**Approved by Management Committee 02-28-06**

# UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

# COORDINATED RESERVOIR OPERATIONS

# IMPLEMENTATION PLAN

## INTRODUCTION

Coordinated Reservoir Operations (CRO) originated with the Coordinated Reservoir Operations Study which was a component of the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program). The purpose of the study was to identify operational flexibility in existing water storage reservoirs (both federal and private) that could be used to enhance peak flows in the 15-Mile Reach of the Colorado River (the reach between the Grand Valley Irrigation Co. diversion dam and the confluence with the Gunnison River) to benefit endangered fish species and their habitat without reducing a project's yields, increasing costs or affecting a project's water rights. The study team released a draft interim report in August 1996. While the interim report raised a number of issues, the study team identified some operational flexibility in individual facilities that could be used to enhance spring peak flows during water years in which near average, or better, runoff conditions exist.

In water years with significantly above average runoff conditions, the potential for peak flow enhancement is diminished due to flood concerns and the relatively minor contribution peaking operations would have on total flows on a percentage basis. Conversely, in water years with below average runoff conditions there is little, if any, flexibility in modifying reservoir operations to enhance peak flows without affecting reservoir yields. It was further recognized by the study team that while individual facilities possess only limited ability to enhance spring peak flows, coordination of releases of inflow[1] and/or filling patterns of multiple reservoirs may result in spring peak flow enhancement that may be beneficial to endangered fish species and their habitat without adversely affecting reservoir yields. Based upon the findings of the study, the participants decided to go ahead and were successful in enhancing the spring peak flows through coordinating reservoir operations in the spring of 1997. This coordination has continued since 1997 in years when the 15-Mile Reach flows have been in a desired range for enhancement and when the participating reservoirs have had the ability to participate. During 1998 and 1999, a total of 65,000 acre-feet of water was released to support spring flows, which on average added 2,000 cfs to the annual peak flows. Coordination of reservoir operations was curtailed in 1997 because flows at Cameo exceeded 26,000 cfs which is the upper bound of when CRO is possible.

1 The term “release of inflow” is used to describe inflows to a reservoir that pass directly through a reservoir without being stored in the reservoir. Stated another way, such “releases of inflow” do not constitute a release of any water that has been previously stored. It is further intended that such “releases of inflow” will pass through any hydropower facilities and will not bypass any hydropower facility unless determined to do so at the operator’s sole discretion.

The plan outlined below was developed under the CRO Study and provides the basis for implementing the CRO process used to coordinate the efforts of individual reservoir operators to enhance peak flows to assist in maintaining and improving fish habitat in the 15 Mile Reach of the Colorado River without affecting the yields or water rights of the reservoirs involved.

**Background and Ground Rules**

The objective of Coordinated Reservoir Operations is to coordinate, on a voluntary basis, releases of inflows from various reservoirs upstream of the 15-Mile Reach of the Colorado River mainstem to enhance habitats in the 15-Mile Reach without exceeding the National Weather Service flood stage of 12.0 feet at Cameo. These are releases of inflow that are normally passed through the participating reservoirs, typically toward the end of the runoff period. Coordinated Reservoir Operations shifts those releases of inflow to the peak of the runoff hydrograph to enhance spring peak flows, which are important to spawning and the improvement and maintenance of aquatic habitat. Coordination and modification of operations are voluntary and occur within current authorizations and guidelines, without affecting project yields or water rights of participating reservoirs. It is important to note that the releases of inflow are not releases of stored water, but simply a release of inflow that would otherwise have spilled or been released at a later time because the reservoir filled. Thus, coordinated reservoir operations only change the timing of the releases that would have traditionally occurred and therefore does not impact reservoir yield.

## IMPLEMENTATION PLAN

The objectives of this implementation plan are to establish a Coordination Committee and Coordination Process in an attempt to enhance peak flows at certain times to assist in the recovery of the endangered fish species.

National Environmental Policy Act compliance should not be triggered as a result of implementing this process because reservoir operations will not exceed their traditional operational ranges and that the operations will be consistent with existing institutional authorizations, commitments and constraints.

**Participating Entities and Facilities**
The following entities have agreed to participate in this coordination process:

| Participating Entity | Participating Facility |
|---|---|
| Colorado River Water Conservation District | Wolford Mountain Reservoir |
| Denver Water | Williams Fork Reservoir |
| | Dillon Reservoir |
| Colorado Springs Utilities | Homestake Reservoir |
| Bureau of Reclamation | Green Mountain Reservoir |
| | Ruedi Reservoir |
| (in consultation w/ NCWCD) | Granby & Willow Ck Reservoirs |
| Northern Colorado Water Conservancy District (NCWCD) | Windy Gap Project |
| Recovery Program for the Endangered Colorado River Fishes | |
| U.S. Fish and Wildlife Service | |
| National Weather Service | |
| Colorado Water Conservation Board | |
| Colorado Division of Wildlife | |
| Colorado Division of Water Resources, Division 5 Office | |
| Southeastern Colorado Water Conservancy District | |

This list may be expanded as other entities join the effort.

**Establishment of Coordination Committee**
A Coordination Committee will be established to provide a forum to consider and plan for the annual coordination of reservoir operations. The committee will initially be composed of representatives from each of the participating entities listed above. As other entities that may contribute to the process are identified, they can be added to the committee.

Since significant future water resource developments in the Colorado River above the 15-Mile Reach will likely be based upon development of water supplies from the spring peak, future water resource developers/operators will be encouraged to participate in this coordination process.

**Contributions of Participants**
Participation in the coordination process will be on a voluntary basis. The Committee will strive for consensus; however, individual reservoir operators will retain full and ultimate control of their facilities. It is understood that hydrologic conditions can change; necessitating changes in planned reservoir operations. Participants in CRO will make their best efforts to communicate changes in reservoir operations to all other participants.

A representative from the Colorado Water Conservation Board will act as chair for this process. If in the future the Colorado Water Conservation Board cannot provide the necessary staff, a rotating chair will be considered. The chair is responsible for organizing and facilitating the

meetings of the committee each year. This will involve a fair amount of work given the number of participants and issues potentially involved. The entities involved have agreed to provide the following services in support of coordinated operations:

- National Weather Service - Reservoir inflows and peak flow projections (estimated discharge and range of dates of occurrence);
- Colorado Water Conservation Board - Access to and use of the Colorado River Decision Support System (CRDSS) and other technical support as may be needed;
- Colorado Division of Wildlife - Input to the Committee on fisheries, habitat and related issues;
- Colorado Division of Water Resources, Division 5 Office - Advice to the Committee on water right and river administration issues and reservoir storage and release accounting;
- Participating Reservoir Facility Operators - Development of annual operating plans for their individual storage facilities and any releases of inflow as may be agreed on and feasible to enhance peak flows in the 15-mile reach;
- Recovery Program staff - Guidance regarding annual recovery flow targets, monitoring of effects of coordinated reservoir operations and evaluation of the contribution of coordination efforts toward recovery of the endangered fish species and progress of the Recovery Program.
- Reclamation, Colorado Water Conservation Board and Recovery Program staffs - Joint responsibility for developing and issuing press releases to keep the public informed of the status of the coordination efforts.

## COORDINATION PROCESS DESCRIPTION

During the first few years of implementation of the coordination process, public meetings were held in the basin in January or February to present the concept of coordination of discretionary releases of inflow. These meetings were used to inform the public about the process and potential operations that may affect them and to solicit feedback on the coordination process. In the future, the CRO meetings may be held in conjunction with the Ruedi Reservoir annual operations meeting or other public meetings addressing similar river operation issues in order to be more efficient. The process for implementing CRO each year is described below.

### 1. Receipt and Consideration of National Weather Service Projections

In early April of each year, following receipt of projected hydrologic data from the National Weather Service and other information, the reservoir owner/operators will hold a meeting or conference call to determine whether or not peak flows in the coming runoff season for the 15-Mile Reach can and should be enhanced. As the runoff season progresses the entities will communicate and may revise the determination in response to current hydrological information. The Fish and Wildlife Service has asked the CRO group to attempt to enhance peak flows in the 15-Mile Reach when flows between 12,900 and 26,000 cfs can be achieved through CRO.

## 2. Development of Initial Annual Operating Plans

Once it is determined that peak flows can and should be enhanced during the upcoming runoff season, participating reservoir operators will develop two initial annual operating plans (AOPs) for their facilities for the runoff season. The first plan will project reservoir operations with no consideration for peak flow enhancement (Traditional AOP). The second would give consideration to enhancing spring peak flows (Peak Enhancement AOP). The Peak Enhancement plans will have the goal of releasing inflows during a ten day period around the estimated natural peak flows in the 15-Mile Reach. The operating plans may include reasonable maximum, most probable and reasonable minimum runoff conditions. The Traditional AOPs will be based on the operational parameters traditionally used in determining reservoir operations for each participating facility. The Peak Enhancement AOPs will give consideration to peak flow enhancement at the Cameo gage as well as other required operational parameters, including the peak flows at all critical downstream gages. The National Weather Service will continue to monitor and revise the stream flow forecast and timing of the peak flows at the Cameo gage.

## 3. Preparation for Coordinated Releases of Inflow

Following the development of individual operating plans, the participating entities will meet or hold a conference call to present their plans and prepare for coordinated releases of inflow. The entities will review individual AOPs, the coordination of their releases of inflow and consider the potential effects of coordinated releases. AOPs and releases may be revised in light of considerations for the coordinated operations.

## 4. Public Presentation of Initial Operating Plans

In early May of each year that the Committee makes a determination that coordination is possible; the Committee will conduct a public meeting to present the proposed operating plans to interested members of the public. Presentation of CRO for that year may also be made at Ruedi Annual Operations meeting, the Summit or Grand County State of the River meetings or other public meetings addressing similar river conditions. Press releases will be made to explain the potential for CRO and to notify the public of the meetings where presentations will be made. Stakeholder comments and concerns will be solicited and recorded. Mailing and email lists will be compiled for distribution of meeting records to interested members of the public.

During years when it has been determined by the Coordination Committee that coordinated releases are not possible, a press release or the Ruedi Reservoir Annual Operations Meeting will be used to announce that coordinated releases are not planned for the upcoming runoff season.

Following the public meeting, individual reservoir operators and the Committee may modify the operating plans based upon revised hydrologic projections and stakeholder concerns. A meeting record and explanations of the modifications of the operating plans will be maintained and upon request sent out to interested members of the public along with the modified AOPs to be utilized as operational guidelines for the upcoming runoff period. The plans will stress that the Peak Enhancement AOPs are based on best available hydrologic data, but that changing runoff

conditions and project demands will be the primary factors in determining actual reservoir operations and the operations of the individual reservoirs will remain in the control of the reservoir operator/owners.

**5. Coordination of Releases of Inflow**

The Water Division 5 Engineer and the Fish and Wildlife Service will collaborate to make a determination of the timing of the peak in conjunction with National Weather Service predictions. They will then notify the participating reservoir owner/operators of this target so that releases of inflow may be scheduled and coordinated. During the period of peak flows, the participating entities, so far as feasible, will attempt to schedule and coordinate releases of inflow during a ten day period around the natural peak in the 15-Mile Reach and in accordance with their respective Peak Enhancement AOPs. Reservoir operators and the Colorado Division of Water Resources Division 5 Engineer's office will account for the releases. The Recovery Program will conduct monitoring in the 15-Mile Reach to determine the effects on habitat caused by the coordinated releases. During the period of coordinated releases, representatives from Reclamation, Colorado Water Conservation Board and Recovery Program will be available to field questions from the media and public in regard to peak flows that will be achieved and to assure the public that every effort is being made to avoid flooding. Press releases and/or email notifications will be issued on a regular basis to inform the public of the progress of the effort and anticipated flows below participating reservoirs.

**6. Annual Review of Coordination Efforts**

An annual review of the actual operations will be held by the Coordination Committee in January and presented at the April meeting. The goal of this review will be to examine the effectiveness of the process, results achieved and the need for improvements in coordination or enhancement of predictive capabilities (e.g. snow course stations, hydrologic models, etc). The accounting of actual releases of inflow and Cameo Gage flows conducted by the Colorado Division of Water Resources Division 5 Engineer will be included. A comparison of actual releases under coordinated Peak Enhancement operations versus projected releases under Traditional operations will be made by each participating entity. The releases and the effect of the releases as monitored by the Recovery Program will also be reported. This information will be collected and documented in a report, to be prepared either separately or jointly, by the CRO participants and approved by the Coordination Committee and Recovery Program.

Any other concerns or issues resulting from the coordination of the releases of inflow will be discussed with the goal of resolving the issues and improving future coordinated releases. Members of the affected public will be encouraged to participate in the review and to present problems and offer suggestions for subsequent years.

The Recovery Program will assess the success of the operations and contribution of the operations towards recovery of the endangered fish species based upon a comparison of the potential releases under Traditional operation versus actual flows resulting from coordinated releases of inflow conducted under Peak Enhancement operations. The Recovery Program may

develop indices of habitat improvement that can be monitored and reported on in order to assess the benefits and impacts of CRO on an annual basis. Absent such habitat indices, the monitoring done by the Recovery Program to determine if the demographic criteria contained in the recovery goals are being met will be used to help assess the benefit of CRO.

## RECOMMENDATIONS

The Coordinated Reservoir Operation process has been in place since 1997. Experience has demonstrated that the process can be implemented successfully. The five dry years between 2000 and 2004 were not years when coordinated reservoir operations were possible, but the coordination process was followed. The Committee has remained active, and as in 2005, continued to function as was originally envisioned. The key to success is to keep trying and to remain committed to the process. Runoff conditions conducive to CRO will occur in the future and coordination efforts will again be possible.

The CRO participants, after considering the challenges and issues associated with the enhancement of spring flows, request that the Recovery Program concur in the CRO concept and process as presented above. It is recognized that the process will be dynamic due to the highly variable nature of the hydrologic conditions each year and information gained over time regarding the flow needs of the endangered fish. Attached is the proposed calendar and agency responsibilities list.

**Table 1. Coordination Committee Responsibilities**

| AGENCY | **RESPONSIBILITY** |
|---|---|
| U.S. Fish and Wildlife Service | Flow targets in the 15-Mile Reach;<br>Monitoring of endangered fish in critical habitat and CRO influences on critical habitat;<br>Coordinate reservoir operations with CDWR and reservoir operators |
| National Weather Service | Develop list of forecast locations<br>Provide peak runoff forecasts (volume, rate & time) |
| U.S. Bureau of Reclamation | Annual operating plans for Ruedi;<br>Annual operating plans for Green Mountain;<br>Annual operating plans for Granby and Willow Creek (in consultation with NCWCD);<br>Organize meeting & conf. call locations & times;<br>Prepare and mail press releases and necessary public notices. |
| Colorado Water Conservation Board | Chair meetings;<br>Coordinate mailing & email list development;<br>Access to CRDSS as required;<br>Coordinate annual report preparation. |
| Colorado Division Water Resources | River administration;<br>Water right accounting;<br>Coordinate reservoir operations with USF&WS and reservoir operators. |
| Colorado Division of Wildlife | Monitoring of cold water fisheries & habitat |
| Upper Colorado River Recovery Program | RIPRAP implementation;<br>Develop indices of habitat improvements for annual assessment;<br>Prepare report on CRO benefits to 15-mile reach habitat;<br>Monitor Recovery Goals. |
| Colorado River WCD (in consultation with Denver Water as appropriate) | Annual operating plans for Wolford Mtn. |
| Denver Water | Annual operating plans for Dillon<br>Annual operating plans for Williams Fork |
| Cities of Aurora and Colorado Springs | Annual operating plans for Homestake |
| Northern Colorado WCD | Annual operating plans for Windy Gap;<br>Develop annual operating plans for Granby and Willow Creek with USBR |

**Implementation Schedule**

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| March | Schedule a public meeting between May 1 – 15.<br>Purpose: Explain annual operating plans for each reservoir identified above and receive public comment.<br>Prepare press release and public announcements.<br>Coordinate these meetings with other pubic meetings that cover similar subject matter (i.e. the Ruedi annual operations meeting, or the Summit or Grand County State of the River meetings at which Dillon and Green Mountain operations are explained, or the Orchard Mesa Check meeting, or other). |
| April 1-5 | National Weather Service e-mails the runoff forecast information to the participating entities identified above.<br>The Committee, or in the alternative Colorado Water Conservation Board, Colorado Division of Water Resources Division 5 Engineer and U.S. Fish & Wildlife Service representatives, will determine which set of flow recommendations CRO should strive to achieve under the forecast hydrologic conditions and suggest an approximate starting date and duration time for releasing inflows. The committee or representatives will also indicate whether or not it would be desirable for everyone to release inflows at the same time or whether releases would be better staggered in some fashion. |
| April 15 | Reclamation will mail/email press release and appropriate public announcements. |
| April 5-25 | Each reservoir owner operator will prepare annual operating plans as appropriate for their respective reservoirs. Up to six plans may be needed, (a probable minimum, probable maximum and most probable for Traditional operations and the same 3 plans for releasing inflows to enhance the peak in the 15-Mile Reach). |
| May 1-15 | Hold a public meeting, record public comments and distribute as appropriate ASAP. |
| May-July | Monitor runoff and adjust operating plans as appropriate, this includes modifications made based on public comment.<br>The National Weather Service will update the runoff forecast on 2-week intervals or as otherwise appropriate.<br>The U.S. Fish and Wildlife Service and Colorado Division of Water Resources Division 5 Engineer will determine when it is most appropriate to begin releases of inflow to enhance the peak in the 15-Mile Reach and notify the participants.<br>Participants will indicate within 24-hours, or sooner, of notification whether or not they will actually make releases of inflow that year.<br>Colorado Division of Water Resources Division 5 Engineer will monitor releases |

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| | of inflow and provide a record of all releases of inflow made to enhance the peak during the specified time frame.<br>U.S. Fish & Wildlife Service will monitor the effects of peak flows on the 15-mile reach habitat and fish populations, and provide a report to be included in the annual CRO report. |
| August | Review coordinated operations and preliminary accounting and monitoring reports.<br>Each operator will describe their operations and how they differed from traditional operations, if at all.<br>The Division 5 Engineer will indicate the estimated cumulative impact of coordinated operations on the hydrograph and provide appropriate water right accounting.<br>The Service will report on endangered fish and critical habitat monitoring.<br>Issues, concerns, problems that occurred and potential fixes will be discussed. |
| January | CWCB will prepare a draft summary report containing operator reports, with Division 5 accounting and Service monitoring report as attachments.<br>Committee will review report and approve its submittal to the Recovery Program's Management Committee and for general distribution.<br>CWCB will distribute report to interested parties on behalf of the Committee. |

Repeat Process.