Unruly River: Two Centuries of Change along the Missouri. Robert Kelley Schneiders. Lawrence KS: University of Kansas Press, 1999.

ONE: Introduction

"This is the story of how the Missouri changed from a broad, meandering river to a partially regulated stream consisting of dams, reservoirs, and thousands of channelization structures." [1]

Establishment of navigation channel for agriculture was the primary, initial justification, yet the final result produced mixed results for agriculture.

> Development plans began "without sufficient information about the river's complex environment," and eventually "caused disastrous and costly environmental repercussions."

Schneiders's focus is on the lower (below Sioux City) river, because that was the initial focus, and because developments there led to construction of the upriver dams.

Four periods of writing about the Missouri [1-5]:

1. Impressions of explorers (1804-1880), with impressions of flora/fauna and native peoples;
2. Historians focusing on European-American settlement and anthropologists on a "vanishing Indian presence" in the river valley (1890-1920);
3. Historical writing promoting (1944-1960) dams and channelization;
4. Scientific studies on the river and valley environments (1970 – present).

Writers of the third period "portray the Missouri in its natural state as an enemy of civilization and material progress."

> Development/control viewed as crucial to stability and prosperity.

"Histories that describe both the political origins of the Missouri River development and the long-term environmental changes induced by that development are absent from the literature" (of the fourth period). [5]

The recent histories "fit into the larger historiography of water development in the United States" – with four shared characteristics:

1. Focus on topics related to river development in the American West from 1930 on;
2. Focus on the role of local, state, and federal organizations in implementing and managing development;
3. Authors either indict or absolve the developers of wrongdoing;
4. No focus on "the actual environmental change that resulted from the construction of dams, diversion canals, and channelization works" – emphasis, rather, is on politics – i.e., the role of interest groups. [5-6]

Donald Worster's *Rivers of Empire* (1985) has been influential. He "argues that the modern American West. . . is organized into a hydraulic society characterized by the concentration of wealth and power in

the hands of a few individuals and organizations, whom he refers to as the water, or power, elited" (large agribusiness firms and the federal government). [6]

> "Their ability to control, and manipulate, rivers has enabled them to establish an undemocratic regime across the region."
>
> Historians have tended to line up to support or oppose this thesis.

John Opie (1993) highlights pluralist-democratic aspects of water management that have had enormously beneficial results. [7]

> He focuses on the transformation of arid territory into a very productive region – and is confident in the ability to manage the Ogallala Aquifer to avoid its depletion.

Norris Hundley (1992) concludes that water development in California has been instrumental in economic growth, and is confident in the ability of future management to deal with shrinking water supply and rising demand. [8]

James Sherow (1991) disagrees on the existence of a water elite, but concurs with Worster on environmental degradation (but explores these only cursorily). He argues against pluralist-capitalist development, and that only "long-term planning and a supragovernment agency can sustain balanced and ecologically sensitive development in the valley."

Schneiders's perspective seeks to understand "the river and valley through time, exploring how these environments have changed since the early nineteenth century." [9]

> He argues that the river itself was an active entity affecting ongoing planning.
>
> He also argues that water elites and grassroots organizations cooperated to accomplish their respective goals.

"Prior to the development projects of the nineteenth and twentieth centuries, the Missouri River radiated with life. Life pulsated in the river's darkest depths, percolated onto its sandbars, and burst through the brush and trees lining the banks. This life, this energy, was manifested in a symphony of sounds and a smorgasbord of smells. The wind blowing through the silver-lined leaves of a tall cottonwood, the splash of a rolling catfish, the subtle rush of a bird's wings, and the steady, ominous humming of millions of mosquitoes proclaimed life just as surely as did the rancid, decaying flesh of a beached buffalo fish or the dank mustiness of vegetation rotting in stagnant pools. The Missouri River lived. There existed no distinction, no separation, between the river's waters (its essential element) and all the life that drew nourishment from it." [10]

> Development "quieted the river's noises, sanitized its robust odors, and redirected its waters for the sustenance of one species, Homo Sapiens…"

TWO: The Modern Missouri

The Missouri flows ca. 2,466 miles from Montana to its confluence with Mississippi; with source streams and tributaries, it drains 529,000 square miles (1/6 of the land mass of the continental U.S.). [12]

The Yellowstone is "the only undammed major river remaining in the continental U.S." [13]

Dam at Great Falls "destroying what had once been considered the most beautiful falls west of Niagara." [15]

Charles M. Russell Wildlife Refuge: "the longest stretch of the entire river system that has not been either dammed or channelized."

Because the Missouri is dammed where the Yellowstone converges with it, the Yellowstone deposits more silt, leading to a higher water table and increased lowland flooding. [16-17]

"Lake Sakakawea is a windswept monster of a lake" – created by Garrison Dam. At 23.8 MAF, it is the largest reservoir on the river. [17]

All the river valley bottomlands of the Fort Berthold Reservation (including a town) were flooded.

From Garrison to the next reservoir (Oahe), the Missouri "somewhat resembles its former self" – but its "waters are clear and cold, not warm and silt-laden." [17]

Lake Oahe (23.1 MAF) has 2,250 miles of shoreline – at Little Bend, shore-to-shore distance of 20 miles.

Lake Francis Case: "The dead trees resemble the bleacher bones of some giant, slithering beast now lying silent in the river and serve as a reminder of a once vibrant valley ecosystem that has been stilled." [18-19]

"Shorline slumping" of as much as 20 feet per year. [19]

Silt mass whre Niobrara enters Missouri. [19-20]

Below Gavin's Point, the Missouri again appears largely as it did in the 19th century. [20]

"From Sioux City to the river's confluence with the Mississippi, over 8,000 wing dams and hundreds of miles of quarried limestone line the riverback, forcing the water into a uniform, monotonous channel."

Corps of Engineers office in Omaha: "the nerve center for regulating the flow of the river." [21]

1993 flood (July 25) destroyed Elwood KS, and ravaged much of central Missouri.

Corps official: "In the next 50 or 100 years we'll probably be able to keep things the way the are, but in the long run the Missouri will have its way. Over geologic time, nature will do what it wants to do." (Claude Strouser) [22]

"… the Missouri changed from a river lightly touched by the human presence to a river completely transformed to serve people."

THREE: The Missouri River Yesterday

Nicknames of, and popular sai8ngs about, the Missouri. [23]

Extreme fluctuation in channel, width, volume, depth, speed, etc., at various times of year, and within varying climate patterns. [24-27]

Annual spring (April) and summer (June) rise. [26]

Silting had raised river bottom, and river was often higher than adjacent valley.

In upper reaches, average annual variance of height was 7.3 feet; in lover reaches the oscillations could reach as high as 38 feet. [27]

March ice-outs coincided with localized flooding. [27-28]

Ice-jams above and below Vermillion SD demolished the town in the flood of 1881. [28]

Through the early 19th century, Missouri was not muddy, as prairie topsoil did not yet saturate it. Its coloration was light-brown or gray – from sands, clays, gravels, and limestone = silt. [29]

Sandbars littered the river from back to bank. [30]

"The Missouri eroded its backs endlessly, shifting its channels and frequently cutting off bends to borm oxbow lakes." [33]

"The Missouri possessed, or was possessed by, whirlpools." [33]

The river "accreted more land than it eroded" – eroding one side of its channel, it rebuilt the other – it "redistributed soils, working in concert with geological and climatic forces to more voils off the plains and prairies, deposit sediments along its entire length, and dump a portion of its silt load into the Mississippi." [35]

Silt along the valley was fertile, and "contributed to the growth of thick underbrush, tall prairie grasses, and forests."

Indians had diverted water for irrigation of small plots, burned prairie grass to encourage plant growth, and extracted timber. [36]

"But the Indians only minimally affected the environmental character of the river and valley."

Missouri attracted settlers because of the biodiversity of the valley: game animals, fish, fresh water, wood, rich soil – "it its undammed and unchannelized state, the Missouri River played a crucial role in the successful agricultural settlement of the Missouri Valley and the adjacent uplands." [36-37]

<u>FOUR: The Missouri Valley and American Settlement, 1803-1880</u>

Early settlers tried to improve river conditions fro navigating by removing snags, but this was no longer necessary after the railroads arrived. [38]

By the 1880s, though, the railroads were perceived as exploitative monopolies, and the public – no longer satisfied with snag removal – began to call for "the complete remaking of the stream to facilitate barge traffic."

In the two years between Lewis and Clark's Westward journey and their return, settlement had moved 50 miles upriver. [38-39]

> By 1850, 225,000 Americans lived in or immediately adjacent to the Missouri River Valley in the state of Missouri. Sioux City was founded in 1856. Dakota territory opened to settlement in 1859. [39]

Because of the river bed's elevation, the water table was high and wells easy to dig. [40]

Sawmills developed for building and fuel – bottomland timber thus sustained settlement. [41-42]

Game animals were plentiful, as were fish. [43-44]

Fruits and vegetables added variety to the diet. [44]

Early settlers used the bottomlands primarily for hay.

"The flat alluvial plain facilitated the establishment of farmsteads." [45-46]

> The valley's fertile soil produced abundant corn.

Keelboats plied the Missouri from 1804 into the 1830s – propelled by sail, oaring, and poling – also by cordelilng (pulled by rope by men walking tha banks).

> Exceedingly difficult navigation meant very slow travel – Lewis and Clark averaged less than ten miles a day.

Despite the difficulties, keelboats kept settlements and forts supplied – and shipped agricultural produce downstream. [47]

> The difficulty, though, led to steamboats – first on the lower Missouri – especially during the Spring and Summer rises.
>
> Through the 1830s-1850s, steamboat travel increased in the upper Missouri as well. [48]
>
> > This enabled easier supply for settlements, and greater capacity for transporting agricultural produce. [49]

Eventually, boats were designed better suited for the Missouri, which resulted in greater demand and higher profits. [51]

> Still, dangers and delays remained constant, and steamboats frequently sank. [52]

From 1838-1870s, the government became progressively involved in removal of snags and other obstructions to steamboat navigation – overhanging trees were cut to prevent snags. [54-55]

> Snagboats operated by the Corps of Engineers became progressively more sophisticated. [55]
>
> > These efforts were only marginally successful, because snags continually recurred, and because snag removal was easiest during low-water times when steamboat traffic was also lowest.

Estimate: 3 of every 7 steamboats operating on the Missouri were lost. This led to exorbitant insurance rates. [57]

Arrival of the railroad offered greater reliability, safety, efficiency, and lowered expense and greater comfort. They also provided farmers with more direct access to markets in the eastern U.S. and Europe. [57-58]

> The Great Northern reached Helena in 1887, and through-steamboat travel ended, though some operated to connect towns not served by the railroad with those that were. [59]

As dependence on the river for navigation ended, "the perception of the river changed." It now came to be considered "a threat to agriculture and a wasted natural resource in need of improvement."

> This new perception, along with belief that railroads came to charge usurious rates, "led directly to efforts by valley residents to redesign the Missouri to carry barge traffic."

FIVE: The River Abandoned

Late 19th century saw Missouri, Kansas, and Iowa lobbying for channelization of the river to enable barge traffic, which they argued would be competitive with railroads. [60]

> The federal government was reluctant, but Missouri river Valley residents persisted in pushing for development.

A first small appropriation came in 1875, for bank stabilization work. [61]

> The Corps of Engineers gave strong support, submitting a feasibility report in 1881 that concluded the river could be channelized to maintain a minimum depth of 12 feet below Sioux City.

Devastating flood of 1881 = a "disaster reinforcing the public's belief that the river no longer contributed to civilization." [62-68]

> Residents of cities and towns "became acutely aware fo the need to protect their commun ities from the Missouri's annual rises." [68]

That same year, a Missouri River Improvement Convention was held in St. Joseph MO; it petitioned Congress for river improvement appropriations.

> They argued that barge traffic (over rail) would provide sufficient savings to more than pay for river improvement. [69]

InAugust, 1882, Congress passed the Act for the General Improvement of the Missouri River, appropriating $850,000 for channelization. This "represented a notable shift in the federal role. . . abandoning piecemeal work for the systematic, continuous improvement of an 800-mile reach of river." [69]

The Corps used the initial appropriation to purchase the equipment needed for channelization – seemingly presuming that given such an initial outlay, Congress would find it hard to reject future appropriation once such an investment had been made. [69-70]

> In 1884, Congress established the Missouri River Commission, appointing Charles Suter of the Corps as chair. [70]
>
> > An additional $500,000 was also appropriated.

Plans were to begin channelization at Kansas City and move downriver. [71]

Another convention was held in late 1885, drawing representatives from the Dakota and Montana Territories, as well as from Missouri and Iowa. Participants "came exclusively from the professional classes" – no farmers. [72]

Further appropriations came in 1886, and 1888, but the Missouri River Commission spent them on bank-protection structures, because of demands from residents of specific localities (especially Kansas City and St. Joseph). [74]

The 1890s saw greater unity among Missouri River Valley communities, and channelization began in 1891. But the commission reversed the engineering recommendation to work from Kansas City to St. Louis – which served to "subject the newly completed channelization structures to the full erosive power of the unchannelized river just upstream." [74-75]

Suter planned to utilize the Missouri's sild laoad for channelization purposes. ("Corps officials estimated the ratio between maximum monthly silt load and minimum monthly silt load at 166 to 1.") [75-76]

By erecting pile dikes which slowed the river's current and caused silt deposits, "engineers created a new back line, redirected the flow of the river, narrowed the river's channel area, deepened and stabilized the thalweg, and improved the stream's navigability." [77]

"The Corps' work on the Missouri River had no precedent; it would be experimental, trial and error." [80]

To ensure continued appropriations, another conventions was held in 1891; the men leading this movement continued to come from the commercial and professional classes. [80-81]

The basic argument was this: "Channelization would allow valley farmers to reclaim thousands of acres of bottomland formerly occupied by the river channel, enable them to drain oxbow lakes and swampland into the deeper river, and increase property values by reducing the threat of erosion. These changes would have a multiplier effect. The new acres put under the plow would contribute to increases in agricultural productivity and larger farm incomes, which would result in more business orders for Kansas City firms. A rise in property values would increase the tax base of the valley counties and at the same time permit farmers to borrow more money for capital improvements on their farms." [82]

There was a wide base of support in the Missouri River Valley for this project. [83]

> B ut by 1896, only 45 miles had been completed – at a cost of $58,000 per mile – 5 times the originally estimated cost – and a channel depth of only 6 feet had been achieved.
>
> It was clear by this time, that the project would be vastly more complicated and expensive than had been thought, and that the originally sought depths were simply not achievable.
>
> > Congress curtailed appropriations in 1896.
> >
> > Through 1902, work reverted to snag removal, and in 1902, the Missouri River Commission was disbanded. [84]

SIX: The River Rediscovered

The “100-year flood of 1903” rekindled interest in the project. [85]

> It was soon agreed that deepening the channel and increasing the river’s velocity “would allow future floods to move more quickly past the city [Kansas City] and through the state.” [86]

Another River Congress (1903) shifted the rationale from barge traffic to flood control.

> Congress rejected subsequent proposals on the basis that the federal government had constitutional authority for navigation [interstate commerce] but nor for flood control. [87]

Flooding occurred again in 1904 and 1905. Kansas Citians revived efforts to promote “the moribund barge channel, the construction of which would supposedly lessen the likelihood of floods.”

A new Missouri River Valley Improvement Association sought to sustain the economic boom Kansas City had been experiencing “by lowering transportation costs, increasing the value of real estate, and developing new avenues of trade.”

> Their strategy was to prove the navigability of the river, then argue for Congressional appropriations for channelization, and then to invest in a barge line.

Commercial Club chartered a demonstration steamboat/barge trip from St. Louis to Kansas City in September 1906; subsequently, Congress appropriated a modest amount to snag removal. [88]

> Commercial Club’s Lawrence M. James: “Possessing the evangelical fervor of a recent convert to a religious cult…”
>
> Theodore Roosevelt was devoted “to the development of the nation’s inland waterways.”

Private and federal interests joined “as part of the progressive conservation movement.” Roosevelt, e.g., “believed the federal government should use its authority to conserve the nation’s natural resources for sustained-yield production.”

> “… by 1907 the progressives believed the nation’s rivers needed to be developed to the fullest extent possible for hydroelectric generation, irrigation, navigation, or all three.”

Progressives envisioned an integrated waterway transportation system (Great Lakes, Missouri/Mississippi/Ohio Rivers, Panama Canal) “providing the United States with the means to ship agricultural commodities directly from the bountiful Midwest to virtually any port in the world without breaking bulk…” [89]

> This would:
>
> 1. Increase U.S. competitiveness in global markets; and
> 2. Decrease the economic/political power of the railroads. [90]
>
> In 1907, Roosevelt established the Inland Waterways Commission “to take an inventory of the nation’s water resources and to establish guidelines for their development.”

At this time, lobbying efforts focused on channelization downriver from Kansas City, decoupling that agenda from upriver concerns.

Kansas City Commercial Club "effectively tied their movement for river channelization to the larger national crusade for inland-waterways development advocated by the progressive conservationists." [91]

In 1907, corps of Engineers favored a Kansas City District Office to oversee work on the river, illustrating "the increased importance placed on the stre3am by the federal bureaucracy."

This enabled more direct communication/cooperation between commercial and government interests.

This also meant that "the careers of the Corps' military officers and civilian engineers became intertwined with Missouri River improvement." [91]

Institutional survival of the Kansas City office depended on "improvement" of the Missouri River. This gave commercial interests a major ally in seeking federal financing.

A 1907 publication (*The Missouri: A Deep Waterway*) reiterated prior arguments, along with new justifications (including the additional usefulness of the Panama Canal if the Missouri were navigable). [92]

This revival of interest in downriver development spurred activity by upriver interests.

It was recognized that federal appropriations would be forthcoming only if unified public opinion in the River Valley supported it – necessitating a public education campaign. [93]

Congressman Edgar Ellis: "We must have a public sentiment that will prompt the people to support with some constancy and consistency their representatives in Congress who must fight this fight."

A Congress in January 1908 (in Sioux City) "represented a notable moment in the history of efforts to channelize the Missouri River – with a wide range of representatives from throughout the region: "an example of democracy in action, of private citizens taking the initiative to develop a major natural resource to benefit themselves. Federal authorities played a minor if not nonexistent role…."

A 1908 promotional publication projected a total cost of $42.5 million for the entire 800 miles ($50,000 per mile) to a 12 foot depth. [94]

This ignored the prior effort which had achieved only a 6 foot depth at a cost of $58,000 per mile.

Further projected was reclamation of over 210,000 acres of bottomland, which would pay the entire cost of channelization.

Proponents continued to charter steamboat/barge traffic between St. Louis and Kansas City for "its propaganda value" – "Hauling freight on the river, even at a loss, allowed association members to argue with federal officials that carriers would use the river even more frequently if congress would channelize the stream."

Boats were loaded lightly and scheduled only during river rises to ensure success.

Spring 1908 flood was devastating for farmers, preventing even a marginal crop in the bottomlands that year.

Congressman Ellis "took the initiative or organize the people of the valley," promoting local organizations. [95]

> "Support for river improvement readily increased in the river towns, especially with the flood of 1908 still fresh in everyone's minds."

Congress appropriated $665,000 in 1909, with Ellis predicting a larger appropriation in 1910 that "would tacitly commit the federal government to the completion of any project."

At Ellis's urging, Kansas City Commercial Club organized a commercial venture operating barge traffic (1909), with over 4,000 investors. [96]

In 1910, Congress appropriated funds for channelization of the Mississippi from St. Paul to New Orleans. "Large scale construction of a national waterways system had begun in earnest." [97]

> Appropriation for a 6-foot channel from Kansas City to St. Louis followed in 1912. (The Corps estimated that this was the maximum achievable depth.)
>
> > "… the sympathies of the progressive conservation movement and the widespread public enthusiasm for development of the nation's rivers for navigation made federal officials receptive to the promotional efforts" of Ellis, the Commercial Club, *et al*.

Prior to World War I, Congress provided regular funding. In this period, the technologies used were essentially the same as those of the 1890s. [98]

Criticism of the project also increased at this time, and Congress ordered the Corps to conduct a cost-effectiveness review in 1915.

> This review concluded "that Missouri River barge traffic would never reach levels necessary to justify the expense of constructing the navigation channel." It also concluded that railroad rates could be lowered by regulation, without barge competition. Recommendation was that federal efforts be restricted to snagging operations.

The Commercial Club urged widespread encouragement for continued federal support of channelization. "The public response to the Commercial Blub's call for action was breathtaking in scope." [99]

> Largely because o this response, the review's recommendations were rejected – "… private interests overrode the authority and recommendations of the Corps of Engineers and determined the direction of Missouri River development." [100]

A Wisconsin congressman (James Frear) "argued that the navigation project was a sham, that the real purpose of the project had been and continued to be the stabilization of the Missouri's backs so that bottomland farmers could acquire the land that either accreted behind the pile dikes or remained free from inundation as the channel deepened itself."

World War I forced reduction in waterways expenditures, and work virtually ceased. [101]

> Existing channelization structures deteriorated.

In 1924-1925 another Kansas City businessman (J.C. Nichols) resumed organization and lobbying efforts. [102]

Herbert Hoover, as Secretary of Commerce, addressed a 1925 conference, and urged completion of an integrated waterways system ("the Cross of Commerce, which gave the movement "an overtly religious tone"). [104]

He committed the federal government to "a connected national waterways system."

The subsequent promotional organization (The Missouri River Navigation Association) "consisted mostly of bankers, lawyers, businessmen, head of farm organizations, presidents of commercial clubs, and state and local government officials." [105]

Two primary goals:

1. Induce Congress to fund completion of the project from Kansas City to St. Louis;
2. Convince Congress to authorize extension of the project upriver.

Initial focus was on completion of improvement of the Mississippi, which "had to be deepened before the Missouri coul ever be used for barge traffic."

The Corps initially opposed any work above Kansas City until downriver channelization had been completed, but pressure was exerted to reverse this position. [107]

Leaders "worked diligently to generate and to sustain mass public support for the proposed navigation channel." [108]

In 1926, Congress appropriated $2 million for downriver, but nothing for upriver.

This appropriation had symbolic significance in giving assurance that the project would now be seen through to completion.

Assured of achievement of their first goal, advocates now pressed for extension upriver – especially given the favorable political climate in Washington.

Upriver interests argued that their communities needed relief from freight costs that could only come by river navigability. [109-111]

In January 1927, the first appropriations for upriver channelization became law. [111]

It began to be argued now that the 6-foot channel approved between Kansas City and St. Louis was insufficient, because a 9-foot channel would coordinate with the depth of the Mississipppi channel, and thus of navigation below St. Louis.

SEVEN: The Dry Years, 1927-1942

Appeals for funding continued to be made, arguing the need for reduced freight costs and increased employment, but without response until 1933 when FDR pledged commitment of the 6-foot channel to Sioux City and "the construction of the world's largest earthen dam at Fort Peck, Montana." [113]

Low river levels at this time had made it apparent that large upriver res3ervoirs would be needed to maintain even a 6-foot downriver channel.

By 1932, the river below Kansas City had been confined into a single channel, and by 1940 most of the river between Kansas City and Sioux City had been channelized.

In 1937, Fort Peck Dam was completed.

"By the end of 1942, 750 miles of the lower river and 134 miles of the upper river barely resembled the Missouri's former character." [113-114]

Hoover's Secretary of War, James W. Good, wanted focus to be on completion of the Kansas City to St. Louis channel so that barrage traffic would increase, which would, in turn, provide revenue that could be applied to upriver projects. [115]

Nebraska and Iowa interests continued, however, to lobby for immediate works.

In 1929, a total of $13 million was allocated to the Missouri – the largest amount yet.

Prompt completion of the Kansas City to St. Louis segment, along with progress on the Mississippi and the Ohio, "would be a substantial step toward the realization of Hoover's Cross of Commerce." [116]

Hoover: "I favor modernizing of every part of our waterways which will show economic justification. . . what the river has lost in romance it has gained in tonnage."

He even committed himself to a 9-foot channel as an eventual goal – even though a 6-foot channel had not yet been achieved.

While politicians and businessmen promoted the idea of the 9-foot channel, the Corps' engineers "doubted whether the Missouri could ever be engineered to a nine-foot depth." [117-118]

"The division engineer did not want to rush construction on a nine-foot channel until the engineers understood more of the Missouri's intricacies." [118]

Conscious of costs, the Hoover administration made no commitment upriver, and only committed to 6-foot channel below Kansas City. [119]

As the Depression deepened, lobbying progressively focused on the ability of the upriver project to provide employment. [120]

While little money was allocated above Kansas City from 1927-1932, however, "colossal sums" were allotted for the reach east of Kansas City. As a result, "the Missouri River below Kansas City was transformed in just a few short years." [121]

In those years, 10,000 – 13,000 men were employed. [122]

Electric lights were installed to enable night work. [123]

By the e4nd of the Hoover administration, "a total of 370 miles of the river had been narrowed and deepened with channelization structures." [124]

"The previously wide, shallow, unstable, meandering channel maintained an almost uniform width and depth; sandbars, side channels, islands, and snags disappeared from the river." [124]

Roosevelt's 1932 campaign largely focused on rejecting Hoover's 'failed policies' and promised a focus on employment. [126]

His wide margin of victory provided opportunity to initiate bold projects.

Simultaneously, opening the 9-foot channel on the Mississippi and the ohio "made the Missouri River's six-foot channel obsolete before it was even finished." [127]

Unless the Missouri were deepened, the $60 million already invested would be a waste.

Drought had "raised the serious question of whether the navigation channel would ever be used to carry barges." [127]

From 1929-1931, the river's flow had been too shallow to allow even a 6-foot channel 56% of the time. [127]

"The Corps of Engineers had made a serious and costly miscalculation by believing the Missouri would never drop below 23,000 cfs cubic feet per second] at Kansas City."

In September 1931, it dipped to 10,700 cfs.