

County	Park	Upstream River Mile	564.8
Classification	CS: Confined straight	Downstream River Mile	560.2
General Location	Gardiner to Little Trail Cr.	Length	4.60 mi (7.40 km)

Narrative Summary

Reach PC1 is the upstream-most reach of the project area, beginning at Gardiner Montana, and extending northward almost five miles to the Trail Creek confluence. Reach PC1 is confined/straight reach type and shows minimal impact in terms of flow alterations, bank armoring, and side channel loss. The bankfull area has remained essentially unchanged since 1950. Land use is dominated by non-irrigated agriculture, with some conversion of flood irrigation to sprinkler from 1950 to 2011. There are over 300 acres of urban/exurban development in the reach, dominated by the town of Gardiner. Although the development in Gardiner is very close to the river, it is located high on bluffs that are outside of the Channel Migration Zone (CMZ) and floodplain. The bluffs are composed of glacial outwash deposits that are very coarse and erosion resistant. The total CMZ area in Reach PC1 is only 115 acres, and there is essentially no riparian zone in this reach. This section of river is relatively steep, with steep boulder runs and associated wave trains that make it a popular stretch of river for recreational white water rafting. There is one boat ramp in the reach at RM 561.5, and the Queen of the Waters Fishing Access Site is located at RM 563.

This area of the upper Yellowstone River basin experienced three severe floods in the last 20 years. The largest floods were in 1996 and 1997, when the 32,200 cfs peak flow measured at the Corwin Springs gage exceeded a 100-year flood for those two years in a row. The 1974 and 2011 floods were major as well, with both events exceeding 30,000 cfs. The Corwin Springs gage is located downstream of Reach PC1 at the Corwin Springs Bridge.

CEA-Related observations in Reach PC1 include:

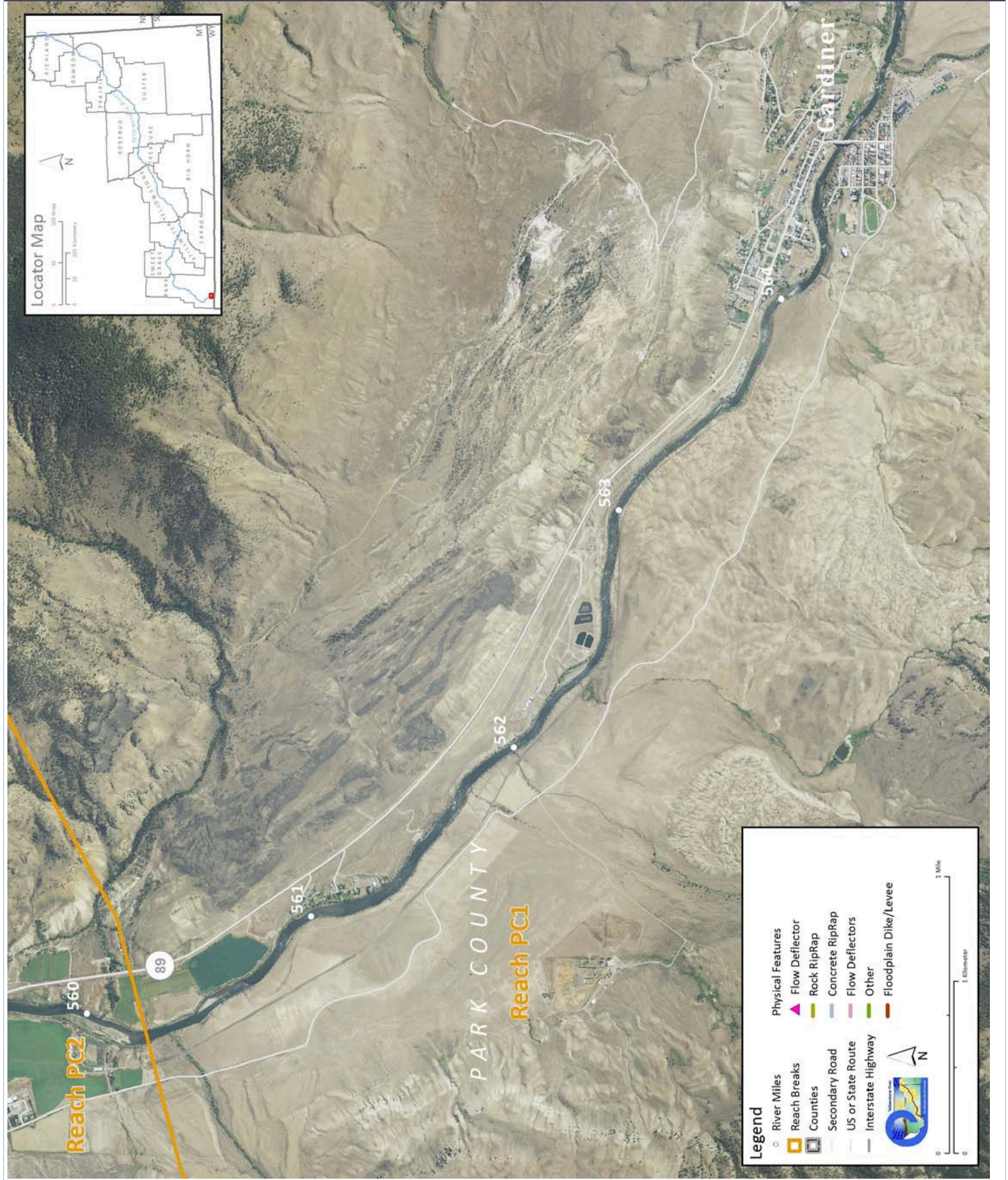
- Urban/Exurban development at Gardiner

No reach-specific Practices have been identified for this reach.

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.

Discharge	Undev.	Developed	% Change	"Undeveloped" flows represent conditions prior to significant human development, whereas "developed" flows reflect the current condition of both consumptive and non-consumptive water use.		
2 Year (cfs)	16,800	16,800	0.0%			
100 Year (cfs)	32,100	32,100	0.0%			
Bankfull Channel Area (Ac)	1950	1976	1995	2001	1950-2001	Bankful channel area is the total footprint of the river inundated at approx. the 2-year flood.
	107.2			110.1	2.9	
Physical Features	2011 Length (ft)	% of Bankline	2001-2011 Change	There are additional types of bank armor such as car bodies and steel retaining walls, but they are relatively minor.		
Rock RipRap	0	0.0%	0			
Concrete Riprap	0	0.0%	0			
Flow Deflectors	0	0.0%	0			
Total	0	0.0%	0			
Length of Side Channels Blocked (ft)	Pre-1950s	Post-1950s	Numerous side channels have been blocked by small dikes.			
	0	0				
Floodplain Turnover	1950 - 1976	1976 - 2001	1950-2001 In-channel riparian encroachment (negative number indicates retreat)	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.		
Total Acres			acres			
Acres/Year						
Acres/Year/Valley Mile						
Open Bar Area	Point Bars	Bank Attached	Mid-Channel	Total	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.	
Change in Area '50 - '01 (Ac)						
Floodplain Isolation	Acres	% of FP	Floodplain isolation refers to area that historically was flooded, but has become isolated do to flow alterations or physical features such as levees.			
5 Year						
100 Year						
Restricted Migration Area	Acres	% of CMZ	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.			
Land Use	1950	2011	1950	2011	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.	
Agricultural Land (Ac)	1,647.8	1,399.5	Flood (Ac)	42.4	0.0	
Ag. Infrastructure (Ac)	1.8	0.0	Sprinkler (Ac)	0.0	36.0	
Exurban (Ac)	31.5	157.9	Pivot (Ac)	0.0	0.0	
Urban (Ac)	51.6	174.6				
Transportation (Ac)	60.1	58.0				
1950s Riparian Vegetation Converted to a Developed Land Use (ac)	To Irrigated	To Other Use	Total Rip. Converted	% of 1950s Rip.	Changes in the extents of riparian vegetation are influenced by land use changes within the corridor.	
National Wetlands Inventory	Acres	Acres per Valley Mi	Total Wetland Acres	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).		
Riverine	0.0	0.0	0.0			
Emergent	0.0	0.0	0.0			
Scrub/Shrub	0.0	0.0	0.0			
Russian Olive (2001) (Appx. 100-yr Floodplain)	Acres	%	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.			
	0.1	0.3%				
Riparian Forest at low risk of Cowbird Parasitism (Ac/Valley Mile)	1950	1976	2001	Change 1950-2011	Cowbirds are associated with agricultural and residential development, displacing native bird species by parasitizing their nests.	

PHYSICAL FEATURES MAP (2011)



CHANNEL MIGRATION ZONE MAP

