Introduction

The need to protect and steward remaining natural lands has grown along with the wave of suburban development in southeastern Pennsylvania. In response, public agencies and private foundations are helping municipalities and land conservancies protect critical natural lands within the region through fee acquisition and conservation easements. Some municipalities, through Smart Growth practices, now require that new developments contain a percentage of open space. In addition, public agencies and private conservation organizations are working to inform landowners about the "best management practices" for the remaining—both protected and unprotected—natural lands.

Natural lands provide many environmental, ecological, and recreational benefits including protection of soil and water resources, habitat for local and migratory wildlife, and areas for hiking and nature study. In order to maximize the ecological and community benefits of natural lands, landowners and land managers must establish an effective long-term land stewardship program.

Holly Harper

Why stewardship?

In order to maximize the ecological and community benefits of natural lands, landowners and land managers must establish an effective long-term land stewardship program.

natural lands **are areas that are dominated by vegetative cover types native to our region (e.g., forest, meadow, marsh, barrens) and typically require less maintenance to perpetuate than lands outside this category, such as formal landscapes and agricultural fields.**

What is land stewardship?

Taking care of natural lands to achieve conservation objectives.

Stewardship is an active process of engagement with your land to direct it toward (or keep it at) a desired state. Because natural processes in the region have been and continue to be significantly altered by human activity, natural lands left to themselves will—in most cases—become degraded and dysfunctional. It is not good enough to let natural lands go.

Defining stewardship goals for individual properties and understanding the existing resources and various issues and opportunities associated with each site are critical to sustaining healthy ecosystems beneficial to wildlife and safe and enjoyable recreational areas for human visitors.

What this handbook will do for you

Land for Life provides a framework in which to make decisions on the stewardship of natural lands. It will assist the owner or manager of existing or potential natural lands in developing ***stewardship goals*** and a regimen to implement ***stewardship practices***. *Land for Life*:

- *Provides information on the options available for stewarding natural lands and the challenges and opportunities associated with each option;*
- *Guides you through a "decision tree" to determine which stewardship option is appropriate for the existing or potential natural lands based on the existing conditions and your goals; and*
- *Provides a list of additional resources on major stewardship topics.*

Land for Life is written primarily for those involved with natural lands planning and stewardship within the five counties surrounding Philadelphia (Bucks, Chester, Delaware, Montgomery, and Philadelphia counties). This includes owners and managers of natural lands (conservancies, homeowners' associations caring for open space in conservation subdivisions, officials responsible for park and greenway maintenance) and planning professionals (including developers required to create a stewardship plan for open space within a development) engaged in the design, layout, and preparation of stewardship plans. However, most of the planning concepts and stewardship issues and recommendations are applicable to natural lands throughout the greater southeastern Pennsylvania region and beyond.

Land for Life employs current best management practices and is intended to help the land steward gain a greater understanding of the importance of protecting and restoring a broad range of native ecosystems including forests, grasslands, wetlands, and riparian areas. It can be used for properties of any size and type—from large parcels of unbroken forest to small open space parcels within conservation subdivisions.

Ultimately, it is hoped that *Land for Life* will help to improve the stewardship of the growing "nature network" of protected public and private lands in the region.

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How to steward natural lands

Your *stewardship objective* is to take the land *from* its current state *to* a desired future state (or keep it in the same state).

Your *stewardship plan* [p. 44] helps you identify...

What are the current **resources** on your land?

- Geology and soils **[p. 9]**
- Water **[p. 13]**
- Vegetation cover type(s) **[p. 14]**
- Cultural (scenic locations, trails, etc.)

What are the stewardship **issues** that affect the health of these resources?

- The four most common:
  - ~ Overabundant deer **[p. 20]** severely affect the sustainability of native plant communities, especially forests
  - ~ Fragmentation and edge effects **[p. 23]** encourage invasive plants and reduce plant/wildlife diversity
  - ~ Invasive plants **[p. 26]** replace native plants and reduce plant/wildlife diversity
  - ~ Disrupted water cycle **[p. 29]** depletes groundwater and causes flooding

What are your stewardship **conservation priorities [p. 56]** and **goals [p. 59]**?

- Preserve and enhance the most important conservation value(s) of the site

What are your stewardship **strategies** to achieve the goals **[p. 59]**?

- What you need to do over time (years, in fact)

Your *stewardship practices* implement the plan [p. 104].

Use the best management practices and techniques for your site, such as:

- Decrease deer abundance **[p. 104]**
- Reduce forest fragmentation **[p. 122]**
- Control invasive plants **[p. 125]**
- Establish and sustain meadows **[p. 138]**
- Recharge groundwater **[p. 149]**
- Design and maintain trails **[p. 155]**
- Monitor and remove hazard trees **[p. 165]**
- Plant native trees, shrubs and flowers **[p. 168, 172]**

Adapt! Monitor results, change practices or even goals if it is not working. Keep up with new management techniques.

Land for Life first introduces you to the types and composition of natural lands in southeastern Pennsylvania and the current stewardship issues affecting these areas that should be addressed within a stewardship plan.

It then walks you through the process of developing a stewardship plan, a multistep process:

Step 1: Inventory existing natural resources to identify and better understand the natural resources within the property and current stewardship issues.

Step 2: Delineate natural lands from remainder of the property.

Step 3: Establish stewardship units to delineate areas with similar vegetation and past management.

Step 4: Establish the conservation priority for the natural lands.

Step 5: Establish the stewardship goals for the natural lands.

Step 6: Determine appropriate strategies for each stewardship unit.

Step 7: Prioritize and schedule tasks for each stewardship unit.

Step 8: Establish a monitoring program to determine if goals are being met within each stewardship unit.

Step 9: Assemble the Stewardship Plan to record information gathered and decisions made.

Human intervention, while necessary, should be minimized and should, as much as possible, support the natural processes inherent to the area.

Land for Life specifically assists you in determining the driving consideration, or "conservation priority," for conserving and maintaining your natural lands. ***Your most important decision as a land steward is whether to maintain, restore or convert the current cover type(s) on your site to protect and enhance the conservation priority.*** This will depend on site conditions, resources on adjacent properties, historical site use, and available funding. The major cover types addressed in *Land for Life* are forests, hedgerows, shrublands, meadows/grasslands, pasture/cropland, wetlands, streambanks/riparian areas, ponds, lawns/landscaped areas, and traditional stormwater management areas.

Land for Life provides perspective and guidelines for converting and maintaining the current cover types as natural lands. In general, *Land for Life* is written from the perspective that human intervention, while necessary, should be minimized and should, as much as possible, support the natural processes inherent to the area. The **Stewardship Techniques and Procedures** *(page 104)* section gives additional detail on the major stewardship issues and recommendations. Finally, the main body of *Land for Life* is followed by a glossary and a list of resources from which you can find additional information.

Stewardship challenges, stewardship opportunities

As a land steward you will face numerous challenges in implementing your goals. The good news is that you are not alone. Your land is unique, but the problems are common to many other land stewards. That means that there is a wealth of learning out there about what works and what doesn't. *Land for Life* will help you

meet these challenges by formulating appropriate goals and strategies.

There are ***four major challenges*** to land stewards in southeastern Pennsylvania today.

Fragmentation/edge effects

Removal of native vegetation from large areas of the region—through conversion to agriculture and followed by residential and commercial development—have left the remaining natural lands as primarily fragmented "edge" type forest habitat. Edges are dominated by light-loving plants (often invasive non-natives) and they support much less diverse wildlife than large, contiguous forests.

For the land steward the challenge is to either reduce fragmentation through restoring links between forest patches, or to minimize edge effects by management of the invasive plants.

Deer overabundance

Deer are a natural part of the region's ecosystem, but long ago lost their primary natural predators (other than humans). A lack of natural controls coupled with a highly successful Pennsylvania Game Commission policy (originally implemented to save the species from extinction in the 19th century) focused on maximizing the sustained yield for hunters has resulted in populations much greater than natural lands can sustainably support. Although deer thrive on the edge habitat that a fragmented, suburbanized landscape provides, in overabundant numbers they consume the young trees, shrubs, and wildflowers that make a forest healthy, beneficial to wildlife, and self-sustaining. They can also cause significant damage to agricultural crops and ornamental plantings, and contribute to the spread of Lyme disease and vehicular accidents.

For the land steward the challenge is to manage the deer population at a density that restores and sustains native plant communities.

Invasive plants

Invasive plants—exotic (non-native) plants introduced for horticultural or agricultural purposes—can spread rapidly and aggressively into natural areas and effectively displace native plants and lower biodiversity. Not only do they alter the makeup of the plant communities on a site, but they also may affect soil chemistry and hydrology. Exotic invasive plants are usually less beneficial to wildlife than the native plants they replace, contributing further to loss of biodiversity.

For the land steward the challenge is to manage invasive plants (eliminating them is highly unlikely) to a level that protects and sustains diverse native plant and animal communities.

Water quality (stormwater management)

The natural hydrologic cycle returns stormwater to the ground through infiltration: as rain falls, most of it percolates down through the soil into the groundwater table. Groundwater replenishes not only the underground aquifers that supply drinking water for much of the region but also wetlands and waterways. Suburban development, particularly the huge amounts of paved (impervious) surface that comes with it, as well as old-style stormwater management that pipes runoff into streams, has so altered this cycle that groundwater is depleted and flooding is common.

For the land steward the challenge is to restore, as much as possible, the natural hydrologic cycle on the stewarded land.

Before you go out

A few last words are offered about using *Land for Life* (or any other land management resource) and stewarding natural lands. First, ***today's stewardship recommendations are based on current knowledge and technology***. You should use *Land for Life* knowing that plant communities will evolve, resource information and technology will change, and new impacts to natural lands are inevitable that may require new strategies

Stewardship recommendations will evolve over time.

to address. In addition, our knowledge of natural systems will grow and new techniques and technologies will be developed to address stewardship issues. To illustrate this point, remember that within the past twenty years, best management practices have included maximizing edge and habitat diversity on every property and the planting of invasive plant species for erosion control and wildlife food. Both ideas are strongly discouraged today.

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Second, ***every property has a unique combination of inherent environmental conditions (geology, soils, slope, aspect, hydrology, climate) and management history***. Every parcel of land will require a stewardship plan tailored to its particular conditions and history. It is extremely

Every property is unique.

important to be patient, observant, and not afraid to modify your original stewardship plan if you are not meeting your stewardship goals (a process that scientists call "adaptive management"). It also does not hurt to question any recommendation from this or any other source if it does not fit into the reality that you experience on a particular land parcel.

Finally, ***managing natural lands in our region is truly a relationship that benefits from mental flexibility, a light approach, and more humor and humility than hubris***. History is littered with evidence—failed projects and civilizations—that testifies to the human capacity for stubbornly mismanaging natural systems. This capacity is painfully

Stewardship is a relationship.

evident in the human origins of the most serious issues facing land stewards today (overabundant deer, invasive plants, water quality degradation). Like other relationships, the stewardship of natural lands requires an ongoing commitment to understand (which will take many years) and respect your "partner" and it is guaranteed to provide you with unexpected surprises (good and bad) along the way.