

Duchesne River
Tour of Diversions below Starvation Reservoir
Date of Tour May 5, 2003

Attendance

John Swasey, Duchesne River Commissioner
Tim Modde, U.S. Fish and Wildlife Service
Gene Shawcroft, Central Utah Water Conservancy District
Chris Keleher, Central Utah Water Conservancy District
Keith Hooper, Central Utah Water Conservancy District (did not attend field tour)

Summary

On 5 May 2003 those identified above met at the Central Utah Water Conservancy District Office in Duchesne. Prior to touring the diversion locations and structures in the lower Duchesne River, John Swasey provided an overview of water rights, duties, and distribution schedules associated with operating the Duchesne River below Starvation Reservoir. Gene Shawcroft also provided an overview of the importance of Starvation Reservoir for providing the storage that allows for exchanges necessary to operate the river and to make the Bonneville Unit of The Central Utah Project (CUP) function as it was intended. The following bulleted statements summarize key points brought up in the discussion:

- Water diverted below Myton Townsite Diversion is entirely made up of return flows during the irrigation season. This includes water diverted at Ouray School Diversion, Leland Ditch, and Jenkins Pump.
- Water is delivered based on crop reports that are submitted to the river commissioner on an annual basis. The acreage of crop production dictates the amount of water diverted.
- The Strawberry River above Starvation Reservoir and Currant Creek are not “regulated” because water comes back to the system as return flows.
- Water is delivered according to a “duty” or court distribution order which targets the delivery of 4 acre-feet of water per acre of cropland for the irrigation season (April 1 – October 15). The distribution schedule is based on the typical flow of the river in that early in the irrigation season flow deliveries are low (e.g. 1 cubic foot/second per 160 acres of cropland), at the typical time of peak run-off deliveries are highest (e.g. 1 cfs per 70 acres of cropland), and delivery rates taper off though the irrigation season to their lowest (e.g. 1 cfs per 250 acres of cropland). The delivery schedule for the Duchesne River for the irrigation season accounting for a distribution rate of 4.0 acre-feet of water per acre of cropland is attached (Attachment 1).
- A “duty” distribution schedule has been proposed in dry years since sometime in the 1930’s.
- Starvation Reservoir

- Constructed as part of CUP
- A year-round water right allows CUP storage in Starvation Reservoir during the winter and when prior rights are being met
- Storage includes water from the Strawberry River directly, and from the Duchesne River delivered to the reservoir from Knights Diversion (limited to 300 cfs of Duchesne River flow)
- Storage capacity of Starvation Reservoir is 167,310 acre-feet, 21,400 acre-feet is the CUP yield for irrigation and 500 acre-feet is the CUP yield for Municipal and Industrial uses (M&I), the remainder is to satisfy exchanges for prior water rights
- Starvation Reservoir is a “3-year carry-over reservoir” in that it has storage capacity to meet needs for 3 years.
- Starvation Reservoir is a flood control feature and operates according to U.S. Army Corps of Engineers flood control guidelines. The safe channel capacity below Starvation Reservoir is 1100 cfs. Releases exceeding this amount result in flooding problems downstream.
- Storage in Starvation Reservoir provides for irrigation deliveries downstream which allows for exchange to Strawberry Reservoir through the Strawberry Aqueduct Collection System (SACS) which collects water from the upper reaches of the Duchesne River and Currant Creek. Water stored in Strawberry Reservoir is delivered to Utah Lake through the Diamond Fork System. Stored water in Utah Lake allows for exchange to Jordanelle Reservoir. Jordanelle Reservoir water is delivered to the Wasatch Front as M&I water. A schematic representation of the Bonneville Unit of CUP and features of the lower Duchesne River is attached (Attachment 2).
- The Midview Reservoir (storage capacity is 5000 acre-feet) in addition to Starvation Reservoir has winter storage rights and receives water from the Duchesne River through the Duchesne Feeder Canal. Although it doesn’t happen often, the Duchesne Feeder Canal can dry dam the river in winter (this occurred in the winter of 2002-2003)

Field Tour and Description of River Features

The purpose of this field tour was to gain an understanding of the operation of the lower Duchesne River and the logistics of delivering flows through the lower river to provide for endangered fish needs. As a reference, graphs of USGS gage data on the day of the field trip are attached for: 1) the Uinta River at Randlett (10-15 cfs), 2) the Duchesne River above the Uinta River near Randlett (20-30 cfs) and 3) the Duchesne River near Randlett (25-30 cfs) are attached (Attachment 3a, 3b, and 3c).

Knight Diversion is located on the Duchesne River above the confluence with the Strawberry River and diverts up to 300 cfs for storage in Starvation Reservoir. This is a year-round storage right and diversion. Knight Diversion was not visited during this field tour.

Orchard Mesa Canal diverts water from the Duchesne River at Knight Diversion. Structural features for the Orchard Mesa Diversion are incorporated in Knight Diversion. As mentioned above, this diversion was not visited as part of this field tour.

Rocky Point Diversion is located on the Duchesne River below Knights Diversion and above the confluence with the Strawberry River. Water rights date back to 1905, 1908 and 1964. The river can be dry dammed at this diversion. Rocky Point Diversion was not visited during this field tour. This diversion was modified by the Utah Reclamation Mitigation and Conservation Commission to provide fish passage.

Duchesne Feeder Canal Diversion diverts water to lands north of the river and for storage in Midview Reservoir which has a storage capacity of about 5000 acre-feet. Water rights date back as far as 1861. This is the only diversion below Starvation Reservoir that has a right to divert water outside of the irrigation season. The river can be dry dammed at this diversion and this occurred in the winter of 2002-2003. The Duchesne Feeder Canal was not visited during this field tour.

NOTE: Lake Fork Creek, a tributary to the Duchesne River can be dry dammed above the siphon from Midview Reservoir. Lake Fork Creek converges with the Duchesne River between Myton Townsite Diversion and Ouray School Diversion, above the USGS gage at Myton.

Gray Mountain Diversion is the largest diversion on the Lower Duchesne River. Water rights date back to 1861. Approximately 14,250 acres of crop land are irrigated from this diversion. Water is diverted from the river down a canal about ½ mile before being measured and split (Figure 1). Excess water returns to the river via a small ditch. A concrete sill is present at the actual diversion, but was not in use during this field tour (Figure 2).



Figure 1. Gray Mountain Diversion Canal with Duchesne River in background.



Figure 2. Duchesne River looking upstream at Gray Mountain Diversion.

Myton Townsite Diversion has water rights that date back to 1861. Every year since John Swasey has been river commissioner (since 1988) the river has been dry dammed at this diversion for the irrigation season. A concrete sill and dam crosses the river with the dam elevation about three feet above the water surface elevation on the downstream side (Figure 3). Diversions below this site are made up from irrigation return flows. During this field tour water was leaking through the diversion gate to the river downstream (Figure 3) and John Swasey called the ditch rider and informed him that they were losing water. Approximately 3700 acres of cropland are irrigated from this diversion (Figure 4).

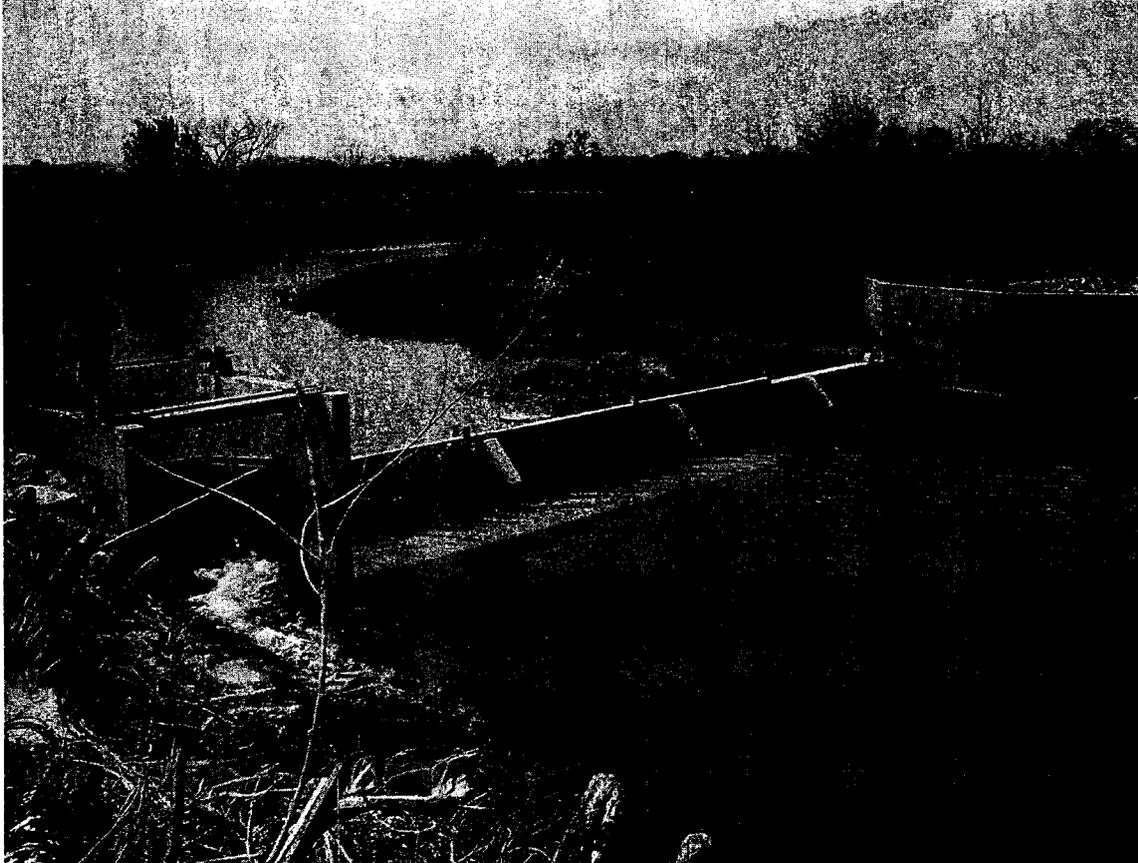


Figure 3. View looking upstream on Duchesne River at Myton Townsite Diversion.



Figure 4. View looking downstream on Duchesne River at Myton Townsite Diversion with diversion ditch to right of photo.

Dude Young Diversion historically diverted water for irrigation, but since the property fed by this diversion was acquired as mitigation, diversions have not been consistent. This diversion was not visited as part of this field tour.

Ouray School Diversion has water rights that date back to 1861. Water diverted here is usually made up of return flow from diversion off Lake Fork Creek. A gravel dam (pile of rocks) in the river directs water into an off-channel canal. Water flows down the canal about 600 yards and is measured and diverted to the irrigation canal (Figure 5). Extra water returns to the river via a small ditch. Approximately 2300 acres of cropland are irrigated from this diversion. This diversion can dry dam the river (Figure 6).

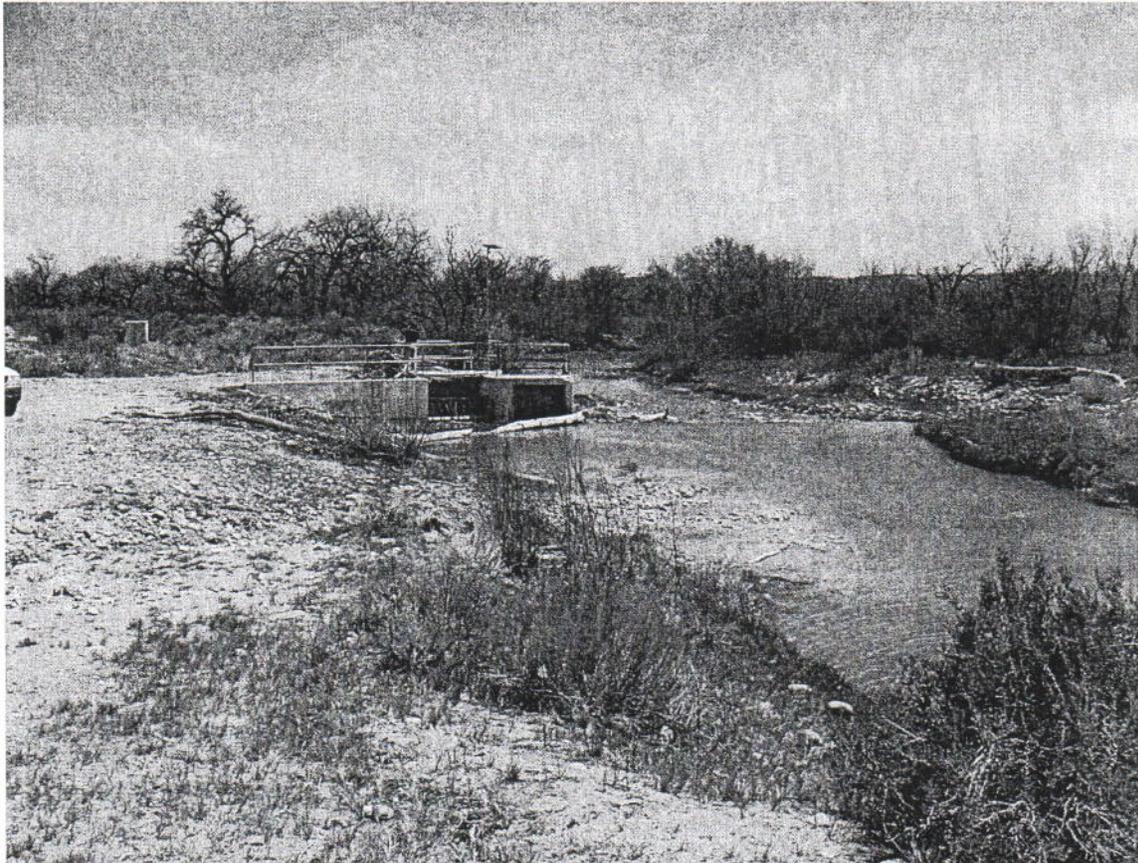


Figure 5. Irrigation Canal that receives water from Ouray School Diversion with measuring gate and overflow channel that goes back to the river.



Figure 6. View looking downstream on Duchesne River at Ouray School Diversion with irrigation canal branching to the left on this photo, Duchesne River branching to the right.

Leland Ditch has water rights that date back to 1861. Approximately 450 acres of cropland are irrigated from this diversion. The diversion consists of a gravel pile which directs the river flow into an irrigation canal (Figure 7). Water flows about 400yards down the canal to a measuring and distribution gate. Overflow at the gate returns to the river via a ditch. This diversion can dry dam the river.

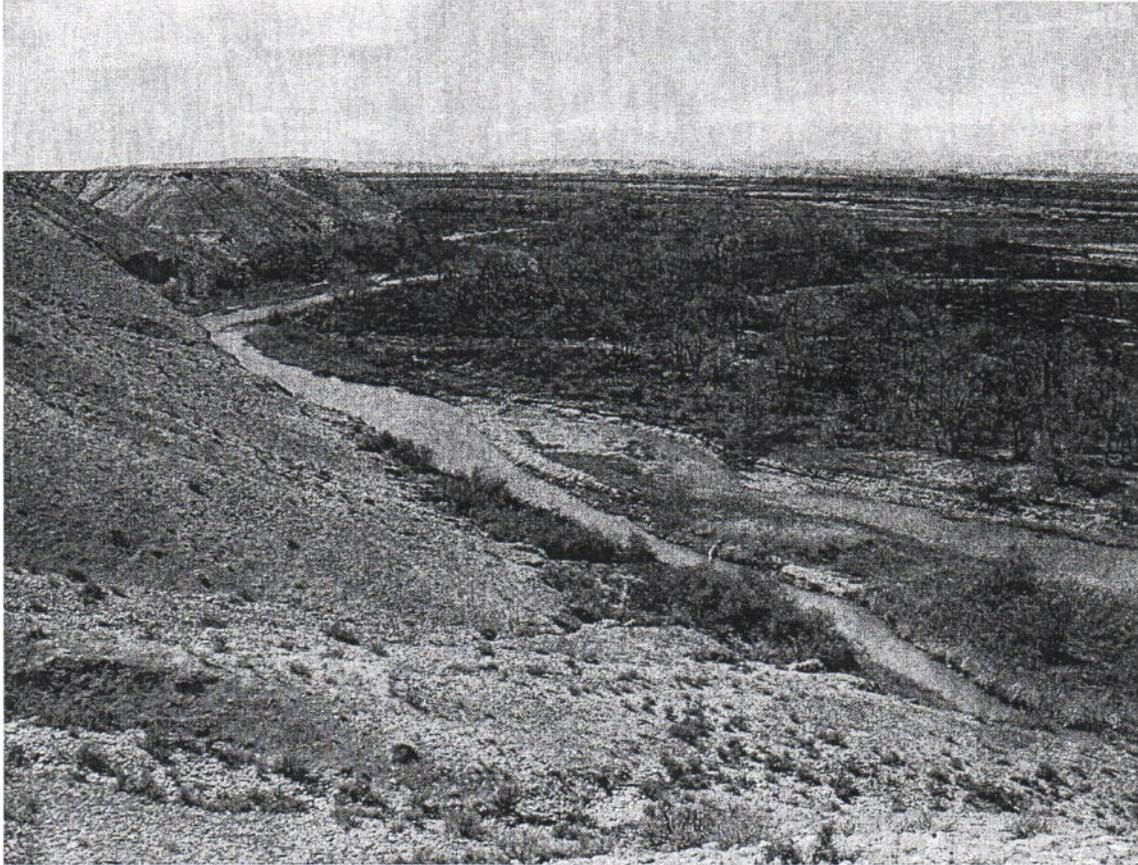


Figure 7. View from bench looking upstream on Duchesne River at Leland Ditch Diversion. The diversion canal forks to the right and is the closer channel in the photo.

NOTE: The Uinta River converges with the Duchesne River below Leland Ditch and above the USGS gaging station at Randlette. The Uinta River is managed by a different river commissioner (not John Swasey). At the time of this field tour, the stage at the USGS gage on the lower Uinta River was being influenced by a beaver dam just downstream from the gage.



Figure 8. View looking upstream on Uinta River just above confluence with the Duchesne River. Cable in background is at gaging station where the stage of the river is being influenced by the beaver dam in the foreground.

NOTE: The field tour included a stop at the USGS gaging station at Randlett. There was a beaver dam upstream of the gage that was directing flow to the south side of the river (i.e. across from the gage house). Some of this flow remained on the south side of the river was not being measured by the USGS gage. This redirected flow joined the main channel just downstream from the USGS gage.



Figure 9. View looking downstream on Duchesne River towards USGS gaging station at Randlett showing braided channel.



Figure 10. View of Duchesne River from USGS Randlett gage showing braided channel and stage differences across channel.

Jenkins Pump has water rights that date to 1962 and amount to about 7-8 cfs. About 600 acres of cropland are irrigated from this diversion. Water is diverted down a canal (Figure 11) into an off-channel pond (Figure 12) and then pumped uphill to another pond. From the second pond water is distributed into a sprinkler irrigation system.



Figure 11. View of Duchesne River at Jenkins Pump Diversion looking downstream. The diversion canal branches off to the left on this photo and the river continues downstream into the background.

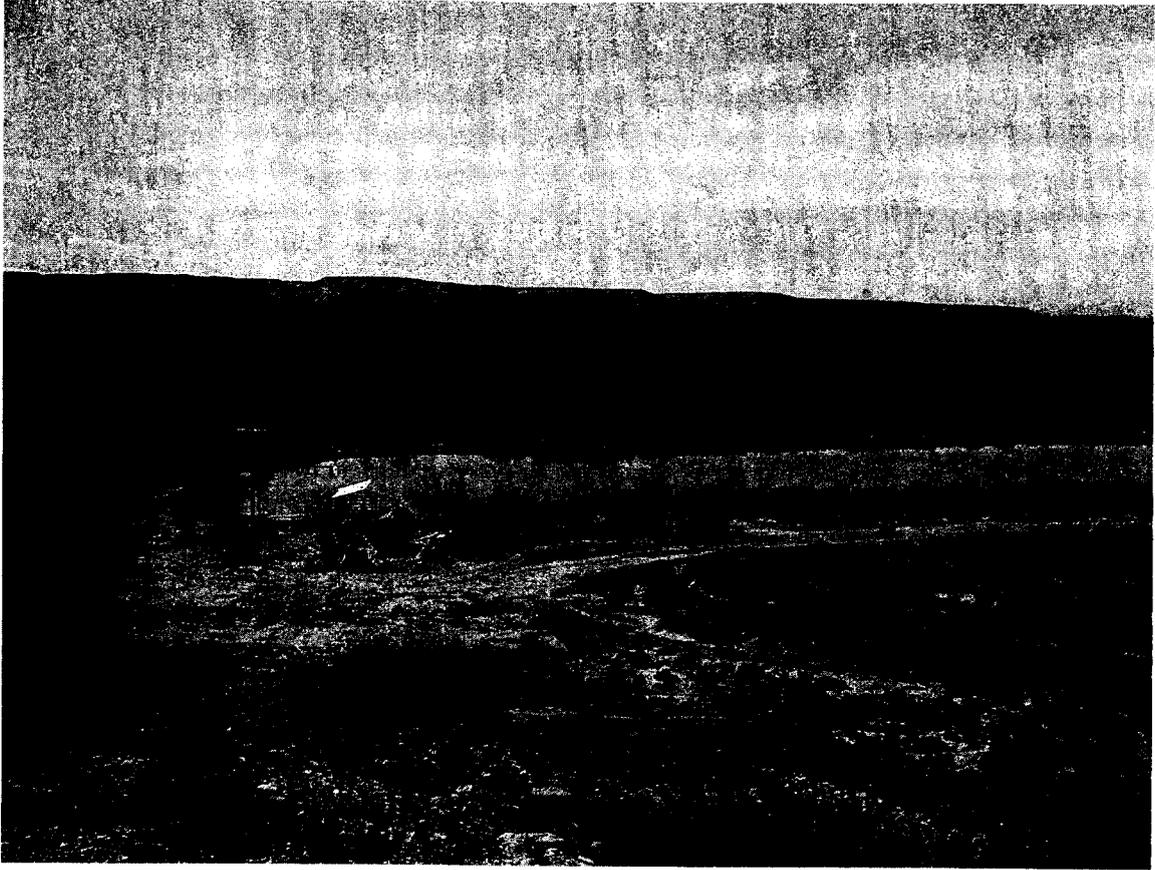


Figure 12. Off-channel pond fed by canal from Jenkins Pump Diversion. Pounded water is pumped uphill to another pond from where it is distributed via sprinkler irrigation.

**DISTRIBUTION SCHEDULE
DUCHESNE – STRAWBERRY RIVER**

DESCRIPTIONS OF DISTRIBUTION ZONES

For the purposes of this Distribution Schedule, the Duchesne – Strawberry River System is divided into three zones which are described as follows:

ZONE I

Zone I includes the lands irrigated between the headwaters of the Duchesne River and the bridge (locally known as the Williams Bridge) on State Route 35 just above the confluence of Rock Creek with the Duchesne River. Zone I also includes the lands irrigated between the headwaters of Red Creek and its confluence with the Strawberry River, excluding Currant Creek.

ZONE II

Zone II includes the lands irrigated between the bridge (locally known as Williams Bridge) on State Route 35 just above the confluence of Rock Creek and the Duchesne River and down to the confluence of the Strawberry River with the Duchesne River.

ZONE III

Zone III includes all the lands irrigated below the confluence of the Strawberry River with the Duchesne River including Indian Canyon.

DELIVERY SCHEDULES

ZONE I

Either Delivery Schedule A or Delivery Schedule B (both shown below) may be used for the distribution of water in Zone I. The Duchesne River Commissioner will determine which schedule should be used for the current year depending upon the climatic conditions existing in Zone I.

ZONE II

Either Delivery Schedule B or Delivery Schedule C (both shown below) may be used for the distribution of water in Zone II. The Duchesne River Commissioner will determine which schedule should be used for the current year depending upon the climatic conditions existing in Zone II.

III

Delivery Schedule C (shown below) shall be used for the distribution of water in Zone III.

DELIVERY SCHEDULE "A" ZONE I

May 1 - October 15, 4.0 Acre-Feet per Acre

<u>PERIOD</u>		<u>DUTY</u>		<u>DELIVERY</u>	
Date (1)	No. of Days (2)	CFS/Acres (3)	AF/Day (4)	AF/Period (5)	Accum AF (6)
				0.298	0.30
May	1-15	1/100	0.01983	0.529	0.83
May	16-31	1/60	0.03306	0.496	1.32
June	1-15	1/60	0.03306	0.458	1.78
June	16-30	1/65	0.03051	0.425	2.21
July	1-15	1/70	0.02834	0.397	2.60
July	15-31	1/80	0.02479	0.372	2.98
Aug.	1-15	1/80	0.02479	0.373	3.35
Aug.	16-31	1/85	0.02333	0.298	3.65
Sept.	1-15	1/100	0.01983	0.198	3.84
Sept.	16-30	1/150	0.01322	0.149	3.99
Oct.	1-15	1/200	0.00991		

DELIVERY SCHEDULE "B" ZONE II

April 20 - October 15, 4.0 Acre-Feet per Acre

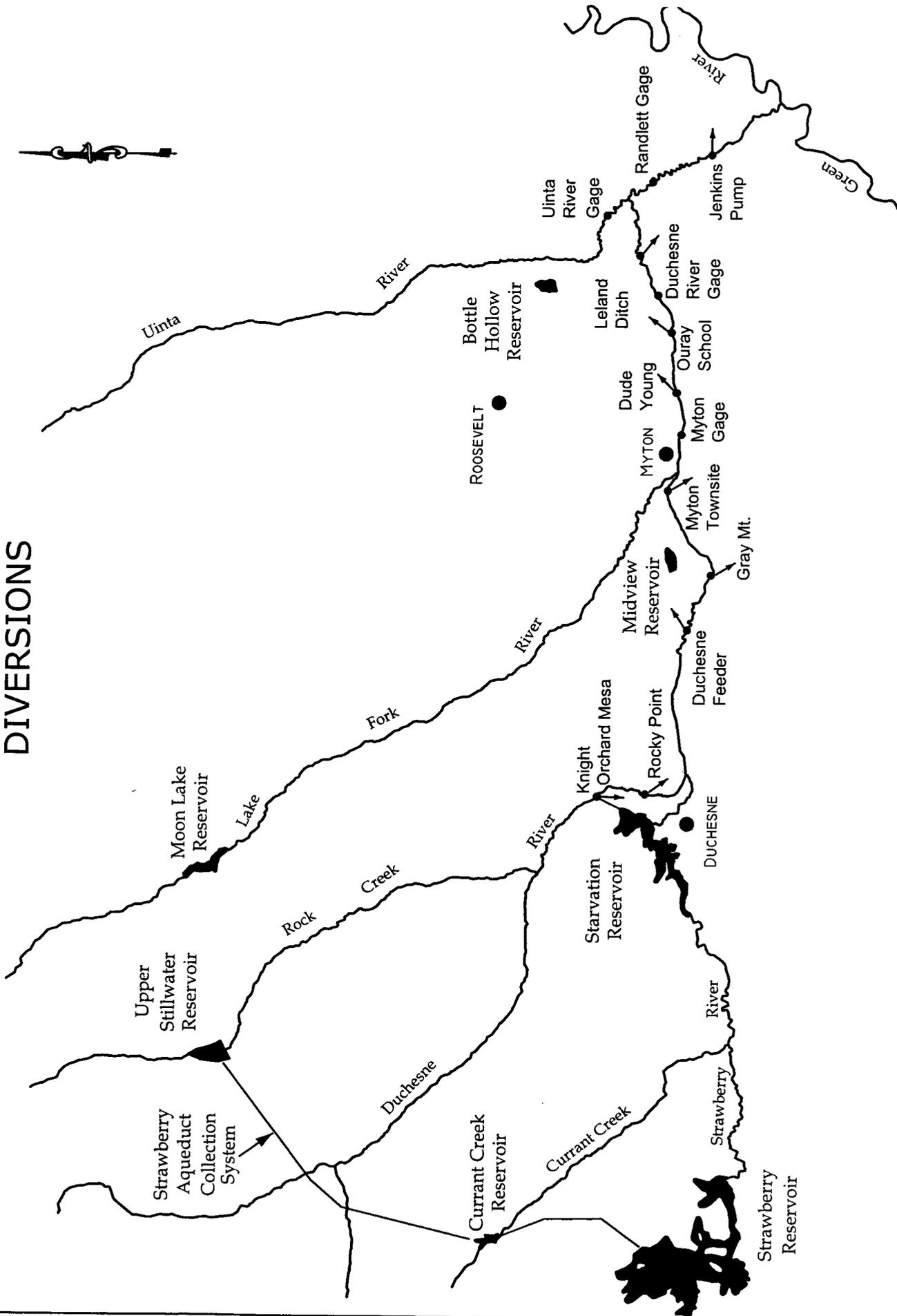
<u>PERIOD</u>		<u>DUTY</u>		<u>DELIVERY</u>	
Date (1)	No. of Days (2)	CFS/Acres (3)	AF/Day (4)	AF/Period (5)	Accum AF (6)
				0.150	0.15
Apr.	20-30	1/145	0.01368	0.298	0.45
May	1-15	1/100	0.01983	0.373	0.82
May	16-31	1/85	0.02333	0.496	1.32
June	1-15	1/60	0.03306	0.458	1.78
June	16-30	1/65	0.03051	0.425	2.21
July	1-15	1/70	0.02834	0.397	2.60
July	15-31	1/80	0.02479	0.372	2.98
Aug.	1-15	1/80	0.02479	0.373	3.35
Aug.	16-31	1/85	0.02333	0.298	3.65
Sept.	1-15	1/100	0.01983	0.198	3.85
Sept.	16-30	1/150	0.01322	0.149	4.00
Oct.	1-15	1/200	0.00991		

DELIVERY SCHEDULE "C" - ZONE III

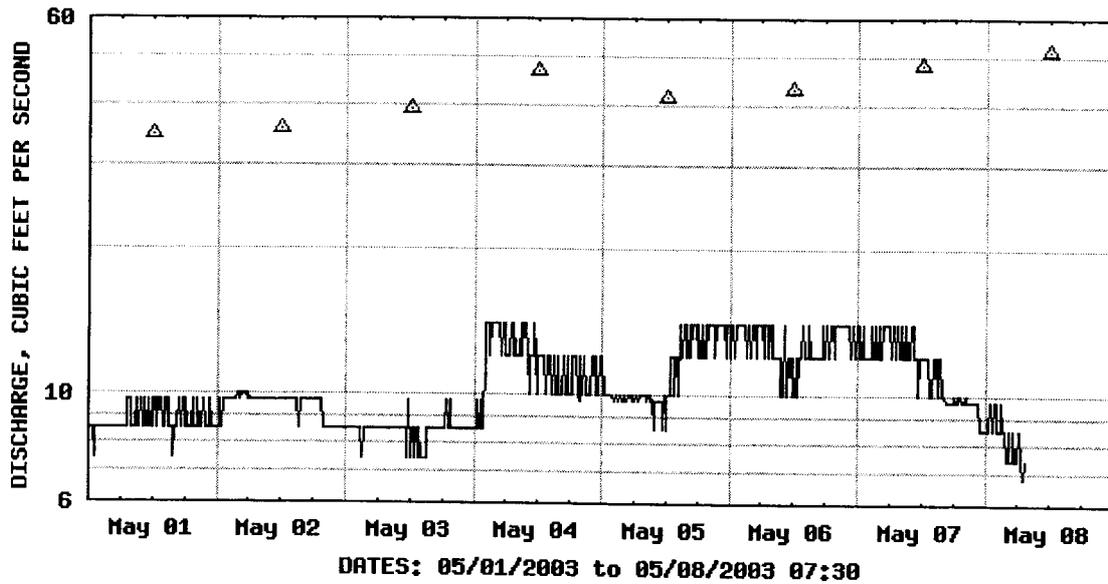
April 1 - October 15, 4.0 Acre-Feet per Acre

<u>PERIOD</u>		<u>DUTY</u>		<u>DELIVERY</u>	
Date (1)	No. of Days (2)	CFS/Acres (3)	AF/Day (4)	AF/Period (5)	Accum AF (6)
April 1-15	15	1/160	0.01240	0.186	0.186
April 16-30	15	1/160	0.01240	0.186	0.186
May 1-10	10	1/125	0.01587	0.159	0.531
May 11-20	10	1/90	0.02204	0.220	0.751
May 21-31	11	1/80	0.02479	0.273	1.024
June 1-10	10	1/70	0.02834	0.283	1.307
June 11-20	10	1/70	0.02834	0.283	1.590
June 21-30	10	1/75	0.02645	0.265	1.855
July 1-10	10	1/75	0.02645	0.265	2.120
July 11-20	10	1/80	0.02479	0.248	2.368
July 21-31	11	1/80	0.02479	0.273	2.641
Aug. 1-15	15	1/80	0.02479	0.372	3.013
Aug. 16-31	16	1/85	0.02333	0.373	3.386
Sept. 1-15	15	1/100	0.01983	0.297	3.683
Sept. 16-30	15	1/150	0.01322	0.198	3.881
Oct. 1-15	15	1/250	0.00793	0.119	4.000

LOWER DUCHESNE RIVER DIVERSIONS



NOT TO SCALE


USGS 09801500 UINTA RIVER AT RANLETT, UT

EXPLANATION

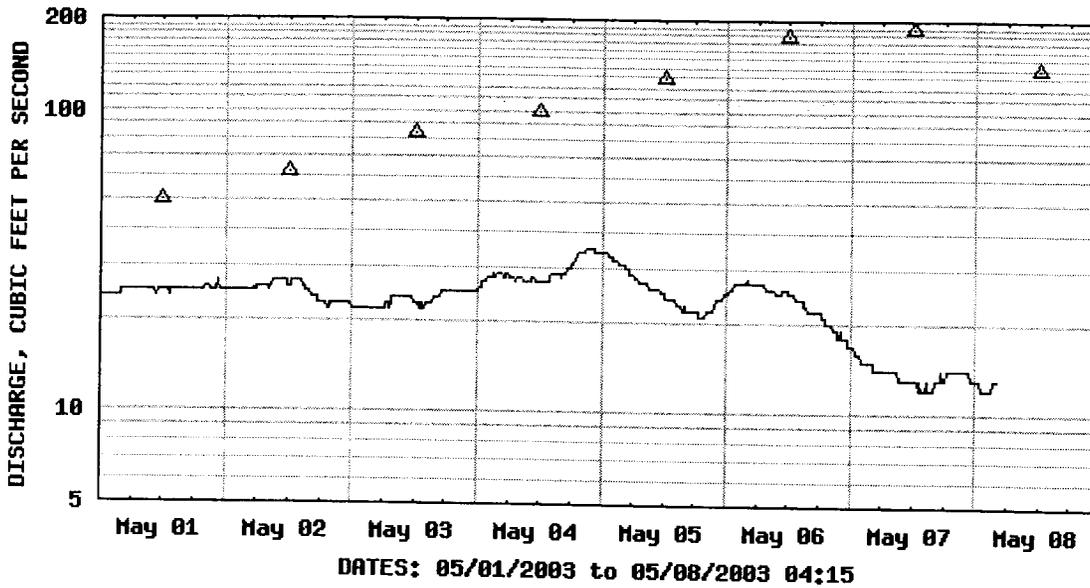
— DISCHARGE

△ MEDIAN DAILY STREAMFLOW BASED ON 10 YEARS OF RECORD

Provisional Data Subject to Revision



USGS 09295100 DUCHESNE R AB UINTA R NEAR RANDETT, UT.

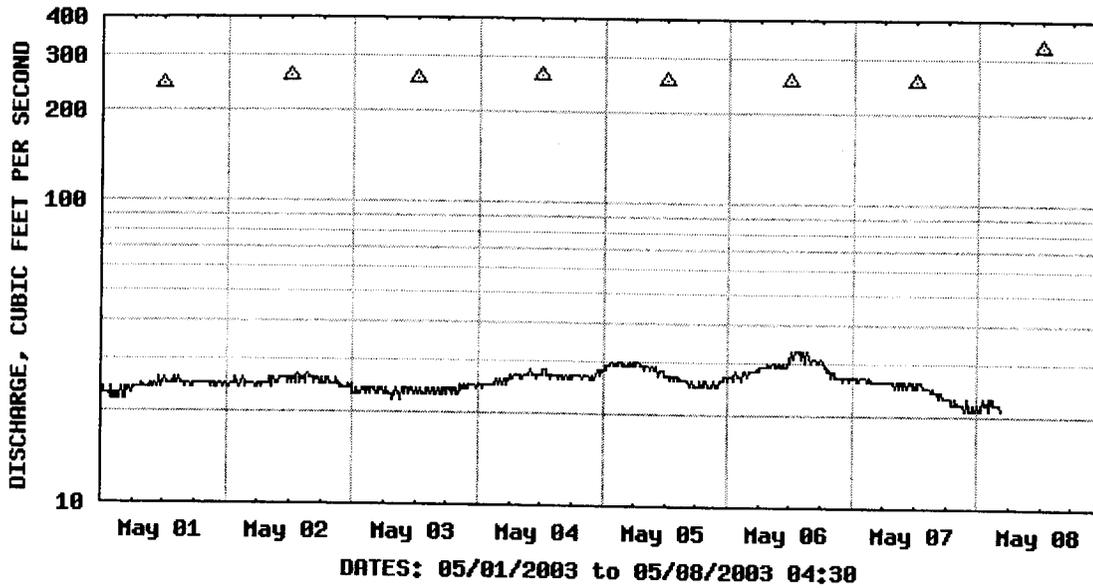


- EXPLANATION
- DISCHARGE
 - △ MEDIAN DAILY STREAMFLOW BASED ON 5 YEARS OF RECORD

Provisional Data Subject to Revision



USGS 09302000 DUCHESNE RIVER NEAR RANDLETT, UT



- EXPLANATION
- DISCHARGE
 - △ MEDIAN DAILY STREAMFLOW BASED ON 60 YEARS OF RECORD

Provisional Data Subject to Revision