

Application Note

Largest River Island in the United States Manages Flood Control with In-Situ® System

Level TROLL® controller, and telemetry system monitor water levels and activate pumps

January 2012

Introduction

Some of the most fertile agricultural lands in the United States are found in the Willamette Valley of Oregon. Sauvie Island, the largest river island in the United States, lies approximately 10 miles (16 km) northwest of downtown Portland. The Columbia River flows along the east, the Multnomah Channel lies to the west, and the Willamette River to the south. The 26,000-acre (105 km²) island provides rich farmland and a refuge for wildlife.

The Sauvie Island Drainage Improvement Company was created to maintain and manage the flood control works built by the U.S. Army Corps of Engineers (USACE) in the 1940s. Originally created as a Drainage District, the company reorganized as an Oregon non-profit corporation in 1995. The Company is supported through assessments on land owner's property within the boundaries of the District.

Water level management a necessity

The island's elevation is below the Willamette and Columbia Rivers. In order to maintain arable land, over 30 miles of canals drain the island to a low point. A pump station, built in 1941 by the USACE, pumps water over a levee and into the Willamette River. Pumps installed in the 1940s are still operating. Depending on river elevation and seasonal requirements for farmers, up to four pumps can be run to lower water levels behind the levee.

Until recently, the district manager, Tim Couch, monitored water levels by checking a staff gage or rowing a boat across the drainage pond to retrieve a logging instrument that was not connected to a controller, and not able to communicate remotely. When the time came to remove water from the island,



Tim Couch, district manager for the Sauvie Island Drainage Improvement Company, checks forebay water levels displayed on the In-Situ Con TROLL PRO System.

Couch manually turned on pumps. Typically, Couch runs the pumps seven months each year.

“For example, when fall comes and farmers are harvesting, we pump water out of the canals so that the land dries out for easier harvesting,” Couch explained. “During the growing season, water levels are higher so that farmers can irrigate crops. In the summer, canal water levels are maintained at about 5 to 6 feet (1.5 to 1.8 m) and in the fall, 3 to 4 feet (0.9 to 1.2 m).”

Energy costs spur change

“When I was manually monitoring water levels and running the pumps, we'd often run pumps longer than necessary to ensure that water levels were lowered properly,” Couch said.

But with rising energy costs, this method lacked the efficiencies that automation could provide. So the Sauvie Island Drainage Improvement Company worked with engineers to develop a solution that would reduce energy consumption. Engineers determined that a water level data logger and a controller could be used to automate pumping. A grant from the Energy Trust of Oregon helped to pay for new equipment.

“The engineering company estimates that we’ll save \$4,000 per year in energy costs,” Couch said. “So we installed In-Situ® Inc.’s Level TROLL® 300, Con TROLL® PRO System, and a TROLL® Link Telemetry System. By reducing energy expenses, we’ll be able to pay for the system within one year.”



Sauvie Island Drainage pump station

System improves efficiency

Couch installed an In-Situ Level TROLL 300 Instrument into a stilling well 20 feet (6 m) below the pump station. The Level TROLL 300 is wired into the Con TROLL PRO System, which is mounted in the pump house. Couch has programmed the Level TROLL 300 to log data at regular intervals, which allows him to accurately track water levels throughout the year. Depending on the water level that needs to be maintained in drainage canals, the Level TROLL 300 can trigger the Con TROLL PRO System to turn pumps on and off as necessary.



The Level TROLL 300 Instrument continuously monitors water levels and can trigger the Con TROLL PRO System to turn pumps on and off as necessary.

One high-voltage relay in the Con TROLL PRO System is used to turn pumps on and off when water levels reach a user-defined set point. And the other high-voltage relay runs a vacuum system. Though extremely durable, the old pumps require a vacuum system for priming so that they can lift water 31 feet over the levee.

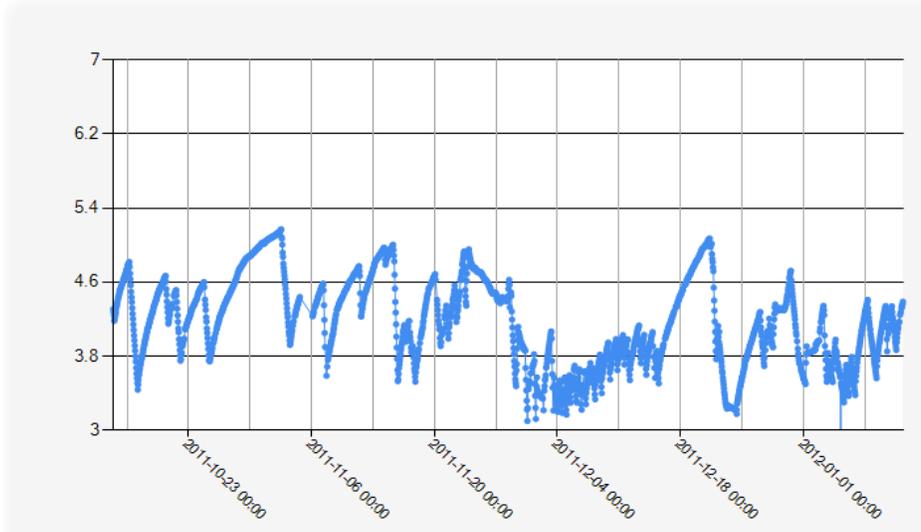
All of the In-Situ equipment is connected to a TROLL Link Telemetry System. Couch can check on the pump station and monitor system status from any location with Internet access. In addition, the telemetry system can send text messages or emails or make phone calls if something needs attention.

“Even while on vacation halfway around the world, I could monitor water levels and pump system status in real time,” Couch said. “This system really gives me peace of mind.”

LT300 Corrected Level

Report Time: 90 Days

Switch to: Data View Graph Range View



Tim Couch can check on the pump station and monitor system status from any location with Internet access to the In-Situ Data Center. This chart shows surface elevation data reported by the Level TROLL 300 Instrument for a 90-day period.

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In addition, the pumps are too old to work with variable-frequency drives (VFDs), but the In-Situ® system will allow for similar results. The use of VFDs reduces power consumption and wear on equipment.

“Now that the In-Situ system has automated pumping, we anticipate saving a lot of energy just by increasing the efficiency of our pumps,” Couch said. “Plus, we’ll reduce labor costs as we only need one person to monitor the pump house instead of two.”



View of the forebay outside of the pump station.

Island residents rewarded

By installing the In-Situ system, farmers and wildlife will benefit from better water management. By pumping only when necessary and by reducing pumping times, riparian areas aren’t subjected to dramatic water level changes. This helps to maintain a natural environment for animals and plants living in the wildlife refuge. In addition, district members will reduce energy consumption and cut costs every year going forward. For this island oasis, the results of automation are greening up an already lush landscape.



Fertile farmlands of Sauvie Island. Photo courtesy of Mathew Dodson.



For more information, contact In-Situ Inc.

221 East Lincoln Avenue, Fort Collins, CO 80524

1-800-446-7488 (toll-free in U.S. & Canada)

1-970-498-1500 (international & domestic)

www.in-situ.com

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