Employee Training: Part 1

Agricultural Water Quality: Introduction

Management of agricultural runoff has become one of the biggest challenges for agricultural producers in Southern California. Increasingly strict water quality regulations can be cumbersome and costly. Changes in the way a grower manages a growing operation may be necessary to fulfill the requirements of the laws and regulations. Although the federal laws protecting water quality are not new, there are recent changes in state and local water quality laws.

The State of California, through the Regional Water Quality Control Boards, issues **Stormwater Permits** to local municipalities. The local governments then jointly develop what is commonly called a **Stormwater Ordinance**, or a set of local regulations to control the discharge of pollutants into the storm drain system. Agriculture is included in the group of regulated businesses and activities. An annual inspection of all regulated businesses, including many agricultural properties, is conducted to determine if water quality regulations are being followed.

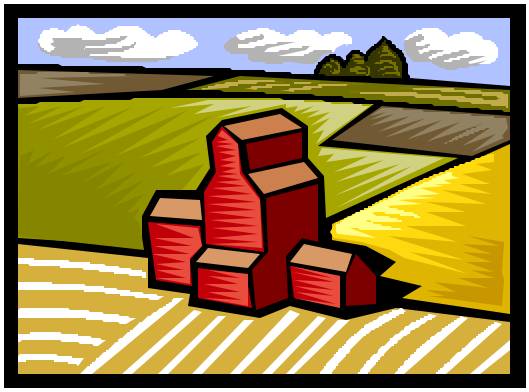
The name "Stormwater Ordinance" is somewhat misleading. This ordinance regulates runoff that is not from a storm, but rather from some other source or activity, such as irrigation. The regulations prohibit water that is not from a storm or other precipitation event from entering the **stormdrain system,** or the system of interconnected street drains, ditches, streams, rivers, lakes, and the beaches. When all sources of water within a drainage area are considered, it is called a **watershed approach.** Water that enters the stormdrain system is not treated or purified in any way, but rather flows directly to the river, lake or to the beach in its polluted state.

There are numerous ways for an agricultural operation to decrease its contributions to water pollution. Some of these methods are simple, and are called best management practices, or **BMP's** that can benefit the grower and the growing operation by increasing productivity while decreasing water pollution.

One of the requirements of the Stormwater Ordinance is for agriculture to raise the awareness of its employees, and incorporate them into efforts to minimize or eliminate runoff from the agricultural properties. These educational materials are designed to cover the topics that are of most concern, and to allow producers to have appropriate materials available for employee training.

Employee Training: Part 2

Agricultural Water Quality: Site and Emergency Information



Certain types of information must be provided when a farm is inspected for compliance with stormwater regulations. It is recommended that growers use the Agricultural Water Quality Record Keeping System developed as part of the UC Cooperative Extension Ag Water Quality Research and Extension Program, or develop their own system that works with their growing operation.

One of the items that must be a part of water quality record-keeping is a **map of the farm site**. This must include street or road names, general neighborhood location and any streams, lakes, rivers or other water bodies located on or near the property. The slope or drainage should also be noted on the map.

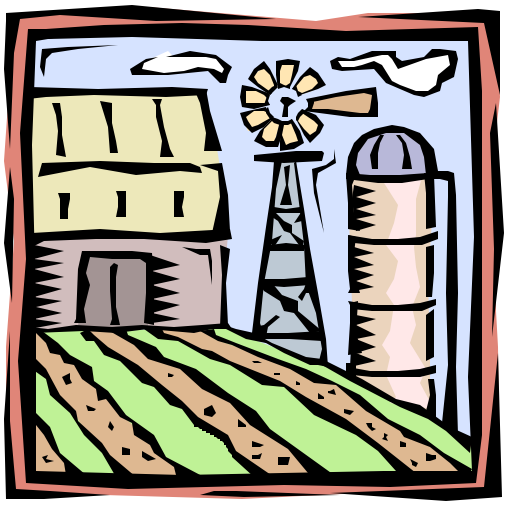
In addition to the map showing the general location of the farm, an additional map showing location of various facilities on the farm must be included. The same general site map that is used for hazardous materials inspections can be used for water quality records. Location of facilities such as pesticide storage, wells, gasoline pumps and other chemical storage should be added to the map if they are not already there. Reviewing the map will indicate if there are materials stored in any locations that will impact water quality.

In addition to mapping the farm site, **emergency information** must be available in the event of a chemical spill or other incident that may have an impact on water quality. A **spill response plan** needs to be in place, with care taken to note possible water quality impacts. Employees must be familiar with clean-up procedures. Phone numbers of those to contact in the event of an event that causes contamination of a water body must be included in the record keeping, and should also be posted in a readily available location.

Take a look around: With your site map in hand, walk your farm site with any employees that will be involved in hazardous materials management or spill responses. Amend your map Use this as an opportunity to change the location of storage of materials or other activities if it is obvious that there is a better location that will have less impact on water quality. Check on postings for emergency numbers and make sure your **supplies for spill clean-up** are easily available and in adequate supply. Note in your water quality records that you have reviewed your map and location, and any changes you have made.

Employee Training: Part 3

Agricultural Water Quality: Employee Training and Annual Facilities Review



Planning for adequate water quality protection includes a number of items that must be addressed on an annual basis. Document the following efforts for your annual inspection:

- **Annual Review of Facilities and Activities:**
- All facilities, activities, operations and procedures potentially impacting water quality need to be reviewed annually.
- Look for illegal stormdrain connections or illegal discharges of non-storm runoff into the stormdrain system.
- Check for illegal disposal practices and take corrective measures.

- **Stormdrain Tileage and Signage:**
- Both are encouraged as a BMP, but not required
- Anti-dumping message should be placed on or near stormdrains

- **SWPPP-Stormwater Pollution Prevention Plan:**
- If your enforcement agency requires you to develop a SWPPP, it is usually because of a violation or special circumstances.
- Review your SWPPP and update annually.

- **Pollution Prevention**
- Implement pollution prevention measures where necessary
- Review measures and repair or update annually

- **Employee Training**
- All employers with ten or more full time employees must conduct annual water quality training.
- Documentation of training must be maintained on site.
- Training must be adequate to ensure compliance with stormwater ordinance.

Take a look around: Review all locations, practices and situations that may contribute to water quality problems, with your employees if possible. Illegal stormdrain connections are fairly common, and some of them may have been installed even before you owned or managed the property. Remember, only stormwater is allowed to flow into the stormdrain system. Sometimes it is helpful to have the assistance of a representative of an agency providing help to growers in meeting the water quality requirements. There are also self-assessments available from UC Cooperative Extension that will allow you to review your operation and pinpoint problem areas.

Employee Training: Part 4

Agricultural Water Quality: Hazardous Materials

Hazardous materials management and storage may impact water quality on your farm. There may be a larger impact from a spill or leak in hazardous materials far beyond the boundaries of your growing operation.

- **Hazardous Materials Loading, Unloading and Storage BMP's:**
- Handle, store, manage and dispose of all hazardous materials according to all applicable regulations and label instructions.
- Hazardous materials should be stored off the ground and indoors whenever possible. If they must be stored outdoors, they should be covered.
- Make sure that all drums and containers are in good condition, and do not contain rusted-out areas that can leak hazardous materials. They should be securely closed when not in use.
- All spill response materials, or spill kits, should be maintained close to the hazardous materials. Employees must be trained in the use of the spill kit.
- Significant spills of hazardous materials must be reported to the proper authorities promptly.
- If an area containing hazardous materials has the potential to discharge those materials, secondary containment should be used to minimize risk.
- Prior to the rainy season, hazardous materials storage areas must be inspected to minimize problems that can be associated with flooding, standing water, leaking roofs on storage areas and any other factor that could lead to contamination of the water.

Take a look around: Make sure you and any employees that have responsibility for the hazardous materials used on your farm review the storage and handling procedures annually. It is very important that you have a spill kit on hand, and that it contains adequate materials to take care of any immediate problems associated with spills of hazardous materials. If you think you need to install secondary containment because you storage area is in an area that could potentially flood or otherwise cause problems, install it before the rainy season.

Employee Training: Part 5

Agricultural Water Quality: Waste Management

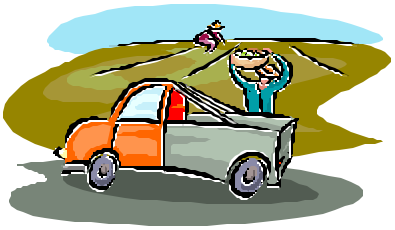
Management of on-farm waste is an important part of maintaining water quality.

- **Waste Management BMP's:**
- Keep trash and disposal areas clean and free of debris.
- Keep dumpsters and other waste containers in good conditions. Check for areas where they have "rusted out" and could potentially leak. Securely close lids.
- Dispose of trash and other wastes in a timely manner and in appropriate containers. Do not forget the areas that are used for employee lunch tables, porta potties, handwashing areas etc.
- Materials and equipment for clean-up of trash and debris should be kept handy and in good condition.
- Inspect trash storage/disposal areas and all loading and unloading areas at least weekly for potential problems.
- Wet clean trash storage/disposal areas only if there is not possibility of discharge of the wash water.
- Load and unload of significant materials only in designated areas.
- Spills and leaks from loading and unloading must be cleaned up promptly.
- Spill response materials or a "spill kit" should be kept near loading and unloading area. Employees should be trained in the use of the spill response kit.
- If there is a stormdrain inlet near the trash storage area or the loading and unloading areas, protect it during the loading and unloading events.
- Make sure that your loading and unloading equipment such as forklifts and pallet jacks are maintained to avoid leaks of hazardous materials in the loading and unloading area.

Take a look around: Management of wastes on farm is often overlooked because it is not seen as a part of the actual farming operation. With your employees involved in managing the waste materials, loading or unloading and any other activity, review your practices and locations where waste management occurs and make sure there is no potential for your waste management methods to contribute to water quality problems.

Employee Training: Part 6

Agricultural Water Quality: Vehicles and Equipment



Agricultural operations utilize a variety of vehicles and equipment in producing, harvesting and transporting crops. Certain aspects of vehicle fueling, maintenance, repair and washing can contribute to water quality degradation if care is not taken to avoid problems.

- **Vehicle and Equipment Fueling BMP's:**
- Prevent spills and leaking during fueling.
- Maintain a "spill kit" close to the area where fueling takes place. Report significant spills of fuel promptly.
- Protect stormdrains in areas near fueling.
- Fuel only in designated areas with spill precautions.

- **Vehicle and Equipment Maintenance and Repair BMP's:**
- Precautions should be taken to prevent spills during vehicle maintenance and repair.
- Keep a "spill kit" in the maintenance and repair area, and make sure the employees know how to use it. Report significant spills promptly.
- Protect stormdrains in the maintenance and repair areas.
- Perform maintenance and repair activities only within designated areas.
- Wet cleaning of maintenance and repair areas only if there is no danger of discharging wash water. Dry cleaning is preferred.
- Use drip pans or other containment during maintenance.
- If you store retired vehicles, drain them of all fluids.
-
- **Vehicles and Equipment Washing BMP's:**
- Do not allow washing in areas where there is direct access to the storm drains.
- Only wash vehicles and equipment in designated areas.
- If possible, plumb wash areas to sewer.
- Do not allow wash water from de-greasing engines, mechanical parts or heavy equipment to infiltrate soil.
- Reduce or eliminate soaps and degreasers where possible.
- Use drip pans and other containment for equipment stored outdoors.
- Equipment stored outdoors should be bermed and covered where possible and practical.
- Spill kit maintained in outdoor equipment storage area, and employees should be trained in its use.

Take a look around: Washing vehicles and equipment is often overlooked as a pollutant source, since it is not really considered part of the growing operation. However, it can significantly contribute to water quality problems. All employees involved in equipment maintenance should be well informed of precautionary measures that will minimize pollution problems from vehicle and equipment management.

Employee Training: Part 7

Agricultural Water Quality: Outdoor Areas

Rooftops, Parking Areas and Grounds/Landscaping are all areas in a growing operation that can contribute significantly to water quality degradation. There are numerous BMP's that can aid is reducing the pollution problems from these areas:

- **Rooftop BMP's:**
- Do not store any materials on rooftops that may contaminate stormwater as it falls onto those areas.
- If you are storing equipment on rooftops, inspect it periodically for leaks.
- Remove accumulated materials and bird droppings periodically, especially before the rainy season.

- **Parking area BMP's:**
- Route downspouts away from parking and other hard surface areas, and into a pervious area to allow the water to soak into the ground.
- Periodically clean parking areas, but be careful to protect storm drains. Dry cleaning preferred.
- Evaluate new parking areas for 100+ vehicles for best management practices, including routing of water.
- Inspect stored vehicles for leaks.
- Provide trash containers in parking areas.
- Avoid contact of stormwater and stored equipment.

- **Landscape BMP's:**
- Prevent leaks, spills and chemical over-application on landscaped areas.
- Use chemicals according to label directions, and dispose of properly.
- Try to avoid chemical applications just before a rainfall.
- Properly label and store landscape chemicals.
- Use IPM whenever possible for landscape pest control.
- Clean landscape areas and remove debris and litter.
- Have a "spill kit" available and make sure the employees are trained in its use.
- Report spills in outdoor areas promptly.
- Stabilize exposed slopes to eliminate problems with erosion.
- Clean sidewalks periodically, preferably with dry methods.

Take a look around: Check your outdoor areas carefully for any location that will flow into a stream, ditch or other portion of the stormdrain system. Once again, these are areas of a growing operation that are often overlooked since they are not necessarily related to production. It is most effective to review your outdoor areas just prior to the rainy season, as the rainwater will quickly carry the accumulated pollutants into the stormdrain system, causing water quality problems.

Entrenamiento del Trabajador: Parte 8
La calidad del agua en las labores agrícolas: **IPM y el uso de pesticidas**

El IPM, o el Control Integrado de Plagas, es un método ampliamente recomendado para el control de plagas en todo tipo de operación en crecimiento. Requiere organización y compromiso a largo plazo pero, bien aplicado, es una manera muy efectiva para controlar plagas. El IPM no necesariamente excluye el uso de pesticidas sino que se basa en los niveles de tolerancia de las plagas para determinar la aplicación de pesticidas.

BMPs para el control integrado de plagas:

- Familiarícese con los cultivos, las plagas que comúnmente se encuentran en los cultivos y también las nuevas plagas que pudieran convertirse en un problema en su región.
- Asigne a una persona o a un equipo de personas para que caminen por los plantíos en busca de la presencia de insectos y, al encontrarlos, observen qué tan numerosos son. Muchos agricultores usan servicios de consultoría para esta tarea.
- Determine los niveles de tolerancia para las plagas en cuestión. Esto variará dependiendo del cultivo y partes de las plantas afectadas, época del año, tiempo de la cosecha, etc.
- Familiarícese con el uso de agentes de control biológico que puedan ser efectivos para controlar plagas. Tenga en mente que si necesita aplicar pesticidas, estos probablemente eliminarán los agentes de control biológico junto con las plagas y usted tendrá que comenzar de nuevo a establecer un programa de control biológico.
- Busque prácticas alternativas que puedan reducir los problemas de plagas, como prácticas alternativas de riego, enmallado de viveros, uso de plantas certificadas para sembrar o resistentes a plagas, eliminación de agua estancada que pueda ser un criadero de insectos y otras medidas que permitan mantener la granja y las instalaciones más limpias.

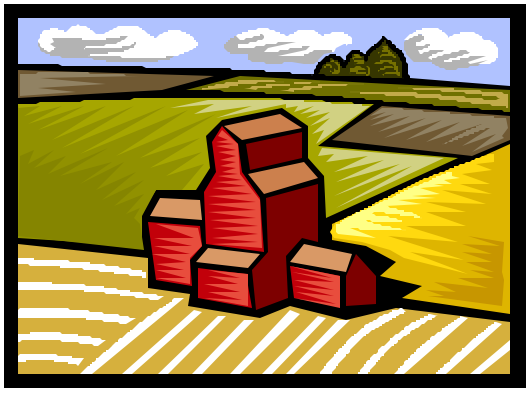
BMPs para el manejo de pesticidas:

- Determine qué pesticidas se usan para controlar las plagas en cuestión y vea si tendrán efectos en otras plagas.
- Considere el factor de resistencia para los insectos y otras plagas en cuestión.
- Al usar pesticidas, recuerde seguir las instrucciones al mezclar, aplicar, almacenar y todas las demás medidas de seguridad.
- Almacene los pesticidas en áreas cubiertas, bajo llave y que no toquen el piso.
- Inspeccione las áreas de almacenamiento de pesticidas para ver que no haya fugas.
- Tome en cuenta las condiciones climáticas y el calendario de irrigación en áreas en que se aplicarán los pesticidas para reducir el riesgo de que el agua lleve el material aplicado a las vías fluviales.

Eche un vistazo a su alrededor: Revise con frecuencia los procedimientos para el control de plagas. Con la ayuda de la Extensión Cooperativa de la UC, asesores de control de plagas y otros profesionales determine si su empresa puede beneficiarse al implementar un programa IPM.

Employee Training: Part 9

Quality: Nutrient and Fertilizer Management



Excessive amounts of nutrients flowing into streams and waterways are currently one of the most common water pollution concerns. Excessive nutrient application and runoff is found in areas where plants are produced, as well as in recreational areas such as golf courses, parks, playing fields, and from neighborhoods. It is also associated with animal agriculture, particularly confined animal operations such as dairies, feedlots and stables. Management of nutrient runoff in plant production includes the management of irrigation, as the two are closely related.

Nutrient Management BMP's:

- Review the nutrient needs of your plants. Not all plant types require the same amount or types of fertilizers.
- Review the nutrient needs of your plants. Not all plant types require the same amount or types of fertilizers.
- Familiarize yourself with the different nutritional needs of your plants at different times of the year.
- Avoid over watering your plants. Remember that nitrogen is very water soluble, and if there is water running out of the bottom of the pot, it is likely there is fertilizer running out of the pot also.
- Try to adjust the type of fertilizer you use. It may be possible that you can use a material that is considered to be "time released", such as Osmocote, instead of one that is immediately available, such as calcium nitrate.
- If you are applying fertilizer with your irrigation water, you may be able to apply the fertilizer at a different time in the irrigation cycle or adjust your irrigation cycles to allow for maximum uptake of the nutrients.
- Work with your Crop Consultant, Pest Control Advisor or Farm Advisor to determine the best nutrient management scheme for your growing operation.
- Learn how to use a small, hand-held nutrient analyzer to check the amount of nutrients in any runoff water.
- Consider the amount of nutrients already in your irrigation water, and adjust your amount added.

Fertilizer Storage and Handling BMP's:

- Follow label instructions for storage, handling and disposal of fertilizer materials and containers.
- Always have your application equipment in good working order.
- Keep fertilizer materials dry and covered, preferably in an enclosed area.

Take a look around: One of the most common areas for fertilizer leakage and water contamination is near the fertilizer tanks that deliver the fertilizer solutions to your irrigation system. Check that area for leaks, improper fittings, and improper calibration and delivery.

Employee Training: Part 10

Agricultural Water Quality: Irrigation and Runoff Management

Good irrigation management is one of the keys to minimizing runoff problems from your farm. While most growers in Southern California are very aware that is it necessary to conserve water because of the high cost, there are still improvements that can be made to most systems. Management of runoff water is also important, as it carries with it pollutants that will affect the waterways.

- **Irrigation Management BMP's:**
- Check the water needs for the types of plants you are growing. You may be overwatering some plant types.
- Review your irrigation system. Does it deliver a uniform amount of water? Or do you have to water some plants excessively to make sure that all plants are getting the minimum amount of water.
- Work with an irrigation professional and conduct an "irrigation uniformity evaluation". Mission RCD in Fallbrook will assist you free of charge. This will allow you to determine the percent efficiency of your irrigation system. You should be trying to attain an efficiency rate of at least 80%, meaning that 80% of the sprinklers deliver the same amount of water.
- Check for sprinklers that are "homeless"-they are not in a pot, or their target plant is dead. They will simply deliver water that becomes runoff.
- If you are growing on hilly terrain, use a system of pressure compensation to allow your system to deliver an approximately equal amount of water to areas at the top and the bottom of the hills.
- If possible, install a tailwater recovery system to capture any irrigation runoff, and reuse it in your growing operation. The Natural Resources Conservation Service can assist you in designing a system.
- **Runoff Management BMP's:**
- Differentiate between irrigation runoff, and stormwater runoff. Irrigation runoff may not leave your property. Stormwater runoff will leave your property, in a clean a state as possible.
- Stockpiles of materials should be placed away from waterways and areas where runoff will pass through in a storm event.
- Routinely dry clean work areas where stormwater will pass through, to avoid materials being carried into waterways.
- Make sure to avoid erosion problems in a storm event, by planting hillsides to stabilize them or by using some other erosion control method.

Take a look around: Walk through your greenhouses, groves or fields while the irrigation system is on to look for any sprinklers that do not have a target plant. Shut them off to minimize runoff. Check your irrigation system for uniformity