

<b>County</b>	Park	<b>Upstream River Mile</b>	543.2
<b>Classification</b>	PCA: Partially confined anabranching	<b>Downstream River Mile</b>	539.4
<b>General Location</b>	Hwy 89 Br. to Big Creek	<b>Length</b>	3.80 mi (6.12 km)

### Narrative Summary

From the Highway 89 Bridge downstream to Big Creek, Reach PC5 is the first notably dynamic reach below Gardiner, with high rates of bank movement and a relatively high density of side channels and islands. In 2001, there were almost four miles of active side channel in the reach, although one 3,500-foot long channel on the west side of the river has been blocked by a dike. This dike does appear to have a culvert in it, keeping the channel somewhat accessible. In addition to side channel blockages, this reach has been impacted by over 5,000 feet of bank armor, most of which is rock riprap. One section of riprap that was about 150 feet long when constructed has been flanked and is now in the middle of the river. Since the rock was flanked, the river has migrated over 100 feet behind the old armor.

Similar to other reaches in Park County, the extent of flood irrigation has dropped in the reach since 1950, and the amount of sprinkler and pivot irrigation has increased. Reach PC5 has seen a net expansion of about 150 acres of irrigated lands since 1950, with most of the expansion into pivot. There has also been 100 acres of exurban development in Reach PC5 since 1950. There is one boat ramp at RM 542.5 at the Point of Rocks Fishing Access.

The influence of irrigation on streamflow is small but evident in Reach PC5. When gage data are extrapolated to reaches based on drainage area, Reach PC5 shows a 100 cfs reduction in the 2-year flood under developed conditions. This is a 0.5 percent reduction in the total flow of 19,000 cfs.

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 upstream of Reach PC5 at the Corwin Springs Bridge.

CEA-Related observations in Reach PC5 include:

- Blockage of a 3,500feet-long side channel by a dike which may have a culvert
- Flanking of rock riprap and accelerated erosion behind
- Net expansion of irrigated lands

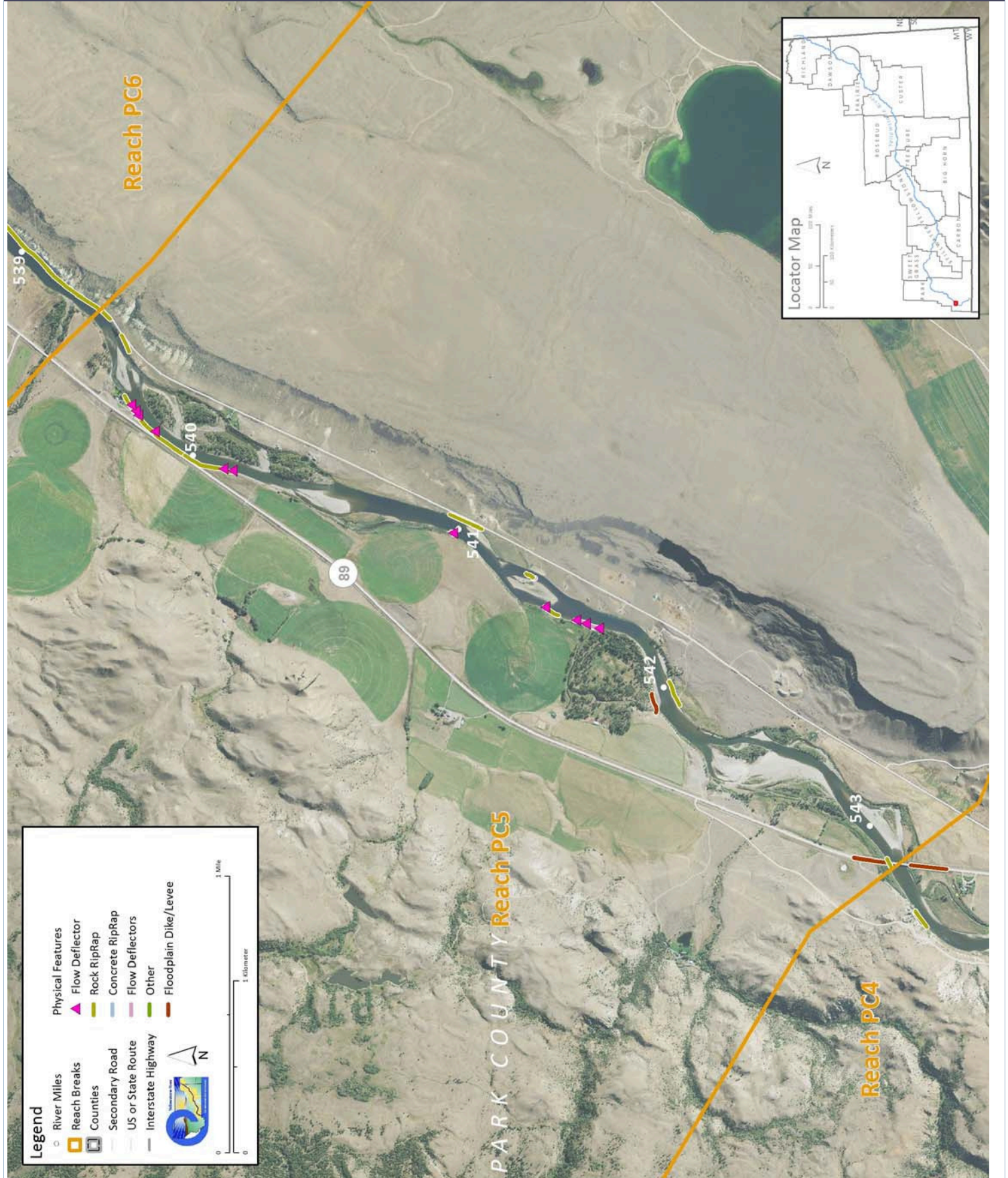
Recommended Practices (may include Yellowstone River Recommended Practices--YRRPs) for Reach PC5 include:

- Side Channel Restoration at RM 542
- Removal of flanked bank armor at RM 541.4

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>	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)	19,100	19,000	-0.5%			
100 Year (cfs)	36,000	36,000	0.0%			
<b>Bankfull Channel Area (Ac)</b>	1950	1976	1995	2001	1950-2001	Bankful channel area is the total footprint of the river inundated at approx. the 2-year flood.
	219.7			199.2	-20.5	
<b>Physical Features</b>	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	4,371	10.8%	-201			
Concrete Riprap	0	0.0%	0			
Flow Deflectors	993	2.5%	-81			
<b>Total</b>	<b>5,365</b>	<b>13.3%</b>	<b>-282</b>			
<b>Length of Side Channels Blocked (ft)</b>	Pre-1950s	Post-1950s	Numerous side channels have been blocked by small dikes.			
	0	3,503				
<b>Floodplain Turnover</b>	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/Year Acres/Year/Valley Mile			acres			
<b>Open Bar Area</b>	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)						
<b>Floodplain Isolation</b>	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						
<b>Restricted Migration Area</b>	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.			
	22.3	6%				
<b>Land Use</b>	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)	994.5	892.7	Flood (Ac)	188.3	38.7	
Ag. Infrastructure (Ac)	0.0	13.8	Sprinkler (Ac)	0.0	74.2	
Exurban (Ac)	0.0	102.2	Pivot (Ac)	0.0	222.4	
Urban (Ac)	0.0	0.0				
Transportation (Ac)	34.7	49.2				
<b>1950s Riparian Vegetation Converted to a Developed Land Use (ac)</b>	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.	
<b>National Wetlands Inventory</b>	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	60.4			
Emergent	26.4	7.4				
Scrub/Shrub	34.0	9.6				
<b>Russian Olive (2001) (Appx. 100-yr Floodplain)</b>	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	0.1%				
<b>Riparian Forest at low risk of Cowbird Parasitism (Ac/Valley Mile)</b>	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

