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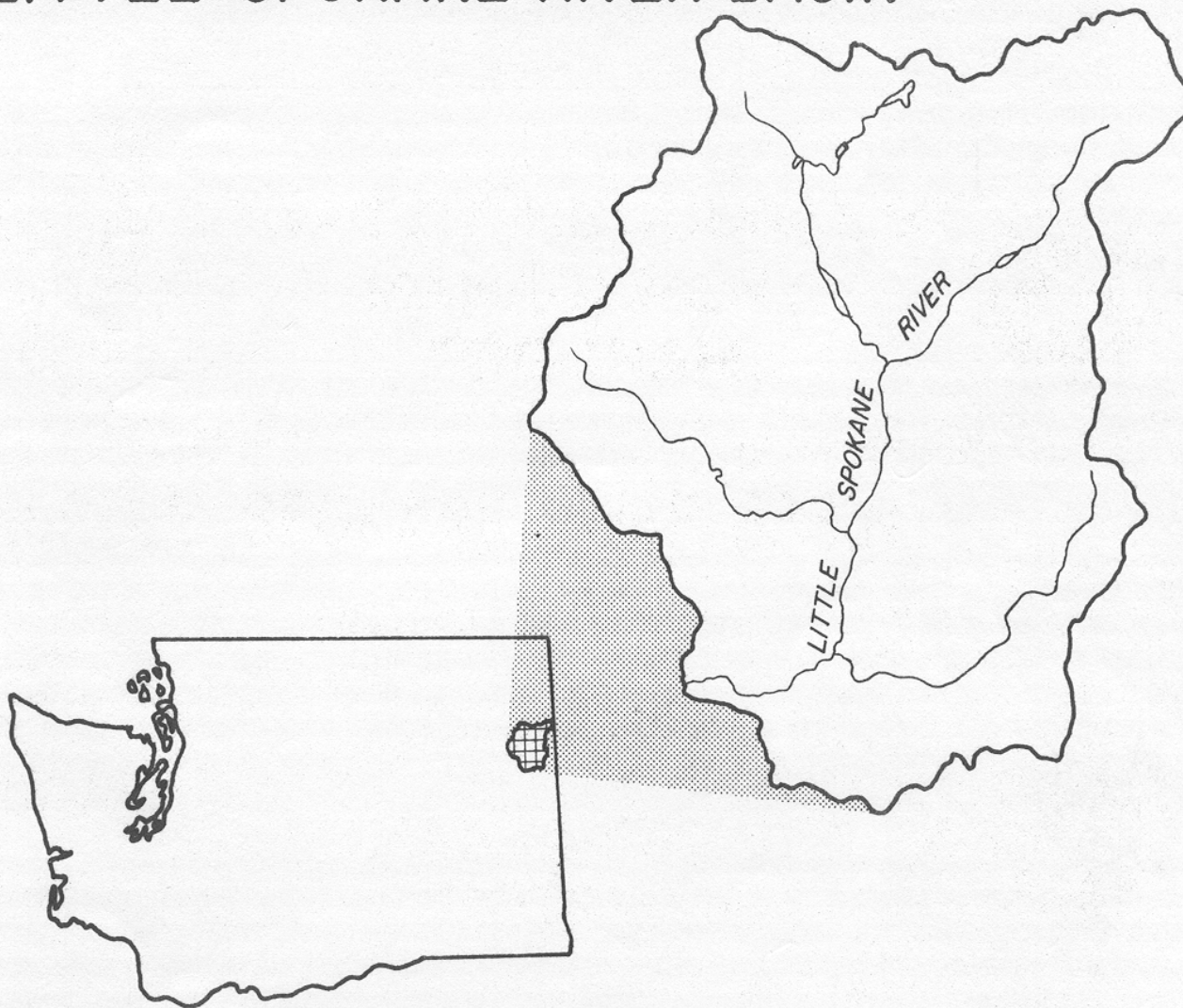


WATER RESOURCES MANAGEMENT PROGRAM



BASIN PROGRAM SERIES I

LITTLE SPOKANE RIVER BASIN



August, 1975

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OLYMPIA, WASHINGTON

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BASIN PROGRAM SERIES NO. 1

WATER RESOURCES MANAGEMENT PROGRAM

LITTLE SPOKANE RIVER BASIN

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ABSTRACT

This program document sets forth the management policies on water resources in the Little Spokane River Basin. These policies provide a process for making decisions on future water resource allocation and use.

The program establishes (a) “base flows” necessary for preserving instream values, (b) declares beneficial use priorities, (c) “closes” certain streams and all natural lakes in the basin to further consumptive appropriation except for domestic and stockwatering uses, (d) allocates public water by specific quantities to specific stream management units and specific use priority categories, and (e) sets forth water resources administrative procedures.

Section IV, “Water Resources and Resource Use,” analyzes basin hydrologic conditions, stream flow characteristics, and ground water resources, and compares recorded water rights and their actual uses. This and the appendices further describe methodologies used in determining the base flow, appropriation limit, and available water for further appropriation. Regression techniques are used to analyze tributary streams without continuous gaged records.

Key Words: Little Spokane River Basin; water resources management; base flow; appropriation; allocation; public waters; public interest; closure; reservation; water rights; low flow regression curve.

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I. INTRODUCTION

A. PUBLIC PARTICIPATION

In the late 1960's, conflicts over water use developed in the Little Spokane River Basin. As a result, the Department of Ecology "withdrew" the waters from additional appropriation in the early 1970's.

From the time of the withdrawal until June 30, 1976, the Department was to fully study the management problems of the basin, and assess the desires of the residents. Should the Department adopt a water management policy for the basin, the withdrawal would end before June 30, 1976.

In 1974, a water resource advisory group was established. It was made up of citizens representing a cross-section of basin interests. The main function of this group was to advise the Department on how best to obtain public participation, and to help with the development of the management program itself.

On October 29, 1974, a well publicized workshop was held at Mead Middle School. One hundred people attended. A questionnaire, which had been mailed to residents, was used as the basis for the workshop.

The main purpose of the first workshop and questionnaire was to explain why a management program was needed for the Little Spokane watershed, and to identify public interest and major issues pertinent to water resource use.

In December 1974, a second questionnaire was sent to people who live in the area to obtain their opinions as to specific stream stretches and the priorities of use on each. A fact sheet was sent out on each of the problem areas discussed at the first workshop. These included fishing, flood control, access, and water quality. The information obtained was used in the development of the management program.

The public participation activities were led by a basin resident, Patty Dickinson, advised by Rich Bakes, Robert Byrne, Morey Haggin, Robert Jens, Jud Melton, Peggy Ostness, Jim Sauers, Sally Reynolds, and Eldon Thomas.

Accompanying the assessment of public desires and attitudes was a technical evaluation of the basin's waters. The watershed was evaluated in terms of its surface and ground water use and availability. The existing recorded water rights were researched. Estimates of unused rights were made. Base flows, for preserving instream values such as fisheries and recreation, were computed. Calculations were then made to see if any waters remained for further appropriation.

Throughout this process, departmental staff consulted with persons in the regional offices of the departments of Game, Natural Resources, the U.S. Geological Survey, and U.S. Soil Conservation Service, as well as with the Spokane County planning and engineer's offices. All available information including the drafts of the Corps of Engineers Metropolitan Spokane Study was reviewed.

Discussion of the resulting draft of the management program was the subject of the second public workshop held in Spokane and Pend Oreille counties on June 11 and 12, 1975. Comments and concerns expressed by the public and agencies were incorporated into the revision of the draft.

In conjunction with revision of the review draft, management regulations were written.

B. WATER RESOURCES MANAGEMENT PROGRAM

The goals of this management program are three-fold in that it:

- a. Represents the desires of the residents of the watershed for the management of their water resources.
- b. Provides clear direction to the Department of Ecology's regional staff who have first-line responsibility to administer and manage the water resources.
- c. Fulfills the directive of the 1971 Water Resources Act to "ensure that waters of the state are protected and fully utilized for the greatest benefit to the people of the State of Washington"

Research in the Little Spokane Basin resulted in three major findings:

- a. The public has an overwhelming desire to protect instream flows.
- b. The public desires to maintain a rural agricultural environment.
- c. Water is available for future appropriation only along the main stem of the Little Spokane.

The findings became the "foundation" in the building of the proposed program.

The management program itself:

Declares first and foremost that existing valid water rights will be protected by the management program. They are, in effect, first in priority and are not affected by this program.

Sets "base flows" necessary for preserving instream values such as fish and wildlife, aesthetics, and environmental quality. The base flow is that flow which is present 80 percent of the time (four out of five years) at any given date under natural fluctuating conditions. The management of this base flow is intended to be a cooperative effort between the public and the Department of Ecology.

Declares that holders of new rights (granted after the adoption of this management program) will be limited in their use of water, depending upon drought conditions. When the natural flow falls below the established base flow level, new right holders will have to stop diversion.

States that water will be available for future appropriation in the mainstem of the Little Spokane River. All the tributary streams will be closed except for domestic household use and riparian stockwatering uses.

Retains lakes substantially in their natural condition by allowing appropriations only for domestic, stockwatering, and nonconsumptive uses.

This management program establishes the Department's policies with regard to management of the water resources in the Little Spokane River Basin, and sets forth standard administrative procedures for regional office operations.

The management policies in Section II are codified as Chapter 173-550 Washington Administrative Code. Upon adoption, the chapter became a vehicle to carry on major policies established in the management program, and guides administration, utilization, and operation of the water resources in the Little Spokane River Basin.

The Department, working with the citizens advisory committee, will reevaluate the effectiveness of the management program no later than 1985. If social and economic conditions change significantly, program reevaluation may occur before that time.

C. ORGANIZATION OF THE PROGRAM DOCUMENT

Details of the management program constitute Chapter II.

The rest of the document consists of "back-up" material.

Chapter III sets forth public interests and factual findings.

Chapter IV is of a technical nature. It expands the factual findings concerning the resource base and use, and substantiates the proposed allocation program.

Technical terms are defined in the Glossary, on page 68.

Information pertinent to the basin's water resources, but not directly related to the allocation program, appears at the end of the document.

WATER RESOURCES MANAGEMENT PROGRAM
LITTLE SPOKANE RIVER BASIN

Section II

WATER RESOURCES MANAGEMENT POLICY

II. WATER RESOURCES MANAGEMENT POLICY

"The Legislature finds that proper utilization of the water resources of this state is necessary to the promotion of public health and the economic well-being of the state and the preservation of its natural resources and aesthetic values." RCW 90.54.010 Water Resources Act of 1971.

INTRODUCTION

The primary goal of the Little Spokane River Basin Water Resources Management Program is "to protect and fully utilize" the basin surface and ground water resources "for the greatest benefit to the people of the State of Washington." Efficient management and enforcement of the water use policies are essential for accomplishment of this primary goal in harmony with the preservation of the natural aesthetic assets in this basin.

Searches and analyses of information have been conducted since the withdrawal" of the surface waters of the Little Spokane River Basin from further appropriation in September of 1973. This management policy establishes base flows at four control stations along the Little Spokane River. These are the level of flows necessary to provide for preservation of wildlife, fish, scenic, aesthetic, and other environmental values of the perennial stream and rivers. All future water rights will be restricted by these flow levels.

Where there are surface waters available in excess of the base flows and actual consumption under existing water rights, priorities are established among different uses and the amounts of water for future appropriation for beneficial uses are specified. This management policy also declares closures (except for domestic and riparian livestock uses), from future surface water appropriation on certain streams in cases where sufficient water is not available.

All future appropriation of surface waters shall be subject to this Little Spokane River Basin water resources management program or future revisions thereof. Existing valid water rights shall not be adversely affected by these management policies.

A. MANAGEMENT OF SURFACE WATERS

1. DECLARATION OF BENEFICIAL USE AND USE PRIORITY

The State Water Resources Act of 1971 declares the following uses of water to be beneficial: domestic, stock watering, industrial, commercial, agricultural, irrigation, hydroelectric power production, mining, fish and wildlife maintenance and enhancement, recreational, and thermal power production purposes, and preservation of environmental and aesthetic values, and all other uses compatible with the enjoyment of the public waters of the state (RCW 90.54.020(1)).

Among these beneficial uses, the public views and current departmental investigations have led to the conclusion that actual demand for water may be limited only to certain use categories. Because of the limitation of available surface waters it became inevitable to establish priorities among the many beneficial uses and allocate resources accordingly.

Management of the surface water resources of the Little Spokane River will follow the following beneficial use priorities:

Priority I

Nothing in this management policy will lessen, enlarge, or modify the existing water rights acquired by appropriation, or otherwise. Therefore, the existing water rights have highest priority in use. Use priority between existing water rights has been established by the date of filing of the original application with the department (RCW 90.03.340).

Priority II

The second priority use category is the flow necessary to maintain base flows for preservation of wildlife, fish, scenic, aesthetic, and other environmental values. Consistent with the fundamental policy of this state and public desires expressed through public meetings and surveys, appropriation of future water rights shall not impair maintenance of base flows in the stream.

Priority III

Domestic use, including irrigation of lawn and noncommercial garden not to exceed one-half acre, and livestock use excluding feedlot operation, are placed in the third priority. Therefore, water rights appropriated for domestic and stock watering use after adoption of this policy will be subject to base flows and prior rights.

Irrigation of lawn and garden under this category, therefore, may not be allowed when the natural flow falls below the level necessary to satisfy base flow requirements.

However, where there is no practical alternative source of water supply without exorbitant cost, base flows and stream closures may not apply to diversions for household use and stock watering excluding feedlot operation.

In the stream reaches where the investigation showed no remaining surface waters after satisfying the three previous priority uses, streams will be

closed to other future consumptive appropriation. Where unappropriated public waters remain, they are further allocated to other consumptive uses and nonconsumptive uses.

Priority IV

The fourth priority use category is noncommercial agricultural irrigation up to three (3) acres per family. Because of the particular characteristics of this basin, it is necessary to single out noncommercial agricultural activity and give it a higher priority than commercial agricultural irrigation. This will enable the sharing of limited resources by many individuals and meet the public desire to maintain a rural agricultural environment. Large irrigation projects are encouraged to develop ground water resources.

Priority V

The remaining surface waters will be appropriated to the other consumptive and nonconsumptive uses. Therefore, all beneficial uses which are not specified in the preceding priorities are grouped and given fifth priority. When the local land use policy is established and the need arises, further priorities may be made as appropriate.

This priority, however, will not apply to diversions of high spring runoff for artificial storage provided that the storage facilities are environmentally acceptable and are not in conflict with the public interest.

2. ESTABLISHMENT OF BASE FLOWS

It is a fundamental policy of this state that "perennial rivers and streams be retained with base flows necessary to provide for preservation of wildlife, fish, scenic, aesthetic, and other environmental values, and navigational values." Further, lakes and ponds shall be retained substantially in their natural condition.

It is also a desire of the public that a base flow level be established and enforced so that the present aesthetic environment will not be impaired by future water use activities. In consonance with the fundamental policy of the state and public desire, base flows for the Little Spokane River and its tributaries are hereby established as an element of this management program.

No appropriation of surface water shall be made by the department from the Little Spokane River and its tributaries below the base flow levels established through this policy. Enforcement and maintenance of base

flows will be as per the administrative procedures established as part of this program described in section II.B.1, page 16 and existing laws.

Continuous discharge flow measurements at the Dartford U.S. Geological Survey gaging station No. 12-4310 and snow survey by the U.S. Soil Conservation service will be the basis of monitoring natural flow levels and management of resources.

The base flows will be monitored and maintained at the following control stations for the stream reaches specified in Table II-1, below. Base flows for the first and fifteenth day of the months are also presented in the Table.

Base flows for any specific day not identified in the Table can be obtained from Figure II-1, Base Flow Hydrographs for the Little Spokane River. Base flow hydrographs are drawn on the semilogarithmic daily record sheet.

TABLE II-1. Base Flows on the 1st and 15th Day in the Little Spokane River (cfs)

Control Station Description		Months and Dates													
		APR		MAY		JUN		JUL		AUG		SEP		OCT	
Station No.	Control Stream Reach	1	15	1	15	1	15	1	15	1	15	1	15	1	15
12-4270 at Elk, (34.6) 8-19N-44E	Confl w/Dry Cr. to headwaters	54	52	49	47	45	43	41.5	39.5	38	38	38	38	38	39
12-4295 at Chattaroy, (23.05) 34-28N-43E	Confl w/Deer Cr. to confl w/Dry Cr.	165	143	124	104	83	69	57	57	57	57	57	63	70	77
12-4310 at Dartford, (10.8) 6-26N-43E	Confl w/Deer Cr. to confl w/Little Cr.	250	218	192	170	148	130	115	115	115	115	115	123	130	140
12-4315 near Dartford, (3.9) 3-26N-42E	Mouth to confl w/Little Cr.	490	460	440	420	395	385	375	375	375	375	375	380	385	390

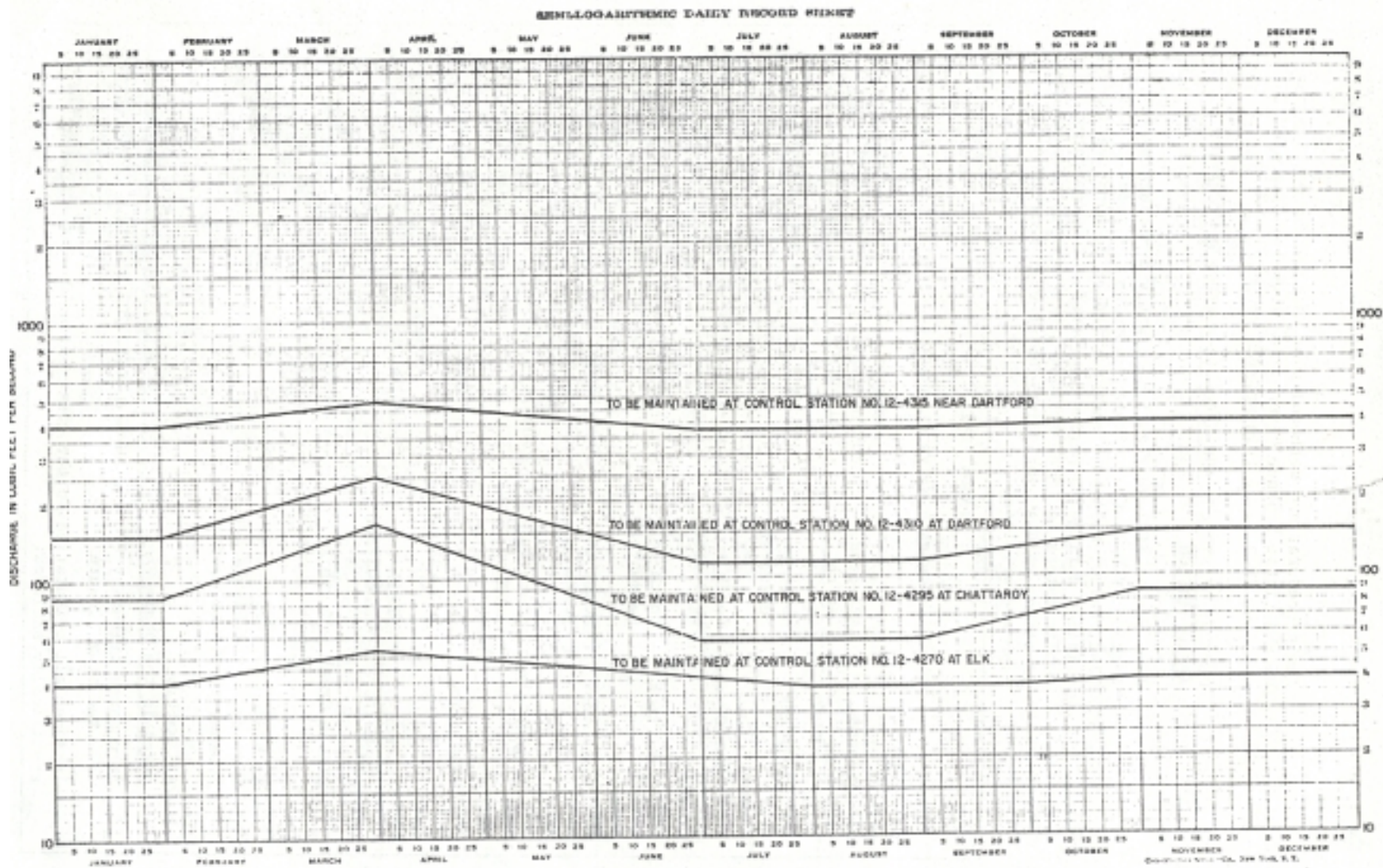


FIGURE II-1. BASE FLOW HYDROGRAPHS FOR THE LITTLE SPOKANE RIVER.

The procedures and methodologies used in the development of the Little Spokane River base flows are discussed in section, IV.D.1, of this program document.

3. CLOSURE OF STREAMS AND LAKES TO FURTHER CONSUMPTIVE APPROPRIATION

As a result of investigation on water availability in Section IV D 2, the tributary streams specified in Table II-2, below, will be closed to further consumptive appropriation during the period specified. The remaining public waters in those streams are necessary to maintain in-stream values, including the provision of food for fish and wildlife.

TABLE II-2			
SURFACE WATER CLOSURES			
Stream* Name	Affected Reach	Date of Administrative Closure	Period of Closure
Dry Creek	Mouth to headwaters	5-26-1952	June 1 – October 31
Otter Creek	Mouth to headwaters	2-23-1971	“
Bear Creek	Mouth to headwaters	4-13-1953	“
Deer Creek	Mouth to headwaters	2-29-1968	“
Dragoon Creek	Mouth to headwaters	7-02-1951	“
Deep Creek	Mouth to headwaters	6-14-1961	“
Deadman Creek <u>1/</u>	Mouth to headwaters	11-28-1961	“
Little Creek	Mouth to headwaters	4-13-1953	“
W. Branch Little Spokane River	Outlet of Eloika Lake to headwaters	Date of adoption	“
All natural lakes in the basin		“	“
<u>1/</u>	An unnamed tributary flowing through Sec. 20, T 26 N., R. 44 E. is exempted from closure.		
*	Includes all tributaries in the contributing drainage area unless specifically excluded.		



- LEGEND -

- River Basin Boundary
- - - Sub Basin Boundary
- Open Stream
- Closed Stream
- ▲³ Control Station

Figure II-2 STREAM CLOSURES AND CONTROL STATIONS, LITTLE SPOKANE RIVER BASIN.

It is declared to be prejudicial to the public interest to allow further appropriations for consumptive uses from the streams listed in the table above, except for domestic and normal stock watering uses excluding feedlot operations during the period beginning the first of June through the end of October.

In order to retain the lakes substantially in their natural condition, appropriations from the lakes and ponds in this basin will not be granted to consumptive uses except for domestic and stock watering purposes, thereby satisfying only priority one through three for beneficial uses.

Diversion of surface water which would conflict with the closures in this management policy shall be authorized only in those situations where it is clear that overriding considerations of the public interest will be served (Chapter 90.54.020(3)(2)).

4. ALLOCATION OF UNAPPROPRIATED SURFACE WATERS

Unappropriated surface waters in the Little Spokane River are allocated to the following specific stream management units: a) Confluence with Dry Creek to headwaters (east branch), and b) confluence with Little Creek at Dartford to the confluence with Dry Creek and to the outlet of Eloika Lake.

The unappropriated surface waters are determined by subtracting the amount necessary to satisfy base flows plus estimated actual diversions by existing water right holders from the appropriation limit established in this management program.

The waters allocated to specific management units are further allocated to the following beneficial use categories:

- a. Instream uses up to the amount provided as base flow,
- b. Domestic use, livestock watering on riparian lands, and noncommercial agricultural irrigation up to three acres per household,
- c. Consumptive uses except those under b. above and nonconsumptive uses which require more than the amount provided as base flow.

Allocation schemes to specific stream management units and to specific use categories within the stream unit for the first and fifteenth day of the irrigation season are presented in Tables II-3 and II-4, below.

TABLE II-3. ALLOCATION OF SURFACE WATERS BY USE-PRIORITY FROM CONFLUENCE WITH DRY CREEK TO HEADWATERS (EAST BRANCH) (Units in Cubic Feet Per Second)

Use Priority	Use Description	APR		MAY		JUN		JUL		AUG		SEP		OCT	
		1	15	1	15	1	15	1	15	1	15	1	15	1	15
2	Instream Use under Base Flow	54	52	49	47	45	43	41.5	39.5	38	38	38	38	38	39
3 & 4	Domestic, Livestock, and Noncommercial Irrigation Use	3	3	3	3	3	3	3	3	3	3	3	3	3	3
5	Other Consumptive and Nonconsumptive Use	20	22	23	19	14	11	8	6	2	2	2	2	4	4

TABLE II-4. ALLOCATION OF SURFACE WATERS BY USE-PRIORITY FROM DARTFORD TO ELOIKA LAKE OUTLET, AND TO CONFLUENCE WITH DRY CREEK (Units in Cubic Feet Per Second)

Use Priority	Use Description	APR		MAY		JUN		JUL		AUG		SEP		OCT	
		1	15	1	15	1	15	1	15	1	15	1	15	1	15
2	Instream Use	250	218	192	170	148	130	115	115	115	115	115	123	130	140
3 & 4	Domestic, Livestock, and Noncommercial Irrigation Use	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5	Other Consumptive and Nonconsumptive Use	318	328	335	231	147	98	57	29	6	6	6	6	15	15

Estimation of allocated quantities for the days unspecified in the Tables can be made from Figures II-3 and II-4. Methodologies and procedures applied in the allocation schemes are described in Section IV.D.2 and 3.

B. ADMINISTRATIVE PROCEDURES

1. REGULATION OF BASE FLOW

All future consumptive water rights will be subject to base flows at the nearest control station. Therefore, all these rights will carry the proviso that the holders will cease diverting from the stream when the flow falls or is expected to fall below the level necessary to meet the base flow.

Early prediction of summer flow level is a must for adequate management of overall resources. The prediction will be generally guided by the stream flow forecasts by the U.S. Soil Conservation Service, which are published as "Water Supply Outlook, Washington." The forecasts are based principally on measurements of the water-equivalent of the mountain snowpack. Snow surveys are made monthly or bimonthly from January 1 to June 1.

When a drought water year is anticipated, based on the said forecasts, close monitoring will be initiated by not later than May 15 of the year. Administration of base flow will be generally guided by the procedure set forth in the following.

- a. Inform water right holders expected not to be able to obtain water. This may be done by letter or a meeting or both.
- b. Monitor control stations Nos. 12-4270 at Elk, 12-4295 at Chattaroy, 12-4310 at Dartford, and 12-4315 near Dartford, beginning not later than July 1.
- c. Estimate the date that the actual regulation will begin.
- d. Prepare letters and notify the water users as to dates when they will desist from diversion.
- e. Check all notified water right holders as to their compliance.
- f. Issue violators an administrative order to cease and desist from diversion, or post it at the point of diversion depending on the urgency of the situation.

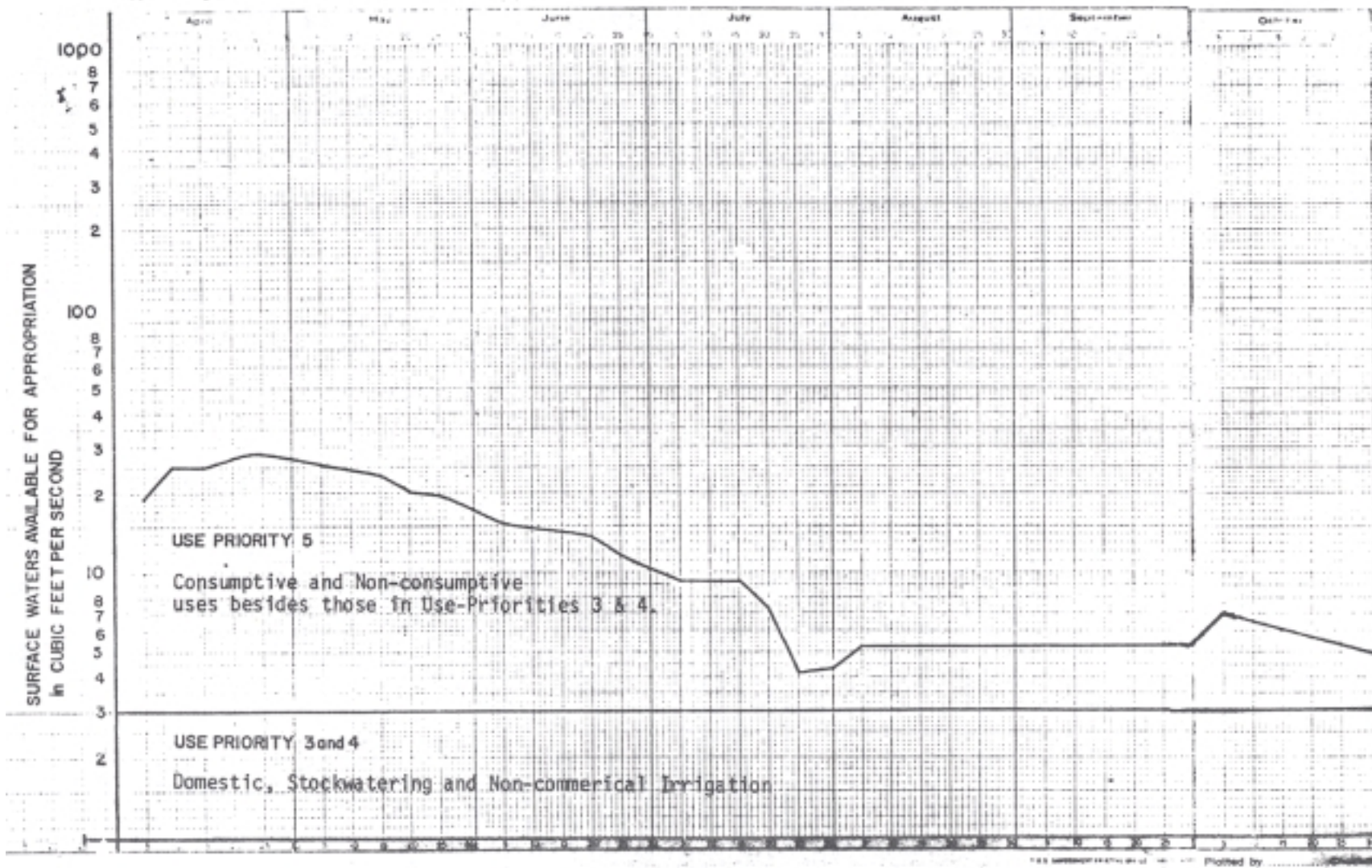


FIGURE II-3 AVAILABLE SURFACE WATERS FOR APPROPRIATION BY USE PRIORITIES FROM CONFLUENCE WITH DRY CREEK TO HEADWATERS, CONTROL STATION 12-4270

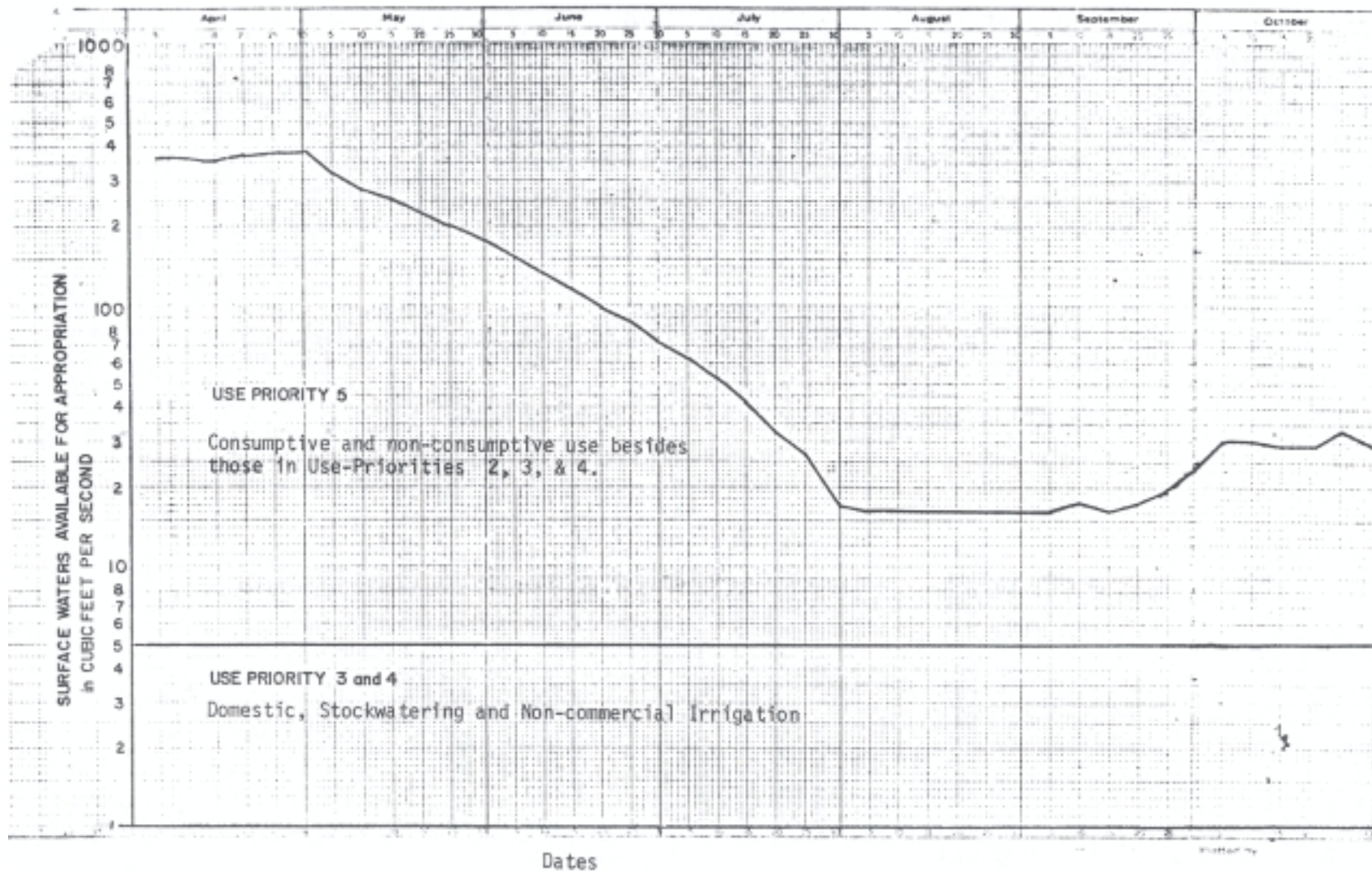


FIGURE 11-4 AVAILABLE SURFACE WATERS FOR APPROPRIATION BY USE-PRIORITIES FROM CONFLUENCE WITH DRY CREEK TO OUTLET OF ELOIKA LAKE TO CONFLUENCE WITH LITTLE CREEK CONTROL STATION 12-4310

NOTE: The Water Code - 1917 Act, Sections 90.03.400 and 90.03.410, stipulates that unauthorized use of water and wrongful use of water is a misdemeanor.

If development of a well or spring affects the base flow, it will also be subject to base flow. If it is not certain at the time of investigation, the water right may be issued with a proviso to install a measuring device to collect evidence.

2. ISSUANCE OF FUTURE WATER RIGHTS AND ACCOUNTING

A system of accounting to keep track of water appropriation versus availability is an essential part of this management program.

A net depletion quantity for all consumptive water rights will be deducted from the amount specified for each month in order to keep track of the remaining water available for further appropriation. Exact quantification will have to be based on the hydrographs in Figures II-3 and II-4, which represent availability on a daily basis.

Although unappropriated surface waters have been allocated to specific stream management units and to use priorities within the unit, the principle of "first-in-time, first-in-right" will be applied on a basin-wide basis within the amount allocated to each stream management unit.

Allocations to use priorities III (domestic and stockwater uses) and IV (noncommercial agricultural irrigation) are de facto "reservations" except that the amount will be immediately available after adoption of this program to qualified applicants. Water rights from use priority V (other consumptive and nonconsumptive uses) allocation will be restricted, therefore, by the flow level necessary to maintain base flow and actual diversion by use-priorities III and IV water rights, while use-priorities III and IV water rights are subject to only base flow and prior rights.

When the total amounts allocated to priorities III and IV have been appropriated, water right applications which meet these categories may be continuously issued water rights from the next lower priority allocation block(s) without priority III or IV status.

Surface water and/or ground water appropriation permits that will allow direct diversion from, or have measurable effect on, streams where base flows have been established, shall be subject to the base flow limitations, and any such permits or certificates shall be appropriately conditioned to assure maintenance of said base flows in Section II. A.2.

All water right applications filed with the Department but not permitted due to unavailability of water or otherwise shall be listed in the water right application record. It will be guided by Chapter 90.03.270 RCW (1917) - record of application. When water is available for the application, it will be processed in accordance with the 1917 Water Code. Priority date will be established as of the date of receipt of the completed application.

3. APPROPRIATION OF WATER FOR SINGLE DOMESTIC SUPPLY

Issuance of water rights for single domestic supply purposes will be guided by the following standard operating procedure:

- a. "Domestic supply," when used without qualification, means the noncommercial use of water for: a) normal needs within a residence, for example cooking, drinking, washing, bathing, and other sanitary purposes, and: b) normal needs for maintenance of exterior amenities and ground of not more than one-half (1/2) acre in size, associated with a residence, for example lawn and garden watering or automobile and boat washing.
- b. The above definition can be considered as a general classification for initial processing and publication of all applications for "domestic supply." It should not normally be necessary to attempt refinements prior to publication or field investigation.
- c. On water sources where there is no problem with availability of water at the time of determination, the general classification of "domestic supply" may be used for any of the inclusive purposes listed in the definition. In other words, as a practical matter, applications should be refined only when the situation makes it necessary.

However, refinement is appropriate when the facts are clear. For example, if the applicant only intends to water his lawn and garden, the use should be designated "domestic supply (lawn and garden watering only)."

- d. On water sources where the availability of water is marginal such as a stream that has been administratively closed to further appropriation for other than domestic supply or stockwatering purposes the following criteria should be used:
 - (1) If water is available from another source, the application should be denied based on lack of available water and highest feasible use of the remaining waters. This logic

would prevail even for household water, since the denial would not be endangering health or welfare - rather, it would merely be requiring the applicant to use an alternate and more reliable source.

(2) If water is not available from another source, the application should be approved for "domestic supply." By adopting this stand, the Department is essentially saying that people are entitled not only to household water, but also sufficient water to maintain a pleasant yard surrounding, over and above instream needs; except as provided in item f below.

e. On water sources where the availability of water is critical (i.e., the taking of additional water will, in fact, adversely affect existing rights to use the waters in question), all applications for "domestic supply" shall be denied.

Where no other source of water appears to exist, the applicant should be advised of the provisions of 90.03.040 RCW, and the denial should be conditioned to allow further processing and issuance of the permit if the applicant acquires a water right sufficient to meet his needs by purchase or condemnation; provided that such action to acquire the water right is initiated within one year from the date of denial.

f. On water sources where the cumulative effect of numerous diversions for domestic supply would seriously impair either the aesthetic or fisheries resource values of the water source for riparian owners and the public in general, all applications for domestic supply shall be denied as being detrimental to the public, except to the extent that such waters are needed for household supply.

The use under the excepted category should be designated "domestic supply (household use only)."

g. If an application is accepted and published with irrigation as the use and it is later found that the use is for lawn and/or noncommercial garden watering of 1/2 acre or less, it should be ruled on in the same manner as a "domestic supply" application.

4. APPROPRIATION OF WATER FOR IRRIGATION PURPOSES

Appropriation of water for irrigation purposes will be generally guided by the criteria set forth in the following:

- a. In the field investigation of an application, the quantities of water allocated, as expressed in gpm or cfs and acre-feet per year, will be determined and specified.
- b. To the extent possible, the intent of the applicant in the development of his irrigation program will be determined and be used as the basis for the water allocation.
- c. The field examiner shall determine the maximum acreage to be irrigated under the proposed project, as well as the segregation of this acreage into different crops. If an annual rotation program is to be followed by the applicant, the field examiner shall determine the breakdown of crops and associated acreages. Where there is uncertainty as to the rotation program, the field examiner shall show discretion in allocating what might be expected to be the maximum use of water
- d. Net irrigation water requirements for each crop shall be determined from the two-year frequency of occurrence table set forth in Station Circular 512 entitled "Irrigation Water Requirements Estimates for Washington," published by Washington Agricultural Experiment Station, College of Agriculture, Washington State University, November 1969. This frequency of occurrence is selected in recognition of the facts that the values reported (a) do not take into account those waters available to the crops at the commencement of the irrigation season as soil moisture storage and (b) are based upon maximum crop production where water is not the limiting factor.

Irrigation water requirements in depth of inches of water for the crops common in the basin are shown in the Table below, with frequency of occurrence of one in two years and five years.

TABLE II-5 Irrigation Water Requirements in Inches Depth of Water

Crops	1 in 2 year	1 in 5 years
Alfalfa	29	35
Grain (spring)	20	22
Orchard (clear)	23	26
Pasture	24	29
Peas	18	20
Potatoes	22	26
Strawberries	7	8
Wheat (winter)	10*	11*

* Includes three-inch preplanting irrigation requirements. Source: Station Circular 512, November 1969.

- e. Water shall be allocated for the net irrigation water requirement of the crops, as well as for reasonable delivery and application losses. The following irrigation efficiencies shall be used for computing total irrigation water needs:
 - (1) Sprinkler systems (pump at source of supply): 70 percent,
 - (2) Rill irrigation (at farm headgate): 65 percent.
- f. The rate of diversion or withdrawal shall be limited to a maximum of 10 gpm per acre.
- g. The total annual allocation, as expressed in acre-feet per year, shall be calculated from the acreage to be irrigated and the crop demand as adjusted (increased) by appropriate irrigation efficiency.
- h. In all instances, the maximum number of acres to be irrigated in any calendar year will be the controlling consideration in the allocation of water for irrigation purposes. This acreage will be associated with a specific parcel of land to be described in the permit.
- i. Pre-irrigation of wheatlands will be considered to be a beneficial irrigation use. Water requirements for pre-irrigation purposes will be included in the net irrigation water determination.

WATER RESOURCES MANAGEMENT PROGRAM

LITTLE SPOKANE RIVER BASIN

SECTION III

PUBLIC INTERESTS AND FACTUAL FINDINGS

III. PUBLIC INTEREST AND FACTUAL FINDINGS

"Expression of the public interest will be sought at all stages of water planning and allocation discussions.--RCW 90.54.020(9).

Interests of the basin residents and appropriate agencies have been sought and identified by the department. Public opinion accumulated through public workshops, surveys, and correspondence provided the foundation for this water resources management program.

The following are findings on public interests identified by public and factual findings resulting from departmental studies.

These public interests and factual findings are presented under separate headings in the section on basin-wide findings, while in subsequent subbasin findings no separation has been made. A short description of subbasin characteristics precedes each subbasin finding.

A. BASIN-WIDE FINDINGS - LITTLE SPOKANE RIVER BASIN

1. PUBLIC INTERESTS

- a. Conservation of natural aesthetic assets and of rural atmosphere are of major importance to the people in this basin.
- b. Effective management of basin water resources should preserve the natural environment in harmony with agricultural interests.
- c. Headwaters and tributaries of the Little Spokane River have high potential to support more wildlife and fish populations.
- d. Instream uses of water are as important as out-of-stream uses of water.
- e. It is essential to establish and maintain instream flows to preserve "instream values."
- f. Full utilization of instream-use potential is restricted by ownership of the adjacent lands. Public access to the stream is only through limited public lands.
- g. Localized flooding occurs along the river from Chattaroy to the confluence with the Spokane River.
- h. Nonstructural measures are preferred over structural flood control.
- i. Good water quality of the river should be maintained and improved, as appropriate.

- j. Through the public involvement program, priorities among different water uses in the tributaries and main stream segments have been found to be:
- (1) West Branch Little Spokane River: domestic, fish, wildlife, stock watering, irrigation, aesthetic, recreation.
 - (2) East Branch Little Spokane River: domestic, stock watering, irrigation, fish and wildlife, aesthetic, recreation.
 - (3) Otter Creek: domestic, stock watering, fish and wildlife, aesthetic, irrigation.
 - (4) The Little Spokane River below branches and above Chattaroy: domestic, aesthetic, stock watering, fish and wildlife, irrigation, recreation.
 - (5) Dragoon Creek: domestic, fish and wildlife, stock watering, irrigation.
 - (6) Deer Creek: domestic, stock watering, fish and wildlife, aesthetic, recreation.
 - (7) Deep Creek: domestic, stock watering, fish and wildlife, irrigation use.
 - (8) Deadman Creek: domestic, stock watering, fish and wildlife, irrigation, recreation.
 - (9) Little Spokane River below Chattaroy and above Dartford: domestic, stock watering, fish and wildlife, aesthetics, irrigation.
 - (10) Little Spokane River below Dartford to the confluence with the Spokane River: domestic, stock watering, fish and wildlife, recreation, aesthetics, irrigation.

2. FACTUAL FINDINGS

- a. The downstream portion of the basin is under pressure for rapid growth because it is close to the Metropolitan Spokane area.
- b. Supply for domestic use from both surface and ground water is of great importance although the amount of consumption is relatively small. This specific water use will be more demanding because of the natural setting of the basin and the proximity to the metropolitan area.
- c. The total amount of water available annually is sufficient to satisfy all water needs; however, there is a seasonal distribution problem in all tributaries.

- f. In many of the tributary streams during the low flow months, remaining natural flows are less than the amount necessary to sustain a desirable level of aquatic life.
- g. In addition to the withdrawal in September 1973, the following streams and tributaries have been recommended by the Game Department for closure to further appropriation for consumptive water uses, except domestic water supply and stock watering.

Table III-1 Existing Administrative Stream Closures

Stream	Date of Closure	County
Otter Creek	2-23-71	Spokane
Dry Creek	5-26-52	Pend Oreille
Bear Creek	4-13-53	Spokane
Deer Creek	2-29-68	Spokane
Dragoon Creek	7-02-51	Spokane & Stevens
Deep Creek	6-14-61	Spokane
Deadman Creek*	11-28-61	Spokane
Little Creek	4-13-53	Spokane

* Closure except unnamed tributary flowing through Sec. 20, T26N., R44E.

- h. In many of the tributary streams, future large quantities of water may be satisfied by off-stream storage of winter flow and/or by development of ground water.
- i. Out of a total basin area of 435,000 acres, 119,000 acres (27%) are grazed and another 92,400 acres are devoted to cropland primarily for hay, pasture and small grain. Of this cropland, approximately 6,400 acres are presently being irrigated. The land under actual irrigation represents approximately 41 percent of the total irrigated acreage covered under recorded surface and ground water rights as shown in Table III-2.

Table III-2 Ratio of Estimated Actual Irrigation to Land Under Irrigation Water Rights in the Little Spokane River Basin ^{1/}

Source of Water	Existing Irrigation Water Rights (acres)	Estimated Actual Irrigated Land as of 1973	Ratio of Actual Use
Ground Water	9,900	3,962	40%
Surface Water	5,700	2,416	42%
Total	15,600	6,378	40.8%

^{1/} For subbasin breakdown, see Table IV-8 in Section IV.C.2. Water Resources Use.

- j. There exists about 67,000 acres of land with irrigable soils (Class II & III); however, the short frost-free period limits irrigation developments in much of the upper part of this basin.
- k. The main stem of the Little Spokane River receives a large amount of ground water discharge throughout the year from springs and subsurface seepage, especially along the stream reach between three miles north of Chattaroy to four miles below Dartford. The large ground water discharge provides the mainstem Little Spokane River with relatively high summer flows.
- l. The ground water component of the Little Spokane River summer flows measured at Dartford ranges from about 65 to 115 cubic feet per second.
- m. Ground water in the Little Spokane River Basin stems from both direct precipitation and from underflow moving north from Spokane Valley through the Hillyard trench. It is estimated that about one-fifth of the precipitation falling on the basin annually recharges the ground water reservoir in the Little Spokane River Basin, while roughly 130,000 acre-feet per year enters the basin as underflow through the glaciofluvial deposits beneath Hillyard.
- n. Presently, approximately 90,000 acre-feet of ground water are being pumped from the basin. Of this total, about 66 percent is drawn from the area south of Mead, and is used for public water supply and industrial purposes,
- o. The present level of ground water withdrawal is not significantly impacting overall ground water storage. However, the development of ground water has been increasing, and is expected to continue.
- p. The Little Spokane River Valley proper is the most suitable part of the basin for developing additional ground water supplies. The Dragoon Creek (Deer Park) watershed and the valleys between the mesas are also suitable for ground water development for small acreage farming or other moderate uses.
- q. The ground water quality is such that it can be used for domestic and irrigation water supply with little or no treatment.
- r. A large number of water right claims have been filed in accordance with the state law, Chapter 90.14.041 RCW: Water Rights - Registration - Waiver, etc.
- s. Except for bacteriological measurements, the Little Spokane River meets the Class A Water Quality Standards.

The coliform counts, which increase from the headwaters to the mouth of the river, correspond to increasing residential development.

B. SUBBASIN FINDINGS

1. UPPER LITTLE SPOKANE RIVER SUBBASIN - LITTLE SPOKANE RIVER AND THE TRIBUTARIES ABOVE CHATTAROY

This study area covers 278 square miles in the State of Washington and includes the watersheds of the West Branch Little Spokane River, Otter Creek, Dry Creek, Bear Creek, and the main stem of the Little Spokane River above Chattaroy.

Four natural lakes along the West Branch Little Spokane River and Diamond Lake possess high instream use potential for fish, wildlife, and aesthetic use with surrounding high mountains. Much of this area is forest land while 15,000 acres (8.5%) are croplands. Frost-free period ranges from 80 to 110 days.

- a. Irrigable lands are located along the Little Spokane River Valley, around Eloika Lake, Diamond Lake, and Horseshoe Lake.
- b. Much of the irrigable lands are covered under existing water rights. No new significant irrigation development is expected at this time, although development of small holdings is expected to grow.
- c. Public access and private and public resort areas are available at most of the lakes. Because of the proximity of the City of Newport, Diamond Lake and Sacheen Lake are expected to continue development with summer homes and residential housing.
- d. Domestic water supply and stock watering are major water uses. Only 5 percent or less of the total population obtain domestic water supplies from surface water.
- e. There are no existing or contemplated significant industrial or municipal water uses.
- f. Potential exists for enhancement of fish population, recreation, and aesthetic enjoyment with several lakes and undeveloped areas in this subbasin.
- g. A moderate to large amount of ground water is available in much of this subbasin along the stream.
- h. The State Game Department has requested the closure of all the small streams in this subbasin to further consumptive appropriation except for domestic water supply and stock watering use.

2. DRAGOON CREEK SUBBASIN

The Dragoon Creek study area covers 177 square miles (113,300 acres) of forest and pasture lands in the western part of Spokane County and the southeastern corner of Stevens County. This subbasin lies generally on the altitude ranging between 2,000 and 2,300 feet above mean sea level.

Average precipitation at Deer Park is 22.44 inches, and the frost-free period varies from 80 days to 130 days. In general, surface soils are loamy sands underlain by well sorted silts, sand, and some clay with a little gravel. Good soils and climate stimulate irrigation of croplands of small grains, hay, and pasture. Approximately 52 percent of croplands covered under recorded water rights are actually irrigated. While surface water levels reach critical limits to sustain aquatic life during the irrigation season, ground water is available on a localized basis.

- a. During the low flow season, surface water is available only by storage of winter flow.
- b. About 40,600 acres or 36 percent of the total subbasin are identified as having favorable soil conditions for crop irrigation, 32,880 acres being "Class IV"* soil.
- c. Large-scale irrigation developments are not expected to occur at the present time due to the limited economic return from large investment; however, irrigations of small acreage dry croplands are being contemplated by individuals. Production of crops on these lands could be increased by the addition of water.

*Irrigability is determined by using permeability and drainage (slope) and in some cases, the water table as the major limiting factor. The economic feasibility will have to be determined by a field study.

- d. Ground water is available locally to support limited amounts of irrigation activities.
- e. Seasonal and yearly fluctuation of the level of ground water reservoir occurs, which may cause localized well interference problems if new wells are concentrated in a limited area. However, there has been no significant change in the ground water storage in this basin.
- f. Most recharge to the ground water reservoir in this watershed occurs in winter and early spring as the result of snowmelt and winter rains.

- g. Potential exists in this basin to increase crop yields by application of adequately treated municipal wastewater and sludge. The general area lying south and west of Deer Park has favorable soil and has been considered for land application of treated wastewater.
- h. Public access to the stream is limited.
- i. Surface waters of Dragoon Creek and its tributaries have been closed to further consumptive appropriation except for domestic water supply and stock watering in accordance with the recommendations by the State Department of Game.

3. DEADMAN CREEK SUBBASIN

This study area covers 165 square miles (105,600 acres) in the southeastern part of the Little Spokane River Basin. Deer Creek, Deep Creek, and Deadman Creek are the main streams which drain the highlands of Peone Prairie, Orchard Prairie, Pleasant Prairie, Green Bluff, Orchard Bluff, and the west side of Mount Spokane.

The preglacial deposits beneath the Hillyard area southwest of this subbasin provide a large amount of ground water for municipal and industrial water supply. The southern part of this basin is experiencing rapid urbanization as the Metropolitan Spokane region grows.

- a. On a total annual yield basis, water is available to satisfy all water needs; however, this watershed has critical distribution problems during the low flow period.
- b. Because of topographic and geologic characteristics of this subbasin, Deep Creek and Deer Creek often become dry during summer.
- c. Water may be obtained during the low flow season by storage of winter flow or development of ground water.
- d. Large quantities of ground water are available along the southwest boundary of this basin and near the confluences of the creeks with the Little Spokane River.
- e. The valleys between the mesas may also yield small to moderate quantities of ground water. Only small quantities of ground water are available locally on the mesas, such as Green Bluff and Orchard Bluff.
- f. All creeks and their tributaries have been closed to further consumptive appropriation except for domestic water supply and stock watering in accordance with the recommendations of the State Department of Game.

- g. The southern part of the basin is developing into suburban residential neighborhoods.
- h. The preglacial valley beneath Hillyard provides substantial quantities of municipal and industrial water supplies. (31,000 acre-feet annually to the City of Spokane and 20,000 acre-feet to the Kaiser Aluminum/Chemical Corporation for metal processing).
- i. The industrial cooling water return flow from Kaiser Aluminum significantly increases the flow in Deadman Creek downstream from the Newport Highway. Summer low flows in this reach are almost totally dependent on the operation of the Kaiser Aluminum plant. Should the operation use less cooling water as technology develops, this reach may also suffer extremely low summer flows.
- j. Existing surface and ground water rights cover 870 acres and 1,600 acres of croplands, respectively. However, actual irrigation is only about one-third of the total land under existing water rights.
- k. Presently, 31,369 acres of land are used for dryland farming of small grains, hay, pasture, fruit orchards, and truck farming.

4. LOWER LITTLE SPOKANE RIVER BELOW CHATTAROY

This study area covers 59 square miles (37,760 acres) of the Little Spokane River Basin below Chattaroy and the Little Creek watershed.

This drainage area features Lockhart Hill, Rattlesnake Hill, Homann Corner, and the northern part of Five Mile Prairie.

The readily available ground water south of the river below Chattaroy and its proximity to Metropolitan Spokane has resulted in residential developments and the existence of 17 public water suppliers. The service population of these domestic and municipal water suppliers ranges from 18 people to part of the City of Spokane.

- a. As part of Metropolitan Spokane, the region south of the lower Little Spokane River is developing as a residential neighborhood while adjacent lands along the stream below Dartford have potential to develop into a recreational area. Sufficient water is available to support instream use activities in this reach. Public agencies are acquiring some adjacent lands.
- b. Perennial discharge of ground water from the ground water reservoir and Hillyard aquifer maintains a high level of summer flow.

- c. Natural settings and historical sites increase the instream values of this stream reach.
- d. Public access to the river front is limited except through limited state and county parks and privately donated land.
- e. Localized flood damages occur on pastures and croplands.
- f. Most of the irrigation water rights are for small farm land holdings with the exception of a few rights for more than 150 acres. Approximately 85 percent of the water rights are for less than 20 acres.

WATER RESOURCES MANAGEMENT PROGRAM

LITTLE SPOKANE RIVER BASIN

Section IV

WATER RESOURCES AND RESOURCE USE

IV. WATER RESOURCES AND RESOURCE USE

A. PHYSICAL SETTING

TOPOGRAPHY AND DRAINAGE

The Little Spokane River Basin covers a 701 square mile drainage area which includes north-central Spokane County, southern Pend Oreille County, southeastern Stevens County, and approximately 23 square miles of Idaho State. The area is, in general, a broad basin surrounded by the Okanogan bedrock highlands on the west and the Selkirk bedrock highlands to the east.

Elevations range from a low of 1,553 feet above sea level at Fort Spokane Historic Site to 3,998 feet atop Scoop Mountain west of Dragoon Creek, 5,256 feet atop Boyer Mountain to the north of West Branch Little Spokane River, to a high of 5,878 feet atop Mt. Spokane to the east of the Little Spokane River Valley.

Because of similar basin characteristics and convenience in assimilation of information, the drainage basin has been subdivided into four subbasins: (1) Dragoon Creek Subbasin on the west of the Little Spokane River Valley; (2) Upper Little Spokane River Subbasin covering the West Branch and the Little Spokane River above Chattaroy drainage areas; (3) Deadman Creek Subbasin east of the Valley to include Deer Creek, Deep Creek, Peone Creek, and Deadman Creek drainage areas; and (4) Lower Little Spokane River below Chattaroy (Figure IV-1).

Dragoon Creek Subbasin lies mostly between 2,000 feet and 2,200 feet above mean sea level. Several mesas, Orchard Bluff, Green Bluff, Foothills, Pleasant Prairie, and Orchard Prairie, and the valley between the mesas form a large portion of the area east of the Little Spokane River. The mesas rise about 400 feet above their bases, and the tops of the mesas are generally between 2,300 and 2,400 feet above sea level (Fig. IV-2).

The soils on the upper parts of the plateaus are generally deep, medium textured, and well drained. (Detailed subbasin descriptions are included in Section III. B., Subbasin Findings.)

GEOLOGIC SETTING ^{1/}

Plutonic and metamorphic rocks of pretertiary age (more than 63 million years) underlie the entire area. These basement rocks form the mountains that surround the drainage basin.

^{1/} Source: "Ground Water Resources and Related Geology, North-Central Spokane and Southeastern Stevens counties of Washington." By Denzel R. Cline, Department of Ecology, Water Supply Bulletin 27, 1969.

During late Tertiary time (1 million to 63 million years ago) extensive basaltic lava flows flooded a vast region and blocked stream drainages, including the ancestral Spokane River. The blockages formed lakes into which sediments eroded from the higher lands were deposited. The resulting lake beds underlie and are interbedded with the basalt, particularly southwest of Spokane.

With cessation of the outpouring of the basalt, the Spokane River carved a deep trench through the basalt and lakebeds. This trench, later buried beneath Quaternary glacial deposits (less than 1 million years ago), probably now underlies the Hillyard area and turns westward along the Little Spokane River and northwestward down the present valley of the Spokane River.

During Pleistocene time (less than 1 million but more than 10,000 years ago), extensive glaciers moved into the area from north and east, stopping just south of Milan, and a short distance east of Spokane in the Spokane River Valley.

Erosion by the ice and intermittent torrential glacial streams left a number of basalt-capped mesas. At various times since, the edges of the mesas have given away in landslides. The glaciers also brought much debris that was deposited in a variety of ways, some directly by ice (morainal deposits), some in glacial lakes (glaciolacustrine deposits), some by streams of glacial melt water (glaciofluvial deposits), and some, like the Palouse Formation, by long-distance wind transport.

During Holocene (recent) time, following the retreat and disappearance of the glaciers, the rivers, principally the Little Spokane River, have been depositing alluvium along their channels, and winds have blown loose sand to form dunes at several places in the basin.

CLIMATE

The basin climate ranges from semiarid to subhumid, with precipitation increasing northerly and easterly with altitude. In the lower part of the Little Spokane River Valley, the precipitation is usually less than 20 inches per year, whereas in the higher northern and eastern part of the basin it is more than 35 inches per year (Fig. IV-3).

Frost penetrates 12 to 18 inches into the ground during a normal year, while during a cold winter it may penetrate as deep as 30 inches. The frost-free period ranges from 80 to 140 days depending on soil characteristics and climate; the frost-free period of the Eloika series is 80 days, that of the Clayton series which is predominant in Dragoon Creek Subbasin is 110 days, Green Bluff series - 135 days, Uhlig series on Pleasant Prairie - 140 days, and Phoebe series in the area of Wethey Creek and on Half Moon Prairie are about 140 days. ^{1/}

^{1/} Source: "Soil Survey, Spokane County, Washington." USDA, Soil Conservation Service, 1968.



Figure IV-1
 LITTLE SPOKANE RIVER BASIN
 and SUBBASINS



Figure IV-2 GENERALIZED GEOLOGY OF THE LITTLE SPOKANE RIVER BASIN.

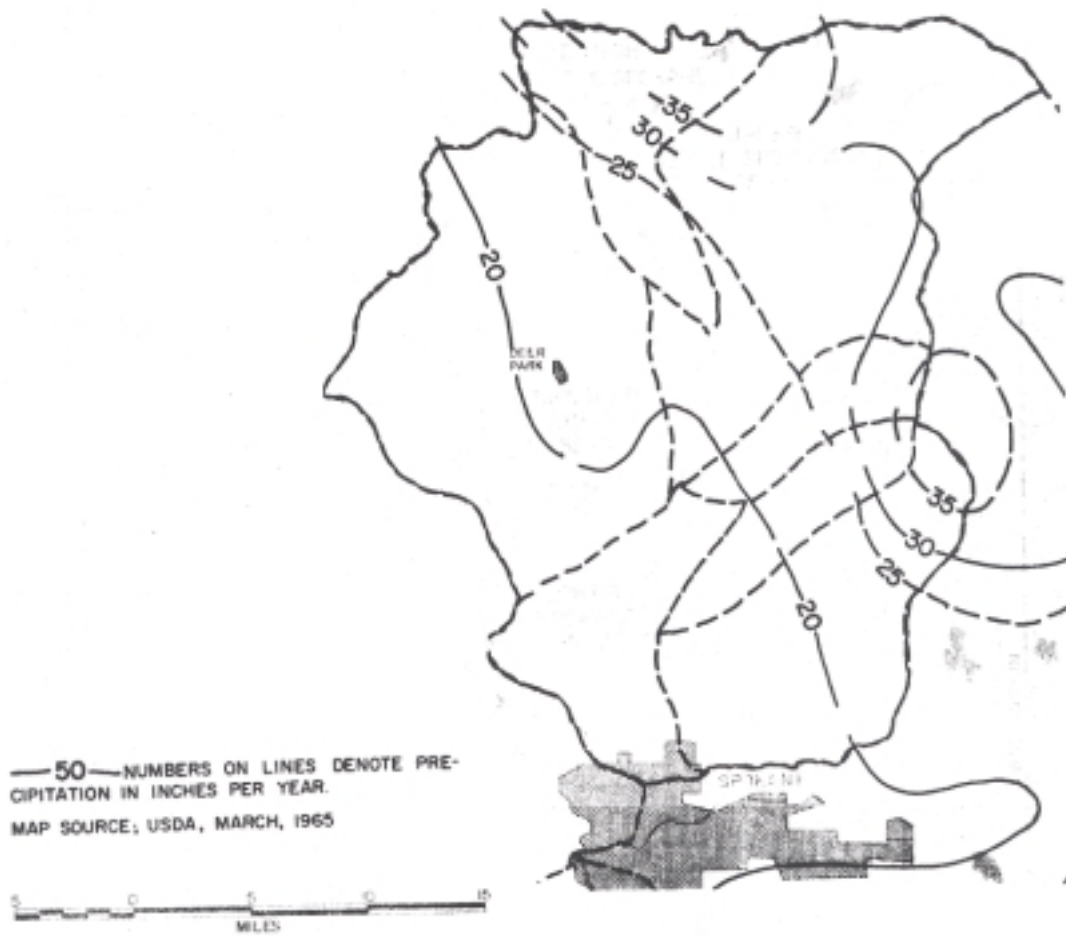


Figure IV-3 Average Annual Precipitation in Inches
Little Spokane River Basin

Table IV-1 Average Monthly and Annual Climatic Condition
at Deer Park, Elv. 2214 ft. MSL, Latitude 47° 57' N., Longitude 117° 26'

Parameter	Years of Record	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
i) Temperature	1931-72	24.4°	29.6°	36.4°	45.4°	53.7°	59.6°	66.0°	64.1°	56.4°	46.6°	34.3°	28.1°	45.4°
ii) Day hr.	-	6.17	6.41	8.26	9.17	10.52	10.72	10.81	9.89	8.45	7.51	6.24	5.85	-
iii) Precip.	1931-71	2.99	2.13	1.87	1.58	1.61	1.60	0.52	0.65	1.17	2.09	2.87	3.26	22.44
iv) PET	(Estimate)	-	-	0.4	1.7	3.1	4.0	5. °	4.4	2.8	1.4	0.2	-	23.0
v) Ea(6)	(Estimate)	-	-	0.4	1.7	2.9	3.0	2.0	1.1	1.4	1.4	0.2	-	14.2

Note

ii) Day hr. : Monthly average daytime hours for month latitude 48°.

iii) Precip. : Precipitation, vi) PET: Estimated potential evapotranspiration,

v) Ea(6): Estimated actual evapotranspiration for the 6-inch water holding capacity soil.

Table IV-2 Monthly Precipitation Means and Extremes

Station	Years of Record	Eleva-tion	Items	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept	Oct.	Nov.	Dec.	Annual
Deer Park 2%	1931-1971	2114	Mean	2.99	2.13	1.87	1.58	1.61	1.60	.52	.65	1.17	2.09	2.87	3.36	22.44
			Max.	5.59	5.94	4.91	4.12	5.94	4.11	1.54	2.48	3.35	6.37	7.25	7.23	29.95
			Min.	.48	.44	.20	.30	.17	.29	T	.00	.03	.11	.24	1.20	13.13
			Max. Day	1.49	1.92	2.18	2.24	1.24	1.87	.93	.94	1.34	1.42	1.55	1.97	2.24
Mt. Spokane Summit	1954-1971	5890	Mean	5.82	4.77	4.79	3.44	2.73	2.72	1.31	1.74	2.74	3.83	6.37	6.13	46.39
			Max.	10.10	13.20	9.35	7.50	7.19	6.78	3.76	5.64	9.64	7.16	13.26	14.01	57.64
			Min.	1.31	1.85	.35	.40	.55	.69	.00	.00	.24	.22	.90	1.98	35.03
			Max. Day	3.33	2.54	3.53	3.99	1.66	3.52	2.25	1.40	2.82	2.95	2.74	2.92	3.99
Spokane	1954-1971	1875	Mean	2.44	1.56	1.53	1.28	1.48	1.43	.48	.74	.85	1.37	2.26	2.36	17.78
			Max.	4.59	3.94	3.04	2.65	3.85	3.41	1.45	2.06	2.35	3.03	4.95	3.91	21.34
			Min.	.17	.34	.18	.12	.37	.14	.00	.00	.15	.04	.14	.69	14.18
			Max. Day*	1.07	1.18	1.85	1.69	1.07	2.58	.81	.76	.68	1.03	1.81	1.17	2.58
Spokane Airport	1931-1971	2357	Mean	2.42	1.77	1.50	1.00	1.17	1.48	.39	.47	.712	1.43	2.18	2.49	17.01
			Max.	4.96	3.94	3.75	3.08	5.71	3.06	1.29	1.73	2.05	4.05	4.64	5.13	26.07
			Min.	.50	.40	.31	.08	.45	.16	T	T	.06	.05	.34	1.21	10.65
			Max. Day	1.48	.96	1.72	1.71	1.67	1.52	.79	1.09	.92	.98	1.41	1.60	1.72

Occasional sudden warm winds or rains in winter melt the snow rapidly. If this happens when the ground is frozen, the water runs off rapidly into the streams instead of soaking into the ground. Tables IV-1 and IV-2, below, show climatic information measured at weather reporting stations at Deer Park, Mt. Spokane Summit, and at the Spokane Weather Bureau at the Airport (WBAS).

B. WATER RESOURCES

With high mountains on the north and the east of the Little Spokane River Basin, there exists a large amount of surface water available on an annual basin-wide basis.

Precipitation in the high mountains, largely in the form of snowfall during the winter months, produces large spring runoff when it is combined with spring rainfall. The tributary streams, having steep slopes in the headwaters, rapidly empty the surface runoff and suffer low summer flows, causing seasonal distribution problems.

Part of the precipitation on the surface soaks into the ground and moves downward to the zone of saturation, where it becomes part of the Little Spokane River ground water reservoir. This in turn is discharged into the mainstem Little Spokane River when the flow level is low. The lower reach of the river, approximately four miles below Dartford, obtains a large amount of ground water discharge from the Spokane Valley aquifer.

1. SURFACE WATER RESOURCES AND STREAM FLOW CHARACTERISTICS

The stream flows of the Little Spokane River have been measured for a number of years at Dartford (1929 to 1932 and 1948 to present), and at Elk (1948-1970). Summer low-flows of the tributary streams were measured extensively for the period 1961 - 1970 through a cooperative program by the U.S. Geological Survey and the State Department of Ecology. The continuous gaging stations and miscellaneous stream gage locations are shown in Figure IV-4.

^{1/} Source: "Soil Survey, Spokane County, Washington." USDA, Soil Conservation Service, 1968.

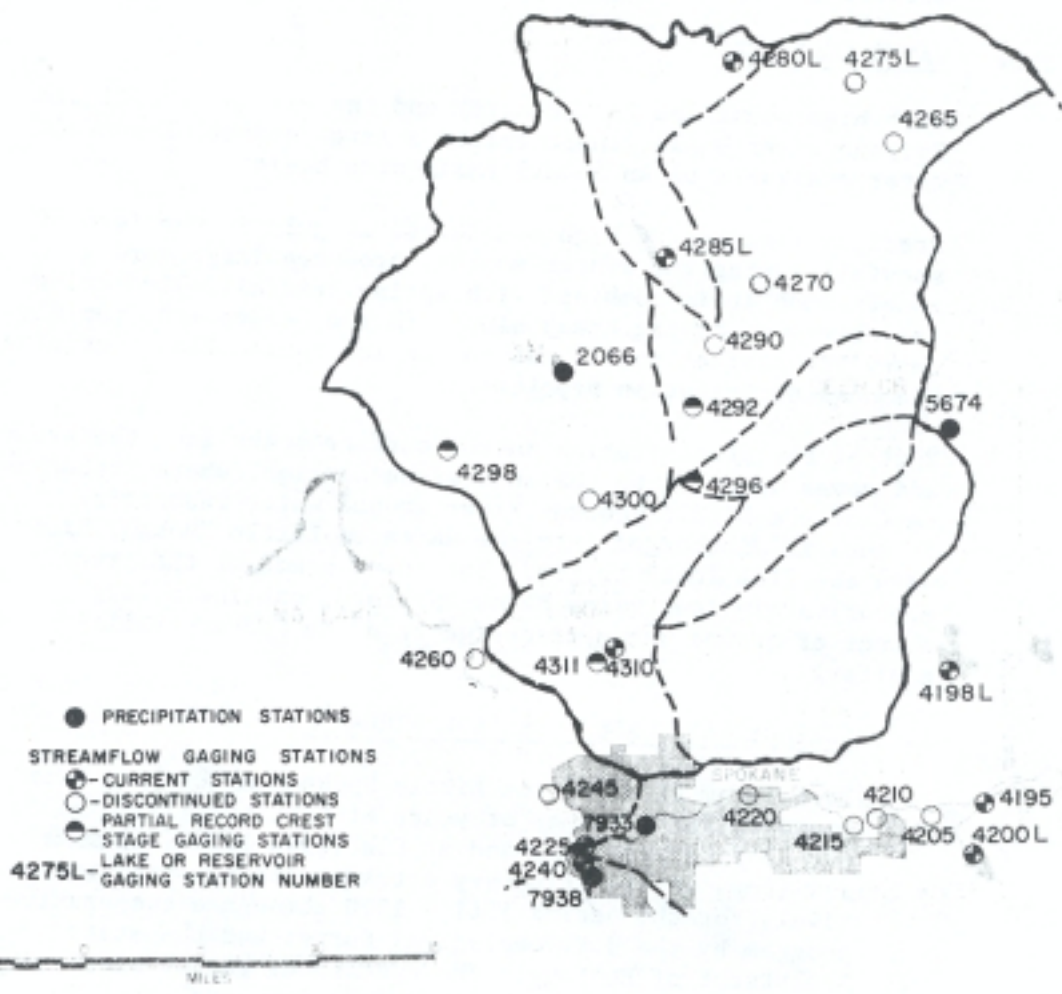


Figure IV-4. Precipitation and Stream Gaging Stations

The annual average discharge measured at the Dartford gaging station is 312 cubic feet per second and the total discharge per year is 226,000 acre-feet. Spring high flows are rapidly emptied in all the tributary streams leaving little flow during the summer months.

While the tributary streams suffer extreme low flows during the summer months, the mainstem Little Spokane River maintains relatively high stream flow where large amounts of ground water inflow occurs from the Dragoon Creek ground water reservoir and the valleys between the mesas on the east.

The analysis of low-flows indicates that nearly all of Dartford summer flows can be accounted for as ground water discharge. When the summer low-flow measurements of the tributary streams are correlated to the concurrent daily mean flows of the continuous gaging station at Dartford, the estimated flows at the mouth of the tributary streams are close to zero when the flow at Dartford gaging station is about 110 cfs.

It may be also substantiated by the fact that the "annual minimum 7-day average flow" curve of Dartford gaged records shows a break at approximately 115 cfs with a nonexceedence frequency of once every four years as shown on Figure IV-5. This figure shows the annual minimum flow of this river consists of (1) a flow from the headwaters and (2) an inflow of 65-110 cfs from the ground water reservoir.

The minimum 7-day low-flow frequency curve of the river at Elk is a normal straight-line form without a break, which indicates a single source of constant summer inflow (Fig. IV-6).

The yields of 7-day low-flow per square mile with 5-year and 10-year recurrence intervals at Elk Station and Dartford Station are shown in the following Table:

Table IV-3 Yields of Annual Minimum 7-Day Low-Flow

Gage Station	Frequency	Drainage Area (sq. mi.)	Yield (cfs)	Yield Rate (cfs/sq. mi.)
Elk	1 in 5 year	115	38	0.33
“	1 in 10 year	115	35	0.3
West Branch 1 Mile below Eloika Lake	1 in 5 year	104	5.2*	0.05*
	1 in 10 year	104	2.8*	0.03*
Dartford	1 in 5 year	665	112	0.17
“	1 in 10 year	665	92	0.14

* Estimated (See Fig. IV-5).

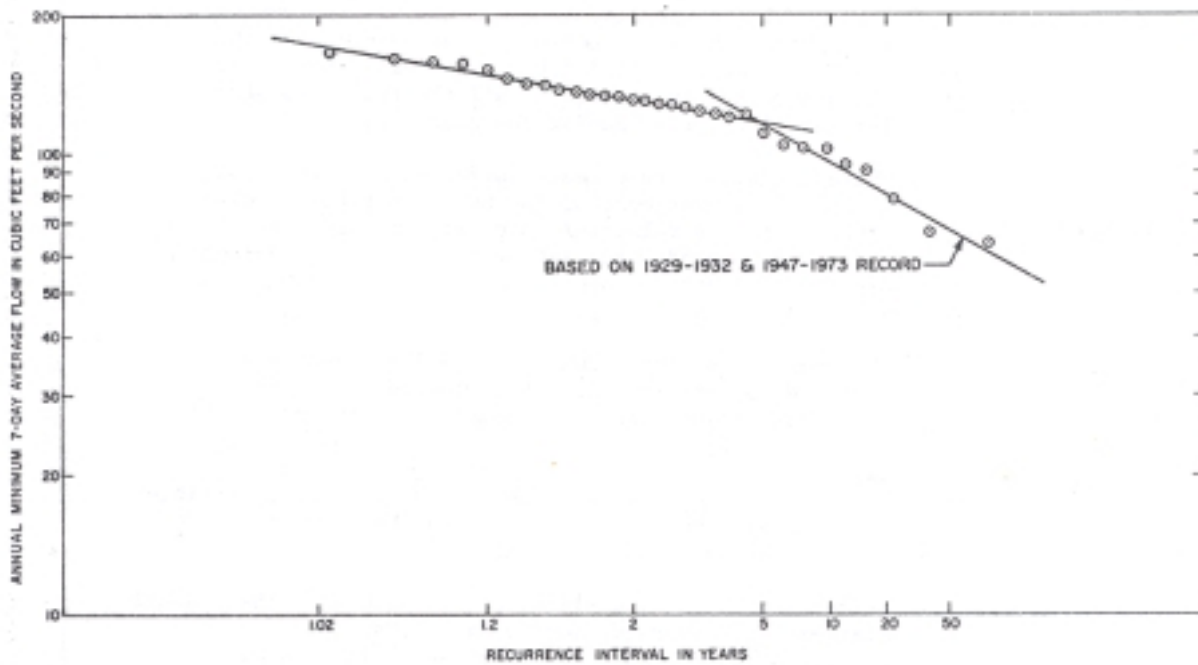


Figure IV-5

LOW FLOW FREQUENCY CURVE, LITTLE SPOKANE RIVER AT DARTFORD, U.S.G.S. GAGE 4310

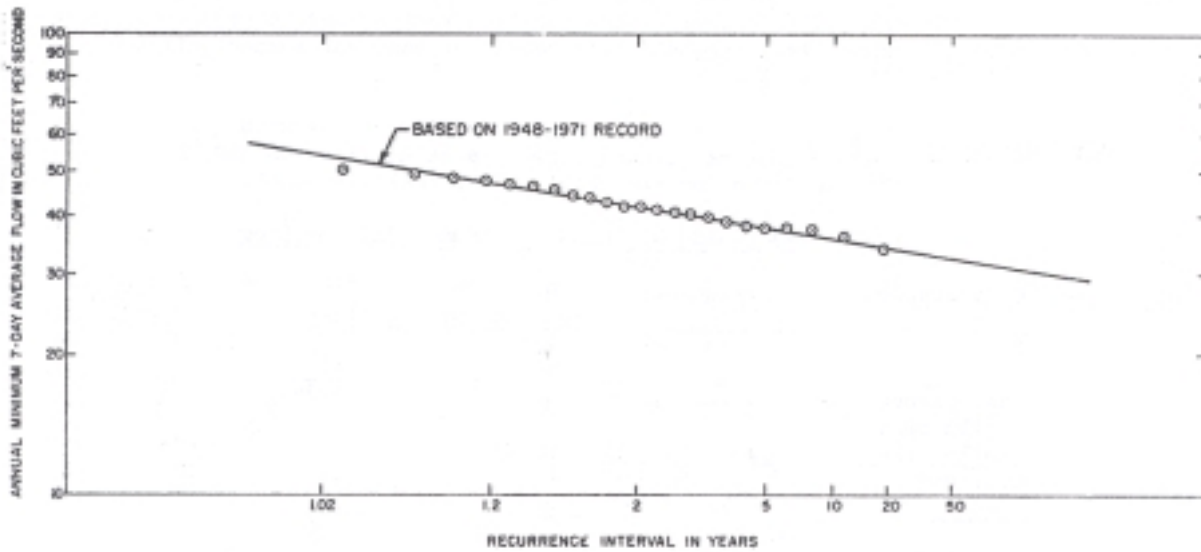


Figure IV-6

LOW FLOW FREQUENCY CURVE, LITTLE SPOKANE RIVER AT ELK, USGS. GAGE 4270

Table IV-4 shows a larger unit yield of low flow in the east branch Little Spokane River Subbasin than the unit yield in the Little Spokane River Basin at Dartford where ground water contribution seems more favorable because of the relatively large permeable Dragoon Creek Subbasin. The unit low flow yield at Elk is about ten times larger than that at West Branch one mile below Eloika Lake which has the same magnitude of drainage area.

It appears that there exists constant inflow into the east branch Little Spokane River from Pend Oreille River starting one mile west of Newport.

Peak flood flows in this basin are largely lessened by the permeable soils and the large forest cover as compared with Hangman Creek Basin. The "100 year" flood peak of the Little Spokane River Basin is entirely determined by rainfall rather than snowmelt. The flood peak is equivalent to a runoff of 7.05 cubic feet per second per square mile.

A line diagram attached in Appendix A represents the magnitude of low-flow and flood flow occurrences on the mainstem Little Spokane River and its tributaries.

2. GROUND-WATER RESOURCES

RECHARGE ^{1/}

Previous investigation by Cline in 1965 estimated that the total recharge into the ground water reservoir within the basin was about 160,000 acre-feet or approximately 17 percent of the annual precipitation falling on the basin. The recharge quantities, however, vary from year to year depending upon rainfall and snowmelt.

Part of the precipitation falling on the basin floor that does not run off promptly and is not consumed by evapotranspiration infiltrates the sand and gravel deposits, and then moves down the valley or locally toward tributary streams. Rapid snowmelt on frozen ground reduces the amount of recharge as the melted water

^{1/} The ground water resources in most parts of the Little Spokane River Basin were investigated and published by the Department of Ecology (previously Department of Water Resources) in 1969 as Water Supply Bulletin No. 27, "Ground Water Resources and Related Geology North-Central Spokane and Southeastern Stevens Counties." Much of the information in this section was excerpted from this previous bulletin.

runs off rapidly into the stream instead of recharging the ground water reservoir. Although annual and seasonal fluctuation of ground water levels occurs, observation of well 27/42-8H1, in the Dragoon Creek Subbasin, indicated that no significant net change in water level had occurred in 18 years, between 1947-1965.

MOVEMENT AND OCCURRENCE

Generally, the configuration of the ground water surface conforms to that of land surface. As the Little Spokane River flows southward, the valley-ward ground water flows are added from the peripheral highlands. Noticeable increase in the summer flow occurs approximately 3 miles above Chattaroy. August and September flows at Dartford consist entirely of ground water discharges which are on the order of 150 cfs.

A large amount of ground water also comes into the basin as underflow through the glacial material beneath the Hillyard area from Spokane Valley. Much of the ground water which originates in Idaho is discharged into the Spokane River above Spokane Falls. Some of it flows through the Spokane Valley as underflow and turns northward through the preglacial valley between Five-Mile Prairie and Orchard Prairie. This underflow is finally discharged into a 4-mile reach of the Little Spokane River below Dartford.

In addition, the Pend Oreille River recharges the northeastern part of the basin where porous sand and gravel deposits prevail. Recharge from the Pend Oreille River and precipitation supply a large amount of year-round flow in the east branch of the Little Spokane River. The elevation of the east branch of the Little Spokane River, which begins about 1 mile west of Newport, is lower than the nearby Pend Oreille River, which enables the water to flow through the porous deposits. The unit yield of summer low-flows in this subbasin is about 10 times larger than the basin-wide average.

DEVELOPMENT OF GROUND WATER

Ground water is available in much of the basin except the area of dune sand deposits east of Deer Park and adjacent to Mead, in the major part of the morainal deposits, along West Branch below Eloika Lake, and along the Little Spokane River Valley in the vicinity of Elk (Figure IV-2).

The area most suitable for developing ground water supplies is beneath the Hillyard area where coarse sands and gravels are deposited in the deep preglacial valley. Yields of more than 5,000 gallons per minute are obtained in this area, and considerably larger yields could be obtained with little drawdown. However, further investigations are necessary before attempting larger ground water development because of local differences in the thickness of deposits.

The buried preglacial valley extends northward from the Hillyard area, decreasing rapidly in depth until it disappears, two or three miles from Chattaroy. Wells tapping the glacial or alluvial deposits in this buried valley produce as much as 1,700 gpm. However, yields vary considerably within short distances.

The yields of ground water vary but are generally favorable in the Dragoon Creek Subbasin. Moderate quantities of water are obtained mainly from sand and gravel beds in the glaciolacustrine deposits. The greatest reported yield is 500 gpm near Deer Park at a depth of 192 feet.

Because of the presence of fine-grained deposits as well as consolidated rocks, little or no water is obtained in some parts of the Dragoon Creek Subbasin, particularly in the vicinity and north of Clayton where much clay occurs. Depths to water in this subbasin are generally shallow except along the eastern part near the Little Spokane River Valley where water levels range from 100 to 150 feet below the surface.

In the valleys bordering the mesas east of the Little Spokane River (between Green Bluff and Orchard Bluff, and the area immediately north of Orchard Bluff), ground water yields range from 0 to 600 gpm. The wide range in yields is due to the variety of rock types beneath these areas.

Small quantities of ground water are generally available beneath Orchard Bluff, Green Bluff, Orchard and Pleasant Prairies, Foothills, and Five-Mile Prairie. Because of differences in geologic formation, the task of obtaining water in these mesas can be difficult and some wells do not produce enough for domestic use.

The quality of ground water obtained in this basin is generally suitable for most purposes without much treatment. Harder water may need softening treatment to reduce the soap consuming character of the water, and the water high in iron may be treated by simple aeration or filtration before storage.

C. LAND AND WATER RESOURCE USE

1. AGRICULTURAL LAND USE

The U. S. Census of Agriculture, 1969, ranked Spokane County the third highest in alfalfa hay production among Washington counties, and tenth in cattle and cows.

Most of the hay is produced north of Spokane, especially in the Dragoon Creek subbasin where the concentration of dairy herds is largest. Of 434,500 acres of total land in the Little Spokane River Basin, 92,400 acres or 21 percent was cropland, predominantly for hay and pastures, and only 5.4 percent or 5,000 acres of the cropland were irrigated according to 1965 U.S. Soil Conservation Service data (see Table IV-4).

TABLE IV-4 Summary of Agricultural Land Use (1965)
Unit in Acres)

Subbasin Name	Total Element Area	Range and Pasture	Dry	Cropland Irrigated Hay and Pasture	Other	Estimated* Irrigable Lands
Upper Little Spokane River	177,920	25,392	14,907	920	-	5,106
Deadman and Deer Creek	105,600	744	31,369	350	110	12,778
Dragoon Creek	113,280	-	36,745	2,920	-	40,630
Lower Little Spokane River	37,760	10,845	4,363	400	300	8,800
Total	434,560	36,981	87,384	4,590	410	67,314

Source: U.S. Soil Conservation Service, Spokane Office.

*The estimated irrigable lands include Class II and III soils. Irrigability is determined using permeability and drainage (slope), and in some cases, the water table as the major limiting factor. The economic feasibility will have to be determined by a field study.

Although the Little Spokane River Valley is known as dairy country, the number of herds has been continually declining because of unfavorable market conditions and high prices for production items.

Total value of statewide livestock and dairy products in 1973 of \$451.5 million rose 129 percent from 1972, as the result of record high prices for

all livestock, dairy, and poultry items. However, shortages and high prices for production items minimized any overall net profit increase and resulted in a one percent decline of total population from the previous year (Washington Agricultural Statistics, 1973).

Washington Agriculture, 1974, showed a further decline of one percent in production and three percent in livestock and livestock products from 1973. The total number of herds in northeast Washington has been continuously declining as shown in Table IV-5.

Table IV-5 Northeast Washington Dairy Farm Summary 1/
(Number of Herds 2/)

Source	Month, Year	Spokane County	Stevens County	Pend Oreille County	Grant County
Census of Agriculture	1964	165	193	23	32
Census of Agriculture	1969	121	139	11	35
Market Milk Admin.	3/1973	105	107	10	38
	3/1974	89	86	5	39
	7/1974	87	81	5	32

The southern part of the Little Spokane River Basin, adjacent to the metropolitan Spokane area, is under pressure of urbanization. As the value of the land increases many of the land owners are contemplating subdivision of agricultural land into small parcels. This is also true in the northern part of the basin where many recreational opportunities exist. Summer homes and permanent residential dwellings are increasing around the lakes in this area.

Pend Oreille County studies indicated that less than five percent of the waterfront residents obtain their water supply from the lakes. The rest of the population either has wells or brings water from other sources. Domestic use of lake waters will be further discouraged as recreational activities increase.

In general, no new large irrigation developments are expected to occur in the foreseeable future. However, in the Otter Creek, Dragoon Creek, and

1/ Source: Spokane County Agricultural Extension Service

2/ Number of herds is for farms reporting 10 or more cows per farm. There are additional farms that had from 1-9 cows.

the Deadman Creek subbasins where soil conditions are favorable, it is expected that the present level of irrigation activities will continue.

Whereas the croplands of the Dragoon Creek subbasin are oriented toward dairy farming, those of Deadman Creek raise a variety of crops including small grains, grass seeds, orchards and vegetables besides hay and pasture. If the dairy farming activities continue to decline, the cropping pattern may change in the Dragoon Creek subbasin in the near future. More water may be required for irrigation, especially in the west and south of the Town of Deer Park. Although water availability is a limiting factor, approximately 40,000 acres of land in this basin are classified irrigable by the SCS in terms of land capability,

2. WATER RESOURCE USE

Much of the water resource development in this basin relies on the ground water resources. Practically all of the public domestic and industrial water supply is from ground water sources, and there are twice as many irrigated lands using ground water sources as those using surface waters.

Development of ground water is extensive in the Dragoon Creek subbasin, along the Little Spokane River Valley, and the southern part of the basin where the Spokane Valley pre-glacial aquifer extends beneath the Hillyard Valley.

The Little Spokane River and its tributaries meander through country farms and residential backyards. Much of the river bed is under private ownership and the stream was ruled as nonnavigable through legal proceedings. Although public recreational uses are limited because of restricted access to water fronts, the instream values are high for environmental and aesthetic reasons. The instream values of this stream can be fully utilized as the public recreational facilities develop along the stream.

WATER RIGHTS

Presently, approximately 15,600 acres are covered under recorded irrigation water rights. There is additional acreage under claims. Although not all water rights are exercised, they are perpetual unless they are "relinquished."

The summary of existing recorded water rights may be an accumulation of historical desires and wishes of the applicants, and may also represent general basin water use characteristics. Table IV-6 shows the status of existing water rights and water right applications as of September, 1973. The figures in the table do not include the water right claims filed with the department under Chapter 90.14 RCW - Claims Registration, 1967.

Table IV-6. WATER RIGHTS IN THE LITTLE SPOKANE RIVER BASIN (1973)
(Units in cubic feet per second)

Use	Subbasin	Upper Little Spokane		Deadman & Deer		Dragoon		Lower Little Spokane		Total	
		Surface	Ground	Surface	Ground	Surface	Ground	Surface	Ground	Surface	Ground
Domestic Use		1.62	-	0.45	-	0.37	-	0.15	-	2.59	-
Group Domestic and Municipal		-	0.63	-	2.95	-	3.34	-	54.86 ^{2/}	-	61.78
Irrigation		35.49	13.6	8.74	34.2	13.35	51.0	9.82	14.58	67.4	113.38
Industrial		-	-	-	29.18	-	0.24	-	-	-	29.42
Fish Propagation		5.55	-	33.42 ^{1/}	0.03	2.5	-	-	0.9	41.47	0.93
TOTAL		42.66	14.23	42.61	66.36	16.22	54.58	9.97	70.34	111.46	205.51

Note: Conversion of irrigation use – 1 acre-ft = 0.004 cfs based on growing period of 125 days.
Conversion of other use – 1 acre-ft = 0.00138 cfs continuous use.

^{1/} Includes 20 cfs for log transportation, nonconsumptive use.

^{2/} Includes 3,510 acre-ft (42.1 cfs) by the City of Spokane.

Irrigation use is the single largest consumptive water user followed by municipal and industrial water supply. The sources of public and industrial water supplies are exclusively from ground water south of Mead where a large amount of ground water flows into this basin from the preglacial Spokane Valley.

There are 17 public water supply entities. The service population ranges from 18 people to a quarter of the City of Spokane. Because of the readily available ground water source practically all of these are from wells, and the number of water suppliers is exceptionally large.

Consumptive surface water rights in the Little Spokane Basin are further analyzed by stream reaches and by tributaries, as summarized in Table IV-7. The amounts in the table are totals of domestic, stockwatering, and irrigation rights covered under existing surface water right permits and certificates. The column on the right shows the amount of consumptive water right applications filed with the department as of September, 1973.

TABLE IV-7. RECORDED CONSUMPTIVE SURFACE WATER RIGHTS AND APPLICATIONS, SEPTEMBER 1973 (cfs)

Stream Name	APR	MAY	JUN	JUL	AUG	SEP	OCT	Application
East Branch	2.5	7.0	7.0	7.0	7.0	7.0	2.6	2.5
Dry Creek	0.04	1.25	1.25	1.25	1.25	1.25	-	0
Otter Creek		2.9	2.9	2.9	2.9	2.9		1.2
West Branch	2.5	10.8	10.8	10.8	10.8	10.8	1.4	4.6
Bear Creek		1.5	1.5	1.5	1.5	1.5		0.02
Deer Creek		0.76	0.76	0.76	0.76	0.76		0.65
Deadman Creek		6.4	6.4	6.4	6.4	6.4		0.6
Deep Creek		0.8	0.8	0.8	0.8	0.8		0
Dragoon Creek		13.4	13.4	13.4	13.4	13.4		0.25
Little Spokane R. Chattaroy-Elk:	1.0	2.4	3.6	3.6	3.36	3.5	0.1	1.5
Dartford- Chattaroy	2.3	6.6	8.7	8.7	8.7	8.1	3.0	1.25

ACTUAL WATER USES VS. RECORDED WATER RIGHTS

It is practically impossible to distinguish "inactive water rights" 1/ from active ones because rights are granted in perpetuity. The administration process itself contains difficulties for estimation of actual consumption from existing water rights. Further, calculation of actual diversion and depletion from the sources at any given date is even more difficult if not impossible.

The irrigated croplands in Column 5, Table IV-4, "Summary of Agricultural Land Use as of 1965," were divided by the source of water supply, ground water and surface water, by multiplying the percentage of acreages under existing surface and ground water rights. Then all applications for surface and ground water rights since 1964 were added to the SCS figures to estimate actual irrigated croplands as shown in Column 6, Table IV-8, below. Finally, the estimated irrigated acreages are divided by the total acreage under recorded water rights and applications to determine ratios of active vs. inactive irrigation water rights as presented in Column 7, Table IV-8.

Table IV-8. ACTUAL USE VERSUS RECORDED WATER RIGHTS

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Subbasin Name and Source of Supply	Acreage Under Water Rights (acres)	Percentage By Source	SCS Estimated Actual Irrigation By Source (acres)	Water Right Applications Since 1964	Estimated Actual Irrigation Col. (4) + Col. (5) (acres)	Actual Use Versus Water Rights Col. (6) + Col. (2) (percent)
<u>Upper Little Spokane</u>						
Ground water	1,569	36	295	260	555	35.4
Surface water	<u>2,787</u>	<u>64</u>	<u>625</u>	507	<u>1,132</u>	<u>40.6</u>
Subtotal	4,356	100	920		1,687	38.7
<u>Deadman & Deer Creek</u>						
Ground water	2,542	75	345	108*	453	17.8
Surface water	<u>829</u>	<u>25</u>	115	157	<u>272</u>	<u>32.8</u>
Subtotal	3,371	100	460		725	21.5
<u>Dragoon Creek</u>						
Ground water	4,195	77	2,263	121	2,384	56.8
Surface water	<u>1,220</u>	<u>23</u>	<u>657</u>	100	<u>757</u>	<u>62.0</u>
subtotal	5,415	100	2,920		3,141	58.0
<u>Lower Little Spokane</u>						
Ground water	1,589	65	497	72	569	35.8
Surface water	<u>870</u>	<u>35</u>	<u>203</u>	52	<u>255</u>	<u>29.3</u>
Subtotal	2,459	100	700		824	33.5
<u>Total Little Spokane River Basin</u>						
Ground water	9,895	63	3,400	561	3,961	40.0
Surface water	<u>5,706</u>	<u>37</u>	<u>1,600</u>	<u>816</u>	<u>2,416</u>	<u>42.3</u>
Total	15,601	100	5,000	1,377	6,377	40.8

*Exclude known unexercised right of 500 acres by an irrigation district.

The results of the comparison indicate that on a basin-wide basis only a maximum of about 40.8 percent of irrigation water rights are being exercised. Deadman Creek and Lower Little Spokane River subbasins resulted in ratios of only 21.5 percent and 33.5 percent respectively. By contrast, 58 percent of the water rights in the Dragoon Creek subbasin are active. This may indicate less impact by urbanization and a more favorable environment.

The surface water rights for agricultural irrigation in the Little Spokane River Basin cover about 96 percent of the total consumptive surface water rights. Therefore, the percentages developed in Column 7, Table IV-8 for each subbasin are used in the estimation of active consumptive water rights, and subsequently, in the estimation of available surface waters for future appropriation in the following section.

D. BENEFICIAL USES OF SURFACE WATER

Determination of beneficial uses in this section is guided by fundamentals of the State Water Resources Policy in Chapter 90.54 Revised Code of Washington, and the public interests identified through public participation activities under the Little Spokane River Basin water resource management program.

1. BASE FLOWS

The necessity of preserving stream flow to protect fish, wildlife, recreational or aesthetic resources was first recognized by the state legislature in 1967 and codified as Chapter 90.22 RCW - Minimum Water Flows and Levels. The State Water Resources Act of 1971 further declared it as fundamental policy to retain "base flows" in the perennial streams for the preservation of instream values.

The base flows in this program are to satisfy the desires of the public as well as to follow the two statutory requirements. The instream values of the Little Spokane River are rated very high.

The mainstem Little Spokane River maintains a relatively high level of summer low flows as the result of continuous ground water inflow as discussed in the previous sections. The area residents appreciate this flow and the aquatic life is accustomed to relatively abundant flows.

Stream flow frequency analyses were conducted on continuous stream flow measurements by U.S. Geological Survey for the Little Spokane River at Dartford from 1929 through 1973, and at Elk for the period of 1948-1970. Results of statistical analysis of seasonal stream flow fluctuations at these two USGS gaging stations conducted by the Portland Division, Corps of Engineers, were plotted on semilogarithmic scale paper to draw a "flow-duration hydrograph."

The flow-duration hydrographs make it possible to visualize the stream flow characteristics in terms of the percent of time a certain level of flow is equaled or exceeded at a specific date throughout the year based on the past flow measurements. The hydrographs plotted by electronic computer depict average daily flow levels with probabilities of occurrence ranging from one percent to 99 percent.

Alternative frequency flow levels were evaluated and discussed with the representatives of state agencies in the Spokane area with regard to impacts at base-flow levels on other beneficial uses. The following principles were established:

- a) Base flows will respond to seasonal fluctuations of the stream under natural conditions.
- b) Base flows will be established at flow levels that exist most of the time. As a minimum, the ground water component of the summer stream flow will be left instream.
- c) Base flows will be at a reasonable level so that adequate amounts of water can be made available to satisfy and to maintain the rural agricultural environment.

Based upon the foregoing analysis and the results of low-flow investigations (annual minimum average 7-day low-flows) summer base flows at Dartford are established at the level where natural flows would be maintained equal to, or more than, four out of five years, or 80 percent of the time on a daily basis.

A general procedure for establishing base flow is described in a DOE publication "Department of Ecology Stream Preservation Program," WRIA Technical Bulletin No. 11.

Stream flow of the Little Spokane River at Elk is relatively uniform. The results of low-flow investigations at the Elk gaging station indicated that every other year the minimum average 7-day low-flow may fall below the 80 percent exceedence duration flow level during the summer. Therefore, the August and September base flows at Elk are based on the annual minimum average 7-day low-flow with nonexceedence frequency of 1 in 5 years. This is equivalent to 90 percent exceedence on a discharge flow-duration curve.

No sufficient continuous flow records are available at the control stations, No. 12-4295 at Chattaroy, and No. 12-4315 near Dartford. However, there are a sufficient number of low flow measurements and miscellaneous measurements to develop regression curves to estimate concurrent daily flows at these control stations based on the Dartford gaged records.

Base flows hydrographs at the control stations, No.12-4295 and No. 12-4315, were developed based on the regression curves, Figure IV-7 and Figure IV-8 respectively, and the base flows at Dartford. Therefore, the frequency characteristics at these control stations should be similar to those at Dartford.

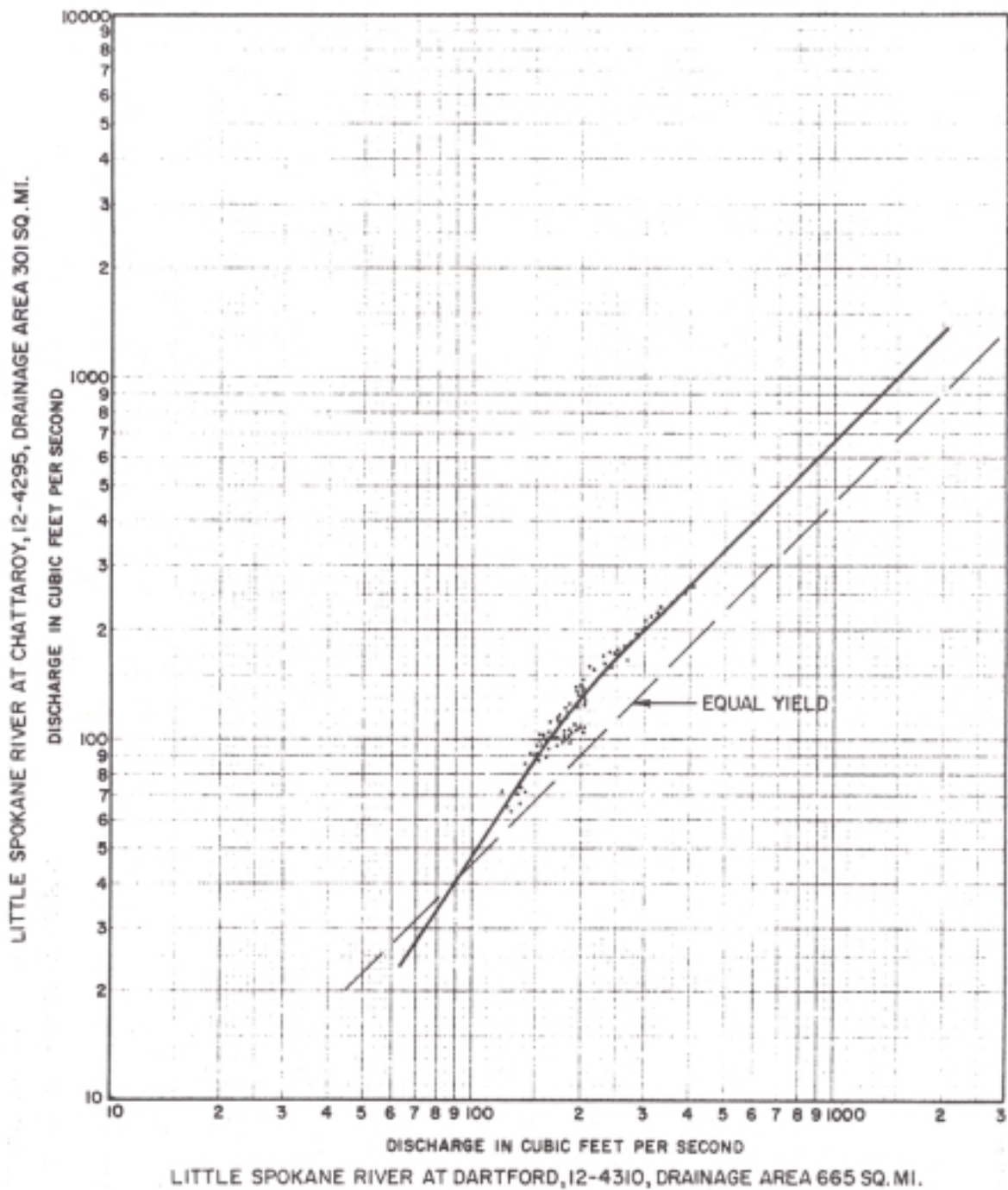


Figure IV-7 RELATION OF LOW FLOW AND MISCELLANEOUS MEASUREMENTS OF LITTLE SPOKANE RIVER AT CHATTAROY TO CONCURRENT GAGED DAILY AVERAGE FLOWS AT DARTFORD, WA.

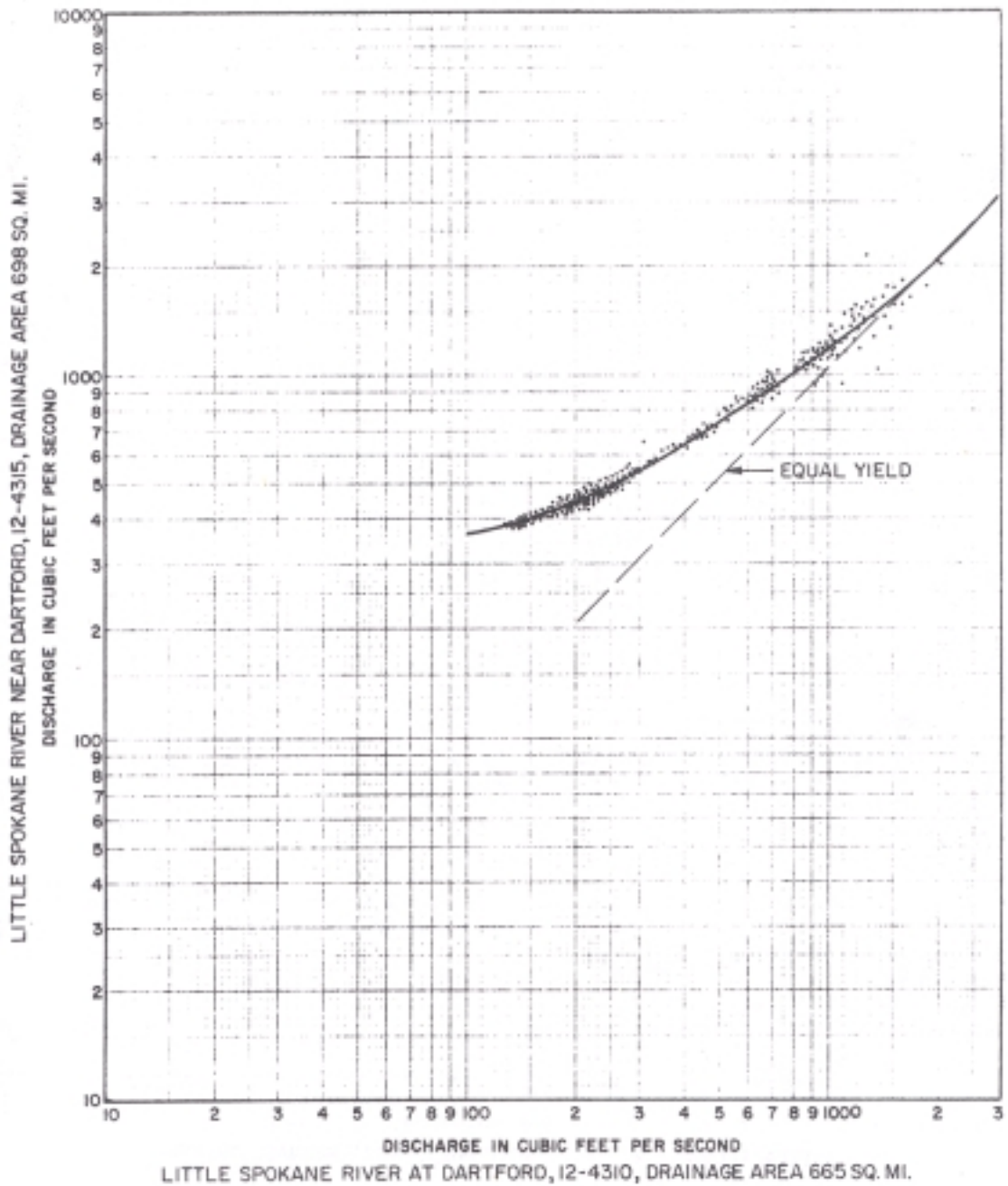


Figure IV-8. RELATION OF LOW FLOW AND MISCELLANEOUS MEASUREMENTS OF LITTLE SPOKANE RIVER NEAR DARTFORD TO CONCURRENT GAGED DAILY AVERAGE FLOWS AT DARTFORD, WA.

The base flows on the first and fifteenth day of each month at the control stations along the main stem Little Spokane River are depicted on Table II-1. Base flows for the days which are not specifically defined on the Table should be determined from the base flow hydrographs in Figure II-1 on page 11.

Because only the main stem of the Little Spokane River will be left "open" for further appropriations, it is not necessary to establish base flows for the "closed" streams to the same level of detail, Base flows on the 15th day of summer months at the mouths of major tributary streams are presented in Table A-1 in Appendix A. These flows are equivalent to base flows at an adjacent control station.

The relation curves and the base flow equivalents on the closed streams can be useful for spring flow storage or low flow augmentation projects in the future. From the relation curves, discharges of ungaged streams with specific frequencies can be determined.

2. UNAPPROPRIATED PUBLIC SURFACE WATERS

Investments in water resource developments are made on the basis that water supply sources are reasonably dependable and reasonable return will be possible with minimal risks. Soundness of supply source and the degree of risks tolerable depend on the source and the type of projects.

The probability of obtaining water (or frequency of any flow level which is equaled or exceeded under natural conditions) is one of the major and essential criteria in determining the cost-benefit ratio of a water project.

Such uses as domestic household and livestock water which are essential for sustenance are beyond the cost-benefit concept. However, if the water supply source is not reliable and may not be available for any prolonged period, other measures such as development of ground water or provision of a storage facility should be taken to find a constant supply source.

Administrative appropriation of water resources above a certain level may be meaningless if water is not naturally available within an allowable probability. Excess appropriation will only create more inconvenience to the public as well as to the administrators. Therefore, it is imperative that the appropriation limit be set at a reasonable flow level.

Resource use characteristics and subsequently the value of the water influence the establishment of flow level. Based on the evaluation of basin resource use characteristics and use trends, the appropriation limit is established at a level which the natural flow has a 50 percent probability of reaching or exceeding on any day on a daily average basis.

"Appropriation limit hydrographs" for Control Stations Nos. 12-4270 (Elk), 12-4295 (Chattaroy), and 12-4310 (Dartford) were developed depicting a 50 percent chance exceedence curve from discharge-flow duration hydrographs, which are presented in Figure IV-9. Appropriation limits for the first and 15th day of the month at the control stations are also shown in Table IV-9, below.

Table IV-9. Appropriation Limits on the 1st and 15th Day in the Little Spokane River (cfs)

Control Station Description		Months and Dates													
Station No.	Control Stream Reach	APR		MAY		JUN		JUL		AUG		SEP		OCT	
Location, (River Mile) Sec. Twp. Rge.		1	15	1	15	1	15	1	15	1	15	1	15	1	15
12-4270 at Elk, (34.6) 8-19N-44E	Conf w/Dry Cr. to headwaters	78	78	78	72	65	60	55	51	46	46	46	46	46	46
12-4295 at Chattaroy, (23.05) 34-28N-43E	Confl w/Deer Cr. to confl w/Dry Cr.	400	385	375	290	220	170	130	102	81	81	81	86	94	101
12-4310 at Dartford, (10.8) 6-26N-43E	Confl w/Deer Cr. to confl w/Little Cr.	600	580	570	440	330	260	200	170	144	144	144	152	160	170

With established base flows and appropriation limits, the quantification of unappropriated public surface water (the surface water available for future appropriation) is determined for any day by subtracting the actual consumptive diversion quantity under existing recorded water rights and the base flows from the appropriation limit.

The quantification process is expressed by the following equation:

$$Q = Q_{up} - (Q_{base} + R \times Q_{c.r}) \quad \text{IV-1}$$

Where;

Q: Available surface water quantity for appropriation.

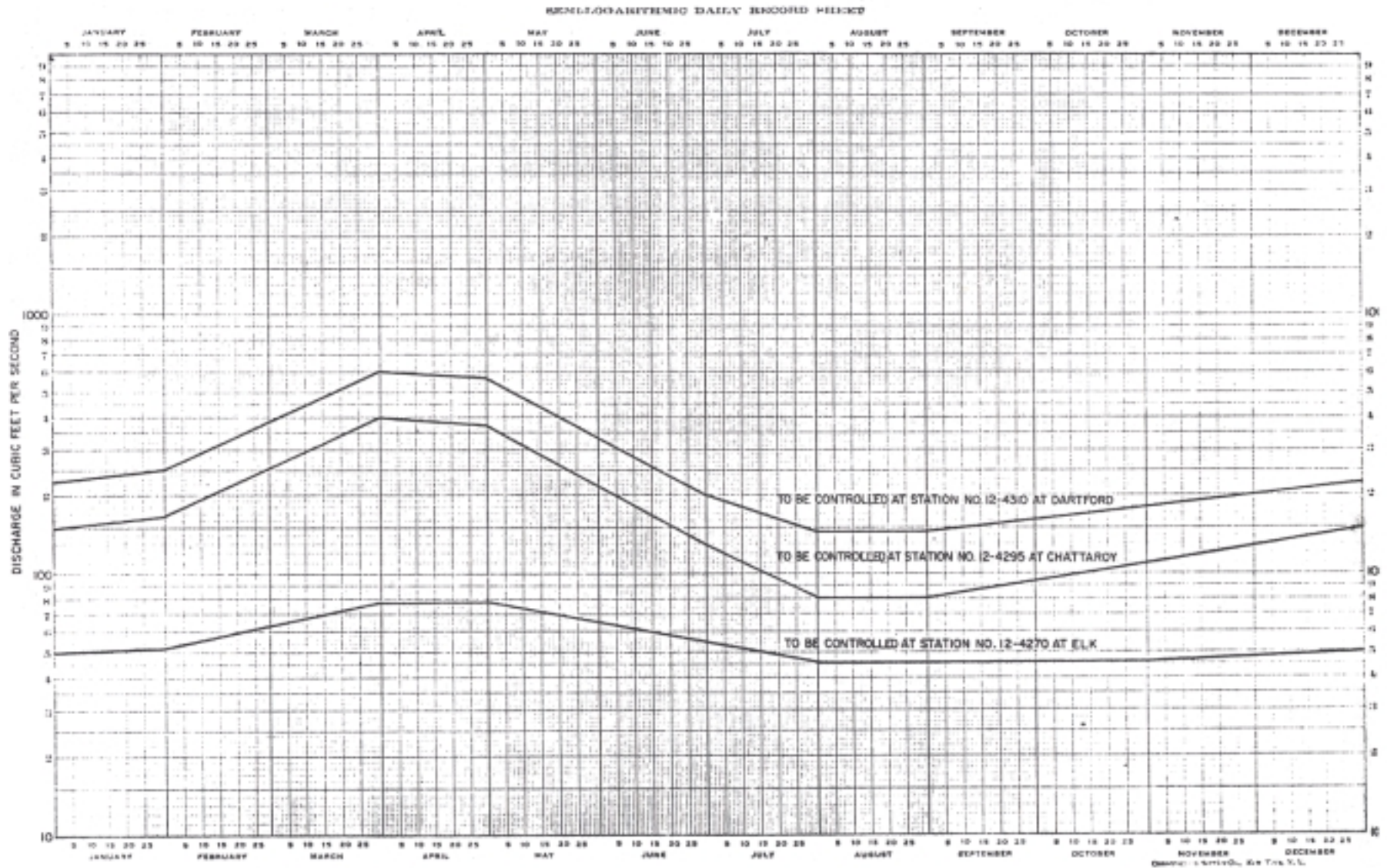


Figure IV-9. APPROPRIATION LIMITS AT CONTROL STATIONS IN THE LITTLE SPOKANE RIVER BASIN.

Qup: Appropriation limit (Table IV-9)

Qbase: Base flow level (Table II-1)

Qc.r: Total instantaneous quantity under recorded consumptive surface water rights (Table IV-7). (Note: recorded consumptive surface water rights in Table IV-8.)

R: Ratio between actually irrigated land and land covered under recorded water right.

If the result of calculation for a particular stream reach is negative or very small, it is an indication that there is no more water available for further appropriation. Subsequently, the stream reach is closed to further appropriation. If the Q is positive it can be construed that there remains unappropriated surface water. Unappropriated surface waters in the main stem Little Spokane River at major control stations Nos. 12-4270 (Elk), and 12-4310 (Dartford) are calculated as shown in Tables IV-10 and IV-11, below.

Table IV-10 *UNAPPROPRIATED SURFACE WATERS IN EAST BRANCH FROM CONFLUENCE WITH DRY CREEK TO HEADWATERS (CFS)

Description	APR		MAY		JUN		JUL		AUG		SEP		OCT	
	1	15	1	15	1	15	1	15	1	15	1	15	1	15
Appropriation Limit	78	78	78	72	65	60	55	51	46	46	46	46	46	46
Present Diversion ^{1/}	1	1	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	1	1
Base Flow	54	52	49	47	45	43	41.5	39.5	38	38	38	38	38	38
Unappropriated and Available	23	25	26.2	22.2	17.2	14.2	10.7	8.7	5.2	5.2	5.2	5.2	7	7

*Use Figures II-1 and IV-10 to determine the quantities of unappropriated surface waters for the days unspecified in this Table.

^{1/} Present diversion: R x Qc.r.

Table IV-11 *UNAPPROPRIATED SURFACE WATERS IN THE LITTLE SPOKANE RIVER FROM DARTFORD TO ELOIKA LAKE OUTLET, AND TO CONFLUENCE WITH DRY CREEK

Description	APR		MAY		JUN		JUL		AUG		SEP		OCT		Remarks
	1	15	1	15	1	15	1	15	1	15	1	15	1	15	
Appropriation Limit	600	580	57.0	44.0	330	260	200	170	144	144	144	152	160	170	
Present Diversion ^{1/}	3.5	3.5	11.4	11.4	12.7	12.7	12.7	1.7	12.7	12.7	12.7	12.7	3.3	3.3	
Base Flow	250	218	192	170	148	130	115	115	115	115	115	123	130	140	
Upstream Allocation	23	25	26.2	22.2	17.2	14.2	10.7	8.7	5.2	5.2	5.2	5.2	7	7	
Unappropriated and Available	323.5	333.5	340.4	236.4	157.1	103.1	651.6	33.6	11.1	11.1	11.1	11.1	19.7	19.7	

*Use Figures II-1 and IV-10 and tables references to determine the quantities of unappropriated surface waters for the days unspecified in this table..

^{1/} Present diversion: R x Qc.r.

The results of calculation indicates that there exists a small quantity of water in August and September while a large amount of water is available in June and July. It is apparent, therefore, that future appropriation quantities will have to be closely associated with the varying quantities of unappropriated waters by months.

Although appropriations in August and September will cease when the specified unappropriated waters are consumed, waters will be available during other months. All accounting will be based on applicable hydrographs.

Results of the calculation for tributary streams were negative or very small in summer months at the mouths of the tributary streams. Undoubtedly, water is available in spring when naturally available rainfall is generally sufficient for crops. Most of the tributary streams have been recommended for closure by the State Game Department for protection of fish and wildlife and their food supply. Information pertinent to the tributary streams is included in Appendix A.

3. ALLOCATION OF UNAPPROPRIATED SURFACE WATERS

The unappropriated surface waters determined in the previous section are allocated to specific reaches.

Allocation to the East Branch of the Little Spokane River for any date is the Q resulting from the equation IV-1 based on control station Nos. 12-4270 at Elk.

The allocation amount on the main stem from the confluence with Little Creek to the confluence with Dry Creek and the West Branch Little Spokane River below the outlet of Eloika Lake is the result of the equation IV-1 less the upstream east branch allocation quantity.

Establishment of date of priority of water right - first in time, first in right - still pertains on a basin-wide basis. However, if the amount allocated to any of the stream management units has been appropriated, that reach will be administratively closed automatically; thence, the priority of right will apply only to waters appropriated from the remaining reaches.

The quantities allocated to a stream management unit are further allocated to use priorities established in Section II.A.1, which are:

Priority 1) Existing water rights

Priority 2) Base flow

Priority 3) Domestic and stockwatering uses

Priority 4) Noncommercial agricultural irrigation less than three (3) acres

Priority 5) Other consumptive and nonconsumptive uses.

It should be noted that the noncommercial agricultural irrigation category is separated from other consumptive uses including larger commercial irrigation. This is to meet the particular use characteristics of land adjacent to the metropolitan Spokane area and to spread limited resources among a great number of residents.

The noncommercial agricultural irrigation category applies only to the irrigation water rights up to three acres per household, and for which the products from the land are to support family needs. Allocation amounts to domestic stockwatering and noncommercial irrigation were put together in Table II-2 in Section II, because the amount necessary for domestic and stockwatering uses is relatively small.

Estimation of the quantity allocated to priority three and four uses is based on the following assumptions:

- a. Population density along the river for the year 2020 is based on a study by the U.S. Army Corps of Engineers and sponsored by the Spokane Regional Planning Conference.
 - (1) Population density of 38 people per square mile is applied to a stretch from above Dartford (River Mile 10.8) to the confluence with Dry Creek (River Mile 34.6). This is an average population projection for census tract numbers 102 and 103.
 - (2) For the stretch above the confluence with Dry Creek to the headwaters (east branch of the Little Spokane River) the density will be 29 people per square mile (projection for census tract number 102).
- b. Average family size will be four or less.
- c. One family will irrigate on the average two acres, and the water requirement will be 0.0116 cubic feet per second per acre which is an average diversion quantity for existing water rights.
- d. Quantification of this allocation is based on the requirements by noncommercial irrigation within half a mile on both sides of the river.

Thus, allocation for domestic, stockwatering, and noncommercial irrigation is five (5) cfs for the stream unit above Dartford and below the confluence with Dry Creek, and below the outlet of Eloika Lake, and three (3) cfs for a reach above the confluence with Dry Creek to the headwaters.

The remaining unappropriated surface waters are available for all other consumptive uses and nonconsumptive uses exceeding the priority II allocation under the base flow. Allocation schemes by use priority and by stream management unit were presented in Table II-2 in Section II. The appropriation procedure within and among priority categories with respect to the principle of first-in-time first-in-right was described in section II-B, Administrative Procedures.

REFERENCES

1. Department of Water Resources, State of Washington. "Ground Water Resources and Related Geology, North-Central Spokane and Southeastern Stevens Counties of Washington." Water Supply Bulletin No. 27, 1969.
2. Orsborn, John F. and Mahinder N. Sood, "Technical Supplement to the Hydrographic Atlas, Spokane River Basin Study Area" prepared for the State of Washington Department of Ecology, the R.L. Albrook Hydraulic Laboratory, Washington State University. Unpublished.
3. Riggs, H.D. "Low Flow Investigations", U.S. Geol. Survey Hydrologic Analysis and Interpretation, Book 4, 1972.
4. Garling, M. Edward, "Department of Ecology Stream Preservation Program," WRIS Technical Bulletin No. 11, State of Washington, Department of Ecology. Olympia, Washington 1976.

GLOSSARY

ACRE FOOT: A unit for measuring the volume of water or sediment. It is equal to the amount of water needed to cover one acre of land with water one foot deep. This is 43,560 cubic feet, or 325,851 gallons.

ALLOCATION: The process of designating specific amounts of the water resource for application to specific beneficial uses or use categories.

APPROPRIATION: The process of legally encumbering specific amounts of the water resource for application to beneficial uses through instruments called water rights.

BASE FLOW: As defined in the Water Resources Act of 1971, base flows are the flows administratively established "necessary to provide for the preservation of wildlife, fish, scenic, aesthetic and other environmental values, and navigational values." RCW 90.54.020 3 (a).

CLOSURE: Administrative measure to keep water resources from further appropriation to consumptive uses. Generally, domestic household use and normal stockwatering are exempted when there is no practicable alternative source of supply.

CONFLUENCE: A place of meeting of two or more streams; the point where a tributary joins the main stream; a fork.

CONJUNCTIVE USE: The integrated use of ground and surface water in such a way as to increase the benefits of the use of all the waters of a basin.

CONSUMPTIVE USE: The amount of water used in such a way that it is no longer directly available. Includes water discharged into the air during industrial uses, or given off by plants as they grow (transpiration), or water which is retained in the plant tissues, or any use of water which prevents it from being directly available.

CONSUMPTIVE USE REQUIREMENT (crop): The amount of consumptive use for irrigation each year for a particular type of crop. Measured in acre-feet or feet per acre.

CONTROL STATION: Any measurement site at which a regulatory base flow has been established.

CUBIC FEET PER SECOND (cfs): A unit of measure for the rate of discharge of water. One cubic foot per second is the rate of flow of a stream with a cross section of one square foot which is flowing at one foot per second. It is equal to 448.8 gallons per minute.

DISCHARGE: In simplest form, discharge simply means outflow. The term can describe the flow of water from a faucet or from a drainage basin covering hundreds of square miles.

DIVERSION: Taking water from a stream or other body of water into a canal, pipe, or other conduit.

DOMESTIC USE: Water used by a single household generally including one-half an acre lawn or noncommercial garden irrigation.

DRAINAGE AREA: The area of land drained by a stream, measured in the horizontal plane. It is the area which is enclosed by a drainage divide.

DRAINAGE BASIN: A part of the surface of the earth that is occupied by a drainage system consisting of a surface stream or a permanent body of water together with all tributary streams and bodies of impounded water (lakes, ponds, reservoirs, etc.).

FLOOD: Any relatively high streamflow or an overflow that comes from a river or body of water and causes or threatens damage.

GAGING STATION: A particular location on a stream, canal, lake, or reservoir where systematic measurements of the quantity of water flowing are made.

GROUND WATER: Water in the ground that is in the zone of saturation. Natural recharge includes water added by rainfall, flowing through pores or small openings in the soil into the water table. Artificial recharge includes adding water to the aquifer through wells.

HYDRAULIC CONTINUITY: A cause and effect relationship between water under the ground and water standing or flowing on the surface.

HYDROGRAPH: A graph showing varying streamflow (or stream discharge) with respect to time during a year as determined at a specific cross-sectional location in the stream.

INSTREAM VALUE: The attitude of society respecting the use of water instream, for aesthetic, fish and wildlife, recreation, hydroelectric and general environmental purposes.

NONCOMMERCIAL AGRICULTURAL IRRIGATION: Beneficial use of water upon single family tracts of not more than three acres for the purpose of crops and livestock for domestic use.

NONCONSUMPTIVE USE: Use of water in a manner which does not consume the resource. Fishery, aesthetic, and hydropower uses are examples of nonconsumptive use.

PERENNIAL STREAM: A stream, at any given location, is considered perennial if its natural flow is normally continuous.

PRECIPITATION: The discharge of water as rain, snow, hail, etc. out of the atmosphere, generally onto land or water surfaces. This is the process which permits atmospheric water to become surface or subsurface water. The term precipitation is often used to describe the amount of water that is precipitated.

PUBLIC WATER SUPPLY: The system for the collection, treatment, storage, and distribution of potable water from the sources of supply to any community, collection or number of individuals, but excluding water supplies serving one single family residence.

RESERVATION: An approved priority claim to water for a future beneficial use.

RETURN FLOW (irrigation): Irrigation water which is not consumed in evaporation or plant growth and which returns to a surface stream or ground water aquifer.

RELINQUISHMENT: Reversion to the state of a right to divert or withdraw water.

RIPARIAN: Pertaining to the banks of streams, lakes, or tidewater.

RIVER BASIN: The total area drained by a river and its tributaries; watershed; drainage basin.

RUNOFF: That part of precipitation that appears in surface streams. The stream flow before it is affected by artificial diversions, reservoirs, or other man-made changes in or on stream channels.

STORAGE: Water naturally or artificially impounded in surface or underground reservoirs.

STREAM FLOW: The discharge or water flow that occurs in a natural channel. The word discharge can be applied to a canal, but stream flow describes only the discharge in a surface stream course. Stream flow applies to discharge whether or not it is affected by diversion or reservoirs.

STREAM MANAGEMENT UNIT: Stream segments, reaches, or tributaries, each containing a control station, which are identified as units for defining base flow levels.

APPROPRIATION LIMIT: The level beyond which appropriation permits will not be granted.

WATER RIGHT: A legal right and property interest (subject to certain limitations) to obtain specific maximum quantities of water from specific sources for application to beneficial use.

WATERSHED: The area drained by a given stream; drainage basin.

WITHDRAW: The administrative procedure of closing a water supply source from further appropriation for an indefinite period of time. RCW 90.54.050(2).

APPENDIX A

Table A-1	Appropriation Status on Major Tributary Streams
Table A-2	Available Surface Waters in West Branch Little Spokane River
Table A-3	Stream Flow Characteristics Line Diagram
Table A-4	Streams Subject to Low Flow Restrictions

Table A-1 Appropriation Status on Major Tributary Streams
(in Cubic Feet Per Second)

Stream Name	Description	April	May	June	July	Aug	Sept	Gaging Station No. River Mile Sec. Twp. Rge.
Dragoon Creek	Appro. Limit*/	155	115	52	28	20	21	21-4301. 0.1
	Base Flow */ Equivalent	42	29	17	10	10	13	4-27-43E
	Existing Water Right	13.4	13.4	13.4	13.4	13.4	13.4	
Deadman Creek	Appro. Limit*/	78	46	11	3.3	1.9	2	12-4303.5 3.5 mile from confluence
	Base Flow */	7.5	3.8	1.6	1	1	1.2	22-27-43E
	Existing Water Right	6.4	6.4	6.4	6.4	6.4	6.4	

* These are estimated by correlating 15th daily appropriation limits and base flows at Dartford on the regression curves in Figures IV-8 and IV-9.

Table A-2 Available Surface Waters in West Branch
Little Spokane River* (Below Eloika Lake)

Description	APR	MAY	JUN	JUL	AUG	SEP	OCT	Remarks
Upper Limit	160	104	46	18.5	11	13.5	20	Table
Consumptive Water Rights Present	2.5	10.8	10.8	10.8	10.8	10.8	1.4	Table
Consumption	1.0	4.4	4.4	4.4	4.4	4.4	0.6	Ratio 0.4
Base Flow	40	19	19	6	6	7.2	11	Table
Available for Appropriation	119	80.6	32.6	8.1	0.6	1.9	8.4	Table








*To be maintained one mile below Eloika Lake at U.S. Gaging station NO. 12-4286.

Table A-3 Stream Flow Characteristics Line Diagram
Little Spokane River and its Tributaries ^a

Terms for Summary Table on Line Diagram

- P - Average Annual Precipitation, inches per year
- A - Drainage Basin Area, square miles
- QAA - Average Annual Flow, cubic feet per second (cfs)
- QF2 - 2-Year Flood, cfs
- QF50 - 50-Year Flood, cfs
- Q7L2 - 7-Day Average, 2-Year Low Flow, cfs
- Q7L20 - 7-Day Average, 20-Year Low Flow, cfs

Legend for Line Diagram

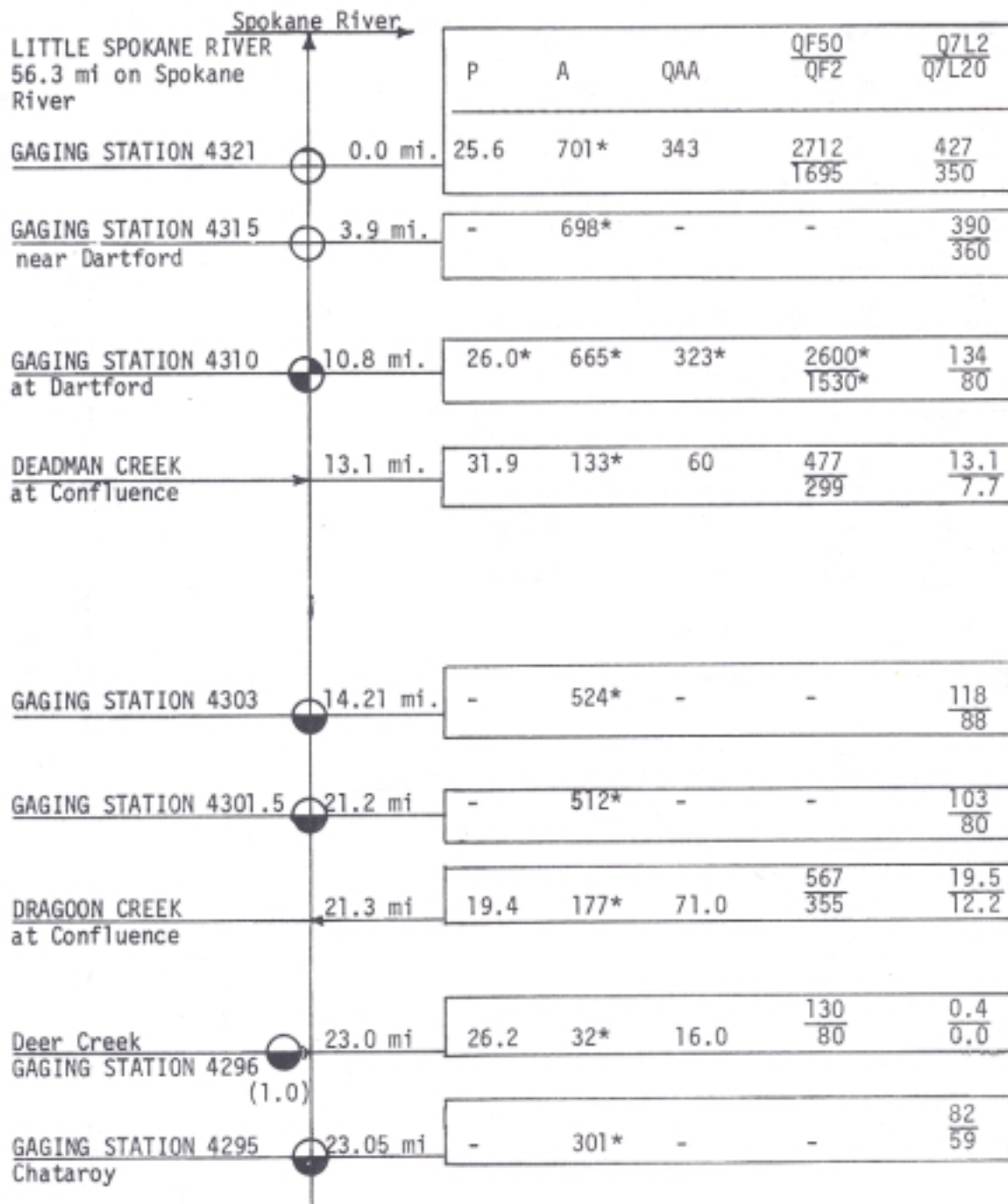
- 4473 - USGS Gaging Station Number *
 -  - Continuous Gaging Station in Operation
 -  - Discontinued Gaging Station
 -  - Crest Stage Partial Record Station
 -  - Low Flow Partial Record Station
 - (4.2) - Distance from Mouth of Stream to Gaging Station
 -  - Reservoir/Lake
 -  - Tributary
 -  - Main Stream
 - 60.1 - Distance from Mouth of River to Tributary
-

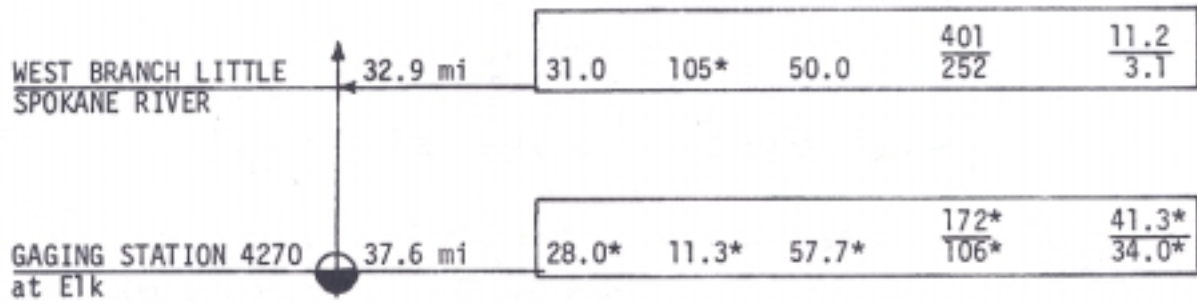
STATE WATER PROGRAM STUDY AREA SPOKANE

DRAINAGE BASIN LITTLE SPOKANE RIVER

WATER RESOURCES INVENTORY AREA NUMBER 55

SUBBASIN Little Spokane River Mainstem





* Values published by U.S. Geological Survey; all other values calculated by regional correlations between drainage basin characteristics, precipitation and stream flow records.

Source: Hydrographic Atlas, Spokane River Basin Study Area,
by Dr. John Orsborn, Washington State University, Pullman, WA

TABLE A-4
LITTLE SPOKANE RIVER BASIN
WRIA-55
STREAMS SUBJECT TO LOW FLOW RESTRICTIONS

STREAM NAME	TRIBUTARY OF	LOW FLOW IN CFS & DATE ESTABLISHED	LOCATION & COUNTY
Bear Cr.	L. Spokane R.	1.0 4-13-53	NE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 10, T. 28 N., R. 43 E., Spokane
		1.0 9-11-62	SW $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 3, T. 28 N., R. 43 E., Spokane
Beaver Cr.	Dragoon Cr.	2.0 8-29-47	SE $\frac{1}{4}$, Sec. 8, T. 28 N., R. 42 E., Spokane
		0.5 3-14-50	NE $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 9, T. 28 N., R. 42 E., Spokane
		0.3 8-8-50	NW $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 9, T. 28 N., R. 42 E., Spokane
Dartford Cr. (Little Cr.) (Sheep Cr.)	L. Spokane R.	1.0 3-14-50	SE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 31, T. 27 N., R. 43 E., Spokane
		1.0 4-5-61 6-25-65	NW $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 29, T. 27 N., R. 43 E., Spokane
		1.0 7-25-65	NW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 29, T. 27 N., R. 43 E., Spokane
Deadman Cr.	L. Spokane R.	5.0 7-6-50	SW $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 1, T. 26 N., R. 43 E., Spokane
Deep Cr.	Deadman Cr.	0.25 10-19-51	NE $\frac{1}{4}$, Sec. 33, T. 27 N., R. 43 E., Spokane
		1.5 4-13-53	W $\frac{1}{2}$ NW $\frac{1}{4}$, Sec. 4, T. 27 N., R. 44 E., Spokane

STREAM NAME	TRIBUTARY OF	LOW FLOW IN CFS & DATE ESTABLISHED	LOCATION & COUNTY
Deer Cr.	L. Spokane R.	1.0 5-20-49	NW ¹ / ₄ NE ¹ / ₄ , Sec. 34, T. 28 N., R. 43 E., Spokane
		1.0 4-19-60	NW ¹ / ₄ SE ¹ / ₄ , Sec. 20, T. 28 N., R. 44 E., Spokane
Dragoon Cr. West Branch	Dragoon Cr.	3.0 4-11-50	W. Line Sec. 9, T. 28 N, R. 42 E., Spokane
		0.5 5-25-56	NE ¹ / ₄ SW ¹ / ₄ , Sec. 6, T. 28 N, R. 42 E., Spokane
Dry Cr.	L. Spokane R.	2.5 3-14-50	NE ¹ / ₄ NW ¹ / ₄ , Sec. 30, T. 29 N, R. 44 E., Spokane
		1.5 5-26-52	NW ¹ / ₄ NW ¹ / ₄ , Sec. 28, T. 29 N, R. 44 E., Spokane
Frog Cr.	Dragoon Cr.	0.70 10-9-53	SE ¹ / ₄ NE ¹ / ₄ , Sec. 12, T. 28 N, R. 41 E., Spokane
Little Spokane River	Spokane R.	6.0 6-10-46	SW ¹ / ₄ SE ¹ / ₄ , Sec. 5, T. 30 N, R. 45 E., Pend Oreille
Little Spokane River West Branch	L. Spokane R.	15.0 4-20-50	NE ¹ / ₂ NE ¹ / ₄ , Sec. 32, T. 30 N, R. 43 E., Pend Oreille
		20.0 4-10-52	NW ¹ / ₄ , Sec. 23, T. 29 N, R. 43 E., Spokane
		6-17-52	
		9-17-54	
Moon Cr.	Sacheen Lk.	20.0 3-26-65	NE ¹ / ₄ , Sec. 22, T. 29 N., R. 43 E., Spokane
		6-20-66	
		4-5-66	
		5.0 7-2-51	E ³ / ₄ , Sec. 31, T. 31 N., R. 44 E., Pend Oreille

STREAM NAME	TRIBUTARY OF	LOW FLOW IN CFS & DATE ESTABLISHED	LOCATION & COUNTY
		0.25 8-1-67	NE ¹ / ₄ , Sec. 17, T. 30 N., R. 44 E., Pend Oreille
Mud Cr.	Dragoon Cr.	0.25 6-11-47	SE ¹ / ₄ SE ¹ / ₄ , Sec. 20, T. 28 N., R. 42 E., Spokane
Otter Cr.	L. Spokane R.	2.0 4-14-54	SE ¹ / ₄ SW ¹ / ₄ , Sec. 1, T. 29 N., R. 43 E., Spokane
		5.0	E ¹ / ₂ E ¹ / ₂ NW ¹ / ₄ , Sec. 12, T. 29 N., R. 43 E., Spokane
Peone Cr.	Deadman Cr.	3.0 5-25-55	NE ¹ / ₄ SE ¹ / ₄ , Sec. 33, T. 27 N., R. 43 E., Spokane
Unn. Stream (Ice House Creek)	L. Spokane R. (Chain Lake)	0.30 8-1-52	SE ¹ / ₄ SE ¹ / ₄ , Sec. 27, T. 30 N., R. 44 E., Pend Oreille
		0.25 12-13-66	SE ¹ / ₄ SE ¹ / ₄ , Sec. 34, T. 30 N., R. 44 E., Pend Oreille
Unnamed Stream (L. Deep Cr.)	Deep Cr.	0.25 10-19-51 Spokane	E ¹ / ₂ SE ¹ / ₄ , Sec. 28, T. 28 N., R. 44 E., Spokane
Unnamed Stream	Eloika Lk.	0.25 6-17-52	SW ¹ / ₄ NW ¹ / ₄ NE ¹ / ₄ , Sec. 15, T. 29 N., R. 43 E., Spokane
Unnamed Stream	L. Spokane R.	0.50 3-29-62	NW ¹ / ₄ , Sec. 10, T. 29 N., R. 44 E., Spokane
Wethey Cr.	Dragoon Cr.	0.75 6-6-50	At mouth, NW ¹ / ₄ , Sec. 35, T. 28 N., R. 42 E., Spokane

TRANSMITTAL OF RULES ADOPTED

FROM: DEPARTMENT OF ECOLOGY
(Name of Agency)

TO: CODE REVISER
LEGISLATIVE BLDG. (Southwest Corner, Ground Floor)
OLYMPIA 98504

The enclosed rules Permanent rules , being Order No. DE 75-24
Emergency rules

relating to (Name of rules or description of subject matter)

a water resource management program for the Little Spokane River Basin consisting, among others, of elements pertaining to criteria for use in making decisions on future uses of water, the establishment of flows to protect instream values, the closure of streams from further appropriation, and the retention of lakes in their natural condition; creating chapter 173-555 WAC.

(ALTERNATIVE A. Use only for adoption of permanent rules)

pursuant to Notice No. 5432 filed with the code reviser
8/27/75, 10/8/75, 5524 5621 & 5641
on 12/10/75 and were regularly adopted as permanent rules of
12/23/75 Lacey, WA
this agency at Dept. of Ecology, / on 1/6/76 and are herewith
(date)
filed in the office of the code reviser pursuant to chapter 34.04
RCW. The effective date of such rules shall be _____.

(ALTERNATIVE B. Use only for adoption of emergency rules)

pursuant to its finding in the attached administrative order,
that the immediate adoption of these rules is necessary for the
preservation of the public health, safety, or general welfare and
that observance of the requirements of notice and opportunity to
present views on the proposed action would be contrary to the
public interest, were regularly adopted as emergency rules of this
agency at _____ on _____ and
(place) (date)
are herewith filed in the office of the code reviser pursuant to
chapter 34.04 RCW.

The undersigned hereby certifies that the requirements of chapter 34.04 RCW and of the Open Public Meetings Act of 1971, chapter 42.30 RCW have been fulfilled.

Dated this 6th day of January 1976.

STATE OF WASHINGTON
FILED
JAN 6 1976
CODE REVISER'S OFFICE
DOCKET # FILE #

DEPARTMENT OF ECOLOGY
(AGENCY)
By *Wesley A. Hunter*
Wesley A. Hunter
Deputy Director
Title

- ① Notice number as appears on the copy of notice returned to you by reviser's office (if proceedings were continued, use no. of last notice)
- ② Stamped date as appears on the copy of notice returned to you by reviser's office (if proceedings were continued, use date of last notice)
- ③ Unless a later date is specified in this order or is prescribed in another statute, rules are effective 30 days after filing:
RCW 34.04.040. Leave this space blank except in such special cases.
[Order 9, filed 9/25/74, eff. 10/25/74] [Form CR-2: Rev. 9/21/74]

Water Resources Program in
the Little Spokane River Basin, WRIA-55

Chapter 173-555 WAC

NEW WAC 173-555-010 GENERAL PROVISION. These rules, including any subsequent additions and amendments, apply to waters within and contributing to the Little Spokane River Basin, WRIA-55 (See WAC 173-500-040). Chapter 173-500 WAC, the general rules of the Department of Ecology for the implementation of the comprehensive water resources program, applies to this Chapter 173-555 WAC.

NEW WAC 173-555-020 DEFINITION. “NON-COMMERCIAL AGRICULTURAL IRRIGATION” means beneficial use of water upon not more than three acres for the purpose of crops and livestock for domestic use.

NEW WAC 173-555-030 ESTABLISHMENT OF BASE FLOWS. (1) Base flows are established for stream management units with monitoring to take place at certain control points as follows:

Stream Management Unit Information

Control Station Number, Stream Manage- ment Unit Name	Control Station Location by River Mile and Section, Township Range	Affected Stream Reach
No. 12-4270.00 Little Spokane River Elk.	34.6 sec. 8, T. 29 N., R. 43 E.W.M.	From confluence with Dry Creek to the headwaters including tributaries except Dry Creek.
No. 12-4295.00 Little Spokane River Chattaroy	23.05 Sec. 34, T. 28 N., R. 43 E.W.M.	From confluence with Deer Creek to confluence with Dry Creek including tributaries except Deer Creek
No. 12-4310.00 Little Spokane River Dartford	10.8 Sec. 6, T. 26 N., R. 43 E.W.M.	From confluence with Little Creek to confluence with Deer Creek including tributaries except Little Creek.
No. 12-4315.00 Little Spokane River Confluence	3.9 Sec. 3, T. 26 N., R. 42 E.W.M.,	From mouth to confluence with Little Creek including tributaries.

(2) Base flows established for the stream management units in WAC 1713-555-030(1) are as follows:

Base Flows in the Little Spokane River Basin
(in Cubic Feet Per Second)

Month	Day	12-4270.00 Elk	12-4295.00 Chattaroy	12-4310.00 Dartford	12-4315.00 Confluence
Jan.	1	40	86	150	400
	15	40	86	150	400
Feb.	1	40	86	150	400
	15	43	104	170	420
Mar.	1	46	122	190	435
	15	50	143	218	460
Apr.	1	54	165	250	490
	15	52	143	218	460
May	1	49	124	192	440
	15	47	104	170	420
Jun.	1	45	83	148	395
	15	43	69	130	385
Jul.	1	41.5	57	115	375
	15	39.5	57	115	375
Aug.	1	38	57	115	375
	15	38	57	115	375
Sept.	1	38	57	115	375
	15	38	63	123	380
Oct.	1	38	70	130	385
	15	39	77	140	390
Nov.	1	40	86	150	400
	15	40	86	150	400
Dec.	1	40	86	150	400
	15	40	86	150	400

(3) Base Flow hydrographs, Figure II-1 in the document entitled “Water Resources Management Program in the Little Spokane River Basin” dated August, 1975 shall be used for definition of base flows on those days not specifically identified in WAC 173-555-030(2).

(4) All rights hereafter established shall be expressly subject to the base flows established in sections WAC 173-555-030(1) through (3).

NEW WAC 173-555-040 FUTURE ALLOCATIONS—RESERVATION OF SURFACE WATER FOR BENEFICIAL USES. (1) The Department determines that these are surface waters available for appropriation from the stream management units specified in the amount specified in cubic feet per second (cfs) during the time specified as follows:

(a) Surface water available from the east branch of the Little Spokane River, confluence with Dry Creek to headwaters, based on measurement at control station number 12-4270.00 at Elk are:

Month	May		June		July		Aug.		Sept.		Oct.	
Date	1	15	1	15	1	15	1	15	1	15	1	15
Amount	26	22	17	14	11	9	5	5	5	5	7	7

(b) Surface water available from the Little Spokane River from confluence with Little Creek at Dartford to Eloika Lake outlet, and to confluence with Dry Creek based on measurement at control station number 12-4310 at Dartford are:

Month	May		June		July		Aug.		Sept.		Oct.	
Date	1	15	1	15	1	15	1	15	1	15	1	15
Amount	340	236	152	103	62	34	11	11	11	11	20	20

(c) Available surface waters for those day spot specified in (a) and (b) shall be defined from Figures II-3 and II-4 in the document entitled "Water Resources Management Program in the Little Spokane River Basin" dated August, 1975.

(2) The amounts of waters referred to in WAC 173-555-040 (1) above are allocated for beneficial uses in the future as follows:

(a) Three cubic feet per second from the amount available in the east branch of the Little Spokane River referred to in WAC 173-555-040(1)(a) above and five cubic feet per second from the amount available in the Little Spokane River, besides east branch, referred to in WAC 173-555-040(1)(bb) are allocated to future domestic, stockwatering and noncommercial agricultural irrigation purposes within the stream reaches specified therein throughout the year.

(b) The remainder of the amount referred to in WAC 173-555-040(1)(a) and (b) besides the amount specified in WAC 173-555-040(2)(a) are allocated to consumptive and nonconsumptive uses not specified in WAC 173-555-040(2)(a). These are further described in the Figures appended hereto.

NEW

WAC 173-555-050 PRIORITY OF FUTURE WATER RIGHTS DURING TIMES OF WATER SHORTAGE. (1) As between rights established in the future pertaining to waters allocated in WAC 173-555-040(2)(a) and (b), all rights established in (a) shall be superior to those pertaining to (b) regardless of the date of the priority of right.

(2) As between rights established in the future within a single use category allocation of WAC 173-555-040, the date of priority shall control with an earlier dated right being superior to those rights with later dates.

NEW

WAC 173-555-060 STREAMS AND LAKES CLOSED TO FURTHER CONSUMPTIVE APPROPRIATIONS. The Department, having determined there are no waters available for further appropriation through the establishment of rights to use water consumptively, closes the following streams to further consumptive appropriation except for domestic and normal stockwatering purposes excluding feedlot operation:

SURFACE WATER CLOSURES

Stream* Name	Affected Reach	Date of Closure	Period of Closure
Dry Creek	Mouth to headwater	5-26-1952	1 June-31 Oct.
Otter Creek	Mouth to headwaters	2-23-1971	"

Bear Creek	Mouth to headwaters	4-13-1953	“
Deer Creek	Mouth to headwaters	2-29-1968	“
Dragoon Creek	Mouth to headwaters	7-02-1951	“
Deep Creek	Mouth to headwaters	6-14-1961	“
Deadman Creek <u>1/</u>	Mouth to headwaters	11-28-1961	“
Little Creek	Mouth to headwaters	4-13-1953	“
W. Branch Little Spokane River	Outlet of Eloika Lake to headwaters	Date of adoption	“
All natural lakes in the basin		“	“

* Includes all tributaries in the contributing drainage area unless specifically excluded.

1/ An unnamed tributary flowing through Sec. 20, T 26N., R. 44 E. is exempted from closure.

NEW WAC 173-555-070 EFFECT ON PRIOR RIGHTS. Nothing in this chapter shall be construed to lessen, enlarge or modify the existing rights acquired by appropriation or otherwise.

REPEAL WAC 173-108-010, 173-108-020, 173-108-030, 173-108-040, 173-108-050, and 173-108-060 are hereby repealed.

COMMENT:

On September 21, 1973, the Department of Ecology adopted Chapter 173-108 WAC for the purpose of withdrawing the waters of the Little Spokane River watershed from further appropriation pending the development and adoption of a water management program for this basin. With the adoption of the water resource management program embodied in Chapter 173-555 WAC this requirement is formally met.