

APPENDIX E . PROPOSED METRICS AND THEIR DATA SOURCES FOR THE BASE SET OF FOREST SUSTAINABILITY INDICATORS FOR THE NORTHEASTERN AREA¹

NA Base Indicator	Metrics	Data Source
Criterion 1—Conservation of Biological Diversity		
1. Area of forest land relative to nonforest land, area of timberland, and area of reserved land	Total land area (acres)	USDA FS FIA
	Total forest area (acres, acres per resident population ratio)	USDA FS FIA U.S. Census Bureau
	Forest as a percent of all land	USDA FS FIA
	Timberland area (acres, acres per resident population ratio)	USDA FS FIA U.S. Census Bureau
	Reserved forest land (acres, acres per resident population ratio)	USDA FS FIA U.S. Census Bureau
2. Extent of area by forest type and by size class, age class, and successional stage	Forest area by forest type (SAF forest types) (which includes successional stage)	USDA FS FIA and ECOMAP; Compared with U.S. NVC types
	Size class by forest type (acres by d.b.h. size class)	USDA FS FIA
	Age class by forest type (acres by years)	USDA FS FIA
3. Degree of forest land conversion, fragmentation, and parcelization	<i>Fragmentation:</i> Average patch size Amount of edge Inter-patch distance?	Remotely sensed analysis (forested vs. nonforested)
	<i>Parcelization:</i> Private forest landowner track size	USDA FS FIA landowner survey
4. Status of species and communities of concern with focus on forest associated species	Number of Federally listed forest associated species (by status and major taxa and relative to total)	USDI F&WS, Federal T&E database List of “forest occurring” species from U.S. Roundtable on Sustainable Forests
	Number of State listed species (by status and major taxa and relative to total)	State T&E species lists (need to be accessed individually)
	Number of U.S. NVC Globally Rare Communities (number by class and relative to total)	ABI; U.S. NVC; USDA FS ECOMAP
	Number of State rare forest and woodland communities (number and relative to total)	Natural Heritage Network and NatureServe

¹ See the acronym glossary following the table for definitions.

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Criterion 2—Maintenance of Productive Capacity of Forest Ecosystems		
5. Area of timberland	Timberland area (acres)	USDA FS FIA
	Forest land area (acres)	USDA FS FIA
6. Annual removal of wood products compared to net growth	Net growth to removal (ratio)	USDA FS FIA
Criterion 3—Maintenance of Forest Ecosystem Health and Vitality		
7. Area and percent of forest affected by damaging agents such as insects, disease, exotic/native species, fire, storm, land clearance, and domestic animals	Insects and diseases (including exotics) (acres/region)	USDA FS FHM
	Number and abundance of nonnative plant species and communities	USDA FS FHM
	Mortality (per acre)	USDA FS FIA
	Fire (occurrence, acres burned, severity, and ignition source)	National Interagency Fire Management Integrated Database
	Storm damage (wind, hurricane, ice, snow)	USDA FS FIA; NOAA; States
	Land use change (forest land conversion)	USDA NRCS
	Animal browsing, animal population statistics	USDA FS FIA; other USDA agencies; States
	Drought/flooding	USDA FS FIA; NOAA
Criterion 4—Conservation and Maintenance of Soil and Water Resources		
8. Status of species and communities of concern with focus on forest associated species	Soil erosion Diminished soil organic matter and/or change in other soil chemical properties Compaction and/or change in other soil physical properties resulting from human activities	USDA FS FHM

NA Base Indicator	Metrics	Data Source
9. Area and percent of forest land adjacent to surface water and area of forested land by watershed	Forest land adjacent to surface water (acres, percent, acres and percent by watershed)	Remote sensing analysis
	Forest land per watershed (percent) (use same HUC level that IWI uses to identify watershed) (acres, geographic distribution—map)	USGS HUD
10. The condition and vulnerability of aquatic systems by watershed	Index of Watershed Indicators (IWI)	U.S. EPA, Office of Water
Criterion 5—Maintenance of Forest Contribution to Global Carbon Cycles		
11. Total forest ecosystem biomass and carbon pool and contribution of forest ecosystems to the total carbon budget	Ecosystem biomass (tons)	USDA FS, U.S. Global Change Research Program
	Carbon pool (metric tons)	USDA FS, U.S. Global Change Research Program
	Carbon flux (metric tons/year)	USDA FS, U.S. Global Change Research Program
Criterion 6—Maintenance and Enhancement of Long-term Multiple Socio-economic Benefits to Meet the Needs of Societies		
12. Value and volume of wood and wood products production, consumption, imports, and exports	Production (value and volume by industry) Value added	USDA FS, Forest Products Lab; U.S. Census Bureau
	Consumption (value and volume)	USDA FS FIA, RPA Assessment
	Imports and exports (value and volume)	USDA FS FIA, RPA Assessment
	Degree of recycling (value and volume)	USDA FS, Forest Products Lab; AF&PA
13. Outdoor recreation activities and use, recreational facilities and use	Participants by activity Trips and days spent on different types of activities Expenditures by activity	USDI F&WS, National Survey of Fishing, Hunting, and Wildlife-Associated Recreation
	Trails (miles of type) Campgrounds	Survey of States; USDA FS NFS or other existing recreation data?

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14. Public and private investments in forest health, management, processing, manufacturing, and research	Manufacturing/processing investment (lumber, wood products, paper products)	AF&PA; U.S. Census Bureau
	Forestry program budgets	NASF State data
	State forestry statistics	NASF State data
	Forest land ownership: public, nonindustrial private, industrial private	USDA FS FIA
15. Public, private and industrial ownership and land use (including acres of specially designated land)	<i>The metrics listed for this indicator are not necessarily mutually exclusive; therefore, compilation and data manipulation is required to develop accurate summary statistics.</i>	
	Urban forest (acres)	USDA FS FIA
	National Forests and Parks (acres)	USDA FS NFS; USDI NPS
	State—forests, parks, wilderness areas (acres)	State forestry statistics
	Wild and Scenic Rivers	USDI NPS, National Wild and Scenic Rivers System
	Forest Legacy (acres)	USDA FS, Forest Legacy Program
	Wilderness Areas (acres)	National Wilderness Preservation System (USDI NPS, BLM, and F&WS; USDA FS)
	Research Natural Areas (acres)	USDA FS, RNA Program
	Biodiversity protection areas (acres)	Survey of States
	Old growth (definitions, acres)	State forestry statistics, other?
Other conservation lands, etc. (acres)	TNC, Trust for Public Land	
16. Trends in forest-related sectors' (e.g., wood products, recreation, and forest management) earnings and employment	Forest-related sectors (using NAICS codes) Earnings Employment State forestry personnel	U.S. Census Bureau; USDA FS IMI; IMPLAN; NASF forestry statistics

NA Base Indicator	Metrics	Data Source
Criterion 7—Legal, Institutional, and Economic Framework for Forest Conservation and Sustainable Management		
17. Existence, type, and monitoring of voluntary or mandatory best management practices	Existence of BMP's (yes/no)	Survey of States
	Type of BMP's (e.g., address soil, water, wetlands)	Survey of States
	Monitoring of BMP's (yes/no, type of monitoring)	Survey of States
18. Existence, type, and frequency of forest-related planning, assessment, and policy review, including cross-sectoral planning and coordination		Survey of States

ACRONYM GLOSSARY

ABI	Association for Biodiversity Information
AF&PA	American Forest & Paper Association
BMP	Best Management Practice
D.b.h.	Diameter breast height
HUC	Hydrologic Unit Codes (hierarchical watershed units)
IMPLAN	IMpact analysis for PLANning
IWI	Index of Watershed Indicators
NAICS	North American Industry Classification System
NASF	National Association of State Foresters
NOAA	National Oceanic and Atmospheric Administration
RNA	Research Natural Areas
RPA	Forest and Rangeland Renewable Resources Planning Act
SAF	Society of American Foresters
T&E	Threatened and endangered
TNC	The Nature Conservancy
U.S. EPA	U.S. Environmental Protection Agency

USDA FS U.S. Department of Agriculture, Forest Service
ECOMAP Ecological Classification and Mapping
FHM Forest Health Monitoring Program
FIA Forest Inventory and Analysis Program
IMI Inventory and Monitoring Institute
NFS National Forest System

USDA NRCS U.S. Department of Agriculture, Natural Resources Conservation Service

USDI U.S. Department of the Interior
BLM Bureau of Land Management
F&WS Fish and Wildlife Service
NPS National Park Service

USGS U.S. Geological Survey

U.S. NVC U.S. Natural Vegetation Classification