

**Statement to United States House of Representatives Committee on Foreign Affairs  
Subcommittee on Europe, Eurasia, and Emerging Threats hearing, 2:00 p.m., November 18, 2014  
“Water Sharing Conflicts and the Threat to International Peace”**

**Testimony of Amanda E. Wooden, Ph.D. (Associate Professor of Environmental Politics & Policy,  
Bucknell University)**

Chairman Rohrabacher, Ranking Member Keating, other distinguished Members of the Committee, thank you for inviting me to testify here today. I will provide an overview of water security in Central Asia, potential for regional conflict, how water-driven disputes impact U.S. interests, and possible steps for the U.S. government.

**Summary – Strategic Overview**

In Central Asia, a direct relationship between water scarcity and interstate conflict is an unlikely scenario. The main water disputes concern the water-energy nexus. Existing cooperation, even with the current weak regional water-sharing institutions, means that conflict is avoidable. It is necessary to understand and evaluate the long-term, complex and indirect relationships between water and contentious politics *within countries* in Central Asia. Internal (intrastate) instability may be indirectly related to water regime changes, but it is also a consequence of socio-economic changes we see happening in the region (namely migration and poverty). Internal political problems related to water – such as drought driven hydroelectricity shortages - can spillover into international disputes. The already existing contentious politics of water *within* several countries in the region combines and is enhanced with finger pointing between Central Asian leaders, who at times have used threats about water as political instruments to influence other issues.

**Key Issue Overview**

In this overview of regional water relationships in Central Asia, I consider and focus on the five ‘post-Soviet’ countries in the Aral Sea basin: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan (see map 1). Shared water issues in these countries are connected to China and Afghanistan, who are on the edges of the Aral basin (see map 2).

Some of the most important water issues that currently relate to tensions between governments in Central Asia and create everyday hardships and social discontent are: hydroelectric dam development, irrigation management, infrastructure failures, tensions about water sharing along militarized border zones, and flooding potential. Some of these problems result from the rapid post-Soviet collapse transition to the current state boundaries without parallel transformation of water resource infrastructure and energy production. Additionally, socio-economic pressures in border regions and these countries more broadly – especially in Kyrgyzstan and Tajikistan – create livelihood challenges that are and will worsen with unpredictable weather, precipitation, and temperatures. The collapse of the Aral Sea ecosystem is a significant livelihood threat. The water-energy nexus is an important sphere to consider the potential for deepening disputes between states but also contentious politics within countries.

In the future the biggest physical risk to water supplies and thus contention about transboundary waterways is glacier loss and precipitation changes. Migration pressures from these water regime shifts are a possible link between water and conflict. Migration is already a significant socio-economic pressure; for example, close to 20-25% of Tajikistan and Kyrgyzstan’s populations work abroad. Adaptive capacity matters for how governments deal with the everyday issues citizens face in confronting acute

water challenges, such as drought, flooding, electricity outages, and extreme weather events. Kyrgyzstan and Tajikistan currently face significant capacity limitations in this regard, and all five countries have vulnerable rural places and populations.

There are ongoing disagreements between Central Asian governments about the key rivers in the Aral Sea watershed - the Syr Dar'ya and Amu Dar'ya (see map 2), and annually recurring seasonal tension between communities in securitized border regions such as in the Ferghana Valley (where Kyrgyzstan, Tajikistan, and Uzbekistan meet). But also there exist complex functioning relationships from the local cross-border community to the international level. Cooperation is more regular than disagreements and tense events, although at times that cooperation seems fragile. Shared 'upstream-downstream' waterways, such as these Aral basin rivers, are more difficult to coordinate and create opportunities for heightened rhetoric, also depending on how military and economic power is distributed. (In contrast, cooperation is achieved more easily among states whose boundaries were created along a shared river, such as the Central Asian Chui-Talas, Panj, and Khorogos rivers). Whether or not this relationship is more cooperative or more conflictual depends in part on how – at any given time – a country's government identifies water as integral to the nation-state's survival, as part of the nation-building project, or as leverage in other relationships with neighboring countries.

In sum, the biggest conflict risks in Central Asia are political and economic: government willingness to tackle people's everyday struggles with water and power, subsequent contention between people and governments about non-responsive policies, and regional leaders' use of nationalistic rhetoric to lay claim to waterways and rationalize particular waterway uses.

### **Central Asia – the Hydrosphere**

The Syr Dar'ya and Amu Dar'ya terminate in the former Aral Sea, in a depression that straddles Kazakhstan at its north and northwest end, Uzbekistan on its east and south, and Turkmenistan to the south and west. These rivers are primarily glacier-fed, from glacier fields in the Tien Shan mountains which the Kyrgyzstan-Kazakhstan-China borders transect and the Pamir-Alai mountains where the Tajikistan-Kyrgyzstan border meets and mountain ranges join in Tajikistan and Afghanistan (see map 1). (According to NASA, the average runoff from glaciers in Kyrgyzstan is 15% of the total, higher during warmer seasons.) The glaciers in both the Pamirs and the Tien Shan have recorded on average steady declines in the 20<sup>th</sup> and early 21<sup>st</sup> centuries. The smaller glaciers at lower elevation – those closest to and most important freshwater source for populated areas - are primarily at risk and receding fastest.

The Aral Sea – a terminal lake in the Kyzyl Kum desert, once the fourth largest freshwater lake in the world– is infamous as what the United Nations called the worst environmental disaster of the 20<sup>th</sup> century. Unsustainable irrigation development upstream mostly for cotton production – canals and irrigation network diversions – siphoned off enough water to desiccate more than 90% of the lake area from 1960-2014 (see images 1 and 2). The lake split in two in 1987 and subsequently into four parts (see image 3). As of this summer 2014, NASA satellite images now show separate seas, and that the largest portion of the lake no longer exists as such (see image 4). The average annual inflows have changed from 55 km<sup>3</sup> in 1910-1960 to 4.1 km<sup>3</sup> in 2006-2010. Water salinity levels went from 10 percent in 1960 to more than 100 percent salinity in the West and East Basins of the Large Aral. In August 2005, with World Bank funding, the government of Kazakhstan constructed the 8-mile Kok-Aral dam, further reducing flows to the Large (southern) Aral and holding the Syr Dar'ya flow in the Small (northern) Aral, which increased to 22.0 km<sup>3</sup> in 2011. This dam construction has been identified by the World Bank as a success story, but it contributed to a faster decline of the majority of this lake ecosystem, once one of the largest in the world, which is now gone and irretrievable. Thus the Kok-Aral dam is an example of an international intervention that arguably provided localized development benefits but negative

ecosystem impacts, thus serves as a warning of caution for the ways in which the international community engages in regional water issues.

There are numerous environmental, health, and economic ramifications of the loss of the Aral Sea ecosystem, such as a shortened growing season, water salinity increase, desertification, dust storms (see images 5 and 6), soil salinization and water logging, species loss, high rates of skin disorders, esophageal and other cancers, and a myriad of other health issues among residents from poor air and water quality interacting with nutritional limitations. Restoration efforts now focus on the Small Aral (in Kazakhstan) and the former deltas of the Amu Dar'ya and Syr Dar'ya. The Large Aral is mostly abandoned – the Eastern Basin seems unrecoverable and the deeper Western basin is in decline. This desiccation has led to a significant warming of 6 degrees C (2m) air temperatures over the lake bed and 1 degree C in 200 km area around the former lake boundary.

The Aral Sea matters for many ecological, socio-economic, cultural, and political reasons. In terms of conflict, it is an indirect factor, as further declines in quality of life among residents – mostly in Uzbekistan where communities are closest to the now disappeared Large Aral – could contribute to animosity toward the government and dissent. Most important are continuing problems of access to freshwater, soil quality loss, and reductions in the length of the growing season. A long growing season is crucial for community-scale food production, as well as for the cotton sector which the state tightly controls and from which it draws revenue. Water diversions – such as in the Qaraqum Canal (see image 7, Hanhowuz Reservoir, Turkmenistan) – primarily for cotton production were a main cause of the Aral Sea's collapse and ironically cotton production is impacted by this ecosystem loss.

The Aral Sea crisis has also figured into regional narratives about the water-energy nexus, and criticisms of Kyrgyzstan's and Tajikistan's upstream hydroelectricity development plans by Uzbekistan and Kazakhstan. In 2007, Uzbekistan's President Karimov stated that the construction of large dams upstream would "speed up the ecological catastrophe of the desiccation of the Aral Sea and make it practically impossible to live for tens of millions of residents of Kazakhstan, Turkmenistan, and Uzbekistan."

This rhetoric rings false as the government of Uzbekistan has done very little to address the main causes of the catastrophe, but rather has impeded civil society attempts to draw attention to the Aral Sea disaster and the problems with cotton monoculture – at times imprisoning critics of its environmental policies – consistently blocks regional action to tackle the Aral Sea issue, does not allow the government of the Autonomous Republic of Karakalpakstan (the region most impacted by the Aral Sea's collapse) to practice its political autonomy, and has resisted change in its agricultural sector. However, claims of threat to the Aral Sea from upstream hydroelectricity development cannot be dismissed outright because dams do create river regime changes and there is inadequate public (national) and international level discussion of the ecological impacts of these dams' construction.

### **Hydroelectric Dam Development**

One point of contention at the inter-governmental level surrounds the issue of hydroenergy development in the upstream countries, Kyrgyzstan and Tajikistan. Downstream countries are concerned that these developments will alter the waterways, impacting availability and timing of flow for communities that rely on this water for irrigation and flood control. The key issue here is how the timing of releases is managed. Everyday experiences in near border regions are important locations of ongoing tension as well as required cooperation. Water resource concerns are widely shared across the region. In Kyrgyzstan, for example, I conducted a nation-wide public opinion poll in 2009 in which water ranked highest among environmental concerns in every single province; 48.41 percent of Kyrgyzstanis

were concerned most about water supply or pollution. Water supply and pollution also figured first for the majority of 140 key informants I interviewed from 2009-2013. Water infrastructure maintenance is a major problem throughout the region and a consideration for international assistance.

Kyrgyzstan and Tajikistan rely on hydropower for the vast majority of their electricity production (~90% in both countries). Both countries are dependent on Soviet-era dam infrastructure for this energy supply, since the trading relationship of importing coal, oil, and gas from Kazakhstan, Turkmenistan and Uzbekistan was monetized at the Soviet break-up and the upstream countries do not have adequate fossil fuels for their energy demands, especially in the cold winters which these mountainous countries experience. Given this predicament, both Kyrgyzstan and Tajikistan are reviving Soviet-era plans to upgrade and expand the hydroenergy sector, primarily by constructing a series of dams. Kyrgyzstan is constructing the large Kambar-Ata 1 and 2 dams and four smaller dams, all on the Naryn River, a major tributary of the Syr-Dar'ya, which runs through the country and into Kazakhstan and Uzbekistan. The Kambar-Ata 2 dam is producing electricity already, and Russian state investment in the upper dam construction was announced in 2013. These four small dams are targeted for completion in 2019. Tajikistan is investing heavily in the Rogun dam which has generated the most ire from Uzbekistan's government. The government of Uzbekistan has seemingly engaged in economic retribution through border securitization and cutting off gas supplies to both countries at various times.

In September 2012, during an official visit to Astana, Uzbekistan's President Islam Karimov noted that leaders of upstream Kyrgyzstan and Tajikistan forget the transboundary nature of the region's rivers. "Because today many experts declare that water resources could tomorrow become a problem around which relations deteriorate, and not only in our region. Everything can be so aggravated that this can spark not simply serious confrontation but even wars." Kazakhstan's President Nursultan Nazarbayev then stated, "To our neighbors and brothers who are 'sitting' on the upper reaches of these rivers, we send another 'fraternal signal' that we -- Kazakhstan and Uzbekistan on the Amu-Darya and Turkmenistan, located downstream -- most of all perceive the shortage of water; each person feels it, because this is their life; this is the life of millions of people." One year later when these two leaders met in Tashkent (June 2013), they called for UN review of Kyrgyzstan's and Tajikistan's dam construction plans and stated their common position on resolving regional water and energy problems through international law. President Nazarbayev noted, "We want to send a friendly message to our neighbors that we ourselves need to address these issues together. There are no unsolvable problems and issues. ... We are ready to meet you halfway. Kyrgyzstan and Tajikistan have transport and energy issues. We are also prepared to deal with these issues." So downstream states continue to pressure upstream states to halt large dam construction or open the process to neutral evaluation and regional discussion.

However, both Kyrgyzstan and Tajikistan also face the reality of electricity shortages and concerns about the impact of power outages on their populations' well-being and the possibilities for popular discontent. For example, in some parts of Tajikistan, electricity is available only three hours a day. In 2010, water sector partial privatization and doubling of electricity, water, and heating tariffs helped trigger protests against the Kyrgyz government. This rate increase was widely unpopular in light of the daily electricity shortage most Kyrgyzstanis experienced in 2008-09 (71.4% in my survey at the time indicated experiencing significant blackout impacts). When government forces cracked down on protesters on April 7<sup>th</sup>, President Bakiev was run out of power. Since this moment, the interim government of Roza Otunbaeva and current government of Almazbek Atambayev have cautiously approached the electricity tariff issue, invested heavily in the energy sector, and moved forward on Bakiev-era plans to develop hydroelectricity dams and invest in grid improvements. However, tariff policy was again broached this year, as water levels are again low in Toktogul dam and blackouts this winter are imminent. In this context, it is hard to imagine Kyrgyzstan halting dam construction plans.

This discussion demonstrates the many ways water is seen and valued by people living in the region, beyond water as ‘an emerging threat’. Threat rhetoric has political meaning and is used by governments to mobilize citizens. Therefore, the U.S. Government should be cautious when using threat and risk language in our search to understand potential water problems and in our approach to assisting with these issues, as this could contribute to an at times difficult dialogue between Central Asia states.

Despite what seems like widespread support for hydroelectricity development to address these severe energy needs, dams – especially large ones with high numbers of people displaced – are often the sites of social contestation and major social disruption. The existing major dams in Kyrgyzstan and Tajikistan are respectively Toktogul (the largest reservoir in Central Asia) and Nurek (the highest dam in the world, see image 8). Historically there was contention surrounding the construction of these two large dams, mostly regarding displacement, and plans to build the Rogun may have also been a factor in the Tajik civil war. In Kyrgyzstan, most of the dams currently under construction or planned will not displace large numbers of communities and residents (although there still may be contentious issues in those communities affected or due to loss of communal pasture lands), but the Rogun dam is estimated to displace more than 40,000 people and is more unpopular than Kyrgyzstan’s dams where there is little criticism.

Both countries have embarked on public relations campaigns to paint these hydroelectric development projects as fundamentally crucial nation-building endeavors, identifying environmental and energy security and regional independence goals. For Tajikistan it seems that the current campaign to show Rogun in this light is important for garnering adequate popular support for a project that will potentially negatively impact so many. So nationalistic rhetoric by the leaders of both countries – in Kyrgyzstan this rhetoric about the Naryn river dams spans several administrations – is used to mobilize internal support but contributes to regional tensions by signaling the domestic political importance of these projects regardless of other countries’ concerns.

In response to some of these pressures and to attract international financing, the government of Tajikistan asked the World Bank to conduct an impact assessment of the Rogun dam, which was completed in September 2014. The report concluded that this is a technically feasible project, and identified the need for better population relocation plans, limiting downstream impacts during the reservoir filling period, and managing seasonal releases of water to minimize disruption to available flows and to ensure flooding is managed (this is a concern for Kazakhstan along the Syr-Dar’ya – see image 9 of flooding along that river basin in 2004). There is ambiguity in the regional water sharing system and treaties, with no clear language about seasonal transfers and annual flow allocations determined in semi-annual meetings, so clarity is needed about how Rogun will be operated, or tensions will remain and perhaps increase during dam construction until the filling period begins and flow changes become evident. Another point of contention is about the CASA-1000 project to export electricity from Kyrgyzstan and Tajikistan to Afghanistan and Pakistan. Uzbekistan opposes this project as it arguably depends on construction of the Naryn dams and Rogun for adequate electricity production to export.

### **Limitations of Regional Water Institutions**

Regional water institutions in Central Asia are elaborate, but they are widely regarded as weak and based on vague treaties determined by Soviet era considerations. These institutions work at the Aral basin regional level, rather than one for each major river basin. The International Crisis Group (ICG) recently suggested improving the institutional framework by creating multiple bilateral agreements instead of the current dysfunctional set of multilateral agreements. Kazakhstan and China recently created regional waterway institutions to help resolve water sharing and pollution concerns, yet the

substantive outcomes are still to be seen. One somewhat successful example of a cooperative water sharing body was the Chui-Talas Rivers Commission between Kazakhstan and Kyrgyzstan. This commission facilitated resolution of a number of issues, including payments for upkeep of water supply and storage infrastructure on the Kyrgyzstani side and improved monitoring for water forecasts. However, this relationship was tested in 2010 when Kyrgyzstan closed off canals into Kazakhstan during the growing season in the summer. Kazakhstan had closed the borders following violence in Osh, Kyrgyzstan in June 2010, and it seems the stoppage of water flow was a response; Kazakhstan immediately re-opened the borders. This is a dangerous example of water used as a weapon. It does not mean conflict potential has gone up markedly, but it does reveal the limitations of regional institutions.

### **Water Pollution Concerns**

Often forgotten in discussion of scarcity or distribution are issues of water pollution, which create immediate impacts on residents relying on these sources but also interact with reduced supply to effectively create more scarcity, where water becomes unusable. Non-point water pollution problems include inadequate sanitation and agricultural chemical and sediment runoff, including high concentrations of DDT. Industrial, point-source pollutants include aging Soviet-era industrial facilities like the Khaidarkan mercury plant (the last exporting mercury mine in the world) in Kadamjay, southern Kyrgyzstan and the TALCO (Tajik Aluminum Company) aluminum factory in Tursunzoda, Tajikistan. There are numerous radioactive uranium tailings and waste sites throughout the region – such as Mailuu-Suu and Min-Kush, Kyrgyzstan in the Naryn River basin – and oil pollution around the Caspian Sea, such as in the Karachaganak oil field, Kazakhstan and Turkmenbashi Bay, Turkmenistan. Pollution concerns - combined with increased extraction for a growing population and expanded cotton production - are central to the Kazakhstan-China relationship in the Ili and Irtysh rivers (the largest and most contentious among the 20 transboundary rivers between them, see map 2), as industrial development rapidly grows in China's Xinjiang Province (see image 10).

### **Emerging Concerns – Glacier Decline & Permafrost Changes**

Much like in California, water planners in Central Asia have long been concerned with the implications of climate change for this glacier-dependent (glacio-nival) regional hydrological regime. Projections of decreases in Tien Shan Mountain glacier surface areas and volume over the next few decades means the region would shift from this hydrological regime to a pluvio-nival one, which is precipitation dependent. This means greater variation in water levels between seasons and between years. The Intergovernmental Panel on Climate Change (IPCC) prediction for Central Asia by 2050 is a 4-8% increase in winter precipitation and decrease in summer precipitation by 4-7%. There are ways of adapting to this slow-moving process, but this requires significant international support. The latest IPCC report identified a more immediate hazard of breach potential for moraine-dammed glacial lakes – such as Lake Petrov in Kyrgyzstan and a number of naturally dammed lakes in the Pamir mountains, Tajikistan.

Another consideration for the Tien Shan mountains that comes out of the most recent IPCC report is impact of climate change on melting permafrost, which is now expected sooner than previously predicted. The location of Kyrgyzstan's Kumtor gold mine in a glacial zone in the Ak Shirak range of the Tien Shan mountains – it is the only mine in the world operating on active glaciers, including mining the glaciers – connects with both glacier decline but also waste management with risk for water quality. The Kumtor tailing pond is situated between Lake Petrov and the Kumtor River, a tributary of the Naryn River. The unlined tailing pit holds more than 34 million m<sup>3</sup> of wastewater and tailings from the cyanide leachate and other chemicals used to process gold at Kumtor and relies on underlying permafrost for continuous, permanent, impermeable containment. Therefore, changes in the permafrost underneath

this extensive tailing pit at the headwaters to the Naryn river and breach threats to Lake Petrov above the tailing pond are concerns that should be monitored.

### **Policy Implications: What should the U.S. Government be doing?**

The policy implications of the water security situation in Central Asia are five-fold, ranging from broad considerations to specific intervention opportunities. First, given the tight relationship between water and energy, regional disputes related to the distribution of both, and the problem of energy insecurity at the household level, it is most important to provide strong support for investment in and expansion of renewable energy sources and off-grid household energy systems. Examples include micro-hydro, solar, wind power, and geothermal energy source developments. It is also possible to invest in the technological development of these sectors in the region, which would provide longer-term benefits than short-term pilot or small-scale projects, and in national grid expansion and improvements. In light of the political, social, and environmental problems of both fossil fuel and hydroelectric development, renewables is the energy sector which the international community and the U.S. government should seek to expand.

Second, one of the key points of tension for countries in the region is predicting water flows, glacial decline, and permafrost changes. Supporting scientific glaciology and hydrology research and monitoring in Central Asia would be a valuable, lasting contribution to a once vibrant sector that is now drastically underfunded. In Kyrgyzstan and Tajikistan, the need is particularly acute for glacier monitoring instrumentation, which would be useful for all Aral Sea basin states. There are currently some efforts to assist and support in improving this instrumentation and regular monitoring. One example is the German funded Regional Research Network "Central Asian Water" CAWa, which works in partnership with the University of Idaho. Another is the World Bank Central Asia Hydrometeorology Modernization Program (CAHMP). However, scientific research needs to be funded to a greater extent and continuously. This is a funding area that would provide regional benefit in predictability and information transparency.

Third, water pollution is often missed in discussions of conflict, but it is fundamental to tackle everyday problems residents face and consequentially is valuable for maintaining political stability. The U.S. Government could increase significantly its contributions to international efforts to aid in sanitation improvements and tackle other pernicious pollution problems, providing greater support to local and international organizations involved in this effort, such as the Central Asian Alliance for Water. USG funding to help address the uranium tailings legacy would be positively received by multiple countries, upstream and downstream, and if done carefully and in the long-term, would be welcomed by affected communities. Support for tackling these pollution problems would contribute to water supply improvements and help address serious health impacts.

Fourth, one of the most important roles that the U.S. Government has played over the last few decades has been funding for US scholars studying the region. The continuation of support is necessary for understanding emerging issues in Central Asia such as water security concerns we are discussing today. I sit before you as a product of multiple research grants through Title VIII funding organizations such as ACCELS/American Councils, IREX, and NCEEER. Without continuous support for research, the ability of this committee to understand the region will be affected and limited. Removing this link between our community of scholars and the community of scholars and residents in the countries we study would be shortsighted. I encourage continued support for these research funds as a tangible U.S. government involvement in Central Asia that produces observable results and positive transnational relationships. Similarly, support for educational institutions and programs in the region, such as the American University of Central Asia, where I taught in 2001, is a similarly vital contribution.

Fifth, some of the main fears among people and planners in the region about climate change relate to glacial decline. Thus, one of the most important ways the U.S. Government could help mitigate future water supply problems in Central Asia is to begin tackling this problem. The U.S. Congress should recognize the important role of climate change in creating ecological problems for human communities around the world, particularly in vulnerable places currently less economically capable of adapting to these shifts, like many rural areas in Central Asia. Some of those changes are already discernible, and the patterns identified as probably or likely – such as glacier loss – will have clear impacts on water distribution in the region. Recognizing this important role means seeking to tackle the overall issue of climate change by reducing the U.S. contribution to greenhouse gases over the next dozen years and decades, as well as targeting aid in Central Asia to mitigation and adaptation efforts.

Thank you, I look forward to your questions.