WVA Monte Carlo (MC) Model

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Background

- **Wetland Value Assessment (WVA) Model**
  - Suite of Models developed for evaluation of Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) projects in Louisiana
    - [http://lacoast.gov/new/About/Default.aspx](http://lacoast.gov/new/About/Default.aspx)
    - Used to identify optimal combination of habitat conditions for all fish and wildlife species in coastal Louisiana
  - Main focus is to quantify the wetland benefits for project alternative comparison
    - Characterize habitat quality relative to fish and wildlife
    - Value of future variables determined with project and without project
Background

- Wetland Value Assessment (WVA) Model
  - Calculations use Suitability Indices (SI) to determine an overall Habitat Suitability Index (HSI)
  - HSI is used to calculate total Habitat Units (HU)
  - The Annual Average Habitat Unit (AAHUA) is used to compare alternatives and projects
Background

- WVA Model Certification
  - Battelle evaluated WVA and determined areas of concern
  - ERDC-EL addressed several comments with assistance from New Orleans District and ECO-PCX
    - Equation errors
    - Usability of spreadsheets
    - Suitability Index concerns
    - Incorporation of uncertainty
    - Sensitivity analyses performed
Background

WVA Methodology

- Includes seven community habitat assessment models
  - Marsh Models
    - Saline
    - Brackish
    - Fresh/Intermediate
  - Coastal Chenier/Ridge
  - Swamp
  - Barrier Island
  - Barrier Headland
Marsh Model Description

- Variable Description
  - V1 – Percent Emergent Marsh
  - V2 – Percent Open Water Covered by Submerged Aquatic Vegetation
  - V3 – Marsh Edge Interspersion
  - V4 – Percent Open Water (Greater than 1.5 feet)
  - V5 – Salinity
  - V6 – Aquatic Organism Access
Swamp Model Description

- Variable Description
  - V1 – Stand Structure
  - V2 – Stand Maturity
  - V3 – Water Regime
  - V4 – Mean High Salinity During Growing Season
Barrier Headland Model Description

- **Variable Description**
  - V1 – Percent of Project Area Classified as Dune
  - V2 – Percent of Project Area Classified as Supratidal Habitat
  - V3 – Percent Vegetative Cover of Dune and Supratidal Habitat
  - V4 – Percent Vegetative Cover by Woody Species
  - V5 – Beach/Surf Zone Features
Barrier Island Model Description

- **Variable Description**
  - V1 – Percent of Project Area Classified as Dune
  - V2 – Percent of Project Area Classified as Supratidal Habitat
  - V3 – Percent of Project Area Classified as Intertidal Habitat
  - V4 – Percent Vegetative Cover of Dune and Supratidal Habitat
  - V5 – Percent Vegetative Cover by Woody Species
Coastal Chenier/Ridge Model Description

- Variable Description
  - V1 – Percent Tree Canopy Cover
  - V2 – Percent Shrub/Midstory Cover
  - V3 – Native Woody Species Diversity
Updates to Model

- All models included in a single spreadsheet
- Monte-Carlo Simulation
  - Two ways to account for uncertainty
    - High/Low
    - Standard Deviation
- Any empty cell is treated as zero
Updates to Model

- Two methods to handle data between Target Years
  - Linear
    - Assumes straight line relationship for data
  - Step
    - Assumes data remains constant until user specifies
Updates to Model

- Built in statistics
  - Mean
  - Standard Deviation
  - 95% Confidence Interval
Updates to Model

- Ability to run model and have results exported to new excel file for multiple scenarios
  - Set-up of export file
    - Filename: Project
      - This is the Test Site
    - Tab: Simulation Name
      - Test Run 1
Updates to Model

- Incorporation of Land Loss
  - Not dependent on spreadsheet version
    - Acreage values must be in columns
  - Ability to import values from any land loss spreadsheet
Current Spreadsheet Limitations

- When changing file name input values will automatically clear.
- If rows or columns are frozen to ensure parameters are placed in correct location the model will not run.
- All output is displayed on Output tab and can be cumbersome depending on number of Monte Carlo Iterations.
Acknowledgements

► Ecosystem Management and Restoration Program (EMRRP)
► Dredging Operations and Environment Research Program (DOER)
► Engineering With Nature (EWN)
References

- http://lacoast.gov/new/Projects/WVA.aspx