



MEMORANDUM

September 28, 2003

To: SJRIP Coordination Committee
From: SJRIP Biology Committee, Bill Miller, Chairman
CC: SJRIP Hydrology Committee
Subject: San Juan River Basin Recovery Implementation Program Maintenance Base Flow Recommendations for Water Conservation

At the request of the San Juan River Basin Recovery Implementation Program (SJRIP) Coordination Committee, the Biology Committee has reviewed baseflow recommendations to determine if temporary maintenance flows in the San Juan River necessary for survival, but not recovery, of Colorado pikeminnow and razorback sucker could be lower than the present 500 cfs minimum base flow recommendation. This request came because of the extended extreme drought in the basin, the low reservoir level and the need to conserve water for all water uses, including spring peak releases for the endangered species. The following recommendations address this request and include flows that will not likely jeopardize, but may delay, the recovery of the species.

The analyses and recommendations were completed separately for the November through March winter period and the April through October summer period due to differences in stresses on the fish and historical conditions under which the endangered species survived. The biological foundation follows presentation of the recommendations. These recommendations apply to the remainder of 2003 and 2004 only and shall not be construed as a permanent amendment to the flow recommendations. The conditions for implementation follow the recommendations.

Winter Period Recommendation

In October 2002 the Biology Committee prepared a recommendation for a one-time modification of the winter baseflow criteria. For that recommendation we used the following criteria. Flows in the critical habitat have historically been as low as 400 cfs during the November through March period less than 4% of the time. The driest year (1931) had 43 days below 400 cfs. Therefore, setting the allowance at 8 cumulative

weeks at 400 cfs places the fish at about the same risk as the historical pre-dam condition (more days, but limiting the minimum to 400 cfs). We believe that the flow in the critical habitat may be lowered to 400 cfs for not more than 8 cumulative weeks during the November through March period without jeopardizing the recovery of the endangered species. We have carefully reviewed the criteria upon which this recommendation was made and recommend that it be extended for the 2003-2004 winter period.

Summer Period Recommendation

For the 2003 irrigation season, a shortage sharing agreement was signed by Navajo Reservoir contractors and the major run-of-river diverters in the San Juan River whereby all shared shortages equally, including flows for the endangered species. The Biology Committee reviewed historical flows, habitat and biological data and recommended that a limit be set on the shortage to the endangered species such that flows in the critical habitat area not fall below 250 cfs during April – October using the 3-gage rule¹. Shortage sharing was to be calculated based on a 500 cfs normal demand wherein the volume of water released to support this use would be shorted equally with other water users.

For 2004, recognizing the need to conserve water and provide sufficient water for a spring peak release at the earliest possible time, the Biology Committee recommends that the non-shortaged minimum target flow for April through October be set to 400 cfs for the remainder of 2003 and 2004 only. Any shortage would be computed based upon 400 cfs rather than 500 cfs. To protect the fish from possible harm, we further recommend that the flows be allowed to fall below 350 cfs for no more than 50 cumulative days and below 300 cfs for no more than 40 cumulative days for this period under implementation of the shortage sharing rules. As determined last spring, the 7-day average flow in the habitat should not fall below 250 cfs. All compliance calculations are to be made using the three-gauge rule.

Prior to closure of Navajo Dam, the limits specified above occurred about 20% of the time during the summer months. During this time, flows dropped below 250 cfs, but very infrequently and for short durations of time. Using 400 cfs as the non-shortaged summer flow minimum in combination with the limits on smaller flows shifts the risk for the fish from the very low flows where impacts could be felt if continued for extended periods of time to the higher flow end, minimizing the negative impacts while at the same time conserving water to hasten the opportunity for a spring release.

Implementation

Water supply forecasting for the 2003 water year was based on the low decile inflow forecast. We recommend that the drought conservation measures, specified above, be implemented only as long the low decile inflow forecast projects an end-of-July Navajo Reservoir content of less than 1,000,000 af and only for the remainder of 2003 and the

¹ The lesser of the 7-day running average of the Farmington, Shiprock and Four Corners or the Shiprock, Four Corners and Bluff gauges.

2004 irrigation season. Any time the low decile forecast shows a reservoir level above 1,000,000 af at the end of July, the normal habitat flow would revert to 500 cfs.

According to the flow recommendation report, Table 8.4, this reservoir level will protect water users, including the fish, from shortages up through the depletion base level, which is somewhat greater than present depletion. Today's depletion levels are higher than those described as "current" in the flow recommendation report due to the continued expansion of NIIP and the delay of NIIP return flow. Using the recommended minimum carry-over storage for the depletion base in Table 8.4 will sufficiently protect all users from shortage and provide some margin to assist in conserving water for a future spring release.

Biological Foundation of Recommendations

The Biology Committee is uncertain as to the full effect the decreased base flows will have on the fish community, but based on historical base flows this short-term reduction will not likely jeopardize the listed species but could delay the recovery of those species. Observational data on fish species were made during the low flow conditions in 2002 and 2003. Habitat mapping quantified habitat at flows less than 300 cfs. Potential impacts from flows less than 350 cfs include reduction in habitat area, increased fish density, increased potential for predation, increased potential for disease, migration blocks, and elevated water temperatures.

When flows are lower than 350 cfs fish density is higher due to reduced habitat area. There is a higher probability of predation impacts on the listed fish from both aquatic and avian predators in these smaller habitats. In addition, the risk for disease due to crowding is increased. The lower flows may also restrict fish movement through riffles that connect the deeper habitats. Radio telemetry data from the San Juan and Yampa rivers show that Colorado pikeminnow move through riffles in short river reaches during summer baseflows. Restricting this movement may impact normal feeding behavior.

The reduced flow and surface area during summer may result in short term increases in water temperature. These elevated water temperatures if they persist over long periods could have chronic impacts on the aquatic species.

The potential impacts that may delay recovery include lowered or no recruitment from early life stages to juveniles and subadults. Propst et al. (2003) reported a negative relationship between density of native fish and number of days summer flow dropped below 500 cfs. Further, they show that densities of nonnative species show a positive relationship to the same flow metric.

Flows in the San Juan River as low as those envisioned under this memo for the most extreme drought conditions have the potential to severely impact the effort to restore Colorado pikeminnow to the basin if sustained for longer than this one-year allowance or for longer than the duration recommended. Young and juvenile fish are at greater risk than larger adults at low flows due to restricted habitat and the potential for increased

predation. The Colorado pikeminnow recovery effort is based on the use of juvenile fish that may take 5-10 years to become adults. Hence, several year classes of stocked pikeminnow could be impacted by very low flows. Razorback sucker are stocked at a subadult stage and although survival and retention of fish stocked this year may be reduced, it is less likely that fish stocked previously would be affected. It is likely that recovery of both Colorado pikeminnow and razorback sucker will be extended by these low flows with a somewhat longer delay expected for pikeminnow than razorback sucker. During extremely low flow periods such as envisioned under the most severe drought by this memo both species are more susceptible to catastrophic influences, such as toxic material spills, since they would be crowded into fewer habitats. While such a catastrophic event could set the recovery program back to the starting point even at recommended base flow levels, the risk is increased substantially with the reduced flows that could be seen during severe drought