III. Species Targets in the North Atlantic Coast Ecoregion

Definitions and Planning Methods

Species Targets In Ecoregional Planning

Species targets consist of a heterogeneous set of species warranting priority conservation action in the ecoregion. Typically they cross many taxonomic lines (mammals, birds, fish, mussels, insects and plants), but each species exhibits one or more of the following distribution and abundance patterns:

- Globally rare, with fewer than 100 known populations (G1-G3)[1].
- Endemic to the ecoregion.
- Currently in demonstrable decline.
- Extremely wide ranging individuals, thus requiring conservation of habitat at larger scales.
- Designated as threatened or endangered by federal or state authorities.

Primary Species Targets: A subset of the above species is defined as primary species targets. The implication of a species being identified as a ***Primary Target*** is that its conservation needs to be addressed explicitly in the ecoregional plan because its habitat requirements are unlikely to be adequately addressed via the coarse filter approach of conservation of representative ecosystems. This means that for each primary target the science team: 1) sets a quantitative goal for the estimated number and distribution of local populations necessary to conserve the species, 2) compiles information on the location and characteristics of known populations/habitats in the ecoregion, and 3) assesses the viability of each local population with respect to its size, condition, landscape context and ultimately its probability of persistence over the next century. This information is used to select specific sites for conservation for that species.

Viable examples of local populations ("occurrences") are spatially mapped and their locations given informal "survey site" names. The number and distribution of viable occurrences are evaluated relative to the conservation goals to identify portfolio candidates, inventory needs and information gaps for remediation. Ultimately each viable population occurrence and its survey site will require a local and more extensive conservation plan to develop a strategy for long term protection of that population at that location.

Secondary Species Targets: A second set of species, termed ***Secondary Targets***, is also identified from the species pool and, in some cases, additional species viewed as vulnerable based on the life history, distribution and demographics of the species are added to the pool. Secondary targets are species of conservation concern in the ecoregion due to many of the same reasons as the primary targets except that either there are no clear locations that can be identified where their habitat can or must be conserved, or we have reasonable confidence that they can be conserved through the "coarse-filter" conservation of ecosystems.

---

[1] G1 refers to a global rarity rank where there are only between 1-5 viable occurrences of an element rangewide. G2 references a global rarity rank based on 6-20 viable occurrences rangewide, and G3 on 21-100 occurrences rangewide. Transitional ranks like G3G4 reflect uncertainty about whether the occurrence is G3 or G4 and T-ranks reflect a rarity rank based on rarity of a subspecies or other taxonomically unique unit (Maybury 1999).

The compiled list of secondary targets is used in three ways to inform the ecoregional plan/conservation blueprint. First, habitat needs of secondary target species are used in developing viability criteria and number and distribution goals for the ecosystem targets. Second, known occurrences of secondary targets are used to guide selection of which examples of ecosystems are chosen for the portfolio and prioritized for conservation action. Third, the secondary target species are used to highlight information gaps and conservation concerns that may not be addressed by traditional land conservation.

Developing The Target List

Development of the primary and secondary target species lists began with a compilation of all species occurring in the ecoregion that exhibited the characteristics mentioned above. The initial list was compiled from state conservation databases, Partners-in-Flight and American Bird Conservation lists for corresponding ecoregions, literature sources and solicited expert opinion. The database searches began with all species occurring in the ecoregion for which there are fewer than 100 known populations anywhere (G1-G3G4 and T1-T3). Common species (G4, G5) were nominated for discussion by each of the state programs and by other experts based on considerations of their vulnerable status within the ecoregion with particular attention paid to vulnerable disjunct populations and to wide-ranging species.

The exhaustive initial list was whittled down to a smaller final set through input from technical teams of scientists familiar with the species in the ecoregion. The results were then compiled to create the final species target list. The justifications for including each target species is archived in ecoregional databases.

Primary vs. Secondary Targets

No single defining factor guaranteed that a species would be confirmed as a primary target. Thoughtful consideration was given to each species' range-wide distribution, the reasons for its rarity, the severity of its decline both locally and globally, its relationships to identifiable habitats and the importance of the ecoregion to its conservation. As the list was refined, species were eliminated for different reasons. Some were removed because of questions about the taxonomic status of the species, others because they were considered to be more common throughout their range than reflected in the current global rank; the global ranks for the latter species need to be updated. Some were moved from primary to secondary because it was felt they would be adequately addressed through a careful coarse filter approach. Among species for which distribution information was considered to be inadequate, several were retained on a potential target list for future consideration. However, at a minimum, any species considered globally endangered at either the species or subspecies level (G1-2 or T1-2) or legally protected as endangered at the national level were kept as primary target species.

Setting Minimum Conservation Goals For Species Targets

The minimum conservation goal for a primary target species in an ecoregional plan is defined conceptually as the minimum number and spatial distribution of viable local populations required for the persistence of the species in the ecoregion over one century. Ideally, conservation goals should be determined based on the ecology and life history characteristics of each species using a population viability analysis.

Because it was not possible to conduct such assessments for each species during the time allotted for the planning process, generic minimum goals were established for groups of species based on their distribution and life history characteristics. These minimum goals were intended to provide guidance for conservation activity over the next few decades. They should serve as benchmarks of conservation progress until more accurate goals can be developed for each target. The generic

goals were not intended to replace more comprehensive species recovery plans. On the contrary, species that do not meet the ecoregional minimum goals should be prioritized for receiving a full recovery plan including an exhaustive inventory if such does not already exist.

Quantitative Global Minimums

Our conservation goals had two components: numeric and distributional. The numeric goal assumed that a global minimum number of at least 20 local populations over all ecoregions were necessary to insure the persistence of at least one of those populations over a century (see Cox et al. 1994, Anderson 1999, Quinn and Hastings 1987 and reliability theory for details). This number is intended to serve as an initial minimum, *not* a true estimate of the number of local populations need for multi-century survival of the species. Subsequently, the number 20 was adjusted for the ecoregion of focus based on the relative percentage of the total population occurring in the ecoregion, the pattern of the species distribution within the ecoregion and the global rarity of each species (Table 1). When the range of a rare species extended across more than one ecoregion, the assumption was made that the species would be included in the protection plans of multiple ecoregions. Such species may require fewer protected examples within the ecoregion of focus relative to a species whose ranges is contained entirely within the ecoregion. To highlight the importance of the ecoregion to the species, each primary target species was assigned to one of four rangewide distribution categories – Restricted, Limited, Widespread, Peripheral – all measured relative to the ecoregion (Table 1). Assignments were made by the species technical teams using distribution information available from NatureServe, the Heritage Programs, and from other sources available at the Eastern Conservation Science (ECS) center. In general, for species with a "restricted" distribution, the ecoregional goal was equal to the global minimum and set at 20; for species with a "limited" distribution, the ecoregional goal was set at 10. For species with "widespread" or "peripheral/disjunct" distributions, the goal was set at 5 for the entire ecoregion. This default algorithm was followed most loosely for plants somewhat less so for animals. In practice, for most of the primary target animals there were many fewer known occurrences than the minimum goal.

Table 1. Conservation goals based on distribution categories and global rarity rank (GRank). Numbers refer to the minimum number of viable populations targeted for protection.

CATEGORY	DEFINITION	G1	G2	G3-G5
Restricted	Occurs in only one ecoregion	20	20	20
Limited	Occurs in the ecoregion and in one other or only a few adjacent ecoregions	10	10	10
Widespre ad	Widely distributed in more than three ecoregions	5	5	5
Peripheral or Disjunct	More commonly found in other ecoregions	5	5	5

Distribution And Stratification Goals

The distribution component of the conservation goal, referred to as the stratification goal, was intended to insure that independent populations will be conserved across ecoregional gradients reflecting variation in climate, soils, bedrock geology, vegetation zones and landform settings under which the species occurs. In most cases the distribution criteria required that there be at least one viable population conserved in each subregion of the ecoregion where the species

occurred historically, i.e. where there is or has been habitat for the species. The conservation goal is met for a species when both the numerical and stratification standards are met.

In addition to the scientific assumptions used in setting conservation goals, the goals contain institutional assumptions that will require future assessment as well. For example, the goals assume that targeted species in one ecoregion are targeted species in all ecoregions in which they occur. That is likely the case for rare (G1-G3) species, but not a certainty for more common (G4, G5) species. After the completion of the full set of first or second iteration ecoregional plans, species target goals should be assessed, reevaluated and adjusted. Rangewide planning should eventually be undertaken for all targets.

Assessing The Viability of Local Populations

The conservation goals discussed above incorporate assumptions about the viability of the species across the ecoregion. The goals assume that local populations unlikely to persist over time have been screened out by an analysis of local viability factors. This section describes how the planning teams evaluated the viability of each local population or "occurrence" at a given location.

Merely defining an occurrence of a local population can be challenging. The factors that constitute an occurrence of a species population may be quite different between species of differing biology and life histories. Some are stationary and long lived (e.g. woody plants), others are mobile and short lived (e.g. migrating insects), and innumerable permutations appear in between. Irrevocable life history differences between species partially account for the critical importance of the coarse-filter strategy of ecosystem and habitat conservation. Nevertheless, for most rare species the factors that define a population or an occurrence of a population have been thought through and are well documented in the state Natural Heritage databases. The criteria take into account metapopulation structure for some species, while for others they are based more on the number of reproducing individuals. Whenever it was available we adopted the Heritage specifications, termed "element occurrence specifications" or EO specs for short (where *element* refers to any element of biodiversity) [2].

Whenever possible, the local populations of each species selected for a conservation portfolio should exhibit the ability to persist over time under present conditions. In general, this means that the observed population is in good condition and has sufficient size and resilience to survive occasional natural and human stresses. Prior to examining each occurrence, we developed an estimate of potential viability through a succinct assessment of a population's **size**, **condition**, and **landscape context**. These three characteristics have been recorded for most occurrences by Natural Heritage programs that have also developed separate criteria for evaluating each attribute relative to the species of concern. This information is termed "element occurrence ranking specifications" and these "EO rank specs" served as our primary source of information on these issues.

As the name implies, element occurrence ranking specifications were not originally conceived to be an estimate of the absolute viability of a local population, but rather a prioritization tool that ranked one occurrence relative to another. Recently, however, the specifications have been revised in concept to be a reasonable estimate of occurrence viability. Unfortunately, revising the information for each species is a slow process and must be followed by a reevaluation of each occurrence relative to the new scale. Fortunately, the catalog records for each population occurrence tracked in the Heritage database usually contain sufficient information on its size,

[2] An Element Occurrence, or EO, is a geo-referenced occurrence of a plant or animal population or a natural community recorded in a Natural Heritage database.

condition and landscape context that a generic estimate of occurrence viability may be ascertained from the database records.

The synthesized priority ranks (EO rank) currently assigned by the state Heritage Program staff reflected evaluations conducted using standard field forms and ranking criteria that were in use at the time that the occurrence was first documented by a field biologist. These ranks, while informative, were somewhat variable for similar occurrences across state lines. In fact, very few EO ranks were available except for plant and natural community EOs. Thus, for viability estimation the EO rank was supplemented by the raw tabular information on size, condition and landscape context and as often as possible by the knowledge of biologists familiar with the taxon and the locations. Additionally, information on each EO was further augmented with a spatial GIS assessment of the land cover classes and road densities located in a 1,000 acre proximity of the occurrence's central point. The latter served as an objective measure of landscape context.

All known occurrences for each primary target species were assembled at ECS from the state Heritage Programs through data sharing agreements. The occurrences were sorted by species, and spreadsheets for the species targets were prepared for group discussion, using the information described above. Further data included: a unique occurrence identification number, the species name, global rank, site name, and date of last observation. Tables of all occurrences were provided to each technical team member along with ecoregional distribution maps of the occurrences. Final decisions on the estimated viability of each local population was provided by the technical team and reviewed by the appropriate state, provincial and divisional scientists.