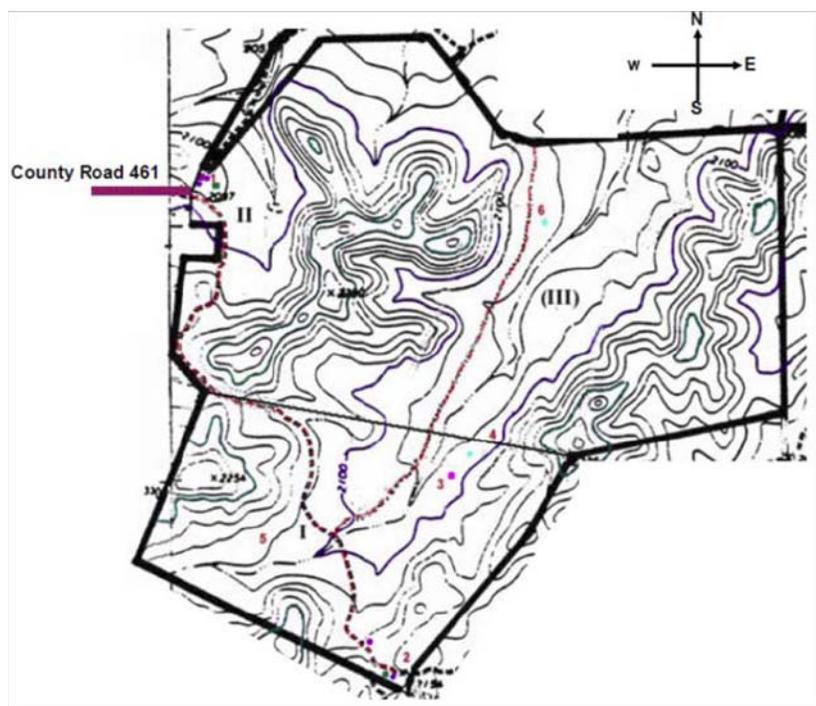


Water Management at the Rocking JB Ranch

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When we bought our 1184 acre ranch in the Southern Hill Country of Texas in 1997, it was overgrazed with large stands of cactus and little grass except in two small meadows. The only water was a shared windmill well at the front gate on the west side. The large central valley had no water except for a neighbor's windmill well on the southeast corner across a high fence which was not accessible for our wildlife.

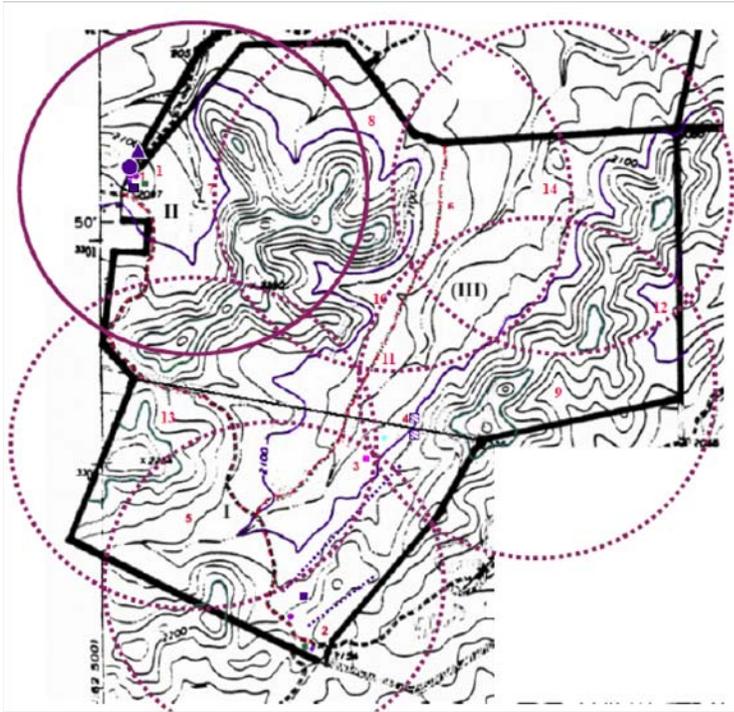
Map of Rocking JB Ranch



The white tailed deer were concentrated in the west meadow by the gate where water was accessible. Since purchasing the land had left our budget too low to put in more wells right away, we turned to the concept of the rain catcher. In 2000 we became involved in the Texas Parks and Wildlife Managed Lands Program. With the help of our assigned biologist, we planned a system of rain catchers intended to spread the deer out across the land and also encourage the presence of small animals and birds. We were told that deer prefer to go no further than about half a mile for water so we planned for a system of rain catchers on a half mile grid across the ranch.

This grid is shown in the next picture where solid circles indicate an existing water source and dotted circles indicate a planned water source.

Original Water Coverage and Projected Half Mile Grid



ONE SIDED RAIN-CATCHER:

Our initial rain catcher concepts were fairly primitive. The first one used a one-sided catcher as shown in the figure below.

One-Sided Rain-Catcher with 100 Gallon Tank



This consisted of a roof for catchment with a rain gutter on one side which fed into a 100 gallon tank/trough. We later added a rain gutter on the other side of the roof with a separate hose into the tank. To reduce evaporation we covered the tank with a canvas and fed the water through a hose at the base of the trough to a smaller 50 gallon trough with a float in a shady mott of oak trees downhill from the rain catcher which is shown in the following figure.

Drinking Trough with Float in Shady Oak Mott



It was soon clear that our 100 gallon tank was too small to catch enough water to last more than a week or so. We also had trouble with possums crawling into the tank and drowning. We then replaced the 100 gallon tank with a 550 gallon tank and painted the tank white to reduce the temperature of the water in the tank. This larger tank lengthened the time that the catcher could go between rainstorms. During the dry season we carried water in a 125 gallon tank on our truck once or twice a month to maintain a permanent water source.

Granddaughter Helping Haul Water in 125 gallon Tank to Rain Catcher



Initially we used a 250 gallon tank on the truck but that much water weighed over a ton and bent the axle of the truck. Over time we found the average usage at this rain catcher was about 50 gallons/week except during the driest parts of the summer when it went to 100 gallons/week.

One problem we ran into with this guzzler was that the tank collected water efficiently from only one side of the roof since we inadvertently put the tank on the up-hill side of the collector. This made the single roof catchment area too small to fill the tank in a single rain. A hose around the back connecting the two sides never worked well since gravity was against us. We tried jacking the legs up on the other side but only managed to bend the rain gutter extension to the tank.

Our solution was to extend the roof on the collecting side. We also had problems with the paint we had used on the collector degrading in the intense west Texas sun and jamming our gutter system with flakes of paint. For this reason, we added galvanized steel roofing on the catcher. The current system looks like the following picture.

One Sided Galvanized Steel Rain Catcher with 550 Gallon Water Tank



We have not had to truck water since we put in the new roof extension, but have not yet gone through a full summer with the new catcher either. We had now designed a single sided rain catcher that was efficient to build and that could be effectively used with a 550 gallon tank.

The trough that the animals drink from also needed some work since our ranch, like most of the ranches in Texas, has problems with wild hogs who like to tip the troughs over and wallow in the mud from the spilled water. Our "hog-proof" water trough is shown in the next picture. A heavy board nailed between two trees was sufficient to keep the trough upright.

Water Trough with "Hog-Proofing" and Stepping Stones for Small Animals and Birds



Heavy stones were added outside and inside the trough for the small animals and birds to stand on while drinking. This eliminated the problem of small animals drowning in the trough as well as bringing in a diverse range of birds, and butterflies that regularly use this water source.

PORTABLE CANVAS RAINCATCHER:

Our second rain-catcher project also used a 550 gallon tank and a 50 gallon trough with a float. The catcher, however, was a canvas sheet. This turned out to be a very efficient and low cost rain catcher over a 5 year period. It did take time to position properly and the canvas needed to be replaced about once per year due to sunlight related degradation of the material.

We also found this type of rain catcher to be a learning experience. We hung the sides of the canvas from trees around the tank. This worked well until the first time the weight of the water from a sudden downpour broke a 10 year old tree off at the base (we counted the tree rings for age). 1 gallon of water weighs about 8.34 pounds and the larger canvas held about 40 gallons of water making a total weight of over 330 lbs. We changed to a smaller canvas and a larger drain hole and the problem wasn't repeated.

Canvas Rain-Catcher with 550 Gallon Tank



We also experimented with screening techniques to keep the leaves out of the drain hole in the canvas and with the correct length and type of tubing to connect from the hole in the canvas into the top of the tank. An early problem was the wind would lift the canvas with the tubing out of the tank so we lost water and the canvas was light enough that a strong wind storm could shred it. The canvas couldn't be attached to the tank as the wind would tear it. We finally designed a system of weights placed inside the canvas around the drain hole that weighted the canvas down sufficiently but let it rise and fall slightly so the wind didn't tatter it. We found that this rain catcher also required trucking water during the summer when the usage was high.

PERMANENTLY FILLED RAINCATCHER

A permanently filled raincatcher was created from an 1100 gallon tank filled from one side of the roof of the 600 ft² cabin that we had completed by 2001. This tank in eight years has never run out of water. Since a 300 ft² roof area will catch 187 gallons in a 1" rain (7.5 gallons in a ft³), this means that it would take 5.87 inches of rain to fill the 1100 gallon tank. Average rainfall in our part of Texas is about 20 inches per year so the tank will be filled 3.4 times in a year with a total of 3740 gallons. Dividing 3740 by 52 weeks in a year, means the animals can use up to 72 gallons a week before the tank would run dry. Our experience indicates the animals tend to use about 50 gallons of water per week from one of the water points, explaining why this tank never runs dry.

The drinking trough was placed downhill about 200 feet so that we could enjoy watching the wildlife drinking at the trough without disturbing them. A picture of this rain catcher taken from the position of the drinking trough follows. The green tank is to the left of the cabin.

1100 Gallon Cabin Roof Rain Catcher (background) and Trough with Float (Foreground)



TWO-SIDED INVERTED RAIN-CATCHER WITH 1100 GALLON TANK:

Using what we had learned from our first rain-catchers, we now tackled a more difficult project. There is an area of the ranch that is not readily accessible by truck for carrying water because of a steep hill on the access road. We needed to use what we had learned to build a rain catcher that would not need to have water trucked in.

We started with an 1100 gallon tank since we knew from the cabin rain catcher that if we could fill this tank with each rainstorm, we would never need to truck in water. The next problem was to design a rain-catcher that entailed minimal cost and caught enough water.

We decided on a two sided, inverted top catcher which we placed on a ledge on the hill so that worst case, during a long dry season, a long hose or pipe could be run down the hill to fill the tank from the top of the hill. The trough was placed at the bottom of the hill in a grove of shady oak trees.

Initially we used a canvas rain-catcher to spread out the cost of the installation over two years - doing the tank in first year and inverted rain-catcher in second year. This first catcher is shown in the following picture. Since there were no trees nearby, we went ahead and built the frame which would ultimately hold the inverted rain-catcher and hung the canvas from it.

Rain Catcher with 1100 gallon tank and Canvas Rain Catcher on Wooden Frame



The next year we built the inverted top for this raincatcher using plywood overlaid with sheets of roofing metal. Gutters and drain attachments were used to connect the rain catcher with the tank. Care was taken to support the top assembly to compensate for the weight of any water collected.

Final Assembly of Inverted Rain Collector with 1100 Gallon Tank



Water collected was taken out by hose from the bottom of the tank to a 50 gallon trough in a shady grove about 150 feet down hill from the collector. Vertically this was about 50 feet.

Trough for Inverter Rain Catcher in Shady Grove at Bottom of Hill



To avoid developing too much instantaneous water pressure at the trough for the float to contain, three 50 ft sections of garden hose were used. Metal washers with small diameter holes were inserted at the four connections. A picture of one of the metal washers in the hose is shown..

Metal Washer With Small Diameter Hole in Hose from Raincatcher to Trough



The washers appear to have solved the pressure issue and the assembly appears to be working. The physics of this approach is still being debated.

This rain-catcher turned out to be top-heavy due to the weight of the plywood sheeting and was toppled in a wind storm soon after completion. The process of restoring and anchoring this rain-catcher is shown in the following sequence of pictures.

Inverted Rain Catcher Topped by Wind Storm



Affixing Lines Firmly in Preparation for Hoisting the Rain-Catcher Upright



Using Come-Along and Jacks to Hoist the Rain-Catcher Upright before Anchoring



This rain-catcher is on a ledge halfway up a steep road.. A pipeline was laid from the top of the hill to avoid driving down the hill to refill with the weight of a water tank during a drought.

Pipeline Laid From Top of Hill to Fill RainCatcher During Droughts



UPDATING AN OLD RAIN CATCHER:

The canvas rain-catcher with the 550 gallon tank, discussed earlier, was replaced after several years by a single sided rain-catcher. The issue of being top heavy was addressed by replacing the plywood on top with a skeleton frame made of 2"x4"'s covered with metal roofing material as shown in the picture. It was also anchored to a tree. This guzzler has worked well and, to date, has kept the tank continuously full. The large back-splash ensures complete collection of water in a heavy rain. A larger tank is planned for this guzzler to reduce trucking water during droughts.

Single Sided Rain Catcher with 550 Gallon Tank

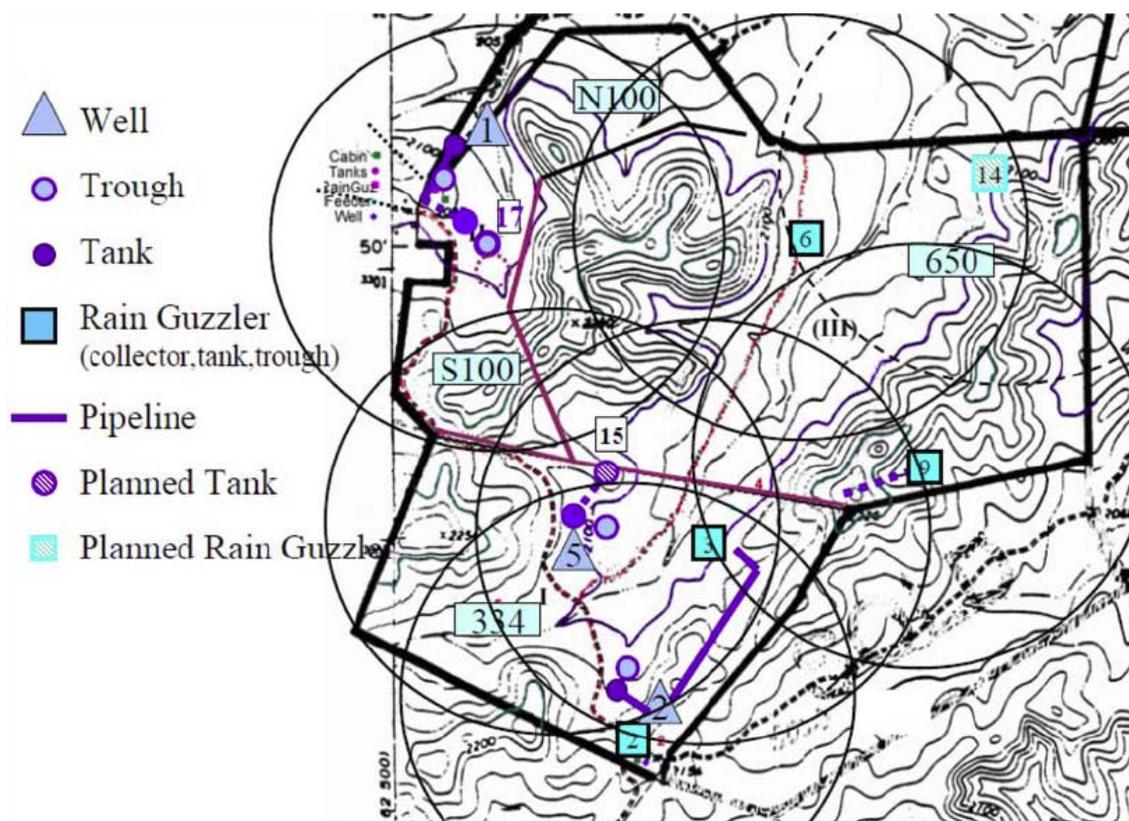


We continue to attempt to design our rain catchers to reflect the location where they are positioned and the usage they are expected to have.

CURRENT WATER SUPPLY GRID:

Currently our water supply grid for the ranch includes four rain catchers and three well-fed tanks and troughs. In addition to the original shared windmill well, two additional wells were drilled to supply the cabin as well as tanks and troughs for the wildlife. A water coverage grid now shows that most wildlife on the ranch are within 1/2 mile or less of water with redundant coverage over much of the ranch.

Current Water Supply Grid for the RockingJB Ranch



Designs for our rain catchers are available on our web site at www.rockingjb.com.