

# CATEGORY 4C: PROCESSES AND EXAMPLES OF SUCCESSFUL IMPLEMENTATION IN MONTANA



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## Category 4C



# History of 4C

- Generalized beneficial use assessment or Best Professional Judgement to determine impairments
- "Windshield Surveys"
- This led to a considerable amount of historical or legacy listings that could be "viewed" from the '80s and early '90s
- Listings were welcomed as a tool for 319 grant eligible cleanup



# Late '90s Changes

- Legislation changed the way MT completes assessments
- Language added to the Montana Water Quality Act requiring sufficient credible data and the development of database and Assessment Methods
- Pollutants vs. Pollution
  - MT DEQ's monitoring program focused on pollutants due to TMDL litigation during 2000's
  - Most historic 4C listings seemed to continue to generally hold true and were carried forward
  - Addressed 4C within TMDL planning by addressing pollution with pollutant TMDLs

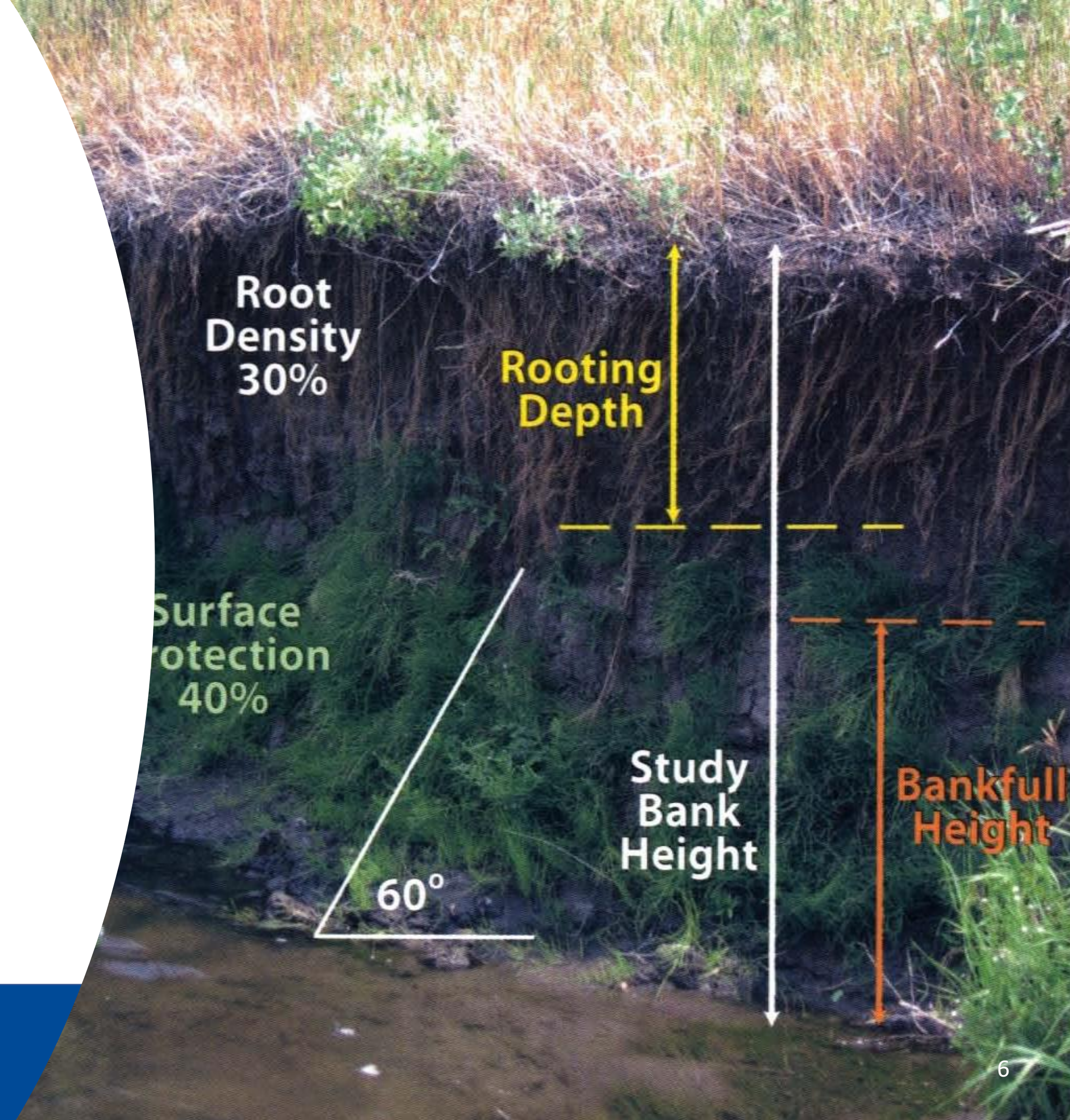


# Current Status

- Sediment/Habitat are linked in current Assessment Method
  - Habitat listing route in the Sediment AM
- A new, more robust Habitat AM in development
  - Instream fish habitat
  - Riparian health
- Case by case for flow alteration and fish passage barrier assessments with just cause for listing/delisting –
- Converting all Algae/Chl. *a* to cat 5 in 2024 IR – nutrient related

Six attributes are the principal determinants of the physical habitat structure provided by a stream (EPA, 2021):

- Stream size and channel dimensions
- Channel gradient
- Channel substrate size and type
- Habitat complexity and cover
- Vegetation cover and structure in the riparian zone
- Channel-riparian interactions



# Exclusive vs. Co-listed Impairments

EPA CALMS Guidance: If States have data and/or information that a water is impaired due to a pollutant, it would need to be reported in Category 5 (with added 4a).

AKA: Don't only chase pollution if pollutants are also a problem.

# MT Stream Stats: Exclusive vs. Co listings

- 4C Only: 1,838 miles
- 4C/5: 7,650 miles
- 5 only: 3,608 miles
- Statewide streams: 59,400 miles
- Stream AUs with use support determination: 20,832 miles

Table 7. Common Causes and Cause Groups

Cause or Cause Group	Total River Mileage Impaired by Cause	% of River Miles that have been Assessed that are Listed as Impaired by Cause*	% of Perennial Rivers Excluding ORW and Tribal Waters that are Listed as Impaired by Cause*	Total Lake Acreage Impaired by Cause	% of Lake Acres that have been Assessed that are Listed as Impaired by Cause*	% of Named Lakes 5 Acres or Larger Excluding ORW and Tribal Waters that are Listed as Impaired by Cause*
Habitat (4C)	10,226	49%	21%	9,446	2%	2%
Metals	7,524	36%	15%	392,132	78%	66%
Mercury	1,663	8%	3%	311,192	62%	52%
Nutrients	7,231	35%	15%	111,479	22%	19%
PCBs	75	0.36%	0.15%	60,622	12%	10%
Salinity	2,919	14%	6%	16,191	3%	3%
Sediment	8,220	40%	17%	10,948	2%	2%
Temperature	2,717	13%	5%	0	0%	0%

\*An assessed AU is an AU with at least one use support determination.



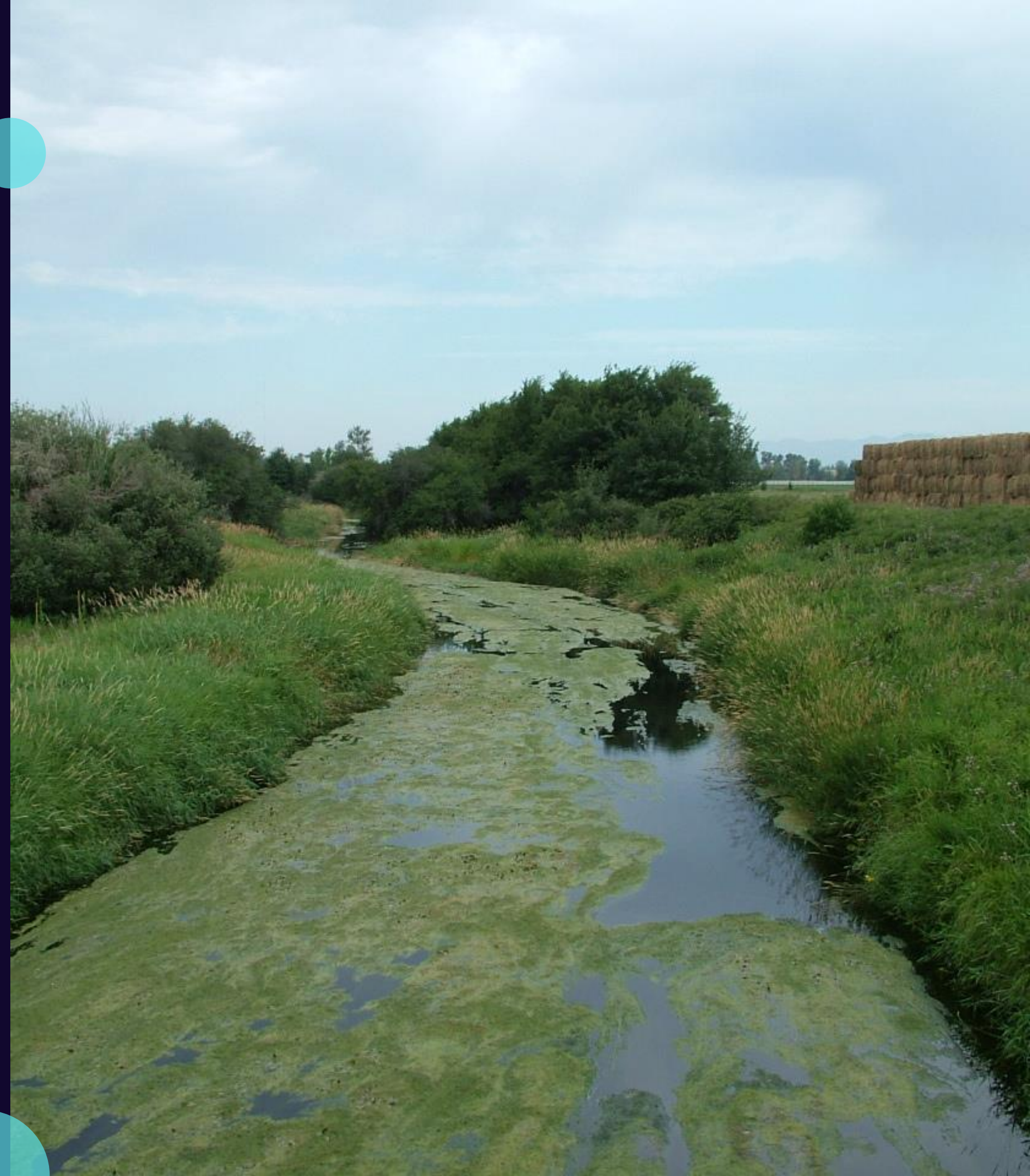
# CATEGORY 4C: SUCCESSFUL IMPLEMENTATION IN MONTANA

CATEGORY 4C: PROCESS AND EXAMPLES OF SUCCESSFUL RESTORATION



# 4C IMPAIRMENTS

- **Habitat Alterations:**  
Streamside/Littoral Vegetative Cover and  
Physical Substrate
- **Flow Regime Modifications:**  
Low Flow and Fish Passage Barriers



# 4C IMPAIRMENT SOURCES

- **Habitat Alterations:**

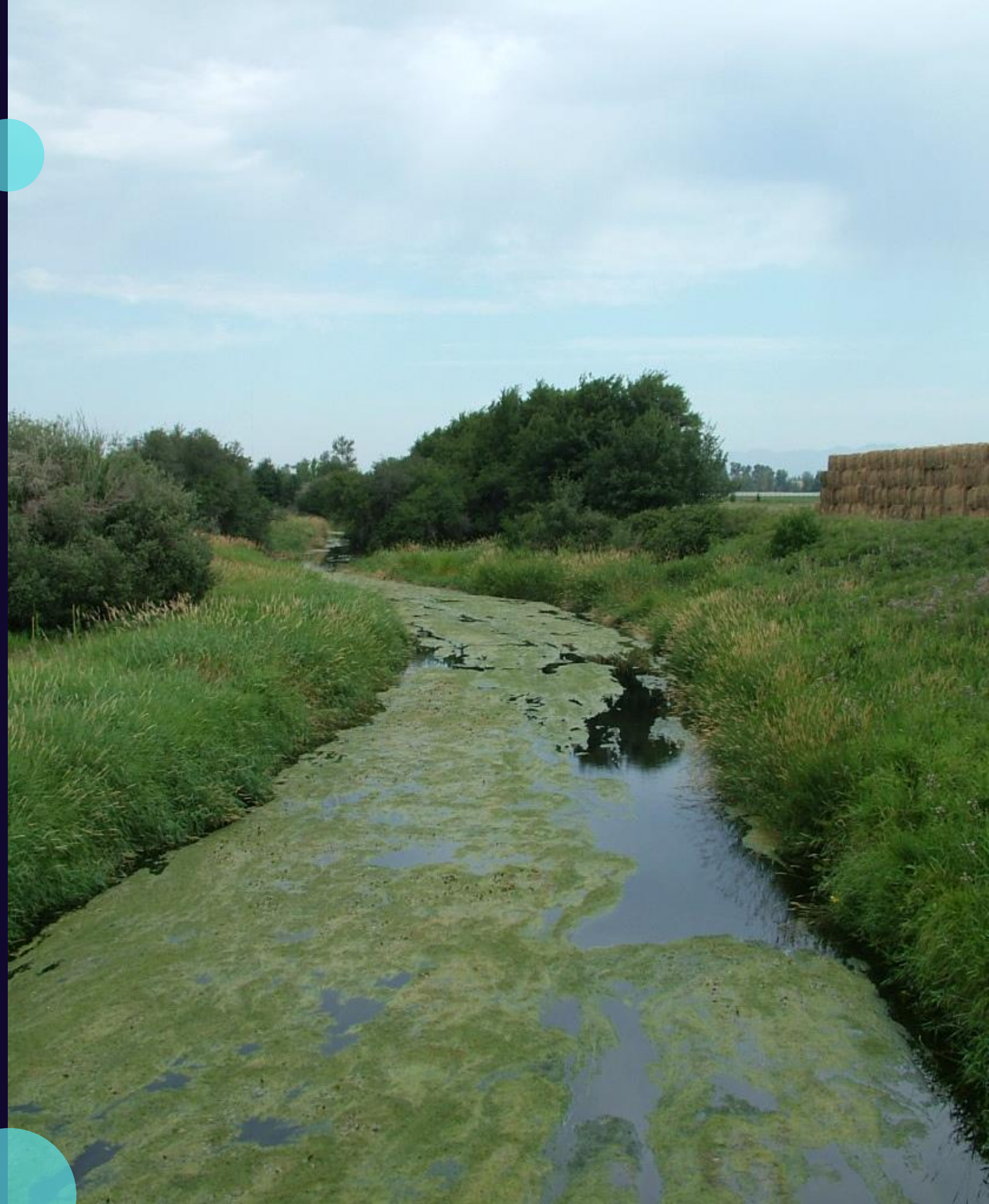
Streamside/Littoral Vegetative Cover and Physical Substrate

- Riparian Vegetation Removal
- Channelization
- Overwidening

- **Flow Regime Modifications:**

Low Flow and Fish Passage Barriers

- Water withdrawals and diversions
- Dams (large and small)
- Stream crossings and culverts



# ADDRESSING 4CS IN TMDL DOCUMENTS

- **Common associated pollutants**
  - Sediment
  - Temperature
  - Nutrients



# ADDRESSING 4CS IN TMDL DOCUMENTS

**Table 1-1. Water Quality Impairment Causes for the Beaverhead TPA Addressed within this Document**

Waterbody & Location Description	Waterbody ID	Impairment Cause	Pollutant Category	Impairment Cause Status	Included in IR 2012 Integrated Report*
BEAVERHEAD RIVER, Clark Canyon Dam to Grasshopper Creek	MT41B001_010	Low flow alterations	Not Applicable; Non-Pollutant	Partially addressed	Yes
		Alteration in streamside or littoral vegetative covers	Not Applicable; Non-Pollutant	Addressed via restoration plan (see Sections 6 and 7)	Yes
BEAVERHEAD RIVER, Grasshopper Creek to mouth (Jefferson River)	MT41B001_020	Sedimentation/Siltation	Sediment	Sediment TMDL completed	Yes
		Physical substrate habitat alterations	Not Applicable; Non-Pollutant	Addressed by sediment TMDL	Yes
		Low flow alterations	Not Applicable; Non-Pollutant	Partially addressed	Yes
		Alteration in streamside or littoral vegetative covers	Not Applicable; Non-Pollutant	Addressed by sediment TMDL	Yes



# ADDRESSING 4CS IN TMDL DOCUMENTS

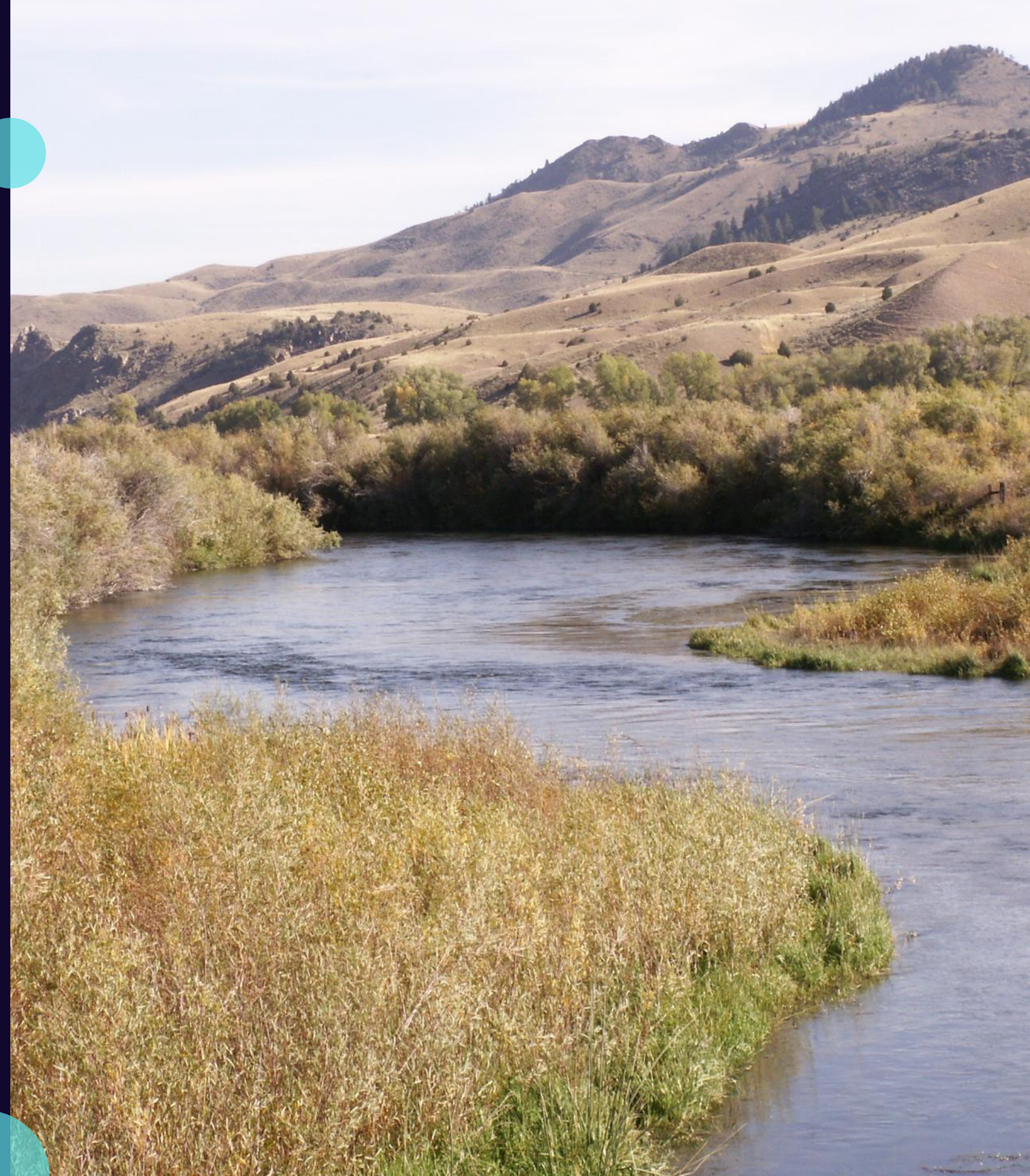
- Addressed through TMDL targets (% riparian cover, W/D ratios, etc)

**Table 5-15. Existing Sediment-Related Data for Blacktail Deer Creek Relative to Targets**

Reach ID	Assessment Year	Mean BFW (ft)	Existing Stream Type	Potential Stream Type	Riffle Pebble Count		Grid Toss	Channel Form		Instream Habitat		Riparian Health	
					% < 6mm (mean)	% < 2mm (mean)		Pool % < 6m m (mean)	W/D Ratio (mean)	Entrenchment Ratio (median)	Residual Pool Depth (ft)	Pools / Mile	Greenline % Shrub Cover
BLKD 02-08	2010	30	C4/E4	C4/E4	28	20	19	17	8.9	1.6	48	42	22
BLKD 02-14	2010	24	C4/F	C4	22	17	3	17	<b>1.3</b>	<b>1.3</b>	42	38	6
BLKD 02-30	2010	24	C4	C4	22	16	18	22	7.1	1.3	69	68	0

Values that do not meet the target are in bold.

- Addressed in implementation recommendations (native riparian vegetation restoration, management actions, etc)



# ADDRESSING 4CS IN TMDL DOCUMENTS

- Addressed through TMDL targets (% riparian cover, W/D ratios, etc)

**Table 5-15. Existing Sediment-Related Data for Blacktail Deer Creek Relative to Targets**

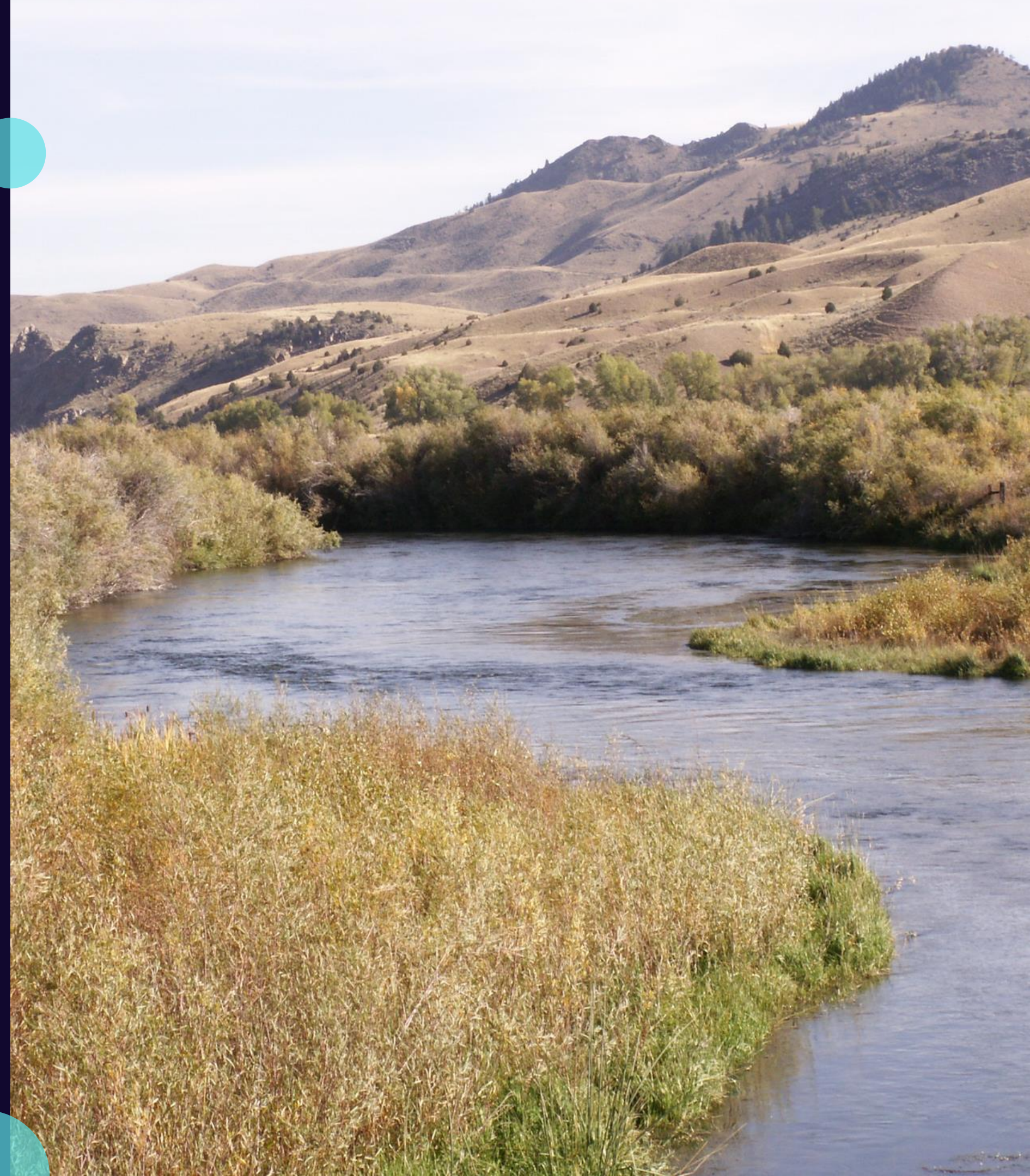
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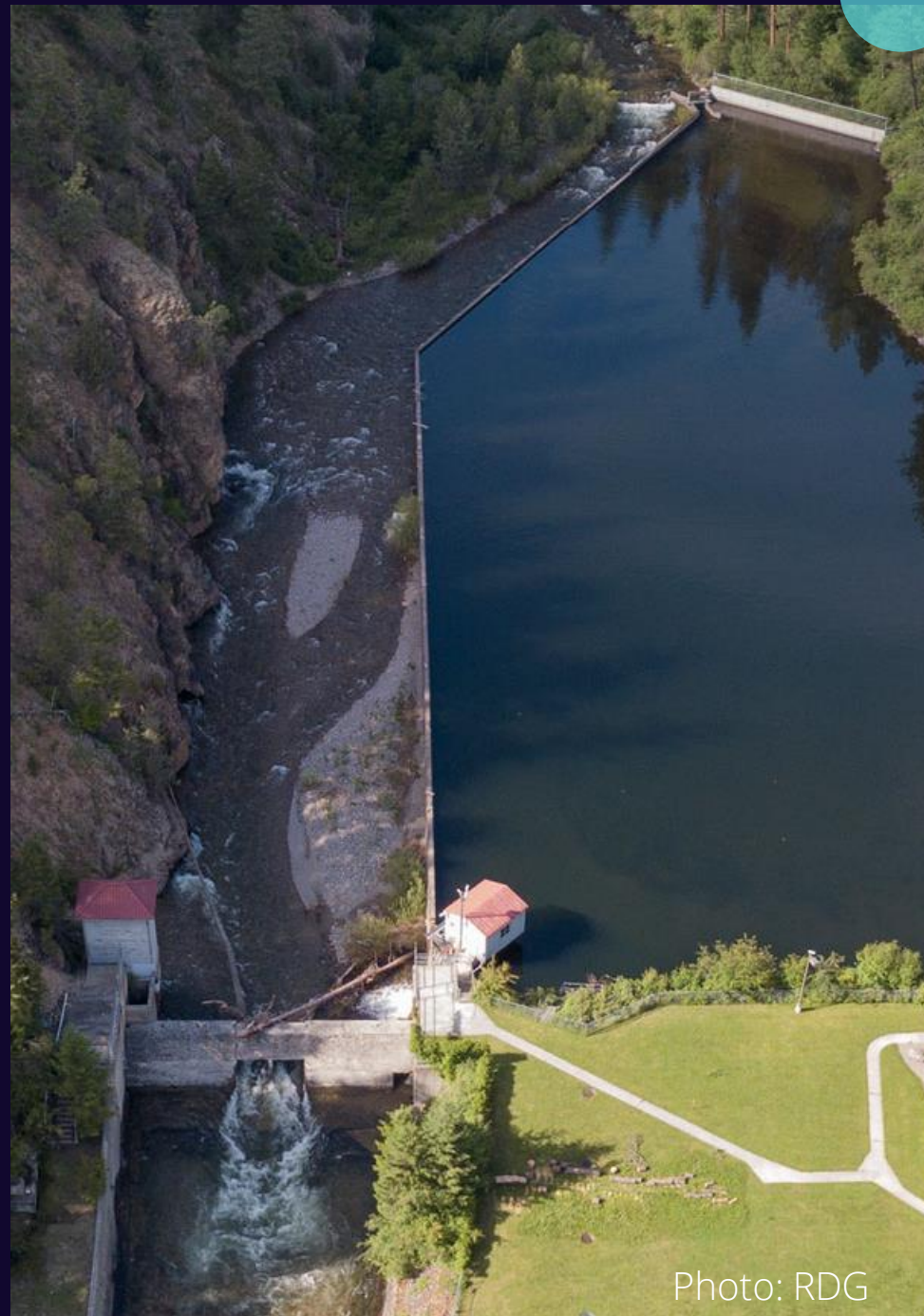
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Physical substrate

Streamside Vegetative Cover

- Addressed in implementation recommendations (native riparian vegetation restoration, management actions, etc)





# IMPLEMENTATION

## Restoration

- Channel morphology and floodplain restoration
- Riparian vegetation restoration
- Dam removal

## Management Actions

- Dam operations
- In-stream flow leasing
- Drought management plans



# IMPLEMENTING 4C RECOMMENDATIONS FROM TMDL DOCUMENTS

**Example:** Beaverhead Sediment TMDL

**Pollutant Impairment:** Sediment

**Associated 4Cs:** Low flow, streamside vegetative cover,  
physical substrate

**Recommendation: Dam operations**

Time flushing flow to move sediment on the Beaverhead  
River, near Dillon MT



Photo: BWC



# DAM OPERATIONS

In certain years, limited releases in spring have resulted in large depositions of fine sediment in the upper segment of the Beaverhead River



# DAM OPERATIONS

Reservoir releases From Clark Canyon Dam not timed to correlate with tributary sediment discharges into the Beaverhead River





# DAM OPERATIONS

Flushing flow study and MOU for  
Clark Canyon Creek and the  
Beaverhead River



# IMPLEMENTING 4C RECOMMENDATIONS FROM TMDL DOCUMENTS

**Example:** Ninemile Creek

**Pollutant impairment:** Sediment

**Associated 4Cs:** Low flow

**Recommendation:** Restore channel morphology

Increasing floodplain access, water storage, in-stream flows, streamside vegetation, and aquatic habitat in Ninemile Creek, MT



# FLOODPLAIN RESTORATION

Heavily impacted by historical placer mining

- Channelized
- Disconnected floodplain
- High eroding banks
- High peak runoff



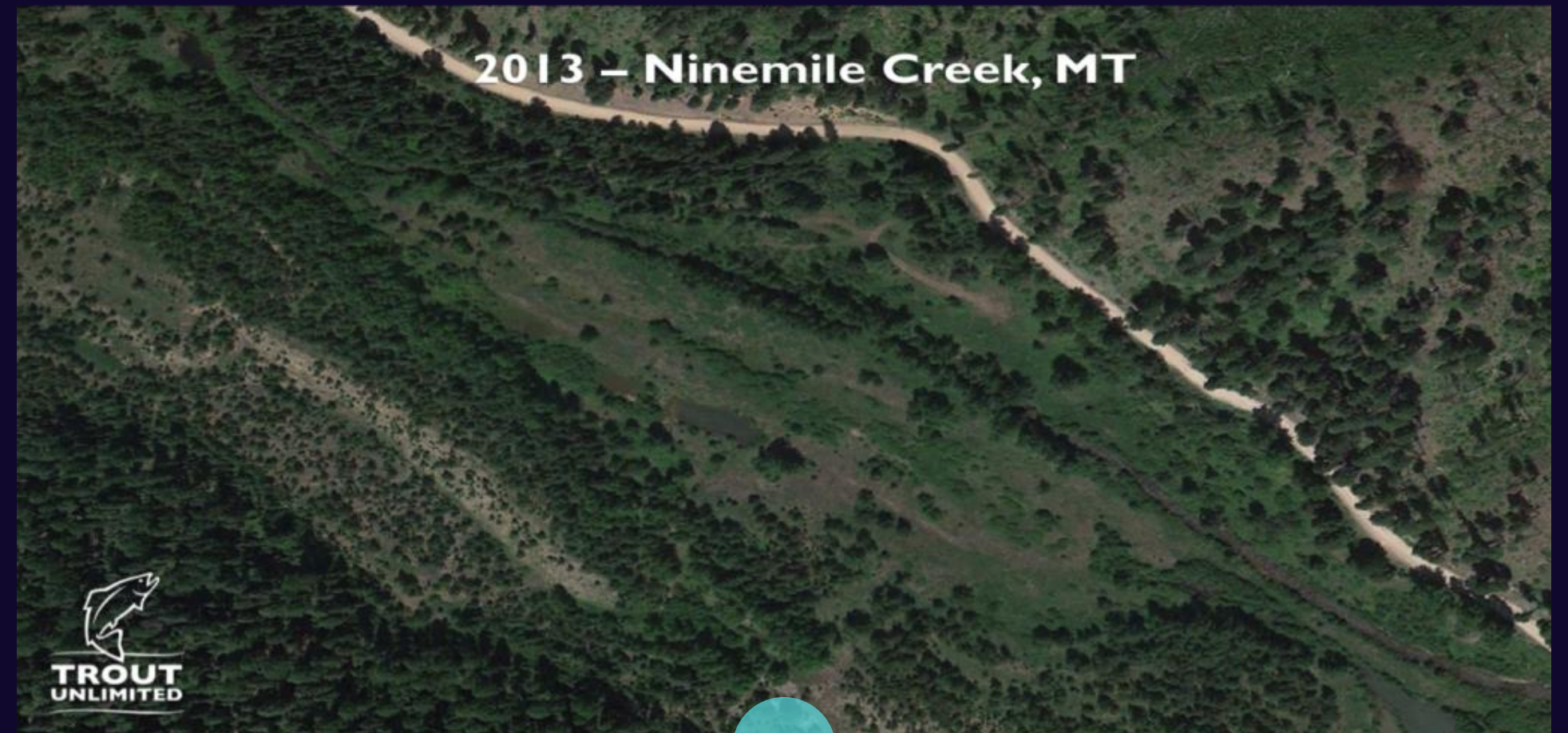
# FLOODPLAIN RESTORATION

## Restoration

- Remove tailings piles
- Restore stream geometry
- Restore riparian habitat
- Create wetland habitat

## Phases

- 5 complete
- 6th in progress
- Spaced out to minimize disturbance in watershed
- Highly specialized crew needed



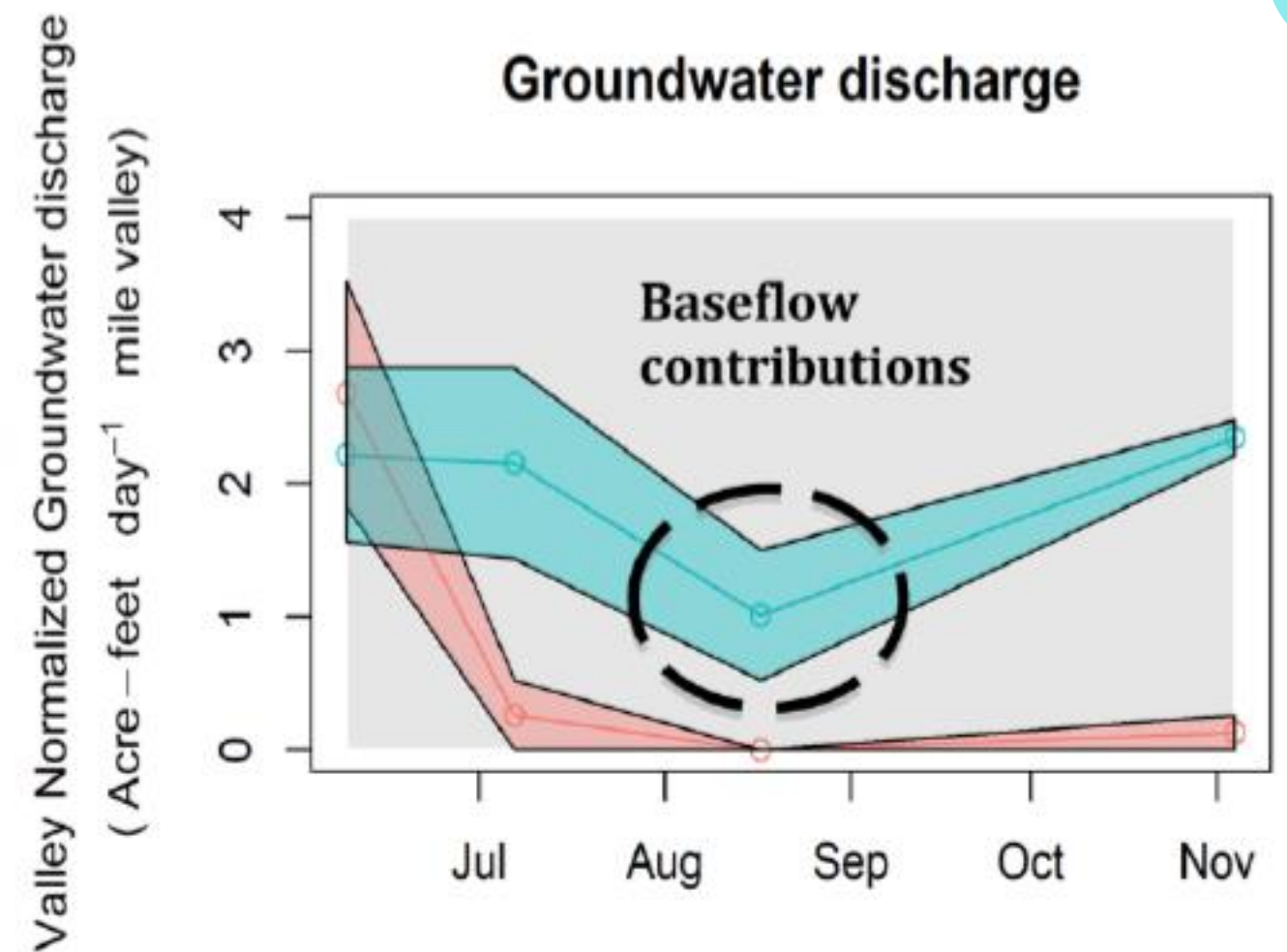
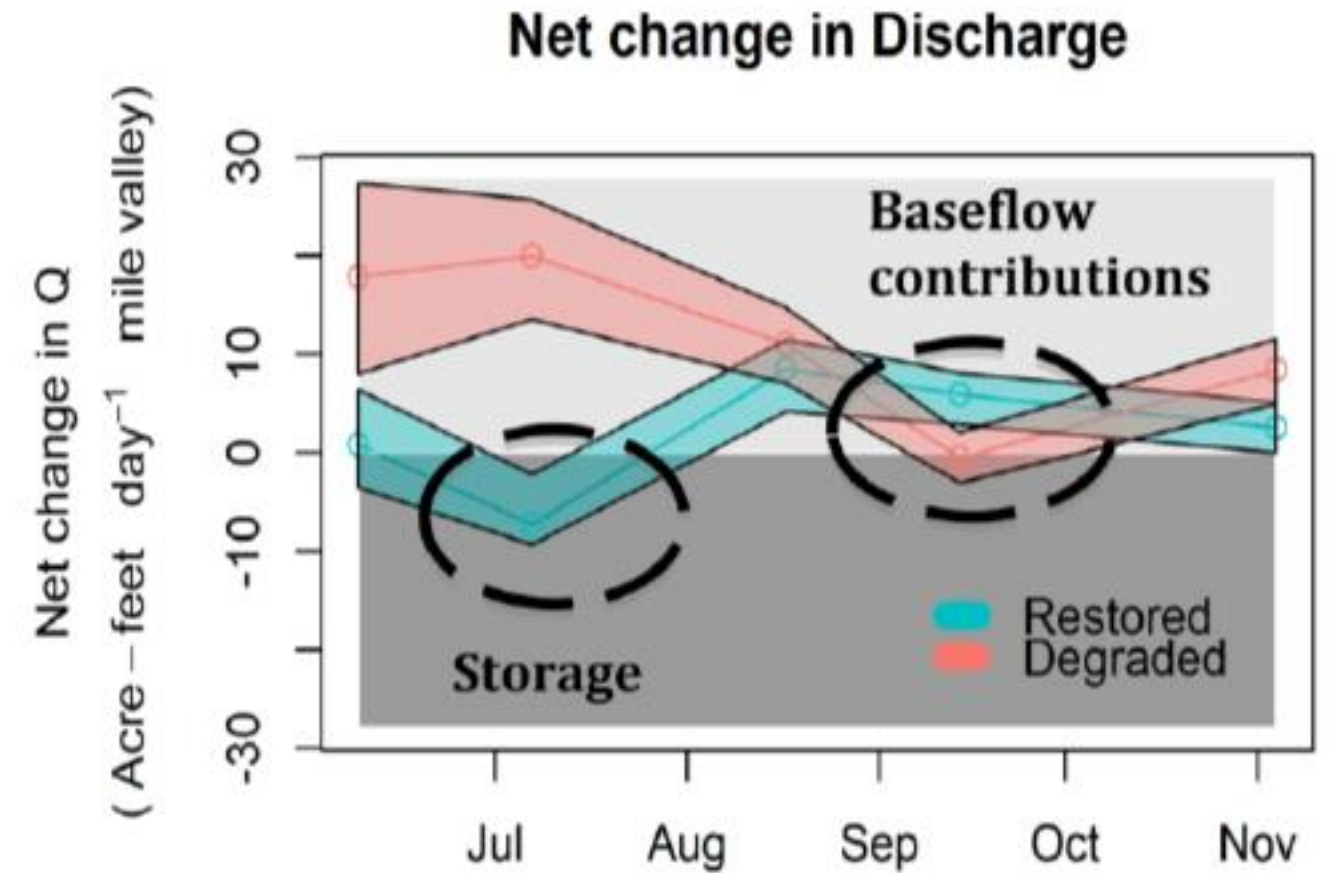
# FLOODPLAIN RESTORATION

## Results

- Increased early season water storage
- Decreased peak discharge
- Increase in late-season base flow
- Increase in wildlife and streamside habitat returning (beaver dams, etc)
- Reduced sediment load by 860 tons/year

## Collaboration

- 319 money
- FEMA PDM Grant
- Other state agencies
- Wide range of issues addressed in one project





# Flow on Rattlesnake Creek

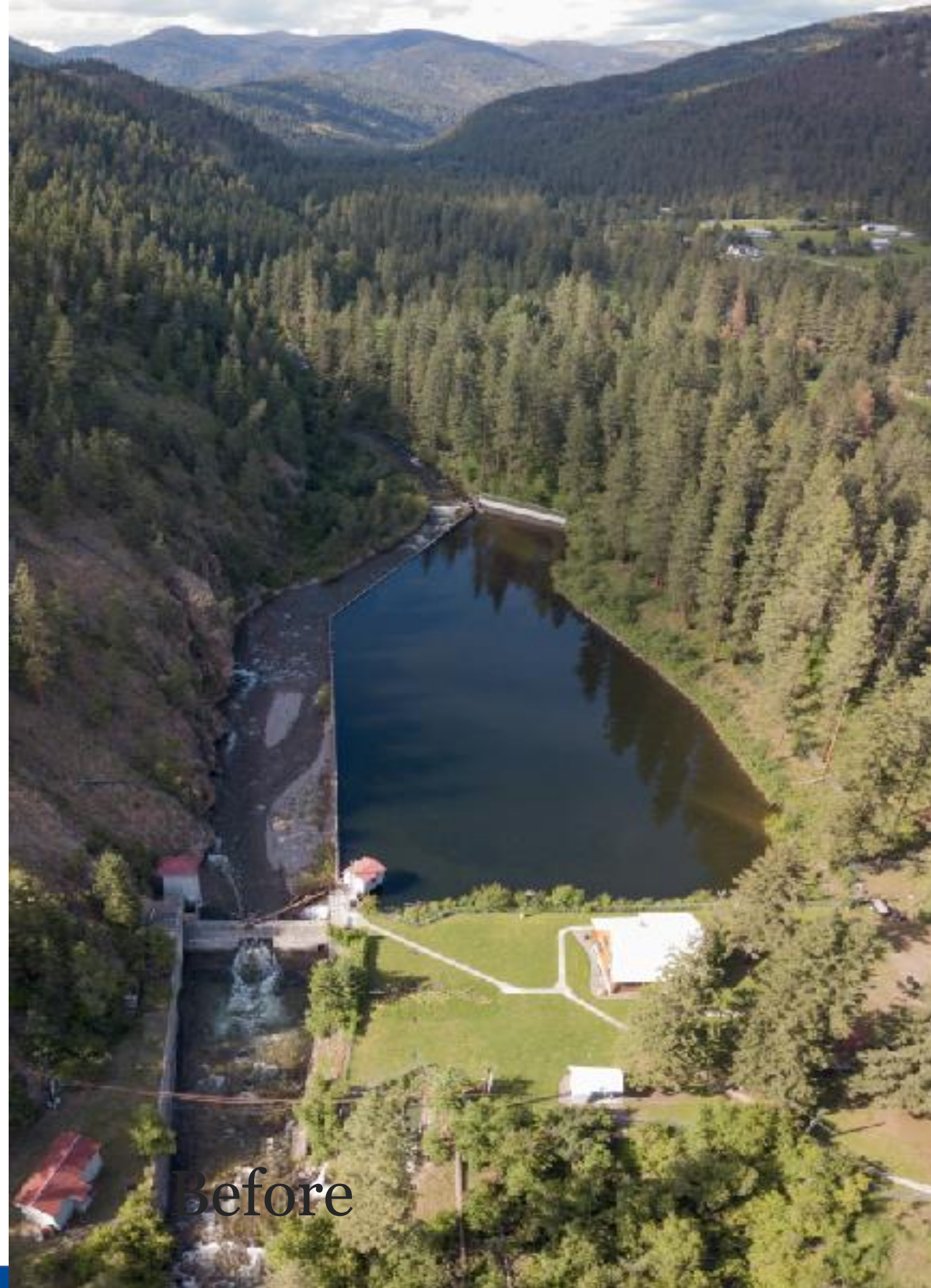
The historical drinking water supply for the city of Missoula came from the Rattlesnake Dam. The dam was considered inoperable after Giardia was discovered in the reservoir and the city switched to a groundwater aquifer. The dam was the source of the aquatic life impairment due to flow regime modifications.

## Restoration

- Remove all infrastructure
- Restore approximately 1,200 feet of stream channel
- Add in natural floodplain features and wetlands

## Results

- Increase floodplain function and water storage
- Mitigate flooding hazard
- Reconnect 26 miles of stream
- Add recreational opportunities
- Will move out of Category 4C



Before



After

# Sed/Hab and Fish Passage in Bitterroot Headwaters

- Forest roads and silviculture activities were identified as the primary source of all impairments
  - Alteration in stream-side or littoral vegetative covers
  - Fish Passage Barriers
  - Sedimentation/Siltation
- Land transfer prompted restoration work
  - Replaced 37 culverts and decommissioned over 60 miles of forest roads
    - Assess if restoration activities have helped meet TMDL/303d sediment, fish passage and fish habitat/riparian habitat goals
    - More wholistic approach than just siltation/spawning





MT views 4c as a useful tool for:

Provides a communication tool about sources and pathways when linked to pollutants

Addresses local habitat conditions that affect aquatic life and fish along with pollutant loading during watershed planning and restoration

Better buy-in and coordination with natural resource managers because of wholistic approach



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**THANK YOU**

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