

TEXAS

PARKS &

WILDLIFE

Development of Watershed BMPs for Conservation of Texas Aquatic Ecosystems













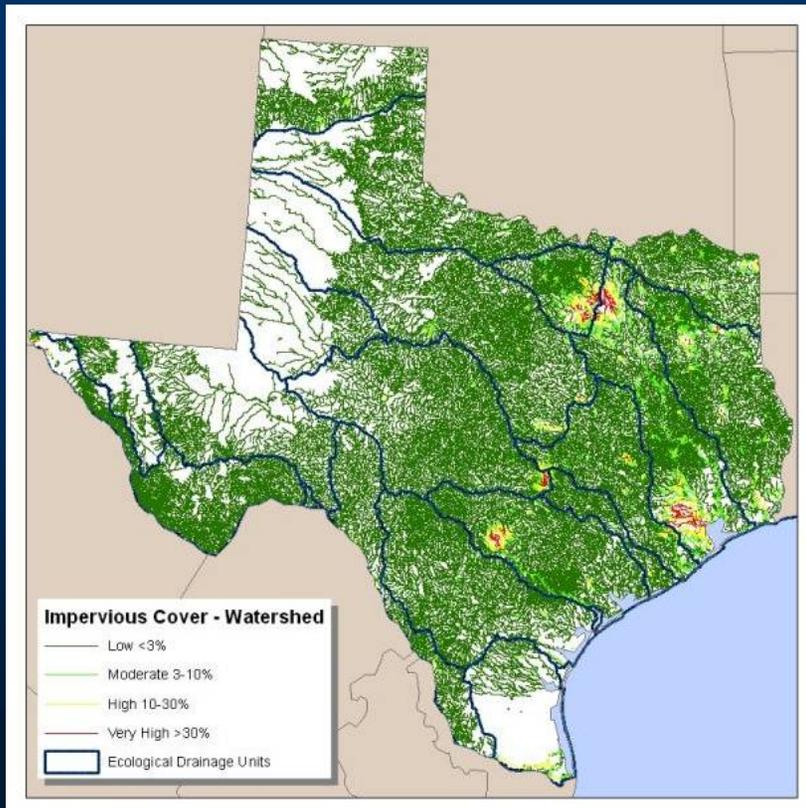
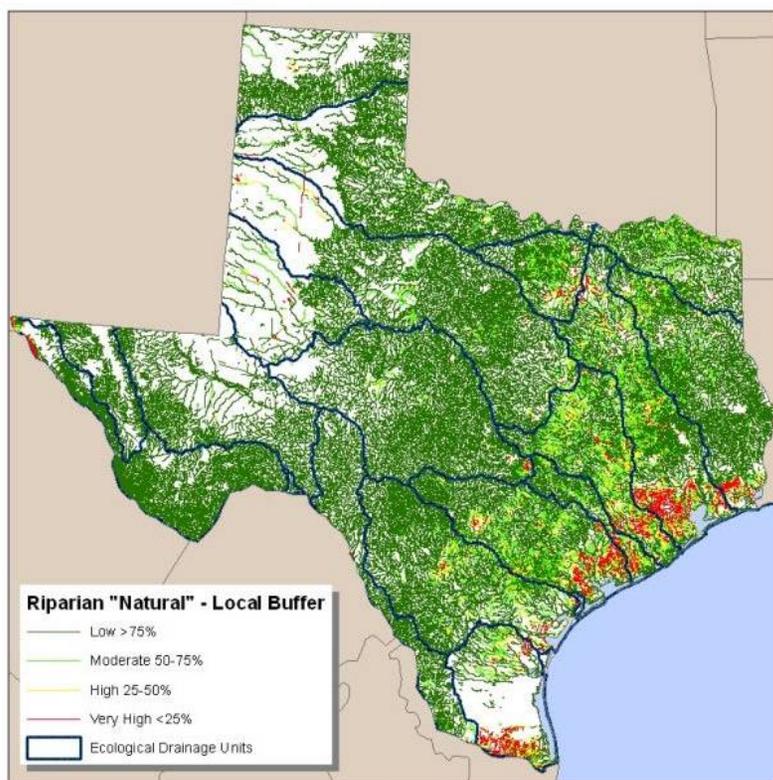
Watershed Best Management Practices for Conservation of Texas Aquatic Ecosystems

Project Objectives:

- (1) Identify landscape factors affecting the health of aquatic habitats and ecosystems;**
- (2) Develop BMPs to address specific impairments;**
- (3) Provide web-based access to BMPs;**
- (4) Facilitate project planning and implementation**

Watershed Condition Assessment

- u Measures of landscape disturbance are effective predictors of aquatic ecosystem health
- u Landscape data are useful for assessing large areas where site-specific data may not be available



Summary Information by Ecoregion

- u **Watershed degradation issues**
- u **Recommended BMPs**
- u **Conservation priorities**
- u **Restoration and preservation projects**
- u **Conservation partners**
- u **Sources of funding and technical assistance**

Best Management Practices

For the Conservation of Texas Aquatic Ecosystems

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Search

Conservation BMP Partners

- [Texas Parks and Wildlife Department](#)
- [Southeast Aquatic Resources Partnership](#)
- [The Nature Conservancy](#)

Watershed Highlights

- [Guadalupe Bass Restoration Initiative](#)
- [TPWD Landowner Incentive Program](#)
- [TPWD Texas Wetland News Newsletter](#)
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State Information

- [Impairment Issues](#)
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Best Management Practices

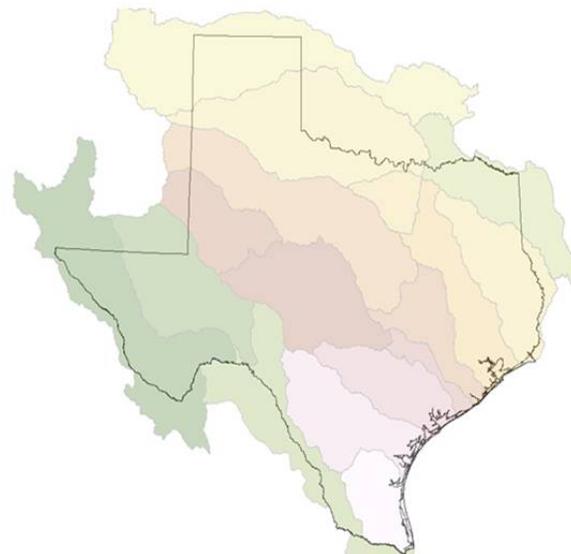
Conservation best management practices (BMPs) are methods or actions that promote the conservation, protection, and/or restoration of our natural resources.

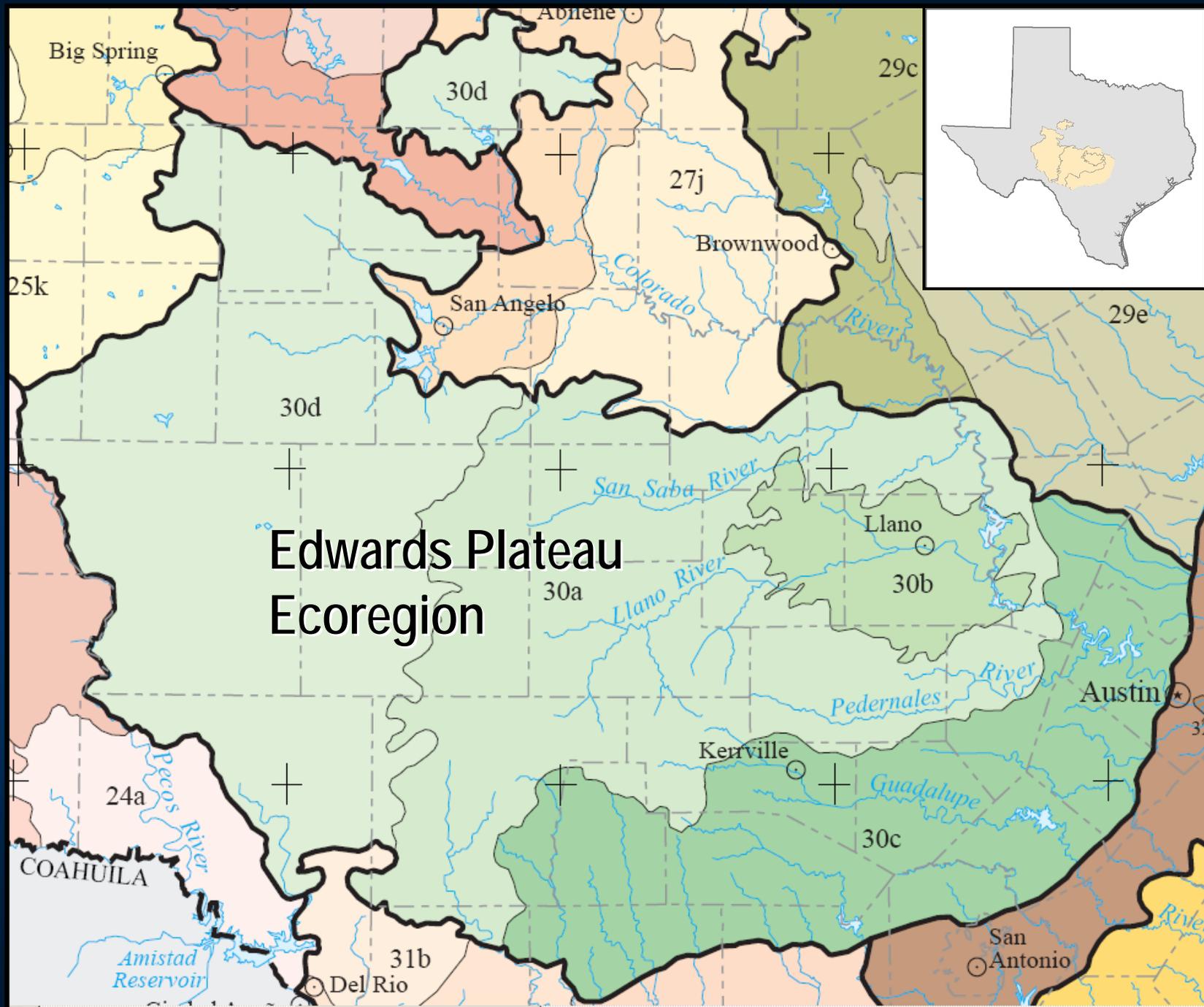
Conservation BMPs are an important tool for implementing plans and actions necessary to conserve, protect, and/or restore natural resources. This project was developed in Texas to identify BMPs to address landscape factors, land use practices, and impairments affecting the health of freshwater watershed habitats and ecosystems. To date, over 2,000 BMPs from more than 300 local, state, national, and international organizations and agencies have been collected to address these threats. Scientific literature, species lists, critical habitats, and conservation priorities were also compiled to more effectively facilitate conservation planning and habitat restoration.

Search BMPs by [conservation objective](#) or by [land use](#) for the state. Or search BMPs by [ecological drainage unit](#) on the map below.

Search for Best Management Practices

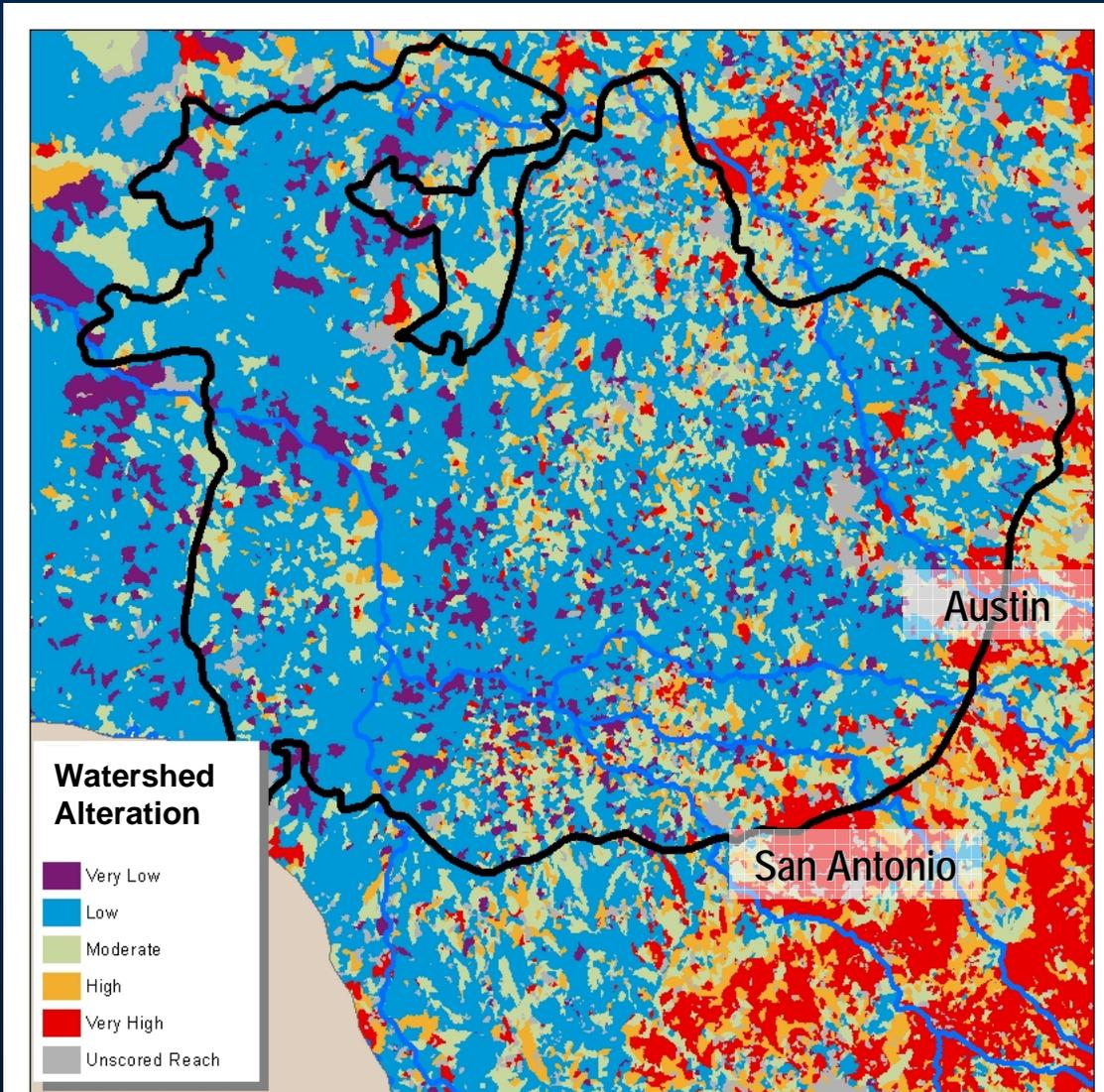
Select an EDU on the map to view EDU information and BMPs.





Edwards Plateau Ecoregion

Watershed Condition in the Edwards Plateau Ecoregion







PRIMARY USE: To reduce coarse sediment transport from construction sites.
ADDITIONAL USES:

BRUSH BARRIER

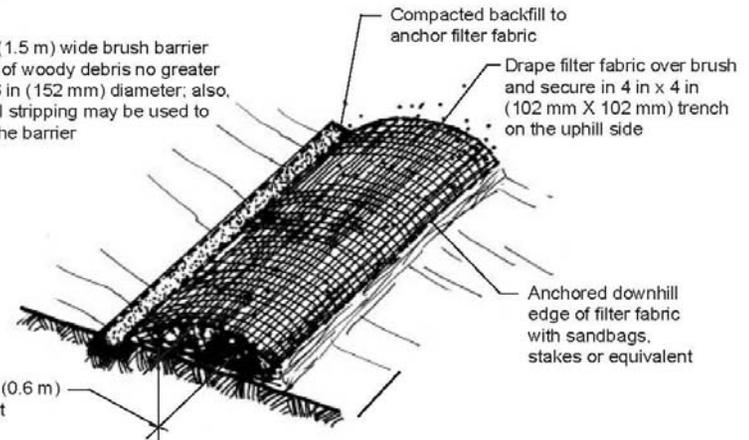
What is it? The brush barrier provides a temporary physical barrier located downslope of disturbed areas by using stacked shrubs and related materials.

Purpose

Brush barriers reduce stormwater runoff velocities of sheet flow and impede sediment caused by erosion.

≥ 5 ft (1.5 m) wide brush barrier made of woody debris no greater than 6 in (152 mm) diameter; also, topsoil stripping may be used to form the barrier

≥ 2 ft (0.6 m) height



**Brush Barrier
Perspective View**

Limitations

This BMP is not intended for concentrated flows or substantial amounts of sheet flow. Application of brush barriers should be for small construction sites and slopes not exceeding 1.5:1 (H:V).

Materials

Brush; woody material not to exceed six inches (152 mm) in diameter; filter fabric as required by local conditions or regulations.

Installation

Filter fabric may be required to ensure a barrier's filtration ability. Where concentrated flow passes around or under the barrier, it should be expanded and increased in size accordingly and/or augmented by toed-in filter fabric. After installation, barrier dimensions must be maintained.

Source: Surface Water Design Manual; King County, Washington.



PRIMARY USE: Reduce pollution into streams.

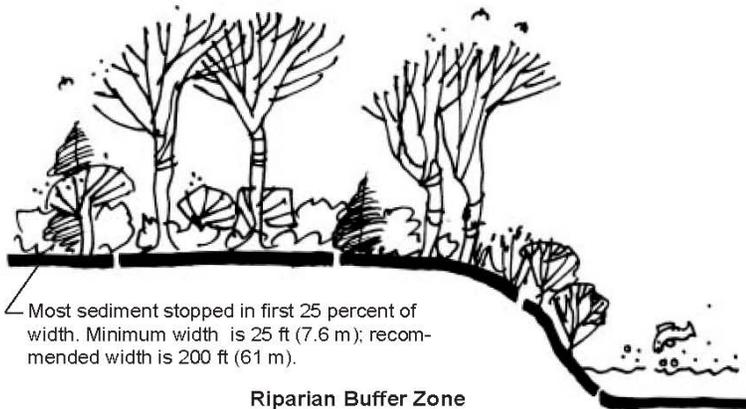
ADDITIONAL USES: Reduce erosion; wildlife habitat; aesthetics; provide shade to control water temperature.

RIPARIAN BUFFER ZONE

What is it? A riparian forest buffer is an area of trees, usually accompanied by shrubs and other vegetation, along a stream, river, or shoreline that is managed to maintain the integrity of the waterway, to reduce pollution, and to provide food, habitat, and thermal protection for fish and wildlife.

Purpose

Riparian forest buffers slow and filter nutrients and sediments out of stormwater before they reach the waterway. Forest buffers also stabilize streambanks and floodplains, reducing erosion. The cool stream temperatures maintained by riparian trees are essential for the survival of many fish and other aquatic species. Leaves and fallen logs and branches provide food and habitat for many organisms that are critical to the aquatic food chain. Riparian forest buffers can also attract birds and wildlife, providing important habitat and migration corridors for many species.



Most sediment stopped in first 25 percent of width. Minimum width is 25 ft (7.6 m); recommended width is 200 ft (61 m).

Riparian Buffer Zone
Section View

Limitations

Runoff into the buffer zone should not be channeled. Livestock should be prevented from entering the zone.

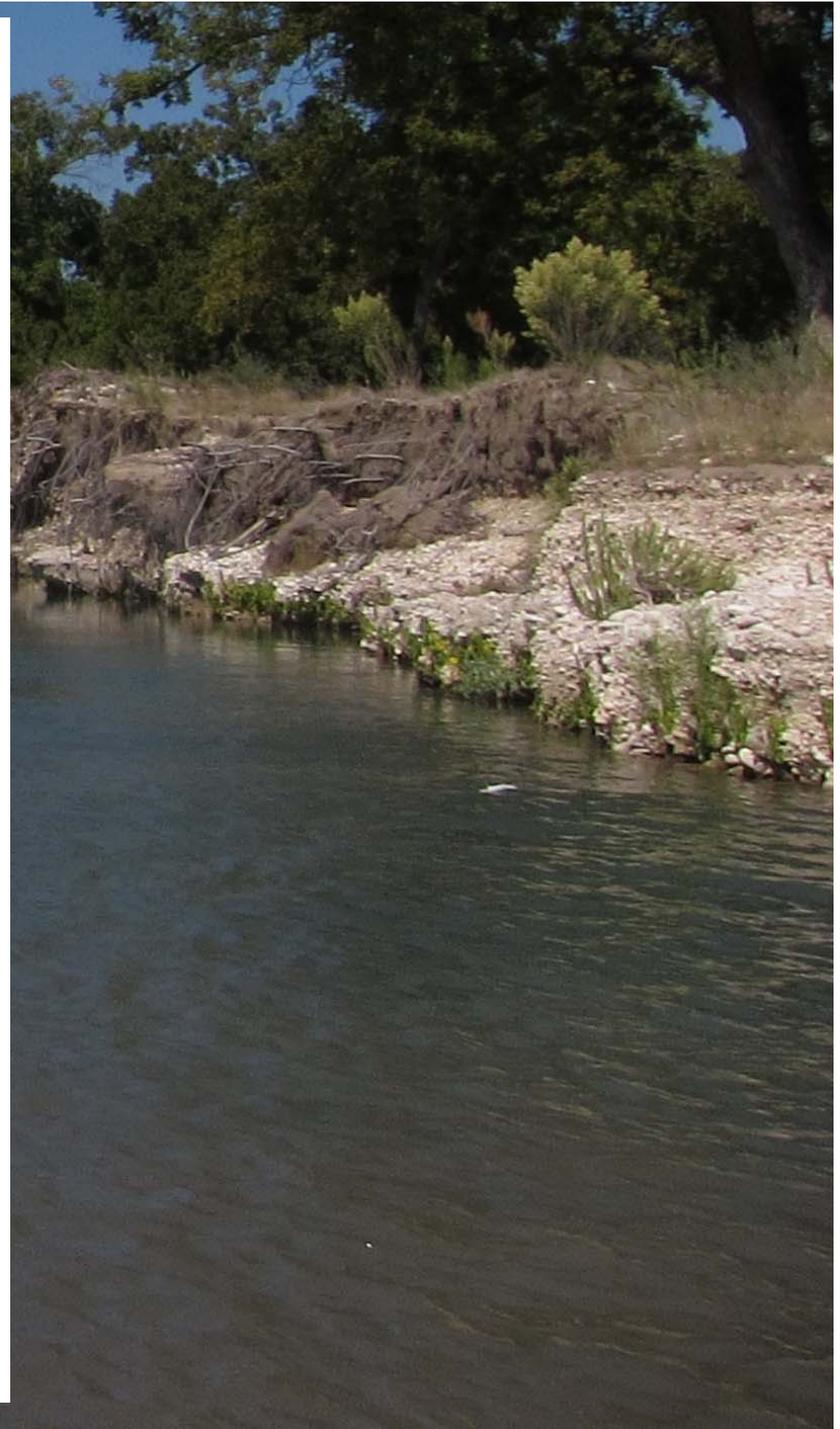
Materials

Existing natural vegetation is usually preferred. Planted stock may be used.

Installation

Buffer zone width is variable, depending upon location, erosion potential and slope. It should be wide enough so that no transported sediment is visible in the first (streamside) 25 percent of the zone.

Source: [NRCS Planning & Design Manual](#), NRCS.



PRIMARY USE: Improve habitat for aquatic plants and animals, and contribute to food web dynamics.
ADDITIONAL USES: Sediment flushing and deepening of scour pools caused by increased stream velocity.

TREE COVER

What is it? In this technique trees or large shrubs are felled and anchored at various locations along the stream bank to provide needed aquatic habitat.

Purpose

They provide excellent overhead cover and an ideal substrate for aquatic organisms. Under certain conditions, trees can provide excellent benefits with little expense.



Tree Cover - Hinge Felling
Section View

Limitations

Channels must be large enough to accommodate trees without threatening bank erosion and limiting needed channel flow capacity. Suitable trees may not be nearby. Where trees cannot be felled directly into the stream, heavy equipment will be required for placement. Tree covers generally require frequent maintenance; ice is particularly damaging to them.

Materials

Vegetation on site.

Installation

Minimize disturbance to the stream and adjoining areas by scheduling the work when it will interrupt aquatic plants and animals the least. Greatest benefits probably occur in wide, shallow streams with sand or gravel substrate. Whenever possible, fell trees directly into the stream with tips pointing downstream and with the trunk parallel to or at an angle no more than 20 degrees from the bank. Bank trees can be hinge-felled in shallow streams, but in deeper streams it will be necessary to cut off the tree, place it in the stream, and cable it to the stump, deadman in the bank, or other stable object.

Source: [Stream Corridor Restoration Handbook](#), USDA.

PRIMARY USE: Improve the habitat for aquatic plants and animals.
ADDITIONAL USES: Increase channel depth.

BOULDER CLUSTERS

What is it? This is a technique in which a group of boulders are placed either randomly or selectively in clusters and/or individually (depending on the pattern of natural boulders in the reach), at strategic points along a channel bed.

Purpose

Boulder clusters provide overhead cover and create deep areas which are used by juvenile fish as resting areas. They can restore meanders in channelized reaches, protect eroded banks by deflecting flow, and improve gradation of substrate materials.

Boulder Clusters Perspective View



Limitations

Boulders may not be available at project site. Current speed must exceed 2 ft (0.6 m)/second for this to be an effective technique. Heavy equipment may be necessary to place boulders. Small boulders may eventually be covered by channel aggradation.

Materials

Large 3-5 ft (0.9-1.5 m), irregularly shaped, angular boulders provide the most hiding spaces. Quarry rock is preferable since it will not usually require anchoring or lacing together as more rounded or smaller boulders do.

Installation

Minimize disturbance to the stream and adjoining areas by scheduling the work when it will interrupt aquatic plants and animals the least. Select stable stream reaches which are not likely to degrade and undermine rock placements. Boulders can be placed in riffles, runs, flats, glides, and open pools. Embed the boulders a short distance into the stream bed in a triangular pattern with spaces between the boulders ranging from 6 in (152 mm) to 1 ft (0.3 m). This spacing provides cover and other habitat niche needs, and ensures the creation of scour pockets. Boulders should be placed in the middle half of the channel where deposition is not expected to occur. A suggested spacing of clusters within the same stream segment is one-third of the stream width apart. Avoid locations where placement could divert the stream channel's thalweg or threaten impingement on potentially unstable stream banks.

Source: [Stream Corridor Restoration Handbook](#), USDA.





The Upper San Joaquin River watershed is a 1,000 square mile area that drains into the San Joaquin River. The watershed is a mix of forest, agriculture, and urban areas. The watershed is managed by the State Water Resources Control Board. The Board is responsible for the water quality and quantity of the San Joaquin River. The Board is also responsible for the protection of the watershed. The Board is made up of representatives from the State, local governments, and the public. The Board meets regularly to discuss the water quality and quantity of the San Joaquin River. The Board also has a public participation process. The public can provide input to the Board through public hearings, public comments, and public meetings. The Board is committed to protecting the water quality and quantity of the San Joaquin River for the benefit of all.

Water, water, everywhere

Where does it come from?
Where does it go?

Spring feed naturally flow groundwater
Groundwater is a large reservoir
Divided by geology

One watershed shared by many

The Tioga Fork watershed contains an aquifer, water resources, and provides the City of Red Bluff with drinking water.

Watershed
Watershed
Watershed

The Bridge Creek Fire

Watershed residents had learned that burning their own property was not the best solution with respect to resources after a fire.

A watershed approach to fire
Watershed fire prevention
Watershed fire response

Next Steps

- u **Watershed BMPs Demonstration Workshops**
- u **Riparian conservation workshops**
- u **Coastal habitat BMPs**
- u **Regional and national expansion**

Partners



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