DELMARVA RESTORATION AND CONSERVATION NETWORK STRATEGIC RESTORATION AND CONSERVATION ACTION PLAN

Final Plan
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Prepared for the Delmarva Restoration and Conservation Network by

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INTRODUCTION

The Delmarva Peninsula stretches from the Delaware Bay in the north, to the tip of Virginia in the south, and is bounded by the Chesapeake Bay to the west and Atlantic Ocean to the east. A shared sense of rural and maritime culture unites Delaware, Maryland, and Virginia as Delmarva, a place unto itself, represented best through descriptions that illustrate its unique character…

> *Farmers find peace after planting winter wheat, as Canada geese soar overhead, stoking hunters' hopes of seasons to come.*
>
> *The sound of a hunter's gunshot echoes through loblolly pines, standing tall at the water's edge.*
>
> *The majestic great blue heron perches on a snag, silhouetted in the moonlight.*
>
> *A kayaker silently glides through winding river passages in a green maze of salt marsh grasses swaying in the breeze.*
>
> *Generations learn to cast lines from the banks of the upper Choptank and Nanticoke rivers, and joyfully reel in their first "sunny."*
>
> *Watermen toss crab pots into calm morning waters, speckling the bays with buoys, as the sky turns pink under the rising sun.*
>
> *Only the sweet saltiness of a freshly harvested oyster can match the savory spice of a freshly steamed crab at a family crab feast.*
>
> *Roadside produce stands offer Eastern Shore sweet corn and juicy tomatoes.*
>
> *Children laugh among feeding shore birds, and a retreating tide enchants beachcombers with treasures left behind.*

In its peaceful seclusion, Delmarva has been spared from intensive development, standing as one of the last great remaining open spaces on the U.S. Eastern seaboard. However, new forces are challenging Delmarva's seclusion and wellbeing. Sprawling development is squeezing productive farms, forests, and wildlife habitat. Between 2002 and 2010, the State of Maryland lost more than 127,000 acres of farmland, forests, and wetland to development— a rate of about 40 acres every day. Rising seas are intruding on wetlands, forests, fields, and homes. Economically and environmentally important fisheries are at risk or declining, including oysters, shad, weakfish, and sturgeon. In spite of these challenges, there are opportunities to create a Delmarva that can sustain its unique culture, rural character, and vital natural resources for future generations.

The Delmarva Peninsula provides critical social, economic, and environmental benefits to the Delmarva states and the entire mid-Atlantic region. The importance of natural areas and farmland to the economy of Delmarva is borne out by an economic study (Southwick Associates 2012) that shows that:

- Boaters, hunters, anglers, cyclists, and other outdoor enthusiasts spend up to $3.9 billion per year on Delmarva, supporting 27,900 jobs;

- Seven thousand farms (including 5,500 family-owned farms) yield $2.8 billion in farm products per year on 1.3 million acres of farmland;

- The annual value of commercial fishing in the Chesapeake Bay alone is $300 million and the Delmarva Peninsula fishery leads the nation in total weight of catch; and

- Delmarva's 1.7 million acres of wetlands, 450,000 acres of forests, and 3.2 million acres of grassland, pasture, and farm fields contribute over $15 billion in ecological benefits, supporting important regional industries that rely on fisheries and tourism.

All three Delmarva states and most of their counties and towns have worked for years to protect and restore natural resources and farmland, to improve water quality, support healthy populations of fish and wildlife, and to preserve the rural lifestyle. Especially given more existential threats like a changing climate, it has become clear to many that a coordinated planning effort - across all three states - is necessary in order to safeguard the Delmarva countryside for the future.

To lay the groundwork for a Delmarva-wide effort, a group of local, state, and Federal government agencies and non-governmental organizations (NGOs) began collaborating on this Strategic Restoration and Conservation Action Plan for the entire Peninsula in 2017. The group chose the name "**Delmarva Restoration and Conservation Network**" (DRCN).

The DRCN consists of practitioners with years of collective experience in working with landowners, local governments, and others to prioritize, plan, and implement restoration and conservation projects on the Delmarva Peninsula. The DRCN plan will outline a strategy for how the network will work with private and public landowners and local governments to identify the most important places to protect and restore, and to obtain support and funding for voluntary restoration and conservation -- ensuring a working rural landscape for present and future residents of Delmarva.

STATUS AND BRIEF HISTORY OF THE DELMARVA COUNTRYSIDE

The Delmarva Peninsula consists of the entire State of Delaware and the "Eastern Shores" of Maryland and Virginia. The Eastern Shore is so named because it is the Eastern Shore of the Chesapeake Bay. Delmarva is 180 miles long, up to 60 miles wide, and encompasses 6,000 square miles. It is mostly flat, with an average elevation of 35 feet above sea level – in fact, subsidence is causing the land to sink. The population of Delmarva's thirteen counties is roughly 1,445,000 with over 900,000 people living in the Wilmington, Delaware metropolitan area, the most populous area of the peninsula. To the south, the Salisbury, MD-DE Metropolitan Statistical Area, is the second largest area of the Delmarva and has an approximate population of 410,000 people.

Prior to European settlement, the Delmarva countryside was carpeted with hardwood forests

dominated by white oaks. Native Americans of several tribes burned the forest floor to clear the understory for hunting. Early Europeans described the forests as "park-like." Non-tidal wetlands held ancient bald cypress and Atlantic white cedar. These forests were rapidly cleared for shipbuilding, as well as roof shingles.

Once settlement began in earnest, remaining forests were cleared for agriculture--primarily tobacco, corn, and grains. By the late 18th century, most ancient old growth forests near settled areas were gone. Since settlements tended to be on rivers and streams to facilitate trading, many of these water bodies quickly filled with silt after the sediment-trapping forests were replaced with agriculture. The sedimentation degraded water quality and fish habitat, and many towns and industries that relied on rivers for transportation of goods were economically isolated due to once navigable rivers becoming too shallow. The rise of the charcoal industry for iron smelting and gunpowder production signaled the end of virgin timber on Delmarva. Today, there are no forests that have not been cleared many times over.

Beginning in the 1600s, dairy farming was prevalent, and cows grazed on salt hay until the marshes could no longer support the growing herds. The farmers then ditched and drained many saltmarshes and planted Kentucky blue grass to feed the cows. Peach orchards were prevalent beginning in the 1830s but were nearly completely gone by the 1890s due to a blight.

From the 1880s through the 1950s canneries across Delmarva packaged oysters, fruit, and vegetables, including tomatoes, lima beans, and string beans which were grown and canned locally. Cambridge became known as the "tomato canning capital of the world" during this period. Strawberries were boxed and shipped by railroad to points north, including Canada. At its peak, the canning industry employed 15,000 workers. During World War II canneries thrived on Delmarva; however, following the War, the industry declined, and business was lost to the frozen food industry, competition from California, and the loss of large wartime contracts.

After World War II, chickens became the main agricultural product on the Peninsula along with the corn and soybeans used to feed them. This changed the Delmarva landscape from one of small fields and pastures surrounded by hedgerows to large open fields of corn and soybeans.

Today, 43 percent of the land is farmed, naturally forested or intentionally planted with less diverse monocultures of loblolly pine. Loblolly pine, an important Delmarva resource, has supported a timber products industry that has declined in recent years due to many factors, including the closing of regional pulpwood producers.

Seven percent of the Delmarva Peninsula consists of cities, towns, and small hamlets, and the remainder is a mosaic of forests, fields, wetlands, and saltmarsh. Rivers and streams weave through the farmland and population centers. All of this is surrounded on three sides by the Chesapeake Bay, Delaware Bay, and the Atlantic Ocean, waterbodies that are integral to the Delmarva economy, define the lifestyle of its people, and support its fish and wildlife.

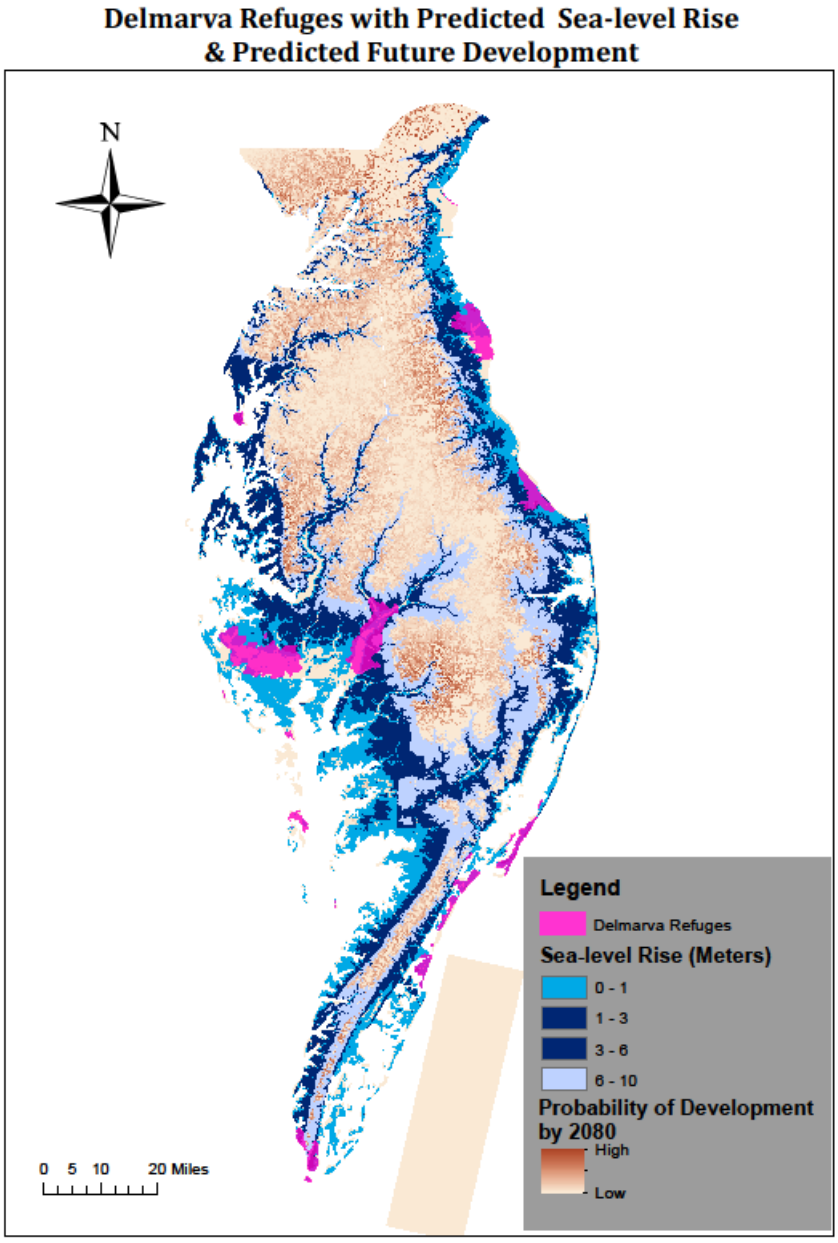
CHALLENGES

Climate Change – The impacts of climate change on Delmarva are already evident and are

affecting its people, economy, culture, and fish and wildlife (Map 1). The sea level is rising, some areas are sinking, precipitation is fluctuating, temperature is increasing, and the timing of important ecological relationships is being altered. For example, red knots, a federally threatened shorebird, are arriving at their arctic breeding grounds weeks after the insect hatch, which is occurring prematurely due to early snowmelt. The result is that young red knots are not consuming enough calories to survive. Climate change-related increases in water temperature and acidity could have dire consequences for important aquatic resources like bay grasses, oysters, and blue crabs.

Map 1 – Delmarva Refuges with Predicted Sea-level Rise & Development

Under conservative estimates, sea level in the Delmarva region is predicted to rise by at least two feet by 2100. A two-foot rise in sea level will result in the loss of 625 square miles of land by 2100, representing more than six percent of Delmarva's coastal wetlands, forests, fields, farms, and towns (including 36 percent of tidal marshes and 69 percent of ocean beaches). With a larger estimate of a five-foot rise in sea levels, the Maryland portion of the Chesapeake Bay can expect to have more than 55,000 people and 41,000 homes (representing $19.6 billion in real estate) be impacted, by 2100, if carbon emissions are not reduced.



Development – Development will continue to occur on Delmarva into the future. If poor land use planning continues to result in sprawl development (especially in southern Delaware and along

the coastal communities of Delmarva), it will consume and isolate our most ecologically and economically important lands. The overwhelmingly rural nature of the Delmarva countryside provides us with an opportunity to thoughtfully plan and locate that development to maintain productive soil for farms, protect fish and wildlife habitat, and allow for the migration of wetlands as sea level rise changes the landscape.

Capacity – The DRCN exists because most DRCN members lack the organizational capacity to adequately implement a Delmarva-wide restoration and conservation plan. This is particularly true for many of the conservation NGOs and some county governments. Capacity challenges are expected to continue to be an issue; however, there are funding opportunities that support network capacity building to help knit individual efforts into a region-wide vision and plan. For example, in 2019, the U.S. Fish and Wildlife Service, The Conservation Fund, and the Lower Shore Land Trust combined efforts to obtain $69,000 in grants from the Network for Landscape Conservation and the National Fish and Wildlife Foundation. The funds were used to employ a coordinator for the DRCN to plan meetings, provide communications to members, create outreach materials, convene stakeholder meetings, and assist with strategic planning and to create a replicable marsh migration pilot project.

Funding – There are many sources of funding for restoration and conservation implementation, including Farm Bill Programs, Federal grants, state programs, and private foundation grants. However, for a project as large as the Delmarva Peninsula, a dedicated source of implementation and capacity funding over a period of years is essential.

Coordination – There are many organizations funding and implementing restoration and conservation actions on Delmarva, however communication between and among conservation organizations and initiatives is frequently disconnected and/or haphazardly attempted. The DRCN is designed to facilitate communication among organizations as to how they are setting their individual goals and completing their desired projects. Coordination raises awareness of funding opportunities, allows for education of best practices among organizations, prevents duplication of projects, and allows individual organizations to come together and seek funding under a shared vision.

Political Will – At all levels of government, many important issues and needs compete for limited funding or governmental bandwidth. Historically, environmental issues have been viewed as a lower priority or ignored for political reasons. Over the past decade, Maryland, Delaware, and Virginia have all witnessed significant state regulation to prevent sprawl development or further environmental degradation, but the legislation was often publicly cast as "anti-business" or "anti-property rights." Especially as witnessed in Maryland's *Sustainable Growth and Agricultural Preservation Act* (2012), rural lawmakers tended to place a higher value on being seen as "pro-business" compared to "pro-environment," and chose not to support further conservation, water quality, or climate resiliency measures. In order to increase political will, NGOs and partner organizations adapted the framing of these issues to promote conservation as a tool to support habitat, hunting and fishing, and as an opportunity to reinvest in rural and resource-based industries.

Economy – More than 12 percent of Delmarva residents live in poverty, with three counties, Somerset, Accomack, and Northampton, hovering around 20 percent. It is difficult for people to

prioritize protecting the environment when they are struggling to afford food, housing, and health care. As noted in a BEACON at Salisbury University report and through American Forest & Paper Association data, as recently as 2015, the combined forestry industry of Delaware and Maryland's Eastern Shore combined for 4,650 jobs, of which the Eastern Shore's forestry impact was nearly $856 million. However, in 2019 more Delmarva sawmills closed and institutions like the Eastern Correctional Institute, in Somerset County, MD, made the change from using woody biomass to using natural gas to power the campus. Without sawmills and use of other ancillary forest products, forests will not be managed sustainably.

DELMARVA RESTORATION AND CONSERVATION NETWORK

The Delmarva Restoration and Conservation Network consists of federal, state, and local government agencies and non-governmental organizations that are collaborating on a Restoration and Conservation Action Plan for the Delmarva Peninsula in Delaware, Maryland, and Virginia.

This project was initiated through a series of stakeholder meetings in each state beginning in February of 2017. This is expected to be an iterative process, so that the Network will revisit and update the plan as needed through time. The DRCN consists of practitioners with years of collective experience in working with landowners, local governments, and others to prioritize, plan and implement large and small scale restoration and conservation projects on the Delmarva Peninsula.

MISSION

The DRCN Mission is to restore and conserve Delmarva's landscapes, waterways, and shorelines that are special to its people, fundamental to its economy, and vital for its native fish, wildlife, and plants.

VISION

We envision a Delmarva where native fish and wildlife thrive; working lands and waters enrich the lives of those who live, work, and play here; and rich forestlands and coasts support and sustain present and future generations.

GOALS

Protect and Restore Natural Resources

With over 90 percent of Delmarva's countryside still undeveloped, we have a great opportunity to work together to design, restore, and protect fish and wildlife habitat and movement corridors that will enable species to thrive into the future despite the warming climate, rising seas, and future development pressure. Working with private landowners, we also plan to maintain farms and working forests, which, in addition to their socioeconomic and cultural value to the region, provide undeveloped buffers around and between aquatic and terrestrial fish and wildlife habitat and movement corridors. Such soft buffers cushion wildlife from the noise, light pollution, and

disturbance associated with roads, houses, and other infrastructure of development.

Objective
Identify, conserve, restore, and manage the vital network of working and natural lands and waters that support a diversity of habitats for native fish and wildlife, and maintain resilience in the face of future development and climate change for present and future generations.

Strategies
- Increase the capacity and on the ground capabilities of DRCN partners as we prepare to restore and conserve. Working with local NGOs and partner organizations, DRCN will help support land conservation and restoration prioritization, increase technical capacity, and help pull together grant funding.
- Plan and map a strategic restoration and conservation design, including working with The Conservation Fund to map out Water Quality Protection Value, Water Quality Restoration Value, and Fish & Wildlife Connected Networks.
- Develop a Strategic Action Plan for achieving our mapped restoration and conservation vision.
- Promote the shared restoration and conservation vision for Delmarva through outreach to Delmarva residents, decision makers, and other stakeholders.
- Raise funds for restoration and conservation from public and private grants and other sources.
- Restore habitat (including Black Duck, Saltmarsh Sparrow, etc.) and conserve land by working collaboratively across the DRCN and by supporting local government planning and decision-making.

Support Resource-based Industries

Delmarva's rural countryside of farms, forests, wetlands, rivers, streams, bays, and beaches provides sustenance for Delmarva residents and contributes billions of dollars to the regional and national economy each year. In order to protect Delmarva's natural resources for the future, it is imperative that the farming, timbering, commercial fishing, and outdoor recreation industries are maintained into the future.

Objective
Support sustainable resource-based industries -- including fisheries, agriculture, forest products, tourism, and outdoor recreation -- that enable Delmarva communities to thrive.

Strategies
- Continue to expand the membership of the DRCN to engage a broader swath of natural resource-based industries and organizations that support these industries on Delmarva, in order to ensure their perspective is central to our work.
- Engage business leaders in the natural resource-based industries on Delmarva, including resource-based industry finance organizations like Maryland Agriculture and Resource-based Industries Development Corporation (MARBIDCO) or Farm Credit.
- Increase stakeholder awareness of the importance of natural resources to the economy, culture, and quality of life on Delmarva in order to garner funding and political support for on the ground restoration and conservation.

- Encourage private investment in renewable natural resources on Delmarva.
- Cultivate well-informed political and industry leaders and decision makers within and outside Delmarva concerning the regional and national significance of Delmarva's natural resources.

Create Cooperative Partnerships

There are many state, Federal, local, and non-governmental organizations working to protect and restore the Delmarva countryside. In light of the predicted impacts to the landscape resulting from climate change, a coordinated Peninsula-wide planning and implementation program will need to cross political boundaries and consider the sustainability of Delmarva as a whole.

Objective
Shape and support the DRCN, a network of cooperative alliances among the diversity of people, governments, organizations, and industries that rely on Delmarva's natural resources.

Strategies
- Engage other agencies and organizations in the DRCN to build a broader range of partner support, capacity, and funding sources for projects.
- Enhance stakeholders and partners capacity for communication within and outside the DRCN.
- Through outreach activities:
    - Garner support of residents to encourage local organizations and governments to invest in Delmarva's natural resources and wildlife habitats.
    - Foster a sense of community, stewardship ethic, and a sense of urgency for action among Delmarva residents.
- Create the conditions to sustain the DRCN partnership and member organizations.

CONSERVATION DESIGN

The DRCN Restoration and Conservation Network Strategic Action Plan outlines a strategy for identifying the most important places to protect and restore. The Network also will work with private and public landowners and local governments to obtain support and funding for voluntary restoration and conservation ensuring a working rural landscape for present and future residents of Delmarva. The Action Plan consists of two major work products: 1) a Conservation Design for a resilient natural and rural working Delmarva landscape and 2) an Optimization Analysis to allocate public and private restoration and conservation resources efficiently.

The foundation of a conservation design is the identification of conservation features that are important to each partner. For example, in the case of the U.S. Fish and Wildlife Service, these features are surrogate species selected to represent all species that use a specific type of habitat and the National Wildlife Refuge System's Strategic Growth Priorities, namely waterfowl, migratory birds of conservation concern, and federally-listed threatened and endangered species. Other important conservation features identified by each partner are used to determine the geographic extent of the conservation design, develop conservation targets, and identify limiting factors, such as climate change and land development, and model future conditions.

The DRCN employed conservation decision support tools known as "Nature's Network" (http://naturesnetwork.org) consisting of datasets created by the University of Massachusetts (UMass) in partnership with the North Atlantic Landscape Conservation Cooperative (NALCC). The decision support tools describe the ecosystem and species capability characteristics of a given location in the present and predict future conditions based on estimates of the potential impacts of stressors like climate change and development pressure. The DRCN used local information and Nature's Network decision support tools, which are at the regional scale, to identify restoration, protection, and management measures necessary to address identified resource concerns, attain desired future conditions, sustain ecosystem function, and achieve goals and objectives of each partner organization.

DRCN partners can individually or collectively apply these conservation design results to conservation initiatives on Delmarva. The DRCN Conservation Design effort is modeled after the Connecticut River Watershed Conservation Design, also known as "Connect the Connecticut" (http://connecttheconnecticut.org/about), which served as a pilot project to test the application of the Nature's Network decision support tools, which are now available for the entire Northeast Region (Maine to Virginia) at naturesnetwork.org. As with the Connecticut River Watershed pilot, the DRCN Conservation Design is a network of ecologically important and resilient habitat hubs and corridors, which will be targeted for conservation.

Organization and Process

The DRCN consists of a Core Team and an Extended Team. The Core Team participates in monthly meetings to come to consensus on goals and objectives, surrogate species, and local and regional data sources to be employed in the conservation design. The Extended Team is kept apprised of conservation design progress and provided with the opportunity to contribute to Core Team conservation design products. Twenty-five individuals from 11 federal, state, local, and non-governmental organizations (NGO) staff the Core Team and 102 individuals from 42 organizations staff the Extended Team.

Consensus or majority preference was used to reach decisions related to the design. Major decision points included: defining the Geographic Extent of the conservation design; determining a Vison and establishing Goals and Objectives to realize that Vison; selecting Surrogate Species; and determining which regional, statewide, and local data sets to employ for the conservation design.

The entire body of work, including this Strategic Action Plan, meeting agendas, meeting minutes, power point presentations, and NALCC, state, local, and NGO datasets used to create the conservation design are housed at Databasin and can be accessed at https://nalcc.databasin.org. Instructions for accessing the DRCN Databasin group site can found in Appendix 1. A story map and an interactive map for the project are housed on a DRCN Arc GIS On-line site at https://arcg.is/1SGXuq. The interactive map includes selected conservation design datasets, protected lands, and property parcels. This map is easily accessed by the click of a mouse and is ready for use by practitioners for restoration

and conservation planning on Delmarva.

Geographic Extent

The Core Team decided that the geographic extent of the DRCN would consist of the entirety of the Delmarva Counties, namely: Sussex, Kent, and New Castle Counties in Delaware; Cecil, Kent, Queen Anne's, Talbot, Caroline, Dorchester, Wicomico, Worcester, and Somerset Counties in Maryland; and Northampton and Accomack Counties in Virginia. This accounts for the three major watersheds of Delmarva, the Chesapeake Bay, Delaware Bay, and Atlantic Coastal Bays, as well as the Delaware Inland Bays and the barrier islands on the Atlantic coast of Maryland and Virginia.

DRCN Representative Species Table

Following the Nature's Network Conservation Design Model developed by the NALCC and UMass, the DRCN prepared a "Representative Species" table.

Column 1 Delmarva Habitat Types
These are the general habitats important to Delaware, Maryland, and Virginia Species of greatest Conservation Need (SGCN) on the Delmarva Peninsula as determined by review of the State Wildlife Action Plans.

Column 2 DRCN Representative Species
To inform their Nature's Network Landscape Conservation Design for the entire Northeast Region of the United States, including Delaware, Maryland, and Virginia, the NALCC with UMass prepared Landscape Capability Models for a subset of terrestrial "representative species" with the assumption that relatively few species can act as surrogates for the many priority species that use the various habitat types found throughout the northeast. The criteria for choosing the representative species were that they: 1) use habitat clusters that account for large portions of the northeast; 2) are sensitive to human disturbance; 3) are relatively well understood; and 4) data to inform the models was readily available (http://jamba.provost.ads.umass.edu/web/lcc/DSL_documentation_species.pdf). The resulting representative species capability models are expected to account for suites of priority terrestrial species that occur in the major terrestrial ecosystems of the northeast. In combination with ecosystem characteristics including ecological integrity and resiliency, the species landscape capability models were factored into an optimization analysis that identified the most important terrestrial habitat cores and connectors for conservation purposes at the regional scale.
In the case of aquatic species, the Natures Network Aquatic Core Network identifies intact and connected stream segments, lakes, and ponds that, if protected, will support high aquatic species and habitat diversity across the landscape into the future. The aquatic core networks consist of the best examples of 21 stream habitat classes and 12 lake/pond classes mapped by The Nature Conservancy (TNC) in each HUC 6 watershed in the northeast. In the case of streams and rivers, stream reaches with eastern brook trout occurrence not accounted for in the TNC habitat classes were included to represent cold water headwater species, as were stream/river reaches with occurrences of Atlantic and shortnose sturgeon and the top 5% of watersheds for occurrences of alewife, American shad, and blueback herring.

The DRCN representative species are a combination of species for which NALCC landscape capability maps exist and those species that were identified by the DRCN partners as being key species due to their importance within the major Delmarva habitat types for SGCN. Representative species in bold in the table are species for which landscape capability maps are available from the NALCC. Those species listed in regular script are representative species identified by the DRCN and for which we will need to obtain or create landscape capability maps from other sources (e.g. state, county, academia, Nature Serve, etc.).

In the case of the NALCC"s region-wide Nature's Network, species landscape capability models were: 1) factored into an optimization analysis along with ecological integrity and resilience models to identify the most important habitat cores and connectors for the entire region; and 2) used to make landscape capability maps that users can review and overlay with other ecological and socioeconomic information in Geographic Information Systems for planning and targeting purposes.

The DRCN need not complete the optimization analysis to identify habitat cores and connectors because that work was already done by the NALCC and we have access to state, local, and NGO Green Infrastructure data and maps. However, it is important for the DRCN to go through the exercise of identifying representative species, SGCN, and any other species of significance to the partnership to 1) target, prioritize, protect, and restore the most important habitat on Delmarva by consulting species landscape capability maps in addition to other maps, models, and data; and 2) justify to stakeholders the ecological and socioeconomic importance of this work as exemplified by the species whose habitat we are targeting for restoration and protection.

Column 3 DRCN Priority SGCN Species

The DRCN Priority SGCN were initially a subset of Delmarva SGCN that are of High Regional (Northeast) Concern and also of High and Very High State Concern for all three Delmarva States. To this were added SGCN that were identified as priorities by one or more of the DRCN partners and either: 1) rank High or Very High for a subset of the three Delmarva States; 2) rank Low or Moderate in one or more of the states; or 3) rank Low or Moderate region-wide, but rank High or Very High in one or more of the states.

Column 4 Other Species of Significance

These are species that were identified by one or more DRCN partners as being of importance for various reasons, including: commercial, recreational, social, economic, and ecological. For example: 1) in Delaware, painted turtle is considered to be a species that is indicative of healthy pond and impoundment systems; 2) in all three states, muskrats are indicative of ecologically healthy marshland and they also have varying degrees of commercial, recreational, social, and economic importance; 3) largemouth bass and bluegill are important game species; and 4) blue crabs, clams, and eastern oyster are important from a commercial and economic standpoint, in addition to their ecological importance in estuarine and marine systems.

Delmarva Habitat Types	**DRCN Representative Species**	DRCN Priority SGCN Species	Other Species of Significance	
Upland Forest (Mixed Mesic, Basic Mesic, Oak-Pine, Maritime)	**Wood Thrush, Ovenbird, Eastern Box Turtle,** Delmarva Fox Squirrel,	*Wood Thrush, Delmarva Fox Squirrel, Eastern Small-Footed Myotis, Bicknell's*		

	Kentucky Warbler, Hooded Warbler	*Thrush, Eastern Red Bat, Little Brown Myotis*		
Upland Shrub Land/ Early Successional Forests	**Prairie Warbler, American Woodcock,** Northern Bobwhite, Eastern Hog-nose Snake	*American Woodcock, Northern Bobwhite, Eastern Hog-nose Snake*		
Grasslands, Oldfield, Meadow	**Eastern Meadowlark**, Grasshopper Sparrow, Monarch, Northern Bobwhite, Eastern Hog-nose	*American Woodcock, Northern Bobwhite, Grasshopper Sparrow, Eastern Hog-nose Snake*	*Monarch*	
Vernal Pools, Springs, Seeps, Depression Swamps, Delmarva Bays	**American Woodcock,** Carpenter Frog, Spotted Turtle, Eastern Spadefoot Toad	*American Woodcock, Eastern Small-Footed Myotis, Carpenter Frog, Spotted Turtle, Eastern Spadefoot Toad*		
Ponds, Lakes, and Impoundments	Black-necked Stilt, Northern Pintail	*Black-banded Sunfish, American Eel*	*Painted Turtle, Largemouth Bass. Bluegill, Pumpkinseed, Green-winged Teal, Black-necked Stilt, Semipalmated Sandpiper*	
Forested Wetland, Floodplain & Riparian Forests (Tidal, Non-Tidal)	**Louisiana Waterthrush, Wood Duck,** Delmarva Fox Squirrel Habitat Models, Spotted Turtle, Eastern Spadefoot Toad, Eastern Red Bat	*Delmarva Fox Squirrel, Eastern Red Bat, Little Brown Myotis, Spotted Turtled ,Eastern Spadefoot Toad*		
Freshwater/Brackish Emergent Marshes and Shrub Land (Tidal, Non-Tidal)	**American Black Duck, Virginia Rail, Marsh Wren, Snowy Egret,** American Eel	*American Black Duck, Black Rail, American Eel*	*Muskrat, Wild Rice*	
Tidal Saltmarsh & Shrub Land	**American Black Duck, Marsh Wren, Saltmarsh Sparrow, Snowy Egret, Northern Diamond-Backed Terrapin,** Black Rail, Banded Killifish	*Saltmarsh Sparrow, American Black Duck, Black Rail, Northern Diamond-Backed Terrapin, Clapper Rail, Whimbrel, Banded Killifish, Northern Harrier, Seaside Sparrow*	*Muskrat, Blue Crab*	
Streams and Rivers (Tidal, Non-Tidal)	**Nature's Network Aquatic Core, Louisiana Waterthrush, Common Loon,** Yellow Perch, American Shad, Blueback Herring, Alewife	*Alewife, Blueback Herring, American Shad, American Eel, Shortnose Sturgeon, Atlantic Sturgeon, Banded Sunfish, Bridle Shiner, Triangle Floater, Alewife Floater, Dwarf Wedgemussel, Northern Lance, Yellow Lampmussel, Tidewater Mucket, Eastern Pondmussel*	*Largemouth Bass, Yellow Perch, Striped Bass*	
Beaches, Dunes, & Mudflats	**Northern Diamond-backed Terrapin, American Oystercatcher,**	*Red Knot, Piping Plover, Northern Diamond-Backed , Northeastern Beach*	*Seabeach Amaranth, Monarch, Horseshoe Crab*	

	Sanderling, Red Knot, Piping Plover, Black Skimmer, **Common Tern**	*Tiger Beetle, Terrapin, Peregrine Falcon, Whimbrel, loggerhead sea turtle, Common Tern, Black Skimmer*		
Nearshore Marine	**Common Loon,** Northern Gannet, Kemp's Ridley Sea Turtle, Loggerhead Sea Turtle, Long-tailed duck, Blue Mussels, Eastern Oyster	*Forster's Tern, Common Tern, Least Tern, Black Skimmer, Roseate Tern, Common Eider, Loggerhead Sea Turtle. Leatherback Sea Turtle, Kemp's Ridley Sea Turtle, Green Sea Turtle*	*Clams, Eel Grass, Summer Flounder, Blue Crab, Long-tailed Duck, Black Sea Bass, Structure-Building Organisms*	

University of Massachusetts/NALCC Nature's Network

Following is a brief description of the models and data sets created by UMass in partnership with the NALCC and employed by the DRCN to form the basis for the conservation design. More detailed and comprehensive information on the development of the Nature's Network models are found at www.naturesnetwork.org and www.connecttheconnecticut.org.

Three Nature's Network data sets form the nucleus of the Conservation Design (Map 2): 1) The Terrestrial Core-Connector Network; 2) Aquatic Core Areas; and 3) Core Habitat for Imperiled Species. Areas where these Nature's Network datasets coincide and overlap with state and local priorities may be important areas for restoration and conservation action.

1) Terrestrial and Wetland Cores, Connectors, Natural Blocks, and Grassland Bird Cores: If protected, terrestrial and wetland cores and connectors are expected to protect a high diversity of flora and fauna and ecosystems into the future despite changes brought about by climate change and development. For the purposes of the DRCN, it was decided to consider predicted climate change and development-related changes to the landscape from the present to 2080, since that is the timeframe that was used in the creation of the Nature's Network datasets. Core areas represent intact, resilient examples of every major ecosystem in the northeast. Connectors are structured in a way as to enable movement of plants and animals between cores today and into the future. Core areas were identified by five characteristics, namely high ecological integrity, great potential to be resilient to changing conditions over time, rare natural communities as identified by state natural heritage programs, priority river floodplains, and current and predicted future high quality habitat for 27 surrogate species representing the habitat requirements of the majority of species in the northeast. Index of ecological integrity and surrogate species habitat capability datasets were created by UMass. The resilient sites dataset was prepared by TNC. Terrestrial and wetland cores were designed to cover approximately 25% of the Northeast Region of the U.S.

Ecological integrity, referring to the ability to sustain ecological function and biodiversity over a timeframe of years to decades is derived from intactness (intensity of habitat loss) and resilience (quantity of upstream impervious surface). Terrestrial resilience refers to adjustment or adaptation of living organisms over a much longer time horizon—decades to centuries—and depends on the geophysical features (geology, landforms, and elevation) in place. Rare natural

communities are those ranked as critically imperiled, imperiled, or vulnerable, and since they exist at a much finer scale than ecosystem types, would be missed if not mapped by state natural heritage programs and added to the terrestrial core areas.

Road-bounded natural blocks (not included on Map 2, but available on the DRCN Databasin site) are habitat zones that occur between the habitat cores and human development, typically roads. Like the connectors, these buffer zones permit the dispersal of plants and animals between cores and also are considered to be targets for conservation, particularly where other local conservation priorities also occur.

Based on habitat capability for the eastern meadowlark, grassland bird core areas were identified separately from the terrestrial and wetland cores and connectors, because the creators of Nature's Network found that grassland species were not sufficiently accounted for by those models. The Nature's Network design incorporates the top 10% of grassland bird habitat cores in the Northeast Region. Grassland bird cores included several open field land use types, including working farmland.

2) Aquatic Core Networks: Aquatic core networks are intact and connected stream segments, lakes, and ponds that, if protected, will support high aquatic species and habitat diversity across the landscape into the future. The aquatic core networks consist of the best examples of 21 stream habitat classes and 12 lake/pond classes mapped by TNC in each HUC 6 watershed in the northeast. Each system was analyzed for ecological integrity using the UMass index of ecological integrity. Stream reaches with Eastern brook trout occurrence but not identified by TNC were included to represent cold water headwater species, as were stream reaches with occurrences of Atlantic and shortnose sturgeon and the top 5% of occurrences of alewife, American shad, and blueback herring watersheds. Aquatic core networks also included headwaters upstream of core areas that must be protected in order to maintain habitat quality in the cores. By design, aquatic cores cover approximately 30% of the Region's stream and river miles and lake surface area.

Aquatic buffers (not included on Map 2, but available on the DRCN Databasin site) are areas that are expected to have a large influence on the condition of aquatic core areas. Controlling erosion, pollution, and other human inputs in the aquatic buffers benefits the aquatic cores.

3) Core Habitat for Imperiled Species: This dataset was created to account for habitat required to support over 600 terrestrial and aquatic SGCN species identified by state natural heritage programs. It incorporates TNC's Terrestrial Habitat Classification System, species occurrence tracked by NatureServe, a distance to water class, and the index of ecological integrity. The top 10% of core habitat necessary for sustaining imperiled species was incorporated into the Nature's Network design.

State and Local Datasets Selected to Compliment and Refine the Nature's Network Datasets to Create the Conservation Design Map

Since over 100 datasets were gathered to be incorporated into the DRCN conservation design project, the conservation design team decided to create Map 2, a map of select datasets to which all other datasets could be added based on the conservation needs of a partner organization or

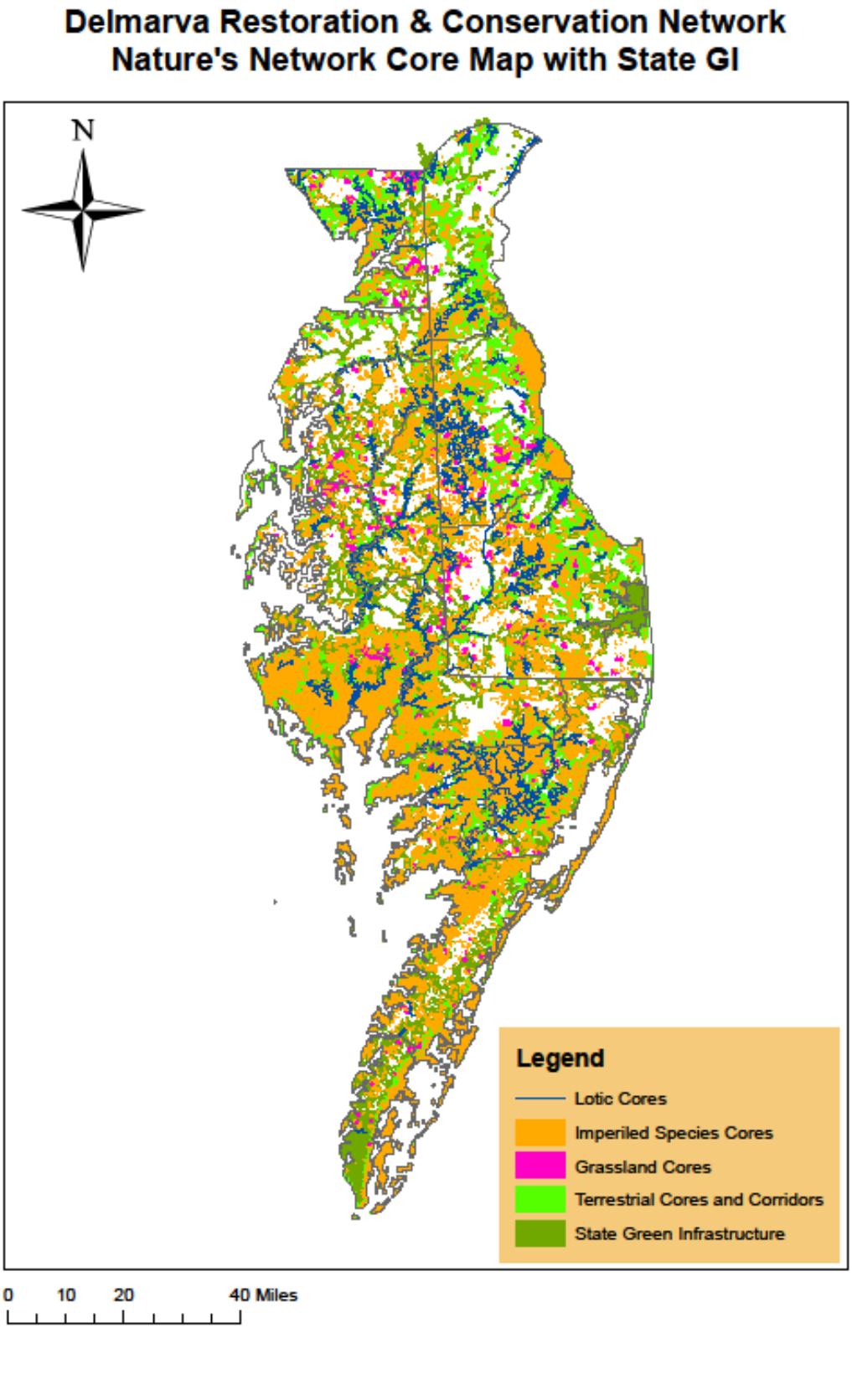
any combination of partner organizations. Map 2 in many cases can stand alone as the primary or first tier landscape conservation design for the DRCN and can be used interactively for planning on the DRCN Arc GIS On-line and Databasin sites.

1) MD DNR Green Infrastructure: The Green Infrastructure Assessment was developed to provide decision support for the MD DNR's land conservation programs. To identify and prioritize Maryland's green infrastructure, the MD DNR developed a tool called the Green Infrastructure Assessment (GIA). The GIA is based on principles of landscape ecology and conservation biology, and provides a consistent approach to evaluating land conservation and restoration efforts in Maryland. The GIA identified two types of important resource lands – "hubs" and "corridors." Hubs are typically large contiguous areas separated by major roads and/or human land uses that contain one or more of the following: large blocks of contiguous interior forest containing at least 250 acres; large wetland complexes with at least 250 acres of unmodified wetlands; important floral and faunal habitats of at least 100 acres, including rare, threatened, and endangered species locations, unique ecological communities, and migratory bird habitats; relatively pristine stream and river segments that support trout, mussels, and other sensitive aquatic organisms; and existing protected natural resource lands which contain one or more of the above. Corridors were identified using land cover, roads, streams, slope, flood plains, aquatic resource data, and fish blockages. Corridors connect hubs of similar type. For example, hubs containing forests are connected to one another; while those consisting primarily of wetlands are connected to others containing wetlands.

2) Delaware Ecological Network: The Delaware Ecological Network (DEN) is a statewide conservation network developed from GIS and field-collected data. The DEN, based on principles of landscape ecology and conservation biology, provides a consistent framework to help identify and prioritize areas for natural resource protection. The DEN is composed of the following elements: core areas, which contain relatively intact natural ecosystems, and provide high-quality habitat for native plants and animals; hubs, which are slightly fragmented aggregations of core areas, plus contiguous natural cover; and corridors, which link core areas together, allowing wildlife movement and seed and pollen transfer between them. Core areas were validated using independent field data and verified using aerial photos.

3) Virginia Natural Landscape Assessment: The Virginia Natural Landscape Assessment (VaNLA), a component of the Virginia Conservation Lands Needs Assessment (VCLNA), is a landscape-scale GIS analysis for identifying, prioritizing, and linking natural habitats in Virginia. Using land cover data derived from satellite imagery, the VaNLA identifies unfragmented natural habitats called Ecological Cores, large patches of natural land cover (mainly upland forests and forested wetlands statewide, but also marshes, beaches, and dunes in the coastal plain) with at least 100 acres of interior conditions. Large, medium, and small Ecological Cores have been identified, along with a smaller feature type called Habitat Fragments that may be important in the more urban localities. Ecological Cores provide habitat for a wide range of species, from those dependent upon interior forests to habitat generalists, as well as species that utilize marsh, dune, and beach habitats. Ecological Cores also provide benefits in terms of open pace, recreation, water quality (including drinking water protection), and carbon sequestration, along with the associated economic benefits of these functions. The VaNLA generates fundamental ecological data layers for conservation of land and natural resources in Virginia.

Map 2. Delmarva Restoration and Conservation Network Conservation Design



Note: All users of the DRCN Arc GIS On-line and Databasin group sites have the ability to manipulate the Conservation Design Map in order to address their specific conservation planning needs. Datasets can be added and removed and colors can be changed to suit the eye of each individual. Additionally, in Databasin, shape files for all datasets are available for download into Arc GIS. Map 2 incorporates the NALCC's Terrestrial and Wetland Core-Connector Network overlaid on the state and Green Infrastructure datasets. It is an example of the importance of local information in fleshing out and refining the regional-scale Nature's Network datasets. It is evident, however, by the limited exposure of much of the underlying state and local information, that the Nature's Network Cores and Connectors compare closely to much of the state and local information.

LOGIC SCORING OF PREFERENCE METHOD AND OPTIMIZATION MODEL

The first step in realizing the DRCN Strategy was to agree on our Vision for Delmarva, and outline the Goals, Objectives, and Strategies that we will employ to achieve that Vision. Next, we identified and mapped the important natural resource characteristics of the landscape in order to visualize restoration and conservation priorities. The third step was to use our collective professional knowledge to rank and prioritize land parcels based on those characteristics using a structured decision-making approach known as the Logic Scoring of Preference (LSP) method. The final step in the process was to include funding to further analyze the parcels by using an optimization model to identify a suite of projects that will get us the most natural resource value with a finite budget.

Logic Scoring of Preference Project Methodology

On October 9, 2019, DRCN convened a structured decision-making LSP workshop to help inform its Strategic Restoration and Conservation Action Plan for the Delmarva Peninsula. The LSP method helps ensure that important decision-making criteria are included in the evaluation and that project evaluation is based on the fundamental properties of human reasoning. The LSP method uses "attribute trees" with weightings and logic structures as the organizing method for ensuring that decision support models reflect the desired intent of decision makers (Table 1; Appendix 2).

Once areas have been evaluated for the fish and wildlife habitat, water quality, coastal resilience, and working landscape values, the DRCN partners can identify relevant sources of funding to implement projects within each category and forecast annual revenue amounts for the next few years to set as a "budget" for optimization scenarios. For more information on the LSP method and optimization, see the following journal article and recent book.

Filtering the Parcel Analysis

There are over 755,000 unique parcel PINs totaling over 3.68 million acres in the thirteen Delmarva counties. Many of these parcels are not suitable for restoration or conservation investments within the focus areas of the DRCN partners. We removed parcels less than 20 acres and those confirmed to be managed lands under fee simple protection or conservation easements. We used the owner name field in the CoreLogic parcel data that The Conservation Fund uses on a license restricted basis as well as the Protected Areas Database of the US

(PADUS) and the National Conservation Easement Database (NCED) to reduce the number of parcels analyzed using the Logic Scoring of Preference (LSP) method to only 26,617 – about 3.5% of all parcels, totaling over 1.9 million acres – about 53% of the acreage.

There are still 184 parcels totaling 13,234 acres (less than 1% of the analyzed acreage) with a blank owner name in the parcel database, which usually means they are tax exempt and therefore publicly owned. We kept them in for GIS analysis purposes for the workshop but would remove those from any future optimization scenarios if we were able to confirm they were already publicly owned and/or protected.

Quick summary of the analyzed parcels in the Delmarva peninsula

- All: 26,617 parcels | 1,913,935 acres | Range: 20 – 1,286 acres
- DE: 8,566 parcels | 564,373 acres | Range: 20 - 1,141 acres
- MD: 14,653 parcels | 1,133,599 acres | Range: 20 – 1,286 acres
- VA: 3,398 parcels | 215,963 acres | Range: 20 – 1,210 acres
    - PADUS in Delmarva: 706,040 acres
    - NCED in Delmarva: 451,952 acres

The resulting plan identifies the most important places to protect and restore and describes how the DRCN partners will work together to obtain funding for on-the-ground restoration and conservation investments.

Workshop Project Stations

Each branch of the LSP attribute tree had its own station with 3-4 maps associated with the four restoration and conservation investment types: wildlife habitat, water quality, coastal resiliency, and working lands (Appendix 2). Feedback from workshop attendees (Appendix 3) was used to assign weightings and logic structures for the LSP attribute tree as well as to inform the optimization scenarios for restoration and conservation investments.

Sample maps and models using the LSP method were developed so that stakeholders could visualize potential conservation and restoration priorities: a) 11 Fish & Wildlife Habitat (Map 3), b) 121 Water Quality Protection Value (Map 4), and c) 122 Water Quality Restoration Value (Map 5). The LSP results for Climate Resiliency and Working Lands were inconclusive. Employing the LSP method to those landscape characteristics will require further refinement of the corresponding attribute trees.

Table 1. Attribute Table with Weights provided by October 9, 2019 workshop

Fish & Wildlife Habitat

1 Delmarva Restoration and Conservation Network – LSP Attribute Tree
    11 Fish and Wildlife Habitat
        40% 111 Fish & Wildlife Habitat Connected Networks
            40% 1111 Acreage of Connected Network Designations* in Parcel
            40% 1112 Percent of Parcel with Connected Network Designations
            20% 1113 Total Parcel Size
                *Connected Network Designations

Nature's Network
Terrestrial Cores
Aquatic Cores
Imperiled Species Cores
Grassland Cores
State Green Infrastructure Network Designations
Maryland Green Infrastructure
Delaware Ecological Network
Virginia Conservation Vision

35% 112 Representative Species Landscape Capability
40% 1121 Number of Representative Species*
40% 1122 Acreage of Representative Species Suitable Habitat
20% 1123 Percent of Parcel with Representative Species Habitat
* Representative Species
Uplands: *Wood Thrush*, *Ovenbird*, *Eastern Box Turtle*, *Prairie Warbler, Red-Shouldered Hawk*
Riparian Forests, Wetlands: *Louisiana Wood Thrush*, *Wood Duck*, *American Woodcock*
Marshes: *American Black Duck (Breeding & Non-Breeding)*, *Virginia Rail*, *Snowy Egret, Saltmarsh Sparrow*
Beach & Near Shore: *Northern Diamond-Backed Terrapin*, *American Oystercatcher*, *Sanderling*
25% 113 *Proximity to existing protected/managed land (PADUS + NCED)*

Water Quality

1 Delmarva Restoration and Conservation Network – LSP Attribute Tree
12 Water Quality
50% 121 Protection Value
60% 1211 *Nature's Network Aquatic Buffers*
30% Total acreage of aquatic buffers within the parcel
45% of parcel within aquatic buffers
25% Total parcel size
40% 1212 *Healthy Watershed Designations*
50% 122 Restoration Value
30% 1221 *Nature's Network Habitat Condition*
30% Total acreage of suitable restorable habitat in parcel
45% of parcel with suitable restoration habitat
25% Total parcel size
20% 1222 *EPA Impaired Waters / 303d list*
25% 1223 *EPA Total Maximum Daily Load stream segments*
25% 1224 Important Anadromous Fish Habitat

As a next step, DRCN partners will identify relevant sources of funding to implement projects within each category and forecast annual revenue amounts for the next few years to set as a

"budget" for optimization scenarios. LSP attribute trees will then be refined based on the specific requirements of the funding sources.

The LSP model results were used to develop the business planning section of the Strategic Restoration and Conservation Action Plan, describing how the DRCN partners will work together to obtain funding for on-the-ground restoration and conservation investments. Now stakeholders can forecast funding available from key conservation and restoration programs over the next few years that can be set as a budget. This allows the DRCN to model some optimization scenarios that inform how to get the "best bang for the buck" of those conservation and restoration investments. Optimization and cost effectiveness are two methods that can provide better conservation and restoration outcomes on the ground at the same budget level. As noted in the book *The Science of Strategic Conservation: Protecting More with Less*, project selection methods using cost effective techniques are superior to traditional "rank-based" methods where the top scoring projects are selected regardless of their cost.

An example of how optimization and cost-effective analysis works is in a pilot project where we applied the LSP model results for fish and wildlife habitat and water quality to the project selection criteria of the Chesapeake Bay Wild program (Table 2). The Chesapeake Wild Act, signed into law in 2020, authorizes the establishment of a grant program to fund fish and wildlife habitat restoration and conservation projects in the Chesapeake Bay watershed. The legislation summarizes how the funding should be used:

- A) to sustain and enhance restoration and protection activities;
- B) to improve and maintain water quality to support fish and wildlife, habitats of fish and wildlife, and drinking water for people;
- C) to sustain and enhance water management for volume and flood damage mitigation improvements to benefit fish and wildlife habitat;
- D) to improve opportunities for public access and recreation in the Chesapeake Bay watershed consistent with the ecological needs of fish and wildlife habitat;
- E) to facilitate strategic planning to maximize the resilience of natural ecosystems and habitats under changing watershed conditions;
- F) to utilize green infrastructure or natural infrastructure best management practices to enhance fish and wildlife habitat;
- G) to engage the public through outreach, education, and citizen involvement to increase capacity and support for coordinated restoration and protection activities in the Chesapeake Bay watershed;
- H) to sustain and enhance vulnerable communities and fish and wildlife habitat;
- I) to conserve and restore fish, wildlife, and plant corridors; and
- J) to increase scientific capacity to support the planning, monitoring, and research activities necessary to carry out coordinated restoration and protection activities.

We assumed that $22.5 million (i.e. $5 million, $7.5 million, and $10 million over a three-year period) would be available from the program and that it could be leveraged by 50% to support the acquisition of conservation easements. Project costs were estimated through an analysis of land values in each county. We ran the cost-effective analysis for the entire peninsula, inclusive of areas outside the Chesapeake Bay watershed, since we assumed that the equivalent and previously authorized Delaware River Basin program would have similar selection criteria.

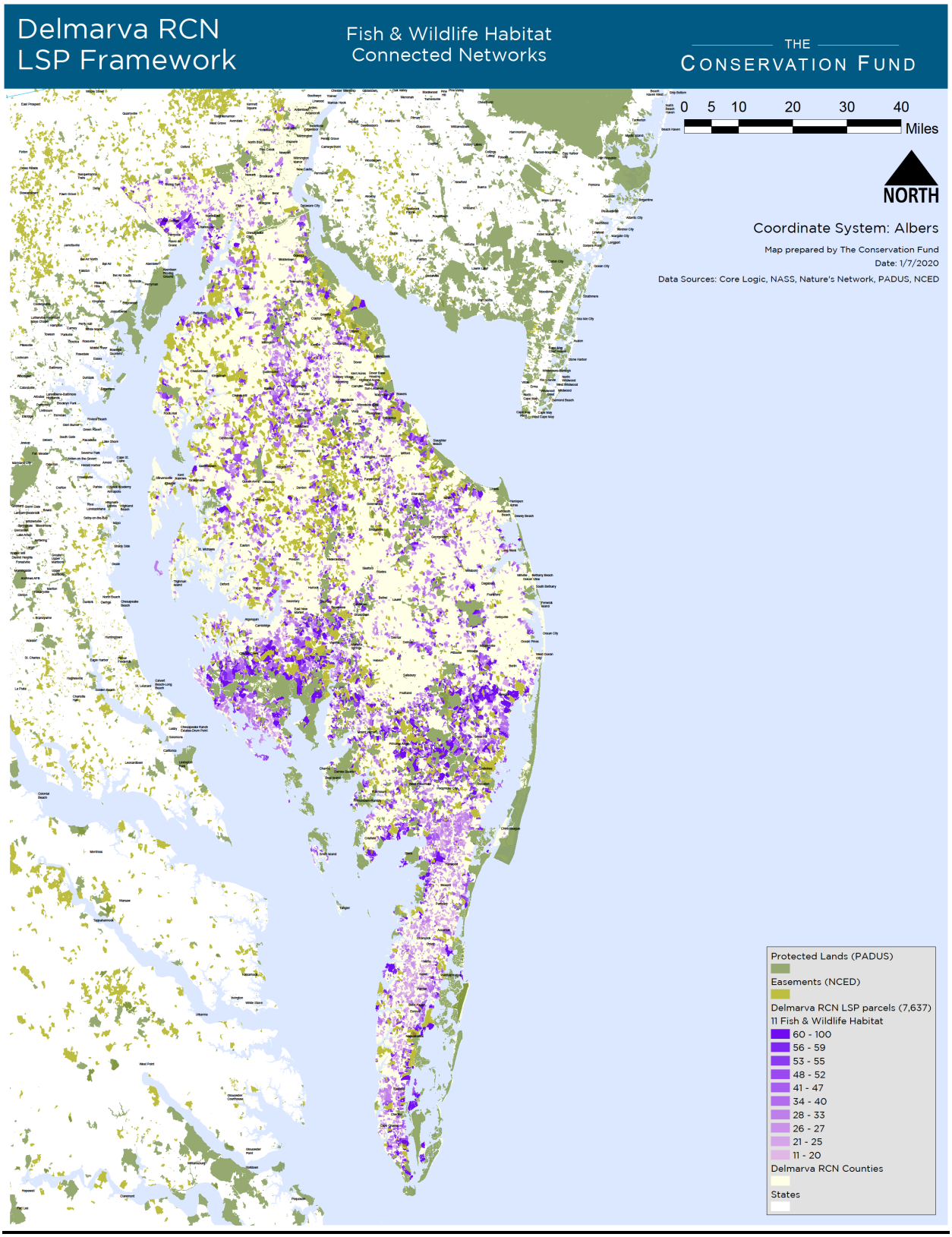
The cost-effective analysis ratio is the benefit of the project, as measured by the LSP model score, divided by the cost of purchasing the easement. As you can see in Table 2, if you used the cost-effective analysis project selection instead of the traditional rank-based method, you would be able to protect 26% more acres, complete three additional projects, get 19% better projects (as measured by mean LSP score), and get 36% better quality (as measured by the aggregate LSP scores). The Optimization results are presented visually in Map 6.

The LSP and Optimization Maps are also available for GIS planning applications at the DRCN Arc GIS On-line (https://arcg.is/1SGXuq) and Databasin (https://nalcc.databasin.org) sites.

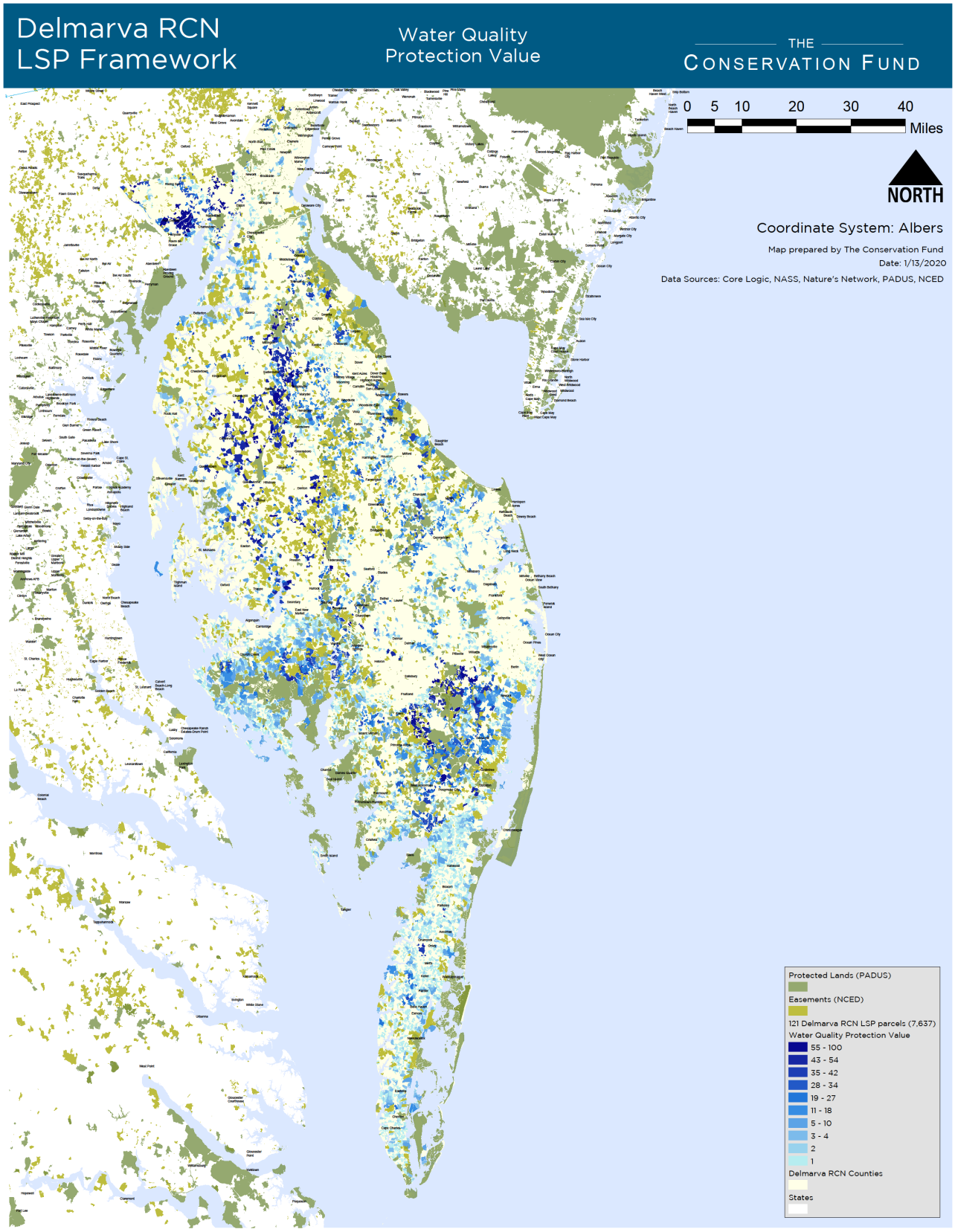
Table 2. Pilot Project Optimization Results

Method	# Projects	Acres	Mean LSP Score (0-100)	Aggregate LSP Value
Cost-Effective Analysis	24	12,502	86.0	2,065
Rank-Based Method	21	9,987	72.1	1,515

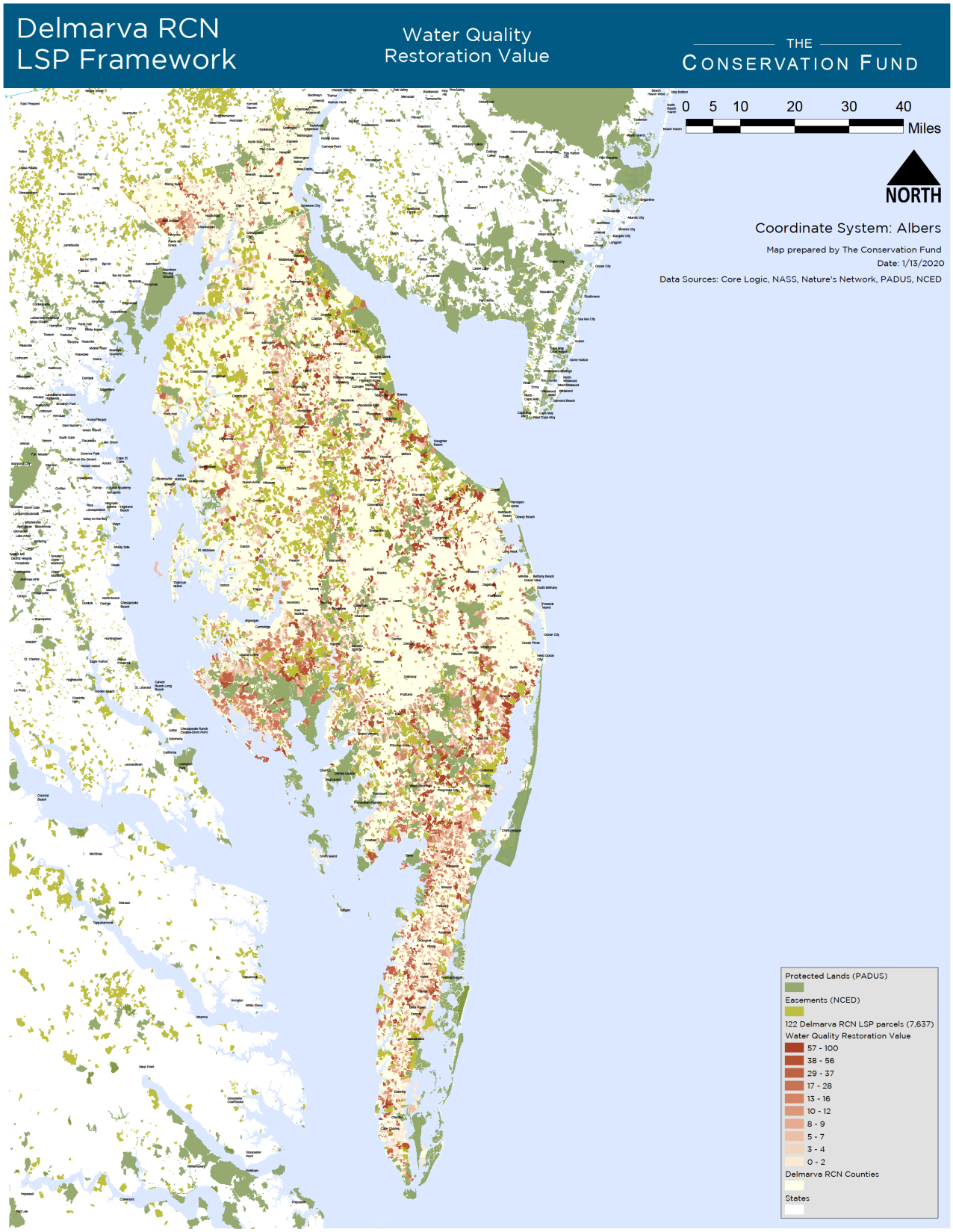
Map 3.


Delmarva RCN
LSP Framework
Fish & Wildlife Habitat
Connected Networks
THE
CONSERVATION FUND
0 5 10 20 30 40
Miles
NORTH
Coordinate System: Albers
Map prepared by The Conservation Fund
Date: 1/7/2020
Data Sources: Core Logic, NASS, Nature's Network, PADUS, NCED
Protected Lands (PADUS)
Easements (NCED)
Delmarva RCN LSP parcels (7,637)
11 Fish & Wildlife Habitat
60 - 100
56 - 59
53 - 55
48 - 52
41 - 47
34 - 40
28 - 33
26 - 27
21 - 25
11 - 20
Delmarva RCN Counties
States

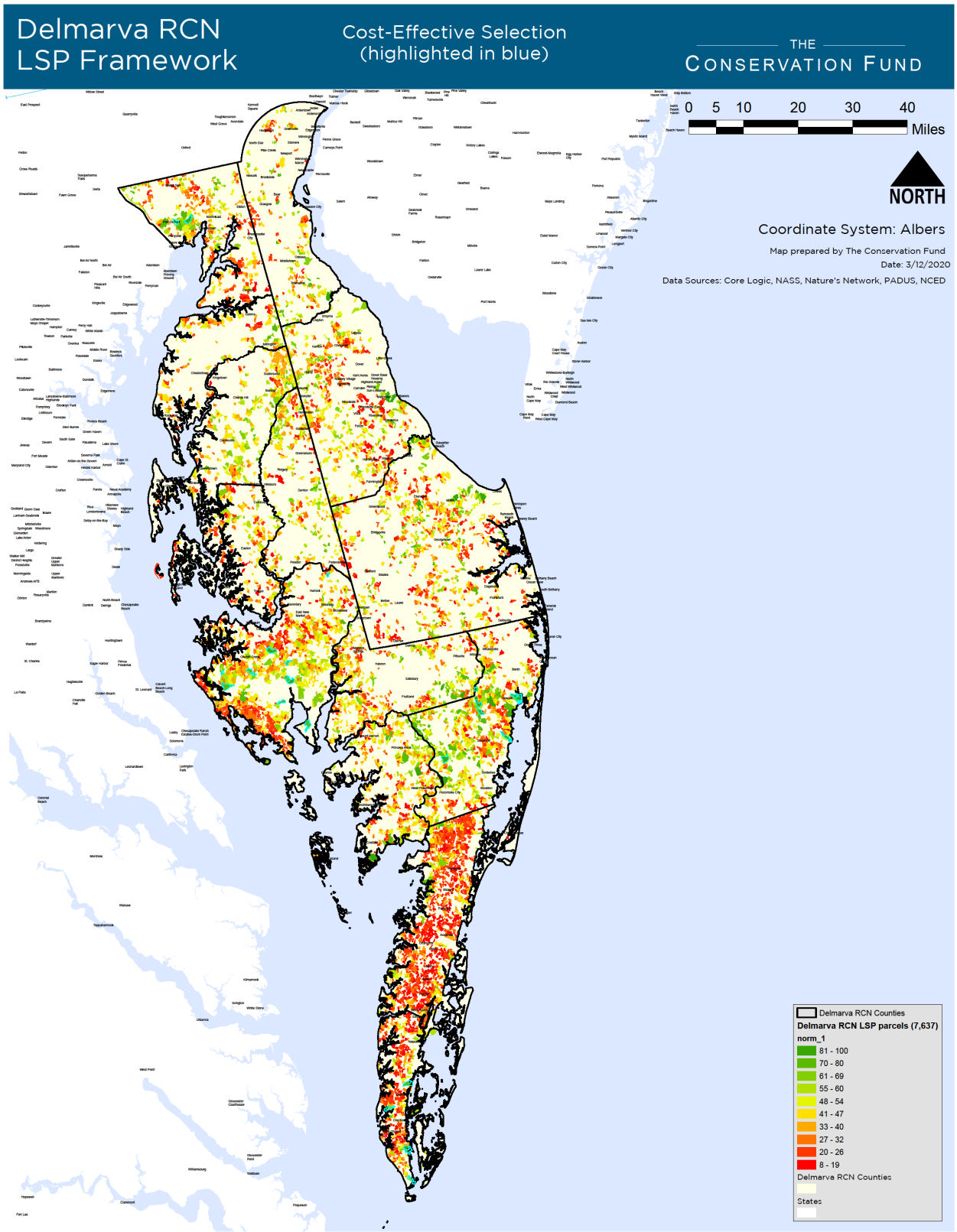
Map 4.


Delmarva RCN
LSP Framework
Water Quality
Protection Value
THE
CONSERVATION FUND
0 5 10 20 30 40
Miles
NORTH
Coordinate System: Albers
Map prepared by The Conservation Fund
Date: 1/13/2020
Data Sources: Core Logic, NASS, Nature's Network, PADUS, NCED
Protected Lands (PADUS)
Easements (NCED)
121 Delmarva RCN LSP parcels (7,637)
Water Quality Protection Value
55 - 100
43 - 54
35 - 42
28 - 34
19 - 27
11 - 18
5 - 10
3 - 4
2
1
Delmarva RCN Counties
States

Map 5.


Delmarva RCN
LSP Framework
Water Quality
Restoration Value
THE
CONSERVATION FUND
0 5 10 20 30 40
Miles
NORTH
Coordinate System: Albers
Map prepared by The Conservation Fund
Date: 1/13/2020
Data Sources: Core Logic, NASS, Nature's Network, PADUS, NCED
Protected Lands (PADUS)
Easements (NCED)
122 Delmarva RCN LSP parcels (7,637)
Water Quality Restoration Value
57 - 100
38 - 56
29 - 37
17 - 28
13 - 16
10 - 12
8 - 9
5 - 7
3 - 4
0 - 2
Delmarva RCN Counties
States

Map 6.


Delmarva RCN
LSP Framework
Cost-Effective Selection
(highlighted in blue)
THE
CONSERVATION FUND
0 5 10 20 30 40
Miles
NORTH
Coordinate System: Albers
Map prepared by The Conservation Fund
Date: 3/12/2020
Data Sources: Core Logic, NASS, Nature's Network, PADUS, NCED
Delmarva RCN Counties
Delmarva RCN LSP parcels (7,637)
norm_1
81 - 100
70 - 80
61 - 69
55 - 60
48 - 54
41 - 47
33 - 40
27 - 32
20 - 26
8 - 19
Delmarva RCN Counties
States

BUSINESS PLAN

DRCN Business Plan- FY2021 to FY2023

Organizational Management and Governance

Network

The DRCN (or the "Network") will be coordinated by a self-nominated Steering Committee (Core Group) comprised of professionals and volunteers from a larger group of interested parties that represent the following types of institutions:

1) Regional federal agencies responsible for fish and wildlife management; environmental protection; forestry and agriculture; park, trail, and historic site management; emergency management; and navigation and waterways management;

2) State agencies from Delaware, Maryland, and Virginia, particularly those charged with fish and wildlife management, parks and recreation, environmental protection, forestry and agriculture production, climate change planning and response, Bay and waterways management (including ports, marinas, and harbors), and emergency management;

3) Local governments (counties and municipalities) from the three-state region;

4) Non-governmental (non-profit) organizations, including land trusts, river- and watershed associations, restoration specialists, wildlife conservation organizations, climate adaptation professionals, and others; and

5) Non-governmental professional, trade and industry, and local government associations, including agricultural, fisheries, and maritime groups.

The Steering Committee will select a coordinating chair and vice-chair to run meetings and help the Steering Committee and full Network operate effectively.

The Steering Committee shall meet at least quarterly each year – with the goal of rotating meeting locations across the Delmarva - and share meeting minutes, agendas, announcements, and other information with Network members. All Network Members are welcome, but not required to attend Steering Committee meetings. The entire Network will meet at least once per year to hold an "All Network Meeting." The All Network Meeting will be a chance for Network members and committees to highlight accomplishments, discuss challenges and opportunities, and plan and coordinate activities for the year ahead.

Operating Committees (described below) shall consist of members of the Steering Committee and other interested Network representatives. Each Operating Committee shall set its own annual schedule of meetings in coordination with its members, the Chair, and the Network Coordinator (see staff description).

Operating Committees

The Steering Committee shall designate Operating Committees as it sees fit. Initially, the Steering Committee shall designate the following Operating Committees:

1) *Land Protection* – This Operating Committee shall determine the highest priority funding sources for each fiscal year, determine the key selection criteria for each funding pool, and apply the logic scoring of preference (LSP) approach to identify and determine the DRCN's fee simple and conservation easement priorities for each state (using Nature's Network and other mapping to inform its priority setting.) The Committee will recruit member agencies and organizations to implement annual or multi-year acquisition priorities it establishes.

2) *Agricultural Land and Forestry Management* – This Operating Committee shall establish priorities for action to maintain, enhance or restore wildlife and fish habitat associated with working agricultural or forested lands among federal NRCS or state or private industry programs. It will work with the Network Coordinator and the Steering Committee to communicate its objectives among members, especially local governments and relevant state agencies, to enlist additional outreach and technical assistance. Priorities will be guided by funding source criteria and Nature's Network and other mapping that identifies high potential lands and connectivity with natural areas and/or future adaptation needs.

3) *Restoration and Adaptation* – This Operating Committee shall establish priorities for natural resource restoration, longer term adaptation (such as coastal marsh transgression or migration corridors), and climate-adaptive measures (such as erosion and shoreline protection, stream-daylighting, and floodplain restoration) that provide added benefits for fish and wildlife and aligned regional economic activities (such as commercial and recreational fishing, oyster and crab fisheries, and port functioning). The Committee shall annually assess available funding for restoration and adaptation activities and serve to coordinate work among Network members. Generally, projects for restoration and adaptation may require longer timelines to plan and complete than conservation land acquisition or best management practices. Consequently, this Committee's planning should be based on a rolling three-year basis with annual assessments on funding available.

4) *Town/Urban* – This Operating Committee is expected to work with Delmarva communities to plan and implement restoration activities and best management practices and identify project funding opportunities. Focus will be on green infrastructure remedies to climate resiliency challenges, creating green space and park access opportunities for all community members, and innovative measures to address TMDL requirements.

Staff

The Steering Committee will solicit grant and/or cooperative agreement support from among interested Network members one or more agencies or organizations to support the position for a paid Coordinator and/or recruit donated staffing from one or more agencies.

To the extent possible, grants and cooperative funding awards for project implementation activities will include proportional funding for administrative operating expenses for such

Network "backbone" functions as a salary for the coordinator position, local travel for the coordinator, and communications services, such as a website, social media, video- and voice communications, and printed materials. Network members will be encouraged to offer in-kind matches of facilities, coordinating staff and other resources to enable the Network to pursue its vision and implement annual business plans.

Budget

In 2020, the Network, in partnership with the Lower Shore Land Trust, supported a Coordinator to help organize meetings, recruit new members, share the DRCN story, and support the network as a whole. Future funding of a Coordinator should include a salary, fringe benefits, travel costs, trainings and conference costs, subscription and license costs, technology costs, communications costs, office supplies, meeting supply costs and more.

The Steering Committee should determine if this position should be funded in a full time or part time capacity as well as if an intern could be helpful to support the Network. Costs will depend upon if a Coordinator is in place and the number of hours or activities, he/she would take on. Travel and training costs could include local travel across Delmarva ($500) as well as the costs for regional trainings and conferences ($350). Technology and communications costs could include web hosting ($120/year), printed materials ($450), software licenses ($1,500/year), computer rentals or purchases, while meetings expenses could include rental costs, food/refreshments ($250), and other printed materials. See below for a projection of potential expected expenses for a Coordinator and Intern.

Potential Projected Costs for Coordinator & Intern 2021-22

Position	Hourly Rate	Average Hours Per Week	Budgeted Project Salary	Fringe Amount (10% of Salary)	Travel and Trainings	Tech., Subscriptions, & Office Supplies	Meeting Expenses and Comms Materials	Total Personnel
DRCN Coordinator	$25.00	32	$ 41,600	$ 4,160	$ 850	$ 2,400	$ 1,800	$ 50,810
Part Time Intern	$13.00	15	$ 10,140	$ 1,014	$ 200	$ 250		$ 11,604
Total			$ 51,740	$ 5,174	$ 1,050	$ 2,650	$ 1,800	**$ 62,414**

Selected Revenue (Public) Sources for FY2021 – 2023

Land Conservation

- Chesapeake WILD (Watershed Investments for Landscape Defense) Act of 2020 (USFWS and other agencies) – newly enacted legislation in 2020 to preserve and protect ecosystems & ecological processes on which fish and wildlife depend, and for use/enjoyment by the public.

- Delaware Watershed Conservation Program (NFWF-administered – USFWS funds) - for recreation, water quality, water management, and habitat conservation in Delaware River watershed
- Land & Water Conservation Fund
    - USFWS – priorities set in June for FY2022 (NE Region nominate top 5 refuges)
    - NPS – various programs including State and Local grants, Outdoor Recreation Legacy Partnership. Core NPS projects should already have been submitted for FY2022.
- Department of Defense REPI (Readiness and Environmental Protection Integration) Program
    - Various programs, multiple service branches (e.g., Navy, Army, Air Force, National Guard). Intended to use conservation/agricultural lands to buffer DOD installations and training corridors from incompatible development; use natural GI to maintain or improve installation resilience, preserve or restore off-base habitat.
- FEMA BRIC (Building Resilient Infrastructure and Communities) Program – New grant program for pre-disaster projects using nature-based solutions to protect infrastructure, natural systems and communities from hazards, including flooding and storms

Agricultural Land and Forestry Management

- Chesapeake WILD Act and Delaware Watershed Conservation Program (funding can be used for broad range of restoration and protection projects involving fish and wildlife habitat, natural ecosystems, and GI BMPs to enhance fish and wildlife habitat.
- NRCS – various programs involving conservation easement acquisition, BMP installation, stewardship support, conservation innovation, etc. for agricultural landowners.
- Maryland Rural Legacy Program (DNR) or Maryland Agricultural Land Preservation Foundation (MDA) - Every MD County has at least one Rural Legacy Area and are all available for MALPF funding. These programs are under Program Open Space and intended to preserve large contiguous blocks of valuable farmland, forests, and natural areas.
- Delaware Agricultural Lands Preservation Foundation (DALPF)

Restoration and Adaptation

- NMFS Community-based Restoration Program – Coastal and Marine habitat restoration grants (FFO expected in November 2020, FY2021 awards)
- NFWF/NMFS National Coastal Resilience Fund – funding to create, expand, restore natural coastal systems to both protect coastal communities and increase fish and wildlife habitat.
- USFWS – North American Wetlands Conservation Act and National Coastal Wetlands Conservation Grant programs. Inland and coastal wetlands protection, restoration and enhancement grant funding for migratory birds and/or coastal ecosystems.

Town/Urban

- NFWF Chesapeake Bay Small Watershed Grants
- Maryland DNR Chesapeake and Coastal Bays Restoration Fund

MEASURING OUR PROGRESS

Metrics to measure progress toward the DRCN vision annually.

Policies and Actions

Protecting and Restoring Natural Resources:

- # technical assistance actions provided by and to DRCN partners
- # of landowners contacted regarding conservation and restoration opportunities within Delaware, Maryland, and Virginia
- # of acres of habitat restored and/or conserved
    - Types of targeted species (Black Duck, Saltmarsh Sparrow, etc.) within acres
- # of acres of riparian buffers installed under network partnership
- # of best management practices installed for climate change mitigation
- Conservation and restoration priorities and maps re-evaluated biennially
- Policy priorities developed and evaluated at the annual meeting
    - Advocacy successes or failures under individual network partners, towards the DRCN goals

Supporting Resource-based Industries:

- # of farmers and landowners engaged regarding conservation and restoration opportunities within Delaware, Maryland, and Virginia
    - # of resource publications distributed to landowners and land managers with the network
- Acres of agricultural or working lands restored and/or conserved
- # of business leaders, resource-based industry leaders, and other industry stakeholder groups contacted or engaged
- Amount of capacity funding, implementation funding, and private investment contributed by industry sources in the conservation of working rural lands and renewable natural resources
- New goals or policy objectives set to support resource-based industries while meeting the DRCN goals and objectives

Creating & Sustaining Cooperative Partnerships:

- Amount of capacity funds obtained by and for DRCN partners
- # of grant applications applied for under the DRCN network/partnership
    - # of letters of support completed on behalf of the network
- # of new agencies added to the DRCN
- # of new local NGOs or partner organizations added to the DRCN
- # of meetings, webinars, or presentations that DRCN leadership provides to the public and the # of attendees to outreach events
- # of residents, decision makers, community leaders, and other stakeholders that DRCN contacts
- Annual DRCN All Network Meeting hosted
- # of strategic action plan copies distributed

REFERENCES

American Forest & Paper Association. State Industry Economic Impact: Delaware. Accessed at https://cpb-us-e1.wpmucdn.com/wordpressua.uark.edu/dist/9/350/files/2018/04/DE2017-FactSheet-AFPA_State_Industry_Ecomomic_Impact-2nnlatk.pdf on March 26, 2020.

Boesch, D.F., W.C. Boicourt, R.I. Cullather, T. Ezer, G.E. Galloway, Jr., Z.P. Johnson, K.H. Kilbourne, M.L. Kirwan, R.E. Kopp, S. Land, M. Li, W. Nardin, C.K. Sommerfield, W.V. Sweet. 2018. Sea-level Rise: Projections for Maryland 2018, 27 pp. University of Maryland Center for Environmental Science, Cambridge, MD.

Burke, D. G. and J. E. Dunn (editors). 2010. A Sustainable Chesapeake: Better Models for Conservation. The Conservation Fund, Arlington, VA. 278 pp.

Delmarva USA. 2019. The Delmarva Peninsula. Accessed at https://delmarvausa.com on October 31, 2019.

Diriker, M., Guy, S. and Chambers, D. January 2018. Economic Impact of Select Resource Based Industries in Maryland. Conducted by BEACON at Salisbury University. Accessed at http://www.marbidco.org/_pdf/2018/Full_Report_All_Maryland_Resource_Based_Industries_Beacon_2018.pdf on March 26, 2020.

Fincham, M. W. and J. Brainard. 2014. Reckoning with the rising, editorial. Chesapeake Quarterly, Volume 13, Numbers 2 and 3. Maryland Sea Grant College.

King, H.J. 2016. Needs Assessment of Black Farmers on the Delmarva Peninsula: New Research to Recommend Intervention Priorities. The Common Market. Phila., Pa.

Maryland Commission on Climate Change. 2016. 2016 Annual Report. Prepared for Larry Hogan, Governor, State of Maryland, and the Maryland State Assembly. 32 pp. plus appendices.

Messer, K.D. and W.L. Allen III. 2018. The Science of Strategic Conservation Protecting More with Less. Cambridge University Press. 345 pp.

Plowman, T. 1999. Delmarva Millennium, Volume 1. Thomson-Chesapeake. October 1999. Accessed at https://www.wikiplanet.click/enciclopedia/tab/en/Delmarva_Peninsula/e45182a278817e889c9c05809d70fadd539d16ae on October 31, 2019.

Scott, J. 1991. Between Ocean and Bay – A Natural History of Delmarva. 206 pp. Tidewater Publishers, Centreville, MD.

Southwick and Associates. 2012. The Economics Associated with Natural Areas in the Delmarva Peninsula. Southwick Associates, Fernandina Beach, Florida. For: Theodore Roosevelt Conservation Partnership.

https://tidewatertimes.com/HaroldHurstAugust2006.htm. Accessed January 27, 2020.

U.S. Environmental Protection Agency. 2016. What Climate Change Means for Delaware. EPA-430-F-16-010. August 2016.

U.S. Environmental Protection Agency. 2016. What Climate Change Means for Maryland. EPA-430-F-16-022. August 2016.

U.S. Environmental Protection Agency. 2016. What Climate Change Means for Virginia. EPA-430-F-16-048. August 2016.

APPENDIX

Appendix 1. Instructions for Accessing the DRCN Group site on Databasin

This is one of two locations where we house the datasets, meeting agendas and notes, presentations, and other products of the DRCN. More datasets will be added over time to be incorporated into the conservation design part of the Strategic Action Plan. Instructions for accessing the Databasin group site are as follows:

Go to https://nalcc.databasin.org/ and click on "Sign up" in the upper right hand corner and follow the instructions to create an account on Databasin. Once you create an account, send an email to dan_murphy@fws.gov and Dan Murphy will add you to the DRCN Group to give you access to the conservation design map, data sets, and gallery. After your name is added to the DRCN Group on Databasin, you can login to Databasin, click on "My Workspace" and then click on "My Groups". After you click on My Groups, you should see the link to the DRCN Group. Once in the Group space you will have access to the Map, Data sets, and the Gallery, which houses meeting agendas, meeting minutes, and other project related documents. Once on the Group page, click on "Content" and then click on the Map entitled "Delmarva Restoration and Conservation Master Map." This is the Master map for the conservation design. Once in this map, you can add and remove data sets and explore the conservation design under different scenarios of your choice.

Note: You will find that only 20 data sets can be loaded on the map at one time.

Appendix 2. Logic Scoring of Preference Attribute Tree and Structured Decision Making Workshop Stations

1 Delmarva Restoration and Conservation Network – LSP Attribute Tree

- 11 Fish and Wildlife Habitat
  - 111 Fish & Wildlife Habitat Connected Networks
    - 1111 Nature's Network
      - 11111 *Terrestrial Cores*
      - 11112 *Aquatic Cores*
      - 11113 *Imperiled Species Cores*
      - 11114 *Grassland Cores*
    - 1112 State Green Infrastructure Network Designations
      - 11121 *Maryland Green Infrastructure*
      - 11122 *Delaware Ecological Network*
      - 11123 *Virginia Conservation Vision*
  - 112 Representative Species Landscape Capability
    - 1121 Uplands
      - *11211 Wood Thrush*
      - *11212 Ovenbird*
      - *11213 Eastern Box Turtle*
      - *11214 Prairie Warbler*
      - *11215 Red-Shouldered Hawk*
    - 1122 Riparian Forests, Wetlands
      - *11221 Louisiana Woodthrush*
      - *11222 Wood Duck*
      - *11223 American Woodcock*
    - 1123 Marshes
      - *11231 American Black Duck (Breeding)*
      - *11232 American Black Duck (Non-Breeding)*
      - *11233 Virginia Rail*
      - *11234 Snowy Egret*
      - *11235 Saltmarsh Sparrow*
    - 1124 Beach & Near Shore
      - *11241 Northern Diamond-Backed Terrapin*
      - *11242 American Oystercatcher*
      - *11243 Sanderling*
  - 113 *Proximity to existing protected/managed land (PADUS + NCED)*
- 12 Water Quality
  - 121 Protection Value
    - 1211 *Nature's Network Aquatic Buffers*
    - 1212 *Healthy Watershed Designations*
  - 122 Restoration Value
    - 1221 *Nature's Network Habitat Condition*
    - 1222 *EPA Impaired Waters / 303d list*

1223 *EPA Total Maximum Daily Load stream segments*
1224 *Important Anadromous Fish Habitat*

13 Coastal Resiliency
131 *Sea Level Rise wetland migration zones*
132 *Aquatic connectivity | Fish passage, in-stream barriers*
133 *Coastal Vulnerability Index*
134 *Submerged Aquatic Vegetation | Eelgrass*

14 Working Lands
141 Land Use Types
1411 *Market Agriculture land use* (fruits, vegetables, dry beans)
1412 *Intense Agriculture land use* (commodities, pasture, hay)
1413 *Evergreen land cover* (Pine plantations)
142 Location and Characteristics
1421 *Soil Productivity*
1422 *Riparian Habitat Condition*
1423 *Proximity to existing protected/managed land*

Station 1 - Fish & Wildlife Habitat

1a) Nature's Network Features (111)

This map shows the connected network features that are in the LSP attribute tree.

- Nature's Network: *Terrestrial Cores*, *Aquatic Cores*, *Imperiled Species Cores*, *Grassland Cores, River and Stream Core Network, Terrestrial Core to Core Connectors*
- State Green Infrastructure Network Designations: *Maryland Green Infrastructure*, *Delaware Ecological Network*, *Virginia Conservation Vision*

1b) Connected Networks – 7,637 parcels (111)

This map shows 823,128 acres of parcels with 50% or more of the property as part of Nature's Network or state green infrastructure designations AND that have an above average total Nature's Network / green infrastructure acreage among the 26,617 analyzed parcels (168 raster cells = ~37 acres). Parcel map color classification = Natural Breaks + legend shows the number of raster cells within each property. The map also shows the PADUS and NCED layers.

1c) Representative Species Landscape Capability Composite (112)

This map shows an aggregate output of representative species landscape capability of 15 species, where occurrences are more likely than not, based on each species' relative probability model. As there are different habitat requirements for each of the species mapped, the maximum number of species in a specific raster cell is 5.

1d) Representative Species – 4,896 parcels (112)

This map shows 629,667 acres of parcels with above average representative species landscape capability relative probability (score of 128). As there are different habitat requirements for each of the species mapped, the maximum number of species in a specific parcel is 5 (out of the possible 16 species models representing 15 species).

- Uplands*: Wood Thrush, Ovenbird, Eastern Box Turtle, Prairie Warbler, Red-Shouldered Hawk*
- Riparian Forests, Wetlands: *Louisiana Woodthrush*, *Wood Duck*, *American Woodcock*
- Marshes: *American Black Duck (Breeding & Non-Breeding)*, *Virginia Rail, Snowy Egret, Saltmarsh Sparrow*
- Beach & Near Shore: *Northern Diamond-Backed Terrapin, American Oystercatcher, Sanderling*

Station 2 - Water Quality

12 Water Quality

121 Protection Value

2a) Aquatic Buffers | Healthy Watersheds | No TMDL/303d (1211, 1212)

Nature's Network aquatic core networks are intact, well-connected stream reaches, lakes, and ponds that, if protected as part of stream networks and watersheds, will support a broad diversity of aquatic species and the ecosystems on which they depend. Aquatic buffers represent the areas estimated to have a strong influence on the integrity of the aquatic cores.

This map also shows Healthy Watershed designations and shows watersheds with no TMDLs or 303d designation. If there are two labels for the same watershed, it means they meet both conditions.

2b) Aquatic Connectivity – 1,867 Parcels (1211)

This map shows 215,269 acres of parcels with at least 50% in the aquatic buffer and an above average amount of aquatic buffer (177 raster cells = ~39 acres). Aquatic buffers represent the areas estimated to have a strong influence on the integrity of the aquatic cores.

122 Restoration Value

2c) Impaired Waters | Total Maximum Daily Load (1222, 1223)

This map shows the status of stream segments in the Delmarva peninsula, whether they 1) have at least one TMDL (1223), 2) are on EPA's 303d impaired waters list (1222), and/or 3) part of the core streams in Nature's Network.

2d) Nature's Network Habitat Condition – 2,115 Parcels (1221)

The habitat condition layer shows where habitat importance for imperiled species is high but ecological integrity is poor. This map shows 216,796 acres of parcels that meet the following conditions: 1) above mean percent of parcel designated for restoration/buffer in the Nature's Network habitat condition layer (above 35%), 2) above mean total restoration/buffer land in the Nature's Network habitat condition layer (above 105 raster cells = ~23 acres), 3) within 300 feet of a TMDL steam segment or a 303d impaired waters stream segment or an important anadromous fish habitat.

Appendix 3. Logic Scoring of Preference Structured Decision Making Feedback Forms

Appendix 4. Logic Scoring of Preference Structured Decision Making Workshop Scoring

Station 3 Coastal Resilience

13 Coastal Resiliency

3a) Marsh Migration Zone – 6,236 parcels (131)

This map shows 494,155 acres of parcels in the Marsh Migration Zone, which addresses the unique problem of connectivity of tidal marsh habitat to adjacent uplands and the need for marshes to move in response to sea level rise. The Marsh Migration data identify which of the best opportunities for tidal marsh habitat have the greatest potential for upland migration with advancing sea levels.

3b) Fish Passage & In-Stream Barriers (132)

This map shows the fish passage dataset, which is the consensus anadromous fish prioritization of in-stream barriers from the North Atlantic Aquatic Connectivity Collaborative's Northeast Aquatic Connectivity project. These results are designed to be screening-level tools that can be used to help investigate potential fish passage projects in the context of many ecological factors.

3c) Coastal Vulnerability | Coastal Habitats | Submerged Aquatic Vegetation – 4,609 Parcels (133, 134)

This map shows 432,865 acres of parcels that contain important coastal habitats and/or are within 300 feet of submerged aquatic vegetation. The coastal vulnerability index (CVI) provides insight into the relative potential of coastal change due to future sea-level rise. Coastal geomorphology is the most important variable in determining the CVI. Coastal slope, wave height, relative sea-level rise, and tide range provide large-scale variability to the coastal vulnerability index. The coastal habitat layer represents the extent, approximate location and type of intertidal wetlands. The submerged aquatic habitat layer is a compilation of eelgrass data.

Station 4 Working Lands

14 Working Lands

4a) USDA NASS Land Cover (1411,1412,1413)

The US Department of Agriculture's National Agriculture Statistical Service annual developed refined National Land Cover Dataset with detailed agricultural land use types. This map has reclassed all of the agricultural uses into two categories: 1) Market Ag, 2) Intense Ag. The detailed classes in each category are listed here, from most to least number of acreages in the Delmarva peninsula:

Market Ag = Watermelons, Dry Beans, Potatoes, Peaches, Apples, Pumpkins, Peas, Peppers, Cucumbers, Grapes, Clover/Wildflowers, Blueberries, Cantaloupes, Sweet Potatoes, Other Crops, Tomatoes, Misc Vegs & Fruits, Cabbage

Intense Ag = Corn, Soybeans, Dbl Crop WinWht/Soybeans, Grassland/Pasture, Other Hay/Non Alfalfa, Dbl Crop Barley/Soybeans, Sod/Grass Seed, Fallow/Idle Cropland, Alfalfa, Winter Wheat, Sorghum, Dbl Crop Corn/Soybeans, Dbl Crop Barley/Corn, Cotton, Dbl Crop WinWht/Corn, Barley, Millet, Switchgrass, Dbl Crop WinWht/Sorghum, Rye, Rape Seed, Christmas Trees, Dbl Crop Soybeans/Oats, Triticale, Oats, Aquaculture, Tobacco

4b) Soil Productivity (1421, 1423)

This map shows just the soil productivity for NASS agricultural land cover. The parcel boundaries are all of the LSP analysis parcels (26,617). Parcels with red are in an agricultural land use and have the highest productivity (144). Protected lands and easements are also on the map (145)

4c) Agricultural land use & Riparian habitat condition (1422)

This map shows agricultural areas in conjunction with Nature's Network areas recommended as restoration areas or buffer areas for a regional network of habitats critical for sustaining populations of imperiled species. The habitat condition data can also be used as a tool for planning the recovery of populations and restoration of their habitats where habitat importance for imperiled species is high but ecological integrity is poor. In general, the habitat condition analysis indicates that riparian areas, including associated sandplains and other unique lowland habitats, are the most critical for the imperiled species assessed. Note that the most intact 1/3 of areas recommended for protection have no color on this map.

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