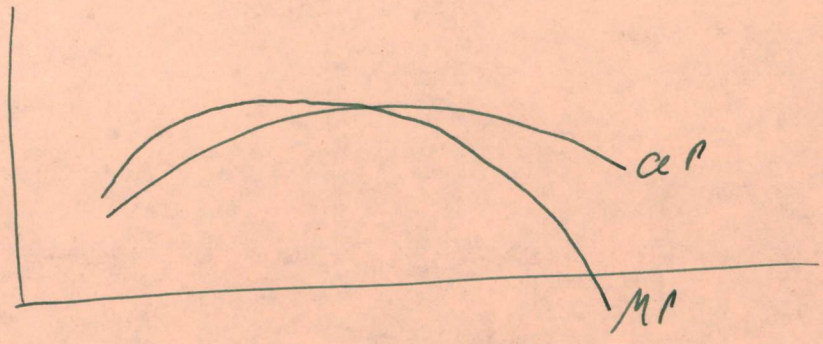
f 4 a Benefits - cost analysis



In practice, max. b/c won't fall very short of MR = MC bec MR falls so fast when a.R. falls a little.



MERAMEC BASIN RESEARCH PROJECT

WASHINGTON UNIVERSITY
ST. LOUIS 30, MISSOURI

May 23, 1960

Professor Mason Gaffney
Department of Agricultural Economics
University of Missouri
Columbia, Missouri

Dear Mason:

Enjoyed meeting and talking with you last week. I hope we can have some more get-togethers. Ed said I could go to Columbia any time. (Well almost!)

I am enclosing, for your "edification," a few articles on the Rifkind decision and the reactions thereto. I do hope you, Milliman, the Chicago boys, etc. will have a few cogent analyses and statements to make about the Central Arizona Project and its economic "feasibility." Let's not play favorites.

A question or problem have I to pose to you. Generally, as you know, the various agencies involved in planning water resources do not bother to discount benefits and costs for each year back to the present, i.e., determine present value. (There is some justification for this lack since the agencies all use only one trace of hydrology, the historical, which does not really yield much information on potential outputs and hence on potential benefits. Of course they impute far more accuracy to their final answers than is justified.) Assuming that discounting will be done - this will be my approach - the obvious question is what interest rate(s) to use. I am not concerned at the moment with the whole question of opportunity cost, etc. Rather my concern is with interest rates in relation to different segments of costs and benefits. (This is a long-winded opening; reflects my contacts with economists over the last few years.)

As you may remember, McKean pointed out that in the Green River case the SCS used 2 1/2% for public and 4% for private in discounting costs. No time horizon was specified and no method for discounting benefits was indicated. Some benefits are measured by least alternative cost, for example, hydropower--for which the interest rate used in evaluation is the private rate. In discounting a future time stream of power benefits should not this same private interest rate be used? For water supply, the least alternative cost is generally a public development--surface or ground--but by a local or state agency. Shouldn't the interest rate used to discount the time stream of water supply benefits be the applicable rate "faced by" the local public agency? Similarly on the cost side--some costs are federal, some private, and some local or state (public). The interest rates vary accordingly. Is it justifiable and logical to use the variety of interest rates? Basically the agencies never face this question since they use average annual values. (I am not sure but what I am compounding sophistication on a foundation of inaccurate and imprecise data.) Of course the effect of discounting benefits at 4% and costs at 2 1/2% would be to decrease net benefits and economic feasibility even further!

Yours for more FRP's, (How else would you stay in business?)

Sincerely, Blair (Bowen)

areas in the District have not known the adversity of at least periodic water shortage.

The water shortage experience of the drought years, compounded by the pressure of expanding population in the area, has turned the attention of many people toward such questions as: How much water do we have? Is stringency of the water supply likely to limit economic development of the region? How should water be used to support a maximum increase in population? In what use is water most valuable from an economic point of view? Is the use of resources for water development projects in arid areas in the national interest? What standards may be used to determine whether a particular project is justified, or to choose between alternative projects? This article is devoted to a consideration of the last question.

Benefits and Costs Considered

The economic evaluation of water development projects fits into the more general question of what constitutes an efficient use of resources by an economic system. Analysis of the question of economic efficiency is a highly specialized branch of economics, called welfare economics. As project evaluation currently is carried out by various agencies of the Government, upon whom basin development has devolved in our economy, it is essentially the application of some postulates of welfare economics to a particular problem. This application is usually termed benefit-cost analysis. On the basis of such benefit-cost analyses, various agencies determine the economic feasibility and priority of projects which are then recommended to the Congress. In the Federal Government alone, at least four major executive departments, the Federal Power Commission, and the Bureau of the Budget employ benefit-cost analysis.

The benefits of a project obviously are, in some sense, the goods and services which a project yields. The costs, on the other hand, constitute a loss or a negative item in terms of goods or services. But it will be seen in benefit-cost analyses that the costs and benefits of a project are expressed not in terms of physical units of goods and services but rather in terms of dollar values. Since the public, acting through Government agencies, presumably is interested in determining the real worth (in goods and services) and the real cost of the project, why then are these quantities expressed in dollars?

There are at least two reasons. First, dollar values are a convenient method of counting. Unfortunately it is not possible to add up quantities of dissimilar goods expressed in terms of physical units into any sort of meaningful total. The dollar values then serve as a counting device or "numeraire." Second, dollar values represent a means of expressing the worth of something. For example, it may be said that "this article is worth $10," which means that if one sells the article a ten dollar bill may be obtained in exchange for it. It may also be said that "gross national product was worth $429 billion last quarter" or "the worth of this water development project is $7 million." Obviously, in the latter cases, we mean by the word "worth" something different from the first case. We mean that the total production of final goods of the economy or the establishment of a water resources project had a certain value to society which is described by the dollar value we attached to it. This latter is a very complicated idea and it is here, at the juncture between numbers of dollars serving as mere counting devices and numbers of dollars serving to represent goodness, or utility, or value, or welfare, that the ideas of welfare economics come into the picture.

The Central Concept

It is not possible to explore the ideas of welfare economics with any degree of thoroughness in a brief article, but a central idea is the following: Under certain conditions,

sorbed about 95 per cent of the increased supply. Holdings of issues in this maturity range by individuals, nonfinancial corporations, state and local governments, and the other miscellaneous investors increased by about $1 billion over the year, in contrast to a rise of more than $4 billion in the first half of 1958.

An assumption that commercial banks would continue to expand markedly their holdings of issues maturing in more than 5 years, and thereby absorb the floating supply in the hands of temporary holders, became increasingly tenuous towards the close of the first half of this year. Evidence of improvement in business conditions was growing, carrying with it the suggestion of a revival in bank loan demands and a less expansive monetary policy. In this altered economic climate, the expectation of a stable-to-rising level of bond prices no longer could be firmly held, and speculative ownership was subject to greatly increased risk of capital loss. The level of bond yields then rose sharply, creating an added inducement for permanent investors to take up the floating supply of long-term issues.

Economic Analysis of

Water Resource Development Projects

THE TENTH FEDERAL RESERVE DISTRICT lies athwart four of the most important river basins in the United States. Three of the rivers that have created these great and fruitful basins rise in the District. Along its western extremes the District encompasses much of the area in which the Colorado River rises. Considerable development of the water resources of the upper Colorado is under way and, in the next few years, will result in several large new dams and reservoirs.

In the southwestern part of the District rises the Rio Grande, the "great river" of the Spanish Conquistadores. Plans are presently under consideration which would, if executed, divert water from the San Juan River to the Rio Grande River via an intermountain diversion tunnel.

In the southern part of the District is found the source of the complex web of rivers which compose the Arkansas-White-Red River Basin. A generalized program for the development of this basin is now under way.

Finally, roughly the northern half of the District lies in the giant Missouri River Basin. The Pick-Sloan plan undertaken in this basin by the U. S. Corps of Engineers and the Bureau of Reclamation includes numerous multiple purpose reservoirs.

The presence of these basins in the District by no means indicates the existence of vast quantities of water, however. The District is semi-arid, except for its eastern extreme and certain high altitude areas in the west. Average rainfall of the District states varies greatly, but generally falls below the national average. In many areas, even the small amount of rain which is deposited falls quite irregularly and is subject to a high percentage of loss due to rapid runoff. Few

considered not too unreasonable, an economy operating with highly competitive markets and with consumers and producers who are rationally attempting to achieve the largest possible benefit for themselves, will tend to produce maximum welfare for its citizens within the context of a given distribution of income. Three reasons account for this.

First, competition will tend to force prices down to the lowest possible level which will still permit the full costs of production to be covered, including a high enough return on the investment of firms to make them willing to keep their investment in the industry in the long run.

Second, each productive resource will be used up to the point where the cost of an additional unit is just equal to its contribution to the value of production. For example, in the case of labor, additional workers will be hired until the wage paid to the last worker employed just equals the dollar value of the extra product he produces. This will be done because each worker hired up to that point will have added more to the revenues of the firm than to its costs. Now if this condition prevails in each firm and if the price of a resource — let us say labor — is uniform as between any two firms, the value of product contributed by the last unit of labor used in each firm will be identical. Thus, if the wage for a given quality of labor is uniform for the economy, the value of the product of the last unit hired in any particular line of activity will be equal to that of the last unit hired in any other activity. This is important because it means that the market price which a firm pays for a resource represents the value of the product which that resource could have produced in another line of activity. For example, if a firm hires an additional unit of labor for one dollar, it means that production elsewhere has been reduced to the extent of one dollar due to the withdrawal of that unit of labor. As the welfare economist puts it, the market price of the resource is equal to its opportunity cost. This is a crucial idea in benefit-cost analysis even though, as may be apparent to the reader at this point, the above analysis can hold strictly only if the amount of resources available to the economy is fixed. Under that condition, an increase in the production of one item requires a reduction in the production of some other commodity.

Finally, consumers attempting to achieve maximum satisfaction from a given amount of income will tend to allocate their expenditures in such a way that the last dollar spent for any particular item will yield an amount of satisfaction equal to the last dollar spent on any other item. When this condition exists, it follows that the market price of a particular commodity reflects its worth, or goodness, or want-satisfying power. If the price of one commodity is twice as high per unit as the price of another commodity, the last unit of the higher priced commodity which an individual buys must yield twice as much satisfaction as the last unit of the lower priced one. The concept of benefit-cost analysis rests heavily upon this presumed characteristic of consumer behavior.

When the three conditions outlined above are present, it becomes obvious that market prices represent more than quantities of goods with dollar signs attached. Inferences concerning public welfare may be derived from them. For example, presume that a dollar's worth of labor can be moved from one activity where it yields a dollar's worth of goods to another activity where, for some reason, labor has not been utilized up to the point where the cost of the last unit is equal to the value of the product it produces, and therefore an additional dollar's worth of labor will produce more than a dollar's worth of goods in that activity. Not only is the total value of production enhanced but the total satisfaction derived by society from the use of re-

sources is increased. In strict logic, it is upon the possibility of this sort of an improved allocation of a fixed stock of resources that the reasonableness of benefit-cost analysis largely depends. It probably already will be apparent to the reader that an analysis so heavily grounded upon reasoning concerning a system in which the total stock of resources remains unchanged will not always be completely satisfactory for the purpose of analyzing problems of resource development which are of an essentially dynamic nature. And it is, in fact, around this consideration that much of the recent discussion of benefit-cost analysis has centered. This problem will be discussed more extensively later, but first a brief review of the terminology and technique of benefit-cost analysis will be presented.

The Direct Costs and Benefits

As a first step, it is useful to look at the most direct costs and benefits of the tangible or quantifiable variety to which a project may give rise, reserving for later discussion the more difficult-to-gauge and less direct secondary effects of a project. It is useful to follow the terminology of the Federal Inter-Agency River Basin Committee in identifying the various concepts central to benefit-cost analysis.

The primary benefits of the project are, quite simply, the value of the products or services which result directly from the project. In an irrigation project, the primary benefit would be the value of the additional farm crops which are produced upon the irrigated land. In a multiple purpose river valley development program, primary benefits might include such things as farm crops, electricity, flood control, and navigation services. In accordance with the principles of welfare economics outlined above, the market value of these goods and services attributable to the project usually is taken to represent the contribution to social benefit of the project.

Project costs are the value of the goods and services—land, labor, and materials – used for the establishment, maintenance, and operation of the project. In the case of irrigation, the project costs would be those of making water available to the farmer.

Associated costs are the value of the goods and services needed, over and above those included in the cost of the project itself, to make the direct products or services of the project available for use or sale.

Both categories of costs are usually calculated on the basis of the market prices of the resources used in the project and associated activities. If the conditions visualized by welfare economics hold, these costs represent actual opportunity costs. In other words, a dollar's worth of resources drawn into the project or associated activities will reduce the value of production elsewhere by one dollar and also the satisfaction produced elsewhere by one dollar.

On the basis of information concerning primary benefits, project costs, and associated costs, a benefit-cost ratio may be computed.[1] First, associated costs are subtracted from total primary benefits and the residual is termed "primary benefits attributable to the project." The following ratio can then be computed: Primary Benefits Attributable to the Project/Project Costs.

Project costs are set equal to unity, or one. Thus, a benefit-cost ratio of 1.5 - 1 would indicate that for every dollar of real social cost, the project will yield one and one-half dollars of real social benefit. If a project yields a benefit-cost ratio in excess of unity, with only primary benefits regarded, it is considered

[1] / *The agencies which consider secondary benefits and costs in project justification will, as is explained later, include these quantities in the computation of the benefit-cost ratio. The discussion here is initially limited to primary benefits and costs for expositional reasons. The nature of the benefit-cost analysis and its conceptual foundation are more easily understood at the primary level.*

FEDERAL RESERVE BANK OF KANSAS CITY

KANSAS CITY 6, MISSOURI

October 27, 1958

Mr. Mason Gaffney
Associate Professor
Department of Agricultural Economics
College of Agriculture
University of Missouri
Columbia, Missouri

Dear Mr. Gaffney:

Thank you very much for your kind comments concerning my Monthly Review article. It was a great pleasure to meet you at Bismark. I only wish we could get together and discuss our common interest in resource development projects at intervals in the future.

You are correct in stating that my article suggested no specific remedy for the inadequacies of benefit-cost analysis. I think that a movement toward greater identification of external economies would do something toward justifying certain projects which under current practice do not display positive benefit-cost ratio or do so only by virtue of some fudging somewhere along the line. Problems of structural underemployment and the economic and sociological effects of fostering labor mobility as opposed to fostering the shift of labor to higher productivity uses by means of local resource development projects require attention.

I think that given the current state of economic knowledge the benefit-cost analysis will necessarily continue to hold a central place in the early stages of project evaluation. This, despite its many problems of which only a few were mentioned—consider the problem presented by private and public monopolies, joint and interdependent preference functions, and immobilities, for example. Nevertheless information, which unfortunately will often be nonquantitative, concerning the factors mentioned above, should be made available to the Congress and should also be the subject of our research.

Thank you again for your comments. They were greatly appreciated.

Sincerely yours,

Allen V. Kneese
Industrial Economist

AVK:AD

clearly economically justifiable.[2] Theoretically, in order to produce an ideal allocation of resources, increments should be added to the project until the benefit-cost ratio of the last increment is unity. Similarly, given available alternatives, the project or portion thereof showing the highest ratio of incremental benefits to incremental costs should be chosen. Unfortunately, however, available data will not ordinarily permit benefits and costs to be computed for sufficiently small increments to a project to enable the analysis to be used legitimately for anything more than an indication that the project as a whole or some major part thereof is an economically justified or unjustified use of public funds.

It is probably apparent to the reader that benefit-cost analysis, insofar as it serves the purpose of the social justification of projects, is based upon a long and, at times, rather tenuous process of theoretical reasoning. This is indeed true. If benefit-cost analysis is to mean, in a rigorous fashion, what it is intended to mean, a long series of demanding conditions must be met, many of which have not even been touched upon in this article.

Some departures from the strict conditions listed above are specifically provided for in benefit-cost analysis and adjustments are made to take account of them. But the question of whether conditions encountered in reality conform closely enough to those envisaged by the theory underlying benefit-cost analysis to make that analysis useful, remains crucial. It appears that most economists who have written concerning the matter would argue that benefit-cost analysis at the primary benefit level is useful if applied with care.

Secondary and Intangible Effects Require Attention

Fundamental disagreement exists, however, concerning the appropriateness of inclusion and manner of measurement of secondary and intangible effects in benefit-cost analysis. There is especially intense disagreement concerning the degree to which projects not justifiable on the basis of primary benefits alone should be considered justifiable on the basis of the inclusion of secondary and intangible benefits in the analysis.

Intangible benefits and costs which may be either direct or secondary results of a project apparently do not, under current Federal agency practice, enter heavily into the justification of projects. This category of benefits and costs is in fact somewhat difficult to define since it is apparently constituted of a residual of items which seem important on the basis of qualitative judgment, but are difficult or impossible to value in money terms. Commonly mentioned intangible benefits are such things as stabilization of a regional economy or aid in improving the national diet on the part of an irrigation project. Flood control may have the effect of saving human lives and providing a greater feeling of security, as well as, incidentally, providing recreational opportunities. Intangible costs may involve such things as the destruction of scenic values and uprooting of families as a consequence of the creation of a reservoir. It should be pointed out that considerable progress has been made in measuring some of these items and thus taking them out of the field of intangibles.

[2] / *Thus far in this discussion it has been presumed that the benefits and costs being referred to relate to the Nation as a whole. It is quite possible that the net primary benefits (total primary benefits minus project and associated costs) of a particular project would be much larger for a particular locality than for the Nation as a whole. This is true because the possibilities of resource substitution from one product to another are much more limited within a particular region than they are for the Nation as a whole. Thus, the entire amount of resources employed by a project may represent a net gain for a particular region but no gain whatsoever for the Nation as a whole because of alternatives foregone elsewhere. Rather elaborate techniques have been worked out for the analysis of purely regional benefit. Such benefits are usually represented by value added or total value of product data rather than by some measure of "net" benefits.*

Truly unmeasurable items may, of course, be extremely important, but unfortunately their very nature makes it impossible to say how important.

Secondary benefits and costs do, however, enter directly into the process of project evaluation. Secondary benefits and costs for irrigation and hydroelectric power are measured by the Bureau of Reclamation only, but these factors are considered for flood control projects by the Bureau, the Corps of Engineers, the Federal Power Commission, and the Department of Agriculture. Only in the case of the Bureau of Reclamation does the computation of secondary benefits play an important part in determining benefit-cost ratios. The other agencies either do not compute them or do so in a relatively limited manner.

The Customary View

The discussion of secondary benefits in recent times appears to have distinguished at least three varieties. From a practical standpoint the first is most important in the sense that it is the one which the Bureau of Reclamation ordinarily measures. This customary variety of secondary benefits is perceived to arise from two sources. The effects which are termed "stemming from" are attributed to the industries that supply the project area with goods or services. The "induced" effects are attributed to the industries that process, distribute, or consume the products of the project. The indirect costs are the value of additional resources that must be consumed in order to realize the indirect benefits. The Bureau has devised a series of factors which it applies to the value of production made possible by the project and to the amount of purchases accounted for by the project and associated activities. The application of these factors and a "Federal cost adjustment factor"[3] is used to approximate the result that would be obtained if a complete assessment of benefit (value of goods sold) and associated costs had been made in the secondary industries.

The rationale for including secondary benefits of this variety in project justification is based upon the principles of welfare economics and is identical to that discussed in regard to primary benefits. Criticism has, however, been directed at this general method of estimating secondary benefits. Most of it is to the effect that in a reasonably fully employed economy, resources used in a project will have alternative uses and there is no good reason to suppose that the stream of such secondary effects set in motion by the alternate (public or nonpublic) use of the resources would not be as large as that induced by the project. If this criticism is correct, the appropriate use of the "induced" and "stemming from" approach to secondary benefits would be found in situations in which resources in secondary industries in the project area (but not in other areas where the resources absorbed by the project might otherwise be used) would be unemployed or underemployed in the absence of a project.

Secondary Benefits Due To External Economies

The second variety of possible secondary benefits, which apparently gets small attention in current techniques of estimation, grows out of the fact that productive processes of different productive establishments may be interrelated in such a way that an increase in the scale of output of one establishment will lower the costs of production or enhance the production possibilities of another activity. The economist gives this phenomenon the rather imposing name "technological, external scale economies." This condition can better be illustrated than explained. One example would be a situation in which surface water irrigation recharges water-bearing strata, or aquifers, underlying land in a vicinity which is irrigated from subsurface water sources.

[3] / *The "Federal cost adjustment factor" is derived from the relationship between project benefits and associated costs and is used to convert secondary benefits from a gross to a net basis.*

The benefit to the users of subsurface water should clearly be credited as a secondary benefit of the project.

Another example is the incidental pollution abatement which may result from navigation projects. In the case of hydroelectric projects, interdependence between upstream storage and generating facilities and downstream generating facilities often will be found. The capacity of the downstream facilities usually will be greatly enhanced by the presence of upstream storage. This increment in downstream capacity should be credited as a secondary economic benefit of the upstream storage facility.

In addition, a benefit attributable to the project may arise out of the fact that an expansion of the market in a sparsely populated or low income area may contribute generally to efficiency of production by making possible a more extensive division of labor.

Another source of secondary benefits due to external economies can arise in the field of social overhead capital. Facilities such as schools, roads, utilities, and other urban social capital may have excess capacity and thus be subject to decreasing costs as their use expands. The fuller use of social overhead capital is a legitimate secondary benefit attributable to a project. These types of secondary benefits may be of great importance in specific projects. Although their effects are invariably difficult to trace, they are nevertheless quite tangible.

Dynamic Secondary Benefits

The third and final variety of secondary benefits is much more difficult to conceptualize and no adequate means of measuring these benefits exists as yet, although in many cases they may well be the most important of the three. This variety of benefit may be termed dynamic or developmental. Such benefits do not depend upon adjustments leading to more efficient allocation of a given stock of resources, but rather arise from the dynamic social engineering aspect of resources development. These benefits are based upon the development of more skilled labor and the introduction of advanced techniques and capital, which will convert the underutilized resources of the area to optimal employment. The type of reasoning which stresses this type of dynamic benefit has been basic to much of the recent literature on underdeveloped countries, but it has also long impelled many proponents of resource development programs in the less highly developed areas of our own country. The benefits which such social and economic engineering might yield are potentially tremendous, but unfortunately economic science has not developed to the point where accurate measurement is possible.

Two other sources of secondary benefits falling loosely into this category of dynamic effects of resource development projects may be mentioned. The first is sociological as well as economic. The migration of population within the country in the last decade or so reveals an area preference which is gradually moving the center of population westward. If such a movement continues, the productivity of human resources in the areas experiencing large population increases will fall unless the population movement is accompanied by a transfer of capital and the careful development and husbanding of resources, including water. The portion of the population which has gone west has demonstrated its mobility and presumably, under conditions of economic stress, could be forced to return. Yet, the provision of employment opportunities in areas which offer the amenities of living which attract people to them increases satisfaction just as surely as any policy which enhances the gross national product as ordinarily measured. Needless to say, this effect of development projects is highly speculative and currently no means of measuring it exists.

Secondly, resource development has long been supported by conservationist ideas. Con-

servation policies are ordinarily designed to make a greater provision for the future than the market mechanism (or any procedure based upon the imputation of market values) would demand. Resources development projects present the opportunity of providing very durable, in some cases almost perpetual, additions to the Nation's capital stocks. It may be presumed that this capital usually will grow in value as population and the economy expands. The problem of to what degree conservationist nonmarket-oriented philosophy should govern resource development projects is one of the most important in the entire field.

Conclusions

The issue concerning the inclusion or exclusion and manner of measurement of secondary benefits of the external economy and dynamic type is a matter of great importance in the formulation of desirable public economic policies. It is possible that numerous socially justified development projects are not undertaken and that some projects are undertaken when superior alternatives are available simply because we lack the means of measuring accurately the general impact of a project upon the economy. It is quite possible that much of the disagreement which besets the water resources development field could be eliminated if the impact of particular projects could be traced with greater accuracy. Whereas matters of principle no doubt are at issue in this field, there are also, unfortunately, large areas of unresolved matters of fact. These unresolved factual issues result because the ability to gauge the full ramifications of resources development projects is severely circumscribed by limited economic knowledge.

BANKING IN THE TENTH DISTRICT

District and States	Loans				Deposits			
	Reserve City Member Banks		Country Member Banks		Reserve City Member Banks		Country Member Banks	
	August 1958 Percentage Change From							
	July 1958	Aug. 1957	July 1958	Aug. 1957	July 1958	Aug. 1957	July 1958	Aug. 1957
Tenth F.R.Dist.	+2	+7	+2	+19	+1	+9	+2	+9
Colorado	+2	+11	+2	+18	+1	+11	+2	+10
Kansas	+1	+14	+5	+32	†	+7	+2	+8
Missouri*	+2	+4	−1	+4	−2	+7	+2	+10
Nebraska	+1	+1	−2	+10	+5	+10	+4	+9
New Mexico*	**	**	−1	+12	**	**	†	+13
Oklahoma*	+2	+6	+4	+24	+2	+11	†	+10
Wyoming	**	**	+1	+13	**	**	+1	+6

*Tenth District portion only. **No reserve cities in this state.
†Less than 0.5 per cent.

PRICE INDEXES, UNITED STATES

Index	Aug. 1958	July 1958	Aug. 1957
Consumer Price Index (1947-49=100)	123.7	123.9	121.0
Wholesale Price Index (1947-49=100)	119.1	119.2	118.4
Prices Rec'd by Farmers (1910-14=100)	251	254	247 r
Prices Paid by Farmers (1910-14=100)	304	305	295

r Revised.

TENTH DISTRICT BUSINESS INDICATORS

District and Principal Metropolitan Areas	Value of Check Payments		Value of Department Store Sales		*Value of Residential Building Permits	
	Percentage change—1958 from 1957					
	August	Year to date	August	Year to date	August	Year to date
Tenth F.R.Dist.	0	+2	+3	+1	+8	+29
Denver	+2	+6	n.a.	n.a.	−16	0
Wichita	+3	+6	−4	−5	+16	−12
Kansas City	+1	+3	+4	−1	−30†	+89†
Omaha	−2	+6	+2	+2	−1	+20
Okla. City	−11	−4	+2	−1	+18	+21
Tulsa	−4	−6	+14	+10	+5	+76

*City only. †Kansas City, Mo., and Kans. n.a. Not available.

ECKSTEIN, O. & KRUTILLA, J. V.

The cost of federal money, Hells Canyon, and economic efficiency, I. Nat. Tax Jour., Mar. 1958. Pp. 20.

Professor M. Gofney
Department of Economics
University of Missouri
Columbus, Missouri.

SOME RECENT DEVELOPMENTS IN RIVER BASIN PLANNING AND EVALUATION

John V. Krutilla*

I have been asked to review recent progress in economic planning and evaluation of water resources programs with special application to international streams. For the purpose of this paper "recent" means since 1952-53. I have chosen this date as a point of departure for two reasons. First, 1952-53 marks roughly the end of a period during which -- at least in the United States -- the principal evaluation procedures were those developed in the familiar "Green Book" 1/ and the original draft of "Circular A-47". 2/ It was the beginning of a period in which there has been greater emphasis on criteria consistent with reducing public works expenditures and emphasis on analyses directed toward maximizing an objective function subject to budgetary constraints. Moreover, maximization subject to side conditions appears to be particularly appropriate where program formulation involves investments in more than one political jurisdiction, as in the case of international streams. The second reason is that the results of this new line of inquiry are not yet at the publication stage or else have just been published and thus may not be familiar to those who have not been touched directly by the ferment of activity the new emphasis has fostered.

Section I of this paper deals primarily with capital costs and investment criteria, while Section II addresses principally a benefit estimation problem within the context of an international development, along with some side issues to which this gives rise.

I

Efficiency Investment Criteria for Public Expenditures

Although some awareness of budget constraints appeared in embryonic form in the Green Book 3/ and elsewhere, 4/ the first systematic attempt at incorporating side conditions appropriate to the constraint appear in the work of McKean 5/ and Eckstein 6/. Both draw more explicitly from the corpus

of welfare economics than do the earlier efforts. Both assume a restricted budget insufficient to undertake all the projects the gains from which exceed their costs as determined by prices in factor markets, and develop criteria to guide allocation of a limited budget efficiently within the water resources field, subject to this constraint. The resulting criteria nonetheless vary somewhat owing to differences in judgment on the appropriate discount rate to be used for planning purposes and on whether the constraint applies appropriately to capital or to total budget expenditures. The problem is conceived basically as maximizing gains for a stipulated outlay; the inverse of the minimum cost problem encountered in a purely competitive regime. McKean proposes selecting projects that provide the maximum present value. The net benefit streams (sum of the discounted value of the annual gross benefits less annual operation and maintenance costs) are discounted by that rate which will equate the present value of the marginal project to its capital costs, subject to the condition that total investment just equals the capital ration. The appropriate rate, accordingly, is determined by the rate of return on the marginal project and all projects' marginal increments, permitted by the capital ration. Where project interdependencies pose difficulties, McKean suggests examining interdependent projects iteratively to find that combination of projects and scale for which the present value of the net benefit stream is maximized, consistent with the capital ration. 7/

Eckstein's approach differs by virtue of his assumption that the total budget expenditures, rather than investment funds alone, are subject to the constraint, and his use of a social time preference for planning purposes. In this, he follows more closely the conventional benefit-cost procedures. That is, he develops an investment criterion which seeks to maximize the present value of the difference between gross benefits and total costs (original investment plus the sum of the discounted stream of annual operation and

maintenance outlays). He incorporates a social discount rate for planning purposes (2.5-3.0 per cent) which reflects the prevailing political consensus and can be interpreted as a social time preference, along with a minimum benefit-to-cost cut-off point to insure that the restricted budget is employed so as to maximize the net gains for the stipulated budget. With a sufficiently restricted expenditure ration, the minimum benefit-to-cost ratio serving as the cut-off point would result in a smaller water resources development program than necessary to equalize the social marginal productivity of resources in the water-resources and private sectors. 8/ With a more adequate budget, the cut-off point is determined so as to equalize the social marginal productivity of water resources expenditures and the opportunity cost of resources drawn out of private employments. If the social time preference is, as assumed, less than the opportunity cost of public funds, the resultant benefit cost ratio, of course, would still have to exceed unity. 9/

The decision as to whether the constraint applies to investment funds alone, or to the total budget ration for the planning agency, is not a simple one. McKean argues that non-marketable project benefits can be regarded in some sense as current receipts from the nation's standpoint. 10/ Although the rationale is not made explicit, presumably they may appear ultimately in the tax base and thus be reflected in the Treasury's revenues to lessen somewhat the effective constraint. At any rate, he feels there is no justification for ignoring the revenue receipts from marketable project services in determining what funds the constraint applies to. Since the efficiency investment models are all developed to guide resource allocation under conditions of full employment, however, resources not otherwise used in the water field would find alternative employment and generate equivalent taxes elsewhere. The situation for receipts from marketable project services is perhaps more complicated.

For example, a large part of the benefits from the Corps of Engineers' projects are non-marketable, while power from the Corps' projects is marketed by one of the several Interior Department power-marketing agencies. Such receipts will go to the general fund of the Treasury rather than appear as available for offsetting current O & M costs of Corps programs. On the other hand, some of the O & M costs of Bureau of Reclamation irrigation projects are met by advances from water users; others in some cases are met by Congressional appropriations, albeit from the Reclamation fund; while still others, those allocable to flood control and perhaps other nonreimbursable project purposes, must be met out of the budget ration. Accordingly while there is greater justification for regarding the constraint as applying to capital alone in the case of the Bureau of Reclamation, the McKean formulation of the investment criterion, if required of all agencies, would make the Corps' program largely inoperable. 11/ I would judge that if for political reasons only one form of criterion is to be employed uniformly by all of the public agencies in the water resources field -- or by the review agency in evaluating projects submitted to the Congress in the President's budget -- the Eckstein formulation would be the preferable compromise. On the other hand, it does appear conceivable that political sanction could be obtained for use of different forms of the investment criterion appropriate to the different circumstances, with respect to current receipts and outlays, that are faced by different agencies.

Shortly following the appearance of the McKean and Eckstein studies (in manuscript form, spring 1955) Margolis addressed a similar or related problem. 12/13/ I believe that he perceived a situation involving multiple constraints, each attaching to a separate component of complementary investment opportunities. Thus it seems to me that he addresses a problem of this nature: given a federal irrigation project justified by benefits received by private farmers and requiring associated investment on the land by them to utilize the developed irrigation

water supply, what discount rate should be employed when (1) the farmers encounter capital rationing, and (2) the relevant public agency's budget is fixed by political considerations?

Margolis assumes that the total federal budget is fixed by considerations stemming from counter cyclical fiscal policies. He therefore argues there are no opportunity costs normally associated with yields foregone by diverting resources out of the private sector. 14/ Moreover, he regards the budget allocation to the development agency in question as politically determined, and hence argues that there are no genuine (as against shadow) benefits foregone from otherwise possible alternative applications in the public sector. 15/ Given these circumstances he attempts to provide a rationale for applying the internal rate of return to farmers as the appropriate rate with which to discount the stream of net benefits from the public irrigation project.

Discounting the net benefit appears justified, in view of Reclamation Bureau's covering of current outlays with current receipts. As to the rate advanced for discounting, I believe it provides a solution for an unrealistic problem. On the one hand, if the government expenditures are determined by federal counter cyclical policy, is it meaningful to discuss the question in terms of a benefit cost efficiency criterion? 16/ On the other hand, if the problem is perceived as one of allocating scarce resources, implicit in the form of criterion developed, the resources drawn out of private employments have an opportunity cost. Within the context of the latter interpretation there would then be two opportunity costs; one given by the yields in the private sector precluded by the public use of productive resources in the irrigation project; and one given by the internal rate of return of farmers for the associated private investment in complementary irrigation facilities. The two rates would be identical only if the funds for the public project could be conceived as diverted from the capital ration in the agricultural sector; or, alternatively, if one relaxed the Margolis assumption that

sub-allocations among public programs were not given by political determinants and that such funds could be diverted alternatively to increase the agricultural capital ration. 17/

In the absence of these possibilities, the approach recognizing multiple constraints does not differ in principle from the approach advanced in the Green Book for multiple discount rates where opportunity costs differ between two parties to complementary investments. 18/ It does serve to focus attention on the implications (all too often ignored) of imperfections in the capital market for program formulation and project evaluation. For this, Margolis should be enthusiastically commended.

Criteria for Evaluating "Partnership" Proposals

Accompanying the emphasis on reducing the expenditures of the federal government in the United States following 1953, has been a parallel effort in the water field directed toward involving private interests more fully in developing river basin projects. In response to this political development, Krutilla and Eckstein have developed a model which, unlike the efforts treated immediately above, does not address the question of allocating a public budget optimally but rather the question of criteria required for evaluating the comparative efficiency of federal and partnership plans for development. 19/ Taking explicit account of the divergence between private and social product of investments in the water field, they develop a model for comparing the net social product under federal and partnership plans of development for a number of partnership proposals. No budgetary constraints were assumed in order that the opportunity cost by which the federal plans of development were evaluated, in relation to the partnership plans, would not be raised artificially over the marginal productivity of resources drawn out of private employments. That is, the model short-circuits the possibility of arbitrarily disqualifying a public project by an "irrational" budget constraint.

This study assumes that if a project were undertaken by the federal government, resources would be siphoned out of the private sector by means of federal taxation, rather than being undertaken at the expense of other public uses. It assumes that in the absence of undertaking a given federal project, federal taxes could be reduced by an equivalent amount. Two tax changes are postulated; one favoring relatively the lower income classes and consumption; the other, the higher income groups and investment. The economy is next sectored into analytically meaningful categories, and an estimate made of the opportunity cost of the marginal tax dollars whose incidence is traced to the several sectors. The study produces an estimate of the opportunity cost of federal expenditures of between five and six per cent, given the characteristics of the tax models, when the social marginal productivity of resources is equalized in the public and private sectors.

With this estimate of the opportunity cost of federal funds, the social cost of alternative plans is compared with the corresponding social products, treating the difference between the federal and partnership proposals as project increments.

On the heels of these developments, Steiner 20/ developed an investment decision model designed to evaluate potential partnership developments on the assumption that a budget constraint does obtain in the public sector. Steiner assumes that the public budget is given and fixed; a similar assumption is made with respect to the capital ration for the private sector. A corrolary of these assumptions is that a particular public investment in the water field must come at the expense of alternative opportunities in the public sector, and that where a public investment preëmpts an ~~infra~~ SUPRA-marginal private investment opportunity, private investment funds thus displaced find alternative employment in marginal investment opportunities in the private sector. On the assumption that the constraint applies to capital rather than to total outlays, the magnitude to be maximized (subject to the capital constraint) consists of the difference between

two present values: (1) the present value of the sum of the net benefits from the public development and net returns from the marginal private investment, and (2) the present value of the sum of the net benefits foregone from other expenditures in the public sector and the net returns otherwise available from the private investment opportunity precluded by the public project. A conceptually attractive feature of the Steiner model is that it provides a means of determining the optimal allocation to the water resources field, given a fixed total public budget; i.e., an objective function is specified such that the maximum conditions yield an equal social marginal product for capital in all sub-sectors of the public sector. Moreover, it takes into account explicitly the yields foregone in the private sector by reason of a public preëmption of an inframarginal private opportunity under conditions wherein the assumptions governing the capital rations are realistic.

While it is possible that a set of circumstances could prevail in which the assumptions of the model would be in approximate accord with reality, a number of observations seem warranted. In the United States at least, while the initiative for public investment theoretically resides with the Executive Branch, and planning by the water development agencies must recognize the budget ration fixed by the Executive, the considerable initiative taken by the Congress in authorizing public works modifies the effectiveness of the Executive budgetary curbs. Individual projects may be authorized and funds for their construction appropriated without reference to the totals budgeted by the Executive Branch for use by the water resource development agencies. Moreover, the possibility of a public preëmption of a private investment opportunity is restricted largely to power projects. A power project contributes to the same region's power supply whether publicly or privately developed. Accordingly, since the investment opportunity is preëmpted, and utilities do not have internally generated funds for alternative reinvestment 21/ it appears of greater probability that a public preëmption of an investment

opportunity, coupled with the reality of Congressional initiative, would be accompanied by a siphoning out of the public sector the investment funds which otherwise would have been devoted to the displaced private investment opportunity. These considerations, to my mind, lessen the force of the argument in favor of a model which assumes an inflexible division of capital between the public and private sectors. 22/

This is as far as recent developments on investment criteria have taken us. Whatever the relative merits of alternative formulations of the investment criterion may be, all have contributed to a growing awareness that no single formulation has universal applicability. Instead, it is now recognized that there is need to develop criteria for each of the generic classes of realistic possibilities, to provide a shelf of models from which the professional practitioners in the field can choose the one which is most appropriate to the conditions prevailing. In this connection work is now being undertaken by Eckstein for Resources for the Future, which will examine the models in the technical literature, formally demonstrating the relation among them, identifying gaps in the spectrum which need to be filled, and developing criteria appropriate to the cases as yet not covered. In this connection it is appropriate to note that criteria for cases involving two or more political jurisdictions, as in the case of international streams, will receive attention.

II

Benefit Analysis with Particular Reference to International Streams

Progress in the field of evaluating benefits has been perhaps less concentrated than it has on the investment side of planning criteria. Partly for this reason I shall make only the briefest bibliographic reference to the contributions by such investigators as Clark, Grant and Kelso 23/; Curran 24/; Eckstein 25/; Krutilla 26/;McKean 27/; Meyer, Peck, Zwick and Stenson 28/; Renshaw 29/; Ulrich 30/;

and others. Some of these contributions to benefit estimation were done within the context of analyzing water resource development problems; others are in independent fields having implications for benefit evaluation for river basin planning criteria. Because of the international character of these meetings and the limitation on time, I shall confine my remarks to a critical aspect of benefit evaluation when river basin planning involves the development of an international stream.

Eckstein, so far as I know, was the first to state fully the fundamental significance of specifying the sequence of project additions to a system, for efficient programming of river basin development and project evaluation. 31/ The direct interdependence among project elements of a river basin program creates investment complementarities. This is particularly true in the case of storage reservoirs and run-of-river hydro-electric installations. 32/ In the case of an international stream such as the Columbia River, maximizing the value of the benefits from its development may require the construction of storage capacity, the real costs of which may fall predominantly in Canada, whereas the real gains will accrue predominantly at United States power plants downstream. The fact that the real costs and the gains occur in different countries makes it of critical importance to specify accurately the benefits from such storage sites in order to achieve a viable agreement for joint development of the most efficient system. The benefits attributable to a particular storage reservoir, however, depend on the sequence of its addition to the system, since successive equal increments of storage, other things being equal, add diminishing incremental benefits. This follows since the reservoir contents must be spread over successively longer critical periods, diminishing thereby the prime power gain.

Since the order in which storage sites are developed determines the gross benefits attributable to such developments, it may be thought that in order for each nation to maximize the gains it can claim, each should press for having its storage reservoirs first added. This, I believe, can be demonstrated to be incorrect.

To illustrate, let us take an extreme example. Country A and Country B each have two storage sites contending for priority as "next added." Assume they are identical in every respect (capacity and elevation, with identical developed heads downstream) except for cost. That is, gross benefits, G, are identical if one site is substituted for any other in a specified sequence of development:

$$G_{A1} = G_{A2} = G_{B1} = G_{B2}$$

but, of course, any one added later in the sequence has an incremental value less than preceding storage elements in the sequence:

$$G_1 > G_2 > G_3 > G_4$$

The cost of the storage, on the other hand, is assumed to differ for each site in the following manner:

$$C_{A1} < C_{B1} < C_{A2} < C_{B2}$$

Assuming further that:

$$G_1 \geq C_{B2} > G_2 \geq C_{A2} > G_3 \geq C_{B1} > G_4 \geq C_{A1}$$

What might be some principles of ordering priorities?

Let us consider one approach which assumes that the representatives of the two nations, motivated by a spirit of amity are reluctant to take advantage of their opposite numbers. They agree to alternate, first one nation's site is given priority, and then the others. Moreover, this is done with the understanding that the maximum number of sites be developed subject only to the constraint that the added gains from each compensate for its costs. Straws are drawn and the first choice falls to B which chooses B2, followed by A's choice of A2, followed successively by the selection of B1 and A1. The agreement is satisfied in this manner, i.e., it produces the maximum development consistent with the constraint that the added cost of each project (in that sequence) is covered by project gains.

This is not unlike, in principle, what results when planning personnel, unable to predict the sequence of development in a political environment,

visualize the maximum development which can be justified on the assumption that all project elements are brought into being simultaneously, and benefits are allocated in some proportion to the costs.

Another approach, however, seems preferable to me. This would involve an application of the economic principle; i.e., add successive increments in ascending order of their costs. In this manner the most economical storage site, (A1) would be first added with a benefit of G1 indelibly associated with it, followed by development of site B_1 with an added gain of G_2 attributable to it. However, since the gains from the next added storage are less than the cost associated with its development, and similarly for the fourth site, these would be omitted from the efficient program.

What criteria are implicit in the two approaches? In the first approach the criterion is maximum development. That is, it maximizes the development which can be "justified" by the fact that total benefits exceed total cost. An alternative equivalent expression of this criterion is maximization of the development agencies' expenditures with respect to the river basin. But it may result in no appreciable net gain. The surplus of gains over costs associated with the construction of the two most efficient sites can be dissipated to cover the excess of costs over gains in undertaking the next two sites. Application of this criterion can result in a destruction of as much wealth in one form as it creates in another.

The alternative approach has its basis in a welfare criterion; i.e., resources are so allocated that no redirection from one application (planned commitment) to another could produce greater returns in the alternative employments. This condition is met if sites 1 and 2 are undertaken, but not if development is extended to include sites 3 and 4. This criterion, if systematically applied, will maximize the contribution which development of the river can make to the incomes of the two nations combined.

Does it follow equally that if all the sites justified by the welfare criterion occur in only one of the two countries that it remains to the advantage of the other to encourage a sequence of development based on the welfare criterion? In the final analysis this depends on the agreement reached between the two nations with respect to sharing of net gains.

The decision model which employs the welfare criterion is consistent with maximizing the joint welfare function specified for the two countries combined. The maximum net gain from exploiting the resources of the river basin can be achieved in this manner, thereby providing the largest net benefit for mutual sharing. But realistically considered, the guiding principle for representatives of the two nations must be welfare maximization for their respective nationals. If, for example, the most economical sites are in the headwater nation, and that nation requires all of the net gains which accrue in the downstream nation as a condition for developing the storage, then it is to the latter's advantage to develop its own storage providing the alternative sites within its own borders will provide some net gain. Such sub-optimization achieves gains for the downstream nation at the expense of the potential benefits available from joint optimization, yet would justify such action from a nationalistic viewpoint if it otherwise would not share in the net benefits. This suggests a realistic basis for a viable agreement with respect to compensation to induce development in one nation having external economies for the neighboring country.

It can be assumed that neither country will acquiesce in a share of the net gains from cooperative development which is smaller than it can realize by pursuing an independent course of action. Welfare economics can guide the selection of criteria for planning river basin development on the assumption that each nation pursues an independent course. A welfare function specified for each nation separately, (and independent of the external diseconomies its maximization may inflict on the neighboring country 33/) can provide the investment criteria for

application within this sub-optimization context. By reason of the external economies-diseconomies problem inherent in a system of physically interdependent works, the sum of the net gains from individual sub-optimization will be less than the net gain from maximizing the joint welfare function. If each nation accepts as its minimum share of the net gains from joint development an amount equivalent to the maximum it can achieve from pursuing its most attractive independent alternative, the area for negotiation with respect to residual net benefits is clearly defined, and an environment is created in which the most efficient system of development from both parties' points of view can be undertaken.

The analysis can be extended equally to a case where the headwater nation has the opportunity of integrating its reach of the commonly shared river basin with an independent domestic river system, as for example, the upper Columbia and the Fraser systems in British Columbia. One cannot say a priori that maximizing the net gains from joint development of the Columbia River will contribute more to the income of the two economies combined, than would the maximization of the net gains from integrating a portion of the common river system with another independent river system. If the full head of the Fraser can be developed economically 34/ and would be justified independently of the Columbia diversion, it is conceivable that the net gains from such a development combined with those from sub-optimizing on the lower reach of the Columbia, subject to the diversion, could exceed the sum of the net gains from optimizing with respect to each basin separately. For example, the diversion costs could be offset in greater or lesser degree by transmission economies stemming from the generation of power nearer the load centers in British Columbia.

The time distribution of costs and gains will be a critical factor in evaluating the alternatives under these circumstances. The head is already developed along the United States reach of the Columbia, whereas the development of the Fraser is a matter for the future, pending resolution of some stubborn problems.

Assuming that these problems will be solved, but only in the future, the superiority of the diversion plan as judged by the sum of the undiscounted annual net benefits, would have to be the greater the more distant in time that the diversion would become feasible. That is, the value of the future stream of net benefits attributable to the diversion, discounted to the point in time at which the diversion would become feasible, would have to exceed the sum of (1) the present value represented by the Canadian share of the net benefits realizable from immediately developing a cooperative plan, and (2) its reinvestment yields during the interval before the diversion became feasible. 35/

If this represents a realistic possibility, the only remaining prospect for cooperative development of the Columbia would be for the two nations to proceed recognizing that diversion would be a possibility at some future date. The date would have to fall sufficiently in the future so that the present value of the United States' share of net benefits during the interval would exceed the present value of the net gains from developing the United States' most attractive independent alternatives. Whether or not the gains from cooperative development during the interval would compensate for the alternative yields foregone, 36/ along with the risk of future preclusion of presently feasible United States' sites, 37/ is a question which cannot be answered in the absence of intensive analysis.

The most careful analysis of such questions is required in order that each nation can rest satisfied that it enters into an agreement with the most accurate relevant information -- a necessary condition for a viable agreement. Moreover, such an analysis would enable the nationals of each country to enjoy the returns from a development firmly based on economic welfare criteria rather than a development resulting from tactics to achieve cooperation at the expense of the welfare contribution available from developing the river rationally. As an end product, I can conceive of obtaining data for a pay-off matrix, based on the several physical alternatives incorporating the time element explicitly into each

alternative, combined with the net gains imputable to each alternative under different assumptions as to the investment criteria appropriate to the different means by which the physical plans could be undertaken financially. This would provide decision makers with the information which would (1) assist the planning of the most efficient system, and (2) permit inferring the minimum share which each nation requires out of the joint development to induce its participation.

Beyond this, welfare economics can provide no guidance. The residual net gains from cooperative development (above the minimum each nation requires to place it on the margin of indifference) represents the classical distribution problem for which welfare economics can offer no assistance. Here perhaps the theories of bargaining and negotiation, or possibly the theory of games[38] may provide useful tools for predicing the final outcomes (though not of evaluating their equity). But the problem of distributing the residual net gains is not essentially a part of the planning and evaluation of river basin projects consistent with welfare maximization. It is necessary only to program a system which will maximize the net benefits for mutual sharing. How the residual gains are to be shared between the two nations is not a problem which technicians are qualified to decide; rather it falls within the exclusive province of the politically responsible decision makers.

III

In this paper I have sought to concentrate on the two most significant recent developments for river basin planning and evaluation with implications for development of international streams. Attention was first focussed on recent developments in the area of expenditure criteria, which suggest a variety of criteria appropriate to maximizing an objective function subject to different side conditions. Since international streams fall within two or more political jurisdictions, the likelihood of different criteria being appropriate for the separate reaches of the basin, even under cooperative development, should not be overlooked. Moreover,

in view of the imperfections in the capital market which may in fact be more significant in connection with financing a program of interdependent investments in two or more political jurisdictions, the empirical content as well as the form of criterion may differ for parties to the development of international streams. These considerations may be significant for planning of an efficient system for cooperative undertaking as well as suggest alternative means of financing development so as to minimize the social cost of a given development.

The second major point concerned the sequence in which projects are introduced into a system of complementary works: its significance for the problem of determining the most efficient system and evaluating benefits of specific project elements. The planning of river basin development for streams under divided jurisdiction is greatly complicated by the problem of reaching agreement as to the division of net gains. Application of welfare criteria to the programming of development, and the analysis of alternatives available within each political jurisdiction, was suggested as a means of narrowing the area of disagreement and moving the problem of sharing gains outside the range in which it could compromise the programming of an economically efficient system.

Footnotes

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1/ Proposed Practices for Economic Analysis of River Basin Projects, Report to the Federal Inter-Agency River Basin Committee, prepared by the Subcommittee on Benefits and Costs, 1950.

2/ Bureau of the Budget Circular A-47, Executive Office of the President, Washington, D. C., December 31, 1952.

For a concise summary of the position reached as of 1952-53, in the United States, see Mark M. Regan and John F. Timmons, "Current Concepts and Practices in Benefit Cost Analysis of Natural Resource Developments," paper presented at the joint session of the economics and engineering section of the December 27, 1954 meetings of the American Association for the Advancement of Science, reproduced in Report No. 3 Benefit-Cost Analysis, by the Committee on the Economics of Water Resources Development of the Western Agricultural Economics Research Council.

3/ Proposed Practices, op. cit., p. 14.

4/ Regan and Timmons, op. cit., p. 5.

5/ Roland N. McKean, Efficiency in Government Through Systems Analysis, with Emphasis on Water Resource Development (New York, John Wiley and Sons, Inc., 1958)

6/ Otto Eckstein, Water Resources Development, The Economics of Project Evaluation (Cambridge, Harvard University Press, 1958).

7/ McKean, op. cit., pp. 86-87, 89-91, 98-99, 122.

8/ This observation is equally true for the McKean criterion, where the social marginal productivity of capital in the water resources applications (if the constraint is effective) will exceed the social marginal productivity in the private sector.

9/ Eckstein computes a sample set of benefit cost ratios, on the assumption the social time preference ranges from 2.5-3.0 per cent, required to ensure that marginal productivity of resources in the public sector are at least equal to the yields foregone from private alternatives.

10/ McKean, op. cit., pp. 114-116.

11/ Actually, McKean's investment criterion abstracts from existing institutions. It is designed for dealing with the total investment budget subject to Congressional discretion. Thus while the form of criterion may be correct if one abstracts from the agencies through which the investments are actually made, it would not be universally applicable in the absence of a pretty fundamental reorganization of governmental agencies and procedures.

12/ Julius Margolis, The Discount Rate and the Benefit-Cost Justification of Federal Irrigation Investment, Department of Economics, Stanford University,

13/ What follows immediately should best be prefaced by a remark akin to that of the lay preacher addressing a Saturday morning streetside congregation, "I am going to elucidate a subject about which the Lord was not very clear."

14/ Margolis, op. cit., p. 10.

15/ Ibid., p. 10.

16/ For example, the appropriate benefit stream to be discounted would have to take account of the multiplier effects of re-employing otherwise idle resources since by assumptions political constraints prevent their use in any alternative public programs, and they would be unproductive if left idle in the private sector.

17/ Margolis along with McKean abstracts partly from the institutional environment, considering a land and water resources development budget subject to Congressional allocation, rather than the appropriate portions of the Departments of Agriculture and Interior budgets.

18/ Proposed Practices, op. cit., pp. 22-24.

19/ John V. Krutilla and Otto Eckstein, Multiple Purpose River Development, Studies in Applied Economic Analysis (Baltimore, The Johns Hopkins Press, 1958) Chapters IV, V and VI.

20/ Peter O. Steiner, An Economic Model of Efficient Public Expenditures in Water Resource Development (Harvard University, Water Resources Seminar, processed).

21/ Since electric utilities are regulated monopolies, rates for service are fixed so as to assure a rate of return which precludes financing of plant except by resort to external sources in response to specific investment opportunities.

22/ If in fact the constraint is not effective due to the independent action of the Congress, the four sector Steiner model collapses to the simple two sector model employed by Krutilla and Eckstein. The objective function as formulated by Steiner, however, can be modified to reflect intermediate positions between the polar cases represented by the original Steiner and the Krutilla-Eckstein models. This is a conceptual virtue whether or not it has operatinnal possibilities.

23/ John M. Clark, Eugene L. Grant, and Maurice W. Kelso, Report of the Panel of Consultants on Secondary or Indirect Benefits of Water Use Projects, to Michael Strauss, Commissioner of Reclamation, June 26, 1952.

24/ Charles D. Curran, "Evaluation of Federal Navigation Projects," Task Force Report on Water Resources and Power, Commission on Organization of the Executive Branch of the Government, Volume III, p. 1330.

25/ Otto Eckstein, Water Resources Development, especially pp. ____, ____ & ____.

26/ John V. Krutilla and Otto Eckstein, Multiple Purpose River Development, Chapter III.

27/ Roland N. McKean, Efficiency in Government Through Systems Analysis, Chapters 10 and 11.

28/ John R. Meyer, Merton J. Peck, Charles W. Zwick, and W. J. Stenson, The Economics of Competition in the Transportation Industry (Cambridge, Harvard University Press, in press).

29/ Edward F. Renshaw, Toward Responsible Government, an Economic Appraisal of Federal Investment in Water Resources Programs (Chicago, Idyia Press, 1957).

30/ Rudolph Ulrich, "Relative Costs and Benefits of Land Reclamation in the Humid Southeast and the Semi-Arid West," Journal of Farm Economics, Vol. XXV, No. 1.

31/ Otto Eckstein, Water Resources Development, pp. ___/ ____, and ____.

32/ See Krutilla and Eckstein, Multiple Purpose River Development, pp. 61 ff.

33/ Subject of course to the restraints imposed by international treaties, conventions or the international law governing cases for which both nations accept jurisdiction of the International Court.

34/ This assumes that the problem involving the spawning grounds for anadromous fish can be satisfactorily resolved.

35/ The diversion would represent an economic undertaking only so long as the first expression exceeded the second, the second accumulating increasingly the more distant in time the diversion would be postponed.

$$\sum_{i=1}^{n}\sum_{t=m}^{T_i}\frac{b_{it}}{(1+r)^t}-\sum_{i=1}^{n}K_i > \alpha\left[\sum_{j=1}^{p}\sum_{t=1}^{m}\frac{b_{jt}}{(1+r)^t}-\sum_{j=1}^{p}K_j\right](1+r)^m$$

Where: b_{it} = the net benefit of the i^{th} project in the diversion plan in the t^{th} year.

b_{jt} = the net benefit of the j^{th} project in the cooperative plan in the t^{th} year.

$T_{i(j)}$= the planning horizon in years appropriate to the i^{th} (j^{th}) project.

n = the number of projects in the diversion plan.

p = the number of projects in the cooperative plan.

m = the year in which the diversion plan can be initiated

$K_{i(j)}$= the capital outlay of the i^{th}(j^{th}) project in the diversion (cooperative) plan.

α = Canadian share of the net benefits of the cooperative plan.

36/ Symbolically:

$$\beta\left[\sum_{j=1}^{p}\sum_{t=1}^{m}\frac{b_{jt}}{(1+r)^t}-\sum_{j=1}^{p}K_j\right]+\sum_{k=1}^{q}\sum_{t=m}^{T_\beta}\frac{b_{kt}}{(1+r)^t}-\sum_{k=1}^{q}K_k \;>\; \sum_{k=1}^{q}\sum_{t=1}^{T_\beta}\frac{b_{kt}}{(1+r)^t}-\sum_{k=1}^{q}K_k$$

where: β = the United States share of the net benefits associated with cooperative development and all other symbols remain as previously.

k = subscript appropriate to the projects in the United States independent plan of development.

q = number of projects in the U. S. independent alternative.

37/ As economic development proceeds in western United States, the costs of developing storage may become prohibitive or it may become politically infeasible due to the preëmption of potential reservoir areas by economic or social facilities such as expansion of towns, transportation routes, etc.

38/ Game theory will not provide a clear cut solution to the general problem, i.e., the admixture of community and conflicts of interest. The community of interest element leads to joint maximization with departures resulting in a non-constant sum game. Conceivably by a proper formulation of the problem, the division of the constant sum residual net benefits may be amenable to a game theory solution.

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SOME RECENT DEVELOPMENTS IN RIVER BASIN PLANNING AND EVALUATION

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I have been asked to review recent progress in economic planning and evaluation of water resources programs with special application to international streams. For the purpose of this paper "recent" means since 1952-53. I have chosen this date as a point of departure for two reasons. First, 1952-53 marks roughly the end of a period during which -- at least in the United States -- the principal evaluation procedures were those developed in the familiar "Green Book" 1/ and the original draft of "Circular A-47". 2/ It was the beginning of a period in which there has been greater emphasis on criteria consistent with reducing public works expenditures and emphasis on analyses directed toward maximizing an objective function subject to budgetary constraints. Moreover, maximization subject to side conditions appears to be particularly appropriate where program formulation involves investments in more than one political jurisdiction, as in the case of international streams. The second reason is that the results of this new line of inquiry are not yet at the publication stage or else have just been published and thus may not be familiar to those who have not been touched directly by the ferment of activity the new emphasis has fostered.

Section I of this paper deals primarily with capital costs and investment criteria, while Section II addresses principally a benefit estimation problem within the context of an international development, along with some side issues to which this gives rise.

I

Efficiency Investment Criteria for Public Expenditures

Although some awareness of budget constraints appeared in embryonic form in the Green Book 3/ and elsewhere, 4/ the first systematic attempt at incorporating side conditions appropriate to the constraint appear in the work of McKean 5/ and Eckstein 6/. Both draw more explicitly from the corpus

of welfare economics than do the earlier efforts. Both assume a restricted budget insufficient to undertake all the projects the gains from which exceed their costs as determined by prices in factor markets, and develop criteria to guide allocation of a limited budget efficiently within the water resources field, subject to this constraint. The resulting criteria nonetheless vary somewhat owing to differences in judgment on the appropriate discount rate to be used for planning purposes and on whether the constraint applies appropriately to capital or to total budget expenditures. The problem is conceived basically as maximizing gains for a stipulated outlay; the inverse of the minimum cost problem encountered in a purely competitive regime. McKean proposes selecting projects that provide the maximum present value. The net benefit streams (sum of the discounted value of the annual gross benefits less annual operation and maintenance costs) are discounted by that rate which will equate the present value of the marginal project to its capital costs, subject to the condition that total investment just equals the capital ration. The appropriate rate, accordingly, is determined by the rate of return on the marginal project and all projects' marginal increments, permitted by the capital ration. Where project interdependencies pose difficulties, McKean suggests examining interdependent projects iteratively to find that combination of projects and scale for which the present value of the net benefit stream is maximized, consistent with the capital ration. 7/

Eckstein's approach differs by virtue of his assumption that the total budget expenditures, rather than investment funds alone, are subject to the constraint, and his use of a social time preference for planning purposes. In this, he follows more closely the conventional benefit-cost procedures. That is, he develops an investment criterion which seeks to maximize the present value of the difference between gross benefits and total costs (original investment plus the sum of the discounted stream of annual operation and

maintenance outlays). He incorporates a social discount rate for planning purposes (2.5-3.0 per cent) which reflects the prevailing political consensus and can be interpreted as a social time preference, along with a minimum benefit-to-cost cut-off point to insure that the restricted budget is employed so as to maximize the net gains for the stipulated budget. With a sufficiently restricted expenditure ration, the minimum benefit-to-cost ratio serving as the cut-off point would result in a smaller water resources development program than necessary to equalize the social marginal productivity of resources in the water-resources and private sectors. 8/ With a more adequate budget, the cut-off point is determined so as to equalize the social marginal productivity of water resources expenditures and the opportunity cost of resources drawn out of private employments. If the social time preference is, as assumed, less than the opportunity cost of public funds, the resultant benefit cost ratio, of course, would still have to exceed unity. 9/

The decision as to whether the constraint applies to investment funds alone, or to the total budget ration for the planning agency, is not a simple one. McKean argues that non-marketable project benefits can be regarded in some sense as current receipts from the nation's standpoint. 10/ Although the rationale is not made explicit, presumably they may appear ultimately in the tax base and thus be reflected in the Treasury's revenues to lessen somewhat the effective constraint. At any rate, he feels there is no justification for ignoring the revenue receipts from marketable project services in determining what funds the constraint applies to. Since the efficiency investment models are all developed to guide resource allocation under conditions of full employment, however, resources not otherwise used in the water field would find alternative employment and generate equivalent taxes elsewhere. The situation for receipts from marketable project services is perhaps more complicated.

For example, a large part of the benefits from the Corps of Engineers' projects are non-marketable, while power from the Corps' projects is marketed by one of the several Interior Department power-marketing agencies. Such receipts will go to the general fund of the Treasury rather than appear as available for offsetting current O & M costs of Corps programs. On the other hand, some of the O & M costs of Bureau of Reclamation irrigation projects are met by advances from water users; others in some cases are met by Congressional appropriations, albeit from the Reclamation fund; while still others, those allocable to flood control and perhaps other nonreimbursable project purposes, must be met out of the budget ration. Accordingly while there is greater justification for regarding the constraint as applying to capital alone in the case of the Bureau of Reclamation, the McKean formulation of the investment criterion, if required of all agencies, would make the Corps' program largely inoperable. 11/ I would judge that if for political reasons only one form of criterion is to be employed uniformly by all of the public agencies in the water resources field -- or by the review agency in evaluating projects submitted to the Congress in the President's budget -- the Eckstein formulation would be the preferable compromise. On the other hand, it does appear conceivable that political sanction could be obtained for use of different forms of the investment criterion appropriate to the different circumstances, with respect to current receipts and outlays, that are faced by different agencies.

Shortly following the appearance of the McKean and Eckstein studies (in manuscript form, spring 1955) Margolis addressed a similar or related problem. 12/13/ I believe that he perceived a situation involving multiple constraints, each attaching to a separate component of complementary investment opportunities. Thus it seems to me that he addresses a problem of this nature: given a federal irrigation project justified by benefits received by private farmers and requiring associated investment on the land by them to utilize the developed irrigation

water supply, what discount rate should be employed when (1) the farmers encounter capital rationing, and (2) the relevant public agency's budget is fixed by political considerations?

Margolis assumes that the total federal budget is fixed by considerations stemming from counter cyclical fiscal policies. He therefore argues there are no opportunity costs normally associated with yields foregone by diverting resources out of the private sector. 14/ Moreover, he regards the budget allocation to the development agency in question as politically determined, and hence argues that there are no genuine (as against shadow) benefits foregone from otherwise possible alternative applications in the public sector. 15/ Given these circumstances he attempts to provide a rationale for applying the internal rate of return to farmers as the appropriate rate with which to discount the stream of net benefits from the public irrigation project.

Discounting the net benefit appears justified, in view of Reclamation Bureau's covering of current outlays with current receipts. As to the rate advanced for discounting, I believe it provides a solution for an unrealistic problem. On the one hand, if the government expenditures are determined by federal counter cyclical policy, is it meaningful to discuss the question in terms of a benefit cost efficiency criterion? 16/ On the other hand, if the problem is perceived as one of allocating scarce resources, implicit in the form of criterion developed, the resources drawn out of private employments have an opportunity cost. Within the context of the latter interpretation there would then be two opportunity costs: one given by the yields in the private sector precluded by the public use of productive resources in the irrigation project; and one given by the internal rate of return of farmers for the associated private investment in complementary irrigation facilities. The two rates would be identical only if the funds for the public project could be conceived as diverted from the capital ration in the agricultural sector; or, alternatively, if one relaxed the Margolis assumption that

sub-allocations among public programs were not given by political determinants and that such funds could be diverted alternatively to increase the agricultural capital ration. 17/

In the absence of these possibilities, the approach recognizing multiple constraints does not differ in principle from the approach advanced in the Green Book for multiple discount rates where opportunity costs differ between two parties to complementary investments. 18/ It does serve to focus attention on the implications (all too often ignored) of imperfections in the capital market for program formulation and project evaluation. For this, Margolis should be enthusiastically commended.

Criteria for Evaluating "Partnership" Proposals

Accompanying the emphasis on reducing the expenditures of the federal government in the United States following 1953, has been a parallel effort in the water field directed toward involving private interests more fully in developing river basin projects. In response to this political development, Krutilla and Eckstein have developed a model which, unlike the efforts treated immediately above, does not address the question of allocating a public budget optimally but rather the question of criteria required for evaluating the comparative efficiency of federal and partnership plans for development. 19/ Taking explicit account of the divergence between private and social product of investments in the water field, they develop a model for comparing the net social product under federal and partnership plans of development for a number of partnership proposals. No budgetary constraints were assumed in order that the opportunity cost by which the federal plans of development were evaluated, in relation to the partnership plans, would not be raised artificially over the marginal productivity of resources drawn out of private employments. That is, the model short-circuits the possibility of arbitrarily disqualifying a public project by an "irrational" budget constraint.

This study assumes that if a project were undertaken by the federal government, resources would be siphoned out of the private sector by means of federal taxation, rather than being undertaken at the expense of other public uses. It assumes that in the absence of undertaking a given federal project, federal taxes could be reduced by an equivalent amount. Two tax changes are postulated; one favoring relatively the lower income classes and consumption; the other, the higher income groups and investment. The economy is next sectored into analytically meaningful categories, and an estimate made of the opportunity cost of the marginal tax dollars whose incidence is traced to the several sectors. The study produces an estimate of the opportunity cost of federal expenditures of between five and six per cent, given the characteristics of the tax models, when the social marginal productivity of resources is equalized in the public and private sectors.

With this estimate of the opportunity cost of federal funds, the social cost of alternative plans is compared with the corresponding social products, treating the difference between the federal and partnership proposals as project increments.

On the heels of these developments, Steiner 20/ developed an investment decision model designed to evaluate potential partnership developments on the assumption that a budget constraint does obtain in the public sector. Steiner assumes that the public budget is given and fixed; a similar assumption is made with respect to the capital ration for the private sector. A corrolary of these assumptions is that a particular public investment in the water field must come at the expense of alternative opportunities in the public sector, and that where a public investment preëmpts an ~~infra~~ supra-marginal private investment opportunity, private investment funds thus displaced find alternative employment in marginal investment opportunities in the private sector. On the assumption that the constraint applies to capital rather than to total outlays, the magnitude to be maximized (subject to the capital constraint) consists of the difference between

two present values: (1) the present value of the sum of the net benefits from the public development and net returns from the marginal private investment, and (2) the present value of the sum of the net benefits foregone from other expenditures in the public sector and the net returns otherwise available from the private investment opportunity precluded by the public project. A conceptually attractive feature of the Steiner model is that it provides a means of determining the optimal allocation to the water resources field, given a fixed total public budget; i.e., an objective function is specified such that the maximum conditions yield an equal social marginal product for capital in all sub-sectors of the public sector. Moreover, it takes into account explicitly the yields foregone in the private sector by reason of a public preëmption of an supra marginal private opportunity under conditions wherein the assumptions governing the capital rations are realistic.

While it is possible that a set of circumstances could prevail in which the assumptions of the model would be in approximate accord with reality, a number of observations seem warranted. In the United States at least, while the initiative for public investment theoretically resides with the Executive Branch, and planning by the water development agencies must recognize the budget ration fixed by the Executive, the considerable initiative taken by the Congress in authorizing public works modifies the effectiveness of the Executive budgetary curbs. Individual projects may be authorized and funds for their construction appropriated without reference to the totals budgeted by the Executive Branch for use by the water resource development agencies. Moreover, the possibility of a public preëmption of a private investment opportunity is restricted largely to power projects. A power project contributes to the same region's power supply whether publicly or privately developed. Accordingly, since the investment opportunity is preëmpted, and utilities do not have internally generated funds for alternative reinvestment 21/ it appears of greater probability that a public preëmption of an investment

opportunity, coupled with the reality of Congressional initiative, would be accompanied by a siphoning out of the public sector the investment funds which otherwise would have been devoted to the displaced private investment opportunity. These considerations, to my mind, lessen the force of the argument in favor of a model which assumes an inflexible division of capital between the public and private sectors. 22/

This is as far as recent developments on investment criteria have taken us. Whatever the relative merits of alternative formulations of the investment criterion may be, all have contributed to a growing awareness that no single formulation has universal applicability. Instead, it is now recognized that there is need to develop criteria for each of the generic classes of realistic possibilities, to provide a shelf of models from which the professional practitioners in the field can choose the one which is most appropriate to the conditions prevailing. In this connection work is now being undertaken by Eckstein for Resources for the Future, which will examine the models in the technical literature, formally demonstrating the relation among them, identifying gaps in the spectrum which need to be filled, and developing criteria appropriate to the cases as yet not covered. In this connection it is appropriate to note that criteria for cases involving two or more political jurisdictions, as in the case of international streams, will receive attention.

II

Benefit Analysis with Particular Reference to International Streams

Progress in the field of evaluating benefits has been perhaps less concentrated than it has on the investment side of planning criteria. Partly for this reason I shall make only the briefest bibliographic reference to the contributions by such investigators as Clark, Grant and Kelso 23/; Curran 24/; Eckstein 25/; Krutilla 26/;McKean 27/; Meyer, Peck, Zwick and Stenson 28/; Renshaw 29/; Ulrich 30/;

and others. Some of these contributions to benefit estimation were done within the context of analyzing water resource development problems; others are in independent fields having implications for benefit evaluation for river basin planning criteria. Because of the international character of these meetings and the limitation on time, I shall confine my remarks to a critical aspect of benefit evaluation when river basin planning involves the development of an international stream.

Eckstein, so far as I know, was the first to state fully the fundamental significance of specifying the sequence of project additions to a system, for efficient programming of river basin development and project evaluation. 31/ The direct interdependence among project elements of a river basin program creates investment complementarities. This is particularly true in the case of storage reservoirs and run-of-river hydro-electric installations. 32/ In the case of an international stream such as the Columbia River, maximizing the value of the benefits from its development may require the construction of storage capacity, the real costs of which may fall predominantly in Canada, whereas the real gains will accrue predominantly at United States power plants downstream. The fact that the real costs and the gains occur in different countries makes it of critical importance to specify accurately the benefits from such storage sites in order to achieve a viable agreement for joint development of the most efficient system. The benefits attributable to a particular storage reservoir, however, depend on the sequence of its addition to the system, since successive equal increments of storage, other things being equal, add diminishing incremental benefits. This follows since the reservoir contents must be spread over successively longer critical periods, diminishing thereby the prime power gain.

Since the order in which storage sites are developed determines the gross benefits attributable to such developments, it may be thought that in order for each nation to maximize the gains it can claim, each should press for having its storage reservoirs first added. This, I believe, can be demonstrated to be incorrect.

To illustrate, let us take an extreme example. Country A and Country B each have two storage sites contending for priority as "next added." Assume they are identical in every respect (capacity and elevation, with identical developed heads downstream) except for cost. That is, gross benefits, G, are identical if one site is substituted for any other in a specified sequence of development:

$$G_{A1} = G_{A2} = G_{B1} = G_{B2}$$

but, of course, any one added later in the sequence has an incremental value less than preceding storage elements in the sequence:

$$G_1 > G_2 > G_3 > G_4$$

The cost of the storage, on the other hand, is assumed to differ for each site in the following manner:

$$C_{A1} < C_{B1} < C_{A2} < C_{B2}$$

Assuming further that:

$$G_1 \geq C_{B2} > G_2 \geq C_{A2} > G_3 \geq C_{B1} > G_4 \geq C_{A1}$$

What might be some principles of ordering priorities?

Let us consider one approach which assumes that the representatives of the two nations, motivated by a spirit of amity are reluctant to take advantage of their opposite numbers. They agree to alternate, first one nation's site is given priority, and then the others. Moreover, this is done with the understanding that the maximum number of sites be developed subject only to the constraint that the added gains from each compensate for its costs. Straws are drawn and the first choice falls to B which chooses B2, followed by A's choice of A2, followed successively by the selection of B1 and A1. The agreement is satisfied in this manner, i.e., it produces the maximum development consistent with the constraint that the added cost of each project (in that sequence) is covered by project gains.

This is not unlike, in principle, what results when planning personnel, unable to predict the sequence of development in a political environment,

visualize the maximum development which can be justified on the assumption that all project elements are brought into being simultaneously, and benefits are allocated in some proportion to the costs.

Another approach, however, seems preferable to me. This would involve an application of the economic principle; i.e., add successive increments in ascending order of their costs. In this manner the most economical storage site, (A1) would be first added with a benefit of G1 indelibly associated with it, followed by development of site B_1 with an added gain of G_2 attributable to it. However, since the gains from the next added storage are less than the cost associated with its development, and similarly for the fourth site, these would be omitted from the efficient program.

What criteria are implicit in the two approaches? In the first approach the criterion is maximum development. That is, it maximizes the development which can be "justified" by the fact that total benefits exceed total cost. An alternative equivalent expression of this criterion is maximization of the development agencies' expenditures with respect to the river basin. But it may result in no appreciable net gain. The surplus of gains over costs associated with the construction of the two most efficient sites can be dissipated to cover the excess of costs over gains in undertaking the next two sites. Application of this criterion can result in a destruction of as much wealth in one form as it creates in another.

The alternative approach has its basis in a welfare criterion; i.e., resources are so allocated that no redirection from one application (planned commitment) to another could produce greater returns in the alternative employments. This condition is met if sites 1 and 2 are undertaken, but not if development is extended to include sites 3 and 4. This criterion, if systematically applied, will maximize the contribution which development of the river can make to the incomes of the two nations combined.

Does it follow equally that if all the sites justified by the welfare criterion occur in only one of the two countries that it remains to the advantage of the other to encourage a sequence of development based on the welfare criterion? In the final analysis this depends on the agreement reached between the two nations with respect to sharing of net gains.

The decision model which employs the welfare criterion is consistent with maximizing the joint welfare function specified for the two countries combined. The maximum net gain from exploiting the resources of the river basin can be achieved in this manner, thereby providing the largest net benefit for mutual sharing. But realistically considered, the guiding principle for representatives of the two nations must be welfare maximization for their respective nationals. If, for example, the most economical sites are in the headwater nation, and that nation requires all of the net gains which accrue in the downstream nation as a condition for developing the storage, then it is to the latter's advantage to develop its own storage providing the alternative sites within its own borders will provide some net gain. Such sub-optimization achieves gains for the downstream nation at the expense of the potential benefits available from joint optimization, yet would justify such action from a nationalistic viewpoint if it otherwise would not share in the net benefits. This suggests a realistic basis for a viable agreement with respect to compensation to induce development in one nation having external economies for the neighboring country.

It can be assumed that neither country will acquiesce in a share of the net gains from cooperative development which is smaller than it can realize by pursuing an independent course of action. Welfare economics can guide the selection of criteria for planning river basin development on the assumption that each nation pursues an independent course. A welfare function specified for each nation separately, (and independent of the external diseconomies its maximization may inflict on the neighboring country 33/) can provide the investment criteria for

application within this sub-optimization context. By reason of the external economies-diseconomies problem inherent in a system of physically interdependent works, the sum of the net gains from individual sub-optimization will be less than the net gain from maximizing the joint welfare function. If each nation accepts as its minimum share of the net gains from joint development an amount equivalent to the maximum it can achieve from pursuing its most attractive independent alternative, the area for negotiation with respect to residual net benefits is clearly defined, and an environment is created in which the most efficient system of development from both parties' points of view can be undertaken.

The analysis can be extended equally to a case where the headwater nation has the opportunity of integrating its reach of the commonly shared river basin with an independent domestic river system, as for example, the upper Columbia and the Fraser systems in British Columbia. One cannot say a priori that maximizing the net gains from joint development of the Columbia River will contribute more to the income of the two economies combined, than would the maximization of the net gains from integrating a portion of the common river system with another independent river system. If the full head of the Fraser can be developed economically 34/ and would be justified independently of the Columbia diversion, it is conceivable that the net gains from such a development combined with those from sub-optimizing on the lower reach of the Columbia, subject to the diversion, could exceed the sum of the net gains from optimizing with respect to each basin separately. For example, the diversion costs could be offset in greater or lesser degree by transmission economies stemming from the generation of power nearer the load centers in British Columbia.

The time distribution of costs and gains will be a critical factor in evaluating the alternatives under these circumstances. The head is already developed along the United States reach of the Columbia, whereas the development of the Fraser is a matter for the future, pending resolution of some stubborn problems.

Assuming that these problems will be solved, but only in the future, the superiority of the diversion plan as judged by the sum of the undiscounted annual net benefits, would have to be the greater the more distant in time that the diversion would become feasible. That is, the value of the future stream of net benefits attributable to the diversion, discounted to the point in time at which the diversion would become feasible, would have to exceed the sum of (1) the present value represented by the Canadian share of the net benefits realizable from immediately developing a cooperative plan, and (2) its reinvestment yields during the interval before the diversion became feasible. 35/

If this represents a realistic possibility, the only remaining prospect for cooperative development of the Columbia would be for the two nations to proceed recognizing that diversion would be a possibility at some future date. The date would have to fall sufficiently in the future so that the present value of the United States' share of net benefits during the interval would exceed the present value of the net gains from developing the United States' most attractive independent alternatives. Whether or not the gains from cooperative development during the interval would compensate for the alternative yields foregone, 36/ along with the risk of future preclusion of presently feasible United States' sites, 37/ is a question which cannot be answered in the absence of intensive analysis.

The most careful analysis of such questions is required in order that each nation can rest satisfied that it enters into an agreement with the most accurate relevant information -- a necessary condition for a viable agreement. Moreover, such an analysis would enable the nationals of each country to enjoy the returns from a development firmly based on economic welfare criteria rather than a development resulting from tactics to achieve cooperation at the expense of the welfare contribution available from developing the river rationally. As an end product, I can conceive of obtaining data for a pay-off matrix, based on the several physical alternatives incorporating the time element explicitly into each

alternative, combined with the net gains imputable to each alternative under different assumptions as to the investment criteria appropriate to the different means by which the physical plans could be undertaken financially. This would provide decision makers with the information which would (1) assist the planning of the most efficient system, and (2) permit inferring the minimum share which each nation requires out of the joint development to induce its participation.

Beyond this, welfare economics can provide no guidance. The residual net gains from cooperative development (above the minimum each nation requires to place it on the margin of indifference) represents the classical distribution problem for which welfare economics can offer no assistance. Here perhaps the theories of bargaining and negotiation, or possibly the theory of games[38] may provide useful tools for predicing the final outcomes (though not of evaluating their equity). But the problem of distributing the residual net gains is not essentially a part of the planning and evaluation of river basin projects consistent with welfare maximization. It is necessary only to program a system which will maximize the net benefits for mutual sharing. How the residual gains are to be shared between the two nations is not a problem which technicians are qualified to decide; rather it falls within the exclusive province of the politically responsible decision makers.

III

In this paper I have sought to concentrate on the two most significant recent developments for river basin planning and evaluation with implications for development of international streams. Attention was first focussed on recent developments in the area of expenditure criteria, which suggest a variety of criteria appropriate to maximizing an objective function subject to different side conditions. Since international streams fall within two or more political jurisdictions, the likelihood of different criteria being appropriate for the separate reaches of the basin,even under cooperative development, should not be overlooked. Moreover,

in view of the imperfections in the capital market which may in fact be more significant in connection with financing a program of interdependent investments in two or more political jurisdictions, the empirical content as well as the form of criterion may differ for parties to the development of international streams. These considerations may be significant for planning of an efficient system for cooperative undertaking as well as suggest alternative means of financing development so as to minimize the social cost of a given development.

The second major point concerned the sequence in which projects are introduced into a system of complementary works: its significance for the problem of determining the most efficient system and evaluating benefits of specific project elements. The planning of river basin development for streams under divided jurisdiction is greatly complicated by the problem of reaching agreement as to the division of net gains. Application of welfare criteria to the programming of development, and the analysis of alternatives available within each political jurisdiction, was suggested as a means of narrowing the area of disagreement and moving the problem of sharing gains outside the range in which it could compromise the programming of an economically efficient system.

7/ McKean, op. cit., pp. 86-87, 89-91, 98-99, 122.

8/ This observation is equally true for the McKean criterion, where the social marginal productivity of capital in the water resources applications (if the constraint is effective) will exceed the social marginal productivity in the private sector.

9/ Eckstein computes a sample set of benefit cost ratios, on the assumption the social time preference ranges from 2.5-3.0 per cent, required to ensure that marginal productivity of resources in the public sector are at least equal to the yields foregone from private alternatives.

10/ McKean, op. cit., pp. 114-116.

11/ Actually, McKean's investment criterion abstracts from existing institutions. It is designed for dealing with the total investment budget subject to Congressional discretion. Thus while the form of criterion may be correct if one abstracts from the agencies through which the investments are actually made, it would not be universally applicable in the absence of a pretty fundamental reorganization of governmental agencies and procedures.

12/ Julius Margolis, The Discount Rate and the Benefit-Cost Justification of Federal Irrigation Investment, Department of Economics, Stanford University,

13/ What follows immediately should best be prefaced by a remark akin to that of the lay preacher addressing a Saturday morning streetside congregation, "I am going to elucidate a subject about which the Lord was not very clear."

14/ Margolis, op. cit., p. 10.

15/ Ibid., p. 10.

16/ For example, the appropriate benefit stream to be discounted would have to take account of the multiplier effects of re-employing otherwise idle resources since by assumptions political constraints prevent their use in any alternative public programs, and they would be unproductive if left idle in the private sector.

17/ Margolis along with McKean abstracts partly from the institutional environment, considering a land and water resources development budget subject to Congressional allocation, rather than the appropriate portions of the Departments of Agriculture and Interior budgets.

18/ Proposed Practices, op. cit., pp. 22-24.

19/ John V. Krutilla and Otto Eckstein, Multiple Purpose River Development, Studies in Applied Economic Analysis (Baltimore, The Johns Hopkins Press, 1958) Chapters IV, V and VI.

20/ Peter O. Steiner, An Economic Model of Efficient Public Expenditures in Water Resource Development (Harvard University, Water Resources Seminar, processed).

21/ Since electric utilities are regulated monopolies, rates for service are fixed so as to assure a rate of return which precludes financing of plant except by resort to external sources in response to specific investment opportunities.

22/ If in fact the constraint is not effective due to the independent action of the Congress, the four sector Steiner model collapses to the simple two sector model employed by Krutilla and Eckstein. The objective function as formulated by Steiner, however, can be modified to reflect intermediate positions between the polar cases represented by the original Steiner and the Krutilla-Eckstein models. This is a conceptual virtue whether or not it has operational possibilities.

23/ John M. Clark, Eugene L. Grant, and Maurice W. Kelso, Report of the Panel of Consultants on Secondary or Indirect Benefits of Water Use Projects, to Michael Strauss, Commissioner of Reclamation, June 26, 1952.

24/ Charles D. Curran, "Evaluation of Federal Navigation Projects," Task Force Report on Water Resources and Power, Commission on Organization of the Executive Branch of the Government, Volume III, p. 1330.

25/ Otto Eckstein, Water Resources Development, especially pp. ____, ____ & ____.

26/ John V. Krutilla and Otto Eckstein, Multiple Purpose River Development, Chapter III.

27/ Roland N. McKean, Efficiency in Government Through Systems Analysis, Chapters 10 and 11.

28/ John R. Meyer, Merton J. Peck, Charles W. Zwick, and W. J. Stenson, The Economics of Competition in the Transportation Industry (Cambridge, Harvard University Press, in press).

29/ Edward F. Renshaw, Toward Responsible Government, an Economic Appraisal of Federal Investment in Water Resources Programs (Chicago, Idyia Press, 1957).

30/ Rudolph Ulrich, "Relative Costs and Benefits of Land Reclamation in the Humid Southeast and the Semi-Arid West," Journal of Farm Economics, Vol. XXV, No. 1.

31/ Otto Eckstein, Water Resources Development, pp. ___/ ____, and ____.

32/ See Krutilla and Eckstein, Multiple Purpose River Development, pp. 61 ff.

33/ Subject of course to the restraints imposed by international treaties, conventions or the international law governing cases for which both nations accept jurisdiction of the International Court.

34/ This assumes that the problem involving the spawning grounds for anadromous fish can be satisfactorily resolved.

35/ The diversion would represent an economic undertaking only so long as the first expression exceeded the second, the second accumulating increasingly the more distant in time the diversion would be postponed.

$$\sum_{i=1}^{n}\sum_{t=m}^{T_i}\frac{b_{it}}{(1+r)^t}-\sum_{i=1}^{n}K_i > \alpha\left[\sum_{j=1}^{p}\sum_{t=1}^{m}\frac{b_{jt}}{(1+r)^t}-\sum_{j=1}^{p}K_j\right](1+r)^m$$

Where: b_{it} = the net benefit of the i^{th} project in the diversion plan in the t^{th} year.

b_{jt} = the net benefit of the j^{th} project in the cooperative plan in the t^{th} year.

$T_{i(j)}$= the planning horizon in years appropriate to the i^{th} (j^{th}) project.

n = the number of projects in the diversion plan.

p = the number of projects in the cooperative plan.

m = the year in which the diversion plan can be initiated

$K_{i(j)}$= the capital outlay of the $i^{th}(j^{th})$ project in the diversion (cooperative) plan.

α = Canadian share of the net benefits of the cooperative plan.

36/ Symbolically:

$$\beta\left[\sum_{j=1}^{p}\sum_{t=1}^{m}\frac{b_{jt}}{(1+r)^t}-\sum_{j=1}^{p}K_j\right]+\sum_{k=1}^{q}\sum_{t=m}^{T_g}\frac{b_{kt}}{(1+r)^t}-\sum_{k=1}^{q}K_k > \sum_{k=1}^{q}\sum_{t=1}^{T_g}\frac{b_{kt}}{(1+r)^t}-\sum_{k=1}^{q}K_k$$

where: β = the United States share of the net benefits associated with cooperative development and all other symbols remain as previously.

k = subscript appropriate to the projects in the United States independent plan of development.

q = number of projects in the U. S. independent alternative.

37/ As economic development proceeds in western United States, the costs of developing storage may become prohibitive or it may become politically infeasible due to the preëmption of potential reservoir areas by economic or social facilities such as expansion of towns, transportation routes, etc.

38/ Game theory will not provide a clear cut solution to the general problem, i.e., the admixture of community and conflicts of interest. The community of interest element leads to joint maximization with departures resulting in a non-constant sum game. Conceivably by a proper formulation of the problem, the division of the constant sum residual net benefits may be amenable to a game theory solution.

From Graham

84th Congress
2d Session

COMMITTEE PRINT

Murray is angling for rt wing support by emphasizing issue of Congress vs Exec. — which really is incidental to ec.-pol. qn of who does water, & how, & for whom.

MEMORANDUM

FROM THE

CHAIRMAN OF THE SENATE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

ON

S. Res. 281

CONSERVATION AND DEVELOPMENT OF LAND AND WATER RESOURCES RELATING TO THE CONGRESS AND EXECUTIVE AGENCIES

He presents, with approval, reactionary outbursts by Goldwater.

Leg: BB circ. A-41, 1952
Rpt, Pres's advisory comm.
But this print sums them up.

Printed for the use of the Committee on Interior and Insular Affairs

UNITED STATES
GOVERNMENT PRINTING OFFICE
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FOREWORD

Attached are a statement by me dated June 13 and other material in connection with Senate Resolution 281, which I desire to bring to the attention of all concerned. The subject matter involves maintenance of the orderly legislative processes and the maintenance of the dignity and responsibilities of the Senate of the United States as a coordinated arm of the Government.

The growing tendency of the executive agencies to carry on by administrative fiat requires immediate attention. This tendency is confirmed by the failure to submit the legislative recommendations incident to the President's Water Policy Committee report and the reports that the intention is to put the recommendations into effect without reference to the Congress.

At my request the Senate has referred Senate Resolution 281 jointly to the Committee on Public Works and the Committee on Interior and Insular Affairs. Chairman Chavez is joining me in formal requests to the executive agencies to make prompt comments on the resolution.

It is our hope that joint hearings can be held on the resolution during the last week in June. I am asking Senator Anderson, chairman of the Subcommittee on Irrigation and Reclamation, to arrange an appropriate date with Senator Kerr, chairman of the Public Works Subcommittee on Flood Control.

JAMES E. MURRAY,
Chairman, Senate Committee on Interior and Insular Affairs.

MEMORANDUM ON SENATE RESOLUTION 281

STATEMENT BY SENATOR MURRAY

I have introduced Senate Resolution 281, dealing with vital matters concerning the relationship of the executive departments with the Senate of the United States.

Joining me in the sponsorship of the resolution are three distinguished Members of the Senate: the chairman of the Senate Committee on Public Works, Mr. Chavez; the chairman of the Subcommittee on Irrigation and Reclamation of the Senate Committee on Interior and Insular Affairs, Mr. Anderson; and the chairman of the Subcommittee on Flood Control of the Committee on Public Works, Mr. Kerr.

The subject matter of the resolution relates to fundamental subjects which are the responsibility of two committees. I asked and secured unanimous consent that it be referred for consideration to the Senate Committee on Interior and Insular Affairs, of which I have the honor to be chairman, and to the Committee on Public Works, the chairman of which, Senator Chavez, a cosponsor, is agreeable to this procedure.

I have been assured of the cooperation of the chairman of the Public Works Committee and the other sponsors of the resolution in holding joint hearings at the earliest convenient date before July 1. In the meantime, the comments of the executive agencies concerned and the Bureau of the Budget will be requested, and spokesmen for these agencies will be invited to testify. It is our hope to conclude the hearings speedily so that appropriate consideration may be given the resolution promptly.

The resolution is comparatively brief. The preamble recites cogent reasons for its introduction and consideration by the Senate.

Briefly, these reasons are based in part on the promulgation by the Bureau of the Budget, late in 1952, of Budget Circular No. A–47, prescribing standards, procedures, and policies for the evaluation of proposed Federal projects for land and water resources development. It also calls attention to revision of Circular No. A–47, which would impose further restrictions on Federal participation in land and water resources development.

The resolution would declare the sense of the Senate to be that water resource development continues to be a responsibility of the Federal Government. It warns against nullification of this long-established policy by executive agencies and asserts that such action constitutes a usurpation of the legislative function. Comprehensive planning of land and water resources is stated to be vital.

Of particular concern to all Members of the Congress is the "layering" process in the executive agencies. The number of agencies

dealing with water resources should be reduced rather than increased, as proposed by the President's Committee, so that the administrative procedure of review could be simplified and shortened.

Section 4 calls for the submission of project reports to the Congress that conform to criteria presented by congressional committees having jurisdiction over the subject matter. It seeks to assure to the Congress a full disclosure of all essential facts, estimates, and views without limiting reports to preconceived views of executive agencies.

Section 5 declares that any departure from established policies, procedures, and standards by executive agencies shall be effected only after, I quote, "full examination and consideration of the Congress."

In brief, we propose that the Senate shall go on record against government by fiat of the executive agencies rather than by orderly congressional procedures.

The preamble also deals with the report of the President's Advisory Committee on Water Resources Policy and mentions that the President asks that the Congress give prompt attention to its proposals. Pointed reference is also made to the failure of the executive branch of the Government to implement recommendations of the water policy advisory group. This omission has come about notwithstanding the President's statement that legislative proposals would "be submitted to implement the recommendations."

I ask unanimous consent that, at the conclusion of my remarks, the text of the resolution be printed in full, together with a statement which I have prepared explaining in detail the reasons and the objectives of the proposal.

Attached to the statement is a copy of my memorandum dated April 4 to the members of the Senate Committee on Interior and Insular Affairs. This memorandum outlines a problem which has confronted our committee (as I am sure it has others) in connection with the attitude of some of the executive departments (at least on occasions) with respect to reports on bills for which official requests have been made. The immediate occasion for the memorandum was the cogent comments of two distinguished members of the Senate Committee on Interior and Insular Affairs (Mr. Barrett, of Wyoming, and Mr. Goldwater, of Arizona). Their remarks are attached to the letter for the information of the Senate.

(The text of the resolution is as follows:)

RESOLUTION

Whereas the Bureau of the Budget, on December 31, 1952, issued Circular No. A–47, prescribing standards, procedures, and policies for the evaluation of proposed Federal projects for land and water resources conservation and development; and

Whereas the Bureau of the Budget, on November 29, 1954, proposed a revision of Circular No. A–47, the application of which would impose further restriction by the executive agencies on Federal participation in the conservation and development of land and water resources, and on which hearings were held by the House Committee on Interior and Insular Affairs March 15 and March 30, 1955; and

Whereas on January 17, 1956, the President of the United States transmitted to the Congress the Report (H. Doc. No. 315, 84th Cong., 2d Sess.) of the Presidential Advisory Committee on Water Resources Policy, consisting of the Secretary of Defense, the Secretary of the Interior, and the Secretary of Agriculture, designated by the President May 26, 1954, with a recommendation that "* * * the Congress give prompt attention to its proposals"; and

Whereas it is stated, at page 84 of the Economic Report of the President, transmitted to the Congress January 24, 1956, that "in due course, legislative proposals will be submitted to implement the recommendations" of the Presidential Advisory Committee on Water Resources Policy, but no such proposals have yet been submitted to the Congress and instead it is indicated that the recommendations may be implemented by direct action of the executive agencies: Now, therefore, be it

Resolved by the Senate, That it is the sense of the Senate that the stabilization of the national economy and the effectuation of the wisest, most orderly, and most economic utilization of the land and water resources of the Nation for the widest possible public benefit require that the Federal Government continue to exercise all of its constitutional powers not only to encourage but to participate in the conservation and development of such resources for all purposes, and that the continued nullification by the executive agencies of this fundamental and long-established national policy would constitute a usurpation of the legislative power.

SEC. 2. That land and water resources development should be planned on comprehensive bases and with a view to such an ultimately integrated operation of component segments as will insure the realization of an optimum degree of physical and economic efficiency.

SEC. 3. That the number of Federal agencies, offices, and organizations having to do with the planning and review of projects for the conservation and development of land and water resources should be reduced, rather than increased, and that technical and administrative routing and review procedures should be simplified and shortened in order to facilitate and to accelerate the submittal of reports to the Congress in support of requests for the authorization of projects.

SEC. 4. That reports to the Congress in support of requests for the authorization of projects for the conservation and development of land and water resources should include evaluations made in accordance with criteria prescribed by the Congressional committees having jurisdiction of the subject matter, and that they should fully disclose the details and results of all studies and analyses of all potential utilizations, costs, allocations, payout, and benefits, both direct and indirect, made by all interested operating agencies.

SEC. 5. That the preservation of the constitutional principle of separation of powers requires that any departure by the executive agencies from the observance and employment

of the traditional policies, standards, procedures, and techniques reflected in and growing out of the settled administration of the large body of organic law governing the conservation and development of the land and water resources of the Nation be effected only after full examination and consideration by the Congress.

STATEMENT IN EXPLANATION OF SENATE RESOLUTION 281

The purpose of this Senate resolution is to correct a situation in which the executive agencies of the Government are progressively arrogating to themselves land and water resources development policymaking functions which properly reside with the Congress.

It is elementary that the National Government has a set of constitutional powers which provide the legal foundation for broad activity in this field. These derive from the commerce clause, the property clause, the treatymaking provisions, the war powers clauses, and the power to provide for the general welfare.

For more than a half-century the Congress has repeatedly exercised these constitutional powers through the enactment of legislation authorizing the construction of works and directing the conduct of activities in myriad fields of land and water resources conservation and development. These fields include the following:

1. River regulation.
2. Rivers and harbors and inland waterways.
3. Improvement of navigation.
4. Control of floods.
5. Conservation, storage, and replenishment of surface and underground water supplies, and their release and delivery for domestic, agricultural, municipal, and industrial purposes.
6. Generation, transmission, and marketing of hydroelectric power and energy.
7. Watershed management.
8. Soil conservation.
9. Salinity repulsion.
10. Stream pollution abatement.
11. Beach erosion control.
12. Conservation and development of fish and wildlife resources.
13. Protection of life and heglth.
14. Enjoyment of recreational benefits.

The Congress has regularly appropriated moneys for loans, grants, and direct expenditures for the foregoing purposes.

These many years have built up a large body of organic law, with an attendant growth of traditional standards, procedures, and techniques, all reflecting a fundamental and well-established national policy of Federal participation in the full utilization of all of our land and water resources.

More recently, however, a dangerous trend of encroachment by the executive agencies on the constitutional powers of the legislative branch of the Government has become apparent.

On December 31, 1952, the Bureau of the Budget issued Circular No. A–47, on the subject Reports and Budget Estimates Relating to

Federal Programs and Projects for Conservation, development, or Use of Water and Related Land Resources. It is generally recognized that many land and water resources projects which already are in varying stages of authorization, construction, and operation could not have been justified as economically feasible by the rigid, executively imposed standards of Circular No. A–47.

It is empirically demonstrable, nevertheless, that the potential contributions of these projects to the national wealth exceeds the initial Federal investment by many times.

On November 29, 1954, the Bureau of the Budget proposed a revision of Circular No. A–47. This revision, if adopted, would establish even more inflexible standards for Federal participation in the conservation and development of land and water resources.

Circular No. A–47 and the proposed revision were the subjects of hearings conducted by the House Committee on Interior and Insular Affairs March 15 and 30, 1955. It was then indicated by the Director of the Bureau of the Budget that formal issuance of a revision of the circular would await the recommendations of the Presidential Advisory Committee on Water Resources Policy, consisting of the Secretary of Defense, the Secretary of the Interior, and the Secretary of Agriculture. This Committee had been designated by the President May 26, 1954, with an instruction to submit its recommendation "* * * not later than December 1, 1954."

The Committee's report was not submitted, however, until December 22, 1955, and it was transmitted to the Congress by the President January 17, 1956, with his recommendation that "* * * the Congress give prompt attention to its proposals." Shortly threafter, on January 24, 1956, the President transmitted to the Congress his Economic Report, in which it was stated that "in due course, legislative proposals will be submitted to implement the recommendations" of the Presidential Advisory Committee on Water Resources Policy. No such proposals have yet been submitted to the Congress, nor, on the other hand, has the proposed revision of Budget Circular No. A–47 been formally adopted.

However, there are indications that the executive agencies may undertake to put the recommendations of the Presidential Advisory Committee on Water Resources Policy into actual operation by administrative fiat. The practical application of a number of them would have a most serious and damaging impact on the continued conservation and development of the land and water resources of the Nation, by reason of the resultant curtailment of Federal participation in such activity.

Exemplary of the expressed executive attitude is a statement of the Presidential Advisory Committee on Water Resources Policy in the submittal of its report to the President. It is there stated that the recommendations are believed to "* * * avoid the undue intrusion of the Federal Government into this field." The Committee further has recommended that individual units within regional or river-basin plans be set up as component segments or projects, stating that—

> to so separate general plans into their component projects offers much wider opportunity for participation of non-Federal agencies, and thus not only reduces Federal responsibility but leaves the door open for local initiative.

The Committee has recommended an extraordinary and highly layered scheme of organization for the planning and review of land and water-resources projects. This would include (1) a number of regional or river basin water resources committees, composed of Federal and State representatives, which would "* * * coordinate resources planning and development activities" and recommend annual work schedules "* * * to be reflected in the budget requests of each cooperating agency"; (2) a permanent Interagency Committee on Water Resources, composed of high-level officials of six Federal agencies, to "* * * have authority by unanimous action to determine finally interagency relationships"; (3) an office of Coordinator of Water Resources, in the Executive Office of the President, which would "* * * cooperate with the Bureau of the Budget and the Council of Economic Advisers in the evaluation of departmental requests for appropriations, and assist in the reconciliation of water-resources policy with other Federal policies"; and (4) a Board of Review for Water Resources Projects, also in the Executive Office of the President, composed of three persons "* * * who have had no part in the original planning of the projects they would be asked to review and who would not be involved in the subsequent construction of such projects."

The functions of all of the foregoing would be in addition to and separate from the functions of the several operating agencies and the budgetary, fiscal policy review, and legislative-clearance functions of the Bureau of the Budget. It is manifest that the repetitive review which these processes would entail could succeed in bringing Federal participation in land and water-resources conservation and development to a complete standstill.

The Presidential Advisory Committee on Water Resources Policy has failed to accord adequate recognition to the development of hydroelectric power potential as a national water-resources problem. This is particularly true with respect to the essential financial significance of such development in the economic justification of multiple-purpose projects for the irrigation and reclamation of arid and semiarid lands in the 17 Western States.

The Presidential Advisory Committee on Water Resources Policy has recommended that—

> * * * no loans or guaranties should be made to cover costs of developing projects or portions thereof for power or municipal and industrial water, since, if these are economically sound, they may be readily financed otherwise.

With respect to the evaluation of projects for the conservation and development of land and water resources, the Presidential Advisory Committee on Water Resources Policy has recommended (1) that the separable costs-remaining benefits method of costs allocation be employed to the exclusion of other methods, (2) that benefit-cost ratios be calculated on the basis of primary benefits only, (3) that the evaluation period for estimating benefits and costs in no circumstances be greater than 50 years, and (4) that all Federal agencies conform to uniform standards of evaluation.

It is imperative that the Congress reaffirm and implement its constitutional responsibility for establishing national policies and prescribing standards in the field of land and water resources conservation

and development. Legislative acquiescence in a contrary course of executive action would constitute an abdication of that responsibility. This resolution will make clear the sense of the Senate.

MEMORANDUM FROM SENATOR MURRAY
UNITED STATES SENATE,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
April 4, 1956.

Memorandum.
To: Members of the full committee.
From: James E. Murray.

You will be interested in the attached excerpts from a colloquy between Senators Goldwater and Barrett at a committee hearing on Monday, March 19 on S. 863 (and Senator Barrett's amendments thereto), a bill to govern the control, appropriation, use, and distribution of water.

In reviewing the transcript of the hearing, I was impressed with Senator Goldwater's views on two points, which I regard as of moment to bring to the direct attention of the members of the committee individually. When you have reviewed the comments of our two colleagues, particularly with respect to the trend that has been accentuated in the present administration with respect to the reports on pending legislation, I shall be glad to have your views as to appropriate action looking to correction of the situation emphasized by the two Senators.

Senator Goldwater's comments, while particularly pointed to the reports on S. 863, are directed generally toward the trend in the executive departments. I am sure we all feel that this trend is not particularly new but that it is now being accentuated, as the Senator emphasizes. I quote the following paragraphs from the statement of the junior Senator from Arizona, which I feel are especially pertinent:

"I do not know why we in the legislative branch have to wait patiently and bend over backward and salaam toward the upper end of Pennsylvania Avenue waiting for these reports.

"I have read the Constitution a thousand times and I cannot find anything which says that when we are writing our legislation we have to wait for somebody up there to say 'yes' or 'no.'

"Personally, I do not like the idea of such reports having such a bearing on legislation. I think it is a complete infringement on the intent of the Constitution, to have the executive, through its various agencies, influencing legislation down here."

Other phases of Senator Goldwater's statement relate to the merits of S. 863 and the proposed amendments, as well as to the ever greater need for the Western States to take action against the accelerated trend toward complete Federal control, especially with respect to water laws. The legislation before us well may be a step toward solving the water rights phase of the problem.

My purpose in bringing the observations of Senators Goldwater and Barrett to the attention of each individual member of the committee is with a view to determining whether the Committee on Interior and Insular Affairs should consider the adoption of a rule which would seek to remedy the situation that is stated so succinctly. I have

noted, over the years, the growing tendency in the executive departments to attempt to dictate to the Congress. They hold over our heads the threats of veto by the President, although I doubt if any President is often consulted directly prior to the making of such threats except with respect to major pieces of legislation which carry out his announced program.

When you have considered this memorandum, together with the attached copy of Senator Goldwater's observations and those of Senator Barrett on this subject, I will appreciate your comments, by April 20, on the following suggestion:

That the committee consider the adoption of a rule that would, among other things, seek expressions from the executive agencies only along these lines:

(*a*) Objective or factual reports to be submitted promptly as a matter of information;

(*b*) Specific authority or precedents are to be cited by the agencies in support of whatever conclusions they wish to state;

(*c*) Recommendations shall be couched in language that recognizes the legislative responsibility as separate from that of the executive;

(*d*) Unless reports are furnished promptly, the committee will assume there is no objection on the part of the executive agencies, including the Bureau of the Budget; and

(*e*) That when expressions such as "in accord" or "not in accord" with the President's program are used, there shall be specific references to the President's views rather than generalizations.

On receipt of your comments, I will call a special meeting of the committee to consider the subject. The date will probably be a day convenient to the majority of the committee during the first week in May.

JAMES E. MURRAY, *Chairman.*

EXCERPTS FROM A COLLOQUY BETWEEN SENATORS GOLDWATER AND BARRETT AT A COMMITTEE HEARING ON MONDAY, MARCH 19, ON S. 863 (AND SENATOR BARRETT'S AMENDMENTS THERETO), A BILL TO GOVERN THE CONTROL, APPROPRIATION, USE, AND DISTRIBUTION OF WATER

Senator GOLDWATER. Senator Barrett, as you know, you and I discussed this situation last year when these court decisions came down and I agreed with you at that time concerning the necessity of legislation, and I do now more than ever.

I, myself, as a Republican, am deeply concerned and disturbed by the attitude of this administration as reflected in the several reports that we have before us. Where this administration heretofore has diverted most of its domestic efforts to getting the Federal Government out of the business of the several States, in conformity with the 10th amendment, it now seems bent on getting into the area that is most sacred and most important to the arid and semiarid States of the West.

They are, in effect, tampering with the way of life in the West that has existed since the West has existed; in fact, as was brought out this morning, the present recognition of water rights stems from the very founding of California and has been borne out through over 100 years of practice as accepted by the people of the West.

This attitude of the several agencies of the Government I think will seriously affect western land values inasmuch as water rights and land values are one and the same thing when one is figuring property and property values in our part of the country.

I think the very fact that these several agencies of Government have expressed themselves as being of a mind that the Federal Government should get into an area where the States have historically operated will probably throw a cloud over these values even as of now.

Now, in one of these reports, the report of the Bureau of the Budget, I believe, they state on page 2, and I quote in part as follows:

> The fact remains that serious problems of Federal policy regarding the exercise of water rights, particularly in the arid and semiarid areas of the West, have existed for a long time and there are basic conflicts which must be resolved

Now, Mr. Chairman, you and I, coming from the West, know that that is not true. I cannot recall in my memory where the Federal Government and the State of Arizona have come into any argument that has not been resolved amicably and quickly and usually in the direction that the Federal Government wanted it to be resolved in.

Senator BARRETT. If my colleague will yield to me, the next witness is going to be the State engineer of Wyoming, and I am sure that he will confirm the statement that I am about to make, which is that there never has been a conflict between the Federal Government and the State of Wyoming with reference to water rights that interfered with the Federal Government in any shape or form.

Senator GOLDWATER. I knew that the experience of the chairman was the same as mine and I think witness after witness from all the 17 Western States will bear us out.

Many people, particularly people in non-Indian States, express concern over the Indians' rights. That is an area that might be called Federal policy.

I would just like to put this for the record: That in every major decree that Arizona has ever had concerning its rivers, the Indians' rights are the first to have been spelled out.

That is true of the Colorado compact, and in the Kent system, which comprises the Salt and the Verde, and the Gila decrees that applied to the Gila, the Indians' rights were fully and adequately protected. So it is just not true what the various Federal agencies of the Government are saying.

I concur in what Senator Malone has said; they have either done it through ignorance—and I would like to think that that is the case—or they have done it through malicious intent to interfere with our way of life and, as a Republican, I would resent that.

I appreciate the opportunity to make this statement and I also want to compliment you, Senator Barrett, on the excellent statement you made covering the whole problem this morning.

Senator BARRETT. Thank you very much, Senator Goldwater. I may say, in defense of the administration, that several departments of the executive arm of the Government are in favor of this legislation; so I have been advised for quite some time.

It is true, as you point out, Senator Goldwater, that the Justice Department has raised some legal questions, some constitutional questions, in hearings over on the House side.

I may say that water lawyers who have had extensive experience in that particular field for a long period of years in the West have examined the record and are wholly in opposition to the position taken by the Justice Department.

I am hoping as a result of these hearings we can at least convince every reasonable man on this committee that they are wrong in their contentions and their position and that the rule, as laid down by the Congress for the past 90 years, is a sound one and that there is no good reason why we should not reaffirm or restate that at this time.

I want to congratulate you at this time, Senator Goldwater, on the splendid statement you made here this morning.

Senator GOLDWATER. If I may be permitted to go one step further, because this brings up something that has been extremely distasteful to me before I came to the Senate and particularly since I have been here, and that is the idea that the executive branch of the administration enter into the legislative branch's work by the submission of these reports.

I do not know why we in the legislative branch have to wait patiently and bend over backward and salaam toward the upper end of Pennsylvania Avenue waiting for these reports.

I have read the Constitution a thousand times and I cannot find anything which says that when we are writing our legislation we have to wait for somebody up there to say "Yes" or "No."

Personally, I do not like the idea of such reports having such a bearing on legislation. I think it is a complete infringement on the intent of the Constitution, to have the executive, through its various agencies, influencing legislation down here.

Here is legislation that affects 17 Western States, some 138 million acres of land, which is more land than lies east of the Mississippi, and the millions and millions of people that live on it, and yet if we are to follow the accepted practice of Congress during the last 25 or 30 years, I would say that this legislation has a pretty bad start because several people, and I imagine most of them are from the Eastern States, have written these reports and written them in a way that will not be of benefit to the people that we represent.

I think it is incumbent upon us in this legislation, and in all legislation, to disregard whether it is favorable or unfavorable to those reports insofar as they influence legislation.

Senator BARRETT. I may say to my colleague that Senator Knowland spoke to me just a few minutes ago and he wants an opportunity to appear before this committee. He feels just as strongly as you do that while the committee may feel under some compulsion to consider the reports that are brought up here by these departments of the Government, nevertheless we in the Congress have the final responsibility and it is going to be incumbent upon us to write legislation that we think is fair and equitable for the Western States and legislation that will at the same time protect the legitimate interests of the United States.

So far as I know, I think that is precisely what this committee is going to do and what the Senate will do, and I hope what the House will do.

When we get this legislation down there to the White House, then is when their responsibility starts and if they want to take the position contrary to the position taken by the Congress since 1866, that again is their responsibility.

Senator GOLDWATER. Yes.

Senator BARRETT. Thank you very much, Senator Goldwater.

Senator GOLDWATER. Thank you very much.

NEWS RELEASE OF JUNE 13, 1956

Four Senators charged today that the administration, in an interagency conspiracy, is usurping the right of Congress to determine national water resources policy.

They introduced a resolution protesting recommendations of the President's Advisory Committee on Water Policy and admonished the Senate to halt "continued nullification" of it constitutional powers by the Executive.

The Senators are James E. Murray, Montana, chairman of the Senate Interior Committee, and Clinton P. Anderson, New Mexico, a member of the committee and chairman of its Irrigation and Reclamation Subcommittee; Dennis Chavez, New Mexico, chairman of the Senate Public Works Committee; and Robert S. Kerr, Oklahoma, a member of the Public Works Committee and chairman of its Subcommittee on Rivers, Harbors and Flood Control.

The President, the resolution says, sent the water policy report to the Capitol in January and urged that Congress "give prompt attention to its proposals." The President promised to make subsequent legislative recommendations, the resolution notes, but has not followed up. Meanwhile, the resolution asserts, "it is indicated that the (advisory water policy) recommendations may be implemented by direct action of the executive agencies."

The whole thing is objectionable, the Senators say, because the Advisory Water Policy Committee has set up criteria in Circular No. A–47 so strict as to rule many congressionally approved projects infesible.

The Water Policies Committee was organized in May 1954 and reported its findings last December.

The purpose of the resolution, the Senators say, is—

> to correct a situation in which the executive agencies of the Government are progressively arrogating to themselves land and water resources development policymaking functions which properly reside with the Congress.

The effect of the encroachment, the Senators allege, is to place new stumbling blocks in the path of congressionally authorized projects. In addition to the traditional obstacles, projects now must clear the Advisory Water Policy Committee and the Bureau of the Budget, each of which may set up standards totally different from those used by congressional committees. This can halt work on projects with a potential contribution to the national wealth far exceeding the initial Federal investment.

The Senators say they oppose an "administrative fiat" which would, by practical application, adopt this Advisory Water Policy Committee philosophy:

1. Policies should avoid "undue" Federal intrusion into the water resources.
2. Projects should offer wider participation to non-Federal agencies.
3. An Office of the Coordinator of Water Resources should be established.
4. A Board of Review for Water Resources Projects should be set up.
5. No Federal loans or guaranties should be made to cover costs of projects "since if * * * economically sound, they may be readily financed otherwise."
6. All Federal agencies should conform to the same standards.

No 6 seems ok

From Graham

Calendar No. 2732

84TH CONGRESS, 2d Session | SENATE | REPORT No. 2686

RELATIVE TO THE CONSERVATION AND DEVELOPMENT OF LAND AND WATER RESOURCES

JULY 20 (legislative day, JULY 16), 1956.—Ordered to be printed

Mr. MURRAY, from the Committee on Interior and Insular Affairs and the Committee on Public Works, submitted the following

REPORT

[To accompany S. Res. 281]

The Committee on Interior and Insular Affairs and the Committee on Public Works, to whom was jointly referred the resolution (S. Res. 281) to reassert and to reestablish the powers and the functions of the Congress in the field of land and water resources development, having considered the same, report favorably thereon with amendments, and jointly recommend that the resolution, as amended, be agreed to by the Senate.

GENERAL STATEMENT BY ORIGINAL SPONSORS

The following statement, in explanation of the reasons for and the objectives of this resolution, was submitted by its sponsors at the time of its introduction:

STATEMENT IN EXPLANATION OF SENATE RESOLUTION 281

The purpose of this Senate resolution is to correct a situation in which the executive agencies of the Government are progressively arrogating to themselves land and water resources development policymaking functions which properly reside with the Congress.

It is elementary that the National Government has a set of constitutional powers which provide the legal foundation for broad activity in this field. These derive from the commerce clause, the property clause, the treatymaking provisions, the war powers clauses, and the power to provide for the general welfare.

For more than a half-century the Congress has repeatedly exercised these constitutional powers through the enactment

71008—56——1

of legislation authorizing the construction of works and directing the conduct of activities in myriad fields of land and water resources conservation and development. These fields include the following:

1. River regulation.
2. Rivers and harbors and inland waterways.
3. Improvement of navigation.
4. Control of floods.
5. Conservation, storage, and replenishment of surface and underground water supplies, and their release and delivery for domestic, agricultural, municipal, and industrial purposes.
6. Generation, transmission, and marketing of hydroelectric power and energy.
7. Watershed management.
8. Soil conservation.
9. Salinity repulsion.
10. Stream pollution abatement.
11. Beach erosion control.
12. Conservation and development of fish and wildlife resources.
13. Protection of life and health.
14. Enjoyment of recreational benefits.

The Congress has regularly appropriated moneys for loans, grants, and direct expenditures for the foregoing purposes.

These many years have built up a large body of organic law, with an attendant growth of traditional standards, procedures, and techniques, all reflecting a fundamental and well-established national policy of Federal participation in the full utilization of all of our land and water resources.

More recently, however, a dangerous trend of encroachment by the executive agencies on the constitutional powers of the legislative branch of the Government has become apparent.

On December 31, 1952, the Bureau of the Budget issued circular No. A–47, on the subject Reports and Budget Estimates Relating to Federal Programs and Projects for Conservation, Development, or Use of Water and Related Land Resources. It is generally recognized that many land and water resources projects which already are in varying stages of authorization, construction, and operation could not have been justified as economically feasible by the rigid, executively, imposed standards of circular No. A–47.

It is empirically demonstrable, nevertheless,, that the potential contributions of these projects to the national wealth exceeds the initial Federal investment by many times.

On November 29, 1954, the Bureau of the Budget proposed a revision of circular No. A–47. This revision, if adopted, would establish even more inflexible standards for Federal participation in the conservation and development of land and water resources.

Circular No. A–47 and the proposed revision were the subjects of hearings conducted by the House Committee on Interior and Insular Affairs March 15 and 30, 1955. It was

then indicated by the Director of the Bureau of the Budget that formal issuance of a revision of the circular would await the recommendations of the Presidential Advisory Committee on Water Resources Policy, consisting of the Secretary of Defense, the Secretary of the Interior, and the Secretary of Agriculture. This Committee had been designated by the President May 26, 1954, with an instruction to submit its recommendation "* * * not later than December 1, 1954."

The Committee's report was not submitted, however, until December 22, 1955, and it was transmitted to the Congress by the President January 17, 1956, with his recommendation that "* * * the Congress give prompt attention to its proposals." Shortly thereafter, on January 24, 1956, the President transmitted to the Congress his Economic Report, in which it was stated that "in due course, legislative proposals will be submitted to implement the recommendations" of the Presidential Advisory Committee on Water Resources Policy. No such proposals have yet been submitted to the Congress, nor, on the other hand, has the proposed revision of Budget Circular No. A–47 been formally adopted.

However, there are indications that the executive agencies may undertake to put the recommendations of the Presidential Advisory Committee on Water Resources Policy into actual operation by administrative fiat. The practical application of a number of them would have a most serious and damaging impact on the continued conservation and development of the land and water resources of the Nation, by reason of the resultant curtailment of Federal participation in such activity.

Exemplary of the expressed executive attitude is a statement of the Presidential Advisory Committee on Water Resources Policy in the submittal of its report to the President. It is there stated that the recommendations are believed to "* * * avoid the undue intrusion of the Federal Government into this field." The Committee further has recommended that individual units within regional or river-basin plans be set up as component segments or projects, stating that "to so separate general plans into their component projects offers much wider opportunity for participation of non-Federal agencies, and thus not only reduces Federal responsibility but leaves the door open for local initiative."

The Committee has recommended an evtraordinary and highly layered scheme of organization for the planning and review of land and water-resources projects. This would include (1) a number of regional or river basin water resources committees, composed of Federal and State representatives, which would "* * * coordinate resources planning and development activities" and recommend annual work schedules "* * * to be reflected in the budget requests of each cooperating agency"; (2) a permanent Interagency Committee on Water Resources, composed of high-level officials of six Federal agencies, to "* * * have authority by unanimous action to determine finally interagency relationships"; (3) an office of Coordinator of Water Resources, in

the Executive Office of the President, which would "* * * cooperate with the Bureau of the Budget and the Council of Economic Advisers in the evaluation of departmental requests for appropriations, and assist in the reconciliation of water-resources policy with other Federal policies"; and (4) a Board of Review for Water Resources Projects, also in the Executive Office of the President, composed of three persons "* * * who have had no part in the original planning of the projects they would be asked to review and who would not be involved in the subsequent construction of such projects."

The functions of all of the foregoing would be in addition to and separate from the functions of the several operating agencies and the budgetary, fiscal policy review, and legislative-clearance functions of the Bureau of the Budget. It is manifest that the repetitive review which these processes would entail could succeed in bringing Federal participation in land and water-resources conservation and development to a complete standstill.

The Presidential Advisory Committee on Water Resources policy has failed to accord adequate recognition to the development of hydroelectric power potential as a national water-resources problem. This is particularly true with respect to the essential financial significance of such development in the economic justification of multiple-purpose projects for the irrigation and reclamation of arid and semiarid lands in the 17 Western States.

The Presidential Advisory Committee on Water Resources Policy has recommended that "* * * no loans or guaranties should be made to cover costs of developing projects or portions thereof for power or municipal and industrial water, since, if these are economically sound, they may be readily financed otherwise."

With respect to the evaluation of projects for the conservation and development of land and water resources, the Presidential Advisory Committee on Water Resources Policy has recommended (1) that the separable costs-remaining benefits method of costs allocation be employed to the exclusion of other methods, (2) that benefit-cost ratios be calculated on the basis of primary benefits only, (3) that the evaluation period for estimating benefits and costs in no circumstances be greater than 50 years, and (4) that all Federal agencies conform to uniform standards of evaluation.

It is imperative that the Congress reaffirm and implement its constitutional responsibility for establishing national policies and prescribing standards in the field of land and water resources conservation and development. Legislative acquiescence in a contrary course of executive action would constitute an abdication of that responsibility. This resolution will make clear the sense of the Senate.

TESTIMONY BEFORE COMMITTEES

Copies of the resolution were sent, over the signatures of both the chairman of the Committee on Interior and Insular Affairs and the chairman of the Committee on Public Works, to all of the executive

departments and establishments which it was conceived should have any responsibility within the field of the subject matter embraced by the resolution, with earnest requests for their written comments and invitations for oral supplementation by their authorized spokesmen. These requests and invitations went to the Director of the Bureau of the Budget, the Secretary of Defense, the Attorney General, the Secretary of the Interior, the Secretary of Agriculture, the Secretary of Health, Education, and Welfare, and the Chairman of the Federal Power Commission.

Pursuant to the joint reference of the resolution, joint hearings before the Committee on Interior and Insular Affairs and the Committee on Public Works were held July 6 and July 9, 1956. The committees then had before them responses from all of the above executive officers, except the Attorney General.

The spokesman for the Bureau of Budget insisted that Budget Circular No. A–47, its proposed revision, and the report of the Presidential Advisory Committee on Water Resources Policy have been intended only as guides in the executive planning and review of land and water resources development projects in the absence of specific congressional guidance. It remained unclear, however, wherein the standards embodied in those documents should be so restrictive as to require frequent and substantial departures from them in order to justify projects conceded to be otherwise worthy of the initial investment of Federal funds for the common good.

The most forthright and authoritative declaration of the executive branch, through indirection, came from the Department of the Army, in its report of June 28:

> This Department favors action by the Congress setting forth uniform policies and procedures to be followed by Federal agencies concerned with the development and control of the land and water resources of the Nation. These policies should cover planning and processing procedures, evaluation, allocation of costs, cost sharing, and other related matters.
>
> This report has been coordinated within the Department of Defense in accordance with procedures prescribed by the Secretary of Defense.
>
> Inasmuch as the committee has requested that the report be expedited, it is submitted without a determination by the Bureau of the Budget as to whether or not it conforms to the program of the President. As soon as such advice is received it will be forwarded to your committee.

On July 6, the Department of the Army informed the chairman of the Committee on Interior and Insular Affairs that—

> * * * the Bureau of the Budget, on July 5, 1956, advised the Department of the Army that it had no objection to the report submitted to you on June 28, 1956.

Oral presentations were made during the July 6 and July 9 hearings by representatives of the Bureau of the Budget, the Department of Defense, the Department of the Interior, the Department of Agriculture, and the Federal Power Commission.

Other witnesses were representatives of the National Rural Electric Cooperative Association, the Missouri River Division of the Mississippi Valley Association, the Brazos River Authority, of Texas, the

Central and Southern Florda Flood Control District, the Central Arizona Project Association, and the National Reclamation Association.

In addition, the record of the hearings on Senate Resolution 281 includes written comments by the State of New Mexico, through State Engineer S. E. Reynolds, the Upper Colorado River Commission, through Ival V. Goslin, its engineer-secretary, the North Dakota State Water Conservation Commission, through Milo W. Hoisveen, its secretary and chief engineer, Morris L. Cooke, Chairman of the President's Water Resources Policy Commission in 1950–51, and the Ohio Valley Improvement Association, through William J. Hull, the chairman of its legislative committee.

It should not escape notice that the oral testimony and the written comments from the private or other non-Federal sources were, without exception, in support of this resolution.

The Federal agencies have expressed themselves tactfully, discreetly, and, on occasion, equivocally, both in writing and orally. The Bureau of the Budget has, understandably, presented the most skillful and most polished response to the committees' requests for comments. In Acting Director Jones' letter of June 22, a paraphrasing of the text of the resolution is accompanied throughout by what in effect is either (*a*) a hearty endorsement of its principles, or (*b*) a dignified disclaimer that there ever has or ever will be an administrative departure from its principles.

HISTORY OF FEDERAL PARTICIPATION IN NATIONAL RESOURCES DEVELOPMENT

President Theodore Roosevelt, in an extended message to the Congress that has become a literary landmark to those who are intensely interested in both the wise conservation and the wise use of the Nation's natural resources, had this to say some 55 years ago, 1 year before the enactment of the Reclamation Act, and with particular reference to the development of land and water resources:

> The forests are natural reservoirs. By restraining the streams in flood and replenishing them in drought they make possible the use of waters otherwise wasted. They prevent the soil from washing, and so protect the storage reservoirs from filling up with silt. Forest conservation is therefore an essential condition of water conservation.
>
> The forests alone cannot, however, fully regulate and conserve the waters of the arid region. Great storage works are necessary to equalize the flow of streams and to save the flood waters. *Their construction has been conclusively shown to be an undertaking too vast for private effort. Nor can it be best accomplished by the individual States acting alone. Far-reaching interstate problems are involved; and the resources of single States would often be inadequate. It is properly a national function, at least in some of its features. It is as right for the National Government to make the streams and rivers of the arid region useful by engineering works for water storage as to make useful the rivers and harbors of the humid region by engineering works of another kind.* The storing of the floods in reservoirs at the headwaters of our

rivers is but an enlargement of our present policy of river control, under which levees are built on the lower reaches of the same streams.

The Government should construct and maintain these reservoirs as it does other public works. Where their purpose is to regulate the flow of streams, the water should be turned freely into the channels in the dry season to take the same course under the same laws as the natural flow. [Emphasis supplied.] (35 Congressional Record 86.)

Our highest Court has repeatedly upheld the activities which this statement envisaged.

AMENDMENTS

The amendments recommended are as follows:

Page 2, insert an additional paragraph in the preamble as follows:

Whereas notwithstanding that the conditions recited in this resolution result by reason of policies or actions under more than one national administration and by more than one branch and department of the Federal Government, it is desirable that this Congress initiate proper corrective action;

Page 2, line 5, strike the words "Federal Government" and insert in lieu thereof "Congress".

Page 2, line 6, strike the words "not only".

Page 2, line 7, strike the words "but to participate in".

Page 2, line 8, strike the words "for all purposes," and insert in lieu thereof "to establish national policy pertaining thereto,".

Page 3, line 1, strike the words "the continued" and insert in lieu thereof "and that any".

Page 3, line 2, strike the words "fundamental and"; strike the words "national policy" and insert in lieu thereof "principle".

Page 3, lines 21 and 22, strike words "congressional committees having jurisdiction of the subject matter," and insert in lieu thereof "Congress;".

Page 4, line 4, strike "traditional".

Page 4, lines 5 and 6, strike the words "settled administration of the large body of organic".

Page 4, lines 8 and 9, strike the words "full examination and consideration" and insert in lieu thereof "approval".

Page 4, after line 9, insert a new section as follows:

SEC. 6. That the Committee on Interior and Insular Affairs and the Committee on Public Works be, and they hereby are, directed jointly to study, in consultation with other appropriate committees and executive agencies, and to design and to formalize a comprehensive and particularized set of standards and overall criteria for the evaluation of all proposed projects for the conservation and development of land and water resources, including attention to the several specific factors recognized in section 4 of this resolution, all to the end that the Congress shall fully exercise its constitutional powers, as reflected throughout the text of this resolution. The Committee on Interior and Insular Affairs and the Committee on Public Works are hereby directed to submit to the Senate, as early as practicable during the first session

of the Eighty-fifth Congress, a detailed report with respect to their implementation of this section.

EVALUATION OF AMENDMENTS

The first amendment adds an additional clause to the preamble, for the purpose of clarifying the intent of the resolution and the desirability that the Congress initiate proper corrective action to maintain a proper relationship between the legislative and the executive branches.

The other amendments, with the exception of section 6, are for the purpose of clarification, or are principally consequential.

The amendment embodying section 6, offered by the Senator from Oklahoma (Mr. Kerr), chairman of the Subcommittee on Flood Control of the Public Works Committee, implements the resolution. It directs the Committee on Interior and Insular Affairs, and the Committee on Public Works to initiate a joint study for the purpose of developing a comprehensive standard for the evaluation of all proposed water projects so far as the requirements of the Senate are concerned. The study is to be carried out in consultation with other appropriate legislative committees and the executive agencies concerned, and a detailed report with respect to the results of the study and recommendations for its implementation are to be made as early as practicable during the 1st session of the 85th Congress.

COMMITTEES' CONCLUSIONS

The Committees on Interior and Insular Affairs and Public Works are concerned about the great expansion in the need for control and utilization of our Nation's water supplies and feel that Congress should maintain its prerogative in establishing policies and procedures for the development of these resources, and that studies and procedures are necessary in order to assure that the proper information will be submitted to Congress for its consideration of water resources development projects.

This resolutiton is designed to accomplish the desired purpose and the committees recommend its passage, as amended.

EXECUTIVE REPORTS

The following are comments of executive agencies on Senate Resolution 281:

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D. C., June 22, 1956.

Hon. JAMES E. MURRAY,
Chairman, Committee on Interior and Insular Affairs,
Hon. DENNIS CHAVEZ,
Chairman, Committee on Public Works,
United States Senate, Senate Office Building,
Washington, D. C.

MY DEAR MR. CHAIRMEN: This is in reply to your joint letter of June 13, 1956, requesting the comments of the Bureau of the Budget on Senate Resolutiton 281, dealing with water resources policy and

standards and criteria for authorization of water resources projects.

The Bureau of the Budget does not consider it appropriate to make a recommendation with regard to action on Senate Resolution 281. It is a matter entirely within the responsibility of the Senate. Our comments are intended to explain pertinent facts and circumstances bearing upon Senate Resolution 281.

Senate Resolution 281 appears to be directed at project reports submitted to the Congress in support of the request for authorization of water resources projects. The resolution consists of a series of statements of policy which, if acted on favorably by the Senate, would represent an expression of the views of the Senate on general matters of water policy and would affect the actions to be taken by the substantive committees of the Senate which have legislative responsibility for the various Federal programs. The Senate, of course, may at any time adopt as a guide expressions of policy regarding water resources programs. On the other hand, the submission of a project report to the Congress as a basis for legislative authorization is a recommendation by an agency of the executive branch of the Government made in response to a statutory requirement as to procedures to be followed. In the interest of orderly operation of the executive branch, the Bureau of the Budget under Executive Order No. 9384 has since 1943 conducted a review of project reports on behalf of the President. This procedure is designed to assure that submission of a project report to the Congress either is consistent with the programs and policies of the President or informs the Congress of any objections or other views the President may have regarding the project.

The preamble of Senate Resolution 281 refers to the issuance by the Bureau of the Budget, on December 31, 1952, of Budget Circular No. A–47, setting forth standards and procedures for the review of proposed Federal water and related land resources programs and projects. The preamble also refers to a draft revision of circular A–47, circulated for review and comment to the interested Federal agencies on November 29, 1954. Budget Circular A–47 and the draft revision of the circular were the subject of hearings held by the House Committee on Interior and Insular Affairs on March 15, and March 30, 1955, at which former Budget Director Rowland R. Hughes testified.

As Mr. Hughes stated at that time, the original circular A–47 was issued by the previous administration, and the circular has been under review by the present administration. No decisions have yet been made with regard to issuance of a revised circular A–47, but we recognize the need for standards and criteria to guide the executive departments and agencies in preparing recommendations on water resources projects. The matters dealt with in circular A–47 are related to the comprehensive review of water policy which was undertaken, at the President's direction, by his Advisory Committee on Water Resources Policy. The recommendations of the Advisory Committee have been commended by the President for the consideration of the Congress in the President's letter of January 17, 1956

While specific legislative proposals to implement the recommendations of the Presidential Advisory Committee have not yet been sent to the Congress, consideration is being given to such legislative proposals. At the same time, of course, consideration is being given to the possibility of implementing those aspects of the Water Policy

Report which lie wholly within the administrative responsibilities of the executive branch. Revision of Budget Circular A–47, therefore, has been deferred pending determination as to which aspects of the Water Policy Report will require legislation for implementation.

It should be noted and emphasized that the use of such general standards by the executive branch in the review of project reports does not determine the recommendations of the operating agencies to the Congress regarding authorization of projects, and does not change any of the requirements of existing law. As stated in paragraph 4 of Circular A–47, "The standards and procedures set forth in this Circular shall not be regarded as authorizing any deviation from general or specific requirements of law." Actions taken by the Executive Office of the President under Circular A–47, therefore, represent presentation of information and recommendations to the Congress. The Congress, of course, in its action on legislation, makes the final decisions on authorization of projects.

In the body of the proposed Senate resolution, section 1 states that it is the sense of the Senate that the wise and orderly use of the land and water resources of the Nation requires the exercises by the Federal Government of its constitutional powers to encourage and to participate in the development of such resources for all purposes and that "the continued nullification by the executive agencies of this fundamental and long-established national policy would constitute a usurpation of the legislative power."

The Bureau of the Budget agrees that the basic importance of the water resources of the Nation requires the continued participation by the Federal Government in the development of these valuable resources. This administration has consistently made provision in its annual budget recommendations for the initiation of construction of an additional number of new projects. Further, the Bureau is not aware of any instances in which the executive agencies of the Government have in any sense nullified, or attempted to nullify, the fundamental and long-established national policies regarding the development of water resources.

Section 2 states that, in order to realize the most efficient and optimum development of land and water resources, such developments should be planned and undertaken on a comprehensive basis. The Bureau of the Budget is in complete agreement with the objective of this section. The administration's endorsement of the upper Colorado River storage project clearly indicates its strong support of sound, comprehensive river-basin development. In addition, there have recently been transmitted to the Congress, by direction of the President, the comprehensive reports on the New England-New York region and the Arkansas-White-Red River Basins. These reports are desirable steps toward comprehensive river basin planning in line with the sense of section 2 of the resolution.

Section 3 resolves that the number of Federal agencies, offices, and organizations having to do with the planning and review of land and water resources projects should be reduced, rather than increased, and that technical and administrative routing and review procedures should be simplified and shortened in order to facilitate and to accelerate the transmittal of reports to the Congress in support of requests for the authorization of projects.

The Bureau of the Budget has long been concerned with the need to simplify and improve the organization of the executive branch for the planning and review of natural resources programs and projects. From our studies and from the investigations of other groups such as the first and second Hoover Commissions and the Presidential Advisory Committee on Water Resources Policy, it would appear that the desired improvements to promote consistency and coordination among the Federal and State agencies involved can be achieved in either of two ways: (1) consolidating departments and agencies in the field of resource development, or (2) accepting multiple-agency administration but providing additional special organizational arrangements. After giving careful consideration to the problems involved, the Presidential Advisory Committee on Water Resources Policy recommended the latter approach.

Section 4 expresses the principle that reports to the Congress for authorization of projects should be evaluated in accordance with criteria prescribed by the appropriate congressional committees and should fully disclose the details and results of all studies and analyses regarding the economic evaluation, costs, and financial arrangements for proposed projects. Project reports are designed for this specific purpose and constitute a procedural step prescribed in law as a step precedent to legislative authorization of the project by the Congress. As such the report and accompanying views represent recommendations to the Congress either for favorable or unfavorable action. In the former case they should be consistent with the programs and policies of the President. In the latter case they should clearly state the reason for the adverse views. In either case the Bureau of the Budget conducts its review work in such a way as to assure full disclosure of all pertinent information regarding the economic evaluation and financial aspects of proposed project developments.

Section 5 of the resolution states that the preservation of the constitutional principle of the separation of powers requires that any departure by the executive agencies from the traditional policies, standards, and procedures growing out of the settled administration of the large body of organic law governing the conservation and development of the land and water resources of the Nation be effected only after full examination and consideration by the Congress. Again, the Bureau of the Budget agrees.

Each water resources project report requires specific action by the Congress, unless the project can be administratively authorized under general provisions of existing law. Under these circumstances, the Bureau of the Budget believes that the conservation and development of land and water resources are being effected after full examination and consideration by the Congress. At the same time, it should be recognized that, in the complex field of water resources development, changes in basic legislation will be required from time to time to accommodate Federal programs to the economic growth and changing needs of the Nation. While the separation of powers set forth in the Constitution places on the Congress the responsibility of enacting such legislation, it also places responsibility on the Executive to recommend measures for the consideration of the Congress. These may involve recommended changes in basic legislation and the administration thereof.

The Bureau of the Budget appreciates this opportunity to comment with regard to the provisions of Senate Resolution 281 and will be available to participate in any hearings on this subject, if desired.

Sincerely yours,

A. R. JONES, *Acting Director.*

DEPARTMENT OF THE ARMY,
Washington, D. C., June 28, 1956.

Hon. JAMES E. MURRAY,
Chairman, Committee on Interior and Insular Affairs,
United States Senate.

DEAR MR. CHAIRMAN: Reference is made to your request to the Secretary of Defense for the views of the Department of Defense with respect to Senate Resolution 281, 84th Congress, a resolution relative to the conservation and development of land and water resources. The Secretary of Defense has assigned to the Department of the Army responsibility for preparation of a report thereon.

The Department of Defense has considered the above-mentioned resolution. The purpose of the resolution is to declare the sense of the Senate with respect to the utilization and development of land and water resources policy.

The Department of Defense has always recognized that it is the function of Congress to determine what projects shall be undertaken or participated in by the Federal Government and to establish uniform rules and regulations for those projects if it wishes, and the Department conforms strictly to legislative directives.

This Department favors action by the Congress setting forth uniform policies and procedures to be followed by Federal agencies concerned with the development and control of the land and water resources of the Nation. These policies should cover planning and processing procedures, evaluation, allocation of costs, cost sharing, and other related matters.

This report has been coordinated within the Department of Defense in accordance with procedures prescribed by the Secretary of Defense.

Inasmuch as the committee has requested that the report be expedited, it is submitted without a determination by the Bureau of the Budget as to whether or not it conforms to the program of the President. As soon as such advice is received it will be forwarded to your committee.

Sincerely yours,

WILBER M. BRUCKER,
Secretary of the Army.

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D. C., July 2, 1956.

Hon. JAMES E. MURRAY,
Chairman, Committee on Interior and Insular Affairs,
United States Senate.

Hon. DENNIS CHAVEZ,
Chairman, Committee on Public Works,
United States Senate.

GENTLEMEN: A report has been requested from this Department on Senate Resolution 281, a measure which, if adopted, would express the sense of the Senate with respect to certain matters concerning the planning and preparation of reports on water-resource developments.

Reference is made in the resolution to the report of the Presidential Advisory Committee on Water Resources Policy (H. Doc. No. 315, 84th Cong.) and the fear is expressed that the recommendations contained therein "may be implemented by direct action of the executive agencies" rather than by congressional enactment. This report expresses basic and carefully considered policy conclusions of this administration. It is the intent of the administration to seek legislative implementation of those conclusions in every case in which existing law does not clearly leave discretion in the executive agencies. You may be assured that, like the authors of the resolution, the Department of the Interior is fully aware of the constitutional doctrine of separation of powers and that its constant effort has been and will be to avoid even seeming to arrogate to itself those powers which belong to the Congress.

This Department is also committed to assisting in "the effectuation of the wisest, most orderly, and most economic utilization of the land and water resources of the Nation for the widest possible benefit." It favors planning water resource developments "on comprehensive bases and with a view to such an ultimately integrated operation of component segments as will insure the realization of an optimum degree of physical and economic efficiency." It is of opinion that its reports to Congress, whether in support of or in opposition to proposals for the authorization of projects for the conservation and development of land and water resources, should and do "disclose the details and results of all studies and analyses of all potential utilizations, costs, allocations, payout, and benefits, both direct and indirect, made by * * * interested operating agencies." It does everything within its power "to facilitate and to accelerate the submittal of reports to the Congress in support of requests for the authorization of projects" whenever it has the factual materials with which to do so and the proposed projects are found worthy. It endeavors and will endeavor in every way possible to cooperate with the congressional committees having jurisdiction over legislation involving projects in which it is interested and to present to those committees data on the projects in such form that they can determine their merits on the basis of such criteria as they may adopt as well as in terms of the criteria prescribed by other competent authority.

The Bureau of the Budget has advised that there would be no objection to the submission of this report to your committee.

Sincerely yours,

FRED A. SEATON,
Secretary of the Interior.

DEPARTMENT OF AGRICULTURE,
Washington, D. C., June 25, 1956.

Hon. JAMES E. MURRAY,
Chairman, Committee on Interior and Insular Affairs,
United States Senate.

Hon. DENNIS CHAVEZ,
Chairman, Committee on Public Works,
United States Senate.

DEAR SENATORS: This is in reply to your joint letter of June 13, 1956, requesting comments by this Department on Senate Resolution 281.

From the standpoint of the continued orderly administration of the watershed protection and flood prevention programs of this Department, we see no need for the resolution.

Following a preamble making reference to Bureau of the Budget circular A–47 and proposed revisions thereof and to the report of the Presidential Advisory Committee on Water Resources Policy, the resolution would declare the sense of the Senate to be that the Federal Government should continue to exercise all of its constitutional powers for conservation of land and water resources; that continued nullification by the executive agencies of this fundamental and long-established national policy would constitute a usurpation of the legislative power; that land and water resources development should be planned on comprehensive bases; that the number of Federal agencies, offices, and organizations having to do with the planning and review of land and water resources conservation and development projects should be reduced, rather than increased; that technical and administrative routing and review procedures should be simplified and shortened; that authorizing projects reports should include evaluations made in accordance with criteria prescribed by congressional committees and should fully disclose the results of all studies and analyses; and that preservation of the constitutional principle of separation of powers requires that any departure by the executive agencies from traditional policies, standards, procedures, and techniques reflected in and growing out of settled administration of organic law governing the conservation and development of land and water resources be effected only after full examination and consideration by the Congress.

In assisting local organizations in the preparation of plans for small watersheds in accordance with the provisions of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Cong.), the only Department program which the circular affects, this Department's procedures have been in conformance with the provisions of Bureau of the Budget circular A–47, referred to in the preamble to the resolution, and in general accord with the proposed revisions thereof.

That circular provides, among other things, that "The standards and procedures set forth in this circular shall not be regarded as authorizing any deviations from general or specific requirements of law. Whenever a report or budget estimate varies from such standards or procedures because of a requirement of existing law, the variation shall be indicated and reference made to the section of law imposing such a requirement." No instance has occurred to date in which the law has required such a variation in connection with a report that this Department has assisted in preparing under Public Law 566.

This Department's policies and procedures for administration of Public Law 566 also are in general accord with the policy recommendations of the Presidential Advisory Committee on Water Resources Policy.

It is our understanding that the Bureau of the Budget is submitting general comments on the resolution to you.

Sincerely yours,

TRUE D. MORSE, *Acting Secretary.*

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,
Washington, D. C., July 5, 1956.

Hon. JAMES E. MURRAY,
Chairman, Committee on Interior and Insular Affairs.
Hon. DENNIS CHAVEZ,
Chairman, Committee on Public Works,
United States Senate.

DEAR MESSRS. CHAIRMEN: This letter is in response to your request for a report on Senate Resolution 281, relating to congressional and executitve branch policy on development of land and water resources and, in particular, the evaluation of proposed Federal projects for that purpose.

This Department does not have responsibility for the evaluation of Federal projects for the conservation and development of land and water resources. This Department's activity in the field of water resources is largely one of providing technical advice and assistance to the States, other Federal agencies, and the Congress on water quality to protect the public health and on water-pollution control. In addition, this Department engages in research in the water-pollution control field, and plays a part in enforcement of water-pollution abatement on interstate waters.

The bulk of the Department's advisory and consultative work in this field is carried on by the Public Health Service under the provisions of the Water Pollution Control Act (Public Law 945, 80th Cong., as amended). In state of the Union and health messages last year and this, President Eisenhower recommended legislation to the Congress to extend and strengthen the act. A bill, S. 890, to accomplish this purpose has been passed by the Congress and is now before the President.

In providing technical assistance to States and to the Federal agencies, this Department is frequently called upon to evaluate multiple-purpose water-resource projects from the point of view of water-pollution control, as well as insuring water of a quality that will pro-

tect the public health, particularly through the adequacy of sustained flows. In doing this, there is need, especially in evaluating costs and benefits, for uniform procedures and policies among the Federal agencies of a type such as are now provided by Budget Bureau Circular A–47 and the coordinating procedures of the Inter-Agency Committee on Water Resources.

We believe that our interests in this field are being promoted on a sound basis by the administration's existing policies.

Time has not permitted us to obtain advice from the Bureau of the Budget in regard to this report.

Sincerely yours,

M. B. FOLSOM, *Secretary.*

FEDERAL POWER COMMISSION REPORT ON SENATE RESOLUTION 281, 84TH CONGRESS, A RESOLUTION RELATIVE TO THE CONSERVATION AND DEVELOPMENT OF LAND AND WATER RESOURCES

The resolution declares it to be the sense of the Senate that water-resource development continues to be a responsibility of the Federal Government and emphasizes the importance of carrying out comprehensive planning of land and water resources development in conformity with standards, procedures, and policies established by Congress for the analysis and evaluation of proposed Federal multiple-purpose projects.

The role of the Federal Power Commission with respect to water resources development is defined and limited by congressional enactments. The licensing function, which is the Commission's oldest activity, dates back to the Federal Water Power Act of 1920, now part I of the Federal Power Act. Pursuant to that authority, the Commission issues licenses to non-Federal interests, including citizens, corporations, States, and municipalities, authorizing the construction, operation, and maintenance of waterpower projects on Government lands and on streams over which the Congress has jurisdiction. It may also issue licenses to such non-Federal interests for the purpose of utilizing the surplus water or waterpower from a Government dam. Licenses issued under the Federal Power Act are for fixed periods not exceeding 50 years and contain terms which protect both the public interest and the licensee.

An important provision of the Power Act which safeguards overall Federal interests and insures initial consideration of Federal development is the requirement in section 10 (a) that each project to be licensed shall, in the judgment of the Commission, be best adapted to a comprehensive plan for the development and utilization of the water resources of the river basin for public purposes. Also, under section 7 (b), if, in the judgment of the Commission the "development of any water resources for public purposes" should be undertaken by the United States, the Commission is directed not to approve any application for "any project affecting such development." In such case, it must prepare certain data and submit its findings to Congress with recommendations concerning the proposed development.

Closely allied with the licensing activities are the Commission's studies and investigations of river basins and its power market surveys. Under the provisions of the Federal Power Act the Commis-

sion is given broad authority to make investigations and collect data concerning the utilization of our waterpower resources, and is authorized to cooperate with the executive departments and other agencies of the Federal Government and with State governments in such investigations. The Commission's investigatory authority was broadened by the Flood Control Act of 1938 and subsequent flood control and river and harbor acts, which provided that power penstocks shall be installed at dams therein authorized when approved by the Secretary of the Army upon recommendations of the Chief of Engineers and the Federal Power Commission.

These river basin and power market studies provide the basis for Commission action in the issuance of licenses, and also the basis for advising and making recommendations to the Federal constructing agencies on power matters. Cooperative arrangements have been established with the Corps of Engineers and with the Bureau of Reclamation for furnishing advice and assistance on power matters. This cooperation begins in the early planning stages between the staffs of the Commission's regional offices and the field representatives of the constructing agencies.

As a member of the Interagency Committee on Water Resources, which was formed by agreement with the Departments of the Army, Interior, Agriculture and Commerce, the Commission cooperates closely with Federal and State agencies in planning the power aspects of sounder and better designed river development programs. Through its participation in such a joint effort the Commission has made significant contributions toward achieving a better understanding and solution of the power phases of common problems involved in the standardization of practices for the economic analysis of river basin projects.

The Federal Power Commission is an independent agency having primarily licensing and investigatory functions under part I of the Federal Power Act with respect to non-Federal water power development and it has no direct statutory responsibility for reports by other agencies to Congress in support of requests for authorization of Federal projects. As will be apparent from the foregoing analysis, this is the only agency of the Federal Government having complete and continuing records and information on practically all segments of the power industry, publicly and privately owned, its capacity, operations, requirements, loads, locations and interconnections from which intelligent planning can be projected in accordance with the statutory directives of Congress. However, since the Commission's functions are limited and since Senate Resolution No. 281 involves essentially considerations of congressional policy pertaining to authorization of federally constructed projects, we prefer to express no opinion with respect to the advisability of adopting this Senate resolution.

FEDERAL POWER COMMISSION,
JEROME K. KUYKENDALL,
Chairman.

The text of the resolution, as amended, is as follows:

Whereas the Bureau of the Budget, on December 31, 1952, issued Circular Numbered A–47, prescribing standards, procedures, and policies for the evaluation of proposed Federal projects for land and water resources conservation and development; and

Whereas the Bureau of the Budget, on November 29, 1954, proposed a revision of Circular Numbered A–47, the application of which would impose further restriction by the executive agencies on Federal participation in the conservation and development of land and water resources, and on which hearings were held by the House Committee on Interior and Insular Affairs March 15 and March 30, 1955; and

Whereas on January 17, 1956, the President of the United States transmitted to the Congress the Report (House Document Numbered 315, Eighty-fourth Congress, second session) of the Presidential Advisory Committee on Water Resources Policy, consisting of the Secretary of Defense, the Secretary of the Interior, and the Secretary of Agriculture, designated by the President May 26, 1954, with a recommendation that "* * * the Congress give prompt attention to its proposals"; and

Whereas it is stated, at page 84 of the Economic Report of the President, transmitted to the Congress January 24, 1956, that "in due course, legislative proposals will be submitted to implement the recommendations" of the Presidential Advisory Committee on Water Resources Policy, but no such proposals have yet been submitted to the Congress and instead it is indicated that the recommendations may be implemented by direct action of the executive agencies;

Whereas notwithstanding that the conditions recited in this resolution result by reason of policies or actions under more than one national administration and by more than one branch and department of the Federal Government, it is desirable that this Congress initiate proper corrective action: Now, therefore, be it

Resolved, That it is the sense of the Senate that the stabilization of the national economy and the effectuation of the wisest, most orderly, and most economic utilization of the land and water resources of the Nation for the widest possible public benefit require that the Congress continue to exercise all of its constitutional powers to encourage the conservation and development of such resources to establish national policy pertaining thereto, and that any nullification by the executive agencies of this long-established principle would constitute a usurpation of the legislative power.

SEC. 2. That land and water resources development should be planned on comprehensive bases and with a view to such an ultimately integrated operation of component segments as will insure the realization of an optimum degree of physical and economic efficiency.

SEC. 3. That the number of Federal agencies, offices, and organizations having to do with the planning and review of projects for the conservation and development of land and water resources should be reduced, rather than increased, and that technical and administrative routing and review procedures should be simplified and shortened in order to facilitate and to accelerate the submittal of reports to the Congress in support of requests for the authorization of projects.

SEC. 4. That reports to the Congress in support of requests for the authorization of projects for the conservation and development of land and water resources should include evaluations made in accordance with criteria prescribed by the Congress, and that they should fully disclose the details and results of all studies and analyses of all potential utilizations, costs, allocations, payout, and benefits, both direct and indirect, made by all interested operating agencies.

SEC. 5. That the preservation of the constitutional principle of separation of powers requires that any departure by the executive agencies from the observance and employment of the policies, standards, procedures, and techniques reflected in and growing out of the law governing the conservation and development of the land and water resources of the Nation be effected only after approval by the Congress.

SEC. 6. That the Committee on Interior and Insular Affairs and the Committee on Public Works be, and they hereby are, directed jointly to study, in consultation with other appropriate committees and executive agencies, and to design and to formalize a comprehensive and particularized set of standards and overall criteria for the evaluation of all proposed projects for the conservation and development of land and water resources, including attention to the several specific factors recognized in section 4 of this resolution, all to the end that the Congress shall fully exercise its constitutional powers, as reflected throughout the text of this resolution. The Committee on Interior and Insular Affairs and the Committee on Public Works are hereby directed to submit to the Senate, as early as practicable during the first session of the Eighty-fifth Congress, a detailed report with respect to their implementation of this section.

○

Ransmeier, Joseph S.
The TVA Nashville,
Vanderbilt U.P., 1942

on b-c. analysis

At end, throws you
back on qualitative
judgements.

1616 W. Clinch Avenue
Knoxville, Tennessee
June 8, 1954

Dear Mase,

Your letters of May 16 and 21 have been received and greatly appreciated. I see that I have to do more work on spelling out the structure of the aluminum industry for it doubtless is confusing to someone who has not emersed himself in the industry. That may explain the cool reception I got on it from the QJE--I have planned some additional work before trying it out again.

Incidentally, the man from the Bureau of the Budget came to join our staff. He was a staff man for our present assistant general manager when the latter was with the Bureau. He turns out to be a classmate of mine from Harvard whom I just couldn't place by name. Now I write this to let you know that there is probably a vacancy in the Bureau of the Budget for someone who has been specializing in water resources and land economics. If you are interested write me about it and I can get the poop from Henry Erlanger(the fellow who came to us from the Bureau). Or you might write saying you have learned the position formerly occupied by Henry Erlanger is open and that you would be interested.

Incidentally Henry has been working on the Circular A-47 re benefit-cost analysis. He would be in a good position to review the paper you had let me have and which I was holding pending Henry's arival. If you are interested in some thinking on the matter I would gladly ask him to criticize it for you.

Another thing. There has been some very good work done on this question by Otto Eksting at Harvard this year. Otto is a German-born economist who just finished his Ph.D. thesis on Cost-Benefit at request of Smithies. He is reputed to be a brilliant little bastard who prepared a devastating critique of some of Leontief's work as an honors thesis at Princeton. Then, without taking any courses at Harvard(informal reading courses only), passed his Ph.D. generals with an excellent plus. He has confered with Henry Erlanger re the question of benefit-cost analyses(they were brought up in the same town in Germany) and Henry is familiar with his thinking on the subject. If you are interested, I suggest you write the Department at Harvard for the title of Eksting's work--and see if you can get a copy either from the department or from the Library.

Having just returned from a 10 day trip to the PN the suggestion to apply to Macy is certainly tempting. I am committed to TVA for a year, however, since I'm now the acting Chief Economist. My boss left for Brazil on a UN mission and

Def.s; benefits & costs.

Inter-agency, unusual procedure – call primary benefits, e.g. of Bonneville, not value of power; but value of things produced with the power, minus associated costs.

Pretty clever – includes c.s.

Simpler, just to speak of project net benefits – net of assoc. costs. Which is simply MVP of output.

E.g. on irrig-n project, value of ~~water~~ land's product, minus assoc. costs, is value of water.

Now proceed as tho knew what B&C are .... later discuss extended B.

Basic problems (p.5)

1. Scale
2. alternative uses of site
3. Priority

apply basic ec. principles, in slightly diff. context.

We're used to MP  ... addition to total benefits.

They use totals – we can string along.

Is also problem of who gets gain --- maybe shd use beneficiaries i.n., if gov't to collect from other than benefs. as they are landholders, wd. be fairly low i.n.

But dubious: if are going to tax some citizens to provide benefits for others, are starting right off w. gross diseconomy, not much pt. in being very precise from there on.

So will assume gov't will collect from beneficiaries.

Limit pd. of analysis? No! No more than compound int. does anyway.

Cost of labor -- free, in depress? If is living off relief, something to it.

But careful - leads to philosophy of slavery, & waste ... idea that pvt ec. can't work, govt must employ.

Benefit-cost Analysis.

Public Acctg. Not just like pvt. Non-salable benefits.

Very first problem we encounter is tough. What i.r. use? Makes big diff.

No interest? Often done, but basically absurd. Allows infinite time to repay, thus can justify about any project, just so variable costs < annual benefits.

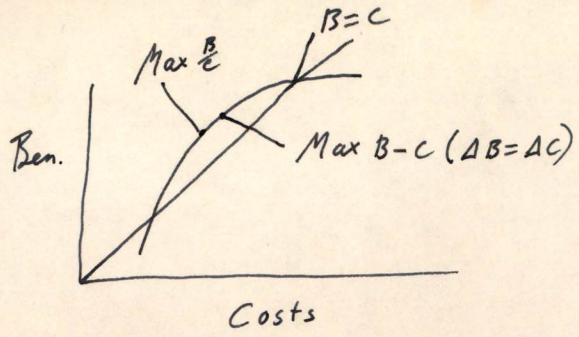
?. r. at which gov't can borrow? Too low — results in turning too many resources over to gov't. Bcs gov't can borrow low, not bcs of particular project, but bcs of taxpower. Takes funds from other borrowers who wd use better.

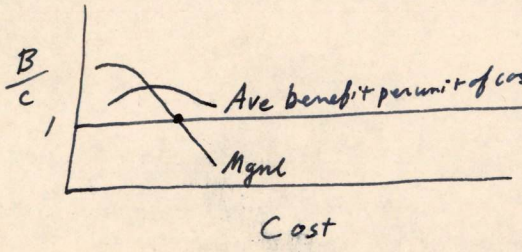
In practise, bo & o i.r. policies have offset other errors — so we have done right thing for wrong reason, very rough way.

What i.r. shd gov't use? Roughly, that of medium size corp.

—

Discount future values for risk? Perhaps yes, but keep calc. separate from i.r. Convert range of future possibilities to a "certainty equivalent". & risk doesn't nec. call for negative discount — is also risk of gain. Considering no. of gamblers, in gen public, we can't assume gen public dislikes risk





~~Mgnl~~. cost per unit of cost. (also = AC per unit of cost)

advantage of their method: avoid having both cost per unit & MP change.

Is this like sht or long run analysis of ec. thy? ~~Short~~ Short — bcs we are determining scale of a given "project", which means how intensively we use a given site, or set of sites — e.g., how high we build Hell's Canyon Dam

Inter-ag. proposes, to msre ben/cost ratio, $\frac{\text{Proj. ben}}{\text{Proj. costs}}$

Weeks wants $\frac{\text{Total ben}}{\text{Total costs.}}$

Bcs is parallel to efficiency formula; & bcs does away w. problem of assigning imputing ~~cost~~ ben. between proj. & assoc. costs. And makes sure you don't neglect assoc. costs.

(To define effic, must put value on site, as cost. To value site, must find best use. Simul. solution, like timber problem. Extend timber problem, show govt tendency to neglect site cost.)

"Net farm income", ~~ggg~~ as usually used, is less for tnt than o-o.

BR surveys proj. benefits to find "ability to pay"; allocate costs on that basis.

Weeks has always advocated benefits received rather than ability to pay as repayment criterion. BR uses other, ability to pay.

(Maybe ability to pay is ok, bcs ability to pay comes from land of past. But maybe comes from development of past. Might be either, confused)

CHAP. 2.2 IRRIGATION BENEFITS 2.2.1

IDENTIFICATION AND MEASUREMENT

.1 Irrigation benefits are project effects comprising improvements in the general welfare and increased values resulting from increased production of goods and services or decreased costs of production. They come initially from lands newly irrigated, receiving supplemental water, or rehabilitated to improve utilization of the existing water supply or to decrease costs of operation. Irrigation benefits include direct farm benefits and indirect, public and intangible irrigation benefits.

DIRECT FARM BENEFITS

.2 Direct farm benefits comprise the increase in:

A. Family living, which includes:

(1) Value of crops, livestock, and livestock products from the farm consumed by the farm family.

(2) Value of other perquisites, such as rent of the farm dwelling.

(3) Cash allowance for family living expenditures.

B. Cash income remaining after (1) cash family living allowance (above) and (2) production expenses for farm investment and farm operation (excluding irrigation O&M cost of the project) have been deducted from the value of farm products sold. This item of benefits is identical with increase in payment capacity.

C. Allowance for accumulation of equity in the farm investment.

MEASUREMENT OF DIRECT FARM BENEFITS

.3 Direct farm benefits will be calculated from summaries of farm budget data representing future conditions with and without the project. The summaries will usually represent combinations of various farm budgets expanded to cover the entire area under consideration. Procedures for preparing farm budgets are outlined in Manual Volume V, Part 4, and Volume XV, Part 2. The following example shows how direct farm benefits are derived from the farm budget summary.

.4 Derivation of Direct Farm Benefits from Summary of Farm Budgets for Entire Project Annual Values under Full Development

EXAMPLE

	Item	With Irrigation	Without Irrigation	Difference	Direct Farm Benefit
1.	Type of farm	Irrigated farm	Dry farms and grazing		
2.	Number of farms	100	10	(90)	
3.	Acres per farm	160	1,600		
4.	Irrigible acres	16,000	16,000		
5.	Farm products sold	$1,350,000	$100,000	$1,250,000	
6.	Products consumed in home	50,000	3,000	47,000	
7.	Rental value of dwelling	25,000	2,000	23,000	
8.	Gross farm income	$1,425,000	$105,000	$1,320,000	
9.	Production Expenses 1/	900,000	60,000	840,000	
10.	Family living allowance 2/	225,000	22,500	202,500 3/	A. $112,500 4/
11.	Payment capacity	300,000	$22,500	$277,500	B. $277,500 5/
12.	Payment capacity per acre	18.75	1.41	13.74	
13.	Less 25% contingency			13.00	
14.	Project O&M per acre			$5.00	
15.	Amortization capacity per acre			8.00	
16.	Farm investment	$4,000,000	$400,000	$3,600,000	C. $36,000 6/
17.	Total direct farm benefits				$426,000 7/

1/ Annual cost for farm investment and farm operation.

2/ $2,250 per family, comprising lines 6 and 7 plus allowance for cash requirements.

3/ Reflects conditions without irrigation for dry farmers and ranchers but not for the 90 new farmers.

4/ $202,500 less $90,000 representing $1,000 family living allowance without irrigation for 90 new farmers.

5/ Identical with increase in payment capacity.

6/ One percent of increase in farm investment.

7/ Direct benefit under full production will be combined with other benefits before adjustment for development period and inclusion in benefit-cost ratio.

INDIRECT IRRIGATION BENEFITS

.5 Indirect irrigation benefits comprise the increase in:

A. Profits of local wholesalers and retailers from handling increased sales of farm products consumed locally off the project without processing.

B. Profits of all other enterprises between the farm and the final consumer, from handling, processing, and marketing increased sales of farm products locally and elsewhere.

C. Profits of all enterprises from supplying goods and services for increased farm purchases for family living and production expenses.

D. Land value of local residential property.

MEASUREMENT OF INDIRECT BENEFITS

.6 Like direct farm benefits, indirect irrigation benefits will be calculated from summaries of farm budget data representing future conditions with and without the project. Indirect benefit factors will be applied to increases or decreases in the value of individual commodities listed in the budget summaries. The indirect benefit from increased land value of local residential property will be calculated separately.

INDIRECT BENEFIT FACTORS

.7 The following factors will be used to derive indirect irrigation benefits from summaries of farm budget data:

Indirect Benefit A	5 percent
Indirect Benefit B	
Cotton	83 percent
Wool	78 "
Grain (wheat, oats, corn, barley)	48 "
Oil crops (flax, cottonseed, soybeans)	30 "
Sugar beets	26 "
Fruits and vegetables	24 "
Dry beans	23 "
Rice	13 "
Livestock (meat)	11 "
Seed crops	10 "
Dairy products	7 "
Poultry products	6 "
Indirect Benefit C	18 "

A factor of 4 percent will be applied to the increase in land value of local residential property to derive an annual value for Indirect Benefit D.

.8 Derivation of Indirect Irrigation Benefits from Summary of Farm Budgets for Entire Project Annual Values under Full Development EXAMPLE

	Item	With Irrigation	Without Irrigation	Difference	Factor	Indirect Benefit
1.	Type of farm	Irrigated farms	Dry farms and grazing			
2.	Number of farms	100	10	(90)		
3.	Acres per farm	160	1,000			
4.	Irrigible acres	16,000	16,000			
5.	Sales to local wholesale and retail business					
6.	Fruit and vegetables	$50,000	----	$50,000	5	$2,500
7.	Hay and forage	300,000	10,000	290,000	5	14,500
8.	Subtotal, Benefit A	350,000	10,000	340,000		17,000
9.	Sales for local and non-local processing, marketing, etc.					
10.	Grain	25,000	50,000	-25,000	48	-12,000
11.	Fruit and vegetables	25,000	----	25,000	24	6,000
12.	Sugar beets	250,000	----	250,000	26	65,000
13.	Seed crops	10,000	----	10,000	10	1,000
14.	Dry beans	10,000	----	10,000	23	2,300
15.	Soybeans	5,000	----	5,000	30	1,500
16.	Livestock (meat)	550,000	25,000	525,000	11	57,750
17.	Wool	75,000	5,000	70,000	78	54,600
18.	Dairy products	25,000	5,000	20,000	7	1,400
19.	Poultry products	25,000	5,000	20,000	6	1,200
20.	Subtotal, Benefit B	1,000,000	90,000	910,000		$178,750
21.	Purchases for family living and production expenses					
22.	Direct Farm Benefit A 1/			$112,500		
23.	Less increased perquisites 2/			-70,000		
24.	Increased purchases for family living			42,500		
25.	Increased farm production expenses 3/			840,000		
26.	Subtotal, Benefit C			882,500	18	$158,850
27.	Total Indirect Benefits A, B, and C					$354,600

1/ See Paragraph 2.2.4, item 10
2/ See Paragraph 2.2.4, items 6 and 7
3/ See Paragraph 2.2.4, Item 9

BR gives Congs statement of ben. derived, to satisfy Congress, but actually it is ability to pay (thus Kings R. dispute).

D.A. got into flood control by some act, thus upstream-downstream controversy.

D.A. flood control ben.: Δnet inc, use freq of flood data, figure damage per year, Also look upstream (a.e. don't), figure effects of watershed treatment on flow.

Army Eng: flood damages prevented, plus Δnet inc. from higher utiliz-n

Neither adequately subtracts assoc. costs

Weeks wants neither ave., nor mgnl concept, but "bulk line" figure. What is that? Just means line where ~~majority~~ "the bulk of" settlers can get by.

---

as long as teachers have to inc. L social status, they will tend to assoc. w. poorer people, L pickup that viewpoint. Thus, if one criticizes me for assoc. w. Crisp, well, why doesn't Louis Sutton ask me over?

Girl to my office. Suppose I asked:

Q.3. Draw a curve of $e = 1$

$e = -1$

Q.4 Add up MC curves, sht run.

Long run, add up long run MC, & add new firms.

Before doing so, relate it to larger picture. Why are we doing it?

S & D – basic to ec. To understand supply, understand costs. -- relate each set of graphs to other sets.

Before relating cost & supply, analyze Hell's Canyon.

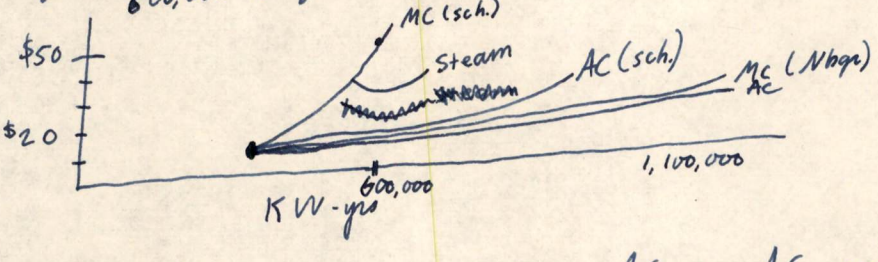
Steam plant, min. AC, LR., ~~$50~~ $20 / kw yr. (Maybe)

Cost of dam. Moot

Low dam, PPC, c. $150m for c. 500,000 kw

Hi " , c. 350 m for c. 600,000 or 1,100,000 kw

If Sch. right, MC > AC, AC rising. N-bga has MC rising, but not so much. – get another 600,000 kw for another 200 m – just a little above AC.



Sch. made his case on MC – not AC. AC cd. be lower than steam, he still wdn't be for it.

Are these long or sht run? Half & half – site fixed. Dim. ret. – Δg costs.

Future – better to overdevelop than underdevelop.

Subjects to Cover. – in 8 days.

~~Benefit - cost analysis.~~

~~*Hell's Canyon~~ size – mgnl benefits & costs, valuj site, etc.

Recreational benefits

~~Extended ben.~~

~~Cost allocation.~~

~~CVP, de Roos, practical politics.~~

~~Col. Basin – pres Comm.~~

~~(Watershed mgmt – Thomas, p.t.?) (Forest, range, city)~~

5-14 Fri. B-C analysis. Huffman, pp 190-206; and ch. 13 Inter-agency rep't, ch. 2.

17 Mon Off and pp 21-26, on i.n. & pd. of analysis.

19 Wed. B-C " Opt. ch. ~~4~~ 3 & 4, on measuring benefits.

21 Fri. Hell's Canyon – valuing site. To bring the theory down to earth.

5-24 Mon. Extended benefits – bcs we may have to rely on them to justify Hi's Canyon.

5-26 Wed Ext. Ben., 2

5-28 Fri. CVP & cost allocation – theory & politics. Inter-agency, ch. 5 de Roos,

over

5-31 Holiday

6-2 Wed. Col. Basin.

6-4 Ren. Ren.; watershed mgmt.

NEWS bulletin

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Smithies

THE BUDGETARY PROCESS IN IN THE UNITED STATES

ARTHUR SMITHIES
Chairman, Department of Economics
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in NATIONAL MUNICIPAL LEAGUE – 1/56

(contents overleaf)

For every individual concerned with the improvement of government, this enlightening analysis performs a double service. It points up the critical importance of Federal budgeting in national political and economic life. And it develops specific suggestions for improving the processes by which the Federal government reaches expenditure decisions.

> In a practical discussion that surveys the whole problem, this book applies economic principles to the budgetary process - at the same time paying due regard to constitutional arrangements and the problems of public administration.

The author takes for granted that the Federal budget will continue to be large in relation to national resources and will continue to be dominated by the defense program. In the light of these facts, he examines the adequacy of the budgetary process as it now exists - and has existed from the inception of the Republic - as a focus for policy decisions. And he presents a wide range of specific proposals for improvements in Executive and Congressional procedures.

Appropriation Committee hearings and Presidential messages to the Congress form the main data for the book. Besides serving as illustrations, these materials also provide a brief historical sketch of the budget process in operation. Technical terms throughout the discussion have been held to a minimum.

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