WCN-SMcCall
ENV-4.00
PRJ-13.00

[Mailed out 2/10/97; remailed to public 2/13/97]

Subject: Wayne N. Aspinall Unit Operations

Dear Interested Party:

Enclosed is a summary of our January 13-14 meeting to coordinate Reclamation's operation of the Aspinall Unit. Also included is an updated 24-Month Study. The next meeting will be in Grand Junction on **Wednesday, April 16 at 12:30.** Please note that this is one day earlier than we discussed at the operation meeting. Additional details will be sent out later this spring.

Highlights of the January meeting include:

-- Presentations were made Monday afternoon and Tuesday morning by 8 individuals who conduct research on, or manage resources associated with the Aspinall Unit reservoirs and tailwaters. Topics included downstream endangered fish, tailwater trout fisheries, reservoir limnology and fisheries, hydropower generation, stream morphology, woody riparian vegetation in the Black Canyon, recreational use of the Gunnison Gorge, and fish entrainment at Blue Mesa Reservoir. The presenters did an excellent job of disseminating information on how river flows and reservoir levels influence these resources.

--Above average snow conditions were recorded on January 1 snow courses. The most probable inflow to the Aspinall Unit is estimated at 150-160 percent of normal based on January 1 conditions. A lot can change between now and spring runoff, but most probable forecasts show Blue Mesa Reservoir filling, Crystal Reservoir spilling, and relatively high flows through the Gunnison Gorge in parts of May, June, and July.

If you have questions, please call me at (970) 248-0654.

Sincerely,

Ed Warner
Water Resources Group Chief

Enclosure

cc: Chief, Curecanti Field Division, Attention: CCI-100, 1820 South Rio Grande Avenue, Montrose CO 81401

Regional Solicitors Office, Attention: Scott Loveless, 125 South State Street, Room 6201, Salt Lake City UT 84138

Regional Director, Salt Lake City UT
Attention: UC-288, UC-297, UC-600, UC-320, UC-332
(ea w/copy of encl)

bc: WCN-CDeAngelis, -DMutz, -EWarner, -CStanton, -MSteves, -LWest, -SMcCall, -JWright, -RStorbo, -KFogelquist
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Aspinall Unit Operation Coordination Meeting
January 13 and 14, 1997

Presentations: Prior to the regular operations meeting, Reclamation and NPS sponsored two half-day sessions in which researchers and managers made presentations on various resources and how they relate to river flows and reservoir operations.
Excerpts from these talks are included at the end of this report.

Operation Meeting: An attendance list for the operation meeting is attached. The purpose of these meetings-- held in January, April, and August-- is to develop recommendations for operation of Blue Mesa, Morrow Point, and Crystal Reservoirs. These recommendations are then included in the overall 24-month study for Reclamation Upper Colorado reservoirs. Recommendations are based on projected inflows to the reservoirs, the need to protect existing water rights, minimum flow levels, target elevations for reservoirs, flows for endangered fish and other resources, recreation, hydropower needs and other factors. In addition, the meetings are used to coordinate activities between agencies, water users, and others. Handouts provided included background data on projected inflows to the reservoirs and potential operation plans under maximum, most, and minimum probable inflows.

August-December 1996 Operation: In this period, Crystal Reservoir releases were reduced as Gunnison Tunnel diversions decreased. Following the irrigation season, flows in the Gunnison Gorge and Black Canyon were around 1,200 cubic feet per second (cfs). Reservoir inflows were higher than projected, and Blue Mesa Reservoir levels were around 2 feet above the December 31 target level at the end of the period. Releases were increased in January to approximately 1,850 cfs. Transformer replacement problems at Crystal continued to limit hydropower production flows to around that amount. No major problems occurred during the period.

Proposed January-April Operation: Snow measurements in the Gunnison Basin were approximately 169 percent of normal on January 1, and most probable inflow to the Aspinall Reservoirs this year is projected at 150-160 percent of normal. Under most probable conditions, Blue Mesa Reservoir will fill in late June or early July. **Average** monthly flow projections in the Black Canyon and Gunnison Gorge under most probable conditions were presented: 1,700-2,000 cfs in February; 2,200 cfs in March; 3,400 cfs in April; 3,000-3,500 cfs in May and June; and 2,700 cfs in July. Average flows in August are projected at 2,000 cfs with averages around 1,000 cfs for the remainder of the year. These projections are based on early January snow course data and will change as changes in snowpack occur. Daily peaks may be significantly higher than monthly averages and will be influenced by air temperatures and precipitation during the runoff period. Recreation levels in the reservoirs should be very good. River flows through the Black Canyon and Gunnison Gorge will be high, as shown above, and it should be remembered that flows during high runoff years such as predicted are very **difficult to predict** and can **change suddenly**.

The operation group accepted the planned operation and requested the following items be incorporated if possible: If the peak can be “directed” from June toward the last 2 weeks of May it would benefit trout fisheries and recreation and would be compatible with downstream endangered fish needs. Since Crystal is expected to spill, it is requested that special efforts be made to reduce daily river fluctuations. It was also agreed that the replacement of the Crystal transformer should be completed as early in the spring as possible to increase operational options; however, all agreed that safety considerations of transporting the transformer down the access road (steep, snowpacked) will be the deciding consideration.

Special Flow Requests: The Colorado Division of Wildlife requested 600 cfs from September 29 to October 2 for their annual fish census. This level is needed in the Ute Park area by 10 am on the 29th and flows can increase after noon on the 2nd. No other special flows were requested. The National Park Service has scheduled their paleontological excavations at Blue Mesa for the period after runoff; a reservoir elevation around 7,912 feet in August would be helpful for this work.

Agency/Organization Activities and Comments
(additional input can be found at the end of this report)

National Park Service - Work for 1997 will include support of the limnology studies on Blue Mesa, the paleontology excavations at Blue Mesa, and a continuation of creel census work. No special studies are planned in the Black Canyon this year.

Colorado Division of Wildlife - Sherman Hebein reported that, while there was a strong 1996 year class of rainbow trout in the Gorge in August and September, most of these fish were heavily infested with whirling disease and survival has been insignificant based on field surveys. The Division plans to stock 3-5" Colorado River strain rainbows in the Gunnison Gorge in the fall of 1997 to compensate for whirling disease losses. Brown trout continue to maintain excellent numbers through natural reproduction. The kokanee spawning operation at Roaring Judy Hatchery is scheduled for October and early November.

Western Area Power Administration - Clayton Palmer expressed concern that restrictions at Glen Canyon and Flaming Gorge reduce the flexibility of the power system. More flexibility at Morrow Point would help this situation. It was not clear what increased flexibility would mean to downstream river flows; but the operation group expressed concern about increases in daily fluctuations. The National Park Service also was concerned if this would affect recreation on Morrow Point. It was agreed that a small meeting would be held between WAPA and Reclamation for clarification, then information would be provided to the operation team.

Fish and Wildlife Service - The 5 years of fieldwork on endangered fish in the lower Gunnison River is complete. A “synthesis report” on the individual studies will be completed in February 1998. Operation of the fish ladder at the Redlands will resume in the spring. In terms of peak flows, a peak in May

is fine for endangered fish. The FWS reported that the upcoming biological opinion on reservoir operations would probably set a basic framework to protect endangered fish and call for adaptive management so that results could be monitored and adjustments made in operations. There was some discussion on whether the study period provided adequate flows, especially dry year flows, for research. The Colorado Water Conservation Board pointed out that the range of flows originally requested was met.

Bureau of Reclamation - The transformer at Crystal is now scheduled for replacement in spring of 1997, as soon as it can be transported down the access road safely. Reclamation will have a “fax tree” in place to provide more timely flow information, especially during spring runoff when conditions change rapidly. Work on one of the units at Blue Mesa will be done at the end of February and first of March; and oil leaks at the Morrow Point transformers will be repaired beginning in late October. Neither of these actions should affect releases from Crystal.

Colorado River Water Conservation District - The District requested information on the “NPS contract” process, in reference to efforts to resolve and quantify the Black Canyon Monument’s reserved water right. NPS plans to tie into the endangered species consultation schedule so that issues can be resolved concurrently. It was pointed out that the reserved right would be based on specific Monument needs, and downstream endangered fish would not be one of them.

U.S. Geological Survey - Final report on entrainment of fish at Blue Mesa is being prepared. There will be no fieldwork this year. The Survey strongly recommends resuming entrainment monitoring in the future when low reservoir levels occur. The Survey is also working on installation of a river gage on the North Fork near Hotchkiss.

Upper Gunnison District - Mentioned that water quality should always be considered in addition to water quantity. There are four NAWQA water quality sites in the basin that can provide data--Whitewater; at the Tunnel; between Blue Mesa and Gunnison; and on the East River.

Butch Clark (POWER) - Programs such as this are important and it is important that information be pulled together and discussed in a public forum.

Water Accounting

Randy Seaholm of the CWCB, and Chuck Pettee of the National Park Service reported that the water accounting group is still working on spreadsheets for allocating reservoir releases. Discussions with the State Engineers Office are needed to clarify some of the questions on accounting.

Next Meeting - The next operation meeting will be on **April 16 at 12:30** in Grand Junction (this is a change from the date discussed at the operation meeting). More information will be mailed out on this meeting later.

Excerpts from Presentations on January 13-14

Formal papers have been prepared, or are being prepared related to these studies. Reclamation and other agencies maintain a library of these for use in Aspinall Unit studies.

1. Status of endangered fish studies and Synthesis Report--Chuck McAda, FWS

The FWS is leading an interagency group in preparing a Synthesis Report based on physical and biological studies conducted on the Gunnison and Colorado Rivers over the last 5 years. These studies include general geomorphology studies, a site specific geomorphology study, habitat studies, fish passage monitoring, fish community inventory, larval drift inventories, non-native fish investigations and others. The draft of the report is scheduled for December 1997, and the final in February 1998.

Several preliminary flow numbers are coming out of the individual studies; duration of flows will be addressed in the Synthesis Report:

- 7,000 cfs (at Whitewater) to scour and maintain side channels
- 12,000 cfs (at Whitewater) to flush sand and silt from bars and pools
- 17,000 cfs (at Whitewater) to flush gravel from pools
- 950 cfs (at Whitewater) to maintain riffles during summer
- 1,000 cfs (at Whitewater) qualitatively seen as a good base flow
- 8-10,000 cfs (at Whitewater) as a flow for initial flooding of important wetland habitat
- 300 cfs (Below Redlands gage) to provide fish passage downstream from Redlands

In the Colorado River downstream from the Gunnison, initial bed movement occurs between 12,000 and 20,000 cfs; and major bed movement occurs between 39,000 and 48,000 cfs.

Fishery studies have shown a high percentage of native species in the Gunnison River compared to other rivers in the region. Ten Colorado squawfish were seen or caught during the study, and tracking of five tagged fish showed a possible spawning congregation between Escalante and Whitewater. One squawfish used the fish ladder, which was not placed in operation until late in the migration period. No wild razorback suckers were documented; small numbers were stocked downstream from the Hartland Dam in 1995 and 1996, and this will increase in 1997. There was some indication that non-native numbers were suppressed by high flows.

2. Importance of hydropower generation at the Aspinall Unit-Jeff Ackerman, WAPA

Jeff made an interesting presentation on the importance of the Unit in the big power picture. An overall view of power distribution in the west was presented. Colorado River Storage Projects like the Aspinall Unit are important in responding quickly to demand fluctuations in the western systems--in effect these units can be “turned on” instantly, unlike coal-fired plants. Under WAPA contracts, both energy and capacity are sold. Peaking limitations at Flaming Gorge and Glen Canyon increase the importance of the peaking ability at Blue Mesa and Morrow Point. Reclamation controls Crystal Reservoir releases to stabilize flows, while WAPA schedules the timing of daily releases from Blue Mesa and Morrow Point.

3. Blue Mesa limnology and fishery-Brett Johnson, CSU

Dr. Johnson has been directing a 3-year study on Blue Mesa's productivity and fishery with a goal of being able to predict the effects of reservoir operations on the productivity and fishery. The study is also providing very helpful data for the management of the fishery. Three components of the study were presented:

Limnology sampling (physical measurements, plankton surveys)
Fish sampling (hydroacoustics, gill nets, creel census)
Computer modeling (reservoir thermal model, bioenergetic model)

Blue Mesa is one of the most important recreational fisheries in Colorado and is considered by some a world class kokanee fishery. Most of this is supported by *Daphnia*- tiny zooplankton which in turn are very much controlled by the thermal structure of the reservoir. Temperature drives production of food organisms, as well as the consumption rates of predators. In addition, thermal structure controls internal nutrient cycling and can isolate or

concentrate predators and prey. Data from three sources-gill nets, creel census, and hydroacoustics-indicate a downward trend in the population of adult kokanee, which is yet to be explained with certainty. An upward, and perhaps related, trend in lake trout populations is also occurring.

4. Status of Blue Mesa and Gunnison Gorge Fisheries-Sherman Hebein, CDOW

The CDOW has 15 years of consecutive data on the Gunnison Gorge trout fishery. This data has been correlated with reservoir releases over the years, and one conclusion has been that large fluctuations, particularly in June, can lower the reproductive success of rainbow and brown trout in this river. Data from 1994-1996 shows almost a complete loss of rainbow trout recruitment; most probably due to whirling disease. Stocking of Colorado River strain rainbows is scheduled for the fall of 1997 and 1998, which will be the first stocking of this river in many years. Brown trout are still doing well in the river.

At Blue Mesa Reservoir, angler hours have decreased from 450,000 in 1993 to around 200,000 in 1996 for three possible reasons: a decline in the catch/hour rate; negative publicity about flooding in area; and negative publicity about whirling disease. The last two factors probably have no real effect on the reservoir fishery, but do affect the anglers' perceptions. Based on recent studies, several changes are being made in reservoir management: adjusting the location of rainbow stocking; possibly increasing kokanee stocking, and liberalizing lake trout harvest.

5. Occurrence and significance of hyporheic zones in the Gunnison River-Jack Stanford, University of Montana

Dr. Stanford has studied changes in the Gunnison River downstream from the Aspinall Unit for 20 years and has concentrated on the relationship between geomorphology, food webs, fisheries, and changing water temperatures. Overall goals include providing data for natural habitat restoration and maintenance. His talk concentrated on the importance of the floodplain, stream gravels/cobbles, and the hyporheic zone (zone of river influenced groundwater) in maintaining the invertebrate populations and providing habitat for young fish. In the Gunnison Gorge the broader floodplain zones, not the canyon reaches, are critical to fisheries. In low water years, fine material can basically seal the bottom of the river to the detriment of invertebrates and fish. Occasional high flows are very important in maintaining the quality of gravels and cobbles, and stable base flows are also important. The magnitude of peak flows is probably more important than the duration; as far as frequency of large peaks, try to provide them during wet years.

6. Distribution and abundance of woody riparian vegetation in Black Canyon of the Gunnison National Monument-Jonathan Friedman, U.S. Geological Survey

Vegetation scouring in the Monument has been reduced since construction of the Aspinall Unit. Historic photos show a markedly different canyon than now exists. Riparian vegetation, including box elders, have been monitored for several years with a goal of determining flow needs to maintain a more historic vegetation condition. Before the Aspinall Unit, shear stress of high spring flows was the major controller of vegetation; after the Unit, inundation became more important. An interesting sidelight of the study is that the exotic plant tamarisk may be declining in the Monument.

7. Recreation use in the Gunnison Gorge-John Arkins, Bureau of Land Management

Much of the river in the Gorge has been recommended for inclusion in the Wild and Scenic River system, and much of the area is under management as a Wilderness Study Area. Fishing is the number one recreational pursuit; sports like kayaking have increased significantly--100 launches in 1990 versus 1000 in 1996. Total visitation continues to increase, although high water years like 1995 reduce use. Vandalism at trail heads is a continuing problem. River levels affect the safety and recreation experience. Based on interviews with users, guides, and agency personnel the following flow guidelines are used (flows as measured at “below tunnel” gage):

Hike-in Fishing: 500-1,200 cfs is ideal
Wading River: <800 cfs to cross
Float fishing: 800-2,200 cfs is best
Whitewater boating: 1,000-5,000 cfs
Hazardous floating conditions: below 500 cfs and above 5,000 cfs. The river above 10,000 cfs is considered very dangerous.

8. Fish entrainment at Blue Mesa-Gordon Mueller, U.S. Geological Survey

This study has included monitoring fish loss through Blue Mesa Dam and hydroacoustic studies to determine fish distribution in relation to the outlet works of the dam. Losses were monitored for 3 years using sieve nets attached to the dam discharge. Estimated losses of fish ranged from around 1,000 in 1994 to 60,000 in 1995. An estimated 96 percent of the fish that are lost are kokanee salmon. A small percent (10-30 is very rough estimate) of the fish survive and move into Morrow Point Reservoir. In terms of Blue Mesa fisheries and fish populations, the loss is not considered significant and does not explain the observed kokanee decline in the reservoir.

Loss rates do not correlate well with reservoir operations under the conditions monitored; however, a period of low reservoir levels and high releases was not tested. When these conditions next occur, it is recommended that sampling be resumed.

Distribution List - January 13-14, 1997 Aspinall Meeting
*An asterisk indicates person attended the meeting

Individuals . . . . . Ruth Hutchins
Argonne National Laboratory . . . . . John Hayse*
Club 20 . . . . . Greg Walcher, Shane Henry*
Colorado State University . . . . . Brett Johnson*
Environmental Defense Fund . . . . . Jim Martin
Gunnison Basin POWER . . . . . Ralph (Butch) Clark*
Gunnison River Expeditions . . . . . Hank Hotze*, Bo Gates
High Country Citizens Alliance . . . . . Steve Glazer
Trout Unlimited . . . . . Pat Oglesby*
Western Colorado Congress . . . . . Fred Wetlaufer
University of Montana . . . . . Jack Stanford*
City of Grand Junction . . . . . Greg Trainor
Colorado River Water Conservation District . . . . . Mike Gross*, Dave Kanzer*
Ray Tenney*
North Fork Water Conservancy District . . . . . Tom Alvey*
Redlands Water and Power Company . . . . . Gregg Strong
Uncompahgre Valley Water Users Association . . . . . Jim Hokit*, Mark Catlin
Upper Colorado River Commission . . . . . Anne Englert*
Upper Gunnison River Water Conservancy District . . . . . Tyler Martineau*
Colorado Department of Agriculture . . . . . Jim Miller
Colorado Division of Water Resources . . . . . Ken Knox*
Colorado Division of Wildlife . . . . . Rick Anderson
Robert Caskey, Pat Martinez*
Sherman Hebein*
Dan Braugh*
Colorado Water Conservation Board . . . . . Peter Evans, Gene Jencsok, Randy Seaholm*
Wyoming State Engineers Office . . . . . John Shields
Army Corps of Engineers . . . . . Grady McNure
Bureau of Land Management . . . . . John Arkins*, Allan Belt
Roy Smith
Dennis Murphy*
Fish and Wildlife Service . . . . . John Hamill
Reed Harris
Chuck McAda*
Terry Ireland*, Rick Krueger*
George Smith, Sam Williamson
National Park Service . . . . . Chuck Pettee*, Mark Wondzell*
Rick Harris*, Sheridan Steele*
Myron Chase*, Dave Roberts
National Weather Service . . . . . Jim Pringle
U.S. Geological Survey . . . . . Paul von Guerard*, Bob Jenkins
John Elliot
Gordon Mueller*
Jonathan Friedman*
Western Area Power Administration . . . . . Gary Burton*
Jeff Ackerman*, Kathy Crane*
Clayton Palmer*
Reclamation . . . . . Coll Stanton*, Ed Warner*
Steve McCall*, Russ Storbo*, Lorrie West*
Rick Gold, Paul Davidson*, Chris Karas, Ron Sutton*, Tony Morton
Jim Schumacher*, Gary McDermott*