

**APPENDIX D**  
**BIOLOGICAL EVALUATION**  
**for**  
**REGIONAL FORESTER'S SENSITIVE SPECIES**  
**AND LOCALLY RARE SPECIES:**  
**NANTAHALA/PISGAH PLAN AMENDMENT # 10**  
**NATIONAL FORESTS IN NORTH CAROLINA**  
**July, 2000**

**I. INTRODUCTION**

**Purpose and need.** This programmatic Biological Evaluation (BE) evaluates the effects of implementing new management standards proposed in Amendment 10 of the Nantahala/Pisgah (NP) National Forest Land and Resource Management Plan (Plan). Project-specific analysis will be conducted at the time of a project proposal to determine site-specific effects. Amendment 10 is proposed for the purpose of adding new standards to minimize take of the endangered Indiana bat (*Myotis sodalis*). The basis for this proposed action is a USDI Fish and Wildlife Service (Service) biological opinion and the terms and conditions contained therein.

**Objectives of BA.** The objectives of this analysis are (1) to assess potential effects, of the proposed standards and guidelines, on Regional Forester's Sensitive Species, and (2) to assess potential effects, of the proposed standards and guidelines, on Locally Rare Species.

**Legal direction.** This BE was prepared in accordance with USFS manual 2671.44 and 2672.42. Determinations of effects by species are made based on best available information. As significant new information becomes available through inventory, monitoring and research, a revision of this evaluation will be completed.

**Management location.** The planning area is located in the western portion of North Carolina within the Southern Blue Ridge Section and includes all federal land managed or administered by the Nantahala and Pisgah National Forests. This area is approximately 1,020,000 acres in size and contains portions of 18 counties.

**II. PROPOSED MANAGEMENT ACTION:** Implementation of Amendment 10 is the proposed action. The amendment represents Alternative B, the preferred alternative. This alternative identifies direction and standards, for the Indiana bat, that would minimize the risk of incidental take and conserve habitat to allow for future recovery following all management activities, and require monitoring of roost and forage use by this species on the NP.

**Implementation Area.** The immediate effect of the plan amendment is localized to the 4 county area of Graham, Swain, Macon, and Cherokee counties. The long term effect of the plan amendment is broader to encompass the entire Nantahala and Pisgah NFs. Standards would apply only in the following Forest types suitable for the Indiana Bat:

Cove Hardwoods = CISC types 8, 9, 41, 46, 50, 55, 56

Yellow Pine-Hardwood = CISC types 12, 13, 15, 16, 20

Upland Hardwoods = CISC types 10, 42, 44, 45, 47, 48, 51, 52, 53, 54, 57, 59, 60

**Specific standards.** (1) retain live trees with exfoliating bark, (2) retain suitable snags, hollow, den, or cavity trees, (3) retain additional living trees in the vicinity of snags for protection, (4) limit openings along intermittent streams to single tree gaps, (5) retain all trees within 30 feet of perennial streams and retain 60% canopy cover in the remainder of the riparian area, (6) protect all active roost trees, (7) do not decrease the Indiana bat habitat suitability index by more than 5% for projects impacting five or more acres of forest stands, and (8) continue monitoring efforts to determine use by Indiana bats, consultation with the Service, and coordination with universities, state, and other federal land management agencies to improve the understanding of Indiana bat distribution and abundance on the national forests.

**IV. SPECIES CONSIDERED AND SPECIES EVALUATED:** We considered all Regional Forester's sensitive species and locally rare species that either occur now or could potentially occur in the future within the administrative boundaries of the NP. There are a total of 419 species: 133 sensitive and 286 locally rare in the following groups: 10 amphibians, 6 arachinids, 12 birds, 11 bivalves, 11 crustaceans, 29 fishes, 24 gastropods, 19 insects, 9 mammals, 56 mosses, 34 hornworts, lichens, and liverworts, 193 vascular plants, and 5 reptiles (Appendix D1).

#### **A. HISTORY OF SPECIES LISTS**

**Sensitive and Forest-listed Species in the Plan.** In 1992, Sensitive Species and Forest-listed species on the NP were updated to reflect anticipated changes in the Regional Forester's list. These species are identified in Appendix K, FEIS of the Plan. In the Plan, sensitive species included those with global and state ranks of G1, G2, G3, T1, T2, T3, S1, S2, or North Carolina Status of T, E, or C that occur or could potentially occur on the NP. Forest-listed species included all other species with state ranks of S1 or S2 that occur or could potentially occur on the NP.

**Sensitive Species.** In 1996, the fourth revision of the Regional Forester's Sensitive Species list was published. It was based on the status and conservation priority of species that merit special management consideration under the USFS sensitive species policy. Sensitive Species are those plant and animal species for which population viability is a concern and were defined as "...USDI Fish and Wildlife Service candidate species or

Natural Heritage Network [species with global ranks of] G1, G2, G3, T1, T2, T3, N1, N2, N3; or H.”

**Locally Rare Species.** In 1996 the Regional Forester defined locally rare species as “species for which continued representation on the forest is a concern”. However, unlike sensitive species, locally rare species are at no risk of imperilment at a range-wide scale. In concept, these species are equivalent to “forest-listed” species in the NP plan.

**Amendment 10.** All sensitive species and forest-listed (hereinafter termed locally rare) species that were included in the Biological Evaluation in the Plan are included here. Although the status (sensitive vs. locally rare) for some of these species is different, there are no new species on the 1996 Regional Forester’s Sensitive Species list that were not evaluated in the EIS for the Plan.

## **B. CRITERIA USED FOR SPECIES EVALUATION**

**Species eliminated from further analysis.** One hundred and thirty nine (139) of the 419 sensitive and locally rare species do not occur in forest types suitable for the Indiana bat. Because standards and guidelines presented in Amendment 10 apply only to habitats where Indiana bat may occur, implementation of this amendment would have “no effect” on these species. They include species that occur in the Spruce-fir zone, those that occur on mountain balds, high elevation rocky summits, rock outcrops, spray zones of waterfalls, and open fields. These 47 sensitive and 92 locally rare species will not be evaluated further for potential management impacts of implementing Amendment 10. They are listed in Appendix D1, Table 1.

**Species included in analysis.** Two hundred and eighty (280) species were evaluated for potential management impacts. They are listed in Appendix D1, Table 1. One hundred and twenty nine (129) of these species do not occur on the NP and therefore effects to these species are related to potential impacts to suitable habitat rather than to populations.

## **V. EVALUATED SPECIES SURVEY INFORMATION**

The Nature Conservancy’s Biological and Conservation Database and the North Carolina Natural Heritage Program Element Occurrence (EO) records were reviewed to determine the distribution and abundance of species included in the analysis. These databases include all current survey information collected by private individuals, USFS personnel, and other federal and state agencies.

## **VI. ENVIRONMENTAL BASELINE FOR THE SPECIES EVALUATED**

### **A. EXISTING ENVIRONMENT**

**Geography.** The NP covers over a million acres of mountains and foothills within the Southern Appalachians, an area roughly 37.4 million acres in size. Forests cover 70 percent of the Appalachian region, pastures 17.4 percent, croplands 3.4 percent, and areas developed for roads, dwellings, and other human structures 3.1 percent (SAMAB 1996). The NP is located in western North Carolina within the Blue Ridge Mountains ecological Section; elevations range from 1000 to over 6000 feet.

**Climate.** Average precipitation is 40 to 50 inches but ranges up to 60 inches on the highest peaks. Along parts of the southern Blue Ridge escarpment bordering the Southern Appalachian Piedmont Section, rainfall averages over 100 inches.

**Lithology and Soils.** Bedrock is composed primarily of metasediments (quartzite, schist, and gneiss) and meta-igneous rocks (granite, rhyolite, basalt, and gabbro). Smaller areas underlain by granite occur along the eastern edge of the Section, with sandstone, shale and dolomite, and broad zones of intensely sheared and altered rock. Soils are generally moderately deep and medium textured, have a mesic temperature regime, a udic moisture regime, and mixed mineralogy (McNab and Avers 1994).

**Disturbance Regimes.** Fire, wind, ice, and precipitation are the principal causes of natural disturbance. Fire caused by lightning is more prevalent in some areas, especially in parts of the Grandfather Ranger District. Tornadoes are uncommon, but more prevalent are localized “microbursts” of intense winds that cause small patches of trees to be up-rooted. An introduced pathogen, the chestnut blight, caused considerable disturbance to composition of most forest stands from 1920 to 1940 by top-killing all American Chestnut trees.

**Potential Natural Vegetation and Fauna.** The predominant vegetation form is montane cold-deciduous broad-leaved forest dominated by oaks. The oak forests include black, white, red, and chestnut oaks that dominate montane slopes. Smaller areas of mixed oak – pine are present in the intermontane basins and along drier ridges. Mesophytic species such as yellow-poplar, hemlock, basswood, and sweet birch dominate the valleys and moist slopes and coves. Mesic sites at higher elevations (4500 ft.) are occupied by northern hardwoods (e.g. sugar maple, basswood, buckeye). The highest elevations, above 5000 ft., are dominated by spruce and fir.

### **B. AREA AFFECTED BY THE PROPOSED ACTION**

**Forest Composition.** The NP is comprised of the following forest type groups:

Upland Hardwood - 464,200 acres (46%)    White Pine-Hardwood - 43,500 acres (4%)

Cove Hardwood - 289,400 acres (29%)	Yellow Pine-Hardwood - 37,700 acres (4%)
Conifer - 83,800 acres (8%)	Non-Forest - 25,200 (2%)
Northern Hardwood - 51,400 acres (5%)	Not inventoried - 23,400 (2%)

**Forest Structure.** These forests are distributed in the following age-classes (rounded):

0-10 years – 22,500 acres (2%)	70-99 years – 512,400 acres (50%)
11-39 years – 102,400 acres (10%)	100+ years – 184,500 acres (18%)
40-69 years – 204,900 acres (20%)	

Upland hardwoods, 70 to 99 years in age, cover roughly one-quarter of the NP.

**Perennial streams.** There are approximately 2,550 miles of perennial streams on the NP. There are approximately 1,300 miles of perennial streams within management areas suited for timber production. A perennial stream buffer, 100 feet on each side of streams in management areas suited for timber production, would occupy about 32,000 acres. These buffers would be comprised of the following forest type groups and age-classes:

Upland Hardwood – 8,530 acres (27%)	White Pine-Hardwood – 2,540 acres (8%)
Cove Hardwood – 15,770 acres (49%)	Yellow Pine-Hardwood – 680 acres (2%)
Conifer – 2,060 acres (6%)	Non-Forest – 135 (<1%)
Northern Hardwood – 1,810 acres (6%)	Not inventoried – 510 (2%)
0-10 years – 590 acres (2%)	70-99 years – 17,535 acres (55%)
11-39 years – 1,900 acres (6%)	100+ years – 3,040 acres (9%)
40-69 years – 8,950 acres (28%)	

**Intermittent streams.** There are approximately 3,320 miles of intermittent streams on the NP. There are approximately 1,800 miles of intermittent streams within management areas suited for timber production. An intermittent stream buffer, 30 feet on each side of the streams in management areas suited for timber production, would occupy about 12,300 acres. These buffers would be comprised of the following forest type groups and age-classes:

Upland Hardwood – 4,390 acres (36%)	White Pine-Hardwood – 650 acres (5%)
Cove Hardwood – 5,430 acres (44%)	Yellow Pine-Hardwood – 370 acres (3%)
Conifer – 790 acres (6%)	Not inventoried – 140 (1%)
Northern Hardwood – 550 acres (4%)	
0-10 years – 374 acres (3%)	70-99 years – 6,300 acres (51%)
11-39 years – 1,170 acres (10%)	100+ years – 1,250 acres (10%)
40-69 years – 3,230 acres (26%)	

**Past activities in perennial and intermittent stream buffers.** In the past 10 years, timber harvest and regeneration activities occurred in over 630 stands on the Nantahala National Forest. Individual stands or management units averaged about 26 acres in size (EA, Chapter 3). The location of these stands relative to perennial and intermittent

streams was calculated to determine the type of landscapes where past management activities occurred. It was assumed that future management activities on the NP would likely occur in similar landscape positions.

On the Nantahala National Forest in the last decade, approximately 360 acres of timber harvest occurred within 100 feet of a perennial stream and about 260 acres occurred within 30 feet of an intermittent stream. This represents about 4% of the over 16,000 acres of harvest activities during this period. These activities include timber management, recreation, and wildlife management projects. On average, about ½ acre of perennial stream buffer and 1/3 acre of intermittent stream buffer occurred within the individual management units. Over two-thirds of the stands examined had 1% or less of their area within an intermittent stream buffer. Only nine of the 631 stands examined had 10-14% (the highest amount) of their area within an intermittent stream buffer. Similarly, 83% of the stands had 1% or less of their area within a perennial stream buffer and only four stands had 33-88% (the maximum amount) of their area within the perennial stream buffer.

## VII. EFFECTS OF PROPOSED MANAGEMENT ACTION

### A. GENERAL HABITAT CHANGES

The potential effects of implementing Amendment 10 on habitat suitability for sensitive and locally rare can be evaluated by examining the extent of the NP landscape where the new standards apply and the degree to which these standards affect forest structure and composition in these areas.

**Extent of habitat change.** Implementing Amendment 10 will result in no measurable change in forest structure and composition on nearly three quarters of the NP that are unsuitable for timber production. This is due to standards that emphasize minimizing incidental take and conserving Indiana bat habitat during timber management activities. For example: 14(1a)-(1e), and 14(2a)-(2c). In the past and foreseeable future, these activities are more likely in areas suitable for timber production (275,798 acres – NP Plan, Appendix E). For this reason, most potential habitat change would occur only in 27% of the total 1,024,902 acres on the NP. Consequently, perennial and intermittent stream standards 14(2a), (2b) could potentially affect habitat conditions on just 8% (44,300) of management areas with all lands suitable and management areas where lands unsuitable for timber production are mixed with suitable lands. Finally, limiting a change in the Indiana bat habitat suitability index to no more than 5% (Standard 14(4)) applies only where activities impact at least five acres in size and these are also more likely to occur in lands suitable for timber production.

**Degree of habitat change.** In general, implementation of Amendment 10 would result in greater structure in upland and riparian forest habitats. This structure would include downed woody debris, standing dead trees, live canopy layers, and cavity trees. Again,

this change would occur primarily in areas suitable for timber production. More trees (snags and live trees) would remain in harvest units. Over time, forests in harvest units would become more multi-aged and would have more canopy layers. However, this may not be measurably different from current conditions because of the present emphasis on modified shelterwood harvests that already retain some overstory trees. Likewise, retaining shagbark and shellbark hickories (Standard 14(1b)), both relatively uncommon species, and retaining bitternut hickory which is not a common species, will not noticeably change species composition in harvest units.

The greatest potential habitat change, from current direction, could occur in riparian areas associated with perennial and intermittent streams. Standards expand riparian areas along intermittent streams to 30 feet on each side of the stream and limit tree removal from this area to single tree gaps at least 75 feet apart. Standards also require that management activities must leave at least 60% canopy cover beyond the 30-foot no-cut areas on each side of perennial streams. This could alter the current direction in the Plan for tree cover and density within riparian areas. However, during the last decade, timber management activities in the past have impacted only 4% of all riparian areas on the Nantahala Forest (EA, Chapter 3) an area that, if avoided, would not significantly change forest habitats structure or composition on the NP.

## **B. POTENTIAL EFFECTS TO SENSITIVE AND LOCALLY RARE SPECIES**

**Short-term effects.** The extent of potential changes in forest composition and structure will differ in the short-term versus the long-term. If we assume that timber harvest and other management activities in the next decade are similar to the past decade (see Section VI), changes in forest condition in riparian areas across the landscape will be insignificant. It is also unlikely that maintaining more snags and live trees with exfoliating bark or with suitable cavities would have a significant effect on forest composition and structure. However, localized short-term effects may be more noticeable.

**Long-term cumulative effects.** Implementation of Amendment 10 is likely to result in a change in forest composition and structure in the long-term (beyond 50 years) in localized areas and localized habitats such as riparian areas. This cumulative effect may benefit species that rely on plentiful snag habitat or small cavity habitat (Eastern Small-footed bat, Yellow-bellied sapsucker, Appalachian Bewicks Wren). Increasing riparian vegetation density along intermittent streams will not only improve downstream nutrient transport but may also reduce erosion and downstream sedimentation. This may in turn improve downstream perennial stream habitats and adjacent riparian areas through reduced effects of sedimentation. This may benefit species that rely on some extended periods of nearly-sediment free water, (*Hydrothyria venosa*, Logperch, Tennessee Heelsplitter) and species associated with properly functioning riparian and wetland

habitat, e.g., no dramatic changes in the normal fluctuations in hydrologic condition (Junaluska Salamander, Marsh Bellflower, Robin Runaway, Perennial Sundrops).

**Status, Distribution, Habitat Relationships, and Potential Effects.** Appendix D1 includes a table listing each sensitive and locally rare species, species habitat relationships, number of populations documented on the NP, and the potential effects from implementing Amendment 10. Potential impacts of implementing Amendment 10 are also summarized below by species group.

There are only two types of effects that may result from implementing Amendment 10: no impact, and beneficial impact. There will be no impact to species that do not occur in forest types or other habitats suitable for the Indiana bat because new standards will not apply to those areas. There will also be no impact to species that occur in habitats suitable for the Indiana bat but that are not associated with or strongly influenced by riparian areas or require snags and tree cavities for nesting, protection, or feeding. On the other hand, there may be a beneficial effect for species associated with these conditions.

**Table 1: Potential Impacts to Regional Forester’s Sensitive and Locally Rare Species from Implementation of Amendment 10**

Group	Total # Species	Regional Forester’s Sensitive Species		Locally Rare Species	
		no impact	beneficial	no impact	beneficial
Amphibian	10	1	1	3	5
Arachnids	6	5	0	1	0
Birds	12	1	0	9	2
Bivalves	11	0	5	0	6
Crustaceans	11	0	3	1	7
Fishes	29	0	5	0	24
Gastropods	24	6	0	15	3
Insects	19	4	5	8	2
Mammals	9	1	2	5	1
Mosses	56	18	4	25	9
Hornworts, Lichens, and Liverworts	34	18	4	10	2
Vascular plants	193	38	11	104	40
Reptiles	5	0	1	2	2
all species	419	92	41	183	103

**VIII. DETERMINATION OF EFFECT:** Management activities proposed for individual projects will undergo site specific environmental analysis and must adhere to the Plan standards. Forest-wide direction in the Plan includes “Provid(ing) site specific analysis of occurrence and effects on proposed, endangered, threatened, and sensitive (PETS) species and Forest-listed species at the project level”. This does not change under Amendment 10. Management activities will therefore incorporate best management practices and, as required by law, will not result in a loss of species range-wide viability or cause a trend to federal listing. This does not change under Amendment 10 and consequently there will be no change in the “beneficial effects or no viability effects” determination made in the BE of the Plan.

**Specifically, implementation of standards in Amendment 10** (Alt. B or C) of the Nantahala-Pisgah Land and Resource Plan will have “no impact” on 92 Regional Forester’s Sensitive Species and 183 Locally Rare Species.

**Specifically, implementation of standards in Amendment 10** (Alt. B or C) of the Nantahala-Pisgah Land and Resource Plan Plan may have a “beneficial impact” on 41 Regional Forester’s Sensitive Species and 103 Locally Rare Species.

Prepared by :

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Steven A. Simon  
FOREST ECOLOGIST

APPENDIX D1: List of Regional Forester's Sensitive and Locally Rare Species

**Table 1: Regional Forester's Sensitive and Locally Rare Species that occur or may occur on the NP. HAB. = habitat Y=yes, N=no; STAT. = status L-locally rare, S – Sensitive; HABITAT = general habitat where species is found, M = mountains, P = Piedmont, C = Coastal Plain.**

Scientific name	Common name	HAB.	STAT.	#	Potential	HABITAT
<b>AMPHIBIANS</b>						
				pops.	Effect	
<i>Ambystoma talpoideum</i>	Mole Salamander	Y	L	4	beneficial	MP: breeds in fish-free semipermanent woodland ponds; forages in adjacent woodlands
<i>Aneides aeneus</i>	Green Salamander	N	L	12	no impact	M: damp, shaded crevices of cliffs or rock outcrops in deciduous forests (southern mountains)
<i>Cryptobranchus alleganiensis</i>	Hellbender	Y	L	10	beneficial	M: large and clear fast-flowing streams
<i>Eurycea junaluska</i>	Junaluska Salamander	Y	S	2	beneficial	M: forests near seeps and streams in the Cheoah River system
<i>Eurycea longicauda longicauda</i>	Longtail Salamander	Y	L	3	beneficial	M: moist woods and floodplains
<i>Necturus maculosus</i>	Mudpuppy	Y	L	0	beneficial	M: rivers and large streams (French Broad drainage)
<i>Plethodon aureolus</i>	Tellico Salamander	Y	S	4	no impact	M: forests in the Unicoi Mountains
<i>Plethodon dorsalis</i>	Zigzag Salamander	N	L	2	no impact	M: moist areas of talus slopes or rock outcrops in hardwood forests
<i>Plethodon welleri</i>	Weller's Salamander	N	L	2	no impact	M: high elevation forests in the northern mountains, mainly spruce-fir
<i>Pseudacris brachyphona</i>	Mountain Chorus Frog	Y	L	0	beneficial	M: forests near temporary pools or ponds, in extreme southwestern mountains
<b>ARACHNIDS</b>						
<i>Nesticus carolinensis</i>	Linville Cavern Spider	N	L	0	no impact	M: caves (apparently endemic to Linville Caverns)
<i>Nesticus cooperi</i>	Lost Nantahala Cave Spider	N	S	2	no impact	M: caves along Nantahala River (endemic to Swain County, NC)
<i>Nesticus crosbyi</i>	A Nesticid Spider	N	S	0	no impact	M: spruce-fir forests (apparently endemic to Mount Mitchell)
<i>Nesticus mimus</i>	A Nesticid Spider	Y	S	0	no impact	M: rocky areas; known from Grandfather Mountain and Table Rock; also Virginia
<i>Nesticus sheari</i>	A Nesticid Spider	Y	S	0	no impact	M: on ground in moist or rich forests (apparently endemic to Graham County, NC)
<i>Nesticus silvanus</i>	A Nesticid Spider	Y	S	0	no impact	M: habitat not indicated (apparently endemic to southern mountains of NC)
<b>BIRDS</b>						
<i>Accipiter gentilis</i>	Northern Goshawk	Y	L	0	no impact	M: extensive, remote forests, mainly at high elevations
<i>Aegolius acadicus</i>	Northern Saw-whet Owl	N	L	11	no impact	M: spruce-fir forests or mixed hardwood/spruce forests (for nesting)
<i>Catharus guttatus</i>	Hermit Thrush	N	L	4	no impact	M: spruce-fir forests (for nesting)
<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	Y	L	6	no impact	M: deciduous forests, mainly at higher elevations
<i>Contopus borealis</i>	Olive-sided Flycatcher	Y	L	0	no impact	M: montane conifer forests (mainly spruce-fir) with openings or dead trees (breeding season only)
<i>Dendroica cerulea</i>	Cerulean Warbler	Y	L	13	no impact	MC: mature hardwood forests; steep slopes and coves in mountains, natural levees in Coastal Plain (breeding only)
<i>Dendroica magnolia</i>	Magnolia Warbler	N	L	5	no impact	M: spruce-fir forests, especially in immature stands
<i>Empidonax alnorum</i>	Alder Flycatcher	N	L	7	no impact	M: high elevation shrub/sapling thickets
<i>Lanius ludovicianus</i>	Loggerhead Shrike	N	S	0	no impact	MPC: fields and pastures
<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	Y	L	13	beneficial	M: mature, open hardwoods with scattered dead trees (breeding season only)
<i>Thryomanes bewickii altus</i>	Appalachian Bewicks Wren	N	L	0	beneficial	M: woodland borders or openings, farmlands or brushy fields, at high elevations (breeding season only)

<i>Vermivora pinus</i>	Blue-winged Warbler	N	L	1	no impact	M: low elevation brushy fields and thickets
<b>BIVALVES</b>						
<i>Alasmidonta undulata</i>	Triangle Floater	Y	L	0	beneficial	PC: most river systems in Piedmont and Coastal Plain
<i>Alasmidonta varicosa</i>	Brook Floater	Y	S	0	beneficial	PM: many Piedmont systems and along Blue Ridge escarpment of Catawba River system
<i>Alasmidonta viridis</i>	Slipper Shell Mussel	Y	L	0	beneficial	M: Little Tennessee River
<i>Elliptio dilatata</i>	SPike	Y	L	0	beneficial	M: Little Tennessee and New rivers
<i>Fusconaia barnesiana</i>	Tennessee Pigtoe	Y	S	0	beneficial	M: Little Tennessee River
<i>Lampsilis fasciola</i>	Wavy-rayed Lampmussel	Y	L	0	beneficial	M: French Broad, Pigeon, and Little Tennessee rivers
<i>Lasmigona holstonia</i>	Tennessee Heelsplitter	Y	S	0	beneficial	M: Watauga River; formerly in Valley Creek in Cherokee County
<i>Lasmigona subviridis</i>	Green Floater	Y	S	0	beneficial	CPM: Tar, Neuse, and Cape Fear systems downstate; New and Watauga systems in mountains
<i>Tritogonia verrucosa</i>	Pistolgrip	Y	L	0	beneficial	M: New River near the Virginia border
<i>Villosa nebulosa</i>	Alabama Rainbow	Y	S	0	beneficial	M: French Broad, Hiwassee, and Little Tennessee rivers (only known in LT)
<i>Villosa vanuxemensis</i>	Mountain Creekshell	Y	L	0	beneficial	M: French Broad and Hiwassee systems
<b>CRUSTACEAN</b>						
<i>Asctocythere cosmeta</i>	Grayson Crayfish Ostracod	Y	L	0	beneficial	M: symbiotic on crayfish in sub-surface waters of burrows
<i>Caecidotea carolinensis</i>	Bennets Mill Cave Slater	N	L	0	no impact	P: caves; in McDowell County
<i>Cambarus georgiae</i>	Little Tennessee Crayfish	Y	S	0	beneficial	M: streams in Little Tennessee drainage
<i>Cambarus hiwasseeensis</i>	HiwasseeCrayfish	Y	L	0	beneficial	M: streams in Hiwassee drainage
<i>Cambarus parrishi</i>	Parrish Crayfish	Y	S	2	beneficial	M: streams in Hiwassee drainage
<i>Cambarus reburrus</i>	French Broad Crayfish	Y	S	1	beneficial	M: streams in Little Tennessee drainage
<i>Cymocythere clavata</i>	Oconee Crayfish Ostracod	Y	L	0	beneficial	M: symbiotic on crayfish in mountain streams and rivers
<i>Dactylocythere prinsi</i>	Whitewater Crayfish Ostracod	Y	L	1	beneficial	M: cold streams of Savannah drainage in Jackson County (endemic to NC; poss. SC and GA)
<i>Skistodiaptomus carolinensis</i>	Carolina Skistodiaptomus	Y	L	0	beneficial	M: Lake Ravenel in Macon County (endemic to NC)
<i>Stygobromus carolinensis</i>	Yancey Sideswimmer	Y	L	1	beneficial	M: seeps at Mount Mitchell (endemic to NC)
<i>Waltoncythere acuta</i>	Transylvania Crayfish Ostracod	Y	L	0	beneficial	M: symbiotic on crayfish in high gradient rivers and streams in Transylvania County
<b>FISH</b>						
<i>Acipenser fulvescens</i>	Lake Sturgeon	Y	S	0	beneficial	M: large rivers of Tennessee drainages
<i>Aplodinotus grunniens</i>	Freshwater Drum	Y	L	0	beneficial	M: French Broad River
<i>Carpoides carpio</i>	River Carpsucker	Y	L	0	beneficial	M: French Broad River
<i>Carpoides velifer</i>	Highfin Carpsucker	Y	L	0	beneficial	PC: Catawba, Pee Dee, and Cape Fear rivers
<i>Clinostomus funduloides ssp.</i>	LT Royside Dace	Y	L	0	beneficial	M: Little Tennessee drainage
<i>Cottus carolinae</i>	Banded Sculpin	Y	L	0	beneficial	M: French Broad River system
<i>Etheostoma acuticeps</i>	Sharphead Darter	Y	S	0	beneficial	M: streams in Nolichucky system (Toe and Cane rivers)

<i>Etheostoma inscriptum</i>	Turquoise Darter	Y	L	1	beneficial	M: streams of Savannah drainage
<i>Etheostoma jessiae</i>	Blueside Darter	Y	L	0	beneficial	M: streams in Mills River system
<i>Etheostoma vulneratum</i>	Wounded Darter	Y	S	0	beneficial	M: streams of Little Tennessee system; perhaps extirpated from French Broad system
<i>Exoglossum laurae</i>	Tonguetied Minnow	Y	L	0	beneficial	M: New drainage
<i>Hiodon tergisus</i>	Mooneye	Y	L	1	beneficial	M: French Broad River
<i>Ictiobus bubalus</i>	Smallmouth Buffalo	Y	L	0	beneficial	MP: French Broad River; Piedmont reseviors
<i>Lampetra appendix</i>	American Brook Lamprey	Y	L	0	beneficial	M: French Broad drainage
<i>Luxilus chrysocephalus</i>	Stripped Shiner	Y	L	9	beneficial	M: Cane River system
<i>Micropterus coosae</i>	Redeye Bass	Y	L	2	beneficial	M: Savanna drainage
<i>Notropis lutipinnis</i>	Yellowfin Shiner	Y	L	1	beneficial	MP: Savannah, Litle Tennessee, and Broad drainages
<i>Notropis rubescens</i>	Rosyface Chub	Y	L	0	beneficial	M: Savanna drainage
<i>Noturus eleutherus</i>	Mountain Madtom	Y	L	0	beneficial	M: French Broad drainage
<i>Noturus flavus</i>	Stonecat	Y	L	0	beneficial	M: Cane River
<i>Percina burtoni</i>	Blotchside Darter	Y	S	0	beneficial	M: South Toe River; formerly in French Broad drainage
<i>Percina caprodes</i>	Loggerhead	Y	L	3	beneficial	M: Tennessee drainages
<i>Percina macrocephala</i>	Longhead Darter	Y	S	0	beneficial	M: French Broad River; probably extirpated
<i>Percina oxyrhynchus</i>	Sharpnose Darter	Y	L	0	beneficial	M: New drainage
<i>Percina sciara</i>	Dusky Darter	Y	L	0	beneficial	M: French Broad drainage
<i>Percina squamata</i>	Olive Darter	Y	L	0	beneficial	M: Tennessee drainages
<i>Phenacobius teretulus</i>	Kanawha Minnow	Y	L	0	beneficial	M: New drainage
<i>Polyodon spathula</i>	Paddlefish	Y	L	0	beneficial	M: French Broad River
<i>Stizostedion canadense</i>	Sauger	Y	L	2	beneficial	M: French Broad and Hiwassee rivers
<b>GASTROPODS</b>						
<i>Discus bryanti</i>	Saw-tooth Disc	Y	L	3	no impact	M: Watauga to Madison counties
<i>Glyphyalinia clingmani</i>	Fragile Glyph	Y	S	3	no impact	M: Black Mountains of Yancey County (endemic to NC)
<i>Glyphyalinia junaluskana</i>	Dark Glyph	Y	L	0	no impact	M: southwestern mountains
<i>Glyphyalinia pentadelphia</i>	Pink Glyph	Y	L	0	no impact	M: southwestern mountains
<i>Glyphyalinia vanattai</i>	Honey Glyph	Y	L	0	no impact	M: Avery, Mitchell, and Yancey counties
<i>Goniobasis interrupta</i>	Knotty Elimia	Y	L	0	beneficial	M: Hiwassee River and tributaries
<i>Haplotrema kendeighi</i>	Blue-footed Lancetooth	Y	L	0	no impact	M: southwestern mountains
<i>Helicodiscus bonamicus</i>	Spiral Coil	Y	L	1	no impact	M: Nantahala Gorge vicinity (endemic to this area)
<i>Helicodiscus fimbriatus</i>	Fringed Coil	Y	L	0	no impact	M: extreme southwestern corner NC, in Cherokee and Graham counties
<i>Leptoxis dilatata</i>	Seep Mudalia	Y	L	9	beneficial	M: New River in Ashe County

<i>Leptoxis virgata</i>	Smooth Mudalia	Y	L	9	beneficial	M?: reported from Hiwassee River, possibly in error
<i>Mesodon chilowheensis</i>	Queen Crater	Y	L	0	no impact	M: southern half of the mountains
<i>Pallifera hemphilli</i>	Black Mantleslug	N	S	0	no impact	M: high elevation forests, mainly spruce-fir
<i>Paravitrea andrewsae</i>	High Mountain Supercoil	Y	L	2	no impact	M: northern half of the mountains
<i>Paravitrea lacteodens</i>	Ramp Cove Supercoil	Y	L	1	no impact	M: Graham County, possibly Cherokee County (endemic to this area)
<i>Paravitrea lamellidens</i>	Lamellate Supercoil	Y	L	0	no impact	M: southern half of the mountains
<i>Paravitrea placentula</i>	Glossy Supercoil	Y	S	1	no impact	M: Mitchell and Swain counties
<i>Paravitrea ternaria</i>	Sculpted Supercoil	Y	S	5	no impact	M: Madison County (endemic to this county and Unicoi County, TN)
<i>Paravitrea umbilicaris</i>	Open Supercoil	Y	L	1	no impact	M: extreme southwestern mountains
<i>Paravitrea varidens</i>	Roan Supercoil	Y	S	1	no impact	M: Mitchell and Yancey counties (endemic to NC and TN)
<i>Patera clarki</i>	Dwarf Proud Globe	Y	L	0	no impact	M: southwestern mountains
<i>Stenotrema depilatum</i>	Great Smokey Slitmouth	Y	L	0	no impact	M: Great Smokey Mountains National Park (essentially endemic to this area)
<i>Ventridens coelaxis</i>	Bidentrate Dome	Y	S	9	no impact	M: northern mountains
<i>Zonotroides patuloides</i>	Appalachian Gloss	Y	L	0	no impact	M: southwestern mountains
<b>INSECTS</b>						
<i>Autochton cellus</i>	Golden-banded Skipper	Y	L	3	beneficial	MPC: moist woods near streams or ponds; host plants -- legumes, mainly hog peanut ( <i>Amphicarpa</i> )
<i>Celastrina ebenina</i>	Dusky Azure	Y	L	7	no impact	M: rich, moist deciduous forests; host plant -- goat's-beard ( <i>Aruncus dioicus</i> )
<i>Celastrina neglectamajor</i>	Appalachian Blue	Y	L	3	no impact	M: rich deciduous forests; host plant -- maple-leaf viburnum ( <i>Viburnum acerifolium</i> )
<i>Enodia anthedon</i>	Northern Pearl Eye	Y	L	0	beneficial	M: moist deciduous woods, especially near streams; host plants -- grasses
<i>Erora laeta</i>	Early Hairstreak	Y	L	2	no impact	M: decid. forests, esp. along roads or edges at high elev.; host plants -- beech( <i>Fagus</i> ), hazlenut( <i>Corylus</i> )
<i>Euchlaena milnei</i>	A Looper Moth	Y	S	0	no impact	no location data
<i>Eulonchus marialiciae</i>	Mary Alice's Small-headed Fly	Y	S	2	no impact	M: (endemic to NC)
<i>Gomphus consanguis</i>	Cherokee Clubtail Dragonfly	Y	S	0	beneficial	M: small spring-fed streams
<i>Hesperia sassacus</i>	Indian Skipper	N	L	4	no impact	M: old fields, clearings, wood margins, at high elev.; host plants -- grasses
<i>Macromia margarita</i>	Margarita River Cruiser	Y	S	9	beneficial	M: rivers and streams
<i>Ophiogomphus edmundo</i>	Edmund's Snaketail	Y	S	0	beneficial	M: Blue ridge escarpment streams
<i>Ophiogomphus howei</i>	Pygmy Snaketail	Y	S	0	beneficial	M: New River
<i>Phyciodes batesii</i>	Tawny Crescent Butterfly	Y	L	2	no impact	M: dry hillsides, upland pastures, at higher elevations; host plants = asters, mainly <i>Aster undulatus</i>
<i>Polygonia progne</i>	Gray Comma	Y	L	2	no impact	M: rich, decid. forests mixed with hardwoods; host plant -- varied, mainly birch, willow, alder
<i>Pyrgus wyandot</i>	Southern Grizzled Skipper	N	L	0	no impact	M: openings and edges in wooded hilltops; host plants -- Rosaceae, e.g. strawberry( <i>Fragaria</i> )
<i>Satyrrium edwardsii</i>	Edwadr's Hairstreak	Y	L	1	no impact	MPC: scrubby or xeric oak woods; host plants -- mainly oaks( <i>Quercus</i> )
<i>Semiothisa fraserata</i>	Fraser Fir Angle	N	S	0	no impact	M: Fraser Fir forests

<i>Speyeria diana</i>	Diana Fritillary Butterfly	Y	S	2	no impact	MP: rich woods and adjacent edges and openings, often near streams; host = violets (Viola)
<i>Speyeria idalia</i>	Regal Fritillary Butterfly	Y	S	1	beneficial	M: wet or dry meadows, bogs, open hilltops; host = violets (Viola)
<b>MAMMALS</b>						
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared Bat	Y	L	0	beneficial	MC: roosts in old buildings, caves, and mines, usually near water
<i>Microtus chrotorrhinus carolinensis</i>	Southern Rock Vole	Y	S	5	no impact	M: rocky areas at high elevations, forests or fields
<i>Myotis leibii leibii</i>	Eastern Small-footed Bat	Y	S	2	beneficial	M: roosts in hollow trees (warmer months), in caves and mines (colder months)
<i>Neotoma floridana haematoresia</i>	Eastern Woodrat	Y	L	5	no impact	M: rocky places in deciduous or mixed forests
<i>Neotoma floridana magister</i>	Eastern Woodrat	Y	L	2	no impact	M: rocky places in deciduous or mixed forests
<i>Sorex dispar</i>	Long-tailed Shrew	Y	L	7	no impact	M: high elevation forests with talus or rocky slopes
<i>Sorex hoyi winnemana</i>	Southern Pygmy Shrew	Y	L	9	no impact	MC: montane deciduous forests; old fields and clearcuts in northeastern Coastal Plain
<i>Sorex palustris punctulatus</i>	Southern Water Shrew	Y	S	6	beneficial	M: stream banks in montane forests
<i>Sylvilagus transitionalis</i>	New England Cottontail Rabbit	Y	L	0	no impact	M: dense cover of montane woods and thickets
<b>MOSSES</b>						
<i>Bartramidula wilsonii</i>	Dwarf Apple Moss	N	S	3	no impact	M: in spray zones of waterfalls, moist rocks in humid gorges
<i>Brachydontium trichodes</i>	Peak Moss	N	S	1	no impact	M: on moist rocks in spruce fir forests
<i>Brachymenium andersonii</i>	Anderson's brachymenium	Y	S	0	no impact	M: on humus in acidic cove forests (mixed hardwood-hemlock)
<i>Brachymenium systylium</i>	Mexican brachymenium	Y	L	1	no impact	M: on humus in acidic cove forests (mixed hardwood-hemlock)
<i>Brachythecium populeum</i>	Mated Feather Moss	Y	L	0	no impact	M: mountain forests
<i>Brachythecium rotaeanum</i>	Rota's Feather Moss	Y	L	0	no impact	M: on bark or rock in cove forests
<i>Bryocrumia vivicolor</i>	Gorge Moss	Y	S	1	beneficial	M: rocks and streambanks in humid gorges, spray zones of waterfalls
<i>Bryoerythrophyllum inaequalifolium</i>	A Moss	Y	L	1	no impact	M: on thin soil over shale
<i>Bryoxiphium norvegicum</i>	Sword Moss	N	S	3	no impact	M: rocks in humid gorges, spray zones of waterfalls
<i>Bryum riparium</i>	A Moss	N	L	0	no impact	M: spray zones of waterfalls
<i>Buxbaumia aphylla</i>	Bug-on-a-stick	Y	S	0	no impact	M: forests, roadside banks
<i>Buxbaumia minakatae</i>	Hump-backed Elves	Y	S	0	no impact	M: on rotten logs and stumps in mountain forests
<i>Campylopus atrovirens</i> var. <i>cucullatifolius</i>	Cliff campylopus	N	S	1	no impact	M: cliffs, high elevation rocky summits
<i>Campylopus paradoxus</i>	Paradoxical Campylopus	N	S	0	no impact	M: high elevation rock outcrops
<i>Cirriphyllum piliferum</i>	A Moss	N	L	2	no impact	M: moist rocks, wet by seepage or waterfall spray
<i>Coscinodon cribrosus</i>	Copper Grimmi	N	S	0	no impact	M: high elevation rocky summits
<i>Dichodontium pellucidum</i>	A Moss	N	L	6	no impact	M: seepage or spray zones of waterfalls on mafic or calcareous rocks
<i>Dicranum undulatum</i>	Bog Broom-Grass	Y	L	1	beneficial	M: bogs, seeps
<i>Ditrichum ambiguum</i>	Ambiguous Ditrichum	Y	S	0	no impact	M: acidic cove forests

Encalypta procera	Extinguisher Moss	Y	L	1	no impact	M: on moist calcareous rocks
Entodon compressus	Flattened Entodon	Y	L	1	no impact	MP: on moist calcareous rocks
Entodon sullivantii	Sullivant's Entodon	Y	L	7	no impact	M: on rocks or bark in humid gorges and cove forests
Eucladium verticillatum	Lime-seep Eucladium	Y	L	0	no impact	M: on moist calcareous rocks
Homalia trichomanoides	Lime Homalia	N	L	3	no impact	M: in spray zones of waterwalls, on rocks in humid gorges
Homaliadelphus sharpii	Sharp's Homaliadelphus	Y	S	2	no impact	M: on dry mafic or calcareous rocks in gorges
Hygrohypnum closteri	Closter's Brook-hypnum	Y	L	0	beneficial	MP: on rocks submersed in streams
Leptodontium excelsum	Grandfather Mt. Leptodontium	N	S	0	no impact	M: on bark of Frazier Fir & Red Spruces, in spruce-fir forests
Leptodontium flexifolium	Pale-margined Leptodontium	N	L	1	no impact	M: high elevation rocky summits and moist calcareous rocks
Leptohymenium sharpii	Mount Leconte Moss	N	S	1	no impact	M: moist rocks in spruce-fir forests
Macrocoma sullivantii	Sullivant's Manned-Moss	Y	L	10	no impact	MP: bark of cedar or hardwoods
Orthodontium pellucens	Translucent Orthodontium	Y	S	1	no impact	MP: moist felsic or calcareous rocks
Orthotrichum keeverae	Keever's Bristle-moss	N	S	0	no impact	P: on trees around low elevation granitic domes
Palamocladium leskeoides	Palamocladium	Y	L	1	no impact	M: calcareous rocks in humid gorges
Plagiomnium carolinianum	Carolina Mnium	Y	S	3	beneficial	M: rocks and streambanks in humid gorges
Platydictya confervoides	Alga-like Matted Moss	N	L	0	no impact	M: calcareous rocks (other: ravine,cliff,limestone sink)
Platyhypnidium pringlei	Pringle's Eurhynchium	Y	S	0	beneficial	M: rocks and streambanks in humid gorges, spray zones of waterfalls
Rhabdoweisia crenulata	Himalayan Ribbed-Weissia	Y	L	2	no impact	M: moist rocks in cove forests in humid gorges (other: wet ledge seep)
Rhytidium rugosum	Golden Tundra-Moss	N	L	4	no impact	M: high elevation rocky summits, grassy balds, glades, over mafic rocks
Schlotheimia lancifolia	Highlands Moss	Y	S	2	no impact	M: on bark of hardwoods in cove forests
Scopelophila cataractae	Agoyan cataract Moss	Y	L	2	no impact	MP: copper-rich soils
Scopelophila ligulata	Coppermoss	Y	L	2	no impact	M: copper-rich soils and rock faces (granite, limestone, mica schist)
Sphagnum angustifolium	Narrowleaf Peatmoss	Y	L	1	beneficial	M: bogs (other: forested bogs)
Sphagnum capillifolium	Northern Peatmoss	Y	L	0	beneficial	M: bogs
Sphagnum fallax	Pretty Peatmoss	Y	L	3	beneficial	M: bogs (other: northern low shrub bog)
Sphagnum flexuosum	Flexuous Peatmoss	Y	L	0	beneficial	M: bogs
Sphagnum pylaesii	Simple Peatmoss	N	L	2	no impact	M: seepage cliffs, natural pools
Sphagnum russowii	Russow's Peatmoss	Y	L	0	beneficial	M: bogs
Sphagnum squarrosum	Squarrose Peatmoss	N	L	1	no impact	M: spray zones of waterfalls, seepage in spruce-fir forest
Sphagnum subsecundum	Orange Peatmoss	Y	L	0	beneficial	M: bogs and fens
Sphagnum tenellum	Delicate Peatmoss	N	L	1	no impact	M: high elevation granitic domes (other: bogs)
Sphagnum warnstorffii	Fen Peatmoss	Y	L	0	beneficial	M: bogs and fens
Splachnum pennsylvanicum	Southern Dung Moss	Y	S	0	beneficial	M: bogs

<i>Taxiphyllum alternans</i>	Japanese Yew-Moss	N	S	1	no impact	M: on limestone in spray zones of waterfalls
<i>Tortula ammonsiana</i>	Ammons's tortula	N	S	0	no impact	M: shaded rock faces, probably with nutrient-rich seepage
<i>Tortula fragilis</i>	Fragile Tortula	N	L	0	no impact	M: shaded rock faces, probably with nutrient-rich seepage
<i>Warnstorfia fluitans</i>	Floating Sickle-Moss	N	L	1	no impact	M: in spray zones of waterfalls
<b>HORNWORTS, LICHENS, LIVERWORTS</b>						
<i>Anaptychia setifera</i>	A Foliose Lichen	N	L	1	no impact	M: high elevation rocky summits
<i>Anastrophyllum saxicola</i>	A Liverwort	N	L	1	no impact	M: high elevation rocky summits
<i>Aspiromitus appalachianus</i>	A Hornwort	Y	S	0	beneficial	M: on rocks in streambeds
<i>Barbilophozia barbata</i>	A Liverwort	N	L	0	no impact	M: on high elevation rocky summits
<i>Barbilophozia hatcheri</i>	A Liverwort	N	L	0	no impact	M: on high elevation rocky summits
<i>Bazzania nudicaulis</i>	A Liverwort	N	S	1	no impact	M: on bark of Fraser Fir or on shaded rock in spruce-fir forests
<i>Cephaloziella hampeana</i>	A Liverwort	Y	L	0	beneficial	M: fens
<i>Cephaloziella obtusilobula</i>	A Liverwort	N	S	0	no impact	M: high elevation cliffs or other moist rocks
<i>Cephaloziella spinicaulis</i>	A Liverwort	N	L	1	no impact	M: in crevices of high elevation rocky summits
<i>Cheilolejeunea evansii</i>	A Liverwort	Y	S	2	no impact	M: on bark of hardwoods in humid gorges
<i>Chiloscyphus appalachianus</i>	A Liverwort	N	S	3	no impact	M: on rock faces in spray zone of waterfalls
<i>Drepanolejeunea appalachiana</i>	A Liverwort	Y	S	7	no impact	M: on moist rock, rhododendron bark, and rhododendron leaves in humid gorges
<i>Hydrothyria venosa</i>	An Aquatic Lichen	Y	L	53	beneficial	MP: submersed in brooks and streams
<i>Lejeunea blomquistii</i>	A Liverwort	N	S	1	no impact	M: on dead tree bark or vertical rock faces in spray zone of waterfalls
<i>Lophozia excisa</i>	A Liverwort	N	L	0	no impact	M: on high elevation rocky summits
<i>Lophozia heterocolpa</i>	A Liverwort	N	L	0	no impact	M: on high elevation rocky summits
<i>Megaceros aenigmaticus</i>	A Hornwort	Y	S	0	beneficial	M: on rocks in streams
<i>Melanelia stygia</i>	A Foliose Lichen	N	L	3	no impact	M: high elevation rocky summits
<i>Mylia taylorii</i>	A Liverwort	N	L	1	no impact	M: moist rock outcrops at high elevations, spray zone of waterfall
<i>Nardia scalaris ssp. scalaris</i>	A Liverwort	N	L	0	no impact	M: on high elevation rocky summits and on moist rocks in spruce-fir forests
<i>Plagiochila austinii</i>	A Liverwort	Y	S	5	no impact	M: moist rocks
<i>Plagiochila caduciloba</i>	A Liverwort	Y	S	12	beneficial	M: rocks and streambanks in humid gorges, spray zone of waterfalls
<i>Plagiochila corniculata</i>	A Liverwort	N	S	1	no impact	M: on bark of Fraser Firs in spruce-fir forests, rarely on hardwoods
<i>Plagiochila echinata</i>	A Liverwort	Y	S	2	beneficial	M: rocks and streambanks in humid gorges, spray zone of waterfalls
<i>Plagiochila sharpii</i>	A Liverwort	N	S	5	no impact	M: damp rockfaces in humid gorges, high elevation rocky summits
<i>Plagiochila sullivantii var. spinigera</i>	A Liverwort	N	S	2	no impact	M: on moist rocks in spray zones of waterfalls
<i>Plagiochila sullivantii var. sullivantii</i>	A Liverwort	N	S	7	no impact	M: on moist rocks (rarely bark), in spray zones of water falls, and spruce-fir forests
<i>Plagiochila virginica var. caroliniana</i>	A Liverwort	N	S	4	no impact	M: rockfaces in spray zone of waterfalls, other moist rockfaces

<i>Plagiochila virginica</i> var. <i>euryphylla</i>	A Liverwort	N	S	0	no impact	M: rockfaces in spray zone of waterfalls
<i>Porella appalachiana</i>	A Liverwort	N	S	1	no impact	M: on rocks in spray zones of waterfalls
<i>Porella wataugensis</i>	A Liverwort	Y	S	0	no impact	M: on rocks in humid gorges
<i>Radula voluta</i>	A Liverwort	N	S	1	no impact	M: on moist rocks in spray zones of waterfalls
<i>Sphenolobopsis pearsonii</i>	A Liverwort	N	S	1	no impact	M: on bark of Fraser Firs in spruce-fir forests
<i>Xanthoparmelia monticola</i>	A Foliose Lichen	N	S	1	no impact	M: high elevation rocky summits
<b>VASCULAR PLANTS</b>						
<i>Abies fraseri</i>	Fraser Fir	N	S	99	no impact	M: spruce-fir forests
<i>Aconitum reclinatum</i>	Trailing Wolfsbane	Y	L	16	no impact	M: rich coves, seepage slopes, boulderfields, rocky stream banks, mainly over mafic rocks
<i>Adlumia fungosa</i>	Climbing Fumatory	Y	L	16	no impact	M: coves and cliffs
<i>Agrostis mertensii</i>	Arctic Bentgrass	N	L	2	no impact	M: high elevation rocky summits and balds
<i>Allium burdickii</i>	Narrow-leaved Wild Leek	Y	L	2	no impact	M: cove forests
<i>Alnus viridis</i> ssp. <i>crispa</i>	Green Alder	N	S	3	no impact	M: balds
<i>Amelanchier sanguinea</i>	Roundleaf Shadbush	N	L	2	no impact	M: thin soils around mafic rock outcrops at lower and middle elevations
<i>Arabis glabra</i>	Tower Mustard	Y	L	0	no impact	M: mountain forests
<i>Arabis hirsuta</i> var. <i>adpressipilis</i>	Hairy Rockcress	N	L	0	no impact	MP: thin soils around basic rock outcrops
<i>Arabis patens</i>	Spreading Rockcress	Y	L	2	no impact	M: thin soils around limestone and nutrient-rich seepage from amphibolite
<i>Arethusa bulbosa</i>	Bog Rose	Y	L	2	beneficial	M: bogs
<i>Arisaema triphyllum</i> ssp. <i>stewardsonii</i>	Bog Jack-in-the-Pulpit	Y	L	1	beneficial	M: bogs
<i>Asplenium bradleyi</i>	Bradley's Spleenwort	N	L	1	no impact	MP: acidic rock outcrops and cliffs
<i>Asplenium monanthes</i>	Single-sorus Spleenwort	N	L	0	no impact	M: outcrops near waterfalls in escarpment gorges
<i>Asplenium ruta-muraria</i>	Wall-rue	N	L	0	no impact	M: limestone outcrops
<i>Aster avitus</i>	Alexander's Rock Aster	N	S	0	no impact	M: thin soil around granitic outcrops
<i>Aster oblongifolius</i>	Aromatic Aster	N	L	1	no impact	M: thin soils around limestone outcrops
<i>Aster shortii</i>	Short's Aster	Y	L	1	no impact	M: bluffs and rocky banks
<i>Astilbe crenatiloba</i>	Roan False Goat's Beard	Y	S	0	no impact	M: cove forests
<i>Berberis canadensis</i>	American Barberry	Y	L	1	no impact	MP: open forests and glades on basic soils
<i>Betula cordifolia</i>	Mountain Paper Birch	N	L	7	no impact	M: high elevation forests and landslide scars
<i>Botrychium jenmanii</i>	Alabama Grape Fern	Y	L	0	no impact	MP: moist woods
<i>Botrychium lanceolatum</i> var. <i>angustisegmentum</i>	Lance leaf Moonwort	Y	L	1	no impact	MP: cove forests
<i>Botrychium matricariifolium</i>	Daisy-leaf Moonwort	Y	L	0	no impact	MP: cove forests
<i>Botrychium multifidum</i>	Leathery Grape Fern	N	L	0	no impact	M: grassy balds
<i>Botrychium oneidense</i>	Blunt-lobed Grape Fern	Y	L	1	no impact	MP: cove forests, bogs

<i>Botrychium simplex</i> var. <i>simplex</i>	Least Moonwort	N	L	0	no impact	M: open, grassy sites
<i>Buckleya distichophylla</i>	Piratebush	Y	S	9	no impact	M: bluffs, dry slopes, forests on lower slopes
<i>Calamagrostis cainii</i>	Cain's Reedgrass	N	S	0	no impact	M: high elevation rocky summits
<i>Calamagrostis canadensis</i>	Canada Reedgrass	Y	L	1	no impact	M: high elevation openings (other: bogs, wetlands, tundra, prairies, aspen woodlands)
<i>Caltha palustris</i>	Marsh marigold	Y	L	0	beneficial	M: boggy sites
<i>Calystegia catesbiana</i> ssp. <i>sericata</i>	Blue Ridge Bindweed	Y	S	19	no impact	MP: open sunny sites (other: roadbanks, disturbed trail, below highway slide)
<i>Campanula aparinoides</i>	Marsh Bellflower	Y	L	4	beneficial	M: bogs and other wet, open sites
<i>Cardamine clematitidis</i>	Mountain Bittercress	N	S	5	no impact	M: high elev. seeps, shaded outcrops, and streambanks
<i>Cardamine rotundifolia</i>	Mountain Watercress	Y	L	5	beneficial	MP: seeps, banks of mountain brooks
<i>Carex aenea</i>	Fernald's Hay Sedge	N	L	3	no impact	M: grassy balds
<i>Carex biltmoreana</i>	Biltmore Sedge	N	S	39	no impact	M: granitic domes and other cliffs and outcrops (other: crevices, edges, seeps over granite)
<i>Carex buxbaumii</i>	Buxbaum's Sedge	Y	L	0	beneficial	MP: bogs and fens
<i>Carex cristatella</i>	Small Crested Sedge	N	L	0	no impact	M: grassy balds, bogs
<i>Carex eburnea</i>	Bristle-leaf Sedge	N	L	0	no impact	M: calcareous outcrops
<i>Carex leptoneuria</i>	A Wood Sedge	Y	L	7	no impact	M: rich cove forests and seepage slopes
<i>Carex manhartii</i>	Manhart's Sedge	Y	S	0	no impact	M: rich cove forests
<i>Carex misera</i>	Wretched Sedge	N	S	11	no impact	M: high elevation rock outcrops (other: rocky summits, crevices, cliffs, cliff base)
<i>Carex oligosperma</i>	Few-seeded Sedge	Y	L	2	beneficial	M: seep and bogs (other: seepy grassy balds, high elev. bogs)
<i>Carex pedunculata</i>	Longstalk Sedge	Y	L	1	no impact	M: rich cove forests
<i>Carex projecta</i>	Necklace Sedge	Y	L	5	beneficial	MPC: bogs, marshes, swamps (other: woodland)
<i>Carex roanensis</i>	Roan Sedge	Y	S	1	no impact	M: forests
<i>Carex schweinitzii</i>	Schweinitz's Sedge	Y	S	1	beneficial	M: bogs and swamp forests
<i>Carex trisperma</i>	Three-seeded Sedge	Y	L	1	beneficial	M: bogs, wet forests at high elevations
<i>Carex woodii</i>	Wood's Sedge	Y	L	12	no impact	MPC: forested slopes, cove forests, and northern hardwoods (other: ravine, open pine grass, mesic woodland)
<i>Cheilanthes alabamensis</i>	Alabama Lip-fern	N	L	0	no impact	M: calcareous outcrops
<i>Chelone cuthbertii</i>	Cuthbert's Turtlehead	Y	S	9	beneficial	MPC: bogs
<i>Chenopodium simplex</i>	Giant-seed Goosefoot	N	L	0	no impact	M: shaded soil at bases of cliffs
<i>Cladium mariscoides</i>	Smooth Sawgrass, Twig-Rush	Y	L	0	beneficial	MCS: bogs, fens, brackish marshes, sandhill seepage bogs
<i>Clematis glaucophylla</i>	White-leaved Leatherflower	Y	L	0	no impact	MP: habitat not known
<i>Clematis occidentalis</i>	Mountain Clematis	Y	L	0	no impact	M: rocky forests
<i>Coeloglossum viride</i> var. <i>virescens</i>	Long-bracted frog Orchid	Y	L	0	beneficial	MP: seeps in cove forests (other: wooded cove, rich woods)
<i>Conioselinum chinense</i>	Hemlock-parsley	Y	L	0	no impact	M: high elevation seepage slopes
<i>Coreopsis latifolia</i>	Broadleaf coreopsis	Y	S	11	no impact	M: cove forests and other rich woods (other: road shoulder, seeps, rock outcrop, bluff, rocky slopes, streambank, gorges)

<i>Croton monanthogynus</i>	Prairie-tea Croton	N	L	0	no impact	M: calcareous rock outcrops
<i>Cypripedium reginae</i>	Showy Lady'slipper	Y	L	0	no impact	M: habitat not known
<i>Cystopteris tennesseensis</i>	Tennessee Bladder-Fern	N	L	1	no impact	CM: calcareous rock outcrops
<i>Cystopteris tenuis</i>	Upland Bladder Fern	N	L	0	no impact	M: high elevation rocky summits, cliffs
<i>Dalibarda repens</i>	Robin runaway	Y	L	1	beneficial	M: bogs and moist woods under rhododendrons
<i>Delphinium exaltatum</i>	Tall Larkspur	N	S	0	no impact	MP: grassy balds, glades, woodlands, mostly over mafic rock (other: rich shaded woods, thickets, limestone bluffs)
<i>Deschampsia cespitosa</i> ssp. <i>glauca</i>	Tufted Hair Grass	N	L	1	no impact	M: olivine barrens, high elevation outcrops of mafic rock
<i>Dicentra eximia</i>	Bleeding Heart	N	L	13	no impact	M: Rock outcrops (other: moist cove, rock near seeps, wooded slope)
<i>Dodecatheon meadia</i> var. <i>meadia</i>	Shooting Star	Y	L	6	no impact	PM: rich, rocky woods, over mafic or calcareous rocks
<i>Draba ramosissima</i>	Branching Draba	N	L	4	no impact	MP: calcareous and mafic rock outcrops (other: rich woody slopes, ledges, shaley slopes, cliffs, crevices)
<i>Echinacea purpurea</i>	Purple Coneflower	Y	L	0	no impact	MP: open woods and clearings
<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	Slender Wheatgrass	N	L	2	no impact	M: olivine barrens
<i>Epilobium ciliatum</i>	Purpleleaf Willowherb	Y	L	4	beneficial	M: seeps and bogs (other: shrubby bottom along stream, drainage ditch, rock seepage outcrop, wet meander)
<i>Eupatorium incarnatum</i>	Pink thoroughwort	Y	L	0	no impact	PMC: rich woods and thin woodlands over diabase, calcareous rocks, other basic rocks, or rich alluvium
<i>Euphorbia commutata</i>	Cliff Spurge	N	L	0	no impact	MP: thin soil around mafic or calcareous outcrops
<i>Euphorbia purpurea</i>	Glade Spurge	Y	S	6	no impact	M: forests, especially over mafic rock
<i>Filipendula rubra</i>	Queen-of-the-Prairie	Y	L	2	beneficial	M: bogs, wet meadows (other: sphagnum bog)
<i>Fothergilla major</i>	Large Fothergilla	Y	S	6	no impact	MP: dry ridgetop or bluff forests
<i>Frasera caroliniensis</i>	Columbo	Y	L	9	no impact	M: deciduous forests
<i>Gentiana flavida</i>	Yellow Gentian	Y	L	0	no impact	M: habitat not known
<i>Gentianopsis crinita</i>	Fringed Gentian	N	L	1	no impact	M: glades, serpentine barrens, open sites over basic rocks
<i>Geum aleppicum</i>	Yellow Avens	Y	L	0	beneficial	M: bogs
<i>Geum laciniatum</i>	Rough Avens	Y	L	0	beneficial	M: bogs
<i>Glyceria laxa</i>	Lax Mannagrass	Y	L	3	beneficial	M: seeps (other: swamp marsh, moist trailside, shallow water, beaver marsh, bog)
<i>Glyceria nubigena</i>	Smoky Mountain Mannagrass	Y	S	2	beneficial	M: high elevation seeps (other: trail margins, swamps, bogs, spruce-fir, grass balds)
<i>Grammitis nimbata</i>	Dwarf Polypody	N	L	1	no impact	M: spray zone behind waterfalls
<i>Helianthemum bicknellii</i>	Plains sunrose	N	L	1	no impact	M: rock outcrops, glades, fens
<i>Helianthemum propinquum</i>	Creeping Sunrose	N	L	2	no impact	M: rock outcrops, glades (other: grassy balds)
<i>Hexalectris spicata</i>	Crested Coralroot	Y	L	1	no impact	MPC: dry or mesic woods on basic soils
<i>Hexastylis contracta</i>	Mountain Heartleaf	Y	S	0	no impact	M: acidic forests under rhododendron
<i>Hexastylis rhombiformis</i>	French Broad Heartleaf	Y	S	3	no impact	M: cove forests (other: bluff, ravine)
<i>Hierochloa odorata</i>	Holy Grass	Y	L	0	beneficial	M: bogs

<i>Huperzia appalachiana</i>	Fir Clubmoss	Y	L	8	beneficial	M: high elevation rocky summits, seeps, fens
<i>Huperzia porophila</i>	Rock Clubmoss	N	L	9	no impact	M: in spray zone of waterfalls (other: damp ledges, wet cliffs, spray crevices)
<i>Hydrastis canadensis</i>	Goldenseal	Y	L	8	no impact	MP: cove forests, other rich deciduous forests
<i>Ilex collina</i>	Long-Stalked Holly	Y	S	0	beneficial	M: bogs, wet streambanks or high elevation forests
<i>Jeffersonia diphylla</i>	Twin Leaf	Y	L	0	no impact	M: rich cove forest, especially over calcareous rocks
<i>Juglans cinerea</i>	Butternut	Y	L	99	no impact	MP: cove forests, rich woods
<i>Juncus gymnocarpus</i>	Seep Rush	N	L	0	no impact	M: bogs, seeps, streambanks
<i>Juncus trifidus</i>	Carolina Highland Rush	N	L	1	no impact	M: high elevation rocky summits
<i>Juniperus communis</i> var. <i>depressa</i>	Dwarf Juniper	N	L	0	no impact	MP: high elevation granitic domes, low elevation rocky summits
<i>Liatris aspera</i>	Rough Blazing Star	N	L	1	no impact	M: glades, open woods, fens
<i>Liatris turgida</i>	Shale-Barren Blazing Star	Y	S	1	no impact	M: dry rocky woods
<i>Lilium canadense</i> ssp. <i>canadense</i>	Yellow Canada Lily	Y	L	0	beneficial	M: bogs, wet meadows
<i>Lilium canadense</i> ssp. <i>editorum</i>	Red Canada Lily	Y	L	0	beneficial	M: bogs, wet meadows
<i>Lilium grayi</i>	Gray's Lily	Y	S	8	beneficial	M: bogs, wet meadows, seeps, grassy balds, high elevation forests (other: mtn summits, open wood edges of spruce-fir)
<i>Lilium philadelphicum</i> var. <i>philadelphicum</i>	Wood Lily	N	L	1	no impact	M: grassy balds, glades
<i>Liparis loeselii</i>	Fen Orchid	Y	L	0	beneficial	MC: seeps, bay swamps
<i>Listera cordata</i>	Heart-leaved twayblade	Y	L	0	no impact	M: habitat not known
<i>Lonicera canadensis</i>	American Fly-Honeysuckle	Y	L	10	beneficial	M: bogs, moist woods
<i>Lonicera flava</i>	Yellow Honeysuckle	N	L	0	no impact	MP: thin soils around rock outcrops, mainly mafic
<i>Lycopodiella inundata</i>	Bog Clubmoss	Y	L	0	beneficial	M: bogs and seeps
<i>Lysimachia fraseri</i>	Fraser's Loosestrife	Y	S	16	no impact	M: forests, roadsides (other: meadows, roadside seeps, hardwood road edge)
<i>Marshallia grandiflora</i>	Large-fl. Barbara's Buttons	Y	S	2	beneficial	MP: bogs, dry basic soils
<i>Marshallia trinervia</i>	Broadleaf Barabara's Buttons	Y	S	0	no impact	M: habitat not known
<i>Meehanian cordata</i>	Meehanian	Y	L	3	no impact	M: cove forests, boulderfields (other: hardwood bluff)
<i>Melica nitens</i>	Three-flowered Melic	Y	L	1	no impact	M: open calcareous woods
<i>Milium effusum</i>	Millet-grass	Y	L	0	no impact	M: high elevation forests or openings
<i>Minuartia groenlandica</i>	Greenland Sandwort	N	L	4	no impact	MP: high and low elevation rocky summits (other: exposed crevices, grassy balds, heath & alnus balds, rock outcrops)
<i>Monotropsis odorata</i>	Sweet pinesap	Y	S	3	no impact	MP: dry forests and bluffs
<i>Muhlenbergia glomerata</i>	Bristly Muhly	N	L	2	no impact	M: olivine barrens, fens, mafic cliffs
<i>Muhlenbergia sobolifera</i>	Rocky Muhly	N	L	0	no impact	M: dripping cliffs and rocky slopes
<i>Oenothera perennis</i>	Perennial Sundrops	Y	L	4	beneficial	MPC: bogs
<i>Orbexilum onobrychis</i>	Lanceleaf Scurfpea	Y	L	0	no impact	M: habitat not known

<i>Panax trifolius</i>	Dwarf Ginseng	Y	L	21	no impact	MP: cove forests, northern hardwoods, other rich forests
<i>Parnassia grandifolia</i>	Large-lvd.-Grass of Parnassus	Y	L	4	beneficial	MPC: fens and seeps over calcareous or mafic rocks (other: old road bank)
<i>Paxistima canbyi</i>	Canby's Mountain-lover	N	S	0	no impact	M: rock outcrops
<i>Pedicularis lanceolata</i>	Swamp Lousewort	Y	L	3	beneficial	M: bottomlands, swampy woods (other: bogs, swampy soils, quaking sphagnum peat)
<i>Phegopteris connectilis</i>	Northern Beech Fern	N	L	6	no impact	M: spray zone of waterfalls, spruce-fir forests, high elev. seepage bogs (other: cove forest, crevices)
<i>Phlox subulata</i>	Moss Pink	N	L	1	no impact	M: outcrops and glades, esp. over mafic rocks
<i>Platanthera flava</i> var. <i>herbiola</i>	Northern Green Orchid	Y	L	2	beneficial	M: bogs and moist forests
<i>Platanthera grandiflora</i>	Large Purple-fringed Orchid	Y	L	5	beneficial	M: bogs, seeps, grassy balds, high elevation moist forests and banks
<i>Platanthera integrilabia</i>	White Fringless Orchid	Y	S	0	beneficial	M: bogs
<i>Platanthera peramoena</i>	Purple fringeless Orchid	Y	L	1	beneficial	MP: bogs, forests (other: along gravel road in edge of woods, edge of peat-bog meadow)
<i>Poa paludigena</i>	Bog Bluegrass	Y	S	0	beneficial	M: bogs
<i>Poa palustris</i>	Swamp Bluegrass	N	L	2	no impact	M: spruce-fir forests, grassy balds (other: heath and <i>Alnus crispa</i> balds, shore, marsh, moist ground)
<i>Poa saltuensis</i>	Bluegrass	N	L	1	no impact	M: olivine barrens
<i>Prenanthes roanensis</i>	Roan Rattlesnakeroot	N	S	29	no impact	M: grassy balds, high elevation forests and outcrops
<i>Prosartes maculata</i>	Nodding Mandarin	Y	L	99	no impact	M: drier cove forests and northern hardwoods forests
<i>Pyrola elliptica</i>	A Shinleaf	Y	L	0	no impact	M: moist forests
<i>Rhododendron cumberlandense</i>	Cumberland Azalea	N	S	1	no impact	M: grassy or shrub balds
<i>Rhododendron prinophyllum</i>	Election Pink	Y	L	0	no impact	M: high elevation forests
<i>Rhododendron vaseyi</i>	Pink-Shell Azalea	Y	S	32	beneficial	M: wet swampy places, high elevation rocky areas, openings, or forests (other: heath balds, acidic cliff, sedge meadow)
<i>Rhynchospora alba</i>	Northern White Beakrush	Y	L	1	beneficial	MCS: fens, bogs, pocosin openings, limesink ponds (other: seeps)
<i>Robinia hispida</i> var. <i>fertilis</i>	Fruitful Locust	Y	S	2	no impact	M: acidic cove forests, northern hardwood forests, high elevation granitic domes (other: open rock woods, pinelands)
<i>Robinia hispida</i> var. <i>kelseyi</i>	Kelsey's Locust	Y	L	1	no impact	M: high elevation red oak forests, dry rocky woods (other: roadbank, trail margin, track spur, ledge)
<i>Robinia viscosa</i> var. <i>hartwegii</i>	Hartwig's Locust	N	S	3	no impact	M: high elevation granitic domes
<i>Rubus idaeus</i> ssp. <i>strigosus</i>	Red raspberry	N	L	3	no impact	M: high elevation spruce-fir forests and openings
<i>Rudbeckia triloba</i> var. <i>pinnatifida</i>	Pinnate-lobed Black-eyed Susan	N	S	2	no impact	M: mafic cliffs (other: basic cliffs, calcareous rocks, glades, open woodlands)
<i>Ruellia purshiana</i>	Pursh's Wild-Petunia	Y	L	2	no impact	MP: glades and woodlands, mostly over mafic or calcareous rocks (other: clay roadsides, woodland margins, ledges)
<i>Rugelia nudicaulis</i>	Rugel's Ragwort	N	S	0	no impact	M: spruce-fir forests
<i>Sanguisorba canadensis</i>	Canada burnet	Y	L	10	beneficial	M: bogs, seeps, rarely seepy exposed cliffs at high elevations (other: fen, upland peat, ledge seep, meadow depression)
<i>Saxifraga caroliniana</i>	Carolina Saxifrage	N	S	7	no impact	M: high to middle elevation moist cliffs and rock outcrops
<i>Saxifraga pennsylvanica</i>	Swamp Saxifrage	Y	L	0	beneficial	MP: bogs, seeps
<i>Scirpus cespitosus</i>	Deerhair Bulrush	N	L	0	no impact	M: high elevation rocky summits, moist cliffs (other: exposed wet rocks, ledges, heath balds, crevice in cliff)

<i>Scutellaria saxatilis</i>	Rock Skullcap	Y	L	3	no impact	MP: northern hardwood forests, rocky woodlands
<i>Sedum rosea</i>	Roseroot	N	L	1	no impact	M: high elevation rocky summits (other: cliff faces)
<i>Senecio millefolium</i>	Divided-leaf Ragwort	N	S	16	no impact	M: granitic domes, other outcrops
<i>Senecio pauperculus</i>	Balsam Groundsel	Y	L	0	beneficial	PMC: fens, bogs, and diabase glades
<i>Senecio plattensis</i>	Prairie Ragwort	N	L	3	no impact	M: mafic and calcareous rock outcrops and cliffs
<i>Senecio schweinitzianus</i>	schweinitz's groundsel	N	L	4	no impact	M: grassy balds
<i>Shortia galacifolia</i> var. <i>brevistylia</i>	Northern Oconee Bells	Y	S	3	beneficial	M: streambanks, slopes, and outcrops in humid gorges
<i>Shortia galacifolia</i> var. <i>galacifolia</i>	Oconee Bells	Y	S	0	beneficial	M: streambanks, slopes, and outcrops in humid gorges
<i>Silene ovata</i>	Mountain Catchfly	Y	S	12	no impact	M: rich slopes, cove forests (other: roadside forest edge, rocky slopes, parkway culvert, forest edge)
<i>Smilax biltmoreana</i>	Biltmore Carrion-Flower	Y	S	13	no impact	MP: dry to mesic forests, over felsic or mafic rocks
<i>Smilax lasioneura</i>	A Carrion-flower	Y	L	0	no impact	M: oak-hickory forests over mafic rocks
<i>Solidago uliginosa</i>	Bob Goldenrod	Y	L	6	beneficial	MPS: bogs, seeps
<i>Spiranthes ochroleuca</i>	Yellow Ladies'-tresses	N	L	1	no impact	M: grassy balds, meadows, wooded slopes
<i>Sporobolus heterolepis</i>	Prairie Dropseed	N	L	1	no impact	M: olivine barrens (other: pitch pine savanna)
<i>Stachys clingmanii</i>	Clingman's Hedge-nettle	N	S	0	no impact	M: spruce-fir forests, northern hardwoods forests
<i>Stachys eplingii</i>	Epling's Hedge-nettle	Y	L	0	beneficial	M: bogs
<i>Stellaria alsine</i>	Longstalk Starwort	Y	L	0	beneficial	M: seeps
<i>Stellaria corei</i>	Core's Starwort	Y	L	1	no impact	MP: coves, seeps, northern hardwood forests
<i>Streptopus amplexifolius</i>	White Mandarin	N	L	4	no impact	M: spruce-fir forests, northern hardwoods forests
<i>Synandra hispidula</i>	Synandra	Y	L	0	no impact	M: rich cove forests
<i>Thaspium pinnatifidum</i>	Mountain Thaspium	Y	L	2	no impact	M: calcareous slopes
<i>Thermopsis fraxinifolia</i>	Ash-leaved Golden-Banner	Y	S	4	no impact	MP: dry ridges (other: dry roadsides, mountain woods, laurel thicket in ravine)
<i>Thermopsis mollis</i>	Appalachian Golden-Banner	Y	L	1	no impact	MP: dry ridges and open woodlands (other: roadcut shoulder)
<i>Tofieldia glutinosa</i>	Sticky Bog Asphodel	Y	L	2	beneficial	MP: bogs, seepages (especially over mafic rocks)
<i>Trichomanes boschianum</i>	Appalachian Filmy-Fern	N	L	2	no impact	M: spray zone of waterfalls, seeps over rocks
<i>Trichomanes petersii</i>	Dwarf Filmy-Fern	N	L	3	no impact	M: moist rocks in humid gorges (other: rock outcrops, tree trunks, walls of mines, smooth bark trees)
<i>Trichostema brachiatum</i>	Glade Blue Curls	N	L	1	no impact	MP: diabase glades, other dry calcareous or mafic outcrops (other: moist roadsides)
<i>Trientalis borealis</i>	Starflower	Y	L	2	no impact	M: coves
<i>Trillium discolor</i>	Mottled Trillium	Y	S	1	no impact	M: rich coves in the Savannah River drainage
<i>Trillium flexipes</i>	Bent White Trillium	Y	L	0	no impact	M: rich coves
<i>Trillium pusillum</i> var. 1	Least Trillium	Y	S	0	no impact	M: rich cove forests (other: hardwood bottoms and swamps)
<i>Trillium recurvatum</i>	Prairie Trillium	Y	L	0	no impact	M: rich coves
<i>Vaccinium hirsutum</i>	Hairy Blueberry	Y	S	31	no impact	M: ridgetop red oak forests

Vaccinium macrocarpon	Cranberry	Y	L	1	beneficial	MC: bogs, seeps, pocosins
Veronica americana	American Speedwell	Y	L	4	beneficial	MC: seeps, bogs (other: grassy balds, stream margin, marsh)
Woodsia appalachiana	Allegheny Cliff Fern	N	L	0	no impact	M: cliffs, rock outcrops
Woodsia ilvensis	Rusty Woodsia	N	L	0	no impact	M: cliffs, rock outcrops
Zigadenus elegans ssp. glaucus	White Camas	N	L	0	no impact	M: calcareous rock outcrops
Zigadenus leimanthoides	Pinebarren Death-camas	N	L	3	no impact	M: high elevation rocky summits, thin soil at high elevations
REPTILES						
Apalone spinifera spinifera	Eastern Spiny Softshell	Y	L	0	beneficial	M: large streams in the French Broad system
Clemmys muhlenbergi	Bog Turtle	Y	S	11	beneficial	MP: bogs, wet pastures, wet thickets
Opheodrys vernalis	Smooth Green Snake	N	L	0	no impact	M: fields and grassy meadows
Pituophis melanoleucus melanoleucus	Northern Pine Snake	Y	L	0	no impact	CM: dry and sandy woods, mainly in pine/oak sandhills
Sternotherus minor pettifer	Loggerhead Musk Turtle	Y	L	1	beneficial	M: streams and rivers in Mississippi drainage

