DESCRIPTION OF THE COLORADO-BIG THOMPSON PROJECT

The Colorado-Big Thompson Project is one of the largest and most complex natural resource developments undertaken by the Bureau of Reclamation. It consists of over 100 structures integrated into a trans-mountain water diversion system through which multiple benefits are provided.

The Project spreads over approximately 250 miles in the State of Colorado. It stores, regulates, and diverts water from the Colorado River west of the Rocky Mountains, providing supplemental water for irrigation of 720,000 acres of land east of the Rocky Mountains. It also provides water for municipal use, industrial use, hydroelectric power, and water-oriented recreation.

Major features of the Project include dams, dikes, reservoirs, powerplants, pumping plants, pipelines, tunnels, transmission lines, substations, and other associated structures (Table 1, Exhibits 1 and 2).

Historically, the Project has diverted approximately 230,000 acre-feet of water annually (310,000 acre-feet maximum) from the Colorado River headwaters on the western slope to the South Platte River Basin on the eastern slope, for distribution to project lands and communities. The Northern Colorado Water Conservancy District apportions the water used for irrigation to more than 120 ditches and 60 reservoirs. Twenty-nine communities receive municipal and industrial water from the Project. The Western Division of the Pick-Sloan Missouri Basin Program markets the electric power produced at the six powerplants.

The western slope collection system captures runoff from the high mountains and stores, regulates, and conveys the water to Adams Tunnel for diversion to the East Slope under the Continental Divide.

To ensure irrigation and power generation under prior rights on the Colorado River, Green Mountain Reservoir was constructed on the Blue River. Spring runoff is stored in this reservoir and later released to meet the requirements of the senior water rights holders downstream along the Colorado River and to allow East Slope diversion of water by the Project throughout the year.

Pursuant to authorities in Senate Document 80, (which authorized the C-BT), and the 1984 Green Mountain Operating Policy and the agreements in the September 1996 Stipulation and Agreement of the Orchard Mesa Check Case settlement (Case No. 91CW247, Colorado Water Div. 5), the content of the Historic Users Pool (HUP) in Green Mountain Reservoir is evaluated during the summer to determine the availability of water surplus to historic beneficiaries needs. If it is determined that surplus water is available, it may be delivered based upon need, first to the federal Grand Valley powerplant and then to other uses based on a priority system or on specific agreements.

Irrigation systems on the Colorado River, above the Blue River confluence, were improved to enable continued use of existing rights. Releases are made from Lake Granby to maintain the Colorado River as a live fishing stream.

The C-BTs principal storage facilities on the West Slope are Lake Granby, Grand Lake, and Shadow Mountain Reservoir located on the Colorado River near Granby, and Willow Creek Reservoir located on Willow Creek, a tributary to the Colorado River below Lake Granby. Willow Creek Pumping Plant lifts the water 175 feet. It then flows by gravity via the Willow Creek Feeder Canal down to Lake Granby.

Granby Pumping Plant lifts the water 99 feet from Lake Granby to Granby Pump Canal. The canal conveys the water 1.8 miles to Shadow Mountain Lake. which also intercepts North Fork flows of the Colorado River. Shadow Mountain Lake connects with Grand Lake to make a single body of water from which diversions flow to Adams Tunnel to begin the journey to the eastern slope.

Emerging from Adams Tunnel into the East Portal Reservoir. the water flows across Aspen Creek Valley in a siphon and then under Rams Horn Mountain through a tunnel. At this point, it enters a steel penstock and falls 205 feet to Marys Lake Powerplant. This powerplant is located on the west shore of Marys Lake, which provides afterbay and forebay capacity for re-regulating the flow. The water is conveyed between Marys Lake and Estes PowerPlant, on the shore of Lake Estes, through Prospect Mountain Conduit and Prospect Mountain Tunnel.

Lake Estes, which serves as an afterbay for the Estes Powerplant, is formed by Olympus Dam. The storage in Lake Estes and the forebay storage in Marys Lake enable the Estes Powerplant to meet daily variations in energy demand.

Water from Lake Estes and the Big Thompson River flows are conveyed by Olympus Siphon and Tunnel, and Pole Hill Tunnel and Canal, to a penstock through which the water drops 815 feet to Pole Hill PowerPlant. The flow is then routed through Pole Hill PowerPlant Afterbay, Rattlesnake Tunnel, Pinewood Lake, and Bald Mountain Pressure Tunnel, and eventually dropped 1,055 feet through two penstocks to Flatiron PowerPlant. This powerplant discharges into Flatiron Reservoir, which regulates the water for release to the foothills storage and distribution system. The afterbay storage in Flatiron Reservoir and the forebay storage in Pinewood Lake enable Flatiron PowerPlant to meet daily power loads.

Southward, the Flatiron reversible pump/turbine lifts water from Flatiron Reservoir, a maximum of 297 feet, and delivers it through Carter Lake Pressure Conduit and Tunnel to Carter Lake. When the flow is reversed, the unit acts as a turbine-generator and produces electrical energy.

The St. Vrain Supply Canal delivers water from Carter Lake to the Little Thompson River, St. Vrain Creek, and Boulder Creek Supply Canal. The latter delivers water to Boulder Creek and Boulder Reservoir. The South Platte Supply Canal, diverting from Boulder Creek, delivers water to the South Platte River.

Northward, the Charles Hansen Feeder Canal transports water from Flatiron Reservoir to the Big Thompson River and Horsetooth Reservoir. The canal crosses the Big Thompson River in a siphon above the river and highway. Water from the Big Thompson River can be diverted into the canal by Dille Diversion Dam and utilized for power generation at Big Thompson PowerPlant.

Project water deliveries and Big Thompson River water to be returned to the river are dropped through a chute from the feeder canal ahead of the siphon crossing, or are passed through the Big Thompson PowerPlant to convert the available head to electrical energy.

Horsetooth Reservoir is located west of Fort Collins between two hogback ridges, where Horsetooth Dam closes the gap at one end. Soldier, Dixon, and Spring Canyon Dams and Satanka Dike close the

remaining gaps. An outlet at Soldier Canyon Darn supplies water to the City of Fort Collins, three rural domestic water districts, Colorado State University, and the Dixon Feeder Canal for the irrigated area cut off from its original water supply by the reservoir. The principal outlet from Horsetooth Reservoir is through Horsetooth Dam into the Charles Hansen Supply Canal. This canal delivers water to a chute discharging into the Cache la Poudre River and to a siphon crossing the river to supply the Windsor Reservoir and Canal Company. A turnout from the Supply Canal supplies the City of Greeley municipal water works. Water is delivered to the river to replace, by exchange, water diverted upstream to the North Poudre Supply Canal, which conveys it to the North Poudre Irrigation Company System.

SUMMARY OF 2003 OPERATIONS

For at least the fourth consecutive year, relatively dry conditions prevailed over the Colorado-Big Thompson Project (C-BT) area during most of Water Year 2003. A series of winter storms during late February and March brought significant relief to the Colorado and the Big Thompson river basins, but they were not enough to bring the drought in the area to an end. Storage at most reservoirs recovered considerably after the dry calendar year of 2002. Snowpack totals during Water Year 2003 bounced back, resulting in runoff totals that were significantly higher than during Water Year 2002. Peak inflows in May and June brought some reservoir storages up to near capacity.

The runoff during May and June was sufficient to allow replacement of the ring seal gate at Green Mountain Reservoir penstock number I in July and August. The highest inflow into Green Mountain Reservoir was observed on June 1, 2003, a 24-hour average of 2,221 ft^3/s. In comparison, the previous year's highest observed inflow was 555 ft^3/s, also on June 1. In order to perform the work needed to replace the ring seal gates, the reservoir level had to reach the top of the radial gates. That allowed the water deliveries to continue uninterrupted while the work took place. Green Mountain reached its highest level on July 31, with a storage of 152,751 acre-feet.

During average weather years, peak monthly inflows at Dillon and Green Mountain reservoirs are observed in June. In Water Year 2003 the highest daily inflows for both reservoirs were experienced on June I^{s}', and the peak monthly-undepleted inflows were also observed in the month of June.

Lake Granby also experienced an increase in total runoff during the water year. The inflow for the Water Year 2003 was 310,900 acre-feet. In comparison, the 30-year average inflow is 252,930 acre-feet. The highest daily natural inflow was observed on May 30, 2003, a 24-hour average of 4,251 ft^3/s. In 2002, the highest natural inflow was only 1,234 ft^3/s. The reservoir content never reached the spillway crest during the Water Year, therefore, no spills were observed. By late July of 2003, Lake Granby had reached its highest water surface level for the year at 8259.89 feet above sea level. Transmountain diversions were reduced to satisfy only the immediate needs for water deliveries along the Charles Hansen Feeder Canal during the spring and summer months, therefore allowing Granby Reservoir to gain over 67 feet in water surface elevation.

The inflow into Willow Creek Reservoir was also substantially higher during the Water Year 2003 than the previous water year. The total inflow in Water Year 2002 was the lowest in reservoir history. Water Year 2003 inflow was 4 times higher than 2002, and the highest in 6 years at 61,300 acre-feet. The highest daily average inflow was reported on May 30 at 1,066 ft^3/s, compared to only 74 ft^3/s in 2002 and 409 ft^3/s in 2001.

Temperatures in general were relatively normal during the winter, both on the West Slope and the East Slope. Winter was never extremely cold, and spring temperatures began to warm up at a normal rate. The last days of the month of May the area experienced a heat-wave that caused runoff to increase dramatically. But aside from that heat-wave in May, summer temperatures were relatively mild compared to the previous year. Temperatures remained on the warm side throughout September and October.

Precipitation over the West Slope was intermittent during most of the Water Year. Summer showers

produced runoff on numerous occasions, bringing some drought relief to the area. Contrary to the previous year, the summer of 2003 did not experience a large number of forest fires due in part to substantially higher precipitation in the spring and summer months.

The East Slope experienced most of its precipitation during late February. March and April. A late winter storm in March produced record breaking snowfall along the Front Range, with many locations reporting close to or over 30 inches in a two-day period. The storm was produced by a weather system that pulled tremendous amounts of moisture from the Gulf of Mexico, which eventually collided with the high peaks of the Front Range. The system impacted the area for several days, but as the snow melted it produced significant runoff which helped to improve the severe drought conditions along the Front Range.

Native inflow into Lake Estes was significantly higher in 2003 than in 2002. The total annual inflow bounced back from a low of 42,800 acre-feet in 2002, the lowest in reservoir history, to 102,000 acre-feet in 2003. The highest release of native inflow out of Lake Estes during Water Year 2003 was 896 ft^3/s, recorded on May 30. The high releases of May 30 triggered a Response Level 1. Local officials were notified of possible higher-than-normal river levels fot the Big Thompson River through the canyon. The situation was managed successfully without any incidents.

The Poudre River also experienced substantially higher flows in 2003. Flows jumped from the lowest ever recorded in 2002 to the highest in 4 years and six times higher than 2002.

The quota declared in April by the Northern Colorado Water Conservancy District for Water Year 2003 was 30% (93,000 acre-feet) to be used for the allocation of C-BT water to allotment contract holders. As the year progressed, the quota was increased to 50%. As a result, the Alva B. Adams Tunnel (Adams Tunnel) diversions for the Water Year 2003 totaled only 175,300 acre-feet. That was 52,000 acre-feet less than the 30-year average.

Work on all the Horsetooth Reservoir dams was completed in September of 2003. Start of refill was delayed until November because of all the maintenance work taking place at many of the powerplants along the Foothills delivery system, including the Charles Hansen Feeder Canal.

The total seasonal water deliveries (November 2002-October 2003) were 121,140 acre-feet.

Total project generation for the Water Year 2003 was below average at 410.9 giga-watt-hours, or 65% of average.

PROJECT PLANNING AND CONTROL

The C-BT is operated to provide supplemental municipal and industrial water supply, irrigation water supplies, hydroelectric power production, flood control, recreation, fish and wildlife preservation, and other purposes. The project is operated for the purposes for which it was authorized and constructed.

The integrated operation of the C-BT is planned and coordinated by the Bureau of Reclamation, Water Scheduling and Control Group, Eastern Colorado Area Office in Loveland, Colorado. Staff at this office collects and analyzes information daily and makes the decisions necessary for successful operation of the C-BT. This continuous water management function involves coordination between the Northern Colorado Water Conservancy District, Upper Colorado and Great Plains Regions of Reclamation, the Department of Energy, and many other local, state, and Federal agencies.

Experience has proven that proper utilization of the available water resource in a multi-purpose project such as this can be achieved only through careful budgeting and management of the anticipated water supply. One end product of this budgeting and management process is an Annual Operating Plan (AOP).

The C-BT is operated on a water year basis (October I through September 30). The AOP is prepared in January of each year, following the plan's review and necessary public meetings. AOPs are prepared for reasonable maximum and reasonable minimum conditions of water supply and requirements as well as for the most probable runoff conditions. The C-BT is operated to optimize the most probable water supply without jeopardizing operational position should either the reasonable maximum or the reasonable minimum water supply conditions occur. The plan is reviewed and revised *as* necessary during the year as new information or changing conditions occur. Flexibility is a keynote and a necessity of the plan. Computer programs and models are used by Reclamation to develop the AOP's and water supply forecasts.

Green Mountain Reservoir

Green Mountain Reservoir and Powerplant, completed in 1943, are located south of the town of ICremmling, a few miles upstream of the confluence of the Blue River and the Colorado River in North Central Colorado. The reservoir, with a total capacity of 153,639 acre-feet, provides storage water releases for power production, replacement of out-of-priority depletions, and contract water deliveries.

The powerplant has two units with a total installed capacity of 26 megawatts. The spillway located on the left abutment is controlled by three 25 x 22 foot radial gates and is capable of discharging 25,000 ft^3/s.

Water Year 2003 began with optimism, with October and November precipitation in the Blue River basin being well-above average. However, December and January were very dry, resulting in the February 1 basin wide snowpack being just 84-percent of average. The following three months experienced above-average precipitation over the basin, which brought the snowpack up to 116-percent of average by May 1. The last two weeks of May brought well-above average temperatures to the basin, resulting in an extremely rapid snowpack melting rate. Combined with below-average May precipitation, this melt rate reduced the basin wide snowpack to just 38-percent of average by June 1.

The extremely dry conditions of water year 2002 resulted in very low carryover storage in the Blue River basin's reservoirs. The 2002 end-of-water-year content in both Dillon Reservoir and Green Mountain Reservoir were the lowest since the initial filling of those reservoirs. Dillon Reservoir's content on September 30, 2002 was just 152,668 acre-feet, approximately 76,000 acre-feet below the 30-year average for that date. Green Mountain Reservoir's content of 48,545 acre-feet on September 30, 2002 was approximately 75,000 acre-feet less than its 30-year average for that date.

With the winter releases, primarily for replacement of C-BT Project depletions, Green Mountain Reservoir's water surface elevation was drawn down to the minimum for the year at 7863.57 feet (35,934 acre-feet) on April 3. Green Mountain Reservoir's Water Year 2003 start-of-fill date was declared to be April 11, at which time the reservoirs content was 36,400 acre-feet, well below its start-of-fill target of 65,000 acre-feet.

The Blue River basin's above-average May 1 snowpack resulted in approximately 104-percent of average runoff for April through July. This near-normal runoff allowed Dillon Reservoir to fill to a near capacity 253,613 acre-feet by July 16. Due to the extremely low starting content of upstream reservoirs, depletions upstream of Green Mountain Reservoir were well-above normal during the April through July runoff period. For this reason, while the basin's runoff was near-normal, the total April through July inflow to Green Mountain Reservoir was just 143,500 acre-feet, approximately 64-percent of the 30-year average.

By maintaining releases at the minimum required 60 ft^3/s between April 11 and July 10, Green Mountain Reservoir was able to overcome the much-below average inflow and the extremely low

starting content and attain a Division 5 fill. The reservoir reached a maximum physical content for the year of 152,750 acre-feet on July 31. With the reservoir filling this year, the 52,000 acre-foot Colorado-Big Thompson Project replacement pool, the 5,000 acre-foot Silt Project pool, the 66,000 acre-foot HUP pool, and the 20,000 acre-foot contract pool were all available in 2003.

Releases to augment the water rights of HUP beneficiaries downstream of Green Mountain began on July 10, with a total of 8,499 acre-feet being released for that purpose between July 10 and October 31. With improved streamflow conditions and conservation efforts by the Grand Valley irrigators, only 780 acre-feet was released from the HUP to support the Cameo call this year. On August 27 the managing entities declared that HUP surplus was available. Surplus releases of 50 ft^3/s began theafternoon of August 27 to the Grand Valley power plant and then to the municipal recreational contract, and continued at that rate through September 9, when releases were terminated as a major storm system moved through the basin. As the effects of the storm subsided, HUP surplus releases resumed on September 17, initially at 100 ft^3/s and then significantly increased when the target flow at Palisade was increased to 1240 ft^3/s. By September 25, the HUP surplus releases exceeded 500 ft^3/s and remained above that level until October 31, when they were terminated for the year. HUP surplus releases totaled 47,526 acre-feet in 2003, with 21,199 acre-feet being released under the agreement for the Grand Valley Power Plant and 26,327 acre-feet being attributable to the Municipal/Recreation Contract. Together, the releases for HUP beneficiaries downstream of Green Mountain, the releases to support the Cameo call, and HUP surplus release totaled 56,805 acre-feet. In addition, there was 766 acre-feet of evaporation from the HUP resulting in an HUP balance of 8,428 acre-feet on October 31.

In 2002, landslide concerns at Heeney, Colorado resulted in maximum drawdown rate and minimum water surface elevation limitations on Green Mountain Reservoir. In 2003, the minimum water surface elevation limitation was eliminated and the maximum drawdown rate limitation was revised. The drawdown rate limitations were to be initiated when the reservoir's water surface elevation dropped below 7880.0 feet. With the reservoir filling in 2003, the water surface elevation remained above 7904.0 feet during the irrigation season, and therefore, the drawdown rate limitations were never triggered.

The total 2003 Water Year undepleted inflow at Green Mountain Reservoir was 400,400 acre-feet, slightly above the 30-year average of 395,600 acre-feet. Physical inflow to Green Mountain Reservoir peaked on May 31 at 2545 ft^3/s. Blue River, Dillon Reservoir, and Green Mountain Reservoir operations for Water Year 2003 are summarized in table 2. Gross generation at the Green Mountain PowerPlant totaled 18,100,000 kilowatt-hours for Water Year 2003, 31% of the 30-year average.

Willow Creek Reservoir

Completed in 1953, Willow Creek Reservoir has a total storage capacity of 10,600 acre-feet. The uncontrolled spillway, located at the left abutment, has a maximum flow capacity of 3,200 ft^3/s. The Willow Creek Feeder Canal also begins at the left abutment and it has a capacity of 400 ft^3/s. The canal is used transfer water to Granby Reservoir. Excess inflow into the reservoir is moved by way of the Willow Creek Feeder Canal and pumped to Lake Granby for storage.

Reservoir carryover storage coming into Water Year 2004 was 9,000 acre-feet, slightly higher than the 30-year average.

Inflow into Willow Creek Reservoir was below average during the winter months and early spring. The February 1, 2003 snow-water content for the Willow Creek Reservoir watershed was reported at only 91% of average. This resulted in an April-July most-probable-runoff forecast of only 38,000 acre-feet, which is 10,000 acre-feet below the average most-probable forecast. But, precipitation increased dramatically during March, and by April 1 the most-probable-runoff forecast for April-July jumped to 62,000 acre-feet. This forecast proved to be a very accurate one. But, by the middle of May runoff had increased significantly. Inflow into the reservoir was above the 30-year averages during May and June. Total inflow for the entire Water Year was 61,300 acre-feet, four times higher than the previous year. The 30-year average inflow for Willow Creek Reservoir is 59,910 acre-feet.

The peak daily inflow for the Water Year was reported on May 30, a 24-hour average of 1,066 ft^3/s. To illustrate the significance of such an increase in flow, by comparison, records from Water Year 2002 report a peak daily average inflow of 74 ft^3/s. Water Year 2002 was one of the driest on record for the area.

Pumping from Willow Creek to Granby Reservoir was also significantly higher during Water Year 2003 than the previous water year. Pumping operations took place mainly between the months of April to July, but there were also periods of pumping during August, September and October. The total volume moved from Willow Creek to Granby Reservoir was 40,923 acre-feet, significantly higher than the 30-year average volume of 27,650 acre-feet.

During the Water Year 2003, controlled releases to the river made out of Willow Creek Reservoir totaled 18,065 acre-feet. Most of those releases took place between May and July.

Granby Reservoir

Completed in 1950, Granby Reservoir on the upper Colorado River collects and stores most of the water supply for the C-BT. The reservoir stores the flow of the Colorado River as well as water pumped from Willow Creek Reservoir. The reservoir has a total storage capacity of 539,800 acre-feet. The spillway is located on the left abutment. Flows over the spillway are controlled by two radial gates, with a total release capacity of 11,500 ft^3/s. The Granby Pumping Plant has three units with a combined installed capacity of 600 ft^3/s.

Reservoir carryover storage into Water Year 2003 was 176,700 acre-feet, the lowest since Water Year 1950 and less than 50% of the 30-year average.

A total of 18.42 inches of precipitation was reported for the Lake Granby watershed for Water Year 2003. The average precipitation for the watershed is 17.35 inches. Total precipitation during the first few months of the water year was slightly higher than average, and the March I runoff forecast for April-July was estimated at 204,000 acre-feet, which was 8,000 acre-feet higher than the average. By April 1, the expectations were even higher, as relatively wet weather continued to dominate. The forecasted

runoff volume on April 1 for the period April-July increased to 230,000 acre-feet. At the end, those predictions proved to be short of the actual runoff for the period. The total inflow into Lake Granby for those months was estimated at 260,700 acre-feet, the highest since Water Year 1995 and over 50,000 acre-feet above the 30-year average. By the middle of July, the water surface level in the reservoir had increased over 67 feet. The highest inflow for the season was computed May 30, a 24-hour average of 5,478 ft^3/s. The reservoir's highest water surface level was reached on July 29, an elevation of 8259.86 feet, with a storage of 402,829 acre-feet.

Due to the dry condition that prevailed during the previous years over the area, Granby Reservoir never reached its maximum capacity during Water Year 2003. As was the case during water years 2001 and 2002, there was no water spilled from Lake Granby during Water Year 2003. Pumping from Windy Gap to Granby during Water Year 2003 took place between April and June and totaled 63,257 acre-feet.

Granby Reservoir ended the Water Year with 372,043 acre-feet in storage. This volume was 66,000 acre-feet below the 30-year average, but almost 200,000 acre-feet higher than the volume recorded on September 30, 2002.

Adams Tunnel

Flows through the Adams Tunnel were the lowest since 1999, totaling only 175,300 acre-feet. Most of the water diverted was directly delivered to users from the Hansen Feeder Canal and to Carter Reservoir. Storage space limitations caused by the construction work taking place at Horsetooth Reservoir, along with a low water quota for the year, residential watering restrictions across the state and a relatively wet spring on the East Slope were the determining factors for the relatively low flows through the tunnel. The highest flows through Adams Tunnel occurred during the winter months, as water was being pumped to Carter Lake. The total volume diverted through Adams Tunnel during Water Year 2003 was only 77% of the 30-year average.

Lake Estes

Completed in 1949, Lake Estes on the Big Thompson River provides regulating capacity for power generation purposes. The reservoir has a total capacity of 3,100 acre-feet. It captures the discharge of Estes PowerPlant and inflow coming from the Big Thompson River, regulates river flow below the dam, and releases of water to the Foothills Power System via Olympus Tunnel (550 ft^3/s capacity). The Estes PowerPlant has three hydroelectric units with a total installed capacity of 45 megawatts. The combined flow capacity for the three units is 1,300 ft^3/s. The spillway, located on the right abutment, has five radial gates with a total discharge capacity of 21,200 ft^3/s. The center gate has been automated, and is operated remotely from the Loveland Control Center (LCC). During the winter months, C-BT water is diverted through Adams and Olympus Tunnels and routed through the Foothills Power System on its journey to terminal storage at Carter and Horsetooth reservoirs. This complete operation is controlled remotely from the LCC.

Weather conditions on the East Slope during the October-January period were similar to the West Slope. Dry conditions and mild temperatures dominated the region. Most of February had similar weather. But by the middle of March, the weather patterns change dramatically. A massive winter storm fed by

humidity from the Gulf of Mexico brought record snow accumulations for the East Slope. Most locations along the Front Range recorded well over 2 feet of snow in two days or less. After a very dry summer, fall and winter, precipitation had returned to the Big Thompson River watershed. Suddenly, precipitation over the watershed had jumped from below to above average. By April, runoff forecast was estimated at 81,000 acre-feet. That was 11,000 acre-feet above the 30-year average. After the big winter storm in March, weather during the remaining months of spring returned to a slightly drier pattern. Although precipitation continued to occur on a regular basis, totals were mostly below average. Total precipitation for the Water Year 2003 at the Lake Estes automated tipping bucket rain gage was 14.35 inches, 77 % of the 30-year average (not an official National Weather Service rainfall station). The natural inflow into Lake Estes for Water Year 2003 was 101,768 acre-feet, 108 % of the 30-year average. Inflow into Lake Estes began to increase by the middle of May. By May 30, the runoff had reached its maximum for the water year; a 24-hour average of 1,271 ft^s/s was the computed natural inflow for the day. Releases to the river below Olympus Dam peaked at 896 ft^3/s during the same day. Precipitation during the summer continued to be below average.

Foothills System

The Big Thompson River natural inflow into Lake Estes, in excess of the minimum outflow required by the State of Colorado below Olympus Dam, was diverted as skim water through Olympus Tunnel. Skim operations began on May 15. Diversions through the Adams Tunnel were relatively low during the summer months. That allowed skim operations to begin early and continue throughout the summer months. Water diverted was used for power generation at Pole Hill, Flatiron and the Big Thompson powerplants, and eventually returned to the river below the Big Thompson Canyon. The total volume skimmed through the Olympus Tunnel during Water Year 2003 was 48,164 acre-feet, compared to only 1,910 acre-feet the previous year. The Water Year 2003 total skim volume was 14,000 acre-feet higher than the 30-year average. Skim operations for Olympus Tunnel continued uninterrupted from May through September.

Dille Tunnel operations diverted a total of 14,600 acre-feet intermittently between the months of April and September, although most of the skimming occurred between late June and late August. Water diverted through this tunnel serves two purposes; I) it can supply the City of Loveland and other users with their priority water from the Big Thompson River; 2) it can also be used as skim water and passed through the Big Thompson Powerplant to generate electricity. Skim water is returned to the river below the Trifurcation of the Charles Hansen Feeder Canal at the Big Thompson Canyon mouth. The total volume diverted through Dille Tunnel during Water Year 2003 was over 9,200 acre-feet less than the 30-year average. Skim operations through Olympus Tunnel limited the volume of water skimmed through Dille Tunnel.

There were 640 acre-feet of East Slope priority water diverted from the river between May 31 and June 3. The priority water was stored at Horsetooth Reservoir. Despite the skim operations at Olympus Tunnel and Dille Tunnel, the stream gage at the Mouth of the Big Thompson Canyon measured a total of 100,500 acre-feet of water during the water year, most of it between May and July.

The Water Year 2003 began with a severe drought affecting the state and municipalities imposing watering restrictions along the Front Range. Water conservation practices across the state, whether

voluntary or mandatory, were reflected in the lower power generation totals during the water year. Estes PowerPlant generation totaled 76,000,000 kilowatt-hours, which is only 75% of the 1966-1995 average. When added to the other C-BT powerplants in the system, they combined for a total generation of 467,200,000 kilowatt-hours, also 75% of the average.

Carter Lake

Completed in 1952 with three dams, Carter Lake has a total storage capacity of 112,200 acre-feet. Inflow of C-BT water to Carter Lake is from the Flatiron Pumping Plant with a capacity of up to 400 ft^3/s.

Carter Lake storage content was 57,100 acre-feet at the beginning of the Water Year 2003, slightly higher than the 30 year average, and 17,000 acre-feet higher than the year before.

Pumping from Flatiron Reservoir to Carter Lake began on November 12, and continued uninterrupted until February 3. The pump was brought back on line on February 10 for an additional 8 days. The reservoir reached its highest level for the water year on February 18, climbing up to 5752.53 feet, with a storage volume of 104,914 acre-feet. A total of 60,335 acre-feet of water was pumped into Carter Lake during the Water Year 2003, 19,000 acre-feet less than the 30-year average. This activity required a total of 19,458,000 kilowatt-hours of energy, 76 % of the 30-year average. After February, the pump was kept off-line for the remainder of the year. Immediately after reaching its maximum elevation, the reservoir level began to drop steadily, as water demands increased. Water deliveries to the St.Vrain Supply Canal for Water Year 2003 totaled 51,900 acre-feet. The 30-year annual average water delivery total is 70,150 acre-feet. The month of August had the highest volume delivered, with 16,100 acre-feet. Flatiron Unit 3 was not used for hydropower generation during Water Year 2003.

Horsetooth Reservoir

Completed in 1949, with four dams, Horsetooth Reservoir has a total constructed capacity of 156,700 acre-feet. Inflow of C-BT water comes from Flatiron Reservoir via the Charles Hansen Feeder Canal.

Horsetooth began the Water Year 2003 with 10,900 acre-feet of water in storage. Since calendar year 2000, ongoing Safety of Dams work has limited the reservoir elevation to a maximum of 5360.00 feet above sea level. This restriction was lifted early fall of 2003 when construction work was completed. The reservoir reached its highest elevation of the water year on September 25 at 5365.87 feet, a storage volume of 53,877 acre-feet. Water deliveries made through the Charles Hansen Supply Canal totaled 46,300 acre-feet for the year. The highest delivery flows were observed in August, with a total of 17,100 acre-feet. Flows through the Charles Hansen Supply Canal were never higher than 380 ft^3/s. Horsetooth ended the Water Year with a storage volume of 52,900 acre-feet.

C-BT water began to flow into Horsetooth in September, as part of the operation to refill the reservoir. But the flow was interrupted late in the month because of the maintenance schedules for powerplants and canals. The flow north was initiated once again in the middle of November, 2001

FLOOD BENEFITS

Precipitation over the upper Colorado River basin was relatively low for the fourth consecutive year. While Water Year 2003 was not as dry as the previous one, precipitation was sporadic and limited to a few months during the spring and early summer. Precipitation early in the water year was extremely low, but the snowpack later in the spring was significantly high and produced considerable runoff during May and June. The highest inflows into the C-BT reservoirs were observed during May 29 and May 30, 2003.

According to figures provided by the U.S. Army Corps of Engineers, C-BT reservoirs prevented flood damages during Water Year 2003 estimated at $58,900. Most of the flood protection benefits were attributed to reservoirs in the collection system; Grand Lake, Shadow Mountain, Granby and Willow Creek. Those four reservoirs provided $56,700 in flood protection benefits. Green Mountain also contributed $2,200 in flood protection during the water year.

Runoff along the Big Thompson watershed was evenly distributed over the late spring and summer months. The C-BT reservoirs in the Big Thompson watershed did not face any significant flooding conditions during Water Year 2003. Therefore, there were no flood protection benefits attributed to the C-BT East Slope reservoir during the water year.

Since construction, the C-BT has prevented flood damages totaling $374,900.

OPERATING CRITERIA FOR GREEN MOUNTAIN RESERVOIR

Paragraph 6 of the October 5, 1955, Stipulation and Decree (as amended on October 12, 1955, and filed with the United States District Court for the District of Colorado in civil action Nos. 2782, 5016, and 5017) calls for the development and submission of operating plans for Green Mountain Reservoir and are included as a part of this report. Paragraph 3.e.(1) of the Green Mountain Historic Users Pool (HUP) Operating Criteria, developed pursuant to Paragraph 5.a. of the Stipulation and Agreement of the Orchard Mesa Check Case (case No. 91CW247, Colo. Water Div. 5) calls for the annual development of an HUP Operating Plan which is included in the following criteria.

The provisions that relate to the operation of Green Mountain Reservoir are contained in the:

October 12, 1955, Stipulation and Decree
April 16, 1964, Stipulation and Decree
November 2, 1977, Memorandum Opinion and Order
February 9, 1978, Supplemental Judgment and Decree
Consolidated Case Nos. 2782, 5016, and 5017
Senate Document No. 80, 75th Congress, 1st Session
December 22, 1983, Federal Register, Operating Policy as amended September 11, 1987
September 4, 1996, Stipulation and Agreement of the Orchard Mesa Check Case, Colorado Water Div. 5, 91CW247 and attached HUP Operating Criteria.

Operations will be consistent with these provisions.

The criteria are listed below.

1. Winter operation (November-March)

a. Bypass inflow to supply downstream vested rights.

b. Replace water withheld by the C-BT, as required.

c. Make required releases for West Slope natural flow domestic water users depletions per Green Mountain Operating Policy and Orchard Mesa Check case Settlement.

d. Make required releases for contract water depletions.

e. Maximize power generation, while maintaining:

(1) Adequate storage to meet the anticipated requirements of Senate Document No. 80 and the agreements under the Stipulation and Agreement of the Orchard Mesa Check Case.

(2) A minimum power head, which is consistent with the integrated system power operations.

2. Operation during snowmelt period (April-July)

a. Bypass inflow, as required, to supply downstream vested rights.

b. Replace water withheld by the C-BT, as required.

c. Make required releases for West Slope natural flow irrigation and domestic water users depletions.

d. Reduce releases from traditional levels before and after the peak flow enhancement for the Coordinated Reservoir Operations effort. During peak flow enhancement, release the lesser of inflows or turbine capacity (approx. 1500 113/s) for approximately a ten-day period.

e. On or before June 30, each year, assess availability of surplus water in the Historic Users Pool (HUP), on a regular basis, in consultation with the Managing Entities established under the settlement of the Orchard Mesa Check Case.

f. If a surplus condition is declared in the HUP, make releases, under agreement, to the Grand Valley PowerPlant to the lesser of the amount of the surplus or the capacity of the Grand Valley PowerPlant canal system or the amount needed to generate power at the Grand Valley PowerPlant.

g. Release surplus amounts to other needs downstream.

h. Make required releases for contract water depletions.

i. Fill without spilling.

j. Maximize power operation consistent with I.e.

k. Make releases as outlined in the above referenced documents.,

3. Operation after snowmelt teriod (August-October)

a. Bypass inflow as required, to supply downstream vested rights.

ı By the use of these criteria for current operating purposes, the United States does not intend to imply any definition of rights and obligations. The order in which these criteria are listed does not reflect any intended priority.

b. Replace water withheld by the C-BT, as required.

c. Make required releases for West Slope natural flow irrigation and domestic water users depletions.

d. Assess availability of surplus water in the Historic Users Pool (HUP), on a regular basis, in consultation with the Managing Entities established under the settlement of the Orchard Mesa Check Case.

e. If a surplus condition is declared in the HUP, make releases, under agreement, to the Grand Valley PowerPlant to the lesser of the amount of the surplus or the capacity of the Grand Valley PowerPlant canal system or the amount needed to generate power at the Grand Valley PowerPlant.

f. Make required releases for contract water depletions.

g. Release to other surplus amounts.

h. Maximize power operation consistent with I.e.

i. Make releases as outlined in the above referenced documents.

[I] By the use of these criteria for current operating purposes, the United States does not intend to imply any definition of rights and obligations. The order in which these criteria are listed does not reflect any intended priority.

GREEN MOUNTAIN HISTORIC USERS POOL AND THE ORCHARD MESA CHECK CASE SETTLEMENT

Background and Authority

The Orchard Mesa Check (Check) is a structure below the common afterbay of the Orchard Mesa Irrigation District (OMID) Pumping Plant and the federal Grand Valley PowerPlant in the Grand Valley of Colorado. The operation of the Check provides the ability to raise the water level in the common afterbay to a level, which causes water to flow through the bypass channel and return to the Colorado River upstream of the Grand Valley Irrigation Company (GVIC) diversion dam.

Operation of the Check was determined to constitute an 'exchange' of water whereby water destined for the senior GVIC irrigation water rights is borrowed for pumping and hydroelectric power generation purposes and returned to GVIC for irrigation use. Operation of the Check influences the supply of water available to Grand Valley irrigation systems; to the Grand Valley PowerPlant for power production; Green Mountain Reservoir releases; and the flow in the 15-Mile Reach of the Colorado River. The 15-Mile Reach is that section of the Colorado River from the GVIC diversion darn to the confluence of the Gunnison River and has been designated critical habitat by the Upper Colorado River Endangered Fish Recovery Program.

The Check has been operated on an informal basis without a decreed right since approximately 1926 to manage flows in the Colorado River for the benefit of the United States, Grand Valley Water Users Association (GVWUA), and OMID (Co-applicants). In the late 1980's, a hydropower development was proposed in a reach of the Colorado River between the Grand Valley Diversion Dam, the point where the exchange water is diverted, and the GVIC diversion dam where the exchange water is returned. The Co-applicants were concerned that a water right awarded for this development would have the ability to interfere with the exchange of water. In response to this potential threat to the continued operation of the exchange, the Co-applicants filed an application in State Water Court on December 30, 1991, for approval of an exchange of water. This case (Water Division 5, Case No. 91CW247) was informally known as the Orchard Mesa Check Case. Resolution of the case resulted in a negotiated Stipulation and Agreement entered into the District Court, Water Division No. 5, State of Colorado, on September 4, 1996.

Overview of the Stipulated Settlement

The settlement contains two major components: the Stipulation and Agreement and the Green Mountain Reservoir Historic Users Pool Operating Criteria (Operating Criteria). The Operating Criteria further defines operation of the Green Mountain Reservoir Historic Users Pool (HUP) consistent with Senate Document 80 and the 1984 Operating Policy. The parts of the Stipulation and Agreement pertinent to the operation of the HUP are summarized below:

As part of the Stipulation and Agreement the Co-applicants and GVIC agree not to exercise their irrigation rights against any upstream HUP beneficiary provided that the Check is physically operable; there is at least 66,000 acre-feet of water in storage in the Green Mountain Reservoir HUP, or approved substitute storage reservoir, when Green Mountain Reservoir storage rights cease to be in priority; and

the water rights for the Shoshone PowerPlant continue to be exercised in a manner consistent with their historical operation. (Section 3.b. of the Stipulation and Agreement)

The Stipulation and Agreement also provides that Reclamation will declare surplus water which is in excess of the needs of HUP beneficiaries for a given Water Year. Water declared surplus might be delivered through agreements to beneficial uses in Western Colorado. This is to be done in accordance with the provisions of the HUP Operating Criteria, which are summarized below:

Management of the HUP Under the Operating Criteria

The management of the HUP is accomplished through the process defined in Sections 3.d. and 3.e. of the Operating Criteria. This process requires the development of this Annual HUP Operating Plan on or before June 30 of each year.

The Annual HUP Operating Plan is developed by the Bureau of Reclamation, in consultation with the Grand Valley Water Users Association, the Orchard Mesa Irrigation District, the Grand Valley Irrigation Company, the Division 5 Engineer, the Colorado Water Conservation Board and, Fish and Wildlife Service. These entities are collectively known as the 'Managing Entities'. The Managing Entities agree to make a good faith effort to develop an Annual HUP Operating Plan that is unanimously supported. However, the Bureau of Reclamation reserves the right to establish a release schedule, should unanimous consent be unattainable.

The Annual HUP Operating Plan is based upon actual HUP storage conditions; projected runoff forecasts: operational and climatological conditions; projected irrigation demands: and, 15-Mile Reach flow needs. It is expressly recognized, however, that in some years, release of the entire HUP by the end of the irrigation season will not be necessary or possible.

On or before June 30 of each year, the Bureau of Reclamation assembles initial information on storage in the HUP and comparative runoff years. Based upon the information assembled, a meeting is held with the other Managing Entities. During this meeting, a review of the forecasts is analyzed, and initial determinations of the level of "checking" required to preserve water in the HUP, as well as any determination of water surplus to HUP beneficiaries needs are made.

The HUP operations are reviewed and modified by the Managing Entities as necessary to respond to changing conditions. Subsequent meetings or conference calls are held on an as needed basis to reexamine HUP storage conditions, runoff forecasts, climatological conditions, irrigation demands, 15-Mile Reach flow needs, and other operational conditipns. Based upon this information, the Managing Entities adjust the checking. They also determine the water surplus for HUP beneficiary needs, as well as the release of such water. During periods of below average river flows, review meetings or conference calls may be held as frequently as every week.

This mechanism provides a way to integrate management of releases from the HUP with operation of the Check to accomplish the purposes of the Operating Criteria. The mechanism is also used to integrate releases from the HUP with releases for the endangered fish from other reservoirs including Ruedi and Wolford Mountain.

OPERATION SKIM

Big Thompson River water in excess of the minimum requirements, as recommended by the State of Colorado Division of Wildlife and the United States Fish and Wildlife Service, is diverted at Lake Estes into the Foothills System for power generation. This operation is known as operation "skim." The amount diverted depends on the flow at the Big Thompson River and the tributaries above Lake Estes, importations through the Adams Tunnel, and the capacity of the Foothills System.

The water taken from the Big Thompson River can be used for power generation immediately. It can also be held in storage and replaced to the river with water from other sections of the system, depending on the power requirements. In general, water taken from the Big Thompson River at a variable rate, on a given date, is returned to the river at a flat rate, on the following day.

Operation "skim" and storage of surplus water from the Big Thompson River in C-BT reservoirs are managed according to the AOP and as prescribed by the ECAO Water Scheduling staff

During Water Year 2003, a total of 48,164 acre-feet of water was diverted through Olympus Tunnel for "skim" operations. Skim operations through Olympus Tunnel took place between April and September. Dille Tunnel diversions totaled 14,600 acre-feet for Water Year 2003.

TABLE 1

WESTERN DIVISION - PICK-SLOAN MISSOURI BASIN PROGRAM
PERTINENT RESERVOIR DATA

(Data in Acre-feet)

Reservoir	Dead Storage 1/	Active Storage 2/	Total Storage	Normal Minimum Storage	Limitation on normal minimum storage
Green Mountain	6,860	146,779	153,639	47,684	Minimum elevation for rated power output
Willow Creek	1,486	9,779	10,553	6,675	Elevation of pump canal head-works
Lake Granby	74,190	465,568	539,758	74,190	Lowest outlet elevation
Shadow Mountain	506	16,848	17,354	16,026	Minimum permissible Grand Lake elevation; 8,366 ft.
Grand Lake	3/	511	1,015	504	Legislation limits fluctuation
Marys Lake	42	885	927	308	Minimum elevation for power generation
Lake Estes	409	2,659	3,068	740	Minimum elevation to release 550 ft3/s
Pinewood Lake	416	1,765	2,181	613	Minimum elevation for power generation
Flatiron	125	635	760	324	Minimum elevation to release 550 ft3/s
Carter Lake	3,306	108,924	112,230	306	Lowest outlet elevation
Horsetooth	7,003	149,732	156,735	17,600	Elevation on highest delivery works
Total	94,343	903,373	998,220	167,970	

1/ Storage capacity below elevation of lowest outlet
2/ Total storage minus dead storage
3/ Not determined

TABLE 2

Colorado-Big Thompson
Monthly Summary of the Blue River Operations

WY 2003 (ACRE-FEET)

	INITIAL	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
UNDEPLETED RUNOFF ABOVE GREEN MTh/ RESERVOIR		11,000	9,700	8,000	7,600	6,800	9 400	18 500	96,400	133.100	49,300	28,000	22,600	400,400
UNDEPLETED RUNOFF ABOVE DILLON RES.		6,600	5,800	4,600	4,400	4,000	4,900	8,400	55,300	81,600	28.800	14,900	12,100	231,400
PERCENT OF TOTAL UN-DEPLETED RUNOFF ORI-GINATING ABOVE DILLON		0.600	0.598	0.575	0.579	0.588	0.521	0.454	0.574	0.613	0.584	0.532	0.535	0.578
DEPLETIONS BY 1929 COLORADO SPRINGS RIGHT		0	0	0	0	0	0	23	268	570	201	70	58	1190
DEPLETIONS BY 194$ COLORADO SPRINGS RIGHT		454	-510	0	0	0	0	0	2372	4104	600	0	-21	6091
INFLOW TO DILLON		7,000	6,300	4,600	4,400	4,000	4,900	8,400	52,700	76,900	28,000	14,800	12,000	224,000
DILLON STORAGE (1000 AF)	152.7	152.1	146.5	139.4	132.4	124.6	120.8	125.3	173.1	245 3	251.6	244.9	245.9	
ROBERTS TUNNEL DIVERSIONS		3,600	8,200	8,400	7,800	7,300	4,200	700	1,100	1,700	11,000	13,600	3,500	71,100
DILLON OUTFLOW TO THE RIVER		3,200	3,100	3,200	3.700	4,500	4,500	3,200	3,200	3,100	9,600	6,800	6,300	54,400
TOTAL DEPLETIONS BY DENVER		3,800	3,200	1,400	700	-500	340	5,200	49,100	73,300	18,250	7,900	5.600	168,300
RUNOFF ORIGINATING BETWEEN DILLON AND GREEN MTN RESERVOIR		4,500	4,000	3,400	3,250	2,900	4,600	10,250	41,900	52,600	20.900	13,300	10,700	172,300
ACTUAL INFLOW TO GREEN MTN RESERVOIR		7,700	7,000	6,600	6,900	7,300	9,000	13,300	44,700	55,200	30,300	20,000	16,900	224,900
GREEN MTN RESERVOIR STORAGE (1000 AF)	48.5	49.5	436	41.7	39.8	374	36.1	44.4	84.3	134,2	152 8	135.7	117.3	
TOTAL GREEN MTN OUTFLOW		6,600	12,900	8,500	8,800	9,600	10,300	4,900	4,400	4,600	10,500	36,200	34.800	152.100

PICK-SLOAN MISSOURI BASIN PROGRAM
WESTERN DIVISION WATER AND POWER SYSTEM

COLORADO-BIG THOMPSON PROJECT

2003 ACTUAL OPERATIONS

WATER IN 1000 ACRE-FEET

	INITIAL OR TOTAL	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
GREEN MOUNTAIN RESERVOIR													
Depleted Watershed Inflow	224.9	7.7	7.0	66	6.9	7.3	9.0	13.3	44.7	55.2	30.3	20.0	16.9
Turbine Release	114.2	3.9	12.9	8.5	8.8	9.6	8.5	2.0	0.0	0.0	7.3	21.1	31.6
Bypass	37.8	2.7	0.0	0.0	0.0	0.0	1.8	2.9	4.4	4.6	3.2	15.0	3.2
Spill	00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	00	00	0.0
End of Month Content	48.5	49.5	43 6	41.7	39.8	37.4	36.1	44.4	84.3	134.2'	152.8	135.7	117.3
Kwh/AF		128.2	131.8	094.1	090.9	104.2	105.9	100.0	000.0	000 .0	164.4	213.3	101.3
Generation	18.1	0.5	1.7	0.8	0.8	1.0	0.9	0.2	0.0	0.0	12	4.5	6.5
WILLOW CREEK RESERVOIR													
Inflow	613	08	0.7	07	0.7	0.6	0.9	3.6	254	20.7	4 1	1.8	1.3
Release to River	17.9	0.5	0.4	0.4	04	0.4	04	0.4	7.3	47	26	0.2	0.2
Pumped to Granby	40.9	1.2	0	0	0	0	0	4.2	15.7	15.7	1 8	0.9	1.4
End of Month Content	9.0	77	79	8.1	8.4	86	9.1	7.6	9.7	9.6	9.0	9.5	9.0
Pump Energy	88	0.3	0.0	0.0	0.0	0.0	0.0	0.9	3.4	3.3	0.4	0.2	0.3
GRANBY - SHADOW MOUNTAIN - GRAND LAKE													
Natural Watershed Inflow	310.9	4.6	4.1	3.1	2.8	3.4	4.9	14.4	839	120.9	41.5	15.4	11.9
Total Inflow into Granby	376.5	60	29	2.4	1.2	2.2	3.6	23.1	124.5	159.3	30.7	10.8	9.8
Granby Fish Release	25.5	1 4	1.2	1.2	1.2	1.1	1.2	1.2	4.1	5.2	5.0	2.0	0.7
Granby Seepage	1.4	0 1	0.1	0.1	0.1	0.1	0.1	0 1	0.1	0.1	0.1	0.2	0.2
Granby Spill	00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Adams Tunnel	175.3	0 1	22.8	27.2	26.0	14.6	10.3	1.4	2.0	6.6	13.3	284	22.6
Granby End of Month content	176.7	179.8	159.1	133 7	109.3	97.0	90.3	111.6	230.5	382.3	402.1	384.7	372.0
SM-GL End of Month Content	17.5	17 3	17.8	17.9	17.8	177	17.7	17.6	17.0	17.2	17.7	17.7	17.7
Pumped from Granby	141 3	0.5	22.2	26.5	242	13.3	9.0	00	0.0	0.0	2.3	236	197
Granby Pump Kwh/AF		200.0	202.7	211.3	219.0	225.6	233.3	000.0	000.0	000.0	173.9	156.8	157.4
Granby Pump Energy	27.8	0.1	4.5	5.6	5.3	3.0	2.1	0.0	0.0	0.0	0.4	3.7	3.1

ENERGY IN GM

PICK-SLOAN MISSOURI BASIN PROGRAM
WESTERN DIVISION WATER AND POWER SYSTEM
COLORADO-BIG THOMPSON PROJECT

2003 ACTUAL OPERATIONS

WATER IN 1000 ACRE-FEET

ENERGY IN GWH

	INITIAL OR TOTAL	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MARYS LAKE - ESTES - FLATIRON													
Adams Tunnel Water	175.3	0.1	22.8	27.2	26.0	14.6	10.3	1 4	2.0	6.6	13.3	28.4	22.6
Marys Lake Generation	16.3	0.0	4.0	4.9	4.6	2.4	0.3	0.0	0.0	0.0	0.0	0.0	0.1
Estes Generation	76.0	0.0	9.9	12.2	11.7	6.2	4.3	0.3	0.6	3.0	5.4	124	100
Divertible Big-Thompson	58.5	0.0	0.2	0.1	0.1	0.0	0.0	1.8	15.1	27.7	10.2	1.8	1 5
Diverted Big-Thompson Water	48.1	0.0	0.0	0.0	00	0.0	0.0	1.5	9.8	23.2	10.2	1.9	1.5
Olympus Tunnel	224.7	1.7	21.7	27.3	26.1	14.3	10.2	3.2	13.3	29.0	23.7	30.0	24.2
Pole Hill Generation	153.6	06	15.0	19.5	18.5	9.0	6.5	1.3	8.3	20.7	16.3	20.9	17.0
Flatiron 1 a 2 Generation	192.9	1.7	17.4	24 0	22 8	12.3	8.3	2.3	11.9	25.8	20.3	25.8	20.3
Flatiron 3 Turbine Release	00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	00	0.0	0.0	0.0	0.0
Flatiron 3 KwWAF Gen.		0.0	0.0	0.0	00	0.0	0.0	00	0.0	0.0	0.0	00	0.0
Flatiron 3 Generation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flatiron 3 Pumping	60.3	0.0	138	21.2	19.0	6.3	0.0	0.0	00.0	00.0	0.0	00	0.0
Flatiron 3 KWNAF Pump		0.0	297.1	316.0	336.8	365.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flatiron 3 Pump Energy	19.5	0.0	4 1	6 7	6.4	2 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CARTER LAKE													
Pumped from Flatiron	60.3	00	13.8	21.2	19.0	6.3	0.0	0.0	0.0	0.0	00	0.0	0.0
Release to Flatiron	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	00
Irrigation Delivery	51.9	4.9	1.0	1.0	1.1	0.9	0.9	2.5	4.4	3.8	84	16.1	6.9
Evaporation 8 Seepage	2 2	0.1	0 1	0.0	0.0	0.0	0.0	0.3	0.3	0.2	0.5	0.4	0.3
End of Month Content	57 1	51.4	63.3	82.5	99.6	104.4	102 9	99.6	94.9	89 9	79.1	61.0	52.6
BIG THOMPSON POWERPLANT													
Diverted Dille Tunnel Water	16.8	0.0	0.0	0.0	0	0	0	0.2	4 4	1 4	5.4	3.8	1.6
Irrigation Delivery	15.2	08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	6.0	7.6
Turbine Release	696	0.0	0.0	0.0	0.0	00	0.0	0.4	12.2	22.7	14.8	10.5	9.0
Generation	10.1	0.0	0.0	0.0	0.0	0.0	00	00	1.8	3.4	2.2	1.4	1.3
HORSETOOTH RESERVOIR													
Hansen Feeder Canal Inflow	96.4	1.9	62	5 1	5.9	7.4	10.0	1.9	4.9	4.7	11.7	22.1	14.6
Irrigation Delivery	46.3	1.8	1.0	0.9	1.0	0.9	1.1	1.3	1.9	2.6	9.1	17.1	76
Evaporation	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	04	0.6	0.4	0.4
End of Month Content		9. /	15.1	18.7	22.8	28.3	37.1	37.8	40 8	42.7	43.8	46.7	529
TOTAL CBT DELIVERY	112.2	7.5	2.1	2.0	2.1	1.9	2 1	3.9	6.1	6.2	17.8	38.9	21.6

PICK-SLOAN MISSOURI BASIN PROGRAM
WESTERN DIVISION WATER AND POWER SYSTEM
COLORADO-BIG THOMPSON PROJECT

2003 ACTUAL OPERATIONS

WATER IN 1000 ACRE-FEET • • • • • • • • • • • • • • • ENERGY IN GYM

	INITIAL OR TOTAL	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
BASE GENERATION													
Green Mountain	18.1	0.5	1.7	0.8	0.8	1.0	0.9	0.2	00	00	1.2	4.5	6.5
Flatiron 3	0.0	0.0	0.0	0.0	0.0	00	0.0	0.0	0.0	0.0	00	0.0	00
Bg Thompson	10.1	0.0	00	0.0	0.0	0.0	00	00	1 8	3.4	2.2	1 4	1.3
TOTAL	28.2	0.5	1.7	0.8	0.8	1.0	0.90	0.2	1.8	3.4	3.4	59	7.8
LOAD FOLLOWING GENERATION													
Marys Lake	16.3	00	4.0	4.9	46	2.4	0.3	0.0	0.0	0.0	0.0	0.0	0.1
Estes	76.0	0.0	9.9	12.2	11.7	6.2	43	0.3	0.6	3.0	5.4	124	10.0
Pole Hill	153.6	06	15.0	19.5	18.5	90	6.5	1.3	8.3	20.7	16.3	20.9	17.0
Flatiron 182	192.9	1.7	17.4	24.0	22.8	12.3	8.3	2.3	11.9	25.8	20.3	25.8	20.3
TOTAL	438.8	2.3	46.3	60.6	57.6	29.9	19.4	3.9	20.8	49.5	42.0	59.1	47.4
PUMP ENERGY													
Wallow Creek	8.8	03	0.0	0.0	0.0	0.0	0.0	0.9	3.4	3.3	0.4	0.2	0.3
Granby	27.8	0.1	4.5	5.6	5.3	3.0	2.1	00	0.0	0.0	0.4	37	3.1
Flatiron 3	19.5	0.0	4 1	6.7	6.4	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	56.1	0.4	8.6	12.3	117	5.3	2 1	0.9	3.4	3.3	0.8	3.9	3.4
TOTAL GENERATION	467 0	2.8	48.0	61.4	58.4	30.9	20.3	4.1	22.6	52.9	45.4	65.0	55.2
TOTAL GENERATION MINUS PUMP	410.9	24	39.4	49.1	46.7	256	18.2	3.2	19.2	49.6	44.6	61.1	51 8

TABLE 4

COLORADO-BIG THOMPSON PROJECT

FLOOD DAMAGE PREVENTED IN WATER YEAR 2003

	Cumulative Total Prior to WY2003	WY2003	Cumulative Total Current
Granby	$228,000	$56,700	$284,700
Green Mountain	$92,000	$2,200	$94,200
Total	$320,000	$58,900	$378,900

WESTERN DIVISION POWER SYSTEM
WATER YEAR 2003 — GENERATION AND PUMP ENERGY

The Western Division Power System (System) boundaries are illustrated in Exhibit 1. Hydropower generation was slightly above average across the East Slope system of the Colorado-Big Thompson Project (C-BT), but the dry conditions over the West Slope limited the generation capacity of Green Mountain Reservoir. Green Mountain only produced 18.1 gigawatt-hours (GWh) during Water Year 2003, only 31% of its average yearly production.

During Water Year 2003, the total gross System generation for load was 1701.6 GWh compared to the 30-year average of 2768.8 GWh. Municipal and industrial watering restrictions and conservation practices reduced water consumption along the Front Range. That affected power generation negatively during the summer and fall of 2003. Maintenance schedules for powerplants in the system also had a negative effect on power generation. After subtracting pumping energy from the gross System generation for load, the net generation for load during the Water Year 2003 was 1187.7 GWh, much lower than the averageof 2525.6 GWh. The total generation for load is the gross generation less the total C-BT pumping; gross generation includes one-half of the Yellowtail generation. The total System load includes firm energy deliveries, C-BT use energy, support energy, plant station service, and an estimate of transmission system losses. Power generation was below average for most of the water year. By the end of September, the gross generation for all the powerplants in the system (Table 1) was only 61% of average. Table 3 shows monthly generation and pumping energy, by plant, as well as monthly System loads for Water Year 2003. The total energy required to operate the pumps in the System (Table 2) was 211% of the 1975-2000 average (513.9 GWh), and 37.8 GWh higher than the previous water year.

The Western Area Power Administration's Loveland Area Office sold 2,713,744 MWh of power during Water Year 2003, with the price of $62,864,002. Energy deficits were covered by a combination of scheduled interchange energy, use of the Mt. Elbert pumped storage plant, and power purchases. The Western Area Power Administration's Loveland Area Office power purchases totaled $47,778,000 for Water Year 2003, a total of 1,160,193 MWh.

TABLE 1

WESTERN DIVISION SYSTEM
GROSS GENERATION - WATER YEAR 2003
(Energy in GWh)

Powerplant	Accumulated Gross Generation 1/		
	WY 2003	Yearly Avg.2/	Percent of Avg.
Green Mountain	18.1	59.0	31
Marys Lake	16.3	38.5	42
Estes	76.0	101.5	75
Pole Hill	153.6	178.5	86
Flatiron 1 & 2	192.9	232.5	83
Big Thompson	10.1	12.2	83
Seminoe	81.4	148.0	55
Kortes	100.5	155.0	65
Fremont Canyon	152.3	261.8	58
Alcova	76.5	130.1	59
Glendo	46.7	89.5	52
Guernsey	4.5	22.4	20
Boysen	25.4	80.7	31
Heart Mountain	18.2	13.1 3/	139
Buffalo Bill	44.5	82.6 3/	54
Shoshone	15.1	21.7 3/	70
Spirit Mountain	14.9	13.7 4/	109
Mt. Elbert	340.6	169.0 5/	202
Yellowtail4/	314.0	959.0 6/	33
Total	1701.6	2768.8	61

1/ October-September
2/ 30-year average
3/ 1993-2000 average
4/ 1995-2000 average
5/ 1990-1999 average
6/ 1971-1990 average; one-half of the Yellowtail energy is marketed through the Western Division System. The other half is marketed through the Eastern Division System.

TABLE 2

WESTERN DIVISION SYSTEM
PUMP ENERGY-WATER YEAR 2003

Pumping Plant	October-September Pump Energy		
	WY2003 (GWh)	Avg. 1/ (GWh)	Percent of Avg.
Willow Greek	8.8	5.7	154.0
Granby (Fan Plant)	27.8	29.8	93.0
Flatiron 3	19.5	25.6	76.0
Mt. Elbert	457.8	182.1 2/	251.0
Total	513.9	243.2	211.0

1/ 30-year average
2/ 1990-1999 average

TABLE 3

WATER YEAR END

FY03 ACTUAL WESTERN DIVISION POWER SYSTEM GROSS GENERATION LESS PUMPING (GWH)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Mt. Elbert	3.7	1.3	0.3	0.0	1.7	1.6	1.4	6.2	6.5	2.5	0.4	0.5	26.4
Green Mtn.	0.5	1.7	0.8	0.8	1.0	0.9	0.2	0.0	0.0	1.2	4.5	6.5	18.1
Willow Cr. pump	0.3	0.0	0.0	0.0	0.0	0.0	0.9	3.4	3.3	0.4	0.2	0.3	8.8
Farr pump	0.1	4.5	5.6	5.3	3.0	2.1	0.0	0.0	0.0	0.4		3.1	27.8
Marys Lake	0.0	4.0	4.9	4.6	2.4	0.3	0.0	0.0	0.0	0.0	0.0	0.1	16.3
Estes	0.0	9.9	12.2	11.7	6.2	4.3	0.3	0.6	3.0	5.4	12.4	10.0	76.0
Pole Hill	0.6	15.0	19.5	18.5	9.0	6.5	1.3	8.3	20.7	16.3	20.9	17.0	153.6
Flatiron 162	1.7	17.4	24.0	22.8	12.3	8.3	2.3	11.9	25.8	20.3	25.8	20.3	192.9
Flatiron 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flatiron 3 pump	0.0	4.1	6.7	6.4	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.5
Big Thompson	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	3.4	2.2	1.4	1.3	10.1
Seminoe	4.2	4.2	4.2	3.8	3.4	3.6	3.7	11.4	15.7	16.5	6.9	3.8	81.4
Kortes	5.5	5.6	5.8	5.3	5.1	5.4	5.4	14.3	17.0	17.7	8.2	5.2	100.5
Fremont Canyon	0.5	4.5	4.6	4.5	4.0	8.2	15.7	13.7	29.9	40.7	19.1	6.9	152.3
Alcove	3.6	2.9	2.8	2.9	2.5	3.9	5.7	5.7	14.5	20.7	8.6	2.7	76.5
Glendo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	8.5	22.5	14.7	0.0	46.7
Guernsey	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	0.4	4.5
Pilot Butte te	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.0	0.2	2.2
Boysen	0.3	0.6	0.8	0.8	0.7	0.9	1.8	3.3	5.0	5.1	3.8	2.3	25.4
Shoshone	0.6	0.9	0.0	0.1	0.7	1.0	1.4	2.0	2.2	2.2	2.1	1.9	15.1
Buffalo Bill	0.7	0.0	0.0	0.0	0.0	0.0	1.6	4.7	10.7	11.9	9.5	5.4	44.5
Spirit Mtn.	0.8	0.0	0.0	0.0	0.0	0.0	0.0	1.4	3.2	3.3	3.7	3.0	14.9
Diamond Cr. pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Heart Mtn.	0.8	0.0	0.0	0.0	0.0	0.0	1.4	3.6	3.2	3.2	3.0	1.0	18.2
Yellowtail/2	8.6	10.1	12.2	13.1	12.1	12.8	11.0	10.0	15.8	20.8	17.7	13.1	157.0
Fry-Ark	3.7	1.3	0.3	0.0	1.7	1.6	1.4	6.2	6.5	2.5	0.4	0.5	26.4
CBT	2.4	39.4	49.1	46.7	25.6	18.2	3.2	19.2	49.6'	44.6	61.1	51.8	410.9
North Platte	13.8	17.2	17.4	16.5	15.0	21.1	30.5	46.1	85.6	118.1	61.6	19.0	461.9
Bighorn	12.3	11.7	13.0	14.0	13.5	14.7	17.2	25.0	40.1	46.9	40.3	28.9	277.3
TOTAL GEN	32.2	69.6	79.8	77.2	55.8	55.6	52.3	96.5	181.8	212.1	163.1	100.2	1176.5
TOTAL LOAD	162.8	162.6	177.5	173.2	137.3	149.9	171.5	179.6	205.6	255.8	206.3	157.7	2114.8
SURPLUS/DEFICIT	-130.6	-93.0	-97.7	-96.1	-81.5	-94.3	-119.2	-83.1	-23.8			-52.5	998.3

WESTERN DIVISION - PICK-SLOAN MISSOURI BASIN PROGRAM

POWERPLANT DATA

Facility	No. Units	Capacity Each Unit	Total Installed Capacity	Normal Operating Head (ft)	Output at Rated Head (ft3/s)
Green Mountain	2	13,000	26,000	192-262	1,660
Marys Lake	1	8,100	8,100	202-217	550
Estes	3	16,500	49,500	551-571	1,300
Pole Hill	1	33,250	33,250	830-838	550
Flatiron	2	43,000	86,000	1,096 - 1,118	1,070
(Flatiron 1/)	1	8,500	8,500	158-287	440
Big Thompson	1	5,300	5,300	183- 184	350
Seminoe	3	15,000	45,000	97-227	2,850
Kortes	3	12,000	36,000	192-204	2,700
Fremont Canyon	2	33,000	66,000	247-363	2,200
Alcova	2	18,000	36,000	153-165	2,200
Glendo	2	19,000	38,000	73-156	2,800
Guernsey	2	2,400	4,800	89-91	820
Pilot Butte2/	2	800	1,600	-- --	---
Boysen	2	7,500	15,000	72-112	2,415
Shoshone3/	1	3,000	3,000	-- --	---
Buffalo Bill3/	3	6,000	18,000	-- --	---
Heart Mountain	1	5,000	5,000	265-275	355
Mt. Elbert	2	103,000	206,000	447-477	6,400
Yellowtail	4	72,000	288,000	327-440	8,500
TOTAL	34		979,050		

TABLE 7

WESTERN DIVISION - PICK-SLOAN MISSOURI BASIN PROGRAM

PUMPING PLANT DATA

	Pumping Units		Plant Rating		
Facilities	No	Capacity (ft3/s)	Normal Operating Head (ft)	Installed (Hp)	Kwh to Pump 1-Acre-ft at Maximum Head
Granby	3	600	92-186	18,000	227
Willow Creek	2	400	167-169	18,000	227
Flatiron	11/	440	173-287	13,000	391
Mt. Elbert	2	5,690	447-477	340,000	620

Exhibit 2

WESTERN DIVISION POWER SYSTEM
GROSS GENERATION LESS PUMPING WATER YEAR 2003