SUMMARY REPORT ON THE RESULTS OF AN ACCURACY ASSESSMENT OF THE NATIONAL PARK SERVICE'S PROVISIONAL VEGETATION MAP OF CONGAREE NATIONAL PARK

by

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INTRODUCTION

In the fall of 1999, terra incognita was awarded a contract to carry out an assessment of the accuracy of a provisional vegetation map of Congaree National Park ("the Monument" or "Congaree" hereafter). As part of a United States Geological Survey-National Park Service effort to produce vegetation maps of all of the nation's national parks, the Congaree mapping initiative began in the mid-1990s when The Nature Conservancy (TNC), Environmental Systems Research Institute (ESRI), and Aerial Information Services were contracted by the USGS to compile a vegetation map of the 21, 000-acre Monument.

METHODOLOGY

We received a digital set of the data from the provisional map in October of 1999. Dr. Brooks analyzed the data set and created an EXCEL table of data, pertinent portions of which are given below (BIGSAMFINAL). Following National Park Service Accuracy Assessment guidelines for Protocols A-D, Dr. Brooks generated a stratified random sample of 596 points through the Monument. Following National Park Service Protocol E, Dr. Brooks also generated a non-random sample of 32 points which were termed "unique signatures" by AIS personnel (SEE LITTLESAM for Protocol E data). Maps of both sets of points, UTM coordinates, and other pertinent data were given to Dr. L. L. Gaddy, who was in charge of the field portion of the accuracy assessment. (Dr. Gaddy did not know which class the photointerpreters had assigned to a given polygon when he conducted his field work; he could, however, see the polygon boundaries on the map.)

As USGS-NPS protocol dictated, Gaddy visited 585 points from October, 1999 through May 2000. Points were located through the use of a PLGR GPS unit and false-color infrared photographs. At each point dominant vegetation types were recorded and a field key was used to determine the plant community/cover type present. Over 85 percent of the points were reached on foot, the remainder were located by boat.

When all of the points had been visited, Dr. Gaddy complete the two tables comparing his field interpretation of the polygon with that of the photointerpreters. Dr. Brooks then performed the final accuracy assessment through a statistical analysis of the data using contingency tables and statistical tests (see CROSS 1, CROSS 2, AND CROSS 3).

RESULTS

Numerous map problems were brought to the attention of Mr. Mike Story, the supervisor of the project for USGS-NPS. Most of these problems (see below under RECOMMENDATIONS) were, however, related to map class definition and terminology and did not involve map accuracy *per se*. Through the use of contingency tables and other statistics, Dr. Brooks calculated that the provisional map had an overall accuracy of 87 percent (see CROSS 1, CROSS 2, AND CROSS 3). Mr. Story arrived at a similar figure with a manually-generated contingency table, and Dr. Gaddy also came up with an 87 percent figure by way of a manual calculation of the map's overall accuracy. The statistics from only one class—map class A, the *Celtis-Liquidambar* (Typical) class—failed to meet the NPS 80 percent accuracy standards (see CROSS 3). Data indicates that this class may be *undermapped*, being more widespread than was actually mapped.

In the Protocol E table (EXCEL table LITTLESAM), which was not analyzed statistically due to its sample size (n=32), class F, the *Nyssa biflora-Ilex opaca* class, was generally overmapped (in LITTLESAM, ASMA is "as mapped" and FIELD is the "field"-determined mapping class). Most of the points in Protocol E, which were thought to be unique signatures, however, can easily fit into existing map classes.

Because map class definition and terminology appeared to be a bigger problem than accuracy in the provision map, an analysis of the dominant tree species in each PI class was conducting using 361 of the 553 points in Protocol A-D (only points clearly within polygons that best represented the PI classes were used) (see CONGAREE. SPECIES). Below is a summary of the dominant species (by percentage fidelity) in ten of the most common mapping classes:

CELTIS-LIQUIDAMBAR (TYPICAL) (PI=A; N=40)—LIQUIDAMBAR 100%, CELTIS 62%, QU. LAURIFOLIA 60%.

TAXODIUM-NYSSA AQUATICA (PI=C; N=89)—NYSSA A. 100%, TAXODIUM D. 79%, FRAXINUS CAROLINA 37%, ACER RUBRUM 26%, PLANERA AQUATICA 25%.

TAXODIUM D.-FRAXINUS P. (PI=D; N=19)—TAXODIUM D. 100%, FRAXINUS P. 74%, QU. LAURIFOLIA 74%, ACER RUBRUM 68%.

LIQUIDAMBAR-QUERCUS NIGRA-QUERCUS LAURIFOLIA-PINUS TAEDA (PI=E; N=18) --LIQUIDAMBAR 89%, PINUS TAEDA 83%, ILEX OPACA 72%.

NYSSA BIFLORA-ACER RUBRUM-LEUCOTHOE AX. (PI=F; N=17)—NYSSA BIFLORA 100%, ILEX OPACA 76%.

LIQUIDAMBAR-QU. NIGRA-PINUS TAEDA-MYRICA C. (PI=I/J; N=17)—PINUS TAEDA 65%, LIQUIDAMBAR 47%.

QUERCUS PHELLOS UPLAND DEPRESSION (PI=I/J; N=12)—QUERCUS PHELLOS 93%, QU. PAGODA 60%.

FAGUS GRANDIFOLIA-QUERCUS NIGRA (PI=J; N=20)—FAGUS G. 90%, QUERCUS NIGRA 70%, ILEX OPACA 70%.

CELTIS-LIQUIDAMBAR (SWEET GUM COMPONENT) (PI=M; N=31)—LIQUIDAMBAR 100%, ILEX OPACA 68%, CELTIS 32%.

CELTIS-FRAXINUS P.-ACER NEGUNDO (PI=U; N=25)—CELTIS 100%, ACER NEGUNDO 76%, PLATANUS OCCIDENTALIS 68%.

PROBLEMS/RECOMMENDATIONS

1. In most of the types above, the dominant species also occur as the dominants (or indicators) in the type name. In the *Liquidambar-Quercus* spp.-*Pinus taeda* and *Liquidambar-Qu. nigra-Pinus taeda-Myrica* types, however, *Pinus taeda* is more dominant than is indicated in the type name. In the former type in Congaree, old-growth *Pinus taeda* is the primary indicator of the type; however, it is not included in the type name in some TNC reports. Furthermore, in the *Celtis-Fraxinus p.-Acer negundo* type, *Fraxinus p.* is not a dominant in the canopy or understory. It is understood here that these are national association types that cannot be altered to fit each local vegetation type. We do request, however, that the names and utility of these three type names be reviewed in the final analysis of the Congaree vegetation map. A possible way to handle this problem may be to have a *Liquidambar-Quercus-Pinus taeda* (Upland Component) and a *Liquidambar-Quercus-Pinus taeda* (Bottomland Component). An alternative way to use the large pines as an indicator type would be to call the bottomland type *Liquidambar-Quercus-Pinus taeda* (Old Growth Component).

2. *Liquidambar-Qu. laurifolia-Magnolia v.,* the type name for PI "G" is actually an early successional component of this type. I suggest that the type be called "Nyssa biflora-Acer rubrum-Liquidambar-Qu. laurifolia-Magnolia virginiana" or the"Nyssa biflora-Mixed Hardwoods Streambank Type."

3. The Vitis-Ampelopsis type rarely is <u>dominated</u> by these two vines. Of the 30 or so samples of this type, about half were clearcut/cut-over and half were tree falls. I suggest calling this type something like "Successional Forest—No or Partial Canopy."

4. Field data indicates that the Planera aquatica thicket type is much rarer than was previously thought. I saw only three P. aquatica thickets—two in a clearcut area. Most of the polygons labeled Planera aquatica are really the "L" type (see number 3 above). I have added a type "R" as the true Planera aquatica map class.