Soil Health Outcome

WQGIT/TENTATIVE: AGRICULTURAL WORKGROUP

DRAFT OF PROPOSED OUTCOME LANGUAGE

- **SOIL HEALTH OUTCOME:** Maintain and improve soil health, the foundation for healthy ecosystems and productive working lands. By 2035, develop and implement an approach to assess and incentivize actions to improve soil health, including modeling the soil health impacts of current water quality BMPs and identifying additional BMPs and other priority actions that support both soil health and water quality.
- **WATER QUALITY GOAL**

OUTCOME DISPOSITION ADVICE TO MANAGEMENT BOARD: ADD

- **Background-Current Condition**: As of 2023, jurisdictional BMPs in place across the watershed are estimated to achieve 57% of the nitrogen and 67% of the phosphorus reductions needed to ensure water quality standards for the Chesapeake Bay by 2025[1]. Our most challenging reductions, those in the nonpoint source sectors, largely remain[1]. In order to sustain healthy productive ecosystems and improve water quality in the context of changing environmental conditions, agricultural intensification and increasing human population, a new holistic approach is needed [2,3]. This approach will focus on improving watershed health, sustainability and productivity from the ground up by prioritizing efforts to maintain and improve soil health—the foundation for healthy, productive ecosystems and working lands [4].
- **Outcome alignment with administrative goals and legislative mandates of signatory jurisdictions**:
  - ✓ **Signatory jurisdictions and partners**:
    WIP Goals: Supports/aligns with WIP soil health initiatives (all states), many WIP strategies for changing conditions and water quality improvements emphasize the CBP approved guiding principle of capitalizing on the co-benefits of soil health and suggest increased incorporation of soil health educational outreach and consideration in BMP prioritization efforts. [2]
    Legislative Initiatives: supports/compliments state level healthy soils, regenerative working lands and waters, and watershed health legislative initiatives, passed and pending [5]
    State Agencies: supports programmatic implementation of state climate action plans, conservation efforts and local water quality improvement efforts [5]
    Federal agencies: Supports multiple agency recommendations and action plans that promote soil health as key for achieving beneficial environmental outcomes while promoting ecosystem services and economic health.[5]
- **Value of devoting CBP resources to this Outcome in helping signatory jurisdictions achieve their administrative goals and legislative mandates:**
  - ✓ **CBP** focuses significant resources towards water quality and watershed health and conservation efforts. Establishing this new outcome would support, enhance and expand these existing efforts.
  - ✓ **CBP** could expand capacity and resources for soil health improvements by evaluating needs, coordinating stakeholder resources, focusing attention on the outcome, and facilitating collaborative ways to achieve progress [3]. (please see management strategies below).
- **Outcome Importance:** Soil health directly determines the capacity of soil to perform essential functions such as nutrient cycling, water regulation (infiltration, availability, recharge), filtering and buffering (of pollutants/toxics), and sequestering and storing carbon. Improved soil health results in improved water quality, air quality, water management, adaptation to changing environmental

conditions, working lands productivity and profitability, and reduced GHG emissions, pesticide and fertilizer use. [4,8,9] Changing environmental conditions have increased risk and made water quality protection more difficult and expensive.[3] Soil health improvements simultaneously improve environmental and economic outcomes and the resilience of watersheds and working lands to weather extremes [9,10]. Long term stewardship of existing soil health maintains the health of watershed areas and protected lands.

- **Source of the Outcome:** Phase 1 of the Beyond 2025 process, specifically from the Beyond 2025 Small Climate Group: EPA CBPO, USFS, NOAA, FFAR, Habitat GIT, STAR, Modeling WG, AgWG, Choose Clean Water Coalition
- **Partners needed to achieve the Outcome:** Federal, state and local agency level partners, universities, nonprofits, private sector and CBP entities: Agriculture, Forestry, Toxics, Modeling, Changing Conditions WG/STAR, all CBP Advisory Committees, Water Quality and Healthy Watershed GITs, Communications Team, SET
- **Major factors influencing ability to achieve Outcome:** Ability to achieve the management strategies below with existing CBP resources when possible, and to identify and implement the changes in organization and structure needed to achieve others.
- **Key Management Strategies for meeting the outcome:**
  - ✓ Facilitate CBP stakeholder/partner participation in assessing existing resources and approaches: identifying needs/gaps/barriers, areas of overlap, and potential to expand resources and capacity through coordination and collaboration by 2027
  - ✓ Adopt a set of metrics to evaluate the impacts of conservation and management practices on soil health by 2027
  - ✓ Consider the incorporation of soil health principles and management approaches in relevant workplans by 2027
  - ✓ Identify key practices (BMPs) and approaches that provide maximum return on investment in terms of efficacy, cost and multiple benefits- support those programmatically by 2030
  - ✓ Improve and expand soil health education (include strategic planning, demonstration sites, field days, mentoring opportunities), communication and outreach to key stakeholders by 2033
  - ✓ Explore opportunities to incentivize the incorporation of soil health principles and standards in soil related management activities including food, fiber, forestry production and lawncare. Other incentives may include pay for outcomes (include ecosystem service markets), cost support, direct market support, corporate investment, and transitional risk abatement by 2035.[3, 6,7]
- **Measuring Progress (SMART:** Specific, Measurable, Achievable, Realistic, Timebound)
  - ✓ **What to measure:** Implementation of key practices with multiple benefits, consider soil metrics (organic carbon, aggregate stability, microbial respiration, bulk density/infiltration capacity) measures and the principles of building soil health[10, 11]
  - ✓ **How to measure:** Track practice implementation & management approaches associated with soil health improvements, make use of existing soil health metric data, explore modeling options
  - ✓ **Implementation partners:** Corporate partners, NGOs, nonprofits, universities, local, state and federal agencies, business entities, ecosystem service buyers, institutional and tribal entities
  - ✓ **Funding sources:** Many actions can be accomplished with existing resources, explore additional funding strategies with implementation partners listed above
  - ✓ **Incentives/rewards:** Decreased reliance on crop inputs/improved profits, improved plant health and land productivity, ecosystem/human/animal health[9-10], grants, cost-share, payment for outcomes, direct market rewards [6, 7]

References:

1. **Chesapeake Progress: Jurisdictional WIPs**
2. **CAST P3 WIPs and Trends Over Time**
3. **Written Comments from: A Critical Path Forward for the Chesapeake Bay Program Partnership Beyond 2025 Comments from Thriving Ag Project Scientists, American Farmland Trust, Alliance for the Chesapeake Bay, Choose Clean Water Coalition**: **Beyond 2025 Steering Committee Report and Public Comments**
4. **Rutgers University Extension: Soil Health Purpose and Management**
   Chesapeake Stormwater Network: **Soil Health, Stream Health, Urban Soils**
5. **State:** VA Graze 300 Initiative, VA Soil Health Coalition (MD, PA, NY have also), MD: Chesapeake Bay Legacy Act: pending, MD Healthy Soils Program, NY Soil Health and Climate Resiliency Act, PA: Sustainable Agriculture Act, DE Soil Health Program- pending, State Climate PRPS: MD Example **Federal:** 5th National Climate Assessment, USDA: Climate-Smart Food and Forestry Practices, EPA-FRRCC Report
6. **CESR Report Chapters 3 & 4:** Pay for Outcomes and Prioritization
7. **STAC Report: Using Ecosystem Services to Increase Progress Toward, and Quantify the Benefits of Multiple CBP Outcomes:** Pay for ecosystem services and private sector involvement
8. **More Than Dirt: Soil Health Needs to Be Emphasized in Stream and Floodplain Restorations** Inamdar, S. P., Kaushal, S. S., Tetrick, R. B., Trout, L., Rowland, R., Genito, D., & Bais, H. (2023)**.** *Soil Systems*, *7*(2), 36.
9. **Effects of Soil Health on Lawns and Gardens: UMD Extension**
10. **NACD, Soil Health Institute, and NRCS Economic Analysis of Soil Health Management Systems**
    American Farmland Trust, Rodale Institute, Stroud Water Research Center: Improvements in soil health improve farm production and profitability while helping to mitigate agricultural runoff pollution (Rodale Institute). For every 1% increase in soil organic matter, soils gain an additional 17,000-25,000 gallons of available water per acre (Stroud Water Research Center). Adopting soil health practices can increase yield and decrease input costs, leading to a return on investment of $3 for every $1 spent. **Soil Health Case Study Analysis** (American Farmland Trust)
11. **Soil Health Institute Soil Health Measurement Factsheet**