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**POLICY ARTICLE**

# Gila River Water Management

*This Article is Authored by  
AIPi Policy Assistant Mikhail Sundust*

## **The Gila River Indian Community of Arizona is Using Wireless Technology to Conserve Water and Harness the Full Potential of its Canal System**

The Akimel O’otham (Pima) are well-known for their innovation and industriousness when it comes to water management in the desert. Prior to European contact, they – and their Huhugam ancestors before them – constructed hundreds of miles of canals to control water flow and multiply the production capacity of their farmlands. Today, the Gila River Indian Community is building on that legacy, using wireless technology to conserve water and harness the full potential of its canal system.

Home of the Akimel O’otham and Pee Posh (Maricopa) tribes, the Gila River Indian Community is in the process of implementing a state-of-the-art management tool to control water flow through its canal system. It’s called SCADA (supervisory control and data acquisition, pronounced skAy-duh) and the goal is to ensure responsible, efficient use of its water delivery system.

### **Background**

A 1983 record of decision from the U.S. Department of the Interior provided 173,100 acre-feet of Central Arizona Project (CAP) water to the Gila River Indian Community (GRIC); the Community agreed and signed the delivery contract for that water in 1992. This agreement required the Bureau of Reclamation (BOR) to construct a canal system that would ensure users had not just a legal right but also physical access to water. However, GRIC did not want to depend on the BOR to construct the system.

In 1995, the Gila River Indian Community established the Pima-Maricopa Irrigation Project (P-MIP) with instructions to design and construct a single common-use irrigation system that would serve all agricultural water users within the Community. To date, more than 138 miles have been constructed.

The GRIC/P-MIP canal system runs from east to west through the reservation. The system conveys water from nine sources, including Central Arizona Project, the Gila River, Salt River Project, City of Mesa and City of Chandler reclaimed water, the Roosevelt Water Conservation District, Haggard Decree water, and groundwater. CAP water (the largest source at 311,800 acre-feet) enters the system on the east end of the reservation near the village of Blackwater.



P-MIP began installing the SCADA system in 2013. SCADA units are installed at water control structures, gates, turnouts, or other important checkpoints along the system. This system allows the Community to monitor water flow with real-time accuracy and control the rate of flow remotely. There are approximately 50 sites along the system and more will be installed as the system continues to develop.

### **What does SCADA do?**

SCADA saves time and resources. It does this by shortening the time it takes to deliver water downstream and ensuring an accurate amount of water is delivered. Imagine, for example, a farmer near the end of a particular branch of the canal system. Let's say his fields are 36 miles downstream from the start of the canals, he needs a flow rate of 15 cfs (cubic feet per second), and there are 22 water control gates between the headwaters and his farm. Every gate along the way from the point of origin to the point of delivery has to be individually adjusted to ensure the farmer receives adequate water, without affecting the water distribution to other lands.

"In the old days," said P-MIP Director David DeJong, "somebody had to drive and open every gate along the way. Now you don't have to." The SCADA system has cut water delivery time down from days to hours and instead of driving to adjust each checkpoint, it's all done with a few clicks of a computer mouse. Furthermore, the rate of flow is monitored by sensors on the water gates, which provide an accurate recording of how much water is flowing from one section to another at that point. Previously, said DeJong, "somebody went out there, cranked the gate, and said, 'Yeah that's about 50 cfs.'" The tool used to gauge the flow rate was little more than a measuring stick with markings corresponding to estimated flow rates. The new system ensures water is not wasted from underestimating the amount of water passing through each checkpoint.

Ultimately, the Community would like to transition its SCADA system to a model called Total Channel Control (TCC). With TCC, one set of instructions for water delivery at a particular SCADA unit will cause the entire system to respond dynamically and adjust every control point along the path of delivery.

### **GRIC Water Policy Goals**

Everything P-MIP has constructed was done at the direction of policymakers in the Gila River Community Council. "The charge that the Council gave P-MIP in the very beginning," said DeJong, was to construct a system that was extremely efficient and "the highest quality possible [but] at the lowest possible cost." High-tech methods are the natural extension of such policy directives.

"We're on the cutting edge of this kind of technology," said GRIC Gov. Stephen Roe Lewis. "This fits right into our value system of being good caretakers of our water."

The Community's water policy goals are summed up in two main points: 1) decrease its dependence on Colorado River water and 2) build a sustainable supply of water for the future. The Community is avoiding being overly reliant on one source of water, especially CAP water, because "the Colorado River is stressed," said Lewis. "We're in a drought scenario ... and the water is over-allocated." In terms of sustainability, said Gov. Lewis, the Gila River Indian Community hopes to build its water reserves to, "help our Gila River Farms, our small farmers, and a new generation of farmers."

The Gila River Indian Community has also identified ways to be a good neighbor in the Arizona water system. For one, it stores some of its allocation of CAP water in Lake Mead to help prevent the reservoir from reaching critical levels. Additionally, the Community has installed a number of

Managed Aquifer Recharge (MAR) sites. MAR sites are innovative, multi-faceted conservation assets. First of all, they make use of GRIC-allocated water to help the Community avoid “use-it-or-lose-it” situations. Second, they strategically place water in natural settings to replenish indigenous flora and rehabilitate areas for wildlife. Finally, they restore and rehabilitate natural aquifers below the surface.

As an added benefit, “[there are] opportunities, through state law, where we can store water in those MARs where we can get credit for that as well,” said Gov. Lewis. “Other outside entities are actually storing [their] water in our aquifers. We’re getting credit for that and the water stays there and keeps our aquifers healthy.”

Planning for the future is an essential job for any community leader. Gov. Lewis views Gila River as “not just a leading advocate [for conservation], but also a moral authority. We have to make sure that we protect water, we don’t overuse it, and we don’t waste it.”

### **Additional Efforts**

The SCADA system is only one tool GRIC is using to improve water management. For decades, P-MIP has been busy transforming the old earthen system into one with modern, cost-efficient, concrete-lined canals. Most unlined canals can lose 30 to 40 percent of the water in them. Lined canals lose only about five percent, mostly due to evaporation. “So every canal that we’re lining,” said DeJong, “in essence, increases the water supply.”

Finally, the Community has developed and is implementing a Comprehensive Water Management Plan (CWMP) to accurately account for all incoming and outgoing water flows. “[The CWMP] looks at all these inputs, all these outputs, and then it helps us understand what’s happening below the surface,” said DeJong. The goal of the CWMP is to “protect the quantity and quality of Community land and water resources to ensure sustainable use for future generations.”

### **Conclusion**

Water is precious in the desert. The Gila River Indian Community is working hard to manage its water in the most responsible and efficient manner possible. Its goals are independence, conservation, and sustainability. All of the efforts described above – the SCADA system, concrete lining, and the CWMP – ensure that the Gila River Indian Community manages its water efficiently and responsibly. In this way, the Gila River Indian Community ensures prosperity for its future generations and remains a good neighbor in the Arizona water system and the Lower Colorado River Basin overall.

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*The Gila River Indian Community is located on 580 square miles in central Arizona, south of and adjacent to the Phoenix metropolitan area. It is home to the Akimel O’otham (Pima) and Pee Posh (Maricopa) people. It is home to more than 12,000 Tribal members and its enrollment is greater than 21,000. For more information about the Community, [click here to visit www.gilariver.org](http://www.gilariver.org).*

For more information contact:

**ASU** American Indian  
Policy Institute  
Arizona State University

Arizona State University  
American Indian Policy Institute  
College of Liberal Arts & Sciences  
PO Box 872603  
Tempe, AZ 85287-2603  
<https://aiji.clas.asu.edu/>

Phone: 480-965-1055 / Fax: 480-965-6404