

## Vascular Plant Checklists from Oklahoma

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A bibliography of 85 references involving Oklahoma flora is provided, 52 of which provide a vascular plant species list from an unambiguous area. I list geographic, topographic, and taxonomic summary data for 59 floras (some references provide multiple lists). The species-area relationship for Oklahoma (with a  $z$  value of 0.15) is similar to that of North America as a whole. In the face of imminent climate change, the pace of floristic research in Oklahoma needs to accelerate.

### INTRODUCTION

Vascular plant checklists are proving valuable as raw material for broad-scale analyses of biodiversity (Qian and Ricklefs 1999; Chiarucci and Bonini 2005). But they also prove a more basic (and arguable more essential) function: to guide practicing botanists in the field. For either purpose, it is useful to have access to bibliographic data to find such floras.

The Floras of North America project (not to be confused with the *Flora of North America Project*; Flora of North America Editorial Committee 1993) is an attempt to catalogue and analyze vascular floras within North America, north of Mexico. The purpose of this paper is to present a bibliography of floristic checklists within Oklahoma, and to provide basic geographic and taxonomic data for comparative purposes.

### METHODS

I used standard library techniques as well as informal inquiries to gather bibliographic information on floras from throughout North America. I then extracted geographic data (with help from maps and geographic databases) and

summarized the number of taxa in the species lists. In some cases geographic data are approximate. Details about the methodology are given in Fridley et al. (2006), Palmer (1995, 2005, 2007), Qian (in press), and Withers et al. (1998) as well as <http://botany.okstate.edu/floras/index.html>

### RESULTS AND DISCUSSION

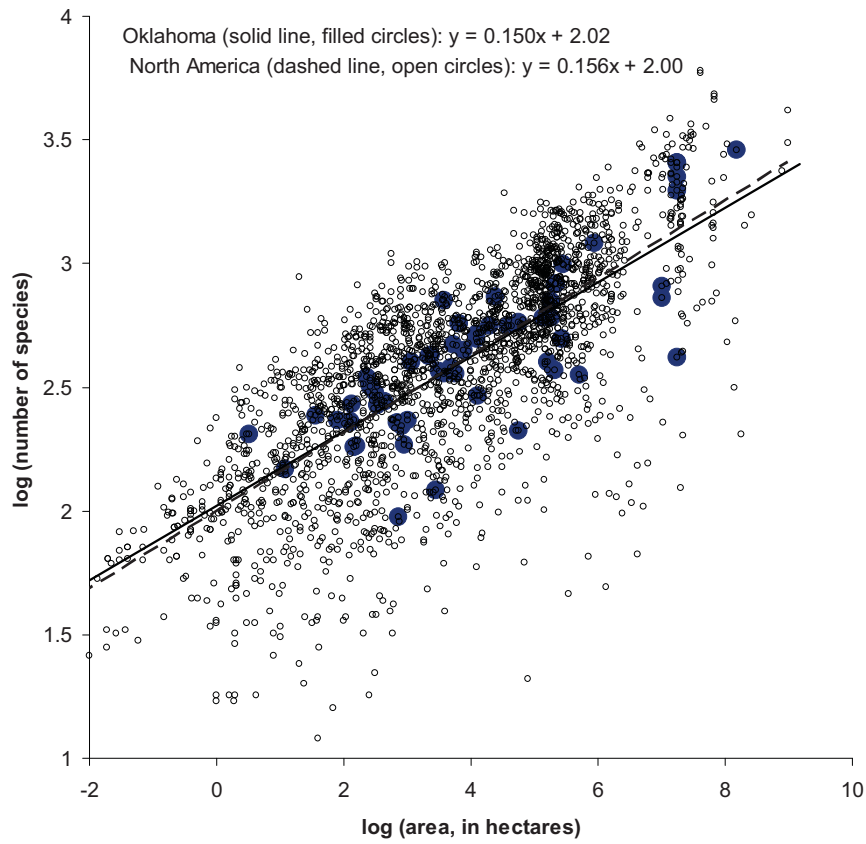
I found 85 references including floristic lists, or with titles suggesting the presence of such lists (Appendix 1). Of these, I was able to gather complete data (minimum and maximum latitude and longitude, minimum and maximum elevation, and the number of families, genera, species, total taxa, and % alien species) for 51 references (Appendix 2).

The vascular plant species-area relationship for Oklahoma is remarkably similar to that of North America as a whole (Figure). The slope of the line, known in biogeography as the  $z$  coefficient, is 0.150, and is similar to that of many continental species-area relationships (Rosenzweig 1995). The fact that there is much scatter around the species-area relationship implies that there may be interesting variation in biodiversity that can be explained by environmental or biogeographic factors.

While the list of Oklahoma floras may seem impressive, a number of other states (led by California, Virginia, Iowa, Louisiana, Illinois, Texas, Arizona, Ohio, New York, and Wyoming) have surpassed us in numbers of floristic publications. Current work by Oklahoma botanists is helping to rectify the situation, with the work of Bruce Hoagland and his colleagues being most notable. Nevertheless, there are ample opportunities for new teams of botanists, including dedicated amateurs, to become involved with basic floristic research. Indeed, with extreme climate change predicted for the region (Seager et al. 2007), it may not be too long before we lose many of our vascular plant species. Thus, the time to document their existence is now.

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**Figure** Species-area relationship for 59 Oklahoma floras (data from Appendix 2) in comparison with 2283 lists from throughout North America.

**Appendix 1** Vascular plant checklists written within Oklahoma. Although not conventionally included in bibliographies, first names are included, when available, to allow more ready identification of the scholars involved. The citation ends with a bracketed reference number associated with the Floras of North America project and the author reference in Appendix 2. Some citations are not floras, but are included here because their titles resemble those of floras and including them in this list avoids accidental rediscovery. Keywords follow the citations: COMPLETE = all taxonomic and geographic data have been gathered; DATA DUPLICATE = the same data are available in another source listed elsewhere; NO AREA = the geographical area is impossible to determine based on available information; NO DATA YET = the reference has either not yet been seen, or it has not been evaluated; NOT A FLORA = despite the name, the document is not a flora; OTHER STATES = data include regions outside Oklahoma; TAXA EXCLUDED = data were not gathered because some taxa (e.g. ferns, graminoids) were intentionally excluded.

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**Appendix 2** Geographic data and taxonomic data from Oklahoma floras. The Reference numbers correspond to author references in Appendix 1. Multiple checklists within a reference are indicated by decimals. Note that lists for some areas (especially the state of Oklahoma as a whole) have been compiled multiple times.

Site name	Year	latitude	longitude	Min. Elev. (m)	Max. Elev. (m)	Area (hectares)	# Families	# Genera	# spp	# Tot. Taxa	% of species alien	Appendix I Author Reference
Great Plains	1986	41.5	-104.0	290	1600	152226662	160	851	2862	3189	11.5	Grea 536
Mesa de Maya Region	1953	37.3	-103.7	1524	2088	56175	75	293	577	589	8.3	Roge 2051
Black Mesa Preserve	1994	36.9	-103.0	1456	1516	36	55	172	243	244	6.6	McPh 21362
Black Mesa State Park	2004	36.9	-102.9	1298	1516	312	58	191	300	301	7.0	Foll 21363
Washita Battlefield NHP	2004	35.6	-99.7	588	610	136	62	201	271	271	11.4	Hoag 21491
Greer County	1932	34.9	-99.6	487	669	165700	65	245	401	401	6.7	Bull 94
Gypsum Hills and Redbed Plains	1975	34.7	-99.5	366	671	514892	63	230	354	359	9.6	Barb 90
Altus Air Force Base	1996	34.7	-99.3	408	425	1036	63	175	232	233	17.2	John 21373
Selman Living Laboratory	2002	36.7	-99.2	511	560	130	60	155	226	226	9.7	Buck 21259
Selman Living Laboratory	2003	36.7	-99.2	511	560	130	61	149	229	229	9.2	Buck 21316
Kiowa Co.	1937	34.8	-99.1	399	730	265475	81	269	497	527	7.6	Bald 89
Gypsum dominated site	2005	36.4	-98.9	457	508	80	61	173	233	233	9.4	Hoag 21706
Hackberry Flat	2004	34.3	-98.9	349	366	2770	33	99	121	122	17.4	Hoag 21360.2
three sites in Tillman County	2004	34.4	-98.9	332	381	3842	69	241	357	352	13.7	Hoag 21360
Suttle Creek	2004	34.2	-98.9	332	358	161	55	155	182	182	9.3	Hoag 21360.3
Little Sahara State Park	1980	36.5	-98.9	423	470	146	55	145	181	181	6.6	Sher 107
Frederick Lake	2004	34.5	-98.9	360	381	911	52	155	185	187	10.3	Hoag 21360.1
Oklahoma	1952	35.2	-98.8	87	1516	17814538	141	741	2247	2542	8.9	Wate 3064
Oklahoma	1994	35.2	-98.8	87	1516	17814538	172	850	2549	2844	14.6	Tayl 20006
Territory of Oklahoma	1900	35.3	-98.8	110	1516	10108770	97	377	724	737	6.6	Bogu 1228
Territory of Oklahoma	1902	35.3	-98.8	111	1516	10108770	103	412	811	812	6.4	Van 1232
Oklahoma	1930	35.3	-98.8	88	1516	17781645	125	661	1957	1981	7.7	Jeff 1117
Oklahoma	1991	35.2	-98.8	87	1517	17944297	159	846	2548	2830	11.9	Tayl 1964
Wichita Mountain Wildlife Refuge	1977	34.8	-98.7	387	751	23885	104	359	730	749	5.5	Buck 674
Fort Sill	1990	34.7	-98.5	329	673	38300	99	344	556	562	11.5	John 671
Salt Plain National Wildlife Refuge	1964	36.8	-98.2	343	369	12955	71	200	293	298	9.6	Baal 3248

Kegelman Auxiliary Field	1996	36.7	-98.1	345	370	431	68	187	276	277	9.1	John	21371.1
Pottawatomie County	1933	35.1	-98.0	274	345	212380	76	228	372	374	10.2	Bark	92
Oklahoma	1901	36.0	-98.0	86	1516	17781904	93	226	419	421	1.4	Whit	1234
Vance Air Force Base	1996	36.3	-97.9	388	401	740	31	77	94	94	46.8	John	21371
Cleveland County	1994	35.2	-97.9	311	386	137011	160	362	605	605	17.5	Foll	4852
Frank Tract	1998	36.2	-97.7	229	323	340	72	187	268	268	7.5	Roe	20001
Oklahoma County	2001	35.6	-97.4	267	429	186000	91	308	601	644	12.5	Hoag	20010
Deer Creek Archaeological Site	1980	36.7	-97.4	291	294	12	48	113	147	148	12.9	Tyrl	2056
Arbuckle Mountains	1908	34.4	-97.1	228	396	55943	73	162	211	221	5.7	Gage	98
Love Valley WMA	2004	33.8	-97.1	197	243	3134	86	258	368	368	8.4	Hoag	21707
Chickasaw NRA	2001	34.5	-97.0	240	352	3849	105	397	713	717	12.2	Hoag	20021
Arbuckle Mountains	1947	34.5	-96.9	229	415	222740	96	397	823	867	8.4	Dale	96
Pennington Creek	1997	34.4	-96.7	251	263	3	64	157	203	203	4.9	Shan	20003
Pontotoc County	1958	34.7	-96.7	244	396	185781	98	380	698	730	1.6	McCo	101
Pontotoc Ridge Preserve	1998	34.4	-96.6	257	340	1174	79	261	399	402	7.0	John	21372
Keystone WMA	2003	36.1	-96.5	222	237	4893	79	254	380	380	15.5	Hoag	21364
Tallgrass Prairie Preserve	1993	36.8	-96.4	256	352	12250	78	273	496	496	11.5	Palm	1975
Tallgrass Prairie Preserve	1993	36.8	-96.4	256	352	12250	81	258	517	517	8.9	The	4095
Boehler Seeps and Sandhills Preserve	1997	34.2	-95.9	155	175	235	84	225	345	346	4.3	Clar	20002
Oologah Wildlife Management Area	2003	36.7	-95.6	192	258	5226	95	305	470	470	8.3	Hoag	21315
Hugo Lake WMA	2004	34.1	-95.5	121	154	6475	113	359	573	573	8.9	Hoag	21407
Muskogee County	1938	35.5	-95.4	183	301	213934	131	424	829	842	8.9	Litt	99
Muskogee County	1929	35.6	-95.4	142	300	219240	104	423	828	842	9.1	Litt	1882
Pushmataha WMA	2003	34.5	-95.4	150	400	7690	96	287	447	447	7.2	Cran	21287
Camp Gruber	1994	35.7	-95.1	152	327	19500	101	347	561	568	8.0	John	21370
Sans Bios/Kiamichi	1969	34.8	-94.9	152	914	277482	119	457	991	1067	7.9	Mean	104
Oklahoma Ozarks	1963	36.1	-94.8	140	457	875316	125	515	1206	1318	2.8	Wate	109
Red Slough/Grassy Slough WMA	2004	33.8	-94.8	200	113	2422	106	269	426	426	6.6	Hoag	21479
Red Slough WMA	2004	33.7	-94.8	100	104	2158	106	269	422	422	6.6	Hoag	21479.1
Grassy Slough WMA	2004	33.8	-94.8	105	113	264	92	221	318	318	6.6	Hoag	21479.2
McCurtain County Wilderness	1997	34.3	-94.7	183	415	5701	95	236	359	359	5.8	Smit	20005
Sally Bull Hollow Tract	2003	34.7	-94.6	300	500	810	62	145	219	219	8.7	Haye	21266