# Waterway Monitoring

Many rivers and streams all over the US are monitored for flow, temperature and level. The information is used by multiple agencies in each state. Some rivers are subject to daily water release for recreation purposes. Many businesses are reliant on the rivers and streams. Early indications of flow conditions help preparations for extreme conditions of high and low levels. The Endangered Species Act and an increased focus on water resource management are among the forces driving more monitoring. Cutting costs of monitoring is paramount. Measurement systems were mostly manual not so long ago (see inset). The cost of maintaining manual methods is prohibitive to taxpayers. Bringing water-way monitoring systems into the 21st century provides cost savings and the ability to predict outcomes well in advance.
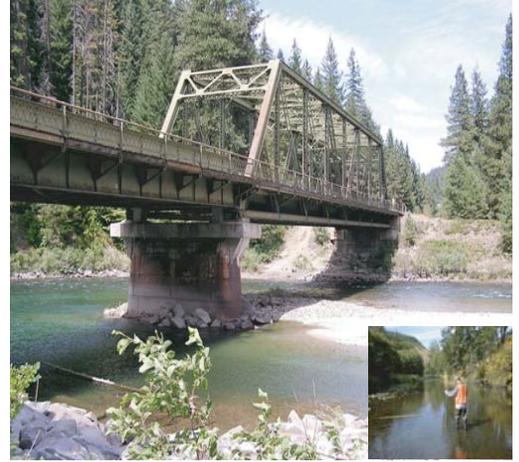
The solution is to put in place a system to do the following:

1. Monitor the temperature and flow rate of the water.
2. Monitor the water level and warn if the level is too high or too low (set points).
3. Wirelessly report current temperatures, flow rates, water levels and alarms back to a central display station in the resource management department where they are logged and trended.

The solution is to use ioSelect Airio wireless sensors, the AirioGate and ioPro WDL radios to gather flow, temperature and level information at strategic positions and relay the information to central databases. At the remote sites the system was designed to read temperature values from an IRCON non-contact temperature sensor. The flow is typically measured from a battery powered turbine flowmeter connected to a wireless 4-20 mA transmitter. The level can be measured either from a wireless pressure sensor at the bottom of the river or via an ultrasonic level sensor mounted on a bridge or other permanent structure that spans the river. These units are wirelessly connected to an AirioGate which gathers and transmits the data through as many ioPro WDL radios as necessary to get to the Master station which typically has a graphical operator interface terminal that logs the regional data, displays on screen trends, and allows PC access for data archive and further analysis.

Reliable wireless communications is a key requirement, since this system is a retrofit in any existing facility. The cost of running wire is prohibitive in many locations. The ioPro WDL robust 1 Watt, 900 MHz Frequency Hopping Spread Spectrum (FHSS) radio communications link is immune to electrically noisy facilities and provides reliable communications between the remote units and the master. It can also be deployed as a repeater in environments where required.