

Solar-powered Livestock Watering

Keeping Cattle, Fish, and People Healthy

Introduction

Have you ever thought of cattle as solar-powered animals? Think about it. They take grass, which turns sunlight into food, and convert it into something we can eat. With the availability of reliable photovoltaic cells, sunlight can offer cattle a drink of water too, making them fully solar powered! That is just what the Snohomish Conservation District accomplished on a farm near Arlington, Washington.

Problem

Cattle need lots of clean water to ensure good growth and keep them healthy—60 to 70 percent of their body mass is water. Animals that don't drink enough water can suffer stress and are more susceptible to disease. Cattle also produce a lot of poop—about 60 lbs. per day. One study showed cattle deposit about 10 percent of their waste directly into the water when they have direct access to a stream. When local waters are polluted with cattle waste, it increases the chances that both cattle and people will get sick. Cattle watering in ditches sometimes get trapped in mud, causing herd losses. Cattle can destroy fish redds and other fish habitat. Washington State law does not permit cattle waste to be deposited in streams under any circumstances.

Livestock should not have direct stream access



Project goals

Solar panel and battery box



October 2009

The Snohomish Conservation District (SCD) wanted to help cattle producers raise healthy cattle while keeping local streams healthy for people and fish. The producers told them that off-stream watering facilities don't work well, and they didn't like some of the systems that are currently available.

Using a solar-powered system pioneered by Al Latham at the Jefferson Conservation District, SCD had an idea to set up a demonstration site and develop a loaner program for ranchers who wanted to "kick the tires" on a new system, or who needed to quickly come into compliance with state law. The Department of Ecology was able to help the SCD, using a new small grant program aimed at on-the-ground improvements, to get polluted waters clean.

Milestones and outcomes

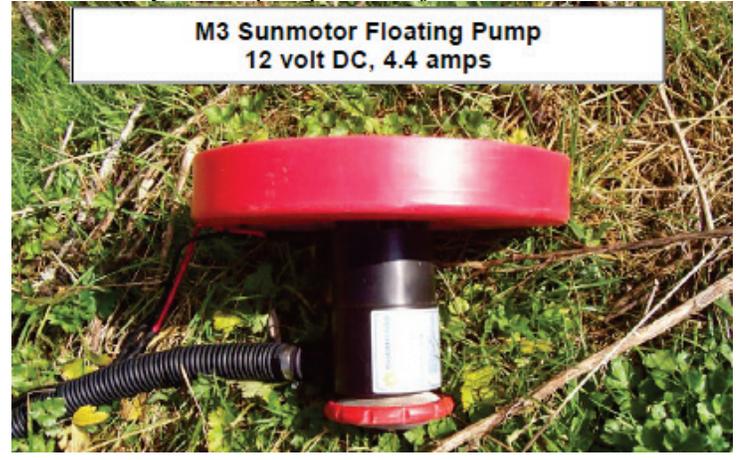
The District put the call out for cattle producers who wanted to participate in the pilot program that paid for 100 percent of the cost of a new off-stream watering system. Due to a perception that there is no need to protect streams from cattle damage, only one farmer wanted to participate. Unfortunately, his short-term

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lease with a local landowner did not allow a suitable agreement to be prepared. SCD cast a wider net and, with help from Bill Blake, Environmental Manager of the city of Arlington, a local rancher agreed to give the system a try.

Once a site was identified, SCD purchased two off-stream watering systems, one for the farmer and one for the loaner program. Each system consists of a solar panel, one or two water troughs, a pump that floats on the surface of the stream, a 12-volt battery, and a float valve that controls water levels in the troughs. The cost of materials for one solar powered watering system is about \$3,000-\$3,500.

A sturdy motor pumps water from the local creek



During the summer of 2009, the new system was installed and tested. A gravel heavy use pad was installed and the solar panel was located over the fence line to avoid animal damage. Water coming from the stream was buried in 100 feet of pipe to avoid freezing problems in the winter.

Once the pilot system was installed, SCD started working on their Solar Watering Loaner Program. The District knew that state and local officials were working to remove animal access to streams because of widespread pollution problems and concerns over damaged salmon habitat. The loaner program would help get animals out of streams faster by (1) giving farmers a chance to observe feasibility of the system without an initial cost, (2) helping farmers act quickly to meet state and local requirements, and (3) preventing direct animal access to state waters.

Project highlights

Installed system ready for thirsty livestock



This project benefits not only the cattle and landowner, but also the public in protecting streams and water quality. The dual trough unit installed at the pilot project site serves 50 cattle. However, a single 300-gallon trough would likely be enough for most landowners, unless they have milk cows or are looking to expand in the future. The solar panel has a 25-year warranty.

The Solar Watering Loaner Program was now in place. Within a month, the SCD had an opportunity to offer the system to a farmer who was contacted by local officials concerning the problem of direct animal access to surface water. The extra system has been advertised in the SCD Quarterly Newsletter, The NEXUS, and can be shown to others at fairs and workshops as well.

Lessons learned

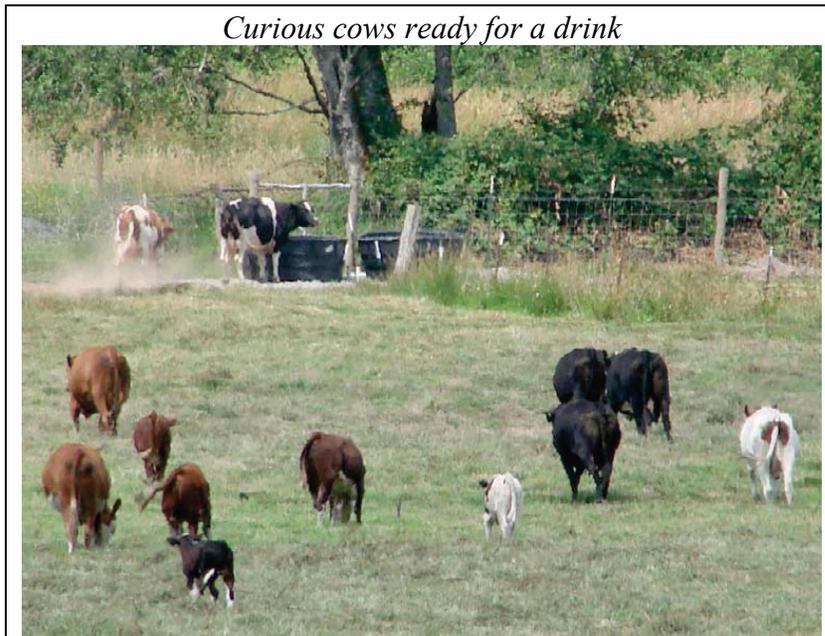
The SCD is optimistic about the future for solar-powered watering systems in Snohomish County. As with other programs assisting landowners with best management practice (BMP) installation, 100 percent funding results in less “buy-in” from the

owner and reduced initial participation. This first project also exceeded initial estimates ending in \$8,000 in addition to the grant award in staff hours. This figure was higher due to costs associated with hand trenching and

pipe burial, gravel transport across the pasture, incidental equipment not in the budget, and initial troubleshooting. The first two items provide excellent landowner match opportunities when a tractor is on site. Staff costs in the future are expected to range from \$2,000 to \$4,000 per system.

The SCD recommends no more than a 75 percent payment to the landowner, preferably with the match helping to install and set the system up so the new owner can help troubleshoot and fix the system if problems do occur.

Although freezing conditions are infrequent in the lowland areas of Snohomish County, the SCD advises monitoring operations of the solar powered watering systems closely during very cold weather. The pumping system is designed to drain after each filling; however, ice-buildup is a possibility during extreme weather events. Like other watering systems that are exposed to air, water on the surface of the trough can be expected to freeze and must be broken as needed.



Partners

Snohomish Conservation District
Bill Blake, City of Arlington
Department of Ecology, Water Quality Program
Local Landowner

Funding

This pilot project required about \$15,000 in staff time and materials through the SCD. Ecology's Direct Implementation Fund provided about \$8,000, and additional staff time was provided by Ecology and city of Arlington staff.

For more information

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