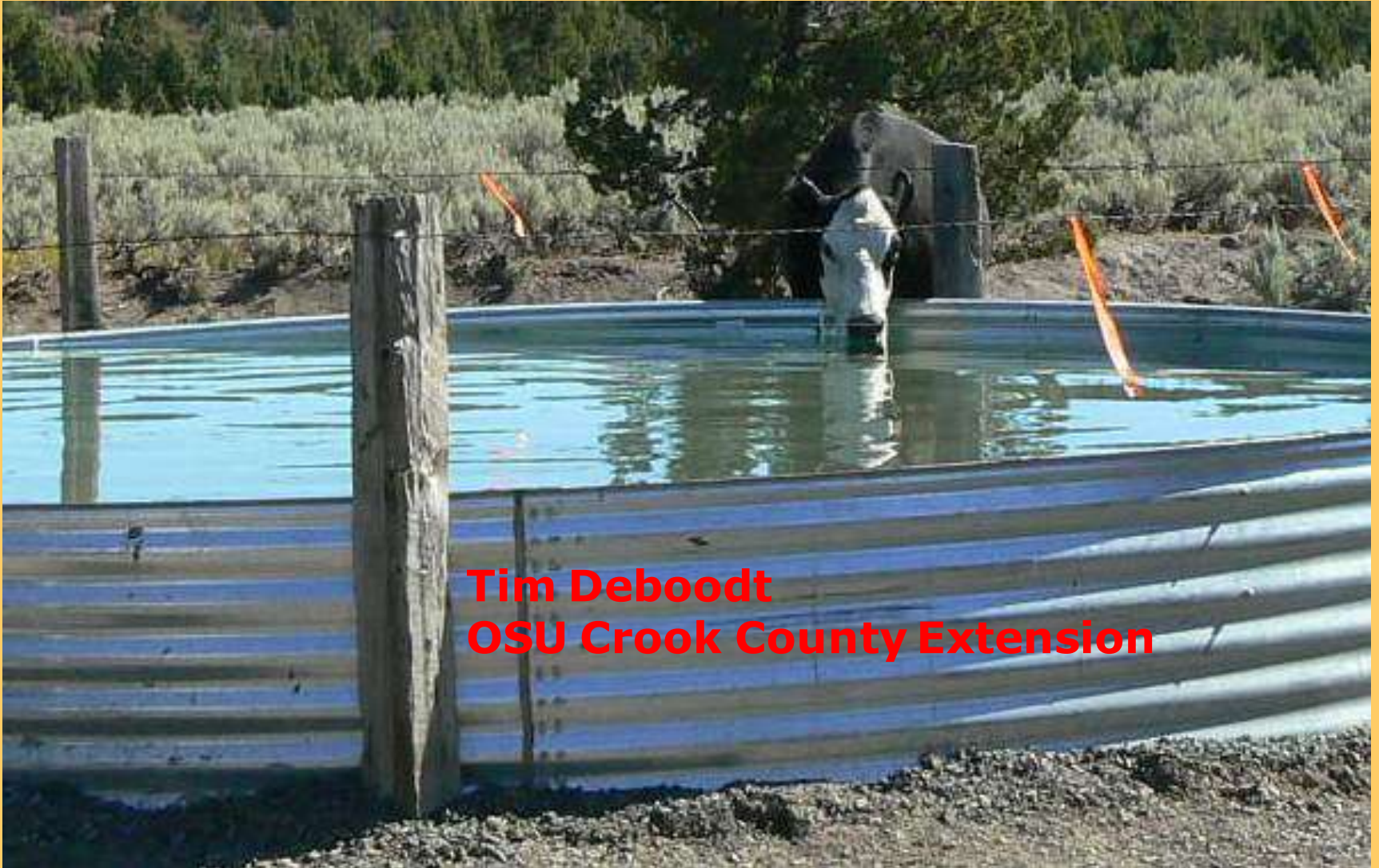


# **SATELLITE TECHNOLOGY PROVIDES REMOTE SENSING OPPORTUNITIES FOR LIVESTOCK PRODUCERS IN TRACKING WATER SUPPLIES**



**Tim Deboodt  
OSU Crook County Extension**



**Water developments in the intermountain west provide one of the most effective means of managing livestock distribution and forage utilization**

**In the great basin, ranches are often large, covering tens of square miles, involving multiple herds in pastures scattered sometimes over 50 miles apart.**

**Ranchers are challenged with assuring water is available daily to livestock while trying to manage multiple activities each day.**

**Labor resources, cost of fuel, vehicle maintenance and time require the rancher to make choices about daily workloads and priorities.**









**Challenge:**

**Find a way to monitor water supplies  
that is reliable and cost effective**



# REMOTE SENSING

## Collection of information

Sensors

Data Loggers

## Communication

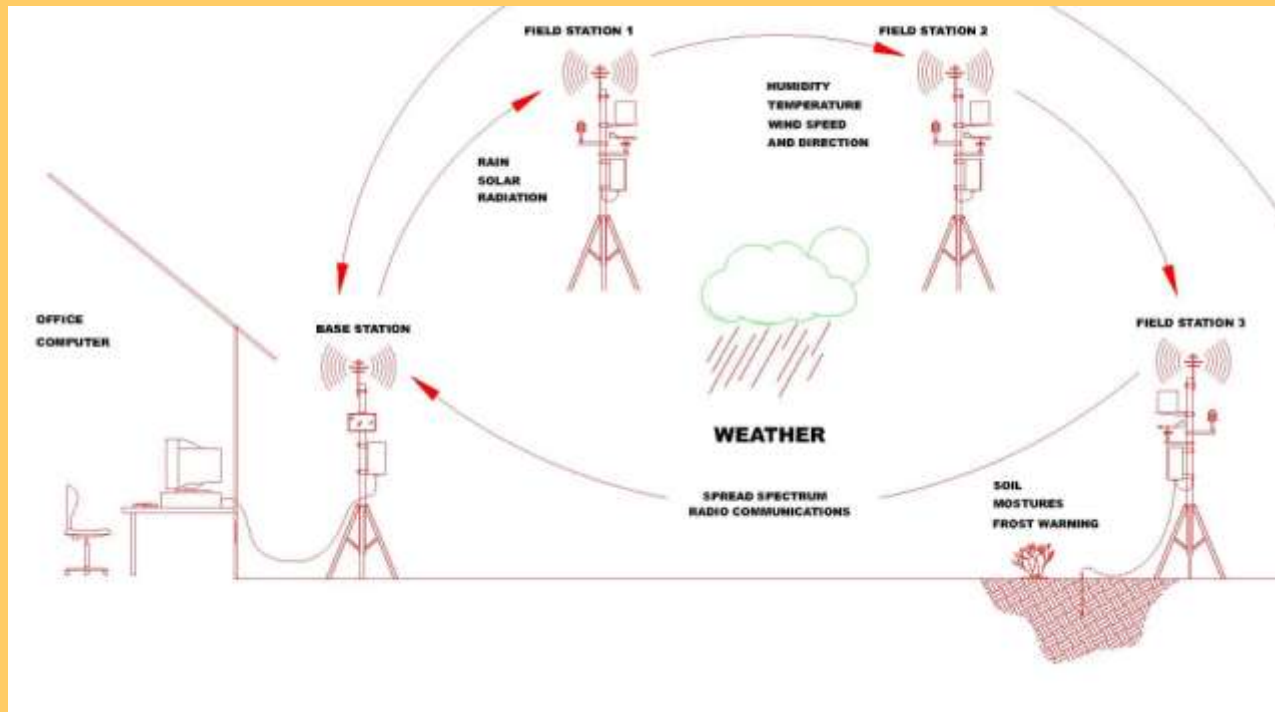
Cell Phone

Spread Spectrum Radio (Ground Based)

Satellite

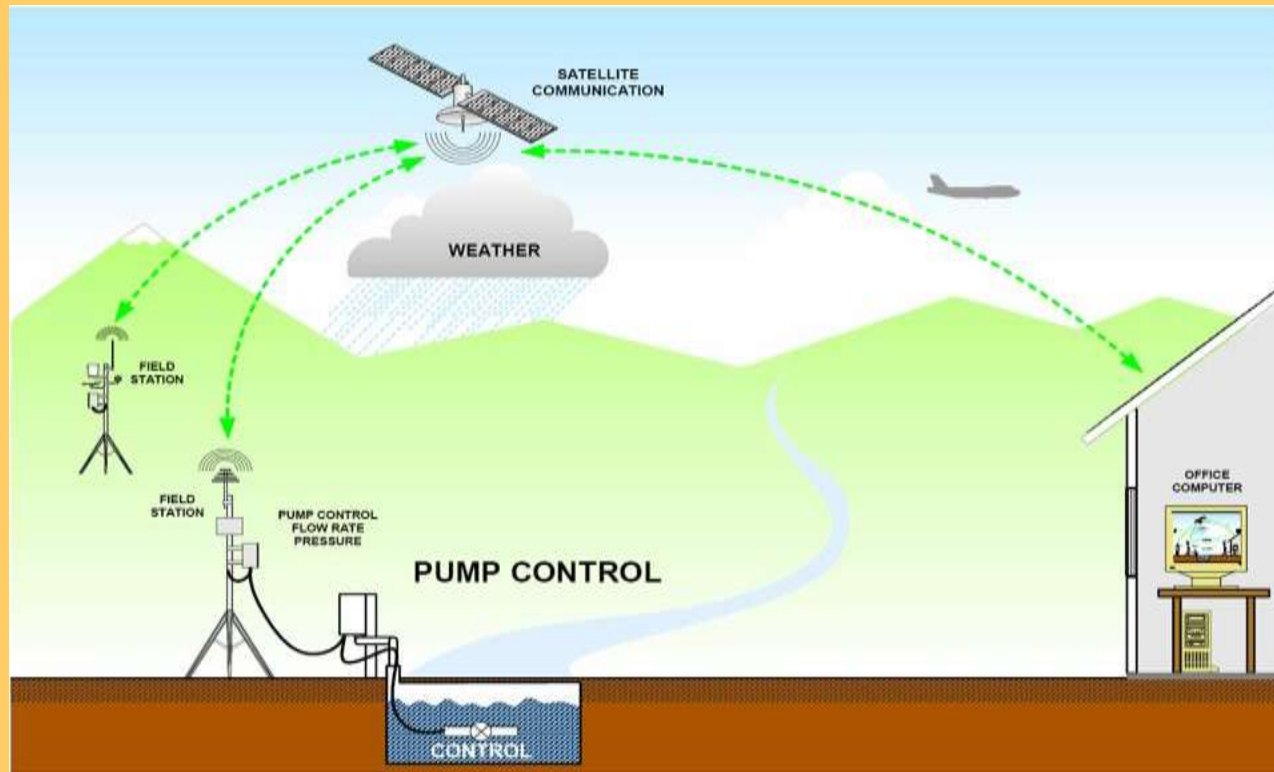






## Ground based Systems

- Large number of stations (monitoring sites)
- Radio communications require line of sight
- Repeater stations can be used as field station
- Base station can access up to 150 field stations
- Large variety of sensors
- Real time access and sensor control
- Customizable email and telephone alarms for low water level
- No annual charges



## Satellite

- **Field station is stand alone—doesn't need a base station**
- **Large variety of sensors**
- **Doesn't need line of sight – install anywhere**
- **Customizable email and telephone alarms for low water level**
- **Delayed access and sensor control**
- **Annual satellite and web server fees**



**Camp Creek Paired Watershed Study, Est. 1994**































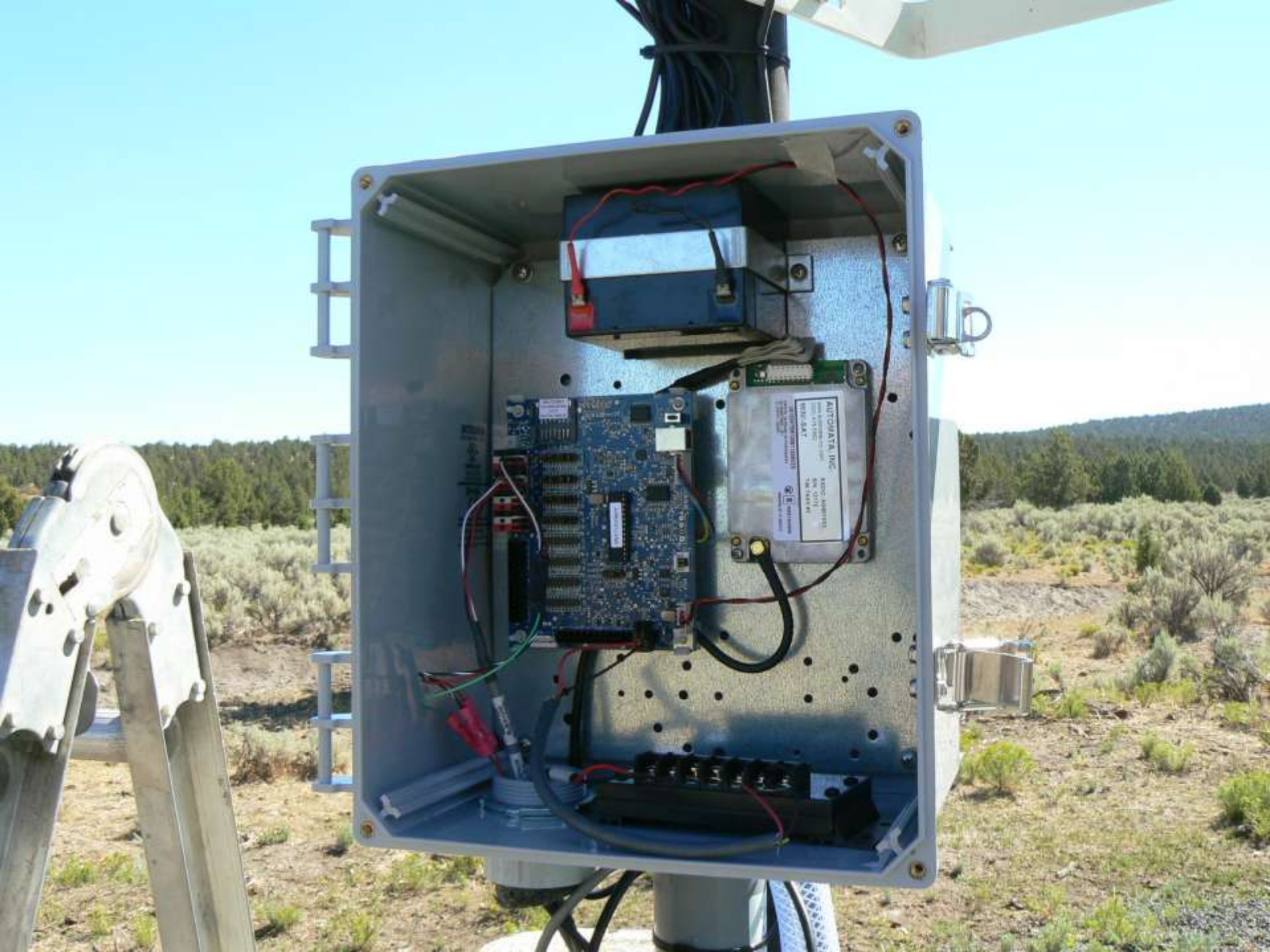




# Mini-AT Processor Board Specifications

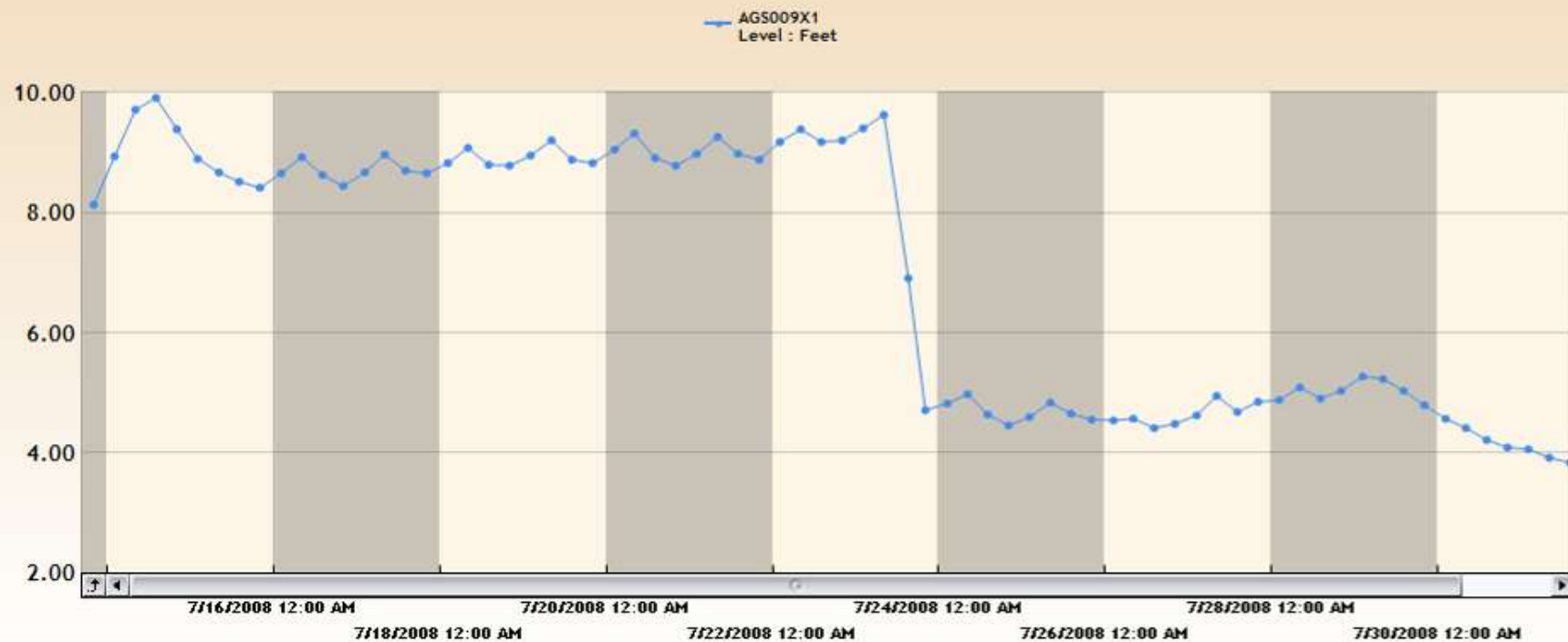
Pin	Function	Voltage
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2	Ground	0V
3	Power	5V
4	Ground	0V
5	Power	5V
6	Ground	0V
7	Power	5V
8	Ground	0V
9	Power	5V
10	Ground	0V
11	Power	5V
12	Ground	0V
13	Power	5V
14	Ground	0V
15	Power	5V
16	Ground	0V
17	Power	5V
18	Ground	0V
19	Power	5V
20	Ground	0V
21	Power	5V
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24	Ground	0V
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49	Power	5V
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88	Ground	0V
89	Power	5V
90	Ground	0V
91	Power	5V
92	Ground	0V
93	Power	5V
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97	Power	5V
98	Ground	0V
99	Power	5V
100	Ground	0V



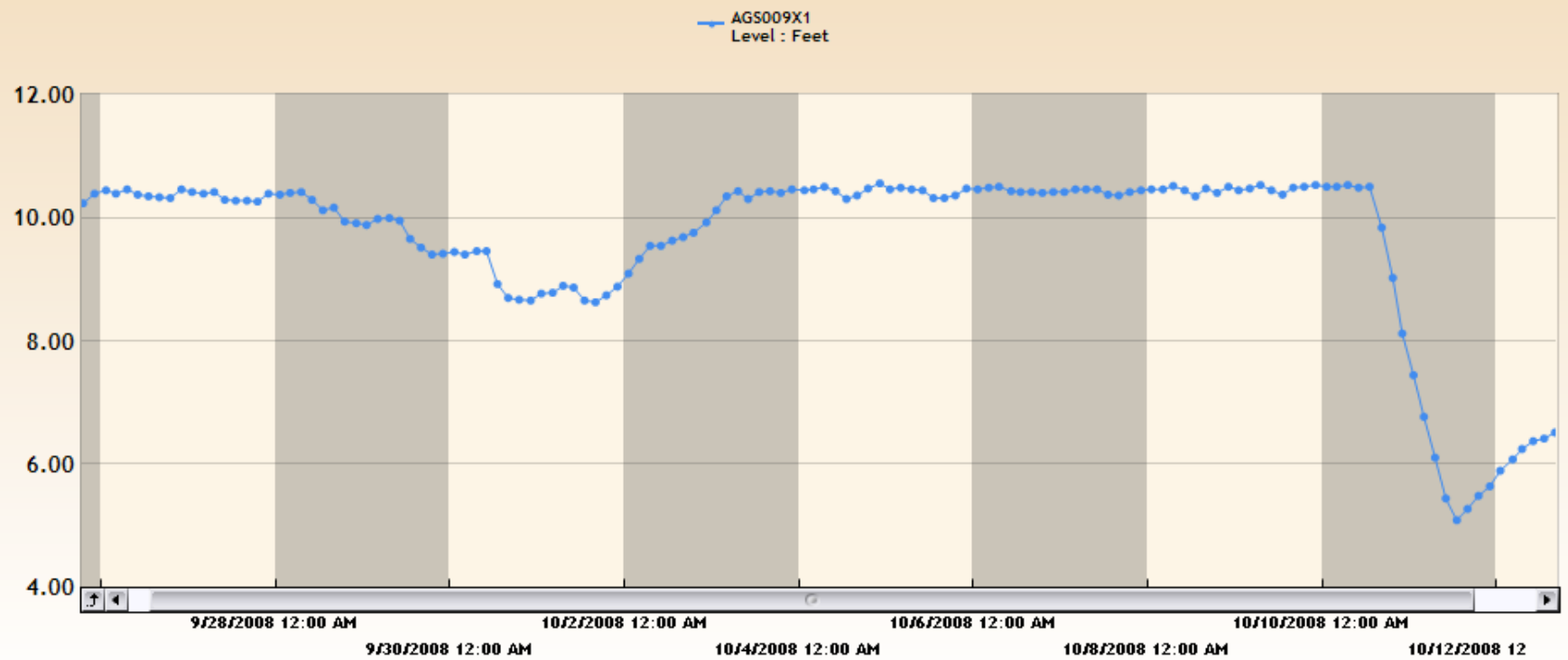


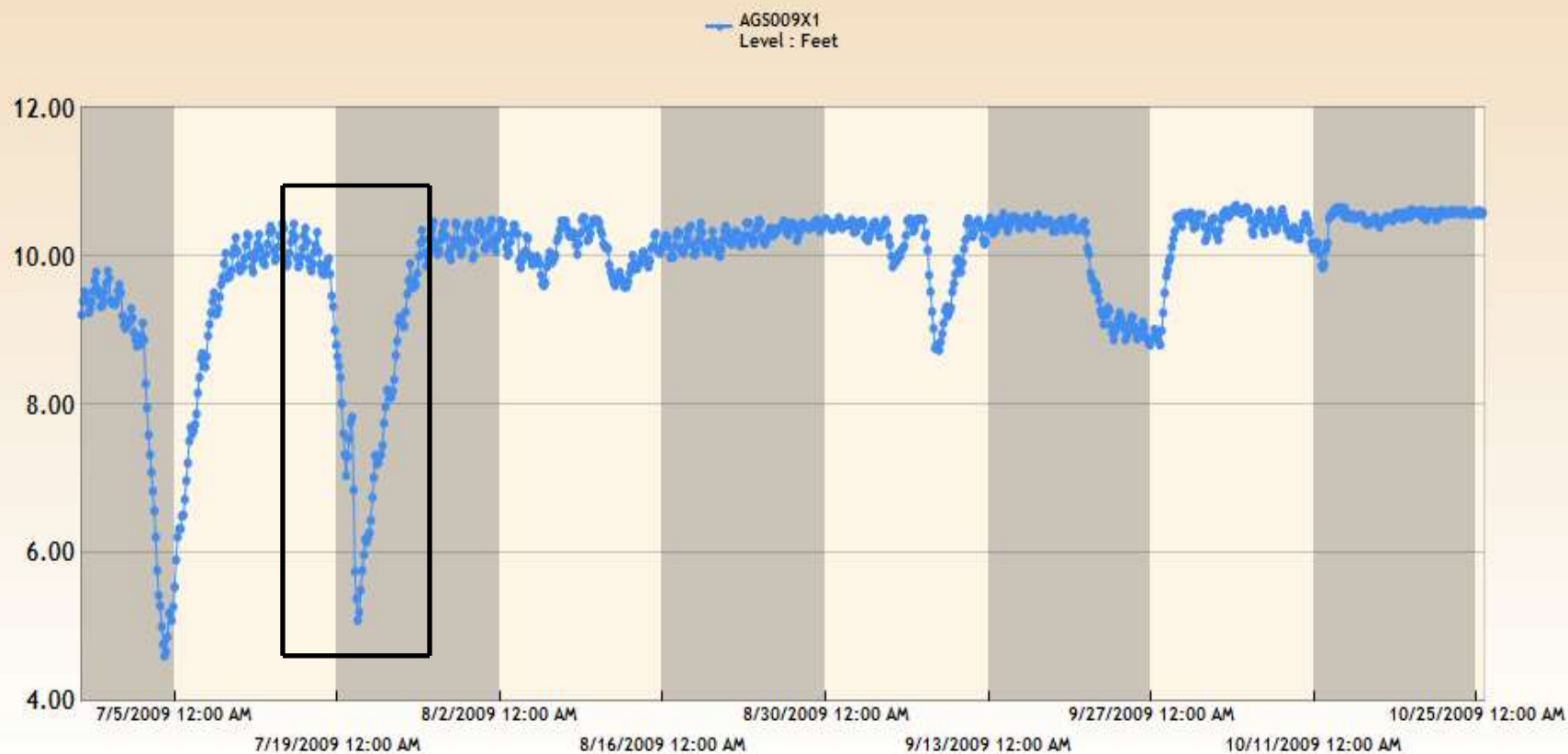




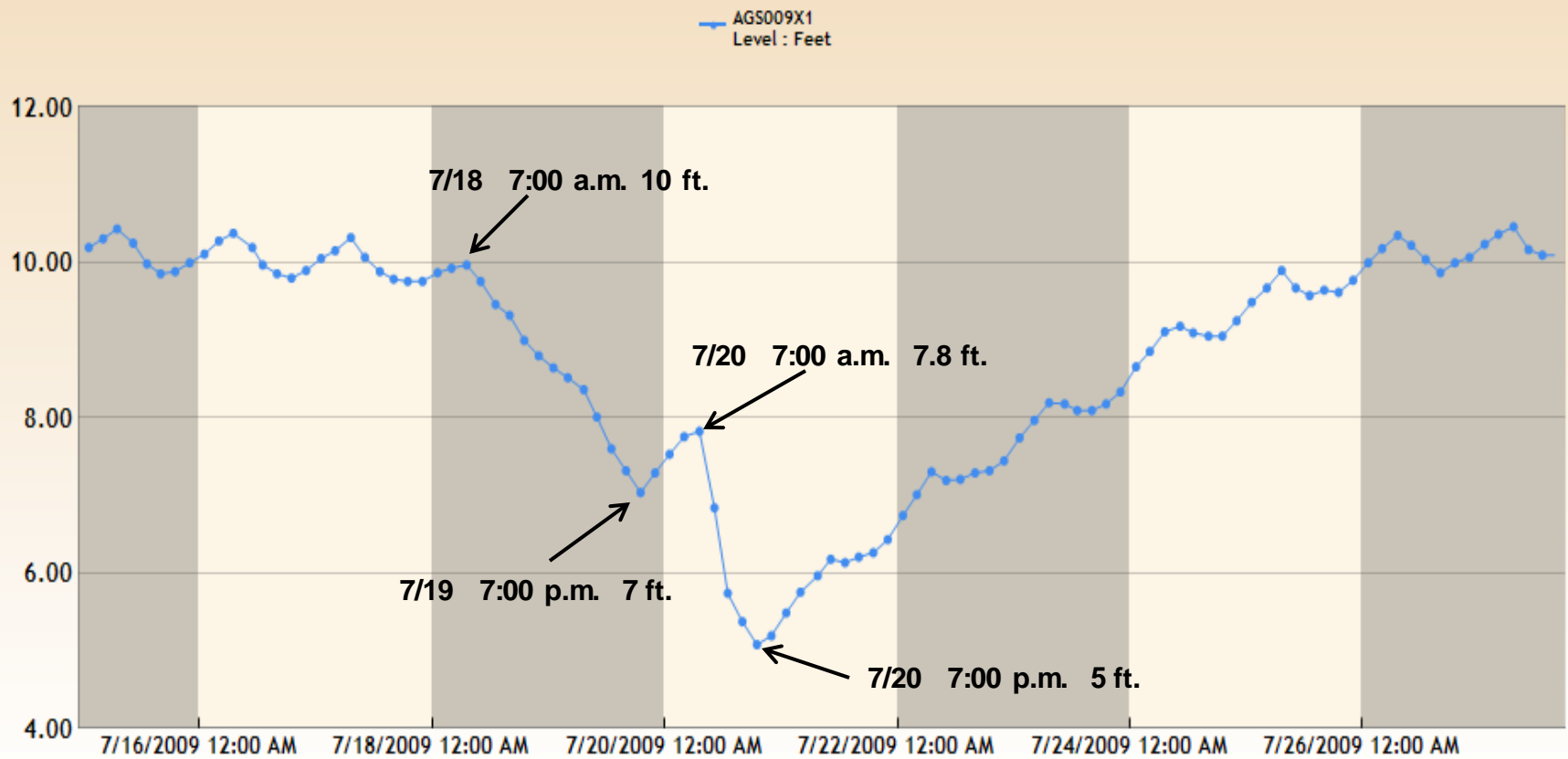












## Testimonial – Did it work?

“Yes, the remote water monitoring system did work! It was excellent. We had absolutely no problems with the monitoring system. We checked the water level each morning at 5:30 on our computer, sometimes up to 3 times a day depending on the weather.

During May though November it saved us 3 days a week. Following is a cost savings to our ranch.

3 days/week \* 60 miles/trip = 180 miles/week  
180 miles @ 20miles/gal = 9 gallons a week for 7 months  
7 months \* 4 weeks= 252 gallons \*\$3/gal = *\$756 saved in fuel costs.*

3 hrs/trip\*3 days\*4 wks\*7 months = 252 hrs @ \$8.00/hr = *\$2016 in labor costs.*

**Total Savings in 1 year = \$2772.00**

We seem to always mess something up during the summer forgetting to check or saying "they'll (the cows) be alright", then the cows ruin a trough or something. That did not happen this year, so we figured at least a savings of \$800 on a replacement trough.

Most importantly we had water to the cows all year and that's what it is all about...

**Happy Cows....”**



## **Case 2 – 1 herd/150 cow/calf pairs**

### **Pre-Installation**

**40 miles round trip**

**10 mpg gas, \$4.30/gallon**

**gas powered pump – checked 5 times per week**

**2 hours to fill trough**

**1200 miles per month**

**\$17.20/trip = \$86.00/week = \$387.00/month**

### **Post-installation**

**2 trips per week**

**\$34.40/week = \$154.80/month**

**540 less miles @ .55/mile = \$297.00**

**Savings = \$232.20 Gas/month**

**Total savings = \$529.20/month**

## **Cost per unit**

**\$1850.00**

**Solar panel/solar controller**

**mini-sat**

**Satellite radio**

**Transducer sensor**

**\$50.00 Miscellaneous installation parts**

**Annual fee = \$ 60.00**

### **Case 1**

**Fuel savings = \$756.00**

**Total savings = \$3572.00**

### **Case 2**

**Fuel savings = \$232.20**

**Total savings = \$530.00**



A photograph of a remote stock water monitoring system. In the foreground, a large, circular, blue-lined water tank is partially filled with water. A wooden post stands in the water. To the left of the tank, a tall wooden pole supports a solar panel and a white electronic control box. The background shows a dry, hilly landscape with sparse vegetation and a line of trees under a clear blue sky.

## Conclusions:

- Remote stock water monitoring systems are reliable
- Portable
- Expandable
- Cost effective
- Provide accurate data
- Easy too !!