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REPORT
ON
MANAGEMENT OF FOREST RESOURCES
IN THE BULL RUN DIVISION

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"To inform its members and the community in public matters and to arouse in them a realization of the obligations of citizenship."
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REPORT
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IN THE BULL RUN DIVISION

To the Board of Governors,
The City Club of Portland:

I. INTRODUCTION

The Bull Run Division of the Mt. Hood National Forest is the sole source of municipal water for the City of Portland and, under normal conditions, for adjoining communities. Your Committee was asked to “consider present policy by which land and other resources of the Bull Run Reserve are managed and make recommendations for policies guiding future management.” Major facets studied included the natural features of the Bull Run Division; history of the Division; definition, measurement and standards of water quality; the impact of timber harvest and road construction on water quality; alternative uses of the Division, and planning in the Bull Run Division.

Although many technical issues are involved on which the Committee, as a whole, can profess no expertise, the importance of the water supply, the general inaccessibility of the area, and the wide variety of potential use combinations warranted this lay review of Bull Run Division management.

II. SCOPE OF INQUIRY

Your Committee has limited its study to resource management of the present Bull Run Division; in years past, boundaries of the Division (then called “Reserve”) included a somewhat larger area. On two occasions your Committee visited the Bull Run Division with United States Forest Service (USFS) and Portland Bureau of Water Works personnel.

A list of persons interviewed individually or by the entire committee is contained in Appendix A. Special appreciation is extended to the Columbia Gorge Ranger District staff and Portland Bureau of Water Works staff for their enthusiastic cooperation in this study.

Major reference documents are identified in Appendix B. Appendix C contains an explanation of some of the abbreviations used in the report.

1 A similar study by an ad hoc Mayor’s Special Study Committee for the Corvallis city watershed was recently (March 1973) submitted to the Corvallis City Council. The Corvallis study recommended appointment of a permanent advisory committee for watershed management, preparation of an integrated management plan for the USFS and city lands, designation of a city employee to supervise timber management and reinvestment of some timber revenues in timber management. The study further found that current guidelines provide adequate protection of soil and water resources, that timber harvest levels can be maintained or increased (with priority on harvesting old growth and poorly stocked areas), that post-harvest activities should be modified to require removal of slash, replanting and the management of brush with herbicides where appropriate, and that recreation uses of the watershed, although feasible, “at this time seem to have little justification.”

As reported by Corvallis Utilities Engineer Alton R. Andrews: “Although the report was prepared by a group of highly qualified individuals, some members of the Council felt they were not sufficiently oriented toward the spotted owls and other ‘old growth’ oriented wildlife. The Council has therefore deferred action on the report for six months to permit a review by a group of environmentalists.”
III. PHYSICAL RESOURCES OF THE BULL RUN DIVISION

The Bull Run Division occupies 149 square miles of the Mt. Hood National Forest in eastern Multnomah and Clackamas Counties, from 26 to 43 miles east of downtown Portland (Figure 1). The area, whose maximum dimensions extend 17 miles east and west and 12 miles north and south, encompasses nearly all the drainage of the Bull Run River and its tributaries. Forty-two square miles lie outside the drainage; 107 square miles (72 percent of the Division) lie within the drainage area. Seventy-seven percent of the watershed area is classified by the Forest Service as commercial timber land.

Elevations range from 750 feet at the lower dam spillway to 4751 feet at Buck Peak. The peaks around the eastern divide are mostly above 4500 feet in elevation. Three main reservoirs have elevations of 750 feet, 1042 feet and 3160 feet (Bull Run Lake). The area consists of a volcanic upland surface constructed from many overlapping shield volcanoes (low flat cones of lava flows), which have been eroded by generally west-flowing youthful streams so that only a small part (15-20 percent) of the original upland surface remains. The rest consists of steeply sloping canyon walls, with the main Bull Run valley modified by glaciation, which has widened the valley, over-steepened its walls, and deposited glacial moraines and outwash alluvium along its course. Glacial moraines and a possible landslide or recent lava flow form the natural dam creating Bull Run Lake.

Deep weathering of lavas, interbedded fragmental volcanic rocks and inter-stratified glacial deposits, in a humid climate, combined with the steepened valley walls and high rainfall, have produced conditions favorable to landslides, past and future. Excavations for dam sites have exposed past landsliding. Recent slides (1972) have occurred and new slides can be expected in the future. No detailed geologic survey has been made of the Division. Such a study could pinpoint past slides and future hazardous areas and suggest preventative measures. One general
paper\(^2\) was written in 1920; local studies of dam sites\(^1,4,5\) have been made more recently. A soil management report for the Bull Run-Sandy area\(^6\) is consistent with the earlier geological studies but is not sufficient of itself to specify what actions on the land are suitable or unsuitable. One potential hazard which exists on the adjoining Hood River, Zigzag, and Sandy River drainages is that of possible volcanic eruptions from Mt. Hood which could trigger widespread mud flows. The Bull Run Division fortunately does not lie in the course of any such disastrous hazard, since it is protected from the mountain by its eastern divide located just northwest of Lolo Pass. The supply conduits to the city, unlike most of the rest of the system, are more vulnerable to geologic hazards (i.e. a mudflow down the Sandy river, breakage due to earthquakes or landslides along the route to the City). No engineering and geologic study of the potential hazards along the course of the conduits has been made although the Bureau of Water Works indicates that such a study will be accomplished in the near future.

The Bull Run Division supplies water to 34 percent of the population of Oregon; total future water use in the metropolitan Portland area is certain to increase. Table I summarizes water resources of the Bull Run River. Fortunately, the rainfall is substantial in the higher elevations, amounting to as much as 143 inches per year, while the average in Portland is between 40 and 50 inches per year. This, however, does create a problem for dam spillway design. The Bull Run drainage area has the second highest recorded peak flow per square mile of area of 50 measured river drainages in western Oregon and Washington which have basins from 10 to 1000 square miles.\(^7\) The annual average river flow at present is 516 million gallons per day (mgd), more than five times the average daily use (103 mgd). However, the extreme minimum river flow is well below the maximum daily use. It is thus possible that, during a hot dry summer, the demand might exceed the river flow by a factor of six times! The storage capacity of the four reservoirs, however, totals 21.4 billion gallons which would last for 94 days at maximum use. While this may appear adequate one should note that with the light snowfall of the winter of 1972-73, Bull Run Lake did not even fill during the spring runoff and was eight feet below full level when visited on May 19, 1973. Additional capacity is planned through future construction of dams on Cedar Creek and Blazed Alder Creek, although no schedule for this work has been proposed by the Bureau of Water Works. Of greater concern is the Portland area distribution storage, which would last for only one day at maximum use, or for 2.5 days at average use.

### IV. HISTORICAL AND LEGAL BACKGROUND

The name of Portland's watershed, Bull Run, apparently originated when cattle escaped from immigrants and ran wild in that vicinity during the pioneer years of 1849 to 1855\(^8\).

Prior to the 1890s Portland relied on sources other than the Bull Run watershed for its water supply. In 1886 the City awarded a contract for construction of headworks on the Bull Run River. In 1888 the City purchased some of the proper

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\(^7\) Geological Survey, Washington, D.C.

\(^8\) McArthur, Oregon Geographic Names, 1944, p. 64.
TABLE I

WATER RESOURCES OF THE BULL RUN WATER SUPPLY

<table>
<thead>
<tr>
<th>Daily River Flow</th>
<th>Million Gallons per Day (mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual average</td>
<td>516</td>
</tr>
<tr>
<td>Annual maximum (1964)</td>
<td>774</td>
</tr>
<tr>
<td>Annual minimum (1941)</td>
<td>277</td>
</tr>
<tr>
<td>Monthly maximum (December, 1934)</td>
<td>2,104</td>
</tr>
<tr>
<td>Monthly minimum (October, 1953)</td>
<td>48</td>
</tr>
<tr>
<td>Daily maximum (December 22, 1964)</td>
<td>16,200</td>
</tr>
<tr>
<td>Daily minimum (August 14, 1926)</td>
<td>41</td>
</tr>
</tbody>
</table>

Recent Daily Usage (1971-1972)

<table>
<thead>
<tr>
<th></th>
<th>Billion Gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total capacity of three conduits</td>
<td>225</td>
</tr>
<tr>
<td>Maximum use</td>
<td>250</td>
</tr>
<tr>
<td>Average use</td>
<td>103</td>
</tr>
<tr>
<td>Minimum use</td>
<td>72</td>
</tr>
</tbody>
</table>

Storage

<table>
<thead>
<tr>
<th></th>
<th>Billion Gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bull Run Lake</td>
<td>4</td>
</tr>
<tr>
<td>Boody Lake (North Fork Reservoir)</td>
<td>0.4</td>
</tr>
<tr>
<td>Reservoir No. 1 (Ben Morrow Lake)</td>
<td>10</td>
</tr>
<tr>
<td>Reservoir No. 2</td>
<td>7</td>
</tr>
<tr>
<td>Local distribution storage</td>
<td>0.25</td>
</tr>
</tbody>
</table>

The City within the Bull Run watershed, apparently about four square miles, which land had been in private ownership. Most of the remainder of the land within the watershed was owned by the federal government. Public protection of today's Bull Run Division began with enactment of a federal law on March 3, 1891 which stated:

"The President of the United States may, from time to time, set apart and reserve, in any State or Territory having public land bearing forests, in any part of the public lands wholly or in part covered with timber or undergrowth, whether of commercial value or not, as national forests, and the President shall, by public proclamation, declare the establishment of such forests and limits thereon."

By a proclamation dated June 17, 1892, President Benjamin Harrison exercised the power given him by the 1891 law as follows:

"Now, therefore, I, Benjamin Harrison, President of the United States, do hereby make known and proclaim that there is hereby reserved from entry or settlement and set apart as a Public Reservation, all those certain tracts, pieces or parcels of land lying and being situate in the State of Oregon, and particularly described as follows, to-wit (here the legal description of the Bull Run reserve was set forth) * * *. Warning is hereby expressly given to all persons not to enter or make settlement upon the tract of land reserved by this proclamation."

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9 The City now owns 5,142 acres in the Bull Run Division. Private individuals own 360 acres (not in the watershed) and the federal government owns the balance.


11Act of March 3, 1891, 16 USC 471.

12Presidential Proclamation dated June 17, 1892, 27 Stat. 1027.
It is interesting to note that this proclamation is silent as to whether the reserve was to be used primarily as a source of water or for other purposes. Your Committee did not find any history on this question, and recommends further study on it. In any case, the area originally contained within the Bull Run reserve (now Bull Run Division) was about 218 square miles.

In 1897 another federal law\(^3\) was enacted, the effect of which was to expand the purposes for which national forests could be established by the President to include watershed protection, as follows:

"All public lands designated and reserved * * * by the President of the United States * * * shall be as far as practicable controlled and administered in accordance with the following provisions. No national forest shall be established, except to improve and protect the forest within the boundaries, or for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States* * *" (emphasis added)

Further federal legislation\(^4\) was enacted in 1904 for protection of the Bull Run Division, by prohibiting trespass on it. The preamble to that law specified that it was "for the protection of the Bull Run Forest Reserve and the sources of the water supply of the City of Portland, State of Oregon." This law has been revised several times, and currently reads as follows:

"Whoever knowingly trespasses upon any part of the Reserve known as Bull Run National Forest, in the Cascade Mountains, in the State of

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\(^{13}\) Act of June 4, 1897, 16 USC 475.

\(^{14}\) Act of April 28, 1904, 33 Stat. 526, 18 USC 1862.
ployed by the United States to protect the forest, or to Federal and State officers and employees of the water board of the City of Portland, State of Oregon, in the discharge of their duties."

A similar law\textsuperscript{15} prohibiting trespass within the "Bull Run National Forest" was enacted by the Oregon legislature in 1947.\textsuperscript{16}

Federal legislation\textsuperscript{17} was enacted in 1905 transferring the duty of management of national forests, including the Bull Run Division, to the Department of Agriculture. Actual management is currently in the hands of the Forest Service, an arm of the Department of Agriculture.

In 1908, President Theodore Roosevelt issued an Executive Order\textsuperscript{18} under which the Bull Run Reserve became a part of a new unit known as the Oregon National Forest. By a proclamation\textsuperscript{19} dated June 30, 1911, President William H. Taft eliminated approximately four square miles from the Oregon National Forest (Figure 2). It is interesting to note that the area removed in 1911, a part of which is definitely located within the Bull Run watershed, represents the only portion of the watershed not currently included within the Division, and that the removed area was federally owned whereas the proclamation states, apparently erroneously, that it did not remove any "public land".

The area contained within the Oregon National Forest was increased by each of two federal laws enacted in 1920.\textsuperscript{20} Then, by a 1924 Executive Order issued by President Calvin Coolidge, the Oregon National Forest was renamed the Mt. Hood National Forest.\textsuperscript{21}

In the following years, the City of Portland acquired additional private lands in the Bull Run Division and water rights.\textsuperscript{22} In 1858 the City attempted to purchase the federal land contained within the Bull Run Division for a nominal amount, apparently to ensure full control over the watershed by the City, but this proposal was not accepted by the federal government.\textsuperscript{23}

By an Administrative Order\textsuperscript{24} issued August 12, 1959, the Regional Forester of the USFS opened up for public use approximately 65 of the 218 square miles originally contained within the Bull Run Division (but none within the watershed), thus effectively removing this 65 square miles from the Division (Figure 2). There is a legitimate question as to whether this order is legally effective, inasmuch as it arguably overturned the 1904 federal trespass law by administrative action.

Bull Run Lake was the site of the first water storage efforts in 1915. The lake has no surface outlet. Instead, the outflow passes through a porous bottom and region of basalt to appear in a series of large springs about a mile down the canyon and 175 feet below the lake surface. By depositing clay on the lake bottom and constructing a log dam and earthen dike, lake water elevation was increased 20 feet.

\textsuperscript{15}ORS 449.505.

\textsuperscript{16}Several other municipal watersheds are protected by specific federal laws, notably Los Angeles, Salt Lake City, Prescott, Arizona; Yakima, Washington, and Ketchikan, Alaska. Many other cities utilize National Forest watersheds under "cooperative agreements."

\textsuperscript{17}Act of February 1, 1905, 16 USC 472.

\textsuperscript{18}Executive Order of June 30, 1908, No. 864.

\textsuperscript{19}Presidential Proclamation of June 30, 1911, 37 Stat. (Part II) 1704.

\textsuperscript{20}Act of February 11, 1920, 41 Stat. 405; Act of May 20, 1920, 41 Stat. 605.

\textsuperscript{21}Executive Order of January 21, 1924, No. 3944.

\textsuperscript{22}Exclusive right to use the waters of the Bull Run and Little Sandy Rivers is granted to the City of Portland (ORS 538.420). However, on the Little Sandy River, prior ownership exists by Mt. Hood Railway and Power Company (now Portland General Electric Company) of water rights for "lighting, power and manufacturing purposes." By agreement with the company (City Ordinance 131214 of July 14, 1970), the City is allowed to divert all of the Little Sandy drainage above the most westerly Goodfellow Lake into the Bull Run watershed.

\textsuperscript{23}July 7, 1958 letter from Comptroller General of the United States to U.S. Senator Wayne Morse.

\textsuperscript{24}Administrative Order for Bull Run Division, Mt. Hood National Forest, Oregon, issued August 12, 1959 by J. Herbert Stone, Regional Forester, USFS.
In 1929, a concrete gravity arch dam, Bull Run Dam No. 1, was constructed at the junction of Bull Run River and Bear Creek. Bull Run Dam No. 2 was constructed (1958-1963) further downstream and just above the headworks structure for the municipal water supply.

Non-Forest Service Uses

All non-Forest Service uses of the Bull Run Division are governed by "special use permits". Other than timber harvest permits and permits for Portland water supply facilities, the only major permittee in Bull Run Division is the Bonneville Power Administration, which under a 1940 permit has a transmission line crossing the Division and watershed south of Larch Mountain.25

The division of control and responsibility with regard to the watershed, as between the USFS and the City presents somewhat of a dilemma. The federal law enacted in 1904 prohibiting trespass in the area specified that it was adopted for the protection of the City's water supply. On the other hand, most of the watershed is located on federal land, and, as such, is under the administration of the USFS. Significantly, there is federal legislation26 which provides:

"that when a city obtains municipal water from a national forest and has entered into a cooperative agreement with the Secretary of Agriculture for the protection of the watershed within the national forest from which the water is secured, the President of the United States may * * * set aside from all forms of location, entry, or appropriation any national forest lands, which are covered by said cooperative agreement * * *"

"Whenever national forest lands are withdrawn * * *, and the municipality concerned objects to the utilization of the timber or other resources of lands withdrawn, and the Secretary of Agriculture agrees to withhold such resources from utilization, said municipality shall pay to the Forest Service annually an amount which the Secretary of Agriculture shall determine is necessary to reimburse the United States for the loss of the net annual revenues which would be derived from the resources so withheld from disposition."

The U. S. Department of Agriculture has adopted implementing regulations.27 To summarize, the Forest Service is specifically authorized to enter into cooperative agreements with the City of Portland, under which the City could be given any measure of control over the watershed as might be mutually acceptable. To the extent that such an agreement prevented the federal government from harvesting timber in the watershed, the City would probably be required to reimburse the Forest Service for lost revenues.

The cooperative agreements entered into between the City and the USFS to date include the following: (1) an apparent agreement reached in 195428 acknowledging the necessity of providing access roads in the watershed for fire protection; (2) agreement reached in 195529 to study " * * * the relationship between the forest cover, soil mantle and waterflow within and near the Bull Run watershed as a basis for determining the best available procedures to promote the highest efficiency and use of all available resources insofar as the uses are compatible with the supply of adequate Bull Run water for the present and future needs of * * * Portland * * *"; (3) agreement reached in 195930 under which

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25See the "Proposed Hanford-Ostrander Transmission Line Multiple Use Survey Report, Stage I" issued by the Pacific Northwest Region, USFS, December 9, 1969.
2616 USC 552(a) and (c), 54 Stat. 224-25.
2736 C.F.R. 251.9, 7 F.R. 7180, September 11, 1942.
29City Ordinance 103012 of November 9, 1955 and Agreement 8204 of November 17, 1955.
30Cooperative Agreement dated March 11, 1959, between City of Portland and United States of America acting through the Forest Supervisor, Mt. Hood National Forest, United States Department of Agriculture (See Ordinance No. 109355 adopted by the Portland City Council on February 25, 1959), as amended April 6, 1959 (See Ordinance No. 109717 adopted by the Portland City Council March 26, 1959).
the Forest Service agreed to prepare an inventory of the timber located on the City land within the Bull Run Division and to establish a management plan for the harvesting of timber on the City land under the supervision of the Forest Service; (4) agreement reached in 1971, outlining the understanding between the City and the Forest Service regarding the management of the Bull Run watershed, in which it is expressly recognized that the City is responsible for all improvements and operations relating to the collection, treatment, storage and transmission of water to downstream users, and under which the Forest Service and the City have each agreed to coordinate their planning and give advance notice of any significant management decision to the other, and (5) the recent establishment of the Bull Run Planning Unit under which the watershed is to be studied by the City and Forest Service from 1973 through 1975.

It therefore appears that the overall approach of the Forest Service is to cooperate with the City, with a view to insuring high quality water while at the same time retaining overall control of the management of the watershed, including logging operations. To the extent that the management of the watershed by the USFS, including logging operations, should ever become unacceptable to the City it should at that time seek to enter into an appropriate additional cooperative agreement with the USFS, recognizing that the City would have to reimburse the Forest Service for any limitations imposed on logging that were not otherwise acceptable to the Forest Service.

Based on the fact that the 1904 federal legislation prohibiting trespass on the Bull Run Division specified that it was for the protection of the sources of water supply of the City of Portland, it has been argued that the harvesting of timber in the watershed by the USFS is inconsistent with the purpose for which the area was set aside, and that such logging is therefore improper. On the other hand, a Forest Service attorney in 1943 issued an opinion that the 1904 law only prevented an actual "trespass", i.e., an unauthorized entry. He therefore concluded that, so long as a logger is authorized by the USFS to enter upon the watershed, he has not committed a trespass, and there has been no violation of the law. Also, there is specific federal legislation authorizing the Secretary of Agriculture to sell so much of the dead, matured, or large growth of trees found upon such national forests as may be compatible with the utilization of the forests thereon. Timber harvesting appears to be an expressly authorized purpose under both the 1897 federal law defining allowable uses for national forests and the Multiple Use-Sustained Yield Act of 1960. It has been forcefully argued that the Multiple Use-Sustained Yield Act of 1960 had the effect of causing more legal confusion in an already confused area of the law. Others have argued that the 1960 Act does not apply to virgin forests and undisturbed wildlife habitats, like the Bull Run watershed, because such resources are not renewable and that Act applies only renewable surface resources. It has also been pointed out that, because the 1960 Act allows land to be used for less than all of its resources, the Forest Service should not feel obligated to log this particular area. Because of the highly complex legal issues involved in this

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31Memorandum of Understanding between Forest Service, United States Department of Agriculture, and Bureau of Water Works, City of Portland, dated November 10, 1971.
33January 2, 1973 letter from Joseph L. Miller, Jr., M.D. to Robert T. Huston, member of your Committee.
34April 19, 1943 letter from Robert H. Shields, Forest Service Solicitor addressed to Lyle F. Watts, Chief, Forest Service.
3516 USC Section 476, 30 Stat. 35, June 4, 1897.
36Act of June 4, 1897, 16 USC 475.
3716 USC 528-531, 74 Stat. 215.
38See Footnote 33.
39See Footnote 38.
question of the legality of logging in the watershed, your Committee has not attempted to reach a conclusion on the matter but leaves this matter to the courts.

Although recreational use of the watershed has generally not been allowed in the past, the Forest Service recently considered the possibility of adopting a management plan that would ultimately allow recreational use.\(^4\) Both the City Water Bureau\(^4\) and general public opinion were opposed to such recreational use. The management direction issued by the Forest Service specified that "No general public recreation is proposed for this Zone". This statement was modified to some extent by another statement that "Though recreation use is presently unacceptable there is a long range suitability which must be recognized in on-going activities."\(^4\) The management plan proposed a new recreation road through the Bull Run watershed to a proposed campground and horse camp at Little Pass, on the northern watershed boundary. Horse trails and foot trails would extend northeast and follow the watershed boundary in the vicinity of Latourell Prairie. This management plan is being implemented, although the process of planning (filing of an Environmental Impact Statement) is not yet officially complete. The ultimate decision on legality of recreational use within the watershed will probably be determined in court under the same guidelines and legislation as will the legality of harvesting timber in the watershed.

V. PORTLAND'S WATER SUPPLY

Major features of the distribution system for Bull Run water are shown in Figure 3.\(^4\) In addition to the three conduits, ranging from 52-inch to 66-inch diameter, originating at the headworks, a fourth conduit with a capacity of over 150 million gallons per day (mgd) is in the planning stages, although no schedule has been proposed by the Bureau of Water Works. The facilities in the City include: (1) six storage reservoirs with a total capacity of 190 million gallons (four on Mt. Tabor and two in Washington Park); (2) 56 tanks and standpipes with a combined total capacity of almost 250 million gallons, and (3) related equipment such as 56 pumps with a total pumping capacity of almost 100 million gallons per day, 1,520 miles of mains, 121,500 meters and 8,480 hydrants. These facilities not only serve the users in Portland, but also the users in 42 independent water districts whose annual consumption is 41.3 percent of that used by the City of Portland customers, at a cost of 41.5 percent of the total amount charged Portland users. The ratios, however, do not take into account the relative costs to residential, commercial and industrial users. Larger users generally enjoy substantially lower rates. In fact, the Portland residential customer pays only 20 to 50 percent of the average residential rate charged to customers in outlying areas served with Bull Run water. Many city customers pay the minimum monthly charge so the City rates may not actually be so favorable. Portland water rates have been estimated by Water Bureau personnel as being in the bottom 5 percent of water rates in the nation.

As noted earlier, the three conduits from the headworks at Portland presently in use may not always equal the daily requirements. This situation is aggravated by independent water districts purchasing water from the City of Portland but not complying fully with their contractual agreement to provide their own storage equivalent to three days' supply.\(^4\) While the system has operated satisfactorily in


\(^{43}\) See Footnote 41, page 20.

\(^{44}\) The Goodfellow Lakes project, shown as "under construction," was begun as a result of a 1966 study of additional small storage projects in the Bul. Run watershed. This project, which is actually outside the watershed, would divert water from the Little Sandy basin through a tunnel to the top of Cedar Creek. The project is currently partially completed but work is stopped and the project is under reconsideration because of escalated project costs.

\(^{45}\) It may not be economic for many of the smaller districts (20 customers or less) to provide this storage. Consolidation of such districts could be a partial answer to the problem.
the past, the reliability of the distribution system is weakened by the following situations:

1. Major reservoirs of the watershed are connected in series; the headworks drains water only from the lowest reservoir with no conduit connections to other reservoirs.

2. All three conduits originate within an area less than one acre. Two of the three conduits run adjacent to each other in their 25-mile route to Portland. No study of geologic hazards along the route has been made.

3. Two of the five Willamette River pipeline crossings are located on the Ross Island Bridge, and four of the five are located within a total width of one mile.

4. The six distribution reservoirs on Mt. Tabor and in Washington Park are uncovered and have only minimal safeguards against man-caused hazards.

5. No alternate sources of supply are presently available for immediate use in an emergency.

Planning by Bureau of Water Works

As noted above, several water system developments are planned but not scheduled by the Portland Bureau of Water Works. This indecision stems in part from the fact that the water service outside the Portland city limits is a large part of the total water used and is provided under short-term contracts and on condition of surplus water. Long-term contracts and firm supply agreements are necessary to finance any additional reservoir or conduit. Past planning efforts for metropolitan water supplies have not resulted in binding agreements for rational development. The "CRAG Water Plan" of July, 1969 (Clark & Groff Engineers, Salem) is little more than an inventory of present systems. Obviously, the City of Portland would be in an awkward position if it went ahead with major water supply developments only to have neighboring communities seek firm and ample water supplies elsewhere, including wells, rivers, or other storage projects. The City of Portland is currently sponsoring another study to recommend a plan for the comprehensive development of water supplies and systems for the entire Portland metropolitan area. The study, being done by Stevens, Thompson & Runyan, will examine subjects such as water needs, the geographic area that is presently served, the area that should be served by the Portland water system, potential alternate sources of water, alternate water supply programs, comparisons and costs, probable future financing costs, etc. Similar broad regional and national studies of water supplies are in process. One such study, the National Water Commission Report, purports to "determine what policies the nation should adopt to ensure that its finite water resources are used in ways which yield the highest measure of welfare to society, now and in the future." The study examined community water needs and reports findings "not reassuring with regard to the future." Specific recommendations are offered to eliminate alleged public subsidies for providing private industrial water supplies and to make more efficient use of existing water supplies. These concerns seem applicable to Portland. It is common practice in many other localities to utilize alternate supplies for large quantity users not requiring high quality water. Presently, Bull Run water is used by all customers for all purposes without regard to the quality needed for any specific use. To date, the Bull Run supply has been adequate, but the system is now faced with a very substantial increase in costs if it is to increase its capacity and maintain present quality throughout the system.

Full Use of Present Water Supplies

Beyond finding new supplies of water, the Water Bureau of the City of Portland could assist its users in minimizing water costs by promoting in every way feasible the conservation of water. Through conservation of the resource, the need for increased facilities will be minimized; the need for alternate and more expensive methods of acquiring quality water will also be minimized. Although the matter of water conservation has not been studied in detail, it is obvious that significant reductions can be made in water consumption, without personal sacrifice or

Figure 3. Schematic diagram of Bull Run supply and distribution system. Private water companies and water districts include Rockwood (9841 active customers), Wolf Creek Highway (8182), Powell Valley (7552), Beaverton (4876), Hazelwood (3040), Gresham (3012), West Slope (2826), Rose City (2748), Capitol Highway (2299), Metzger (2170), and thirty-two smaller companies or districts.
huge cost. As examples, it is estimated that even the smallest steady stream from a leaky faucet uses 10,000 gallons per year, and Portland's drinking fountains, which operate without demand control valves, use 75 million gallons per year. In the industrial sector, it has been shown that increases in industrial sewer charges sharply increase water conservation efforts.47

Much of the annual runoff from the Bull Run watershed is unused by the Portland water system. This water might be used to generate electric power in existing dams. Fifteen years ago such work was proposed by the City but defeated by the voters.48 The situation has changed since that time. The City has in hand an appraisal report in which it is indicated that a hydro-electric development at Bull Run is technically feasible, could be constructed in four to five years' time and would produce net revenue of $250,000 per year, based upon what appear to be reasonable assumptions.49 The estimated costs total $7,724,000. Recent regulations and environmental considerations may make such a project less desirable than the engineers indicate.50 On the other hand, much of the excess water flow occurs in the winter when local demand for electric power is highest. It should be noted that in the 1971-72 fiscal year, sale of the surplus water for use in Portland General Electric's lower elevation Roslyn Lake and Bull Run hydro-electric plant brought in only 0.17 percent of the total revenues of the Bureau of Water Works while using more than half as much water as was sent through conduits to the entire Portland water system.

VI. WATER QUALITY

Portland's "pure water" has often been acclaimed as among the best in this nation. Thus, it was a cause of surprise and indignation to many to find that the water system was only "provisionally" accepted by the Environmental Protection Agency (EPA) in late 1972. The point overlooked by many people is that Portland's "pure water" refers to the uncontaminated source (Bull Run watershed), whereas the EPA rating refers to system reliability and quality of water delivered to customers (specifically, customers who use the water in interstate commerce). Table II compares Portland's water with that of other large cities.

**Definition of Water Quality**

If water as it occurs in nature were "pure" water and nothing else, there would be no need for water analysis and water conditioning. However, water nearly always contains impurities in solution or suspension. Falling rain picks up oxygen, nitrogen and carbon dioxide (the normal gases present in the atmosphere). Rain water also encounters dust, smoke and fumes which are dissolved or retained in suspension. Bacteria and the spores of microscopic organisms may be picked up. Rain water, in descending through the air and in percolating through the upper layers of soil, absorbs carbon dioxide with which it forms carbonic acid. This action increases the solvent power of the water so that it dissolves a certain amount of the mineral matter in soil or rock. Water obtained from surface streams may be rendered turbid by the presence of clay and silt. Agricultural land may contribute organic matter and may pollute the water with fertilizer and animal waste. Swamps

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48 The City Club of Portland report on this measure appearing in the Bulletin of October 31, 1958 concluded that "hydroelectric plants at Bull Run Dams #1 and #2 should be built when contracts for the sale of power can be negotiated at rates which will provide a net income for the City of Portland for these facilities."


### TABLE II

#### COMPARATIVE WATER QUALITY

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Portland</th>
<th>Seattle</th>
<th>Los Angeles</th>
<th>Chicago</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color, CU (C.U.)</td>
<td>&lt;5</td>
<td>N.R.</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Turbidity, JTU</td>
<td>0.3</td>
<td>1.6</td>
<td>1.3</td>
<td>4</td>
</tr>
<tr>
<td>Chloride</td>
<td>2.4</td>
<td>1.2</td>
<td>100</td>
<td>10.2</td>
</tr>
<tr>
<td>Iron</td>
<td>0.26</td>
<td>0.2</td>
<td>0.06</td>
<td>0.01</td>
</tr>
<tr>
<td>Nitrate nitrogen</td>
<td>0.015</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulfates</td>
<td>0.6</td>
<td>1.5</td>
<td>330</td>
<td>23</td>
</tr>
<tr>
<td>Total dissolved solids</td>
<td>24</td>
<td>22</td>
<td>751</td>
<td>176</td>
</tr>
<tr>
<td>Alkalinity (CaCO₃)</td>
<td>10</td>
<td>26</td>
<td>122</td>
<td>108</td>
</tr>
<tr>
<td>pH (hydrogen ion conc.)</td>
<td>6.9</td>
<td>7.6</td>
<td>8.2</td>
<td>8.42</td>
</tr>
<tr>
<td>Hardness (CaCO₃)</td>
<td>14</td>
<td>20</td>
<td>353</td>
<td>138</td>
</tr>
</tbody>
</table>

| After Treatment          |          |         |             |         |
| Color, CU (C.U.)         | <5       |         | 0.3         | 0       |
| Turbidity, JTU           | 0.3      | 0.9     | 0.3         | 0.2     |
| Chloride                 | 2.6      | 3       | 107         | 10.7    |
| Iron                     | 0.18     | 0.3     | 0.01        | 0.02    |
| Nitrate nitrogen         | 0.02     |         | 0.9         | 0.26    |
| Sulfates                 | 1.2      | 2.0     | 330         | 26      |
| Total dissolved solids   | 24.5     | 30      | 706         | 180     |
| Alkalinity (CaCO₃)       | 12       | 19      | 121         | 102     |
| pH (hydrogen ion conc.)  | 7.1      | 7.6     | 8.3         | 8.13    |
| Hardness (CaCO₃)         | 13.3     | 19      | 147         | 136     |

1. All data except color, turbidity and pH reported in units of parts per million (ppm).
2. Portland Bureau of Water Works, "recent averages." After treatment chemical values from 1969 PHS and SBH joint survey of water system.
5. Average, calendar year 1971.
6. N.R.—not reported.

Water treatment encompasses a broad range of processes, most of which remove objectionable substances from the water. The softening process removes or modifies calcium and magnesium salts that tend to form scale and to inhibit the action of soap and detergents. In municipal water systems, such chemicals as chlorine, fluoride, etc., are commonly injected in small concentrations to promote public health.

The presence of solid particles in the water is of periodic interest to users of water from the Bull Run watershed. Abnormally high flowrates in the streams and rivers can result in the entrance of solid particles into the water supply. Most of these particles subside with time and remain on the lake and reservoir bottoms. Some particles are of sufficiently small size and density such that there is not adequate settling time in the system. Such particles remain suspended in the water and comprise turbidity such as that recently encountered.

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PORTLAND CITY CLUB BULLETIN
In most water systems, the presence of turbidity also signifies the presence of harmful organic material. The turbidity encountered occasionally in the Portland water supply consists of finely divided mineral substances only, and thus may pose an esthetic or industrial problem but does not result in danger to the public health. This circumstance was apparently not recognized by the EPA in setting a singular national standard for turbidity.

Removal of solid particles is generally accomplished by one or both of two methods where subsidence is inadequate: coagulation and filtration. Coagulation is that process whereby finely divided particles capable of remaining in suspension indefinitely are combined by chemical means into masses sufficiently large to effect rapid settling. Filtration is the process of passing a liquid containing suspended matter through a suitable porous material in such a manner as to effectively remove the suspended matter from the liquid. Filtration, without coagulation, will not remove the fine particles of turbidity if a filter medium sufficiently coarse for modern filtration rates is employed. Coagulation is required to agglomerate the suspended particles, thus making the water more readily filtered and also causing much of the coagulated matter to settle out prior to filtration. Filtration as such does not provide removal of dissolved solids, although it may be used in conjunction with a softening process that does reduce the dissolved solids content of the water treated. Most municipal water supplies in the United States and all municipal water supplies for cities larger than Portland require treatment such as coagulation and filtration to meet public health standards.

Bacteriological water quality is commonly measured by the existence of what is known as coliform group bacilli. According to Public Health Service Drinking Water Standards,51 "The coliform group includes all of the aerobic and facultative anaerobic, Gram-negative, nonspore-forming, rod-shaped bacilli which ferment lactose with gas formation within 48 hours at 35 degrees Centigrade." Of the various coliform group, Escherichia coli is especially important, because it characteristically is an inhabitant of human and animal intestines. Although human wastes generally carry more bacterial pathogens than wild animal wastes, such as found in the Bull Run watershed,52 the presence of any type of coliform organism in treated drinking water suggests either inadequate treatment or contamination after treatment.

The bacteriological quality of Portland's treated water in the distribution system appears adequate. Between city, county and state water quality checks, over twice the required number of samples are taken each month.53 In the 1960-1971 period, only 1.5 percent of the samples showed existence of coliform group bacilli after incubation; for 1972, only 9 out of 7200 samples gave similar results. Qualitative

<table>
<thead>
<tr>
<th>Diameter of Particle, Millimeter</th>
<th>Description</th>
<th>Time Required to Settle One Foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.0</td>
<td>Gravel</td>
<td>.3 sec.</td>
</tr>
<tr>
<td>1.0</td>
<td>Course sand</td>
<td>3 sec.</td>
</tr>
<tr>
<td>.01</td>
<td>Fine sand</td>
<td>38 sec.</td>
</tr>
<tr>
<td>.001</td>
<td>Bacteria</td>
<td>33 min.</td>
</tr>
<tr>
<td>.0001</td>
<td>Clay particles</td>
<td>230 days</td>
</tr>
<tr>
<td>.00001</td>
<td>Colloidal particles</td>
<td>63 years</td>
</tr>
</tbody>
</table>

52Some attempts at controlling animal wastes are endorsed by the Forest Service and Bureau of Water Works—requirements for horses to wear diapers when used for logging in the watershed. At the same time, however, timber harvest activities increase big game (deer) populations and the Forest Service actually seeds cut-over areas with browse supporting these larger populations.
53City employees sample and analyze water at the Bull Run headworks; County employees sample and analyze water in the distribution system under merged city and county health departments.
public health standards for treated water allow up to 5 percent of the samples to show existence of any coliform bacteria.

Actual counting of incubated coliform colonies is used to measure raw water bacteriological quality. During the past year, Portland’s raw water has averaged four coliform colonies per 100 milliliter samples. EPA standards for raw water indicate that sources with up to 100 coliform colonies per 100 milliliters may be used for drinking water with disinfection being the only treatment. Thus, for Bull Run water, the only treatment required to meet state and federal health requirements has been chlorination.

**Drinking Water Standards**

Federal public health standards for drinking water supplies go back to 1914. The current applicable standards date from 1962.54 In the past several years, the responsibility for these criteria has shifted to the EPA. The EPA is in the process of re-evaluating these standards and drafts of revised standards indicate more restrictive limits on turbidity. Some typical levels for present and proposed standards are given below:

### Changes in Treated Drinking Water Standards

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Color, CU (&lt;5)</td>
<td>15</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Turbidity, JTU (0.3)</td>
<td>5</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Taste and odor (—)</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Chloride, ppm (2.6)</td>
<td>250</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>Cyanide, ppm (—)</td>
<td>0.01</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Lead, ppm (—)</td>
<td>0.05</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>Mercury, ppm (—)</td>
<td>—</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td>Nitrate nitrogen, ppm (0.02)</td>
<td>45</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Sulfate, ppm (1.2)</td>
<td>250</td>
<td>250</td>
<td></td>
</tr>
</tbody>
</table>

One important point to note is that the public health standards do not recognize or tolerate even “temporary” or “inevitable” degradation of water quality below the level of standards, for any reason whatever.

In January 1972 a local debris blockage in the North Fork of the Bull Run River caused a mineral washout which increased the turbidity to values as high as 120 JTU at the headworks.55 As can be seen below, the normal winter peak is only in the range of 5 JTU (barely visible in comparison with distilled water).

### Turbidity at Bull Run Headworks

<table>
<thead>
<tr>
<th>Year</th>
<th>January Avg., JTU</th>
<th>February Avg., JTU</th>
<th>Winter Peak, JTU</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>.5</td>
<td>2.5</td>
<td>6.6</td>
</tr>
<tr>
<td>1969</td>
<td>1.5</td>
<td>.7</td>
<td>3.2</td>
</tr>
<tr>
<td>1970</td>
<td>1.3</td>
<td>.7</td>
<td>3.4</td>
</tr>
<tr>
<td>1971</td>
<td>1.1</td>
<td>.5</td>
<td>2.6</td>
</tr>
<tr>
<td>1972</td>
<td>24</td>
<td>20</td>
<td>120</td>
</tr>
<tr>
<td>1973</td>
<td>2.7</td>
<td>1.2</td>
<td>8</td>
</tr>
</tbody>
</table>

In 1969, the EPA and State Health Division personnel conducted a survey of Portland’s municipal water supply to determine suitability for interstate use. After

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54 See Footnote 51.
discussing their inspection of the system in a report\(^{56}\) they summarize their findings regarding Bull Run watershed management in the final five paragraphs:

"Logging practices are adhered to which minimize the erosion from a logged area but some increase in turbidity is to be expected in any event. Along with the turbidity, the addition of nutrients to the water from these logged off areas must also be considered. Undoubtedly, these nutrients will make algae control in the Bull Run reservoirs much more difficult in the coming years."

"A similar problem relates to the logging roads in the area. Although providing the benefit for increased access for fire control, they contribute to increased turbidities in the basin. The roads also represent an 'attractive nuisance' in opening up the watershed to unauthorized recreational use. There are 10 points of entry to the watershed that generally are unattended by watchmen, and routine surveillance to apprehend and prosecute trespassers is lacking. Without changes, it is expected that undesirable levels of recreational use of the basin may be reached."

"A discussion has already been presented on the need for changing the analytical techniques for examining the bacteriological characteristics of the raw waters. This change is necessary to determine if the coliform levels are less than 100 coliform per 100 ml of water. This is the limit for disinfection to be acceptable as the only treatment.

"Chemical characteristics of the raw water have always been acceptable and should continue to be so. The physical characteristics, however, have at times presented problems. Earlier in this report, for example, it was noted that turbidities have been in excess of the limits of the Drinking Water Standards on several occasions. In addition to reducing the aesthetic characteristics of a water, particles causing turbidity also impair the disinfection process. With continued logging of the basin and increasing mileage of access roads, the turbidity problem can only worsen."

"Summarizing, the raw water of the Portland water system is only marginally acceptable for treatment by chlorination only at present. It appears that the future will bring a deterioration of the present quality and that treatment by filtration will be required in the not too distant future. For the most orderly development of those treatment facilities, it is recommended that planning begin for further treating this water supply."

In late 1972, upon resurvey of the water supply, the EPA through the state agency, "provisionally" accepted the Portland water supply, based on a general lack of progress in meeting deficiencies found in the earlier survey. These deficiencies included the fact that occasionally the turbidity of the water increases above federal standards. Part of the slowness in Portland Bureau of Water Works reaction stems from a lack of historical knowledge about the watershed. Turbidity data as presently gathered only extend back to 1967. For the past decade, periodic sampling at the headworks has been utilized. At present, continuous recording at the headworks plus daily sampling at 12 watershed locations has been instituted. Thus, part of the Portland Bureau of Water Works response has been to increase its watershed monitoring and study in order to determine possible options to develop a water supply which meets Federal standards.

At present, some of the options might be listed as follows:

1. Filter Portland water supply in the vicinity of the Bull Run headworks so as to handle a maximum flow of 225 mgd.

2. Filter a portion of the City water supply at the Bull Run headworks so as to meet the winter typical water demands of 75 mgd. This would serve to dilute turbid water with filtered water in order to lower the turbidity to comply with EPA standards.

3. Provide separated headworks structures within the Bull Run watershed so

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that high turbidity in one sub-basin could be avoided by using water from other sub-basins.

4. Petition EPA officials to set standards recognizing the difference between turbidity sources in Portland's water and turbidity sources in water supplies of other cities (e.g., breakdown of treatment plant).

It has been pointed out that the EPA has no cost responsibility for achieving water quality standards it may set. Thus, perhaps, the single turbidity standard proposed is based in part on ease of national administration and enforcement. Furthermore, it is not clear exactly what sanctions the federal government would impose on a non-complying water supply for Portland.

Outside of these watershed management options, there obviously exist other solutions. Among these are:

1. Development of an alternative water supply (Columbia, Willamette, Clackamas Rivers);
2. Use of ground water;
3. Treatment of only the water distribution lines used by interstate commerce (airlines, railroads, etc.). While this might technically meet EPA requirements that exist today, future state adoption of the stricter limits would seem likely and thus this option is not a substantive resolution of the problem.

To summarize, changing requirements for municipal water quality place the Portland water supply system in prompt need for improvement if the requirements are to be fully met.

VII. TIMBER AND WATER SUPPLY

A major resource of the Bull Run Division, in addition to a water supply for the Portland metropolitan area, is a valuable stand of timber. The Bull Run Division harvest represents some 8 percent of the Mt. Hood National Forest's annual harvest, and 0.4 percent of the total Oregon annual harvest. Table III summarizes the inventory, present condition, and USFS plans for harvesting timber in the Bull Run Division.

The forest is managed under ten-year timber management plans, with a new (1973-1983) plan to be announced shortly. Your Committee understands that the plan will not significantly change the extent of harvest in the Bull Run Division. Specific timber planning is done through a revolving five-year action plan prepared each winter. Such plans may be modified each year based on economic, political or natural factors. As an example, destructive east winds this past winter blew down some 60 million board feet (mmbf) of timber. This loss of more than a year's normal cut has drastically altered the sale and cutting plan for this year. Much of the blowdown is under contract to be removed this summer. Sales originally planned for this summer are being modified by the blowdown but generally are being deferred for a year. Several areas of concentrated blowdown are within inventoried roadless areas. Except for emergencies, the USFS is under legal obligation to prepare a full Environmental Impact Statement (EIS) on any timber sales in inventoried roadless areas.57 The time required for processing an EIS conflicts with planned early harvest, in that the normally endemic bark beetle concentrates in these blowdown areas and can damage weakened nearby trees in subsequent years. Early harvest removes the nesting spots (bark in dead trees) and minimizes any infestation of bark beetles above normal levels.

57 In a recent proceeding of the Sierra Club against the U.S. Forest Service, a court order (U.S. District Court, Northern District of California C-72-1455-SC of August 29, 1972) granted an injunction against general logging in roadless areas which had been inventoried by the USFS but not selected for wilderness study. A directive from the Chief of the Forest Service (November 28, 1972) specified how emergencies were to be determined and acted on. The Mt. Hood National Forest received approval to harvest the blowdown in roadless areas by approval from the Chief on July 2, 1973. Harvest methods include helicopter and skyline methods, some limited yarding on flat slopes and several short temporary road spurs into the roadless areas.
TABLE III
BULL RUN TIMBER SUPPLY

<table>
<thead>
<tr>
<th></th>
<th>Bull Run Division</th>
<th>Bull Run Watershed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Acres</td>
<td>92,755</td>
<td>69,678</td>
</tr>
<tr>
<td>Available Cut Acres</td>
<td>55,618</td>
<td>41,345</td>
</tr>
<tr>
<td>Acreage Already Cut</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clearcut</td>
<td>5,471</td>
<td></td>
</tr>
<tr>
<td>Partial Cut</td>
<td>5,600</td>
<td></td>
</tr>
<tr>
<td>Timber Volume Per Acre, mbf²</td>
<td>66.7</td>
<td>66.7</td>
</tr>
<tr>
<td>Annual Acreage Cut, Percent</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Regulated Annual Cut, mmbf³</td>
<td>37.1</td>
<td>27.6</td>
</tr>
<tr>
<td>Total Planned Sales, mmbf⁴</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FY 1974</td>
<td>49.0</td>
<td>39.0</td>
</tr>
<tr>
<td>FY 1975</td>
<td>52.2</td>
<td>35.9</td>
</tr>
<tr>
<td>FY 1976</td>
<td>49.1</td>
<td>33.7</td>
</tr>
<tr>
<td>FY 1977</td>
<td>40.9</td>
<td>37.3</td>
</tr>
</tbody>
</table>

¹Not reported.
²mbf (thousand board feet).
³mmbf (million board feet).
⁴The difference between regulated annual cut and total cut is in thinning and salvage sales. The larger numbers in recent years represent increasing log utilization by the mills and less slash to dispose of in the woods.
⁵It is customary for a timber sale to precede actual cutting by 2.5 years.

Timber harvest in the Bull Run was not begun extensively until 1958.⁵⁸,⁵⁹ Reportedly concern over firefighting access and control of natural pests and diseases formed the basis for this action, although a review of newspapers reveals strong economic interests at work with a view toward timber harvest.⁶⁰ Based on heavy rainfall and extensive stands of old-growth timber, the Bull Run Division does not appear naturally prone to frequent and extensive fires.⁶¹ Evidence of fires 75 or 100 years ago can be seen, however. In virgin areas of the Bull Run Division, snags and dead trees exist at higher concentrations than in young stands. The U. S. Forest Service, acting under its charter to protect National Forests, has aggressively constructed trails, fire breaks, access roads, pumping stations and, more recently, helispots, as aids in controlling forest fire. In recent years, several slash burns which got out of control have been the cause of the largest fires in the Bull Run Division. It is thus questionable whether the added activity associated with timber harvest actually decreases the incidence of forest fire. If all the Bull Run Division were fully accessible, it seems likely that any fire could be limited in size. However, full access appears to require many new roads which, in nearly all cases, are financed by timber sales. It is important water quality not be lost in this repeating, if not circular, sequence of forest management.

Pressure for increased sale of Bull Run Division timber comes from higher wood product prices and additional dependence by private timber companies on National Forest resources. A decade ago, timber companies could rely on their own lands which were, in general, more accessible. Today, a significant portion

⁵⁸The area on Larch Mountain proper has a history of timber-cutting activity dating back to railroad logging in the early 1900s. The Forest Service planted extensive areas about 1928.
⁵⁹The full allowable cut was first obtained in 1961.
⁶¹Of all fires in the Columbia Gorge District, 90 percent originate in the gorge area as opposed to Bull Run Division. Historically, the railroad along the river is the largest single contributor.
of the low elevation old-growth Douglas fir forest in the region has been logged. A 1969 U. S. Forest Service timber supply study\textsuperscript{62} indicates that, in Western Oregon, private timber lands have been cut at a rate in excess of what is growing back. The pressure to make all forest lands produce wood fiber most efficiently will undoubtedly continue. To date about 15 percent of the Bull Run Division has been logged, as shown in Figure 4.\textsuperscript{63} Nearly all clearcut units have been replanted and are at various ages of regrowth.

The economic worth of timber harvest in the Bull Run Division is significant. Table IV presents a summary of timber cost distributions representative of Bull Run sales. Scaling these estimates to annual Bull Run Division harvest levels of 40 mmcf means over $1 million each year for county roads and schools, about $500,000 annual return to state forest highways, and some $16 million total return to the local economy. At the present time, the two major operators in the Bull Run Division are Publishers Paper and Crown Zellerbach. If this activity is not damaging either short-term or long-term prospects for the Bull Run water supply, it is obviously valuable to the community and should continue.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure4.png}
\caption{Bull Run Timber-Harvested Areas (solid) and Study Areas.}
\end{figure}

\textbf{Watershed Management Guides}

The first priority in management of the Bull Run Division is maintenance of an adequate water supply for Portland. This requirement is written in law and is the stated opinion of local USFS managers. Several obvious questions arise: (1) what constitutes acceptable raw water from the standpoint of the forest manager? (2) what relationship is there between timber harvest and water quality?

On the definition of acceptable natural water, your Committee found very little documentation (only the EPA biological standard previously noted) and specifically no written agreement between the Mt. Hood National Forest and the City of Portland. The 1971 "Larch Mountain-Bull Run Management Plan" of the Forest Service states that the included part of the Bull Run watershed will be

\begin{quote}
\end{quote}

\begin{quote}
\textsuperscript{63}City lands are managed by the USFS. Although management was reported by both City and USFS personnel to follow the same sustained yield concepts as for Forest Service lands, the Columbia Gorge District multiple-use plan states that on city lands, "timber harvest is related to the stumpage price of logs and need by the Water Bureau for additional funds." Income from the sale of timber on City lands goes to the Bureau of Water Works after deduction of Forest Service management fee.
\end{quote}
managed to "provide a continuous supply of domestic water which will meet or exceed State of Oregon Water Quality Standards". The State Water Quality Standards appear general and more lenient than existing natural Bull Run water quality. For example, numerical count of coliform colonies are required to be less than 240 per 100 milliliters. The present average at the Bull Run headworks is four colonies per 100 milliliters. There do occur general prohibitions against the addition or development of "fungi", "organic or inorganic deposits" or "bacterial pollution" injurious or deleterious to public health. There is a provision prohibiting "any measurable increases in natural stream turbidities" except for certain "short term activities specifically authorized by the Department of Environmental Quality" under restrictive conditions. Finally, there exists a requirement that "the highest and best practicable treatment and/or control of wastes, activities and flows shall in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels. . . ." EPA guidance in its "Manual for Evaluating Public Drinking Water Supplies" offers similar general criteria for water quality where surface water is used without filtration, viz:

"Terminal reservoirs (end storage of water prior to treatment) and Class A upstream reservoirs (water derived from uninhabited area to be distributed with disinfection only) should never be used for recreation.

"The character of the watershed should be such that heavy rainfall does not excessively increase the turbidity in the storage reservoir. Excessive turbidity exceeds 5 units.

"One protective measure is a strong program for pollution control and abatement. The entire watershed area should be surveyed periodically to detect existing or potentially dangerous sources of pollution.

"When permission is given for limited recreational use of upstream reservoirs, permission should be only by permit and under proper supervision and should be revocable. Sufficient laboratory testing should be conducted to evaluate the effect of such use."

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Although the EPA guide contains a photograph of logged areas in the Seattle watershed, no mention is made of timber harvest precautions necessary in watersheds which provide drinking water with only disinfection treatment.

Similarly, statements of policy by the American Water Works Association, a professional organization of the public water supply industry, offer little guidance on raw water quality criteria in watersheds like Bull Run. AWWA policy statements are limited to examples such as:

"Each water source should be developed and managed with careful attention to the hydrologic and ecologic systems of which the particular source is a part. Political boundaries should not become barriers to most effective utilization for public supply.

"The responsibility for assuring good water quality through pollution control and abatement rests with those who return waste products to our streams, lakes, and underground sources. All levels of government, federal, interstate, state, and local, must take effective action to identify and reduce to the lowest practical minimum the pollution of our waters."

There is an apparent need for clear definition of acceptable raw water in the Bull Run River. Assurance that the USFS will protect the water resource is not meaningful without objective criteria.

Research on Logging in Municipal Watersheds

With regard to logging and water quality, it appears fair initially to quote the summary statement of USFS forest hydrologist Jack Rothacher: "Water from undisturbed forests is generally of the highest quality available." Restrictive logging methods and use of only a minimum number of roads appear useful in limiting the impact of logging on water quality.

Research on the relationship between timber harvest and water quality goes back some thirty years on eastern forests. In the Pacific Northwest, intensive research goes back to the mid-1950s. Other Pacific Northwest research, however, is limited in its applicability to Bull Run because of bedrock geology, soil, terrain and weather variability among test areas. In the Bull Run Division, research began in 1956 with layout of the B1 Study Area (Figure 4). This research has been jointly sponsored by the Forest Service and the City of Portland. The B1 Study Area consists of some 1000 acres of gentle slope in the south central part of the Bull Run Division. Three subdrainages of Fox Creek are available for study. Gauges were initially installed to measure precipitation and streamflow. In 1964, a road was constructed across two watersheds and into the third watershed. In 1969, four small clearcut units (8 to 10 acres each) were harvested on the north slope of the southernmost watershed, followed in 1970, 1971 and 1972 by two larger cuts (20 acres each) on the northern watershed. Cable yarding was used on all these timber sales. The small sales were burned and then hand planted with Douglas fir. The larger areas were intentionally not burned in an effort to investigate nitrogen cycle differences between the two practices. Logging activities were reportedly more closely supervised than Bull Run Division timber sales generally. Stream buffer zones were left at the lower edges of clearcut sale units. Your Committee toured one unit last fall and another unit this spring. Although not expert on the subject, the Committee was somewhat disturbed to see large trees adjacent to the stream uprooted by wind (exposing bare soil to stream...

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flow) and an algal bloom in the stream where it emerges from deep forest into a sunny clearing associated with the clearcut and a road crossing.

The Bull Run B1 research has taken a long time to produce data. Even now, there is no report documenting the work and findings which could be useful to forest managers. In the early stages of research, emphasis was directed at controlling water quantity through forest management. More recently, sediment, various chemical constituents and biota in the water have been examined. In this connection it should be noted that the use of fertilizer and herbicides to enhance regeneration is not generally allowed in the Bull Run Watershed.

Research at the regional level has produced useful data. Surface soil erosion and mass erosion are the principal mechanisms of damage associated with logging. Surface erosion in Bull Run can stem from exposing large areas of mineral soil to heavy rains. Soil compaction on skidding trails or yarning roads is a contributing factor. These problem areas can be avoided or minimized by operating on soil with the least available slope, by utilizing rubber tired vehicles rather than tracked vehicles, and by lifting logs off the ground during movement (e.g. helicopter or skyline logging methods). In mass erosion on steeper slopes, entire soil layers move relative to each other. It can occur as a result of road construction in unstable soils. In the Bull Run Division, much of the south slope of Larch Mountain exhibits hillocks representative of unstable soil layers. The North Fork debris blockage and resultant muddy water of January, 1972 apparently derived in part from mass erosion in unstable soils. Perhaps the most dramatic statistic from regional work is that some 70 percent of sedimentation in streams results from road construction rather than any particular type of logging practice. In the Bull Run Division, Forest Service personnel have estimated that as much as one-half of the sediment in the reservoirs comes from dust raised by travel on unpaved roads.

Aside from erosion, logging can result in stream temperature changes. This is generally viewed as damaging to the fish resource. There is no protected fish resource in the Bull Run Division, but the same temperature increases can increase algal life and suspended matter in the City's intake water.

Other studies conclude further that:

1. water supply may be increased some twenty percent by the appropriate use of small clearcut openings which produce more ground snow pack than in a dense forest and from the reduction in evaporation of water from trees that were there. Unless this increase can be effectively stored, it may be of no use to the municipal supply system in drier late summer months.

2. important natural soil nutrients have not been carefully identified and measured before, during and after logging operations in conditions analogous to Bull Run. Some data suggest that elements such as nitrogen may not be seriously depleted; other evaluations are less optimistic and point out the basic lack of data in this area, and

70One report, USFS Research Note PNW-88 of September, 1968 entitled “Natural Filtering of Suspended Soil by a Stream at Low Flow” is based specifically on the B1 Study Area in the Bull Run Watershed. Its basic finding was that during construction of a stream road crossing, suspended particle concentration was reduced from 1055 ppm at 150 feet downstream from the road to 108 ppm at 1200 feet downstream. The “filtering” action was temporary and deposited soil tended to be later flushed downstream during high flows.

71However, a 20-year research project (1972-1992) exists directly on the south shore of Reservoir #2 to “determine the effects of nitrogen fertilization and alder interplants on root disease development in a thinned Douglas Fir plantation.”

72This is of particular importance in the Bull Run watershed where, in 1962, there were a reported 65 miles of road and 103 miles of maintained trail (for fire access); today there are over 200 miles of road in the watershed and no maintained trails. About 30 percent of the roads are paved today.


(3) most silvicultural methods which remove only a portion of the timber stand at one time provide better protection of soil and water. In the Bull Run Division this might dictate following the natural species conversion to shade-tolerant hemlock rather than planting and encouragement of the shade-intolerant Douglas fir which requires clearcutting for intensive growth management.

But the diversity of land forms in Western Oregon and even within the Bull Run Division apparently require more than simple rules to overcome these kinds of problems. What is required are more skilled foresters and associated support specialists, time to study and plan each road and timber sale carefully, and money enough to implement the findings of these people. In a recent GAO study\textsuperscript{76} similar concerns have been expressed more bluntly:

"Procedures and practices followed by both agencies (BLM and USFS) in planning timber sale and road construction projects did not insure that the expertise of resource specialists was obtained and used to the extent practicable to help minimize avoidable damage to forest resources.

"Timber management and engineering personnel, who do the detailed planning of timber sale and road construction, usually decided whether the expertise of resource specialists was needed."

**Bull Run Watershed Management**

Your Committee received testimony from a wide variety of persons that management of the Bull Run for water quality is among the best in the nation.\textsuperscript{77} Nevertheless, foresters themselves stated that watershed protection practices were roughly proportional to the amount of supervisory effort provided—both in planning and specification of a timber sale and in field observation of compliance with contract provisions. It has been argued that mere encouragement and exhortation to “protect” water and soil “values” are not sufficient; the problem is one of finances.\textsuperscript{78} The Columbia Gorge Ranger District spends less than $1,000 each year in directly appropriated watershed maintenance and protection funds. This money is largely spent on marking the boundaries of the Bull Run Division against public entry. Another $2,000 each year is estimated spent on legal enforcement and patrol effort on the Division boundary and entry points. The Bureau of Water Works has no funds directly budgeted for watershed protection. Employees of both agencies monitor entry and watershed uses during other assigned work. Without appropriations, watershed protection funds must come from either commercial timber operations or from Portland metropolitan area water users. Additional funds from water users have been discussed above under the subject of Cooperative Agreements. Protective measures now taken in the Bull Run watershed are financed as appropriated timber sale costs or as “allowable costs” to the buyer in a timber sale. What is an allowable cost is a matter of custom, judgment and local regulation. In the Bull Run Division, many erosion control measures are “allowable costs.” One important expansion of this principle might be to the analysis of water samples.\textsuperscript{79} Forest Service Manual\textsuperscript{80} paragraph 2542.5 specifically notes that “payment for this service is authorized to be paid from the benefitting activity.”

**Reservoirs and Water Quality**

In addition to timber harvest, the construction and operation of reservoirs can impair water quality. Broad public concern over Bull Run resource management and Portland water quality was occasioned in January, 1972, when the entire water supply carried turbidity levels as high as 120 JTU. The increased turbidity


\textsuperscript{78} For current expansion of this viewpoint, see Cogswell, Phil, “Heat off Forest Lumber, but Conservation is Ignored,” The Oregonian, June 19, 1973.

\textsuperscript{79} Regional Forest Service personnel have indicated that preliminary study of this concept is under way.

\textsuperscript{80} USFS Manual, Title 2500, “Watershed Management.”
was caused by bank undercutting on the North Fork Bull Run River by a flash flood, and a consequent temporary blockage of stream flow with washout of a clay soil which did not settle out in reservoirs, as is normally the case. The $1 million repair work in 1972 consisted of creating and lining with rock a diversionary stream channel much like the original stream bed, and constructing and rock lining an "overflow" stream bed in the immediate vicinity of the clay bank. Press reports and independent reviews have stated that logging was not related to the January, 1972 slide. Committee review of the situation generally agrees with these findings but goes further to note that the flash flood which created the undercutting and slide and consequent turbidity started when a man-made impoundment, Lake Boody, at the top of the watershed, failed. Specifically, a bridge structure over the reservoir spillway became blocked with ice and snow following normal cold weather. A sudden warm and wet spell in January melted the ice dam, and the sudden release caused the washout. Management of Lake Boody is now such that it remains empty during winter months and is filled during the spring to augment summer storage. Thus, development of Bull Run water resources was associated with the turbidity of January, 1972.

VIII. PLANNING IN THE BULL RUN

Until Congress established the Forest Service in 1905, the Departments of Agriculture and Interior shared the responsibility for management of national forests. Since the early acts authorizing the establishment of national forests, the major legislative policy directive from Congress has been the Multiple Use-Sustained Yield Act of 1960, which provides in part:

"It is the policy of the Congress that the national forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes. . . . The Secretary of Agriculture is directed to develop and administer the renewable surface resources of the national forests for multiple use and sustained yield. . . . Due consideration shall be given to the relative values of the various resources, in particular areas. . . ."

"Multiple use" means: "the management of the various renewable resources of the national forests so that they are utilized in the combination that will best meet the needs of the American people." Purportedly, the Act was a codification of long-standing Forest Service practices and policies.

Alternatives For Management

Within these multiple use guidelines and the specific laws relating to establishment of the Bull Run Division, the Forest Service has been delegated the trust of management of the Bull Run Division. Since these guidelines are general and are subject to human interpretation and application, the possible management alternatives for the Division are myriad. Until 1958, when logging began, the dominant and almost sole use of the Division was for watershed purposes. Since the initiation of logging, it has become an important use. Recreation has never been a significant use, although educational tours have been conducted over the years, and certain research projects are allowed. Although recreation throughout the Division has not been allowed, the Pacific Crest Trail follows the watershed line for some nine miles within the northeast part of the present Division boundaries. In several places, the trail actually lies inside the watershed. The top of Larch Mountain was also once within the Division boundaries. Today a small area near the top of Larch Mountain is the only part of the watershed not in the legally protected boundaries of the Division. It is somewhat ironic that this small area receives the heaviest recreation use in the area—100,000 visitors per year.

In determining what management alternatives should be adopted for the Division, it is necessary to determine what uses are suitable. Quite obviously the Division is uniquely suited for watershed purposes. In addition, resources of the Division allow rapid timber growth. Not as obvious to the general public is the

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81 16 USC 528-531, 74 Stat. 215.
tremendous recreational potential of the area. At the lower elevations, one finds stands of old-growth Douglas fir five to six feet in diameter. Nowhere else so near Portland do such stands remain untouched. These timberlands appear much as they did to early Oregon settlers.

As expected in a mountain area of heavy rainfall, the Bull Run Division is resplendent with pure mountain streams. Among the magnificent stands of old-growth fir, cedar and hemlock bubble underground springs, one of which provided your Committee the opportunity to taste “the real thing”. Numerous waterfalls cascade into the gorge of the Bull Run River. Topping off the magnificent scenery is the hypnotic serenity of the namesake of the area, Bull Run Lake.

Bull Run Lake is formed by the runoff waters from the nearby forested areas which are caught in a glacial cirque. Standing on the western shore of Bull Run Lake, gazing across between Sentinel Peak and Hiyu Mountain to the snow-capped slopes of Mt. Hood provides one of the most spectacular sights in the watershed. A natural area of approximately 361 acres was established in 1966 on the eastern end of Bull Run Lake, primarily for scientific purposes. The natural area was recommended because it contained one of the last stands of old growth true fir-noble fir uninfluenced by man, and interesting plant and soil communities existed in the area. Other scenery includes lakes and streams, matters of geological interest, a variety of wildlife, and diversified flora and associated forest environment. Other recreational potential includes berry picking, nature study, snowshoeing, cross country skiing, picnicning, trail camping, car-camping, snowmobiling and sightseeing by car. The lakes, and particularly the reservoirs, could provide water-related activities, such as swimming, boating, water skiing and fishing. Despite blockage of anadromous fish by the dams, the Bull Run waters are reported to contain excellent fishing, although your Committee did not interview anyone willing to admit his trespasses. Approximately 55 years ago, fish were reportedly planted in Blue Lake and Bull Run Lake. Recent interest in developing anadromous fish runs in the Bull Run watershed are discouraged by the Forest Service, noting “Many questions raised regarding the quality of water and effect thereon must be answered before the proposal will be endorsed.”

The Division provides a habitat for a variety of wildlife and hunting potential is high. The Columbian black tailed deer is the most plentiful big game animal. The timber harvest program in the Division has created favorable habitat conditions permitting the deer herd to expand. On fall and spring tours, your Committee saw 21 and 8 deer respectively during midday hours along the roads. The Forest Service reports several elk sightings in 1971-72 period and notes that an elk herd is establishing itself between the upper levels of the Columbia Gorge and the Bull Run drainage. The current Columbia Gorge Ranger District multiple use plan notes that “reduction of big game population by hunting will be considered on a permit basis” after cooperative study and agreement with the City and Oregon State Game Commission. The same plan notes that the Bull Run Division is designated as a game reserve. The Division has a moderate population of black bear and contains a diverse animal population. Blue and ruffed grouse are the most important upland game birds. Other birds include owls and a few eagles.

The importance of this recreational potential becomes more meaningful when one considers the proximity of the Portland metropolis to the area and when one considers the increasing demand being placed upon forest lands to provide outdoor recreation.

82 No research has taken place in this area since its establishment.
85 Contrary to these Forest Service reports, Oregon State Health Division personnel who sought fish samples for background radiation monitoring have reported catching only 5 fish (6-8 inches) in three days of effort during summer 1972.
87 Columbia Gorge District Multiple Use Management Plan.
The 19 National Forests in the Pacific Northwest Region now host over 27,000,000 visitor days of recreation use annually. Recreation use is expected to double by the year 2000. Some of this increase results from mere population growth, but the greatest increase is being caused by increases in leisure time, improved transportation, a greater awareness of the recreational resource, and greater desire for recreation which differs from the normal urban environment.

Your Committee has interviewed no one who advocates opening the Bull Run Division for recreational use. People oppose the idea because they presume that to do so would adversely affect Portland's water quality. In other areas, however, it is quite common to use water supply drainage basins for recreation. Scientific studies are indeterminate on the effect of recreational use on water quality. The studies conclude with findings such as "By present techniques, no measurable influence could be determined on bacterial indicator population densities because of the increase in human use."90

The Bull Run Division can be managed in a form with little management (wilderness of primitive classification), or intensively managed for timber (tree farming), or for recreation purposes, or any point between these extremes. Your Committee has interviewed people whose views have run the whole gamut, from little or no management to intensive management directed toward timber production. Yet everyone, despite his recommendation for the type of planning or amount of planning, recommends that maintenance or improvement of the quality of the water coming from the area for public consumption be a primary objective of management of the area. The City and USFS have agreed that this objective should be a primary goal of any management plan for the Division. Consequently, the primary decision now to be made in formulating a complete management plan for the area is to determine what other uses are compatible with management of a watershed, within the confines of existing legislation, and within the concept of "multiple use". In other words, what other uses than watershed should be allowed, and how should that determination be made.

**Planning Practices**

Until recently, USFS planning followed a form of final plans consisting of an overall "multiple use" plan and a number of subsidiary plans for timber management, watershed protection, recreation, transportation, etc. Coordination of the several plans can best be described as difficult.91

On the Columbia Gorge District, the "multiple use" plan92 notes that "many prescriptions have been specifically written for management and administration of the timber resource within the watershed". No comprehensive watershed management plan exists even though the Forest Service Manual93 calls for such plans to be developed "as soon as practical" and states that "High priority is assigned to the development of watershed management plans for municipal water supply, flood source and other high value watersheds". The responsibility for leadership, direction and inspection in watershed planning is assigned to the Regional Forester by the Forest Service Manual; preparation of a specific plan is assigned to the responsible Forest Supervisor. "Guidelines" for management of the Bull Run watershed have been prepared by the Forest Service;94 this document does not meet the Forest Service Manual requirements for comprehensive survey and specific guidance to forest users.

88Regional Recreation Plan, Region 6, Forest Service, December 4, 1972.
90Ibid.
94See Footnote 77.
Similarly, the USFS concept of “Streamside Management Units” is generally adopted by managers of the Bull Run Division by their action of stream classification, but separate and specific management areas and rules are not delineated.

Again, USFS plans to generally subscribe to rules of a “Landscape Management Zone” to recognize aesthetic qualities of the Bull Run watershed as viewed from Larch Mountain and the more frequently traveled roads and trails, but the affected areas will not carry the official land management designation.

Limitations on watershed planning in the Bull Run Division may go deep into USFS policy. For example, the Forest Service Manual states, regarding watershed management:

"Only in special cases, such as those where municipal water is not given adequate treatment, is it necessary to depart from the principle of full multiple use. Where modern water treatment methods can be used, restriction of human and animal use in the water-source areas is unnecessary. Complete isolation of water sources is seldom attainable under even the most favorable circumstances. Closures are difficult to enforce. Trespass or laxity in enforcement of closures may result in poorer water quality than regulated use.

"Various public health agencies have responsibilities and jurisdictions overlapping those of the Forest Service in ensuring that public water supplies are safe and that pollution is adequately controlled. It is essential that the Forest Service cooperate fully with these public health agencies and recognize their assigned responsibilities. In the event unresolved disagreement between public health officials and Forest Service officers arises, Forest Service standards will govern."

As another example of limited planning in the Bull Run Division, your Committee found that the eastern third of the Bull Run Division lies in the Eagle Creek Study Zone, which is part of the "primary recreation zones" of the National Forests in Oregon. All study zone areas other than the Bull Run area have been committed to management which will "protect wilderness and/or recreation values pending a complete review and future decision as to their eventual management." The Bull Run area was not similarly classified because it "is partially occupied by transmission lines authorized by Congress. In addition the area has been roaded and developed to the point where it can no longer be considered for management in its natural state." This classification is in conflict with the on-site observations of your Committee and with the later inventory by the USFS of undeveloped areas in the Bull Run Division.

National Environmental Policy Act

The USFS has recognized some of the shortcomings of past planning policies. On November 9, 1971, the Chief of the Forest Service issued a directive indicating a new planning process. In part, this new planning process was precipitated by the enactment of the National Environmental Policy Act of 1969, which required that all agencies of the Federal government prepare detailed environmental statements on proposals for major federal action significantly affecting the quality of the human environment. Anyone conversant with the purposes and provisions of that Act could easily predict that sooner or later the USFS would be deeply involved in preparing environmental impact statements related to their management plans, or in some other way complying with the terms and purposes of the National Environmental Policy Act of 1969.

The new planning process of the Forest Service begins with hundreds of individual planning units consisting of a drainage or series of drainages within the national forests. After the planning unit is established, a multi-discipline team consisting of foresters, scientists and others inventory the planning unit's resources

95FSM 2542.6 and 2543.


and capabilities. The team also determines the public need for the uses to which the unit can be managed. Once the inventory study is completed, the team formulates management assumptions and at least three management alternatives for the unit, based on (i) little or no development, (ii) partial development, and (iii) intensive development. The alternatives are then presented to the public with explanations of the differences among the alternative management plans. It is difficult to tell whether public input is actually used because the process has not been completed on significant numbers of planning units. This new planning process is still in the formulative stage, and thus various aspects of the new planning process are evolving through experimentation and application. The present practice, at least in the Mt. Hood National Forest, is to accompany the alternative management plans with a draft environmental statement evaluating the environmental effects of the plan. A Forest Service officer, usually the District Ranger, then chooses a management alternative based on the objectives and policy preferences provided by his superiors and the public. The completed plan is then again presented to the public, and a final environmental impact statement is filed with the Council on Environmental Quality if potential environmental impacts are deemed to be significant. The unit management plan is then forwarded to the Forest Supervisor, who combines the various plans under his supervision into an integrated forest multiple-use plan drawn upon general Forest Service objectives established by the Chief of the Forest Service.

Larch Mountain-Bull Run Planning Unit

The first planning unit studied in the Mt. Hood National Forest was the “Larch Mountain-Bull Run” study area in 1971, which included the Larch Mountain area and the northwest section of the Bull Run Division (approximately 1/5 of the Bull Run drainage), including Reservoir #1 and Reservoir #2. Several of the alternative plans contemplated public entry into the Division for recreational purposes, as evidenced by the following alternative: “The waterfront area north of Bull Run Reservoirs #1 and #2 and the surfaces of the Reservoirs make up this zone. Storage of water is the key use. The potential for recreation use is high, and camping, picnicking, boating, swimming, fishing, hiking and visitor information facilities are proposed. . . .”

Public response to these management alternatives suggesting entry for recreational purposes was overwhelmingly negative. From the public response, it is clear that Portland area citizens do not want people playing in or playing about their water supply. The Forest Service accepted the public response, and decided in its final management plan not to introduce any “new recreational uses” for the Bull Run area in the present planning period. The new planning process contemplates that the plan will be used for ten years, at the end of which the plan will be reviewed, much in the manner in which it was formed.

The Larch Mountain-Bull Run management plan adopted the following general management objectives for the Bull Run watershed within the planning unit: “Bull Run watershed will be managed to: 1) provide a continuous supply of domestic water which will meet or exceed State of Oregon water quality standards; 2) practice timber management and fire control activities which support the watershed objective stated above; 3) maintain a balance of plant communities which will support wildlife populations, including non-game species, at a level consistent with habitat potentials and watershed objective stated above.”

Your Committee notes in this regard that the Bull Run Division has never been a single management unit of the Mt. Hood National Forest. All the watershed is included as part of the Columbia Gorge District. Smaller areas of the Bull Run...
Division are in the Zigzag and Hood River districts. As noted, even smaller areas of the Bull Run Division are owned by the City of Portland and several private individuals. Recreation is supposedly not allowed within either the Division or the watershed, and yet certain uses (Larch Mountain, Pacific Crest Trail) are encouraged by Forest Service facilities. Land planning units (Larch Mountain-Bull Run and Bull Run) split both the watershed and the Division. A different and more detailed breakdown of timber volumes available for harvest than has been used in the past is to be used in the forthcoming ten-year management plan. These different ownerships and management plans make accurate data on timber management difficult to assemble. Similar problems have been encountered in other recent studies. While new planning areas and methods of timber land classification appear based on natural land features, it seems that the burden of proof rests with the land managers (USFS) to prove that the new management techniques do not over-utilize the timber resource at the expense of water quality.

Bull Run Planning Unit

This spring, the USFS and the City of Portland announced a joint study of a Bull Run planning unit consisting of that portion of the Bull Run Division area not in the Larch Mountain-Bull Run study area. Apparently the Forest Service recognized the importance of now studying and planning for the whole drainage. Although a management plan was established for that part of the Division within the Larch Mountain-Bull Run Study area, it is anticipated that none of those decisions will control in formulating an overall plan for the Bull Run planning unit and are susceptible to change if dictated by the needs of a uniform integrated management plan formulated under the Bull Run planning unit.

On May 15 and 16 of this year, the Forest Service and City of Portland presented to the public an outline and plans for the Bull Run planning unit. Public attendance at these meetings was dismal, perhaps evidencing that few people realize their vested interests in the Bull Run area, as a result of closure of the area to the public. Your Committee hopes that this report will help spur interest in the Bull Run study unit, since public input is an integral part of the new planning process. The USFS staff has shown a sincere interest in obtaining public comment on its management of the Mt. Hood National Forest. The new planning process is a great improvement over the old dual system of planning. Aside from creating only a single plan, this system positively encourages public participation.

At the May 15 and 16 meetings, the City-Forest Service team announced the following tentative objectives for the study: (1) Produce a management plan which will maintain or improve the quality of raw water produced. (2) Determine what forms of use the area can sustain, while maintaining or improving a high quality of water. (3) More clearly define how the watershed will be managed, while meeting the intent of the Congressional Acts. (4) Consolidate existing information and provide additional data to determine capabilities and limitations of management. (5) Summarize legislative directives for the management of the watershed.

Also at the meeting, the following flexible schedule was announced: (1) Completion of collection of the ecological and other data (inventory)—Fall, 1973. (2) Preparation of land suitability analysis for potential uses and presentation to the public, along with a review of initial public input and tentative management objectives—Winter, 1973. (3) Preparation of alternative management plans and presentation to the public. Draft environmental statement—Fall/Winter, 1974. (4) Completion of land use development plan and presentation to the public. Filing of final environmental statement—Fall, 1975.

The multi-discipline team for the planning unit consists of a graduate forester, a civil engineer, a landscape architect, a geographer, a biologist and a botanist. They will be able to draw upon the part-time services of a soil scientist, a geologist, a wildlife biologist, a fish biologist, a range specialist, a hydrologist, a sociologist, a watershed specialist, an economist, a fire specialist, and a lawyer. The multi-discipline team will prepare inventories for five general categories: (1) vegetation

communities (including timber) (2) soils (3) fish and wildlife (4) scenic analysis (including recreational potential and historical interest), and (5) water analysis.

Much of this information has already been obtained, but inventory will not be completed until the fall of this year. The length of this planning process gives the public sufficient time to fully develop and offer its views on development and management alternatives.

IX. CONCLUSIONS

1. Water Supply Should be the Dominant Use of the Bull Run Division.
   The “dominant use” of the entire Bull Run Division should be for water supply rather than recreation or timber supply.

2. City Interest In Watershed Management Should be Increased.
   Bull Run Division provides a unique water supply resource for the Portland metropolitan area. The City should be more aggressive in protecting its interest in high quality water from Bull Run. Citizen interest should be further encouraged.

   The reliability of the present water supply system from Bull Run is inadequate in view of its geologic and geographic setting. Additional periodic studies should be conducted to document conditions such as geologic hazards. The greatest increase in reliability can be achieved by diversifying the supply, such as constructing alternate headworks and conduits elsewhere in the drainage or constructing pumping and treatment plants from other water sources.

4. Water Quality and Quantity are Adequate.
   The quantity and quality of water from Bull Run are presently adequate. If Portland water supplies run short, the shortage will probably be caused by a lack of conduit capacity and local storage capacity. The City should act promptly to increase its own local storage and require adequate storage in outlying areas contracting for Bull Run water. To pay for any additional storage in the Bull Run Division, the City should insist on long term supply contracts upon renewal of existing agreements with outlying cities and water districts served by Bull Run.

5. Present Water Supplies Should Be Fully Utilized.
   City planning should emphasize the wise and full use of existing Bull Run water resources in addition to considering the alternate sources recommended above. Hydroelectric power generation at existing Bull Run dams and a broad campaign of consumer water conservation appear to be practical measures which offer both economic and environmental benefits.

   Monitoring of raw water quality has been insufficient to show that the USFS has met its obligation not to degrade water quality from Bull Run. Objective criteria for Bull Run raw water quality are not documented. An increased and sustained monitoring program by both USFS and City personnel appears necessary. Funding of USFS monitoring has been small compared with resources applied to timber harvest operations in the Bull Run Division. Funding of this work should be sufficient to measure more than the minimum required water quality parameters (e.g., soil parameters may be leading indicators of future water quality), and to document localized effects of timber management as well as any general watershed effects (not detectable in the past).

7. Watershed Management Research Has Been Insufficient.
   The USFS has the burden of proof that present timber management and road construction programs do not lower Portland water quality. Past research is inadequate. Specifically,

   a. The Bull Run B1 study plot is inadequate for determination of the effect of logging practices on Portland's water.

   b. Except by analogy, research on the effect of forest practices on Portland water has followed rather than preceded extensive logging in the area.
c. Watershed management research has not been adequately funded on the Bull Run Division.

d. Watershed management guidelines for Bull Run, while conservative in the judgment of foresters consulted, are not developed directly from the results of research in this area.


Occasional turbidity in Portland water stems from washout and suspension of local volcanic soils; the turbidity does not have the usual undesirable health significance that gave rise to recent proposed lowering of EPA limits. However, apparent EPA requirements do not allow concurrent timber harvest in the Bull Run Division and disinfection-only treatment of municipal water.

9. Controlled Timber Harvest Allowed.

Timber harvest in the Bull Run Division should be an important use to the extent it is compatible with Conclusions 1, 6 and 7. In your Committee's opinion, blowdown in the inventoried roadless areas may be logged (now in progress) to minimize insect damage and fire hazard as long as the adverse effects for purposes of classification as possible wilderness areas are kept to a minimum and as long as no permanent roads are built to remove the blowdown.

10. Scenic and "Old Growth" Values to be Protected.

Adverse effects upon scenic values and recreation potential should be considered in the planning of all timber sales in the Bull Run Division. Recognizing that the mix of uses in the Bull Run Division may change in the future, certain areas of outstanding scenic and recreational potential should be preserved from logging. In particular, no timber harvesting should be allowed in the watershed around Bull Run Lake. In addition, some limited existing stands (at least hundreds of acres) of old growth timber, within the present roadless areas or elsewhere, should be preserved for educational purposes and potential recreational use. Some members of your Committee desire that some such areas be left in a completely natural condition; others feel that such areas should be managed specifically for old growth stands of Douglas fir (300 year rotation cycle).

11. Logging Quota Should be Based on Measured Data.

The allowable cut within the Bull Run Division and any future change from the present 100 year rotation cycle should be based only on silvicultural facts directly applicable to the Division and consistent with raw water objectives recommended to be developed.

12. Planning Efforts are Commendable.

Current joint planning efforts between the USFS and the City (the Bull Run Planning Unit) are heartily commended. The management plan developed (and associated environmental impact statements) should evaluate and include more specific guidance regarding water quality criteria and protection, timber management methods, harvest locations and associated road construction than is evidenced in past planning documents of this type.

13. Road Paving Should Be Encouraged.

All roads adjacent to reservoirs should be immediately asphalted. The USFS should continue its policy of asphalting all heavily used roads within the watershed.

14. Legality of Present Uses is Questionable.

There appear to be a number of unresolved legal questions concerning management of the Bull Run Division. Of particular importance are (1) the validity of the Administrative Order issued August 12, 1959 by the USFS under which 65 square miles were effectively removed from the Division, (2) the legality of harvesting timber on the Division and (3) the legality of recreational use of the Division.

15. No New Recreation Uses Should Be Allowed.

No new recreation uses should be introduced into the drainage at the present time. Your Committee draws this conclusion for the following reasons:
(a) Many alternative recreational areas are available.
(b) Continuing the present nearly complete ban on recreational use will preserve recreational potential for future generations.
(c) All potential contamination of Portland’s water source should be avoided because of the lack of alternate supplies.

16. Big Game Should Not Be Encouraged.
Because of a potential for water contamination, big game animals should not be encouraged in the Bull Run watershed as long as extensive recreational use is not allowed. Wherever possible, natural means of animal population control (i.e., selection of browse types) are desirable over limited hunting; this philosophy is consistent with minimizing uncontrolled public access in the watershed.

17. Boundaries Should Be Revised.
Management areas of the USFS should be realigned to incorporate the entire Bull Run Division in one administrative unit so that its resources can be measured and managed on a consistent data base. The USFS should investigate the merits of slightly expanding the boundaries of the BRD in the vicinity of Larch Mountain, so that the entire watershed will be within the Division, and then, if worthwhile, initiate appropriate action to cause the President and/or Congress officially to change the boundary accordingly. Changes in the Division boundaries outside the watershed should be proposed by the USFS where benefits may exceed costs (e.g., hunting and fishing in the Little Sandy drainage balanced against additional effort in controlling access to the Bull Run watershed).

X. RECOMMENDATIONS

Therefore, your Committee recommends that:

(1) The U. S. Forest Service, through its Bull Run Planning Unit, should recognize water supply as the dominant use of the Bull Run Division.

(2) The City of Portland Bureau of Water Works should extend its involvement in Bull Run management to include:
   (a) a review of all Forest Service actions and associated water quality protection measures,
   (b) the assignment of additional manpower specifically for this professional task, and
   (c) encouragement of citizen awareness and participation through more widely available information and conducted tours of the area.

(3) The Bureau of Water Works should adopt as an important criteria for future facilities the increase in system reliability through diversification of supply.

(4) The Bureau of Water Works should immediately develop additional local storage, should enforce the requirement that outlying users provide their own adequate storage, and contract on a longer range basis with such outlying users.

(5) To make full use of existing water resources, the Bureau of Water Works should further investigate and implement, if justified, hydroelectric power generation at Bull Run dams, and should also launch an energetic campaign for consumer water conservation.

(6) The Forest Service and the Bureau of Water Works should develop and agree upon objective criteria for Bull Run raw water quality, including non-degradation of present water quality, and should provide for a sustained monitoring program to ensure such criteria are met.

(7) The Forest Service, in order to protect Portland’s water quality, should strengthen its Bull Run management program by:
   (a) additional participation by geological and soil scientists in Bull Run Division project planning to provide objective data for roads, timber harvest and any other proposed use or developments and the determination of geological hazards. Additional mapping efforts should be directed toward the local area of specific projects.
   (b) limitation of logging to terrain where available data establish that there would be no degradation of water quality as a result of the logging.
(c) establishment of additional experimental study areas in steeper terrain more representative of the Bull Run drainage.
(d) continued and expanded use of advanced logging techniques which minimize soil disturbance during harvest, and
(e) reduction where possible of road construction in Bull Run consistent with actual knowledge of the impact of road construction on water quality.

(8) In order to secure Environmental Protection Agency approval of the Portland water system, the Bureau of Water Works should simultaneously pursue the following alternatives and actions:
(a) initiate and adopt a Cooperative Agreement with the Forest Service which clearly states that water quality has priority over any and all other activities even though some loss of USFS revenue may be charged to the City;
(b) investigate more carefully the legislation establishing and protecting the Bull Run Division with a view toward any restrictions and limitations on present timber management, and
(c) formally petition the Environmental Protection Agency to recognize the difference in source and effect of Portland's occasional water turbidity from turbidity in other cities' (treated) water systems and evaluate Portland's water system based on this difference.

(9) The Forest Service should continue timber sales in the Bull Run Division but sales should be restricted beyond current practices in accordance with the water quality recommendations of this report.

(10) In its planning of all timber sales in the Bull Run Division, the Forest Service should give consideration to the scenic values and recreational potential of the area. Additional selected areas involving "old growth" timber should be reserved from logging for the foreseeable future.

(11) The Forest Service should base the allowable timber harvest and any quota changes on local silvicultural data.

(12) The City/USFS Bull Run management plan currently under development should include more specific guidance to Forest Service land managers regarding water supply protection measures than have been contained in recent similar management plans.

(13) The Forest Service should continue its policy of road paving in the Bull Run area.

(14) The Forest Service and the City of Portland should clarify their positions on the legality of multiple uses within the Bull Run Division.

(15) The Forest Service should prohibit any additional recreational uses in the Bull Run drainage area at the present time.

(16) The Forest Service should not encourage big game animal population in the Bull Run area.

(17) The Forest Service should, after appropriate study, realign the Bull Run Division boundaries so that:
(a) all of the watershed is within the Division, and
(b) a complete and consistent data base is utilized for management of Bull Run resources.

Respectfully submitted,

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E. Barry Post
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APPENDIX A
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Lyal Zaugg, Member, Mt. Hood National Forest Multi-Discipline Planning Team

APPENDIX B
Bibliography

“Betz Handbook of Industrial Water Conditioning,” Betz Laboratories, Inc., Trevose, Pa., 1962

APPENDIX C
Glossary of Abbreviations

<table>
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<tr>
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<tr>
<td>BRD</td>
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