2.1 BASIS OF PLANNING REPORT

At the initiation of this wastewater facilities planning effort, background information was gathered on service area definition and characteristics, population and land use projections, existing wastewater flows and loadings, regulatory requirements, surface and ground water resources, and capabilities of existing wastewater conveyance and treatment facilities. From the background information, projections of future wastewater flows and loadings were developed. This information was compiled and issued as *Spokane County Wastewater Facilities Plan, Draft Basis of Planning Report*, in December 2000. In conjunction with release of the *Draft Wastewater Facilities Plan, 2000* the preliminary work was updated and reissued as the *Final Basis of Planning Report*.

The *Basis of Planning Report, 2001* provides the foundation for subsequent identification, evaluation and selection of appropriate wastewater management strategies. It identifies the goals and objectives of the planning process, describes the current characteristics of the planning area, projects future wastewater flows and loadings, defines key water quality and water resource issues, reviews the capabilities of existing wastewater systems, and presents insight into the values and concerns of interested stakeholders.

The text below presents a summary of the original *Final Basis of Planning Report* as updated in this *2006 Wastewater Facilities Plan Amendment*. As a step in preparing this *2006 Wastewater Facilities Plan Amendment*, previous assumptions and data from 2001 have been reviewed and updated for 2006 where appropriate.

2.2 GOALS AND OBJECTIVES OF THE BASIS OF PLANNING

Chapter 1 of the *Basis of Planning Report, 2001* describes the goals, objectives, and planning elements for the development of the Facilities Plan and EIS. At the outset of the planning process, the following goals were established to guide development of a successful wastewater management program for Spokane County:

- Provide reliable wastewater service–both near- (20-years) and long-term (50-years)
- Protect public health
- Protect and improve the region's water resources – surface water and groundwater
- Provide cost-effective solutions for County ratepayers
- Provide for growth in concurrence with the Growth Management Act
- Ensure the County has the authority and control to meet future wastewater needs
- Gain approval by the public, elected officials and regulatory agencies

To support these goals, the project team also identified a range of project objectives that describe specific measures of success used to guide the project and gauge its outcome.

The Basis of Planning report is just one element of the County's current wastewater planning efforts. A *Comprehensive Wastewater Management Plan* (CWMP) Update was prepared by Engineering and Economic Services. The demographic and flow projections developed in the

CWMP Update served as the basis for the flow and loading projections presented in the Basis of Planning Report. The County has also developed an interlocal agreement with the City. Key areas of focus are the future allocation of capacity at the Riverside Park Water Reclamation Facility (RPWRF), formerly known as the Spokane Advanced Wastewater Treatment Plant, and methodologies for equitable cost sharing within the City's conveyance system, and the responsibilities and rights of the City and County. Finally, this report serves as support for development of the *Wastewater Facilities Plan* and *Programmatic Environmental Impact Statement* (EIS). These documents have been updated and provide the County with a recommended wastewater management strategy that meets both near-term (20 year) and long-term (50 year) needs, and is environmentally responsible.

2.3 PLANNING AREA CHARACTERISTICS

The planning area comprises many varying features, which impact wastewater management and treatment. These characteristics are described in Chapter 2 of the *Basis of Planning, 2001*.

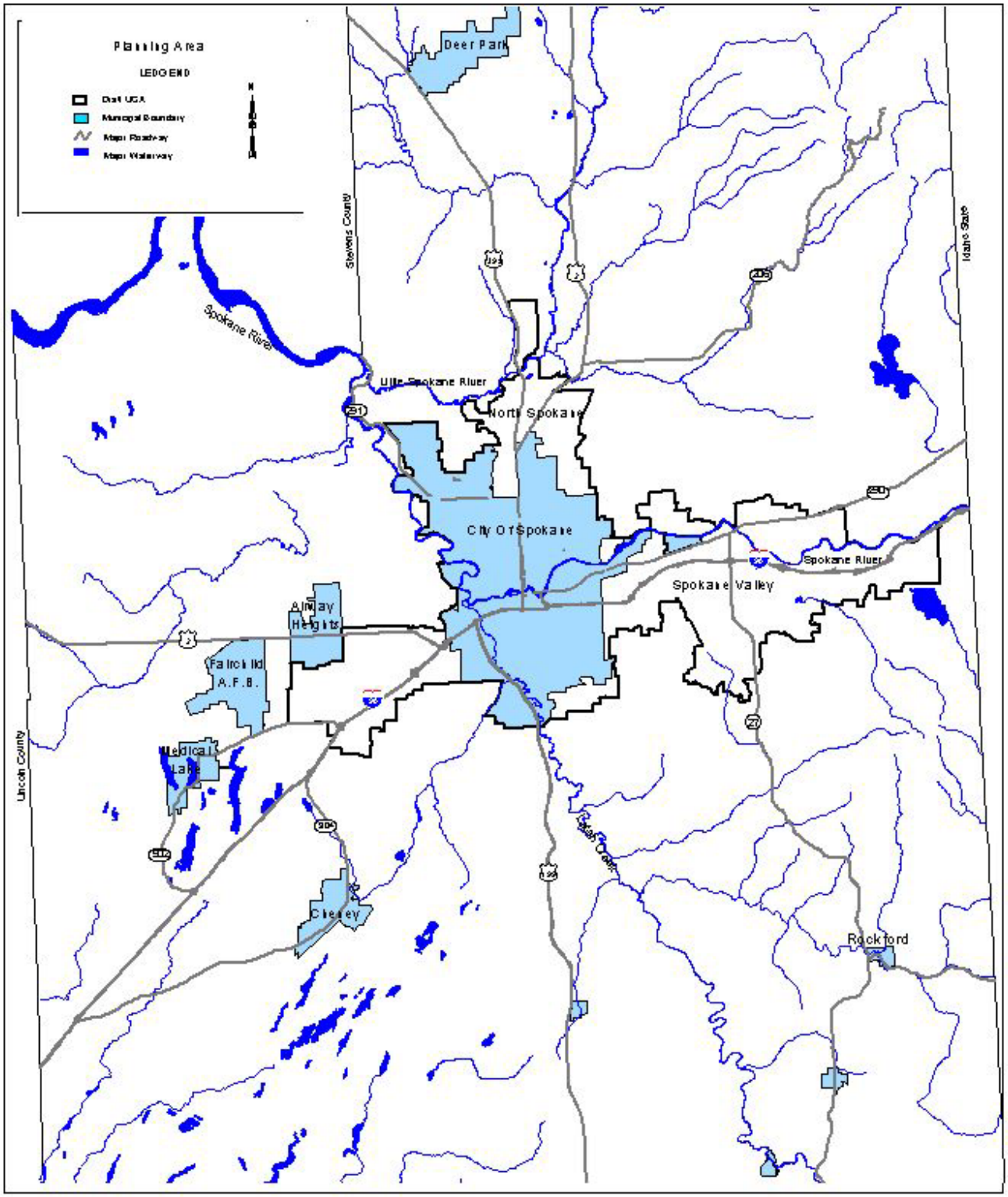
2.3.1 Planning Area Definition

The planning area for this Facilities Plan consists of two distinct service areas: one located in North Spokane and one located in the Spokane Valley; see Drawing 2-1 (Planning Area) on the next page. The 20-year boundaries for these planning areas are defined by the Urban Growth Area (UGA) and the service boundaries between the County and the nearby City of Spokane and Liberty Lake Sewer and Water District No. 1. The UGA was established as part of the County's on-going long-range planning, was approved by the Spokane County Board of County Commissioners, and is currently undergoing revision for approval by the commissioners in 2008.

While the Facilities Plan will examine infrastructure requirements for a 50-year planning horizon, this is a longer horizon than the Growth Management Act (GMA) requires public agencies to consider. However, it is assumed that only areas within the UGA, as amended in the future, will be served by the County's wastewater program.

2.3.2 Physical Environment

Spokane County is located in northeastern Washington adjacent to the Idaho border. While the County has an array of landscapes ranging from the mountainous area in the northeast to the semiarid basalt plains in the southwest, the planning area is nearly all urban landscapes with flat to moderately rolling hills. The climate in the planning area is relatively temperate, with average monthly temperatures ranging from approximately 30 degrees F in January to just over 70 degrees F in July. Precipitation is relatively low, averaging 17 to 21 inches per year and ranging from approximately ½-inch to 2.5 inches per month. Soils in the planning



DRAWING 2-1: Planning Area
SPOKANE COUNTY
Utilities Division
Wastewater Facilities Plan

area are porous with low water-holding capacity, although soils in the southeastern and northern parts of the County are fine- to medium-textured with moderate to slow permeability. These areas support much of the County's farming.

2.3.3 Water Resources

Many important water resources are located in and around the planning area; see Drawing 2-2 (Surface and Ground Water Sources), at the end of this chapter. The most important groundwater resource is the Spokane Valley-Rathdrum Prairie Aquifer, which serves as a source of drinking water for over 400,000 people. In the planning area, the aquifer is recharged along its margin on all sides from percolation through porous soils overlying the aquifer and through seepage from the Spokane River. Because of its importance as a primary drinking water source, the United States Environmental Protection Agency has declared the aquifer a "sole source" aquifer. Many other aquifers, most of them also drinking water sources, are located within the County. Because of the high permeability of soils overlying much of the aquifer, contamination by surface and subsurface activities is always a primary concern.

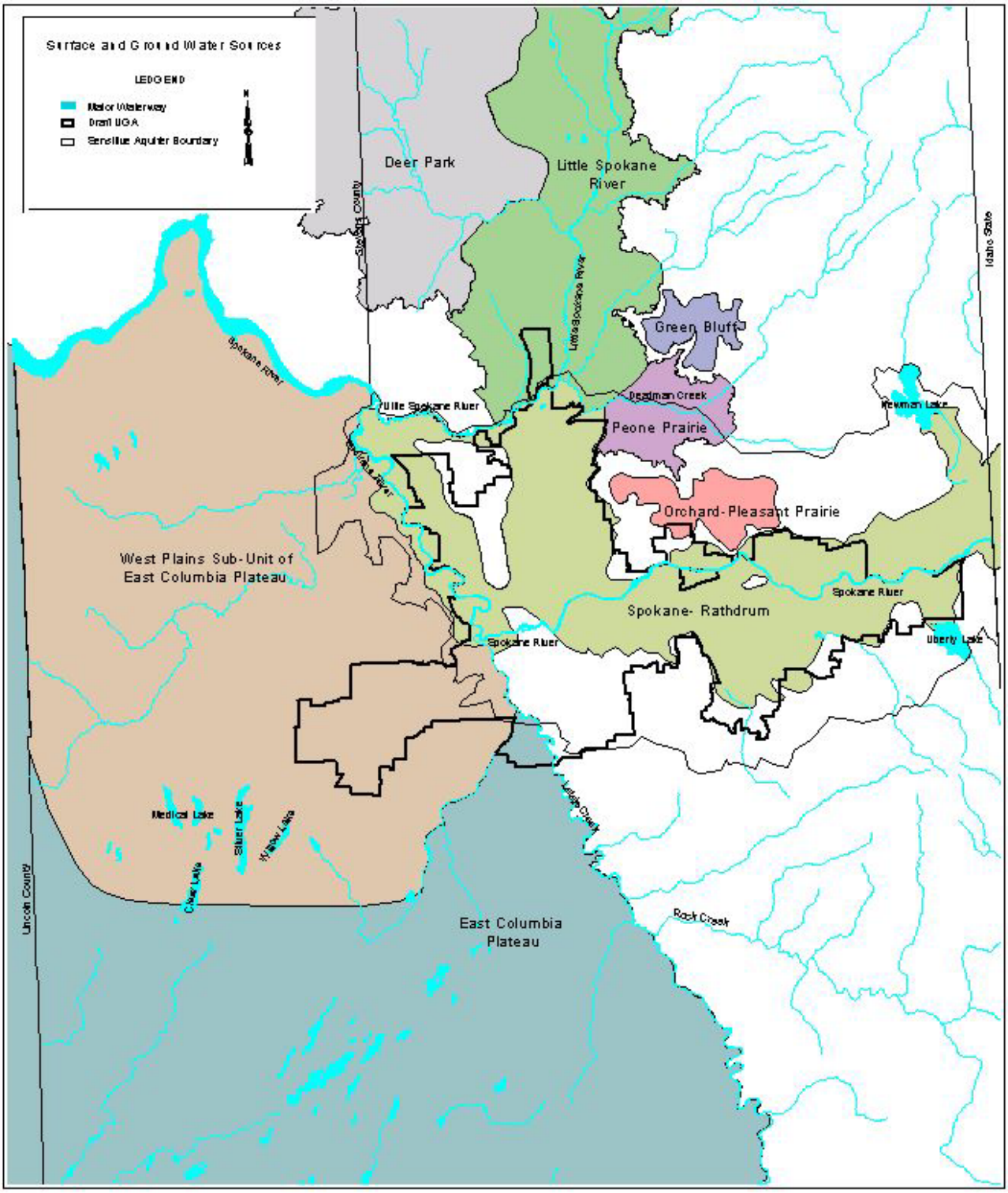
In addition to groundwater resources, Spokane County has many surface water bodies that provide a variety of economic, recreational and aesthetic benefits and uses. The Spokane River is the principal surface water body in the planning area. It begins in Idaho at Lake Coeur d'Alene and flows west through Washington and finally into Long Lake. Various reaches of the river gain water from, or lose water to, the Spokane Valley-Rathdrum Prairie Aquifer. This interaction is also observed in lower segments of the Little Spokane River, which originates north of Spokane County and flows south to Long Lake. The other primary surface water feature in the planning area is Latah Creek, which originates in Benewah County, Idaho and flows north to a confluence with the Spokane River at the west side of the City of Spokane.

2.3.4 Human Environment

Growth in Spokane County has increased since 1890, with a steady increase of approximately 2 percent per year since 1940. The 2005 population in the County is approximately 441,000, of which 128,000 are located within the planning area.

Land use within the planning area is primarily urban residential, with the City of Spokane and surrounding areas providing the economic and cultural center for much of eastern Washington and northern Idaho. This change has largely occurred over the last 60 years as orchards and vegetable farming were replaced by urban uses. This conversion of land use resulted from accessibility to roads, a dependable supply of water, and level land characteristics with few physical constraints to development. Prime farmland still exists directly north of the planning area, and on the western and southeastern boundaries of the County.

A wide range of governmental agencies have interest in wastewater management issues in Spokane County. These agencies span many jurisdictional levels: local, regional, state and federal. Local wastewater service providers include the County, the City of Spokane, the Town of Millwood, and the Liberty Lake Sewer and Water District. Many other agencies



DRAWING 2-2: Surface and Ground Water Sources
SPOKANE COUNTY
Utilities Division
Wastewater Facilities Plan

HDR

have an interest in the facility plan because of their regulatory functions, responsibility for facilities located within the watershed, interest in the surface and groundwater resources, or ability to impact development or implementation of the plan.

2.4 PLANNING PROJECTIONS

Chapter 3 of the *Basis of Planning Report* summarized planning projections for three planning horizons: 2020, which coincides with the planning horizon used in Spokane County's *Growth Management Plan*; 2025, which originally provided the County with a 20-year management strategy *after* the recommended plan had been implemented; and 2050 for long-range planning. Planning projections included the following three primary elements:

- Population and land use forecasts
- Wastewater flow projections
- Wastewater loading projections

2.4.1 Population and Land Use Forecasts

Planning projections established in the *Basis of Planning Report* rely on projections of population growth and development of industrial and commercial properties developed through the *CWMP Update*. These projections account for current users of the system, existing residents and commercial/industrial facilities within the current Urban Growth Area that have not yet been connected to the County's system (i.e., are served by septic tanks), and new development within the planning area.

For this Facility Plan Amendment, the population projections were updated to reflect recorded population from recent years and predicted population and wastewater flows in four regions of the Spokane County service area, consistent with the Comprehensive Plan update that is currently in progress. Population projections for year 2005 and 2026 were provided by Spokane County Planning Division (December 23, 2005) and extrapolated linearly from 2006 to 2026 for year 2030. These population data are shown in Table 2-1, and include projections based on low, medium and high growth rates, as determined by the Washington State Office of Financial Management.

Table 2-1. Population and Flow Forecasts to Year 2030 (June 28, 2006)

	Population		
Wastewater Service Areas	**2005**	**2026**	**2030**
OFM High Growth Rate 1.63 % per Year			
Millwood	1,645	2,310	2,443
City of Spokane Valley	85,010	119,380	126,254
Unincorporated Valley UGA & Urban Reserve	13,663	19,187	20,292
North Metro UGA & Urban Reserve	27,600	38,759	40,991
TOTAL	127,918	179,636	189,980
OFM Medium Growth Rate 1.1 % per Year			
Millwood	1,645	2,070	2,155
City of Spokane Valley	85,010	106,966	111,357

	Population		
Wastewater Service Areas	**2005**	**2026**	**2030**
Unincorporated Valley UGA & Urban Reserve	13,663	17,192	17,898
North Metro UGA & Urban Reserve	27,600	34,728	36,154
TOTAL	127,918	160,956	167,564
OFM Low Growth Rate 0.62 % per Year			
Millwood	1,645	1,873	1,919
City of Spokane Valley	85,010	96,792	99,148
Unincorporated Valley UGA & Urban Reserve	13,663	15,557	15,936
North Metro UGA & Urban Reserve	27,600	31,425	32,190
TOTAL	127,918	145,647	149,193

2.4.2 2006 Wastewater Flow Analysis

The initial wastewater flow projections were developed in 1999. In the previous analysis, no evidence of seasonal infiltration was identified. Inflow did not appear to be present in the North Valley Interceptor (NVI), but some evidence of inflow was indicated in the Spokane Valley Interceptor (SVI) when hourly precipitation was 0.2 inches or more.

Since seven years have elapsed from the time the initial flow projections were developed, two weeks of flow and precipitation data were gathered for both winter and summer conditions (January and June 2006) and compared with the original projections. Precipitation data was obtained for Felts Field, an airport located in the Spokane Valley. These data are shown in Figure 2-1 through Figure 2-4.

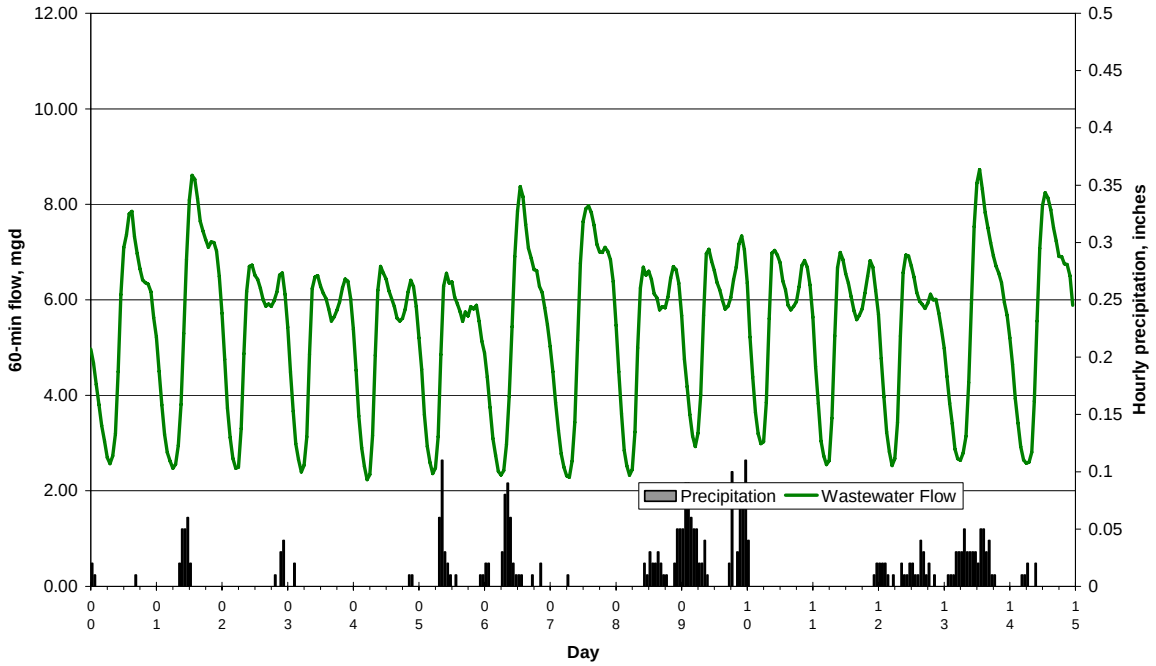


Figure 2-1. Spokane Valley Interceptor Flow, January 1-15, 2006

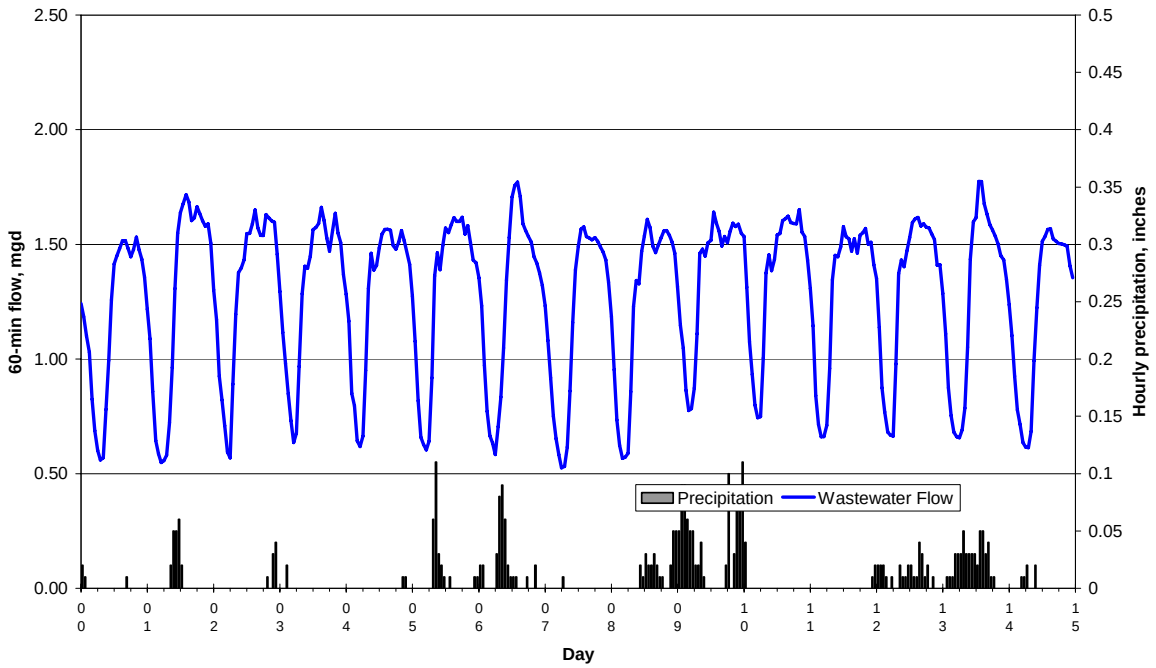


Figure 2-2. North Valley Interceptor Flow, January 1-15, 2006

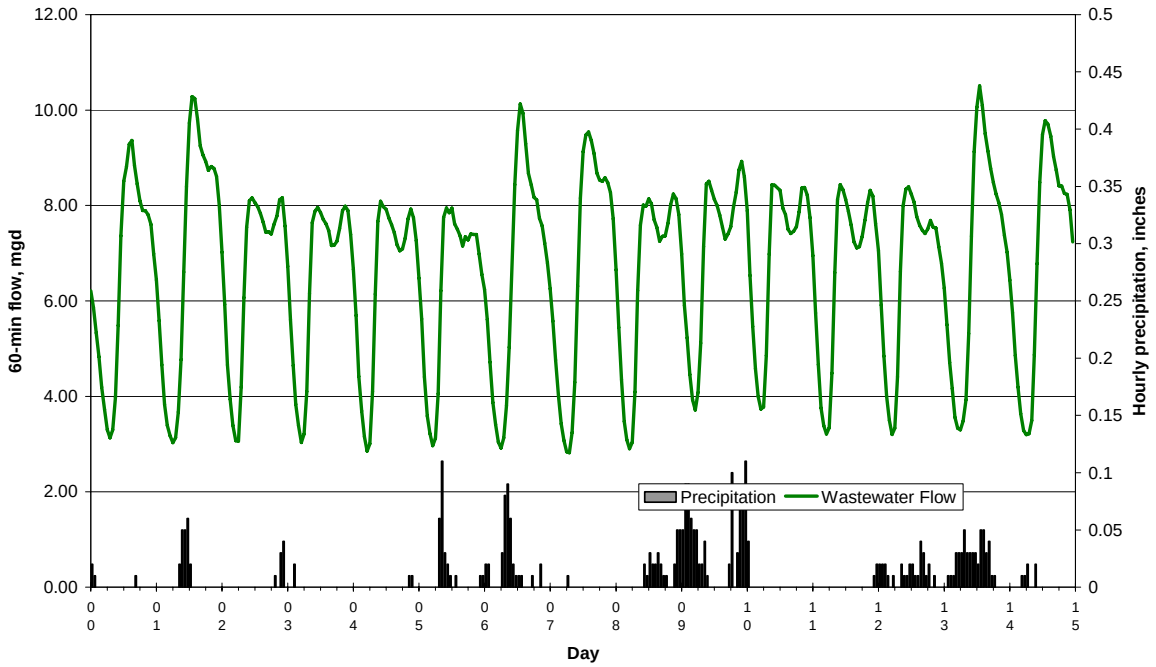


Figure 2-3. Combined Flow from Both Interceptors, January 1-15, 2006

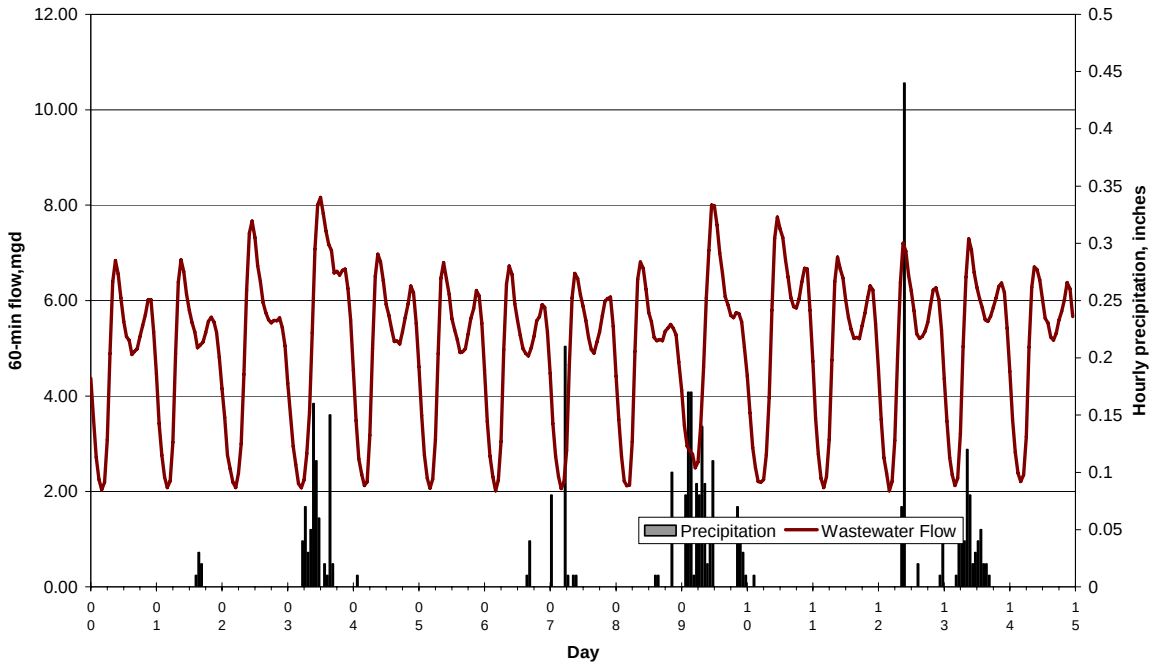


Figure 2-4. Spokane Valley Interceptor Flow, June 1-15, 2006

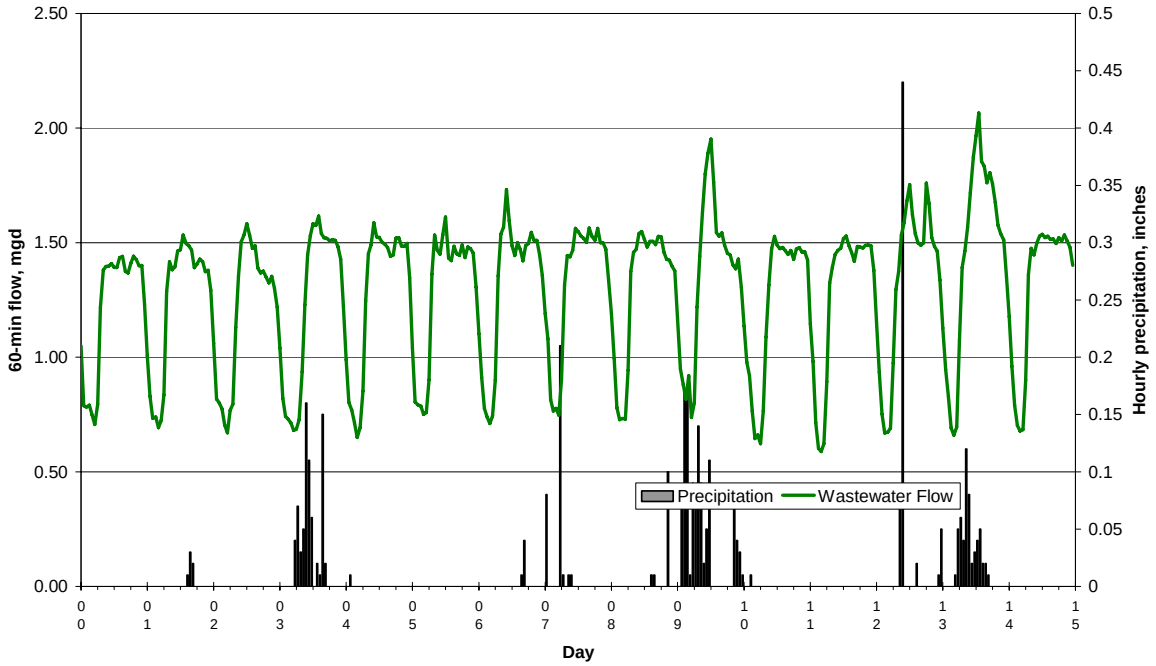


Figure 2-5. North Valley Interceptor Flow, June 1-15, 2006

The new data were reviewed for evidence of infiltration and inflow, any other unusual flow patterns, and general confirmation of the flow projections developed in 1999. A few conclusions were developed from the data:

- Flow in the SVI has increased from a 1999 average of 3.5 mgd to a current summer average of 5 mgd.
- The average winter flow in the SVI is about 0.4 mgd greater than the summer flow (5 mgd), and NVI summer and winter flows are almost exactly the same. Based on the limited information, a difference of 0.4 mgd does not appear to be a significant variation between winter and summer flow, and sewer system infiltration therefore does not appear to be a significant factor. This assessment is unchanged from 1999.
- Peak flow in the SVI appears to be higher on the weekends and holidays. This trend is apparent in the January 2006 plot for the SVI (Figure 2-1), where the peak flow for January 7th and 8th (Saturday and Sunday) are higher than the values for the five days that follow. Note that January 2nd, a Monday, was a holiday and the flow pattern for this day is similar to a weekend day. This weekly trend is also apparent in the June 2006 plot for the SVI (Figure 2-4), where June 3rd and 4th (Saturday and Sunday) flow rates are higher than the following five days. Additional data were not reviewed to see if higher weekend peak flow was a consistent trend or just an anomaly in the January 2006 data. Higher peak weekend events could reflect that the service area is primarily residential and more people are at home during the weekend. Weekend average flow did not appear to vary from weekday average flow, but a statistical analysis was not performed to confirm this. During development of an implementation plan for the preferred option, treatment plant operations and staffing should be reviewed to determine if peak weekend flow events have any impact.
- There were only a few precipitation events that occurred during the monitoring period where the rate approached 0.2 inches per hour, which is the threshold for inflow identified in the 1999 analysis. The peak wastewater flow for Sunday, June 4th, and Saturday, June 10th (Figure 2-4) may have been influenced by precipitation. Also, some inflow induced peak flow appeared to have occurred on June 13 and 14, 2006.
- A peak hourly precipitation of 0.44 inches was recorded at Felts Field on June 13, 2006, but Figure 2-4 (Spokane Valley Interceptor) does not appear to show any increase in flow.
- The combined flow data from both the NVI and the SVI (Figure 2-3) show that the January 2006 average flow was 6.66 mgd and the peak flow was 10.5 mgd (peak hour peaking factor of 1.58). Current combined flows are approaching the proposed design conditions for the proposed new treatment plant (8 mgd average and 12 mgd peak).
- The 2006 data indicate that actual flow is lagging the projections developed in 1999, particularly for the North Valley Interceptor. Although the County has pursued an active program to extend the collection system, the County has not enforced connection of individual homes with functional septic tanks to new sewer extensions. This strategy has been followed due to limited available wastewater treatment

capacity available to the County at the City's Riverside Park Water Reclamation Facility (RPWRF).

2.4.3 Wastewater Flow Projections

Wastewater flow projections include both base sanitary flow from residences, businesses, institutions, and industrial establishments, and extraneous flow (groundwater or stormwater) that enters the separated sewer system. Minimal amounts of infiltration and inflow (I/I) exist in the County collection system. Average flow projections were calculated by starting with the 1999 base flow determined through meter readings at three City/County connections, and adding allowances for the following:

- Future residential, commercial, and industrial sanitary flow for the year 2030 based on the low, medium, and high population and land use estimates reflected in Table 2-1.
- The ERU's for 2030 were estimated based upon 2.5 persons per ERU and 0.25 commercial ERU for every new residential ERU.
- Wastewater flows from 2005 through 2030 are projected based on 200 gallons per day per ERU. Wastewater Flows projected do not include provision for any NEW single large industrial or commercial customers.
- Wastewater Flows projected do not include any reductions that might occur through in-home conservation efforts (see Chapter 4).
- Inflow and infiltration (I/I) estimated at 7.5 gallons per day per ERU.
- Total County annual average wastewater flow is projected to increase to 8.8 mgd by 2010, 10.3 mgd by 2015, and between 14.9 and 19.0 mgd by 2030, depending on the actual annual rate of population growth.

The flows from 2005 to 2015 were estimated by assuming a growth rate of 600 new connections per year. Also, approximately 800 septic systems will connect to the sanitary sewer per year from 2005 to 2011 during the period of voluntary connection (through 2010). The rate by which septic systems will connect to the sanitary sewer will increase to 916 septic systems connecting per year from 2011 through 2015 after the Spokane County Regional Water Reclamation Facility (SCRWRF) is operational. The 2030 flow was estimated using the population projected by the Spokane County Planning Department for 2026, linearly extrapolated to the year 2030.

These values were summed to generate the total system wide annual average flow projection shown in Figure 2-6 (Wastewater Flow Projections). The projected annual average flow for the North Valley and Spokane Valley Interceptors at low, medium, and high growth rates is shown on this figure, also. Flow peaking factors were developed from interceptor wastewater flow monitoring to determine the maximum month and peak instantaneous flow. The projections are shown in tabular form in Table 2-2.

Table 2-2. Projected Systemwide Wastewater Flow

	Total Flows (All County Service Area), mgd				NVI & SVI Flows (Valley Service Area), mgd		
Year	Total Average Sanitary Flow	Total Infiltration	System wide Maximum Month Flow	Systemwide Peak Hourly Flow	Average Sanitary Flow (No North)	Maximum Month Flow (No North)	Peak Hourly Flow (No North)
1995	3.5		3.5	5.5			
2000	6.2		6.2	9.7			
2005	7.4		7.4	11.7	5.8		
2010	8.8	0.66	9.5	14.9	7.2	7.7	12.2
2015	10.3	0.77	11.1	17.5	8.7	9.4	14.8
High Growth Rate							
2020	13.2	0.99	14.2	22.4	10.8	11.6	18.3
2025	16.1	1.21	17.3	27.4	12.8	13.8	21.8
2030	19.0	1.42	20.4	32.3	14.9	16.0	25.3
Medium Growth Rate							
2020	12.5	0.93	13.4	21.2	10.2	11.0	17.3
2025	14.6	1.10	15.7	24.8	11.7	12.5	19.8
2030	16.8	1.26	18.0	28.5	13.1	14.1	22.3
Low Growth Rate							
2020	11.8	0.89	12.7	20.1	9.7	10.4	16.5
2025	13.4	1.00	14.4	22.7	10.7	11.5	18.2
2030	14.9	1.12	16.0	25.3	11.7	12.6	19.9

Notes:
1. Growth from 2005 to 2015 includes 600 new connections (ERU's) per year.
2. Septic systems are expected to connect to the sanitary sewer at a rate of 800 per year from 2005 to 2011 and 916 per year from 2011 through 2015 for a total of 8,580 new connections.
3. Average sanitary flow calculated at 200 gpd/ERU.
4. Maximum month average flow = (average sanitary flow) + infiltration

2.4.4 Conveyance and Treatment Hydraulic Capacity Sizing Strategy

Several options have been proposed for managing wastewater generated in the Spokane Valley and are presented in more detail later in this *2006 Wastewater Facilities Plan Amendment*. The preferred alternative presented in the *2002 Wastewater Facilities Plan* provides for the County to continue to route flow from the North Spokane Interceptor and a portion of flow from the NVI and SVI to the RPWRF, and the County will construct a new water reclamation plant using membrane bioreactor technology in the Spokane Valley. The following section describes sizing criteria for the membrane bioreactor.

The current sizing practice for a membrane bioreactor by one vendor (US Filter) assumes that any maintenance outages would be scheduled for low-flow periods, and no redundant membranes would be provided for peak flow conditions. There are three membrane flux rates that the vendor believes can be sustained at 20 degrees Celsius without permanently damaging the membranes:

- Average flow - 15 gallons per square foot per day.
- Peak day flow - 20 gallons per square foot per day.
- Peak hour flow - 23 gallons per square foot per day.

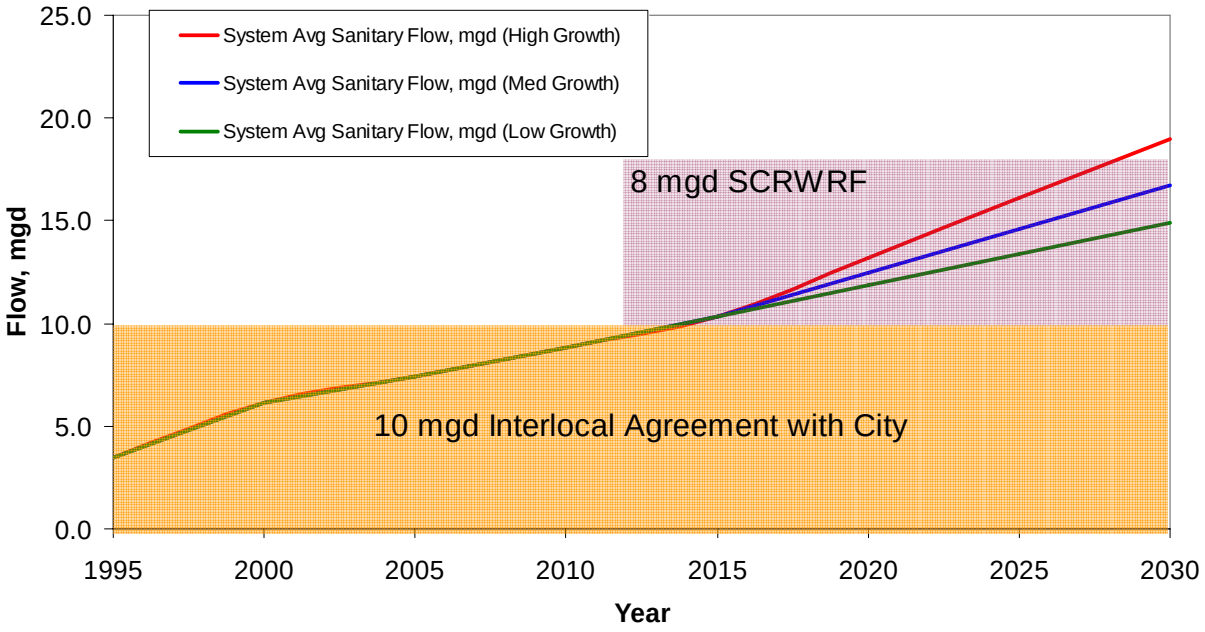


Figure 2-6. Wastewater Flow Projections

If the peak hour flow peaking factor is less than 1.53 (ratio of peak hour flux rate 23 gpd/sf to average day flux rate 15 gpd/sf), then average day conditions dictate membrane sizing. If the peak hour peaking factor is greater than 1.53, then peak hour flow conditions dictate

membrane sizing, and either equalization must be provided or sufficient membrane area must be provided to keep the flux to 23 gpd/sf.

In the case of Spokane County, the peak flow could be managed by offloading flow to the RPWRF. It appears that the most efficient design (at least in terms of membrane area) would be to size the County treatment plant for a peak hour flow 1.53 times the average, and a peak day flow 1.33 (20/15) times the average. By coincidence, the 2006 flow data indicates that the peak hour flow is commonly 1.58 times the average, nearly at the optimum membrane sizing condition.

It appears that a membrane bioreactor plant should be sized for a 1.58 peaking factor, but that the conveyance hydraulic structures should be designed for the extreme peak hydraulic event, per the criteria developed in 1999. The interlocal agreement with the City should be reviewed to confirm hydraulic capacity owned by the County in the City sewer system. Initial information indicates that the County owns 15.5 mgd of capacity (peak flow basis) in the City interceptor downstream from the SVI connection, and that there is no current restriction on the ratio of peak flow to average flow.

2.4.5 Wastewater Loading Projections

Wastewater loading projections reflect a combination of the baseline flows described above, unit loading rates, and peaking factors that reflect maximum month, week, and day conditions. To develop a reasonable projection of future wastewater loadings, an assessment of County and City data was supplemented by a review of other local wastewater utilities with generally similar service area characteristics. Average wastewater concentrations for the County and other utilities in the area are generally lower than literature values. Because the County's data are limited (quarterly sampling has been conducted over three years), the Facilities Plan will be developed using average literature values, but higher than values measured in the County's wastewater. However, it is recommended that the County's recently implemented sampling program be continued to generate more reliable local data. Wastewater peaking factors were developed based on the average peaking factors for other communities in the area.

BOD, Suspended Solids and Nutrient Data - Spokane County Interceptors

Useful water quality data for the County's interceptor system is limited to quarterly sampling conducted by the City along the North Valley and Spokane Valley interceptors. Figure 2-7 and Figure 2-8 present the sampling results at each location for BOD, suspended solids and total phosphorus. No data have been gathered on ammonia or total nitrogen concentrations. Currently, the County is conducting more extensive sampling to supplement this database.

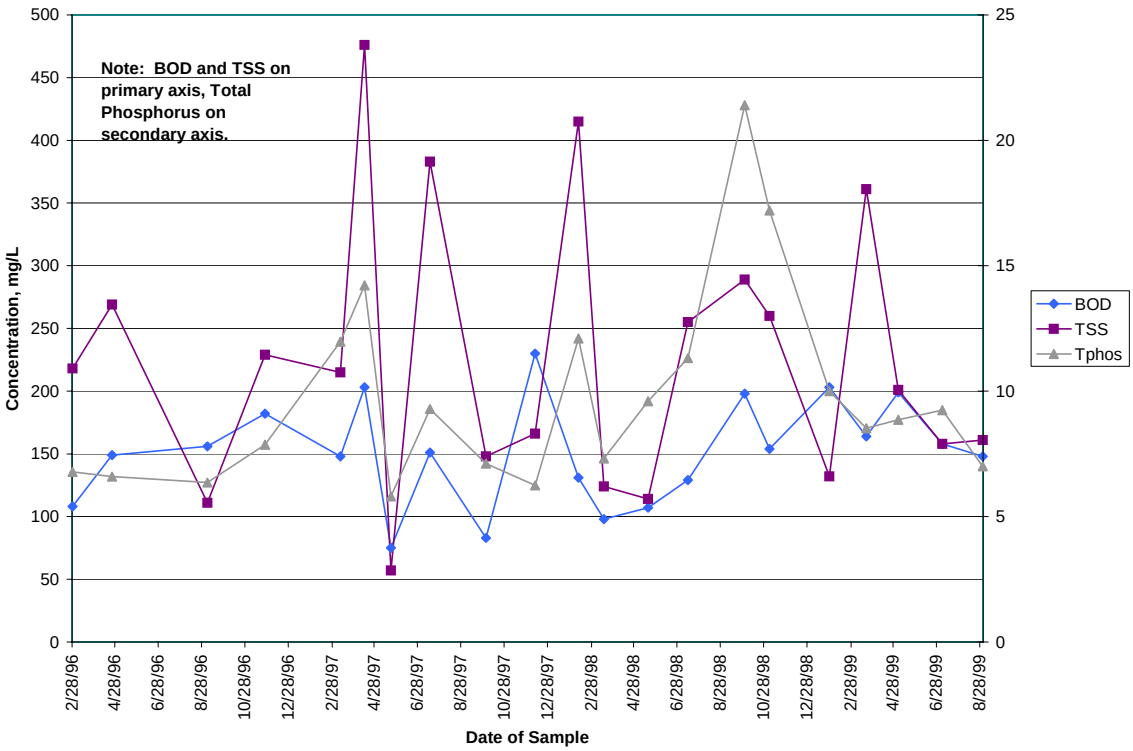


Figure 2-7. North Valley Interceptor Wastewater Characteristics

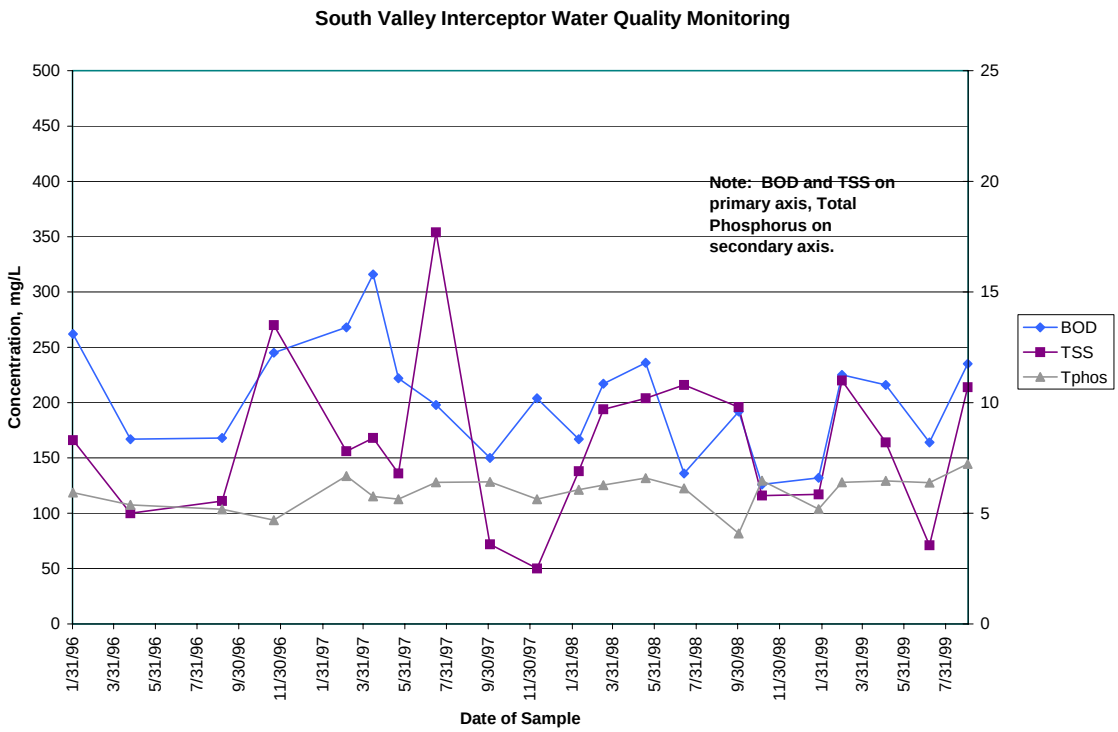


Figure 2-8. Spokane Valley Interceptor Wastewater Characteristics

A summary of the quarterly monitoring results is presented in Table 2-3. The data appear to show that the North Valley wastewater has the greater concentration of total suspended solids and total phosphorus, but the Spokane Valley wastewater has a higher concentration of BOD. This observation may reflect the greater number of industrial customers in the North Valley area.

Table 2-3. Interceptor Sampling, Summary of Quarterly Sampling 1996 to 1999

Interceptor	Biochemical Oxygen Demand, mg/L		Total Suspended Solids, mg/L		Total Phosphorus, mg/L	
	Ave.	Max.	Ave.	Max.	Ave.	Max.
Spokane Valley	202	316	163	354	6.0	7.2
North Valley	151	230	226	476	9.8	21.4

BOD, Suspended Solids and Nutrient Data – Other Local Communities

Since limited information on Spokane County wastewater quality is available, information from surrounding communities was obtained to characterize regional wastewater trends. Data were obtained from Liberty Lake Water and Sewer District #1, City of Cheney, City of Spokane (which includes Spokane County contribution), City of Coeur d'Alene, City of Deer Park, City of Post Falls, and Hangman Valley (Spokane County Utilities). Information on regional wastewater characteristics is summarized in Table 2-4. To provide a point of reference for the regional data, Table 2-6 also presents literature values for wastewater concentrations. These values are typically used if local data are insufficient or considered unreliable.

Table 2-4. Wastewater Loading Summary for Nearby Communities

	BOD		Suspended Solids		Total Nitrogen		Total Phosphorus		
Community	mg/l	lb/day/ capita	mg/l	lb/day/ capita	mg/l	lb/day/ capita	mg/l	lb/day/ capita	Note
Liberty Lake Water and Sewer District #1	270	0.180	286	0.191	N/A	N/A	5.9	0.0040	b
City of Cheney	200	0.135	150	0.101	N/A	N/A	N/A	N/A	c
City of Spokane	165	0.230	165	0.230	32	0.044	5	0.0070	d
City Coeur d'Alene	249	0.147	203	0.120	N/A	N/A	6.85	0.0040	e
City of Deer Park	164	0.122	282	0.209	N/A	N/A	N/A	N/A	f
City of Post Falls	195	0.155	245	0.194	N/A	N/A	6.9	0.0056	g
Spokane Co. - Hangman Valley STP	225	N/A	178	N/A	N/A	N/A	N/A	N/A	h
Spokane Co. - Spokane Valley	202	0.127	163	0.103	N/A	N/A	5.95	0.0038	i
Average	**209**	**0.157**	**209**	**0.164**	**32**	**0.044**	**6.1**	**0.0049**	
Standard Deviation	38	0.038	55	0.054	N/A	N/A	0.8	0.0014	
Sum of Average plus Standard Deviation	246	0.194	264	0.218	N/A	N/A	6.9	0.0063	
Literature Values	**240**	**0.20**	**240**	**0.20**	**40**	**0.04**	**7.19**	**0.006**	j
Ratio of Community Average	0.87	0.78	0.87	0.82	0.79	1.10	0.85	0.81	
to Literature Values									

Notes
- a Average Annual Values
- b Source: Table 2-10, Draft Facilities Plan for the Liberty Lake Wastewater Treatment Facility, Century West Engineering Corp., October 1998
- c Source: Page II-4, Final Wastewater Facilities Plan, City of Cheney, Esvelt et al, November 1990
- d Source: Page ES-19, City of Spokane Wastewater Final Facilities Plan, Bovay Northwest, March 2000
- e Source: City of Coeur d'Alene Draft Wastewater Facilities Plan, HDR Engineering, 2000 (dry weather conditions)
- f Source: 1999 Annual Assessment, City of Deer Park, Wastewater Treatment Facility
- g Source: City of Post Falls Laboratory Worksheet for the Year of 1999
- h Performance Report Summary provided by Spokane County Utilities
- i Quarterly sampling conducted by City of Spokane, 1996 through 1999
- j Source: Water Environment Federation, MOP 8, Design of Municipal Wastewater Treatment Plants

The data show that the average regional values are less than the literature values. The County interceptor sampling results also result in unit loadings below literature values; however, the County data are limited (quarterly sampling over three years) and do not form a sufficient basis for projecting future loads. City of Spokane concentrations are generally low, but are likely diluted by infiltration and inflow. City of Spokane per capita loadings are greater than literature values, but may include commercial/industrial contributions. In the absence of other data, it is recommended that literature unit loading values be used for wasteload projections. It also is recommended that the County's recently implemented sampling program be continued for a one-year period. If it can be demonstrated that County wastewater has a lower strength than City wastewater, cost savings in capital and operational expenditures could be realized.

It is anticipated that any new County treatment facility will receive septage (solids pumped from septic tanks) loadings. To develop an estimate of septage loading, it was assumed that 60 percent of the septage loading currently received at RPWRF will be redirected in the future to one or more new County treatment facilities. Information on RPWRF septage characteristics was not available.

Table 2-5. Projected County Septage Loading

Constituent	Per Load, lbs/day	Total, lbs/day	Total, 1,000 lbs/day
BOD	50	1,200	1.2
Total Suspended Solids	125	3,000	3.0
Total Nitrogen	6	140	0.1
Total Phosphorus	2	50	0.05

The wastewater influent concentrations are shown in Table 2-6. Since the Spokane County wastewater collection system experiences very little infiltration and inflow, the influent loading to the SCRWRF will be based upon these concentrations.

Table 2-6. Raw Wastewater Concentrations

Parameter, mg/L	Municipal Wastewater	Septage	Average Wastewater Influent
BOD	240	18	258
Total Suspended Solids	240	45	285
Total Nitrogen	40	2	42
Total Phosphorus	7.19	0.75	7.94

2.5 WATER QUALITY AND WATER RESOURCE ISSUES

Chapter 4 of the Final Basis of Planning Report reviews the characteristics of key water resources that may be impacted by the County's wastewater management program – the Spokane Valley-Rathdrum Prairie Aquifer, the Spokane River, and Little Spokane River. These water bodies comprise the major components of a large, hydraulically-interconnected water system in the Spokane region. As such, actions affecting one of the resources may have direct or indirect impacts on the other resources as well. Water quality issues and other factors that will shape quality requirements for discharge of effluent to receiving waters, beneficial reuse of effluent and beneficial reuse of biosolids are discussed in this section.

2.5.1 Spokane Valley-Rathdrum Prairie Aquifer System

The exchange of surface water and groundwater through the hydraulic connection between the rivers and the aquifer can have important implications with regard to the quality and quantity of the surface and groundwater resources in the County. Permits for water purveyors using the Spokane aquifer total 1,009 cfs, which is approaching the natural supply of the aquifer and may actually exceed the aquifer's ability to meet demand. If more groundwater is pumped than is available, the water table will be lowered and flow in the Spokane and Little Spokane rivers may decrease. Minimum streamflows in the Little Spokane River have been established by state regulation. The watershed planning unit for WRIA 57 has recommended to the Department of Ecology that a minimum instream flow of 500 cfs be established for the Spokane River at Barker Road. Given these developments and the ongoing watershed planning in the state, no "new" water may be available for consumptive use at some point in the future.

Water quality in the aquifer has been monitored routinely for the past 20 years. These data show that while the quality of water in the aquifer is generally good to excellent, the aquifer is clearly impacted by development. In unsewered areas with residential and commercial development, clear trends exist toward increasing contaminant concentration in some wells. The Onsite Sewage Disposal Systems Phosphorus Loading Estimate presented in Appendix B illustrates increasing groundwater phosphorus concentrations. Spokane County Division of Utilities has recorded water quality monitoring data in select wells in the Spokane Valley-Rathdrum Prairie (SVRP) aquifer. In 2004, the annual average total phosphorus concentrations in groundwater pumped from 69 wells ranged from non-detect (assumed to be equal to 0 µg/L) to 49.1 µg/L. In 2006 (January to August available), the annual average total phosphorus concentrations in groundwater pumped from 44 wells ranged from 20 µg/L to 230 µg/L. Stormwater injection through drywells also leads to degradation of water quality. On a positive note, in areas where sewer construction has occurred and/or development has slowed or stopped, contamination levels have fallen.

2.5.2 Surface Waters

The surface water features of interest in the planning area – the Middle Spokane River (from Nine Mile Bridge to the state line), the Little Spokane River, and Long Lake – are designated for "characteristic uses" such as water supply; stock watering; fish and shellfish rearing, spawning, and harvesting; wildlife habitat; primary contact recreation; and commerce and navigation. To preserve the designated characteristic uses, in stream water quality must comply with the numerical and narrative guidelines given in the Washington State Surface Water Quality Standards. Water quality standards for the Spokane and Little Spokane River system are established for fecal coliform, dissolved oxygen, total dissolved gas, temperature, pH, turbidity, toxic materials, radioactive materials, aesthetics, and nutrients.

Generally, toxicity criteria for the Spokane and Little Spokane River are based on protecting cold-water fisheries. The ammonia criteria are based on the presence of salmonids. The segments of the rivers where discharge of Spokane County effluent may occur are considered to provide habitat for salmon rearing, but not for spawning.

There are currently seven permitted point source discharges to the Spokane River between Coeur d'Alene Lake and Long Lake, and two point source discharges to the Little Spokane River.

2.5.3 Dissolved Oxygen Total Maximum Daily Load (TMDL)

During the summer months, segments of the Spokane River and Lake Spokane exhibit low dissolved oxygen levels, and fail to meet Washington State water quality standards for dissolved oxygen. In response, Ecology initiated a TMDL process to assess water quality problems, define the sources of pollutants that cause the problems and determine the amounts of pollutants that can be discharged to the river while meeting water quality standards.

The Washington State Department of Ecology published a *Draft Total Maximum Daily Load to Restore and Maintain Dissolved Oxygen in the Spokane River and Lake Spokane (Draft DO TMDL)* in October 2004. This TMDL posed stringent effluent phosphorus (P) targets and called for a reduction of 208 lbs/day phosphorus from point sources, nonpoint sources,

and other controllable sources. Following the publication of the Draft TMDL, a collaborative TMDL process was undertaken which culminated in the June 30, 2006 *Foundational Concepts for the Spokane River TMDL Managed Implementation Plan.* This document identifies the effluent phosphorus wasteload allocation and target pursuit actions for a Spokane County facility to discharge to the Spokane River.

2.5.4 Foundational Concepts for the Spokane River TMDL Managed Implementation Plan

The *Foundational Concepts Document* (see Appendix A) is an aggressive, managed approach that removes phosphorous from a variety of sources through a variety of methods and monitors and assesses the impacts of dissolved oxygen over the next 20 years in a reasonable way to maximize the effectiveness of the investments in actions taken to improve the Spokane River. The *Foundational Concepts Document* will result in a Managed Implementation Plan and Final TMDL, which are consistent with the *Foundational Concepts Document.* The *Foundational Concepts Document* targets reductions in phosphorous to raise the level of dissolved oxygen in the River. The *Foundational Concepts Document* allows the County and other NPDES permit holders that discharge to the River to achieve their phosphorous target through a combination of wastewater treatment technologies and other actions. The difference between what wastewater treatment technology can achieve and the target is referred to as the "Delta". The *Foundational Concepts Document* authorizes the County to achieve the seasonal average 10 ug/L through the use of offsets. The *Foundational Concepts* document calls for a thorough reassessment of the TMDL after the 10th year of the Managed Implementation Plan (MIP) and anticipates that the second 10 years of the plan could include new actions, such as consideration of river oxygenation and/or reconsideration of water quality standards.

Waste Load Allocation Targets

The *Foundational Concepts* document presents a wasteload allocation for point source dischargers that is summarized in Table 2-7. Dischargers are to develop a combination of the most effective feasible phosphorus removal treatment technology and implementation of other phosphorus reduction efforts that together result in meeting the wasteload allocation. The MIP is to achieve the wasteload allocations by 2027, except it is expected that the County's new plant must achieve compliance with the 10 ug/L phosphorous concentration target through its wastewater treatment technology and offset actions at the time the plant begins normal, routine operations (*Foundational Concepts Document*, p. 9)

Table 2-7. Wasteload Allocation Table from *Foundational Concepts for the Spokane River TMDL Managed Implementation Plan*

Discharger	Projected 2017 WWTP Influent Flow, mgd	2017 Target Phosphorus, lbs/day	Projected 2027 Influent Flow, mgd	TMDL Phosphorus Wasteload Allocation (WLA), lbs/day
Liberty Lake	1.41	0.12	1.51	0.13
Kaiser	15.4	1.29	15.4	1.29
Inland Empire Paper	4.1	0.34	4.1	0.34
City of Spokane				
From City of Spokane	36		41.77	
From Spokane County	5.76		9	
From Airway Heights	0		0	
Total City of Spokane	41.76	3.49	50.77	4.24
Spokane County (new plant)	8	0.67	8	0.67

New Spokane County Treatment Plant

The *Foundational Concepts* document identifies the following requirements for a new Spokane County treatment plant discharge to the Spokane River:

- County will submit to Ecology for approval, the County's engineering report for the plant show how the most effective, feasible phosphorus removal technology has been selected, and how the offsets will be timely developed.
- At the time the plant begins normal, routine operations, it is expected the combination of offset actions and the plant's treatment of water to be discharged in the River will together achieve compliance with a seasonal average 10 µg/L total phosphorus.
- Consistent with NPDES requirements, the plant will be permitted by Ecology in order to enable rapid conversion of septic systems to sewers consistent with the approved septic tank elimination program prior to the completion of the County plant.
- The County will construct the plant within the first 6 years of the MIP as the County's offsets from the target pursuit actions are being developed and made operative.
- It is recognized that any phosphorus reduction actions selected by the County that rely on the plant achieving normal, routine operation for their full implementation (such as septic tank elimination and water reuse) can still contribute to the County's offsets.
- It is further recognized that, because modern phosphorus removal technology is challenging, achieving normal and routine operation may require two years, assuming average seasonal conditions (temperature and flow) during both years. During this period, Ecology will recognize these conditions and their effects on compliance with interim discharge limits.

- The County will also develop a comprehensive program for reclaimed water production, reuse and aquifer recharge of effluent. This reuse program will be subject to the same conditions described for other reuse target pursuit action plans.

2.5.5 Potential Spokane River Effluent Discharge Requirements

Effluent quality requirements for the SCRWRF will be based on the dissolved oxygen TMDL prepared by the Department of Ecology. The June 30, 2006 *Foundational Concepts for the Spokane River TMDL Managed Implementation Plan* identifies the effluent phosphorus requirements for the SCRWRF to discharge to the Spokane River with a combination of treatment technology and other offset actions to achieve compliance with 10 µg/l phosphorus. The Department of Ecology is currently finalizing the dissolved oxygen TMDL to incorporate the content of the *Foundational Concepts for the Spokane River TMDL Managed Implementation Plan*. It is anticipated that the requirements for the initial National Pollution Discharge Elimination System (NPDES) permit for effluent discharge will be based on the June 30, 2006 *Foundational Concepts for the Spokane River TMDL Managed Implementation Plan.*

Based on water quality analyses conducted to date, Spokane County has proposed to the Department of Ecology that the effluent quality limits listed in Table 2-8 be used in the initial NPDES permit. The Department of Ecology will respond to this proposal and identify actual permit requirements. The summer low-flow period is the most critical for water quality; consequently, more stringent requirements are often needed in summer months.

Proposed effluent discharge permit limits in Table 2-8 are based on the following:

- Compliance with the effluent phosphorus limits should be determined on a seasonal average basis in recognition of variability in treatment performance when achieving very low effluent phosphorus concentrations in accordance with the *Foundational Concepts for the Spokane River TMDL Managed Implementation Plan*.
- Effluent CBOD limits should be determined on a seasonal average basis in recognition of variability in treatment performance when achieving very low effluent concentrations.
- Ammonia-nitrogen limits should be determined on a seasonal average basis in recognition of variability in treatment performance when achieving very low effluent concentrations. Peak ammonia-nitrogen discharge limits should be specific to the outfall location and based on either preventing reasonable potential for toxicity in the mixing zone or dissolved oxygen impacts in the river.
- A seasonal average approach is appropriate for summer season phosphorus, CBOD, ammonia-nitrogen, and dissolved oxygen limits due the difficulty in meeting stringent daily-maximum limits and the limited impact that daily variations have on water quality in the Spokane River.
- The start of the summer permit season is determined to be from April 1 through October 31 based on the TMDL prepared by the Department of Ecology and the June 30, 2006 *Foundational Concepts for the Spokane River TMDL Managed Implementation Plan.*
- During the winter permit season, instream dissolved oxygen levels greatly exceed the Class A criterion of 8 mg/L. Consequently, discharge of tertiary effluent would not cause an instream dissolved oxygen violation.

- Dilution studies and a mixing zone analysis indicate that there is not a reasonable potential for arsenic, copper, chromium, mercury, nickel and silver to exceed toxicity criteria. Consequently, numerical limits are not warranted for these constituents. The only metals requiring limits are lead, cadmium and zinc, which are governed by the Spokane River metals TMDL.
- The proposed discharge from the Spokane County Regional Water Reclamation Facility (SCRWRF) will not cause instream temperature to exceed the water quality standard of 20°C for the Middle Spokane River, and will not result in a temperature increase that exceeds the allowable incremental increases of 2.0^{o}C and 1.3^{o}C for winter and summer, respectively.[1]
- Ecology is expected to relax the permit conditions for a period of up to two years as the SCRWRF begins operations to allow optimization of the treatment processes.

In addition to the anticipated limits presented in Table 2-8, the County has elected to reduce effluent nitrate-nitrogen levels during the summer permit season to a concentration of 10 mg/L or less. This measure is designed to minimize nitrate loadings to the Spokane Aquifer resulting from either reuse practices or groundwater recharge of treated effluent discharged to the Spokane River.

The County expects that the proposed membrane technology for the SCRWRF will provide a higher quality effluent than is required to meet the anticipated initial NPDES permit effluent limits.

[1] Based on equation t = 34/(T + 9), where T = background temperature.

Table 2-8. Anticipated Effluent Quality Limits for SCRWRF Discharge to the Spokane River

Parameter	Summer Permit Season (April – October)			Winter Permit Season (November – March)		
	Seasonal Average Limit	**Weekly Average**	**Daily Limit**	**Seasonal Average Limit**	**Weekly Average**	**Daily Limit**
$CBOD_5$, mg/L[a]	2	-	-	<25	<40	-
Total Suspended Solids, mg/L	2	45	-	<30	<45	-
Nitrate-Nitrogen, mg/L[b]	-	-	-	-	-	-
Dissolved Oxygen, mg/L	-	> 5	-	-	-	-
Fecal Coliform, cfu/100 mL	200	-	-	200	-	-
pH (s.u.)	-	-	6.0-7.8	-	-	6.0-7.8
Chlorine Residual, mg/L	-	-	0.10	-	-	0.10
Lead, ug/L[c]	2	-	3	2	-	3
Zinc, ug/L[c]	60	-	82	60	-	82
Cadmium, ug/L[c]	0.2	-	0.3	0.2	-	0.3
Phosphorus Requirements	**Seasonal Average Limit**	**Weekly**	**Daily**	**Seasonal Average Limit**	**Weekly**	**Daily**
Total Phosphorus (April – October), mg/l[d]	0.010	Report	Report	-	-	-
Total Phosphorus (April – October) lbs/day[d]	0.67	Report	Report	-	-	-
Total Phosphorus (November - March)	-	-	-	Report	Report	Report
Ammonia Requirements[e]	**Seasonal Average Limit**	**Weekly**	**Daily**	**Seasonal Average Limit**	**Weekly**	**Daily**
Ammonia-Nitrogen (April, May), lbs/day	66.72	-	-	-	-	-
Ammonia-Nitrogen (April, May), mg/l[g]	-	-	16	-	-	-
Ammonia-Nitrogen (June, July, August, September) lbs/day	16.68	-	-	-	-	-
Ammonia-Nitrogen (June, July, August, September) mg/l[f]	-	-	8	-	-	-
Ammonia-Nitrogen (October) lbs/day	66.72	-	-	-	-	-
Ammonia-Nitrogen (October) mg/l[f]	-	-	16	-	-	-
Ammonia-Nitrogen (November - March), mg/l[g]	-	-	-	Report	Report	21

[a] The Draft TMDL includes a draft Wasteload Allocation for CBOD, ammonia nitrogen, and phosphorus. Future discharge permit revisions are expected to include performance based limits. The Managed Implementation Plan (MIP) calls for NPDES limits based on seasonal average values and CBOD limits will be calculated on an average seasonal basis from April through October.

[b] The County has elected to reduce effluent nitrate-nitrogen levels during the summer permit season to a concentration of 10 mg/L or less.

[c] Performance based limits are required by the metals TMDL. Estimated values are based on the RPWRF permit. Actual values for the SCRWRF must be established by monitoring effluent metals concentrations.

[d] The Managed Implementation Plan (MIP) calls for NPDES limits based on seasonal average values. The MIP targets of 10 µg/l total phosphorus are expressed as pounds of phosphorus discharged to the River based on the discharge volume estimates established through the TMDL Collaboration. The MIP projected flow for Spokane County for 2017 is 8 mgd and for 2027 is 8 mgd. The total phosphorus Wasteload Allocation (WLA) for Spokane County for 2017 is 0.67 lbs/day and for 2027 is 0.67 lbs/day. Compliance in meeting the pounds of phosphorus target will be achieved by a combination of phosphorus removal treatment technology and implementation of other phosphorus reduction actions that together result in the net pounds of phosphorus discharged to the River being equal to, or less than, the target pounds. SCRWRF effluent

concentration and loading limits for April-October are based effluent total phosphorus <0.050 mg/l combined with other phosphorus reduction actions to meet the Managed Implementation Plan (MIP) targets of 10 µg/l total phosphorus.

[e] The Managed Implementation Plan (MIP) calls for NPDES limits based on seasonal average values and ammonia limits will be calculated based on the following: April/May (61 day average), June/July/August/September (122 day average), and October (31 day average).

[f] The daily limits for ammonia are based on effluent mixing zone toxicity control, unless superseded by dissolved oxygen limitations at compliance locations in the Spokane River upstream of Lake Spokane.

2.6 OTHER SPOKANE RIVER WATER QUALITY ISSUES

The Spokane River is listed by the U.S. Environmental Protection Agency (EPA) as impaired by several different pollutants, including polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs), and dioxins and furans. PCBs are discussed in more detail below. PBDEs are chemical additives used in everyday household products to reduce death and injury from fires. Dioxins and furans are the abbreviated names for a family of toxic substances that all share a similar chemical structure. There are a variety of dioxin sources. Most dioxins and furans are not man-made or produced intentionally, but are created when other chemicals or products are made. Some of the chemicals that produce dioxins/furans when created include herbicides and products in the pulp and paper industry. They also can be produced when other items are burned, such as municipal waste, sludge, medical waste, wood (both forest fires and yard waste), and cement kilns.

2.6.1 Polychlorinated Biphenyls (PCBs)

The Spokane River is listed by the U.S. Environmental Protection Agency (EPA) as impaired by polychlorinated biphenyls (PCBs) and Ecology is required to prepare a total maximum daily load (TMDL) as a water quality cleanup plan. Ecology has conducted a PCB study on the Spokane River and published a draft technical report in June 2006.

Original Sources of Polychlorinated Biphenyls (PCBs)

Polychlorinated biphenyls (PCBs) are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are mixtures of man-made chemicals with similar chemical structures. PCBs can range from oily liquids to waxy solids. Due to their non-flammability, chemical stability, high boiling point and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; as plasticizers in paints, plastics and rubber products; in pigments, dyes and carbonless copy paper and many other applications. In 1975 it was estimated that industries consumed PCBs as follows: capacitors, 70 percent; and transformers, 30%. PCBs were formerly used in the United States as hydraulic fluids, plasticizers, adhesives, fire retardants, way extenders, dedusting agents, pesticide extenders, inks, lubricants, cutting oils, in heat transfer systems, and carbonless reproducing paper.

Concern over the toxicity and persistence (chemical stability) in the environment of Polychlorinated Biphenyls (PCBs) led Congress in 1976 to enact Section 6(e) of the Toxic Substances Control Act (TSCA) that included among other things, prohibitions on the manufacture, processing, and distribution in commerce of PCBs. EPA banned most uses of

PCBs in 1979. Therefore, the PCBs in the environment are from previous disposal or are residuals.

Fate of PCBs

PCBs entered the air, water, and soil during their manufacture, use, and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs. PCBs can still be released to the environment from hazardous waste sites; illegal or improper disposal of industrial wastes and consumer products; leaks from old electrical transformers containing PCBs; and burning of some wastes in incinerators.

PCBs do not readily break down in the environment and thus may remain there for very long periods of time. PCBs can travel long distances in the air and be deposited in areas far away from where they were released. In water, a small amount of PCBs may remain dissolved, but most stick to organic particles and bottom sediments. PCBs also bind strongly to soil.

PCBs are taken up by small organisms and fish in water. They are also taken up by other animals that eat these aquatic animals as food. PCBs accumulate in fish and marine mammals, reaching levels that may be many thousands of times higher than in water.

Removal of PCBs

PCBs are very recalcitrant and are not easily biodegradable under either aerobic or anaerobic conditions due to the stable chemical structure and low bioavailability (solubility). PCBs tend to partition strongly to the surface of solids. Biodegradation of PCBs have been shown to be successful if they are first pre-oxidized (ozone, UV, oxidant). The oxidization process can help break the ring-structure and the oxidation products become more biodegradable. Addition of biosurfactant, or enzymes, may help improve bioavailability and improve biodegradability. Currently, the most efficient approach known for removal of PCBs is via adsorption using activated carbon or other sorbents.

PCBs in Wastewater Treatment

It is generally assumed that PCB removal in wastewater treatment is via adsorption with biomass. The following table listed some removal result for PCBs from the technical literature. The influent PCBs in raw wastewater varies with country and region. In the United States, most PCBs entering wastewater treatment plants are likely from old PCB pollution sources such as landfill leaching. Stormwater may also contribute to PCB loading if there are PCB wastes and spills had occurred in the area.

Treatment processes with high levels of particulate solids removal, such as membrane bioreactors (MBR) and membrane filtration processes, are expected to increase PCB removals over conventional treatment processes since most PCBs are most associated with particulates. Chemical addition will likely increase the removal as well, due to the improvement in particulate/colloidal removal and the chemical precipitate may also serve as an adsorbent.

Table 2-9. Wastewater Treatment Plant Literature Summary of Polychlorinated Biphenyls (PCBs)

Treatment Process	Removal Rate, %	Observed Concentration	References
Primary Treatment			
Primary Influent		17 ng/L	Pham et al., 1997
Primary Treatment	45%		Steven et al. 1994
Secondary Treatment			
Overall Activated Sludge Process	67% 0%	Increase of soluble PCBs in effluent	Pham et al., 1997 Bergovist et al., 2006
Secondary Effluent		6 ng/L	Pham et al., 1997
Primary and Secondary Solids			
Primary Sludge		8.7 to 659.3 mg kg^{-1}	Steven et al. 1994
Secondary Sludge (WAS)		1.6 to 5.4 mg kg^{-1} dry weight	Steven et al. 1994

2.7 EFFLUENT REUSE

With appropriate levels of treatment and system management, reclaimed water has been used successfully for many applications. Reuse programs in the study area must consider the state's guidance provided in the Water Reclamation and Reuse Standards, which outlines four classes of reclaimed water that can be used for different applications. These range from Class A water, which has the most stringent treatment requirements but minimal restrictions on use, to Class D water which has limited uses which must be accompanied by strict controls to minimize human contact. The June 30, 2006 *Foundational Concepts for the Spokane River TMDL Managed Implementation Plan* calls for Spokane County to produce Class A reclaimed water. Class A reclaimed water is suitable for reuse in urban irrigation, as industrial process water, aquifer recharge, and wetlands restoration. A programmatic effluent reuse plan was presented in Chapter 5 of the *2002 Wastewater Facilities Plan*. Spokane County will initiate the development of a Reclaimed Water Reuse Plan in 2007 which details the County's reuse program.

2.8 BIOSOLIDS MANAGEMENT

Land application, composting and land filling are the biosolids management techniques typically used in Eastern Washington and Northern Idaho. These uses are regulated by Ecology using rules which closely follow those promulgated by the U.S. EPA under 40 CFR 503 ("Part 503 regulations"). These regulations use three measures to determine the level of restriction placed on the application practice: (1) concentration of trace elements; (2) quantity of pathogens; and (3) vector attraction. Several degrees of pathogen reduction are recognized, with associated differences in the level of restriction placed on reuse of the treated biosolids.

The Washington State Department of Ecology (Ecology) is currently updating the state biosolids rule. This update became effective June 24, 2007. The updated biosolids rule changes septage requirements and fee structure, as well as requirements for Class A biosolids, eliminating some options that require only sampling and testing (EPA Class A

Alternatives 3 and 4). The rule now includes a requirement for "significant removal of manufactured inerts," from biosolids before land application. The rule specifies that solids must be screened "through a bar screen with a maximum aperture of 3/8-inch," or inerts must be removed using another method approved by Ecology. Grinding will not be an acceptable option.

2.9 EXISTING WASTEWATER FACILITIES AND PROGRAMS

The County's wastewater management facilities are integrated into a regional network of conveyance and treatment facilities serving the greater Spokane area. These systems were summarized in Chapter 2 of the *2002 Wastewater Facilities Plan*.

2.10 STAKEHOLDER VALUES AND CONCERNS

Stakeholders from various sectors of the community were interviewed during the Basis of Planning phase to gain an understanding of the various community priorities, issues and concerns regarding wastewater management. The objective was to understand the variety of community issues early in the planning process so they could be considered during the review and identification of wastewater management alternatives. Stakeholder values and concerns were summarized in Chapter 2 of the *2002 Wastewater Facilities Plan*.