

# THE PRAGMATICS OF ALLOCATING WATER FOR STREAM FLOWS

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May 4, 2009 by Steve Harris<sup>1</sup>

**The Decline of Southwestern River Ecosystems:** After 150 years of river management whose conceptual model was based on impounding and diverting surface water to supply economic development (and control floods), *most Southwestern rivers are fully allocated for water supply and managed primarily as water delivery channels.* Today, some major southwestern rivers, like the Salt and Gila, after passing through irrigated valleys, do not reach the destinations ordained for them by nature. Almost all rivers, large and small have modern flow regimes that differ significantly from their natural state of punctuated equilibrium.

Modern society's single-minded quest to control the flow of rivers has made unintended and often profound changes to the ecology of rivers. Natural runoff patterns, the timing of flows of various magnitudes, are altered to the benefit of invasive, and detriment of native, species. Many species native to western rivers, cottonwood for example, have evolved in response to spring flood pulses, flows which are now typically captured and released later in the season to optimize water supplies.

Every western river has been the scene of extirpation or extinction of aquatic species and continues to host struggles to conserve or recover endangered native fish.

Long-term, large-scale flow manipulation is linked to water quality problems, as when flows are diminished, dissolved and suspended solids and waterborne contaminants tend to increase in concentration.

Below storage reservoirs, the ability of rivers to work and transport its sediments are often disrupted. Sediments may accumulate and aggrade or occlude river channels, causing water to seep onto adjacent lands and/or increase flood frequencies. Dam and levee construction also promotes an inverse process, the incision and narrowing of channels, lowered water tables and altered physical habitat for aquatic species. Floodplains may become effectively disconnected from the flow of water and nutrients, perhaps reducing primary productivity. Paradoxically, many rivers are subject to both sets of impacts in different reaches.

And, significantly, both riverine habitats and surface water agriculture are adversely affected by these continuing trends.

**Consensus in Favor of the Natural Flow Regime:** With so many of our rivers manifesting these kinds of losses of ecological services, "soft engineering" approaches, in lieu of traditional construction, (e.g. channelization and leveeing) are increasingly appealing to policy makers.

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I believe it is safe to say that today, a growing consensus has developed among water professionals that the key to maintaining healthy freshwater ecosystems and the services they provide lies in shifting the river management paradigm, preserving or restoring basic elements of the natural flow regime while continuing to accommodate valued “traditional” uses of water.

Similarly, public sentiment in favor of living rivers remains strong. As a public policy imperative, however, the public energy that might be devoted to addressing our manifestly imperiled riverine ecology continues to be deferred in favor of other vexing issues: economic recession, public health, safety, education and war.

The notion that managing to achieve some appropriate measure of the natural flow regime necessarily requires “goring the ox” of irrigation agriculture has created, shall we say, severe anxiety among decision-makers that there is inherently a conflict between fish and farmers. This powerful mythology has frustrated many jurisdictions from even beginning the conversation about environmental flow. However, as I hope to demonstrate, this is a false dichotomy; *the real conflict is between existing uses (including ecological) and new development.*

Here I must also mention a second, equally daunting, barrier to progress: the logistical and administrative complexity of providing instream water rights in a context long devoted to accommodating diversion and consumption of water. *It is almost axiomatic that nothing will change for the better for our rivers until river protection takes a place alongside river use in the policy framework of our states.*

**The Science of Environmental Flows:** A threshold question is “can we determine how much water a river needs?” Yes. Quantum leaps are being made in understanding river functions and the complex ways in which rivers shape the natural system. The national (actually international with the inclusion of the Canadian provinces) Instream Flow Council suggests that appropriate science considers hydrology, biology, geomorphology, water quality and connectivity, to which it adds three policy components: legal and institutional constraints and effective public involvement.

There are dozens of methodologies available to provide river managers with some sort of answer to the question of reserving water for nature. Try this sometime: Google the term “Instream Flow” and you’ll find an astonishing 261,000 entries, many describing techniques that use sophisticated computer models which focus on historic stream flows and present deviation from them or the relationships between flow and habitat for target species or flow and the shape of channels. Some require lots of data to get results, some provide outputs from a single session using freely available USGS stream flow data. Suffice it to say that, *sooner or later, in order to get a target to aim for, any project will have to consider what is the most appropriate technique to apply to its particular stream.*

The consensus is that, to arrive at a flow management prescription, seasonal and year to year variations must be considered along with the magnitude, timing, duration,

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frequency and rate of change in flows. The trend in all of this science is toward holistic approaches, marrying a range of variables and desired outcomes into a managed flow regime for the target stream.

**Addressing Logistical and Administrative Complexity:** In the process of writing a new constitution after the fall of apartheid, South Africa codified a new doctrine for the sustainable allocation of water. Henceforth, there would be a “Water Reserve”, a protected baseline consisting of the water needed for basic human and ecosystem needs. Only after the Reserve is secured, may water be allocated for agriculture or industry.

By contrast, our allocation system regards water, foremost of all, as an article of property. In a minority of rivers, an unappropriated increment of water might be reserved for environmental purposes, although in times of shortage, such a right would be considered “junior” and in jeopardy of not being served at the very time it might be most needed.

Rivers shared by several states, such as the Colorado River and Rio Grande, have been the subject of apportionment agreements, which obligate the upstream state(s) to bypass an increment of the annual flow to serve the agreed-to water needs of the downstream state(s). Assuming favorable “plumbing” (i.e. strategically located storage reservoirs), the timing of such compact deliveries might be altered to conform more closely with an environmental flow prescription.

Most western rivers are at least “fully appropriated”. And generally the most hydrologically altered sections, those most in need of flow management, are in mid-stem, irrigated valleys, nestled into a complex of ownerships. Though much can be done with better water management, if management alone can’t satisfy the river’s basic environmental flow needs, one must concede that, in a fully appropriated system *reallocating water from offstream to instream uses requires a market transfer.*

Even when rights can be acquired in such a valley, additional complexities may exist. An instream water right may not fit neatly into the administrative system, as when a water right holder downstream of the instream right seeks a transfer water to a point upstream. When the transferred water is diverted from the stream, water to serve the instream right may be rendered unavailable, or conversely if the instream right were administered, the downstream right might be prevented from being transferred.

Resolving such a conundrum is difficult for the administrators, so that it is no wonder that wildlife management agencies so often complain that water managers are resistant to creating instream flow programs.

**Case Study-House Joint Memorial 3:** Prior to the start of the 2009 New Mexico legislative session, a small coalition of five wildlife, watershed and environmental groups determined that they would attempt to take the state on a small, exploratory step toward an environmental flow program.

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This was not new territory: in the late 1980's environmental interests had introduced a bill into the legislature that would have declared instream flow to be a beneficial use of water. The response of the agricultural community was, perhaps predictably, a scream of anguish. For the next fifteen years any New Mexico politician with a decent regard for self-preservation ran for cover at the mention of "the I-word". When, in 1998, the Attorney General's office opined that there was nothing in statute to prevent a water right from being transferred to streamflow, the firestorm of opposition erupted again.

By now, though, the state had made important strides: New Mexico is home to two of the largest acquisitions of water rights for rivers: Pecos River compact compliance (retiring certain water righted lands) and Rio Grande silvery minnow conservation (leasing so-far-unused, municipally controlled San Juan Chama Project water) . In 2004, the Legislature had approved, and appropriated funds for, a Strategic Water Reserve, through a process in which proponents and agricultural groups negotiated mutually acceptable statutory language. And, in 2007, the state Environment Department was funded for a series of River Ecosystem Restoration Grants. None of this amounted to an environmental flows program, but it was substantial progress.

For the HJM 3 effort, we had three objectives:

1. Have on record a legislative statement that it was the policy of the state to bring maintenance of environmental flows into its water management practices.
2. Conduct a study designed to discover the stream segments where hydrologic alteration had most impacted, or threatened, riverine values.
3. Survey the various methodologies that might be used to answer the "how much water does a river need?" question.

We had, for a model, the Texas Environmental Flow process, in which succeeding Legislatures acknowledged that the state had ecological water problems in one session, convened parallel scientific and politically-representative task forces to explore alternatives in another and initiated local scientist-stakeholder groups to determine individual basin flow prescriptions, in a third. While the jury was still out on the outcome of such a step-wise process, it looked like something that just might fly in our state.

We identified the three key political entities whose support would be needed to move forward in the legislature:

1. The Governor, who has a lot of leverage on state agency policies.
2. The agencies most likely to be involved in implementing environmental flow: Game and Fish, Environment and State Engineer/Interstate Stream Commission and
3. The Agriculture Lobby, a feisty, cohesive group which often contended over the regulatory and water policies of these agencies, and a group that could make or break the initiative.

We set about reaching out to each of them.

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Governor Richardson had, earlier in '08, created a Water Cabinet, composed of cabinet secretaries and other department heads, to direct water policy-making and water project spending. We met with his energy, environment and water advisors, who agreed to the need for the inclusion of river ecology in the state's policy framework and suggested that the Water Cabinet (which included Energy and Agriculture agencies in addition to those previously identified) be the vehicle for the study.

We then held a round of meetings with the agency heads who, after determining that the governor supported the measure, were generally agreeable to the direction HJM 3 would take river policy, but were concerned about the burden that another unfunded mandate might place on their staff and fiscal resources. They were also less than enthusiastic about our language that mandated the participation of water user and public interest groups, federal and university scientists and volunteer consultants. The process contemplated seemed to them to portend even more work, loss of control of the process and "mission-drift". Still, the Water Cabinet seemed willing to engage.

With the agricultural lobby: we had hoped to get face-to-face meetings with Farm Bureau and Acequia Association lobbyists prior to the start of the Legislature in mid-January, but as the session approached, we began distributing our drafted memorial widely and making follow-up phone calls, asking for critiques and suggestions for improvement. We received no substantive feedback from anyone in the ag sector.

No input that is, until the session had started and the Memorial introduced. Going into the session, the 2009 Legislature had acquired its own distinctive brand. Senate Republicans and "red dog Democrats" had banded together to attain leadership control of the Senate; the Oil and Gas and Mining industry lobbies had a sheaf of regulatory roll-back bills ready for introduction and the state faced a budgetary crunch that pointed to no new spending and a round of cutbacks in the budgets of our state agencies.

One morning, in the halls of the Capitol, I caught up to a friend who was a board member of the state Farm Bureau and also of her local Conservancy District. I said: "So, how are you liking our Environmental Flow Memorial?". "Oh, its hateful," she replied, "the ags are going to stomp all over it." "Can it be fixed?" I asked. "Maybe so."

Hereupon, there ensued a long, and sometimes painful, dialogue, during which the proponents of environmental flow learned a great deal about what our neighbors in the agriculture industry value and fear, and from which, emerged a committee substitute for HJM 3 which, if "her people", the ag lobby and "our people", the wildlife and water agencies and lobbyists, could support.

What we learned was that, like the majority of citizens, farmers and ranchers had positive feelings about the natural world, the river and the creatures it supported. The farm for them was, like the river for us, something they could not bear to lose. That, the present trend was not very encouraging: urban expansion was happening fast and the water management officials were helping, and going to keep helping, it to happen. That, a policy that said that New Mexico could not afford to lose its river ecosystems

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might tend to protect farms, and vice-versa. A whole universe of ideological differences set aside, this was some pretty substantial common ground.

What we did was comb through the text of HJM 3 suggesting and rejecting, in turn, self-serving rhetoric. Words are powerful things, sometime suggesting to the ears of others, things that are not at all what we intended to say. It was very important to the negotiator that whatever process resulted from this measure not result merely in some new regulatory scheme or worse, a taking of anyone's water rights.

To provide assurance and gain the critical, but elusive, element of trust a couple of phrases were agreed to that raised environmentalist eyebrows: establishing a flow program that might eventually require protecting water from further depletion might help farmers in their struggle against conversion of agricultural land, but were the farms actually providing habitat, aquifer recharge and water quality as the Memorial asserted?

The HJM 3 proponents' answer to this question was controversial, because it challenged fundamental environmentalist dogma- farms are bad because they create monocultures of food crops on formerly wild (biodiverse) lands; they pour pesticides, herbicides and fertilizers onto soils, which end up polluting habitat for aquatic life: look at the nitrified, hypoxic dead zones at the mouth of the Mississippi!

In fact: feed lot operations notwithstanding, the scale of New Mexico agriculture can never be confused for California-style agri-business. Except for large amounts of irrigation water itself, its use of inputs is remarkably small. Although it may be rightly criticised for its inefficiencies in production of useful calories, alfalfa farming does some useful things, not the least of which is maintaining the productive potential of the land. Would we rather see the fertile irrigated valleys growing grass and hay, or subdivisions? To us, this was a no-brainer.

A second hot-button for our environmental allies was the Memorial's assertions that "the essential interdependency of New Mexico's rivers, riparian area and agricultural lands comprise and *agro-ecosystem*" and "the flow of water in New Mexico's rivers is critical to a healthy agro-ecosystem. Our use of the unfamiliar term "agro-ecosystem" affronted fundamental beliefs a second time: this is not what we're trying to protect, is it?

In fact: the term agro-ecology was coined by agronomic scientist Miguel Altieri in a ground-breaking study of sustainable agriculture. The thesis of "Agroecology" was that the farm behaves like an ecosystem-receiving inputs and producing outputs that resonate through the land at several scales. Altieri and his successors in scientific agriculture speak of the desirability of poly-culture and managing the relationship of on-farm and off-farm habitats, for outputs that sound suspiciously like biodiversity. Our use of this term may have been more aspirational than realistic in the present milieu, but we do aspire to change, do we not?

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In any case, the language that was ultimately agreed to appealed to the agriculture lobby precisely because it challenged the urban environmentalist dogma, which seemed to them always to result in poorly conceived regulatory schemes, dreamed up in remote bureaus, frameworks that not only burdened them unfairly, but didn't necessarily achieve their own, self-defined objectives on the landscape. I believe this critique has some validity.

In any case, the amended HJM 3 became something that the entrenched opponents of environmental flow programs could support. At least for the moment, the political playing field had been reset, making progress possible. The environmental flow memorial sailed through the House of Representatives by a 62-0 vote. Its failure to pass the Senate was attributable to inter-cameral wrangling, not a breakdown in the fragile consensus.

**Lessons:** I take away from this experience several lessons, which I expect to fight to see applied. One is that when one talks about environmental flow, one may expect a farmer to hear "taking my water". Our rhetoric must be carefully framed, so that the goodness of our intentions can be trusted. We fully intend to honor, in our work on this issue, the values of those who took a chance with us on collaboration.

Two is that there is actual, not merely conceptual, common ground; and that is that the voracious appetite of American market capitalism to control water threatens both riverine resources and agriculture. If the global economic experiment is just another bubble, based on over-exploitation of people and resources, it will eventually burst. If local land and water have been alienated, human society will have lost the tools it needs to survive and recover.

Three is that activists and scientists alike are insulated from the centers of power in the agencies which implement government policy. It will be a difficult struggle to achieve true inclusion and engagement of citizens with so much to gain or lose in successfully resolving an issue like environmental flow. To translate good science into good policy relies upon developing a taste for "creative conflict", knocking on the door until we are let in.

Last is that there is no gold ring to be grabbed. The true test of our success will lie in what happens on the land and on the river, not in what happens in the halls of power, though power and politics are vitally important. Good actions, at whatever scale can create momentum that may ultimately prevail.

**Conclusion:** One week from today, the Water Cabinet will hold its first post-legislative session meeting to consider whether, and perhaps how, to fulfill the intent of HJM 3.

It is quite possible that inertia will carry the day. More likely a nod will be made to the necessity of such an effort. Perhaps, the Water Cabinet will even step outside of history and take the actions that are required, engage with stakeholders and scientists in the messy business of problem-solving by collaboration, embrace the little-regarded, but

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manifest potential for making informal agreements about water in one corner of this watery planet, answer the challenge of including ecosystems in the policy imperative for human uses (and vice-versa) and make the good faith effort to find one river in New Mexico with the right combination of environmental need and opportunity to make a case that rivers can be protected and even restored.

If they do not, it will not be because fish and farmers could not find common ground.

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