

Mind over Water: An Innovative and Scalable Water Recapture System

Bizon Nursery Company Case Study

Founded in 1979, Bizon Nursery is a provider of high quality field and containerized plant material. What started as a small nursery offshoot for three brothers has grown to 450 acres of field production, 60 acres of container production, and a retail division. One of the challenges faced during decades of expansion was creating an irrigation infrastructure that could expand with the business. This article focuses on an innovative solution Steve Bizon created for the nursery container operation; it is a flexible and easily expandable underground water recapture and storage system which currently provides up to 1,200 gallons per minute using a 30 gallon per minute pump.

It has been said that necessity is the mother of invention, and if that's true, then the parents of this innovation were budget and expansion capability. Ponds used to hold irrigation water are expensive to build and maintain, inefficient due to evaporation, and they aren't easily expanded for future production needs. The Bizon's needed a better way. Steve Bizon: "There comes a time in a persons career when the things they've experienced and the problems they've banged their heads on for years all of the sudden become an epiphany that lead them to a solution, and for me that epiphany was this underground water recapture and storage system."

The storage system is analogous to a spider's web, where one central collection point is fed with interconnected channels. A 12 ft. cylindrical culvert (on end) 25 ft. deep acts as the central collection point. Into this culvert feed two 5 ft. diameter underground pipes that span the entire 60 acres, and one pipe feeding water in from a well. The culvert and the large 5 ft. pipes act as the main water storage structure, but the web builds from there with 8-inch pipes running every 100 ft. underneath the entire container yard operation. These 8-inch pipes capture irrigation and rain water runoff, which then goes toward re-filling the culvert and 5 ft. pipes. When irrigation is not needed – which in Oregon is several months of the year - the water is drained away by gravity. The entire system – this web of pipes and culvert – act as the underground water storage system that when full holds about 300,000 gallons of water.

There is enough water storage in this system to run a 1,200-gallon per minute irrigation operation for 12 hours with additional water being fed from the well with one small 30 HP pump. Water is drawn down as the nursery is irrigated, but the pump runs to refill the system during irrigation and through the night. In addition, water is recaptured and routed back into the culvert and 5 ft. pipes. So even though the water levels in the storage system diminish when the container yard is irrigated, the system is never fully depleted and by the next day is full again.

“The benefits of this system go beyond the reduced energy use we experience from needing only one small pump to re-fill the storage system. There are other operational benefits: no pond means no pond maintenance, or recycle pump, or evaporation, or space for that structure so we have more land on which to grow nursery stock. In addition to this, photosynthetic algae are eliminated since the water is stored underground which eliminates some treatment requirements. The system is also easily expanded; we recently ran underground pipe to our retail operation with no additional well pumping needs. Moreover, the underground pipe expansion into that operation provides even more water storage needs for irrigation – it’s a classic win-win.”

Water is the key ingredient for life on earth and arguably our most precious natural resource. The world’s fresh water resources supply the water necessary for drinking, recreation, industry, agriculture, and fish and wildlife. Worldwide, 70 percent of fresh water is used for agriculture, and irrigated agriculture is expected to account for increasing demand over the next 40 years. Energy also plays a vital role in our society and in every nursery operation.

“Water is the driving force of all nature.”

- Leonardo da Vinci

Energy prices have increased significantly over the past decade; at times that increase has been steady, and at times the fluctuations have been severe due to natural disasters and global uncertainties. A single 200 HP pump that is run at full load can consume as much as \$70,000 worth of electricity a year.

An innovative and efficient system such as the one the Bizons created reduces energy consumption, reduces the use of chemicals to treat the water while increasing the percentage of land used for growing and increasing the amount of water storage flexibly as the system itself grows. By implementing an underground water recapture and storage system, they are utilizing resources more efficiently, and setting the stage for a more profitable future.