CHAPTER 6. SYNTHESIS OF CONSERVATION PRIORITIES

Criteria to Set Conservation Priorities

Throughout the preceding basin and habitat sections, we detail many specific conservation priorities, such that within a particular basin or habitat, a reader can assess the most pressing needs and actions. But we also wanted to assess cross-cutting strategies that provide straightforward direction among and across basins and habitats, over the first cycle of Plan implementation. This chapter is dedicated to doing just that. In order to assess priorities among basins and habitats, Technical Committee team members developed the following model (Figure 6.1). The criteria described below can be applied to individual species, groups of species, habitats, or ecosystem processes (i.e., an "element").

Tier 1 – Ideal criteria to assess ("what's most important?"):

- Risk/threat: Immediacy and/or severity of threats to element.
- Need: Conservation needs not being adequately addressed by an existing program or funding source
- Knowledge: Knowledge gaps or deficiencies necessary to making a conservation decision

Tier 2 – Realistic considerations to assess ("what will produce the best results?"):

- **Feasibility (cost/ benefits analysis)**: Degree to which initiating conservation actions will be worth the cost/effort; degree to which actions can mitigate a threat, impact a solution
- Benefit: Degree, longevity, and magnitude of conservation benefits (ecological, educational, social, and/or economic)
- Funding: Match opportunities
- Partnerships: Partnership opportunities, ability to leverage resources
- Opportunity: Reducing reactive opportunities, promoting/enhancing proactive opportunities

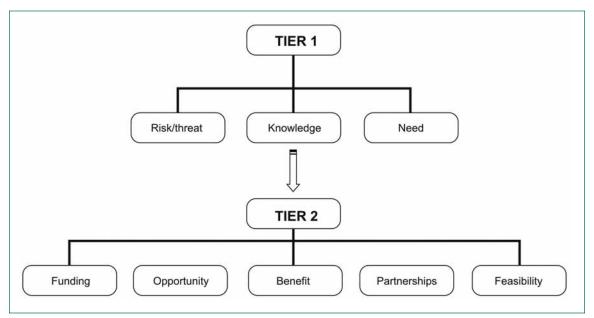


Figure 6.1. Conceptual conservation action priorities model.

Priority Conservation Actions

Prioritized conservation actions will be implemented across multiple individual projects during Plan implementation. In order to develop a logical framework for prioritizing specific conservation actions and performance indicators, we first grouped conservation actions and potential indicators into generic categories (Table 6.1).

| Table 6.1 . Generic conservation actions and potential performance in | ndicators | tor each. |
|--|-----------|-----------|
|--|-----------|-----------|

| Generic Conservation Action Category | Potential Performance Indicators |
|---|---|
| Surveys, research | # of areas surveyed, # of new survey sites, # of species/populations located, # of species trapped/tagged/located, compilation of new data collected, new information on distribution, population size estimates, measures of life history metrics, survival, competition, predation, response to management |
| Monitoring | # of new monitoring sites or species protocols established, # of species for which trend information can be assessed, # of species for which population targets can be assigned, compilation of habitat trend information, # of projects for which monitoring information led to adaptive management, identification of causal factors in population change, # of adaptive management decisions (as a result of monitoring) |
| Land protection (acquisition, easements, buffers) | # of acres protected in buffers/conservation easements/purchase, # of sites posted, # of cooperative habitat protection projects, quantitative changes in degree of habitat fragmentation, connectivity |
| Habitat and watershed management | # of acres/miles of stream length restored or managed, measures of flow/water quality/habitat quality improvements, measures of species diversity/composition |
| Population management | # of individuals removed/added to a site, evidence of new colonization, # of restoration plans initiated |
| Data standards development, data management | # of species tracked, # of species with new data available, # of users, # of data exchanges, # of new data sources, user evaluations/comments |
| Program coordination, cooperation | # of partnerships developed, # of information exchanges (e.g., meetings, reports, data), # of Memorandum's of Agreement/Understanding |
| Education/outreach products, programming, surveys | # of media/outreach products developed, # of audiences reached, # of participants in programs, # of presentations given, # of programs offered, # of reports/presentations/publications given, # of positive/negative comments from public, # of surveys/polls initiated, # of public interactions/ educational opportunities |
| Technical guidance, permit review | # of sites visited, # of plans/permits commented on, % of recommendations implemented, measures of degree of compliance and quality of compliance, # of project partnerships established, # of permits commented on, # of best management practice (BMP) recommendations made |

Next, biologists on the Technical Committee applied the model above (Figure 6.1) to synthesize and prioritize across the individual habitat and river basin sections and to identify cross-cutting conservation actions (considering the 5-year time frame for the next revision of the Plan). Stakeholders were then called upon to help refine and revise conservation actions, objectives, and performance indicators through review and comment.

Starting with our broadest organizing theme, the Plan goals, we have organized cross-cutting priority conservation actions to fit with the following 'step-down' framework (Figure 6.2) (also see Tables 6.2-6.6):

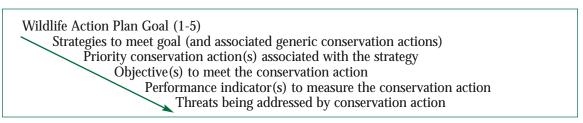


Figure 6.2. Step-down framework for organizing cross-cutting conservation action priorities.

This level of organization is not meant to supersede the conservation actions identified within the preceding sections of Chapter 5. Rather, this organizational framework takes a broader-scale approach to synthesizing those needs. We anticipate that those who will use this Plan as a resource and planning guide will look to the habitat or basin-specific conservation actions as much as they will use this broader-brush approach.

Table 6.2. Goal 1: Improve our understanding of the species diversity of North Carolina and enhance our ability to make conservation management decisions for all species.

| Strategies that Address Goal (associated generic conservation actions) | Priority Conservation Action(s) | Objective(s) | Performance Indicator(s) | Threat(s) Addressed by Conservation Action |
|--|--|--|--|---|
| Expand information base for priority species (surveys, research) | Establish baseline status and distribution information for priority species, and their habitats, to facilitate long-term monitoring and to fill critical data gaps | Inventory and survey for poorly understood priority species (see priority species tables in Chapter 2 for indication of knowledge): • Amphibians • Reptiles • Mammals • Birds • Fish* • Mollusks* • Crayfish* *especially recently recognized taxa Determine distribution of potentially injurious non-native species (e.g., red swamp crayfish). | # of species for which baseline data has been collected # of species for which 'knowledge' scores (Species Prioritization process) improve # of species for which threats are conclu- sively identified | Limited knowledge Data gaps |
| | Conduct research to resolve questions of life history, productivity, and mortality factors for priority species | Obtain data on mortality factors impacting priority species groups (e.g., in the Coastal Plain, sea birds, landbirds, sea turtles, snakes) Focus productivity studies on early successional waterbirds on estuarine islands, and landbirds utilizing high priority habitats Initiate northern flying squirrel genetics and habitat assessment research Expand research on priority fish, mollusk, and crayfish species to improve basic understanding of population dynamics, life history, and habitat requirements | # of species for which explored factors (e.g., mortality, life history) could be assessed # of management plans/ conservation actions influenced by research results | Limited knowledge Data gaps Inability to determine vulnerability to or mitigate against threats Declining productivity Declining populations levels |
| | Resolve taxonomic problems that potentially affect conservation priorities | Pursue formal descriptions for known or putative undescribed species Improve ability to identify cryptic or narrowly differentiated taxa | # of species or taxa assessed/verified | Limited knowledge Misinformation Data gaps |

Table 6.2 (*continued*). Goal 1: Improve our understanding of the species diversity of North Carolina and enhance our ability to make conservation management decisions for all species.

| Strategies that Address Goal (associated generic conservation actions) | Priority Conservation Action(s) | Objective(s) | Performance Indicator(s) | Threat(s) Addressed by Conservation Action |
|---|---|--|--|--|
| Expand information on long-term trends across species groups, habitats, and management actions (monitoring) | Continue and expand monitoring of high priority species and species groups to inform priority status revisions, conservation priority revisions, and management decisions | Expand or continue long-term monitoring of select species/groups, e.g.: • Sea turtle nesting and stranding • Red-cockaded woodpecker nesting • Landbird population trends • Waterbird populations • Northern flying squirrels • Peregrine falcons • Bald eagles Establish monitoring protocol, schedule, and sites to determine population trends for other priority aquatic and terrestrial species (e.g., standardized aquatic monitoring stations, bird species not adequately sampled in existing efforts- nocturnal species, landbirds not easily tracked by BBS, waterbirds) Monitor spread and impacts of potentially injurious non-native species | # of populations/ sites/species monitored # of routes/sites surveyed # of new monitoring programs/protocols initiated Progress towards assessing population targets | Limited knowledge Data gaps |
| | Improve understanding of habitat trends and key habitat associations for priority species | Improve habitat mapping capabilities Expand participation in collaborative habitat trend monitoring Identify threats to key habitats | # of habitats accurately mapped # of habitats for which trends can be assessed # of threats decisively identified for key habitats | Limited knowledgeData gapsMissed acquisition opportunities |
| | Monitor the implementation of specific conservation actions | Assess aquatic species restoration efforts Assess habitat restoration efforts (e.g., dredge island renourishment, hydropower remediation, stream/wetland/riparian restoration or mitigation) | # of assessment projects | Habitat degradation Declining populations/ productivity |

Table 6.3. Goal 2: Conserve and enhance habitats and the communities they support.

| Strategies that Address Goal (associated generic conservation actions) | Priority Conservation Action(s) | Objective(s) | Performance Indicator(s) | Threat(s) Addressed by Conservation Action |
|---|--|--|---|---|
| Promote and support habitat protection efforts (land acquisition, easements, buffers) | Identify priority areas for habitat conservation and restoration through acquisition and easements (also see Chapter 4C) | Protect (fee title or easement) additional quality habitats of the following types: • Beach/estuarine islands • Maritime forest • Longleaf pine forest • Floodplain forest • Early successional habitats • Small wetland communities • Mountain bogs • Rock outcrops • Caves and mines • High elevation forest • Streams and riparian zones • Other strategic parcels (e.g., unfragmented tracts > 1000 ac.) Prioritize aquatic sites, considering: • Species diversity • Rare and/or endemic species • Specific areas critical to the survival of priority species (e.g., particular streams or spawning sites) and, • Areas recognized by previous prioritization efforts (e.g., areas identified in Smith et al. 2002, NC Natural Heritage Program SNHAs) Influence consideration of broader conservation priorities (e.g., aquatic and terrestrial habitat priorities identified in the Plan) by the Commission Coordinate prioritization of conservation partners (e.g., local, state, and federal government agencies, land trusts, etc.) | # of acres acquired or protected # of long-term cooperative habitat protection projects # of completed site inventories Adoption of a standardized procedure for Commission land acquisition # of acquisition processes that incorporated considerations/ priorities identified in the Plan | Habitat conversion Habitat loss Incompatible forestry and farming practices Pollution and sedimentation Inappropriate development |
| Manage and restore terrestrial and aquatic habitats to maintain ecological function (habitat and watershed management) | Reintroduction and continued use of prescribed fire, especially in dry coniferous woodlands, longleaf pine, pocosin, and wet pine savanna habitats | Work with private landowners to encourage and facilitate burning on their properties in fire-dependent ecosystems Continue burning lands in conservation ownership (e.g., Game Lands) on a regular rotation Cooperate with non-governmental organizations and governmental agencies to encourage, facilitate, and/or provide technical guidance on prescribed fire Educate the public about the importance and role of fire in coastal ecosystems | # of acres burned # of technical guidance interactions # of educational efforts | Fire suppression Incompatible management practices |

Table 6.3 (continued). Goal 2: Conserve and enhance habitats and the communities they support.

| Strategies that Address Goal (associated generic conservation actions) | Priority Conservation Action(s) | Objective(s) | Performance Indicator(s) | Threat(s) Addressed by Conservation Action |
|--|--|---|---|--|
| Manage and restore terrestrial and aquatic habitats to maintain ecological function (habitat and watershed management) (continued) | Actively manage habitats that can support stable or growing populations of key priority species groups. This can occur both directly (on Commission lands) and indirectly (through partnerships with state/federal agencies, non-governmental organizations, private landowners) | Actively manage (as needed) the following important habitats: • Beach/dune • Longleaf pine • Early successional habitat • Bogs/wetlands • High elevation forest • Riparian zones • Fire maintained ecosystems (see conservation action above) Increase adoption of farming and forestry management practices that positively affect grassland and shrubland priority species Increase adoption of wildlife-friendly Farm Bill programs, especially within CURE focal areas | # of acres/miles of stream positively affected by management Population response to management Measures of habitat quality/water quality improvements | Land conversion Inappropriate development Fire suppression Successional changes Incompatible management practices |
| | Pursue restoration of wetland and early successional habitats | Promote wetland restoration projects (key for wetland breeding amphibians) Promote restoration of Piedmont Prairies through native seed propagation, acquisition of sites with appropriate soils, and active management | # of acres/sites restored Population response to restoration | Land conversionDevelopmentWetland drainageFire suppressionSuccessional changes |
| | Incorporate aquatic and riparian habitat conservation and restoration priorities in land and water use planning and practice | Incorporate aquatic conservation priorities in Commission Watershed Enhancement Program and Game Lands management Influence management and restoration efforts of other state and federal programs, and nongovernmental organizations, regarding aquatic conservation priorities Influence county and regional land and water use planning to conserve and restore riparian habitats, water quality and quantity, and hydrology | # of technical guidance interactions # of decision making protocols changed to include aquatic conservation priorities | Aquatic habitat degradation Habitat loss Species diversity loss Pollution and sedimentation Lack of information/consideration of aquatic conservation priorities |
| Manage and restore populations to maintain sustainable communities of species (population management) | Reintroduce or augment priority species populations in areas where water quality and/or habitats have recovered sufficiently to support them | Re-establish fish and mollusk populations within species' historic range Establish means and protocol for bog turtle captive breeding program Develop plans for bog turtle reintroductions Improve long-term sustainability of imperiled species by increasing population numbers, strengthening metapopulation structure, and reducing vulnerability to isolated catastrophic events or genetic problems Pursue augmentation/reintroduction to fulfill recovery goals for federally listed species | # of populations established Proof of reproduction/ increased productivity rates Federal or state-listed species de-listing or down-listing | Species diversity loss Reduced productivity Unsustainable population sizes |

Table 6.4. Goal 3: Foster partnerships and cooperative efforts among natural resource agencies, organizations, academia, and private industry.

| Strategies that Address Goal (associated generic conservation actions) | Priority Conservation Action(s) | Objective(s) | Performance Indicator(s) | Threat(s) Addressed by Conservation Action |
|--|--|--|--|---|
| Improve data collection, management, and dissemination within and among agencies (data standards development, data management) | Enhance Commission data standards, management and coordination/sharing in order to facilitate improved data accuracy and precision through access to all available and relevant data | Expand comprehensive species database to include additional Species Viability Tool fields as data and resources allow [developed by Jeff Holmes(TNC) and adapted by South Carolina and Arkansas for use in their Strategies] Work to integrate NC Natural Heritage Program database upgrades and the species database Standardize existing database output specific to current research projects to improve summarization of data for 'big-picture' analyses and ease information exchange with partners (e.g., NC Natural Heritage Program) | # of species/species groups tracked # of data users Extent of new data sources, analyses possible # of data requests/ exchanges | Data gaps Inefficient use of data Insufficient knowledge that data already exists |
| | | Develop and maintain a database of existing species and habitat conservation plans for easy reference and future revisions, including parameters such as population objectives, priority species listings, habitat priorities, management recommendations, etc. | | |
| | | Develop and maintain a centralized project tracking database to facilitate straightforward monitoring of progress towards conservation actions and, ultimately, Plan goals (see Chapter 8 for further discussion) | | |
| | | Develop comprehensive agency permitting database and mechanisms for data incorporation derived through agency permits | | |
| | | Pursue development of web-based information systems to facilitate data exchange among partners, with appropriate limitations on access and use | | |
| | | Develop and distribute metadata for existing databases | | |
| | | Improve ability to be spatially explicit (map species locations, habitat coverages) and link spatial (GIS) data to the species database to connect distribution and habitat information (cooperate with NC Natural Heritage Program) | | |
| | | Improve ability to assess habitat/land-use trends over time | | |

Table 6.4. (*continued*). Goal 3: Foster partnerships and cooperative efforts among natural resource agencies, organizations, academia, and private industry

| Strategies that Address Goal (associated generic conservation actions) | Priority Conservation Action(s) | Objective(s) | Performance Indicator(s) | Threat(s) Addressed by Conservation Action |
|--|--|---|---|--|
| Support partnerships to achieve common goals, improve efficiency and prevent duplication of efforts (coordination, partnerships) | Pursue cooperation and collaboration with other state and federal agencies, non-governmental organizations, colleges and universities and other conservation groups to facilitate implementation of priority conservation actions and Plan goals | Expand and reinforce relationships between natural resource agencies and local entities (e.g., bird clubs, Project Bog Turtle, NC Herpetological Society) Support and pursue partnerships to reach shared priorities through ongoing conservation initiatives in North Carolina, e.g., • Coastal Habitat Protection Plan • One North Carolina Naturally Initiative • Albemarle-Pamlico National Estuary Program • Onslow Bight Conservation Forum • Triangle Greenprint Increase communication, cooperation and collaboration among conservation partners at the state, regional, and nation scales via partnerships and working groups, e.g., • Atlantic Coast Joint Ventures • Appalachian Mountains Bird Conservation Region • Partners in Flight • Robust Redhorse Conservation Committee • South Atlantic Migratory Bird Initiative • Partners in Amphibian and Reptile Conservation • US Fish & Wildlife Service Ecosystem Teams Develop new partnerships to coordinate conservation efforts and address conservation needs in the Yadkin-PeeDee corridor, Uwharrie Mountain region, and in the northern tier counties of the Piedmont | # of active partnership efforts # of new partnerships developed # of information exchanges (e.g., meetings, reports, data) Project specific results of collaborative efforts | Redundant efforts Inefficient use of resources (potentially leading to missed opportunities) 'Reinventing the wheel' |

Table 6.5. Goal 4: Support educational efforts to improve understanding of our wildlife resources among the general public and conservation stakeholders.

| Strategies that Address Goal (associated generic conservation actions) | Priority Conservation Action(s) | Objective(s) | Performance Indicator(s) | Threat(s) Addressed by Conservation Action |
|---|--|---|---|--|
| Disseminate information to selected audiences through appropriate media (education, outreach) (also see Chapter 4D) | Improve, maintain, and develop new web-based resources to share with partners | Provide accessible information on distribution, biology, status, threats, etc. for priority species groups (cooperate with the NC Natural Heritage Program) Update online crayfish and mussel atlases Complete on-line fish atlas w/federal and state listed species | # of web-products developed/updated # of audiences/ partners reached | Lack of information Inefficient information exchange |
| | Build education and outreach components into project implementation to facilitate information exchange and education in appropriately timely and geographically focused ways | Develop and disseminate print media, including: stand alone documents, press releases, newspaper and magazine articles, and displays Increase volunteer opportunities on projects Develop programming and public presentations to advertise agency projects/initiatives/results | # of media/outreach products # of audiences reached, programs given # of reports/ publications distributed # of participants/ volunteers | Lack of information Fear/misunderstanding Misinformation Public indifference |
| Identify public perceptions towards wildlife resources (human dimensions surveys) | Support and assist in implementation of surveys and polling to assess North Carolina resident attitudes and knowledge of specific wildlife resources highlighted in the Plan | Identify specific survey needs and target population subsets (e.g., urban residents, private landowners) Initiate public/user group polls, stakeholder/focus group meetings Develop response actions targeting needs identified from surveys | # of surveys/polls initiated # of survey returns | Misinformation Lack of wildlife knowledge Fear/misunderstanding |
| Promote and expand public participation in agency programs (education, outreach) | Increase efforts of volunteer recruitment when possible | Obtain useful data from volunteer projects | # of new volunteers # of in-kind support hours | Inefficient volunteer recruitment |

Table 6.6. Goal 5: Support and improve regulations and programs aimed at improving and protecting habitats and communities.

| Strategies that Address Goal (associated generic conservation actions) | Priority Conservation Action(s) | Objective(s) | Performance Indicator(s) | Threat(s) Addressed by Conservation Action |
|---|---|---|---|--|
| Increase efficiency and effectiveness of guidance and review processes aimed at minimizing negative impacts on species and habitats (technical guidance, permit review) | Provide direct technical guidance to private landowners, state and federal land managers, and regulatory agencies on key habitats and species | Provide technical guidance for bald eagle, red- cockaded woodpecker, waterbirds, sea turtles, peregrine falcon, bog turtle, bats, landbirds, and other priority species Focus technical guidance for aquatic species on conserving and restoring water and habitat quality, especially in priority aquatic areas | # of landowner/ agency contacts # of projects reviewed % of recommendations implemented Measures of degree of compliance | Lack of information Misinformation Poor/improper management techniques |
| | Participate in planning and implementation processes by providing supporting information, conservation priorities, and other technical guidance | Work through the Federal Energy Regulatory Commission relicensing process and other opportunities to mitigate negative impacts from hydropower development Support establishment of riparian buffers along streams, implementation of low impact develop- ment, and better stormwater management (e.g., secondary and cumulative impacts) through program coordination, cooperative projects, and technical guidance Support incentive and information programs that help reduce sedimentation and erosion (e.g., fencing livestock from streams, improve tilling practices), minimize pesticide and herbicide use, and modernize wastewater treatment facilities | # of projects/review processes participated in # of cooperators # of technical guidance interactions % of recommendations implemented Measures of degree of compliance | Lack of information Misinformation Poor/improper management techniques |
| Increase efficiency and effectiveness of statutes, rules, regulations and review processes affecting priority species and habitats (rules and regulations) | Support and utilize species listing processes and associated programs to conserve imperiled species and their habitats | Standardize the species listing process under the state Endangered Species statutes Provide information and technical guidance to the federal species listing processes Improve coordination with US Fish & Wildlife Service to focus Section 6 (US Endangered Species Act) activities on priorities for listing and recovery Investigate, implement, and support (as appropriate) programs that are directed at listed species recovery (e.g., Habitat Conservation Planning, Landowner Incentive Program, Safe Harbor) | Changes/standards applied to the listing process Efficiency of coordination among agencies # of landowner agreements/ participants in programs aimed at listed species recovery | Species imperilment/ loss factors Inefficient listing procedures Inefficient coordination/ recovery activities |
| | Support review of and improvements to existing regulations aimed at protecting species and habitats | Analyze and promulgate appropriate regulations to minimize negative affects of activities detrimental to wildlife populations (e.g., 2004 turtle regulations) Support water quality rules and watershed designations (e.g., Outstanding Resource Waters and High Quality Waters) that conserve habitats for priority aquatic species. | Adherence to schedules for rules review and updates # of regulation change proposals # of species protected from unregulated use or impact # of regulation changes that enhance or protect wildlife or habitat Amount of habitat affected | Inefficient volunteer recruitment |

Table 6.6 (continued). Goal 5: Support and improve regulations and programs aimed at improving and protecting habitats and communities.

| Strategies that Address Goal (associated generic conservation actions) | Priority Conservation Action(s) | Objective(s) | Performance Indicator(s) | Threat(s) Addressed by Conservation Action |
|---|--|---|---|---|
| Improve coordination with local and regional land-use planning efforts and regulatory agencies (coordination, technical guidance) | Protection of unfragmented landscapes and key habitats through land use planning. This is especially critical in these regions: • PeeDee river/Uwharrie region • The northern tier of Piedmont counties (Stokes, Rockingham, Caswell, Person) • Lands identified in the Triangle Greenprint report (NCDPR et al. 2002) • Lands identified by the Sandhills Conservation Partnership (Nelson 2004) • Lands identified by the Onslow Bight Conservation Forum (OBCDC 2004) | Identify highest priority lands within priority regions for open space protection (in coordination with partners) Encourage the adoption of growth management plans by county/municipal governments Work with zoning and planning boards to steer development away from priority areas and habitats | # of local/regional conservation plans created # of partners in the planning and implementation process # of counties that adopt or positively amend growth management plans # of zoning regulations influenced | Habitat conversion Habitat loss Inappropriate development |

References

N.C. Division of Parks and Recreation (NCDPR), Triangle J Council of Governments, and Triangle Land Conservancy. 2002. Triangle GreenPrint regional open space assessment. Raleigh, NC.

Nelson, L. 2004. Final draft site conservation plan for the North Carolina Sandhills. Unpublished.

Onslow Bight Conservation Design Committee (OBCDC). 2004 (DRAFT). Onslow Bight conservation design plan. North Carolina Onslow Bight Conservation Forum.

Smith, R. K., P. L. Freeman, J. V. Higgins, K. S. Wheaton, T. W. FitzHugh, K. J. Ernstrom, and A. A. Das. 2002. Priority areas for freshwater conservation action: a biodiversity assessment of the Southeastern United States. The Nature Conservancy.