RESULTS FOR TERRESTRIAL COMMUNITIES AND SYSTEMS*

All natural terrestrial vegetation community types are identified as conservation targets in the ecoregion. Aquatic communities are analyzed separately. A description of the aquatics selection process and results appear in the aquatics systems and species chapter.

Modification to Standard Method

The methodology used to develop an ecoregional vegetation classification in other Northeastern ecoregions (NAP, NAC, LNE, CBY, and CAP) was applied to the HAL Ecoregion to define the full complement of associations that occur in the ecoregion. Of the 140 associations initially described for HAL in the NVC, 34 were evaluated as not occurring in HAL. Three associations not previously identified as within HAL were added, and several associations were described for consideration for inclusion in a revised NVC. Every association within HAL was also categorized into a coarser scale vegetation system or **group**, of which 14 were initially identified. A total of 109 associations known or thought to occur in the HAL ecoregion were described through these efforts. By comparison, 126 associations were described for CAP and 153 for LNE. These results were assembled into a single document for HAL natural communities and reviewed by the participating ecologists (Sneddon et al., 2000).

Three (possibly four) associations within HAL were described as matrix forming (see matrix forest chapter). Fourteen NVC types were described as large patch (or which may occur as large patch), 65 were described as small patch, and 8 were described as linear. For 36 associations, the patch size was either uncertain or believed to be intermediate between patch types; hence the number of associations tallied by patch size exceeds the total number of associations with the ecoregion. For 21of the types, the patch type was assigned based on best available knowledge, but with less certainty than for the majority of the types (see discussion in Assessing Viability section below). For a small number of types the patch size was completely unknown at the time of this assessment, but these cases were too few to affect the overall results presented here.

Data were assembled for the three states within the ecoregion. A total of 509 occurrences were in this dataset: 20 for NJ, 282 for PA, and 206 for NY. Each of these occurrences was initially identified within their respective state classifications, and thus needed to be linked ("crosswalked" or "tagged") to the NVC classification developed for HAL. Each association was also categorized as one of the 14 vegetation systems or groups. Some occurrences were easily connected to a specific association; others were a mosaic of identifiable associations and could be considered to be occurrences of multiple associations; for some it was not possible to crosswalk them to the HAL classification given available data. In the cases where it was not possible to connect an occurrence to a specific association, but it was clear that the occurrence was high quality and able to be matched to a coarser scale level of classification, occurrences were tied to the appropriate vegetation **group**.

Unlike many community occurrences in other ecoregions, most community occurrences documented by the Natural Heritage Programs in HAL were very detailed and scaled similarly to associations within the NVC, so that occurrences could be effectively crosswalked to specific

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* Anderson, M.G. and S.L. Bernstein (editors). 2003. Results for terrestrial communities and systems. Based on Zaremba, R.E. 2002. High Allegheny Plateau Ecoregional Plan; First Iteration. The Nature Conservancy, Conservation Science Support, Northeast and Caribbean Division, Boston, MA.

associations. For 38 of the occurrences (7%), however, it was necessary to limit analysis to the coarser-scale Group level (Appendix nc1).

Assessing Viability

Viability assessment followed the standard method for terrestrial communities and systems. Combining the viability criteria of size, condition, and landscape context for HAL resulted in Table NC-1, which guided the assessment.

Table NC-1. Natural community (small, large, and linear patch) viability ranking grid.

Landscape context	Condition/Rank	Size: Large or linear patch	Size: Small or linear patch	Viability estimate
1	A, AB, B,	>100	>0	Yes
1	BC,C, ?, E			Maybe = ?
2	A,AB,B	>100	>0	Yes
2	BC,C,?,E			Maybe = ?
3	A,AB,B	>100	>25	Yes
3	BC,C,?,E,			No
4	A,AB,B	>100	>50	Maybe = ?
4	BC,C,?,E			No
1,2,3,4	D			No

Note that linear patch communities were variously evaluated on small or large patch size criteria depending on an understanding of the growth and habitat characteristics of the vegetation type. Also, where there was uncertainty about the classification of a community to patch type (e.g., large vs. small), generally the more conservative criteria were applied.

Stratification

As in other ecoregions, HAL was divided into groups of subsections to reflect the range of physiographic variability throughout the ecoregion. For the purposes of stratification, HAL subsections were grouped to reflect similar ecological settings. Table NC-2 shows the levels that were defined. Level 1 refers to anywhere within the ecoregion. The first and most fundamental ecological separation in HAL is between subsections that are within the glaciated portion of the ecoregion and those that were never subject to glaciation. For the most common widespread communities at a minimum, occurrences should be distributed in both of these units (Level 2), if in fact, the association occurs in both units. Level 3 divides the ecoregion into four groups, reflecting glaciation, elevation, and bedrock differences. Level 4, reserved for Restricted associations, further divides the lower elevation subsections reflecting differences between the rugged terrain in the vicinity of the Poconos and the Middle Delaware River and the more gently sloping, rolling hills of the northern subsections of HAL.

Table NC-2. Sectional and subsectional classification (USFS categories) and geographic extent in HAL ecoregion.

High Allegheny Plateau					**Level 1**
Non-glaciated	**Glaciated**				**Level 2**
Western PA Highlands-Ga/Gb	**Catskills**-Ea	**Kittatinny**-Bd	**Allegheny Lowlands**		**Level 3**
Western PA Highlands-Ga/Gb	**Catskills**-Ea	**Kittatinny**-Bd	**NY Lowlands and Catskill Hills** Eb/Fb/Fa	**Poconos/ Neversink** Fc/Fd	**Level 4**

Conservation goals

Conservation goals for terrestrial communities in HAL were set to reflect that Restricted and Limited associations in HAL should be distributed in the ecoregion more broadly than Peripheral and Widespread communities, because a high percentage of the global range of these communities occurs in the ecoregion. For those communities whose distribution is thought to be Restricted to HAL, occurrences should be located as broadly as possible, in all five sections shown in Level 4 of Table NC-2.

For those communities categorized as Limited to HAL (found in HAL and one other ecoregion), the goal was set at Level 3, with four subsection groups. For the more widely distributed Widespread and Peripheral communities, the stratification level was Level 2, occurrences distributed in both glaciated and non-glaciated subsections. Level 1 with occurrences anywhere in the ecoregion is limited to those widespread or peripheral communities that only occur in either the glaciated or non-glaciated parts of HAL. Within these stratification units, the number of occurrences was set at four per unit for large patch and linear communities and five per unit for small patch communities (Table NC-3).

Table NC-3. Minimum conservation goals for HAL natural communities as a function of patch size and rangewide distribution of the type.

		Patch Size	
Rangewide Distribution	**Minimum Stratification (Level)**	**Large or Linear (4)**	**Small (5)**
Restricted	4 (5 groups of subsections)	20	25
Limited	3 (4 groups of subsections)	16	20
Widespread	2 (2 groups of subsections)	4*	5*
Peripheral	2 (2 groups of subsections)	4*	5*

* For Widespread and Peripheral associations the total ecoregional goal is 4 for Large Patch and 5 for Small Patch associations. If the association occurs in both glaciated and non glaciated parts of HAL, then these occurrences must be distributed in both units.

The combination of stratification levels across the ecoregion and minimum number of occurrences per section produces a set of numerical conservation goals for natural community targets in HAL that ranges from four to 25 (Table NC-3).

Results: Summary of HAL Natural Community Portfolio by Group

Of the total of 509 Heritage natural community occurrences in the HAL database, 253, or 50%, were assessed as viable and included in the HAL portfolio. These Heritage element occurrence records represent 264 occurrences of NVC types. The number of occurrences of NVC types in HAL does not equal the number of element occurrences identified as viable and included in the portfolio because some documented Heritage occurrences consisted of multiple viable NVC associations. This was particularly true of black spruce bogs and dwarf shrub gobs, which are most often documented as complexes of NVC types. In those cases where data provided in the

element occurrences record were detailed or where the staff ecologist personally knew the occurrence, all NVC types included at the site were included in the portfolio and counted toward community goals.

Fifty-nine NVC associations of the total of 109 are included in the portfolio. Ten NVC types had examples within the HAL database, but none of these occurrences were considered to be viable. Forty NVC types were not represented by any occurrences in the database. Eight Heritage community occurrences were included in the portfolio that could not be connected to a specific NVC association but were connected to a vegetation group.

Communities best represented in the portfolio include those that have been considered globally rare and the focus of Heritage surveys. These communities include bogs, fens, black spruce wetlands, ridgetops and rocky summits, and cliffs. Recent Heritage work has increased the numbers of some of the more common forest associations, particularly for deciduous forests which are dominant in HAL.

There are many groups that are very poorly represented in the portfolio that will require extensive additional field work to meet ecoregional goals. There are no occurrences of marshes and wet meadows or springs and seeps and very few occurrences of talus slope woodlands, floodplain forests, or the broad range of communities in HAL related to streams, rivers, lakes, and ponds.

Summary of results by NVC group

A summary of the success of capturing natural communities in the HAL portfolio by group is presented in Table NC-4 and below, with observations on inventory needs, likelihood of additional occurrences at other portfolio sites, and restoration potential.

Table NC-4. Assessment of HAL Portfolio for Natural Communities in relation to Goals by Group.

Group #	Group Name	# NVC types in HAL	#NVC types with EORs	Total # of Occurrences	Total # viable	Goal for Group	% of Goal Met
1	Bogs and Acid Fens	6	4	99	51	60	85
2	Calcareous Fens	8	5	30	10	110	5
3	Cliffs (not wooded)	2	1	9	5	10	50
4	Deciduous or Mixed Woodlands	3	2	10	7	65	11
5	Floodplain Forests and Rivershores	15	8	36	16	155	10
6	Marshes and Wet Meadows	5	4	7	0	24	0
7	Palustrine Forests and Woodlands	23	16	86	50	339	15
8	Ponds and Lakes	4	2	15	3	20	15
9	Ridgetops and Rocky Summits	13	11	46	34	169	20
10	Rivers and Streams	4	1	1	1	20	5
11	Seeps and Springs	1	0	0	0	5	0
12	Terrestrial Coniferous Forests	5	2	16	12	65	18
13	Terrestrial Deciduous Forests	12	6	33	27	114	54
14	Terrestrial Mixed Forests	8	6	18	13	65	20
	All NVC Types	109	68	416	264	1221	22

Group 1: Bogs and Acid Fens. 6 NVC Types. Goal: 60. Total in portfolio: 51 Progress: Good. Bogs and acid fens have been the target of many of the inventory projects in the glaciated portion of HAL. This is the southern limit of these communities and also the southern limit of several of the major species found in these Heritage communities. Most of the work to date has focused on the dwarf shrub bog aspect (NVC type 6225) of this assemblage. Most occurrences in the database are probably mosaics of several communities in this group and may also include examples of Group 7 Palustrine Forests and Woodlands, as well. There are undoubtedly many more examples of these communities within HAL. All of them will be in the glaciated part of the ecoregion, mainly in the Catskills and in eastern Pennsylvania. Some may remain in good condition even in very small patches. Surveys within matrix forest blocks should lead to additional occurrences for the portfolio. There is an excess of one dwarf shrub bog NVC association in the portfolio (Goal=5; Viable in the portfolio=27).

Group 2: Calcareous Fens. 8 NVC Types. Goal: 110. Total in portfolio: 10. Progress: Good- (the goals are highly inflated). The number of fens in HAL is limited by the low percentage of calcareous bedrock areas within the ecoregion. Within those areas in New York and New Jerseys where fens are found significant attention has been focused on the documentation and management of fens and fen-related communities. Viability has been a major concern for most fen occurrences. Because fens occur in alkaline environments, upland soils near fens are generally well suited for agriculture, row crops in areas with good soil development, and pastures in areas with thinner, rocky soil. Many fens are found in a generally agricultural landscape. Some have cornfields at the upland edge. Cows are often grazing in wetlands on alkaline soil in plant communities that might be good fens with fewer disturbances. Despite considerable nearby impacts, many of these fens have persisted for years without serious loss of native species diversity or invasion by weeds. There are likely very few additional fens to document with increased field work. Restoration may be possible in some areas. It may be difficult to reach the current goals set for these associations**.** The goals for this group are dramatically inflated by the limited and restricted distribution of some of these NVC types. While restoration may be possible at some sites to increase numbers of occurrences in the portfolio, the very limited extent of available habitat will restrict the possible number of occurrences. Additional work is also needed to connect currently documented occurrences to NVC types.

Group 3: Cliffs (not wooded). 2 NVC types. Goal: 10. Total in portfolio: 5. Progress: Good. With the exception of the Shawangunks, cliffs have received little attention in HAL. There are significant areas with cliffs in the Catskills, along the Shawangunk/Kittatinny Ridge, along the major rivers where shale deposits have been eroded, and along the steep cut valleys of the West Branch of the Susquehanna River. Elsewhere in HAL, despite moderate elevation hills, most slopes are gradually tapered without rock exposures. The diversity of cliffs within HAL has not been assessed well, mainly because these are sparsely vegetated areas and most inventory work has focused on forest and woodland communities in HAL. There are likely other NVC cliff types in HAL. Many more examples of good quality cliff communities will likely be found within the many matrix forest blocks with steeply sloped mountains, particularly in the Catskill and in north-central Pennsylvania.

Group 4: Deciduous or Mixed Woodlands. 3 NVC types. Goal: 65. Total in portfolio: 7. Progress: Poor. Most dry woodland communities are found on thin soils along upper slopes and on rocky summits. These NVC types are grouped together in Group 9: Ridgetops and Rocky Summits. This group in HAL is limited to talus slope woodlands and low elevation areas with

poor, rocky soil. These community types are believed to exist throughout the ecoregion. These communities are not well understood in HAL in terms of vegetation types or distribution. Areas with woodrats or rattlesnakes probably support these types of communities. Many examples will be small patch in HAL and likely in good condition. Many matrix forest blocks likely support good examples of Deciduous or Mixed Woodlands.

Group 5: Floodplain Forests and Rivershores. 15 NVC types. Goal: 155. Total in Portfolio: 16. Progress: Poor. This is a broadly defined and poorly understood group in HAL. Floodplain Forests and Rivershore could easily be subdivided, since most of the rivershore communities are dry upland grass- and shrub-dominated open canopy communities that are associated with rivershore processes, particularly ice scour in the winter, and only slightly related to floodplain forest communities. Detailed work by the Heritage Programs in LNE and CAP has characterized most of the community types represented in this group. The distribution and composition of these associations in HAL are not well understood. To create goals for these types, a conservative estimate of distribution was used when there were incomplete data. It was assumed that the NVC types were at rarest "Limited" to HAL because these types were first described in other ecoregions. Many are probably Widespread. Floodplain forest work is planned in both NY and PA that will lead to a refinement of the NVC types in HAL, better distribution information, and new occurrences for the databases. It is likely that many of the NVC types described for Hal to date will be combined and rewritten leading to fewer overall types in the ecoregion. Because there are extensive networks of rivers and streams throughout HAL, there are also numerous floodplain forests. Most of the sites have, however, been altered dramatically because original floodplain forest sites provide ideal locations for agriculture or residential or commercial development. Virtually all of these areas in HAL have been cleared over times. Only a few have been allowed to revert to natural forest. Most of these occurrences are small. Floodplain forest types that were formerly large patch are probably extant only as small patches. Restoration will be needed to establish floodplain forest community examples at historical scales. However, little is known of biodiversity in these formerly extensive forests in HAL.

Group 6: Marshes and Wet Meadows. 5 NVC types. Goal: 24. Total in portfolio: 0. Progress: No progress. Marshes and wet meadows have not been the focus of any Heritage field work in HAL. Most of the marshes and wet meadows in HAL are successional and associated with floodplains, beaver activity, or human disturbance. These communities have received little conservation attention. The five NVC types are broadly defined. Additional field work on marshes and wet meadows associated with continued aquatic assessment will likely define new NVC types already known from other ecoregions.

Group 7: Palustrine Forests and Woodlands. 23 NVC types. Goal: 339. Total in portfolio: 50. Progress: Fair (considering goals are inflated) Palustrine forests and woodlands have not been well studied in HAL. Survey projects in LNE and CAP have identified numerous NVC types that may be present in HAL. After surveys within the ecoregion, it is probable that many NVC types in this group will be combined and rewritten. Goals for this group are highly inflated due to the high number of NVC types currently described in HAL and insufficient data to make an accurate assessment of distribution. Notable among these associations in HAL are Atlantic white cedar dominated communities that extend into the eastern portion of HAL and Northern white cedar communities that reach their southern limit in the calcareous part of the ecoregion. Many of the palustrine forest and woodlands in HAL have been filled or drained. Most occurrences are now present as small patch communities, which were previously larger. Many of

the remnant examples are associated with the numerous rivers within the ecoregion. Surveys within matrix forest blocks should identify many of the best examples of these communities remaining in the ecoregion.

Group 8: Ponds and Lakes. 4 NVC types. Goal: 20. Total in portfolio: 3. Progress: Poor. Very little inventory work has been conducted in the ponds and lakes of HAL. Only two NVC types associated with these features have been identified. There are certainly many more associations within the ecoregion related to ponds and lakes. It is probable that none of these are unique to HAL, and that all are widespread and small patch. Little information has been compiled about important species associated with lakes and ponds in the ecoregion.

The southern limit of glaciation runs through HAL. The northern and eastern parts of the ecoregion were glaciated and have numerous ponds and lakes related to glacial landforms. Most large lakes, particularly in the Catskills, have been modified with dams and are either reservoirs or flood control features. The unglaciated portion of HAL in the southwest have very few natural ponds and lakes.

Group 9: Ridgetops and Rocky Summits. 13 NVC types. Goal: 169. Total in portfolio: 34. Progress: Good (goals are inflated). The eastern sections of HAL support numerous hills and ridges with open canopy communities. Many of these summits are in good condition and support unusual species and communities. Several ridgetop communities that have been identified as globally rare have been well surveyed. A general rocky summit inventory effort was undertaken in New York that added numerous occurrences in the eastern part of HAL to the database. There are fewer open canopy rocky summit community occurrences in the non glaciated southwestern part of the ecoregion. Better distribution information about these communities is likely to indicate limitation to the range of these association in HAL and will reduce general goals for this group. It is also likely that for some of these associations, all occurrences have been documented and that goals for these community types will need to be adjusted to reflect natural distribution and abundance. Restoration is not like to play a major role in the establishment of new occurrences although fire management is needed in several types that have been fire-suppressed for many years.

Group 10: Rivers and Streams. 4 NVC types. Goal: 20. Total in portfolio: 1. Progress: No progress. This group refers to vegetated areas within rivers and streams and the palustrine graminoid/herbaceous borders of rivers and streams. The numerous rivers and streams in HAL have not been inventoried at all for natural communities, except for the more upland types of communities associated with flooding and ice scour. These communities appear in Group 5: Floodplain forest and rivershores. There are many occurrences of emergent vegetation in shallow, slow moving sections of streams and rivers, and many instream aquatic community occurrences dominated by plants. These need additional assessment in terms of the NVC and documentation of occurrences. Most of these occurrences will be small patch, but there may be some large patch occurrences associated with slow moving, shallow sections of the major rivers.

Group 11: Seeps and Springs. 1 NVC type. Goal: 5. Total in portfolio: 0. Progress: No progress. Seeps and springs occur as small patch communities throughout HAL. No inventories have been conducted in these communities to date. The related communities associated with waterfalls have also not been documented, although Pennsylvania carried occurrences of waterfalls as a physical feature in the database and has begun an NVC assessment of these small

patch communities. Good examples should be found in the matrix forest blocks identified in HAL.

Group 12: Terrestrial Coniferous Forests. 5 NVC types. Goal: 65. Number in portfolio: 12. Progress: Fair. Terrestrial conifer-dominated forests occur mainly at high elevations and in the eastern part of HAL. There have been detailed surveys of the spruce-fir forest of the Catskills, but fewer surveys of the pine and hemlock forests scattered along ravines throughout the Catskills and in other steep terrain in the eastern parts of HAL and on the steep slopes along the West Branch of the Susquehanna River. Past logging has significantly altered many of these forests. More recently, effects of the wooly adelgid have decimated some hemlock stands. The wooly adelgid currently occurs in the southeast and eastern sections of the ecoregion, but has not yet advanced into central Pennsylvania and western New York, where hemlocks are more scattered. Additional inventory work in matrix forest blocks will result in many new occurrences for the portfolio. The Pine-hemlock forest (6328) is probably no longer present as a large patch community over much of its range in HAL.

Group 13: Terrestrial Deciduous Forests. 12 NVC types. Goal: 114. Number in portfolio: 20. Progress: Fair. Terrestrial deciduous forests dominate much of the remaining natural areas of HAL. All the current matrix forest types are in this group. Because the initial focus of Heritage Programs was on globally rare natural communities, few terrestrial deciduous forests have been inventoried until recently. These forest have also been significantly altered by excessive logging, management for particular species, notably cherry and oak, forest pathogens, and severe deer browse. Chestnuts were once dominant in several of these community types and are now nearly absent. Beech has declined severely as a result of beach bark disease. Gypsy moths have reduced oak dominance locally and even killed trees over some large areas. Many forest occurrences in HAL have a continuous canopy, but lack much of the diversity of the former forest communities. Restoration of many of these associations may be necessary to reestablish some forest processes. Occurrences of most of these associations will be abundant within matrix forest blocks. Additional NVC types may be identified for this group. Some types may be combined and altered significantly with additional field work. In the statistics for this group, it is assumed that examples of all matrix forming associations will be found in selected matrix forest blocks.

Group 14: Terrestrial Mixed Forests. 8 NVC types. Goal: 65. Number in portfolio: 13. Progress: Fair. Terrestrial mixed forests, like Deciduous forests, are widespread and common in HAL. Because none of these associations are globally rare, only limited field work has been conducted to document these communities. These associations have also been severely altered from their condition prior to European settlement by selective logging, clearing for agriculture, forest pathogens, and excessive deer browse. Many occurrences of these associations will be found in matrix forest blocks. Many of these occurrences may be large, although significantly altered from their original compositions, structure and conditions.

Heritage occurrences not selected for the portfolio

From the combined Heritage state databases, 256 natural community occurrences were not included in the HAL portfolio.

There were a broad range of reasons why natural communities were not selected for the portfolio. Chief among these was that occurrences did not represent recognizable NVC associations. Occurrences of waterfalls and plunge pools and high gradient streams did not

include any vegetation data. Nor in most cases did these occurrences include detailed condition information. Vernal pools were also not included, because within the NVC, vernal pools are generally very small and considered to be a part of the larger, usually forested, association in which they are located.

Many occurrences were eliminated because the data were very old. All occurrences with a LASTOBS (last observation) date before 1988 were questioned. If the ecologist in the state knew that the occurrence remained in good condition, the occurrences was included. If no additional data were available, the occurrences were not included, but annotated that the element occurrence record needs to be updated. These occurrences, particularly those with a high occurrence rank, should be the first investigated to add community occurrences to the HAL portfolio.

Some Heritage occurrences lacked sufficient detail to be able to distinguish the NVC association or in a few cases even whether the occurrence was a forest, woodland , or open canopy community. These were annotated and not included in the assessment.

Several occurrences were not included because their size was too small to meet the minimum standards of the NVC association. The concept of patch size for specific NVC associations is only recently developed and has not been included in some Heritage documentation. There are numerous occurrence of natural communities that, while highly recognizable as a vegetation unit, are no longer able to persist over time, because they are irreparable fragmented or otherwise compromised and lack necessary ongoing processes. Several occurrences of matrix forest communities were very small, some under 100 acres, and not capable of maintaining the diversity and processes necessary to capture the full range of biodiversity expected in a matrix forest example. Similarly, several very small large patch community examples were discarded from the portfolio. In many cases, particularly for floodplain forests and the upland forests that occur at sites suitable for agriculture or residential/commercial development, remnant examples are very small and lack sufficient extent to allow all necessary processes to occur to maintain the natural community long term. In many of these cases, it will be necessary to identify restoration sites, if these natural communities are to be included in the portfolio. Remnant occurrences may play an important role as a nucleus for these restoration efforts, but to date these occurrences have not been include in this portfolio without further assessment of their potential.

Many occurrences were eliminated from the portfolio because of poor landscape context. Landscape context has for many years been a major component of assessing the rank of a Heritage community occurrence. In general, low quality context diminishes a rank, but often has not eliminated the documentation of a recognizable occurrence. Following an initial assessment by each state ecologist, the community database was returned to the ecologist with the GIS landscape assessment of the 1000 acres surrounding each occurrences. The ecologists were asked to look again at those occurrences with a landscape context of “3,” highly developed or “4,” intensely developed. Many of these occurrences, particularly for large patch communities, were not included in the portfolio. Those occurrences with a low landscape context value that were included in the portfolio were generally small patch communities which are believed to be capable of persisting in very small areas because the processes needed to maintain the community are very local and not highly impacted by surrounding conditions.

Comments were recorded for all community occurrences that were not included in the portfolio and returned to the Heritage Programs. Of the 256 natural community occurrences in HAL that

were not selected, 71 of these are labeled with a "?" in a column describing viability. All of these occurrences would benefit from additional assessment, usually including a field visit. This group of occurrences is one of the best sources of additional occurrences for the HAL portfolio to meet community goals.

Geographically, Heritage occurrences not included in the portfolio are found throughout the ecoregion with highest concentrations in central and western Pennsylvania, in the calcareous section of central New York, and at scattered small sites in the agricultural areas of central and western New York and Pennsylvania.

General observations about the HAL natural community assessment

Goals: Stratification and numerical goals for communities in HAL are based on having good information on global distribution and patch size for each NVC association. The HAL ecoregion occurs in parts of each of the three participating states that are not known well to the ecologists. Most of the data included on distribution and patch size are estimates. The link between state classifications and the NVC require new ways of looking at plant communities for many ecologists. Furthermore, most state ecologists are not familiar with the full range of associations outside their state. A conservative approach was used in calculating numerical goals from estimated patch size and distribution. Many of the associations in HAL are probably more widespread than noted. Additional refinement of the distribution of NVC associations is likely to reduce numerical goals for many groups.

The goals set for several NVC types are unrealistically high and should be modified downward to reflect the potential distribution of biodiversity in the ecoregion. For example, there are several small patch communities that are believed to be restricted to HAL. These are particularly rare communities and it is important that the HAL portfolio recognize their relative importance within the ecoregion. In many cases, there is, however, very limited available habitat of these communities. For example, the dwarf pine community in the Shawangunks (NVC- 6079) is found only at this one site. It is described as a small patch restricted community with a goal of 25 occurrences in the ecoregion. There is only one occurrence in the portfolio and no other occurrences are reasonably expected to be found anywhere. There are other similar examples within the classification, particularly for the globally rare communities that have been well studied throughout their ranges. Numerical goals should be adjusted for these communities to reflect current occurrences and any potential occurrences that might benefit from restoration.

Additional field work is needed to meet goals for most communities in HAL. There is a significant opportunity to document many of these communities that are represented in the portfolio at levels below their goals by conducting field surveys associated with matrix forest blocks and aquatic systems conservation action. Most viable occurrences of communities in HAL will be associated with these areas and will benefit from conservation associated with other ecoregional targets.

The HAL NVC needs additional work that will further clarify goals. Many of the associations currently ascribed to HAL will be modified as the ecoregion becomes better known. Palustrine forests and woodlands and floodplain forests are poorly understood in the ecoregion. All HAL NVC types in these groups were first described from other ecoregions and believed to extend into HAL. More detailed work on these groups in HAL should define fewer NVC types and clarify what appears to be a proliferation of wetland types resulting from a series of projects in neighboring ecoregions. It is likely that the 38 NVC types in these two groups can be combined

into far fewer associations and descriptions effectively broadened to create a more even approach to these communities. Many of the occurrences of these communities are highly altered by filling, changes in hydrology, or past land use. Restoration is likely to be an important tool in capturing the biodiversity in these communities at their former scale.

Other communities poorly understood in the HAL classification include cliffs, talus slope woodlands, and the full range of non-forested communities associated with the many rivers and streams in HAL.

Next Steps for Natural Communities in HAL

1. Continue to refine the HAL NVC.
2. Continue inventory work on HAL associations, particularly focusing on poorly understood groups.
3. Continue to make connections between NVC associations and the physical features associated with ELUs.
4. Create more usable versions of the HAL NVC that can become a part of standard Heritage documentation and TNC conservation action.
5. Create more efficient crosswalks between state classifications and the NVC, leading to the connection of all documented Heritage natural communities to NVC associations.
6. Encourage and enable the Heritage programs to update their natural community databases with information collected during this ecoregional planning process. Maintain the connections between field assessment of HAL portfolio sites and Heritage documentation.