
APPENDIX H. ALLEGANY FORESTS PROJECT CAP SUMMARY

Step 1: Project Team

The project team is made up of staff from The Nature Conservancy (TNC, both the Maryland and Pennsylvania chapters), Western Pennsylvania Conservancy (WPC), PA Natural Heritage Program, and MD Natural Heritage Program. All of the team members participated in the planning process.

WPC and PA Heritage Staff

Michael Knoop*, Special Projects Coordinator, Sideling Hill Creek Center; Charles Bier, Senior Director, Conservation Science; Tolif Hunt, Director, Agriculture Conservation Services (former Special Projects Coordinator, Sideling Hill Creek Center); Jeremy Deeds, Aquatic Ecologist; Jeff Wagner, Director Pennsylvania Natural Heritage Program; Jason Heinze, Allegheny Forestlands Program Director; Greg Socha, Senior Director, Forest Conservation; Jacqui Bonomo, Vice President, Conservation

TNC (MD and PA) and MD Heritage Staff

Donnelle Keech*, Allegheny Forests Project Director (MD); Mark Bryer, Chesapeake Bay Initiative; Doug Samson, Senior Scientist (MD); Deborah Landau, Conservation Ecologist (MD); Charles DeCurtis, Director Conservation Science (PA); Stephanie Orndorff, Conservation Planner (PA); Margo Burnham, Director Conservation Operations (MD); Ed Thompson, Western Region Ecologist, MD DNR Natural Heritage Program; Harry Kahler, Natural Resource Biologist, MD DNR Natural Heritage Program; Dylan Jenkins, Director of Forest Conservation and PA Northcentral Highlands Project; Keith Eshleman, Associate Professor, Appalachian Lab; Phil Townsend, Associate Professor, Department of Forest Ecology and Management

* Denotes Team Leader

Step 2: Vision, Scope, and Focal Targets

Vision

The vision of the Allegheny Forests Project is to protect the full range of native biodiversity within the project area.

Scope

The geographic scope of the Allegheny Forests Project includes:

- Watersheds of Town Creek, Sideling Hill Creek, and Fifteenmile Creek.
- The Green Ridge Matrix Forest Block and the Buchanan Matrix Forest Block, which were identified in TNC's plan for the **Central Appalachian Forests Ecoregion**.

Focal Targets

Stream Systems (including Riparian Zones)

This target is defined as the main stems of Sideling Hill Creek, Fifteenmile Creek, and Town Creek, **and** riparian zone habitat throughout the three watersheds. More specifically, it is the portion of these stream systems that have watersheds 30 – 200 square miles in extent (named “size 2” waterbodies in TNC's freshwater portfolio analysis); and the land adjacent to all perennial streams within the three watersheds a certain distance above stream level (as determined by Digital Elevation Model analysis).

Note that this target does not include all small tributaries – the biodiversity health or protection of these small perennial or ephemeral tributaries is not a goal in and of itself, but obviously it is important to maintaining, improving, or even assessing the health of the target as defined.

These three watersheds drain into the upper Potomac River and are within the Chesapeake Bay watershed. They capture two different aquatic system types and all three of these size 2 streams are targets identified in the **Chesapeake Bay Freshwater Ecoregional** portfolio, outlining species and habitats in need of protection for the entire Chesapeake Bay.

Nested targets within the stream systems are:

- Harperella (*Ptilimnium nodosum*)
- White Mountain tiger beetle (*Cicindela ancocisconensis*) (G3, S1 in MD)
- Odonate assemblage
- Fish assemblage
- Wood turtle habitat

Harperella is found only in Sideling Hill and Fifteenmile creeks, with by far the larger population in the former. This species is globally rare, with a rank of G2. It is a target in TNC’s Central Appalachians Ecoregional plan. This plan encompasses the area including the Blue Ridge Mountains, Great Valley, Ridge and Valley, and Allegheny Mountains and includes plants, animals, and natural communities that represent TNC’s most urgent conservation priorities, including the protection of 467 sites. Of these, 122 are immediate priorities.

Native Mussel Assemblage

This target is defined as all native mussel populations (rare and common species, listed below) in Sideling Hill Creek. There are nine species of mussels currently known from Sideling Hill Creek, including four globally rare species, and two that are targets in the Central Appalachians Ecoregional plan.

Common Name	Scientific Name	Global Rank	State Rank (MD/PA)
green floater*	<i>Lasmigona subviridis</i> *	G3	S1/S1
brook floater*	<i>Alasmidonta varicose</i> *	G3	S1/S1
Atlantic spike	<i>Elliptio producta</i>	G3Q	N/S2
triangle floater	<i>Alasmidonta undulata</i>	G5	S2/S3S4
northern lance	<i>Elliptio producta</i>	G4	S1/S2
eastern elliptio	<i>Elliptio complanata</i>	G5	S5/S5
yellow lampmussel	<i>Lampsilis cariosa</i>	G3-G4	S1/S3-S4
creeper	<i>Strophitus undulates</i>	G5	S4/S4

*Ecoregional target species, Sideling Hill Creek occurrence is “tagged” element occurrence

Plain pocketbook (*Lampsilis cardium*) is also present in Sideling Hill Creek, but is not considered part of this target, because it is an Ohio River basin species that was introduced to the Potomac drainage back in the early 1900s. It is not invasive, just not native. The bass host fish species is also not native (source: Charles Bier).

It is unknown at this time how important restoration of mussels in Town Creek might be to range-wide status of rare or uncommon species. There are also unanswered questions about how suitable current conditions in Town Creek might be to mussel re-establishment, although there was general optimism

expressed among the project team and from Dan Feller of MD DNR about the state of knowledge for mussel reintroduction.

The mussels are designated as a target separate from the stream system target because they may likely have lower viability than the stream system.

Mixed Oak Forests

This target is defined as the mosaic of native forest types that occupy the landscape across the project area.

Forest type maps from remotely sensed data and forest monitoring plots in Green Ridge State Forest show current forest types for a portion of the project area. Likely or potential component community types are enumerated and described in the Allegheny Forests Project Site Conservation Plan, first iteration dated September 2003.

Both the Green Ridge Matrix Forest Block and the Buchanan Matrix Forest Block outlined in TNC's Central Appalachian Forest Ecoregional Plan have been selected for conservation action under this plan. Forest blocks are areas of connected intact forest, usually of higher quality, that serve as important habitat and corridors for wildlife. The boundary of the Green Ridge Block is slightly modified from the boundary identified in the 2001 Central Appalachian Forest Ecoregional Plan, and the core area boundary was created by TNC MD staff through analysis. The Buchanan Boundary is shown as identified in the Ecoregional plan. Work currently underway by WPC and PA TNC is re-evaluating forest blocks in Pennsylvania, and may result in modification of the Buchanan block.

Nested targets:

- northern metalmark
- southern grizzled skipper

Shale Barrens

This target is defined as occurrences of shale barrens throughout the project area. Shale barrens have been mapped in both MD and PA, with MD data being more complete and PA data reflecting many of the very best known shale barrens examples.

Shale barrens are designated as a target separate from forests, because of their importance as an element of diversity in the area, because they are subject to different threats than forest targets, and because their viability may be different than forests.

Single Species Targets

Paxistima canbii (Canby's Mountain Lover)

This is a single species target. This G2 ecoregional target species occurs at one site in the Maryland portion of the Town Creek watershed, and this occurrence is a tagged EO in the ecoregional plan. It is designated as a separate target because it is a G2 species with only one occurrence that could be threatened/lost even if forest matrix is protected.

Neotoma magister (Allegheny Woodrat)

This is a single species target. It is designated as a separate target because it has threats and viability that do not necessarily track with the Mixed Oak Forest target.

Step 3: Assess Viability of Focal Targets

Through December 2005 and April 2006 workshops, the project team identified at least one Key Ecological Attribute (KEA) for each of the project's six Focal Targets. These are characteristics of the targets that can be used to gauge the health of the targets, such as macroinvertebrate assemblage to assess the health of perennial streams (see spreadsheet at the end of this Appendix). Most of these KEAs are in very rough draft form, and very few have well-defined indicators and indicator rankings. We do not intend to implement all of these draft KEAs in our monitoring plan at this time. Over the next year, the Core Implementation team will work with other project team members to "operationalize" the KEAs selected for inclusion in current monitoring. We will improve other draft KEAs as/if they are incorporated into a revised or expanded monitoring plan in future versions of the Allegany Forests CAP plan.

Step 4: Identify Critical Threats

At December 2005 and April 2006 workshops, the project team identified and ranked direct threats to focal targets. Diagrams were created to visually model the relationships of these threats to the focal targets. A description of these threats is given under Step 5 and a diagram illustrating these relationships can be found at the end of this Appendix.

Step 5: Conduct Situational Analysis

Situation diagrams were created that articulate and visually model a shared understanding of the relationships among direct threats, focal targets, and the factors that drive or influence the direct threats.

A pilot version of a new software tool, e-Adaptive Management (or eAM), was used to record threat rankings. Overall degree of threat was based on a score of "very high," "high," "medium," or "low" for each of the three categories—scope, severity, and irreversibility.

Scope – Most commonly defined spatially as the geographic scope of impact on the conservation target at the site that can reasonably be expected within 10 years under current circumstances (i.e., given the continuation of the existing situation).

- 4 - **Very High:** The threat is likely to be very widespread or pervasive in its scope, and affect the conservation target throughout the target's occurrences at the site.
- 3 - **High:** The threat is likely to be widespread in its scope, and affect the conservation target at many of its locations at the site.
- 2 - **Medium:** The threat is likely to be localized in its scope, and affect the conservation target at some of the target's locations at the site.
- 1 - **Low:** The threat is likely to be very localized in its scope, and affect the conservation target at a limited portion of the target's location at the site.

Severity – The level of damage to the conservation target that can reasonably be expected within 10 years under current circumstances (i.e., given the continuation of the existing situation).

- 4 - **Very High:** The threat is likely to destroy or eliminate the conservation target over some portion of the target's occurrence at the site.

- 3 - **High:** The threat is likely to seriously degrade the conservation target over some portion of the target's occurrence at the site.
- 2 - **Medium:** The threat is likely to moderately degrade the conservation target over some portion of the target's occurrence at the site.
- 1 - **Low:** The threat is likely to only slightly impair the conservation target over some portion of the target's occurrence at the site.

Irreversibility – The degree to which the effects of a source of threat can be restored.

- 4 - **Very High:** The effects of the threat are not reversible (e.g., wetlands converted to a shopping center).
- 3 - **High:** The effects of the threat are reversible, but not practically affordable (e.g., wetland converted to agriculture).
- 2 - **Medium:** The effects of the threat are reversible with a reasonable commitment of resources (e.g., ditching and draining of wetland).
- 1 - **Low:** The effects of the threat are easily reversible at relatively low cost (e.g., off-road vehicles trespassing in wetland).

Overall, the threat ranking for the Allegany Forests Project is “High.” The highest ranked threats are:

- Residential Development (high)
- New Large Developments (high)
- Road Maintenance (medium)
- Pest and Pathogens (medium)
- Invasive Plants (medium)
- Poor Forestry Practices (medium)
- Water Withdrawals (medium)

Step 6: Develop Conservation Strategies

Team members worked at both the December 2005 and April 2006 workshops to develop conservation strategies to address all of the highest-ranked threats and/or key factors that are driving these threats. Team members assigned each prospective strategy a rank of 1 – 4 for each of these criteria:

- Importance – how important is this strategy for achieving conservation success?
- Urgency – how urgent is it that we undertake these actions?
- Gap – are there others involved in this strategy, or will it not happen without our involvement?
- Cost – how expensive, in terms of time and money, is this strategy?
- Like/Ability – do we like to do this stuff? are we good at it (i.e., is it a strength of our organization and/or our current staff)?

The top strategies and the associated objectives that were selected for action by one or both of our organizations are listed below. These strategies are in various states of development.

Strategy: Work with local jurisdictions responsible for managing and maintaining local public roads.

Objective 2: Elimination of sedimentation problem spots on dirt and gravel roads in the Conservation Area.

Strategy: Implement strategies to improve our understanding of relative contribution of these sources to sediment pollution in stream systems, so we can adjust/confirm threat rankings and invest adequately/appropriately in threat abatement strategies.

Objective 3: Within three years, determine through strategic actions the approximate proportions of sediment pollution contributed by roads, agriculture, forestry activities, and development.

Strategy: Implement strategies to become more involved in local land-use decision-making, supporting programs, plans, and ordinances that coincide with conservation objectives.

Objective 4: Work with local communities to ensure that land-use/zoning ordinances that identify and protect critical sites for riparian habitat and water quality/quantity protection are adopted, and institutions are in place to enforce them in relevant PA townships (Mann, Monroe, Southampton) and MD counties (Allegany, Washington).

Strategy: Implement strategies to directly protect riparian and matrix forestland.

Objective 5a: By 2010, identify and legally protect target acreage of riparian forestland vulnerable to conversion/development.

Objective 5b: By 2010, identify and legally protect target acreage of matrix forestland vulnerable to conversion/development.

Strategy: Provide free forest planning and management services to private forest landowners within our targeted areas.

Objective: Ensure that a target number of acres of private forest lands are under management plans done through our program within three years.

Strategy: Get involved in public land management.

Objective: Within three years, work with state land managers to develop, adopt, and begin to implement management plans that achieve conservation goals to protect identified core forest blocks and buffers.

Step 7: Measures

At an April 2006 workshop, a short list of measures of strategy effectiveness were developed, and ranked using these three criteria:

- return – how much would this information contribute to our work?
- feasibility – can we do it?
- cost – how much does it cost, in terms of time and money?

The selection of 13 measures were identified to be implemented in the next one to three years. They are:

1. % change natural flow – IHA
2. Benthic Index of Biological Integrity (using MD Biological Stream Survey data)
3. % forested buffer (Riparian Zone)
4. % impervious surface in subwatersheds
5. % natural cover within 10 km buffer of forest core, matrix block
6. % forest cover in block in various seral stages
7. % forest cover in block
8. Disturbance of Canby's Mountain Lover sites

Three Sisters Watershed Conservation Plan

9. Presence of Canby's Mountain Lover at previous known sites
10. % of protected land in core forest matrix areas and in each watershed
11. Protection status known *Paxistima*, Allegheny woodrat sites
12. Degree of support from local governments for natural resources protection
13. Road quality scoring system for identifying priority roads – critical sites over 50

Assessment of Target Viability: Allegany Forests Project

Conservation Target Enter # of Target	Category	Key Attribute	Indicator	Poor	Fair	Good	Very Good	
1	Mixed Oak Forests	Landscape Context	Landscape pattern & structure (buffering forested landscape)	Percent natural cover within 10k buffer width	0-50%	50-70%	70-90%	>90%
1	Mixed Oak Forests	Condition	Landscape successional dynamics	Proportion of forested block in various seral stages	<15% acreage of matrix block in LSOG stage	15-25% acreage of matrix block in LSOG stage	25-40% <i>acreage of matrix block in LSOG stage</i>	>40% acreage of matrix block in LSOG stage
1	Mixed Oak Forests	Condition	Population structure & recruitment	Adequate understory regeneration of appropriate LSOG tree species for stands in late-MS and LSOG successional stages (live tree density(BA) - #trees(BA)>=4" dbh/acre)	<80 (6)	80-160 (6-12)	160-370 (12-17)	>370 (17+)
1	Mixed Oak Forests	Condition	Successional dynamics (stand level)	Number of cohorts and/or presence of uneven-aged vertical structure within late-MS and LSOG stands	1	2	3	4+
1	Mixed Oak Forests	Condition	Woody Debris	BA of standing snags within late-MS and LSOG stands				
1	Mixed Oak Forests	Condition	Woody Debris	Volume of downed woody debris, > 3 inches in diameter within late-MS and LSOG stands				

Assessment of Target Viability: Allegany Forests Project (continued)

Conservation Target Enter # of Target	Category	Key Attribute	Indicator	Poor	Fair	Good	Very Good	
1	Mixed Oak Forests	Size	Forest Matrix Area	Acres composing block	< 30,000 acres	30,000-45,000 acres	45,000 - 65,000 acres	> 65,000 acres
2	Perennial Streams (incl Riparian Zone)	Landscape Context	Forest cover in the riparian zone	% of riparian zone in "natural" forest riparian cover for watershed	70%		> 80%	90-100%
2	Perennial Streams (incl Riparian Zone)	Landscape Context	Hydrological flow regime at USGS stations and other areas at low?	% of change of natural flow (flashiness)	TBD	TBD	TBD	TBD
2	Perennial Streams (incl Riparian Zone)	Landscape Context	Linear connectivity	Percentage of total connected miles in mainstem of stream and lower major tributaries during wet periods		< 80%	> 80% ?	> 95%
2	Perennial Streams (incl Riparian Zone)	Landscape Context	Macroinvertebrate assemblage	BIBI (Benthic Index of Biotic Integrity)	1.0 - 1.9	2.0 - 2.9	3.0 - 3.9	4.0 - 5.0
2	Perennial Streams (incl Riparian Zone)	Landscape Context	Sedimentation	Embeddness (%) based on EPA standards				
2	Perennial Streams (incl Riparian Zone)	Landscape Context	Water physical chemistry regime	Nitrate; Total P under spring baseflow conditions			N at <.5 mg/l, P < .05 mg/l	
2	Perennial Streams (incl Riparian Zone)	Condition	Fish assemblage	FIBI (Fish Index of Biotic Integrity)	1.0 - 1.9	2.0 - 2.9	3.0 - 3.9	4.0 - 5.0
2	Perennial Streams (incl Riparian Zone)	Condition	Invasive plants in herb and shrub layer	% of riparian zone impaired by invasive plants; Plant indicators	lots	some	few	none

Assessment of Target Viability: Allegany Forests Project (continued)

Conservation Target Enter # of Target	Category	Key Attribute	Indicator	Poor	Fair	Good	Very Good	
2	Perennial Streams (incl Riparian Zone)	Condition	Normal Stream Processes	Woody debris	0 - 5%	5-10%	10-20%	20%+
2	Perennial Streams (incl Riparian Zone)	Condition	Percent forest cover	Percent impervious surface			<5%	
2	Perennial Streams (incl Riparian Zone)	Condition	Size and distribution of tiger beetle population	Number of beetles and distribution (number of patches)			Sideling Hill Creek 2003 level "A Rank" (according to Heritage data)	
2	Perennial Streams (incl Riparian Zone)	Condition	Structure of forest community	Age Class; Seedling recruitment; woody debris				
3	Native Mussel Assemblage	Condition	Presence of host fish	Presence of x, y, z species	fish absent		fish present	co-occur throughout
3	Native Mussel Assemblage	Size	Population size, distribution, and structure	Number of beds with rare species, density in beds of rare species			=baseline	
3	Native Mussel Assemblage	Size	Population size, distribution, and structure	Recruitment rare species			juveniles present	
4	Shale Barrens	Landscape Context	Connectivity among communities & ecosystems	GIS metric of connectivity and fragmentation				

Assessment of Target Viability: Allegany Forests Project (continued)

Conservation Target Enter # of Target	Category	Key Attribute	Indicator	Poor	Fair	Good	Very Good	
4	Shale Barrens	Landscape Context	Forest buffer	Depth of the forest buffer	< 50 meters	50 - 100 meters	100 meters	> 100 meters or to the top of the watershed (whichever is greatest)
4	Shale Barrens	Landscape Context	Linkage to the stream	Degree of disturbance	Heavy disturbance	Moderate disturbance	Little disturbance	No disturbance
4	Shale Barrens	Condition	Presence of select invasive species	Percent cover of selected invasive species	increasing	not changing	decreasing	
4	Shale Barrens	Size	Individual patch size of shale barrens/woodlands	GIS metric of connectivity and fragmentation				
4	Shale Barrens	Size	Overall size of the shale barrens and woodlands complex	Area of complex		Loss	No net loss	Increase in area
7	Paxistima canbii (Canby's Mountain Lover)	Size	Population presence, size	Disturbance to site			no new disturbance to site	
7	Paxistima canbii (Canby's Mountain Lover)	Size	Population presence, size	Species present at previously known locations			present, approximately same extent and numbers (order of magnitude estimate) as in previous years	

Assessment of Target Viability: Allegany Forests Project (continued)

Conservation Target Enter # of Target	Category	Key Attribute	Indicator	Poor	Fair	Good	Very Good
8	Neotoma magister (Allegheny woodrat)	Size	Population size & dynamics	Number of individuals			

Full Situation Analysis Model With Objectives

