

PANEL

Rio Grande restoration: Future directions

Moderated by: Deborah M. Finch¹

INTRODUCTORY COMMENTS

By Deborah M. Finch

The purpose of this panel was to discuss historical and current changes to the Rio Grande system, focusing on the middle Basin, and to present and review different individual, organizational, and political perspectives on the future of the system. Invitations were made to panelists based on their past and current interests and activities pertaining to restoration of the Rio Grande. Invited panelists included Honorable Senator Pete Dominici or a representative from his staff; Jeff Whitney, U.S. Fish and Wildlife Service Coordinator for the Middle Rio Grande Bosque Initiative; Brian Shields, Director of Amigos Bravos; and Steve Harris, Executive Secretary, Rio Grande Restoration. In addition, Clifford Crawford, Team Leader of the Bosque Biological Management Plan (Crawford, C.S., Cully, A.C., Leutheuser, R., Sifuentes, M.S., White, L.H., and Wilber, J.P., 1993, U.S. Fish and Wildlife Service, Albuquerque, NM), was invited to provide concluding remarks.

I asked participants to be prepared to debate topics related to whether, why, and how the Rio Grande should be restored in light of current ecological, economic, and social realities, including the realities of human population growth, restoration costs, changing water supplies, recreation, regulatory requirements, and ecosystem functioning and health. The following questions were posed to each panel member:

1. What is "restoration" from your individual or organizational perspective, and why is it important or not important?

2. What components should be included in restoration targets?
3. Where is restoration most needed?
4. Should restoration benefit people, or is it justified for other reasons?
5. What are the indirect costs and benefits of maintaining the *status quo* versus restoring the river?

Panel participants were additionally asked to address restoration topics of interest to each of them, including specific projects they or their organizations had undertaken or sponsored. Each panelist was given 10-15 minutes for an oral presentation. After presentations were completed, time was made available for questions and interactions with the audience.

Cheryl Garcia, a Staff Representative for Senator Dominici, was the first speaker, reading a gracious letter by the Senator that reviewed his support of Rio Grande improvement efforts. The Senator's message is presented at the beginning of the Rio Grande section of this proceedings and also here.

LETTER BY SENATOR PETE DOMENICI

By Pete Domenici²

Thank you for your invitation to attend today's panel discussion on "Rio Grande Restoration: Future Directions." I apologize for not being able to attend in person, but I hope you will understand that now is a particularly busy time here in Congress.

As we all know, the Rio Grande is synonymous with life in New Mexico. It is this basic fact that

¹ Project Leader, USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, 2205 Columbia SE, Albuquerque, NM 87106.

² (Presented by Staff Representative, Cheryl Garcia) Pete V. Domenici, United States Senate, Washington, DC 20510-3101.

makes today's discussion so important. Our State depends on the Rio Grande for so much—for basic water resources, for riparian wildlife habitat, for simple aesthetic beauty—that we simply must make the best decisions about how we use and protect it. Fortunately, recent years have seen important progress being made in crafting policies that will restore and preserve the Rio Grande.

I have tried to help in this regard. For example, I have been involved in the ongoing bosque preservation initiative since 1991, and am happy to say that the Senate has recently approved a \$500,000 appropriation to aid in the implementation of recommendations made by the Rio Grande Bosque Conservation Committee. Another \$940,000 was also approved by the Senate, at my request, for much-needed rehabilitation of the Bosque del Apache Wildlife Refuge. This money will be used for such projects as a new service and storage facility, replacement of obsolete heavy equipment, and rehabilitation of road and water delivery systems. Finally, the Senate has approved my request for \$1 million to continue the U.S. Geological Survey's comprehensive study of the availability of water in the Middle Rio Grande Basin.

Money alone, however, will not solve the problems facing the Rio Grande, and that is why today's conference is so very important. To make lasting progress on Rio Grande restoration, there must also be full and sustained coordination at all levels—federal, state, county, and local. Only in this way, with all of us working together, can we ensure the protection, preservation, and enhancement of this most precious resource.

RESTORATION OF THE MIDDLE RIO GRANDE ECOSYSTEM AND THE BOSQUE BIOLOGICAL MANAGEMENT PLAN

By Jeffery C. Whitney'

BACKGROUND/STATUS

For a number of years there has been considerable interest in the Middle Rio Grande and the associated riparian community commonly referred

to as "the Bosque". Substantial management activity has occurred along the Rio for many decades. With Senator Pete Domenici's support, a four year process involving the University of New Mexico, the U.S. Army Corp of Engineers, the Bureau of Reclamation, and the U.S. Fish and Wildlife Service, with considerable support and interaction with the community at large, developed the Middle Rio Grande Ecosystem: Bosque Biological Management Plan which was distributed in final form at a public meeting in the fall of 1993.

Within the Bosque Biological Management Plan, there are 21 broad recommendations which are designed to protect and enhance the biological aspects, both aquatic and terrestrial, associated with the Rio Grande riparian ecosystem from Cochiti Reservoir downstream to the headwaters of Elephant Butte Reservoir (190 miles). Implementation of these broad recommendations can and has taken many forms.

The nature of the landscapes, political boundaries, jurisdictions, land ownership patterns and local customs and traditional values all contribute to the past and present condition of the Bosque. The Service is providing leadership and facilitation through the "Bosque Coordinator" and a GIS support person. We, as a community of responsible agencies and individuals, are seeking additional ways to extend and enhance the value of the Middle Rio Grande Ecosystem in our own ways by coordinating with those around us, we hope to create a robust and diverse landscape which includes the social and economic and biological aspects associated with the Bosque.

Toward a coordinated approach to management of the bosque, continued emphasis has been placed on opportunities to implement the Bosque Biological Management Plan (BBMP). In January of 1995 during a Joint Initiatives Meeting (involving the three federal agencies above and numerous other management entities including all water interests) it was decided to hold a meeting with broad representation to initiate a broader and inclusive process designed to further the implementation of the BBMP. At the March meeting it was decided by the group that a retreat would be appropriate to begin to address the questions of:

- What has been accomplished so far toward implementation of the BBMP?

¹ Middle Rio Grande Coordinator, U.S. Fish and Wildlife Service, Albuquerque, NM.

- What else could be done with existing resources and authorities?

On May 5th and 6th, 1995, a group of 20 individuals representing federal, state, local agencies and citizens met at the Sevilleta National Wildlife Refuge/ National Science Foundation Long Term Ecological Research Center administered by UNM to explore several aspects of the BBMP to consider the two aspects identified above.

The group felt that it would be beneficial if we developed a product which captured this sense of accomplishment to date. In addition, the product would more clearly identify where we have come from, who we are, what can and should not be done, and where do we go from here.

What we found was that there are many examples of considerable activity which does indeed meet the intent of the Bosque Biological Management Plan. We also agreed that we should reorganize ourselves into a broader and more inclusive loose organization specifically designed to cooperate where possible to further the implementation of the Plan. Thus the Bosque Improvement Group (BIG) was formed.

The Bosque Improvement Group (BIG) is an informal adhoc non-exclusive “think tank”. BIG provides a forum for those interested in Bosque Management for cooperation and coordination of ongoing activities involving interagency, intergovernmental, organizational interests, private landowner, and interested citizens within the Middle Rio Grande Reach from Cochiti outflow to the headwaters of Elephant Butte Reservoir.

There is no ‘LEAD AGENCY’, the Coordinator is only that, a coordinator who assists and facilitates activities which are viewed as beneficial to meeting the intent of the Middle Rio Grande Bosque BBMP. No uninvited intrusion of private property rights is warranted nor intended. For the purposes of general discussion “the Bosque” includes those lands found within existing levees and or immediately associated with the Rio in unleveed floodplain areas of the lower reaches.

TOP PRIORITIES

- Establish a coordinated monitoring program.
- Centralized repository and monitoring coordinator (USFWS funding).

- BIG participation in allocation of the discretionary portion of FWS bosque funds.
- Expand support of local Bosque interest groups (i.e. Socorro’s ‘Save Our Bosque’ group).
- Emphasize continuing evaluation, identification, and monitoring of site potential for revegetation.
- Update vegetation classification and mapping (Hink and Ohmart) to reflect current vegetation structural changes that have occurred since the initial early 1980’s H/O Classification.
- Study relocation of levee and low flow conveyance channel (LFCC) from DdANWR downstream. Coordinate planning, scoping, analysis, etc., among agencies.

The recommendations in this Bosque Biological Management Plan define a major shift in long-term management of the Middle Rio Grande bosque ecosystem. The plan emphasizes an integrated management approach, with special emphasis being placed on “communication” and “coordination”.

MIDDLE RIO GRANDE ECOSYSTEM: BOSQUE BIOLOGICAL MANAGEMENT PLAN

RECOMMENDATIONS

The Executive Summary of the Bosque Biological Management Plan provides us the impetus to initiate this effort in the following direct quote, “The Bosque Biological Management Plan was created to mitigate that stress in the Middle Rio Grande Valley from Cochiti Dam to San Marcia1 and to send a message to resource managers and decision makers that a new approach is needed. The plan’s purpose is to determine conditions and to recommend action that will sustain and enhance the biological quality and ecosystem integrity of the Middle Rio Grande bosque, together with the river and floodplain that it integrates.”

HYDROLOGY

1. Coordinate Rio Grande water management activities to support and improve the

Bosque's riverine and terrestrial habitats, with special emphasis placed on mimicking typical natural hydrographs.

2. Implement measures to allow fluvial processes to occur within the river channel and the adjacent bosque to the extent possible.
3. Reintroduce the dynamics of surface-water / ground-water exchange, manage ground-water withdrawal, and restrict contamination.

II. AQUATIC RESOURCES

4. Protect, extend, and enhance the structure of the aquatic habitat to the benefit of native communities.
5. Protect and enhance surface-water quality.
6. Integrate management of nonnative and native fish species in all aquatic environments in the Middle Rio Grande riparian ecosystem including wetlands, canals, and drains.

III. TERRESTRIAL RESOURCES

7. Protect the geographic extent of the Rio Grande bosque and avoid fragmentation of the riparian ecosystem and component habitats.
8. Protect, extend, and enhance riparian vegetation in noncontiguous areas in the floodplain.
9. Manage the buffer zone of the contiguous bosque to protect ecosystem processes, enhance wildlife habitat values, and maintain rural and semirural conditions.
10. Manage livestock grazing activities in a manner compatible with biological quality and ecosystem integrity.
11. Manage activities that remove wood in manner compatible with biological quality and ecosystem integrity.
12. Manage recreational activities in the bosque in a manner compatible with biological quality and ecosystem integrity.
13. Prevent unmanaged fires in all reaches of the bosque.

14. Use native plant species and local genetic stock in vegetation establishment and management efforts throughout the Middle Rio Grande riparian zone.
15. Protect, enhance, and extend (create) wetlands throughout the Middle Rio Grande riparian zone.
16. Sustain and enhance existing cottonwood communities, and create new native cottonwood communities wherever possible throughout the Middle Rio Grande riparian zone.
17. Contain the expansion of existing large stands of nonnative vegetation in the Middle Rio Grande riparian zone. At the same time, study the ecology of these stands and develop creative ways of maximizing their biological values.

IV. MONITORING AND RESEARCH

18. Develop a coordinated program to monitor biological quality (with emphasis on diversity and abundance of native species) and ecosystem integrity (with emphasis on restoring the functional connection between the river and riparian zone) of the Middle Rio Grande ecosystem.
19. Develop a coordinated research program to study the ecological processes and biotic communities that characterize the Middle Rio Grande riparian ecosystem.

V. IMPLEMENTING AND REVISING THE BIOLOGICAL MANAGEMENT PLAN

20. Regularly review and update the Middle Rio Grande Ecosystem: Bosque Biological Management Plan.

VI. THE MIDDLE RIO GRANDE — PART OF A LARGER RIPARIAN SYSTEM

21. Integrate resource management activities along the Rio Grande and within the contributing watersheds to protect and enhance biological quality and ecosystem integrity.

JUST ADD WATER!

Steve Harris'

Thanks to Debra Finch for the honor of participating in this panel. Thanks also to my colleagues on the podium for the work they've undertaken on behalf of the Rio Grande, Rio Bravo, Rio Tiguex, Rio del Norte, this singular, diverse and complex river.

Jeff Whitney, I know to be committed to the Middle Rio Grande Bosque and to the recovery of the Rio Grande Silvery Minnow and not just because it is his job; I get a strong sense that Jeff is personally committed to accomplishing his difficult mission. Brian Shields, has worked for many years toward meeting the goals and aspirations of the indigenous people for a river they consider sacred; Brian is also now a citizen member of the habitat recovery team for our silvery friend and I applaud him for this and more.

Cliff Crawford is truly the guiding light of the effort to manage the Bosque as a healthy ecosystem. The planning document, of which he is principal author, is a supremely valuable educational resource, as is Dr. Crawford, himself.

Senator Domenici has earned my praise for expending some of his considerable political capital in arranging the public financing of the Biological Management Plan. I hope the Senator won't stop here because much more remains to be done and it will take a considerable commitment from people of the United States if it is to be done.

I apologize in advance if some of my remarks seem critical of irrigated agriculture and a water allocation system in service to agriculture. Agricultural development in the Rio Grande required securing water rights and often these rights were applied with little regard for neighboring users. When the Europeans settled a place, we used resources as fast as we could, because there was always another valley to exploit, somewhere to the west. That's history and we should be aware of it and the nearsightedness of human vision, but I feel we should be aimed at the future. Today, there are signs that irrigation districts are awakening to the

needs of each other, the cities and the environment. So I hope my remarks will be a call to greater commitment from these entities, and more and more of us, to rehabilitating a natural river that is now in unmistakable decline.

Sometimes, in the depths of my study, staring at the 12 inch screen, I catch a little of the hopelessness that is often expressed to me, that "can't do" attitude:

- Too many people are too satisfied with the status quo,
- The river basin is filling with thirsty people, like a bathtub, right before our very eyes,
- We really don't "have the budget" to make meaningful change. At such times I'm reminded of what my grandmother said, what everybody's grandmother probably said: "Of course you can't do it, if you don't try."

One evening, a couple of years ago, I was addressing a meeting of the directors of the Conejos irrigation district in Colorado, when an older farmer asked me, "Now, exactly what is it you're trying to restore?"

My short answer was: "some of the flow in the river."

"What good will that do?" he asked.

"Well for one thing, we could keep the fish alive."

He looked thoughtful for a moment, as his mind drifted off to flies cast over clear pools. Then he said, nodding, "I'll bet we could help you out".

Before my heart could leap from my chest for joy, the engineer in charge of the district interjected, "Now, Kelly, I don't think this board should be speaking too precipitously." I wanted to say, "Yes, yes you should".

Because I had already arrived at the conviction that the way to restore the Rio Grande to health is very, very simple:

Just add water!

- Can't get the cottonwoods of the bosque to regenerate?

Just add water.

- All the little fish species are blinking out?

Just add water.

¹ Executive Secretary, Rio Grande Restoration, Inc., P.O. Box 1612, El Prado, NM 87529.

- Aquifers being mined out, so that the taps of Santa Fe and Albuquerque and Las Cruces and El Paso and Juarez, and beyond are likely to run very salty (or nothing at all) before the middle of the next century?

Just add water.

But, while the solution is simple, providing that solution is a bit more complex. Like: where are we going to get the water? I'd like to briefly tell you about a project that Rio Grande Restoration has undertaken, which has recently gotten a boost in the form of an opportunity to purchase a considerable amount of privately owned water.

At the very top of the Rio Grande lies the San Luis Valley Closed Basin. For the past 3 million years or so, this area has collected the annual runoff from a portion of the San Juan Mountains on the West and the Sangre de Cristo Mountains on the East. Some of the water has collected in a complex of aquifers which are considered non-tributary to the Rio Grande. By one estimate, the deepest aquifer contains about 2 billion acre feet of sweet water. The shallowest aquifers evapotranspire over 100,000 acre feet annually.

For the past 90 years, major irrigation diversions in the vicinity of Del Norte, Colorado have added additional recharge to the shallow aquifers in the form of irrigation return flows from water diverted out of the Rio Grande.

For the past several years, the Rio Grande Water Conservation District has been studying the effects of these return flows on the aquifer, in an effort to conjunctively manage surface and groundwater in the Closed Basin. Ray Wright, a closed basin potato farmer who is a member of the Colorado Water Conservation Board (in addition to his membership on the RGWCD board and the three member Closed Basin Project operating committee) says "The Closed Basin is our reservoir". That is, at late season, when streamflows are inadequate to satisfy irrigation needs, farmers pump groundwater to ensure their production, just as other valleys call on surface water captured in reservoirs.

The history of Colorado's performance in delivering its water obligations to the downstream states under the Rio Grande Compact is well known. Before 1985, Colorado had consistently underdelivered its obligations, ultimately accruing a debt of nearly 1,000,000 acre feet to the downstream users. New

Mexico and Texas sued Colorado (in 1966) to force them to make timely deliveries and to whittle down the debt. Colorado stipulated, to obtain a continuance in this suit, that it would strictly adhere to Compact delivery schedules.

At the same time, by way of satisfying their water "debt" **they** resurrected **an** old proposal to salvage the 104,000 acre feet of water that evapotranspires from the shallow aquifers of the Closed Basin. And so, at a cost of \$100 million, Congress authorized Bureau of Reclamation to construct the Closed Basin Project. Basically, the project consists of a series of 170 shallow wells, including observation wells and plastic-lined, 30 mile delivery canal, which conveys the water production to the river.

While it was being constructed, a series of wet years enabled Colorado to whittle down their debit and in 1985 received the blessing of a spill at Elephant Butte, which forgave the remaining half a million acre feet that Colorado owed. When Closed Basin Project became fully operational in 1993, one of its purposes, satisfying the debt, became moot.

In 1993, the project produced about 40,000 acre feet of water. Over **the past two** years, the District has operated the Project well under capacity because Colorado had no delivery obligation, due to consecutive spills **at Elephant Butte**.

During this time, Rio **Grandr** Restoration **has** engaged San Luis Valley interests in dialogue aimed at getting the District to consider ways of operating the Project for ecosystem benefits downstream. Principally, we have focused on the reach of the Rio Grande around the Colorado-New Mexico **state** line, where upstream water use often reduces late season flows to a pathetic trickle, with adverse consequences for the ecosystem, fishing and boating in the National Wild and Scenic River. But, of course, having once delivered water to the New Mexico state line, it is possible that the benefits of streamflow will find their way downstream, as well.

On June 1 of this year, it was announced that a 100,000 acre tract, the Luis Maria Baca Grant #4 had been sold to Mr. Gary Boyce and his Stockman's Water Company, whose intention is to offer for sale some 50,000 acre feet of senior surface water rights associated with the Baca Grant. This offer has shifted our focus somewhat from the public project to the private project, though both are

related sociopolitically and hydrologically. The Baca project seems to offer a window of opportunity for a straightforward acquisition of a considerable amount of water that could be used in the restoration of Silvery Minnow habitat and Middle Rio Grande Bosque Biological Management. The US Fish and Wildlife Service has indicated some interest in this proposal. We are now in the process of widening the discussion of this opportunity to include the NM State Engineer's Office and other water managing entities including the Middle Rio Grande Water Conservancy District and the Elephant Butte Irrigation District who may be affected.

If you find the concept of a public purchase of private water rights for the restoration of ecosystems intriguing, I invite you to pick up a copy of the discussion paper we prepared for a recent interagency field trip which we sponsored. These are on the table with the Rio Grande Restoration poster.

There's other recoverable water in the basin, San Juan-Chama water, Albuquerque waste water, Rio Costilla and most presently, the products of water conservation: not just from scaling back domestic consumption in Albuquerque, but from water-thrifty crops and low head sprinklers and more cautious use of flood irrigation. The question is:

Do we have the wisdom and the will to apply some of this water to river dependent lifeforms that do not walk erect or seek to harness nature?

A few more, final words about Rio Grande Restoration (the organization):

I think this panel wants to focus today on specific projects and problems related to restoration, and in order to build our organization's capacity we have been engaged in some of these: cattle and elk exclosures, tamarisk eradication experiments, constructed wetlands. We're working with a public-private group to possibly do some ambitious aquatic habitat restoration on the Red River. We're watching with interest our friends in the Bosque's effort to implement the Biological Management Plan. Getting these projects off the drawing board is important and I want to make the point that all can be aided by enhanced streamflows.

In closing, I want to share with you some of our guiding principles represented by aphorisms that are easy to hold in front of us to remind us of our

mission and guide our efforts on behalf of the Rio Grande:

"A river's gift to people is the fruits of irrigation; people's gift to a river is streamflow."

This implies a recognition that the original water rights reside in the creatures that inhabit the stream—a recognition that may someday obtain legal force, as a kind of deeper extension of the Winters Doctrine rights now being asserted for Native American peoples. If our domination of rivers is so complete that the web of life in them threatens to unravel, and this is almost certainly the case with the Rio Grande, then we have gone too far. We should begin to recognize our obligation to honor the source of our wealth. And recognize, too, that if we do not honor the other lifeforms that share our world, we condemn ourselves to what Chief Seattle called a "great loneliness of spirit".

"We're all downstreamers".

A beaver pond at 10,000 feet feels the effect of the sheep that have grazed down the grasses above it. The small acequia users feel the effects of the beaver. Alamosa alfalfa growers feel the effects of Summittville. Isleta Pueblo feels the effects of Albuquerque's sewage effluent. El Paso feels the effects of the Hatch and Mesilla valleys' nutrient-laden return flows. Big Bend feels the effect of maquila wastes. The Lower Valley of Texas and Tamaulipas feels the effect of large scale diversions in the Rio Conchos. If we build a low flow conveyance channel to deal with sediment, fish habitat may diminish.

The point is that we're all connected and that none of us can behave as if we had no responsibilities to the next reach of river down the line. We must recognize that our neighbor's interests matter to us, morally and practically. Unseen critters and "frivolous" recreation deserve consideration in the mix, and this they have not had. There is a big picture out there and we must all begin to look closely at it.

"Recreation is neither good nor bad, but only what you make of it."

Rio Grande Restoration's funding derives primarily from the whitewater boating industry and we are often criticized as being insincere in our call for streamflow protection, because of this. In advocating flows for recreation, we take a somewhat broader view of recreation than water to float rafts

or grow exotic trout. Recreation takes many forms: Some are mere sport, sought after to escape the ultimate problem of our mortality and some are more on the order of “re-creation”: a sunset walk along the levee, sitting quietly beneath a cottonwood, listening to the voice of the river, seeing a flight of Sandhill Cranes on a frosty morning—things that add a sense of meaning to our lives. Swimming, fishing, boating, birding, walking, running, meditating, the family picnic—all of these are gifts that the river gives us. We believe that these are worthy of protection and enhancement. From a practical side: there are economic values to our communities from a river walk and a river run. Natural values are part and parcel of “tourism products”. The fact that we can ascribe a dollar value to whitewater rafting, for example, helps us make a case for river restoration, when we ask for the money to make restoration happen.

If the lawyers are nervous, we must be doing something right.”

We recognize that political and legal considerations are a big part of the process of restoring a river. But we believe that the “command-control” paradigm that is the present basis of government management of public resources misses a fundamental target: the assistance of the general citizenry in achieving environmental goals. Likewise the “win-lose” orientation of environmentalist groups is proving ineffective as a model for environmental protection. We prefer to work collaboratively with folks that could be viewed as adversaries, if for no other reason than to move them out of complacency about things we feel are urgent. We recognize that “it’s working for us” is a powerful argument. We seek changes that still work for existing uses while placing a more appropriate emphasis on the diversity of life, the importance of water for recreation and ultimately, the notion that rivers need water, too.

Finally, I know another farmer, general manager of the Rio Grande Water Conservation District, actually, who remarked to me after hearing an environmental lawyer on a float trip talking about reallocating existing water rights, “What is he? Some kind of visionary?” I said, “Yes, Ralph, and so are you, because you’re talking about this river’s “ecosystem”. And so must we all be “some kind of visionaries”. Because if we don’t visualize a future where we share the river equitably with

rafters and minnows and Mexicans, the fish and the trees and the farms and the cities and all of us who live in the valleys of the Rio Grande will suffer a thirst like we’ve never known before and this time, there will be nowhere else to go.

Questions posed by the moderator:

1. What is restoration from your perspective?

I’ve probably convinced some of you that I am a hopeless Pollyanna, unversed in the current complexities of ownership and the real-life, dogged resistance of water managing agencies to reform. I probably think that we can turn back the clock to “a better time”. Not so: but I think we can at least reverse the trend toward degradation, restore a small watershed here and a preserve patches of bosque there. Stabilizing ecosystems which are crashing.

Restoring streamflows is the common solution, but my definition of restoration also includes:

- Preserving patches of wildness or naturalness that currently exist.
- Connecting these patches by repairing the damage caused by removing riparian areas (such as by revegetating riverbanks, restoring resacas)
- Abating sources of pollution: (cleaning up sewage discharge, agricultural inputs/wastes, reclaiming mines like Summittville and Red River).
- Deliberately providing the floods that scour the channels and create habitat for aquatic life to exist and riparian species to continue to regenerate and neotropical birds to migrate and breed. (To some extent all of this is possible. In fact, there are growing numbers of folks in the public sector that recognize the need for restoration measures, who see the opportunities out there and are taking first steps toward their accomplishment.)

Restoration also means respecting the carrying capacity of the basin: I’m convinced that we can sustain the uses we’ve got. It is the new uses, the future uses that are breathing down our necks, that we can’t sustain. In the interests of economic development our civic leaders have encouraged industries like Intel to settle here and share our

water. In the interest of improving their own quality of life, thousands of residents of New York and California and Illinois and Michigan have headed, and are still heading for “wide open spaces” in places like Albuquerque. In the interest of sheer survival, a million Mexican citizens have just arrived, and a million more are on the road o La Frontera. And current immigration policy threatens to do no more than stack up the refugees along the Rio Bravo del Norte.

The only answer I see for this dilemma of dilemmas is for the leaders of each and every community in each and every valley to recognize the finite capacity of our river to sustain us and act today, in small, incremental ways, to reduce our communities’ demands on the water.

The Clean Water Act, the Endangered Species Act, the Superfund, if they survive, will be very helpful in meeting this litany of challenges. But, alone, they will not be enough to restore the Rio Grande, without the fundamental recognition that: we cannot go on like this. We, biologists and advocates and policy makers and bureaucrats, must carry this message forward to the citizens and leaders of communities in which we reside.

2. Should the Rio Grande be restored?

To the greatest degree possible, yes. What is possible is limited as much by our lack of knowledge, our stifled imaginations, as by our pocketbook.

3. Is it important to restore the Rio Grande?

It is as compelling a national challenge as PACFISH or Mississippi/ Missouri Cooperative Resource effort or Glen Canyon Reauthorization, all strong federal initiatives dealing with costly restoration programs on major national rivers, hopeful programs which every river conservationist supports. I believe the Rio Grande is worthy of this sort of national commitment, not to mention its international importance. Why is it important? The river has given us so much, how can we willfully destroy it? So much is known today about our impacts on the Rio Grande over the last century and over the last 25 years and about what the trends are right now, that we fail to try to reverse our destructive ways only at our own peril. This may require a heroic effort for relatively modest gains, but I believe that the people of the Rio Grande want to see it happen. They want us to show them how.

4. Can we restore the Rio Grande?

I like Dr. Cliff Crawford’s idea of selective or partial restorations to re-establish native riparian communities in select sections where conditions, including land ownership seem favorable. Design floods could be provided during years of high runoff, timed to regenerate aging cottonwood communities.

Restoring aquatic habitat in ma mainstem river is more problematic and costly, but no doubt some mainstream segments could be identified where scouring flows could improve stream channels. And in headwaters streams, we have excellent opportunities to restore chunks of overgrazed, overharvested watersheds and preserve healthy ones.

Crawford also speaks of constructed wetlands that mimic the form and function of remnant resacas or to excavate and water historic resacas.

In line with my “just add water” theme, Dr. Crawford suggests that a design flood might have unexpected or “unmanaged” restorative benefits in areas where intensive management is not possible or not undertaken. Having established ecological beachheads, just managing our water as if the river itself mattered would help. The river could perform a lot of the work of restoration.

Another real positive indicator for the feasibility of restoring this river is the sheer volume of people who would respond to a volunteer effort on a cleanup, or a revegetation project or tamarisk removal. Many people in the basin, perhaps a majority would really like to make a positive contribution and don’t know how. The many citizens that might be mobilized could create some of Dr. Crawford’s wetlands or set out the native plants that could help rehabilitate the IBWC floodway below Caballo Reservoir.

5. Where is restoration most needed?

Restoration of the Rio Grande should flow from the top of the watershed, Willow Creek, Summittville, Red River, where mine wastes are entering the streams, all the way down to the Laguna Madre where accumulated pollution impacts from the river are destroying a formerly biologically rich, diverse estuary.

To return to earth, the Bosque would have to top my wish list. The Bosque has the prerequisites: surviving diversity, a human induced extinction scenario, the existence of what conservation biolo-

gists call “refugia”- suitable habitat to grow wild critters, a solid body of science, including the elements of a restoration plan and a human constituency of friends (including, significantly, the chairman of the Senate Finance Committee).

Restoration is needed in the high impact zones, as well. Streams like the aforementioned, the Red River and the Santa Fe River can be cleaned up and restored; if not to their pristine, pre-Columbian conditions, then to managed streams of which we need not be ashamed.

Finally, the reaches we have transformed into sacrifice zones deserve some of our attention. Specifically, the dewatered sections in the state line reach, the floodways below Cochiti, the dewatered reach between Ft. Quitman and Presidio/Ojinaga deserve loving care. These are areas where we’ve disconnected the river and where we should give some regard to ways of reconnecting it. Which opens the question of providing so-called “upper basin water” to the lower basin. There is certain to be a market for it, as the Rio Conchos heads for full appropriation of its waters.

6. What components should be included in restoration targets?

Watershed protection: if upper watersheds can retain water for longer periods of time, there will be more water in the system during dry times. Riparian Zones: here is the home of diversity. We should protect the zones that are relatively intact and revegetate where possible to expand the acreage that is available to support life. Aquatic habitat and streamflow also need, and deserve, our stewardship.

7. Should it benefit only people or is it justified for other reasons?

I remind the conferees of Chief Seattle’s incredibly penetrating insight: that all forms of life are connected. He said, “The rivers are our brothers. They quench our thirst; they carry our canoes; they feed our children. So you must give to the rivers the kindness you would give any brother.” And: “Man did not weave the web of life, he is merely a strand in it. Whatever he does to the web, he does to himself.” He also said that “to harm the earth is to heap contempt on its creator.”

I also think that there is a sound economic reason for restoration in the creation of a sustainable visitor economy.

8. What are the costs and benefits of maintaining the status quo vs. restoring the river?

Maintaining the status quo will see our soils continue to run away downstream, leading to a decline in agriculture. It will see the basin’s human population grow to unsupportable levels. It will see a number of species decline into extinction. The benefit is that we will save some energy, save some money that might be spent on restoration.

9. Can we afford the costs of restoration?

I’ve heard it said that a restoration costs 10 times more than preservation. So, it makes sense to hang on to the wild places we’ve got. The problem is that the impacts will continue to flow into the pristine places.

Without doubt, the dollar costs for restoration could add up quickly. For instance, I wonder whether scientifically prescribed flood flows might be destructive to structures which people have placed within the floodplain, such as in north valley. The costs of restoration can add up if you’re talking about having to restrain flood waters from certain areas.

Many people assumed when Cochiti was closed that we now had the absolute power to prevent downstream flooding, but sooner or later there will be a regionwide storm event of sufficient magnitude to run the Jemez and Galisteo and a bunch of dry arroyos. Or the water managers’ crystal balls will break, we’ll get a precipitous melt on top of a full reservoir. A structure alone will not save the house built in the floodplain.

When you consider what the river has given to its brothers the humans, is \$100,000,000 too much to pay in return? I dare say the public treasury has paid several times \$100 million in the effort to harness and control the river. How can we accept the argument that we cannot afford some amount of public money to nurture and restore the river?

We can also prioritize projects very carefully, do projects that benefit the greatest geographical areas (and I submit that public water acquisition to provide streamflow, however expensive, falls into this category) do projects that rely upon volunteers or upon many partners. We could also do something on the BECC/NADBANK model, where communities, state agencies, conservation NGO’s could apply for long term, low interest loans for restoration projects. This kind of approach makes

fully as much sense as a lot of the Reclamation project repayment contracts that have been subsidized throughout the West over the last 100 years.

10. What specific projects have you or your organization undertaken to restore the river?

The streamflow protection project I mentioned seeks to apply available sources of water to the ecosystem. It also seeks public support for the “radical” notion that a river needs water, too.

We’re also involved in a project that promises to experiment with a river degraded by toxic mine wastes. This is barely even on the drawing boards, will take years, has significant political hurdles and may not work. But we are excited by the prospects and committed to it for the long haul.

We also have a growing corps of volunteers to wield the shovel, so to speak. We are developing the capacity to do restorations by contributing to BLM and Forest Service projects in Taos and Rio Arriba County.

**PEOPLE RECLAIMING RIVERS:
AMIGOS BRAVOS**

Brian Shields¹

The way to protect and reclaim water quality and the riverine ecosystem in the Rio Grande watershed and in New Mexico as a whole is through the empowerment of the grassroots communities which are dependent on that water. Affected communities need the information, coalition-building, legal support and political voice to hold polluters accountable and to reverse river degradation through reclamation initiatives. For this reason, Amigos Bravos—an eight year old grassroots river and social justice advocacy organization, with close to 600 members—operates as a watch-dog and pro-active force with programs which involve both protection and reclamation initiatives. In addition, Amigos Bravos provides technical assistance to communities, organizations and individuals.

In semi-desert country, rivers define communities. Rivers provide the lifeblood that allows

communities to maintain a sustainable and productive existence. The people of northern New Mexico who are now in late middle-age recall drinking directly from the rivers as children—without fear—in an act that was both necessary, and, in the case of Native American communities, of spiritual and ceremonial import. Water from springs, rivers and lakes is revered. The Hispanic acequia is an irrigation system, which taps from rivers, around which the Hispanic culture of northern New Mexico is built. Even now there are older people in these communities who will not use a flush toilet because it is inconceivable to them to degrade water in that way.

In less than fifty years, the 1,885 mile Rio Grande has become a health hazard of major proportions. American Rivers named the Rio Grande the Most Endangered River in North America in 1993. The American Medical Association has labeled the lower reaches “a virtual cess-pool and breeding ground for infectious disease.” Half of the Rio Grande’s original fish fauna have disappeared. The silvery minnow is on the brink of extinction. In areas such as the Rio Grande Bosque, a number of species have already disappeared, including the gray wolf, grizzly bear, longnose gar, shovelnose sturgeon, and phantom and bluntnose shiners. The southwestern willow flycatcher is also on the edge of extinction. Meanwhile, the last and best remaining forest of cottonwoods—which stretches along the Rio Grande from Cochiti to Elephant Butte Dam—is in a state of biological crisis. Although it is still possible to swim with impunity in the north, a young boy died this year when he was infected by the water in the lower reaches.

Water quality degradation is occurring from industrial and government waste, municipal sewage discharges and most importantly, **non-**point source pollution resulting from ill-conceived land and water management practices. Plutonium placer deposits have been found in Cochiti Lake. Mining has killed numerous tributaries of the Rio Grande, including the Red River outside of Questa. Logging is altering water flows and aquifer recharge rates, while non-sustainable grazing practices have turned water into mud from siltification and desertification. Municipalities and industry have pumped out so much water that wetlands and tributary streams go dry. Flows are being

¹Amigos Bravos, P. O. Box 238, Taos, NM 87571 (505) 758-3874. Amigos Bravos is funded solely through private and member donations.

managed in a way that no longer resemble nature's natural rhythms which are designed to generate biodiversity. In short, the entire ecosystem are being altered away from life.

Without citizen action and advocacy, water quality will continue to degrade. People who are frustrated by economic and spiritual decline that is a direct result of a polluted environment will seek the nearest scapegoat and fall prey to the inconsistencies and false premises of corporately-backed, top-down "movements" such as People for the West. Government agencies, whose responsibility it is to protect the public's resources are, by the nature of the bureaucratic process, moved to act according to where pressure is being applied. Historically, that pressure has been applied by "moneyed" interests, including other government agencies such as the Departments of Energy and Defense, municipal leagues, real estate developers, and industry as a whole. In fact, many of the current government regulations were, and are continuing to be, devised in cooperation with those interests.

The purpose of Amigos Bravos is to return the Rio Grande watershed and New Mexico's rivers to drinkable quality wherever possible, and to contact quality everywhere else; to see that natural flows are maintained and where those flows have been disrupted by human intervention, to see that they are regulated to protect and reclaim the river ecosystem by approximating natural flows, while maintaining environmentally sound, sustainable practices of indigenous cultures. Amigos Bravos holds that protection of the environment and social justice go hand in hand.

HOW MUCH CAN THE BASIN HOLD?

Clifford S. Crawford'

My colleagues on this panel have addressed, often with eloquence, reasons why the condition of the Middle Rio Grande ecosystem deserves our utmost attention at this moment in the river's history. Indeed, their words appear to reflect the values of

many managers, biologists and private citizens attending this timely symposium. As I contemplate their support for a new and different approach to managing the river and its riparian forest, I marvel that such sentiments were virtually unheard of only a few decades ago.

Our current image of how the middle river should appear and function is conditioned by what we now know of its past. However, it was most greatly changed at a time when people were more concerned with survival than with history. To them, an altered river meant security. To many of us, it means that important natural processes have been pushed to the point of no return. Human values change with time and circumstance, but the working of the natural world is based on unchanging principles, one being that continuous use of a resource depends on the resource's availability. If we understand that, we might well want to ask what the Middle Rio Grande ecosystem will be like, not just ten or twenty years from now, but fifty, one hundred, five hundred(!) years from now.

We focus in this panel on the condition of a waterway that collects water from a basin being filled by people like ourselves. Many of us here today came to the middle valley because of the real and imagined opportunities it held for us, and for the beauty and freedom the open spaces seemed to provide. Others have family and tribal histories that, in the basin and the region, go back for hundreds or even thousands of years. Several papers in this symposium have reminded us that abrupt cultural changes involving the use of the Rio Grande floodplain occurred during the last four hundred years. Some of the changes had painful cultural consequences, others led to new levels of prosperity, and all affected the hydrology of the basin.

Irrigation farming followed the floodplain colonization by Spanish settlers, replacing the earlier floodwater and dryland farming of the river pueblos. Water diverted into acequias may not have affected the pattern of groundwater recharge then — but does so now when combined with other changes in basin hydrology. These transformations occurred mainly in the present century but were significantly influenced by grazing and logging on basin watersheds during the previous century. Erosional deposits raised the river bed, and as a result elevated the water table of the

'Department of Biology, The University of New Mexico, Albuquerque, NM 87131-1091.

adjacent floodplain. The effect on agriculture and floodplain settlements was twofold: rising water in the soil brought salts to the surface, and heavy runoffs from melting mountain snowpacks produced drastic floods. The obvious solutions were to drain the valley and dam the river. However, these technically admirable accomplishments — achieved in the lifetimes of many of us here — created new concerns. Add downstream sediment accumulation, polluted water, a straightened and channelized river, a rapidly declining urban water table, and an invaded and progressively flood-isolated bosque to the abovementioned conversions, and you have what some would call an environmental crisis of major proportions.

To my mind there are two ways to think about the problem. Both are valid and should be pursued. One is to roll up our sleeves and cope with the problem's many facets. Many in this symposium, myself included, are doing this right now, although in our piecemeal approach we tend to

lose sight of the need to pull together toward a common goal. The other way is more passive, but in the long run may be more important. It addresses the issue of the basin's **carrying capacity**. How many people and how much human activity as we know it today can the water and water-related resources of the basin sustain? The question directly addresses the issue of **population growth**, not an easy one for politicians to consider seriously-or publicly. Essentially, there is no good answer because nobody knows. And nobody will continue to know until we get together and talk about it.

Thinking about the environmental problems of the local riparian forest and the river responsible for its existence has forced me to face the implications of overreaching the basin's carrying capacity. We may never totally agree on how many of us the basin can hold on a sustainable basis, but in my opinion we had better confront the issue voluntarily before the distorted hydrological cycle makes confrontation mandatory.