

FROM VISION TO POLICY: A PLAN TO GET SAVVY ABOUT URBAN WATERSHEDS

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ABSTRACT

To prepare for long-term adaptive management, watershed management plans should help stakeholders get savvy about environmental regulations, city planning, and land development economics, as well as about aquatic ecology and urban stream and wetland restoration.

California's Silicon Valley area drains to the shallow, wetland-ringed southern tip of San Francisco Bay. Urban streams here have been disrupted and altered by dams, water diversions, land subsidence, channelization, levees, and storm drain outfalls, but some support runs of steelhead and coho salmon.

USEPA and the San Francisco Bay Regional Water Quality Control Board started the Santa Clara Basin Watershed Management Initiative (SCBWMI) in 1996. They were soon joined by state and Federal resource agencies, all Basin municipalities, the Santa Clara Valley Water District, business interests, environmental advocates, and citizens groups.

In 2001, stakeholders brainstormed 112 one-to-two-page "Action Worksheets." These were analyzed in the context of existing policies and programs for: (1) urban land use planning, (2) imperviousness and drainage, (3) floodplain and riparian planning, (4) water use and recycling, (5) biodiversity, (6) stream functions, and (7) pollutants. Seven narratives state the stakeholders' vision, summarize natural and social history, and identify how stakeholder agencies and organizations can align, coordinate, and integrate their current policies and programs. The SCBWMI plans to facilitate adaptive management groups and evaluate progress.

INTRODUCTION

Over the past decade or so, watershed managers have learned a lot about fundamental physical and ecological processes and about what we can (and can't) achieve through intervention. Our task is complex; we start with limited understanding and knowledge, and nature is unpredictable. We've learned that watershed management "planning" is really an interactive, experimental process of planning, doing, assessing results, and learning from our mistakes (adaptive management) (Holling 1978; FEMAT, 1993; ERMS Initiative, 2000).

The complexities and uncertainties inherent in hydrogeomorphology and ecology are matched by equally daunting complexities and uncertainties in public policy. What we are able to do, and when we are able to do it, depends on permissions, funding, and stakeholder consensus as much as on the physical and biological characteristics of our streams.

This is doubly true in an urbanized watershed with hundreds of thousands of individual landowners, competing land uses, overlapping political jurisdictions, and a legacy of resource exploitation and environmental damage. A plan for change must be much more than a menu or "wish list" of actions; it must describe an integrated program that serves the interests of all stakeholders. Those interests include state and

Federal agencies' need to demonstrate implementation of regulations, local agencies' need to show compliance, and the needs of builders and manufacturers to obtain permits and control costs.

In this changeable, uncertain situation, stakeholder consensus is fragile. Maintaining that consensus requires not simply balance but a never-ending balancing act. It is similar to holding together a political coalition, and often just as frustrating.

An implementable urban watershed management plan, then, must perpetuate the alignment of stakeholder interests in such a way that each stakeholder can foresee that ongoing participation will yield continued benefits to their agency or organization. This sustained alignment of stakeholder interests must also be tied to a long-term process that can also achieve real benefits to watershed ecology.

For all these reasons, urban watershed management "planning" becomes more process than plan. In that process, stakeholders do more than provide input. Rather, they share an experience of collective discovery, learning, and problem-solving.

This shared experience creates a challenge for the scientist, engineer, and policy analyst. By tradition and training, technical expertise is isolated from the political give and take. Ostensibly, this insures scientific and analytical objectivity. However, the process of discovery, learning, and problem-solving requires that all stakeholders engage in a deep and detailed examination of the scientific, as well as political, facts and uncertainties. Only through this engagement can stakeholders achieve a sophisticated understanding of watershed science and environmental policy and develop consensus around the kinds of actions needed to preserve and enhance conditions in the watershed. For example, stakeholders may need a common, sophisticated understanding of the sources, fate, transport, and effects of a pollutant before they can agree on a Total Maximum Daily Load (TMDL). As another example, stakeholders may need a common understanding of how floods create and maintain stream morphology before they can agree on restoration actions.

Stakeholder engagement in nitty-gritty technical and policy details is also a challenge to senior agency staff and decision-makers. With very broad responsibilities, and always pressed for time, executives typically rely on executive summaries or "bullet points" for their information.

The need for stakeholder engagement revises our expectations of what our documentation – whether watershed management "plans," evaluations of existing conditions, or issue papers – should look like. Documentation must reflect and support the stakeholders' collective process of discovery, learning, and problem-solving.

Watershed plans should effectively convey the critical technical and policy facts, state the stakeholders' consensus objectives, and prescribe ongoing, participatory adaptive management to achieve those objectives. As planning continues, and stakeholders gain a greater understanding of the technical and policy issues in specific watersheds and stream reaches, these objectives become more specific and detailed.

In short, watershed management plans should help stakeholders get savvy – about environmental regulations, city planning, and the economics of land development, as well as about aquatic ecology and of the potential for restoring urban streams and wetlands – and should prepare stakeholders for ongoing adaptive management.

The authors developed this perspective during six years of work toward a watershed management plan for the Santa Clara Basin (Silicon Valley), California.

THE SANTA CLARA BASIN WATERSHED MANAGEMENT INITIATIVE

The Santa Clara Basin Watershed Management Initiative's (SCBWMI's) watershed, the Santa Clara Basin, encompasses southern South San Francisco Bay (south of the Dumbarton Bridge) and the 840-square-mile area that drains to it. This area includes San Jose and neighboring cities in Silicon Valley and is home to two million people. For planning, the SCBWMI has identified 13 watersheds within this area, corresponding to major streams entering southern South San Francisco Bay. The Basin also includes the Baylands, lands that are inundated by tides or that would be tidal were it not for levees and seawalls (Goals Project, 1999).

The Basin's streams have been disrupted and altered by dams, water diversions, land subsidence, channelization, levees, and storm drain outfalls. However, early conservationists successfully argued for a system of streamside parks and trails, and some of the Basin's urban perennial streams still support runs of steelhead and coho salmon.

The United States Environmental Protection Agency (USEPA), the California State Water Resources Control Board, and the San Francisco Bay Regional Water Quality Control Board (RWQCB) started the SCBWMI in 1996. The SCBWMI is a collaborative, stakeholder-driven effort among representatives from regional and local public agencies; civic, environmental, resource conservation and agricultural groups; professional and trade organizations; business and industrial sectors, and the public.

A SCBWMI Core Group meets monthly. The following subgroups advise the Core Group: Bay Monitoring and Modeling, Communications, Flood Management, Land Use, Regulatory, Sustainable Water Supply, and Watershed Assessment. Ad-hoc working groups focus on wetland issues and on pollutant TMDLs.

Three of the Basin's 13 cities and towns operate wastewater treatment plants that discharge to San Francisco Bay. All 13 cities and towns, along with Santa Clara County and the Santa Clara Valley Water District (SCVWD) share a common stormwater NPDES permit. The California Regional Water Quality Control Board for the San Francisco Bay Region (RWQCB) has scheduled TMDLs for mercury, PCBs, diazinon, selenium, chlordane, DDT, dieldrin, furans, and dioxins in San Francisco Bay and for mercury and sediment/siltation in various Santa Clara Basin creeks. Additional TMDLs for trash, polybrominated diphenyl ethers, endocrine disrupting chemicals, and pathogens are being considered (RWQCB, 2001).

However, the Clean Water Act and California Water Code represent only a small part of the regulations that must be considered in a watershed management plan. The Santa Clara Basin is also home to at least 93 "special status species," of which 24 are listed by the U.S., California, or both. Flood management projects and stream maintenance activities are reviewed by the California Department of Fish and Game, the San Francisco Bay Conservation and Development Commission, the US Army Corps of Engineers, US Fish and Wildlife Service, National Marine and Fisheries Service, cities and towns, Santa Clara County, and local resource conservation districts and open space agencies (SCVWD, 2001).

Parallel with the watershed planning process, the SCBWMI has achieved some notable successes. Stakeholder working groups negotiated uncontested discharge permits for the three wastewater treatment plants, adoption of site-specific standards for copper and nickel in southern South San Francisco Bay, and an innovative multi-year, multi-agency permit for sediment removal, erosion protection, and other stream maintenance activities.

A WATERSHED MANAGEMENT PLAN FOR THE SANTA CLARA BASIN

In 1998, the SCBWMI envisioned a watershed management plan in four phases:

1. An overview of watershed characteristics.
2. An assessment of beneficial uses within the watershed.
3. A report on potential actions to preserve and enhance the watershed.
4. An agreement on what would be done to preserve and enhance the watershed.

The first two phases were completed in 2001 and 2002, respectively. The third and fourth phases were combined and are being wrapped up (as of November 2002).

Phase One: Watershed Characterization Report

During 1999, the SCBWMI subgroups developed chapters of a Watershed Characterization Report (SCBWMI, 2001). The City of San Jose, SCVWD, and the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) funded consultant assistance, and the report was compiled during 2000.

Although its chapters were prepared independently, and with limited resources, the 500-plus-page report is a useful reference, particularly for the area's natural history and existing land uses. It was difficult for stakeholders to foresee which watershed "characteristics" would be critical to planning future actions. For example, the report contains a comprehensive list of agencies and organizations in the Basin, but little documentation of the policies and programs those agencies implement. Environmental laws are identified, but the report contains little analysis of how environmental laws and regulations relate to watershed management objectives.

The SCBWMI's watershed characterization aimed to be quite comprehensive; in retrospect, the effort needed more focus. If stakeholders had first worked to achieve a common background in general watershed science and policy (e.g. stream ecology; pollutant sources, fate, transport, and effects; conservation biology; environmental law and regulation; flood management) they would have been better prepared to prioritize needs for watershed-specific information.

The SCBWMI also prepared and distributed a 100-page condensed version of the Watershed Characterization Report (SCBWMI, 2000b).

Phase Two: Watershed Assessment

In 2000, the SCBWMI selected the watersheds of San Francisquito Creek, the Guadalupe River, and Upper Penitencia Creek for pilot assessments. Because new data collection would be expensive and would take time, the SCBWMI compared available data to selected quantitative parameters. The results were augmented by the judgment of local experts (SCBWMI, 2000a). Decision-support logic diagrams were used to evaluate attainment of selected beneficial uses: water contact recreation, cold freshwater habitat, preservation of rare and endangered species, and municipal water supply. The SCBWMI evaluated the same three watersheds for protection from flooding, based on a hydraulic model's prediction of response to a 1% event.

A Watershed Assessment Report (SCBWMI, 2002) analyzed how the results could be applied to future SCBWMI actions. The report states that the Assessment Framework is generally an excellent tool for assessing attainment of beneficial uses, but existing data are inadequate to apply it to most stream reaches in the Santa Clara Basin. The report suggests that, before similar assessments are attempted, the SCBWMI should:

- Examine the beneficial uses that should be evaluated in each reach or reservoir (i.e. not all uses should be assessed in all reaches, as was done in the pilot assessments).
- Conduct a geomorphic characterization of streams. This would help determine which beneficial uses may apply to which reaches.
- Improve the methodology to better consider the reasons that uses are not attained. (When non-support for beneficial use was indicated, it was difficult to determine whether it was because of a lack of data, because the designated use was inappropriate, or because of actual conditions in the watershed.)
- Consider whether the criteria used are appropriate. For example, post-treatment drinking water standards were used to evaluate the municipal supply beneficial use, and the rare and endangered species habitat use was evaluated based on the occurrence of those species.
- Reevaluate the 100-year flood as the criterion for protection from flooding. Consider using property damage occurrence as criterion.

Lack of available quantitative data limited the usefulness of the pilot assessment results. However, even if more data were available, the methodology still might not yield information or perspectives that could help stakeholders decide which actions should be carried out, or where. This is because the relationship between the quantitative criteria and the stakeholders' goals for the watershed was not yet well-defined.

In discussions of the assessment report, stakeholders concluded that the next step should be an "assessment of assessment methods," i.e., a reconsideration of the methodology used and an investigation of assessment

methods that are more likely to support decisions and actions. The ways that we learn, as well as our knowledge, improve with experience.

Phase 3: Planning Watershed Actions

SCBWMI stakeholders created a vision of a future Santa Clara Basin (SCBWMI, 2000c). An illustration shows natural stream channels within a broad riparian corridor. The area between set-back levees is shared by parks, recreation facilities, and urban agriculture, as well as areas reserved for habitat. Outside the levees are densely populated, compact communities, served by a variety of transit modes.

Soon after, the Core Group decided to move directly to a “Watershed Action Plan” (SCBWMI, in preparation). The decision may have been motivated, in part, by frustration with the slow pace of the uncompleted watershed assessment and uncertainties about how useful its results might be.

During 2001, the SCBWMI’s subgroups prepared approximately 112 “Action Worksheets.” The SCBWMI Core Group reviewed each Action Worksheet and refined or revised it with help from the subgroups. The SCBWMI intended to compile these Action Worksheets into the Watershed Action Plan.

These 112 Action Worksheets were a mixed bag. Most were generic representations of specific interests or concerns (e.g., “Restore fish passage to upstream spawning and rearing habitat,” e.g., “Eliminate pesticide-caused toxicity to aquatic life from urban runoff sources); some were ideas of things a watershed group could do (e.g., “Set up tours of reservoirs with water supply educational features,” e.g., “Involve local schools in watershed restoration and protection,”) or that public agencies were doing (e.g., “Implement a mercury pollution prevention program”). Some of the Action Worksheets listed tasks, but most of these identified some basic steps that might be common to any project (e.g., assess conditions, convene interested parties, develop a plan, implement plan, assess results).

In retrospect, it may have been unrealistic to expect that this “brainstorming” process could successfully create the raw material for an implementable Watershed Action Plan. Stakeholders were familiar with their specific areas of concern, but most of us lacked a broad overview and analysis of watershed conditions. We didn’t have the comprehensive understanding of existing programs and policies that would be required to adequately define the who, what, when, or where of potential actions, let alone to determine their feasibility or to prioritize and organize them.

However, the Action Worksheets did mark a significant step forward: they defined the universe of concerns among the SCBWMI’s stakeholders and represented a preliminary consensus on the kinds of actions needed. This definition and preliminary consensus made it possible to take the next steps forward in crafting a program for the SCBWMI. Once sorted by subject, the Action Worksheets guided development of a narrative about the issues facing the watershed and the available solutions.

The first step in creating that narrative was to review existing policies and programs and consider how they were already implementing, or could potentially implement, the actions that stakeholders had identified in the Action Worksheets.

A Fresh Perspective on Environmental Protection Programs

This policy analysis led to the following perspective:

New environmental-protection programs typically follow the emergence of major environmental problems. Often, new policies are enacted only after resources have been depleted or ecosystems have been damaged.

Environmental-protection regulations have expanded rapidly since the first Earth Day in 1970. By the mid-1990s, local agencies were struggling to keep up with the pace of new environmental requirements. The local programs, like the regulations they implement, have grown up one at a time in response to specific environmental issues. Because ecosystems and political systems are integrated and interdependent, many of these programs overlap and can even conflict with one another. Program overlaps and conflicts occur within agencies (both regulatory and local agencies) and between agencies.

In response to local environmental advocacy, local agencies have adopted stronger local environmental-protection mandates. For example, SCVWD's expanded mission incorporates watershed stewardship, and the City of San Jose has adopted a Riparian Corridor Protection Policy. This has created even more potential for overlaps and conflicts.

In large part, the SCBWMI's Action Worksheets overlapped existing regulatory mandates and existing local programs. Many stakeholders didn't recognize this as they prepared the Action Worksheets, because no previous analysis placed the myriad of existing mandates and programs in the context of a comprehensive vision for the watershed. In general, there is a need to evaluate these programs, track their progress, coordinate them with each other, and make them comprehensible to the public.

Further, local agencies typically implement their regulatory compliance programs in a compartmentalized fashion. Under regulatory "command and control," regulators and permittees alike focus on individual permit provisions. Implementation tends to be reactive and piecemeal, rather than embracing broad ecosystem objectives. This by-the-numbers approach is not conducive to new, more scientific analyses of problems, or to new, more creative solutions.

Compilation of the stakeholders' Action Worksheets opened up a fresh look: What if the funding, staffing, and authority vested in existing environmental-protection programs could be coordinated and directed toward achieving the SCBWMI's vision? Surely, that would be more effective and more efficient than implementing parallel SCBWMI actions.

Having achieved this perspective, the SCBWMI looked for ways to put it into practice. To guide its next steps, the SCBWMI developed "strategic policy objectives." The strategic policy objectives specify desired outcomes to be achieved by aligning, coordinating, and integrating existing policies and programs.

From Actions to Narrative

From its beginning as an unarranged list of actions, the Watershed Action Plan became a narrative that summarizes the natural and social history of environmental problems, describes the relevant existing policies and programs, identifies ways these can be expanded and improved, sets some objectives, and describes next steps to move toward integrated, multi-objective adaptive management of the Basin's natural resources.

That narrative covers the following subject areas: (1) urban land use planning, (2) imperviousness and drainage, (3) floodplain and riparian planning, (4) water use and recycling, (5) biodiversity, (6) stream functions, and (7) pollutants. Condensed summaries follow:

- 1: Moving Beyond "Smart Growth"

This section describes a strategy for incorporating the SCBWMI's vision of a future urban watershed into land-use plans and policies. The Santa Clara Basin developed most rapidly in the period from World War II through the 1970s, when land-use controls were governed by modernist principles – segregation of uses, circulation systems focused on the car, and a loss of public orientation for buildings and gathering places. Santa Clara Basin cities (and California) have since moved toward "Smart Growth," which emphasizes government accountability, livable communities, better housing and transportation, and conserving green space and the natural environment. "Smart Growth" is a prerequisite for achieving the SCBWMI's vision, but preserving and enhancing the watershed will also require changes to the spatial structure of land use in the Basin, from one continuous swath of urbanized land to a more fine-grained pattern characterized by more intensely urbanized areas that are interstitial to broad, continuous stream corridors.

California's General Plan law makes it possible for cities to map and designate some areas for more intense, "smart-growth," transit-accessible types of development, while identifying other, sensitive habitat areas to be preserved or restored. Cities and towns are also using their review authority under the California Environmental Quality Act (CEQA) to require that specific projects preserve habitat and limit effects on water quality. There may also be ways that cities and towns can use tax and financial incentives that encourage developers to pursue these same goals voluntarily.

The SCBWMI advocates that General Plans should incorporate detailed maps and plans to preserve and enhance watersheds. Cities, towns, and the County should study obstacles to implementing detailed maps of habitat corridors in General Plans and should consider how to make these maps part of future General Plan updates. Agencies that acquire and manage open space in the Santa Clara Basin should coordinate their individual strategies and link their efforts with General Plans, habitat conservation plans, and floodplain management.

The SCBWMI plans to assist this process by convening a dialogue with Planning Commissioners and Directors on how to use of General Plans and Specific Area Plans to implement the SCBWMI's vision of continuous habitat corridors and intensely developed neighborhoods, by joining or convening discussions among agencies that acquire and manage open space, and by cultivating alliances with "smart growth" advocates.

- 2: Better Designs for Buildings, Streets and Drainage

This section foresees changes in design standards for buildings, streets, and parking lots – standards that currently encourage rapid and efficient drainage.

New amendments to the stormwater NPDES permit require cities and towns to manage any increases in peak flow and runoff volume to avoid increased erosion of creek beds and banks, siltation of streambeds, or other effects on streams. This could require that future development projects be designed so that runoff is not increased above pre-development amounts. However, the cities and towns, county, and SCVWD have the option of showing that existing drainage facilities, or new facilities, can handle the increases without causing any damage to creeks.

Runoff can be retained by limiting the amount of paved or impervious surface and by directing runoff to vegetated swales and basins. There, pollutants settle out or are absorbed by soil before the water drains off slowly or percolates down to replenish groundwater.

The SCBWMI plans to work with SCVURPPP to develop model public works policies, specifications, and details to encourage detention and infiltration of runoff and to control erosion and sedimentation from construction activities, as well as to implement other requirements of the stormwater NPDES permit.

- 3: Planning Floodplain and Riparian Stewardship

This section discusses how better land-use policies can protect streamside areas and wetlands and also reduce flood damage. SCVWD has shifted its policies and practices to emphasize natural flood protection and stewardship of natural resources. In most cases, this means preserving or expanding the area that is allowed to flood. This sometimes conflicts with plans to place new homes and businesses in flood-prone areas. Conflicts may also occur when streamside homeowners wish to add to their houses, or construct outbuildings, in riparian areas.

SCVWD's flood management program entitles homeowners within specifically mapped areas to take advantage of lower flood insurance rates. But this mapping is not yet coordinated with municipal land-use maps, plans for trails and recreation, or conservation of riparian habitat.

The SCBWMI advocates an integrated planning process to chart the future landscape of the Basin's floodplains and riparian corridors. Integrated floodplain and riparian planning should also incorporate interpretive signs and other opportunities for the public to learn about the values and multiple functions of stream corridors and to develop a shared sense of place.

The SCBWMI plans to work with local agencies to provide a forum and develop a process for integrated planning of floodplains and riparian corridors. The SCBWMI can also provide a neutral place where potentially contentious floodplain management issues (e.g. protection from flooding vs. floodproofing for specific areas; e.g., location of recreational facilities) can be referred.

- 4: Conserving and Reusing Water

This section seeks ways to serve the Basin's growing population and economy while maintaining natural seasonal flow in creeks. About half the Santa Clara Basin's water supply is imported from other parts of

California. The other half is pumped from groundwater. Beginning in the 1860s, as farmers began growing water-intensive crops, drawdown of groundwater caused rapid land subsidence, altering the slope and elevation of streams, destabilizing streambanks, and increasing tidewater incursion and the frequency of flooding.

Since the State Water Project's South Bay Aqueduct was completed in the 1960s, the SCVWD has used imported water, as well as local water, to recharge aquifers. SCVWD artificially increases groundwater recharge by releasing water from eight large reservoirs and from pipelines into streams during the dry season. Some water percolates through the streambed, but SCVWD also diverts stream flow into percolation ponds. SCVWD's permanent and temporary dams, and the alteration of stream flows, can affect the survival and reproduction of fish and other aquatic life.

Once water is used by homes and businesses, it is collected in sewers and piped to three wastewater treatment plants. It is then discharged to South San Francisco Bay. Discharges from the four treatment works meet criteria intended to insure that wastewater pollutants don't affect San Francisco Bay. However, the volume of fresh water flowing from one of the plants, the Santa Clara/San Jose Water Pollution Control Plant, may have caused some tidal wetlands to convert to brackish marsh, reducing scarce salt marsh habitat.

The SCBWMI advocates that SCVWD, San Jose, and the Basin's other cities and towns should use the state-mandated Integrated Water Resources Planning (IWRP) process to focus and coordinate their water conservation and water recycling policies and programs. The process should document the many environmental benefits of water conservation and recycling – more water to support stream ecosystems in the Santa Clara Basin and statewide, more reliable supply, and reduced effects of freshwater discharges – and should link these benefits to the overall water supply strategy. Conservation and recycling should be built into the projections of future demand that are used for planning potable water supply.

The SCBWMI can help by developing broad representation and facilitate efficient decision-making in the IWRP stakeholder process, communicating IWRP participants' consensus to agency decision-makers, and by organizing and facilitating outside expertise and technical resources.

- 5: Preserving and Enhancing Biodiversity

The arrival of European settlers dramatically changed the distribution and species composition of the Basin's plant communities. Non-native annual grasses displaced native perennial grasslands. The Douglas fir and redwood forests in the foothills were chopped down. As settlement continued, natural stands of vegetation were converted to grazing, vineyards, and orchards. As agricultural land gave way to urban development, much of the valley oak woodland in the lower foothills was also lost.

The section on *Preserving and Enhancing Biodiversity* describes how it is possible to sustain the many ecosystems within the Santa Clara Basin by re-establishing and managing large, contiguous natural areas and controlling invasive species. Because the Basin features complex and varied soils and climate, many of its plant and animal species are adapted to specific conditions that occur only in small areas. As these specialized habitats have been altered, and as non-native competitors and predators have been introduced, many of these specialized and rare (special-status) species are threatened with extinction.

The tidal wetlands that once surrounded southern South San Francisco Bay have been radically altered. Some were diked, filled, and converted to farmland, airfields or industrial parks; others have been diked and the flows controlled to evaporate Bay water and produce salt. Some of these changes are irreversible; others should not be reversed, because the altered flow regime has created forage and resting habitat for various bird species. Surveys and maps are needed to identify opportunities where habitats can be expanded and made contiguous and where changes in tidal circulation could enhance habitat quality.

The SCBWMI advocates that efforts to preserve and enhance habitats for endangered, threatened, and special status species should provide for the protection of natural communities and species diversity on a landscape or ecosystem level through the creation and long-term management of habitat reserves or other measures that provide equivalent conservation of covered species (California, 2002).

The preserves should be developed in cooperation with the US Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG) in compliance with Federal requirements for Habitat

Conservation Plans (HCPs) and California's recently updated requirements for Natural Community Conservation Plans (NCCPs). The HCPs/NCCPs should begin with updated, improved biological surveys of special status species and their habitats, should incorporate (as appropriate for the conservation of targeted species) existing reserves, refuges, parks, and public lands, and should provide for acquisition of additional lands where needed to preserve and enhance critical habitat, incorporate restoration of native plants and animals in target areas. The HCPs/NCCPs should be implemented using adaptive management, with specific, measurable objectives and provisions to monitor and report progress.

Today, the Santa Clara Basin has an historic opportunity to restore tidal wetlands, salt ponds, and adjacent habitats. Cargill Salt Company has agreed to sell the public an additional 15,500 acres of former salt ponds in the South Bay. The addition will nearly double the size of the wildlife refuge. Some of the salt ponds would be managed to maintain their current functions as refuge and foraging grounds for shorebirds. Others could be restored to link currently isolated patches of habitat for the endangered salt marsh harvest mouse and clapper rail. Levees would need to be removed or altered to restore and maintain adjacent upland zones of salt-tolerant plants.

The SCBWMI advocates a comprehensive, integrated, stakeholder-based planning process for expanding the refuge. USFWS, the Army Corps of Engineers, CDFG, RWQCB and other state and Federal agencies should work closely with SCVWD, other local agencies, and other SCBWMI stakeholders to plan the restoration of newly acquired wetlands. Permits should be issued timely and allow for flexibility and adaptive management to successfully reconvert salt ponds to wetlands while allowing reasonable protection to South Bay water quality.

The potential for flooding of adjacent urban areas, and the need to selectively maintain levees, should be addressed early and squarely in a way that balances the objectives of urban flood protection and habitat restoration.

The SCBWMI can assist by convening and facilitating a stakeholder group or groups to participate in scoping HCPs/NCCPs and planning for the refuge and to participate in adaptive management as plans get underway.

- 6: Preserving and Enhancing Stream Functions

In the next 10-15 years, SCVWD will spend hundreds of millions of dollars to alter stream channels to contain floods. It will spend additional hundreds of millions to mitigate the environmental consequences of those alterations.

SCVWD models potential flooding in each watershed and prioritizes flood-control expenditures accordingly. In contrast, stream restoration and other mitigation measures are planned project-by-project. Most have been initiated in connection with environmental permits or in response to legal and regulatory challenges.

In the *Preserving and Enhancing Stream Functions* section of the Watershed Action Plan, the SCBWMI advocates an integrated planning process to maximize both ecosystem renewal and flood control objectives and to allocate and prioritize the available budget. This integrated planning process should also incorporate floodplain management as a strategy to reduce potential flood damages. From a watershed perspective, it makes sense to reduce damages from large, rare (i.e. 100-year) events by zoning, floodproofing, and relocating and elevating structures. The resources saved can be applied to watershed management practices (such as retaining perviousness and increasing on-site detention) that will reduce more frequently recurring flooding problems.

Perhaps most importantly, integrated planning should engage people from a variety of perspectives and technical backgrounds in creative and strategic design of better projects, large and small, that promote multiple objectives for ecosystem restoration, flood protection, and recreation.

Planning should also be integrated with regulation of alterations and impacts to streams, with efforts to restore natural flow regimes, and with stream maintenance.

The SCBWMI can assist by convening and facilitating groups of stakeholders to participate in adaptive management for watersheds, communicating adaptive management participants' recommendations to decision-makers, and organizing and facilitating outside expertise and technical resources.

- 7: Understanding and Controlling Pollutants

This section of the Watershed Action Plan describes which pollutants may be affecting organisms in streams, wetlands and the southern South Bay, and what is being done to reduce or eliminate those effects.

All of the Santa Clara Basin's municipal and industrial wastewater is collected in municipal sewers and is thoroughly treated before being discharged to southern South San Francisco Bay. However, a separate system of storm drains pipes runoff from rooftops, parking lots, and streets directly to hundreds of stream outfalls.

Upstream of the urban area, grazing, agriculture, and other rural activities can contribute pesticides, fertilizers, and sediment to the creeks. Some of the most serious pollutant problems are a legacy of the Basin's history and of a time when the consequences of pollution were less understood. Now-banned pesticides (DDT, chlordane, and dieldrin) linger in aquatic sediments, as do PCBs, which were once widely used in electrical equipment and in industrial paints. Tailings from mercury mining and processing (particularly in the Guadalupe watershed), dumped in the creeks over a hundred years ago, continue to wash downstream. However, the presence of newly created chemicals, such as popular garden pesticides and fire retardants, shows that urban activities continue to generate pollutants that find their way into streams and the Bay.

The effects of these pollutants depend on how they interact with sediments, how they are transported, and how they are distributed in the food chain. Storms flush pollutant-laden water and sediment into the creeks, where they flow downstream. By contrast, pollutants tend to accumulate in the sediments of shallow southern South San Francisco Bay. During the dry summers, as the pollutants leach from the sediments, evaporation and lack of circulation cause them to concentrate in the overlying water. In wetlands, the natural decomposition of rooted aquatic plants creates conditions where relatively harmless inorganic mercury is transformed to methylmercury. Methylmercury – like PCBs and DDT – tends to become concentrated in animal tissues. Animals near the top of the food chain, such as fish-eating birds and people, may be the most vulnerable.

The sources, fate, transport, and effects of each pollutant must be understood to determine the acceptable amounts in water, sediment, and animal tissue, and to develop reasonable, effective plans for source reduction and clean-up.

The SCBWMI advocates that future watershed assessments rapidly review (screen) stream reaches or wetland areas, identify which may be affected by pollutants, and prioritize these locations for further investigation. Criteria might include nearby land uses, proximity of known pollutant sources, or physical and visual evidence (disturbance, turbidity, oil sheen, trash) commonly associated with pollutants. The prioritization should also consider specific uses, habitat functions, and seasonality and how these may affect how long organisms are exposed and at what stage in their life cycle. The prioritization should lead to focused, well-designed studies to determine whether specific pollutants impair specific reaches or areas.

The TMDL process provides a venue for stakeholders to participate in creating comprehensive, long-term plans to reduce specific pollutants. These pollutant-specific plans should build on previously planned and ongoing programs to reduce erosion, control urban runoff pollutants, restore habitat functions, and preserve and enhance Basin watersheds. Regulatory actions should be pragmatic (results-oriented) and linked to achievable environmental benefits.

When the RWQCB has placed a pollutant on the 303(d) list or “watch list,” a structured, stakeholder-based process should be used to coordinate all further efforts to investigate or control that pollutant.

Monitoring plans should be flexible and heuristic (i.e., stepwise; monitoring projects should test problem statements and conceptual models and use the results to guide the next phases of the investigation). Agencies should synthesize, interpret, and report data timely and make completed reports readily available.

The SCBWMI will strengthen its role as a forum for presenting and discussing assessments and assessment methods. This will assist RWQCB and others to improve assessments, TMDLs, and discharge permits.

The SCBWMI will also continue and build on the successful collaborative processes that led to the adoption (in 1998) of uncontested discharge permits for the three wastewater treatment plants and to the adoption (in 2002) of site-specific objectives for copper and nickel in southern South San Francisco Bay.

DISCUSSION

Ecosystems are integrated and complex; social, legal, and political systems are also integrated and complex. These systems are in constant change, and change each other. Successful intervention requires an understanding of these relationships.

Watershed management, particularly in an urban area, should leverage the existing mandates, authorizations, and funding for environmental protection programs. Because these programs were conceived as solutions to individual environmental problems, they overlap and conflict. Agencies can save money and accelerate environmental improvements if they align, coordinate, and integrate these programs around a common vision. The potential environmental benefits far exceed what might be achieved by new, overlapping actions or programs.

However, the bureaucratic barriers are daunting. Each agency and interest has its own agenda and drivers. Interagency coordination costs time, staff hours, and money. If the coordination is unsuccessful, agencies and interests feel they have wasted hard-to-come-by resources, and may face regulatory consequences. What's more, agencies typically account for and track their regulatory compliance projects individually. Project managers may resist delaying or complicating "their" project so that it can be coordinated with a larger plan.

This inertia frustrates watershed advocates, who may favor small projects with visible results over attempts to reform bureaucracy. Indeed, a plan which is "more process than plan" is prone to the criticism that it is "just planning for more planning," and is irrelevant to achieving tangible, on-the-ground results.

CONCLUSION

The SCBWMI aims not merely to create a plan of actions to be implemented by others, but rather to establish an ongoing, iterative process of adaptive management for Santa Clara Basin watersheds. Creating that process requires, first and foremost, that stakeholders share a common, detailed, sophisticated understanding of how our social, political, and natural environments interact. Stakeholders need to understand how management of local environmental resources has evolved before they can reach consensus on how that management might be improved. An implementable watershed management plan, therefore, must help stakeholders achieve that understanding, and must point the way toward an ongoing process to refine and improve the quality of their consensus decision-making.

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FOR MORE INFORMATION

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