

SPDSS Memorandum Final

To: Ray Alvarado and Ray Bennett
From: LRE, Rick Parsons and Mary Presecan
Subject: Task 3 – Identify Key Diversion Structures
Notes from Water District 47 Meeting
Date: December 6, 2004 (Revised July 06, 2006)

Introduction

This memorandum provides notes from the October 7, 2004 meeting with the two Water Commissioners for the North Platte River basin (Water Division 6, Water District 47). The South Platte Decision Support Systems (SPDSS) study area includes the South Platte River, North Platte River, and Laramie River basins within the state of Colorado. Meetings are being held with Water Commissioners in each Water District in the study area. The objectives of these meetings are 1) to develop an initial basin understanding; 2) to determine what irrigation structures should be included as “Key Structures” in future detailed modeling efforts; and 3) to determine which reservoirs and diversions warrant more detailed investigation and technical documentation. These objectives support Task 3 – Identify Key Diversion Structures and Task 5 – Identify Key Storage Reservoirs and Develop Operating Memoranda. Information in this memorandum is believed to be accurate. However, this information should not be relied upon in any legal proceeding.

Approach

Prior to the meeting, potential Key Structures for District 47 were identified using the following procedure outlined in the SPDSS Scope of Work:

- 1) Identify net absolute water rights per structure. Select initial key structure cutoff value based on the 85 percent recommendation (SPDSS Feasibility Study, October 2001) for each water district.
- 2) Determine average annual diversion data for structures during three average hydrologic years, one year each during the 1950s, the 1970s, and the 1990s. Add additional structures to the key list that diverted an average of 1,000 acre-feet (ac-ft) per year during any of the representative years. Note that this step will allow the inclusion of larger diversion structures having active water rights during the earlier years of the study that were subsequently transferred to other ditches or other uses.
- 3) Review readily available straight-line diagrams and include additional structures as appropriate, based on water rights and location. Straight line diagrams were

neither available from the Water Division 6 office nor the Colorado Water Conservation Board; therefore, a large-scale map with a quadrangle background was produced showing stream gages and the potential Key Structures and was used for discussion purposes at the meeting.

Table 1, provided at the end of this memorandum, provides the initial list of key diversion structures, the total of their decreed water rights, the period of record of available diversion records, the average annual diversions for the period of record, and the water source. In addition, as noted in the comment line, it includes new structures added during the interview, or structures that were removed as key and should be modeled in an aggregated fashion. Table 1 generally lists structures in upstream to downstream order. A simplified schematic is included (Figure 1) that includes structures recommended to be modeled explicitly and in aggregated fashion, as noted in the text and Table 1.

The interview was intended to determine additional structures that should be considered key based on seniority, water administration, or basin operations (including structures with supplemental reservoir water). Prior to the meeting, a brief description of the purpose and goals of the interview was relayed to the Water Division 6 Engineer, Bob Plaska. The following is a summary of the meeting agenda:

- 1) Discuss overall river basin management in Colorado within the context of the North Platte River Compact (1945) and North Platte River Compact Amendment (1953) between the states of Colorado and Wyoming.
- 2) Develop a list of major projects, reservoirs, and ditches in the Water District, including names of knowledgeable contact people.
- 3) Gather information on dry-up points on the river, calling rights, augmentation plans, and administration specific to the Water District.
- 4) Gather general information on the preliminary list of municipal and irrigation diversions selected to included in future detailed modeling efforts (Key Structures), and solicit input on their final inclusion.
- 5) Develop information on reservoirs, such as owner entities, ditches that get reservoir deliveries, assigned delivery losses, etc.

Meeting Attendance

The meeting was held at the River Rock Restaurant in Walden. The following people attended part or all of the meeting:

Bob Plaska – Division 6 Engineer

Erin Light – Division 6 Hydrographer

Sue Petersmann – Water Commissioner District 47 (upper basin) for the Michigan River, Illinois River, and Big Grizzly Creek

Kincaid (Caid) Waldron – Water Commissioner District 47 (lower basin) for Pinkham Creek, Canadian River, Little Grizzly Creek, Roaring Fork River, North Fork North Platte River, and the main stem North Platte River

Rick Parsons - Leonard Rice Engineers

Mary Presecan - Leonard Rice Engineers

Meeting Notes

Rick Parsons began the meeting with an overview of the SPDSS modeling effort, the Task 3 and Task 5 data collection efforts, and the role of the North Platte River basin in the SPDSS effort. The Water Commissioners then described the various river drainages within the North Platte River basin, moving from the east side to the west side of the basin, and discussed general administration and operations specific to the river drainages. Details regarding the hydrology, transbasin diversions, ditch and storage use, inter-basin diversions, and return flow locations were discussed.

Some general comments are appropriate to characterize the North Platte River basin in District 47 and water uses within the area. Within the state of Colorado, the North Platte River basin covers the extent of Jackson County. The basin is characterized by a broad, high mountain meadow known as North Park, surrounded by the Continental Divide to the west and south and by the Medicine Bow Mountains to the east. The only major municipality in District 47 is the town of Walden, with approximately 800 people (out of about 1,600 residents total in Jackson County). Water use in the basin is primarily for irrigation, stock water, and recreational uses, primarily fishing. Meadow grasses and pasture are the only crops irrigated in North Park. Irrigated grasses are cut only once per year due to the short growing season. With minor exception, all of the lands in North Park are flood-irrigated and most ranches are served by multiple ditches. Although ground water is rarely used for supplemental irrigation, the town of Walden is served by two high-capacity wells and there are many small-capacity, exempt wells in the basin that are used for stock watering purposes.

Transbasin Diversions

While transbasin water is diverted out of District 47, there are no imports into District 47. Transbasin diversions from District 47 are made at the following two structures:

- **Michigan Ditch** (4704603) is a predominantly open canal that diverts water from the Michigan River Basin into Joe Wright Creek, tributary to the Cache la Poudre River basin (Water Division 1, Water District 3). Winter diversions are approximately 1 cubic foot per second (cfs) until the ditch is fully opened in the late spring and more water can be conveyed to Joe Wright Creek. Water from the Michigan Ditch system is used by Fort Collins in its Joe Wright Reservoir system. Transbasin diversions through the Michigan Ditch system are recorded in HydroBase under the Michigan Ditch at Cameron Pass stream gage (06746000).
- **Cameron Pass Ditch** (4704602) is an open canal that diverts water from the Middle Fork Michigan River Basin into Joe Wright Creek. Water from the Cameron Pass Ditch is used by Water Supply and Storage Company in its Chambers Lake system in the Cache la Poudre River basin. The ditch is not operated over the winter. The ditch is opened in the late spring and water is typically run through the ditch for six to eight weeks each year. Transbasin diversions through the Cameron Pass Ditch system are

recorded in HydroBase under the Cameron Pass Ditch near Cameron Pass stream gage (CAPDCPCO).

Where to find more information:

- Additional information on each of these transbasin diversions is presented in the structure-specific memoranda prepared for SPDSS Task 4 – Identify Key Transmountain Diversion Structures and the SPDSS Task 5 memoranda prepared for Fort Collins and the Water Supply and Storage Company.

Compacts and Agreements Affecting District 47 Administration

North Platte River Basin Decree. The 1945 and 1953 decrees limit Colorado's use of North Platte River basin water as follows. There is no other cross-border administration between the states of Colorado and Wyoming.

- 1) Total irrigation in District 47 is limited to 145,000 acres.
This condition has not historically limited irrigation use in the District 47.
- 2) Total storage for irrigation is limited to 17,000 ac-ft per year.
Although there is approximately 36,000 ac-ft total storage in the basin, this condition generally has not limited irrigation storage in District 47 since storage units are typically not drawn down so far over the summer as to require more than 17,000 ac-ft of irrigation storage fill the following year. This compact limitation has surfaced twice, in 1978 and 2003, when, after successive drought years resulting in reservoirs drawn down, there was more physical space available for storage. In 2003, spring storage for irrigation purposes reached 17,600 ac-ft total, necessitating a 600 ac-ft storage release.

This condition does not apply for storage used for stock water, fisheries, or other non-irrigation uses.

- 3) The amount of total water exported from the North Platte River in Colorado is limited to 60,000 ac-ft total over any 10-year period (6,000 ac-ft per year average).
This condition has not historically limited transbasin diversions from District 47 due to extended freeze periods over the winters that limit access to transbasin diversion structures.

Stream Gages and General Administration

There are seven active, satellite-linked stream gages in the North Platte River basin and four additional gages that have been rated and are used for administrative purpose. Three of the active gages have been installed over the last few years. There are a number of other stream gages that have been installed for project-specific work and operated for a short period of time but these gages were shut down when the projects were finished. Only one gage (North Platte River near Northgate) has stream flow data recorded over

the entire 1950-2002 SPDSS study period. Records from the seven active, satellite-linked stream gages are listed below. Records from these gages available in HydroBase are listed in parentheses and are considered good:

- 1) Michigan River near Cameron Pass (06614800, 1973-present), located above the Michigan Ditch (4704603) transbasin diversion structure.
- 2) Michigan River near Meadow Creek Reservoir (06616500/MICMERCO, 1999-present), located above the Meadow Creek confluence. This gage replaced the Michigan River near Gould gage (MICGOUCO, 1993-1995).
- 3) Michigan River at Walden (06617100/MICWLDCO, 1924-1947 and 2002-present). This Division 6 office has sporadic records for this gage over 1977-2001.
- 4) Illinois River near Rand (06617500/ILLRANCO, 1931-1940, 1994-1998, and 2002-present).
- 5) Illinois River below Ish Baldwin Ditch (06618300, 2002-present), located about 100 yards below the Home Ditch No. 2 headgate (4700670).
- 6) Illinois River below Potter Creek (06618480, 2001-present).
- 7) North Platte River near Northgate (06620000, 1915-present).

The following staff gages are rated and currently used for administration purposes but have some data available in HydroBase (listed in parentheses):

- 1) South Fork Michigan River near Gould (06615000, 1950-1958), located below the Mason Ditch headgate (4700759) and above the Lost Treasure Ditch (4700738) headgate.
 - 2) North Fork Michigan River near Gould (06616000, 1950-1982), located on spillway of North Fork Michigan Creek Reservoir (4703753).
 - 3) Middle Fork Michigan River near Gould (no Structure ID), located above the confluence with South Fork Michigan River.
 - 4) Illinois River at Walden (06618500, 1923-1947)
- Sue Petersmann has been in North Park since 1991 and became Water Commissioner in 1999.
 - Kincaid (Caid) Waldron has been in District 47 since 1990. He started working for Water Division 6 part-time in 1989 prior to becoming Water Commissioner in 1990.
 - Sue and Caid maintain end-of-month contents for the reservoirs in the upper basin and the lower basin, respectively.
 - Erin Light has area/capacity information for most reservoirs in District 47.
 - Sue manages releases from Walden Reservoir (4703627) and the occasional releases from Meadow Creek Reservoir (4704335). Releases from other reservoirs are

typically administered by the owners of the storage units recorded by the Water Commissioners, as discussed below.

- Evaporation is charged to on-channel reservoirs based on 70 percent times the readings from the evaporation pan in Walden.
- Only two augmentation plans that have been adjudicated are addressed in river administration in the District. These plans are summarized below:
 - Arnold Pond and Wells – Augmentation of about 0.1 ac-ft total for pond evaporation and well depletions used to supply 10 to 15 parcels in the Illinois River drainage near Rand.
 - Gould Augmentation Plan – Augmentation of about 15 ac-ft to 20 ac-ft of uses associated with 6 fish ponds (2 filled for fish and 4 filled in priority and used for augmentation) in the Michigan River drainage near Gould.

The following table provides a normal-year river call sequence. Specifics for each of the tributaries in the basin are described in more detail, following.

Normal-Year River Call Sequence

| | |
|---|---|
| Winter | Storage season starts as soon as irrigation calls cease, which is typically July 15 in the upper basin and August 1 in the lower basin. Reservoirs store by priority until the diversion headgates and inlet works freeze, typically in December. Storage diversions begin again in the spring with all storage units generally operational by April. |
| Begin Irrigation Season (May 1) | Direct right diversions |
| May 1 to Mid-June | Direct right diversions and diversions for storage. |
| Mid-June until End of Irrigation Season | Direct right diversions and storage releases through July 15 in the upper basin and through August 1 in the lower basin. |

- Irrigation season calling rights in North Park, by sub-basin, are as follows:
 - Pinkham Creek - Newport Ditch (4700793), all summer
 - Canadian River - New Pioneer Ditch (4700790), although infrequently
 - Michigan River - Kiwa Ditch (4700711), May 1 – July 15 except when river comes up during spring runoff
 - Illinois River
 - Everhard Baldwin Ditch (4700615), mid-June – July 15
 - Home Ditch No. 2 (4700670), typically in latter two weeks of irrigation season (July 1 – July 15) if return flows drop significantly
 - Big Grizzly Creek - Peterson Ditch No. 1 (4700829), mid-August – October 1, typically calls out Eureka Ditch (4700614) diverting for storage upstream
 - Roaring Fork - These calls are typically placed all summer
 - Sunday Creek Ditch (4700911), high-mountain diversion on Roaring Fork

- Mitchell Ditch (4700777), high-mountain diversion on Beaver Creek tributary
- Wolfer Ditch (4700961), on Roaring Fork below Beaver Creek
- North Fork North Platte River
- Victor Ditch (4700932), although infrequently
- West Fork Ditch (4700951), although infrequently
- North Platte River - None
- Similar to the South Platte River basin, North Platte River basin ditch priorities are owned by a number of people, although the ditch systems are not organized into mutual ditch companies. The priorities in the ditches are generally owned by different ranches and diverted water is distributed to the different ranches based on the available priorities and ranch ownership.
- Unlike the South Platte River basin, most parcels of land in the North Platte River basin can be served by multiple ditches. Development of a complete list of the ditches that serve the same lands on ranches throughout North Park was considered too onerous for this meeting, except for particular ranches and ditch systems that were identified in the discussions of river operations. The location of active stream gages in the basin, discussions regarding the general operations on the different tributaries, and identification of the calling water rights in the basin were used to recommend the aggregation of certain groups of structures to simplify future modeling efforts of the North Platte River basin within the state of Colorado. These recommendations are discussed by sub-basin, below, and summarized in Figure 1 and the comments in Table 1, located at the end of the memorandum.
- Diversion data coding in North Park is recorded in accord with the Water Commissioner Manual published by the Colorado Division of Water Resources and the Office of the State Engineer. The coding is relatively straightforward due to the limited types of uses within the basin, which typically consist of
 - From River (1) to Storage (0), Irrigation (1), Municipal (2, town of Walden only), or Stock (9),
 - From Storage (2), directly or by exchange, to Irrigation (1) or Stock (9),
 - From Ground water (3) to Municipal Uses (2, town of Walden only).
 - Inter-basin diversions are coded From Other (5); Source (Structure ID diverting water); Use (Structure ID receiving water)

Camp Creek

Camp Creek is a minor tributary located in the northeast portion of the county that conveys water to the North Platte River below the Northgate gage. Camp Creek typically dries up in mid-summer.

- **Camp Creek Ditch** (4700538) is the sole key structure identified on Camp Creek.
- The approximately 400 total acres irrigated on Camp Creek should probably be excluded for modeling purposes due to their limited impact in the basin and location below the Northgate gage.

Pinkham Creek

Pinkham Creek is located in the northeast portion of the county and conveys water to the North Platte River below the Canadian River confluence. Pinkham Creek is an intermittent stream that typically runs only eight to ten weeks per year.

- **Newport Ditch** (4700793) is the sole key structure identified on Pinkham Creek.
- **Capron Ditch** (4700543) is another structure that has historically placed calls on Pinkham Creek.
- For modeling purposes, the approximately 2,000 total irrigated acres in the Pinkham Creek basin could be grouped together and operated as a Pinkham Creek system.

Government Creek

Government Creek is located adjacent to the Pinkham Creek basin.

- **Coe Ditch No. 1** (4700563) and **Coe Ditch No. 2** (4700564) have historically placed calls on Government Creek to compete for the scarce water supplies.
- For modeling purposes, Government Creek operations and the Coe Ditch Nos. 1 and 2 should be excluded and its small amount of diversions (approximately 500 ac-ft/yr) left in the downstream gages.

Canadian River

The Canadian River is located on the east side of the basin and conveys water to the North Platte River west of the town of Northgate. The Medicine Bow Mountains form the eastern boundary of the Canadian River drainage and serve as a barrier to sands entrained in winds that travel from west to east across North Park. The Canadian River is characterized by very sandy soils. There are no significant storage units in the Canadian River basin. There are no active stream gages on the Canadian River.

Ditch-specific information related to Canadian River ditches includes the following:

- The Canadian River typically operates as a free river since water supplies are usually sufficient to meet demands.
- **Sales Ditch No. 2** (4700996), located on South Fork Canadian River diverts native water and picks up water diverted at the **Sales Ditch** headgate (4700864) from the North Fork Michigan River. The Sales Ditch No. 2 irrigates lands to the west on Sales Creek, which is tributary to the Michigan River.
- **Smith Ditch** (4700884), located below Sales Ditch No. 2, diverts water for irrigation on lands north and east of Sales Creek and Meadow Creek. Tail water from the Smith Ditch is collected in Meadow Creek Reservoir (4704335). Return flows on the order of 3 cfs to 5 cfs from the Smith Ditch-irrigated lands accrue to the Canadian River above and below the Bona Fide Ditch (4700515) headgate.
- Return flows from all lands irrigated downstream of the Smith Ditch (4700884) return to the Canadian River.
- **New Pioneer Ditch** (4700790) placed a call in July 2002, the first call on the Canadian River since the 1970s drought.
- Over the last ten years, Silver Spurs Ranches has purchased most of the ranches in the Canadian River drainage and the associated water rights. They own all of the key structures on the Canadian River down to, and including, the New Pioneer Ditch and are able to essentially operate its water rights in aggregate to meet its overall crop demand.
- A number of key ditches were identified on the Canadian River below the Smith Ditch. For modeling purposes, these ditches (Bona Fide Ditch-4700515, Pomroy Ditch No. 1-4700840, Medicine Bow Ditch-4700768, Sand Creek Ditch-4700866,

Dwinell Ditch-4700601, Stillwater Ditch-4700905, Sanborn Ditch-4700865, and New Pioneer Ditch-4700790) could be operated together.

- **Hunter Ditch** (4700679) is the most downstream key structure identified on the Canadian River and is located below the Silver Spurs Ranches property.

Michigan River

The Michigan River is located to the west of the Canadian River and conveys water to the North Platte River below the town of Cowdrey and above the Canadian River confluence. Two transbasin diversions (Michigan Ditch and Cameron Pass Ditch) convey water from the upper Michigan River basin to the Cache la Poudre River basin in Water Division 1, Water District 3. Two major storage units, North Michigan Creek Reservoir and Meadow Creek Reservoir, are operated in the basin. Two stream gages were recently installed on the Michigan River. The lower gage, at Walden, is used to administer water deliveries to the lower ditches.

Ditch-specific information related to Michigan River ditches includes the following:

- Ditch systems at the top of South Fork Michigan River (**Lost Treasure Ditch**-4700738, **Mason Ditch**-4700759) divert water to irrigate lands along the south side of river and in the Owl Creek basin to the south. Owl Creek flows into the Michigan River above the Wales Ditch (4700939).
 - The Lost Treasure Ditch can convey water to Owl Creek (usually ~5 cfs), where it is picked up by the Lowland Ditch (4700740). This diversion typically occurs every year.
 - The Mason Ditch can convey water to Owl Creek, where it is currently picked up by the Brocker Endomile Ditch (4700530). This diversion occurs infrequently, typically if Owl Creek flows above the Brocker Endomile Ditch headgate are less than 5 cfs. Historically, the inter-basin diversion was picked up by the Owl Ditch (4700820).
- **Overland Ditch** (4700819), diverts water for irrigation of lands to the west of Highway 14 and to the north of the lands irrigated by the Poverty Meadows ditches (see below).
- **Poverty Flat Ditch No. 2** (4700844) at the bottom of the South Fork Michigan River and **Poverty Flat Ditch No. 1** (4700845), just below the confluence of the South Fork Michigan River with the main stem of the Michigan River, irrigate lands along the river. The Poverty Ditch No. 1 headgate is located below the Middle Fork Michigan River near Gould gage.
- For modeling purposes, the key ditches on the upper Michigan River above the North Fork Michigan River (Lost Treasure Ditch, Mason Ditch, Overland Ditch, Poverty Flat Ditch Nos. 1 and 2) and the ditches on Owl Creek (Lowland Ditch, Brocker Endomile Ditch, and Owl Ditch) that receive water from these Michigan River ditches could be operated together.
- **Sales Ditch** (4700864), located on the North Fork Michigan River, diverts water into the South Fork Canadian River above where it is picked up by the **Sales Ditch No. 2** (4700996). This inter-basin diversion occurs infrequently and only to the extent of a few cfs since the ditch has not been maintained.

- **North Michigan Creek Reservoir** (4703753, ~1,200 ac-ft capacity), located below the Sales Ditch (4700864), is owned by Colorado Division of Wildlife (CDOW) and used for wildlife, fisheries, and recreational purposes. The reservoir is typically kept full and only stores water to make up evaporation losses. Releases from the reservoir beyond inflows are infrequent but did occur in 2002 to keep the river wet near the town of Walden to ensure that Michigan River diversions could be made in Walden for domestic purposes.
- **Squibob Ditch** (4700893) irrigates land on the east side of the Michigan River above the Meadow Creek confluence.
- **Michigan Highline Ditch** (4700773) irrigate lands on the east side of the Michigan River above, and below, the Meadow Creek confluence.
- For modeling purposes, the key ditch headgates on the Michigan River below the confluence with the North Fork Michigan River and the above the confluence with Meadow Creek could be operated together.
- **Meadow Creek Reservoir** (4704335, ~4,750 ac-ft total capacity, ~4,666 ac-ft active capacity, ~84 ac-ft dead storage) is owned by the Michigan River Water Conservancy District. Shareholders in the reservoir include local irrigators (~1/3 of storage capacity) and the City of Fort Collins (1,200 ac-ft total – first 500 ac-ft + up to additional 700 ac-ft, based on fill level). The remaining storage water is an extra Water Conservancy District pool and is used to replace evaporation losses. Since its acquisition of Meadow Creek storage in 1973, Fort Collins has used its storage capacity to augment out-of-priority diversions through the Michigan Ditch. The irrigators use storage water as a supplemental source for their direct flow water rights. Numerous exchange decrees have been adjudicated involving use of Meadow Creek Reservoir to replace out-of-priority diversions by irrigators located upstream.
- **Cleveland Ditch** (4700559), **Cleveland Ditch Kimmons Extension** (4700560), and **Cleveland Ditch Owl Creek Extension** (4700558) serve the same lands. Return flows from these irrigated lands typically return to the Michigan River although a small amount, less than 5 percent of returns accrue to the Illinois River drainage in wet years.
- **Bostwick Ditch** (4700521) is located below the Cleveland Ditch and irrigates lands on the east side of the river.
- **Old S C Ditch** (4700813) is used for irrigation purposes and as a carrier ditch for Walden Reservoir (4703627). Storage diversions through the Old S C Ditch headgate are conveyed to the Illinois River and then picked up by an inlet ditch that shares the same river headgate as the Home Ditch No. 2 (4700670). The inlet ditch splits off about 300 feet to 400 feet down ditch on its way to Walden Reservoir.
- For modeling purposes, the four key structures identified below Meadow Creek and above the Old S C Ditch (the three Cleveland Ditch structures and the Bostwick Ditch) could be operated together.
- A number of key ditches were identified below the Old S C Ditch and above the Michigan River at Walden stream gage. For modeling purposes, these ditches (Curtin Ditch-4700578, Matthews Ditch-4700760, Wales Ditch-4700939, Dry Creek Ditch-4700595, and Ruction Ditch-4700859) could be operated together.
- The **town of Walden** diverts its municipal water supply (0.2 cfs – 0.8 cfs) from two high-capacity alluvial wells located on the east edge of town (Walden Well No. 1-

4705000, Walden Well No. 2-4705001). The wells are located south of the Michigan River, near the north end of Walden where Highway 125 crosses the river. Water levels in these wells are typically sustained by up-basin, irrigation return flows. Due to their shallow depth and proximity to the river, these well diversions could be considered as river diversions for modeling purposes. The town also has a senior river diversion (Walden Michigan River Diversion-4701083), located just upstream of the Michigan River at Walden stream gage, that is used when low aquifer levels limits the use of the wells. Water year 2002 presented unusually low river flows that limited Walden's diversion capabilities. CDOW released water from North Michigan River Reservoir that year to bring the river up to a level sufficient to permit municipal diversions.

- Sue administers the Michigan River in the summer below the town of Walden to ensure that generally 100 cfs - 115 cfs total is available to the lower ditches, depending on weather conditions, available return flows, and other possible river issues, from a combination of river flows (based on Michigan River in Walden and Illinois River at Walden stream gages) and Walden Reservoir releases.
- **Queen Ditch** (4700847) has historically been located below the stream gage until the gage was moved below the Queen Ditch headgate in October 2004 due to beaver dam issues.
 - The Queen Ditch should be modeled below the Michigan River at Walden stream gage for the purpose of developing base flows. The Queen Ditch should be moved above the stream gage for future model simulations.
- Two key ditches were identified below the Michigan River in Walden stream gage and above the confluence with the Illinois River. For modeling purposes, these ditches (North Park Ditch Nos. 4 – 4700802 and 5-4700803) could be operated together.

Illinois River

The Illinois River is located to the west of the Michigan River and conveys water to the Michigan River below the town of Walden and Walden Reservoir. Two major storage units, MacFarlane Reservoir and Walden Reservoir, are operated in the basin. Two stream gages were recently installed on the Illinois River below the existing, upper-basin gage near Rand. The two new gages are located below the MacFarlane Reservoir filler ditch and above the Walden Reservoir filler ditch, respectively. The new gages are also located near the top and bottom, respectively, of the Arapahoe National Wildlife Refuge (ANWR). These gages are used to track the delivery time of water down the Illinois River through ANWR, which is characterized by numerous beaver ponds. The travel time for water through ANWR is about 5 days. The Illinois River generally dries up below ANWR every year in late-July through August.

Irrigation return flows from lands under Illinois River ditches return to the Illinois River and Big Grizzly Creek, including its major tributary, Buffalo Creek. Ditch-specific information related to Illinois River ditches includes the following:

- **Kerr Ditch** (4700710), located near the bottom of Rock Creek, a tributary to Willow Creek and the Illinois River, typically places a call throughout the summer.
- **Donelson Ditch** (4700591), located near the Kerr Ditch often places a call.

- **Shearer Ditch** (4700873), located near the top of Rock Creek below the Darcy Ditch. This diversion is typically called out by the Kerr Ditch but has placed calls infrequently.
- **Darcy Ditch** (4700586), located at the top of the Rock Creek tributary, diverts water out of the basin to Lost Creek, a tributary of Big Grizzly Creek. This diversion occurs infrequently since it is junior to the Kerr Ditch but, when it does divert, the inter-basin diversions are picked up by the Lost Ditch (4700737).
- For modeling purposes, the Kerr Ditch, Donelson Ditch, Shearer Ditch, and the Darcy Ditch should be excluded and their small amount of diversions (less than 1,500 ac-ft/yr) left in the downstream gages.
- A number of key ditches were identified on upper Willow Creek above the Howard Ditch headgate (4700672). For modeling purposes, these ditches (Cochrane Ditch-4700J W Sutton Ditch-4700705, Big Willow Ditch-4700513, Hanover Ditch-4700646, Peabody Ditch-4700826, and Salem Ditch-4700863) could be operated together.
- A number of key ditches were identified on Jack Creek and the Illinois River above the Illinois River at Rand gage. For modeling purposes, these ditches (John S Sutton Ditch-4700702, Garland Ditch-4700628, and Stella Ditch-4700899) could be operated together.
- **Howard Ditch** (4700672), located on Willow Creek and the **MacFarlane Extension Ditch** (4700745), located on the Illinois River upstream of the Willow Creek confluence, are used to irrigate two ranches above MacFarlane Reservoir (Illinois Ranch, owned by Dick McCloud and the Howard Ranch, owned by the Howard family) in addition to the use of the ditches to convey water to MacFarlane Reservoir via the Howard Ditch. Irrigation operations at the two ranches are essentially the same and could be considered as a single system for modeling purposes. Diversions under the two ditch systems are operated according to the relative priorities under the ditches:
 - 1) First 33 cfs of available flow from the ditch priorities is used for irrigation at the Illinois Ranch and Howard Ranch from the following water rights:
 - Senior 20 cfs in Howard Ditch (8 cfs-1888 appropriation date and 12 cfs-1892 appropriation date)
 - Senior 13 cfs in MacFarlane Extension Ditch (1901 appropriation date)
 - 2) Remaining water available under the two ditches' priorities go to storage or irrigation below the reservoir.

Total river diversions to storage into MacFarlane Reservoir are recorded under the Howard D MacFarlane Acct structure (4701198).
- **MacFarlane Reservoir** (4703614, 6,833 ac-ft active storage capacity), is filled by the Howard Ditch (4700672). The MacFarlane Extension Ditch (4700745) diverts water and conveys it to Willow Creek for re-diversion into the Howard Ditch. The MacFarlane Reservoir storage capacity is owned equally by the U.S. Fish and Wildlife Service (USFWS) and Mr. Blaine Evans, a local irrigator.
 - Water stored under the original rights can only be used for irrigation. Water stored under the refill rights can be used for other purposes (e.g., to replace evaporation depletions in ponds).

- Storage releases are made down Soap Creek, which eventually discharges into Big Grizzly Creek, or into the MacFarlane Ditch, which irrigates lands toward the Buffalo Creek basin.
- USFWS uses its storage capacity as a supplemental supply for its direct flow water rights in the filler ditches for irrigation and releases to fill ponds in ANWR. There are about 80 ponds in ANWR with a total storage capacity between 800 ac-ft to 1,200 ac-ft but only about 4 of the ponds can physically receive water from MacFarlane Reservoir. The remaining ponds are filled via other ditches (see below). USFWS has a water court case pending to address pond evaporation depletions and water resources operations at ANWR.
- Mr. Blaine Evans uses his storage capacity as a supplemental supply for his direct flow water rights to irrigate lands below the reservoir. The other water rights used on the Evans Ranch include junior direct flow water rights in the Howard Ditch and MacFarlane Extension Ditch, and smaller ditches on Big Grizzly Creek (Castle Ditch-4700549, Homestead Ditch-4700671) and Buffalo Creek (New Ross Ditch-4700791).
- Return flows from all lands irrigated downstream of the Willow Creek confluence with the Illinois River return to the Illinois River.
- **Midland Ditch** (4700774) and **Pioneer Ditch** (4700835) are located on lower Willow Creek and the Illinois River below the Willow Creek confluence, respectively.
- For modeling purposes, these two ditches (Midland Ditch and Pioneer Ditch) could be operated together.
- **Everhard Baldwin Ditch** (4700615) typically places a call on the river for four weeks (June 15-July 15).
- **Hubbard Ditch No. 2** (4700674), is a long ditch that diverts water for irrigation and is used to store water in a number of ANWR ponds.
- A number of key ditches were identified on the Illinois River below the Everhard Baldwin Ditch and above the Illinois River near Walden stream gage. For modeling purposes, these ditches (Oklahoma Ditch No. 1-4700810, Oklahoma Ditch-4700809, Hubbard Ditch 2-4700674, Ward Ditch No. 1-4700942, and Boyce Brothers Ditch No. 1-4700524) could be operated together to model irrigation diversions and storage diversions below the calling right and above the gage.
- The Potter Creek sub-basin includes a portion of ANWR and its many ponds. Flows from Potter Creek reduce to about 1 cfs after the spring runoff but no water reaches the Illinois River. The Potter Creek confluence with the Illinois River is located above the Home Ditch No. 2 (4700670) headgate.
- **Home Ditch No. 2** (4700670) irrigates lands just north of Highway 14, west of the town of Walden. The Home Ditch No. 2 was enlarged during the construction of Walden Reservoir to facilitate its use as a feeder canal for Walden Reservoir. The ditch splits below Highway 14 (about 300 feet to 400 feet down ditch) with irrigation water conveyed to the north and storage water conveyed to Walden Reservoir.
- **Walden Reservoir** (4703627, ~5,600 ac-ft total capacity) is filled from the Illinois River via the Home Ditch No. 2 and from the Michigan River via an inter-basin transfer of water carried from the Old S C Ditch to the Home Ditch No. 2. The reservoir is owned by the Walden Reservoir Company and decreed for irrigation uses.

There are 300 total shares in the reservoir, which are used by CDOW (50 shares), the town of Walden (5 shares), and 5 ranches (Silver Spurs Ranches, King Ranch, Hackleman Ranch, Trick Ranch, and Willford Ranch). Sue operates the releases from Walden Reservoir. About 15% of the water owned by the ranches is used by exchange to supplement direct flow water rights in the following upper ditches:

- Queen Ditch (4700847)
- North Park Ditch No. 4 (4700802)
- North Park Ditch No. 5 (4700803)

The remaining storage water owned by the ranches is used directly to supplement direct flow water rights in the following lower ditches:

- Col Davis Ditch (4700567)
- North Park Ditch No. 7 (4700799)
- Buckeye Ditch (4700532)
- Seneca Ditch (4700868)
- Alma Ditch (4701008)
- Cumberland Ditch (4700577)
- Hiho Ditch (4700662)
- Kiwa Ditch (4700711)

Carlstrom Reservoir (4703599, ~613 ac-ft total capacity) is filled from the Illinois River via the Cumberland Ditch. The reservoir is operated to provide supplemental water supplies to the Cumberland Ditch. For modeling purposes, this reservoir should be aggregated with Walden Reservoir with a single account used to deliver water to lands under the Cumberland Ditch

- **Cowdrey Ditch** (4700574), located below the Alma Ditch is a very senior water right although not senior with respect to the two most senior Kiwa Ditch priorities. The Cowdrey Ditch is the only lower Michigan River ditch that does not receive Walden Reservoir storage water but typically receives sufficient return flows to preclude the need for it to place a call on the river.
- For modeling purposes, the river headgates on the Michigan River below the Illinois River confluence can be modeled as 2 structures – those ditches that receive storage water from Walden Reservoir (Col Davis Ditch, North Park Ditch No. 7, Buckeye Ditch, Seneca Ditch, Alma Ditch, Cumberland Ditch, Hiho Ditch, and Kiwa Ditch) and the Cowdrey Ditch, which does not receive storage water from Walden Reservoir.

Big Grizzly Creek and Little Grizzly Creek

Big Grizzly Creek and Little Grizzly Creek are located to the west of the Illinois River basin and come together to form the North Platte River. A number of small reservoirs are operated in these basins for supplemental irrigation supplies. Other than the inter-basin diversion listed below, very little return flows cross the boundary between the two upper basins. Ditch-specific information related to Big Grizzly Creek and Little Grizzly Creek ditches includes the following:

- **Moraine Ditch** (4700785), located at the top of Colorado Creek, a tributary to Big Grizzly Creek diverts water out of the basin to Doran Creek, a tributary of Little Grizzly Creek.
- For modeling purposes, the Moraine Ditch should be excluded and its small amount of diversions (approximately 600 ac-ft/yr) left in the downstream gages.
- A number of key ditches were identified on Big Grizzly Creek and its upper tributaries above the Mutual Ditch (4700786). For modeling purposes, these ditches (Lewis Ditch-4700723, Eureka Ditch-4700614, Arapahoe Ditch-4700500, Damfino Ditch-4700583, Surprise Ditch-4700913, Kopling Ditch-4700712, Pole Mountain Reservoir Feeder Ditch-4700838, Nine Six Nine Ditch-4700969, and Spicer Ditch-470890) could be operated together.
- **Forrest Ditch** (4700621), located on Big Grizzly Creek above the Mutual Ditch, historically placed a call once to keep an upstream junior water right from damming the river to divert the entire stream. A pipeline has since been installed to facilitate bypasses to the Forrest Ditch.
- For modeling purposes, the Forrest Ditch should be excluded and its small amount of diversions (approximately 340 ac-ft/yr) left in the downstream gages.
- **Addison Ditch** (4701001) is the sole key structure identified on Buffalo Creek, a tributary to Big Grizzly Creek.
- **Mutual Ditch** (4700786) carries water to the Mountain Meadow Ranch and carries water to lands irrigated under the Marr Ditch No. 2 (4700755) and lands irrigated under the Peterson Ditch No. 1 (4700829).
- Big Grizzly Ditch (4700786), located on Big Grizzly Creek above the confluence with Little Grizzly Creek is used for irrigation on the Mountain Meadow Ranch.
- A number of key ditches were identified on Newcomb Creek and Chedsey Creek, upper tributaries to Little Grizzly Creek. For modeling purposes, these ditches (Bennett and Leshure Ditch-4700508, Staples Ditch No. 2-4700896, Newcomb Ditch-4700792, Darby Ditch-4700584, and Staples Ditch No. 1-4700895) could be operated together.
- A number of key ditches were identified on Little Grizzly Creek above the confluence with Chedsey Creek. For modeling purposes, these ditches (Jennie Ditch-4700700, Chapman Ditch-4700552, Chedsey Ditch No. 2-4700554, Antelope Ditch-4701011, and Nairn Ditch-4700787) could be operated together.
- The Mountain Meadow Ranch, located on the east side of Little Grizzly Creek near the confluence with Big Grizzly Creek gets water from Little Grizzly Creek (Little Grizzly Ditch-4700728 and Buckeye Ditch-4700531) and Big Grizzly Creek (Mutual Ditch-4700786 and Big Grizzly Ditch-4700512).

Roaring Fork

Roaring Fork is located on the western side of North Park and is tributary to the North Platte River below the Nile Ditch (4700795) headgate, which is below the Big Grizzly Creek-Little Grizzly Creek confluence. Ditch-specific information related to Roaring Fork ditches includes the following:

- **Sunday Creek Ditch** (4700911), on the Roaring Fork, and the **Mitchell Ditch** (4700777), on Beaver Creek, a tributary to the Roaring Fork, are high-mountain diversions that place calls throughout the summer.

- A number of key ditches were identified on the upper Roaring Fork and its tributaries, including Beaver Creek and Norris Creek. For modeling purposes, these ditches (Moore Ditch No. 4-4700782, Alvin H Norell Ditch-4701009, Sunday Creek Ditch-4700911, Luckpenny Ditch-4700741, Mitchell Ditch-4700777, Open A Diamond Ditch-4700816, Roaring Ditch-4700857, Beaver Ditch-4700506, Manville Ditch No. 2-4700753, Mallon Ditch-4700747, and Mallon Ditch No. 2-4700748) could be operated together.
- **Wolfer Ditch** (4700961), located on the Roaring Fork above the confluence with the North Platte River, generally places a call throughout the summer.
- The Delaney Lakes are located to the north of Roaring Fork, on the east side of the Delaney Buttes. The lakes are natural lakes that have had minimal enlargements and are used by CDOW and for supplemental irrigation uses below the reservoirs.
 - **Laune Reservoir** (aka North Delaney Lake, 4703742, ~8,673 ac-ft capacity)
 - **Butte Reservoir** (aka South and East Delaney Lakes, 4703598, ~3,942 ac-ft capacity).

About half of the lands irrigated below the lakes are irrigated solely with storage releases and irrigation return flows. The other half of the lands are also irrigated with direct flow water rights (Wolfer Ditch, and others).

North Fork North Platte River, Lake Creek, and North Platte River Main Stem

The North Fork North Platte River traverses the west side of some mountain ridges, including Sheep Mountain, as it travels along the south side of Lake John and meets the North Platte River below the Roaring Fork confluence and above the Dam Ditch headgate (4700582). Ditches on the North Fork are generally water-long. Ditch-specific information related to ditches on the North Fork North Platte River, Lake Creek, and the North Platte River includes the following:

- A number of key ditches were identified on the upper North Fork North Platte River. For modeling purposes, these ditches (Pleasant Valley Ditch-4700837, Shafer Ditch-4700871, Little Nellie Ditch-4700730, Stormy Ditch-4700906, Mabel Dow Ditch-4700743, Haworth Ditch No. 2-4700658, Dry Run Ditch-4700596, Briggs Bohn Ditch-4700527, Boulder Ditch-4700522, Hillside Ditch-4700665, and Independent Ditch-4700684) could be operated together.
- **Legal Tender Ditch** (4700720), located on the south end of Sheep Mountain, diverts direct flow water by priority and exchanges from the downstream Lake John.
- **Lake John** (4703750, ~7,000 ac-ft capacity), located on the southeast end of Sheep Mountain, is owned primarily by CDOW with the top one foot (~560 ac-ft) used for supplemental irrigation in the Legal Tender Ditch, by exchange. Lake John can be filled from the North Fork North Platte River through the Legal Tender Ditch or from Lake Creek, which traverses the eastern side of the mountain ridges that include Sheep Mountain.
- **Lake Creek**, tributary to North Fork North Platte River
 - Lakes located along the east side of the mountain ridges to the north and east of Lake John in the Lake Creek drainage are primarily natural lakes and are not operational. Boettcher Lake is in the area and was apparently operated for supplemental irrigation purposes prior to its dam being breached sometime in the 1970s.

- **Hill Ditch No. 1** (4700663) and **Hill Ditch No. 2** (4700664), located above Boettcher Lake are used along with supplies from South Fork Big Creek – Independence Ditch (4700683) diversions and releases from Big Creek Reservoir (4703595, ~1,414 ac-ft capacity) to irrigate lands on the Silver Spurs Ranches property in the Lake Creek basin. South Fork Big Creek flows into Wyoming. The top 3 feet to 4 feet of water in the main reservoir on South Fork Big Creek was enlarged by Silver Spurs Ranches and is used for supplemental irrigation purposes. The smaller reservoir on South Fork Big Creek, located above Big Creek Reservoir, typically remains full.
- **East Lynne Ditch** (4700605) is located on South Fork Big Creek below the Independence Ditch. Return flows from the ditch accrue to Big Creek on its way north towards Wyoming.
- **Rhea Ditch** (4700853) is the only key structure identified on Beaver Creek, a tributary to Big Creek.
- For modeling purposes, the lands irrigated on the Silver Spurs Ranch property served by Big Creek Reservoir, Independence Ditch, and Hill Ditch Nos. 1 and 2 could be operated together.
- **Victor Ditch** (4700932) and **West Fork Ditch** (4700951), located below Lake John and above the confluence with the North Platte River have historically placed calls on the North Fork North Platte River, although infrequently.
- For modeling purposes, the two lower calling rights on North Fork North Platte River (Victor Ditch and West Fork Ditch) could be operated together.
- North Platte River ditches located on the main stem are typically satisfied by return flows from upstream systems and do not place river calls.
- For modeling purposes, the key structures identified on the North Platte River main stem below the confluence with the North Fork North Platte River and above the confluence with the Michigan River (Dam Ditch-4700582, Dalom Ditch-4700581, Boone Ditch-4700519, and Mammoth Ditch-4700749) could be operated together.

Recommended Detailed Documentation

Additional technical memoranda are not recommended for individual ditch or reservoir systems beyond the information provided herein. Operation of diversion systems in North Park, with multiple owners in ditch priorities and multiple ditches serving each ranch, are the norm rather than the exception. Larger reservoirs operated within the basin are identified herein and included in Table 1. It is recommended that, using the information summarized in Table 1, a number of ranches and ditch systems in North Park be modeled as diversion systems to simulate the effects of river diversions and returns in the basin.

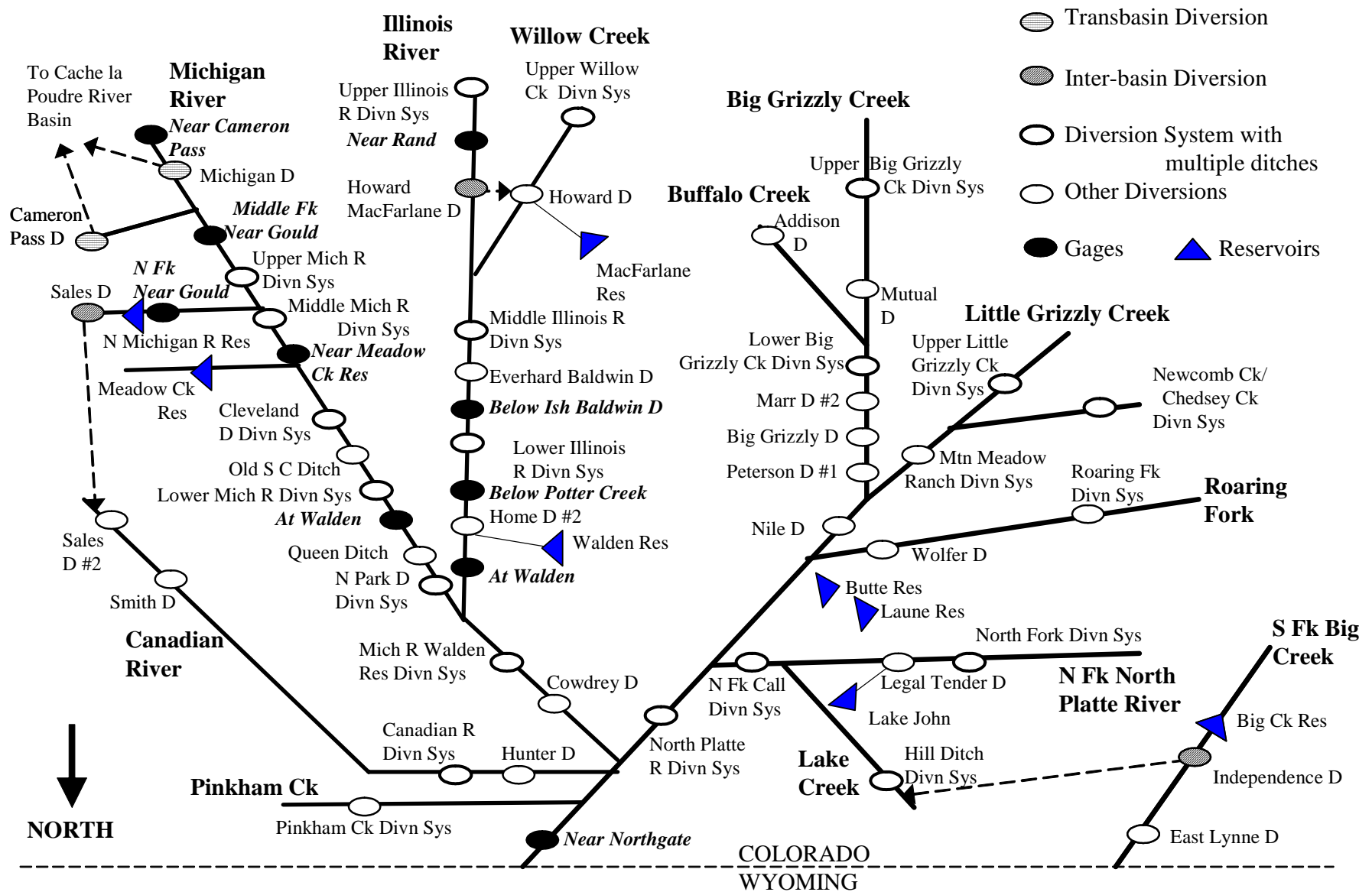
Comments and Concerns

- The structures listed in Table 1 include the 123 preliminary key structures and 22 structures identified by the Water Commissioners that are either calling water rights or are operated in tandem with some of the preliminary key structures.

- A number of structures included in Table 1 have historical diversions starting in the late-1960s, early-1970s, or other post-1950 start dates. Although the diversion records for these structures have not been exhaustively reviewed, the data reviewed for this effort indicate many structures have multiple years of data missing within the stated period of record. Division 6 personnel indicated they do not have any diversion data beyond what is available from HydroBase.
- The recommended location of diversion systems shown in Figure 1 is based on discussions during the meeting with Water Commissioners. The structures identified for each diversion system meet the water rights and annual diversion criteria initially defined for key structures. During modeling efforts, it is anticipated that additional structures may be added to these diversion systems based on location of irrigated acreage and diversion source.

Figure 1

Simplified Schematic of Proposed Modeling of North Platte River Basin (District 47) for SPDSS Effort



Note: South Fork Michigan River near Gould not displayed on figure since South Fork not displayed (key structures on South Fork aggregated with Middle Fork structures in Upper Mich R Divn Sys)

TABLE 1

| Structure | Total Decree | Diversion Period | Average Annual | | | | Key - DivSys= DivSys = Diversion System under downstream ID |
|-----------|-----------------------|---------------------|-------------------|--------------|-------------------------|---|---|
| ID | Name | (cfs) | Record | Divn (ac-ft) | Water Source | Comments | ID |
| 4700538 | CAMP CREEK DITCH | 20 | 1973 – 2003 | 374 | CAMP CREEK | | No |
| | | | | | | | |
| 4700793 | NEWPORT DITCH | 54.6 | 1954 - 2003 | 1,160 | PINKHAM CK | Key diversions used on Pinkham Creek Divn System | DivSys |
| 4700543 | CAPRON DITCH | 7.75 | 1949 - 2003 | 675 | PINKHAM CK | | Yes |
| | | | | | | | |
| 4700996 | SALES DITCH NO 2 | 5 | 1971 - 1999 | 483.7 | SOUTH FK of CANADIAN R | | Yes |
| 4700884 | SMITH DITCH | 21.3 | 1953 - 2003 | 982 | SOUTH FK of CANADIAN R | | Yes |
| 4700563 | COE DITCH NO. 1 | 8 | 1971 - 2003 | 2307 | GOVERNMENT CK | | No |
| 4700564 | COE DITCH NO. 2 | 7 | 1971 - 2003 | 290 | GOVERNMENT CK | | No |
| 4700515 | BONA FIDE DITCH | 10 | 1954 - 2003 | 1,394 | CANADIAN RIVER | Key diversions on Canadian Creek used on Canadian River Divn System | DivSys |
| 4700840 | POMROY DITCH 1 | 50.7 | 1954 - 2003 | 2,535 | CANADIAN RIVER | | DivSys |
| 4700768 | MEDICINE BOW DITCH | 33 | 1954 - 2003 | 2,436 | CANADIAN RIVER | | DivSys |
| 4700866 | SAND CREEK DITCH | 18.1 | 1954 - 2003 | 943 | CANADIAN RIVER | | DivSys |
| 4700601 | DWINELL DITCH | 40 | 1962 - 2003 | 2,716 | CANADIAN RIVER | | DivSys |
| 4700905 | STILLWATER DITCH | 27.3 | 1970 - 2003 | 1,456 | CANADIAN RIVER | | DivSys |
| 4700865 | SANBORN DITCH | 45 | 1970 - 2003 | 1,935 | CANADIAN RIVER | | DivSys |
| 4700790 | NEW PIONEER DITCH | 50.1 | 1971 - 2003 | 2,360 | CANADIAN RIVER | | Yes |
| 4700679 | HUNTER DITCH | 65.16 | 1971 - 2003 | 2,611 | CANADIAN RIVER | | Yes |
| | | | | | | | |
| 4704603 | MICHIGAN DITCH | 183.3 | 1986 - 2003 | 4,198 | MICHIGAN RIVER | Transbasin diversion | Yes |
| 4704602 | CAMERON PASS DITCH | 28 | 1986 - 2003 | 103.8 | MIDDLE FK of MICHIGAN R | Transbasin diversion | Yes |
| 4700738 | LOST TREASURE DITCH | 55 | 1949 - 2003 | 5,704 | SOUTH FK of MICHIGAN R | Key diversions on South Fork Michigan River, Middle Fork Michigan River, and Owl Creek used on Upper Michigan River Divn System | DivSys |
| 4700740 | LOWLAND DITCH | 6 | 1971 - 2003 | 1,636 | OWL CK | | DivSys |
| 4700759 | MASON DITCH | 33 | 1953 - 2003 | 1,148 | SOUTH FK of MICHIGAN R | | DivSys |
| 4700530 | BROCKER ENDOMILE | 15.6 | 1971 - 2003 | 801 | OWL CK | | DivSys |
| 4700820 | OWL DITCH | 0 | 1971 - 2003 | 1,906 | OWL CK | | DivSys |
| 4700819 | OVERLAND DITCH | 108.32 | 1952 - 2003 | 3,352 | SOUTH FK of MICHIGAN R | | DivSys |
| 4700845 | POVERTY FLAT D NO 1 | 42 | 1953 - 2003 | 1,669 | MICHIGAN RIVER | | DivSys |
| 4700844 | POVERTY FLAT D NO 2 | 53 | 1952 - 2003 | 1,509 | SOUTH FK of MICHIGAN R | | Yes |
| 4700864 | SALES DITCH | 22.4 | 1971 -1998 | 2,119 | NORTH FK of MICHIGAN R | Carrier ditch to S Fk Canadian River | Yes |
| 4703753 | NORTH MICHIGAN CK RES | 1,250 af | | | NORTH FK of MICHIGAN R | | Yes |
| 4700893 | SQUIBOB DITCH | 106.5 | 1953 - 2003 | 3,566 | MICHIGAN RIVER | Key diversions used on Middle Michigan River Divn System | DivSys |
| 4700773 | MICHIGAN HIGHLINE | 27.5 | 1952 - 2003 | 3,366 | MICHIGAN RIVER | | Yes |

TABLE 1

| Structure | | Total Decree | Diversion Period | Average Annual | Key - DivSys= DivSys = Diversion System under downstream ID | | |
|-----------|----------------------------|-----------------------------------|---------------------|-------------------|---|---|--------|
| ID | Name | (cfs) | Record | Divn (ac-ft) | Water Source | Comments | ID |
| | DITCH | | | | | | |
| 4704335 | MEADOW CREEK RES | 6,179 af | | | MEADOW CK | | Yes |
| 4700521 | BOSTWICK DITCH | 82.5 | 1952 - 2003 | 4,427 | MICHIGAN RIVER | Key diversions on Michigan River used on Cleveland Ditch Divn System | DivSys |
| 4700560 | CLEVELAND D KIMMONS EXT | 5 cfs - 4 cfs Alt Pt to 559 | 1969 - 2003 | 1,603 | KIMMONS DRAW | | DivSys |
| 4700558 | CLEVELAND D OWL CK EXT | 5 cfs - 4 cfs Alt Pt to 559 | 1973 - 2003 | 1,445 | OWL CK | | DivSys |
| 4700559 | CLEVELAND DITCH | 53.41 | '1952 – '2003 | 2,039 | MICHIGAN RIVER | | Yes |
| | | | | | | | |
| 4700813 | OLD S C DITCH | 57.4 | '1952 – '2003 | 2,647 | MICHIGAN RIVER | Used for irrigation and carrier ditch to Illinois River for Walden Reservoir | Yes |
| 4700578 | CURTIN DITCH | 53 | '1952 – '2003 | 3,949 | MICHIGAN RIVER | Key diversions used on Lower Michigan River Divn System | DivSys |
| 4700760 | MATHEWS DITCH | 18 | '1952 – '2003 | 1,637 | MICHIGAN RIVER | | DivSys |
| 4700939 | WALES DITCH | 20 | '1952 – '2003 | 1,594 | MICHIGAN RIVER | | DivSys |
| 4700595 | DRY CREEK DITCH | 47.49 | '1952 – '2003 | 1,739 | MICHIGAN RIVER | | DivSys |
| 4700859 | RUCTION DITCH | 20 | '1952 – '2003 | 1,454 | MICHIGAN RIVER | | Yes |
| 4701083 | WALDEN MICHIGAN R DIV | 2.25 | '1975 – '2003 | 82.6 | MICHIGAN RIVER | Town of Walden supplemental divn Town of Walden municipal supply Town of Walden municipal supply | DivSys |
| 4705000 | WALDEN WELL NO 1 SOUTH | 0.557 | '1975 – '2003 | 82.3 | MICHIGAN RIVER | | DivSys |
| 4705001 | WALDEN WELL NO 2 MDLE | 1.11 | '1975 – '2003 | 104.3 | MICHIGAN RIVER | | Yes |
| 4700847 | QUEEN DITCH | 22.8 | '1938 – '2003 | 1,437 | MICHIGAN RIVER | | Yes |
| 4700802 | NORTH PARK DITCH NO 4 | 24 | '1938 – '2003 | 1,033 | MICHIGAN RIVER | Key diversions on Michigan River used on North Park Ditch Divn System | DivSys |
| 4700803 | NORTH PARK DITCH NO 5 | 35 | '1938 – '2003 | 1,265 | MICHIGAN RIVER | | Yes |
| | | | | | | | |
| 4700586 | DARCY DITCH | 43.38 | '1950 – '2003 | 317.1 | LIL WILLOW AKA ROCK CK | Carrier to Lost Ck infreq. Operated | No |
| 4700873 | SHEARER DITCH | 12 | '1971 – '2003 | 566 | LIL WILLOW AKA ROCK CK | | No |
| 4700710 | KERR DITCH | 13.5 | '1971 – '2003 | 325.3 | LIL WILLOW AKA ROCK CK | | No |
| 4700591 | DONELSON DITCH | 5 | '1971 – '2003 | 687 | LIL WILLOW AKA ROCK CK | | No |
| | | | | | | | |
| 4700705 | J W SUTTON DITCH | 32 | '1953 – '2003 | 1,160 | EAST FK of BIG WILLOW CK | | DivSys |
| 4700513 | BIG WILLOW DITCH | 37 | '1953 – '2003 | 1,917 | BIG WILLOW CK | | DivSys |

TABLE 1

| Structure | | Total Decree | Diversion Period | Average Annual | | | Key - DivSys= DivSys = Diversion System under downstream ID |
|-----------|--------------------------------|-----------------|---------------------|-------------------|----------------|--|---|
| ID | Name | (cfs) | Record | Divn (ac-ft) | Water Source | Comments | ID |
| 4700646 | HANOVER DITCH | 26 | '1972 – '2003 | 1,443 | BIG WILLOW CK | Key diversions used on Upper Willow Creek Divn System | DivSys |
| 4700826 | PEABODY DITCH | 46.9 | '1949 – '2003 | 1,979 | BIG WILLOW CK | | DivSys |
| 4700863 | SALEM DITCH | 46.8 | '1954 – '2003 | 1,550 | BIG WILLOW CK | | Yes |
| 4700702 | JOHN S SUTTON DITCH | 30 | '1949 – '2003 | 1,388 | JACK CK | Key diversions used on Upper Illinois Creek Divn System | DivSys |
| 4700628 | GARLAND DITCH – AKA NO 1 DITCH | 0 | '1968 – '1977 | 2,088 | JACK CK | | DivSys |
| 4700699 | JAY DITCH | | | | | | |
| 4700899 | STELLA DITCH | 24.3 | '1949 – '2003 | 1,087 | ILLINOIS RIVER | | Yes |
| 4700672 | HOWARD DITCH | 106 | '1950 – '2003 | 3,982 | BIG WILLOW CK | Key diversion for McFarlane Divn System . McFarlane Ext Ditch is a carrier ditch to Howard Ditch. | Yes |
| 4700745 | MACFARLANE EXT D | 53 | 1972 – 2003 | 1,821 | ILLINOIS RIVER | System carries water to MacFarlane Reservoir | DivSys |
| 4701198 | HOWARD D MACFARLANE ACCT | 0 | '1994 – '2003 | 4,048 | BIG WILLOW CK | | DivSys |
| 4703614 | MACFARLANE RES | 7,135 af | | | SOAP CK | | Yes |
| 4700774 | MIDLAND DITCH | 214.5 | '1952 – '2003 | 9,832 | ILLINOIS RIVER | Key diversions used on Middle Illinois River Divn System | DivSys |
| 4700835 | PIONEER DITCH | 20 | '1949 – '2003 | 1,074 | ILLINOIS RIVER | | Yes |
| 4700615 | EVERHARD BALDWIN DITCH | 35 | '1953 – '2003 | 2,786 | ILLINOIS RIVER | | Yes |
| 4700810 | OKLAHOMA DITCH NO 1 | 0 | '1953 – '1974 | 4,284 | ILLINOIS RIVER | Key diversions used on Lower Illinois Creek Divn System | DivSys |
| 4700809 | OKLAHOMA DITCH | 61 | '1950 – '2003 | 1,888 | ILLINOIS RIVER | | DivSys |
| 4700674 | HUBBARD DITCH 2 | 103 | '1953 – '2003 | 4,180 | ILLINOIS RIVER | | DivSys |
| 4700942 | WARD DITCH 1 | 19 | '1950 – '2003 | 1,982 | ILLINOIS RIVER | | DivSys |
| 4700524 | BOYCE BROS DITCH NO 1 | 29.75 | '1954 – '2003 | 1,571 | ILLINOIS RIVER | | Yes |
| 4700670 | HOME DITCH NO 2 | 4 | '1953 – '2003 | 505.1 | ILLINOIS RIVER | Used for irrig.. & carrier to Walden Res | Yes |
| 4703599 | CARLSTROM RESERVOIR | 613 af | | | MICHIGAN RIVER | Filled via Cumberland Ditch | No |
| 4703627 | WALDEN RESERVOIR | 8,211 af | | | ILLINOIS RIVER | | Yes |
| | | | | | | | |
| 4700567 | COL DAVIS DITCH | 23.2 | '1938 – '2003 | 1,368 | MICHIGAN RIVER | Key diversions on Michigan River used on Michigan River Walden Reservoir Divn System | DivSys |
| 4700799 | NORTH PARK DITCH NO 7 | 15.6 | '1938 – '2003 | 1,067 | MICHIGAN RIVER | | DivSys |
| 4700577 | CUMBERLAND DITCH | 71 | '1938 – '2003 | 5,556 | MICHIGAN RIVER | | DivSys |
| 4701022 | BUCKEYE DITCH | 20 | '1938 – '2003 | 1,434 | MICHIGAN RIVER | Cumberland Ditch also used as carrier ditch to Carlstrom Reservoir | DivSys |
| 4700868 | SENECA DITCH | 73 | '1938 – '2003 | 4,915 | MICHIGAN RIVER | | DivSys |
| 4701008 | ALMA DITCH | 15 | '1938 – '2003 | 432.3 | MICHIGAN RIVER | | DivSys |
| 4700662 | HIHO DITCH | 48 | '1938 – '2003 | 1,989 | MICHIGAN RIVER | | DivSys |
| | | | | | | | |

TABLE 1

| Structure | | Total Decree | Diversion Period | Average Annual | | | Key - DivSys= DivSys = Diversion System under downstream ID |
|-----------|-----------------------|-----------------|---------------------|-------------------|-------------------|---|---|
| ID | Name | (cfs) | Record | Divn (ac-ft) | Water Source | Comments | ID |
| 4700711 | KIWA DITCH | 50 | '1938 – '2003 | 3,141 | MICHIGAN RIVER | | Yes |
| 4700574 | COWDREY DITCH | 19 | '1938 – '2003 | 820.6 | MICHIGAN RIVER | | Yes |
| | | | | | | | |
| 4700785 | MORAIN DITCH | 16 | '1968 – '2003 | 631.4 | COLORADO CK | Carrier ditch to Doran Creek | No |
| 4700723 | LEWIS DITCH | 80 | '1957 – '2003 | 2,386 | COLORADO CK | Key diversions used on Upper Big Grizzly Creek Divn System | DivSys |
| 4701024 | COCHRANE DITCH | 30 | '1972 – '2003 | 2,319 | NINEGAR CREEK | | DivSys |
| 4700614 | EUREKA DITCH | 70 | 1952 - 2003 | 4,545 | ARAPAHOE CK | | DivSys |
| 4700500 | ARAPAHOE DITCH | 37 | 1949 - 2003 | 2,570 | ARAPAHOE CK | | DivSys |
| 4700583 | DAMFINO DITCH | 1.66 | 1958 - 2003 | 1,045 | BIG GRIZZLY CK | | DivSys |
| 4700913 | SURPRISE DITCH | 10 | 1971 -1975 | 1,111 | BIG GRIZZLY CK | | DivSys |
| 4700712 | KOPING DITCH | 6.5 | 1971 - 2002 | 1,214 | BIG GRIZZLY CK | | DivSys |
| 4700838 | POLE MTN RES FEEDER D | 45 | 1972 - 2003 | 529.3 | MEXICAN CK | | DivSys |
| 4700969 | NINE SIX NINE DITCH | 47.91 | 1958 - 2003 | 2,363 | BIG GRIZZLY CK | | DivSys |
| 4700890 | SPICER DITCH | 16 | 1958 - 2003 | 1,944 | BIG GRIZZLY CK | | Yes |
| 4700786 | MUTUAL DITCH | 150 | 1968 - 2003 | 11,313 | BIG GRIZZLY CK | | Yes |
| 4700621 | FORREST DITCH | 5.7 | 1971 - 2001 | 337 | BIG GRIZZLY CK | | No |
| 4701001 | ADDISON DITCH | 18 | 1949 - 2003 | 1,124 | BUFFALO CK | Key diversions used on Lower Big Grizzly Creek Divn System | DivSys |
| 4700791 | NEW ROSS DITCH | 14 | 1972 - 2003 | 775.2 | BUFFALO CK | | DivSys |
| 4700549 | CASTLE DITCH | 13.5 | 1970 - 2003 | 673.9 | BIG GRIZZLY CK | | DivSys |
| 4700671 | HOMESTEAD DITCH | 12.25 | 1970 - 2003 | 853.7 | BIG GRIZZLY CK | | Yes |
| 4700512 | BIG GRIZZLY DITCH | 50 | 1970 - 2003 | 4,279 | BIG GRIZZLY CK | Key diversion used on Mountain Meadow Ranch Divn System | DivSys |
| 4700755 | MARR DITCH 2 | 22 | 1968 - 2003 | 1,556 | BIG GRIZZLY CK | | Yes |
| 4700829 | PETERSON DITCH 1 | 9.5 | 1972 - 2003 | 911 | BIG GRIZZLY CK | | Yes |
| | | | | | | | |
| 4700508 | BENNETT & LESHURE D | 25.11 | 1952 - 2003 | 1,792 | NEWCOMB CK | Key diversions used on Newcomb Creek/Chedsey Creek Divn System | DivSys |
| 4700896 | STAPLES DITCH NO 2 | 61.5 | 1949 - 2003 | 2,569 | NEWCOMB CK | | DivSys |
| 4700792 | NEWCOMB DITCH | 15 | 1968 - 2003 | 1,211 | NEWCOMB CK | | DivSys |
| 4700584 | DARBY DITCH | 103.9 | 1949 - 2003 | 6,956 | CHEDSEY CK | | DivSys |
| 4700895 | STAPLES DITCH 1 | 100 | 1949 - 2003 | 5,686 | CHEDSEY CK | | Yes |
| 4700700 | JENNIE DITCH | 17 | 1958 - 2003 | 1,794 | LITTLE GRIZZLY CK | Key diversions used on Upper Little Grizzly Creek Divn System | DivSys |
| 4700552 | CHAPMAN DITCH | 31 | 1958 - 2003 | 3,064 | LITTLE GRIZZLY CK | | DivSys |
| 4700554 | CHEDSEY DITCH 2 | 29.5 | 1958 - 2003 | 1,521 | LITTLE GRIZZLY CK | | DivSys |
| 4701011 | ANTELOPE DITCH | 39 | 1969 - 2003 | 2,293 | LITTLE GRIZZLY CK | | DivSys |

TABLE 1

| Structure | Total Decree | Diversion Period | Average Annual | | | | Key - DivSys= DivSys = Diversion System under downstream ID |
|-----------|-----------------------|---------------------|-------------------|--------------|-------------------------|---|---|
| ID | Name | (cfs) | Record | Divn (ac-ft) | Water Source | Comments | ID |
| 4700787 | NAIRN DITCH | 34.5 | 1968 - 2003 | 2,730 | LITTLE GRIZZLY CK | | Yes |
| 4700531 | BUCKEYE DITCH | 21.33 | 1952 - 2003 | 1,335 | LITTLE GRIZZLY CK | Key diversions used on Mountain Meadow Ranch Divn System | Yes |
| 4700728 | LITTLE GRIZZLY DITCH | 25 | 1972 - 2003 | 1,406 | LITTLE GRIZZLY CK | | DivSys |
| | | | | | | | |
| 4700795 | NILE DITCH | 17 | 1972 - 2003 | 986 | NORTH PLATTE RIVER | | Yes |
| | | | | | | | |
| 4700782 | MOORE DITCH NO 4 | 0 | 1973 - 1976 | 1,318 | ROARING FORK | Key diversions used on Roaring Fork Divn System | DivSys |
| 4701009 | ALVIN H NORELL DITCH | 19.5 | 1972 - 2003 | 2,262 | ROARING FORK | | DivSys |
| 4700911 | SUNDAY CREEK DITCH | 23.4 | 1954 - 2003 | 1,976 | ROARING FORK | | DivSys |
| 4700741 | LUCKPENNY DITCH | 21 | 1957 - 2003 | 1,842 | BEAVER CK of ROARING FK | | DivSys |
| 4700777 | MITCHELL DITCH | 31.75 | 1953 - 2003 | 2,822 | BEAVER CK of ROARING FK | | DivSys |
| 4700816 | OPEN A DIAMOND DITCH | 40 | 1952 - 2003 | 1,838 | NORRIS CK | | DivSys |
| 4700857 | ROARING DITCH | 38.25 | 1952 - 2003 | 2,613 | NORRIS CK | | DivSys |
| 4700506 | BEAVER DITCH | 14 | 1953 - 2003 | 1,463 | NORRIS CK | | DivSys |
| 4700753 | MANVILLE DITCH NO 2 | 71.25 | 1969 - 2003 | 3,269 | SOUTH FK of BEAVER CK | | DivSys |
| 4700747 | MALLON DITCH | 37.5 | 1952 - 2003 | 1,433 | ROARING FORK | | DivSys |
| 4700748 | MALLON DITCH NO 2 | 80 | 1954 - 2003 | 6,198 | ROARING FORK | | Yes |
| 4700961 | WOLFER DITCH | 218.5 | 1952 - 2003 | 14,065 | ROARING FORK | | Yes |
| | | | | | | | |
| 4703598 | BUTTE RES | 3,942 af | | | TRIBUTARIES | aka South & East Delaney Lakes | Yes |
| 4703742 | LAUNE RESERVOIR | 8,673 af | | | TRIBUTARIES | aka North Delaney Lake | Yes |
| | | | | | | | |
| 4700837 | PLEASANT VALLEY DITCH | 36 | 1972 - 2003 | 1,379 | NORTH FORK | Key diversions on North Fork North Platte River used on North Fork Divn System | DivSys |
| 4700871 | SHAFFER DITCH | 48 | 1969 - 2003 | 1,197 | SHAFFER CK | | DivSys |
| 4700730 | LITTLE NELLIE DITCH | 89.16 | 1969 - 2003 | 5,424 | NORTH FORK | | DivSys |
| 4700906 | STORMY DITCH | 22 | 1969 - 2003 | 1,355 | BLUE LAKE AKA HILL CR | | DivSys |
| 4700743 | MABEL DOW DITCH | 34 | 1969 - 2003 | 1,370 | UTE CK | | DivSys |
| 4700658 | HAWORTH DITCH 2 | 0 | 1970 - 1976 | 1,104 | BEAR CK | | DivSys |
| 4700596 | DRY RUN DITCH | 22.8 | 1970 - 2003 | 1,672 | BEAR CK | | DivSys |
| 4700527 | BRIGGS BOHN DITCH | 44 | 1952 - 2003 | 4,259 | NORTH FORK | | DivSys |
| 4700522 | BOULDER DITCH | 20 | 1949 - 2003 | 1,691 | LONE PINE CK | | DivSys |
| 4700665 | HILLSIDE DITCH | 75 | 1949 - 2003 | 4,005 | LONE PINE CK | | DivSys |
| 4700684 | INDEPENDENT DITCH | 113.05 | 1953 - 2003 | 5,216 | NORTH FORK | | Yes |
| 4700720 | LEGAL TENDER DITCH | 64 | 1953 - 2003 | 4,583 | NORTH FORK | Used for irrig. & carrier to Lake John | Yes |

TABLE 1

| Structure | Total Decree | Diversion Period | Average Annual | | | | Key - DivSys= DivSys = Diversion System under downstream ID |
|-----------|---------------------|---------------------|-------------------|--------------|---------------------|--|---|
| ID | Name | (cfs) | Record | Divn (ac-ft) | Water Source | Comments | ID |
| 4700663 | HILL DITCH NO 1 | 20 | 1972 - 2003 | 1,670 | LAKE-SCRIBNER CK | Key diversions on Lake Creek used on Lake Fork Divn System | DivSys |
| 4700664 | HILL DITCH NO 2 | 18 | 1972 - 2003 | 1,146 | LAKE-SCRIBNER CK | | Yes |
| 4703750 | LAKE JOHN | 7,092 af | | | LAKE CK | | Yes |
| 4703595 | BIG CREEK RESERVOIR | 6,900 af | | | SOUTH FK of BIG CK | Key structures on South Fk Big Creek used on Lake Fork Divn System | Yes |
| 4700683 | INDEPENDENCE DITCH | 95 | 1972 - 2003 | 3,247 | SOUTH FK of BIG CK | | DivSys |
| 4700605 | EAST LYNNE DITCH | 20 | 1970 - 2003 | 1,359 | SOUTH FK of BIG CK | | Yes |
| 4700853 | RHEA DITCH | 20 | 1969 - 2003 | 1,381 | BEAVER CK of BIG CK | | Yes |
| | | | | | | | |
| 4700932 | VICTOR DITCH | 61.4 | 1952 - 2003 | 4,966 | NORTH FORK | Key diversions used on North Fork Calls Divn System | DivSys |
| 4700951 | WEST FORK DITCH | 32.1 | 1952 - 2003 | 2,876 | NORTH FORK | | Yes |
| | | | | | | | |
| 4700582 | DAM DITCH | 33.5 | 1972 - 2003 | 2,172 | NORTH PLATTE RIVER | Key diversions used on North Platte Divn System | DivSys |
| 4700581 | DALOM DITCH | 28 | 1970 - 2003 | 1,071 | NORTH PLATTE RIVER | | DivSys |
| 4700519 | BOONE DITCH | 19 | 1970 - 2003 | 1,071 | NORTH PLATTE RIVER | | DivSys |
| 4700749 | MAMMOUTH DITCH | 14.8 | 1971 - 2003 | 1,470 | NORTH PLATTE RIVER | | Yes |