A Comparison of Two Science Based Collaborative Processes

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Abstract

The place of science and scientists in deciding issues that can affect significant portions of the public, or of public resources, and the conflict between science and non-scientists over control of the decision process has long been a matter of debate, perhaps arousing the most notable outbursts with the presentations of C.P. Snow's Rede lecture in 1959 and the subsequent publication in book form as *The Two Cultures*. This paper presents a comprehensive, though not detailed synopsis, of two attempts to meld together both influences within a science-based collaborative approach, and attempts to discern the major reasons one effort met with great success and one foundered.

Eagle Nest Reservoir

> "The significant problems we face today will not be solved at the same level of thinking we were at when we created them" -- Albert Einstein

In 1916, rancher Charles Springer built the concrete-arch Eagle Nest Dam across the Cimarron River in the 9,000 feet high Sangre de Cristos Mountains in Colfax County, NM. He had large land holdings in the foothills and plains below and wished to farm those lands. He believed he could irrigate up to 64,000 acres at 1.5 acre-feet per acre per year. Eagle Nest Dam holds only 70,000 acre-feet at full capacity.

Caught with a cash shortage, Charles Springer sold some of the lands he wished to irrigate. Along with deeds to the land, the purchasers also received deeds to water supplied by Eagle Nest Reservoir. Often the different deeds contained provisions for shortage sharing and drought protection that conflicted with provisions in previous or subsequent deeds. These conflicts generated disputes as to who would receive what water in any given year. A court decree in 1950 attempted to resolve the conflicts but brought little clarity to the complex issues. In the 1980's, lawsuits again erupted when Charles Springer's heirs, as CS Ranch, attempted to institute regulations defining how water would be allocated during shortages. The case went to the New Mexico Supreme Court, and resulted in a narrow decision that found the CS Ranch could not require shortage regulations that conflicted with any provisions of the original deeds without gaining the consent of the holders of those deeds.

While the Court's decision settled the question of whether CS Ranch could unilaterally impose shortage-sharing regulations, the narrow focus did nothing to address the basic, underlying predicament: the average annual supply that could be realized from Eagle Nest Reservoir was less than the annual demand. In the early 1990's, CS Ranch again attempted to institute modified regulations. Complicating matters, the original water deeds had been for irrigation. Since the 1980's, the bulk of the water rights had been purchased and transferred to municipal supply. To meet the new municipal demands for water, CS Ranch had sold contracts for not only additional Eagle Nest water, but had also sold space in the reservoir to store that additional demand. Already over-allocated, the new water contracts and the new "private" storage space further reduced the reservoir supply, reducing the already inadequate supply that was supposed to meet the obligations in the original deeds. In short, any court solution would not only have to

unscramble a very messy legal tangle, but also balance the new health and safety concerns attendant to possibly shutting off domestic water.

An attorney's dream, all these issues were working their way through the legal system, with a return date at the New Mexico Supreme Court assured, when in 2002 the New Mexico Department of Game and Fish purchased Eagle Nest Dam from the CS Ranch by quit-claim deed. In addition to title to the dam and reservoir, the state assumed all water delivery obligations. Because the New Mexico Department of Game and Fish had no water right or administration expertise, dam operations and maintenance were passed to the New Mexico Interstate stream Commission (ISC). The ISC had previously made estimates of water supply and demand from Eagle Nest Reservoir and identified a significant shortfall. Using the data available, the ISC undertook more rigorous modeling and came to the conclusion that over time, average annual supply ranged between 9,700 acre-feet and 11,000 acre-feet per year. Contractual and deeded obligations summed to 10,600 acre-feet per year. Because the deeds and some contracts provided for the reservoir to provide conveyance losses through tens of miles of dirt ditches, total demand on Eagle Nest Reservoir ranged between 14,000 to 16,000 acre-feet per year, depending on climate and ditch losses. Clearly, Eagle Nest Reservoir could not meet its water supply obligations. Like the previous owners, the state would be embroiled in ongoing and costly legal battles until the issue of shortage allocation was resolved.

Not counting state agencies, sixteen parties would have to sign off on any Eagle Nest settlement. Shortly after the state purchased Eagle Nest, the water users made one last attempt at a mediated legal solution. It failed miserably, and actually generated even more motions, complaints, and cross-complaints. After over twenty years of bitter, expensive, and unresolved legal battles there was little left but animosity between some parties, and even less good feeling between opposing attorneys. Realizing no court could resolve the problem of a short supply, the ISC created a simple spreadsheet tool with graphics illustrating the underlying problem and began a series of presentations to groups of water users. After about a month, some of the users approached the ISC and requested help in resolving the conflicts. Other parties used political influence to try to pressure the ISC into operating the dam and reservoir to their advantage.

Working with those parties that sought a factual resolution, the ISC refined the modeling and made some preliminary recommendations to resolve the over appropriation issue. Faced with the reality that the total contractual and deeded demand greatly exceeded supply, one of the key water rights owners offered to compromise on what had before been a non-negotiable position. The ISC conveyed the compromise to some of the parties that had not been willing to enter into settlement discussions. They, and then all remaining parties, agreed to meet, facilitated by ISC. The first meetings of the group were tense and combative, but all parties agreed to some basic rules. Everyone pledged to focus on a solution for the real issue – not enough water – and leave legal disputes outside the room. Technical consultants for various parties were present, but while parties were encouraged to consult with their attorneys, no attorneys were allowed to the settlement meetings.

The ISC began the first meeting with a "straw man" resolution for the shortages issue, in both textual and graphical format. The straw man was projected for all to see. Parties reacted and discussion, channeled by the ISC, began on how to address the real

supply shortfall that underlay the conflicts. This pattern was followed in subsequent monthly meetings. As issues arose and possible dam operation scenarios were proposed to address the issues, the ISC would bring the modeling results based on those scenarios to the next meeting. Modeling results were presented at various levels of complexity but always reduced to simple equations; e.g., how much would each user get under one scenario or another (Figures 1 and 2).

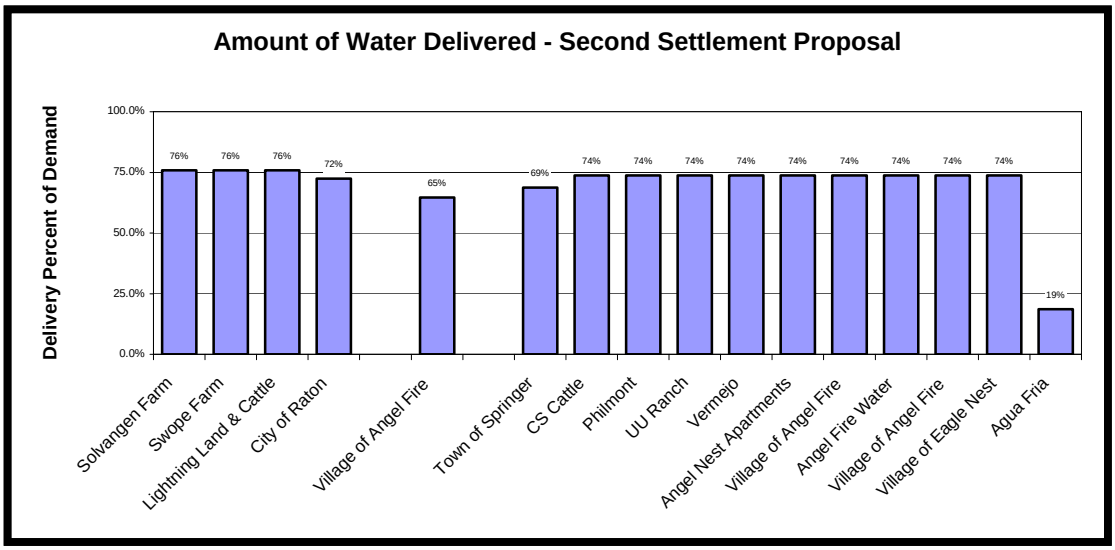

Figure 1. Simple graphic illustrating how much water each Eagle Nest user would receive under the "Second settlement Scenario."

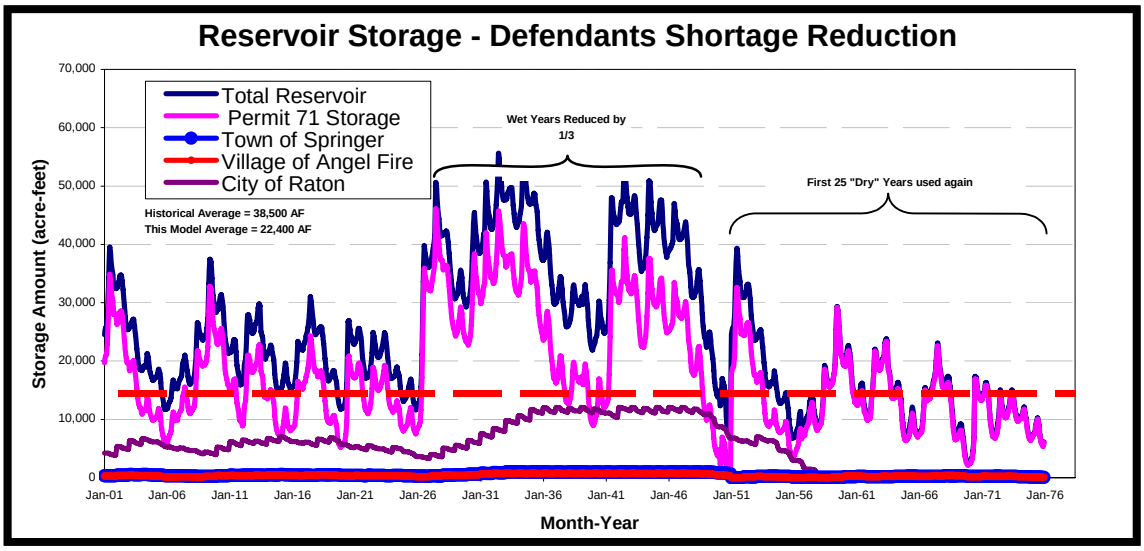

Figure 2. Simple graphic illustrating total Eagle Nest Reservoir storage and water amounts available to different parties over a 75-year dry-medium-dry scenario.

Although modeling was used and presented to illustrate some very complex issues, graphs such as Figures 1 and 2 were important graphics in that they were simple for a layman to follow and provided the users with the basic information upon which they could base their decisions. Modeling often produced unexpected results. For instance,

many of the parties who had purchased storage rights had not accepted that allocations of private storage in Eagle Nest reduced the effective storage volume of the reservoir and inevitably impaired the long-term water amounts non-private storage users received. This misunderstanding was quickly corrected through simple modeling and graphic presentations. Conversely, arguments over highly contentious interpretations of conflicting deed and contract provisions were often shown to result in delivery changes for any party of a single percent or less.

There was another dynamic that was equally as important as science in the settlement process. The state was not immune to the suspicions and antagonism among water users. In fact, if there was one unifying facet among the Eagle Nest water users, it was distrust of the state. In addition to good, solid science simply displayed, it took a great deal of work to get the users to believe the state was sincere and would stick by the deal, regardless of political motivation or future changes in administration. The latter concern was accommodated through legal means wherein the state allowed itself to be bound in perpetuity. The natural distrust of government was a more difficult hurdle. A representative of the Office of the Governor, swathed in that executive's authority, sat as a member of the state negotiating team. His presence was necessary to assure the users that the state was negotiating in good faith, looked for a fair and equitable solution, and would stand by any settlement crafted.

Given solid facts (with clear error potentials) upon which to make decisions, confident that they had a relatively certain estimate of what water they would receive under different scenarios, and assured the state would honor its word, the users made rapid progress in negotiating a term sheet for settlement of the ongoing litigation. Although minor issues and legal dotting of i's and crossing of t's would continue for another two years, once all the parties agreed to sit at the table and let the scientific facts weigh in their deliberations, the contentious and seemingly intractable water allocation issues were essentially resolved in less than one year.

In the end, the settlement terms were in detail far different than what the ISC first proposed as a straw man. Yet the settlement had all the necessary elements of a sustainable resolution. It represented a fair and equitable resolution not by any court or outside authority, but by the parties themselves. The terms of the settlement promised to fairly meet, as much as possible, the needs of the Eagle Nest water users. Key to the settlement was a series of reservoir levels that would trigger self-imposed reductions in water allocations. The actual reservoir levels that triggered the reductions, and the magnitude of these reductions imposed were the subject of much debate amongst the users. However, once the users understood that without an agreement to manage shortages, no sustainable resolution to their water conflicts was possible, the necessity of the triggers was never in question. The other key was a voluntary reduction in private storage, in order to prevent unacceptable impairment of original deeded water rights. These two features represented a hydrologically sustainable resolution.

The result of this settlement process is not simply a sustainable hydrologic solution. Perhaps as important, users on the system that had previously been loath to be in the same room now work hand in hand, bound by a common understanding of their water environment. It was because of the success of this science-based process that the

ISC chose to execute a similar effort in the discussions involving the Gila settlement of the Arizona Water Settlements Act.

The Gila Settlement

In the 2004 Arizona Water Settlements Act (AWSA), Congress granted New Mexico up to $128 Million in non-reimbursable funding and 140,000 acre-feet of additional water depletions in the Gila Basin in New Mexico (the Gila Settlement). By 2014, New Mexico must inform the Secretary of the Interior if New Mexico will develop any of the additional water. If not, up to $62 Million of the funding is lost. The Endangered Species Act, the Fish and Wildlife Coordination act, and other federal environmental mandates must be met before any water can be developed or any money expended, whether for development of the additional water or for any other use.

The New Mexico Interstate Stream Commission (ISC) was faced with resolving divergent ideas and beliefs concerning how the large benefits involved might be used, the present or future need for additional water, expected increases in future demand, and especially the sincere environmental concerns about any development of additional water in the ecologically rich and valuable Gila Basin.

The Gila Settlement Planning/Decision Process

> "Conservation is the positive exercise of skill and insight,
> not the mere negative exercise of abstinence or caution."
> -- Aldo Leopold

Following state statutes, the AWSA directed that any expenditure of the federal funds granted New Mexico or any contract for additional Gila Basin water under the Act be approved by the state of New Mexico through the Interstate Stream Commission. Decisions of the type and magnitude that fell to the ISC under the AWSA are usually driven primarily by politics, economics, legalities, and/or cultural imperatives, with minimal factual or scientific basis influencing the initial decision. Science is then tasked to find a way to make it all happen. This is in fact the sequence for even the classic NEPA process: only after an intended action is chosen, has gained general political and public support, is science asked to analyze the environmental impacts and/or modify or optimize the project. Seeking to institute a new process where science could provide a basis for informed and considered decisions, the ISC attempted to place science at the head, not the tail, of the process. Even prior to the conclusion of negotiations on the AWSA, the ISC proposed a policy directing how it would make any decisions related to the Gila settlement in the AWSA:

> "The Interstate Stream Commission recognizes the unique and valuable ecology of the Gila Basin. In considering any proposal for water utilization under Section 212 of the Arizona Water Settlements Act, the Commission will apply the best available science to fully assess and mitigate the ecological impacts on Southwest New Mexico, the Gila River, its tributaries and associated riparian corridors, while also

considering the historic uses of and future demands for water in the Basin and the traditions, cultures and customs affecting those uses."

There are three main directives in the adopted policy. First, recognize and protect the valuable ecology of the Gila Basin. Concurrently, recognize the current deficit and growing need for water in the region. Sandwiched between these logical requirements, the ISC directed that the best available science be used to resolve the expected conflicts. Environmental groups approved of the ecological constraints, and initially, use of the best available science. They objected strongly to the consideration of present uses of and future demands for water and refused to support the policy. The water users in the region, recognizing the economic value of an unsullied Gila ecology, approved the policy in total and as did the ISC and the Governor of New Mexico. To meet the three directives in the ISC policy would require a new method of approaching the planning and decision-making process.

Expecting strong competition for funding and water among local entities, and aware of the fervent resistance by environmental interests to any water development, no matter how innocuous, the ISC chose to initiate a collaborative, science-based investigative process incorporating full public access and involvement (Figure 3 below).

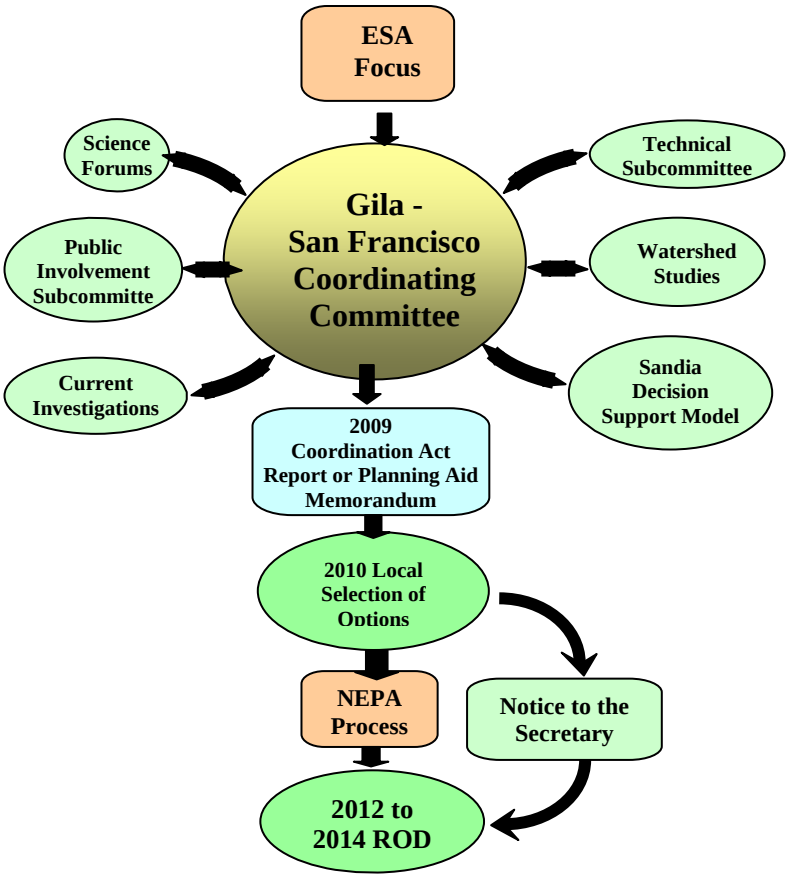

Figure 3. The planning/decision process from 2006 to 2009 will focus on endangered species issues and result in a US Fish and Wildlife Coordination Act Report or Planning Aid Memorandum. Selection of alternatives and the full NEPA process, required even for non-diversion projects or activities, was anticipated by 2012-2014.

The process is structured in two phases. The first phase extends through the end of 2009, with the deliverable being a Fish and Wildlife Coordination Act Report (CAR) or Planning Aid Memorandum (PAM), produced by the US Fish and Wildlife Service. The CAR or PAM would synthesize and summarize existing data and information and additional information gained from a number of scientific endeavors. Not intended to satisfy the requirements of NEPA or any other environmental mandate, the initial scientific investigations were only focused on providing baseline scientific information. The ISC preferred that the region make any proposals related to use of the water or money and the initial assessments would allow the public and decision-makers the ability to craft proposals from an informed and considered basis, and second, to hopefully streamline the decision-making and consensus-building process.

At the core of the process is the Gila-San Francisco Coordinating Committee (GSFCC, Figure 4 below). The GSFCC is formed by Memorandum of Understanding among the Southwest Water Planning Group (water users and local governments), the ISC, the NM Department of Game and Fish, the US FWS, the Bureau of Reclamation, and Office of the Governor, the GSFCC is responsible for ensuring good science is properly executed, that the work of the various scientific endeavors are complimentary and coordinated, and especially that the process proceeds in a collaborative but timely and efficient manner. The GSFCC is composed of those entities that have responsibility, in the Act or under federal or state statute, for implementation of the Gila Settlement. The alternate for the Office of the Governor was Chairman of the Gila Conservation Coalition. According to the Coalition's website, that appointment "provides a seat at the table for the environmental and conservation community in this decision making process."

Figure 4. The Gila-San Francisco Coordinating Committee is made up of those entities that have statutory responsibility for implementation of the New Mexico portions of 2004 Arizona Water Settlements Act. It is the responsibility of the GSFCC to manage the scientific, technical, and public involvement processes that will provide for an adequate CAR or PAM by the end of 2009.

One primary and one alternate represent each entity on the GSFCC. All decisions are intended to be by unanimous consent. However, if an issue cannot be resolved after sincere attempts at compromise a majority vote will decide. The members of the GSFCC identified the initial goal of a CAR or PAM by 2009, with the understanding that the Committee could proceed to manage the process through to receipt of a ROD by 2014. Prior to initiation of work under the GSFCC, the entire planning/decision process was vetted with the New Mexico congressional delegation, heads of the US Fish and Wildlife service, the Southwest New Mexico Water Planning Group, and the appropriate New Mexico legislative committees. Upon approval by all these entities, the GSFCC instituted and coordinated four main scientific endeavors: A Technical Subcommittee, independent science forums, ongoing ecological studies, and a decision-support model. The full activities of the GSFCC may be found at http://www.ose.state.nm.us/isc_colorado_gila_sanfran_committee.html .

The independent science forums were structured and organized by four ecologists from national laboratories and universities. These four experts functioned as independent Science Coordinators. The ISC paid expenses of the Coordinators and forums but intentionally abdicated any other involvement. In October of 2006, the first science forum was held with presentations by a panel of six ecologists of national and international standing, including a member from Australia. The Forum was scheduled, organized, structured, and hosted by the Science Coordinators.

Six speakers presented at the Upper Gila River Science Forum. Stuart Bunn, a river ecologist and director of the Australian Rivers Institute, spoke on general principles of setting environmental flows and his experience in dryland rivers of Australia. David Meko, a dendrochronologist from the tree ring laboratory at the University of Arizona specializing in paleohydrograph reconstruction, provided a long-term perspective on river flow and variability in the southwestern United States. Robert Wissmar, a landscape ecologist at the University of Washington, presented a landscape perspective for assessing key interactions between streams and riparian zones. Julian Olden, a fisheries biologist at the University of Washington, showed clear connections between flow modification and the success of invasive fish species and summarized existing fish data from the Lower Colorado River basin. John Bolte, a biological and ecological engineer at Oregon State University, presented the process used to successfully assess alternative futures in the Willamette River basin using stakeholder input, geographic information systems (GIS), and various modeling procedures. Finally, Dave Goodrich, a hydrologist at the Agricultural Research Service and the University of Arizona specializing in riparian zone evapotranspiration, showed how the hydrological and biological sciences were integrated with the social sciences for decision-making on the Upper San Pedro River in Arizona. A lively hour and a half discussion between members of the audience and the speakers followed immediately after the presentations.

The six presenters then spent the following day with the Science Coordinators in further discussion concerning the science needed in the Upper Gila River basin to support the decision-making process associated with New Mexico's benefits in the 2004 Arizona Water Settlements Act. Two critical observations were reached, the first on overall process and the second on the science that is done in context of this process. The group then defined the set of scientific information they would find most useful for the decision

making process. The full presentations and reports of the Science Forum may be found at http://www.ose.state.nm.us/isc_colorado_gila_sanfran_TS_ScienceForum-2006.html.

The Technical Subcommittee (Figure 5 below) first met in March of 2006. Its charge was to craft scopes of work for the necessary investigations. Rather than a dispassionate scientific setting and collegial give-and-take, monthly meetings were characterized by strong disagreements on what studies should proceed, and who should execute, manage, or be funded for those studies. After nine months of difficult meetings, proposed scopes for the necessary ecologic studies and work were delivered to the GSFCC in December 2006. The three co-chairs of the TSC acknowledged that the scopes had gaps, overlaps and were not well coordinated.

Figure 5. Composition of the Technical Subcommittee. Altogether, over twenty-five scientists and lay individuals participated on the Technical Subcommittee, providing not only full scientific but interest-based coverage as well. With much the same dynamics as the decision-modeling effort (see below), the Technical subcommittee had great difficulty agreeing on scopes or work plans.

To finalize, perfect, and integrate scopes developed by the TSC, the GSFCC asked the Science Coordinators to host a workshop in early January. The workshop was attended by the three co-chairs of the TSC, ecologists or hydrologists from the Bureau of Reclamation and the Fish and Wildlife Service, the ISC biologist, and the hydrologist from The Nature Conservancy. Based upon similar successful investigations, the workshop participants adopted a plan and integrated the TSC scopes (Figure 6 below).

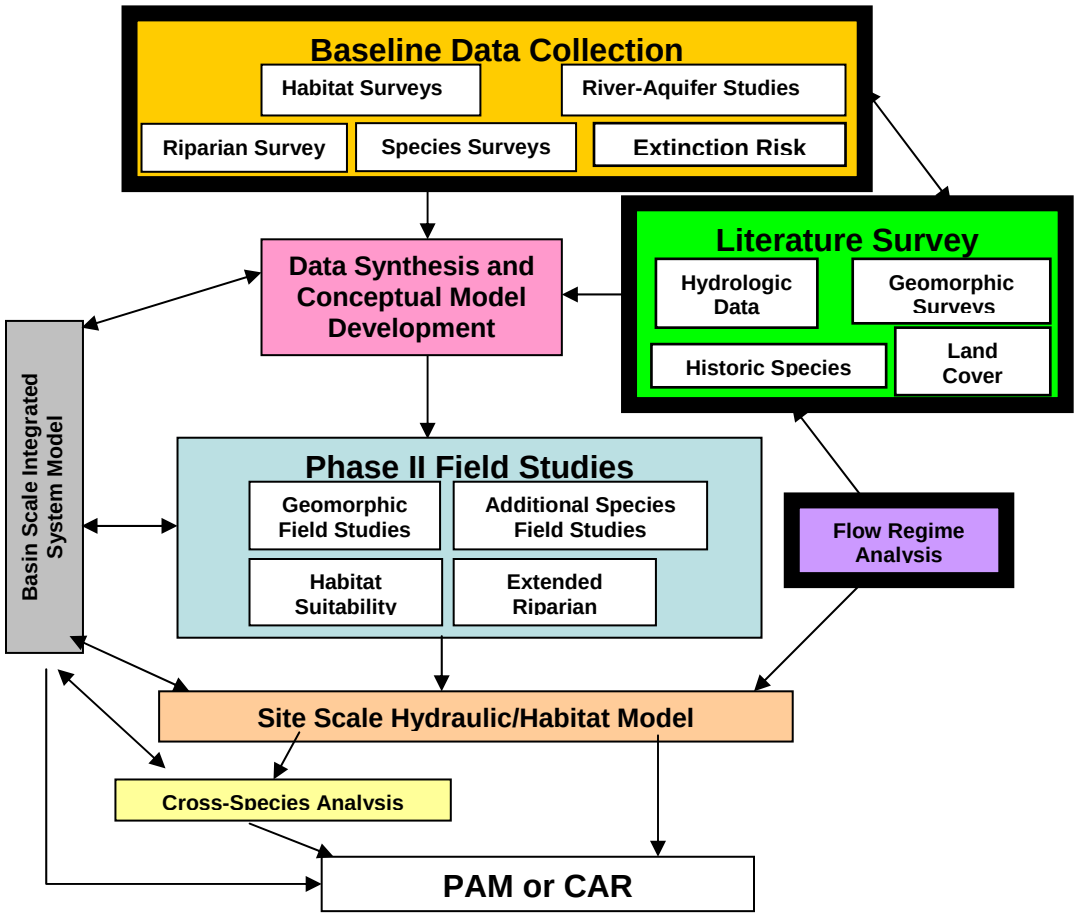

Figure 6. The integrated plan of studies developed at the January 2006 workshop. The plan results in a Planning Aid Memorandum (PAM) or Coordination Act Report (CAR) summarizing and synthesizing historical information and additional ecologic studies completed by the end of 2009.

A dedicated staff from Sandia National Laboratories led the development of a collaborative decision-support model. The model-building team members initially represented all interests in the region. (Figure 7 below).

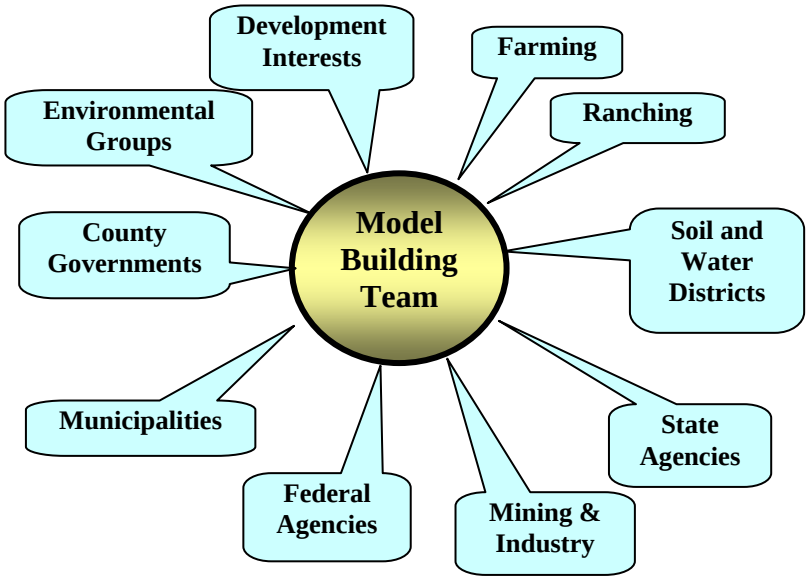

Figure 7. Initial composition of the decision-support model. By the summer of 2007, there was little if any participation by non-environmental interests.

The Sandia National Laboratories decision-support model was intended as an integrated presentation of complex, interrelated hydrologic and ecologic processes in a user-friendly format that would allow the decision-makers and general public in the region to quickly understand the implications of various alternative uses of the water or money available under the AWSA. The development of this collaborative model produced two important results.

Too Much Science?

> "Yes Sir, we got trouble, right here in River City!
> That starts with "T," that rhymes with "C,"
> That stands for Collaboration!"
> – "The Music Man by Meredith Wilson" (with apologies)

First, the demands by environmental interests to include conditions in the model that they felt would support their agendas, combined with objections to any feature that would support the future need for additional Gila water, resulted in a very difficult process. Though the Sandia modeling team strove mightily to keep the product well balanced and defensible, the non-environmental interests in the group eventually lost confidence in the model and the collaborative process, and gradually left the model building effort, if not the collaborative planning process as well. As of the summer of 2007, the team is composed almost entirely of environmental members. There is no buy-in to the decision support model from non-environmental interests.

The second effect of the model-building process likely proved even more detrimental to the over-all collaborative planning process. During discussions of the data to be used in the model, the ISC made all its information available, including preliminary models and data used during negotiations of the AWSA. This information predicted that even while maintaining flows over twice the median flow of the Gila River, and only diverting insignificant portions during flood flows, there was ample opportunity to acquire the full allotment of water apportioned to New Mexico in the AWSA, with no apparent harm to the Gila ecology. This initial assessment, even though subject to much more detailed analysis, proved anathema to the environmental lobby.

The Veto

"But, Mousie, thou art no thy lane,
In proving **foresight** may be vain;
The best-laid schemes o' mice an' men
Gang aft agley,
An' lea'e us nought but grief an' pain,"
- Robert Burns

Following the January workshop led by the Science Coordinators, and finalization of scopes of work for ecologic studies, local governments in southwest New Mexico strongly lobbied the New Mexico Legislature to fully fund the necessary science. The total bill was $945,000 for the first year, all for basic ecologic studies. The legislature appropriated the monies. After the very successful science forum, a difficult year of contentious Modeling Team and Technical Subcommittee meetings and the workshop that integrated the studies proposed by the Technical Subcommittee into a viable scientific process, it appeared that a science-based collaborative planning/decision effort was successfully under way.

The Gila River is of course closely associated with the Gila Wilderness, the first wilderness area in the United States and very much venerated by environmentalists, both because it was the first of its type and also because it was created mainly through the efforts of Aldo Leopold, who many call the father of American conservation. Even before passage of the AWSA, the call went out nationally to "save our Gila River, the last free-flowing river in the Southwest, from the dam-builders!" Repeated proclamations that the ISC had no plans to dam the Gila, and in fact thought it was neither wise nor feasible, had little effect.

The governor vetoed the funding, citing ambiguity between water development and scientific study in the wording of the appropriation. From a functional standpoint, the ISC's attempt to execute a collaborative, science-based collaborative process was left in doubt. From a practical standpoint, the veto deepened the divide between environmentalists and water users. It also cemented resistance by water users against what they accurately perceived as a unilateral dictate of their futures by a recently arrived environmental minority, bolstered by outside money and organizations. The outlook for a rational, science-based collaborative process appears dim indeed. The question that must be asked is why the environmental lobby advocated so strongly against funding science and ecologic studies on the Gila?

Saving the Gila?

> "Conservation is paved with good intentions which prove futile, or even dangerous, because they are devoid of any critical understanding, either of the land or of economic land-use." – Aldo Leopold

Certainly no one dismissed the sincere concerns of the environmental lobby. Protection of the Gila Basin ecology was foremost in the policy adopted by both the ISC and the Governor. Perhaps the strident opposition to any development of additional water in the Gila Basin can be laid at the foot of the past patterns of ecologically insensitive – or even disastrous –water developments throughout the west. Indeed, past proposals for use of additional Gila water, such as the Hooker and Conner main stem dams would have resulted in significant negative ecologic impacts. However, the planning process begun by the GSFCC, with protection of the environment as its foremost objective, was designed to obviate just such a possibility. As an added benefit, the data developed would have determined the limit of how and what – if any – water could be developed without harming the ecology of the Gila Basin. The limit so unambiguously defined would have served as the solid basis for approval or disapproval of what is the single greatest threat to the Gila, future growth and development.

The issues surrounding the AWSA and the real threats to the Gila are much more complex than the environmental mantra, "The Gila and San Francisco Rivers are the last wild and free-flowing rivers in the Southwest" would suggest. The Gila and the San Francisco are the main surface water streams in the Gila Basin. Below the Wilderness, diversions are ubiquitous, and only the Gila is either free flowing or wild and then only in those reaches within the confines of the Gila Wilderness. The Gila Wilderness itself is protected from all else but excessive recreational use. In that sense, in those wilderness reaches, the Gila is "wild and free-flowing." Downstream of the wilderness, the Gila River and Basin is not so protected. Leaving the Gila Wilderness and Upper Box, the Gila enters the Cliff-Gila Valley, a broad, flat alluvial plain that has been irrigated, at least in part, for almost a hundred years (Figure 8 below). It is in the Cliff-Gila Valley where its most imperiled species survive and also where the Gila is diverted to the extent it often dries up between diversions, a serious ecological problem.

Undeveloped except for marginal agriculture with a mild, temperate climate, the scenic land of the Cliff-Gila Valley is ideal for development. The amenities in the Silver City/Cliff-Gila Valley are much more desirable than the Phoenix/Central Valley, Ft. Huachuca/San Pedro, or Prescott areas of Arizona; than in Cheyenne or Laramie, Wyoming; or in the Las Cruces or Deming cities in New Mexico; more desirable than any of a number of other burgeoning communities in the southwest United States. For decades, the Gila Valley/Silver City area has been an undiscovered, undeveloped jewel that houses some of the most important and critical ecological habitats in the United States. In 2006, Oprah Winfrey listed the Silver City/Gila area as one of the ten best places to live in America. Undiscovered no more.

The Cliff-Gila Valley is key to protection of most extant ecological treasures on the Gila as well. Below the Cliff-Gila valley is the Middle Box and Gila Bird Area, an internationally recognized birding area. The great fecundity of this reach, including the Cliff-Gila reach, is due to the merger of several life and habitat zones. Downstream, near the Arizona-New Mexico border, irrigation holds the rights to and diverts virtually all the flow of the Gila. With or without the AWSA water, the Gila River ceases to exist as a natural riparian element before it crosses the Arizona-New Mexico border. If the ecologically valuable reaches in the Cliff-Gila Valley are lost to development, everything between the Gila Wilderness and the desiccated reaches in Arizona is lost as well.

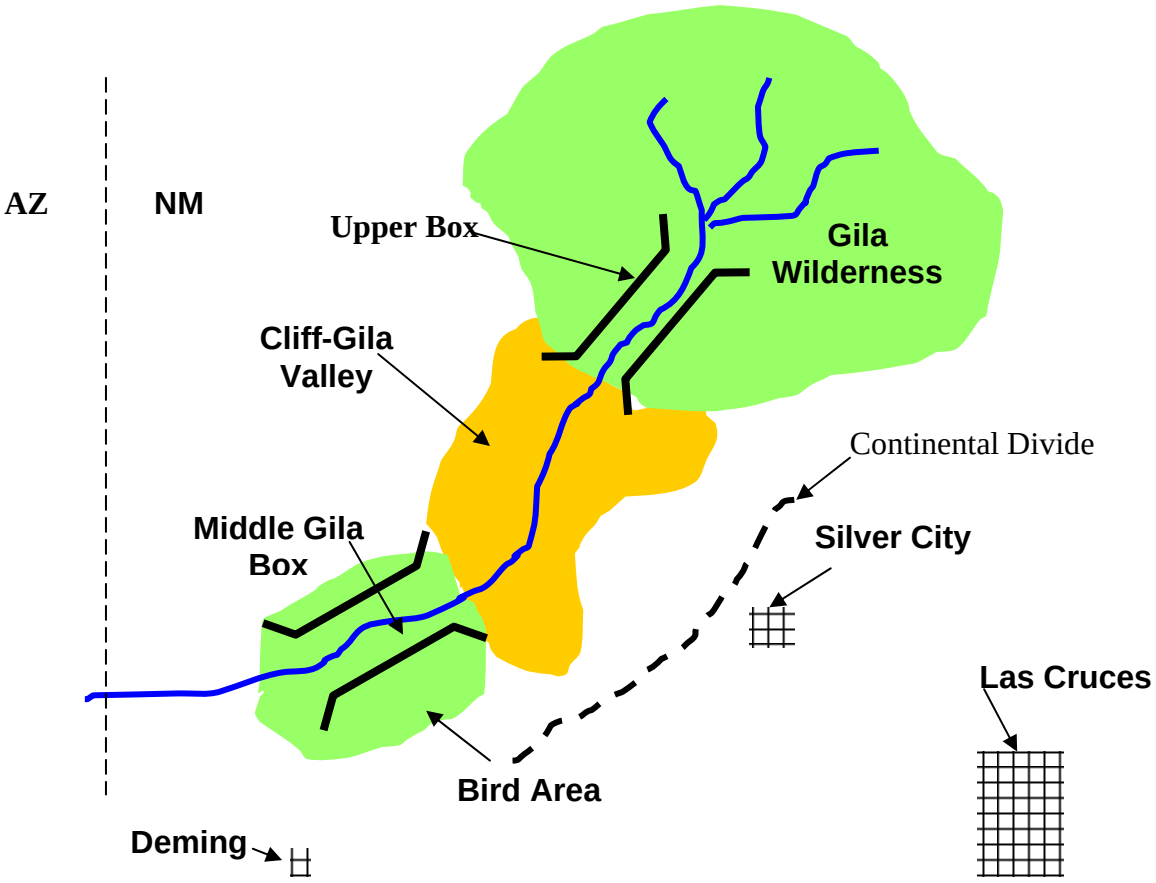

Figure 8. Schematic of the locations of the Gila Wilderness, the Cliff-Gila Valley, the Middle Box of the Gila River, and Bird Area (within the National Forest). The schematic is not to scale, and presents only the general positional relationships between the main areas and features discussed.

In the 1940's and 1950's, Phelps Dodge Mining Corporation bought the majority of the land and water rights in the Cliff Gila Valley and transferred the water rights to uses in their Tyrone copper mine operations. The Tyrone mine is nearing the end of its useful life. Very likely, the most lucrative use for either the Tyrone mine or the AWSA water will be to supply future demand in New Mexico. While future Silver City or other

regional demand presents a logical use for both the Tyrone mine Gila water and the AWSA water, the Cliff-Gila Valley presents an even more attractive potential.

Phelps Dodge was purchased in the spring of 2007 by Freeport-McMoRan. Phelps Dodge has very large assets and Freeport-McMoRan has very large debt. Usually, the pattern in these types of buyouts involves selling of assets to reduce debt. Should the Tyrone mine water rights in the Cliff-Gila Valley be transferred to the Cliff-Gila Valley in order to provide water for development along the Scottsdale pattern; e.g., 10,000 homes and two golf courses, wells and well pumping would be the most logical means to provide certain, year-around water supply. The effects of well-pumping would continue well past the time a well is shut down, even if the pumping could be halted at all given health and safety issues. The diminishment of stream flows from the continuous pumping effects would be ecologically disastrous on the Gila River during the summer months when flows frequently drop to twenty cubic feet per second or less.

Most environmentalists have expressed confidence that their political power is such that they will be able to enact statues and ordinances that would prevent any development in the Gila Basin, and thus are unconcerned about this threat, or at least not concerned enough to actively try to address the threat in terms of the AWSA. In Silver City, the environmental constituency is significant, in the range of 20% of voters. Some no-growth sentiment adds to that voting block. In the rest of the region, the environmental lobby has little or no support and growth is either accepted or actively encouraged. Even if the no-growth factions were to prevail, the need for the AWSA water exists throughout southern New Mexico. The cities of Las Cruces, NM and Deming, NM are down slope from the Gila Basin. Deming population grew 8.4% from 2000 to 2006. Las Cruces grew at almost double that rate, 16.2%, and is on track to soon become New Mexico's second-largest city. Silver City is almost 1,400 feet above the Cliff-Gila Valley. Las Cruces is 600 feet below the elevation of the Cliff-Gila Valley. Once siphoned over the continental divide (See Figure 8 above), the conveyance of water to rapidly growing communities along the Rio Grande becomes trivial. In terms of energy and costs over the project life, it may be cheaper to siphon the water to Las Cruces than to pump it uphill to Silver City.

Other demands for the water exist as well. The irrigators who make up the Texas portion of the Elephant Butte Irrigation Project recently filed suit against the Bureau of Reclamation claiming under-delivery of their share of the project waters. Part of their argument rests on groundwater pumping in the lower Rio Grand Basin in New Mexico where Las Cruces is located. El Paso, TX and Juarez, Mexico are also experiencing a rapidly growing demand for water and an uncertain or inadequate supply. It is well within the realm of possibility that future resolution of the water deficits in these intrastate, interstate, and international water arenas would include both Salt Basin and Gila waters.

Given these predictable threats, why did the environmental lobby oppose scientific investigations that could have preserved and protected the Gila into the foreseeable future? There are many possible reasons, but probably three most important: lack of trust, unfavorable scientific results, and the lack of a common goal.

Conclusions

> "It would be bitter if, when this storm of history is over, the best epitaph that anyone could write was only that: The wisest men that had not the gift of **foresight**."
>
> -- C.P. Snow, *Science and Government*

If it can be argued that the environmental lobby had precious little foresight when it comes to the real threats to the Gila, it is no less true that the ISC had little foresight into either the complexities and pitfalls of a fully inclusive collaborative, science-based process or of the willingness of the environmental lobby to pursue a political rather than a science-based solution. The ISC sought to base a Gila planning and decision process on the science-based model so successful in the Eagle Nest settlement. The same personnel, including the representative from the Office of the Governor, who had proven so effective in the Eagle Nest process, were utilized. There were significant differences, however, that proved fatal.

In the Eagle Nest process, the settling parties had first been presented preliminary modeling illustrating the basic dilemma. Before any comprehensive negotiations took place, the Eagle Nest parties were aware of the consequences of continuing down their present path. In the Gila process, the ISC did not generate initial modeling for a number of reasons. Foremost, the ISC was determined that the citizens and elected officials in southwest New Mexico should make any decisions concerning use of the Gila Settlement water and money and did not wish to influence that difficult process. The ISC was also fearful of being perceived as an advocate for one side of the water development question or the other and feared presentation of what could be a balanced solution would engender distrust. The ISC also naively believed that a fully inclusive, science-based planning process would generate its own initial solutions and trust.

This strategy for scientific implementation had three serious shortcomings. First, this approach falsely assumed a collegial scientific atmosphere. The ISC was adamant that only the best available science should be used. Long-term protection of the Gila ecology and responsible management of the resource demands no less. Unfortunately, advocates within the Technical Subcommittee and Decision Support Model Team argued for data, studies and work that would support their own preconceptions and funding needs rather than for the best basic science necessary to illuminate the true ecologic situation on the Gila. While the independent Science Coordinators were eventually successful in bringing good science forward, the open process produced much animosity and consumed unnecessary time and effort. An initial proposal by the ISC of a potential balanced solution, though certainly not what would have been a final resolution, might have encouraged more participation in an unbiased, better functioning scientific process.

Secondly, in the Gila the ISC forgot the Eagle Nest lesson to work first with those parties that were favorable to a science-based solution, and allow those opposing such an approach to remain outside the process if they chose. In the Eagle Nest process, this approach eventually resulted in all parties accepting and <u>constructively</u> engaging in a productive science-based process, to everyone's mutual benefit. Lastly, not coming

forward with a suggestion for a balanced solution allowed opponents of a science-based process to obscure or disregard the real threats to the Gila ecology and to cast the ISC in the role of "dam builders" with a secret agenda to construct a Hoover dam on the Gila. This made gaining trust nigh impossible for the ISC. In the Gila, the attempt at a fully inclusive scientific process from inception was an admirable political goal, but proved hugely difficult and largely counterproductive.

At least as important as any other factor in a successful collaborative process is an agreement on goals or objectives. In the Eagle Nest settlement, the users all accepted the fact they had to craft a fair and equitable means to accommodate inevitable shortages. On the Gila there could have been no less accord. Water users and the ISC fully appreciated environmental concerns and were committed to allow nothing that might impair the valuable Gila ecology, while also planning for future increases in demand. The intent of both the ISC and the water users was to let science define the proper balance that would fully protect the Gila ecology and meet, as much as possible, future demand for water.

This search for a sustainable, protective balance was unacceptable to the environmental community. To the environmental lobby, the environmental attributes of the Gila surpass any possible benefits of any outcome that admits of water development, innocuous or not. To the environmentalist, the Gila Wilderness is an emotional symbol of all that hasn't gone wrong in the western US and cannot be disturbed. This is an admirable sentiment but preordained not only that the Gila must be protected and preserved, it must be preserved inviolate, even where it was already developed and even if a solution promised protection from future overdevelopment. The understanding of the parties in the Eagle Nest settlement that all faced the same threat resulted in a common goal and made the Eagle Nest settlement possible. The ISC should have first insisted that all who participated in the collaborative process pledge to work toward well-defined balanced goals. The two radically different goals on the Gila, and the lack of political support, probably in itself doomed a science-based process on the Gila.