Executive Summary

As required by Section 12(a) of P.A. 25-125, DEEP has evaluated 22 of its programs that integrate and advance nature-based solutions (NBS) to address a changing climate, biodiversity loss, and restoring community resilience. This effort involved pulling together dozens of interdisciplinary staff and technical experts in the most in-depth look to date on how NBS are being deployed across the state.

Nature-based solutions include a wide variety of ecosystem-based approaches utilized to address societal challenges. At the most basic level, think about the decisions involved with planting and maintaining trees in an urban area. What species of trees, where, how, when? These are important considerations because the environmental and community benefits provided by a healthy urban forest and green spaces – shade, wildlife habitat, flood retention, and other ecosystem services – can be magnified when best practices are employed.

DEEP's evaluation found that NBS are generally well-integrated into DEEP's programs. **Chapter III** shows the synergies between DEEP's 22 NBS programs and 10 NBS best practices identified in Section 12(b) of P.A. 25-125. **Chapter II** describes and provides local examples of each of the 10 NBS best practice icons shown below. **Appendix III** provides a key to the icons and color-coding for significance.

The following graphic (discussed further in the introduction to **Chapter III**) summarizes how often DEEP's 22 NBS programs use the 10 best practices and divides the uses into three categories: as a **primary purpose**, **co-benefit**, or as an **eligible** practice for funding support.

DEEP NBS Programs	Carbon sequestration	Control Invasives	Soil Health	Avoid Conversion	Restore Habitats	Climate-Smart Ag	Stormwater Management	Shoreline Protection	Urban Forestry	Open Space	Totals
Primary Purpose	0	3	0	5	9	0	6	4	6	9	42
Co-Benefit	11	5	8	5	6	3	7	3	4	6	58
Eligible	4	3	3	5	2	4	1	0	3	3	28
Totals	15	11	11	15	17	7	14	7	13	18	128

In developing this evaluation, DEEP also consulted with seven state agencies – the Departments of Agriculture, Housing, Insurance, Public Health, and Transportation as well as the Office of Policy and Management and the Connecticut Green Bank. DEEP asked each agency to identify its NBS programs and conducted a similar analysis relating programs to the 10 best practices.

The following graphic summarizes the 25 NBS programs identified across those seven (7) agencies, as discussed more in the introduction to **Chapter IV**.

Other Agencies NBS Programs	*Carbon sequestration*	*Control Invasives*	*Soil Health*	*Avoid Conversion*	*Restore Habitats*	*Climate-Smart Ag*	*Stormwater Management*	*Shoreline Protection*	*Urban Forestry*	*Open Space*	Totals
Primary Purpose	1	1	4	1	8	0	1	0	0	1	17
Co-Benefit	3	7	8	3	5	8	5	2	4	4	49
Eligible	3	6	4	3	7	4	6	4	4	2	43
Totals	7	14	16	7	20	12	12	6	8	7	109

The Public Act also charged DEEP with identifying opportunities to "advance NBS in the state;" **Chapter V** addresses that challenge. Opportunities for advancement include building on NBS programs that until recently were federally funded (e.g., the Urban and Community Forestry grant programs of the USDA Forest Service that have been eliminated or cut severely); funding NBS programs that have received bonding previously; and addressing current deficiencies in the natural and working lands (NWL) data and models for DEEP's greenhouse gas inventory reporting. Program evaluation conclusions are summarized in **Chapter VI**.

I. Introduction

In 2025, the Connecticut Legislature turned its attention to a rapidly growing area of interest to stakeholders across the state: Nature-Based Solutions (NBS). Through Section 12(a) of Public Act 25-125 (P.A. 25-125), the Legislature required the Department of Energy & Environmental Protection (DEEP) to "evaluate how to integrate and advance nature-based solutions in the state that support climate change mitigation, climate change adaptation, ecosystem resilience and biodiversity." Those efforts by DEEP to advance nature-based solutions are collectively referenced in the legislation as the "nature-based solutions initiative," or NBS Initiative.

As part of its evaluation, DEEP must also (pursuant to Section 12(b)) "consider best practices that encourage the use of the state's ecosystems to naturally sequester and store carbon, reduce greenhouse gas emissions, increase biodiversity and protect against climate change impacts …" and (pursuant to Section 12(c)) seek review and input from seven other state agencies – the Departments of Agriculture, Housing, Insurance, Public Health, and Transportation as well as the Office of Policy and Management and the Connecticut Green Bank.

All of those goals have been met in preparing this draft evaluation.

Lastly, DEEP is required by Section 12(c) of P.A. 25-125 to host one listening session for the purpose of receiving public comments before posting an "NBS Initiative Program Evaluation" (hereafter referenced as the "NBS Report") on the DEEP website by July 1, 2026 for additional review and written comment.[1]

Two listening sessions were held on the afternoon and evening of Tuesday, May 26, and DEEP received public comments on a Draft NBS Initiative Program Evaluation that were considered in this final version. A summary of comments either presented at the listening sessions on May 26th or

[1] The text quoted in this section is excerpted from Section 12 of Public Act 25-125.

submitted via email to DEEP through June 2, 2026 are included in **Appendix VI**. Conclusions of the findings from this program evaluation are included in **Chapter VI**.

A. What are Nature-Based Solutions (NBS)?

"Nature-based solutions" or "NBS" are umbrella concepts that include a wide variety of ecosystem-based approaches utilized to address societal challenges. NBS rely on natural processes that are dynamic, so they require adaptive management, monitoring, and adjustments over time.[2] The NBS goals in P.A. 25-125 are to help address the societal challenges posed by climate change, biodiversity loss, and supporting community resilience.

Efforts on NBS are regional, national, and global in scope. NBS are defined globally as:

> *Actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits.*[3]

NBS include a wide variety of actions and policies implemented in natural and managed ecosystems that ultimately provide benefits to communities through reduced flooding, retained ecosystem services, sustainable economies, and many other desirable results such as risk reduction during extreme weather events.

Although "ecosystems" are referenced in the definition of NBS, it's important to note that areas that may be more urbanized are not meant to be excluded. Indeed, it can be helpful to think about NBS in almost any setting involving three elements:

(1) there is a challenge or set of challenges that natural systems can help to solve (e.g., the lack of shade, and/or wildlife habitat, and/or flood retention),

(2) the challenge or set of challenges is coupled with a nature-based activity or element that provides a "nature-based solution" (e.g., the planting of trees), and importantly

(3) the legal, policy, financial, and other social factors that represent pre-conditions necessary to support and sustain elements (1) and (2) are developed or at least considered.

The inter-relationships between the actions and policies involved with nature-based solutions can be quite complex. However, it is important to recognize that **there is no one-size-fits-all solution** available to address Connecticut's complex climate, biodiversity, and resilience threats as they intensify; and it is likely that neither built nor nature-based solutions can handle these existential threats alone.

Despite their inherent complexities, NBS are clearly an important tool in society's "solutions toolbag" to achieve a healthy mix of ecosystem, resilience, and biodiversity benefits that makes Connecticut special, and it is important to both understand how state agencies are currently

[2] Cohen-Shacham, E., Walters, G., Janzen, C., & Maginnis, S. "Nature-Based Solutions to Address Global Societal Challenges." 2016. https://portals.iucn.org/library/sites/library/files/documents/2016-036.pdf
[3] Definition of nature-based solutions adopted by United Nations Environmental Assembly. 2022.

integrating NBS into their programs as well as evaluate opportunities for the state to advance NBS-related investments going forward.

B. Synergies between NBS and Other State/National Efforts

DEEP's efforts to integrate and advance NBS programs build upon many synergies with related work at the state and national level. Following are some notable examples of foundational efforts that both preceded and complement DEEP's ongoing work on nature-based solutions:

Governor's Council on Climate Change

In 2020, the Governor's Council on Climate Change (GC3) featured dedicated working groups that published several in-depth reports on "Working & Natural Lands" that featured recommendations related to Agriculture/Soils, Forests, Rivers, and Wetlands. The reports provide important source materials for this report.

In 2021, the GC3 Phase I Report: Taking Action on Climate Change and Building a More Resilient Connecticut for All included several recommendations for near term actions in the Working & Natural Lands areas (see recommendations #24 – 48 in that report) that continue to be priorities for DEEP and other state agencies.

Subsequent reports and plans such as the Policy on Resilient Forests for Connecticut's Future (PRFCT Future) were produced to reflect community consensus points and provide additional clarity to help carry forward recommendations from the GC3 working groups. This NBS report cites several recommendations from the GC3.

Executive Order 21-3

In December, 2021, Governor Lamont's Executive Order 21-3 includes 23 actions that State executive branch agencies are directed to take to reduce carbon emissions through over 30 recommendations from the GC3 in the areas of buildings and infrastructure; clean transportation; community climate resilience; health, equity and environmental justice; economic development and jobs; and working and natural lands. The working and natural lands section of the executive order features efforts by DEEP to implement Connecticut's Forest Action Plan and further climate resilience using nature-based solutions; and by the Department of Agriculture to engage stakeholders around the climate resilience and mitigation potential of agricultural lands.

Net Zero Policy for Connecticut

Connecticut's annual Greenhouse Gas (GHG) Inventory historically only included data on gross emissions, which means that it only tracked the sectors responsible for emitting GHGs. Starting in 2022, following Executive Order 21-3 implementing recommendations of the Governor's Council on Climate Change, DEEP began using the land use, land use change, and forestry (LULUCF) output of the Environmental Protection Agency's (EPA) State Inventory Tool to estimate the amount of carbon being sequestered in Connecticut's natural and working lands as part of the GHG Inventory. With the establishment of a net-zero by 2050 target in Section 2 of Public Act 25-125, DEEP is now required by law to include carbon sequestration in the inventory.

The current GHG Inventory shows that natural and working land sequestered 4.9 MMTCO2e in 2023, with 98% of that sequestration occurring in forest land and urban forests. While the LULUCF output from the State Inventory Tool allows for analysis of forest carbon at a statewide scale and comparison to other sectors and states, it does not allow for tracking policy implementation (e.g., progress on tree planting) or assessing trends in forest carbon on a timescale that is meaningful for climate policymaking. Finer spatial and temporal resolution is required for this. DEEP intends to explore options, within available resources, to update its carbon sequestration methodology, including adding spatial and temporal resolution of GHGs from forestlands, related land use change, and biological carbon stocks in urbanized areas.

By incorporating the best available science and sequestration data, Connecticut can track and report on its progress towards its 2050 target with greater accuracy and precision. Connecticut's current 2050 target is to reduce emissions 80% below the 2001 level, equivalent to 9.7 MMT CO2e. If the 2023 carbon sequestration levels of 4.9 MMTCO2e were, at a minimum, maintained, Connecticut would still need an additional 4.8 MMTCO2e in carbon sequestration to reach net zero, assuming emissions could not be reduced more than 80% below 2001 levels. There are two overarching pathways for carbon sequestration available for the state to meet its net-zero by 2050 target: Natural and Working Lands (NWL) which are considered alongside efforts highlighted in this report on nature-based solutions; and through Technological Carbon Dioxide Removal (Tech CDR).[4]

U.S. Climate Alliance

Connecticut is an active member of the U.S. Climate Alliance (USCA) -- a bipartisan coalition of governors representing 24 states dedicated to securing America's net-zero future by advancing state-led, high-impact climate action. USCA includes Natural and Working Lands as one of its top policy priorities and published a Policy Guide on Climate and Land Use Planning in 2025 which includes case studies from various states that can be used to advance climate goals through land use planning, climate-resilient development, and various methods of promoting healthy natural and working lands. In 2025, DEEP received support from USCA to conduct a Connecticut Net Zero Carbon Sequestration Assessment. The work on this assessment has been foundational to assist DEEP in fulfilling its obligations to report on the greenhouse gas sequestration potential for natural and working lands in the state's greenhouse gas inventory.

Green Infrastructure

Green infrastructure is a nature-based solution that delivers environmental benefits by mimicking natural processes, such as natural water flow and infiltration. Green infrastructure is often implemented through the technique of low impact development (LID) which can be integrated into development and redevelopment projects to manage stormwater. These actions are instrumental to improving and protecting water resources to ensure a clean and adequate supply of water today and into the future. Green infrastructure often enhances traditional stormwater management

[4] More information on DEEP's implementation efforts associated with the state's Net-Zero Policy are available in 2026 CT DEEP Report on Connecticut's Climate Progress required by the Global Warming Solutions Act (CGS Sec. 22a-200a). https://portal.ct.gov/DEEP/Climate-Change/CT-Greenhouse-Gas-Inventory-Reports

practices with extensive co-benefits such as aesthetic views, pollinator support, habitat for wildlife, flood mitigation, temperature mitigation, and more. DEEP provides more information on its efforts on green infrastructure via https://portal.ct.gov/deep/water/green-infrastructure.

Connecticut's Conservation and Development Policies Plan for 2025-2030

Connecticut's Conservation and Development Policies Plan for 2025-2030 (C&D Plan) is the state's comprehensive strategies plan for land and water resource conservation, preservation, and development, guiding state agencies and influencing regional and local planning with a focus on smart growth via principles like higher density housing, transit-oriented development, resource protection, and resilience. The C&D Plan is legislatively adopted, and it is developed and implemented by the Office of Policy and Management in partnership with the Continuing Legislative Committee on State planning and Development.

The C&D Plan, adopted in early 2025, establishes a set of Visions affecting the future of the state's shared natural, built, cultural, and social environments, and emphasizes the overlapping and sometimes competing nature of these priorities. For state agency plans, programs, and actions required to be consistent with the C&D Plan, new implementation processes encourage holistic thinking beyond typical areas of expertise and consideration of all relevant aspects of the Plan in assessing benefits and drawbacks. Incorporation of nature-based solutions and related principles is an example of how a state agency may balance conservation and development objectives in line with the C&D Plan. Moreover, the interrelated C&D Plan visions work well with the multi-agency and multi-disciplinary approaches inherent to nature-based solutions.

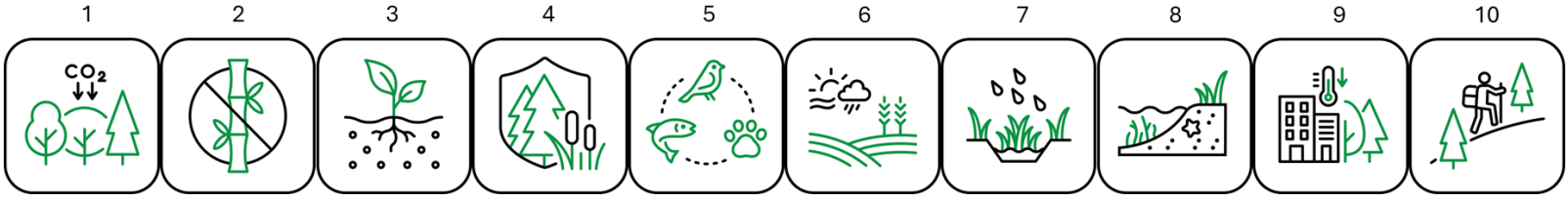
C. Using Icons and Color-coding for NBS Practices and Program Priorities

There are many NBS practices employed by resource management professionals, engineers, and others to make progress toward climate, biodiversity, and community resilience goals. Sometimes, describing these practices concisely can be difficult.

Icons, however, are images that communicate information clearly, concisely, and consistently. Icons can be easier to absorb than large blocks of text by utilizing memorable and concise visual images. DEEP developed icons to be used in two ways in this report:

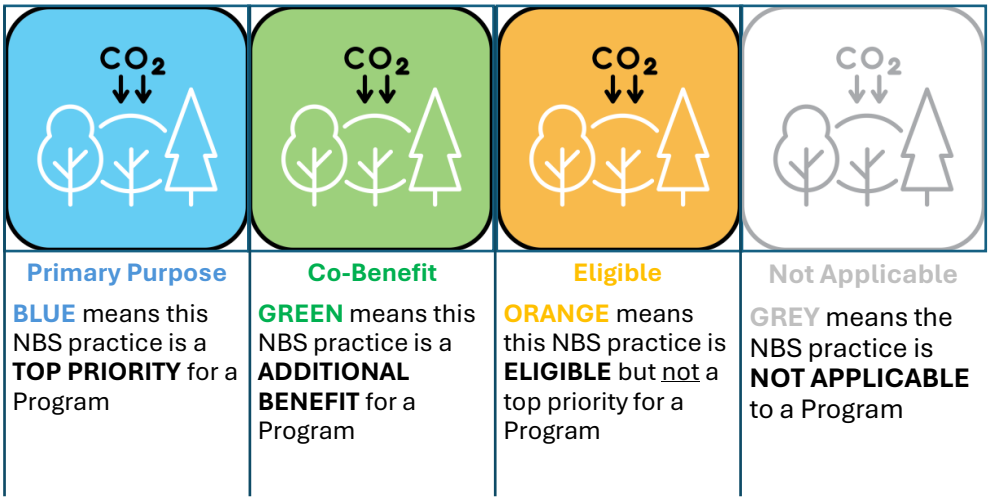
- to represent certain NBS practices highlighted in Section 12(b) of Public Act 25-125; and
- to identify (through "color-coding") the intensity of relevance of these NBS practices to various NBS programs of DEEP and other state agencies.

Following are icons that DEEP developed to represent the NBS practices in Public Act 25-125:

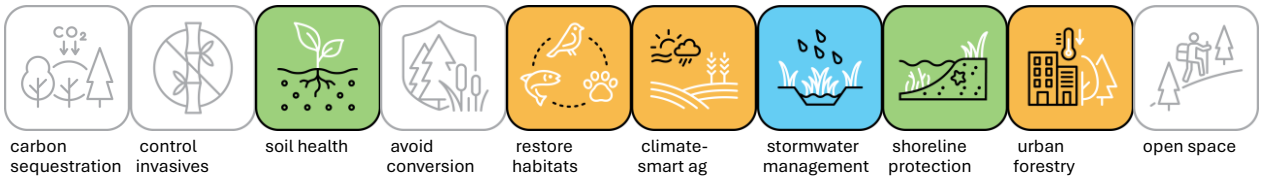


1. Increase carbon sequestration through increased forest acreage, including reforestation.
2. Control invasive species.
3. Encourage soil health across all landscapes.
4. Protect carbon stocks through avoiding the conversion of forests and wetlands to other purposes.
5. Restore habitats to improve biodiversity.
6. Increase climate-smart agriculture and soil conservation to reduce greenhouse gas emissions while improving habitat and protecting biodiversity.
7. Increase community resilience by improving water quality and addressing flooding and drought through nature-based stormwater management.
8. Increase community resilience by improving water quality and addressing flooding and drought through shoreline protection that uses nature-based approaches such as living shorelines.
9. Improve air quality and reduce urban heat island effects through urban forestry and increasing green spaces.
10. Increase access to open space for public health benefits.

Color-coding shows the **Primary**, **Co-Benefit**, **Eligible**, or **N/A** relevance of an NBS practice:



Program Example: Clean Water Act/Section 319 Grants



For the "Clean Water Act/Section 319 Grants" example above, the color-coding shows that:

- **One** NBS practice (in **BLUE**) is a **Primary Purpose** of the Program,
- **Two** NBS practices (in **GREEN**) are additional **Co-Benefits** of the Program,
- **Three** NBS practices (in **ORANGE**) are **Eligible** but not priorities of the Program,
- **Four** NBS practices (in **GREY**) are **Not Applicable** to this NBS program.

A "Key to Icons and Color-Coding" is included as Appendix III. It may be useful to open Appendix III as a separate document for a side-by-side easy reference as you read through this report.

** Although individual NBS programs and 10 practices from Section 12(b) of P.A. 25-125 are emphasized throughout this report, this report is not intended to be a fully comprehensive list of NBS programs and practices, nor should this limitation detract from the likelihood that a wide variety of actions and practices (beyond those represented here) may be required to address the specific challenges of climate change and/or biodiversity loss while also providing ecosystem services, resilience, and other benefits to people.