Outcome: Land Use Methods & Metrics Development

Goal: Conserve landscapes to maintain water quality and habitat; sustain working forests, farms and maritime communities; and conserve lands of cultural, indigenous and community value.

Outcome: Develop a Chesapeake Bay watershed-wide methodology and local level metrics for characterizing rate of farmland, forest and wetland conversion, measuring the extent and rate of change in impervious surface coverage and quantifying the potential impacts of land conversion to water quality, healthy watersheds and communities. Launch a public awareness campaign to share this information with citizens, local governments, elected officials and stakeholders.

Long term Target: Continual monitoring of land use and change every 2-5 years

2 year Target: By 2016, develop methodology and local level metrics for measuring rate and extent of land conversion and quantify potential impacts to ecosystems and communities. Launch a public awareness campaign.

Management Approach 1: Monitor the (rate of) conversion of forests, wetlands, farmlands (,and impervious surfaces).

Key Action** *Description of work/project. Define each major action step on its own row. Identify specific program that will be used to achieve action.*	**Performance Target(s)** *Identify incremental steps to achieve Key Action.*	**Participating Entity** *Identify responsible partner for each step.*	**Geographic Location**	**Timeline** *Identify completion date (month & year) for each step)*	**Deliverables**	**Factors Influencing and/or Gap** *Identify related factor or gap in Management Strategy*
Design a manual, stratified sampling approach at the county level and assess land cover change from high resolution imagery circa 2005-2013. *-FMI: Why not ground stratified sampling in physical small to mid-sized watersheds and later relate findings back to counties?*	Research stratification techniques	USGS, LUWG, UMBC Summer Intern Program	TBD	Summer 2016	Report ~ " An overview of High Resolution Land Cover Stratified Sampling Techniques", LUWG Presentation.	Methodology for assessing landscape change with high-resolution data with sufficient precision to inform county-level decisions
	Design sampling framework	USGS, LUWG			Report: ~ "A High Resolution Land Cover Change Sampling Design for One County in the Cheapeake Bay Watershed"	
	Implement sampling framework				GIS Rasters with attribute tables and Metadata, Report:~ " Implementation of a High Resolution Land Cover Change Sampling Design in One County of the Chesapeake Bay Watershed", LUWG presentation	
Assess land use change throughout the entire Bay Watershed, at a 30 meter minimum mapping unit, from 1984-2011 using the P6 land use database and the MRLC National Land Cover database (NLCD).	Work with CBP GIS Team to assign and complete task	CBPO (USGS), LUWG	Chesapeake Bay Watershed and intersecting Counties	end of Summer 2016 *FMI: Including QAQC?*	GIS Rasters and attribute tables with Metadata, Report: "Summary of 1984-2011 Chesapeake Bay Watershed Land Use Change", LUWG presentation	Monitoring land use change over multi-date images
Assess difference in high resolution land cover maps for one prototype County.	Quantify changes in two high-res land cover maps representing different years.	CBPO, USGS, LUWG	Prince George's County, MD	end of Summer 2016	GIS Rasters with Metadata, Report:~ "Quantifying High Resolution Land Cover Change Over Two Years, Observations, Recommendations, and Lessons Learned"	Methodology for assessing landscape change with high-resolution data with sufficient precision to inform county-level decisions.
	Separate persistent from ephemeral change				GIS Rasters and attribute tables. Report: Findings to be included in above report.	
	Quantify commission and omission errors.				Maps, Tables, Report: Findingsto be included in above report.	
Conduct a literature review on high resolution land cover change methods. (Unfunded FY 2016 GIT Funding proposal)	Review literature of the science and technologies associated with remote sensing and image interpretation as well as consultation with remote sensing professionals	LUWG Staffer	N/A	end of Summer 2016	Report: ~ " literature review on high resolution land cover change methods." LUWG Presentation?	Methodology for assessing landscape change with high-resolution data with sufficient precision to inform county-level decisions.
Explore the development and implementation of a methodology to establish climate related goals and baselines for individual Chesapeake Bay Agreement Management Strategies such as the Land Use Methods and Metrics Development Management Strategy.	Compile existing climate change vulnerability research and data, including available assessment products and tools.	STAR; Climate Resiliency Workgroup	Chesapeake Bay Watershed	Dec-17		Vulnerability of the watershed
	Work with the Climate Resiliency Workgroup to refine Climate Resiliency Analysis Decision Making matrix and recommend implementation process for applying matrix analysis and decision-making process to other Management Strategies such as the Land Use Methods and Metrics Development Management Strategy.	Climate Resiliency Workgroup	Chesapeake Bay Watershed	Dec-17		Cross-cutting programmatic gap

Management Approach 2: Quantify the impacts of land conversion on water quality, healthy watersheds, and communities

Key Action** *Description of work/project. Define each major action step on its own row. Identify specific program that will be used to achieve action.*	**Performance Target(s)** *Identify incremental steps to achieve Key Action.*	**Participating Entity** *Identify responsible partner for each step.*	**Geographic Location**	**Timeline** *Identify completion date (month & year) for each step)*	**Deliverables**	**Factors Influencing and/or Gap** *Identify related factor or gap in Management Strategy*

Quantify impact of land conversion on: 1. Water Quality (Explaining changes in nutrient and sediment that relate to monitored and modeled land conversion) *-FMI1: At the County?/Basin?/HUC8?/Other level? -FMI2: No mention of ground water lag times, legacy soils, or stream geomorphology anywhere in this doc.*	Work with USGS to explain change in water quality related to major source sectors (urban, agriculture)	USGS and LUWG (No State Geological Surveys?)	Chesapeake Bay Watershed	Dec-17	Report: Findings and Recommendations, LUWG Presentation	Methodology to quantify impacts to water quality
	Work with CBPO to interpret Phase 6 sensitivity of water quality to land conversion	CBPO, USGS, and LUWG	Chesapeake Bay Watershed		Report: Findings and Recommendations, LUWG Presentation	
Quantify impact of land conversion on: 2. Healthy Watersheds and Habitats	Vulnerability to land conversions, both historical and future projections	CBPO, USGS, and LUWG	State-identified healthy watersheds	Dec-17	Report: Findings and Recommendations, LUWG Presentation	Methodology to quantify impacts to healthy watersheds and habitat
	Impact (relates to tracking health)			TBD	Report: Findings and Recommendations, LUWG Presentation	
Quantify impact of land conversion on: 3. Communities	Set up an Action Team to define the metrics and assess the impacts to communities	LUWG, in coordination with LGAC	Chesapeake Bay Watershed Counties	TBD	Goal Statement, Meeting Minutes and Action items.	Methodology to quantify impacts to communities and the environment
	Work with Healthy Watersheds GIT and Land Use Options Evaluation Management Strategy team to link the results of land use methods and metrics analyses and results to determine how best to assist communities in reducing the rate of conversion (the Land Use Options Goal)	HWGIT, CAC, LGAC, CBP Communications team, and other CBP identified partners	Chesapeake Bay Watershed	TBD	Work Plan with meetings schedule, anticipated outcomes. White paper with analysis results and action plan.	
Management Approach 3: Communicate results to public, elected officials, and to the Bay Program						
Key Action**	**Performance Target(s)** *Identify incremental steps to achieve Key Action.*	**Participating Entity** *Identify responsible partner for each step.*	**Geographic Location**	**Timeline** *Identify completion date (month & year) for each step)*	**Deliverables**	**Factors Influencing and/or Gap** *Identify related factor or gap in Management Strategy*
Link the results of the Land Use Methods and Metrics outcome and the Land Use Options Evaluation Workplan	Work with Healthy Watersheds GIT and Land Use Options Evaluation Management Strategy team to link the results of land use methods and metrics analyses and results to determine how best to assist communities in improving the character and reducing the rate of conversion (the Land Use Options Goal)	HWGIT, CAC, LGAC, CBP Communications team, and other CBP identified partners	N/A		Action plan/meeting schedule with anticipated outcomes, Synthesis document with recommendations for local, county and state interactions.	Cross-Outcome Challenge
Chesapeake Bay Land Change website	Launch Phase 6 land use data website	USGS and CBPO (Web Team)		Dec-15	Beta web site	Agreement on the temporal and spatial scale at which to assess change; Also, communications challenge
	Testing, refinement, expansion			Dec-17	Published web site	
	Develop land change forecasts	USGS and LUWG		Summer 2016	Field tested web site with land change forecast data.	
Work collaboratively with Bay Program partners to identify legislative, budgetary and policy needs to advance the goals of the Chesapeake Bay Agreement. We will, in turn, pursue action within our member state General Assemblies and the United States Congress. (Per CBC Resolution #14-1)	Work with GIT to consider policy changes or legislative actions identified by the GIT.	CBC	PA, MD, VA	Ongoing		Political climate and budgets
Note: Management Approach 3 (Communicate results to public, elected officials, and to the Bay Program) is outside the scope and expertise of the CBP GIS team and the LUWG.						

***Note:** As a member of the Chesapeake Executive Council and a signatory to the Chesapeake Bay Watershed Agreement, the Chesapeake Bay Commission (CBC) functions as the legislative arm of the Chesapeake Bay Program working within Maryland, Pennsylvania and Virginia and at the federal level to identify specific Bay management concerns requiring intergovernmental coordination and cooperation. CBC makes recommendations to the federal, state and local governments on legislative and administrative actions necessary to effectuate coordinated and cooperative management for the Bay watershed. The Commission will work collaboratively with Bay Program partners to identify legislative, budgetary and policy needs to advance the key actions identified in this outcome and to anticipate those needed in the future. The CBC's work is supported by the annual appropriations of its three member states totaling $675,000 and is, on occasion, supplemented by project-specific grants.*

Acronym Guide

AACC – Anne Arundel Community College
ACFHP - Atlantic Coast Fish Habitat Partnership
ACJV – Atlantic Coast Joint Venture
AgNPS – AGricultural Non-Point Source Pollution Model
Appalachian LCC - Appalachian Landscape Conservation Cooperative
ASTSWMO – Association of State and Territorial Solid Waste Management Officials
BayFAST/CAST/MAST/VAST – Federal Assessment Scenario Tool/Chesapeake AST/Maryland AST/Virginia AST
BDJV – Black Duck Joint Venture
BKT – Brook trout
BMP – Best Management Practice
CAC – CBP Citizens' Advisory Committee
CAFO – Concentrated Animal Feeding Operation
CB – Chesapeake Bay

CBC – Chesapeake Bay Commission
CBF – Chesapeake Bay Foundation
CBIBS – Chesapeake Bay Interpretive Buoy System
CBIG – Chesapeake Bay Implementation Grants
CBP – Chesapeake Bay Program
CBPO – Chesapeake Bay Program Office
CBRAP – Chesapeake Bay Regulatory and Accountability Program grants
CBSAC – Chesapeake Bay Stock Assessment Committee
CBSSC – Chesapeake Bay Sentinel Site Cooperative
CBT – Chesapeake Bay Trust
CCWC – Choose Clean Water Coalition
CEAP – Conservation Effects Assessment Project
Chessie BIBI – Chesapeake Bay Basin-wide Index of Biotic Integrity
CNMP – Comprehensive Nutrient Management Plan
CNU – Christopher Newport University
CRC – Chesapeake Research Consortium
CREP – Conservation Reserve Enhancement Program
CSN – Chesapeake Stormwater Network
CWA – Clean Water Act
DAT – CBP Diversity Action Team
DC – District of Columbia
DCNR – Pennsylvania Department of Conservation and Natural Resources
DE – Delaware
DEP – Department of Environment
DE DNREC – Delaware Department of Natural Resources and Environmental Control
DNR –Department of Natural Resources
DoD – Department of Defense
DOEE – Dist. Of Columbia Department of Energy and Environment
DOF – Department of Forestry
DOT – Department of Transportation
DST – Decision support tool
DU – Ducks Unlimited
EC – Chesapeake Executive Council
EJ SCREEN – Environmental Justice Screening and Mapping Tool
EO Strategy – Executive Order 13508 Strategy for Protecting and Restoring the Chesapeake Bay Watershed
EJ – Environmental Justice
EL – Environmental Learning
ELCSS – Environmental Literacy Challenge for Systemic Sustainability
ERP – Elizabeth River Partnership
EPA – Environmental Protection Agency
Ex Comm - Executive Committee of the Sustainable Fisheries GIT
FERC – Federal Energy Regulatory Commission
FOD – Chesapeake Bay Program Federal Office Directors
FTE – full time employee
FWG – Forest Work Group
FWS – Fish and Wildlife Service
GIS – Geographic Information System
GIT – CBP Goal Implementation Teams
GMU – George Mason University
GSA – General Services Administration
HBCUs – historically black colleges and universities
HSCD – EPA Hazardous Site Cleanup Division
HWGIT – Healthy Watershed Work Group
ICPRB – Interstate Commission on the Potomac River Basin
IPC – Interfaith Partners for the Chesapeake
LCC – Landscape Conservation Cooperatives
LGAC – CBP Local Government Advisory Committee
LL – Local Leadership
LU – Land Use
LUWG – Land Use Work Group
MATOS - Mid-Atlantic Telemetry Observing System
MB – CBP's Management Board
MD - Maryland
MDE – Maryland Department of Environment
MDSG – Maryland Sea Grant
MOU – Memorandum of Understanding
MSP – Math Science Partnership
MS4 – Municipal Separate Storm Sewer System

MWCOG – Metropolitan Washington Council on Governments
MWEEs – Meaningful Watershed Educational Experiences
MWS – Master Watershed Stewards
NAAQS – National Ambient Air Quality Standards
NALCC - North Atlantic Landscape Conservation Cooperative
NATA – National Air Toxics Assessment
NCBO – NOAA Chesapeake Bay Office
NGO – Non-government organization
NEIEN – National Environmental Information Exchange Network
NERR – Chesapeake Bay National Estuarine Research Reserve
NFWF – National Fish and Wildlife Foundation
NOAA – National Oceanic and Atmospheric Administration
NP – National Parks
NPDES – National Pollutant Discharge Elimination System
NRCS – Natural Resources Conservation Service
NPS – National Park Service
NYS DEC – New York State Department of Environmental Control
ODU – Old Dominion University
ORES – Oyster Reef Ecosystem Services
ORP – Oyster Recovery Partnership
OSSE – Office of the State Superintendent of Education
PA – Pennsylvania
PA DEP – Pennsylvania Department of Environmental Protection
PCB – polychlorinated biphenyl
PMP -- Pollution Minimization Plan
PRFC – Potomac River Fisheries Commission
PSC – CBP's Principles' Staff Committee
QA – quality assurance
RFB – Riparian Forest Buffer
RMNs - Regional Monitoring Networks
SAV – Submerged Aquatic Vegetation
SERC - Smithsonian Environmental Research Center
SHWG – Stream Health Work Group
SRBC -- Susquehanna River Basin Commission
STAC – CBP Scientific and Technical Advisory Committee
STAR – CBP Scientific and Technical Assessment Research team
TCW – Toxics Contaminants Workgroup
TEA - Tidewater Ecosystem Assessment Division of MD DNR
TMDL – Total Maximum Daily Load
TNC – The Nature Conservancy
TSCA – Toxic Substance Control Act
UMBC – University of Maryland Baltimore County
UMCES – University of Maryland Center for Environmental Science
UMCES-CBL – University of Maryland Center for Environmental Science-Chesapeake Biological Lab
UMD – University of Maryland
USACE – U.S. Army Corps of Engineers
USDA – U.S. Department of Agriculture
USFWS – U.S. Fish and Wildlife Service
USFS – U.S. Forest Service
USGS – U.S. Geological Survey
UVA – University of Virginia
VA – Virginia
VCU – Virginia Commonwealth University
VA CZM – Virginia Coastal Zone Management
VBOE – Virginia Board of Education
VDGIF – Virginia Department of Game and Inland Fisheries
VIMS – Virginia Institute of Marine Science

Virginia DEQ – Virginia Department of Environmental Quality
VMRC – Virginia Marine Resources Commission
WG – work group
WIP – Watershed Implementation Plan
WQN - Water Quality Network