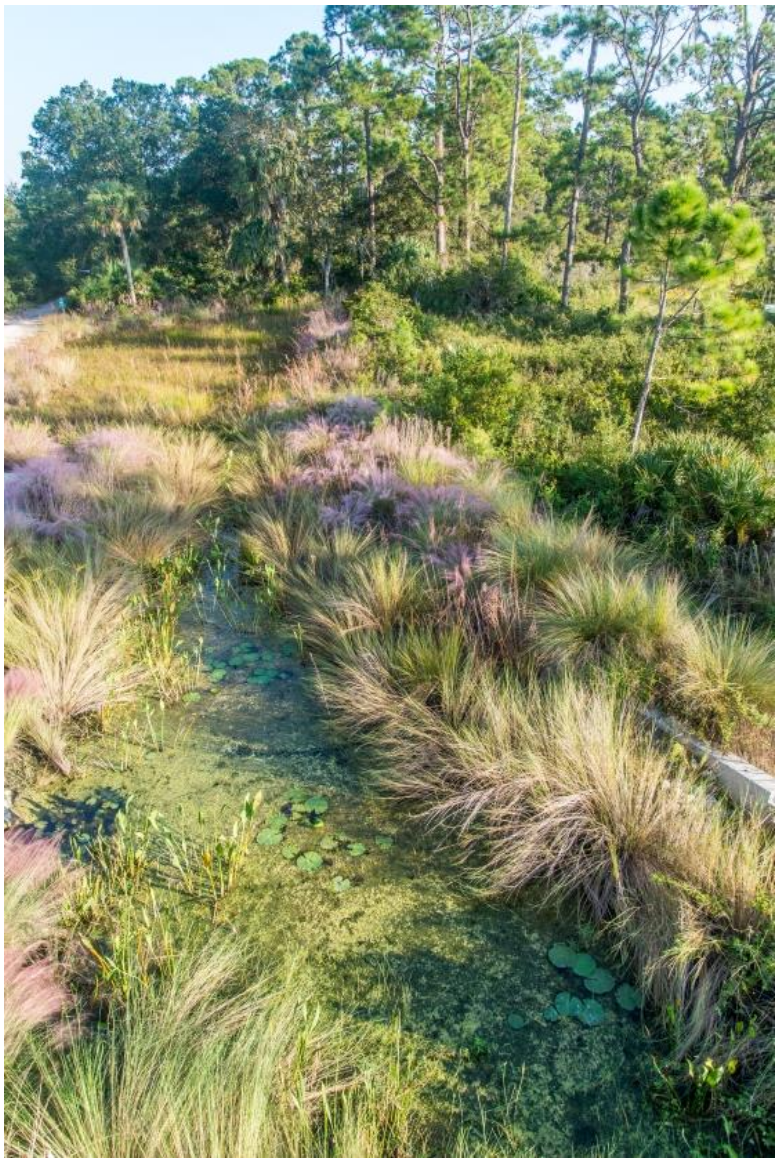
Water, water everywhere – 2018

During the winter and spring of 2017-2018, Archbold Biological Station's property was completely dried out. The dry and hot spring weather turned seasonal wetlands into beds of dried grass, soaked soils into flaky crusts, and green and springy vegetation into crunchy and dry fuel. One of the quotes at the entrance of Archbold's Frances Archbold Hufty Learning Center is by Benjamin Franklin: "When the well's dry, we know the worth of water." And indeed, now that the summer rains have arrived, starting with a record breaking amount of rainfall in May 2018, Archbold is well-equipped to care for every drop of water that comes its way. Water is essential to all life, after all.

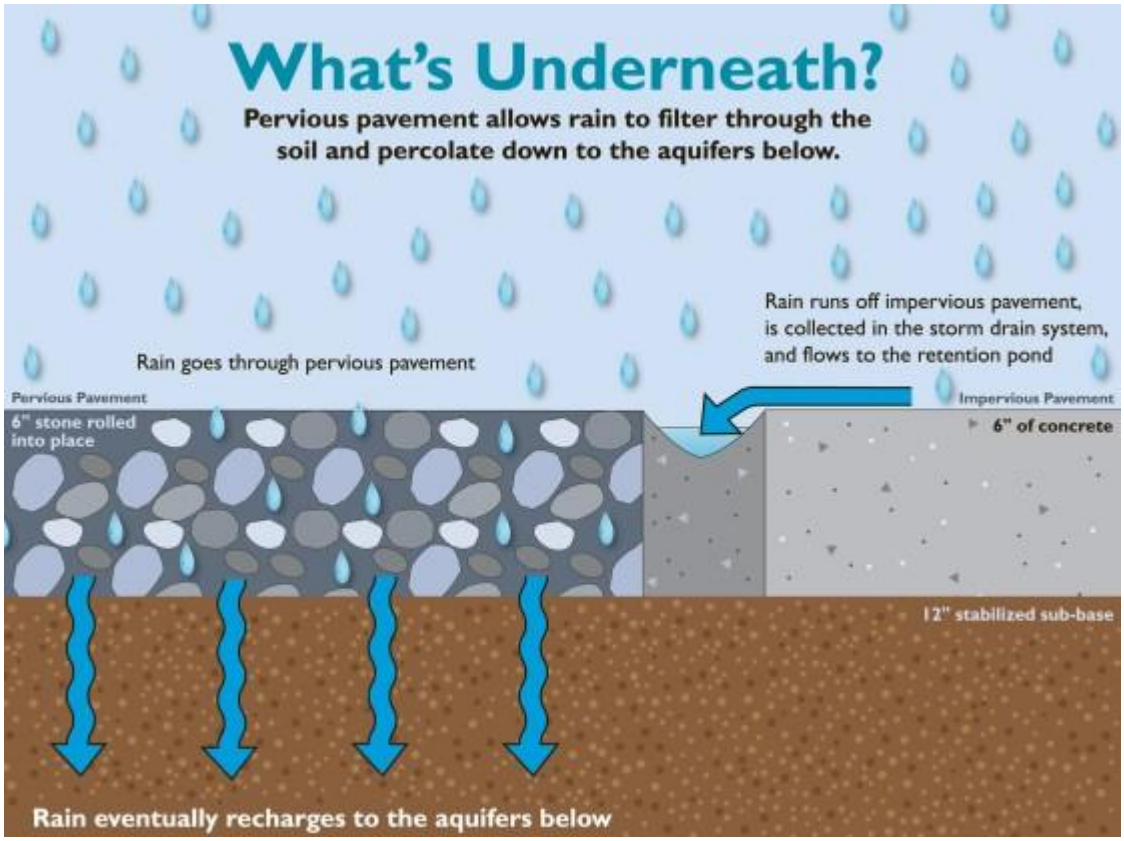


Retention ponds, like the one pictured here at Archbold Biological Station, help reduce the amount of water flowing off a site and allow pollutants to be absorbed by plants or to settle out. Photo by Kevin Main.

So what happens now that the rains have come, and come fast and hard? "We have taken advantage of multiple means of collecting and recycling water here at Archbold. Florida's natural system has wonderful ways of coping with times of duress, such as saving water for drought, and times of stress, such as slowing the flow during floods. Our goal in building these water harvesting and recycling systems was to mimic these natural ways," explains Executive Director Dr. Hilary Swain. "Using gutters and downspouts, we direct rainwater from the roofs of the Frances Archbold Hufty Learning Center and the Adrian Archbold Lodge into a large underground cistern. This system is a mimic of

nature: certain plants, like the saw palmetto, are able to channel rain straight down to their thirsty roots using their folded and strong leaves; our gutters do the same thing by directing water from the roof to our rainwater cistern." The cistern can hold more than 5,500 gallons of water and meets more than 80% of Archbold's non-potable water needs, flushing toilets and washing laundry.

Even when the cistern is full or when water falls on areas that are not designed to harvest rainfall, Archbold is finding creative ways to retain precious rainwater. "When the cistern is full, excess rainwater flows through an outlet pipe into a newly constructed shallow area next to the main drainage ditch, where it has time to seep through the soil and replenish the aquifer," continues Swain. "Additionally, almost half of our parking lot is constructed as permeable pavement that allows some rain to seep slowly through to the soil below. This permeable pavement can absorb up to one and a quarter inches, or 7,000 gallons, of rain in 24 hours, which then soaks into the ground and eventually recharges the aquifers below."



Pervious pavement allows rainwater to filter through the soil and percolate down to the aquifers below. Photo credit: Archbold Biological Station.

When rain falls onto conventional pavement at Archbold, the water flows off the impermeable surface, carrying with it the typical dirt, oil, sediment, heavy metals, and motor vehicle chemicals of any parking lot. To contain this, Archbold built a retention pond as another means of water collection. "By capturing stormwater in a retention pond, we reduce the amount of water flowing off the site and allow pollutants to be absorbed by plants, or to settle out," says Swain. "We used native plants typical of this area to turn our retention pond into a good habitat for local wildlife, especially by adding shallow shoreline areas for plants that benefit from seasonal floods. Plants protect the banks from erosion, and can improve water quality by taking up nutrients and pollutants. Water in the retention pond is held back, evaporating into the air, taken up and transpired into the air by plants, or seeping into the soils below, recharging the aquifer."

Eventually this water is returned to Archbold too. Towering above the tree line at Archbold is its 75,000 gallon water tower and storage tank, which stores water pumped from the Upper Floridan aquifer 1,500 feet below ground for potable water needs. “The Lake Wales Ridge, where Archbold is located, has deep sandy soils that are particularly important for aquifer recharge,” notes Swain. “The Floridan aquifer system, considered one of the most productive aquifers in the world, lies within limestone and dolostone (magnesium limestone) rock formations underlying much of Florida. The Upper Floridan aquifer is the main source of drinking, irrigation, and industrial water for much of central and northern Florida. In addition to the 11 acres at the main campus, the protected property at Archbold provides 9,841 acres of recharge to this important system.” By either harvesting rainfall for non-potable water needs, or by allowing natural processes to clean rainwater and then pumping it up from the aquifer for potable water needs, Archbold is forging a path towards self-sustaining water use.

Archbold’s water tower pumps potable water up from the Upper Floridan aquifer and can store 75,000 gallons in its tank. Photo credit: Archbold Biological Station.