YELLOWSTONE RIVER
Cumulative Effects Analysis
AT A GLANCE...

WHAT WAS DONE:

The Yellowstone River Conservation District Council (YRCDC) has collaborated with the U.S. Army Corps of Engineers, and many other partners, since 2001 to complete a Cumulative Effects Analysis (CEA). The CEA is an in-depth look at the response of the river to the sum of incremental human impacts over the course of time. The CEA results were the basis for a series of voluntary management recommendations for the river and its adjacent floodplain. The analysis addressed the cumulative hydrologic, biological, physical, and socio-economic impacts of human activity on 565 miles of the Yellowstone River from Gardiner, Montana to its confluence with the Missouri River in North Dakota.

The resulting report, Yellowstone River Cumulative Effects Analysis (March 2016) provides 1) a scientific basis for management decisions; 2) a shared broad-based vision for the river using local, regional, and national input; 3) a resource for technical and financial assistance to address sustainability issues on the river; 4) a platform for constructive dialog among all river stakeholders; 5) an educational framework to inform river users and the public; and 6) a baseline for future evaluations of trends.

WHO WE ARE:

The Yellowstone River Conservation District Council (YRCDC) is a grassroots, locally-led organization comprised of eleven Conservation Districts along the Yellowstone River. Conservation Districts are units of local government tasked with providing solutions to deal with natural resource management issues and activities.

YRCDC MISSION:
Working Relationships Yield a Shared Vision...

By encouraging communication and cooperation through collaboration, education, incentives and voluntary action, it is our purpose to ensure a healthy river and riparian system capable of sustaining the needs of Montana Citizens and the communities we serve.

Yellowstone River
Conservation District Council

WHAT WE LEARNED: One hundred and fifty years of human settlement and activity along the Yellowstone River corridor have changed many aspects of the river and its floodplain. While the river remains a beautiful, ecologically diverse, and economically valuable resource, the CEA indicates that major changes have occurred throughout the system with human development. Our challenge as citizens and stewards is to use this information to manage this system into the future and to satisfy the mission of the YRCDC by limiting adverse impacts, improving degraded conditions, and securing the health of the Yellowstone River for future generations. The following are a sampling of what was learned.

Riparian and Wetland Habitats: occur on a relatively small part of the corridor but are very important to river health and wildlife. Over half of all wildlife species in Montana depend on these areas during their lifetime.

- Woodlands and wetlands along the Yellowstone River have been greatly altered in extent, distribution, and complexity over time.
- Much of the habitat loss occurred before 1950 as lands were settled, however some 6,800 acres have been lost since then.
- Expansion of woody plants into former side channels below the confluence with the Big Horn River mask even greater losses.
- Agricultural land changes and railroad berms have cut off over 20,000 acres of riparian vegetation from active flooding.

Fisheries: Distinct fish communities occur in the upper, middle, and lower river. Some 59 species of fish, of which 63 percent are native, create robust recreational fisheries which are culturally and economically important to communities along the river.

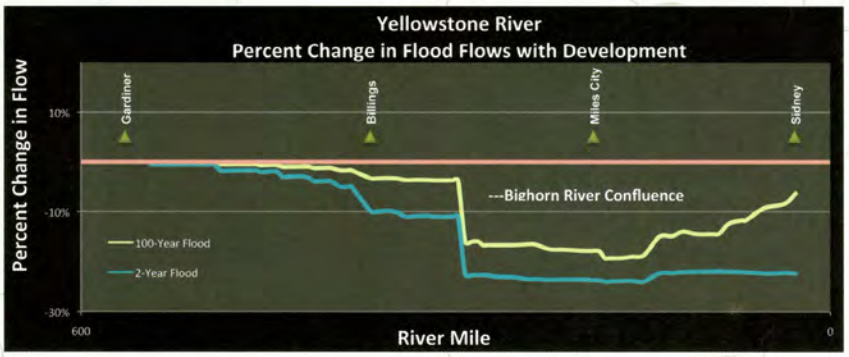
- Reduction in the extent of and access to side channels and floodplains during high flows adversely affects fish, amphibian, and reptile habitats.
- Six mainstream diversion dams negatively affect the distribution and viability of some fish populations.

Land Use and Development: Land use in the corridor remains primarily agricultural, although this use and other land use changes have dramatically altered the landscape. About 24,000 acres, or 38 percent, has been developed for either urban/exurban, transportation or irrigated agricultural land uses.

Invasive Species: The introduction and spread of a large number of non-native species has increasingly become a long-term threat to the health of the river system.

- Russian olive and salt cedar have become naturalized to nearly the entire river corridor, greatly impacting channel, riparian, and wetland habitats where Russian olive occupies nearly 4,600 acres.
- Introduced fish such as rainbow and brown trout, walleye, northern pike and smallmouth bass aggressively compete with native fish.

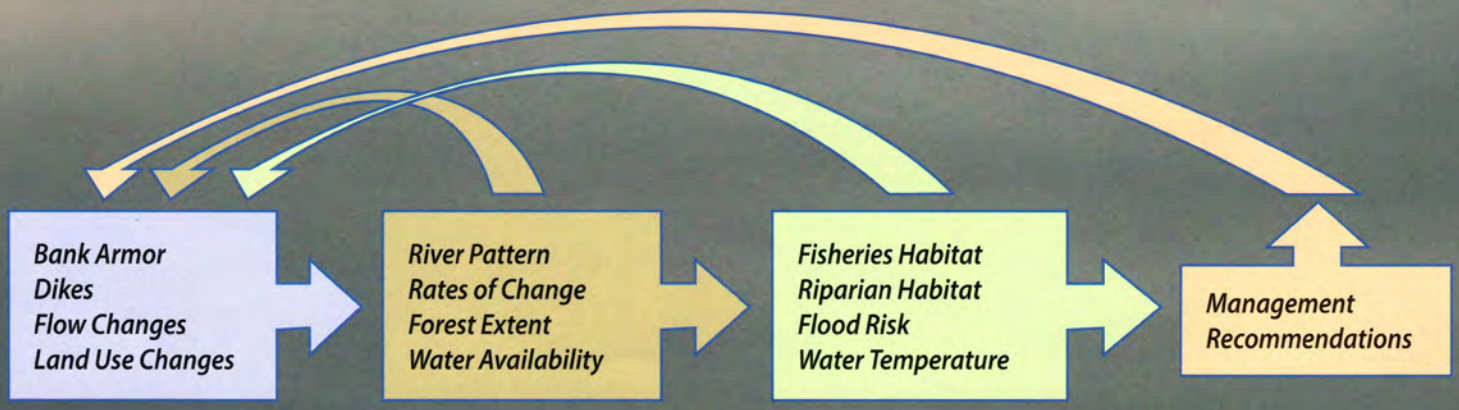
Birds (Avian): Nearly 100 species of birds were observed during the study, primarily within cottonwood forests. Expansion of brown-headed cowbirds due to the decline of cottonwood forests and increase of pastures decreases native bird nesting success.



Streamflow: Combined influences of irrigation-related water use and flow alterations on the Bighorn River have resulted in major changes in the amount and patterns of streamflow on the Yellowstone.

- Below the mouth of the Bighorn River, the 100-year flood discharge has dropped by 16%. The 2-year flood flow has dropped by 23%.
- Very low flows have dropped by approximately 30% at Billings and 40% at Miles City.

Bank Armor, Dikes, and Channel Form: Bank armor and dikes have altered channel patterns and rates of change. As of 2011, there were approximately 136 miles of bank armor on the river and about 90 miles of side channels have been blocked by dikes.



WHY THIS STUDY IS IMPORTANT: A dynamic river and its healthy floodplain perform valuable functions such as reducing flood impacts, filtering water, creating wildlife habitat, and regenerating riparian forests. A dynamic, ecologically sound Yellowstone River system is vitally important to all of us. Impacts can be reversed, but typically at great expense. It is far better to understand and acknowledge cumulative impacts and act early to stop declines than to correct them later.

The CEA shed light on many cause and effect relationships. For example, how bank armor dampens river dynamics, or how floodplain dikes result in the long-term loss of important side channels. The study also showed the complex interrelationships between multiple impacts and their physical and biological consequences. One primary objective was to develop targeted management strategies in order to minimize future impacts, thus optimizing ecological function while maintaining an economic and cultural base.

WHERE DO WE GO FROM HERE? The YRCDC has developed both position statements and Yellowstone River Recommended Practices to address resource concerns identified through the CEA process. Both are intended to help maintain the economy and the long-term health of the system through voluntary measures. Some of the topics addressed include:

- Side Channel and Floodplain Restoration
- Nutrient Reduction
- Channel Bank Stabilization
- Irrigation Water Management
- Noxious Weed Control
- Soil Health
- Solid Waste Removal
- Channel Migration Zone Maps
- Fish Passage/ Entrainment
- Altered Flow

WHERE CAN YOU LEARN MORE? The full CEA report, technical reports, GIS data, position statements, recommended practices, and much more information about the Yellowstone River CEA can be found here:

- Online at the Montana State Library: geoinfo.msl.mt.gov/Home/data/yellowstone_river_corridor_resource_clearinghouse
- Online at YRCDC: yellowstonerivercouncil.org
- County Conservation District offices

Project Partners: US Army Corps of Engineers • Montana Department of Natural Resources & Conservation (Conservation & Resource Development Division, Water Resources Division) • Montana Fish, Wildlife & Parks • Montana State University–Billings • Natural Resource Conservation Service • Northern Great Plains Joint Venture • The Nature Conservancy • US Bureau of Reclamation • US Fish and Wildlife Service • US Geological Survey • US Bureau of Land Management • Montana Association of Conservation Districts • Our Montana • Yellowstone Valley Audubon Society