CONSERVATION ON THE FARM

Click for more info

Clallam Conservation District provides assistance to farm and livestock owners on a variety of land and livestock management topics. We can help you evaluate the capabilities and limitations of your land and identify the most appropriate Best Management Practices (BMPs) for your particular situation.

Don't have animals yet? No problem, we can help you develop a plan before you bring animals onto your land. Already have animals? Great, we can help you research options for improving your property and livestock facilities. **We encourage all farm and livestock owners to work with us to develop a farm conservation plan!**

Through the farm planning process, District staff will work with you to evaluate current conditions on your farm and areas for improvement. Typically farm plans address the following practices (click each topic for more information):

- Pasture Management - determine productivity and grazing capacity, identify grasses and weeds, efficiently

Search

OFFICE HOURS:
TUESDAY, WEDNESDAY, THURSDAY
9:00 AM TO 4:00 PM

MONDAY AND FRIDAY - BY APPOINTMENT

SPRING NEWSLETTER

SOIL TESTING
1st & 3rd Wednesday of each month

PIC INFORMATION

MONTHLY BOARD MEETING

2nd Tuesday of each month, 3:00pm

UPCOMING CLASSES, WORKSHOPS

manage irrigation water, develop a rotational grazing system.

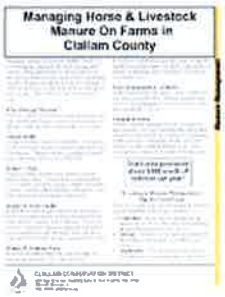
- Manure Management - estimate the volume of manure produced by livestock and options for safely storing and utilizing manure on your land.
- Mud Management - Identifying causes of excessively muddy livestock areas on your farm and options for minimizing these areas.
- Stream & Wetland Management - options for protecting streams and wetlands on your land.

IRRIGATION WATER CONSERVATION

- ***Sequim-Dungeness Water Users Association Rules and Regulations***
- **Map of Irrigation Districts & Companies**

Click on the guide above for tips on building mud-free paddocks for livestock.

Click on the guide above for information on managing healthy pastures in Clallam County.



Click on the guide above for information on managing horse and livestock manure in Clallam County.

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Contact Us | Login

Farm Conservation Planning

Clallam Conservation District is **non-regulatory** sub-division of state government. We work with land users on a voluntary basis to help you be a better steward of your land. Our assistance is **FREE** of charge.

We provide technical and financial assistance to help livestock owners **develop plans** for managing their land in a way that protects natural resources and benefits the health of their animals.
Financial assistance may be available to help off-set the costs of implementing practices that conserve natural resources. Please refer to our brochure titled *Financial Assistance for Agricultural Conservation.*

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December 2011

What is a Farm Conservation Plan?

A farm conservation plan is a document developed by you (with help from your Conservation District) that outlines actions necessary to meet your farming goals, while keeping your animals healthy, protecting water quality and conserving natural resources on your property.

Through the farm planning process, Conservation District staff will help you determine the grazing capacity of your pasture(s) and estimate the volume of manure produced by your livestock. Problem areas, such as muddy paddocks or roof drainage issues will be identified and potential solutions explored. Conservation District staff can help with the design of mud-free paddocks with durable footing, or assist with the development of an improved roof runoff management system to divert roof water away from paddocks, or other heavily used areas.

Who is Eligible for a Farm Conservation Plan?

Any land user in Clallam County is eligible, no matter what the size of your land or the number of animals that you have. Even if you don't have animals yet, a farm conservation plan can help get your farm off to the right start and help you avoid problems.

How Can a Farm Conservation Plan Benefit Me?

Benefits, include: saving money by increasing productivity over the long term; increased ease and efficiency of chores; healthier livestock; and a more attractive farm. Completion of a farm plan may also make you eligible for financial assistance for your improvements.

How Can a Conservation Plan Benefit the Environment?

A farm plan ensures better water quality for you, your livestock and your neighbors. Valuable natural resources, like soil, water, plants, and wildlife are protected on your land, enabling you to be a better steward of the environment while still managing a productive farm.

Do I Have to Follow My Plan?

Your conservation plan is a dynamic document that you can change over time to meet your needs and goals. Ever-changing factors such as finances, land availability, livestock numbers, etc., require periodic updates to your plan.

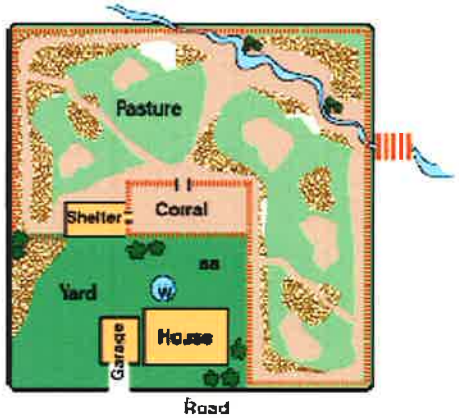
What Is the Farm Conservation Planning Process?

1. **Schedule an appointment** for a Conservation District planner to meet you at your farm. You will be asked to review and fill out a **Cooperator Agreement** (a voluntary agreement stating that we will work together to develop a mutually acceptable plan).
2. You will need to **define goals and objectives** for your farm. Goals and objectives can be as broad as wanting to raise cattle, or as specific as wanting to reduce mud and improve pastures.
3. Your planner will assist you with conducting an **inventory** of your farm. An inventory typically includes:
   - ✓ Soil type and slope of the land
   - ✓ Type and number of livestock
   - ✓ Pasture, hayland, and/or forestland health
   - ✓ Streams, ponds, ditches or other water bodies
   - ✓ Weed identification
   - ✓ Mud and manure management
4. Once the inventory is complete, your planner will assist you in **evaluating the condition** of your farm and your current management practices. Problem areas, such as muddy paddocks and over grazed pastures, for example, will be identified.
5. Work with your planner to **develop** and **explore alternatives** to address problem areas identified on your farm.
6. **Select alternatives** that best fit your management abilities, goals for your farm, and financial situation.
7. **Implement your farm conservation plan**. Your planner will provide you with the technical assistance needed to implement the alternatives you have chosen (for example how to build a fence, or what time of year to spread manure or mow pastures, or how to build a mud-free heavy use area).

Your planner can also help you explore any financial assistance that may be available to install practices that protect natural resources. Please refer to our ***Financial Assistance*** brochure for more information.

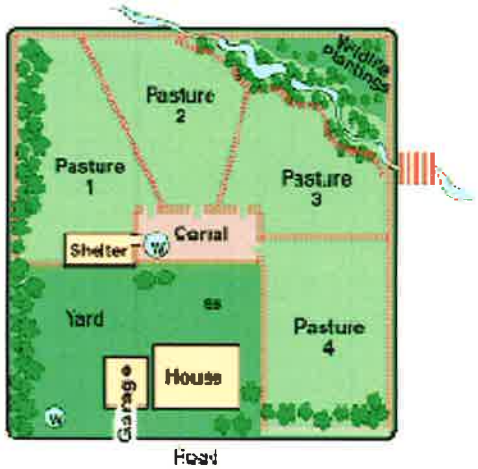
Without A Plan

- ✓ Pastures are **overgrazed**, weed invasion is likely due to bare ground
- ✓ Animals drink from stream, contributing to **erosion**
- ✓ Manure and sediment can enter the stream; there is **no vegetation** to filter runoff
- ✓ Bare soil creates **dust** in summer and **mud** in winter
- ✓ **Little food or cover** for wildlife



After A Plan

- ✓ Multiple pastures created, allowing for rotational grazing = **healthier pastures & more forage**
- ✓ **Stream is fenced** from animals and **replanted** with vegetation to prevent erosion
- ✓ Animals no longer drink from the stream; **stock water is in a central location**, accessible from all pastures
- ✓ **Corral has mud-free** footing - useable for winter confinement
- ✓ Trees and shrubs planted to create **wildlife habitat & windbreak**



Heavy Use Areas:

A Guide for Planning & Building Heavy Use Areas for Horses & Livestock

Mud Management

Heavy use areas, also called sacrifice areas, confinement areas, and winter paddocks, are your animals' winter outdoor living area. Heavy use areas are constructed using techniques to minimize mud. Livestock are confined in heavy use areas during the winter to keep the animals from compacting, overgrazing, and trampling wet pastures. Many livestock owners in Clallam County have built heavy use areas and most will agree they are essential for managing their farms.

Benefits of a Well-Planned Heavy Use Area

- Healthy, productive pastures — Keeping livestock off rain-soaked pastures is critical. Pastures typically cannot survive continuous grazing and trampling, especially during the winter months. Hooves compact the soil, suffocating plant roots and reducing the soil's capacity for holding water. Livestock can also remove all vegetation during the winter, leaving exposed bare ground that can erode into nearby waterways.
- Healthier, happier livestock — Mud is a slippery dangerous footing for livestock and living in mud can cause numerous health problems such as mud rot, rain scald, thrush, etc. Mud-free heavy use areas offer safe footing and a dry environment, minimizing these health problems.
- Easier manure management — Manure greatly contributes to mud problems, especially since most livestock manure contains between 70-80% moisture. Cleaning muddy, manure-filled paddocks is very difficult, if not impossible during the wet months. Heavy use areas allow for easy, year round cleaning, keeping your property beautiful and your livestock healthy.
- Better rotational grazing — Rotating livestock between pastures greatly increases grass production and overall pasture health. As a general rule of thumb, livestock should be removed from a pasture when the stubble height is 3 inches and should not be allowed back onto the pasture until the grass is 6-8 inches tall. Heavy use areas can be used to confine livestock until the pastures are ready for grazing.

LOCATION & SIZE

It is important to carefully consider the location of your heavy use area. The best place to build is on the highest, driest ground away from streams and wetlands. Livestock should have access to a shelter or barn. A slight slope will help with drainage, but avoid areas with steep slopes (over 30%) because they can be dangerous for livestock and are susceptible to erosion. Make sure the area you choose is convenient for cleaning and feeding. Heavy use area size is dependent on the number and type of livestock you own. They can range from small areas (such as 20' x 20') to long, narrow paddocks (such as 12' x 100') that will allow livestock room to exercise. Multiple animals can be kept in one sacrifice area so long as there is space for them to avoid one another if fighting occurs and each animal has access to feed.

Gravel heavy use area on a horse farm in Joyce.

Ask yourself the following questions when considering a site for a heavy use area:

- Can feed/delivery trucks easily access the area (gates should be about 12 feet wide)?
- Do livestock have access to fresh water?
- Can animals be fed without having to walk through the sacrifice area (this can be important if you have inexperienced people caring for your livestock)?
- Are alleys and pathways large enough for equipment such as tractors or wheelbarrows?
- Does this location allow easy access to pastures or fit well into your rotational grazing system?

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SELECTING FOOTIN G

Selecting and properly installing footing is essential when constructing a heavy use area. The benefits and drawbacks of different types of footing are discussed below. Keep in mind that the footing you choose will largely depend on the type of livestock you own, the availability of products, and costs. Many livestock owners have used a variety of these footing options in their heavy use areas. We recommend rock as a base footing, but other types of footings can be used for the top coat.

Footing Type	Benefits	Drawbacks	Notes
Hogfuel - This coarse wood product is made from chipped stumps, branches or logs. Hogfuel is available locally and prices range significantly depending on the supply.	• Inexpensive when compared to gravel, although you should apply 1-2' of material when constructing the heavy use area. • Natural composting process of the wood product contributes to the breakdown of the nitrogen in livestock urine and manure, thus reducing urine or ammonia smell.	• Decomposes overtime. Decomposed material must be removed every year and new material added. • Not a suitable footing for areas that are poorly drained because it becomes super-saturated and is difficult to clean.	When shopping for hogfuel, always look at the product prior to purchasing it. Avoid hogfuel made from lumber, building materials or mill ends as this may contain metal or nails. Take note of the size of the material, fine material will decompose before the end of winter and very coarse material will make picking up manure difficult. Make sure the wood pieces are soft and won't impale hooves.
Gravel - A minimum of 6 inches of compacted gravel should be applied and the size of gravel will depend on the type of material you want your livestock standing on; 3/8", 5/8", and 7/8" crushed rock are commonly used.	• Long term material life • Compacts to form a hard, durable surface • Easy to clean • Water typically flows along the top of the fabric • Allows for some drainage through the footing	• Expensive • An ammonia or urine smell is sometimes evident • Requires thorough manure removal for functionality • Some gravel will turn up in your manure pile • Surface may be too hard or sharp for some livestock (e.g. – horses don't like to roll on gravel)	
Sand - Coarse sand can be a useful footing in some heavy use areas. Sand should not be used as the only footing in areas where there is poor drainage. A minimum of 8-12" of sand should be applied.	• Soft surface that most livestock will lay/roll on • Easy to pick up manure • Allows for some drainage • Long term material life	• Expensive • Requires thorough manure removal for functionality • Cannot feed horses on sand surface (ingestion of sand particles will cause colic in horses and other livestock) • Plugs up with manure/organic material over time, leading to mud.	Sand can become dusty during the summer months, which can be unpleasant for both livestock and people. Sand, like gravel, varies greatly from pile to pile so be sure to inspect the pile before you buy.

Geotextile Fabric

Made of woven plastic, geotextile fabric is a heavy duty material that is commonly used for road building. Geotextile fabric is very useful in constructing heavy use areas as well. The fabric allows water to pass through, but does not allow sand or silt to migrate up. By using geotextile fabric, you will keep the gravel from "sinking" into the native soil over time, prolonging the life of your heavy use area. There are several types of geotextile fabric available at most local building supply stores. We recommend selecting a durable woven fabric designed for road building rather than the less expensive felt fabric which tends to breakdown faster.

CONSTRUCTION

Now that you have decided where to build your heavy use area and what type of material to use, it's time to start construction! Keep in mind that the best time of year to build a heavy use area is when the soil is dry. Do not try to build an area when the site is already muddy, you'll be wasting time and money!

1. **Eliminate water flowing into heavy use area.** Make sure that barns and shelters are equipped with gutters and downspouts that divert clean roof runoff water away from the heavy use area. Install curtain drains around the heavy use area to divert seasonal water (if needed). All diverted water should outlet to a dry well or clean grassy area away from manure piles.

Downspout carries roof water via pipe to drywell.

2. **Grade the area.** Remove any organic material such as manure and shape the bare ground to create a slight slope (1-2% is ideal). Avoid scrapping too much soil off the surface, the goal is to build up heavy use areas.

Geotextile fabric installed on bare ground and tucked into trench.

3. **Cover prepared bare ground with geotextile fabric.** Lay the fabric down in the same direction as the slope for enhanced water flow. Be sure to overlap the fabric pieces at least 2 feet to allow for shift when the footing is applied on top. You can temporarily hold the fabric down until you get the footing on or use garden staples or stakes to permanently pin the fabric to the ground. The edge of the fabric should be pulled outside of the fence to keep livestock from pulling up the edges. Alternatively, dig a trench around the heavy use area and tuck the fabric into the trench.

4. **Build a perimeter around your heavy use area to retain the footing.** Use railroad ties, fence posts, or other long lasting materials to build a perimeter around the heavy use area. The retaining perimeter around the heavy use area keeps the footing from being pushed out, especially along sloped areas or where livestock pace frequently along a fence line. Be sure that the retaining perimeter is outside of the fence line. Leave a small gap (1-2") between the retaining boards to allow for water passage.

5. **Spread base footing.** We recommend a 6-inch layer of rock. Size of rock can range from 3/4" to 1 1/4" minus or larger. Compact every four-inch layer of gravel using a compactor (commonly found at equipment rental stores). Use a hose to water the area and continue to compact it until the surface is firm.

Dump truck spreading gravel.

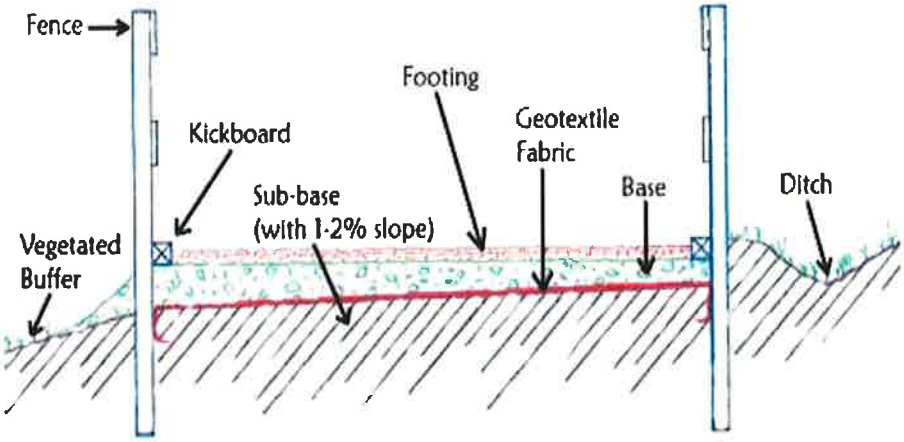
6. **Apply top footing, if desired.** Pea gravel, sand, and hogfuel are commonly used as top footings. Sand can migrate into the base footing over time, leading to plugging, so it is not recommended as a top footing over rock.

Compacting gravel with hand compactor.

7. **Leave a grass filter strip around heavy use area.** This grassy area around the outside of the heavy use area will catch excess nutrients (from livestock manure) and sediments and also soak up excess water running off the area. Clip grass regularly to promote growth and utilization of the nutrients. The width of the grass filter strip will vary depending on your soil type, vegetation density (thickness of the grass), and slope. A 25-foot grass buffer should be adequate for an area with little or no slope. Generally, the steeper the slope, the wider the filter strip needed to slow down faster moving water.

Grass filter strip downhill from heavy use area.

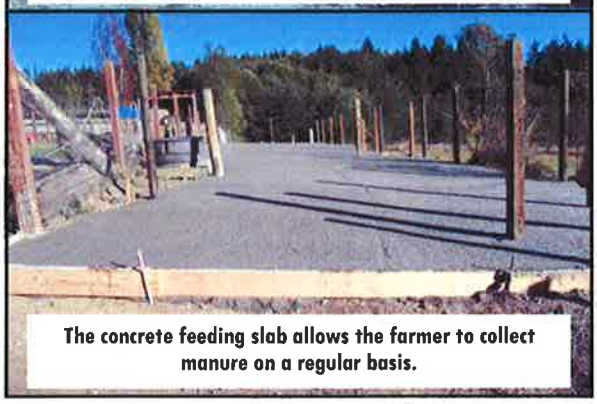
Diagram of a Sacrifice Area : Longitudinal Section



LOCAL EXAMPLES OF MUD CONTROL ON FARMS IN CLALLAM COUNTY

Location: Beef Cattle Farm in Sequim
Problem: The cattle traveled along a muddy lane from their winter pasture to the feeding area which was leading to pollution of a drainage ditch and nearby ponds. The winter feeding area was plagued with heavy mud and the farmer scraped the area to remove mud and manure, resulting in significant soil loss.
Solution: A concrete slab was poured in the feeding area. The slab was lined with concrete ecology blocks. The farmer can now scrape manure on a regular basis without removing native soil. The lane was protected by installing geotextile fabric and crushed rock, reducing muddy runoff .

This lane, used to move cattle from their feeding area to their winter sacrifice pasture, was protected from mud by installing geotextile fabric and crushed gravel.



The concrete feeding slab allows the farmer to collect manure on a regular basis.

Location: Horse Farm in Agnew
Problem: Horses were drinking water from an irrigation ditch and muddy runoff was flowing from the horse paddocks into the irrigation ditch.
Roof runoff water from the horse barn flowed into the paddock area, creating considerable mud in high traffic areas and adding to the runoff problem.
Solution: The horses were fenced out of the irrigation ditch and gutters and downspouts were installed on the barn. The roof water was directed into a stock tank and the overflow/excess roof water was piped to a drywell.

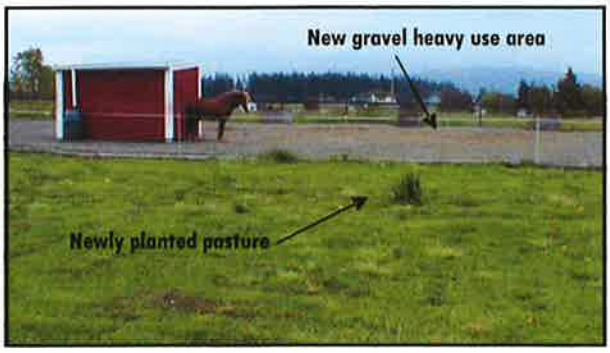
This horse owner used heavy use area construction techniques to eliminate mud around a water trough. Permeable pavers along with compacted gravel protect this heavily used area from mud.

Permeable pavers for mud control

Location: Sheep farm in Agnew
Problem: High traffic areas near the barn and feeding area became muddy during the winter. The barn was equipped with gutters but the downspout drained into the barnyard
Solution: Downspouts were installed on the barn and the roof runoff water was piped to a drywell out side of heavy traffic area. Gravel was installed in the barnyard to cover the bare soil and minimize mud.

Location: Horse farm in Sequim
Problem: Horses were confined to a large pasture (about 1 acre) during the winter months. The pasture was poorly drained and very muddy during the winter. Hogfuel was piled in areas to keep the horses out of the mud.
Solution: The winter pasture was reduced in size to a 60 x 100 foot area. The area was graded to remove excess organic material (manure and old hay/hogfuel) and covered with geotextile fabric and compacted 3/4" gravel. The area remained mud free over the first winter but the landowners noticed that the horses were not growing much hoof and that they would not roll on top of the footing. On a recommendation from their veterinarian, they top coated the heavy use area with pea gravel (which promotes hoof growth). They also constructed "sand boxes" which the horses roll in.

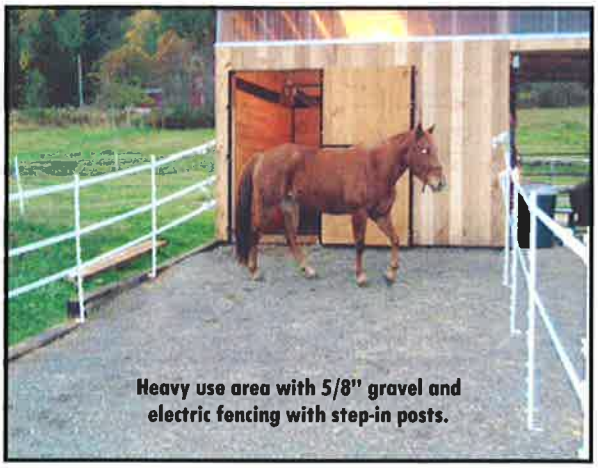
The remaining winter paddock area was planted to pasture. Roof runoff water is directed into a sealed rain barrel, where it is then used to fill a small stock tank. Excess roof runoff water is piped into the newly planted pasture.



FENCING

There are several things to consider when selecting and constructing fencing in your heavy use area:

- Safety should be the first consideration. Fences need to be safe and durable, especially since livestock will be living in the area for extended periods of time. The type of fence you choose will depend on your livestock. It is recommended that you offset the fence with a hot wire if your livestock tend to test/lean on the fence. Remember, the grass is always greener on the other side! Also, keep in mind that once built, your heavy use area will require periodic maintenance. Removable fencing (such as livestock panels) allow for easy access for maintenance. At a minimum, be sure that equipment can easily access the area through gates (minimum width of 12 feet).
- Different livestock have different needs. For horses, we recommend that you avoid barbed wire and hog or chicken wire, which they can become entangled in. Board or rails, smooth wire, and no climb woven wire are commonly used as fencing in heavy use areas. We recommend that you offset any fence with an electric wire to minimize damage by horses. Cattle tend to be less likely to interfere with fencing and will respect barbed wire. Again, your fence will last longer if it is offset by a hot wire.
- Be sure that gates are durable and swing conveniently (open to allow for easy cleaning, access, animal movement, etc.). We recommend that you install at least 12-foot gates to allow for equipment access.



Heavy use area with 5/8" gravel and electric fencing with step-in posts.

Mud-Reducing Tips:
Protect mud-prone areas such as gates, water troughs, walkways and feeding areas with the same heavy use area protection techniques.

MAINTENANCE

1. **Clean on a regular basis.** The most important maintenance activity to keep heavy use areas functional is regularly cleaning. Fine organic material, like manure and hay, will plug the footing layers over time, causing the area to drain poorly and become muddy. Manure should be removed at least every 3 days, though many livestock owners have found that daily manure removal yields the best results.

Try to avoid feeding on top of the footing since hay and grain can also plug the footing (not to mention that livestock may ingest some of the footing). Avoid allowing livestock to routinely move from muddy areas into the heavy use areas since they will track mud (from hooves) into the area.

2. **Fill in holes or low areas right away**. Be sure that the geotextile fabric is always covered, direct access to the fabric by livestock may cause damage to both the fabric and the livestock (the fabric is very slippery).

Maintenance Tips:

- **Do not feed on the surface of heavy use areas. Hay and other feed can plug the footing material. Also, livestock can ingest footing particles if they eat off the surface.**
- **For best results, clean the area daily to prevent manure from grinding into the footing.**

3. **Replace/add footing every year**. Some new footing will be needed every year to replace the material removed during cleaning. For best results, remove the top few inches of footing and replace it with new footing. This will enhance drainage, reduce odor, and provide for easier cleaning. Footing products that decompose, such as hogfuel, may be composted.
4. **Ensure that water is not draining into heavy use area**. Check that gutters, downspouts, and drainage ways are functioning and in good repair. One broken downspout can contribute a lot of water to your heavy use area!
5. **Maintain a grassy filter strip**. Keep the grass filter strip around the heavy use area healthy and productive. Grass height should be 3 to 6 inches, graze or mow to keep grass from going to seed.

OTHER APPLICATIONS

Areas around gates, water troughs, feeding areas, and livestock trails are also prone to mud because of heavy use by livestock. The construction techniques discussed in this handout can be used to protect these areas and make them functional and accessible year round.

Design A Heavy Use Area For Your Livestock

1. **Location & Size**
   Describe the location of your planned heavy use area:

   _____

   _____

   Is there at least a 25' filter strip between your heavy use area and any surface water?: YES NO

   Is the area convenient for cleaning, feeding, watering, and ongoing maintenance: YES NO

   Is all surface water, including roof water, directed away from your heavy use area? YES NO
   What is the estimated slope of the area?____%

   What is the size of your planned heavy use area? ___ft. long x ___ft. wide; Total sq. ft.=__
   (For horses, we recommend a minimum of 1,000 square feet per animal)

   What is the existing **soil type** where you will be constructing the heavy use area? (check one)

   ☐ (A) Drains poorly, water at surface most of the rainy season; soil shallow (hardpan) with clay

   ☐ (B) Drains moderately well, water puddles after a storm event , drains after a few hours

   ☐ (C) Drains well, water does not puddle at surface, deep gravelly or sandy soils

   If you checked **A or B**, use rock footing as a base in your heavy use area.
   If you checked **C**, you may not need rock as a base footing and you can apply a top footing to cover the bare soil. We encourage the use of hogfuel footing in well-drained soils to help protect ground water quality.

2. **Geotextile Fabric** – Install geotextile fabric on the bare ground to retain your footing and keep mud from migrating up through the footing layers. Geotextile fabric typically comes in rolls that vary in length. Most fabrics are 12.5 feet wide (road width). You can buy entire rolls or you can buy cut lengths (12.5 feet wide). Install the fabric in the same direction as your slope and overlap the fabric about 2 feet to allow for shift.

   Example: Your heavy use area will be 20 wide and 50 long. You will need approximately 2, 50+ foot lengths of geotextile fabric to cover this area (comes in 12.5' width). So, you will need about 1,350 square feet of fabric (or 108 lineal feet of 12.5' width fabric).
   Enter the square feet of fabric you need here:_____

3. **Selecting Footing** – We recommend that horse heavy use areas have a compacted rock base when built on poorly drained soils. Our general rule of thumb is 6 inches of compacted gravel as a base footing. You may choose to apply 2-4 inches of top footing (like sand or hogfuel). Volume calculation for base footing: volume = length x width x height; divide by 27 to get cubic yards.

   Enter the cubic yards of gravel needed:_____

   Enter the cubic yards of top footing (if desired):_____

(Selecting Footing *continued)*

Example: Your heavy use area will be 50' x 50' size with footing 6 inches deep:

50' x 50' x 0.5' = 1,250 cubic feet of rock

Most gravel companies sell their rock by the yard. **1 yard = 27 feet; 1,250/27 = 46.3 cubic yards** 1,250 cu ft = approximately 46 cubic yards. Most gravel trucks deliver 10 yards at a time. Round up to factor in the compaction of the rock. For a 50' x 50' square foot heavy use area, you would need approximately 5 trucks (or 50 yards) of gravel.

4. **Build the perimeter to retain footing – The "Sandbox" Technique**
Install edging around the perimeter of the heavy use area to keep livestock from pushing out the footing material. This is especially important on the downhill side of the heavy use area. Use re-bar to drive the timbers securely into the ground. Be sure to leave small gaps to allow for water passage, especially on the downhill sides. To determine the amount of retaining timbers you need, add up the perimeter of the heavy use area. Figure that you will need 2, 3 foot rebar stakes per timber (stakes should be pounded in the ground 2-3').

Example: For a 50' x 50' heavy use area, you will need 200 lineal feet of retaining timbers (or 25, 8' posts) You will also need 50 rebar stakes to secure the posts (2 stakes per post).

Enter number/feet of retaining timbers you need here:_____

Enter number of rebar stakes you need here:_____

5. **Compile materials list and calculate cost estimates.**
Now that you know how much materials you need, you can easily calculate your material costs. Fill in the table below to determine your heavy use area protection costs:

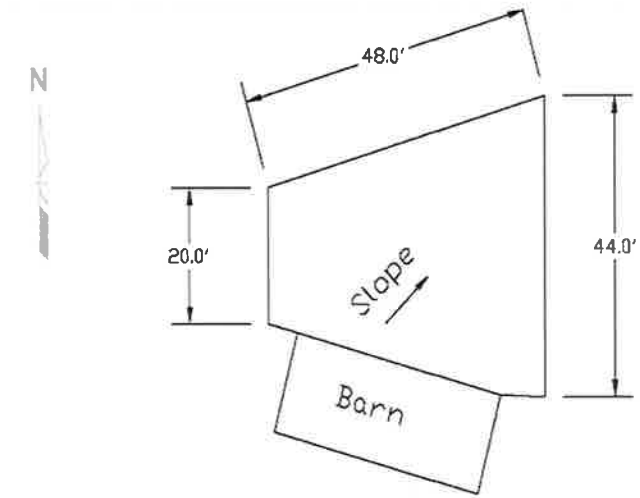
Item Description	Units Needed	* Estimate Cost Per Unit	Total Cost Estimate
Geotextile Fabric	Square feet	$1.60 per lineal foot or $0.13 per foot (comes in 12.5' widths)	
Footing Material (base)	Cubic yards	$18—$22 per yard, depends on material	
Footing Material (top coat)	Cubic yards	$18—$22 per yard, depends on material	
Retaining Perimeters	Each	$8.00 —$16.00 for new timbers or railroad ties, can use old fence posts, etc.	
Rebar Stakes	Each	$5.49 for 20' stake	
Fabric Staples	Each	$0.06 per staple	
Misc. Supplies			
TOTAL			

**** PRICES AS OF 2008***

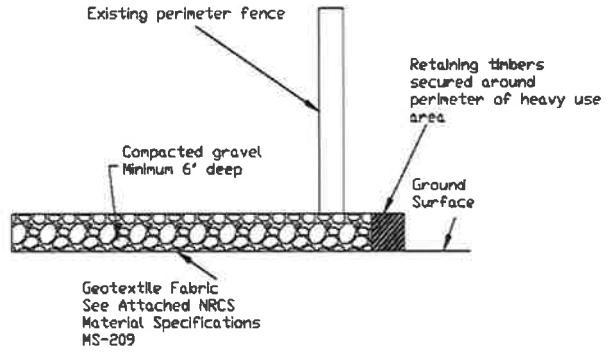
NOTE: While it is possible to build heavy use areas without a tractor, we recommend that you budget for the rental of a tractor with a front-end loader and/or contractor. A tractor will be needed to grade the bare ground (**Important: Do not excavate out soil when preparing the base, the goal is to build up the area, not dig down.)** A tractor can quickly and easily spread the footing. We also recommend renting a compactor to firmly compact the gravel base. You can usually find tractors and compactors by contacting your local equipment rental stores and contractors. Also, don't forget to talk to that neighbor with a tractor, maybe you can work out a deal!

Developing a Site Plan for your Heavy Use Area

Below is a **sample plan** for a heavy use area. Please use the back of this sheet (or graph paper) to design your heavy use area. We recommend including a plan view (top view) of the area and a cross-section (side view). Include all the information and details that you (or a contractor) will need to build the heavy use area. Be sure to include the slope, materials list, and size dimensions.



PLAN VIEW HEAVY USE AREA PROTECTION



HEAVY USE AREA PROTECTION
CROSS SECTION AT ENTRANCES

SURFACE PREPARATION
1. Dry season, excavate top soil to remove organic material.
2. Slope finished grade to the north and to the west.
3. Repair any damage to top fill material as soon as possible.

ESTIMATED MATERIALS LIST
23 cubic yards of coarse gravel
122' of retaining timbers
103 linear feet of GeoTextile fabric
Fabric staples to secure GeoTextile fabric

MAINTENANCE
1. Manure must be removed from confinement area on a regular basis (every 1–3 days).
2. Any bare soil surrounding the confinement area must be planted to grass and maintained for the life of the project.
3. Replace footing as needed and maintain slope.

Managing Healthy Pastures in Clallam County

What is Pasture Management?
Pasture management is simply the collective actions you as a landowner use to grow forage for your livestock. Think of yourself as a "grass farmer"; your job is to grow grass for your livestock. To do this, you need a *Pasture Management Plan* to guide your efforts. This handout will help you develop a pasture management plan. Also included is information on establishing, reseeding, and renovating pastures in Clallam County.

Benefits of a Well Managed Pasture
- Lower feed bills, healthier livestock
- Fewer weedy plants
- Improved aesthetics of your farm
- Protection of natural resources such as water quality and soil

Creating a Pasture Management Plan
There are three main steps for developing a pasture management plan for your farm:

1. Identify Goals– What are your goals for your pasture? How many animals can your pasture feed?
2. Inventory & Analysis– How much grass can you expect to grow? Will your pastures provide enough feed for your livestock?
3. Management Actions– What actions do you need to take to have healthy, productive pastures? This handout will explore management practices that you can use to increase the productivity of your pasture while protecting natural resources like water quality.

Pasture or Exercise Area?
Are your pastures actually providing any valuable forage for your livestock or are they merely for exercise for your animals? Most livestock owners want their animals to be happy and healthy, and productive pastures can achieve both those goals. Designate an exercise or play area for your livestock. This is oftentimes referred to as a "sacrifice area" or a "sacrifice pasture" because this area is sacrificed for the health of the remaining pastures. Please refer to the ***Constructing a Heavy Use Area*** handout for information on building a mud-free, year round sacrifice area for our livestock.

Pasture Management Basics
Good pasture management requires basic knowledge of the following:
- Climatic data—rainfall, growing seasons
- Soils—limitations, capabilities
- Pasture grasses—identification, basic growth requirements
- Management techniques—rotational grazing, dragging, clipping
- Fertility— nutrient levels and needs
- Weed control— identification and control

Growing more grass for your livestock will lower your annual feed bills. One acre of productive pasture can provide two tons of feed over a growing season!

CLALLAM CONSERVATION DISTRICT
1601 East Front Street, Ste A, Port Angeles, WA 98362
360-452-1912 ext. 5
http://www.clallamcd.org

Climatic Data

The specific location of your farm will affect the growth and overall management of your pastures. Clallam County rainfall varies significantly with an average of 16 inches on the east end of the county (Sequim area) to over 200 inches in the west end (Forks area). Elevation also influences the amount of rainfall your pastures receive, with higher rainfall occurring at higher elevations. The Conservation District can help you determine the average rainfall that can be expected annually on your farm. In addition to rainfall, your location will also determine the pasture growing season, which is the time of year that pastures are actively growing. Generally speaking, our growing season is typically March—October but this varies depending on your specific location. Typically, pastures higher in elevation have a shorter growing season than pastures lower in elevation.

Soils

The types of grasses you plant and your pasture management techniques should be based on the specific soil type found on your property. Pastures can be established on most soil types in Clallam County, however some soils are more challenging to manage pastures on than others. Soils can be classified as excessively well-drained, well-drained, moderately well-drained, somewhat poorly drained, or poorly drained. Sandy or gravelly soils drain rapidly thus do not hold water. Poorly drained soils are more prone to compaction and ponding, both of which decrease grass plant health. Many farms have more than one type of soil in pastureland. For example, bottomlands tend to be poorly drained and need special care whereas hillsides tend to be droughty, leading to a decrease in grass growth later in the growing season. **The Conservation District can assist you with determining the type of soil on your farm and the appropriate management.**

Pasture Grasses

To best manage pastures it is important to have a basic understanding of how pasture plants grow. Most desirable pasture species are *perennial*, meaning that they persist in a pasture long term by growing during the spring and summer and then become dormant in the fall and winter.

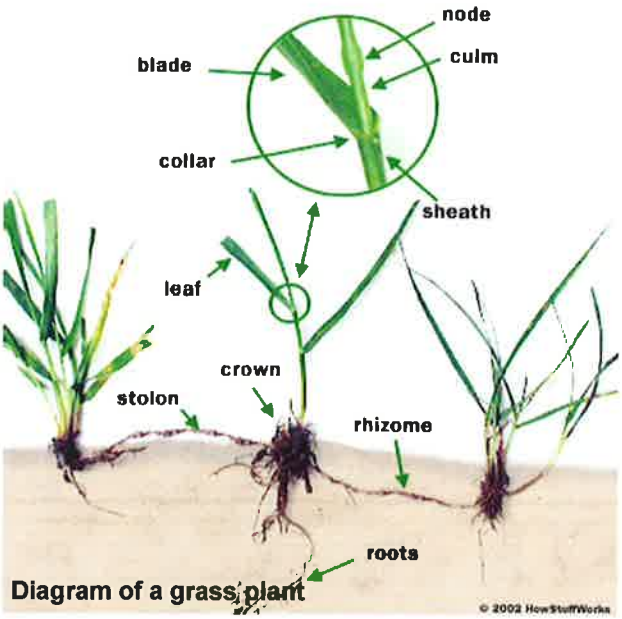
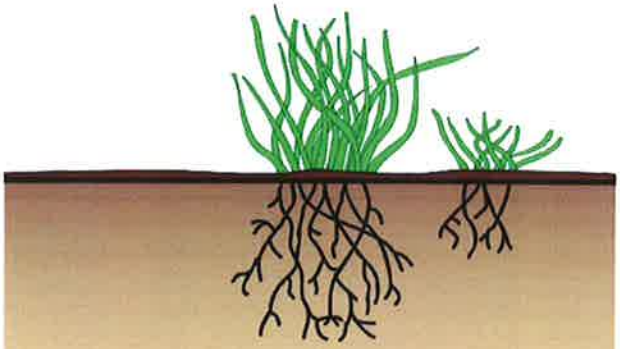


Diagram of a grass plant

Annual grasses persist in a pasture for one growing season, unless they go to seed and re-grow the following year. Well-established roots are important for healthy pastures and contain the energy needed for the plant to grow. Deep, healthy roots readily absorb nutrients and moisture, leading to healthy pasture plants. Grasses store the energy they need to grow (sugars) in the lower part of the plant. Like the leaves on a tree, grass leaves collect energy from sunlight using photosynthesis.



Percent leaf volume removed	Percent root growth stopped
10%	0%
20%	0%
30%	0%
40%	0%
50%	2-4%
60%	50%
70%	78%
80%	100%
90%	100%

PASTURE MANAGEMENT STRATEGIES

Continuous Grazing & Overgrazing

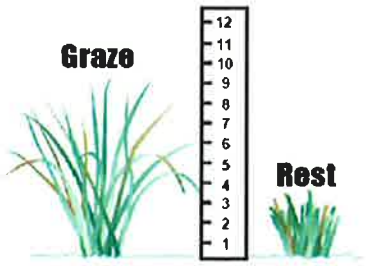
Many livestock owners allow their animals free access to pastures at all times, which is called continuous grazing. Unless your pastures are highly productive and you have relatively few livestock, this is not a recommended practice. When livestock have continuous access to a pasture they typically overgraze the grasses. Overgrazing occurs when there is three inches or less of the grass plant. Over time, overgrazing stunts a grass's ability to grow by dramatically reducing underground root structure and depleting the plant of its energy reserves and ability to photosynthesize. Long-term overgrazing will eventually kill the grass plant, leaving bare soil that is susceptible to weed invasion.

Rotational Grazing

Overgrazing can be minimized through the use of a rotational grazing system. Rotational grazing is simply the process of moving livestock between pastures or paddocks to limit their access to plants. Generally speaking, livestock should be moved onto a pasture when the plants are 6-8 inches tall and removed when the grasses are 3-4 inches tall. An alternative to rotational grazing is **time-limited grazing** in which livestock are only permitted to graze a pasture for a few hours each day to maintain stubble height. This grazing strategy is most commonly practiced with horses.

Pasture Tip

Use the "Take Half, Leave Half" rule of thumb– Livestock should be turned onto a pasture when the grass height is 6-8 inches and removed from the pasture when the stubble height is 3-4 inches.



Clipping & Dragging

Periodically mowing or clipping your pastures will promote more uniform grazing by livestock, keep the grass from going to seed, and prevent weeds from going to seed. Clipping can be performed with a tractor or riding lawn mower. If using a riding mower, put the blade deck up as high as possible, there should be at least 3" of stubble height remaining. Many farmers find it helpful to clip a pasture as soon as the livestock are rotated out. This will help control weeds and promote more even re-growth of the pasture.

Dragging your pastures as soon as you rotate out livestock will help promote uniform pasture re-growth and evenly distribute manure. Commercial drags are available for purchase and can be pulled behind a tractor. Drags can also be made from old pieces of chain link fencing, weighted down with T-posts, and can be drug behind a riding mower or ATV.

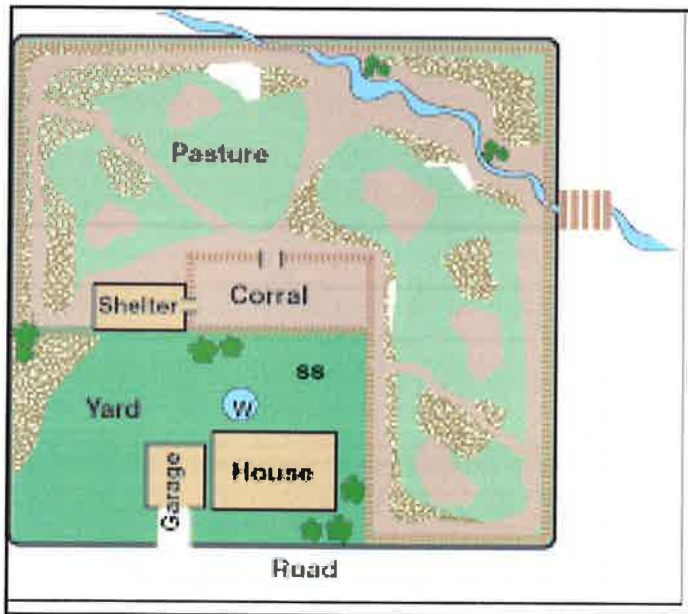
Fertilizing

Most pastures in Clallam County will require some form of fertilizer. Pastures that are low in fertility typically have high amounts of weeds and moss, bright green patches around manure piles, and short, wispy tufts of grass.

When and how much fertilizer you apply should be based on the results of a soil test. The Conservation District offers a low-cost soil testing service that will provide you with nutrient level conditions and fertilizer recommendations specific for your pasture. If you do not have soil testing information available for your pastures, a general rule of thumb is to apply 60 pounds of phosphorus and potassium and 60 pounds of nitrogen per acre, per year. It is best to split the applications into two, one in the early spring and one in the early fall. In addition to fertility, the acidity of your soil can also affect the health of your pastures. Ideally, a pH of 6.0 is optimum for grass growth but many Clallam County soils are more acidic (lower pH). Applying lime to your pasture will help raise the pH of your soil. Without soil testing data, a good rule of thumb is to apply 1 ton per acre per year of lime.

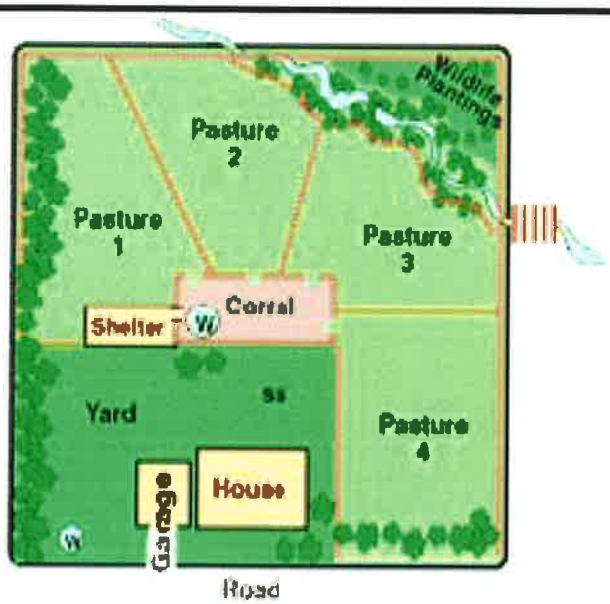
HEALTHY PASTURES, HEALTHY LIVESTOCK, HEALTHY LAND

The benefits of managing healthy pastures extend to more than just the health of your livestock. Productive, well-managed pastures protect natural resources like water quality and soil. Properly managed pastures will uptake nutrients found in livestock manure and keep them from washing into nearby surface water. If you have gravelly, well-drained soils, it is especially important to properly manage livestock manure piles and pastures to prevent nutrients from manure leaching through well-drained soils and into groundwater (*please refer* ***Managing Horse & Livestock Manure in Clallam County***). Groundwater in areas of Clallam County, like Agnew and Carlsborg, have tested high for nitrates (which comes from nitrogen), and drinking water high in nitrates can lead to serious health concerns, especially for pregnant women and infants. Maintaining a 3-inch stubble height in your pastures will prevent soil erosion and help reduce water pollution.



Before Pasture Management Plan

- One large pasture which is overgrazed and producing at less than half of its potential.
- Weed invasion is more likely due to excessive bare ground.
- Animals are drinking directly from the stream, contributing to erosion and degrading water quality.
- Manure and sediment can enter the stream, there is no vegetation to filter runoff.
- Bare soil will lead to dust in the summer and mud in the winter.
- Little food or cover for wildlife.



After Pasture Management Plan

- Pastures have been divided (cross fenced) into multiple units, allowing for rotational grazing (and more grass!)
- Livestock have been fenced out of the stream and the banks have been replanted with native vegetation to help prevent erosion and protect water quality.
- Livestock no longer drink directly from the stream; water is located in a central location easily accessible from all pastures.
- A corral with mud-free footing is used for winter confinement.
- Trees and shrubs have been planted to create wildlife habitat, windbreaks and screens.

Seasonal Management

The management of your pastures must adjust with the season. Allowing livestock access to pastures during the winter when the grasses are dormant and the soils saturated can dramatically reduce the amount of grass that will grow the following spring. Livestock should not have access to streams, ditches, ponds and wetlands. Please refer to the Seasonal Management Calendar for suggested management activities by season:

Seasonal Management Calendar	
Spring	• **Do not turn livestock out until ground is firm and grass is 6 - 8 inches tall.** • **Rotate livestock between pastures, do not graze below 3 inches.** • **Apply fertilizer as indicated by soil test.** • **Clip pastures at end of grazing period to encourage uniform grass growth and control weeds.** • **Check for & control weeds.**
Summer	• **Continue rotational grazing system, (maintain 3" stubble height). You may need to remove livestock from pastures and feed hay if pastures go dormant.** • **Clip pastures at end of each cycle** • **Spread manure after animals are removed from pasture** • **Check for and control weeds, keep perennial weeds from going to seed.** • **Irrigate pastures, if available.**
Autumn	• **Fertilize as indicated by soil test.** ***This is the time of year to apply lime.*** • **Animals should be removed from the pasture when minimum stubble height is met or when soils become wet, or by November 1 to allow plants to produce leaf growth for winter.**
Winter	• **Confine livestock to heavy use area, do not allow access to pastures during the winter.** • **Plan out next year's grazing strategy.**

Irrigation

Though most people consider Clallam County rather wet, the reality is that most of our rains occur during the fall and winter months and not during the growing season. If you do not have access to irrigation water, you will notice a decrease in production during mid-summer and production will significantly decrease in late summer and early fall when we experience the driest weather. If you have access to irrigation water, you can significantly increase your production during the growing season.

Irrigation water should be applied according to an irrigation water management plan. The Conservation District can help you develop an irrigation water management plan for your pasture. The plan evaluates your crop type, soil characteristics, and irrigation application methods. In the absence of an irrigation water management plan, a general rule of thumb is to apply 1-inch of water per week during the growing season (you can measure the amount of water being applied by simply placing a straight-sided can or baking pan in the field while irrigating and then measure water depth after one hour). You should irrigate deep but not too often as frequent irrigation can lead to shallow grass roots. Livestock should not be permitted on the pasture during or directly after irrigation.

Weed Control

Weeds are opportunists and will establish in poorly managed, over-grazed pastures with bare spots and poor grass growth. The best weed control is achieved by managing healthy, productive pastures which reduces bare spots and increases the competitiveness of grasses. Herbicides can be used for serious weed infestation. Broadleaf weeds can be controlled with selective herbicides which may also kill clover. It is generally recommended to spot spray weedy areas rather than broadcast spray an entire pasture. Mechanical control, such as clipping and pulling will also help control some weeds. Poisonous weeds such as Tansy Ragwort and Poison Hemlock should never be allowed to establish in a pasture. Many weed infestations originate from weed seeds found in hay. Limiting your hay feeding area to one location on the farm and routinely checking for weed infestations is recommended.

For more information on weed management, contact Clallam County Noxious Weed Control Board at 360-417-2442.

RESEEDING & RENNOVATING PASTURES

When to Reseed

Reseeding and renovating pastures is costly and time intensive. Before you begin renovating a pasture evaluate the current management of the field. Is reseeding really necessary or could your pastures be improved with a change in management practices or soil fertility? If desirable grass plants are present and the pasture is not heavily infested with weeds, simply changing your management actions should improve the overall production of the pasture.

Reseeding is recommended if a pasture is significantly weedy and desirable pasture grasses are not present. Keep in mind that if you reseed the pasture but continue with current management practices, your pasture will probably revert back to its previous condition, wasting resources and time. Management changes might include reduced stocking rates, limiting the grazing season, cross fencing, and fertilization. A general recommendation is to renovate no more than 20% of your total pasture area in one year because livestock are typically not allowed on a newly renovated pasture for several months and other pastures must be available to meet their needs. Also, new pasture seedings sometimes fail because of weather or other unforeseen events.

Reseeding Pastures: Getting Started

1. Start by obtaining a soil test of the pasture to be reseeded. A soil test will determine the nutrient needs to give your new pasture grasses the best possible start. This is especially important if you are seeding land recently converted from forestland. The Conservation District offers a low-cost soil testing program.
2. Select the appropriate forage or grass species for your soil type and planned use. Many seed dealers can provide input on the type of seed that will work best for your pasture.
3. Kill the existing vegetation in the pasture before reseeding. This can be achieved either through the use of chemicals, mechanically (tilling) or a combination of both. Be sure to eradicate weeds in the pasture before planting. Tackling weed problems now will allow for better grass establishment.
4. Ensure that soil is not compacted as a result of heavy equipment or livestock use during the wet months. Tools such as subsoilers or aerators work well to help break up compaction. Use caution not to damage existing drain tiles or other underground pipelines. A properly prepared seedbed should not be fluffy. An easy test to ensure that your seedbed is properly prepared is to walk across the field. You should leave footprints no deeper than a 1/4".
5. Seeding should occur in the spring or fall. Apply the selected seed at the recommended rate per acre (typically pounds of seed per acre). Grass and legume seeds are very small and should not be placed deeper than a 1/4 of an inch. It is better to seed too shallow rather than too deep. Roll or drag the pasture after seeding to provide light cover over the seeds.
6. Once your pasture has been seeded, it is especially important to control any weeds that may emerge. This is best achieved by clipping, especially if the weeds are annuals which typically grow faster (and over the top) of the new grass seedlings. If you have access to irrigation, routinely irrigate the newly planted pasture. Use caution not to over-irrigate a newly seeded pasture as too much water can erode soil and wash away seeds.
7. Do not graze livestock on the pasture until you conduct the "Pull Test." To ensure your grass is ready, grab a single plant and give it a firm tug. If you can rip the plant out with roots intact, the field is not ready for grazing. Be sure to only graze the pasture lightly during the first 90 days after the pasture has passed the "Pull Test" to ensure healthy root development. Field mowing to a 4" stubble height is also beneficial for encouraging good root growth.

For More Information:

Contact the Conservation District for more information. The publication ***Pasture & Hayland Renovation for Western Washington & Oregon*** is an excellent resource and is available free of charge at the District office or can be downloaded from:

http://cru.cahe.wsu.edu/CEPublications/eb1870/eb1870.pdf

Managing Horse & Livestock Manure On Farms in Clallam County

Managing manure on farms in Clallam County can be challenging, especially for small acreage landowners. Many landowners in our area have more animals than their land can support and a substantial amount of manure to handle as well. For example, a 1,000-pound horse produces about 50 pounds of manure per day. That's about 8 tons of manure per year!

Why Manage Manure?

There are numerous reasons to properly manage manure, and by not doing so, you are jeopardizing your animals' health and the overall health of your land.

Animal Health

Living in manure creates an unhealthy environment for livestock and can lead to parasite infestation and hoof disease. Manure can be a breeding ground for many annoying insects such as filth flies.

Manure = Mud

Manure contains moisture and organic material which creates mud. Horse manure contains about 63% moisture and cattle manure contains about 88% moisture. Manure filled paddocks will quickly turn into a muddy mess during the rainy season.

Manure & Water Quality

Runoff from manure piles and manure filled paddocks can pollute nearby streams and ground water with nutrients, bacteria, and sediments. Excess nutrients in waterways can cause algae growth and deplete oxygen levels and can make water unsafe to drink and swim in and can harm aquatic life as well.

Manure & Drinking Water

Runoff from manure piles can leach through soil and into groundwater. The risk increases if you have well-drained, gravelly soils. Polluted runoff from manure piles can lead to high levels of nitrates in drinking water, leading to potential human health risks.

Farm Management & Aesthetics

Stinky manure piles can lead to cranky neighbors and cause excessive flies. Manure management can be very challenging if you do not have a clear plan and facility to do so.

Valuable Fertilizer

Manure contains nutrients that are essential for plant growth. The same nutrients that can pollute waterways can actually do wonders for producing healthy pastures. Spreading manure back onto pastures creates a natural nutrient cycle. One horse produces about $150 worth of fertilizer per year.

One horse produces about $150 worth of fertilizer per year!

Creating a Manure Management Plan for Your Farm

There are 3 main steps for developing an effective manure handling program on your farm:

- **Collection** – Where are you picking up the manure from? How often will you be picking up and what equipment will you use?
- **Storage** – Where will you store the manure? Is the storage location easily accessible year-round?
- **Application** – How and where will you use the manure? Can you use it all on your land?

CLALLAM CONSERVATION DISTRICT
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Manure Collection

Manure should be collected from stalls, paddocks, and pens every 1-3 days. Worm eggs hatch every 3 days; so by collecting manure within that time period you should be able to eliminate parasite re-infestations. Manure deposited in healthy, productive pastures (dense stands of grass at least 3 in. tall) does not need to be collected. Dragging pastures periodically will help break up clumps of manure and evenly distribute the nutrients.

Collection Tips

- Invest in a good manure fork and wheelbarrow. Overly large wheelbarrows can be very hard to maneuver and push when full. Many livestock owners use motorized equipment such as a tractor with front-end loader or an ATV with an attached dump trailer.
- Rubber stall mats will minimize the amount of bedding material you use, significantly reducing the volume of material you need to handle.
- Install outdoor lighting so you can easily clean paddocks in the evenings.

Manure Storage

By building a well-designed manure storage structure, you will create a neat, tidy spot to store manure as well as prevent polluted runoff from entering surface or groundwater.

Location of Manure Storage

When deciding where to store your manure, consider the following:

- Pick a high, dry location away from wells or surface water (minimum of 100 feet), further if land is sloped.
- Choose a spot that is close to where you will be collecting the manure from; don't push your wheelbarrow any farther than you have to! Ensure year-round access is available for a truck and/or tractor.
- Prevailing wind direction – away from your home and your neighbors

Storage Structures- Options

There are numerous options and designs for manure storage structures. The design you choose should meet your management needs. Regardless of what design you choose for your storage, **any concentrated pile of manure should be covered with a roof or tarp.**

By covering your manure pile you will retain the valuable nutrients that plants need and minimize polluted runoff from leaving the pile.

- **Compost Bins** – There are a variety of shapes and styles of compost bins and we recommend a minimum of 2 bins so raw manure can be loaded into one bin while finished compost can be removed from the second bin. Composting is discussed in more detail later in this handout.
- **Long Term Storage** – A concrete base and durable walls (made of cinder blocks, concrete or treated timbers) is recommended.
- **Temporary Storage** – Can be as simple as a manure pile covered with a tarp or a portable structure.

Covering your manure pile with a tarp will retain the valuable nutrients that your plants need to grow and will protect the environment by minimizing polluted runoff.

Manure Storage Structures– Base

Manure should be stored on a concrete slab, especially if you live on well-drained or gravelly soils. By storing your pile on a slab, you will minimize the risk of polluted runoff leaching into ground water.

Sizing Manure Storage Structures

We recommend that you size your storage structure to store a minimum of 6 months worth of manure production. Please refer to page 7 of this handout for sizing guidelines.

A 1,000 pound horse will produce about 50 pounds of manure per day. That's about 8 tons of manure per year!

Application

Knowing what to do with the manure that you collect is an essential step to keep your manure pile from turning into a manure mountain. Below are some options for utilizing livestock manure:

Apply it to your pastures – If you manage your pastures for grass production (rather than an exercise area for your horses), you can spread fresh or composted manure back onto your pastures. Most of the nutrients that animals eat end up in their manure. For example, more than 75% of the nitrogen that a steer eats will be passed into the manure. Manure can be spread onto pastures using manure spreaders or can simply be flung with a manure fork. Follow the tips below when spreading manure onto your pasture:

- **Only apply manure to pastures during the growing season.** This is generally March – October. Manure should not be applied to pastures during the winter because grass is dormant and will not uptake the nutrients. Excess nutrients on winter pastures can runoff and pollute nearby streams or leach into groundwater.
- **Take a soil test.** A soil test will provide information on your pasture's current nutrient levels and how much fertilizer/nutrients you need to apply for optimum grass growth. The Conservation District offers a low-cost soil testing service (see *Soil Testing* brochure).
- **Only apply manure to healthy, productive pastures.** There should be at least 3 inches of grass before manure is applied to a pasture. Applying manure to overgrazed pastures can lead to pollution of surface and groundwater with excess nutrients and bacteria.

Give it away – Your neighbors and friends might appreciate using manure on their properties. Many gardeners compost manure and use it on their gardens and flower beds. The Conservation District's "Manure Share Program" links livestock owners who have extra manure with those who want it.

Manure Share Program

To utilize the Conservation District's Manure Share Program, simply call the office and asked to be added to the "Supplier List". This list, along with your phone number and a general description of the manure & your location, will be distributed to local gardeners and residents who will contact you directly to make arrangements for pick-up.

Compost – Composting is nature's recycling process. This biological process utilizes heat, moisture, oxygen, and microbial organisms to decompose plant and animal material. When the correct ratio of carbon (found in "brown" material like straw), nitrogen (found in "green" material like manure), moisture, and oxygen are mixed, microorganisms break-down the manure into soil-like material. Compost is a rich soil enhancer which improves the health of both plants and the soil. Turn your compost pile on a regular basis to aerate the pile and allow the material on the outside of the pile to heat up.

Benefits of Composting

- Composting reduces the volume of material you need to handle. On average, composting can reduce the size of a manure pile by about 50%.
- Reduces flies by eliminating their breeding ground and reduces the chance of parasite reinfestation (the heat generated during the compost process kills worm eggs).
- Kills most weed seeds.
- Reduces the chance of manure contaminated runoff from your property reaching surface and groundwater.
- Compost is a stable source of nutrient-rich soil amendment and fertilizer.

Composting Tip:

An easy way to ensure that oxygen reaches the center of your compost pile is to drill holes in a 4" PVC pipe and then insert that pipe into the pile.

Composting—How To

1. Determine the number of bins you need (see page 5). You will need a minimum of two bins to successfully compost. The more bins you have, the easier it will be to continuously compost livestock manure.

2. Ensure that you have the correct carbon to nitrogen ration (C:N). Generally speaking, the desirable ratio is about 25:1. Horse manure nearly contains the correct ratio, but needs slightly more carbon (which can come from shavings or straw).

3. Keep your compost pile about as damp as a wrung out sponge. This will require that you water the pile during the dry months. Keeping your pile covered with a tarp will help retain moisture, speed up the composting process, and keep your pile from becoming saturated during the wet months which can lead to anaerobic conditions (and a foul smell).

4. Turn your compost pile on a regular basis (at least once every few weeks). Turning will allow the material on the outside of the pile to heat up, as well as distribute oxygen throughout the pile. The organisms that are hard at work in the pile need plenty of oxygen to do their job. An easy way to help oxygen reach the center of your compost pile is to insert a 4" PVC pipe drilled with holes into your pile.

Composting can reduce the size of a manure pile by about 50%.

5. Finished compost will have an earthy smell and a crumbly, dark texture. This highly valued material can be used on pastures, lawns, gardens, flower beds, and flower boxes.

Conclusion

Developing and following a well thought-out manure management plan will help create a healthy farm for you, your family, your livestock, and the environment. Contact Clallam Conservation District for free assistance with developing a site-specific manure management plan for your

TROUBLESHOOTING THE COMPOSTING PROCESS

SYMPTOM	PROBLEM	SOLUTION
The compost has a bad odor.	Not enough air.	Turn the pile, add more PVC pipes.
The compost has a bad odor and is soggy.	Not enough air and/or too wet.	Mix in dry ingredients like straw or shavings, add PVC pipes and cover with a tarp.
The inside of the pile is dry.	Not enough water.	Add water when turning the pile. Should be as damp as a wrung out sponge.
The compost is damp and warm in the middle, but nowhere else.	Pile is too small.	Collect more raw material and mix it with the old ingredients. Piles smaller than 3' square have trouble holding heat.
The pile is damp and smells fine, but is not heating up.	Too many shavings, wood chips or bedding (carbon source) and not enough manure (nitrogen source).	Mix in a nitrogen source (fresh manure, fresh grass clippings, blood meal or ammonium sulfate.

EXAMPLES OF MANURE MANAGEMENT ON FARMS IN CLALLAM

Location: Agnew area Horse Farm
Problem: Horse manure and stall waste were stored in an old, timber structure located along an irrigation ditch. The walls of the storage structure had failed, allowing manure to topple into the irrigation ditch. Manure-contaminated runoff flowed off the pile and into the ditch during storms.
Solution: The landowners worked with the Conservation District to identify an area for a new manure storage structure that was both convenient for cleaning and did not pose a risk to ground or surface water quality. A new storage structure, which consisted of concrete floor with ecology block walls, was constructed in a location 130 feet away from the irrigation ditch. The concrete floor protects groundwater from nutrients that can leach off the pile and provides a durable surface for the tractor to load and unload the manure.

New manure storage structure with concrete floor and ecology block walls

Location: Agnew area Hobby Farm
Problem: The landowners collected manure from their four donkeys, one horse, and goats and sheep, and piled it on native soil in a corner of their property. This corner became very muddy because of heavy traffic and roof runoff, which flowed off a nearby barn and into this area. Runoff from the manure pile posed a threat to the water quality of a nearby pond and to groundwater.
Solution: The landowners worked with the Conservation District to develop a farm plan that lead to the construction of a heavy use area, drastically improved pasture production, eliminated muddy areas, and resulted in the construction of a new composting structure for manure. The new structure consists of three, 5'x5'x4' pressure-treated wooden bins with a roof. The boards are removable, allowing the landowners to easily load fresh manure into a bin and remove finished compost out of the other bins. Roof runoff water from the barns were directed into drywells which protected the quality of the clean rainwater and reduced muddy areas on the farm.

Three-bin compost structure with roof

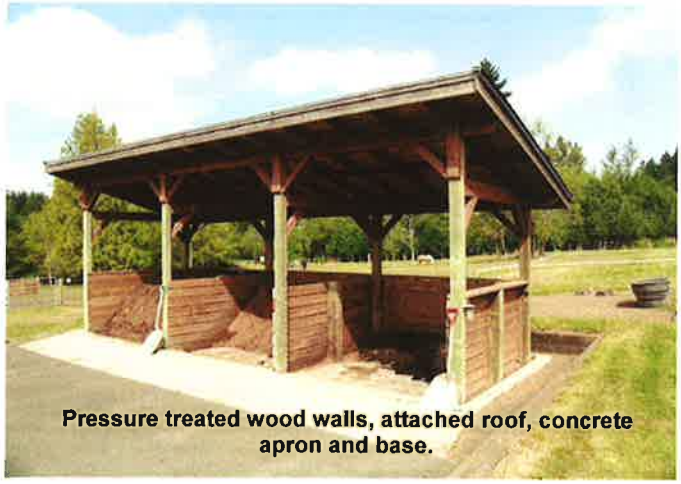
Full bin in process of composting

Location: Horse Boarding Farm near Carlsborg
Problem: Horse manure and stall waste was stored in a pile near a drainage ditch. The pile often tumbled into the drainage ditch and manure-contaminated runoff impacted the water quality of the ditch.
Solution: A new manure storage structure was constructed with a concrete slab, ecology block walls, and a curb to retain runoff. This new structure provides a defined, safe space to store the manure, preventing contaminated runoff from entering the ditch. A grassy filter strip was installed between the manure storage structure and the drainage ditch to help collect and utilize nutrients in runoff before they enter the waterway.

New structure prevents manure & runoff from flowing into nearby drainage ditch.

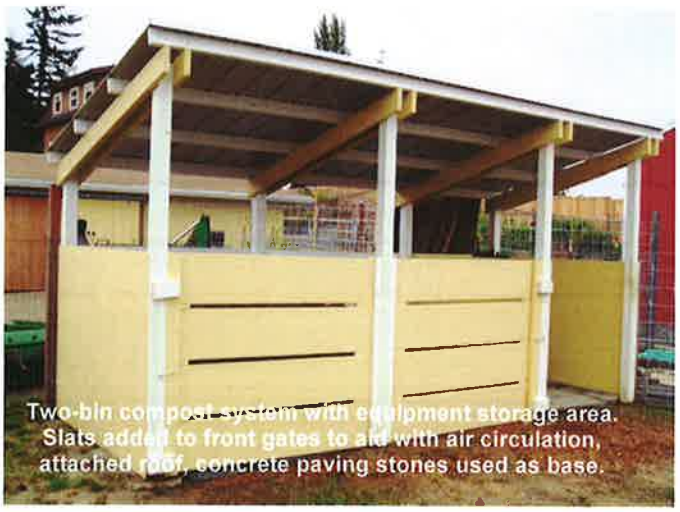
SAMPLE MANURE STORAGE STRUCTURES & COMPOST BINS

Poured concrete walls and concrete slab base.



Pressure treated wood walls, attached roof, concrete apron and base.

Three-bin compost system with ecology block walls, adjustable timber fronts, attached roof, and concrete base.



Two-bin compost system with equipment storage area. Slats added to front gates to aid with air circulation, attached roof, concrete paving stones used as base.

Pressure treated timber compost bins on compact native soil, covered with a tarp.

Basic manure pile covered with tarps. At a minimum, manure should be covered with a tarp to minimize polluted runoff.

Manure Management Plan

Designing a Manure Storage Structure for Your Farm

Name:_____ Property Size:_____
Acres of Pasture:_____

1. Fill in the table below. Refer to the table below for waste generated per month.

Animal	Number	Waste/month (cu. ft.)	Storage Needed per Month
TOTAL			

Waste generated per month by livestock type:

Animal	Weight (Lbs)	Waste (Cu. ft. per month)
Beef	1000	28.5
Horse	1000	24.3
Pony	700	16.8
Sheep	100	1.8
Llama	330	6.93

2. Decide how many months of storage you will need. **We recommend that you plan for a manure storage structure that will hold 6 months worth of manure.** Multiply your total monthly storage needs by the number of months you are planning to store the manure. Enter that number here:_____cu. ft.

3. Now that you know how much manure you need to store, determine the size and number of bins you will need. The size of the bin you choose is flexible.
Remember: length x width x height = volume

Bin	Length feet	Width feet	Height feet	Volume (cubic feet)
Example Bin	**6**	**6**	**4**	**144**
Bin 1				
Bin 2				
Bin 3				
TOTAL	_____	_____	_____	

Cut Here

Utilizing Manure on Your Farm—Pasture Application

1. The table below lists the amount of nutrients produced annually by different livestock. These numbers are based on the size of the animal. Fill in the blank table to determine the pounds of nutrients produced on your farm each year.

Animal	Nitrogen (lbs/year)	Phosphorus (lbs/year)	Potassium (lbs/year)
Horses (1,000 lbs.)	102	18.25	69
Cow (1,000 lbs.)	120	44	95
Sheep (100 lbs. each)	16	2.5	11
Pig (150 lbs.)	26	8	16

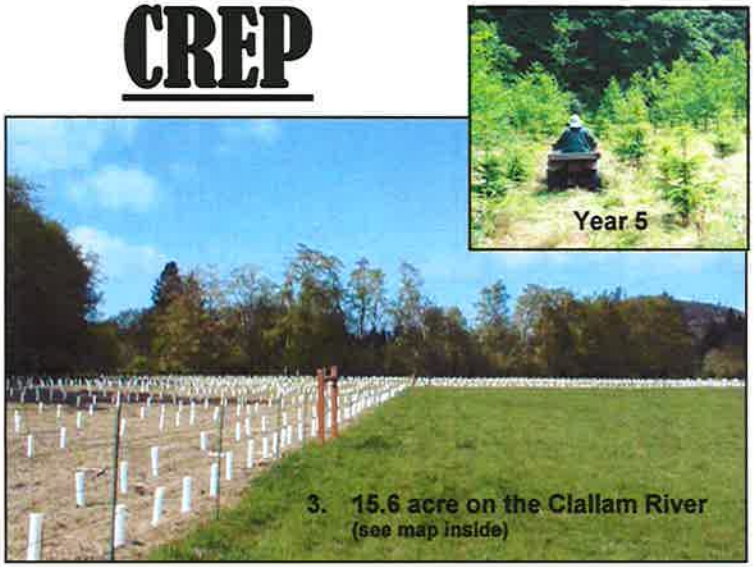
Livestock Type	Number of Animals	Nitrogen (lbs/year)	Phosphorus (lbs/year)	Potassium (lbs/year)
TOTAL	———			

2. Fill in the blank table below. Use the data from the table below to determine how much pasture you need in order to apply all the manure generated by your livestock. Remember, these numbers are based on whether your pasture is in fair or good condition. We do not recommend spreading manure on poor pastures.

Livestock Type	Number of Animals	Acres of Good Pasture Needed	Acres of Fair Pasture Needed
Horse	1	1.0	1.5
Cow	1	1.0	3.0
Goats	5	1.0	3.0
Sheep	5	1.0	3.0

Your Livestock Type	Number of Animals	Acres of Pasture Available	Acres of Pasture Needed
TOTAL			

CREP



The Conservation Reserve Enhancement Program (CREP) is a voluntary program designed to compensate landowners for establishing forested buffers along streams.

100% of Planting Costs Covered

Landowners are reimbursed for 100% of the eligible costs for CREP buffer establishment *and* maintenance. In addition landowners may be reimbursed for livestock exclusion fencing, livestock watering facilities, and in some cases livestock crossings.

Get Paid to Plant Trees

Landowners also receive annual rental payments ranging from $100 to $260 per acre for the length of the contract, 10 to 15 years.

Tired of Battling Weeds?

CREP is a great program for landowners who are fed up with trying to control invasive plants such as reed canary grass and Himalayan blackberry. CREP pays to replace non-native vegetation with native vegetation.

CONSERVATION RESERVE ENHANCEMENT PROGRAM

CREP in CLALLAM COUNTY

# of projects to date:	22
Miles of buffer:	6.8
Acres of buffer:	89.5
Seedlings planted:	43,045
Feet of livestock fence:	5,805

Buffers Planted On:

Bell Creek, Big River, Chicken Coop Creek, Clallam River, Cassalery Creek, Jimmy Come Lately Creek, Lotzgesell Creek, Matriotti Creek, and Salt Creek

Wondering What All the Blue & White Tubes Are?

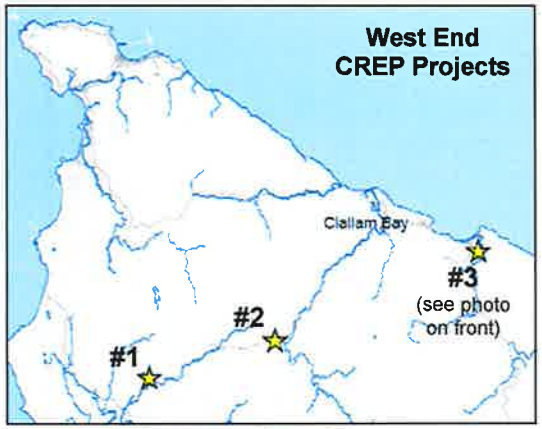
Plant protectors! They keep mice and voles from girdling newly planted trees and shrubs, and protect plants from weed whackers.

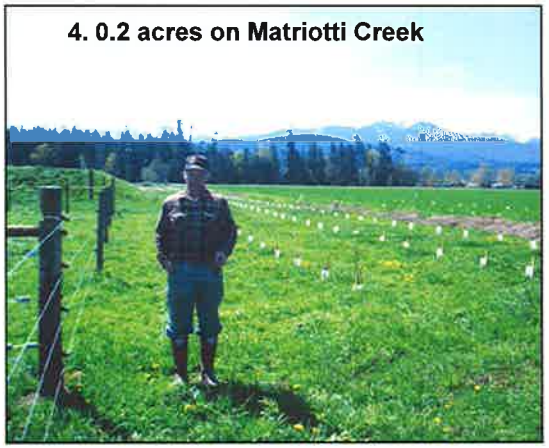
CREP pays for plant protectors to be installed on all of the trees planted through the program.

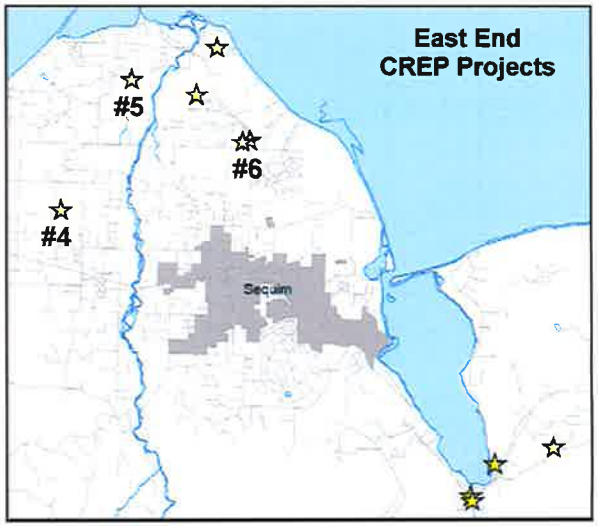
CLALLAM CONSERVATION DISTRICT

1601 East Front St., Bldg/Suite A, Port Angeles, WA 98362
(360) 452-1912 ext. 5
http://www.clallamcd.org

December 2011







1. 3.8 acres planted on Trout Creek

2. 4.8 acres planted on the Big River

Is Your Land Eligible for CREP?

- Land eligible for CREP must have a history of being either cropland or land capable of providing forage for a grazing animal
- The proposed buffer area must not already be thickly forested with conifer trees.

Three Program Options to Suit Landowner Needs:

Riparian Forest Buffer - ***Planting of trees and shrubs along a stream***

- Must be along a CREP eligible stream.
- The width of the buffer (the area to be planted) can be 35 to 180 feet in width.

Wetland Restoration - ***Planting of trees and shrubs around a wetland***

- Wetland must be surface or ground water connected to a CREP eligible stream.
- 20 foot minimum buffer width and 120 foot maximum.

Hedgerow Planting - ***Planting a narrow strip of vegetation along a waterway***

- Must be along a waterway within ten miles of a CREP eligible stream.
- Buffer width is exactly 15'.

Want to Learn More?

For more information or to schedule a free no-obligation meeting with a Conservation Planner to see if your property is eligible for CREP, please call the Conservation District at (360) 452-1912 ext. 109.

The program is funded by United States Department of Agriculture and Washington State Conservation Commission, and the Clallam Conservation District administers the program.

5. 16.4 acres planted on Matriotti & Lotzgesell Ck.

6. 2.2 acres planted on Cassalary Creek