PART IV

EVALUATION OF FUTURE CONDITIONS

CHAPTER 12

Philosophy of Comprehensive Basin Planning in the Okanagan Basin

Comprehensive river basin planning of the nature adopted for the Okanagan Basin is new in Canada - in fact there are few river basins in North America or indeed the world where this planning approach has been undertaken. It is new because it examines together, a broader range of water and related resource uses than has been the case in the past. It is new because it considers a number of future courses for development in the Okanagan, instead of just one projection as was the case in the past in most other studies. It is new because it includes environmental and social values as well as economic values in the assessment of water resource plans and it is new because Okanagan residents have been explicitly invited to share in the development of the framework plan and in preparing specific recommendations. Because comprehensive planning does represent a departure from traditional approaches to planning, this chapter presents the basic philosophy used to develop a comprehensive framework plan for the Okanagan Basin, examines the nature of the planning process and defines the role that water resources management can play in achieving the goals set out in the Canada-British Columbia Okanagan Basin Agreement.

12.1 THE NATURE OF PLANNING

"Why do river basin planning studies need to be undertaken?" First, planning attempts to improve man's ability to make decisions regarding the use or protection of natural resources in the light of two types of unknowns:

a lack of knowledge regarding the present values of resources to society and even greater uncertainties concerning the future. The planned use of our resources is therefore necessary to ensure that the widest possible range of options remain open for future generations. Second, past experience in resource management has indicated that choices have to be made, so that water resources can be effectively allocated among competing uses and users. Therefore plans have to be developed as a means of understanding the constraints to efficient resource use, and for resolving conflicts through such methods as arbitration.

Despite the best efforts of previous water resource studies in the Okanagan Basin, there were still many aspects of the resource that were not fully understood at the initiation of the Okanagan Study. The nature of these unknowns are detailed in subsequent chapters of this report and encompass almost every aspect of the Study. Furthermore, it was recognized that there were important linkages between various components of the water resource in the valley. For example, tributary streams flow into the main valley lakes which are themselves connected by Okanagan River. Thus, decisions that affect one part of

this resource chain may in turn affect other parts to which it is linked and consequently an understanding of these linkages within the complete Okanagan water resource 'system' as it is called, is necessary before plans can be developed.

12.1.1 Planning for the Future

Water resource planning performs a more useful service if it serves not only the demands of today, but also the desires for tomorrow. Inclusion of the time dimension in the planning process compounds its complexity, for in addition to the relatively unknown response of the Okanagan water resource system to existing demands, is the greater uncertainty of what future generations will desire and the behaviour of the water resource system when subjected to changing demands. In view of these uncertainties, it becomes necessary to prepare several plans which may encompass the actual course along which the Okanagan may develop and to examine in some detail the likely consequences of each path on water resource development and management.

The key to the philosophy of comprehensive basin planning is the realization that it is not desirable to plan only one path for the future. Future generations must not be locked into a single course of action based upon the imperfect perception of what planners and the public today think should be their desires and values. It seems far more preferable to leave as many alternatives open as possible. There are two good reasons for this approach:

First, future generations should have the right to select their own course of action for they should have a better idea than we do of the proper course to follow when the time for decision arrives. Second, in view of possible technological changes in living styles, planning for the future is an extremely difficult task and the framework plan should be left as flexible as possible. This approach certainly should not be construed as meaning that nothing should be done now - on the contrary - steps may have to be undertaken to protect future alternatives and to meet the social betterment objective, as stated in the Okanagan Basin Agreement.

12.1.2 The Challenge of Choice

A second basic principle in river basin planning is that choices will have to be made, both now and in the future, between various alternatives for water resource management. Generally, choices have to be made for two reasons: First, there is usually a limited supply of the water resource itself, and of money to finance water management projects to meet the desires of basin residents. Consequently, priorities must be established. Second, water resource uses can often be in direct conflict - for example, discharge of municipal wastes into waters adjacent to public recreational areas - and some means of resolving these conflicts for the betterment of the valley residents must be devised. These decisions are based upon the capacity of various water resource management alternatives to reach the desired goals described in the following section.

12.2 STUDY GOALS

The purpose of the Okanagan Basin Study, as set out in the Canada-British Columbia Okanagan Basin Agreement is:

"to develop a comprehensive framework plan for the development and management of water resources for the social betterment and economic growth in the Okanagan Basin."

The Consultative Board recognized that the broad policy goals of social betterment and economic growth as stated in the Agreement may conflict. For example, a high rate of economic growth may not be compatible with improved social betterment in the Okanagan, and in fact could detract from it. The Board also recognized that the Agreement made several references to aspects of environmental quality such as:

"provision for an adequate . . . quality of water in the Basin," and "to determine the effects of water resources development and utilization on the fish and wildlife, and on the aesthetic values of the Basin."

In view of possible conflicts between social, economic and environmental values, it should be understood that river basin planning cannot maximize the achievement of each goal simultaneously, but rather should seek a desirable balance between these three sets of values.

This balance can only be obtained through an understanding of the set of human values - known as criteria - associated with the multiple goals set out in the Agreement. A knowledge of these criteria can enable the decision-makers to make the best selection between various alternatives for the benefit of the basin as a whole. Consequently, for the purpose of evaluating plans, it is important that the multiple goals of the Study be explicitly defined, including the necessary criteria to allow for the proper assessment of any particular course of action.

The three major goals of economic development, social betterment and environmental quality have therefore been defined as follows for this particular study:

1. Economic Development - to increase economic development as measured by net regional income; that is, the economic value of income, goods and services accruing to the residents of the region. The geographic boundaries for economic development should be drawn wide enough to encompass all significant economic impacts of water resource development plans in the Okanagan Basin.

2. Environmental Quality - to maintain and enhance environmental quality through management, preservation and improvement of certain natural resources and ecological systems. Generally, all benefits and costs associated with the environmental quality goal can only be expressed in quantitative units (biological, physical) and/or in qualitative terms rather than dollar values.

3. Social Betterment - to enhance social betterment by providing the opportunity for a more equitable distribution of income, employment, recreational opportunities and environmental quality that will contribute to the security of life and health.

In theory, achieving a desirable balance between these multiple goals involves a broad study of a wide range of social and economic plans for the management of natural and human resources. Within the context of the Okanagan Basin Agreement, water, and water-related resources such as fisheries, wildlife, water-based recreation and shoreline landuse, were the primary areas of study. However, the Board recognized that a broader set of criteria associated with these multiple study goals should be considered in the development of a framework plan. Examples of these general criteria and their relationship to the major study goals are shown in Table 12.1.

TABLE 12.1

GENERAL FEATURES ASSOCIATED WITH MULTIPLE GOALS

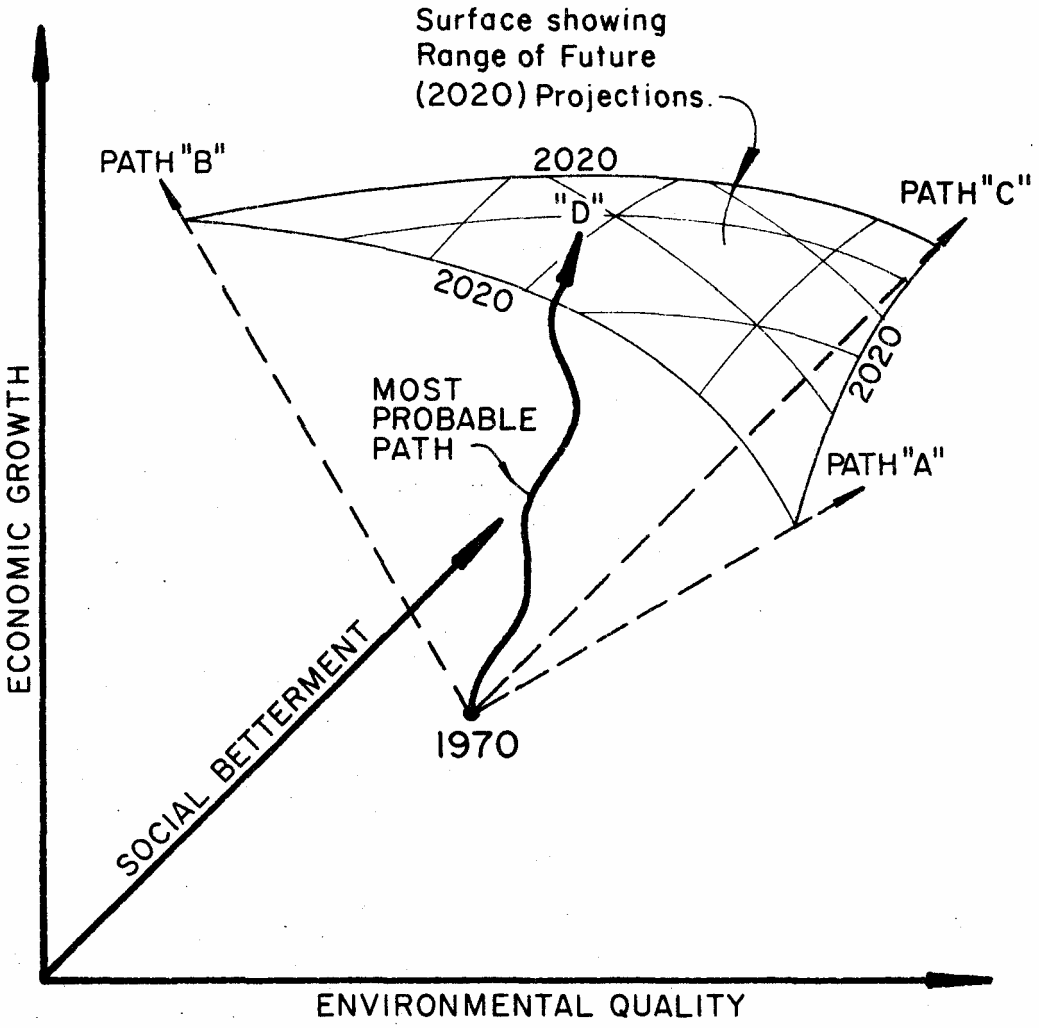
(Assumes adequate supplies of water and other natural resources are available)

GOAL	ECONOMIC GROWTH	ENVIRONMENTAL QUALITY	SOCIAL BETTERMENT
General Features (Criteria)	regional income total employment per capita income	air, water and land quality fisheries production aesthetics wildlife and other ecological systems quietness wilderness areas recreation opportunities	population density job security health education cultural amenities urban conditions communications income distribution

12.3 DEVELOPMENT OF FUTURE PROJECTIONS

The Agreement specified that the planning horizon for the Okanagan Study would be 2020. The broader range of evaluation criteria presented in Table 12.1 resulted through the development of alternative future paths for the valley over the next 50 years. These projections were obtained by varying the emphasis that Okanagan residents place on the criteria associated with economic growth, environmental quality and social well-being. In theory, the mix of features associated with future development in the Okanagan Basin can be illustrated as a three-dimensional surface as shown in Figure 12.1.

Points marked on this surface represent three future development projections which respectively place maximum weights on the set of features associated with each major goal. For example. Point A represents a high concern for environmental quality with minimum emphasis on economic growth. Point B represents an extremely high rate of economic activity with a minimum acceptable level of environmental quality. Point C places most weight on enhancing



EXAMPLES OF POSSIBLE FUTURE DEVELOPMENT PATHS
FOR THE OKANAGAN BASIN

Figure 12.1

social betterment by providing the opportunity for a more equitable distribution of income, employment, and recreational pursuits, between individuals and groups in the basin, with less emphasis on achieving maximum rates of economic growth or enhancing environmental quality. There are an infinite number of future development plans for the Okanagan based on different combinations of weightings on each of the three major goals within this three dimensional surface. Point D represents the most probable path that will be reached due to changing emphasis on each of these goals through time.

Recognizing it was impossible to consider all possible alternatives, the Consultative Board selected three examples to illustrate the range of plans open to future generations and to examine in some detail the consequences of associated future demands on water and related resource management in the Okanagan. More specifically, the projections developed in this study involved the following assumptions:

I Projection of the existing pattern of economic activity as it has developed over the past 10-15 years, with the qualification that water quality will not be degraded below 1971 conditions. This alternative represents the "status quo" against which the other two projections can be compared.

II Creation of a greater level of economic activity than would occur under Projection I described above, limited only by the qualification that environmental quality must be maintained at a level that will not impair human health.

III Reduction of rates of economic activity compared to Projection I with greater emphasis placed upon the enhancement and maintenance of a high quality natural environment in the basin.

It is important to recognize that all three goals are involved in each of the projections. A high economic growth (Projection II) simply places more emphasis on economic growth than on environmental quality and social betterment, while a low economic growth places more emphasis on environmental quality and to some extent social betterment. It is also reemphasized that management of the water resource is only one step towards achieving any of the future projections described above. The inter-dependency of man and other components of the ecological system on water and land resources makes it undesirable to consider alternatives for the management of one resource in isolation from other resources. Present and future values associated with other resource uses could be compromised if framework plans for the Okanagan were based solely on optimizing the use and development of the water resources.

12.4 WATER RESOURCE PLANNING

Complete plans for any one of the future growth projections described above can only be fully achieved through an understanding and management of

the diverse mix of resource uses in the basin, including agriculture, forestry, recreation, tourism, mining, industrial development and urban design as shown in Figure 12.2. Such total resource planning was not undertaken for two reasons. First, the Okanagan Basin Agreement specifically stated that the framework plan should be concerned with the management and development of the basin's water resource. Second, multiple resource planning, though desirable may not be realistic at present because of the lack of adequate planning tools and experience to undertake such a large-scale study. As mentioned at the beginning of this chapter, comprehensive planning of a single resource such as water is considered a new and experimental concept in resource planning and much has to be learned from this approach before multiple-resource planning can be attempted in one step. The framework plan developed for water resource management should, however, be flexible enough to allow adaptation into multiple resource plans of the future.

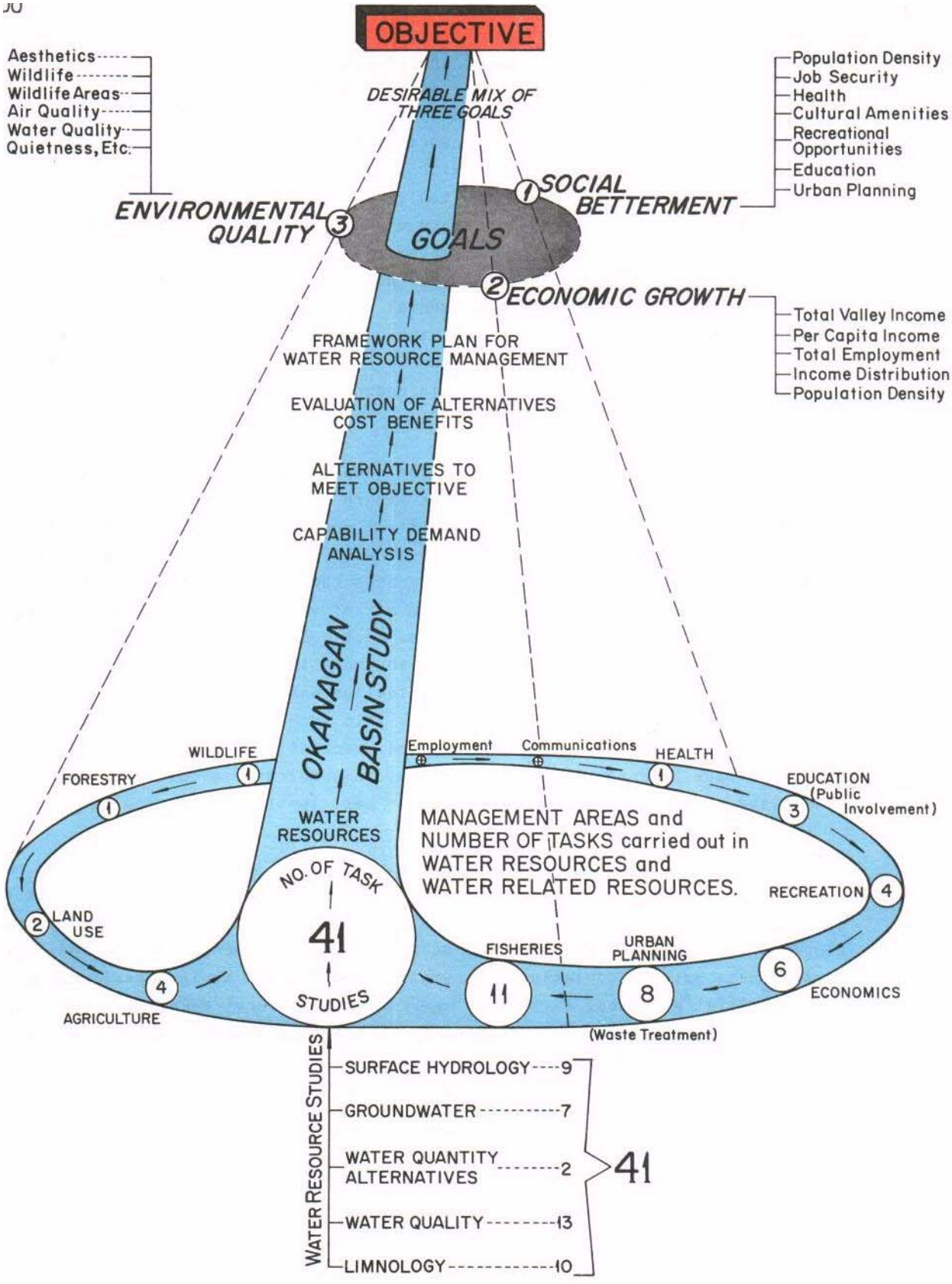
Figure 12.2 relates the scope of the comprehensive water resource planning to the goals of the Agreement. The Figure shows the inter-relationships between three levels of analysis. The first and top level is represented by the three major study goals of economic growth, social betterment and environmental quality. The second level indicates the range of resources that should be managed to achieve a desirable mix of values associated with these multiple goals. This dearly illustrates that water is only one of many resources, although in the Okanagan, one of the most important ones. The third level shows that although most of the attention was placed on water resource management, this did not preclude studies into such water related resources as landuse, economic development, agriculture, recreation and fish and wildlife. Details of the type of studies involved at this third level of the comprehensive planning process are described in the next section.

12.5 COMPONENTS OF THE FRAMEWORK PLANS

It should now be understood that within the context of the Okanagan Study, the social, environmental and economic goals can be partially achieved by developing plans to allocate water and related resources among existing and future uses. These water uses include consumptive demands for agricultural, municipal and industrial purposes, as well as non-consumptive requirements for recreation, aesthetics, fish and wildlife resources. Social and economic values are associated with each of the major uses of water described above and it is through the analysis of these values that the achievement of major study goals can be assessed.

To facilitate the planning process and to specify how each of the major uses of water in the Okanagan can contribute to the multiple goals of the Study, the complex water resource system was broken down into four management components:

(a) Water Quantity Management
(b) Water Quality Management
(c) Sport Fishery Management
(d) Water-based Recreation Management



THE RELATIONSHIP OF WATER RESOURCE MANAGEMENT IN COMPREHENSIVE PLANNING

Figure 12.2

Within each of these management components a number of general planning objectives were established to act as guidelines for developing framework plans. These planning objectives are defined in more detail than the broadly conceived study goals and thus act as intermediary steps to relate the uses of water to the set of social and economic values contained in the major goals.

Examples of such planning objectives include:

(a) Water Quantity Management

- to supply water for all consumptive water requirements for agricultural, residential, commercial and industrial purposes.
- to supply water for all non-consumptive water requirements for fisheries, wildlife, recreation and aesthetic resources.
- to minimize economic and social consequences of floods and droughts in lakes and tributary streams.
- to minimize conflicts between existing and potential uses of water.

(b) Water Quality Management

- to protect the health of Okanagan residents.
- to provide water quality compatible with agricultural, municipal, domestic and industrial uses.
- to provide water quality compatible with water-based recreation, sport fisheries and other non-consumptive uses of water.

(c) Fishery Management

- to preserve, enhance and manage environments suitable for sport fishery development.
- to maintain and protect the environment for Sockeye salmon stocks in the Okanagan River.

(d) Water-Based Recreation Management

- to provide opportunities for a full range of water-based recreational activities.
- to protect and enhance the aesthetic qualities of the Okanagan Valley.

It is unrealistic to assume that a11 the requirements of these planning objectives can be achieved for each of the future growth projections described earlier. Because of physical limitations, the quantity and quality objectives of water use interact, with some of these interactions being complimentary and some in conflict. Over the planning horizon of the next 50 years, as values associated with the achievement of these planning objectives change, new inter-actions will become evident, The basic reason for presenting various projections of future growth in the basin is to assess the capability of the water resource base to meet a wide range of potential demands and to develop different weighting systems such that different balances between economic, environmental and social values can be assessed.

This concept represents a fundamental departure from the traditional approach to resource planning developed in the past. First, most planning studies were undertaken to achieve one goal, that of increasing economic growth, and consequently only economic values were explicitly brought into the decision-

making process. Second, usually only one projection of future development and attendant resource demand was generated, and thus neither the public nor the planners examined the implications of alternative growth paths on regional resource planning. Third, water resource development plans have usually been prepared without direct involvement of the public. Because of the need to consider a variety of future development paths and to include social values, public input during the preparation of the framework plan is essential.

12.6 REVIEW OF THE PLANNING PROCESS

The major steps in the planning process as illustrated in Figure 12.3. Following the definition of Study Goals and the related water planning objectives. the capability of the water resource base to meet present demands must be assessed (Part II of this report). The third step involves forecasting requirements for both consumptive and non-consumptive uses of water and related resources such as landuse, fishery production and shoreline recreation facilities over the 50 year planning horizon of the study (Chapter 13).

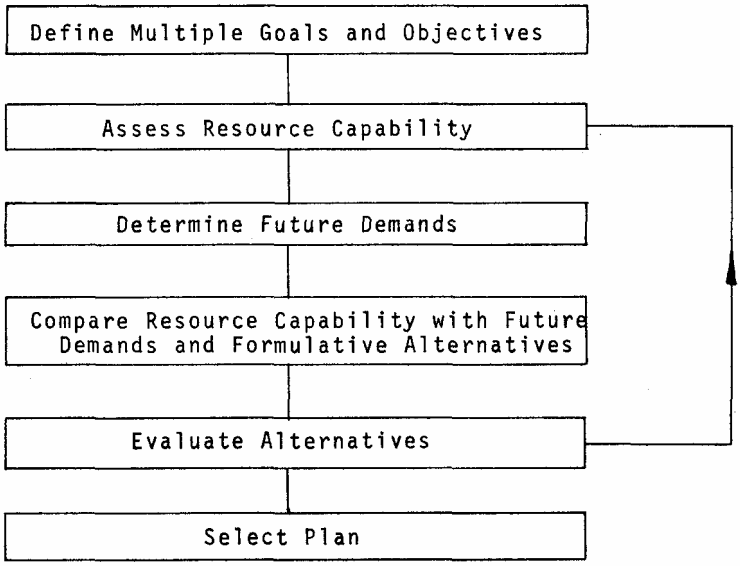


Figure 12.3

Such forecasts must be undertaken for each of the three paths of future development described earlier and then planning objectives for each of the major water uses can be specified for future as well as present conditions.

The fourth step in the planning process is to assess the capability of the water and related land and biological resource base to meet projected demands (Chapter 14 to 17). When conflicts exist, alternative ways of managing the water resource system to enable the achievement of these planning

objectives can be devised within established physical and biological limitations of the resource base itself.

These alternative measures for water resource management should then be evaluated in terms of the social, environmental and economic values associated with the major study goals. The benefits associated with achieving certain planning objectives should be weighed against the costs required to meet them and the costs of foregoing the full achievement of other planning objectives because of conflicts in resource use. Framework plans should consist of a combination of water and related resource management alternatives that present a desirable balance between these benefits and costs.

As noted earlier, past water resource planning studies have been mainly concerned with contributing towards the single goal of economic growth and consequently most of the benefits and costs associated with water development plans have been evaluated in dollar terms. It was recognized however, that under the concept of multiple goals stated in the Okanagan Agreement, it was not satisfactory to evaluate all the consequences of water resource plans in solely economic terms. Although the values associated with environmental quality and social betterment goals are difficult, if not impossible to measure in monetary terms, real attempts must be made to include them in the evaluation process so that they can be weighed against economic values. It is only when economic, social and environmental values relating to water management alternatives are compared in total that it is possible to determine whether the residents of the Okanagan are better or worse off.

Finally, framework plans can be assembled through a combination of water and related resource management alternatives for each of the future economic projections. The plan developed by the Consultative Board is based to a large extent on recommendations prepared by the public task forces concerning the type of future life-style preferred by Okanagan residents. This framework plan describes a sequence of steps over the next 50 years for managing both water quantity and water quality to meet future consumptive and non-consumptive requirements as fully as possible, as well as component plans for enhancing sport fishery production and water-based recreation facilities. It is not presented in detail with a view for immediate implementation; rather, it represents a framework of information based upon an understanding of the interactions that exist between the physical limitations of the water resource and the developing social and economic system in the basin. The main intent then of the framework plan is, to map out a range of future projections that may encompass future development in the basin and supply an information base from which detailed water and related resource decisions can be implemented at the appropriate time and place by the appropriate institution.

12.7 SUMMARY OF PLANNING PRINCIPLES

The main planning principles are reviewed here in summary form:

1) The Okanagan Study is concerned with developing a framework plan for the development and management of water and directly related resources

such as sport fisheries, water-based recreation and shoreline landuse over the next 50 years. This plan is designed to contribute to the multiple goals of economic growth, environmental quality and social betterment of valley residents.

2) It was recognized that future development in the Okanagan to the year 2020 cannot be foreseen with any degree of certainty. This problem is compounded by the fact that society's set of values associated with the three goals of the study will change through time. Consequently, the framework plan developed must consider a wide range of paths to cover the breadth of probable public preferences in water resource management. In keeping with this principle, a range of future growth patterns for the basin were considered involving differing rates of economic growth and expected levels of environmental quality.

3) For each of these future projections for the basin, a complete range of demands for water and related resources were assessed and plans developed to meet these demands. To provide some basis for evaluation, a third planning principle was established, namely that all future water management alternatives should be compared with the consequences of doing nothing, i.e. maintaining the status quo.

4) In recognition of the multiple goals of the study, it was considered unsatisfactory to evaluate the consequences of water management alternatives in economic terms alone. Thus, a fourth planning principle was developed requiring assessments be made to evaluate intangible factors associated with environmental quality and social well-being goals and weigh these against economic values.

5) Planning in a vacuum, insulated from the residents of the Okanagan Basin, is unacceptable under the planning process described above because social values and desires must be taken into account in the decision-making process. Consequently, a fifth principle states that involvement of the public is an essential ingredient in the planning process, and also during the implementation of the desired framework plan.

6) The sixth planning principle requires that a range of water resource development and management alternatives be considered in developing framework plans. This principle is in keeping with the intent of the Agreement, which states that "the Study will focus on ... the evaluation of economic, engineering, ecological, financial and organizational alternatives for water resource utilization". Both structural proposals and non-structural or management alternatives to improve the efficiency of water resource utilization are therefore included in the development of framework plans.

7) In view of the constraints of time and resources imposed on the Study, not all water management alternatives can be examined in depth. Thus, the seventh and final planning principle embodies the concept that framework plans are really a "bag of tools" to indicate procedures and methods for evaluating water management alternatives and to provide a broad information base. It is anticipated these evaluation procedures and the information base can be applied periodically to determine the course to be followed as conditions and desires change in the future. It is also anticipated that these procedures and the information base may be expanded and improved throughout the next 50 years.