ECOLOGY

Once a Terminal Case, the North Aral Sea Shows New Signs of Life

A dike supported by the World Bank and repairs along the banks of the Syr Darya River have increased the water level dramatically

ALMATY, KAZAKHSTAN—By the early 1990s, much of the area around the northern end of the Aral Sea had become a salt-encrusted wasteland, desiccated by decades of ill-conceived cotton irrigation. Some ecologists seemed ready to write it off, but the World Bank decided in 1999 to support a rescue mission. Among other measures, the project created a 13-kilometer dike designed to raise the sea's level and decrease its salinity.

Managers settled in for a long haul, assuming that it would take up to 10 years for the water to rise 3 meters and cover 800 square kilometers of dry seabed (*Science*, 18 February 2005, p. 1032). They were wrong. Just 7 months after the dike's completion, the Small Aral Sea has reached the target level, 42 meters above the level of the Baltic Sea. Spare water is already flowing through the spillway—evidence of what may become one of the biggest reversals of an environmental catastrophe in history.

"We are very pleased," says Masood Ahmad, the World Bank project coordinator. Looking back, Ahmad points to several factors that may have sped the project to an early success. All relate to the health of the Syr Darya River in the north, one of Central Asia's two great givers that flow into the Aral Sea and sustain it.

The Syr Darya itself deteriorated in the years following the collapse of the Soviet Union, as barriers along its banks fell into disrepair, lowering the amount of water it could carry safely. Another key problem, according to Ahmad and other specialists, was that Kyrgyzstan took an increasing volume of water during winter to run power turbines. To avoid flooding the eroded infrastructure downstream, this water had to be shunted off into lakes along the river, where it served no useful purpose. During summer, when the water level was naturally low, more water was withdrawn for crop irrigation. The result: Little water reached the sea.

Now, after several years of rehabilitation work on dams, sluices, and barrages along the Syr Darya in Kazakhstan, the river's capacity has been safely doubled to 700 cubic meters per second, which allows nearly all of the water released by Kyrgyzstan to reach the Aral, according to Ahmad. The increased flow may eventually bring enough water to the southern sea to slow the decline there as well, Ahmad says.

Nikolai Aladin of the St. Petersburg Academy of Sciences, a Russian biologist who has been studying the sea for nearly 3 decades, calls it "a paradise in the desert." Even though it's only 10,000 years old and has no endemic species, the sea is exceptionally rich in both biodiversity and biomass, he says. And the Syr Darya River is home to one of the world's rarest sturgeon species, a half-meter-long shovelnose. "The bigger water flow is going to considerably increase the chances for recovery of this evolutionary relic," says sturgeon specialist Phaedra Doukakis of the Pew Institute for Ocean Science. "The way and the speed with which the marine flora and fauna will expand with the water will be very instructive for future rehabilitation projects," says Aladin.

Residents of Aralsk, the Aral Sea's main northern port—built on the shore in the 19th century—also have more than passing interest in sea life. Aralsk once boasted one of the biggest canneries in the Soviet Union. Lenin famously asked Aralsk fishers to send 17 wagons of fish to the front during the Civil War in the 1920s, an event immortalized in a huge mosaic mural in Aralsk's train station.

But starting in the 1960s, the Soviet government promoted the diversion of water from the Syr Darya and the Amu Darya in the south for cotton irrigation, making a calculated bet that cotton was more valuable than fish. By the time the Soviet Union collapsed, the sea had lost 70% of its surface and retreated 80 kilometers from Aralsk, leaving hundreds of rusting ships stranded along the way amid grazing horses and camels. The city's population dropped from 80,000 to 30,000, its airport closed, and its cannery is now an enormous, spindly steel skeleton.

But today, after the sea crept back to within 15 kilometers from Aralsk, the markets are already selling fresh fish at a fraction of the old price, says Marat Turemuratov, a hospital physician. He hopes the change will reduce chronic malnutrition and help abate a tuberculosis epidemic in Aralsk's children.

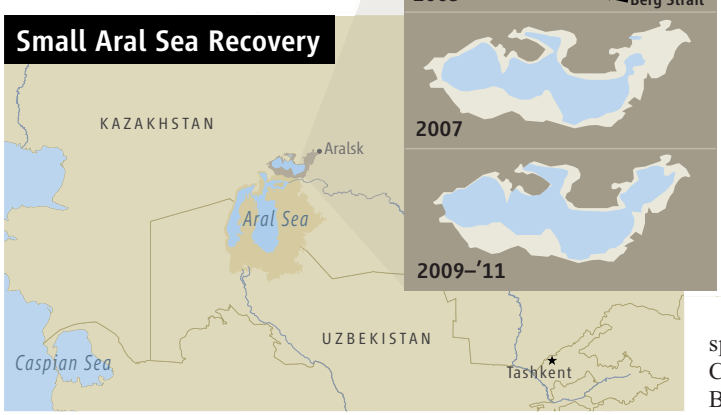
Michael Glanz, an Aral Sea specialist with the U.S. National Center for Atmospheric Research in Boulder, Colorado, calls the North Aral Sea project "a bright spot in a dismal landscape." To the south, however, the Amu Darya River continues to shrink. Civil strife once prevented Afghanistan from drawing water from this river. But now Afghans in the relatively peaceful north are starting to draw from the river for irrigation—and they're planning to draw much more, Glanz says: "Once the Afghans start withdrawing a lot of water, the delta is going to dry up, and people upstream are going to suffer."

Meanwhile, Kazakhstan has become flush with cash from high oil and metals prices. President Nursultan Nazarbayev announced a popular decision to raise the northern sea's level another 4 to 6 meters, senior Kazakh officials say. This would cover another 925 km^2 of dry seabed and bring the northern sea to about two-thirds of its size before desiccation began in the 1960s. It would also bring water back to within a few kilometers of Aralsk.

Just how that is going to be done—by digging upstream canals, raising the dike, or other means—is still being studied, but Kazakhstani officials say they are committed to the project.

–CHRISTOPHER PALA

Christopher Pala is a writer in Hawaii.



Rising tide. After a long decline, the northern part of the Aral Sea may be on the way to recovery.

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