APPENDIX C: ANNOTATED BIBLIOGRAPHY

Bilhimer, D., L. Sullivan, and S. Brock. 2005. Quality Assurance Project Plan –East Fork Lewis River Temperature and Fecal Coliform Bacteria Total Maximum Daily Load Study. WA Dept of Ecology – Environmental Assessment Program, Olympia, WA, Publication Number 05-03-110.

This study is a preliminary report for the East Fork Lewis Total Maximum Daily Load (TMDL) study that is being prepared in response to Clean Water Act Section 303(d) listings in the East Fork Lewis for exceedance of water temperature and fecal coliform bacteria standards. The Quality Assurance (QA) Project Plan describes the technical study that will evaluate pollutants in the impaired waterbodies. The plan states that it will build on previous data collection efforts conducted by a variety of governmental and private organizations and that it will be conducted by the Washington State Department of Ecology (Ecology) Environmental Assessment (EA) Program.

Blythe, L.S. 1995. Slide Creek – 1995 Stream Survey Narrative. Gifford Pinchot National Forest Central Skills Center, Amboy, WA.

USFS Level II stream survey report of 3.4 miles of Slide Creek and 1.06 miles of a tributary to Slide Creek. Surveys conducted July 1995 through August 1995.

Caldwell, B, J. Shedd, and H. Beecher. 1999. East Fork Lewis River Fish Habitat Analysis Using the Instream Flow Incremental Methodology and Toe-Width Method for WRIA 27. WA Dept of Ecology, Open File Technical Report, Publication #99-151.

This document reports on the Washington State Department of Ecology instream flow study conducted on the East Fork Lewis River using the Instream Flow Incremental Methodology (IFIM). The effort also collected Toe-Width information on 13 streams in WRIA 27. These studies provide information about the relationship between stream flows and fish habitat which can be used in developing minimum instream flow requirements for fish in the East Fork Lewis River and the 13 chosen streams in WRIA 27. For the IFIM study on the E.F. Lewis River one site was chosen, composed of eight transects. The site was located at approximate River Mile 10.8 at Daybreak County Park. Streamflow measurements and substrate information were recorded at high, medium and low flows. This information was entered into the IFG4 hydraulic model to simulate the distribution of water depths and velocities with respect to substrate and cover under a variety of flows. Using the HABTAT model, the simulated information was then used to generate an index of change in available habitat relative to changes in flow; this index is referred to as "weighted usable area" (WUA). Other variables, including water temperature, water quality, and sediment load were not addressed in this study. No instream flow recommendations were made in this report.

Clark County Public Works Department-Clean Water Program. 2002. Long-Term Index Site Monitoring Project: 2002 Physical Habitat Characterization.

This report compiles and provides summary information relevant to long term water quality monitoring in tributaries of the EF Lewis River. It describes water

quality monitoring and results and summarizes and incorporates new information as well as pre-existing information. In addition, it details goals and objectives to meet NPDES clean water program requirement and activities to improve stream health.

Clark County Public Works Department-Clean Water Program. 2008. Lockwood Creek Subwatershed Needs Assessment Report.

This report compiles and provides summary information relevant to stormwater management in Lockwood Creek. It proposes stormwater-related projects and activities to improve stream health and to assist with adaptive management of the County's Stormwater Management Program. Assessments are conducted at the subwatershed scale (1 to 20 square miles). The report summarizes and incorporates new information as well as pre-existing information. In many cases it includes basic summary information or incorporates, by reference, longer reports which may be consulted for more detailed information. This report produces information related to three general categories: 1) potential stormwater capital projects for County implementation or referral to other organizations, 2) management and policy recommendations, and 3) natural resource information. Descriptions of potential projects and recommended program management actions are provided to County programs. Potential project or leveraging opportunities are also referred to local agencies, groups, and municipalities.

Clark County Public Works Department-Clean Water Program. 2008. Mason Creek Subwatershed Needs Assessment Report.

This report compiles and provides summary information relevant to stormwater management in Mason Creek. It proposes stormwater-related projects and activities to improve stream health and to assist with adaptive management of the County's Stormwater Management Program. Assessments are conducted at the subwatershed scale (1 to 20 square miles). The report summarizes and incorporates new information as well as pre-existing information. In many cases it includes basic summary information or incorporates, by reference, longer reports which may be consulted for more detailed information. This report produces information related to three general categories: 1) potential stormwater capital projects for County implementation or referral to other organizations, 2) management and policy recommendations, and 3) natural resource information. Descriptions of potential projects and recommended program management actions are provided to County programs. Potential project or leveraging opportunities are also referred to local agencies, groups, and municipalities.

Clark County Public Works Department-Clean Water Program. 2008. Mill Creek Subwatershed Needs Assessment Report.

This report compiles and provides summary information relevant to stormwater management in Mill Creek. It proposes stormwater-related projects and activities to improve stream health and to assist with adaptive management of the county's Stormwater Management Program. Assessments are conducted at the subwatershed scale (1 to 20 square miles). The report summarizes and incorporates new information as well as pre-existing information. In many cases it includes

basic summary information or incorporates, by reference, longer reports which may be consulted for more detailed information. This report produces information related to three general categories: 1) potential stormwater capital projects for county implementation or referral to other organizations, 2) management and policy recommendations, and 3) natural resource information. Descriptions of potential projects and recommended program management actions are provided to county programs. Potential project or leveraging opportunities are also referred to local agencies, groups, and municipalities.

Clearwater BioStudies, Inc. 2001. The 2001 Poison Gulch Stream Survey Report. Gifford Pinchot National Forest, Mount St Helens National Volcanic Monument, Amboy, WA.

USFS Level II stream survey report of 1.92 miles of Poison Gulch. Surveys conducted August 30, 2001, to September 1, 2001.

Collins, B. 1997. Application of geomorphology to planning and assessment of riverine gravel removal in Washington. Chapter IX in Geology and Geomorphology of Stream Channels – University of Washington, Seattle, WA.

This is a chapter in "Geology and Geomorphology of Stream Channels" that focuses on the history and geomorphic impacts of riverine gravel removal in Washington rivers. The following topics are covered: 1) riverine gravel removal, 2) floodplain mining, 3) gravel bar mining, and 4) methods for assessing the effects of gravel removal. Floodplain gravel mining on the East Fork Lewis is treated as a case study in the "floodplain mining" section.

Deschamps, S. and D. Hodges. 1998. East Fork Lewis River – 1998 Stream Survey Narrative. Gifford Pinchot National Forest, Mount St Helens National Volcanic Monument, Amboy, WA.

USFS Level II stream survey report of 7.6 miles of the upper East Fork Lewis River (RM 32.7, Sunset Falls, to RM 40.3, bedrock waterfall). Surveys conducted June 29, 1998 through August 5,1998.

Deschamps, S. and D. Hodges. 1998. Green Fork of the East Fork Lewis River – 1998 Stream Survey Narrative. Gifford Pinchot National Forest, Mount St Helens National Volcanic Monument, Amboy, WA.

USFS Level II stream survey report of 1.8 miles of the Green Fork of the East Fork Lewis River (RM 0 to 1.8). Surveys conducted August 31, 1998 through September 5,1998.

Dover Habitat Restoration, LLC. 2003. Assessment & Strategic Plan – East Fork Lewis River. Prepared for Friends of the East Fork.

This assessment and strategic plan is focused primarily on the main channel of the East Fork Lewis River. New data was obtained and analyzed along with data and information from existing plans, studies, reports, and projects. This plan outlines problems within the various reaches of the East Fork and describes potential remedial actions. This plan presents a concept of how the river would look and

function after restoration, but it does not present a final design or detailed construction specifications.

Hutton, R. 1995. East Fork Lewis River land use and water quality background report – for water quality protection from nonpoint source pollution. Clark County Dept of Community Development, Water Quality Division.

This report presents a simplified statistical and graphic evaluation of several potentially important nonpoint source pollution relationships between common land uses and monitored water quality in the East Fork Lewis River watershed. Significant relationships were plotted to examine how sampled water quality changed with different levels of specific land uses, and to look for unusual occurrences. Relationship characteristics were compared to generalized ideal values to aid interpretation. The proportions of significant relationships for various selected subarea land uses were evaluated for their relative impact on water quality. Conclusions and recommendations are provided.

Google Earth 2008. www.googlearth.com

We reviewed aerial imagery provided by Google Earth to evaluate some physical conditions including road/stream crossing locations, riparian cover, land use, and topography.

Hutton, R. 1995. East Fork Lewis River water quality assessment background report – for water quality protection from nonpoint source pollution. Clark County Dept of Community Development, Water Quality Division.

This report summarizes the surface water quality found in the watershed of the East Fork Lewis River. The report characterizes and documents the water quality status of the East Fork's mainstem and some of the major tributaries. This report provides baseline information and the foundation for the development of the East Fork Lewis River Watershed Action Plan.

Hutton, R. 1995. East Fork Lewis River watershed action plan – for water quality protection from nonpoint source pollution. Clark County Dept of Community Development, Water Quality Division.

This plan addresses, through coordinated nonpoint control strategies, the probable nonpoint source pollution problems in the East Fork Lewis River watershed. The plan is a developed as a working tool, developed from a screening of the East Fork's probable nonpoint problems at a subwatershed level of resolution, to assist the future implementation of more site specific corrective actions. A phased approach to implementation is suggested. Recommended strategies are targeted for specific regions of the watershed and are not site specific.

Hutton, R. 1995. East Fork Lewis River watershed characterization background report – for water quality protection from nonpoint source pollution. Clark County Dept of Community Development, Water Quality Division.

This report characterizes the East Fork Lewis River watershed so that potential nonpoint source and their impacts may be addressed in the context of both natural watershed features and human activities. Clark County's portion of the watershed

is emphasized. The degree of detail in this characterization is usually limited to watershed subbasins or areas with similar features and is not site specific.

Johnston, G., N. Ackerman, and B. Gerke. 2005. Chapter 4: East Fork Lewis River Basin - Habitat Assessment. Prepared by SP Cramer & Associates for Lower Columbia Fish Recovery Board, Longview, WA.

The assessment involved stream habitat, riparian, hydromodification, and sediment source evaluations in the East Fork Lewis Basin. The project identified conditions impacting salmonid production and recovery measures. Aquatic habitat surveys were performed on 40 km of stream following standard protocols. Riparian conditions were evaluated using aerial photos and field surveys. The ability of riparian zones to provide shade and large woody debris recruitment was determined for the current and potential (restored) conditions. Hydromodifications impacting channel dynamics were identified along the lower mainstem river corridor. Geomorphic assessment was used to identify the current and historical channel migration zone. Geographic Information System (GIS) and field surveys were used to characterize sediment supply conditions and land-use practices contributing to sediment impairments. Recommendations for additional data collection and a prioritized list of habitat enhancement projects were developed.

Kondolf, G.M., and D.D. Kelso. 1996. Effects of aggregate mining in river floodplains: Some observations relevant to the policy on floodplain mining in Clark County, Washington. Comments submitted to the Clark County Planning Commission, April 1996.

These comments discuss the Ridgefield Pit avulsion on the East Fork Lewis.

Kondolf, G.M., M. Smeltzer, and L. Kimball. 2002. Freshwater gravel mining and dredging issues. White Paper prepared for WA Dept of Fish & Wildlife, WA Dept of Ecology, and WA Dept of Transportation.

This report builds upon existing literature for Washington and elsewhere to summarize current scientific information regarding the environmental effects of mining gravel and sand for construction aggregation from rivers and streams, along with the effects of other freshwater dredging. The emphasis is on effects on salmonids in their various freshwater-based life stages, to provide a scientific basis for future development of guidelines that will be protective of the resource. This document does not make policy recommendations, but summarizes the scientific literature and unpublished research on gravel mining effects in Washington state and elsewhere. It also draws upon discussions with resource managers, site visits, and analysis of historical aerial photographs and maps of selected sites. The East Fork Lewis River and the 1995 and 1996 avulsions into streamside gravel mining pits are discussed.

Lenhart, J. and S. Reeder. 1995. McKinley Creek – 1995 Stream Survey Narrative. Gifford Pinchot National Forest Central Skills Center, Amboy, WA.

USFS Level II stream survey report of 2.3 miles of McKinley Creek. Surveys conducted July 20, 1995, through August 23, 1995.

Lower Columbia Fish Recovery Board. 2004. Lower Columbia Salmon and Steelhead Recovery and Subbasin Plan. Lower Columbia Fish Recovery Board. Longview, WA.

This is a plan for the protection and restoration of native fish, aquatic habitats, and sensitive wildlife species in Washington lower Columbia River subbasins. It serves as 1) a recovery plan for Washington lower Columbia salmon and steelhead populations and 2) a Northwest Power and Conservation Council Fish and Wildlife Plan for eleven lower Columbia subbasins. The East Fork Lewis Basin is one of the subbasins covered in this plan. The plan is the product of a collaborative process facilitated by the Lower Columbia Fish Recovery Board (LCFRB). The primary species focus is on salmon, steelhead and trout species listed under the ESA. The plan describes existing conditions, limiting factors, and threats to these and other target species. Recovery goals are provided as well as the suite of strategies, measures, and actions that are needed to accomplish those goals.

Lower Columbia Fish Recovery Board. 2008. Lower Columbia Salmon Recovery 6-Year Habitat Work Schedule and Lead Entity Habitat Strategy

The 6-Year Habitat Work Schedule is developed in order to support and carry out the critical elements identified in the Lower Columbia Salmon Recovery and Fish & Wildlife Subbasin Plan. The work schedule accomplishes 2 primary objectives: 1) Assist agencies, local governments, tribes, non-profit organizations and others who fund and/or undertake habitat protection and restoration projects in identifying high priority salmon habitat needs in the Lower Columbia; and 2) Assist agencies, local governments, and landowners in developing and applying regulations, incentives, and land and resource management plans that will protect and restore important salmon habitat. This is an annually updated work plan developed by the LCFRB and is used to help make project funding decisions for Salmon Recovery Funding Board funds.

Lower Columbia Fish Recovery Board. 2006. Salmon-Washougal and Lewis Watershed Management Plan (WRIAs 27-28). Lead Agency: LCFRB. Prepared by LCFRB, EES Consulting, and HDR consulting. For Submission to the Planning Area Counties. WA Ecology Grant #9900294.

Under the State of Washington's Watershed Management Act (Chapter 90.82 RCW) local governments are authorized to initiate a watershed planning process. The process is broad in scope and involves stakeholders and agencies at the local, regional, state and federal levels. The watershed planning program is designed to foster planning for water quantity, water quality, aquatic habitat and instream flow in a comprehensive and integrated fashion. This Watershed Management Plan has been prepared for Water Resource Inventory Areas (WRIAs) 27 and 28. WRIA 27 comprises the Kalama and Lewis River Basins. WRIA 28 comprises the Salmon Creek, Burnt Bridge Creek, Lacamas Creek, and Washougal River Basins, as well as additional smaller creek basins. Planning objectives include: 1) protect or enhance conditions in the watershed, 2) develop and implement the watershed plan, and 3) improve information and data management. This Plan addresses a range of issues related to water resources in WRIAs 27 and 28, including water supply, stream flow management, water quality, and fish habitat. It reviews

alternative approaches for managing water resources in the area and recommends selected strategies for implementation.

Lower Columbia Fish Recovery Board. 2001. WRIA 27/28 Salmon-Washougal and Lewis Watershed Planning – Level 1 Assessment. Lead Agency: LCFRB. Prepared by LCFRB, GeoEngineers, Inc., WEST Consultants, Inc., and Hammond Collier Wade Livingstone.

Under the State of Washington's Watershed Management Act (Chapter 90.82 RCW) local governments are authorized to initiate a watershed planning process. The process is broad in scope and involves stakeholders and agencies at the local, regional, state and federal levels. The watershed planning program is designed to foster planning for water quantity, water quality, aquatic habitat and instream flow in a comprehensive and integrated fashion. The Level 1 Assessment is a comprehensive compilation and review of existing data. The assessment contains the following categories: Water Quantity, Water Quality, Water Use, Water Rights, Water Balance, Land Use, Hydraulic Continuity, Future Projections, Precipitation, Conclusions and Recommendations

Lower Columbia Fish Recovery Board. 2004. WRIA 27/28 Salmon-Washougal and Lewis Watershed Planning – Level 2 Assessment. Lead Agency: LCFRB. Prepared by LCFRB, EES Consulting, HDR Consulting, Pacific Groundwater Group, WA State University, Kennedy/Jenks Consultants, Pacific Water Resources Inc.

Under the State of Washington's Watershed Management Act (Chapter 90.82 RCW) local governments are authorized to initiate a watershed planning process. The process is broad in scope and involves stakeholders and agencies at the local, regional, state and federal levels. The watershed planning program is designed to foster planning for water quantity, water quality, aquatic habitat and instream flow in a comprehensive and integrated fashion. The Level 2 Assessment involves collection of new data to fill critical data gaps and support well-defined decision needs. The assessment comprises 14 Technical Memos including Water Reclamation and Reuse Opportunities, Comparison of Potential Water Supply Management Strategies, Instream Flow Conditions in Four Pilot Streams, Instream Flow Management Approaches in Four Pilot Streams, Ground Water Development Scenarios, Assessment of Priorities for Surface Water Cleanup Plan, Strategies for Managing Flows in Two Pilot Subbasins, Management Actions to Protect Ground Water Quality, EF Lewis River Ground Water And Surface Water Relationships, Effects of Exempt Wells on Baseflow in the Washougal Subbasin, Hydrologic Modeling, Surface Water Quality Monitoring Strategy, and Tidal Effects as Related to Stream Flow Rule.

Polacek, M.C. 1995. East Fork Lewis River – 1995 Stream Survey Narrative. Gifford Pinchot National Forest, Mount St Helens National Volcanic Monument, Amboy, WA.

USFS Level II stream survey report of 6.4 miles of Copper Creek. Surveys conducted August 29-30, September 6-7, and September 19-22, 1995.

Mundorff, M. J. 1964. Geology and ground water conditions of Clark County, with a description of a major alluvial aquifer along the Columbia River. USGS Water-Supply Paper. 1600. p 24-33, 38-41, 56, 67-74, 94-95, 161-165, and Plates 1-3.

This report presents the results of an investigation of the ground water resources of the populated parts of Clark County (in 1964). A summary of Clark County geology is presented with a description of available groundwater resources. This report was undertaken at the request of the US Bureau of Reclamation for the purpose of determining whether ground water supplies were sufficient for irrigation of the area.

Norman, D.K., C.J. Cederholm, and W.S. Lingley. 1998. Flood plains, salmon habitat, and sand and gravel mining. Washington Geology, vol. 26, no. 2/3.

This paper, published in Washington Geology, discusses the geomorphic impacts of riverine gravel mining in Washington. It describes which rivers in Washington have been affected by gravel mining and discusses 5 rivers where floodplain gravel mining pits have been recently captured by the river. The East Fork Lewis is included as one of these sites.

Rawding, D., N. Pittman, C. Stearns, S. VanderPloeg, and B. McTeague. 2001. The lower East Fork Lewis River subbasin: a summary of habitat conditions, salmonid distribution, and smolt production. Prepared *by* the WA Dept. of Fish and Wildlife Fish Management and Habitat Science Programs *for* the Lower Columbia Fish Recovery Board. Project No. 99-1113P. WA Dept. of Fish and Wildlife, Olympia.

This document reports on smolt trapping and habitat evaluation studies conducted by WDFW on the East Fork Lewis in 2000. Two rotary screw traps were installed in the mainstem of the EF Lewis River near the mouth of Mason Creek (RM 7) and below Lucia Falls (RM 21) to estimate natural salmonid smolt production in the spring of 2000. Smolt yield by species was estimated for each trap location and is reported in the document. Available habitat information was gathered and summarized across the following categories: access, floodplain connectivity, bank stability, large woody debris (LWD), pools, side channels, substrate fines, riparian conditions, water quality, water quantity, and biological processes. Additionally, the Salmon and Steelhead Habitat Inventory and Assessment Program (SSHIAP) methodology was utilized to summarize aquatic habitat by type and gradient/confinement. Salmonid distribution was mapped on a SSHIAP hydrolayer using the Washington Conservation Commission (WCC) Limiting Factors Analysis (LFA) data generated in year 2000. Stream habitat restoration project recommendations are provided.

Schnabel, J. 2003. Long-Term Index Site Monitoring Project: 2002 Physical Habitat Characterization. Clark County Public Works, Water Resources Section. Clark County, WA.

This document reports on results of Clark County's physical habitat monitoring that is a component of the County's Long-term Index Site Project (LISP) that is conducted by Clark County Public Works Water Resources Section. The goal of the LISP is to identify trends in stream health at a set of stormwater-influenced streams. There are two LISP sites in the East Fork Lewis River Basin: 1) Brezee

Creek near the mouth, and 2) upper Rock Creek North. The LISP includes physical habitat, water quality, biological, and hydrologic components. This document summarizes the physical habitat characterization portion of the 2002 LISP. 2002 was the first year of LISP physical habitat data collection using EMAP protocols. Therefore, this summary focuses not on trends or changes in condition, but rather on establishing a baseline characterization of habitat conditions at each site. Discussions of watershed attributes, stressor identification, and causal factors for the observed conditions are beyond the scope of this report. This summary includes descriptions of individual habitat metrics and indices, results of multi-metric index calculations, a general comparison of LISP sites to reference conditions in the Willamette Valley and Cascades ecoregions, and an overall habitat characterization for each LISP reach based on a number of physical habitat attributes.

Steel, E.A., A. Fullerton, Y. Caras, M. Sheer, P. Olson, D. Jensen, J. Burke, M. Maher, D. Miller, and P. McElhany. 2007. Lewis River Case Study Final Report - A decision-support tool for assessing watershed-scale habitat recovery strategies for ESA-listed salmonids. NOAA Fisheries – NW Fisheries Science Center, Seattle, WA.

This effort predicts the impacts of 6 alternative watershed management strategies and evaluates those potential future landscapes with a suite of physical and biological response models. There are four main steps in the application of the decision support system. First, a series of potential watershed management strategies is generated. Next, specific actions that would result from the application of each strategy are identified and modeled. The physical habitat impacts of those actions are modeled, creating 6 potential future landscapes. Third, habitat quality and distribution for each potential future landscape is quantified and the biological implications for multiple species are predicted. And, fourth, results are synthesized using metrics that summarize predicted physical conditions and biological responses for each of the watershed management strategies. The outcomes of the analyses are predictions of the benefits and trade-offs across the watershed of each of the 6 modeled strategies. These predictions can help to guide the development of an on-the-ground watershed management strategy for the Lewis River basin.

Sweet, H.R., R2 Resource Consultants, Inc., IT Corporation, WEST Consultants, Inc., Ecological Land Services, Inc., Maul, Foster, and Alongi, Inc., Janice Kelly, Inc., Perkins Coie, LLP. 2003. Habitat Conservation Plan - J.L. Storedahl & Sons, Inc. Daybreak Mine Expansion and Habitat Enhancement Project. R2 Resource Consultants, Inc. Redmond, Washington.

This Habitat Conservation Plan (HCP) was developed to specify how J.L. Storedahl & Sons, Inc. (Storedahl) will operate its Daybreak Mine in Clark County, Washington and implement conservation measures in a manner that is consistent with the requirements of the federal Endangered Species Act. The Daybreak site is located near the East Fork Lewis River. A small tributary to the river, Dean Creek, flows along the northwest boundary of the site. Several threatened and candidate species under the Endangered Species Act occur in the waters near the site, including Chinook, coho, and chum salmon; steelhead; and possibly bull trout (native char) and Oregon spotted frog. In addition, three fish species of concern, coastal cutthroat trout, and Pacific and river lamprey also could occur in these

waters. The life histories, status, presence, and potential effects of implementing this HCP on these nine species are emphasized throughout this report. The report contains a Conceptual Restoration Plan for Ridgefield Pits, and a Geomorphic Analysis of the East Fork Lewis River in the vicinity of the pits.

U.S. Forest Service (USFS). 1995. Upper East Fork of the Lewis River Watershed analysis. Gifford Pinchot National Forest.

This document is a USFS watershed analysis for the upper East Fork Lewis, with a focus primarily on lands within the Gifford Pinchot National Forest.

Wade, G. 2000. Salmon and Steelhead Habitat Limiting Factors, WRIA 27 (Lewis). Washington Department of Ecology.

Section 10 of Engrossed Substitute House Bill 2496 (Salmon Recovery Act of 1998), directs the Washington State Conservation Commission, in consultation with local government and treaty tribes to invite private, federal, state, tribal, and local government personnel with appropriate expertise to convene as a Technical Advisory Group (TAG). The purpose of the TAG is to identify habitat limiting factors for salmonids. This report is based on a combination of existing watershed studies and the personal knowledge of the TAG participants. TAG members mapped fish distribution maps for coho, Chinook, and chum salmon, and for winter and summer steelhead in Water Resource Inventory Area (WRIA) 27. Salmonid habitat limiting factors were identified for each major anadromous stream within WRIA 27.

Washington Department of Ecology. 2008. Washington Water Resources Explorer Webpage. https://test-fortress.wa.gov/ecy/wrxt/statewide/viewer.htm

A webbased explorer provided by the Washington Department of Ecology which provides GIS information on the type and location of existing or claimed water rights throughout the State of Washington.

WEST Consultants. 1996. East Fork Lewis River Hydrology, Hydraulics and River Mechanics Study. Submitted to J.L. Storedahl & Sons, Inc.

This study evaluates the impacts of mining a 342-acre site on stream channel morphology, sedimentation, and flooding. Investigations are included with respect to: 1) historic river pattern changes, 2) the February 1996 flood, 3) future channel pattern change, and 4) streambank stabilization at Storedahl offices. Recommendations and conclusions are provided.

Wierenga, R. 2005. Benthic Macroinvertebrate and Water Temperature Monitoring for Clark County Watershed Assessments in 2004. Clark County Public Works Department – Water Resources Program. Washington Department of Ecology Grant number G0300020 and Clark County Clean Water Program.

This document summarizes water quality monitoring conducted by the Clark County Water Resources Program. It is intended to support the watershed assessment effort in Clark County led by the Lower Columbia Fish Recovery Board (LCFRB) in support of salmon recovery. The component of water temperature monitoring and benthic macroinvertebrate sampling targeted reach scale

assessments of water quality and were intended to support habitat data collected at a similar scale. Monitoring for hydrology, physical habitat, water temperature, and benthic macroinvertebrates occurred through the coordinated efforts of Clark County Water Resources and the Lower Columbia Fish Recovery Board. The primary goal of this project was to describe benthic macroinvertebrate communities and to identify water temperature limitations to salmonid production at priority salmon recovery reaches in Clark County. The benthic macroinvertebrate and water temperature data augments physical habitat surveys performed by the project partners, including the LCFRB and consultants. Results also provide information to characterize conditions as a baseline for future reference and for comparison to other subwatershed characteristics under further analysis of receiving water conditions and stormwater program effectiveness.

Wierenga, R. 2005. Subwatershed Characterization and Classification – Clark County Washington – Technical Report. Clark County Water Resources Program.

This report was created for use internally by Water Resources Program staff in support of monitoring activities for the Water Resources Program, including designing water quality monitoring projects, data analysis, and reporting. This approach to watershed analysis is applied to ongoing and future water quality monitoring projects, including Clark County's Centennial Grant Watershed Characterization Project and the Long Term Index Site Project. Future NPDES storm water permit monitoring intended to assess receiving waters in the county will utilize the watershed attribute data. The report presents a broad suite of information at the subwatershed scale (1 to 20 square miles), including metrics related to land cover, development, hydrology, geology/soils, and land use/zoning. The report covers all of Clark County, including subwatersheds within the East Fork Lewis River Basin.

OTHER DATA WITH RELEVANCE TO THE EF LEWIS BASIN

Description	*Source*	*Date*
GIS files		
EF Lewis Parcel Ownership (private, County, DNR, conservation easements)	WDNR, Clark County	2004
LIDAR Ground Surface	Clark County	
LiDAR derived contours	Clark County	2002
WA Soils (STATSGO)	USDA - NRCS	1994
WA Soils (state soil survey)	WA DNR	2000
WA Geology (southwest quadrant)	USGS	1999
Transportation data layer	WA DNR	1996
FEMA flood boundaries	FEMA	2004
Cadastral maps (georeferenced)	LCFRB / CFS	2004
Surveyed reaches (2004 assessment)	LCFRB / CFS	2004
EDT reach data	LCFRB / CFS	2004/08
Recovery Planning Reach Tiers	LCFRB / CFS	2004
Lower EF Lewis Hydromodifications	LCFRB / CFS	2004
Lower EF Lewis riparian buffers and condition ratings	LCFRB / CFS	2004
SHIAP fish passage barriers	WDFW	2008
Urban Growth Boundaries, Comprehensive Land Use	Clark County	2004
Aerial Photos		
Digital Orthophotos (0.5' and 2')	Clark County	2002
Digital Orthophotos (1990)	Clark County	1990
Digital Orthophotos (1984)	Clark County	1984
Digital Orthophotos (1978)	Clark County	1978
Digital Orthophotos (1974)	Clark County	1974
Digital Orthophotos (1968)	Clark County	1968
Digital Orthophotos (1955)	Clark County	1955
1939 aerials (digitized)	USACE	1939
Infrared orthophotos	Clark County	2002
Other data and reports		
Habitat survey data (lower mainstem and selected tribs)	LCFRB / CFS	2004
Habitat survey data (portions of lower mainstem, for EDT)	WDFW (Vancouver office)	2003
Chinook and Steelhead spawning surveys	WDFW (Vancouver office)	2005-present
Water Quality Monitoring (Brezee Creek, Rock Creek north)	Clark County (Water Resources)	ongoing
Stream Flow Gaging (Heisson Gage)	USGS	ongoing
Annual reports of the Chief of Engineers to the Secretary of War (circa 1876 – early 1900s) – clearing and snagging reports on the East Fork	US Army Corps of Engineers	1876 to early 1900s
Government Land Office (GLO) cadastral survey reports and maps (survey and map dates as far back as 1853)	Government Land Office (now BLM)	as far back as 1853
US Army Corps of Engineers Condition of Improvement Report for the Lewis River	US Army Corps of Engineers	September 30, 1990
USACE map of the East Fork Lewis River	US Army Corps of Engineers	1935
USGS topo quad map from a 1910 survey	USGS	1910

Description	*Source*	*Date*
Corps of Engineers “Emergency Flood Control” project report (rip-rap bank and levee at RM 11.5)	US Army Corps of Engineers	1967
Sampling for the invasive amur goby in the La Center wetland complex on the lower East Fork Lewis River	USGS – Biological Resources Division and US Fish & Wildlife Service	2008
Friends of the East Fork habitat and water quality data	Friends of the East Fork	ongoing
Fish First habitat and water quality data	Fish First	ongoing
Clark County water quality and habitat data	Clark County Public Works – Clean Water Program	ongoing