Summary of the North Carolina Natural Heritage Program
Methods for Rating Natural Areas

Introduction

The North Carolina Natural Heritage Program (NCNHP) compiles the N.C. Department of Natural and Cultural Resources' list of natural areas as required by the Nature Preserves Act (N.C.G.S. § 143B-135.250 - § 143B-135.272). The list is based on the program's inventory of the natural diversity in the state. Natural areas are evaluated on the basis of the occurrences of rare plant and animal species, rare or high-quality natural communities, and special animal habitats, collectively termed the "Elements" of natural diversity. They represent the Program's estimates of the best locations for supporting natural diversity in the state and are given priority ranks that indicate the degree of their importance for conservation. Inclusion on this list does not directly confer protection to a natural area. Instead, the information on natural areas included in the Biennial Protection Plan is intended to help guide the conservation decisions affecting of the state's biodiversity at multiple levels, including the actions of state agencies, local government planning offices, private conservation groups, and particular individual landowners. The list includes both protected and unprotected areas. Inclusion on this list does not mean that public access exists. Permission of the landowner is needed to access all lands not open to the public.

The list of natural areas and their significance ratings are based on the best available information. All data used in our assessments are obtained from field surveys conducted in the natural areas either by the staff of the Natural Heritage Program or by other field biologists. Only species, communities, and other features of biodiversity that were actually observed in the natural area are used in our evaluations of their significance.

This information is compiled in the Program's Biotics Database and conforms to standards established by the nationwide network of Natural Heritage Programs in partnership with NatureServe. These standards include the specifications for recording and evaluating occurrences of NCNHP Elements, as well as guidelines for estimating of the degree of imperilment of these Elements at the state and global levels. All of this information is used in defining and prioritizing natural areas.

Data used in our evaluations of natural areas are acquired or updated on an ongoing basis. The Protection Plan is produced every two years. This list updates the set of known significant areas and their significance ratings, reflecting changes since the last list was published. Not all natural areas have been visited in this time period, and some of the ratings are based on older data. It is possible that some natural areas have been damaged or destroyed since they were last visited. More information on these natural areas may be obtained from the Natural Heritage Program. For contact information, as well as direct access to many of our datasets, please visit our website at www.ncnhp.org.

Natural Area Significance

Natural Heritage methodology is designed to address both species and natural communities as "Elements" of biodiversity. This standard methodology is used to describe the rarity of particular Natural Heritage Elements and to delineate individual occurrences of these Elements across the landscape. In assigning priorities for conservation, NCNHP gives special emphasis to natural areas that

support populations of rare species or rare or high quality natural communities. A key product resulting from this information is the assessment of conservation priorities for the natural areas that have been identified.

- In 2013, NCNHP revised its process for establishing conservation priorities among the more than 2,400 Significant Natural Heritage Areas identified through field investigations. Each natural area now receives two significance ratings, which measure different values:

    1. Element Collective Value rates each natural area on the basis of the number and rarity of the Elements it contains.
    2. Element Representational Value rates each natural area on its importance in protecting the best occurrences of individual Elements.

This paired rating system provides two distinct values for each natural area, one which reflects the biodiversity of the state and one which reflects the overall biodiversity of each natural area. Each natural area is assigned two values, a Representational Rating (R1-R5) and a Collective Value Rating (C1-C5). The two ratings measure different and complementary qualities of each natural area.

Natural Area Significance Ratings

Element Collective Value

The Element Collective Value Rating for each natural area sums the number of Elements at a given natural area, and the rarity of those Elements, weighted by their degree of imperilment at both the global level (G-Rank) and just within North Carolina (S-Rank).

The imperilment scores are assigned to each extant Element Occurrence on a 10-point scale, based on their combination of G-Ranks and S-Ranks as shown in Table 1. The highest scores are given to Elements that are considered imperiled at both the global (G1) and state (S1) levels with successively smaller scores given to Elements that are considered more secure (G5S5 being considered secure at both the global and state levels).

Table 1: Collective Value Point Scoring for each G-Rank and S-Rank combination.

G-Rank	S-Rank	Element Score
G1	S1	10
G2	S1	9
G2	S2	8
G3	S1	7
G3	S2	6
G3	S3	5
G4/G5	S1	4
G4/G5	S2	3
G4/G5	S3	2
G4/G5	S4/S5	1

For each natural area, the scores for occurrences of each Element are added to give the final "Collective Value Score" for the natural area. (For example, if a natural area has four Elements: a G2S2, a G3S1, a G5S1, and a G5S3, it scores: 8 + 7 + 4 + 2 = 21 points.) The total scores are divided into 5 Categories of "natural area significance": Exceptional (C1 rating), Very High (C2 rating), High (C3 rating), Moderate (C4 rating), and General (C5 rating). From Table 2 (below), a site that scores 21 points, as in the above example, is given a Moderate (C4) Collective Value rating.

Table 2: Collective Value Ratings

Collective Value Rating	Cumulative Element Score	Minimum Number of Elements
C1 (Exceptional)	91 and above	10
C2 (Very High)	61-90	7
C3 (High)	31-60	4
C4 (Moderate)	11-30	2
C5 (General)	2 -10	1

Element Representational Value

The NCNHP uses Element Occurrence ranks to determine the natural areas containing the 10-12 best extant and natural occurrences of each Element. The relative importance rank for each occurrence is assigned using the categories listed in Table 3. When there are more than 12 occurrences of a G1-G2 Element or 10 occurrences of a G3-G5 Element, the remaining natural areas containing occurrences are assigned to the General category (R5), as described below. Information about these natural areas and the Element Occurrences is maintained in the database.

Collectively, these natural areas will make up a portfolio representing the best natural areas for each Element tracked by NCNHP. Each of the natural areas is rated according to the importance of the Element Occurrences contained within the natural area.

The NCNHP database is queried for occurrences (EO's) for each Element. The query sorts the EO's from best to worst using data in the database and then assigns them to categories. The initial sorting is by EO rank (the "EO rank" summarizes information on viability and value for conservation, incorporating condition, size, and landscape context). The EO's are then further sorted to clarify which ones are the best within the same EO rank, breaking ties to determine which will be selected for the portfolio of highest quality occurrences. Data used to help determine the best EO's include (in order of importance): viability, condition, acreage, landscape context, aggregate acreage of community EO's at the natural area, and total number of EO's at the natural area. The fields that are most accurate for the purpose of identifying the best EO's are used first, and if they are unavailable or result in ties, the next most desirable fields are used. Use of all the fields in the hierarchy effectively eliminates ties and provides an unambiguous calculation of which EO's are best to meet the conservation goals. It should be noted that, if the ratings returned by this query seem unreasonable or inaccurate, a more detailed analysis of the data is performed. In cases where the algorithm does not measure the most import important ecological features of a natural area, NCNHP staff can override the calculated results and record justification comments in the database.

After EO's are sorted and ranked from 1-12 for each Element, natural areas are rated on the basis of the quality of the EO's they contain. The highest element importance in the natural area determines

the natural area significance rating. This value is entered into the natural area record in the NCNHP database. For example, a natural area that contains three Element Occurrences may have one that is the 8th best example of a G4 Element, one that is the 5th best example of a G2 element, and one that is the 2nd best example of a G5 Element. The overall Representational Value rating of the natural area is R2 (Very High), as the 2nd best example of a G5 Element has the highest Element importance score (an R2). This Element is often called the "defining Element" for the natural area.

Table 3: Representational Value Rating Categories for Natural Areas based on Element Occurrences

Representational Value Rating	Definition	Defining EO Importance	
		G1-G2	G3-G5
R1 (Exceptional)	Site contains one of the best two examples of G1 or G2 Elements.	1st or 2nd	--
R2 (Very High)	Site contains the 3rd or 4th best examples in the state of G1-G2 Elements, and/or one of the best two examples of G3-G5 Elements.	3rd or 4th	1st or 2nd
R3 (High)	Site contains the 5th to 8th best examples in the state of G1-G2 Elements and/or the 3rd to 6th best occurrences of any G3-G5 Element within it.	5th to 8th	3rd to 6th
R4 (Moderate)	Site contains natural area contains the 9th to12th best examples in the state of G1-G2 Elements within it and/or the 7th to 10th best occurrences of any G3-G5 Element within it;	9th to 12th	7th to 10th
R5 (General)	Site contains one of the 30 best examples in the state of Elements within it, which do not qualify for categories R1-R4.	13th to 30th	11th to 30th