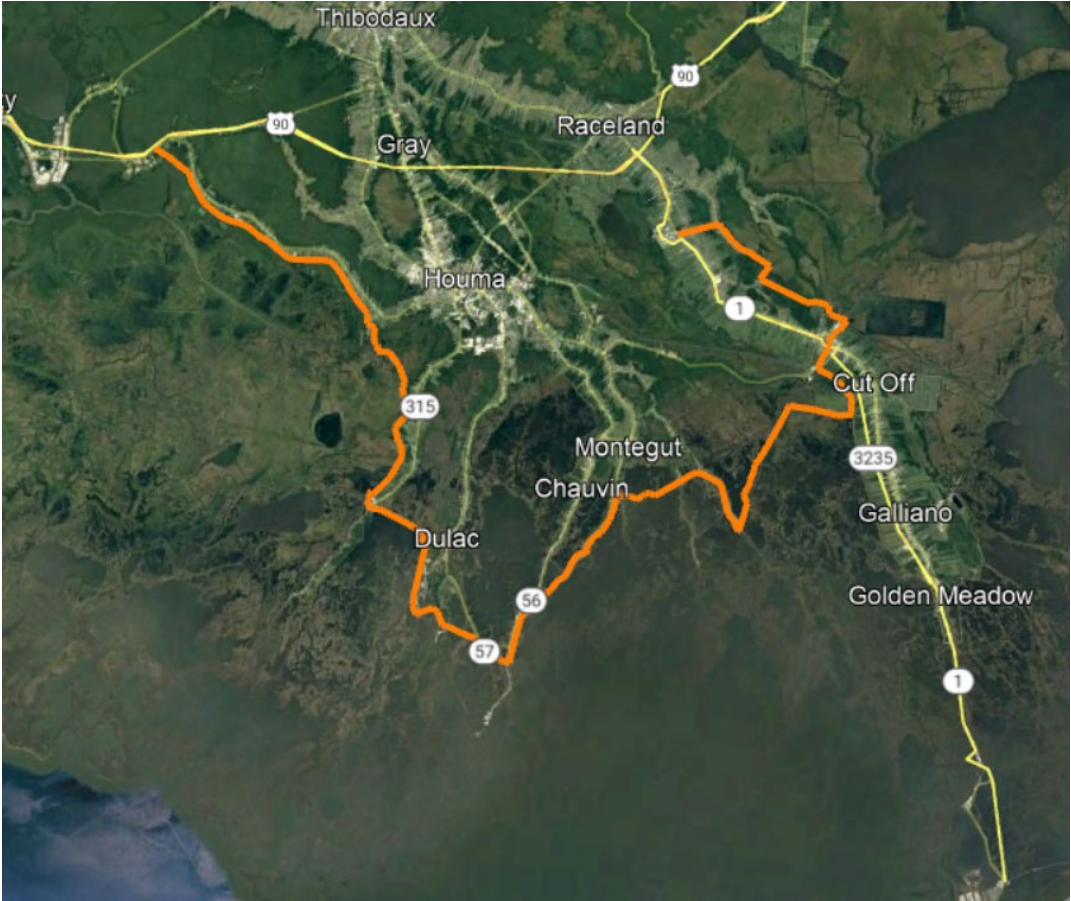


**MORGANZA TO THE GULF
SURVEYS AND BORINGS ANALYSIS
TERREBONNE AND LAFOURCHE PARISHES, LOUISIANA**



APPENDIX D: WETLAND VALUE ASSESSMENT

Model Name Wetland Value Assessment - Swamp Community Model
Model Version 2
Original Model Version December 6, 2018
Date of Last Update March 10, 2010

Objective of Model The swamp model was developed to determine the suitability of swamp habitat in providing resting, foraging, and nesting habitat for a diverse assemblage of wildlife species. The model is generally applied to areas supporting or capable of supporting a canopy of woody vegetation which covers at least 33 percent of the area's surface, and with at least 60 percent of that canopy consisting of any combination of baldcypress, tupelogum, red maple, buttonbush, and/or planertree. If greater than 40 percent of the woody vegetation canopy consists of species such as oaks, hickories, American elm, green ash, sweetgum, sugarberry, boxelder, persimmon, honeylocust, red mulberry, eastern cottonwood, American sycamore, etc., then a bottomland hardwood model should be applied.

Instructions Enter data in green cells. All green cells must contain values (including 0's) in order for the HSI calculation to compute for that year. Always error check data following entry. Click on variable name in column B for a brief description of the variable. Intermediate Calculations are "over flow" calculations that were too long or complex to fit within one cell within the table.

Refer to WVA documents for model structure and background.

Notes

- 1) Enter data in units noted.
- 2) All percentages should be entered as whole numbers between 0 and 100.
- 3) It is recommended that Microsoft Office Excel Version 2007 or higher be used. Earlier versions may result in compatability issues or loss of some functions.

Color Coding Key:

Input
Calculation
Output
No Input
No Input

WETLAND VALUE ASSESSMENT COMMUNITY MO Swamp 2.0

Project: Reach A PACRalign_SurveyOnly_A8andA9-swamp

Project Area: 0

Condition: Future Without Project

Variable		TY	0	TY	1	TY	16
		Class/Value	SI	Class/Value	SI	Class/Value	SI
V1	Stand Structure	% Cover		% Cover		% Cover	
		Overstory		Overstory		Overstory	
		54		54		51	
		Scrub-shrub		Scrub-shrub		Scrub-shrub	
		8		8		4	
		Herbaceous		Herbaceous		Herbaceous	
		100		100		100	
		Class		Class		Class	
		4	0.60	4	0.60	4	0.60
V2	Stand Maturity	Cypress dbh		Cypress dbh		Cypress dbh	
		9.2		9.3		9.6	
		Cypress Basal Area		Cypress Basal Area		Cypress Basal Area	
		130		131		162.5	
		Tupelo et al dbh		Tupelo et al dbh		Tupelo et al dbh	
		7.6		6.1		7	
Tupelo et al. Basal Area		Tupelo et al. Basal Area		Tupelo et al. Basal Area			
		143	0.44	2	0.28	2	0.39
V3	Water Regime	Flow/Exchange		Flow/Exchange		Flow/Exchange	
		Low		Low		Low	
		Floding Duration		Floding Duration		Floding Duration	
		Permanent	0.30	Permanent	0.30	Permanent	0.30
V4	Salinity	Salinity		Salinity		Salinity	
		0.3	1.00	0.3	1.00	0.3	1.00
V5	Forest Size	Class		Class		Class	
		2	0.40	2	0.40	2	0.40
V6	Surrounding Land Use	Values %		Values %		Values %	
		Forest / marsh		45	0.64	45	0.64
		Abandoned Ag		0		0	
		Pasture / Hay		48		48	
		Active Ag		0		0	
Development		7		7			
V7	Disturbance	Class		Class		Class	
		4	1.00	4	1.00	4	1.00
		Class		Class		Class	
		1		1		1	
		HSI =	0.52	HSI =	0.47	HSI =	0.51

WETLAND VALUE ASSESSMENT COMMUNITY MODEL Swamp 2.0

Project: Reach A PACRalign_SurveyOnly_A8andA9-swamp

Project Area: 0

Condition: Future With Project

Variable		TY	0	TY	1	TY	16
		Class/Value	SI	Class/Value	SI	Class/Value	SI
V1	Stand Structure	% Cover		% Cover		% Cover	

		Overstory		Overstory		Overstory	
		54		54		51	
		Scrub-shrub		Scrub-shrub		Scrub-shrub	
		8		8		0	
		Herbaceous		Herbaceous		Herbaceous	
		100		100		0	
		Class		Class		Class	
		4	0.6	4	0.60	3	0.40
V2	Stand Maturity	Cypress dbh		Cypress dbh		Cypress dbh	
		9.2		9.3		10.4	
		Cypress Basal Area		Cypress Basal Area		Cypress Basal Area	
		130		131		150	
		Tupelo et al dbh		Tupelo et al dbh		Tupelo et al dbh	
		7.6		6.1		6.98	
		Tupelo et al. Basal Area		Tupelo et al. Basal Area		Tupelo et al. Basal Area	
		143	0.44	2	0.28	2	0.41
V3	Water Regime	Flow/Exchange		Flow/Exchange		Flow/Exchange	
		Low		Low		Low	
		Flooding Duration		Flooding Duration		Flooding Duration	
		Permanent	0.3	Permanent	0.30	Permanent	0.30
V4	Salinity	Salinity		Salinity		Salinity	
		0.26	1	0.3	1.00	0.3	1.00
V5	Forest Size	Class		Class		Class	
		2	0.4	2	0.40	2	0.40
V6	Surrounding Land Use	Values %		Values %		Values %	
	Forest / marsh	45	0.6427	45	0.64	45	0.64
	Abandoned Ag	0		0		0	
	Pasture / Hay	48		48		48	
	Active Ag	0		0		0	
	Development	7		7		7	
V7	Disturbance	Class		Class		Class	
	Type	4	1	4	1.00	4	1.00
	Distance	Class		Class		Class	
		1		1		1	
		HSI =	0.52	HSI =	0.47	HSI =	0.46

AAHU CALCULATION

Project: Reach A PACRalign_SurveyOnly_ A8andA9-swamp

Future Without Project		x HSI	Total HUs	Cummulative HUs
TY	Acres			
0	0	0.52	0.04	
1	0	0.47	0.04	0.04
16	0	0.51	0.04	0.60
32	0	0.50	0.04	0.65
62	0	0.52	0.04	1.24

Max TY=	62			
			Total	
			CHUs =	2.53
			AAHUs =	0.04

Future With Project			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	0	0.52	0.04	
1	0	0.47	0.00	0.02
16	0	0.46	0.00	0.00
32	0	0.48	0.00	0.00
62	0	0.46	0.00	0.00

**Original CWPPRA
Model Version**

1.0 - March 10, 2010

**CWPPRA Model
Revisions**

Version 1.1 - 1/6/2012

- 1) Minor formatting changes to font type, font size, font color, etc.
- 2) Spreadsheet formatted to populate FWP TY0 with FWOP TY0 values.

Version 1.2 - 4/26/2012

- 1) The previous version contained incorrect line formulas for Variable 4-Salinity. The line formulas have been corrected and are consistent with the Word document.

Version 1.3 - 11/18/2015

- 1) The previous version contained incorrect formulas in cells D199, D200, and D201. Those cells were not referencing the correct target years. The formulas were revised to reference the correct cells.
- 2) Cells corrected to allow entry of decimal values for tupelo basal area.

**USACE Civil Works
Model Revisions**

Version 2.0 - 12/06/2018

- 1) Increased TYs to 15
- 2) Changed Target Year cell calculations to give ERROR message if cell to the left is less than current cell or equal to previous.
- 3) Updated color coding key in Notes tab for white and gray cells.
- 4) Added landscape variables (V5, V6, and V7).
- 5) Updated V1 to include all possible field measurement combinations.

Model Name Wetland Value Assessment - Brackish Marsh Community Model
Model Version USACE Civil Works Model 2.0
Date of Last Update Sep-17
Original Model Version 1.0 - March 10, 2010
Objective of Model The coastal marsh models were developed to determine the suitability of marsh and open water habitats in the Louisiana coastal zone. These models were designed to function at a community level and therefore attempt to define an optimal combination of habitat conditions for all fish and wildlife species utilizing coastal marsh

Instructions Enter data in green cells. All green cells must contain values (including 0's) in order for the HSI calculation to compute for that year.

Always error check data following entry.

Be sure to enter only the needed target years. Unintended values in target year cells will result in erroneous AAHU outputs!!
 If more than 12 target years and or more than ten access openings, contact the WVA Manager.
 Missing target year inputs will also result in incorrect AAHU output !!

Intermediate Calculations are "over flow" calculations that were too long or complex to fit within one cell within the table.

Notes

Refer to WVA documents for model structure and background.

- 1) Enter data in units noted.
- 2) All percentages should be entered as whole numbers between 0 and 100.

Color Coding Key:

Input
Calculation
Output
No Input
No Input

To avoid calculation errors for Interspersion Classes (Variable 3):

- 1) The total of Interspersion Classes 1 to 5 must equal 100%.
- 2) Only whole numerical values between 0 through 100% can be entered in cells for all of the five Interspersion Classes for each target year.
- 3) No cells may be left blank

To avoid calculation errors for Salinity (Variable 5):

When the salinity for the community marsh model exceeds the following levels, consider the next marsh habitat with higher optimal salinity. Refer to WVA documents for further details.

- For Fresh Marsh: Between 0* to 5 ppt.
- For Intermediate Marsh: Between 0* to 7 ppt.
- For Brackish Marsh: Between 0* to 16 ppt
- For Saline Marsh: Between 0* to 35 ppt

* A value of 0 ppt for all models "makes allowances for lower salinities to account for occasions when there is a trend of decreasing salinities through time toward a more intermediate condition." (See WVA documents for details.)

V6 calculator application (Variable 6):

- 1) Under the "V6 Calculator" spreadsheet, use pull-down menu to obtain Structure Rating (R calc) from V6 Table.
- 2) % Wetland accessible by all access points (P) may be determined by examination of aerial photography, knowledge of field conditions, or other appropriate methods.

See "Procedure for Calculating Access Value" Section in WVA Marsh Models Manual for example V6 calculations and further details.
 Structure Rating (R calc) and % wetland (P) must be entered for each opening. "Error" results from missing entry.

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Fresh/Intermediate Marsh

Project: Reach A Surveys-South of Marmande Ridge
FWOP

AAHUs = -0.01

Project Area (ac)	0	1	32	58	62								
% Fresh	100	100	100	100	100								
% Intermediate	0	0	0	0	0								
Target Year (TY)	0	1	32	58	62								
V1: % Emergent	100	100	97	90	89								
V2: % Aquatic	0	0	0	0	0								
V3: Interspersion Class 1	0	0	100	100	85								
V3: Interspersion Class 2	0	0	0	0	15								
V3: Interspersion Class 3	100	100	0	0	0								
V3: Interspersion Class 4	0	0	0	0	0								
V3: Interspersion Class 5	0	0	0	0	0								
V4: %OW <= 1.5ft	0	0	0	0	0								
V5: Salinity (ppt) - Fresh	0.24	0.24	0.38	0.50	0.51								
V5: Salinity (ppt) - INT													
V6: Access Value - Fresh	1.00	1.00	1.00	1.00	1.00								
V6: Access Value - INT													

FWP

Project Area (ac)	0	1	32	58	62								
% Fresh	100	100	100	100	100								
% Intermediate	0	0	0	0	0								
Target Year (TY)	0	1	32	58	62								
V1: % Emergent	100	0	0	0	0								
V2: % Aquatic	0	0	0	0	0								
V3: Interspersion Class 1	0	0	0	0	0								
V3: Interspersion Class 2	0	0	0	0	0								
V3: Interspersion Class 3	100	0	0	0	0								
V3: Interspersion Class 4	0	0	0	0	0								
V3: Interspersion Class 5	0	100	100	100	100								
V4: %OW <= 1.5ft	0	0	0	0	0								
V5: Salinity (ppt) - Fresh	0	0.24	0.38	0.50	0.51								
V5: Salinity (ppt) - INT													
V6: Access Value - Fresh	1.00	1.00	1.00	1.00	1.00								
V6: Access Value - INT													

Computed SIs - do not enter data here !

FWOP SIs													
Target Year (TY)	0	1	32	58	62								
% Emergent	0.63	0.63	0.69	0.82	0.83								
% Aquatic	0.10	0.10	0.10	0.10	0.10								
Interspersion													
Class 1	0.50	0.50	0.75	0.75	0.79								
Class 2													

Interspersion Calculations													
TY	0	1	32	58	62								
	0	0	0.75	0.75	0.75	0	0	0	0	0	0	0	0
	0	0	0	0	1	0	0	0	0	0	0	0	0
	0.5	0.5	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
Salinity Calculations													
TY	0	1	32	58	62								
	1.00	1.00	1.00	1.00	1.00								
Access Value Calculations													
TY	0	1	32	58	62								
	1.00	1.00	1.00	1.00	1.00								

Interspersion Calculations													
TY	0	1	32	58	62								
	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.5	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0
Salinity Calculations													
TY	0	1	32	58	62								
	1.00	1.00	1.00	1.00	1.00								
Access Value Calculations													
TY	0	1	32	58	62								
	1.00	1.00	1.00	1.00	1.00								

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Fresh/Intermediate Marsh

Project: Reach A borings-South of GIWW
FWOP

AAHUs = -0.28

Project Area (ac)	1	1	1										
% Fresh	100	100	100										
% Intermediate	0	0	0										
Target Year (TY)	0	1	62										
V1: % Emergent	94	94	92										
V2: % Aquatic	50	50	40										
V3: Interspersion Class 1	100	100	100										
V3: Interspersion Class 2	0	0	0										
V3: Interspersion Class 3	0	0	0										
V3: Interspersion Class 4	0	0	0										
V3: Interspersion Class 5	0	0	0										
V4: %OW <= 1.5ft	0	0	0										
V5: Salinity (ppt) - Fresh	0.24	0.24	0.51										
V5: Salinity (ppt) - INT													
V6: Access Value - Fresh	1.00	1.00	1.00										
V6: Access Value - INT													

FWP

Project Area (ac)	1	1	1										
% Fresh	100	100	100										
% Intermediate	0	0	0										
Target Year (TY)	0	1	62										
V1: % Emergent	94	0	0										
V2: % Aquatic	50	0	0										
V3: Interspersion Class 1	100	0	0										
V3: Interspersion Class 2	0	0	0										
V3: Interspersion Class 3	0	0	0										
V3: Interspersion Class 4	0	0	0										
V3: Interspersion Class 5	0	100	100										
V4: %OW <= 1.5ft	0	0	0										
V5: Salinity (ppt) - Fresh	0	0.24	0.51										
V5: Salinity (ppt) - INT													
V6: Access Value - Fresh	1.00	1.00	1.00										
V6: Access Value - INT													

Computed SIs - do not enter data here !

FWOP SIs													
Target Year (TY)	0	1	62										
% Emergent	0.74	0.74	0.78										
% Aquatic	0.90	0.90	0.74										
Interspersion													
Class 1	0.75	0.75	0.75										
Class 2													

Interspersion Calculations													
TY	0	1	62										
	0.75	0.75	0.75	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
Salinity Calculations													
TY	0	1	62										
	1.00	1.00	1.00										
Access Value Calculations													
TY	0	1	62										
	1.00	1.00	1.00										

Interspersion Calculations													
TY	0	1	62										
	0.75	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0
Salinity Calculations													
TY	0	1	62										
	1.00	1.00	1.00										
Access Value Calculations													
TY	0	1	62										
	1.00	1.00	1.00										

Class 3														
Class 4														
Class 5														
%OW <= 1.5ft	0.10	0.10	0.10											
Salinity (ppt)														
fresh	1.00	1.00	1.00											
intermediate														
Access Value														
fresh	1.00	1.00	1.00											
intermediate														
Emergent Marsh HSI =	0.80	0.80	0.83											
Open Water HSI =	0.86	0.86	0.76											
FWP SIs														
Target Year (TY)	0	1	62											
% Emergent	0.74	0.10	0.10											
% Aquatic	0.90	0.10	0.10											
Interspersion														
Class 1	0.75	0.10	0.10											
Class 2														
Class 3														
Class 4														
Class 5														
%OW <= 1.5ft	0.10	0.10	0.10											
Salinity (ppt)														
fresh	1.00	1.00	1.00											
intermediate														
Access Value														
fresh	1.00	1.00	1.00											
intermediate														
Emergent Marsh HSI =	0.80	0.24	0.24											
Open Water HSI =	0.86	0.23	0.23											

AAHU CALCULATION - EMERGENT MARSH

Project: Reach A borings-South of GIWW

FWOP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
0.607473099	0	0.571025	0.80	0.46	
0.607473099	1	0.571025	0.80	0.46	0.46
0.607473099	62	0.558875	0.83	0.46	28.01

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Fresh/Intermediate Marsh

Project: RchA_NorthSurveyOnlyPACR (poly 635)
FWOP

AAHUs = -0.29

Project Area (ac)	1	1	1	1	1									
% Fresh	100	100	100	100	100									
% Intermediate	0	0	0	0	0									
Target Year (TY)	0	1	9	41	61									
V1: % Emergent	100	100	100	100	100									
V2: % Aquatic	0	0	0	0	0									
V3: Interspersion Class 1	100	100	0	100	100									
V3: Interspersion Class 2	0	0	0	0	0									
V3: Interspersion Class 3	0	0	100	0	0									
V3: Interspersion Class 4	0	0	0	0	0									
V3: Interspersion Class 5	0	0	0	0	0									
V4: %OW <= 1.5ft	0	0	0	0	0									
V5: Salinity (ppt) - Fresh	0.24	0.24	0.28	0.42	0.51									
V5: Salinity (ppt) - INT														
V6: Access Value - Fresh	1.00	1.00	1.00	1.00	1.00									
V6: Access Value - INT														

FWP

Project Area (ac)	1	0	0	0	0									
% Fresh	100	100	100	100	100									
% Intermediate	0	0	0	0	0									
Target Year (TY)	0	1	9	41	61									
V1: % Emergent	100	0	0	0	0									
V2: % Aquatic	0	0	0	0	0									
V3: Interspersion Class 1	100	0	0	0	0									
V3: Interspersion Class 2	0	0	0	0	0									
V3: Interspersion Class 3	0	0	0	0	0									
V3: Interspersion Class 4	0	0	0	0	0									
V3: Interspersion Class 5	0	100	100	100	100									
V4: %OW <= 1.5ft	0	0	0	0	0									
V5: Salinity (ppt) - Fresh	0.24	0	0	0	0									
V5: Salinity (ppt) - INT														
V6: Access Value - Fresh	1.00	0.01	0.01	0.01	0.01									
V6: Access Value - INT														

ERROR ERROR ERROR ERROR

Computed SIs - do not enter data here !

FWOP SIs														
Target Year (TY)	0	1	9	41	61									
% Emergent	0.63	0.63	0.63	0.63	0.63									
% Aquatic	0.10	0.10	0.10	0.10	0.10									
Interspersion														
Class 1	0.75	0.75	0.50	0.75	0.75									
Class 2														

Interspersion Calculations														
TY	0	1	9	41	61									
	0.75	0.75	0	0.75	0.75	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0.5	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salinity Calculations														
TY	0	1	9	41	61									
	1.00	1.00	1.00	1.00	1.00									
Access Value Calculations														
TY	0	1	9	41	61									
	1.00	1.00	1.00	1.00	1.00									

Interspersion Calculations														
TY	0	1	9	41	61									
	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0
Salinity Calculations														
TY	0	1	9	41	61									
	1.00													
Access Value Calculations														
TY	0	1	9	41	61									
	1.00	0.31	0.31	0.31	0.31									

Class 3															
Class 4															
Class 5															
%OW <= 1.5ft	0.10	0.10	0.10	0.10	0.10										
Salinity (ppt)															
fresh	1.00	1.00	1.00	1.00	1.00										
intermediate															
Access Value															
fresh	1.00	1.00	1.00	1.00	1.00										
intermediate															
Emergent Marsh HSI =	0.72	0.72	0.70	0.72	0.72										
Open Water HSI =	0.28	0.28	0.26	0.28	0.28										
FWP SIs															
Target Year (TY)	0	1	9	41	61										
% Emergent	0.63	0.10	0.10	0.10	0.10										
% Aquatic	0.10	0.10	0.10	0.10	0.10										
Interspersion															
Class 1	0.75	0.10	0.10	0.10	0.10										
Class 2															
Class 3															
Class 4															
Class 5															
%OW <= 1.5ft	0.10	0.10	0.10	0.10	0.10										
Salinity (ppt)															
fresh	1.00	0.00	0.00	0.00	0.00										
intermediate															
Access Value															
fresh	1.00	0.31	0.31	0.31	0.31										
intermediate															
Emergent Marsh HSI =	0.72	0.10	0.10	0.10	0.10										
Open Water HSI =	0.28	0.12	0.12	0.12	0.12										

AAHU CALCULATION - EMERGENT MARSH

Project: RchA_NorthSurveyOnlyPACR (poly 635)

FWOP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
0.6012	0	0.6012	0.72	0.44	
0.6012	1	0.6012	0.72	0.44	0.44
0.6012	9	0.6012	0.70	0.42	3.41
0.6012	41	0.6012	0.72	0.44	13.66
0.6012	61	0.6012	0.72	0.43	8.70

Original Model Version 1.0 - March 10, 2010

Model Revisions

Version 1.1 - 11/15/2011

- 1) Spreadsheet formatted to populate FWP TY0 with FWOP TY0 values.
- 2) Spreadsheet formatted to allow entry of any value in Marsh and Water acreage cells in AAHU calculation section.
- 3) Minor formatting changes to font type, font size, font color, etc.

User Friendly Revisions Version 2.2
7/28/2015

- 1) Added input cells for input of unique project area acres for each TY in both FWOP and FWP.
- 2) Added column in acreage calc region to display project area acreages.
- 3) Edited formulas to automatically calculate marsh and water acreages.
- 4) Edited formulas for HSIs and HUs to not display numbers/ref error messages in rows below the last TY.

Model checked against V1.1 model - same AAHU outputs !!

8/20/2015

- 1) Added 3 more target years.
- 2) Re-arranged input page to facilitate pasting in rows of input by eliminating blanks cells and rows.
- 3) Locked portions of the model page - password = FWS
- 4) Inserted AAHU output at top of page to avoid having to scroll down to see results.
- 5) Added ERROR warnings below green input field to warn of computation errors.

Model Version Update: Civil Works ver. 2.0

8/4/2017 Model updated per Battelle (2010) Comment #10 as part of USACE PMIP
See Revised WVA Procedure Manual 8/2/2017

8/4/2017

- 1) V5 formatted to give error message for negative and non-numerical values.
- 2) Added error alert to only allow values greater than 0 for project area.
- 3) Updated cell format; all cells where user enters data are green.
- 4) Changed Target Year cell calculations to give ERROR message if cell to the left is less than current cell.

9/25/2017

- 1) Included V6 Calculator sheet for Fresh and Intermediate Marsh to provide P & R calculations for each TY (See "Notes" tab).
- 2) Linked V6 Calculator to populate V6 in Fresh-Intermediate Marsh spreadsheet.

Model Name Wetland Value Assessment - Bottomland Hardwoods Community Model
Model Version 1.2
Original Model Version March 10, 2010
Date of Last Update December 6, 2018

Objective of Model The bottomland hardwood model was developed to determine the suitability of the habitat in providing resting, foraging, and nesting habitat for a diverse assemblage of wildlife species. Bottomland hardwoods are defined as an area supporting or capable of supporting a canopy of woody vegetation of which greater than 40 percent consists of tree species such as oaks, hickories, American elm, cedar elm, green ash, sweetgum, sugarberry, boxelder, common persimmon, honeylocust, red mulberry, eastern cottonwood, black willow, American sycamore, etc.

If 60 percent of the woody canopy consists of any combination of baldcypress, tupelogum, red maple, buttonbush, and/or planertree, the fresh swamp model should be applied.

Instructions Enter data in green cells. All green cells must contain values (including 0's) in order for the HSI calculation to compute for that year.
Always error check data following entry.
Click on variable name in column B for a brief description of the variable.
Intermediate Calculations are "over flow" calculations that were too long or complex to fit within one cell within the table.

Refer to WVA documents for model structure and background.

Notes

- 1) Enter data in units noted.
- 2) All percentages should be entered as whole numbers between 0 and 100.
- 3) It is recommended that Microsoft Office Excel Version 2007 or higher be used.
Earlier versions may result in compatability issues or loss of some functions.

Input
Calculation
Output
No Input
No Input

To avoid calculation errors for Surrounding Land Use (Variable 6):

- 1) The total of land use categories must equal 100%.
- 2) Only whole numerical values between 0 through 100% can be entered in cells for all of the five land use categories for each target year.
- 3) No cells may be left blank.

Original CWPPRA**Model Version**

1.0 - March 10, 2010

CWPPRA Model**Revisions**

Version 1.1 - 1/6/2012

- 1) Minor formatting changes to font type, font size, font color, etc.
- 2) Spreadsheet formatted to populate FWP TY0 with FWOP TY0 values.

Version 1.2 - 7/16/2014

- 1) Corrected hydrology, variable 4, flow/exchange = low and flooding duration = seasonal calculated an SI of 0.35 but should have been 0.65 according to manual.
- 2) Revised formuals for V6, surrounding land use; used formuals from first column that will require all rows to have a digit entered (formula uses OR instead of AND) per Notes tab.

Version 1.3 - 1/13/2015

- 1) Placed version name in cell a2 and "acres" in cell g4
- 2) Linked data cell between TY0 FWOP & TY0 FWP columns for all variables except V4 to get Habitat Suitability Index to display for TY0 FWP; replaced IF statements.

USACE Civil Works**Model Revisions**

Version 1.2 - 12/6/2018

- 1) Increased TYs to 15
- 2) Changed Target Year cell calculations to give ERROR message if cell to the left is less than current cell or equal to previous.
- 3) Updated color coding key in Notes tab for white and gray cells.
- 4) Revised V6 formula - updated weighting for non-habitat

Version 1.2a - 3/8/2023

Revised to a user-friendly format. All formulas remain unchanged and same results produced as version 1.2

WETLAND VALUE ASSESSMENT COMMUNITY MODEL

Bottomland Hardwoods v1.2a

Project: A7 Surveys

Acres: 0.016695

FWOP			TY =					
			0	1	16	32	47	61
Variable - Description		Class	Value	Value	Value	Value	Value	Value
V1	Tree Species Composition	Class	5	5	5	5	1	1
V2	Maturity	Age (yrs)						
		Dbh	9.2	9.32	9.8	10.4	0	0
V3		Understory (%)	50	50	50	30	60	100
		Midstory (%)	70	70	65	45	0	0
V4	Hydrology	Flow/Exchange	Low	Low	Low	Low	Low	Low
		Flooding Duration	Semi-Permanent	Semi-Permanent	Semi-Permanent	Semi-Permanent	Permanent	Permanent
V5	Forest Size	Class	4	4	4	4	1	1
V6	Surrounding Land Use	Forest / marsh	47	47	47	47	47	47
		Abandoned Ag	0	0	0	0	0	0
		Pasture / Hay	45	45	45	45	45	45
		Active Ag	0	0	0	0	0	0
		Development	8	8	8	8	8	8
V7	Disturbance	Disturbance Type	4	4	4	4	4	4
		Distance	3	3	3	3	3	3

FWP			TY =					
			0	1	16	32	47	61
Variable - Description		Class	Value	Value	Value	Value	Value	Value
V1	Tree Species Composition	Class	5	5	5	5	1	1
V2	Maturity	Age (yrs)						
		Dbh	9.2	9.32	9.8	10.4	0	0
V3		Understory (%)	50	0	0	0	0	0
		Midstory (%)	70	0	0	0	0	0
V4	Hydrology	Flow/Exchange	Low	Low	Low	Low	Low	Low
		Flooding Duration	Semi-Permanent	Semi-Permanent	Semi-Permanent	Semi-Permanent	Permanent	Permanent
V5	Forest Size	Class	4	4	4	4	1	1
V6	Surrounding Land Use	Forest / marsh	47	47	47	47	47	47
		Abandoned Ag	0	0	0	0	0	0
		Pasture / Hay	45	45	45	45	45	45
		Active Ag	0	0	0	0	0	0
		Development	8	8	8	8	8	8
V7	Disturbance	Disturbance Type	4	4	4	4	4	4
		Distance	3	3	3	3	3	3

FWOP SI Calculations			TY =					
			0	1	16	32	47	61
Variable - Description		Class	Value	Value	Value	Value	Value	Value
V1	Tree Species Composition	Class	1.00	1.00	1.00	1.00	UNUSED	UNUSED
V2	Maturity	Age (yrs)						
		Dbh	0.18	0.19	0.22	0.26		
V3		Understory (%)						
		Midstory (%)	0.90	0.90	0.93	1.00	UNUSED	UNUSED
V4	Hydrology	Flow/Exchange						
		Flooding Duration	0.45	0.45	0.45	0.45	0.30	0.30
V5	Forest Size	Class	0.80	0.80	0.80	0.80	UNUSED	UNUSED
V6	Surrounding Land Use	Forest / marsh						
		Abandoned Ag						
		Pasture / Hay	0.65	0.65	0.65	0.65	0.65	0.65
		Active Ag						
		Development						
V7	Disturbance	Disturbance Type	1.00	1.00	1.00	1.00	1.00	1.00
		Distance						
HSI =			0.54	0.54	0.57	0.60		

FWP SI Calculations			TY =					
			0	1	16	32	47	61
Variable - Description		Class	Value	Value	Value	Value	Value	Value
V1	Tree Species Composition	Class	1.00	1.00	1.00	1.00	UNUSED	UNUSED
V2	Maturity	Age (yrs)						
		Dbh	0.18	0.19	0.22	0.26		
V3		Understory (%)						
		Midstory (%)	0.90	0.10	0.10	0.10	UNUSED	UNUSED
V4	Hydrology	Flow/Exchange						
		Flooding Duration	0.45	0.45	0.45	0.45	0.30	0.30
V5	Forest Size	Class	0.80	0.80	0.80	0.80	UNUSED	UNUSED
V6	Surrounding Land	Forest / marsh						
		Abandoned Ag						

WETLAND VALUE ASSESSMENT COMMUNITY MODEL

Bottomland Hardwoods v1.2a

Project: H8 Surveys

Acres: 0.087988

FWOP			TY =					
			0	1	16	32	47	57
Variable - Description			Value	Value	Value	Value	Value	Value
V1	Tree Species Composition	Class	5	5	5	5	5	1
V2	Maturity	Age (yrs)						
		Dbh	13.4	13.6	13.6	13.6	14.4	0
V3		Understory (%)	50	50	50	50	45	100
		Midstory (%)	50	50	50	50	40	0
V4	Hydrology	Flow/Exchange	Low	Low	Low	Low	Low	Low
		Flooding Duration	Temporary	Temporary	Temporary	Temporary	Temporary	semi-Permanent
V5	Forest Size	Class	4	4	4	4	4	4
V6	Surrounding Land Use	Forest / marsh	36	36	36	36	36	36
		Abandoned Ag	0	0	0	0	0	0
		Pasture / Hay	40	40	40	40	40	40
		Active Ag	19	19	19	19	19	19
		Development	5	5	5	5	5	5
V7	Disturbance	Disturbance Type						
		Distance						

FWP			TY =					
			0	1	16	32	47	57
Variable - Description			Value	Value	Value	Value	Value	Value
V1	Tree Species Composition	Class	5	5	5	5	5	1
V2	Maturity	Age (yrs)						
		Dbh	13.4	13.6	13.6	13.6	14.4	0
V3		Understory (%)	50	0	0	0	0	0
		Midstory (%)	50	0	0	0	0	0
V4	Hydrology	Flow/Exchange	Low	Low	Low	Low	Low	Low
		Flooding Duration	Temporary	Temporary	Temporary	Temporary	Temporary	semi-Permanent
V5	Forest Size	Class	4	4	4	4	4	4
V6	Surrounding Land Use	Forest / marsh	36	36	36	36	36	36
		Abandoned Ag	0	0	0	0	0	0
		Pasture / Hay	40	40	40	40	40	40
		Active Ag	19	19	19	19	19	19
		Development	5	5	5	5	5	5
V7	Disturbance	Disturbance Type	4					
		Distance	1					

FWOP SI Calculations			TY =					
			0	1	16	32	47	57
Variable - Description			Value	Value	Value	Value	Value	Value
V1	Tree Species Composition	Class	1.00	1.00	1.00	1.00	1.00	UNUSED
V2	Maturity	Age (yrs)						
		Dbh	0.54	0.56	0.56	0.56	0.63	
V3		Understory (%)						
		Midstory (%)	1.00	1.00	1.00	1.00	1.00	UNUSED
V4	Hydrology	Flow/Exchange						
		Flooding Duration	0.70	0.70	0.70	0.70	0.70	0.45
V5	Forest Size	Class	0.80	0.80	0.80	0.80	0.80	UNUSED
V6	Surrounding Land Use	Forest / marsh						
		Abandoned Ag						
		Pasture / Hay	0.56	0.56	0.56	0.56	0.56	0.56
		Active Ag						
		Development						
V7	Disturbance	Disturbance Type	0.98	0.98	0.98	0.98	0.98	0.98
		Distance						
HSI =			0.77	0.77	0.77	0.77	0.80	

FWP SI Calculations			TY =					
			0	1	16	32	47	57
Variable - Description			Value	Value	Value	Value	Value	Value
V1	Tree Species Composition	Class	1.00	1.00	1.00	1.00	1.00	UNUSED
V2	Maturity	Age (yrs)						
		Dbh	0.54	0.56	0.56	0.56	0.63	
V3		Understory (%)						
		Midstory (%)	1.00	0.10	0.10	0.10	0.10	UNUSED
V4	Hydrology	Flow/Exchange						
		Flooding Duration	0.70	0.70	0.70	0.70	0.70	0.45
V5	Forest Size	Class	0.80	0.80	0.80	0.80	0.80	UNUSED
V6	Surrounding Land	Forest / marsh						
		Abandoned Ag						

	Use	Pasture / Hay Active Ag Development	0.56	0.56	0.56	0.56	0.56	0.56
V7	Disturbance	Disturbance Type Distance	0.98	0.98	0.98	0.98	0.98	0.98
HSI =			0.77	0.57	0.57	0.57	0.59	

AAHU CALCULATION

Project: H8 Surveys

FWOP			Total HUs	Cummulative HUs
TY	Acres	x HSI		
0	0.087988	0.77	0.07	
1	0.087988	0.77	0.07	0.07
16	0.087988	0.77	0.07	1.02
32	0.087988	0.77	0.07	1.09
47	0.087988	0.80	0.07	1.04
57	0.087988		0.00	0.35
61	0.087988		0.00	0.00
61 = Max TY			Total AAHUs = 3.56	
			AAHUs = 0.06	

FWP			Total HUs	Cummulative HUs
TY	Acres	x HSI		
0	0.087988	0.77	0.07	
1	0.087988	0.57	0.05	0.06
16	0.087988	0.57	0.05	0.75
32	0.087988	0.57	0.05	0.80
47	0.087988	0.59	0.05	0.76
57	0.087988		0.00	0.26
61	0.087988		0.00	0.00
61 = Max TY			Total	

WETLAND VALUE ASSESSMENT COMMUNITY MODEL

Bottomland Hardwoods v1.2a

Project: H9 Surveys

Acres: 0.02457

FWOP			TY =					
			0	1	16	32	47	61
Variable - Description			Value	Value	Value	Value	Value	Value
V1	Tree Species Composition	Class	5	5	5	5	1	1
V2	Maturity	Age (yrs)						
		Dbh	13.1	13.3	12.8	13.9	0	0
V3		Understory (%)	25	25	22	20	30	100
		Midstory (%)	50	50	45	65	50	0
V4	Hydrology	Flow/Exchange	Low	Low	Low	Low	Low	Low
		Flooding Duration	Seasonal	Seasonal	Seasonal	Seasonal	Semi-Permanent	Semi-Permanent
V5	Forest Size	Class	1	1	1	1	1	1
V6	Surrounding Land Use	Forest / marsh	34	34	34	34	34	34
		Abandoned Ag	0	0	0	0	0	0
		Pasture / Hay	45	45	45	45	45	45
		Active Ag	15	15	15	15	15	15
		Development	7	7	7	7	7	7
V7	Disturbance	Disturbance Type						
		Distance						

FWP			TY =					
			0	1	16	32	47	61
Variable - Description			Value	Value	Value	Value	Value	Value
V1	Tree Species Composition	Class	5	5	5	5	1	1
V2	Maturity	Age (yrs)						
		Dbh	13.1	13.3	12.8	13.9	0	0
V3		Understory (%)	25	0	0	0	0	0
		Midstory (%)	50	0	0	0	0	0
V4	Hydrology	Flow/Exchange	Low	Low	Low	Low	Low	Low
		Flooding Duration	Seasonal	Seasonal	Seasonal	Seasonal	Permanent	Permanent
V5	Forest Size	Class	1	1	1	1	1	1
V6	Surrounding Land Use	Forest / marsh	34	34	34	34	34	34
		Abandoned Ag	0	0	0	0	0	0
		Pasture / Hay	45	45	45	45	45	45
		Active Ag	15	15	15	15	15	15
		Development	7	7	7	7	7	7
V7	Disturbance	Disturbance Type						
		Distance						

FWOP SI Calculations			TY =					
			0	1	16	32	47	61
Variable - Description			Value	Value	Value	Value	Value	Value
V1	Tree Species Composition	Class	1.00	1.00	1.00	1.00	UNUSED	UNUSED
V2	Maturity	Age (yrs)						
		Dbh	0.51	0.53	0.48	0.59		
V3		Understory (%)						
		Midstory (%)	0.93	0.93	0.88	0.78	UNUSED	UNUSED
V4	Hydrology	Flow/Exchange						
		Flooding Duration	0.65	0.65	0.65	0.65	0.45	0.45
V5	Forest Size	Class	0.20	0.20	0.20	0.20	UNUSED	UNUSED
V6	Surrounding Land Use	Forest / marsh						
		Abandoned Ag						
		Pasture / Hay	0.54	0.54	0.54	0.54	0.54	0.54
		Active Ag						
		Development						
V7	Disturbance	Disturbance Type	0.80	0.80	0.80	0.80	0.80	0.80
		Distance						
HSI =			0.66	0.67	0.65	0.67		

FWP SI Calculations			TY =					
			0	1	16	32	47	61
Variable - Description			Value	Value	Value	Value	Value	Value
V1	Tree Species Composition	Class	1.00	1.00	1.00	1.00	UNUSED	UNUSED
V2	Maturity	Age (yrs)						
		Dbh	0.51	0.53	0.48	0.59		
V3		Understory (%)						
		Midstory (%)	0.93	0.10	0.10	0.10	UNUSED	UNUSED
V4	Hydrology	Flow/Exchange						
		Flooding Duration	0.65	0.65	0.65	0.65	0.30	0.30
V5	Forest Size	Class	0.20	0.20	0.20	0.20	UNUSED	UNUSED
V6	Surrounding Land	Forest / marsh						
		Abandoned Ag						

	Use	Pasture / Hay Active Ag Development	0.54	0.54	0.54	0.54	0.54	0.54
V7	Disturbance	Disturbance Type Distance	0.80	0.80	0.80	0.80	0.80	0.80
HSI =			0.66	0.50	0.49	0.51		

AAHU CALCULATION

Project: H9 Surveys

FWOP			Total HUs	Cummulative HUs
TY	Acres	x HSI		
0	0.02457	0.66	0.02	
1	0.02457	0.67	0.02	0.02
16	0.02457	0.65	0.02	0.24
32	0.02457	0.67	0.02	0.26
47	0.02457		0.00	0.12
61	0.02457		0.00	0.00
61 = Max TY			Total AAHUs = 0.64	
			AAHUs = 0.01	

FWP			Total HUs	Cummulative HUs
TY	Acres	x HSI		
0	0.02457	0.66	0.02	
1	0.02457	0.50	0.01	0.01
16	0.02457	0.49	0.01	0.18
32	0.02457	0.51	0.01	0.20
47	0.02457		0.00	0.09
61	0.02457		0.00	0.00
61 = Max TY			Total	

WETLAND VALUE ASSESSMENT COMMUNITY MODEL

Bottomland Hardwoods v1.2a

Project: H10 Surveys

Acres: 0.020273

FWOP			TY =					
			0	1	16	32	47	61
Variable - Description			Value	Value	Value	Value	Value	Value
V1	Tree Species Composition	Class	5	5	5	5	5	1
V2	Maturity	Age (yrs)						
		Dbh	11.5	11.7	13.1	14.8	16.7	0
V3		Understory (%)	20	20	20	20	15	100
		Midstory (%)	80	80	65	55	40	0
V4	Hydrology	Flow/Exchange	Low	Low	Low	Low	Low	Low
		Flooding Duration	Seasonal	Seasonal	Semi-Permanent	Semi-Permanent	Semi-Permanent	Permanent
V5	Forest Size	Class	2	2	2	2	2	1
V6	Surrounding Land Use	Forest / marsh	34	34	34	34	34	34
		Abandoned Ag	0	0	0	0	0	0
		Pasture / Hay	40	40	40	40	40	40
		Active Ag	20	20	20	20	20	20
		Development	7	7	7	7	7	7
V7	Disturbance	Disturbance Type						
		Distance						

FWP			TY =					
			0	1	16	32	47	61
Variable - Description			Value	Value	Value	Value	Value	Value
V1	Tree Species Composition	Class	5	5	5	5	5	1
V2	Maturity	Age (yrs)						
		Dbh	11.5	11.7	13.1	14.8	16.7	0
V3		Understory (%)	20	0	0	0	0	0
		Midstory (%)	80	0	0	0	0	0
V4	Hydrology	Flow/Exchange	Low	Low	Low	Low	Low	Low
		Flooding Duration	Seasonal	Seasonal	Semi-Permanent	Semi-Permanent	Semi-Permanent	Permanent
V5	Forest Size	Class	2	2	2	2	2	1
V6	Surrounding Land Use	Forest / marsh	34	34	34	34	34	34
		Abandoned Ag	0	0	0	0	0	0
		Pasture / Hay	40	40	40	40	40	40
		Active Ag	20	20	20	20	20	20
		Development	7	7	7	7	7	7
V7	Disturbance	Disturbance Type						
		Distance						

FWOP SI Calculations			TY =					
			0	1	16	32	47	61
Variable - Description			Value	Value	Value	Value	Value	Value
V1	Tree Species Composition	Class	1.00	1.00	1.00	1.00	1.00	UNUSED
V2	Maturity	Age (yrs)						
		Dbh	0.35	0.37	0.51	0.65	0.78	
V3		Understory (%)						
		Midstory (%)	0.70	0.70	0.78	0.83	0.78	UNUSED
V4	Hydrology	Flow/Exchange						
		Flooding Duration	0.65	0.65	0.45	0.45	0.45	0.30
V5	Forest Size	Class	0.40	0.40	0.40	0.40	0.40	UNUSED
V6	Surrounding Land Use	Forest / marsh						
		Abandoned Ag						
		Pasture / Hay	0.53	0.53	0.53	0.53	0.53	0.53
		Active Ag						
		Development						
V7	Disturbance	Disturbance Type	0.78	0.78	0.78	0.78	0.78	0.78
		Distance						
HSI =			0.60	0.61	0.64	0.69	0.72	

FWP SI Calculations			TY =					
			0	1	16	32	47	61
Variable - Description			Value	Value	Value	Value	Value	Value
V1	Tree Species Composition	Class	1.00	1.00	1.00	1.00	1.00	UNUSED
V2	Maturity	Age (yrs)						
		Dbh	0.35	0.37	0.51	0.65	0.78	
V3		Understory (%)						
		Midstory (%)	0.70	0.10	0.10	0.10	0.10	UNUSED
V4	Hydrology	Flow/Exchange						
		Flooding Duration	0.65	0.65	0.45	0.45	0.45	0.30
V5	Forest Size	Class	0.40	0.40	0.40	0.40	0.40	UNUSED
V6	Surrounding Land	Forest / marsh						
		Abandoned Ag						

	Use	Pasture / Hay Active Ag Development	0.53	0.53	0.53	0.53	0.53	0.53
V7	Disturbance	Disturbance Type Distance	0.78	0.78	0.78	0.78	0.78	0.78
		HSI =	0.60	0.47	0.49	0.52	0.55	

AAHU CALCULATION

Project: H10 Surveys

FWOP			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	0.020273	0.60	0.01	
1	0.020273	0.61	0.01	0.01
16	0.020273	0.64	0.01	0.19
32	0.020273	0.69	0.01	0.22
47	0.020273	0.72	0.01	0.22
61	0.020273		0.00	0.10
61 = Max TY			Total AAHUs = 0.74	
			AAHUs = 0.01	

FWP			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	0.020273	0.60	0.01	
1	0.020273	0.47	0.01	0.01
16	0.020273	0.49	0.01	0.15
32	0.020273	0.52	0.01	0.16
47	0.020273	0.55	0.01	0.16
61	0.020273		0.00	0.08
61 = Max TY			Total	