Protect your Stream

Healthy streams and rivers are valuable and vital natural resources. How we manage the land around them directly affects their health - for both better and worse.

Streamside Buffers

There's more to a stream than the stream itself. The land right next to a stream or river is part of the ***riparian zone***. This zone includes a stream, its banks, the surrounding floodplain and any connected wetlands.

To take good care of our streams it's important to take good care of the land surrounding them. **The first and most important step is to establish a streamside buffer** (also called a *riparian buffer*). This is an area along the edge of the stream that protects it from pollution and erosion. Trees and plants growing here play a critical role in keeping the stream healthy.

The buffer zone absorbs nutrients and pollutants. It slows the runoff of rainwater into the stream and filters out sediments. Trees and shrubs with deep root systems hold the soil and resist erosion. They also act like shock absorbers that diffuse the energy of floodwaters and thus reduce damage downstream. Trees cast shade that cools the water, reduces the growth of algae and improves fish habitat.

Tips for Creating a Streamside Buffer

- Begin with a "no mow" or "no graze" zone along your stream banks. An ideal buffer is 35-75 feet wide. Make yours as wide as possible.
- Plant trees and shrubs in your buffer zone. They provide many long-lasting benefits and can be quite inexpensive to establish and maintain.
- Using shrubs will give your buffer a quick start; many reach full size in just a few years.
- Use the list of plants inside as a guide to select native Pennsylvania grasses, trees and shrubs. They're beautiful and easy to maintain, and they attract wildlife.
- Where you do keep a lawn, set your mower blades at least three inches high. Taller grass slows runoff, resists drought and needs less fertilizer.

Erosion and Bank Stabilization

Well-planted streamside buffers are a proven, low-cost way to control erosion. Where buffers alone aren't enough, there are new and innovative techniques that can help solve the problem.

It's best to work with experienced professionals as you look for the causes of, and the solutions to, erosion problems. Your county planning commission, county conservation district or a regional watershed organization can help you find the local resources you need.

Tips for Stabilizing Your Streambank

- Limit the use of lawns along streams. The shallow roots of lawn grasses offer little protection against erosion. Never mow right to the edge of the stream.
- Use land management practices that protect streamside vegetation.
- Make sure you (and your consultant) fully understand the problem before trying to fix it.
- Be aware that a poorly designed solution on your property can make matters worse for your neighbors downstream.
- Work with your neighbors to manage the land along the *entire* length of a stream.
- Avoid or minimize channel narrowing and straightening.
- Contact your regional office of the Pennsylvania Department of Environmental Protection (DEP) before you alter a stream bank. Permits are likely to be required.

Sediment and Silt

Let a glass of stream water sit for a while and you'll notice that a layer of silt settles out on the bottom. Every stream carries fine particles of soil. But too much soil can choke the life out of a stream. Sediments clog the streambed, covering rocks and gravel where fish lay their eggs and smothering the other animals living there.

A major source of silt and sediment is construction – not just large-scale developments, but any project that disturbs the soil. Farming activities can also cause soil runoff. You can prevent excess silt and sediment with a few simple steps.

Tips to Prevent Sediment

- Use hay bales or a special silt fence to prevent soil from washing off construction sites.
- Cover piles of soil with tarps to protect them from rain.
- Never store loose soil near a stream.
- Use good farm practices like no-till cropping and planting winter cover crops to conserve soil.
- Contact your local DEP office or county conservation district if you see soil runoff from a construction site.

Learn more about

Managing Streamside Buffers

Streamside buffers do more than protect the stream. A meadow or buffer with trees and shrubs is home to birds, butterflies and other fascinating creatures. To keep our local ecosystems thriving, learn more about the wildlife living there. The US Fish and Wildlife Service, Natural Resources Conservation Service and Pennsylvania Game Commission are good sources of information.

Many landscape professionals specialize in ecologically friendly design. These experts can help you select and arrange plantings to create a streamside garden. Contact your county Cooperative Extension for a list of referrals. Your area PA DCNR-Service Forester can also provide assistance.

Invasive plants like purple loosestrife, mile-a-minute weed and Japanese knotweed crowd out desirable native species. You can find good information on native plants, invasive plants, and streamside buffers on the Internet.

This list represents a limited selection of Pennsylvania's native species appropriate for planting throughout the state along streams and in adjacent floodplains and wetlands. Plants are highly influenced by soil properties including moisture holding capacity, proximity to the water table, acidity-alkalinity (pH). Choose plants adapted for your soil conditions, and your garden will thrive with less watering and without the use of chemical fertilizers or pesticides.

KEY

○, ◗, ●	full sun, light shade, shade
OBL	consistently wet or saturated soils (obligate in wetlands)
FACW	wet to moist soils (facultative wetland)
FAC	moist soils (facultative)
FACU	moist to dry soils (facultative upland)
UPL	dry soils (upland)

Common Name	Botanic Name	Flower	Bloom Time	Sunlight	Moisture	Notes
FERNS						
Cinnamon fern	*Osmunda cinnamomea*			○-●	FACW	Cinnamon-colored fertile fronds; moist acid soils.
Interrupted fern	*Osmunda claytoniana*			◗-●	FAC	Grows in clumps; distinctive fertile fronds. Common in woods, seeps, swamps and bogs.
Sensitive fern	*Onoclea sensibilis*			○-●	FACW	Sunny or shaded swamps, marshes, moist meadows. Forms colonizing masses
GRASSES & SEDGES						
Big blue stem	*Andropogon gerardii*		Aug-Sept	○	FAC	Tall clump forming; streambanks and moist meadows
Broom sedge	*Carex scoparia*		Summer	○	FACW	Moist open ground
False nut sedge	*Cyperus strigosus*		Summer	○-◗	FACW	Moist fields, woods, swamps and streambanks
Lurid Sedge	*Carex lurida*		Jun-Oct	○	OBL	Common in swamps, wet meadows and bogs
Riverbank wild rye	*Elymus riparius*		July-Sep	○	FACW	Alluvial flats, meadows and streambanks
Sedge	*Carex vulpinoidea*		Summer	○	OBL	Swampy areas
Soft rush	*Juncus effusus*		Summer	○	OBL	Swamps, moist fields and floodplains
Switch grass	*Panicum virgatum*		Aug-Sep	○	FAC	Clump grass; can help to control erosion. Sandy and river soils.
Tussock sedge	*Carex stricta*		May-Aug	○-◗	OBL	Forms a hummocky mound; swamps, streambanks and wet meadows
Virginia wild rye	*Elymus virginicus*		Jun-Sept	○-◗	FACW	Moist woods, meadow, streambanks
Wool grass	*Scirpus cyperinus*		Jul-Sep	○	FACW	Tall clump forming, with wooly seed head. Marshes, moist meadows, swales and shorelines.
FLOWERING PERENNIALS						
Beard-tongue	*Penstemon digitalis*	White	May-Jul	○	FAC	Attracts hummingbirds; moist meadows
Bottle gentian	*Gentiana andrewsii*	Blue	Apr-Oct	○-◗	FACW	Bottle-shaped flowers; moist meadow species
Blue vervain	*Verbena hastata*	Blue	Jun-Sept	○-◗	UPL	Bright flowers; herbal uses; streambanks and moist meadows
Blue-eyed grass	*Sisyrinchium angustifolium*	White	Jun-Jul	○-◗	FACW	Tiny blue flowers above grassy foliage; dry to moist meadows and fields
Boneset	*Eupatorium perfoliatum*	White	Jul-Aug	◗-●	FACW	Wet meadow species
Cardinal flower	*Lobelia cardinalis*	Scarlet	Jul-Sep	○-●	FACW	Long bloom time; attracts butterflies and hummingbirds; streambanks and pond margins
Cut-leaf coneflower	*Rudbeckia laciniata*	Yellow	Jul-Sep	○-◗	FACW	Herbal uses; streambanks
Ironweed	*Vernonia noveboracensis*	Purple	Aug-Sep	○	FACW	Tall plant with brilliant late summer flowers
Jack-in-the-pulpit	*Arisaema triphyllum*	Green-purple	Apr-Jun	◗-●	FACW	Unusual flower; bright red berries; moist woods, swamps and bogs
Joe-pye weed	*Eupatorium fistulosum*	Purple	Aug-Sep	◗	FACW	Attracts beneficial insects; herbal uses
New England aster	*Aster novae-angliae*	Purple	Aug-Oct	○-◗	FACW	Showy and frequently cultivated; dry to moist meadows
Partridgeberry	*Mitchella repens*	White	Jun-Jul	◗-●	FACU	Evergreen; ground cover; edible berry; moist woods
Purple stemmed aster	*Aster puniceus*	Blue	Aug-Sep	○-◗	OBL	Does well in moist meadows; deep green foliage
Smooth goldenrod	*Solidago gigantea*	Yellow	Jul-Nov	○-◗	FACW	Tall; purplish stem with smooth leaves; dry to moist fields
Swamp milkweed	*Asclepias incarnata*	Rose	July-Aug	○	OBL	Attracts butterflies; moist meadows
Tall meadowrue	*Thalictrum pubescens*	White	Jun-Jul	○-◗	FACW	Tall plant with cloudy clusters of tiny flowers; bluish foliage; moist meadows and swales
Wingstem	*Verbesina alternifolia*	Yellow	Aug-Oct	◗	FAC	Moist riverbanks, shaded lowlands
Wood geranium	*Geranium maculatum*	Rose-pink	Apr-May	○-◗	FACU	Woods and fields
SHRUBS						
American elderberry	*Sambucus canadensis*	White	Jun-July	◗	FACW	Edible berries & flowers; multi-stemmed; very high wildlife value
Arrowwood	*Viburnum dentatum*	White	May	○-●	FAC	Dark blue fruits in fall; high wildlife value; streambanks, pastures
Black chokeberry	*Aronia melanocarpa*	White	Mar-Jul	◗	FAC	White flowers; black berries; fall color
Buttonbush	*Cephalanthus occidentalis*	White	Jun-Sep	○	OBL	Multi-stemmed; tolerates inundation
Dangleberry	*Gaylussacia frondosa*	White	May	○-◗	FAC	Edible fruits; high wildlife value; acid soils
Highbush blueberry	*Vaccinium corymbosum*	White	May-Jun	◗	FACW	Multi-stemmed; edible berries; fall color; very high wildlife value
Maleberry	*Lyonia ligustrina*	White	June	◗	FACW	Dry to wet woods and thickets; acid soils
Ninebark	*Physocarpus opulifolius*	White	May-July	○-◗	FACW	Wet woods, sandy or rocky stream banks
Northern arrowwood	*Viburnum recognitum*	White	May	○-●	FACW	Dark blue fruits in fall; high wildlife value; streambanks, swamps, wet pastures
Pussy willow	*Salix discolor*	Yellow-green	April	○	FACW	Swamps and wet woods
Red chokeberry	*Aronia arbutifolia*	White	May	◗	FACW	Red berries; high value for wildlife
Rosebay	*Rhododendron maximum*	Pink	Jun-July	●	FAC	Showy flowers; evergreen; multi-stemmed; acid soils
Silky dogwood	*Cornus amomum*	White	May-Jul	○	FACW	Flowers in summer; blue berries; multi-stemmed; very high wildlife value
Silky willow	*Salix sericea*	Yellow-green	May	○-●	OBL	Good wildlife value; needs wet conditions
Spice bush	*Lindera benzoin*	Yellow	Mar-May	◗-●	FACW	Bright red berries in fall; herbal uses; wildlife value
Swamp dogwood	*Cornus racemosa*	white	May-Jun	◗	FAC	Colonizer; high wildlife value
Swamp rose	*Rosa palustris*	Pink	May-June	○	OBL	Showy and fragrant
Winterberry holly	*Ilex verticillata*	White	May-June	◗	FACW	Showy berries in winter; high wildlife value; good colonizing shrub for stream banks
Witch-hazel	*Hamamelis virginiana*	Yellow	Sep-Nov	○-●	FAC	Bright yellow flowers fragrant; medicinal uses
TREES						
American beech	*Fagus grandifolia*	Yellow	Apr-May	○-●	FAC	Large tree with handsome smooth gray bark; moist, but well-drained soils; high wildlife value
Basswood	*Tilia americana*	Yellow	May-Jun	○-●	FACU	Flowers aromatic; with herbal uses
Black ash	*Fraxinus nigra*	Purple	April	○-◗	FACW	Large tree in wet woods and bottomlands
Black gum	*Nyssa sylvatica*	Greenish white	Apr-May	○-◗	FAC	Tall tree with outstanding fall color; high wildlife value
Black walnut	*Juglans nigra*	Yellow	May-Jun	○	FACU	Fast growing tall tree; high wildlife value
Black willow	*Salix nigra*	Yellow	Apr-May	○	FACW	Catkins in spring; very fast grower
Green ash	*Fraxinus pennsylvanica*	Purple	Apr-May	◗	FACW	Fast growth; good fall color
Hornbeam	*Carpinus caroliniana*	Red	Apr-May	○-●	FAC	Small tree with sinuous gray bark; moist woods
Pagoda dogwood	*Cornus alternifolia*	White	May-June	◗	FAC	Small tree for moist woods and shaded ravines; dark blue fruit
Pin oak	*Quercus palustris*	Yellow	Apr-May	○	FACW	Ornamental street tree; fall color; very high wildlife value
Red maple	*Acer rubrum*	Red	Mar-Apr	○-●	FAC	Adapts to range of moisture conditions; good fall color
River birch	*Betula nigra*	Yellow-green	May	○-◗	FACW	Notable for its peeling bark; floodplains, streambanks, wet woods and swamps
Shadbush	*Amelanchier arborea*	White	Apr	◗	FAC	Small tree with early spring flowers; delicious edible berries in summer
Shagbark hickory	*Carya ovata*	Yellow	May	○-◗	FAC	Shaggy gray exfoliating bark; very high wildlife value
Silver maple	*Acer saccharinum*	Yellow-red	April-May	○-◗	FACW	Moist woods, streambanks, alluvial soils
Swamp white oak	*Quercus bicolor*	Yellow	May	◗	FACW	Large tree with very high wildlife value; good wetland oak
Sweet birch	*Betula lenta*	Yellow-green	May	○-◗	FACU	Wintergreen scented bark and foliage; streambanks and woodlands
Sycamore	*Platanus occidentalis*	Yellow	April	○	FACW	Large tree with showy mottled bark; riverbanks, floodplains and alluvial soils
Tulip tree	*Liriodendron tulipifera*	Yellow	May-Jun	○-●	FAC	Large tree with green/orange flowers; fast growth; moist, but well drained soils

This brochure offers some simple land management tips you can use to keep our rivers clean and healthy and protect your streamside property. Whether you live on a farm, in a city, or in a suburb, you can use these practices to help protect our water resources.

Pollution

Most stream pollution comes from manure, fertilizers, road salts, oil and other chemicals. Called *non-point source pollution,* these come from the entire watershed rather than from any one point. Each adds only a small amount of pollution, but together, they add up to a huge problem.

Poorly stored trash, litter and yard debris also wash into streams. The result of the accumulated pollution and trash is an unattractive and unhealthy stream.

Tips for Reducing Pollution

- Base your fertilizer use on the conditions of your soil. More is not better; follow directions. Don't fertilize plants near streams.
- Limit your overall use of pesticides and herbicides, and use extreme caution when using them near streams.
- Keep grazing and other farm animals out of and away from the stream. Contact your county conservation district or the U.S. Fish and Wildlife Service to find out about farm fencing programs.
- Compost yard waste. Don't bag lawn trimmings; leave them in place for effective recycling of nutrients.
- Don't store or dump manure, garden waste or grass clippings near streams.
- Don't burn refuse near stream banks.
- Store firewood, trash and other materials well away from streams.
- Never dump trash or chemicals into streams, storm drains or sewers.

References

The Plants of Pennsylvania: An Illustrated Manual, Ann Fowler Rhoads and Timothy Block; illustrations by Anna Anisko, University of Pennsylvania Press, Philadelphia 2000. ISBN 0-8122-3535-5

Atlas of the Flora of Pennsylvania, William Klein and Ann Fowler Rhoads, University of Pennsylvania Press, Philadelphia 1993. ISBN 08916192074

Terrestrial & Palustrine Plant Communities of Pennsylvania, Jean Fike, PA Department of Conservation and Natural Resources, Bureau of Forestry, Harrisburg 1999, Publication number 8140-BK-DCNR 1128

Forest Buffer TookKit-Reforesting Pennsylvania's Streams, available on PA DEP's website (see below)

Web Resources

Delaware Riverkeeper Network
www.delawareriverkeeper.org

Morris Arboretum of the University of Pennsylvania
www.upenn.edu/paflora

Pennsylvania Department of Environmental Protection
www.dep.state.pa.us Subjects: Stream Releaf

Pennsylvania Conservation Districts www.pacd.org/

Pennsylvania Department of Conservation & Natural Resources www.dcnr.state.pa.us/forestry/pndi

Pennsylvania State University - Outreach and Cooperative Extension www.outreach.psu.edu/Cooperative/Extension/Regions

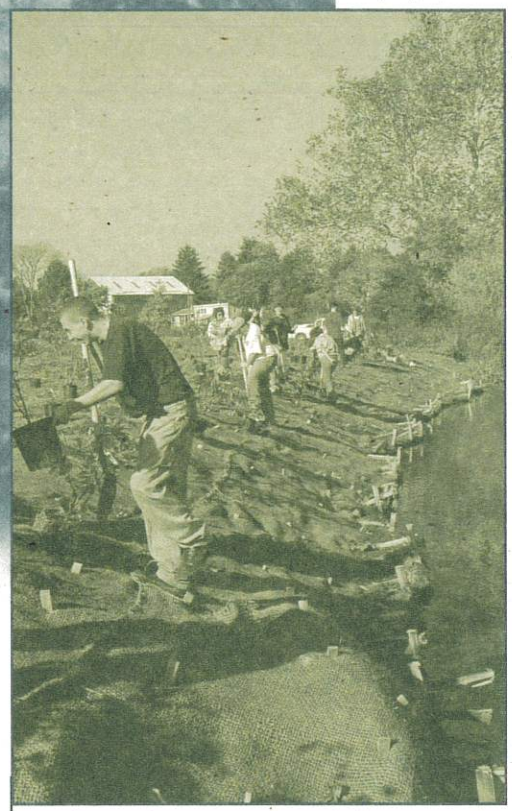
Pennsylvania Game Commission
www.pgc.state.pa.us link to Wildlife, Wildlife Notes

Natural Resource Conservation Service www.nrcs.usda.gov link to Backyard Conservation

Brooklyn Botanic Garden, Invasive Plants
www.bbg.org/gardening/botany/conservation/invasives.html

U.S. Fish and Wildlife Service www.fws.gov/

This brochure was financed in part by a Federal Coastal Zone Management Grant provided by the Pennsylvania Department of Environmental Protection with funds provided by the National Oceanic and Atmospheric Administration.



25 ways to protect your Stream and Streamside Property

Morris Arboretum of the University of Pennsylvania
Official arboretum of the Commonwealth of Pennsylvania