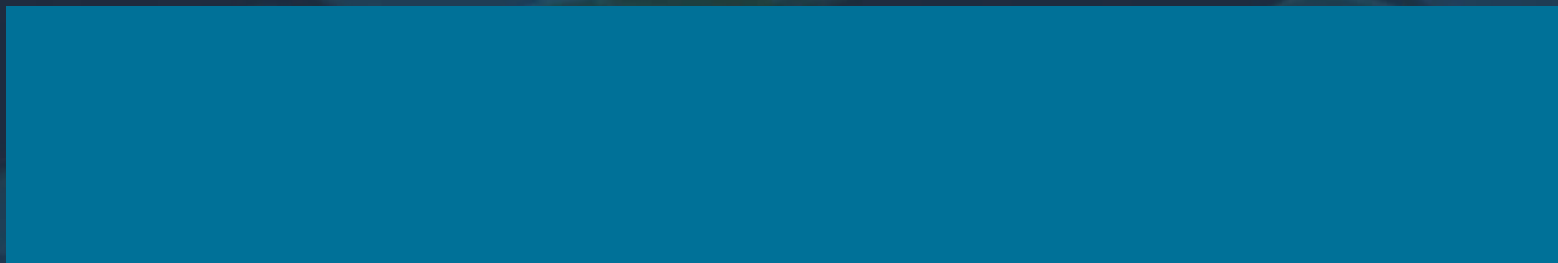




Standards for a
Sustainable Future



Steve Emmett-Mattox

- Applicability Conditions
- Additionality

General Applicability Conditions (REDD+ MF)

- REDD+ MF sets out applicability conditions for each of the VCS project categories covered including WRC
- ARR projects must apply procedures in CDM methodology AR-ACM0003 (Afforestation and reforestation of lands except wetlands), but wetlands-related procedures are in the PEAT and TW modules. Described in BL-ARR and M-ARR
- WRC has general and specific applicability conditions
- Specific applicability conditions exist for each module and must be met (BL-TW and M-TW have no specific applicability conditions)

WRC Applicability Conditions

- WRC encompasses Restoring Wetland Ecosystems (RWE) and Conservation of Intact Wetlands (CIW)
- Peatlands and tidal wetlands have both shared and individual applicability conditions
- If tidal wetlands include significant organic soils, peatland procedures must be followed

Tidal Wetland Restoration

Project activities restoring tidal wetlands may include any of the following, or combinations of the following:

- Creating, restoring and/or managing hydrological conditions (e.g., removing tidal barriers, improving hydrological connectivity, restoring tidal flow to wetlands or lowering water levels on impounded wetlands)
- Altering sediment supply (e.g., beneficial use of dredge material or diverting river sediments to sediment-starved areas)
- Changing salinity characteristics (e.g., restoring tidal flow to tidally-restricted areas)
- Improving water quality (e.g., reducing nutrient loads leading to improved water clarity to expand seagrass meadows, recovering tidal and other hydrologic flushing and exchange or reducing nutrient residence time)
- (Re-)introducing native plant communities (e.g., reseeding or replanting)
- Improving management practice(s) (e.g., removing invasive species, reduced grazing)
- In RWE-ARR project activities, the prescribed burning of herbaceous and shrub aboveground biomass (cover burns) may occur

Conservation of Intact Wetlands (CIW)

Project activities conserving tidal wetlands may include:

- Protecting at-risk wetlands (e.g., establishing conservation easements, establishing community supported management agreements, establishing protective government regulations, and preventing disruption of water and/or sediment supply to wetland areas)
- Improving water management on drained wetlands
- Maintaining or improving water quality for seagrass meadows
- Recharging sediment to avoid drowning of coastal wetlands
- Creating accommodation space for wetlands migrating with sea-level rise

WRC Applicability Conditions - Hydrology

- Project activities that lower the water table are not eligible, unless the project converts open water to tidal wetlands, or improves the hydrological connection to impounded waters
- Hydrological connectivity of the project area with adjacent areas may not lead to a significant increase in GHG emissions outside the project area

WRC Applicability Conditions – Soil Organic Carbon

Projects activities must:

- Intend to sequester carbon through sedimentation and/or vegetation development, resulting in accumulation or maintenance of (SOC) stock

OR

- Increase salinity to reduce CH₄ emissions, but still account for any changes in SOC stocks

WRC Applicability Conditions - Other

- Project activities that include the burning of organic soil are not eligible
- If nitrogen fertilizer(s) are applied in the project area during the project crediting period, the project is not eligible

Restoring Wetland Ecosystems (RWE)

Applicability Conditions

Prior to the project start date, the project area must meet the following conditions:

a) The area is free of any land use that could be displaced outside the project area, demonstrated by:

- The project area has been abandoned for two or more years prior to the project start date; or
- Use of the project area for commercial purposes (i.e., trade) is not profitable as a result of salinity intrusion, market forces, or other factors. In addition, timber harvesting in the baseline scenario within the project area does not occur; or
- Degradation of additional wetlands for new agricultural/aquacultural sites within the country will not occur or is prohibited by enforced law

OR

RWE - *continued*

OR

b) The area is under a land use that could be displaced outside the project area, although in such case, baseline emissions from this land use must not be accounted for, and where degradation of additional wetlands for new agricultural/aquacultural sites within the country will not occur or is prohibited by enforced law.

OR

c) The area is under a land use that will continue at a similar or greater level of service or production during the project crediting period (e.g., reed or hay harvesting, collection of fuelwood, subsistence harvesting, commercial fishing).

Avoiding Unplanned Wetland Degradation (AUWD)

Avoiding unplanned wetland degradation activities are eligible under the following condition:

- Baseline agents of wetland degradation (i) cause an alteration in the hydrology of the project area (involving drainage, interrupted sediment supply, or both) and/or a loss of soil organic carbon; (ii) have no documented and uncontested legal right to degrade the wetland; and (iii) are either residents in the reference region for wetland degradation or immigrants. Under any other condition, this methodology must not be used

This is similar to Avoiding Unplanned Deforestation and/or Degradation (AUDD) – the same principles regarding land use, degradation factors and agents apply.

Avoiding Planned Wetland Degradation (APWD)

Avoiding planned wetland degradation activities are eligible under the following condition:

- Conversion of intact or partially altered wetlands to a degraded condition must be legally permitted

This is similar to Avoiding Planned Deforestation (APD).

Additionality – VMD0052 (ADD-AM)

Demonstration of additionality of tidal wetland restoration and conservation project activities

All WRC project activities using VM0007 are additional.

All other projects activities, including non-tidal wetlands such as peatlands, must use a project-specific approach (“project method”) to demonstrate additionality.

Additionality - *continued*

- Methodologies may adopt a standardized method to determine additionality for a class of project activities, rather than requiring project level determinations.
- The Activity Method is one such standardized approach.
- Seeks to incentivize under-utilized approaches (activities) to achieving GHG reductions.
- All projects meeting the eligibility criteria are on the positive list and deemed additional.

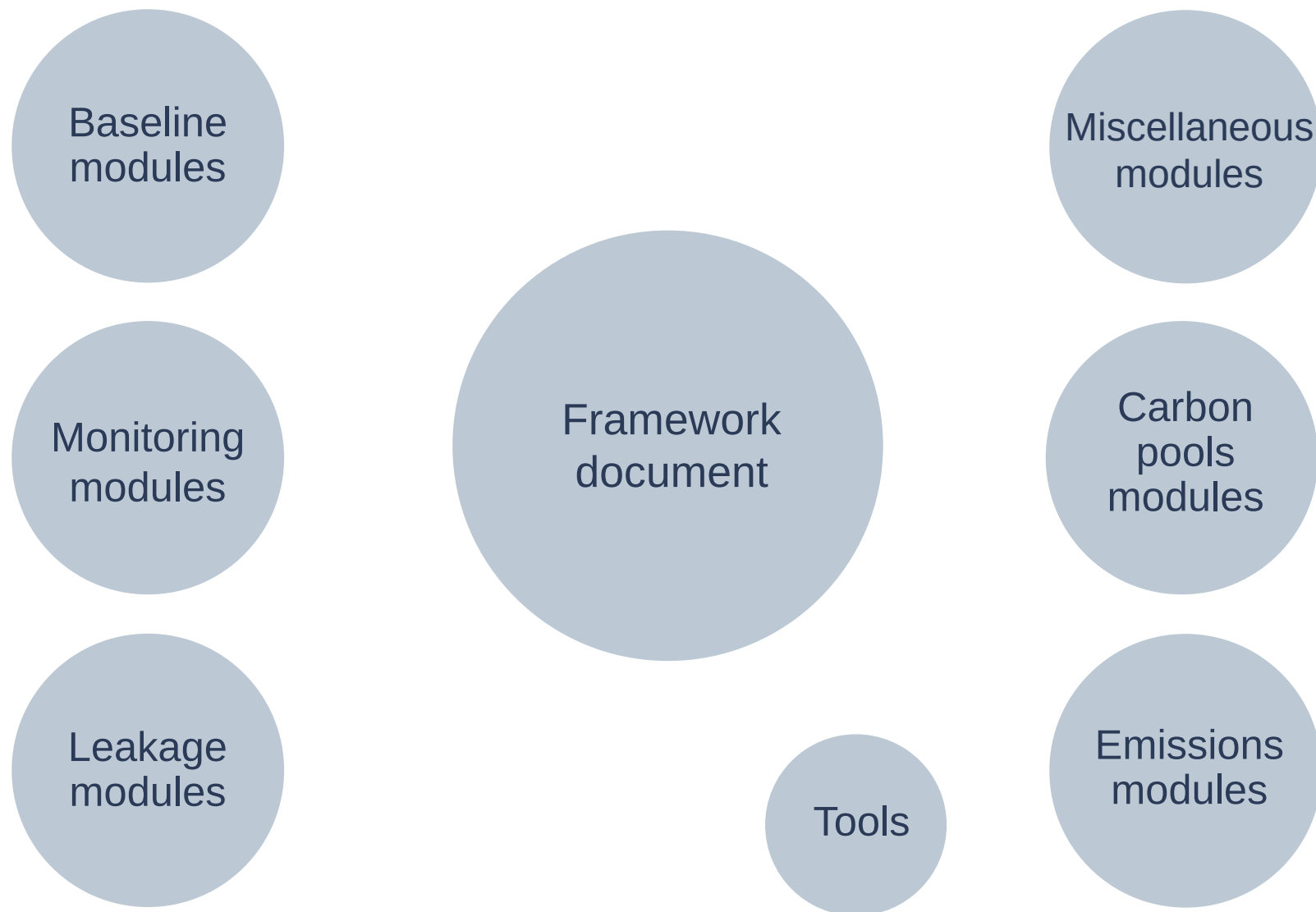
Additionality - *continued*

- Tidal wetland and seagrass restoration and conservation are not keeping pace with losses, and global decline of these critical ecosystems is occurring at alarming rates
- We analyzed level of tidal wetland and seagrass conservation activities, compared to maximum conservation potential
- Restoration activities in the U.S. – covered by VM0033, activity method
- Restoration outside of the U.S. – VM0007, via comparison to U.S.
- Conservation activities globally – VM0007, activity method, via geospatial analysis*
- **ALL WRC Projects using VM0007 are on the positive list and are therefore additional**

*Special thanks to Myra Butt for her work on the geospatial analysis

- Navigating tidal wetlands procedures in VM0007 modules

Documents constituting VM0007



Updating VM0007 for inclusion of tidal wetlands

- **REDD+ MF** framework document (backbone)
- 30 modules and tools included and referred to
- **7 New or significantly altered modules**
- 7 Amended modules where principles of accounting for tidal wetlands are similar to existing procedures (mostly bookkeeping-related edits*)

*) Making sure that procedures are properly linked across modules, and that new parameters are correctly incorporated in equations)

Baseline modules

- VMD0006 Estimation of baseline carbon stock changes and greenhouse gas emissions from planned deforestation and forest degradation and planned wetland degradation (BL-PL)
- VMD0007 Estimation of baseline carbon stock changes and greenhouse gas emissions from unplanned deforestation and unplanned wetland degradation (BL-UP)
- VMD0008 Estimation of baseline emission from forest degradation caused by extraction of wood for fuel (BL-DFW)
- **VMD0041 Estimation of baseline carbon stock changes and greenhouse gas emissions in ARR project activities (BL-ARR)**
- VMD0042 Estimation of baseline soil carbon stock changes and greenhouse gas emissions in peatland rewetting and conservation project activities (BL-PEAT)
- **VMD0050 Estimation of baseline soil carbon stock changes and greenhouse gas emissions in tidal wetland restoration and conservation project activities (BL-TW)**

Monitoring modules

- VMD0015 Methods for monitoring of greenhouse gas emissions and removals in REDD project activities (M-REDD)
- **VMD0045 Methods for monitoring greenhouse gas emissions and removals in ARR project activities (M-ARR)**
- VMD0046 Methods for monitoring of soil carbon stock changes and greenhouse gas emissions and removals in peatland rewetting and conservation project activities (M-PEAT)
- **VMD0051 Methods for monitoring of soil carbon stock changes and greenhouse gas emissions and removals in tidal wetland restoration and conservation project activities (M-TW)**

Leakage modules

- VMD0009 Estimation of emissions from activity shifting for avoiding planned deforestation and planned forest degradation and avoiding planned wetland degradation (LK-ASP)
- VMD0010 Estimation of emissions from activity shifting for avoiding unplanned deforestation and avoiding unplanned wetland degradation (LK-ASU)
- VMD0011 Estimation of emissions from market-effects (LK-ME)
- VMD0012 Estimation of emissions from displacement of fuelwood extraction (LK-DFW)
- VMD0043 Estimation of emissions from displacement of pre-project agricultural activities (LK-ARR)
- **VMD0044 Estimation of emissions from ecological leakage (LK-ECO)**

Miscellaneous modules

- **VMD0016 Methods for stratification of the project area (X-STR)**
- VMD0017 Estimation of uncertainty for REDD+ project activities (X-UNC)
- VMD0019 Methods to Project Future Conditions
- **VMD00XX Demonstration of Additionality of Tidal Wetland Restoration and Conservation Project Activities (ADD-AM)**

Carbon pool modules

- VMD0001 Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools (CP-AB)
- VMD0002 Estimation of carbon stocks in the dead-wood pool (CP-D)
- VMD0003 Estimation of carbon stocks in the litter pool (CP-L)
- VMD0004 Estimation of carbon stocks in the soil organic carbon pool (mineral soils) (CP-S)
- VMD0005 Estimation of carbon stocks in the long-term wood products pool (CP-W)

Emissions modules (applicable to baseline, project scenario and leakage)

- VMD0013 Estimation of greenhouse gas emissions from biomass and peat burning (E-BPB)
- VMD0014 Estimation of emissions from fossil fuel combustion (E-FFC)
- CDM tool Estimation of direct N₂O emissions from nitrogen application (E-NA)

Tools

- CDM Tool for testing significance of GHG emissions in A/R CDM project activities (T-SIG)
- CDM Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities (T-ADD)
- VCS AFOLU Non-Permanence Risk Tool (T-BAR)

Pools and sources in tidal wetlands GHG accounting

Emissions or removals in WRC project activities in tidal wetlands are attributed to

- Carbon stock changes in biomass carbon pools
- Soil processes
- Emissions from fossil fuel use
- Emissions from biomass burning

Which category?

Projects may be stand-alone REDD, ARR and/or WRC

Projects may combine WRC with REDD, or WRC with ARR

WRC is subdivided into RWE and CIW

Possible categories involving WRC (stand alone or a combination):

- Stand-alone RWE
- Stand-alone CIW
- RWE-ARR
- RWE-REDD
- CIW-REDD

Determining the category

Table 1: Decision Tree for Determining REDD Project Activity Type

Is the forest land expected to be converted to non-forest land in the baseline case, or expected to be subject to authorized conversion to a managed tree plantation in the baseline case?			
YES³		NO	
Is the land legally authorized and documented to be converted to non-forest or a managed tree plantation?		Is the forest in the baseline expected to degrade by fuelwood extraction or charcoal production?	
YES⁴	NO	YES	NO
Avoiding planned deforestation/planned degradation	Avoiding unplanned deforestation	Avoiding forest degradation	Proposed project is not a VCS REDD+ ⁵ activity currently covered by the methodology

Table 2: Determining ARR Suitability

Is part or all of the land non-forest land or with degraded and unmanaged forest?	
YES	NO
Suitable for ARR	Not suitable for ARR

Table 3: Determination of WRC and Combined Categories

Baseline Scenario		Project Activity	Combined or Stand-alone Categories
Pre-Project Condition	Land Cover		
Drained peatland or degraded tidal wetland	Non-forest	Peatland rewetting or tidal wetland restoration [#] combined with conversion to forest, or revegetation	RWE+ARR
		Wetland restoration without vegetation establishment or <i>de minimis</i> vegetation changes	RWE
	Forest with deforestation/ forest degradation	Peatland rewetting and avoiding deforestation/ forest degradation or tidal wetland restoration and avoiding deforestation/forest degradation	RWE+REDD
Undrained or partially drained peatland or intact or partially altered tidal wetland ⁸	Non-forest	Avoiding drainage and/or interrupted sediment supply Avoiding conversion to open water or impounded wetland Avoiding degradation	CIW*
	Forest with deforestation/ forest degradation	Avoiding drainage or wetland degradation combined with avoiding deforestation/forest degradation	CIW+REDD

Which modules for tidal wetlands?

REDD+ MF Table 4 indicates which modules under certain conditions

Need to check for each relevant category

Modules can be:

- Mandatory
- Mandatory with a comment: for tidal wetlands where it includes fossil fuel combustion; otherwise optional
- Not applicable
- Not applicable with a comment: Procedures for carbon pools provided in Modules BL-TW and M-TW (if WRC activities are combined with REDD, CP modules must be used except Module CP-S)
- Optional: fossil fuel use

In addition to table 4, modules give additional guidance

Table 4: Determination of When Module/Tool Use is Mandatory (M) or Optional (O)

for all project activities covered by this methodology

Module	AUDD	APD	AD [#]	ARR	RWE		AUWD		APWD	
					Peatland	Tidal Wetlands	Peatland	Tidal Wetlands	Peatland	Tidal Wetlands
REDD+ MF	M	M	M	M	M	M	M	M	M	M
M-REDD	M	M	M	-	-	-	M	M	M	M
M-ARR	-	-	-	M	-	-	-	-	-	-
M-PEAT	-	-	-	-	M	-	M	-	M	-
M-TW	-	-	-	-	-	M	-	M	-	M
T-ADD	M	M	M	M	M	@	M	@	M	@
T-BAR	M	M	M	M	M	M	M	M	M	M
X-UNC	M	M	M	M	M	M	M	M	M	M
X-STR	M	M	M	---	M	M	M	M	M	M
BL-UP	M	-	-	-	-	-	M	M	-	-
BL-PL	-	M	-	-	-	-	-	-	M	M
BL-DFW	-	-	M	-	-	-	-	-	-	-
BL-ARR	-	-	-	M	-	-	-	-	-	-
BL-PEAT	-	-	-	-	M	-	M	-	M	-
BL-TW	-	-	-	-	-	M	-	M	-	M
LK-ASU	M	-	-	-	-	-	M	M	-	-
LK-ASP	-	M	-	-	-	-	-	-	M	M
LK-DFW	-	-	M	-	-	-	-	-	-	-
LK-ARR	-	-	-	M	-	-	-	-	-	-
LK-ECO	-	-	-	-	M	M	M	M	M	M
LK-ME	(m) ¹	(m) ¹	(m) ²	-	-	-	-	-	-	-
CP-AB	M	M	M	-	---	---	---	---	---	---
CP-D	(m) ³	(m) ³	(m) ³	-	---	---	---	---	---	---
CP-L	O	O	O	-	---	---	---	---	---	---
CP-S	O	O	O	-	---	---	---	---	---	---
CP-W	(m) ¹	(m) ¹	-	-	---	---	---	---	---	---
E-BPB	M	M	M	-	M	M	M	M	M	M
E-FFC	O	O	O	-	(m) ⁵	(m) ⁵	O	O	O	O
E-NA	(m) ⁴	O	O	-	-	-	-	-	-	-

Avoiding Degradation (Fuelwood / Charcoal)

- Not applicable

M Modules marked with an M are fully mandatory for the given project activity (i.e., the indicated modules and tools must be used)

O Modules marked with an O are fully optional for the given project activity (i.e., the indicated pools and sources can be included or excluded as decided by the project, but if included in the baseline they must also be included in the project scenario)

(m)¹ Mandatory for the given project activity where the process of deforestation involves timber harvesting for commercial markets

(m)² Mandatory for the given project activity where fuelwood or charcoal is harvested for commercial markets

(m)³ Mandatory for the given project activity if this carbon pool is greater in baseline (post-deforestation/degradation) than project scenario and significant; otherwise can be conservatively omitted

(m)⁴ Mandatory for the given project activity where leakage prevention activities include increases in the use of fertilizers

(m)⁵ Mandatory for the given project activity on tidal wetlands where it includes fossil fuel combustion; otherwise optional

· VCS *AFOLU Requirements* and the tool *T-SIG* must be used to justify the omission of carbon pools and emission sources

** Procedures provided in Modules *BL-ARR* and *M-ARR*

--- Procedures provided in Modules *BL-PEAT* and *M-PEAT* or *BL-TW* and *M-TW* (if WRC activities are combined with REDD, CP modules must be used except Module *CP-S*)

@ For tidal wetlands, an activity method is applicable (see Module *ADD-AM*)

Table 4: Determination of When Module/Tool Use is Mandatory (M) or Optional (O)

for all project activities covered by this methodology

Module	AUDD	APD	AD [#]	ARR	RWE		AUWD		APWD	
					Peatland	Tidal Wetlands	Peatland	Tidal Wetlands	Peatland	Tidal Wetlands
REDD+ MF	M	M	M	M	M	M	M	M	M	M
M-REDD	M	M	M	-	-	-	M	M	M	M
M-ARR	-	-	-	M	-	-	-	-	-	-
M-PEAT	-	-	-	-	M	-	M	-	M	-
M-TW	-	-	-	-	-	M	-	M	-	M
T-ADD	M	M	M	M	M	@	M	@	M	@
T-BAR	M	M	M	M	M	M	M	M	M	M
X-UNC	M	M	M	M	M	M	M	M	M	M
X-STR	M	M	M	***	M	M	M	M	M	M
BL-UP	M	-	-	-	-	-	M	M	-	-
BL-PL	-	M	-	-	-	-	-	-	M	M
BL-DFW	-	-	M	-	-	-	-	-	-	-
BL-ARR	-	-	-	M	-	-	-	-	-	-
BL-PEAT	-	-	-	-	M	-	M	-	M	-
BL-TW	-	-	-	-	-	M	-	M	-	M
LK-ASU	M	-	-	-	-	-	M	M	-	-
LK-ASP	-	M	-	-	-	-	-	-	M	M
LK-DFW	-	-	M	-	-	-	-	-	-	-
LK-ARR	-	-	-	M	-	-	-	-	-	-
LK-ECO	-	-	-	-	M	M	M	M	M	M
LK-ME	(m) ¹	(m) ¹	(m) ²	-	-	-	-	-	-	-
CP-AB	M	M	M	**	---	---	---	---	---	---
CP-D	(m) ³	(m) ³	(m) ³	**	---	---	---	---	---	---
CP-L	O	O	O	**	---	---	---	---	---	---
CP-S	O	O	O	**	---	---	---	---	---	---
CP-W	(m) ¹	(m) ¹	-	-	---	---	---	---	---	---
E-BPB	M	M	M	**	M	M	M	M	M	M
E-FFC	O	O	O	-	(m) ⁵	(m) ⁵	O	O	O	O
E-NA	(m) ⁴	O	O	-	-	-	-	-	-	-

Stand-alone ARR

Avoiding Degradation (Fuelwood / Charcoal)

- Not applicable

M Modules marked with an M are fully mandatory for the given project activity (i.e., the indicated modules and tools must be used)

O Modules marked with an O are fully optional for the given project activity (i.e., the indicated pools and sources can be included or excluded as decided by the project, but if included in the baseline they must also be included in the project scenario)

(m)¹ Mandatory for the given project activity where the process of deforestation involves timber harvesting for commercial markets

(m)² Mandatory for the given project activity where fuelwood or charcoal is harvested for commercial markets

(m)³ Mandatory for the given project activity if this carbon pool is greater in baseline (post-deforestation/degradation) than project scenario and significant; otherwise can be conservatively omitted

(m)⁴ Mandatory for the given project activity where leakage prevention activities include increases in the use of fertilizers

(m)⁵ Mandatory for the given project activity on tidal wetlands where it includes fossil fuel combustion; otherwise optional

· VCS *AFOLU Requirements* and the tool *T-SIG* must be used to justify the omission of carbon pools and emission sources

** Procedures provided in Modules *BL-ARR* and *M-ARR*

*** Procedures provided in Modules *BL-PEAT* and *M-PEAT* or *BL-TW* and *M-TW* (if WRC activities are combined with REDD, CP modules must be used except Module *CP-S*)

@ For tidal wetlands, an activity method is applicable (see Module *ADD-AM*)

Table 4: Determination of When Module/Tool Use is Mandatory (M) or Optional (O)

for all project activities covered by this methodology

Module	AUDD	APD	AD [#]	ARR	RWE		AUWD		APWD	
					Peatland	Tidal Wetlands	Peatland	Tidal Wetlands	Peatland	Tidal Wetlands
REDD+ MF	M	M	M	M	M	M	M	M	M	M
M-REDD	M	M	M	-	-	-	M	M	M	M
M-ARR	-	-	-	M	-	-	-	-	-	-
M-PEAT	-	-	-	-	M	-	M	-	M	-
M-TW	-	-	-	-	-	M	-	M	-	M
T-ADD	M	M	M	M	M	M	M	M	M	M
T-BAR	M	M	M	M	M	M	M	M	M	M
X-UNC	M	M	M	M	M	M	M	M	M	M
X-STR	M	M	M	-	M	M	M	M	M	M
BL-UP	M	-	-	-	-	-	M	M	-	-
BL-PL	-	M	-	-	-	-	-	-	M	M
BL-DFW	-	-	M	-	-	-	-	-	-	-
BL-ARR	-	-	-	M	-	-	-	-	-	-
BL-PEAT	-	-	-	-	M	-	M	-	M	-
BL-TW	-	-	-	-	-	M	-	M	-	M
LK-ASU	M	-	-	-	-	-	M	M	-	-
LK-ASP	-	M	-	-	-	-	-	-	M	M
LK-DFW	-	-	M	-	-	-	-	-	-	-
LK-ARR	-	-	-	M	-	-	-	-	-	-
LK-ECO	-	-	-	-	M	M	M	M	M	M
LK-ME	(m) ¹	(m) ¹	(m) ²	-	-	-	-	-	-	-
CP-AB	M	M	M	-	-	-	-	-	-	-
CP-D	(m) ³	(m) ³	(m) ³	-	-	-	-	-	-	-
CP-L	O	O	O	-	-	-	-	-	-	-
CP-S	O	O	O	-	-	-	-	-	-	-
CP-W	(m) ¹	(m) ¹	-	-	-	-	-	-	-	-
E-BPB	M	M	M	-	M	M	M	M	M	M
E-FFC	O	O	O	-	(m) ⁵	(m) ⁵	O	O	O	O
E-NA	(m) ⁴	O	O	-	-	-	-	-	-	-

RWE and ARR

Avoiding Degradation (Fuelwood / Charcoal)

- Not applicable

M Modules marked with an M are fully mandatory for the given project activity (i.e., the indicated modules and tools must be used)

O Modules marked with an O are fully optional for the given project activity (i.e., the indicated pools and sources can be included or excluded as decided by the project, but if included in the baseline they must also be included in the project scenario)

(m)¹ Mandatory for the given project activity where the process of deforestation involves timber harvesting for commercial markets

(m)² Mandatory for the given project activity where fuelwood or charcoal is harvested for commercial markets

(m)³ Mandatory for the given project activity if this carbon pool is greater in baseline (post-deforestation/degradation) than project scenario and significant; otherwise can be conservatively omitted

(m)⁴ Mandatory for the given project activity where leakage prevention activities include increases in the use of fertilizers

(m)⁵ Mandatory for the given project activity on tidal wetlands where it includes fossil fuel combustion; otherwise optional

· VCS *AFOLU Requirements* and the tool *T-SIG* must be used to justify the omission of carbon pools and emission sources

** Procedures provided in Modules *BL-ARR* and *M-ARR*

*** Procedures provided in Modules *BL-PEAT* and *M-PEAT* or *BL-TW* and *M-TW* (if WRC activities are combined with REDD, CP modules must be used except Module *CP-S*)

@ For tidal wetlands, an activity method is applicable (see Module *ADD-AM*)

Table 4: Determination of When Module/Tool Use is Mandatory (M) or Optional (O)

for all project activities covered by this methodology

Module	AUDD	APD	AD [#]	ARR	RWE		AUWD		APWD	
					Peatland	Tidal Wetlands	Peatland	Tidal Wetlands	Peatland	Tidal Wetlands
REDD+ MF	M	M	M	M	M	M	M	M	M	M
M-REDD	M	M	M	-	-	-	M	M	M	M
M-ARR	-	-	-	M	-	-	-	-	-	-
M-PEAT	-	-	-	-	M	-	M	-	M	-
M-TW	-	-	-	-	-	M	-	M	-	M
T-ADD	M	M	M	M	M	@	M	@	M	@
T-BAR	M	M	M	M	M	M	M	M	M	M
X-UNC	M	M	M	M	M	M	M	M	M	M
X-STR	M	M	M	***	M	M	M	M	M	M
BL-UP	M	-	-	-	-	-	M	M	-	-
BL-PL	-	M	-	-	-	-	-	-	M	M
BL-DFW	-	-	M	-	-	-	-	-	-	-
BL-ARR	-	-	-	M	-	-	-	-	-	-
BL-PEAT	-	-	-	-	M	-	M	-	M	-
BL-TW	-	-	-	-	-	M	-	M	-	M
LK-ASU	M	-	-	-	-	-	M	M	-	-
LK-ASP	-	M	-	-	-	-	-	-	M	M
LK-DFW	-	-	M	-	-	-	-	-	-	-
LK-ARR	-	-	-	M	-	-	-	-	-	-
LK-ECO	-	-	-	-	M	M	M	M	M	M
LK-ME	(m) ¹	(m) ¹	(m) ²	-	-	-	-	-	-	-
CP-AB	M	M	M	**	---	---	---	---	---	---
CP-D	(m) ³	(m) ³	(m) ³	**	---	---	---	---	---	---
CP-L	O	O	O	**	---	---	---	---	---	---
CP-S	O	O	O	**	---	---	---	---	---	---
CP-W	(m) ¹	(m) ¹	-	-	---	---	---	---	---	---
E-BPB	M	M	M	**	M	M	M	M	M	M
E-FFC	O	O	O	-	(m) ⁵	(m) ⁵	O	O	O	O
E-NA	(m) ⁴	O	O	-	-	-	-	-	-	-

Stand-alone REDD (AUDD)

Avoiding Degradation (Fuelwood / Charcoal)

- Not applicable

M Modules marked with an M are fully mandatory for the given project activity (i.e., the indicated modules and tools must be used)

O Modules marked with an O are fully optional for the given project activity (i.e., the indicated pools and sources can be included or excluded as decided by the project, but if included in the baseline they must also be included in the project scenario)

(m)¹ Mandatory for the given project activity where the process of deforestation involves timber harvesting for commercial markets

(m)² Mandatory for the given project activity where fuelwood or charcoal is harvested for commercial markets

(m)³ Mandatory for the given project activity if this carbon pool is greater in baseline (post-deforestation/degradation) than project scenario and significant; otherwise can be conservatively omitted

(m)⁴ Mandatory for the given project activity where leakage prevention activities include increases in the use of fertilizers

(m)⁵ Mandatory for the given project activity on tidal wetlands where it includes fossil fuel combustion; otherwise optional

• VCS *AFOLU Requirements* and the tool *T-SIG* must be used to justify the omission of carbon pools and emission sources

** Procedures provided in Modules *BL-ARR* and *M-ARR*

*** Procedures provided in Modules *BL-PEAT* and *M-PEAT* or *BL-TW* and *M-TW* (if WRC activities are combined with REDD, CP modules must be used except Module *CP-S*)

@ For tidal wetlands, an activity method is applicable (see Module *ADD-AM*)

Table 4: Determination of When Module/Tool Use is Mandatory (M) or Optional (O)

for all project activities covered by this methodology

Module	AUDD	APD	AD [#]	ARR	RWE		AUWD		APWD	
					Peatland	Tidal Wetlands	Peatland	Tidal Wetlands	Peatland	Tidal Wetlands
REDD+ MF	M	M	M	M	M	M	M	M	M	M
M-REDD	M	M	M	-	-	-	M	M	M	M
M-ARR	-	-	-	M	-	-	-	-	-	-
M-PEAT	-	-	-	-	M	-	M	-	M	-
M-TW	-	-	-	-	-	M	-	M	-	M
T-ADD	M	M	M	M	M	@	M	M	M	@
T-BAR	M	M	M	M	M	M	M	M	M	M
X-UNC	M	M	M	M	M	M	M	M	M	M
X-STR	M	M	M	---	M	M	M	M	M	M
BL-UP	M	-	-	-	-	-	M	M	-	-
BL-PL	-	M	-	-	-	-	-	-	M	M
BL-DFW	-	-	M	-	-	-	-	-	-	-
BL-ARR	-	-	-	M	-	-	-	-	-	-
BL-PEAT	-	-	-	-	M	-	M	-	M	-
BL-TW	-	-	-	-	-	M	-	M	-	M
LK-ASU	M	-	-	-	-	-	M	M	-	-
LK-ASP	-	M	-	-	-	-	-	-	M	M
LK-DFW	-	-	M	-	-	-	-	-	-	-
LK-ARR	-	-	-	M	-	-	-	-	-	-
LK-ECO	-	-	-	-	M	M	M	M	M	M
LK-ME	(m) ¹	(m) ¹	(m) ²	-	-	-	-	-	-	-
CP-AB	M	M	M	-	---	---	---	---	---	---
CP-D	(m) ³	(m) ³	(m) ³	-	---	---	---	---	---	---
CP-L	O	O	O	-	---	---	---	---	---	---
CP-S	X	O	O	-	---	---	---	---	---	---
CP-W	(m) ¹	(m) ¹	-	-	---	---	---	---	---	---
E-BPB	M	M	M	-	M	M	M	M	M	M
E-FFC	O	O	O	-	(m) ⁵	(m) ⁵	O	O	O	O
E-NA	(m) ⁴	O	O	-	-	-	-	-	-	-

AUDD and AUWD

Avoiding Degradation (Fuelwood / Charcoal)

- Not applicable

M Modules marked with an M are fully mandatory for the given project activity (i.e., the indicated modules and tools must be used)

O Modules marked with an O are fully optional for the given project activity (i.e., the indicated pools and sources can be included or excluded as decided by the project, but if included in the baseline they must also be included in the project scenario)

(m)¹ Mandatory for the given project activity where the process of deforestation involves timber harvesting for commercial markets

(m)² Mandatory for the given project activity where fuelwood or charcoal is harvested for commercial markets

(m)³ Mandatory for the given project activity if this carbon pool is greater in baseline (post-deforestation/degradation) than project scenario and significant; otherwise can be conservatively omitted

(m)⁴ Mandatory for the given project activity where leakage prevention activities include increases in the use of fertilizers

(m)⁵ Mandatory for the given project activity on tidal wetlands where it includes fossil fuel combustion; otherwise optional

· VCS *AFOLU Requirements* and the tool *T-SIG* must be used to justify the omission of carbon pools and emission sources

** Procedures provided in Modules *BL-ARR* and *M-ARR*

--- Procedures provided in Modules *BL-PEAT* and *M-PEAT* or *BL-TW* and *M-TW* (if WRC activities are combined with REDD, CP modules must be used except Module *CP-S*)

@ For tidal wetlands, an activity method is applicable (see Module *ADD-AM*)

Tidal wetlands net emissions in REDD+ MF

- Accounting for peatland and tidal wetland is separate and therefore the WRC procedures in Chapter 8 needed to be overhauled
- For CIW, a better distinction between avoided planned and avoided unplanned degradation

$$NER_{REDD+} = NER_{REDD} + NGR_{ARR} + NER_{WRC} \quad (1)$$

$$NER_{WRC} = GHG_{BSL-WRC} - GHG_{WPS-WRC} - GHG_{LK-WRC} \quad (6)$$

$$GHG_{BSL-WRC} = GHG_{BSL-PEAT} + GHG_{BSL-TW} \quad (7)$$

$$GHG_{BSL-TW} = GHG_{BSL-TW,planned} + GHG_{BSL-TW,unplanned} \quad (9)$$

$$GHG_{WPS-WRC} = GHG_{WPS-PEAT} + GHG_{WPS-TW} \quad (11)$$

$$GHG_{LK-WRC} = GHG_{LK-WRC-AS,planned} + GHG_{LK-WRC-AS,unplanned} + GHG_{LK-ECO} \quad (12)$$

- Edits to peatland-related procedures (for clarity and more comprehensive bookkeeping)
- Existing procedures for ensuring permanence of soil carbon stock extended to include mineral tidal wetland soil
 - How much SOC accumulates and how much oxidizes in the baseline and the project scenario over a period of 100 years?
 - $SOC_{\text{project},t=100} \geq 1.05 \times SOC_{\text{baseline},t=100}$
- Soil Organic Carbon Depletion Time (SDT)
 - Avoided soil emissions (conservation projects as well as restoration project with a stop-loss component)
 - Follows existing procedures for PDT
 - $SDT = SOC / \text{Rate of loss}$
 - $t \geq SDT$: no avoided emissions can be claimed

X-STR - *continued*

Project Boundaries and Effects of Sea Level Rise

- Erosion of tidal wetlands at the seaward edge and along channels
- Submergence of tidal wetlands
- Landward shift of wetlands (potentially beyond project area if not set appropriately)
- See presentation on tidal wetlands procedures by Steve Crooks

BL-ARR and M-ARR

Referring the CDM methodology AR-ACM0003

New procedures

- Harvesting of trees: long-term average carbon stock
- Effects of sea level rise
- Herbaceous vegetation (tidal marshes)

Module specific for wetlands project activities

Centers around promoting an appropriate project design avoiding ecological leakage; the point being that if significant ecological leakage occurs, the project fails

Includes a new table identifying potential leakage processes of providing guidance to avoid such leakage

Developers of avoided degradation projects experience issues with establishing reference regions

- The modules rendered relatively small tidal wetlands projects unfeasible due to the need for a relatively large reference region
- Ecotope-wide tidal wetlands projects (e.g. covering an entire delta) leave no space for a reference region, reminiscent of a jurisdictional approach

Modification to procedures for establishing a reference region

- Use all available remaining area if all provided easing options are exhausted
- Similar less strict rules for leakage belt
- However: choice of quantification options for annual area of baseline deforestation/degradation must be the most conservative

Steve Crooks

- Introducing GHG accounting procedures in modules BL-TW and M-TW



VMD0050 – BL-TW and VMD0051 – M-TW

Estimation of Baseline Carbon Stock Changes and Greenhouse Gas Emissions in Tidal Wetland Restoration and Conservation Project Activities

Methods for Monitoring of Carbon Stock Changes and Greenhouse Gas Emissions and Removals in Tidal Wetland Restoration and Conservation Project Activities

These modules provide accounting procedures for mineral wetland soils. Accounting procedures for organic soils (also those existing in tidal wetlands) are provided in modules BL-PEAT and M-PEAT.

M-TW also provides procedures for monitoring key variables.

Accounting for biomass is covered in Modules CP-AB (conservation) and BL-ARR and M-ARR (restoration). However, for future submergence due to sea level rise, BL-TW and M-TW provide additional procedures for accounting biomass loss.

New definitions

- Allochthonous Soil Organic Carbon Soil organic carbon originating outside the project area deposited within the project boundary
- Carbon Preservation Depositional Environment (CPDE) Type of sub-aquatic sediment deposition environment that impacts the amount of deposited organic carbon that is preserved. Carbon preservation is affected by mineral grain size, sediment accumulation and burial rates, O₂ availability in the overlying water column and sediment hydraulic conductivity.
- Mangrove A subset of wetlands dominated by mangrove plant species, which are shrubs or trees that grow in coastal saline or brackish water
- Marsh A subset of wetlands characterized by emergent soft-stemmed vegetation and shrubs adapted to saturated soil conditions

New definitions - *continued*

- Tidal Wetland A subset of wetlands under the influence of the wetting and drying cycles of the tides (e.g., marshes, seagrass meadows, tidal forested wetlands and mangroves). Subtidal seagrass meadows are not subject to drying cycles, but are still included in this definition.
- Tidal Wetland Restoration Re-establishing or improving the hydrology, salinity, water quality, sediment supply and/or vegetation in degraded or converted tidal wetlands. For the purpose of this methodology, this definition also includes activities that create wetland ecological conditions on uplands under the influence of sea level rise or activities that convert one wetland type to another or activities that convert open water to wetland.

Submergence and erosion

Causes: Sea level rise and wave action, disturbance by boats

Consequences:

A. Carbon stocks from aboveground biomass are lost to oxidation

- Baseline – conservatively not accounted for
- Project scenario – AG biomass carbon is immediately and entirely returned to the atmosphere

B. Depending upon the geomorphic setting, soil carbon stocks may be submerged and held intact or be eroded and transported beyond the project area

- Procedures for mapping effects of SLR provided in module X-STR
- Baseline
 - Submergence without erosion: no significant loss
 - Erosion: accounting procedures provided in module
- Project scenario
 - AG biomass carbon is immediately and entirely returned to the atmosphere
 - SOC procedures same as baseline

Project boundaries and effects of sea level rise

When defining geographic project boundaries and strata, the Project Proponent must consider expected relative SLR and potential for expanding the project area landwards to account for wetland migration, inundation and erosion; see module X-STR.

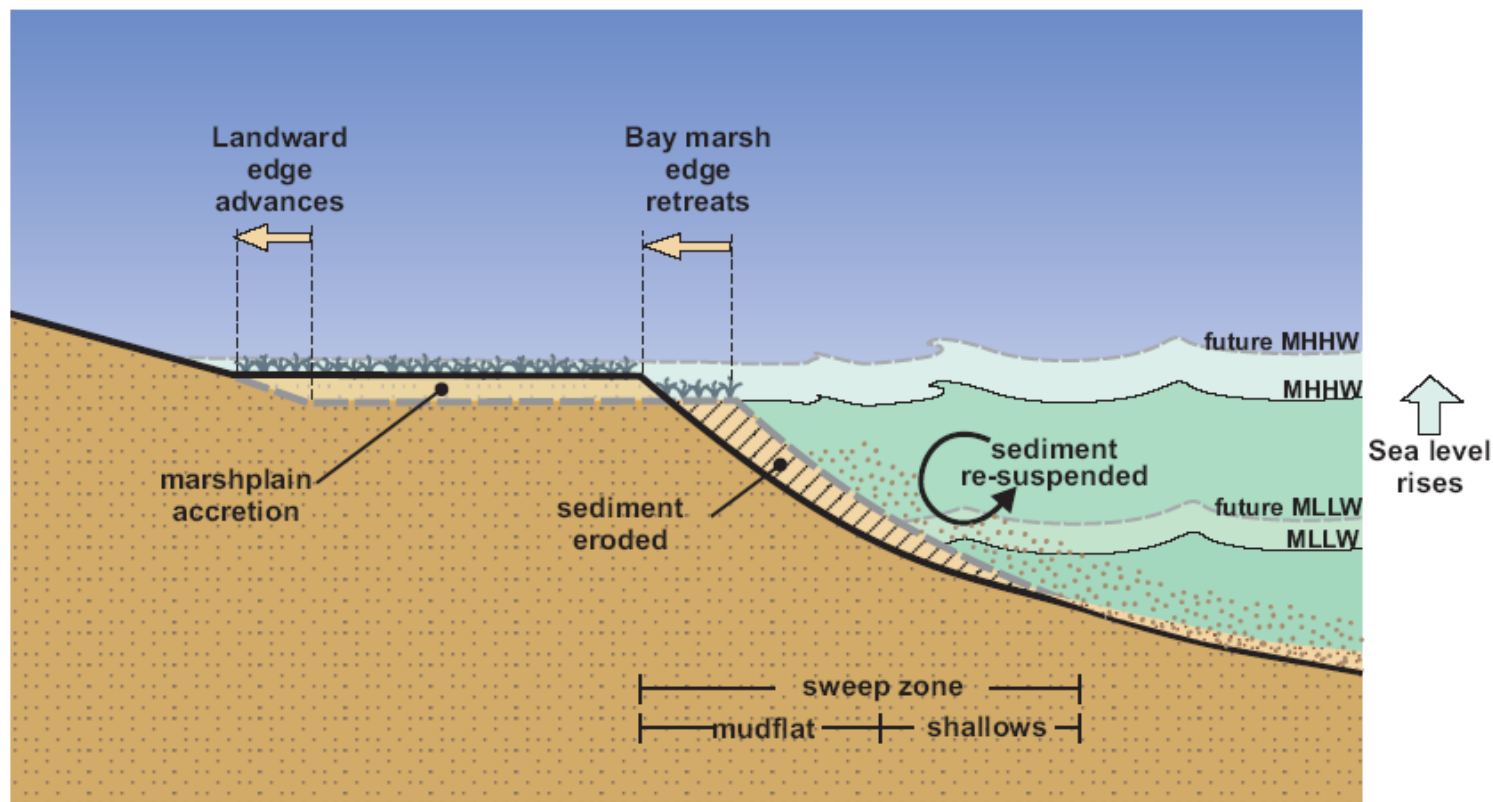


Figure: ESA

GHG emissions from the tidal wetland SOC pool

GHG_{BSL-TW} and **GHG_{WPS-TW}**

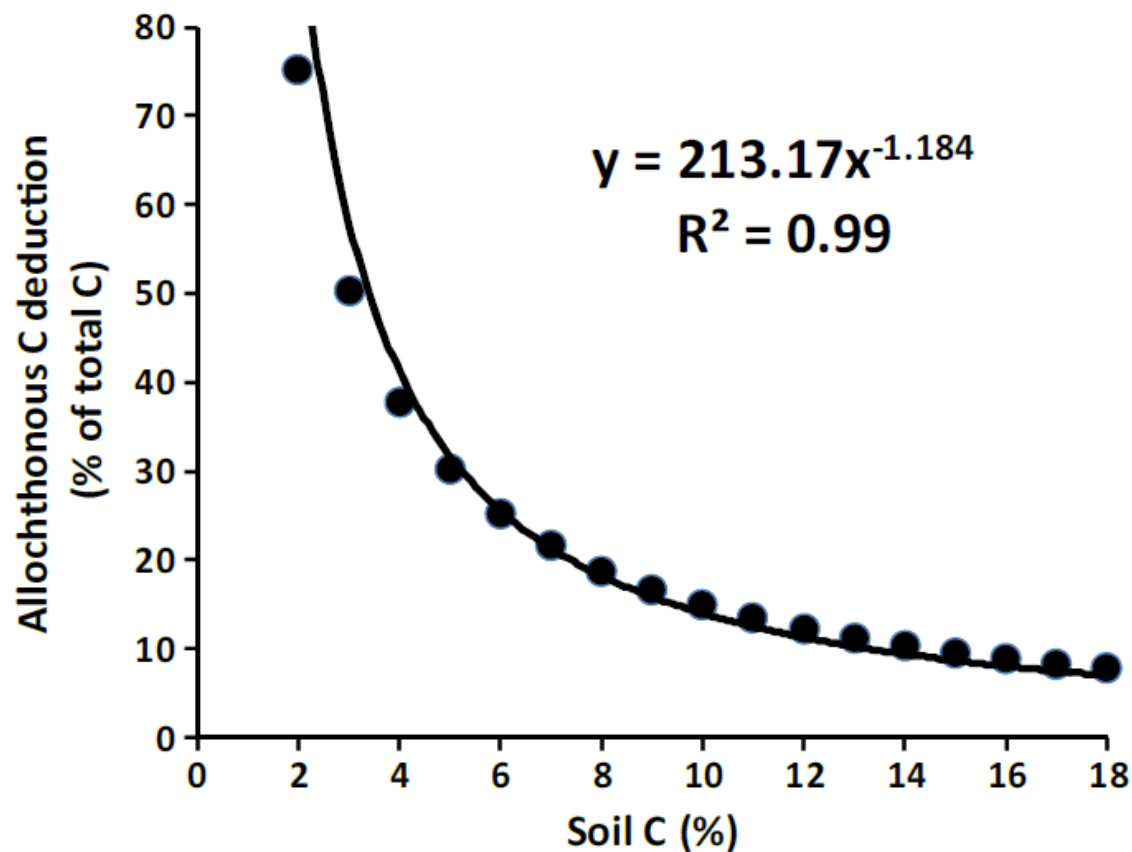
Sum of:

- CO₂ emissions or removals
- CH₄ emissions
- N₂O emissions
- Deduction from CO₂ emissions from the SOC pool to account for the percentage of the carbon stock that is derived from allochthonous soil organic carbon

General principles of allochthonous soil organic carbon accounting

- Should only receive credits if carbon would have been returned to atmosphere in the baseline scenario
- Only account for recalcitrant allochthonous carbon associated with mineral deposition – various approaches are provided in the modules
- Deduction may be conservatively set to zero in the baseline scenario

Allochthonous C calculation



Needleman, B. A., Emmer, I., Emmett-Mattox, S., Crooks, S., Megonigal, J.P., Myers, D., Oreska, M.P.J. & McGlathery 2018. The Science and Policy of the Verified Standard Methodology for Tidal Wetland and Seagrass Restoration. *Estuaries and Coasts*. <https://doi.org/10.1007/s12237-018-0429-0>

Defaults provided in BL-TW and M-TW

CO₂ emissions from the tidal wetland SOC pool of in-situ soils:

$$-1.46 \text{ t C ha}^{-1} \text{ yr}^{-1} \times 44/12 \text{ (Chmura et al. 2003)}$$

- Module X-STR points to the necessity for stratifying wetland area according to vegetation cover

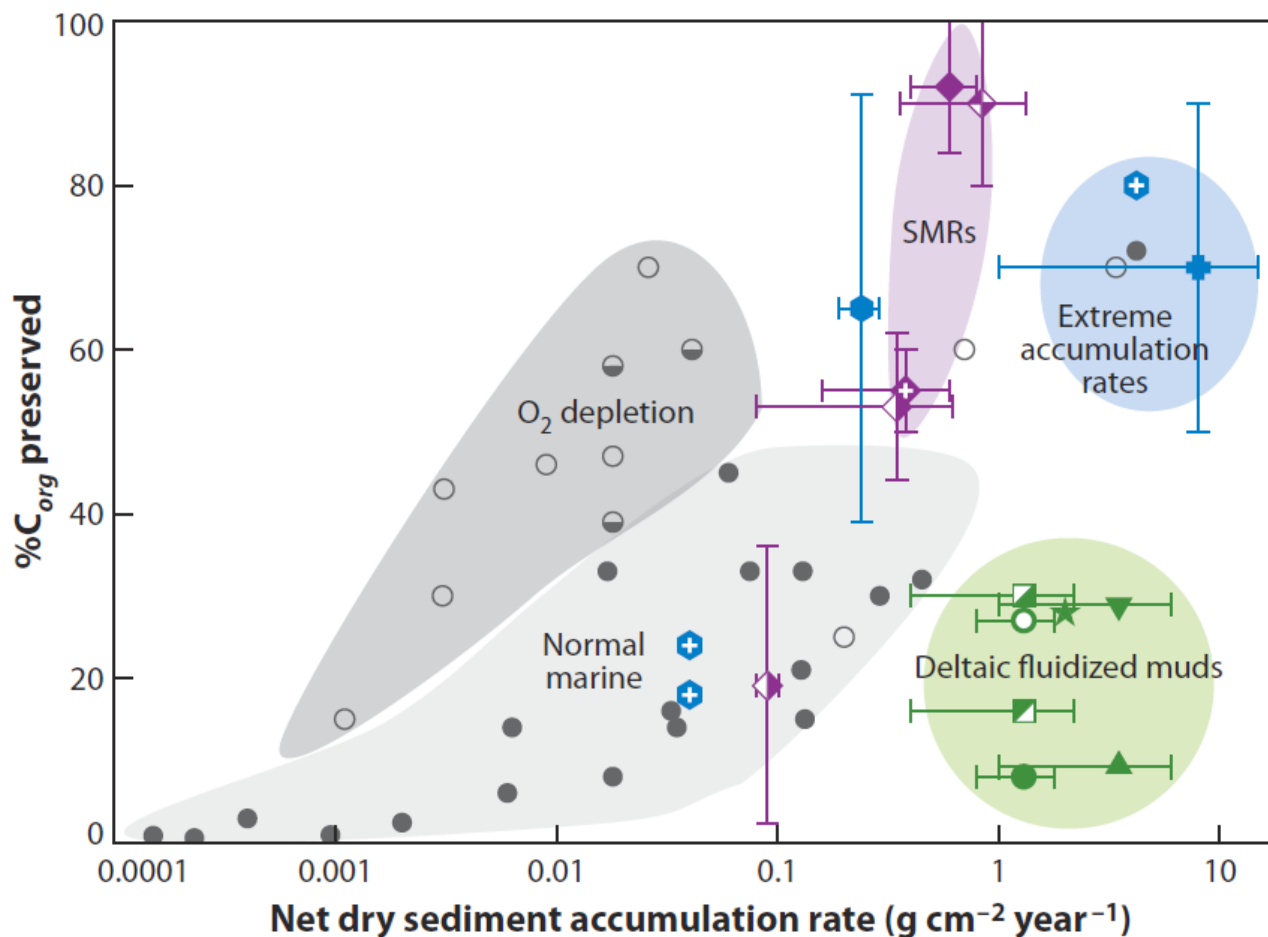
% Carbon at a steady-state equilibrium attained 20 years following exposure to an aerobic environment:

$$1.6 \% \text{ (David et al. 2009)}$$

Organic carbon loss due to oxidation, as a percentage of C mass present in eroded tidal wetland soil material:

- Depending on CPDE, varies between 39% and 80% (Blair and Aller 2012)
- If no connectivity between the eroded area and a river-estuary system
 - and erosion mass is greater in the baseline scenario than the project scenario: conservative to assume net zero emissions from eroded strata in the baseline scenario and the project scenario
 - and erosion mass is the same or lower in the baseline scenario than the project scenario: 100%

Fate of soil carbon on submergence



Blair, N.E., and Aller, R.C. 2012. The Fate of Terrestrial Organic Carbon in the Marine Environment. Annual Review of Marine Science 4(1): 401–423.

CH₄ emissions (only *in situ*)

Here too, various alternative approaches are provided

Module X-STR provides procedures for stratifying wetland area according to salinity

Defaults for CH₄ emissions (Poffenbarger et al. 2011):

- Salinity average or salinity low point is >18 ppt

$$0.011 \text{ t CH}_4 \text{ ha}^{-1} \text{ yr}^{-1} \times CH4\text{-GWP}$$

- Salinity average or salinity low point is ≥ 20 ppt

$$0.0056 \text{ t CH}_4 \text{ ha}^{-1} \text{ yr}^{-1} \times CH4\text{-GWP}$$

The project proponent must not use the default value of 0.011 t CH₄ ha⁻¹ yr⁻¹ for the baseline scenario and 0.0056 t CH₄ CH₄ ha⁻¹ yr⁻¹ for the project scenario to create a difference in emissions and claim an emission reduction. The use of the default factor is intended for projects that restore salinity levels from fresh/brackish to much higher levels that inhibit CH₄ emissions.

N₂O emissions (only *in situ*)

Here too, various alternative approaches are provided

Defaults for N₂O emissions (Smith et al. 1983):

- Open water systems where the salinity average or salinity low point is <5 ppt, between 5 and 18 ppt or >18 ppt
- Non-seagrass wetland systems where the salinity average or salinity low point is <5 ppt, between 5 and 18 ppt or >18 ppt

Defaults vary between **0.000157** and **0.000864** t N₂O ha⁻¹ yr⁻¹ × N₂O-GWP

Use of a default factor is only permitted for the systems listed above, and no default factors may be used where the project area receives hydrologically direct inputs from a point or non-point source of nitrogen such as wastewater effluent or an intensively nitrogen-fertilized system

Thank you

Hilary Stevens (RAE) – hstevens@estuaries.org

Amy Schmid (Verra) – aschmid@verra.org

Steve Emmett-Mattox (Strategic Collaborations, LLC) – sem@alumni.rice.edu

Igino Emmer (Silvestrum Climate Associates) – igino.emmer@silvestrum.com

Steve Crooks (Silvestrum Climate Associates) – steve.crooks@silvestrum.com

Verra

1 Thomas Circle, NW

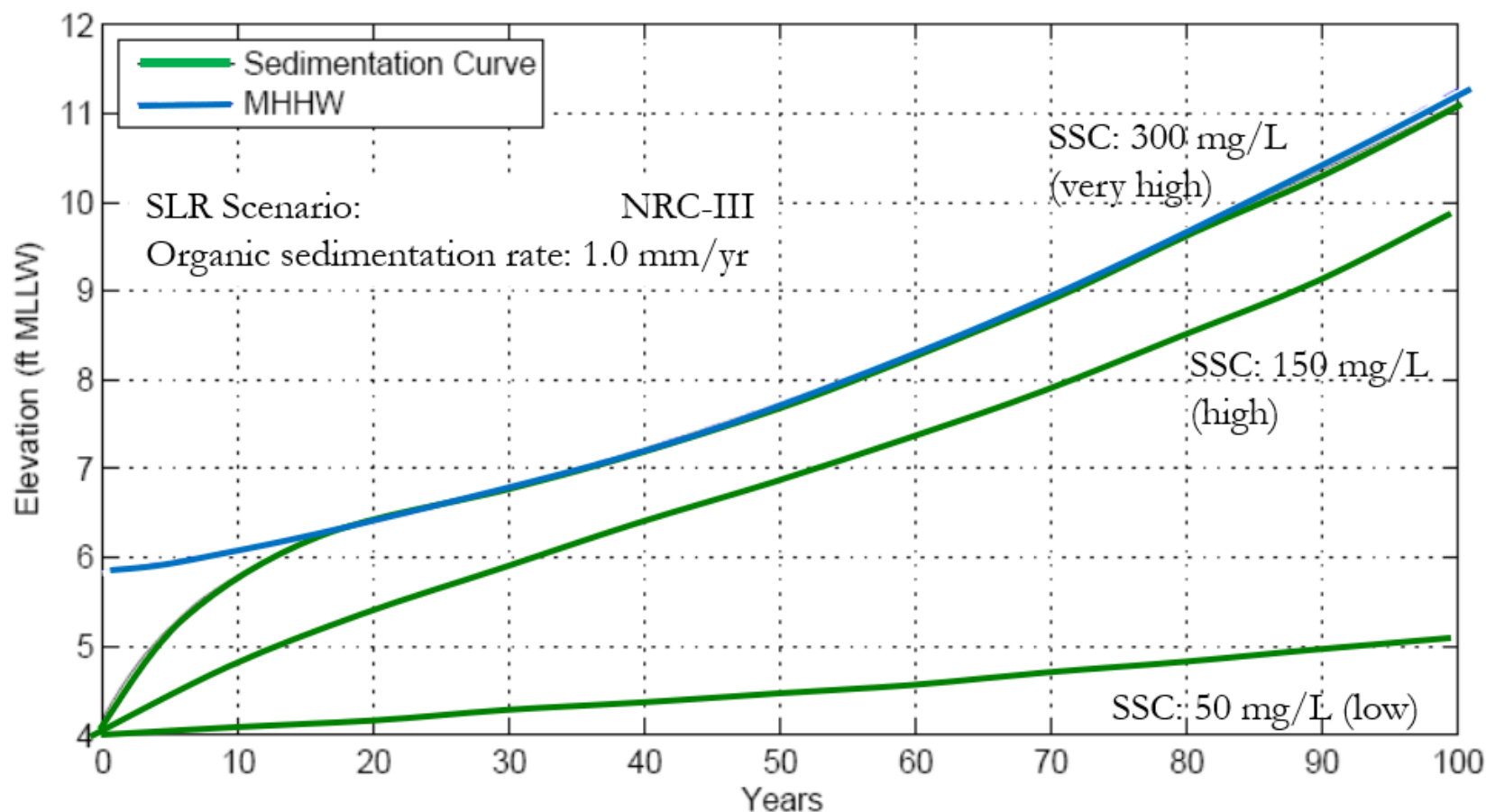
Suite 1050

Washington, DC 20005

www.verra.org



Importance of sediment supply



Morris, J.T., Edwards, J., Crooks, S., & Reyes, E. 2012. Assessment of Carbon Sequestration Potential in Coastal Wetlands. Chapter 24 in: *Recarbonization of the Biosphere: Ecosystems and the Global Carbon Cycle*. Springer Science.517-531