

Executive Summary

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The Bay Area Water Supply and Conservation Agency's (BAWSCA's) water management objective is to ensure that a reliable, high quality supply of water is available where and when people within the BAWSCA service area need it. BAWSCA is developing a strategy to meet the projected water needs of its member agencies through 2035 and to increase their water supply reliability under normal and drought conditions. A reliable supply of water is required to support the health, safety, employment, and economic opportunities of the existing and expected future residents in the BAWSCA service area and to supply water to the agencies, businesses, and organizations that serve those communities.

The Long-Term Reliable Water Supply Strategy (Strategy) is proceeding in three phases: Phase I (now complete) defined the magnitude of the water supply issue and the scope of work for the Strategy; Phase II will continue the development of the Strategy through detailed analysis of the water supply management projects, and development of the implementation plan for the Strategy; and Phase III will include the implementation of specific water supply management projects of the Strategy.

Water Demands in the BAWSCA Service Area are Projected to be Greater than Supplies

The number of people living and working within the BAWSCA service area is projected to increase by approximately 400,000 (i.e., 22 percent) between now and 2035 (Maddaus 2009). Even after accounting for savings associated with the existing and planned water conservation activities, water demands within the BAWSCA service area are projected to exceed available supplies after 2018. Up to 25 million gallons per day (mgd) of additional water supply may be needed by 2035 to meet the needs of the current and future residents, businesses, and organizations in normal years. Even more water (i.e., up to 76 mgd) will be needed each year during extended drought conditions.

Existing Water Supplies are Subject to Reductions

The San Francisco Public Utilities Commission (SFPUC) Regional Water System provides approximately two-thirds of the BAWSCA service area water supply. This source of supply can be, and has been, affected by a variety of factors including drought, regulatory actions, policy decisions, and climate change. The extent and frequency of such impacts in the future are uncertain.¹

¹ The July 2009 Water Supply Agreement presents the wholesale customer share of SFPUC supply under different drought conditions (City and County of San Francisco and Wholesale Customers 2009). Under normal conditions, wholesale customers receive 69.4% of the total available supply, or 184 mgd of 265 mgd. For the largest cutback evaluated, a 20% reduction in supply system-wide (212 mgd available), wholesale customers would receive 62.5% (or 132.5 mgd) of the overall SFPUC supply available. This 20% system-wide drought reduction

Many of the member agencies also have other water supply sources in addition to their SFPUC supplies. These sources of supply, especially those originating in the Delta, are also subject to cutbacks during drought, and even under normal hydrologic conditions. These reductions in supply may be even more severe than the effect on the SFPUC supply.

The Consequences of Supply Shortfalls are Regional and Severe

Without sufficient water supplies to meet projected future needs on an average annual basis, future residential and economic development could be curtailed within the BAWSCA service area and relocated elsewhere. This could mean loss of new housing, jobs, manufacturing, and community services. This could occur under normal conditions.

If the water supplies currently available to the BAWSCA member agencies continue to be unreliable and subject to cutbacks, then existing and future customers will be increasingly affected. This is not only true under normal conditions, but is exacerbated during drought events. Water supply cutbacks, when they occur, have significant economic and lifestyle impacts to residents and businesses.

The 2007 study, "An Economic Evaluation of the Water Supply Reliability Goal in the SFPUC Water System Improvement Plan," prepared by William Wade, Ph.D., a resource economist, estimated that a subset of industrial sectors that are particularly sensitive to curtailments in water supply (i.e., computer/electronic manufacturers, food and beverage manufacturers, and biotechnology) would be significantly affected by drought. The impact of a 20% water supply deficiency on shipments from these industries located in the wholesale customer service area was estimated at nearly \$7.7 billion annually, for each year the drought persists. (Wade 2007)

The water supply challenges faced by the BAWSCA member agencies are regional and not limited to individual cities or water districts as the residents and voters in one community typically work or own businesses in another community within the BAWSCA service area. Therefore, a water supply shortfall in one BAWSCA agency that results in loss of jobs or other impacts can detrimentally affect the customers of another BAWSCA agency, even if that agency itself is not facing a supply shortfall.

BAWSCA's Strategy to Address the Identified Regional Water Supply Issues

BAWSCA is developing the Strategy to quantify when, where, and how much additional supply reliability and new water supplies are needed throughout the BAWSCA service area through 2035. The Strategy will then identify water supply

132.5 mgd) of the overall SFPUC supply available. This 20% system-wide drought reduction scenario results in a total 28% reduction in supplies for wholesale customers. Individual agency cutbacks may be higher depending on the allocation of the reduced supply.

management projects that can be cost-effectively implemented by a single member agency, by a collection of the member agencies, or by BAWSCA in an appropriate timeframe to meet the identified needs.

In all instances, and in accordance with a key BAWSCA principle, the water supply management projects that are developed as part of this Strategy will be paid for by those agencies that benefit from their development.

Actions by BAWSCA and Member Agencies are Required to Implement the Strategy

Success of the Strategy will depend on timely and appropriate actions by the BAWSCA Board and by the individual member agencies. Progress on the development of the Strategy will be monitored closely to ensure that a reliable, high quality supply of water is available where and when people within the BAWSCA service area need it.

Principles Inform Strategy Development

Based on discussions with member agency representatives, five principles have been identified that will continue to inform the development of the Strategy:

1. The Strategy must add value to BAWSCA member agency customers.
2. The Strategy must provide certainty for future planning and development.
3. The Strategy must not result in the uncompensated or involuntary reallocation of member agency assets.
4. The Strategy must be consistent with water transfer provisions of the Water Supply Agreement (WSA) between the SFPUC and its Wholesale Customers.
5. The projects that are developed as part of the Strategy will be paid for based upon cost allocation methods that will be agreed upon by BAWSCA and the member agencies.

A Wide Range of Water Supply Management Projects will be Evaluated in Phase II

The inventory of possible water supply management projects to be evaluated in Phase II was developed pursuant to the principle that no project would result in any uncompensated or involuntary reallocation of member agency assets. The project inventory was developed based on:

- Reviewing BAWSCA member agency 2005 Urban Water Management Plans (UWMPs)² and other publically-available documents;
- Identifying those projects that could create new sources of supply;
- Identifying those projects with a potential to increase yield beyond what an agency had planned to meet its own needs, or with a potential to accelerate the schedule to bring the supply online sooner than currently planned; and
- Incorporating review comments from BAWSCA member agencies regarding the update, addition or removal of projects to be evaluated in Phase II of the Strategy.

The identified projects are categorized based on their source of water. These potential sources include groundwater, recycled water, water transfers, surface water and reservoirs, desalination, expanded conservation, and localized water capture and reuse. Supply sources may differ in their ability to provide potable or non-potable supply or meet normal or drought year demands.

Furthermore, the identified projects have been classified based on their current level of development and location (i.e., within and outside of the BAWSCA service area), two characteristics critical to understanding how to incorporate projects into the long-term Strategy. Each project has therefore been classified as one of four types:

1. *Existing projects within the BAWSCA service area* that are under development by, or in partnership with, a BAWSCA member agency and that may have the potential to be expanded or to have the project timeline accelerated to either offset additional demand within the service area of the BAWSCA agency(ies) that is involved in the project, or to offset the demand of another BAWSCA agency(ies) through a sale, exchange, or transfer;
2. *Planned projects within the BAWSCA service area* that have been identified by a BAWSCA member agency which may have the potential to be expanded or to have the project timeline accelerated to either offset additional demand within the service area of the BAWSCA agency(ies) that is involved in the project, or to offset the demand of another BAWSCA agency(ies) through a sale, exchange, or transfer;
3. *Potential future new projects within the BAWSCA service area* that have not been specifically identified by a BAWSCA member agency to date, but that may have the potential to be developed to either offset additional demand within the service area of the BAWSCA agency(ies) that is involved in the project, or to offset the demand of another BAWSCA agency(ies) through a sale, exchange, or transfer; and

² Brisbane, Guadalupe Valley Municipal Improvement District, Purissima Hills Water District, Skyline County Water District (now part of California Water Service Company), and Stanford University did not complete UWMPs due to their small service areas.

4. Existing, planned, or potential projects outside the BAWSCA service area that may have the potential to be developed, to be expanded, or to have the project timeline accelerated to offset the demand of a BAWSCA agency(ies) through a sale, exchange, or transfer.

Strategy Evaluation Framework

In order to effectively evaluate and rank the potential water supply management projects, a decision process has been developed that is transparent, adaptable, and defensible. The decision process includes four levels of screening and evaluation:

1. *Preliminary "Fatal Flaw" Screening* – This step identifies those individual water supply management projects that either cannot be completed in time to meet the future demands of the BAWSCA member agencies within the Strategy planning horizon (i.e., by 2018 or 2035), or those projects with environmental impacts that would likely prohibit their implementation.
2. *Individual Water Supply Management Project Evaluation* – Individual water supply management projects will be grouped into supply categories (e.g., desalination, surface water, etc.). Each water supply management project will then be assessed using evaluation criteria to establish their relative ranking within each supply category. This will allow for accurate comparison of similar projects and will aid in the development of different water supply management portfolios.
3. *Portfolio Development* – Since no single water supply management project is likely to meet the future supply need, multiple water supply management projects will be combined into portfolios formulated to meet the entire supply need. Multiple portfolios will be developed to satisfy different objectives (e.g., least cost, 100% drought reliability, etc.) that will be identified for the Strategy. Additionally, because the portfolios will likely include multiple supply sources, they will increase the water supply diversity within the BAWSCA service area.
4. *Portfolio Evaluation* – This step will involve the assessment of the different water supply management portfolios based on the evaluation criteria. This will provide decision makers with the information needed to make informed decisions about supply management costs, impacts, benefits, and where to expend additional resources to gather additional information (e.g., field investigations).

Evaluation criteria have been developed to evaluate the water supply management projects and portfolios during the development of the Strategy. The proposed evaluation criteria address the Strategy planning objectives including: 1) increasing supply reliability; 2) providing a high level of water quality; 3) reducing cost impacts; 4) increasing potable water use efficiency; 5) reducing environmental impacts; and 6) increasing implementation potential.

The evaluation criteria will be used as part of an interactive decision process. BAWSCA and the member agencies will provide input on project and portfolio evaluation, criteria weighting, and other factors during the Phase II evaluation process.

Phasing of Work Streamlines Strategy Development

The Strategy is being developed in three phases. Phase I of the Strategy has been the development of the scope for the Strategy, including the development of this Report.

Phase II is the continuation of the Strategy through the development and analysis of alternative water supply management projects and groups of projects (portfolios) to meet the water supply needs of the member agencies in normal and drought years.

Developing specific recommendations and an implementation plan will require an extensive amount of analysis. This analysis is required to: 1) develop sufficient information on the water supply management projects, many of which are only identified as potential concepts, to ensure that the projects are feasible; and 2) develop a similar level of project-specific information to allow comparison between the projects.

Based on the information gathered for this Report (i.e., water demands, supply needs, potential projects and the evaluation framework) a phased approach seems most appropriate to identify potential opportunities to best address near-term normal and drought year supply needs, while concurrently developing a strategy to address the longer-term supply needs. The Phase II Strategy development process has three sub-phases:

- *Phase II A – Develop Near-Term Recommendations* – The work in Phase II A focuses on identifying and developing initial recommendations for implementation of near-term member agency and regional projects that will help member agencies meet normal and drought supply needs over the next decade. In addition, as part of Phase II A, recommendations will be made for potential mid-term projects that could be implemented during Phase II B or II C. Furthermore recommendations for field work that will be required to further characterize and demonstrate the feasibility of projects and will identification of the projects that will be included in Phase II C (i.e., more detailed development and analysis) will be made in Phase II A.

Approach To Strategy Development Consists Of Multiple Phases

- Phase I – Scoping Report
- Phase II A – Develop Near-Term Recommendations
- Phase II B – Develop Mid-Term Projects and Conduct Field Investigations
- Phase II C – Develop Long-Term Recommendations
- Phase III – Implementation of Specific Water Supply Management Projects Identified as Part of the Strategy

- *Phase II B – Develop Mid-Term Projects and Conduct Field Investigations* –Phase II B will evaluate mid-term projects that were identified in Phase II A that should move forward as soon as possible, but that may require limited additional analysis or support. In addition, this phase includes the field and other investigations that are required to estimate certain project yields, feasibility, and cost. Phase II B will be performed after the initial evaluation of the project alternatives is completed in Phase II A, but could possibly occur before the completion of Phase II A. By phasing the Strategy this way, the field investigations will be focused on a limited number of potentially viable projects where the investigations are required to confirm their feasibility and other key information (i.e., yield).
- *Phase II C – Develop Long-Term Recommendations* – Phase II C will include updating of BAWSCA member agencies’ supply need information and further evaluation of potential projects to meet the long-term supply out to 2035. Phase II C will also incorporate the Phase II A and Phase II B work into the development of an implementation plan to meet the near- and long-term supply needs for the member agencies for normal and drought conditions.

Phase III will be the implementation of specific water supply management projects identified as part of the Strategy. These projects may be developed by individual member agencies, groups of member agencies, or by BAWSCA and the BAWSCA board on behalf of the member agencies.

Figure ES-1 indicates the schedule for the Phase II work.

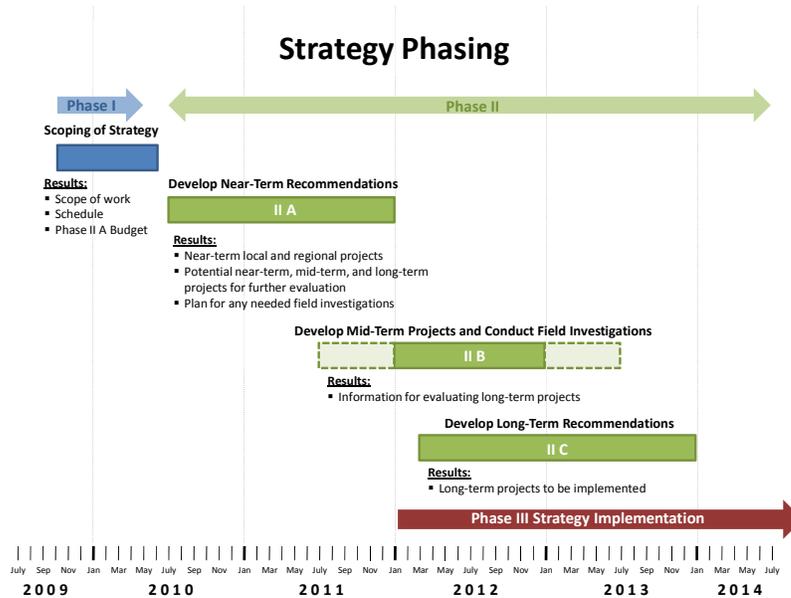


Figure ES-1
 Strategy Phasing and Schedule

Phase II Scope Elements

The anticipated scope elements for Phases II A, B, and C are summarized in Table ES-1. Section 8 describes these phases and tasks in more detail.

Table ES-1: Anticipated Scope Elements	
Phase II A - Develop Near-Term Recommendations	
Task	Description
1	Update Water Demand and Supply Need
2	Update Agency Project Information
3	Update Regional Project Information
4	Perform Fatal Flaw Analysis and Screening of Agency and Regional Projects
5	Develop Tools to Evaluate Projects and Portfolios
6	Evaluate and Compare Projects and Portfolios
7	Develop Recommendations for Near-Term Projects, Phase II B Mid-Term Projects and Field Investigations, and Phase II C Long-Term Projects and Portfolios
8	Develop Scope and Budget for Phase II B
9	Develop Preliminary Scope and Budget for Phase II C Long-Term Recommendations
10	Prepare Phase II A Report
11	Project Management
Phase II B - Develop Mid-Term Projects and Conduct Field Investigations	
Task	Description
1	Finalize Work Plans, Bid Documents and Access Agreements
2	Field Investigations for Agency Projects
3	Field Investigations for Regional Projects
4	Support for Implementing Mid-Term Projects
5	Stakeholder Outreach (As needed)
6	Project Management
Phase II C – Develop Long-Term Recommendations	
Task	Description
1	Update Local Agency Need and Supply Information Based on Agency Updates
2	Determine Specific Supply Need by Agency and Region
3	Update Agency and Regional Project Information Based on Phase II B Field Work and Analysis
4	Update Economic Information for Agencies and Projects
5	Develop Portfolios to Address Near- and Long-term Supply Needs
6	Compare and Rank Projects and Portfolios
7	Develop Recommendations
8	Prepare Implementation Plan (Long-Term Recommendations)
9	Stakeholder Outreach
10	Project Management

The Phase II work will include additional technical expertise, including technical, environmental, and planning specialists to perform this work. The level of involvement required in each of these areas will depend on the specific projects that

are carried through the multiple phases, and level of analysis required to develop and evaluate them. The areas of expertise are summarized in Table ES-2.

Table ES-2	
Technical Expertise Requirements for Phase II	
Specialty	Sub-Area
Treatment Processes	Water quality
	Water treatment
	Desalination treatment
	Wastewater treatment
	Process engineers
Infrastructure	Pipeline engineers
	Electrical engineers
	Mechanical engineers
	Structural engineers
	Cost estimators
	Schedulers
Water Rights	Legal counsel
	Water rights experts
Water Transfers	Water transfer planners/facilitators
	Legal counsel
Groundwater	Groundwater modelers
	Hydrogeologists
Reservoirs	System modelers
	Hydrologists
	Distribution system modelers
Economics	Economists
	Systems engineers
	Rate specialists
Planning	Land use planners
	Water conservation specialists
	Rain/stormwater capture and greywater specialists
	Legal/institutional/permitting specialists
Environmental Analysis	California Environmental Quality Acta and National Environmental Policy Act specialists
Grant Writers	State and Federal grant specialists

Phase I Conclusions

BAWSCA members are faced with potentially significant water supply shortfalls under normal and drought conditions. The extent of the shortfalls depend on a variety of variables. BAWSCA has undertaken this project to develop a strategy for addressing member agency needs/priorities and potential future water supply projects. The Strategy will be supported by a process for formulating the projects into water supply management portfolios and systematically evaluating them against criteria that reflect BAWSCA and member agency priorities and concerns.

Phase I of the Strategy involved quantifying the projected water supply need out to 2035, defining the evaluation that will be used to evaluate and select the preferred

water supply management projects, and identifying the water supply management projects to be evaluated in Phase II. Phase I also included developing the scope for Phase II.

Even after accounting for savings associated with the existing and planned water conservation activities, water demands within the BAWSCA service area are projected to exceed available supplies after 2018. Up to 25 million gallons per day (mgd) of additional water supply may be needed by 2035 to meet the needs of the current and future residents, businesses, and organizations in normal years. Even more water (i.e., up to 76 mgd) will be needed each year during extended drought conditions.

Phase II of the Strategy will involve detailed evaluation of potential water supply management projects and will consist of the following sub-phases:

- Phase II A - Develop Near-Term Recommendations
- Phase II B - Develop Mid-Term Projects and Conduct Field Investigations
- Phase II C - Develop Long-Term Recommendations

Phase III will include the implementation of specific water supply management projects identified as part of the Strategy.

Due to the timing and magnitude of the forecasted shortages, and the time required to implement the various elements of the Strategy, rapid and efficient development of the Strategy is necessary to sustaining a safe and reliable water supply within the BAWSCA service area.