

<b>County</b>	Sweet Grass	<b>Upstream River Mile</b>	443.6
<b>Classification</b>	PCB: Partially confined braided	<b>Downstream River Mile</b>	438.5
<b>General Location</b>	Bridger Creek	<b>Length</b>	5.10 mi (8.21 km)

## Narrative Summary

Reach A8 is 5.1 miles long, and is at Bridger Creek. The reach is classified as Partially Confined Braided (PCB), which indicates some valley wall influences on river form and relatively extensive gravel bars and low flow channel complexity. Within this reach, the river intermittently follows the northern bluff line of the river valley which is comprised of Cretaceous-age Hell Creek Formation sandstones and mudstones. The other side of the river valley consists of low floodplain and terrace deposits. The Bratten fishing access site is located in the lower end of the reach.

Similar to other reaches in Region A, the overall footprint of the river channel has increased in size since 1950. In 1950, the channel footprint was 436 acres but by 2001 it had expanded to 482 acres.

As of 2011, about 10 percent of the banks in Reach A8 were armored by almost 4,000 feet of rock riprap and 1,400 feet of flow deflectors. There is also a ~760 foot long retaining wall on the right bank at the very upstream most end of the reach that protects several structures. At Rm 441.1, rock riprap on both sides of the river has constricted the channel corridor to essentially the width of the active channel, which is about 550 feet. Physical features also occupy the floodplain; over three miles of transportation encroachment and 1,800 feet of floodplain dikes have been mapped in the reach. Transportation infrastructure and agriculture-related dikes have isolated 25 percent of the historic 100-year floodplain in the reach.

Reach A8 has experienced the loss of almost a mile of side channel since the 1950s due to dike construction. All of the side channel loss is from one project at the mouth of Bridger Creek, where the lower portion of the creek was channelized downstream of the I-90 Bridge. This channelization included re-routing the creek through a channelized section to an active side channel of the Yellowstone River. The channelization included construction of a dike that guides Bridger Creek into the side channel, and blocks the side channel at the intersection, essentially turning the lower portion of the side channel into lowermost Bridger Creek. The channelization of lower Bridger Creek occurred between 1950 and 1976.

Even though Reach A8 has experienced some side channel loss, it still supports extensive side channel length. As of 2001 there were 6.6 miles of active side channel in the 5.1 mile long reach.

Land use in Reach A8 is predominantly agricultural, although there almost 230 acres of transportation-related development in the mapping footprint. Most of the agricultural land is non-irrigated, although there are 900 acres of ground under flood irrigation and 56 acres under pivot. A total of 236 acres of developed land are in the Channel Migration Zone. Most of that is in flood irrigation (211 acres), but 8 acres are in pivot and 4 are in exurban development. About 16 percent of the CMZ is restricted by physical features.

A hydrologic evaluation of flow depletions indicates that flow alterations over the last century have been moderate in this reach. The mean annual flood is estimated to have dropped from 13,700 cfs to 13,000 cfs, a drop of about 5 percent. The biggest influence has been on low flows: severe low flows described as 7Q10 (the lowest average 7-day flow anticipated every ten years) for summer months has dropped from an estimated 2,020 cfs to 1,670 cfs with human development, a reduction of 17 percent. More typical summer low flows, described as the summer 95% flow duration, have dropped from 1,760 cfs under unregulated conditions to 1,680 cfs under regulated conditions at the Livingston gage, a reduction of 4.6 percent.

The reduction in flows is evident by the contraction of the 5-year floodplain area in Reach A8 by 24 acres, or 11 percent.

CEA-Related observations in Reach A8 include:

- Side channel loss as part of tributary channelization
- Isolation of 25 percent of historic 100-year floodplain primary due to transportation infrastructure
- Contraction of 5-year floodplain due to flow alterations.

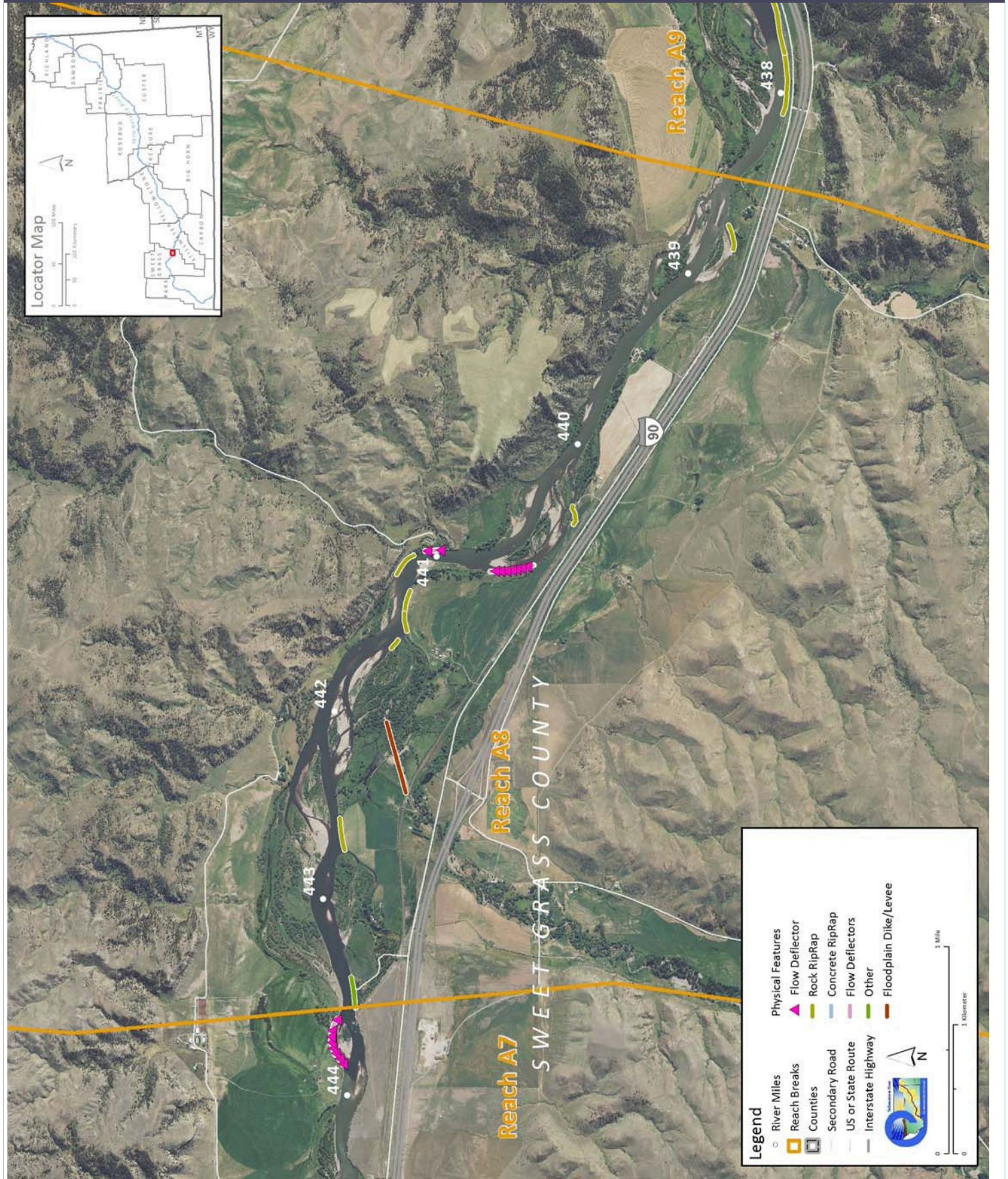
Recommended Practices (may include Yellowstone River Recommended Practices--YRRPs) for Reach A8 include:

- Side channel restoration at RM 442
- Floodplain restoration/reconnection on south side of interstate at RM 439.5
- CMZ management due to extent of CMZ restriction (16 percent)

The following table summarizes some key CEA results that have been used to describe overall condition and types of human influences affecting the river. The values are specific to this single reach. Blanks indicate that a particular value was not available for this area. This information is consolidated from a large dataset that is presented in more detail in the full reach narrative report.

<b>Discharge</b>	<b>Undev.</b>	<b>Developed</b>	<b>% Change</b>	<b>"Undeveloped" flows represent conditions prior to significant human development, whereas "developed" flows reflect the current condition of both consumptive and non-consumptive water use.</b>		
2 Year (cfs)	26,600	25,800	-3.0%			
100 Year (cfs)	49,000	48,500	-1.0%			
<b>Bankfull Channel Area (Ac)</b>	<b>1950</b>	<b>1976</b>	<b>1995</b>	<b>2001</b>	<b>1950-2001</b>	<b>Bankfull channel area is the total footprint of the river inundated at approx. the 2-year flood.</b>
	436.3	445.2	460.7	482.4	46.1	
<b>Physical Features</b>	<b>2011 Length (ft)</b>	<b>% of Bankline</b>	<b>2001-2011 Change</b>	<b>There are additional types of bank armor such as car bodies and steel retaining walls, but they are relatively minor.</b>		
Rock RipRap	3,970	7.4%	274			
Concrete Riprap	0	0.0%	0			
Flow Deflectors	1,415	2.6%	-134			
<b>Total</b>	<b>5,386</b>	<b>10.1%</b>	<b>140</b>			
<b>Length of Side Channels Blocked (ft)</b>	<b>Pre-1950s</b>	<b>Post-1950s</b>	<b>Numerous side channels have been blocked by small dikes.</b>			
	0	4,657				
<b>Floodplain Turnover</b>	<b>1950 - 1976</b>	<b>1976 - 2001</b>	<b>1950-2001 In-channel riparian encroachment (negative number indicates retreat)</b>	<b>The rate of floodplain turnover reflects how many acres of land are eroded by the river. Turnover is associated with the creation of riparian habitat.</b>		
Total Acres	107.8	106.2				
Acres/Year	4.1	4.2				
Acres/Year/Valley Mile	0.9	0.9	33.22 acres			
<b>Open Bar Area</b>	<b>Point Bars</b>	<b>Bank Attached</b>	<b>Mid-Channel</b>	<b>Total</b>	<b>The type and extent of open sand and gravel bars reflect in-stream habitat conditions that can be important to fish, amphibians, and ground-nesting birds such as least terns.</b>	
<b>Change in Area '50 - '01 (Ac)</b>						
<b>Floodplain Isolation</b>	<b>Acres</b>	<b>% of FP</b>	<b>Floodplain isolation refers to area that historically was flooded, but has become isolated do to flow alterations or physical features such as levees.</b>			
5 Year	23.6	11%				
100 Year	197.0	25%				
<b>Restricted Migration Area</b>	<b>Acres</b>	<b>% of CMZ</b>	<b>Channel Migration Zone restrictions refer to the area and percent of the CMZ that has been isolated by features such as bank armor, dikes, levees, and transportation embankments.</b>			
	195.8	16%				
<b>Land Use</b>	<b>1950</b>	<b>2011</b>	<b>1950</b>	<b>2011</b>	<b>Changes in land use reflect the development of the river corridor through time. The irrigated agricultural are is a sub-set of the mapped agricultural land.</b>	
Agricultural Land (Ac)	3,285.3	3,019.8	Flood (Ac)	1,161.0	903.6	
Ag. Infrastructure (Ac)	63.0	128.0	Sprinkler (Ac)	0.0	0.0	
Exurban (Ac)	0.0	10.2	Pivot (Ac)	0.0	55.9	
Urban (Ac)	0.0	0.0				
Transportation (Ac)	54.6	228.8				
<b>1950s Riparian Vegetation Converted to a Developed Land Use (ac)</b>	<b>To Irrigated</b>	<b>To Other Use</b>	<b>Total Rip. Converted</b>	<b>% of 1950s Rip.</b>	<b>Changes in the extents of riparian vegetation are influenced by land use changes within the corridor.</b>	
	1.1	3.6	4.7	1.0%		
<b>National Wetlands Inventory</b>	<b>Acres</b>	<b>Acres per Valley Mi</b>	<b>Total Wetland Acres</b>	<b>Wetlands units summarized from National Wetlands Inventory Mapping include Riverine (typically open water sloughs), Emergent (marshes and wet meadows) and Shrub-Scrub (open bar areas with colonizing woody vegetation).</b>		
Riverine	14.8	3.2	<b>112.5</b>			
Emergent	73.1	15.7				
Scrub/Shrub	24.6	5.3				
<b>Russian Olive (2001) (Appx. 100-yr Floodplain)</b>	<b>Acres</b>	<b>%</b>	<b>Russian olive is considered an invasive species and its presence in the corridor is fairly recent. Its spread can be used as a general indicator of invasive plants within the corridor.</b>			
	0.4	0.0%				
<b>Riparian Forest at low risk of Cowbird Parasitism (Ac/Valley Mile)</b>	<b>1950</b>	<b>1976</b>	<b>2001</b>	<b>Change 1950-2011</b>	<b>Cowbirds are associated with agricultural and residential development, displacing native bird species by parasitizing their nests.</b>	
	0.0	2.2	0.0	0.0		

## PHYSICAL FEATURES MAP (2011)



## CHANNEL MIGRATION ZONE MAP

