New Hampshire's Coastal Watershed Conservation Plan
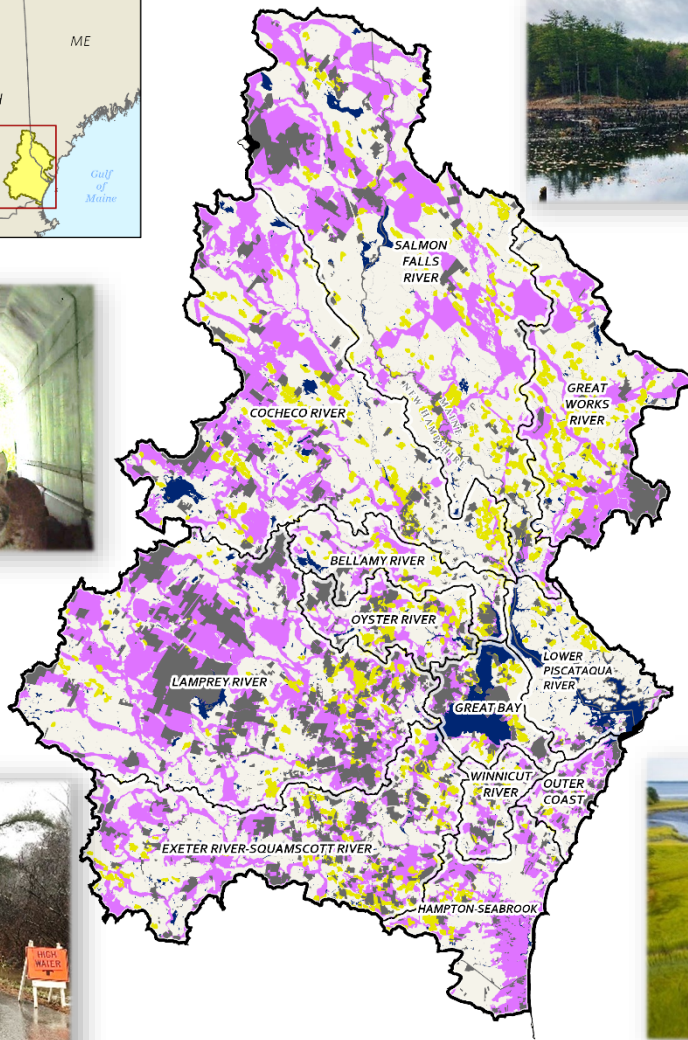## *2021 UPDATE*

The Nature Conservancy
New Hampshire

New Hampshire's Coastal Watershed Conservation Plan
2021 UPDATE

FINAL REPORT

6/30/2021

<u>**Authors**</u>

Peter Steckler
GIS & Conservation Project Manager
The Nature Conservancy, New Hampshire

Anna Ormiston
Conservation & GIS Analyst
The Nature Conservancy, New Hampshire

The Nature Conservancy
New Hampshire

Table of Contents

Acknowledgements

This plan was developed and completed in partnership with many organizations. An Advisory Committee, comprised of members from the Great Bay Resource Protection Partnership, provided high-level guidance throughout the project. A Technical Committee, comprised of GIS, fish and wildlife, resource management, and land trust professionals, guided the strategic prioritization decisions and methods that resulted in the Coastal Conservation Focus Areas. An Agricultural Resources Committee guided and directed the development of Coastal Priority Agricultural Resources. And finally, a Final Products and Outreach Committee guided the structure of the final report and complimentary final products to maximize the utility and implementation of the plan. Committee members and additional contributing partners include:

Advisory Committee
Dea Brickner-Wood (GBRPP)
Jeannie Brochi (US EPA)
Jessica Carloni (NHFG)
Joanne Glode (TNC)
Brian Hotz (SPNHF)
Matt Hillman (US FWS)
Duane Hyde (SELT)
Vanessa Johnson (NHA)
Jackie LeClair (US EPA)
Cory Riley (GBNERR)
Ian Rogers (US NRCS)
Rachel Stevens (GBNERR)
Sharon Ware (US FWS)

Agricultural Resources Committee
Dea Brickner-Wood (GBRPP)
Jeremy Lougee (SELT)
Ian Rogers (US NRCS)

Technical Committee
Dea Brickner-Wood (GBRPP)
Katie Callahan (NHFG)
Joanne Glode (TNC)
Sandi Houghton (NHFG)
Brian Hotz (SPNHF)
Duane Hyde (SELT)
Cory Riley (GBNERR)
Rachel Stevens (GBNERR)
Amanda Stone (UNHCE)

Final Products & Outreach Committee
Dea Brickner-Wood (GBRPP)
Duane Hyde (SELT)
Trevor Mattera (PREP)
Cory Riley (GBNERR)
Amanda Stone (UNHCE)

Additional final report review and input thanks to Dea Brickner-Wood, Jeannie Brochi, Sandi Houghton, Duane Hyde, Jeremy Lougee, Jim O'Brien, Cory Riley and Amanda Stone.

David Justice at the New Hampshire Geographically Referenced Analysis and Information Transfer System (NH GRANIT), with support from the New Hampshire Coastal Program, was instrumental in making the plan's geospatial data layers available to the public through the NH Coastal Viewer.

Key to Partner Acronyms

GBNERR	Great Bay National Estuarine Research Reserve	SPNHF	Society for the Protection of New Hampshire Forests
GBRPP	Great Bay Resource Protection Partnership	TNC	The Nature Conservancy
NHA	New Hampshire Audubon	UNHCE	University of New Hampshire Cooperative Extension
NHFG	New Hampshire Fish & Game Department	US EPA	United States Environmental Protection Agency
PREP	Piscataqua Region Estuaries Partnership	US FWS	United States Fish and Wildlife Service
SELT	Southeast Land Trust	US NRCS	United States Natural Resource Conservation Service

Executive Summary

New Hampshire's Coastal Watershed Conservation Plan identifies key conservation priorities across the lands in New Hampshire, Maine, and Massachusetts that drain to the Atlantic Ocean via the Piscataqua River and through the Hampton-Seabrook Estuary. This area is known as New Hampshire's coastal watershed. The coastal watershed region encompasses many of the diverse and complex habitats that the New England region has to offer. It grades from inland forests from the west to estuaries and the Atlantic coastline to the east, including a mixture of landforms that support rich fish and wildlife habitats and ecosystem services that benefit all who consider the coastal watershed home.

New Hampshire's Coastal Watershed Conservation Plan delivers two primary geospatial prioritization products: **Coastal Conservation Focus Areas** and **Coastal Priority Agricultural Resources**. These priorities represent a broad set of conservation targets and values including water quality and quantity, regionally important wildlife areas and habitats, migratory bird habitat, working landscapes, recreational and educational opportunities, climate resiliency, and landscape connectivity. These values align with the conservation and stewardship goals of the Great Bay Resource Protection Partnership (GBRPP), which is the partnership structure that initiated and supported the development of the plan. All aspects of this plan were developed in close coordination with the ten organizations represented by the GBRPP.

Coastal Conservation Focus Areas encompass conservation priorities to maintain ecological function and integrity across a landscape that is under threat from habitat loss, habitat degradation, and the impacts of climate change. Ten conservation datasets covering nearly 70 percent of the project area were synthesized into a set of focused priorities that account for 38.2 percent (265,368 acres) of New Hampshire's coastal watershed area. Just over 28 percent (75,165 acres) of these areas are already conserved. Approximately 64 percent (170,813 acres) of Coastal Conservation Focus Areas are considered vulnerable or unprotected. Coastal Conservation Focus Areas update and replace the previous conservation focus areas identified by Zankel et al. (2006).

Coastal Priority Agricultural Resources represent the highest priority agricultural lands based on their productivity, versatility, and resilience. Agricultural resource priorities are maintained separately from the Coastal Conservation Focus Areas because they represent markedly different conservation goals and desired outcomes. Coastal Priority Agricultural Resources account for just 4.7 percent (32,562 acres) of New Hampshire's coastal watershed area. Just under 20 percent (6,344 acres) of these areas are already conserved, leaving 80 percent (26,281 acres) as vulnerable or unprotected. Mapping products are available for both the Coastal Conservation Focus Areas and the Coastal Priority Agricultural Resources (see Project Data and Maps section).

This plan represents a turning point for coastal watershed conservation. While reflecting on the tremendous conservation progress made over the last 15 years, it recognizes that considerably more conservation still needs to be done to protect the integrity of natural systems and the natural infrastructure that supports human communities. This report recommends that the land protection community collectively sets a goal to protect 4,000 acres per year across the coastal watershed. This will reverse declining land protection rates tracked since 2007. Based on 2021 values we expect 4,000 acres to require an investment of approximately $15,000,000 annually, which will require strong advocacy for public funding support. Effectively engaging with land use planning, advancing public policy, and targeted outreach are equally important toward achieving the plan's vision.

Definitions

Coastal Conservation Focus Area: Areas identified by New Hampshire's Coastal Watershed Conservation Plan that encompass conservation priorities to maintain ecological function and integrity based on a synthesis and prioritization of ten input conservation datasets. Coastal Conservation Focus Areas represent priorities for wildlife and habitat, coastal water resource protection, coastal resilience, and climate adaptation.

Coastal Priority Agricultural Resource: Areas identified by New Hampshire's Coastal Watershed Conservation Plan that encompass the highest priority agricultural lands for food production based on their productivity, versatility, and resilience.

Ecosystem services: The benefits that functional ecological systems provide to people, such as clean drinking water, clean air, flood storage, outdoor recreation, and aesthetics, among others.

GAP Status: An attributing system instituted by the USGS Gap Analysis Program to track a combination of legal protection and management statuses of conservation and public lands. See the Primer on Conservation Land Inventories and Tracking section for additional details.

New Hampshire's Coastal Watershed: The land in New Hampshire, Maine, and Massachusetts that drains to the Atlantic Ocean via the Piscataqua River and through the Hampton-Seabrook Estuary (see Figure 1).

Prioritized Habitat Block: Areas identified by the Connect The Coast project (Steckler and Brickner-Wood 2019) that represent a network of regionally important habitat blocks in need of connecting and protecting.

Resilience: The ability to adapt and/or recover from disruption.

Wildlife Corridor: Areas identified by the Connect The Coast project (Steckler and Brickner-Wood 2019) that represent regionally important habitat connectivity pathways that connect between Prioritized Habitat Blocks.

1. Introduction

New Hampshire's coastal watershed encompasses many of the diverse and complex habitats that the New England region has to offer, all across the southeastern portion of New Hampshire and a slice of southwestern Maine. This region grades from inland forests from the west to estuaries and the Atlantic coastline to the east—a mixture of landforms that support rich fish and wildlife habitats and ecosystem services that benefit all who consider the coastal watershed home.

Historically and currently, the environmental and geographic attributes of the coastal watershed also make it a very attractive place for people to live, work, and enjoy. Rockingham and Strafford counties in New Hampshire, which encompass the majority of the coastal watershed, have some of the highest population growth rates in New Hampshire (Piscataqua Region Estuaries Partnership 2018). As a result, development pressure is similarly high, which continues to nibble away at the region's valuable natural resources.

Fortunately, the region has a robust conservation community invested in protecting its lands and waters. Conservation and planning organizations have worked together on multiple rounds of conservation planning initiatives since 2006 to prioritize the protection of the region's highest value and essential natural resources in the face of persistent development pressure. This started with the *Land Conservation Plan for New Hampshire's Coastal Watersheds* (Zankel, et al. 2006), followed by *Land Conservation Priorities for the Protection of Coastal Water Resources* (Steckler, Glode and Flanagan 2016), *Connect The Coast* (Steckler and Brickner-Wood 2019), and most recently the *Resilient Tidal Marshes* (NHFG 2014 & 2020) analysis.

We also benefit from state and continental scale planning initiatives that further inform conservation priorities from broader perspectives. State level conservation priorities from New Hampshire's and Maine's *State Wildlife Action Plans* (New Hampshire Fish and Game Department 2020, Maine Department of Inland Fisheries and Wildlife 2017) have been developed and updated along a similar timeframe since 2006. Similarly, the recently completed *Resilient and Connected Network* (Anderson, et al. 2020) identifies continental scale conservation priorities to maintain a resilient and connected landscape.

New Hampshire's coastal watershed is fortunate to have this abundance of strong conservation science and planning information to focus our land conservation efforts. However, as this information has accumulated for different conservation targets over the last 15 years, it has become increasingly challenging to use the information efficiently and cohesively to prioritize action. For example, all of the combined conservation focus areas from the plans noted above identify nearly 70 percent of the coastal watershed area as conservation priorities. Seventy percent is an exceedingly large area that does not offer a targeted and effective protection approach given limited resources available for conservation measures.

It's with these realities and challenges in mind that a comprehensive coastal watershed conservation plan update was initiated and undertaken with a group of partner organizations. The New Hampshire Coastal Watershed Conservation Plan incorporates each of these previously completed plans into one set of prioritized conservation priorities. It emphasizes the protection of areas offering essential and multiple benefit conservation values and ecosystem services—a set of places that maintain ecological

function and integrity for nature and people in the face of continuing threats from habitat loss and climate change.

This introduction provides context for New Hampshire's Coastal Watershed Conservation Plan including a description of the project area, the purpose of the plan, an introduction to the prioritized spatial datasets used, and context and trends relative to coastal watershed conservation and land cover changes. Following the Introduction section, a summary of Methods is provided detailing how the spatial prioritizations were completed, Results are presented, followed by Conclusions.

1.1 Project Area

New Hampshire's coastal watershed, which defines the project area for the plan, includes the land in New Hampshire, Maine, and Massachusetts that drains to the Atlantic Ocean via the Piscataqua River and through the Hampton-Seabrook Estuary (see Figure 1). The area of these drainages amounts to nearly 695,000 acres (1,085 square miles), with 76 percent of the area overlapping 48 communities in New Hampshire, 23 percent overlapping 11 communities in Maine, and one percent overlapping two communities in Massachusetts. Appendix A provides a list of each community addressed by New Hampshire's Coastal Watershed Conservation Plan.

The project area includes twelve prominent river drainages based on the National Hydrography Dataset's hydrologic units (U.S. Geological Survey, National Geospatial Program 2016). Table 1 lists these watersheds based on their Hydrologic Unit Code (HUC) and name, including their respective areas, percentages of the entire watershed, and conservation status. Certain HUC 10 level watersheds include multiple major drainages, which is why the Great Bay HUC 10 is split out by HUC 12 level watersheds to represent the Winnicut, Oyster, and Bellamy rivers. Similarly, the Hampton River-Frontal Atlantic Ocean HUC 10 watershed is split out by HUC 12 watersheds to represent the Lower Piscataqua River, the Outer Coast, and the Hampton-Seabrook Estuary drainage.

> **Explaining Hydrologic Unit Codes (HUC):**
>
> *"Watersheds are delineated by USGS using a nationwide system based on surface hydrologic features. This system divides the country into 21 regions (2-digit), 222 subregions (4-digit), 370 basins (6-digit), 2,270 subbasins (8-digit), ~20,000 watersheds (10-digit), and ~100,000 subwatersheds (12-digit). A hierarchical hydrologic unit code (HUC) consisting of 2 additional digits for each level in the hydrologic unit system is used to identify any hydrologic area."* - (USGS n.d.)

New Hampshire's coastal watershed, and the Great Bay and Hampton-Seabrook estuaries that it drains to, has long been the focus of protection and restoration efforts at national and global scales because of its irreplaceable natural resources. The establishment of the Great Bay National Estuarine Research Reserve in 1989 committed focused and science-based management for the Great Bay Estuary through the Coastal Zone Management Act with support from the National Oceanic and Atmospheric Administration (NOAA) and the New Hampshire Fish and Game Department. Soon after, the New Hampshire Estuaries Project, which changed in 2009 to the Piscataqua Region Estuaries Partnership (PREP), was conceived through the U.S. Environmental Protection Agency's National Estuary Program.
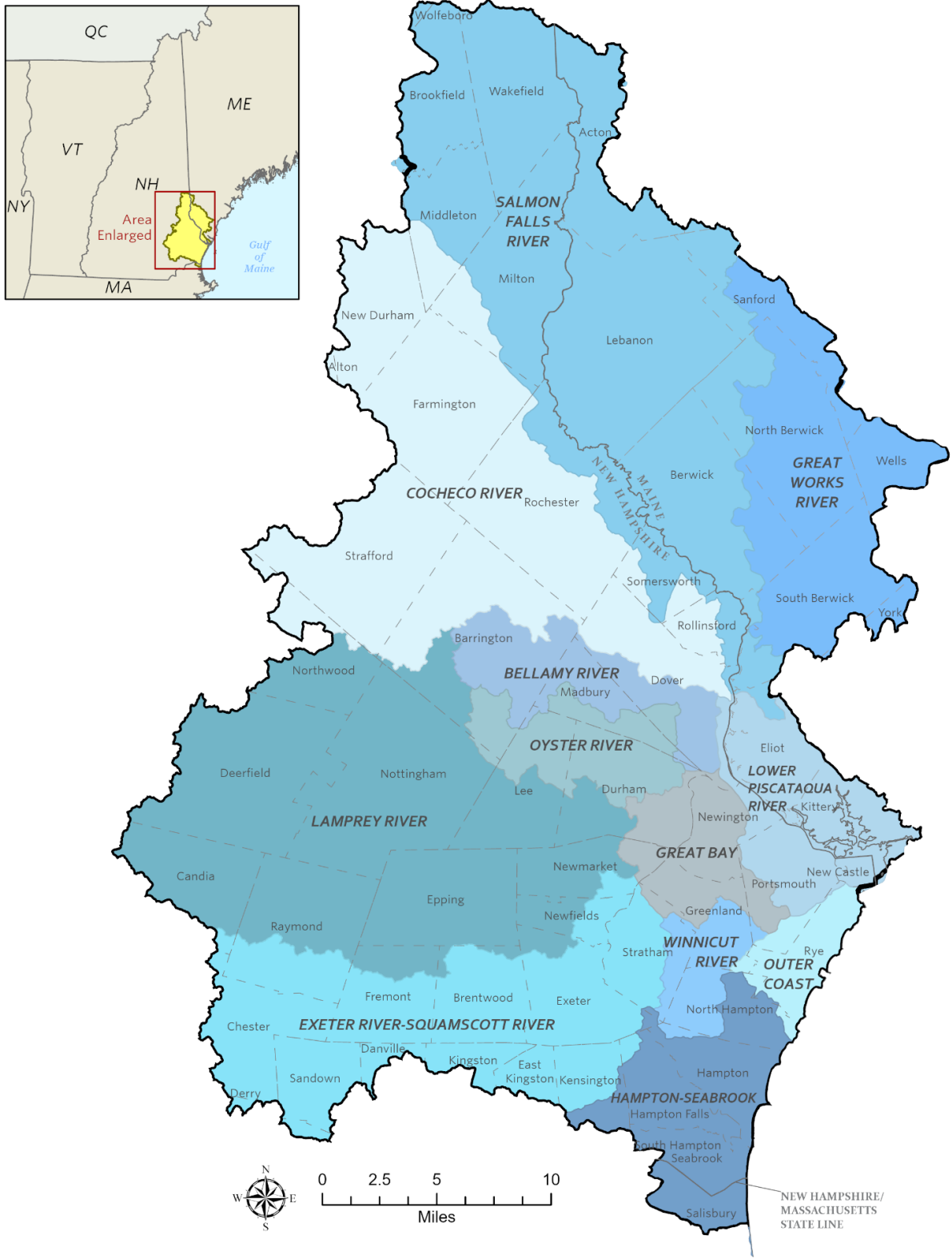
Figure 1: A map of the project area that represents New Hampshire's coastal watershed (black outline), also known as the Piscataqua-Salmon Falls HUC 8 level sub-basin. The major drainages are labeled and differentiated by different shading, which align with those detailed in Table 1. Municipal boundaries are also depicted.

The National Estuaries Program was established under the Clean Water Act to protect and enhance nationally significant estuarine resources. In 2002 the Important Bird Area program, a partnership between New Hampshire Audubon, the New Hampshire Fish and Game Department, and the University of New Hampshire Cooperative Extension, identified the Great Bay and Hampton-Seabrook Estuaries as global Important Bird Area protection priorities, which remain in effect today.

These designations anchor our conservation foci to protect key natural resources across the coastal watershed to support our region's estuaries. In addition, conserving lands that provide important ecosystem services such as clean and abundant water supplies and reduced flood risks also support and benefit resilient human communities.

Table 1: This table lists the major drainages within the project area as depicted in Figure 1. The major drainages are a combination of HUC 10 and 12 level watersheds. The drainage areas, their percentage of the entire watershed area, and their existing conservation status (percent conserved), are included. Conservation status is based on lands categorized as GAP Status 1, 2, or 3. See the Primer on Conservation Land Inventories and Tracking section for an explanation of GAP Status codes and a definition for each.

HUC ID	Sub-Watershed Name	Acres	Percent of Watershed	Percent Conserved
106000304	Great Works River	55,460	8	9
106000305	Salmon Falls River	155,445	22	8
106000306	Cocheco River	118,811	17	9
106000307	Lamprey River	136,816	20	23
106000308	Exeter River-Squamscott River	81,666	12	16
10600030901	Winnicut River	11,151	1.5	18
10600030902	Oyster River	19,860	3	23
10600030903	Bellamy River	21,612	3	11
10600030904	Great Bay	19,224	3	25
10600031001	Lower Piscataqua River	30,404	4	4
10600031002	Outer Coast	10,618	1.5	19
10600031003/05	Hampton-Seabrook	34,319	5	9

1.2 Purpose

The purpose of New Hampshire's Coastal Watershed Conservation Plan is to identify and prioritize high value natural resources across the project area to conserve and restore through land protection, land use decision making, and management. The plan results in a vision that prioritizes the protection and integrity of natural systems and natural infrastructure to support resilient human communities. Through its prioritization, the plan also balances these protections with opportunities for economic growth and development.

The act of conservation is often associated with permanent land protection by acquiring a property or a conservation easement. These approaches are still the primary conservation strategies used by land trusts and local, state, and federal land protection entities, but they are not the only means for achieving the conservation vision we've set our sights on. In fact, a "buy it all" approach is certainly not

achievable. The plan will be most effective through a combination of traditional land protection and the plan's use to support land use decision making by local, state, and federal regulators.

The water quality, wildlife habitat, and climate resiliency priorities, among others, identified by this plan can be incorporated into land use decisions at each governmental scale. Project siting, conservation overlay districts or ordinances, transportation upgrades, or local setbacks are all examples of land use decisions that will ideally be informed by the results of this project. Land use decisions are made at the local level by planning boards, zoning boards of adjustment, and conservation commissions. At the state level, these decisions are made by departments of environmental protection and are informed by departments of fish and wildlife and natural heritage programs. Federal oversight tends to inform state-level land use decision making.

The plan's prioritization process was guided by a broad set of conservation values and targets. Some of these are critical to every community across the project area, such as clean and abundant drinking water supplies, while others might be newer conservation concepts such as landscape connectivity for wildlife or climate resilience. The complete list of conservation values and targets that the plan prioritizes includes water quality and quantity, regionally important wildlife areas and habitats, migratory bird habitat, working landscapes, recreational and educational opportunities, climate resiliency, and landscape connectivity. These values align closely with the conservation and stewardship goals of the Great Bay Resource Protection Partnership (GBRPP), which is the partnership structure that initiated and supported the development of this plan. GBRPP is a group of conservation organizations that promote landscape-scale land conservation and stewardship across the plan's project area. Table 2 lists the spatial datasets used in the prioritization process and their associated target conservation values. Each of these spatial datasets are introduced and described in further detail in the sections that follow.

Combining all of the prioritized datasets in Table 2 results in coverage of a broad majority (nearly 70 percent) of the project area, which is a challenge given the adage that "when everything is a priority, nothing is a priority". The New Hampshire Coastal Watershed Conservation Plan synthesizes and prioritizes the input datasets for this very reason. The project methods, in essence, boil down the set of inputs into a cohesive network of conservation priorities that ensures critical ecosystem functions and services are represented and areas offering multiple conservation benefits are further prioritized. These inputs are described in the following section.

1.3 Prioritized Spatial Input Datasets

This section introduces each of the spatial datasets used to develop the prioritized set of conservation focus areas identified by the New Hampshire Coastal Watershed Conservation Plan. Input datasets are presented by conservation value categories, as listed in Table 2, including wildlife and habitat, water resources, climate adaptation, and agricultural resources.

1.3.1 Wildlife and Habitat

Areas of important wildlife occurrences and high value habitats are traditional conservation targets that are prioritized through this planning effort. They represent places of known irreplaceable wildlife occurrences, such as federal or state listed rare, threatened, or endangered species. Known locations of Blanding's turtles are an example, which is an endangered species in New Hampshire and Maine

considered critically imperiled. High value habitats represent areas that remain relatively wild or unspoiled when compared to their surrounding landscape or they represent patches of uncommon habitat that support assemblages of species that are restricted to certain habitat types. Early successional habitats are an example of an increasingly uncommon habitat type in our region that supports species like New England Cottontail (endangered in NH) and a variety of habitat dependent bird species.

Table 2: The spatial datasets prioritized in New Hampshire's Coastal Conservation Plan are categorized by conservation values including the associated conservation targets that the plan seeks to identify for protection. Many, if not all, of the input datasets support recreational and education opportunities even though they are not categorized individually.

Prioritized Spatial Datasets by Conservation Value Categories	Conservation Target
Wildlife and Habitat Category	
New Hampshire Wildlife Action Plan, Tier 1 and Tier 2 Habitats *(New Hampshire Fish and Game 2020)*	*- Regionally important wildlife areas and habitats*
Beginning with Habitat Focus Areas *(Maine Department of Inland Fisheries and Wildlife 2017)*	*- Migratory bird habitat*
Connect The Coast Prioritized Habitat Blocks *(Steckler and Brickner-Wood 2019)*	
Connect The Coast Wildlife Corridors *(Steckler and Brickner-Wood 2019)*	*- Landscape connectivity*
Resilient & Connected Network (Anderson, et al. 2020)	*- Climate resiliency* *- Landscape connectivity*
Water Resources Category	
Source Water Protection (Steckler, Glode and Flanagan 2016)	*- Water quality and quantity*
Pollutant Attenuation (Steckler, Glode and Flanagan 2016)	*- Water quality and quantity*
Climate Adaptation Category	
Resilient Tidal Marshes (New Hampshire Fish and Game Department 2020)	*- Regionally important wildlife areas and habitats* *- Migratory bird habitat* *- Climate resiliency*
Flood Storage and Risk Mitigation (Steckler, Glode and Flanagan 2016)	*- Climate resiliency*
Agricultural Resources Category	
Productive, Versatile, and Resilient Agricultural Lands (Freedgood, et al. 2020)	*- Working landscapes*

Six data inputs were incorporated and synthesized to prioritize important wildlife occurrences and high value habitats. They include *State Wildlife Action Plan* priorities in New Hampshire and Maine, results of a wildlife connectivity plan completed in 2019 titled *Connect The Coast*, and a continental scale analysis of terrestrial resilience titled the *Resilient and Connected Network*. Each of these data inputs are introduced in the following sections.

New Hampshire Wildlife Action Plan, Tier 1 and Tier 2 Habitats

The New Hampshire Fish and Game Department prioritizes conservation targets for wildlife habitat through their *Highest Ranked Wildlife Habitat by Ecological Condition* dataset included in the 2020 update to *New Hampshire's Wildlife Action Plan* maps (New Hampshire Fish and Game Department 2020). The dataset identifies wildlife habitats in the best relative condition in New Hampshire, especially for Species of Greatest Conservation Need. The dataset considers three factors: (1) the locations of rare, threatened, and endangered species and exemplary natural communities, (2) the context of each habitat location in relation to the broader landscape, and (3) the effects of human activities on each habitat location. Tier 1 habitats represent the highest ranked habitats in New Hampshire, while Tier 2 habitats represent the highest ranked habitats within each of New Hampshire's biological regions.

Beginning with Habitat Focus Areas

Beginning with Habitat's Focus Areas (Maine Department of Inland Fisheries and Wildlife 2017) are analogous to New Hampshire's Wildlife Action Plan spatial priorities. They represent large blocks of undeveloped habitats that include rare, threatened, and endangered species, significant wildlife habitats, and at-risk and high-quality natural communities. The focus areas were developed to direct conservation to areas with the greatest biodiversity significance.

Connect The Coast: Prioritized Habitat Blocks and Wildlife Corridors

The Nature Conservancy and the Great Bay Resource Protection Partnership, in partnership with over 15 contributing organizations, completed the *Connect The Coast* project in 2019 (Steckler and Brickner-Wood 2019). *Connect The Coast* is a regional wildlife connectivity conservation plan focused on New Hampshire's coastal watershed. Prioritized Habitat Blocks were identified using state and regional conservation plans; they represent a network of regionally important habitat blocks in need of connecting and protecting. Computer models were used to identify Wildlife Corridors that connect the Prioritized Habitat Blocks. In combination, these areas represent a network of connecting lands that are a priority for maintaining regional opportunities for wildlife to move across the landscape, especially in the face of continuing habitat loss and a changing climate. The project team focused on meeting the movement needs of upland species like bobcat, fisher, and New England cottontail, as well as river and wetland associated species like otter, Blanding's and spotted turtles.

Resilient & Connected Network

The Nature Conservancy's *Resilient and Connected Network* (RCN) represents a continental scale set of conservation priorities to sustain biodiversity and ecological functions, especially in the face of our changing climate. It prioritizes resilient and connected lands based on climate resilient sites, broad-scale connectivity and climate flow gradients, and areas with recognized biodiversity values. The RCN was developed over a 10-year period with input from over 150 scientists across the United States (Anderson, et al. 2020).

1.3.2 Water Resources

Natural infrastructure is a critical and cost-effective solution for protecting water resources, which are essential for sustaining both natural and human communities. Yet rapid development across New Hampshire's coastal watershed threatens both water quality and quantity; in some places our coastal waters are classified as impaired based on standards set by the Clean Water Act. Undeveloped lands provide ecosystem services to purify and retain water and recharge aquifers. Developed lands often contribute pollution and stormwater runoff to our wetlands, rivers, ponds, lakes, and estuaries.

Two data inputs were incorporated and synthesized to prioritize the protection of water resources, both from the *Land Conservation Priorities for the Protection of Coastal Water Resources* (Steckler et al. 2016). One represents conservation focus areas to maintain public water supplies, the other represents pollutant attenuation and removal focus areas to maintain and improve water quality. Each of these data inputs are introduced in the following sections.

Source Water Protection

Undeveloped lands protect critical water supplies upstream of communities across New Hampshire's coastal watershed. Source water protection, or public water supply, priorities were identified for New Hampshire in the *Land Conservation Priorities for the Protection of Coastal Water Resources* (Steckler et al. 2016) and updated as part of this conservation planning effort for the Maine portion of the project area. Surface and groundwater priorities for source water protection were supplied by the New Hampshire Department of Environmental Services (NHDES) Drinking Water and Groundwater Bureau and the Maine CDC Drinking Water Program (Maine Center for Disease and Control and Prevention Drinking Water Program 2020). These data were prioritized into two tiers of land conservation priorities to protect surface water and groundwater supplies. Both tiers of priorities are incorporated equally in New Hampshire's Coastal Watershed Conservation Plan.

Pollutant Attenuation

Natural infrastructure plays a critical role in maintaining water quality and mitigating water quality impairments from pollutant sources. The *Land Conservation Priorities for the Protection of Coastal Water Resources* (Steckler et al. 2016) conservation plan identified and prioritized conservation focus areas that attenuate pollutants to benefit coastal water quality. These areas were identified through two separate analyses, one that identified riparian buffer priorities to attenuate pollutants before entering aquatic systems, and the other that identified wetlands to attenuate pollutants

already in the aquatic systems. Two tiers of priorities resulted; both are incorporated equally in New Hampshire's Coastal Watershed Conservation Plan.

1.3.3 Climate Adaptation

Our changing climate is the harbinger of more frequent and intense storms that puts communities, including public and private infrastructure, at additional risk from flooding. Since 1901 the region has experienced more than a 50 percent rise in precipitation from extreme storms, sometimes with costly flood damages (Kirshen, et al. 2014). Natural infrastructure plays an important role as a nature-based solution for flood storage and risk mitigation by holding back floodwaters. The need for this kind of ecosystem service is all the more important as development intensifies. Development sits on both sides of the flood equation; impervious surfaces result in additional flooding, and development in certain areas are subject to greater flooding risks. Two climate adaptation focused datasets, Resilient Tidal Marshes and Flood Storage and Risk Mitigation Areas, are incorporated into New Hampshire's Coastal Watershed Conservation Plan

Resilient Tidal Marshes

Salt marshes offer multiple ecosystem functions and services. These critically important habitats face climate induced sea level rise threats on the front line while attenuating storm surges from increasingly frequent and powerful weather events. Salt marshes also are important for carbon sequestration, maintaining and improving water quality, and for the truly unique fish and wildlife habitat that they offer. Understanding where resilient tidal marshes exist and their migration potential is necessary for adaptation to sea level rise and for protecting coastal habitats. The New Hampshire Fish and Game Department's *Sea Level Affecting Marshes Model* (New Hampshire Fish and Game Department 2014) and *Draft Comprehensive Plan for Resilient Salt Marsh in New Hampshire* (New Hampshire Fish and Game Department 2020) were used to represent current resilient tidal marsh habitat and areas that are suitable for salt marsh migration.

Flood Storage and Risk Mitigation

The conservation focus areas for flood storage and risk mitigation from the *[Land Conservation Priorities for the Protection of Coastal Water Resources](#)* (Steckler et al. 2016) identify areas across the landscape to maximize flood storage potential from both freshwater flooding and tidal inundation. Freshwater flood storage areas were identified using high resolution LiDAR data associated with riparian wetlands and prioritized based on each area's flood storage capacity. At-risk locations from tidal inundation were identified by the New Hampshire Fish and Game Department's *Sea Level Affecting Marshes Model* (2014) approach. Two tiers of priorities resulted; both are incorporated equally in New Hampshire's Coastal Watershed Conservation Plan.

1.3.4 Agricultural Resources

Farmlands, and the productive agricultural soils that they often overlay, are a valuable natural resource that maintains undeveloped open space and supports local food production. Additionally, the ability to produce food locally supports sustainable communities, diversifies local economies, supports local jobs,

and is far less reliant on fossil fuels to import food from far-away places. A concerted effort to support local food production has shifted to the mainstream recently thanks to the growing appreciation of local food production. This shift, in part, may be in recognition of the threats to local and sustainable agriculture.

According to a recent study by the American Farmland Trust titled *Farms Under Threat: State of the States* (Freedgood, et al. 2020), 11,600 acres of agricultural land in New Hampshire were developed or compromised between 2001 and 2016. Forty percent of these lands were converted to urban and highly developed land uses, while 60 percent were converted to low density residential uses. While low density residential does not necessarily exclude agriculture, it is a transitional land use that is six times more likely to be converted to urban and highly developed land uses when compared to other agricultural land. Across New England, 19 acres of agricultural land are being lost or threatened every day based on trends from 2001 to 2016. That is a total loss of 7,000 acres over a 15-year period (Freedgood, et al. 2020). Incorporating agricultural resources into New Hampshire's Coastal Watershed Conservation Plan fills a gap at the watershed scale toward prioritizing the protection of these increasingly threatened and essential lands.

Productive, Versatile, and Resilient (PVR) Agricultural Lands

The *Farms Under Threat: State of the States* (Freedgood, et al. 2020) produced a geospatial data layer to prioritize the protection of agricultural lands. This data layer is titled *Productive, Versatile, and Resilient Agricultural Lands* (PVR). It is a raster-based dataset providing wall-to-wall coverage of the conterminous United States with values ranging from zero to one. A value of one represents a land unit with the highest suitability for long-term, intensive crop production, whereas a value of zero represents the lowest suitability. PVR can be used to identify a state's best agricultural lands by using a threshold at or above the state's median PVR threshold. Given that this project's area spans multiple states, the median PVR value for the project area was used to identify the best agricultural lands for conservation. Full details of the data processing and analysis are included in the methods section.

1.4 Conservation and Land Cover Contexts

Conservation practitioners across the region have worked diligently over the last 20 years to protect important lands as fast as time and resources have allowed. Concurrently, conversion of land from open space to developed areas has steadily increased. This section explores the progress made toward protecting conservation priorities from *The Land Conservation Plan for New Hampshire's Coastal Watersheds* (Zankel, et al. 2006), followed by a broader look at regional land protection and land cover changes over the last twenty years. This allows for a better understanding of the progress we've made protecting land and the threats to the natural landscape from development. A primer on conservation land inventories and tracking is introduced first for context.

1.4.1 Primer on Conservation Land Inventories and Tracking

Conservation lands are tracked in each state across the project area. NH GRANIT tracks Conservation and Public Lands through a GIS data layer in New Hampshire (Earth Systems Research Center, University of New Hampshire 2020). The most up to date layer in Maine is tracked by The Nature Conservancy in

Maine through the Secured Areas GIS data layer (Coker 2021), while MassGIS tracks Protected and Open Recreation Space in Massachusetts (MassGIS (Bureau of Geographic Information) 2020) . It is important to note that these data layers are based on voluntary submissions from protection entities and are not a complete representation of actual lands protected. Furthermore, there is a lag time between when most projects are completed and when they are added to their respective state-based databases.

Each of the state databases include a combination of lands with different levels of conservation or legal protection statuses. The databases have different attributes that detail the entity that owns the land or holds an interest in the land, the type of interest or legal protection mechanism (e.g. conservation easement or deed restriction), the management intent of the property (e.g. no management, managed for wildlife habitat, or managed for extractive uses such as silviculture) and dates of when the transaction or interest was recorded, among others.

One attribute that tracks a combination of protection and management statuses is the USGS Gap Analysis Program's protection status, also known as GAP Status. This report uses the GAP Status attribute as the primary method for evaluating conservation status and trends. Conservation accomplishments associated with *The Land Conservation Plan for New Hampshire's Coastal Watersheds* (Zankel, et al. 2006), coastal watershed conservation trends over the last 20 years, and Coastal Watershed Conservation Plan priorities in the results section are all evaluated using GAP Status.

GAP Status codes 1, 2, and 3 are all associated with legally protected lands—those lands owned by an entity committed to protecting it in perpetuaty or where development rights have been extinguished through a conservation easement or deed restriction. GAP Status 4 is associated with other conservation or public lands that are not legally protected. States use GAP Status codes 1, 2, and 3 consistently, GAP Status 4 codes somewhat less consistently, and other codes to track other types of lands. Table 3 provides defintions for GAP Status codes 1, 2, 3, and 4 from the USGS Gap Analysis Program (USGS 2018).

States use additional GAP Status codes to track other types of land too. New Hampshire uses a GAP Status 3A code for lands with "No legal protection, but current ownership has institutional mandates or intention to manage for natural land cover" (NH GRANIT 2019). GAP Status 3A lands in New Hampshire are grouped with GAP Status 4 for the purposes of this plan because they are not permanently protected. Maine uses a GAP Status code of 39 to track permanently protected agricultural lands; we grouped these lands with GAP Status 3 because of their permanent protection allowing for extractive uses. GAP Status 9 represents lands with unknown protection and/or management status so are tracked independently of the other GAP Status codes.

GAP Status is used throughout this report to track the protection and management of the coastal watershed's portfolio of conservation lands. Breaking out conservation and public lands by GAP Status codes provides greater detail and hopefully introduces those unfamiliar with these details to consider them based on the watershed's protected lands of today and those to come in the future. That said, this report groups GAP Status 1 and GAP Status 2 lands together because they are both managed toward a prmarily natural state. GAP Status 1 lands are primarily no-management lands. GAP Status 2 lands allow limited management to maintain or provide certain types of habitat for biodiversity.

*Table 3:* *Definitions of GAP Status codes from the USGS Gap Analysis Program (2018).*

GAP Status Code	GAP Status Description
1	"An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a natural state within which disturbance events (of natural type, frequency, intensity, and legacy) are permitted to proceed without interference or are mimicked through management."
2	"An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a primarily natural state, but which may receive uses or management practices that degrade the quality of existing natural communities, including suppression of natural disturbance."
3	"An area having permanent protection from conversion of natural land cover for most of the area, but subject to extractive uses of either a broad, low-intensity type (e.g., logging, Off Highway Vehicle recreation) or localized intense type (e.g., mining). It also confers protection to Federally listed endangered and threatened species throughout the area."
4	"There are no known public or private institutional mandates or legally recognized easements or deed restrictions held by the managing entity to prevent conversion of natural habitat types to anthropogenic habitat types. The area generally allows conversion to unnatural land cover throughout or management intent is unknown. See the PAD-US Standards Manual for a summary of methods or the geodatabase look up table for short descriptions."

1.4.2 Protection Progress toward *The Land Conservation Plan for New Hampshire's Coastal Watersheds*

The 2006 *Land Conservation Plan for New Hampshire's Coastal Watersheds* (Zankel, et al. 2006) has guided land protection across the New Hampshire portion of the coastal watershed over the last 15 years. Like this plan, the 2006 plan was a collaborative effort supported by many partners that resulted in broad-based buy-in of its identified priorities. Funders of land protection have prioritized investments in the conservation focus areas resulting from the 2006 plan.

Figure 2 illustrates the area of lands protected by year across New Hampshire's portion of the Coastal Watershed as related to the *Land Conservation Plan for New Hampshire's Coastal Watersheds'* Core Focus Areas, Supporting Landscapes, and all other lands not prioritized by the 2006 plan. Figure 2 is limited to New Hampshire GAP Status 1, 2, and 3 attributed records with known protection dates. Since the release of the 2006 plan, 50.1 percent (12,296 acres) of lands protected have occurred within the Core Focus Areas and 20.5 percent (5,023 acres) have occurred within the Supporting Landscape areas. Together, over 70 percent of lands protected across New Hampshire's portion of the coastal watershed are associated with priorities from the 2006 plan. This inventory demonstrates the effectiveness of the 2006 plan at directing land protection investments towards the priority resource areas it identified. As a

result, 9.2 percent of the Core Focus Areas and 6.0 percent of the Supporting Landscapes identified in the 2006 plan were protected during the 11-year period between 2007 and 2017.
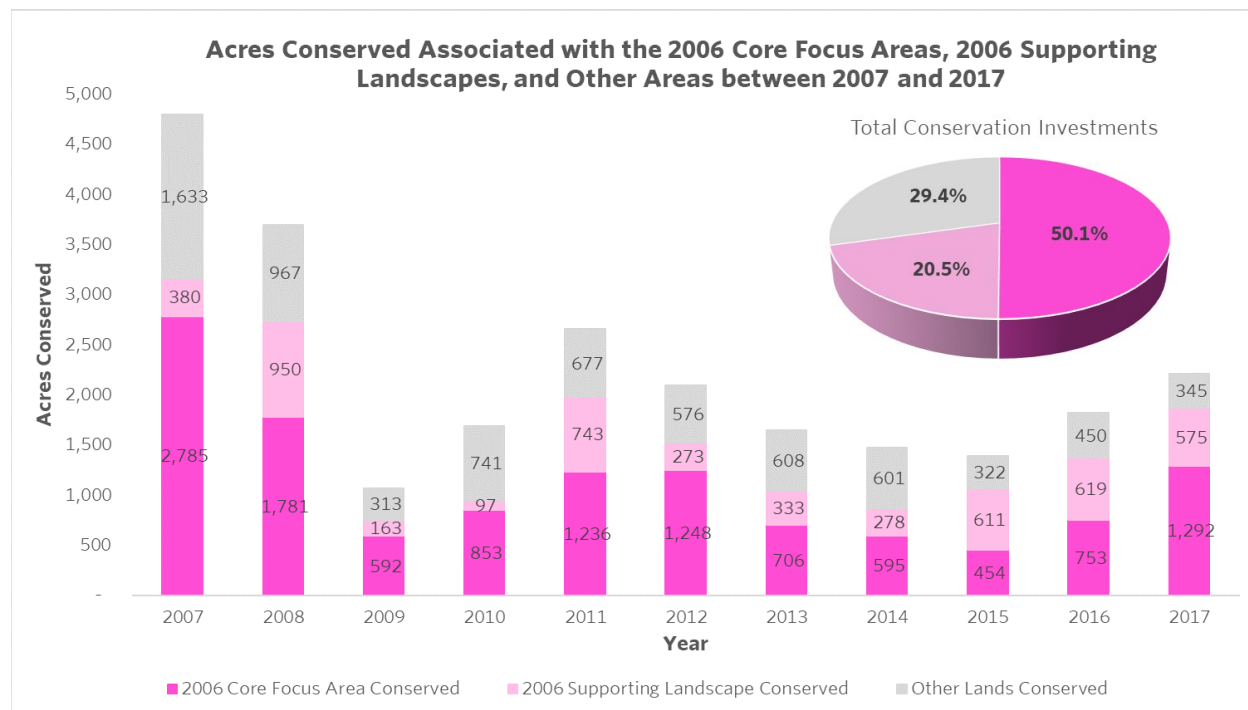
Figure 2: Acres of land protected by year across New Hampshire's portion of the coastal watershed as related to the Land Conservation Plan for New Hampshire's Coastal Watersheds' (Zankel, et al. 2006) Core Focus Areas, Supporting Landscapes, and all other lands not prioritized by the plan. Records are limited to New Hampshire GAP Status 1, 2, and 3 attributed tracts with known protection dates. The pie chart aggregates the percent of lands protected across the 11-year period for the three categories of conserved land areas.

1.4.3 Conservation Status and Trends

In addition to understanding protected lands associated with *The Land Conservation Plan for New Hampshire's Coastal Watersheds* (Zankel, et al. 2006), it is also informative to understand conservation status and trends at the watershed level. Table 4 represents our current understanding of conservation and public lands across New Hampshire's coastal watershed by GAP Status, including the distribution of these lands across New Hampshire and Maine. The watershed total columns of Table 4 include Massachusetts lands by GAP Status. The Massachusetts portion of the project area is very small, and the Massachusetts conserved areas are much smaller, which is why they are not tracked independently throughout the report's tables.

Most of the conservation and public lands across the watershed are GAP Status 3, which are legally protected lands that allow for extractive uses such as silviculture or agriculture. These lands account for 9.1 percent of the coastal watershed's area. GAP Status 1 and 2 lands are the next most prevalent accounting for 4.4 percent of the project area—these lands are legally protected and are managed entirely or primarily to maintain natural conditions. In total 13.5 percent of the coastal watershed is legally protected; an additional 2.5 percent is included as GAP Status 4 (not legally protected) or with an unknown GAP Status.

Table 4: *Inventory of conservation and public lands by GAP Status for the entire coastal watershed and for the New Hampshire and Maine portions. Conservation and public lands in Massachusetts are included in the watershed total columns but are not explicitly broken out because of the small amount of Massachusetts included in the project area. SOURCES: (Earth Systems Research Center, University of New Hampshire 2020); (MassGIS (Bureau of Geographic Information) 2020); (MassGIS (Bureau of Geographic Information) 2020)*

	Watershed Acres (*total*)	Watershed Percent (*total*)	NH Acres	NH Percent	Maine Acres	Maine Percent
GAP Status 1 & 2	30,363	4.4	26,992	5.1	3,371	2.1
GAP Status 3 (*includes 39 lands in Maine*)	63,454	9.1	57,253	10.8	5,658	3.6
GAP Status 4 (*includes 3A lands in NH*)	10,836	1.6	9,949	1.9	888	0.6
GAP Status 9 (*unknown*)	6,493	0.9	5,996	1.1	497	0.3

Trends of land protected per year between the years of 2000 and 2017 are also informative to understand the current trajectory of land protection across the coastal watershed. This time span is used because it both generally mirrors the time span when the best available land cover data is available for the region (the next section looks at land cover trends over a similar period) and conservation and public lands data are well represented through 2017 but not thereafter; this is because there has been no substantial updates to the conservation lands datasets since 2017 and lands protected are underrepresented after that point. Figure 3 displays the acres of lands protected (GAP Status 1, 2, and 3) per year across New Hampshire's Coastal Watershed during this period. The figure differentiates conservation lands reported with known protection dates in orange versus unknown protection dates in gray. Conservation lands with unknown protection dates are attributed to the year they were first added into the conservation lands dataset. These are included in the figure to acknowledge that the conservation lands represented in orange are not a complete representation of all the land protection completed over this timespan. The trendline in Figure 3 represents the acres conserved by year for only the conservation lands with a known protection date.

Figure 3 shows that land protection trends across the watershed are declining. On average, lands were protected at a rate of approximately 3,100 acres per year in 2000 and have declined to approximately 2,100 acres per year in 2017. Land protection rates since 2009, following the Great Recession of 2008, are consistently low when compared to the preceding period. In 2012 there is a large increase in the amount conservation lands with an unknown protection date. This is because an intensive effort was undertaken in 2011 to update New Hampshire's Conservation and Public Lands data layer, and a large amount of protected lands were added to the dataset in 2012 with unknown protection dates. These 4,039 acres of conservation lands with unknown protection dates were protected sometime before

2012; if their protection dates were known the declining conservation trendline would likely be even steeper than it is currently shown.
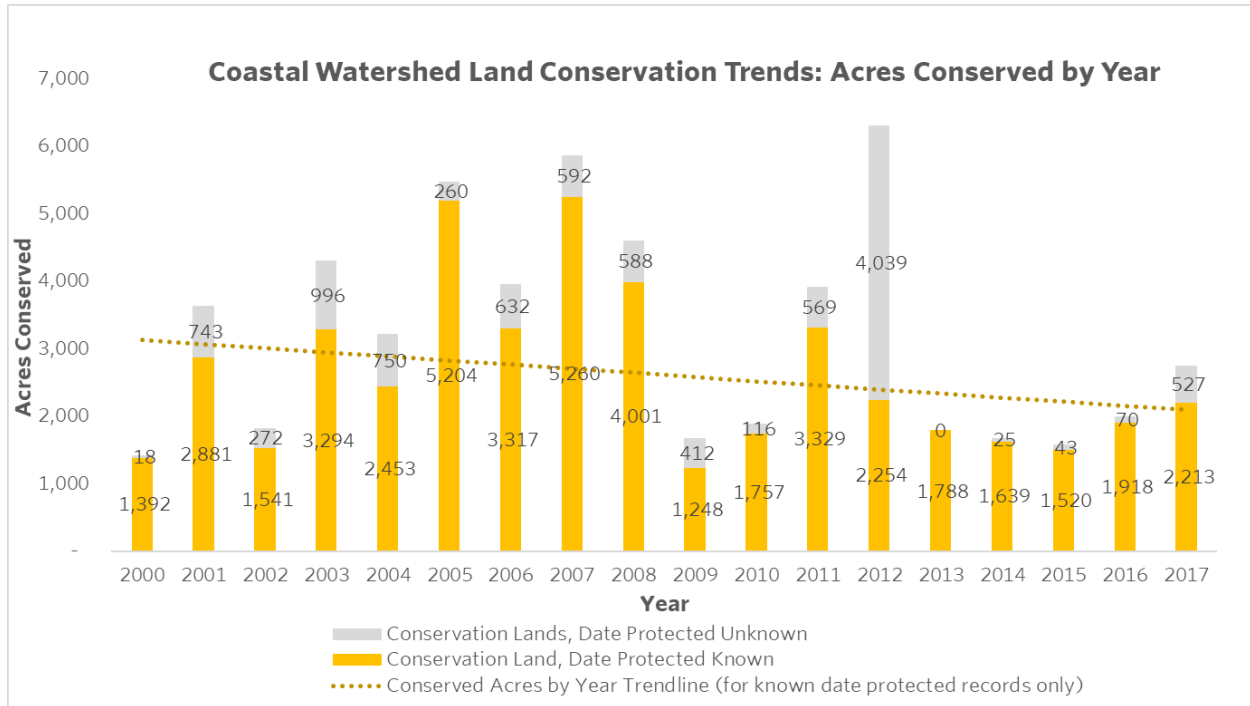

Figure 3: *Acres of lands protected (GAP Status 1, 2, and 3) per year across the New Hampshire's Coastal Watershed between 2000 and 2017. Conservation lands with known protected dates are represented in orange; conservation lands with unknown protection dates are attributed to the year they were first added into the conservation lands dataset. The conservation lands with an unknown protection date are included to acknowledge that the conservation lands shown in orange are not a complete representation of all the land protection completed over this timespan. The trendline represents the acres conserved by year for only the conservation lands with a known protection date (i.e. those shown in orange).*

1.4.4 Trends in Coastal Watershed Land Cover Change

The National Land Cover Dataset (NLCD) published by the U.S. Geological Survey (2019) is the best available source to assess trends in land cover change over the last 20 years. NLCD has been updated every five years since its inception in 2001; it tracks land cover at a fairly coarse 30-meter pixel resolution. As such, it doesn't necessarily capture finer resolution changes like an individual house constructed in a forested setting. However, it is a powerful dataset to help understand long term and broad-scale land cover change over time.

Figure 4 illustrates NLCD derived land cover for New Hampshire's Coastal Watershed at five-year intervals from 2001 to 2016. This 15-year period resulted in a net decrease of natural land cover classes (forest (-1.9%), early successional (+1.4%), agriculture (-0.3%)) by 0.8 percent of the landscape equating to approximate 5,500 acres. During the same timeframe, development classes increased by the same amount. As a result, the region is experiencing habitat loss at a rate of approximately one acre per day.
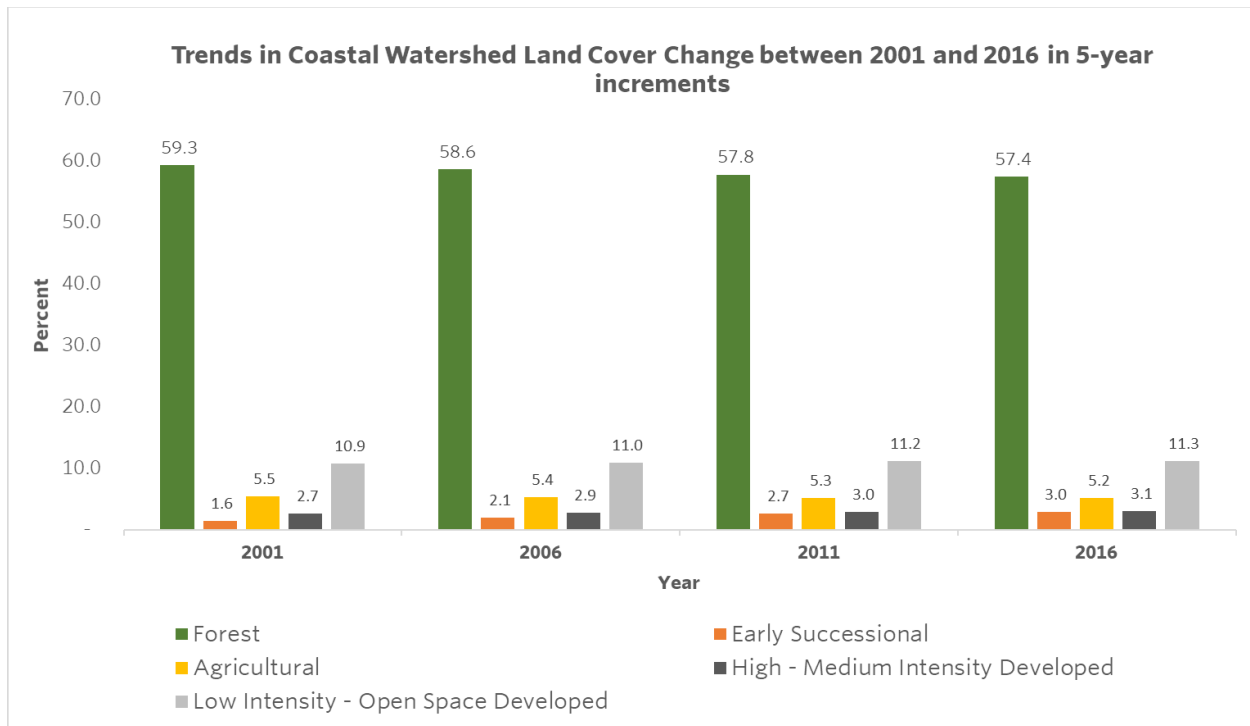
Figure 4: *Trends in land cover change across New Hampshire's Coastal Watershed between 2001 and 2016 in five year increments according to the National Land Cover Dataset (U.S. Geological Survey 2019).*

Fortunately, conservation trends have outpaced natural land cover losses to development over the last 20 years based on data presented here and in the previous section. However, the additional acres of habitats protected versus acres of habitats lost shouldn't ease the conservation and land use planning community into a sense of comfort. Land protection often occurs in sizable pieces at 40+ acres or more for each conservation project (based on average conservation tract size across the project area). Development occurs indiscriminately across the landscape in association with the road network, sometimes in large subdivisions but often piecemeal, through an added developed lot here and there. Some of this dispersed but low-density conversion isn't necessarily reflected in the NLCD land cover data that likely underestimates low density development. It is important to be aware of threats to the landscape associated with this kind of dispersed development, which quietly erodes broad ecosystem functions and services and fragments the landscape.

1.5 Conservation for Climate Change Mitigation

Identifying and conserving our most critical natural resources is more important than ever in the face of unprecedented climate challenges. There are many uncertainties about how severe these challenges will become over time, but there is broad consensus about the trajectory we are on, including:

- Our region has experienced a three-degree Fahrenheit increase in average annual temperature since the early 20th century, with additional rising temperatures projected. Historically unprecedented warming is quite possible (Runkle, et al. 2017)
- Extreme heat events are projected to increase, and cold events are projected to become less intense (Runkle, et al. 2017)

- Higher temperatures are expected to increase the intensity of droughts (Runkle, et al. 2017)
- Frequent and intense storm events, which increased significantly over the last 50+ years, will continue to increase based on projections (Wake, et al. 2019)
- Sea levels are rising and will continue to do so more rapidly. Groundwater will rise in low lying coastal areas in association with rising seas (Wake, et al. 2019)

New Hampshire's Coastal Watershed Conservation Plan identifies opportunities for climate mitigation and adaptation for both nature and people. Some examples include the following:

- Wildlife must be able to move about the landscape to meet their near and long-term needs, whether to access water during more intense droughts or for range and habitat shifts in response to rising temperatures. Important habitat blocks and wildlife corridors that run between them are included in the Coastal Conservation Focus Areas, which will allow wildlife to shift and adapt.
- More intense droughts jeopardize public drinking water supplies already under pressure from growing demand from expanding human populations. Coastal Conservation Focus Areas incorporate the protection of existing and future public water sources. If conserved Coastal Conservation Focus Areas also facilitate groundwater recharge across the entire watershed.
- More frequent and intense storms, in addition to rising sea levels, increase the risk of dangerous and damaging flooding. This is especially true for the coastal watershed, which is particularly vulnerable to strong coastal storms. Flood storage and risk mitigation priorities are included in the Coastal Conservation Focus Areas, as are sea level rise driven salt marsh migration pathways.
- Coastal Conservation Focus Areas identify intact and productive forests and wetlands that sequester carbon. Carbon sequestration using natural climate solutions is an important strategy toward mitigating the effects of climate change.
- Resilient human communities depend on locally produced food. Coastal Priority Agricultural Resource Areas include productive, versatile, and resilient agricultural lands based on soil and land cover characteristics.

Protecting natural areas and ecosystems is important for building climate-resilient landscapes. As described in the Introduction, New Hampshire's Coastal Watershed Conservation Plan identifies and prioritizes the protection of natural areas offering essential and multiple-benefit conservation values. It results in a set of priorities that aim to maintain essential ecological functions and integrity at the watershed scale, which is especially important in the face of ongoing threats from habitat loss and climate change.

2. Methods

This section details the methods used to complete the geospatial prioritization for New Hampshire's Coastal Watershed Conservation Plan. Project committees were instrumental in guiding the various project components, from the general focus of the plan to the technical details and production of the final report. An Advisory Committee was comprised of members of the Great Bay Resource Protection Partnership to provide high level guidance for the plan. A Technical Committee advised on the data inputs and prioritization methods, as well as spatial data review and quality control. An Agricultural Resources Committee was formed to provide guidance on the development of the Coastal Agricultural Resources analysis. A Final Products and Outreach Committee oversaw the structure and development of the plan and will continue to develop strategies for outreach and implementation of the plan. The methods described below led to the development of two resulting spatial data layers: (1) Coastal Conservation Focus Areas and (2) Coastal Priority Agricultural Resources.

2.1 Coastal Conservation Focus Areas

Using ArcGIS Pro 2.5 (ESRI 2020), a weighted sum model was used to generate the Coastal Conservation Focus Areas. This process sums weighted input data layers into an output data layer with aggregated scores. Weights were applied to previous conservation plan data layers based on relative importance and with input from the Technical Committee. Weights range from 1 to 5, where 5 is a highest ranked input. Inputs with lower weights are important but are not as essential for broad-scale ecosystem integrity and function. These areas are prioritized when they overlap with other conservation values that offer multiple benefits. Weighted sum scores equal to or greater than 4.5 were kept in the prioritization. Fragmented areas less than 500 acres were removed from the prioritization. After review by the Technical Committee, some areas that were removed through the acreage thresholds were added back in. Weights for each input and add-in methods are described in the following sections.

2.1.1 Prioritization Inputs and Weighting Scheme

Table 5 lists the input data layers and their weights used for determining Coastal Conservation Focus Areas. *Connect the Coast* (Steckler and Brickner-Wood 2019) Prioritized Habitat Blocks and Wildlife Corridors were used as highly weighted inputs. The Technical Committee reviewed and agreed that the 2006 *Land Conservation Plan For New Hampshire's Coastal Watersheds* are well represented by the *Connect the Coast* (CTC) Prioritized Habitat Blocks. Each CTC Prioritized Habitat Block was weighted a score of 5. By weighting this input as a 5, all Prioritized Habitat Blocks are retained in the Coastal Conservation Focus Areas. The CTC analysis also identified coastal watershed Wildlife Corridors. After review, the Technical Committee agreed that the CTC Wildlife Corridors should be weighted a score of 5, so that all wildlife corridors would be represented in the Coastal Conservation Focus Areas too.

The *Land Conservation Priorities for the Protection of Coastal Water Resources* (Steckler et al. 2016) Pollutant Attenuation areas, Flood Storage and Risk Mitigation areas and Public Water Supply were all used as inputs in the prioritization. Pollutant Attenuation areas and Flood Storage and Risk Mitigation areas were both assigned a weight of 3. The 2016 Public Water Supply analysis was originally limited to the New Hampshire Portion of the coastal watershed. That analysis was expanded in this planning effort

Table 5: Input data layers used to develop Coastal Conservation Focus Areas, their weights, and the threshold used for the weighted sum method.

Input Conservation Plan	Weight	Weighted Sum Threshold
2019 Connect the Coast – Prioritized Habitat Block	5	4.5
2019 Connect the Coast – Wildlife Corridors	5	
2020 New Hampshire Wildlife Action Plan – Tier 1	3	
Maine Beginning with Habitat Focus Areas	3	
2016 Water Resources – Pollutant Attenuation	3	
2016 Water Resources – Flood Storage and Risk Mitigation	3	
2020 New Hampshire Wildlife Action Plan – Tier 2	2	
Salt Marsh Resiliency Areas	2	
2020 Resilient and Connected Network	1.5	
2016 Water Resources – Public Water Supply	1	

to include the Maine portion of the coastal watershed. The updated Public Water Supply data layer represents priorities across the entire coastal watershed and was weighted with a value of 1.

Salt Marsh Resiliency Areas (New Hampshire Fish and Game Department 2020) were incorporated into the prioritization using the resilient marsh management categories and associated undeveloped salt marsh migration space. Salt Marsh Resiliency Areas were assigned a weight of 2. Many of these areas coincide with Flood Storage and Risk Mitigation Areas, as well as Wildlife Action Plan Tier 1 areas, which amplifies their priority in the resulting Coastal Conservation Focus Areas.

Statewide and regional conservation plan data layers were also included as inputs in the prioritization. New Hampshire Wildlife Action Plan (New Hampshire Fish and Game Department 2020) Tier 1 and Tier 2 Habitats were weighted 3 and 2, respectively. Maine's Beginning with Habitat Focus areas (Maine Department of Inland Fisheries and Wildlife 2017) were assigned a value of 3 (equivalent to New Hampshire Wildlife Action Plan Tier 1 Habitats). The Nature Conservancy's Resilient and Connected Network (Anderson, et al. 2020) was also included with a weight of 1.5. These conservation plans are not specific to the coastal watershed, yet they capture important conservation values such as climate resiliency, connectivity, and biodiversity at state and broader scales.

2.1.2 Weighted Sum Threshold

The results of the weighted sum prioritization ranged from areas scoring zero to eighteen based on overlapping inputs and their respective weights. Areas that had a sum of one or greater represented 69 percent of the coastal watershed. To further prioritize the model output, areas with a weighted sum score that were equal to or greater than 4.5 were maintained as the initial Coastal Conservation Focus Areas. This weighted sum threshold approach retains critical conservation areas and prioritizes areas where multiple conservation inputs overlap.

2.1.3 Minimum Size Threshold and Add-Ins

Fragmented areas resulting from the prioritization were filtered out once the weighted sum threshold was applied. Areas less than 500 acres were removed. This minimum size threshold maintains connectivity and integrity of the Coastal Conservation Focus Areas while removing small fragmented areas. The Technical Committee reviewed the areas removed by applying a 500-acre minimum size threshold and identified specific areas to address through an add-in process.

Salt Marsh Resiliency Areas were disproportionately underrepresented in the Coastal Conservation Focus Areas once the 500-acre size threshold was applied. A subset of salt marsh experts from the Technical Committee developed a method to add Salt Marsh Resiliency Areas back into the Coastal Conservation Focus Areas. This entailed applying a 2-acre minimum size threshold for Salt Marsh Resiliency Areas to be added back into the Coastal Conservation Focus Areas.

2.1.4 Coastal Conservation Focus Area Final Extent

Coastal Conservation Focus Areas were extended slightly beyond the coastal watershed boundary to capture their entire extent of ecosystem function relative to the coastal watershed area. For example, Prioritized Habitat Blocks cross the coastal watershed boundary in numerous places. Instead of clipping these areas to the coastal watershed, their full extents are represented in the Coastal Conservation Focus Areas. Additionally, in some cases Wildlife Corridors connect Prioritized Habitat Blocks through pathways that run on the outside of the coastal watershed. These pathways were included in the Coastal Conservation Focus Areas rather than not including wildlife connectivity priorities immediately adjacent to the project area.

2.1.5 Quality Control and Manual Refinements

The Technical Committee reviewed and provided final input on the draft Coastal Conservation Focus Areas as a quality control measure that resulted in a small number of manual refinements. Manual refinements were limited to areas identified as Core Conservation Focus areas from *New Hampshire's Land Conservation Plan for New Hampshire's Coastal Watersheds* (Zankel, et al. 2006) that were not incorporated into Connect The Coast Prioritized Habitat Blocks. Wildlife Action Plan Tier 1 and Tier 2 areas were used to manually supplement the Coastal Conservation Focus Areas in these places.

## 2.2 Coastal Priority Agricultural Resources

Coastal Priority Agricultural Resources were developed under the guidance of the Agricultural Resources Committee. The prioritization was driven by two primary data inputs, (1) the Farmlands Under Threat's *Productive, Versatile, and Resilient Agricultural Lands* (Freedgood, et al. 2020) and (2) Coastal Change Analysis Program (C-CAP) 10-meter land cover data – beta version (NOAA Office for Coastal Management 2019). The following documents the steps undertaken to develop the Priority Agricultural Resources using ArcMap version 10.5 software (ESRI 2016):

1. Mosaic coastal watershed *Productive, Versatile, and Resilient Agricultural Lands* (PVR) (Freedgood, et al. 2020) coverages for NH, ME, and MA.
2. Extract the mosaiced PVR data to a 10-mile buffer of the Coastal Watershed.
3. Multiply the PVR score of the resulting layer from step two by 1000 and convert to integer.

4. Run zonal statistics on the resulting layer from step three. Median value is 277 (0.277 based on original PVR values). The median PVR for NH is 0.24 and 0.34 for ME and MA. Mean is 320.893 and Standard Deviation is 210.11.
5. Using the layer resulting from step three, query PVR >=277criteria as a first screen AND apply a 10-acre minimum size threshold to these areas.
6. Pull in areas adjacent to the resulting layer from step five with a PVR score of >111. A score of 111 represents one standard deviation below the mean score (321). This step was taken to add additional buffer around the highest PVR lands. This required the following sub-steps:
   a. Query PVR >=277 AND area >=10 acres
   b. Query PVR >111 . Erase out developed classes from C-CAP (NOAA Office for Coastal Management 2019).
   c. Explode results from step 6.b.
   d. Append resulting areas from 6.c. that intersect the result of 6.a.
   e. Dissolve and explode the resulting layer from 6.d.
7. Erase developed classes from step 6.e.
8. Dissolve, explode, apply 10-acre minimum size threshold to step 7.
9. Update each of the contiguous PAR areas from step 8 with mean PVR score using zonal statistics.
10. The resulting data layer comprises the Coastal Priority Agricultural Resources. Mean PVR values are included in the attribute table for each polygon.

3. Results

As detailed in the Introduction and Methods sections, a comprehensive and partner-driven approach led to the development of New Hampshire's Coastal Watershed Conservation Plan. To summarize, multiple previously completed conservation plans, focused on a variety of conservation values for both nature and people, were synthesized and prioritized. The result is a set of places to maintain ecological function and integrity at the watershed scale in the face of continuing threats from habitat loss and climate change. Figure 5 simplistically illustrates the prioritization that was undertaken to condense these previously identified conservation priorities that cumulatively cover nearly 70 percent of the watershed to a focal set of priorities that is both reasonable and, with continued investment and dedication, achievable through a combination of land use planning, protection, and management strategies.
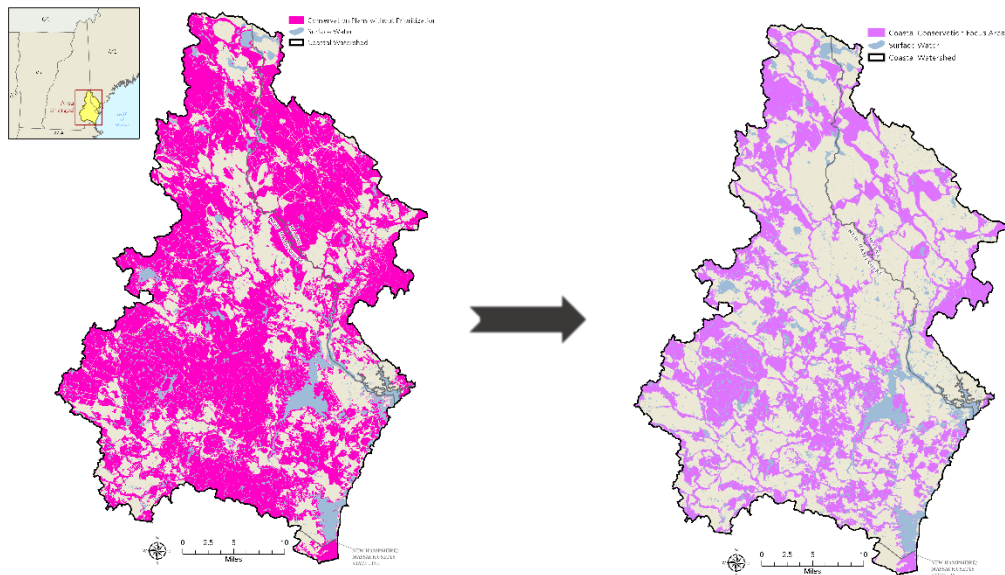
Figure 5: Prioritization of input conservation plans within the coastal watershed boundary (black outline). The map on the left displays input conservation plans overlayed together representing nearly 70% of the coastal watershed's area (pink). The map on the right shows the Coastal Conservation Focus Areas, which are the result of the prioritization process (purple). The Coastal Conservation Focus Areas represent 38.2% of the coastal watershed's area. Surface waters are shown in blue.

This section starts by presenting results of New Hampshire's Coastal Watershed Conservation Plan at the entire watershed scale. That is, how much of the watershed is prioritized as Coastal Conservation Focus Areas and Coastal Priority Agricultural Resources, how much is conserved and in what conservation management status, and how much remains vulnerable to adverse impacts and habitat loss. In addition to the watershed-level assessment, these data are differentiated for New Hampshire and Maine. Massachusetts values are included in the Coastal Watershed summaries. They are not differentiated because they are such a small percentage of the watershed.

Sub-watershed scale results follow the watershed results. These offer a report card on the Coastal Conservation Focus Areas and Coastal Priority Agricultural Resources at the major tributary watershed level. These results are particularly useful for watershed scale conservation initiatives such as those in the Designated Rivers program. Following sub-watershed scale results, detailed results are presented that (1) compare the 2006 *Land Conservation Plan for New Hampshire's Coastal Watersheds* (Zankel, et al. 2006) with New Hampshire's Coastal Watershed Conservation Plan priorities, (2) represent how each of the input datasets used in the prioritization are represented in the Coastal Conservation Focus Areas, and (3) assess the land cover status of the Coastal Conservation Focus Areas. Priority Agricultural Resources are compared against more traditional agricultural resource datasets including land cover comparisons. A closer look at the relationship between Coastal Conservation Focus Areas and Coastal Priority Agricultural Resources is also presented. The section concludes with a description of where to access data and mapping products for the Coastal Conservation Focus Areas and Coastal Priority Agricultural Resources.

3.1 Watershed Scale Results

This section presents high level results for the Coastal Conservation Focus Areas and Coastal Priority Agricultural Resources. This includes the area and extent of the watershed prioritized, conservation and conservation management status of these areas, and how much remains vulnerable to adverse impacts and habitat loss.

3.1.1 Coastal Conservation Focus Areas

Figure 6 and Table 6 represent the Coastal Conservation Focus Areas in relation to the entire coastal watershed, existing conservation lands, and low risk of conversion landscape features (surface waters and the wettest of wetlands). The Coastal Conservation Focus Areas account for 38.2 percent of the coastal watershed's area. Twenty-eight percent of the Coastal Conservation Focus Areas are conserved. Of the remaining 72 percent of the Coastal
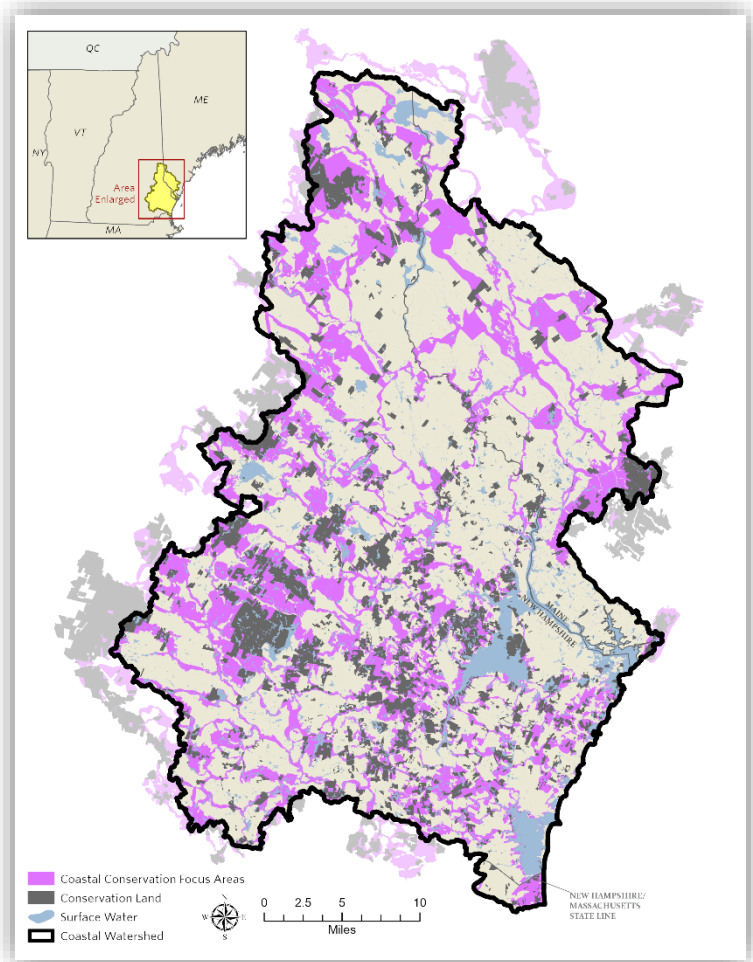
Figure 6: An overview of Coastal Conservation Focus Area results in relation to existing conservation lands. Existing conservation lands are shown in gray, surface waters are shown in blue, and unprotected Coastal Conservation Focus Areas are shown in purple. These purple areas are the conservation targets to protect critical ecosystem functions and services. They extend beyond the coastal watershed in places where habitat blocks and connectivity pathways extend into adjacent watersheds.

Table 6: *This table summarizes the extent of the 2021 Coastal Conservation Focus Areas for the entire coastal watershed and the respective portions in New Hampshire and Maine. The Coastal Conservation Focus Areas are inventoried at these scales in relation to existing conservation lands, Unconserved surface waters and the wettest of wetlands (e.g. those at lowest risk of conversion), and their areas that remain unprotected and vulnerable.*

	Coastal Watershed Acres	Coastal Watershed Percent	Acres in NH	Percent of NH	Acres in ME	Percent in ME
Coastal Conservation Focus Areas	265,368	38.2	216,889	40.8	46,618	29.5
Portion of Coastal Conservation Focus Areas Conserved	75,490	28.4	68,981	31.8	6,183	13.3
Portion of *Unconserved* Coastal Conservation Focus Areas that are Surface Water or Undevelopable Wetland*	19,065	7.2	15,789	7.3	2,412	5.1
Portion of Coastal Conservation Focus Area that are Vulnerable or Unprotected	**170,813**	**64.4**	**132,119**	**60.9**	**38,023**	**81.6**

* NOAA Coastal Change Analysis Program (C-CAP) Regional Land Cover Database (NOAA Office for Coastal Management 2019) *classes used for portion of Coastal Conservation Focus Areas that are surface water or undevelopable wetland include the following: Palustrine Emergent Wetland, Estuarine Forested Wetland, Estuarine Scrub/Shrub Wetland, Estuarine Emergent Wetland, Unconsolidated Shore, Water, Palustrine Aquatic Bed, and Estuarine Aquatic Bed. Forested wetlands are not included.*

Conservation Focus Areas, approximately seven percent are water resource types considered at low risk of conversion from a natural condition to a developed condition, leaving approximately 64 percent of the Coastal Conservation Focus Areas as vulnerable and in need of protection. When considered in relation to the entire watershed, nearly 171,000 acres, or 25 percent, of the coastal watershed's area is vulnerable; this is the conservation work left to do to protect critical ecosystem functions and services.

Table 7 provides additional context about the conservation status of the Coastal Conservation Focus Areas by GAP Status (see *Primer on Conservation Land Inventories and Tracking* section for details about GAP Status codes). Data is presented for the entire coastal watershed and the New Hampshire and Maine portions. Across the watershed, approximately 10 percent of the Coastal Conservation Focus Areas are

Why GAP Status Matters

Certain sensitive habitats, such as exemplary natural communities and especially high value areas that support sensitive species, are more vulnerable to intensive extractive uses. GAP Status 1 or 2 type conservation would be appropriate in these places. Homogeneous forest habitat tends to be better suited for GAP Status 3 management.

conserved as GAP Status 1 or 2, which means they are protected and managed toward a natural state. Eighteen percent are protected but allow for extractive uses such as silviculture. In total, 28 percent of the Coastal Conservation Focus Areas are legally protected from conversion. Conservation progress in New Hampshire is well ahead of that in Maine; in New Hampshire nearly 32 percent of the Coastal Conservation Focus Areas are conserved while just under 13 percent are conserved in Maine.

Table 7: *This table summarizes the conservation GAP Status of the Coastal Conservation Focus Areas for the entire coastal watershed and the respective portions in New Hampshire and Maine.*

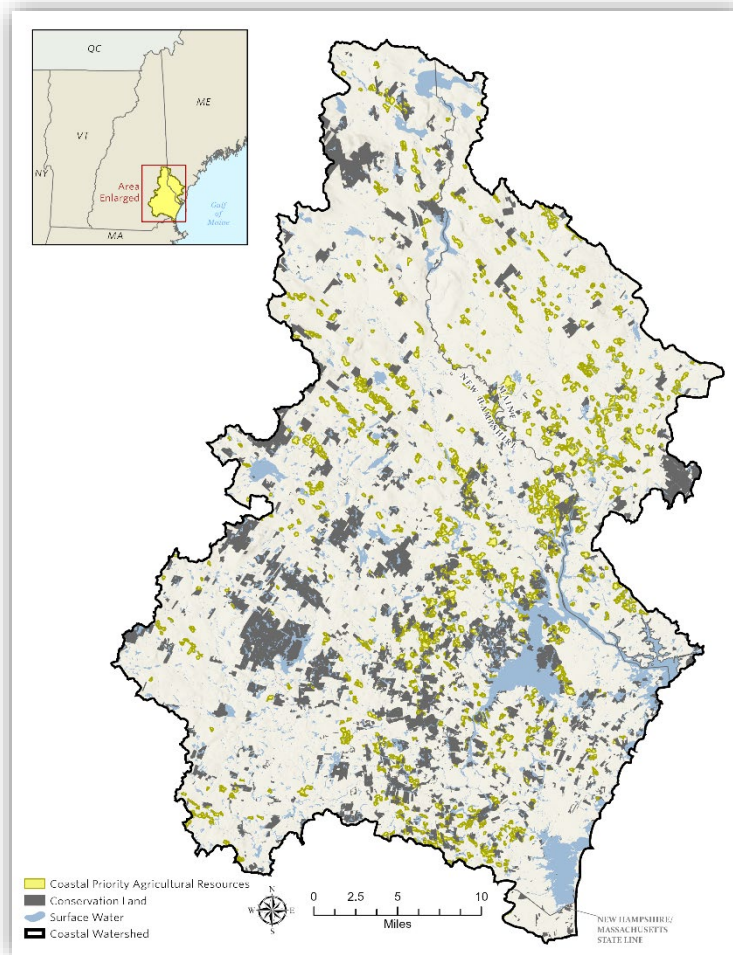|	Coastal Watershed Acres	Coastal Watershed Percent	Acres in NH	Percent of NH	Acres in Maine	Percent of Maine
GAP Status 1 & 2	26,291	9.9	23,968	11	2,323	4.8
GAP Status 3	49,198	18.5	45,013	20.8	3,860	8.0
Total Conserved (GAP Status 1, 2 & 3)	**75,165**	**28.4**	**68,981**	**31.8**	**6,183**	**12.8**
GAP Status 4 (includes 3A lands in NH)	6,567	2.5	6,083	2.8	484	1.0
GAP Status 9 (unknown)	3,640	1.4	3,201	1.5	439	0.9

A small amount (2.5 percent of the watershed) of GAP Status 4 lands, those not legally protected but publicly owned or intended to remain in a primarily natural state by institutional mandate, coincide with the Coastal Conservation Focus Areas. An additional 1.4 percent of the Coastal Conservation Focus Areas coincide with lands tracked as conservation or public but with unknown conservation status. Determining the conservation status of these lands would be a valuable step toward clarifying the conservation status of the Coastal Conservation Focus Areas. Similarly, transitioning GAP Status 4 lands that coincide with the Coastal Conservation Focus Areas toward a legally protected status would be desirable.

3.1.2 Coastal Priority Agricultural Resources

The Agricultural Resources Committee investigated multiple prioritization methods to identify a focused portfolio of target agricultural resources for conservation. The committee started by looking at farmland soil classes from the Natural Resource Conservation Service's (NRCS) soil surveys and supplemental Soil Productivity Index information. In the end the committee agreed to use the recently completed *Productive, Versatile, and Resilient Agricultural Lands* (PVR) dataset provided by American Farmland Trust (Freedgood, et al. 2020) as the basis of the prioritization. This data layer builds off the foundation of NRCS soil survey data with additional built-in screening based on land cover and other soil attributes.

Figure 7 and Table 8 represent the 2021 Coastal Priority Agricultural Resource areas at a high level in relation to the entire coastal watershed and existing conservation

Figure 7: An overview of Coastal Priority Agricultural Resource focus areas, shown in yellow. Existing conservation lands are shown in gray and surface waters are shown in blue.

lands. Coastal Priority Agricultural Resources account for just under five percent of the entire coastal watershed, of which nearly 20 percent are conserved. This leaves approximately 80 percent, or 26,000 acres of Coastal Priority Agricultural Resources unprotected and vulnerable to loss and conversion.

A Note About Tracking Conserved Agricultural Lands

Conserved agricultural lands in New Hampshire are currently tracked as GAP Status 4, which is not a true reflection of these land's legal protection status. Conserved agricultural lands in Maine are tracked as GAP Status 39, which is easier to differentiate them and associate them with GAP Status 3, which is a closer match than GAP Status 4. For New Hampshire's Coastal Watershed Conservation Plan, conserved New Hampshire agricultural lands' GAP Statuses were updated from GAP Status 4 to GAP Status 3 through a cursory review of the relevant conservation attributes. A thorough review of GAP Status attributes for the coastal watershed's conservation lands is warranted for an improved understanding of the conservation status of Coastal Priority Agricultural Resources.

Table 8: This table summarizes the extent of the Coastal Priority Agricultural Resource focus areas for the entire coastal watershed and the respective portions in New Hampshire and Maine. The Coastal Agricultural Resources are inventoried at these scales in relation to existing conservation lands and their areas that remain unprotected and vulnerable.

	Coastal Watershed Acres	Coastal Watershed Percent	Acres in NH	Percent of NH	Acres in Maine	Percent of Maine
Coastal Priority Agricultural Resources	32,562	4.7	23,753	4.5	8,755	5.5
Portion of Coastal Priority Agricultural Resource Areas Conserved	6,356	19.5	6,082	25.6	261	3.0
Portion of Coastal Priority Agricultural Resources that are Vulnerable/Unprotected	**26,218**	**80.5**	**17,671**	**74.4**	**8,494**	**97.0**

Table 9 provides additional context about the conservation status of Coastal Priority Agricultural Resource focus areas by GAP Status. Intentional conservation of agricultural resources for agricultural production should result in lands that allow for agricultural uses. The majority of Coastal Priority Agricultural Resources already conserved across the watershed, 17 percent, are categorized as GAP Status 3, which does allow for agricultural uses. A small amount of conserved Priority Agricultural Resources, 2.5 percent, are categorized as GAP Status 1 or 2, which precludes agricultural uses. It is important to consider conservation objectives when protecting Coastal Priority Agricultural Resources, especially since they account for such a small portion of the coastal watershed's area.

Table 9: This table summarizes the conservation GAP Status of the 2021 Coastal Priority Agricultural Resources for the entire coastal watershed and the respective portions in New Hampshire and Maine.

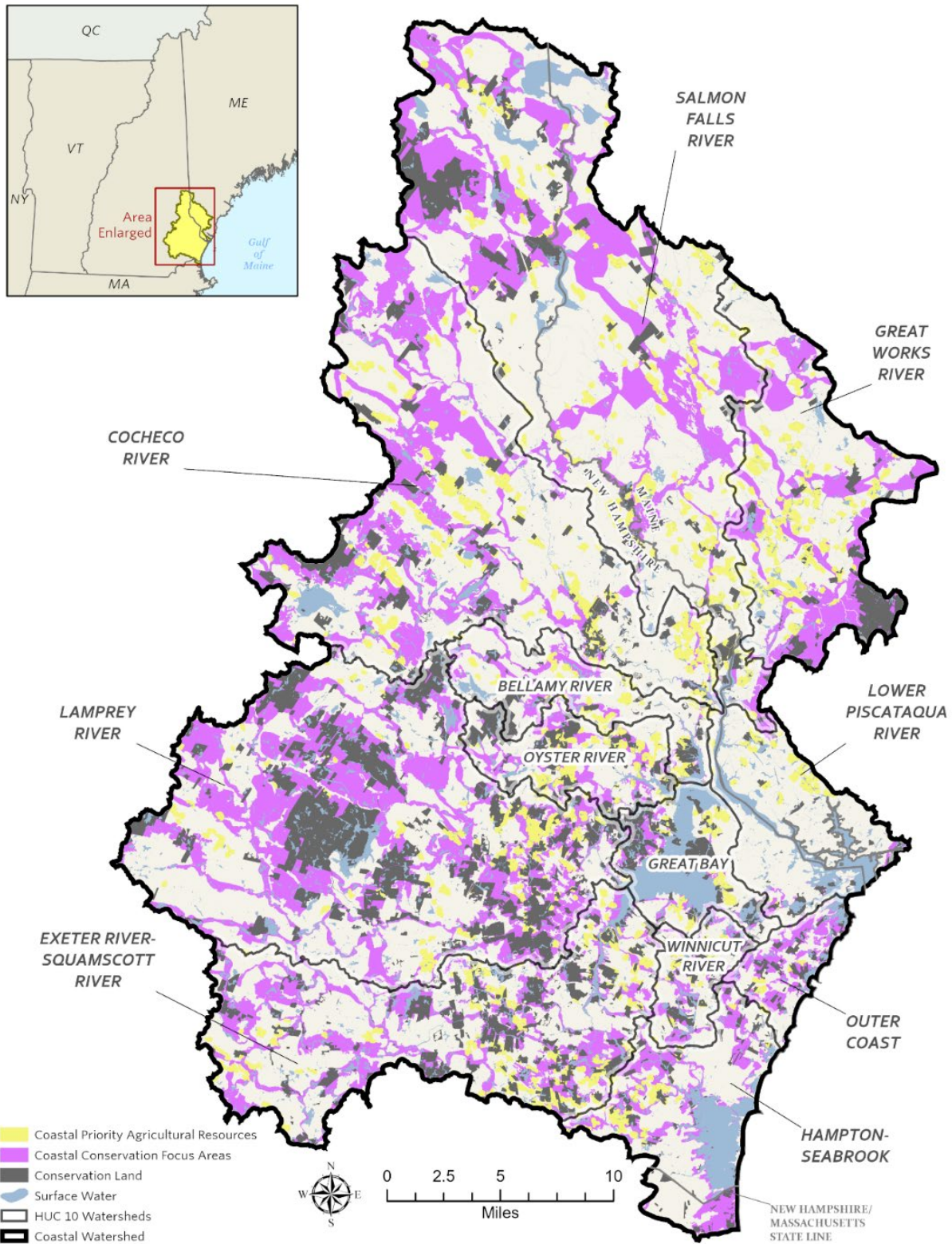|	Coastal Watershed Acres	Coastal Watershed Percent	Acres in NH	Percent of NH	Acres in Maine	Percent of Maine
GAP Status 1 & 2	823	2.5	740	3.1	84	1.0
GAP Status 3	5,532	17.0	5,343	22.5	177	2.0
GAP Status 4 (includes 3A lands in NH)	974	3.0	939	4.0	35	0.4
GAP Status 9 (unknown)	188	0.6	187	0.8	1	0.02

3.2 Sub-Watershed Scale Results

Conservation practitioners operate at different scales across the coastal watershed. While some practitioners and resource managers focus on the entire watershed, others are focused on a particular sub-watershed or community. For example, Local River Management Advisory Committees (LAC) are

established for each designated river in New Hampshire, which includes the Cocheco, Exeter-Squamscott, Isinglass, Lamprey, and Oyster (New Hampshire Department of Environmental Services-Watershed Management Bureau 2018). This section presents results that are relevant to those practitioners operating at the sub-watershed level. These results also offer a more manageable understanding of conservation status across the entire coastal watershed in bite-sized units. It helps us to understand where more or less conservation has been accomplished and might inform how we allocate conservation resources going forward.

Figure 8 depicts the Coastal Conservation Focus Areas and Coastal Priority Agricultural Resources in relation to each of the major sub-watersheds across the project area. Appendix B includes more detailed maps for each of these sub-watersheds. Table 10 provides details for each sub-watershed including its percent included as Coastal Conservation Focus Area, the percent of the Coastal Conservation Focus Area conserved, the percent included as Coastal Priority Agricultural Resources, and the percent of the Coastal Priority Agricultural Resources conserved. Conservation status is based on lands identified as GAP Status 1, 2, or 3.

Table 10: Representation of each sub-watershed including its percent included as a Coastal Conservation Focus Area, the percent of the Coastal Conservation Focus Area conserved, the percent included as Coastal Priority Agricultural Resources, and the percent of the Coastal Agricultural Resources conserved. Conservation status is based on lands identified as GAP Status 1, 2, or 3.

Sub-Watershed	Percent of Sub-Watershed Included as Coastal Conservation Focus Area	Percent of Sub-Watershed Coastal Conservation Focus Area Conserved	Percent of Sub-Watershed Included as Coastal Priority Agricultural Resources	Percent of Sub-Watershed Coastal Priority Agricultural Resources Conserved
Great Works River	38	8	7	0.1
Salmon Falls River	34	6	4	1
Cocheco River	34	7	5	1
Lamprey River	53	21	3	1
Exeter River-Squamscott River	39	12	6	2
Winnicut River	35	15	5	2
Oyster River	43	19	10	3
Bellamy River	28	8	8	2
Great Bay	31	21	6	2
Lower Piscataqua River	6	2	3	0.2
Outer Coast	54	17	2	0.3
Hampton-Seabrook	43	7	3	1
AVERAGE	*36.5*	*11.8*	*5.2*	*1.3*

Figure 8: *An overview of project results in relation to the major sub-watersheds delineated by interior outlines with sub-watershed labels. Coastal Conservation Focus Areas are shown in purple, Coastal Priority Agricultural Resources are in yellow and existing conservation lands are shown in gray.*

Some sub-watersheds disproportionately include more focal conservation resources than others, and similarly, some sub-watersheds have made more progress conserving those resources than others. For example, both the Lamprey River and Outer Coast sub-watersheds include higher than average amounts of Coastal Conservation Focus Areas on a percentage basis. Twenty-one and seventeen percent of those Coastal Conservation Focus Areas are conserved across the Lamprey River and Outer Coast sub-watersheds, respectively, which is above the 11.8 percent average for all the sub-watersheds. The Oyster River sub-watershed includes the highest proportion of Coastal Priority Agricultural Resources and is well above average toward conserving them, though only at three percent conserved. The Great Works River sub-watershed has an above average amount of Coastal Priority Agricultural Resources and almost none of them conserved; this presents an opportunity for conservation across that geography.

3.3 Detailed Results: Comparing Data Inputs to Output Priorities

The 2021 Coastal Conservation Focus Areas account for 38.2 percent of the coastal watershed's area yet represents the vast majority of conservation resources used in the prioritization process. This section starts by comparing the 2006 *Land Conservation Plan for New Hampshire's Coastal Watersheds'* Conservation Focus Areas (Zankel, et al. 2006) to the updated Coastal Conservation Focus Areas, followed by results that detail how each of the input datasets used in the prioritization are represented in the Coastal Conservation Focus Areas. Land cover status of the Coastal Conservation Focus Areas are also presented. Coastal Priority Agricultural Resources are compared against more traditional agricultural resource datasets including land cover comparisons. A closer look at the relationship between Coastal Conservation Focus Areas and Priority Agricultural Resources is also presented.

3.3.1 2006 Coastal Plan Compared to Coastal Conservation Focus Areas

The 2006 *Land Conservation Plan for New Hampshire's Coastal Watersheds* (Zankel, et al. 2006) has been the principle guiding conservation plan for the coastal watershed over the last 15 years. The Core Conservation focus areas from the 2006 plan represented the highest conservation priorities identified at the time. Analyses completed since 2006 to compare the 2006 Core Focus Areas to multiple iterations of New Hampshire's Wildlife Action Plan supported the 2006 Core Focus Areas designations time and time again. The 2006 Core Focus Areas were updated in consultation with the 2015 Wildlife Action Plan (New Hampshire Fish and Game Department 2015) for use as Prioritized Habitat Blocks in the *Connect The Coast* project (Steckler and Brickner-Wood 2019), which were subsequently used as a highly weighted input in the development of the Coastal Conservation Focus Areas.

Table 11 details the original extent of the 2006 *Land Conservation Plan for New Hampshire's Coastal Watersheds'* (Zankel, et al. 2006) Core Focus Areas and Supporting Landscapes and their overlap with the Coastal Conservation Focus Areas. Over 90 percent of the 2006 Core Focus Areas are represented in the Coastal Conservation Focus Areas, signaling excellent alignment between the plans. The 2006 Supporting Landscapes are not as well represented at only 49 percent of their extent. The 2006 Core Focus Areas and Supporting Landscapes account for 40.9 percent of the New Hampshire portion of the coastal watershed when combined, amounting to nearly the same amount of the Coastal Conservation Focus Areas in New Hampshire (40.8%, see Table 6). The 2006 Core Focus Areas were prioritized for inclusion in the 2021 update, and the Supporting Landscape areas were included where they coincide with other conservation value inputs to prioritize their protection where multiple benefits occur.

	NH Area (Acres)	Percent of NH Watershed	Area Coinciding with 2021 CFAs	Percent Coinciding with 2021 CFAs
2006 Core Focus Areas	133,874	25.2	121,002	90.4
2006 Supporting Landscapes	83,219	15.7	40,953	49.2

3.3.2 Coastal Conservation Focus Area Results Relative to All Data Inputs

Table 12 provides an inventory of each of the input datasets used to develop the Coastal Conservation Focus Areas. The original extent of the input data layers are shown as a percentage of the entire coastal watershed for context, followed by how well each of the inputs are represented by the Coastal Conservation Focus Areas relative to their entire extent within the coastal watershed. The table also shows the extent that each input contributes to the Coastal Conservation Focus Areas (*see Table 12 caption for an example*).

Overall, Table 12 shows that the Coastal Conservation Focus Areas represent each of the input datasets quite well. Out of the ten data inputs used to drive the prioritization, four are represented in the Coastal Conservation Focus Areas at 90 percent or more of their original extent. Five are represented between 60 and 90 percent of their original extent, and only one input is represented at less than 60 percent of its original extent. Representation strongly aligns with the input weighting scheme used in the prioritization (see Table 5).

Table 12: *Each of the input data layers that were used in the development of the Coastal Conservation Focus Areas are listed including their original extent as a percentage of the coastal watershed area, the percent that each input is represented by the Conservation Focus Areas relative to their entire area across the coastal watershed, and the extent that each input contributes to the Coastal Conservation Focus Areas. For example, Connect The Coast Prioritized Habitat Blocks cover 22% of the coastal watershed, which are fully (100%) included in the Coastal Conservation Focus Areas. Fifty-seven percent of the Coastal Conservation Focus Areas coincide with Connect The Coast Prioritize Habitat Blocks.*

Conservation Plan Input	Percent of Input within the Coastal Watershed	Percent of Input Represented in Coastal Conservation Focus Areas	Percent of Coastal Conservation Focus Areas Input
CTC Prioritized Habitat Blocks	22	100	57
CTC Wildlife Corridors	11	100	29
Salt Marsh Resiliency	1	98	3
Maine Wildlife Action Plan	3	94	8
NH Wildlife Action Plan Tier 1	18	77	36
NH Wildlife Action Plan Tier 2	12	60	19
Flood Risk and Storage Mitigation	5	83	12
Pollutant Attenuation	17	75	33
Public Water Supply	17	40	18
Resilient and Connected Network	35	63	58

3.3.3 Land Cover Associated with Coastal Conservation Focus Areas

Table 13 provides an inventory of land cover types associated with the Coastal Conservation Focus Areas, which is helpful to verify that our conservation priorities going forward are targeting the right resources. The table shows that the Coastal Conservation Focus Areas are overwhelming targeting natural habitats associated with forests (61.8%) and wetlands (26.7%); these are the only two land cover types exceeding four percent of the focus area's extent—in total they amount to 88.5 percent. High and medium intensity development are the least appropriate land cover types to be considered conservation targets, which amount to just 0.2 percent of the Coastal Conservation Focus Areas.

Table 13: *Thirty meter resolution National Land Cover Database (U.S. Geological Survey 2019) data was used to inventory the land cover associated with the Coastal Conservation Focus Areas for the entire watershed and the portions in New Hampshire and Maine.*

	Coastal Watershed Acres	Coastal Watershed Percent	Acres in NH	Percent of NH	Acres in Maine	Percent of Maine
Forest (deciduous, evergreen, mixed)	163,916	61.8	136,399	62.9	27,279	58.5
Early Successional (shrub/scrub, herbaceous)	7,181	2.7	6,125	2.8	1,052	2.3
Wetlands (emergent herbaceous, woody)	70,874	26.7	54,342	25.1	15,086	32.4
Open Water	7,295	2.7	5,747	2.6	1,488	3.2
Agricultural (cultivated crops, hay/pasture)	8,531	3.2	7,883	3.6	616	1.3
High and Medium Intensity Developed	558	0.2	507	0.2	21	0.05
Low Intensity and Open Space Developed	5,900	2.2	5,009	2.3	839	1.8
Other (barren land)	1,114	0.4	877	0.4	236	0.5

3.3.4 Coastal Priority Agricultural Resources:

Coastal Priority Agricultural Resources target productive, versatile, and resilient agricultural lands or those with high potential for such use in the future. Soil attributes and land cover are major drivers considered by the Farmlands Under Threat PVR data (Freedgood, et al. 2020) used for the prioritization. Table 14 evaluates the performance of the Coastal Priority Agricultural Resources results based on intersecting land cover groups including agriculture, natural lands, and development. For comparison the table also inventories the unfiltered "best agricultural lands" from the Farmlands Under Threat analysis, which uses a median value (0.277) for the analysis area as the classification threshold, and traditional farmland classifications from NRCS soil surveys (U.S. Department of Agriculture, Natural Resources Conservation Service 2019) .

Table 14 shows that the Coastal Priority Agricultural Resources are the most tightly targeted of the agricultural focused data layers at 4.7 percent of the watershed area. Table 14 also shows that the Coastal Priority Agricultural Resources are the most tightly aligned with current and potential agricultural areas based on the most precise land cover data available (NOAA Office for Coastal Management 2019). Coastal Priority Agricultural Resources focus almost exclusively on agricultural lands and other natural lands including forests and early successional habitats. It includes no developed lands and a small amount of land classified as wetlands (not shown in Table 14). In comparison, the Best Agricultural Lands method prioritizes a slightly higher percentage of agricultural land cover but also includes over seven percent as developed. NRCS farmland classifications of prime, statewide and local importance soils all account for significantly more area in total, a significantly lower percent of agricultural land cover and a significantly higher percent of developed land cover than the Coastal Priority Agricultural Resources prioritization.

Table 14: Comparison of Coastal Priority Agricultural Resources to the Farmlands Under Threat Best Agricultural Lands and NRCS farmland classes representing prime, statewide, and locally important soils. The area and percent of each of these areas is listed for the coastal watershed, followed by an inventory of each data layer's grouped land cover classes based on recent 10-meter land cover (NOAA Office for Coastal Management 2019). Note that wetland and surface water areas are not inventoried, which explains why the percentages don't add up to 100.

	Watershed Acres	Watershed Percent	Percent Agriculture	Percent Natural	Percent Developed
Coastal Priority Agricultural Resources	**32,562**	**4.7**	**51.1**	**42.3**	**0**
Best Agricultural Land (from Farmlands Under Threat Median PVR)	*41,675*	*6.0*	*55.6*	*32.6*	*7.2*
NRCS Prime	*55,274*	*8.0*	*27.9*	*55.8*	*11.1*
NRCS Statewide	*65,536*	*9.4*	*23.0*	*59.3*	*11.4*
NRCS Local	*85,959*	*12.4*	*14.1*	*61.8*	*8.9*

Table 15 provides a full inventory of land cover associated with the Coastal Priority Agricultural Resources. NLCD 30-meter resolutions data was used for Table 15 calculations, which is less precise than the 10-meter C-CAP (NOAA Office for Coastal Management 2019) data presented in Table 14 but is comparable to the land cover used in Table 13 and other NLCD-based tables and graphs presented throughout the report. Table 15 shows that 52 percent of the Coastal Priority Agricultural Resources are in agricultural land cover classes, followed by 40 percent that is forest. Just one percent overlaps with low intensity and open space development classes and almost no (0.02%) high and medium intensity developed areas are included.

Table 15: Thirty meter resolution National Land Cover Database (U.S. Geological Survey 2019) data was used to inventory the land cover associated with the Coastal Priority Agricultural Resources for the entire watershed and the portions in New Hampshire and Maine.

	PAR Coastal Watershed Acres	PAR Coastal Watershed Percent	PAR Acres in NH	PAR Percent of NH	PAR Acres in Maine	PAR Percent of Maine
Forest (deciduous, evergreen, mixed)	13,160	40.4	9,688	40.8	3,450	39.4
Early Successional (shrub/scrub, herbaceous)	275	0.8	228	1.0	46	1
Wetlands (emergent herbaceous, woody)	1,705	5.2	1,168	4.9	536	6.1
Open Water	33	0.1	30	0.1	3	0.03
Agricultural (cultivated crops, hay/pasture)	17,011	52.2	12,359	52.0	4,624	52.8
High and Medium Intensity Developed	7	0.02	6	0.03	1	0.01
Low Intensity and Open Space Developed	337	1.0	243	1.0	92	1.1
Other (barren land)	34	0.1	31	0.1	3	0.03

3.3.5 Coastal Conservation Focus Areas & Coastal Priority Agricultural Resources

Whereas previous sections present Coastal Conservation Focus Areas and Coastal Priority Agricultural Resources results independently, Table 16 details the extent of these two data layers when combined and their combined conservation status. Merging the Coastal Conservation Focus Areas and Coastal Priority Agricultural Resources results in an area covering 41.4 percent of the total coastal watershed. Tables 6 and 8 represent that these two data layers represent 38.2 percent and 4.7 percent when

considered independently, respectively, which would total 42.9 percent of the coastal watershed if each layer were exclusive of the other. However, 1.5 percent of the coastal watershed's area is covered by overlapping Coastal Conservation Focus Areas and Coastal Priority Agricultural Resources (more on this in Table 17).

Table 16: The extent of Coastal Conservation Focus Areas and Coastal Priority Agricultural Resources when combined, including their combined conservation status relative to the entire coastal watershed and the New Hampshire and Maine portions.

	Coastal Watershed Acres	Coastal Watershed Percent	Acres in NH	Percent of NH	Acres in ME	Percent in ME
Combined Coastal Conservation Focus Areas and Coastal Priority Agricultural Resources	287,740	41.4	231,325	43.5	54,524	34.5
Conserved Portion of Combined Coastal Conservation Focus Areas and Coastal Priority Agricultural Resources	77,565	27.0	70,922	13.3	6,316	4.0

Table 17 provides more detail about the spatial relationship of Coastal Priority Agricultural Resources relative to Coastal Conservation Focus Areas for the entire coastal watershed and the New Hampshire and Maine portions. Thirty one percent of the Coastal Priority Agricultural Resources extent coincides with Coastal Conservation Focus Areas, which accounts for the 1.5 percent of the coastal watershed area where these two data layers overlap. Of these coinciding areas, 41 percent are conserved leaving nearly 59 percent as unprotected/vulnerable.

Table 17: Relative to the total extent of Coastal Priority Agricultural Resources, areas of Coastal Conservation Focus Areas that coincide , are conserved, and remain vulnerable/unprotected relative to the entire coastal watershed and the New Hampshire and Maine portions.

	Coastal Watershed Acres	Coastal Watershed Percent	Acres in NH	Percent of NH	Acres in Maine	Percent of Maine
Portion of Coastal Priority Agricultural Resources coinciding with Coastal Conservation Focus Areas	10,188	31.3	9,316	39.2	848	9.7
Conserved portion of Coastal Agricultural Resources coinciding with Coastal Conservation Focus Areas	4,231	41.4	4,141	44.5	80	9.4
Portion of Coastal Priority Agricultural Resources coinciding with Coastal Conservation Focus Areas that are Vulnerable/Unprotected	**5,981**	**58.6**	**5,175**	**55.5**	**768**	**90.6**

3.4 Project Data and Maps

New Hampshire's Coastal Watershed Conservation Plan's data and maps are currently available in three formats to maximize accessibility and use. The access points and descriptions of these formats are as follows:

- **Appendix A** provides a list of coastal watershed towns organized by state with an internet link to download Portable Document Format (PDF) maps for each respective town. Figure 9 is an example of the town-scale maps available through Appendix A. These maps display Coastal Conservation Focus Areas, Coastal Priority Agricultural Resources, conservation and public lands, tax map parcels (where available), surface waters and wetlands, and an aerial photo background.
- Sub-watershed scale PDF maps are also available, which are formatted similarly to the town maps. **Appendix B** provides a list of sub-watersheds with an internet link to download the map for each sub-watershed. Figure 10 is an example of a sub-watershed scale map available through Appendix B.
- **Online viewing and download** of New Hampshire's Coastal Watershed Conservation Plan's data is also available from the NH Coastal Viewer, an online mapping tool. The NH Coastal Viewer allows users to interact with a variety of spatial data layers together with New Hampshire's Coastal Watershed Conservation Plan data, such as tax parcel data, USGS topographic maps, and aerial photos. A 10-minute getting started video is recommended for users new to the NH Coastal Viewer platform.
  - o **Appendix C** provides a data dictionary for the Coastal Conservation Focus Areas and Coastal Agricultural Priority Area geospatial data layers. The data dictionary defines and describes each attribute included in each respective data layer.
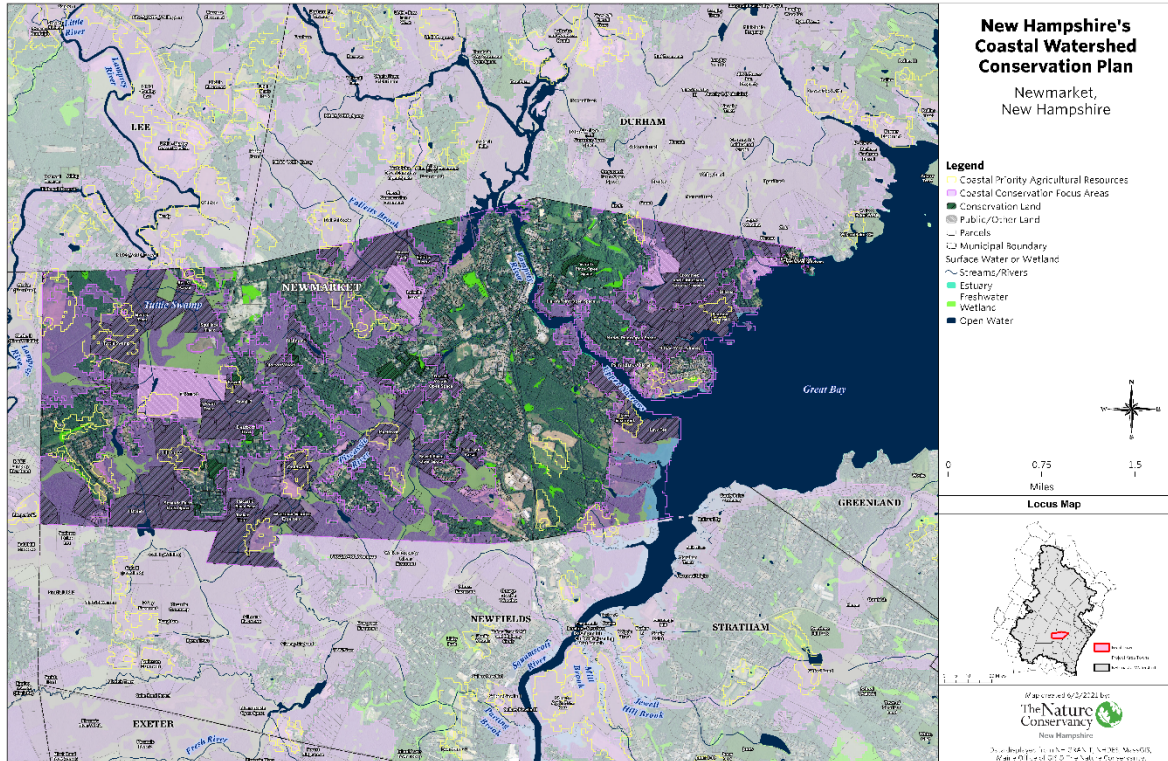
Figure 9: *A one-third scale (approximate) example of a town map available for every community within New Hampshire's coastal watershed. See Appendix A for downloadable links.*
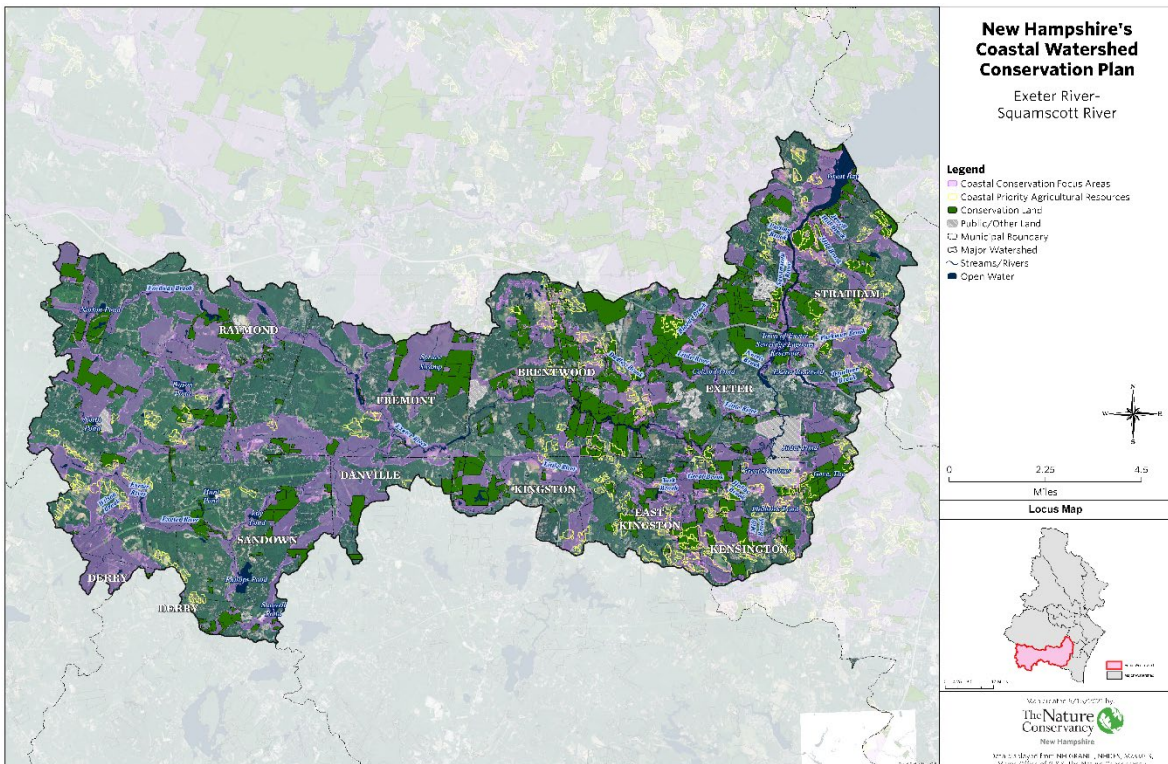

Figure 10: *A one-third scale (approximate) example of a sub-watershed map available for every major drainage within New Hampshire's coastal watershed. See Appendix B for downloadable links.*

3.4.1 NH Coastal Viewer Instructions

This section provides step by step instructions for accessing New Hampshire's Coastal Watershed Conservation Plan on the NH Coastal Viewer. There is more than one way to access these data on the NH Coastal Viewer; these steps offer the simplest and most user-friendly approach for starters (see Figure 11 for orientation):

1. Go to the NH Coastal Viewer using this address: https://granit.unh.edu/nhcoastalviewer/
2. Click on the "Go to Viewer" link (the address is http://nhcoastalviewer.unh.edu/)
3. A Disclaimer will popup that you will need to acknowledge
4. On the left side of the screen there is an "About the Viewer" text box. Just below the text are two tabs, one for the "About the Viewer" text box and a second to access a table of contents for the "Layers" available to view on the NH Coastal Viewer. Select the "Layers" tab.
5. At the top of the table of contents available on the Layers table, select the dropdown option that says "All Layers"
6. Select "Coastal Watershed Conservation Plan (2021)"
    - ➢ Selecting this option reduces the number of layers available for viewing to just those most relevant to the plan. By staying on the "All Layers" theme from step 5, all of the NH Coastal Viewer layers are available to view in relation to the Coastal Conservation Focus Areas and the Coastal Priority Agricultural Resources.
7. Click on the check box next to the "Environment and Conservation" heading **AND** select the "+" mark to the left of the "Environment and Conservation" heading. *Note: This step is not shown in Figure 11 because it is hidden behind the dropdown menu that displays during step 6.*
8. Click on the check box next to the "Land Conservation Plan" heading **AND** select the "+" mark to the left of the "Land Conservation Plan" heading
9. The first data layers listed under the "Land Conservation Plan", titled "Study Area Boundary", is New Hampshire's coastal watershed boundary. Select the check box to turn it on.
10. The second layer is titled "Coastal Conservation Focus Areas – 2021". Click the check box to turn it on.
11. The third layer is titled "Coastal Priority Agricultural Resources – 2021". Click the check box to turn it on.
12. Other data layers are also included in the "Coastal Watershed Conservation Plan (2021)" Layer theme. Many of these layers were used as input datasets that drove the geospatial prioritization process.
    - ➢ You can click layers on and off by checking/unchecking their box to see more or less information, or to overlay some of the other data layers available in the NH Coastal Viewer.
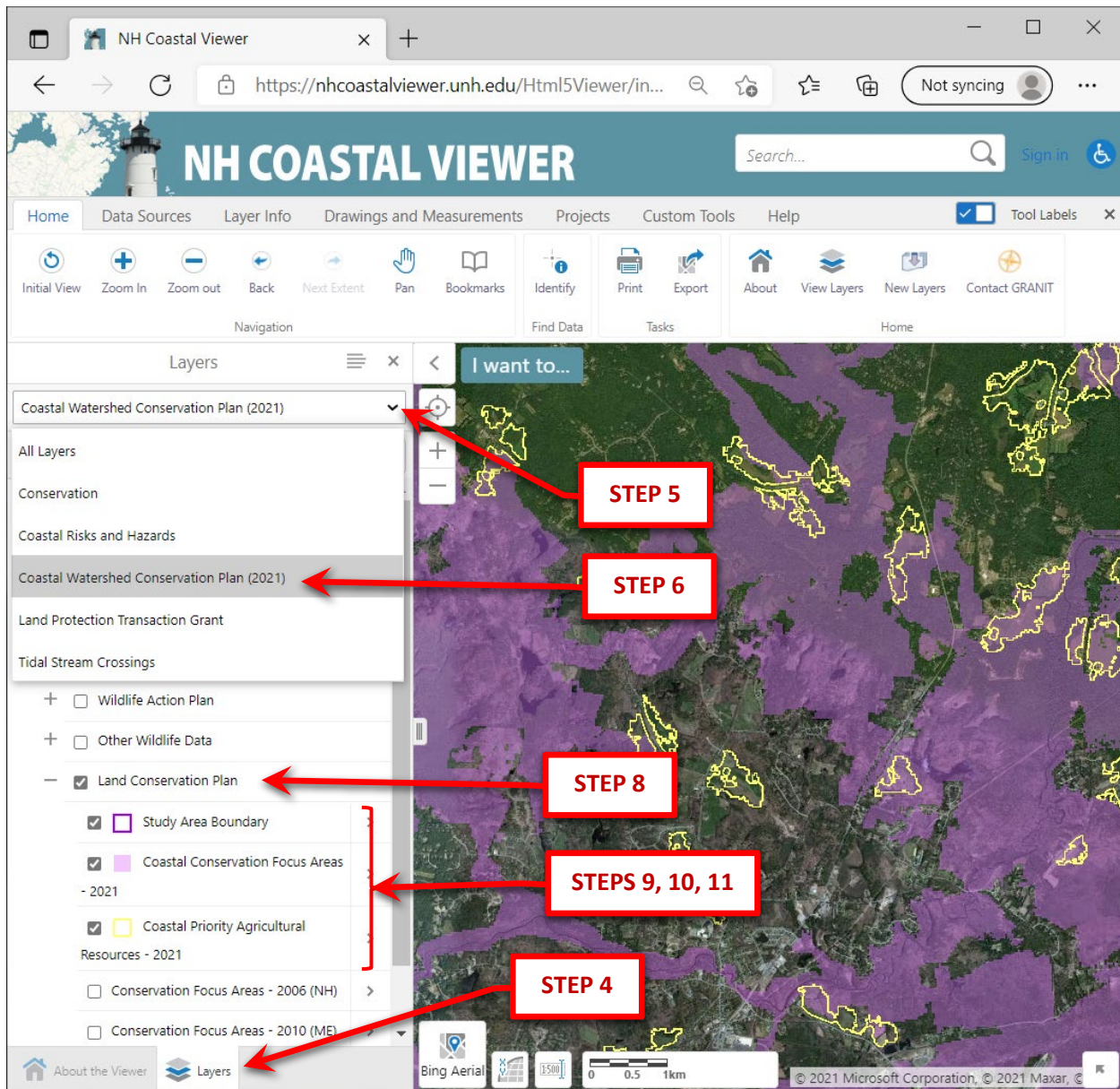
Figure 11: *A visual guide for orienting and using New Hampshire's Coastal Watershed Conservation Plan data on the NH Coastal Viewer. Steps correspond to those described in the NH Coastal Viewer Instructions section above. Note that Step 7 is not shown; it is hidden behind the dropdown menu that displays during step 6.*

4. Conclusion

New Hampshire's Coastal Watershed Conservation Plan is the result of a multi-year, partnership driven process. The result of this process is a plan that identifies conservation priorities to maintain ecological function and integrity across a landscape that is under threat from habitat loss, habitat degradation, and the impacts of climate change. The plan includes geospatial priorities that identify Coastal Conservation Focus Areas and Coastal Priority Agricultural Resources. Project data and maps, for both towns and major sub-watersheds, are available to support conservation activities through land conservation, land use planning, public policy, and outreach and engagement.

The Land Conservation Plan For New Hampshire's Coastal Watersheds (Zankel, et al. 2006) is the preceding conservation plan for the region that New Hampshire's Coastal Watershed Conservation Plan (2021) updates and replaces. The 2006 plan has been an invaluable and effective guide for directing land conservation investments over the last 15 years. Over 70 percent of land protection investments in New Hampshire's portion of the coastal watershed has occurred within its priorities (see Figure 2). New Hampshire's Coastal Watershed Conservation Plan builds off the effective conservation science and planning from the 2006 plan while incorporating broader and more recently identified conservation values and priorities.

4.1 Coastal Conservation Focus Areas

Coastal Conservation Focus Areas account for 38.2 percent (265,368 acres) of New Hampshire's coastal watershed area. These areas were identified based on a prioritization process to synthesize ten different geospatial datasets representing priorities for wildlife and habitat, water resources, coastal resilience, and opportunities for climate adaptation using nature-based solutions. Just over 28 percent (75,165 acres) of these areas are already conserved. Approximately 64 percent (170,813 acres) of Coastal Conservation Focus Areas are considered vulnerable or unprotected once surface waters and the wettest of wetlands are removed (i.e. areas very unlikely to be converted from natural to developed because of environmental regulations).

Coastal Conservation Focus Areas are not evenly distributed across coastal sub-watersheds. Some sub-watersheds, like the Lower Piscataqua River, include very limited areas of Coastal Conservation Focus Areas, while others, such as the Lamprey River and Outer Coast, are covered by more than half of their area. The Lamprey River, Oyster River, and Great Bay sub-watersheds are examples of where the most land protection progress have been made relative to the Coastal Conservation Focus Areas; the Great Works River, Salmon Falls River, Cocheco River, Bellamy River, Lower Piscataqua River and Hampton-Seabrook are sub-watersheds where considerably more conservation investments should be made (see Table 10).

4.2 Coastal Priority Agricultural Resources

Coastal Priority Agricultural Resources are conservation areas that were largely not represented by *The Land Conservation Plan for New Hampshire's Coastal Watersheds* (Zankel, et al. 2006). These geospatial priorities are the result of newly available data from American Farmland Trust (Freedgood, et al. 2020), with additional custom refinements and prioritization for the coastal watershed's extent. Protecting

agricultural resources offers valuable benefits including supporting and maintaining local food production, supporting local economies, and supporting ecosystem services associated with open space. In 2001 the coastal watershed included 38,225 acres of active agricultural land cover classes (U.S. Geological Survey 2019). The 36,140 acres remaining in 2016 represent a 0.3 percent loss. Less than 20 percent of existing agricultural lands are conserved, which demonstrates a strong need to advance protections of agricultural resources to secure local food production.

Coastal Priority Agricultural Resources account for just 4.7 percent (32,562 acres) of New Hampshire's coastal watershed area. Just under 20 percent (6,344 acres) of these areas are already conserved, leaving 80 percent (26,281 acres) as vulnerable or unprotected. It is important to note that farmland is especially attractive for development because of avoided or reduced costs associated with construction (e.g. clearing, grubbing and leveling), which makes the protection of these lands all the more urgent.

4.3 Next Steps

A multi-pronged conservation approach will be necessary to achieve the protection of ecological function and integrity envisioned by this plan. Protecting land through purchasing property outright, acquiring a conservation easement, or imposing a deed restriction are traditional approaches to conservation that will not achieve this vision alone. Additional approaches such as land use planning, public policy, and outreach and engagement are other key approaches that must also be incorporated. Each of these approaches are discussed in this concluding section.

4.3.1 Land Protection

Current day levels of land protection yield approximately 2,100 acres per year of lands conserved across New Hampshire's coastal watershed. At this rate, through land protection alone, it would take 80+ years to get to the scale of conservation necessary to protect the ecological function and integrity envisioned by this plan. At 3,100 acres per year, which was the trendline-based rate from 2007 (see Figure 3), it would take 55 years. Looking back 50+ years shows a drastically different coastal watershed landscape than the one we experience today. Presumably the coastal watershed landscape in 2070 will be markedly different than todays too, especially if transformational conservation action isn't undertaken. Long-term success requires aggressive near-term progress.

It is critical to double-down on investments in land protection and change the declining trajectory of land protection trends that has occurred between 2007 and 2017. It is recommended that the land protection community collectively sets a goal to protect 4,000 acres per year across the coastal watershed. This will require strong advocacy for public funding support and a collaborative, all-hands on deck approach for scaling land protection. Each land protection project is often a multi-year effort that requires relationship building with landowners, marketing and communications, grant proposals, private fundraising, and project management. Continued support, coordination, and funding through entities like the Great Bay Resource Protection Partnership will be necessary to maintain current rates of land protection; expanded support and collaboration is needed to leverage and scale land protection even further.

Based on 2021 values we expect 4,000 acres to require an investment of approximately $15,000,000 annually. These ambitious targets won't be easy to achieve but have the potential to draw success twice

as fast as the trajectory we are currently on. Securing new and sustainable funding sources will be essential through public policy and innovative financing. Time is of the essence—the window of opportunity for protection will close if bold action is not undertaken immediately.

4.3.2 Land Use Planning

New Hampshire's Coastal Watershed Conservation Plan priorities must also be incorporated into local and regional land use planning initiatives to reach success. As previously mentioned, a "buy it all" approach is not feasible. For example, Coastal Conservation Focus Areas include narrow bands of riparian habitat to protect water quality and wildlife corridors. These areas wind between more densely settled areas that contain smaller lots not conducive to traditional land protection. Designating zoning districts associated with New Hampshire's Coastal Watershed Conservation Plan priorities is a scalable approach toward protecting these resources without having to protect every single parcel through traditional land protection mechanisms. Updating municipal natural resource inventories is another way to bring coastal watershed conservation priorities into focus for municipally led conservation projects.

Outreach and engagement with the land use planning community is necessary to integrate New Hampshire's Coastal Watershed Conservation Plan priorities into local planning efforts. Regional planning commissions and municipal conservation commissions are a good starting place for this outreach and engagement work.

4.3.3 Public Policy

Public policy plays a critical role for advancing conservation, from funding land protection to improving regulatory protections of critical resources at the state and federal levels. The conservation community must look for opportunities to work with complementary interests, such as agriculture, public water suppliers, hazard mitigation advocates, and coastal resilience proponents, to advance public policies that will support the multiple conservation values and ecosystem services that this plan prioritizes. Non-traditional conservation partners should be engaged too, such as business groups, housing advocates, and the civil engineering community, to build common ground and shared goals for the future of the region. A broad group of partners and advocates is needed to reach the scale of impact this plan envisions.

Increasing public funding available for land protection is one example of a priority public policy to advance. Instituting state-wide wetland and riparian buffer protections is another, which would provide important protections to a large area of Coastal Conservation Focus Areas. Following the mitigation hierarchy to avoid, minimize, and mitigate proposed project impacts to Coastal Conservation Focus Areas is another opportunity to advance protections through existing state-level regulatory structures.

4.3.4 Outreach and Engagement

Outreach to and engagement with decision-makers and the public is a critical step for successful conservation planning and restoration initiatives. We've worked closely with project partners for the last year and a half to develop New Hampshire's Coastal Watershed Conservation Plan. A strong investment in targeted public outreach and engagement will help maximize commitment to, and implementation of, the plan. It is also recognized that some of the key target audiences for outreach turn over regularly,

such as volunteer municipal board members. This means that long-term outreach is needed in addition to intensive outreach efforts in the near-term. Key target audiences for outreach include:

- **Land Trusts:** Non-profit organization that undertake land protection at local, regional, and statewide scales. Infusing New Hampshire's Coastal Watershed Conservation Plan into land trust priorities coordinates land protection toward achieving a common vision.
- **Conservation Commissions:** Conservation Commissions are municipal level volunteer boards that advise other municipal boards regarding projects with natural resource related impacts. Conservation Commissions are also authorized to conserve and own/manage municipal conservation land.
- **Planning Boards:** Planning Boards review and approve (or deny) site plans for development projects. Projects that impact natural resource zoning districts, such as designated shorelands and wetlands, must apply for variances from the Planning Board. The Planning Board evaluates project impacts and can condition their approvals upon their recommendations to avoid, minimize, and mitigate impacts.
- **Natural Resource Professionals:** Natural resource professionals navigate a complex regulatory environment on behalf of project proponents. They can translate to their clients why avoiding and minimizing impacts to resources identified by this plan is the appropriate course of action for both nature and people.
- **Regulators:** State and federal departments and agencies review and approve permit applications for projects that have environmental impacts. Permit review processes should consider impacts to priority natural resources such as those identified by this plan. Ideally through public policy, statutory rules will be updated to require such considerations.
- **Transportation Infrastructure Managers, Maintainers, and Engineers:** Wildlife Corridors identified through the *Connect The Coast* project (Steckler and Brickner-Wood 2019) are include in the Coastal Conservation Focus Areas. These Wildlife Corridors provide connecting habitat across the landscape. They also intersect the road network in many places. These intersections represent priority places along the road network to improve safe passage for both people and wildlife. Accommodating under-road wildlife passage through upsizing culverts and bridges is a type of infrastructure-based restoration action that enhances landscape connectivity for wildlife. Transportation managers at state transportation agencies and municipal public works departments should be engaged to incorporate wildlife connectivity strategies into roadway projects that intersect Coastal Conservation Focus Areas.
- **Members of the Public:** It is important to gain buy-in from local residents and voters to build support for local and regional conservation initiatives and associated funding needs.

5. References

Anderson, Mark G., Analie Barnett, Melissa Clark, Arlene Olivero Sheldon, John Prince, and Barbara Vickery. 2020. *Resilient and Connected Landscapes for Terrestrial Conservation, New England version.* Boston, MA.: The Nature Conservancy, Eastern Conservation Science.

Coker, Dan. 2021. *Secured Areas from the Maine Chapter of the Nature Conservancy.* Brunswick, ME.

Earth Systems Research Center, University of New Hampshire. 2020. *New Hampshire Conservation/Public Lands at 1:24,000 Scale.* Durham, New Hampshire, June 16.

ESRI. 2020. *ArcGIS Pro (version 2.5). Software.* Redlands.

ESRI. 2016. *ArcMap (version 10.5). Software.* Redlands, California.

Freedgood, J., M. Hunter, J. Dempsey, and A. Sorenson. 2020. *Farms Under Threat: The State of the States.* Washington, D.C.: American Farmland Trust.

Kirshen, P, C Wake, M Huber, K Knuuti, and M Stampone. 2014. *Sea-level rise, storm surges, and extreme precipitation in coastal New Hampshire: Analysis of Past and Projected Future Trends.* New Hampshire Coastal Risks and Hazards Commission.

Maine Center for Disease and Control and Prevention Drinking Water Program. 2020. *Public Water Resources Information System.*

Maine Department of Inland Fisheries and Wildlife. 2017. *Beginning with Habitat Focus Areas.* Augusta, Maine.

MassGIS (Bureau of Geographic Information). 2020. *MassGIS Data: Protected and Recreational OpenSpace.* Boston, Massachusetts, December.

New Hampshire Department of Environmental Services- Watershed Management Bureau. 2018. "Designated Rivers of New Hampshire- NH Rivers Management & Protection Program." https://www4.des.state.nh.us/blogs/rivers/wp-content/uploads/Designated_Rivers_Poster_FINAL_2018.pdf#:~:text=DESIGNATED%20RIVERS%20of%20NEW%20HAMPSHIRE%20NH%20Rivers%20Management,8%2F11%2F95%20%26%205%2F31%2F11%208.%20Isinglass%20River%206%2F30%2F02%209.

New Hampshire Fish and Game Department. 2020. *Draft Comprehensive Plan for Resilient Salt Marsh in New Hampshire.* Data available from: Great Bay National Estuarine Research Reserve, Greenland, NH.

New Hampshire Fish and Game Department. 2014. *Sea Level Affecting Marshes Model (SLAMM) for New Hampshire.*

New Hampshire Fish and Game Department. 2015. *Wildlife Action Plan.* Concord, New Hampshire.

New Hampshire Fish and Game Department. 2020. *Wildlife Action Plan spatial data.* Concord, New Hampshire.

NH GRANIT. 2019. "NH GRANIT Conservation/Public Lands Standards." *NH GRANIT.* June. https://granit.unh.edu/resourcelibrary/GRANITresources/standards/ConservationLandsStandard.pdf.

NOAA Office for Coastal Management. 2019. *2015-2017 C-CAP Derived 10 meter Land Cover - BETA.* Charleston, August 15.

Piscataqua Region Estuaries Partnership. 2018. "State of Our Estuaries Report." *2018 State of Our Estuaries Report.* https://www.stateofourestuaries.org/2018-reports/sooe-full-report/.

Runkle, Jennifer, Kenneth E Kunkel, David Easterling, Rebekah Frankson, and Brooke C Stewart. 2017. "New Hampshire State Climate Summary." *NOAA Technical Report NESDIS 149-NH.* 4. https://statesummaries.ncics.org/chapter/nh/.

Steckler, P., and D. Brickner-Wood. 2019. *Connect The Coast final report.* Concord, NH.: The Nature Conservancy and the Great Bay Resource Protection Partnership.

Steckler, Peter, Joanne Glode, and Shea Flanagan. 2016. *Land Conservation Priorities for the Protection of Coastal Water Resources: A Supplement to The Land Conservation Plan for New Hampshire's Coastal Watersheds. Prepared for the New Hampshire Department of Environmental Services Coastal Program.* Technical Report, Concord, NH: The Nature Conservancy.

U.S. Department of Agriculture, Natural Resources Conservation Service. 2019. *Soil Survey Geographic (SSURGO) database.* Fort Worth, Texas.

U.S. Geological Survey. 2019. *National Land Cover Database 2016 - Landcover & Imperviousness (NLCD2016).* Sioux Falls, South Dakota, January.

U.S. Geological Survey, National Geospatial Program. 2016. *USGS National Hydrography Dataset (NHD) Best Resolution for HU8-01060003 20160107 HU-8 Subbasin FileGDB 10.1.* Reston, VA, January 7.

USGS. n.d. *Hydrologic Unit Codes (HUCs) Explained.* Accessed May 28, 2021. https://nas.er.usgs.gov/hucs.aspx.

—. 2018. *Protected Areas Database of the United States (PAD-US) Metadata.* September 30. Accessed June 1, 2021. https://www.sciencebase.gov/catalog/file/get/5b030c7ae4b0da30c1c1d6de?f=__disk__ee/e1/dc/eee1dc2e9d09731048a41e560a310c7f8acbd94e&transform=1&allowOpen=true#Entity%20and%20Attribute%20Information.

Wake, Cameron P, Jayne Knott, Thomas Lippmann, Mary D Stampone, Thomas P Ballestero, David Bjerklle, Elizabeth Burakowski, Stanley J Glidden, Iman Hosseini-Shakib, and Jennifer M Jacobs. 2019. *New Hampshire Coastal Flood Risk Summary Part 1: Science.* Report, Durham: Prepared for the New Hampshire Coastal Flood Risk Science and Technical Advisory Panel. Report published by the University of New Hampshire.

Zankel, Mark, Cynthia Copeland, Peter Ingraham, J Robinson, Cliff Sinnott, Dan Sundquist, and J. Alford. 2006. *The Land Conservation Plan for New Hampshire's Coastal Watersheds.* The Nature Conservancy, Society for the Protection of New Hampshire Forests, Rockingham Planning Commission, and Strafford Region Planning Commission. Prepared for the New Hampshire Coastal Program and the New Hampshire Estuaries Project, Concord, NH.

Appendix A: Links to New Hampshire Coastal Watershed Conservation Plan Maps by Town

Massachusetts Communities:

Amesbury*
Salisbury*

New Hampshire Communities:

Allenstown**	Derry*	Hampton Falls	Newton**	Sandown*
Alton*	Dover	Hooksett**	North Hampton	Seabrook*
Auburn**	Durham	Kensington*	Northwood*	Somersworth
Barnstead**	East Kingston*	Kingston*	Nottingham	South Hampton*
Barrington	Epping	Lee	Ossipee	Strafford*
Berwick	Epsom**	Madbury	Pembroke	Stratham
Brentwood	Exeter	Middleton*	Pittsfield*	Wakefield*
Brookfield*	Farmington*	Milton	Portsmouth	Wolfeboro*
Candia*	Fremont	New Durham*	Raymond	
Chester*	Greenland	Newfields	Rochester	
Danville*	Hampstead*	Newington	Rollinsford	
Deerfield*	Hampton	Newmarket	Rye	

Maine Communities:

Acton*	North Berwick
Alfred**	Ogunquit
Eliot*	Sanford*
Kennebunk	Shapleigh*
Kittery*	South Berwick*
Lebanon	Wells*
Newfield**	York*

*   Denotes communities that partially overlap with New Hampshire's coastal watershed

** Denotes communities that are outside of New Hampshire's coastal watershed but that include Coastal Conservation Focus Area Priorities (e.g. such as for wildlife habitat blocks and/or connectivity)

Appendix B: Links to New Hampshire Coastal Watershed Conservation Plan Maps by Sub-watershed

Bellamy River

Cocheco River

Exeter River-Squamscott River

Great Bay

Great Works River

Hampton-Seabrook

Lamprey River

Lower Piscataqua River

Outer Coast

Oyster River

Salmon Falls River

Winnicut River

Appendix C: Data Dictionary for Coastal Conservation Focus Areas and Coastal Priority Agricultural Resources

Coastal Conservation Focus Areas			
Field Name	Field Alias	Description	Type
CTC_PHB	Connect the Coast Prioritized Habitat Blocks	Indicates if record has a CTC Prioritized Habitat Block area contributing as an input conservation value	String
Poll_Atten	Pollutant Attenuation	Indicates if record has a pollutant attenuation area contributing as an input conservation value	String
Flood_Risk	Flood Storage and Risk Mitigation	Indicates if record has a Flood Storage and Risk Mitigation area contributing as an input conservation value	String
PWS	Public Water Supply	Indicates if record has a Public Water Supply area contributing as an input conservation value	String
WAP_Tier1	NH Wildlife Action Plan - Tier 1	Indicates if record has a NH Wildlife Action Plan Tier 1 area contributing as an input conservation value	String
NHWAPTier2	NH Wildlife Action Plan - Tier 2	Indicates if record has a NH Wildlife Action Plan Tier 2 area contributing as an input conservation value	String
ME_BwH	Maine Beginning with Habitat - Focus Areas	Indicates if record has a Maine Beginning with Habitat area contributing as an input conservation value	String
RCN_2020	Resilient and Connected Network 2020	Indicates if record has a Resilient and Connected Network (2020) area contributing as an input conservation value	String
SM_Addins	Salt Marsh Resiliency	Indicates if record has a Salt Marsh Resiliency area contributing as an input conservation value	String
CTC_cor	Connect the Coast Wildlife Corridors	Indicates if record has a CTC Wildlife Corridor area contributing as an input conservation value	String
No_Inputs	Number of Overlapping Input Conservation Values	Total number of overlapping input conservation values.	Long
Wgtd_Score	Weighted Score	The weighted score of overlapping inputs conservation values resulting from the weighted sum.	Double
Acres	Acres	GIS acreage	Double

Coastal Priority Agricultural Resources			
Field Name	Field Alias	Description	Type
Type	Type	Label for coastal priority agricultural resources	String
Mean_PVR	Mean_PVR	Average productivity, versatility and resilient (PVR) agricultural land score	Double
Acres	Acres	GIS acreage	Double