Berry Land Management Practices for Soil and Water Quality

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Whatcom Conservation District

• WCD’s mission is to assist land managers with their conservation choices.

• Since 1946, we have worked with landowners and farmers to manage natural resources in Whatcom County.

• The WCD has a wealth of information concerning water quality issues, management of small and large farming operations, and implementation of best management practices (BMPs).
Pollution Issues in Western Washington

• **Surface Water**
  • Sediment – Soil
  • Nutrients – Fertilizer, manure
  • Chemicals – Sprays and granular
  • Pathogens – Manure, human, natural

• **Groundwater**
  • Nitrate – Fertilizer, manure
  • Other
Importance of water quality

• Recreational use
• Aquatic habitat and fish
• Shellfish industry
• Marine life

Photo credit: feed14million.com, bigtacklebox.blogspot.com, king5news.com
Water Quality Concerns

• **Pathogen** - Fecal coliform bacteria in watershed is of primary concern.
• **Nutrient** - Run-off and leaching of fertilizer materials
• **Sediment** - Erosion, drainage and water clarity
• **Sprays** - Managing drift, run-off and collateral exposure
Pathogen: Fecal Coliform in Waterways

Manure Use
- Timing
- Location
- Incorporation

Compromised Septic
- Use of RV’s and portable toilets
- Temporary housing

Seasonal flooding

Photo credit: wa.gov
Managing Nutrients

Application Considerations:

• Timing
• Rate
• Placement
• Source
When is Manure Used in Berry?

- Field renovation/planting
- In-season fertilizer
- Mulch replacement
Placement of Manure

• Avoid spreading manure on **sloped areas** where manure could run to water sources

• Avoid spreading manure in **close proximity** to water sources

• Avoid manure application in areas subject to annual **flooding**, especially during flood prone periods

• Review seasonal setback distances
## Seasonal Manure Application Setback Distances

<table>
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<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<td>80³</td>
<td>80³</td>
<td>40</td>
<td>40</td>
<td>40/10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>40</td>
<td>80</td>
<td>80²³</td>
<td>80²³</td>
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</tbody>
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¹This is a floating date and should be evaluated based on current weather and forecast information.
²Application during November and December is typically not necessary and must be shown to be agronomic before manure is applied.
³Any manure application made from November-February should have a winter spreading plan in place.

See your local county guidelines for critical areas ordinance setbacks and/or manure application ordinance.
Incorporation of Manure

• Manure incorporated into the soil is less prone to run-off
• Less likely to volatilize and be lost as ammonia
• Especially important for sloped areas and areas with close natural water and during wet seasons

Photo credit: news.maryland.gov, agripedia.au
Rate of Manure Application

• Avoid applying more than needed - excess material can lead to run-off and/or leaching

• Manure should be tested prior to application to know levels of nutrients

• Compare results of soil and manure nutrient tests to calculate how much manure you need

• Nutrient analysis can help apply targeted nutrients to keep plants within the sufficiency ranges

Photo credit: zimmermansberryfarm.com
Timing of Manure Use

• Only apply manure when conditions are favorable
  • No application on saturated or frozen soils, or flooded areas
  • Avoid applying when rain is expected

• Avoid applying from late fall through early spring
  • Frequent rain and saturated soils can increase the risk of run-off and leaching
Application of **Liquid** Manure

- Soil tests = How much manure do you need?
- Get a test – will vary by season and facility
- Injection is best in high risk seasons
- Observe the forecast to find best timing
- Watch for swales/slopes to waterways
- Follow manure setback guidance
Storage and Application of **Solid** Manure

- Get a test – Solid manure has nutrient content
- Observe manure setback distances
- Incorporate immediately
- Manure should be properly covered and contained to prevent runoff or leaching to groundwater
- Don’t store manure piles:
  - On well drained soils
  - On fields in flood plane
  - Within 100 feet of waterbody
  - Within 250 feet of wells
  - On a slope to a waterbody
  - Near neighbors

Photo credit: newagtalk.com, peakbuildersca.com
Non-manure Fertilizer Timing

Keys to efficient fertilizer timing

• Match application to peak demand of the plant
• Observe local weather forecast and plan product application accordingly
• For blueberries, manure is not recommended before planting but digested solids can be used as a topdressing or mulch
• For fall fruiting berries, composted manure can be applied to the soil in spring
Rate of Fertilizer Application

• Applying more fertilizer than recommended doesn’t ensure increased yield or lead to better uptake
• Excess increases both the cost and potential contamination of water supplies
• Excessive nitrogen application increases the potential for nitrate leaching
• Excessive phosphorus can lead to a buildup of P in the soil and increased losses due to run-off when soil erosion is not minimized
Placement of Fertilizer Application

The applied nutrient, crop type, soil conditions and tillage systems impact the placement of nutrients. A few placement methods include:

- Broadcast
- Banding
- Fertigation
- Point injection
- Manure solids as mulch

Photo credit: biocycle.net, uwex.edu
Sediment Pollution

- Preventing erosion
- Excess sediment from erosion can backfill salmon spawning areas
- Turbidity can negatively effect water plants as well as wildlife

Photo credit: danhellar.com, wunderground.com
Spray Applications

Effective Application of Nutrients and Pesticides and Herbicides

- Adherence to the product label
- Attention to weather conditions
- Time of day (pollinator health)
- Setbacks and spay buffers/screens

Photo credit: cornandsoybeandigest.com, newgarden.org
Land Management Practices
Sediment, Buffer Zones, Wetlands, Pollinator Habitat, Row Crops and Soil Quality
Minimizing Sediment Pollution

• Maintaining water flow
• In-stream sediment screens
• Maintaining field cover
• Vegetative buffers and filter strips

Photo credit: danhellar.com, wunderground.com
Riparian Buffers

Setting up and maintaining buffer zones

• Riparian buffer zones are areas of trees and shrubs located adjacent to streams, ponds, and wetlands

• Vegetative buffers act as bio filters, they absorb nutrient and chemical run-off
Wetlands

Land that is either permanently or seasonally saturated with water, providing a unique ecosystem for plants and animals.

- Wetlands act as a bio-filter improving downstream water quality
- Seasonal flood protection
- Multiple federal agencies including EPA, FWS and USDA regulate wetland management
- The WCD can help in assessing possible areas of wetland and in wetland restoration

Photo credit: cornandsoybeandigest.com, newgarden.org
Pollinator and Beneficial Insect Habitats

• Native pollinators can increase fruit set and reduce commercial pollinator demands

• Habitat strips may improve native pollinator populations

• Habitat strips may also increase populations of predatory insects and aid in the management of insect pests

Photo credit: cornandsoybeandigest.com, newgarden.org
Cover and In-Row Crops

Crops planted to manage soil erosion, soil fertility, soil quality, water, weeds, pests and diseases.

Can be installed both as a pre-plant cover crop or as a permanent alleyway cover.

**Cover crops offer:**

- Decreased soil compaction
- Increased water infiltration
- Reduced run-off and erosion
- Equipment traction

Photo credit: cornandsoybeandigest.com, newgarden.org
Storage of Mulches

• Including: wood chips, sawdust, manure solids, etc.

• Mulch materials should be stored away from irrigation ditches, streams and other waterways.

• Long term storage should take into account season flooding and wet season field conditions.

Photo credit: cornandsoybeandigest.com, newgarden.org
Reducing Field Compaction

- Why its important?
  - Reducing ponding
  - Run-off
  - Increases water infiltration
  - Soil health

- Cover crops help reduce compaction

- Repeated tillage at the same depth and Rain drop impact and driving on it while wet increases compaction

Photo credit: cornandsoybeandigest.com, newgarden.org
Outlook

Regulatory
• The Dairy industry saw increased regulation of farm practices starting in 1998 as a result of watershed pollution (potentially originating with dairy's) impacting shellfish beds
• The potential for regulation imposing similar restrictions on nutrient products is likely in the berry production industry.

Industry Outlook
• Forecasting use
Resources Available

- Cost share
  - Hedgerows
  - CREP
  - Land management practices
  - Structures

- Farm planning at WCD
  - Identify resource concerns
  - Suggest corrective measures

- Educational materials
  - Factsheets
Thank you!

For more info, go to: www.whatcomcd.org/berry-farm or call (360) 526-2381