REGION X

WATER QUALITY MANAGEMENT

WALLA WALLA RIVER BASIN
WASHINGTON AND OREGON

ENVIRONMENTAL
PROTECTION
AGENCY
SEATTLE WASHINGTON

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WATER QUALITY MANAGEMENT PLAN

Walla Walla River Basin

Washington and Oregon

EPA-910-8-74-090

May 3, 1974

FIGURES AND TABLES

FIGURES AND TABLES (continued)

Chapter 1. INTRODUCTION

Section 303(e) of the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) requires that each State maintain a continuing planning process which will result in the preparation of water quality management plans for all waters within the State. These plans are then to serve as the basic management guidance for the State's water pollution control programs.

The purpose of preparing basin plans is to provide the information that the States of Washington and Oregon will need to make centralized, coordinated water quality management decisions; to provide the strategic guidance for developing the State water pollution control program under Section 106 of PL-92-500; and to encourage establishment of water quality objectives which take into account overall State policies and programs, including those for land use and other related natural resources. The plans are to assist the States and the Environmental Protection Agency (EPA) in directing resources, establishing priorities, scheduling and coordinating actions, and reporting progress toward meeting objectives.

The report contained herein is the proposed water quality management plan for the Walla Walla River Basin. In view of the inter-state nature of this Basin, it was deemed appropriate that the basin plan be prepared by the Environmental Protection Agency, with the concurrence of the States. Following completion of this plan, a hearing is to be held to obtain public input. The plan is to be modified as appropriate after consideration of the information gained in the hearing. Another hearing on the revised plan will then be held if necessary. The plan will then be adopted by the Washington Department of Ecology (DOE) and the Oregon Department of Environmental Quality (DEQ) as the official State water quality plans for the Walla Walla River Basin. The implementation of the provisions of these plans will be achieved through enforcement of State regulations adopted pursuant to recommendations set forth in the plans and through State and Federal enforcement of stipulations and compliance schedules contained in waste discharge permits scheduled to be issued to waste dischargers in the basins.

As presently envisioned, at least two generations of plans will be required in the planning process. The first generation plans, as typified by the Walla Walla plan presented herein, will be used to assess water quality problems, develop recommendations for programs for control of all sources of pollution (including non-point), and provide recommendations and priorities for issuing waste discharge permits for point sources and for awarding municipal construction grants. This first phase of activity will concentrate on permitting of significant waste dischargers, using secondary treatment for municipal dischargers and best practicable treatment (BPT) for all other point sources as an overall effluent limit. When water quality analyses of a receiving stream have been performed which indicate a higher degree of treatment is needed to meet water quality standards, the higher degree of treatment will be used to establish the effluent limitations. However, BPT, is a requirement for obtaining a Federal grant for construction of waste treatment facilities after June 30, 1974.

Best practicable treatment for industrial point sources is the best practicable control technology currently available as determined by the Administrator of EPA. Guidelines defining this level of treatment for most categories of industrial wastes are now available from the EPA. Secondary treatment for municipal waste dischargers is defined by EPA regulations which were published in the Federal Register on August 17, 1973.

First generation 303(e) plans will recommend areas where additional technical studies are required to develop waste load allocations for various stream reaches. Second generation plans will then use waste load allocations in developing permit stipulations for dischargers whose permits have expired and for new classes of sources for which permits were not issued initially. Procedures for establishing land use controls as an aid to achieving stream quality goals were not developed in this initial plan. It is anticipated that this area of activity will be addressed in the second generation for this basin. A first generation plan, then, will remain in force until the second generation plan is prepared, perhaps in the 1976-1977 period. Any plan prepared in this process, however, may be revised if necessary. Public hearings are required prior to any significant change in a plan.

The following basic objectives are to be achieved through the development of this planning effort:

1. An assessment of the present water quality problems in the Walla Walla River Basin to serve as a base line against which to measure the progress toward stream quality goals as pollution control programs are implemented.

2. An evaluation of where stream water quality goals will and will not be met through achievement of best practicable treatment at point sources of pollution.

3. In some areas, recommendations for more stringent waste load limitations which could reasonably be expected to result in achievement of stream quality goals.

4. A determination of the technical and field studies necessary to make additional waste load allocations and achieve controls over non-point source pollution, and to provide an improved data base for a second generation plan for the basin.

5. An assessment of planning needs, treatment requirements, and investment costs for municipal waste treatment facilities.

6. The development of an action program to guide waste discharge permitting and municipal construction grant activities.

7. The definition of areas where the DOE, DEQ, and EPA can maintain coordinated and mutually complimentary pollution control programs in the Walla Walla River Basin.

A sewage drainage basin 3(c) study has been prepared for the Washington portion of the Walla Walla River basin by a consultant under contract to the Walla Walla Regional Planning Council. In view of the existence of this comprehensive planning document, and to satisfy the immediate requirements for Section 303(e) plan production, an agreement was reached between the Washington Department of Ecology and the Environmental Protection Agency under which an attempt would be made to meet 303(e) planning requirements by preparing an addendum to the existing Sewage Drainage Basin Study. This agreement outlined minimum contents of an acceptable 303(e) plan and presented a procedure whereby completion of the 303(e) planning program could be hastened by maximum utilization of existing planning reports.

The addendum document referred to, as typified by this plan, serves to bridge the gap between the 3(c) and 303(e) planning requirements. It takes the form of an administrative action program that spotlights the short-term management needs to be undertaken by the States. In the case of the Walla Walla River Basin, the addendum will also expand the existing 3(c) plan (which covered only the Washington portion of the basin) to include the Oregon portion as well. Thus, this report incorporates the material presented in the Sewage Drainage Basin Study with emphasis on generating management actions or commitments to provide input to formulation of annual State strategies on a basin-wide scale.

This basin plan addendum contains two components: a basin-wide program, and analyses of the individual segments identified in the initial State continual planning processes. The basin-wide component is concerned with development of a basin action program, scheduling of water quality management recommendations made in the individual segment analyses, and guidance of waste discharge permitting and municipal construction grant activities. The segment analyses have as their objectives the following:

1. A presentation of segment water quality and identification of problem areas and standards violations.

2. An inventory of point source waste generators, including identification and quantification of all wastewater sources contributing to the overall water pollution problem.

3. A discussion of the significance and character of nonpoint source pollution in the segment.

4. Formulation of effluent limitations for significant dischargers, and scheduling of permit issuance, completion of permit conditions, and accomplishment of load limitations required.

5. A discussion of municipal facility needs.

6. A formulation of a segment-oriented monitoring and data collection program to identify areas where it is expected that water quality goals will not be achieved even after implementation of best practicable treatment and to provide input for calculations of total maximum daily pollutant load and waste load allocations.

Chapter 2. BASIN DESCRIPTION

Delineation of Study Area

Figure 1 is a map of the Walla Walla River Basin. The Washington portion of the basin has been designated as Walla Walla 303(e) Consolidated Planning Area Number 13-08-15, which consists of Water Resources Inventory Area 32; the Washington portion shall be referred to as Basin 15-32. The Oregon portion of the basin has been designated as Department of Environmental Quality Hydrologic Basin 28, and is included by the Oregon State Water Resources Board as a subbasin of the Umatilla River Basin. For the purposes of this report, the Walla Walla River Basin will consist of the total area drained by the Walla Walla River.

Figures 2a and 2b are the individual State hydrologic basin maps for the Walla Walla Basin. The Basin includes portions of Walla Walla and Columbia Counties in Washington, and Umatilla and Wallowa Counties in Oregon.

Basin Characteristics

The Walla Walla River Basin lies in northeastern Oregon and southeastern Washington. The Walla Walla River and its major tributaries have their headwaters in the Blue Mountains, located in the eastern portion of the basin. Elevations within the Basin range from 3000 to 6000 feet above mean sea level, in the Blue Mountains, to a low of 400 to 500 feet at Wallula, where the Walla Walla River discharges into the Columbia River. The Walla Walla River drainage area covers 1881 square miles, of which about 1395 square miles are in Washington and the rest in Oregon.

The Walla Walla River Basin is a triangular shaped structural depression bordered by the Blue Mountains on the east, the Touchet Highlands on the north and northwest, and an extension of the Horse Heaven Hills on the south and southwest. The Walla Walla Valley forms the central portion of the basin.

All of the Basin's perennial streams head in the Blue Mountains and, together with intermittent streams heading at lower levels, flow in a northwesterly direction into the Columbia River. Mainly due to prevailing semi-arid conditions, all major, and most minor streams, on reaching the valleys, are dry in some parts of their channels during the lowest flow period of many years.

The Walla Walla River is formed by the confluence of its north and south forks, at a point about four miles upstream from the town of Milton-Freewater, Oregon. At Milton-Freewater the river forms two branches, one of which is joined by another branch in Washington. These three branches are, from west to east, the West Little Walla Walla River, the East Little Walla Walla River, and the Walla Walla River.

The two major tributaries to the Walla Walla River are the Touchet River and Mill Creek. The Touchet River is separated from the Walla Walla Valley by a series of low hills; its headwaters are located in the Blue Mountains south and east of Dayton, Washington, and its total drainage area is 490,770 acres. Mill Creek originates in the high central part of the Blue Mountains and drains an area of 51,990 acres, flowing southwesterly through the City of Walla Walla to the Walla Walla River. Other tributaries include Pine Creek and its main tributary, Dry Creek, which rise south of the Walla Walla River headwaters and flow northwesterly to join the river. Russell, Yellowhawk, Cottonwood, and Birch Creeks enter the area in its eastern boundary with their waters joining the Walla Walla River about midway between the cities of Walla Walla and Milton-Freewater. A second Dry Creek, in Washington, rises in the Blue Mountains north of Mill Creek and joins the Walla Walla River near the town of Lowden.

The Sewage Drainage Basin Study which has been prepared for the Washington portion of the Basin contains detailed information on the geology, soils, and drainage characteristics applicable to the basin as a whole. For the purposes of this addendum, geologic data is important in the consideration of the basin's groundwater resources and will be discussed in that context.

The basin's climate is characterized by moderate temperatures, low rainfall, and a high incidence of sunshine during the summer season. Summers are relatively warm and dry and winters cold. Average low temperatures in winter are below freezing around Walla Walla City about three months of the year, and maximum precipitation occurs in mid-winter.

Precipitation rates increase with elevation in an easterly direction across the basin; the annual average is about 7 inches near the community of Wallula, 10 inches near Lowden, 14 inches at Milton-Freewater, 15 inches at Walla Walla, and 25 to 45 inches along the slopes of the Blue Mountains. Precipitation increases in the fall, reaches a peak in winter, gradually decreases in the spring, increases slightly in May and June, and drops sharply in July.

Surface water hydrologic characteristics for the Walla Walla River and its major tributaries will be discussed in the individual segment analyses. In general, the discharge pattern is characterized by peak discharges between January and May (a direct result of precipitation and snowmelt) and minimum flows during the late summer and fall. The natural low flow conditions existing during the summer season are intensified by surface water diversions and withdrawals for agricultural and other uses. The seriousness of the low flow situation is seen in the fact that the minimum 7-day, 10-year recurrence interval flow in Mill Creek is 0.9 cfs, and for the Walla Walla River at Touchet, the same flow is less than 10 cfs. Table 1 presents a list of water quality flow and monitoring stations maintained by various agencies in the Basin.

The only flood regulation structure in the Basin is the Mill Creek control project operated by the U.S. Army Corps of Engineers. This project, located about 3 miles upstream from Walla Walla, consists of a diversion dam, canal, and offstream reservoir with 6700 acre feet capacity. The project diverts flood flows in Mill Creek into the offstream reservoirs; once the crest has passed, stored flows are either released back to Mill Creek or to Garrison and Yellowhawk Creeks to satisfy downstream water rights in the latter streams. In a sense, these creeks can be said to have their origins at the Mill Creek Reservoir, under the current status of flow management in the Basin.

Groundwater is found in two types of aquifers: basaltic, and unconsolidated sand and gravel deposits overlying the basalt. The availability of groundwater in the Walla Walla Basin is the subject of a soon-to-be published report by the U.S. Geological Survey and the State of Washington. The Geological Survey had made a comprehensive study of the groundwater resources of the Basin in 1948; on the basis of this study, it was estimated that there existed some 250,000 acre feet of groundwater in storage in the upper 100 feet of basalt and an additional 250,000 acre feet in the upper 100 feet of the gravel aquifer.

The new USGS study is based on substantially more data than was available in 1948, and has resulted in new estimates of the availibility of groundwater in the unconsolidated aquifer. Well logs have shown that the unconsolidated aquifer is roughly 20 miles long, 10 miles wide and in the order of 200 feet thick. These materials contain approximately 5,000,000 acre feet of groundwater. The new study estimates that approximately 1,000,000 acre feet of this groundwater would be available for development. At the present time, some 75,000 acre feet a year moves in and out of the gravels. The new USGS report also concludes that large amounts of groundwater are still available for development from the basalt aquifers outside the areas of concentrated withdrawals in the Walla Walla-College Place area in Washington and the Milton-Freewater area in Oregon.

FIGURE 1 WALLA WALLA RIVER BASIN

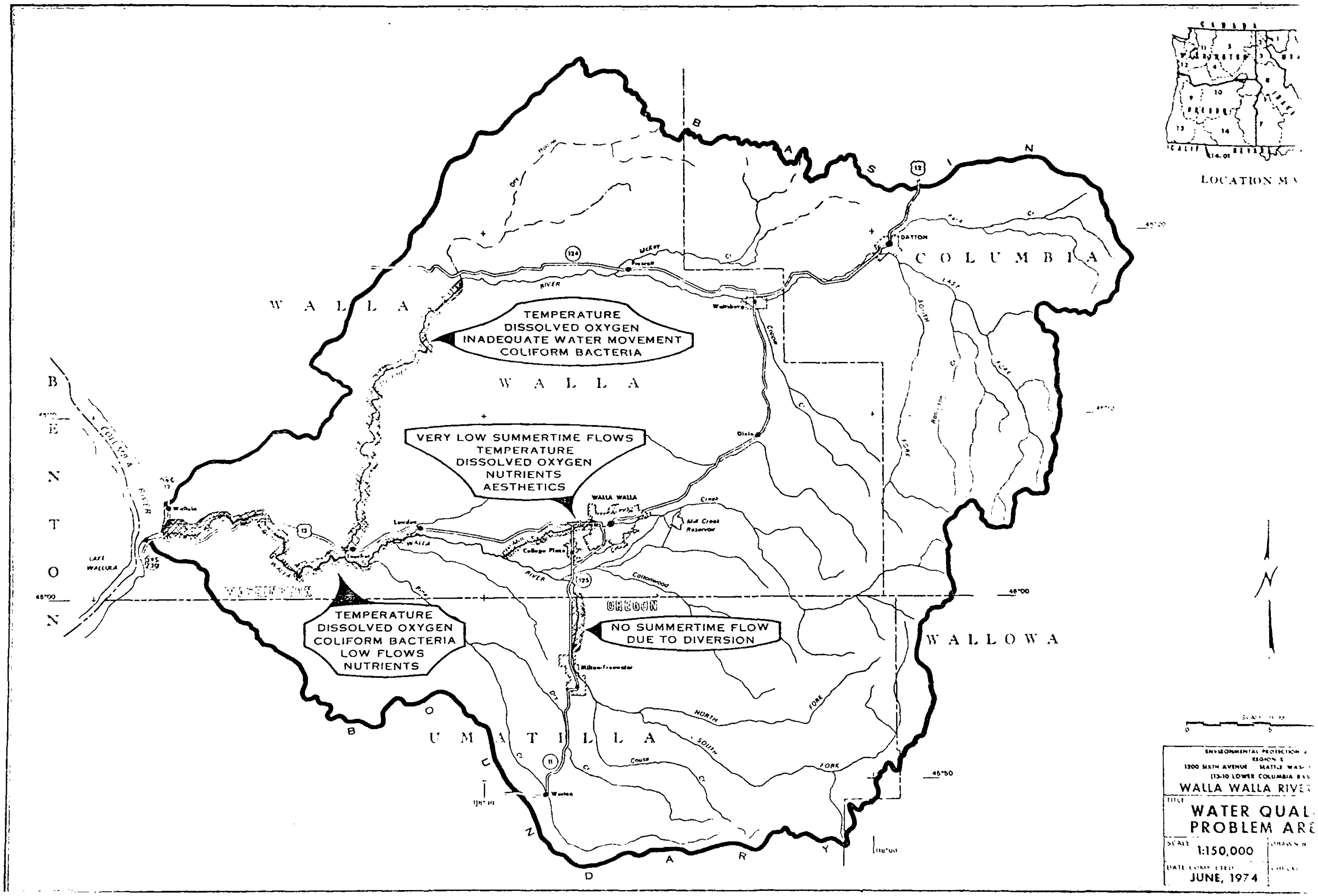
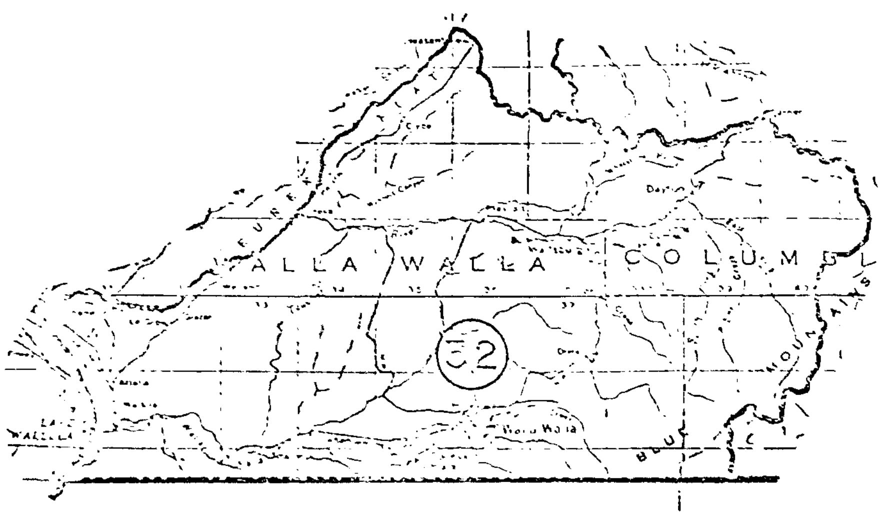


FIGURE 2a

WALLA WALLA RIVER BASIN-WASHINGTON
(STATE HYDROLOGIC BASIN MAP)

WALLA WALLA 303(e) Consolidated Planning Area
NUMBER 13-08-15
Includes River Basins: (32) Walla Walla



WALLA WALLA RIVER BASIN-OREGON
(STATE HYDROLOGIC BASIN MAP)

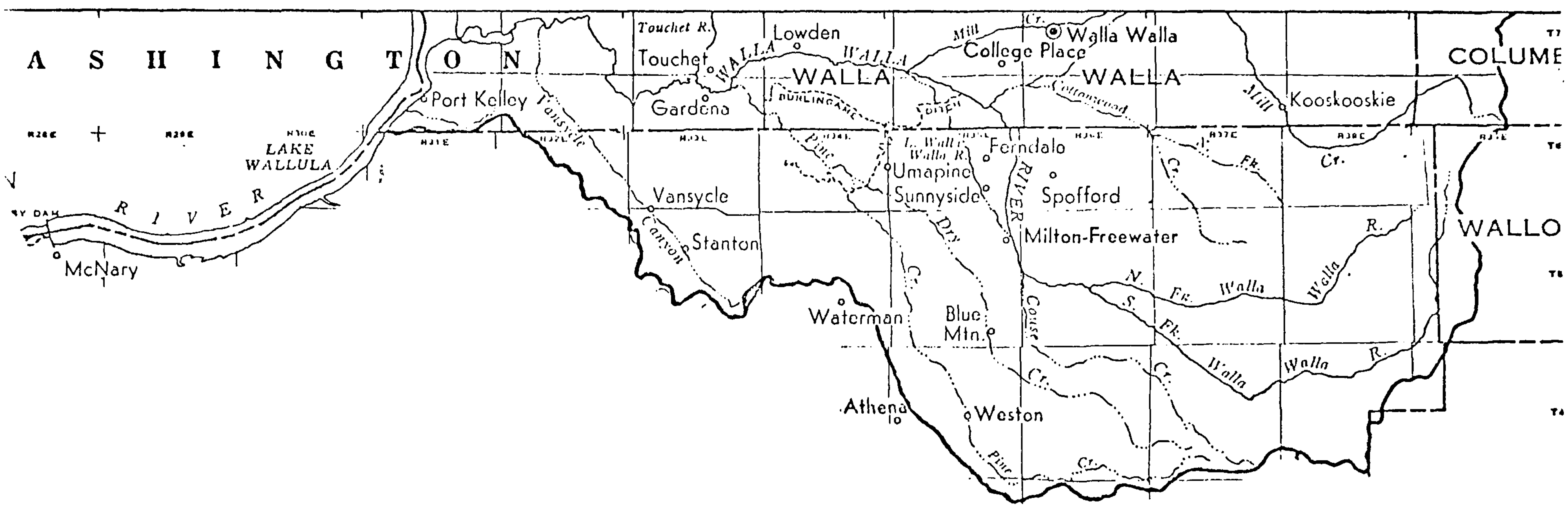


Table I WATER QUALITY MONITORING AND FLOW STATIONS
WALLA WALLA RIVER BASIN

Station Number	Location	RM	Agency	Notes
32 A070	Walla Walla R. near Touchet		DOE	All listed DOE stations are part of a year-long semi-monthly joint DOE-USGS sampling program that began in September 1973.
32 A110	Walla Walla R. at State Boundary		DOE	Parameters sampled (types): Standard Test Minerals Trace Metals Nutrients (Kjeldal N, NO_2)
32 B070	Touchet R. at Touchet		DOE	
32 B120	Touchet R. near Dayton		DOE	
32 B100	Touchet R. near Bolles		DOE	
32 C070	Mill Creek at Mission St. Bridge		DOE	
32 C110	Mill Creek at Tausick Way Bridge Walla Walla		DOE	
402389	Walla Walla R. above Milton-Freewater		DEQ	
14 0136	Mill Creek below Blue Creek	14.8	USGS	Sampled Temperature and sediment October 1962 to June 1970. Discontinued June 1970.

TABLE 1 WATER QUALITY MONITORING AND FLOW STATIONS
WALLA WALLA RIVER BASIN (cont)

Station Number	Location	RM	Agency	Notes
14 0170	Touchet R. near Bolles	40.1	USGS	Measured discharge and water temperature November 1969 to May 1971; discharge measurements continue
14 0185	Walla Walla R. near Touchet	15.7	USGS	Chemical analyses, water temperature, sediments sampled July 1959 to June 1970. Discontinued in June 1970.
14 0175	Touchet R. at Touchet	0.5	USGS	Joint USGS-DOE chemical and physical analyses October 1971-September 1972. Discontinued September 1972.
14 0155.5	Walla Walla R. near Lowden	29.0	USGS	Sampled temperature, discharge, chemical analyses December 1970-September 1971. Discontinued September 1971.
14 0130	Mill Creek near Walla Walla	21.2	USGS	Temperature, flow, suspended sediment, March 1962-September 1964.
14 0135	Blue Creek near Walla Walla		USGS	Temperature, flow, suspended sediment, March 1962-September 1964.
14 0144	Yellowhawk Creek near College Place		USGS	Temperature, flow, suspended sediment, November 1962-May 1964; Chemical analyses February-June 1968.
14 0160	Dry Creek near Walla Walla		USGS	Temperature, flow, suspended sediment, November 1962-September 1964.
14 0160.5	Dry Creek at Lowden			Temperature, flow, suspended sediment, October 1962 - May 1964.
14 0161	Pine Creek near Touchet		USGS	Temperature, flow, suspended sediment, October 1962 to May 1969.

TABLE 1 WATER QUALITY MONITORING AND FLOW STATIONS
WALLA WALLA RIVER BASIN (cont)

Station Number	Location	RM	Agency	Notes
14 0108	North Fork Walla Walla R. near Milton-Freewater Oregon	5.6	USGS	Discharge Only
14 0110	North Fork Walla Walla R. near Milton Oregon	1.2	USGS	Discharge Only. Discontinued October 1969
14 0150	Mill Creek at Walla Walla	10.5	USGS	Discharge only

In addition to the above listed stations, USGS has measured discharge occasionally at a number of sites on minor tributaries to the Walla Walla River, Mill Creek, and the Touchet River. These partial-record stations are not given here, but data at these locations is available from USGS.

Chapter 3. BASIN-WIDE WATER QUALITY AND APPLICABLE STANDARDS

Water quality goals represent the levels of water quality required to fully support the maximum water uses. In managing the subregion's water, the primary purpose is to protect and enhance the quality and value of the water resources; to establish programs for the prevention, control and abatement of water pollution; and to allow maximum use of the resource for all beneficial purposes.

Section 303(a) of PL 92-500 required that the States of Oregon and Washington, in conjunction with EPA, review and revise their respective existing water quality standards. Accordingly, the standards have been revised and were formally adopted by the Oregon Department of Environmental Quality on June 29, 1973, and the Washington Department of Ecology on June 19, 1973 after which they were adopted by EPA. These standards now form the criteria against which the adequacy of water quality in each State is measured.

In establishing the water quality standards, the use of each body of water was determined, and criteria were set to protect these uses through quality levels which must be maintained. In addition, the standards incorporate an anti-degradation provision by requiring that waters whose existing quality is better than the established standards be maintained at the existing higher quality level. Specifically, the water quality standards of the State of Washington require that "wherever receiving waters of a classified area are of a higher quality than the criteria assigned for said area, the existing water quality shall constitute water quality criteria". The State of Oregon's anti-degradation provision is contained in Section 41-010 of its water quality standards as follows:

"Notwithstanding the general and special water quality standards contained in this subdivision, the highest and best practicable treatment and/or control of wastes, activities and flows shall in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperatures, coliform bacteria concentrations, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor and other deleterious factors at the lowest possible levels."

Water quality classifications for Washington are based on water uses and are defined by specific criteria; minimum or maximum values of certain parameters (total coliforms, dissolved oxygen, temperature, turbidity, toxic, radioactive or deleterious materials, and aesthetic reaction to overall water quality). These criteria define acceptable conditions. In Washington, each water quality classification is denoted by a letter (AA, A, B, C); a brief explanation of classifications is presented in Table 2. Table 3 gives the classification of the major surface waters of the Washington portion of the Walla Walla Basin.

The State of Oregon has not adopted a letter classification system, but again the water quality standards are based on minimum or maximum levels of specific parameters. The State of Oregon "Standards of Quality for Public Waters of Oregon and Disposal Therein of Sewage and Industrial Wastes" contains specific water quality standards for the public waters of the mainstem of the Walla Walla River, which supplement the general water quality standards contained in the overall regulation.

The comprehensive water quality standards for each State are available from the regulatory agency of that State. For the purposes of this report, those criteria which apply specifically to the Walla Walla River Basin have been extracted and are presented in Table 4.

Discussion of Basin Water Quality Characteristics

Assessment of water quality in the Walla Walla River Basin is hampered by the lack of an adequate data base. The most recent compilation of water quality data and assessment is the Sewage Drainage Basin Plan for the Washington portion of the Basin, which source was utilized along with available water quality data for the Oregon site in the preparation of this report.

It is important to keep in mind that, in so far as water quality is concerned, the Walla Walla River Basin can be considered to have only two seasons - a "wet" season, from November through May, and a "dry" season the remainder of the year. As noted below, many of the most obvious water quality characteristics of the Basin are often related to the season in which they occur, since both climate and topography are major determinants of basin streamflow and water use, and thus of instream water quality.

In general, the quality of water in the Walla Walla River Basin reflects the arid climate and the use of water for irrigation In the upper reaches, the streams are usually low in dissolved solids and contain relatively clear waters. With the exception of summer low-flow conditions, the streams flow to the Columbia River without serious water quality degradation. Quality problems during much of the year are restricted to excessive turbidity during periods of high runoff. However, during the summer, as the streams flow through the arid parts of the Basin, stream diversions and irrigation return flows significantly affect water quality. In the Walla Walla Basin as a whole, stream diversions have resulted in flows too low to assimilate oxygen demanding wastes and in some cases have reduced a stream to stagnant pools where biological nuisance conditions occur. Irrigation return flows contribute to increases in suspended and dissolved solids, color, turbidity, and temperatures. Nutrient concentrations have reached levels significantly above the threshold limit for algal stimulation (0.3 mg/l for nitrates and 0.025 mg/l for phosphates). Phosphate concentrations have been reported at over 1.0 mg/l in the Walla Walla River.

A brief comparative presentation of instream water quality is contained in Table 5. Note that no current "dry" season water quality data is available for Mill Creek below the City of Walla Walla; a change in wastewater disposal practices at the City of Walla Walla municipal treatment plant and at two food processing operations in the city rendered all pre-1973 water quality data inoperative. This will be further discussed in the Mill Creek segment analysis.

Water Quality Problem Areas

The June 1973 Summary of the State of Washington "continuing planning process" described the following for Basin 15-32 (Walla Walla River Basin, Washington):

Segment	Standards Violations
Walla Walla River and Tributaries	Coliform, Temperature, DO
Touchet River and Tributaries	Coliform, Temperature, DO
Mill Creek and Tributaries	Temperature, DO

The existing Sewage Drainage Basin Plan for the Washington portion of the Basin has expanded this description of standards violations to produce a "Summary of Water Quality Standards Violations", reproduced here as Table 6. However, recognition of water quality problem areas should be extended beyond merely noting standards violations, to include observations made by field personnel of problems existing in these mainstreams and their tributaries. Often such observations must be considered subjective due to the nonexistence of a data base adequate to quantify the problems noted; however, identification of the full range of water quality problems is essential to recognition of the overall quality status of the Basin. Table 7 presents brief descriptions of the problem areas observed in the Walla Walla Basin.

Table 2 BRIEF EXPLANATION OF CLASSIFICATIONS, STATE OF WASHINGTON WATER QUALITY STANDARDS

Classification of Washington Intrastate Waters is as follows:

1. Lake Class applies to lake waters in virtually their natural conditions. For example, dissolved oxygen, temperature, and pH are to show no measurable change. Water uses include fish reproduction and rearing, wildlife habitat, drinking water supply, swimming and other recreational areas.

2. Class AA (Extraordinary) applies to quality associated with the natural state in an undeveloped condition. Uses are the same as for Lake Class.

3. Class A waters are of excellent quality, but allow for some slightly degrading effects due to land use and human activity. Highest water uses, however are the same for Class AA.

4. Class B (Good) applies to waters slightly more polluted than A, but still of good quality. Uses differ from Class A in that drinking water supply and fish reproduction and rearing are not intended.

5. Class C waters are described as Fair in quality. Quality criteria for this class are the least stringent and are based on a possible heavy use of a water's waste assimilation capacity.

TABLE 3 CLASSIFICATION OF MAJOR SURFACE WATERS IN THE WASHINGTON PORTION OF THE WALLA WALLA RIVER BASIN

River	Reach	Water Quality Classification	Special Conditions
Walla Walla River	Mouth to Lowden	B	Interstate waters
	Lowden to Oregon Border	A	Interstate waters; Temperature increase restriction
Mill Creek	Confluence with Walla Walla R. to 13th St. Bridge in Walla Walla	B	Dissolved oxygen content 5.0 mg/l or 50% saturation, whichever is greater
	13th St. Bridge to City of Walla Walla Waterworks Dam	A	
	Dam to Headwaters	AA	No waste discharge permitted
Touchet River	Confluence with Walla Walla R. to Dayton Water Intake	A	
	Dayton Water Intake Headwaters	AA	

TABLE 4 WATER QUALITY CRITERIA BY STREAM REACH WALLA WALLA RIVER BASIN

River	Reach	Water Quality Classification	Coliform Bacteria no./100ml Total	Fecal	Dissolved Oxygen	pH Data	Turbidity	Temperature	Toxic, Radioactive and Deleterious Materials	Aesthetic Values	Dissolved Chemical Su
Walla Walla River	Mouth to Lowden	B	Average <1000 with 90% of samples <2400	None. Total must be "associated with a fecal source	>5.0 mg/l or 70% saturation	6.5 to 8.5	Not to exceed 10 JTU over natural conditions	not to exceed 21.2°C	Below those levels adversely affecting public health or characteristic uses	Shall not be reduced by dissolved, suspended, floating or submerged matter not attributable to natural causes	
	Lowden to Oregon Border	A	Average <240 with 80% of samples <1000	None. Total must be "associated with a fecal source"	>8.0 mg/l	6.5 to 8.5	Not to exceed 5 JTU over natural conditions	not to exceed 20°C	Below those levels of public health significance	Shall not be impaired by the presence of materials or their effects, excluding those of natural orgin, which offend the senses of sight, smell, though, or taste	Arsenic 0.01 Barium 1.0 Boron 0.5 Calcium 0.01 Cyloride 25.0 Chromium 0.05 Copper 0.005 Cyonide 0.01 Fluoride 1.0 Iron 0.1 Lead 0.05 Manganese 0.05 Phenols 0.001 Total Dissolved Solid Zinc 0.1 Heavy metals 0.5
	Main stem Oregon border to confluence of North and South Forks	—	Average < 1000 with 80% of samples <2400	Total must be associated with a fecal source	Not to be less than 75% saturation at seasoned low, or 95% saturation during spawning, hatching and fry stages of salmon fishes	6.5 to 8.5	Not to exceed 5 JTU over natural conditions	not to exceed 20°C	Below those levels deleterious to fish or other aquatic life or affecting the potability of drinking water or palatability of fish or shell fish	Shall not be impaired by objectionable discoloration, turbidity, scum, oily sleek or floating solids	

TABLE 4 WATER QUALITY CRITERIA BY
STREAM REACH WALLA WALLA RIVER BASIN

ver	Reach	Water Quality Classification	Coliform Bacteria no./100ml Total	Fecal	Dissolved Oxygen	pH Data	Turbidity	Temperature	Toxic, Radioactive and Deleterious Materials	Aesthetic Values	Dissolved Chemical Substances
alla alla	Tributaries within Oregon	--			in excess of 6 mg/l	6.5 to 8.5		Not to exceed 17.8°C	Not to create conditions deleterious to water used for a cited beneficial purpose, or to be injurious to public health.	Not to be offensive to the human senses of sight, taste, smell, or taste	
ll eek	Confluence with Walla Walla River to 13th. ST. Bridge in Walla Walla	B	Avg. < 1000 with 90% of samples < 2400	None. Total to be associated with a fecal source.	5.0 mg/l or 50% saturation (which ever is greater)	6.5 to 8.5	Not to exceed 10 JTU over natural conditions	Not to exceed 21.2°C	Below those levels adversely affecting public health or characteristic uses.	Shall not be reduced by dissolved, suspended floating or submerged matter not attributable to natural causes	
	13th St. Bridge to City of Walla Walla Waterworks Dam	A	Avg. < 240 with 80% of samples < 1000	None. Total to be associated with a fecal source	> 8.0 mg/l	6.5 to 8.5	Not to exceed 5 JTU over natural conditions	Not to exceed 18.4°C	Below those levels of public health significance	Shall not be impaired by the presence of materials or their effects excluding those of natural orgin, which offend the senses of sight, smell, touch, or taste	
	Waterworks Dam to headwaters	AA	Avg. < 50 with 90% of samples < 230	None. Total to be associated with a fecal source"	> 9.5 mg/l	6.5 to 8.5	Not to exceed 5 JTU	Not to exceed 15.6°C	Below those levels which may affect the public health, the natural aquatic environment or the desirability of the water for any usage	Shall not be impaired by the presence of materials, or their effects, excluding those of natural orgin, which offend the senses of sight, smell, touch, or taste	

(Special Condition: No waste discharge permitte

TABLE 4 WATER QUALITY CRITERIA BY STREAM REACH WALLA WALLA RIVER BASIN

River	Reach	Water Quality Classification	Coliform Bacteria no./100ml Total	Fecal	Dissolved Oxygen	pH Data	Turbidity	Temperature	Toxic, Radioactive and Deleterious Materials	Aesthetic Values	Dissolved Chemical Substances
Touchet River	Confluence with Walla WAlla River to Dayton Water Intake	A	Avg. <240 with 80% of samples <1000	None. Total to be associated with a fecal source	>8.0 mg/l	6.5 to 8.5	Not to exceed 5 JTU over natural conditions	Not to exceed 18.4°C	Below those levels of public health significance	Shall not be impaired by the presence of materials or their effects excluding those of natural origin, which offend the senses of smell, sight, touch or taste	
	Dayton Water Intake to Headwaters	AA	Avg. <50 with 90% of samples <230	None. Total to be associated with a fecal source	>9.5 mg/l	6.5 to 8.5	Not to exceed 5 JTU	Not to exceed 15.6°C	Below those levels which may affect the public health, the natural aquatic environment or the desirability of water for any usage.	Shall not be impaired by the presence of materials or thier effects, excluding those of natural origin, which offend the senses of sight, smell, touch, or taste	

TABLE 5 COMPARATIVE WATER QUALITY WALLA WALLA RIVER BASIN

Stream	Reach	Parameter	Season	Subjective Assessment
Walla Walla River	Headwaters (South Fork Walla Walla R.)	DO, turbidity pH, nutrients	Wet	Quality is excellent
			Dry	Inadequate data base
	Middle Area (Lowden to Oregon Border)	All	Wet	Flows increase three-fold from headwaters. Levels of DO, pH and temperature remain about the same. Turbidity increases significantly due to erosion. Total coliforms average 1800 to 3500 colonies/100 ml, but fecal coliform count is very low: 71/100ml
		All	Dry	Mean dry season flows are 10% of wet season flows. Mean temperature is doubled, averaging 17.1-20.7°C. DO is supersaturated during day by 2 mg/1. Turbidity is low, pH higher than wet season. Total coliforms increase four-fold. Nutrients: Nitrate is unchanged, phosphorus decreased by 50%, of wet season levels perhaps due to uptake by waterborne plants. Electoconductivity increases due to irrigation returns.

TABLE 5 COMPARATIVE WATER QUALITY WALLA WALLA RIVER BASIN

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	Middle Area (Lowden to Oregon Border)	All	Wet	Flows increase three-fold from headwaters. Levels of DO, pH and temperature remain about the same. Turbidity increases significantly due to erosion. Total coliforms average 1800 to 3500 colonies/100 ml, but fecal coliform count is very low: 71/100ml
		All	Dry	Mean dry season flows are 10% of wet season flows. Mean temperature is doubled, averaging 17.1-20.7°C. DO is supersaturated during day by 2 mg/1. Turbidity is low, pH higher than wet season. Total coliforms increase four-fold. Nutrients: Nitrate is unchanged, phosphorus decreased by 50%, of wet season levels perhaps due to uptake by waterborne plants. Electoconductivity increases due to irrigation returns.

TABLE 5 COMPARATIVE WATER QUALITY WALLA WALLA RIVER BASIN

Stream	Reach	Parameter	Season	Subjective Assessment
Walla Walla River	Lower (Mouth to Lowden)	All	Wet	Flow increases 2-3 times over middle reach. Temperature, DO, pH unchanged over middle area; turbidity is much increased (up to 82 JTU). Total coliform (9000/100 ml) and Fecal Coliforms (200/100ml) both exceed Class B criteria. Nitrate levels increase four-fold, perhaps indicating the presence of animal wastes in the river.
		All	Dry	Mean flows are 6 to 12 percent of wet season flows. Temperature is higher, DO is supersaturated during the day time due to algal production of oxygen. Turbidity is increased by 2-3 times the upstream dry season level. Increased total dissolved solids, possibly from irrigation returns.
Touchet River	Upper Reach (Headwaters area)	All	Wet, Dry	Quality is generally very high during all seasons. DO is consistently above Class AA standards, turbidity is low. No significant coliform levels, no excessive nitrogen. Phosphorous levels are unexplainably high.

Table 5 COMPARATIVE WATER QUALITY WALLA WALLA RIVER BASIN

Stream	Reach	Parameter	Season	Subjective Assessment
Touchet River	Middle	All	Wet, Dry	Inadequate data base
	Lower	All	Wet	Overall quality is significantly degraded mean turbidity levels are 118 JTU very high level of suspended solids. Total coliform count averages 6700 colonies/100 ml, constituting a violation of Class A Standards. High nutrient level and high coliform counts indicate possible contamination by animal wastes
			Dry	Dry-season flow is seriously depleted by withdrawals. Average temperature is 20°C. Turbidity is very low 2.5 JTU Total coliforms: 8000/100 ml. Nitrogen concentrations are lower than wet season levels. Phosphorus levels are also lower, possibly due to uptake by aquatic plants.

Table 5 COMPARATIVE WATER QUALITY
WALLA WALLA RIVER BASIN

Stream	Reach	Parameter	Season	Subjective Assessment
Mill Creek	Headwaters	Temperature	Wet	Average 6°C
			Dry	Average 8.1-11.5°C, due to natural heating
		Dissolved oxygen	Wet	At saturation (12 mg/1)
			Dry	At saturation
		pH	Wet	Average 7.7 slightly alkaline
			Dry	Average 8.3 again, slightly alkaline
		Total Coliform	Wet	MPN very low no significant pollution.
			Dry	Same as Wet season
		Nutrients	Wet	Nitrate levels very low, phosphorus quite high.
			Dry	Nitrate low, phosphorous quite high
		Turbidity	Wet, Dry	Low (3.2-5.9 JTU) indicating very little siltation
	Middle (though and immediately below Walla Walla City)	All	Dry	No current data available due to changes in wastewater discharge methods in 1973.

TABLE 5 COMPARATIVE WATER QUALITY
WALLA WALLA RIVER BASIN

Stream	Reach	Parameter	Season	Subjective Assessment
Mill Creek	Lower (near confluence with Walla Walla River)	Temperature	Wet	9-10^{o} C
			Dry	Average 16.2^{o} C, due to natural warming
		Dissolved oxygen	Wet	Average 9.7 mg/1 (87% of saturation.
			Dry	Inadequate data base.
		Turbidity	Wet	Increase of 3-5 times the value in the headwaters area
			Dry	Low values 5.5 JTU
		pH	Wet	No significant change from headwaters.
			Dry	No significant change from headwaters
		Total coliforms	Wet	No change from headwaters-no significant organic pollution
			Dry	Inadequate data base below city.
		Nutrients	Wet	Nitrate values increase to 30 time the headwaters values, phosphorous levels increase fourfold due to wet season discharge of STP effluent at Walla Walla.
			Dry	Inadequate data base.

TABLE 6 WATER QUALITY STANDARDS VIOLATIONS
WALLA WALLA RIVER BASIN

Stream	Reach	Season	Dissolved Oxygen	Temperature	Turbidity	Coliform	pH	Harmful Materials	Aesthetics
Mill Creek	Upper	Wet	A	A	O	A	A	A	A
		Dry	A	A	O	A	A	A	A
	Lower	Wet	A	A	X	O	A	I	X
		Dry							
Walla Walla River	Upper (in Oregon)	Wet	A	A	A	A	A	A	A
		Dry	I	I	I	I	I	I	I
	Middle	Wet	A	A	X	X	A	I	X
		Dry	X	X	X	X	I	X	X
	Lower	Wet	A	A	X	X	A	I	X
		Dry	X	X	X	X	I	X	X
Touchet River	Upper	Wet	A	A	A	A	A	A	A
		Dry	A	A	A	A	A	A	A
	Middle	Wet	I	I	I	I	I	I	I
		Dry	I	I	I	I	I	I	I
	Lower	Wet	A	A	X	X	A	I	X
		Dry	O	O	O	X	A	O	X

*Wet Season: Generally November through May
*Dry Season: Generally June through October

Key
- A Always meets DOE or DEQ criteria
- O Occasionally fails to meet criteria
- X Frequently fails to meet criteria
- I Insufficient information

TABLE 7 WATER QUALITY PROBLEM AREAS
WALLA WALLA RIVER BASINS

Stream	PROBLEMS IDENTIFIED
Walla Walla River and Tributaries	
Walla Walla River State line to confluence with Mill Creek	Dry Season: high temperatures, color, odor, total coliform levels
Walla Walla River Milton-Freewater to State Line	Dry Season: dry streambed due to irrigation diversions. Colifrom levels high from land runoff.
Garrison Creek	Dry Season: high coliform levels, high temperature
Yellowhawk Creek	Dry Season: high coliform levels high temperature
Russell Creek	Dry Season: high coliform levels high temperature
West Little Walla Walla River	High temperature, color, odor, turbidity, high coliform levels, low DO, excessive algae or plant growth toxic materials
East Little Walla Walla River	
Walla Walla River-mouth to Lowden	During wet season:Excessive turbidity and suspended solids, coliforms During dry season: high temperatures excessive algal and plant growth, high coliform levels.
Minor tributaries: Mud Creek, Blue Creek, Dry Creek Pine Creek	During dry season: excessive temperatures, high color, high turbidity, excessive algae plants, high coliforms level.

TABLE 7 WATER QUALITY PROBLEM AREAS
WALLA WALLA RIVER BASIN

Stream	Problems Identified
Touchet River and Tributaries	
Touchet River-Dayton to Mouth	During wet seasons-high turbidity During dry season- occasional high temperatures, excessive algae and plants, coliform counts, low DO
Mill Creek and Tributaries	
Mill Creek above Walla Walla Water Intake	Excessive turbidity during wet season
Mill Creek below diversion works	Dry season: high temperatures, color-turbidity, low DO, excessive algal growth inadequate water movement.
Cold Creek	Possible irrigation returns; high algal level and plant growth
Doan Creek	

Chapter 4. Segment Classification

The State Continuing Planning Process regulations (40 CFR 130.11) provide that the process establish a segment classification system to be employed for categorizing segments in the preparation of a basin plan. The segment classification systems of both Oregon and Washington were approved by EPA in the States' Continuing Planning Process as required by Section 303(e) of the Act.

In Washington, the ranking of segments is based on the statewide segment ranking system developed for Section 106, the Annual State Program. The ranking was based on a point system which considered severity of pollution problems, population affected, and need for preservation of high quality waters. As explained in the Oregon's River Basin Planning Methodology, that State's general assignment of classification is based either on: 1. The actual fact of existing water quality criteria violations not expected to be fully abated by best practicable treatment at point sources; or 2. a non-degradation framework (based on Oregon Water Quality Standards) applied to waters where existing quality is higher than water quality criteria.

Table 8 lists the segments in the Walla Walla River Basin and gives their classification. The segments are ranked in order of pollution abatement priority in the table and their classification (Water Quality Limited or Effluent Limited) is indicated in keeping with 40 CFR 130.11. In general, the water quality segment classifications are the result of undefined non-point pollution sources. For those segments, it was felt that the magnitude of the non-point influences would prevent standards from being met even with best practicable treatment at point sources. Other smaller tributaries are presently considered water quality limited due to insufficient data. However, there are no point source dischargers on these minor streams, and it is expected that water quality will improve as nonpoint and agricultural waste controls are achieved.

TABLE 8 SEGMENT DESIGNATION
WALLA WALLA RIVER BASIN

Segment Rank Within Basin	Within State	Segment Number	Segment Name	Class[1]	Violations
1	65	15-32-02	Walla Walla River & Tributaries (Washington)	WQ-NPS	Coliform, Temperature, DO
2	116	15-32-03	Touchet River & Tributaries	WQ-NPS	Coliform, Temperature
3	117	15-32-04	Mill Creek and Tributaries	WQ-NPS	Temperature, DO
4	70		Walla Walla River (Oregon)	WQL	Flow, Temperature, Non-degradation

[1] The State of Washington has subdivided the basic "Water Quality Limited" segment designation in accordance with the following system:

WQ-PS	Water Quality-Point Source
WQ-PS-SWL	Water Quality-Point Source-Sulfite Waste Liquor
WQ-PS-Gas	Water Quality-Point Source-Total Dissolved Gas
WQ-NPS	Water Quality-Nonpoint Source
WQ-No Data	Segments so noted are those where data is insufficient to subclassify and where water quality violations are not caused by point source dischargers.
I	Data type I segment. Data are sufficient to execute load allocations without additional monitoring
II	Data type II segment. Additional data collection is needed to classify the segment with certainty or to execute waste load allocations.

Chapter 5. Basin Population, Land Use, and Economic Base Population

The population of the Walla Walla River Basin is estimated to have been 54,147 in 1970. The overall basin population trend has been towards stability in recent years, and in fact several local areas have experienced population declines during the 1960's. Population of the Basin and its Oregon and Washington portions, and its major cities and towns is shown in Table 9.

The major population center is the Walla Walla urban area, which consists of Walla Walla City, College Place, and the adjacent residential and commercial areas. The next largest urban center is Milton-Freewater, which includes the strip development along the Walla Walla-Milton-Freewater Highway as well as the urbanized portions of Milton-Freewater itself. Next in size is Dayton, in Columbia County, Washington, with a 1970 population of 2596.

As noted above, the historic basin population trend is toward stability. This lack of population growth is due primarily to the dominance of agriculture and the interactions of the agricultural industry and population dynamics. Agriculture has experienced declining employment over the past two decades as labor productivity has increased; consequently, the basin's rural area population has declined by 5.8 percent during the 1960's. Counterbalancing this rural population decline was a slight growth in the Basin's urban population; incorporated cities and towns in the Basin grew 1.3 percent between 1900 and 1970, due primarily to growth at College Place and Walla Walla East.

Population Projections

Projections shown in Table 10 indicate a relatively steady basin population over the next decade with a slight decline by the year 2000. These projections are extracted from available planning documents and are based on interpolations of U.S. Bureau of the Census enumeration district data for rural areas and population data for cities and towns and industrial prospects for each subbasin. In most instances, population projections have not been formulated for individual cities but rather for minor subbasins or planning areas.

The main function of population projections in water quality planning is to aid in determining future waste loads and treatment facility needs by forecasting growth in population and employment. In the Walla Walla River Basin as a whole, the population trends are clearly indicated by historical data: a rural urban migration pattern, slight growth in certain areas of the Basin's towns, but an overall population growth of only a few percent per decade. Exceptions to these patterns would include College Place, which has experienced a 11.9 percent population growth in the period from 1960 to 1970, the community of Walla Walla East, which has grown 82.4 percent in the same period, and possible Milton-Freewater, where certain planners have postulated a tripling of the area's population by the year 2000. On the basis of available data, the assumption of steady state basin population over the next five years is acceptable for the purposes of this plan, and the adequacy of existing wastewater treatment facilities to handle anticipated increases in volume will be reviewed from that standpoint.

Land Use

The land use pattern of the Walla Walla River Basin reflects the areas dependence upon agriculture. Much of the land area is utilized for small grain and livestock production, with enclaves of irrigated land along streams and in areas of available water supply. Forest lands further broaden the agricultural base, while food processing and other agricultural industries lend stability to the basin's economy.

A major source of income is small grain production. Small grains and peas are grown on dryland farms in the eastern portion of the area where precipitation rates permit successful yields. This dry cropland is a portion of a large dry-farmed grain belt running in a curve through Lexington, Pendleton, and Milton-Freewater, in northeastern Oregon, and is interspersed with irrigated lands lying adjacent to streams. The dry cropland is an area of good soils, having between 10 and 20 inches of precipitation annually, and produces its greatest agricultural returns from grain crops. Lands in the drier western areas are generally limited to production of native grasses.

In areas where adequate irrigation water supplies are available, lands produce a wide variety of crops including field and sweet corn, alfalfa for hay and seed, sugar beets, beans, peas, asparagus, spinach, tomatoes, onions, and melons. An in-depth inventory of irrigation areas and practices is recommended as an action item by this plan, since very little information is currently available to characterize this type of land use. In Washington, irrigated lands are principally located south of the Walla Walla River near its confluence with minor tributaries in the reach from Touchet to Walla Walla; in Oregon, irrigated lands are located along most perennial streams, as well as in the area west of Milton-Freewater which is served by a number of irrigation canals and ditches.

Rangeland occurs in a higher elevation strip between cropland and forest land, interspersed with dry cultivated land where soil and rainfall conditions are favorable. Forest lands cover approximately 11 percent of the basin, lying in a band covering the higher elevations of the Blue Mountains, between 3000 and 5000 feet above mean sea level. In addition to lumber production, forest lands have important values for grazing, recreation, and upper watershed benefits (the City of Walla Walla Watershed encompasses a large portion of the Upper Mill Creek area). Particularly important is the capacity of forested areas to delay winter snowmelt, leading to more stable spring and early summer streamflow. Commercial forest lands amount to about 90 per cent of forest areas; the remaining 10 per cent are composed of lands which are not capable of producing commercial timber or pulpwood or are reserved from timber harvest (as parks or watershed areas). Approximately 50 percent of the forest land is under Federal ownership.

Very little mining occurs in the Walla Walla Basin, due primarily to the lack of mineralization in the Columbia River basalt which overlies much of the area. Several sand and gravel operations are found in the Basin, one each located at Walla Walla and Milton-Freewater.

Generalized projections of Basin land use are to be found in the Sewage Drainage Basin Study for the Washington portion. No significant changes in population, commerce, or industry are projected through the year 2000; therefore, it is expected that the present land use pattern will continue. Table 11 presents land use by acreage in the Basin.

Basin Economy

The history of economic development in the area has largely been a pattern of agricultural development, determined to a great extent by climate, physical features and soils. Today, agriculture and its related trades and industries continue to be the economic base for this area of Washington and Oregon. Production of a number of important food crops has led to the development during the past 30 years of a large food processing complex in the valley. Currently, several canning and frozen food plants serve the needs of the area. These plants process a variety of fruits and vegetables, including up to one-third of the national output of green peas. The communities of Walla Walla, Milton-Freewater, Weston, Dayton, and Waitsburg are the primary processing locations.

Some growth in production by the Basin's food processing industries is anticipated. However, the individual industries feel that implementation of water-saving practices and possible technological innovations will result in a reduction of wastewater generated. Changes in agricultural output will depend primarily on expansion of irrigated acreage, which in turn is dependent of market conditions and the availability of water for irrigation. Surface water storage for irrigation has been a favorite subject for study (for example, the U.S. Bureau of Reclamation's Touchet, Milton-Freewater, and Marcus Whitman Divisions, and several Soil Conservation Service project proposals); the availability or suitability of groundwater for irrigation is a topic worthy of deeper exploration. Expansion of irrigated acreage in the Basin is not expected to produce significant land use changes within the time frame of this plan.

The canning and frozen foods, livestock and meatpacking and feedlot industries are expected to expand faster than other industries. Growth indices formulated by consultants for specific economic activities yielded the following:

Activity	1970	1985	2000
Food and Related Products	100	137	177
General Basin-Wide	100	122	149

Yearly production increases in each of these activities would then be:

Food and Related Products:	2.5% per year
General Basin-Wide	4.6% per year

Projection of waste loads over the five-year scope of this plan will be based on these figures. These yearly production increases are not absolute indicators of increased waste loads, however, since water-saving operations are expected to be implemented at nearly all of the Basin's industries.

In summary, the projected economic and population growth shows a trend toward stability. Increased loads to municipal facilities will result from a continuing rural-to-urban migration and the installation of sewerage services in presently unserviced areas, but such increases will be well within the treatment capacities of existing facilities in the affected areas. Industrial waste loads are expected to increase slightly, but since the major portion of industrial waste receives treatment by land disposal, the implications for water pollution control are minor. Increased acreage devoted to farm type activity may result in population growth - such factors as the increased prices of agricultural products, importation of surface waters (Snake River to Touchet Basin), groundwater availability and proposed reservoirs may result in expanded activity in agricultural sectors of the economy. This activity should be closely monitored to determine its implications for water quality control.

TABLE 9 POPULATION WALLA WALLA RIVER BASIN

Area	1960	1970	Percent Change
Walla Walla River Basin	55,081	54,147	-1.5
Washington Portion	45,381	45,081	-1.6
Walla Walla	24,536	23,619	-3.7
College Place	4,031	4,510	11.9
Prescott	269	242	-10.0
Waitsburg	1,010	953	-5.9
Walla Walla East	1,557	2,840	82.4
Dayton	2,913	2,596	-10.9
Rural Areas			
Dixie	N/A	183	N/A
Wallula	N/A	721	N/A
Touchet-Gardena	N/A	794	N/A
Burbank	N/A	477	N/A
Lowden	N/A	339	N/A
Other	N/A	8,407	N/A
Oregon Portion	9,250	9,066	-2.2
Milton-Freewater	4,110	4,105	0
Weston	783	660	-15.7
Umapire	85	85	0
Rural Areas	4,272	4,216	-1.3

Sources: US Bureau of the Census
Pacific Northwest Bell
CH_2M Hill, "Water Pollution Control and Abatement Plan, WRIA 32 and 33", 1974; Tudor Engineering Co., "A Report on a Water and Sewer Plan, Umatilla County, Oregon", November 1968.

TABLE 10 POPULATION PROJECTIONS

Area	1970	1975	1980	1985	1990
Walla Walla River Basin					
Washington Portion	45,081			45,070	
Oregon Portion					
Athena-Weston Vicinity	2,300	2,250			2,400
Milton-Freewater & East End	8,400	8,600			9,400

TABLE 11 LAND USE BY ACREAGE (in thousands of acres)
WALLA WALLA RIVER BASIN

Type	Washington	Oregon	Total
Dryland Cropland	547.7	133.2	680.9
Irrigated Cropland and Pasture	82.5	Included as Above	
Forest Land	102.7	88.2	190.9
National Forest	2.2	Included in Above	
Rangeland	190.3	86.3	276.6
Other	25.7	3.3	29.0
	951.1	311.0	

Chapter 6. Individual Segment Analyses

This chapter contains in-depth point source analyses of each of the four 303(e) segments in the Walla Walla River Basin. Where appropriate, water quality criteria and instream quality data have been extracted from the foregoing chapters and included here; the reader is referred to the previous treatments of these subjects for further detail.

Non-point sources of pollution will be covered on a basin-wide basis in a later chapter. It should be recognized that, while control of point sources is necessary to meet the requirements of PL 92-500 and thus forms the major thrust of this first generation planning effort, instream water quality may not be significantly improved by the application of point source controls. Deterioration of quality will continue due to the influence of nonpoint and other sources. Unfortunately, the level of knowledge of nonpoint sources of pollution and general land-use activities in the Basin is insufficient to allow quantification of the interrelationships between land use and instream water quality. Procedures for developing land use controls as an aid to achieving stream quality goals have not been developed in this initial plan.

Similarly, the available water quality data base does not permit calculations of total maximum daily loadings of all pollutants in violation of stream criteria, nor does it allow development of waste load allocations for point dischargers. This first-generation 303(e) plan will recommend permitted effluent limits based on best practicable treatment or secondary treatment for all point sources, will examine cases where a higher level of treatment may be required to aid in meeting stream quality goasl, and will recommend the implementation of such higher levels as necessary. This approach is necessary since the rapidly approaching deadline for the issuance of point source waste discharge permits necessitates the drafting of permits on the basis of available information, with recommendations of areas where additional technical studies are required to develop waste load allocations for the various reaches. Second generation plans will then use the waste load allocations in developing more stringent permit stipulations necessary to meet the requirements of the "best available treatment" definition.

A. Walla Walla River and Tributaries (Washington)

This segment is presently classified as "Water Quality Limited--Non-point Sources", with violations noted by the DOE in the standards for temperature, dissolved oxygen and coliform bacteria. In addition, water quality problems related to low summertime flow include violations of aesthetics standards by the presence of odors, stagnant water, and masses of floating and attached plant growth. Data from water quality monitoring stations in this segment is summarized in Table 12; this data is arrayed to depict the differences in characteristics between "wet" and "dry" seasons. Monitoring stations are listed in Table 1 and depicted in Figure 3.

Point source dischargers in this segment are two domestic waste treatment facilities: the City of College Place municipal waste treatment plant, and a small treatment plant operated by the Housing Authority of Walla Walla County at a Farm Labor Camp located five miles southwest of the City of Walla Walla. Table 13 indicates the limited amount of discharge data available for these two plants.

The City of College Place operates an efficiently-run secondary treatment plant performing within its design capacity, except during rain, when infiltration and inflow may result in occasional bypasses. A recent Sewage Drainage Basin Study done for Walla Walla and Columbia Counties concluded that treatment plant and collection system improvements currently being undertaken by the City should result in adequate plant capacity to the year 2000, even with the rapid rate of population growth that this area is experiencing.

Effluent from the College Place plant is dealt with in two different manners, depending upon the season. During the irrigation months (April-July) most of the effluent is taken by a local irrigator to fulfill his water rights; this irrigator has a pumphouse installed over the effluent outfall line, and when he needs water he pumps effluent out of the outfall into a small holding pond on his land. Thus for most of this period, effluent from the plant does not actually reach Garrison Creek. During those times when the irrigator does not need the water (for instance during times of harvesting alfalfa), the effluent is discharged to Garrison Creek.

The Walla Walla County Farm Labor Camp operates a waste treatment plant that nominally provides secondary treatment. However, the poor condition of this facility and the lack of adequate disinfection is creating a major problem due to passage of essentially raw sewage to the Walla Walla River. This facility is considered the number one abatement priority item in both the segment and the Basin.

Table 14 shows present NPDES permit status of these dischargers, and tabulates the effluent limitations which will be required under the conditions of the permits. The Walla Walla River segment has been classed as "WQ-NPS" by the State of Washington. Under this classification, no wasteload allocation is needed for the issuance of permits. The permits have and will be written to reflect best practical treatment or secondary treatment as required.

No effluent requirements more stringent than the secondary treatment level are needed for these municipal dischargers, due to influences of nonpoint sources on water quality. However, improved controls over the summertime disposal of effluent of College Place are recommended.

The Sewage Drainage Basin Study for Walla Walla and Columbia Counties considered regionalization of College Place with Walla Walla in alternative future waste treatment proposals. Specific alternatives included combining the two cities' flows for treatment at the existing Walla Walla Treatment Plant; construction of a new facility to handle the combined flows at a different location; and several regional alternatives to include treatment of wastes from College Place, Walla and suburbs, Dayton, Waitsburg, and Touchet. None of these regionalization schemes proved economically feasible, due primarily to the efficient operating conditions of the existing Walla Walla and College Place treatment plants, the capability of these plants to handle waste loads generated by future growth, and the pumping and transmission costs associated with regionalization of towns widely separated in space. The only municipal needs identifiable at College Place are interceptor projects and possible sewer system rehabilitation to reduce excessive infiltration and inflow and thus reduce the hydraulic loading on the existing plant.

The Farm Labor Camp facility will require extensive upgrading to meet the requirements of secondary treatment; due to the deteriorated condition of the plant, replacement by a package treatment plant or nonoverflow lagoon may be more feasible. The facility should be designed to accomodate a peak seasonal population of 450, with recognition of possible non-operation during the agricultural off season. The Sewage Drainage Basin Study found that costs of a package treatment plant to replace the existing one may range as high as $60,000. The cost of a nonoverflow lagoon would be variable, dependent on specific site considerations. The lagoon concept has been considered by the County in the past, and a preliminary engineering report prepared at that time may provide a basis for current design needs. In view of the seasonal nature of this facility and the difficulties associated with seasonal operation of biological treatment processes, the nonoverflow lagoon concept should be explored in detail.

An additional municipal facility need in the segment has been identified for the community of Touchet, located on the mainstem Walla Walla River at RM 21.5. The town has a population of about 800, presently served by septic tanks and drainfields; at present, the only waste treatment unit is a package secondary plant which treats wastes from the Touchet School and which discharges to a nonoverflow lagoon. The Touchet Development Community has prepared an engineering report which investigates the need for and feasibility of water and wastewater facilities for the community. The engineering report describes three treatment plant alternatives: (1) non-over flowing lagoon; (2) overflowing lagoon; (3) package treatment plant. Capital costs of the latter alternative have been estimated at $323,000. Further design work will be needed on these alternatives.

Residual wastes (sludge) at College Place is handled by sludge digesters, with final disposal on sludge drying beds. These beds are being enlarged to provide additional capacity. No residual wastes disposal considerations have arisen at the Farm Labor Camp, but such disposal must be considered in any planning effort.

In general, nonpoint sources far outweigh point sources as factors in water quality deterioration in this segment. The combination of depleted summertime flows, high temperatures, and a high incidence of sunlight are responsible for some of the observed quality changes, especially in the lower river (below Lowden). Two known feedlots adjacent to the river, in the vicinity of Lowden, apparently are sources of coliform bacteria and nutrients; water quality data indicate that instream levels of these pollutants increase dramatically below the locations of the feedlots during times of the year when climactic conditions would favor the runoff of animal wastes into receiving streams. In addition, there are indications of animal wastes entering the rivers from more diffuse sources, such as smaller livestock concentrations and general range management activities. No irrigation return flows have been identified as directly entering the Walla Walla River, but further analysis will be needed for the Little Walla Walla River, Gardena and Pine Creeks, and the outlet of the Burlingame Ditch (all in the vicinity of Touchet) to assess possible return flows from irrigation activities in areas drained by these tributaries.

TABLE 12 AVERAGE AND LIMITING VALUES OF SELECTED PARAMETERS
NECESSARY TO DESCRIBE INSTREAM WATER QUALITY

WALLA WALLA RIVER BASIN
SEGMENT: WALLA WALLA RIVER AND TRIBUTARIES (WASHINGTON)

Class	Description	Flow(3)	D.O. (mg/l)	pH	Cond. @ 25°C µMHOS	(°C)	Turb. (J.T.U.)	Coliform Total (No/100ml)	Coliform Fecal (No/100ml)	NH_3 as N (mg/l)	NO_3 as N (mg/l)	PO_4 (mg/l)	Hard. mg/l as $CaCO_3$	Alk. mg/l as $CaCO_3$	Other Parameters
B	Walla Walla River - mouth to Lowden		>5.0 or 70% sat.	6.5 to 8.5		Not to exceed 21.2°	<10 over natural	Average <1000 with 90% <2400							
A	Walla Walla River - Lowden to State Line		>8.0	6.5 to 8.5		Not to exceed 20°	<5 over natural	Average <240 with 80% <1000							

Class	Monitoring Station Designation	Location River Miles(3)	Location Map Key(4)	D.O. Ave	D.O. Min	pH Min	pH Max	Cond. Ave	Cond. Max	(°C) Ave	(°C) Max	Turb. Ave	Turb. Max	Coliform Total Ave	Coliform Fecal % Exceeds	NH_3 Ave	NH_3 Max	NO_3 Ave	NO_3 Max	PO_4 Ave	PO_4 Max	Hard. Ave	Alk. Ave	Other Ave	Other Max	Other Ave	Other Max	Other Ave	Other Max
"WET SEASON" - November through May																													
A	32A 110			11.7	9.0	7.4	7.9			7.7	12.9	43.5	1000	1087		.027	.34	.47	.78	.47									
A	32A 090			11.3	7.8	7.5	8.1			8.8	10.0	23.2	500	3524		.073	.12	.58	1.06	.31									
B	14-0185			11.1		7.5				9.1		40.0		8900		.094		2.07		.18									
B	32A-070			11.5	10.9	7.5	7.9			7.7	7.9	82.3	840	7327		.115	.46	.72	3.01	.19									
"DRY SEASON" - June through October																													
A	32A 110			11.4	9.5	8.2	8.6			17.1	29.0	6.9	80	2690		.025	.14	.45	.51	.18									
A	32A 090			12.1	7.0	7.8	8.6			20.7	32.3	6.8	20	12,845		.56	2.8	1.22	5.0	.29									
B	14-0185			10.6		7.9				23.2		10.1		3478		.19		1.53		.15									
B	32A-070			11.4	8.2	7.8	8.2			16.7	28.2	18.3	45	4816		.34	.50	.92	1.10	.14									

TABLE 13 WASTE SOURCE INVENTORY AND RANKING
WALLA WALLA RIVER BASIN
SEGMENT: Walla Walla River And Tributaries (Washington)

Present Discharge Characteristics

Rank	Name	Receiving Water	Map Key	Flow cmd mgd	BOD mg/1	BOD kg/day (lb/day)	Suspended Solids mg/1	Suspended Solids kg/day (lb/day)	Coliform Total no/100ml	Coliform Fecal no/100ml	Other
1	Walla Walla River	Walla Walla River		NK	NK	NK	NK	NK	NK	NK	
2	College Place STP	Garrison Creek		2649 (0.7)	30	170 (374)	30	170 (374)	NK	NK	

TABLE 14 ESTABLISHED OR TARGET EFFLUENT LIMITATIONS
WALLA WALLA RIVER BASIN
SEGMENT: Walla Walla River and Tributaries (Washington)

Source	NPDES Permit Status	Expir. Date	Flow, cmd (mgd)	BOD mg/l	BOD kg/day (lb/day)	Suspended Solids mg/l	Suspended Solids kg/day (lb/day)	pH	Temp °C &(°F)	Coliform Total No/100 ml	Compliance Date
Walla Walla Farm Labor Camp	Drafted		204 (0.054)	30	6 (14)	30	6 (14)	6.5 to 8.5			
College Place	Issued	7/1/78	5678 (1.5)	30	170 (374)	30	170 (374)	6.5 to 8.5	N/A	200	In Compliance

B. Touchet Rivers and Tributaries

This segment is presently classified as "Water Quality Limited--Nonpoint Sources", with violations noted by the DOE in the standards for temperature, dissolved oxygen, and coliform bacteria. Additional water quality problems have been noted to include excessive plant growth and obnoxious bottom conditions in the lower Touchet River during the summer low flow season. Data from water quality monitoring stations in this segment is very limited; available data is summarized in Table 15 for "wet" and "dry" seasons. Monitoring stations are listed in Table 1 and depicted in Figure 3.

Point source dischargers in this segment include two municipal wastewater treatment plants (Dayton and Waitsburg) and two industrial dischargers (Green Giant vegetable canning plants at Dayton and Waitsburg). Table 16 presents discharge characteristics for these plants.

The Green Giant plants generate two types of wastewaters; vegetable processing water and can cooling water. Process water receives land disposal by screening and spray irrigation (through a small percentage of the Dayton plant's process water is diverted to the City's treatment plant). The cooling water discharges to the Touchet River consist primarily of can cooling water of relatively large volume and high temperatures. Minor components of these discharges include brine room floor drainage, condenser cooling water, and boiler blowdown. Effluent limitations at these plants must include discharge temperature restriction to prevent violations of the Class A temperature standard in the Touchet River.

Dayton's municipal wastewater treatment facility is not meeting EPA secondary standards for suspended solids and fecal coliform levels during normal and bypass operations. Studies by consultants have recommended giving consideration to construction of a new treatment plant; the Sewage Drainage Basin Study calculated a capital cost of $730,000 for an activated sludge process secondary treatment plant to serve a population equivalent of 4,000. The Department of Ecology is satisfied with the present level of treatment at Dayton but recognizes that the age of the plant may pose future problems for water quality control.

The Waitsburg municipal facility does not satisfy secondary treatment requirements. The plant is a nominal secondary facility but actually provides little more than primary treatment. The effluent does not receive adequate chlorination, resulting in high coliform bacteria levels in the receiving water (Coppei Creek). Substantial upgrading of the existing plant or construction of a new facility will be required to provide full secondary treatment, correct excessive infiltration/inflow, and insure adequate disinfection of the effluent. This discharger is considered the highest abatement priority item in the segment.

Table 15 shows the present NPDES permit status of these dischargers, and tabulates the effluent limitations which will be required under the conditions of the permits. The Touchet River segment has been classified as "WQ-NPS" by the State of Washington. Under this classification, no waste load allocation is needed for the issuance of permits; therefore, no waste load allocation is made here. Municipal permits have been written to reflect the requirements of secondary treatment. Industrial permits have been written to allow only discharge of uncontaminated can cooling water at a maximum temperature of 65°F.

The Sewage Drainage Basin Study for Walla Walla and Columbia Counties considered regionalization of Waitsburg and Dayton for joint treatment of municipal wastes, and also considered inclusion of the two cities in a basin-wide wastewater treatment plant. It concluded that reconstruction of existing facilities or construction of new plants at Dayton and Waitsburg was more cost-effective than any of the regionalization plans studied.

Residual waste disposal is accomplished at both Dayton and Waitsburg by sludge digesters with ultimate disposal by means of sludge drying beds adjacent to the treatment plants.

It appears that nonpoint sources far outweigh point sources as determinants of water quality in this segment. A combination of depleted summertime flows, high air temperatures, and a high incidence of sunlight result in observed violations of the temperature and dissolved oxygen standards. Unfortunately, the nature of nonpoint sources of pollutants is so diffuse in this segment that not much can be said beyond noting that the water quality problems described in Chapter 3 do exist and by their nature cannot be due to point sources. No large concentrations of livestock or point sources of irrigation return flows are known. Measurements of instream water quality indicate the entrance of pollutants from sources such as agricultural field runoff and animal wastes from scattered locations. In the middle and lower Touchet River, irrigation activities adjacent to the river may have an impact on instream quality, but the nature of such impact cannot be stated in other than qualitative terms prior to implementation of a land use survey of nonpoint sources in conjunction with water quality monitoring efforts.

TABLE 15 AVERAGE AND LIMITING VALUES OF SELECTED PARAMETERS NECESSARY TO DESCRIBE INSTREAM WATER QUALITY

WALLA WALLA RIVER BASIN

SEGMENT: TOUCHET RIVER AND TRIBUTARIES

Class	Description	Flow(3)	D.O. (mg/l)	pH	Cond. @ 25°C μMHOS	(°C)	Turb. (J.T.U.)	Coliform Total (No/100ml)	Coliform Fecal (No/100ml)	NH_3 as N (mg/l)	NO_3 as N (mg/l)	PO_4 (mg/l)	Hard. mg/l as $CaCO_3$	Alk. mg/l as $CaCO_3$	Other Parameters
A	Touchet River-confluence with Walla Walla R. to Dayton water intake		>8.0	6.5 to 8.5		Not to exceed 18.4°	<5 over natural	Average <240 with 80% <1000							
AA	Touchet River-Dayton water intake to headwaters		>9.5	6.5 to 8.5		Not to exceed 15.6°	5	Average <50 with 90% <230							

Class	Monitoring Station Designation	Location: River Miles(3)	Location: Map Key(4)	D.O. Ave	D.O. Min	pH Min	pH Max	Cond. Ave	Cond. Max	°C Ave	°C Max	Turb. Ave	Turb. Max	Total Coliform Ave	% Exceeds	NH_3 Ave	NH_3 Max	NO_3 Ave	NO_3 Max	PO_4 Ave	PO_4 Max	Hard. Ave	Alk. Ave	Other Ave	Other Max	Other Ave	Other Max	Other Ave	Other Max
"WET SEASON" - November through May																													
AA	3-4			11.7			8.9	86		1.9		40		4		0		0.1		2.29									
A	14-0170																												
A	32B 070			10.4	13.2	7.6	8.0	115		8.5	11.0	118		6673		.20	.48	.87	2.60										
"DRY SEASON" - June through October																													
AA	3-4			9.7	10.0		8.4	106		8.3		0		6						.1									
A	14-0170																												
A	32B 070			11.3	10.9	7.2	8.2	148		19.6	29.9	2.5		8000		.08	.37	.4	.58										

TABLE 16 WASTE SOURCE INVENTORY AND RANKING
WALLA WALLA RIVER BASIN
SEGMENT: Touchet River and Tributaries

Rank	Name	Receiving Water	Map Key	Flow cmd/ mgd	BOD mg/1	BOD kg/day (lb/day)	Suspended Solids mg/1	Suspended Solids kg/day (1b day)	Coliform Total no/100ml	Coliform Fecal no/100ml	Other
					Present Discharge Characteristics						
1	Waitsburg STP	Coppei Creek		946 (0.25)	49	46 (101)	45	42 (92)	NK	NK	
2	Green Giant Waitsburg	Touchet River		3406 (0.90)	3.2	11 (24)	19	65 (142)	NK	NK	Temperature 27°C (81°F) Total Solids 186 mg/1 kg/day (1460lbs/day)
3	Green Giant Dayton	Touchet River		3785 (1.00)	11	41 (91)	52	196 (432)	NK	NK	Temperature 23°C (73°F) Total Solids 884 mg/1 kg/day (7340 lb/day)
4	Dayton STP	Touchet River		1893 (0.5)	30	57 (125)	30	57 (125)	NK	NK	

TABLE 17 ESTABLISHED OR TARGET EFFLUENT LIMITATIONS
WALLA WALLA RIVER BASIN
SEGMENT: **Touchet River and Tributaries**

Source	NPDES Permit Status	Expir. Date	Flow, cmd (mgd)	BOD mg/l	BOD kg/day (lb/day)	Suspended Solids mg/l	Suspended Solids kg/day (lb/day)	pH	Temp °C &(°F)	Coliform Total No/100 ml	Compliance Date
Waitsburg	Issued	7/1/78	1325 (0.35)	30	40 (88)	30	40 (88)	6.5 to 8.5	N/A	200	7/1/76
Green Giant Waitsburg	Drafted	12/31/76	3406 (3785)						18.5°C (65°F)		12/31/75
Green Giant Dayton	Drafted	12/31/76	3785 (1.00)						18.5°C (65°F)		12/31/75
Dayton STP	Issued	7/1/78	1893 (0.5)	30	57 (125)	30	57 (125)	6.5 to 8.5	NA	200	In Compliance

C. Mill Creek and Tributaries

This segment is presently classified as "Water Quality Limited--Nonpoint Sources", with violations noted by the DOE in the standards for dissolved oxygen and temperature. In addition, severe water quality problems associated with low summertime flows and high temperature have been noted in the form of large masses of attached and floating aquatic growth. Data from water quality monitoring stations in this segment is limited; no current dry-season data exists for Mill Creek below the City of Walla Walla due to a change in June, 1973 in the discharge practices of several industries located in Walla Walla. This change eliminated much of the summertime waste loadings to the creek and made all pre-1973 water quality data inoperative. Available data for other locations and seasons is presented in Table 18. Monitoring stations are listed in Table 1 and depicted in Figure 3.

Only two point source dischargers are currently located in this segment: the City of Walla Walla municipal treatment facility, and Jones-Scott Company's Sand and Gravel operation, both located on Mill Creek just west of the City of Walla Walla. Two significant waste generators are located in the segment but are exempt from the requirements of the NPDES permit program since they do not discharge to surface waters. Available information for this latter class of dischargers is presented in Table 24, together with a description of present waste disposal methods and reasons for concluding that these sources are indeed exempt from the need for a Federal discharge permit.

The City of Walla Walla municipal wastewater plant does not achieve EPA standards consistently for suspended solids removal during winter. Efficient fecal coliform removal is questionable due to chlorination prior to final clarification. A higher level of disinfection may be necessary due to use of the secondary effluent for irrigation of crops grown for human consumption. In the past, discharge conditions in Mill Creek were such that the treatment plant's effluent, in combination with discharges from the food processors in Walla Walla and the low summertime flows in Mill Creek, resulted in massive water quality problems--the infamous Mill Creek "sewer". As of the summer of 1973, this situation has changed: the two major food processors no longer discharge their process and cooling water to Mill Creek; instead the bulk of the wastewater is spray-irrigated on the City Farm located north of the City. A small portion of the industrial waste is treated with the sanitary waste at the municipal treatment plant. During the irrigation season, the resultant secondary effluent is discharged, not to the creek, but to an irrigation outfall to satisfy water rights held by two local irrigation districts.

The Walla Walla treatment plant discharges secondary effluent to Mill Creek only during the "wet" season (November-May), when there is generally sufficient flow in the creek to assimilate wastes. However, there may be a short overlap at each end of the irrigation season during which effluent is discharged to the creek before sufficient flows are actually present.

Jones-Scott Company operates a sand and gravel washing operation which discharges wash water to Mill Creek. The washing and wastewater disposal operation is as follows: The washing plant operates five days a week. Discharge water from the washing operation, amounting to as much as 170,000 gallons per day, is piped to a lagoon, where it is allowed to settle. The lagoon stores the wash water accumulated from five days of operation; on the seventh day, the stored wash water is discharged to Mill Creek. Surface water discharge from this operation thus consists of a once-weekly discharge of up to 0.85 mgd.

Jones-Scott's effluent is of concern due to its high concentration of total solids and total dissolved solids (Table 19) and the effects that such discharge may have on the turbidity of Mill Creek. In view of the low summertime flow in this stretch of Mill Creek, and the overall low background turbidity level as indicated by available water quality data, stringent effluent limitations will be required to insure that Jones-Scott's discharge does not cause a violation of water quality criteria. A policy of non-discharge would be the best guarantee against turbidity standards violations.

Table 20 shows the present NPDES permit status of these dischargers, and tabulates the effluent limitations recommended under the permit conditions. The Mill Creek and Tributaries Segment has been classed as "WQ-NPS" by the State of Washington under this classification, no wasteload allocation is needed for the issuance of permits. The permits have and will be written to reflect best practical treatment or secondary treatment as required.

The Sewage Drainage Basin Study for Walla Walla and Columbia Counties considered regionalization of Walla Walla with College Place in alternative future waste treatment proposals specific alternative included combining the two cities' flows for treatment at the existing Walla Walla Sewage Treatment plant; construction of a new facility to handle the combined flows at a different location; and several regional proposals to include treatment of wastes from Walla Walla, College Place, Walla Walla, Dayton, Waitsburg, and Touchet. None of these regionalization schemes proved economically feasible, due primarily to the efficient operating conditions of the existing Walla Walla and College Place treatment plants, the capability of these plants to handle waste loads generated by future growth, and the pumping and transmission costs associated with regionalization of towns widely separated in space. The only municipal needs identifiable at Walla Walla are improved solids and sludge handling facilities, at an estimated cost of $275,000.

Redisual waste at Walla Walla is handles by sludge digesters, with final disposal on sludge drying beds.

The lower portion of Mill Creek is severly impacted by withdrawals and diversions for irrigation and other purposes. The resultant low flows, in combination with returns from irrigation operations and the effects of general land use activities, have caused water quality degradation of a very dispersed nature. Special studies of this problem will be recommended in the basin wide action program.

TABLE 18 AVERAGE AND LIMITING VALUES OF SELECTED PARAMETERS NECESSARY TO DESCRIBE INSTREAM WATER QUALITY

WALLA WALLA RIVER BASIN
SEGMENT: MILL CREEK AND TRIBUTARIES

Class	Description	Flow(3)	D.O. (mg/l)	pH	Cond. @ 25°C µMHOS	(°C)	Turb. (J.T.U.)	Coliform Total (No/100ml)	Coliform Fecal (No/100ml)	NH_3 as N (mg/l)	NO_3 as N (mg/l)	PO_4 (mg/l)	Hard. mg/l as $CaCO_3$	Alk. mg/l as $CaCO_3$	Other Parameters
B	Confluence with Walla Walla R. to 13th Street Bridge, Walla Walla		5.0 or 50% sat.	6.5 to 8.5		Not to exceed 21.2°	<10 over natural	Average <1000 with 90% <2400							
A	13th Street Bridge to City of Walla Walla Waterworks Dam		>8.0	6.5 to 8.5		Not to exceed 18.4°	<5 over natural	Average <240 with 80% <1000							
AA	Waterworks Dam to headwaters		>9.5	6.5 to 8.5		Not to exceed 15.6°	5	Average <50 with 90% <240							No waste discharge permitted

Class	Monitoring Station Designation	Location: River Miles(3)	Location: Map Key(4)	D.O. Ave	D.O. Min	pH Min	pH Max	Cond. Ave	Cond. Max	°C Ave	°C Max	Turb. Ave	Turb. Max	Total Coliform Ave	Fecal Coliform % Exceeds	NH_3 Ave	NH_3 Max	NO_3 Ave	NO_3 Max	PO_4 Ave	PO_4 Max	Hard. Ave	Alk. Ave	Other Ave	Other Max	Other Ave	Other Max	Other Ave	Other Max
"WET SEASON" - November through May																													
A	14-0130																												
B	14-0150																												
"DRY SEASON" - June through October																													
A	14-0130																												
B	14-0150																												

(No current monitoring data or trend analysis is available.)

WALLA WALLA RIVER BASIN
SEGMENT: Mill Creek and Tributaries

Present Discharge Characteristics

Rank	Name	Receiving Water	Map Key	Flow cmd mgd	BOD mg/1	BOD kg/day (1b/day)	Suspended Solids mg/1	Suspended Solids kg/day (1b/day)	Coliform Total no/100ml	Coliform Fecal no/100ml	Other
1	Jones-Scott Company	Mill Creek		643 (0.17) (0.85) mg/week			1792	109 (240)	NK	NK	Total Solids 2024 mg/1 123 kg/day (270 1b/day)
2	Walla Walla STP	Mill Creek		25,738 (6.8)	9	232 (510)	16	412 (907)	200	NK	

TABLE 20 ESTABLISHED OR TARGET EFFLUENT LIMITATIONS
WALLA WALLA RIVER BASIN
SEGMENT: Mill Creek and Tributaries

Source	NPDES Permit Status	Expir. Date	Flow, cmd (mgd)	BOD mg/l	BOD kg/day (lb/day)	Suspended Solids mg/l	Suspended Solids kg/day (lb/day)	pH	Temp °C &(°F)	Coliform Total No/100 ml	Other	Compliance Date
Jones-Scott Co.	Drafted	2/28/75	643 (0.17) (0.85 mg weekly)			1792	109 (240)	6.5 to 8.5			Total Solids 2024 mg/l 123 kg/day (270 lb/day)	2/28/75
				(After February 28, 1975: No discharge)								
Walla Walla STP	To be Drafted		37,850 (10.0)	9	232 (510)	16	412 (907)	6.5 to 8.5		200		

D. Walla Walla River and Tributaries (Oregon)

This segment is presently classified by the Oregon Department of Environmental Quality as "Water Quality Limited", with problems noted by the DEQ in the areas of flow, temperature, and non-degradation.

The upper Walla Walla River, above Milton-Freewater, is generally of excellent quality the year round. Most of the water quality problems described occur in the reach directly below Milton-Freewater, where complete summertime diversion of the main-stem river into its branches (Little Walla Walla River) results in a dry streambed for a distance of seven or eight miles below the town. By that point, sufficient groundwater inflow, surface runoff and tributary input allow enough water in the streambed to re-form the river.

Wastewater generators in this segment are varied in nature, and their disposal methods are equally varied. Table 22 and 23 describe present and target discharge characteristics of point sources in the segment. Refer also to Table 27 for a description of the disposal practices at the "exempt" industries.

The City of Milton-Freewater sewage treatment facility is a secondary wastewater treatment plant that obtains satisfactory reduction of BOD and suspended solids and is an efficiently operated facility. Effluent from the plant is not directly discharged to a receiving stream but is mixed with industrial wastewater and used for irrigation. An issued NPDES permit for this plant permits discharge to Dry Creek; such discharge does occur on an infrequent basis but should be eliminated by appropriate effluent limitations included in the plant's next discharge permit.

Industrial wastewater disposal at Milton-Freewater is by means of an irrigation outfall to an alfalfa raising area six miles west of the City, where sprinkler irrigation of the wastewater occurs. Components of the wastewater include cooling and process waters from two vegetable processing plants (Western Farmers and Smith Canning and Freezing); process water only from a third (Rogers Walla Walla, Milton Freewater plant); and secondary effluent from the City facility as described above. The industrial input is seasonal in nature, reaching a peak of 8 mgd during the height of the processing season; while during the winter months, essentially the only component of the wastewater is sanitary effluent. Rogers Walla Walla has an NPDES permit allowing the discharge of uncontaminated cooling water to the Walla Walla River.

Two other industries for which little discharge data is currently available are located in Milton Freewater. Readymix Sand and Gravel operates an asphalt plant, rock crushing, and sand and gravel washing operation facility adjacent to the Walla Walla River just south of town. Their wastewater (primarily highly turbid wash water) is essentially recycled in a closed system, after flocculation and settling, but the settling pond has a high water overflow leading to a surface stream. A point discharge from this pond could then occur, and an NPDES permit will be required, based on the existing State permit.

No discharge data is available for the City of Milton-Freewater Water Treatment Plant. Should any discharge be made to a receiving water an NPDES permit will be required. No State permit is currently in effect for this plant.

Municipal facilities needs for this portion of the Walla Walla Basin are discussed in the "Report on a Water and Sewer Plan, Umatilla County, Oregon", prepared by Tudor Engineering Company in November, 1968. This report noted that the existing sewage treatment plant serving the City of Milton-Freewater is in good condition but is 20 years old and was designed to handle 0.5 million gallons per day for a design population of 5000. The City has a consultant's estimation that by 1988, the combined population of the City and developing areas north of the City will be 8,500 and the daily flow will be 1.0 million gallons per day. The consultant recommended treatment plant additions costing $205,000.

The City consultants also proposed an alternate plan to treat sewage flow from the North side area at a separate plant, located in the vicinity of Locust Road and the Freewater Highway, designed to handle a predicted 1985 population of 2000. This would not eliminate the need for expansion of the existing sewage treatment plant. The new facilities, including pump station, oxidation ditch and gravity pressure outfall were estimated to cost $155,500.

The Tudor report noted comments from certain quarters that current population projections for the Milton-Freewater area are extremely conservative and that a more rapid development of the Northside area should be anticipated, resulting in a population of 20,000 in the Milton-Freewater area by 1990. An alternative plan submitted by the City consultant addresses this condition by abandoning the existing sewage treatment plant after construction of a new treatment plant in the vicinity of Locust Road to serve the future needs of the entire area. The estimated cost of the new plant, including pump station, high rate trickling filter plant and interceptor sewer from the existing sewage treatment plant was $657,000. All costs are based on 1968 estimates.

No significant municipal facility needs have been identified for the Town of Weston. There is no indication that the area's population will increase during the next twenty years; in fact, a slight decline may occur. The Tudor report recommended installation of a sewer system at the community of Umapine, located northwest of Milton-Freewater. The community has a present population of 85, with no indication of a significant increase in the future. Cost of a packaged sewage treatment plant was estimated at $13,800, cost of the collection distribution system was estimated at $32,400.

Residual waste is handled at both Milton-Freewater and Weston by drying on sludge beds and final disposal by trucking and land filling. Present disposal methods are considered satisfactory.

In the mainstem Walla Walla River, the major impact on water quality is the diversion of streamflow at Milton-Freewater, with the resultant dry streambed during the summer. This problem is not actually due to nonpoint source pollution but is related to the dominant pattern of water use in the basin, that of the use of surface water for agriculture. The significance for water quality is that the river must begin anew a few miles below Milton-Freewater; during the summer, the effects of tributary water quality and various return flows are more strongly reflected by mainstem water quality.

Serious problems have been noted in the East and West Little Walla Walla Rivers (Table 7). The sources of the problems are not clear at this time, but may be due to the agricultural activities in the area. No point irrigation return flows are known to directly enter either the mainstem or its major tributaries. Animal holding activities in the area include overwintering and cow-and-calf lots, and a number of animal concentrations of a small number of head each. In this segment, as in the others, it appears that the bulk of the water quality problems noted due to a combination of dispersed nonpoint source pollutants and topography and climate.

TABLE 21 AVERAGE AND LIMITING VALUES OF SELECTED PARAMETERS NECESSARY TO DESCRIBE INSTREAM WATER QUALITY

WALLA WALLA RIVER BASIN
SEGMENT: WALLA WALLA RIVER (OREGON)

Class	Description	Flow(3)	D.O. (mg/l)	pH	Cond. @ 25°C µMHOS	(°C)	Turb. (J.T.U.)	Coliform Total (No/100ml)	Coliform Fecal (No/100ml)	NH_3 as N (mg/l)	NO_3 as N (mg/l)	PO_4 (mg/l)	Hard. mg/l as $CaCO_3$	Alk. mg/l as $CaCO_3$	Other Parameters
	Walla Walla River (main stem)		75% sat (95% during spawning)	6.5 to 8.5		Not to exceed 20°	<5 over natural	Average <1000 with 80% <2400							
	Tributaries within Oregon		>6.0	6.5 to 8.5		Not to exceed 17.8°		Deleterious conditions prohibited							

Class	Monitoring Station Designation	Location: River Miles(3)	Location: Map Key(4)	D.O. Ave	D.O. Min	pH Min	pH Max	Cond. Ave	Cond. Max	°C Ave	°C Max	Turb. Ave	Turb. Max	Coliform Total Ave	Coliform % Exceeds	NH_3 Ave	NH_3 Max	NO_3 Ave	NO_3 Max	PO_4 Ave	PO_4 Max	Hard. Ave	Alk. Ave	Other Ave	Other Max	Other Ave	Other Max	Other Ave	Other Max
"WET SEASON" - November through May																													
	402389			11.7	11.1	7.0	7.5			5.4	7.5	9	13																
"DRY SEASON" - June through October																													
	402389			9.3	8.7	7.3	8.1			16.6	21.0	11	19																

TABLE 22 WASTE SOURCE INVENTORY AND RANKING
WALLA WALLA RIVER BASIN
SEGMENT: WALLA WALLA RIVER–OREGON

				Present Discharge Characteristics							
				Flow	BOD		Suspended Solids		Coliform		
Rank	Name	Receiving Water	Map Key	cmd mgd	mg/l	kg/day lb(day)	mg/l	kg/day (lb/day)	Total no/100ml	Fecal no/100ml	Other
1	Readymix Sand and Gravel	Walla Walla River		NK	NK	NK	NK	NK	NK		
2	City of Milton-Freewater water treatment plant	Walla Walla River		NK	NK	NK	NK	NK	NK		
3	City of Weston	Pine Creek		454 (0.12)	30	11 (25)	30	11 (25)	200		
4	City of Milton-Freewater STP	Dry Creek (Land)		2366 (0.625)	30	70 (155)	30	70 (155)	200		
5	Rogers Walla Walla Milton-Freewater	Walla Walla River		1136 (0.30)	NK	NK	NK	NK	NK		Temperature 35°C (95°F)

TABLE 23 ESTABLISHED OR TARGET EFFLUENT LIMITATIONS
WALLA WALLA RIVER BASIN
SEGMENT: Walla Walla River-Oregon

Source	NPDES Permit Status	Expir. Date	Flow, cmd (mgd)	BOD mg/l	BOD kg/day (lb/day)	Suspended Solids mg/l	Suspended Solids kg/day (lb/day)	pH	Temp °C &(°F)	Coliform Total No/100 ml	Compliance Date
Readymix Sand & Gravel	To be drafted by 9/74										
City of Milton-Freewater Water Treatment Plant	To be drafted by 9/74										
City of Weston	Issued	10/31/74	379 (0.10)	30	11 (25)	30	11 (25)	6.0 to 9.0		200	In Compliance
City of Milton-Freewater STP	Issued	10/31/74	2366 (0.625)	30	70 (155)	30	70 (155)			200	In Compliance
Rogers Walla Walla Milton-Freewater	Issued	12/31/75	1136 (0.30)						35°C (95°F)		In Compliance

Chapter 7. BASIN WIDE POINT SOURCE SUMMARY

This chapter presents basin-wide summaries of municipal and industrial discharge characteristics and municipal facilities needs (Tables 24, 25 and 26). Seasonal variations in waste loadings have not been described here; the "average" discharge characteristics listed in the tables describe the pollutant loadings to be expected on an average operating day during the times of year when discharge to a receiving water occurs.

Table 27 lists industries which are exempt from the requirements of the NPDES permit program since they currently practice no surface water discharge. Inclusion of these industries here is intended as an aid in presenting a complete description of waste disposal methods in the Basin and will prove useful should any industry which is currently exempt decide to alter its disposal practices.

Very little growth in waste loads is projected over the next twenty years due to the stable nature of the Basin's population and economic base. No treatment needs resulting from growth in waste loads are evident in this period; the treatment needs listed in Table 25 are related to required upgrading of existing facilities or, in the case of the communities of Touchet and Umapine, to a new plant to service an area currently dependent upon septic tanks for waste disposal.

Residual waste disposal is generally accomplished by drying sewage sludge on sludge beds or in lagoons. Ultimate disposal is often by trucking to land filling operations or by utilization of dried sludge by local farmers as soil stabilizer. These methods of sludge disposal are working satisfactorily, with no problems noted except a need at College Place for increased capacity of the sludge drying beds (which is currently being accomplished) and an identified need at the Walla Walla plant for improved solids and sludge handling facilities.

The proportion of point source to nonpoint source water quality problems is such that no significant improvements in water quality may result even after implementation of point source controls and achievement of best practicable treatment. The most significant pollution loads in the future are expected to be those related to nonpoint sources.

No Federal facilities that can be considered point source discharges are located in the basin.

Examination of Table 25 shows that, basin-wide, land application is a common method of waste disposal. From the standpoint of available land on which to practice disposal, suitable climate and topography, and opportunities for reuse of wastewater for agricultural purposes, the land disposal operations are an efficient system of waste treatment. No problems have manifested themselves yet, although evidence of hydraulic overloading of certain areas has caused concern that too much water may be applied to a given amount of land. No qualitative effects on surface streams have been noted. Opportunities for expansion of this basin-wide land disposal practice are open, such as the cooling water discharges at the Green Giant plants (Dayton and Waitsburg) and Rogers Walla Walla in Milton-Freewater and firming up the situation of water rights to sanitary effluent at College Place and Walla Walla. The suitability of the area and possible benefits of land disposal should be kept in mind in future facilities planning.

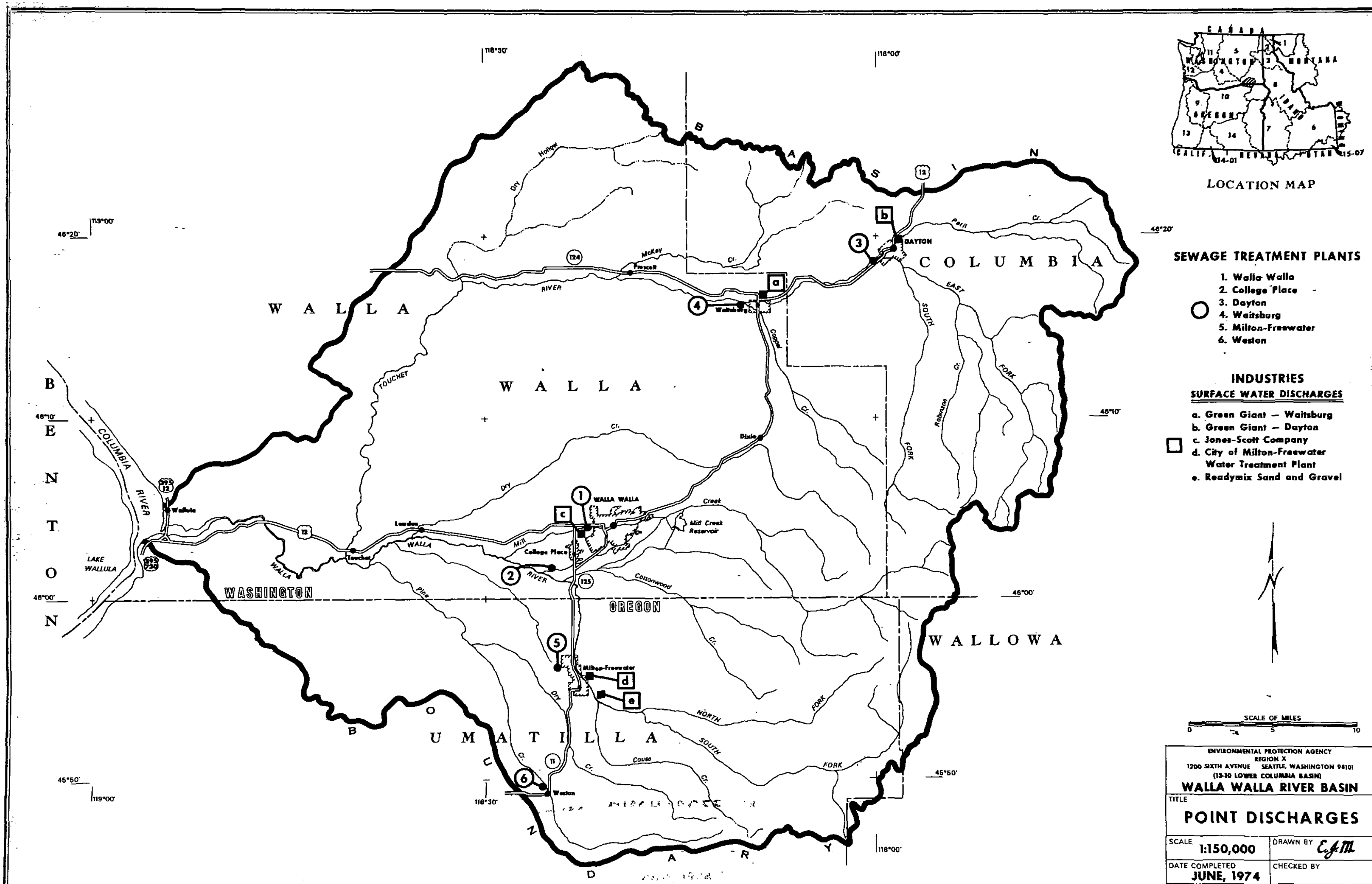
LOCATION MAP
SEWAGE TREATMENT PLANTS
1. Walla Walla
2. College Place
3. Dayton
4. Waitsburg
5. Milton-Freewater
6. Weston
INDUSTRIES
SURFACE WATER DISCHARGES
a. Green Giant — Waitsburg
b. Green Giant — Dayton
c. Jones-Scott Company
d. City of Milton-Freewater Water Treatment Plant
e. Readymix Sand and Gravel
SCALE OF MILES
0 5 10
WALLA WALLA
COLUMBIA
BENTON
WALLOWA
UMATILLA
WASHINGTON
OREGON
BASIN BOUNDARY
ENVIRONMENTAL PROTECTION AGENCY
REGION X
1200 SIXTH AVENUE SEATTLE, WASHINGTON 98101
(13-10 LOWER COLUMBIA BASIN)
WALLA WALLA RIVER BASIN
TITLE
POINT DISCHARGES
SCALE 1:150,000
DRAWN BY
DATE COMPLETED JUNE, 1974
CHECKED BY

TABLE 24 MUNICIPAL DISCHARGE INVENTORY BASIN WIDE SUMMARY
WALLA WALLA RIVER BASIN

Municipality	Ranking In Segment	Ranking In Basin	Existing Treatment	Flow cmd (mgd)	BOD mg/l	BOD kg/day (lb/day)	Suspended Solids mg/l	Suspended Solids kg/day (lb/day)	NPDES Permit Status	Permit Effluent Limitations: Flow cmd (mgd)	Permit Effluent Limitations: BOD mg/l	Permit Effluent Limitations: BOD kg/day (lb/day)	Permit Effluent Limitations: Suspended Solids mg/l	Permit Effluent Limitations: Suspended Solids kg/day (lb/day)	pH	Total Coliform No/100ml
Walla Walla County Farm Labor Camp	1	1	None	NK	NK	NK	NK	NK	Drafted	204 (0.054)	30	6 (14)	30	6 (14)	6.5 to [illegible]	200
Waitsburg	1	2	Primary	946 (0.25)	49	46 (101)	45	42 (92)	Issued	1325 (0.35)	30	40 (88)	30	40 (88)	6.5 to 8.5	200
Walla Walla	2	3	Secondary	25,738 (6.8)	9	232 (510)	16	412 (907)	To be Drafted	37,850 (10.0)	9	232 (88)	16	412 (907)	6.5 to 8.5	200
College Place	2	4	Secondary	5678 (1.5)	30	170 (374)	30	170 (374)	Issued	5678 (1.5)	30	170 (374)	30	170 (374)	6.5 to 8.5	200
Dayton	4	5	Secondary	1893 (0.5)	30	57 (125)	30	57 (125)	Issued	1893	30	57 (125)	30	57 (125)	6.5 to 8.5	200
Weston	3	6	Secondary	454 (0.12)	30	11 (25)	30	11 (25)	Issued	379 (0.10)	30	11 (25)	30	11 (25)	6.5 to 9.0	200
Milton-Freewater	4	7	Secondary	2366 (0.625)	30	70 (155)	30	70 (155)	Issued	2366 (0.625)	30	70 (155)	30	70 (155)		200

TABLE 25 MUNICIPAL NEEDS INVENTORY BASIN WIDE SUMMARY
WALLA WALLA RIVER BASIN

Municipality	Rank in Basin	Receiving Water	Present Situation	Required Actions	Est. Cost	Grant Steps	Date of Grant (FY)	Facility Operation FY
Walla Walla Co. Farm Labor Camp	1	Walla Walla River	Nominal secondary treatment actually provides inadequate stabilization of chlorination of wastes	Upgrade to full secondary level. Insure adequate disinfection	$60,000	1-2-3	FY 75	FY 76
Waitsburg	2	Coppei Creek	Primary (partial secondary) plant achieving inadequate treatment and disinfection. Infiltration and inflow believed excessive.	Install adequate disinfection facilities. Determine extent of infiltration inflow and correct as needed. Upgrade facility to full secondary level.		1-2-3	FY 75	FY 76
Walla Walla	3	Mill Creek or land	Secondary treatment	Improved solids and sludge handling facilities	$275,000			
College Place	4	Garrison Creek	Secondary treatment	Analysis of infiltration/inflow from several tributary sewers.				
Dayton	5	Touchet River	Secondary treatment	Present plant is old, may require upgrading or rebuilding in near future.				

TABLE 25 MUNICIPAL NEEDS INVENTORY BASIN WIDE SUMMARY
WALLA WALLA RIVER BASIN

Municipality	Rank in Basin	Receiving Water	Present Situation	Required Actions	Est. Cost	Grant Steps	Date of Grant(FY)	Facility Operations (FY)
Weston	6	Pine Creek	Secondary treatment	None				
Milton-Freewater	7	Land	Secondary treatment	None needed within near future. Population expansion in Northside area may necessitate regional facility by 1990.				
Touchet	8	To be determined	Community served by septic tanks and drainfields	Installation of central collection system & packaged treatment plant or overflow or non-overflow lagoon	$323,000			
Umapine	9	To be determined	Community served by septic tanks & drainfields	Installation of sewer system & packaged treat-	$ 46,200			

TABLE 26 INDUSTRIAL DISCHARGE INVENTORY AND NEEDS
BASIN WIDE SUMMARY
WALLA WALLA RIVER BASIN

Source	Location	Ranking Segment	Ranking Basin	Receiving Stream	Type of Waste	Present Average Effluent Characteristic	NPDES Permit Status	Average Effluent Limitations
Green Giant Co.	Waitsburg	2	1	Touchet R.	Can cooling water	Flow: Avg.3406cmd (0.90)mgd Temp. avg. 27°C (81 F)	Drafted	Flow:Avg.3406cmd (0.90 mgd) Temp. Avg. 18.5°C (65°F)
Green Giant Co.	Dayton	3	2	Touchet R.	Can cooling water	Flow Avg.3785cmd (1.00 mgd) Temp. avg. 23°C (73°F)	Drafted	Flow: Avg. 3785cmd (1.00 mgd) Temp: Avg. 18.5°C (65 F)
Jones-Scott Co.	Walla Walla	1	3	Mill Creek	Sand & Gravel Wash Water	Flow Avg. 643cmd (0.17 mgd) Suspended Solids 1792 mg/1 109 kg/day (240 lb/day)	Drafted	No Discharge
Rogers Walla Walla	Milton-Freewater	5	4	Walla Walla River	Uncont-aminated cooling water	Flow: Avg. 1136cmd (0.30mgd) Temp: 35°C (95°F)	Issued	Flow: Avg. 1136cmd (0.30 mgd) Temp: 35°C (95°F)

TABLE 27 "EXEMPT" INDUSTRIAL FACILITIES INVENTORY
WALLA WALLA RIVER BASIN

Industry	Location	Segment	Present Characteristics of Discharge: Wastewater Types	Flow, cmd (mgd)	Parameters	Treatment Method	Effective State Permit?
Rogers Walla-Walla	Walla Walla	Mill Creek and Tributaries	Vegetable processing and can cooling water (seasonal)	6435 (1.7) Average	NK	Collection by industrial interceptor. Bulk receives land disposal by sprinkler irrigation on City Farm. Remainder (5%) receives secondary treatment at Walla Walla STP.	None Current
General Foods Birdseye Corp.	Walla Walla	Mill Creek and Tributaries	Vegetable processing & can cooling water (seasonal)	6813 (1.8) Average	NK	Collection by industrial interceptor. Bulk receives land disposal by sprinkler irrigation on City Farm. Remainder (5%) receives secondary treatment at Walla Walla STP.	None current
Frank Curcio Meats, Inc.	Walla Walla	Mill Creek & Tributaries	Meatpacking	19 (0.005)	NK	Septic tank and drainfield Land disposal of settled solids. No discharge to surface waters.	DOE No.4150
Shady Lawn Creamery Inc.	Walla Walla	Mill Creek and Tributaries	Dairy processing wastes (butter only)	NK	NK	Treatment at Walla Walla STP. Discharge to Mill Creek or to irrigation district outfall.	DOE No. 2713

TABLE 27 "EXEMPT" INDUSTRIAL FACILITIES INVENTORY
WALLA WALLA RIVER BASIN

			Present Characteristics of Discharge				
Industry	Location	Segment	Wastewater Types	Flow, cmd (mgd)	Parameters	Treatment Method	Effective State Permit?
College Dairy	College Place	Walla Walla River & Tributaries	Dairy processing wastes	NK	NK	Treatment at College Place STP. Discharge to Garrison Creek	DOE No. 2911
Western Farmers Umatilla Canning Co.	Milton-Freewater	Walla Walla River (Oregon)	Vegetable processing & can cooling water (seasonal)	(2.75) peak	NK	Combined wastewaters from canneries, plus STP effluent, goes to irrigation outfall. Land disposal by spray irrigation in a hay raising area 6 miles west of the City. Tail water is discharged to an outfall which ends in 3 small ponds. No discharge or overflow from these ponds.	
Smith Freezing and Canning Co.	Milton-Freewater	Walla Walla River (Oregon)	Vegetable processing & can cooling water (seasonal)	(3.22) peak			
Lamb-Weston Inc.	Weston	Walla Walla River (Oregon)	Vegetable processing & can cooling water	NK		Screening and spray irrigation of about 200 acres of land near plant.	

TABLE 28 RESIDUAL WASTES DISPOSAL
WALLA WALLA RIVER BASIN

Municipality	Segment	Treatment	Residual Wastes Disposal Method
Walla Walla Co. Farm Labor Camp	Walla Walla River & Tributaries (Washington)	None	None at present
College Place	Walla Walla River & Tributaries (Washington)	Secondary	Drying on sludge drying beds. Capacity of beds currently being increased.
Waitsburg	Touchet River & Tributaries	Primary	Drying of sludge drying bed near plant
Dayton	Touchet River and Tributaries	Secondary	Drying of sludge drying bed. Ultimate disposal by land filling.
Walla Walla	Mill Creek and Tributaries	Secondary	Drying of sludge drying beds. Ultimate disposal by land filling.
Milton-Freewater	Walla Walla River (Oregon)	Secondary	Drying on sludge drying beds.
Weston	Walla Walla River	Secondary	

Chapter 8. NONPOINT SOURCES

The objective of this plan has been to present data on known water quality standards violations and observed problems and to document the extent of point source contribution to instream quality degradation. It should be clear that, judging from the limited number of point sources and the nature of their discharges, the observed quality problems cannot be due to point sources alone. This was recognized by both States when the individual segments were classified as "Water Quality Limited"; the definition of this segment designation indicates that present quality is below standards and specified criteria are not expected to be achieved with the implementation of BPT for all controllable discharges.

Unfortunately, after having concluded that the observed problems must be due to causes other than point sources, the lack of understanding of the magnitude of nonpoint source pollutants arising from land use activities within the Basin does not allow a quantitative assessment of their impact on water quality. The present level of knowledge of agricultural, forestry and other activities in the Basin which may generate nonpoint source pollutants, and the interrelationships of these pollutants with climate, topography, dominant water use patterns, and other factors, does not allow the formulation of control methods for these types of wastes. This chapter will assess what is known of nonpoint pollution in the Basin; will describe in a general way nonpoint pollution in the Basin; will describe the impacts of various land use activities on instream water quality; and will point out data gaps and "needs to know" before the nonpoint situation can be fully evaluated

Septage

Several smaller communities in the Basin rely on septic tanks as a method of sanitary waste treatment. These communities include Touchet, Prescott, Dixie, Lowden, Eureka, and Kooskooskie, Washington; and Umapine, Oregon. In addition, the remaining scattered rural population relies on septic tanks.

The Basin's total population is divided between rural and urban as described in Chapter VI. The proportion of rural to urban population is expected to decrease, reflecting a slight trend toward urban migration, but no significant changes in rural waste disposal practices are foreseen. The Sewage Drainage Basin Study for the Washington portion of the Basin contains projections of future population dependence on septic tanks.

In general, pollution problems related to septage and disposal of rural domestic wastes are confined to failing septic tank systems and to local contamination of groundwater. Soils limitations for septic tank use are based on permeability, groundwater levels, and slope. The sand and silt loam type soil which covers most of the area generally is of high turbidity, but slopes greater than 16 percent often make them unsuitable for septic tanks. Within the communities listed, conventional septic tank and drainfield systems appear to be functioning properly, with good percolation noted in the drainfields. The only identifiable upgrading needs are at Touchet and Umapine, where the development stage of the community may require central collection and treatment of wastes. For the remainder of the communities, their remote location and the adequacy of the present method of treatment rule out any pressing need for local or regional collection and treatment.

Scattered rural residences and summer homes are found throughout the Basin, from the dryland farms of the lower Walla Walla River to the foothills above Milton-Freewater. The proximity of many of these residences to streams raises questions concerning the disposal of sanitary wastes. No documentation of problem areas in available, though localized groundwater contamination problems are of concern in several areas adjacent to Milton-Freewater, where the pollution is associated with individual sewage disposal units situated in porous soil over shallow domestic well supplies. Walla Walla and Umatilla Counties have adopted sewage ordinances to govern individual disposal of sanitary wastes. Columbia County does not have regulations governing septic tanks. Such a regulation should be adopted since a potential problem area is developing along the Touchet River above Dayton, where summer home developments are being built without guidelines for installation of septic tanks.

Agricultural Activities

The dominant water use in the Basin is for agricultural purposes. These uses primarily include stock watering and irrigation of crops and pastureland. The effects of these activities is reflected in instream water quality in two ways: by the effects of reducing streamflow by diversion or appropriation, and by the effects of return flows from these activities.

The prevailing precipitation patterns result in natural low flows over much of the Basin during the dry season. These flows are further reduced by withdrawals for municipal, industrial, and agricultural purposes. The result is that in several stream reaches summertime flow is essentially nonexistent; the streambeds turn into series of ponds of standing water, with insufficient flow to provide waste assimilation. Typical symptoms of stream reaches suffering from this condition include, in addition to standing water, high temperatures, a wide diurnal fluctuation in dissolved oxygen, and excessive plant growth. The most extreme example of the effects of the reduction of streamflow on water quality is the Walla Walla River immediately below Milton-Freewater; summertime diversion of streamflow into the Walla Walla River results in a dry streambed for a distance of seven or eight miles below the diversion dam.

The extent of irrigation activities in the Basin, and their effect on water quality, is not well known. Several irrigation districts are identified in the area west of Walla Walla (Gose Irrigation District and Blalock Irrigation District Number 3), and irrigation is practiced along the Lower Touchet River, Mill Creek, and Doan, Cold, Gardena, Dry, Pine, Yellowhawk, Garrison, and Russell Creeks, and allegedly along the branches of the Little Walla Walla River. The total acreage irrigated at present is not known with certainty, but the prevailing practice of irrigation along stream bottoms ("shoestring irrigation") indicates the potential for significant irrigation return flows to the streams. Impacts of irrigation return flow on instream quality can only be stated generally here, but increases in sediment, total dissolved solids, and nitrate nitrogen are often observed in areas of agricultural activity.

Two streams in the Mill Creek segment, Doan Creek and Cold Creek, especially need further investigation, since they may be significant irrigation return routes, either of return flow (Cold and Doan Creeks) or unused irrigation water (Cold Creek, Blalock Lake). Blalock Lake receives tailwater from Blalock Irrigation District's outfall; this tailwater is composed mostly of secondary effluent from the City of Walla Walla Sewage Treatment Plant. Cold Creek then carries the overflow from Blalock Lake to Mill Creek. This overflow cannot be considered as merely irrigation return water its characteristics and impact on Mill Creek need further investigation.

Certain point sources of irrigation return flow will require NPDES discharge permits under P.L. 92-500. No point source irrigation returns have been identified in the Walla Walla River Basin of such size as to require permits, but final analysis of permitting needs must depend on an inventory of irrigated acreage.

Confined animal feeding operations are considered in P.L. 92-500 to be point sources of pollution, subject to waste discharge permits and strict operational controls. However, some feedlots have no discreet discharge or handle such a small number of animals that a permit will not be required during initial permitting activities even though these feedlots may have a significant effect on water quality. Therefore, in this plan, feedlots are treated as non-point sources.

Three basic types of confined animal feeding operations may contribute to significant water pollution at various times and locations in the Walla Walla River Basin. Included are beef cattle feedlots, dairies, and livestock overwintering operations. Overwintering operations includes calving and lambing in a concentrated area. These areas are not generally classified as feedlots but do cause a certain amount of stream pollution and so should be considered in this discussion. The greatest pollution impact presently comes from beef cattle feedlots. Several lots are located near or within surface water drainage systems (on banks of streams, drains, canals, and in flood plains). No accurate count is available at this time of the number of feedlots in the Walla Walla River Basin, their sizes, or the number of animals confined in such lots. The number of animals held changes from season to season and the number of lots in operation changes from year to year.

A variety of water quality problems are associated with many poorly operated animal feeding operations. The most serious water pollution problems occur during the spring runoff period. During this period, the surface layers of the lots begin to thaw while the subsurface remains frozen, thus allowing the winter accumulations of animal wastes to flow easily off the lot into adjacent water courses as spring rains and upland drainage flush across the lots. The problem is especially severe when these loads are carried into smaller receiving streams with limited capacity to assimilate the waste. The waste generated in this manner is high in biochemical oxygen demand, ammonia and total nitrogen, phosphorus, potassium, and bacteria.

Another water quality problem occurs when accumulated manure is inadvertently or deliberately dumped into nearby watercourses. This causes an increase in suspended solids in the receiving streams, visual and odor problems in addition to BOD and nutrient enrichment cited above. A side effect of feedlot waste which enters irrigation canals is that it often requires irrigation districts to call for additional flushing flows to keep the canals clear, thus contributing to excessive diversion rates in some areas.

Table 29 summarizes the available information of feedlots in the Walla Walla River Basin. The small number of identified feedlots is somewhat misleading, since the total livestock population of the Basin is quite large. As with other agricultural activities, animal concentrations are quite diffuse throughout the Basin; large numbers of holdings of a few animals each are observed along the North Fork Walla Walla River, The Lower Touchet River, and many of their tributaries.

A significant portion of the Basin's land is used for dryland farming of small grains and hay. One of the practices which contributes most heavily to soil erosion, with resultant stream sediment and turbidity, is that of summer fallowing of fields. With this practice, soil is left vulnerable to spring runoff and high intensity summer storms, which can cause severe erosion. Wind erosion is a serious problem in parts of the Basin. Erosion has increased noticeably during recent years with severe gully patterns developing over much of the cropland. The increasing use of large, fast-moving farm machinery also contributes to erosion and stream sedimentation.

Approximately 18 percent of the Basin is useable as grazing land. Localized areas of range deterioration are evident, due to overgrazing by livestock and big game. The quantitative effects of grazing land overuse on water quality have not been determined.

Forestry

Forests cover 11 percent of the Basin, with approximately 50 percent of the forest in public ownership. Ninety percent of the forest stands are available for commercial use. Logging and road construction are the major activities which disturb the soil and create erosion problems. Excessive turbidity levels are often noted in the wet season in runoff from the upper, forested portions of the major streams draining the Blue Mountains. Upper Mill Creek and the Upper Dry Creek subbasin have especially been noted for excessive turbidity from forested areas. The soils, slope characteristics, and climactic conditions of the area are conducive to erosion if improper forest management practices occur.

To date, nonpoint pollution from forestry activities has not been noted to play a major role in the overall water quality problems of the Basin. Excessive turbidity has been observed, but the soil characteristics of much of the upper watershed indicates that natural causes may be as much at fault as man-induced alterations of the forest environment. Management controls for forest activities are being examined by EPA's Silviculture Project; when suitable control methods applicable to the particular conditions of the Walla Walla River Basin are developed, they should be implemented under the available legal framework of the States' Forestry Practices Act. Present control methods exist in U.S. Forest Service timber sales contracts, which generally are adequate in minimizing impacts from timber harvesting; the major shortcoming is the lack of provisions for correcting resource damages that occur after sales are completed.

Other Nonpoint Sources

Urban stormwater runoff plays an undetermined part in Basin water quality. The major cities--Walla Walla, College Place, and Milton-Freewater--use both combined and separated sewer systems, with newly installed sewers being separated. Dayton, Waitsburg, and Weston have separated sewer systems. The total amount of stormwater runoff from urbanized areas is not known but can be assumed to be dependent on frequency and intensity of storm activity. Parameters which would be expected to be impacted by stormwater runoff include turbidity, BOD, coliform, and nutrients.

Urbanizing areas are another potential source of nonpoint pollutants. The transition of rural land to urban use, and the associated construction activity, often results in water quality degradation from sedimentation and turbidity. Even though the total area involved in the Basin is small and individual occurrences are usually of short duration, the yields per acre make this type of land use one of the highest producers of sediment. Titus Creek, near Walla Walla, has been observed to be carrying excessive levels of turbidity arising from construction of the new community college.

Recreation wastes consist of wastes from Forest Service campgrounds, the National Park Service Marcus Whitman Massacre site, and scattered recreational developments along the upper reaches of Mill Creek and the Touchet River. The quantity and characteristics of campground wastes, and their method of disposal, are unknown. The sanitary wastes at the Marcus Whitman site are handled by septic tank and drainage field.

A major future source of recreational wastes would be the proposed Skyline Basin Winter Sports Development, to be located on Umatilla National Forest land in the Blue Mountains of Columbia County, Washington, about 22 miles south of Dayton. Facilities planned include a daylodge, maintenance and operations buildings, ski lifts and runs, parking lots, and appurtenant structures. Major environmental impacts would be related to construction and operation, with potential sedimentation from erosion. The local area is drained by a small tributary to the East Fork of the Touchet River. Sewage would be handled by trucking to Dayton; raw or treated sewage would be discharged to groundwater or receiving channel at the development site. An Environmental Impact Statement issued for this project recognizes the need for careful planning and site preparation to avoid significant environmental degradation.

Streamflow Management

While not actually a nonpoint source problem, streamflow management has a close relationship to water quality. In the Walla Walla River Basin, the dominant use of surface water for agricultural and other purposes results in reduction of streamflow with often drastic effects on instream quality, the summertime situation in the Mainstem Walla Walla River below Milton-Freewater being the extreme example. In a more general vein, diversions and withdrawals of natural low dry-season flows results in substantial reductions in volume, often to the point that water movement is impeded. The streambed becomes choked with algae and aquatic plants, water temperatures often exceed applicable criteria, and certain beneficial uses of the stream are curtailed.

A certain level of flow in surface streams is necessary to create adequate water movement, to flush and cleanse streambeds and to assimilate residual wastes from point sources and uncontrollable nonpoint sources. The minimum flow requirements for assimilation of wastes are related to a number of factors, including the strength and characteristics of the wastes and the temperature, recreation capacity, elevation, and minimum allowable dissolved oxygen of the stream.

Overappropriation of surface waters is identified as an important part of the water quality problems in the Basin. A discussion of the full impacts of water management on quality is not possible here due to a lack of knowledge of the cause and effect relationships between low streamflow and observed parameter levels. However, a number of pertinent subjects worthy of consideration are recommended for study. Specifically, the State of Oregon water laws (ORS 537.810) stipulate that no waters within the State shall be diverted, impounded, or in any manner appropriated for diversion outside the State without consent of the Legislative Assembly. In this regard, and specifically with reference to the Walla Walla River, a 1936 United States Supreme Court ruling confirms the right of Oregon to utilize flows of the Walla Walla River arising in that State. Further, with regard to the Walla

Walla River, the State Water Resources Board of Oregon has resolved that 40,000 acre-feet of unappropriated water in the river be reserved exclusively for domestic, livestock, irrigation, and municipal and industrial uses, within Oregon, and that there be no out-of basin or out-of-State appropriations of water from the Walla Walla River.

Similar topics such as the 1929 Superior Court appropriation of basin waters on the Washington site, and the legal requirements placed on the City of Walla Walla regarding irrigation disposal of sanitary effluent to fulfill water rights, are all components of this complex problem and should be viewed as constraints on water quality management planning.

TABLE 29 ANIMAL FEEDLOT INVENTORY
WALLA WALLA RIVER BASIN

NAME OF LOT	LOCATION	SEGMENT	RECEIVING STREAM	TYPE OF ANIMAL	LOT SIZE ANIMALS	LOT SIZE ACRES	COMMENTS AND IDENTIFIED AND POTENTIAL PROBLEMS
Key Bros., Inc.	Near Milton-Freewater (Umatilla Co.)	Walla Walla River (Oregon)		Dairy Heifers Holstein	1,190	10	
				Dairy Bulls Holstein	26		
				Beef Feeders	2,000		
MacGregor Land and Livestock Co. (Walla Walla County Project)	Near Lowden	Walla Walla River (Washington)	Walla Walla River	Beef Cattle	40,000	580	
Frazer Cattle Company	5 miles S.E. of Walla Walla	Walla Walla River (Washington)		Beef Cattle	1,200	30	

Chapter 9. OTHER WATER QUALITY ORIENTED PLANNING

Both the Oregon and Washington portions of the Basin have been the subject of recent sewage drainage basin studies. Under contract to the Walla Walla Regional Planning Council, CH_2M/Hill produced a report entitled Water Pollution Control and Abatement Plan for WRIA 32 and 33, Walla Walla and Columbia Counties. This report has been the source of much of the information utilized in this plan, and is particularly valuable for its water quality analyses and coverage of municipal facilities, inventories and needs. A similar plan, entitled Report on a Water and Sewer Plan, Umatilla County, Oregon by Tudor Engineering (November 1968) covers the municipal facility needs of the Oregon portion of the Basin. This latter plan does not consider instream water quality conditions or water quality standards criteria to more than a limited extent. Various engineering reports and past water quality summaries also served as input to the Walla Walla River Basin plan.

Section 201 of the FWPCA Amendments of 1972 provides for municipal waste treatment management on an areawide basis. Regulations pertaining to Section 201 supersede the basin and regional/metropolitan water quality management planning process required by 40 CFR 35.835-2&3. The 201 planning process provides that the State will coordinate facilities planning efforts through its Continuing Planning Process and through other mechanisms as necessary. Table 30 provides a list of those areas in the Walla Walla Basin where facility planning will be required in the future. Table 30 will be updated each year as part of the State Continuing Planning Process.

Section 201 facility plans must conform to requirements imposed by basin plans prepared pursuant to Section 303(e). When facility plans are completed and adopted, they are to be submitted to the Washington State Department of Ecology or the Oregon Department of Environmental Quality for review and certification. When approved by the State, the plans will be forwarded to EPA for review and approval. Approved facility plans are to serve as an input to the State Continuing Planning Process and will be a prerequisite to approval of construction grants.

Section 208 of the FWPCA Amendments of 1972 provides for comprehensive waste treatment management planning in metropolitan areas with major urban/industrial concentrations and substantial water quality control problems. It appears that there will not be any areas in the Walla Walla River Basin that will require a Section 208 plan. Therefore, all future areawide planning will be performed under the guidelines of Section 201 facility plan.

Comprehensive Water Planning

The Walla Walla River Basin was covered in the Pacific Northwest River Basin's Columbia-North Pacific Region Comprehensive Study, which recommended a long-range program of construction of water storage projects for augumentation of the Basin's irrigation water supply and for other purposes. The program included pumping from the Columbia River and storage totaling about 125,000 acre-feet in Washington and 136,000 acre-feet in Oregon. Two major reservoirs, Dayton (which has been authorized for construction) and Blue Creek, would be located in Washington on the Touchet River and Mill Creek, respectively. In Oregon, one major reservoir, Joe West, would be located on the Walla Walla River upstream from Milton-Freewater, and a small watershed project, Hudson Bay, would be located in the Pine Creek-Dry Creek area.

Irrigation water supplies, to be provided primarily by Federal reservoirs, would firm up supplies for inadequately served lands and serve a moderate amount of new land along Touchet River and in other areas of the Walla Walla Basin. A total of 49,500 and 16,000 acres of new lands would be irrigated in Washington and Oregon respectively

Augmentation of existing summer and fall streamflows in Touchet River, Mill Creek, and Walla Walla River would be supplied to improve fish habitat and recreation values. In addition to the fishery provided by the reservoirs, increased flows and improved water quality would enhance stream fishing for both resident and anadromous fish.

The U.S. Bureau of Reclamation has been interested in the development possibilities of the Walla Walla River since prior to 1947. The Bureau's first studies of the valley started in 1946, and in 1947 a report on the results of the reconnaissance investigation study area was completed. For the purposes of specific project studies the study area was divided into three sections, the Touchet in the Touchet River subbasin and the Marcus Whitman and Milton-Freewater divisions occupying the remaining portion of the Basin.

Planning efforts were concentrated on the Touchet division and a feasible plan of development for this division was reported on in 1964; authorizing legislation was approved by Congress in 1970. The plan would provide irrigation water for 9,960 acres within the Touchet valley, a municipal and industrial water supply for the City of Dayton, flood control, fish and wildlife enhancement, and recreation opportunities.

The two remaining divisions, Marcus Whitman (in Washington) and Milton-Freewater (in Oregon) straddle the State line in a 46,000 acre area centered on the Walla Walla-Milton-Freewater urban area. The basis on the project proposal, as presented in a July, 1971 "Feasibility Report", was construction of the Joe West Dam and Reservoir on the Walla Walla River, immediately downstream from the confluence of the forks. Major features of the Milton-Freewater Division include Joe West Dam and Reservoir on the Walla Walla River, Spofford tunnel to convey irrigation water under gravity pressure from Joe West Reservoir to a project-constructed pipe distribution system serving 9,600 acres rehabilitation and modification of existing irrigation distribution systems to serve another 18,600 acres, drainage facilities, and fishery enhancement and recreation features at Joe West Reservoir.

Marcus Whitman Division features would include the Wallula Pumping Plant on the Columbia River, the Wallula-Gardena pump canal system including conveyance canals and relift pumping plants to carry Columbia River water to division lands, project constructed pipe distribution systems to serve 8,900 acres, improvement of existing distribution systems where necessary to deliver water to 19,100 acres, drainage facilities, and transmission and switchyard facilities to deliver power to project pumping plants.

In the two divisions, a total of 56,200 acres would be provided irrigation water service; 29,800 acres would receive supplemental service and 26,400 acres full service. Supplemental service lands and interspersed small blocks of full service lands, together totaling about 37,700 acres, would receive water through existing distribution systems. Of the total project acreage, 28,200 acres including 13,700 acres of supplemental service and 14,500 acres of full service lands would be within the Milton-Freewater Division. Marcus Whitman Division lands would total 28,000 acres of which 16,100 acres would be supplemental service and 11,900 acres full service.

The project plan proposed a water exchange agreement to circumvent the restrictions imposed by the Oregon Legislature on out of state uses of Walla Walla River water. Under the proposed agreement, an area of approximately 5000 acres in Washington located adjacent to the State line and east of the City of Walla Walla, known as the Russell Creek Exchange area, would receive water stored at the Joe West site in Oregon. In return, the Umapine Exchange Area, of comparable acreage and located west of Milton-Freewater, would receive water pumped from the Columbia River at Wallula.

The Soil Conservation Service and Corps of Engineers are engaged in water resource studies in the area. At the request of local sponsorship the Soil Conservation Service has completed a preliminary investigation of improvement opportunities in the Hudson Bay watershed in Oregon under Public Law 90-566 program. A preliminary watershed improvement plan provides for storage on Dry and Pine Creeks in Oregon, which are tributary to Walla Walla River, and diversions of some Walla Walla River flows to meet multiple purpose needs.

The Corps of Engineers has been studying water resource development opportunities in the Mill Creek basin; Mill Creek is a major tributary to the Walla Walla River in Washington. The Corps had identified some storage potential at the Blue Creek site on Mill Creek, and as initially formulated, Blue Creek Dam and Reservoir storage was incorporated into the Bureau's multiple purpose plan. However, subsequent to completion of the detailed development plan, the Corps determined that storage at Blue Creek lacked economic justification using 1970 criteria.

The Hudson Bay District Improvement Company, the East Umatilla Soil and Water Conservation District, and the city of Weston, Oregon are sponsoring a Hudson Bay Watershed investigation as a part of the Public Law 90-566 program. The area of investigation encompasses a portion of the water and land resources within the Bureau of Reclamation's Milton-Freewater Division.

TABLE 30 FACILITY PLANNING REQUIREMENTS
WALLA WALLA RIVER BASIN

Planning Area	Responsible Entity	Classification	Planning Considerations	Constraints	Schedule: Begin Plan	Schedule: Complete Plan	Schedule: Submit to State	Schedule: Submit to EPA
Walla Walla County Farm Labor Camp	Walla Walla County	Non-complex		BPT				
Waitsburg	Municipality	Non-complex		BPT				
Touchet	Municipality	Non-complex	New facility-No central collection or treatment at present	BPT				
Umapine		Non-complex	New facility-No central collection or treatment at present	BPT				

Chapter 10. BASIN WIDE ACTION PROGRAM

This chapter presents the proposed action program for water quality management of the Walla Walla River Basin.

Analysis of the technical information available for the Basin makes it clear that achievement of point source controls will probably not result in the achievement of the stream quality goals of PL 92-500, due to the influence of nonpoint sources. The intent of the action program for this Basin will be to proceed as rapidly as possible with the achievement of the effluent limitations required by law, while at the same time recommending special studies to increase knowledge of the nature and extent of nonpoint sources and to assess their control ability.

The previous chapters of this plan have identified existing water quality problems in each of the segments, have presented available information on the point source dischargers, and have assessed control strategies and abatement needs for these dischargers. This management chapter will accomplish the following basin-wide:

A. Verification of basin and segment planning boundaries and implement changes as appropriate.

B. Verify segment water quality standards and schedule required changes.

C. Verify segment classifications and recommend changes as appropriate.

D. Develop a point source action program, including:

NPDES permit drafting and issuance dates.
Existing or target effluent limitations.
Municipal facilities needs.
Recommendations for treatment beyond BPT or secondary treatment.

E. Develop a nonpoint source action program.

F. Recommend studies on other programs as identified.

G. Recommend monitoring and surveillance activities.

The action items related to each major problem area are presented in the following sections.

Verification of Basin and Segment Planning Boundaries

Management and solution of the water quality problems of the Walla Walla River Basin will require basin wide action. This will require much closer coordination between the activities of the States of Washington and Oregon than seems to have ocurred in the past. In many instances, the two State pollution control agencies have demonstrated a lack of familiarity with the "other" portion of the Basin - that portion outside their own State.

The Walla Walla Basin must be considered a continuous unit. Water quality problems recognize no political subdivisions such as state boundaries; many of the water quality problems observed in the Washington portion of the Basin are influenced by water uses or pollution causing activities in Oregon. The basin-wide nature of identified water quality problems requires a basin-wide approach to their solution. To be sure, certain legal constraints exist on water quality management planning; these constraints include the U.S. Supreme Court decision regarding Oregon's rights to all waters of the Walla Walla River which arise within the State, and the implications of the subsequent actions taken by the Oregon legislature and the State Water Resources Board with regard to out-of-state diversions of Walla Walla River water. Similarly, the deeply rooted pattern of water rights and dominant uses, which results in over-appropriation of surface streams, is a constraint on planning.

But many aspects of water quality management could benefit from closer coordination between the States. Facilities planning at Waitsburg and other locations in Washington could benefit from examining the year around land disposal system at Milton-Freewater and assessing the potential for such a system in other areas of the Basin. Land disposal of process waters from vegetable processing plants, animal holding areas, and locations of irrigated lands are all subjects which should be assessed basin wide to determine their impacts on water quality.

In summary, the Walla Walla River Basin should be viewed as a unit. Segment boundaries are acceptable as presently formulated; the distinction between the Walla Walla River segments in Oregon and in Washington is necessary and proper, since different sets of water quality criteria cover the two divisions. But water quality management planning should not be bound solely by the political divisions imposed on the Basin.

Verification of Segment Water Quality Standards

The existing segment standards are consistent with present and projected water uses. No changes or modifications to the standards should be contemplated prior to implementation of controls at all point sources, assessment of the improvement in water quality resulting from such controls, and evaluation of the remaining instream pollutants.

Verification of Segment Classification

All of the Basin's segments are currently classified under the general headings "Water Quality-Nonpoint Sources" (Walla Walla River and Tributaries, Touchet River and Tributaries, Mill Creek and Tributaries) or "Water Quality Limited" (Walla Walla River, Oregon portion). These designations are appropriate and no needs for classification changes are seen at the present time.

Point Source Action Program

The individual segment analyses have presented narrative discussions and tables of effluent characteristics, NPDES permit status, and effluent limitations for all municipal and industrial point sources. Tables 24 and 26 have summarized this information on a basin-wide basis.

Control of point sources will continue to rely on discharge permit and construction grants activities. NPDES permits are to be issued by December 31, 1974. Based on review of municipal facilities needs, only two projects, Waitsburg and Walla Walla County Farm Labor Camp are of an urgent nature; the remaining facilities needs identified deal with central collection and treatment systems for towns not presently served by such systems, or with relatively minor treatment plant improvements. Table 25 presents municipal facilities needs for the Basin.

Treatment levels beyond the defined level of secondary treatment will not be required, at least within the five year scope of this plan. After upgrading of the Farm Labor Camp and Waitsburg facilities and minor improvements at Dayton and Walla Walla, all municipal sources in the Basin will be meeting secondary treatment requirements. Nutrient removals from secondary effluent is not considered a concern at present; however, pending study of the effects of discharge of unused irrigation water from Blalock Lake, the impacts on Mill Creek may dictate the need for nutrient removal at Walla Walla's facility.

Industrial discharges predominantly are cooling water from vegetable processing plants. Limitations on discharge temperature are necessary to prevent violations of instream temperature standards. Two sand and gravel operations in the Basin may be required to curtail discharge; experience has found that reuse of wash water is possible at operations of this type.

Needs for a basin-wide assessment of land disposal of wastewaters will be recommended in the section on monitoring and surveillance. Action items to be undertaken related to land disposal include the need to firm up the water disposal situation at College Place. At present, a local irrigator has water rights to the secondary effluent from the College Place treatment plant. A small pump station is located over the plant's outfall; when the irrigator exercises his water rights, the pump removes effluent from the outfall to a small holding sump, from which it is applied to land by irrigation. When the water rights holder chooses to not exercise his rights, effluent passes to Garrison Creek. This is not a satisfactory arrangement during times of low flow in Garrison Creek. A legally binding agreement to require continuous withdrawal of effluent during the dry season would be a recommended oontrol method

Similarly, controls over land disposal at Milton-Freewater should be made legally binding on the part of the irrigator to take the total combined effluent. The current NPDES permit for the Milton-Freewater municipal facility allows occasional discharge to Dry Creek. After expiration of this permit, the effluent limitation should be changed to allow no discharge to surface water.

Nonpoint Source Program

The level of knowledge of nonpoint sources in the Basin does not allow formulation of control strategies. The major action item will be to increase the data base. A land use survey or inventory would be one method; under each type of nonpoint source activity, a certain number of "needs to know" can be identified as being helpful in relating land uses to an observed instream water quality. Much of the needed information on subjects such as irrigation practices, animal population and distribution, areas of erodible soils, failing septic tanks, and forest land activities may be available from other agencies. The first step in assessing non-point problems would be to enter into meaningful working relationships with agencies such as the U.S. Forest Service, Soil Conservation Service, County Agricultural Extension Service, and Bureau of Land Management.

The second major task would be to conduct water quality monitoring to assess the pollutant loading remaining in the streams after implementation of point source controls. This is discussed below in the section on monitoring.

Continuing control measures which could be undertaken to reduce nonpoint pollution include enforcement of the States' Forest Practices Act, permitting of feedlots and irrigation tracts as appropriate, and State directed financial assistance programs aimed at erosion and sediment control, under the auspices of the Rural Development Act.

Recommended Studies of Other Programs

Assuming that over-appropriation of surface waters iss recognized as a contributor to water quality degradation, and specific steps are to be taken to correct this problem, there is a need for methods to specify flow requirements for well-defined levels. These flow requirements could be considered minimum flows for the corresponding level of use, such as a minimum stream flow determination for water quality or for recreation. In addition, there must be a study to formulate legal methods of insuring that such flows remain in the streams, that is, once the minimum flow for a certain level of use is determined, that minimum flow must be protected from diversion. If one of the alternatives to be seriously considered is stream-flow management for water quality improvement, planners will need additional background flow and water quality data to assess minimum flow needs for water quality maintenance and to provide adequate velocities to sweep away algae and waterborne weeds.

Management of the groundwater resource should be considered. The soon-to-be published report by the U.S. Geological Survey and the State of Washington, entitled "Appraisal of Groundwater Availability and Management Projections, Walla Walla River Basin, Washington and Oregon", by Robert MacNish et al., estimates that approximately 1,000,000 acre feet of the unconsolidated aquifer would be available for development. The inference is that groundwater supply, by substitution for surface water rights, may be a factor in alleviating the continuous over-appropriation of surface waters in the basin. The implications of this substantial groundwater resource to water quality management are tremendous. For example, legal procedures to substitute groundwater for surface water to fulfill water rights, and protection from withdrawal of the water which would remain in the surface stream, would increase the desirability of the Basin's waters for recreation and aquatic life habitat, both of which are stated goals in the program for enhancement of the nations waters.

Monitoring

This management plan's approach has of necessity been point-source oriented. It should be clear that nonpoint source problems are of greater significance than point source ones, and since it is here that data gaps occur, a need exists to increase the level of knowledge about cause-and-effect relationships between water quality and such activities as irrigation (diversion and return flows), flow management, urban runoff, and agricultural activities. Until these cause/effect relationships are better understood, water quality problems in the basin will not be significantly corrected.

To document these cause/effect relationships, a nonpoint source pollution assessment will be necessary. The first two elements in such an assessment will need to be:

1. Establish water quality monitoring programs to fill data gaps, establish a working base for further water quality assessments, and attempt to localize the origins of diffuse nonpoint pollutants.

2. Inventories of agricultural practices, land use activities, feedlot and livestock locations and other factors to assessing effects of basin activities on water quality.

The first element, establishment of a water quality monitoring program, will be the focus of this plan. The approach to monitoring and surveillance needs in this Basin has been based on:

1. Presentation of applicable water quality standards for each segment.

2. Presentation of average and maximum/minimum parameter values necessary to describe instream water quality.

3. Identification of standards violations by reference to the violations noted in the States' Continuing Planning Processes

4. Identification of additional problem areas noted in the Basin, including tributaries, based on engineering judgement and knowledge of the basin.

This approach has served to identify data gaps and areas where further investigation is needed. The next step will be to describe the relationships between specific waste generating activities, whether point or nonpoint source, and instream water quality in a way that will permit control of the activity in question. Data necessary to allow the determination of maximum instream daily loads and waste load allocations for dischargers must be collected. Another facet of additional water quality monitoring needs would be the opportunity to assess improvements in quality due to control measures such as upgrading or reconstruction of treatment plants and permitting activities. After a suitable period of time, when all known point sources have been controlled and the resultant improvements to water quality have been observed, the monitoring program could concentrate on nonpoint sources using the expanded data base to help assess nonpoint source pollution problems in localized areas.

Three types of monitoring activities will be needed to cover the scope of data collection needs identified for the Basin. These types of activities are:

1. Compliance monitoring to define and monitor significant point dischargers in the Basin.

2. Special Studies to qualify and quantify major nonpoint dischargers as well as quality and quantify in more detail significant point dischargers.

3. Trend monitoring to monitor long range water quality trends. This will permit an evaluation of whether the water quality trends in the basin are consistent with the States' nondegradation policies.

Compliance monitoring activities in the Walla Walla Basin will be of limited scope since no major dischargers are located within the Basin. This type of monitoring will be aimed at the existing point sources on a cyclic basis as time and funds allow, to determine compliance with effluent limitations. Occasional compliance monitoring of the designated "exempt" industries may be advisable to insure that no discharges to surface water occurs from these operations. Trend monitoring stations will be maintained by the Department of Ecology at the seven stations at which monitoring is presently being undertaken. These stations, and a list of point sources requiring compliance monitoring, are presented in Tables 32 and 33.

The nonpoint sources of pollution are apparently so diffuse that monitoring solely of mainstem water quality will be of little help in localizing the input of pollution from agricultural and related activities. Since a number of tributaries have been identified as experiencing water quality problems (Table 7), an essential part of an in-depth nonpoint assessment should include monitoring of the water quality of these streams to determine their impact on the quality of mainstem rivers and to aid in controlling pollutants from diffuse sources by identifying local areas of concern.

Two tributaries to Mill Creek, Cold and Doan Creeks, especially need further investigation, since they may be significant irrigation return routes, either of return flow (Cold and Doan Creeks) or unused irrigation water (Cold Creek, Blalock Lake). Blalock Lake receives tailwater from Blalock Irrigation District's outfall. This-tailwater is probably comprised mostly of secondary effluent from the City of Walla Walla Sewage Treatment Plant which was not used in the irrigation system. Cold Creek then carries overflow from Blalock Lake to Mill Creek. This overflow cannot be considered as merely irrigation return water; its characteristics and impact on Mill Creek need further investigation.

As an additional item, land disposal of treated effluent is a basin wide practice meriting further study to determine efficiency of present land disposal methods. Topics of interest would include water application rates and methods, soil types, crops grown, seasonal practices, availability of land to accomodate growth in wasteloads, observed runoff or water effects, and the possibility of year-round land disposal (as is currently practiced at Milton-Freewater, Oregon).

TABLE 31 ACTION PROGRAM
WALLA WALLA RIVER BASIN

Topic	Location	Situation	Action Items	By Whom
Point Source Municipal	Walla Walla County Farm Labor Camp	Present facility provides inadequate treatment. No disinfection of wastes. NPDES permit will require initial treatment at primary level, full upgrading to nonoverflow lagoon	Prepare 201 Facilities Plan	Walla Walla County Consultant
			Process and award construction grant (Steps 1,2,3) FY 75	DOE, EPA
			Upgrade present facility tp primary treatment level	Walla Walla County
			Issue NPDES Permit	DOE
			Construction of nonoverflow lagoon	Walla Walla County
	Waitsburg	Primary treatment. Inadequate disinfection. NPDES permit requires secondary treatment by	Update preliminary engineering report	Municipality
			Upgrade disinfection	Municipality
			Prepare 201 Facilities Plan	Municipality
			Conduct SSE Study	Municipality
			Process and award construction grant (Steps 1,2,3) FY 75	DOE, EPA
			Upgrade to secondary treatment	Municipality

TABLE 31 ACTION PROGRAM
WALLA WALLA RIVER BASIN

Topic	Location	Situation	Action Items	By Whom
	Walla Walla	Secondary treatment In compliance NPDES permit to be drafted	Draft NPDES Permit	DOE
			Public Notice and issuance of NPDES permit	DOE
			Sludge drying and solids handling facilities	Municipality
			Tausick Way Interceptor construction grant	DOE, EPA
			Assess amount of additional inflow to STP provided by Tausick Way Interceptor and determine effects on the amount of industrial water needed to satisfy water rights of irrigators	Municipality

TABLE 31 ACTION PROGRAM
WALLA WALLA RIVER BASIN

Topic	Location	Situation	Action Items	By Whom
Point Source-Municipal	College Place	Secondary treatment. In compliance NPDES Permit issued	Determine possible excessive I/I	Municipality
			Assess arrangements for disposal of effluent via irrigation. Firm up the agreement by College Place to provide water to irrigator. Legally binding requirement on irrigator to take all water (effluent) so that none gets directly to Garrison Creek	Municipality, DOE
	Dayton	Secondary treatment. In compliance. Old plant, rapidly approaching its life span. NPDES permit issued.	Determine need to modernize, upgrade & increase reliability of existing plant	Municipality, DOE
	Milton-Freewater	Secondary treatment. In compliance NPDES permit issued	After expiration of present NPDES permit, draft next permit to allow no discharge to Dry Creek, i.e., allow discharge to land only	DEQ
			Evaluate population projections, assess municipal facilities needs-increased waste loads from growing population	City of Milton-Freewater

TABLE 31 ACTION PROGRAM
WALLA WALLA RIVER BASIN

Topic	Location	Situation	Action Items	By Whom
Point Source Municipal	Weston	Secondary treatment In compliance NPDES Permit issued	Determine needs for treatment beyond 30/30 in keeping with State of Oregon's non-degradation policy.	DEQ
	Touchet, Umapine	Communities presently not served by collection or treatment systems	Assess effectiveness of present methods of waste disposal	DOE, DEQ
			Prepare 201 Facilities Plans as necessary	Municipalities, Consultants
			Construction Grant application	EPA, States
			Priority Rating	State
Point Source Industrial	Green Giant Co. Dayton & Waitsburg	Discharge of cooling water to Touchet River	Issued NPDES Permits	DOE
			Impose stringent temperature limits on discharge to protect Touchet River	DOE
			Require land disposal of all wastewaters except uncontaminated cooling water. This would include process waters, brine room floor drainage, condenser cooling water and boiler blowdown	DOE
			At Dayton plant, require process water to no longer go to City plant	DOE

TABLE 31 ACTION PROGRAM
WALLA WALLA RIVER BASIN

Topic	Location	Situation	Action Items	By Whom
Point Source Industrial	Jones-Scott, Walla Walla	Discharge of highly turbid sand and gravel washwater to Mill Creek	Issue NPDES Permit allowing interim discharge of effluent of present quality & quantity	DOE
			Require no discharge after	DOE
	Rogers Walla Walla Milton-Freewater	Issued NPDES permit allows discharge of uncontaminated cooling water to Walla Walla River	Draft next NPDES permit to require land disposal of all process and cooling waters	DEQ
	Industrial discharges at Milton-Freewater	Present irrigation outfall carries effluent from three canneries, plus STP effluent	Assess legal aspects of the land disposal method Take steps to make the present agreement legally binding on the part of the irrigator to take all flow carried by the irrigation outfall	DEQ
	Milton-Freewater Water Treatment Plant; Readymix Sand & Gravel, Milton-Freewater	Lack of knowledge of discharge characteristics	NPDES permits to be drafted by December 1974	DEQ
			Require no discharge from Readymix Sand & Gravel	DEQ

TABLE 31 ACTION PROGRAM
WALLA WALLA RIVER BASIN

Topic	Location	Situation	Action Items	By Whom
"Exempt" Industries	Basin-wide (See Table 27)	Industries which practice land disposal exclusively and thus not subject to NPDES	Review "exempt" status periodic review of water uses, waste sources and disposal practices	DOE, DEQ
Nonpoint Sources-Agricultural Wastes	Basin wide	Irrigation practices	Obtain data on basin irrigation practices: -Location of irrigated lands -Irrigation methods -Runoff from irrigated lands (quantity, quality, location) -Surface streams affected -Inventory land uses, soil types, crop types	DOE, DEQ
			Establish water quality monitoring stations to determine influence of nonpoint sources (see Table 33)	DOE, DEQ
			Identification of control methods	DOE, DEQ
			Development of general irrigation practices guidelines	EPA Agricultural Project
			NPDES Permit requirements - determine irrigation districts which will require permits - draft permits	EPA Agricultural Project

TABLE 31 ACTION PROGRAM
WALLA WALLA RIVER BASIN

Topic	Location	Situation	Action Items	By Whom
Nonpoint Sources Agricultural Wastes	Cold & Doan Creeks	Irrigation Practice (cont)	Determine characteristics of return flow from these two streams	DOE
			Determine whether unused secondary effluent from Walla Walla STP is returning to Mill Creek via Blalock Lake	DOE
	Basin-wide	Animal Waste Practices	Obtain data on basin animal waste disposal practices - livestock populations - locations and distributions of livestock - quantity and characteristics of wastes - runoff to surface streams - waste handling methods at feedlots - surface streams affected	DOE, DEQ
			Establish water quality monitoring stations to determine influence of nonpoint sources (See Table 33)	DOE, DEQ
			Identification of control methods	
			Implement EPA animal waste disposal guidelines	
	Basin-wide survey; Specific feedlots: McGregor, Lowden; Key Brothers, Milton-Freewater; Fraser Cattle Company, Walla Walla		NPDES Permits requirements - determine permit needs - effluent guidelines - draft permits	EPA Agricultural Project; DOE, DEQ

TABLE 31 ACTION PROGRAM
WALLA WALLA RIVER BASIN

Topic	Location	Situation	Action Items	By Whom
Nonpoint Sources-General, Grazing, Forestry, Recreation, Urban Storm-water Run-off	Basin-wide	Diffuse nonpoint sources contribute to water quality degradation	Obtain data on activities -survey of basin land uses -logging activities -soil inventories; identify areas of fragile soil -erosion -prone activities -construction activities and methods -grazing and dry land farming activities -urban stormwater runoff characteristics	DOE, DEQ
			Determine effects on receiving waters	DOE, DEQ
			Determine control methods	DOE, DEQ
Other Planing		USBR Water Resource Developments: Touchet Division, Marcus Whitman-Milton-Freewater Division	Participate in planning for dam and reservoir projects	DOE, DEQ
			Determine significance for water quality; increased water use for irrigation	
			Assess environmental impacts	
	Walla Walla and Columbia Counties Washington	Recently completed <u>Water Pollution Control and Abatement Study,</u> CH_2M/Hill	Implement recommendations of this study with regard to municipal facilities needs, nonpoint sources and streamflow management	Walla Walla Regional Planning Council
	Umatilla County Oregon	Report on a Water and Sewer Plan, Tudor Engineering, 1968	Review recommendations of this plan; update and revise municipal facilities needs as necessary	DEQ

TABLE 31 ACTION PROGRAM
WALLA WALLA RIVER BASIN

Topic	Location	Situation	Action Items	By Whom
Other Programs	Basin-wide	Flow depletion by withdrawal	Determine impacts of withdrawals and diversions on water quality	DOE, DEQ
			Determine locations and magnitudes of withdrawals	DOE, DEQ
		Groundwater management	Undertake studies of possibility of utilization of groundwater to substitute for surface water (development of groundwater for agricultural and other uses)	States
			Study legislation needed to retain surface flow in streams for recognized beneficial purposes	States

TABLE 32 COOPERATIVE MONITORING PROGRAM
WALLA WALLA RIVER BASIN

Monitoring Effort	Segment	Point Source Locations	Source: Point	Source: Nonpoint	Parameters: Routine	Parameters: Nutrients	Parameters: Pesticides	Parameters: Other	Estimated Field Resource man-years or man-months	Agency	Monitoring Frequency
Compliance	Walla Walla R. & tributaries (Washington)	College Place STP Walla Walla County Farm Labor Camp	X		X					DOE	
	Touchet River & tributaries	Dayton STP	X							DOE	
		Waitsburg STP	X							DOE	
		Green Giant Co (Dayton)	X							DOE	
		Green Giant Co. (Waitsburg)	X							DOE	
	Mill Creek & tributaries	Walla Walla STP	X							DOE	
		Jones-Scott Co.	X							DOE	
	Walla Walla River (Oregon)	Milton-Freewater STP	X							DEQ	
		Weston STP	X							DEQ,	
		City of Milton-Freewater water treatment plant	X							DEQ	
		Rogers Walla Walla	X							DEQ	
		Readymix Sand and Gravel	X							DEQ	

TABLE 33 COOPERATIVE MONITORING PROGRAM
WALLA WALLA RIVER BASIN

Monitoring Effort	Segment	Monitoring Station Locations	Source: Point	Source: Nonpoint	Parameters: Routine	Parameters: Nutrients	Parameters: Pesticides	Parameters: Other	Estimated Field Resource man-years or man-months	Agency	Monitoring Frequency
Trend	Walla Walla River & tributaries (Washington)	32A070- Walla Walla River near Touchet			X					DOE	
		32A110 Walla Walla River at State Boundary			X					DOE	
	Touchet River & Tributaries	32B070 Touchet River at Touchet			X					DOE	
		32B100 Touchet River at Bolles			X					DOE	
		32B120 Touchet River near Dayton			X					DOE	
	Mill Creek & Tributaries	32C070 Mill Creek at Mission St. Bridge			X					DOE	
		32C110 Mill Creek at Tausick Way Bridge			X					DOE	

TABLE 33 COOPERATIVE MONITORING PROGRAM
WALLA WALLA RIVER BASIN

Monitoring Effort	Segment	Monitoring Station Locations	Source: Point	Source: Nonpoint	Parameters: Routine	Parameters: Nutrients	Parameters: Pesticides	Parameters: Other	Estimated Field Resource man-years or man-months	Agency	Monitoring Frequency
Trend	Walla Walla River & Tributaries (Oregon)	Pine Creek above Weston			X					DEQ	
		North Fork Walla Walla River			X					DEQ	
		South Fork Walla Walla River			X					DEQ	
		Little Walla Walla River at Milton-Freewater			X					DEQ	
		Little Walla Walla River at State line			X					DEQ	

TABLE 34 MONITORING AND SURVEILLANCE NEEDS
SPECIAL STUDIES
WALLA WALLA RIVER BASIN

Segment	Segment Violations and Problems Areas	Objectives	Locations of Study Needs
Walla Walla River & Tributaries (Washington)	1. High Temperature	1. Determine causes of high water temperature. Determine effects of low streamflow on water temperature.	1. Mainstem Walla Walla River, Garrison Creek, Yellowhawk Creek, Russell Creek, East aand West Little Walla Walla Rivers, minor tributaries.
	2. Low Dissolved Oxygen.	2. Determine low DO causes Determine input of low DO water from tributaries. Determine effects of waterborne plant on instream DO	2. Mainstem Walla Walla River below confluence with Mill Creek, East and West Little Walla Walla Rivers, minor tributaries.
	3. Excessive Coliform	3. Determine sources of excessive coliform organisms. Determine input from animal feedlots agricultural activities, point source discharges, and storm water runoff.	3. Mainstem Walla Walla River, Garrison Creek, Yellowhawk Creek, Russell Creek, East and West Little Walla Walla Rivers, minor tributaries
	4. Turbidity	4. Determine causes of observed high wintertime turbidity, determine effects of land use activities on summer turbidity.	4. Mainstem Walla Walla River East and West Little Walla Walla Rivers, Mud Creek, Dry Creek, Pine Creek
	5. Nutrients	5. Determine nutrient contributions from non-point sources. Determine seasonal fluctuations in instream nutrient levels	5. Mainstem Walla Walla River below confluence with Mill Creek, East and West Little Walla Walla River, Gardena Creek

TABLE 34 MONITORING AND SURVEILLANCE NEEDS
SPECIAL STUDIES
WALLA WALLA RIVER BASIN

Segment	Segment Violations and Problems Areas	Objectives	Location of Study Needs
Walla Walla River & Tributaries (Washington)	6. Total Dissolved Solids	6. Determine effects of irrigation return flows on water quality.	6. Mainstem Walla Walla River, East and West Little Walla Walla River, Garrison Creek, Yellowhawk Creek, Russell Creek, Dry Creek, Pine Creek, Mud Creek, Gardena Creek.
	7. Low summertime streamflow	7. Determine causes and effects of low seasonal flow as it relates to observed temperature and DO problems	7. Basin-wide

TABLE 34 MONITORING AND SURVEILLANCE NEEDS
SPECIAL STUDIES
WALLA WALLA RIVER BASIN

Segment	Segment Violations and Problems Areas	Objectives	Locations of Study Needs
Touchet River and Tributaries	1. High Temperature	1. Determine causes of high water temperature. Determine effects of low streamflow on water temperature	1. Touchet River-Dayton to mouth
	2. Low Dissolved Oxygen	2. Determine low DO causes Determine effects of waterborne plants on instream DO	2. Touchet River-Dayton to mouth
	3. Excessive coliform	3. Determine sources of excessive coliform organisms. Determine input from animal wastes, agricultural activities, point source discharges, and storm water runoff	3. Touchet River Dayton to mouth; Coppei Creek
	4. Turbidity	4. Determine causes of observed high wintertime turbidity. Determine effects of land use activities on summertime turbidity	4. Touchet River-Dayton to mouth
	5. Nutrients	5. Determine nutrient contributions from nonpoint source	5. Touchet River-Dayton to mouth
	6. Low summertime flow	6. Determine causes and effects of low seasonal flow as related to observed temperature and DO problems	6. Touchet River-Dayton to mouth

TABLE 34 MONITORING AND SURVEILLANCE NEEDS
SPECIAL STUDIES
WALLA WALLA RIVER BASIN

Segment	Segment Violations and Problems Areas	Objectives	Locations of Study Needs
Walla Walla River (Oregon)	1. Temperature	1. Determine causes of observed high temperatures.	1. Walla Walla River
	2. Excessive coliform	2. Determine sources of excessive coliform	2. Walla Walla River, East and West Little Walla Walla rivers.
	3. Low summertime flow	3. Determine causes and effects of low seasonal streamflow	3. Walla Walla River below diversion structure at Milton Freewater.
	4. Non-degradation	4. Determine compliance with State Non-degradation policy	4. Walla Walla River

TABLE 34 MONITORING AND SURVEILLANCE NEEDS
SPECIAL STUDIES
WALLA WALLA RIVER BASIN

Segment	Segment Violations and Problems Areas	Objectives	Locations of Study Needs
Mill Creek & Tributaries	1. High Temperature	1. Determine causes of high water temperature. Determine effects of low stream flow on water temperature	1. Mill Creek below Walla Walla
	2. Low Dissolved Oxygen	2. Determine low DO causes Determine input of low DO from minor tributaries. Determine effects of water-borne plants on instream DO.	2. Mill Creek below Walla Walla; Cold Creek; Doan Creek
	3. Turbidity	3. Determine causes of excessive wet-season turbidity.	3. Mill Creek above Walla Walla water intake.
	4. Nutrients	4. Determine nutrient contributions from nonpoint sources.	4. Mill Creek below Walla Walla, Cold Creek, Doan Creek
	5. Total Dissolved Solids	5. Determine possible return flows from irrigation activities	5. Cold Creek, Doan Creek
	6. Low summertime streamflow	6. Determine causes and effects of low seasonal streamflow as it relates to observed temperature and DO problems.	6. Mill Creek below Corps of Engineers diversion works