

*Design and
Management
Handbook for
Preservation Areas*

*in
Lower Merion Township
Montgomery County, Pennsylvania*

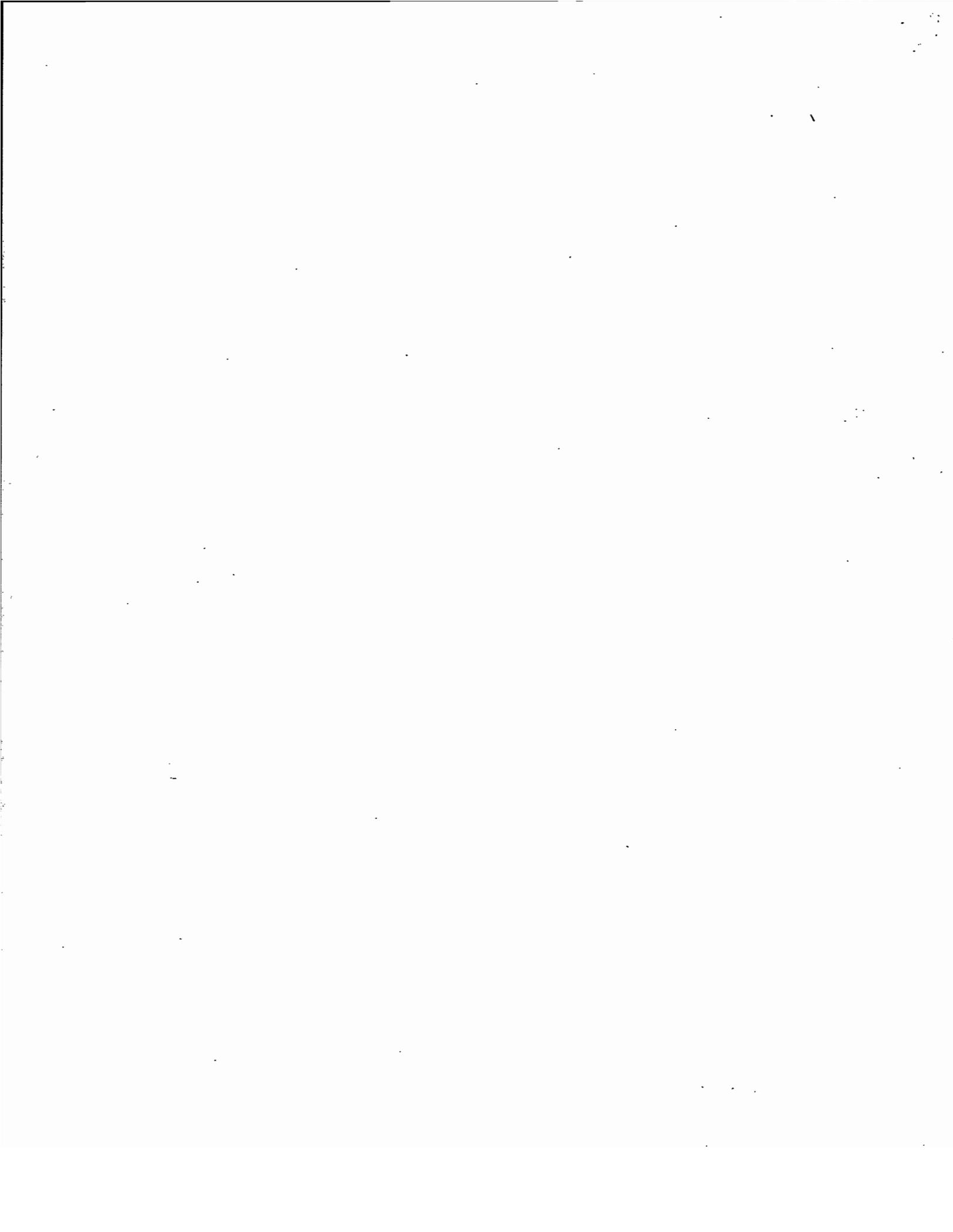
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Chapter 1

Introduction

In 1990, Lower Merion Township passed its Open Space Preservation District Ordinance requiring creation of open space, or Preservation Areas, on every new development over five acres in size in the Township. In order that these areas be properly managed into the future, the ordinance required the preparation and submission of Maintenance and Operation plans. Since the passage of the ordinance a number of such plans have passed through the township approval process. As a result of this experience, the Township decided to clarify the requirement by preparing model Maintenance and Operation documents as an example of what the township expects in these submissions.

Early in 1993, the Natural Lands Trust was retained to prepare these model documents. The Trust had previously reviewed several plans prepared under the Open Space Preservation District Ordinance. In addition, as a result of decades of experience in designing conservation projects the Trust recognized that while developers were making an honest attempt to design projects according to the ordinance, the purpose of conservation was often not being met due to confusion over the best way to achieve conservation goals. In addition, the Trust recognized that some long term mechanisms were needed for monitoring Preservation Areas to ensure that they were, indeed, protected as originally intended.

As the Trust began the project in late winter of 1993, it conducted interviews with a number of parties active in the development process. These interviews reinforced the need for model documents and clarification of design guidelines. It also raised other issues. Looming large among these were the problems that were being encountered during the construction process, namely encroachments on Preservation Areas that were damaging the very resource which was supposed to be protected.

This handbook is therefore intended to meet the following objectives:

1. Guide developers and their consultants in the design of Preservation Areas.
2. Set forth a common format and contents for preparation of Maintenance and Operation documents.
3. Provide guidance in setting management goals and objectives for different types of resources found in Preservation Areas.
4. Give detailed and specific means for restoration and maintenance of resources.
5. Suggest a method for monitoring of Preservation Areas both during construction and over the long term.

Chapter 2

Format for Maintenance & Operation Documents

Maintenance and Operation Documents shall be prepared in the form of an 8¹/₂" by 11" written report according to the following outline:

Section 1.0 Executive Summary

A brief summary of the contents of the report focusing on how the existing resource shall be restored and maintained.

Section 2.0 Description of Existing Conditions

A succinct description of resources and site history of the overall site with emphasis on the Preservation Area. *All* resources should be discussed - natural, cultural/historical, scenic and other resources that may be present. Discussion of natural resources should list species found on the site and the overall condition and health of the natural system. Discussion of cultural and historic resources should include the significance or importance of the resource and its physical condition. Other resources should be similarly described and their relative health, condition or significance assessed. Site resources should be discussed with regard to their larger context and the potential to help protect the larger resource by action on a particular site.

Section 3.0 Goals and Objectives for the Preservation Area

List the overall, general goals and specific, measurable objectives to be achieved in the Preservation Area. An example of a goal for a wooded Preservation Area would be to "Maintain the existing healthy forest and restore degraded wooded areas to a healthy condition." An objective might include "Remove all invasive vines in the overstory and 90% of the invasive plants in the understory over a five year period."

Section 4.0 Proposed Restoration Measures

This section will describe the actions, budget and schedule for restoring the resource to a healthy and/or stable condition in accordance with the goals and objectives described in Section 3.0. In the case of a structure this might include physical repair of roofs, walls, etc. In the case of a natural system, such as a woodland, it may include removal of invasive plant and new plantings of native species.

Section 5.0 Maintenance and Operation Plan

A description of the plans for annual maintenance and operation of the Preservation Area specifically describing mowing schedules, invasive plant removal measures, structure upkeep, and other relevant activities.

Chapter 3

Design of Preservation Areas and Conservation Easements

The following guidelines are an attempt to set forward a few general rules that will result in the design of better, more effective Preservation Areas (PA) and will equally apply to the design of conservation easements used to protect PA's.

Guideline 1. Preservation Areas should include the most sensitive resource areas of a property.

Guideline 2. Preservation Areas should be designed as one, large block of land with logical, straightforward boundaries.

Corollary 2.1 - The Preservation Area should cover as few ownerships as possible to limit the difficulty and complexity of future monitoring and enforcement, preferably just **one parcel per project**. If more than one ownership is absolutely unavoidable, then the PA should be configured so that one parcel contains all the sensitive natural area that is present, both to avoid fragmenting the natural system and to ease the burden of monitoring and enforcement.

Corollary 2.2 - Long, thin strips of land should be avoided as PA's unless they are necessary to connect other significant areas or are designed to protect a linear resource that cannot otherwise be protected, e.g., a stream or trail.

Corollary 2.3 - Under no circumstances should PA's extend into small corners of individual lots.

Corollary 2.4 - The boundaries of PA's should be designed to be as simple and short as possible, so they can easily be found in the field and enforced. Where possible, natural boundaries or existing features of the land should be used.

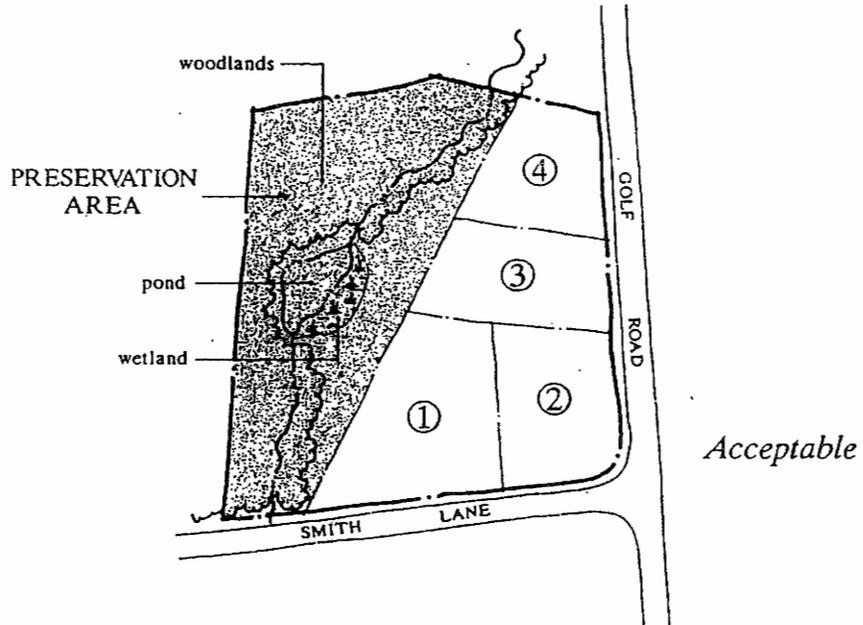
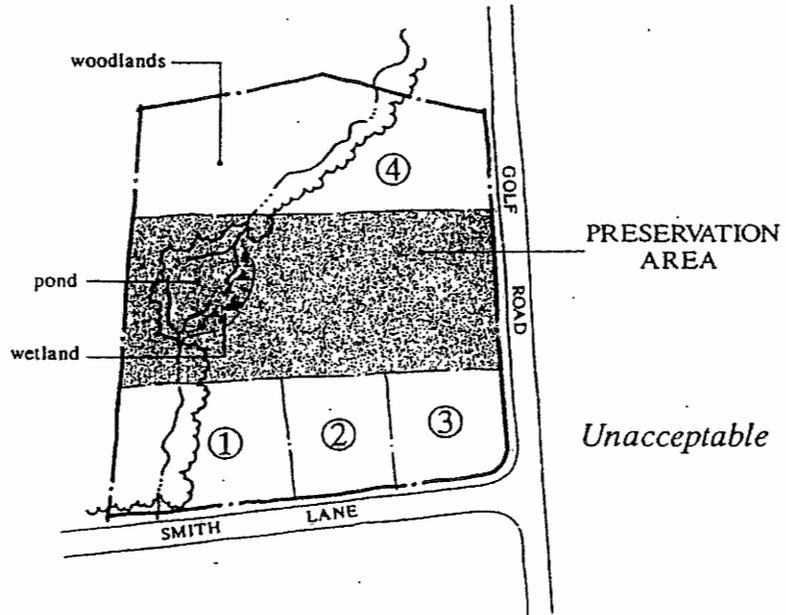
Guideline 3. The PA should be designed as part of a larger continuous and integrated open space system.

Corollary 3.1 - The PA should be contiguous to other protected areas on adjoining lands.

Corollary 3.2 - Where this is not possible, some connection to the other protected areas should be made.

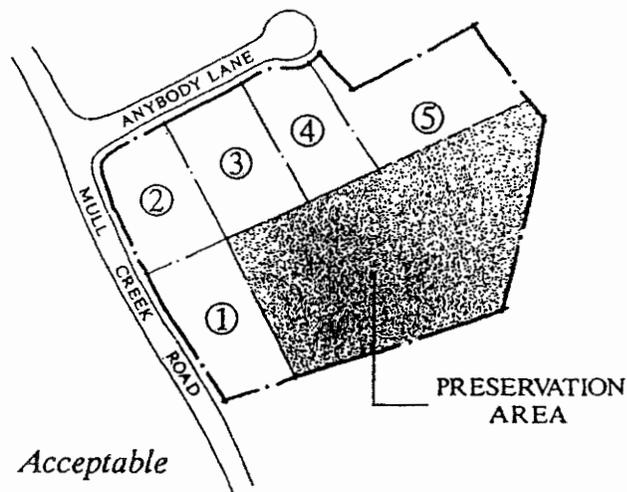
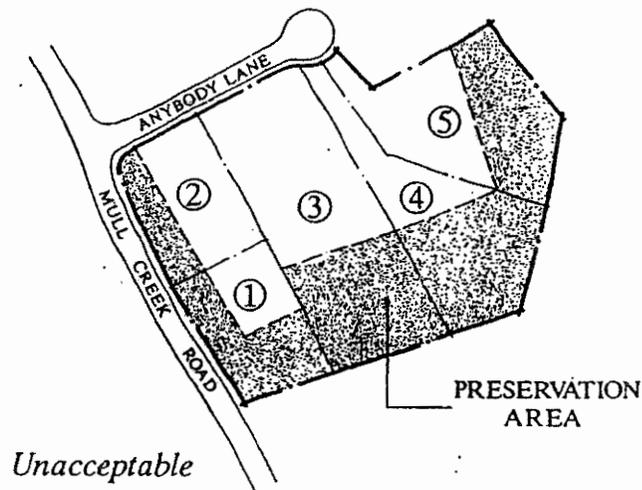
Guideline No. 1

Preservation Areas should include the most sensitive resource areas of the property.



Guideline No. 2

Preservation Areas should be designed as one, large block of land with logical, straightforward boundaries.

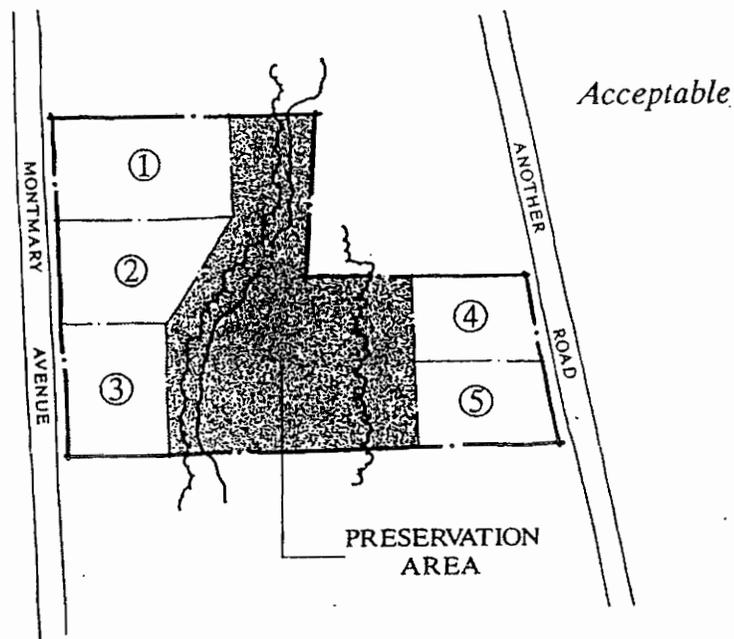
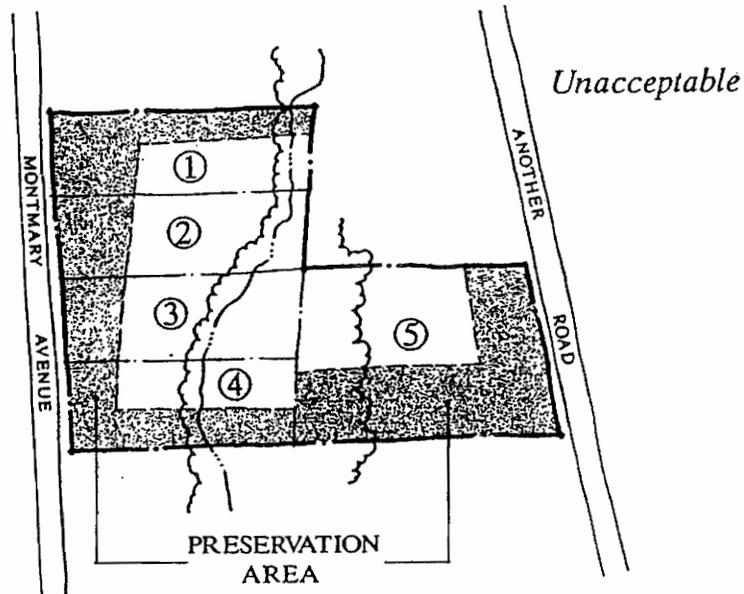


Corollary 2.1

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Preservation Areas should be designed as one, large block of land with logical, straightforward boundaries.

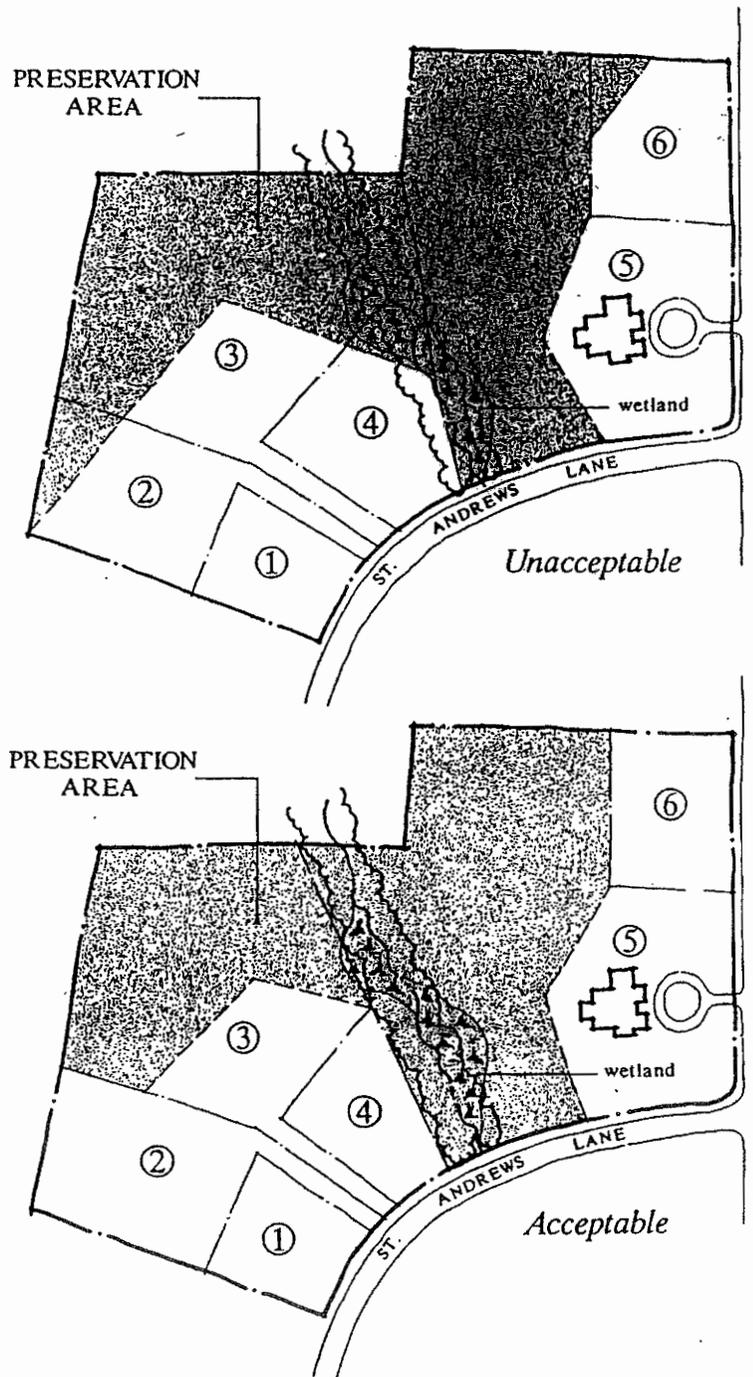


Corollary 2.2

Long, thin strips of land should be avoided as Preservation Areas unless they connect other significant areas or are designed to protect a linear resource that cannot otherwise be protected, e.g., a stream or trail.

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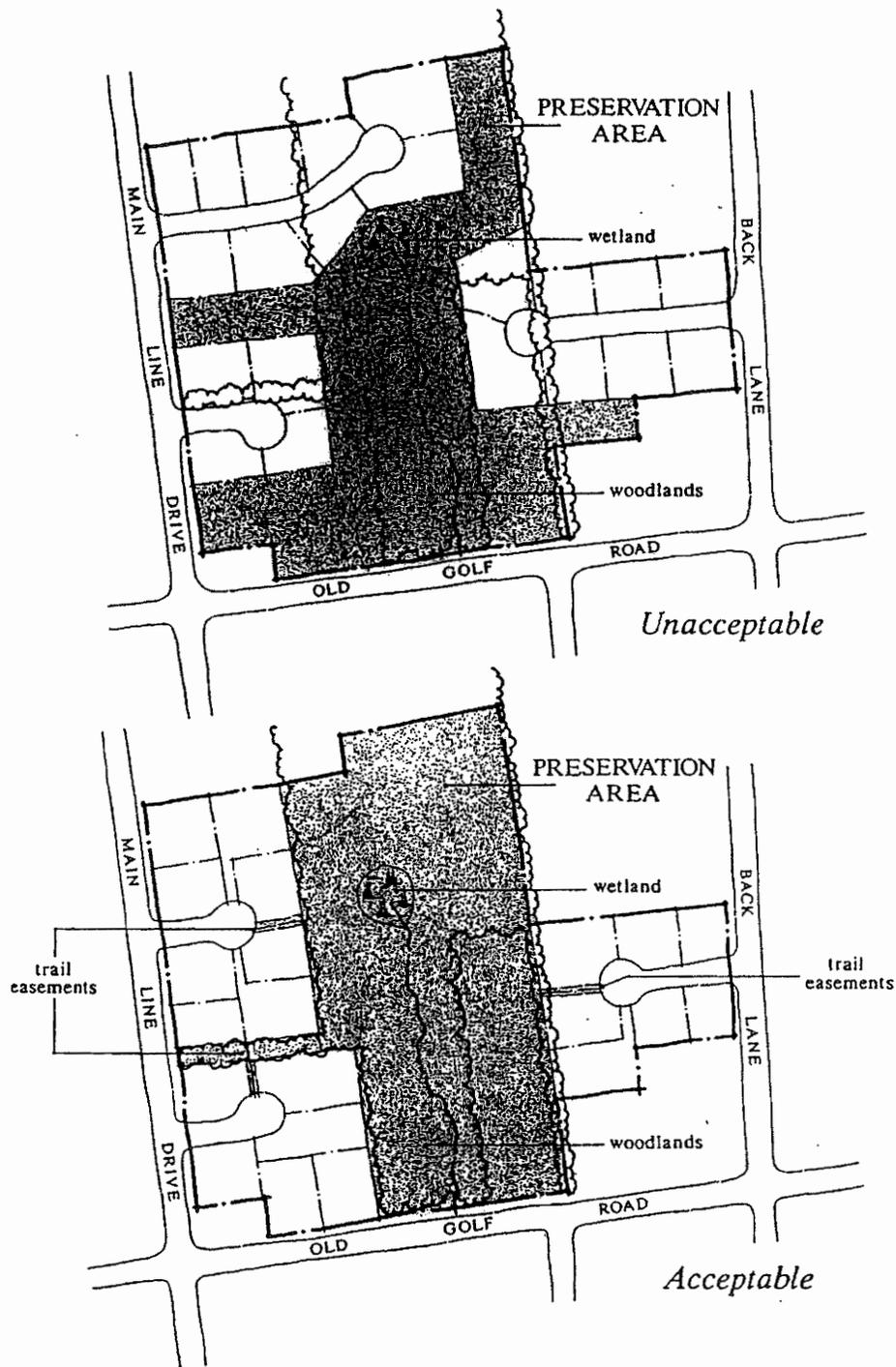


Corollary 2.3

Under no circumstances should Preservation Areas extend into small corners of lots.

Guideline No. 2

Preservation Areas should be designed as one, large block of land with logical, straightforward boundaries.

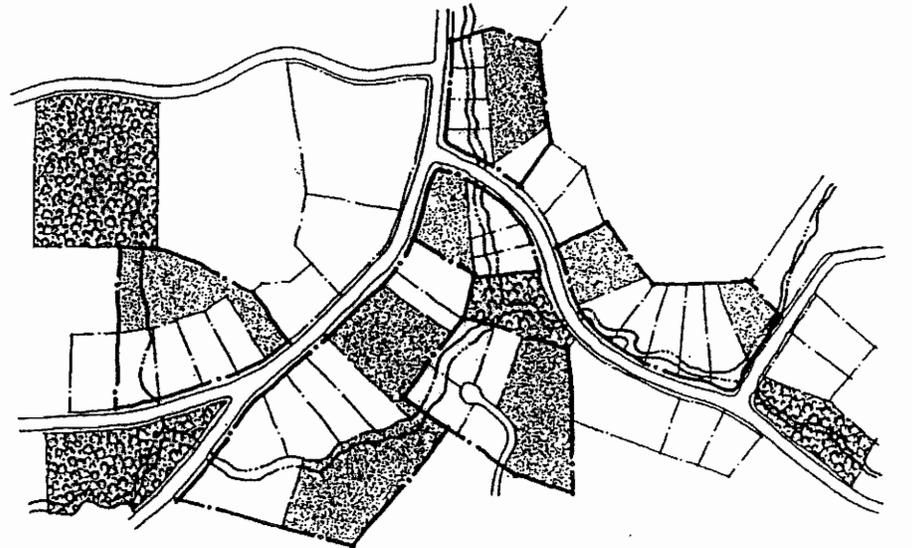


Corollary 2.4

The boundaries of Preservation Areas should be designed to be as simple and short as possible, so they can easily be found in the field and enforced. Where possible, natural boundaries or existing features of the land should be used.

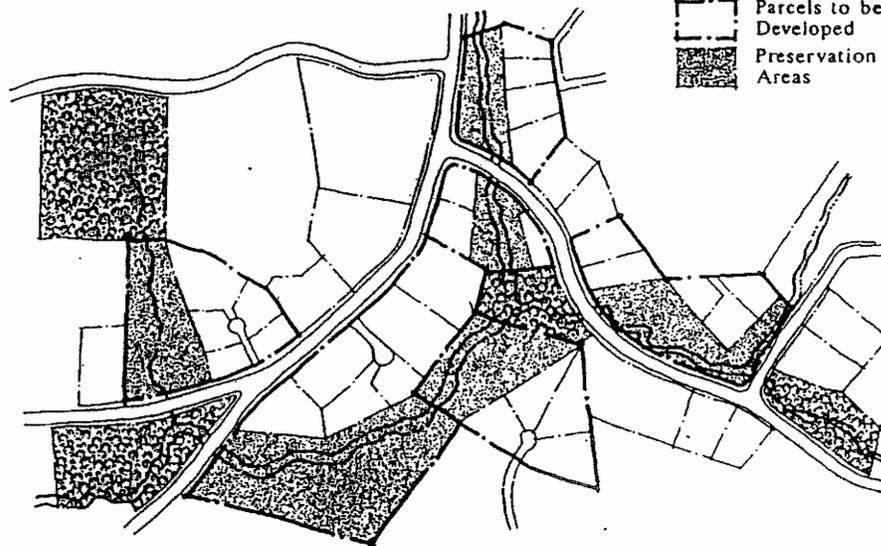
Guideline No. 3

The Preservation Area should be designed as part of a larger continuous and integrated open space system.



Unacceptable

-  Existing Protected Lands
-  Parcels to be Developed
-  Preservation Areas



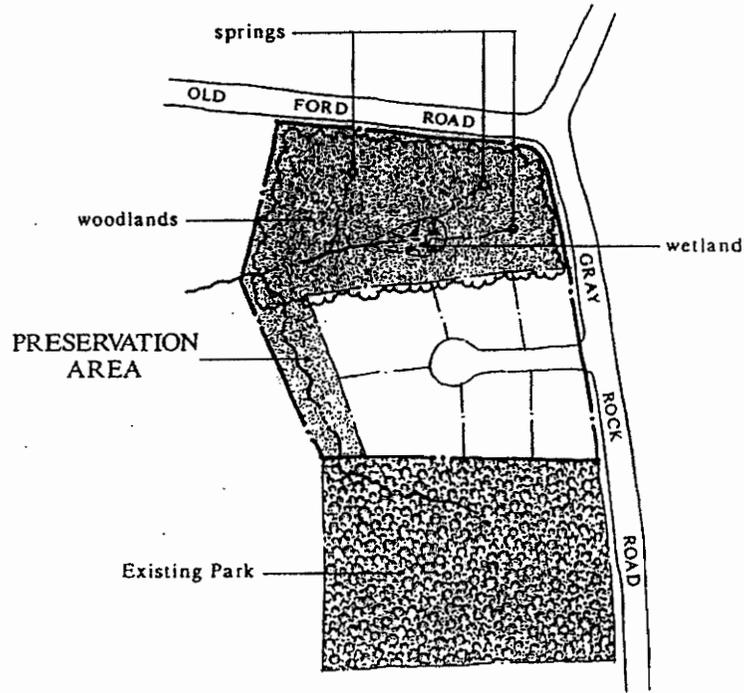
Acceptable

Corollary 3.1

The Preservation Area should be contiguous to other protected areas on adjoining lands.

Guideline No. 3

The Preservation Area should be designed as part of a larger continuous and integrated open space system.



Corollary 3.2

Where this is not possible, some connection to the other protected areas should be made.

Chapter 4

Ownership and Easement Options

One of the most important aspects of structuring a project under the Open Space Preservation District Ordinance concerns the legal and ownership mechanisms for ensuring long term protection of Preservation Areas. There are generally four options for ownership of Preservation Areas:

- (1) individual ownership on residential lots,
- (2) common ownership through a Homeowners or Condominium Association (HOA),
- (3) nonprofit conservation ownership, probably a land trust, or
- (4) public ownership through Lower Merion Township.

In addition, the land owned by any one of these entities must be further protected in a "belts and suspenders" approach of placing it under conservation easement, or at a minimum, placing deed restrictions on the land. In the case of an easement given to a land trust, most trusts will require the donation of an easement endowment to cover long term monitoring and enforcement costs. A Homeowners Association or the Township could also hold an easement. As shown in the following matrix, there are eight possible combinations for ownership and easement protection of a Preservation Area.

		Easement Holder		
		HOA	Land Trust	Township
Owner	Individual	●●●	●●●	●●●
	HOA		●●●	●●●
	Land Trust		●●●	●●●
	Township		●●●	

Each option will be discussed below.

Individual Ownership

The Open Space Preservation District Ordinance permits Preservation Areas to be within individual lots so long as adequate protection is present in the form of a conservation easement or adequate deed restrictions. This is the optimal approach when the resources being protected within the PA are of limited importance, particularly when the PA consists of lawn and landscaped areas. In this situation, a

deed restriction is probably adequate legal protection for the PA. However if there is a more significant resource on an individual lot or if the PA is part of an integrated, contiguous system of open space, such as that which Lower Merion Township plans to create along Mill Creek, a conservation easement should go to a land trust or the township in order to strengthen the likelihood of long term protection of that resource. An easement could also go to the HOA if neither a land trust nor the township were interested.

Common Ownership

Condominium and Homeowners Associations (HOAs) can also own PA's. This makes a great deal of sense when there are common features such as recreational areas that benefit all members of the community or when some strong environmental feature is present, such as a stream corridor, and no public or nonprofit entity is interested in ownership. If there is a natural resource of note within the PA, an easement should be given to a land trust or the township.

Nonprofit Ownership

A nonprofit conservation organization, such as the Natural Lands Trust or Brandywine Conservancy, represents an alternative to individual, association or municipal ownership. Of all the possible owners a land trust is likely to be the most sensitive to stewardship of the ecological resource, i.e., the health of the forest, bird populations, etc. Land trust ownership would also relieve the individual owner or HOA of the long term obligations of ownership. However given those obligations a land trust will only be interested in ownership if the land concerned has special ecological or cultural importance and if arrangements can be made to ensure there are adequate funds to pay taxes, insurance and normal operating expenses over the long term. A gift of the PA to a land trust may, in some cases, yield tax benefits to the donor in the form of charitable contributions. If a land trust were to be the owner, a conservation easement should be granted to another land trust or the township.

Public Ownership

To the extent that a proposed PA is within or adjacent to an existing or proposed township park the municipality is also a potential owner. This would also be the case if the property in question represents a special opportunity for a new township park. The township offers two major benefits as a landowner - it already has an established administrative structure for managing park lands, and it is fully capable of operating a recreation program, if that were appropriate. If the township were to be the owner, the only realistic easement holder would be a nonprofit conservation organization.

Mixed Ownership

In some projects that have been submitted to date, a mixed ownership arrangement has been proposed. As a rule, this is not desirable as it greatly complicates the long term task of management of the PA and enforcement of PA maintenance

requirements. However, in a situation where there are two or more noncontiguous PA areas with different resources, such as a wooded stream corridor in one location and a lawn area in another, it may make sense to put the high resource area into common, nonprofit or municipal ownership and the lawn area in individual ownership. This must be judged on a case-by-case basis.

Contiguous Open Space Parcels

When adjoining properties are developed with Preservation Areas, it becomes particularly important to correlate the plans and ownership structures to achieve as much integration of open space and its management as possible. This would be particularly important along linear resource area like streams. Every effort should be made to ensure that the same or similar entities own and/or hold easements on adjoining PA's.

Chapter 5

Stewardship Matrix & Guidelines

5.1 Introduction

The stewardship matrix and accompanying management guidelines are designed to provide direction for the development of Preservation Area (PA) management plans. Under the heading Existing Resource Type are listed the various resource types that can be found within Lower Merion Township. In association with each resource type are listed management options which are viewed as preferable relative to current Township regulations and the Open Space Preservation District Ordinance. An overview and general management guidelines for each preferred option are provided under the referenced section.

The existing resource types are broadly divided into wooded and open areas. Some are further segregated into healthy and degraded. For the purpose of this guide the term "healthy" refers to a resource that has not been degraded by human or natural factors. The most common and obvious sign of degradation within the Township will be the presence of exotic, invasive vegetation. Others include soil erosion, dumping, and a lack of plant regeneration.

Stewardship Matrix

Existing Resource Type	Available Options				
	Preserve As Is	Restore to Healthy State	Convert to Woodland	Convert to Meadow	Convert to Lawn
Wooded Areas					
Native Woodland - Healthy	Section 1				
Native Woodland - Degraded		Section 2a		Section 2b	Section 2c
Hedgerow - Healthy	Section 1				
Hedgerow - Degraded		Section 2a		Section 2b	Section 2c
Open Areas					
Meadow - Healthy	Section 3a		Section 3b		
Meadow - Degraded		Section 4a	Section 4b		Section 4c
Pasture - Healthy	Section 5a		Section 5b	Section 5c	Section 5d
Pasture - Degraded		Section 6a	Section 6b	Section 6c	Section 6d
Old Field/Shrub			Section 7a	Section 7b	Section 7c
Lawn/Landscaped Areas	Section 8a		Section 8b	Section 8c	
Formal Gardens	Section 9a	Section 9b	Section 9c	Section 9d	Section 9e
Wetlands	Section 10a	Section 10b	Section 10c	Section 10d	
Pond	Section 11a	Section 11b	Section 11c	Section 11d	Section 11e
Stream Corridors	depends on existing vegetative cover, maintain as forest or meadow - see Section 12				
Historic Resources	Section 13a	Section 13b			

This handbook cannot anticipate the presence of every possible resource. On particular properties, special resources not covered here, such as a champion tree or a community trail, may be present. In these situations, common sense should prevail and every effort should be made to protect this resource.

The determination of which option is best for a given Preservation Area will be influenced by numerous considerations. These include site conditions, existing resources on adjacent properties, the historical use of the site, the amount of financial commitment that can be given to the management of the Preservation Area, and the need to make the property functional and aesthetically pleasing for the property owner. All factors must be weighed in determining which avenue to pursue. In the case of Preservation Areas which require fairly severe and expensive restorative measures, the best approach may be to plan for a slow, long term restoration that spreads the cost over many years. In this situation, the cost of restoration is likely to be similar or less than that for maintenance of a lawn or formal landscape. It is the Township's intention that the approved management plan for each Preservation Area will be a practical compromise between protecting the environmental, ecological, and historical resources of the property and providing recreational opportunities for the current and future property owners.

To illustrate this point, consider the options for addressing a degraded hedgerow. There are three preferable options available - restoration, conversion to meadow, or conversion to lawn. If the hedgerow is not heavily impacted by invasive plants, serves as a screen, wildlife corridor, or protects a stream, it would be best to restore it. However, if the hedgerow is severely degraded by exotic vegetation to the degree that it is unsightly, would be exorbitantly expensive to restore, and provides no essential environmental or ecological benefits, then it might be best to convert it to meadow or lawn, or remove it and replant it with appropriate species. There will, of course be many real-life situations that fall between these two examples.

In general it is best to fit the desired resource to site conditions so that management costs are minimized and the resource can be fully utilized. Maintaining lawn is one of the most costly land management goals for a suburban property. Minimizing the amount of wet and steep areas (areas often not usable for recreation) that remain in lawn will not only save money but, through conversion to meadow or woodland, will substantially increase the environmental and ecological benefits of the site. Below is a list of additional rules that should be followed while developing the PA management plan.

1. Minimize the creation of additional edge; reduce edge if possible.
2. Plant native species that are adapted to site conditions.
3. Protect stream corridors by buffering with woodland or meadow.
4. Utilize future lawn or meadow as construction staging areas. Avoid using established woodlands or meadows as construction staging areas.
5. Prepare plans in accordance with known financial resources so that the desired management option(s) can be properly established and maintained.

5.2 Stewardship Guidelines

Section 1: Healthy Native Woodland and Hedgerows

Overview

There are undoubtedly few wooded areas in Lower Merion Township that remain in an ecologically healthy condition. To qualify as such would require the site to be well-stocked with native trees relative to its age and site conditions, be free of exotic invasive plants, and not be adversely impacted by deer browse. This could include a variety of "looks", from a dense stand of young tuliptree that has reclaimed an old field to a steep hillside dominated by a relatively open beech forest. A hedgerow would also qualify if it meets the criteria above. Any Preservation Area of this type would be rare and would provide important environmental (air and water purification, erosion control); ecological (habitat for native wildlife), and recreational benefits.

Management Guidelines

Preserve As Is - The preferred management option for a Preservation Area containing this resource should be to preserve it in its current condition. In order to achieve this goal every effort should be made to minimize disturbance to the area - both from natural and human sources. This would include clearing for construction or converting it to another resource. Interior trails are compatible with the resource although they should be minimized since they often act as avenues for other disturbance factors such as invasive plants and bikes. Most importantly, the site should be monitored on a regular basis for the presence of invasive vegetation, reduced levels of regeneration due to over-browsing by herbivores (particularly white-tailed deer), or changes in environmental conditions (air or water pollution) that may adversely impact existing vegetation. If any of these conditions arise within the woodland the property owners/managers should consult Section 2. Degraded Woodland and/or contact a qualified resource manager for an appropriate management solution. The Pennsylvania Bureau of Forestry (R.D. 2, Rt. 23, Pottstown, PA 469-6217) can provide you with general information on forest management and financial assistance programs, and a list of consulting foresters that you can contact for further assistance.

Section 2: Degraded Woodland and Hedgerows

Overview

The majority of woodlands and hedgerows in Lower Merion Township exist in a more or less degraded condition. This usually results from the presence of exotic invasive vegetation or a lack of advanced tree and shrub regeneration due to over-browsing by deer. Woodlands and hedgerows also are degraded by dumping and soil erosion.

The amount of degradation by invasive vegetation on any given property will vary relative to the age of the woodland, the degree of fragmentation, the availability of seed, and the aspect of the site. In general, the vitality and impact of invasive plants increases directly with available light (an exception to this rule is Norway maple, a tree that is well adapted to growing in dense shade). Consequently, woodlands usually are degraded most severely along their edges and within interior gaps. Invasive plants degrade woodlands in a number of ways. Invasive vines (Oriental bittersweet, Japanese honeysuckle, grape, porcelainberry, five-leafed akebia, tearthumb) essentially freeze ecological succession by pulling down large trees and smothering shrubs and small trees. Invasive trees (Norway maple, ailanthus) and shrubs (multiflora rose, bush honeysuckle, Russian olive) create a woodland that is much less diverse in vertical structure and wildlife food than the native woodland. The result is a decline in native species populations, particularly songbirds.

Deer are another natural disturbance that is currently degrading many woodlands because of their high number. The fragmented nature of the Township's natural areas and recent development have fostered a dramatic increase in the impact of white-tailed deer on residual woodlands. Degradation by deer is often not easily apparent since they do not affect the canopy trees that dominate the woodland. Deer degrade woodlands by over-browsing tree seedlings and shrubs which prevents the woodlands from perpetuating itself.

Secluded woodland areas are often used as dumping sites for construction and landscape debris. This is not only unsightly, but potentially can introduce toxic material (asbestos, paint cans, painted wood, solvents, chemicals) or exotic vegetation into the woodland. Trails cut for horses, bikes, or pedestrians can lead to soil erosion if overused or not run along the contour of the slope. This can eventually lead to gullying and sedimentation of nearby streams or ponds.

Management Guidelines

There are three preferred management options for degraded woodlands. Which option or options is (are) chosen will depend on the degree of degradation, site conditions, available management budget, and the environmental, ecological, and recreational benefits of the resource. In general, options 2b. and 2c. should only be considered for sites that have been severely impacted by invasive plants.

2a. Restore to Healthy State - Because of the many environmental, ecological, and recreational benefits of woodlands and hedgerows the most preferred management option is to restore the degraded resource to its original state. Use the following guidelines in developing restoration and maintenance plans for degraded woodlands and hedgerows.

- (1) Address the source of degradation as soon as possible to minimize restoration costs.
- (2) It will often require many years of treatment to successfully control invasive plants due to budgetary constraints and/or the vitality and persistence of invasive plants. Start by cutting larger vines on canopy trees and work down to tree seedlings and shrubs.
- (3) Plant woodland gaps with native trees appropriate to light and moisture conditions. Trees should be planted on 10' X 10' spacings and protected from deer damage with measures such as fencing, tree shelters, or flexible tree guards. This should continue on an as-needed basis to assure that sufficient regeneration is available to replace canopy trees as they die.
- (4) If possible remove invasive trees last (they help shade vines) by cutting and treating stumps with an appropriate herbicide. Replace with native tree species.
- (5) Heavy equipment should be used only in extreme situations. If used, protect existing trees by staying as far away as possible (at least outside of the drip line) to prevent soil compaction and trunk scarring.
- (6) Remove any trash and dispose of according to current Township and DER regulations.
- (7) Correct soil erosion by rerouting trails along the contour and/or controlling water source. Fill gullies and plant with an annual rye and/or oats and native trees and shrubs. Do not use standard conservation seed mixes- they may introduce exotic species into the woodland.
- (8) Monitor the woodlands annually and address degradation as needed.

2b. Convert to Meadow - A woodland or hedgerow sometimes becomes so degraded by invasive plants that it is better to remove part or all of it with heavy equipment. This is most obvious when the majority (>75%) of the canopy trees have been killed or drastically deformed by vines; or when Norway maple or ailanthus is the dominant species. Creating a grass and wildflower meadow is one option other than reforestation that will provide most of the environmental benefits of woodlands and help to diversify the ecological communities within the Township. Use the following guidelines in developing management plans for grass and wildflower meadows.

- (1) Prepare the area for seeding by eliminating all existing vegetation. Remove trees and shrubs manually or mechanically; use a combination of herbicide application and cultivation several times at two week intervals to eliminate existing grasses and herbaceous plants.

- (2) Use only native grass and wildflower species appropriate to site conditions. Add annual rye or oats to the seed mix to provide a quick cover for erosion control. Plant in spring or early fall. Liming and fertilization is not necessary for native species.
 - (3) Mow meadow twice a year at a height of 4"- 6" to prevent intrusion by woody vegetation or invasive vegetation. Recommended dates are mid-July and early March. Do not mow more than three times per year. Meadows should not be mowed between March 15th and July 1st, when wildlife is nesting. Maintain trails at a 6'- 8' width.
 - (4) If desired or needed, augment existing meadow species with native species appropriate to site conditions through overseeding or installation of plugs.
- 2c. Convert to Lawn - The least preferred option is to convert a highly degraded woodland or hedgerow to lawn. It may be appropriate, however, if lawn adjoins the wooded area and additional lawn is needed for recreational activities. This option is not appropriate for areas of hydric soils or steep (>15%) slopes. Use the following guidelines in developing management plans for lawn areas.
- (1) Prepare the area for seeding by eliminating all existing vegetation. Remove trees and shrubs manually or mechanically; use a combination of herbicide application and cultivation several times at two week intervals to eliminate existing grasses and herbaceous plants.
 - (2) Apply lime, fertilizer, and organic matter as prescribed by a Penn State University (or comparable laboratory) soil analysis recommendation. Soil test kits are available from the Penn State Cooperative Extension (P.O. Box 20, 1015 Rt. 113, Creamery, PA 19430-0020 or phone 215-489-3415). Seed according to Cooperative Extension recommendations.
 - (3) Maintain lawn by mowing on an as-needed basis to keep grass 3"- 5" in height.
 - (4) Herbicides and pesticides should not be applied to lawn within the PA.
 - (5) Streams and ponds should be buffered from lawn areas on each side by woodland or meadow that has a width equal to the greater of 25' or 20% of the perpendicular width of all (PA and non-PA) adjacent lawn; except that lawn may be maintained along a section of the stream or pond not to exceed 30' to allow for access for passive recreation or a foot bridge, or as a trail (not to exceed 8' in width, or come within 10' of the stream or pond bank) within the buffer area. The lawn area within 10' of the stream or pond bank should be mowed with a walk-behind mower or weed whip to prevent degradation of the bank by heavy lawn tractors.

Section 3: Healthy Meadow

Overview

Meadows are open areas maintained in high (> 5") grass and wildflowers. They provide many environmental (erosion control, stream buffer), ecological (wildlife habitat), and recreational (walking and equestrian trails) benefits, and can be an attractive part of the landscape.

Management Guidelines

Because they are uncommon in the Township, the most preferred management option for healthy meadows (those that have not been degraded by natural or human factors) is to preserve them in their current condition. The other preferred option is to convert part or all of it to woodland.

- 3a. Preserve As Is - Meadows are kept in a healthy condition by following or mimicking the management practices that have kept them healthy. In most cases meadows originate from old hay fields or pasture. Both are maintained through periodic mowing. Use the following guidelines in developing management plans for preserving established healthy meadows.
- (1) Mow meadow once or twice a year at a height of 4" - 6" to prevent intrusion by woody vegetation or invasive vegetation. Recommended dates (to maximize ecological benefits) are mid-July and early March. With the exception of trails, do not mow more than three times per year. Meadows should not be mowed between March 15th and July 1st, when wildlife are nesting. Maintain trails at a 6' - 8' width.
 - (2) Monitor the meadow for intrusion by invasive plants. Consult Section 4a. for recommendations on addressing any problems.
 - (3) If desired or needed augment existing meadow species with native species appropriate to site conditions through overseeding or installation of plugs.
- 3b. Convert to Woodland or Hedgerow - This option would be appropriate if the planted area would provide a needed screen, significantly reduce the amount of edge of an adjacent, degraded woodland, or create a wildlife corridor. Use the following guidelines in developing management plans for converting meadow to woodland or hedgerow.
- (1) Plantings should be spaced to allow for control of competing vegetation with available mowing equipment, but close enough for the canopy to close quickly. For woodland and deep hedgerows this will require a spacing of approximately 10' x 10'. Narrow hedgerows that are principally screens should have at least 20' spacings in staggered rows to allow for full development of trees.
 - (2) Select native species that are appropriate for site conditions.
 - (3) Use protective measures such as fencing, tree shelters, and flexible tree

- guards to minimize deer damage.
- (4) Reduce vegetative competition through selective herbicide use around base of tree or mowing at least four times during the growing season until the canopy has closed. After closure monitor for invasive plants and control as needed.

Section 4: Degraded Meadow

Overview

Meadows within the Township are often impacted by invasive plants, particularly vines (Oriental bittersweet, Japanese honeysuckle), shrubs (multiflora rose, bush honeysuckle), and herbaceous perennials (thistle). They also can suffer from human disturbances such as soil erosion and dumping.

Management Guidelines

There are three preferred options for managing a degraded meadow: restore to a healthy condition; convert to woodland; or convert to lawn. Which option or options is (are) chosen will depend on the degree of degradation, site conditions, available management budget, and the relative environmental, ecological, and recreational benefits of the resource.

- 4a. Restore to Healthy State - This would be the preferred option for a mildly degraded site and would be one of the least costly of the three options to establish and maintain. Use the following guidelines in developing management plans for restoring a degraded meadow to a healthy state.
- (1) Regrade and seed any eroded areas with a mix of native grasses and wildflowers and annual rye or oats to control erosion.
 - (2) Remove any trash and dispose of according to current Township and DER regulations.
 - (3) Eliminate invasives through spot spraying or wick application of appropriate herbicide or manual or mechanical pulling. Do not use spray application of herbicides within 50' of streams. Areas that are disturbed by manual or mechanical removal should be seeded with annual rye and/or oats and mulched to hinder reestablishment of invasives.
 - (4) Mow meadow twice a year at a height of 4" - 6" to prevent intrusion by woody and invasive vegetation. Recommended dates (to maximize ecological benefits) are mid-July and early March. With the exception of trails, do not mow more than three times per year. Meadows should not be mowed between March 15th and July 1st, when wildlife are nesting. Maintain trails at a 6' - 8' width.
 - (5) If desired or needed augment existing meadow species with native species appropriate to site conditions through overseeding or installation of plugs.
 - (6) Monitor the meadow for intrusion by invasive plants.
- 4b. Convert to Woodland or Hedgerow - This would be appropriate if the planted area would provide a needed screen, significantly reduce the amount of edge of an adjacent woodland, or create a wildlife corridor. Use the following guidelines in developing management plans for converting degraded meadow to woodland or hedgerow.

- (1) Planting design should be spaced to allow for control of competing vegetation with available mowing equipment, but close enough for the canopy to close quickly. For woodland and deep hedgerows this will require a spacing of approximately 10' x 10'. Narrow hedgerows that are principally screens should have at least 20' spacings in staggered rows to allow for full development of trees.
 - (2) Select native species that are appropriate for site conditions.
 - (3) Use protective measures such as fencing, tree shelters, and flexible tree guards to minimize deer damage.
 - (4) Reduce vegetative competition through selective herbicide use around base of tree or mowing at least four times during the growing season until the canopy has closed. After closure monitor for invasive plants and control as needed.
- 4c. Convert to Lawn - The least preferred option is to convert a degraded meadow to lawn. It may be appropriate, however, if lawn adjoins the degraded meadow area and additional lawn is needed for recreational activities. This option is not appropriate for areas with hydric soils or steep (> 15%) slopes. Use the following guidelines in developing management plans for converting meadow to lawn area.
- (1) Prepare the area for seeding by eliminating all existing vegetation. Remove trees and shrubs manually or mechanically; use a combination of herbicide application and cultivation several times at two week intervals to eliminate existing grasses and herbaceous plants.
 - (2) Apply lime, fertilizer, and organic matter as prescribed by a Penn State University (or comparable laboratory) soil analysis recommendation. Soil test kits are available from the Penn State Cooperative Extension (P.O. Box 20, 1015 Rt. 113, Creamery, PA 19430-0020 or phone 215-489-3415). Seed according to Cooperative Extension recommendations.
 - (3) Maintain lawn by mowing on an as-needed basis to keep grass 3"- 5" in height.
 - (4) Herbicides and pesticides should not be applied to lawn within the PA.
 - (5) Streams and ponds should be buffered from lawn areas on each side by woodland or meadow that has a width equal to the greater of 25' or 20% of the perpendicular width of all (PA and non-PA) adjacent lawn; except that lawn may be maintained along a section of the stream or pond not to exceed 30' to allow for access for passive recreation or a foot bridge, or as a trail (not to exceed 8' in width, or come within 10' of the stream or pond bank) within the buffer area. The lawn area within 10' of the stream or pond bank should be mowed with a walk-behind mower or weed whip to prevent degradation of the bank by heavy lawn tractors.

Section 5. Healthy Pasture

Overview

Pastures are open areas of short grass and forbs that are used for livestock grazing. Today horse grazing dominates the few remaining pastures within the Township. A healthy pasture can provide greater environment benefits than a lawn, be less costly to maintain, and be an attractive part of the landscape.

Management Guidelines

There are four preferred options for managing an existing healthy pasture: preserve as is; convert to woodland; convert to meadow; or convert to lawn. Which option or options is (are) chosen will depend on site conditions, available management budget, and the relative environmental, ecological, or recreational benefits of the resource.

- 5a. Preserve As Is - Pastures are maintained in a healthy state by timely mowing, proper fertilization, and proper livestock density. Use the following guidelines in developing management plans for pasture.
- (1) Establish proper stocking density as per recommendations by the Soil Conservation Service (P.O. Box 380, Rt. 113, Creamery, PA 19430, or phone 215-489-6071). Appropriate densities will vary with soil type, but in general it is best not to exceed one horse per acre.
 - (2) Mow at least three times per year to stimulate forage growth and discourage undesirable plants such as woody vegetation, thistles, and multiflora rose.
 - (3) Exposed soil indicates overgrazing. Correct stocking density in order to maintain permanent cover over entire pasture.
 - (4) Fence pasture to keep livestock out of streams.
 - (5) Streams and ponds should be buffered from pasture areas on each side by woodland or meadow that has a width equal to the greater of 25' or 20% of the perpendicular width of all (PA and non-PA) adjacent pasture; except that pasture may be maintained along a section of the pond not to exceed 30' to allow for access for livestock, a foot bridge, or as a trail (not to exceed 8' in width, or come within 10' of the stream or pond bank) within the buffer area. The pasture or meadow area within 10' of the stream or pond bank should be mowed with a walk-behind mower or weed whip to prevent degradation of the bank by heavy tractors.
- 5b. Convert to Woodland - This option would be appropriate if the planted area would provide a needed screen, significantly reduce the amount of edge of an adjacent woodland, or create a wildlife corridor. Use the following guidelines in developing management plans for converting pasture to woodland or hedgerow.

- (1) Planting design should be spaced to allow for control of competing vegetation with available mowing equipment, but close enough for the canopy to close quickly. For woodland and deep hedgerows this will require a spacing of approximately 10' x 10'. Narrow hedgerows that are principally screens should have at least 20' spacings in staggered rows to allow for full development of trees.
- (2) Select native species that are appropriate for site conditions.
- (3) Use protective measures such as fencing, tree shelters, and flexible tree guards to minimize deer damage.
- (4) Reduce vegetative competition through selective herbicide use around base of tree or mowing at least four times during the growing season until the canopy has closed. After closure monitor for invasive plants and control as needed.

5c. Convert to Meadow - Meadows provide more environmental and ecological benefits than pastures and are less costly to maintain. This would be a preferred option if grazing animals were no longer kept on site. Use the following guidelines in developing management plans for converting pasture to meadow.

- (1) Reduce mowing schedule to twice a year at a height of 4"- 6" to prevent intrusion by woody vegetation or invasive plants. Recommended dates (to maximize ecological benefits) are mid-July and early March. With the exception of trails, do not mow more than three times per year. Meadows should not be mowed between March 15th and July 1st when wildlife are nesting. Maintain trails at a 6'- 8' width.
- (2) If desired or needed augment existing meadow species with native species appropriate to site conditions through overseeding or installation of plugs.
- (3) Monitor the meadow for intrusion by invasive plants and treat as needed.

5d. Convert to Lawn - This would be a preferred option if lawn adjoins the pasture area and additional lawn is needed for recreational activities. This option is not appropriate for areas with hydric soils or steep (> 15%) slopes. Use the following guidelines in developing management plans for converting pasture to lawn area.

- (1) Maintain as lawn by mowing on an as-needed basis to keep grass 3"- 5" in height.
- (2) If the lawn area requires rejuvenation apply lime, fertilizer, and organic matter as prescribed by a Penn State University (or comparable laboratory) soil analysis recommendation. Soil test kits are available from the Penn State Cooperative Extension (P.O. Box 20, 1015 Rt. 113, Creamery, PA 19430-0020, or phone 215-489-3415). Seed according to Cooperative Extension recommendations.

- (3) Herbicides and pesticides should not be applied to lawn within the PA.
- (4) Streams and ponds should be buffered from pasture areas on each side by woodland or meadow that has a width equal to the greater of 25' or 20% of the perpendicular width of all (PA and non-PA) adjacent pasture; except that pasture may be maintained along a section of the pond not to exceed 30' to allow for access for livestock, a foot bridge, or as a trail (not to exceed 8' in width, or come within 10' of the stream or pond bank) within the buffer area. The pasture or meadow area within 10' of the stream or pond bank should be mowed with a walk-behind mower or weed whip to prevent degradation of the bank by heavy tractors.

Section 6. Degraded Pasture

Overview

Pasture becomes degraded when it is overgrazed or not mowed on a timely basis. This can lead to the establishment of invasive plants, soil erosion, and an unattractive landscape.

Management Guidelines

There are four preferred options for managing a degraded pasture: restore to a healthy state; convert to woodland; convert to meadow; or convert to lawn. Which option or options is (are) chosen will depend on the degree of degradation, site conditions, available management budget, and the relative environmental, ecological, and recreational benefits of the resource.

- 6a. Restore to a Healthy State - This would be a preferred option if the property owner(s) maintained the appropriate livestock facilities on site.
- (1) Eliminate invasives manually, mechanically, or through chemical application according to Penn State Cooperative Extension recommendations.
 - (2) Apply lime, fertilizer, and organic matter as prescribed by a Penn State University (or comparable laboratory) soil analysis recommendation. Soil test kits are available from the Penn State Cooperative Extension (P.O. Box 20, 1015 Rt. 113, Creamery, PA 19430-0020, or phone 215-489-3415).
 - (3) Regrade and seed any exposed areas according to Penn State Cooperative Extension recommendations.
 - (4) Establish proper stocking density as per recommendations by the Soil Conservation Service (P.O. Box 380, Rt. 113, Creamery, PA 19430, or phone 215-489-6071). Appropriate densities will vary with soil type, but in general it is best not to exceed one horse per acre.
 - (5) Mow at least three times per year to stimulate forage growth and to discourage undesirable plants such as woody vegetation, thistles, and multiflora rose.
 - (6) Exposed soil indicates overgrazing. Correct stocking density in order to maintain permanent cover over entire pasture.
 - (7) Fence pasture to keep horse out of streams.
 - (8) Herbicides and pesticides should not be applied to pasture within the PA except as part of the restoration process.
 - (9) Streams and ponds should be buffered from pasture areas on each side by woodland or meadow that has a width equal to the greater of 25' or 20% of the perpendicular width of all (PA and non-PA) adjacent pasture.
- 6b. Convert to Woodland - This would be a preferred option if the planted area would provide a needed screen, significantly reduce the amount of edge of an adjacent, degraded woodland, or create a wildlife corridor. Use the following

guidelines in developing management plans for converting pasture to woodland or hedgerow.

- (1) Eliminate invasives manually, mechanically, or through chemical application according to Penn State Cooperative Extension recommendations.
- (2) Regrade and seed any exposed or eroded areas with a combination of a perennial native grass and annual rye or oats.
- (3) Planting design should be spaced to allow for control of competing vegetation with available mowing equipment, but close enough for the canopy to close quickly. For woodland and deep hedgerows this will require a spacing of approximately 10' x 10'. Narrow hedgerows that are principally screens should have at least 20' spacings in staggered rows to allow for full development of trees.
- (4) Select native species that are appropriate for site conditions.
- (5) Use protective measures such as fencing, tree shelters, and flexible tree guards to minimize deer damage.
- (6) Reduce vegetative competition through selective herbicide use around base of tree or mowing at least four times during the growing season until the canopy has closed. After closure monitor for invasive plants and control as needed.

6c. Convert to Meadow - Meadows provide more environmental and ecological benefits than pastures and are less costly to maintain. This would be a preferred option if grazing animals were no longer kept on site. Use the following guidelines in developing management plans for converting pasture to meadow.

- (1) Eliminate invasives manually, mechanically, or through chemical application. Use a combination of herbicide application and cultivation several times at two week intervals to eliminate existing grasses and herbaceous plants.
- (2) Regrade and seed any exposed or eroded areas with a mix of native grasses and forbs. Add annual rye or oats to the mix to provide quick erosion control.
- (3) Reduce mowing schedule to twice a year at a height of 4"- 6" to prevent intrusion by woody vegetation or invasive plants. Recommended dates are mid-July and early March. With the exception of trails, do not mow more than three times per year. Meadows should not be mowed between March 15th and July 1st, when wildlife are nesting. Maintain trails at a 6'-8' width.
- (4) If desired or needed, augment existing meadow species with native species appropriate to site conditions through overseeding or installation of plugs.
- (5) Monitor the meadow annually for intrusion by invasive plants and treat as needed.

6d. Convert to Lawn - This would be a preferred option if lawn adjoins the pasture area and additional lawn is needed for recreational activities. This option is not appropriate for areas with hydric soils or steep (> 15%) slopes. Use the following guidelines in developing management plans for converting degraded pasture to lawn area.

- (1) Eliminate invasives manually, mechanically, or through chemical application. Use a combination of herbicide application and cultivation several times at two week intervals to eliminate existing grasses and herbaceous plants.
- (2) Regrade and seed according to Penn State Cooperative Extension recommendations.
- (3) Apply lime, fertilizer, and organic matter as prescribed by a Penn State University (or comparable laboratory) soil analysis recommendation. Soil test kits are available from the Penn State Cooperative Extension (P.O. Box 20, 1015 Rt. 113, Creamery, PA 19430-0020; or phone 215-489-3415).
- (4) Maintain lawn by mowing on an as-needed basis to keep grass 3"- 5" in height.
- (5) Herbicides and pesticides should not be applied to pasture within the PA except as part of the restoration process.
- (6) Streams and ponds should be buffered from lawn areas on each side by woodland or meadow that has a width equal to the greater of 25' or 20% of the perpendicular width of all (PA and non-PA) adjacent lawn; except that lawn may be maintained along a section of the stream or pond not to exceed 30' to allow for access for passive recreation or a foot bridge, or as a trail (not to exceed 8' in width, or come within 10' of the stream or pond bank) within the buffer area. The lawn area within 10' of the stream or pond bank should be mowed with a walk-behind mower or weed whip to prevent degradation of the bank by heavy lawn tractors.

Section 7. Old Field/Shrub

Overview

The natural tendency for most sites within the Township is to exist as woodlands. Maintaining areas as agricultural fields, meadows, pasture, or lawn essentially freezes the process of ecological succession that moves a site from domination by herbaceous plants (grass and forbs), to an intermediate stage dominated by shrubs and small trees, and then finally to forest. When these activities stop succession proceeds. Old field/shrub areas are formerly open sites that have moved to the intermediate shrub/small tree stage. Although old field/shrub areas provide unique ecological benefits (wildlife habitat) they are costly to maintain (requiring heavy equipment to clear it periodically) and are ideal sites for invasive plants to become established. As a result, they are usually not an attractive part of the landscape.

Management Guidelines

The preferred option for an old field/shrub site would be to move it to another resource type as quickly as possible. There are three preferred options: convert to woodland; convert to meadow; and convert to lawn. Which option or options is (are) chosen will depend on the degree of succession and degradation, site conditions, available management budget, and the relative environmental, ecological, and recreational benefits of the resource.

- 7a. Convert to Woodland - This preferred option can be either the easiest or hardest road to take depending on the degree of succession and degradation by invasive plants. It will be the least costly if trees are about to dominate the site and the amount of invasive plant material is small. It will be the most difficult option if the site was recently let go and invasive plants are prominent. Use the following guidelines for developing management plans for converting old field/shrub to woodland.
- (1) Identify trees and release from competition with invasive plants by cutting or wick application of herbicide. Use protective measures such as fencing, tree shelters, and flexible tree guards to minimize deer damage.
 - (2) If necessary, augment natural tree regeneration by planting native tree seedlings. Use protective measures such as fencing, tree shelters, and flexible tree guards to minimize deer damage.
 - (3) Monitor annually for invasives and treat as necessary.
- 7b. Convert to Meadow - This preferred option would be best if the site is heavily impacted by invasive plants. Creating a grass and wildflower meadow will provide many environmental benefits and help to diversify the ecological communities within the Township. Use the following guidelines in developing management plans for converting old field/shrub to grass and wildflower meadows.

- (1) Prepare the area for seeding by eliminating all existing vegetation. Remove trees and shrubs manually or mechanically; use a combination of herbicide application and cultivation several times at two week intervals to eliminate existing grasses and herbaceous plants.
- (2) Use only native grass and wildflower species appropriate to site conditions. Add annual rye or oats to the seed mix to provide a quick cover for erosion control. Plant in spring or early fall. Liming and fertilization is not necessary for native species.
- (3) Mow meadow twice a year at a height of 4" - 6" to prevent intrusion by woody vegetation or invasive vegetation. Recommended dates are mid-July and early March. Do not mow more than three times per year. Meadows should not be mowed between March 15th and July 1st, when wildlife is nesting. Maintain trails at a 6' - 8' width.
- (4) If desired or needed, augment existing meadow species with native species appropriate to site conditions through overseeding or installation of plugs.

7c. Convert to Lawn - The least preferred option is to convert a highly degraded old field/shrub to lawn. It may be appropriate, however, if lawn adjoins the area and additional lawn is needed for recreational activities. This option is not appropriate for areas of hydric soils or steep (> 15%) slopes. Use the following guidelines in developing management plans for converting old field/shrub to lawn areas.

- (1) Prepare the area for seeding by eliminating all existing vegetation. Remove trees and shrubs manually or mechanically; use a combination of herbicide application and cultivation several times at two week intervals to eliminate existing grasses and herbaceous plants.
- (2) Grade and apply lime, fertilizer, and organic matter as prescribed by a Penn State University (or comparable laboratory) soil analysis recommendation. Soil test kits are available from the Penn State Cooperative Extension in (P.O. Box 20, 1015 Rt. 113, Creamery, PA 19430-0020, or phone 215-489-3415)
- (3) Seed according to Penn State Cooperative Extension recommendations.
- (4) Maintain lawn by mowing on an as-needed basis to keep grass 3" - 5" in height.
- (5) Herbicides and pesticides should not be applied to lawn within the PA.
- (6) Streams and ponds should be buffered from lawn areas on each side by woodland or meadow that has a width equal to the greater of 25' or 20% of the perpendicular width of all (PA and non-PA) adjacent lawn; except that lawn may be maintained along a section of the stream or pond not to exceed 30' to allow for access for passive recreation or a foot bridge, or as a trail (not to exceed 8' in width, or come within 10' of the stream or pond bank) within the buffer area. The lawn area within 10' of the stream or pond bank should be mowed with a walk-behind mower or weed whip to prevent degradation of the bank by heavy lawn tractors.

Section 8. Lawn/Landscaped Areas

Overview

Lawn and landscaped areas are open areas that are formally landscaped and maintained principally for recreational and aesthetic benefits. With proper planning (use of native plant material, planting to buffer stream corridors) and management they can be, in certain circumstances, an appropriate resource for a PA. However, because they afford the least environmental and ecological benefits (indeed they can create environmental problems if not managed properly) and usually require the most financial commitment to maintain, their extent should be minimized.

Management Guidelines

There are three preferred options for lawn/landscaped areas: preserve as is; convert to woodland; and convert to lawn. Which option or options is (are) chosen will depend on the site conditions, available management budget, and the relative environmental, ecological, and recreational benefits of the resource.

8a. Preserve As Is - This would be a preferred option for areas contiguous to lawn within the building lot(s) that would provide important additional recreational benefits. Areas dominated by hydric soils or steep (> 15%) slopes should be considered inappropriate for lawn; they may be appropriate as part of a landscaped area that does not require access by heavy maintenance equipment such as lawn tractors. Use the following guidelines in developing management plans for lawn/landscaped areas.

- (1) Maintain lawn by mowing on an as-needed basis to keep grass 3" - 5" in height.
- (2) If the lawn area requires rejuvenation apply lime, fertilizer, and organic matter as prescribed by a Penn State University (or comparable laboratory) soil analysis recommendation. Soil test kits are available from the Penn State Cooperative Extension (P.O. Box 20, 1015 Rt. 113, Creamery, PA 19430-0020, or phone 215-489-3415).
- (3) Herbicides and pesticides should not be applied to lawn within the PA.
- (4) Streams and ponds should be buffered from lawn areas on each side by woodland or meadow that has a width equal to the greater of 25' or 20% of the perpendicular width of all (PA and non-PA) adjacent lawn; except that lawn may be maintained along a section of the stream or pond not to exceed 30' to allow for access for passive recreation or a foot bridge, or as a trail (not to exceed 8' in width, or come within 10' of the stream or pond bank) within the buffer area. The lawn area within 10' of the stream or pond bank should be mowed with a manually-pushed lawn mower or weed whip to prevent degradation of the bank by heavy lawn tractors.
- (5) Trees and shrubs within the landscaped area should be pruned as needed to prevent injury to recreational users and to maintain the health of the plants.

- (6) Any tree or shrub that is replaced within the PA should be replaced with a native species appropriate to site conditions.

8b. Convert to Woodland - This option is preferred if the existing lawn or landscaped area is dominated by hydric or steep (>15% slope) conditions, borders a stream, is needed as a visual screen, can significantly reduce the amount of edge of an adjacent woodland, or can create a wildlife corridor. Use the following guidelines in developing management plans for converting lawn or landscaped area to woodland or hedgerow.

- (1) Planting design should be spaced to allow for control of competing vegetation with available mowing equipment, but close enough for the canopy to close quickly. For woodland and deep hedgerows this will require a spacing of approximately 10' x 10'. Narrow hedgerows that are principally screens should have at least 20' spacings in staggered rows to allow for full development of trees.
- (2) Select native species that are appropriate for site conditions.
- (3) Use protective measures such as fencing, tree shelters, and flexible tree guards to minimize deer damage.
- (4) Reduce vegetative competition through selective herbicide use around base of tree or mowing at least four times during the growing season until the canopy has closed. After closure monitor for invasive plants and control as needed.

8c. Convert to Meadow - Converting lawn/landscaped areas to meadow would increase the environmental and ecological benefits of the PA, especially if it augmented an existing meadow, buffered a stream corridor, or was located on a wet or steep (>15%) site. Meadow can be "created" from lawn areas simply by reducing the mowing frequency to once or twice annually or through eliminating the existing vegetation and planting. The latter option is preferable in that it allows the landowner to introduce desired species and to eliminate undesirable grasses (tall fescue and perennial rye) or herbs that compete with desirable species. The former option, however, may be more appropriate on wet or steep areas where meadow establishment procedures would be more difficult and could create environmental problems. Any plan that calls for the elimination of existing vegetation to establish meadow on wet or steep (>15%) areas should follow Soil Conservation Service (P.O. Box 380, Rt. 113, Creamery, PA 19430 489-6071) recommendations to minimize environmental impacts. Use the following guidelines in developing management plans for converting lawn and landscaped areas to meadow.

- (1) If establishing a new vegetative cover, prepare the area for seeding by eliminating all existing vegetation. Remove trees and shrubs (native species could be transplanted to a wooded area; exotic species to a landscaped area outside the PA) and use a combination of herbicide

application and cultivation several times at two week intervals to eliminate grasses and herbaceous plants. It may be desirable to keep trees within the meadow area, but they should be minimized for ease of maintenance and to provide proper light conditions for meadow plants.

- (2) Use only native grass and wildflower species appropriate to site conditions. Add annual rye or oats to the seed mix to provide a quick cover for erosion control. Plant in spring or early fall. Liming and fertilization is not necessary for native species.
- (3) Mow meadow twice a year at a height of 4"- 6" to prevent intrusion by woody vegetation or invasive vegetation. Recommended dates are mid-July and early March. Do not mow more than three times per year. Meadows should not be mowed between March 15th and July 1st, when wildlife is nesting. Maintain trails at a 6'- 8' width.
- (4) If desired or needed, augment existing meadow species with native species appropriate to site conditions through overseeding or installation of plugs.
- (5) Monitor the meadow for intrusion by invasive plants and treat as needed.

Section 9. Formal Gardens

Overview

Formal gardens are areas devoted to special plant collections, often containing structural enhancements such as stone wall, fountains, and arbors. Examples include rose, perennial, and dwarf conifer gardens. Most of the old estates within Lower Merion Township contain one or more formal gardens. The environmental and ecological benefits of formal gardens varies with the type of garden. They can potentially provide food and cover for insects, birds, and small mammals, although these benefits can be negated if chemical biocides are used in the maintenance regime. Because these gardens usually require the highest degree of maintenance of any resource option, they should be minimized within the PA. They should only be considered if they are already established on site and if sufficient funds are designated to the perpetual maintenance of plants and structures. Otherwise these sites can quickly deteriorate into an unsightly collection of invasives and masonry rubble.

Management Guidelines

There are five preferred options for formal garden area: preserve as is; restore to a healthy state; convert to woodland; convert to meadow; or convert to lawn. Which option or options is chosen will depend on the site conditions, available management budget, and the relative environmental, ecological, and recreational benefits of the resource.

- 9a. Preserve As Is - This would be the preferred option if a formal garden exists in the PA and would provide significant recreational and aesthetic benefits if preserved. This option should only be undertaken if sufficient funds are set aside to properly manage the garden in perpetuity. Use the following guidelines in developing management plans for maintaining formal garden areas.
- (1) Formal gardens should be maintained by knowledgeable personnel in order to preserve garden health and maximize its aesthetic and recreational benefits.
 - (2) When replacing plants, choose materials (preferably native plants) adapted to the site that require similar culture (water, light, fertilization) in order to minimize management costs.
 - (3) Minimize the use of chemical biocides. Any necessary chemical should be applied by qualified personnel to minimize any adverse effects on the environmental or ecological benefits within and around the garden.
 - (4) Contact the Philadelphia Horticultural Society (325 Walnut Street, Philadelphia, PA 19106; Phone: 625-8250) or Morris Arboretum of the University of Pennsylvania (100 Northwestern Avenue, Philadelphia, PA 19118; Phone: 247-5777) for further information on formal gardens. If the garden has historical significance, consultation with a garden historian is

recommended.

- 9b. Restore to a Healthy State - This would be the preferred option if a formal garden exists in the PA, is in a state of poor maintenance, but would provide significant recreational and aesthetic benefits if restored and preserved. This option should only be undertaken if sufficient funds are set aside to properly restore and manage the garden in perpetuity. Use the following guidelines in developing management plans for restoring and maintaining formal garden areas.
- (1) Formal gardens should be maintained by knowledgeable personnel in order to preserve garden health and maximize its aesthetic and recreational benefits.
 - (2) If a formal garden is historically significant because of its design or association with important persons, every effort should be made to research and retain the original design and plant selection. If, however, the garden is not significant historically, strong consideration should be given to an adaptive redesign in which emphasis is placed on use of low maintenance native plant materials adapted to the site.
 - (3) Minimize the use of chemical biocides. Any necessary chemical should be applied by qualified personnel to minimize any adverse effects on the environmental or ecological benefits within and around the garden.
 - (4) Contact the Philadelphia Horticultural Society (325 Walnut Street, Philadelphia, PA 19106; Phone: 625-8250) or Morris Arboretum of the University of Pennsylvania (100 Northwestern Avenue, Philadelphia, PA 19118; Phone: 247-5777) for further information on formal gardens. If the garden has historical significance, consultation with a garden historian is recommended.
- 9c. Convert to Woodland - This would be a preferred option if there is no desire to preserve the garden. Converting to woodland would increase the environmental and ecological benefits of the PA, especially if it augmented an existing woodland, buffered a stream corridor, or was located on a wet or steep (>15%) site. Use the following guidelines in converting a formal garden to woodland.
- (1) As necessary, remove structural and plant components that will be incompatible with a natural setting - particularly invasive plants or structures that may become a hazard or maintenance problem. Some structural components may add function or interest to a woodland setting and could be retained. For example walkways could become woodland trails, and low walls, if safe, could become interesting artifacts.
 - (2) Seed any exposed ground with a combination of annual rye or oats and perennial native grasses.
 - (3) Planting design should be spaced to allow for control of competing

vegetation with available mowing equipment, but close enough for the canopy to close quickly. For woodland and deep hedgerows this will require a spacing of approximately 10' x 10'. Narrow hedgerows that are principally screens should have at least 20' spacings in staggered rows to allow for full development of trees.

- (4) Select native species that are appropriate for site conditions. For best survival trees should be 1 - 2 inches in caliper for hardwoods and 6 - 8 feet in height for conifers.
- (5) Use protective measures such as fencing, tree shelters, and flexible tree guards to minimize deer damage.
- (6) Reduce vegetative competition through selective herbicide use around base of tree or mowing at least four times during the growing season until the canopy has closed. After closure monitor for invasive plants and control as needed.

9d. Convert to Meadow - This would be a preferred option if there is no desire to preserve the garden. Converting to meadow would increase the environmental and ecological benefits of the PA, especially if it augmented an existing meadow, buffered a stream corridor, or was located on a wet or steep (>15%) site. Use the following guidelines in converting a formal garden to meadow.

- (1) As necessary, remove structural and plant components that will be incompatible with a meadow setting - particularly invasive plants or structures that may become a hazard or maintenance problem. Some structural components may add function or interest to a meadow and could be retained. For example walkways could become trails, and low walls, if safe, could become interesting artifacts.
- (2) Prepare the area for seeding through a combination of herbicide application and cultivation several times at two week intervals to remove herbaceous plants .
- (3) Use only native grass and wildflower species appropriate to site conditions. Add annual rye or oats to the seed mix to provide a quick cover for erosion control. Plant in spring or early fall. Liming and fertilization is not necessary for native species.
- (4) Mow meadow twice a year at a height of 4" - 6" to prevent intrusion by woody vegetation or invasive vegetation. Recommended dates are mid-July and early March. Do not mow more than three times per year. Meadows should not be mowed between March 15th and July 1st, when wildlife is nesting. Maintain trails at a 6' - 8' width.
- (5) If desired or needed, augment existing meadow species with native species appropriate to site conditions through overseeding or installation of plugs.

9e. Convert to Lawn - This would be a preferred option if there is no desire to preserve the garden. Converting to lawn might increase the recreational

benefits of the PA, especially if it augmented an existing lawn or landscaped area. This option is not appropriate for areas of hydric soils or steep (> 15%) slopes. Use the following guidelines in converting a formal garden to lawn.

- (1) As necessary, remove structural and plant components that will be incompatible with a lawn, particularly invasive plants and structures that may become a hazard or lawn maintenance problem. Some structural components may add function or interest and could be retained. For example walkways could be useful, and low walls, if safe, could become interesting objects in the landscape.
- (2) Grade and seed according to Penn State Cooperative Extension recommendations.
- (3) Apply lime, fertilizer, and organic matter as prescribed by a Penn State University (or comparable laboratory) soil analysis recommendation. Soil test kits are available from the Penn State Cooperative Extension in (P.O. Box 20, 1015 Rt. 113, Creamery, PA 19430-0020, or phone 215-489-3415).
- (4) Maintain lawn by mowing on an as-needed basis to keep grass 3"- 5" in height.
- (5) Herbicides and pesticides should not be applied to lawn within the PA.
- (6) Streams and ponds should be buffered from lawn areas on each side by woodland or meadow that has a width equal to the greater of 25' or 20% of the perpendicular width of all (PA and non-PA) adjacent lawn; except that lawn may be maintained along a section of the stream or pond not to exceed 30' to allow for access for passive recreation or a foot bridge, or as a trail (not to exceed 8' in width, or come within 10' of the stream or pond bank) within the buffer area. The lawn area within 10' of the stream or pond bank should be mowed with a walk-behind mower or weed whip to prevent degradation of the bank by heavy lawn tractors.

Section 10. Wetlands

Overview

Wetlands are defined as areas which satisfy any one of the following parameters: (1) they support hydrophytic (water-loving plants); (2) they contain hydric soils; or (3) their hydrology is such that there is permanent or periodic inundation, or soil saturation for seven days or more during the growing season. Although historically maligned as wasteland, wetlands (particularly wooded wetlands) are finally receiving proper recognition for the many important ecological and environment benefits they provide. These include storm water control, stream buffers against pollution from soil erosion and chemical herbicides and fertilizers, and wildlife habitat. For this reason management activities within wetlands are highly regulated at the federal, state, and local level. Wetland restrictions in Lower Merion Township are covered in the Natural Features Conservation Ordinance.

Because wetland regulations are still being modified it is prudent to contact the Soil Conservation Service (P.O. Box 380, Rt. 113, Creamery, PA 19430; phone 215-489-6071) and/or the Pennsylvania Department of Environmental Resources (Ridley Creek State Park; phone 215-566-4800) prior to any management work in a wetland area.

Management Guidelines

There are four preferred options for wetland areas: preserve as is; restore to healthy state; convert to woodlands; or convert to meadow. Which option or options is (are) chosen will depend on the site conditions, available management budget, and the relative environmental, ecological, and recreational benefits of the resource. However, every effort should be made to minimize the amount of wetland maintained as lawn/landscaped area.

- 10a. Preserve As Is - This would be a preferred option if the existing resource is a woodland, meadow or pasture in a healthy condition. Consult Sections 1, 3a and 5a for management guidelines for healthy woodland, meadow and pasture respectively. Any permitted management work within wetlands is best undertaken when the ground is frozen or dry. This will not only make the task easier but minimize the impact to the site.
- 10b. Restore to Healthy State - This would be a preferred option if the existing resource is a woodland, meadow or pasture in a degraded condition. See Sections 2a, 4a, and 6a for management guidelines for restoring degraded wet woodland, meadow and pasture, respectively. Any permitted management work within wetlands is best undertaken when the ground is frozen or dry. This will not only make the task easier but minimize the impact to the resource.
- 10c. Convert to Woodland - This would be a preferred option if the existing

resource is meadow, pasture or lawn. See Sections 3b, 4b, 5b, 6b or 8b, respectively, for guidelines to convert meadow, pasture or lawn to woodland. Any permitted management work within wetlands is best undertaken when the ground is frozen or dry. This will not only make the task easier but minimize the impact to the resource.

- 10d. Convert to Meadow - This would be the preferred option if the existing resource is pasture or lawn/landscaped area. This would not be a preferred option if the existing resource is woodland. See Section 5c, 6c or 8c for guidelines to convert pasture or lawn/landscaped area to meadow. Any permitted management work within wetlands is best undertaken when the ground is frozen or dry. This will not only make the task easier but minimize the impact to the resource.

Section 11. Ponds

Overview

Ponds are open bodies of water formed by damming a stream or through excavation. Ponds can provide many benefits including environmental (as silt traps for associated streams), ecological (habitat for aquatic plants and animals, and waterfowl), and recreational (fishing, boating) and can be an attractive part of the landscape. They do, however, require specialized maintenance (periodic dredging and dam repairs) that are potentially very costly. For this reason ponds should only be included as part of the PA if sufficient funds are designated for proper maintenance.

Management Guidelines

There are five preferred options for ponds: preserve as is; restore to healthy state; convert to woodland; convert to meadow; or convert to lawn. For further information on pond maintenance (or prior to any conversion of the existing resource) contact the Soil Conservation Service (P.O. Box 380, Rt. 113, Creamery, PA 19430, phone: 489-6071) or the Montgomery County Conservation District (phone: 278-3618).

- 11a. Preserve As Is - This would be the preferred option if the pond is in sound condition and there is sufficient funds to perpetually maintain the resource. If the pond remains part of the PA it is important to buffer it from lawn or pasture areas by maintaining woodland or meadow along its edge. Consult the Stewardship Matrix to reference the appropriate section for converting the existing resource to woodland or meadow. The woodland or meadow should have a width equal to the greater of 25' or 20% of the perpendicular width of all (PA and non-PA) adjacent lawn; except that lawn or pasture may be maintained along a section of the pond not to exceed 30' to allow for access for passive recreation or livestock, a foot bridge, or as a trail (not to exceed 8' in width, or come within 10' of the stream or pond bank) within the buffer area. The lawn or pasture area within 10' of the stream or pond bank should be mowed with a walk-behind mower or weed whip to prevent degradation of the bank by heavy tractors.
- 11b. Restore to Healthy State - This would be a preferred option if the pond is structurally unsound, silted in, or dominated by undesirable vegetation and there is sufficient funds to both restore it to a sound condition and perpetually maintain the resource. If the pond remains part of the PA it is important to buffer it from lawn or pasture areas by maintaining woodland or meadow along its edge. Consult the Stewardship Matrix to reference the appropriate section for converting the existing resource to woodland or meadow. The woodland or meadow should have a width equal to the greater of 25' or 20% of the perpendicular width of all (PA and non-PA) adjacent lawn; except that lawn or pasture may be maintained along a section of the pond not to exceed 30' to

allow for access for passive recreation or livestock; a foot bridge, or as a trail (not to exceed 8' in width, or come within 10' of the stream or pond bank) within the buffer area. The lawn, pasture, or meadow area within 10' of the stream or pond bank should be mowed with a walk-behind mower or weed whip to prevent degradation of the bank by heavy tractors.

11c. Convert to Woodland - This would be a preferred option if there is no desire to preserve the pond and DER (Ridley Creek State Park; Phone: 566-4800) approval was obtained for filling in the pond, or alternatively, breaching the dam. Use the following guidelines in converting a pond to woodland.

- (1) Follow DER or SCS recommendations for draining, removing structures, and filling.
- (2) Seed exposed ground with a combination of annual rye or oats and perennial native grasses.
- (3) Planting design should be spaced to allow for control of competing vegetation with available mowing equipment, but close enough for the canopy to close quickly. For woodland and deep hedgerows this will require a spacing of approximately 10' x 10'. Narrow hedgerows that are principally screens should have at least 20' spacings in staggered rows to allow for full development of trees.
- (4) Select native species that are appropriate for the site, which in this case are likely to be wetland conditions. For best survival trees should be 1 - 2 inches in caliper for hardwoods and 6 - 8 feet in height for conifers.
- (5) Use protective measures such as fencing, tree shelters, and flexible tree guards to minimize deer damage.
- (6) Reduce vegetative competition through selective herbicide use around base of tree or mowing at least four times during the growing season until the canopy has closed. After closure monitor for invasive plants and control as needed.

11d. Convert to Meadow - This would be a preferred option if there is no desire to preserve the pond and DER approval was obtained for filling the pond or breaching the dam. Use the following guidelines in converting a pond to meadow.

- (1) Follow DER or SCS recommendations for draining, removing structures, and filling.
- (2) Use only native grass and wildflower species appropriate to the site, which is likely to be wet. Add annual rye or oats to the seed mix to provide a quick cover for erosion control. Plant in spring or early fall. Liming and fertilization is not necessary for native species.
- (3) Mow meadow twice a year at a height of 4" - 6" to prevent intrusion by woody vegetation or invasive vegetation. Recommended dates are mid-July and early March. Do not mow more than three times per year.

Meadows should not be mowed between March 15th and July 1st, when wildlife is nesting. Maintain trails at a 6'- 8' width.

- (4) If desired or needed, augment existing meadow species with native species appropriate to site conditions through overseeding or installation of plugs.

11e. Convert to Lawn - This would be a preferred option if there is no desire to preserve the pond and DER approval was obtained for filling the pond. Converting to lawn would increase the recreational benefits of the PA, especially if it augmented an existing lawn or landscaped area. This option is not appropriate for areas of hydric soils or steep (> 15%) slopes. Use the following guidelines in converting a formal garden to lawn.

- (1) Follow DER or SCS recommendations for draining, removing structures, and filling.
- (2) Grade and seed according to Penn State Cooperative Extension recommendations.
- (3) Apply lime, fertilizer, and organic matter as prescribed by a Penn State University (or comparable laboratory) soil analysis recommendation. Soil test kits are available from the Penn State Cooperative Extension in (P.O. Box 20, 1015 Rt. 113, Creamery, PA 19430-0020 489-3415).
- (4) Maintain lawn by mowing on an as-needed basis to keep grass 3"- 5" in height.
- (5) Herbicides and pesticides should not be applied to lawn within the PA.
- (6) Streams and ponds should be buffered from lawn areas on each side by woodland or meadow that has a width equal to the greater of 25' or 20% of the perpendicular width of all (PA and non-PA) adjacent lawn; except that lawn may be maintained along a section of the pond (not to exceed 30') as: access for passive recreation; a foot bridge or ford; or as a trail (not to exceed 8' in width, or come within 10' of the stream or pond bank) within the buffer area. The lawn area within 10' of the stream or pond bank should be mowed with a walk-behind mower or weed whip to prevent degradation of the bank by heavy lawn tractors.

Section 12. Stream Corridors

Overview

Stream corridors are land areas immediately adjacent to streams, typically including floodplains, alluvial soils and stream related wetlands. Stream corridors can provide many benefits including environmental (as silt and chemical buffers for associated streams), ecological (wildlife habitat), and recreational (fishing) and can be an attractive part of a PA. Given their critical position all stream corridors within a PA should be maintained as woodland or meadow to maximize their buffering role. The width of the buffer needed to protect the stream resources and provide environmental and ecological benefits will vary relative to soils and slope. In general the buffer should be no less than 25 feet on either side of the stream and may need to be more to include sensitive areas such as floodplains. The exact extent of the protected stream corridor should be made on a case-by-case basis. Streams should be buffered from lawn or pasture areas on each side by woodland or meadow that has a width equal to the greater of 25' or 20% of the perpendicular width of all (PA and non-PA) adjacent pasture; except that lawn or pasture may be maintained along a section of the stream (not to exceed 30') as: access for passive recreation or livestock; a foot bridge or ford; or as a trail (not to exceed 8' in width, or come within 10' of the stream or pond bank) within the buffer area. The pasture or meadow area within 10' of the stream or pond bank should be mowed with a walk-behind mower or weed whip to prevent degradation of the bank by heavy tractors.

Management Guidelines

As stated above, stream corridors should be consist of woodland or meadow to buffer the adjacent water resource. Therefore, regardless of the existing resource the goal should be to maintain the corridor as healthy woodland or meadow or move the existing resource to healthy woodland and/ or meadow. Use the Stewardship Matrix to reference the appropriate section for guidelines to achieve this goal.

Section 13. Historic Resources

Overview

Lower Merion Township's historic resources, which recall the area's heritage and contribute to the community's character, can be categorized as follows: (1) *built resources* incorporating residences, barns, commercial buildings, houses of worship, civic structures, etc.; (2) *archeological resources* encompassing artifacts and relics of past human cultures; and (3) *cultural resources* including combinations of built and natural resources, such as trees, streams, bridges, walls, spring houses, corn cribs, railroad tracks, and cemetery markers.

The Lower Merion Township Historic Architectural Review Board (HARB) has inventoried many of the Township's historic resources. HARB is a seven-member board appointed by the Board of Commissioners to protect the Township's distinctive historical character and cultural heritage. Because historic resources provide area residents and visitors with a critical link to the past, it is recommended that you contact the HARB directly for advice (75 E. Lancaster Avenue, Ardmore, PA 19003, phone 642-5039) if your PA contains built, archaeological or cultural resources.

Management Guidelines

There are two preferred management options for historic resources: preserve as is and restore to a healthy state. The option selected will depend upon the condition and integrity of the resource, the available management budget, and the interpretive value of the resource. The HARB considers a resource to have a high degree of integrity if it possesses one of the following: (1) an authentic, remnant historic or architectural identity evident through surviving or physical characteristics such as location, setting, design, materials and/or workmanship; (2) the documented potential of possessing retrievable or surviving characteristics; or (3) documented association with an historical event or person, accompanied by surviving relevance to the setting of the event or person. It is recommended that you contact the HARB directly for assistance in determining the integrity and interpretive value of your historic resource(s). If required, the HARB will also help you identify potential sources of preservation funding.

- 13a. Preserve As Is - If a resource has a high degree of integrity and interpretive value, measures should be taken, at the very least, to sustain the existing form, integrity and material of the resource. Preservation may include either initial stabilization or ongoing maintenance. Because of the varied nature of historic resources, it is recommended that an expert in the type of resource present be retained to advise on the most appropriate methods for preservation, i.e., an architect specializing in historic architecture, an archeologist, or landscape historian. In the case of simple vernacular structures such as spring houses any sensitive, competent design professional is probably qualified.

13b. Restore to a Healthy State - If a resource, which has a high degree of integrity, and interpretive value, exists in a state of disrepair, every effort should be made (funds permitting) to restore the resource to its form and condition at an appropriate point in history. If restoration is not feasible for financial or other reasons, the goal should be to stabilize the resource in order to prevent further damage. Consultation with the HARB will help determine the appropriate point in history.

Chapter 6

List of Recommended Native Plants

The following list of plants are generally suitable for use in Preservation Areas. However the user of this handbook should be aware that even among native plants, different species are more or less suitable to different sites depending on factors such as shade tolerance and moisture availability. Therefore a knowledgeable landscape architect, horticulturalist, or landscape contractor should be retained to develop planting plans for the specific site in question. For more information on these plants, please see Selected Native Trees and Shrubs of Eastern Pennsylvania and Southern New Jersey and Their Wildlife Uses, published by Natural Lands Trust, 1992.

6.1 Shrubs

<u>Scientific name</u>	<u>Common name</u>
<i>Amelanchier canadensis</i>	SHADBUSH or SHADBLOW SERVICEBERRY
<i>Aronia arbutifolia</i>	RED CHOKEBERRY
<i>Aronia melanocarpa</i>	BLACK CHOKEBERRY
<i>Calycanthus floridus</i>	COMMON SWEETSHRUB
<i>Clethra alnifolia</i>	SUMMERSWEET CLETHRA
<i>Cornus sericea</i>	RED-OSIER DOGWOOD
<i>Hamamelis vernalis</i>	VERNAL WITCHHAZEL
<i>Ilex glabra</i>	INKBERRY
<i>Ilex verticillata</i>	WINTERBERRY
<i>Itea virginica</i>	VIRGINIA SWEETSPIRE
<i>Kalmia latifolia</i>	MOUNTAIN LAUREL
<i>Magnolia virginiana</i>	SWEETBAY MAGNOLIA
<i>Myrica pensylvanica</i>	NORTHERN BAYBERRY
<i>Rhododendron carolinianum</i>	CAROLINA RHODODENDRON
<i>Rhododendron maximum</i>	ROSEBAY RHODODENDRON
<i>Rhododendron arborescens</i>	SWEET AZALEA
<i>Rhododendron calendulaceum</i>	FLAME AZALEA
<i>Rhododendron canescens</i>	PIEDMONT AZALEA
<i>Rhododendron prunifolium</i>	PLUMLEAF AZALEA
<i>Rhododendron viscosum</i>	SWAMP AZALEA (prefers wet conditions)
<i>Vaccinium corymbosum</i>	HIGHBUSH BLUEBERRY
<i>Viburnum dentatum</i>	ARROWWOOD VIBURNUM
<i>Viburnum lentago</i>	NANNYBERRY
<i>Viburnum prunifolium</i>	BLACKHAW VIBURNUM
<i>Viburnum trilobum</i>	AMERICAN CRANBERRY

6.2 Small Trees

Scientific name

Cercis canadensis
Chionanthus virginicus
Cornus florida
Crataegus phaenopyrum
Franklinia alatamaha
Halesia carolina
Hamamelis virginiana
Ilex opaca
Oxydendrum arboreum
Sorbus americana
Stewartia ovata

Common name

EASTERN REDBUD
WHITE FRINGETREE
FLOWERING DOGWOOD
WASHINGTON HAWTHORN
FRANKLIN TREE
CAROLINA SILVERBELL
COMMON WITCHHAZEL
AMERICAN HOLLY
SOURWOOD
AMERICAN MOUNTAINASH
MOUNTAIN STEWARTIA

6.3 Large Trees

Scientific name

Acer rubrum
Acer saccharinum
Acer saccharum
Betula nigra
Betula lenta
Carya ovata
Celtis occidentalis
Fagus grandifolia
Fraxinus americana
Fraxinus pennsylvanica
Gleditsia triacanthos
Juglans nigra
Juniperus virginiana
Liquidambar styraciflua
Liriodendron tulipifera
Nyssa sylvatica
Picea glauca
Pinus strobus
Quercus acutissima
Quercus alba
Quercus palustris
Quercus rubra
Tilia americana
Tsuga canadensis

Common name

RED MAPLE
SILVER MAPLE
SUGAR MAPLE
RIVER BIRCH
SWEET BIRCH
SHAGBARK HICKORY
COMMON HACKBERRY
AMERICAN BEECH
WHITE ASH
GREEN ASH
COMMON HONEYLOCUST
BLACK WALNUT
EASTERN REDCEDAR
AMERICAN SWEETGUM
TULIP POPLAR
BLACK GUM
WHITE SPRUCE
EASTERN WHITE PINE
SAWTOOTH OAK
WHITE OAK
PIN OAK
RED OAK
AMERICAN LINDEN
EASTERN HEMLOCK

6.4 Sources of Native Plant Materials

Most nurseries carry at least some native species, although they are often cultivars. Straight native species are preferable for maximum benefit.

Eccles Nurseries, Inc.
P.O. Drawer Y
Rimersburg, Pa. 16248

Environmental Concern, Inc.
210 West Chew Avenue
Post Office Box P
St. Michaels, MD 21663
(410) 745-9620

Feeney's Nursery
York Road
Furlong, Pa. 18925

Flickinger's Nursery
P.O. Box 245
Sagamore, Pa. 16250

Moon Nursery
Box 482, Quarry Road
Yardley, Pa. 19067
(215) 968-6141

Natural Landscapes
345 N. Jennersville Road
West Grove, Pa. 19390
(215) 869-3788

North Creek Nurseries
R.R. #2, Box 33
Landenburg, Pa. 19350
(215) 255-4762

Octoraro Wetland Nurseries
P.O. Box 24
Oxford, Pa. 19363
(215) 932-3762

Pinelands Nursery
323 Island Road
Columbus, NJ 08022
(609) 291-9486

Shemin Nurseries
100 Green Tree Road
P.O. Box 649
Oaks, Pa. 19456-0649
(215) 666-0595

Sylva Native Nursery & Seed Co.
R.D. #2, Box 1033
New Freedom, Pa 17349

Snipes Nursery
U.S. Route 1
Morrisville, Pa. 19067
(215) 295-1138

Pinelands Nursery
R.R. 1, Box 12, Island Road
Columbus, NJ 08022
(609) 291-9486

Temple University - Ambler Campus
Native Plant Propagation Center
580 Meetinghouse Road
Ambler, Pa. 19002-3999
(215) 283-1330

This is a partial list of sources. It does intend to be complete or to imply endorsement.

6.5 Planting Guidelines

When planting trees or shrubs following these guidelines will maximize the chances of success.

1. Use only native tree and shrub species appropriate to site conditions per Sections 6.1, 6.2, and 6.3.
2. Planting shall occur only in early spring or early fall unless otherwise recommended as a sound conservation management practice. Deciduous trees and shrubs shall be planted prior to bud break, leafing out, or after leaf fall to optimize plant survival.
3. All plants shall be nursery grown and in accordance with the American Standards for Nursery Stock, latest edition.
4. All plants shall be typical of their species or variety and shall have a normal habit of growth. They shall be sound, healthy and vigorous, well-branched, and densely foliated when in leaf. They shall be free of disease and insect pests, eggs, or larvae. They shall have healthy, well-developed root systems.
5. Trees should be large enough to survive deer pressure (browse and rub), but not too large that they suffer prolonged shock in transplanting. Large trees lose a greater percentage of their root system during transplanting than small trees and consequently suffers "transplanting shock" for a longer time. This results in limited top growth until the root system can be re-established. Small trees suffer less shock and can often overtake larger trees before they have recovered. Planting large trees, therefore, can be both financially wasteful and poor arboriculture. Hardwood trees shall be 0.75" - 1.5" in caliper and/or 6' - 8' tall at planting and softwood trees shall be 6' - 8' tall at planting. This height will help ensure that plants will resist competition from invasive plants and damage from deer browse. Shrubs shall be a minimum of 18" - 24" tall at planting.
6. All plants shall be balled and burlapped or containerized.
7. Root balls of all plants shall be adequately protected at all times from sun, drying winds, and frost.
8. Woodland gaps shall be planted with trees on 10' x 10' spacings and protected from deer damage with fencing, tree shelters, or flexible tree guards.
9. Hedgerows that are principally screens shall have at least 20' spacings in staggered rows to allow for full development of trees.
10. The planting hole shall be 2-3 times as wide as the diameter of the root ball, but need not be much deeper than the root ball. As necessary, mound soil in the hole so that when set in place, the plant will have the top of its root ball at or slightly above ground level. If debris is encountered, e.g., rocks, broken concrete, trash, etc., remove it to a minimum depth of 30" and backfill with soil, leaving a hole as deep as the root ball.
11. Any burlap, twine, or wire basket covering the upper half of the ball must be loosened and laid flat in the hole or cut away completely after the plant has been

- set in place. It is essential to completely remove all synthetic string and fabric from around the root ball (natural burlap will decompose in time).
12. Backfill with soil and lightly tamp soil surface.
 13. If space permits, mound the soil into a collar 4" - 5" high surrounding the perimeter of the root ball to retain water.
 14. If planting on a slope, mound soil on the downslope side to prevent water runoff.
 15. Watering is only necessary if the plant is planted with foliage and not during optimal planting times. However, if water is easily accessible, water all plants to help remove air pockets from backfilled soil. In this case, the planting hole shall be backfilled 3/4 full with soil and watered well. When the water has been absorbed, the hole shall be filled the rest of the way with soil and tamped lightly.
 16. If available and/or desired, put a layer of mulch 2" - 3" thick over the planting area, but no closer than 2" to the trunk of the tree.
 17. Stakes shall not be used unless the tree is planted with a loose root ball or later found to be displaced. If they are required, hardwood stakes no less than 2" x 2" across shall be driven into the ground outside the root ball. Use two stakes for trees smaller than 2.5" - 3.5" in caliper, three stakes for trees larger than 2.5" - 3.5" in caliper. The stakes shall be tall enough to provide the firm support necessary for proper root development, but not too tall to permit the tree to flex in the wind. The stakes shall all be the same height for uniform support. Number 10 galvanized wire shall be looped around the trunk, allowing enough space for growth, and tied to each stake. The trunk shall be protected by placing a short piece of 3/4" diameter, 2-ply reinforced hose around the wire where it comes into contact with the trunk. All stakes and wire shall be removed from the plants after one year.
 18. Heavy equipment shall be used only in extreme situations. If necessary, protect existing trees by staying as far away as possible (at least outside the drip line) to prevent soil compaction and trunk scarring.
 19. Mow as necessary to maintain any herbaceous vegetation at a height no greater than 6" until areas are permanently re-established with new plantings.
 20. Planting shall continue on an as-needed basis to assure that sufficient regeneration is available to replace canopy trees as they die.

Chapter 7

Recommendations for Monitoring and Enforcement of Preservation Areas

Monitoring or inspections of Preservation Areas both during construction and annually thereafter is important to ensure that the plan is being implemented correctly, to address new or unforeseen problems, and to allow for the incorporation of the latest knowledge and technology into the plan. There is a far greater likelihood of proper stewardship of resource areas over the long term with this component. The procedures proposed below are based on discussions with the Township Building Regulation staff, consultants active in the Township and, in the case of the procedures for annual inspections, on the annual monitoring and enforcement that the Natural Lands Trust and other land trusts now conduct on their conservation easements.

7.1 Monitoring During the Construction Phase of a Project

During construction it is inevitable that there will be problems when work must be done in or around the Preservation Area. "Construction" and "preservation" are contradictory terms at least when it comes to natural areas. However the problems can be minimized by careful planning for construction and through better communication during the construction phase.

Planning for construction

It is recommended that the plans for Preservation Area recognize necessary intrusions into the PA for installation of utilities, removal of invasive plants that require machinery, etc. The plan should clearly delineate three zones:

- (1) areas that are not to be intruded upon at any time - the "pristine areas";
- (2) areas that must be intruded upon for installation of utilities and other necessary components of the development plan; and
- (3) areas where intrusion is required in order to effect restoration of the resource, e.g., vehicles needed for removal of undesirable vegetation, earthmoving equipment to fill in eroded areas, or cherry-pickers to prune large trees.

Pre-Construction Communication

To improve communication and scheduling during the construction process there should be a pre-construction conference between the Township Building Regulation staff, the general contractor, and *all* the subcontractors at which the contractors are

made aware of the restriction on access into the Preservation Area. All contractors should be made to sign an acknowledgement form at this meeting. Either at this meeting or as soon thereafter as is practical, a master schedule should be drawn up which lists all permitted intrusions into the PA and when they will occur. The Building Regulation staff should then be informed before these permitted intrusions so that they can arrange to be on site at the proper time.

7.2 Long Term Monitoring, Interpretation and Enforcement

To ensure the long term integrity of Preservation Areas, it is recommended that Lower Merion Township institute administrative procedures for the Preservation Areas program.

Long term administration of Preservation Areas will include three principal tasks: 1) annual monitoring, 2) interpretation of PA restrictions and maintenance requirements, and 3) enforcement of PA restrictions and maintenance requirements. Based on the experience of nonprofit conservation organizations, the heart of this long term process will be an ongoing, annual monitoring process followed up with appropriate enforcement actions. Procedures for annual monitoring are described below. Interpretation is usually a minor item and consists primarily of answering owners' questions about what they can and cannot do within restricted areas.

Database

The Township should create and maintain a database of every property that contains a Preservation Area. Such a database could be developed from models already in use at land trusts, such as the Natural Lands Trust. Based on the experience of nonprofit organizations, the database should include the following information (data fields):

- a. Project code number
- b. Conveyance date (where applicable)
- c. Recording date
- d. Developer name and address(es)
- e. Restriction type
 - conservation easement
 - deed restriction
 - trail easement
 - other
- e. Tax parcel numbers
- f. Deed Book and Page
- g. Other location data: Map Book, Aerial photo

- h. Funding provisions, e.g., endowment
- i. Amendments
- j. Property Address
- k. Watershed/subwatershed
- l. Protected acreage (by tax parcel)
- m. Total property acreage (by tax parcel)
- n. Property description
- o. Natural features present:
 - woodlands
 - floodplain, alluvial soil
 - ponds
 - meadow
 - streams
 - steep slopes
 - wetlands
- p. Chain of title from time of conveyance/protection
 - donor name and address
 - value of land and easement at time of donation
 - each successor owner and date of transfer
 - purchase price at each transfer
 - current landowner
- q. Summary of restrictions with emphasis on nonstandard, special provisions.
- r. List of pre-existing improvements
- s. Summary of permitted improvements and status
- t. Inspection record with reports from each annual inspection and results of any actions
- u. File number if applicable

Annual Inspection

It is extremely important to inspect each property annually, not only to detect any violations that may have occurred, but to remind landowners that their land is under special restriction and that someone is monitoring and enforcing those restrictions. It also provides an opportunity for the landowner to gather stewardship recommendations for specific problems within the PA.

The procedure described below is based on that used at the Natural Lands Trust.

- a. Annual monitoring begins with a verification of the ownership of each eased or otherwise protected parcel.
- b. This research is followed up by a letter to each owner notifying them that an inspection of their property will be scheduled within a certain specified time period and giving them the name of the person who will contact them to set an

- appointment.
- c. The inspecting staff person then contacts each owner by phone and makes an appointment.
 - d. At the specified time, the staff person walks the property with the owner, photographs the property, and fills out a simple standard form which lists general easement standards and specific restrictions of the property being inspected.
 - e. The inspection report is then formally typed (or word processed, or preferably entered directly into the database) and a copy mailed to the owner with an accompanying acknowledgement form for the owner to sign and return.
 - f. If any violations are discovered they are discussed by an appropriate committee and action taken on a case-by-case basis.

This process results in four annual contacts between the owner and the monitoring organization, usually over a four to six month period. By using good database software it is possible to reduce the quantity of time involved in this process to a minimum. All the paperwork can be handled by a computer literate secretary or technician.

Enforcement

In the case of conservation easements held by nonprofit conservation organizations, the nonprofit would be the first line of defense with respect to enforcement of PA restrictions. The Lower Merion Building Regulation Department should also participate in enforcement because of their strong enforcement powers. If no conservation easement were in force, the Township would be the principal enforcement entity, although in some cases, the homeowners association might also play a role.

Staffing

It is important that the persons who inspect Preservation Areas have both a practical knowledge of land and natural systems and the ability to read and interpret legal documents. The Township can either assign this task to existing staff, hire new staff or contract the work out to an existing organization with the appropriate experience already available.