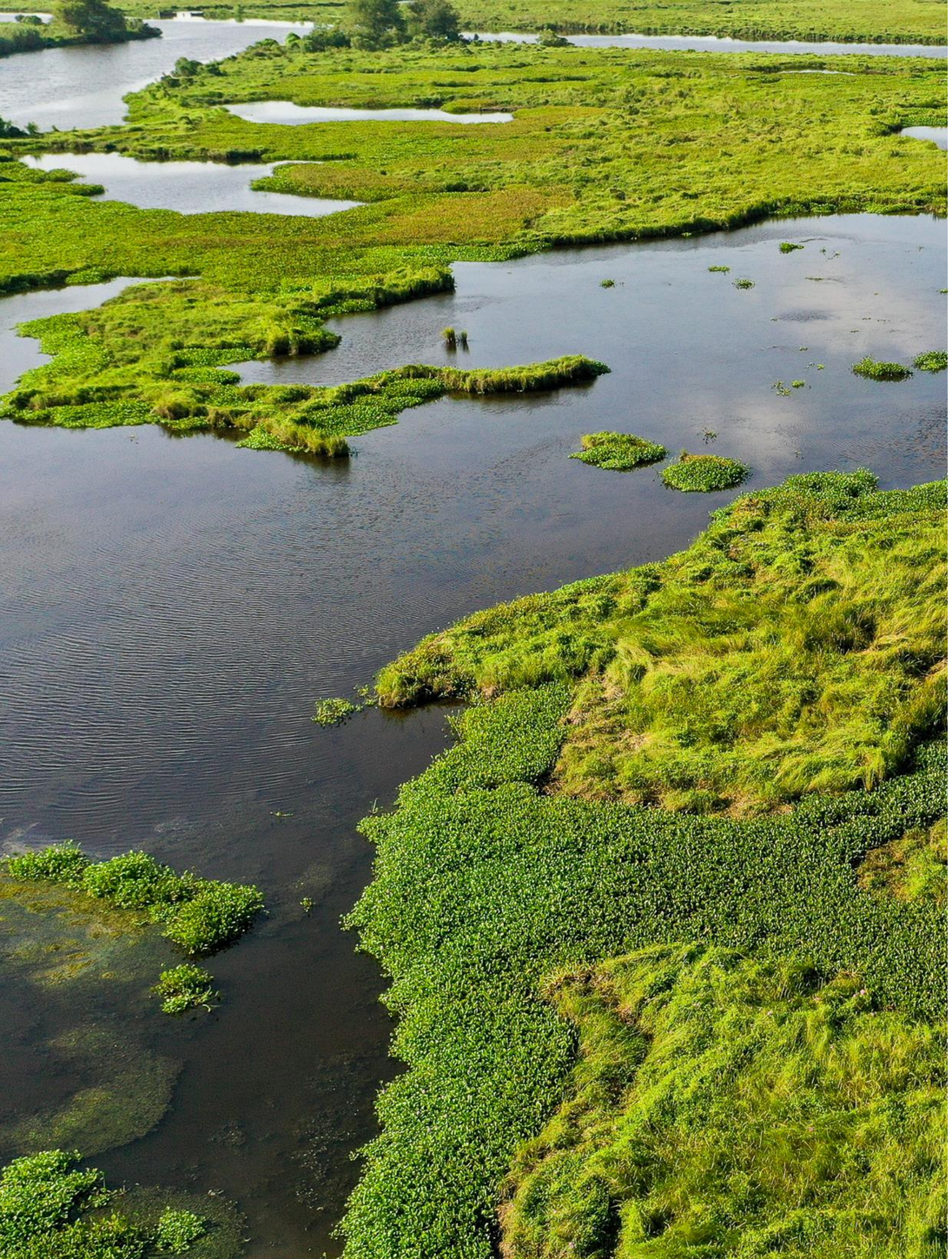


2029 COASTAL MASTER PLAN
COMMITTED TO OUR COAST

ADDITION OF WETLAND VALUE ASSESSMENT TO THE LA COASTAL MASTER PLAN ICM FOR EVALUATION OF UPPER BASIN DIVERSIONS

BRANDON CAMPO, PE, CFM & HENRY MCCALL, EI

MAY 22, 2025

PURPOSE

- Primary metrics from Integrated Compartment Model (ICM) for project evaluation do not capture all project impacts.
- Wetland Value Assessment (WVA) provides a secondary metric to indicate habitat benefits.

Maurepas Swamp

ADAPTATION TO THE ICM

Explicit

Quantitative variables with directly comparable data available in the ICM

Implicit

Qualitative analysis structures, or the quantitative data unavailable in the ICM.

Adapted to make analogous evaluation of Wetland Habitat Suitability with available data

Held Constant

No meaningful methodology could be developed to define the variable on a cell-by-cell basis.

- Development of ICM-WVA from existing WVA methodologies
- CWPPRA Marsh Community Models
  - Fresh / Intermediate
  - Brackish
  - Saline
- CWPPRA Swamp Community Model
- USACE Bottomland Hardwoods Community Model

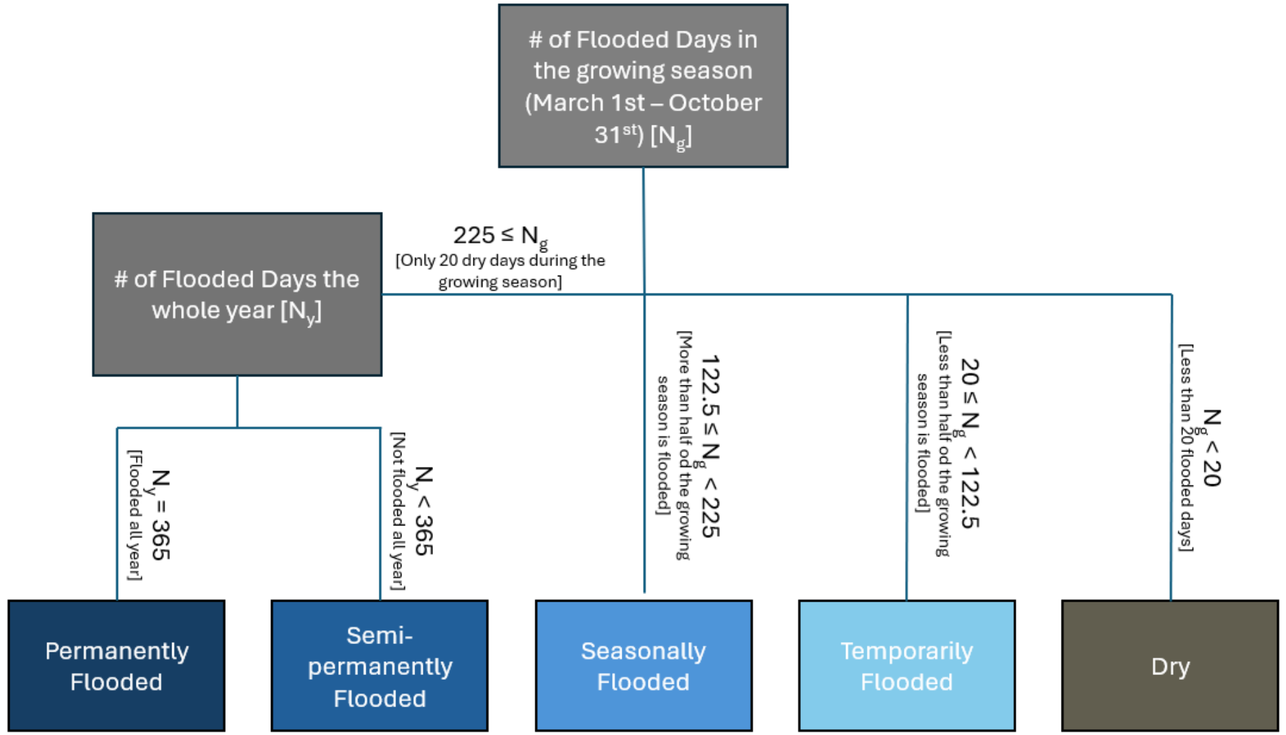
EXAMPLE ADAPTATION – SWAMP V3: WATER REGIME

Original WVA Variable Definition:

Flooding Duration

- Permanently Flooded: Water covers the substrate throughout the year in all years.
- Semi-permanently Flooded: Surface water is present throughout the growing season in **most years**.
- Seasonally Flooded: Surface water is present for **extended periods**, especially in the growing season, but is absent by the end of the growing season in most years.
- Temporarily Flooded: Surface water is present **for brief periods** during the growing season, but the water table **usually lies well below the surface** for most of the season.

ICM-WVA Variable Definition:



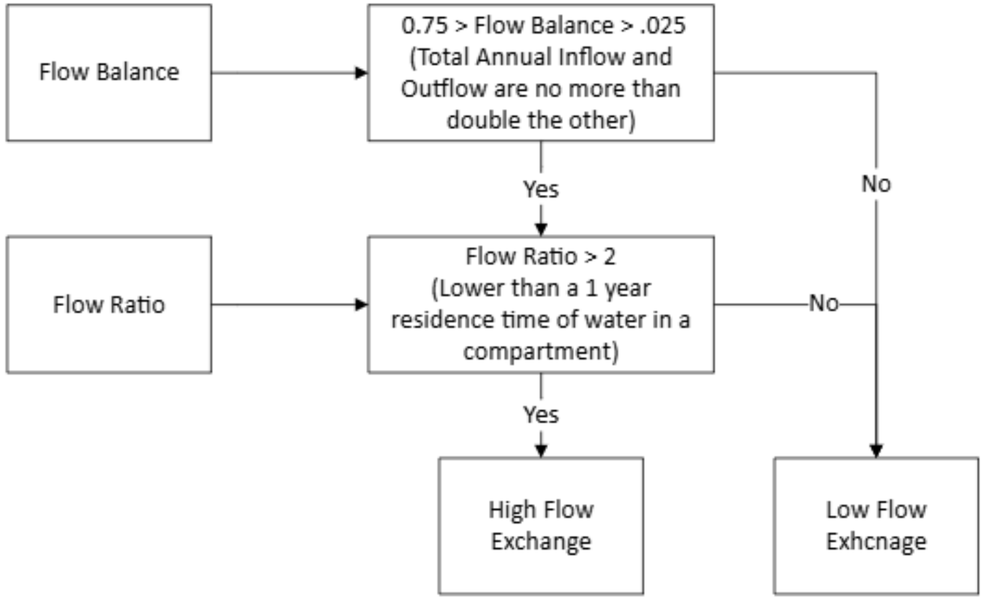
EXAMPLE ADAPTATION – SWAMP V3: WATER REGIME

Original WVA Variable Definition:

Flow Exchange

- High: Receives **abundant and consistent** riverine input and through-flow.
- Moderate: **Moderate water exchange**, through riverine and/or tidal input.
- Low: **Limited water exchange**, through riverine and/or tidal input.
- None: No water exchange (stagnant, impounded).

ICM-WVA Variable Definition:



		Flow Exchange			
		High	Moderate	Low	None
Flooding Duration	No Flooding	-	-	-	-
	Temporary	0.90	0.75	0.65	0.40
	Seasonal	1.00	0.85	0.70	0.50
	Semi-Permanent	0.75	0.65	0.45	0.25
	Permanent	0.65	0.45	0.30	0.10

		Flow Exchange	
		High	None
Flooding Duration	No Flooding	0.65	0.10
	Temporary	0.90	0.40
	Seasonal	1.00	0.50
	Semi-Permanent	0.75	0.25
	Permanent	0.65	0.10

OUTPUT METRICS

Habitat Units

- Adaptation of Average Annual Habitat Units from WVA methodology.
- Represents the broader picture of wetland health and quantity over an analysis region.

SI and HSI Sums

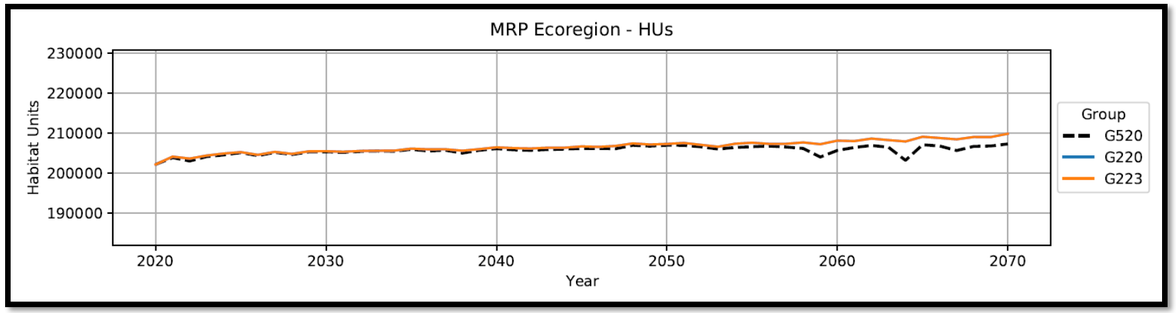
- Sums of individual Suitability Indices and Habitat Suitability Indices.
- Allow for more direct insight into the causes of changes in the metric.

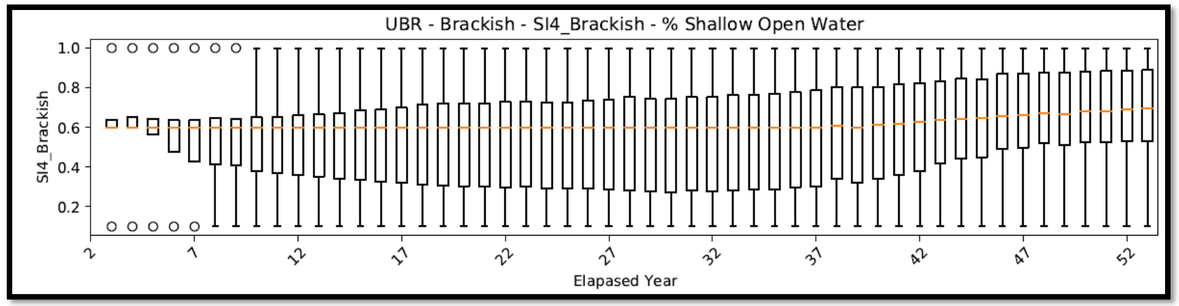
Box Plots

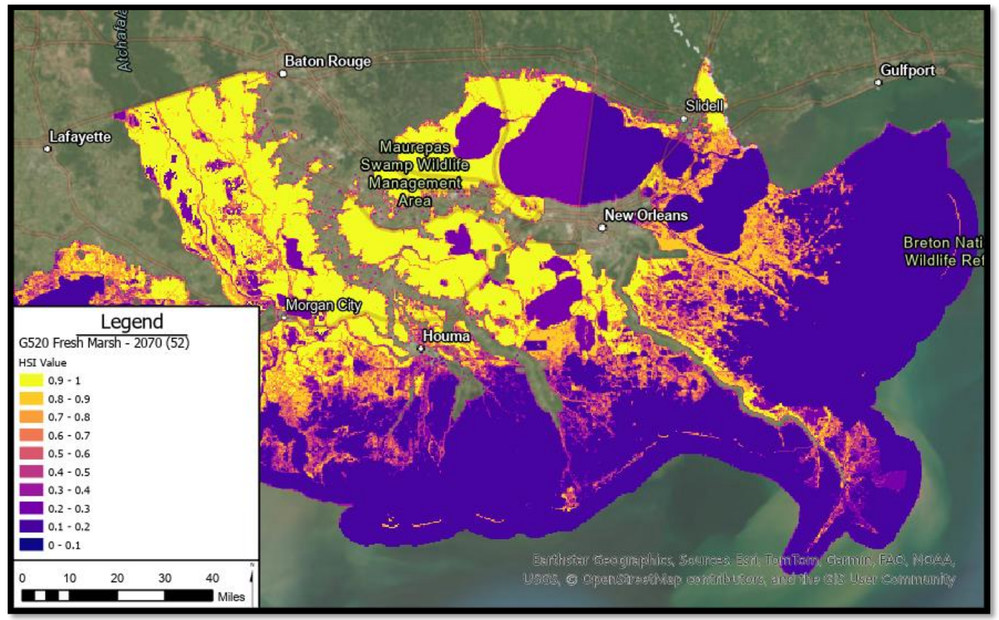
- Box plots provide a method of isolating the quality of wetland habitats from the quantity aspect.
- Direct evaluation to the ICM-WVA model parameters

Mapped Outputs

- Allow for a more spatial analysis of ICM-WVA outputs







USE TO EVALUATE UPPER BASIN DIVERSIONS

Union Diversion

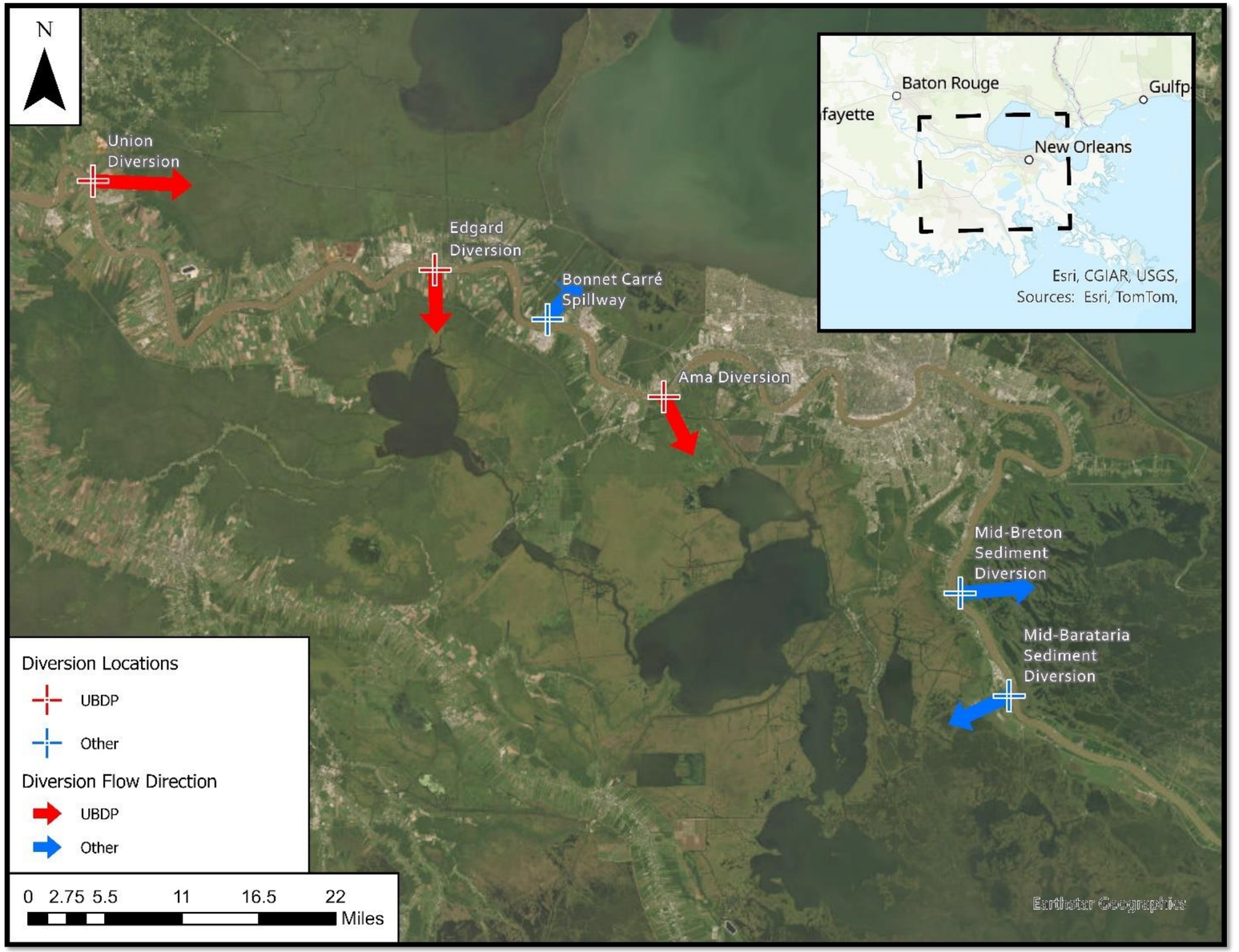
- Freshwater Diversion into Maurepas Swamp
- River Mile 169

Edgard Diversion

- Freshwater Diversion into Upper Barataria region
- River Mile 137

Ama Diversion

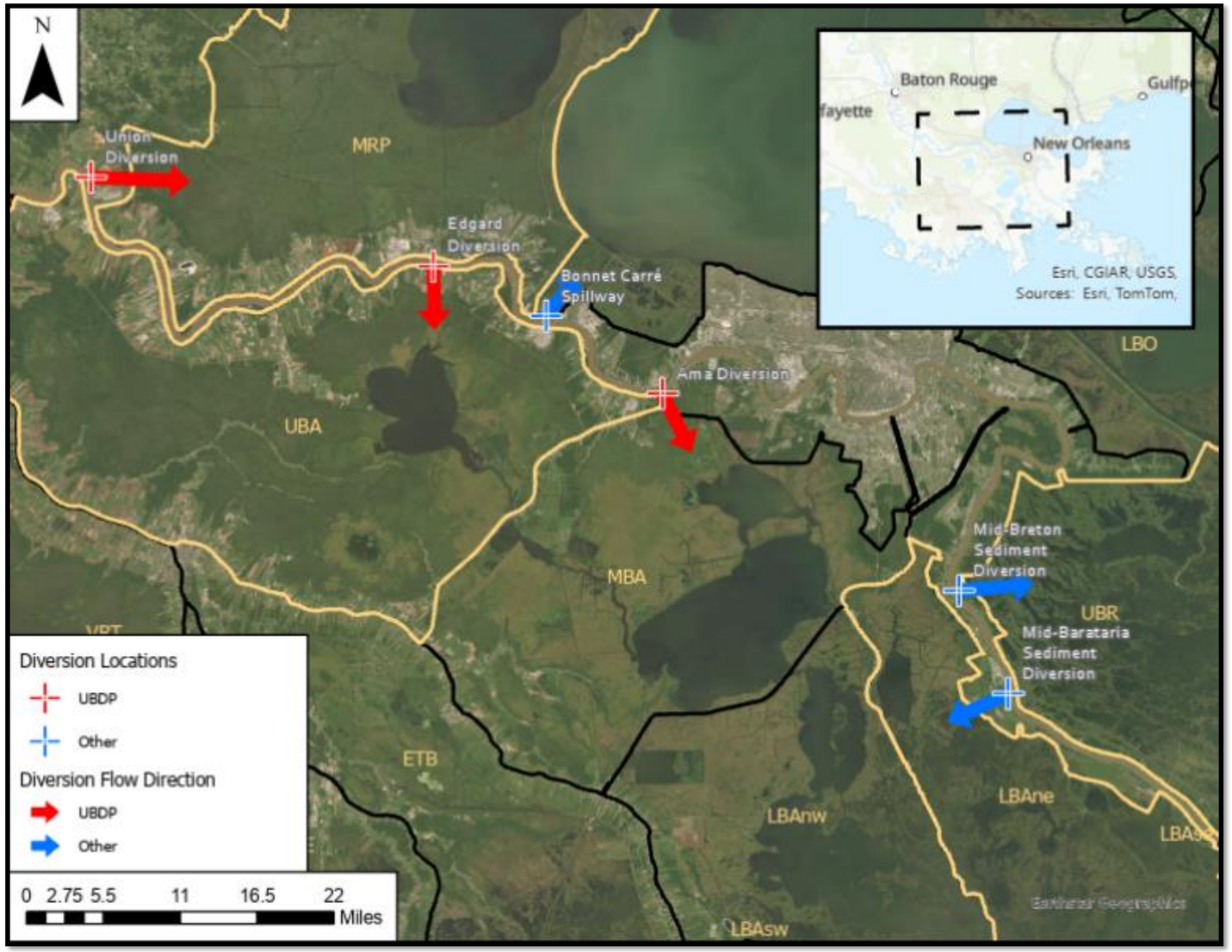
- Freshwater Diversion into Mid-Barataria region
- River Mile 115



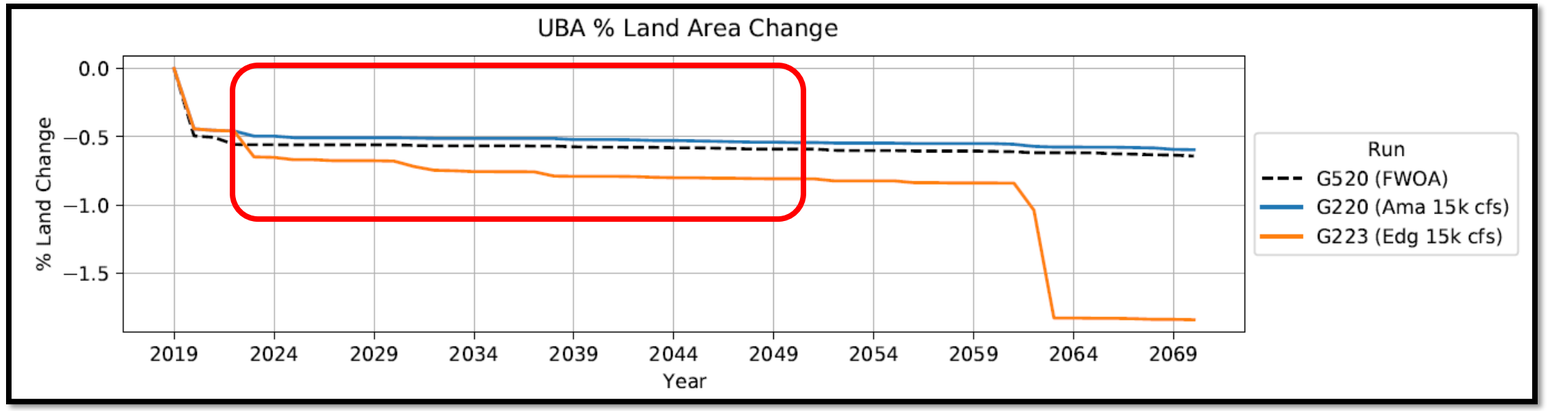
USING ICM-WVA AS A COMPARATIVE METRIC

Study Questions

- **What are the effects of these diversion on the primary ICM metrics?**
- **What are the effects of these diversions on the secondary ICM metrics?**
- Does the operation of these diversions have adverse impacts with downstream diversion operations?
- What flow rate should these diversions operate at to maximize positive project impacts?
- What operations curve should these diversions operate at?

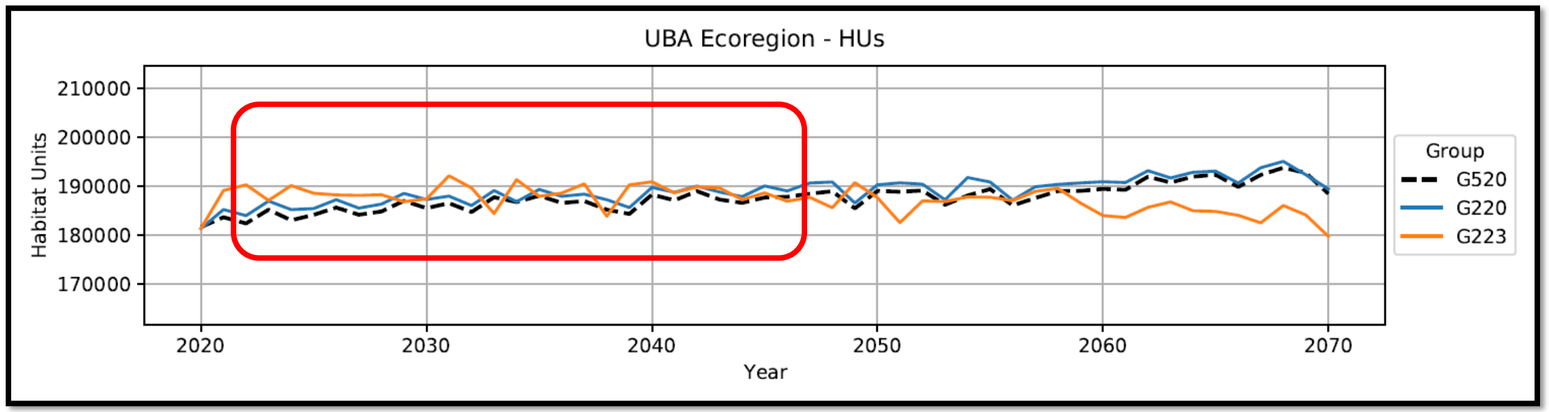


USING ICM-WVA AS A COMPARATIVE METRIC



Land Area

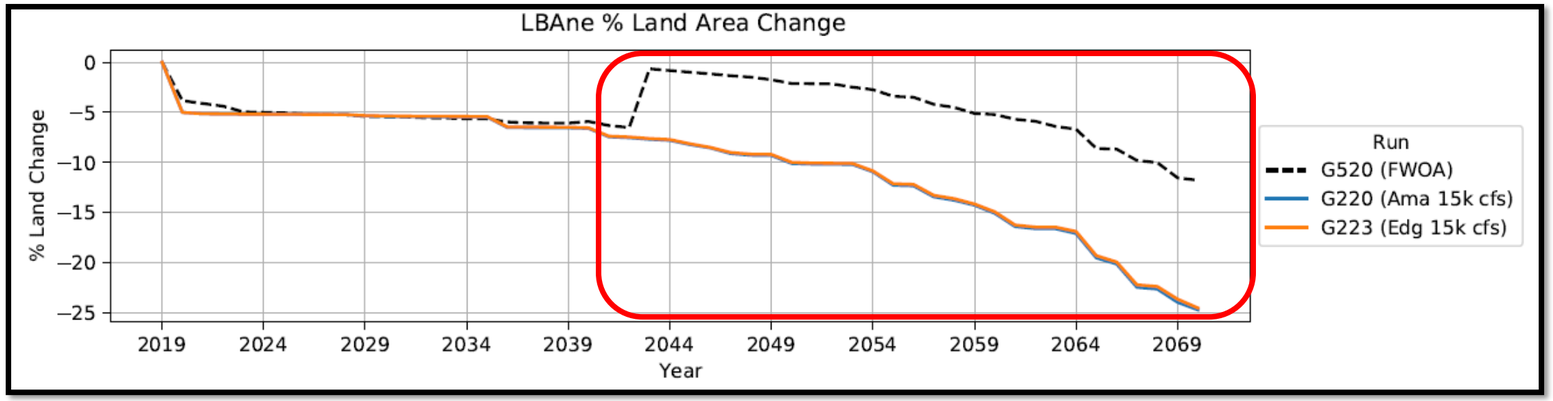
- Slight increase in land loss in Upper Barataria region when operating Edgard diversion
- Most likely due to an increase in water surface elevations despite sediment deposition



Wetland Habitat Units

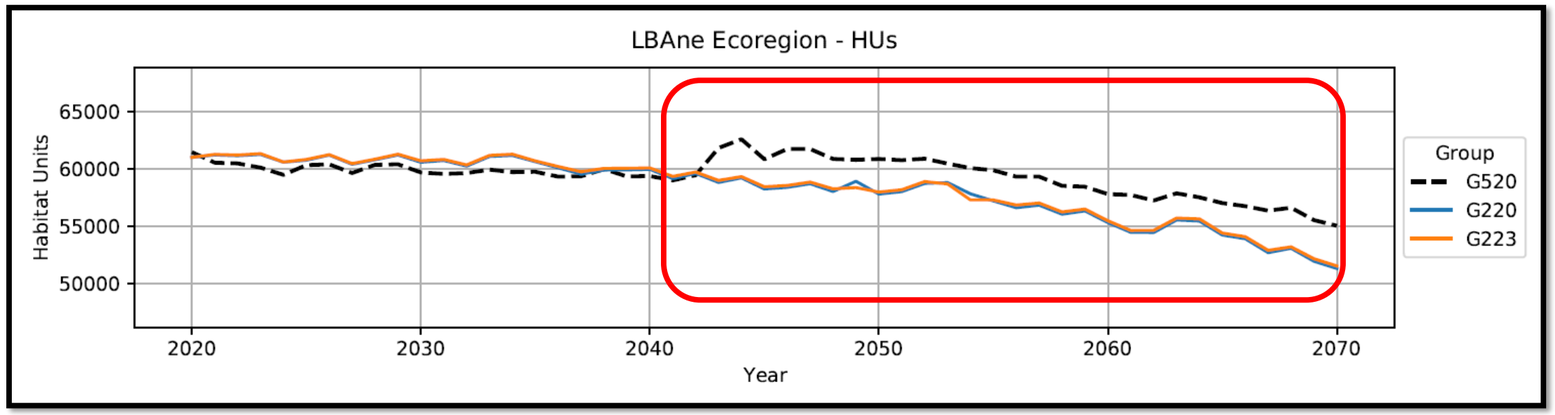
- Despite the increased land loss, wetland habitat units when operating Edgard Diversion remain consistent with or elevated from FWOA
- This indicates that the land loss seen in the region is either of unhealthy wetland areas or an increase in wetland health of remaining wetland areas

USING ICM-WVA AS A COMPARATIVE METRIC



Land Area

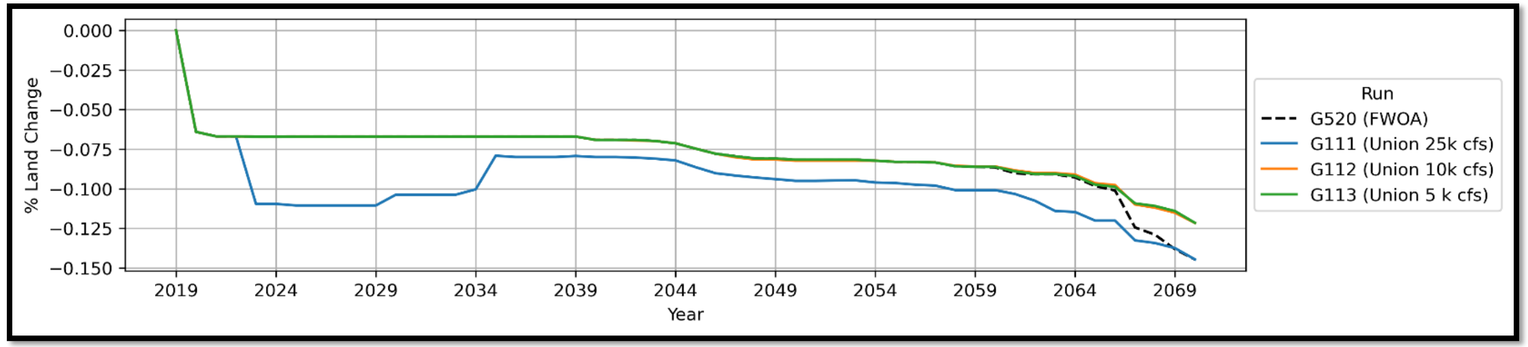
- FWOA simulates significant land building in Year 2042 due to the operation of Mid-Barataria Sediment Diversion.
- Ama and Edgard simulations see a dramatic increase in land loss due to Mid-Barataria not being operated



Wetland Habitat Units

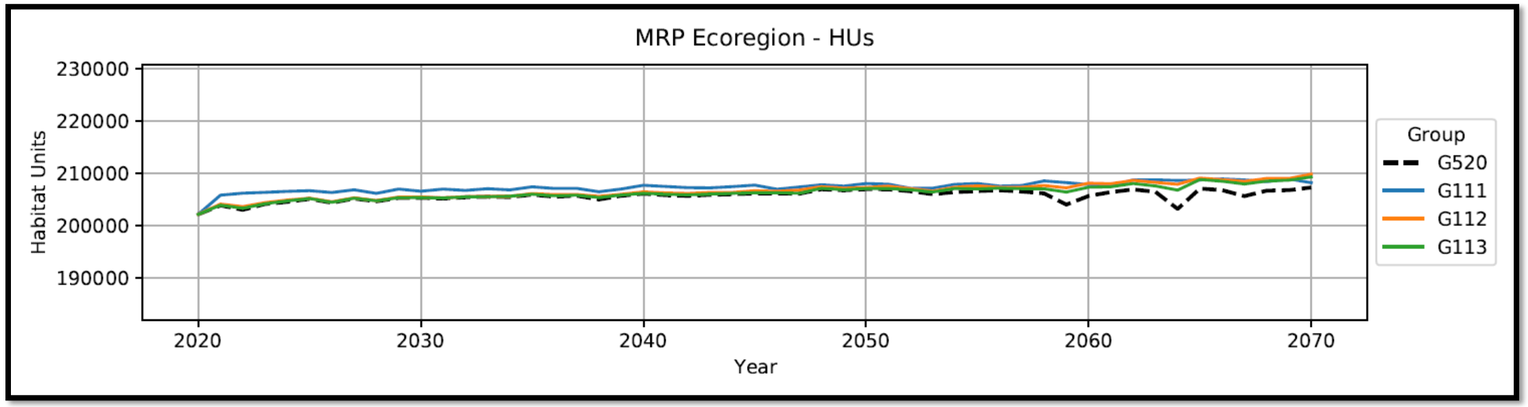
- Despite the increased land loss, wetland habitat units do not trend as poorly when operating Edgard or Ama Diversion FWOA
- This indicates that amount of freshwater diverted through Mid-Barataria Sediment Diversion did not provide as much quality wetland area
- The operation of Ama / Edgard Diversion increased swamp quality of remaining land areas.

USING ICM-WVA AS A COMPARATIVE METRIC



Land Area

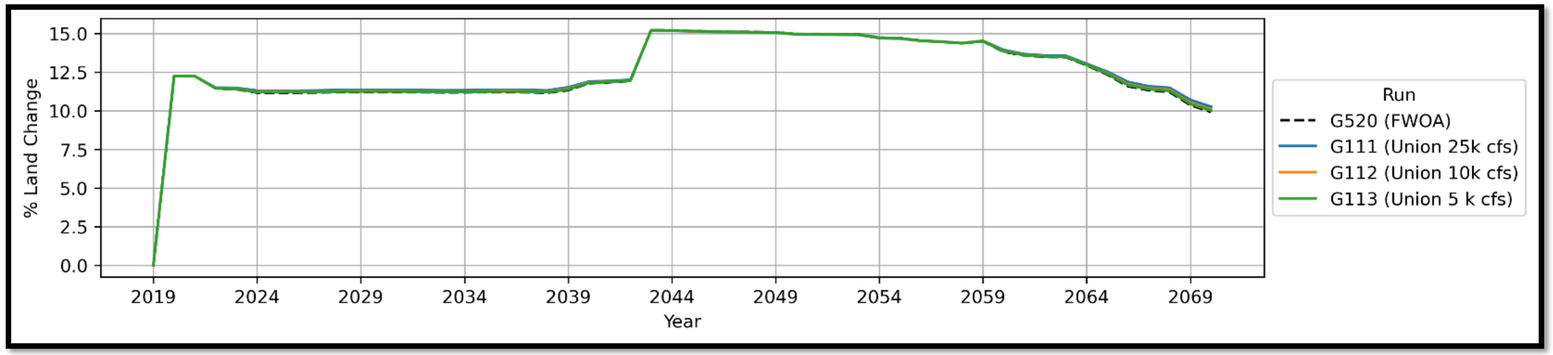
- Union Diversion when operating between 0 and 10k cfs did not demonstrate and land area changes to the Maurepas Swamp region except for late in the simulation
- 25k cfs increased land loss, slightly but consistently throughout the simulation period



Wetland Habitat Units

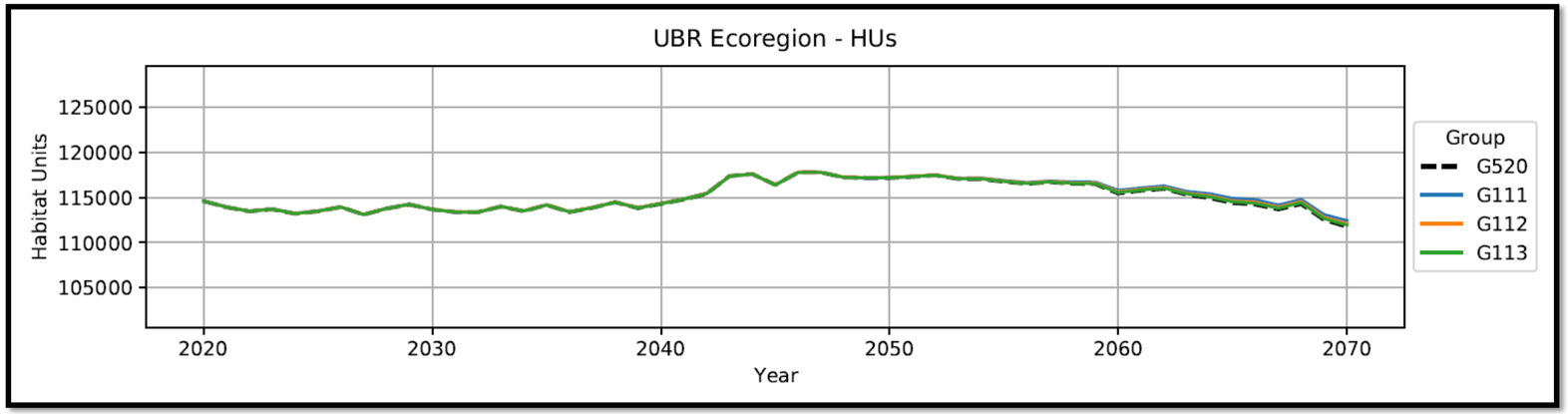
- Despite the increase land loss, Union diversion operating at 25k cfs demonstrates the highest Habitat Units in the region, indicating the increase of marsh quality, but reduction in quantity
- 25k cfs increased land loss, slightly but consistently throughout the simulation period

USING ICM-WVA AS A COMPARATIVE METRIC



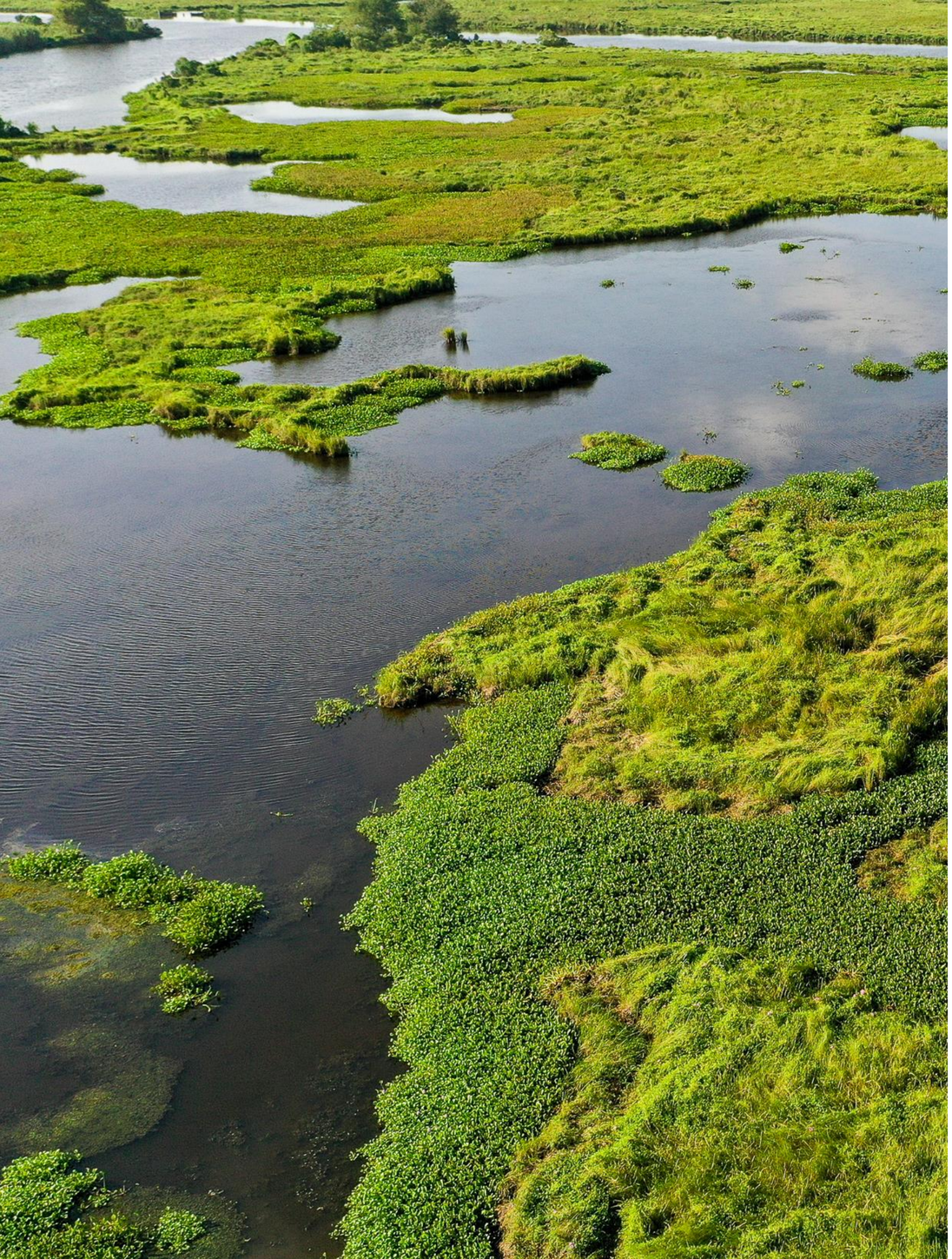
Land Area

- Concern that operating both Union diversion and Mid-Breton Sediment Diversion would cause adverse downstream impacts
- Land area metrics from the ICM indicate no adverse impacts, but rather a reduction in land loss in the end of the simulation



Wetland Habitat Units

- The conclusion of no adverse impacts is supported by the ICM-WVA metrics that match the trends of land area.
- Operating Union diversion provides benefit late in the simulation, most likely due to decreased salinity intrusion.



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