WHITE PAPER –WATER CONSERVATION PROGRAM

Developed by the Conservation Work Group
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The Edwards Aquifer Recovery Implementation Program (EARIP) stakeholders have expressed interest in including a Water Conservation Program (WCP) as part of the proposed Habitat Conservation Plan (HCP).

The communities and industries in the Edwards Aquifer region have had considerable success in reducing water use. Several local conservation efforts have received state and national recognition. Despite the overall and specific success, the stakeholders recognize opportunities for more savings in most phases of water use. The EARIP appointed a Conservation Work Group to explore water conservation potential for small water communities and water systems and the agricultural sector.[1] The goal was to identify the potential for conserved water to serve as "trade-off" water for the EARIP for use in the proposed Habitat Conservation Plan or long-term adaptive management actions. Opportunities for water savings were especially noted in: residential uses of exempt wells; "lost water" through municipal infrastructure deficiencies; agricultural irrigation; industrial and commercial processes; rural and small community residential plumbing technologies; excessive landscape watering and failure to effectively utilize gray water; and condensate and rain water harvesting for landscape uses. The work group also proposed a voluntary, temporary, term-based program for conserving existing surplus or excess water of water suppliers as part of the WCP.

As proposed by the work group, the EARIP Water Conservation Program could be organized into four components to address the identified conservation opportunities:

I. A Best Management Practices Program for water systems. Small municipal or private water purveyors would contract with a large water purveyor such as the San Antonio Water System (SAWS) to utilize all or portions of an existing best management practice implementation structure.
II. A Technical Assistance Program for water systems. Technical assistance coordinated by the Edwards Aquifer Authority (EAA or Authority) with the cooperation of the staff of the large water purveyors – San Antonio Water System, Bexar Met, San Marcos, and New Braunfels would be provided to help water systems to perform audits, determine and address water loss, and implement programs aimed to reduce waste and encourage conservation.
III. An Agricultural Irrigation Improvement Program. Water savings would be achieved by enhanced irrigation conservation practices funded by cost-sharing through participation in the Natural Resources Conservation Service (NRCS) Agricultural Water Enhancement Program (AWEP).
IV. A Voluntary Dedicated Water Supply Program. Water purveyors with unused Edwards Aquifer inventory derived from conservation or from secured future water supplies may voluntarily dedicate an amount of water as unavailable for pumping for a temporary period. The dedicated water remains in the aquifer and is intended to benefit the endangered species.

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SECTION I – BEST MANAGEMENT PRACTICES PROGRAM FOR WATER SYSTEMS

This portion of the WCP uses existing conservation tools, namely, identified Best Management Practices (BMPs), developed by large water purveyors and replicates them for smaller municipal or private water systems. As an example, the San Antonio Water System offers various parts of its conservation program to subscribers on a menu basis. The water purveyors take advantage of the purchasing power of SAWS for high efficiency toilets, showerheads and other items. The contract also may include education services, leak detection and conservation auditing. Costs are assigned based on SAWS' costs for the materials and administration of the program. Funding may be provided to participating entities to implement BMPs or other conservation services. To provide an example of conservation tools and costs, below is a sample menu of available services and BMPs offered by SAWS:

Water Conservation Partnership
Proposal for Universal City
DRAFT

Service/BMP #	Scope of Service	Cost
School Education BMP # 6	SAWS curriculum and classroom services are offered to schools in the partner's area. A monthly report is prepared to record services delivered. Partner may designate two special education events (1 day each) per year.	Subscription Fee ($1,200/month)
Public Information BMP #5	SAWS public information efforts that cover the partner's area are recorded in a monthly report. The partner's name will be mentioned in the media when appropriate. SAWS personalities will be available for area events.	Covered by Subscription Fee
Conservation Coordinator BMP #8	Part of the time of a senior SAWS Planner (III or IV) will be designated to supervise the production of the Conservation plan and reporting to EAA. Time available to meet with partner staff, Board, or EAA once/month.	Covered by Subscription Fee
Residential Water Use Survey BMP #11	SAWS staff will conduct interior and/or landscape surveys for partner in same way they are conducted for SAWS customers. The surveys will be scheduled by the partner on a designated day/month or period/year for efficiency.	$24/survey
Small Landscape Incentives BMP #15	Bexar County Master Gardeners or another S AWS contractor will review the application and inspect the work. The partner may use the SAWS application and literature handouts.	$60/rebate
Cooling Tower Audit BMP #NA	A SAWS contractor will conduct scheduled audits for the partner	$2,400/audit
SIP (ET) BMP #NA	The partner has SIP kits available at the City or utility offices and for special events. The kits must be purchased in groups of 50.	$3.60/kit
Low-Flow Toilets BMP #12	The partner may take advantage of SAWS' low-flow toilet contracts. SAWS will arrange the delivery of the toilets to designated site in units of 10 or more.	$60/toilet

Showerhead & Flow Restrictors BMP #12	The partner may take advantage of SAWS' showerhead and aerator contract. Kits will be delivered in units of 50 or more.	$3.60/kit
Leak Detection BMP #1	The partner may schedule days of water line survey or to detect the exact location of suspected leaks.	$1,000/day

SECTION I I– TECHNICAL ASSISTANCE PROGRAM FOR WATER SYSTEMS

In many cases, small water purveyors within the Edwards Aquifer region lack the funding, staff and experience to implement a successful water conservation program and/or properly account for water use throughout their distribution system. To assist these small water purveyors, the Edwards Aquifer Authority, along with experts from organizations such as the Texas Water Development Board, Alliance for Water Efficiency, and large water purveyors, will be available to offer technical support when needed. In addition, this group will convene periodically to discuss key conservation issues and organize workshops focused on the implementation of conservation programs. Group discussion attendees can review successes, failures and technical issues related to the implementation of conservation programs in an open forum. The Edwards Aquifer Authority will promote the program to small water purveyor permit holders. The Authority will coordinate meetings and workshops to discuss topics such as:

1. How to properly perform a system water audit.
2. How to identify causes of lost water.
3. The importance of a water meter replacement program.
4. How to implement and enforce water waste prohibition measures.
5. How to implement a plumbing retrofit program or a conservation kit distribution program.
6. How to implement a school and public education program.
7. How to implement a landscape irrigation survey program.
8. How to implement a conservation pricing structure.

In addition to coordinating meetings and workshops, the Authority will identify experts who are willing to share their expertise and first-hand knowledge on such topics as water audits, leak detection and other conservation best management practices. The Authority could put small water purveyors in contact with identified experts upon request.

Through this technical assistance group, there may be an opportunity to combine efforts to negotiate lower prices per unit for ultra low-flow toilets and conservation kits. These efforts could allow small water purveyors to maximize their funds.

The Authority would be responsible for the organization of the Technical Assistance program. However, there would be a heavy reliance on industry experts and organizations with first-hand knowledge. It is believed that staff from large water purveyors would be willing to participate in this program if this activity was identified as an EARIP activity to be included in the HCP or Implementation Plan. A funding source will need to be identified for potential expenses such as meeting room rental and expert services.

SECTION III – AGRICULTURAL IRRIGATION IMPROVEMENT PROGRAM

Through the Agricultural Water Enhancement Program (AWEP), the Natural Resources Conservation Service (NRCS) partners with a local political subdivision or entity to provide

financial and technical assistance to farmers and ranchers to assist them in applying agricultural water enhancement activities that conserve ground and surface water and improve water quality on agricultural lands. AWEP provides a 70% cost share basis for conservation practices that will contribute to an improvement in an identified resource concern. Conservation tillage, irrigation scheduling, and brush control may also be eligible for AWEP funding. The Conservation Work Group found that replacement of existing pivot systems may actually provide a higher conservation savings per dollar than replacement of furrow irrigation with pivot or drip irrigation systems. The installation of efficient irrigation systems, which have the potential to conserve water for the duration of the HCP and beyond, are of mutual interest to the NRCS and the EARIP.

As part of the proposed Water Conservation Program, the EARIP would apply to NRCS to administer and monitor an AWEP for the Edwards Aquifer region. In the grant application, the EARIP and NRCS would highlight the nexus between conserved agricultural water and water made available to contribute to endangered species protection. The targeted activities for the AWEP part of the WCP include replacement of older, inefficient pivots with higher efficiency, low pressure pivots; and conversion of furrow/flood irrigation to more efficient center pivot, lateral pivot, or drip irrigation systems. AWEP would provide 70% of installation cost for each project, and the EARIP would provide the remaining 30% of the cost. In return, the irrigator would be required to leave half of the water conserved in the aquifer, neither marketed nor pumped, for ten years.

The estimated cost to the EARIP would be $3,900,000. Approximately 8,250 acre feet of water would be conserved, of which 4,125 acre feet would be required to remain in the aquifer. To assess the potential for regional agricultural conservation, the Conservation Work Group reviewed the following information from the Medina and Uvalde county NRCS offices:

	New Irrigation Systems Installed (last 5 years)	Acres Irrigated by New Irrigation Systems (last 5 years)	Acres remaining in flood irrigation or inefficient pivots (NRCS Estimate)
Medina County	50	8,192	20,000
Uvalde County	94	8,507	13,000
Total	144	16,699	33,000
Yearly Avg. for both counties	29	3,339.8	

- New Irrigation Systems Installed includes all permanent irrigation systems (center pivots, lateral pivots, and drip/micro irrigation) installed either on furrow irrigated land or as replacements for older, inefficient systems under the Environmental Quality Incentives Program (EQIP). They do not include systems installed without NRCS assistance.
- The average increase in irrigation efficiency is estimated to be 30% - 35%.
- The average increase in efficiency and the Acres Irrigated by New Irrigation Systems do not include the dry-land corners that are created by putting a circular pivot in a square field. Typically, this situation results in 75% of the field under the pivot, and 25% in non- irrigated corners.
- The acres remaining in flood/furrow irrigation and inefficient pivots are estimated because not all farmers choose to participate in NRCS/FSA programs and provide their information. EAA records may be used to refine these numbers, but estimates by NRCS staff are reasonably accurate and provide a good starting point.

If the trends demonstrated over the last five years continue, it is expected that approximately 3,300 acres per year will be converted to more efficient irrigation systems. Over five years this will add up to 16,500 acres, which is also half of the NRCS estimate for the land remaining in inefficient irrigation. Since the NRCS will continue to offer EQIP, which provides 70% cost assistance, it is likely that some irrigators may choose to participate in EQIP and not an AWEP that may place additional requirements on participants. It is equally likely that, since EARIP will be offering 100% cost assistance, the EARIP effort will attract some new irrigators who have not been able or willing to pay their 30% of the cost. The Conservation Work Group believes it is reasonable to assume that at least half of the remaining 33,000 acres in Medina and Uvalde counties will be converted to more efficient irrigation systems in five years through the AWEP.

Currently EQIP provides 65%-70% estimated cost share of a pivot at about $37.20 per foot. This means that the full cost of the pivot is estimated to be about $55 per foot. This figure does not include the cost of underground pipe at an estimated cost of $10 per foot. Not all systems will require a new pipeline, but other systems will require a very long pipeline, depending on their distance from the well. This works out to about $700 per acre for a 120 acre circular pivot.

Assuming one foot of base irrigation water remains for irrigation, and assuming irrigation efficiency increases from 60% to 90%, 1/3 acre foot of water will be conserved for every acre converted to more efficient irrigation. In addition, dry-land corners will conserve water at a full acre foot per acre. For a 120 acre circular pivot, this works out to 40 acre feet conserved under the pivot and 40 acre feet conserved on the corners, for a total of 80 acre feet conserved.

If 16,500 acres were converted from furrow irrigation to circular pivots, the total cost would be $11,550,000, and 11,000 acre feet of water would be conserved. This is, of course, assuming absolutely ideal conditions. Installation costs per foot for circular pivots are likely to increase. Not all pivots will be able to make perfect circles, which makes the cost per acre rise. Drip systems have a higher cost per acre than pivots. Linear pivots and drip irrigation typically don't have any dry-land corners associated with their installation, which would cut down on the amount of conserved water. More realistic numbers might be $13,000,000 and 8,250 (75% of 11,000) acre feet conserved.

AWEP would provide 70% of the funding. Under the proposed plan, the EARIP would provide an additional 30% of the funding, or $3,900,000. In return, irrigators would be required to leave half of the conserved water, 4,125 acre feet, not to be pumped for a period of ten years. This works out to a cost of $945.45 per acre foot to the EARIP.

SECTION IV – VOLUNTARY DEDICATED WATER SUPPLY PROGRAM

Component 1 – Purveyor Surplus Water Supplies

Water purveyors that have extra water supplies for a specified period of time due to water conservation or secured future water supplies may voluntarily dedicate an amount of water to the EARIP that would be unavailable for pumping for a set time period.

This part of the WCP would have water purveyors inventory their supplies in relation to demand and identify the surplus that exists for some number of five year blocks. A purveyor may then commit to not pump the identified water for the period specified. The dedicated water stays in the Edwards Aquifer to provide springflow. This commitment of surplus water is included in the HCP and allows modeling to occur at a reduced pumping level for the specified committed period. The purveyor retains ownership and has the water available for growth needs beyond the committed water.

It is anticipated that large and small purveyors will be attracted to participate because the conserved water will support the EARIP goals and objectives and will reduce the need for certain expensive engineered solutions. Benefits of the conserved water supply program are that it can be implemented immediately, and it would allow for an adaptive management period to test the capability of critical period rules, the dry year option, SAWS Aquifer Storage and Recovery systems, land stewardship and other activities intended to maintain springflow for the endangered species before expensive engineered solutions must be implemented.

Based on preliminary discussions with water purveyors, it is believed that at least 10,000 – 15,000 acre-feet of surplus water is available for the WCP for a period of 10 – 15 years.

Component 2 – Organizing a SAWS type Water Conservation Program for the Region

This component envisions building on the success of the SAWS Conservation Program to implement conservation activities throughout the region. To accomplish this component a number of questions would have to be answered.

1. How much water is available to be conserved?
2. Which activities would be used to conserve the water and how much would they cost?
3. How would water savings accomplished through the activities be translated to springflow to benefit the endangered species?
4. How would the program be organized?
5. How would a Water Conservation Program built on the SAWS model be administered and funded?

1. How much water is available to be conserved?

The expectation is that water entities that have implemented water conservation efforts with results equal to or greater than SAWS has achieved would not participate in the conserved water portion of the EARIP Water Conservation Program. These entities include Bexar Met, San Marcos, and New Braunfels water utilities. However, if one or more of these entities could utilize available funding to achieve additional conservation, they may seek to participate in this program. The EARIP decision to fund participation would have to take into consideration total available budget, estimated costs and expected results. It is possible, for example, that one or more of the large utilities may have a "lost water" condition that could be addressed. To be conservative in projections of participation, the work group initially subtracted these four large water purveyors from the universe of potential conserved water savings. Additionally, the group did not include agricultural irrigation as a source of savings.

The work group estimated that Edwards Aquifer area communities and industries utilize approximately 500,000 acre-feet of water and production agriculture uses approximately 40% of that total, leaving 300,000 acre-feet for all other users. Subtracting the supplies of the four largest water purveyors (SAWS – 200,000 acre-feet, Bexar Met – 32,000 acre-feet, San Marcos – 1,400 acre-feet and New Braunfels – 3,000 acre-feet)produces leaves an amount of approximately 65,000 acre-feet per year for targeted water conservation. Based upon Region L Water Planning Group statistics for water use, the work group found it reasonable to assume that per capita water use for the target population is approximately 140 gallons per person per day, which is about 10% greater than SAWS' high water demand goal of 126 gallons per capita per day. This rough calculation identifies the available water to be saved at about 6,500 acre-feet.

Exempt Wells and Small Residential Well Systems- Reduction in Edwards Aquifer pumping

The EAA reports that exempt wells pump approximately 14,500 acre-feet of Edwards' water. The 14,500 acre-feet was included in the estimated 65,000 acre-feet total identified for conservation savings. With no city or large utility to serve as a mechanism to secure funding assistance or guide conservation practices, individual well owners and small residential well systems have likely been lagging in water conservation. Individual wells are also not subject to mandatory conservation or drought management programs. Program sponsors are needed to access the individual and small system pumpers and to properly monitor and credit associated water savings. The work group discussed working through the EAA, counties, or non-profit organizations to provide conservation education to well owners and serve as a funding pass through organization to provide financial assistance for things such as water and energy efficient plumbing fixtures and appliances and rainwater collection systems. Financial support through the EARIP would require that 50% of the conserved water remain in the aquifer for a set period of time.

2. Which activities would be used to conserve the water and how much would they cost?

The work group believes that the use of Best Management Practices to produce structural changes that result in permanent savings would be the easiest to monitor and document. Conservation audits are effective in reducing water use up to 20% in the average house audited but the results are harder to measure and are more likely to be more temporary.

Other education methods targeting behavior change are also hard to document savings but are important to complement the structural changes.

Examples of such structural BMPs include:

High efficiency toilets
Industrial processes
Commercial processes
Infrastructure improvements ("lost water")
Condensate, rain water harvesting and gray water for landscape watering

Based upon SAWS' experience with specific structural programs – namely, the use of high efficiency toilets, showerheads and faucet aerators, and an industrial/commercial rebate program, reasonable costs and water savings can be projected. SAWS' overall cost per acre-foot of water saved is approximately $500. Also based on SAWS' experience, it is assumed that leak detection and other activities to eliminate "lost water" will deliver results at $500 per acre-foot.

Details of the costs and savings experienced by SAWS are as follows:

High Efficiency Toilets **-** Each old toilet that is replaced in a home saves 12,500 gallons per year on average. More water is saved for old toilets replaced in schools and commercial establishments such as restaurants. Each toilet conversion saves .04 acre-feet per year. Once an old toilet is replaced, the savings are permanent because all new toilets are now more water efficient than pre-1992 toilets. The Caroma two speed high efficiency toilet distributed by SAWS costs the utility approximately $100 per unit.

High Efficiency Showerheads and Faucet Aerators **-** Replace showerheads and faucet aerators in a typical household and 10,500 gallons per year is saved. The fixture generally last for 10 years and providing one set of showerheads and faucet aerators to a household costs $6.

Industrial and Commercial Process Rebates **–** In this program, SAWS pays 50% of the cost of technological changes that save water up to $400 per acre-foot saved over 10 years. SAWS spends approximately $500,000 per year on this program, although the budget is limiting in some years. The funds are spent on small items such as using air cooled ice machines and efficient dish rinsing apparatus and large items such as the implementation of water recycling systems for microchip manufacturing.

Gray Water, Rain Water Harvesting and Condensate Collections **-** The idea of reducing potable water use for landscape watering by utilizing gray water, rain water harvesting and condensate collection has been an attractive option for some water uses. It is believed that homeowners and businesses would retrofit their structures to collect the water for use on landscapes. Unfortunately, the water savings accomplished by such systems are not as cost effective as other conservation activities; an investment of $500 would not usually result in a savings of an acre-foot of water. The work group proposes that program participants must agree to temporarily (perhaps 15 years) retire one acre-foot of water for every $1,000 rebate

offered by the program even if a $1,000 investment on their part would not result in two acres of water saved.

Based upon SAWS data, the economic return for inclusion of technology to capture and use rain water, gray water and condensate in new construction is greater than the return from retrofitting a structure. Benefits of new technology could be expanded if local communities would require, by ordinance, that new development or construction include such technology.

Leak Detection (Lost Water) **-** One of the most desirable ways to conserve water is to reduce the "lost water" that occurs in the transmission and distribution of water by water purveyors. Water losses hurt the bottom line of water providers and result in wasting a scarce resource. SAWS has reduced its lost water amount from approximately 25% in the 1980's to about 8% at the present time. It is believed that many water purveyors in the Edwards Region have lost water ratios of 15% or greater. If the small water purveyors targeted by this activity pump approximately 65,000 acre-feet and average a 15% lost water ratio, the lost water would approximate 9,750 acre-feet. If the program goal was to reduce lost water to 10%, the water conserved would total 3,250 acre-feet. SAWS' experience with leak detection indicates that it is reasonable to expect that lost water can be reduced at the cost of $500 per acre-foot.

3. How would water savings accomplished through a SAWS type program be translated into springflow to benefit the endangered species?

The most reasonable way to translate the conserved water into springflow appears to be to subsidize the conservation activities and receive in return a commitment from the benefactor of the subsidy to reduce the subject Edwards' pumping by a portion of the water saved. If the commitment amounts to 50% of the water saved for a period of 15 years, the cost per acre-foot of the program would be approximately $1,000 per acre-foot. It seems likely that the participant would agree to the idea of receiving half of the saved water immediately and half after 15 years.

4. How would the program be organized?

The program would target the water pumped by small non-agricultural pumpers in the Edwards' Region, an amount assumed to be approximately 65,000 acre-feet per year.

The program would subsidize conservation activities in the five categories described below and based upon the SAWS program. In return, the entity sponsoring the conservation activity (water purveyor, local government, Edwards' permit holder, etc.) would commit to reduce Edwards' pumping by 50% of the savings achieved (more for the gray water, rain water harvesting, and condensate collection activity) for 15 years through a contract with the Regional entity. Fifty percent of the water saved would be available to the purveyor for growth immediately and the other 50% would be available after 15 years.

a) Target 24,000 high flow toilets in the Region
   Cost over 10 years at $150 per toilet will be ≈ $3.6 million
   Savings – 12,500 gallons per year = 918 acre-feet per year
   Reduced pumping equals 50% of savings = 459 acre-feet per year

b) Target 24,000 homes in the Region to receive efficient showerheads and faucet aerators at $6 per home. The total cost would be $144,000 and 798 acre-feet of water would be saved (10,500 gallons per home). If 50% was committed to reduced pumping, it would be 394 acre-feet.

c) Target a reduction of "lost water" from 15% to 10% for a savings of 3,200 acre-feet at $500 per acre-foot.

Fifty percent of the savings would equal 3,250 acre-feet per year which would be 1,625 acre-feet of less pumping for 15 years.

d) Target 1,000 acre-feet per year savings through a large scale retrofit program.

At $500 per acre-foot that would cost $500,000. The savings would translate into 500 acre-feet less pumping for 15 years.

e) Target a savings of 1,000 acre-feet of landscape watering savings through use of gray water, rain water harvesting, and condensate at $500 per acre-foot for a cost of $500,000.

Savings could be achieved by providing rebate for conversions; rebate for new construction and ordinances that require use of gray water, condensate and/or rain water harvesting.

Fifty percent of the savings would be 500 acre-feet per year for a reduction in pumping of 500 acre-feet per year for 15 years.

Total approximate budget:	Total Water Savings	Temporary Pumping Reductions
Toilets - $3.6 million	918	459
"Lost Water" - $3.25 million	3,250	1,625
Large Scale Retrofit - $500,000	1,000	500
Rain water – $500,000	1,000	500
Shower Heads & Faucets - $144,000	798	394
$7.99 million	6,966	3,478

5. How would a Conservation Program built on the SAWS model be administered and funded?

A regional conservation program could be administered by a subcontractor through a contract with the EAA that would directly contract with Edwards' permit holders or the customers of Edwards' permit holders.

Funding would best be accomplished by a region wide sales tax. A secondary option may be an Edwards' Conservation fund fee of $5 per acre-foot of Edwards' permitted supplemented by a matching amount of legislated funds to represent a downstream contribution.

Scaling up or down:

50% of water saved becomes permanent pumping reduction

– More pumping savings but entities are less likely to participate

50% of water saved is not pumped for 25 years instead of 15 years

– More pumping savings but entities are less likely to participate

Increasing rebates

– Entities are more likely to participate but funding becomes a more difficult issue

Component 3 – Combining Component 1 and 2

Component 1, "Dedicated Purveyor Surface Water Supplies" could be operated as an HCP activity by itself.

It is believed that somewhere around 15,000 acre-feet would be available for a period of 10 – 15 years. Such a commitment would reduce the period of time that Senate Bill 3 modeling would show springflows at Comal County at 30 cubic feet per second or less.

Another option would be to link Component 1 with a Regional Water Conservation Program (Component 2) on the SAWS model to achieve a 25-year reduced pumping commitment. Limiting the program to the smaller water purveyors and exempt wells would limit the water savings possible to about 3,483 acre-feet. If the program was opened to Bexar Met, New Braunfels, San Marcos and SAWS, it is believed the program could reduce pumping by 10,000 acre-feet. The Combined Conserved Water Option to follow presents such a program.

Combined Conserved Water Option - 10,000 acre-feet for 25 years

A more ideal situation would be if 10,000 acre-feet of dedicated water supply could be matched to conservation savings of 10,000 acre-feet for a commitment of reduced pumping over a 25-year period. The 10,000 acre-feet of excess water for the first 15 years appears available but, without including Bexar Met, SAWS, San Marcos and New Braunfels, it appears that a total of conserved water any greater than 3,483 acre-feet will be difficult to achieve. To derive the greatest benefit to the EARIP by achieving up to an additional 6,627 acre-feet of committed water savings, the program would need the participation of the four large water providers.

The option that follows reflects a 25-year, 10,000 acre-feet Conserved Water Program that could include the voluntary participation of SAWS, Bexar Met, San Marcos and New Braunfels:

a) Target 80,000 high flow toilets in the Region
   Cost over 10 years at ≈ $150 per toilet ≈ $12,000,000
   Water savings – 12,500 gallons per year per toilet = 3,062 acre-feet
   Reduced pumping at 50% of savings = 1,531 acre-feet

b) Target 80,000 homes in the Region for replacement of inefficient showerheads and faucet aerators at $6 per home cost would be $480,000
   Savings at 10,500 gallons per home would be 2,572 acre-feet

Reduced pumping at 50% of savings = 1,286 acre-feet

c) Target a reduction of "lost water" from 15% to 10% for a savings of 7,500 acre-feet at $500 per acre-feet saved

d) Target 5,000 acre-feet of savings through a large scale retrofit program
At $500 per acre-foot the program would cost $2.5 million
Savings would translate to 2,500 acre-feet less pumping for 15 years

e) Target a savings of 2,000 acre-feet of landscape watering savings through use of gray water, rain water harvesting and condensate at $500 per acre for a cost of $1 million.

Savings could be achieved by providing a rebate for conversions and/or new construction. The new construction can be through voluntary action or as a result of an ordinance requirement.

Fifty percent of the savings would be 1,000 acre-feet per year of pumping reductions.

Total Cost:	Total Water Savings	Pumping Reductions
Toilets - $12 million	3,062	1,531
Lost Water - $480,000	2,572	1,286
Large Scale Retrofit - $7.5 million	7,500	3,750
Rain water – $2.5 million	5,000	2,500
Shower Heads & Faucets - $1.0 million	2,000	1,000
$23.48 million	20,134 acre-feet	10,667 acre-feet