A FARMER'S HANDBOOK

FOR THE IMPERIAL COUNTY FARM BUREAU'S

CONDITIONAL WAIVER

TO REDUCE

SILT

SEDIMENT

PHOSPHATE

PESTICIDES

FROM LEAVING YOUR FIELDS

Imperial County Farm Bureau Voluntary TMDL Compliance Program
August, 2018

TABLE OF CONTENTS

Program Overview

Imperial Valley farmers scored a huge victory with the development of the Imperial County Farm Bureau's (ICFB) Voluntary TMDL Program in 2001. Included in the rules, farmers must make every attempt to reduce the silt and sediment leaving their fields draining into the New and Alamo Rivers and ultimately the Salton Sea along with those drains that flow directly into the Salton Sea.

How the Program Works

As long as the targeted total suspended solids level goals are met, as determined by the Regional Water Quality Control Board (RWQCB), monitoring at the field level is not required. Fields are grouped into ten regions throughout the Imperial Valley that combine their best management practices to develop feasible methods of controlling pollutant runoff. Each TMDL participant will prepare a plan for their farming operations and implement the plan. Being organized into groups provides an organizational structure that enables ICFB to maintain the anonymity of individual growers through a region-wide monitoring and reporting program. Protecting individual operations from the scrutiny of the RWQCB is a major priority of the ICFB Program.

The RWQCB has agreed to grant temporary immunity to growers who participate in the ICFB Program. Growers who elect to participate register with the ICFB Voluntary Compliance Program and have their name submitted to the RWQCB are then free from further enforcement action from the RWQCB. They will, however, be accountable to ICFB and be required to follow through with their yearly commitment to cooperate.

The Alternative

As distasteful as cooperating with another regulatory program may seem, the alternative is even more grim. Growers who choose not to participate in the ICFB Program will be contacted by the RWQCB and required to submit a water quality management plan, proof of implementation, and monitoring results directly to RWQCB, which will cost over $30,000 per year. In addition, individuals registering directly with RWQCB fall under Tier III on the fee schedule, a price significantly higher than working with the coalition. (https://www.waterboards.ca.gov/resources/fees/docs/fy1718_agland_fees.pdf)
Another downside to individual compliance is the lack of privacy it provides, which is a primary objective of the ICFB Program. To top it off, growers who go it alone will be at the head of the list when it comes to RWQCB enforcement actions.

Who Must Participate

Any property over ten (10) acres in size that receives water from the Imperial Irrigation District (IID), or any property over five (5) acres in size that produces any commercial agricultural products must be enrolled.

The Tenant And Landowner Obligations

To reduce silt and sediment, farmers implement management practices at their own expense. Local farmers are not required to use certain management practices. Instead they are free to use any and all common sense approaches tailored to their particular field to reduce the silt and sediment from leaving their field while irrigating. Proper maintenance of IID drains is also a necessity and works in conjunction with the efforts farmers are undertaking in their fields.

In a nutshell, the Imperial County Farm Bureau's award winning TMDL Program is straightforward and uncomplicated. It is because of its simplicity that it has long been a regarded as one of the most successful programs in the state, if not the nation.

In 2015, the State Board required that we change our program from a Conditional Prohibition, which required no fee, to a Conditional Waiver, which has a state fee attached. (Hey folks, this is California!) As a result, landowners will be billed a yearly fee. This fee is sent directly to the State of California to cover costs of administering programs. The State Water Resource Control Board has the ability to increase the fees it administers as needed.

Working together, the Imperial Irrigation District and Imperial County Farm Bureau created a coalition to administer the new Conditional Waiver so that it qualifies for Tier I pricing (the cheapest option). For 2018 that yearly fee is $0.87 per acre. IID has agreed to do the billing for ICFB to reduce participation costs. Each landowner will receive a bill from the Imperial Irrigation District in November of each year, and payment must be receive by December 31st to remain in the program.

In addition, whoever is farming a particular field, whether it is the landowner or a tenant, **must maintain a current membership in the Imperial County Farm Bureau.**

Goals Of The Program

The program mandates that farmers must strive to reduce the amount of silt leaving their fields in each of the ten management areas enough so that the total amount of silt entering the Salton Sea is reduced by 50%.

Participation Success

Since the transition of the program from a conditional prohibition to a conditional waiver in 2015, TMDL has been able to achieve a 95% participation rate. Upon the transition, ICFB worked diligently on outreach to ensure that Imperial Valley farmers and landowners were aware of the irrigated lands program and took the opportunity to obtain coverage through the coalition to avoid facing the requirements and fees imposed by having to register directly with the state. Although we know that updating TMDL farm plans and paying the irrigated lands fee each year is not anyone's favorite thing to do, we must consider there is a much more negative alternative. We hope that the TMDL program continues it's success for the benefit of Imperial Valley Agriculture.

How Much Silt Is Too Much

A turbidity meter, which measures how much sediment is suspended in the water, can be used to see what degree of clarity is acceptable and what degree of clarity is not acceptable. The Imperial County Farm Bureau's Voluntary TMDL Compliance Program On-Farm Consultant can test your drainwater for you with a turbidity meter, but basically, if you can't see the bottom of your drain ditch when drain water is flowing through it, you are probably creating too much silt.

Growers will find that many of the farming practices they use today will reduce the amount of silt leaving their fields. The key is to determine which combination of management practices are the most economical and beneficial to accomplish the job. After all, you know your field better than anyone else so we leave it up to you to decide how to reduce the silt leaving your field.

SLOW IS THE ONLY WAY TO GO!

The key to the reduction of silt leaving the field is to keep the velocity of drain water below the magic speed at which soil particles are picked up and put into suspension by the speed of the water. The faster the water flows, the more silt it will carry in suspension. It's important to remember that once the silt and clay is in suspension and the drain water is muddy, it is too late to improve the situation until that muddy water has left the field. If you keep the drain water moving slowly from the very start, it becomes much simpler to manage.

Experience has shown that for most soils, if the drain water velocity is kept below 36 feet per minute the water will pick up little, if any, clay or silt and will remain clear. However, it is important to note that each field is different and requires different management practices to achieve clean water leaving your field through the drain box.

IMPORTANT MANAGEMENT PRACTICES

In most cases, one single management practice is not enough to reduce silt from leaving a field. Instead, many different management practices, working together, are usually required to reduce the sediment suspended in the drain water.

Drain Box

The Imperial Irrigation District requires a drain box on most Imperial Valley fields so that drainage water leaving the field can be measured as it drops in elevation from the farmer's field to the IID drain ditch. Although this simple device is designed to transfer water to different levels while allowing it to be measured, it also becomes one of the best tools that farmers can use to reduce silt in their drains. By regulating the sill or grade board of the drain box, soil erosion can be minimized.

The majority of drain boxes are made from concrete. They are heavy and hard to handle during installation. A new injection molded plastic drain box with a steel frame that accepts grade boards is currently available that reduces the cost of installation. The whole box weighs less than 50 pounds and is easily handled by one person. However, care must be taken to keep the area around the box free of dry weeds since the plastic material will burn.

Plastic Drain Box – Steel Frame

Concrete Drain Box

Wider Drain Box

If you have a damaged drain box that can't be repaired and must be replaced you should consider replacing it with a much wider 42-48" version. The major cost of replacing a drain box is labor, so the extra dollars spent for a wide version does not change the total cost significantly.

A wide drain box allows more water to be removed from the field without having to lower the level of the drain box sill while still allowing the drain water to travel slowly to the drain box.

Wide Drain Box

Drain Box Installation

When installing a new drain box care should be taken to carefully chip away the concrete around the current pipe connection so you can fit the new drain box to the old existing drain pipe. If you have to replace the existing drain pipe to the IID drain it must have an inside diameter of 12 inches. The last section must be increased to 18 inches and set partially submerged in the drain to reduce erosion on the opposite drainbank. This can be problematic because most backhoes cannot reach down far enough to install the drain pipe at the legal elevation in an IID drain. An excavator must be used. Sometimes, the IID will cooperate and bring in an excavator to install the new drain pipe for you. Under no circumstances should a new drain pipe be installed above the water level of the drain. It would only increase the erosion in the IID drain.

Drain Box Erosion Wings

If the drain box is not armored on both sides soil can be easily eroded around the drainbox. Many farmers stack broken pieces of concrete on either side of the drain box to form erosion wings. Others may use cinder blocks or even old tires, stacked on top of each other and the tires filled with soil to form a barrier.

Old Tires Used As Erosion Wings

Broken Concrete Pieces Used To Form Erosion Wings

Formed Concrete Erosion Wings

Wider Pan Ditch

The bottom of a pan ditch is usually the width made by a grader blade, (12-14 feet) and level from side to side so that drain water flows evenly across its width. Because of its width, a pan ditch is able to carry a much larger quantity of water at a slower speed and with less depth. For vegetable growers, who need to enter a field soon after irrigating to harvest, a pan ditch has the added benefit of drying much faster than a deep V-ditch.

In most cases, a wide pan ditch can replace a deep V-ditch for the same amount of labor and do a much better job of moving drain water off the field at a slower velocity without the water becoming muddy.

A wide pan ditch in conjunction with a wide drain box are two of the best tools available to reduce silt in the drainwater

Deep Drains and Deep Reverse Grade Drains

Deep Drain Before Irrigation

Deep Drain Blocked While Irrigating

Many fields east of Brawley and Calipatria have very deep drain ditches. Drain water moves from the field into the drains through concrete drop boxes or plastic spills. Some of the deeper versions are designed to flow in the opposite direction of the natural side-fall of the field. Although this type of field drain is very efficient in removing drain water from the field it can create many problems when trying to satisfy the requirements of the Silt TMDL.

The first point of erosion is where the irrigation water exits the end of the furrow, or area planted to crop, and travels straight for 20 to 50 feet across the lower end of the field to the drain. The sill boards in the concrete drain box should be adjusted while the field is being irrigated so the water can tell the irrigator what the proper level is. Ideally, when adjusted correctly, the water should be backed up to where the water exits the furrow or planted crop. Care must be taken that the crop is not submerged and that water will not stand when the field is finished irrigating.

In many cases this 20 to 50 foot strip of land between the end of the furrows and the drain is bare of any growth. In some situations planting this bare area with a grass will greatly reduce soil erosion. Any grass that is planted should be mowed and baled before it is allowed to go to seed. Rye grass, wheat, or oats would be good choices for planting on the end of sugar beet or alfalfa fields and the baled grass would make excellent feed for horses or calves. The grass should not be allowed to become too rank or it may back the water up into the field. On sandier fields bermuda grass may start growing naturally at the lower end of the fields.

The second point of erosion is where the water dumps into the drain ditch and begins flowing towards the final drain box that empties the field drain ditch into the Imperial Irrigation District's drain ditch.

In some cases plastic sheeting is used as a spillway to dump water from the field into the drain. This usually causes heavy erosion because the water picks up speed as it travels across the plastic sheeting. A layer of fiber mat material like used in construction placed over the plastic sheeting may slow down the water enough to stop the erosion if the differences in elevations are not too great.

Where concrete drain boxes are used to dump water from the field level to the drain ditch level, erosion occurs as the water exits the concrete pipe and drops a distance into the drain ditch causing large, round washes. If control structures were installed in the deep drains at the proper intervals, determined by the side fall of the field, it would allow the drains to remain full of water during irrigation. The pipes from the drop boxes would then be submerged by the water, which should help reduce turbulence and erosion. A self starting siphon can be installed in the main drain box dumping to the IID drain ditch to allow the field drain to empty slowly.

It's important that the final drain box, which dumps into the district drain, is adjusted to the correct level. Many of the deep drains are far deeper than they need to be and have become even deeper over the years. With the sill board set correctly, and water left to stand in the drains for a few days after each irrigation, the drains may slowly fill up with silt to the proper levels.

Self Starting Siphon Installed in a Drain Board

Self Starting Siphon Installed in a Drain Box

Drain Water Ditch Checks

Drain water ditch checks are small plastic lined dams placed in a ditch to control the flow and reduce the velocity of the water. When the side-fall of a field is too steep to allow drain water to run slowly, drain water ditch checks can be added to back up the water, slow it down, and reduce erosion. These small dams can be made from concrete, plastic covered earth, metal, wood, or whatever works the best for the grower.

New, labor saving products woven from straw and other fibers are being produced for erosion control in highway construction and landscaping. These work great to create a speed bump in a field drain to slow down the velocity of the drain water.

Speed Bump Made With An Erosion Log to Reduce Drain Water Velocity

Lined Spillways to Drain Water Into Drain Ditches

Small spillways, usually made from plastic sheeting is often used where the water drops from the small V-ditch down to the lower level of the main drain ditch. Lining the spillway with slick plastic sheeting only speeds up the water and means even more erosion may occur when the water hits the bottom of the drain ditch. Instead of plastic sheeting, if the spillway is lined with woven fiber mat, like used for erosion control in landscaping and highway construction, the water velocity is reduced by the coarse texture of the woven fiber mat and much less erosion occurs.

Fiber Matt Installed Over Plastic Sheetig To Stop Erosion

Maintaining the Proper Grade

While doing the groundwork for a new crop, growers should check the levels on the tail end of their fields. Many times low spots develop, particularly close to the drain box, and a slight touch-up with a laser land leveler plus resetting the height of the sill board on the drain box will do wonders to reduce the amount of erosion that occurs in the new crop.

Draining Water Across the End of a Field (No Drain Ditch)

If the borders are eliminated on the last 50 feet or so of the field, and the crop is maintained to the end of the field, the drain water from the upper lands can be used to irrigate the crop at the ends of the adjacent lower lands. The growing crop acts as a barrier to slow down the velocity of the water and crystal clear water is usually the end result when this method of drainage is used.

This method will not work if there is too much side slope on the field or where water standing in the lower portion of the field for too long a period may harm the crop or rise too high in the furrows and submerge the plants.

Wheat is Planted at Lower End of Field with No Drain Ditch to Slow the Water

Filter Strips

The bed that furrow crops are planted on must end before they reach the end of the field so cultivation and harvesting equipment can turn. In addition, the lower ends of hay fields, irrigated with borders, may die out from heavy traffic and compaction caused by the harvesting equipment.

This is where a filter strip works well, with or without a drain ditch, to reduce the velocity of the drain water. On sandy fields, different types of grasses will automatically replace the alfalfa on the lower ends of fields and act as a filter strip.

For crops planted on beds, natural occurring grassy weeds or light plantings of grasses such as wheat or rye grass will create a very good buffer to reduce the velocity of the drain water. Care should be taken to select the proper plant to use for the filter strip so that it does not become a weed that is difficult to control in the crop being grown.

For hay crops, the planted filter strips should be harvested separately so as not to contaminate the quality of the crop being grown. Even in hot weather when rye or wheat filter strips die out, the roots left in the soil will help prevent erosion until the process can be repeated in the fall.

Sprinkler Irrigation, Drip Irrigation, and Level Basin Irrigation

High amounts of erosion usually occur during the first irrigation when a new crop is being germinated on recently worked soil. When a moveable sprinkler irrigation system is used to germinate the crop no drainwater is produced. A level basin irrigation system as well as a drip irrigation system also produces no drain water and growers need to understand that these can be considered as the ultimate management practice.

Planting In The Mulch

Planting a crop such as wheat and even late sudan in the mulch is an excellent management practice. The Imperial Irrigation District does not allow any drain water to leave the field during the mulching irrigation. After the soil is mulched the seed is planted below the mulch and into the mud where it germinates without further irrigation. By the time the first irrigation is needed the plant will have grown to almost a foot high with a well-developed root system which reduces erosion. In addition the solid stand of the crop will act like a filter strip to slow down the water and reduce soil movement.

Pump-Back Systems

Pump-back systems, which return drain water back to the irrigation ditch, will reduce the amount of silt leaving the field because a portion of the water is being recycled and used over.

This too, can be listed as a very useful management practice but it comes with an added expense of labor and fuel required to pump the water back to the irrigation ditch.

Polyacrylamides (PAMs)

Polyacrylamides, or PAMs for short, are group of polymer compounds, relatively new to farming, that show great promise in reducing silt during irrigation where no other method is effective. The material works by either keeping the silt particles from becoming suspended in the drain water or allow suspended silt particles to settle out rapidly when applied to drainwater.

PAM granules can be metered into the irrigation water or broadcast into the soil at the end of the field. The cost of using PAM is relatively inexpensive and works great for the first irrigation after layby. PAM should be considered for higher value crops on very steep ground where the drainwater exiting the furrows is already too muddy.

Gopher Ditches

Unique to this area, a gopher ditch keeps a gopher from burrowing out of the field and directly into a deep drain thus stopping washouts and a tremendous loss of soil. Many times a deep drain or even the Alamo or New River may run next to a field with only a road separating the two. If a gopher burrows out of the field, under the road, and into the deep drain, irrigation water may cause terrible washouts. By digging a deep V-ditch along the edge of the field an extra barrier is created to keep the water contained should the gopher burrow out of the field. Instead of the burrow exiting in the deep drain or one of the rivers it comes out in the gopher ditch which allows the irrigator to see the washout, contain it in the gopher ditch, and repair it before serious damage is done. Care must be taken to keep the gopher ditch as weed free as possible or the weeds may attract gophers as a food source.

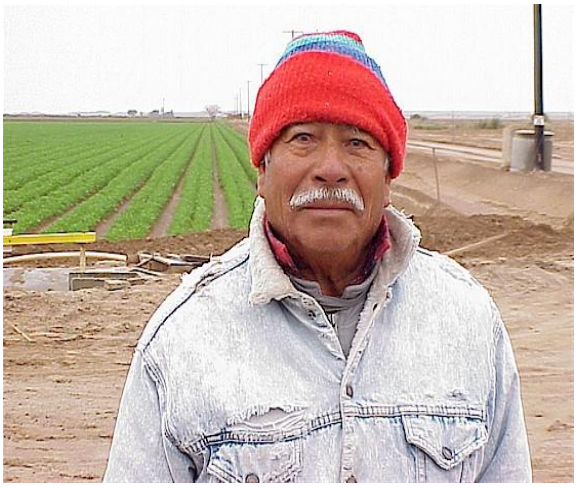
Gopher Ditch Between The Field And IID Drain Ditch

Fine Tuning

Already growers are inventing new ways to reduce the amount of silt that leaves a field. One grower has successfully used small lines of planted wheat across the bottom of a pan ditch as well as in front of a drop box to slow down the water leaving the field. With a positive attitude and innovative thinking, just about anything is possible.

The management plans listed above are only a small portion of what can be used to reduce the amount of silt leaving the fields. Whatever a grower can think of that works for that particular field, can also be considered a management plan whether or not its use is recognized.

The Most Important Person to Make TMDL Work



Even if all of the key BMP's are implemented, the success of whether or not there is a reduction of silt during an irrigation will depend on the **IRRIGATOR**.

The grower should use every possible means to re-educated the irrigator so that he understands what is trying to be accomplished and that he has the grower's backing to accomplish the task.

IVTMDL WEBSITE

www.ivtmdl.com

How to update your farm plan:

1. Log on to www.ivtmdl.com

2. Enter your username (email address) and password

3. Update the information for each field; add or delete fields if needed.

4. Verify all fields have been updated, as indicated with a green check mark under STATUS.

5. Print or save a report of all Up-to-Date fields for your records.

CONTACTS & RESOURCES

ICFB Staff:

ICFB Executive Director
Brea Mohamed
1000 Broadway
El Centro, CA 92243
brea@icfb.net
(760) 352-3831

ICFB Executive Assistant
Rachel Zajdel
1000 Broadway
El Centro, CA 92243
rachel@icfb.net
(760) 352-3831

ICFB TMDL On-Farm Consultant
Al Kalin
P.O. Box 1
Westmorland, CA 92281
akalin@hughes.net
(760) 455-1399

Websites:

www.ivtmdl.com
On the TMDL website, growers can register their their fields and update TMDL plans.

www.icfb.net
Find out more information on Imperial County Farm Bureau.

www.cfbf.com
Visit California Farm Bureau's website to join or renew your membership.

List of Suppliers:

Concrete Drain Boxes:
Superior Ready Mix
802 East Main Street
El Centro, CA 92243
(760) 352-4341

Plastic Drain Boxes:
Elms Equipment Rentals, Inc.
1676 Main Street
Brawley, CA 92227
(760) 344-3780

Drainbox Installation and Repair:
Clayton's Drain Tile Maintenance
1619 River Drive
Brawley, CA 92227
(760) 344-2183

Elms Equipment Rentals, Inc.
1644 E. Jones Road
Brawley, CA 92227
(760) 351-1911