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At Cairo, the project flood is estimated at 2, cubic feet per second cfs. The project flood is 11 percent greater than the flood of at the mouth of the Arkansas River and 29 percent greater at the latitude of Red River Landing, amounting to 3, cfs at that location, about 60 miles below Natchez. Main Stem Levees The Mississippi River levees are designed to protect the alluvial valley against the project flood by confining flow to the leveed channel, except where it enters the natural blackwater areas or is diverted purposely into the floodway areas. The main stem levee system, comprised of levees, floodwalls, and various control structures, is 2, miles long. Some 1, miles lie along the Mississippi River itself and miles lie along the south banks of the Arkansas and Red rivers and in the Atchafalaya Basin. The levees are constructed by the federal government and are maintained by local interests, except for government assistance as necessary during major floods. Periodic inspections of maintenance are made by personnel from the U. Army Corps of Engineers and from local levee and drainage districts as it is essential that the levees be maintained in good condition for their proper functioning in the flood control plan. Floodways Cairo to New Madrid, Mo. To protect communities along the Mississippi and Ohio rivers and to reduce the flood heights to which the controlling levees on the Missouri side would otherwise be subjected, the project provides for a setback levee about 5 miles west of the riverfront levee through this reach. The strip between this setback levee and the levee adjacent to the river forms what is known as the Birds Point-New Madrid Floodway, operated only at extremely high stages. Water enters the floodway through lower levee sections or "fuse plugs" in the old front levee below Cairo and reenters the main river just above New Madrid. The floodway was operated in and was of material aid in reducing flood heights at and above Cairo. At the latitude of Red River Landing, the project flood is estimated at 3, cfs. The project provides for dividing this great quantity of water, with 1, cfs of the flow continuing down the main river channel, the remaining 1, cfs being diverted to the Atchafalaya River via the Morganza and West Atchafalaya floodways, and the Old River Control structures. The remaining 1, cfs will continue down the river to the Gulf. The Morganza and the West Atchafalaya floodways follow down on opposite sides of the Atchafalaya River until the end of the levee system along the Atchafalaya River is reached; there they merge into a single broad floodway that passes the flow to the Gulf through two outlets, Wax Lake and Berwick Bay. In major floods, the Morganza would be the first of these two floodways to be used, with water entering it through a control structure just above Morganza. This is accomplished by: Cutoffs Shortening the river and reduce flood heights.

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See Article History Mississippi River, the longest river of North America, draining with its major tributaries an area of approximately 1. The Mississippi River lies entirely within the United States. Rising in Lake Itasca in Minnesota, it flows almost due south across the continental interior, collecting the waters of its major tributaries, the Missouri River to the west and the Ohio River to the east, approximately halfway along its journey to the Gulf of Mexico through a vast delta southeast of New Orleans, a total distance of 2,365 miles, 3,806 km from its source. With its tributaries, the Mississippi drains all or part of 31 U.S. states. Although the Mississippi can be ranked as the fourth longest river in the world by adding the length of the Missouri-Jefferson Red Rock system to the Mississippi downstream of the Missouri-Mississippi confluence for a combined length of 3,806 miles, 6,125 km, the 2,365-mile length of the Mississippi proper is comfortably exceeded by 19 other rivers. Grant with that of the celebrated author Mark Twain. The Mississippi River basin and its drainage network. On the basis of physical characteristics, the Mississippi River can be divided into four distinct reaches, or sections. In its headwaters, from the source to the head of navigation at St. Paul, Minnesota, the Mississippi is a clear, fresh stream winding its unassuming way through low countryside dotted with lakes and marshes. The upper Mississippi reach extends from St. Paul to the mouth of the Missouri River near St. Louis. Below the Missouri River junction, the middle Mississippi follows a mile-long course to the mouth of the Ohio River. The turbulent, cloudy-to-muddy, and flotsam-laden Missouri, especially when in flood, adds impetus as well as enormous quantities of silt to the clearer Mississippi. Beyond the confluence with the Ohio at Cairo, Illinois, the lower Mississippi attains its full grandeur. Where these two mighty rivers meet, the Ohio is actually the larger; thus, below the Ohio confluence the Mississippi swells to more than twice the size it is above. Minneapolis, Minnesota Minneapolis, Minnesota, U.S. Gateway Arch and downtown St. Louis. Physical features Physiography The geology and physical geography of the Mississippi drainage area are essentially those of the Interior Lowlands and Great Plains of North America. Fringes also touch upon the Rocky and Appalachian mountain systems and upon the rim of the Canadian Laurentian Shield to the north. Rising in western uplands, notably in the foothills of the Rockies, rivers such as the Red, Arkansas, Kansas, Platte, and Missouri remove considerable silt loads from the rolling expanses of the Great Plains. These tributaries meander and braid across a wide, gently sloping mantle of unconsolidated materials, laid down over rock beds of the Cretaceous Period. The sandy sediments, moreover, offer little resistance to erosion, so that many of these rivers are only braided in their courses. Most of this group, including the Kentucky, Green, Cumberland, and Tennessee rivers, flows via well-defined valleys into the Ohio and thence into the Mississippi. The erosive capacity of these rivers varies in relation to the geologic structure of their basins. These consist of harder rocks in the higher elevations and a softer sill of limestone of the Late Carboniferous Period. The third contributory area of the Mississippi also differs from the other two. The upper Mississippi gathers its strength in a region marked by glacial action. After the great ice sheets of the Wisconsin Glacial Stage had put down layers of debris across much of Minnesota, Wisconsin, northern Illinois, and northern Iowa, huge quantities of meltwater flowed south, washing channels through this debris. Today the upper Mississippi and its tributaries, the Wisconsin, St. Croix, Rock, and Illinois rivers, all trace the lines of these former sluiceways. Pouring southward, the glacial meltwaters were joined by the proto-Missouri and Ohio rivers. The combined waters then enlarged the great north-south trough along which the lower Mississippi now flows. Some 1,000 miles long, this trough is 25 to 40 miles wide and bounded by escarpments rising up to 60 metres above the valley floor. Geologic studies have revealed that the floor of the glacial trough was later buried by a deep layer of material washed out from an ice sheet and dumped to a thickness of 30 to 90 metres in the central section. There, at the tip of the drainage funnel, millions of years of sedimentation have spilled out across the floor of the Gulf of Mexico, forming cones of sediment that total 77 square miles in radius and 30,000 square km in area. The surface expression of the

many sub-deltas is the Mississippi delta, with an area exceeding 11, square miles 28, square km. Stretching its distributaries into the gulf, the Mississippi once delivered some million tons of sediment there each year, most of it as silt. Today, however, much of this silt is captured behind upstream dams, causing the delta to erode and shrink in area. This is especially damaging in the delta, where annual silt additions from flooding help to keep it from being eroded by waves. Precipitation sources are low-level moisture from the Gulf of Mexico and some low-level and high-level moisture from the Pacific Ocean. Winter and spring precipitation occurs in the vicinity of easterly and southerly fronts and storms. Average monthly precipitation in winter ranges from 5 inches mm or more in the south to more than 3 inches 75 mm over much of the Ohio River basin to less than 1 inch 25 mm over the western and northern Great Plains. Summer and early autumn rainfall occurs mostly as showers and isolated thunderstorms and weaker frontal storms. Average monthly rainfall ranges from six inches in southern Louisiana and over the mountains of Tennessee and North Carolina to only two or three inches over the Great Plains. The climate is humid over the eastern half of the basin, with large quantities of winter and spring runoff generated over the Tennessee, Ohio, and southern Mississippi river basins. A north-south band of subhumid climates, neither fully humid nor semiarid, extends from central Texas northward to eastern North Dakota. To the west are the semiarid climates of the Great Plains, and along the Rocky Mountain crests an alpine climate prevails, in which winter snowfalls are released as spring and early summer meltwater runoff. Hydrology It is not surprising that the hydrology of so powerful a river as the Mississippi has been the subject of intense study. In the 19th century Mark Twain described with considerable wit how the pilots of the Mississippi paddle wheelers banded together to run a common information service about changing conditions along the channel. Today the Mississippi River Commission is responsible for river work and considers it worthwhile to maintain a working scale model of the river so that its engineers can test new plans in miniature before embarking on expensive, full-scale projects. Then in came the most disastrous flood in the recorded history of the lower Mississippi valley. More than 23, square miles 59, square km of land flooded. Communications, including roads and rail and telephone services, were cut in many places. Farms, factories, and whole towns went temporarily underwater. An immense amount of property was damaged, and at least people lost their lives. The river engineers took another look at the hydrology of the Mississippi. NOAA Since the freak conditions of, the mean discharge of water into the lower Mississippi by its major tributaries has been carefully monitored. The mean discharge of the main river at Vicksburg, Mississippi, is calculated at, cubic feet 16, cubic metres per second. About miles km downriver from Vicksburg, approximately 25 percent of the sediment and water discharge of the river is diverted into the Atchafalaya River through the Old River Complex Old River Control Structures. Broadly speaking, the western tributaries have the most-irregular flow regimes. They reach a spring or early summer peak that is up to three or four times as great as their winter contribution. The upper Mississippi and its tributaries reach their maximum flow about the same time Marchâ€”June, when melting snows are followed by early summer rains. The winter runoff from this area, however, is also substantial. At Metropolis, Illinois, just above the confluence with the Mississippi, the greatest monthly discharge is usually recorded in March, at which time the Ohio may be providing more than three-fifths of the water being monitored past Vicksburg in the lower river. Thus, the Ohio is chiefly responsible for the lower Mississippi flood situations, which may be aggravated by such factors as early rains in the Great Plains, a sudden hot spell in early spring that melts the northern snows, and heavy downpours throughout the lower valley. Under such conditions the lower river will rise over its banks and put pressure against its man-made levees. Tributaries will back up and form lakes on the far side of these same levees. The current, which normally runs no more than 2 to 3. Thus, for example, the monitoring station at Vicksburg, which at low water in recorded as little as 93, cubic feet 2, cubic metres per second, measured 2., cubic feet 58, cubic metres per second at high-water stage the following year. In late spring and early summer of another inevitable yet inconceivably large flood occurred on the Mississippi, this time confined to the parts of the river above its confluence with the Ohio which was not in flood. The floods were set off by persistent rains in this region. For the first time in recorded history the Mississippi and the Missouri flooded at the same timeâ€”despite the 29 dams on the Mississippi and the 36 giant reservoirs on their tributaries. The Raccoon River in Des Moines crested at 7 feet 2. In many parts of Iowa crops never got planted. In all, some

15 million acres. This disastrous flood taught many that flood-control structures such as levees, floodwalls, and dams work for some events but fail to provide enough protection from the year or larger floods. The floods of 1927 taught many that tight and total control of rivers as large as the Mississippi is neither possible nor economically feasible. A variety of pollutants, derived from municipal, industrial, and agricultural sources, have been identified in the waters and sediments of the Mississippi River. Organic compounds and trace metals occur in relatively low concentrations; in addition to those naturally present in the water, they derive from industrial and municipal wastes and runoff from agricultural and urban areas. High concentrations of bacteria associated with human waste, however, have been found downstream from some cities and have been attributed to inadequately treated sewage flowing into the river; concentrations downstream from New Orleans, for example, have been found to be many times greater than concentrations above the city. Pollutants have had little widespread effect on the composition of benthic invertebrate populations, which are indicative of changes in water quality. Water samples taken at New Orleans have shown a relatively high dissolved-oxygen content and low biochemical oxygen demand. Thus, by this index, river pollution may be said to be low. Threaded along the river, from the wild-rice marshes of Minnesota to the coastal wetlands of the delta, are pockets of thriving plant-animal associations. There the abundance of natural cover, the comparative isolation, and the food provided by such plants as sedges, pondweeds, and millets encourage regular colonization by waterfowl. The path of these birds, as they move up and down the river with the seasons, has been called the Mississippi Flyway, an appropriate name for the vast aerial highway that reaches from the delta to the distant summer nesting grounds in northern Canada. An estimated eight million ducks, geese, and swans winter in the lower part of the flyway, and many more birds use it en route to Latin America. Typical flyway migrants are Canada geese and lesser snow geese, large numbers of mallard and teal, black ducks, widgeon, pintail and ring-necked ducks, and coots. Mississippi and Atlantic flyways The Mississippi flyway left is the most heavily traveled of the migratory routes for birds. In the north it spreads out across most of interior Canada. The Atlantic flyway right has many west-to-east migration routes, in addition to the more typical north-to-south paths. The most important varieties of fish found in the river include several types of catfish some of which grow to considerable size and are fished commercially by local concerns along the middle and lower river; walleyes and suckers, which thrive in the upper river and provide the basis for a sport-fishing industry in Minnesota and Wisconsin; carp; and garfish. Alligators are now rare, found only in the most isolated backwaters, and the shrimp and crab fisheries of the brackish waters are in decline. Aquaculture was increasingly assuming commercial importance in the early 21st century. Origins of the name Mark Twain. Library of Congress, Washington, D. Kemble for chapter 12, page 92, of the first U. Project Gutenberg Text 76 A century later, farther upriver, in St.

*Improvement of the Mississippi river: Remarks of Hon. Randall L. Gibson, of Louisiana, in the House of representatives [Randall Lee Gibson] on [www.enganchecubano.com](http://www.enganchecubano.com) \*FREE\* shipping on qualifying offers.*

Linkedin By Robert Beduhn, P. Over the course of the last century, the network of 29 federally owned locks and dams has facilitated commerce. Many of these locks and dams have reached or far exceeded their original year designed life cycle by as much as 20 to 30 years. Rehabilitation and modernization is critical to keep the waterways commercially viable. The Upper Midwest Region served by these locks and dams is producing higher yields of agricultural products and new bulk products for export. The system continues to be plagued with lock outages due to scheduled and un-scheduled maintenance. Recently, a lock gate anchorage at Lock 11 near Dubuque, Iowa, was found to be cracked, shutting down the river for barge traffic unexpectedly for a full day. These maintenance-driven outages have been steadily increasing as the system continues to age without a major rehabilitation of the existing infrastructure or modernization improvements. In addition to transport of goods and services, the waterway also provides important benefits for water supply, energy production, recreation, and ecosystem benefits. The Navigation and Ecosystem Sustainability Program was authorized in the Water Resource Development Act of to specifically enhance the navigation and ecosystem benefits provided by the Upper Mississippi and Illinois River systems. To date, however, Congress has not appropriated any funding to implement this effort. The Iowa Department of Transportation has examined alternatives to kick start implementation of rehabilitation and modernization improvements, and is exploring ways to enhance the U. Inland Waterway Modernization Reconnaissance Study, which has been subsequently continued through a second study, Partnerships to Transform a Vital Trade Corridor to the Heartland, scheduled to be completed in summer The Reconnaissance Study was intended to identify and discuss the viability of various financing options. Several recommendations of the study have begun to emerge, including passage of two federal legislative bills that include provisions for alternative financing and study of public-private-partnerships to fund waterway improvements. If the United States does no more than maintain its current level of investment in its inland waterways, the economic losses due to delays and constricted traffic will increase shipping costs over time. Several suggested new governance and financing arrangements are being explored as part of the Partnerships Study, as well as a proposed pilot project to serve as a test case to demonstrate the effectiveness of the new arrangements. Iowa has developed three capital improvement pilots for consideration. These include projects that could reduce congestion, increase system reliability, and increase system capacity. Maintenance-driven outages have been steadily increasing as the Upper Mississippi River System continues to age. But the backlog of projects and authorizations greatly exceeds revenues generated from the Inland Waterway Trust Fund and those provided by Congress. At current funding, some estimates put the backlog at over years. Federal water resource development legislation bills passed in and provide authorizations that could potentially transform project delivery on the inland waterway system. These authorizations relate to the use of non-federal funds, publicprivate partnerships, and non-federal implementation of pilot projects. Specifically, the Water Resources Reform and Development Act of contains several important provisions that potentially address methods to provide much needed financing to the waterway system. These provisions direct USACE to study and develop programs to expand financing options for the inland waterway system. However, these programs have not advanced, primarily due to the lack of appropriations funding them. Until appropriations are provided by Congress to advance many of the authorized alternative financing programs, the Iowa Department of Transportation is exploring potential use of existing programs to finance pilot efforts along the inland waterway system. The bill could be used to address budget scoring, contracting, and other authorizations that could improve the delivery and cost efficiency of construction for the inland waterway system. The energy and water bill could provide specific funding to those portions of the and legislation that have not received appropriations. This would allow USACE to develop and explore additional financing mechanisms for the inland waterway system. A number of entities have a vested interest in improving the lock and dams on the Upper Mississippi. These include various levels of state

government, local port authorities, private industry, agricultural trade groups, the inland waterway users, and recreational interests, not to mention millions of American citizens.

## 4: Mississippi Valley Division - Wikipedia

*TME Online Articles; System Improvement on the Upper Mississippi River. Because the Upper Mississippi River System provides such a vital link to domestic and international trade markets, investing in modernization is critical to keeping the waterways commercially viable.*

The drainage basin empties into the Gulf of Mexico, part of the Atlantic Ocean. The retention time from Lake Itasca to the Gulf is typically about 90 days. These images demonstrate that the plume did not mix with the surrounding sea water immediately. Instead, it stayed intact as it flowed through the Gulf of Mexico, into the Straits of Florida, and entered the Gulf Stream. The Mississippi River water rounded the tip of Florida and traveled up the southeast coast to the latitude of Georgia before finally mixing in so thoroughly with the ocean that it could no longer be detected by MODIS. The reduction in sediment transported down the Mississippi River is the result of engineering modification of the Mississippi, Missouri, and Ohio rivers and their tributaries by dams, meander cutoffs, river-training structures, and bank revetments and soil erosion control programs in the areas drained by them. Through a natural process known as avulsion or delta switching, the lower Mississippi River has shifted its final course to the mouth of the Gulf of Mexico every thousand years or so. The abandoned distributaries diminish in volume and form what are known as bayous. The currently active delta lobe is called the Birdfoot Delta, after its shape, or the Balize Delta, after La Balize, Louisiana, the first French settlement at the mouth of the Mississippi. The southernmost extent of this enormous glaciation extended well into the present-day United States and Mississippi basin. When the ice sheet began to recede, hundreds of feet of rich sediment were deposited, creating the flat and fertile landscape of the Mississippi Valley. During the melt, giant glacial rivers found drainage paths into the Mississippi watershed, creating such features as the Minnesota River, James River, and Milk River valleys. When the ice sheet completely retreated, many of these "temporary" rivers found paths to Hudson Bay or the Arctic Ocean, leaving the Mississippi Basin with many features "oversized" for the existing rivers to have carved in the same time period. Ice sheets during the Illinoian Stage, about 100,000 to 15,000 years before present, blocked the Mississippi near Rock Island, Illinois, diverting it to its present channel farther to the west, the current western border of Illinois. The last Ice Age ended; world sea level became what it is now. Bayou Teche became the main course of the Mississippi. The Mississippi diverted further east. Bayou Lafourche became the main course of the Mississippi. The Red River of the South flowed parallel to the lower Mississippi to the sea 15th century: The Red River below the captured section became the Atchafalaya River. The Great Raft a huge logjam in the Atchafalaya River was cleared. The Atchafalaya started to capture the Mississippi and to become its new main lower course. Since this event was an avulsion, rather than the effect of incremental erosion and deposition, the state line still follows the old channel. Founded as a French colonial community, it later became the capital of the Illinois Territory and was the first state capital of Illinois until 1812. Beginning in 1818, successive flooding caused the Mississippi River to slowly encroach east. A major flood in 1826 caused it to overtake the lower 10 miles of the Kaskaskia River, forming a new Mississippi channel and cutting off the town from the rest of the state. Later flooding destroyed most of the remaining town, including the original State House. Today, the remaining 2-acre island and community of 14 residents is known as an enclave of Illinois and is accessible only from the Missouri side. Louisiana is related to an aulacogen failed rift that formed at the same time as the Gulf of Mexico. This area is still quite active seismically. Four great earthquakes in 1811, 1812, 1819, and 1831, estimated at approximately 8 on the Richter magnitude scale, had tremendous local effects in the then sparsely settled area, and were felt in many other places in the midwestern and eastern U.S. These earthquakes created Reelfoot Lake in Tennessee from the altered landscape near the river. Length[ edit ] When measured from its traditional source at Lake Itasca, the Mississippi has a length of 2,344 miles (3,772 km). Substantial parts of both Minnesota and Louisiana are on either side of the river, although the Mississippi defines part of the boundary of each of these states. In all of these cases, the middle of the riverbed at the time the borders were established was used as the line to define the borders between adjacent states. Also, due to a meander in the river, a small part of western Kentucky is contiguous with Tennessee, but isolated from the rest of its state. Lake Pepin, the widest

naturally occurring part of the Mississippi, is part of the Minnesota & Wisconsin border.

## 5: Rivers and Harbors Act - Wikipedia

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Early legislation[ edit ] Many of the early river and harbor legislation included authorizations for initial surveys of the navigation safety of rivers then used for transportation; as these were developed, authorizations for specific improvements were added. Many of these improvements were driven by the rapid growth in the use of steamboats on inland waters and the great commercial success of the Erie Canal , financed solely by the state of New York. In the Corps conducted an initial survey of the Tennessee River , and in the first steam-powered snagboat was launched at New Albany, Indiana , on the Ohio River. While other works were being implemented by the individual states, the panic of led to a near collapse of federal waterway improvement program. In the Tennessee River was authorized for development, as was the Illinois Waterway , downstream of the state-constructed Illinois and Michigan Canal. While the federal government and the Corps concentrated on navigable rivers, it also assisted in canal work, mostly constructed by individual states. The act includes that the Secretary of War is hereby authorized and empowered to grant leases or licenses for the use of the water powers on the Muskingum River at such rate and on such conditions and for such periods of time as may seem to him just, equitable, and expedient. Provided, that the leases or licenses shall be limited to the use of the surplus water not required for navigation, and he is also empowered to grant leases or licenses for the occupation of such lands belonging to the United States on the Muskingum River as may be required for mill-sites or for other purposes not inconsistent with the requirements of navigation. All moneys received under such leases or licenses shall be turned into the Treasury of the United States, and the itemized statement shall accompany the annual report of the Chief of Engineers. But nothing in this act shall be construed to affect any vested rights, if such there be, of any lessee of water power on said river. Each of these acts identifies hundreds of projects to be built by the Secretary of War under the supervision of the Army Corps of Engineers. Yet for a hundred years after the Constitution was adopted, Congress left the regulation of water power entirely to the states. Federal stream legislation at its beginning had to do chiefly with preventing or removing obstructions to navigation. Starting about this time, river and harbor legislation had to deal with a proliferation of hydroelectric plants and other competing modern multipurpose improvements. List of later acts[ edit ] "Act to Improve Rivers and Harbors for fiscal year ending June 30, and ", 16 Stat. Prior to this act, all river improvements had been directed toward enhancing the existing channel by removing obstructions and redirecting flows with dikes or weirs. With this act, dams and locks began to be constructed that raised the level of the river in an effort to deepen the river for larger vessels and provide deep water during drought conditions. A year earlier the Corps of Engineers completed their first lock built at Davis Island near Pittsburgh. This act forbade "the creation of any obstructions, not affirmatively authorized by law, to the navigable capacity of any waters, in respect of which the United States has jurisdiction. Andrew Bay , Florida, as well as a study of the most efficient means to move cargo. River and Harbor Act of , July 27, , ch. Although other projects were included with then-standard documentation, the House of Representatives had insisted on voting separately for Grand Coulee and Parker dams. These dams were planned for broader purposes and different funding, which include "controlling floods, improving navigation, regulating the flow of the streams of the United States, providing for storage and for the delivery of the stored waters thereof, for the reclamation of public lands and Indian reservations, and other beneficial uses, and for the generation of electric energy as a means of financially aiding and assisting such undertakings Rivers and Harbors Act of , Pub. River and Harbor Act of , Pub. Titling of these acts over the years has been inconsistent. If the act itself is not self-titled, the convention used here "River and Harbor Act of 19xx" is only for consistency of reference only with the US Code in the recognized database at the Legal Information Institute at Cornell University.

## 6: Mississippi River - Wikipedia

*Floods of and , which caused widespread damage in the Mississippi River Valley, revealed the national interest in controlling the mighty river. By the year , the need for improvement of the Mississippi River had become widely recognized.*

History and economy Early settlement and exploration As its respectful Indian name indicates, the Mississippi played an important role in the lives of the aboriginal peoples settled on its banks. To the Native American peoples of the river, the Mississippi was both highway and larder. On it they paddled their cottonwood dugouts and their bark canoes, and from it they took the fish that was a mainstay of their diet. Constant shifts of migration, local or large-scale, interwove tribal languages and cultures. By the time Europeans arrived, the Sioux , who originally had lived on the upper river, had withdrawn westward to give place to Ojibwa , Ho-Chunk Winnebago , Fox , and Sauk. Downriver the Illinois tribe had established prosperous agricultural communities. Choctaw Indian encampment on the Mississippi River. In May his raiding force reached the river at a point south of what is now Memphis , Tennessee. The river Indians launched repeated attacks; the Mississippi floods caught the Spanish unawares; and, ironically, de Soto, the European discoverer of the river, was buried in its waters, after which the rest of his disappointed expedition retreated to the sea, their homemade boats under fire from the Indians. Powell, 1853, in the rotunda of the U. Architect of the Capitol The next European explorers of the river appeared in out of French Canada—two canoe loads of voyageurs commanded by Louis Jolliet , a French government agent, and Jacques Marquette , a Jesuit priest. Portaging from the Fox River to the Wisconsin , they paddled down the Mississippi as far as the mouth of the Arkansas River. He grasped at once the strategic significance of the huge drainage system and promptly claimed the entire Mississippi basin for France. French traders settled the upper river, establishing towns like St. Louis and Prairie du Chien now in Wisconsin , whose names survive to this day. But the lower river passed into Spanish hands in , the Peace of Paris optimistically declared the river as the western boundary of the United States , and republican France reacquired the much-bartered stream only long enough to sell it to the United States as part of the Louisiana Purchase This last move recognized what had been obvious for a quarter of a century—the growing domination of the river by the Americans. Unwieldy and expendable, these craft floated downstream to leave their cargoes and occupants as advance guards of American political and economic expansion. Only the long, slim keelboats made the return trip. Library of Congress, Washington, D. The torch of exploration also passed to the Americans after the Louisiana Purchase. In 1806 the pioneer expedition of U. Like some fearful omen, its maiden voyage coincided with the series of powerful earth tremors centred in Missouri just south of St. Louis called the New Madrid earthquake that caused much flooding and sudden relocation of sections of the main channel. But the New Orleans won through, and within a decade its successors had wrought a revolution on the Mississippi. In only 21 steamboats called at New Orleans, whereas arrived during , and 14 years later more than 1, cargo ships were unloaded during the year. As the freight rates by steamer on the Ohio and Mississippi rivers plummeted, it became cheaper to send freight from Cincinnati, Ohio, to the U. Steamboat taking on wood on the banks of the Mississippi River, With the introduction of larger, high-pressure engines and more streamlined hulls, the steamboats extended their range, and the Mississippi became economic overlord to half the country. In the Western Engineer probed up the Missouri. The steamboats brought an era of unprecedented prosperity to the river. Town after town sprang up, dependent on the regular arrival of packet boats bringing mail and passengers or freight boats that took on local produce and left off manufactured goods. Riverbank plantations maintained their own landings so they could ship crops directly, and riverside towns vied with each other to provide services such as fueling and warehousing. The waterfront at New Orleans, with its double line of twin-stacked steamers mingled with oceangoing ships, was among the busiest in the country. In , however, came the Civil War ; a sharp struggle for control of this vital waterway ensued immediately, which culminated in Ulysses S. When Vicksburg and the river fell into Union hands, the Confederacy was dealt a heavy commercial and strategic blow. New and faster steamboats were built and operated, often in rivalry to one another, a rivalry made

famous by the three-day race, commencing June 30, , between the Natchez and the Robert E. The latter won by dint of stripping out all unnecessary superstructure and taking on extra fuel supplies from tenders while steaming upriver at full speed. Yet even as the river was at its most flamboyant , the same westward expansion that had brought its development now passed it over. Towns that had once sought to become staging posts up and down the river now competed to become crossing points. Commercial traffic dwindled, and the grand luxury paddle wheelers gave way to sombre, more prosaic towboats with blocks of barges. Lee and the Natchez in the race from New Orleans to St. As other lines of transport became congested, the river was recognized as an increasingly valuable asset. With federal initiative , new barge lines were organized, and by the annual barge traffic moving along the river was twice the volume moved in any single year during the previous century. In , for instance, the steamer Sprague established a new world record for size of tow. Its raft of 60 coal barges weighed 67, tons and covered an area of 6. Screw-driven and diesel-engined, the modern towboat is made fast to the stern of its tow. Ahead stretches a rigid platform of barges as much as 1, feet metres long and with a designed draft of 9 feet 2. Most barges are built for specific cargoes. For dry cargo they average 1, tons capacity and measure feet 60 metres long by 35 feet 10 metres wide; for liquid cargo the proportions are about 2, tons capacity and feet 90 metres by 50 feet 15 metres. To aid navigation, towboat captains have at their disposal electronic depth finders, radar , contra-guide rudders, global positioning systems, a sophisticated system of riverbank lights and markers, and a radio telephone to warn other river users of their approach in narrow passages. Among the cargoes to be carried along the river in this fashion since about are the booster rockets for space research, which are so bulky as to be unsuitable for any other mode of transport. Commercial use of the Mississippi waterway has shown sturdy growth. Leading cargoes, by bulk, are petroleum and derivative products, coal and coke , iron and steel , chemicals, sand and gravel , crushed rock, and sulfur. An increasing emphasis on bulk handling inevitably has meant the rapid growth of a few key port cities at the expense of their rivals. A barge traveling down the Mississippi River in Louisiana. Responsibility for overseeing the maintenance and improvement of the Mississippi as a commercial waterway, as well as the related tasks of flood control and bank protection see below , falls upon the Mississippi River Commission. Created by act of Congress in , the commission has supervised a massive program of river work that has profoundly reshaped the character of the Mississippi. The main stages of the navigation-improvement program include a channel 9 feet 2. In addition, a ship channel 45 feet 14 metres deep from Baton Rouge to the Gulf of Mexico has been under construction since its authorization by Congress in Farther upriver, the outstanding achievement has been the construction of 29 locks and dams on the upper river to take the 9-foot channel upstream to Minneapolis â€”St. Connecting into the Mississippi is a vast complex of related waterwaysâ€”from the Intracoastal Waterway in the south, stretching between Florida and the Mexican border, to the channels that lead up the Ohio to its tributaries and through the Illinois waterway to the Great Lakes and St. Flood control Flood control along the river dates to the foundation of New Orleans in by the French, who built a small levee to shelter their infant city. Over the next two centuries a complex array of riverbank structures was erected along the river to contain or divert floods. But it was not until after the catastrophic flood of that the federal government became committed to a definite program of flood control. This program has altered the face of the river even more than the navigation programâ€”with which it is linkedâ€”has altered its bed. This concrete barrier has, incidentally, isolated the river from much of the surrounding countryside; hence, many former riverbank towns are now severed from their natural setting. In the event that the main levees are threatened, the excess floodwater drains away down spillways e. A major example of this type of floodway occurs at New Madrid , Missouri, just south of the Ohio confluence. At times the system is overwhelmed, such as in when low-lying New Orleans was flooded after the levees holding back Lake Pontchartrain and the Mississippi River were unable to contain the storm surge waters accompanying Hurricane Katrina. Another such occurrence was in the spring of when snowmelt and heavy rains produced record high flood crests on the Mississippi that forced the opening of numerous floodgates and sluiceways and produced massive flooding of farmland and riverside towns. Army Corps of Engineers , using mattresses of concrete slabs, has reduced lateral erosion and increased channel stability. The careful positioning of underwater dikes to deflect the current, the cutting through of oxbow bends at their necks i.

Although the system operated successfully against the high-water levels of and , it could not contain the flood of , the record inundation of of the upper and middle Mississippi and the lower Missouri, or the massive spring flooding of . No matter how large, once flood-control reservoirs are full, they serve no additional function, since at that point all the water that enters must be immediately let through. Thus, the Mississippi flood-control program is not without its problems. It has been increasingly necessary, now that the river is caught behind the main-stem levees, to attend to the isolated tributaries. In some cases, costly pumping stations have been installed to lift the impounded water over the levees and into the main river. More dramatic has been the penalty for using the Atchafalaya River as a convenient spillway for floods on the lower river. The Mississippi threatened to divert permanently into this secondary channel, inundating the lower Atchafalaya, bypassing New Orleans, and rendering useless millions of dollars of flood-control works and docks. Only at the cost of a vast and complex system of locks and barrages has the danger been averted. Perhaps because of the impacts of the Mississippi floods and Hurricane Katrina in and the importance of the long-term health of the riverine environment , flood-control management and prevention strategies continue to be reviewed and evaluated. Presumably, future floodplain management strategies will be designed more to limit land use on flood-prone areas to those kinds of uses that can tolerate flooding rather than to prevent or minimize flood damage in those areas by way of engineered structures.

### 7: The Mississippi River and Tributaries Project

*THE IMPROVEMENT - OF THE - MISSISSIPPI RIVER. An Address Delivered at St, Louis, Mo. January 26, - ON THE INVITATION OF THE - MERCHANTS' EXCHANGE. BY. JUDGE ROBERT S. TAYLOR, OF INDIANA.*

Water Quality in the Mississippi River Introduction Want to know what you can do at home to reduce the amount of pollutants entering the river? Incorporate a few water quality tips into your daily life and make a difference? Learn more about research that fuels new discoveries and helps us to manage the national parks, including the Mississippi National River and Recreation Area. Unfortunately, these "impairments" can make the water unsuitable for fishing, swimming, and drinking. The parks are also a place to track wildlife and plant populations, changes in the landscape, and the effects of pollution on the environment. Great Lakes Network scientists use the parks for science and our science is used to help the parks. Learn more about the research and monitoring projects at the Mississippi National River and Recreation Area. Can I safely swim in it? Is water pollution improving? Can I eat the fish I catch? What can we do about Asian carp? Do I need to be concerned about bacteria in the river? How are bald eagles faring? Based upon a broad range of water quality and other river data, the report zooms in on the status and trends of 13 key indicators of river health, highlighting the swimming, fishing, aquatic life and emerging contamination issues facing the river--as well as priority solutions for each. The companion Stewardship Guide for a list of actions you can take at home, in your yard and garden, and in your community to help protect the Mississippi River. Thanks to the great work of public utilities, treated drinking water from the Mississippi is safe and delicious! The National Park Service is participating in the process to identify sources of bacterial contamination in the river and develop a plan to reduce that contamination. The pollution that has led to these conditions cannot be cleaned up overnight-it will take years and widespread coordination to develop and implement effective pollution-reduction plans, and possibly many more years until they are successful. As work to make the river "fishable" and "swimmable" advances, so will our website. The goal is to offer up-to-date information regarding the status of the river, while providing features and information that can be employed in your daily life.

## 8: System Improvement on the Upper Mississippi River | [www.enganchecubano.com](http://www.enganchecubano.com)

*Records of the Committee on the Mississippi River and Its Tributaries, The Committee on Improvement of the Mississippi River and Its Tributaries was established on March 19, , succeeding the Select Committee on the Levee System of the Mississippi River,*

Native Americans lived along its banks and used the river for sustenance and transportation. Early European explorers used the Mississippi to explore the interior and the northern reaches of what was to become the United States. Fur traders plied their trade on the river and soldiers of several nations garrisoned troops at strategic points, at various times, along the river when the area was still on the frontier. White settlers from Europe and the United States and often their slaves arrived on steamboats dispossessing the Native Americans of their lands and converting the landscape into farms and cities. Today, the Mississippi River powers a significant segment of the economy in the upper Midwest. Barges and their tows move approximately million tons of freight each year on the upper Mississippi through a system of 29 locks and dams. It is also a major recreational resource for boaters, canoeists, hunters, anglers, and birdwatchers and offers many outdoor opportunities. The Missouri River, a tributary of the Mississippi River, is about miles longer. The reported length of a river may increase or decrease as deposition or erosion occurs at its delta, or as meanders are created or cutoff. As a result, different lengths may be reported depending upon the year or measurement method. Width At Lake Itasca, the river is between 20 and 30 feet wide, the narrowest stretch for its entire length. The widest part of the Mississippi can be found at Lake Winnibigoshish near Bena, MN, where it is wider than 11 miles. The widest navigable section in the shipping channel of the Mississippi is Lake Pepin, where the channel is approximately 2 miles wide. Speed At the headwaters of the Mississippi, the average surface speed of the water is about 1. At New Orleans the river flows at about three miles per hour. But the speed changes as water levels rise or fall and where the river widens, narrows, becomes more shallow or some combination of these factors. Volume Another way to measure the size of a river is by the amount of water it discharges. Using this measure the Mississippi River is the 15th largest river in the world discharging 16, cubic meters , cubic feet of water per second into the Gulf of Mexico. The biggest river by discharge volume is the Amazon at an impressive , cubic meters 7., cubic feet per second. The Amazon drains a rainforest while the Mississippi drains much of the area between the Appalachian and Rocky Mountains, much of which is fairly dry. At Lake Itasca, the average flow rate is 6 cubic feet per second. Anthony Falls in Minneapolis, the northern most Lock and Dam, the average flow rate is 12, cubic feet per second or 89, gallons per second. At New Orleans, the average flow rate is , cubic feet per second. Watershed Size Some like to measure the size of a river is by the size of its watershed, which is the area drained by a river and its tributaries. The Mississippi River drains an area of about 3. The Mississippi River watershed is the third largest in the world, extending from the Allegheny Mountains in the east to the Rocky Mountains in the west. The Amazon for comparison drains about 7. Water Supply Communities up and down the river use the Mississippi to obtain freshwater and to discharge their industrial and municipal waste. A frequently cited figure of 18 million people using the Mississippi River Watershed for water supply comes from a study by the Upper Mississippi River Basin Committee. The Environmental Protection Agency simply says that more than 50 cities rely on the Mississippi for daily water supply. Commerce Agriculture has been the dominant land use for nearly years in the Mississippi basin, and has altered the hydrologic cycle and energy budget of the region. In measure of tonnage, the largest port district in the world is located along the Mississippi River delta in Louisiana. Representing million tons of shipped goods per year according to the Port of New Orleans , the Mississippi River barge port system is significant to national trade. Shipping at the lower end of the Mississippi is focused on petroleum and petroleum products, iron and steel, grain, rubber, paper, wood, coffee, coal, chemicals, and edible oils. To move goods up and down the Mississippi, the U. Background Information There are 7. One cubic foot of water weighs A 48 foot semi-truck trailer is a 3, cubic foot container. At Lake Itasca, it would take 10 minutes for one semi-trailer of water to flow out of the lake into the Mississippi. Anthony Falls, the equivalent of 3 semi-trailers full of water go over the falls every second. At New Orleans, the equivalent of

semi-trailers of water flow past Algiers Point each second. Wildlife The Mississippi River and its floodplain are home to a diverse population of living things: On the Lower Mississippi, there may be as many as 60 separate species of mussel; The Upper Mississippi is host to more than 50 mammal species; At least species of amphibians and reptiles inhabit the Upper Mississippi River environs. Find out more about our wildlife.

## 9: Mississippi River

*The Mississippi River is known as the Middle Mississippi from the Upper Mississippi River's confluence with the Missouri River at St. Louis, Missouri, for miles ( km) to its confluence with the Ohio River at Cairo, Illinois.*

Visit our new History Page. Coursing through the heart of America, it supplies water for the cities and industries that have located along its banks. Uncontrolled, it would be just as great a liability. The Mississippi River always has been a threat to the security of the valley through which it flows. Garcilaso de la Vega, in his history of the expedition begun by DeSoto, described the first recorded flood of the Mississippi as severe and of prolonged duration, beginning about March 10, , and cresting about 40 days later. By the end of May the river had returned to its banks, having been in flood for about 80 days. Since that time, explorers, traders, farmers, men of commerce, and engineers have known -- sometimes too well -- the Mississippi in flood. The Mississippi Drainage Basin The Mississippi River has the third largest drainage basin in the world, exceeded in size only by the watersheds of the Amazon and Congo Rivers. It drains 41 percent of the 48 contiguous states of the United States. The basin covers more than 1,, square miles, includes all or parts of 31 states and two Canadian provinces, and roughly resembles a funnel which has its spout at the Gulf of Mexico. Waters from as far east as New York and as far west as Montana contribute to flows in the lower river. The lower alluvial valley of the Mississippi River is a relatively flat plain of about 35, square miles bordering on the river which would be overflowed during time of high water if it were not for man-made protective works. This valley begins just below Cape Girardeau, Missouri, is roughly miles in length, varies in width from 25 to miles, and includes parts of seven states -- Missouri, Illinois, Tennessee, Kentucky, Arkansas, Mississippi, and Louisiana. Floods of and , which caused widespread damage in the Mississippi River Valley, revealed the national interest in controlling the mighty river. By the year , the need for improvement of the Mississippi River had become widely recognized. The necessity for coordination of engineering operations through a centralized organization had finally been accepted. Accordingly, in that year, the Congress established the Mississippi River Commission and assigned it the duties. Coast and Geodetic Survey; and three civilians, two of whom would be civil engineers. All appointments would be nominated by the President of the United States, subject to confirmation by the Senate. In , three years after establishment of the Commission, one of the most disastrous floods ever known devastated the entire delta area. The losses were appalling. During that flood there were hundreds of crevasses, and the outlook for a permanent solution to flooding in the Mississippi Valley was disheartening. Major floods again occurred in , , and The flood of was the most disastrous in the history of the Lower Mississippi Valley. An area of about 26, square miles was inundated. Levees were breached, and cities, towns, and farms were laid waste. Crops were destroyed, and industries and transportation paralyzed. Over lives were lost and over , people displaced. Out of it grew the Flood Control Act of , which committed the federal government to a definite program of flood control. The Project Flood The flood control plan is designed to control the "project flood. At Cairo, the project flood is estimated at 2,, cubic feet per second cfs. The project flood is 11 percent greater than the flood of at the mouth of the Arkansas River and 29 percent greater at the latitude of Red River Landing, amounting to 3,, cfs at that location, about 60 miles below Natchez. Main Stem Levees The Mississippi River levees are designed to protect the alluvial valley against the project flood by confining flow to the leveed channel, except where it enters the natural blackwater areas or is diverted purposely into the floodway areas. The main stem levee system, comprised of levees, floodwalls, and various control structures, is 2, miles long. Some 1, miles lie along the Mississippi River itself and miles lie along the south banks of the Arkansas and Red rivers and in the Atchafalaya Basin. The levees are constructed by the federal government and are maintained by local interests, except for government assistance as necessary during major floods. Periodic inspections of maintenance are made by personnel from the U. Army Corps of Engineers and from local levee and drainage districts as it is essential that the levees be maintained in good condition for their proper functioning in the flood control plan. To protect communities along the Mississippi and Ohio rivers and to reduce the flood heights to which the controlling levees on the Missouri side would otherwise be subjected, the project provides for a setback levee

about 5 miles west of the riverfront levee through this reach. The strip between this setback levee and the levee adjacent to the river forms what is known as the Birds Point-New Madrid Floodway, operated only at extremely high stages. Water enters the floodway through lower levee sections or "fuse plugs" in the old front levee below Cairo and reenters the main river just above New Madrid. The floodway was operated in and was of material aid in reducing flood heights at and above Cairo. At the latitude of Red River Landing, the project flood is estimated at 3, cfs. The project provides for dividing this great quantity of water, with 1, cfs of the flow continuing down the main river channel, the remaining 1, cfs being diverted to the Atchafalaya River via the Morganza and West Atchafalaya floodways, and the Old River Control structures. The remaining 1, cfs will continue down the river to the Gulf. The Morganza and the West Atchafalaya floodways follow down on opposite sides of the Atchafalaya River until the end of the levee system along the Atchafalaya River is reached; there they merge into a single broad floodway that passes the flow to the Gulf through two outlets, Wax Lake and Berwick Bay. In major floods, the Morganza would be the first of these two floodways to be used, with water entering it through a control structure just above Morganza. This is accomplished by: Cutoffs Shortening the river and reduce flood heights.

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