

Computerized Data Base Built For Vascular Flora of NP System

By Gary S. Waggoner and
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Over the past several years, a service-wide need has grown to obtain basic information in an accurate, efficient manner about the vascular flora of the National Park System. Recently, the Service has needed information concerning the distribution of plants sensitive to air pollutants, the presence and distribution of exotic versus native species, and rare, threatened, or endangered species in the System. A systematic listing of such plants, called a "flora", for any one park unit has limited value when questions arise concerning species in all or a group of parks.

The collection and merging of these park floras into a single Park Service Flora would enable researchers to address these questions. Consequently, the Air Quality and Natural Science Divisions, Office of Science and Technology, WASO, initiated such a project in FY '82 and requested the Branch of Special Programs, Denver Service Center to construct a computerized data base of vascular flora in the National Park System. The objectives used in designing the data base were described by James P. Bennett in the George Wright Society *FORUM*, Spring 1982 "A Computerized Flora of the National Parks." A core staff of four was formed to conduct the work. Gary S. Waggoner, Project Manager/Botanist, Nancy K. Thorwardson, Data Base Manager, Connie L. Malcolm, Data Entry Technician, and Ronald J. Buss, Computer Consultant.

Seventeen class I park units (those units given the most stringent level of protection from the effects of air pollution under the Clean Air Act as amended in 1977) were chosen for entry into the data base by the Air Quality Division. The 17 units occur in all NPS Regions except Alaska and the National Capital Region. Personnel at the park units were contacted and the latest checklists on floras of vascular plants for each park were obtained.

Two recently produced computerized inventories of the vascular flora of North America are:

A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland — Volume II, The Biota of North America, by John T. and Rosemarie Kartesz, 1980 (The University of North Carolina Press, Chapel Hill, NC); *The National List of Scientific Plant Names* (NLSNP), a 1982 publication of the Soil Conservation Service (SCS-TP-159), comprised of two separate volumes: Volume I — List of Plant Names, and Volume II — Synonymy.

Both publications are current and represent professional treatments of the Nation's flora but are decidedly different in nomenclature. Our work uses the NLSNP as the principal source document, following its nomenclature and synonymy wherever possible. The Kartesz and Kartesz publication is used whenever the NLSNP does not adequately treat a particular taxon. One of the strongest reasons for making this selection is that the NLSNP includes distribution and habit (information on general characteristics) which is especially useful for the NPS data base:

1. Distribution in North America (including Alaska, Hawaii, Canada, and the Caribbean)
2. Annual/biennial/perennial
3. Native/introduced
4. Submersed/emergent/floating
5. Epiphytic/parasitic/saprophytic
6. Woody/partly woody/succulent
7. Tree/shrub/vine/herbaceous forb-/grasslike herb

The procedure used to develop the NPS data base, called *NPFLORA*, was to enter the appropriate park data to the NLSNP for each plant appearing in the park floras. In numerous instances (an estimated 10 percent of the taxa) recent changes in botanical nomenclature required the project manager to update the scientific names of the plants. In a few cases (less than 1 percent of the taxa) the proper scientific name could not be determined. These problems will be resolved in future consultation with appropriate park staff. Intraspecific taxa at the forma level were not included in the data base. Such taxa are listed at the species, subspecies, or variety level.

The analysis package used with *NPFLORA* is *SYSTEM 2000*, a data base management system developed and maintained by Intel Systems Corporation. *SYSTEM 2000* offers great flexibility in design and use of a data base and, more importantly, in update and revision. Query capabilities are virtually limitless and *SYSTEM 2000* includes a Report Writer Feature that allows the user to define and generate many different report formats.

Levels of information in the data base include: Family, Genus, Species, Infraspecies (subspecies and/or variety), Habit (General Characteristics), Distribution,

Not
in NRB:b

General
Reference
Do NOT Enter

Computerized Data Base (continued)

and Parks. The hierarchical, or "tree" structure of the data base allows rapid, cost effective searches and minimizes file sizes and storage costs. Queries may be made at any level of the hierarchy. For example, a user may wish to determine in which parks *Ranunculus repens* (creeping buttercup) occurs, and to discover the habit and distribution characteristics of the plant. A simple run of SYSTEM 2000 on the NPFLORA data base yields the information presented in Fig. 1.

6° RANUNCULACEAE

12° RANUNCULUS

22° REPENS

41° I

42° I

43°

44° P

45° F

49° 123... 6... 890AH... WEMG

51° OLYM

51° ROMO

51° SHEN

51° GRSM

51° ISRO

51° SEKI

The species occurs in 7 of the 19 parks currently in the data base. Olympic, Rocky Mountain, Shenandoah, Great Smoky Mountains, Isle Royale, Sequoia and Kings Canyon. The plant is introduced to the continental United States and Hawaii, is a perennial, and is herbaceous. It occurs in regions 1,2,3,6,8,9,0,A,H,W,E,M, and G (Fig. 2).

The user may also make park-specific queries. For example, a query concerning introduced (exotic) plants in the Black

Figure 3 Introduced Plants in the Black Canyon of the Gunnison NM

Agropyron desertorum

Agrostis alba

Bromus commutatus

Bromus inermis

Bromus tectorum

Poa glauca

Urtica dioica

Brassica juncea

Lepidium perfoliatum

Sisymbrium altissimum

Rubus idaeus

Hypericum perforatum

Tamarix galica

Convolvulus arvensis

Lappula redowskii

Carduus nutans

Cirsium arvense

Canyon of the Gunnison, yields the information that there are 17 (Fig. 3). Further inquiry reveals that these introduced species comprise approximately 8 percent of the total vascular flora in the park, and 35 percent of the introduced species are annuals.

It also is possible to determine the presence of a specific plant in a specific park, such as *Agrostis alba* in Great Smoky Mountains National Park. The examples presented represent only a few of the many query possibilities available. The system is flexible and efficient; the example data were generated in a single run of five minutes.

Currently 7019 taxa of vascular plants, from 19 Class I units, have been entered into NPFLORA. The Class I units are:

Acadia NP

Big Bend NP

Black Canyon of the Gunnison NM

Canyonlands NP

Chiricahua NM

Everglades NP

Great Sand Dunes NM

Great Smoky Mountains NP

Guadalupe Mountains NP

Isle Royale NP

Kings Canyon NP

Lava Beds NM

Mesa Verde NP

Mount Ranier NP

Olympic NP

Rocky Mountain NP

Sequoia NP

Shenandoah NP

Theodore Roosevelt NHP

FLORISTIC DATA ON SELECTED CLASS 1 NPS UNITS

(Data in NPFLORA as of 2/15/83)

Total number of taxa: 7019

Total number of families: 187

Total number of native taxa: 6146

Total number of introduced (exotic) taxa: 655

Percentage of total flora which is native: 88%

Percentage of total flora which is introduced (exotic): 9%

PARK	TOTAL INTRODUCED %	NATIVE %	UNKNOWN %
ACAD	266 40 (15%)	218 (81%)	10 (4%)
BISE	96 46 (5%)	902 (94%)	10 (1%)
BLCA	213 17 (8%)	193 (90%)	3 (2%)
CANY	321 23 (7%)	294 (92%)	4 (1%)
CHIR	397 36 (9%)	352 (90%)	4 (1%)
EVER	82 127 (16%)	642 (79%)	42 (5%)
GRSA	245 14 (6%)	231 (93%)	3 (1%)
GRSM	1415 236 (17%)	1127 (79%)	54 (4%)
GUNO	88 46 (5%)	833 (94%)	10 (1%)
ISRO	686 89 (13%)	587 (85%)	12 (2%)
LAVE	234 31 (13%)	201 (85%)	2 (1%)
MEVI	42 54 (13%)	361 (85%)	7 (2%)
MORA	476 48 (10%)	418 (87%)	12 (3%)
OLYM	1226 235 (19%)	972 (79%)	17 (1%)
ROMO	85 59 (7%)	822 (92%)	12 (1%)
SEKI	1834 130 (7%)	1667 (91%)	37 (2%)
SHEN	102 203 (20%)	777 (76%)	45 (4%)
THRO	314 31 (10%)	276 (88%)	7 (2%)

TOTALS 12,621 1473 10,866 290
AVERAGE 702/park 82/park (12%) 604/park (86%) 16/park (2%)

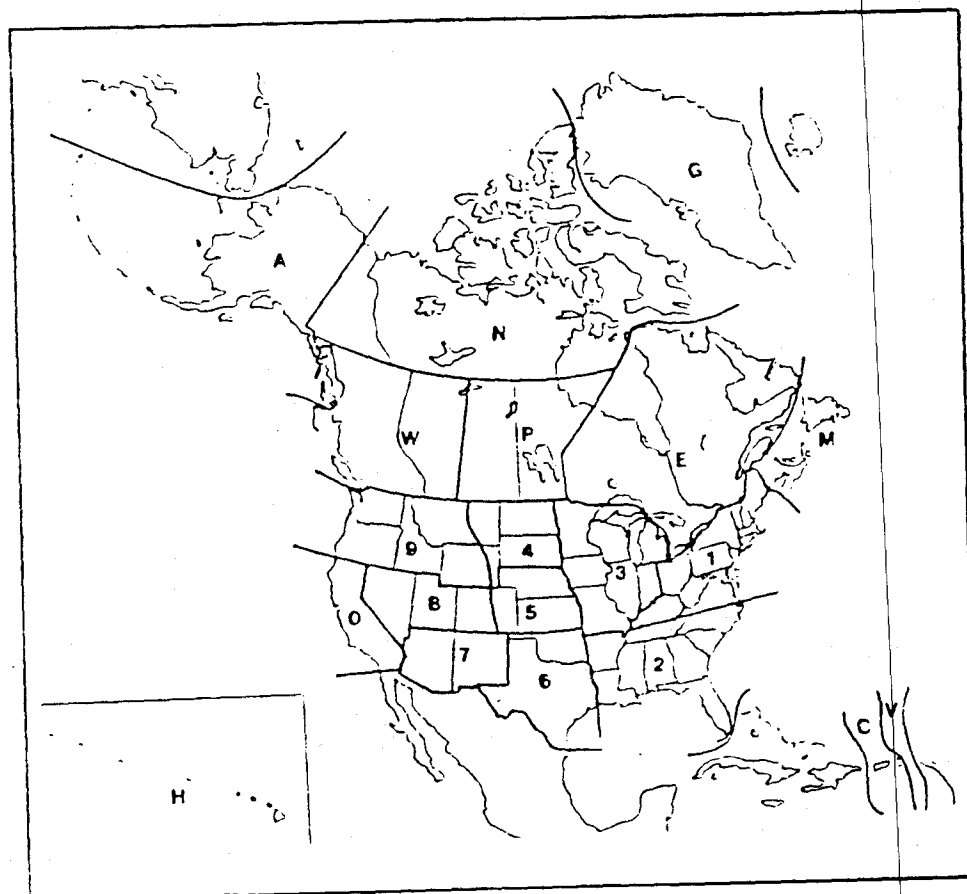


Figure 2. Regional Distribution Map (Taken from NLSPN)

The 19 units represent 40 percent of the total number of Class I parks and 6 percent of the total units in the System. Table I contains summary data for the NPFLORA data base.

The goal for FY'83 is to enter into NPFLORA 30 additional floras, with priority given to Class I units. In addition, a survey is being conducted to identify those units for which reasonably complete floras are available. Plans for the future include the entry of all available floras, thus providing the National Park Service with a valuable tool for science and resource management.

The development of NPFLORA is being funded jointly by the Air Quality and the Natural Science Divisions, WASO. The choice of parks that are entered into the data base is made by scientists in those divisions. Copies of the FY '82 Status Report were recently sent to all Regional Chief Scientists and Regional Air Quality coordinators. At this time, the Science and Remote Sensing Sections will perform searches and queries of the data base at no cost, but in the future, users will pay for requested searches. If you have questions or queries of the data base, please contact the authors in the Denver Service Center (FTS 234-4527) or the Air Quality Division (FTS 234-6620).

Thorwardson is a geographer and Waggoner is a plant ecologist at the NPS Denver Service Center.



The authors, Waggoner and Thorwardson, are shown here querying NPFLORA via their remote terminal at the Denver Service Center.

NPFLORA

The NPFLORA data base is a computerized inventory of vascular plants in the National Park System and also includes information on all plants (native or introduced and naturalized) which occur in North America, Hawaii or the Caribbean region. Plant lists from NPS units with a "natural area" of at least 100 acres are being entered into the data base. There currently is a potential maximum of 253 such areas in the National Park System and 6 affiliated areas. However, several of these units lack even minimal plant checklists and they will not be included into the data base until adequate information is available.

Parks are being requested to send checklists to this office for data entry into NPFLORA. Any future updates, additions or deletions, to these lists should also be sent to us for data base updates. Sources used are the best available information on the park's vascular flora but they vary greatly from published journal articles and books to interpreters lists or lists from planning and environmental documents. Authenticity of these lists rests with their respective authors and the plants listed may or may not be substantiated by herbarium specimens. The sources used for each park are identified on the last page of the park flora list under "Park Sources:"

NPFLORA uses as its botanical standard, The National List of Scientific Plant Names (NLSPN), a January 1982 publication (SCS-TF-159) prepared by the Smithsonian Institution under contract to the Soil Conservation Service. Generally, several plant names from each park list require name changes to modernize and standardize them so they agree with the nomenclature used in the NLSPN. A list of name changes required can be provided if desired, as well as the authors for the plant names.

Several codes are used in the attached computer printout to describe basic plant attributes and distribution. In the headings, C, H, and CA refer to the plant's status, native (N) or introduced (I), in the Continental United States and Canada, Hawaii, or the Caribbean region. In some instances, there are data gaps where neither N nor I is listed. We are entering missing data as we obtain it. Other codes used to describe the plant's attributes are:

N Native
I Introduced
A Annual
B Biennial
P Perennial
Z Submergent
E Emergent
/ Floating
@ Epiphytic (indicated
only if on trees)
T Tree

+ Parasitic
- Saprophytic
\$ Succulent
W Woody
H Partly woody
G Grasslike (grasses,
sedges, & rushes)
V Vines
F or ; Herbaceous other
than G or V
S Shrub

Codes used under the "Distribution" heading refer to the geographic regions where the plant occurs and are shown on the accompanying map.

An explanation for interpreting the flora list codes is given here for clarification.

C	H	CA	DISTRIBUTION					
N	I	.	A	P	\$	F	123..6.....H.EM	

Reading from left to right, each code has the following meaning:

- This plant is native (N) to the continental United States and Canada.
- This plant is introduced and naturalized (I) in Hawaii.
- This plant is not known to occur in the Caribbean region.
- This plant is an annual (A) in part of its range.
- This plant is a perennial (P) in part of its range.
- This plant is a succulent (\$).
- This plant is herbaceous (F).
- This plant occurs in only the northeast (1), southeast (2), midwest (3) and Texas and Oklahoma (6) regions of the United States as well as in Hawaii (H). It also occurs in two regions of eastern Canada (EM).

Questions, updates and further information about NPFLORA should be directed to: Gary S. Waggoner, NPFLORA Program Manager, Geographic Information Systems Field Unit, WASO, National Park Service, P.O. Box 25287, Denver, CO, 80225-0287. The telephone number is FTS 776-8798 (commercial (303) 236-8798).

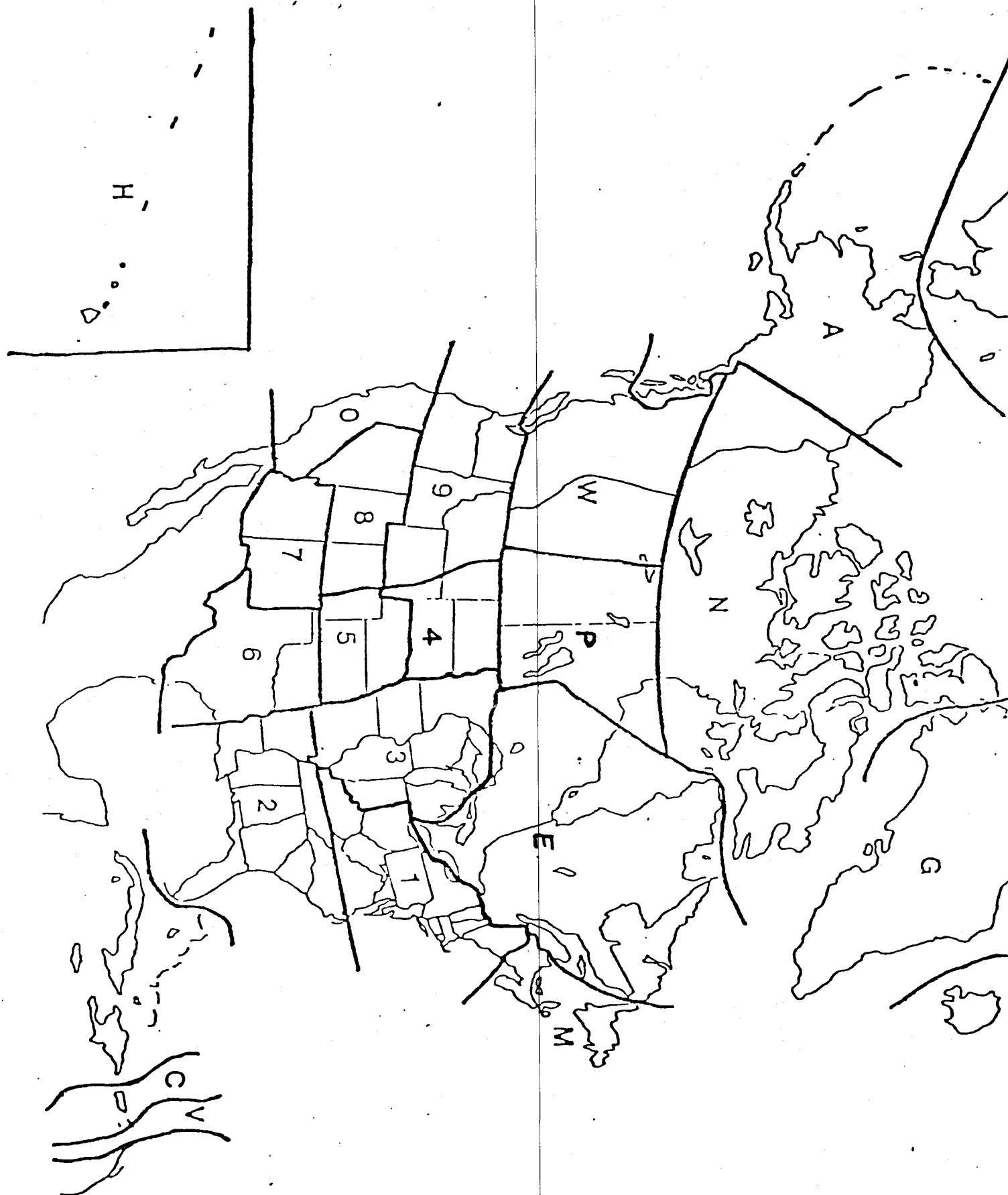


Figure 2: Regional Distribution Map (Taken from NLSPN)

FLORA LIST FOR JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE+
01/08/1986

1

FAMILY	GENUS	SPECIES	INTRASPECIES	C	H	CA	DISTRIBUTION
ACANTHACEAE	DICLIPTERA	BRACHIATA		N	.	.	A F 123.56.....
	HYGROPHILA	LACUSTRIS		N	.	.	P E F .2...6.....
	JUSTICIA	OVATA	VAR LANCEOLATA	N	.	.	P F .23..6.....
	RUELLIA	NUDIFLORA		N	.	.	H P F 67.....
ACERACEAE	ACER	NEGUNDO		N	.	.	T 123456.....PEM
		RUBRUM	SSP DRUMMONDII	N	.	.	T 123..6.....
ALISMACEAE	ECHINODORUS	CORDIFOLIUS		N	I	.	P E F 123.56.....HC.
	SAGITTARIA	LANCIFOLIA		N	.	N	P E F .2.....C.
		PLATYPHYLLA		N	.	.	P E F 123.56.....
AMARANTHACEAE	ALTERNANTHERA	PHILOXEROIDES		I	.	I	P E F 12...6.....
	AMARANTHUS	AUSTRALIS		N	.	.	A F .2...6.....
AMARYLLIDACEAE	HYMENOCALLIS	OCCIDENTALIS		N	.	.	P F .23.....
ANACARDIACEAE	TOXICODENDRON	RYDBERGII		N	.	.	S H 1.3456789.....WPEM
AQUIFOLIACEAE	ILEX	DECIDUA		N	.	.	S T 123.56.....
		VOMITORIA		N	.	.	S T 12...6.....
		DRACONTIUM		N	.	.	P F 123.56.....F
APACEAE	ARISAEMA	ANTIQUEORUM		.	.	.	.
	COLOCASIA	STRATIOTES		N	.	N	P / F .2...67...O...C.
	PISTIA	PERENNIS		N	.	.	P E F 123..6.....
ASCLEPIADACEAE	ASCLEPIAS	GONOCARPA		N	.	.	P V 123.56.....
	MATELEA	CAPREOLATA		N	.	.	W V 123..6.....
BIGNONIACEAE	BIGNONIA	RADICANS		N	.	.	W V 123456.8.....E
BORAGINACEAE	HELIOTROPIUM	CURASSAVICUM		I	N	N	P A \$ F 12.456789...HC.
	LITHOSPERMUM	TUBEROSUM		N	.	.	P F 12...6.....
	MYOSOTIS	MACROSPERMA		N	.	.	A F 123..6.....
BROMELIACEAE	TILLANDSIA	USNEOIDES		N	.	N	P @ F 12...6.....C.
CAMPANULACEAE	LOBELIA	CARDINALIS		N	.	.	P F 123.56.8.O...EM
CANNACEAE	CANNA	FLACCIDA		N	.	.	P E F 12...6.....
CAPRIFOLIACEAE	LONICERA	JAPONICA		I	.	.	S W V 123.5678.O....
	SAMBUCUS	CANADENSIS		N	.	.	S 123456.89...EM
	CERASTIUM	GLOMERATUM		I	I	.	A F .23.56...OAH...
CARYOPHYLLACEAE	STELLARIA	MEDIA		I	I	.	A P F 123456789OAH...NWPEMG
	CERATOPHYLLUM	DEMERSUM		N	I	N	P Z F 123456789OAH...WPEM
	COMMELINACEAE	COMMELINA		I	I	N	A F 123.56.....HC.
COMPOSITAE		ERECTA		I	.	.	P F 123.56.....
		VIRGINICA		I	.	N	P F 123.56.....C.
	TRADESCANTIA	OHIENSIS		N	.	.	P F 123.56.....E
	AGERATINA	ALTISSIMA		N	.	.	.
	AMBROSIA	ARTEMISIIFOLIA		N	I	.	A F 123456789O.H...WPEM
		PSILOSTACHYA		N	.	.	P F 123456789O....
		TRIFIDA		N	.	.	A F 123456.89O...WPEM
	ASTER	LATERIFLORUS		N	.	.	P F 123456.....PEM
		PRAEALTUS		N	.	.	P F 123.567.....PE
		SUBULATUS	VAR LIGULATUS	N	.	.	A F .23.5678.O....
	BACCHARIS	HALIMIFOLIA		N	.	N	S 12...6.....C.
	BIDENS	LAEVIS		N	I	.	P A F 123..67...O.H...
	CIRSIIUM	HORRIDULUM		N	.	.	B A F 12...6.....
	CONOCLINIUM	COELESTINUM		N	.	.	P F 123.56.....
	COSMOS	BIPINNATUS		I	.	.	A F 123.567...O...E
	ECLIPTA	ALBA		N	I	N	A E F 1234567...O.HC.E
	ELEPHANTOPUS	CAROLINIANUS		N	.	.	P F 123.56.....
	ERIGERON	PHILADELPHICUS		N	.	.	B F 123456789O...NWPEM
	EUPATORIUM	CAPILLIFOLIUM		N	.	.	P F 123..6.....

FLORA LIST FOR JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE
01/08/1986

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FAMILY	GENUS	SPECIES	INFRASPECIES	C	H	CA		DISTRIBUTION
CONVOLVULACEAE		SEROTINUM		N	.	.	P F	123.56.....
	IVA	ANNUA		I	.	.	A F	123456.....
	LACTUCA	CANADENSIS		N	.	.	B A F	1234567890....WP
		FLORIDANA		N	.	N	B A F	123456.....C.PE
	MIKANIA	SCANDENS		N	.	.	P V	123..6.....
	PARTHENIUM	HYSTEROPHORUS		I	I	N	A F	123.56.....HC.
	PLUCHEA	ODORATA		I	I	N	S	.2.....C.
	PYRRHOPAPPUS	CAROLINIANUS		N	.	.	A B F	123.56.....
	SENECIO	GLABELLUS		N	.	.	A F	123.56.....
	SMALLANTHUS	UVEDALIA		.	.	.	.	123.56.....
	SOLIDAGO	ALTISSIMA		N	.	.	P F	1234567890....E
		SEMPERVIRENS.		N	.	.	P \$ F	12.....EM
	SPILANTHES	AMERICANA		I	.	.	P F	123.....
	VERBESINA	VIRGINICA		N	.	.	P F	123.56.....
	VERNONIA	GIGANTEA		N	.	.	P F	123.56.....E
	XANTHIUM	STRUMARIUM		N	.	N	A F	1234567890.HC.WP
	YOUNGIA	JAPONICA		I	I	I	A F	12...6.....HC.
	DICHONDRA	CAROLINENSIS		N	.	.	P F	12...6.....
	IPOMOEA	LEUCANTHA		.	.	.	.	.2.....
		SAGITTATA		N	.	.	P V	.2...6.....
		TRICHOCARPA		N	.	.	P V F	.2...6.....
	CORNACEAE	DRUMMONDII		N	.	.	S T	123456.....E
	NYSSA	AQUATICA		N	.	.	T	123..6.....
	CRUCIFERAE	PENNSYLVANICA		N	.	.	A B F	123456.890A....NWPEM
	LEPIDIUM	VIRGINICUM		N	I	N	A B F	123456.890AHC.WEM
CUCURBITACEAE	CUCURBITA	TEXANA		N	.	.	A F V	.23..6.....
CYPERACEAE	MELOTHRIA	PENDULA		N	.	.	P V	123.56.....
	CAREX	AMPHIBOLA		N	.	.	P G	123.56.....EM
		CEPHALOPHORA		N	.	.	P G	123.56...O...E
		CHEROKEENSIS		N	.	.	P G	123..6.....
		CRUS-CORVI		N	.	.	P G	123456.....
		FLACCOSPERMA		N	.	.	P G	123.56.....
		HYALINOLEPIS		N	.	.	P E G	123.56.....E
		TRIBULOIDES		N	.	.	P G	123.56.....WP
	CLADIUM	JAMAICENSE		N	.	N	P E G	12...6.....C.
	CYPERUS	ELEGANS		N	.	N	P G	.2...6.....C.
		ERYTHRORHIZOS		N	.	.	A P E G	1234567890....E
		ESCULENTUS		N	.	N	P G	1234567890A.C.EM
		HERMAPHRODITUS		N	.	.	P G	.2...67.....
		IRIA		I	.	N	A G	123..6.....C.
		OCHRACEUS		N	.	N	P E G	.2...6.....C.
		ODORATUS		N	I	N	A P G	123.567..O.HC.
		OXYLEPIS		N	.	.	P E G	.2...6.....
		STRIGOSUS		N	.	.	P E G	1234567890....PE
		VIRENS		N	.	N	P E G	123.56...O...C.
	ELEOCHARIS	CELLULOSA		N	.	N	P G	.2...6.....C.
		MACROSTACHYA		N	.	.	P E G	1234567890A....
		MICROCARPA		N	.	.	A E G	123..6.....C.
		MONTEVIDENSIS		N	.	.	P G	.2..567.90....
	RHYNCHOSPORA	CORNICULATA		N	.	.	P E G	123..6.....
	SCIRPUS	CALIFORNICUS		N	I	.	P E G	.2...67..O.H..
		CYPERINUS		N	.	.	P E G	123..6..9....NWPEM
		PENDULUS		N	.	.	P E G	123.567.90....E

FLORA LIST FOR JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE
01/08/1986

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FAMILY	GENUS	SPECIES	INFRASPECIES	C	H	CA	DISTRIBUTION
ERENACEAE	DIOSPYROS	VIRGINIANA		N	.	T	123.56.....
EUPHORBIACEAE	ACALYPHA	RHOMBOIDEA		N	.	A F	123456.....EM
	EUPHORBIA	CORDIFOLIA		N	.	A F	.2...6.....
		HIRIA		N	I	A F	.2...67....HC.
		MACULATA		N	.	A F	1234567.90....EM
		NUTANS		I	.	A F	123456..90....
		PROSTRATA		N	I	A F	.2..567..O.HC.
	PHYLLANTHUS	URINARIA		I	I	A F	.2...6.....HC.
	SAPIUM	SEBIFERUM		I	.	T	.2...6.....
FAGACEAE	QUERCUS	NIGRA		N	.	T	123..6.....
		NUTTALLII		N	.	T	.23..6.....
		VIRGINIANA		N	.	T	12...6.....
GENTIANACEAE	SABATIA	CALYCINA		N	.	P F	12...6.....
GERANIACEAE	GERANIUM	SPHAEROSPERMUM		N	.	.	1234567890....WPE
GRAMINEAE	ANDROPOGON	GLOMERATUS wet edge dist.		N	I	N P G	12...678.O.HC.
	ARTHRAOXON	HISPIDUS dist.		I	.	A G	.23.....
	(Panicum) DICHANTHELIUM	COMMUTATUM dist. edge.		N	.	.	123..6.....E
	DIGITARIA	ISCHAEMUM dist. edge		I	.	I A G	1234567890..C.WPEM
		SANGUINALIS dist.		I	I	N A G	1234567890.HC.WPEM
	ECHINOCHLOA	CRUSGALLI damp dist.		I	.	A G	1234567890....WPEM
		WALTERI marsh.		N	.	A E	123..6.....E
	ELEUSINE	INDICA dist.		I	I	I A G	1234567890.HC.E
	ELYMUS	VIRGINICUS dist. edge		N	.	P G	123456789....WPEM
	ERIANTHUS	GIGANTEUS dist. edge		N	.	P G	12...6.....
	HORDEUM	FUSILLUM dist.		N	.	A G	1234567890....WE
	LEERSIA	LENTICULARIS wet areas		N	.	P G	123.56.....
		VIRGINICA dist. edge, forest.		N	.	P G	123456..9.....EM
	OPLISMENUS	HIRTELLUS		N	I	N P G	.2...6.....HC.
	PANICUM	ANCEPS edge, dist.		N	.	P G	123.56.....
		DICHOTOMIFLORUM moist, dist.		N	.	A G	1234567890....EM
		HEMITOMON marsh.		N	.	P E	12...6.....
		RIGIDULUM moist		N	.	N P G	123.56...O....W
		VIRGATUM edge, dist.		N	.	P G	123456789....PE
	PASPALUM	DISTICHUM wet areas		N	.	N P E	12..567890.HC.
		URVILLEI dist.		I	.	P G	123..6...O....
		CAROLINIANA dist.		N	.	A G	123.567890....
	(Panicum) PHALARIS	GYMNOCARPON wet areas		.	.	.	.2...6.....
	PHANOPYRUM	AUSTRALIS marsh.		N	.	N P E	1234567890....NWPEM
	PHRAGMITES	ANNUA dist.		I	I	A G	1234567890AH...NWPEMG
	POA	MONSPELIENSIS dist., marsh		I	.	A G	1234567890A...NWPEM
	POLYPOGON	STRIATA wet areas		N	.	N P G	12...6.....C.
	SACCIOLEPIS	GENICULATA dist.		N	.	N P G	123.567.90..C.
	SETARIA	GLAUCA dist.		I	I	N A G	1234567890.H..WPEM
		MAGNA marsh.		N	.	N A E	12...6.....C.
	SPARTINA	CYNOSUROIDES br. marsh		N	.	P E	12...6.....
		PATENS br. marsh.		N	.	N P G	123..6...O..C.EM
	SPHENOPHOLIS	OBTUSATA edge dist.		N	.	P A	1234567890A...WP
	SPOROBOLUS	INDICUS dist.		I	.	N P G	123.56..90..C.
St. Aug.	STENOTAPHRUM	SECUNDATUM dist.		N	.	N P G	.2...6...O..C.
	TRisetum	PENSYLVANICUM hardwood for.		N	.	P G	123.....
	ZIZANIOPSIS	MILIACEA wet areas (marsh)		N	.	P G	123..6.....
GUTTIFERAE	ASCYRUM	HYPERICOIDES		N	.	S	123.56.....C.
	TRIADENUM	WALTERI		N	.	P E F	123..6.....

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FAMILY	GENUS	SPECIES	INFRASPECIES	C	H	CA		DISTRIBUTION
HAMAMELIDACEAE	LIQUIDAMBAR	STYRACIFLUA		N	.	.	T	123..6.....
HYDROCHARITACEAE	LIMNOBIUM	SPONGIA		N	.	N	P / F	123..6.....C.
HYDROPHYLLACEAE	NEMOPHILA	APHYLLA		N	.	.	A F	123..6.....
IRIDACEAE	IRIS	FULVA		N	.	.	P E F	123..6.....
		GIGANTICAERULEA		N	.	.	P F	.2.....
	SISYRINCHIUM	ROSULATUM		N	I	.	A P F	.23..6.....H..
JUGLANDACEAE	CARYA	AQUATICA		N	.	.	E T	123..6.....
		ILLINOENSIS		N	.	.	T	123.56.....
JUNCACEAE	JUNCUS	EFFUSUS		N	I	.	P E G	.2.....AH..WEM
		TENUIS		N	I	.	P G	1234567890AH..WPEN
LABIATAE	LYCOPUS	RUBELLUS		N	.	.	P E F	123.56.....
		VIRGINICUS		N	.	.	P F	123.56.....
	SALVIA	COCCINEA		N	I	N	P A F H	123..6.....HC.
	STACHYS	AGRARIA		N	.	.	P F	.2...67.....
		TENUIFOLIA		N	.	.	P F	123456.....
LAURACEAE	CINNAMOMUM	CAMPHORA		I	.	I	T	.2...6.....C.
	PERSEA	BORRANIA		N	.	.	T	12...6.....
LEGUMINOSAE	ACACIA	SMALLII		N	.	.	T S	.2...67...O....
	AESCHYNOMEN	INDICA		N	.	.	A F	.2...6.....
	CASSIA	FASCICULATA		N	.	.	A F	123456.....
	CENTROSEMA	VIRGINIANUM		N	.	N	P V	12...6.....C.
	DESMANTHUS	ILLINOENSIS		N	.	.	P F	12345678.....
	DESMODIUM	CANESCENS		N	.	.	P F	123.56.....E
		GLABELLUM		N	.	.	P F	123..6.....
		LAEVIGATUM		N	.	.	P F	123..6.....
		PANICULATUM		N	.	.	P F	123.56.....E
	GLEDITSIA	TRIACANTHOS		N	.	.	T S	1234567890....EM
	MELILOTUS	INDICA		I	I	.	A F	123..67..90.H..WPMG
	MIMOSA	STRIGILLOSA		N	.	.	P F	.2...6.....
	PUERARIA	LOBATA		I	.	.	W V H	123..6.....
	RHYNCHOSIA	MINIMA		N	.	N	P F V	.2...6.....C.
	SESBANIA	EXALTATA		N	.	.	A F	123.567...O....
		PUNICEA		I	.	.	S	.2...6.....
	STROPHOSTYLES	HELVOLA		N	.	.	A V F	123456.....E
	TRIFOLIUM	REPENS		I	.	.	P F	1234567890A...NWPEMG
		RESUPINATUM		I	.	.	A F	123456.....
	VICIA	LUDOVICIANA		N	.	.	A F V	.23.567890....
	VIGNA	LUTEOLA		N	.	N	P V F	.2...6.....C.
LEMNACEAE	LEMNA	MINOR		N	I	.	P / F	1234567890AH..NWPEM
	SPIRODELA	POLYRHIZA		N	I	N	P / F	1234567890.HC.NWPEM
	WOLFFIA	COLUMBIANA		N	I	.	P / F	123456...90.H..E
LENTIBULARIACEAE	UTRICULARIA	GIBBA		N	.	N	A P Z /	123.56...90..C.EM
LILIACEAE	ALLIUM	BIVALVE		N	.	.	P F	123.56.....
		CANADENSE		N	.	.	P F	123456.....EM
	SMILAX	BONA-NOX		N	.	.	H V	123.56.....
		HISPIDA		N	.	.	W V S	123456.....E
		ROTUNDIFOLIA		N	.	.	W V	123.56.....EM
LOGANIACEAE	CYNOCTONUM	MITREOLA		N	.	N	A F	123..6.....C.
LORANTHACEAE	PHORADENDRON	TOMENTOSUM		N	.	.	+ S	.23.567.....
LYTHRACEAE	AMMANNIA	COCCINEA		N	.	N	A E F	1234567890..C.W
	CUPHEA	CARTHAGENENSIS		I	I	.	A F	.2...6.....H..
	LYTHRUM	ALATUM	VAR	N	.	.	F H	12...6.....
	HIBISCUS	MOSCHEUTOS	SSP	N	.	.	P A E F	123.567...O....
MALVACEAE		LANCEOLATUM						
		LASIOCARPUS						

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FAMILY	GENUS	SPECIES	INFRASPECIES	C	H	CA		DISTRIBUTION
		KOSTELETSKYA	VIRGINICA	N	.	.	P E F	12.....
		MALVASTRUM	COROMANDELIANUM	N	I	I	P F	.2...6....HC.
		MODIOLA	CAROLINIANA	N	I	.	P A B F	12...6...O.H..
		SIDA	RHOMBIFOLIA	I	I	N	A P F H	12...67...O.HC.
MELIACEAE	MELIA	AZEDARACH		I	.	I	T	12...67...O..C.
MORACEAE	MORUS	RUBRA		N	.	.	T	123.56.8.....E
MYRICACEAE	MYRICA	CERIFERA		N	.	N	S T	12...6.....C.
NAJADACEAE	NAJAS	GUADALUPENSIS		N	.	N	A Z F	1234567890...C.E
NYMPHAEACEAE	CABOMBA	CAROLINIANA		N	.	.	P Z / F	123.56.....
	NYMPHAEA	ODORATA		N	.	N	P Z / F	123.56.89...C.PEM
OLEACEAE	FRAXINUS	CAROLINIANA		N	.	.	E T S	12...6.....
		PENNSYLVANICA		N	.	.	T	123456.89.....PEM
		PROFUNDA		N	.	.	T	123.....
	LIGUSTRUM	JAPONICUM		I	.	.	S	.2.....
ONAGRACEAE	LUDWIGIA	DECURRENS		N	.	.	E F	123.56.....
		LEPTOCARPA		N	.	.	P E F	.23..6.....C
		OCTOVALVIS		N	I	N	P E F	.2...6.....HC.
		URUGUAYENSIS		N	.	.	P / F	123..6...90....
	OENOTHERA	SPECIOSA		N	.	.	P F	123.567...O....
ORCHIDACEAE	EPIDENDRUM	CONOPSEUM		N	.	.	P F	.2.....
	HABENARIA	REPENS		N	.	N	P E F	.2...6.....C.
	SPIRANTHES	ODORATA		N	.	.	P F	12...6.....
OXALIDACEAE	OXALIS	DEBILIS	VAR CORYMBOSA	I	I	I	P F	.2...6...O.HC.
		DILLENII		N	.	.	P F	123456.89.....
PALMAE	SABAL	MINOR		N	.	.	S T	.2...6.....
PAPAVERACEAE	ARGEMONE	ALBIFLORA		N	.	.	A F	.23...7.....
PASSIFLORACEAE	PASSIFLORA	EDULIS		N	I	N	W V	123.56.....HC.
		LUTEA		N	.	.	P V F	12...56.....
PHYTOLACCACEAE	PHYTOLACCA	AMERICANA		N	.	.	P F	123.567.90....E
	RIVINA	HUMILIS		N	.	N	P F H V	.2...67.....C.
PINACEAE	TAXODIUM	DISTICHUM		N	.	.	E T	123..6.....
PLANTAGINACEAE	PLANTAGO	MAJOR		I	I	I	P F	.234567890AHC.NWPEMG
POLYGONACEAE	BRUNNICHIA	CIRRHOSEA		N	.	.	W V H	123..6.....
	POLYGONUM	DENSIFLORUM		N	.	N	P E F	123.56.....HC.
		HYDROPIPEROIDES		N	.	.	P E F	123456..90A...WEM
		PUNCTATUM		N	.	N	P E F	1234567890...C.
		RAMOSISSIMUM		N	.	.	A F	1234567890...NWPEM
		SETACEUM		N	.	.	P E F	123..6..9.....
		VIRGINIANUM		N	.	.	A P F	123.56.....E
	RUMEX	CRISPUS		I	I	I	P F	1234567890AHC.NWPEM
		PULCHER		I	.	.	P F	123..6...90....
		VERTICILLATUS		N	.	.	P E F	123.56.....E
POLYPODIACEAE	ASPLENIUM	PLATYNEURON		N	.	.	P F	123.567.....E
	POLYPODIUM	POLYPODIOIDES		N	.	N	P F	C.
	THELYPTERIS	KUNTHII		N	.	N	P F	.2...6.....C.
PONTEDERIACEAE	EICHHORNIA	CRASSIPES		N	I	I	P E / F	123..6...O..C.
	PONTEDERIA	CORDATA		N	.	.	P E F	123..6.....EM
PORTULACACEAE	PORTULACA	OLERACEA		N	I	N	A F	1234567890.HC.WPEM
PRIMULACEAE	ANAGALLIS	ARVENSIS		I	I	.	A F	1234567.90.H..WPEMG
	SAMOLUS	PARVIFLORUS		N	.	.	P F	123.5678.O....WEM
RANUNCULACEAE	CLEMATIS	CRISPA		N	.	.	W V	123..6.....
		TERNIFLORA		I	.	.	W V	123.56.....
	RANUNCULUS	PLATENSIS		I	.	.	A F	.2...6.....

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FAMILY	GENUS	SPECIES	INFRASPECIES	C	H	CA				DISTRIBUTION
		PUSILLUS		N	.	.	A	E	F	123.56...O....
		SCLERATUS		N	.	.	A	P	E	1234567890....NWPEM
		TRILOBUS		.	.	.	.	.	.	
RHAMNACEAE	THALICTRUM	DASYCARPUM		N	.	.	P	F		123456789....WPE
ROSACEAE	BERCHEMIA	SCANDENS		N	.	.	W	V		123..6.....
	CRATAEGUS	VIRIDIS		N	.	.	T			123.56.....
	DUCHESNEA	INDICA		I	.	.	P	F		123..6..90....W
	GEUM	CANADENSE		N	.	.	P	F		123456.....EM
	RUBUS	TRIVIALIS		N	.	.	S			123..6.....
RUBIACEAE	CEPHALANTHUS	OCCIDENTALIS		N	.	.	E	S	T	123.567...O....EM
	DIODIA	VIRGINIANA		N	.	.	P	A	E	123..6.....
	GALIUM	APARINE		N	.	.	A	F		1234567890A...WPEMG
		TINCTORIUM		N	.	.	P	F		123.....
SALICACEAE	POPULUS	DELTOIDES		N	.	.	T			123..6.....E
	SALIX	NIGRA		N	.	.	T			123.56.....EM
SALVINIACEAE	AZOLLA	CAROLINIANA		N	.	N	A	/	F	123..6.8...A.C.
SAPINDACEAE	CARDIOSPERMUM	HALICACABUM		N	I	N	A	P	V	123.567....HC.
	KOELREUTERIA	PANICULATA		I	.	.	T			.2.....
SAPOTACEAE	BUMELIA	LYCIOIDES		N	.	.	S	T		123..6.....
SAURURACEAE	SAURURUS	CERNUUS		N	.	.	P	E	F	123.56.....E
SCHIZAEACEAE	LYGODIUM	JAPONICUM		I	I	.	P	V		.2...6....H..
SCROPHULARIACEAE	AGALINIS	PURPUREA		N	.	N	A	F		123.5.....C.PEM
	BACOPA	MONNIERI		N	N	N	P	F		12...6.....C.
	MAZUS	JAPONICUS		I	.	.	A	F		123..6..9.....
	MECARDONIA	ACUMINATA		N	.	.	P	F		123.56.....
		VANDELLIOIDES		N	.	.	P	E	F	.2...67.....
	MIMULUS	ALATUS		N	.	.	P	F		123.56.....E
	VERONICA	PEREGRINA		N	.	.	A	E	F	1234567890....WEM
		PERSICA		I	.	.	A	F		1234567890A...WPEM
SOLANACEAE	PETUNIA	PARVIFLORA		N	.	.	A	F		12...67...O....M
	PHYSALIS	ANGULATA		N	.	N	A	F		123.567...O..C.
	SOLANUM	AMERICANUM		N	.	N	A	F		.2...67..90.HC.
		CAROLINENSE		N	.	.	S	F		1234567890....E
TYPHACEAE	TYPHA	DOMINGENSIS		N	.	N	P	E	F	12..56.8.O..C.
		LATIFOLIA		N	.	.	P	E	F	1234567890AH..NWPEM
ULMACEAE	CELTIS	LAEVIGATA		N	.	.	T			123.56.....
	ULMUS	AMERICANA		N	.	.	T			123456.8.....PEM
		RUBRA		N	.	.	T			123456.....E
UMBELLIFERAE	CHAEROPHYLLUM	TAINTURIERI		N	.	.	A	F		123.567.....
	CICUTA	MEXICANA		N	.	.	P	B	E	123..6.....
	HYDROCOTYLE	RANUNCULOIDES		N	.	.	P	/	F	12..567.90....W
		UMBELLATA		N	.	N	P	/	F	123..67.90..C.WM
		VERTICILLATA		N	I	N	P	F		123..678.O.HC.W
	LILAEOPSIS	ATTENUATA		N	.	.	P	E	F	12.....
	PTILIMNIUM	CAPILLACEUM		N	.	.	A	E	F	123456.....
	SANICULA	CANADENSIS		N	.	.	B	F		123456.....E
URTICACEAE	BOEHMERIA	CYLINDRICA		N	.	N	P	F		123456.....C.E
	PILEA	PUMILA		N	.	.	A	F		123456.....EM
	URTICA	CHAMAEDRYOIDES		N	.	.	A	F		123.56.....
VERBENACEAE	CALLICARPA	AMERICANA		N	.	.	S			123..6.....
	PHYLA	NODIFLORA		N	.	N	P	F		123..67..O..C.
	VERBENA	BRASILIENSIS		I	.	.	A	F		12..56..90....
		RIGIDA		I	.	.	P	F		.2...6.....

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FAMILY	GENUS	SPECIES	INFRASPECIES	C	H	CA		DISTRIBUTION
VIOLACEAE	VIOLA	URTICIFOLIA		N	.	.	A P F	123456.....PEM
		PAPILIONACEA		N	.	.	P F	123.56.....NWPEM
		SEPTEMLOBA		N	.	.	P F	12...6.....
VITACEAE	AMPELOPSIS	ARBOREA		N	.	.	S W V	123..6.....
		CORDATA		N	.	.	W V S	123.56.....
	PARTHENOCEISSUS	QUINQUEFOLIA		N	.	.	W V	12345678.....PEM
	VITIS	CINEREA		N	.	.	W V	123.56.....
		ROTUNDIFOLIA		N	.	.	W V	123..6.....

TOTAL VASCULAR FLORA= 326, TOTAL NUMBER OF FAMILIES= 86, TOTAL NUMBER OF GENERA= 231

•THIS INFORMATION IS FROM NPFLORA, A COMPUTERIZED DATA BASE OF THE VASCULAR FLORA FROM SELECTED UNITS OF THE NATIONAL PARK SYSTEM. QUESTIONS, CORRECTIONS, AND/OR ADDITIONS TO THESE DATA SHOULD BE DIRECTED TO GARY S. WAGGONER, ECOLOGICAL DATA BASES GIS UNIT, DSC-SP, P.O. BOX 25287, DENVER, CO 80225, PHONE: FTS 776-8798 \ COMM. 303-236-8798.

Park Sources:

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and Botany, Vol.24, No.2, July 20,1983, Appendix,pgs. 113-129.