

**TIER-1 APPLICATION TO THE NEW MEXICO INTERSTATE STREAM  
COMMISSION  
FOR NEW MEXICO UNIT OR WATER UTILIZATION ALTERNATIVE**

**APPLICANT INFORMATION (PRINT)**

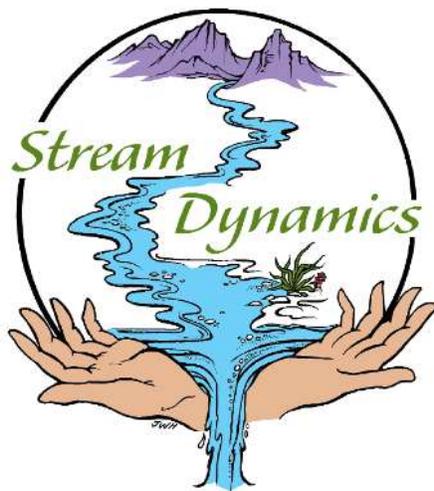
**DATE:**

<p>1. Legal Name: <i>VAN D. CLOTHIER</i></p>	<p>2. Organization: <i>STREAM DYNAMICS, INC.</i></p>										
<p>3. Address (street, city, county, state, and zip code):  <i>Stream Dynamics, Inc. PO Box 2721 Silver City, NM 88062</i></p>	<p>4. Name, email, and phone number of contract person:  <i>VAN CLOTHIER streamdynamics@aznrx.net</i></p>										
<p>5. TYPE OF APPLICATION (check one): <input checked="" type="checkbox"/> Final    <input type="checkbox"/> Preliminary for review    <input type="checkbox"/></p>	<p>6. TYPE OF APPLICANT (CHECK BOX): <input type="checkbox"/> local governments or municipalities  <input type="checkbox"/> soil and water conservation districts, irrigation districts or commissions, acequias, or other political subdivision of the State of New Mexico  <input type="checkbox"/> institutions of higher education or a consortium of such institutions  <input type="checkbox"/> non-profit organizations or associations  <input type="checkbox"/> private individual/s  <input type="checkbox"/> federal agency (ies) <input checked="" type="checkbox"/> Other (specify) <i>Corporation</i></p>										
<p>7. BRIEF PROJECT DESCRIPTION:  <i>Watershed Restoration</i></p>											
<p>8. AREAS AFFECTED (describe by county, municipality, township, etc. as applicable):  <i>Impaired stream reaches in the four county Area</i></p>											
<p>9. TOTAL FUNDING REQUESTED <del>(in \$1,000):</del></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black;">2012: 1,000,000</td> <td style="border: 1px solid black;">2013: 1,000,000</td> <td style="border: 1px solid black;">2014: 1,000,000</td> <td style="border: 1px solid black;">2015: 1,000,000</td> <td style="border: 1px solid black;">2016: 1,000,000</td> </tr> <tr> <td style="border: 1px solid black;">2017: 1,000,000</td> <td style="border: 1px solid black;">2018: 1,000,000</td> <td style="border: 1px solid black;">2019: 1,000,000</td> <td style="border: 1px solid black;">2020: 1,000,000</td> <td style="border: 1px solid black;">2021: 1,000,000</td> </tr> </table>		2012: 1,000,000	2013: 1,000,000	2014: 1,000,000	2015: 1,000,000	2016: 1,000,000	2017: 1,000,000	2018: 1,000,000	2019: 1,000,000	2020: 1,000,000	2021: 1,000,000
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2017: 1,000,000	2018: 1,000,000	2019: 1,000,000	2020: 1,000,000	2021: 1,000,000							
<p>10a. TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL DATA IN THIS APPLICATION ARE TRUE AND CORRECT, THE DOCUMENT HAS BEEN DULY AUTHORIZED BY THE GOVERNING BODY OF THE APPLICANT AND THE APPLICANT WILL COMPLY WITH THE ATTACHED REQUIREMENTS AND ASSURANCES IF THE</p>											
<p>10b. TYPED OR PRINTED NAME OF AUTHORIZED REPRESENTATIVE: <i>VAN CLOTHIER</i></p>	<p>11. TITLE: <i>Director</i></p>										
<p>12. PHONE NUMBER: <i>(575) 388-5296</i></p>											
<p>13. SIGNATURE: <i>[Signature]</i></p>	<p>DATE: <i>July 14, 2011</i></p>										

**AWSA - TIER I APPLICATION**  
**for**  
**WATERSHED**  
**RESTORATION**

**submitted July 14, 2011**  
**by**

**Van Clothier**  
*Stream Dynamics, Inc.*



**1. State whether the proposal is for the “New Mexico Unit,” a “water utilization alternative,” or both.**

This proposal is for a water utilization alternative.

**2. Describe how the proposal will meet a “water supply demand” in the Southwest New Mexico Water Planning Region, comprised of Catron, Grant, Hidalgo and Luna Counties.**

**Executive Summary for the Watershed Restoration Proposal**

Stream Dynamics, Inc. is hereby putting forth what we feel is a critical component of the overall best solution to the AWSA, one that will provide abundant and cost effective water resources, and great long term benefits to the residents of the four county area. This idea is intended to be implemented by qualified individuals, firms, or agencies, including but certainly not limited to Stream Dynamics, Inc.

This proposal will meet a water supply demand through watershed restoration. This suite of techniques will create a very large overall benefit for the people of our four county region from our water resources and the funds that have been appropriated to properly utilize them. Watershed restoration increases the ability of soils to absorb and retain moisture and release it slowly over time, decreasing accelerated runoff and erosion, keeping the supply moving slowly through porous alluvium rather than sending it rapidly downstream. Restoring the historic flow modulation of our degraded waterways is a sound investment for society.

Watershed restoration greatly benefits the water supply through flow modulation. Healthy watersheds have a much less flashy flood hydrograph, with a more gradual slope during the rising limb, a lower flood peak, and a greatly extended declining limb. This reduces the magnitude of destructive floods that blow out bridges and diversion structures, erode streambanks, and deposit coarse grained sediment on roadways, stream terraces, and other growing surfaces. An important result is increased base flow. This affords downstream water users a much longer interval in which to use the water flowing past their diversions, thus improving the consistency of the water supply.

**How Much will it Cost?**

It has been said in the AWSA meetings that the settlement fund is small compared to the amount of work that needs to be done to heal our watercourses. We propose spending \$10,000,000 to give this worthy endeavor a boost. A typical ecological restoration of a small stream, one that drains 30 square miles or less, could cost \$100,000 per mile. This would allow us to heal 100 miles of streams and wetlands.

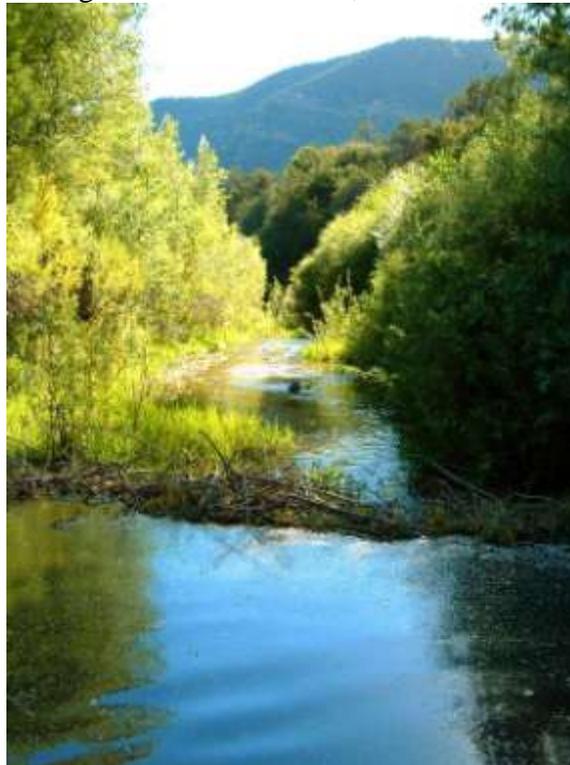
Note that watershed restoration is not in conflict with downstream users. It compliments all other uses of the water, since the water can cleanly cycle through the porous alluvium of a healthy stream. No payments will be demanded from downstream water users if we do this thing that benefits everyone and harms nobody.

### **How Can this be Implemented?**

The restoration grants administered by the New Mexico Environment Department could serve as an example. NMED has a list of impaired streams, and the funding to effect necessary repairs. NMED publishes requests for proposals. Project proponents compete for grant funding, and the winning proposals get funded to do the work under the oversight of NMED. There are two programs right now, RERI and 319. The RERI program will run out of funding next year. Would it be possible for AWSA funds to keep this excellent program going? This and other questions will be answered during preparation for the Tier II proposal process.

### **Improving Water Quality**

The photo below illustrates how miles of healthy stream banks improve the quality of the water. Shaded, tree lined stream banks reduce the water temperature, while stable banks narrow the channel, promoting overbank flooding at a lower stage. This increases percolation, storing water higher in the watershed, which is released slowly over time.



The rock lined pool grade control structure in the photo below was built to heal a gully in a high mountain meadow. This raised the water table and substantially increased the amount of water that is stored in the local alluvium.



### **Quantifying the Supply**

It is difficult to quantify the additional supply of water created by watershed restoration. Reconnecting a stream with its floodplain will allow it to access the porous alluvium during a flood event. This porous sand and gravel layer can have a porosity of perhaps 20%. If the restored floodplain has a width of 50 feet, and floodwaters can now infiltrate a porous layer 10 feet deep, the additional alluvial storage capacity per mile would be:

$$50 \text{ ft} \times 10 \text{ ft} \times 5280 \text{ ft} \div 43,560 \text{ ft}^3 \text{ per acre foot} \times 20\% \text{ porosity} = 12 \text{ acre feet}$$

Hydrologic modeling could approximate other desirable effects such as channel storage and the concomitant flood attenuation for a particular stream reach.

### **3. Describe how the proposal considers the Gila environment and describe how any negative impacts might be mitigated.**

This proposal is specifically formulated to derive maximum water resource benefit for residents of the four county area without causing any harm whatsoever to the environment of the greater Gila area. Instead, the implementation of this proposal will have many positive impacts on the Gila environment. These are illustrated below. Properly done, watershed restoration is not only environmentally acceptable, it is urgently needed – just ask any resident with erosion problems! Statewide, the New

Mexico Wilderness Alliance, and the New Mexico Wildlife Federation support watershed restoration, as do many other groups. Private nonprofits as diverse as the Center for Biological Diversity, The Nature Conservancy and the Malpai Borderlands Group agree that watershed restoration is of paramount importance. The opinion of these nonprofit groups is shared with the New Mexico Environment Department and the U.S. Environmental Protection Agency.

The benefits from watershed restoration include: flood control, extended base flow for ephemeral streams, improved groundwater recharge, higher water quality, less turbidity and a lower sediment load, reduced flooding, lower summer water temperatures, better fishing and more productive wildlife habitat. In general, our watercourses will be more beautiful.

Perhaps the most important benefit realized from modern stream restoration is that it optimizes the economy and utility of the water in our natural stream networks by storing it in the alluvium during high runoff events where it is safe from tampering and evaporation, and then slowly releasing it, allowing it to be used over and over again as it is cleanly cycled to many downstream users, allowing gravity to move it where it needs to go, along ancient pathways, for free.

One of the most difficult challenges for those who understand natural stream processes is explaining them to those who do not. “People like to see the exposed water surface of a reservoir and think it is creating a supply of water, but in New Mexico, the evaporative loss from reservoirs is three times as much as the water put to beneficial use. Unfortunately, reservoirs in the desert southwest function more like evaporation ponds. Hydrologists have calculated that open reservoirs in hot arid regions exposed to wind and sun can have evaporative losses of six to ten feet per year” (from *Let the Water Do the Work: Induced Meandering, an Evolving Method for Restoring Incised Channels*, by Bill Zeedyk and Van Clothier, 2009, available from Island Press)

#### **4. Describe how the proposal considers the historic uses of and future demands for water in the Southwest New Mexico Water Planning Region and the traditions, cultures and customs affecting those uses.**

##### **Historic Uses**

Historically, the Gila River flowed from the mountains in New Mexico, all the way across Arizona and into the Colorado River, which flowed to the Gulf of Mexico. Water supply and demand were balanced naturally, as was erosion, sediment transport, and deposition. Water manipulation through dams and large-scale irrigation diversion created a false impression of increased supply, resulting in an unsustainable demand over the long term, e.g., water hungry alfalfa grown with diverted river water. The balance has been tipped to the degree that the river now goes dry more frequently and rarely, if ever, completes its flow to the Gulf. Implementation of this proposal on any scale would move us toward a more natural balance of water supply and demand, and restore the natural

processes that maintain the integrity of the river and the ecosystem services it supplies to us all free of charge.

### **Future Demands**

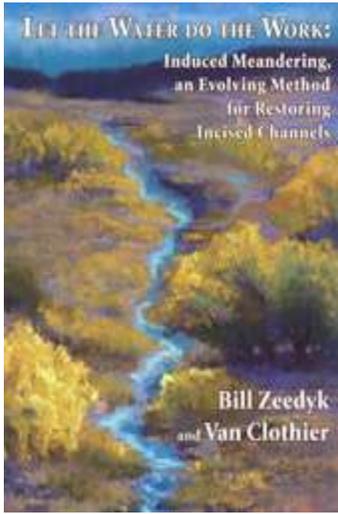
Stream restoration arrests degradation of our precious watersheds, and allows them to begin a process of self healing. People in the future will need a healthy environment to live in. How shall we quantify the value of that? Kurt Vonnegut said "We could have saved the earth, but we were too cheap and lazy."

### **Traditions, Cultures, and Customs**

The Gila region has a long standing minority tradition of respect for natural processes starting with the Native Americans and continuing to this day with Hispanic and Anglo settlers, and many others. Many of us have great respect for rivers and springs, ephemeral arroyos, and wetlands. Aldo Leopold wrote of a trip to the Gulf of California (the ultimate destination of the Gila River) he took with his brother. At that time, it was a cornucopia of natural abundance. Today it is a blighted wasteland of pollution. One day the people who hold on to the traditional values of respect for the waters of the earth hope see the entire Gila River ecosystem restored to its original function, beauty and productivity. This proposal is part of that vision.



## References



**Published: 06/06/2009**

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**ISBN: 9780970826435**

**Paperback: \$50.00**

<http://www.islandpress.org/bookstore/detailsyy27.html>

*Let the Water Do the Work* is an important contribution to riparian restoration. By 'thinking like a creek,' one can harness the regenerative power of floods to reshape stream banks and rebuild floodplains along gullied stream channels. Induced Meandering is an artful blend of the natural sciences—geomorphology, hydrology and ecology—which govern channel forming processes. Induced Meandering directly challenges the dominant paradigm of river and creek stabilization by promoting the intentional erosion of selected banks while fostering deposition of eroded materials on an evolving floodplain. The river self-heals as the growth of native riparian vegetation accelerates the meandering process. Anyone with an interest in natural resource management in these uncertain times should read this book and put these ideas to work. Let's go with the flow!