## 3.5 STORMWATER RECOMMENDATIONS

**Issue:** Unabated stormwater runoff imposes significant costs on local government, property owners and fish. Important stormwater impacts include flooding, landslides, alteration of natural flow regimes in streams, conveyance of pollutants and sediments from uplands to streams, alteration of stream channel morphology, and redd scouring. Where combined sewer overflows exist, stormwater may carry sewage into streams and harbors. Impervious surfaces also reduce groundwater recharge and affect groundwater supplies, especially during summer low flows.

One of the principal measuring tools relating to stormwater management is "effective impervious cover (or surface)." Effective Impervious Cover (or Surface) means that impervious surface which is connected to surface water directly or with a conveyance device (such as a ditch or pipe). When effective impervious cover exceeds 7% of watershed area, ecological stress from increased stormwater becomes apparent. Effective impervious surface densities are a major contributor to stormwater runoff-related sedimentation and pollution, particularly in areas that are not otherwise highly developed.

### Existing Conditions and Current Actions

Lack of comprehensive, effective stormwater controls anywhere in WRIA 18 magnifies pollution problems in the watershed. The Department of Ecology has published a Stormwater Management Manual for Western Washington, responding to a directive of the Puget Sound Water Quality Management Plan to develop a technical resource for local jurisdictions.

Clallam County is working towards a draft stormwater ordinance implementing equivalent protections tailored to County watersheds. Clallam County and other WRIA 18 jurisdictions has reviewed the Puget Sound Water Quality Management Plan's (PSWQMP) Comprehensive Stormwater Management Program, and the Washington Department of Ecology Stormwater Management Manual for Western Washington (August 2001) for their "fit" to conditions of Clallam County, considering regional differences from Sequim to Forks. The County is currently in the process of developing and adopting a tailored program and manual that suits regional needs and the State requirement that jurisdictions which are not adopting the Ecology manual must adopt a manual equivalent to it.

The *City of Port Angeles Stormwater Management Plan* (1996) provides extensive information on then-current and planned activities to improve stormwater handling throughout the eleven drainage management areas that are, in the aggregate, roughly equivalent to the West WRIA 18 area. The City (and the surrounding unincorporated UGA) may become subject to National Pollutant Discharge Elimination System (NPDES) permitting for stormwater discharge. The City has established a Stormwater Utility to correct longstanding problems and provide equitable solutions. The City's ongoing stormwater plan focuses on combined sewer overflows to achieve compliance with the goal of no more than one event per year by 2015.

The 1994 *Port Angeles Regional Watershed Plan* notes that stormwater episodes have caused elevated fecal coliform levels in Dry, Tumwater and White creeks. In Dry Creek, increases in stormwater runoff are primary causes for habitat degradation. Two factors are responsible: loss of wetlands from historic filling and draining projects, and increases in

rain-on-snow runoff events in the headwaters. Sediment yield from a stormwater-related massive gully head-cutting off Black Diamond Road is so great that Tumwater Creek remains highly turbid throughout the winter. Although this has been a long-standing problem, the extent of impact worsened as a result of increased slide and erosion activity in 1997. In Valley Creek, altered hydrology from stormwater discharges has led to incised channel conditions that maintain little spawning gravel. Likely stormwater impacts resulting from altered hydrology in Morse Creek include greater frequency and magnitude of peak storm flows. The Clallam County Comprehensive Plan (1995) states that stormwater runoff is causing considerable bluff-front gully erosion and deposition in the Four Seasons neighborhoods. Both the Mining Creek and Frog Creek subwatersheds of Morse Creek are platted for urban development. Even with protection under the Critical Area Ordinances, new development will likely result in significant stormwater impacts.

In East WRIA 18 and the WRIA 17 Sequim Bay planning area, the City of Sequim adopted the older (1992) stormwater manual, and is involved in a study of stormwater in Bell Creek. Stormwater runoff from developed areas is an increasing concern in Bell Creek, with increased incidence of flood events in Sequim in recent years. Effects of stormwater runoff are expected to increase significantly as the basin is further developed. The primary impacts at this time are from runoff from the Bell Hill development. Stormwater runoff has led to high levels of fine sediment in the substrate Stormwater in the Johnson Creek drainage is also noted as a water quality concern in the Clean Water Strategy for Addressing Bacterial Pollution in Dungeness Bay and Watershed (Ecology 2002). Recurring flooding problems on Jimmycomelately Creek are discussed in A Preliminary Plan for Restoring Jimmycomelately Creek and the Lower Sequim Bay Estuary (Shreffler 2000). If not properly managed, stormwater runoff from large-scale commercial development planned for the City of Sequim (or any other jurisdiction in WRIA 18) has the potential to negatively impact adjacent surface and groundwater supplies.

In East WRIA 18 stormwater problems are compounded by the presence of the extensive system of irrigation ditches. Highland Ditch collects stormwater because of its location relative to local patterns of runoff and serves to abate flood hazards to some degree. However, this is not its purpose, nor a function for which it was designed. Updated stormwater runoff and flood hazard management planning is occurring on the Dungeness River, integrated with habitat restoration planning. The Dungeness Irrigation Company system transfers stormwater flows to Matriotti Creek, which would otherwise not be significantly affected by the stormwater flows. High loads of fine sediment are conveyed to Matriotti Creek during flood events in the Dungeness River through the irrigation network.

Current ASHTO standards allow little, if any, flexibility for alternative design standards for road design. Clallam County is considering modified standards**.** The Clallam County Six Year Transportation Improvement Program 2003-2008 (TIP) lists road improvements to be made during that period and is adopted by the Board of Commissioners. This document also includes transportation-related policies from the Clallam County Comprehensive Plan.

### Desired Conditions and Outcomes

- Proper stormwater management prevents harmful changes to stream hydrology and infiltrates precipitation to maintain the natural water table.

- Stormwater management helps stabilize riverbanks, maintain stream channels and riparian vegetation, retain spawning gravels and large woody debris, and reduce pollutant loads to natural streams.
- Stormwater management protects surface water, groundwater, and the marine nearshore from contamination.
- Stormwater runoff is treated as necessary prior to infiltration.
- A framework for stormwater management is established at a watershed scale, with coordinated implementation among WRIA 18 jurisdictions.
- Low Impact Development methods are used wherever feasible, as cost-saving and water-friendly incentives and alternatives to regulation.
- Stormwater management is implemented in a fashion that does not inhibit economic development or significantly increase the cost of building new houses.
- High quality stormwater management plans and practices are implemented throughout WRIA 18, minimizing pollution by not conveying stormwater into open surface waters such as ditches, streams, and bays.

## Recommendations

A. Comprehensive Stormwater Management:

1. *Coordinated Stormwater Management:* Because stormwater knows no jurisdictional boundaries, the framework for stormwater management should be established at a subbasin scale. It is important that the different jurisdictions within the County coordinate in implementing standards for stormwater management. The ongoing development of stormwater management programs by Clallam County and WRIA 18 cities is supported. An approach to manage stormwater collaboratively by subbasin is encouraged.
2. *Comprehensive Stormwater Management Plan*: Clallam County and Clallam Conservation District, together with WRIA 18 cities and tribes, should consider an intergovernmental cooperative agreement to pool resources for stormwater management program. They should coordinate stormwater management systems and adopt joint stormwater management programs in cooperation with state agencies. Stormwater management should be implemented in a fashion that does not inhibit economic development or housing affordability. The approach should encourage stormwater recharge and control runoff. The comprehensive stormwater management program should consider the elements described in the Puget Sound Water Quality Management Plan (see Box 1). (While a specific technical manual for stormwater management approved by the State is not being adopted in the Watershed Plan, jurisdictions should consider the latest DOE stormwater manual (or an equivalent).[1])

[1] The Planning Unit recognizes that State water quality requirements must be met but did not achieve consensus on adopting the DOE Stormwater Manual.

**Box 1. Puget Sound Water Quality Management Plan Comprehensive Stormwater Management Program Action Items**

- Stormwater controls for new development and redevelopment
- Stormwater site plan review
- Inspection of construction sites & maintenance of temporary BMPs
- Maintenance of permanent facilities
- Source control program
- Illicit discharges and water quality response
- Identification and ranking of problems
- Public education and involvement
- Low Impact Development practices
- Watershed or basin planning
- Create local funding capacity
- Monitor program implementation and environmental conditions
- Schedule for implementation

(*A more detailed description of these Action Items can be found within the Puget Sound Water Quality Management Plan (Section SW – 1.2) and a Fact Sheet titled "Developing a Comprehensive Stormwater Program under the Puget Sound Water Quality Management Plan," published by the Puget Sound Action Team.*)

3. *Adaptive Management*: Monitoring data should be reviewed every five years (or more frequently, if deemed appropriate) to evaluate whether program goals are being met and whether any modifications to the program are needed. Washington Department of Ecology and the Puget Sound Action Team should work with the City and County to develop a system to assess progress.

4. *Runoff from State Highways*: The Washington State Department of Transportation, in consultation with involved jurisdictions, should develop and carry out a program to manage stormwater runoff from all state highways that includes:

    a. Methods to ensure that stream channels, and aquatic species and their habitat, are protected and stream crossings are minimized;

    b. Implementation of a federal NPDES permit;

    c. Adoption and use of a stormwater technical manual that has been approved by Ecology;

    d. Regular inspection of construction sites and use of BMPs to control erosion;

    e. Regular maintenance of temporary and permanent stormwater facilities and structures;

    f. Improvement of existing facilities when roadways are redeveloped;

    g. Identification and ranking of existing stormwater problems that degrade water quality and fish and wildlife habitat, and planning and scheduling to fix these problems;

h. Recognition of stormwater as a resource to recharge aquifers, streams and wetlands;

i. Use of low impact development practices, when appropriate, to treat and infiltrate runoff on site rather than collecting and conveying the runoff off site;

j. Preservation of native vegetation, use of permeable surfaces and use of amended soils to improve infiltration;

k. Use of integrated pest management (IPM) practices to manage roadside vegetation;

l. Activities to respond to spills and water quality violations;

m. An implementation schedule; and

n. Monitoring to measure program implementation and environmental response.

5. *Runoff from County Roads:* The County should continue to develop and carry out a program to manage stormwater runoff from all county roads that includes consideration of:

a. Methods to ensure that stream channels, and aquatic species and their habitat are protected and stream crossings are minimized;

b. Regular inspection of construction sites and use of BMPs to control erosion;

c. Regular maintenance of temporary and permanent stormwater facilities and structures;

d. Improvement of existing facilities when roadways are redeveloped;

e. Identification and ranking of existing stormwater problems that degrade water quality and fish and wildlife habitat, and planning and scheduling to fix these problems;

f. Recognition of stormwater as a resource to recharge aquifers, streams and wetlands;

g. Use of low impact development practices, when appropriate, to treat and infiltrate runoff on site rather than collecting and conveying the runoff off site;

h. Preservation of native vegetation, use of permeable surfaces and use of amended soils to improve infiltration;

i. Use of mowing as a principal vegetation management tool as a part of integrated pest management (IPM) practices to manage roadside vegetation;

j. Activities to respond to spills and water quality violations; and

k. An implementation schedule.

6. *Runoff from Federal Facilities* (Olympic National Park, U.S. Forest Service, Dungeness National Wildlife Refuge) – Managers of federal facilities should

control stormwater runoff on federal lands according to the same practices (or similar practices, where appropriate) that will be used by WRIA 18 jurisdictions.

7. Run*off from Tribal Lands* – Managers of tribal lands should control stormwater runoff on tribal lands utilizing a comprehensive program that incorporates, where appropriate, the elements in the Puget Sound Water Quality Management Plan (Box 1).

8. The involved jurisdictions should assess the relative benefits and costs of stormwater planning and management, and implement a fair and equitable revenue program to distribute the cost among watershed property owners. Potential funding sources for stormwater management are listed in Box 2.

**Box 2. Potential Revenue Sources for Stormwater Management**

A storm or surface water utility is generally the most stable source of funding, and can be used to attract matching funds when applying for grants or loans. Following are a list of additional revenue sources that could potentially fund the implementation of a regional stormwater plan. Partnerships between cities, the county, and various ongoing processes can help to reduce the implementation costs of such a plan.

- Storm or surface water utility
- Grant and loan funding (Centennial, SRFB, 319, PIE)
- Efficiencies with neighboring jurisdictions and other ongoing processes
- General fund or County Opportunity Fund
- Permit fees and drainage impact fees
- Road fund
- Revenue bonds

9. Combined sewer overflows should be eliminated by the most cost-effective means available. City of Port Angeles combined sewer overflow events should be reduced to no more than one per year by 2015. Protect Port Angeles Harbor from erosive, nutrient loading, and salinity effects of high volume freshwater stormwater discharges to the extent feasible.

10. Clear compliance and enforcement procedures should be developed for infractions of stormwater ordinances and regulations.

11. In the Port Angeles and Sequim urban independent drainages, focus on minimizing stormwater and associated impacts to the natural stream channels.

12. As necessary to protect the hydrology of natural drainages in the Port Angeles urban area, the City is encouraged to discharge treated stormwater directly to Port Angeles Harbor rather than into the lower parts of affected drainages. Alternatively, treatment options to reduce stormwater quality impacts to the Harbor could be implemented, such as biofiltration BMPs, wet ponds, and low-impact roadside vegetated swales.

13. Minimize to the extent feasible the impact of stormwater runoff from large-scale commercial development projects throughout WRIA 18 that have the potential of negatively impacting surface and groundwater supplies.

B. Impervious surfaces: Impervious surfaces should be minimized, consistent with good urban planning and transportation engineering.

1. Roads should be designed and laid out to minimize the consequences of stormwater runoff. Where appropriate, road design codes to allow narrower roads in new developments consistent with WRIA 18 local jurisdiction's requirements for emergency vehicle access.

2. The review of new development should focus on the maximum number of parking spaces that should be permitted, rather than on the minimum number that should be provided. However, parking should not be forced onto roadsides.

3. Encourage retrofit, redevelopment, and reuse of older developments and existing infrastructure, including vacant parking lots and abandoned sites, to reduce stormwater impacts as much as possible. Encourage on-site infiltration at these sites to increase aquifer recharge.

4. For urbanized and urbanizing WRIA 18 subbasins, determine existing effective impervious cover and establish goals that balance existing development, planned growth, and stormwater management. Incorporate low impact development techniques. Strive to limit total effective impervious cover in each WRIA 18 subbasin to less than 7%.

5. The County Public Works Department should design roads to the minimum width standards, consistent with State and Federal standards and rural road recommendations in the Comprehensive Plan.

C. Low impact development: Low Impact Development methods should be used wherever feasible, as cost-saving and water-friendly incentives and alternatives to regulation. Incentives for low impact development should be incorporated in stormwater management plans. Best practices may involve the following low impact development site analysis and design steps:

1. *Identify applicable zoning, land use and other local recommendations*: Identify any waivers, modifications or special processes that may be needed to gain approval (e.g., subdivision, drainage, grading).

2. *Define development envelope*: Delineate any critical areas, buffers, setbacks, or other resource protection areas where development is discouraged or prohibited.

3. *Use drainage/hydrology as a site element:* Match the development to the natural landscape to minimize land disturbance. Maintain on-site vegetation and drainage patterns and restrict development and disturbance in valuable hydrologic areas such as forested areas or other established native vegetation and highly permeable soils. Avoid change in land cover runoff characteristics. Attempt to restore natural drainage patterns.

4. *Reduce/minimize total site impervious area:* Impervious areas, such as roofs, roads, parking areas, and sidewalks increase the volume and rate of runoff, convey pollutants, and raise water temperature. Look for opportunities to decrease road width and length, reduce the size of parking areas, and use alternative permeable surfaces. Cluster buildings and other developed areas.

5. *Integrate stormwater controls with site plan layout:* Determine the preliminary amount (area or percentage of the site) that will be required to achieve the site plan's hydrologic objective. Develop standard design templates and practices that will be employed on each lot. Determine the best location, type and size of practice required for each lot.

6. *Minimize directly connected impervious areas:* Divert flows from impervious areas to vegetation and limit the size and length of drainage from impervious areas.

7. *Modify/increase drainage flow paths:* Modify the grading design by flattening slopes and swales and encouraging sheet flow. Use detention devices such as rainwater collection or place drainage structures at more locations to maintain the natural runoff rate within the watershed.

**Examples of Low Impact Development Actions**

- Mimicking the pre-development stormwater flows and water quality;
- Retaining native vegetation and soils to intercept, evaporate and transpire stormwater on the site (rather than using traditional ponds and conveyances);
- Emphasizing a higher standard of soil quality in disturbed soils (by using compost and other methods) to improve infiltration, reduce runoff and protect water quality;
- Clustering development and roads on the site and retaining natural feature that promote infiltration; and
- Reducing impervious surface area and using permeable surfaces.

8. *Compare pre- and post-development hydrology:* Review the design to determine the effectiveness of low impact development practices in meeting stormwater management requirements, using the flow frequency and duration curves predicted by a hydrology model generally accepted as applicable to local conditions. (A specific technical manual for stormwater management is not being adopted in this watershed plan.[2]) The size of stormwater ponds may be significantly reduced by following these practices.

9. *Complete low impact development site plan:* Complete final construction design drawings and specifications, including erosion and sediment controls, pollution prevention and any maintenance or education requirements.

E. Urban tree planting: Retain vegetative cover along water bodies in urban areas. Urban tree planting programs should be continued, expanded, and extended into UGAs.

F. Stormwater as a resource: Where cost-effective and feasible, consistent with good watershed management practice, stormwater may be treated and reused. Stormwater management plans should consider:

1. Surface storage of stormwater for low-flow augmentation.

2. Cisterns or rainbarrels for residential outdoor use.

3. Infiltration of stormwater for aquifer storage and recovery.

[2] The Planning Unit recognizes that State water quality requirements must be met, but did not achieve consensus on adopting the DOE Stormwater Manual.

4. The reuse of stormwater in irrigation of parks, playfields, or golf courses, or in water parks.

G. Irrigation Ditch Piping:

1. Continue irrigation ditch piping wherever appropriate and feasible in order to reduce pollutants to surface water and to minimize interception of natural storm drainage. This is particularly important in urbanized and urbanizing basins and subbasins in WRIA 18.

2. Modify irrigation infrastructure to reduce detrimental effects of stormwater on wetlands and small streams.

H. Remediation: Stormwater concerns in WRIA 18 should be remediated as they are identified and funds become available (examples are given in the discussion of existing conditions above).

I. GIS: Use GIS to link land use changes (impervious surfaces) to stormwater runoff and non-point source pollution.

J. Sediment Management:

1. Clallam County should adopt clearing and grading ordinances.

2. DNR and Clallam Conservation District should work with small forest landowners to implement new DNR forest road management requirements.

K. Public Education

1. Increase public awareness and knowledge of stormwater problems and management opportunities, including LID. Work with water purveyors to include information on stormwater management in annual consumer confidence reports.

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