

USAID/ARMENIA

**CONCEPT PAPER
FOR
USAID ASSISTANCE TO ARMENIA
IN ENVIRONMENT**

By

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Armenia



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ABBREVIATIONS AND ACRONYMS

AWSC	Armenian Water and Sewage Company
BAP	Biodiversity Action Plan
BOD	Biological oxygen demand
EA	Environmental Assessment
EAP	Environmental Action Plan
EPAC	Environmental Policy Advocacy Center
ESP	Environmental Sector Project
EU/TACIS	European Union Technical Assistance to CIS Countries
GOA	Government of Armenia
IDA	International Development Association
IWRMP	Integrated Water Resources Management Plan
LSAP	Lake Sevan Action Plan
MNP	Ministry of Nature Protection
MUD	Ministry of Urban Development
NGO	Non-governmental Organization
NEAP	National Environmental Action Plan
O&M	Operation and maintenance
UNDP	United Nations Development Program
WB	World Bank
WG	Working Group
WWT	Wastewater treatment
WWTW	Wastewater treatment works
YWSC	Yerevan Water and Sewage Company

EXECUTIVE SUMMARY

While there are a few cases of integration of environmental issues into USAID/Armenia's existing portfolio, including the Environmental Public Advocacy Centers (EPACs) and some work with environmental NGOs under the Democracy activities, for the most part critical environmental issues noted in the National Environmental Action Plan (NEAP) are not addressed under the current Mission Strategy.

From November 8 – November 17, a team has been out in Armenia to take a fresh look at the environmental situation and has determined that the most critical area for USAID intervention is the water sector. Under this rubric, the team has developed national strategy that includes a set of low-cost, high-impact interventions that could fit well with, and provide the necessary underpinning for, the potential regional water policy and cooperation initiative. These could also be seen as stand-alone programs, barring the ability to work on a regional level.

The major constraints to execution of the water strategy are:

- **Budgetary:** The environment is clearly an area that presents many more opportunities for intervention than available resources allow. The team has therefore targeted a critical sector for intervention and a general strategic framework within which they have identified key national start-up activities. These will provide an excellent lead-in to the proposed and existing regional programs in water and energy respectively and may easily be expanded in case of additional budgetary resources.
- **Donor coordination.** There are many donors, stakeholders, and organizations looking to resolve the plethora of problems in the water/wastewater sector, however there is a serious lack of coordination. **A donor working group should be established** in order to coordinate potential and existing programs, leverage resources, maximize impact, avoid duplication and allow for cross-fertilization by sharing information in a timely manner.
- **Regional political issues:** 907 with Azerbaijan and restrictions on working with Iran, which is a major riparian nation of the Araks River basin, are impediments to carrying out any regional program.
- **Where to place environmental activities within the Mission strategy:** There are several choices open to the Mission. The first and most immediate practical solution is to house the activities under SO 1.5. The second and optimal medium-term solution is to develop a new environment SO, based on the existing Bureau SO 1.6. The third is to develop a special initiative. Illustrative IRs are presented at the end of the paper for each of these options.

INTRODUCTION

Following is a concept paper for USAID/Armenia assistance in the environment, prepared by Alexandra Burke and Carl Maxwell. This builds on a prior Environmental Assessment (EA) carried out by Carl Maxwell and Carl Mitchell in October of 1998, as well as a series of documents recently produced by the Government of Armenia (GOA) in order to address the country's environmental problems in a systematic and prioritized way. Given budgetary constraints and in light of GOA and Mission priorities, the present team has narrowed down the range of possibilities presented in last year's EA and has come up with a proposed environment program.

In order to carry out this task, the team has done a review of the following background documents:

- last year's EA
- descriptions of donor programs
- the GOA's National Environmental Action Plan (NEAP)
- Lake Sevan Action Plan (LSAP)
- Biodiversity Action Plan (BAP)
- the World Bank Integrated Water Resources Management Plan (IWRMP)
- and other strategic documents (i.e. Water Quality and Water resources Mgt. report by IWACO/JINJ/Norconsult)

Follow-up meetings were held with the following organizations:

- Ministries of Urban Development and Nature Protection
- the World Bank
- EU-TACIS
- UNDP
- Jinj Consulting Co.
- the Armenia Water Company
- Lake Sevan Park Service representatives
- Mission staff

In last year's EA, the team developed a series of interventions, based on interviews, background documents and GOA priorities. The three first-tier interventions were lead removal from gasoline, wastewater and drinking water treatment, and a forest recovery program. Of these three, it has been recently learned from the American University in Armenia that supplier countries providing gas to Armenia are now selling unleaded gasoline and that testing of air has revealed much lower levels of lead in the air than expected. This has de facto removed the need to have an intervention on lead removal from gasoline. Lead contamination of soils is still an issue, but not necessarily an urgent priority. The forest recovery program looks to be covered under the planned World Bank sector loan for the forestry sector. This leaves the remaining issue of the water/wastewater sector needs.

The GOA has recently completed its NEAP as well as a Lake Sevan Action Plan and a Biodiversity Strategy. It has also been collaborating with the World Bank on development of the IWRMP. A new series of interviews with Ministry officials, various donor organizations and local entities has shown that while there remain many sectors of the environment requiring investments and technical assistance, the water sector is most in need of close attention on the local, national and regional levels. It affects all levels of economic development, including local agriculture and industry, national-level power production vs. irrigation tradeoffs, and regional-level transboundary water use and allocation as well as water quality. Wastewater treatment and maintaining a sound potable water supply system directly link to the protection of public health. The costs of not addressing this critical problem in Armenia are much higher than the costs of rehabilitating and restructuring the system. Public awareness and public education are also a critical element of work in the water sector. Without public participation in environmental stewardship and education on the critical role of water in every aspect of life as well as the importance of adequate sanitation, technical and policy solutions will not be enough to ensure sustainability of any measures undertaken.

Although there are certainly many donor efforts in the water/wastewater sector, the needs are so great and immediate that there remain many issues and sites to address. These needs, when filtered through the additional requirements of the Mission, that interventions be low-cost, quick pay-back and high-impact, has led the team to recommend a series of water and wastewater sector activities on the local, national and regional level that can be carried out as a group or individually. The local-level pilots will have the most immediate impact and will be the lower cost items. The national-level policy work will require more time and perhaps more funding over a sustained period, as will the regional water policy and cooperation activity proposed. Nevertheless, given the increasing focus on water and the current political impetus to work more on region-wide and basin-wide water issues, both within USAID and within the donor community at large, the regional water policy and management activity is timely. All the local-level pilots and national-level policy and pricing work, while viable as stand-alone activities, will also bolster regional efforts through their direct impact on the water quality and quantity of an upstream nation, water monitoring methods and capacity, and policies on pricing and water management regimes that are a necessary precursor to implementing transboundary water sharing and management agreements.

Recommendation

It is recommended that the Mission focus its environment strategy on the theme of water. This strategic focus is timely, given the critical needs in the water sector, the priority which the GOA places on water and wastewater sector rehabilitation and restructuring in its NEAP, recent political impetus behind the issue of water from all levels of the U.S. government and the donor community, and the hope that the Nagorno-Karabakh conflict is approaching resolution in the near future thereby allowing for regional-level water policy work. Even if regional activities cannot be undertaken in the near future, the remaining group of proposed activities would provide the necessary underpinning for future regional cooperation on transboundary water issues.

Under this rubric, a set of recommended interventions, all of which would lend to or be supportive of the Mission's proposed regional water management program, is outlined in the document that follows. In order to provide the necessary context, the remainder of this report is organized into the following sections:

- Description of the range of water and wastewater issues in Armenia
- Proposed program elements
- How the recommended strategy could fit within the overall USAID/Armenia and USAID/Caucasus strategies

CRITICAL ISSUES IN THE WATER/WASTEWATER SECTOR

As with any country, water plays a key role in the economy of Armenia. The agriculture sector, which accounts for 33.8% of GDP (including forestry related activities), is heavily irrigated and hydropower provides 35% of total electricity needs. On the face of it, Armenia has abundant water resources. However, there are enormous inefficiencies in irrigation systems, water and wastewater supply systems and hydropower systems. The leakage/loss rate from the water supply systems alone is at least if not surpassing 55%. Finding solutions to these types of infrastructure and management problems will require enormous investments from the donor sector, as Armenia itself clearly will not have the kind of funds needed. In order to put the problem in context, the types of problems the water sector is encountering are outlined below.

A. Deteriorating Infrastructure in Drinking Water Distribution and Wastewater systems

Water supply infrastructure is deteriorating throughout Armenia. Many villages have no or limited access to potable water and other areas have access but the supply infrastructure is damaged to the point where water supply is spotty at best. Furthermore, contamination of drinking water is a problem in cities and villages throughout the country. The sources of the water are generally clean but become contaminated by infiltration of sewage into the water distribution system. The existing water transmission and distribution system was constructed in 1950 and has an estimated leakage rate of at least 45 – 55%. The water distribution system does not provide water 24 hours per day and as a result is not under positive pressure at all times. Sewage mains cross under the water mains at a distance of 1.5 meters and are leaking. Because of periodic negative pressure (suction), sewage water enters the potable water system. Sewage contamination of the drinking water has caused isolated outbreaks of cholera. Water quality testing in Yerevan showed 35% of samples with human fecal coliform and 50% for total coliform. Chlorine levels are not controlled properly and can vary from none to high.

Wastewater systems are in disrepair throughout the country. One of the main problems is that existing treatment plants function as an aeration system, which is insufficient to meet the minimum standards for public health. There are a total of 18 wastewater treatment operations in Armenia, of which none are working at full capacity. Eleven of these are working at half capacity at best and many are just flow-through systems with no biological treatment or sludge removal occurring, which essentially means that untreated wastewater is flowing directly into surface waters. The Yerevan wastewater treatment plant (YWWTP) is treating 50% of the

wastewater it receives and the remaining flows directly into the Hrazdan River. Many regions outside of Yerevan have no treatment of any kind. During the Soviet era pre-treatment of industrial waste was required and there are still existing standards of effluent quality for the various industrial wastes produced. The problem lies in enforcement, which is effectively non-existent.

B. Over exploitation of Lake Sevan

Lake Sevan is one of the world's largest Alpine freshwater lakes in the world and has a central hydrological role in the country. The lake's catchment basin comprises one-sixth of Armenia's total land area, and it constitutes the primary water resource in the country. The lake's waters are used for both hydropower and irrigation and serve other economic roles as well, including as a locale for fish hatcheries and tourism. The lake and surrounding marsh and wetlands also have traditionally been a key habitat for many varieties of aquatic and amphibian species, including some species endemic to the lake itself. Lake Sevan is also a major stopping point for many species of migratory birds. Mismanagement of the lake's resources, however, has caused significant changes in both its hydrological balance and its ecosystem.

In the 1930s, Soviet mismanagement of Lake Sevan destabilized the lake. Water was withdrawn for irrigation at rates substantially greater than the natural inflow, lowering the water level by roughly 19 meters over a period of forty years. The decrease in water level combined with increased external pollution loads from point and non-point sources [including wastewater effluent from bordering towns and industrial waste], greatly altered the lakes' ecological conditions. Recreation and tourism were negatively affected and soon, significant declines in the lake's fishery harvest, constituting almost one half of the nation's entire supply, were seen. Finally it also became apparent that the lake's capacity to provide a reserve for hydropower production and irrigation, as well as possible drinking water, was seriously threatened.¹ These problems have been exacerbated by an inadequate legal and regulatory framework as well as lack of monitoring and enforcement.

C. Water logging in the Ararat Valley

The Ararat Valley, located in the southern part of Armenia, is a key agricultural zone. It is approximately 30,000 hectares in area and represents 8 – 10% of the agricultural land in Armenia. Approximately 70% of Armenia's groundwater resources drain into the Ararat Valley. The Ministry of Agriculture has pinpointed rehabilitation of the irrigation infrastructure and reduction of water-logging and salinization in the Ararat Valley farm lands as critical. Specific problems include:

- Both the open canal and perforated under-drain irrigation and drainage system is severely deteriorated and in need of repair and rehabilitation. The irrigation system consists of approximately 1000 km of open drainage canals and 700 km of perforated under-drains. The piped system is plugged and the open canals are blocked with weeds and have bank erosion causing blockage.

¹ Lake Sevan Action Plan, Page x, GOA, 1999.

- The current drainage problem is exacerbated by the natural drainage into the valley. Runoff from the mountains on both sides of the valley add to the water logging problem.
- Malaria is an increasing problem in the area because of mosquito breeding areas in standing pools of water.
- Pesticides are passing through the food chain to breast-fed infants. Farmers are unaware of safe practices on the use of pesticide and fertilizer or viable alternatives and require training and education.

D. Pollution of Surface, Ground and Potable Water Resources

Shallow groundwater and spring waters are generally of high quality, but they are vulnerable to pollution from the industrial, agricultural and domestic sectors. There are sanitation regulations in place, but poor monitoring and implementation of these. There is no separation of domestic and industrial waste (chemical, toxic, hospital, etc.), and this is viewed as a very serious problem. There are two large waste dump sites with clay liners outside Yerevan but the department does not know how much leachate is leaking into the fresh water aquifer. Separate landfills would solve the problem but the country is too small to allocate land for this purpose and there are not enough funds to make this change in the areas where the landfills are needed. This poses a severe health hazard, as no further treatment of water from aquifers is carried out. In addition, drinking water is polluted by sewage infiltrating into the distribution systems, which are in poor repair. Surface water quality monitoring is inadequate at present, both due to deteriorating monitoring capacity and infrastructure.

E. Allocation of water across sectors

The main hydrological source in Armenia is Lake Sevan. The level of this lake has dropped by approximately 19 meters during the last four decades, mainly due to unrestrained withdrawal of water for agriculture as well as hydropower generation. Generally, Armenia has an abundant amount of water resources, however distribution is uneven, causing water shortages in some areas and not in others. Approximately 200,000 inhabitants, or roughly 5% of the total population, lives under water shortage conditions, which constrains local economic development. This is exacerbated by severely deteriorating water supply infrastructure, which has an average leakage rate of 65%, sometimes more. Funds to pay for the electricity used in pumping the water are limited and therefore cut back on the availability of drinking and irrigation water, leading to a shortage of irrigation water as well in many areas. Potable water is supplied to households often for only 1 to 6 hours per day and is sometimes cut off altogether for the variety of reasons outlined above. Conversely, the problem in Ararat Valley is not shortage of water, but waterlogging due to deteriorating drainage infrastructure.

F. Conflict of Interest in water allocation and associated competition for Water

Mechanisms for allocation of water in Armenia are inadequate, partly due to conflicts of interest in management of this resource. The Ministry of Agriculture is responsible both for water allocation, yet is the main consumer of water as well. Inappropriate institutional arrangements, inadequate management and monitoring practices and an outdated legal framework make it much more difficult to resolve any disputes over water allocation.

G. Management of Transboundary Waters

The Kura River, originating in Georgia and flowing through Azerbaijan to the Caspian Sea, is the major watercourse in the TransCaucasus. The largest tributary is the Araks River, which originates in Turkey then flows through Armenia before running along the shared border of Iran and Azerbaijan and emptying into the Kura. Both the Kura and the Araks are polluted by municipal sewage water, industrial waste, agricultural reflows, and dump site run-offs mainly in the upstream countries of Georgia, Armenia, and Turkey. In downstream Azerbaijan, these polluted rivers are a source of serious health problems and environmental pollution of the Caspian Sea. Moreover, Azerbaijan's irrigated agricultural sector is heavily dependent on river flows from the Kura and Araks Rivers in Georgia and Armenia respectively. Future growth in the demand for water for irrigation and urban/industrial use will make water sharing and water management an increasingly contentious issue among the three countries, as well as the other riparian countries of Turkey and Iran. Resolution of these transboundary issues is impeded by difficult political relations between Armenia and Azerbaijan over the Nagorno-Karabakh enclave, and between the U.S. and Azerbaijan as well as the U.S. and Iran.

H. Inadequate Legal and Regulatory Framework, Weak Institutional Capacity, and Weak Monitoring and Enforcement

The Ministry of Nature Protection is responsible for overseeing water resources use/management. It has in place a system of primarily command and control mechanisms, including fines, pollution taxes and fees, but funds collected are siphoned off for other government expenses rather than being utilized for environmental improvements. Generally speaking, the existing legal and regulatory framework is inadequate and outdated. What regulations do exist on the books are often not effectively enforced, with a lack of monitoring in place. Economic incentives for pollution control and prevention are not in place. These could help greatly in promoting the use of energy efficient insulating materials for homes, for instance. It has been estimated that use of these in and around Lake Sevan could reduce energy losses by 30%, thereby reducing the need for hydroelectric power generation and therefore helping to maintain a viable level of water in Lake Sevan due to decreased water releases. Liability laws for past environmental damages are insufficient and may impede privatization and foreign direct investment. Lack of adequate building codes, safety standards and general disaster planning and procedures in order to preclude or mitigate ecological and environmental impacts from natural disasters such as earthquakes and flooding is of serious concern as well. The situation in Gyumri and other human settlements in the earthquake zone remains serious even 11 years after the 1988 earthquake. Water and wastewater infrastructure, buildings and industries, which were damaged or incapacitated as a result of the earthquake are still in need of rehabilitation. This has a negative effect not only on public health, but also on local populations' ability to rebuild their lives and their local economies.

From this broad array of problems, the team has focused in on specific elements, which are well placed within the overall framework of the Mission strategy, high impact, addressing immediate needs in Armenia, relatively low-cost, and support the proposed regional water policy and cooperation activity. In the event that regional level work is not possible, these activities will nevertheless comprise a coherent and cohesive national program in the water sector.

ELEMENTS OF A WATER STRATEGY

The strategy proposed is both national and regional in nature. It provides a framework for work in the water sector, within which regional and national level components are fit together as companion pieces that can also be separated out as distinctive and stand-alone interventions. The national-level activities are all interconnected and all work in support of the regional concept already tabled. Inasmuch as the regional activity will require further hashing out and interagency coordination/collaboration, the national level activities are proposed as a first phase component of the overarching water strategy. They will lay the necessary groundwork in preparation for the time when the Mission can carry out a regional water policy and cooperation program.

A. National Level Interventions

1) Policy and Institutional Framework (Est. Budget: \$450,000)

- a. Water Pricing: Although water tariffs for household users are approaching a level that would adequately cover O&M costs, there is a serious shortfall in collections. It was suggested by the NEAP Working Group 4 on water that an immediate priority would be to develop a national awareness campaign in order to educate household consumers in an effort to increase their willingness to pay. This combined with a pilot on water metering and water supply would be effective in demonstrating the interconnections between conservation, paying what you owe based on metering rather than a flat rate, increased collections (and therefore revenues) and water supply improvements.
- b. Water Policy: A national policy project would be focused on the priorities outlined by the water working group (WG) under the NEAP. The WG focused in on the following policy/legal/regulatory priorities:
 - i. Improved use of economic instruments to abate industrial pollution, including evaluation of the present effluent levies
 - ii. revision of the industrial effluent norms
 - iii. revision of the relevant legislation
 - iv. assessment of other economic instruments (i.e. product charges, environmental funds, etc.)
 - v. development of policy instruments (to include, presumably, looking at ensuring the use of pollution fees/fines collected for the environmental fund and environmental remediation projects)
 - vi. Legislative and financing mechanisms for industrial sites clean-up, including development of legislation and liability regulations, establishment of funding mechanisms for clean-up activities (looking again, for instance, at the Environmental Fund), and organization of stakeholders meetings.

2) Water Monitoring Systems Rehabilitation (Est. Budget: \$1,100,000)

The Armenian Hydrometeorological Institute (Armhydromet), which reports directly to the Ministry of Nature Protection (MNP), has developed a proposal to

address monitoring capacity. The biggest need seems to be in catching up on modern methods and new technology.

The capabilities and infrastructure of Armenian institutions working in the hydrology field have stagnated or degraded seriously since 1988. The use of models and other analytical tools have not developed in step with the international progress of hydrological science.

This activity would seek to reinforce the capabilities of Armhydromet to:

- Collect, manage, and store data on the quantity and quality of surface and ground water;
- Calculate water balance and forecast changes and ensuing impacts, also resulting from economic activities development;
- Assess the effect of pollution on water bodies (particularly the Lake Sevan) and identify protection and remedial measures. This would include monitoring of aquifers.
- Improve its management structure and procedures and increase the sustainability of operations and maintenance of the system.

The three tasks needed in order to develop and lay the groundwork for carrying out an Integrated Water Monitoring Plan (IWMP), utilizing, e.g., the Global Center for Environment Water IQC are:

1. **Task 1:** Develop Integrated Water Monitoring Plan (IWMP).
Cost: \$98,945
2. **Task 2:** Provide Training
Cost: \$120,000
3. **Task 3:** Procure Equipment
Cost: \$881,160

3. Village Pilot(s) in Biological Wastewater Treatment (Est. Budget: \$450,000)

Recent investigations carried out in Armenia indicate that non-conventional technologies such as ecological or biological wastewater treatment systems are a viable cost-effective alternative to conventional solutions. They often require less energy and fewer high-skilled personnel, are simpler to operate in sludge removal than conventional wastewater treatment plants, and are best suited for small-size towns and rural communities that currently discharge untreated wastewater via their sewerage systems. An additional benefit is that the effluent from such facilities should be suitable for irrigation purposes. This is a major consideration as agriculture is currently the major industry in the country, and for some it is the only source of income.

Although investigations have found that the use of biological wastewater techniques is a potential alternative, this technology has not been tested under

Armenia's climatic, social, and cultural conditions. Under the rubric of the World Bank Environment Sector Program (ESP) Loan (\$19 million, with \$7m of this going to grants), EU-TACIS has been carried out a pre-feasibility study to look at the potential for biological wastewater treatment in Armenia. Their pre-feasibility study has noted the two villages of Vardenik (pop. 4000, near Lake Sevan) and Sasunik (pop. 3000, in SW part of country) as potential pilots for funding under the World Bank ESP Loan.

Although it looks as though the World Bank will fund these two pilots upon submission of the final feasibility study in December of this year, there remain many areas of Armenia that could greatly benefit from this type of technology and are equally suitable for pilot demonstrations. Two areas noted by the local water consulting company, Jinj, are Talin (pop. 7500) and Baghramian (pop. 2000), both located in the Southern part of Armenia. The cost of such a pilot demonstration is estimated in the range of \$450,000 - \$750,000, depending upon the size of the population and the quality of the existing water supply, which would play an integral role in such an activity.

Tasks under such an activity would include:

- upgrading and rehabilitation of water supply and sewerage
- construction of the wastewater treatment facilities
- associated design costs
- project management
- post construction monitoring
- public awareness and information dissemination campaign as well as monitoring of pilot project results
- improvement of collection rates as a model for the transition period until individual metering can be installed

4. EcoLinks (Est. Budget: \$500,000 buy-in from Mission augmented by reg'l funds)

Now is a good time for USAID/Armenia to consider the EcoLinks Partnership Program, which seeks to build the capacity of businesses and municipalities to develop market-based solutions to urban and industrial environmental problems. Other benefits of the program are to facilitate cross-border partnerships, the sharing of best practices, and environmental investment and trade.

Grants Component

The Grants Component of a program in Armenia would:

- Help create lasting environmentally focused partnerships between local governments, private enterprises and associations in Armenia and counterpart organizations in the U.S. and/or within the ENI region. Partnerships are competitively awarded and fall into one of three categories:

Quick Response Awards (up to \$5,000)

Challenge Grants (\$5,000 - 50,000)

Twinning/Trilateral Grants (\$50,000 - 250,000)

- Facilitate trade and investment in environmental goods and services in conformity with the statutory and policy constraints on investment promotion.
- Provide environmental professionals in Armenia with information about environmental laws, policies and regulations, best practices, environmental technologies and management systems.

Recipients of grants would facilitate EcoLinks activities that result in local government officials and businesses in Armenia being better informed regarding cost-effective solutions to air quality, water quality and waste management problems, with particular emphasis, where practical, on solutions involving private parties and market mechanisms. EcoLinks may provide minimal funding of equipment, but it mainly serves as a catalyst for partners to work together to facilitate private trade and investment.

This component will have as its centerpiece a new interactive website on industrial and urban environmental best practices policies and management systems.

Under a Mission Buy-in program, an office would be established in Armenia through the cooperative agreement with the Institute of International Education (IIE) to facilitate the full grants program (Challenge/Twinning grants) for country specific environmental projects in Armenia.

Example: The Lake Sevan region has myriad environmental problems similar to problems experienced in the Lake Tahoe or Chesapeake Bay areas of the United States. Associations have been developed in these areas and have a wealth of information and lessons learned in resolving the economic and environmental problems applicable to Lake Sevan. A twinning grant in the order of \$200-\$250,000 could be awarded to establish a similar program for the stakeholders of the Lake Sevan area. The results and subsequent studies through this twinning program would have a high probability of leveraging funding for necessary feasibility studies and scopes of work for future contracting interventions—a necessary requirement of financial institutions and/or potential donors.

Trade and Investment Component

The Trade and Investment Component would:

- Place a Trade Representative from Department of Commerce in country offices of DOC
- Promote environmental trade and investment by providing information on U.S. suppliers of environmental goods and services through the Global Technology Network (GTN) data base

Environmental trade and investment in Armenia is beginning to take hold. Promoting private sector engagement initially would be a tough sell. Environmental enforcement is not a major "driver", and there is the major question of how to finance environmental investments. Putting these concerns aside, there may be some market for investments that make good economic sense and that just happen to be good for the environment, such as energy efficiency and materials recovery and recycling. EcoLinks could play a catalytic role in getting US companies with technologies in these areas engaged in Armenia -- e.g., through Challenge Grants. Perhaps the mission could leverage Trade Development Agency (TDA) funding for feasibility studies of projects in these areas. But in making this case, some caution would be in order. TDA will only fund feasibility studies for projects that have a reasonable likelihood of being implemented. For example, if the World Bank has a project in the pipeline, that might be a good target. Therefore the likelihood of environmental trade and investment depends on the international financial community having commitments to support projects. The Mission staff would need to investigate what kinds of IFI-funded environmental projects are in the pipeline for Armenia, and then tailor a Challenge Grant/TDA/IFI scenario.

B. Regional Water Resources Management and Policy

The Kura River, originating in Georgia and flowing through Azerbaijan to the Caspian Sea, is the major watercourse in the TransCaucasus. The largest tributary is the Araks River, which originates in Turkey then flows through Armenia before running along the shared border of Iran and Azerbaijan and emptying into the Kura. Both the Kura and the Araks are polluted by municipal sewage water, industrial waste, agricultural reflows, and dump site run-offs mainly in the upstream countries of Georgia, Armenia, and Turkey. In downstream Azerbaijan and in downstream Iran, these polluted rivers are a source of serious health problems and environmental pollution of the Caspian Sea, of which both Azerbaijan and Iran are littoral states. USAID/Armenia and USAID/Caucasus in concert with the country office in Azerbaijan, the Mission in Georgia, and perhaps a multilateral donor such as UNDP (for Iran), can work on a regional level to create a climate of trust and confidence among the riparian states and thereby influence the riparian governments' policy and decision-making processes regarding these two river basins. Activities under this rubric would work to promote sustainable energy and environmental policy reforms and sustainable water management practices. They will be complemented by both the Strengthening Regional Energy Linkages Project and the collaborative local, and national approaches that are also proposed to be a part of this water strategy. They might also be complemented by discreet and highly coordinated activities by USGS and EPA, with overall management responsibility falling to USAID/Caucasus and USAID/Armenia. All efforts would need to be closely coordinated as well with the other relevant donors, including but not limited to EU/TACIS, which currently has plans to address transboundary water issues along the Kura River.

Future growth in the demand for water for irrigation and urban/industrial use will make water sharing and water management an increasingly contentious issue among the riparian countries. Despite its reluctance to cooperate on other issues of regional integration, Azerbaijan

has recently indicated an interest in exploring possibilities for regional cooperation in sustainable water management. This is due both to the fact that it depends greatly on flows from both the Kura and the Araks for irrigation water and that it is the downstream recipient of upstream pollution by Georgia, Armenia and Turkey. Iran is in a similar situation and would need somehow to be brought into the discussion, albeit not by the U.S.

Addressing the contentious transboundary issues of water sharing, use, and quality in the two river basins will require looking at the management of upstream, multiple-use reservoirs. These reservoirs generate electricity to meet peak winter power demands in addition to releasing water to flow downstream in the spring and summer to meet agricultural and urban/industrial uses. Future regional cooperation on water sharing, management, and/or quality on the Kura and Araks rivers will thus have to be carefully considered in terms of its potential impact on dam management (water storage) for power generation as well as for agriculture and other urban/industrial uses. Conversely, current efforts to look at expanding commercial electricity/energy trade and regional cooperation in the shorter term and ultimately full integration of the Caucasus into international energy markets, will require paying attention to the logical companion piece of transboundary water resources management and policy. Without this linkage, USAID would be seeking to resolve one problem, while not addressing the commensurate issues in an integrally related sector. By coupling these issues in closely linked regional programs in energy and water, USAID can create a stronger, more efficient and economically viable region-wide energy and water system.

In order to ensure that sufficient water is available to accommodate multiple uses and that the water available for domestic consumption is of sufficient quality, changes in both infrastructure and policy are necessary in the riparian countries of both the Araks and the Kura River basins. Infrastructure projects tend to be prohibitively expensive, however USAID/Armenia could provide limited TA in this area in the form of the suggested pilot demonstration outlined below. The regional cooperation initiative would strive to bring policy makers from all five riparians together to discuss common concerns and issues related to the management of water resources in the Araks and Kura River basins. Water sharing and pricing activities could work to introduce cooperative and collaborative approaches to problem solving by linking the cost/benefits from alternate uses and qualities of water. Each of the three presence countries could then be assisted in development of national level policies and legislation on water pricing, water quality and water.

Work occurring independently in each river basin could provide valuable guidance and feedback on workable models for water sharing and management along the two rivers. International-level agreements reached for the Araks and the Kura should be augmented by activities which assist in the development of efficient, accountable and sustainable water management at all political and operational levels. By working on regulations and procedures to implement regionally negotiated agreements on the national and sub-national levels, tangible gains can be made in establishing international water sharing and water quality policies that promote the early and mutually agreed resolution of disputes well before the occurrence of any adverse impact. Even if only partially successful, the proposed project would also serve as a confidence building measure towards normalizing economic and political relationships in the region. Agreements on water resource sharing and management resulting from this Initiative and

endorsed and/or ratified by appropriate high-level government representatives should provide the needed momentum for economically and environmentally sustainable and cooperative water resources management. Realistic implementation guidelines and procedures for the meaningful participation of marz and local level entities in the water sharing, pricing, quality assurance, and management institutional structure will indicate substantial progress towards responsible and free market-oriented stewardship of water resources.

Because of the on-the-ground presence of two Missions and their considerable experience in the region, plus the Agency's long history of addressing water management issues, USAID is in a strong position to support this regional initiative on a bilateral or multi-lateral basis. Although this initiative would be regional in nature from a USG perspective, given the existing geographical, topographical, and political separateness of the two river basins, separate treatment of the two river basins and initial focus on basin-specific discussions, cooperation and activities would be the best approach. The obvious groupings would be: a) the Kura River – Georgia, Azerbaijan (and Turkey); and b) the Araks River – Armenia, Azerbaijan (and Iran). The constraining factors concern political injunctions against working with Azerbaijan and Iran. Section 907 of the FREEDOM Support Act bars USAID from providing assistance to the Azeri Government. We are also barred from working with Iran in any capacity. While there are opportunities to pursue regional cooperation in Azerbaijan through NGOs, for-profit private sector organizations, other donors, and/or the proposed Caucasus Cooperation Forum (CCF), Section 907 will still limit USAID's ability to obtain Azeri cooperation and participation in this area. Irani participation from any level (NGO or otherwise) would have to be obtained through a multilateral organization. There do not appear to be any impediments in including Turkey in the initiative, assuming their willingness to participate. If this cooperative spirit exists, Turkey should have an explicit role in this activity.

Proposed Activities:

USAID/Caucasus and USAID/Armenia propose a multi-year Caucasus Water Management Initiative to further regional cooperation in sustainable water management among the Caucasus republics. The plan is to involve the three Caucasus countries of Armenia, Georgia, and Azerbaijan, as well as Turkey and Iran in regional undertakings for the benefit of all. However, due to the unresolved Armenia/Turkey/Azerbaijan political issues, the initial plan is a two track approach that seeks (1) to foster expanded Georgia/Azerbaijan cooperation in management of the Kura River water basin, and expanded Turkey/Armenia/Azerbaijan cooperation in management of the Araks River basin, while maintaining input from the Iranian side through other multilateral institutions such as UNDP; and (2) to improve regional cooperation and integration in issues of water resources management and policy in order to foster increased regional economic growth and development.

The project would provide the following categories of inputs to the extent permitted by Section 907 and the extent to which other donors can assist by managing the Iran side of the equation: technical assistance; long and short-term training; study tours and internships; attendance at, or sponsoring of, regional and international workshops, seminars, and conferences; executive exchanges and partnerships; and limited commodity support. The initiative would illustratively consist of the following components:

-- A needs assessment to identify effective methods of addressing regional issues of efficiency in water use. This would be initiated through literature reviews and consultations with other donors operating in the region and perhaps followed up with regional workshops/seminars held in Tbilisi, for example. These workshops would highlight issues, develop approaches, and further define technical assistance and training requirements. The foci of the first workshops could include: i) regional water quality and sharing; ii) water pricing at the national levels; iii) conflict resolution through negotiation; and iv) bilateral and trilateral agreements for sustainable water management.

-- Access baseline information and simulation modeling (perhaps optimization) of the hydrologic systems in both water basins linked to the underlying economic base of the political and geographic jurisdictions (national and transboundary) in question. Conduct a regional cost/benefit analysis, documenting existing water sharing practices, application of various water and energy pricing methodologies, and monitoring of river, aquifer and lake pollution. Much of this information may become available over the course of the next year due to donor efforts in these areas.

-- Institutional development of regional and/or national institutions to deal with, and negotiate, the technical and political issues of regional water management. Formation and support of regional workgroups to develop workable approaches and recommendations would be emphasized. A possibility would be to broaden the scope of existing regional institutions or develop a new regional body, such as a water and energy uses roundtable that could address both regional water and energy issues. This would greatly improve coordination and cross-fertilization between regional water and energy activities and efforts.

-- Drafting and negotiating agreements on water and energy management. Expertise and training would be provided to the institutions and workgroups in drafting/negotiating agreements between Georgia and Azerbaijan and Armenia, Azerbaijan, and Turkey with other donors providing input from Iran. One focus could be on providing examples and lessons learned from successful negotiation of (i.e., win-win) international agreements on water management in other river basins. Examples include: Indus, Mekong, Columbus, Colorado, and the Brahmaputra River basins. Work on this would be carried out in close cooperation and collaboration with the existing Regional Energy Linkages project and any other existing USAID or other donor programs.

-- In cooperation with other donors such as EU-TACIS, support the development of regional or national multiple-use water management plans to promote environmentally and economically sustainable development of the Kura and the Araks river basins. Explicitly recognizing the sovereign rights of the riparian republics, the plan could deal with national and transboundary issues of water pricing, pollution fines, dam management and flood control, irrigation, energy generation/transmission infrastructure, and new infrastructure investment requirements.

-- Mobilization of loan resources of the International Financial Institutions (IFIs) for essential infrastructure investments in the water and energy sector, and to leverage urgently needed legal and regulatory reforms, which will have a major beneficial impact at the regional as well as the national level. Besides feasibility studies, expertise/training would be provided for assisting the

national governments in implementing the policy reform conditionalities that are usually tied to IFI loans.

-- Support for sustainable natural resource management and pollution abatement. This would include provision of technical assistance and training at the national, sub-national, and ultimately regional levels for the development of programs to: i) restore biological resources, such as wetlands/forests; and ii) maintain biological diversity to protect endangered species of plants and animals. Regarding pollution, the focus would be on bolstering national water quality monitoring systems with an eye towards eventual regional integration of emergency response and monitoring systems, such as those developed under the GEF/Danube program to protect areas of environmental concern.

-- A program of analyses, study tours and national and regional fora to support all the above activities. Regional working groups of technicians and policy makers in the Caucasus would be linked with US counterparts to conduct short-term studies addressing immediate concerns and issues affecting regional cooperation.

Counterpart Organizations:

The potential counterparts for this initiative would include, for example:

- a) Proposed Caucasus Cooperation Forum and/or Regional Water and Energy Uses Roundtable
- b) Various ministries within the national governments of Georgia and Armenia
- c) Local NGOs and other private sector entities in the 3 republics, Turkey and Iran (via a multilateral donor), including the new Caucasus Regional Environment Center, which are dealing with water and energy issues
- d) IFIs and other donors, perhaps through the proposed Donor Environment Working Group
- e) Private sector representatives having an interest or stake in increased regional cooperation.

USAID believes that limited participation of the Azeri Government can be secured in two ways without violating the strictures of Section 907. First, by working with the US Ambassadors in the region, the CCF and NGOs. Second, by gaining the support of, and joining forces with, other donors and private industry interests who are not bound by Section 907. Securing the limited participation of Iran would be more difficult, yet important to the process. This might be done, as aforementioned, via a multilateral donor organization, such as UNDP or perhaps through another donor without the restrictions that the U.S. has on working with Iran.

Expected Results:

- The Caucasus republics reap the economic benefits of regional cooperation in the spheres of sustainable water management and energy trade/security
- Reduction in political and economic tensions in the Caucasus through confidence-building measures
- Bilateral or regional agreements on:
 - Information sharing
 - Water quality/sharing
 - Multi-purpose management of the cascades of dams in both river basins
- Institutional development of key local institutions supporting regional integration
- Coordination and cooperation in regional infrastructure investment planning

- Increased IFI loans for water infrastructure projects of benefit to all three countries

WATER WITHIN THE OVERALL MISSION STRATEGY

Regardless of where proposed environmental interventions might be placed within the strategic framework, it is important to note that the suggested activities also have ancillary benefits and linkages to other Strategic Objectives within the Mission's overall strategy.

Benefits and Linkages to Mission's overall strategy

INTERVENTIONS	SO 1.3 Growth of Competitive Private Sector		SO 1.5 A More Economically Sustainable and Environmentally Sound Energy Sector	SO 2.1 Increased Citizen Participation in the Political, Economic, and Social Decision-Making Process				SO 2.2 Laws are Enforced and Adjudicated Impartially
	IR4	IR5	IR2	IR2	IR2.1	IR3	IR4.2	IR1
National Policy Legal/Regulatory		X						X
Water Monitoring System	X							
Biological Wastewater Treatment Pilot	X		X			X		
EcoLinks		X	X		X			
Wetlands Restoration Pilot (Ex-EcoLinks)		X		X			X	
Regional Water Mgt. & Cooperation Initiative		X						

National Policy/Legal/Regulatory:

- Link to SO 2.2, IR 1: Regulatory agencies administer laws impartially – policy/legal/regulatory assistance in the area of environment will aid in the impartial administering/implementation of laws
- Link to SO 1.3, IR 5: Local economic development stimulated – legal/regulatory framework provides the necessary backing for local economic endeavors. This is true with environmental investments and business ventures as with any other area of the economy
- Other Benefits:

- Underpinning for all other IRs under the proposed SO 1.6.
- Also underpins any regional water policy and cooperation project, providing the substance/action behind any agreements brokered.

Water monitoring system improvements:

- Link to SO 1.3, IR 4: Improved infrastructure – improvements in water quality monitoring stations, equipment, etc.
- Other benefits include:
- indirect benefits to protection of public health, through existence of adequate water monitoring equipment, methods, etc.
- indirect support to any regional level water policy and cooperation efforts – water quality and quantity will be the key issues and accurate baseline data on both of these will be a key input into the discussions and potential agreements on water quality and water sharing

Biological Wastewater Treatment pilot:

- Link to SO 1.5, IR 2: Increased energy efficiency – by utilizing a non-mechanical method of wastewater treatment thereby lowering electricity needs, promoting energy conservation/efficiency
- Link to SO 1.3, IR 4: Improved infrastructure – improvements to the wastewater/water infrastructure on the local level
- Link to SO 2.1, IR 3: Enhanced circulation of information – increased level of public awareness/information on benefits of water/wastewater infrastructure improvements to public health, etc
- Other benefits:
- Reduced environmental risks to public health
- Education of local population in low-cost, simple technology and health benefits of improved water/wastewater system
- Possible companion piece in public information dissemination campaign and educational campaign for children – get them involved in the O&M of this simple but effective system
- Improved water quality – potable (due to associated water system improvements) and surface/ground water (due to treatment of wastewater)
- Increased availability of water for irrigation purposes

EcoLinks:

- Link to SO 1.3, IR 5: Local economic development stimulated – Ecolinks partnership grants have the potential to affect this IR as the focus is on linking US with in-country partners to carry forward investment projects in water/wastewater, cleaner production and air quality improvements.
- Link to SO 1.5, IR 2: Increased efficiency – potential energy efficiency increases in entities that may received grants to form partnerships on issues aforementioned
- Link to SO 2.1, IR 2.1: NGOs are most often associates in Ecolinks partnerships and as such not only play a viable role in improved environmental management but also strengthen their own operations and future sustainability.

Wetlands Restoration pilot (Example given under Ecolinks):

- Link to SO 1.3, IR 5: Local economic development stimulated – revival of fish hatcheries, revival of licensed hunting industry, revival of tourism industry
- Link to SO 2.1, IR 2: Increased citizen advocacy – citizens would be integrally involved in the process of rehabilitation of the wetland area and would therefore gain a voice and see the direct benefits of public participation in management of key natural resources
- Link to SO 2.1, IR 4.2: Government is more accessible – participation of MNP and Lake Sevan park officials, the Governor of the region and the mayors, as well as citizens would mean increased access to and communication with all levels of government

Regional Water Management and Cooperation Initiative

- Links to SO 1.3, IR 5: Local economic development stimulated – providing a framework for cooperation in the sustainable management of transboundary water resources will allow for more efficient water resource use in both the energy sector and the environment sector (irrigation and water quality). This will lower overall operations costs and effect local economies and potential for local economic development positively.
- Links to Mission’s overall strategic focus on regional programs and regional security

Options For Incorporation into Mission Strategy

Pending potential creation of a new environment SO, which is laid out in Option 2 below, it would be possible to house all the outlined activities under SO 1.5 if a new IR were created. It is suggested that as this program progresses it would be optimal to develop a new SO in order to allow for a wider array of water-related activities in the future. These options as well as the option of creating a special initiative are outlined below.

OPTION 1: Incorporation of water/environment IR into the existing SO 1.5***IR 4: Increased local, national, and regional cooperation in integrated water and energy management to promote sustainable economic growth, trade, and security.***

IR 4.1: Increased local-level activities promoting energy efficient/conserving water/wastewater service provision

IR 4.2: Improvements in national-level water monitoring infrastructure and techniques

IR 4.3: Decreased reliance on electricity generated by hydropower through alternative methods of water/wastewater treatment (biological/wetland)

OPTION 2: Adoption of SO 1.6, tailored to water sector:***SO 1.6: Increased local, national, and regional cooperation in integrated water management to promote sustainable economic growth, trade, and security.***

IR 1 Strengthened policy, legal and regulatory framework for environmentally sustainable development in the water sector

IR 1.2 More internationally consistent, cost effective, and locally effective environmental regulations.

IR 1.3 Increased use of market based tools to achieve environmental objectives

IR 2 Increased use of innovative environmental finance mechanisms and environmental investment

IR 3a Improved environmental management practices and adoption of environmentally sound technologies by private and public sector entities

IR 3b Improved Management of Natural Resources and Biodiversity

IR 4 Increased participation of NGOs and citizens in decision-making and environmental advocacy at the local level

OPTION 3: Creation of a Special Initiative

This option would have elements of each of the IRs outlined above. It would probably have a similar Strategic Objective statement to that stated in Option 2, in order to be able to fold in the energy linkages inherent in the suggested water program, particularly on the regional and national levels, but also to some extent on the local level.