STATE WATER BOARD AND REGIONAL WATER BOARDS

INFORMATION MANAGEMENT
STRATEGY

MARCH 2008

STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

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1.1 Purpose of the Agency Information Management Strategy (AIMS) Plan

This Agency Information Management Strategy (AIMS) plan reflects the Water Boards collective thoughts on how to continue to advance information management at the Water Boards. Just as information technologies continue to evolve at a rapid pace, so should our thinking about how to employ them in our business functions. Learning from our past endeavors is a natural and healthy process that should be done routinely, but is often in response to some particular event. That is the case here as well, with several events leading to this revision.

This 2007-2008 update of the 2004 Water Boards AIMS is being written outside of the normal five-year review and update cycle in response to a number of catalysts, including:

- The Legislative Analyst's Office 2007-08 Budget Bill Analysis that cited "significant problems in the way SWRCB has informed the Legislature of its new IT projects and the way new projects have been rolled out to the regional boards."

- The 2007 Budget Act Item 3940-001-0001-State Water Resources Control Board provision No. 2. states that "No funds appropriated in this item or any other items appropriating funds to the State Water Resources Control Board can be used for new information technology modules related to the California Integrated Water Quality System (CIWQS) until the board's Agency Information Management Strategy is updated to reflect the board's current information technology strategy and submitted to the Joint Legislative Budget Committee no sooner than 30 days prior to any spending on information technology modules."

- The Supplemental Report of the 2007 Budget Act Item 3940-001-0001-State Water Resources Control Board, California Integrated Water Quality System which includes the requirement that "[o]n January 10, 2008, the State Water Resources Control Board shall provide to the Joint Legislative Budget Committee and fiscal committees of each house of the Legislature a report with information regarding the boards information technology (IT) projects. The report will include information on ongoing and proposed IT projects, one-time design and development costs, and ongoing maintenance costs." (Note that the tables provided in Section 10, Information Investment Plan, address the specific information requirements of the Supplemental Report.)

- The State Water Board's acknowledgement that organizational processes for proposing, approving, and monitoring information technology projects need significant changes to achieve effectiveness.

- The State Water Board's acknowledgement that processes to prepare the organization for project implementation ("organizational readiness") have been lacking in the past.

- The State Water Board's commitment to improving data quality issues that have surfaced with the California Integrated Water Quality System (CIWQS) and the Board's interest in applying the same rigorous processes to CIWQS as will be applied to other continuing and new information technology projects at the Water Boards.

- The Water Board's commitment to making water quality and water rights information and data readily accessible to the public, stakeholders and decision-makers via the Board's public web site. The Boards have identified information management as a top strategic priority for the next five years.

- The Water Board's commitment to a five-year plan for significantly improving the collection, storage, management and reporting capabilities for information and data regarding waters of the state, and for collaborating with other public and private organizations to establish a comprehensive Statewide Water Data Institute to house and provide public access and analysis tools.

Since the 2004 AIMS was written, the Water Boards have made significant progress in providing information to a wide variety of stakeholders via the Web. Audiences for this information include the general public, the regulated community/partner agencies, the Legislature, and Water Board Members, management and staff. This AIMS update is a further step in moving the Water Boards forward in communicating information more effectively with stakeholder audiences. While e-Government must be addressed as a separate subject to satisfy regulatory requirements, this AIMS in total is in fact an e-Government plan. A primary objective of the Water Boards' vision is to provide a direct link to public information on water quality and water rights via the Web. In addition, the Water Boards are tying their e-Government strategy directly into the e-Government strategies of the State of California and the Federal government.

The Water Boards have determined that changes and improvements must continue to be made to improve the ability of Board staff to maintain and use existing data systems and that new data system components are needed to better enable the Boards to manage and provide public access to water quality data and information. Organizational changes are needed to better facilitate identifying and implementing needed improvements, enhancements and new elements. In addition, the Water Boards' public web sites must be better utilized as the Boards' "public face" for providing information on the quality of our surface waters and groundwater, our beaches and coastal waters. A thorough redesign to reflect user needs and an ongoing commitment to dedicate adequate staff and resources to the design, development and maintenance of the Board's web site is a high priority reflected in this AIMS update.

As evidenced by the dozens of legislative mandates (see Appendix A) requiring the Water Board to provide public information and reports, there is significant interest and need for information regarding the water quality programs implemented by the Water Boards. There is interest in information to enable a better assessment of the impact that water quality programs and initiatives are having on waters of the state. How clean is our water and is it getting better or worse? Is the water in my community safe to drink, to swim or fish in, to irrigate crops with? Are the Water Boards regulatory requirements, permits, compliance and enforcement efforts resulting in improved water quality where there are impairments and in protecting water quality from degradation? Are Water Board programs being implemented consistently and effectively across the state and are their unique challenges facing specific Regional Water Boards and geographic areas or

water bodies? Are bond expenditures having an impact on water quality? Increasingly, the public wants ready access to environmental information that will lead them to answers to these types of questions and many more. And, they expect information to be easily searchable and displayed geographically. They also expect that government is talking to itself and that there be resources that bring together data and information from multiple sources, such as the Department of Public Health, Department of Water Resources, Department of Fish and Game, State and Regional Water Boards, and regional monitoring networks. Through successful implementation of SB 1070 (Chapter 750, Statutes of 2006), which directs the Water Board to convene a California Water Quality Monitoring Council, significant strides can be made towards realizing this needed coordination and integration of water monitoring data and information from multiple sources. The Water Boards information management strategies must be flexible and responsive to address this needed integration.

Information management is an evolving and major undertaking and it will continue to evolve. With this in mind, along with the realization that state government can not and should not attempt to recreate data management and reporting tools that the private sector has invested many millions of dollars in developing, it is the intent with this AIMS to position the Water Boards to make the best use of advances in information management that have already been achieved in the private sector. This can be accomplished through the acquisition of "off the shelf" software and associated services and through building on successful components of the Boards current portfolio of information management systems. Environmental data and information is being gathered, stored, manipulated and reported throughout the world and significant investments have already been made by others in designing and building these tools. The Water Boards must take stock of the investments they have already made in data systems and determine what enhancements and additional tools and data systems will best enable the Boards to reap maximum benefit from the surface water, groundwater and ocean water data and information that is available. Many millions of dollars have been invested in monitoring water quality, it is time for the Water Boards to make this information available and accessible to staff, stakeholders and the public via the Internet. To this end, the monitoring data gathered by the Surface Water Ambient Monitoring Program (SWAMP) and Groundwater Ambient Monitoring and Assessment (GAMA) programs and others will be made accessible to staff, stakeholders, and the public.

The Water Boards must also use information management technology to improve efficiency throughout the organizations. The Water Boards are operating in a resource-constrained environment with a growing regulatory universe (especially in the areas of non-point sources such as: storm water, irrigated lands, septic regulations, etc.). It is unlikely that staff resources will grow commensurate with the growth in regulatory programs. Because of this, it will be imperative that the Water Boards use the elements of current information management systems that are working well to build on, and that new tools should be developed to fill identified gaps. Effort must be devoted to developing public reporting tools to make ground and surface water monitoring data available for display and analysis. Electronic reporting capability must be perfected and deployed to streamline compliance and enforcement efforts and to enable the Boards to quickly identify priority violations and take prompt action. Electronic document management will be one tool for enabling the Boards to better manage incoming correspondence and other documents.

1.2   Alignment of Technology Strategy with Business Mission

While this AIMS update is at least partly in response to the legislative mandates noted above, it has been developed with the aim of aligning the information management and information technology assets, resources, and initiatives of the Water Boards to support the success of their business mission. This updated AIMS is more than a reaction to a legislative requirement. It is a management commitment to a disciplined and sustained approach to information management and use of information technology to support the water quality and water rights programs.

The mission of the State Water Resources Control Board (State Water Board) and the nine Regional Water Quality Control Boards (Regional Water Boards) is to preserve, enhance, and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations. Technology strategy alignment with this business mission begins with an understanding of the fundamental drivers of business mission, delineated below.

1.3   Mandates and Needs Driving Business Mission and Requirements for Supporting Technology

The Water Boards' business mission derives from a number of sources, namely:

- **Legislative and Administrative Mandates** – these include directives for reporting and providing public information. See Appendix A for a detailed listing.

- **Regulated Community and Partner Agency Needs** – these include requirements of regulated communities, other state agencies such as the Department of Water Resources, Department of Fish and Game, and others.

- **Staff Needs** – these include requirements of the Water Boards staff to enable more effective work.

- **Public Needs** – these include requirements for access to information.

All of these sources of requirements have a direct impact on the Water Boards business mission and operations. Information management and the underlying technology are critical to conducting business activities to address these requirements. Information management systems are the basis for determining how well the Water Boards are performing their business mission.

1.4   Strategic Business Goals

The Water Boards are currently in the midst of updating their *business* strategic plan. A number of proposed goals, objectives, and actions have been developed and are listed below. These goals will be updated in this AIMS upon completion of the Water Boards' Strategic Plan.

In particular, the currently proposed Strategic Organizational Priorities will be key drivers of the AIMS Plan. Those (proposed) priorities are:

PRIORITY 1. PROTECT AND RESTORE SURFACE WATERS

> Decrease the number of impaired water bodies in priority watersheds by 10 percent by 2015, working toward the target of all of these water bodies fully supporting beneficial uses by 2030, focusing resources on TMDL adoption and implementation.

PRIORITY 2. PROTECT GROUNDWATER

> Improve groundwater quality by reducing waste discharges to groundwater in high use basins by 25 percent by 2020.

PRIORITY 3. PROMOTE SUSTAINABLE WATER SUPPLIES

> Increase sustainable water supplies available to meet existing and future beneficial uses by 1,725,000 acre-feet per year, in excess of 2002 levels, by 2015.

PRIORITY 4. CALIFORNIA WATER QUALITY PLAN

PRIORITY 5. BASIN PLANNING

> The California Water Plan addresses water quality protection and restoration, and describes how the relationship between water supply and water quality is affected across all water supply management strategies, through the development of a California Water Quality Plan.
>
> Basin Plans are consistently organized by 2012, and updated by 2015, to provide a clear structure that readily conveys the beneficial uses, water quality objectives, goals for watersheds, plans for achieving those goals, and monitoring to inform and adjust the plans.

PRIORITY 6. TRANSPARENCY AND ACCOUNTABILITY

> Improve transparency and accountability by ensuring that Water Board goals and actions are clear and accessible, by demonstrating and explaining results achieved with respect to the goals and resources available and by enhancing and improving accessibility of data and information.

PRIORITY 7. CONSISTENCY

> Enhance consistency across the Water Boards to ensure our processes are effective, efficient, and predictable, and to promote fair and equitable application of the laws, regulations, policies, and procedures.

PRIORITY 8. WORKFORCE CAPACITY

> Ensure that the Water Boards have access to information and expertise, including employees with appropriate knowledge and skills, needed to effectively and efficiently carry out the Water Boards' mission.

1.5   CIWQS

No AIMS Plan can be developed for the Water Boards at the present time without an emphasis on CIWQS. Significant resources from the Water Boards' water quality and water rights programs and from the information technology organization are currently consumed by efforts to address the issues and frustrations that have surrounded the implementation of CIWQS.

Supporting the business plan for addressing the CIWQS issues is an integral and important component of this Information Management Plan. However, to look forward for the next five years, it is important and necessary to look beyond the boundaries of CIWQS.

Rather than contort all information management and information technology activities within the Water Boards to "fit around" a CIWQS-centric view, this AIMS Plan takes the many encouraging processes and concepts being developed and implemented for CIWQS and other information management systems (such as Geotracker) at the time of this writing, and generalizes them so that they can be used more broadly to enable the Water Boards to manage their information management and information technology activities as a portfolio across the entire enterprise.

1.6   An Information Strategy to Support Achieving the Business Goals

Strategic planning can often be derailed by focusing on "the how" (process) rather than "the what" (substantive goals) too soon. In the case of the Water Boards strategic *business* planning, goals such as the ones above clearly reflect a focus on "what," rather than "how", which can be defined later.

In developing the AIMS Plan, there have been parallel efforts to address both process and substance. From the many interviews that were conducted with various Water Boards' stakeholders, the need for significant action to improve technology governance

and management processes was clear. Moreover, it is essential that the Water Boards commit themselves to the discipline necessary to adhere to the management processes once they are implemented. Without the necessary commitment and discipline, many excellent substantive ideas are likely to fall victim to the problems that have plagued CIWQS.

Thus, this AIMS Plan will set forth:

- A technology vision that is driven by and fully supportive of the business mission (water quality, water rights) of the Water Boards.

- A set of management processes for selecting/approving, monitoring, and managing multiple projects that become part of the Water Boards' portfolio of projects.

- A set of substantive projects that the Water Boards intends to pursue in the near-term and which will be subject to the same disciplined processes that apply to all projects in the Water Boards' portfolio.

- The resources required for the information projects included in the AIMS.

- The need to develop practical and affordable tools that will enable staff and public access to water quality and water rights data and information.

Figure 1 below shows the relationship between business strategy, project implementation, and enterprise portfolio management. Enterprise portfolio management is represented as a "layer" between business strategy and project implementation because enterprise portfolio management includes all of the review, approval, and management processes that help ensure alignment of multiple projects with business strategy.

When too much emphasis is placed on the over-arching goals of a single, particular project, as was the past case with CIWQS, business needs as well the needs of other user groups like the general public are often overlooked. The converse is also true, for when a single program or business unit is the sole director of an information project, then the focus of the project remains limited to their immediate needs and other users are left out.

Enterprise portfolio management provides the middle layer that includes the management processes that assess risks and performance metrics of both standalone projects and the entire investment portfolio. In this way a balancing of needs can be achieved and all user groups can have input and receive benefits from different systems. Enterprise portfolio management also allows service holes to be identified and addressed, and is the layer at which the relationship and cooperation of different systems is fine tuned so that all the systems knit together to provide a complete solution for the organization.

Enterprise portfolio management also facilitates a coordinate response to the dynamic nature of the times. Nothing in today's age stands still. Business needs are always responding to new drivers, and technology improvements march on. Utilizing a portfolio management approach improves an organization's likelihood of successfully meeting these challenges in a timely fashion because it allows an organization to apply solutions used in one area to another. Having and managing a diverse portfolio of systems gives

an organization the many tools and approaches needed to quickly address new challenges. The counter point of steering a single enterprise solution in a new direction is necessarily difficult and not a quick endeavor, and limits the organization to one area of experience so as to limit its experiences to draw on.

State Water Board

"The State Board's mission is to preserve, enhance, and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations."

Business Strategy Layer

Water Rights

Water Quality

Water Education

Enterprise Portfolio Management Layer

Enterprise Portfolio Management

- Selection and oversight of project investments
- Management of operational activities (business processes produced by projects)
- Approval and mandate of architectures, standards, and approaches (principles and norms that promote interoperability, effectiveness, and highest return-on-investment)

Project and Operational Activities Layer

Operational Activities

CIWQS-Core

eWRIMS

Geotracker

LGTS

Projects

ECM

LGTS Phase II

Groupwise 7

CIWQS-AMM

Figure 1: State Water Board's Organizational Strategy and Implementation Map

1.7 AIMS Goals

The information management and information technology goals that have emerged from this AIMS update effort are the following:

1. **Governance** - Implementing effective information management and information technology governance, including:

   o **Portfolio Management and Oversight** - Implementing sound processes to manage the Water Boards' current technology project portfolio, including its CIWQS-based process portfolio and future projects and processes that align with the business strategy; and

   o **Project Selection -** Disciplined project selection approaches, based on realistic resource forecasts, for future projects that will be proposed and undertaken within the planning horizon.

2. **Organizational Structure and Direction** – Optimizing organizational structure and resources for:

   o Effective implementation of information management and effective delivery of information technology solutions.

   o Management of application, desktop, server and network support teams.

3. **Business Improvement** – Pursuit of:

   o **Project Alignment** – Aligning technology development and implementation to support the business mission and needs of the Water Boards.

   o **Knowledge Creation** – Turn information into knowledge for use in effectively managing Water Board's business processes.

   o **Data Collection Process Automation** - Automation of Water Boards' core business processes for data collection.

4. **Information Delivery** – Provide expertise in delivery of information management and information technology solutions delivery, including:

   o **e-Government Solutions** - A central, integrated element of the entire AIMS.

   o **Data Management** – A core focus for improved quality.

   o **GIS** - A core, base technology that will be further leveraged over the planning horizon.

   o **Electronic Document Management** - A core, base technology that is just taking shape and will be further leveraged over the planning horizon.

   o **Public access to water quality and water rights information via the Internet** – A current public expectation of all government agencies that the Water Board will strive to meet.

5. **Standards** – Adopt, develop, and promote industry standard support structures, including:

- Technical Architecture
- Project Management Methods
- Process Improvement Framework

2. Scope and Method

An AIMS Plan is an organization's comprehensive plan for using information technology (IT) to support its business needs and is closely aligned to the organization's business strategy. The process of developing the strategy begins with a keen understanding of the organization's mission, vision, goals, objectives, state mandates and directives, and the critical issues facing the organization. An AIMS should define the IT strategy, along with a set of IT goals, measurable objectives, priorities, and resources required to execute the strategy. The plan should articulate strategic IT initiatives and projects that address key factors essential to the organization's success. The AIMS should describe the organization's plan to utilize and support IT as an integral part of the organization's reengineering or its business processes to provide efficiencies, reductions in turnaround time, and improvements in quality and stakeholder service. An AIMS must be tempered by an appreciation of technological possibilities and political and economic realities.[1]

This AIMS outlines the Water Boards' information technology goals and requirements for the next five years necessary to support the business mission of the Water Boards.

The Water Boards contracted with Bluecrane, Inc. ("*bluecrane*") to update the previous AIMS written in 2004. To develop the updated AIMS, *bluecrane* documented baseline issues through interviews with representatives from the State Water Board Executive Office, State Water Board Divisions and Offices, and Regional Water Boards. The AIMS was updated in the winter of 2007 before being submitted for final review and approval.

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[1] See: State of California Statewide Information Management Manual (SIMM), Section 10, AIMS Documentation guidelines.

3. IT Strategy Summary

3.1 AIMS Alignment with the State Water Board's Business Strategy

It has become almost trite to say that "business strategy must drive information technology strategy" or "information technology strategy must support the business mission." One often sees IT strategy and business strategy depicted as building blocks or side-by-side "partners."

In fact, business strategy and IT strategy (and we are using IT strategy to encompass more than "technology" itself, but also the far broader strategy of information management) are locked in a continuous and continual cycle, as depicted in Figure 2.

Business
Drives
Technology

Technology
Changes
Business
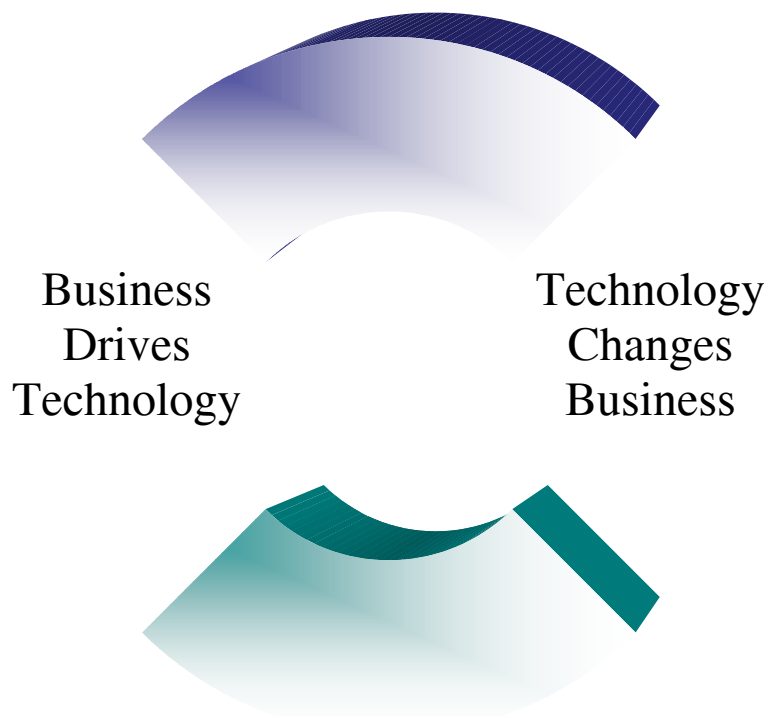
Figure 2. The Business / Technology Cycle

It is absolutely true that business must drive information management strategy and information technology utilization and implementation. However, technology reshapes and changes business over time. For example, the Water Boards have provided information to external users in the past and have created means (manual and technological) to do so. Even so, the emergence of the Web has recently created an expectation among the general public of relatively easy access to needed information.

These kinds of changing expectations reshape business requirements and sometimes make their way into legislative mandates.

It is this cycle of business driving technology and technology reshaping business that has led the Water Board management to propose that there is a newly emerging model for the Water Boards of diverse "users" and their expectations of access to Water Boards data. As illustrated by Figure 3, the Water Board has identified three separate and distinct user groups: general public users with little or no background in the intricacies of a Water Board program, external users such as dischargers who do have experience with Water Board programs, and, of course, our internal staff user community. Each of these user communities, and there are more than is covered here, has distinct needs and abilities in accessing, viewing, and interpreting data. The matrix in Figure 3 contrasts these three user communities against three different water quality datasets and then illustrates what data systems service the different user groups. This is a main aspect of Enterprise Portfolio Management - to identify the suite of systems utilized to meet different needs.

Different User Groups
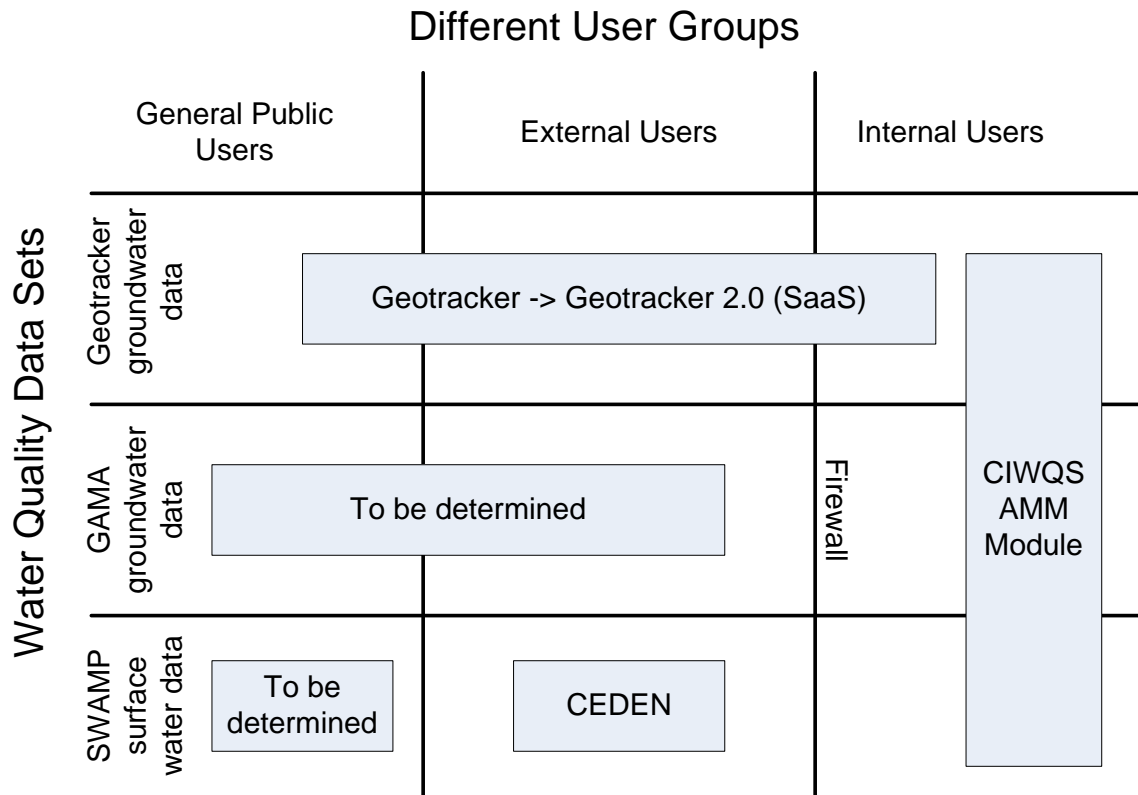
Figure 3. Emerging Model of Users and Water Quality Data Access Needs and a Portfolio Approach to Meeting Those Needs

The systems referenced in Figure 3 are:
- Geotracker: An on-line system to support leaking underground storage tanks cleanup cases and related activity. It provides on-line information access of underground water quality via tabular reports and GIS displays.

- o SaaS refers to the "Software as a Service" approach, in which processing is procured as a service, rather than an application system being procured, implemented, and run "in-house" by the Water Boards. At the time of this writing, the Geotracker 2 Feasibility Study Report (FSR) has been approved and is in the competitive procurement phase. GAMA (see the following item) is the next procurement expected to follow the SaaS model.
- GAMA: The Groundwater Ambient Monitoring and Assessment program.
- SWAMP: Surface Water Ambient Monitoring Program.
- AMM: The Ambient Monitoring Module of the California Integrated Water Quality System.
- CEDEN: The California Environmental Data Exchange Network (CEDEN) provides a data management system called the Bay/Delta and Tributaries (BDAT) Database Project.

In developing a foundation of business strategy and mission upon which to base information management and technology strategy, this AIMS has taken into account:

- The Water Boards Strategic Plan (which is currently being revised);
- The legislative and administrative mandates imposed on the Water Boards, the fulfillment of which rely heavily on information management and IT systems;
- The needs of the regulated community/partner agencies, staff, and the general public, which are being reshaped by the business/technology cycle as described above.

3.2 AIMS Vision and Mission

As noted at the beginning of this AIMS Plan, the mission of State Water Board and the nine Regional Water Boards is to preserve, enhance, and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations. This AIMS Plan has been developed to support this business mission.

The AIMS Vision Statement remains unchanged from that provided in the 2004 AIMS Plan, namely:

> **AIMS Vision Statement:**
>
> Increased sustainability of California's water quality and water use through access to and sharing of data from the State and Regional Water Boards.

Similarly, the AIMS Mission Statement from the 2004 AIMS Plan remains unchanged:

> ## AIMS Mission Statement:
>
> To make accurate, complete and up-to-date water quality and water use information available to all in a flexible and easy-to-use electronic format, and to conduct all applicable business transactions and data sharing electronically.

What has changed is the understanding that is inherent in the emerging model of users and data access needs (see Figure 3 above). In other words, "accurate, complete, and up-to-date" may be defined somewhat differently among diverse users (regulated community/partner agencies, staff, and the public), and the diverse user groups may best be served by different electronic formats.

The expected benefits of pursuing the AIMS Vision and Mission are improvements in the ability to effectively:

- Measure and evaluate the quality of California's streams, rivers, lakes, wetlands, bays, estuaries, beaches, and all its surface and groundwater resources;
- Analyze the condition of and changes in complex watersheds;
- Identify emerging water quality trends or threats, including cross-media environmental issues;
- Share data with federal, state, and local water quality and resource management agencies;
- Meet other legislative mandates;
- Manage the regulatory business of the Water Boards;
- Make reliable water quality and water use information immediately available to the regulated community/partner agencies, staff, and the public, in formats that are appropriate and easily understood by the specific audience;
- Measure and evaluate discharger compliance with waste discharger requirements; and
- Efficiently and responsively meet information requests for documents.

3.3   AIMS Goals

The information management and information technology goals that have emerged from this AIMS update effort are shown below.

Goal 1: Governance
The Water Boards will implement effective information management and information technology governance, including:

- **Portfolio Management and Oversight** - Implementing sound processes to manage the Water Boards' current technology project portfolio, its CIWQS-based process portfolio and future projects and processes that align with the business strategy; and

- **Project Selection** - Disciplined project selection approaches for future projects that will be proposed and undertaken within the planning horizon. Key factors for project selection will include business requirements and needs, alignment with business strategy, and resource availability.

Goal 2: Organizational Structure and Direction

The Water Boards will optimize organizational structure and resources for:

- Effective implementation of information management and effective delivery of information technology solutions.

- Management of application, desktop, server and network support teams.

Goal 3: Business Improvement

The Water Boards will continue to pursue:

- **Project Alignment** – Aligning technology development and implementation to support the business mission and needs of the Water Boards.

- **Knowledge Creation** – Turn information into knowledge for use in effectively managing Water Board's business processes.

- **Data Collection Process Automation** - Automation of Water Boards' core business processes for data collection.

Goal 4: Information Delivery

The Water Boards will provide expertise in delivery of information management and information technology solutions delivery, including:

- **e-Government Solutions** - A central, integrated element of the entire AIMS.

- **Data Management** – A core focus for improved quality.

- **GIS** - A core, base technology that will be further leveraged over the planning horizon.

- **Electronic Document Management** - A core, base technology that is just taking shape and will be further leveraged over the planning horizon.

- **Public access to water quality and water rights information via the Internet** – A current public expectation of all government agencies that the Water Board will strive to meet.

Goal 5: Standards

The Water Boards will adopt, develop, and promote industry standard support structures, including:

- Technical Architecture
- Project Management Methods
- Process Improvement Framework

4. Key Strategies for Governance

To truly understand the concept of "governance," it is important to look beyond the definition of governance and compare the concept to "management processes," another concept with which governance is often easily confused. ***Governance is the process by which an executive committee functions as a unit to direct the organization. Management, on the other hand, is the style of implementation used by staff to translate governance policy into projects and services.***

IT organizations may be well-managed and able to deliver projects efficiently. But, they may be poorly governed if the projects bypass a formal approval process and do not further the interests of the organization.

Ultimately, organizations need to be both well-governed and well-managed in order to optimize the business value of their technology investments and assets. While management relates more to the efficiency of professionals working towards a target or goal, governance is about intellectual innovation in creating a vision and then converting it into achievable goals and targets for the organization.

As noted previously, much encouraging work has been done to change the way IT systems are governed at the Water Boards. On November 27, 2007, a new governance structure for all major information systems, including CIWQS and the Water Rights Information Management System (eWRIMS) was adopted by the Water Boards Management Coordinating Committee (MCC). The MCC is a committee composed of the highest-ranking executives within the Water Boards, namely, the State Water Board's Executive Director, Chief Deputy Directors, and Deputy Directors, and the Regional Water Boards' Executive Officers.

Figure 4 represents a generalization of a governance structure adopted by the MCC for the CIWQS and eWRIMS systems. Such a generalization will allow application of this governance structure across the Water Boards' other IT-based project and process portfolio.
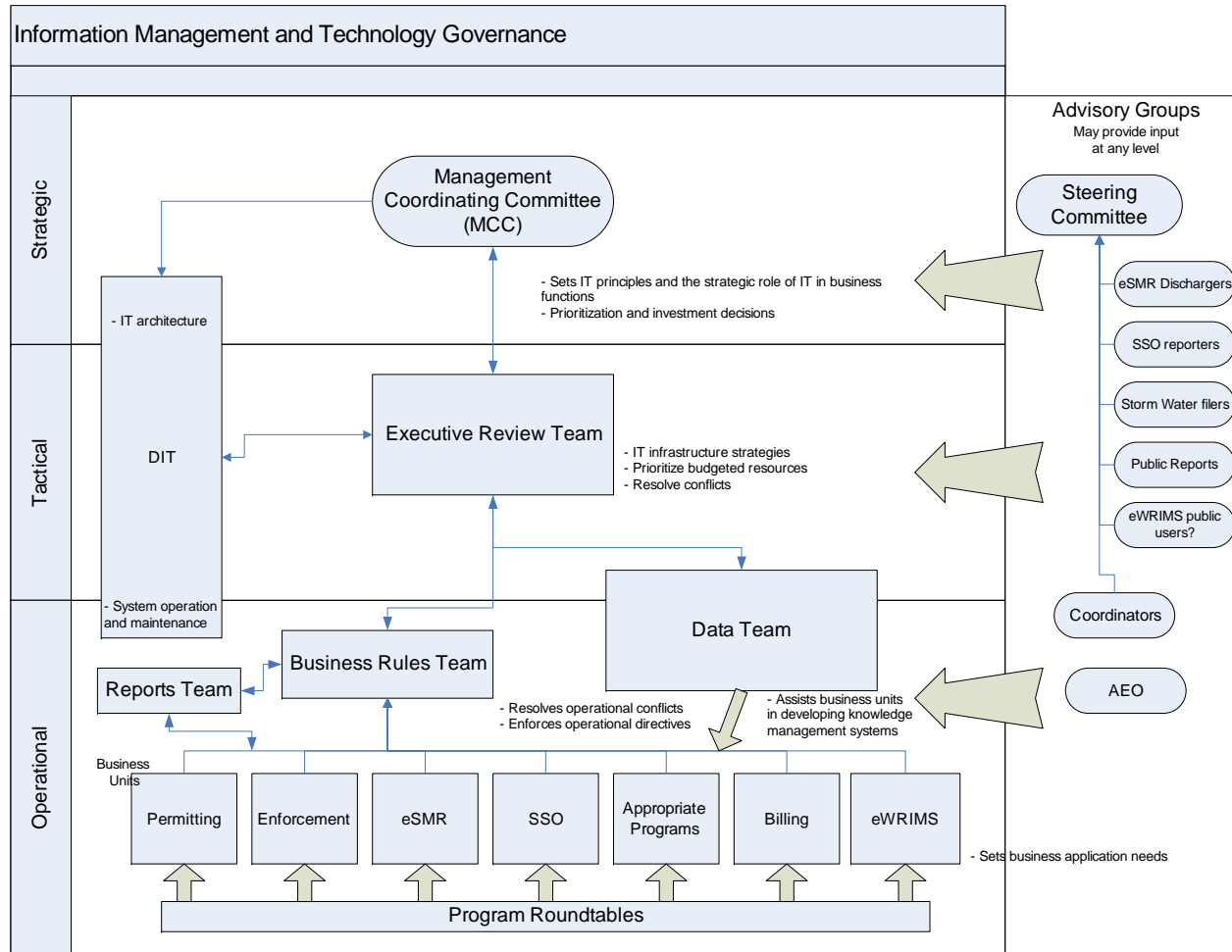
Figure 4. Generalized Governance Model for Water Boards

The diagram is organized under **Information Management and Technology Governance**, with three horizontal levels: Strategic, Tactical, and Operational. An **Advisory Groups** column (May provide input at any level) appears on the right.

Strategic level:
- Management Coordinating Committee (MCC)
- DIT (- IT architecture)
  - Sets IT principles and the strategic role of IT in business functions
  - Prioritization and investment decisions

Tactical level:
- Executive Review Team
  - IT infrastructure strategies
  - Prioritize budgeted resources
  - Resolve conflicts

Operational level:
- Reports Team
- Business Rules Team
  - Resolves operational conflicts
  - Enforces operational directives
- Data Team
  - Assists business units in developing knowledge management systems
- DIT (- System operation and maintenance)

Business Units: Permitting, Enforcement, eSMR, SSO, Appropriate Programs, Billing, eWRIMS
  - Sets business application needs

Program Roundtables

Advisory Groups:
- Steering Committee
  - eSMR Dischargers
  - SSO reporters
  - Storm Water filers
  - Public Reports
  - eWRIMS public users?
- Coordinators
- AEO

This generalized Governance Model becomes a key component of the Enterprise Portfolio Management Layer shown in Figure 1, State Water Board Organization Strategy and Implementation Map. In this generalized Governance Model, there are three distinct "layers" as described below.

Strategic Layer - The MCC sets information management and information technology principles. The MCC defines the strategic role of IT in supporting business functions. The MCC prioritizes and manages IT investment decisions across the Water Boards' portfolio.

Tactical Layer - An Executive Review Team (ERT) is composed of members no lower in the organization than Assistant Executive Officers (AEOs) and Assistant Division Chiefs. The ERT defines IT infrastructure sub-strategies (or tactics), prioritizes budgeted resources, and resolves conflicts in managing the Water Boards' portfolio consistent with the strategic direction provided by the MCC.

Operational Layer – The specific participation at this layer will vary by project and will be dependent on the subject business area(s) involved, as well as the magnitude of the project (budget, timeline, and scope) and the criticality of the process.

Figure 5 applies the generalized Governance Model to the other major projects and processes that exist at the Water Boards today.
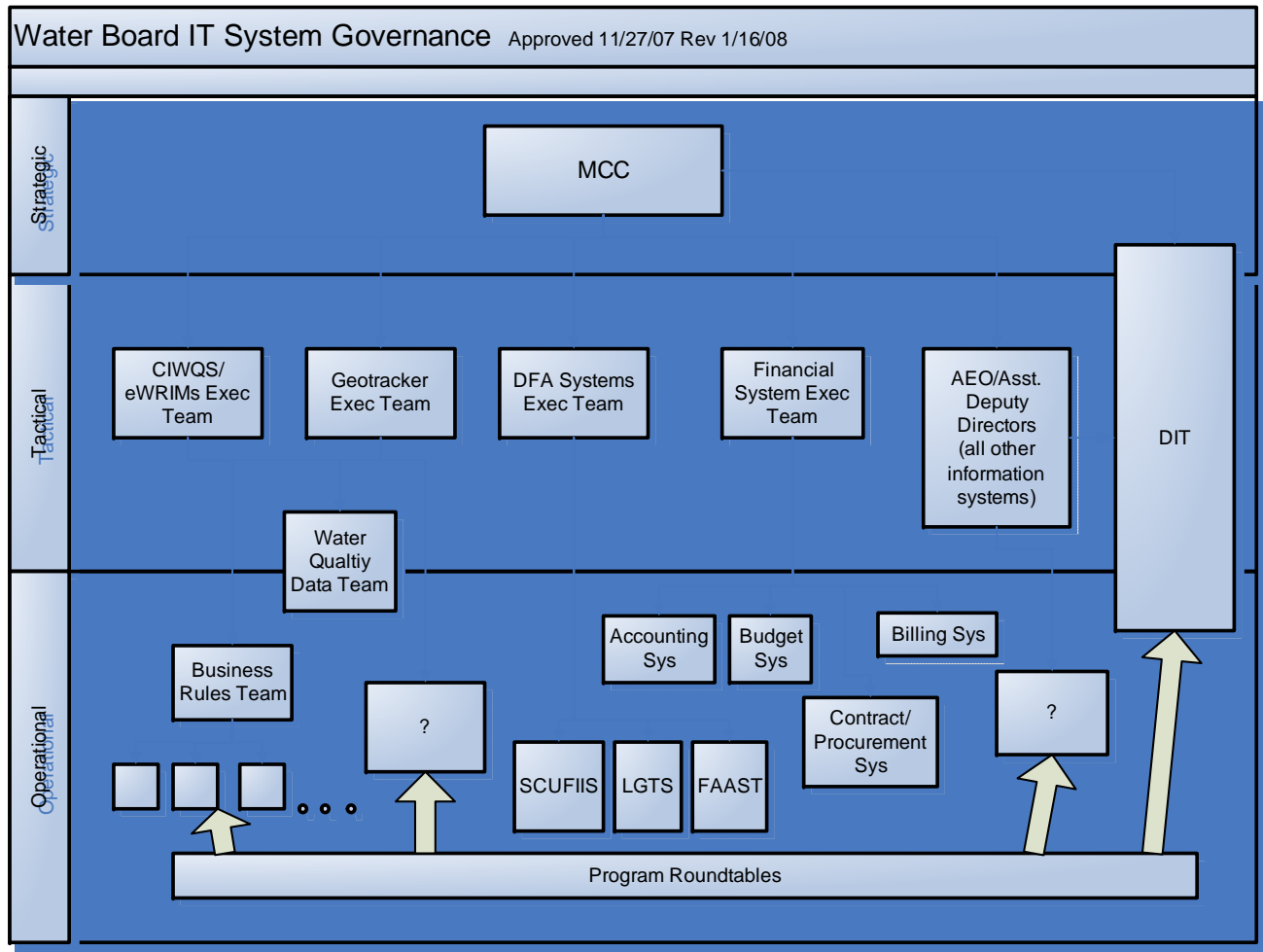
Figure 5. Governance Model for Projects and Processes at the Water Boards

This approach will enable the Water Boards to implement effective information management and information technology Governance through the strategies discussed below.

Strategy 1	Implement portfolio management and oversight.

The Water Boards will utilize the new Governance structure to implement sound processes to manage the technology portfolio, including CIWQS, other productional/ operational processes, other planned projects, and future projects and processes that align with the business strategy. The MCC will oversee budgetary and project priority agreements across the enterprise.

Importantly, the Water Boards recognize that their portfolio consists not only of "projects", but also of operational "processes". In the classic definition, a "project" is a *temporary* (not necessarily "short") effort with a defined beginning and a defined end that is undertaken to accomplish a defined scope of work. For example, the effort to develop CIWQS was "a project". Once a system has been built and moves into an operational status (i.e., becomes a part of on-going business operations), it is no longer a project. Rather, it has become "a process". With all of its challenges, CIWQS is nonetheless now a process – a part of daily routine business operations. ***Sound portfolio management oversees both processes and projects.***

Within a portfolio management and oversight framework, the Water Boards will be able to address operating principles and philosophies with a high degree of flexibility. At the time of this writing, the new Governance structure for the Water Boards is being implemented. Over time, the Water Boards will be able to expand the strategies and goals enumerated in this AIMS Plan, and, based on research, recommendations, and trade-offs, will be able to address operating principles and philosophies such as:

- Effective performance management *post-automation of Water Boards' core business processes for data collection*
    - o Process improvement
    - o Benchmarking
    - o Performance measurement
- Information Management expectations
    - o Public Information Officer function
    - o Executive leadership program in information management (i.e., beyond "technology" alone)
    - o IT as a cost center
- View of certain business functions as cross-program processes
    - o Enforcement
    - o Permitting
    - o Applications
    - o Information Management (including the PIO)

Strategy 2	Adopt rigorous project selection method.

The Water Boards will utilize disciplined project selection approaches, based on realistic resource forecasts, for future projects that will be proposed and undertaken within the planning horizon. The MCC will implement policy that each major technology initiative be documented in a pre-feasibility study report ("pre-FSR") so that it can be reviewed for pre-conditions including:

- Alignment to business strategy;
- Driven by business requirements;
- Within defined parameters of acceptable risk; and
- Supported by a business case with a realistic budget and available resources.

Strategy 3	Implement organizational readiness approach.

The Water Boards will ensure that implementation plans take into account the need to prepare the organization for the new solution. Organizational readiness includes:

- Leadership support and sponsorship
    - The MCC's role in establishing *policy* and then ensuring that business plans and budget exist for each new project

- Organizational change management
    - Governance structures, adhering to the model in Figure 5, will be defined and built for new systems
    - Implementation change teams will be recruited and equipped for their assignments
    - An accountability framework will be in place through the new Governance structure
    - The Water Boards' staff must be engaged

- External stakeholders are involved
- Communications
- Training
- Support
    - Technical support
    - Help Desk
    - Reporting
    - Staffing
    - Resources

- Documentation
- Risk management

Strategy 4	Implement strong contractor and sub-contractor management.

The Water Boards recognize that sound Portfolio Management requires the disciplined management of contractors and subcontractors, i.e., external third-party participants in project and operational activities. The Water Boards have made use of external entities in the past for project work and for operational activity support. The new Governance structure will take the management of contractors and subcontractors into account.

Strategy 5	Maintain flexibility to shift functions over time, if appropriate.

The Water Boards recognize that new capabilities sometimes emerge from a project activity with a (relatively speaking) narrow focus and overtime may grow to become pervasive core capabilities. When this occurs, it is often prudent to shift the function to a new organization.

For example, the current Electronic Content Management (ECM) project has a specific business goal. When the ECM project completes and becomes an operational activity that performs its business function on an ongoing basis, the core electronic content management capability on which the operational activity is based may provide a core capability that can be leveraged across large elements, if not all, of the Enterprise. At that point-in-time, it is likely to be advantageous to make the core capability the responsibility of an organizational unit or staff function that has information management as its core mission.

5. Key Strategies for Organizational Structure and Direction

The Water Boards will optimize organizational structure and resources for effective implementation of information management and effective delivery of information technology solutions that meet the needs of stakeholders. To do this, the Water Boards will strive for broad organizational awareness and support for IT efforts, and will continuously assess and develop the IT skill base. The following set of key strategies outline the Water Boards' plans for the organization's direction.

Strategy 1	**Engage full sponsorship of Water Board executives and senior business managers in information management and IT solutions, and utilize their support to enroll full organizational commitment.**

IT projects are critical to the business of the Water Boards and will continue to increase in significance. The Water Boards recognize that, to attain the goals and objectives set forth in this document, leadership support and commitment to the AIMS are essential. To this end, the Water Boards will engage executives and managers to assist in communications and enrollment efforts so that they visibly promote the organization's information management and information technology efforts and help to achieve enterprise-wide support. The Governance strategies discussed in the previous section will provide on-going executive involvement in the project and process portfolio management.

Strategy 2	**Leverage the Management Coordinating Committee's (MCC) policy and oversight role in Governance.**

As noted in the previous section on Governance, the MCC sets information management and information technology principles. The MCC defines the strategic role of IT in supporting business functions. The MCC prioritizes and manages IT investment decisions across the Water Boards' portfolio. ***Status reporting of projects and operational activities occurs outside of MCC meetings; decision-making occurs at MCC meetings.***

Strategy 3	**Utilize Executive Teams for oversight of tactical-level decisions for the enterprise.**

Tactical oversight includes the capacity to make decisions affecting enterprise-wide IT systems, as well as IT decisions that require quick resolution and do not impact the strategic direction of the Water Boards. While the MCC alone has authority over strategic decisions, an Executive Team has authority to make tactical-level decisions on enterprise-wide IT implementation and utilization issues that further the strategic goals and objectives approved by the MCC.

The Assistant Executive Officer/Assistant Deputy Director (AEO) committee will be responsible to review all potential local projects to ensure these projects are consistent with the AIMS and are not in conflict with any larger information system projects or processes. The Regional Water Boards and State Water Board offices and divisions will request this review from the AEO committee before initiating any such projects.

Strategy 4	**Balance centralized resources and distributed resources for optimal effectiveness.**

A clearly defined IT organizational structure is essential to ensure that all parties understand which organizational entity is responsible for providing specific IT services. The Gartner Group made a number of recommendations in its July 2003 report developed for the Water Boards. In general, the Water Boards are applying these recommendations as follows:

1. Establish an organization-wide IT Governance Structure:

   - Establish a decision making body (the MCC) that will set and approve IT vision, direction, budget, policies and priorities for the organization.

   - Ensure that the entire organization understands and adheres to IT standards and development requirements.

   - Establish and re-enforce the role and authority of program management over information projects.

2. Realign the organization focused on:

   - A Centralized approach to IT infrastructure support aligned with other business and facility support functions within the Division of Administrative Services, for the purpose of efficiency and effectiveness. IT infrastructure includes WAN and LAN management, PC help-desk, and servers.

   - Decentralize business product management for the purpose of increased business awareness, innovation, and responsiveness – subject to enhanced and effective organization-wide IT Governance.

- The Water Boards operate in a highly distributed manner. Historically, the need for and business design of new systems and applications has often emerged from the Regional Boards or program areas. This is good and should be encouraged; however, the actual development of systems and software should be consistent with new more centralized IT governance, and conform to technical architecture guidelines.

Strategy 5	**Engage in an annual workforce skill assessment and adopt a skill development policy to ensure that adequate skills and capabilities exist to support IT solutions.**

The Water Boards rely on the capabilities of their IT workforce to successfully achieve the AIMS goals. Therefore, the Water Boards will continue to assess the scope of skills required by IT projects and management. While recognizing that outsourcing may be a more effective way to complete some work, the Water Boards commit to actively develop the IT staff skills base through mentoring and applied training. This will include further utilization of Individual Development Plans (IDPs) as a tool to help the organization inventory available skills in their workforce and to identify skill areas that need enhancement. The Water Boards will continue development of internal staff to perform technical functions within the organization, but recognize that contractor support is necessary to perform certain tasks and compliment internal abilities. Where applicable, the Water Boards will enlist contractors to participate in a knowledge transfer program to ensure that Water Boards staff gains key skills. The Water Boards' skill development policy incorporates the following training strategies.

- Provide targeted external training for existing resources to meet immediate training needs.
- Provide external training for end-users on standard office automation software.
- Centrally develop and deliver in-house training as the Water Boards introduce new business applications, utilizing a "train-the-trainer approach".

Appendix J presents the skills and capabilities required at the Water Boards.

6. Key Strategies for Business Improvement

The Water Boards will align technology development and implementation to support the business mission and automate the core processes of the Water Boards.

Strategy 1	**Undertake and complete the implementation of a series of projects that facilitate both data collection and accessibility, and business process improvement.**

A fundamental requirement of the State of California Department of Finance AIMS Documentation Guidelines (SIMM 110) is to describe the agency's approach to implementing technology solutions to automate core business processes and provide information management tools. In essence, that is what the entire AIMS is all about. However, the Water Boards are planning to undertake a series of efforts to improve core business processes. Section 10 of this AIMS provides a summary of planned and conceptual strategic initiatives.

Strategy 2	**Validate system requirements.**

Specific to CIWQS, the External Review Committee recommended that system requirements be validated. The Water Boards will generalize the recommendations from the External Review Committee to ensure that in all future systems develop activities:

- Business rules must be established.

- "Cradle-to-grave" tests are conducted, completed, and assessed, with all deficiencies documented in detail.

- A formal system engineering process, including an implementation plan review ***that includes an assessment of organizational readiness*** is conducted.

Strategy 3	**Advance planning for data quality.**

Specific to CIWQS, the External Review Committee recommended that data quality issues be addressed. The Water Boards will generalize the recommendations from the External Review Committee to ensure that in all future systems develop activities:

- Data quality issues are categorized and quantified.

- A data quality plan exists for addressing potential sources of errors and correcting historical errors.

- The data quality plan has been validated with representative data samples.

Strategy 4	Advance planning for reporting.

Specific to CIWQS, the External Review Committee recommended that reporting issues be addressed. The Water Boards will generalize the recommendations from the External Review Committee to ensure that in all future systems develop activities:

- A prioritized list of reports has been compiled and agreed to by the project's steering committee.

- A schedule for report production has been agreed to by the project's steering committee.

- Sample reports that demonstrate the project team's approach to report design and production are available.

- A plan for standard report access has been established.

Strategy 5	Advance planning for user interfaces.

Specific to CIWQS, the External Review Committee recommended that user interface issues be addressed. The Water Boards will generalize the recommendations from the External Review Committee to ensure that in all future systems develop activities:

- An explicit plan for usability testing has been developed by the project team and endorsed by the project's steering committee.

- Sample prototype reports are made available early in the development lifecycle.

7. Key Strategies for Information Delivery

The Water Boards will foster and promote expertise in delivery of information management and information technology solutions delivery, including:

- o e-Government Solutions
- o Data Management
- o GIS
- o Electronic Document Management
- o Public access to water quality and water rights info via the Internet

7.1 e-Government Solutions

e-Government is the provision of information and services by government to the public through the Internet, integrated Internet-based technologies, and voice and data technologies dependent on the Internet. All State of California agencies and departments have been encouraged to develop a comprehensive e-Government strategy[2] that takes advantage of the unique characteristics of the Internet. The State of California Department of Finance AIMS Documentation Guidelines require that an AIMS address e-Government specifically.

In many ways, the Water Boards have made significant progress in implementing e-Government solutions through Geotracker, CIWQS and eWRIMS. In fact, e-Government capability is more of an integral part of these systems than a separate strategic consideration. The Water Boards' Geotracker system was one of the state's first Internet based systems that provided information directly to the public, and was recognized as a national leader when it was deployed.

Through its e-Government solutions, the Water Boards has and will continue to utilize the Internet as a fully functional new channel for providing service to stakeholders and for collecting data for the Water Boards' and public's use. It is anticipated that e-Government services will dramatically and measurably improve outcomes in the management and regulation of the state's water resources. Consistent with the State Administrative Manual's Information Technology Accessibility Policy, the State Water Board will provide equal access to information for people of disabilities. To achieve its e-Government goal, the Water Boards will focus on key strategies, which are the result of market analysis, best practice research, and discussions with Board staff. Each of these strategies is discussed in detail below.

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[2] Executive Order D00-17

Strategy 1	**Adopt a multiple site, single architecture philosophy.**

The Water Boards will adopt a multiple site, single architecture philosophy for all e-Government services, building the architecture a single time and then leveraging it across multiple applications and serving multiple audiences. This will support access to Water Boards information by all the different user groups and allow for more sophisticated transactional capabilities. This infrastructure will also closely integrate with a broader IT infrastructure that supports the organization's core business functions and provides the foundation for future initiatives to expand e-Government services. Appendix I details the Water Boards' standard web architecture.

Strategy 2	**Adopt and follow a structured Project/Systems Lifecycle, including a Software Development Life Cycle (SDLC) approach to Web development.**

The Water Boards will utilize a structured Project/Systems Lifecycle, including a Software Development Life Cycle (SDLC) approach to develop web applications and undertake Internet initiatives. This approach will be utilized throughout all phases of a system's evolution. By following a systematic approach to web development, the Water Boards will achieve consistency in technical approach, coordination across units, and adherence to standards and guidelines.

Strategy 3	**Develop and follow Internet standards and guidelines.**

The Water Boards will develop Internet standards and guidelines to provide a common framework for web application development and deployment. The guidelines will include standards for development tools, architectures, user interfaces, security and access, and performance. Appendix I details the Water Boards' Internet standards and guidelines.

Strategy 4	**Create and follow formal content management processes.**

Content management involves defining roles, formal processes, and supporting systems architecture that will help organizations contribute, collaborate on, and control page elements such as text, graphics, and multimedia. To ensure that its Internet presence provides the regulated community/partner agencies, staff, and the public with a

consistent and high quality experience, the Water Boards will create formal content management processes and will explore the use of content management tools to ensure compliance with these processes.

Strategy 5	**Implement e-Government projects in phases, starting with small projects and building on successes.**

The Water Boards will implement one or more new e-Government projects as frequently as possible to maintain momentum toward building a comprehensive e-Government service line. This phased approach to application deployment will allow the Boards to evaluate the success of each project and measure stakeholder satisfaction with service delivery, quality, and cost savings. The Water Boards will use that information to develop new and improved web-based applications. Appendix H lists the Water Boards' planned e-Government projects. Priority projects for the Water Boards' are electronic document submittal and ECM.

Strategy 6	**Establish consistent stakeholder service processes.**

A critical success factor in delivering value-added e-Government solutions is the ability to provide consistent stakeholder service for all stakeholder groups, including the regulated community/partner agencies, staff, and the public. The Water Boards will establish stakeholder service processes that:

- Provide standard responses to commonly asked questions
- Provide e-mail notification of stakeholder inquiry along with anticipated answer date
- Coordinate stakeholder service across delivery channels
- Allow for contact management capabilities to track stakeholder service across channels and manage long-term stakeholder relationships

Strategy 7	**Develop methods to communicate about new e-Government services and migrate stakeholders from phones and in-person services to those services.**

To encourage use of the Water Boards' Internet-based services, the Water Boards must effectively communicate the availability of those services. The Water Boards will contact and inform stakeholders of this new service channel using various media, including e-mail notification, U.S. Mail, phone, and in-person meetings. The Water Boards are already encouraging stakeholders to seek information on the Internet rather than through

telephone and in-person transactions. By increasing stakeholders' ability to meet their needs through self-service, the Water Boards will become more effective and efficient in their stakeholder service delivery and capacity.

7.2   Data Management

Strategy 10	**Pursue a coordinated approach to data management.**

Data and the policies, processes, and technology surrounding data are central to the business mission of the Water Boards. Data quality is of paramount importance, and the Water Boards will utilize appropriate Quality Assurance/Quality Control to ensure the necessary high quality is achieved. New systems development activities will include formal QA/QC processes linked to data entry to provide immediate feedback on errors and opportunities to correct errors as early as practical.

Specific to CIWQS, the Water Boards' will prepare a Quality Assurance Plan (QAP) that addresses the known data quality issues it has. This plan will call for independent data audits that will be used to assess data quality and give the Water Boards guidance on areas that need to be addressed. Once identified, steps such as preparing better standard-operating-procedures or data entry screen changes can be taken to improve data quality.

The Water Boards will adhere to the following fundamental guidelines for data management:

1. Data should address the needs of the business unit developing and using it first;
2. Data should be displayed spatially (see GIS below) so that connections and relations between and among data are easily identifiable; and
3. Datasets will be combined together so that the data can be used by multiple business units *only when there is an identified need and the benefits justify the costs.*

7.3   GIS

Strategy 11	**Pursue Geographic Information Systems (GIS) capabilities.**

The inherent nature of many, if not most, of the business processes at the Water Boards is geographic and/or spatial in nature. The Water Boards have developed GIS capabilities and have deployed this capability in its Geotracker data system, and most recently in eWRIMS. GIS capabilities are also under development for different modules of CIWQS such as the Sanitary Sewer Overflow (SSO) module.

The Water Boards recognize the value of GIS-based solutions to their business. The Water Boards further recognize that GIS is neither "a program" nor "a module" of a single application system. GIS capability and staff comprise a knowledge base resource that must be leveraged across the enterprise portfolio.

The Water Boards also recognize that a single GIS interface may not be adequate to service different user groups' needs. Staff often needs sophisticated GIS tools that allow display of data and live editing, while the general public needs intuitive GIS tools to display data that does not require manipulation. The Water Boards will work to develop these different types of GIS tools and use them where appropriate.

7.4   Electronic Document Management

Strategy 12	Pursue a unified approach to electronic document management.

Even today, most of the information that the Water Boards receive is paper-based. Most reports get filed and are seldom referenced.

There are state mandates for electronic filings of certain water quality reports. As the Water Boards transition to electronic filings, they must handle both paper reports and electronic reports.

Some initial efforts have been launched to scan paper documents. While this alleviates some of the paper-handling, it does not add an intelligence to the business process. More work is needed to redefine forms and reports so that useful information is collected and indexed in ways that facilitate access and analysis.

The problem and opportunities are magnified by the proliferation of web capabilities and the expectations of the general public and certain external users that information is more readily available. Document management is no longer just about scanned files of documents. Document management includes web content, photos, test results, and other information *in readily indexed and accessible formats.*

The Water Board is pursuing an electronic content management pilot at the San Diego Regional Board office to evaluate and learn the potential of such a system. One test case is to make public the "public record" for a particular cleanup order case for which there are tens of thousands pages of paper documents. Learning from this pilot will enable the experience gained to be applied across the different Water Board offices.

The Water Boards are also pursuing this strategy in their electronic reporting systems. Geotracker was the first Water Board system to receive monitoring data in an electronic format so that it could be manipulated easily. Following this, CIWQS has deployed the SSO module for spill reporting, SWARM for receiving storm water annual reports, and eSMR is under redevelopment for receiving discharger self-monitoring reports. The Water Boards will continue to evaluate the potential and capability to pursue more such projects because they ultimately improve the handling of data and its availability to the public.

8. Key Strategies for Standards

The Water Boards will adopt, develop, and promote industry standard support structures, including:

- Technical Architecture (e.g., vendor, asset ,and architecture management)

- Project Management Methods (e.g., PMBOK)

- Process Improvement Framework (e.g., COBIT, ITIL, or Balanced Scorecard)

8.1   Technical Architecture

Through the establishment and enforcement of appropriate technology standards, organizations can decrease the overall cost of owning technology assets and can improve business outcomes. The Water Boards will establish enterprise-wide hardware and software standards, and invest in and develop IT solutions that comply with these standards. Consistent with the State Administrative Manual's Information Technology Infrastructure Policy, the Water Boards' technology architecture will ensure that applications and databases expand information sharing, are scalable, portable, reusable, and interoperable. In addition, the Water Boards will realize cost savings through the utilization of a consistent and less complex architecture that results in reduced security risks, and streamlined training and support needs. The Water Boards will focus on five key strategies to achieve a uniform technology architecture. The following sections discuss each of these strategies in detail.

Strategy 1	Define hardware architecture standards to guide acquisition of new hardware for the enterprise.

Hardware platforms process and store information for users and applications. The Water Boards will define hardware architecture standards to guide their purchases with the goal of reducing the total cost of ownership of their technical assets. Standardization of these elements, which consist primarily of workstations and servers, will simplify the management of the IT infrastructure and applications. Specific hardware architecture guidelines for desktop workstations and servers (i.e., application, database, and web) are included in Appendix E, which will be updated, as needed. As they acquire new hardware, the Water Boards will follow these broad hardware architecture guidelines:

- Refresh hardware infrastructure elements when they fall below the minimum-documented configuration, their maintenance is no longer cost effective, or if elements have exceeded an assumed four year lifecycle.

- Continue to standardize on the PC hardware architecture for personal computers and laptops. While MS Windows is the operating system standard, the Water Boards will continue to actively evaluate open source alternatives such as Linux for possible future use.

- Continue utilization of Sun Solaris for mid-range and enterprise servers while exploring the potential use of other platforms.

- Move the organization toward a select set of hardware platforms to minimize the total cost of ownership.

Strategy 2	**Adopt personal productivity software standards to ensure maximum interoperability and facilitation of data exchange.**

Software applications enable and assist users in performing the business processes of the enterprise and run across a variety of desktop and server platforms. The Water Boards will adopt personal productivity software standards to ensure their systems function with a high level of interoperability and are able to easily facilitate data exchange. The Water Boards currently utilize both COTS ("commercial off-the-shelf") and custom-developed software applications. These tools include desktop productivity tools such as word processing, spreadsheet, calendaring and scheduling, presentation, database, groupware, web browser, e-mail front end, and statistical analysis applications. For the tools to support the work environment, users must be able to exchange and integrate different types of documents (e.g., word processor and spreadsheet documents). The Water Boards' Personal Productivity Software standards are included in Appendix F.

Strategy 3	**Adopt standardized tools and processes for software development.**

Application development involves the conceptualization, design, creation, implementation, testing, enhancement, and maintenance of application systems. The Water Boards will adopt and utilize standardized development tools, along with uniform project management methodologies, to achieve consistency in application development across the enterprise. Appendix F lists the Water Boards' standards for application development tools. The following are broad guidelines to support the development of applications that are consistent with the Water Boards' infrastructure components:

- Use standard approaches for the development and enhancement of the Water Boards' applications, where key users and application architects work together throughout the application development cycle.

- Utilize principles of Object Oriented Design and Development to maximize code re-use. As appropriate, utilize a Services Oriented Architecture (SOA) approach.

- Utilize a variety of industry proven tools to develop needed application functionality.

- Adopt, promote, and implement throughout the Water Boards a structured development life cycle, which includes business process standardization, identification of business requirements, application design, testing, documentation, and system maintenance.

- Conduct joint business and technical analysis for large applications.

- Test applications prior to deployment.

- Utilize dedicated staff to provide instruction and training.

- Have program staff manage and prioritize application change requests for their application so that their most important needs are met first.

- Report at least quarterly to the MCC on application development and deployment progress.

- Evaluate all core business application development efforts using Enterprise Portfolio Management to assure its mission, place and relation to other systems.

- Provide formal "Help Desk" support for all enterprise applications.

Strategy 4	**Increase network and Internet traffic capacity to support core business functions.**

Networking services provide the transport, Internet-working, and interfaces that enable applications to communicate in a computing environment and are the underlying technology for implementing client/server and web-based applications. A recent analysis of the Water Boards' WAN infrastructure revealed it is sound and currently serves the organization's needs. The Water Boards will pursue acquiring additional capacity to handle the expected increase in network load resulting from broader usage of CIWQS and Geotracker, support of broader GIS functions, Electronic Content Management (ECM), and support of audio and video teleconferencing at all Regional Water Boards. The Water Boards will also pursue, as funds permit, a complementary strategy to build a level of redundancy into it its network infrastructure to guarantee high levels of network availability.

Strategy 5	Improve cross-organizational data exchange and improve stakeholder access to information.

The method of data distribution affects an organization's capacity for cross-organizational data exchange. Data distribution involves the placement and use of data and databases, and addresses whether data should be located centrally, locally, or both (hybrid model). To maximize data exchange across the organization, the Water Boards have adopted a hybrid data distribution model for the enterprise, which means that some of the organization's data is stored centrally, while other data is stored locally at Regional Water Board sites.

Finally, the Water Boards will improve stakeholder and other agencies access to information through the establishment of data exchange nodes such as the California Environmental Data Exchange Network (CEDEN). In partnership with the Department of Water Resources and the Department of Fish and Game, and in its role in administering the California Water Quality Monitoring Council, the Water Board will be an active member for sharing information between agencies and in making it available to the public.

Strategy 6	Provide for information security at all levels of a project.

Information security is an increasingly important aspect of the information technology environment. Implementing it correctly requires establishing it at the different levels of a project. To provide for secure information on Water Board systems, we will implement security procedures that provide for:

- **Physical Security** – All network and enterprise application hardware and software is secured within a locked server room

- **Application Level Security** – The State Water Board strictly controls administrative rights to the WAN, LANs, and applications with administrative passwords.

- **Encryption** –Encryption of some secure data to safeguard its confidentiality.

- **Authorization** – Only the database administrator or authorized designee may alter the system security tables.

- **Firewall** – A Cisco/PIX firewall protects the database assets from unauthorized access.
- **Audits** – The State Water Board conducts ongoing security audits of the Windows-based LANs.

8.2 Project Management Methods

Strategy 7	Define, implement, and maintain project management methods to help ensure the successful execution of projects.

Since the first AIMS, the Water Boards' IT staffing and approach to IT management has rapidly evolved to handle increasingly ambitious projects within an environment of changing technology. To keep pace with these changes, the Boards have adopted project management best practices that include the use of the Project Management Institute's (PMI) Project Management Body of Knowledge (PMBOK) for all system development work (see Project Management Policy in Appendix K). PMBOK provides the Boards with an approach to successfully manage the challenges of IT system development. These management challenges arise from such factors as the complexity of the core business, specific stakeholder needs, technology alternatives, and scarce resources. The PMBOK project management phases include project initiation, planning, execution, control, and closeout. Within each phase, the organization must carefully monitor the project work plan, risk management plan, communication plan, and contracts to mitigate changes to project scope, budget, and resource requirements.

Adhering to a sound project management methodology at each stage of an IT project – from planning to evaluation – ensures that the Water Boards' projects will achieve desired business outcomes and end-user expectations, and will be completed on schedule and within budget.

Strategy 8	Establish the appropriate project oversight to facilitate project delivery and risk management.

Effective project oversight will mitigate the risks inherent in all IT projects and facilitate effective delivery of the Water Boards' projects. The Water Board is responsible for complying with the Project Oversight Framework (SIMM Section 45) and will incorporate this in all its IT projects.

8.3 Process Improvement Framework

Strategy 9	Define, implement, and maintain a process improvement framework to help ensure the success of operational processes.

As noted very early in this AIMS, the Water Boards recognize that their portfolio consists not only of "projects", but also of operational "processes". In the classic definition, a "project" is a *temporary* (not necessarily "short") effort with a defined beginning and a defined end that is undertaken to accomplish a defined scope of work. For example, the

effort to develop CIWQS was "a project." Once a system has been built and moves into an operational status (i.e., becomes a part of on-going business operations), it is no longer a project. Rather, it has become "a process". With all of its problems, CIWQS is nonetheless now a process – a part of daily routine business operations.

The Water Boards will utilize a process improvement framework to ensure the success of operational processes.

9. Critical Success Factors

Certain factors are critical to the successful implementation of the Water Boards' AIMS. The factors listed below highlight the importance of collaboration, commitment, and resource allocation.

- Access to Executive Management, Regional Board Management, and Executive Review Committees for project direction, review, approval, support, and the timely resolution of AIMS implementation issues.

- Support from all levels of the organizations.

- Availability of adequate and dedicated resources toward the completion of AIMS projects and strategies.

- Management of scope-of-work to ensure AIMS goals are reasonable, achievable, and can be met.

- Effective project managers, with demonstrated experience, manageable workloads, and knowledge of standard project management methods.

- Development and management of effective project teams.

- Commitment by all parties to successfully execute the projects and strategies identified in the AIMS as funding and other resources permit.

- Prudent use of contractors to facilitate achievement of AIMS goals.

- Timely cooperation from all stakeholders during the implementation of AIMS projects and strategies.

- Organizational readiness, including introductory and ongoing training, to ensure that end-users can fully utilize new systems and applications.

- Proactive planning and communication in anticipation of organizational changes resulting from IT project implementation to ensure successful transitions to new systems and procedures.

10. Information Investment Plan

The tables on the following pages detail the Water Boards' information investment plan and project activity over the next budget cycle. The tables are categorized as follows:

Table 1 – Water Boards' Development Projects

Table 2 – Water Boards' Infrastructure Projects

Table 3 – Water Boards' On-going Maintenance Activities

Table 4 – Summary of Water Boards' Projects Receiving Contract Resources

Table 5 – In-house Support Costs

Also included as Table 6 is a listing of known information project needs for which there is not currently a formalized project. These projects are concept only and so no cost or timing information has been developed. However, the information management needs are apparent and should be addressed in the near future to allow the program to advance. Feasibility Study Reports will be prepared for these projects as they are moved forward.

Table 1. Water Boards' Development Projects

Development Projects (Projected Costs are One-Time Unless Otherwise Noted)								
Project Title	**Project Full Name**	**Project Status**	**Project Complexity**	**IT Service Area**	**Service Category**	**Project Lead**	**Projected Resource Requirements**	**Project Due Date**
CIWQS – eSMR2	CIWQS-eSMR redesign	In progress	Major	Project Management, Application Development, Data Management	Application and Data Management	WQDT	Included in CIWQS maintenance	Jun-08
CIWQS - EDM	CIWQS data structure cleanup	In progress	Medium	Application Development, Data Management	Application and Data Management	WQDT	In-house staff	Jun-08
CIWQS - SWPAP	CIWQS Stormwater Public Participation Project	Beta testing in progress	Major	Project Management, Application Development, Data Management	Application and Data Management	DWQ	One time $420,000 On-going $100,000 per year	Mar-08
CIWQS - GIS demo	Demo GIS capability for CIWQS	Project initiation	Medium	Application Development, Data Management, GIS Services	Application and Data Management, Infrastructure	WQDT	In-house staff	Feb-08

Development Projects
(Projected Costs are One-Time Unless Otherwise Noted)

Project Title	Project Full Name	Project Status	Project Complexity	IT Service Area	Service Category	Project Lead	Projected Resource Requirements	Project Due Date
CIWQS-AMM	California Integrated Water Quality System - AMM (Ambient Groundwater Monitoring and SWAMP)	Development completed, but not in use	N/A	N/A	Application and Data Management	on-hold	One time $768,293 Authorized on-going $125,000 per year	Nov-06
Geotracker II	Outsource Geotracker system to a system as a service provider	FSR completed, pending procurement	Medium	Project Management	Project Management	DWQ	One time $416,000 On-going $400,000	Oct-08
GAMA	Groundwater Ambient Monitoring Assessment	FSR in final review, procurement pending	Medium	Data Management and Display	Application and Data Management	DWQ	One time $252,800 On-going $246,000	Nov-08
Cost Recovery technology upgrade	Technology upgrade for Cost Recovery Daily Log system for DFA and RBs	In progress (project team conducts business analysis with DFA)	Medium	Application Development	Application and Data Management	DFA	In-house staff	Jun-08
LGTS Phase II	Loans and Grants tracking system expansion	Project initiation, internal FSR in review	Medium	Project Management, Application Development, Data Management	Application and Data Management	DFA	One time $400,000 On-going $90,000	TBD
ABTS	Automated Budget Tracking System (BDAS replacement)	In progress (evaluating COTS product)	Medium	Project Management, Data Management	Application and Data Management	DAS	One time $470,000 On-going $200,000	Jun-08

Development Projects
(Projected Costs are One-Time Unless Otherwise Noted)

Project Title	Project Full Name	Project Status	Project Complexity	IT Service Area	Service Category	Project Lead	Projected Resource Requirements	Project Due Date
AFRS	Annual Fee Remittance System	In progress (Pending procurement of COTS product)	Medium	Project Management, Data management	Application and Data Management	DAS	One time $498,443 On-going $24,500	Oct-08
eTimeSheet expansion	Electronic Timesheet expansion to RBs	Expansion for Redding and Fresno in March/April '08 respectively. After Fresno, DAS will follow WAN upgrade schedule; kick off meeting already conducted in October, new servers are built.	Medium	Project Management, Application Development, Enterprise Server Administration	Application and Data Management, Infrastructure	DAS	In-house staff	Mar-08 to Nov-08
BizFlow eTimesheet dataflow to CalSTARS	eTimesheet dataflow to CalSTARS	In progress	Minor	Project Management, Application Development, Data Management	Application and Data Management	DAS	One time $50,000	Jun-08

Table 2. Water Boards' Infrastructure Projects

**Infrastructure Projects
(Projected Costs are One-Time Unless Otherwise Noted)**

Project Title	Project Full Name	Project Status	Project Complexity	IT Service Area	Service Category	Project Lead	Projected Resource Requirements	Project Due Date
ECM Enterprise	Enterprise roll out of Electronic Content Management	Project initiation, reportable external FSR in development	Major	Project Management, Windows Administration, Network Administration	Infrastructure	DAS	$3.1 million	TBD
Internet Website Conversion	Statewide Internet Website conversion	In progress (first cutover begins 3rd week of November)	Medium	Web Services	Infrastructure	IT	One time $130,000	Feb-08
GroupWise 7 Post Office only	GroupWise 7 post office backup upgrade	In progress	Minor	Novell Administration, PC Support	Infrastructure	IT	In house staff	Jan-08
GroupWise 7 Client upgrade	GroupWise 7 client upgrade	Project planning phase (will use ZEN to push out GW client to desktop)	Medium	Novell Administration, PC Support	Infrastructure	IT	In house staff	Apr-08
RB WAN upgrade	Regional Board Wide Area Network Infrastructure refresh	Project initiation (4 pilot regions, R6v, R9, R1 and R4 are scheduled to have equipment installed by Feb 2008, however, AT&T service upgrade not available until May 2008)	Major	Network Administration, Windows Administration, Novell Administration, PC Support	Infrastructure	IT	In house staff	Jan-08 to Jun-09
Core Switch OS upgrade	Core OS upgrade to support Gig blade, MARS report and IDS to IPS	In progress	Medium	Network Administration	Infrastructure	IT	In house staff	Apr-08

Infrastructure Projects
(Projected Costs are One-Time Unless Otherwise Noted)

Project Title	Project Full Name	Project Status	Project Complexity	IT Service Area	Service Category	Project Lead	Projected Resource Requirements	Project Due Date
ACS configuration	Setup ACS configuration and setup for failover and RB access	In progress (initial testing is already done, pilot regions such as R1)	Medium	Network Administration	Infrastructure	IT	In house staff	May-08
RB Wireless setup	Setup wireless access for RBs	Project initiation (following WAN upgrade schedule)	Medium	Network Administration	Infrastructure	IT	In house staff	May-08 to Jun-09
HQ VLAN migration phase II	Migrate Windows servers to dedicated VLAN	Project initiation (in the process of developing project plan)	Medium	Windows Administration	Infrastructure	IT	In house staff	Dec-08
CalEPA Network upgrade participation	CalEPA Network upgrade	Project initiation (pending CalEPA schedule, SWRCB contributed to the change control document development)	Major	Network Administration	Infrastructure	IT	In house staff	Jun-09
PIX firewall version upgrade	To upgrade software version and hardware of the PIX firewall - security	Project initiation (software and hardware in procurement)	Medium	Network Administration	Infrastructure	IT	In house staff	Jun-09
Video Conference setup	Setup video conference for RBs	Project initiation (following WAN upgrade schedule)	Medium	Network Administration, PC Support	Infrastructure	IT	In house staff	May-08 to Jun-09
Webcasting services	Provide Webcasting capability via third party service	Project initiation (following WAN upgrade schedule)	Medium	Network Administration	Infrastructure	IT	In house staff	May-08 to Jun-09

Infrastructure Projects
(Projected Costs are One-Time Unless Otherwise Noted)

Project Title	Project Full Name	Project Status	Project Complexity	IT Service Area	Service Category	Project Lead	Projected Resource Requirements	Project Due Date
Novell ZEN work	Novell ZEN work deployment on Novell servers	Project initiation (in the process of developing project plan)	Minor	Novell Administration	Infrastructure	IT	In house staff	Mar-08
Annual PC refresh	Annual PC refresh cycle	In progress (each region is in the process of putting together Form 5 packages)	Medium	PC Support	Infrastructure	IT	In house staff	Feb-08
Annual Printer refresh	Annual Printer refresh cycle	In progress (each region is in the process of putting together Form 5 packages)	Medium	PC Support	Infrastructure	IT	In house staff	Feb-08

Table 3. Water Boards' On-going Maintenance Activities

Maintenance Activities (On-going Activities Within the Portfolio) (Projected Costs are On-going)							
Project Title	**Project Full Name**	**Project Status**	**Project Complexity**	**IT Service Area**	**Service Category**	**Project Lead**	**Projected Resource Requirements**
CIWQS - Core	CIWQS phase I	Maintenance and Enhancement	Major	Project Management, Application Development, Data Management	Application and Data Management	DWQ	$350,000 per year
CIWQS - eSMR	CIWQS phase I	Maintenance and Enhancement	Major	Project Management, Application Development, Data Management	Application and Data Management	DWQ	
CIWQS - SSO	CIWQS Sanitary Sewer Overflow	Maintenance and Enhancement	Medium	Application Development, Data Management	Application and Data Management	DWQ	In-house staff
CIWQS - SMARTS	CIWQS Stormwater NOI on-line submission	Maintenance and Enhancement	Medium	Application Development, Data Management	Application and Data Management	DWQ	$50,000 per year
CIWQS - SWARM	CIWQS Storm water Annual report submission	Maintenance and Enhancement	Medium	Application Development, Data Management	Application and Data Management	DWQ	$35,000 per year
CIWQS - Discoverer Reports	Ad-hoc reports for CIWQS	Maintenance and Enhancement	Medium	Data Management	Application and Data Management	DWQ	In-house staff
CIWQS - Reports	CIWQS internal and external customized reports	Maintenance and Enhancement	Medium	Project Management, Application Development, Data Management	Application and Data Management	DWQ	$250,000 per year

Maintenance Activities (On-going Activities Within the Portfolio)
(Projected Costs are On-going)

Project Title	Project Full Name	Project Status	Project Complexity	IT Service Area	Service Category	Project Lead	Projected Resource Requirements
CIWQS data flow to AFBS	CIWQS auto data flow to AFBS for annual billing	Maintenance and Enhancement	Medium	Application Development	Application and Data Management	DAS	In-house staff
CIWQS - eWRIMS	New version of WRIMS	Maintenance and Enhancement	Major	Project Management, Application Development, Data Management, Enterprise Server Administration, GIS	Application and Data Management	DWR	$250,000 first year; $125,000 per year on-going
Geotracker	Geotracker and ESI	Maintenance and Enhancement, being replaced by Geotracker II in 08-09	Major	Project Management, Application Development, Data Management, Windows Administration	Application and Data Management	DWQ	$220,000 per year
WRIMS	Water Rights annual billing	Maintenance only, has been replaced by eWRIMs, shutting off after 6 month parallel run	Medium	Data Management	Application and Data Management	DWR	In-house staff
FAAST	Financial Application Submittal System	Maintenance and Enhancement	Medium	Application Development	Application and Data Management	DFA	$42,000 per year
LGTS and EBET	Loans and Grants Tracking and Environmental Benefit Tracking	Maintenance only, being replaced by LGTS II	Medium	Data Management	Application and Data Management	DFA	$130,000 per year
eTimeSheet	Electronic Timesheet	Maintenance only	Medium	Application Development	Application and Data Management	DAS	$31,000 per year

Maintenance Activities (On-going Activities Within the Portfolio)
(Projected Costs are On-going)

Project Title	Project Full Name	Project Status	Project Complexity	IT Service Area	Service Category	Project Lead	Projected Resource Requirements
Beach Watch	Costal Advisory Database System (Beach Watch)	Maintenance and Enhancement	Medium	Application Development	Application and Data Management	DWQ	In-house staff
SCUFIIS/OSCA	State Cleanup Fund Integrated Information System and Emerge abandoned recalcitrant, and Brownfield	Maintenance and Enhancement	Medium	Application Development	Application and Data Management	DFA	In-house staff
Cost Recovery	Cost Recovery and Daily Log Tracking System	Maintenance only	Medium	Application Development	Application and Data Management	DFA	In-house staff
AFRS	Annual Fee Remittance System	Maintenance only	Minor	Application Development	Application and Data Management	DAS	In-house staff
AFBS	Annual Fee Billing system	Maintenance and Enhancement	Medium	Application Development	Application and Data Management	DAS	In-house staff
Personnel	Personnel database	Maintenance only	Minor	Application Development	Application and Data Management	DAS	In-house staff
Contracts	Contracts database	Maintenance only	Minor	Application Development	Application and Data Management	DAS	In-house staff
BDAS	Budget System	Maintenance only	Minor	Application Development	Application and Data Management	DAS	In-house staff

Maintenance Activities (On-going Activities Within the Portfolio)
(Projected Costs are On-going)

Project Title	Project Full Name	Project Status	Project Complexity	IT Service Area	Service Category	Project Lead	Projected Resource Requirements
GIS Services	GIS data extraction, map creation	Maintenance only	Medium	GIS Services	Application and Data Management	DIT	In-house staff
TMDL	DWQ-TMDL program	hosting system only	Minor	Application Development	Application and Data Management	DWQ	In-house staff
ADWMS - RB3	Agricultural Discharge Waiver Management System	hosting system only	Minor	Application Development	Application and Data Management	RB3	In-house staff
ECM - pilot	Electronic Content Management (paperless office for R9, R3, and R2)	Maintenance and Enhancement	Medium	Project Management, Windows Administration, Network Administration	Infrastructure	DAS	$72,000 per year
Blackberry Phase II	Blackberry service expansion	Maintenance(DAS is in the process of rolling out BBs for regions)	Medium	Windows Administration, Novell Administration	Infrastructure	DAS	In-house staff
CALATERS	CA automated Travel Expense Reimbursement System	Maintenance only	Minor	PC Support	Infrastructure	DAS	In-house staff
Network Administration	Network performance monitoring and administration	Maintenance only	Medium	Network Administration	Infrastructure	DIT	In-house staff
File and Print Services	Novell File and Print Service	Maintenance only	Medium	Novell Administration	Infrastructure	DIT	In-house staff
Servers Administration	Windows and Unix Server Monitoring and Administration	Maintenance only	Medium	Windows Administration, Enterprise Server Administration	Infrastructure	DIT	In-house staff

Maintenance Activities (On-going Activities Within the Portfolio)
(Projected Costs are On-going)

Project Title	Project Full Name	Project Status	Project Complexity	IT Service Area	Service Category	Project Lead	Projected Resource Requirements
Web Posting	Daily posting to Internet and Intranet sites	Maintenance only	Medium	Web Services	Infrastructure	DIT	In-house staff
PC Support	PC and Printer support	Maintenance only	Medium	PC Support	Infrastructure	DIT	In-house staff

Table 4. Summary of Water Boards' Projects Receiving Contract Resources

Projects with Contract Resources

Summary list of IT projects that have contract resources allocated to them. These projects may also have in-house support.

Project Title	Project Status	Project Lead	Project One Time Cost prior to FY 07-08	Projected On-going Resource	FY 07-08	FY 08-09	FY 09-10	FY 10-11	Project Due Date
CIWQS - Core	Maintenance	WQDT	$1,675,300	On-going $350,000 per year	$350,000	$350,000	$350,000	$350,000	N/A
CIWQS - eSMR	Maintenance and enhancement	WQDT							
CIWQS – eSMR2	In progress enhancement	WQDT	N/A	Included in CIWQS maintenance					Jun-08
CIWQS - SMARTS	Maintenance	WQDT	$137,000	On-going $50,000 per year	$50,000	$50,000	$50,000	$50,000	N/A
CIWQS - SWARM	Maintenance	WQDT	$350,000	On-going $35,000 per year	$35,000	$35,000	$35,000	$35,000	N/A
CIWQS - SWPAP	Beta testing in progress	DWQ	$420,000	On-going $100,000 per year		$100,000	$100,000	$100,000	Mar-08
CIWQS-AMM	Development completed, but not in use	on-hold	$768,293	Authorized on-going $125,000 per year	on-hold	on-hold	$125,000	$125,000	Nov-08
CIWQS - Reports	Maintenance	WQDT	$250,000	On-going $250,000 per year	$250,000	$250,000	$250,000	$250,000	N/A
CIWQS - eWRIMS	Maintenance	DWR	$1,881,380	On-going $250,000 first year; $125,000 per year subsequent years	$250,000	$125,000	$125,000	$125,000	N/A
Geotracker	Maintenance	DWQ	$1,834,525	On-going $220,000 per year	$220,000				N/A
Geotracker II	FSR completed, pending procurement	DWQ	One time cost starts in FY0708	One time $416,000	$416,000				Oct-08
				On-going $400,000		$400,000	$400,000	$400,000	
GAMA	FSR completed, pending procurement	DWQ	One time cost starts in FY0708	One time $252,800	$252,800				Nov-08
				On-going $246,000		$246,000	$246,000	$246,000	
LGTS and EBT	Maintenance	DFA	$340,000	On-going $130, per year	$130,000	$130,000			N/A
LGTS Phase II	Project initiation, internal FSR in review	DFA	One time cost starts in FY0809	One time $400,000		$400,000			TBD
				On-going $90,000			$90,000	$90,000	
FAAST	Maintenance	DFA	$184,000	On-going $42,000	$42,000	$42,000	$42,000	$42,000	N/A
Electronic Content Management Pilot (ECM)	Pilot is implemented at Region 9 and is under evaluation.		$326,405	On-going $72,000	$72,000	$72,000	$72,000	$72,000	
ABTS	In progress (evaluating COTS product)	DAS	$470,000	On-going $200,000			$200,000	$200,000	Jun-09
AFRS	In progress (Pending procurementof COTS product)	DAS	One time cost starts in FY0708	One time $498,000	$498,000				Oct-08
				On-going $24,500		$24,500	$24,500	$24,500	
BizFlow eTimesheet	In progress	DAS	$249,000	One time datafloow to CalSTARS $50,000	$50,000				Jun-08
				On-going $31,000	$31,000	$31,000	$31,000	$31,000	
				One time costs total	**$1,216,800**	**$400,000**	**$0**	**$0**	
				On-going costs total	**$1,430,000**	**$1,855,500**	**$2,140,500**	**$2,140,500**	
				Total Costs	**$2,646,800**	**$2,255,500**	**$2,140,500**	**$2,140,500**	

Table 5. In-house Support Costs

In-house Support Positions and Costs Breakout As of FY07-08	
IT staff type	**Positions**
Data Processing Manager III	1
Data Processing Manager II	1
Senior Information System Analyst (Supv)	2
Senior Information System Analyst (Spec)	2
Staff Information System Ananlyst (Supv)	1
Staff Information System Ananlyst (Spec)	12
Associate Information System Analyst	9
Assistant Information System Analyst	5
Senior Program Analyst (Supv)	1
Senior Program Analyst (Spec)	5
Staff Program Analyst	2
Associate Program Analyst	6
Research Program Specialist II-GIS	1
Research Program Specialist I-GIS	2.8
Programmer II	1
Info System Technician	0.5
Management and Admin. Support positions	5
Total	**57.3**

In-house Support Costs	
Personal Services Costs	$5,075,597
Data Management & Unix Service Areas	$587,842
GIS/WEB Service Area	$328,340
PC Support & Help Desk	$1,162,129
Network Infrastructure	$547,521
System Administration (Windows, Novell)	$546,339
Staff Training	$275,266
Total	**$8,523,034**

Table 6. Listing of known information project needs

Project Title	Project Area	Description	Project Lead
Information Project Needs			
Wetland Tracker	Program tracking	Program tracking for the 410 Cert program; should track CA's wetland inventory, provide graphical display of wetlands extent, 401 applications received, mitigation requirements, and wetland CRAM scores before and after activity.	DWQ
Ag Waiver Program Support	Program tracking, data management	Provide enrollment tracking, fee management, and management tools for submitted monitoring data. Evaluate integration with CIWQS.	DWQ, Regional Boards
Dairy Program Support	Program tracking	Provide management data for the Dairy Program such as permit information, inspections, facility details, management plans, and enforcement actions.	
Water Quality Data	Data management	Provide for upload and download of water quality data as part of CEDEN, provide data interpretive tools for general public viewers.	WQDT
Biosolids Tracking	Program tracking, data management	Provide program and data management tools for biosolids program	DWQ
SCUFIIS enhancements	Program tracking	Update system to reflect new procedures changes and add new five year review function.	DFA
GIS display of Water Body Information	Data management	Graphical display of water body information such as: beneficial uses, impairments, and water quality data sets.	DWQ, WQDT

Information Project Needs

Project Title	Project Area	Description	Project Lead
Pretreatment Program Support	Program Tracking	Program tracking for the Pretreatment program; should receive and track quarterly reports, tracking inspections, manage contacts, and hold data about local programs such as budgets and local limits.	DWQ
Water Use Reporting	Data management	Addition to eWRIMs to support online submittal of water use data information by water rights holders.	DWR

11. Appendices

11.1 Appendix A – Mandates

As noted in Section 1.2 of this AIMS, the Water Boards' business mission derives from a number of sources, including legislative and administrative mandates that include directives for reporting and providing public information. The following tables provide details on these mandates. Note that a number of references specific to information management and information systems have been bolded for emphasis.

11.1.1 Legislative Mandates

Statute No.	Requirement	System(s) Used to Meet Requirement
Water Code 1259.2	(a) The board shall annually prepare a written summary, in chart form, of pending applications to appropriate water in the Counties of Marin, Napa, Sonoma, Mendocino, and Humboldt. The summary shall include a description of the status of each pending application, the actions taken in the preceding year, proposed actions for the upcoming year, and the proposed date for final action with regard to that application. (b) For the purposes of carrying out subdivision (a), **the board may post the information described in subdivision (a) on its Web site**.	• Planned to be met with eWRIMS in future when system populated.
Water Code 10781	In order to improve comprehensive groundwater monitoring and increase the availability to the public of information about groundwater contamination, the state board, in consultation with other responsible agencies, as specified in this section, shall do all of the following: (a) Integrate existing monitoring programs and design new program elements as necessary to establish a comprehensive monitoring program capable of assessing each groundwater basin in the state through direct and other statistically reliable sampling approaches. The interagency task force established pursuant to subdivision (b) shall determine the constituents to be included in the monitoring program. In designing the comprehensive	• Not currently being met. Work group convened to establish requirements. Working on design of system to meet requirements.

Statute No.	Requirement	System(s) Used to Meet Requirement

	monitoring program, the state board, among other things, shall integrate projects established in response to the Supplemental Report of the 1999 Budget Act, strive to take advantage of and incorporate existing data whenever possible, and prioritize groundwater basins that supply drinking water.
	(b) (1) Create an interagency task force for all of the following purposes:
	    (A) Identifying actions necessary to establish the monitoring program.
	    (B) Identifying measures to increase coordination among state and federal agencies that collect information regarding groundwater contamination in the state.
	    (C) Designing a database capable of supporting the monitoring program that is compatible with the state board's Geotracker database.
	    (D) Assessing the scope and nature of necessary monitoring enhancements.
	    (E) Identifying the cost of any recommended measures.
	    (F) Identifying the means by which to make monitoring information available to the public.
	(2) The interagency task force shall consist of a representative of each of the following entities:
	    (A) The state board.
	    (B) The department.
	    (C) The State Department of Health Services.
	    (D) The Department of Pesticide Regulation.
	    (E) The Department of Toxic Substances Control.
	    (F) The Department of Food and Agriculture.
	(c) Convene an advisory committee to the interagency task force, with a membership that includes all of the following:
	(1) Two representatives of appropriate federal agencies, if those agencies wish to participate.
	(2) Two representatives of public water systems, one of which shall be a representative of a retail water supplier.	

Statute No.	Requirement	System(s) Used to Meet Requirement
	(3) Two representatives of environmental organizations. (4) Two representatives of the business community. (5) One representative of a local agency that is currently implementing a plan pursuant to Part 2.75 (commencing with Section 10750). (6) Two representatives of agriculture. (7) Two representatives from groundwater management entities. (d) (1) The members of the advisory committee may receive a per diem allowance for each day's attendance at a meeting of the advisory committee. (2) The members of the advisory committee may be reimbursed for actual and necessary travel expenses incurred in connection with their official duties.	
Water Code 1726 (d)	Within 10 days of the date of submission of a petition to the board, the petitioner shall publish in not less than one newspaper of general circulation, in the county or counties in which the petitioner currently stores or uses the water subject to the petition, a notice of the petition and a brief description of the terms of the proposed temporary change. The board shall, in a timely manner, provide to the petitioner a list of water right holders of record on file with the board who may be affected by the transfer, and the petitioner shall provide written notice to those water right holders not later than 10 days after the date on which the petition is submitted. **The board shall post the notice of petition on its Internet web site not later than 10 days after the date on which the petition is submitted.** The notice of the petition shall specify the date on which comments are due. The board may impose on the petitioner any other notice requirement it determines to be necessary.	• Internet site
Water Code 13166	The state board, with the assistance of the regional boards, shall prepare and implement a statewide water quality information storage and retrieval program. Such program shall be coordinated and integrated to the maximum extent practicable with data storage and retrieval programs of other agencies.	• CEDEN • SWAMP database • CIWQS-AMM
Water Code 13167	(a) The state board shall implement, with the assistance of the regional boards, a public information program on matters involving water quality, and shall place and maintain on its Internet Web site, in a format accessible to the general public, an information file on water quality monitoring, assessment, research, standards, regulation, enforcement, and other pertinent matters.	• Internet site • CIWQS • CEDEN • SWAMP database • CIWQS-AMM

Statute No.	Requirement	System(s) Used to Meet Requirement
	(b) The information file described in subdivision (a) shall include, but need not be limited to, copies of permits, waste discharge requirements, waivers, enforcement actions, and petitions for review of these actions pursuant to this division. The file shall include copies of water quality control plans and policies, including any relevant management agency agreements pursuant to this chapter and Chapter 4 (commencing with Section 13200), and monitoring data and assessment information, or shall identify Internet links to that information. The state board, in consultation with the regional boards, shall ensure that the information is available in single locations, rather than separately by region, and that the information is presented in a manner easily understandable by the general public.	
Water Code 13181 (e)	In accordance with the requirements of the Clean Water Act (33 U.S.C. Sec. 1251 et seq.) and implementing guidance, the state board shall develop, in coordination with the monitoring council, all of the following: (1) A comprehensive monitoring program strategy that utilizes and expands upon the state's existing statewide, regional, and other monitoring capabilities and describes how the state will develop an integrated monitoring program that will serve all of the state's water quality monitoring needs and address all of the state's waters over time. The strategy shall include a timeline not to exceed 10 years to complete implementation. The strategy shall be comprehensive in scope and identify specific technical, integration, and resource needs, and shall recommend solutions for those needs so that the strategy may be implemented within the 10-year timeframe. (2) Agreement, including agreement on a schedule, with regard to the comprehensive monitoring of statewide water quality protection indicators that provide a basic minimum understanding of the health of the state's waters. Indicators already developed pursuant to environmental protection indicators for statewide initiatives shall be given high priority as core indicators for purposes of the network described in subdivision (a). (3) Quality management plans and quality assurance plans that ensure the validity and utility of the data collected. (4) Methodology for compiling, analyzing, and integrating readily available	• CIWQS-AMM (partially meets) • CEDEN (partially meets)

Statute No.	Requirement	System(s) Used to Meet Requirement
	information, to the maximum extent feasible, including, but not limited to, data acquired from discharge reports, volunteer monitoring groups, local, state, and federal agencies, and recipients of state-funded or federally funded water quality improvement or restoration projects. **(5) An accessible and user-friendly electronic data system with timely data entry and ready public access via the Internet. To the maximum extent possible, the geographic location of the areas monitored shall be included in the data system.** (6) Production of timely and complete water quality reports and lists that are required under Sections 303(d), 305(b), 314, and 319 of the Clean Water Act and Section 406 of the Beaches Environmental Assessment and Coastal Health Act of 2000, that include all available information from discharge reports, volunteer monitoring groups, and local, state, and federal agencies. (7) An update of the state board's surface water ambient monitoring program needs assessment in light of the benefits of increased coordination and integration of information from other agencies and information sources. This update shall include identification of current and future resource needs required to fully implement the coordinated, comprehensive monitoring network, including, but not limited to, funding, staff, training, laboratory and other resources, and projected improvements in the network.	
Water Code 13193	(a) As used in this section, the following terms have the following meanings: 　(1) "Collection system owner or operator" means the public or private entity having legal authority over the operation and maintenance of, or capital improvements to, the sewer collection system. 　(2) "GIS" means Geographic Information System. (b) On or before January 1 of a year in which the Legislature has appropriated sufficient funds for this purpose, the state board, in consultation with representatives of cities, counties, cities and counties, special districts, public interest groups, the State Department of Health Services, and the regional boards shall develop a uniform overflow event report form to be used for reporting of sanitary sewer system overflows as required in subdivision (c). This event report form shall include, but not be limited to, all of the following:	• CIWQS-SSO module • Internet site

Statute No.	Requirement	System(s) Used to Meet Requirement
	(1) The cause of the overflow. The cause shall be specifically identified, unless there is an ongoing investigation, in which case it shall be identified immediately after completion of the investigation. The cause shall be identified, at a minimum, as blockage, infrastructure failure, pump station failure, significant wet weather event, natural disaster, or other cause, which shall be specifically identified. If the cause is identified as a blockage, the type of blockage shall be identified, at a minimum, as roots, grease, debris, vandalism, or multiple causes of which each should be identified. If the cause is identified as infrastructure, it shall be determined, at a minimum, whether the infrastructure failure was due to leaks, damage to, or breakage of, collection system piping or insufficient capacity. If the cause is identified as a significant wet weather event or natural disaster, the report shall describe both the event and how it resulted in the overflow. If the precise cause cannot be identified after investigation, the report shall include a narrative explanation describing the investigation conducted and providing the information known about the possible causes of the overflow. (2) An estimate of the volume of the overflow event. (3) Location of the overflow event. Sufficient information shall be provided to determine location for purposes of GIS mapping, such as specific street address or the latitude and longitude of the event. (4) Date, time, and duration of the overflow event. (5) Whether or not the overflow reached or may have reached waters of the state. (6) Whether or not a beach closure occurred or may have occurred as a result of the overflow. (7) The response and corrective action taken. (8) Whether or not there is an ongoing investigation, the reasons for it and expected date of completion. (9) The name, address, and telephone number of the reporting collection system owner or operator and a specific contact name.	

Statute No.	Requirement	System(s) Used to Meet Requirement

	(c) Commencing on July 1 of a year in which the Legislature has appropriated sufficient funds for this purpose, in the event of a spill or overflow from a sanitary sewer system that is subject to the notification requirements set forth in Section 13271, the applicable collection system owner or operator, in addition to immediate reporting duties pursuant to Section 13271, shall submit to the appropriate regional board, within 30 days of the date of becoming aware of the overflow event, a report using the form described in subdivision (b). The report shall be filed electronically, if possible, or by fax or mail if electronic submission is not possible.
	(d) (1) Commencing on July 1 of a year in which the Legislature has appropriated sufficient funds for this purpose, in the event of a spill or overflow from a sanitary sewer system that is not subject to the reporting requirements set forth in Section 13271 that is either found by the State Department of Health Services or any local health officer to result in contamination pursuant to Section 5412 of the Health and Safety Code, or is found by the State Department of Health Services to result in pollution or nuisance pursuant to Section 5413 of the Health and Safety Code, the agency making the determination shall submit to the appropriate regional board, within 30 days of making the determination, a report that shall include, at a minimum, the following information:
	    (A) Date, time, and approximate duration of the overflow event.
	    (B) An estimate of the volume of the overflow event.
	    (C) Location of the overflow event.
	    (D) A description of the response or corrective action taken by the agency making the determination.
	    (E) The name, address, and telephone number of the reporting collection system owner or operator, and a specific contact name.
	  (2) The report shall be filed electronically, if possible, or by fax or mail if electronic submission is not possible.
	(e) Before January 1 of a year in which the Legislature has appropriated sufficient funds for this purpose, the state board, in consultation with representatives of cities, counties, cities and counties, and special districts, public interest groups,	

Statute No.	Requirement	System(s) Used to Meet Requirement
	the State Department of Health Services, and regional boards, shall develop and maintain a sanitary sewer system overflow database that, at a minimum, contains the parameters described in subdivisions (b) and (d). (f) Commencing on July 1 of a year in which the Legislature has appropriated sufficient funds for this purpose, each regional board shall coordinate with collection system owners or operators, the State Department of Health Services, and local health officers to compile the reports submitted pursuant to subdivisions I and (d). Each regional board shall report that information to the state board on a quarterly basis, to be included in the sanitary sewer system overflow database. (g) The state board shall make available to the public, by Internet and other cost-effective means, as determined by the state board, information that is generated pursuant to this section. In a year in which the Legislature has appropriated sufficient funds for the purposes described in this subdivision, the state board shall prepare a summary report of the information collected in the sanitary sewer system overflow database, and make it available to the general public through the Internet and other cost-effective means, as determined by the state board. To the extent resources and the data allow, this report shall include GIS maps compiling coastal overflow events.	

Water Code 13196	(a) The state board may require a person submitting a report to the state board, a regional board, or a local agency to submit the report in electronic format. The state board may also require that any report submitted in electronic format include the latitude and longitude, accurate to within one meter, of the location where any sample analyzed in the report was collected.
	(b) The state board shall adopt a single, standard format for the electronic submission of analytical and environmental compliance data contained in reports. In adopting a standard format, the state board shall only consider formats that meet all of the following criteria:
	  (1) Are available free of charge.
	  (2) Are available in the public domain.
	  (3) Have available public domain means to import, manipulate, and store data.
		• Geotracker
		• CIWQS-eSMR

Statute No.	Requirement	System(s) Used to Meet Requirement

	(4) Allow the importation of data into tables indicating relational distances.
	(5) Allow the verification of data submission consistency.
	(6) Allow for inclusion of all of the following information:
	    (A) The physical site address from which the sample was taken, along with any information already required for permitting and reporting unauthorized releases.
	    (B) Environmental assessment data taken during the initial site investigation phase, as well as the continuing monitoring and evaluation phases.
	    (C) The latitude and longitude, accurate to within one meter, of the location where any sample was collected.
	    (D) A description of all tests performed on the sample, the results of that testing, any quality assurance and quality control information, any available narrative information regarding the collection of the sample, and any available information concerning the laboratory's analysis of the sample.
	(7) Fulfill any additional criteria the state board determines appropriate for an effective electronic report submission program.	

Water Code 13197.5	(a) The state board shall adopt, not later than March 1, 2001, emergency regulations in accordance with Chapter 3.5 (commencing with Section 11340) of Part 1 of Division 3 of Title 2 of the Government Code implementing a statewide program for the electronic submission of reports required pursuant to Chapter 6.7 (commencing with Section 25280) of Division 20 of the Health and Safety Code and Article 4 (commencing with Section 25299.36) of Chapter 6.75 of Division 20 of the Health and Safety Code, for those reports that contain soil or water chemistry analysis by a laboratory certified or accredited pursuant to Article 3 (commencing with Section 100825) of Chapter 4 of Part 1 of Division 101 of the Health and Safety Code. (b) (1) The adoption of any regulations pursuant to this section that are filed with the Office of Administrative Law on or before March 1, 2001, shall be deemed to be an emergency and necessary for the immediate preservation of the public peace, health, safety, and general welfare.	• Geotracker

Statute No.	Requirement	System(s) Used to Meet Requirement
	(2) (A) Except as specified in subparagraph (B), subdivisions (e) to (h), inclusive, of Section 11346.1 of the Government Code apply to any emergency regulations adopted pursuant to this section. (B) Notwithstanding the 120-day period imposed in subdivision (e) of Section 1346.1 of the Government Code, the state board shall have one calendar year from the effective date of any emergency regulations adopted pursuant to this section to comply with that subdivision. (c) Regulations adopted pursuant to this section may not require the electronic submission of reports before July 1, 2001, but may require the electronic submission of reports on or after July 1, 2001. (d) Regulations adopted pursuant to this section may specify either of the following as the required reporting format: (1) The Geographic Environmental Information Management System format as described in the report submitted to the state board on July 1, 1999, by the Lawrence Livermore National Laboratory, entitled, "Evaluating the Feasibility of a statewide Geographic Information System." (2) The Electronic Deliverable Format (EDF) developed by the United States Army Corps of Engineers, as the same may be revised from time to time. The specification of the EDF as the reporting format shall be deemed to satisfy the requirements of subdivision (b) of Section 13196.	
Water Code 13225	Each regional board, with respect to its region, shall do all of the following: (a) Coordinate with the state board and other regional boards, as well as other state agencies with responsibility for water quality, with respect to water quality control matters, including the prevention and abatement of water pollution and nuisance. (b Encourage and assist in waste disposal programs, as needed and feasible, and upon application of any person, advise the applicant of the condition to be maintained in any disposal area or receiving waters into which the waste is being discharged. (c) Require as necessary any state or local agency to investigate and report on any technical factors involved in water quality control or to obtain and submit analyses of water; provided that the burden, including costs, of such	• CIWQS (partially meets)

Statute No.	Requirement	System(s) Used to Meet Requirement
	reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained therefrom. (d) Request enforcement by appropriate federal, state and local agencies of their respective water quality control laws. (e) Report rates of compliance with the requirements of this division. (f) Recommend to the state board projects which the regional board considers eligible for any financial assistance which may be available through the state board. (g) Report to the state board and appropriate local health officer any case of suspected contamination in its region. (h) File with the state board, at its request, copies of the record of any official action. (i) Take into consideration the effect of its actions pursuant to this chapter on the California Water Plan adopted or revised pursuant to Division 6 (commencing with Section 10000) and on any other general or coordinated governmental plan looking toward the development, utilization, or conservation of the water resources of the state. (j) Encourage coordinated regional planning and action for water quality control. **(k) In consultation with the state board, identify and post on the Internet a summary list of all enforcement actions undertaken by that regional board and the dispositions of those actions, including any fines assessed. This list shall be updated at least quarterly**.	
Water Code 13307.5 (a)	The regional board shall take all of the following actions when reviewing or approving a cleanup proposal from a primary or active responsible discharger with respect to a site issued a cleanup and abatement order pursuant to Section 13304: (1) Provide to all of the following, notification, in a fact sheet format or another appropriate format, in English and any other languages commonly spoken in the area, as appropriate, of the proposed decision to approve the cleanup proposal for the site, including a contact list of appropriate regional board staff: (A) An affected or potentially affected property owner, resident, or	• Internet site

Statute No.	Requirement	System(s) Used to Meet Requirement

	occupant in the area of the site.
	     (B) An appropriate governmental entity, including a local governmental entity with jurisdiction over the site.
	 (2) Provide timely access to written material, including reports and plans, addenda, and other supporting documentation, including materials listed as references, at the regional board's office and at a local repository in the area of the site, and, to the maximum extent possible, **by posting on the Internet** and acting in accordance with subdivision (a) of Section 13196.
	 (3) Provide no less than 30 days for an interested person to review and comment on the cleanup proposal regarding the site. The regional board shall consider any comments received before taking final action on a cleanup proposal regarding the site.
	 (4) Conduct a public meeting in the area of the site during the public comment period pursuant to paragraph (3), if any of the following conditions applies:
	     (A) A public meeting is requested by an affected or potentially affected property owner, resident, or occupant, in the area of the site.
	     (B) The level of expressed public interest warrants the conduct of a public meeting.
	     (C) A public meeting is specifically mandated by statute.
	     (D) The regional board determines that the existing site contamination poses a significant public health threat.	

Water Code 13307.6 (a)	In addition to the requirements of Section 13307.5, the regional board may develop and use any of the following procedures to disseminate information and assist the regional board in gathering community input regarding a site, if the regional board determines there is expressed community interest in the site, or the existing site contamination poses a significant public health threat: (1) An annual fact sheet. (2) **Internet posting or electronic distribution of an electronic copy of a document or report.** (3) **An electronic comment or electronic feedback form.** (4) Formation and facilitation of an advisory group. (5) An additional public meeting or workshop.	• Internet Site

Statute No.	Requirement	System(s) Used to Meet Requirement
	(6) Extension of a public comment period. (7) Preparation of a public participation plan. (8) Creation of a mailing list for notifying an interested party of a major regional board decision and the regional board's proposed or planned activity regarding the site.	
Water Code 13323	(a) Any executive officer of a regional board may issue a complaint to any person on whom administrative civil liability may be imposed pursuant to this article. The complaint shall allege the act or failure to act that constitutes a violation of law, the provision of law authorizing civil liability to be imposed pursuant to this article, and the proposed civil liability. (b) The complaint shall be served by certified mail or in accordance with Article 3 (commencing with Section 415.10) of, and Article 4 (commencing with Section 416.10) of, Chapter 4 of Title 5 of Part 2 of the Code of Civil Procedure, and shall inform the party so served that a hearing before the regional board shall be conducted within 90 days after the party has been served. The person who has been issued a complaint may waive the right to a hearing. (c) In proceedings under this article for imposition of administrative civil liability by the state board, the executive director of the state board shall issue the complaint and any hearing shall be before the state board, or before a member of the state board in accordance with Section 183, and shall be conducted not later than 90 days after the party has been served. (d) Orders imposing administrative civil liability shall become effective and final upon issuance thereof, and are not subject to review by any court or agency except as provided by Sections 13320 and 13330. Payment shall be made not later than 30 days from the date on which the order is issued. The time for payment is extended during the period in which a person who is subject to an order seeks review under Section 13320 or 13330. Copies of these orders shall be served by certified mail or in accordance with Article 3 (commencing with Section 415.10) of, and Article 4 (commencing with Section 416.10) of, Chapter 4 of Title 5 of Part 2 of the Code of Civil Procedure upon the party served with the complaint and shall be provided to other persons who appeared at the hearing and requested a copy.	• Internet site • CIWQS

Statute No.	Requirement	System(s) Used to Meet Requirement
	(e) Information relating to hearing waivers and the imposition of administrative civil liability, as proposed to be imposed and as finally imposed, under this section shall be made available to the public by means of the Internet.	
Water Code 13383.5	(a) As used in this section, "regulated municipalities and industries" means the municipalities and industries required to obtain a storm water permit under Section 402(p) of the Clean Water Act (33 U.S.C. Sec. 1342(p)) and implementing regulations. (b) This section only applies to regulated municipalities that were subject to a storm water permit on or before December 31, 2001, and to regulated industries that are subject to the General Permit for Storm Water Discharges Associated with Industrial Activities Excluding Construction Activities. (c) Before January 1, 2003, the state board shall develop minimum monitoring requirements for each regulated municipality and minimum standard monitoring requirements for regulated industries. This program shall include, but is not limited to, all of the following: (1) Standardized methods for collection of storm water samples. (2) Standardized methods for analysis of storm water samples. (3) A requirement that every sample analysis under this program be completed by a state certified laboratory or by the regulated municipality or industry in the field in accordance with the quality assurance and quality control protocols established pursuant to this section. (4) A standardized reporting format. (5) Standard sampling and analysis programs for quality assurance and quality control. (6) Minimum detection limits. (7) Annual reporting requirements for regulated municipalities and industries. (8) For the purposes of determining constituents to be sampled for, sampling intervals, and sampling frequencies, to be included in a municipal storm water permit monitoring program, the regional board shall consider the following information, as the regional board determines to be applicable:	• Does not need to be met yet.

Statute No.	Requirement	System(s) Used to Meet Requirement
	(A) Discharge characterization monitoring data. (B) Water quality data collected through the permit monitoring program. (C) Applicable water quality data collected, analyzed, and reported by federal, state, and local agencies, and other public and private entities. (D) Any applicable listing under Section 303(d) of the Clean Water Act (33 U.S.C. Sec. 1313). (E) Applicable water quality objectives and criteria established in accordance with the regional board basin plans, statewide plans, and federal regulations. (F) Reports and studies regarding source contribution of pollutants in runoff not based on direct water quality measurements. (d) The requirements prescribed pursuant to this section shall be included in all storm water permits for regulated municipalities and industries that are reissued following development of the requirements described in subdivision (c). Those permits shall include these provisions on or before July 1, 2008. In a year in which the Legislature appropriates sufficient funds for that purpose, **the state board shall make available to the public via the Internet a summary of the results obtained from storm water monitoring conducted in accordance with this section**.	
Water Code 13383.7 (b)	For the purpose of implementing subdivision (a), the state board shall promote the use of quantifiable measures for evaluating the effectiveness of municipal storm water management programs and provide for the evaluation of, at a minimum, all of the following: (1) Compliance with storm water permitting requirements, including all of the following: (A) Inspection programs. (B) Construction controls. (C) Elimination of unlawful discharges. (D) Public education programs. (E) New development and redevelopment requirements. (2) Reduction of pollutant loads from pollution sources.	• CIWQS (partially meets) • SWAMP database (partially meets)

Statute No.	Requirement	System(s) Used to Meet Requirement
	(3) Reduction of pollutants or stream erosion due to storm water discharge. (4) Improvements in the quality of receiving water in accordance with water quality standards.	
Water Code 13385 (o)	The state board **shall continuously report and update information on its Internet Web site, but at a minimum, annually on or before January 1**, regarding its enforcement activities. The information shall include all of the following: (1) A compilation of the number of violations of waste discharge requirements in the previous calendar year, including storm water enforcement violations. (2) A record of the formal and informal compliance and enforcement actions taken for each violation, including storm water enforcement actions. (3) An analysis of the effectiveness of current enforcement policies, including mandatory minimum penalties. (p) The amendments made to subdivisions (f), (h), (i) and (j) during the second year of the 2001-02 Regular Session apply only to violations that occur on or after January 1, 2003.	• CIWQS • Internet site
Water Code 13611.5	(a) On or before January 1, 2005, and annually thereafter, unless the owner or operator has met the alternative compliance requirements of subdivision (b), an owner or operator of a storage facility that has stored in any calendar year since January 1, 1950, over 500 pounds of perchlorate shall submit to the state board, to the extent feasible, all of the following information: (1) The volume of perchlorate stored each year. (2) The method of storage. (3) The location of storage. To the extent authorized by federal law, in the case of a perchlorate storage facility under the control of the Armed Forces of the United States, "location" means the name and address of the property within which the perchlorate storage facility is located. (4) Copies of documents relating to any monitoring undertaken for potential leaks into the water bodies of the state. (b) The owner or operator of a storage facility that has stored in any calendar year since January 1, 1950, over 500 pounds of perchlorate, is in compliance with this section if both of the following conditions are met:	• Geotracker

Statute No.	Requirement	System(s) Used to Meet Requirement

	(1) The owner or operator has provided substantially similar information as required pursuant to subdivision (a) to a state, local, or federal agency pursuant to any of the following:
	   (A) An order issued by a regional board pursuant to Chapter 5 (commencing with Section 13300) of Division 7.
	   (B) An order, consent order, or consent decree issued or entered into by the Department of Toxic Substances Control pursuant to Chapter 6.8 (commencing with Section 25300) of Division 20 of the Health and Safety Code.
	   (C) An order, consent order, or consent decree issued or entered into by the United States Environmental Protection Agency pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (42 U.S.C. Sec. 9601 et seq.).
	   (D) The requirement under Section 25504.1 of the Health and Safety Code, as added by Assembly Bill 826 of the 2003-04 Regular Session.
	(2) The owner or operator, on or before January 1, 2005, and annually thereafter, notifies the state board of the governmental entity to which the information is provided and the state board determines the information supplied is substantially similar as the information required to be reported pursuant to subdivision (a). In the case of any information submitted to a federal or local agency, the state board may require the owner or operator, in addition, to submit that information to the state board if the state board determines that the information is not otherwise reasonably available to the state board.
	(c) This section shall not be administered or implemented if the state board receives notification from the Secretary for Environmental Protection pursuant to Section 13613 that the Secretary for Environmental Protection has established a database that is able to receive perchlorate inventory information.
	(d) Information on perchlorate storage need only be submitted pursuant to this section one time, unless information originally submitted pursuant to this	

Statute No.	Requirement	System(s) Used to Meet Requirement
	section has changed.	
Water Code 13612	(a) The state board shall publish and make available to the public on or before January 1, 2006, a list of past and present perchlorate storage facilities within the state. The state board may charge an annual fee to each owner of a storage facility that provides information to the board for that purpose, which fee shall not exceed one hundred dollars ($100) for each year information is provided. The fees shall be deposited in the State Water Quality Control Fund, and notwithstanding any other provision of law, shall be available to the state board upon appropriation by the Legislature. (b) The state board shall compile and maintain centrally all information obtained pursuant to Section 13611.5. The information shall be available for public review.	• Geotracker
Water Code 79505.6 (a) (2)	Prior to disbursing grants, each state agency shall conduct two public meetings to consider public comments prior to finalizing the guidelines. Each state agency shall publish the draft solicitation and evaluation guidelines on its Internet Web site at least 30 days before the public meetings. One meeting shall be conducted at a location in northern California and one meeting shall be conducted at a location in southern California. Upon adoption, each state agency shall transmit copies of the guidelines to the fiscal committees and the appropriate policy committees of the Legislature. To the extent feasible, each state agency shall provide outreach to disadvantaged communities to promote access and participation in those meetings.	• Internet site
Water Code 79560.5	For the purposes of carrying out this chapter, the department and the board shall jointly develop project solicitation and evaluation guidelines. Before developing the solicitation and evaluation guidelines, the department and the board shall jointly conduct a public meeting to receive public comments on the scope, procedures, and content of the guidelines. Considering the public comments, the department and the board shall jointly develop solicitation and evaluation guidelines that are consistent with law and state programs and policies. The department and the board shall post the solicitation and evaluation guidelines on their respective Internet Web sites.	• Internets

Statute No.	Requirement	System(s) Used to Meet Requirement
Water Code 79575	Not later than January 1, 2005, and on or before January 1 of each year thereafter, each state agency expending funds pursuant to this division for projects, grants, or loans shall report to the Legislature on the recipient and amount of each project, grant, or loan awarded under this division during the previous fiscal year. The information shall include the total amount awarded, categorized by project, grant, or loan, the geographic distribution of projects, grants, or loans awarded under this division, and the intended public and environmental benefit that the awards provide. The information shall also include data on the balances of funds available under this division for expenditures and grants in that fiscal year and future fiscal years.	• Proposition 40/50 Awards database and website (administered by the Resource Agency)
Health & Safety Code 25290.1.2	(a) The board and the State Air Resources Board, under the direction of the California Environmental Protection Agency, shall certify to the best of their knowledge, that the equipment that meets the requirements of Section 94011 of Title 17 of the California Code of Regulations for enhanced vapor recovery systems at gasoline dispensing facilities, as implemented by the State Air Resources Board, also meets the requirements of this chapter. The board and the State Air Resources Board shall make this certification collaboratively, using existing resources. (b) The board and the State Air Resources Board, under the direction of the California Environmental Protection Agency, when making the certification specified in subdivision (a), shall consult with interested parties, including local implementing agencies, underground storage tank system owners and operators, equipment manufacturers, underground storage tank system installers, and environmental organizations. **(c) The board and the State Air Resources Board shall post the certification and any supporting documentation on their Web sites.** (d) This section shall be implemented by the executive directors of the board and of the State Air Resources Board, or by their designees.	• Internet site
Health & Safety Code 25295 (b)	The board **shall continuously post and update on its Web site, but at a minimum, annually on or before December 1**, a report of all unauthorized releases, indicating for each unauthorized release the responsible party, the site name, the hazardous substance, the quantity of the unauthorized release if known, and the actions taken to abate the problem.	• Geotracker • Internet site

Statute No.	Requirement	System(s) Used to Meet Requirement

Gov. Code 6253.8	(a) Every final enforcement order issued by an agency listed in subdivision (b) under any provision of law that is administered by an entity listed in subdivision (b) **shall be displayed on the entity's Internet website**, if the final enforcement order is a public record that is not exempt from disclosure pursuant to this chapter.
	(b) This section applies to the California Environmental Protection Agency and to all of the following entities within the agency:
	   (1) The State Air Resources Board.
	   (2) The California Integrated Waste Management Board.
	   (3) The State Water Resources Control Board, and each California Regional Water Quality Control Board.
	   (4) The Department of Pesticide Regulation.
	   (5) The Department of Toxic Substances Control.
	(c) (1) Except as provided in paragraph (2), for purposes of this section, an enforcement order is final when the time for judicial review has expired on or after January 1, 2001, or when all means of judicial review have been exhausted on or after January 1, 2001.
	   (2) In addition to the requirements of paragraph (1), with regard to a final enforcement order issued by the State Water Resources Control Board or a California regional water quality control board, this section shall apply only to a final enforcement order adopted by that board or a regional board at a public meeting.
	(d) An order posted pursuant to this section shall be posted for not less than one year.
	(e) The California Environmental Protection Agency shall oversee the implementation of this section.
	(f) This section shall become operative April 1, 2001.
		• CIWQS
		• Internet site

Statute No.	Requirement	System(s) Used to Meet Requirement
Gov. Code 65962.5 (c)	The State Water Resources Control Board shall compile and update as appropriate, but at least annually, and shall submit to the Secretary for Environmental Protection, a list of all of the following: (1) All underground storage tanks for which an unauthorized release report is filed pursuant to Section 25295 of the Health and Safety Code. (2) All solid waste disposal facilities from which there is a migration of hazardous waste and for which a California regional water quality control board has notified the Department of Toxic Substances Control pursuant to subdivision (e) of Section 13273 of the Water Code. (3) All cease and desist orders issued after January 1, 1986, pursuant to Section 13301 of the Water Code, and all cleanup or abatement orders issued after January 1, 1986, pursuant to Section 13304 of the Water Code, that concern the discharge of wastes that are hazardous materials.	• Geotracker • CIWQS

11.1.2   Administrative Mandates - State

Item	Description	System(s) Used to Meet Requirement
Executive Order D-17-00 – e-Government	This Executive Order required all state agencies to develop an e-Government plan and to identify those services best suited to electronic delivery.	• CIWQS-eSMR • CIWQS-SSO • CIWQS-SWARM • Geotracker • Lyris (list serve) • Internet site

11.1.3   Administrative Mandates - Federal

Item	Description	System(s) Used to Meet Requirement
NPS load reductions	Required to report all load reduction on federal CWA 319 grants.	• GRTS (federal database)
CWA 319 Grants	Recipients of CWA 319 implementation grants are required to submit descriptive information about their project.	• NRPI (federal database)
CWA State Revolving Fund Loans	Required to report fiscal activity and beneficial outcomes of State Revolving Fund loan projects.	• NIMS • CBR system • LGTS
Federal Court Decision	Recent 9th Circuit Court ruling that federal regulations require a public participation process for general permits enrollees.	• To be met with future CIWQS module.

11.2 Appendix B – Water Boards Organization

The State Water Resource Control Board (State Water Board) and nine Regional Water Quality Control Boards (Regional Water Boards) make up the Water Boards responsible for the regulation and maintenance of the state's water bodies. This section presents a snapshot of the State Water Board and Regional Water Boards and discusses their high-level responsibilities.

11.2.1   State Water Resource Control Boards' Organization

The State Water Board is at the time of this writing comprised of six divisions and a number of offices: Executive; Chief Counsel; Enforcement; Legislative; Public Affairs; Public Participation; Employee Assistance; and Research, Planning and Performance. Discussions are underway on how to reorganize the work of the Division of Information Technology and the Office of Water Quality Database Programs. The figure below depicts the organizational structure as of this writing:
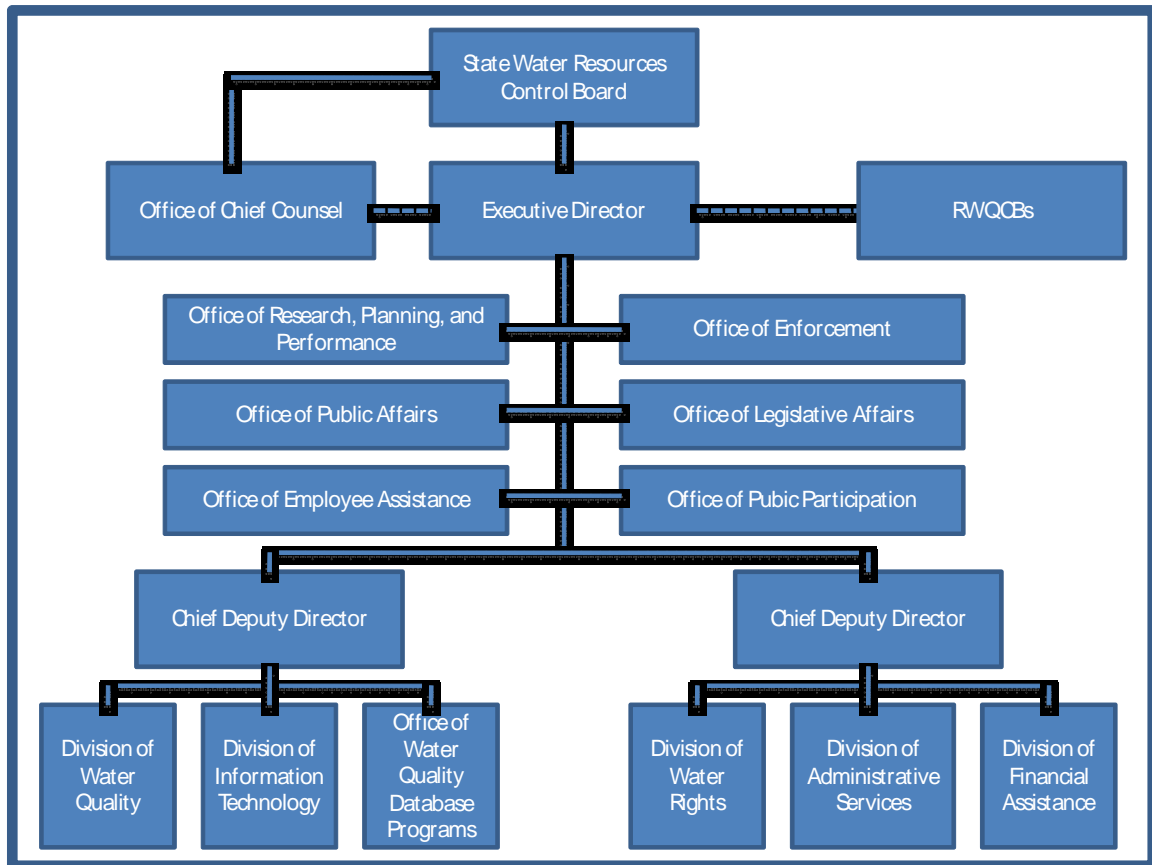
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                          State Water Resources
                             Control Board

   Office of Chief Counsel    Executive Director    RWQCBs

      Office of Research, Planning, and    Office of Enforcement
              Performance

      Office of Public Affairs      Office of Legislative Affairs

      Office of Employee Assistance   Office of Pubic Participation

         Chief Deputy Director          Chief Deputy Director

   Division   Division   Office of    Division   Division    Division
   of Water   of         Water        of Water   of          of
   Quality    Information Quality      Rights     Administrative Financial
              Technology Database                 Services     Assistance
                         Programs
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Figure 6. State Water Board Organizational Structure (Feb 2008)

11.2.2   Regional Water Boards' Organization

Regional Water Boards staff consists of over 1,000 employees located throughout the state. The nine Regional Water Boards serve as the frontline for state and federal water pollution control efforts. The figure below depicts the twelve areas covered by the nine Regional Water Boards.

Regional Water Quality Control Boards

North Coast Region (1)
SF Bay Region (2)
Central Coast Region (3)
LA Region (4)
Central Valley Region (5S)
    Redding Branch (5R)
    Fresno Branch (5F)
Lahontan Region (6SLT)
    Victorville Office (6V)
Colorado River Basin Region (7)
Santa Ana Region (8)
San Diego Region (9)

Figure 7. Regional Water Quality Control Boards

11.2.3   Water Boards' Responsibilities

The Water Boards work together to ensure that clean water is available for more than 30 million Californians, who depend upon water for drinking, food, jobs, power, and recreation, and for fish and wildlife, which depend upon water for life. The Water Boards make important regulatory decisions at public meetings after receiving and considering comments from interest groups and the public. However, the unique characteristics of each Regional Water Board, as well as their autonomy, have resulted in business processes and procedures that vary greatly from one Regional Board to another. In addition, the Water Boards are not the only state agencies that regulate water issues. For example, the Office of Drinking Water, within the Department of Health Services, regulates drinking water after it is removed from the natural resource. Yet, the Department of Water Resources is responsible for ensuring adequate supplies of water

throughout the state. Thus, the Water Boards' efforts are tied inextricably to those of other state agencies. The following sections discuss the Water Boards' broad responsibilities, the activities they regulate, and the corresponding core regulatory programs in more detail.

11.2.3.1   State Water Board Responsibilities

The State Water Board has the following responsibilities:

- Ensure that water development occurs in an orderly way to provide for the economic development of the state.

- Prohibit the waste or unreasonable use and unreasonable method of diversion of surface and ground waters.

- Prevent the illegal diversion and use of water.

- Administer the state's water right program since 1914 for surface waters and subterranean streams flowing through known and definite channels.

- Assist the courts in the determination of claimed water rights initiated prior to 1914, including riparian and pre-1914 appropriative rights.

- Ensure that water development projects do not adversely impact public trust resources, including fisheries, navigation, and recreation.

- Identify streams from which no future appropriations of water can be made.

- Establish water quality standards to safeguard the many beneficial uses of California's water resources.

- Guide and coordinate the nine Regional Water Boards.

- Serve as an appellate body for Regional Water Board decisions on permitting and enforcement actions.

- Ensure compliance with federal mandates, regulations and regulatory programs, when necessary or delegated.

- Develop and revise statewide regulations, regulatory programs, and policies pursuant to California legislation.

- Adopt statewide water quality control plans and state policy for water quality control.

- Administer and manage the statewide regulatory programs.

- Review and make decisions on petitions filed regarding water quality protection issues or regarding the Regional Water Boards' activities.

- Review proposed Assembly and Senate Bills relevant to water quality and water rights, and propose amendments, as appropriate.

- Provide a range of services to employees of the Water Boards' System in accounting, contracting, personnel, and business services (under the Division of Administrative Services) and information technology under the Division of Information Technology.

- Create reports for tracking work plan commitments and regulatory program accomplishments and activities.

- Report to the State Legislature on all of the above-mentioned activities.

- Implementation of the financial assistance programs, which includes loan and grant funding for construction of municipal sewage and water recycling facilities, remediation for underground storage tank releases, watershed protection projects, and nonpoint source (NPS) pollution control projects.

11.2.3.2   Regional Water Boards' Responsibilities

The Regional Water Boards have the following responsibilities:

- Monitor the health, quality, conditions, and beneficial uses of California's surface and ground waters.

- Address region-wide and specific water quality concerns through updates of the Water Quality Control Plan (Basin Plan).

- Prepare, monitor compliance with, and enforce Waste Discharge Requirements, including National Pollution Discharge Elimination System (NPDES) Permits.

- Implement and enforce local storm water control efforts.

- Regulate cleanup of contaminated sites that have already polluted or have the potential to pollute ground or surface waters.

- Enforce water quality laws, regulations, and waste discharge requirements.

- Coordinate with other public agencies and groups that are concerned with water quality.

- Inform and involve the public regarding water quality issues.

- Develop Water Quality Control Plans (Basin Plans) providing scientific and regulatory basis for each Regional Water Board's water protection efforts. Basin Plans contain enforceable region-specific water quality objectives and implementation plans which will best protect the beneficial uses of the state's surface and groundwater.

- Issue waste discharge requirements and permits in compliance with the State Water Board's statewide minimum standards, regulations, policies and programs, including water quality monitoring provisions that incorporate site- and waste-specific features of the discharge.

- Inspect waste discharge sites, facilities and waste management units in order to ensure compliance with applicable waste discharge requirements or permits, water quality monitoring plans, and the Water Code.

- Conduct investigations and follow-up actions on citizens' concerns and complaints about water quality issues and keep records of such activities.

- Conduct enforcement actions on violations and non-compliance.

11.2.4   Board Regulated Activities

The Water Boards are specifically responsible for regulating the following activities:

- Diversions of surface waters and subterranean streams flowing through known and definite channels where the diversions were initiated after 1914.

- Direct discharges, or a threatened discharge, of waste or waste waters to surface waters (including storm drains), to the ground, or to groundwater (sewage treatment plants, industry, cooling water, septic tanks).

- Municipal storm water discharges from urban areas.

- Construction storm water discharges.

- Industrial storm water discharges.

- Storm water and wash water discharges from boatyards.

- Non-point sources of pollution (agricultural runoff, urban runoff).

- Land disposal of wastes, including landfills, ponds, waste piles, or land treatment units.

- Confined animal facilities (e.g., dairies, feedlots, stables, poultry farms).

- Dredging and disposal of sediments.

- Filling of wetlands or waters.

- Storage of petroleum products in aboveground tanks.

- Cleanup of underground tank and pipeline leaks, spills, or the disposal of wastes (this includes cleanups at federal facilities).

- Discharges of treated groundwater.

- Illegal discharges of spills.

11.2.5   Core Regulatory Programs

The Water Boards regulate potential dischargers under several core regulatory programs. These regulatory programs establish Waste Discharge Requirements (WDR) and authorize the Boards to issue permits to dischargers based on their compliance with the WDR. The Water Boards issue permits under the following programs:

NPDES – Pursuant to the Federal Clean Water Act, the National Pollution Discharge Elimination System (NPDES) regulates about 2,250 dischargers of waste to the state's streams, rivers, lakes, and coastal waters. Under federal law, the Water Boards must generally reissue NPDES permits every five years.

Storm Water – Pursuant to NPDES regulations, the Storm Water Program regulates over 15,000 industrial and construction sites contributing to storm water runoff under two general NPDES permits. This program also regulates storm water runoff from 26 municipalities under area-wide general NPDES permits. The Regional Water Boards project they will conduct over 2,000 inspections in the

coming year. Additionally, permittees will submit approximately 9,000 annual reports and 1,600 permittees will terminate their permit coverage. The Water Boards expect the number of sites to double, at a minimum, because of expanding United States Environmental Protection Agency (USEPA) regulations. Construction sites between one and five acres in size and municipalities with between 10,000 and 100,000 residents will now be regulated as well.

Landfills and Surface Impoundments – Pursuant to the Porter-Cologne Water Quality Control Act, Title 23, Division 3, Chapter 15 (hazardous waste) and Title 27 (solid waste, including mining waste), California Code of Regulations, the Water Boards regulate waste-to-waste management units, such as landfills. Statewide, the program includes over 1,200 waste treatment, storage, or disposal sites (landfills, surface impoundments, waste piles, and land treatment units). The Water Boards update the WDR every 5, 10, or 15 years, based on relative threat to water quality by the permit activities.

Discharge to Land – Pursuant to Porter-Cologne, the WDR program regulates 3,670 dischargers of waste to land, excluding to landfills. The WDR is issued and updated every 5, 10, or 15 years. With the addition of more and more dairies, the Water Boards expect the number of permittees to increase by at least 1,400.

Through the permit process, dischargers are required to submit monitoring reports at varying frequencies to ensure that they are in compliance with permitted parameters. The Regional Water Boards rely on inspections by staff, reviews of self-monitoring reports submitted by waste dischargers, and investigations of complaints, to ensure compliance with the core regulatory program's permit and other regulatory requirements.

Enforcement of waste discharge permits and other clean water requirements is important as it serves to induce compliance with requirements that are collectively designed to meet water quality objectives. A lack of consistent and effective enforcement will erode the credibility of the requirements and allow violations to continue undeterred, and may prevent the Water Boards from meeting water quality objectives.

Under state law, the Regional Water Boards have a variety of enforcement tools at their disposal. Depending on the nature and severity of the violation, they may take informal enforcement action by issuing a warning letter to a violator, or more formal enforcement action, including issuing orders requiring corrective actions within a particular time. The Regional Water Boards may also levy administrative civil penalties or refer cases to the Attorney General or District Attorney, who may seek higher penalties in court.

11.2.6   State Water Board Divisions and Offices

The State Water Board, at the time of this writing, consists of the following six divisions:

- Water Quality
- Water Quality Database Programs
- Water Rights
- Financial Assistance
- Information Technology

- Administrative Services

Additionally, the Executive Offices within the State Water Board include:

- Executive
- Chief Counsel
- Enforcement
- Legislative
- Public Affairs
- Public Participation
- Employee Assistance
- Research, Planning and Performance

The following sections describe the State Water Board Divisions and Offices.

Division of Water Quality

The Division of Water Quality (DWQ) is responsible for oversight and administration of the state's water quality. As such, the Division is responsible for monitoring compliance with permit requirements, inspection of treatment facilities, and treatment of industrial waste prior to discharge. The Division is also responsible for developing criteria and water quality standards for inland surface waters, bays, estuaries, and the ocean, and overseeing programs to control non-point sources of pollution.

A main responsibility of the DWQ is the compilation of the Regional Water Boards' Regional Water Quality Assessments. The Division compiles a statewide listing by region and water body type and submits it to the EPA for approval. Both the state and the federal government use the listing to allocate funds for various water programs.

Additionally, the DWQ performs important certification activities for the federal government. Under federal law, every applicant for a federal permit or license for any activity, which may result in a discharge into a water body, must request state certification. This is required to ensure that the proposed activity will not violate state and federal water quality standards. DWQ provides this certification under its Water Quality Certification Program. Projects requiring state certification by the Water Quality Certification Program fall under two broad federal program categories, namely:

- Projects seeking a federal permit to discharge dredged or fill material (e.g., navigational dredging, flood control channeling, levee construction, or fill of wetlands for land development) to oceans, lakes, streams, wetlands, and other water bodies. The U.S. Army Corps of Engineers issues permits under Section 404 of the Clean Water Act. Under state law, the Water Boards can also regulate these facilities under WDR.
- Projects involving construction of hydroelectric dams, power plants, and other facilities requiring Federal Energy Regulatory Commission licenses. The Division of Water Rights is responsible for certification of these projects and for dredge and fill (U.S. Army Corps of Engineers) permits for water diversion projects.

Another area of responsibility for the DWQ is storm water management. The State Water Board regulates storm water runoff from industrial and construction sites through general storm water permits issued by DWQ. DWQ requires permitting for 11 categories of industrial activity, including wastewater treatment plants, hazardous waste treatment plants, hazardous waste treatment storage and disposal facilities, and certain manufacturing facilities. Construction activities that require a permit include projects where there is a land disturbance of five acres or more. In the future, permits will be required for land disturbances of one acre or more. The DWQ is responsible for processing permit applications, accounting for permitting fees, issuing permits to qualifying entities, and managing permit renewals.

Division of Water Quality Database Programs

The DWQ Database Programs provide vision, leadership, and oversight for all of the Water Boards various data projects, with an initial emphasis on the California Integrated Water Quality System (CIWQS). CIWQS is a Web-based enterprise information management system that is used to manage the state and federal permitting process and provides reporting tools to support the Water Boards business processes and ultimately to improve the State and Regional Water Board's ability to enhance and preserve the quality of California's waters. The Division develops solutions and revises short and long-term strategies designed to improve and enhance the Water Board's various Water Quality Database Programs (WQDP).

Presently under consideration is to add other units within the Water Board that deal extensively with water quality data to this Division. Placing these program units with staff that facilitate the data systems may provide synergies that do not presently exist. It is the desire of the Water Board to have close staff cooperation between the users of the data systems and those that build and maintain it. This close cooperation may be best achieved by combining those units that are the heaviest users of data systems within the Division of Water Quality Database Programs.

Division of Water Rights

The California Water Code established the Division of Water Rights (DWR) within the State Water Board to administer water rights in California. The mission of the DWR is to establish and maintain a stable system of water rights in California; and to best develop, conserve, and utilize, in the public interest, the water resources of the state, while protecting vested rights, water quality, and the environment.

Since 1914, the exclusive method to appropriate surface and some ground waters in California is to file a water right application with the State Water Board and receive a water right permit. The DWR processes water right permit applications, ensures that water is available for appropriation and that public trust uses are protected where feasible, and issues permits where appropriate. The California Environmental Quality Act requires the DWR to conduct an environmental assessment in order to determine any environmental effects associated with proposed projects and provide mitigation to any significant impact if feasible. Once a permitted project is completed and full beneficial use of the water has been achieved, the Division issues a license as final confirmation of the water right. The DWR also processes proposed changes to water rights permits and licenses after ensuring that the proposed change will not adversely affect prior right holders or unreasonably affect fish or wildlife.

The State of California continues to recognize water rights that were initiated prior to the creation of the administrative water right system in 1914. The DWR records claims to these rights. The DWR also assists the courts in determining these rights.

The DWR investigates complaints, and takes enforcement action against illegal diverters, those who violate the public trust, those who waste water or use it unreasonably, and those who violate the conditions of their water right permits or licenses. The DWR maintains records of the use of water under permits and licenses it issues, as well as for most other diversions of surface water. The DWR revokes water right permits and licenses if the water user does not maintain the authorized use or forfeits or abandons the use. If insufficient water is available to meet all water demands due to drought or other conditions, the Division implements water diversion curtailments.

The DWR assists the State Water Board in setting flow objectives under the Porter-Cologne Water Quality Control Act for various streams, including the San Francisco Bay-Sacramento/San Joaquin Delta, and implementing those objectives through its water right authority. The DWR also assists the State Water Board in setting flow dependent water quality objectives for the Bay-Delta. The DWR assists the State Water Board in the development of state policy for water quality control for the purpose of water rights administration.

The DWR administers the water quality certification program under Clean Water Act section 401 for all water diversion projects in California, including hydropower generation facilities subject to the Federal Regulatory Energy Commission.

State law requires the Division to register small domestic and livestock pond uses, certify stockponds constructed prior to 1969, and maintain records of groundwater extractions in four southern California counties. Lastly, the DWR administers water right fees. While there is no separate organizational division for DWR database programs, it is important to note that, in addition to eWRIMS, DWR has a database for its files. Each file is bar-coded, and each staff person in DWR and the Office of Chief Counsel (Water Rights) has a bar code. As files are transferred from one person to another, bar codes are scanned to track the movement. Once per week, DWR file room staff scans all files in each staff person's office with a hand-held mobile scanner.

Division of Financial Assistance
The Division of Financial Assistance (DFA) is responsible for financial assistance programs to construct municipal sewage facilities, water recycling facilities, seawater intrusion control facilities, and underground storage tank cleanup sites. It is also responsible for implementation of financial assistance in the cleanup of waste discharges to land from leaking underground storage tanks. In addition, the DFA certifies wastewater treatment plant operators and enforces the program. Programs are administered in DFA based upon watersheds and include the following:

- Project Implementation of Proposition Funding - Manages Propositions 13, 40, 50, 84 and 204 (Agricultural Drainage Loan Program and Agricultural Drainage Management Program) loan and grant programs. Staff writes agenda items, holds workshops, conducts training, education and outreach, provides technical guidance for project applicants, develops RFPs, reviews legislation, and prepares legislative reports. Also manages contracts on individual projects under all of these various loan and grant programs.

- Clean Water State Revolving Fund (SRF) Program - Provides loan funding and other types of assistance for construction of publicly owned wastewater treatment works and water reclamation facilities, development and implementation of programs to control pollution from nonpoint sources and storm water drainage, and implementation of estuary cleanup programs.

- Water Recycling, Seawater Intrusion Control, Loan Programs and Small Communities Grant Program - Provides grants that often coordinate with low interest SRF loans for the construction of wastewater treatment, water recycling, and seawater intrusion facilities.

- Storm Water Grant Program - Proposition 84 Storm Water Grant Program funds are used to provide matching grants to local public agencies for the reduction and prevention of storm water contamination of rivers, lakes, and streams. A Storm Water Management Task Force will provide advice to the State Water Board on its Storm Water Management Program that includes program priorities, funding criteria and project selection.

- Integrated Regional Water Management (IRWM) Grant Program - Funded by Proposition 50, Chapter 8, provides approximately $412 million for competitive grants for projects to protect communities from drought, protect and improve water quality, and improve local water security by reducing dependence on imported water. Funding for the IRWM Program is administered jointly between the State Water Resources Control Board and the Department of Water Resources.

- Clean Beach Initiative Grant Program – The program began in 2001. The Budget appropriated $32 million from Proposition 13 to implement 38 specific projects. The projects address postings and closures at California public beaches caused by bacterial contamination.

- Areas of Special Biological Significance (ASBS) Grant Program - As required by the Public Resources Code, the ASBS Grant Program funds will be used to provide matching grants to local public agencies to fund a variety of water quality improvement projects to assist local public agencies to comply with the discharge prohibition into ASBS contained in the California Ocean Plan.

- Watershed Management Program - Addresses nonpoint source pollution as well as provides water resource protection, enhancement, and restoration while balancing economic and environmental impacts through integrating federally-mandated and state programs.

- Office of Operator Certification – Certifies operators of wastewater treatment facilities in the state meet minimum levels of competence and training.

- Regional Programs Unit - The unit is responsible for managing the federal Clean Water Act Section 319(h) Grant, coordinating with SB and RB staffs on nonpoint source implementation and 319 issues, and conducting nonpoint source education and outreach processes.

- Replacing/Repairing Underground Storage Tank (RUST) Loan Program - Provides low interest loans for underground storage tank owners or operators of small independent UST facilities. RUST Grant funds are available to assist qualified underground storage tank owners or operators of small independent UST facilities with funding to upgrade containment sumps, double walled piping, dispenser; under dispenser containment pans, electronic monitoring system, enhanced vapor recovery system and enhanced leak detection testing.

- Installed Underground Storage Tank (IUST) Grant - Funds are available for Small Businesses who have installed new underground storage tanks within 12 months.

- The Commingled Plume Account (CPA) - Was created to encourage Responsible Parties (RP) with commingled plumes to coordinate their cleanup efforts, avoid litigation, more rapidly address required cleanup, and significantly reduce the cost of cleanup. The CPA program is not a mandatory requirement for RPs who has been identified as a contributor to a commingled plume.

- The Emergency, Abandoned, & Recalcitrant (EAR) Account – This Account was created to provide funding to the Regional Water Quality Control Boards and local agencies to conduct corrective action activities at leaking petroleum UST sites that have an unauthorized release where there is either: 1) An immediate or prompt action response to protect human health, safety and the environment; 2) Action at a site where a responsible party cannot be identified or located; 3) Action at a site where a responsible party is either unable or unwilling to take the required corrective action.

- The State Water Pollution Cleanup and Abatement Account (CAA) - Established by Water Code Sections 13440-13443. The CAA provides funding for the clean up or abatement of a condition of pollution when there are no viable responsible parties available to undertake the work. The Account is supported by court judgments and administrative civil liabilities assessed by the State and Regional Water Quality Control Boards. The State and Regional Water Quality Control Boards or public agencies with authority to clean up or abate a waste are eligible to receive CAA funding.

- The Site Cleanup Program (SCP) - Oversees activities at non-UST sites where soil or groundwater contamination have occurred. Many of these sites are former industrial facilities and dry cleaners, where chlorinated solvents were spilled, or have leaked into the soil or groundwater.

- The Orphan Site Cleanup Account (OSCA) - Program was established to provide financial assistance to eligible applicants for the cleanup of Brownfield sites contaminated by leaking petroleum underground storage tanks where there is no financially responsible party. An important component of the OSCA Program is to cleanup-blighted properties for reuse and protect water quality.

Division of Information Technology

The Division of Information Technology (DIT) has been responsible for leading and coordinating the development of enterprise or Board-wide information systems. However, as stated in this Strategy document, the Water Board is moving control of its data system projects to its program and business units and has created the Division of Water Quality Databases to be the main leading entity on water quality systems. This change, though underway and not complete, will ultimate require realignment of the previous functions conducted by DIT. This realignment will likely result in the separation of system development from management of the Water Board's IT infrastructure. One possible arrangement has the IT infrastructure becoming part of the Board's business support services in its Division of Administrative Services. Final details are not available at the time of this writing, so an update to the AIMS will be required once these changes are completed.

The Division of Information Technology was assigned to perform the following tasks in support of the organization and so, in light of the realignment, these tasks will need to be reassigned within the Water Board's organizations. Some indication of where the Water Board is assigning these tasks is indicated after each item:

- Develop statewide IT standards with the Executive Review Team – IT standards will be set within the governance structure established for each project.

- Establish statewide IT priorities with the MCC and the Executive Review Team – MCC will set statewide IT priorities for the Water Boards.

- Develop statewide IT policies and procedures with the Executive Review Team - IT standards will be set within the governance structure established for each project.

- Oversee statewide IT projects – each statewide IT project will have a formal governance structure established that will provide strategic, tactical, and operation oversight and management.

- Interface regularly with local organizations – each statewide IT project will have a formal governance structure that establishes user groups and a steering committee.

- Perform Project Management Activities – the Water Quality Database group or the specific program group sponsoring the project will manage.

- Coordinate closely with the Executive Review Team, its various subcommittees, subject matter experts within the program areas, and contractors – the Water Quality Database group will perform this function.

- Direct the efforts of those staff and consultants involved in enterprise application planning, development, testing, and deployment – the Water Quality Database group or the specific program group sponsoring the project will manage.

- Negotiate relevant vendor contracts – the Water Quality Database group or the specific program group sponsoring the project will manage.

- Administer the State Water Board/Regional Water Boards WAN and the State Water Board LAN – the IT infrastructure group will be responsible for this.

- Assist Regional Water Boards with Local Area Network (LAN) requests, as required – the IT infrastructure group will be responsible for this.

Division of Administrative Services

The Division of Administrative Services (DAS) provides support services for accounting, contracting and business services, personnel, labor relations, health and safety, and budgets, to employees within the Water Boards.

The Division is composed of the following branches:

- Accounting
- Budget
- Business Management and Support
- Health and Safety
- Labor Relations
- Personnel

Executive Office

The Executive Office provides overall policy and operational direction for the State Water Board staff and policy coordination and leadership for the Regional Water Boards. The Executive Office also prepares State Water Board meeting notices and meeting agendas, coordinates supporting documentation and public testimony, and handles logistical issues such as scheduling meeting times and locations. The Office produces reports of the minutes and action items from past Board meetings. The Office also coordinates and organizes public workshops throughout the state on a variety of water resource issues.

Office of Chief Counsel

The Office of Chief Counsel provides legal advice to the State Water Board, its offices and Divisions, and the Regional Water Boards. The Chief Counsel's office activities are limited to administrative issues. In matters involving courts of law, the State Attorney General's office represents the State Water Board and its interests.

Office of Enforcement

The Office was formed in mid-2006 to emphasize the importance of enforcement as a key component of the Water Boards' core regulatory functions and statutory responsibilities. The role of the Office is to ensure that violations of State and Regional Water Board orders and permits result in firm, fair, and consistent enforcement both

through direct actions, the development of policies and guidance, and identification of metrics for decision-making on enforcement related issues.

Office of Legislative Affairs

The Office of Legislative Affairs represents the Water Boards on all legislative matters, and serves as the primary spokesperson and advocate for the Water Boards before the Legislature. The Office is the primary contact point between the Water Boards and the Legislature, and works with the California Environmental Protection Agency, the Governor's Office, and the Legislature to achieve the Water Boards' legislative goals.

The Office facilitates the development of legislative proposals and sponsors legislation on behalf of the Water Boards; monitors federal and state legislation that is of interest to the Water Boards; prepares analyses of high priority legislation; represents the Water Boards on legislative matters; communicates the Water Boards' accomplishments to the Legislature, and works to develop positive relationships with the Legislature.

Office of Research, Planning, and Performance

The Office of Research, Planning and Performance (ORPP) provides focus for initiatives and issues facing the State and Regional Water Boards. The Office uses a variety of tools to help identify and resolve issues, including:

- Strategic Planning
- Performance Review
- Program Analysis
- Management Coordination
- Training
- Economic Analysis

In addition, ORPP is administrator of the Water Boards' Training Academy and the coordinator on Climate Change.

Office of Public Affairs

The Office of Public Affairs is responsible for the public outreach activities of the State Water Board and is the primary contact for news media, the general public, regulators, educators, and other stakeholders requesting information about environmental concerns. The Office also maintains a multimedia archive of publications, educational material, and outreach materials. A wide variety of State Water Board information is stored in the archive, including informational brochures, posters, biennial reports, videos, watershed models, calendars, and bookmarkers, as well as many publications pertaining to water quality monitoring, underground storage tanks, storm water, non-point source water pollution, the State Revolving Fund, and other programs.

Office of Public Participation

The Office of Public Participation, working cooperatively with the Office of Public Affairs, is also responsible for the public outreach activities of the Water Boards. Additionally, this program will strengthen the Water Boards efforts at involving the public in our decision-making processes.

Office of Employee Assistance

The Office of Employee Assistance administers numerous programs that assist Board employees and the public, when appropriate, in areas ranging from building and

information access, to counseling, career guidance, and complaint resolutions. The Office of Employee Assistance is currently not staffed. Recruitment is currently in process. Questions or concerns in the interim are routed to the Personnel Branch to a personnel analyst or manager.

11.2.7 State Water Board IT Management, Staffing, and Skills Development

The following sections provide detail on the State Water Board's:

- IT Management Structure
- Skills and Training
- IT Development
- IT Support/Application Maintenance

IT Management Structure

The Water Boards has adopted a three-tiered IT governance structure that encompasses a strategic level, a tactical level, and an operational level. This governance structure enables and empowers IT management to take place at multiple places with the Water Boards, but most importantly allows it be aligned with the Water Board's business units. IT is a tool for enhancing business functions, and thus is the appropriate place to have IT management take place.

Skills and Training

IT has established an aggressive training policy for IT staff. IT management provides numerous in-house training opportunities and will provide training funds for staff to learn key skills that will help IT better support the Boards' IT Infrastructure. IT's training policy focuses on developing the following areas:

- Develop in-house expertise with Oracle Tools;

- Develop skills to improve WAN/LAN maintenance and operation; and

- Develop skills to improve Internet/Intranet website design and e-Government functionality.

IT Development

Whenever possible, IT will develop applications and tools using both in-house staff and contractors in whatever is the appropriate mix for the project. When appropriate, IT will use contractors to perform complex development services and as a mean to support in-house staff.

In an effort to encourage staff development, IT will team staff members with contractors on development projects. IT envisions establishing a mentor relationship between contractors and staff to transfer critical knowledge about the application. This, along with IT's staff development and training policy, will enable IT staff to assume subsequent development responsibilities, including future application enhancements.

IT Support/Application Maintenance

Using the mentoring program discussed above, IT intends to support IT applications internally as resources allow. When necessary, IT will use contractors to support the core IT team.

11.3 Appendix C – Management Principles

Key Management Principles

1. Ensure that Business Needs Drive IT solutions

The business needs of the Water Boards must drive the information technology solutions they deliver. The organization's business units (Divisions, Offices, and Regional Water Boards and the programs within them) will direct the nature of the solution to the business problem and have full budgetary and project control. The Water Board's IT staff units will play a key supporting role in planning, execution, and rollout of technology solutions.

Business units should evaluate the potential to improve business processes before automating them. Existing business processes are based on the state of technology at the time the process was developed. In recent years, technology, and particularly the Internet, makes it possible to achieve a true paradigm shift in how government agencies provide services. However, before any business processes are changed, the resources needed to make the change need to be identified.

2. Use a Standard Project Management Methodology

Since the first AIMS, the Water Boards' IT staffing and approach to IT management has rapidly evolved to handle increasingly ambitious projects within an environment of changing technology. To keep pace with these changes, the Boards have adopted project management best practices that include the use of the Project Management Institute's (PMI) Project Management Body of Knowledge (PMBOK) for all system development work. PMBOK provides the Boards with an approach to successfully manage the challenges of IT system development. These management challenges arise from such factors as the complexity of the core business, specific stakeholder needs, technology alternatives, and scarce resources. The PMBOK project management phases include project initiation, planning, execution, control, and closeout. Within each phase, the organization must carefully monitor the project work plan, risk management plan, communication plan, and contracts to mitigate changes to project scope, budget, and resource requirements.

Adhering to a sound project management methodology at each stage of an IT project – from planning to evaluation – ensures that the Water Boards' projects will achieve desired business outcomes and end-user expectations, and will be completed on schedule and within budget.

3. Promote Standard Development Methods

A Systems Development Life Cycle (SDLC) methodology promotes a phased project approach, which ensures adequate planning, prudent system development practices, project documentation, and stakeholder input and enrollment. Traditional SDLC phases are: Plan, Analyze, Design, Construct, Test, Implement, Document, Train, Market, Maintain, and Enhance. The SDLC is particularly important in the current government environment that stresses that an organization handle IT initiatives as an investment. The desired outcome is a business benefit measured in terms of return on investment (ROI). The Water Boards can maximize the ROI through the application of applicable information technology solutions to reengineered business

processes. To do this, the Water Boards will follow the SDLC methodology to guide all application development efforts, tailoring the methodology to the scope and complexity of the IT project.

Integration of the SDLC methodology with the PMBOK project management methodology ensures the following outcomes for each phase of an application or system development project:

- Balances the four elements of an effective project: cost, schedule, technical performance, and quality.
- Provides objective measurement, analysis, and reporting of cost performance against funding ceilings to recognize deviations from project plans and initiate corrective action.
- Provides a mechanism for the identification and mitigation of project risks.
- Establishes mechanisms for communication between stakeholders, project sponsors, and IT development staff. Effective communication ensures the development of a quality product, which meets business and stakeholder needs.

The Water Boards will establish performance measures as part of each IT project and productional process. Performance measures are management tools that measure work performed and results achieved and enable an organization to assess past efforts to determine if they have produced the desired outcome. The Boards will establish performance measures to gauge the effectiveness of the organization's IT projects and productional processes. Additionally, the Boards will utilize performance measure outcomes to evaluate project and process success, and incorporate improvements to the benefit of future IT project development.

4. Maintain an Effective Security Policy

The Water Boards have adopted an Information Security Policy that is consistent with the security standards and policies set forth by the Department of Finance (DOF). As stated in the Information Security Policy, the purpose of this policy is "to establish and maintain a standard of due care to prevent misuse or loss of the Boards' assets". This policy requires the State Water Board and Regional Water Boards to carry out the following responsibilities:

- Establish and maintain management and staff accountability for protection of agency information assets.
- Establish and maintain processes for the analysis of risks associated with agency information assets.
- Establish and maintain cost-effective risk management processes intended to preserve the Boards' ability to meet state program objectives in the event of the unavailability, loss, or misuse of information assets.
- Consistent with California State law, the Water Boards employ a Privacy Program Coordinator and Information Security Officer.

Additionally, the Water Boards have established Organizational Software Usage Guidelines, which outline the Boards' policy on software copyright and license adherence. These guidelines designate employee usage and home computer

installation requirements and identify procedures for software acquisition, registration, installation, disposal, and audits.

The Water Boards designed their security processes to provide the user with appropriate access while maintaining the level of confidentiality needed to ensure data integrity. Security functionality will also allow state security administrators to monitor and track access and use by all users. Finally, the Water Boards' security process is appropriately designed to permit an authorized non-technical user to manage security and serve as the security administrator.

In view of the dynamic environment of IT, the Water Boards anticipate that the security architecture will need to continue to evolve to meet the challenges arising from the employment of new technologies, such as those related to e-Government projects. The organization will continue to identify, evaluate, and implement sound security architecture to operate in a protected manner and successfully meet the security challenge of e-Government.

5. Plan for Disaster and Operational Recovery

The Water Boards will maintain Operational Recovery Plans (ORP) that are consistent with DOF guidelines for all organizational critical systems. The purpose of an ORP is to ensure the recoverability of critical IT applications, and to effectively protect the state's IT resources from unacceptable risk of interruption. DOF has identified ten criteria that every agency must include in an ORP and organizes the criteria into a three-tiered hierarchy of Required (Tier 1), Recommended (Tier 2), and Ideal (Tier 3) practices, with associated timelines for implementing each tier. Figure 8 below presents the primary elements for each of the three tiers.
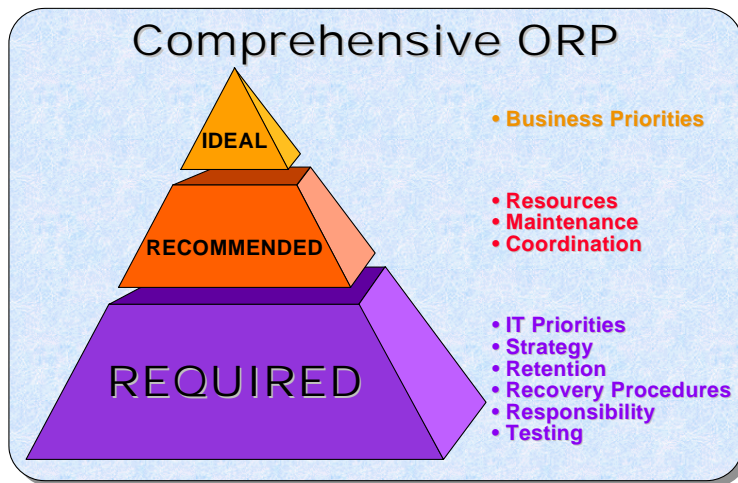

Figure 8. Required, Recommended, and Ideal criteria for a comprehensive ORP

The Water Boards recognize both the costs and benefits of keeping the plan in a state that can be invoked if necessary and that will incorporate ORP costs into project costs. The Water Boards' 2006 ORP addresses those criteria required by Tier 1 practices, and subsequent ORPs will continue to address required practices as documented by DOF. The State Water Board ORP includes:

- An inventory of applications and recovery priorities;
- A strategy for recovery from IT system interruption;
- A data back-up plan and retention schedule;
- Detailed procedures for recovering data and applications;
- A listing of the roles and responsibilities of individuals involved in operational recovery; and
- A testing plan to determine operational recovery readiness.

The Water Boards' ORP processes include the performance of regular back-up and recovery processes on the core databases. Back-up practices include disk mirroring, incremental and full back-ups, and off-site as well as on-site magnetic media storage. The State Water Board data back-up and recovery processes are the responsibility of the Division of Information Technology; Regional Water Boards are generally responsible for their local systems. These procedures may vary depending on the criticality of the data and the data processing procedures of the local organizations.

6. Establish Formal IT Governance Structure for Each Project
New projects will be subject to a formal IT governance structure, following the model described earlier in this AIMS. Single executive sponsorship of a project no longer suffices.

7. Adhere to Established Technology Standards
The Water Boards have adopted technology standards and guidelines to facilitate IT decision-making and will strongly encourage support of and adherence to these standards throughout the organization. Standards are necessary to assure enhanced utility while recognizing the limitations of resources. These standards represent a framework of technology options available for both centralized IT solutions and those pursued locally by the Regional Water Boards. These standards also recognize that business needs may require individual users to acquire hardware and software beyond the standards. Appendix E, Appendix F, and Appendix G further describe the Water Boards' technology standards.

Other Management Principles

8. Pursue Portfolio Based Solutions for Core Business Applications
IT business solutions should serve the business units needs and integrate into the Water Board's portfolio of systems. The IT needs of individual business units should be addressed in a manner that supports the portfolio approach to and shares information between systems to address overall needs, particularly with respect to the efficient use of scarce financial and staff resources, and where core business applications are involved.

9. Build Shared Infrastructure, Shared Code, and Custom Presentation
The Water Boards' IT infrastructure and code will be shared by business units throughout the organization, thereby increasing the return on investment. However, applications must be intuitive to the user, which requires that presentation be in the users' jargon and individualized processes.

10. Develop Open Systems According to Industry Standards
The Water Boards will invest in and develop IT solutions that are consistent with industry standards and as open as possible, thereby ensuring that systems, applications, and databases are scalable, portable, reusable, maintainable, and interoperable.

11. Approve and Prioritize Projects that support Business Goals
Through the newly defined Governance structure described earlier in this AIMS, the Water Boards will maintain a consistent IT project approval process and will effectively prioritize its work as new technology becomes available and new opportunities arise. The Water Boards' project approval process requires that MCC review all proposals for major IT projects and the AEO's review all others, to determine potential association with or impacts to existing systems and programs.

The Water Boards have also identified criteria to use as guidelines to prioritize new projects against existing project priorities. To establish priorities, they will first determine if an existing system already delivers the functionality of the proposed project. Additionally, the Boards will establish project priorities based on the extent to which the proposed project will support program activities at one or all of the Boards, activities with legal requirements, and those that are a priority per the Governor's e-Government Plan, or per Water Board or Cal/EPA strategic plans.

12. Establish Data Ownership Guidelines
The Water Boards will establish policies and procedures that clearly define responsibilities for data ownership and stewardship.

13. Develop Skilled Personnel
The Water Boards will continuously assess the overall skill level of its IT staff and provide the necessary training to ensure that they are able to operate and maintain the IT infrastructure.

14. Engage in Strategic Planning and Management
Management will make decisions that are consistent with the Water Boards' established strategies. The Water Boards will periodically update strategic planning documents to reflect changes in business direction and changes in IT. This will include a yearly checkpoint review to ensure that stated IT goals and priorities align with the business priorities of the organization.

15. Communicate Progress and Solicit Feedback
The Water Boards will regularly communicate progress achieved towards implementing the elements of the AIMS and will solicit feedback to improve existing IT delivery processes.

16. Plan for Replacement Funding

The Water Boards will foster mechanisms to establish continuous replacement funding for all IT facilities and equipment, based on established equipment replacement schedules.

17. Employ Change Management Techniques

The Water Boards will employ change management tools and methods to manage the organizational impact of system implementations. Change management tools and methods:

- Provide a common vision of the organization after the change process is complete;

- Identify, in advance, the changes that will need to occur to achieve organizational goals; and

- Anticipate barriers and enablers to upcoming changes, thereby allowing the organization to proactively address both.

11.4 Appendix D – Operating Principles

Key Operating Principles

1. Pursue Delivery of the Majority of Water Boards Services over the Internet
As the world continues to embrace the Internet, the Water Boards expect to provide more and more services and information over this convenient channel. Furthermore, government and private industry are using web-enabled applications to transact increasing amounts and types of business. e-Government applications and sites should be more than a vehicle for the dissemination of information. Ideally, these sites must be viewed as technically and financially viable business tools for delivering services to the regulated community/partner agencies, staff, and the general public. e-Government sites must go beyond merely posting information and providing limited interactivity; they must also begin to make the experience of doing business with government simpler, faster, and cheaper.

Successful implementation of e-Government applications will have a positive impact on the ability of the State Water Board and the Regional Water Boards to achieve their business missions by enhancing the quality of service delivery. Within this context, effective e-Government sites support the mission of the organization while enhancing its business processes. Leveraging web-enabled applications can result in a variety of management benefits, including streamlining a process by reducing or eliminating manual, labor intensive activities; shortening staff cycle and process times; reducing operating expenses; increasing efficiencies of limited human resources; avoiding costs; and enhancing the quality of service.

From a software/application development perspective, the benefits of web-enabled applications include the following:

- Web-enabled applications are typically faster to develop and deploy than conventional client-server or mainframe applications.
- Web-enabled service delivery applications provide robust capabilities, such as database functionality and connectivity, in addition to electronic commerce.
- Web-enabled applications are relatively straightforward to implement on web servers, which can be located internally at the Water Boards or remotely, offering a variety of cost scenarios and options.
- Web-enabled applications are easier to modify and update, providing on-line access to information in real time.
- Web-enabled applications are easier to maintain on an on-going basis, both from the programming and content management points of view.
- Web-enabled applications are easier and more cost effective to deploy than client server applications, which require that modified applications be replaced on each workstation running the client.

- Web-enabled applications are less costly to use at remote sites than LAN / WAN communication improvements, which are often not cost effective or financially possible.

2. Employ Standard Development Methods

The Water Boards will employ standard developmental approaches that include standard analytic methods (i.e., information engineering), standard developmental tools, and standard application design. Development of standard application development tools and approaches will assist the Boards to achieve consistency and ease-of-use from the end-user perspective as well as ensure that systems are efficiently planned, implemented and supported over the long term. Appendix F provides further information on the Water Boards' application development standards and Appendix K details the Boards' Application Development environments.

3. Utilize Data Modeling

Data and the policies, processes, and technology surrounding data are central to the business mission of the Water Boards. Data quality is of paramount importance, and the Water Boards will utilize appropriate Quality Assurance/Quality Control to ensure the necessary high quality is achieved. New systems development activities will include formal QA/QC processes linked to data entry to provide immediate feedback on errors and opportunities to correct errors as early as practical.

The Water Boards will adhere to the following fundamental guidelines for data management:

1. Data should address the needs of the business unit developing and using it first;
2. Data should be displayed spatially so that connections and relations between and among data are easily identifiable; and
3. Datasets will be combined together so that the data can be used by multiple business units *only when there is an identified need and the benefits justify the costs.*

Other Operating Principles

4. Facilitate Local Decision Making/Empowerment

All Board entities must have access to the information that will allow them to effectively conduct business. The Water Boards will design systems to disperse information for local decision-making, thus empowering the end-user.

5. Collect Data Once, at its Source

The Water Boards will design systems so that users enter data only once at the source, and so that data is used in multiple applications within many organizations without the need to reenter the data. This will allow the Water Boards to build the infrastructure once and leverage it across multiple new applications. The infrastructure must support current applications and be the foundation for future initiatives. It also must be secure, cost-effective, adaptable, reusable, and scalable.

6. Maximize User Productivity

The Water Boards recognize that the user of the information system is the most critical and the most expensive element in the system. Subsequently, the Water Boards will design systems that maximize the productivity of the user based on the user's skill and function, and that require minimal training or computer literacy.

7. Develop Software Portability

The Water Boards will develop systems so that software operates on a variety of platforms regardless of manufacturer or operating system. This will allow the Water Boards to select operating systems and hardware based on business needs.

8. Conform to Open Systems Standards

System components will conform to industry/open system standards, isolating system and network services from the application business logic where practical.

9. Support Desktop Operating System Standards

The user interface on the client component of the computing architecture will support the enterprise-wide desktop operating system de facto standard.

10. Utilize Standardized Vendor Products

The Water Boards will maximize ease of integration (e.g., lower costs) by limiting the variety of vendor operating systems, application development environments, and Relational Database Management Systems (RDBMSs).

11. Build Scalable Applications with a Flexible Design

Applications must be capable of migrating to platforms of greater or lesser power, with little or no change to the underlying applications as needs or system usage change. A scalable physical architecture will provide for the substitution or technology refreshment of elements without the need to redesign or significantly alter the architectural structure. In this way, the Water Boards can add or subtract elements and expand the system capability without overhauling the architecture and without affecting on-going productional operations.

11.5 Appendix E – Hardware Architecture Standards

This section defines the Water Boards' Hardware Architecture Standards. The Water Boards established these standards to decrease the overall cost of owning technology assets and to improve business outcomes.

Desktop Workstation Standards

Most employees use computer workstations. These workstations provide users access to business applications and office automation applications and information. Major IT initiatives require an intelligent access platform capable of supporting complex presentation services such as graphics, images, sound, and video. The platform also must support productivity-enhancing applications such as spreadsheets, word processors, statistical analysis, groupware, and e-mail. Desktop workstation standards are based upon the current state of available technology and will change over time. The Standards Subcommittee, which reports to the Executive Review Team, is charged with establishing and maintaining both hardware and software standards for Personal Computer (Desktop Workstations). The Boards have standardized on the Microsoft Windows Operating System. However, the Boards will continue to evaluate open source alternatives (Linux, etc.).

Desktop hardware standards are based on systems from major manufacturers that utilize central processing units (CPU) from Intel Corporation or compatible units. The Boards will procure systems, as much as possible, in quantity to drive down the per-unit cost.

Server Standards

Servers provide information processing and storage services for a group of users performing selected tasks. The services typically provided include specialized application processing, database management, web services, e-mail, network file storage, shared printers, and productivity applications. Because user access to applications involves the server, reliability and manageability are important. Similarly, because work groups vary in size, scalability is also important. The Water Boards utilize servers from companies like Sun Microsystems and Dell, with operating systems such as Solaris and Netware. Limited use is made of servers running Microsoft Windows**.** Linux-based servers are also in limited use. DIT will continue to evaluate server requirements and match them to current business needs.

11.6 Appendix F – Software Architecture Standards

This section defines the Water Boards' Software Architecture Standards. The Water Boards established these standards and guidelines to ensure a high level of interoperability and to more easily facilitate data exchange. The aforementioned Standards Subcommittee will maintain the standard.

Personal Productivity Software Standards	
Product	**Product Use**
Microsoft Excel	Spreadsheet
Microsoft Word	Word processor
Microsoft PowerPoint and Visio	Presentation
Required Oracle 10g or better (greater than 5 users) Preference: Personal Oracle (fewer than 5 users) Acceptable: Access (fewer than 5 users)	Database
GroupWise 7.0	E-mail, Calendar
Microsoft Project	Project Management
Microsoft Internet Explorer or Netscape	Web Browser

Application Development Tools Standards

The application development environment refers to the tools and approaches used to develop new computer applications. Application development tools include software that allows programmers to build the screen layouts used by computer end-users to input and access data. Application development software tools also are used to ensure proper documentation of computer applications for use by programmers to support and enhance applications. Structured application development life cycle approaches can be adopted that outline steps to planning, developing, and implementing new software applications. Development of standard application development tools and approaches can lead to consistency and ease of use from the end-user perspective, and can help ensure that systems are planned, implemented, and supported over the long term in an efficient and cost-effective manner.

Application Development Tools Standards	
Product	**Product Use**
Enterprise Java Beans	Component Architecture for J2EE platform
Java Server Pages (JSP)	Server-Side Business Logic Implementation
Sun iPlanet	Web Services Enabling Technology
Oracle 10g database engine	Enterprise Relational Data Base Repository
Oracle Internet application server	Application Server Component
Internet Explorer	Enterprise Browser
Oracle's Integrated Developer Suite	Integrated Development Tools
ArcGIS9.2 – ArcView, ArcEditor, and ArcInfo	Geographic Information System (GIS) usage
ArcGIS Server 9.2	GIS Advanced Server
Arc SDE	Spatial Data Management

11.7 Appendix G – Data Management Standards

As noted in Section 7, Key Strategies for Information Delivery, data management is about more than database management systems and technology. Data and the policies, processes, and technology surrounding data are central to the business mission of the Water Boards. Data quality is of paramount importance, and the Water Boards will utilize appropriate Quality Assurance/Quality Control to ensure the necessary high quality is achieved. New systems development activities will include formal QA/QC processes linked to data entry to provide immediate feedback on errors and opportunities to correct errors as early as practical.

Data Management Strategy

The Water Boards will adhere to the following fundamental guidelines for data management:

1. Data should address the needs of the business unit developing and using it first;
2. Data should be displayed spatially so that connections and relations between and among data are easily identifiable; and
3. Datasets will be combined together so that the data can be used by multiple business units *only when there is an identified need and the benefits justify the costs.*

Database Management Systems

A database management system (DBMS) is a collection of software programs that uniformly store, organize, and allow access to data. The overall database architecture determines the preferred structure of the DBMS (e.g., relational, hierarchical, network). Data architecture considers the placement and use of data and databases, and implements a business decision of whether data should be located centrally, locally, or both (hybrid). Different DBMS structures may be selected depending on business needs, including processing speed, required search capabilities, data maintenance, and the complexity of the relationships between data elements. Manageability, scalability, performance, and reliability are all important factors in choosing a database platform. The Water Boards will select products for database management based on the size of the application, as follows:

- **Enterprise-Wide or Broadly Used Applications** – The Boards' standard for enterprise or broadly used applications with large amounts of data or mission critical performance and reliability is Oracle.

- **Single or small Multi-User Applications** – Smaller projects that require more functionality than that provided by spreadsheets should use Personal Oracle or MS Access. These user-friendly relational databases can quickly and easily help individuals and groups achieve project goals.

The table below summarizes the Water Boards' relational database management standards.

Relational Database Management Standards	
Product	**Product Use**
Oracle 10g	Enterprise-Wide RDBMS
Personal Oracle or MS Access	Single or small multi-user RDBMS
Microsoft Excel	Individual Use Only

11.8 Appendix H – e-Government Approach and Projects

e-Government solutions can be grouped into four distinct levels. Each subsequent level increases in technical sophistication and requires more advanced technology resources. As most organizations contemplate implementing e-Government solutions, they typically begin with solutions in Level I, as these are the least costly to implement and require the lowest level of technological sophistication. Organizations can, however, choose to pursue higher-level projects without first completing all envisioned projects for a lower level. A description of each level, as defined by the Gartner Group, follows.

> **Level I – Publish information** – This level uses electronic media via the Internet to deliver general, read-only information such as directories, manuals, policies, news, etc. More advanced services increase functionality to include downloadable forms, e-mail for contacts, and search options.
>
> **Level II – Provide interactions** – This level adds tools to improve service. For example, the addition of a database allows the user to post inquiries, conduct advanced searches to obtain real-time responses, and submit web-based forms.
>
> **Level III – Provide two-way transactions** – This level provides fully web-enabled services (e.g., capture monitoring data from Underground Storage Tank sites and automation of Storm Water Permit Annual Payments) and focuses on individual transactions.
>
> **Level IV – Fully integrate and automate business processes** – This level enables fully automated internal and external interactions and transactions between multiple organizations, applications, and databases. Functions include ordering, delivering, accounting, and reporting. Level IV transactions focus on automating and integrating re-engineered business processes that support the goals and mission of the organization.

Proposed e-Government Projects

As described in Appendix K, the Water Boards already have abundant Level 1 functionality deployed to their Internet site. Planned AIMS e-Government projects, summarized in Section 10, Strategic Initiatives, propose a variety of services that overlap all four levels.

To demonstrate success, the Water Boards must create performance metrics and measure stakeholder satisfaction with service delivery, quality, and cost savings. The Boards will use these measurements in the development of new and improved web applications. The Water Boards plan to launch new applications, as resources permit, to maintain momentum toward building a comprehensive e-Government service line. Planned e-Government projects include the following:

Table 7. Water Boards' e-Government Projects

Development Projects (Projected Costs are One-Time unless Otherwise Noted)								
Project Title	Project Full Name	Project Status	Project Complexity	IT Service Area	Service Category	Project Lead	Projected Resource Requirements	Project Due Date
CIWQS - SWPAP	CIWQS Stormwater Public Participation Project	Beta testing in progress	Major	Project Management, Application Development, Data Management	Application and Data Management	DWQ	$100,000	Mar-08
CIWQS - eSMR	CIWQS-eSMR redesign	In progress	Major	Project Management, Application Development, Data Management	Application and Data Management	DWQ		Jun-08
CIWQS EDM	CIWQS data structure cleanup	In progress	Medium	Application Development, Data Management	Application and Data Management	DIT		Jun-08
CIWQS - GIS demo	Demo GIS capability for CIWQS	Project initiation	Medium	Application Development, Data Management, and GIS Services	Application and Data Management, Infrastructure	DWQ		Feb-08

Development Projects
(Projected Costs are One-Time unless Otherwise Noted)

Project Title	Project Full Name	Project Status	Project Complexity	IT Service Area	Service Category	Project Lead	Projected Resource Requirements	Project Due Date
Geotracker II	Outsource Geotracker system to a system as a service provider	FSR completed, pending procurement	Medium	Project Management	Project Management	DWQ	$416,000	Feb-08
LGTS Phase II	Loans and Grants tracking system expansion	Project initiation, internal FSR in review	Medium	Project Management, Application Development, Data Management	Application and Data Management	DFA	$400,000	TBD
BizFlow eTimesheet dataflow to CalSTARS	eTimesheet dataflow to CalSTARS	In progress	Minor	Project Management, Application Development, Data Management	Application and Data Management	DAS	$50,000	Jun-08
eTimeSheet expansion	Electronic Timesheet expansion to RBs	Expansion for Redding and Fresno in March/April '08 respectively. After Fresno, DAS will follow WAN upgrade schedule; kick off meeting already conducted in October, new servers are built.	Medium	Project Management, Application Development, Enterprise Server Administration	Application and Data Management, Infrastructure	DAS		Mar-08 to Nov-08
ABTS	Automated Budget Tracking System (BDAS replacement)	In progress (evaluating COTS product)	Medium	Project Management, Data Management	Application and Data Management	DAS	$200,000	Jun-08

Infrastructure Projects
(Projected Costs are One-Time unless Otherwise Noted)

Project Title	Project Full Name	Project Status	Project Complexity	IT Service Area	Service Category	Project Lead	Projected Resource Requirements	Project Due Date
ECM Enterprise	Enterprise roll out of Electronic Content Management	Project initiation, reportable external FSR in development	Major	Project Management, Windows Administration, Network Administration	Infrastructure	DAS	$3.1 million	TBD
Internet Website Conversion	Statewide Internet Website conversion	In progress (first cutover began 3rd week of November)	Medium	Web Services	Infrastructure	DIT		Feb-08
RB WAN upgrade	Regional Board Wide Area Network Infrastructure refresh	Project initiation (4 pilot regions, R6v, R9, R1 and R4 are scheduled to have equipments installed by Feb 2008, however, AT&T service upgrade not available until May 2008)	Major	Network Administration, Windows Administration, Novell Administration, PC Support	Infrastructure	DIT		Jan-08 to June 09
HQ VLAN migration phase II	Migrate Windows servers to dedicated VLAN	Project initiation (in the process of developing project plan)	Medium	Windows Administration	Infrastructure	DIT		Dec-08

Infrastructure Projects
(Projected Costs are One-Time unless Otherwise Noted)

Project Title	Project Full Name	Project Status	Project Complexity	IT Service Area	Service Category	Project Lead	Projected Resource Requirements	Project Due Date
Novell ZEN work	Novell ZEN work deployment on Novell servers	Project initiation (in the process of developing project plan)	Minor	Novell Administration	Infrastructure	DIT		Mar-08
CalEPA Network upgrade	CalEPA Network upgrade	Project initiation (pending CalEPA's schedule, SWRCB contributed to the change control document development)	Major	Network Administration	Infrastructure	DIT		Jun-09
PIX firewall version upgrade	To upgrade software version and hardware of the PIX firewall - security	Project initiation (software and hardware in procurement)	Medium	Network Administration	Infrastructure	DIT		Jun-09
Webcasting services	Provide Webcasting capability via third party service	Project initiation (following WAN upgrade schedule)	Medium	Network Administration	Infrastructure	DIT		May-08 to Jun-09

Maintenance Activities (On-going Activities within the Portfolio)
(Projected Costs are On-going)

Project Title	Project Full Name	Project Status	Project Complexity	IT Service Area	Service Category	Project Lead	Projected Resource Requirements
CIWQS - Core	CIWQS phase I	Maintenance and Enhancement	Major	Project Management, Application Development, Data Management	Application and Data Management	DWQ	$350,000 per year
CIWQS - eSMR	CIWQS phase I	Maintenance and Enhancement	Major	Project Management, Application Development, Data Management	Application and Data Management	DWQ	
CIWQS - SSO	CIWQS Sanitary Sewer Overflow	Maintenance and Enhancement	Medium	Application Development, Data Management	Application and Data Management	DWQ	
CIWQS - SMARTS	CIWQS Storm water NOI on-line submission	Maintenance and Enhancement	Medium	Application Development, Data Management	Application and Data Management	DWQ	$50,000 per year
CIWQS - SWARM	CIWQS Stormwater Annual report submission	Maintenance and Enhancement	Medium	Application Development, Data Management	Application and Data Management	DWQ	$35,000 per year
CIWQS - Discoverer Reports	Ad-hoc reports for CIWQS	Maintenance and Enhancement	Medium	Data Management	Application and Data Management	DWQ	
CIWQS - Reports	CIWQS internal and external customized reports	Maintenance and Enhancement	Medium	Project Management, Application Development, Data Management	Application and Data Management	DWQ	$200,000 per year
CIWQS-Geotracker dataflow phase I & II	Geotracker dataflow to CIWQS for Case, Analytical and GIS data	Maintenance only	Medium	Application Development	Application and Data Management	DWQ	

Maintenance Activities (On-going Activities within the Portfolio)
(Projected Costs are On-going)

Project Title	Project Full Name	Project Status	Project Complexity	IT Service Area	Service Category	Project Lead	Projected Resource Requirements
CIWQS - eWRIMS	New version of WRIMS	Maintenance and Enhancement	Major	Project Management, Application Development, Data Management, Enterprise Server Administration, GIS	Application and Data Management	DWR	$375,000 first year; $125,000 per year on-going
Geotracker	Geotracker and ESI	Maintenance and Enhancement	Major	Project Management, Application Development, Data Management, Windows Administration	Application and Data Management	DWQ	$220,000 per year
WRIMS	Water Rights annual billing	Maintenance only	Medium	Data Management	Application and Data Management	DWR	
FAAST	Financial Application Submittal System	Maintenance and Enhancement	Medium	Application Development	Application and Data Management	DFA	$42,000 per year
LGTS and EBET	Loans and Grants Tracking and Environmental Benefit Tracking	Maintenance only	Medium	Data Management	Application and Data Management	DFA	$130,000 per year
Beach Watch	Costal Advisory Database System (Beach Watch)	Maintenance and Enhancement	Medium	Application Development	Application and Data Management	DWQ	
SCUFIIS/OSCA	State Cleanup Fund Integrated Information System and Emerge abandoned recalcitrant, and Brownfield	Maintenance and Enhancement	Medium	Application Development	Application and Data Management	DFA	
ECM - pilot	Electronic Content Management (paperless office for R9, R3, and R2)	Maintenance and Enhancement	Medium	Project Management, Windows Administration, Network Administration	Infrastructure	DAS	
eTimeSheet	Electronic Timesheet	Maintenance only	Medium	Application Development	Application and Data Management	DAS	$31,000 per year
GIS Services	GIS data extraction, map creation	Maintenance only	Medium	GIS Services	Application and Data Management	IT	

Maintenance Activities (On-going Activities within the Portfolio)
(Projected Costs are On-going)

Project Title	Project Full Name	Project Status	Project Complexity	IT Service Area	Service Category	Project Lead	Projected Resource Requirements
Network Administration	Network performance monitoring and administration	Maintenance only	Medium	Network Administration	Infrastructure	IT	
Web Posting	Daily posting to Internet and Intranet sites	Maintenance only	Medium	Web Services	Infrastructure	IT	

11.9   Appendix I – e-Government Architecture

The e-Government architecture is a technology framework within which the Water Boards will work to guide future planning and decision-making regarding e-Government. The framework is based on traditional client/server architecture, which may be separated into three layers:

1. **Presentation** – This layer controls the display of information to the desktop "client".

2. **Business Logic** – This layer uses business rules to control information processing.

3. **Data** – This layer controls how information is stored in the database.

Web applications change where the layers are housed within the architecture. In short, the presentation and business logic layers reside on the web/application server, while the data layer resides in one or more databases.

The remainder of this section addresses the following web architecture elements:

Web Architecture Elements	
Tool	**Function/Role**
HTML	Presentation Layer
Java	Business Logic
Java Script	Client side validation and editing
Oracle	Data Storage
XML	Data Exchange
UltraDev	Web Development Tool
UNIX	Operating System
Sun Solaris	Web Servers
Sun Solaris	Application and Database Servers
T1/DS-3	Network Connectivity
Secure Socket Layer, Public Key Infrastructure, Encryption, and Certificates	Security and Confidentially

HTML

HTML is the standard markup language used for displaying content on the Internet. The current specification put forth by the World Wide Web Consortium (W3C – http://www.w3c.org/) is HTML, and the Water Boards will continue to develop HTML pages according to these standards.

Java

Java provides true cross-platform development capabilities, inasmuch as Java code can be developed and ported to almost any environment. Technologies such as Enterprise JavaBeans™, Java Servlets, and Java Server Pages (JSP) may be used to develop

robust, portable, scalable, mission-critical web applications. In order to use Java for server-side presentation and business logic, a Java Web/Application server such as iPlanet Enterprise Edition Web Server must be installed and properly configured. The Water Boards are currently using these Java technologies and plan to continue use of Java running on iPlanet's web server.

JavaScript

JavaScript can be used for both server-side and client-side processing. However, when using JavaScript, developers should test it with both Netscape and Internet Explorer browsers to ensure they do not use any unsupported objects and methods. JavaScript is being used at the Water Boards for client-side processing and validation.

eXtensible Markup Language (XML)

XML is a powerful subset of Standard Generalized Markup Language (SGML), which is the specification upon which HTML was built. XML allows developers to create their own document types and share their specifications with other users of that document type. However, few older browsers support XML without plug-ins and XML will not be used for pages that might be served to non-compatible browsers. The Water Boards will use XML for business-to-business (B2B) transactions, as appropriate, but will refrain from presenting XML to end-users.

Web Development Tools

Several Integrated Development Environments (IDEs) are currently available. IDEs are toolsets that integrate the programming language Application Programming Interface (API), the language compiler, and debugger into a user-friendly – usually graphical – application to aid application developers. These products provide streamlined interfaces to create Web applications, while aiding the developer with the integration of presentation and business logic in a heterogeneous environment. Web development tools can drastically decrease the time required to develop a web site. The Water Boards utilize Macromedia's UltraDev product for their web development environment. In selecting any future IDEs, the Water Boards will consider cost, the level of integration desired, the target web programming language, and whether any in-house skill sets can be leveraged.

Web Application Servers

Application servers typically house all web application operations between the browser and the backend applications and databases. Current and legacy applications interface with these servers using business rules to extend functionality. Data is collected and processed on the application servers, and then published through the web server. Application servers also include functionalities such as fail-over, load balancing, and fault-tolerance. The Water Boards are utilizing iPlanet's web server running on a Sun Solaris machine under UNIX, in addition to, Microsoft's Internet Information Server (IIS) running on a Windows 2000 server platform. These configurations provide a robust and highly scalable environment.

Database Server

Data-driven web sites require robust relational databases connected on the back-end. Manageability, scalability, performance, and reliability are all important factors in choosing a database platform. The ability of the database platform to integrate with standards, such as XML, is another important consideration when the scope and scale of Internet initiatives begin to include transactional capabilities. The Water Boards are utilizing, and will continue to use, Oracle's RDBMS to house data that is presented via a web interface.

Network Connectivity

The Water Boards currently have a shared DS-3 bandwidth connection to the Internet with other Cal/EPA boards, departments, and offices. This shared Internet access provides access by the Water Boards' staff as well as outside access to the Boards' web server(s) by stakeholders, regulated entities, and others. At the time of this writing, a State Water Board wide area network upgrade project is underway. In addition, there is a project underway to implement a new Opt-E-Man, 500 gigabit high-speed bandwidth increase that will be shared across the Cal/EPA boards, departments, and offices at the Cal/EPA headquarters.

Secure Socket Layer, Encryption, and Certificates

Secure Socket Layer (SSL) uses encryption and decryption to ensure that data is transmitted privately. It works on the public-and-private key encryption system using the Rivest-Shamir-Adelman (RSA) encryption algorithm. The web server contains a private and public key "signed" by a Certificate Authority. The public key is used to encrypt data, but it can only be decrypted using the private key. SSL uses two types of encryption: public key and symmetric key.

Public key encryption, used in Public Key Infrastructure (PKI) uses a key pair made up of a public and a private key. Data encrypted with one key in the pair can only be decrypted using the other key in the pair. A web server and web browser use public key encryption when first establishing communications with each other, during the SSL handshake when the web browser authenticates the web server. After the handshake is complete, the web server and web browser switch to the more efficient symmetric key encryption for the remainder of the transaction.

Symmetric key encryption uses a single key. The web browser and the web server create the key (called a "session key") during their initial interaction (the SSL handshake). The same key is used to both encrypt and decrypt the data. This encryption ensures that no one else can read the data being transmitted in either direction. A different session key is used for each server/browser connection, and the session key automatically expires after twenty-four hours.

SSL uses digitally signed certificates to authenticate the web server. A certificate contains information about the organization and the public key of the organization's public/private key pair. Because the certificate contains the public key, it binds a public/private key pair to the organization. The key pair is used for public key encryption during the SSL handshake.

A server certificate attests to the identity of a party that owns a web server. Trusted organizations, such as Verisign, which are called certificate authorities, issue server certificates. Once the identity of the party is validated, the certificate authority digitally signs the certificate and sends it to the requestor. A digital signature, which is stored with the certificate, is a mathematical way to ensure that the data being sent has not been changed in any way.

When the requesting party receives the certificate, it loads it to its web server. Then, whenever an SSL request is made, the web server sends the certificate to the web browser, which is able to read the information about the organization and its public key. The web browser then verifies the digital signature.

Another technology that incorporates encryption algorithms and PKI is Pretty Good Privacy, or PGP. This technology can be used to encrypt e-mail so that only individuals with access to the user's Public Key can decrypt the text of the message. PGP should be used for all confidential correspondences at the State Water Board.

Together, SSL, encryption algorithms, PGP, and PKI will create a secure web environment for web transmissions. The Water Boards will use SSL technology with certificates from Verisign for all transmissions involving confidential information.

11.10 Appendix J – Necessary IT Skills and Capabilities

The following table presents a list of skills and capabilities required to run a large IT organization efficiently and effectively. The table organizes skills into three broad categories:

- **Organization** – identifies the skills and capabilities required to create a management framework to improve accountability and ensure IT projects align with business processes and strategic objectives.
- **Process** – lists a wide range of business processes and practices that directly or indirectly support IT projects.
- **Technology** – identifies the skills and capabilities required to manage, develop, deploy, and support IT solutions.

Required Capabilities and Skills to Manage a Large IT Organization
Organization
Technology Leadership
Executive Leadership
State Water Board Business Knowledge
Cost and Budget Management
Strategic Planning
Project Management Office
Vendor Management
Process
Governance
IT Capital Planning
IT Project Review and Approval Process
Change Management
Project Management
System's Life Cycle Development Methodology
Risk Management
Performance Measures
Business Process Reengineering
Service Level Management
Security Management
Capacity Management
Outsourcing Guidelines
Support and Training
IT Operations
Technology
Application Development and Maintenance
e-Government Technologies

Required Capabilities and Skills to Manage a Large IT Organization
Centralized IT Management
Network Services Management
Enterprise Data Model
Enterprise Architecture
Technical Standards
Electronic Record Retention Standards
Help Desk
Capacity Testing
Centralized Data Management
Data Warehouse
Disaster Recovery
Geographical Information Systems (GIS)
Software Control and Distribution
Development Tools
Infrastructure Development
Implementation

DIT will continue to strive to increase staff expertise in all of these areas, based on the requirements of the business.

11.11   Appendix K – Current Environment Detail

This appendix documents the following:

- Technical Architecture
    - Data Communications Architecture
    - Hardware Architecture
    - Database Architectures
    - Software Application Architecture
- IT Standards, Methodologies, and Processes
    - Application Development Methodology and Standards
    - Database Development Standards and Procedures
    - Best Practices and Standards in Graphical User Interface
- Project Management Policy
- Enterprise Data Modeling
- Change Control Process
- Information Security
- Backup and Operational Recovery
- Asset Management Program
- Adherence to Software Management Policy
- Plans for Intra-agency Sharing of IT Projects and Resources
- e-Government Perspective
    - Existing e-Government Applications
    - Existing Internet Content for the State Water Board and the Regional Water Boards

11.11.1   Technical Architecture

11.11.1.1   Data Communications Architecture

The following figure illustrates the existing and planned wide area network (WAN) infrastructure that provides network access to the Water Boards' approximately 1,800 staff. The WAN provides T1 connectivity to all regional offices, including high-speed access (T3) to the Internet. Increased demand over time will stem from broader usage of enterprise systems, additional Internet traffic, and continued use of video teleconferencing and streaming audio services for Water Boards' meetings and hearings to the entire State Water Board. The State Water Board utilizes secure wireless technology in providing State Water Board staff and the public access to the Internet in the second floor hearing rooms of the Cal/EPA headquarters building. The State Water Board also has dedicated synchronous connections to CalStars and the Department of Technology Services.
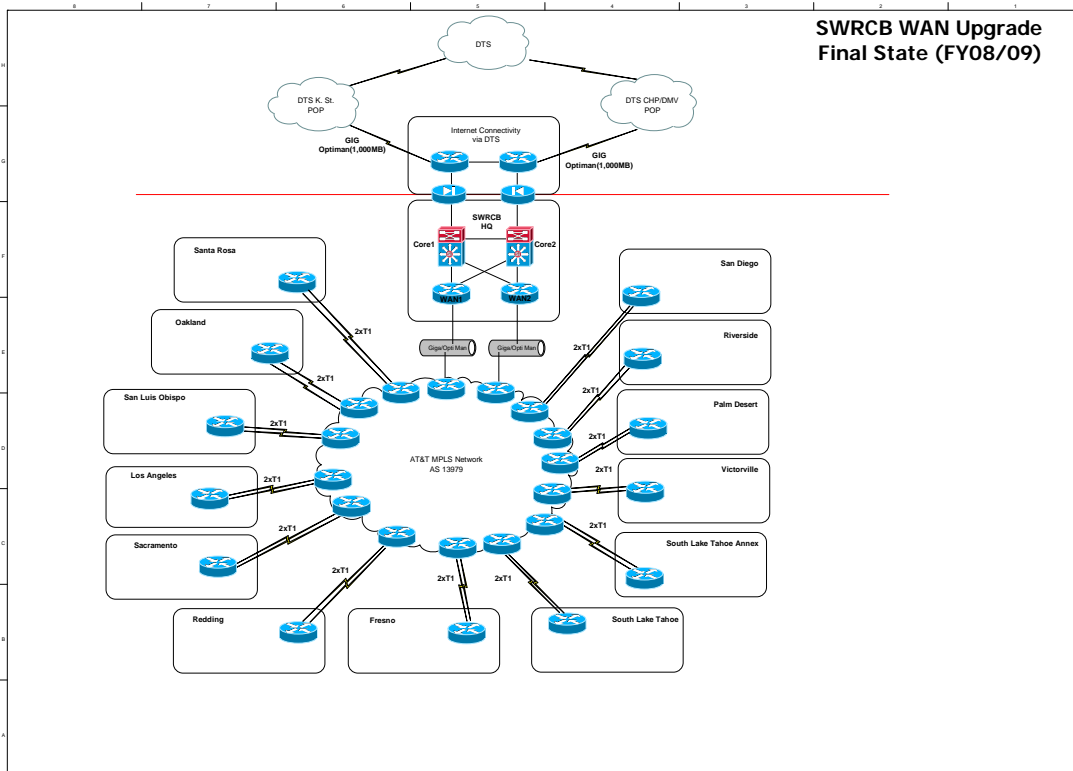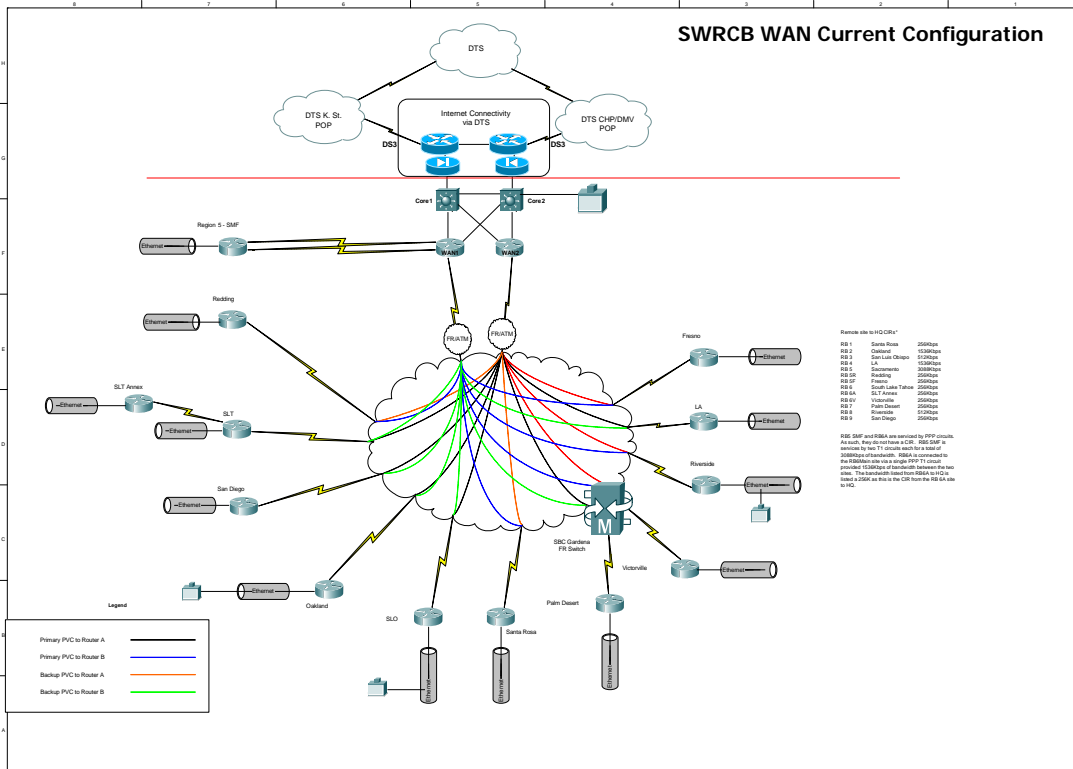
Figure 9. State Water Board WAN Current and Planned Configurations

The information provided below further describes the Water Boards' Data Communications Architecture:

- Bandwidth – Network bandwidth for the LANs is based on Ethernet 10 Mbps – 100 Mbps speeds. A shared T-3 circuit connects the State Water Board with the Department of Technology Services.

- Network Operating Systems – The Boards standardized file/print and email servers are supported by Novell NetWare 6.x. Microsoft 2000 servers host several application and web servers on the local area networks.

- PC Operating System - The Water Boards standardized PC operating system is Microsoft Windows XP.

- Network Management – Cisco's switch software provides network hardware management capabilities.

- Network Protocols – Network protocols supported include IPX, TCP/IP, and SNA. The Water Boards use of the IPX protocol has been phased out. The TCP/IP protocol supports Internet-specific communications. SNA protocol supports external communication with CalStars and other IBM mainframe resources.

- Internet – The Water Boards have access to the Internet and Intranet via the WAN connection. The Boards' Internet and Intranet policy and procedures are published on the State Water Board's Intranet site. Internet services utilized by Water Board staff include remote access to e-mail and network files, search capabilities, and remote access to water quality information.

- Wide Area Network (WAN) Security - A redundant Cisco/PIX firewall protects the WAN from unauthorized intrusion to State Water Board information resources. Security protocols protect the State and regional board telecommunications links and ensure the highest level of protection over the WAN/LAN. The firewall sits between the WAN and the Internet router. A Virtual Private Network (VPN) provides remote network access and teleworking services for authorized Water Board staff. The VPN provides security to the WAN through its own internal firewall. The following figure depicts the Firewall and VPN architecture:
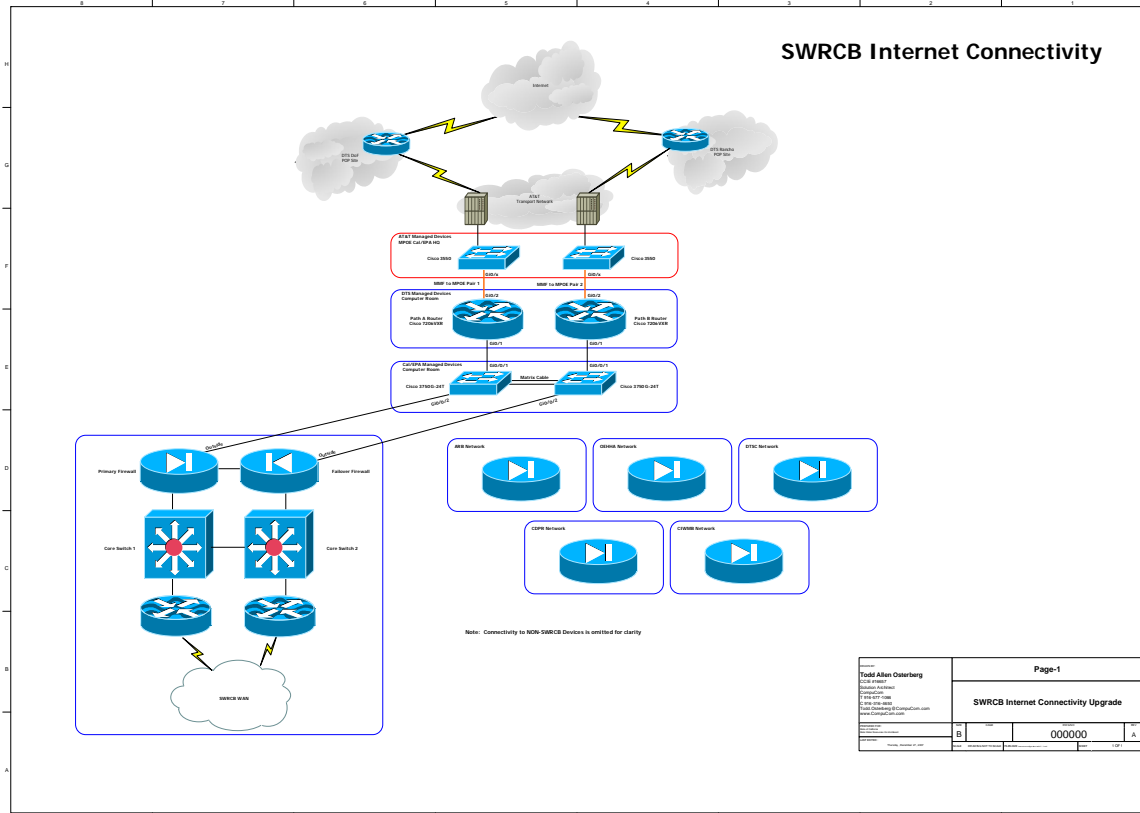
Figure 10. Firewall and VPN Architecture

Local Area Network Security

The Water Boards support the local area network (LAN) security architecture at the network operating system level in addition to software products such as Symantec Norton anti-virus protection. All LANs are internal networks that are setup as virtual networks inside the firewall and are protected from the outside world.

The Novell NetWare operating system requires valid user identification and passwords to access Water Board networks. Network user passwords are unique and updated on a regular basis.

The network operating system, Novell NetWare, security architecture supports the C2 security standard. It also has hierarchical security access architecture. User access control provides a wide range of system access privileges. The user configuration profiles provide staff access to the network through one of the following system access groups:

- Standard Network User Profile – Most network users use this user profile. It provides an encrypted user name and password, user access to home and shared directories, and access to GroupWise e-mail accounts.

- Administrator Network User Profile - LAN administrators use this profile for advanced access privileges to the operating system, data files, and software applications.

11.11.1.2   Hardware Architecture

The State Water Board has a uniform hardware architecture that includes the following hardware platforms:

- PC Workstations – The organization utilizes approximately 1,800 Intel-based PCs (Pentium and IV and above).

- Servers – The State Water Board WAN equipment consists primarily of servers running Novell 6.5. Migration to Novell 7.0 will be complete by June, 2008. In addition, the State Water Board uses Unix/Sun Solaris servers for Internet services and database/application servers. Windows 2000 Server running IIS support several Internet and Intranet web application services.

11.11.1.3   Database Architectures

The Water Boards developed the database architecture of the core applications using commercial off-the-shelf (COTS) database management systems and integrated it to support the Boards' core functions. The State and Regional Boards use the following database architectures:

Database Architecture Tools	
Product/Tool	**Use within Board**
Oracle 10g	State Water Board Enterprise RDBMS
MS Access	Prevalent throughout Water Boards
Informix	Limited to Administrative Systems (invoicing, budget and accounting applications)
Excel	Prevalent throughout Water Boards, used primarily by individuals

The Water Boards have both centralized and decentralized databases. Centralized databases primarily supporting core applications include: California Integrated Water Quality System (CIWQS), System for Water Information Management (SWIM), Geotracker, electronic-Water Rights Information Management System (eWRIMS), Budget Development Administration System (BDAS), Annual Fee Billing System (AFBS), and Annual Fee Remittance System (AFRS). Contract tracking, personnel vacancy classification, and mailing list are other centralized databases. Decentralized databases include: records management databases, such as Fortis Inflo, and numerous standalone databases developed for local and individual use.

11.11.1.4   Software Application Architecture

The core systems are designed as vertical applications, although there is recognition that operational efficiency can be gained by developing applications that support the Water Boards as a whole rather than individual programs or functions. Core applications are built primarily on Sun Solaris Servers. This is the Boards' enterprise architecture, and all applications they are developing will have this hardware platform. The Water Boards will build all enterprise application systems on this platform.

The Water Boards utilize PC-based office automation software. The major applications used include the following:

- Office Suite – Microsoft Office, including MS Word, MS Excel, and MS PowerPoint, is the enterprise-wide standard.

- Calendaring – The Water Boards have standardized on Novell GroupWise 6.5, which has calendaring and scheduling applications.

- Electronic Mail – The organization utilizes Novell GroupWise 6.5 for its e-mail system. Migration to Novell 7.0 will be complete by June, 2008.

- Blackberry – The Water Boards provide Blackberry support services.

Application Development Environment

Application development at the Water Boards is evolving toward a standardized set of tools and methodologies. The application development environment includes Oracle's Integrated Developer Suite, J-Developer, JSP, Oracle 8i database engine, and Oracle Internet application server. This software is run on SUN servers using the SUN Solaris operating system. There is, however, a range of other development environments that DIT still supports to maintain various applications.

Application development projects underway at the Regional Water Boards and within the State Water Board Divisions vary in development methodologies. Historically, program staff have undertaken applications developed at the local level with limited formal training in development methodologies, programming, and tools. The table below summarizes the Water Boards' Application Development environments.

Application Development Environments	
Product	**Use at Board**
Oracle's Integrated Developer Suite	To develop the Oracle-based applications
J-Developer	To develop various applications
Java Server Pages (JSP)	To develop various applications
J2EE	To develop various applications
Active Server Pages (ASP)	To develop various applications
Oracle 10g database engine	To develop Oracle-based applications
Oracle Internet application server	To develop various applications
Oracle Developer Server	To develop the Oracle-based applications
Oracle Designer	To store data models
Internet Explorer 5.x	Web Browser used for the user interface
MS Access (VB)	To develop Single User, multi-user applications
Informix 4 GL	To maintain State Water Board Administrative Applications

Business Applications Architecture

The current information technology environment includes enterprise applications, multi-user applications, and single-user applications. DIT centrally manages some of these applications, while the Regional Boards or State Board Divisions locally manage others.

Business Support

Over time, the Water Boards have developed a large number of enterprise, multi-user, and single-user applications. These applications were developed independently and do not adhere to any consistent development standards. As a result, the applications are unable to share system resources or data. Many applications are essentially independent, isolated information silos. They often store redundant or conflicting data and prevent staff from sharing important information and resources. This host of applications running independently and without coordination creates inefficiencies that significantly impede the achievement of the organization's mission and goals.

The Water Boards are taking steps to retire many of these applications and incorporate their functionality into a planned enterprise system. The deployment of this system will eliminate many of the problems created by these independent applications.

11.11.2 IT Standards, Methodologies, and Processes

This section documents the Water Boards' existing IT standards, methodologies, and processes. The following sections discuss:

- Application Development Methodology and Standards
- Database Development Standards and Procedures
- Best Practices and Standards in Graphical User Interface

11.11.2.1 Application Development Methodology and Standards

DIT is developing applications using Oracle's CASE*Method, a structured approach to carrying out the total task of developing systems to meet business needs. This method is the result of many years of experience delivering systems and building software products. The primary thrust of this methodology is for a top-down approach, which reflects the strongly held belief that any new or revised system must start off within the scope of what the users perceive as their future needs. The DIT maintains documentation on this development methodology.

Even though DIT follows Oracle's CASE*Method and strongly promotes the use of standards, these development guidelines are not universally followed throughout the Water Boards. This is due in part to the lack of formalized application development occurring at some local levels as well as the use of tools other than Oracle to meet local business needs. If the Water Boards do not take a structured, systematic approach, the organization risks the development of software applications that are not integrated, contain duplicate data, and redundant functionality. As the degree of centralization vs. decentralization is determined over time within the new Governance structure, the Water Boards will need to establish and enforce appropriate standard guidelines and approaches.

11.11.2.2   Database Development Standards and Procedures

DIT has adopted a set of Database Development Standards and Procedures for use across the entire organization. The following statements summarize these guidelines and procedures:

- DIT has adopted and is following Oracle's standard for an enterprise applications development environment and is pursuing a browser-based, thin client, three-tiered system architecture standard. DIT programmers are gaining expertise in and using Oracle Application Server, Designer, Developer, and WebDB. The Water Boards use Oracle tools for all development of large workgroup or enterprise-scale database applications.

- Water Boards programs have adopted an Open Database Connectivity (ODBC) compliant database as their standard for the development of standalone or small workgroup database applications. MS Access 2000 is the de facto standard for developing small standalone or small workgroup database applications.

- All Water Boards programmers will use a systematic approach to applications design and programming, including annotation of code and comprehensive system documentation.

In addition to these standards and procedures, DIT also maintains documentation on database design guidelines, which define the rules for database normalization and make recommendations for naming database objects. This enforces consistency at the database level across the organization. A copy of this documentation is available from DIT.

11.11.2.3   Best Practices and Standards in Graphical User Interface

The DIT has developed and adopted best practices and standards for graphical user interface design. Recognizing that these standards and guidelines create consistency for users and result in faster learning, greater efficiency, fewer errors, and increased satisfaction, DIT is committed to following these standards for all enterprise-wide applications. Since adherence to standards results in improved application usability, the DIT encourages developers of Regional Water Board and Division level and individual user applications to adhere to the standards as well. The DIT Graphical User Interface (GUI) standards and guidelines address the following topics:

- General Standards;
- Window, Pane, and Frame Standards;
- Basic Control Standards;
- Button Standards;
- Web Interface Do's and Don'ts; and
- State Water Board Thin Client GUI Standards.

11.11.3 Project Management Policy

One of DIT's roles is to build quality information systems that meet users' requirements. The Project Management Institute (PMI) has developed what DIT believes is a solid framework for managing IT projects that will ensure their success. DIT has therefore adopted the PMI Project Management Body of Knowledge (PMBOK) as a guide for project management and requires all DIT project managers (and strongly encourages the Regional Boards and Divisions) to adhere to the standards specified in that framework. The PMBOK outlines the expectations and standards by which project management functions will be conducted.

DIT project managers will utilize the project plan as the vehicle to consolidate all of the eight PMBOK areas into one governing project document. The following items outline the composition of a typical project plan:

- Scope Management
- Time Management
- Cost Management
- Quality Management
- Human Resource Management
- Communication Management
- Risk Management
- Procurement Management

11.11.4 Change Control Process

In recognition of the importance of managing the scope, cost, and schedule of IT projects, DIT has adopted a formal change control process and strongly encourages the Regional Boards and Divisions to follow similar processes for the IT and application development projects they oversee. DIT uses this Application Development Change Control process to manage changes for medium to large information technology projects. The change control process involves investigation, documentation, review, and approval/deferral/rejection of a change request. The Water Boards will use this process to manage the project changes in future system implementation efforts. The Change Control Process is the following:

1. When a change to project scope is identified, a formal scope change request is made. A change control database is utilized as the repository for recording and tracking change control items. The database records the description of the change, the results of the impact evaluation, and the current status of the change. The change is managed through its life cycle, and change control records are archived.

2. Upon receipt of a change request, the project manager works with the application development team to determine whether the change is truly a change in scope, as well as to assess its impact on the project schedule. The project manager may request a meeting with client management to discuss the impact of a proposed change on the project schedule and resource requirements, and to

consider any other information relevant to making a decision about the change request.

Many factors may contribute to the need for valid changes in scope. These include events such as legislative mandates, errors, or omissions in the defined scope of the project, value-added changes, or changes in business processes. If the change will affect the overall timeline or cost of the project, it is necessary to elevate the request to the MCC for approval.

11.11.5 Information Security

Information security is an increasingly important aspect of the information technology environment. The sections below list the different types and levels of information security at the State Water Board.

- **Physical Security** – All network and enterprise application hardware and software is secured within a locked server room. Access to the server room is monitored and limited to authorized DIT and departmental personnel. Network and application servers are inside locked server cabinets. Only personnel authorized to administer the servers have a key to the appropriate server cabinet. DIT supervisors maintain a master key to all server cabinets.

- **Application Level Security** – The State Water Board strictly controls administrative rights to the WAN, LANs, and applications with administrative passwords, known only to authorized personnel within DIT and the departments. DIT manages administrative passwords and changes them on a periodic basis. At the user level, the software application controls read, update, and delete capabilities via a user logon.

- **Encryption** – DIT encrypts some secure data to safeguard its confidentiality.

- **Authorization** – Only the database administrator or authorized designee may alter the system security tables.

- **Firewall** – A Cisco/PIX firewall protects the database assets from unauthorized access. State Water Board staff has access to system resources through the WAN, inside the firewall.

- **Audits** – The State Water Board conducts ongoing security audits of the Windows-based LANs.

11.11.6 Backup and Operational Recovery

DIT regularly performs back-up and recovery processes on the core databases. Back-up practices include disk mirroring, incremental and full back-ups, and off-site as well as on-site magnetic media storage. The decentralized data back-up and recovery processes vary depending on the data processing procedures of the local organizations and the criticality of the data.

The State Water Board is in the process of updating its Operational Recovery Plan (ORP) for submission to DOF in 2008. Following is a list of business critical applications the State Water Board's OPR will address.

- **Annual Fee Remittance System (AFRS)** – This system is used by the State Water Board to remit discharger payments under the annual WDR Fee Program, Storm Water Program, and the Bay Protection Toxic Cleanup Program. State Water Board staff downloads information from SWIM to a Sun workstation for analyses, forecasts, and fund appropriation, enters invoices from AFBS into the AFRS, and posts remittances against payments.

- **Budget Development Administration System (BDAS)** – The State Water Board uses this system to manage and track the Boards' funds and federal indirect cost rate allocations. The system also tracks allotments and expenditures by fund sources, tasks, and organization units. This system contains fiscal and budget information for the Boards.

- **California Integrated Water Quality System (CIWQS)** – The Water Boards' data system that is used to manage several of its main regulatory programs, provide public information about those programs, and allow dischargers to submit Self Monitoring Report to meeting permit requirements.

- **Contract Management** – This is a single-user database application to track the status of contracts between the State Water Board and third party vendors.

- **Department of Defense (DoD)** – This MS Access database application tracks Water Boards' daily Department of Defense logs and milestones and generates quarterly briefing reports.

- **Geographic Environmental Information Management System (GEIMS)/Geotracker** – GEIMS is a data warehouse that tracks regulatory data about underground fuel tanks, fuel pipelines, and public drinking water supplies. Geotracker is a geographic information system (GIS) application that provides online access to environmental data. Geotracker is the interface to the GEIMS data warehouse.

- **Geo-referenced Water Body System Database** – This database is a catalogue of the state's major water bodies and contains information about water body size, specific pollutants, sources of pollutants, and affected uses. It identifies the general condition of the uses supported by each water body. Regional Water Boards provide the information in this database.

- **LUSTIS** – The Leaking Underground Storage Tank Information System (LUSTIS) is a database management program used by the Water Boards to track and record leaking underground storage tank (LUST) sites. LUSTIS will be retired and its functionality migrated to GEIMS in the future (the migration has been put on hold until GEIMS can accept electronically reported data).

- **Personnel Management** – This is a single-user application to track information on State Water Board personnel. It tracks job classifications, dates of hire, and position vacancies within the various Board departments.

- **Spills, Leaks, Investigation, and Clean Up (SLIC) System** – This system is used by the State Water Board and others to track, analyze, and assess discharger cleanup.

- **Storm Water Database** – This MS Access database application processes and tracks Storm Water Notice of Intent (NOI) and Notice of Termination (NOT) information.

- **System for Water Information Management (SWIM) project** – SWIM replaced the Waste Discharger System (WDS). SWIM added compliance and enforcement functionality and management reporting capabilities.

- **Underground Storage Tank Cleanup Fund (USTCF)** – This MS FoxPro database application tracks claims to the Underground Storage Tank Cleanup Fund.

- **e-Water Rights Information Management System (eWRIMS)** – eWRIMS is the principal application used by the DWR to issue, manage, and protect vested water rights. This system utilizes a relational database and a geographic information system program to administer water right programs and ensure effective management of water resources. The relational database and GIS system are linked in real time.

In compliance with Department of Finance requirements, DIT is currently updating its comprehensive ORP for submission to DOF in 2008.

11.11.7 Asset Management Program

Each Regional Water Board and Division within the State Water Board has its own Asset Management Program or inventory system. These systems track PC, other hardware, and software licenses. These systems are a mix of commercial-off-the-shelf (COTS) products and custom solutions.

DIT maintains the PC Inventory System (PCIS) that tracks information about the IT procurements that DIT reviews and approves. DIT uses the system to record Workgroup Computing Justification (WCJ) forms and Feasibility Study Reports (FSR) as they are associated with IT procurements. Because DIT does not review and does not receive information on all IT procurements and the disposition of IT equipment, it cannot use PCIS as an IT inventory system for the Regional Boards. In the current environment, each organization is responsible for maintaining its own hardware and software inventory system.

11.11.8 Adherence to Software Management Policy

DIT has embarked on an ambitious program to comply with the California Software Management Policy (SMP) by initiating an 18-step process. DIT has already completed

its SMP Policy and Procedures document and has developed a project plan for full implementation of the Software Management Policy. Each organization has assigned staff roles and responsibilities for software management and each organization has developed a Software Support List. The most recent Software Management Policy and Inventory was submitted to the control board on January 31, 2006. Certification of the Software Management Policy compliance is done annually on January 31. The next complete package will be submitted on January 31, 2009.

11.11.9 Plans for Intra-agency sharing of IT projects and resources

The following sections discuss the Water Boards' initiatives to expand Intra-agency sharing of IT projects and resources.

State Water Board/AT&T Agreement and the WAN Upgrade Project

DIT has entered into a telecom agreement with AT&T to provide WAN lines shared between the State Water Board and the nine Regional Water Boards. The Department of Technology Services provides additional data lines that service the DWR and CalStars.

The Wide Area Network (WAN) upgrade project was identified as a priority enterprise technology project as a result of the Regional Boards' request for implementing the following new network services:

1. Wireless Capability
2. Video Conferencing (VTC)
3. Web Casting
4. eTimesheets
5. Electronic Content Management (ECM)

The WAN upgrade project is comprised of two distinct phases.

Phase 1

The first phase will be implemented and partially completed prior to implementing any of the five network services listed above. Phase 1 includes the following three tasks:

1. Upgrade the routers and switches in the Regional Boards to take advantage of the new technology and provide easier management of the new network services.

   a. DIT staff will be visiting each Regional Board office starting in January 2008. Each regional office will have some or all of their network equipment replaced. Each region is expected to have their equipment upgraded no later than June 30, 2008.

2. Upgrade the existing high-speed broadband data circuit in Sacramento to provide faster bandwidth transmission to support the expected increase in network traffic once the new network services are implemented.

   a. AT&T has scheduled installation of the new high speed broadband data circuit for the headquarters on May 1, 2008. DIT will continue to collaborate with AT&T to ensure the timeliness of this installation task.

3. Upgrade the existing network data circuits to the Regional Boards' offices to provide faster bandwidth transmission speed.

   a. Beginning in late March 2008 or early April 2008, AT&T will begin installing the new Regional Boards' high speed data circuits. The schedule allows for installing approximately one Regional Board office every two weeks until all of the Regional Boards offices have been upgraded by early November 2008. Two of the Regional Board offices will have their data circuits upgraded just prior to the Headquarters data circuit upgrade. This approach will allow DIT to thoroughly test the new network circuit architecture to ensure high-speed transmission and availability of network services.

Phase 2

Phase 2 involves implementing the five network services listed above.

Phase 2 will commence once the Headquarters data circuit has been installed and tested, and the first few Regional Board offices have their data circuits installed and tested. The planned date is May 15, 2008. Phase 2 is expected to be implemented in parallel with Phase 1 and as new data circuits are installed and the offices are successfully integrated into the new network architecture.

Shared Training Facilities

The State Water Board shares computer-training facilities in the Cal/EPA building with other building tenants.

Server Consolidation Strategy

Beginning in 2005, the State Water Board conducted an enterprise-wide application consolidation project. The effort consolidated the functionality of several existing applications into a single, unified application. The unified application allowed the State Water Board to eliminate or consolidate a number of the UNIX servers that hosted the previously independent applications. The project has been completed.

11.11.10   e-Government Perspective

The use of the Internet and Intranets in recent years has made electronic commerce and communication faster, cheaper, and more attainable, particularly for business enterprises. The Internet is becoming the primary network used for communication with the public and the Water Boards' partners and stakeholders. Internet technologies enable end-user control of information by empowering individuals and workgroups to access data when and where they need it rather than depending on intermediaries. Recently, web technologies have emerged as a credible alternative to traditional client-server approaches; they are more cost effective and offer universal access. The technology can deliver information to a heterogeneous, distributed stakeholder base without the cost and complexity of client-side software development, installation, and management. Further, Internet-based enterprise computing allows enterprise information technology to bring together disparate systems into a single, manageable environment, namely the browser interface, which facilitates business processing.

Today's Internet solutions are effective for disseminating static information, processing transactions, or accessing databases.

In general, enterprise applications demand five key requirements: Transactional Integrity, Scalable Performance, Robustness, Interoperability, and Security. The Internet-based computing model satisfies all of these requirements. The Water Boards have recognized this evolution to web-based computing and have implemented four e-Government applications. The State Water Board Internet presence is running on a SUN Web Server that includes iPlanet as the web server.

11.11.10.1   Existing e-Government Applications

The Water Boards have established an Internet and Intranet presence for disseminating information both externally and internally. The site serves as a primary medium for disseminating information to the public about the Water Boards' activities. In addition, it provides the public with the ability to contact staff for further information. The site has recently undergone a significant redesign to comply with the State of California's new web portal standards. A UNIX server with a Sun/Solaris 8.0 operating system and iPlanet Internet server host the site. The Water Boards have already deployed four Internet applications for use by its stakeholders, as follows:

eWRIMS – eWRIMS, a module of the State Water Board's enterprise data system, CIWQS, that tracks and supports water rights core business functions (including fees and filings).

CIWQS – the Water Boards' data system that provides public information about Water Quality regulatory programs through tabular reports, and allow dischargers to submit Self Monitoring Reports to meeting permit requirements, report spills online, and submit storm water annual reports electronically.

Water Quality Annual Reports - Responsible parties are required to submit electronically, the sampling results of monitoring well and soil analyses at UST sites. These parties electronically submit data to one or more regulatory agencies (Certified Unified Program Agency [CUPA] or Regional Water Boards) and the data goes in a statewide WRIMS database. Approximately 30,000 - 50,000 reports are involved, no fees.

11.11.10.2   Existing Internet Content for the State Water Board and the Regional Water Boards

The following tables summarize the information found within the Water Boards' websites at the time of the writing. The Water Board's website is under redesign per order of the Governor's Chief Information Officer. This is not intended to be a comprehensive listing of all content and features of the website, but rather a summary of website content. The tables below list the high level links available on the website pages and briefly summarize the subject matter within those links.

The State Water Board Internet Content

www.waterboards.ca.gov	
Link	Content
Home	The State Water Board Home Page consists of the main

www.waterboards.ca.gov	
Link	**Content**
	navigation page for current Water News Information. Other website links consist of: an Alphabetical Index, About the Board, Board Members, Business Help, Cal/EPA Link, Contact Us, Employee List, Employment, E-mail Subscription, Operator Certification, Other Links, Water Words.
Board Business	- Posting of State Water Board agendas for upcoming meetings and minutes of past meetings and workshops. - Live broadcasts of State Water Board meetings. - Biographical information of the current State Water Board Members. - Search engine for finding Enforcement Orders within the System for Water Information Management (SWIM) system. - Listing and links to legislative reports presented by the State Water Board. - Minutes for previous meetings and workshops sponsored by the State Water Board. - Links to Plans and Policies authored by the State Water Board DFA. - Listing of Orders, Decisions, and Resolutions of the State Water Board from 1994 to the present.
Laws/Regulations	Documents that describe laws and regulations that pertain to the jurisdiction of the State Water Board.
Press Room	Current news, press releases, and publications of the State Water Board. There is also a link to subscribe to the Press Releases.
Regional Boards	Links to the Regional Water Boards (see below).
Water Quality	- Links to the Proposition 13 legislative text and other departmental links. - Documents and details of the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary Program. News and notices for Bay Delta hearings. - Program description, mandates, program plans, and reports for the Bay Protection and Toxic Cleanup Program. - Information for proper discharge of sewage sludge as a soil amendment. - Monthly beach data from coastal counties throughout the state listing beach warnings, closures and rain advisories resulting from bacterial contamination as mandated per assembly Bill 1946. - Description and links to the Division of Financial Assistance and descriptions of each program. - Brief description of the CalCert program and links to certifying agencies. - Information regarding Aquatic Pesticide General Permit and Updated Statewide National Pollutant Discharge Environmental System, Utility Vault Permits. - Links to the various funding programs available through the State Water Board and other agencies. - Guidance and Policy documents related to the redevelopment of "Brownfields".

www.waterboards.ca.gov	
Link	Content
	▪ Impaired Water Bodies List; agendas, meeting announcements, for the Assembly Bill 982 Public Advisory Group; Databases and Publications of the state Mussel Watch Program and Toxic Substance Monitoring Program. ▪ Link to the Nonpoint Source Program (NPS) (see below) ▪ Link to the Office of Operator Certification (see below) ▪ Plans and policies of the State Water Board. ▪ State Water Board resolution defining Pollution Prevention Plan formats. ▪ Links to Financial Assistance. ▪ Forms and documents pertaining to Storm Water Pollution ▪ Background, Current Status, Amendments, Public Notices, and documents for the Total Maximum Daily Load Program. ▪ DWQ, Land Disposal Program, general program and technical information, available documents, and links to other agencies. ▪ Description of the Water Recycling Program for California ▪ Information and maps of California Watersheds.
Water Rights	▪ Link to the Water Rights Home Page (see below).
Water Education	▪ Link to Public Outreach Web pages.

Water Rights Internet Content

www.waterrights.ca.gov	
Link	Content
Water Rights Information (Information, Forms, and GIS Maps)	▪ Water Rights Business Information Contacts ▪ Water Rights Decisions, Orders, and Resolutions ▪ Water Right Determinations ▪ Water Right Permits and Licenses ▪ General Information Relating to Water Rights in California ▪ The Water Rights Process California Water Law and Policy ▪ Frequently Asked Questions about Water Rights ▪ Water Rights Information Management Systems (eWRIMS) ▪ Water Rights Information using GIS maps ▪ Water Rights forms ▪ California Water Code ▪ Administrative Procedures Act ▪ California Code of Regulations ▪ Fully Appropriated Streams List ▪ Location Map for State Water Board Division of Water Rights ▪ Division Organization Chart

www.waterrights.ca.gov	
Link	**Content**
Water Rights Public Notices	- Application Notices - Petition Notices - Transfers and Temporary Urgency Actions Notices - Hearing Notices - Bay Delta Program Notices - Small Domestic Use Registration Informational List - California Colorado River Water Use Plan Workshop
San Francisco Bay/ Sacramento-San Joaquin Delta Estuary (Bay-Delta Program)	- Water Rights Decision Implementing Bay Delta Objectives - Water Rights Order 2001-05 - Bay Delta Hearing News - Bay Delta Water Rights Hearing Service List - Parties to Appear at Bay Delta Hearings - Exhibit Lists of Parties to the Hearing - Notices - Subscribe to Electronic Mail List - Water Rights Environmental Impact Reports - Environmental Impact Reports - Comments 1995 Bay Delta Water Quality Control Plan - Related Links - Disclaimer
Application and Petition Programs	- Applications Noticed - Petitions Noticed - Temporary Urgency Actions - Water Rights Application forms and instructions
Water Transfers Program	- State Water Board Guide to Water Transfers - Petition for Temporary Transfer form - Petition for Long Term Transfer form - California Water Market Information
Hearings Program	- Unit Staff - Hearing and Workshop Notices - Current Hearing Projects - Special Projects - Archives - Useful Information
Public Meeting to Improve Water Right Process and Procedures	- Notices for Water Rights Process Improvement meetings - Analysis of the Water Rights Process and Procedures meetings for Licensing, Complaints, Compliance, and Enforcement, Hearings, and Applications and Petitions
Disclaimer	State Water Board website official use disclaimer
Customer Service Survey	On-line customer service survey

Nonpoint Source Internet Content

www.waterboards.ca.gov/nps/index.html	
Link	**Content**
Federal NPS Programs	Contact information for the USEPA Nonpoint Source Program

www.waterboards.ca.gov/nps/index.html	
Link	Content
Coastal Commission	▪ Link to the California Coastal Commission
NPS Staff	▪ Staff listing for the Nonpoint Source Pollution Control Program
Watershed	▪ Watershed Management Initiative Overview ▪ Final California Unified Watershed Assessment (FCUWA) ▪ Index Map of California Watershed Boundaries and Reference Numbers ▪ Final Maps of California Watersheds ▪ California Watershed Information ▪ Russian River Watershed Information
Information on the California Nonpoint Source Conference held October 23-25, 2001	▪ Summary of the state's first conference on Nonpoint Source Programs held on October 23-25 at the Holiday Inn of downtown Sacramento.
Opportunity, Responsibility, and Accountability	▪ Relates successful grass roots actions being taken statewide to reduce polluted runoff
Protecting California's Water Resources By Managing Polluted Runoff	▪ Information on California's NPS Pollution Control Program ▪ NPS Program Plan Biennial Report ▪ First Addendum to Five-Year Implementation Plan (1998-2003) for the State Water Board, Regional Water Boards, and CCC - November 2000 ▪ Interagency Coordinating Committee (IACC) ▪ NPS Pollution Related Reports Required Pursuant to CWC 13369(b) ▪ Draft NPS Compliance Assistance Guidance (CAG) Required Pursuant to CWC 13369(b) ▪ Volume I: Nonpoint Source Program Strategy and Implementation Plan ▪ Volume II: California Management Measures for Polluted Runoff (January 2000) ▪ Quick Reference Document ▪ Overview of California's Program ▪ Current NPS Projects
1995-2005 Clean Water Act 319(h) Projects	▪ Open 319(h) Projects List by regional area ▪ 319(h) Project Schedule ▪ 319(h) Project Contract Forms and Summaries
Funding, Grants & Loans Funding May be Available for Your Project	▪ Overview of Funding Sources ▪ Proposition 13 General Information ▪ 2003 Federal Clean Water Act Request for Proposals ▪ Current Clean Water Act 319(h) Projects ▪ 319(h)/Proposition 13 Contract Preparation/Management Guide

www.waterboards.ca.gov/nps/index.html	
Link	Content
NPS Technical Advisory Committee (TAC) Reports	▪ Committee reports for the following Technical Advisory Committees: Abandoned Mines, California Pesticide Management Plan for Water Quality, California Rangeland Water Quality Management Plan, Coastal Nonpoint Pollution Submittal, Confined Animal Facilities, Evaluation of the Coastal Zone Management Act, Hydromodification, Wetlands, and Riparian Areas, Initiatives in Nonpoint Source Management, Irrigated Agriculture, Marina and Recreational Boating, Nonpoint Source Management Plan, Onsite Sewage Disposal Systems, Pesticide Management, Plant Nutrient Management, Polluted Runoff Watershed Solutions, and Urban Runoff
Citizen Monitoring	▪ Community based watershed
How You Can Help Reduce Water Pollution	▪ General information for limiting and reducing water pollution in home, workplace, and community
NPS Guidance in Your Area of Interest	▪ Agriculture, Forestry, Urban, Marinas, Hydromodification, and Wetlands
Links to Maps and Geographic Information System (GIS) Layers	▪ Links to different sources for GIS data layers

Office of Operator Certification (OOC) Internet Content

www.waterboards.ca.gov/dwqhome/opcert/	
Link	Content
Certification	▪ Requirements, Application, Application Instructions, Operator in Training Information, Reciprocity, and Renewal Application for Operator Certification
Examination	▪ Requirements, Application, Application Instructions, Examination Schedule, and Sample Questions for Certification Examination
Contract Operator	▪ Application, Application Instructions, and Current Listing for Contract Opportunities
WWTPs	▪ Class Requirements, Plant Classification Form, and site listing for California Waste Water Treatment Plants
FAQ	▪ List of 10 frequently asked questions with links to answers
Links	▪ Links to other related websites
Enforcement	▪ Description of enforcement and links to documents describing the complaint and discipline process
Advisory Committee	▪ Description of the Waste Water Advisory Committee and listing of its members

Regional Board Websites Internet Content

Each Regional Board website contains similar content. The table below lists the types of content found within all of the Regional Board websites.

Regional Boards - Internet Content	
Link	Content
Home	▪ News from the Region ▪ Links to Cal/EPA, Proposition 13, Contact Information, Business Help, and E-mail Subscriptions
Public Notices	▪ Board meeting schedules and agendas, public notices, enforcement orders, clean-up decisions, notice of consideration, and workshop announcements
News	▪ Regional Board press releases and notices
Board Meetings	▪ Meeting dates, locations and Board agendas
Board Information	▪ Biographical information for current Board Members
Adopted Orders	▪ Listing of orders adopted for Enforcement Actions, Permits, and Waste Discharge ▪ Monitoring Programs listed by county
Monthly Board Report	▪ Executive Officer's report for the month detailing current events and actions within the Region
Programs	▪ Detailed information about the Region's programs
Available Documents	▪ Links to online Regional documents
Regional Map	▪ Maps of the Region and watershed
Organizational Chart	▪ Organizational Chart for the Region
Phone List	▪ Contact information for all staff
Location	▪ Map and driving directions to the Region Headquarters
Employment	▪ Employment opportunities within the Region
Links	▪ Links to State Water Board, Regional Water Boards, and water related agencies
Water Education	▪ Link to NPS Program
Downloads	▪ Documents available for download
Search	▪ Search engine for Regional information

11.12 Appendix L – Acronyms and Definitions

AFBS   Annual Fee Billing System

AFRS   Annual Fee Remittance System

AMM   Ambient Monitoring Module

ArcSDE   Software developed by ESRI that enables the loading of spatial data into, and the serving of that data from, enterprise caliber relational databases like Oracle

ArcView   Desktop mapping and GIS software developed by the ESRI Corporation

ASCII   American Standard Code for Information Interchange provides information exchange codes for use between computers manufactured by different companies

ASP   Active Server Pages

ATM   Asynchronous Transfer Mode is a network that merges local and wide-area networks and services into a single network and integrates all traffic types – voice, data, and video

BDAS   Budget Development and Administration System

BPR   Business Process Review/Reengineering

Cal/EPA   California Environmental Protection Agency

CalStars   State of California Accounts Management System

CBI   Clean Beaches Initiative

CBR   CWA Benefits Reporting System

CEDEN   California Environmental Data Exchange Network

CIO   Chief Information Officer

CIR   Committed Information Rates

CIWQS   California Integrated Water Quality System

COTS   Commercial off-the-shelf is a software package to which the user is not able to make any custom coding changes. A COTS package is the opposite of custom built software

CPU	A Central Processing Unit is a computer's "brain"
CREEC	California Regional Environmental Education Coordinator
CUPA	Certified Unified Program Agency, a local agency (e.g., county, city) that is certified to design and implement a unified program
CWA	Clean Water Act
DFA	Division of Financial Assistance, a division of the State Water Resources Control Board
DAS	Division of Administrative Services, a division of the State Water Resources Control Board
Data Warehouse	A database used only for querying; it downloads data from the production database at regular intervals. It may also be a point of integration for data from multiple databases. Typically, developers structure warehouse data to facilitate query and analysis.
DBMS	Database management system
DFG	Department of Fish and Game
Disk Mirroring	A hard disk fault tolerance method where drives are duplicated. In case of a drive failure, the duplicate drive takes over, transparently to the user. Similar to disk duplexing that utilizes two controllers; mirroring utilizes one.
DMR	Discharge Monitoring Report
DOD	Department of Defense
DOF	Department of Finance
DWQ	Division of Water Quality, a division of the State Water Resources Control Board
DWR	Division of Water Rights, a division of the State Water Resources Control Board
e-Government	The provision of enhanced access to government information, delivery of government services, and participation in the democratic process through secure, electronic technology designed to protect privacy
eSMR	Electronic Self-Monitoring Reporting
ECM	Electronic Content Management

Encryption	Any procedure used in cryptography to convert plain text into cipher text in order to prevent any but the intended recipient from reading that data
EPIC	Environmental Protection Indicators for California is a collaborative effort to identify outcome-based indicators to monitor effectiveness of environmental protection programs
ESMR	Electronic Self-Monitoring Report
ESRI	Environmental Systems Research Institute, a company based in Redlands, California that focuses on the development of Geographical Information System software
FCUWA	Final California Unified Watershed Assessment
FSR	Feasibility Study Report
GAMA	Groundwater Ambient Monitoring and Assessment
GEIMS Geotracker	Geographic Environmental Information Management System
GIS	Geographic Information System, a computer system designed to allow users to collect, manage, and analyze large volumes of spatially referenced and associated attribute data. The major components of a GIS are: a user interface, system/data base management capability, skilled staff, database creation/ data-entry capacity, spatial data manipulation and analysis package, and display generation function.
GPS	Global Positioning System
GRTS	Grants Reporting and Tracking System
GUI	Graphical User Interface
IMS	Information Management Strategy drafted in accordance with the State Administrative Manual, Section 4900.2, which requires an "ongoing strategic planning process for information technology" for every state agency
IP	Internet Protocol
IT	Information Technology
ITSC	Information Technology Steering Committee, an information technology group for the State and Regional Water Boards
JAD	Joint Application Design

LAN	Local Area Network is networked computers within a small facility or area (e.g., office or building)
LUST	Leaking Underground Storage Tank
LUSTIS	Leaking Underground Storage Tank Information System
MCC	Management Coordinating Committee – State Board Managers and Regional Board Executive Officers
MTBE	Methyl Tertiary-Butyl Ether
NDD	National Diversity Database
Network Operating System	An operating system language that allows computers to communicate across a network
NIMS	National Information Management System
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent to terminate a regulated entities' Waste Discharge Requirement permit
NOT	Notice of Termination of a regulated entities' Waste Discharge Requirement permit
NPDES	National Pollution Discharge Elimination System
NRPI	National Resource Project Inventory
NT	Microsoft Windows "New Technology" network operating system
ODBC	Open Database Connectivity
OEHHA	Office of Environmental Health Hazard Assessment
DIT	Division of Information Technology, an Executive Office of the State Water Resources Control Board
OOC	Office of Operator Certification
ORP	Operational Recovery Plan, a document developed to ensure the recoverability of critical IT applications, and to effectively protect the state's IT resources from unacceptable risk of interruption

OS	Operating System or software designed to control the hardware of a specific data-processing system in order to allow users and application programs to easily employ it
PCIS	PC Inventory System
PDA	Personal Digital Assistant (Palm Pilot is one example) – electronic data capture devices, requiring no connectivity, that may be used in the field for activities such as inspection
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
PMO	Project Management Office
Proxy Server	Software designed to provide extensible firewall and network security
RAM	Random Access Memory
RAP	Remediation Action Plans
RCRA	Resource Conservation and Recovery Act
RDBMS	Relational Database Management System
Regulated Business	A person, business, facility, tank facility, hazardous waste facility, or stationary source
Router	A device that forwards data packets between networks. The forwarding decision is based on network layer information and routing tables, often constructed by routing protocols.
RWQCB	Regional Water Quality Control Board
SaaS	Software as a Service
SAM	State Administrative Manual
SCG	Small Community Grants Program
SDLC	Systems Development Life Cycle methodology
Server	A computer that provides client stations access to files and printers as shared resources to a computer network
Server Redundancy	A system of fault tolerance method for protecting systems that are continuously accessed. Entire computer systems are duplicated in the event of failure. The duplicate system takes

over for a failed computer without the user experiencing a loss in performance.

SIC	Sea Water Intrusion Control Loan Program
SLIC	Spills, Leaks, Investigation, and Cleanups program designed by the State of California to protect and restore water quality from spills, leaks, and similar discharges
SMP	Software Management Policy
SOA	Service Oriented Architecture
SPR	Special Project Report
SRF	State Revolving Fund
SSL	Secure Socket Layer, a protocol designed to provide encrypted communications on the Internet
SSO	Sanitary Sewer Overflow
Stakeholder	Regulated businesses, the public, the legislature, and any other parties with an interest in the business process and services of the State Water Resources Control Board
SWAMP	Surface Water Ambient Monitoring Program
SWARM	Storm Water Annual Report Module
SWIM	System for Water Information Management
Switch	A network device that filters, forwards, and floods frames based on the destination address of each frame. The switch operates at a data link layer. The switch allows a connection to be established as necessary and terminated when there is no longer a session to support.
SWRCB	State Water Resources Control Board
T1	A high-speed digital connection providing 1.54 megabits (million bits) per second transfer speed
T-3	A high-speed digital connection providing 45 megabits (million bits) per second transfer speed (also DS3)
TAC	Technical Advisory Committee
TB	Terabyte or one trillion bytes
TCO	Total Cost of Ownership

TCP/IP	Transmission Control Protocol/Internet Protocol is the standard for transmitting data across the Internet
UNIX	An interactive time-sharing computer operating system developed in the 1960s - Sun Microsystems' Solaris is a UNIX variant.
U.S. ACOE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
U.S. FWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST Program	Underground Storage Tank Program
VPN	Virtual Private Network
WWTP	Waste Water Treatment Plant
XML	Extensible Markup Language
WAN	Wide Area Network
WCJ	Workgroup Computing Justification
WDR	Waste Discharge Requirements outlined in permits issued to regulated entities by the State Water Resources Control Board
WDS	Waste Discharge System
WQ	Division of Water Quality
WRIMS	Water Rights Information Management System