

STATEWIDE FRAMEWORK FOR UPDATING THE HAWAII WATER PLAN

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Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawaii

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LIST OF ABBREVIATIONS

AWUDP:	Agricultural Water Use and Development Plan
BWS:	Honolulu Board of Water Supply
CIP:	Capital Improvement Program
CWRM:	Commission on Water Resource Management
DHHL:	Department of Hawaiian Home Lands
DLNR:	Department of Land and Natural Resources
DOA:	Department of Agriculture
DOH:	Department of Health
GIS:	Geographic Information Systems
GW:	Groundwater
HHCA:	Hawaiian Home Commission Act
HRS:	Hawaii Revised Statutes
HWP:	Hawaii Water Plan
IRP:	Integrated Resource Planning
MAPS:	Multi-Attribute Prioritization of Streams
SCAP:	Stream Channel and Alteration Permit
SDWA:	Safe Drinking Water Act
SLH:	Session Laws of Hawaii
SPAM:	Stream Protection and Management System
SWAP:	Source Water Assessment Program
SWPP:	State Water Projects Plan
SY:	Sustainable Yield
TMK:	Tax Map Key
UIC:	Underground Injection Control
USGS:	U.S. Geological Survey
WQP:	Water Quality Plan
WRPP:	Water Resource Protection Plan
WUDP:	(County) Water Use and Development Plan

SECTION I

FRAMEWORK OBJECTIVES

Introduction

The State Water Code, Chapter 174C, Hawaii Revised Statutes (HRS), requires that the Commission on Water Resource Management (CWRM) implement and utilize comprehensive water resources planning in its regulation and management of our State's water resources. As part of this mandate, the water code requires the development and updating of the Hawaii Water Plan (HWP) to guide the CWRM in executing its general powers, duties, and responsibilities assuring economic development, good municipal services, agricultural stability, and water resource protection.

The State Water Code calls for coordination between the CWRM, the counties, and other state agencies to “formulate an integrated and coordinated program for the protection, conservation, and management of waters in each county ...” To effectively implement these requirements, a *Statewide Framework for Updating the Hawaii Water Plan*, incorporating the techniques of Integrated Resources Planning, is hereby set forth to address current complexities associated with planning, regulation, and management of our water resources. This planning framework will be utilized to integrate and update all the components of the Hawaii Water Plan, which include the:

- 1) Water Resource Protection Plan (*WRPP*);
- 2) Water Quality Plan (*WQP*);
- 3) State Water Projects Plan (*SWPP*);
- 4) Agricultural Water Use and Development Plan (*AWUDP*); and
- 5) County Water Use and Development Plans (*WUDP*).

Framework Objectives

The objectives of developing and outlining a statewide framework for the Hawaii Water Plan are:

- To achieve integration of land use and water planning efforts that are undertaken by federal, state, county, and private entities so that a consistent and coordinated plan for the protection, conservation and management of our water resources is achieved;
- To recommend guidelines for the HWP update so that the plan and its component parts are useful to the CWRM, other state agencies, the counties, and the general public;
- To develop a dynamic planning process that results in a “living document” for each component of the HWP which will provide county and state decision-makers with well formulated options and strategies for addressing future water resource management and development issues;
- To better define roles and responsibilities of all state and county agencies with respect to the development and updating of the HWP components;

- To describe and outline the techniques and methodologies of integrated resource planning as the basic approach that should be utilized in developing and updating the County WUDPs;
- To facilitate permitting and to identify potential critical resource areas where increased monitoring or baseline data gathering should proceed.
- To establish an overall schedule for phased updating of the HWP; and
- To outline an Implementation Plan for near-term and long-term actions.

Status of the Hawaii Water Plan

The initial Hawaii Water Plan prepared by various state and county agencies was formally adopted by the CWRM in 1990. CWRM adoption of the 1992 update to the HWP was deferred pending further refinement of plan components. In the interim, the existing HWP should be considered as a first step toward “comprehensive water resource planning”. More importantly, the currently adopted HWP continues to serve as a valid planning and resource management tool.

While it may be argued that the current HWP falls short of its intended objectives, sufficient provisions established in the 1990 plan, together with policies subsequently adopted by the CWRM, currently provide for appreciable guidance to the CWRM in carrying out its duties and responsibilities. This is not to say that the current components of the HWP should not be updated or that specific elements do not require further revision and/or modification. Specific plan recommendations that emanated from the initial preparation of the HWP clearly identified the need for further studies, assessments, and follow-on actions that should be undertaken by each responsible agency. This inherent need to improve upon the existing plans forms the basis for the proposed HWP framework.

The State Water Code further provides that the CWRM may add to the HWP any other information, directions, or objectives it feels necessary or desirable for the guidance of the counties in the administration and enforcement of code provisions.

As such, the proposed Statewide Framework for Updating the Hawaii Water Plan is intended to provide focus and additional “guidance” to each agency responsible for updating specific components of the plan. The framework should be viewed as a long-term vision to preparation of a “living document” which over several plan iterations will result in a truly comprehensive water resource plan.

Organization of the Framework Document

This framework document is organized into four Sections. Section I briefly outlines the objectives of establishing a statewide framework for updating the Hawaii Water Plan and its various component plans. Section II discusses the overall framework for the Hawaii Water Plan, including a discussion of the integrated approach, the relationships between HWP components, elements of an IRP process, and the need for integration of resource development strategies at the county level. Section III outlines the roles and

responsibilities for those agencies charged with preparing/updating the various components of the Hawaii Water Plan. This section also identifies the minimum requirements of each component plan and the recommended elements that should be included within an integrated resource planning approach. Lastly, Section IV outlines a schedule and preliminary implementation plan for the phased updating of the Hawaii Water Plan and its components.

SECTION II

Framework for the Hawaii Water Plan

General

This section describes the overall framework structure for updating the Hawaii Water Plan components and the overall integrated resource planning methodology for integrating the five components of the Hawaii Water Plan. The relationships between the components of the HWP and the need for integration of resource development strategies at the county level will be discussed herein. This section therefore provides an overview of the proposed planning process that will eventually result in a more integrated and comprehensive Hawaii Water Plan.

The Planning Context

In their current adopted form, the HWP components and in particular the County WUDPs, were developed within a planning framework that may be summarized in the following manner:

- The existing framework is fragmented and in some cases too narrowly focused primarily due to the fragmentation of jurisdictional responsibilities for preparation of the various HWP components.
- Uncertainties in future water requirements and availability of resources are addressed by making simplifying assumptions which arrive at a single manageable scenario to be considered.
- The tradeoffs between competing uses for the same water resource are merely acknowledged as an issue to be dealt with in the detailed planning of specific projects or in the further development of a particular resource development strategy, and are not adequately addressed within the overall planning context.
- All proposed resource development strategies are geared to meeting a single-point future water demand projection (as opposed to a range of scenarios), regardless of the physical, environmental or other socioeconomic costs and impacts of the strategies.

The existing planning framework has therefore resulted in planning documents that are static in nature. However, water resource planning is an ongoing process that requires a dynamic framework which results in planning documents that provide alternative strategies addressing future uncertainties. The following complexities in planning for the future use and development of water resources further support the need for a more effective and coordinated planning process:

- There is growing competition for available potable water resources in the aquifers that have been designated as ground-water management areas. As

future demands grow for potable water, competition will also intensify in other aquifers not currently designated as ground-water management areas. Intensified competition for available resources calls for an *integrated* rather than a fragmented planning approach.

- Major changes have occurred and are still occurring in the agricultural industry, which currently represents the greatest demand for potable and non-potable water in the State. The demise of sugar production and the long-term feasibility of replacement crops or other agricultural activities imply that future agricultural water demands will need to be further defined. Changes in various water demand sectors such as the military, urban land development, and tourism are also significantly driven by events outside the control of our State and local governments. Planning for future water resource development must therefore address these uncertainties with greater sophistication in defining future water demands.
- Public awareness of proposals for water resource development projects is growing. This increased awareness calls for involving the public during the development of the overall strategies for water resource development and in the identification of resource development options. A more comprehensive public information and education program coupled with venues for public participation in the planning process can provide for effective dialogue to occur between entities having various water interests. This can lead to earlier identification of issues and greater public input in the selection and implementation of resource development options and strategies.
- The availability of existing and inexpensive water resources is declining and in certain aquifers has reached levels that warrant closer monitoring and the implementation of management strategies to protect the aquifer from degradation due to over-withdrawal. Continued and increasing demands on these aquifers cannot be met without potential impacts to the quality (and cost) of the water that is being withdrawn. In addition, the changes in agricultural water usage and irrigation practices have reduced the recharge component and ground water availability in specific aquifers.
- As the opportunities for development of inexpensive water resources decline, the resulting increase in development costs will make the use of alternative resources such as reclaimed water and desalinated water more attractive. In such an environment, the appropriate use of the various classes of potable and non-potable sources becomes more important in achieving an optimum mix of future resource supply. Achieving the optimum mix will require decision-making processes and approaches that consider varied and sometimes conflicting factors and impacts of proposed resource development options. Greater consideration will also need to be given to achieving the desired outcomes with non-structural options such as greater demand-side management and conservation programs.

- There is a need to recognize and plan for the water requirements for legally protected water rights under the water code, State Constitution and Hawaii case law, e.g., future water needs for the DHHL, appurtenant rights, and traditional and customary practices of native Hawaiians.

To provide a more effective planning framework for the Hawaii Water Plan, one that will enable the development of alternative strategies that can address the future uncertainties identified above, the CWRM has incorporated the approach known as Integrated Resource Planning (IRP).

Integrated Approach for the Hawaii Water Plan

Using the principles of IRP, the CWRM has developed a framework structure that charts a path each agency should follow over the established planning horizon. The framework for updating the HWP strives to identify the required interactions between the various plan components and planning steps to be undertaken. It should be recognized that each county's situation is unique and not all of the framework steps will look the same or receive the same degree of emphasis during the updating process.

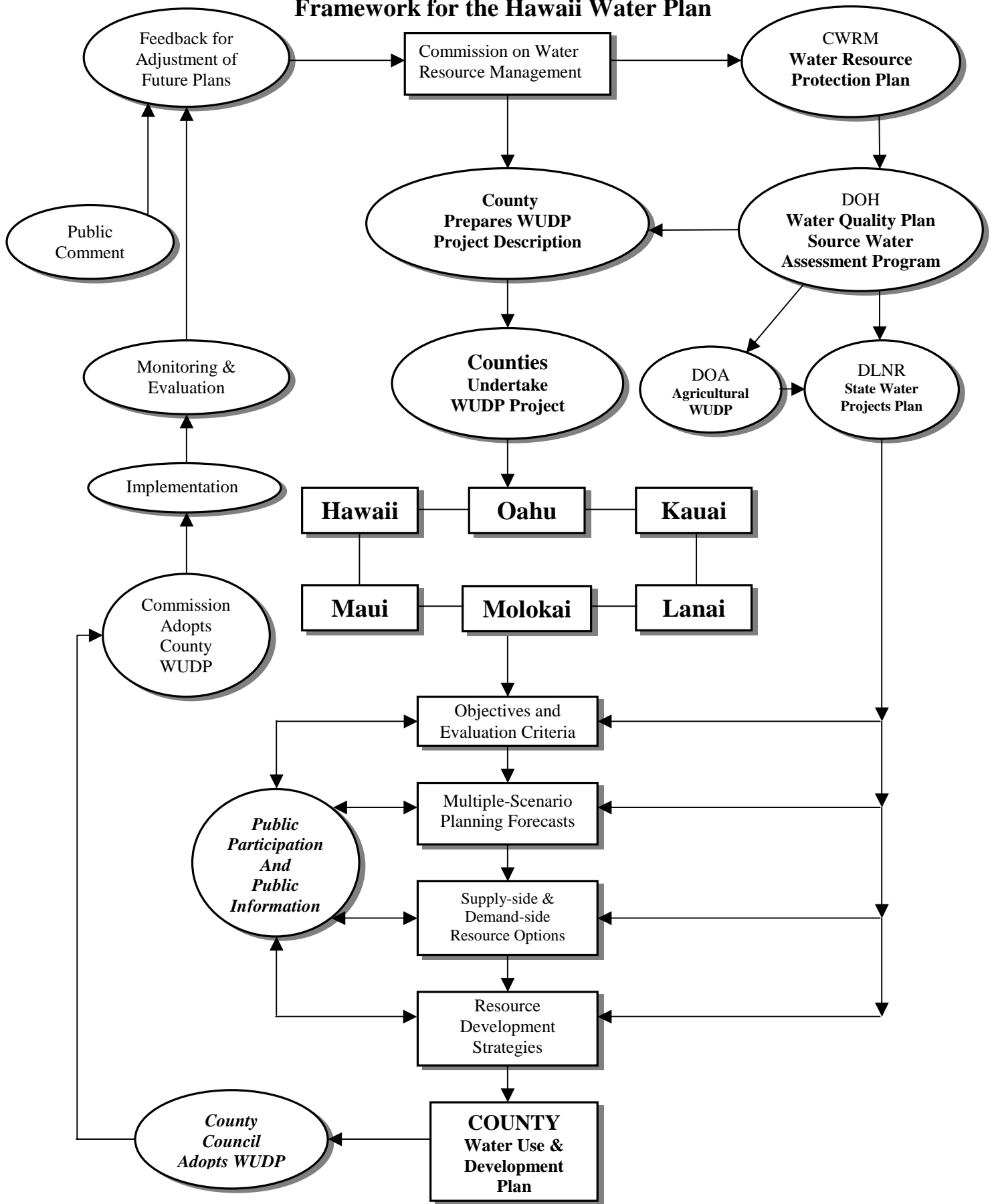
The framework structure for updating the Hawaii Water Plan is schematically depicted on Figure 2-1. The framework structure shown in the figure has three major branches. The first is a branch shown on the right that encompasses the component plans that are prepared by state agencies. The second is a central core that results in the development of the County Water Use and Development Plans. And lastly, an implementation, monitoring and feedback branch, shown at the left, provides for adjustment of future planning efforts.

The Hawaii Water Plan components that are prepared at the state level include the *Water Quality Plan*, the *Water Resource Protection Plan*, the *State Water Projects Plan*, and the *Agricultural Water Use and Development Plan*. These components, as shown on Figure 2-1, should be updated in coordination with the County Water Use and Development Plans.

Federal and state regulations and policies with respect to water quality and resource protection should be implemented under this framework principally through the *Water Quality Plan* and the *Water Resource Protection Plan*. These components of the Hawaii Water Plan provide critical guidance for the counties in updating the WUDPs. This linkage is shown in the framework schematic.

The *WQP* and the *WRPP* also provide guidance for the state agencies responsible for development of the *State Water Projects Plan* and the *AWUDP*. These latter two components represent water use and development plans for all state agencies, state projects, and private agricultural projects, respectively. Since projects undertaken by the State will have an impact on water resources within each of the counties, the planning effort at the state level ultimately must be integrated with the planning at the county level. This linkage is also depicted in Figure 2-1 as occurring at each of the four stages of the county IRP process.

**Figure 2-1
Framework for the Hawaii Water Plan**



The framework structure described in the foregoing should result, in the end, in a more integrated and effective Hawaii Water Plan. However, as will be discussed in detail in the Implementation Plan, the near-term implementation of the framework will need to be phased in due primarily to constraints in funding and the need to coordinate efforts that may already be underway. For example, the Source Water Assessment Program (SWAP) being undertaken by the DOH has a project time frame that will likely be longer than that anticipated for the Oahu WUDP update. Thus true integration of the results of the SWAP with the Oahu WUDP effort may not materialize until the next plan update or cycle. The framework structure thus sets forth that continual monitoring and feedback with respect to the planning process must occur in order for future planning efforts to be appropriately adjusted and coordinated.

Relationships between Plan Components

Because different state and county agencies prepare the separate components of the Hawaii Water Plan, it is critical that the components are interrelated in order for the overall HWP to be cohesive. The relationships between the various component plans, depicted in Figure 2-1, are discussed as follows.

The Water Quality Plan and the Water Resource Protection Plan are the two plan components that are critical to determining water usage and determining strategies for developing water resources. These two components outline the regulations, standards, and resource management policies that define the availability of ground- and surface-water resources and the quality to be maintained in these resources. In addition, the quantity of ground- and surface-water resources that can be withdrawn on a sustainable basis is determined as part of the WRPP. The WQP and WRPP therefore provide critical inputs to the State Water Projects Plan, the Agricultural WUDP and the WUDPs developed by the four counties. The initial WRPP and WQP were adopted in 1990 by the CWRM. The SWPP, AWUDP, and County WUDPs must be consistent with these 1990 plan components until a subsequent update of the WRPP or WQP is adopted by the CWRM.

The relationships between the plans prepared by the state and the WUDPs prepared by the four counties are best understood by noting that the County WUDP must, by statute, encompass all water usage and water development plans projected throughout the county. Since the various state agencies ultimately build their projects within one of the four counties, their water use demands and their proposals for developing various resources to meet those demands must be factored into the overall water demands and development strategies of each of the counties. This relationship is depicted in Figure 2-1 as input from the state level to the county level. In practice, the relationship should be more in the nature of a cooperative dialogue and joint planning effort, if a cohesive Hawaii Water Plan is to be achieved.

As shown on the figure, the *HWP Framework*, developed by the CWRM, principally guides the updating of the various Water Use and Development Plans of the four counties. As part of each county's WUDP update, a *County-Specific Project Description* shall be prepared by each county and submitted to the CWRM. As will be discussed later in detail in Section III, the *WUDP Project Description* should present the specific issues,

planning activities, schedule and objectives to be met by the county in its planned update of the County Water Use and Development Plan.

The *Project Description* document should serve as the basis for implementing the recommended integrated resource planning provisions identified in this framework. The IRP approach, as shown on Figure 2-1, is characterized by a multi-stage planning process beginning with setting objectives and evaluation criteria, developing multiple-scenario planning forecasts, identifying supply- and demand-side resource options and concluding with the selection of resource development strategies.

Throughout this generalized four-stage WUDP planning process, the IRP approach calls for a concerted public participation and public information program to achieve an appropriate level of public consensus with respect to the objectives, criteria, forecasts, options and strategies that are being considered. Integration of the planning effort being conducted at the state level will be achieved by bringing the results of the state planning efforts into the county planning process at each stage.

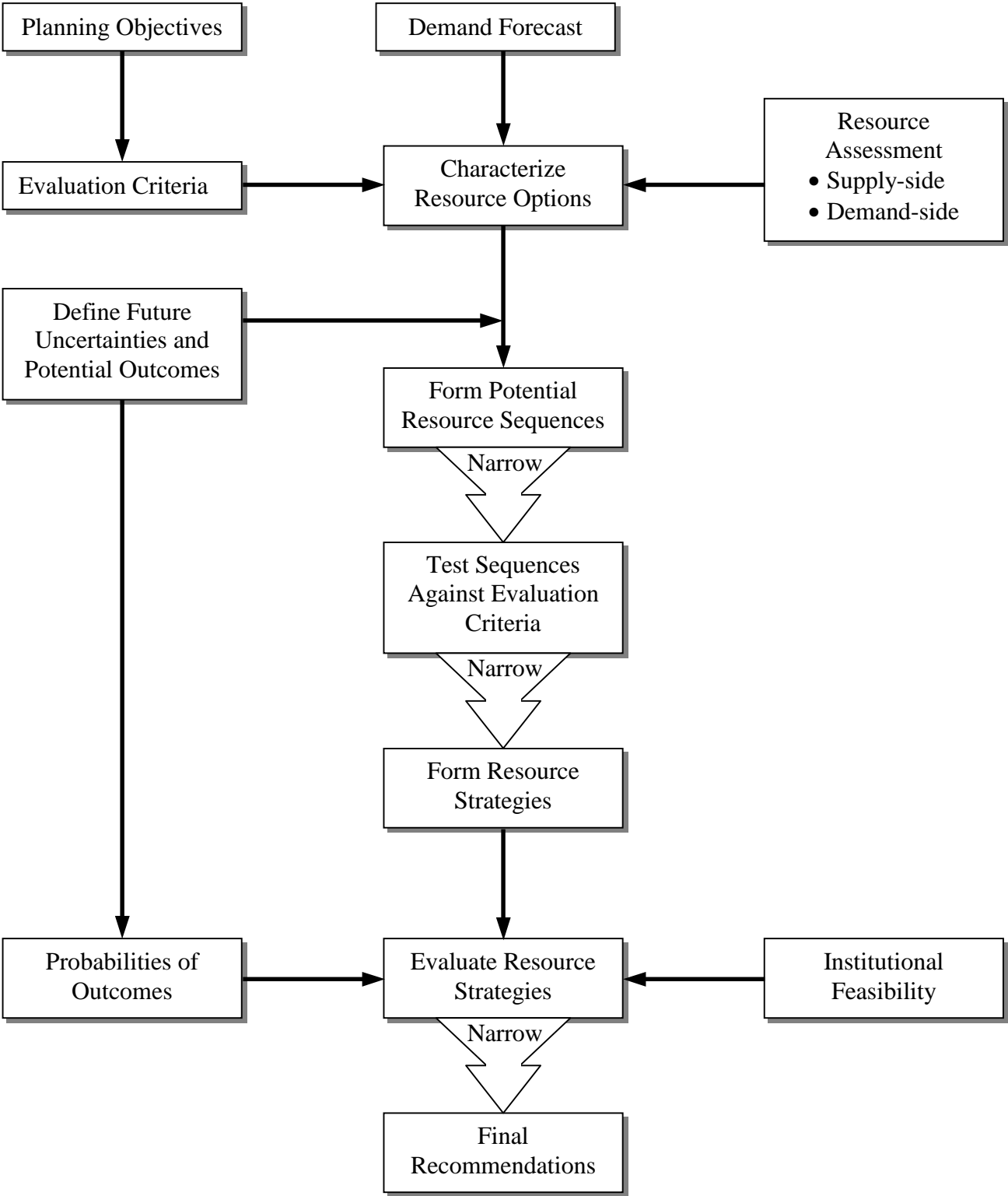
Elements of an IRP Process

The recommended IRP approach can best be described as a comprehensive form of planning that encompasses least-cost analyses of resource management options, as well as a participatory decision-making process. It involves the development of water resource alternatives that take into consideration communities and environments that may be affected, the numerous institutions concerned with water resource development and protection, and the potential for competing policy goals. IRP attempts to consider all direct and indirect costs and benefits of demand-side and supply-side management, and augmentation of supply. This is achieved by using alternative planning scenarios, analyses across disciplines, evaluation of social and environmental impacts, and community involvement in the planning, decision-making, and implementation processes.

Figure 2-2 illustrates the key components of an IRP process. However, every element may not be applied the same way for each county. The planning approach should be adapted to meet county-specific conditions and objectives. A well-coordinated process to inform and involve the public must be provided for which accompanies the steps shown in Figure 2-2.

A distinguishing feature of IRP is the definition of multiple planning objectives. Identification of conflicting objectives can be expected as part of the IRP process. Notwithstanding, planning objectives should form the basis for criteria against which resource scenarios will be evaluated. The definition of planning objectives must be more precise than just phrases such as “minimize costs,” “protect the environment,” or “maintain a reliable system.” Planning objectives must address the kinds of costs, over what time frames, what types of environmental protection, and what is meant by a reliable system. IRP assumes that trade-offs will be made among conflicting planning objectives. As such, the IRP process should provide decision-makers with a framework and necessary information to make these difficult trade-offs. Consideration of trade-offs must, however, recognize that parties may be bound by certain legal or regulatory constraints.

Figure 2-2
ELEMENTS OF AN IRP PROCESS



One or more measurable evaluation criteria should be developed for each planning objective. Evaluation criteria should be designed to measure the performance of resource options against planning objectives. Measurable criteria may be expressed in various ways such as dollars, percentages, concentrations, or rankings and should not be limited to merely one kind of unit value (e.g. dollars). In some cases, evaluation criteria may be resource-specific in order to assess individual resource options.

As part of the IRP process, supply-side and demand-side options should be assessed and ultimately evaluated against the criteria adopted to measure how well various combinations of options meet specific planning objectives. Typically, potential (supply-side and demand-side) resource options will be filtered and screened to eliminate inappropriate options. The goal being to end up with a manageable number of resource options that will be combined into resource sequences which lead to the selection of viable resource strategies.

The IRP process should provide for consideration of future uncertainties that may play a significant role in determining resource decisions. However, actual outcomes for these uncertainties (e.g. permitting) cannot be reasonably predicted. Recommendations, as such, should be made for different sets of possible outcomes. Using the example of permitting uncertainties, the timing of a particular supply option will be dependent upon the issuance of required permits, therefore agencies must identify alternative actions which address various permitting outcomes.

The delineation of planning objectives and associated evaluation criteria, the screening of supply-side and demand-side resource options, and definition of future uncertainties described above together comprise the necessary components to develop recommended resource strategies which best achieve established planning objectives.

Integration at the County Level

The preceding discussion of the HWP framework and the relationships between the plan components establishes that comprehensive water planning must be effectuated at the county level. As previously stated, the State Water Code mandates that the County WUDP “be prepared by each separate county... setting forth the allocation of water to land use in that county.” To achieve this objective within the proposed framework, water-planning efforts related to municipal and non-municipal water demands should be coordinated and integrated at the county level.

As depicted in Figures 2-1 and 2-2, the county planning process serves as the key, central role in coordinating and integrating all water use and development planning for each particular county. Under the proposed Hawaii Water Plan framework the county agency or agencies responsible for this planning effort will need to bring the many other water planning agencies at the state and federal levels and from the private sector into a process that integrates everyone’s efforts. It is envisioned that the use of integrated resource planning techniques and the incorporation of a public and stakeholder participation process will result in the achievement of these framework objectives.

SECTION III
ROLES, RESPONSIBILITIES AND REQUIREMENTS
FOR THE HAWAII WATER PLAN

General

The State Water Code defines certain responsibilities of specific state agencies and the roles and responsibilities of the county in general with respect to the preparation of the Hawaii Water Plan components. These roles and responsibilities are discussed herein within the context of the integrated HWP framework.

In addition to identifying the roles and responsibilities of specific agencies and entities, this section also presents specific guidelines for updating the components of the Hawaii Water Plan. The guidelines identified herein will ultimately result in a fully integrated Hawaii Water Plan. However, as previously stated, funding constraints and existing project timetables may not allow the responsible agencies to immediately fulfill all the informational requirements identified herein. In Section IV, an overall implementation plan will be presented which will identify near-term as well as long-term planning priorities and activities.

Commission on Water Resource Management (CWRM)

The CWRM is responsible for the general administration of the water code and has the final authority in all matters relating to the implementation and administration of the code provisions. Among the specific powers granted to the CWRM are the regulation of both ground and surface water; designation of water management areas; allocation of water use in designated water management areas; and regulation of well drilling, pump installation, stream channel alteration and stream diversion.

To effectively carry out these duties, the CWRM is responsible for the formulation of an integrated program for the protection, conservation and management of the waters of the State. In addition, the CWRM is responsible specifically for the preparation and updating of the Water Resource Protection Plan component of the Hawaii Water Plan.

Water Resource Protection Plan (WRPP)

The major objective of the WRPP is to protect and sustain statewide ground- and surface-water resources, watersheds, and natural stream environments. Such protection shall be established through a comprehensive study of occurrence, sustainability, conservation, augmentation, and other resource management measures.

Legal Mandate and Specific Statutory Requirements - WRPP

To accomplish the objective stated above, the State Water Code (under Section 174C-31, HRS) mandates that the CWRM shall undertake the following activities:

- 1) Study and inventory the existing water resources of the State and means and methods of conserving and augmenting such water resources.

- 2) Review existing and contemplated needs and uses of water including state and county land use plans and policies and study their effect on the environment, procreation of fish and wildlife, and water quality.
- 3) Study the quantity and quality of water needed for existing and contemplated uses, including irrigation, power development, geothermal power, and municipal uses.
- 4) Identify rivers and streams, or a portion of a river or stream, which appropriately may be placed within a wild and scenic rivers system, to be preserved and protected as part of the public trust.
- 5) Study other related matters as drainage, reclamation, flood hazards, floodplain zoning, dam safety, and selection of reservoir sites, as they relate to the protection, conservation, quantity, and quality of water.

The State Water Code also identifies the minimum requirements to be addressed in the WRPP. These minimum requirements are as follows:

- 1) Nature and occurrence of water resources in the State;
- 2) Hydrologic units and their characteristics, including the quantity and quality of available resource, requirements for beneficial instream uses and environmental protection, desirable uses worthy of preservation by permit and undesirable uses for which permits may be denied;
- 3) Existing and contemplated uses of water, identified in the water use and development plans of the State and the counties, their impact on the resource, and their consistency with objectives and policies established in the Plan;
- 4) Programs to conserve, augment and protect the water resource; and
- 5) Other elements necessary or desirable for inclusion in the Plan.

Recommended Plan Elements

To meet these requirements, an updated WRRP should consist of the following plan elements:

Declaration of CWRM Goals, Objectives, and Policies

A comprehensive WRPP should clearly describe and define the goals, objectives, and policies established by the CWRM. The specific application, as well as limitations, of these policies as they relate to the CWRM's protection and management of the State's water resources should be discussed within the plan. Policies should be defined as to statewide and regional/aquifer specific provisions and should serve to guide agencies in the development of supply-side and demand-side options.

These “guiding principles” or policies should include, but not be limited to, applicable Decision and Orders, Declaratory Rulings, and pertinent regulatory actions approved and/or adopted by the CWRM. Where appropriate, legal determination by the Department of the Attorney General should be solicited to clarify statutory mandates or provisions set forth in the State Water Code.

In addition, new policies as they may be developed, as well as modifications to existing provisions that may be further clarified by the courts, should be incorporated within subsequent updates to the WRPP.

The information required in this section of the plan should include, but not be limited to:

1. Declaration of the CWRM’s Overall Goals and Objectives;
2. Current Ground-Water Protection Policies/Guiding Principles and Resource Development Provisions;
3. Current Surface-Water Protection Policies/Guiding Principles and Resource Development Provisions;
4. Current Water Conservation and Resource Augmentation Policies; and
5. Current Watershed Protection Policies

Nature and Occurrence of Resources

This element of the WRPP should address the inventory, assessment, monitoring, and description of all ground- and surface-water resources. The information required in this section of the plan should include, but not be limited to:

1. An inventory and assessment of existing ground water and surface-water resources. Such inventory shall include a description of aquifer classifications, identification of hydrologic boundaries, current estimates of aquifer sustainable yields and instream use and protection provisions for surface watercourses (i.e. Instream Flow Standards).
2. Evaluation of current ground water-and surface-water monitoring programs and projects. Such assessment should include the status of existing ground-water monitoring and surface-water gaging and future plans for development of a strategic statewide ground-water and surface-water monitoring program.

Resource Management and Protection

This element of the WRPP should assess the existing and alternative management and protection programs for all ground- and surface-water resources. The information required in this section of the plan should include but not be limited to:

1. Delineation of statewide, regional, and/or aquifer-specific measures for protection of ground- and surface-water resources. Existing water management/protection measures and resource development provisions should be identified, including permit- and resource-related data requirements.
2. Use of ground-water modeling, including applicability of current models and compliance with modeling guidelines to determine model acceptability.
3. Assessment of alternative ground-water and surface water management strategies. Such assessment should address establishment of acceptable methodologies to evaluate minimum instream flow and other resource criteria.

Resource Conservation and Augmentation

This element of the WRPP should address programs and requirements to conserve and augment the water resources of the State. The information required in this element of the plan should include, but not be limited to:

1. Goals and objectives for a statewide water conservation program. Water conservation guidelines and planning criteria should be discussed in the context of current and future water conservation efforts.
2. A framework for state and county coordination in the development and implementation of water shortage plans, including development of a statewide drought mitigation plan.
3. Current resource augmentation policies and guiding principles. Planning and implementation of augmentation practices including, but not limited to, reuse, recharge, and desalination should be addressed. Criteria to evaluate and prioritize augmentation options should be developed, including identification of potential negative impacts.

The foregoing requirements should lead to an inclusive Water Resource Protection Plan with an emphasis on resource evaluation, resource management/protection and conservation/augmentation for all ground water and surface-water resources. However, existing funding constraints will require phased implementation of recommended WRPP elements. Several plan iterations and continued funding support will be required to complete the updating of the technical and resource management components of the plan. A “living document” approach to updating the WRPP will provide for future amendments and supplements to the plan that lead to better effectuation of State Water Code objectives.

Notwithstanding the relative importance of each recommended element, it should be clearly recognized that there is insufficient funding at this time to complete a full/comprehensive update of the WRPP. As such, plan elements should be prioritized based upon available funding and the comparative importance of each plan element

should be appropriately weighed. Elements initially required or which are supportive of future actions, assessments, or determinations should be implemented on a priority basis.

Such priority elements may include, but are not be limited to:

- Periodic review of sustainable yields and all pertinent hydrologic data and water quality parameters.
- Assessment of current surface water monitoring. Current data gathering should be reviewed and evaluated as to its present adequacy and statistical basis.
- Development and implementation of a statewide resource monitoring and data collection program.
- Delineation of watershed areas suitable for adoption as surface water hydrographic units and codification of perennial streams statewide.
- Development of a statewide inventory of all stream diversion systems.
- Assessment of physical characteristics and stream flow parameters and development of an initial stream classification system. This initial classification should serve as a beginning framework for decisions about instream values and minimum stream flow.
- Identification of required studies/actions that will lead to the establishment of permanent instream flow standards.
- Development of adequate provisions to recognize and provide for legally protected water rights.

The phased implementation of these plan elements is presented in Section IV.

It is critical to ensure the development of adequate provisions for protection of traditional and customary Hawaiian rights, appurtenant and correlative water rights, and the current and foreseeable needs of the Department of Hawaiian Home Lands. Steps to establish and implement such measures should also be addressed within a comprehensive WRPP. In addition, appropriate consideration of these elements should also be included in the formulation and update of each County WUDP. At a minimum, the beginning foundations for these provisions should be discussed and initially set out within a comprehensive WRPP.

Accordingly, the current update to the WRPP should initiate efforts to more effectively clarify and establish measures to protect these water rights. The CWRM, however, recognizes the complexity and magnitude of issues that must be addressed to clearly set forth legal and administrative provisions for meeting these objectives. As such, this framework hereby recommends that acceptable forums for addressing water rights be instituted as part of this update cycle. It is envisioned that the findings of this effort will

formulate the basis for establishing water rights provisions and promulgation of effective administrative rules, including consideration of the appropriateness of the CWRM's continued regulation of certain activities, e.g., taro loi cultivation.

The CWRM's ultimate discharge of its duty to protect water rights should, at a minimum, be governed through adoption of appropriate administrative rules. Such rules should set forth the practice and procedures under which the CWRM shall exercise its powers and duties to protect current and future water rights. In developing these administrative rules, the CWRM shall give consideration to the cultural appropriateness of those regulations, the practices of ancient Hawaiian water systems, objectives necessary to protect traditional and customary Hawaiian uses of water, and the water demand forecasts of the Hawaiian Homes Commission.

The current and foreseeable water needs of the Department of Hawaiian Home Lands (DHHL) shall continue to be incorporated within the State Water Projects Plan (SWPP) component of the HWP. Forecasted water demands for DHHL projects should be integrated with source development strategies developed as part of the updated SWPP.

Department of Health

The Water Code provides that the Department of Health (DOH) shall have primary jurisdiction and responsibility for administration of the State's water quality control programs. These responsibilities include formulation of a State Water Quality Plan for all existing and potential sources of drinking water. The DOH in coordination with the CWRM shall periodically review and revise the Water Quality Plan as needed.

In formulating or revising the plan, DOH shall consult with and carefully evaluate recommendations of concerned Federal, State and local agencies, particularly county water supply agencies.

Water Quality Plan (WQP)

The major objective of the WQP is to protect the public health and sensitive ecological systems by preserving, protecting, restoring and enhancing the quality of ground and surface waters throughout the State of Hawaii.

Legal Mandate and Specific Statutory Requirements - WQP

The WQP is the component of the Hawaii Water Plan that addresses the need to protect all existing and potential sources of drinking water from contamination due to activities that discharge pollutants into ground and surface waters. Development of this component of the HWP is the responsibility of the State Department of Health.

The WQP shall provide for:

- Federal/state/county goals, objectives, and policies related to water quality;
- Water quality criteria for designation of water management areas;
- Water quality standards, monitoring requirements and enforcement provisions; and
- Water quality management programs and recommended strategies.

Recommended Plan Elements

The current WQP was adopted in 1990 and a draft revision was prepared in December 1992. The draft revision compiles existing policies, regulations and programs at the federal, state and county levels that relate to protecting all sources of drinking water. In addition, new research needs and programs are discussed. The CWRM has not acted upon the current draft revision of the WQP. Further efforts to update the WQP have been deferred due to lack of funding. In addition, the State DOH is currently undertaking an assessment of potentially contaminating activities that may threaten existing drinking water sources, the results of which will be integrated into an updated WQP. That assessment project is described as follows.

Source Water Assessment Program (SWAP)

The 1996 reauthorization of the Federal Safe Drinking Water Act (SDWA) included an amendment requiring states to develop a program to assess sources of drinking water and encouraging states to establish protection programs. The drinking water source assessment is the first step in the development of a comprehensive drinking water source protection program. The assessment requires delineation of the area around a drinking water source through which contaminants might move and reach that drinking water supply. In addition, it requires an inventory of activities that might lead to the release of microbiological or chemical contaminants within the delineated area. This enables a determination to be made as to whether the drinking water source might be susceptible to contamination.

The goals of the Hawaii SWAP program include the following:

- Develop guiding principles for the assessments of sources of drinking water supply to benefit public water systems of the State.
- Assess potential impacts to drinking water quality and support effective management and protection of water resources now and in the future.
- Raise awareness of drinking water issues.
- Encourage proactive community-based strategies to protect drinking water sources.
- Prioritize cleanup and pollution prevention efforts for all sources of drinking water.
- Meet federal requirements for establishing a drinking water source assessment program.
- Develop linkages to other water resource protection and planning efforts and to upcoming water quality regulations.

The procedures and activities to be undertaken in conducting the drinking water source assessments to meet the state goals include the following:

- Preparation of an implementation plan for the SWAP activities;
- Conducting a public involvement program;
- Locating sources;

- Delineation of assessment areas and zones for surface-water sources, ground water under direct influence of surface water, and ground-water sources;
- Identification of possible contaminating activities that are considered potential origins of significant contamination within each assessment area and zone;
- Determining susceptibility of drinking water sources to contamination from potential contaminating activities within each assessment area and zone; and
- Assessing new drinking water sources as they are identified and developed.

The completion of the Hawaii SWAP program is currently scheduled for December 2001. A program plan was submitted in February 1999 and has received EPA approval. It is anticipated that demonstration projects will be initiated as the first step of the program implementation plan. The demonstration projects will be undertaken to test the validity of the assumptions made in establishing the assessment areas and zones and assumptions made in the modeling of potential contaminant transport modes and routes.

The SWAP is the initial effort to assess the potential for contamination of all drinking water sources serving the general public. It is expected that these assessments will lead to a comprehensive prevention and protection program, including the inventorying and monitoring of contaminants, identification and implementation of management measures and development of contingency plans to control and mitigate contamination sources.

Because the SWAP project scope is limited to the activities stated above, the development of management measures and contingency plans for mitigation must await the results of the assessments currently underway. Therefore, it is prudent that the updating of the WQP should await the results of the SWAP project. This deferment of the WQP update will allow the DOH and CWRM to better define required elements of the plan and coordinate the development of water quality protection programs with other resource protection programs.

Developing Effective Linkages Between Inter-Agency Programs

As discussed in the preceding section, the CWRM is responsible for coordinating regular updates of the HWP, including the update of the WQP component. In fulfilling this mandate, the CWRM has actively participated with the Department of Health in its development of the SWAP project. These collaborative efforts, we believe, have led to the beginnings of more effective linkages to other water resource protection and management programs in the State.

It should be reiterated that the DOH is statutorily required to update the WQP. Compliance with this mandate should be viewed as an excellent opportunity to integrate similar intra- and inter-agency water protection programs. Elements of SWAP, the Source Water Protection Strategy, and other DOH programs (e.g. UIC, Wastewater, etc.) should be compiled and coordinated as part of a comprehensive inter-agency strategy for water quality protection.

Coordination and identification of program linkages and effective integration of related programs should result in a comprehensive assessment of current/foreseen problems,

identification of available mitigation measures, and the development of improved management strategies.

Program achievements that may result from such coordination include, but are not limited to:

- Providing continual program updates and status reports;
- Identifying required follow-on actions by each agency;
- Coordinating data collection and monitoring efforts;
- Developing a common database and ensuring data consistency;
- Establishing a protocol for more effective data sharing; and
- Identifying relationships between regulatory and non-regulatory program efforts.

Recommended WQP Guidelines

Procedures and program measures for coordinating and streamlining agency activities and permitting requirements of similar federal, state and county programs should be established to ensure effective linkages between agency programs. The major goals and objectives of this effort should include, but not be limited to:

- Maximizing efficient use of agency time, staff and program resources;
- Identification of overlapping and/or duplicative program/statutory responsibilities;
- Establishment of more effective inter-agency coordination and communication;
- Consolidation (wherever possible) of agency review and permitting requirements; and
- Resolving conflicting permit approvals or other agency requirements (if any), including procedural disagreements between agencies.

Department of Land and Natural Resources (DLNR)

DLNR's Land Division has jurisdiction over state projects and, in conjunction with other state agencies, is responsible for preparation of the State Water Projects Plan.

State Water Projects Plan (SWPP)

The major objective of the SWPP is to provide a framework for planning and implementation of water development programs to meet projected water demands for state projects. The plan shall be implemented in coordination with the County WUDPs to insure orderly authorization and development. The SWPP shall provide for:

- An inventory of existing state water systems;
- Identification of proposed state projects/developments;
- Assessment of future water demand projections;
- A water development strategy outline, strategy implementation plan and recommendations; and
- Incorporation of an Agricultural Water Use and Development Plan

Legal Mandate and Specific Statutory Requirements - SWPP

The State Water Projects Plan (SWPP) is the component of the Hawaii Water Plan that addresses water needs for all state agencies on a statewide basis. The plan, in general, shall include, but not be limited to:

- 1) Status of state water and land developments and their existing water use requirements for domestic, industry, agriculture, hydropower, water reclamation, and recharge;
- 2) Future land uses and related water needs (e.g. projected DHHL water demands); and
- 3) Statewide plans for water developments including recommended and alternative plans, costs, adequacy of plans, and relationship to the Water Resource Protection Plan and the Water Quality Plan.

Recommended Plan Elements

The elements of the SWPP presented herein include the guidelines as outlined in Title 13, Chapter 170, Hawaii Administrative Rules (HAR), and the recommended elements for utilizing an integrated resource planning approach to state water projects planning. The SWPP shall be consistent with the WRPP and WQP and should include the following elements:

- 1) *Consistency with the WRPP* – The SWPP shall comport with the provisions of the Water Resource Protection Plan and should utilize the ground-water hydrologic units and surface-water hydrographic units designated statewide by the CWRM for the presentation of data and analyses.
- 2) *Current and Future Demand Forecasts* – The SWPP should evaluate current and future state projects and related water demands to insure orderly authorization and development of existing water resources. Demand forecasts shall include the current and foreseeable potable and non-potable water needs of DHHL. The SWPP shall consider a twenty-year projection period for analysis purposes. The review of all existing and contemplated water projects shall be based upon water consumption guidelines and water demand unit rates used by the CWRM for the purposes of its water use permit application review process. All projects should indicate the following information, at a minimum:
 - a) Type of project;
 - b) Source of water;
 - c) Existing uses;
 - d) Contemplated uses;
 - e) System capacity;
 - f) Location/Tax Map Key (TMK);
 - g) Project schedule;
 - h) Quality of water needed;

- i) Basis for water demand projections (e.g. area, units, etc.); and
 - j) Primary source development plan for the project(s).
- 3) *Water demand-forecasting techniques* – The forecasts developed by state agencies should identify the significant demand determinants used by each agency which may include but are not limited to:
- a) The data, the sources of data, the assumptions, and the analysis upon which the forecast is based;
 - b) The relative sensitivity of the forecasts to changes in assumptions and varying conditions; and
 - c) The procedures, methodologies, and models used in the forecast, together with the rationale underlying the use of such procedures, methodologies, and models.

The approach used by state agencies in their forecasts should be based on sufficient historical data and at a minimum should result in high, medium, and low forecasts of average day demands. Additional forecasts of annual, seasonal, and peak-day system demands, as may be necessary should be based upon forecasted average day demands. The validity and reliability of the approach used by state agencies must be demonstrated and the agencies must be prepared to discuss unexplained variation in demand.

- 4) *Integrated Resource Planning Elements* – To provide consistency and coordination between the State Water Projects Plan and the County Water Use and Development Plan, the following elements of the IRP approach should be followed in the preparation of the SWPP:
- a) *Demand Forecast* – The SWPP shall include a range of forecasts of the amount of water required over the planning horizon. Agencies shall develop forecasts for multiple scenarios that are necessary or appropriate in the development of the SWPP and the County WUDP. Among the scenarios are the base case scenario (a scenario based on the most likely assumptions), a high-growth scenario, and a low-growth scenario.

Forecasts shall be based on yearly increments for the first 5 years. Thereafter, forecasts shall be based on 5-year increments to the year 2020. The agencies are encouraged to extend their forecasts beyond the year 2020, particularly when their forecasts for the initial 20-year period indicates that the limits of particular resources are within reach.

- b) *Water System Profiles* - The SWPP shall include a thorough description of State-owned supplies, major conveyance facilities and storage reservoirs, re-use programs, and conservation programs that are currently operated by state agencies. This description shall also include resources, if any, to which the

State has made commitments. The ability of the current (and, if applicable, committed) system to meet future demands should be explored.

c) *Resource Development Options* – As applicable, the SWPP shall address the following types of resource options:

- **Supply sources**, including both surface-water and ground-water supplies and various combined uses of the two. The issue of inter-basin transfers should be examined, with due regard to the environmental and cultural impacts in the basin of origin.
- **Transmission and other infrastructure**, including, but not limited to, major conveyance, treatment, and pumping facilities to relieve existing or anticipated constraints on effectively utilizing existing supplies.
- **Storage facilities**, to take advantage of annual, seasonal, daily, or diurnal variations in demands and/or available supplies.
- **Conservation programs** for residential, commercial, industrial, agricultural, and institutional customers. Conservation options should be considered as carefully as supply and facility options as to their ability to achieve objectives. In particular, the estimates for future program participation, costs, and savings should be enumerated and explained. As used here, the term “conservation programs” also includes conservation-oriented rate designs.
- **Direct and indirect use of reclaimed wastewater** for non-potable uses. Such options must be consistent with federal, state, and county laws and regulations.

d) *Source Development Plan* – The SWPP must include a source development plan based upon selected resource options. The plan shall be divided into three periods as follows:

Near-term (initial 5 years): For this period, the source development plan must detail all of the actions that need to take place to accommodate state project water demands anticipated for the initial 5-year time frame. A near-term implementation schedule and a detailed description of each action shall be presented. This schedule shall reflect the anticipated timing and sequencing of all near-term actions. The schedule shall also include expected supply-side capacity additions and demand-side program penetration levels by year. Near-term actions may include, but are not limited to pre-design, design, construction, obtaining financing, information-gathering, staff hiring, execution of initial conservation program phases, and additional stakeholder and public involvement

activities. The 5-year plan should also include estimates of incremental annual capital and operating costs.

- **Medium-term (subsequent 5 years):** The source development plan for the medium-term will require less detail, and should focus on major decision points and actions such as plan reassessments, and other actions that may require substantial advance preparation. Precise scheduling and sequencing of events is not critical. However, such information will need to be developed as part of subsequent updates to the SWPP.
- **Long-term (final 10 years):** The long-term source development plan should serve to highlight major events that are anticipated in the final portion of the planning period. It is expected that detailed information may not be available for long-term plans, however, available data should be identified and sufficiently described.

- 5) *Resource Strategies* - The resource and facility options that are identified by the state agencies in the SWPP must be combined into resource strategies and integrated with the county strategies. A resource strategy is defined as:

A flexible sequence of supply, infrastructure, storage, and conservation program additions intended to meet state water needs over the planning period.

The state agencies must be prepared to develop alternative strategies and to evaluate each strategy against the other. During the update of each County's WUDP, state agency strategies should be re-evaluated based upon county-specific objectives and measurable criteria developed under the prescribed IRP process. The final product of this step should result in a manageable number of strategies within the WUDP from which a final recommendation will be selected.

- 6) *Uncertainties* - Future uncertainties should be considered in the development of resource strategies by state agencies. Source development strategies should provide for future contingencies that may arise in the face of particular outcomes. Sensitivity analysis of strategies developed by state agencies should be performed to evaluate the sensitivity of forecasts and outcomes to various future scenarios.
- 7) *Updating* – The responsibility for maintaining, monitoring, and updating the SWPP document resides with the DLNR. However, it is recommended that each state department annually update project information in order to monitor demand forecasts and implementation of water development strategies. State departments should establish a mechanism for regular review of existing, planned, and proposed water resources to meet department project requirements.

Department of Agriculture

Pursuant to Act 101, Session Laws of Hawaii (SLH) 1998, the Department of Agriculture (DOA) shall be responsible for preparation and regular updating of a State Agricultural Water Use and Development Plan (AWUDP). The initial plan shall be prepared and

submitted to the legislature no later than twenty days prior to the convening of the regular session of 2000. Preparation of the AWUDP by DOA shall be coordinated with the CWRM for future incorporation into the SWPP.

Agricultural Water Use and Development Plan (AWUDP)

The major objective of the AWUDP is to develop a long-range management plan that assesses state and private agricultural water use, supply and irrigation water systems. The plan shall address projected water demands and prioritized rehabilitation of existing agricultural water systems.

Legal Mandate and Specific Statutory Requirements - AWUDP

Based on the provisions of Act 101, SLH 1998, the AWUDP shall provide for:

- A master inventory of irrigation water systems;
- Identification of system rehabilitation needs, costs and sources of funding for repair and maintenance;
- Development of prioritization criteria and a 5-year program for system repairs;
- Set up of a long range plan to manage the systems; and
- Incorporation of the above findings into the SWPP.

Recommended Plan Elements

The effort described above is identified in the Act as a “master irrigation inventory plan” and should therefore be considered as an initial step in the development of a comprehensive Agricultural Water Use and Development Plan. The additional steps that would need to be taken to complete a comprehensive AWUDP should include the following:

- 1) Based on existing statewide agricultural land uses, assess the existing agricultural water irrigation needs of each of the counties.
- 2) Based on long-term agricultural crop development plans, develop a range of future agricultural irrigation water needs for each of the counties, including projected agricultural water demands of the DHHL.
- 3) Based on the information from the WRPP and the “master irrigation inventory plan,” identify existing sources for irrigation water and assess any shortfalls or excess capacities in existing irrigation systems.
- 4) Identify options for development of additional and alternative irrigation water sources.
- 5) Identify options for conserving irrigation water and/or managing the uses to reduce the total irrigation water demand.
- 6) Develop strategies encompassing both demand management and resource development options.

In order for the AWUDP to be consistent with the SWPP, the WRPP and WQP, it should include the following elements:

- 1) *Consistency with the WRPP* – The AWUDP shall comport with the provisions of the Water Resource Protection Plan and should utilize the ground-water hydrologic units and surface-water hydrographic units designated statewide by the CWRM for the presentation of data and analyses.
- 2) *Current and Future Demand Forecasts* – The AWUDP should evaluate current and future water demands for agricultural programs and projects statewide to insure orderly authorization and development of existing water resources. The AWUDP shall consider a twenty-year projection period for analysis purposes. The review of all existing and contemplated agricultural projects shall be based upon water consumption guidelines and water demand unit rates used by the CWRM for the purposes of its water permit application review process. All projects should indicate the following information, at a minimum:
 - a) Type of project;
 - b) Source of water;
 - c) Existing uses;
 - d) Contemplated uses;
 - e) System capacity;
 - f) Location/Tax Map Key (TMK);
 - g) Project schedule;
 - h) Quality of water needed;
 - i) Basis for water demand projections (e.g. area, units, etc.); and
 - j) Primary source development plan for the project(s).
- 3) *Water demand-forecasting techniques* – The forecasts developed by the DOA should identify the significant demand determinants used by the agency which may include but are not limited to:
 - a) The data, the sources of data, the assumptions, and the analysis upon which the forecast is based;
 - b) The relative sensitivity of the forecasts to changes in assumptions and varying conditions; and
 - c) The procedures, methodologies, and models used in the forecast, together with the rationale underlying the use of such procedures, methodologies, and models.

The approach used by the DOA in their forecasts should be based on sufficient historical data and at a minimum should result in high, medium, and low forecasts of average day demands. Additional forecasts of annual, seasonal, and peak-day system demands, as may be necessary should be based upon forecasted average day demands. The validity and reliability of the approach used by the DOA must

be demonstrated and the agency must be prepared to discuss unexplained variation in demand.

4) *Integrated Resource Planning Elements* – To provide consistency and coordination between the State Water Projects Plan and the County Water Use and Development Plan, the following elements of the IRP approach should be followed in the preparation of the AWUDP:

a) *Demand Forecast* – The AWUDP shall include a range of forecasts of the amount of water required over the planning horizon. The DOA shall develop forecasts for multiple scenarios that are necessary or appropriate in the development of the SWPP and the County WUDP. Among the scenarios are the base case scenario (a scenario based on the most likely assumptions), a high-growth scenario, and a low-growth scenario.

Forecasts shall be based on yearly increments for the first 5 years. Thereafter, forecasts shall be based on 5-year increments to the year 2020. The DOA is encouraged to extend their forecasts beyond the year 2020, particularly when the forecasts for the initial 20-year period indicates that the limits of particular resources are within reach.

b) *Water System Profiles* - The AWUDP shall include a thorough description of current supplies, major conveyance facilities and storage reservoirs, re-use programs, and conservation programs that are currently in operation. This description shall also include resources, if any, to which the State, county, or private agricultural entities have made commitments. The ability of the current (and, if applicable, committed) system to meet future demands should be explored.

c) *Resource Development Options* – As applicable, the AWUDP shall address the following types of resource options:

- **Supply sources**, including both surface-water and ground-water supplies and various combined uses of the two. The issue of inter-basin transfers should be examined, with due regard to the environmental and cultural impacts in the basin of origin.
- **Transmission and other infrastructure**, including, but not limited to, major conveyance, treatment, and pumping facilities to relieve existing or anticipated constraints on effectively utilizing existing supplies.
- **Storage facilities**, to take advantage of annual, seasonal, daily, or diurnal variations in demands and/or available supplies.
- **Conservation programs** for agricultural water users. Conservation options should be considered as carefully as supply and facility options as

to their ability to achieve objectives. In particular, the estimates for future program participation, costs, and savings should be enumerated and explained. As used here, the term “conservation programs” also includes conservation-oriented rate designs.

- **Direct and indirect use of reclaimed wastewater** for irrigation uses. Such options must be consistent with federal, state, and county laws and regulations.

d) *Source Development Plan* – The AWUDP must include a source development plan based upon selected resource options. The plan shall be divided into three periods as follows:

Near-term (initial 5 years): For this period, the source development plan must detail all of the actions that need to take place to accommodate the projected agricultural water demands anticipated for the initial 5-year time frame. A near-term implementation schedule and a detailed description of each action shall be presented. This schedule shall reflect the anticipated timing and sequencing of all near-term actions. The schedule shall also include expected supply-side capacity additions and demand-side program penetration levels by year. Near-term actions may include, but are not limited to pre-design, design, construction, obtaining financing, information-gathering, staff hiring, execution of initial conservation program phases, and additional stakeholder and public involvement activities. The 5-year plan should also include estimates of incremental annual capital and operating costs.

- **Medium-term (subsequent 5 years):** The source development plan for the medium-term will require less detail, and should focus on major decision points and actions such as plan reassessments, and other actions that may require substantial advance preparation. Precise scheduling and sequencing of events is not critical. However, such information will need to be developed as part of subsequent updates to the AWUDP.
- **Long-term (final 10 years):** The long-term source development plan should serve to highlight major events that are anticipated in the final portion of the planning period. It is expected that detailed information may not be available for long-term plans, however, available data should be identified and sufficiently described.

5) *Resource Strategies* - The resource and facility options that are identified by the DOA in the AWUDP must be combined into resource strategies and integrated with the county strategies. A resource strategy is defined as:

A flexible sequence of supply, infrastructure, storage, and conservation program additions intended to meet agricultural water needs over the planning period.

The DOA must be prepared to develop alternative strategies and to evaluate each strategy against the other. During the update of each county's WUDP, the DOA's strategies should be re-evaluated based upon county specific objectives and measurable criteria developed under the prescribed IRP process. The final product of this step should result in a manageable number of strategies within the WUDP from which a final recommendation will be selected.

- 6) *Uncertainties* - The DOA should consider future uncertainties in the development of resource strategies. Source development strategies should provide for future contingencies that may arise in the face of particular outcomes. Sensitivity analysis of strategies developed by the DOA should be performed to evaluate the sensitivity of forecasts and outcomes to various future scenarios.
- 7) *Updating* – The responsibility for maintaining, monitoring, and updating the AWUDP document resides with the DOA. However, it is recommended that agricultural stakeholders annually update project information in order to monitor demand forecasts and implementation of water development strategies. The DOA should establish a mechanism for regular review of existing, planned, and proposed water resources to meet projected agricultural requirements.

County Government

Each of the four counties is responsible for the preparation of a Water Use and Development Plan in accordance with the requirements of the State Water Code. The framework should additionally guide the preparation of each County WUDP if the WUDPs are to be effectively implemented by the county and utilized by the CWRM for resource management purposes. The responsibility for actual preparation of the County WUDP rests with the specific entities charged with water planning as may be enumerated by county ordinance. As part of the county-specific framework guidelines, each county shall specify the actual roles and responsibilities of the various county agencies involved in the development and preparation of the WUDP.

The State Water Code mandates that the counties adopt their Water Use and Development Plan by ordinance and calls for formal adoption by the CWRM. In accordance with this framework, the specific steps, responsibilities and projected timetable for the updating and adoption process should be included in the project description and submitted to the CWRM for approval prior to undertaking the update process.

In the development of the County WUDP, each county should designate a lead agency or agencies for the undertaking of the WUDP update. In the context of the integrated resource planning approach, the roles and responsibilities of the lead agency or agencies are envisioned as follows:

- To develop a scope of work and budget for the WUDP update;
- To secure funding for the project;

- To develop and coordinate a public and stakeholder participation process; and
- To coordinate the planning efforts of the various levels of government with the efforts of the private sector in order to achieve an integrated WUDP at the county level.

County Water Use and Development Plan

The County WUDP is intended to insure that the future water needs of the county are met. The WUDP should also provide guidance to the CWRM for decision-making on water uses and water reservation requests. The county shall provide an executive summary of the plan and of the analyses conducted and appropriately index its submissions to the CWRM.

Legal Mandate and Specific Statutory Requirements - WUDP

Updating of the WUDPs shall be in compliance with the overall goals and objectives of the HWP and the required provisions outlined in Section 174C-31, Hawaii Revised Statutes. These statutory requirements which must be followed include:

1. Preparation of a WUDP that sets forth “the allocation of water to land use” in each county which shall be adopted by ordinance and submitted to the CWRM for approval and adoption.
2. Requirement for periodic updates and modifications to the WUDP to maintain consistency with zoning and land use policies;
3. Appropriate recognition of the current and future development needs of the Department of Hawaiian Home Lands (DHHL); and
4. Preparation of “regional plans for water development including recommended and alternative plans, costs, adequacy of plans and relationship to water resource protection and quality plan.”

Recommended Plan Elements

The County WUDP update process should incorporate the following recommended elements:

Submission of a County-Specific WUDP Project Description – In conjunction with updating the WUDP, each county shall submit a WUDP Project Description for review and approval by the CWRM. Specific elements of the required project description are described in subsequent sections of the framework. The CWRM shall undertake and complete its evaluation as expeditiously as possible so as not to unreasonably delay the county’s updating of its WUDP.

Coordination with Commission on Water Resource Management– Each county shall brief the CWRM and its staff in conjunction with any planned updates of the County WUDP. The purpose of this briefing shall be to present the scope of work (i.e. WUDP Project Description) that will be followed in the planned update of the County WUDP. At this briefing, the county should be prepared to discuss the specific scope, project activities

and schedule to be undertaken by the county in its updating of the WUDP. The Project Description should also describe how SWPP and AWUDP information will be integrated and used in the updating of the County WUDP. Such briefing before the CWRM shall also serve as additional opportunity for public comment and input into the WUDP planning process.

In addition to presenting the County WUDP Project Description, periodic milestone briefings to the CWRM shall be required. Such briefings shall be for coordinating each county's planning activities with those activities to be undertaken by state agencies responsible for the other components of the HWP. Milestone briefings shall serve as an opportunity to review demand projection methodologies and determine if state project demands are accounted for by county projections, eliminate "double counting" of demands, and check for consistencies in the use of unit rates by land type. Milestone briefings by the county shall also serve to provide the CWRM with regular progress reports, including identification of any constraints encountered as part of the WUDP update.

Upon completion of the plan update and subsequent approval by the County Council, final adoption of the County WUDP by the CWRM shall be effectuated within the subject county to maximize public participation in the updating of the County WUDP.

Stakeholder and Public Involvement - Substantial and credible stakeholder and public involvement (SPI) is critical to the success of the County WUDP. While the precise form of the SPI effort will vary, each county should conclusively demonstrate that the public and identified stakeholders were sufficiently informed about the progress of the plan and that they had adequate opportunity to provide input. The WUDP should discuss how such input was incorporated into the development and evaluation of resource strategy alternatives.

At the start of its WUDP process, each county should develop a detailed SPI strategy that reasonably conforms to the following guidelines. Counties are encouraged to conduct greater efforts to inform and involve the public and stakeholders.

- Essential stakeholders should be identified. These stakeholders should be kept informed about plan progress and their input at critical stages of the plan development should be solicited.
- Sufficient information on important community values with respect to water resources and water supply should be systematically gathered, analyzed, and disseminated.
- A group of key individuals may be created and effectively used in an advisory capacity throughout the development of the plan.

- Other special-purpose groups (e.g. technical advisory committees, focus groups, community teams, etc.) may be convened to provide input and assistance in particular plan phases.
- Public forums of some type should, at minimum, be held at each of the following points of plan development:
 - Developing planning objectives
 - Screening resource options
 - Developing and evaluating resource strategies

The county should use multiple vehicles to inform the public at large in advance about these forums. Information at these forums should be presented in a non-technical manner designed to facilitate public understanding and participation.

- The incorporation of the results of the foregoing activities into the plan must be clearly demonstrated.

Defining the County Public Participation Process – A critical cornerstone of the IRP process is the use of an effective public participation process to identify and evaluate issues, objectives, options and strategies that are of concern to the public and entities with a stake in the outcome of the planning process. Each county should set forth the specific activities that will be undertaken to inform and involve the public and specific stakeholders in the WUDP planning process. Possible activities include, but are not limited to:

- Well-publicized public workshops, meetings, or hearings
- Individual organizations and stakeholder interviews
- Surveys and questionnaires
- Focus groups
- Formal or informal presentations to community groups
- Newsletters
- Utility bill inserts
- Fact sheets
- Slide shows or videos
- Local press coverage
- Information provided on web pages

The public participation strategy developed by each county shall be adequately described and incorporated into the county's WUDP Project Description.

Objectives and Criteria - Each update of the WUDP should include a careful process to develop and refine a set of planning objectives and associated evaluation criteria. This process must include essential stakeholders and consider available information on community values regarding water resource issues. (If such information is not available,

the county should employ a process to gather it, such as surveys, focus groups, interviews, etc.).

The planning objectives form the basis of the evaluation of alternative resource strategies. Their wording and meaning must therefore be carefully developed. Their completeness must be insured. Each objective will have associated with it one or more measurable evaluation criteria. These criteria may be quantitative or qualitative and it is not expected that they be measured in the same or similar units.

Each county should develop its own unique set of planning objectives. Planning issues for which objectives may be developed include, but are not limited to:

- Water supply reliability
- Costs and/or rates
- Environmental impacts
- Water quality
- Appurtenant and correlative water rights
- Traditional and customary gathering rights
- DHHL water rights (Section 221, HHCA)

The above list is intended to provide a starting point for each county to develop relevant planning objectives and evaluation criteria for its own unique water resource planning needs. It is expected that each county will need to expand on this list to reflect its own needs in updating the WUDPs.

Each WUDP should describe the process by which the planning objectives are identified and defined. The description of the process should be in sufficient detail to assure the public that the process has resulted in objectives that meet the foregoing requirements and accurately reflect community values. The plan should also describe in detail the manner in which the evaluation criteria were used to compare the efficacy of alternative resource strategies.

Counties are not required to use the above examples of potential planning objectives. They are presented to assist counties in their own plan development.

Consistency with the WRPP – The WUDP shall comport with the provisions of the Water Resource Protection Plan and should utilize the ground-water hydrologic units and surface-water hydrographic units designated statewide by the CWRM for the presentation of data and analyses.

Current and Future Demand Forecast - Each County WUDP should include a range of forecasts of the amount of water required over the planning horizon. The WUDP forecasts shall incorporate the most recent SWPP and AWUDP forecasts of water requirements within the county. It shall also include forecasts of water requirements of federal and private sector purveyors.

Agencies should develop forecasts for multiple scenarios that are necessary or appropriate in the development of the County WUDP. Among the scenarios are the base case scenario (a scenario based on the most likely assumptions), a high-growth scenario, and a low-growth scenario. To facilitate review of water use permit applications by the CWRM, the county should develop demand forecasts for the initial 5-year period based on specific projects consistent with state and county land use plans and designations. The demand forecasts for the initial 5-year period should also be developed based on the water use and demand guidelines used by the CWRM or a refined set of guidelines based on actual water use. Different approaches to forecasting may be used beyond the initial 5-year projection period, but each forecast should identify the significant demand determinants used by the county which may include but are not limited to:

- The data, the sources of data, the assumptions, and the analysis upon which the forecast is based;
- The relative sensitivity of the forecasts to changes in assumptions and varying conditions; and
- The procedures, methodologies, and models used in the forecast, together with the rationale underlying the use of such procedures, methodologies, and models.

The forecast approach should be based on sufficient historical data and, at a minimum, develop high, medium, and low forecasts of average day demands. Additional forecasts of annual, seasonal, and peak-day system demands, as may be necessary, should be based upon forecasted average day demands. The validity and reliability of the forecast approach used must be demonstrated and any unexplained variation in demand must be discussed.

Forecasts shall be based on yearly increments for the first 5 years. Thereafter, forecasts shall be based on 5-year increments to the year 2020. The counties are encouraged to extend their forecasts beyond the year 2020, particularly when their forecasts for the initial 20-year period indicates that the limits of particular resources are within reach.

Finally, demand forecasts shall be consistent with county land use plans, development plans and/or community plans.

Water System Profiles - The WUDP should include a thorough description of current supplies, major conveyance facilities, storage reservoirs, re-use programs, and conservation programs. This description shall also include resources, if any, to which the county has made commitments. The ability of the current (and, if applicable, committed) system to meet future demands should be explored.

Resource and Facility Options - Each WUDP must describe the resource and facility options that were considered. The planning process must begin with a broad group of options and must successively screen out inappropriate options. In this context, an “inappropriate” option is one that can be shown to do an unacceptably poor job of achieving one or more of the planning objectives.

It is expected that many options will be screened out with a minimum of analytical effort. Analytical resources should be focused on those options that have the highest likelihood of meeting planning objectives. Counties must clearly document the reasoning behind the inclusion or exclusion of any option.

As applicable, each WUDP shall address the following types of resource options:

- **Supply sources**, including both surface water and ground-water supplies and various combined uses of the two. The issue of inter-basin transfers should be examined, with due regard to the environmental and cultural impacts in the basin of origin.
- **Transmission and other infrastructure**, including, but not limited to, major conveyance, treatment, and pumping facilities to relieve existing or anticipated constraints on effectively utilizing existing supplies.
- **Storage facilities**, to take advantage of annual, seasonal, daily, or diurnal variations in demands and/or available supplies.
- **Conservation programs** for residential, commercial, industrial, agricultural, and institutional customers. Conservation options should be considered as carefully as supply and facility options as to their ability to achieve objectives. In particular, the estimates for future program participation, costs, and savings should be enumerated and explained. As used here, the term “conservation programs” also includes conservation-oriented rate designs.
- **Direct and indirect use of reclaimed wastewater** for non-potable uses. Such options must be consistent with federal, state, and county laws and regulations.

Each resource or facility option must be initially characterized to enable a decision to be made regarding its retention or removal. For those options that are retained, sufficient information must be collected and analysis performed to proceed with the development and evaluation of resource strategies described below.

Strategies Development and Evaluation - The resource and facility options that are retained in the preceding step must be combined into resource strategies. For purposes of WUDP development, a resource strategy is defined as:

A flexible sequence of supply, infrastructure, storage, and conservation program additions intended to meet county water needs over the planning period.

Using whatever modeling tools are deemed necessary and appropriate, alternative strategies should be developed and evaluated against each of the measurable criteria that will have already been defined.

The final product of this step must be a manageable number of strategies from which a final recommendation will be selected. The size of this final set will vary, but it is

suggested that it include no more than six strategy alternatives. The manner in which the universe of possible strategies is narrowed to this final set must be carefully described in the WUDP.

Uncertainties - Future uncertainties should be considered in the development of resource strategies. Source development strategies should provide for future contingencies that may arise in the face of particular outcomes. Strategies must explicitly account for future uncertainties by use of the techniques of sensitivity analysis. Such techniques test the sensitivity of the forecasts and outcomes to different futures, and specify how future actions may change in the face of particular outcomes.

Final Strategy Selection - It is expected that no single strategy will perform best against every evaluation criterion. Tradeoffs will therefore have to be made among criteria and each WUDP must make those tradeoffs explicit. The process by which those tradeoffs are made may be formal or informal, and may or may not involve numeric weighting of criteria. It is the responsibility of each county to select and apply a process and thoroughly describe it in the WUDP. The logic of the final strategy selection must be made clear.

Modeling Tools - Each WUDP must carefully describe and document the computerized modeling tool(s) that were instrumental to completing the plan.

Implementation Plan - Each WUDP must include a plan to implement the adopted strategy. The implementation plan shall be divided into three periods as follows:

- **Near-term (initial 5 years):** For this period, the implementation plan must detail all of the actions that need to take place to accomplish the first phase of the adopted strategy. Such actions include, but are not limited to pre-design, design, construction, obtaining financing, information-gathering, staff hiring, execution of initial conservation program phases, and additional stakeholder and public involvement activities. A detailed description of each action shall be presented. The 5-year plan should also include estimates of incremental annual capital and operating costs.

A near-term implementation schedule is also required. This schedule shall reflect the anticipated timing and sequencing of all near-term actions. The schedule shall also include expected supply-side capacity additions and demand-side program penetration levels by year.

- **Medium-term (subsequent 5 years):** The implementation plan for the medium-term will include significantly less detail, focusing on major decision points and actions such as plan reassessments, major investments, bond elections, and other actions that may require substantial advance preparation. Precise scheduling and sequencing of events is not critical. However, such information will need to be developed as part of subsequent updates of the WUDP.

- **Long-term (final 10 years):** The long-term implementation plan will serve to highlight major events that are anticipated in the final portion of the planning period. Projects and strategic actions to be undertaken during this period will likely be described only in conceptual terms.

Underlying Assumptions and Data - The WUDP must clearly indicate all of the assumptions that underlie the plan and the sources of all data used in the plan.

Need for Flexibility

The statewide framework identifies guidelines that state and county agencies should follow, but also recognizes the need for appropriate flexibility that may be necessary due to institutional and/or funding constraints. Plan versatility is also necessary to encourage innovation as well as to accommodate unique and county-specific concerns that may be addressed within the WUDP.

Notwithstanding this need for flexibility, the framework serves to establish important planning elements and issues that should be addressed as part of the IRP process and minimum requirements that should be incorporated into the updated WUDPs. In defining such requirements and recommended plan elements, attention was given to each agency's existing statutory and regulatory requirements. It is the intent that these requirements and recommended planning elements will provide a more cohesive approach for effectively assessing water supply options, project proposals and sequences, conservation and demand-side management strategies, and long-term plans for developing and managing existing and alternative water resources.

Therefore, each county must be provided with sufficient flexibility to implement the integrated resource planning framework in a context that is more specifically tailored to the county's individual needs and priorities. The following section describes the process and provisions by which each county may tailor the framework guidelines to its own water use and development planning process.

Development of County-Specific Project Description

The framework requirements and specific guidelines presented above define the overall parameters that each County's WUDP must meet. However, the CWRM recognizes that each county faces a unique set of conditions that have an impact on the county's planning process, including:

- 1) The nature and occurrence of water resources and existing infrastructure in the county;
- 2) The planning issues and water use priorities the county must address;
- 3) The financial resources available to the county; and
- 4) The financial and organizational structure that has been established by its County Council and administration.

In light of such conditions, counties should develop a scope of work for updating its WUDP which best meets its overall objectives. The process by which these objectives

are to be achieved should be set forth in a detailed project description and schedule for updating the County WUDP.

Establishing Priorities and Objectives – As part of the WUDP Project Description, each county shall identify specific issues relating to land use, water use and resource development, and the relative priority of the issues to be addressed in the update of the WUDP. To the extent possible, the priority of the issues shall be developed in coordination with the County General Plan, Development Plan and/or Community Plan.

In addition to identifying and prioritizing specific county issues, each county shall also provide the CWRM with its proposed methodology for identifying planning objectives and evaluation criteria as required to meet the HWP framework requirements.

Defining the County IRP Project Scope – A major element of the county-specific WUDP Project Description shall be the definition of a specific project scope that the county will undertake in its update of the WUDP. This scope of work shall be based on the techniques of integrated resource planning and shall outline the county's specific proposals in the following arenas:

- Establishment of planning objectives and evaluation criteria
- Public/stakeholder participation and public information program
- Water demand forecasting considering the uncertainties of the future
- Identification of conservation and demand management programs
- Identification of source development options, and any potential impacts to the resource
- Development and integration of resource development strategies

The county's proposed scope of work (i.e. Project Description) should be sufficiently detailed to enable the county to identify the specific water resources planning expertise that would be required to complete the WUDP update. In addition, the scope of work should be sufficiently detailed to identify specific planning tasks and activities that will be undertaken to address the specific issues and priorities previously identified by the county.

Establishment of WUDP Schedule – In order to coordinate the county's planning efforts with the planning activities being undertaken by various state agencies to update other components of the Hawaii Water Plan, the WUDP Project Description shall contain a schedule for the county's updating of its WUDP. This schedule shall be as specific as possible in outlining the different stages and activities of the county's planning effort. The schedule shall also indicate the approximate times and anticipated duration for public participation activities. In addition, the schedule shall indicate the approximate time frame for county approval of the WUDP and submittal of the WUDP to the CWRM for its adoption.

Summary of Framework Guidelines for HWP Components

To ensure that the HWP components are dynamic processes rather than static reports, the framework sets out the following guidelines pertaining to planning, programming, implementation and evaluation:

1. State and county agencies should set priorities and develop appropriate strategies to meet the counties' growing water demands as part of their current planning and decision-making processes. Implementation of integrated resource planning should comport with state and county environmental, health and safety laws. In addition, resource development plans should be consistent with the Water Resource Protection Plan, Water Quality Plan, and with formally adopted state and county land use and community development plans.
2. State and county agencies should develop a robust evaluation and assessment process emphasizing the integration of various planning scenarios into a strategic decision-making process that addresses uncertainties, environmental externalities and public needs.
3. State and county agencies involved in water use and development planning should consider least-cost planning and equal treatment of all types of resources (supply-side and demand-side). The integrated resource planning process should require consideration and analyses of the costs, effectiveness, and benefits of all appropriate, available and feasible supply-side and demand-side options.
4. State and county agencies involved in water use and development planning should identify resources or a mix of resources for meeting near- and long-term water needs in an efficient and reliable manner at the lowest reasonable cost.
5. State and county agencies must adopt a 20-year planning horizon with requirements for regular 5-year updates. Each 5-year update cycle shall commence on the 3rd year, with adoption of a revised HWP component by the 5th year.
6. State and county agencies should incorporate a public participation and education process involving the community, public interest groups and government agencies. The integrated resource planning process should provide for an open public process. Opportunities should be provided for participation by the public and governmental agencies in the development and adoption of the County Water Use and Development Plans.
7. To facilitate regulation and permitting, the county should develop demand forecasts for the initial 5-year period based on specific projects consistent with state and county land use plans and designations. The demand forecasts for the initial 5-year period should also be developed based on water use and demand guidelines used by the CWRM or a refined set of guidelines based on actual water use.

The framework that is outlined above focuses on the integrated resource planning process as a model process for undertaking future updates of the Water Use and Development Plans. This framework further endorses that all water resource development options and strategies planned by federal, state or county agencies, and private sector entities be integrated at the county level. In achieving this integration at the county level, a comprehensive and long-term strategy for efficient and beneficial use of all the water resources within each county and the State as a whole can be effectuated.

SECTION IV

FRAMEWORK IMPLEMENTATION PLAN

Overview

The planning framework described in the three previous sections represents a dramatic shift in the process by which the Hawaii Water Plan components are developed. The framework proposes a more integrated approach particularly at the county level and identifies recommendations for substantive elements for each plan component that either go beyond current mandates and statutory requirements or provide amplification of the statutory requirements. As a result, implementation of the framework will require close coordination and cooperation between the various agencies charged with preparation of the component plans and future amendment of existing statutes may be warranted.

In certain cases, updating of the component plans may already be underway with project scopes fixed by current funding levels and project agreements. The ability to obtain additional funding or to revise existing project agreements is constrained by the current budgetary and financial condition of the State and county governments. These factors indicate that implementation of the requirements and recommendations contained in this framework document will need to be phased over the next several years and possibly over successive iterations of the updating process for the Hawaii Water Plan.

Full implementation of the proposed framework for the Hawaii Water Plan can be achieved in three phases identified as follows:

Phase I: Framework Adoption and Initial Updates to HWP Components

1. Adoption of the framework by the CWRM;
2. Undertaking of an extensive information and educational outreach effort regarding the framework and the use of integrated resource planning techniques for state and county agencies and other stakeholders with an interest in the Hawaii Water Plan components;
3. Completion of existing scopes of work for the WRPP and SWPP, as negotiated;
4. Completion of the SWAP scope of work, as negotiated; and
5. Completion of the AWUDP in accordance with Act 101, SLH 1998.
6. Initiation of the Oahu WUDP update.

Phase II: Development and Funding of New Framework Initiatives

1. Development and funding of project scopes for instream studies, aquifer sustainable yield studies and other water resource protection and management measures relevant to the WRPP;
2. Development and funding of project scope to identify water quality management measures leading to a comprehensive watershed protection

- program based on the results of the SWAP, leading to a more comprehensive scope for the WQP;
3. Development and funding of comprehensive AWUDP scope of work based on recommended elements as identified in this framework;
 4. Funding of SWPP updates with specific emphasis on the Counties of Kauai, Maui and Hawaii;
 5. Development and funding of project scopes for the updating of WUDPs for the Counties of Kauai, Maui (including Molokai and Lanai), and Hawaii.

Phase III: Component Integration Phase

1. Update the WRPP based on instream studies and more refined aquifer sustainable yield modeling;
2. Prepare a comprehensive WQP based on the results of SWAP and water quality protection measures developed in Phase II;
3. Update the AWUDP based on refinement of agricultural development plans, statewide;
4. Update the SWPP based on refinement of state agency projections and development plans, statewide; and
5. Update the County WUDPs incorporating all mandatory and recommended framework provisions, subject to improvements as indicated by public and agency feedback from previous efforts.

The phasing of the Implementation Plan presented above provides agencies with the opportunity to transition current planning efforts and projects that have been previously developed on the basis of the existing requirements and planning methodologies to the CWRM's proposed framework that is based on integrated resource planning methodologies. More importantly, the phasing provides an opportunity for orderly development of scopes of work for the various resource assessments, water resource protection planning and water demand assessment tasks, and to allow for appropriation of required funding to implement the resulting scopes of work.

Detailed Implementation Steps –Phase I

The first objective in this phase of the framework implementation is to establish a new direction and provide guidance to the agencies responsible for specific components of the Hawaii Water Plan. To accomplish this objective, the actions that should be taken are:

1. Adoption of the proposed HWP framework that calls for an integrated approach to water planning particularly at the county level.
2. Undertaking of an extensive information and educational outreach effort to stakeholders and agencies with regards to the proposed framework elements.

A schedule for adoption of the framework that also includes initial efforts to provide information and educate agencies and stakeholders about the proposed framework is

outlined in Figure 4-1. This schedule would result in CWRM adoption of the proposed framework as guidelines in calendar year 2000.

Following the framework adoption and undertaking of initial educational outreach actions, as outlined in Figure 4-1, a second objective of Phase I is to complete the current update of the various components of the Hawaii Water Plan. The actions to be undertaken to meet this objective include:

3. Completion of existing scopes of work for the WRPP and SWPP, as negotiated;
4. Completion of the SWAP scope of work, as negotiated;
5. Completion of the AWUDP in accordance with Act 101, SLH 1998; and
6. Initiation of the Oahu WUDP update.

Each of these action items and the rationale for undertaking them in the limited manner indicated are discussed as follows.

Action items 3, 4, and 5 above essentially involve updating the component plans of the HWP that are the responsibility of state agencies. It is acknowledged that the scopes of work and funding levels for these component plans were developed prior to the development of the new framework and recommendations contained in this document.

In the case of the WRPP, the scope of work and priorities that have been established for the project were developed in conjunction with the conceptual development of the proposed HWP framework. However, the funding for the WRPP was obtained prior to development of the framework concepts and represents a practical constraint in undertaking elements of the plan such as extensive instream studies, aquifer sustainable yield studies and other water resource management measures. Nevertheless, under the currently negotiated scope of work, the WRPP will begin to address certain tasks and activities relating to such elements as shown in Table 4-1, *Summary of WRPP Tasks and Activities*.

In the case of the SWPP, the current scope of work and funding should be able to provide relevant water demand information and projections for use by the counties in their efforts to update their WUDP. Using Oahu as an example, water demand information for state-sponsored projects which could be accommodated by the existing or planned BWS system will be given to BWS for integration into their Oahu Water Use and Development Plan. The summary of tasks and activities to be undertaken under the current scope of work for the SWPP is presented in Table 4-2.

Figure 4-1

**Schedule for Adoption
Hawaii Water Plan Framework**

	OCTOBER 1999	NOV	DEC	Calendar Year 2000
Framework Document: Publish Notice of Availability Draft Available on Website Hard Copy of Draft Made Available Framework Presentations: State Agencies County Water Departments Senate Committees CWRM Commissioners Community Groups Framework Hearings (by CWRM): Initial Informational Hearing 2 nd Information Hearing Final Hearing for Adoption	29-Oct	1-Nov		
	19-Oct 27-Oct 21-Oct 22-Oct	17-Nov		
		17-Nov		26-Jan 16-Feb

Table 4-1

**Summary of Tasks and Activities
1999 Update of the WRPP**

PLAN ELEMENT	Project Task and Activity	References or Basis
Project Scoping	<p>Conduct preliminary scoping meetings Identify range of steps and actions required in project Prepare Implementation Plan and Schedule</p>	<p>CWRM staff interviews</p>
Ground Water Assessments	<p>Verify, revise and update hydrologic units Verify, revise and update sustainable yield estimates Verify, revise and update present quality of resources Incorporate GW aquifer designations for Ewa Caprock Incorporate current chloride management plan for Ewa Incorporate revisions to the sustainable yield for: Kualapuu Aquifer System, Molokai Pearl Harbor Aquifer Sector, Oahu Windward Aquifer Sector, Oahu Identify hydrological components and contribution to SY</p>	<p>Adopted 1990 WRPP Draft 1992 WRPP Pertinent CWRM Decisions No ground water modeling Discuss methodology and applicability of numerical models Consult Mink & Yuen</p>
Surface Water Assessments	<p>Identify/delineate watershed areas to adopt as hydrologic units Establish stream coding system for codification of perennial streams Identify/prioritize rivers/streams for designation as Heritage Streams Develop acceptable ranking systems to identify/prioritize high quality streams Review existing surface water information to identify and compile: Stream Diversion Longitude and Latitude Name (and coding) of Perennial Streams Field Verification Status Longitude and Latitude of Stream Channel Alterations Develop surface water database tables and GIS map coverage Convene/facilitate Stream Assessment Task Force Meetings to: Develop approach for: Evaluating surface water resources Assessing instream flow standards Assessing stream quality Assessing availability for development Identify and prioritize: Potential stream assessment projects Stream management projects Funding mechanisms and options</p>	<p>Adopted 1990 WRPP Draft 1992 WRPP 1990 Hawaii Stream Assessment 1994 State Definition and Delineation of Watersheds Report Proposed Stream Protection and Management System (SPAM) Draft Multi-Attribute Prioritization of Streams (MAPS) Study CWRM Registration and Declaration Database CWRM Stream Channel Alteration Permit (SCAP) Database Pilot Projects to be determined</p>

Table 4-1 (continued)

**Summary of Tasks and Activities
1999 Update of the WRPP**

PLAN ELEMENT	Project Task and Activity	References or Basis
Regulatory and Management Program	<i>Review and assess statewide resource monitoring/data collection programs</i> <i>Recommend improvements and required actions</i> <i>Develop comprehensive statewide monitoring program</i> <i>Compile pertinent CWRM policies, declaratory rulings and guidelines</i> <i>Identify required elements for developing a comprehensive WRPP</i> <i>Prioritize and recommend follow-on studies, including:</i> <i>Identifying priorities</i> <i>Refinement of current resource protection objectives</i> <i>Recommending specific resource-related policies and actions</i> <i>Identifying associated cost implications</i> <i>Develop general recommendations and budget estimates for:</i> <i>Elements not undertaken in this update</i> <i>Costs to implement short- and long-range conservation measures</i> <i>Costs for resource augmentation options</i> <i>Costs to develop water shortage plans</i>	County water agencies, USGS and private entities State Water Code CWRM Regulations DOH Guidelines for Reclaimed Water

Table 4-2

**Summary of Tasks and Activities
1999 Update of the SWPP**

PLAN ELEMENT	Project Task and Activity	References or Basis
Current and Future Water Needs	<i>Identify current and future water needs of state agencies Identify issues/concerns/uncertainties related to future water demands Prioritize state agency needs Assess water conservation programs Identify and evaluate existing conservation programs Incorporate demand-management measures in water projections Recommend improvements to water conservation programs Develop range of forecasts (high, medium and low) for future water demands Compile database and GIS information</i>	Survey of state agencies Projections of future development based on agency plans Demands based on "Guidelines" used by counties and CWRM
Existing Water Systems/Service Areas	<i>Identify systems owned by State Water sources and infrastructure Systems service areas System capacity Existing water use requirements Identify surplus capacity which may be used to meet projected demands Compile database and GIS information</i>	Survey of state agencies
Short- and Long-Range Projections	<i>Identify/assess projected demands and relationships to existing systems Demands which may be accommodated by surplus capacity Determine availability/feasibility for integration of projected demands Identify preliminary costs Develop preliminary implementation schedule Identify projects with CIP funding Demands to be accommodated within existing system master plans Determine availability/feasibility for integration of projected demands Identify preliminary costs Develop preliminary implementation schedule Identify projects with CIP funding Demands not accommodated by existing systems or current plans Develop conceptual source scenarios Existing/planned sources Alternatives for potable and non potable water BWS water allocation credits Conservation options Rank source development scenarios according to: Benefits/costs (including environmental costs) Risk assessment Reliability Quality Availability Institutional feasibility Public support Recommend preferred/alternative options</i>	1990 WRPP as adopted 1992 Draft WRPP Update 1990 WQP as adopted Existing water master plans of various federal, state, county and private water purveyors

With respect to the AWUDP, Phase I of the Implementation Plan proposes that the Department of Agriculture undertake a scope of work that meets the requirements of Act 101, SLH 1998. It is acknowledged that this scope of work essentially undertakes only an inventory of irrigation systems and identifies the extent of repair and rehabilitation that would be required over a five-year period. Such a scope would not provide for the development of agricultural water demand projections, which are critical inputs needed by the counties in their WUDP update. For this phase, the agricultural water demand projections for agricultural lands served by state irrigation systems will be developed under the scope of work for the SWPP (Department of Agriculture and DHHL projections are being compiled as part of the assessment of water needs for all state agencies). Projections of agricultural water demands for privately held agricultural lands are not covered under any current scopes of work for any of the projects being undertaken by the various state agencies. However, for Oahu, preliminary projections may be developed as part of the work to be undertaken within the planned update of the County WUDP as will be discussed shortly hereafter. For the other counties, the required assessment can be undertaken in Phase II of the Implementation Plan.

With respect to the SWAP and WQP, it has already been pointed out that the SWAP is likely to provide critical water quality protection and management requirements as a result of the identification and assessment of potentially contaminating activities for drinking water sources. This work should therefore be completed to provide a basis for developing effective watershed management measures, which would be a central element of a comprehensive Water Quality Plan.

The last item identified in Phase I of the Implementation Plan incorporates the planned update of the Oahu WUDP. The update of the Oahu WUDP should be coordinated with updates of the other HWP components and should be prepared in compliance with the HWP framework provisions.

The project scope of work that was publicly issued by the Honolulu Board of Water Supply for its consultant selection process and the tasks and activities that will be undertaken are summarized in Table 4-3. The scope of work contemplated for the Oahu project will provide for compiling and developing water demand projections for domestic, industrial, agricultural, and non-potable uses of municipal, state, federal and private water systems on Oahu. It will also include assessment of environmental factors as part of the project objectives and evaluation criteria to be developed for the purpose of evaluating resource options and water management strategies for Oahu.

Table 4-3

**Summary of Tasks and Activities
1999 Update of the Oahu WUDP**

PLAN ELEMENT	Project Task and Activity	References or Basis
Water Resources Planning		
Stage I: Planning Objectives and Evaluation Criteria	<p>Develop public/stakeholder participation process Conduct workshops to: Identify issues Establish planning objectives and evaluation criteria</p>	
Stage II: Develop Options & Strategies	<p>Research and review available planning documents Compile existing estimates of surface and groundwater resources for all potable and non potable sources Compile and review existing water demand estimates Develop additional forecasts for all water usage on Oahu Research and compile available information regarding surface water issues Identify needs for additional studies to define impacts on streams due to withdrawal of water from various sources (Optional) Assess existing water conservation programs employed by various water purveyors and large-scale consumers (Optional) Develop programs to enhance water conservation and improve demand-side management programs of all water purveyors Define, develop and assess options for surface and groundwater development Develop source development and water management strategies and assess against established planning objectives and evaluation criteria</p>	<p>State and County land use plans County Development Plans 1990 Oahu Water Management Plan Private sector and Federal agency plans Waiahole Ditch Case Chapter 13-169, HAR regarding Protection of Instream Uses DOH Guidelines for Reclaimed Water CWRM and BWS sustainable yield estimates SWAP project data Water system master plans (BWS, private and military systems)</p>
Stage II: Develop Options & Strategies	<p>Analyze tradeoffs between competing planning objectives Develop suitable strategies for a range of specified planning scenarios</p>	<p>IRP modeling and decision-making techniques/facilitated workshops</p>
Stage IV: Oahu Water Management Plan	<p>Prepare Amended Oahu Water Management Plan document (Optional) Develop Implementation Strategies</p>	

Detailed Implementation Steps – Phase II

Phase I of this Implementation Plan, described in the previous section, could be expected to require a time period of approximately 2-3 years. The various projects identified in that phase have been funded and contracts have been issued for the work.

Phase II of the Implementation Plan represents the period when the required and recommended elements for nearly all the components of the HWP should be supported with the necessary funding based on development of appropriate scopes of work. Some of the effort in developing appropriate scopes of work for elements such as instream studies and aquifer yield studies may be completed in the previous phase. The effort in Phase II would then focus on both expanding and refining the scopes for such studies or focus on identifying and obtaining the required funding to undertake the work.

Phase II would also represent that period of time when the scheduling of projects to update the various components can begin to reflect a more logical progression of planning activities. For example, projects and studies that are critical to the WRPP and the WQP should be scheduled and initiated in this phase in coordination with projects and studies critical to the WUDPs that the state and county agencies undertake. Such scheduling will allow for the timely completion of additional resource assessments and development of water quality management measures which can provide further guidance to state and county agencies during future updates to the HWP.

The action items to be undertaken in this phase include:

1. Development and funding of project scopes for instream studies, aquifer sustainable yield studies, and other water resource management measures relevant to the WRPP;
2. Development and funding of project scope to identify management measures leading to a comprehensive water quality protection program based on the results of the SWAP, leading to a more comprehensive scope for the WQP;
3. Development and funding of a comprehensive AWUDP scope of work based on recommended elements as identified in this framework;
4. Funding of SWPP updates with specific emphasis on the Counties of Kauai, Maui and Hawaii; and
5. Development and funding of project scopes for the updating of WUDPs for the Counties of Kauai, Maui (including Molokai and Lanai) and Hawaii.

These action items are discussed in some detail as follows.

Instream studies, aquifer sustainable yields, and water resource protection and management measures (affecting the activities of agencies and other entities with respect to resource development) are critical to determining the extent and availability of the State's natural resources and the measures needed to protect the quality of the resources. In order to develop a comprehensive Water Resource Protection Plan and Water Quality Plan, these studies must be undertaken with appropriate scopes of work and with adequate budgets to complete the work. There will also be a need to undertake these

studies over an adequate time period to allow for the collection of historical and statistically reliable data.

In this phase, the initial scopes of work for resource assessment studies and water resource management planning activities that have been identified in the previous phase should be refined and expanded as necessary. This scope-refinement activity should be undertaken at the very outset of this implementation phase due to the importance of the studies and the need to provide an adequate time period to establish statistically reliable data.

The scope refinement activities should also identify the types of expertise required and the methodologies for undertaking the studies. In the past, these issues have proven difficult to resolve especially when qualified experts have publicly disagreed on the theories, methods and assumptions that should be used to analyze and evaluate data. The use of facilitated workshops involving a team of experts to achieve consensus in project scope, basis, and methodologies would likely be necessary. Some of these workshops may be undertaken in the previous phase. If not, they should be conducted as part of the scope-refinement effort of Phase II.

Following the scope-refinement activities, effort should then be focused on identifying appropriate budgets, identifying funding sources (federal, state, county and others) and completing the corresponding steps to obtain the necessary funding for the projects. It should be noted that due to the current financial condition of all levels of government in the State, funding from the State Legislature and from the County Councils would likely be very limited. Therefore, it will be important to identify other funding sources such as federal and private-sector sources and to successfully apply for such funding.

The completion of the SWAP project currently being undertaken by the DOH represents a critical prerequisite study for the WQP. Currently, the SWAP is scheduled for completion in 2001. The project will only identify potentially contaminating activities and provide an initial assessment of the risk for contamination of all known drinking water sources. Following the completion of this project, a more difficult task will be faced: identifying appropriate watershed management measures to protect the drinking water sources and obtaining support for the implementation of such measures. It is proposed that this WQP-related effort be undertaken as part of Phase II of the Implementation Plan.

With respect to the other state components of the HWP, the AWUDP will require the most attention in this phase of the Implementation Plan. This is because in the preceding phase, the only work that is contemplated under this plan would encompass inventorying existing state irrigation systems and developing a five-year repair and replacement program. And although the SWPP will make initial estimates of state agricultural water demands in the preceding phase, more extensive demand projections for private agricultural water needs will have to be developed. This is especially true for the Counties of Kauai, Maui and Hawaii. The initial demand estimates developed as part of

the SWPP and any additional information derived as a result of the planned update to the Oahu WUDP will need to be incorporated as part of the AWUDP update in this phase.

A major effort is anticipated with respect to identifying and projecting agricultural water requirements for privately held agricultural lands. A critical planning activity in this effort will be to identify and quantify the types of crops that will be grown and to project the extent of agricultural lands that will be under cultivation over the planning horizon covered by the HWP. This effort essentially requires that a comprehensive statewide agricultural development plan be developed to provide the basis for projecting realistic agricultural water demands.

Obtaining the funding for the type of AWUDP contemplated in this framework is also likely to pose a significant challenge during this phase of the HWP Implementation Plan. Act 101, SLH 1998, which mandates that the Department of Agriculture undertake the AWUDP, did not provide the necessary funding for even the modest scope of work identified in the legislation. Again, given the current financial condition of the State and county governments, the availability of funding for an expanded agricultural development planning effort and subsequent agricultural water needs assessment would likely be extremely limited. Federal funding and assistance from private-sector sources will be needed. Because of its importance in assisting the counties with their overall water use and development planning efforts, the identification and pursuit of funding for the AWUDP is considered a very critical task to be completed in this phase of the HWP Implementation Plan.

The final action items in Phase II of the HWP Implementation Plan focuses on the SWPP and WUDP updates for the Counties of Kauai, Maui (including Molokai and Lanai) and Hawaii. During the time period that this phase encompasses, the DLNR and county agencies should develop the scopes of work required for their updates and identify the level of funding that is appropriate given the unique situations of each county. It may be appropriate to undertake the type of WUDP planning called for in this framework only for those areas or regions within those counties that have reached a critical stage with respect to the use and availability of water resources.

The time frame for undertaking the first two phases of the HWP Implementation Plan could encompass a time period ranging from five to ten years depending on the level of funding that can be provided for the various planning tasks and studies. Given the complexities of the technical work required for some of the studies, the comprehensiveness of the issues that must be addressed, and the time required to establish historical and statistically reliable data, achieving a moderate level of success in implementing the projects discussed above will be a significant challenge. If the Implementation Plan is further constrained by inadequate funding levels during the first two phases, the time frame for achieving full implementation of the proposed HWP framework will be significantly delayed. Such a delay could have an impact on critical future resource management decisions because the types of resource assessments and management program measures that should be conducted or developed may be delayed.

Detailed Implementation Steps – Phase III

Adequate funding of the first two phases would allow the HWP planning process to move into this final phase of the HWP Implementation Plan. This third phase would represent the first iteration of the new framework in which the various component plans would not only be more integrated but would begin to reflect the initial results of the long term studies to determine permanent instream flow standards and more reliable aquifer sustainable yield models. The action items to be undertaken in this phase include:

1. Updating the WRPP based on instream studies and more refined aquifer sustainable yield modeling;
2. Development of a comprehensive WQP based on the results of SWAP and water quality protection measures developed during Phase II;
3. Updating the AWUDP based on refinement of agricultural development plans, statewide;
4. Updating the SWPP based on refinement of state agency development plans, statewide; and
5. Updating all the County WUDPs incorporating all mandatory and recommended framework provisions, subject to improvements as indicated by public and agency feedback from previous efforts.

The action items in Phase III indicate that the component plans would be updated based on the results of the work in the previous phases. More importantly, the planning activities, especially with respect to the updates of the County WUDPs, will be based on more comprehensive resource assessments and projections of water requirements (e.g., total State and private agricultural water demands based upon comprehensive agricultural development plans.)