Hood Canal Regional Pollution Identification and Correction

Animal Waste Pollution Source Identification Strategy

Hood Canal Coordinating Council
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Introduction

Agricultural animals, livestock, pets and wildlife are all valuable economic or recreational resources in Washington State.

Agricultural Animals

Agriculture is a cornerstone of Washington State's economy. Washington's $46 billion food and agriculture industry represents 13% of the state's economy. Agriculture and food industries employ 160,000, including 39,000 in the food processing industry. Washington's 39,500 farms and ranches produced crops and livestock valued at $9.2 billion in 2011. The top 21 agricultural commodities exceed $60 million in value of production. (WSDA, 2013)

Washington's agricultural production set a record high in 2011. The second leading commodity was milk at $1.28 billion. Cattle & calves was the sixth most valuable agricultural commodity at $592,296,000. The value of livestock, at $2.39 billion, increased by 17 percent (USDA, 2012). **The average Washington State farm has livestock, poultry, and products sold valued at $51,878. (USDA, 2011)**

Washington State University Small Farms Team lists 32 farms in Jefferson County, 26 farms in Kitsap County, and 26 farms in Mason County.

		AVERAGE VALUE	PERCENTAGE
	AVERAGE	AGRICUTURAL PRODUCTS	LIVESTOCK, POULTRY
COUNTY	FARM SIZE	SOLD PER FARM	AND THEIR PRODUCTS
Jefferson	59 acres	$32,232	85.38%
Kitsap	27 acres	$52,322	56.62%
Mason	68 acres	$162,524	90.27%
(City-data.com)			

Kitsap Conservation District (Kitsap CD) conducted an inventory of agricultural parcels in Kitsap's portion of the Hood Canal watershed in 2013 and found 419 agricultural parcels.

Livestock

Washington State Horsemen was formed in 1941 for those interested in equine for business or pleasure. Their website notes that they have an economic impact of more than $5 million annually through shows and events (Washington State Horsemen).

Kitsap CD conservatively estimates, based on windshield surveys, that Kitsap County has more than 6,000 horses. A standard sized horse (1,200 pounds) creates about 57 pounds or .92 cubic feet of manure daily. This calculates to 124,830,000 pounds or 74,622 cubic yards of manure deposited in Kitsap County annually.

Mason Conservation District (Mason CD) recently conducted a conservative farmland inventory and documented 102 parcels engaged in livestock-related activities along the Mason County portion of Hood Canal.

Pets

The Centers for Disease Control and Prevention note that most household in the United States have at least one pet (CDC, 2013). They describe some health benefits of pets, including decreasing blood pressure and cholesterol and increasing exercise and outdoor activities. The American Veterinary Medical Association estimates that the United States has approximately 70 million pet dogs and 74.1 million pet cats (AVMA, 2013).

An Issaquah Press article from February 2013 says that Washington State is the sixth highest in the United States for pet ownership at 62.7 percent of households (Issaquah, 2013).

The West Sound Stormwater Outreach Group is a sub-regional stormwater outreach group under the Puget Sound Partnership's Stormwater Outreach for Regional Municipalities (STORM). They estimated that more than eleven tons of dog waste is dropped on the Kitsap Peninsula alone every day in 2010.

Wildlife

Wildlife is an important resource of the Hood Canal area. Vacation homes and parks advertise wildlife viewing and the Washington State Parks website highlights the natural features of Dosewallips State Park including: wildlife, mammals, birds, rabbits, raccoons, squirrels, crows, pigeons, ducks and geese. Wild animals and birds can be a significant source of fecal pollution when they are fed, when pets are fed outdoors, and when garbage and grease waste is not adequately managed. Food and grease waste attracts and concentrates wildlife and can result in fecal pollution of surface waters and stormwater systems.

Microbial source tracking studies of stormwater demonstrates a wide variety of fecal pollution sources, including birds, rats, and raccoons (May and Cullinan, 2005)

Kitsap conducted a bacterial pollution study in the urban Clear Creek watershed between 2005 and 2008 (Fohn, 2008). KPHD partnered with Kitsap Public Works Drainage Inspection Program to perform commercial property inspections in the project area. During the stormwater system inspection, sites with excessive rattraps or food waste and/or grease spillage entering the storm drain system were noted. Twenty one percent of the properties had the potential to provide a food source for urban wildlife or to discharge food waste to storm drains.

Seven properties were discharging food waste to stormwater systems. These sites were re-inspected and the program team met with property owners to discuss solutions. Two sites underwent retrofit construction to divert food contaminated runoff to sanitary sewer. Water samples collected after the retrofits showed dramatic reductions in fecal coliform.

Food waste that attracts and concentrates urban wildlife around surface waters and stormwater systems can result in excessive fecal pollution from the wildlife and the food waste itself.

KPHD found a large raccoon latrine in a residential area adjacent to a threatened shellfish growing area due to during a routine shoreline "hotspot" investigation. This was the result of outdoor pet feeding.

Aquaculture

Shellfish is another valuable resource in Jefferson, Kitsap and Mason Counties. The Pacific Shellfish Institute published an assessment of the economic impact of shellfish production in Washington, Oregon, and California in April 2013. The study analysis applied to commercial shellfish growers and did not include wild and tribal harvest or the economic impacts of the benefits of local shellfish consumption.

	TOTAL ECONOMIC		LABOR
COUNTY	INCOME	EMPLOYMENT	INCOME ONLY
Jefferson	$6,432,900	110	$3,007,400
Kitsap	$2,536,600	40	$1,262,800
Mason	$22,452,500	370	$10,621,000
(Northern Economics, April 2013)			

Water Pollution and Pathogens

Fecal pollution of surface waters is caused by human and animal waste discharged or leaked to the ground or surface waters. During rain events, flowing surface water picks up pollutants like fecal waste, and quickly transports them to streams, bays, beaches and lakes.

Animal waste can come from pets, livestock and agricultural animals, and wildlife. Animal fecal waste is a public health risk as it can contain pathogenic bacteria and viruses that cause human diseases. Pet waste pathogens include *Campylobacter* spp., Cryptosporidium *parvum, Leptospira spp., Salmonella* spp., and roundworms. Livestock and agricultural waste pathogens include *Campylobacter* spp., *Cryptosporidium parvum, Listeria* spp., *Salmonella* spp., and *Escherichia coli*.

Washington State Water Quality Standards

Water quality is important in Washington State and is protected through established water quality standards for surface waters.

- Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A Washington Administrative Code [WAC], the beach classification criteria set forth in Recreational Shellfish Beaches (Chapter 246-280 WAC) and Sanitary Control of Shellfish (Chapter 246-282 WAC) currently use surface water fecal coliform (FC) concentrations to determine whether or not surface waters and shellfish tissue are safe for human contact and consumption, respectively. FC and EC bacteria are indicators used to assess the presence and level of fecal waste in surface and ground waters.

Ground water is also protected in Washington State through Chapter 173-200 Washington Administrative Code (WAC).

Washington State Solid Waste Regulations

The Water Pollution Control Act

Washington State clarifies the importance of clean water in Revised Code of Washington Chapter 90.48 RCW, The Water Pollution Control Act:

> "the public policy of the state of Washington to maintain the highest possible standards to insure the purity of all waters of the state consistent with public health and public enjoyment … and to that end require the use of all known available and reasonable methods by industries and others to prevent and control the pollution of the waters of the state of Washington."

Washington State legislation is very specific about waters to be protected. RCW 90.48.020 defines waters of the state to "include lakes, rivers, streams, inland waters, underground waters, salt waters and all other surface waters and watercourses within the jurisdiction of the state of Washington."
Washington State defines pollution in Chapter 90-48 RCW as:

> "discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state as will or is likely to create a nuisance or render such waters harmful, detrimental or injurious to the public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses…"

Washington State has provided tools to protect water quality through legislation that prohibits pollution:

- Nonpoint Source and Storm Water Pollution Standards (Chapter 173-201-510 WAC) requires that activities that generate nonpoint source pollution "shall be conducted so as to comply with the water quality standards."

- RCW 90.48.080 prohibits discharge of polluting matter in Washington state waters:

  "It shall be unlawful for any person to throw, drain, run, or otherwise discharge into any of the waters of this state, or to cause, permit or suffer to be thrown, run, drained, allowed to seep or otherwise discharged into such waters any organic or inorganic matter that shall cause or tend to cause pollution of such waters…"

- WAC 173-201A-510 addresses nonpoint source and storm water pollution:

(3)(a) "Activities which generate nonpoint source pollution shall be conducted so as to comply with the water quality standards."

(3)(c) "Activities which contribute to nonpoint source pollution shall be conducted utilizing best management practices to prevent violation of water quality criteria."

Animal Waste Strategy Goals and Objectives

Washington State has been clear that agricultural activity AND water quality are both state priorities. This agricultural waste strategy is being developed to respond to this clear and compelling state guidance.

The goals of this animal waste strategy are to:

- Protect the public from waterborne illness related to fecal pollution of surface water, ground water, stormwater, and shellfish;
- Protect shellfish beds and swimming beaches from water quality related closures;
- Protect habitat by preventing and limiting nutrient pollution to surface water and ground water;
- Preserve agricultural land and activity while protecting water quality;
- Address or assist with federal, state and county water quality mandates as required.

Objectives are to:

- Work closely with local agricultural producers and livestock owners to identify water quality concerns and to develop effective and practical correction strategies;
- Identify, evaluate and investigate potential agricultural fecal and nutrient pollution sources in high priority areas;
- Collaborate with conservation districts to help local producers and livestock owners achieve water quality protection and agricultural and recreational goal;
- Prevent fecal and nutrient pollution from animal waste through education and voluntary correction of animal waste pollution sources;

- Correct fecal and nutrient pollution sources;
- Respond to Washington State Department of Health (WSDOH) commercial shellfish harvest classification downgrades.

Current Animal Waste Management

Animal waste in the Hood Canal Action Area is primarily a non-point pollutant because it comes from many sources instead of a single point source. Non-point pollution is best addressed through effective public education and outreach that increases awareness about Puget Sound pollution and motivates residents to adopt new behaviors that prevent pollution from entering surface and stormwater.

The Puget Sound Partnership is leading the recovery of Puget Sound water quality and aquatic habitat. They maintain a web resource center with information about how to reduce pollution, including animal waste. The PSP developed a coalition of groups conducting stormwater outreach, Stormwater Outreach for Regional Municipalities (STORM). This group is made up of cities, counties, state and federal agencies, nonprofit groups, and local organizations. STORM developed the Puget Sound Starts Here campaign with a website that includes a lot of information about how people can help Puget Sound.

Washington Sea Grant (SeaGrant) serves northwest communities through research, education and outreach. It is part of a national network administered by the National Oceanic and Atmospheric Administration, U.S. Department of Commerce. They educate the workforce and public to sustain the vitality of marine resources and associated Pacific Northwest lifestyle. SeaGrant provide marine advisory service and field staff to offer training, workshops, and host conferences and seminars. There are three field staff in the Hood Canal Action Area; one is based in Belfair, one in Bremerton, and one in Port Townsend.

Washington State University Extension's (WSU Extension) natural resource program helps landowners, agencies, businesses, and local governments manage and sustain natural resources. In the Hood Canal Action Area, they have offices in Kitsap, Jefferson and Mason Counties. Their educators develop and implement strategies for reducing non-point pollution. They provide an education program for interested water quality volunteers, who provide public education and outreach services to help their communities protect natural resources.

WSU Extension published a natural resource guide for shoreline and streamside property owners. The Shore Stewards: Guide for Shoreline Living provides information to encourage home and yard care choices that reduce or limit water pollution and protect aquatic habitat. WSU also developed a shore steward volunteer program and trains volunteers to provide water quality information and participate in their communities.

The Hood Canal Action Area is fortunate to have an outreach network that has been active for more than a decade. The Hood Canal Water Education Network (HCWEN) is comprised of local agencies in the Hood Canal region including: WSU Extension, UW SeaGrant, local health departments, local public works, local conservation districts and non-profit groups such as the Hood Canal Coordinating Council and Hood Canal Salmon Enhancement Group. HCWEN provides a network for members to share resources and program ideas, coordinates regional outreach messaging, and facilitates implementation of grant-funded outreach projects. HCWEN is part of the Puget Sound Partnership's Education, Communication and Outreach Networks (ECO Nets), the twelve regional networks working to help save Puget Sound.

Kitsap Public Works conducts a comprehensive water quality outreach and education program focused on encouraging the public to make small changes in their everyday activities to improve the health of Puget Sound waters. They fund education and outreach programs in Public Works, the Kitsap Conservation District, WSU Extension, and Kitsap Public Health District. Each partner implements the program by working with residents, commercial properties, farms, and training volunteers. They maintain an informational website, conduct workshops and school education programs (KCPW).

The Skokomish Department of Natural Resources' Water Quality Program conducts education and outreach events at local schools and tribal events to increase environmental awareness of water quality issues. The program also collects water samples that are analyzed for bacterial and nutrient pollution in order to target potential pollution sources and prioritize restoration efforts.

Mason CD is comprised of natural resource specialists including environmental specialists, farm planners, and technical design and engineering professionals. Staff engages in a range of activities to protect water quality, including outreach and education programs, direct technical assistance to landowners regarding natural resources management, and design and implementation of a variety of conservation practices that help protect water resources.

Pet Waste

The Puget Sound Partnership's website includes a list of actions that people can take to help Hood Canal that includes keeping pet waste out of the canal (Puget Sound Partnership). The site includes links to tips to prevent pollution from dog waste, to "10 things you can do to help Hood Canal" that includes a link to a music video they produced, "Dog Doogity," to encourage young people to protect Puget Sound by picking up after their pets. Their resource center notes that Washington State Parks is installing more pet waste disposal stations to reduce pollution.

The Puget Sound Starts Here campaign emphasizes a few simple things residents can do at home. Stormwater is one of the leading causes of water pollution in Puget Sound and residential neighborhoods are the largest source of stormwater pollution (Puget

Sound Starts Here). Because of this, the campaign is focused on pet waste management along with yard care, car washing and auto care.

SeaGrant published a fact sheet on low dissolved oxygen levels in Hood Canal and what the public can do to help (King). One of those actions is to dispose of pet wastes in a certified landfill to keep organic matter, nutrients and unwanted pathogens out of Hood Canal.

WSU Extension's Shore Stewards: Guide for Shoreline Living has a section on how to prevent polluted runoff. One of the suggestions is to clean up after pets to prevent surface water pollution.

The West Sound Stormwater Outreach Group (WSSOG) conducts education in a portion of the Hood Canal Action area and is an active participant of Puget Sound's Stormwater Outreach for Regional Municipalities (STORM). The group is made up of Kitsap County and the Cities of Poulsbo, Bremerton, Port Orchard, Gig Harbor, Bainbridge Island and Port Angeles.

The WSSOG conducted a baseline public opinion survey in 2008 to identify a baseline of behaviors, attitudes and stormwater awareness. The survey informed the priorities for raising awareness and targeting behavior change campaigns from 2008 until 2011. The WSSOG selected pet waste pick-up and disposal as a key behavior for evaluating awareness and behavior changes. Two programs were implemented in 2009: the Backyard Pet Waste Pilot Campaign and the Community Mutt Mitt Program.

The Backyard Pet Waste Pilot Campaign was launched on a small scale until a follow-up evaluation demonstrated that residents recalled and understood the messages and talked to others about pet waste disposal. In 2010-2012 the campaign was expanded and delivered to more than 25,000 residents with lots of .5 acres or less. WSSOG's 2010 pet waste brochure noted that more than eleven tons of dog waste area was dropped on the Kitsap Peninsula alone every day.

The Community Mutt Mitt Program was established to address pet waste in public places and has resulted in the establishment of 294 Mutt Mitt stations installed and maintained by volunteer community groups. In 2012 alone, over 540,000 pet waste disposal bags were used, representing over 89 tons of dog waste diverted from Kitsap County surface waters.

In 2011, a WSSOG follow-up survey demonstrated increases in public awareness about stormwater messages, particularly about specific actions that can be taken to improve water quality like directing car wash runoff to grass or gravel, and proper disposal of pet waste.

Jefferson County

Jefferson County conducts pet waste education and outreach through WSU Extension – Jefferson County and the Watershed Resource Center. Port Townsend is a partner in the WSSOG pet waste program.

Kitsap County

Kitsap Public Works implements the WSSOG pet waste program (KCPW, accessed 2013)). Their website incorporates the Puget Sound Starts Here music video and recommends pick-up, bagging, and trashing dog waste. They developed and implement a Mutt Mitt program that provides dog waste bag dispensers to community group sponsors.

Kitsap Public Health District's solid waste regulations require that pet feces, especially dog droppings, be disposed by double-bagging and trashing so that they do not pollute surface waters (KCBH). Health District inspectors rely on voluntary correction of pet waste violations but can utilize enforcement when necessary.

Kitsap County Board of Health Ordinance Number 2010-1 "Solid Waste Regulations", Effective July 6, 2010 specifies that:

> "Pet Feces, especially dog droppings, shall be disposed of in a manner, such as burial, or double-bagged and placed into containers described in Section (300(2), which does not create a nuisance or pollute surface waters of the state. Pet feces shall not be disposed of into the sanitary sewer unless approved by the sewer purveyor. This waste shall not be put into a storm sewer or on-site sewage system or allowed to accumulate on the ground so as to create a nuisance."

Mason County

Mason CD conducted a countywide "Scoop the Poop" outreach campaign using *Puget Sound Starts Here* social marketing methods. The campaign focused on pet waste pick up and disposal. Efforts resulted in construction and installation of doggy waste bag stations at popular recreational/dog walking sites in Mason County, as well as a media outreach campaign. Fourteen sites in the Hood Canal watershed received pet waste stations. Mason CD continues to provide bag refills for doggy bag stations and additional signs are available for installation at future pet waste stations.

Mason County Health conducts pet waste education and outreach through their Solid Waste department and through PIC door-to-door surveys.

Agricultural Animals and Livestock

The Puget Sound Partnership's on-line resource center has a section on reducing pollution from human and animal waste that includes runoff from farms with livestock. The site notes that Washington Conservation Commission is working with local

conservation districts to complete hundreds of conservation plans and install practices to prevent pollution. The site includes a link to "10 things you can do to help Hood Canal" that includes keeping cow and horse manure out of the canal, with links to the Kitsap, Jefferson and Mason Conservation Districts (Puget Sound Partnership).

WSU Extension's website has a link to Livestock Management and Water Quality, a publication that provides livestock owners and managers with techniques to address water quality problems (WSU). Their shore stewards guide notes that cleaning up after livestock will prevent surface water pollution.

Local Conservation Districts offer technical assistance to landowners to help preserve natural resources like water quality. They are non-regulatory organizations that work cooperatively with private landowners to reduce soil erosion and improve water quality. They design conservation practices that increase farm productivity while protecting water quality. They combine technical help with cost share incentives to support good stewardship of natural resources. Kitsap, Jefferson, and Mason Conservation Districts are located in the Hood Canal Action Area.

Conservation districts encourage landowners to incorporate best management practices that increase farm productivity and protect water quality. They offer farm plans that are personalized to meet landowner goals and water quality issues through farm conservation design plans, pasture management, livestock manure management, nutrient management, stream bank restoration and protection, rain garden water infiltration techniques. They facilitate cost-share incentives through various agencies including: United States Department of Agriculture and Washington Conservation Commission.

Jefferson Conservation District

The Jefferson County Conservation District (Jefferson CD) has been assisting landowners with farm plans and providing cost-share funding for best management practice (BMP) implementation since 1946. The District has assisted farmers to install miles of fencing to exclude livestock from streams. Through the Conservation Reserve Enhanced Program (CREP) alone, more than 10 miles of riparian buffers, totaling 161 acres, have been planted with native trees and shrubs. Jefferson CD was one of the first districts to make use of solar-powered pumps to provide livestock with off-channel drinking sites. They started a water quality monitoring program in 1993 to measure water quality improvements. The program has documented FC and temperature reductions. Monthly FC reports, with current data and the average of data from the current water year are sent to landowners and have generated numerous BMPs including manure storage, livestock sacrifice areas, cement slabs for water and feeding areas, and bridges to keep animals and vehicles out of streams and creeks. They have presented education and outreach workshops including: Horses for Clean Water, mud and manure management, animal carrying capacity, and soil and pasture management. One-on-one visits with farmers have also led to BMP implementation through the

conservation farm planning process that identifies water quality issues and establishes a correction and management plan.

Mason Conservation District

Technical Assistance

Mason CD is actively involved in pollution identification and correction implementation. They provide free technical assistance to agricultural landowners, supporting farmers as they implement practices to protect water quality. They have thirteen staff members with diverse backgrounds and expertise including: natural resource specialists, lead entity coordination, small farms extension education, education and outreach specialists, environmental specialists, and a district engineer.

Staff assist livestock owners with waste management by: offering informational materials such as the "Healthy Horses, Clean Water" Guide to Horsekeeping; leading manure/pasture management classes; and providing site-specific technical assistance like soil sampling and analysis. Services include site visits, farm planning, manure management guidance, and designing small-scale to engineered waste storage and compost structures. When possible, cost-share funds are provided to assist landowners to implement eligible manure management practices. Mason CD staff provide technical services to property owners with FC violations that have been referred by the state or county.

Small Farms Program

Mason CD partnered with WSU Extension – Mason County to develop a unique Small Farms Program to address Mason County food and farm issues. The program focuses on teaching and implementing site–specific, best available science approaches that builds a vibrant and sustainable agriculture industry that is integrated with natural resource conservation efforts.

The Small Farms Program provides technical assistance, educational opportunities, economic opportunities, and a direct link to state and federal resources that are available to family farmers. This unique partnership provides:

- Conservation farm plans to help landowners inventory property resources (soil, water, livestock, crops, etc.), identify their farm objectives, and create a dynamic plan that reflects the objectives while protecting natural resource quality;
- Cost-share agreements that can pay up to 50-70% of approved BMPs including: waste storage structures, riparian fencing, cross-fencing, composting facilities, barn gutters and downspouts, and livestock heavy-use areas;
- Educational opportunities including: workshops, conferences, continuing education classes, field trips, and on-farm research;
- Access to the vast resources available through WSU's Small Farms Team;

- Building support for local agriculture by connecting the community though projects like the Mason County Farm Map, Harvest Celebration Farm Tours, the Food & Farm Network, and education al displays at local events.

Ranked Farm Inventory

The Mason CD conducts windshield surveys, ground observations and assess aerial photography to create a ranked farm inventory to identify priority watersheds for technical assistance and pollution identification and correction implementation strategies. The ranked drainages and watershed inform Mason CD and their partners about the need for implementation and outreach strategies on a watershed and parcel scale. Inventories are conducted and updated regularly within Hood Canal, Oakland Bay, Totten and Little Skookum Inlets, Case Inlet and Pickering Passage, and the Chehalis watershed. Similar to Kitsap CD, ranking criteria is based on animal units and acreage, proximity and access to surface waters, evidence of current and historic animal agriculture (pasture quality, infrastructure, manure and mud management, and topography.

Manure Management Strategies

Mason CD assists livestock owners implement appropriate, site- and watershed-specific livestock management strategies through farm planning, technical assistance and facilitating available BMP cost-share implementation opportunities to prevent pathogen and nutrient pollution from manure and mud runoff.

Mason CD provides landowners with technical assistance to develop a site-specific nutrient management plan that matches manure application to pasture and crop nutrient take-up needs. They offer livestock operators an opportunity to rent a manure spreader for application of composted manure on pastures at limited times of the year (mid-April through late-August or early-September). They coordinate a Manure Exchange program to link those with excess manure with those looking for manure to use in their landscape and gardens at appropriate times of the year.

Kitsap Public Health District and Kitsap Conservation District

KPHD has been conducting pollution identification and correction activities for high priority farms since 1996 when shellfish beds in the Cedar Cove portion of Port Gamble Bay were closed by WSDOH shellfish program due to fecal pollution. KPHD has developed a cooperative relationship with Kitsap CD to develop effective strategies to work with property owners with fecal pollution violations. The partnership has been very effective in cleaning up fecal pollution sources to Port Gamble Bay, Burley Lagoon, Liberty Bay, and Sinclair Inlet.

Kitsap CD is a Kitsap stormwater utility partner, working in cooperation with KPHD on PIC projects. Kitsap CD provides agricultural inventories and prioritized rankings based on property conditions, free technical assistance and farm planning for landowners, voluntary implementation of BMPs, and can help landowners access and

utilize available cost share funding. They conduct landowner workshops and clinics, farm tours, and realtor workshops.

KPHD has an interlocal agreement and memorandum of understanding for agricultural and livestock sites with Kitsap CD. They can generate a list of high priority farms for investigation based on an agricultural inventory of the project area based on manure management and proximity to surface waters. They offer and provide free technical assistance for animal waste management, mud management, other agricultural challenges, and available resources for BMP cost-share

Ranked Farm Inventory
The process begins with Kitsap CD conducting a farm inventory in the project area. Farm inventories are performed using windshield surveys, ground observations and overhead photography. Site conditions are noted including: number and type of animals, acreage, pasture conditions, waste management, livestock confinement, barns and outbuildings, topography and proximity of agricultural land use activity to surface waters. Kitsap County uses the following 1-5 rating scale, based on potential to pollute, to evaluate properties. Kitsap considers parcels ranked “1” and “2” as high priority.

1: High Priority	Pasture in poor condition. Livestock access to surface water and/or high probability of contaminated runoff due to topography sloping toward water body. Visual evidence of contamination problem.
2: Medium-High Priority	Pasture in poor condition. Some reason to believe degraded conditions are seasonal or could get worse seasonally. Some areas reflect higher levels of management
3: Medium Priority	Pasture in fair condition. Open water in vicinity but limited access or evidence of use. A moderate probability of runoff.
4: Medium-Low Priority	Pasture in good condition. No open water in vicinity and/or low probability of contaminated runoff reaching surface water.
5: Low Priority	Visual inspection from roadside indicates historic or recent past farming activity. Pastures not utilized by livestock and no livestock on site. Old barns and/or farm equipment evident.

Initial Investigation
KPHD conducts an initial project area visit to priority farms to confirm potential fecal and nutrient pollution sources and to determine surface water drainage patterns. OSS records, maps, and overhead photographs provide additional information. They drive around the parcel and along adjacent roads and driveways to confirm the location of surface and stormwater and identify potential sample locations.

Parcel Investigation
If there are a large number of high priority farms, they are prioritized by segment sampling in nearby fresh water and/or marine water. Segment samples are collected during rainy conditions when water is following off pastures and lawns, starting at the discharge and working uphill toward the source of the flow.

When working in marine waters, shoreline surveys are conducted during rainy conditions to determine which fresh water drainages are contaminated. Shoreline samples that exceed a threshold of 500 FC/100ml or 406 EC/100ml are confirmed by collecting one or two confirmation samples and calculating the geometric mean value of the two or three samples. Those drainages that exceed the threshold are confirmed "hotspots" and are ranked for investigation by starting with the top third highest geomeans as high priority, the middle third as medium priority, and the lower third as low priority.

"Hotspot" investigations are conducted by sampling water flowing onto and from the parcel during rainy conditions. The sample stations are named so they will be convenient to remember and to write on the sample bottle. They are typically named by the parcel address. The outflow can be named "out" or "A" or "1", with upstream stations named successively.

Water samples are collected moving from the outflow upstream in order to avoid contaminating downstream samples. A water quality violation occurs when water flowing from the parcel exceeds the state water quality standard. A violation also exists if the water flowing through the parcel increases by the amount of the state water quality standard.

Parcel Site Visit
Parcel site visits are conducted when a water quality violation is found or when the parcel has an obvious potential pollution sources. They involve contacting the property owner or occupant to conduct an interview, informing the owner or occupant of water quality problems in the area and potential pollution sources, obtaining access and consent to field inspect the property, sharing water sample results, and making site-specific recommendations or referral to local conservation districts. Water quality violations are referred to the Conservation District to voluntarily correct manure management through implementing BMPs. Asking the property owner or occupant if a conservation district representative may call them has been an effective referral method.

Technical Assistance
Kitsap CD contacts high priority farms, helps develop investigation and correction strategy, conducts education and outreach and provides free technical assistance to plan and install BMPs. They also provide an interface for and facilitate available BMP cost share funding programs.

Follow-up Investigation
A follow-up investigation is conducted to determine whether BMPs needed have been completed, maintained, and if they have corrected water quality violations. A comprehensive follow-up program for non-participating properties is essential to maintain and build the trust and associated cooperation of the community.

Enforcement is pursued when the owner or resident of a parcel with a water quality violation refuses assistance from the Conservation District or does not correct the fecal pollution problem.

Enforcement
Washington State considers animal waste a solid waste and has made a point of preventing water pollution through development of detailed legislation regulating solid waste. This legislation provides guidance for local jurisdictions to protect water quality from the adverse affects of animal waste.

Washington State provides regulatory tools to enforce correction of animal waste fecal pollution sources:

- RCW 90.48.080 prohibits discharge of polluting matter in Washington state waters. This is the regulatory authority used by the Washington State Department of Ecology (Ecology) when enforcing animal waste. Ecology has been very effective enforcing properties with water quality violations due to animal waste management practices. Pierce County developed a cooperative agreement that has worked very well in the Burley Lagoon and other shellfish beds.

- Revised Code of Washington (RCW) 70.95.020 establishes:

  "a comprehensive statewide program for solid waste handling, and solid waste recovery and/or recycling which will prevent land, air and water pollution and conserve the natural, economic, and energy resources of this state."

  (1) "To assign primary responsibility for adequate solid waste handling to local government…"

- WAC 173-304-190 and WAC 173-350-025 direct that :

  "The owner, operator, or occupant of any premise, business establishment, or industry shall be responsible for the satisfactory and legal arrangement for the solid waste handling of all solid waste accumulated by them on the property."

- WAC 173-350-010 was adopted:

  "to protect public health, to prevent land, air, and water pollution, and conserve the state's natural, economic, and energy resources by: (1) Setting minimum functional performance standards for the proper handling and disposal of solid waste originating from residences, commercial, agricultural and industrial operations and other sources…"

- WAC 173-350-220 establishes that agricultural composting shall be managed to:

  (1)(c)(ii) "Protect surface water and groundwater through the use of best management practices and all known available and reasonable methods of prevention, control, and treatment as appropriate. This includes, but is not limited to, setbacks from wells, surface waters, property lines, roads, public access areas, and site-specific setbacks when appropriate."

- WAC 246-203-130 requires:

  (1) "Any person, firm or corporation is prohibited from keeping or sheltering animals in such a manner that a condition resulting from same shall constitute a nuisance."

(2) "In populous districts, stable manure must be kept in a covered watertight pit or chamber and shall be removed at least once a week during the period from April 1st to October 1st and, during the other moths, at intervals sufficiently frequent to maintain a sanitary condition satisfactory to the health officer."

In summary, Washington State has provided a detailed framework that can be used to protect water quality and prevent water pollution from animal waste.

Kitsap County incorporated state regulations into local Solid Waste regulations that have been effective in correcting animal waste pollution sources. Kitsap County Board of Health Ordinance Number 2010-1 "Solid Waste Regulations", Effective July 6, 2010 integrates the full text of WAC 173-350.

Section 305 specifies solid waste handling standards for specific waste streams. The animal waste sub-section specifies that:

" Animal Manure shall not be deposited, or allowed to accumulate, in any ditch, gulch, ravine, river, stream, lake, pond, marine water, or upon the surface of the ground, or on any highway or road right of way, where it might become a nuisance or menace to health, as determined by the Health Officer, through the breeding of flies, harboring of rodents, or pollution or water, Manure shall not be allowed to accumulate in any place where it can pollute any source of drinking water."

Examples of enforceable solid waste violations include, but are not limited to, uncontrolled run-off from manure piles, pasture areas, heavy use areas, and other areas where manure is inadequately managed.

Public Education, Outreach, and Reporting
Ongoing public education and outreach is essential to protect public health from animal waste pathogens, to prevent animal waste from causing water pollution, and to protect animal health and property value.

Reporting community activities like the success of Mutt Mitt programs and pollution reductions found after correction projects are a great way to show how public funding is working hard to benefit citizens. Reporting project methods, results, conclusions and recommendations are helpful to local communities to protect public health by preventing future pollution. They are also valuable for other areas facing the same challenges.

Innovative reporting methods can include library displays, classroom presentations, shellfish festivals, park displays, farm tours, realtor workshops, local festivals and fairs, and web pages.

People can change their behaviors when they are helped understand the high costs of pollution and learn effective and easy methods.

Wildlife

Microbial source tracking studies of stormwater demonstrates a wide variety of fecal pollution sources, including birds, rats, and raccoons (May and Cullinan, 2005)

A bacterial pollution study in an urban watershed was conducted in Kitsap County between 2005 and 2008 (Fohn, 2008). Clear Creek's commercial corridor had poor water quality flowing into Dyes Inlet and water quality was good upstream. No agricultural practices were found in the project area.

KPHD and Kitsap Public Works Drainage Inspection Program partnered to conduct commercial property inspections in the project area. During stormwater system inspections, sites with excessive rattraps or food waste and/or grease spillage entering the storm drain system were noted. Twenty one percent of the properties had the potential to provide a food source for urban wildlife or to discharge food waste to storm drains.

Seven properties were discharging food waste to the storm drains system. Water samples collected after two sites underwent retrofit construction, to divert food contaminated runoff to sanitary sewer, showed dramatic FC pollution reduction.

Food waste that attracts and concentrates urban wildlife around surface waters and stormwater systems can result in excessive fecal pollution from the wildlife and the food waste itself.

KHPD found a large raccoon latrine in a residential area adjacent to a threatened shellfish growing area, during a routine shoreline "hotspot" investigation, caused by outdoor pet feeding.

Proposed Strategy Elements

The success of animal waste management projects is greatly enhanced through early determination of extent and type of animal waste present in the area of concern. The goal is to assess the scope of the problem and the likelihood it will impact water quality and public health.

Animal waste types are managed very differently. Pet waste is typically generated from residential properties. Livestock and agricultural animal waste can be the result of recreational or commercial activity. Wildlife is attracted by residential outdoor feeding and inadequate residential and commercial garbage and grease management.

Public Education and Outreach

Because animal waste is non-point source pollution, projects in the Hood Canal Action Area need to include effective educational components.

Successful education and outreach programs prevent pollution by developing approaches that result in measurable adoption of specific behaviors. The social marketing process uses marketing principles and techniques to influence public behaviors and has been used effectively to protect and improve Puget Sound water quality.

A regional Hood Canal pilot guidance group will be formed from the regional Hood Canal PIC team and will develop a regional education and outreach plan that will research and utilize existing outreach campaigns and behavior change measurements that were developed using social marketing when possible to realize cost efficiencies. The plan will identify priority audiences and behaviors and target behavior changes that prevent and reduce pathogen and nutrient pollution. The selected audiences and behaviors will be prioritized based on local water quality studies, research, prevalence and experience. A suite of priority behaviors will be chosen and a social marketing approach implemented to determine motivators and barriers for each priority behavior.

The idea is to develop a regional outreach campaign that incorporates motivators and addresses barriers for the priority audience to make the selected behavior changes. The campaign will measure adoption of the selected behaviors, will be refined based on the degree of behavior change, will determine outreach delivery methods.

Regional partners will:

- Research and utilize existing animal waste outreach campaigns and behavior change measurements that were developed using the social marketing process
- Develop a local education and outreach approach to identify priority audiences and behaviors and target behavior changes that prevent and reduce pathogen and nutrient pollution from animal waste
- Prioritize the selected audiences and behaviors based on local water quality studies, research, prevalence and experience
- Choose a suite of priority behaviors and implement a social marketing approach to determine motivators and barriers for each priority behavior
- Develop a regional outreach campaign that incorporates motivators and addresses barriers for the priority audience to make the selected behavior changes
- Conduct a pilot outreach campaign in the region including measuring the adoption of the selected behavior change
- Refine the approach based on the degree of behavior charge implement on a larger scale

Pet Waste

As seen in the current activities section, many excellent pet waste resources are available. These need to be continually utilized to educate the public about how much pet waste accumulates, how it impacts public health, water quality and aquatic habitat, and how to effectively manage it to prevent illness, pollution and degradation.

Kitsap County's Mutt Mitt Program and Mason Conservation District's Pet Waste Campaign need to be enhanced and expanded throughout the Hood Canal Action Area.

Education campaigns need to be developed and implemented at local pet stores and other places where pet owners shop. These campaigns can be tailored for school biology classes.

Wildlife Waste Caused by Human Activities

Wildlife can be a serious fecal pollution source, especially in areas where garbage and grease in inadequately management and where wildlife feeding or outdoor pet feeding occurs.

Commercial garbage and grease storage is often located near stormwater components. Stormwater programs are discussed in the Hood Canal Regional Pollution Identification and Correction Stormwater Pollution Source Identification Strategy. Local health jurisdictions' restaurant and solid waste programs can incorporate information about how inadequate garbage, food waste, and grease storage can be a significant source of fecal pollution and can result in expensive maintenance costs.

Residential education campaigns need to include information regarding wildlife feeding activities, outdoor pet feeding, and garbage and grease storage to prevent accumulations of wildlife waste. It is recommended to build on existing programs and develop additional components when needed.

Fecal pollution hotspot investigations need to look for evidence of wildlife waste pollution sources. Local health jurisdictions and conservation districts can provide technical assistance to parcel owners to voluntary correct wildlife fecal pollution sources.

Livestock and Agricultural Animal Waste

Kitsap County has developed a process that has proven very effective to identify, correct and prevent water pollution and aquatic habitat degradation from livestock and agricultural animal waste. They have found that effective animal waste PIC work can be broken into six tasks: education and outreach, regional planning and project development, inventory and investigation, voluntary correction of water quality violations, enforcement, and reporting to the community. Ongoing education and

outreach, and reporting project successes are essential to the continuing success of animal waste PIC projects.

This regional strategy focuses on education and outreach, regional planning and project development, and effective reporting. It is recommended that local health jurisdictions work with farm experts, WSU Extension, HCWEN and other local educators, and the proposed regional PIC pilot guidance group to develop and implement a regional animal waste education and outreach plan as the first step and a cost effective way to prepare for animal waste projects. Farm experts include local conservation districts, Ecology, Natural Resource Conservation Service, Washington Conservation Commission, and WSU Small Farms Program.

The regional PIC coordinators will work with the pilot guidance group, local health jurisdictions, and farm experts to determine the criteria that will be used to select drainages for animal waste PIC work. These can include documented downstream water quality or habitat problems and how likely these are to contribute pollution to Hood Canal.

Local conservation districts are valuable resources for livestock and agricultural waste management. They can conduct regional workshops, identify and contact high priority farms, help develop investigation and correction strategy, conduct project area education and outreach, and provide free technical assistance to plan and install BMPs. Conservation district's also facilitate available cost share funding programs.

The regional pilot guidance group will also identify, coordinate and/or develop community support systems, a progressive strategy from voluntary cooperation to enforcement, and effective project reporting mechanisms.

The regional strategy needs to include the following outcomes:

- Reducing fecal and nutrient pollution to the Hood Canal Action Area;
- Preserving agricultural activity while protecting water and habitat quality;
- Providing a coordinated, regional approach to animal waste management problems;
- Provide a method of fairly assessing potential animal waste pollution sources;
- Show effective use of grant funding with demonstrated results in order to continue to utilize grants until sustainable regional funding can be developed;
- Provide guidance to other regions grappling with similar challenges by sharing successful methods.

The following are potential tools that have been found useful in evaluating potential livestock and agricultural animal waste fecal and nutrient pollution. Effective tools need to be developed in order to reach the needed outcomes.

- Gather available farm inventory and ranking information to determine the extent of potential livestock and agricultural animal waste pollution sources for funding and staffing purposes.

- Conduct farm inventories using windshield surveys, ground observations and overhead photography. Note site conditions including: the presence of livestock and agricultural animal impacts like presence of mud and manure, signs of overgrazing and erosion, and signs of runoff and/or animal access to surface waters. Evaluate parcels based on their potential to pollute. Consider parcels with a high potential to pollute as high priority.

- Conduct water quality investigations on high priority parcels and make site visits to parcels with water quality violations. Refer these property owners or operators to the conservation district in their jurisdiction for voluntary correction through site specific education and free technical assistance. Conservation districts facilitate available BMP implementation cost share opportunities.

- Conduct water quality investigations after BMP installation to confirm the correction of water quality violations.

- Conduct enforcement only in cases where voluntary correction efforts have been unsuccessful. This is an important step because voluntary cooperation is hindered when non-cooperating properties are allowed to continue polluting practices.

It is recommended that local health jurisdictions work with farm experts and start livestock and agricultural PIC work as soon as possible since the investigation and correction of inadequate livestock and agricultural waste pollution problems can be very time, cost and labor intensive.

In summary, this strategy focuses on education and outreach, regional planning and project development, and effective reporting. Additional tools may include inventory and investigation, voluntary correction of water quality violations, enforcement, and reporting to the community.

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