Improving Water Quality and Manure Management of Humboldt County Dairies

The HCRCD has been awarded a series of State Water Resources Control Board grants to help Humboldt County dairy operators in the Eel River Delta and the Humboldt Bay area bring their operations up to current standards by implementing state of the art water quality management systems through practices and demonstrations of such practices as: manure distribution, heavy use area protection, roof runoff management, and waste storage structures. The HCRCD has received additional grants through NRCS and the County of Humboldt Headwaters Fund to work with dairy operators on many new and innovative practices on their dairies.

Contain, store, and apply at the correct time to the land. These are the three key concepts to managing manure effectively. They also can lead to many challenges, as many dairies in Humboldt County that we work with must be retrofitted in order to meet current water quality standards. Often we are faced with the challenge to put state of the art manure management technology to work on a facility with structures and a layout almost unchanged from the early 1900's. To make matters even more complicated, every dairy is different, and every operator is different in their management philosophies.

The HCRCD works with landowners on a one-on-one basis to create a fully custom idea of what will work on their facility, what the landowner will be most happy with, and what will fit within the budget of the operation.

In order to assist landowners, the HCRCD works with NRCS to provide design services, permitting help, and on selected projects, a cost share payment to the dairy operator for project implementation. All projects must fall into a category for enhancing manure containment, storage, or application to land.

CONTAINMENT:

Containment is the necessary first step to preventing pollution. All manure that is generated from the dairy cow when she is off of the pasture and on the facility must be contained. Additionally, any water that contacts manure becomes contaminated and must also be contained. Think of it as you would a fence around your property – you are essentially containing everything within that boundary from getting out, but if the fence is broken it does not do its job.

STORAGE:

All of that contained manure and contaminated water must be stored somewhere. This is where dairy operator preference is key to the success of the manure storage system. Manure can successfully be stored in two ways. It can be stored in a solid state or it can be stored in a liquid state. Most dairies in Humboldt County employ a combination of both. There is no set time that the operator must store the manure for, but 120 days during the winter is what most operators and the HCRCD are striving for. To store solid manure, specially designed concrete bunkers are employed. Solid manure can also be composted in a windrow. Composted solid manure does not give off much of a smell, and is readily used by plants in the pasture. Liquid manure is stored in either an earthen pond or a concrete structure.

There are other aspects to storage, too. These include any project that can be done on a dairy to increase the amount of time manure can be stored. An example of this would be placing gutters on all of the structures to divert clean rainwater away from a contamination source. All of that contaminated rainwater would have to go into storage. By removing that water the dairy operator has just increased his storage time dramatically. A recent

APPLICATION:

HCRCD project installed a large gutter system on a Ferndale Dairy. By diverting all of the clean rainwater, we were able to keep over 1.5 million gallons of clean water a year from becoming contaminated and having to be stored!

In order to place the manure onto the land as fertilizer at the correct time of the year many technologies must be employed. When placing stored solid manure onto the pasture, the most proven technology is a manure spreader pulled by a tractor. When placing liquid manure, the process gets a little more complicated. The most common approach to the application of liquid manure is the pipe and sprinkler approach. Specially designed PVC irrigation line is buried underground to take the manure from the storage to the field. In order to get it into the pipe at the right pressure, a specially designed manure pump must be used. When it gets to the part of pasture that the operator wants to fertilize, the manure is applied with a large sprinkler gun. The gun is specially designed to place manure at certain rates depending on the speed set by the operator. Therefore, very precise applications of manure as fertilizer can be made. Many other interesting and cutting edge technologies and techniques can be employed when handling liquid manure. For example, if no pipeline exists to get the liquid manure out, a large tank pulled by a tractor can be used to place the manure.

NUTRIENT MANAGEMENT PLANNING:

One new service that the HCRCD recently began to provide to dairy operators is the creation of custom Nutrient Management Plans or NMPs. NMPs are a useful tool to be used by the dairy operator to apply manure at the correct amounts to maximize forage quality and quantity, and to protect against harming water quality. This planning is especially beneficial to Certified Organic dairy operations where commercial fertilizer cannot be utilized. Conventional dairy operators can also benefit as the prices of commercial fertilizer skyrockets.

While figuring out correct application rates for fertilizer is not a new science by any stretch, creating NMPs for Humboldt County is. The HCRCD is leading the way in developing protocols to take the plan from start to finish and give the dairy operator up to date and useful information. Why is this so difficult? NMPs are common across the entire US on dairy facilities from coast to coast. However most of these dairies are large feedlot operations, that generate more manure than the land can handle without pollution. Humboldt County dairies are all pasture based dairies, relatively very small in size when compared to other dairies in California. Typically, Humboldt County dairies do not have too much manure, often the opposite is found. The challenge lies in the fact that each Humboldt County dairy is unique; operations vary from land size, herd size, available infrastructure, to management styles and resource concerns. In comparison, Fresno County can develop an NMP process that will be true with

little modification for 90% of their dairies, but every NMP in Humboldt County must be custom made, one of a kind, with no two alike.

The HCRCD has partnered with the Natural Resources Conservation Service (NRCS), the University of California Cooperative Extension (UCCE) and the Regional Water Quality Control Board (RWQCB) to develop state of the art NMPs for a few dairies as a trial run, and plans to expand its services in the next few years. Why is the HCRCD leading this effort? To protect and enhance water quality for all of us as well as the environment, and to help sustain small pasture based dairy operations within our county. Conserving resources and adding to the economic viability of our community, that's what the HCRCD is all about.

Healthy Pasture on a Ferndale

Gutter System on Dairy Barn

Gutter System on a Classic Barn

New Roof System

Managed Liquids Storage Pond

Underground Mainline

Brand new Manure Spreader

Large manure Irrigation Sprinkler