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TESTIMONY

October 6, 2014

Water and Natural Resources Committee, Las Vegas, New Mexico

Agenda Item 2: Water Demand, Availability, Costs, and Environmental Impacts Related to the Arizona Water Settlement Act and Proposed Gila River Diversion Projects

Dear Mr. Chairman and members of the Water and Natural Resources Committee:

Thank you for inviting me to present testimony regarding crucially important information pertaining to each subject in the title of your agenda item. The New Mexico Interstate Stream Commission (ISC) has conducted the state's Gila River diversion project planning process so as to obscure or not address each subject.

Reclamation's project manager in 2008 described Reclamation's expectations for the ISC's 10-year planning process that ends this year:

> "[Reclamation] would expect that New Mexico would have considered the cost and environmental impacts in sufficient detail to conclude that the plan was viable, such that no fatal flaws would be discovered during the detailed environmental compliance process."

The ISC has been silent publicly regarding feasibility but its pro-diversion intentions are unmistakable. I have determined the Gila River diversion project pursuant to the Arizona Water Settlement Act is infeasible. It will:

- Provide low or no usable water,
- Cost $1+ billion to import water to Deming, and
- Destroy and dewater the wild Gila River in the wild Upper Gila Box, which is
    - Habitat for federally listed endangered or threatened fish, riparian birds, and riparian snakes, and has
    - "Rich aesthetic and unique values," says Reclamation.

The flawed planning process has misrepresented need for the purported yield of diverted Gila River water and has rejected or unfairly considered much more cost-effective solutions to sustainable water supplies for Southwest New Mexico. It has not

identified or confronted these distinct reasons for diversion infeasibility. The ISC has refused to deal publicly with the question of either water availability or the amount of new usable water. Diversion costs have been understated or presented piecemeal. Financial feasibility has been ignored. Public funds have bought worthless reports that the project will have a beneficial impact on endangered species. Other environmental values have been ignored. The flawed planning process has been wasteful, mendacious, and unlawful.

Qualifications

My goal today is to inform you of the substance and provide evidence of the veracity of my critique, which I am uniquely qualified to make. I am a mostly retired licensed water engineer at the end of 40-year successful career. I grew up in southern New Mexico and earned BS and MS in Electrical Engineering and Civil Engineering (water and wastewater) degrees from New Mexico State University. I have worked as a water resources modeler (national specialty consulting engineering firm); water and wastewater utility engineer and manager and water resources manager (19 years, City of Albuquerque); Director of the New Mexico Interstate Stream Commission (6 years ending 2002); and self employed water resource management and planning consultant (12 years). I am extensively familiar with the Gila River including the proposed areas of diversion in the wild Upper Gila Box and the river's behavior during the characteristic times of New Mexico's diversions: spring snowmelt and floods.

Highlights of my water resource development and management experience that are also pertinent qualifications for this critique include:

- Leading Albuquerque's investigations and completing the public planning that dispelled the myth of Albuquerque's infinite aquifer and established Albuquerque's plan for diversions providing for full consumptive use of its San Juan-Chama water.
- Determining the elements of and negotiating the state's successful settlement with irrigation and conservancy districts and Reclamation for New Mexico's permanent compliance with the US Supreme Court Pecos River Compact compliance decree and obtaining passage of a new state law that authorized the settlement.
- Conceiving the Active Water Resources Management program for the State Engineer's priority administration of water rights before completion of adjudications and helping write the State Engineer's statewide implementing regulations. The New Mexico Supreme Court recently upheld this program and the AWRM general regulations.
- Serving continuously for 8 years (from initial federal and state permitting through facilities start-up and initial operations) as a key member of the small team of professionals that implemented Santa Fe's Buckman Direct Diversion (BDD) for drinking water use of San Juan-Chama and Rio Grande water. Author of the RFP for the BDD one megawatt solar generating plant implemented at no capital cost to Santa Fe that provides significant annual energy cost savings.

Background

2014 is the end of a decade-long process to determine the best use of federal funding to meet water needs in Catron, Grant, Hidalgo, and Luna Counties. Sen. Domenici secured $100 million in 2004 dollars for New Mexico through the Arizona Water Settlement Act of 2004 (AWSA). The AWSA affirmed but further constrained New Mexico's 1968 priority diversion rights and imposed a complex and rigorous explicit set of conditions to protect senior water rights in Arizona from New Mexico's diversions under the most junior water right on the river.

The AWSA also directs the Secretary of the Interior to oversee New Mexico's compliance with Gila River diversion constraints and federal environmental law. New Mexico must in advance pay the Secretary of the Interior $146 (2014 cost, officially projected to increase 3 to 5% per year) for each acre-foot of water diverted. ISC's secret spreadsheet contains the assumption that Gila River diversions would commence following prepayment of $8.1 million for the opportunity to divert 54,000 acre-feet followed by annual payments of up to $2.6 million thereafter (2014 dollars). New Mexicans would own no water rights.

Because of three failed Gila River development attempts, Sen. Domenici's conditions for two-thirds of the non-reimbursable federal AWSA funds ($66 million in 2004) allowed their use at the ISC's discretion on any project that meets a water supply demand in the four counties. Those funds have grown to approximately $90 million (2012 dollars). These funds could be spent on infrastructure improvements to public drinking water systems and irrigation systems and for water conservation.

The remaining one-third ($34 million in 2004) can be spent only on construction of an AWSA Gila River diversion project if such a project passes costly, long federal environmental law evaluations. A diversion project capable of diverting and storing Gila River water and exporting it to Deming will cost more than $1 billion to construct and operate, so this appropriation is less than a 5% federal contribution.

The Interstate Stream Commission (ISC) is charged with evaluating the feasibility of a Gila River diversion and deciding how to spend the federal funds. After years and millions expended on studies and engineering, the best design remains fatally flawed. Failure is inevitable and certain due to:

- Immense costs
- Low or no usable water
- Low need for water and no demand at the associated cost
- Endangered species impacts of diversion

The ISC will decide by the end of this year if it will spend millions more of the funds—that could be used to implement needed modest and effective water-producing-and-

saving projects immediately—in pursuit of the infeasible diversion. A decision not to build a diversion will not change New Mexico's rights to this water.

Billion Dollars Means Financially Infeasible

A Gila River diversion project that would store the maximum annual diversion and pump water to Deming will be enormously expensive while routinely suffering severe water shortages. The federal Bureau of Reclamation's July 2014 Appraisal Report prepared for the ISC presents costs for components of such a project. The present value of these capital and ongoing costs exceeds $1.1 billion. Reclamation also shows all diversion alternatives provide a maximum of $0.25 in benefits for every $1.00 in costs. Reclamation overstates these benefits because ISC instructed Reclamation to assume the project would provide full water supplies.

If Deming were to pay its share for water from a Gila River diversion project, the typical monthly Deming water bill would increase from the current $13.68 per month to over $158 per month. Water for supplemental irrigation would cost $8,000 per acre-foot. These are best cases, based on $445 million in revenue bonds for construction, the remainder of capital costs after State of New Mexico appropriations of $250 million and all federal AWSA appropriations. These unit costs assume water users would pay annual costs of operation and revenue bond debt service totaling $47 million per year and the project would produce 6,000 acre-feet per year. I have emailed calculations and other cost documentation to WNRC and LFC staff. My calculations utilize the financing method presented this year to project proponents by private investment banker GK Baum with cost inputs from Reclamation's July 2014 estimates of capital and annual costs.

Limited Water Legally Available for Diversion

The explicit conditions of the AWSA only allow for diversion during floods and spring peak flows at times when all downstream water rights are satisfied. This occurs 9% of the historical days since 1936, when data for the calculations begins.

How much new water can be expected if the Gila River AWSA diversion project were to be built? Despite the ISC's explicit statutory mission to "investigate" rivers and stream systems, the ISC has never publicly addressed this key water availability question except to repeatedly assert average water availability of 14,000 acre-feet per year. That number is merely the upper limit of New Mexico's junior Gila River diversion right. Even the ISC's secret spreadsheet shows the legally available water long-term average is much less. ISC recently said it is not possible for the ISC to estimate the amount of new usable water without massive additional expenditures.

My colleagues and I have corrected and extended ISC's secret spreadsheet. Our professional, documented work applies the complex conditions that must be met for New Mexico to make its junior AWSA diversions to the daily historical data for Gila and

San Francisco Rivers flows and reservoir volumes from 1937 through 2013. Our work shows the ISC's 14,000 acre-feet per year on average water availability description to be false and highly misleading, as shown in the attached figures.

- The median annual legally divertible water volume is 3,700 acre-feet, less than 30% of the mean.
- Twenty percent of the total volume of legally divertible water since 1937 occurred in three years, two of which were in the 1980s and 1990s, the two wettest decades in the last 2000 years. These years contributed disproportionately to the long-term mean of 12,500 acre-feet per year.
- 23% of years since 1937 produced no legally divertible water.
- An additional 22% of years had less than 2,500 acre-feet of legally divertible water, approximately the amount needed just for promised river augmentation for species during dry times, as promised by the ISC.
- This means no water availability for human use in 45% of the years.
- The historical record shows consecutive years with no water legally available for diversion: one 6-year period, four 4-year periods, and two 2-year periods.

Leaky Reservoir Sites Mean No or Low Usable Water

Turning Gila River floods and spring peak flows and into usable water requires expensive diversion facilities, conveyance tunnels, and canals that are capable of diverting large flows upon their rare occurrences into storage reservoirs. These are expensive but possible. It also requires efficient storage reservoirs located off of the river to store the diverted water for later beneficial use. These are impossible.

- Three historical failures by the Bureau of Reclamation to develop this water eliminated better reservoir sites from further consideration.
- The current diversion proposals being considered by the ISC would store water in multiple shallow arroyos adjacent to the Gila River.
- To quote RJH Consultants, Inc., hired by the ISC in March 2014 to review Bohannon-Huston, Inc.'s engineering report following my testimony to the Senate Conservation Committee of the draft report and its fatally flawed preferred alternative, "The expected [reservoir] seepage losses, when combined with the evaporation losses, could easily equal or exceed the planned minimum annual diversion yield of 10,000 ac-ft, which would result in no available usable water from the project."
- My colleagues and I developed a computer simulation model of the reservoirs and the availability of new usable water, based on our corrected daily diversion volumes, evaporation and seepage data and physics, and minimal releases for mitigation, supplemental irrigation, and export to Deming. Our simulations show low and unreliable annual amounts of usable water (frequently none) even

if diversion operations are perfect, conveyance losses are zero, geologic properties of the rock are the least leaky the ISC's reports show can be expected, and future water available for diversion is the same as historical (no climate change impacts). Reservoirs will normally be dry due to excessive reservoir seepage losses if the geologic properties have average values as reported by Reclamation and consultants to the ISC. [The ISC has taken the position our net yield calculation cannot be performed until millions more are spent on geologic investigations of the reservoir sites and project design. Reclamation has chosen to report but not interpret its geologic information. Reclamation managers informed me that it is inappropriate for Reclamation to do more than the ISC has asked.]

- The ISC's most recent BHI engineering report indicates the reservoirs will not hold water and recommends but does not evaluate viability of thin black plastic liners to control reservoir seepage long-term. Lining these reservoirs is infeasible and unworkable in my professional opinion.

Environmental Impacts

All diversion alternatives involve diversion from the wild Gila River within the wild Upper Gila Box canyon, located immediately downstream from the Gila Wilderness boundary. Construction would lay waste to miles of the unique and treasured wild Gila River, the rare habitat the wild river creates, and the species that depend on that habitat. The diversion would destroy recreational uses of the Upper Gila Box. It would require a major construction access road and electric power.

ISC Malfeasance and Unlawful Process

ISC's planning process has ignored or withheld critically important information, such as its secret water availability spreadsheet discussed above. All of the ISC's planning expenditures that should have followed an inexpensive, initial conceptual feasibility study have been wasted. Such a study was not done or made public.

The ISC has wastefully expended huge sums on consultant assessments of secondary issues, some of which were based on impossible assumptions, such as the studies of impacts on endangered fish under the assumption of significant augmentation of river flows from project reservoirs during dry times. Its economic assessments assume full reservoirs and full water supplies for all economic uses of water. ISC eliminated cost-effectiveness as a criterion for short-listing alternatives and selected criteria that are heavily weighted to favor diversion alternatives.

Here is one example of the ISC's mendacious planning and engineering that speaks for itself. The ISC in March 2014 without any public discussion contracted with RJH Consultants, Inc., a Colorado consulting engineering firm specializing in dams and reservoirs, to review Bohannon-Huston, Inc.'s (BHI) Preliminary Engineering Report

prepared for the ISC. [I said the draft of BHI Preliminary Engineering Report "… may be the worst that I have ever reviewed" in my February 13, 2014 written testimony to the Senate Conservation Commission regarding SB89.] In the 5-page June 2014 $3.3 million "work plan" for the first six months of the current fiscal year, ISC staff described the RJH Consultants' review of the BHI report as follows:

> "RJH Consultants, Inc., conducted an independent review of the BHI study and confirmed it was adequate for conceptual level project planning. The RJH evaluation recommended additional geotechnical studies at diversion and storage sites."

Here is what RJH Consultants' actually said in its May 2014 report:

> "In our opinion, several project components were not adequately addressed in the PER and it is currently unknown if these components represent significant technical challenges or potential fatal flaws. These include:
>
> 1. Storage reservoirs and dams.
> 2. Project water availability.
> 3. Gila River sediment."
>
> The "highly permeable dam abutment soils" at the BHI preferred alternative reservoir sites "…represent not only a significant source of reservoir seepage but a significant dam safety risk." "The total cost for the project may be significantly low…[S]ome of the required elements of the dams were not included. In addition, some of the unit costs are unrealistically low. When all of these elements are considered it is our opinion that the cost of the dams could be underestimated by more than 100 percent."

Further, RJH Consultants' report emphasizes, "The projected net project yield is the foundation for justifying the project." RJH identified factors for the ISC to consider in <u>estimating</u> the net project yield. ISC's publicly silent response to RJH Consultants' review and my critique was a new $700,000 contract to BHI for a second phase of engineering evaluation. This $700,000 contract did not appear in any prior work plan but was authorized without any ISC discussion or approval in an open public meeting. Neither the scope of work nor the draft report mention or estimate net project yield, although BHI evaluates several absurd concepts. A staff report submitted to the ISC at its August 2014 public meeting says estimation of net project yield can't be completed until after the diversion project design is 30% complete!

My colleagues formally requested in August and again in early September that we be allowed to present our detailed model simulation of net project yield to the ISC. The former ISC director required that we present our models and resuls to the ISC Gila River project manager and staff. We did so on September 16. My colleagues subsequently were refused time on the ISC September 22, 2014, meeting agenda. They provided copies of both our corrected spreadsheet of daily water available for diversion and our computer simulation of the reservoirs and new usable water to the ISC during the ISC's

public comment period. My colleagues have been informed subsequently that they will be given 10 to 15 minutes to present the models and simulation results at the ISC's October 27 meeting.

ISC has not discussed its policy or business issues and decisions pertaining to its planning and studies, any study results, or any public comments in an open public meeting in 2013 or 2014. It has referred issues raised in an open public meeting to its Gila Subcommittee with no subsequent discussion in an open public meeting. Its public meeting reports from staff and from its Gila Subcommittee have been cryptic and cursory. I provided written notice to the ISC of its pervasive and long-standing violations of the Open Meetings Act on September 22.

Opportunity exists

The State of New Mexico should stop wasting public money on investigations of the clearly infeasible diversion now rather than punt this decision to the federal government by writing the Secretary of the Interior by the end of this year that it wishes to proceed with the AWSA diversion. Instead, New Mexico should establish a process to identify and fairly evaluate worthy projects and invest the available $90 million in federal funds on practical, cost-effective water supply solutions. Utilizing federal funds for these projects means neither New Mexico taxpayers nor southwest New Mexico water consumers will have to pay for them. Projects could include:

- Infrastructure improvements to all publicly owned public water systems in the four counties.
- Water treatment facilities to meet arsenic and uranium drinking water standards for systems that are currently out of compliance.
- Water conservation and watershed restoration programs
- Improvements in irrigation efficiency.
- A fund with remaining federal dollars to address future drought emergencies in the four counties.

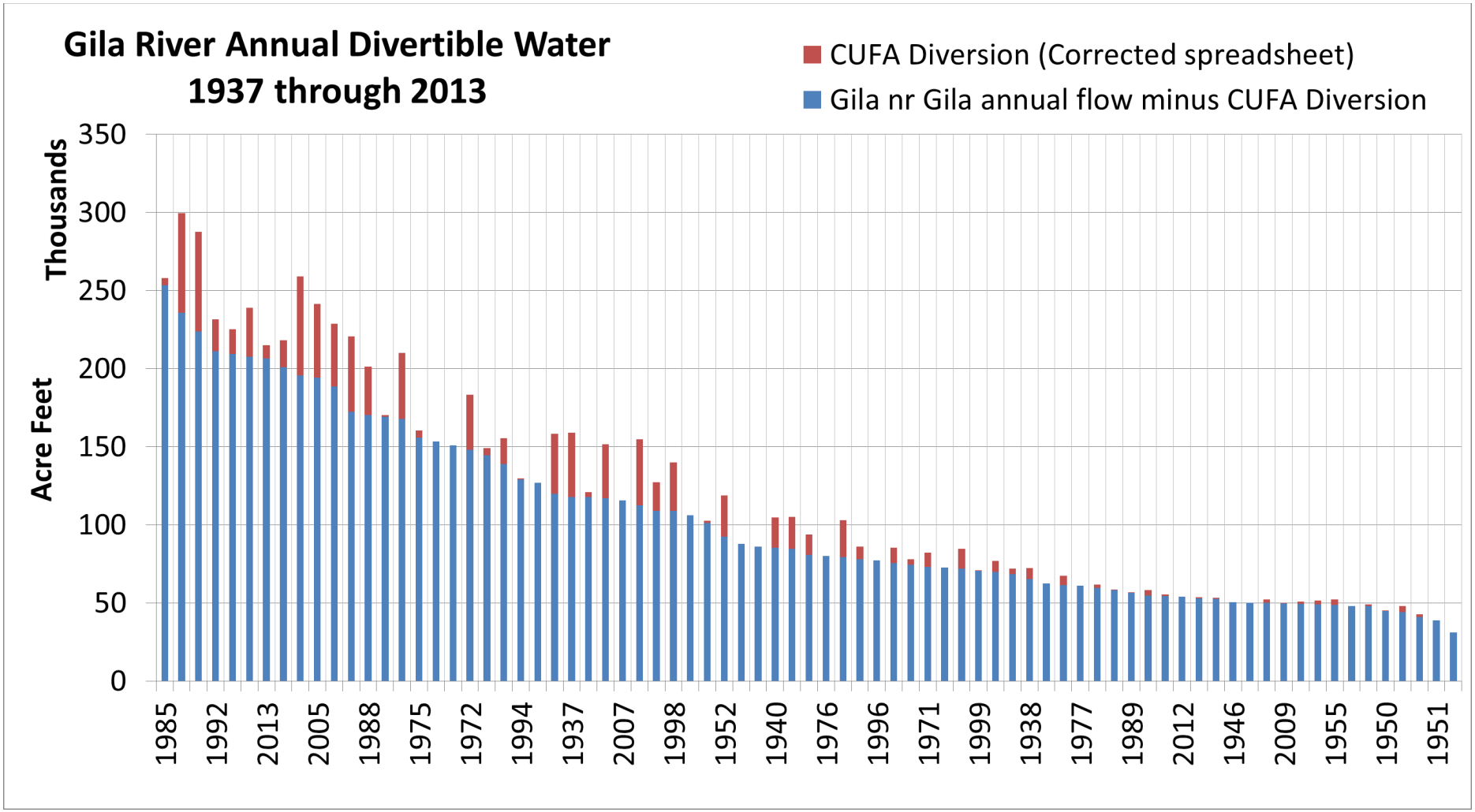
The ISC's expected decision to pursue a Gila River diversion project will yield only waste, embarrassment, and failure. It will commence a long and expensive federal environmental law compliance review process. This process will take several years and waste $5 to $10 million of New Mexico's funds. Overcoming the fatal flaws I have described herein is not possible.

Sincerely,

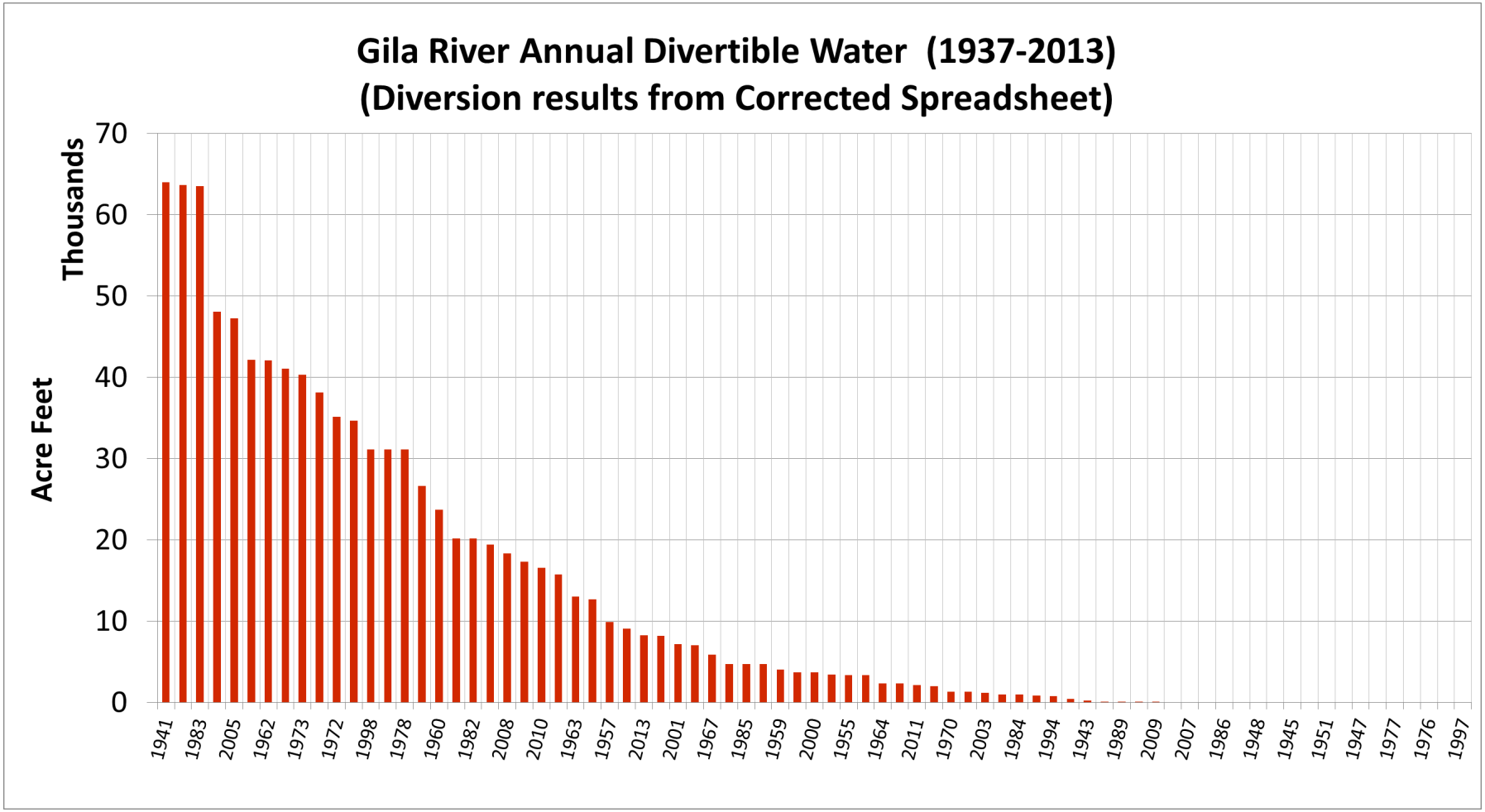
/s/

Norman Gaume, P.E. (ret.)

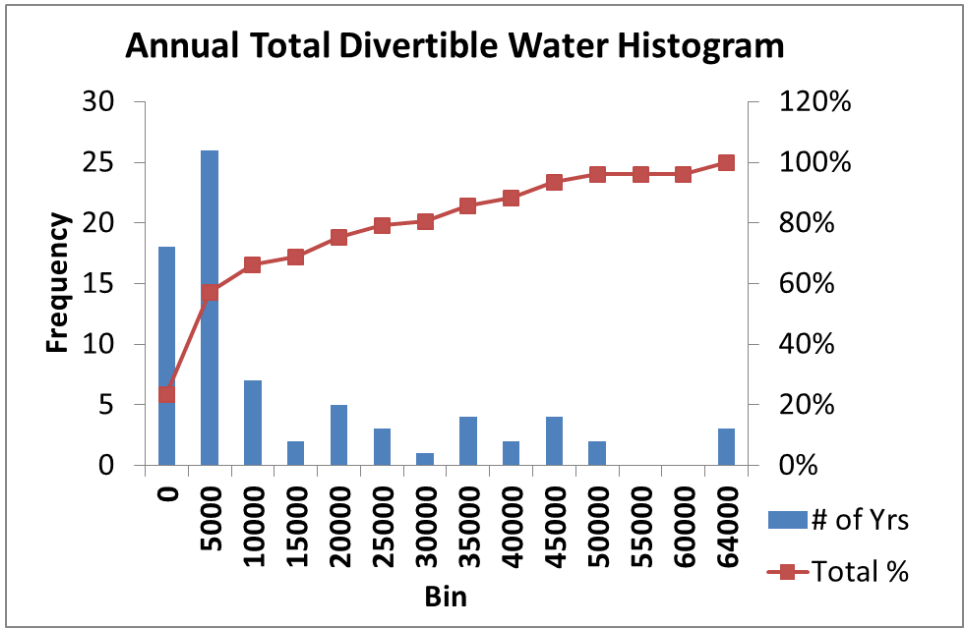
Big Gila Annual Flows Don't Guarantee Legally Divertible Water



Most Years Have No or Very Low Legally Divertible Water



Yearly Distributions



- Extreme variability with nearly ½ of the years providing effectively no divertible flow
- 18 Yrs (23%) had no diversion
- 17 years (22%) had less than 2500 AF diversion
  - Assuming a 10 cfs river augmentation flow for 120 days, 2400 af/y would be needed for mitigation—no usable water from these diversions
- 3 years (4%) delivered 64k AF. These years contribute disproportionally to ISC's mean annual yield statistic