Natural Resource Indicator recommendations

Final version: March 4, 2013

Overview

The 2-4 year mission of the South Atlantic LCC is to "design a shared blueprint for landscape conservation actions that sustain natural and cultural resources in the South Atlantic region". Designing and evaluating the success of this blueprint will require some specific measures of what success would look like for natural resources. The ecosystems of the South Atlantic are complex and indicators help simplify the modeling and monitoring of those systems

These recommendations are based on detailed input from 235 experts in marine, freshwater, and terrestrial resources in the South Atlantic region and 9 experts representing all 5 adjacent LCCs. This input includes:
- 197 online reviews
- Feedback on opportunities for sharing indicators across LCC boundaries from all adjacent LCCs
- Input from regional partnerships (e.g., Atlantic Coast Joint Venture, Southeast Aquatic Resources Partnership, Atlantic Coast Fish Habitat Partnership, Southeast Partners in Amphibian and Reptile Conservation, Albemarle-Pamlico National Estuary Partnership)
- Phone interviews with 18 local experts
- Integration of all feedback and final recommendations by the 20 members of the selection team

Indicator recommendations are based on the ecological, practical, and social criteria identified in the South Atlantic LCC Natural Resource Indicator process. The ecological criteria focus on how well indicators capture key ecosystem elements and major landscape threats. The practical criteria focus on the ability to monitor and model the indicators based on current resources and efforts. The social criteria focus on how well the indicators resonate with a wide variety of audiences capable of changing the landscape.

Selection team members

Beth Stys	Florida Fish and Wildlife Conservation Commission
Reggie Thackston	Georgia Department of Natural Resources
Jan MacKinnon	Georgia Department of Natural Resources
Jimmy Evans	Georgia Department of Natural Resources
Jon Ambrose	Georgia Department of Natural Resources
Joe DeVivo	National Park Service
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Ryan Heise	North Carolina Wildlife Resources Commission
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Roger Pugliese	South Atlantic Fishery Management Council
David Whitaker	South Carolina Department of Natural Resources
Mark Scott	South Carolina Department of Natural Resources
Breck Carmichael	South Carolina Department of Natural Resources
Billy Dukes	South Carolina Department of Natural Resources
Maria Whitehead	The Nature Conservancy
Lisa Perras Gordon	US Environmental Protection Agency
Wilson Laney	US Fish and Wildlife Service
John Stanton	US Fish and Wildlife Service
Duke Rankin	US Forest Service
Brian Watson	Virginia Department of Game and Inland Fisheries

Quick recommendation summary

Beaches and dunes

Productivity of loggerhead sea turtles
Index of beach birds
Miles of altered beach

Estuarine

Index of coastal condition
Index of estuarine birds
Percent of impervious cover

Forested wetlands

Acres of forested wetlands
Index of forested wetland birds
Acres of natural habitat near isolated wetlands

Freshwater aquatic

Percent of natural habitat near rivers and streams
Percent of impervious cover
Index of biotic integrity

Landscapes

Index of functional connectivity
Acres of interior natural communities
Index of structural connectivity
Acres of "biodiversity hotspots" in natural condition

Marine

Abundance of gag grouper
Abundance of red drum
Index of nearshore forage fish

Maritime forest

Abundance of painted bunting
Acres in protected status

Pine woodlands, savannas, and prairies

Index of pine woodland, savanna, and prairie birds
Acres of open canopy habitat that is regularly burned
Occurrence of flatwoods salamanders

Tidal and nontidal freshwater marshes

Index of tidal and nontidal freshwater marsh birds
Acres of tidal freshwater marsh
Acres of invasive species

Upland hardwood forests

Acres of "biodiversity hotspots" in natural condition
Abundance of big trees
Index of upland hardwood birds

Waterscapes

Index of fish passage
Number of dams mimicking natural flow

Detailed recommendations by ecosystem

Beaches and dunes indicators

This ecosystem includes all of the beach and dune ecosystems of the South Atlantic

Productivity of loggerhead sea turtles

Reason for selection

Loggerhead sea turtles provide an indicator of human disturbance and nest predation pressure for beach nesting species, are well monitored, and resonate with a diversity of audiences

Target

14,000 nests with the average nest success rates for the region (based on the species recovery plan)

Index of beach birds

Reason for selection

This index represents a variety of ecosystem features and is already being modeled and monitored for the entire region by the Atlantic Coast Joint Venture. Species in the index include: Piping Plover, American Oystercatcher, Wilson's Plover, Red Knot, Least Tern

Target

Reach wintering and breeding population goals identified in the SE Waterbird and Shorebird plan

Miles of altered beach

Reason for selection

Altered beach (including jetties, groins, and other shoreline hardening) provides a measure of overall habitat alteration and is generally well monitored

Target

Decrease miles by 50% and restore 25% to natural high quality beach habitat

Estuarine indicators

This ecosystem extends upstream to head of tide and seaward to the mouth of the estuary

Index of coastal condition

Reason for selection

This index measures the overall abiotic condition of the system, is well monitored, and is synthesized by the EPA every 5 years. It integrates measures of water quality, sediment quality, benthic habitat quality, coastal wetlands and fish tissue contaminants

Target

All parameters rank at least "good"

Index of estuarine birds

Reason for selection

This index represents a variety of ecosystem features and is already being modeled and monitored for the entire region by the Atlantic Coast Joint Venture. Species in the index include: Seaside Sparrow, Nelson's Sharp-tailed Sparrow, Saltmarsh Sharp-tailed Sparrow, American Black Duck, Wood Stork, Redhead, and Canvasback

Target

Reach breeding and wintering population goals identified in SE Waterbird and Shorebird plan, NAWMP, Atlantic Coast Joint Venture, and Partners in Flight plans

Percent of impervious cover

Reason for selection

Impervious cover is easy to monitor and model, widely used and understood by diverse partners, and is strongly linked to water quality and freshwater inflow

Target

No catchments with more than 10% impervious cover

Forested wetlands

This ecosystem includes forested wetlands on organic soils (e.g., poccosins, carolina bays) and mineral soils (e.g., bottomland hardwood forests, floodplain forests)

Acres of forested wetlands

Reason for selection

Overall acreage provides an indicator of whether forested wetlands being inundated by sea level rise are being replaced or restored somewhere else, is well monitored, and resonates with a diversity of audiences

Target

No net loss of protected forested wetlands

Index of forested wetland birds

Reason for selection

This index represents a variety of ecosystem features and is already being modeled and monitored for the entire region by the Atlantic Coast Joint Venture. Species in the index include: Prothonotary Warbler, Swainson's Warbler, Yellow-throated Warbler, Wood Duck, Swallow-tailed Kite, Cerulean Warbler, Black-throated Green Warbler, Brown-headed Nuthatch, Northern Parula, Chuck-will's-widow, Red-headed Woodpecker, and Red-cockaded Woodpecker

Target

Meet Partners In Flight population objectives for all species

Acres of natural habitat near isolated wetlands

Reason for selection

Natural habitat near isolated wetlands provides a measure of the overall condition of isolated wetlands which is not well captured by the bird index or overall forested wetland acreage indicator, is generally well monitored, and resonates with a diversity of audiences

Target

Increase natural habitat within 200m of isolated wetlands by 25%

Freshwater aquatic

This ecosystem includes lakes, rivers, and streams

Percent of natural habitat near rivers and streams

Reason for selection

Habitat near rivers and streams is strongly linked to water quality and instream flow, is easy to monitor and model, and is widely used and understood by diverse partners. These buffers provide a "frontline defense" for aquatic systems

Target

Ensure 85% natural habitat within 100ft of rivers and streams

Percent of impervious cover

Reason for selection

Impervious cover provides an indicator of water quality and freshwater instream flow that captures land cover patterns throughout the catchment, is easy to monitor and model, and is widely used and understood by diverse partners

Target

Maintain percent of catchments that have 10% or less impervious cover

Index of biotic integrity

Reason for selection

The Index of Biotic Integrity (IBI) provides an indicator of additional elements of water quality not well covered by the other indicators above, is well monitored, and is widely used by diverse partners. This indicator uses the IBI data and classes used by states as biocriteria in determining the 303(d) list of impaired watersheds.

Target

Double the number of sites with a high IBI score for the region of each state that overlaps the South Atlantic LCC (Target is stratified by state due to variations in IBI scoring between states)

Landscapes

This ecosystem focuses on the connections across all terrestrial ecosystems

Index of functional connectivity

Reason for selection

This index provides an indicator of connectivity from the perspective of multiple species with different home range sizes and connectivity requirements, is being modeled through a SALCC funded project, and resonates with a diversity of audiences. Species in the index include: Black Bear, Timber "Canebrake" Rattlesnake, Eastern "Diamondback" Rattlesnake, and Box Turtle

Target

Maintain viable populations of all species

Acres of interior natural communities

Reason for selection

Acres of interior natural communities (including early successional habitats) provide an indicator of large patches of natural communities, are easy to monitor and model, and are widely used and understood by diverse partners

Target

Increase acres of natural communities >200m from an anthropogenic edge by 50% using patches of at least 10,000 acres

Index of structural connectivity

Reason for selection

This index provides an indicator of how well natural habitat is connected in general without using species specific thresholds, is already modeled nationally, and resonates with a diversity of audiences

Target

Increase acreage of highest value connections in protected status by 50%

Acres of "biodiversity hotspots" in natural condition

Reason for selection

This indicator provides an indicator of landscape condition for rare and range restricted organisms, is easy to monitor and model, and resonates with a diversity of audiences. Areas with rare soil types are being used to represent "Biodiversity hotspots" in the South Atlantic

Target

Increase acres of unique soil types (proxy for "hotspots") in protected status by 50%

Additional comments

The group expected indicators #1 and #3 to be highly correlated and so is recommending 4 total indicators. The group expects that #1 and #3 would either be merged or only one would be retained in the future

Marine

This ecosystem goes from either the mouth of the estuary or the splash zone affected by breaking waves to the 200 mile EEZ in the central ocean

Abundance of gag grouper

Reason for selection

Gag grouper provide an indicator of hard bottom habitat condition in state and federal waters, are relatively well monitored, and resonate with a diversity of audiences. The intention is for this indicator to evolve to an index that covers the overall snapper/grouper complex.

Target

Increase Catch Per Unit Effort (CPUE) in fishery independent sampling by 20%

Abundance of red drum

Reason for selection

Red drum provide an indicator of nearshore ocean bottoms, are well monitored, and resonate with a diversity of audiences

Target

Increase spawning stock by 10%

Index of nearshore forage fish

Reason for selection

This index provides an indicator of the prey base for larger fish, seabirds, and marine mammals, is well monitored, and resonates with a diversity of audiences. Species include: Atlantic Croaker, Spot, Star Drum, Brief Squid, and Whiting (Menticirrhus americanus)

Target

Catch Per Unit Effort (CPUE) for all species remains within 1 standard deviation of historic mean

Additional comments

The group plans to explore a number of other potential indicators in the testing / revision process

Maritime forest

This ecosystem includes all types of maritime forests

Abundance of painted bunting

Reason for selection

Painted bunting provides an indicator of habitat structure and configuration, are well monitored, and resonate with a diversity of audiences

Target

Increase population by 100% (based on Partners in Flight population objective)

Acres in protected status

Reason for selection

Acres in protected status provide an indicator of the overall status of the ecosystem, is easy to monitor and model, and is widely used and understood by diverse partners

Target

Double the acres in protected status

Additional comments

The group is only recommending two indicators as a starting point for this habitat type. This ecosystem originally included other forms of scrub-shrub habitat but the group felt that those habitats were better addressed through the other terrestrial ecosystem types.

Pine woodlands, savannas, and prairies

This ecosystem includes longleaf, loblolly, and slash dominated systems and the small number of prairies present in the South Atlantic

Index of pine woodland, savanna, and prairie birds

Reason for selection

This index represents a variety of ecosystem features and is already being modeled and monitored for the entire region by the Atlantic Coast Joint Venture. Species in the index include: Brown-headed Nuthatch, Bachman's Sparrow, Red-cockaded Woodpecker, Northern Bobwhite, American Kestrel, Red-headed Woodpecker, Prairie Warbler, Henslow's Sparrow, and Loggerhead Shrike

Target

Meet Partners In Flight population objectives for all species

Acres of open canopy habitat that is regularly burned

Reason for selection

This indicator represents the overall structure and condition of the habitat, is easy to monitor and model, and is widely used and understood by diverse partners

Target

Double the acres with < 60% canopy cover that's burned at a 2 year interval

Occurrence of flatwoods salamanders

Reason for selection

Flatwoods salamanders provide an indicator of the condition and arrangement of embedded isolated wetlands and is generally well monitored. The group intends for this to eventually evolve into a more diverse index of herpetofauna

Target

Group had insufficient herpetology expertise to set an initial target. Look to Southeast Partners in Amphibian and Reptile Conservation (SEPARC) to set target.

Tidal and nontidal freshwater marshes

This ecosystem includes all types of tidal and nontidal freshwater marshes

Index of tidal and nontidal freshwater marsh birds

Reason for selection

This index represents a variety of ecosystem features and is already being modeled and monitored for the entire region by the Atlantic Coast Joint Venture. Species in the index include: King Rail, American Black Duck, Northern Pintail, Least Bittern, Whimbrel, and Wood Stork

Target

Meet Waterbird and Shorebird initiative population objectives for all species

Acres of tidal freshwater marsh

Reason for selection

Overall acreage provides an indicator of whether tidal freshwater marsh being inundated by sea level rise are being replaced or restored somewhere else, is well monitored, and resonates with a diversity of audiences

Target

Maintain current acres

Acres of invasive species

Reason for selection

Acres of invasive species provides an indicator of habitat structure and quality and is generally well monitored

Target

Decrease acres by 50%

Upland hardwood forests

This ecosystem includes a variety of upland forest types ranging from dry upland forests to wetter hydric hammocks

Acres of "biodiversity hotspots" in natural condition

Reason for selection

This acreage provides an indicator of condition for rare and range restricted organisms, is easy to monitor and model, and resonates with a diversity of audiences. Areas with rare soil types are being used to represent "Biodiversity hotspots" in the South Atlantic

Target

Increase acres of unique soil types (proxy for "hotspots") in protected status by 50%

Abundance of big trees

Reason for selection

Abundance of big trees provides an indicator of mature habitat condition, is relatively easy to monitor, and resonates with a diversity of audiences. Big trees ("thumpers") are defined using a threshold based on the site index and a 6x DBH multiplier

Target

2 per 3000 acres (i.e., 2 per FIA point)

Index of upland hardwood birds

Reason for selection

This index represents a variety of ecosystem features and is already being modeled and monitored for the entire region by the Atlantic Coast Joint Venture. Species in the index include: Acadian Flycatcher, Louisiana Waterthrush, Kentucky Warbler, Swainson's Warbler, Cerulean Warbler, Hooded Warbler, and Wood thrush

Target

Meet Partners In Flight population objectives for all species

Waterscapes

This ecosystem focuses on the connections between freshwater and saltwater ecosystems

Index of fish passage

Reason for selection

The index of fish passage provides an indicator of connectivity, is easy to monitor and model, and resonates with diverse partners. The Index ranges from no passage for any species to complete removal of barrier. Includes level of passage for American Eel, River Herring, American Shad, Atlantic Menhaden, Striped Bass, and Sturgeon

Target

Increase mean index by 20%

Number of dams mimicking natural flow

Reason for selection

Number of dams mimicking natural flow provides an indicator of departures from the natural flow regime where flow is already being altered and is generally easy to monitor. A dam "mimicking natural flow" will be defined as a dam with at least one measure in it's operation plan that is intended to imitate natural flow patterns.

Target

100% of new FERC licensed and CORP projects include mimicking natural flow as part of the operational plan.

Additional comments

The group felt that a third indicator to capture instream flow would be important but unsure of the best one to use. This will be investigated in the indicator testing and revision process.