

# FLOW FOR THE FUTURE

*Chinese officials take action, through water level data, with early warning and flood prevention.*

## Millions Lost in Flood

In 1931, among the plains of Southeastern China, the Yangtze River water level peaked due to torrential rains, flooding nearly 500 square miles of the surrounding area. This historic, devastating flood killed 3.7 million people. Farm land and rice fields were swamped, destroying a major food source for citizens in surrounding cities. As a result, many suffered from starvation and disease.

**The flood was arguably the worst natural disaster in over a century.**

## Dam Proposed For Protection

Sun Yat-sen, founder of the Republic of China, proposed a Dam in 1919 to protect the river communities.

Though construction on the Dam was not yet started, it became a controversial topic among many. Environmentalists cautioned that the Dam would take a toll on the surrounding ecosystem and provide future problems. Planning and implementation of the project was stopped by government officials during the Chinese Civil War in 1947.

In years to follow, extensive flooding continued to occur along the Yangtze river, causing more death and costing billions of dollars in damages.

In the 1980's, the idea of the Dam resurfaced. The Dam and reservoir design would protect residents from flood conditions, provide fresh water for agricultural use, and be a source to generate electricity without greenhouse gas emissions. After much debate, construction started in 1994 on what is now known as the world's largest hydroelectric dam, spanning 1.4 miles (2.3 kilometers) long and 607 feet (185 meters) tall—The Three Gorges.



*Davies, Richard. Central China Floods 1931*



*The Three Gorges Dam, one of the world's largest, on the Yangtze River, Hubei province, China.*

## Facing Drought - Nearly 100 Water Monitoring Sites Installed

Years later, in 2011, the environmentalists' nightmare came true. Southern China was facing the worst drought China had seen in 50 years.

The Dam faced criticism from environmentalists, who blamed the Dam for causing the drought by storing water upstream for power generation. Critics argued that the annual filling of the Three Gorges Reservoir caused plummeting water levels downstream, resulting in two of China's largest freshwater lakes, Poyang and Dongting, to diminish.

Regardless of the droughts cause, Chinese officials took action—installing nearly 100 water monitoring sites along the Yangtze River.

Continuous, water quantity monitoring sensors installed at these sites provide important information to help manage the drought, provide early warning for future flooding, and assist in power generation at the Dam. A H-3553T bubbler from YSI, a Xylem brand was installed to gather stage and flow measurements that help officials accurately monitor the water level of the river, above and below the Dam.

### Water Level Data is Vital

It is important to monitor the water levels above and below the Dam for a number of reasons—a few being public safety, environmental impact, and generation of electricity.

"The sensors from the monitoring sites provide key data to help the Three Gorges Cascaded Dispatch Center and Changjiang Water Resources Commission," states Roger Zhou, Xylem Analytics representative. "The Changjiang Water Resources Commission, can then build a regional water flow model, which is used for power generation estimation and to calculate storage capacity of the Dam".



One of many monitoring stations built along the Yangtze

The reservoir is said to be able to hold water at a maximum height of 574 feet (175 meters). Officials analyze the monitoring data to determine if they need to discharge water to prevent flooding upstream.

In addition to the risk of flooding upstream, data is also used to prevent downstream flooding.

"If the reservoir is filled, there is no room to catch and hold water if there is a flood," explains YSI Water Level Division Product Manager, Tim Jeppsen. "If a big storm is coming they need to know if there is capacity in the reservoir to hold water so the area below the dam is not flooded".

### Managing for Millions

The water level data is also used to assist in the balancing act of providing water both above and below the Dam. Holding the water upstream, when it is needed downstream can have a negative environmental impact downstream—causing drought conditions which can in-turn affect farmers and water transportation.

"The monitoring data also help officials to redirect the water to cities where residents are experiencing shortages downstream," adds Jeppsen. "Managing the water level data directly affects the lives of citizens both upstream and downstream from the Three Gorges Dam".



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