Livestock/CAFO Working Group

Charge from Groundwater Management Area Advisory Committee

Working Group Members

Charlie McKinney, Chair (Department of Ecology), Kirk Cook (Department of Agriculture), Dr. Kefy Desta (WSU), Elizabeth Sanchey (Yakama Nation), Heather Wendt (Benton Conservation District), Helen Reddout (CARE), Jaclyn Ford (Department of Agriculture), Jason Sheehan (Dairy Federation), Jim Newhouse (South Yakima Conservation District), Laurie Crowe (South Yakima Conservation District), Patricia Newhouse (Citizen), Steve George (Yakima County Farm Bureau), Stuart Turner (Turner & Co., Inc.), Ali Sedighi (Yakima County Staff Support, non-member)

Meetings/Calls Dates

Meeting: Thursday, May 23, 2013

Participants

Dr. Bob Stevens, retired WSU soil scientist (Guest Speaker), Charlie McKinney (Dept of Ecology), Kirk Cook (Dept of Ag), Jim Dyjak (Citizen), Jim Trull (SVID), Tom Tebb (Dept of Ecology), Helen Reddout (CARE), Tom Ring (Yakama Nation), Dan DeGroot (WDPC), John Van Wingerden (Port of Sunnyside), Gary Holwegner (Port of Sunnyside), Kathleen Rogers (Sunnyside), Bud Rogers (Sunnyside), Doug Moore (Sunnyside), Mike Shuttleworth (Benton County), Dianne Jung (Benton County), Deborah Harrison (Benton County), Steve Harrison (Benton County), Carl Hurlburt (Granger), Stuart Crane (Yakama Nation), Pony Ellingson (PGG), Troy Ross-Havens (Yakima County), Don Gatchalian (Yakima County), by telephone – Ralph Fisher (EPA)

Key Discussion Points

The following is the speaker presentation summary of Dr. Robert Stevens, retired soil scientist, IAREC Prosser – WSU

- More nitrogen is being imported into the Yakima Valley via nitrogen fertilizer and feed sources, than exported. Feed is the original N source in manure; is cycled through cows, nutrients are concentrated.
- Irrigation is an important driver in the nitrate contamination problem: moves nitrate (water soluble and mobile) below root zones (if over-applied) and ultimately to groundwater. Low natural precipitation can be a factor: nutrients accumulate at a shallow depth until moved by irrigation.
- Every time manure is applied, a percentage becomes available to crops that year and the rest becomes available in later years. This "lagging" source needs to be accounted for when manure is being repeatedly applied. Used example of 3 scenarios where soil tests showed high, medium and low nitrogen levels. High scenario: should crop multiple years with no additional application; medium: crop 1 or 2 years before application; low: needs application prior to first crop.

- Ammonia contained in manure is converted to ammonium, then nitrite (briefly), then nitrate which is mobile in soils. Some ammonia loss to the air from surface-applied manure happens quickly (average maybe 4 days, but is affected by temperature).
- Deep aquifers present a 2-edged sword: they are not as easily contaminated, but once they are; it takes a very long time for them to "clean up".
- "Culprit crops": from experience in the Columbia Basin, these are crops that use high rates of nitrogen but tend to be poor nitrogen scavengers due to less extensive root systems, etc. Examples: onions, mint, potatoes. Require good nitrogen management in order to prevent loss below root zone.
- Believe that rooting depths of crops and their ability to extract deeper nitrogen are generally over-estimated. Most occurs in the top 2 feet. Some roots may be deeper, but they are inefficient at removing nitrogen (depending on crop). Nitrogen removal is never 100% even under good management; more like 50% to 80%. Soil tests were historically usually only taken in the top 1 foot. Better to sample down to 2 feet and sometimes 3 to better understand what is going on.
- Triticale has become an important winter nitrogen scavenger crop where manure is applied. However, more research is needed because the growth, yield and therefore nitrogen uptake of triticale is highly variable. Planting dates and other factors can make a huge difference. It is easy to over-estimate the amount of nitrogen that triticale is removing because the crop is so variable.
- In early 90's, did study on hops in Yakima Valley. At that time there was no good herbicide for hops, which led to lots of weeds, which were dealt with by frequent tillage, which led to high erosion rates and water quality problems. So started using manure to improve soil tilth and reduce erosion. This worked, but led to nitrate problems! Now the problems have been largely overcome by widespread use of drip systems, effective herbicides and use of PAM (polyacrylimide – flocculates soil and reduces erosion). This is an example of the interplay between farming practices.
- Salt build-up is a problem that can occur with repeated use of manure. Needs to be occasionally leached. Needs to be done at a time when nitrate levels in the soil are low to avoid leaching that as well. The idea that salt problems can be solved by applying more manure is a myth.
- Pen areas are probably not a significant source of nitrate contamination compared to field application because these areas "seal up" and prevent downward percolation. Can be risk for surface water contamination. Lagoons tend to seal as well, but there has been some interesting research looking at lagoon margins where liquid levels fluctuate, wetting and drying, and formation of cracks that can be a conduit for nitrate movement.
- An advantage with compost is that it is stable and more easily exported to where nutrients are in demand. Possible down side is the nutrient concentrations are variable, less often analyzed, and therefore more difficult to quantify in a nutrient budget.
- The big key to preventing field application from causing excess groundwater contamination by nitrates is to do ~~accurate~~ accounting of nitrogen (nutrient management planning). It's like keeping an accurate nitrogen budget based on real analyses and realistic projections.
- BMPs work only if used; not if just filling a page in a book.

Resources Requested

None at this time

Recommendations for GWAC

None at this time

Deliverables/Products Status

None at this time

Proposed Next Steps

- Coordinate work with (a) Irrigated Ag Work Group, (b) Residential, Commercial and Industrial Work Group, and (c) Data Collection, Characterization and Monitoring Work Group to find nitrate sources
- Work with the consultant that will be hired to determine regulatory, BMPs and data monitoring plan
- Hold monthly meetings to make sure progress is being made in developing the work plan