SUCCESS STORY

Saving the Everglades — 14 Billion Gallons at a Time

Challenge

Agricultural runoff disrupts native animals and plants in the 607,028-hectare (1.5 million-acre) Everglades National Park in Florida. Federal and state governments have large-scale projects underway to reverse the damaging effects of polluted water and restore the delicate balance of fresh and saltwater in lagoons and estuaries. The effort requires massively powerful and reliable equipment capable of pumping billions of liters/gallons of water every day.

Solution

Flowserve provided 25 vertical pumps, with impellers from 2,438 to 3,226 mm (96 to 127 in) in diameter, to move an estimated 64 billion liters (14 billion gallons) of water per day into filter marshes. The pumps have remained in service without interruption after more than 20 years. Flowserve recently supplied four 1,981 mm (78 in) pumps for a separate project that will lift 3.2 billion liters (710 million gallons) of nutrient-enriched water per day into a pre-treatment reservoir.

Restoring a national treasure

The Indian River Lagoon-South and St. Lucie Estuary in Martin and St. Lucie Counties in Florida are two of the country's most threatened water bodies, according to the U.S. Army Corps of Engineers. The lagoon and estuary have sustained altered flow patterns and degraded water quality. Neighborhoods and farms around the 827-square mile watershed along with outdated stormwater management systems and fertilizer-laden runoff have caused freshwater and pollutants to enter the Everglades waterways.

Moreover, excessive rains require additional freshwater releases from Lake Okeechobee to safely control the level of water behind a series of levies. These releases, combined with large volumes of stormwater runoff, introduce contaminants and alter salinity levels throughout the Everglades. This stresses the sensitive ecosystem of the estuary and lagoon, which are home to more than 4,300 species of plants and animals and supports an annual economic contribution of more than US$730 million.

C-44 reservoir

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Our part: Supplying 25 massive pumps

Flowserve has supported the Indian River Lagoon-South (IRL-S) Restoration Project — the largest environmental restoration project in the world.

From 1998 to 2000, Flowserve supplied 25 VCT vertical pumps, which were installed in six pumping stations. Together, they move 64 billion liters (14 billion gallons) of water per day into a filter marsh to improve the water quality of the Everglades.

The pumps have formed suction inlets, an Army Corps of Engineers Type 10 design, that only require minimum submergence of the pump. The Flowserve VCT pumps have impellers ranging in size from 2,438 to 3,226 mm (96 to 127 in) in diameter; the biggest units pump 189,000 liters per minute (415,000 gpm).

First regular maintenance after 20+ years

The original 25 pumps provided by Flowserve included impellers, casings, diffusers and other components constructed of 316L stainless steel. Their durable design enabled the pumps to operate uninterrupted since commissioning.

In 2020, the South Florida Water Management District (SFWMD) awarded Flowserve a contract to replace composite bearings and sleeves and perform other regular maintenance on four of the original vertical pumps. Three have been removed and repaired at the Flowserve Quick Response Center (QRC) in Pasadena, Texas, where an SFWMD maintenance supervisor reported that the units appeared to be in excellent condition after operating continuously for more than 20 years.

More help to restore the Everglades

Based on the success of the initial restoration project phase, and because of Flowserve's ability to reliably meet all performance and cost requirements, the SFWMD awarded Flowserve a contract to supply four additional VCT pumps. This equipment, commissioned in 2020, moves 3.2 billion liters per day (710 million of gallons per day) from the St. Lucie River to the C-44 reservoir nearby.

In addition to four main pumps, each pumping station housing these VCT pumps includes a SIHI® LEHR 560 duplex vacuum pump from Flowserve for priming.

During periods of heavy rain, water is stored in the reservoir and later released into a stormwater treatment area. By traveling through a 1,376-hectare (3,400-acre), 4.88-m (16-ft) deep reservoir and the 2,550 hectares (6,300 acres) of the stormwater treatment area, dirty water traverses constructed wetlands for sedimentation and nutrient reduction. Removing nutrients will help eliminate a blue algae problem that occurs when the phosphorous-enriched water caused by fertilizer runoff is sent down the canals and rivers.

Flowserve vertical 57 VCT pump

C-44 S-401 pumping station

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Delivering the ‘best value’ in Florida

The delicate balance of fresh and salt water in the lagoons and estuaries of the Florida Everglades will be restored, polluted water will be treated, and degraded habitats will be revitalized, according to the Army Corps of Engineers. Twenty-nine large vertical pumps from Flowserve will continue to reliably perform the critical role of moving billions of liters/gallons of water through a restoration system covering thousands of hectares/acres of wetlands and reservoirs and along hundreds of kilometers/miles of canals.

The SFWMD awarded successive contracts to Flowserve based upon our recognized technical expertise in the design and manufacture of massive, vertical pumps. While federal, state and local governments often are required to award bids based on the lowest price, Flowserve was selected because we offer the “best value” combination of pump durability, service warranty and technical support throughout the 20- to 30-year lives of the pumps.

Flowserve also assumed system responsibility for the complete drive train. We designed, purchased and implemented diesel engines and gears to work with the pumps as an integrated system. This approach provided the SFWMD with a single contact to resolve any issues during commissioning. Plus, Flowserve engineered the pump stations to operate efficiently while minimizing total cost of ownership (TCO). And, to ensure commissioning was completed on time and within budget, a Flowserve field service specialist relocated to Florida to work alongside the SFWMD team and contractors during installation and startup.

For more information about Flowserve VCT circulating pumps and other Flowserve pumps, please go to:
https://www.flowserve.com/en

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