SECTION SEVEN

Wetlands & Stream Protection Management Planning

Stream water quality and protection has become a major environmental concern in recent years. Agricultural operations are receiving more attention for their impacts on water quality than ever before. As a result, more farmers are working to protect streams, creeks, ponds, and other water sources from damage.

In addition, regulatory requirements for agricultural operations are increasing each year. It is becoming a common struggle for farmers to meet regulatory requirements while also maintaining a profitable operation. More effort is now being put into voluntary programs that offer cost-share assistance for protecting water sources from agricultural environmental damage.

The practices listed in this section all address stream protection and management to protect and conserve natural resources.

Conservation practices included in the Wetlands & Stream Protection Management Planning section include:

Channel Bed Stabilization 584

Riparian Forest Buffer 391

Riparian Herbaceous Cover 390

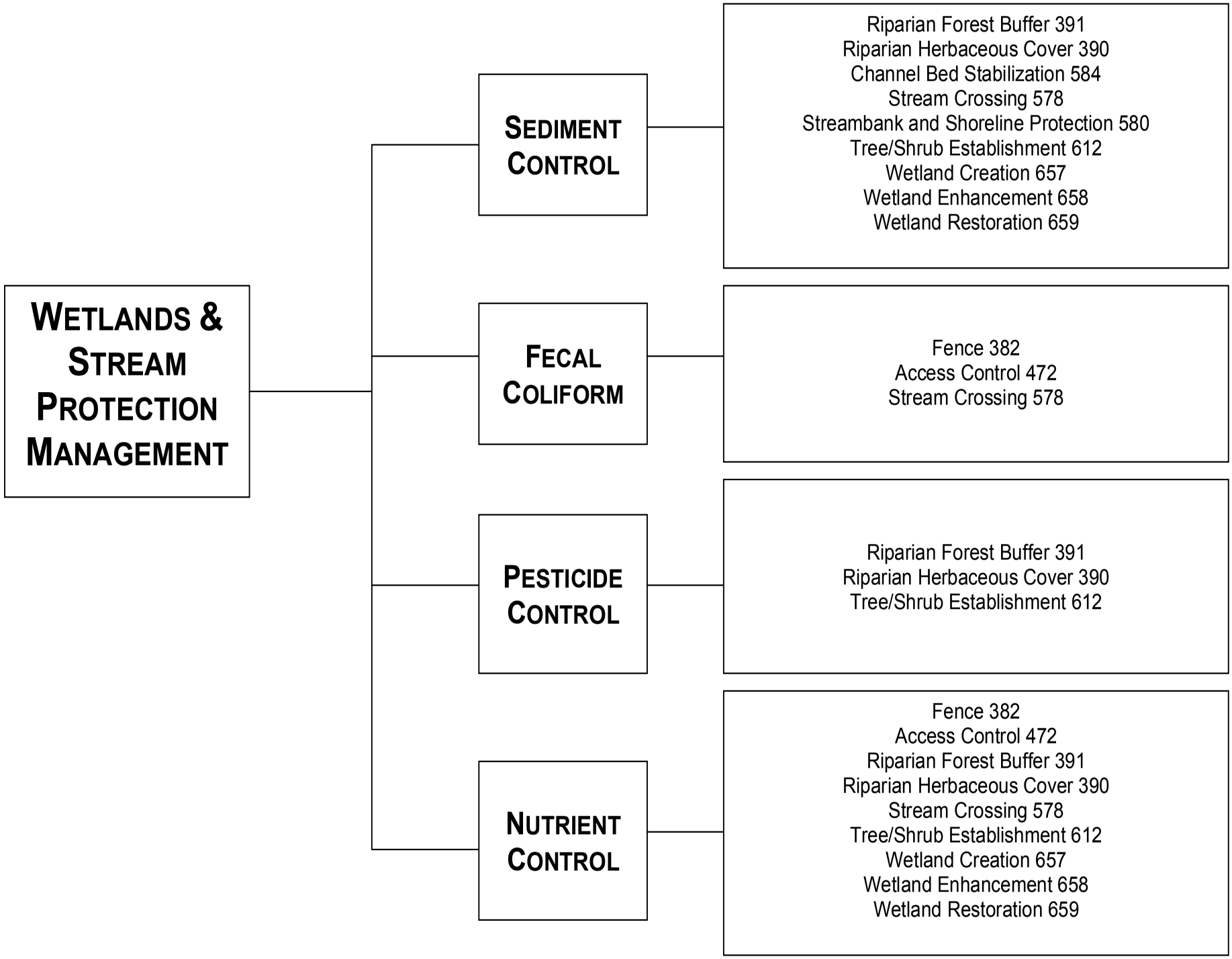
Streambank and Shoreline Protection 580

Tree/Shrub Establishment 612

Wetland Creation 658

Wetland Enhancement 659

Wetland Restoration 657


WETLANDS & STREAM PROTECTION MANAGEMENT
SEDIMENT CONTROL
Riparian Forest Buffer 391
Riparian Herbaceous Cover 390
Channel Bed Stabilization 584
Stream Crossing 578
Streambank and Shoreline Protection 580
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CHANNEL BED STABILIZATION (584) includes actions that can be taken to stabilize or strengthen the bed or bottom of a channel.

Water Quality Benefits

- Reduces sedimentation
- Protects streambed integrity and aquatic habitats

When to Use

Channel bed stabilization is used to alter bed depth and adjust sediment transport when normal maintenance is not sufficient.

How to Establish

Stream channel stability is based on the materials that are part of the channel bottom and the ability to maintain stream peak flows, velocities and volumes.

Re-vegetating disturbed areas around a channel can reduce additional erosion.

In addition, effort should be taken to protect and ensure wildlife habitats and migration needs.

For more information, see *Additional Resources*.

Considerations and Costs

Channel stabilization may temporarily increase soil erosion. Producers should minimize these impacts as much as possible.

Producers should avoid channel clearing whenever possible to protect and maintain aquatic habitats.

A maintenance plan is needed for general operation, use and maintenance.

Contact your local conservation agent prior to beginning any stream channel stabilization project in order to fully understand maintenance requirements.

Channel stabilization is moderate to high in cost.

Effectiveness

Channel bed stabilization can, in the long run, significantly reduce soil erosion and sedimentation entering water.

Additional Resources

NRCS Conservation Practice Standard 584
NRCS Stream Corridor Restoration Manual

RIPARIAN FOREST BUFFERS (391) use trees or shrubs to reduce sediment, organic matter, nutrients and pesticides in surface runoff alongside watercourses.

Riparian forest buffers provide additional habitats for wildlife and promote water quality

Water Quality Benefits

- Reduces soil erosion
- Reduces sediment transport into water sources
- Reduces nutrient loadings in water sources
- Provides shade and lowers aquatic temperature

When to Use

Use forest buffers on areas adjacent to permanent or intermittent streams, lakes, ponds, wetlands and in areas with groundwater recharge capable of supporting woody vegetation.

When establishing new riparian areas between forestland and water bodies, follow streamside management zone (SMZ) guidelines in the Georgia Best Management Practices for Forestry Manual.

These areas can be used for very limited livestock grazing and hay harvesting.

How to Establish

Prepare site to support the type of forest buffer zone that will be established. Use native trees and shrubs that are noninvasive. Plants and trees need time to establish and should be planted when growth will be promoted. Fertilizer may be needed. In addition, livestock and equipment should be kept out of forest buffers until plants and trees are established.

For more information, see *Additional Resources*.

Considerations and Costs

Use Zone 2 buffers on sites that receive nutrient, sediment and animal waste applications where additional protection is needed to reduce soil erosion and water contamination.

Use Zone 3 buffers on sites adjacent to cropland and highly erodible areas to filter sediment, address concentrated flow erosion, and maintain sheet flow. For Zone 3 buffers, follow standards and specifications for filter strips.

Maintenance and labor costs may include sediment build-up removal and periodic inspections to ensure proper function.

Forest buffers are moderate in cost depending on the type of vegetation established.

Effectiveness

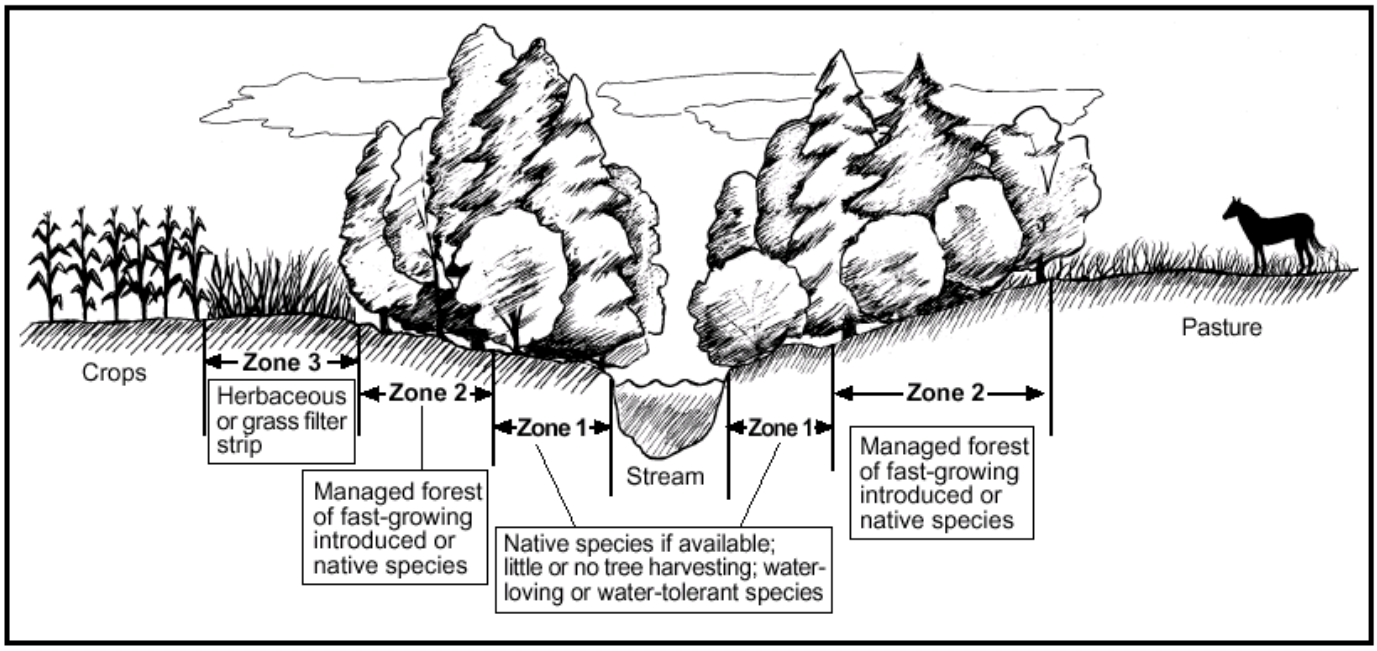
Riparian forest buffers removed 25-85% of nitrogen, 50-75% of phosphorus and 50-75% of sediment in runoff in addition to the acreage converted to forests in studies.

Restored Zone 3 buffers removed 60% of nitrogen and 65% of phosphorus entering from manure application sites to an adjacent water source in one Georgia research study. Grass buffers alone removed 45% of the nitrogen and 20% of the phosphorus from the same sites.

Additional Resources

NRCS Conservation Standard 391

Georgia's Best Management Practices for Forestry Manual



Zone 1 is the area closest to the water body course. Zone 2 is adjacent to and up-gradient from Zone 1 (a minimum of 15 feet). Zone 2 plantings intercept sediment, nutrients, pesticides and other pollutants in surface and subsurface water flows (a minimum of 20 feet). Zone 3 is established if periodic and excessive water flows, erosion and sediment from upslope fields or tracts are anticipated. Zone 3 is generally of herbaceous plants or grass and a diversion or terrace, if needed.

Source: NRCS Conservation Practice Job Sheet 391

Riparian Forest Buffers are called Stream Management Zones by the Georgia Forestry Commission. For more information, see the Georgia Best Management Practices for Forestry Manual

RIPARIAN HERBACEOUS COVER (390) uses grasses, grass-like plants and forbs to protect water quality, provide wildlife habitats and to stabilize streambanks and channels.

Riparian herbaceous cover protects water resources and enhances aquatic habitats

Water Quality Benefits

- Reduces soil erosion
- Reduces sediment transport into water sources
- Reduces nutrient loadings in water sources

When to Use

Riparian herbaceous cover is ideal where runoff can be a problem from pastures and cropland. Riparian cover is used between areas of agricultural land and water bodies. When establishing new riparian areas between forestland and water bodies, follow streamside management zone (SMZ) guidelines in the Georgia Best Management Practices for Forestry Manual.

Riparian Herbaceous Cover areas are not filter strips. Please see page 2.65 for information on filter strips.

How to Establish

The size of a riparian area varies according to use. Use native plant species whenever possible. Avoid harvesting or grazing these areas until plants are established. Then harvest or graze on a carefully monitored rotational schedule. Normal maintenance is required to ensure the function of a riparian herbaceous cover area. Herbaceous cover works best to provide soil stability when used in conjunction with planting shrubs and trees.

For more information, see *Additional Resources*.

Considerations and Costs

Costs associated with riparian herbaceous cover areas include site preparation, seed and plant materials and maintenance.

Herbaceous cover is low to moderate in cost depending on the type of vegetation established.

Effectiveness

Riparian herbaceous cover can potentially reduce nitrogen by 17-58%, phosphorus by 50-75%, and sediment by 50-75%. Riparian herbaceous cover effectiveness depends on maintaining sheet flow across the buffer and increasing infiltration and subsurface flow.

Additional Resources

NRCS Conservation Practice Standard 390
Georgia Best Management Practices for Forestry Manual

STREAMBANK AND SHORELINE PROTECTION (580) is the stabilization and protection of streams, constructed channels and shorelines in order to reduce erosion and water quality degradation.

A stream revetment was used to reduce and prevent streambank erosion along with revegetation

Water Quality Benefits

- Reduces erosion and loss of land
- Protects and maintains water flow and storage capacity
- Can be used to protect and improve stream corridors for wildlife and aquatic species
- Lowers total sediment and nutrient loads entering water bodies
- Provides shade and lowers aquatic temperature

When to Use

This practice can be applied to the streambanks of natural or constructed channels or shorelines that are susceptible to erosion. This type of practice is NOT applicable to ocean fronts or associated areas.

Prior to initiating work in any water body, including wetlands, contact the U.S. Army Corps of Engineers for additional requirements.

How to Establish

All federal, state and local regulations should be followed in the installation process.

Permits are the responsibility of the owner to obtain. These include Georgia 401 Clean Water Certification, Section 404 of the Clean Water Act permits, and authorization from the Department of Natural Resources, Fish and Wildlife Division in addition to any local permits that may be necessary.

Prior to installation, an assessment of the project area should be performed to identify unstable and erosive areas.

Install protective measures to protect streams from up-gradient runoff. The channel grade should be stable and based on a prior field assessment when permanent measures are installed.

Limit the removal of obstructions whenever possible as they provide ideal aquatic habitats. It may be necessary to clear channels when obstructions and/or debris (stumps, fallen trees, etc.) cause erosion or interrupt channel flow and function.

Use materials that cause minimal visual impacts, and maintain or compliment the existing landscape. Protective measures should have a minimal impact on the existing wildlife and habitat.

Disturbed areas should be re-vegetated as soon as possible with plant species that are native or adapted to the local ecosystem. Livestock should be excluded until plants are established, and then use appropriate grazing practices.

For more information, see *Additional Resources*.

Considerations and Costs

Additional protection may be necessary to protect surrounding habitats. Consider implementing other conservation practices to further protect water quality and reduce erosion.

Costs associated with this practice may include site preparation, materials, installation, maintenance, and the re-vegetation of surrounding areas.

Contact your local conservation agent prior to beginning a streambank or shoreline protection project in order to fully understand maintenance requirements.

Streambank and shoreline protection is moderate to high in cost depending on the size and length of the protection area.

Effectiveness

Streambank and shoreline protection can significantly reduce erosion and sediment entering water.

Additional Resources

NRCS Conservation Practice Standard 580
Georgia EPD

A streambank restoration project along the Etowah River

TREE/SHRUB ESTABLISHMENT (612) can be utilized for long-term erosion control by slowing runoff and allowing more time for nutrient absorption.

Water Quality Benefits

- Reduces erosion and runoff in the long-run
- Improves infiltration
- Reduces percolation in soil

When to Use

Trees and shrubs can be planted in areas where woody plants can be maintained.

How to Establish

Prepare site for plant/seedling installation. Plant tree seedlings, shrubs and seeds according to proper horticultural practices. Seedlings should ideally be planted between December 1 and March 15. The ideal planting time for deciduous shrubs is in late winter and is in early fall for evergreen shrubs.

Plant cuttings at least 4 to 6 inches above the ground and 14 to 16 inches below the ground. Planted areas need to be protected from livestock and wildlife until fully established. Depending on the site, it may be necessary to mulch, and to provide supplemental water or other treatments to promote plant establishment and growth.

When planting pines for wood production, 600-700 trees per acre is standard. 900-1,200 trees per acre is recommended on highly erodible lands.

For more information, see *Additional Resources*.

Considerations and Costs

Using locally adapted seed, seedlings or cuttings will encourage viability of plants. Space seeds, seedlings and cuttings appropriately. Consider future activities on the site prior to installation.

Costs associated with this practice may include materials, site preparation, installation, maintenance, protection and repair.

Tree and shrub establishment is low to moderate in cost depending on materials and installation costs.

Effectiveness

As an added benefit to reducing soil erosion, trees have been found to reduce dust particles from poultry houses by 50% in studies and can potentially reduce energy costs by providing shading. Species that work well include Leland Cypress, Red Cedar and White Pine.

Additional Resources

NRCS Conservation Practice 612

The Georgia Forestry Commission has an annual seedling sale for purchases of pine and hardwood seedlings. Visit the GFC website for more information.

WETLAND CREATION, ENHANCEMENT AND RESTORATION (657, 658, & 659) is the establishment, modification or restoration of a wetland to improve and protect water quality.

A restored wetland provides habitats for wildlife and can trap nutrients

Water Quality Benefits

- Reduces nutrient loadings
- Provides and protects native species habitats
- Can improve water quality associated with degraded wetlands
- Can reduce chemical contaminants

When to Use

Creating a wetland is ideal in areas where wetland conditions can be established and maintained by modifying drainage.

Enhancing existing wetlands can improve overall habitat and water quality, and may improve the many functions of a wetland. Restoring a wetland can provide habitats for wildlife.

Large wetland restoration projects can generate income when used to mitigate wetland losses elsewhere. Prior to any wetlands project, contact the U.S. Army Corps of Engineers for additional requirements.

How to Establish

All federal, state and local regulations should be followed. Landowners must obtain all required permits before beginning a restorative process.

Except where seasonal, wetlands require a permanent water source. Examine natural wetlands in the area as a guide for restoring a wetland. Vegetation established in wetlands should be adapted to the area as well as to wet conditions.

Permits are the responsibility of the owner to obtain. These include Georgia 401 Clean Water Certification, Section 404 of the Clean Water Act permits, and authorization from the Department of Natural Resources, Fish and Wildlife Division in addition to any local permits that may be necessary.

For more information, see *Additional Resources*.

Considerations and Costs

Consider any impacts of changes in the volume and rate of runoff, infiltration, evaporation, and transpiration on the water budget that may result from these practices. Producers should also consider any impacts on downstream flows and wildlife habitats prior to creating or modifying a wetland.

Costs associated with wetland creation include planning and design, site preparation, seed/plant materials, and other costs that result from altering water flows and establishing vegetative buffers.

Costs associated with enhancing and restoring wetlands may include drainage modification, additional plant materials, soil improvement costs, expansion costs, etc.

Contact your local conservation agent prior to beginning a wetlands project in order to fully understand maintenance requirements.

Wetland creation is moderately high to high in cost. Wetland enhancement is low in cost. Wetland restoration is moderate in cost.

Effectiveness

Restored wetland buffers with an up slope grass strip and down slope planted pines and hardwoods retained or removed 59% of nitrogen and 66% of phosphorus entering from adjacent manure application sites in studies.

Additional Resources

NRCS Conservation Practice Standard 657
NRCS Conservation Practice Standard 658
NRCS Conservation Practice Standard 659

Wetlands offer nesting sites for wood ducks and other wildlife

Fencing can be used to protect established wetlands and also to prohibit livestock access for restoration projects.