

## Biodiversity and Energy Online Mapping

### About the layers

Layer: Modeled Rare Species Distributions

Date of this document: 31 December, 2012

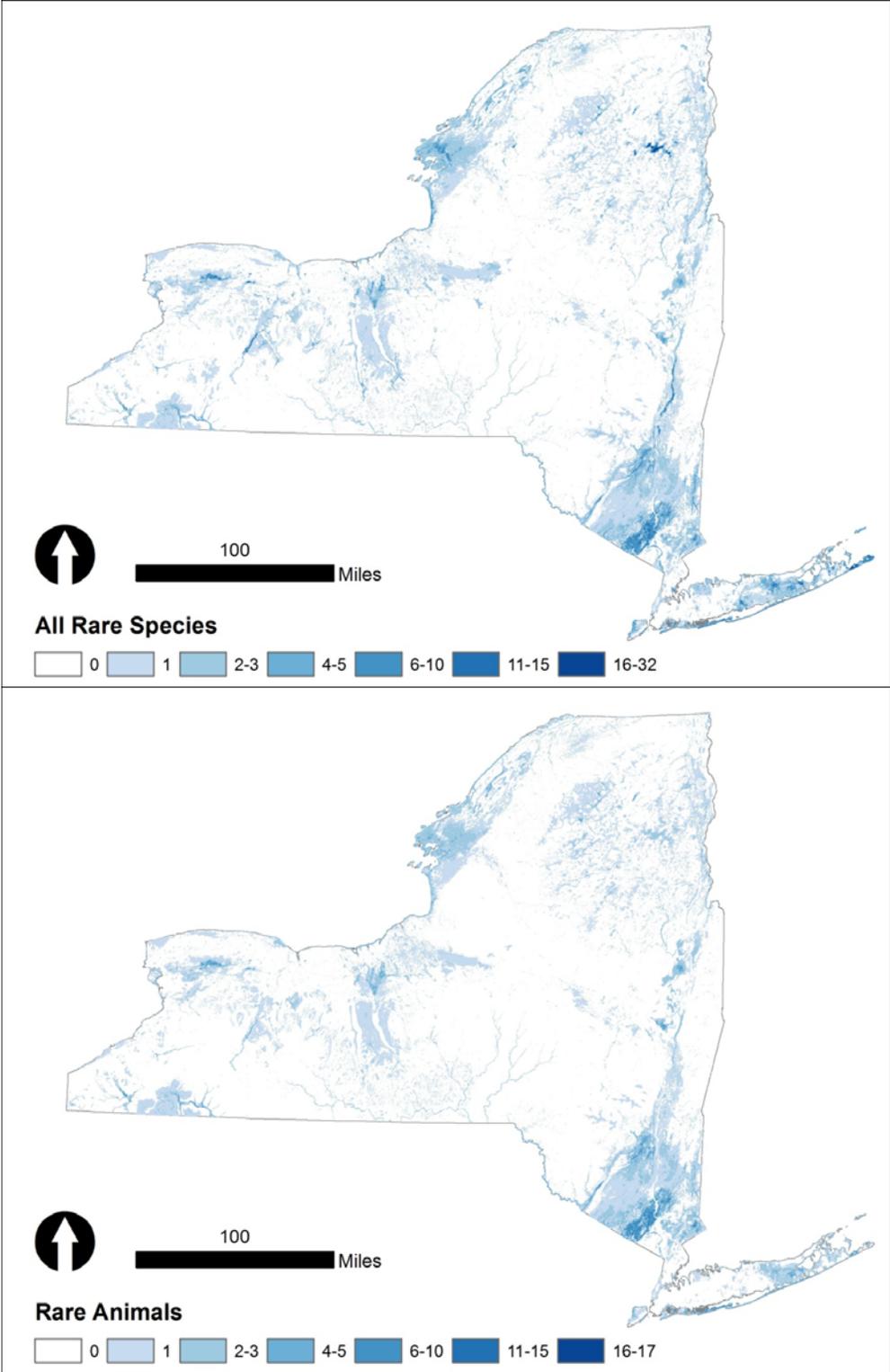
Layer developed by: The New York Natural Heritage Program

**Short Description:** These nine layers depict the predicted richness (number) of up to 379 rare species in various categories. The probability of the existence of suitable habitat for each species was modeled and converted to a presence or absence of suitable habitat; we then summed across all species in each category (i.e., created model “stacks”) to yield the number of species for which suitable habitat was predicted to be present in each cell.

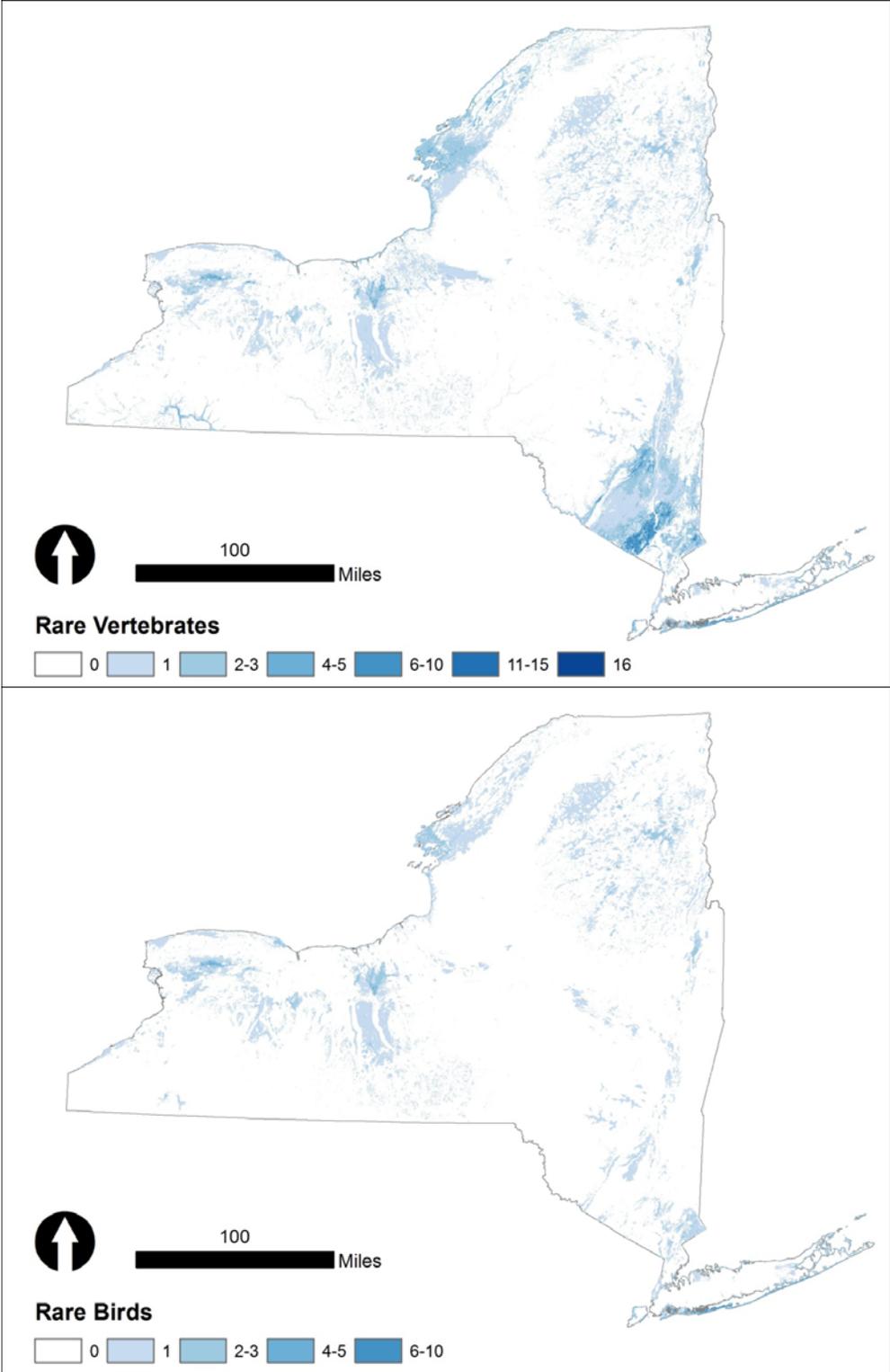
**Source:** Location data come primarily from NY Natural Heritage element occurrence databases. Other sources of known locations, and sources of environmental variables, are noted in Howard and Schlesinger (2012).

### Processing Overview:

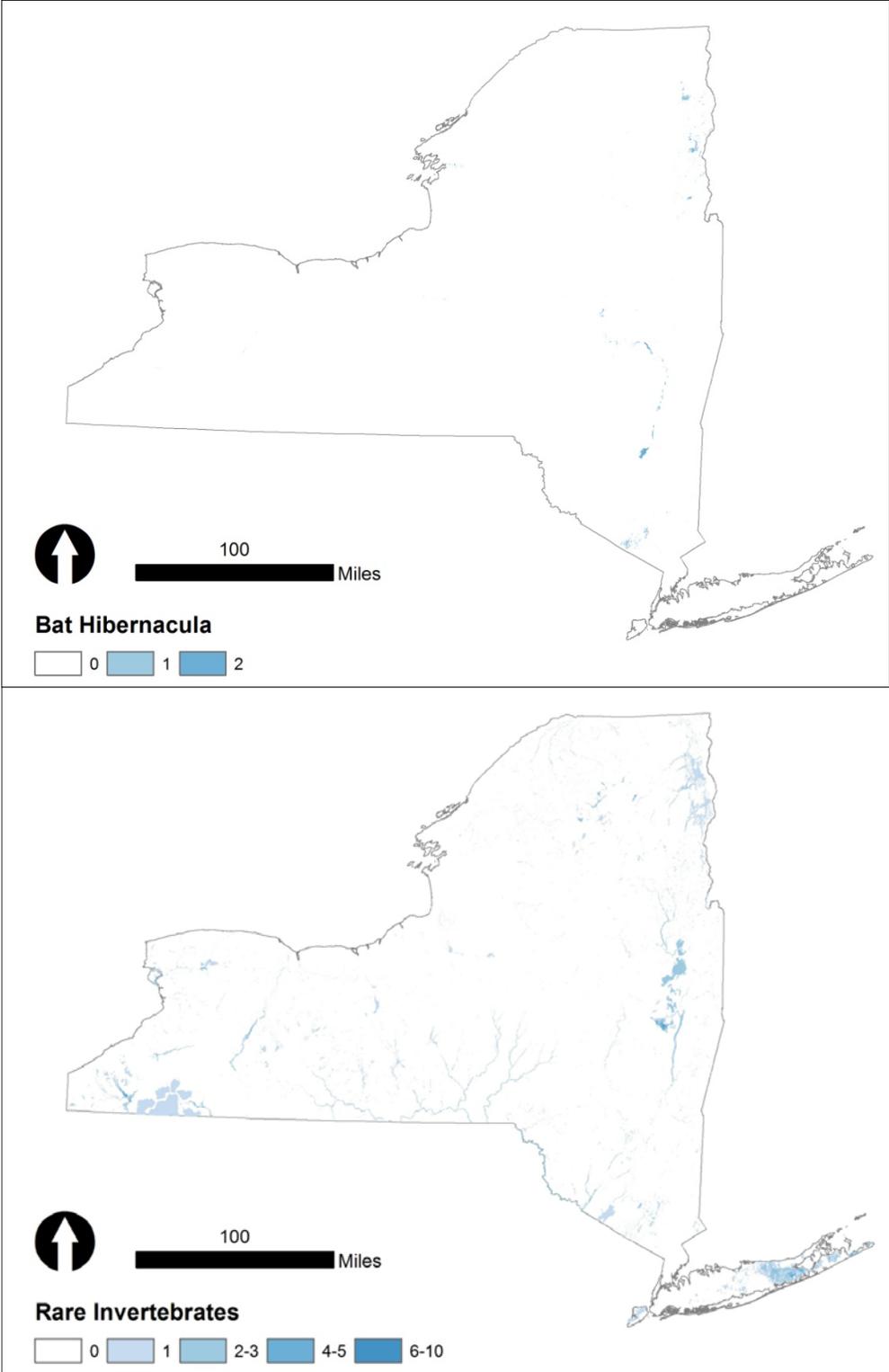
1. Species were selected to represent a range of habitat preferences, niche breadth, and spatial distribution within New York State. Species known to predominantly occupy habitats within streams or lakes were generally excluded from this study in recognition of the additional (catchment and basin-level) landscape metrics needed to adequately model distributions. We selected 243 plant and 136 animal species to be modeled. The number of known locations for each species varied from 2 to 200 (mean = 11) among species. Twenty-six of the animals were modeled for a separate project (Howard and Schlesinger 2012) and included here. The two rare bats were modeled using a modified approach (see 8).
2. We attributed each 30-m cell with 44 environmental variables (see Howard and Schlesinger [2012]).
3. We compared the environmental characteristics of cells with known presence and 10,000 randomly distributed background points using Random Forest analysis.
4. We used the results of this model to predict the probability of suitable habitat for each species.
5. We computed validation statistics for each model and retained models with TSS (Allouche et al. 2006) greater than or equal to 0.5.
6. To convert each model value to a predicted presence (1) or absence (0) of suitable habitat, we used the F-measure (Van Rijsbergen 1979, Sing et al. 2005) with  $\alpha = 0.01$  to find a balance of precision and recall weighted conservatively towards higher recall (more land area represented as suitable).
7. For each of the 10 categories, we summed the 0/1 values for each species to arrive at the number of species predicted to have suitable habitat in each cell.
8. Bat data came from statewide 2009 and 2010 acoustic surveys from 49 fifteen-mile road transects and mist-net surveys (318 points) from various targeted projects 2003-2010. For hibernacula models, we used locations from the NY Natural Heritage database. We modeled summer distribution of two rare species for inclusion in model stacks.



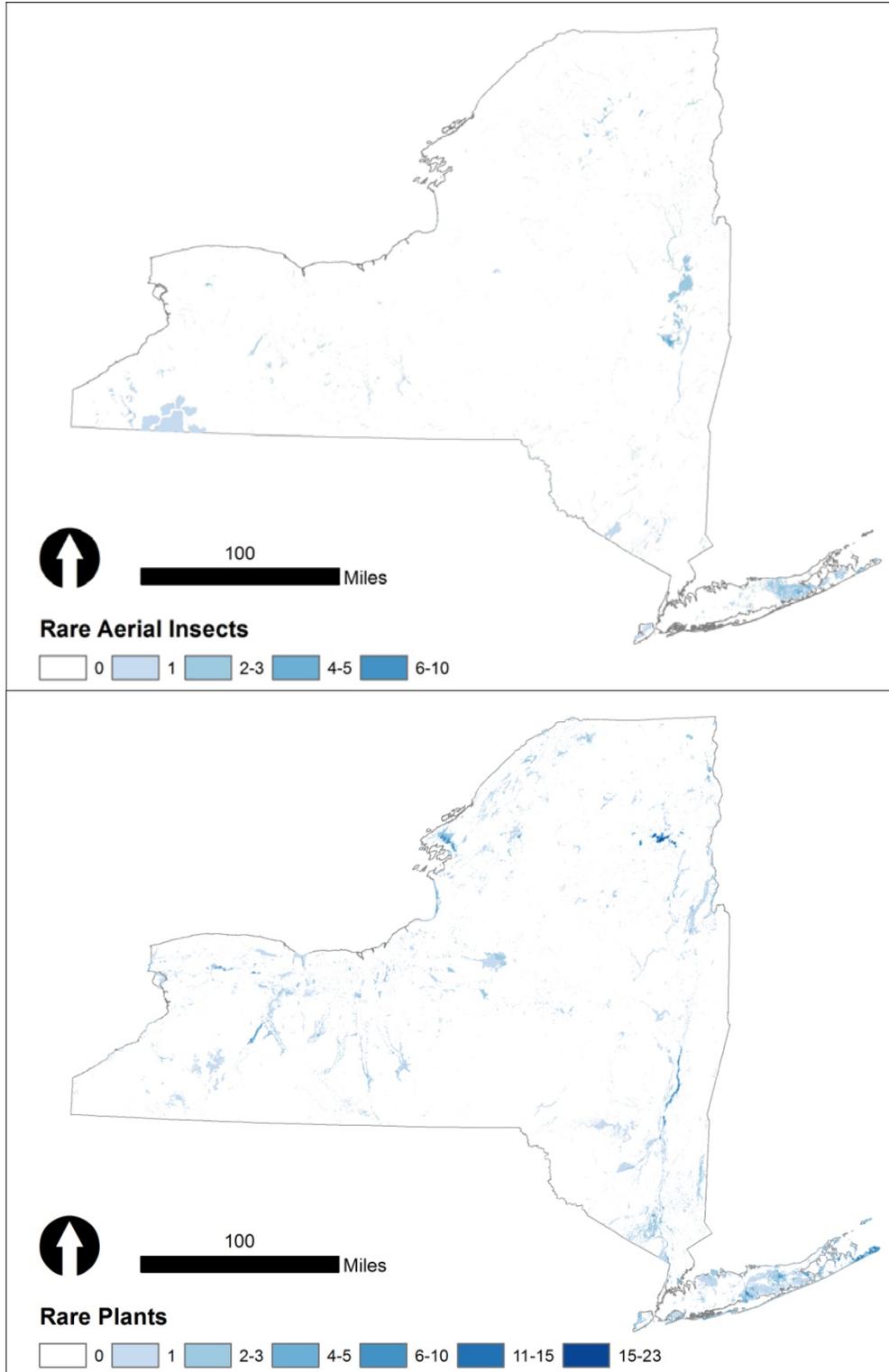
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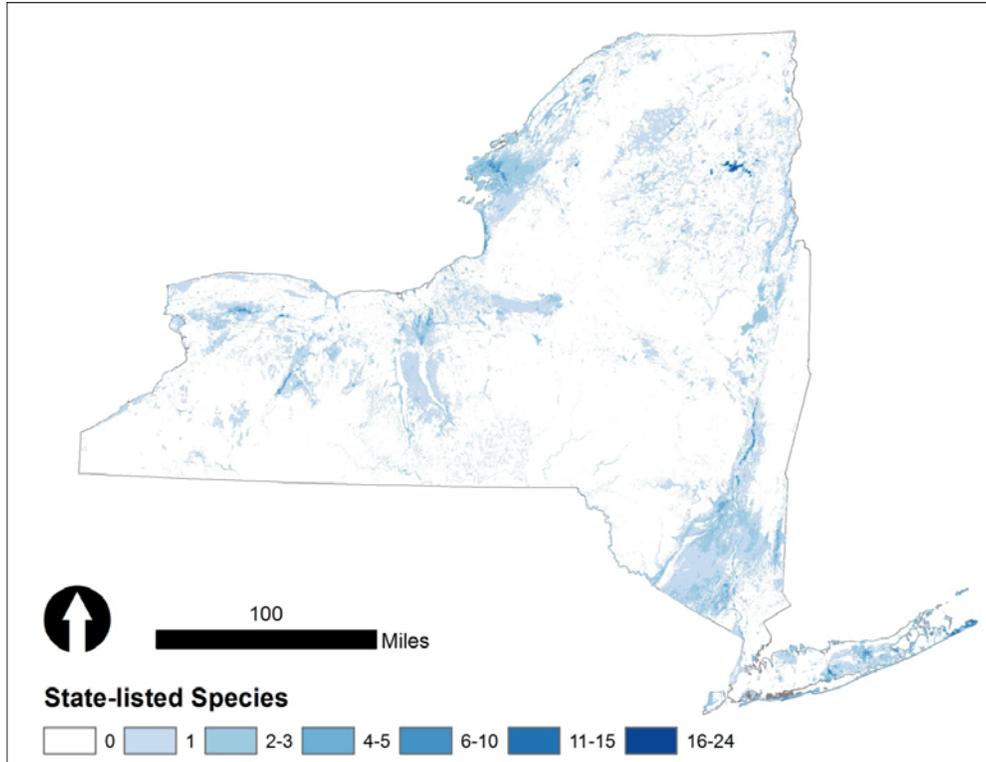
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Scientific name	Common name	TSS	Model stacks including this species							State listed
			Animals	Verts	Bat hib.	Birds	Inverts	Aerial insects	Plants	
<u>Amphibians</u>										
<i>Acris crepitans</i>	Northern Cricket Frog	0.928	X	X						X
<i>Ambystoma jeffersonianum</i> x <i>laterale</i>	Jefferson Salamander Complex	0.537	X	X						
<i>Ambystoma opacum</i>	Marbled Salamander	0.509	X	X						
<i>Cryptobranchus alleganiensis</i>	Hellbender	0.966	X	X						
<i>Eurycea longicauda</i>	Longtail Salamander	0.813	X	X						
<i>Hemidactylum scutatum</i>	Four-toed Salamander	0.591	X	X						
<i>Rana sphenoccephala</i>	Southern Leopard Frog	0.854	X	X						
<i>Scaphiopus holbrookii</i>	Eastern Spadefoot	0.890	X	X						
<u>Beetles</u>										
<i>Cicindela ancocisconensis</i>	Appalachian Tiger Beetle	0.772	X					X		
<i>Cicindela marginipennis</i>	Cobblestone Tiger Beetle	0.917	X					X		
<u>Birds</u>										
<i>Ammodramus henslowii</i>	Henslow's Sparrow	0.546	X	X		X				X
<i>Ammodramus maritimus</i>	Seaside Sparrow	0.992	X	X		X				
<i>Asio flammeus</i>	Short-eared Owl	0.608	X	X		X				X
<i>Caprimulgus carolinensis</i>	Chuck-will's-widow	0.665	X	X		X				
<i>Catharus bicknelli</i>	Bicknell's Thrush	0.963	X	X		X				
<i>Charadrius melodus</i>	Piping Plover	0.948	X	X		X				X
<i>Chlidonias niger</i>	Black Tern	0.841	X	X		X				X
<i>Dendroica cerulea</i>	Cerulean Warbler	0.515	X	X		X				
<i>Euphagus carolinus</i>	Rusty Blackbird	0.654	X	X		X				
<i>Falciennis canadensis</i>	Spruce Grouse	0.936	X	X		X				X
<i>Falco peregrinus</i>	Peregrine Falcon	0.803	X	X		X				X
<i>Helmitheros vermivorum</i>	Worm-eating Warbler	0.574	X	X		X				
<i>Leucophaeus atricilla</i>	Laughing Gull	0.918	X	X		X				
<i>Nyctanassa violacea</i>	Yellow-crowned Night-heron	0.866	X	X		X				
<i>Oporornis formosus</i>	Kentucky Warbler	0.620	X	X		X				

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			Animals	Verts	Bat hib.	Birds	Inverts	Aerial insects	Plants	
<i>Picoides dorsalis</i>	Three-toed Woodpecker	0.698	X	X		X				
<i>Plegadis falcinellus</i>	Glossy Ibis	0.938	X	X		X				
<i>Protonotaria citrea</i>	Prothonotary Warbler	0.851	X	X		X				
<i>Rallus elegans</i>	King Rail	0.883	X	X		X				X
<i>Rynchops niger</i>	Black Skimmer	0.986	X	X		X				
<i>Sterna forsteri</i>	Forster's Tern	0.562	X	X		X				
<i>Sternula antillarum</i>	Least Tern	0.934	X	X		X				X
<i>Tyto alba</i>	Barn Owl	0.664	X	X		X				
<u>Butterflies and moths</u>										
<i>Abagrotis nefascia benjamini</i>	Coastal Heathland Cutworm	0.625	X					X	X	
<i>Callophrys hesseli</i>	Hessel's Hairstreak	0.837	X					X	X	X
<i>Callophrys irus</i>	Frosted Elfin	0.910	X					X	X	X
<i>Catocala herodias gerhardi</i>	Herodias or Pine Barrens Underwing	0.950	X					X	X	
<i>Catocala jair ssp. 2</i>	Jersey Jair Underwing	0.715	X					X	X	
<i>Chaetagnalea cerata</i>	Waxed Sallow	0.819	X					X	X	
<i>Chytonix sensilis</i>	A Noctuid Moth	0.862	X					X	X	
<i>Erastria coloraria</i>	Broad-lined Catopyrrha	0.654	X					X	X	
<i>Eucrocnemis fimbriaris</i>	A Noctuid Moth	0.625	X					X	X	
<i>Fagitana littera</i>	A Noctuid Moth	0.500	X					X	X	
<i>Hemileuca maia maia</i>	Inland Barrens Buckmoth	0.911	X					X	X	
<i>Hemileuca maia ssp. 5</i>	Coastal Barrens Buckmoth	0.958	X					X	X	
<i>Hemileuca sp. 1</i>	Bogbean Buckmoth	0.992	X					X	X	X
<i>Itame sp. 1 nr. inextricata</i>	Barrens Itame	0.823	X					X	X	
<i>Oeneis jutta</i>	Jutta Arctic	0.961	X					X	X	
<i>Pieris virginiensis</i>	West Virginia White	0.864	X					X	X	
<i>Plebejus melissa samuelis</i>	Karner Blue	0.904	X					X	X	X
<i>Psectraglaea carnosae</i>	Pink Sallow	0.803	X					X	X	
<i>Xylena thoracica</i>	Acadian Swordgrass Moth	0.568	X					X	X	

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			Animals	Verts	Bat hib.	Birds	Inverts	Aerial insects	Plants	
Zanclognatha martha	Pine Barrens Zanclognatha	0.921	X					X	X	
<u>Fish</u>										
Acipenser fulvescens	Lake Sturgeon	0.906	X	X						X
Ammocrypta pellucida	Eastern Sand Darter	0.940	X	X						X
Enneacanthus obesus	Banded Sunfish	0.904	X	X						X
Erimystax x-punctatus	Gravel Chub	0.600	X	X						X
Exoglossum laurae	Tonguetied Minnow	0.660	X	X						
Hiodon tergisus	Mooneye	0.807	X	X						X
Ichthyomyzon bdellium	Ohio Lamprey	0.858	X	X						
Ichthyomyzon fossor	Northern Brook Lamprey	0.722	X	X						
Ichthyomyzon greeleyi	Mountain Brook Lamprey	0.531	X	X						
Menidia beryllina	Inland Silverside	0.765	X	X						
Menidia menidia	Atlantic Silverside	0.895	X	X						
Moxostoma valenciennesi	Greater Redhorse	0.789	X	X						
Notropis heterodon	Blackchin Shiner	0.808	X	X						
Percina copelandi	Channel Darter	0.816	X	X						
Percina macrocephala	Longhead Darter	0.878	X	X						X
Prosopium cylindraceum	Round Whitefish	0.920	X	X						X
<u>Mammals</u>										
Myotis leibii	Eastern Small-footed Myotis hibernacula	0.834				X				
Myotis sodalis	Indiana Bat hibernacula	0.556				X				X
Myotis sodalis	Indiana Bat summer	0.765	X	X						X
Sylvilagus transitionalis	New England Cottontail	0.912	X	X						
<u>Crustaceans and mollusks</u>										
Cambarus diogenes	Devil Crawfish	0.811	X					X		
Actinonaias ligamentina	Mucket	0.968	X					X		
Alasmidonta heterodon	Dwarf Wedgemussel	0.846	X					X		X
Alasmidonta varicosa	Brook Floater	0.928	X					X		X

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<i>Amblema plicata</i>	Threeridge	0.876	X					X		
<i>Anodonta implicata</i>	Alewife Floater	0.732	X					X		
<i>Fusconaia flava</i>	Wabash Pigtoe	0.660	X					X		
<i>Lampsilis cariosa</i>	Yellow Lampmussel	0.936	X					X		
<i>Lampsilis fasciola</i>	Wavyrayed Lampmussel	0.927	X					X		X
<i>Lasmigona subviridis</i>	Green Floater	0.862	X					X		X
<i>Ligumia nasuta</i>	Eastern Pondmussel	0.785	X					X		
<i>Margaritifera margaritifera</i>	Eastern Pearlshell	0.791	X					X		
<i>Pleurobema sintoxia</i>	Round Pigtoe	0.926	X					X		
<i>Ptychobranchus fasciolaris</i>	Kidneyshell	0.793	X					X		
<i>Villosa fabalis</i>	Rayed Bean	0.983	X					X		X
<u>Dragonflies and damselflies</u>										
<i>Anax longipes</i>	Comet Darner	0.624	X					X	X	
<i>Argia tibialis</i>	Blue-tipped Dancer	0.859	X					X	X	
<i>Cordulegaster erronea</i>	Tiger Spiketail	0.531	X					X	X	
<i>Cordulegaster obliqua</i>	Arrowhead Spiketail	0.739	X					X	X	
<i>Enallagma laterale</i>	New England Bluet	0.911	X					X	X	
<i>Enallagma minusculum</i>	Little Bluet	0.500	X					X	X	X
<i>Enallagma pictum</i>	Scarlet Bluet	0.894	X					X	X	X
<i>Enallagma recurvatum</i>	Pine Barrens Bluet	0.807	X					X	X	X
<i>Epitheca semiaquea</i>	Mantled Baskettail	0.797	X					X	X	
<i>Gomphus fraternus</i>	Midland Clubtail	0.697	X					X	X	
<i>Gomphus quadricolor</i>	Rapids Clubtail	0.801	X					X	X	
<i>Ischnura ramburii</i>	Rambur's Forktail	0.863	X					X	X	
<i>Libellula auripennis</i>	Golden-winged Skimmer	0.974	X					X	X	
<i>Ophiogomphus anomalus</i>	Extra-striped Snaketail	0.949	X					X	X	
<i>Ophiogomphus aspersus</i>	Brook Snaketail	0.692	X					X	X	
<i>Ophiogomphus howei</i>	Pygmy Snaketail	0.619	X					X	X	

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<i>Rhionaeschna mutata</i>	Spatterdock Darner	0.687	X					X	X	
<i>Somatochlora cingulata</i>	Lake Emerald	0.880	X					X	X	
<i>Somatochlora forcipata</i>	Forcipate Emerald	0.838	X					X	X	
<i>Somatochlora incurvata</i>	Incurvate Emerald	0.996	X					X	X	
<i>Stylurus plagiatus</i>	Russet-tipped Clubtail	0.948	X					X	X	
<i>Tachopteryx thoreyi</i>	Gray Petaltail	0.741	X					X	X	
<i>Williamsonia fletcheri</i>	Ebony Boghaunter	0.994	X					X	X	
<u>Reptiles</u>										
<i>Agkistrodon contortrix</i>	Copperhead	0.673	X	X						
<i>Apalone spinifera</i>	Spiny Softshell	0.931	X	X						
<i>Carphophis amoenus</i>	Worm Snake	0.790	X	X						
<i>Clemmys guttata</i>	Spotted Turtle	0.652	X	X						
<i>Coluber c. constrictor</i>	Racer	0.623	X	X						
<i>Crotalus horridus</i>	Timber Rattlesnake	0.898	X	X						X
<i>Elaphe obsoleta</i>	Eastern Ratsnake	0.575	X	X						
<i>Emydoidea blandingii</i>	Blanding's Turtle	0.811	X	X						X
<i>Eumeces anthracinus</i>	Coal Skink	0.526	X	X						
<i>Eumeces fasciatus</i>	Five-lined Skink	0.760	X	X						
<i>Glyptemys insculpta</i>	Wood Turtle	0.586	X	X						
<i>Glyptemys muhlenbergii</i>	Bog Turtle	0.815	X	X						X
<i>Kinosternon subrubrum</i>	Eastern Mud Turtle	0.807	X	X						X
<i>Regina septemvittata</i>	Queen Snake	0.613	X	X						X
<i>Sceloporus undulatus</i>	Fence Lizard	0.990	X	X						X
<i>Terrapene c. carolina</i>	Eastern Box Turtle	0.597	X	X						
<i>Thamnophis sauritus</i>	Eastern Ribbonsnake	0.514	X	X						
<u>Nonvascular plants</u>										
<i>Conardia compacta</i>	Coast Creeping Moss	0.667								X
<i>Didymodon fallax</i> var. <i>reflexus</i>	Rusty Beard-moss	0.500								X

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			Animals	Verts	Bat hib.	Birds	Inverts	Aerial insects			
<i>Sphagnum angermanicum</i>	Angerman's Peat Moss	0.583								X	
<i>Taxiphyllum taxirameum</i>	Yew-leaf Moss	0.850								X	
<u>Vascular plants</u>											
<i>Aconitum noveboracense</i>	Northern Monkshood	0.856								X	X
<i>Agalinis acuta</i>	Sandplain Gerardia	0.857								X	X
<i>Agalinis maritima</i> var. <i>maritima</i>	Seaside Gerardia	0.980								X	
<i>Agrimonia rostellata</i>	Woodland Agrimony	0.870								X	X
<i>Agrostis mertensii</i>	Northern Bentgrass	0.777								X	X
<i>Aletris farinosa</i>	Stargrass	0.912								X	X
<i>Allium cernuum</i> var. <i>cernuum</i>	Nodding Wild Onion	0.995								X	X
<i>Amaranthus pumilus</i>	Seabeach Amaranth	0.915								X	X
<i>Amelanchier nantucketensis</i>	Nantucket Juneberry	0.884								X	X
<i>Ammophila breviligulata</i> ssp. <i>chAMPLAINENSIS</i>	Champlain Beachgrass	0.900								X	X
<i>Angelica lucida</i>	Seacoast Angelica	0.889								X	X
<i>Anthoxanthum monticola</i> ssp. <i>monticola</i>	Alpine Sweetgrass	0.796								X	X
<i>Anticlea elegans</i> ssp. <i>glaucus</i>	Mountain Death Camas	0.882								X	X
<i>Arethusa bulbosa</i>	Dragon's Mouth Orchid	0.793								X	X
<i>Argentina egedii</i> ssp. <i>groenlandica</i>	Coastal Silverweed	0.565								X	X
<i>Asclepias viridiflora</i>	Green Milkweed	0.962								X	X
<i>Asimina triloba</i>	Pawpaw	0.931								X	X
<i>Asplenium scolopendrium</i> var. <i>americanum</i>	Hart's-tongue Fern	0.858								X	X
<i>Bartonia paniculata</i> ssp. <i>paniculata</i>	Screw-stem	0.500								X	X
<i>Betula minor</i>	Dwarf White Birch	0.891								X	X
<i>Betula pumila</i>	Swamp Birch	0.846								X	X
<i>Bidens bidentoides</i>	Delmarva Beggar-ticks	0.802								X	

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			Animals	Verts	Bat hib.	Birds	Inverts	Aerial insects			
<i>Bidens laevis</i>	Smooth Bur-marigold	0.856								X	X
<i>Boechera grahamii</i>	Purple Rock-cress	0.867								X	
<i>Boechera missouriensis</i>	Green Rock-cress	0.860								X	X
<i>Boechera stricta</i>	Drummond's Rock-cress	0.798								X	X
<i>Bolboschoenus maritimus</i> ssp. <i>paludosus</i>	Seaside Bulrush	0.824								X	X
<i>Bolboschoenus novae-angliae</i>	Saltmarsh Bulrush	0.731								X	X
<i>Bouteloua curtipendula</i> var. <i>curtipendula</i>	Side-oats Grama	0.657								X	X
<i>Cardamine longii</i>	Long's Bittercress	0.840								X	X
<i>Cardamine rotundifolia</i>	Mountain Watercress	0.887								X	X
<i>Carex abscondita</i>	Thicket Sedge	0.661								X	X
<i>Carex backii</i>	Back's Sedge	0.791								X	X
<i>Carex bigelowii</i>	Bigelow's Sedge	0.804								X	X
<i>Carex bullata</i>	Button Sedge	0.711								X	X
<i>Carex chordorrhiza</i>	Creeping Sedge	0.852								X	X
<i>Carex collinsii</i>	Collins' Sedge	0.609								X	X
<i>Carex crawei</i>	Crawe's Sedge	0.522								X	X
<i>Carex davisii</i>	Davis' Sedge	0.790								X	X
<i>Carex debilis</i> var. <i>debilis</i>	White-edge Sedge	0.688								X	
<i>Carex formosa</i>	Handsome Sedge	0.698								X	X
<i>Carex haydenii</i>	Cloud Sedge	0.846								X	X
<i>Carex jamesii</i>	James' Sedge	0.821								X	X
<i>Carex livida</i>	Livid Sedge	0.628								X	X
<i>Carex mesochorea</i>	Midland Sedge	0.545								X	X
<i>Carex mitchelliana</i>	Mitchell's Sedge	0.852								X	X
<i>Carex nigromarginata</i>	Black-edge Sedge	0.592								X	X
<i>Carex sartwellii</i>	Sartwell's Sedge	0.943								X	X
<i>Carex scirpoidea</i> ssp. <i>scirpoidea</i>	Canadian Single-spike Sedge	0.858								X	X

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<i>Carex straminea</i>	Straw Sedge	0.636							X	X
<i>Carex tenuiflora</i>	Sparse-flowered Sedge	0.729							X	X
<i>Carex typhina</i>	Cat-tail Sedge	0.635							X	X
<i>Carya laciniosa</i>	Big Shellbark Hickory	0.921							X	X
<i>Castilleja coccinea</i>	Scarlet Indian-paintbrush	0.769							X	X
<i>Ceanothus herbaceus</i>	Prairie Redroot	0.700							X	X
<i>Cenchrus tribuloides</i>	Dune Sandspur	0.722							X	X
<i>Chamaecyparis thyoides</i>	Atlantic White Cedar	0.911							X	
<i>Chamaelirium luteum</i>	Fairy Wand	0.826							X	X
<i>Chenopodium berlandieri</i> var. <i>macrocalycium</i>	Large Calyx Goosefoot	0.774							X	X
<i>Chenopodium rubrum</i>	Red Pigweed	0.992							X	X
<i>Corydalis aurea</i>	Golden Corydalis	0.864							X	X
<i>Crocanthemum dumosum</i>	Bushy Rockrose	0.757							X	X
<i>Cuscuta obtusiflora</i> var. <i>glandulosa</i>	Southern Dodder	0.600							X	X
<i>Cyperus flavescens</i>	Yellow Flatsedge	0.712							X	X
<i>Cyperus polystachyos</i> var. <i>texensis</i>	Coast Flatsedge	0.686							X	X
<i>Cypripedium arietinum</i>	Ram's-head Ladyslipper	0.780							X	X
<i>Diapensia lapponica</i> var. <i>lapponica</i>	Diapensia	0.923							X	X
<i>Digitaria filiformis</i>	Slender Crabgrass	0.801							X	X
<i>Diospyros virginiana</i>	Persimmon	0.792							X	X
<i>Diphasiastrum complanatum</i>	Northern Running-pine	0.559							X	X
<i>Draba arabisans</i>	Rock-cress	0.803							X	X
<i>Draba reptans</i>	Carolina Whitlow-grass	0.709							X	X
<i>Dryopteris fragrans</i>	Fragrant Cliff Fern	0.826							X	X
<i>Eleocharis equisetoides</i>	Knotted Spikerush	0.760							X	X
<i>Eleocharis tenuis</i> var.	Slender Spikerush	0.959							X	X

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Scientific name	Common name	TSS	Model stacks including this species							State listed
			Animals	Verts	Bat hib.	Birds	Inverts	Aerial insects	Plants	
pseudoptera										
Eleocharis tricostata	Three-ribbed Spikerush	0.833								X X
Eleocharis tuberculosa	Long-tuberclad Spikerush	0.602								X X
Eleocharis uniglumis var. halophila	Salt-marsh Spikerush	0.792								X X
Empetrum atropurpureum	Purple Crowberry	0.919								X X
Empetrum nigrum	Black Crowberry	0.888								X
Endodeca serpentaria	Virginia Snakeroot	0.913								X X
Equisetum palustre	Marsh Horsetail	0.701								X X
Equisetum pratense	Meadow Horsetail	0.809								X X
Eupatorium torreyanum	Fringed Boneset	0.951								X X
Eurybia spectabilis	Showy Aster	0.861								X X
Fimbristylis castanea	Marsh Fimbry	0.856								X X
Frasera caroliniensis	Green Gentian	0.968								X X
Gaylussacia bigeloviana	Northern Dwarf Huckleberry	0.889								X X
Gentianopsis virgata	Lesser Fringed Gentian	0.839								X X
Geocaulon lividum	False Toadflax	0.990								X X
Geum triflorum var. triflorum	Prairie-smoke	0.967								X X
Halenia deflexa	Spurred Gentian	0.720								X X
Hasteola suaveolens	Sweet-scented Indian-plantain	0.870								X X
Helianthus angustifolius	Swamp Sunflower	0.889								X X
Hottonia inflata	Featherfoil	0.833								X X
Hydrangea arborescens	Wild Hydrangea	0.742								X X
Hydrastis canadensis	Golden-seal	0.643								X X
Hypericum adpressum	Creeping St. John's-wort	0.750								X X
Hypericum hypericoides ssp. multicaule	St. Andrew's Cross	0.908								X X
Hypericum prolificum	Shrubby St. John's-wort	0.796								X X
Iris prismatica	Slender Blue Flag	0.863								X X

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			Animals	Verts	Bat hib.	Birds	Inverts	Aerial insects	Plants	
<i>Jeffersonia diphylla</i>	Twin-leaf	0.802							X	X
<i>Juncus debilis</i>	Weak Rush	0.846							X	X
<i>Juncus scirpoides</i>	Scirpus-like Rush	0.625							X	X
<i>Juncus trifidus</i>	Arctic Rush	0.890							X	X
<i>Lechea tenuifolia</i>	Slender Pinweed	0.706							X	X
<i>Leptochloa fusca</i> ssp. fascicularis	Salt-meadow Grass	0.994							X	X
<i>Lespedeza angustifolia</i>	Narrow-leaved Bush-clover	0.574							X	
<i>Lespedeza stuevei</i>	Velvety Bush-clover	0.930							X	X
<i>Liatris scariosa</i> var. novae-angliae	Northern Blazing-star	0.841							X	X
<i>Ligusticum scothicum</i> ssp. scothicum	Scotch Lovage	0.606							X	X
<i>Lilaeopsis chinensis</i>	Eastern Grasswort	0.778							X	X
<i>Lilium michiganense</i>	Michigan Lily	0.500							X	X
<i>Linum intercursum</i>	Sandplain Wild Flax	0.750							X	X
<i>Linum sulcatum</i>	Yellow Wild Flax	0.889							X	X
<i>Liparis liliifolia</i>	Large Twayblade	0.575							X	X
<i>Lipocarpa micrantha</i>	Dwarf Bulrush	0.633							X	X
<i>Listera australis</i>	Southern Twayblade	0.718							X	X
<i>Ludwigia sphaerocarpa</i>	Globe-fruited Ludwigia	0.853							X	X
<i>Lycopus rubellus</i>	Gypsy-wort	0.875							X	X
<i>Lysimachia hybrida</i>	Lance-leaved Loosestrife	0.942							X	X
<i>Magnolia virginiana</i>	Sweetbay Magnolia	0.649							X	X
<i>Myriophyllum alterniflorum</i>	Water Milfoil	0.846							X	X
<i>Myriophyllum farwellii</i>	Farwell's Water-milfoil	0.748							X	X
<i>Myriophyllum pinnatum</i>	Green Parrot's-feather	0.500							X	X
<i>Oldenlandia uniflora</i>	Clustered Bluets	0.667							X	X
<i>Oligoneuron ohioense</i>	Ohio Goldenrod	0.711							X	X

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			Animals	Verts	Bat hib.	Birds	Inverts	Aerial insects			
<i>Oligoneuron rigidum</i> var. <i>rigidum</i>	Stiff-leaf Goldenrod	0.735								X	X
<i>Orontium aquaticum</i>	Golden Club	0.758								X	X
<i>Paspalum laeve</i>	Field Beadgrass	0.791								X	X
<i>Pedicularis lanceolata</i>	Swamp Lousewort	0.824								X	X
<i>Pellaea glabella</i> ssp. <i>glabella</i>	Smooth Cliff Brake	0.922								X	X
<i>Persicaria careyi</i>	Carey's Smartweed	0.533								X	X
<i>Persicaria setacea</i>	Swamp Smartweed	0.610								X	X
<i>Pinguicula vulgaris</i>	Butterwort	0.886								X	X
<i>Pinus virginiana</i>	Virginia Pine	0.519								X	X
<i>Piptatherum canadense</i>	Canada Ricegrass	0.914								X	X
<i>Plantago maritima</i> var. <i>juncooides</i>	Seaside Plantain	0.843								X	X
<i>Platanthera cristata</i>	Crested Fringed Orchis	0.722								X	X
<i>Poa paludigena</i>	Slender Marsh Bluegrass	0.793								X	X
<i>Podostemum ceratophyllum</i>	Riverweed	0.732								X	X
<i>Polygonum aviculare</i> ssp. <i>buxiforme</i>	Small's Knotweed	0.615								X	X
<i>Polygonum douglasii</i>	Douglas' Knotweed	0.692								X	X
<i>Polygonum glaucum</i>	Seabeach Knotweed	0.973								X	
<i>Populus heterophylla</i>	Swamp Cottonwood	0.872								X	X
<i>Potamogeton alpinus</i>	Northern Pondweed	0.987								X	X
<i>Potamogeton hillii</i>	Hill's Pondweed	0.689								X	X
<i>Potamogeton pulcher</i>	Spotted Pondweed	0.631								X	X
<i>Potamogeton strictifolius</i>	Straight-leaf Pondweed	0.909								X	X
<i>Prenanthes bootii</i>	Boott's Rattlesnake-root	0.811								X	X
<i>Primula mistassinica</i>	Bird's-eye Primrose	0.916								X	X
<i>Proserpinaca pectinata</i>	Comb-leaved Mermaid-weed	0.806								X	X
<i>Prunus pumila</i> var. <i>depressa</i>	Dwarf Sand-cherry	0.919								X	X

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			Animals	Verts	Bat hib.	Birds	Inverts	Aerial insects	Plants	
<i>Prunus pumila</i> var. <i>pumila</i>	Low Sand-cherry	0.758							X	X
<i>Ptelea trifoliata</i> ssp. <i>trifoliata</i>	Wafer-ash	0.711							X	X
<i>Pterospora andromedea</i>	Giant Pine-drops	0.868							X	X
<i>Pycnanthemum verticillatum</i> var. <i>verticillatum</i>	Whorled Mountain-mint	0.556							X	X
<i>Pyrola asarifolia</i> ssp. <i>asarifolia</i>	Pink Wintergreen	0.812							X	X
<i>Quercus phellos</i>	Willow Oak	0.667							X	X
<i>Rhododendron canadense</i>	Rhodora	0.733							X	X
<i>Rhododendron lapponicum</i>	Lapland Rosebay	0.880							X	X
<i>Rhynchospora inundata</i>	Drowned Beakrush	0.625							X	X
<i>Rhynchospora nitens</i>	Short-beaked Beakrush	0.729							X	X
<i>Rorippa aquatica</i>	Lake-cress	0.740							X	X
<i>Rotala ramosior</i>	Tooth-cup	0.760							X	X
<i>Rumex fueginus</i>	Golden Dock	0.714							X	X
<i>Sabatia angularis</i>	Rose-pink	0.667							X	X
<i>Sabatia stellaris</i>	Sea-pink	0.900							X	X
<i>Sagittaria montevidensis</i> var. <i>spongiosa</i>	Spongy Arrowhead	0.968							X	X
<i>Salicornia bigelovii</i>	Dwarf Glasswort	0.969							X	X
<i>Salix cordata</i>	Sand Dune Willow	0.921							X	X
<i>Salix uva-ursi</i>	Bearberry Willow	0.810							X	X
<i>Saxifraga aizoides</i>	Yellow Mountain-saxifrage	0.810							X	X
<i>Schoenoplectus heterochaetus</i>	Slender Bulrush	0.931							X	X
<i>Scirpus georgianus</i>	Georgia Bulrush	0.556							X	X
<i>Scleria triglomerata</i>	Whip Nutrush	0.594							X	X
<i>Scutellaria integrifolia</i>	Hyssop-skullcap	0.897							X	X
<i>Sericocarpus linifolius</i>	Flax-leaf Whitetop	0.894							X	X
<i>Sisyrinchium mucronatum</i>	Michaux's Blue-eyed-grass	0.749							X	X
<i>Solidago latissimifolia</i>	Coastal Goldenrod	0.933							X	X

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<i>Solidago leiocarpa</i>	Alpine Goldenrod	0.835							X	X
<i>Solidago simplex</i> var. <i>monticola</i>	Rand's Mountain Goldenrod	0.724							X	X
<i>Sporobolus heterolepis</i>	Northern Dropseed	0.862							X	X
<i>Stellaria longipes</i>	Longstalk Starwort	0.896							X	X
<i>Suaeda linearis</i>	Narrow-leaf Sea-blite	0.920							X	X
<i>Suaeda rolandii</i>	Roland's Sea-blite	0.733							X	X
<i>Symphyotrichum boreale</i>	Northern Bog Aster	0.848							X	X
<i>Symphyotrichum subulatum</i> var. <i>subulatum</i>	Saltmarsh Aster	0.887							X	X
<i>Thalictrum venulosum</i> var. <i>confine</i>	Veiny Meadow-rue	0.800							X	X
<i>Trichophorum cespitosum</i> ssp. <i>cespitosum</i>	Deer's Hair Sedge	0.743							X	X
<i>Triglochin palustre</i>	Marsh Arrow-grass	0.780							X	X
<i>Triphora trianthophora</i>	Nodding Pogonia	0.521							X	X
<i>Tripsacum dactyloides</i>	Northern Gamma Grass	0.884							X	X
<i>Utricularia juncea</i>	Rush Bladderwort	0.801							X	X
<i>Utricularia radiata</i>	Small Floating Bladderwort	0.548							X	X
<i>Utricularia striata</i>	Fibrous Bladderwort	0.771							X	X
<i>Vaccinium boreale</i>	High-mountain Blueberry	0.872							X	X
<i>Valeriana uliginosa</i>	Marsh Valerian	0.950							X	X
<i>Viburnum dentatum</i> var. <i>venosum</i>	Southern Arrowwood	0.846							X	X
<i>Viburnum edule</i>	Squashberry	0.688							X	X
<i>Viburnum nudum</i> var. <i>nudum</i>	Possum-haw	0.750							X	X
<i>Viola nephrophylla</i>	Northern Bog Violet	0.500							X	X
<i>Viola primulifolia</i>	Primrose-leaf Violet	0.737							X	X
<i>Woodsia alpina</i>	Alpine Cliff Fern	0.500							X	X
<i>Xyris smalliana</i>	Large Yellow-eyed-grass	0.944							X	

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## Species not passing validation

Scientific name	Common name	TSS
<u>Animals</u>		
<i>Myotis leibii</i>	Eastern Small-footed Myotis summer	0.244
<i>Dendroica caerulescens</i>	Black-throated Blue Warbler	0.418
<i>Hylocichla mustelina</i>	Wood Thrush	0.279
<i>Oxyura jamaicensis</i>	Ruddy Duck	0.486
<i>Piranga olivacea</i>	Scarlet Tanager	0.493
<i>Vermivora peregrina</i>	Tennessee Warbler	0.021
<i>Chytonix ruperti</i>	A Noctuid Moth	0.333
<i>Euchlaena madusaria</i>	A Geometrid Moth	0.469
<i>Notropis buccatus</i>	Silverjaw Minnow	0.389
<i>Progomphus obscurus</i>	Common Sanddragon	0.377
<u>Nonvascular plants</u>		
<i>Cyrto-hypnum pygmaeum</i>	Pygmy Cedar Moss	0.222
<i>Meesia triquetra</i>	Three-leaved Thread Moss	0.267
<i>Myurella julacea</i>	Small Mousetail Moss	-0.167
<i>Platydictya jungermannioides</i>	False Willow Moss	0.333
<i>Sematophyllum demissum</i>	Hanging Long Beak Moss	0.056
<i>Sphagnum andersonianum</i>	Anderson's Peat Moss	0.333
<u>Vascular plants</u>		
<i>Ageratina aromatica</i> var. <i>aromatica</i>	Small White Snakeroot	0.446
<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	Northern Reedgrass	0.294
<i>Carex buxbaumii</i>	Brown Bog Sedge	0.432
<i>Carex frankii</i>	Frank's Sedge	0.381
<i>Carex houghtoniana</i>	Houghton's Sedge	0.386
<i>Carex lupuliformis</i>	False Hop Sedge	0.475
<i>Cuscuta cephalanthi</i>	Button-bush Dodder	0.250
<i>Desmodium obtusum</i>	Stiff Tick-trefoil	0.068
<i>Eleocharis ovata</i>	Blunt Spikerush	0.375
<i>Eleocharis quadrangulata</i>	Angled Spikerush	0.300
<i>Epilobium hornemannii</i> ssp. <i>hornemannii</i>	Alpine Willow-herb	0.333
<i>Eupatorium pubescens</i>	Serrate Round-leaf Boneset	0.476
<i>Geum virginianum</i>	Rough Avens	0.072
<i>Gymnocladus dioicus</i>	Kentucky Coffee Tree	0.026
<i>Juncus subcaudatus</i>	Woodland Rush	0.487
<i>Lactuca hirsuta</i>	Downy Lettuce	0.000
<i>Linum medium</i> var. <i>texanum</i>	Southern Yellow Flax	0.256

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<i>Lygodium palmatum</i>	Climbing Fern	0.070
<i>Monarda clinopodia</i>	Basil-balm	0.444
<i>Oenothera oakesiana</i>	Oakes' Evening-primrose	0.489
<i>Phlox maculata</i> ssp. <i>maculata</i>	Wild Sweet-william	0.464
<i>Platanthera hookeri</i>	Hooker's Orchid	0.456
<i>Potamogeton diversifolius</i>	Water-thread Pondweed	0.361
<i>Potentilla paradoxa</i>	Bushy Cinquefoil	0.400
<i>Scleria pauciflora</i> var. <i>caroliniana</i>	Few-flowered Nutrush	0.333
<i>Silene caroliniana</i> ssp. <i>pennsylvanica</i>	Wild Pink	0.448
<i>Sparganium natans</i>	Small Bur-reed	0.333
<i>Stachys hyssopifolia</i>	Rough Hedge-nettle	0.478

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