

BETWEEN THE SNOWPACK AND
DOWNSTREAM WATER INTERESTS^{1/}

By

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We all know that the United States claims water in ways that are often inconsistent with various State water statutes. Right now a number of water adjudications are proceeding in several states in which the Federal Government is seeking to have its "reserved" rights recognized by the States. Trouble is, water law in a number of western states doesn't accept the unquantified claims for water under the reserved right - or the priority dates which the United States says must go with those claims. But the U. S. Supreme Court, in directing that the rights of the United States be adjudicated in State courts, has reaffirmed the existence of the "reserved" right. So what does the State court do about all that?

One aspect of the United States claims is that the amount of water, unappropriated as of the reservation date, that is reasonably needed on these lands was reserved with the land for uses pertinent to purposes of these reservations. This paper discusses one large segment of these Federal water claims, the U. S. Forest Service claims, located between the mountain snowpack and the downstream water users. Many people are concerned with, and dependent on, water that starts its downward course on National Forest lands. Forest Service administrators must be aware of needs, tangible and intangible for water. We also desire to communicate our thinking as administrators of public lands and resources to various publics--local, State and national. Being with you at the 1973 Western Snow Conference is one opportunity to do this.

Water Management Goals of the U. S. Forest Service

The basic authority for managing the National Forests is in the Organic Act of 1897 (16 U.S.C. 475). This Act specifies protecting and improving the forests, securing favorable conditions of waterflow, and producing a continuous supply of timber.

Protecting and improving the forest and securing favorable conditions of waterflow have been interpreted by Congress since the early days of forest reservations as including the aspects of multiple use-sustained yield management purposes that were formally identified in the Multiple Use-Sustained Yield Act of 1960 (16 U.S.C. 528-531). These broad purposes include a number of component and inseparable purposes, including but not limited to: growth, management and production of timber; recreation; domestic uses; municipal and administrative site uses; agriculture and irrigation; stock grazing and watering; the development, conservation and management of resident and migratory wildlife and wildlife resources, fire fighting and prevention; forest improvement and protection; commercial, drinking and sanitary uses; road watering; watershed protection and management and the securing of favorable conditions of water flows; wilderness preservation; flood, soil and erosion control; preservation of scenic aesthetic and other public values; and fish culture, conservation, habitat protection and management.

The United States claims the right to the maintenance of such continuous, uninterrupted flows of water and such stream and lake levels as are sufficient in quantity and quality to:

- (1) Insure the continued growth, and reproduction of fish which inhabited such waters, and
- (2) Attain and preserve the recreational, scenic, and aesthetic conditions existing on the reservations (Statement of Claim, 1971).

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Under the Federal interpretation of the reservation doctrine, water on reserved lands is available to all these uses on National Forests. The possible impact of Federal reserved water rights on appropriative water rights can be readily perceived by noting the two principal characteristics of reserved rights. They are: priority, the date of creation of the reservation; and quantum, that amount of water not included in claims valid against the United States which is reasonably necessary to accomplish the purposes for which the land is reserved (Kiechel, 1972).

This position seems a little much to individuals and groups accustomed to working with the appropriative right doctrine of western States. As a matter of fact, and surprising no one, these claims are being challenged by water users and the State of Colorado in the Colorado courts.

The 64 dollar question which needs to be answered before one can assess the real impact of the National Forest reserved right claim is: How much water is reasonably necessary to accomplish the purposes for which the land is reserved? We don't have the full answer to that question yet.

Colorado Litigation

The Federal Government is currently involved in the adjudication of the reserved water rights of the United States in Colorado water courts. Such participation by the United States in Colorado is a departure from its practices in the past.

Two United States Supreme Court decisions, on March 24, 1971, directed this participation. The Syllabus of the decision on the United States vs. District Court In and For the County of Eagle, et al. states that the Court "Held: Section 666(a) (Of the McCarren Amendment) is an all-inclusive statutory provision that subjects to general adjudication in state proceedings all rights of the United States to water within a particular state's jurisdiction regardless of how they were acquired." (Syllabus No. 87).

The Syllabus of the other case, the United States vs. District Court In and For Water Division No. 5, et al. states that the Court, "Held: The State Court has jurisdiction to adjudicate the reserved water rights of the United States." (Syllabus No. 812).

As a result of these two decisions, the United States entered into State of Colorado water adjudication proceedings in Water Divisions 4, 5 and 6. The adjudication includes National Forest water uses for a large number of purposes on all reserved lands on the Western Slope in Colorado with the exception of the San Juan and Dolores drainages, and those lands in North Park. The first evidentiary hearings were held in Grand Junction, Colorado in December of 1972. The National Forest claims were presented to a Special Master appointed by the Water Division Judges of the three water divisions.

The National Forest claims presented before the Court in Grand Junction included water for both diverted and instream purposes.

The counsel for the opposing parties have presented their respective cases before the Special Master. It will probably be early 1974, at least, before the Special Master rules on the claims.

Forest Service Responsibilities in Water Planning

It is not a purpose of this paper to debate the merits of the Government's case. As National Forest administrators, we are public servants to the people of the United States in managing the reserved lands. Our public is national in scope, but the local people are an essential component. Well-informed citizenry of Colorado are expressing involved interest in all aspects of National Forest management. Water, instream and as a developed resource, is one of their paramount concerns. Locally, State-wide, and nationally, we may not be as far apart in our water management goals as is sometimes indicated in the media. Some recent articles have left the impression that the United States' intentions are to control all the water originating on Federal reserved lands. To quote from the claim presented last December in Grand Junction, the Forest Service is claiming only the water "reasonably necessary to fulfill the present or future--purposes for which said reservations were created." Again, the \$64 question: how much is "reasonably necessary?"

From the standpoint of our public servant role, we can look into the future as best we can and comment on what we see if the Federal Government is granted all of its claims.

First, we expect that the Forest Service will quantify its instream needs for water. This intent was expressed at the Grand Junction hearing.

This quantification would not happen overnight. Our best estimate is five years to do Water Divisions 4, 5, and 6 (Gunnison, Colorado, White, Yampa, and North Platte Rivers in Colorado) if provided with the commitment and resources to do the job.

Second, National Forest needs for water would be reasonable. The diverted uses for purposes recognized as beneficial under State law will likely involve relatively small quantities of water. Our review of diverted type water needs has resulted in a 1972 estimate that in Colorado the Forest Service is currently diverting about 4700 acre-feet of water annually for these purposes. We foresee, at this time, a total need for approximately 6100 acre-feet in addition to the current use for a total of about 11,000 acre-feet of diverted water annually.

The Forest Service in Colorado has an estimated 2800 acre-feet in storage, about two-thirds in livestock ponds and the rest in recreation, domestic, and wildlife impoundments. We can foresee at this time, a total storage need for an additional 10,000 acre-feet. About 90% of this would be for recreational developments. This recreation water would, in general, be a one-time, one-filling use. The only annual demands would be to replace that lost to seepage and evaporation. These National Forest amounts, for the entire State of Colorado, are certainly small when compared with the total volumes of water diverted and stored throughout the State.

The instream claims of the Forest Service are meeting with both support and opposition. One important reason for the opposition is because these claims are not quantified. The absence of known volumes makes it difficult, to say the least, for both water users and the State itself to develop water use and management plans. However, recognizing the need for instream flows is not unique to the Federal Government. The State of Colorado is also trying to legally provide for instream flows (with current priority dates) through legislation and possibly constitutional change (Colorado Water News 1973).

Third, the Forest Service must attempt to work with water users and the States in the development of methodology which will be used to determine reasonable instream flow requirements. It is Forest Service policy that in all matters related to water use and water rights, the Forest Service will endeavor to work cooperatively with the States.

For many years Forest Service policy has stated that water required for National Forest System purposes will be used efficiently; in water-scarce areas, it will be used frugally. Forest Service responsibility for meeting the resource needs of the people, including water, dictates a policy of caution and reasonableness in our deliberate use of water to improve the use and productivity of the National Forest System. In determining such water needs in areas of short supply, careful consideration will be given to the needs of non-National Forest users who are dependent on water for their livelihood.

It is a responsibility of the Forest Service to obtain a sufficient quantity of water, in accordance with legal authority, to provide for the development, use, and management of National Forest System resources with due consideration for the needs of other water users. There may be differences in views as to how this policy might affect claims of the United States under the reserved right, or how it might affect the use of that water which is claimed, but in any event, there appears to be ample opportunity for interested and concerned people to work together on the matter of instream flow determination.

Quantifying Instream Flows

The Forest Service is not standing still and waiting for the Courts to rule. We are actively engaged in developing a method for determining what National Forest instream flow needs are. The method must: (1) determine those National Forest purposes that each stream-reach in question must fulfill including, but not limited to, fisheries, aesthetic and recreation purposes, (2) reflect the requirement of reasonableness, (3) be scientifically supportable, and (4) be realistic in terms of time, manpower, and expense. We hope

to have a method for determining instream flow needs developed and ready for field testing soon.

The Forest Service needs instream flow quantification methodology regardless of what court direction with respect to the reserved right might be, because of administrative needs related to permitted structures on National Forest land.

Generally what is meant by instream uses or instream flows is the amount of water needed for fisheries, recreation and aesthetic purposes, but other purposes may be of equal or greater concern in certain stream reaches (e.g., maintenance of the stream associated ecosystem, fur-bearer management, wilderness preservation).

Considerable study has been given to the amount of flows needed to provide habitat for fisheries for spawning and for food production (Hoppe, 1970). Amounts of flow have been specified in connection with many water development projects as bypasses for the purpose of sustaining fisheries. This work has resulted in the maintenance of fisheries in some of Colorado's better streams, such as portions of both the Blue River and the Roaring Fork. It has not resulted in a uniformly accepted methodology of determining instream flows.

Few determinations have been made primarily for the purpose of either recreation use or aesthetics. Only limited work has been done in this field. Finding an acceptable methodology for aesthetic values will be especially difficult. We could all probably come to agreement that a completely dry mountain stream in a high precipitation area would not have enough flow for aesthetic purposes. We would also probably agree that a stream in flood stage, out of its bank and tearing down trees, was more than what was needed for aesthetic purposes. Coming to agreement on what was just right to satisfy our aesthetic needs within a particular stream would, no doubt, leave us with large differences of opinion.

What would be some of the recreation uses of water in addition to fishing? The most obvious one that comes to mind is boating. If a stream is large enough, it could conceivably have value for kayaking, rafting, canoeing, or perhaps even tubing. The value of these various instream flow uses would have to be weighed against each other and considered along with other factors. And what about instream flow needs for other National Forest purposes referred to above? An analysis, including public involvement, of many water uses, including recreation uses, would be needed in the effort to determine the relative values of each. The many values to be considered have no common unit of measure. The mix of values cannot be weighed in simple dollar cost-benefit ratio procedures.

Impossible to determine what instream flows should be, you say? No, not really, but certainly difficult, expensive and time-consuming. It does seem clear that it will be done, not only on Federal lands but on most streams and rivers within the State of Colorado. As pointed out before, the State of Colorado is working to legalize instream uses of water through both the legislative and Constitutional amendment route.

Our method is a combination of field investigation and synthesized streamflow relationships. This method which could be called the Critical Area Method, is an interdisciplinary approach utilizing a field team consisting of (1) a fish biologist, (2) a landscape architect, or someone trained in aesthetic considerations, (3) a hydrologist, trained in water quality, (4) possibly a limnologist, (5) and other disciplines as needed to provide scientific input where instream flows are important for other uses or purposes. This team, after a review of the literature, water diversions, and basic data available on a selected stream, would then study the stream channels and stream situation on the ground. Conditions such as water quality, flow regimes (natural and regulated by diversions), erosion conditions, pool-riffle ratio, structures, etc., would be evaluated. Parameters would be identified which are essential to the analysis of flow needs for those instream uses which are appropriate for study.

Team members of the appropriate disciplines would then identify certain areas on the stream reach which would be the most useful for studying each identified parameter. These would be called "Critical Areas". These are areas that would contain the limiting factors for streamflow for a particular parameter in that stream reach. It might happen that one Critical Area could be used to represent more than one parameter.

In fisheries, for example, the parameters tentatively identified for selection of critical areas are; spawning areas, cover, the aquatic insect production, and fishability. There probably should be more.

The tentative approach to measurements for aesthetics is based on a "change in character" concept. This has to do with the conditioning of people as they travel through the forest. If the other stream channels are dry and the surrounding landscape is arid, then one would expect a dry channel. However, if there is adequate flow or flow covering most of the rocks in the other channels and the surrounding landscape is moist, then a dry channel would look unnatural. Numbers of people viewing a stream reach and the uniqueness of special features, such as waterfalls, would be considered and reported as part of the procedure. However, the selection of a Critical Area for aesthetics would not be dependent on the number of people who would view the scene and would be equally applicable for back-country as for a stream next to a well-traveled highway.

Critical Areas would be marked on the ground and photographed. They would be identified as to the parameters they represent and noted if high flow should also be investigated. A stream cross-section and profile would then be measured. Manning's formula, based on the stream cross-section, slope, and roughness coefficient would be used to synthesize flow at various levels of water depth (Chow, 1964). The team would study the cross-section and the depth-flow relationship. For each Critical Area, the absolute minimum flow needed to meet the minimum criteria for the parameter(s) represented (eg. maintaining aquatic insect production, or meeting minimum aesthetic needs) would be determined by the discipline specialist. Similarly, an optimum flow would be determined at each Critical Area for the parameter(s) represented. This is the flow beyond which little is gained--even though it may mean slightly more fish food production, or be a little more scenic. The specialist must describe in definable and defensible terms, the criteria utilized to set his minimum flow and optimum flow. The flow-parameter relationship in terms of benefits to be expected for various levels of flow would be defined for this Critical Area. An option would exist for the specialist to identify and support his recommended flow rate within this range.

At this point, the Critical Areas would have been defined and ranges of flow for the selected parameters evaluated. The finished product for the interdisciplinary team would be a package for the administrator including the identification of a range of flows for the various parameters related to fishery, aesthetic and other instream flow uses for each stream reach.

The use of ranges rather than an attempt to identify specific volumes of flow for each instream use allows the administrator flexibility in determining the most desirable level of flow with respect to a mix of National Forest instream needs and other considerations.

We are continuing our search to identify criteria for establishing supportable thresholds and optimum levels of flow for the various parameters relating to recreation, aesthetics, fisheries, and other instream uses and purposes. Computer programs would need to be written to do the calculations and handle the analysis of data. If the courts ask that the flows be quantified, we would hope to have a going program and be able to fulfill this mission. Such quantification should reflect our best efforts, input from Research, universities, other agencies at all levels of Government, and interested segments of the public.

Conclusion

Between snowfall and the beginning of spring runoff, the water resource in Colorado lies virtually unclaimed as snowpack in the mountains. Its distribution is, here and there, influenced by National Forest management and by other practices--some by accident and some by design. Part of it may be evaporated by a chinook wind, or part of it may be blown from the Western Slope to the Eastern Slope without vested water interests claiming loss. The results of all this are duly reported by snow surveyors. But at the moment of metamorphosis from solid state to liquid, each drop of water has someone's name on it. It still may not make it to the ocean or even the first headgate. It may be evaporated, transpired or drunk.

Those drops that do reach a natural channel receive loving attention from bureaucrats,--foreign, Federal and State; municipalities; irrigators; fishermen; environmentalists, artists; and many others, singly and in groups.

The U. S. Forest Service is, of course, part of this doting collection of people. We are in an enviable position geographically, being at the head of most of the watersheds. It is our sincere belief that water was reserved with the land for National Forest purposes. Claims for this water must be reasonable. The claims must certainly not be capricious. Methodology for quantification of instream flows is being developed by the Forest Service in anticipation of meeting management needs. The expertise of many people and agencies will be needed and is solicited to help us do this job.

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