

Tidal Fringe HGM (Interim) *(FCI formulas)*

Biota:

$$[\{V_{\text{edge}} + 2 V_{\text{hydro}} + 0.5V_{\text{nhc}}/3.5\} + V_{\text{typical}}]/2$$

Botanical:

$$V_{\text{typical}}$$

Physical:

$$[V_{\text{slope}} + V_{\text{width}} + V_{\text{rough}} + V_{\text{soil}} + V_{\text{hydro}}]/5$$

Chemical:

$$[V_{\text{typical}} \times V_{\text{hydro}}]^{1/2}$$

Need values for: use the existing methods describes in the Tidal fringe model

V_{edge}

V_{hydro}

V_{nhc}

V_{typical}

V_{slope}

V_{width}

V_{rough}

V_{soil}

- The tidal fringe geo-region for this model to be used is limited to the western fringes of the Gulf of Mexico WETLANDS and is only to be used for a rapid non-controversial estimate of the potential impacts and to see if the proposed mitigation will adequately address the wetland functions that are being impacted.

Variables for HGM (Interim) Tidal Fringe

V_{edge} : the amount of marsh-water meters/hectare

Site Description	Qualitative	Quantitative	Subindex
Marsh shows deterioration due to subsidence large amounts of open water	Very High	Greater than 800 m/ha	0.8
Well developed tidal drainage network present OR Simple tidal network with isolated ponds & depression in the marsh interior OR Large amount of shallow shoreline in relations to the entire area	High	350—800 m/ha	1.0
Simple tidal drainage network ..isolated ponds and depressions are few & lacking	Moderate	200-350 m/ha	0.7
Marsh lack both tidal creeks & isolated ponds & depressions, shoreline is linear or smooth ...Marsh area is large relative to shoreline length. OR the WAA is a depression that is not affected by the daily tide (i.e. high marsh)	Low	Less than 200 m/ha	0.4

V_{hydro} : site hydroperiod or degree of hydrological modifications

Site Description	Subindex
Site is open, no hydrologic restrictions	1.0
Moderate hydrologic restriction (i.e low level berms that overtop freq. by waves, or has mutli- breeches or large numerous culverts)	0.6
Severe hydrologic restriction (high elevation berm with in freq over-top, small culverts, single opening or breech)	0.3
Site receives water only during extreme storm events	0.1
Site is cut off from tidal exchange	0.0

V_{nhc} : number of nekton habitat types present

Habitat types: within 150 ft of the edge of the WAA

Low Marsh	High Marsh	Subtidal creeks	Intertidal creeks
ponds or depressions	SAVs	Oyster Reef	Unvegetative flats
Algal flats	Mangroves	Coarse woody debris	

Number of habitat types	Variable Subindex
1	0.2
2	0.3
3	0.5
4	0.7
5	0.8
6	1.0

V_{typical} : proportion of the site that is covered by vegetation typical of the regional subclass

Invasive species: tallow, alligator weeds, spiny aster, common reed, rattlebox, cattail, flat sedge
(*Sapium sabiferum*, *Alternanthera philoxeroides*, *Aster spinosus*, *Phragmites drummondii*, *Sesbania drummondii*, *Typha sp*, *Cyperus entranianus*)

Total % Cover by typical species	Variable sub-index
10 %	0.1
20 %	0.1
30 %	0.2
40 %	0.4
50 %	0.5
60 %	0.6
70 %	0.7
80 %	0.9
90 %	1.0
100 %	1.0

V_{slope}: distance to water greater than or equal to 6 feet deep

Distance to Navigation Channel or water greater than or equal to 6 ft deep	Variable Sub Index
Less than 150 ft	0.1
151-450 ft	0.5
Greater than 451 ft	1.0

V_{width}: average marsh width.

Mean Width WAA Distance (ft)	Variable Sub Index
0-30 ft	0.1
31-75 ft	0.25
76-150 ft	0.5
151-225 ft	0.6
226-300 ft	0.8
301-375 ft	0.85
376-450 ft	0.9
451-525 ft	0.95
526-600 ft	1.0
Greater than 600 ft	1.0

V_{rough}: Manning's roughness coefficient

$n_{base} + n_{topo} + n_{veg} = \text{manning's end}$

(n_{base})

Sediment surface	0.025	Base value for bare marsh soil.
	0.03	More than 25% of the sediment surface covered with gravel or broken shell

(n_{topo})

Topographic relief	0.001	WAA is flat no microtopographic or macrotopographic relief
	0.005	WAA has 5-25% topographic relief
	0.010	WAA has 26-50% topographic relief
	0.20	WAA has greater than 50% topographic relief

(n_{veg})

Vegetation	Less 50% cover	50-75% cover	76-100% cover	Description of Conditions
	0.025	0.030	0.035	Predominantly Short flexible stem grass (i.e. <i>Spartina alterniflora</i> , <i>S. patens</i> , <i>Distichlis spicata</i>)
	0.035	0.040	0.050	Predominantly short stiff trailing stems (i.e. <i>Batis</i> & <i>Salicornia</i>)
	0.050	0.060	0.070	Predominantly tall flexible grass (i.e. tall <i>Spartina alterniflora</i> , <i>S. cynosuroides</i> , <i>Scirpus</i> sp.).
	0.070	0.100	0.160	Predominantly tall with stiff leaves or mixed with woody shrubs (i.e. <i>Juncus roemerianus</i> , Mangroves, etc.)

FCI variable sub index (rounded appropriately)

Roughness	Variable Sub Index
0.04	0.1
0.05	0.2
0.06	0.4
0.07	0.6
0.08	0.8
0.09	1.0
0.10	1.0

V_{soil}: predominant soil texture

Soil Texture	Variable Sub Index
Sandy	0.2
Sandy loam	0.4
Loam	0.6
Clay loam	0.8
Clay	1.0

Tidal Fringe HGM (Interim) Worksheet

WAA #

Variable	Subindex
V _{edge}	
V _{hydro}	
V _{nhc}	
V _{typical}	
V _{slope}	
V _{width}	
V _{rough}	
V _{soil}	

WAA #

Variable	Subindex
V _{edge}	
V _{hydro}	
V _{nhc}	
V _{typical}	
V _{slope}	
V _{width}	
V _{rough}	
V _{soil}	

WAA #

Variable	Subindex
V _{edge}	
V _{hydro}	
V _{nhc}	
V _{typical}	
V _{slope}	
V _{width}	
V _{rough}	
V _{soil}	

WAA #

Variable	Subindex
V _{edge}	
V _{hydro}	
V _{nhc}	
V _{typical}	
V _{slope}	
V _{width}	
V _{rough}	
V _{soil}	

***Tidal Fringe (Interim HGM) Worksheet
Functional Capacity Index (FCI)***

Biota:

$$[\{V_{\text{edge}} + 2 V_{\text{hydro}} + 0.5V_{\text{nhc}}/3.5\} + V_{\text{typical}}]/2$$

Pre: $[\{ ______ + 2______ + 0.5 \times ______ /3.5\} + ______]/2 = \text{FCI} ;$

Post: $[\{ ______ + 2______ + 0.5 \times ______ /3.5\} + ______]/2 = \text{FCI}$

Botanical:

$$V_{\text{typical}}$$

Pre: $______ = \text{FCI}$

Post: $______ = \text{FCI}$

Physical:

$$[V_{\text{slope}} + V_{\text{width}} + V_{\text{rough}} + V_{\text{soil}} + V_{\text{hydro}}]/5$$

Pre: $[______ + ______ + ______ + ______ + ______]/5 = \text{FCI}$

Post: $[______ + ______ + ______ + ______ + ______]/5 = \text{FCI}$

Chemical:

$$[V_{\text{typical}} \times V_{\text{hydro}}]1/2$$

Pre: $[______ \times ______]1/2 = \text{FCI}$

Post: $[______ \times ______]1/2 = \text{FCI}$

Functional Capacity Units (FCU); FCI x wetland acres per WAA...

WAA#	Pre-project FCUs	Post project FCUs
Biota		
Botanical		
Physical		
Chemical		

Tidal Fringe (Interim HGM) Worksheet
Functional Capacity Index (FCI)
 Mitigation

Biota:

$$[\{ V_{\text{edge}} + 2 V_{\text{hydro}} + 0.5 V_{\text{nhc}} / 3.5 \} + V_{\text{typical}}] / 2$$

Pre: [{ _____ + 2 _____ + 0.5 x _____ / 3.5 } + _____] / 2 = FCI ;

Post: [{ _____ + 2 _____ + 0.5 x _____ / 3.5 } + _____] / 2 = FCI

Botanical:

$$V_{\text{typical}}$$

Pre: _____ = FCI

Post: _____ = FCI

Physical:

$$[V_{\text{slope}} + V_{\text{width}} + V_{\text{rough}} + V_{\text{soil}} + V_{\text{hydro}}] / 5$$

Pre: [_____ + _____ + _____ + _____ + _____] / 5 = FCI

Post: [_____ + _____ + _____ + _____ + _____] / 5 = FCI

Chemical:

$$[V_{\text{typical}} \times V_{\text{hydro}}] / 2$$

Pre: [_____ x _____] / 2 = FCI

Post: [_____ x _____] / 2 = FCI

Mitigation

Functional Capacity Units (FCU); FCI x wetland acres per WAA...

WAA#	Pre-project FCUs	Post project FCUs (init.)	Post Project FCUs (3 rd)
Biota			
Botanical			
Physical			
Chemical			

Post project FCU – Pre-project FCU = Net gain/loss

WAA#	Net gain/loss	Net gain/loss	Net gain/loss
Biota			
Botanical			
Physical			
Chemical			

***Tidal Fringe (Interim HGM) Worksheet
Functional Capacity Unit (FCU)
Impact(s) sheet***

Potential Functional Capacity impacts

{i.e. WAA 1 FCU biota loss (bl) + WAA 2 bl + WAA 3 bl + WAA 4 bl = net FCU loss}

Biota:

Botanical:

Physical:

Chemical:

*** Net FCU loss is calculated by deducting the post project FCU from the pre-project FCU per function capacity. Different functional capacity index should NEVER be summarized.**