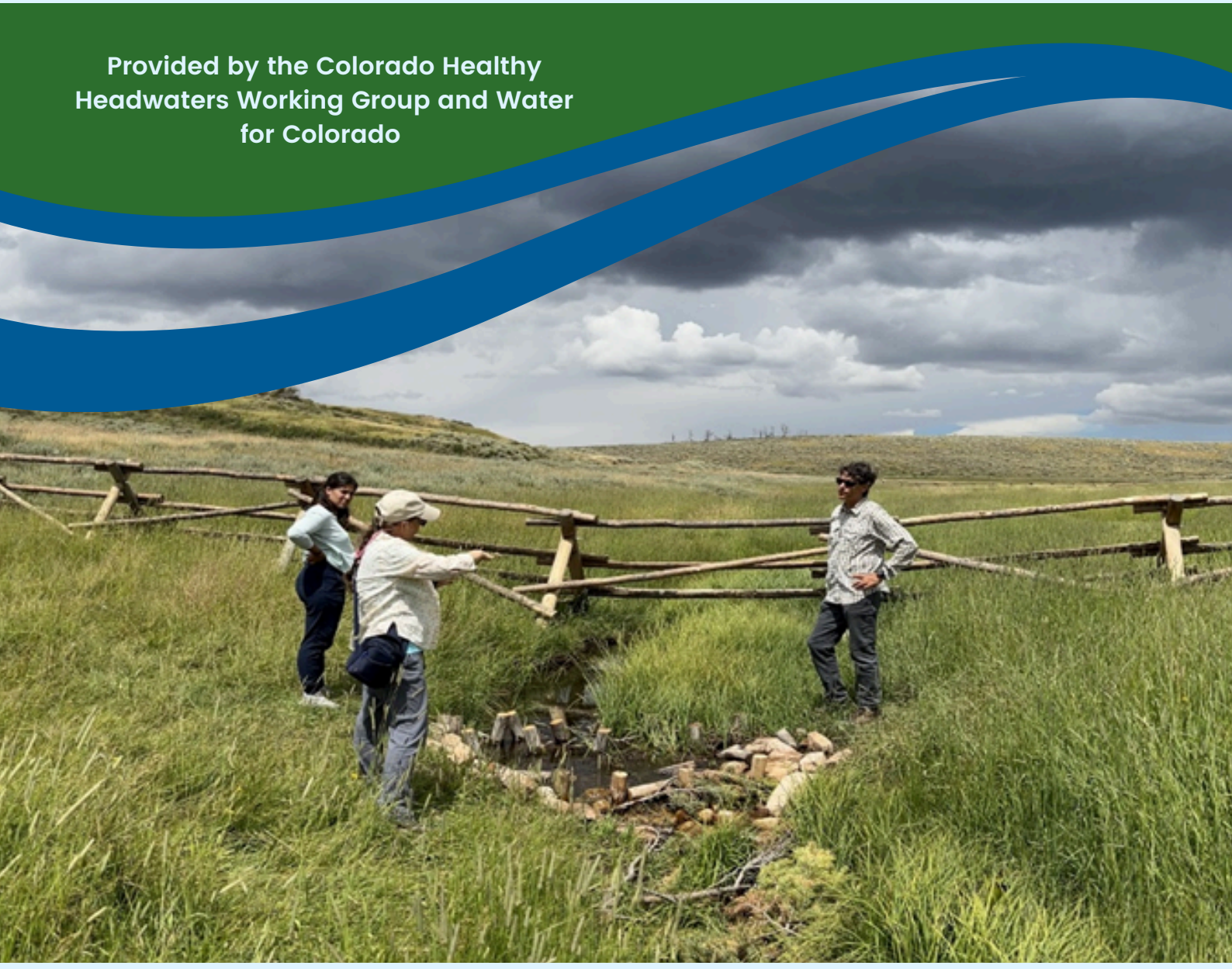
TRAINING MANUAL: TRANSLATING SB23-270 PROJECTS TO RESTORE NATURAL STREAM SYSTEMS

Provided by the Colorado Healthy Headwaters Working Group and Water for Colorado



COLORADO Healthy Headwaters Working Group

WATER for COLORADO
PROTECT COLORADO'S RIVERS

Overview: SB270 & Stream Restoration Activities

What is SB270? Projects to restore Natural Streams Systems

SB270 was passed by the Colorado legislature in 2023 to "facilitate and encourage the commencement of projects that restore the environmental health of natural stream systems." The bill lays out a number of criteria that stream restoration projects must adhere to in order for the project to NOT be subject to water rights administration. SB270 was a dynamic effort led by DNR bringing multiple sectors of water stakeholders together for this legislative "fix" aimed at providing greater certainty for stream restoration proponents around whether or not a water right might be needed for their project. Although SB270 made its debut in 2023, there had been at least four years of internal agency discussion to find a path forward that allowed for stream restoration while respecting water rights.

What is the problem SB270 sought to address?

Degraded, incised streams are unfortunately common across Western states. Causes of degradation vary - the most typical causes are listed in Table 1a. Detrimental impacts of incised streams include lower groundwater tables, lower summer base flows, higher sedimentation, reduced water quality, warmer temperatures and loss of riparian and wetland habitat for wildlife and forage for livestock.

SB270 cites the beneficial nature of functioning natural streams for all Coloradans — see Table 1b. The large majority of all stream restoration projects happening in Colorado are voluntary (as opposed to being required for mitigation) and are happening on both private and public lands.

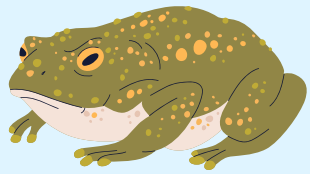
1a. Common Causes of Degraded Streams	1b. Benefits of healthy stream systems listed by SB270
• Riparian vegetation removal often caused by unmanaged grazing, heavy ungulate populations, or development • Historic mining • Historic timber harvest • Altered flows, dams • Moved and channelized for transportation infrastructure, agriculture or development • Beaver removal	• Forest & watershed health; • Wildland fire mitigation; • Flood safety; • Water quality; • Recreation; and • Riparian and aquatic habitats. • Also "functioning natural streams that are connected to floodplains balance the patterns of sediment erosion and deposition, which protects water infrastructure . . ."

Where does SB270 fit into Colorado Water Statutes? CRS 37-92-602 — Exemptions - presumptions - Legislation Declaration

602 creates EXEMPTIONS to typical water rights administration for the use of water because the legislature has deemed these uses essential and unlikely to cause material injury (but many rules apply to each of these that are set forth in the statute).

- Rural residential wells 15gpm or less
- Wells used exclusively for fire-fighting purposes
- Wells used exclusively for monitoring purposes
- Rain barrels-collecting rain from a residence to use for household/yard
- Storm water detention/infiltration facilities
- Post wildland fire facilities
- Minor Stream Restoration Activities

"Exemptions" = Criteria to follow, which are detailed on the following pages!



SB270 Safeguards for water users and compacts

- *The owner or proponent of a stream restoration project shall not install the stream restoration project in a manner that adversely affects the function of structures used to divert water or measure water flow by the holders of vested water rights without the permission of the owners of the structures.* **CRS 37-92-602(9)(d)**
- *Nothing in the statute prohibits the state engineer from taking any action necessary to comply with an interstate compact, interstate apportionment decree, or interstate agreement.* **CRS 37-92-602(9)(e)**

How does SB270 define a "stream restoration project"?

"A project that is designed and constructed within a natural stream system" (see definitions below) AND for purposes of "WILDLAND FIRE MITIGATION; FLOOD MITIGATION; BANK STABILIZATION; WATER QUALITY PROTECTION OR RESTORATION; HABITAT, SPECIES, OR ECOSYSTEM RESTORATION; SOURCE WATER PROTECTION; INFRASTRUCTURE PROTECTION; OR SEDIMENT AND EROSION MANAGEMENT." CRS 37-92-602(9)(b)(IV)."

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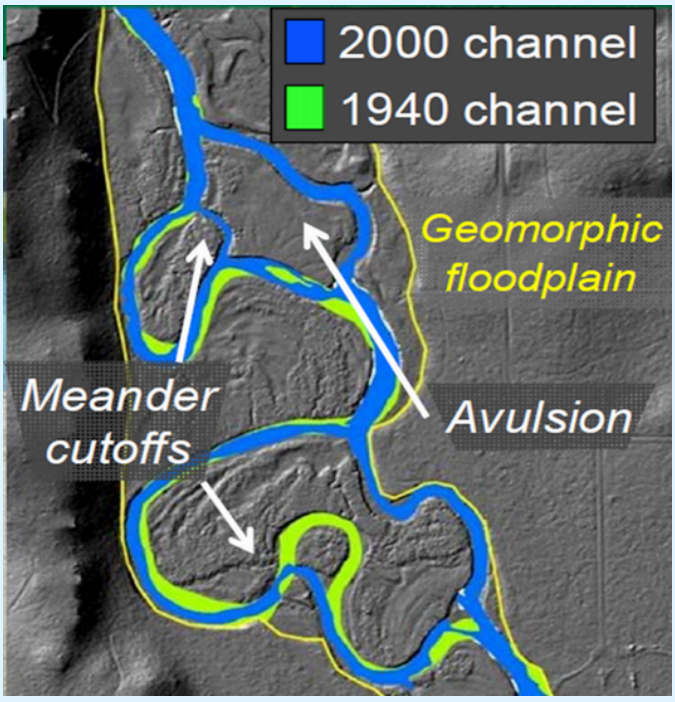
Key Definitions:

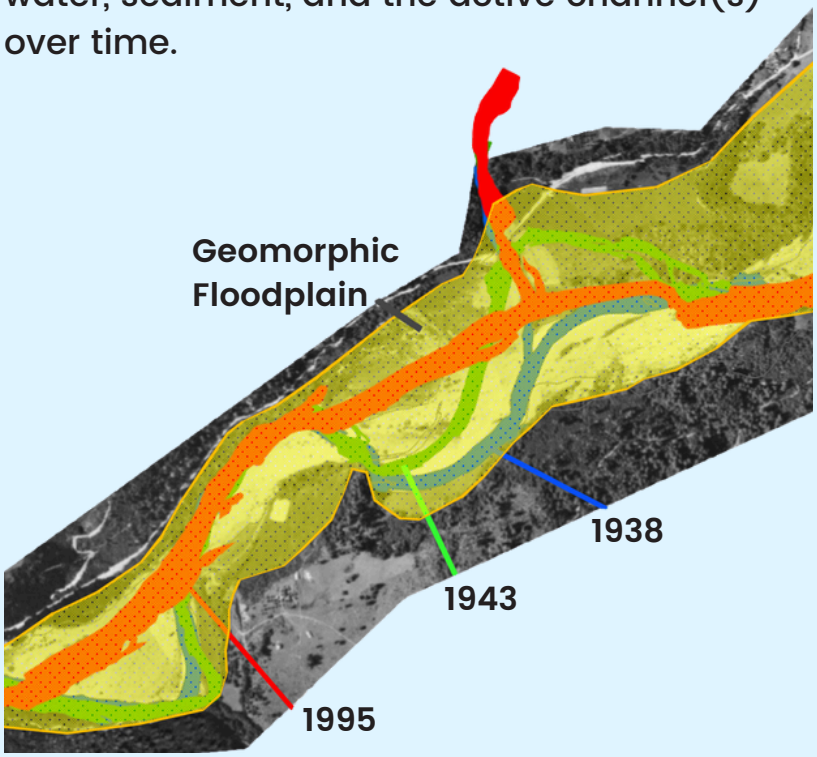
Natural Stream	A place on the surface of the earth where water naturally flows regularly or intermittently with a perceptible current **between observable banks**, although the location of such banks may vary under different conditions. CRS 37-87-102(1)(b)
Natural Stream System	Natural stream system means the extent of a natural stream in the state and the **geomorphic floodplain** and associated riparian area. CRS 37-92-602(9)(b)(III).
Geomorphic Floodplain	Suite of geomorphic surfaces created and shaped by fluvial processes — the land area that the river has moved over and could move into again. Similar to the Fluvial Hazard Zone mapping that "accounts for sediment and debris that moves through a stream corridor while FEMA floodplain maps only account for the water" in a static system.

Why use the Geomorphic Floodplain as the reference for restoration ?



Graphics from USGS, NOAA, & The Nature Conservancy PPT:
[Geomorphic Floodplains and the use of process domains to guide restoration strategy]

It provides a broader context for river restoration based upon the movement of water, sediment, and the active channel(s) over time.



The CRITERIA to follow for the SIX MINOR STREAM RESTORATION ACTIVITIES under SB270 that can proceed without being subject to water rights administration

Read the chart from left to right across the rows

	Restoration Method	Type of stream	Criteria	Criteria	Criteria
1	Stabilizing the banks or substrate	of a Natural stream with hard or natural materials (perennial)	that allow water to flow downstream	and do not cause the water level to exceed the Ordinary High Water Mark (OHWM)	and may Incidentally increase the surface area of the stream
2	Mechanical grading of the ground surface	along a natural stream system	that does not result in ground water exposure	is not a diversion of surface water	and does not collect storm water
3	Stabilizing banks and substrate	of an ephemeral or intermittent stream	with deformable porous structures	that may incidentally and temporarily	increase surface area or infiltration
4	Daylighting	a Natural stream	that has been piped or buried		
5	Reducing the surface area	of a Natural stream	to address reductions in historical flow amounts		
6	Installing structures or reconstructing a channel	in a natural stream system	for the purpose of recovery	from the impacts of fire or flood emergency	

Note: The boxes highlighted in green (1, 3, & 6) are particularly relevant for low-tech process-based restoration "LTPBR" projects

Minor Activity 1: Stabilizing the Bank or Substrate (perennial streams)

How does SB270 define bank or substrate stabilization for perennial streams?

"Stabilizing the banks or **substrate** of a natural stream with hard, bioengineered, or **natural materials** that, under less than extreme flow conditions, **allow water to flow** downstream, do not cause the water level to exceed the **ordinary high water mark**, and may incidentally increase surface area of the natural stream." CRS 37-92-602(9)(b)(II)

This provision can be broken down into 5 elements/criteria that must be followed in order to qualify for the exemption, which means the stream restoration project can proceed without obtaining a water right:

- ✓ Stabilizing the banks or the substrate
- ✓ With hard, bioengineered or natural materials
- ✓ Allow water to flow downstream under < extreme flow conditions
- ✓ The structure does not cause the water level to exceed the OHWM
- ✓ May incidentally increase the natural stream's surface area

Think of this as anything from base flows up to high spring flows

A common description of the OHWM equates it to "the mark left by average peak flow over multiple years."

What is the Ordinary High Water Mark (OHWM)?

Under Section 404 of the Clean Water Act, the OHWM defines the lateral limits of Federal jurisdiction over non-tidal Waters of the United States (WOTUS) in the absence of adjacent wetlands. It is:

- "That line on the shore established by the fluctuations of water and
- Indicated by physical characteristics such as:
  - **A clear, natural line impressed on the bank, shelving**
  - **Changes in the character of the soil**
  - **Destruction of the terrestrial vegetation**
  - **The presence of litter and debris, OR**
- Other appropriate means that consider the characteristics of the surrounding areas."
  USACE National OHWM Field Delineation Manual for Rivers and Streams, Nov. 2022

Ordinary High Water Mark in Colorado:

OHWM is the visible channel of a natural watercourse within which water flows with sufficient frequency so as to preclude the erection or maintenance of man-made improvements without special provision for protection against flows of water in such channel or the channel defined by the mean annual flood, whichever is greater.

CRS 37-87-102(1)(e)

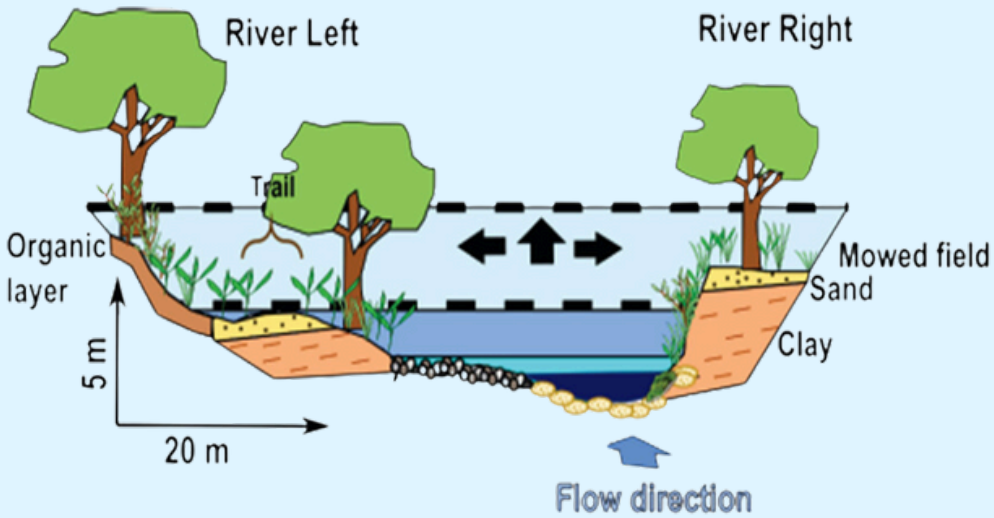
Mean Annual Flood:

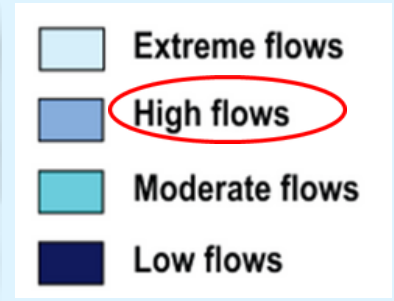
Mean Annual Flood is a flood which has a magnitude which is expected to be equaled or exceeded on the average once every 2.33 years and has a 43% chance of being equaled or exceeded during any year.

CRS 37-87-102(1)(a)

"Despite being used as a regulatory boundary for over a century, the federal definition of OHWM does not refer to a specific frequency of high water." USACE OHWM Manual, 2022

This graphic from the USACE OHWM Manual is helpful to understand the various flows - HIGH FLOWS = OHWM





"In many streams, the boundaries of bankfull channel, active channel, and the location of the OHWM will correspond or closely overlap." USACE OHWM Manual, 2022

Understanding High Flows: Quotes and graphics from the USACE OHWM Manual, 2022

"Streams are dynamic and diverse systems, so there will be special cases in which high flows are not always contained with in the more obvious banks and therefore, the OHWM will be above the active channel."

> For instance, stream-wetland complexes as shown in these graphics of on-channel and off-channel beaver complexes.

On-Channel Beaver Complex

Off-Channel Beaver Complex

Meandering Channel

Low/Moderate

High Flow

Key Takeaways:

- The OHWM is the mark left by average peak flow over multiple years
- The OHWM is NOT a static line, it can change over both time and space
- The USACE definition does not refer to a specific frequency of high water
- Delineating the OHWM is part of your responsibility when designing a restoration project to qualify as "minor" under SB270 - documenting where it occurs before and after your project is installed.

So, how do the 5 criteria for Minor Stream Restoration Activity 1 translate to the ground for projects?

Utah Restoration Project

Your structures must be porous to allow flows to continue downstream and not force the flows above the OHWM. This example meets those criteria.

Where is the OHWM? Try to identify it in this photo! It's not always easy to tell.

PALS near Gunnison, CO

BMS in Utah (Trout Unlimited project)

Key Definitions for common LTPBR structures:

Post-Assisted Log Structure

A hand-built structure that mimics and promotes the process of wood accumulation. The structure is temporary and built using natural woody materials.

Beaver Mimicry Structure

Known by many different names, such as Beaver Dam Analogue (BDA) and Sediment Retention structure, it is a temporary structure constructed mainly from natural wood, cobble, and twigs designed to promote the process of beaver dam activity by beaver.

Large Woody Debris

A structure meant to replicate the natural process of LWD in streams, which is defined as trees, logs, rootwads, and large tree branches greater than 3 feet in length and 4 inches in diameter that fall into streams, the majority of which enters the stream system from bank erosion, landslides, windthrow, and tree mortality.

More Examples of LTPBR Projects that would meet the criteria for SB270 Minor Restoration Activity 1.

Bank attached PALS

Bank attached PALS

Channel spanning PALS

LWD & PALS example from eastern Oregon – Anabranch Solutions project & photo

Minor Activity 2: Mechanical Grading

How does SB270 define "mechanical grading"?

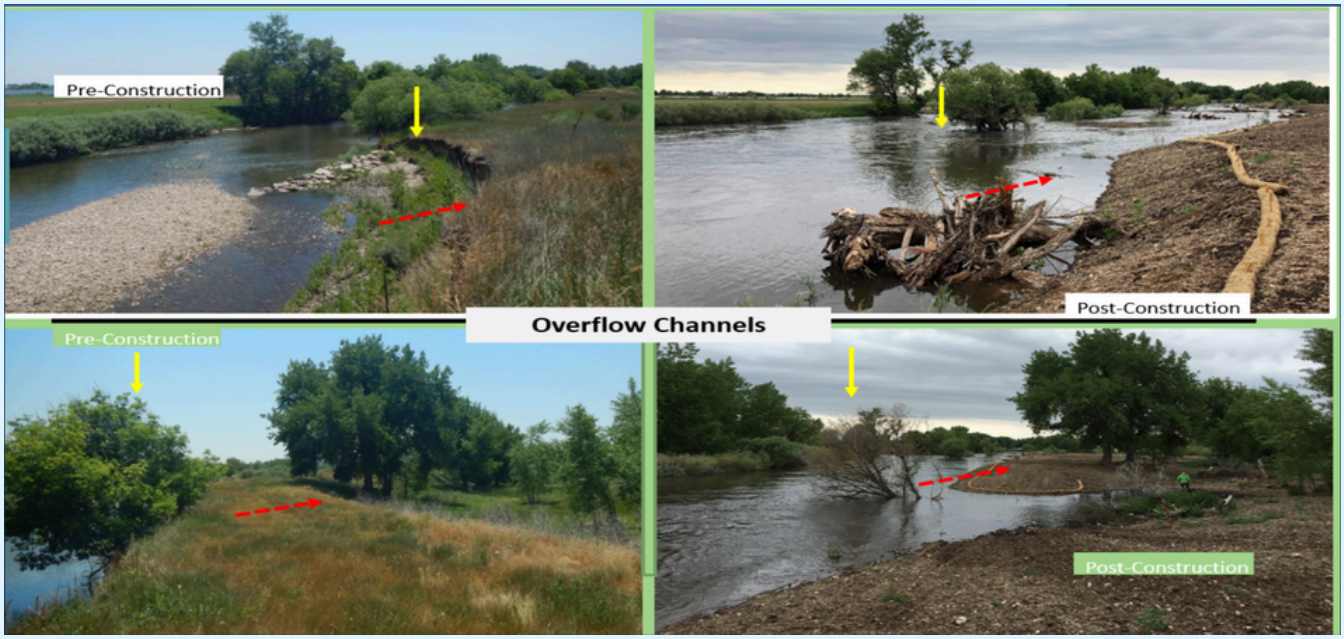
Mechanical grading of the ground surface along a natural stream system in a manner that does not result in:

- groundwater exposure
- diversions of surface water
- the collection of stormwater.

Reminder: This includes the geomorphic floodplain

Case Study: Larimer County's River Buffs Restoration Project

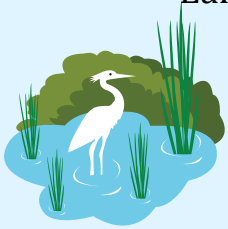
This High-tech PBR project involves using mechanical grading for floodplain reconnection & overflow channel creation, including low-flow channel narrowing. Treatments reconnected extensive floodplain areas using large and small wood structures (including in-channel, on banks and gravel bars, and in overflow channels across the newly reconnected floodplain).



Example Approaches to Mechanical Grading

- Levee setbacks
- Removal of riprap
- Setting former grade of the floodplain
- Traditional high-tech approaches that reset the channel

> *The floodplain surface is not flat, being composed of natural levees, levee back-slopes, splay deposits, abandoned channels, ridge and swale topography, back swamps, and open-water bodies."* Rediscovering, Reevaluating, and Restoring Lost River-Wetland Corridors, Wohl et al., Frontiers in Earth Science, 2021.



Minor Activity 3: Stabilizing the Bank or Substrate (Ephemeral & intermittent streams)

How does SB270 define "stabilizing"?

Stabilizing an ephemeral stream or intermittent natural stream by installing deformable and porous structures into the banks and substrate, which may incidentally and temporarily increase surface area or infiltration.

NOTE: This provision was drafted with particular restoration work in mind that has been done in ephemeral streams over the past decade with great success in stopping erosional headcuts in Western Colorado rangeland ephemeral streams. As shown in the photos, the structures are built with rocks to reduce the erosional force of seasonal flow events - they are called Zeedyk Rock Structures.

The Channel Incision Problem

Sage-grass mesic areas are essential to wildlife and livestock alike. They will be lost if we aren't able to stop erosional headcuts (often caused by roads, livestock trails, or other disturbances), which move up the valley and through the wetland, causing irrevocable damage.

Zeedyk Rock Structure

Low profile, hand-built treatments made of rocks intended to restore hydrologic and ecological function of wet meadows and small, degraded streams.

The Channel Incision Solution

Project photos from Shawn Conner, BioLogic

Examples of Zeedyk rock work in ephemeral streams – stabilizing the erosional headcuts to keep it from destroying the critical meadow habitat

Minor Activity 4: Daylighting a Natural Stream

How does SB270 define “daylighting”?

Daylighting a natural stream that has been piped or buried.

Daylighting and Reconfiguration

Throughout Colorado and the West, rivers have been buried under concrete and asphalt where cities developed — this gives us the opportunity to take the river out of the pipe and “daylight” it again. Furthermore, historic mining tailings have buried streams in more remote areas, where excavating these natural systems is important for restoring floodplains and healthy, natural systems.

Gov Polis, surounded by DNR staff and bill sponsors signs SB270 into law!

Case Study: Swan Creek Restoration Site, Summit County

At Swan Creek in Summit County, the stream had been buried by residual gravel piles left from historic dredge mining totally destroying the riparian corridor and natural stream functions. Through a collaboration, the stream was “daylighted” by first removing the mine tailings and then reconstructing meander bends and riffle, run, pool, glide series. Governor Polis signed SB270 into law here in 2023!

Minor Activity 6: Recovery from Wildland Fire & Flood Emergency

How does SB270 define fire & flood recovery?

Installing structures or reconstructing a channel in a natural stream system for the sole purpose of recovery from the impacts of a wildland fire or flood emergency.

Things to note:

- **Opens up opportunities to do LTPBR work post fire and flooding**
- **There are no OHWM constraints or constraints around incidental increase in surface area**
- **There is no statuatory definition of emergency, but numerous examples in Colorado show substantial impacts to water supplies and fish and other aquatic life from wildfires in the first 1-5 years. The circumstances of the emergency will inform the response and timeline.**

Case Study: Coalition for the Poudre River

The Coalition's Fire Recovery work with many partners in the Cameron Peak burn area is aimed at improving water quality and riparian health and reducing flood risk. Structures installed like in the photo will help capture sediment, reduce the force of high velocity runoff from monsoons and snowmelt, and further reduce erosion and downcutting as well as improve water quality.

Methods Aimed at Reducing Erosion / Post-Fire

- Creating Log Jams
- Felling trees into streams and floodplain
- Zeedyk rock structures
- Willow/riparian vegetation staking
- PALS

All these methods can fit within the SB270 Minor Stream Restoration Activities!

What about pre-fire work?

See next page

Go to Criteria 1 & Criteria 3

What about pre-fire work to improve fire resilience?

An ounce of prevention is worth a pound of cure!

- **Wildfire Ready Watersheds Program: CWCB program that "assists communities in planning and implementing mitigation strategies to minimize these [fire] impacts" before the wildfire comes.**
- **Grants are available to help prepare and implement Wildfire Ready Watershed Action Plans**

See https://www.wildfirereadywatersheds.com/ for more information

What about improving Drought Resilience?

Two recent studies have concluded that beaver have the potential to increase summer water availability in rain dominated basins.

Dryparian: Channelized, rapid runoff

Riparian: Natural storage, slow seep

In summary, if you are working to restore stream corridors BEFORE a fire or flood emergency happens, then you'll need to meet the criteria of Minor Stream Restoration Activities 1 or 3 as explained on the previous pages.

1	Stablizing the bank or substrate	Natural stream — perennial	Allow water flow downstream	don't cause the water level to sceed the OHWM	Incidental increase of surface area
3	Stablizing the bank or substrate	Ephemeral or intermittent stream	deformable porous structures	may incidentally and temporarily	increase surface area or infiltration

Department of Water Resources (DWR) Review of Projects

State law does NOT require stream restoration projects to be reviewed by DWR

SB270 did NOT change that – it did NOT create a new review or permit requirement

How do you go forward?

Project practitioners can decide if they want DWR review before commencing a project. DWR staff have stated they would appreciate being contacted early in the process so they can give input and help identify any issues.

Suggestions from DWR for Successful Collaboration

- Project proponents are encouraged to have informal discussions with local DWR staff about project concepts early.
- Written project proposals submitted to DWR will typically be provided with a written response that constitutes neither approval nor denial of the project; it simply expresses any concerns that DWR has (or doesn't have).

Project elements that are unlikely to trigger DWR's statutory administrative authority include the following: Those that meet the definition of a Minor Stream Restoration Activity.

Visit DWR's website to review general information

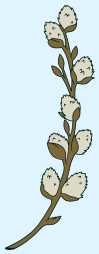
Suggested Best Management Practices for Stream Restoration Projects

Safeguards & Sideboards

You do not want to be doing your project in a way or location that would adversely affect the function or structure used to divert water or measure water flows by holders of vested water rights. Nothing in the statute prohibits the state engineer from taking any action necessary to comply with an interstate compact, interstate apportionment decree, or interstate agreement, or to order the discontinuance of an unpermitted diversion, storage, or obstructions that impede the flow to water users.

Your Best Management Practices Checklist

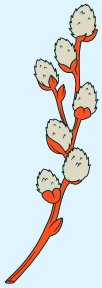
☑ **Early Conversation:**
Discuss with your partners the project goals, and how they can or cannot be met within one of the SB270 Minor Stream Restoration Activities.



☑ **Choose the appropriate Minor Stream Restoration Activity**
Select this based on where you're working (pre or post fire, perennial, intermittent, ephemeral stream).

☑ **Document prior to project commencement:**

- Baseline conditions of the stream system type, photo points of stream corridor during high and low flows if possible, OHWM; document flows if a stream gage or other measuring device is available.
- Best estimate of how proposed restoration methods and project design will conform to SB270 criteria.



☑ **Consider consulting with DWR**
While not required by statute, it's good practice to have DWR review your project for the SB270 criteria before project installation.

☑ **Document project results after installation:**
Especially where and how results relate to SB270

What if my project doesn't qualify as a "minor restoration activity" under SB270?

This would most likely happen if:

- The project goes beyond the OHWM in a perennial stream soon after the installation of the project.
- Project will cause more than an incidental increase in surface area (this is not defined in statute).

How to address it:

- Can you still design the proejct to not cause material injury to water rights?
- Consider requesting DWR review prior to installation
- Utilize best management practices to help reduce risk of harm - see next page.

Remember: The law states there is NO "presumption of injury for any activity that does not meet the definition of a minor stream restoration activity."

CRS 37-92-602(9)(e)

Project Planning Considerations to Reduce Water Rights Concerns

Historical Footprint of the natural stream system:

- **Design your project to restore what was historically present (riparian/wetland vegetation, connection to floodplain etc.) before the degradation occurred, and not beyond that. See box below.**

Choose these factors with care:

- **Location: Look for places that minimize risk of conflicts with water rights & flooding from beavers — e.g. upper watersheds above reservoirs/diversions, partnering with Sr. water right landowners.**
- **LTPBR method/design: beaver mimicry-type structures should mimic naturally occurring Beaver dams that are porous, temporary/deformable, and made of natural materials that allow base flow and fish passage through, under, and around.**
- **Timing of installation: Be careful during low-flow summer months – you don't want your project to reduce flows downstream of your project for any significant time (1 day can be significant).**

Engagement, transparency, and many partners:

Who would potentially be concerned? Include them or at least address their concerns; project planning that proactively includes water users & other watershed stakeholders who may be concerned has many benefits.

Post project considerations:

Adaptive Mgt	Monitoring Changes
• What worked? • What did not? • Where are opportunities to apply lessons learned?	• Hydrology/flow/surface area • Vegetation condition • Sediment capture • Plant & animal species diversity

> Be prepared to work with landowners to address beaver coexistance or other post project aspects if needed!

BDA Design Considerations

✗ Aggressive BDA Design

✓ Low profile, porous design

Here are some helpful tips for identifying historical footprint:

- Aerial photos if available prior to disturbance (post-1930s)
- Colorado Natural Heritage Program's Historical Wetland Areas mapping tool
- Reference reaches of similar streams, valleys, and wetlands
- Geological testing — soil profiles, geomorphic analysis