RECLAMATION

Managing Water in the West

An Overview of the Pick-Sloan Missouri Basin Program

U.S. Department of the Interior
Bureau of Reclamation

Great Plains Region

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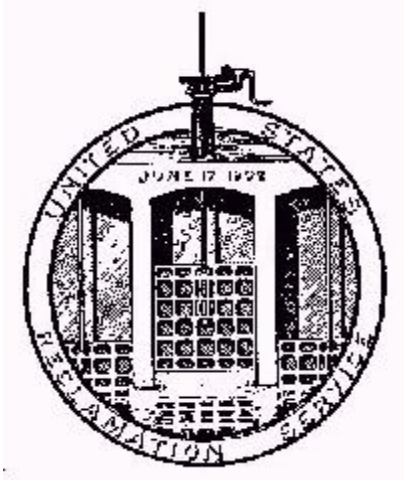
A BRIEF HISTORY OF THE BUREAU OF RECLAMATION

Since they settled the arid Great Plains, early settlers have used irrigation for agriculture. They simply diverted water from streams at first, but there wasn't enough water to grow crops. Settlers wanted to store runoff from rain and snow to make more water available in drier seasons. Private and state-sponsored irrigation projects were pursued but usually failed because of lack of money. They also often lacked engineering skills and the necessary technology.

Pressure mounted for the Federal Government to undertake storage and irrigation projects in the Great Plains. Irrigation projects were known as **"reclamation"** projects then. The idea was that irrigation would "reclaim arid lands for human use." The reclamation movement demonstrated its strength when pro-irrigation planks found their way into both Democratic and Republican party platforms in 1900. Congress finally passed the Reclamation Act of June 17, 1902.



Reclamation Seal – 1908

In July 1902, in accordance with the Reclamation Act, Secretary of the Interior Ethan Allen Hitchcock established the United States Reclamation Service within the U. S. Geological Survey (USGS). The new Reclamation Service studied water development projects in each western state with Federal lands. Revenue from the sale of Federal lands was the initial source of the program's funding. With no Federal lands, Texas did not become a Reclamation state until 1906 when Congress passed a special act including it in the Reclamation Act. From 1903 to 1906, Reclamation began about 25 projects in Western states. Figure 1 shows the 17 western reclamation states.

Figure 1. The 17 Reclamation States

In 1907, the Secretary of the Interior separated the Reclamation Service from the USGS and created an independent bureau within the Department of the Interior. The agency was renamed the "Bureau of Reclamation" in 1923.

During Reclamation's early years, projects encountered many problems. Lands and soils were unsuitable for irrigation. Land speculation sometimes

resulted in poor settlement patterns. Proposed repayment schedules could not be met because of high land preparation costs and construction costs. Most settlers were inexperienced in irrigation farming. Waterlogging of irrigable lands required expensive drainage works. Projects were built in areas which could only grow low-value crops. Reclamation faced increasing settler unrest and financial problems. In 1924, a "Fact Finder's Report" spotlighted many of these issues. The Fact Finders Act, passed in late 1924, sought to resolve some of these problems.

Boulder Dam During Construction

Congress authorized the Boulder Canyon (Hoover Dam) Project in 1928. Large appropriations began, for the first time, to flow to Reclamation from the general funds of the United States. The authorization came only after a hard fought debate about the use of public power versus private power.

The glory years for Reclamation projects came during the depression and for the thirty five years following World War II, or about 1930-1965. Around 70 projects were authorized before World War II. Some major projects were approved during and after the war as well. They included the Columbia Basin Project, authorized in 1933, the Pick-Sloan Missouri Basin Program, authorized in 1944, and the Colorado River Storage Project, authorized in 1956.

The last major Reclamation project authorization for construction was in 1968 when Congress approved the Colorado River Basin Project Act. A number of factors affected Reclamation's activities after the success of the previous thirty-five years: the rise of the environmental movement, which strongly opposed water development projects; the tragic 1976 failure of Teton Dam; announcement of the "hit list" on water projects in the late 1980's, including Reclamation projects; general lack of funding in the budget; and lack of good project sites.

Between 1988 and 1994, Reclamation underwent major reorganization as construction of projects authorized in the 1960s and earlier drew to an end. Emphasis shifted from construction to operation and maintenance of existing facilities. Reclamation's redefined official mission is now to "manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public." In redirecting its programs and responsibilities, Reclamation substantially reduced its staff levels and budgets.

However, Reclamation remains a significant Federal presence in the West. For instance, it is the largest wholesaler of water in the country. It provides water to more than 31 million people. One out of five Western farmers (140,000) irrigate with water provided by Reclamation. This water

irrigates ten million acres of farmland. This farmland produces 60% of the nation's vegetables and 25% of its fruits and nuts.

Reclamation is also the second largest producer of hydroelectric power in the western United States. The agency's 58 powerplants annually provide more than 40 billion kilowatt hours of power generating nearly a billion dollars in power revenues and produces enough electricity to serve six million homes.

The Reclamation project program established some principles. Details may have changed due to legislation and regulations, but the basic principles are still the same.

1. Federal monies spent on Reclamation water development projects which benefit water users would be repaid by water users.

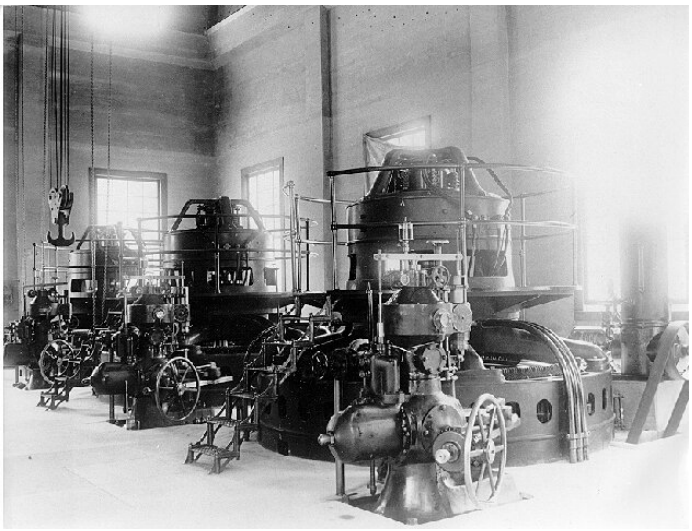
2. The projects remained Federal property even when the water users repaid Federal construction costs.

3. Reclamation generally contracted with the private sector for construction work.

4. Reclamation employees administered contracts to assure that contractors' work meets Government specifications.

5. In the absence of an acceptable bid on a contract, Reclamation, especially in its early years, would complete a project by "force account" (Reclamation employees did the construction work). Sometimes, force account workers would become unionized, setting the stage for unionized Reclamation workers, such as the International Brotherhood of Electrical Workers, to this day.

6. Hydroelectric Power Revenues could be used to repay construction charges.



Power plant – Boise River Diversion Dam, around 1914

THE MISSOURI RIVER BASIN

To understand the Pick-Sloan Program, it is necessary to understand some of the Basic geography of the Missouri River Basin

The Missouri River is around 2,540 miles long, making it the longest river in the United States. The very source of the Missouri River is the point in the Basin, farthest water miles, from the confluence of the Missouri and Mississippi Rivers. That place is Brower's Spring in southwest Montana along the Montanan/Idaho border. It flows into Hellroaring Creek, then into Red Rock River, the Beaverhead River, which joins the Bighole River, and finally into the Jefferson River which joins the with the Madison River at Three Forks to form the Missouri. The Gallatin River flows into the Missouri River about 100 yards from the confluence of the

Jefferson and the Madison. Brower Springs was verified as the true source of the Missouri River in the mid-1890's by surveyor Jacob V. Brower. Brower's Spring is 298.3 miles from the confluence with the Madison.

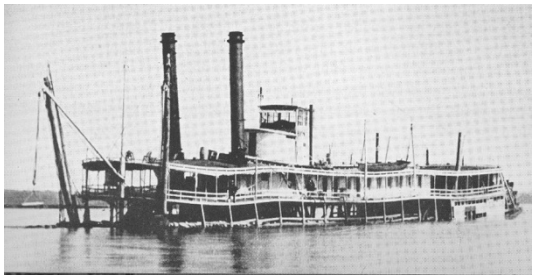
The Basin covers around 528,000 square miles, or about one sixth of the lower 48 states. The Basin includes all of Nebraska, most of Montana, North Dakota, South Dakota, Kansas, and Wyoming; as well as parts of Colorado, Iowa, Minnesota, and Missouri, and a small part of Canada. Although it is the longest river, and the Basin is the largest, it has one of the lowest annual yields of water.

The combination of low water yield and large land area, along with other issues, has created conflicts over river use. Those conflicts continue to this day. The river crosses the 98th meridian near Yankton, South Dakota. This is the roughly the dividing line between the arid and humid (more than 20 inches of rain per year) parts of the Basin. This put Reclamation and the Corps of Engineers in direct competition. Reclamation's mission traditionally deals with water *scarcity*, or irrigation, while the Corps' mission traditionally deals with water *abundance*, flood control and navigation. Figure 2 shows the Missouri River Basin with an approximation of the 98th meridian, as well as the source of the Missouri River

THE MISSOURI RIVER BASIN HISTORY: PRE PICK-SLOAN

In 1824, the Supreme Court ruled in *Gibbons vs. Ogden*, that since navigation involved commerce, the Federal government had the authority not only to control navigable waterways, but also non-navigable tributaries, if the navigable capacity of the waterway was affected by the tributary. In the same year, Congress authorized the U.S. Army Corps of Engineers to (Corps) to aid in navigation on the nation's waterways.

The Missouri River was considered particularly treacherous. It was also considered a potentially great transportation corridor, and navigation was always promoted as such. However, since it was so treacherous, it became known as the "Graveyard of Steamboats." The Corps began "snagging: operations (the removal of hazardous trees and branches in the river) in 1838.



Sunk Riverboat near Sioux City, IA

Years later in 1866, the stage was being set for future conflict when Congress enacted "prior appropriation" legislation. This legislation recognized that beneficial uses such as agriculture, mining, and manufacturing, were entitled to protection under conditions that prevailed in the arid parts of the Missouri River Basin.

After the Reclamation Act was passed in 1902, Reclamation built a number of irrigation projects in the Basin. Reclamation focused on irrigation to

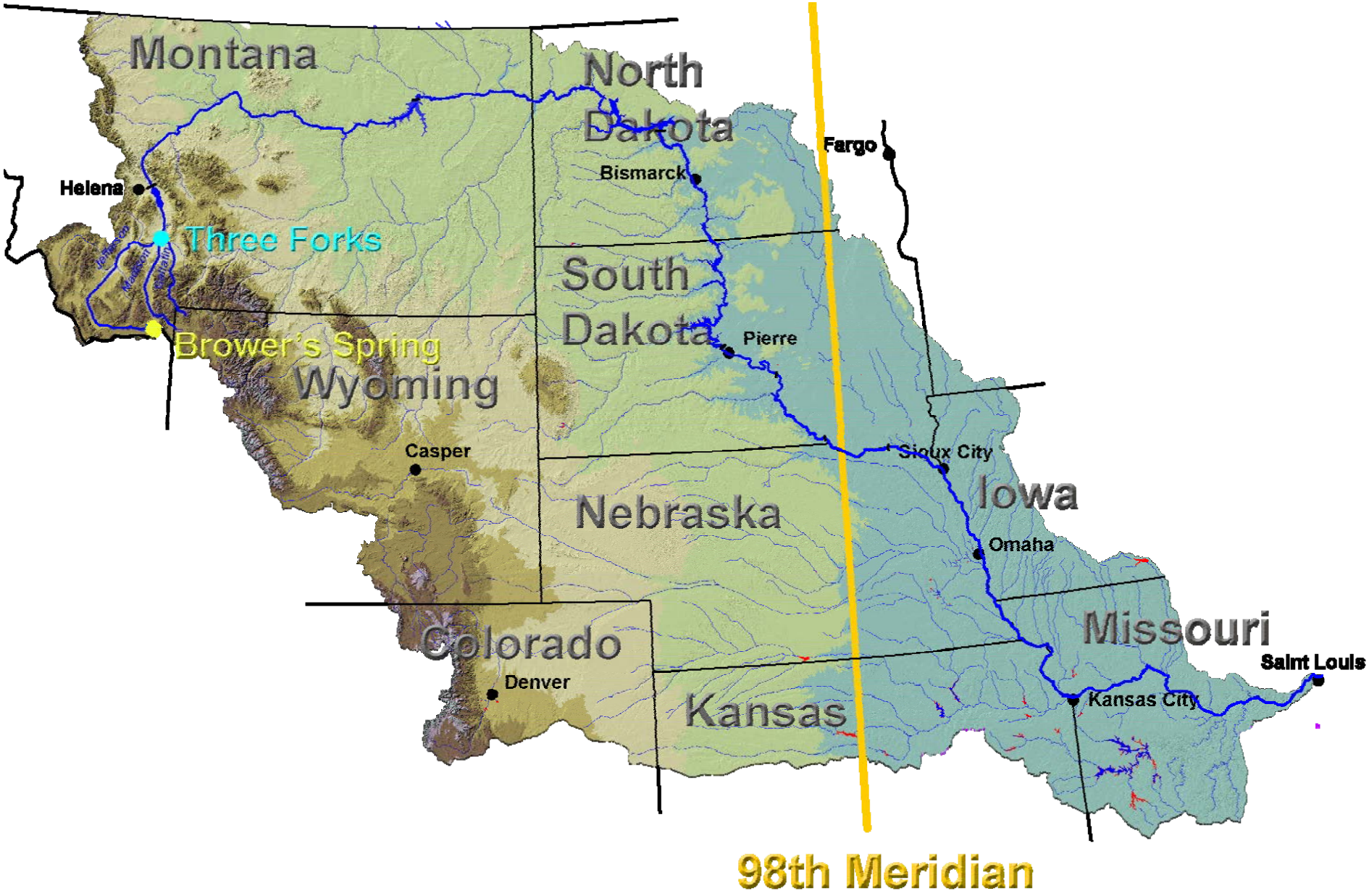


Figure 2 – Source of the Missouri River, 98th Meridian

meet the needs of the Upper Basin States, the Dakotas and Montana.

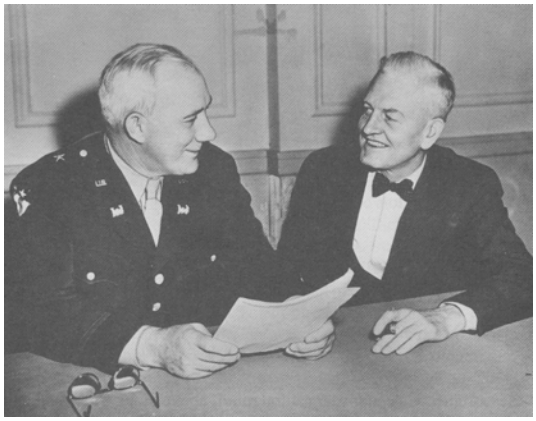
Nine of the original Reclamation projects in the Basin, authorized between 1903 and 1906: Belle-Fourche, Buford-Trenton, Huntley, Lower Yellowstone, Milk River, North Platte, Shoshone, Sun River, and Williston projects (Buford-Trenton and Williston failed). The Riverton Project (originally a BIA project) was authorized in 1918) and The Casper-Alcova (Kendrick) Project was authorized in 1935. It was the first multiple use project in the Basin. The Colorado-Big Thompson Project was authorized in 1937. Buffalo Rapids, Rapid Valley, and Mirage Flats projects, and a new Buford Trenton project, were authorized in 1939.

Meanwhile, the Corps was trying to provide navigation on the Missouri River between Sioux City, Iowa and the confluence of the Missouri and Mississippi near St. Louis, Missouri. The original plan was to have a 200 foot wide and 6 foot deep channel on that stretch of the Missouri.

Congress authorized the Corps to do comprehensive river basin studies, which became known as “308” reports. The “308 Report” for the Missouri River Basin was completed in 1934. It was a 1,200 page study of the entire watershed that identified navigation, flood control, hydropower, and irrigation projects.

Before the “308 Report” was completed, the Corps began construction of Fort Peck Dam on the Missouri in Montana. Construction lasted from 1933 through 1940. Its primary purpose was navigation, to provide the minimum flow in the mainstem of the Missouri River below Sioux City, Iowa for a channel that would be 6 foot deep and 200 foot wide. It provided flood control benefits and was also a jobs program, providing much needed employment during the Depression.

THE PICK-SLOAN PLAN



General Pick and W. Glenn Sloan

In March 1943 major flooding occurred on the Missouri, hitting Omaha particularly hard. In response, Congress requested that the Corps review their previous plans.

The result was a 12-page report, House Document 475, submitted to Congress in early in 1944. It became known as the “Pick Plan” after Colonel Lewis A. Pick, the Corp’s Missouri Basin Division Engineer in Omaha. The report was completed in less than three months. It borrowed heavily from the Missouri River 308 Report.

The Pick Plan called for the Corps to construct three groups of projects.

The first part called for construction of 1,500 miles of protective levees from Sioux City to the Mississippi River for flood control and navigation. The second phase proposed construction of 18 tributary dams, 11 of which had already been authorized. The last part of the plan outlined a series of five multipurpose dams on the mainstem of the Missouri River above Sioux City. In total, the Pick Plan proposed construction of 1,500 miles of levees and 23 dams. The plan asserted the Corps' dominance in the Basin and directly challenged Reclamation as a rival. Figure 3 shows the Pick Plan as envisioned in House Document 475.

In 1939, as part of the Reclamation Project Act, Reclamation was authorized to plan for the use of water in the Missouri River Basin. This plan would eventually become known as the "Sloan Plan," after its author, William Glen Sloan, the Assistant Director in the Billings Regional Office. Officially known as Senate Document 191, Sloan's name never appears in the document.

Reclamation submitted the Sloan Plan to Congress in April 1944, partly in response to the Pick Plan. Much more detailed than the Pick Plan, the Sloan Plan proposed 90 projects, emphasizing irrigation and power development rather than flood control and navigation. The Sloan plan was to irrigate 5.3 million acres. Figure 4 Shows the Sloan Plan as envisioned in SD 191.

The Sloan Plan spread the storage out over 85 new tributary dams and 3 new mainstem dams. The plan provided economic justification in the form of Federal sales of irrigation water and hydroelectric energy.

With release of the Sloan Plan, the Corps and Reclamation were at an impasse. The upper Basin states, which were interested in irrigation, supported the Sloan Plan. The lower Basin states, which were interested in flood control and navigation, favored the Pick Plan.

In particular, there was much discussion about the size of the navigation channel between Sioux City and the mouth of the Missouri. The Corps wanted to enlarge it to a 9 foot deep 300 foot wide channel. The upper Basin states were very concerned about the amount of water required to support the channel.

At the same time, President Roosevelt was endorsing an organization similar to the existing Tennessee Valley Authority, a Missouri Valley Authority (MVA). Plans for an MVA failed when first presented to Congress in the 1930's. However, a Federal mandate for coordinated development in the region seemed like an ideal solution to the stalemate between the Corps and Reclamation.

The news of renewed interest in an MVA caused concern in the two agencies. They realized that a compromise had to be reached. Faced with growing public, Congressional, and Presidential

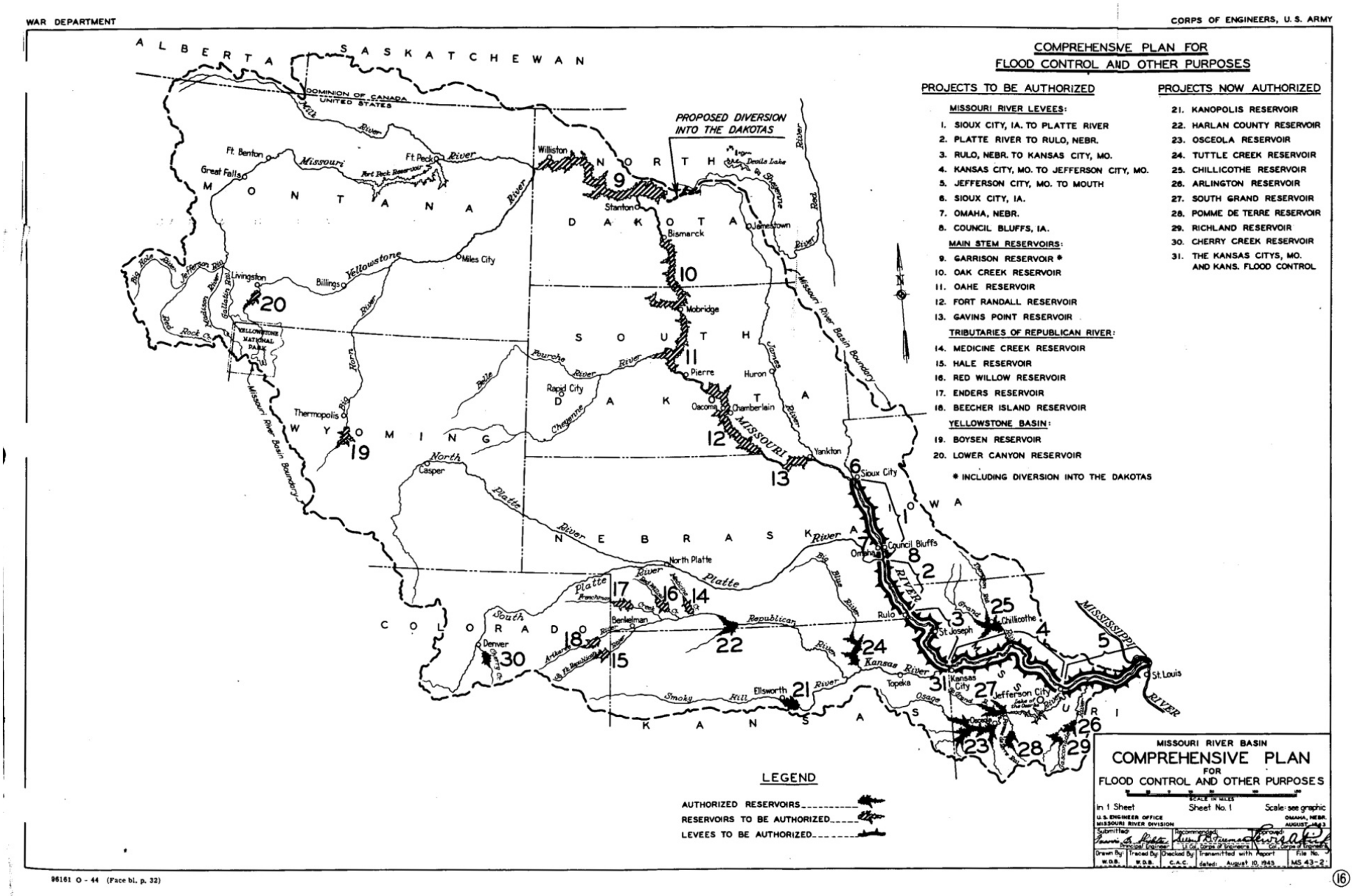


Figure 3. Map of the Pick Plan from HD-475

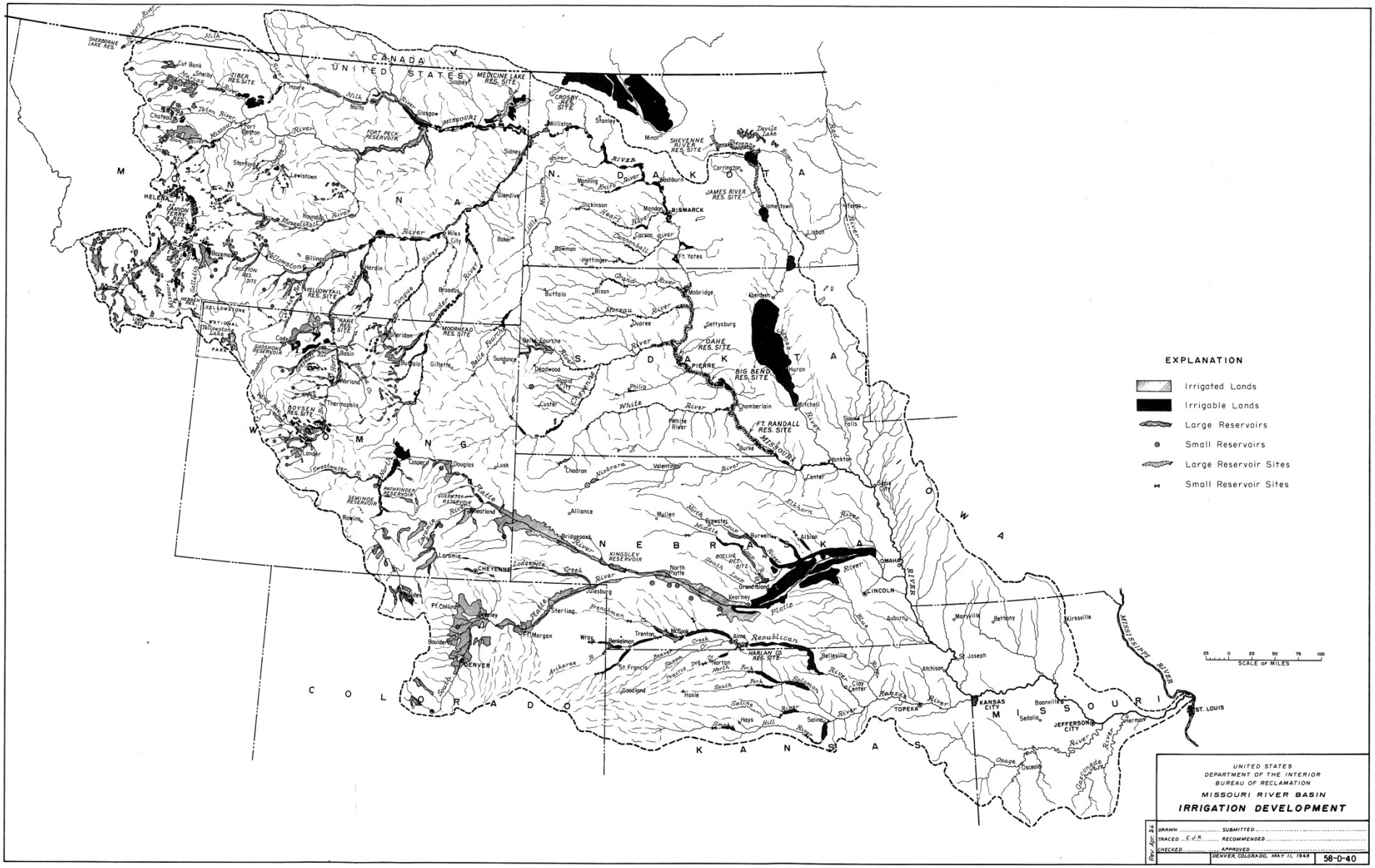


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Figure 4. Map of the Sloan Plan from SD-191

support for the MVA, the Corps and Reclamation scheduled a conference October 17–18, 1944 in Omaha, to draft a joint engineering report.

The result of the conference was a one-page agreement that merged the two plans. With a few minor exceptions, each group merely accepted the other's proposed projects. Both parties agreed on incorporating and improving Fort Peck Dam. The agreement effectively crippled the MVA momentum. Not everyone was happy with the plan: James S. Patton, President of the National Farmers Union, described the merger as "a shameless, loveless shotgun wedding."

The Flood Control Act of 1944, which included the Pick-Sloan Missouri Basin Program, passed on December 22, 1944. It included the O'Mahoney-Millikin Amendment, which made navigation functions subordinate to beneficial consumptive uses west of the 98th meridian. Legislation was passed in 1971 that renamed the Program the Pick-Sloan Program.

AUTHORIZED PURPOSES

Section 9 of the Flood Control Act of 1944, as amended, authorizes the Pick-Sloan Program for 8 purposes. They are;

- Flood Control
- Navigation
- Irrigation
- Power
- Water Supply
- Recreation
- Fish and Wildlife
- Water Quality

Flood Control

Although flood control is primarily the Corps' responsibility, both Pick and Sloan included flood control as a major purpose for their individual plans. The entire system is regulated to prevent flood damage on the downstream reaches of the Missouri. Each individual project is also regulated to prevent project releases from damaging flows downstream from the project.

Navigation

The Missouri River Bank Stabilization and Navigation Project (BSNP) is designed to prevent bank erosion and channel meandering and to provide reliable commercial navigation on the Missouri. While navigation is an authorized purpose of the Pick-Sloan Program, the BNSP was specifically authorized by Congress by the Rivers and Harbors Act of 1945. The project provides a permanent, continuous, open river navigation channel 9 foot deep and 300 foot wide from Sioux City to the confluence of the Missouri and Mississippi Rivers near St. Louis. Figure 5 shows the navigation channel.

Major commodities transported on the Missouri include agricultural products, chemicals, petroleum products, and manufactured goods. Crude materials such as sand, gravel, and materials used to maintain the Missouri River BSNP are also transported on the river.

Figure 5. Map of navigation channel

Irrigation

Senate Document 191 planned to irrigate 5.3 million acres in the semi-arid and arid regions of the Missouri River Basin. Of that total, around 550,000 acres have been developed for irrigation by Reclamation.

Another 2.5 million acres have been deauthorized. Currently, over 2 million acres could theoretically still be developed.

Most of remaining acreage is known as "ultimate development" acreage. Some projects already authorized are not funded due to economic or environmental concerns. Economic evaluation criteria and the state of the current agricultural economy make it extremely unlikely that most of the projects will be developed. Also, since 1964, new projects must be authorized by Congress, even if they include "ultimate development" acres. Finally, existing cost allocations cannot be changed unless authorized by Congress. This restriction prevents removal of any acreage from "ultimate development". Table 1 and Table 2 show the history of Pick-Sloan irrigated acreage. Figure 6 shows the locations of current Pick-Sloan irrigation units.

Table 1: Pick-Sloan Ultimate Development Acreage		
	Acres	
	Adjustment	**Total**
Senate Document 191		5,307,704
5 Additional Authorizations (1954-1956)	146,460	5,454,164
Reclassification in 1958 Study	(1,665,764)	3,788,400
Garrison Diversion Unit Reformulation Act of 1986	(876,060)	2,912,340
Dakota Water Resources Act of 2000 (DWRA)	(55,460)	2,856,880
Reauthorized Units/Acres	388,538	3,245,418
Acreage Withdrawals/Adjustments	(70,000)	3,175,418
DWRA Acres "Under Construction"	(75,480)	3,099,938
Current Units Irrigated /In Service	(544,638)	2,555,300

Remaining acres to be Developed/Ultimate Development	**2,555,300**

Table 2: Pick-Sloan Ultimate Development Acreage			
	Acres		
	Full	**Suppl.**	**Total**
SD 191	4,760,400	547,304	5,307,704
5 Additional Authorizations	146,460		
Subtotal	4,906,860	547,304	5,454,164
Removal by Reclassification in 1958 Study	1,794,760	(128,996)	1,665,764
1958 Study Totals	3,112,100	676,300	3,788,400
	Garrison Withdrawals		
Removal - 1986 GDU Act	(876,060)		(876,060)
Removal - 2000 DWRA	(55,460)		(55,460)
Subtotal	(931,520)		(931,520)
	Reauthorized Units in Service		
Riverton - 1970	64,300		64,300
Gray Goose/Hilltop - 1986	5,665		5,665
Belle Fourch - 1983	56,709		56,709
North Loup - Complete 2006	50,964		50,964
Subtotal	177,638		177,638
	Reauthorized but Undeveloped		
Nebraska Mid-State 1967	140,000		140,000
O'Neil - 1972	10,900		10,900
Pollock-Herried 1976	15,000		15,000
Lake Andes-Wagner - 1982	45,000		45,000
Subtotal	210,900		210,900
	Acreage Withdrawals		
Cedar Bluff	(6,200)		(6,200)
Middle Loup	(70,100)		(70,100)
Armel	(6,000)		(6,000)
Subtotal	(82,300)		(82,300)
1958 Units In Service Increase	4,700	7,600	12,300
Total Pick-Sloan	2,491,518	683,900	3,175,418

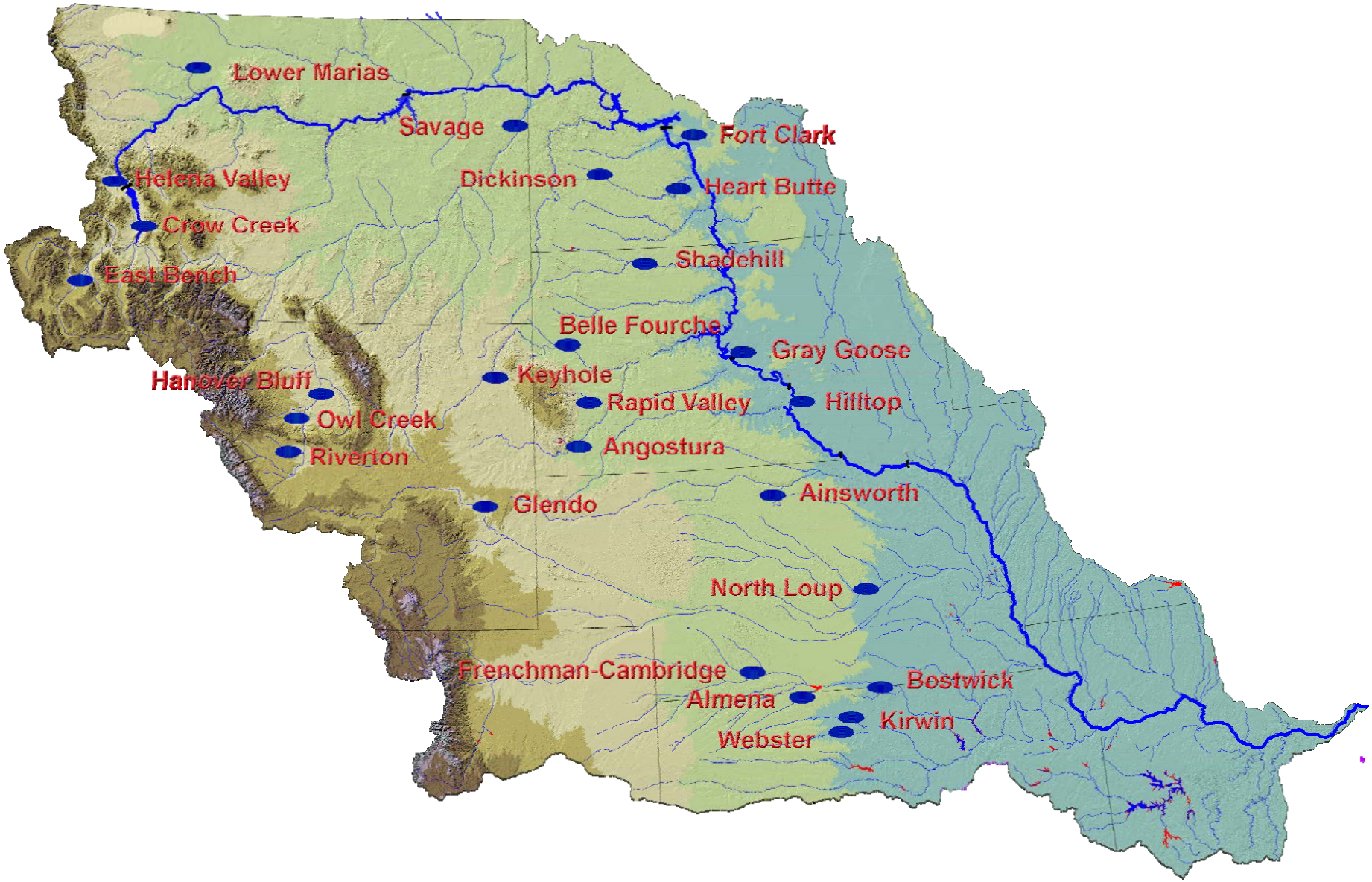

Figure 6. Current In-Service Pick-Sloan Irrigation Units

Power

Development of hydropower fell to both the Corps and Reclamation. Reclamation was responsible for marketing and distributing the hydropower. Power marketing responsibilities were turned over to the Western Area Power Administration (Western) in 1977 when the Department of Energy (DOE) was formed.

The hydropower capacity developed in the Pick-Sloan Program has exceeded the capacity planned in Senate Document 191 by a factor of four. Figure 7 shows the planned versus the developed hydropower capacity as of 2009.

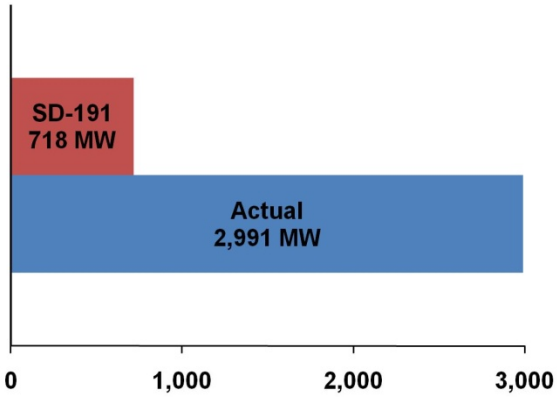

Figure 7. Pick-Sloan Planned vs. Actual Capacity as of 2009

Water Supply

Along with irrigation and power, the Missouri River and its reservoirs supply other water uses. These include municipal and rural water supply, cooling water for power plants, and commercial, industrial, and domestic uses. Around 1,600 water intakes of widely varying size are located within the system and the lower Missouri River. Water supply is also a purpose that has grown more than expected.

Recreation

The projects and facilities of the Pick-Sloan Program provide a number of recreational activities. Water based recreation includes boating, boating related activities, and swimming. Sport fishing is one of the main recreational opportunities in the Basin. Hunting for both small and large game is popular along the Missouri and its tributaries. Camping is also a popular activity.

Recreation as an authorized project purpose has grown far beyond original expectations as recreation facilities have become more developed and the opportunities have increased. Recreation is also a source of income for businesses catering to boating, hunting, fishing, camping, and other forms of recreation.

Fish and Wildlife

Developments of the Pick-Sloan Program, as well as other projects in the Missouri River Basin, have transformed the Missouri River and some related tributaries from alluvial streams and rivers to a chain of long and relatively deep reservoirs. Such a quantity of surface water did not exist naturally in the region. It is also a relatively dry climate. As a result, there has been a great impact on the environment. The purchase and subsequent management of the lands associated with the individual

Pick-Sloan projects has changed use patterns of the lands adjacent to the projects. Regulation of the reservoirs has also affected the river where it is still in a relatively natural state.

The environmental emphasis and prevailing values have change since the Pick-Sloan Program was authorized. Current efforts are focused on increased stewardship of the rivers and surrounding lands by maintaining them in as natural state a possible. Environmental considerations also are important when considering the impact of projects on fish and wildlife, which includes threatened and endangered species.

Water Quality

Water quality characteristics that are of greatest concerns in the basin are chemicals, temperature, biological organisms, taste, odor, and floating material.

The Missouri River and its tributaries have historically contained high sediment loading and naturally occurring high concentrations of metals, such as arsenic and selenium. These water quality characteristics have also changed over the past several decades. The changes are a result of past and current changes in land use practices, increased urbanization, atmospheric deposition of pollutants, and dam construction and regulation within the Missouri River Basin.

With the exception of some tributary streams and isolated reaches of the River below cities and industries, water quality problems in the Basin have been relatively minor. Storage space has been provided in some tributary reservoirs for water quality. Wastewater treatment facilities rather than dilution have been emphasized for water quality.

INTERAGENCY RELATIONSHIPS

The Pick-Sloan Plan resulted in an extremely complex series of interactions between the Corps, Reclamation, and Western. Irrigation and power are the primary uses concerning interagency relationships. While there were some overlapping assignments, the Corps retained jurisdiction over mainstem dams and the tributary projects designed primarily for flood control and navigation. Reclamation retained jurisdiction over most of the tributary projects, as well as over irrigation development. The development of hydropower and other benefits fell to both agencies. Reclamation was responsible for marketing and distributing the hydropower. The power marketing responsibilities were turned over to Western in 1977.

The three agencies engaged in producing and transmitting hydroelectric power in the Pick-Sloan Program are Reclamation, the Corps, and Western. Reclamation is an agency within the Department of the Interior; the Corps is part of the Department of Defense; and Western is an agency within the Department of Energy. The three agencies are funded with Energy

and Water Development Appropriations.

The Corps and Reclamation generate the hydroelectric power. Table 3 shows the installed capacity of the powerplants in the Pick-Sloan Program.

Table 3 – Pick-Sloan Powerplants by Installed Capacity	
Powerplant	**kW**
Oahe – Corps	786,030
Garrison – Corps	583,300
Big Bend – Corps	494,320
Fort Randall - Corps	320,000
Yellowtail – Reclamation	250,000
Fort Peck – Corps	195,250
Gavins Point - Corps	132,300
Fremont Canyon - Reclamation	63,500
Canyon Ferry - Reclamation	50,000
Glendo – Reclamation	38,000
Kortes – Reclamation	36,000
Buffalo Bill - Reclamation	18,000
Boysen Reclamation	15,000
Spirit Mountain – Reclamation	4,500
Shoshone Reclamation	3,000
Pilot Butte – Reclamation	1,600
Total Corps	2,501,200
Total Reclamation	479,600
Total Installed Capacity	2,980,800

Western transmits and markets the hydroelectric power generated by the Pick-Sloan Program. In terms of power marketing, the Pick-Sloan Program is divided into Eastern and Western Divisions, and administered from two Western Regional offices. The Upper Great Plains Regional office, located in Billings, Montana, administers the Eastern Division.

The Rocky Mountain Regional Office, in Loveland, Colorado, administers the Western Division. Figure 8 shows the Western Regions and the related powerplants. Figure 9 shows how the powerplants are arranged organizationally.

As Figure 9 illustrates, the Pick-Sloan Program service territory covers all or parts of 10 states. The service area is operated from two “control areas”, an eastern interconnection and western interconnection. The eastern control center is operated out of the Watertown Control Center out of Watertown, South Dakota. The Western control area is operated out of the Loveland Control Center in Loveland, Colorado.

In addition to receiving power from Reclamation and the Corps, Western has a number of other responsibilities. It allocates the power to preference customers. Western must determine the rates charged for power, transmission, and ancillary services, and repay the costs that are assigned for power. It must also repay capital investment. Finally, it must reliably operate the power system.

Western’s mission is to market and deliver reliable, cost-based hydroelectric power and related services. It is a wholesale power provider. In the Pick-Sloan Program service area, Western transmits power across over 11,000 miles of transmission lines to over 400 customers.

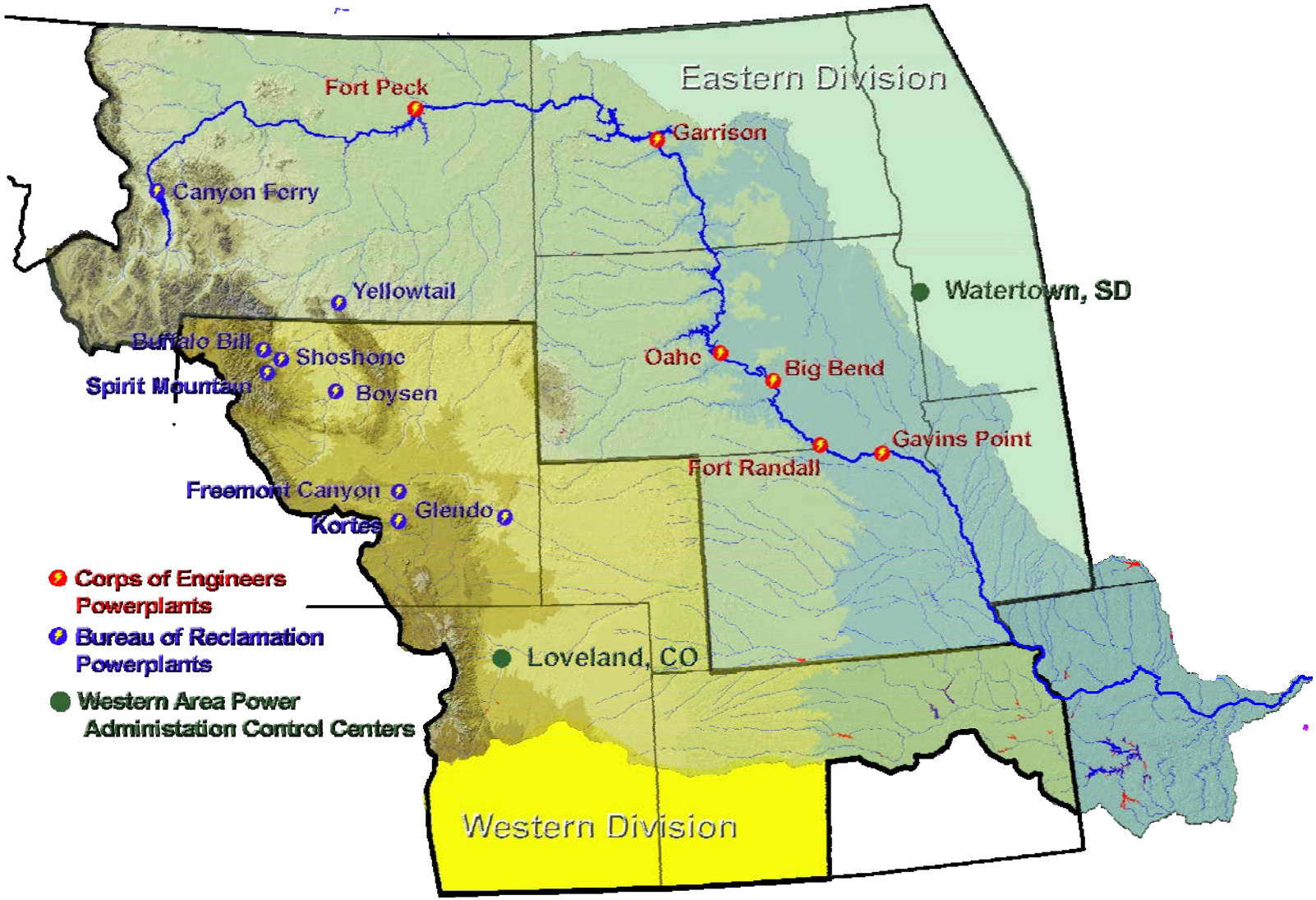

Figure 8: Western Area Power Administration Divisions and related Pick-Sloan Powerplants

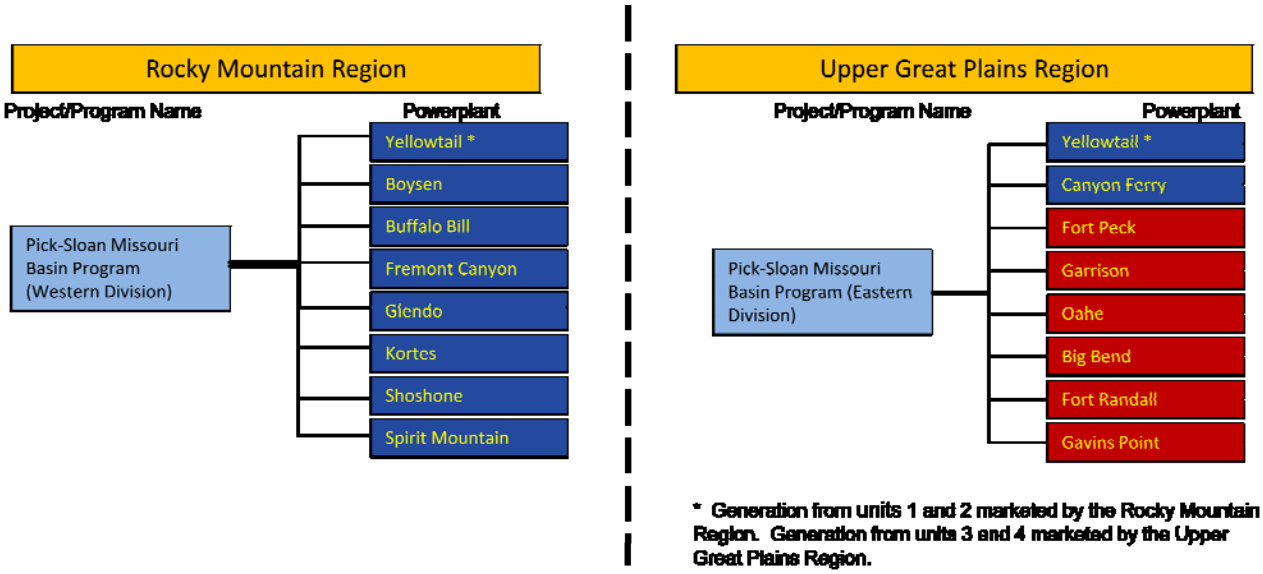

Figure 9: Pick-Sloan Powerplants by Region and Division

PICK-SLOAN POWER

Pick-Sloan Program power sales are prioritized through legislation and regulation. Pick-Sloan power is used for project-use pumping power, preference (firm) power, and non-firm power.

Project-Use Pumping Power

The first priority for power produced by the Pick-Sloan Program is for authorized irrigation projects, referred to as project-use power. It is used for pumping water from a river or a ditch for gravity flow to irrigated land. Project-use power is *not* used for on-farm irrigation. The water is required to be pumped from its source to the first turnout with ten feet of head. In other words, the water must be able to provide irrigation service by gravity. Reclamation administers the contracts with the irrigation districts to provide the project-use power.

The share between commercial power and project-use power has fluctuated as the planning for the Pick-Sloan Program has evolved. Senate Document 191 recognized that part of the generating capacity of the power would be allocated for project-use. That portion set aside for project-use power is called the suballocation. The suballocation is based on the relationship between the installed capacity of the Pick-Sloan power system and the planned capacity for project-use power. The current suballocation of project use power (power set aside for pumping water to irrigated land) is 398 MW. It is based on calculations done at the time of the 1986 Garrison Reformulation Act.

The Pick-Sloan Program has a current installed capacity of around 2,980 megawatts (MW). Although approximately 398 MW of total Pick-Sloan Program generating capacity is suballocated for project-use

power, only 38 MW is currently used for this purpose. The difference has been set aside for future irrigation development and is marketed as commercial power. Figure 10 shows how the power is divided

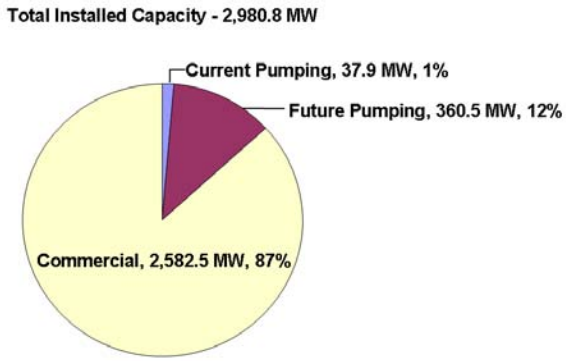

Figure 10: Project Use Power Share

The energy rate for project-use power was originally established at 2.5 mills per kilowatts (kWh). It became apparent that the old rate was not enough to cover operations, maintenance, and replacement (OM&R) costs of the power capacity used for irrigation pumping. A new rate, based upon actual OM&R costs, was established. That rate is currently 16.17 mills per kWh.

There are four categories of project-use power users. Authorized Pick-Sloan Program Projects are projects specifically authorized to use project-use power. Fort Peck Projects were built before the Pick-Sloan Program was created and became integrated in the Pick-Sloan Program with the passage of the Flood Control Act of 1944. Native American Projects receive Pick-Sloan Program project-use power authorized by specific legislation. Two other projects, Gray Goose and Hilltop Irrigation Districts, were integrated into the Pick-Sloan Program with special legislation.

Preference Power

The next priority for Pick-Sloan Program power is preference power. It is marketed by Western. Preference customers (also called firm customers) receive firm commercial power through means established by legislation. The Reclamation Act of 1902 was amended in1906 to give the Secretary of the Interior authority to sell surplus power. The Reclamation Act of 1939 gave preference to certain entities and non-profit organizations. The 1944 Flood Control Act authorized the Pick-Sloan Missouri Basin Program. Finally, the 1977 Energy Act created Western and transferred the power marketing function from Reclamation to Western.

Western is a wholesale power supplier for its preference/firm customers. Western's customers are public power districts, rural electric cooperatives, municipalities, irrigation districts, municipal, rural, and industrial water systems, Native American tribes, and Federal and state agencies.

The customers are divided into two groups, those in the Eastern Division of Pick-Sloan Program, or Upper Great Plains Region (UGPR), and those in the Western Division of Pick-Sloan Program, or the Rocky Mountain Region (RMR). About 340 customers receive their power from the UGPR and 60 customers receive their power from the RMR.

Non-Firm Power

The last priority is surplus non-firm commercial power, which is marketed by Western. This is generally surplus power beyond what Western has contractual commitments for. It is normally sold at spot market rates to commercial customers.

BASIC ECONOMICS/FINANCE OF THE PICK-SLOAN PROGRAM

Project costs can be organized in a number of ways. For example, when a project is built the costs are classified as multipurpose costs versus specific costs. When a project is constructed, it is usually a multipurpose project. A project may be built not only for irrigation, but for power, flood control, and recreation. A complex economic process is used to allocate the costs of the multipurpose project for specific purposes, both for capital costs and operations, maintenance, and replacement costs (O,M&R). The cost allocation allows specific costs of a project to be repaid by the specific users. It also allocates the costs between reimbursable and non-reimbursable costs.

Reimbursable costs are costs repaid by the users, or beneficiaries. Normally these users enter into a contract and have a repayment schedule. The primary reimbursable users are municipal and industrial (M&I), power, and irrigation. All reimbursable users must repay with interest, except for irrigation. Irrigation users receive their benefits interest-free.

Non-reimbursable costs are costs not repaid by the beneficiaries, or users, of the project. These costs are picked up by the taxpayers. Examples of non-reimbursable costs are flood control, recreation, and fish and wildlife. Table 4 shows the construction costs allocation for the Yellowtail Project as an example.

Table 4. Yellowtail Project Construction Costs Allocation	
Irrigation	13.69%
Power	40.77%
M&I	34.01%
Fish & Wildlife	1.22%
Flood Control	10.31%

Another cost is aid to irrigation. Aid to irrigation is that portion of the project that is allocated to irrigation paid for by power revenues. As stated in one of the basic principles of Reclamation, legislation allows that hydroelectric power revenues could be used to repay construction charges for irrigation. How much aid to irrigation a water user receives depends on their “ability to pay.”

POWER REPAYMENT

Repayment rates are established in accordance with the Department of Energy Organization Act of 1977. This act transferred the power marketing functions from Reclamation to Western. It also gave Western the authority to develop power and transmission rates. The rate collects revenue required to recover annual expenses (such as O,M&R, purchased power, transmission service expenses, interest, and deferred expenses),

repay Federal investments, and other assigned costs.

The investment contains the reimbursable costs for power. These costs allocated to power include multipurpose costs allocated to power for Reclamation and the Corps. They also include the costs specific to power incurred by Reclamation, the Corps, and Western.

Annual expenses are recovered in the year they occur. These expenses include O&M, purchased power, transmission, and interest.

Another expense that Western must recover is purchased power. Purchased power is power that Western buys when they do not have enough power from generation to meet their contractual obligations. Purchases may be made due to operational constraints such as navigation, management of endangered species, or water quality. Purchased power is also bought because of the ongoing drought.

Part of Western's current rate includes a "drought adder." Because of the drought in the Missouri River Basin, Western has not been able to meet its' contracted obligations to provide power to its customers. As a result, Western has been purchasing power from outside utilities to make up for the lack of power generation. The drought adder is designed to repay the debt used to buy non-timing purchased power within 10 years. Repayments of project costs are prioritized in the following order:

- Annual expenses
- Deferred annual expenses
- Required principal payments
- Additional principal payments.

The two main products Western (or any wholesale utility) sells are capacity and energy. Capacity or demand is the amount of electricity at any given moment. It is measured in kW or MW. Energy is the amount of electricity over time. It is measured in kWh or MWh.

Western markets firm power, peaking power, and non-firm power. Firm power is both capacity and energy. It is contractually guaranteed to be available 24 hours a day to preference customers, generally on a long term basis. Peaking power is capacity with no energy available. It is available to help meet a customer's power needs over a short period of time. Non-firm power can be terminated by telephone notice. It is also marketed as interruptible and economy power. It may be less expensive than firm power, but it can also be stopped by a telephone call.

Western also markets and receives revenue from ancillary services. In the late 1990's, the Federal Energy Regulatory Commission issued Order 888. Among other things, it identified six ancillary services that are required to be included in an Open Access Transmission Tariff. These services that Western sell are listed in Table 5 below.

Table 5. Ancillary Services provided by Western
Scheduling, System Control, and Dispatch Service
Reactive Supply and Voltage Control from Generation Sources
Regulation and Frequency Response Service
Energy Imbalance Service
Spinning Reserve Service
Supplemental Reserve Service

Finally, Western markets, and receives revenue from transmission service.

ORGANIZATION OF POWER REPAYMENT STUDY (PRS)

Organizationally, the Pick-Sloan Program PRS is a complex process. First, a PRS is done for the entire Pick-Sloan Program using all the considerations listed above. This is done out of Western's UGPR Office. When it is completed, separate rates are computed for the Eastern Division and the Western Division of the Pick-Sloan Program. These separate rates are based on the pro-rated portion of the most recent annual energy sales for each Division. At this point, the rate process is complete for the Eastern Division.

However, the rate for the Western Division portion of the Pick-Sloan rate must be blended with the Fryingpan-Arkansas PRS. The resulting rate is called the Loveland Area Projects (LAP) rate. The Fryingpan-Arkansas rate study and the blending is done in Western's RMR Area Office. The Fryingpan-Arkansas Project is <u>not</u> a Pick-Sloan Program project.

Integrated projects are non Pick-Sloan Program Projects in the region that are included in the PRS for rate setting. The Colorado Big-Thompson (C-BT), Kendrick, and Shoshone projects were administratively combined with the Pick-Sloan Program in 1954, followed by the North Platte Project in 1959. All of the integrated projects are within the Western Division of the Pick-Sloan Program. Figure 12 shows the locations of all the powerplants in Reclamation's Great Plains Region. Figure 13 shows how they fit in by organization.

Table 6 shows the Firm Power Rates for the Eastern Division for Pick-Sloan, or Upper Great Plains Region. Table 6 shows the rates for the Loveland Area Projects, or the Rocky Mountain Region.

Table 6. Pick-Sloan Program Eastern Division/Upper Great Plains Region Rates Effective Jan. 1, 2010	
Firm Service	Rate
Demand	$7.65/Kw month
Energy	19.05 mills/kwh
Composite Rate	33.25 mills/kWh

Table 7. Loveland Area Projects/Rocky Mountain Region Rates Effective Jan. 1, 2010	
Firm Service	Rate
Demand	5.43 $/Kw month
Energy	20.71 mills/kwh
Composite Rate	41.42 mills/kWh

Figure 11: Powerplants in Great Plains Region

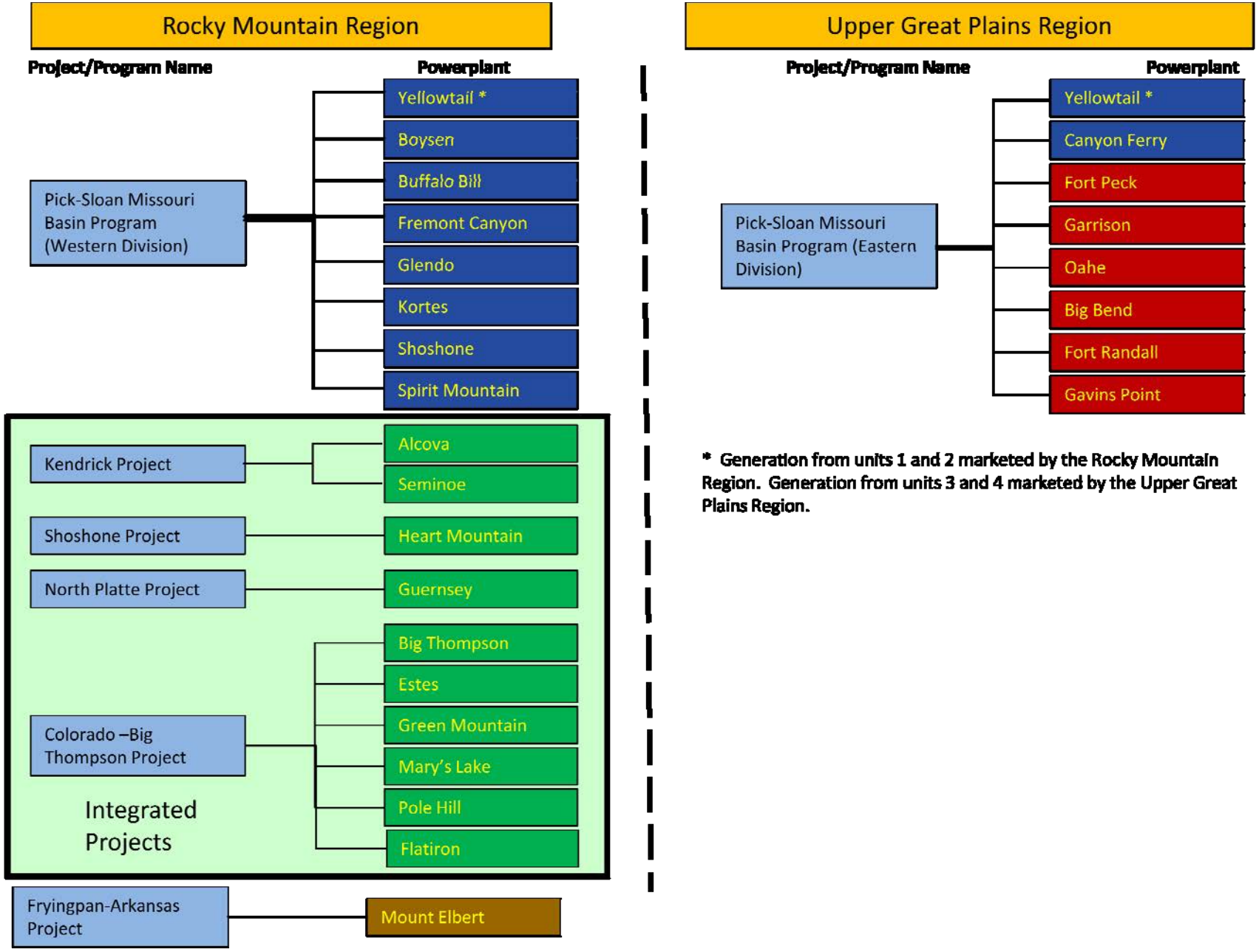

Figure 12: Powerplants in Great Plains Region. Corps Power Powerplants are in red boxes. The remainders are Reclamation Powerplants

OPERATIONS, MAINTENANCE, AND REPLACEMENT (OM&R) BUDGET PROCESS

The fiscal year (FY) begins October 1st and ends September 30th. Reclamation budgets need to be done three years in advance, so development of the FY 2012 budget is planned for the summer of 2009. Reclamation's Washington Office gives the GP Region a budget target level, which the Region in turn provides the Area Offices.

Area Offices submit their budget request by the end of the summer by completing an Activity Plan. The Activity Plan includes a detailed breakout of each program in the Area Office, such as Yellowtail O&M Program, for instance.

The "Operating Budget" occurs annually. It is also referred to as the "above the line" budget. Examples of operating (or base) budget items are employee's salaries, employee benefits, travel, utilities, rent, communications, printing, transportation, standard service contracts, employee training, materials, supplies, and office equipment. It also includes Area and Regional indirect costs, or overhead.

RAX PROGRAM

The RAX budget is for replacements, additions, and extraordinary maintenance. Unlike the Operating Budget, the budget for these items can fluctuate significantly from year to year. The RAX budget is also referred to as the "below the line budget. It contains significant items such as new governors, new runners, and new excitation systems, just to give a few examples.
In the 1990's, some of the Pick-Sloan customers became concerned about RAX items because the RAX budget fluctuated by millions of dollars from year to year, leading to an unpredictable effect on power rates. In addition, many "big ticket" items were being put off.

As a result, the Western States Power Corporation (WSPC) began a partnership with Pick-Sloan Federal agencies to provide direct "up-front" funding for the RAX budget. The GP Region began receiving this funding in FY 1997. The amount of this upfront funding has increased each year since then. This funding is an important part of the budget process, as well as an example of cooperation between the Pick-Sloan Federal agencies and their power customers.

Yellowtail Dam, Montana