J. Dwyer _____

M. Rowe Matthew C. Rowe

A. Jenkins Antonia Jenkins

N. Washington N Washington 7/23/24

Water and Science Administration

MEMORANDUM

To: June Dwyer, Operational Services Administration or Designee

From: Natalie Washington, Administrator

Subject: MOU/Contract Review and Approval

The Water and Science Administration requests your review and approval of the attached MOU/Contract with __**Department of the Army**_____ in the amount of $_**700,000.00**___.

Please return signed originals and purchase order to Natalie Washington.

PCA: **470T2**

Circle one: General **Special** Federal Reimbursable

Program Manager Signature: _____ Date: 07/24/2024

REQUISITION (submit in duplicate)

Ship to: Maryland Department of Environment
1800 Washington Blvd.
Suite 400
Baltimore, MD 21230-1718

PCA Code 4 7 0 T 2

Appropriation Code 3 9 0 1 0 4 4 1 2 0

Item Number 1 2 9 9 **Fund** 0 3

Attention: Natalie Washington x3912 **Req. No.** NWARMY-072324 **Date** 7/23/2024

Quantity	Unit	Description	Unit Price	Ext Price
		Department of the Army Conowingo Reservoir Modeling Study MDE Share of the Study under the Planning Assistance to States (PAS) Program	$700,000.00	**$700,000.00**

Vendor: **Dept. of the Army** **Federal Tax ID:** **TOTAL** **$700,000.00**
Address: **Contact:** **Karl Kerr**
Phone: **410-962-4417**
FAX:

THE UNDERSIGNED HERBY CERTIFYS THAT SUFFICIENT FUNDS ARE AVAILABLE AND HAVE _____ HAVE NOT _____ BEEN APPROVED IN THE BUDGET FOR THE ARTICLES REQUISITIONED HEREIN AND THAT ARTICLES LISTED ARE FOR STATE USE.

Approved Signature _____
UNIT HEAD

Antonia Jenkins (Jul 23, 2024 16:46 EDT)
BUDGET CERTIFICATION

Date Shipped _____ Via _____

MARYLAND STATE DEPARTMENT OF THE ENVIRONMENT

NOTES:

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
2 HOPKINS PLAZA
BALTIMORE, MD 21201

June 20, 2024

Planning Division

Ms. Suzanne Dorsey
Deputy Secretary
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230

Dear Ms. Dorsey:

The purpose of this letter is to transmit an electronic copy of the Letter of Agreement (LOA) for the Conowingo Reservoir Modeling Study (Enclosure 1). The LOA has been reviewed and approved by the U.S. Army Corps of Engineers (USACE), North Atlantic Division Office of Counsel and the Baltimore District Office of Counsel. The LOA specifies the scope of study and financial responsibility of the Maryland Deportment of the Environment (MDE), and the USACE for the study to be performed under the Planning Assistance to States (PAS) program.

Based on the projected level of effort, the total cost for this LOA is estimated at $1,400,000. As you are aware, the PAS program is a cost-shared program, in which the federal government and the non-federal sponsor each contribute 50 percent of the initial cost. Through this program, the non-federal sponsor may voluntarily contribute funds in addition to the initial cost share. This agreement will cover Tasks 1 through 5 of the attached scope of work (Enclosure 2). USACE and MDE will contribute $700,000 each for the cost share.

This is a request that MDE process an Electronic Funds Transfer (EFT) in the amount of $700,000 to the USACE. The following details are needed for setting up the EFT payment:

Bank Name: Cash Link – Ach receiver
Account Name: USACE Finance Center
Account Number 220025
Bank Address: Riverdale, MD, 30-887-6600
Bank ABA Number: 051036706
Account Type: Checking

If you have any questions regarding the LOA, the study, or the PAS program, please contact Mr. Karl Kerr at (410) 962-4417.

Sincerely,

Karl Kerr

Karl Kerr
Program Manager,
Planning Assistance to States

Encl (2)

AGREEMENT
BETWEEN
THE DEPARTMENT OF THE ARMY
AND
MARYLAND DEPARTMENT OF THE ENVIRONMENT
FOR THE PROVISION OF CERTAIN TECHNICAL ASSISTANCE

THIS AGREEMENT is entered into this 14TH day of JUNE, 2024, by and between the Department of the Army (hereinafter the "Government"), represented by the District Commander for Baltimore District (hereinafter the "District Commander") and the Maryland Department of the Environment (hereinafter the "Non-Federal Sponsor"), represented by the Director.

WITNESSETH, THAT:

WHEREAS, Section 22 of the Water Resources Development Act of 1974, as amended (42 U.S.C. 1962d-16), authorizes the Secretary of the Army to provide technical assistance related to the management of State water resources (hereinafter "Technical Assistance") to a State or non-Federal interest working with a State and to establish and collect fees for the purpose of recovering 50 percent of the costs of such assistance except that Secretary may accept and expend non-Federal funds provided that are in excess of such fee; and

WHEREAS, the Government and the Non-Federal Sponsor have the full authority and capability to perform in accordance with the terms of this Agreement.

NOW, THEREFORE, the parties agree as follows:

1. The Government shall provide Technical Assistance in accordance with the attached Scope of Work, and any modifications thereto, that specifies the scope, cost, and schedule for activities and tasks. In carrying out its obligations under this Agreement, the Non-Federal Sponsor shall comply with all the requirements of applicable Federal laws and implementing regulations, including but not limited to, if applicable, Section 601 of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto; the Age Discrimination Act of 1975 (42 U.S.C. 6102); and the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Army Regulation 600-7 issued pursuant thereto.

2. The Non-Federal Sponsor shall provide 50 percent of the costs of providing the Technical Assistance in accordance with the provisions of this paragraph. As of the effective date of this Agreement, the costs of providing the Technical Assistance are projected to be $1,400,000, with the Government's share of such costs projected to be $700,000 and the Non-Federal Sponsor's share of such costs projected to be $700,000.

a. No later than 15 calendar days after the effective date of this Agreement, the Non-Federal Sponsor shall provide the full amount of its share of costs by delivering a check payable to "FAO, USAED, Baltimore (E1)" to the District Commander or by providing an Electronic

Funds Transfer of such required funds in accordance with procedures established by the Government.

b. If the Government determines at any time that additional funds are needed from the Non-Federal Sponsor to cover the Non-Federal Sponsor's costs of the Technical Assistance, the Government shall provide the Non-Federal Sponsor with written notice of the amount of additional funds required. Within 60 calendar days of such notice, the Non-Federal Sponsor shall provide the Government with the full amount of such additional funds.

c. Following completion or termination of the Technical Assistance and resolution of any relevant claims and appeals, the Government shall conduct a final accounting and furnish the Non-Federal Sponsor with the written results of such final accounting. Should the final accounting determine that additional funds are required from the Non-Federal Sponsor, the Non-Federal Sponsor, within 60 calendar days of written notice from the Government, shall provide the Government with the full amount of such additional funds by delivering a check payable to "FAO, USAED, Baltimore (E1)" to the District Commander, or by providing an Electronic Funds Transfer of such required funds in accordance with procedures established by the Government. Should the final accounting determine that the Non-Federal Sponsor has provided funds in excess of its required amount, the Government shall refund any remaining unobligated amount. Such final accounting does not limit the Non-Federal Sponsor's responsibility to pay its share of costs, including contract claims or any other liability that may become known after the final accounting.

3. To the extent practicable and in accordance with Federal laws, regulations, and policies, the Government shall afford the Non-Federal Sponsor the opportunity to review and comment on contract solicitations prior to the Government's issuance of such solicitations; proposed contract modifications, including change orders; and contract claims prior to resolution thereof. Ultimately, the contents of solicitations, award of contracts, execution of contract modifications, and resolution of contract claims shall be exclusively within the control of the Government.

4. In addition to its required cost share, the Non-Federal Sponsor may determine that it is in its best interests to provide additional funds for the Technical Assistance. Additional funds provided under this paragraph and obligated by the Government are not included in calculating the Non-Federal Sponsor's required cost share and are not eligible for credit or repayment.

5. The Non-Federal Sponsor shall not use Federal program funds to meet any of its obligations under this Agreement unless the Federal agency providing the funds verifies in writing that the funds are authorized to be used for the provision of the Technical Assistance. Federal program funds are those funds provided by a Federal agency, plus any non-Federal contribution required as a matching share therefor.

6. Upon 30 calendar days written notice to the other party, either party may elect, without penalty, to suspend or terminate the provision of Technical Assistance under this Agreement. Any suspension or termination shall not relieve the parties of liability for any obligation incurred.

7. The parties agree to use their best efforts to resolve any dispute in an informal fashion through consultation and communication. If the parties cannot resolve the dispute through negotiation, they may agree to a mutually acceptable method of non-binding alternative dispute resolution with a qualified third party acceptable to the parties. Each party shall pay an equal share of any costs for the services provided by such a third party as such costs are incurred. The existence of a dispute shall not excuse the parties from performance pursuant to this Agreement.

8. To the extent permitted under applicable Federal laws and regulations, the Government shall allow the Non-Federal Sponsor to inspect books, records, documents, or other evidence pertaining to costs and expenses maintained by the Government, or at the Non-Federal Sponsor's request, provide to the Non-Federal Sponsor or independent auditors any such information necessary to enable an audit of the Non-Federal Sponsor's activities under this Agreement. The Non-Federal Sponsor shall pay the costs of non-Federal audits without reimbursement or credit by the Government.

9. In the exercise of their respective rights and obligations under this Agreement, the Government and the Non-Federal Sponsor each act in an independent capacity, and neither is to be considered the officer, agent, or employee of the other. Neither party shall provide, without the consent of the other party, any contractor with a release that waives or purports to waive any rights a party may have to seek relief or redress against that contractor.

10. Any notice, request, demand, or other communication required or permitted to be given under this Agreement shall be deemed to have been duly given if in writing and delivered personally or mailed by registered or certified mail, with return receipt, as shown below. A party may change the recipient or address to which such communications are to be directed by giving written notice to the other party in the manner provided in this paragraph.

If to the Non-Federal Sponsor:

D. Lee Currey
Director
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230

If to the Government:

Mr. Karl Kerr
Planning Division
U.S. Army Corps of Engineers, Baltimore District
2 Hopkins Plaza
Baltimore, MD 21201

11. To the extent permitted by the laws governing each party, the parties agree to maintain the confidentiality of exchanged information when requested to do so by the providing party.

12. Nothing in this Agreement is intended, nor may be construed, to create any rights, confer any benefits, or relieve any liability, of any kind whatsoever in any third person not a party to this Agreement.

13. The Non-Federal Sponsor intends to fully fulfill its obligations under this Agreement. Nothing herein shall constitute, nor be deemed to constitute, an obligation of future appropriations by the General Assembly of the State of Maryland, where creating such an obligation would be inconsistent with Article III, Section 32 of the Constitution of the State of Maryland and Md. Code Ann. State Finance and Procurement Article § 7-237, which prohibit a State agency or official from entering into any binding commitment for the payment of State funds in excess of appropriations and require that multi-year contracts be made contingent upon future appropriations.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, which shall become effective upon the date it is signed by the District Commander.

DEPARTMENT OF THE ARMY

BY: _____
Esther S. Pinchasin
Colonel, U.S. Army
Commander and District Engineer

DATE: 14 June 2024

MARYLAND DEPARTMENT OF THE ENVIRONMENT

BY: _____
Suzanne Dorsey
Deputy Secretary

DATE: March 12, 2024

Approved for Legal Form and Sufficiency for MDE this 11th day of March, 2024.

_____
Rebecca Balint Reske
Assistant Attorney General

ATTACHMENT 1
SCOPE OF WORK
Conowingo Reservoir Modeling Study

May 2024

I. STUDY PURPOSE AND STUDY BACKGROUND

There is a critical need to build upon and enhance the Conowingo Reservoir (CR) modeling work done as a component of the Lower Susquehanna River Watershed Assessment. Specifically, there is a need to develop a non-proprietary, three-dimensional (3D) Conowingo Reservoir modeling system that can connect to existing watershed and estuarine models that is capable of simulating the biogeochemical, sediment transport and hydrodynamic processes within CR.

The Maryland Department of the Environment (MDE) is requesting assistance from the U.S. Army Corps of Engineers (USACE) Baltimore District (NAB) with performing a modeling study of CR on the Susquehanna River (see Figure 1) to assess the increased risks to Chesapeake Bay from sediment and nutrient releases from the CR due to increased risk of intense summer and winter season storms. Several meetings held with NAB, MDE, EPA's Chesapeake Bay Program (CBP) and USACE Engineer Research and Development Center (ERDC) scoped the following three objectives for this modeling study: 1) Develop a three-dimensional (3D) water quality modeling system, 2) setup the modeling system to simulate both current and future dredging scenarios, and 3) to simulate future hydrologic-climate scenarios.

II. 2.0 STUDY AUTHORITY

This study will be conducted by NAB, under the Planning Assistance to States (PAS) program which is authorized by Section 22 of the Water Resources Development Act of 1974 (PL 93-251), as amended. The PAS program is designed to provide planning-level assistance to communities and USACE partners for water resource related issues. The project is planning level only. No detailed design or construction will result from this investigation.

Figure 1: Regional View of Conowingo Reservoir

III. STUDY MANAGEMENT

As part of the management of this PAS study, USACE and MDE will create an Executive Committee. The Executive Committee will remain informed of status and progress throughout the study, and engage on any issues causing a deviation from the schedule or overall costs presented in the letter of agreement (LOA) and SOW. The structure, function and communication frequency will be coordinated between both parties.

If, at any time, during the execution of this project, it becomes apparent that a significant commitment by either USACE or the sponsor will not be met, that the completion of a task will be significantly delayed, or there is a change in the estimated cost that exceeds the contingency available, the project delivery team (PDT) will assess whether the delay can be recovered or the costs recouped. Routine scope or budget changes that can be managed within the schedule and costs presented will be considered minor and not significant. These changes will be documented by the project managers for USACE and MDE and recorded in the project files. If the overall completion schedule or cost estimate cannot be maintained according to the LOA and SOW, the decisions of the Executive Committee, including decisions that may result in increased costs, must be agreed to by both parties.

The PDT is responsible for identifying if there is a need to amend the parties Technical Services Agreement and, if so, will make that recommendation to the Executive Committee. With the Executive Committee's concurrence, the PDT will prepare and negotiate the amendment with the USACE project manager having the lead in the amendment drafting process. Legal counsel from both USACE and MDE will review the amendment. Once approved, the amendment will be executed by appropriate signatories from USACE and MDE.

IV. STUDY OBJECTIVES

The objectives of the proposed study are the following:

- Develop a non-proprietary, 3D water quality modeling system of Conowingo Reservoir for the purpose stated above. The modeling system should be capable of simulating hydrodynamics, biogeochemical, and sediment transport processes within CR. Modeling package output will be consistent with requirements of the CBP modeling suite.

- Application of the modeling system to current and future dredging scenarios, specifically the evaluation of sediment and associated nutrient reductions from different dredging scenarios. It must leverage the additional CR sediment characterization work done and lessons learned through Maryland's innovative and beneficial reuse pilot.

- Application of the modeling system to future hydrologic-climate scenarios. This information will help various Chesapeake Bay partnerships better understand and institutionalize the resiliency and response of CR to extreme weather events, flows, future climate change hydrology, and determine CR scour and sediment resuspension and associated nutrient/contaminant increases within the reservoir and transport downstream.

V. TASKS

To achieve these objectives, the following tasks will be performed.

TASK 1 – Data Acquisition

The CR modeling system will require the following categories of data:

- Bathymetry in the model domain, i.e., the CR.
- Meteorological data for the chosen periods of model simulation. These data include time series of wind speed and direction, atmospheric pressures, incident solar radiation, air temperature (both wet and dry bulb), and precipitation.
- Hydrologic data for the chosen periods of simulation. These data include time series of flow, water surface elevations, nutrients, and sediment into the model domain from the Susquehanna River and all other local tributaries and point sources as well as from all nonpoint sources. The CBP will provide these data from their hydrologic model of the Chesapeake Bay watershed.
- Water quality data for the chosen periods of simulation. These data include in-situ water temperature, DO, SOD, nitrogen, phosphorus, and other chosen water quality constituents.
- Sediment characteristics through the model domain. These data include grain size distributions (including percentage of organic matter) from grab samples and sediment cores collected throughout the CR.

TASK 2 – Development of Conowingo Reservoir Modeling System

The 3D Conowingo Reservoir Modeling System (CRMS) will be developed to simulate the following processes:

- Continuous simulation of the reservoir pool including selected hydrometeorological events;
- Change in hydrodynamics from reservoir infill of sediments from the CR watershed, and removal of material through dredging;
- Biogeochemistry in the reservoir pool, responding to the amount and speciation of nitrogen, phosphorus, and sediment inputs from upstream and bottom sediment;
- Biogeochemical changes in sediments, including burial, species changes, and water column exchanges;
- Physical changes in sediment characteristics due to erosion, bed armoring, and deposition of sediment and the resulting morphological changes in the reservoir; and
- Dredging of the reservoir.

CRMS will consist of linked hydrodynamics, nutrient water quality, and sediment transport models. External linkages will be developed to all three models to output from the CBP watershed loading model. A brief description of all three models is given below.

Task 2.1 Hydrodynamic Model

The LTFATE model will be used to simulate the 3D hydrodynamics in the CR. LTFATE is a far-field, Eulerian modeling system that is capable of simulating 3D hydrodynamic, salinity and temperature transport, and mixed sediment transport in coastal waters, estuaries, and rivers. A few sites where LTFATE is currently being used to perform 3D modeling studies include: 1) transport of placed dredged material at the City Point placement site in the James River for the USACE Norfolk District; 2) sediment transport in Lynnhaven Inlet to investigate the excessive sedimentation occurring in the Federal Navigation Channels for the USACE Norfolk District; 3) transport of contaminated Stamp Sands along the eastern shoreline of the Keweenaw Peninsula in Lake Superior for the USACE Detroit District; and 4) transport of placed dredged sand in wetlands and channels in the Mobile Bay delta for the USACE Mobile District.

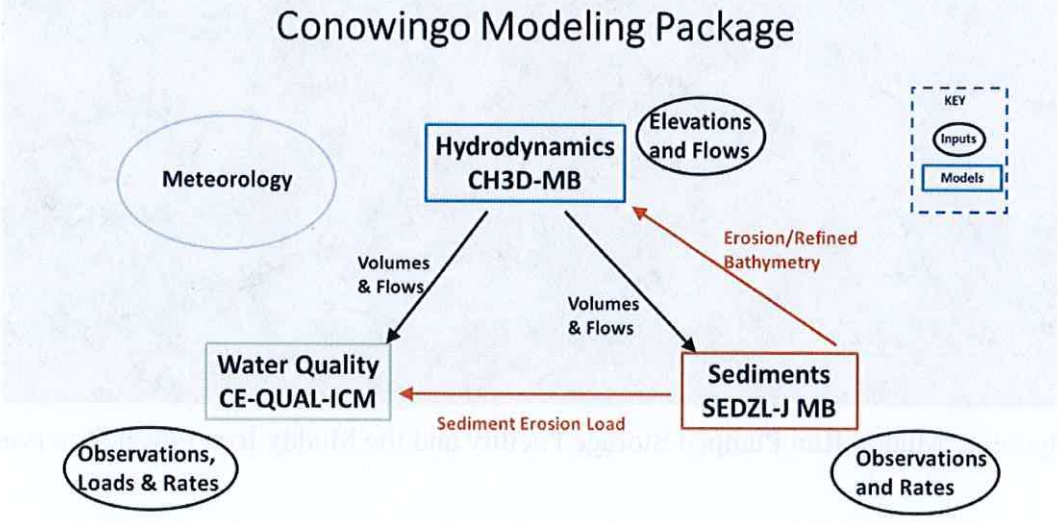

Figure 2: Component Models and Inputs

A curvilinear grid will be developed to represent the CRMS. The grid will include a short reach of all the tributaries of the CR including that from the Muddy Run Power Reservoir and the Muddy Run Pump Storage facility (see Figure 3). The Conowingo Dam will be the downstream boundary for the LTFATE model.

The input files for the LTFATE model that represent river and tributary inflows, winds, and atmospheric pressures will be developed for the chosen calibration and validation time periods as well as for the chosen model scenarios described in the next two tasks. The external linkage to

connect LTFATE to output files from the CBP Chesapeake Bay watershed loading model will be developed and tested as well. The latter will serve as the boundary conditions for the proposed CRMS.

The calibration period and validation period for the CRMS will be selected by the ERDC Project Delivery Team (ERDC PDT) from the 1991-2000 time period previously simulated by the CBP. The first step will be to calibrate and then validate the 3D hydrodynamic model.

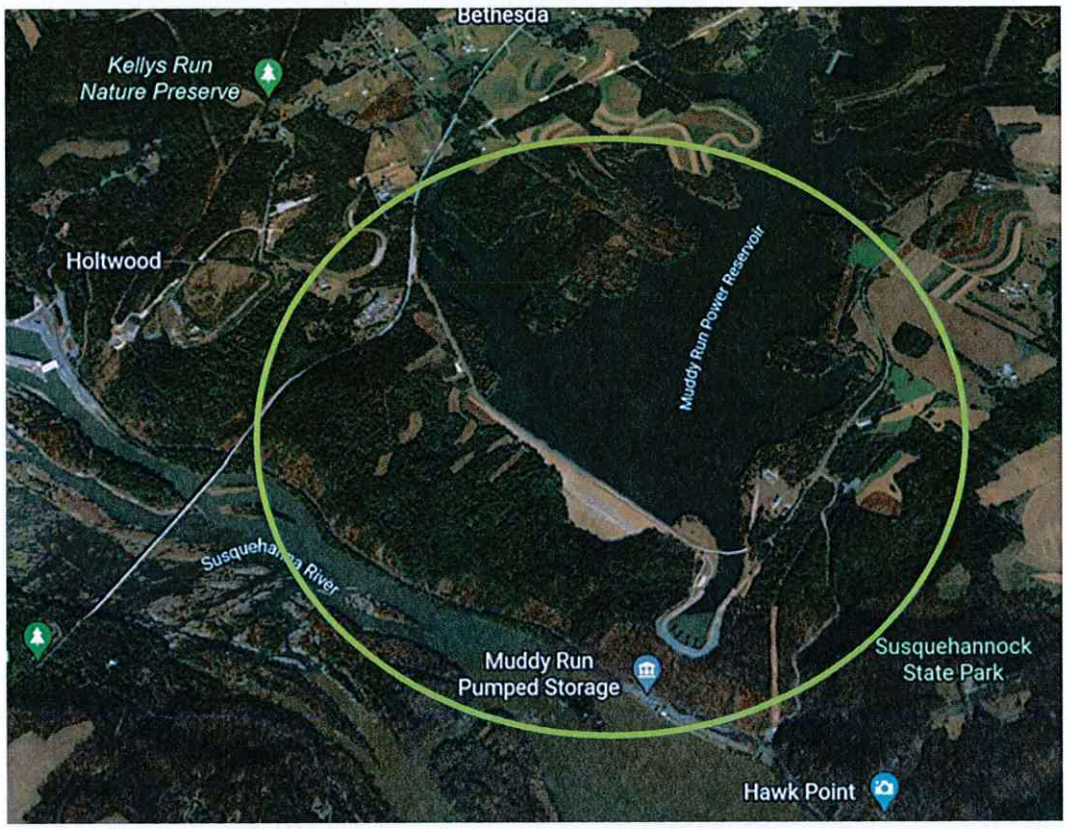

Figure 3: Muddy Run Pumped Storage Facility and the Muddy Run Power Reservoir

Task 2.2 Nutrient Water Quality Model

The CE-QUAL-ICM (ICM) eutrophication model will be used in this modeling study. It is a flexible, widely applicable, state-of the-art eutrophication model. Initial application of ICM was to Chesapeake Bay (Cerco and Cole 1994). Since the initial Chesapeake Bay study, the ICM model code has been generalized with minor corrections and model improvements. Subsequent additional applications of ICM included the Delaware Inland Bays (Cerco *et al.* 1994), Newark Bay (Cerco and Bunch 1997), the San Juan Estuary (Bunch *et al.* 2000), Florida Bay (Cerco *et al.* 2000), St. Johns River (Tillman *et al.* 2004), the Port of Los Angeles (Bunch *et al.* 2003a and 2003b, Martin *et al.* 2008, and Tillman *et al.* 2008), and the Mississippi Sound (Wamsley *et al.*

2013). Each model application employed a different combination of model features and required addition of system-specific capabilities.

General features of ICM include:

- Operational in one-, two-, or three-dimensional configurations.
- Thirty-six state variables including physical properties: multiple forms of algae, zooplankton, carbon, nitrogen, phosphorus, and silica; dissolved oxygen.
- Sediment-water oxygen and nutrient fluxes may be computed in a predictive sub-model or specified based on observations.
- State variables may be individually activated or deactivated.
- Internal averaging of model output over arbitrary intervals.
- Computation and reporting of concentrations, mass transport, kinetics transformations, and mass balances.
- Debugging aids include ability to activate and deactivate model features, diagnostic output, volumetric and mass balances.

Operates on a variety of computer platforms. Coded in ANSI Standard FORTRAN F77.The ICM carbon cycle is shown in Figure 4. Nitrogen, phosphorus, and dissolved oxygen are similarly represented in the model as cycles mediated by various processes (e.g., respiration, photosynthesis, settling, etc.). By selectively activating relevant state variables and processes it is possible to simulate reduced sets of state variables.

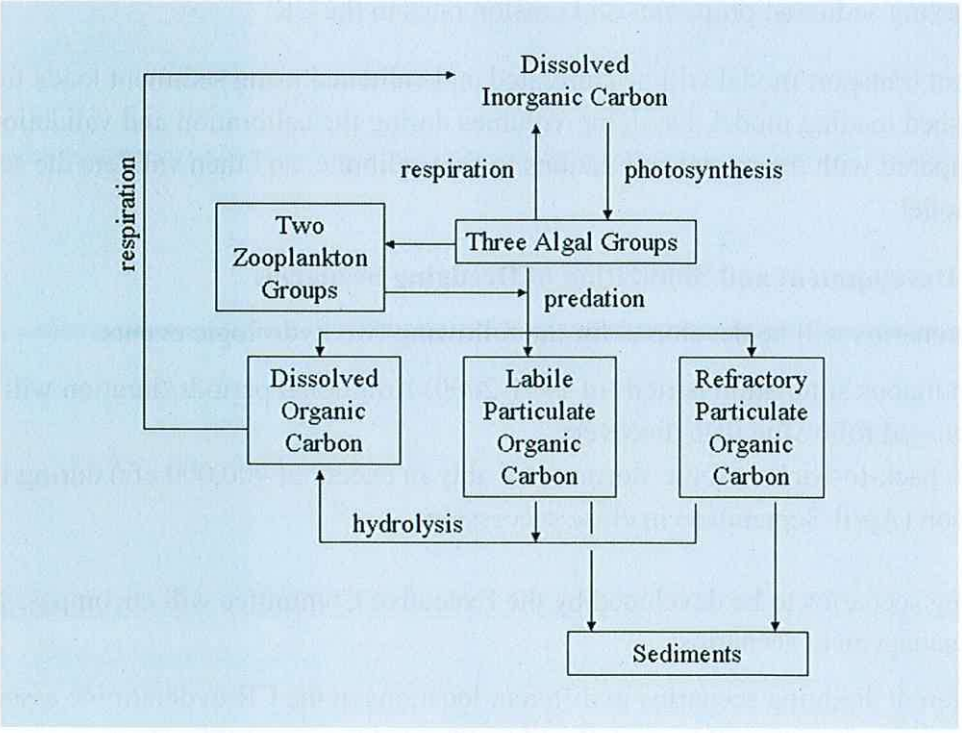

Figure 4. ICM Carbon Cycle

ICM is limited by not computing the hydrodynamics of the modeled system. Hydrodynamic information (i.e., flows, diffusion coefficients, and volumes) must be specified externally and read into the model. Hydrodynamics may be specified in binary or ASCII format and are usually obtained from a hydrodynamic model such as LTFATE.

Task 2.3 Sediment Transport Model

The sediment transport model in LTFATE is a modified version of the SEDZLJ mixed sediment transport model (Jones and Lick 2001; James *et al.* 2010) that a) includes a 3D representation of the sediment bed, and b) can simulate winnowing and armoring of the surficial layer of the sediment bed. SEDZLJ is dynamically linked to LTFATE in that the hydrodynamics and sediment transport modules are both run during each model time step. This enables simulated changes in morphology to be instantly fed-back to the hydrodynamic model.

The sediment data to be collected will be analyzed and used to determine how many discrete sediment size classes are needed to adequately represent the full range of sediment sizes in the CR. This analysis will also be used to design a SEDFLUME study to measure the sediment erosion rates of sediment cores that contain at least 25 percent of fine-grain (i.e., cohesive) sediment. Only eight sediment cores were collected for the SEDFLUME study performed for the previous modeling study. In reviewing that SEDFLUME report, we will need to perform another sediment erosion study in which 5-gallon buckets of sediment are collected from different locations in the CR and then shipped to CHL for analyses. Sediment cores will be formed using homogenized samples from each bucket and then eroded in SEDFLUME to better represent spatially varying sediment properties and erosion rates in the CR.

The sediment transport model will be calibrated and validated using sediment loads from the CBP watershed loading model. Dredging volumes during the calibration and validation periods will be compared with the model simulations to first calibrate, and then validate the sediment transport model.

TASK 3 – Development and Simulation of Dredging Scenarios

Dredging scenarios will be developed for the following two hydrologic events:

- Continuous simulation period (of 1991-2000) Additional periods/duration will be discussed following data discovery.
- Two back-to-back extreme storms (probably in excess of 400,000 cfs) during the warm season (April-September) in close succession;

The dredging scenarios to be developed by the Executive Committee will encompass the following management scenarios:

- Different dredging scenarios in different locations in the CR to determine associated nutrients reduction within the CR and transported to Chesapeake Bay;

- Different infill scenarios based on availably of bathymetry (e.g., 1995 and 2010 conditions or other years depending on data availability).
- A scenario that simulates watershed BMPs and in-reservoir dredging to reduce sediment loading from CR to Chesapeake Bay.

This SOW was prepared assuming that two dredging scenarios and two infill scenarios will be selected. If the number of scenarios is greater than two for either case, then additional funding will be needed. Once the Executive Committee develops these scenarios, input files for the CRMS will be developed for each scenario for both hydrologic events.

TASK 4 – Development and Simulation of Extreme Event Scenarios

This task will include selection of the extreme events by the Executive Committee. Once these are selected, the ERDC PDT will develop a strategy for simulating these using the CRMS, and then meet with the Executive Committee to get their input before starting the development of the necessary input files for all three models in the CRMS.

TASK 5 – Project Deliverables

The following products will be produced during this modeling study:

- An ERDC Technical Report will be written that describes all aspects of this modeling study.
- A Technical Note that describes the CRMS.
- Presentation on the CRMS. This will include model development and calibration/validation results.
- CRMS User Manual.
- A Technical Note that describes dredging scenario design and model simulations.
- A Technical Note that describes extreme event scenario design and model simulations.
- Model Code and Input & Output files will be delivered to the Executive Committee.
- A User Workshop for the CRMS will be presented.

VI. Cost and Schedule

The total cost of this study is $1,400,000 and will be completed in FY26. The non-Federal Sponsor shall provide $700,000 for performing Tasks 1 through 5, the 50 percent required contribution. The Government will contribute $700,000 for the completion of Tasks 1 through 5.

Task	Description	Estimated Federal Cost	Estimated non-Federal Cost	Total Cost by Task
1.	*DATA ACQUISITION*	*$74,000*	*$74,000*	*$148,000*
2.	*DEVELOPMENT OF CONOWINGO RESERVOIR MODELING SYSTEM*	*$294,000*	*$294,000*	*$588,000*
3.	*DEVELOPMENT AND SIMULATION OF DREDGING SCENARIOS*	*$121,000*	*$121,000*	*$242,000*
4.	*DEVELOPMENT AND SIMULATION OF EXTREME EVENT SCENARIOS*	*$136,500*	*$136,500*	*$273,000*
5.	*PROJECT DELIVERABLES*	*$74,500*	*$74,500*	*$149,000*
	TOTAL	***$700,000***	***$700,000***	***$1,400,000***

Anticipated timeline: Dates and durations subject to change. Currently planned for Q3 FY24 initiation of funds

Task	Description	FY24				FY25				FY26			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	*DATA ACQUISITION*			X	X								
2	*DEVELOPMENT OF CRMS*												
	Hydrodynamics					X	X						
	Nutrient Water Quality					X	X						
	Sediment Transport					X	X						
3	*DEVELOPMENT AND SIMULATION OF DREDGING SCENARIOS*						X	X					
								X	X				
4	*DEVELOPMENT AND SIMULATION OF EXTREME EVENT SCENARIOS*								X	X			
									X	X			
5	*PROJECT DELIVERABLES*									X	X		
												X	X
6	*NAB MANAGEMENT*												

VII. SPONSOR RESPONSIBILITIES

The USACE NAB and/or MDE will provide the following data/information to ERDC PDT:

- Bathymetry in the model domain, i.e., the CR.

- Hydrologic data for the chosen periods of simulation. These data include time series of flow, water surface elevations, nutrients and sediment into the model domain from the Susquehanna River and all other local tributaries and point sources as well as from all nonpoint sources. The CBP will provide these data from their hydrologic model of the Chesapeake Bay watershed.
- Water quality data for the chosen periods of simulation. These data include in-situ water temperature, DO, SOD, nitrogen, phosphorus, and other chosen water quality constituents.
- 30 sediment grab samples and four 5-gallon buckets of sediment from different locations throughout the reservoir shall be collected and analyzed to characterize the sediment grain size distribution (including percentage of organic matter) throughout the CR model domain. These samples will be collected and shipped to ERDC-CHL for analysis. Measurement of erosion rates of the collected cores using SEDFLUME will be necessary.

VIII. PROGRESS REPORTING

The ERDC PDT will schedule quarterly meetings with the Executive Committee to provide updates on the progress-to-date, and to discuss any technical issues that occur in performing these tasks.

IX. PROJECT POC(s)

USACE Baltimore District

Technical POC:
Karl Kerr, karl.kerr@usace.army.mil
Anthony Clark, anthony.a.clark@usace.army.mil

MDE

Suzanne Dorsey, Suzanne.Dorsey1@maryland.gov
Matt Rowe, Matthew.rowe@maryland.gov

EPA

Lewis Linker, linker.lewis@epa.gov

USGS

Gary Shenk, GShenk@chesepeakebay.net

ERDC PDT
Technical Lead: Barry Bunch, CEERD-EPW, Research Civil Engineer, 601-634-3617.
Barry.W.Bunch@usace.army.mil

Other ERDC technical team members include Jodi Ryder (Technical Manager), Earl Hayter, Todd Steissberg, and Christina Eddleman, CEERD-EPW.

Financial POC: Kayla Rushing, Mission Integration Office, CEERD-EZM, 601-634-3241. Kayla.K.Rushing@usace.army.mil.

Signature: Natalie Washington
Natalie Washington (Jul 23, 2024 16:31 EDT)

Email: natalie.washington@maryland.gov

Dept of Army Conowingo Study

Final Audit Report 2024-07-24

Created:	2024-07-23
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