet, titled 'Assessment_matrix_total.xlsx', shows a table with columns for 'w Labels', 'Min of LSI coefficient', and 'LSI Value'. A red arrow points to the 'Min of LSI coefficient' column. The bottom spreadsheet also shows a summary row with 'Average: 2.81', 'Count: 2', and 'Sum: 2.81'.

Landscape Location Score	Enter FLUCFCS_Legend	LSI Value Indirect Pct	Landscape Score (LSI Value)
1	0000 Low Density Urban	0.0000	0.0000
2	0000 Residential, Low Density	0.0000	0.0000
3	0000 Residential, Medium Density	0.0000	0.0000
4	0000 High Density Urban	0.0000	0.0000
5	0000 Industrial, High Density	0.0000	0.0000
6	0000 Commercial and Services	0.0000	0.0000
7	0000 Industrial	0.0000	0.0000
8	0000 Holding Ponds	0.0000	0.0000
9	0000 Golf courses	0.0000	0.0000
10	0000 Parks and Zoos	0.0000	0.0000
11	0000 Open Land	0.0000	0.0000
12	0000 Improved Pasture	0.0000	0.0000
13	0000 Unimproved Pasture	0.0000	0.0000
14	0000 Woodland Pastures	0.0000	0.0000
15	0000 Crops	0.0000	0.0000
16	0000 Abandoned Groves & Orchards	0.0000	0.0000
17	0000 Open Land	0.0000	0.0000
18	0000 Open Land	0.0000	0.0000
19	0000 Open Land	0.0000	0.0000
20	0000 Open Land	0.0000	0.0000
21	0000 Open Land	0.0000	0.0000
22	0000 Open Land	0.0000	0.0000
23	0000 Open Land	0.0000	0.0000
24	0000 Open Land	0.0000	0.0000
25	0000 Open Land	0.0000	0.0000
26	0000 Open Land	0.0000	0.0000
27	0000 Open Land	0.0000	0.0000
28	0000 Open Land	0.0000	0.0000
29	0000 Open Land	0.0000	0.0000
30	0000 Open Land	0.0000	0.0000
31	0000 Open Land	0.0000	0.0000
32	0000 Open Land	0.0000	0.0000
33	0000 Open Land	0.0000	0.0000
34	0000 Open Land	0.0000	0.0000
35	0000 Open Land	0.0000	0.0000
36	0000 Open Land	0.0000	0.0000
37	0000 Open Land	0.0000	0.0000
38	0000 Open Land	0.0000	0.0000
39	0000 Open Land	0.0000	0.0000
40	0000 Open Land	0.0000	0.0000
41	0000 Open Land	0.0000	0.0000
42	0000 Open Land	0.0000	0.0000
43	0000 Open Land	0.0000	0.0000
44	0000 Open Land	0.0000	0.0000
45	0000 Open Land	0.0000	0.0000
46	0000 Open Land	0.0000	0.0000
47	0000 Open Land	0.0000	0.0000
48	0000 Open Land	0.0000	0.0000
49	0000 Open Land	0.0000	0.0000
50	0000 Open Land	0.0000	0.0000
51	0000 Open Land	0.0000	0.0000
52	0000 Open Land	0.0000	0.0000
53	0000 Open Land	0.0000	0.0000
54	0000 Open Land	0.0000	0.0000
55	0000 Open Land	0.0000	0.0000
56	0000 Open Land	0.0000	0.0000
57	0000 Open Land	0.0000	0.0000
58	0000 Open Land	0.0000	0.0000
59	0000 Open Land	0.0000	0.0000
60	0000 Open Land	0.0000	0.0000
61	0000 Open Land	0.0000	0.0000
62	0000 Open Land	0.0000	0.0000
63	0000 Open Land	0.0000	0.0000
64	0000 Open Land	0.0000	0.0000
65	0000 Open Land	0.0000	0.0000
66	0000 Open Land	0.0000	0.0000
67	0000 Open Land	0.0000	0.0000
68	0000 Open Land	0.0000	0.0000
69	0000 Open Land	0.0000	0.0000
70	0000 Open Land	0.0000	0.0000
71	0000 Open Land	0.0000	0.0000
72	0000 Open Land	0.0000	0.0000
73	0000 Open Land	0.0000	0.0000
74	0000 Open Land	0.0000	0.0000
75	0000 Open Land	0.0000	0.0000
76	0000 Open Land	0.0000	0.0000
77	0000 Open Land	0.0000	0.0000
78	0000 Open Land	0.0000	0.0000
79	0000 Open Land	0.0000	0.0000
80	0000 Open Land	0.0000	0.0000
81	0000 Open Land	0.0000	0.0000
82	0000 Open Land	0.0000	0.0000
83	0000 Open Land	0.0000	0.0000
84	0000 Open Land	0.0000	0.0000
85	0000 Open Land	0.0000	0.0000
86	0000 Open Land	0.0000	0.0000
87	0000 Open Land	0.0000	0.0000
88	0000 Open Land	0.0000	0.0000
89	0000 Open Land	0.0000	0.0000
90	0000 Open Land	0.0000	0.0000
91	0000 Open Land	0.0000	0.0000
92	0000 Open Land	0.0000	0.0000
93	0000 Open Land	0.0000	0.0000
94	0000 Open Land	0.0000	0.0000
95	0000 Open Land	0.0000	0.0000
96	0000 Open Land	0.0000	0.0000
97	0000 Open Land	0.0000	0.0000
98	0000 Open Land	0.0000	0.0000
99	0000 Open Land	0.0000	0.0000
100	0000 Open Land	0.0000	0.0000

w Labels	Min of LSI coefficient
00-Low Density Urban	2.22
00-Residential, Low Density	3.57
00-Residential, Medium Density	2.81
00-High Density Urban	0.91
00-Residential, High Density	2.72
00-Commercial and Services	0.91
80-Cemeteries	3.42
00-Industrial	1.87
00-Extractive	2.22
10-Strip Mines	2.22
20-Sand & Gravel Pits	2.22
30-Rock Quarries	2.22
00-Holding Ponds	9.08
00-Institutional	2.14
20-Golf courses	3.42
30-Parks and Zoos	3.42
60-Community rec. facilities	3.42
00-Open Land	3.42
10-Improved Pasture	6.96
2120-Unimproved Pasture	8.08
2130-Woodland Pastures	8.87
2140-Row Crops	6.07
2150-Field Crops	6.07
2200-Tree Crops	7.02
2210-Citrus	7.02
2720-Abandoned Groves & Orchards	8.87
2800-Feeding Operations	3.33
2900-Nurseries and Vineyards	6.07
30-2410-Tree Nurseries	7.02

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Water Environment

The water quality and timing is assessed using observational data in two parts.

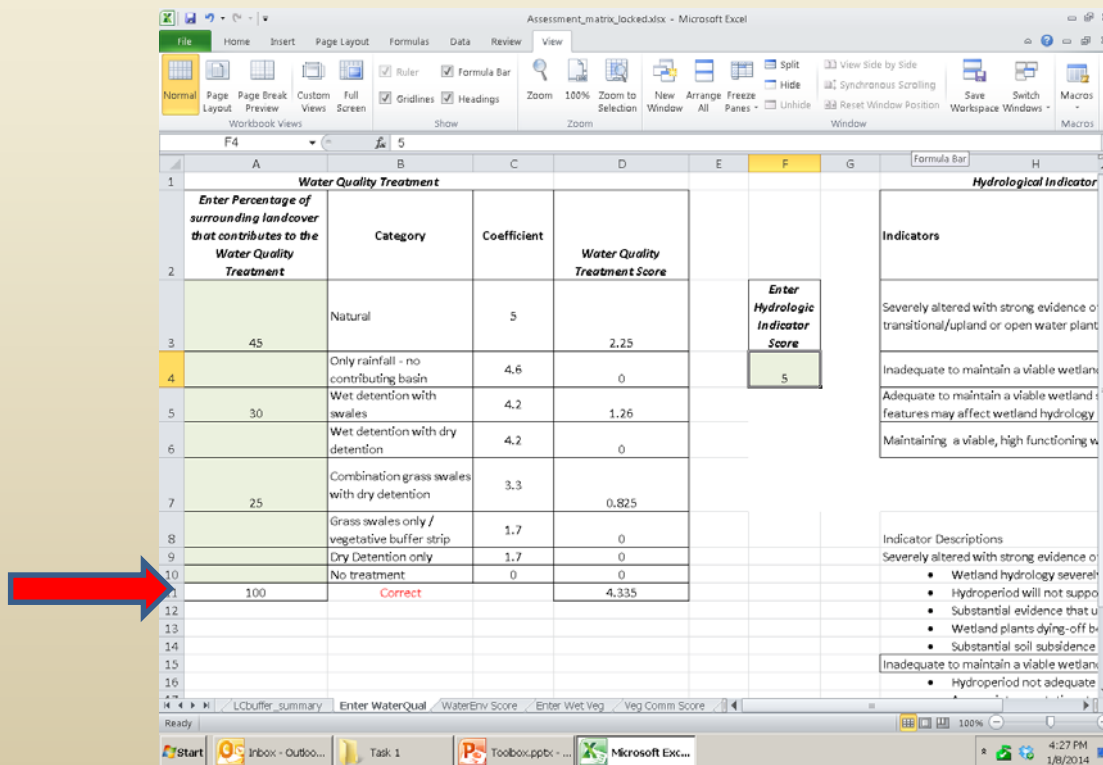
Part 1:

The water quality is assessed by evaluating the water quality treatment that the contributing basin is providing. The percentage of each treatment type is estimated.

The value equals 0 – 5

1. Enter the percentage of each water quality treatment.

Note: If the contributing basin is entirely closed and rain fed a value of 100% is entered for the “Only Rainfall Dependent - no contributing basin” – Water Quality Treatment Score of 4.6



Water Quality Treatment				Hydrological Indicator	
Enter Percentage of surrounding landcover that contributes to the Water Quality Treatment	Category	Coefficient	Water Quality Treatment Score	Enter Hydrologic Indicator Score	Indicators
45	Natural	5	2.25	5	Severely altered with strong evidence of transitional/upland or open water plant
	Only rainfall - no contributing basin	4.6	0		Inadequate to maintain a viable wetland
30	Wet detention with swales	4.2	1.26		Adequate to maintain a viable wetland features may affect wetland hydrology
	Wet detention with dry detention	4.2	0		Maintaining a viable, high functioning w
25	Combination grass swales with dry detention	3.3	0.825		
	Grass swales only / vegetative buffer strip	1.7	0		Indicator Descriptions
	Dry Detention only	1.7	0		Severely altered with strong evidence of
100	No treatment	0	0		Wetland hydrology severely
	Correct		4.335		Hydroperiod will not suppo

The table indicates if the input equals 100% by displaying the red **Correct**.

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Water Environment

Part 2:

The hydrology is evaluated by hydrologic indicators in the wetland, ie. adventitious rooting, lichen lines, staining, upland vegetation encroachment, etc.

The values are 0, 1.7, 3.3 or 5

1. Enter the value for the hydrologic indicator score

The screenshot displays two parts of an Excel spreadsheet. The top part shows a table titled 'Hydrological Indicator' with two columns: 'Indicators' and 'Coefficient'. The bottom part shows a summary table titled 'Water Environment' with columns for 'Water Environment', 'Score', and 'Thresholds'.

Hydrological Indicator	
Indicators	Coefficient
Severely altered with strong evidence of succession to transitional/upland or open water plant community	0
Inadequate to maintain a viable wetland system	1.7
Adequate to maintain a viable wetland system, external features may affect wetland hydrology	3.3
Maintaining a viable, high functioning wetland system	5

A red arrow points to a text box labeled 'Enter Hydrologic Indicator Score' with the value '5' entered.

Water Environment			
	Water Environment	Score	Thresholds
2	Water Quality Treatment	4.335	a perfect water environment would have a maximum score of 10
4	Hydrologic Indicator	5	
5	Sum	9.335	

The spreadsheet will sum the water environment scores and forward the summed value to the Wetland Score tab.

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Water Environment

Indicator Descriptions:

Severely altered with strong evidence of succession to transitional/upland or open water plant community

- Wetland hydrology severely modified
- Hydroperiod will not support wetland plant species associated with the particular community type
- Substantial evidence that upland plant species are encroaching into the wetland because of decreased hydroperiod
- Wetland plants dying-off because of increased hydroperiod
- Substantial soil subsidence of organic soil substrates

Inadequate to maintain a viable wetland system

- Hydroperiod not adequate to maintain the type of wetland system that is being assessed
- Appropriate vegetation stressed or dying from too much or too little water; encroachment of transitional/upland plant species into wetland
- Evidence of soil subsidence of organic soil substrates

Adequate to maintain a viable wetland system, external features may affect wetland hydrology

- Hydroperiod appears adequate, but conditions (canals, ditches, swales, berms, reduced drainage area, culverts, pumps, control elevations, or wellfields) are possibly influencing the hydroperiod of the wetland being assessed
- Plants appear healthy, but some signs of improper hydrology are present
- Little evidence of soil subsidence of organic soil substrates

Maintaining a viable, high functioning wetland system

- Plants appear healthy, no signs of stress from improper hydrology are present
- Wetland has natural hydroperiod
- Not adjacent to features (canals, ditches, swales, berms, reduced drainage area, culverts, pumps, control elevations, or wellfields) that could negatively impact the wetland
- No sign of soil subsidence of organic soil substrates

The spreadsheet will sum the water environment scores and forward the summed value to the Wetland Score tab.

Examples of Water Quality Treatment Categories

Natural



Grass swales with dry detention / vegetative buffer strips



Examples of Hydrologic Indicators

Inadequate to maintain a viable wetland system – Note the pine and facultative broomsedge encroachment



Adequate to maintain a viable wetland system, external features may affect wetland hydrology



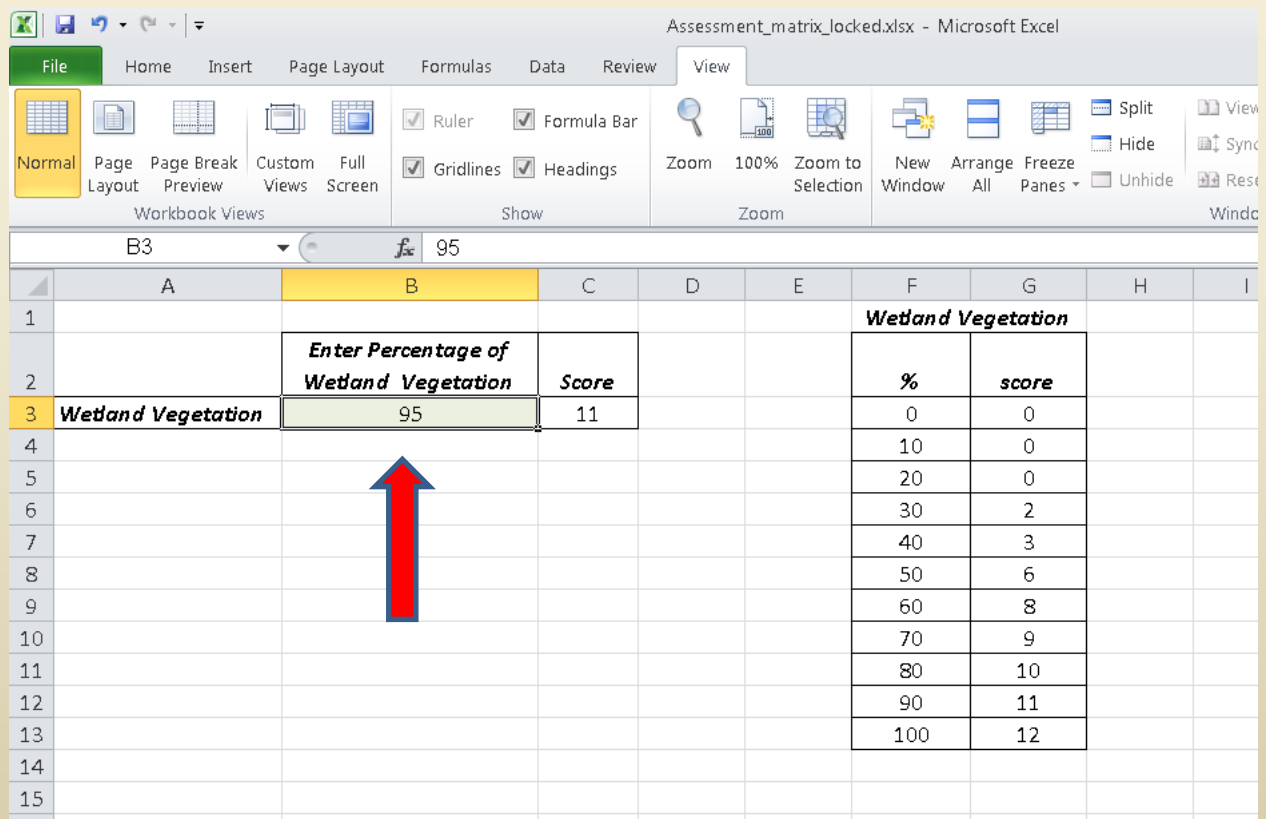
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Vegetative Community

Vegetative Community is evaluated in two parts

Part 1

1. Estimate what percentage of vegetation is considered appropriate for the wetland type (ie. Facultative Wet or Obligate).
2. Enter the percentage in the spreadsheet



Assessment_matrix_locked.xlsx - Microsoft Excel

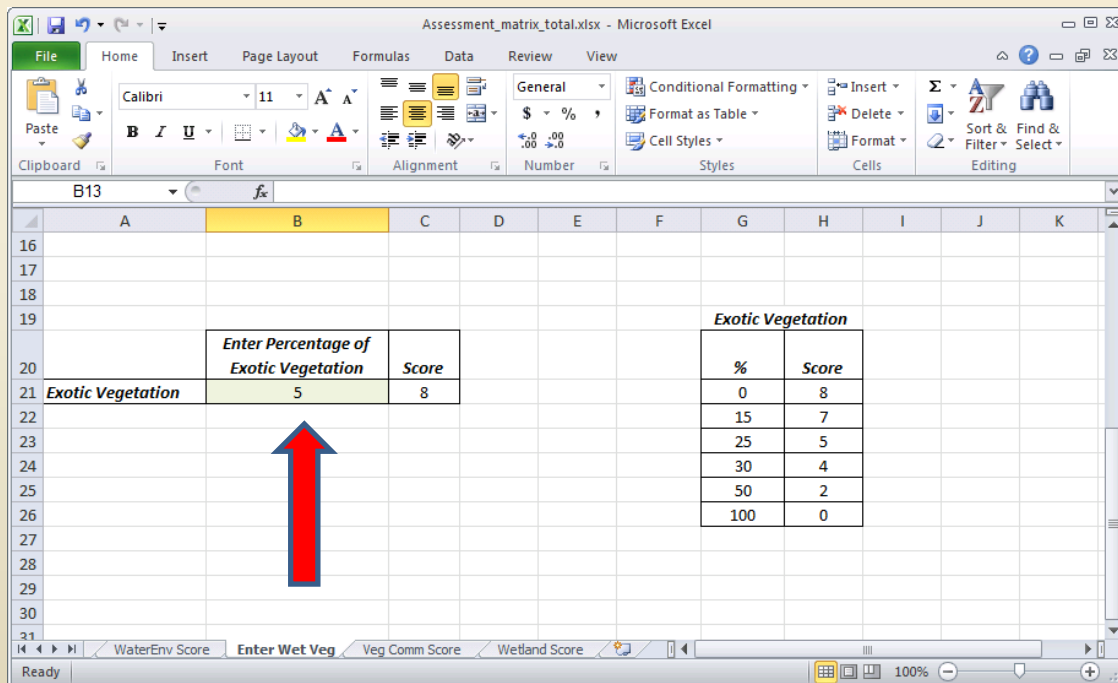
	A	B	C	D	E	F	G	H	I
1						Wetland Vegetation			
2		Enter Percentage of Wetland Vegetation	Score			%	score		
3	Wetland Vegetation	95	11			0	0		
4						10	0		
5						20	0		
6						30	2		
7						40	3		
8						50	6		
9						60	8		
10						70	9		
11						80	10		
12						90	11		
13						100	12		
14									
15									

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Vegetative Community

Part 2

1. Estimate what percentage of vegetation is considered exotic or invasive species
2. Enter the percentage in the spreadsheet
3. The spreadsheet will calculate the score as the average of the appropriateness score and exotic score



The table will average the vegetative scores, unless the exotic value exceeds the wetland value at which point the score will be zero.

The spreadsheet forwards the vegetative score to the Wetland Score tab.

Vegetative Community

Observation of percentage of appropriateness of wetland vegetation – Notice encroachment of pines and facultative broomsedge



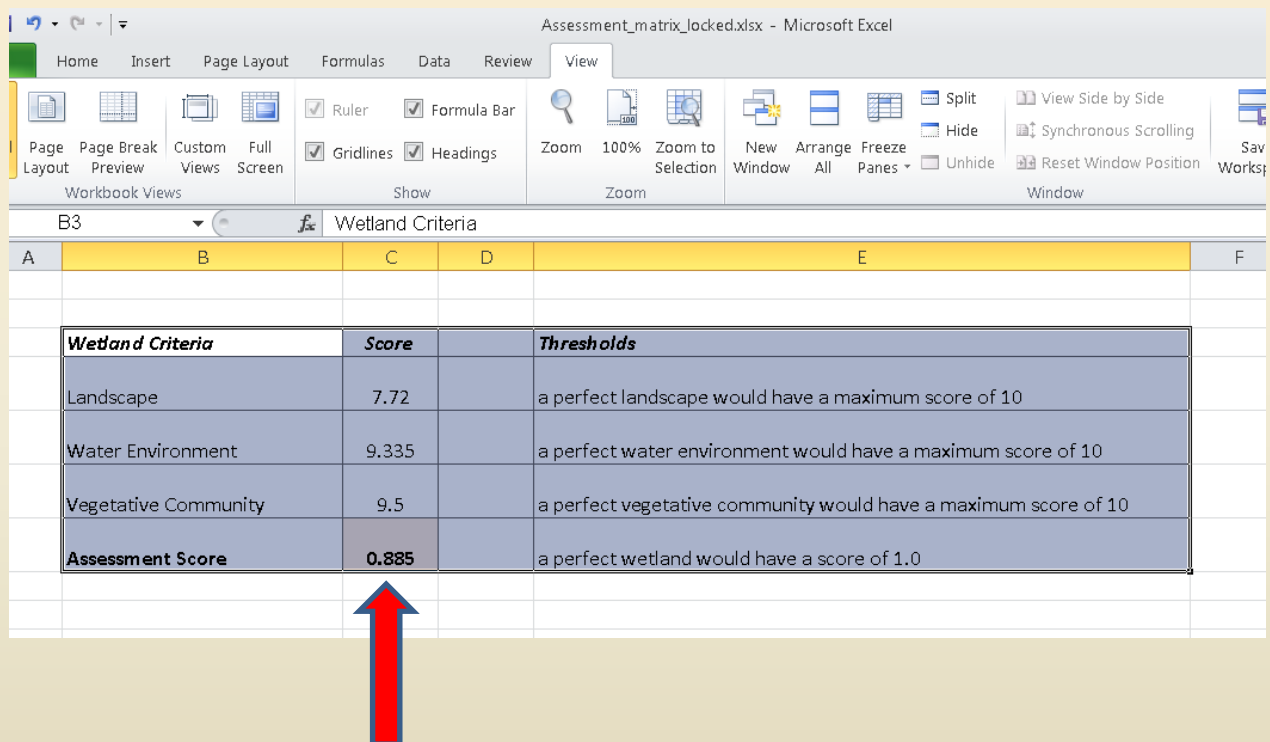
Observation of percentage of exotics or invasive vegetation – Notice density of Brazilian pepper versus no exotic vegetation



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Wetland Score

- The overall wetland assessment score is calculated by summing all three section scores and dividing by 30
- Highest functioning wetlands will have a score near 1.0



Assessment_matrix_locked.xlsx - Microsoft Excel

Wetland Criteria			
Wetland Criteria	Score	Thresholds	
Landscape	7.72	a perfect landscape would have a maximum score of 10	
Water Environment	9.335	a perfect water environment would have a maximum score of 10	
Vegetative Community	9.5	a perfect vegetative community would have a maximum score of 10	
Assessment Score	0.885	a perfect wetland would have a score of 1.0	

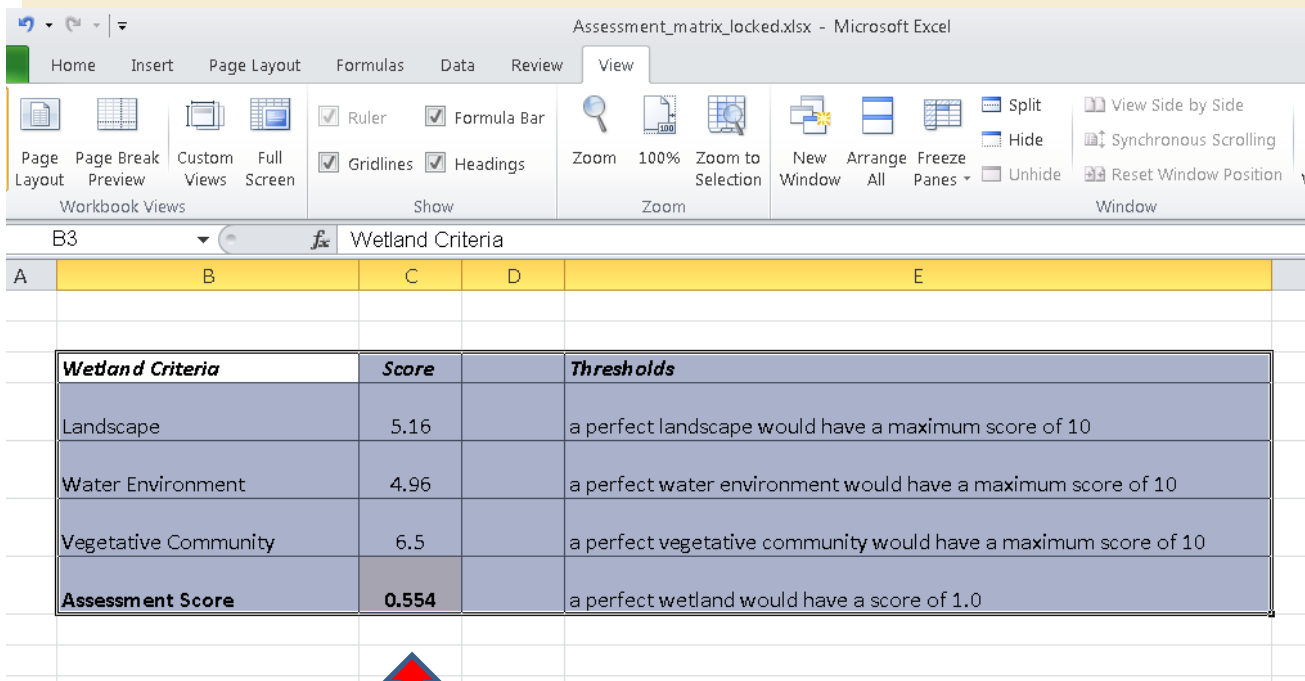
This example wetland ended with a calculated score of 0.885, which would indicate it is a High-Functioning wetland system. This system would require Commission **approval** to allow any impact.

The threshold for assessing if a wetland is considered “High-Functioning” has been determined to be **0.70** or higher.

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Wetland Score

- In this example, the wetland is in poor condition
- The score depicts that the wetland has impacted surroundings, degraded water quality, and a vegetative community composed of 20% exotic plants.



Assessment_matrix_locked.xlsx - Microsoft Excel

Wetland Criteria			
	B	C	D
Wetland Criteria	Score		Thresholds
Landscape	5.16		a perfect landscape would have a maximum score of 10
Water Environment	4.96		a perfect water environment would have a maximum score of 10
Vegetative Community	6.5		a perfect vegetative community would have a maximum score of 10
Assessment Score	0.554		a perfect wetland would have a score of 1.0

This example wetland ended with a calculated score of 0.554, which would indicate it is not a High-Functioning wetland system and could be impacted **without** Commission approval.