

# THE ECONOMIC IMPACTS OF CRITICAL HABITAT DESIGNATION FOR THE RIO GRANDE SILVERY MINNOW

## Background

In June 2002, the U.S. Fish and Wildlife Service (Service) proposed designation of critical habitat for the Rio Grande silvery minnow (*Hybognathus amarus*) on the Middle Rio Grande River in New Mexico from Cochiti Dam to the headwaters of Elephant Butte Reservoir.<sup>1</sup> The Service considers “sufficient flowing water with low to moderate currents” to be essential for the conservation of this species. Because the Middle Rio Grande has periodically experienced intermittent flows in some locations during drought, supplemental flows are likely to be required to assure sufficient habitat for the minnow. Because the total amount of water available for consumption within each stretch of river is limited by legal agreements as well as by nature, this analysis recognizes that any additional water for instream flow must come from an existing use.



(*Hybognathus amarus*)

An active market for water rights exists in New Mexico in which the price of water rights reflects the value the public holds for use of water. This analysis uses the current price of water rights to calculate the opportunity cost associated with providing supplemental flow for the silvery minnow, and assumes a minimum required flow of 50 cubic feet per second (cfs).

***One measure of the economic cost of environmental protection programs is the opportunity cost of resources allocated to achieve the goals of the program. In this case, the principal resource in question is water, as required to maintain sufficient flows to support the silvery minnow. Water in New Mexico is scarce; thus, any use of water for supplemental flow will result in a lost opportunity to use that water for some existing purpose (e.g., for farm irrigation).***

## Major Effects of the Proposed Rule

The hydrological analysis used in this report estimates the amount of supplemental water needed for the silvery minnow to be 40,427 acre-feet in the 95<sup>th</sup> percentile driest year, and 5,635 acre-feet in the 50<sup>th</sup> percentile driest year. That is, to assure a 50 cfs flow rate in 95 years out of 100 it will, at times, be necessary to divert from existing use 40,427 acre-feet of water. This represents between six and 17 percent of all the water currently used for consumptive purposes in the Middle Rio Grande. Using market prices of water rights as a measure of the value of water, this analysis estimates an annualized opportunity cost of \$6.2 million to \$14.4 million (assuming conditions equal to the 95<sup>th</sup> percentile driest year), or \$0.9 to \$2 million (assuming conditions equal to the 50<sup>th</sup> percentile driest year).

To quantify the regional economic impacts of transferring water from other uses to instream flow, this analysis first identifies likely sellers of water rights. Sellers of water rights have historically been in agriculture (90 percent of trades), reflecting the fact that the majority of the water rights, as measured by the total volume of water reflected in those rights, are currently held in the agricultural sector. Thus, assuming that the water required to maintain in stream flow is likely to come from the most common crop (alfalfa), this analysis estimates that the value of foregone production from the transfer of water rights would be \$5.9 million (under the 95<sup>th</sup> percentile scenario). Regional economic impacts associated with that loss of agricultural production could result in a loss of \$8.4 million in regional output, 362 jobs, and \$1.4 million in state and Federal tax payments. These values represent a decrease of less than 0.1 percent each of annual output, employment, and tax revenue in the Middle Rio Grande area.

*Impacts of \$6 million in foregone crop production, \$8 million in regional output, \$1 million in regional tax revenues, and 362 fewer jobs are forecasted for the region.*

A number of other impacts are anticipated as a result of section 7 implementation. This analysis estimates that approximately 49 formal consultations, 131 informal consultations, and 890 technical assistance efforts may occur over the next 20 years, on activities such as dredge and fill projects, permitting of industrial and municipal waste projects, road and bridge construction activities, and emergency rescue/relocation of silvery minnow. The total economic impacts on these projects is expected to range from \$1.0 to 1.8 million annually. Thus, when impacts related to the value of water needed for the minnow are included, the total estimated annualized costs of this designation are estimated to range from \$1.9 to \$16.2 million annually.

<b>TOTAL SECTION 7 COSTS ASSOCIATED WITH THE LISTING OF AND DESIGNATION OF CRITICAL HABITAT FOR THE SILVERY MINNOW IN THE MIDDLE RIO GRANDE RIVER SEGMENT</b>			
	<b>Consultation and Project Modification Costs</b>	<b>Opportunity Cost to Provide Target Flows</b>	<b>Total Costs</b>
Cost 2001 Dollars	\$20.4 to \$36.3 million	\$28.6 to \$205.5 million	\$40.0 to \$241.8 million
Present Value (7%)	\$10.8 to \$19.1 million	\$21.2 to \$152.4 million	\$32.0 to \$171.5 million
Annualized Cost (7%)	\$1.0 to \$1.8 million	\$0.9 to \$14.4 million	\$1.9 to \$16.2 million

### **Benefits Associated with the Proposed Rule**

Drawing upon results from two stated-preference valuation studies of instream flow protection programs on the Middle Rio Grande, this report estimates the total present value of perpetual welfare benefits expected to result from silvery minnow habitat protection to be approximately \$80 to \$100 million (\$2001). This range reflects the range of welfare values from the two existing studies, discounted at both a three and seven percent discount rate. The present value of these benefits over the next 20 years alone would be \$36 to \$74 million.

## Small Business Effects

A significant economic impact on a substantial number of small entities will not result from the designation of critical habitat for the silvery minnow. This would be true even if all of the effects of section 7 consultation on these activities were attributed solely to the critical habitat designation.

## Key Assumptions

The following table presents the key assumptions of this economic analysis, as well as the potential direction of the bias introduced by each assumption.

CAVEATS TO THE ECONOMIC ANALYSIS AND POTENTIAL DIRECTION OF BIAS ON TOTAL SECTION 7 COSTS		
Analysis	Assumption	Effect on Cost Estimate
Hydrological Analysis	Historic water flow data offer an accurate picture of future water needs.	?
	No policy can guarantee flow at all times; this analysis relies on historical data to estimate the quantity of water needed to achieve an instream flow of 50 cfs in the 95th percentile driest year, rather than an average supplemental value.	+
	The hydrological model accurately predicts water volume needed for minnow.	?
Value of Water/ Market Analysis	The current value of water is a reasonable representation of the long-term value of water.	+
	Contingent water markets do not exist.	+
	Inter-state transfers of water are not possible under current regulatory and legal regimes.	+
Regional Economic Analysis	Farmers who trade water rights will retire acreage rather than switch to more efficient technology or less water-intensive crops.	+
	Water removed from irrigation for instream flow will come from alfalfa.	+
	The structure of the economy will be static over time.	+
Consultation and Project Modification Costs	Historic patterns of consultations and project modifications are good predictors of future consultation behavior.	?
	Consultation rates will not decrease over time.	+
	The presence of other species (i.e., bluntnose shiner, flycatcher) has no influence on consultation/project modification costs.	+
- : This assumption may result in an underestimate of real costs. + : This assumption may result in an overestimate of real costs. ? : This assumption has an unknown effect on estimates.		

Notes:

1. The final critical habitat designation for the silvery minnow encompasses the Middle Rio Grande in New Mexico from Cochiti Reservoir downstream to the utility line crossing the Rio Grande at UTM 13-31474E, 3719722N. The lateral boundaries of the final critical habitat designation stretch 300 feet from the bankfull width. The proposed critical habitat designation also included the lands of six Pueblos. However, the Pueblo lands of Santo Domingo, Santa Ana, Sandia, and Isleta are not included in the final designation. This analysis is consistent with the designation as described in the proposed rule. Where possible, this analysis identifies potential changes to the estimates that could be associated with changes to critical habitat areas in the final rule.

In addition, the Service determined that a reach of the Lower Rio Grande stretching from the upstream boundary of Big Bend National Park to the Terrell/Val Verde County line, Texas, and a reach of the middle Pecos River, New Mexico, from Sumner Dam to Brantley Dam in De Baca, Chaves, and Eddy Counties, New Mexico, are essential to the conservation of the silvery minnow. However, these areas were excluded from the final designation of critical habitat for the silvery minnow. These two areas are included in the full economic analysis, but the impacts that would be associated with designation of those areas are not described here.