2022 EPA GIT Funding Ideas

Table 1	
Goal Implementation Team (GIT)	Habitat Goal Implementation Team (GIT 2)
Proposed GIT Technical Lead	Tentatively: Peter Claggett, U.S. Geological Survey, pclaggett@usgs.gov
Annual Weighting Factors to Consider	- Project addresses a Climate Change need. - Project addresses an outcome that is lagging in attainability.
CBP Functional Areas	Yes - GIS Team
Preparers	Peter Claggett, U.S. Geological Survey, pclaggett@usgs.gov
Project Title	**Monitoring vegetation condition throughout the DelMarVa peninsula.**
Project Type	Support for science needed to develop metrics Monitoring/tracking program development
Proposed Project Outcomes	Assessment of changes and stresses on wetland vegetation with special emphasis on tidal wetlands, to inform the potential viability and vulnerability of Black Duck habitat and to inform local and state climate resilience plans targeting wetland mitigation and restoration.
Project Justification (500 words or less)	The loss of wetland habitat for Black Ducks and the potential for wetlands to migrate due to sea level rise are pressing issues facing resource managers. The Chesapeake Bay Program's commitment to monitor land use/land cover change at high-resolution every 4-5 years assists with these needs by capturing the conversion of wetlands to development but because the source imagery is not coordinated with the tides, the high-resolution data are not able to reliably monitor transitions of marsh to open water and saltwater intrusion on farms and forests that are precursors to marsh migration. This project involves the monitoring of vegetation condition with "hyper-temporal" multi-spectral imagery freely available from Landsat and Sentinel satellites. Landsat imagery dates to the 1980's and has been acquired at a 16-day interval, or better, ever since. Current Landsat imagery is acquired every 8 days, and current Sentinel-2 imagery has been acquired every 5 days since 2017. Automated processing of Landsat and Sentinel imagery into spectral indices of vegetation greenness (Normalized Difference Vegetation Index) and wetness (Normalized Difference Moisture Index and/or Tasseled Cap Wetness) will provide a temporally rich dataset of vegetation condition over several decades. Using greenness and wetness indices to track vegetation condition at a high temporal frequency is needed to discern long-term trends in wetland loss/gain irrespective of normal short-term fluctuations (e.g., distinguishing marsh conversion to open water from transient flooding). Hyper-temporal monitoring with wetness indices may also enable separation between low and high marsh black duck habitats when used in conjunction with other wetland datasets. Greenness indices will provide critical distinctions between tidal marsh and forested habitats. Using a combination and greenness and wetness indices to monitor vegetation status is particularly important for tidal marshes because available high-res image sources (NAIP

	and LiDAR) are not acquired in coordination with tidal stage. Hyper-temporal monitoring will represent conditions at all levels of tidal stage and therefore enable the identification of trends outside those caused by the expected range of tidal fluctuations.
Proposed Project Steps and Timeline	1. Meet with the black duck, wetland, forest, and climate resiliency experts on the types of vegetation characteristics most affected by changes in climate and most relevant to black duck habitat condition. 2. Using open-source code, develop automated workflows to obtain and process indices from both Landsat and Sentinel imagery. 3. Discriminate between low and high marsh using Sentinel data coupled with the National Wetlands Inventory. 4. Identify statistical trends in vegetation and moisture indices throughout the DelMarVa peninsula for two periods: (1985 – present) from Landsat and (2017-present) from both Landsat and Sentinel 1 & 2. 5. Present techniques and methods and results to the Habitat GIT for review and comment. 6. Share code, techniques, and metadata with the CBP GIS Team and interested CBP workgroups.
Estimated Costs	$100,000
Cross-Outcome Benefits	- Black Duck Outcome (Primary) - Land Use Methods and Metrics Outcome (Secondary) - Wetlands Outcome (Secondary) - Climate Monitoring and Assessment Outcome (Secondary) - Forest Buffer Outcome (Secondary) - 2025 Watershed Implementation Plan (WIP) Outcome (Secondary)