Project: Climate Change Indicators and Metrics	
Your Name:	Zoë Johnson, Climate Change Coordinator (NCBO)
Goal Implementation Team:	STAR Climate Resiliency Workgroup
Project Title:	Development of Climate Change Indicators and Metrics for the Chesapeake Bay Program
Project Type:	Metric Development and Tracking • Support for science needed to develop metrics • Metric/indicator development • Performance measure development
Goal/Outcome:	Climate Resiliency: Monitoring/Assessment and Adaptation
Estimated Cost:	$75,000
Justification: Provide a 2 paragraph description of the work and why it is needed. It is recommended that you draw upon one or more work plans.	Climatological trends, which vary both spatially and temporally throughout the Watershed, are altering the ecosystems, the watershed, and the human communities of the Chesapeake Bay and will require changes in policies, programs and projects to successfully achieve restoration, sustainability, and conservation and protection goals for the Chesapeake Bay watershed. The Climate Resiliency Goal was included in the 2014 Watershed Agreement for the first time. No framework for measuring or tracking climate trends and impacts or measuring progress toward building climate resiliency has been established. Therefore, the development of a suite of climate-related indicators that can be used to track and analyze trends, impacts and progress towards advancing "climate resiliency" is a high priority of the Climate Resiliency Workgroup. It is envisioned that this project will be the first step in the process to develop a suite of indicators, which can be implemented over time, to measure and assess trends or "factors influencing" (i.e., physical climate drivers); ecological and societal response (i.e. impacts); and, programmatic progress toward building an effective response (i.e., adaptation). The project will include the following four

	deliverables: 1) Recommended suite of climate change indictors for CBP implementation; 2) Proposed methods and analysis process for a sub-set of indicators (2-3 for each indicator types); 3) Suggested schedule for Chesapeake Bay Program implementation; and 4) implementation (data collection, analysis and methods documentation) of a Tidal Wetland Change Indicator.
Methodology: Provide a 1-2 paragraph description of how the work is likely to be accomplished.	Using the Chesapeake Bay Program Indicators Framework (November, 2015) as a guide, the project will focus on the developing recommendations for a suite of CBP climate-related indictors and a proposed implementation approach and schedule for three indicator types: 1) physical climate trends (e.g., sea level rise, temperature increase, precipitation change); 2) ecological and societal response (e.g., salinity change, tidal wetlands loss, societal preparedness); and, 3) "resiliency" progress measurement (e.g., metrics for evaluating programmatic progress toward making "climate-smart decisions). The first step will involve assessing and analyzing a number of existing climate change indicator frameworks to determine suitability for application within the Chesapeake Bay Program. These include: the EPA Climate Change Indicators for the U.S.; the USGRCP Climate Change Indicators; the Department of the Interior Metrics Expert Group; and the UMCES Chesapeake Bay Report Card (2014) Climate Resilience Indicators. The second step will involve identifying a suite of potential indicators that the CBP could use to track and measure change of key physical climate trends and assess impacts. This activity will be informed by discussions (through targeted meetings or workshops) with various CBP Goal Implementation Teams and Workgroups to evaluate and prioritize most critical "factors influencing." The project will also include an assessment of

	existing monitoring and tracking data being collected within the Chesapeake Bay Watershed, including data collected through NOAA's Chesapeake Bay Interpretive Buoy System (CBIBS). A review of existing data and studies of past and ongoing trend and impact assessments conducted by USGS, NOAA, EPA, and the academic community will also be an element. The exploration and recommended set of "climate resiliency" progress indicators will involve a participatory process element. The objective is to recommend a set of indicators that are meaningful and useful to the program to not only track programmatic progress but can also be informative to decision-making processes to influence change. The participatory process will be undertaken using a combination of one-on-one interviews or facilitated or targeted workshops or meetings. The development of the Tidal Wetland Change Indicator will involve some independent mapping, modeling and trend analysis but will also require a strong collaborative process through in-person meetings and workshops. The objective for developing a Tidal Wetland Indicator is to track the status of wetland elevation dynamics and wetland vulnerability to sea level rise across the various Bay geographies, geomorphic types, vegetation communities, etc. The focus of the meetings and workshops will be to bring together a broad swath of researchers (including members of the Chesapeake Bay Sea Level Rise Sentinel Site Cooperative) with long-term data on marsh surface elevations, water level data and other wetland datasets (e.g. vegetation monitoring plots) to collectively work to develop the indicator, methods and analysis process, and ultimately to extract trends and synthesize data sets.
Cross-Goal Benefits: What other goals may be advanced through this work?	This project is cross-outcome in nature, as climate change has been noted a significant "factor influencing" the success of a number of other goals/outcomes in the CB Agreement. In

	addition to the benefits to the Climate Resiliency Outcomes, the tidal wetland pilot component of the project supports Fish Habitat, Black Duck, and Water Quality specific Goals.
Are you willing to serve as GIT lead (see description of the role in Section VI above) If no, suggest other GIT lead	Yes.