A Western Slope Perspective: Endangered Species and Municipal Water

David C. Hallford

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A WESTERN SLOPE PERSPECTIVE:
ENDANGERED SPECIES AND MUNICIPAL WATER

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NATURAL RESOURCES LAW CENTER
University of Colorado
School of Law
Boulder, Colorado
A WESTERN SLOPE PERSPECTIVE: ENDANGERED SPECIES AND MUNICIPAL WATER

by David C. Hallford

I. Summary.

The lower reaches of major river drainages in the Upper Colorado River Basin are designated critical habitat for four fish species listed as endangered pursuant to the Endangered Species Act (“ESA”). These species are the Colorado pikeminnow (f/k/a the Colorado squawfish), the razorback sucker, the humpback chub, and the bonytail. These species are the subject of two recovery action plans, one for the Upper Colorado River Basin upstream of Lake Powell but excluding the San Juan River Basin, and one for the San Juan River Basin. Those recovery plans are intended to mitigate or reverse several factors believed to be associated with the historical decline of these native species, such as predation by and competition for habitat and food supplies from non-native fish species, loss of “back water” nursery and rearing habitat, habitat segmentation (fish passage), and streamflow declines attributable to the diversion and storage of river water for human uses.

The South Platte River endangered species recovery effort presents a unique challenge for those who divert and use water from the Colorado River system in Colorado and, for that matter, in the Upper Colorado River Basin. This challenge arises from the fact that a significant amount of Colorado River water is diverted through facilities to the Colorado “Front Range” for use in the South Platte River and Arkansas River Basins. The amounts of transmountain diversions for municipal and irrigation uses vary annually depending on demands and hydrology. The transmountain diversions to Colorado’s Front Range are made from the Colorado River and its principal tributaries upstream from the confluence.
of the Colorado and Gunnison Rivers at Grand Junction. The river at that location historically has flowed approximately 3.6 million acre feet ("MAF") of water on an average annual basis. The existing transmountain diversions to the South Platte and Arkansas Basins historically have depleted approximately 0.5 to 0.6 MAF, or about 15 percent, of the "virgin" river flow. The South Platte River Basin, home to Colorado’s major municipal use, has a virgin flow of approximately 1.2 MAF. In summary, the Colorado River can be viewed as a major tributary of the South Platte River.

The existing transmountain diversion projects intend to increase their deliveries of water to the Front Range in the future as the demand for water increases. This is one reason why Colorado’s plan for addressing Platte River ESA requirements is based upon the principle that “more people means more water.” More expressly, the State of Colorado and the Colorado water users in the South Platte River Basin believe that increases in human population in that basin will result in increased South Platte River streamflow because additional Colorado River water and nontributary groundwater will be imported to the basin and the return flows and effluent which are not fully reused will accrete to the stream. From a West Slope perspective, this presents the paradox of depleting the Colorado River system, the habitat for four endangered fish species, in order to benefit endangered species in the Platte River Basin.

II. Recovering the Endangered Colorado River and Platte River Species.

A. Colorado River Endangered Fish Species. The recovery needs of the four Colorado River fish species listed as endangered are not known definitively. The U. S. Fish & Wildlife Service continues to work to define “recovery” for these species with more precision than the broad principle of “self-sustaining populations.” This is a “trial-and-error” type of process because of the nature of the habitat and because several factors may have affected the species and contributed to their decline. The Upper Colorado River Basin Recovery Program is an experiment in “adaptive management.” It is hoped that by addressing a range of problems, thereby increasing fish passage and habitat access and decreasing
non-native species competition, a mix of actions will stabilize the species and facilitate “recovery.”

The Recovery Implementation Program Recovery Action Plan (“RIPRAP”) identifies a detailed schedule of actions to be taken generally and in major sub-basins (Green River, Yampa River, Duchesne River, White River, Colorado River mainstem, Gunnison River). The future cost of those actions, both capital projects and related operation and maintenance, was projected at $100 million as of March 1998. Approximately $70 million already been spent on RIPRAP activities.

As a part of its effort to avoid jeopardy to and recover the endangered Colorado River fish species, the Fish & Wildlife Service has developed “flow recommendations” for the Colorado River mainstem and Yampa River, and will develop such recommendations for the other major rivers in the Upper Colorado River Basin. These recommended flows in some cases could not be met without eliminating a substantial amount of existing human water use. The Colorado River flow recommendations, unless revised downward, will become more and more unrealistic as Colorado River water use increases. This will be the case particularly during the spring runoff months when development (largely storage) of additional water can occur under the Colorado water rights system.

Unlike the South Platte River Basin, the water users in the Colorado River Basin and its principal tributaries in the State cannot project that additional West Slope growth dependent on imported water will increase river flows. While uses within these basins will cause some level of future river depletions, those will be offset to some extent by inevitable “ag-to-municipal” transfers of water use, as evidenced by the constant adjudication of consumptive use credits in the West Slope’s Water Courts. The demand for Colorado River water on the Front Range will constitute most of the foreseeable additional depletions to the Colorado River Basin, but the return flows from those uses will accrete to the Platte River system. Thus, water users in the Colorado River Basin face the reality that state-wide growth will
deplete, not accrete, their river system and cause continued environmental and regulatory uncertainty as long as the Colorado River fish have not been de-listed under the ESA.

B. **Platte River Endangered Species.** I expect that much has already been said by prior speakers about the recovery effort for the Platte River species. In summary, the July 1997 Cooperative Agreement among the U. S. Department of the Interior and the States of Colorado, Nebraska and Wyoming is focused on activities to recover four “target species” dependent on the Platte River for habitat (three bird species and one fish species: the interior least tern, whooping crane, piping plover and pallid sturgeon). That agreement creates an “agreement-to-agree” framework for the development and implementation of mechanisms to improve habitat for those species, including as a “first increment” a minimum of 60,000 acre feet per year of “net hydrologic benefits” for those habitats through water conservation and supply programs. A “proposed alternative” recovery implementation program identifies an initial objective of improving Platte River flows at Grand Island, Nebraska by an average of 130,000 to 150,000 acre feet annually through the conservation/supply program and reregulation of water projects.

The State of Colorado’s “Plan for Future Depletions” under the Platte River Cooperative Agreement clearly anticipates that population growth in the South Platte Basin will increase the flow of water in the South Platte River, mostly because of unused return flows, new transbasin imports and additional use of nontributary groundwater, and to a lesser extent from “ag-to-urban” transfers of irrigation water supplies. Those supply components will have “accretive” effects to the extent that the effluent and return flows from the new municipal uses are not reused to extinction. The reuse of such effluent, which would extend the utility of “imported” supplies and, in theory, reduce the need for increases in transmountain diversions, would have a net “depletive” effect on the South Platte flows. Thus, the logic of Colorado’s strategy for addressing the Platte River ESA problem is to
avoid limits on future depletions in that basin through a supply and use regime that will encourage more transmountain diversions.

III. Meeting the Front Range’s Municipal Water Needs.

Unquestionably, municipal and recreational water demands have increased dramatically in Colorado since approximately the end of World War II. Those municipal demands will only continue to increase as Colorado’s human population grows, unless we experience a radical shift in social thinking about the utility and need for pervasive irrigation of lawns, parks, and open spaces within urbanized and suburban areas. During the same time frame, use of water for agricultural irrigation has declined in some parts of the state, in part because municipal development has occupied agricultural lands and municipal suppliers have acquired agricultural water rights and converted them to municipal use.

The future municipal needs on Colorado’s West Slope are small in comparison with those projected for the Front Range’s municipal corridor from Fort Collins on the North to Pueblo on the South. Much of the West Slope’s future municipal demand will occur and be met, as it has been historically, through the conversion of agricultural lands and water rights into residential/commercial developments and municipal supplies. Those conversions have little material impact on the existing river flow regime.

In contrast, transmountain diversions to the Front Range deplete the Colorado River 100 percent of the diverted amount. Current levels of transmountain diversions are generally portrayed in Attachment 1 (the Colorado State Engineer’s depiction of TMDs based on Water Year 1978) and Attachment 2 (UCRC’s presentation of Colorado’s TMDs during the last ten years).

The Colorado Water Conservation Board’s (“CWCB”) Compact Development Workgroup examined population projections of a 50% population increase on the Western  

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2 The Colorado Farm Bureau reports that total Colorado irrigated agriculture has been stable since the 1970's but now uses less water, in part because of efficiency improvements.
Slope by 2020 and an overall 140% increase for the entire state in that time frame. Colorado’s Front Range is the location where most of the current population exists and where most of its increase will occur. The issue of how to meet future municipal water needs has been the subject of detailed studies both by the State of Colorado and by individual water supply agencies.

A. **Colorado Farm Bureau Study.** In 1996 the Colorado Farm Bureau conducted a study, which it published in January 1997, to project the State’s water supply needs and uses to the year 2100 and to make related assessments about current and future water supplies. The study included a state-wide survey of water supply and development agencies. The study concluded that only the Colorado River and South Platte River Basins have the potential for additional depletions, based on current uses and compact provisions. The study projects a potential statewide increase in annual demand for municipal and industrial (“M&I”) water supplies from 930,000 AF to 2,200,000 AF. The study identifies, in very broad concept, a range of potential alternatives to meeting future demands, including efficiency improvements, agricultural water leases for M&I uses, groundwater development, and new surface water projects.

The Farm Bureau’s identification of the Colorado River Basin as the remaining source of most of Colorado’s reliable undeveloped surface water (450,000 AF per year) presents a fundamental dilemma. The growing demand is on the Eastern Slope and renewable water is on the Western Slope, but increases in depletions from the Colorado River main stem and its headwaters will only complicate recovery of the Colorado River endangered fish.

B. **Senate Bill 96-74 Study.** Additional surface water is sought by the Front Range in part to supplement the “nonrenewable” groundwater supplies of the Eastern Slope’s “Denver Basin” aquifers. The SB 96-74 study was authorized by the Colorado General Assembly in 1996 and was completed in April 1998. The final report analyzed twelve surface and groundwater issues related to the resources of
the Denver area. This report quantified the “recoverable” yield of the Denver Basin aquifers. The SB 96-74 study and the related SB 96-153 evaluations demonstrate that the Denver Basin groundwater supplies available to Front Range municipal suppliers are substantial and are not being utilized to the extent of their legal availability.

The SB 96-74 Technical Study’s Executive Summary states that the Denver Basin aquifer system contains 300 million acre feet of drainable storage, while 1996 production from the aquifers was only 56,000 acre feet (less than 2% of the legally allowable annual pumping). Further, the Summary notes that, notwithstanding some localized drawdown issues, “the overall Denver Basin aquifer life at this level of production (56,000 AF/year) may exceed 1,000 years.”

One of the needs identified by the SB 96-74 final report was a better understanding of the interconnection between the Denver Basin aquifers and the South Platte River system. This is particularly important when analyzing the future depletion of the South Platte River due to increases in groundwater withdrawals and quantifying the augmentation necessary to protect surface water rights from the effects of Denver Basin groundwater pumping. The Colorado State Engineer’s Office has built a complex simulation model of the Denver Basin aquifers. The State is looking for private-sector participation in upgrading the data input to the existing model and in creating an additional simulation of the alluvial aquifer adjacent to the South Platte River channel.

C. Metropolitan Water Supply Investigation (“MWSI”). MWSI was initiated by Governor Romer and the General Assembly in 1993 to evaluate potential cooperative solutions to meeting future water supply needs in the metropolitan area in the South Platte Basin (Denver and its suburbs). It was intended to seek solutions that would minimize potential conflicts over large new water storage projects and transbasin diversion projects. The MWSI final report was issued in January 1999. It will serve as a reference document for explaining how Denver
area water suppliers operate and obtain their water supplies. It explores water
supplies available to the Denver Metro area in the future, and identifies
cooperative ventures among water suppliers that could enhance water service to
the Metro area as a whole. The study process resulted in improved
communications among Front Range suppliers.

The MWSI study was not bound by legal and policy constraints but looked at what
might be technically possible within the existing infrastructure. A notable
exception was the examination of the potential for large-scale agriculture-to-
municipal conversion which was not addressed in detail because of alleged
“institutional” barriers.

The MWSI report does not endorse any particular project for satisfying Front
Range demands. It has served as a springboard, however, to four Metro area
regional studies which are looking at specific projects to cover regional demands.
The study identified and evaluated four primary categories of supply-side options:
conjunctive use; effluent management; interruptible supply arrangements; and other
system integration opportunities.

Among the study conclusions are several items of particular interest to the West
Slope:

1. There is no present or easily identified future Metro area water supply
   “crisis.” The Metro area has experienced very localized water shortages,
   primarily due to small-capacity and/or shallow wells tapping perched
   aquifers with low recharge potential, but the overall supply is adequate to
   meet municipal needs through the year 2030 planning horizon without
   building any major new water supply projects.
2. There is a need for additional water storage within the Metro area to effectively manage legally reusable effluent and to facilitate exchanges along the South Platte River.

3. There is undeveloped groundwater beneath the Denver area that is being underutilized (300 million AF of recoverable supply within the Denver Basin aquifers). Most “conjunctive use” schemes seek to reduce dependence on this resource and divert more surface water from various sources, including the West Slope. Use of this vast local groundwater resource is expected to continue at low levels, with or without conjunctive use.

4. Just north of the Metro area is an active agricultural area annually using over 2.5 MAF for irrigation. Present plans call for conversion of only about 76,000 AF (three percent) to municipal and industrial uses.

5. Present plans anticipate an increase in transmountain diversions from the Colorado River Basin under existing rights and completed projects by 100,000 AF annually.

6. Flow in the South Platte River reaching Nebraska is expected to continue to increase in response to growth in population and urban development. The primary reason is the expected increase in return flow from municipal use of new water supplies (i.e., transmountain diversions from the Colorado River Basin and nontributary groundwater).

D. Arkansas River Basin Needs Assessment. The Southeastern Colorado Water Conservancy District and its major municipal and agricultural water supply members are engaged in an assessment of water and storage needs within the District. The executive summary of the December 1998 “Needs Assessment” study contains several conclusions of interest to the West Slope:
1. The planning process is focused by a philosophy of meeting new water demands without reducing agricultural water use. Since the Basin is over-appropriated, this suggests that ag-to-municipal transfers are not viewed as an acceptable strategy for development of additional municipal and industrial water supplies and that such new supplies will be derived from other sources such as expanded transmountain diversions from the Colorado River Basin.

2. Future M&I sector demands may range from 97,000 AF to 187,000 AF of total additional annual demand, depending on which growth projection is considered. At the lower level, the available water supplies will be generally adequate. Most of the municipal suppliers have sufficient water rights to meet anticipated demands through the year 2040.

3. Water use in the District averages 1 MAF/year, and 80 percent of that is use for irrigation. If agricultural irrigation use is not reduced to meet future M&I sector demands, the report projects that District use could grow to 1.2 MAF annually.

4. Additional storage facilities will be needed to manage both existing supplies and future supply increments in order to meet anticipated needs.

IV. Conclusion.

As long as the native Colorado River fishes remain listed as endangered it will be important, particularly to West Slope water users, that Front Range municipal water supply planning begins with options which will not exacerbate the conditions believed by the Fish and Wildlife Service to jeopardize those species. Unfortunately, the Colorado prior-appropriation doctrine rewards the early use of water, the “vesting” of rights based upon “historical use” which encourages water suppliers to develop available surface water
before groundwater. The Platte River recovery planning also seems dependent upon accelerated imports of Colorado River water. Nevertheless, the West Slope looks hopefully toward a reasoned prioritization of Front Range supply activities that sequences local supply opportunities ahead of additional large increments in transmountain diversions.
General References


Colorado Water Development Study by the Colorado Farm Bureau and Montgomery Watson (January 1997).

Cooperative Agreement for Platte River Research and Other Efforts Relating to Endangered Species Habitats Along the Central Platte River, Nebraska (July 1997).

Denver Basin and South Platte River Basin Technical Study (Senate Bill 96-074), prepared for the Special Water Committee of the Colorado General Assembly by Hal D. Simpson, State Engineer, and Chuck Lile, Director of Colorado Water Conservation Board (April 1998).


ATTACHMENT 1

TRANSMOUNTAIN DIVERSIONS

WATER YEAR 1978 TOTAL 634,760 A.F.

GRAND RIVER DITCH 25,230 A.F.
EUREKA DITCH 42 A.F.
ADAMS TUNNEL 263,700 A.F.
MOFFAT TUNNEL 81,590 A.F.

BERTHOUD PASS DITCH 677 A.F.
VIDLER TUNNEL 256 A.F.
ROBERTS TUNNEL 133,800 A.F.
BOREAS PASS DITCH 174 A.F.
HOOSIER PASS TUNNEL 9,750 A.F.
COLUMBINE DITCH 1,990 A.F.
EWING DITCH 1,280 A.F.
WURTZ DITCH 3,840 A.F.
HOMESTAKE TUNNEL 0 A.F.
BUSK-IVANHOE TUNNEL 7,470 A.F.

BOUSTEAD TUNNEL 49,960 A.F.
TWIN LAKES TUNNEL 51,770 A.F.
LARKSPUR DITCH 54 A.F.
TARBELL DITCH 503 A.F.
TABOR DITCH 719 A.F.
### Transmountain Diversions from Colorado River Basin in Colorado

#### 1989-1998

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#### To Arkansas River Basin

| Hoosier Pass Tunnel | 10,720 | 11,200 | 12,400 | 11,570 | 11,186 | 9,188 | 4,532 | 12,300 | 8,312 | 10,400 | 10,181  |
| Cumbine Ditch       | 1,420  | 748    | 1,802  | 1,610  | 2,478  | 1,470 | 2,390 | 2,500  | 1,730  | 1,889  | 1,782   |
| Ewing Ditch         | 788    | 785    | 809    | 934    | 1,622  | 796   | 1,410 | 1,440  | 1,350  | 759    | 1,075   |
| Wurtz Ditch         | 2,070  | 1,702  | 2,260  | 2,173  | 4,031  | 2,073 | 4,241 | 4,210  | 4,180  | 2,183  | 2,912   |
| Homestake Tunnel    | 28,640 | 27,480 | 638    | 28,910 | 26,110 | 24,230 | 23,505 | 38,690 | 37,130 | 23,316 | 25,685  |
| Twin Lakes Tunnel   | 37,410 | 41,368 | 42,980 | 41,970 | 62,664 | 42,850 | 33,120 | 34,850 | 34,190 | 47,441 | 41,864  |
| Charles H. Boustead Tunnel | 37,240 | 47,270 | 61,130 | 57,060 | 88,740 | 55,040 | 91,300 | 38,540 | 76,380 | 53,988 | 60,989  |
| Busk-Ivanhoe Tunnel | 3,780  | 5,170  | 5,860  | 5,210  | 4,680  | 4,100 | 5,817 | 2,450  | 4,640  | 4,174  | 4,596   |
| Larkspur Ditch      | 30     | 8      | 95     | 205    | 334    | 148   | 118   | 60    | 185    | 67     | 125     |

#### To Rio Grande Basin

| Taibell Ditch       | 344    | 79     | 0      | 344    | 109    | 207   | 88    | 368   | 753    | 830    | 310     |
| Tebor Ditch         | 487    | 627    | 608    | 1,060  | 839    | 1,240 | 375   | 1,340  | 1,010  | 846    |         |
| Treasure Pass Ditch | 183    | 53     | 9      | 63     | 113    | 94    | 0     | 15    | 245    | 233    | 98      |
| Don La Font Ditches No. 1 & 2 | 339 | 138 | 473 | 480 | 0 | 364 | 50 | 112 | 64 | 0 | 202 |
| Williams Creek-Squaw Pass Ditch | 238 | 205 | 235 | 475 | 441 | 279 | 92 | 124 | 421 | 289 | 308 |
| Pine River-Weminuche Pass Ditch | 508 | 451 | 257 | 520 | 248 | 172 | 872 | 42 | 1,050 | 396 | 431 |
| Weminuche Pass Ditch | 878   | 960    | 885    | 2,630  | 0      | 0     | 0     | 1,090 | 459    | 670    |         |

### Total

Transmountain Diversions from Colorado River Basin in Colorado to Rio Grande Basin in New Mexico

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