The 50 Year Plan
"From Channels to Creeks"

Contra Costa County Flood Control and Water Conservation District
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On April 9, 1999, Contra Costa County held its first Watershed Symposium. At that Symposium, we outlined a vision to convert our concrete and rip-rap lined channels into natural systems that safely convey the same flood waters. Over the years, this vision has been reviewed and refined. The purpose of this paper is to identify the benefits for the Flood Control District to convert its first generation infrastructure, consisting of concrete and rip-rap lined channels, to second generation facilities, consisting of natural creek systems, and the methods to achieve this. The vehicle to achieve this is long range planning for creek enhancement.

As with most Flood Control Districts, the Contra Costa County Flood Control and Water Conservation District was formed to provide flood protection infrastructure and improvements for a rapidly developing County. Our mandate at that time was defined as simply providing flood protection in the most economical manner. The County paid all right-of-way costs, which often resulted in relatively narrow concrete and rip-rap-lined channels. Today, however, communities desire a broader range of services. The citizens of our county still want flood protection, but they also want a healthy and natural looking eco-system in their drainage channels and creeks (while minimizing the amount on their tax bill for maintenance and new infrastructure costs). They want good water quality and a sustainable and rich plant and animal habitat in their creeks and watersheds. At the same time, our infrastructure is aging and will need to be replaced over the next several decades. Compounding our problem is a severe lack of funding. After passage of Proposition 13 in 1978, our tax revenue was reduced by 58%. We have been scrambling to perform our mission and maintain our existing infrastructure ever since. Planning for the capital replacement of an estimated $500 million in infrastructure is daunting to say the least. To do this we need to take a long view and we need public support to plan and fund our infrastructure replacement.

Our existing major infrastructure has a remaining service life of 30 to 50 years. We need to embark now upon a planning process for long-range replacement of this essential infrastructure. The question for our communities is this; what type of infrastructure should it be replaced with? Should we simply rebuild our concrete or rip-rap channels, or should they be replaced with more natural systems of vegetation and riparian habitat in a manner that allows natural processes to maintain essential flood protection and water quality improvement functions, recreational and aesthetic values, as well as allowing flexibility to respond to climate change? Our experience indicates there will be much more support for replacing the existing infrastructure with natural systems. If we pose this question openly, then the answer becomes a community

design issue, resulting in community involvement, and ultimately community buy-in and support. This long-range process to develop a creek enhancement plan was termed the "50 year plan" simply to illustrate the long-range aspect of the process.

Historical Background

The Contra Costa County Flood Control and Water Conservation District (Flood Control District) was established in July of 1951. This was during the Age of Infrastructure. Americans had just returned from overseas where they had won World War II, in great part due to America's resources, technology, and "Yankee know-how". Americans were filled with optimism, a "can do" attitude, and the sense that any problem could be solved with technology and infrastructure. Contra Costa County, along with the rest of California, was growing and expanding. As the county developed, public policy required the construction of extensive infrastructure. The population in the Walnut Creek watershed increased from 53,000 to 250,000 between 1950 and 1966. The floods of 1955 and 1958 galvanized public support for flood control infrastructure throughout the county. The Flood Control District, in partnership with the the U.S. Army Corps of Engineers and the Department of Agriculture Soil Conservation Service, constructed improvements in the Walnut Creek, Marsh Creek, Pinole Creek, Rodeo Creek and other watersheds. Due to subsidies provided by the federal and state governments, the Flood Control District was able to construct these major regional flood control facilities at a local cost of approximately ten percent of the total project cost. The cities and the county supported the construction of infrastructure to meet the needs of the citizenry. At the time, however, we did not understand the environmental consequences of our infrastructure construction.

In the 1970's we began to understand the effects of unbridled construction activities. We began to understand that many things are interrelated, and saw the need to analyze things from a system-wide perspective and not on an individual basis. Public sentiment began to shift towards being more sensitive to the environment. The National Environmental Policy Act, Clean Water Act, and the Endangered Species Act were all passed in the late 1960's and 1970's. Since then, these and other environmental policies and laws have been strengthened, and regulations established to enforce and monitor infrastructure construction and maintenance activities. Citizen action groups were formed in communities throughout the county to oppose the traditional approach to solving our infrastructure problems. These groups and evolving statutory requirements forced government agencies in the county to analyze the impact of construction activities on the environment. Over the last twenty-five years, these actions have defined the current public policy of providing infrastructure with environmental protection and preservation.

The New Mission and Our Challenge

The original mission of the Flood Control District was to provide flood control infrastructure. This mission was aligned with the public policy at the time, and the District was very successful in providing flood protection improvements for the residents of the county. To be aligned with today's public policy, however, the District's mission must be expanded to include habitat preservation and water quality in the course of providing flood protection.

Other critical issues will also have to be addressed including the significant reduction in financial assistance offered by the state and federal government for flood protection projects, and the means to accumulate and protect reserve funds to implement an infrastructure replacement plan. Flood risk is defined by topography and is not evenly distributed. Hurricane Katrina focused a national debate on the equity of subsidizing disaster recovery costs for property located in hazard prone areas. In California's current "pay as you go" public policy environment, it will be very challenging to enlist the financial support of property owners outside flood hazard areas to implement an overhaul of existing flood channels that seemingly benefit a minority of property owners.

Our customers, the cities, the county, the public, and other agencies, are operating within the same public policy framework that the District is. All public infrastructure has a limited service life, a period of time the infrastructure will perform its designed service with routine maintenance before it needs to be replaced. The question is how do we plan for the replacement of this critical infrastructure within today's public policy framework?

The Approach to Flood Control Issues

The Flood Control District's mission defines its approach to resolving flood control issues. The District's mission is consistent with current public policy and the mandate from the regulatory agencies to provide flood protection while preserving riparian habitat and maintaining water quality. The "flood control" issues of today are different from the flood control issues of the past. The issues of today are, for lack of a better term, "creek issues". Creek issues combine the concerns for flood protection, ecosystem preservation, and water quality. To resolve the issues we face today, we must approach them from a **multi-objective** perspective. We must identify the stakeholders involved in the issue, determine their interests and needs, and then provide alternatives that meet those needs and interests. The alternatives must be based on sound science to ensure that the creek system will provide all the functions necessary for the watershed.

Planning for creek issues requires **community-based planning**. This type of community planning will often transcend jurisdictional boundaries. Resolution of today's issues must go beyond the traditional focus of the "plumbing" of the watershed (i.e., the creeks), and extend to the watershed as a whole. The solutions of tomorrow must be **watershed-based and multi-objective**, or more accurately, the solutions of tomorrow must evolve from **community-based watershed planning**.

Creek Enhancement Planning

The Flood Control District has many miles of engineered, or historically termed "improved", channels that no longer have the natural features of the original creek. Funding will likely become available to restore some natural features to these channels. Some channels were designed for specific land uses that have changed over time and, if this trend continues, may become inadequate in the future. If some of these facilities become inadequate, should they be replaced with the same type of facility or replaced with a facility having the features of a natural creek? Should concrete lined channels be replaced with engineered creeks? Can flood control earthen channels be converted to "flood control creeks"? As our community's age and land uses change, we will have the opportunity through redevelopment to implement more natural flood protection facilities integrated in the new urban landscape.

The Flood Control District can develop Creek Enhancement Plans to, for example, plant trees in an earthen channel and still maintain flood protection, IF the drainage system is looked at from a watershed perspective, to offset the loss in capacity due to the trees planted in the channel. If the goal is to convert a flood control channel to a natural creek, then some Creek Enhancement Plans will need extremely long planning horizons of 50 years or more to achieve all of their objectives. Some plans may be as simple as providing a bypass pipe or an upstream detention basin or increased upstream infiltration to allow a creek section to be natural, while other plans may call for purchasing a row of houses in order to replace a concrete channel with a natural looking creek. These kinds of objectives are achievable and can be implemented without unreasonable disruption to a community if a long-range "50-year" creek enhancement plan is adopted. The Flood Control District will develop these plans if the citizens of our cities and the county are interested in a more natural environment in our flood protection facilities.

Flood Control District Benefits

There are several benefits for the Flood Control District to develop long-range plans to convert its drainage facilities into a natural system.

- Broad public support - Initially it may seem easier to simply replace the existing infrastructure. However, regulatory agencies and public sentiment support conveying flood waters in natural systems rather than artificial concrete systems. Planning future facilities that meet modern expectations will guarantee a broad level of support.

- Grant Funds - There will be opportunities for grant funds to construct elements of a more natural system and probably fewer (or maybe zero) opportunities for grant funds to replace concrete structures.

- Increase Awareness - Going through a long-term planning process provides an opportunity to discuss issues related to flood protection, floodplain management, natural creek system function and form, etc. Increased public awareness of stormwater issues leads to increased understanding and support for funding.

- Community Design - Including the public and community leaders in a long-range plan allows the project to become part of the community design element of a neighborhood or town. These can then be part of the general plan or specific plan for a community and can lead to partial funding through development fees or redevelopment revenue. These kinds of projects can also contribute to making communities more sustainable, including meeting new targets for carbon emission reduction, enhancing greater reliance on local water supplies, and responding to the anticipated effects of climate change.

- Life Cycle Costs - These vary by facility and channel reach. Concrete channels tend to have high initial construction costs, very low ongoing maintenance costs and high replacement costs. Natural channels require increased right-of-way width and generally higher ongoing maintenance but low or zero replacement costs. Taking the long view, the costs for natural channels will be much less compared to the costs of multiple life cycles for concrete channels.

- Water Quality and Conservation – Water flowing in natural creeks flows over and through biological media and is filtered through creek banks and beds, cleansing the water and retaining it longer in the watershed helping to meet stormwater (NPDES) permit requirements and enhancing aquatic habitat features.

- Aesthetics – Natural channels are much more appealing than concrete channels for recreational uses or simply as a visual amenity for a community.

- Recruitment and Retention – Staff working for the Flood Control District will be more likely to be motivated, have a high morale and make a career at the District if the District is progressive, visionary, and places importance on environmental protection.

Opportunities

There are many opportunities for long-range planning for replacement of vital flood protection infrastructure within existing community planning and implementation activities that include the following:

- Redevelopment Plan – area-wide master plan that can include watershed infrastructure.

- Redevelopment Plan Projects – projects outlined in a community's Redevelopment Plan.

- Development Projects – requiring (or negotiating) implementation of short pieces of channel/creek enhancement with land use entitlements.

- General Plan Updates – watershed and system-wide infrastructure planning.

- General Plan Amendments – identify improvements to segments of a regional or watershed infrastructure plan.

- Specific Plans – neighborhood level improvements of watershed infrastructure.

- Watershed Management Plan – regional, watershed level assessment of infrastructure needs.

- Mitigation – opportunity to develop and possibly implement portions of a plan as alternative mitigation.

- Regulation Offsets/Alternative Compliance – opportunities to develop watershed or creek enhancement plans and/or implement portions of improvements as an offset or in-lieu of stormwater (NPDES) or regulatory permit requirements.

- FEMA Mapping – opportunity to review watershed or creek infrastructure needs within floodplains.

- Integrated Regional Water Management Planning – collaboration with water supply agencies that could provide funding or cost-share contributions to alternative stormwater management approaches that retain and "harvest" rainfall, thereby enhancing local water supplies for landscape irrigation and reduction of flood peaks.

- Community Based Organizations – collaborative or independent projects by non-profit organizations with private funding sources.

- Climate Change and Sea Level Rise – may be a trigger for long-range creek planning, especially with expansion of the floodplain incorporating more properties.

- Bay Area Stream Goals – opportunity for watershed and regional infrastructure planning.

- Emergency Planning – predisaster mitigation planning with grants from FEMA and other organizations.

Benefits for the Community

The community gains many tangible benefits in addition to continuing flood risk reduction. These benefits are similar to those of the Flood Control District, but are from a different perspective.

- Quality of Life – having a natural creek system drain through a neighborhood rather than a concrete channel looks and feels better to the surrounding residents resulting in increased property values.

- Community Amenity – the community can plan and design its public spaces and retail/commercial areas to take advantage of the attraction of a natural system. The community can have a recreational and aesthetic focus along the creek as a natural system, rather than a concrete lined flood control utility.

- Habitat – a natural creek will provide the plant and animal habitat necessary for a rich eco-system within the creek and its riparian corridor and can provide wildlife linkages between urban ecosystems and open-space areas.

- Water Quality – a natural system will provide opportunities for cleansing and filtering storm run-off, particularly during low flow events, to reduce pollutants in the stormwater.

- Connection with Nature/Community Health – Nature Deficit Disorder (a term introduced by Richard Louv in his book "Last Child in the Woods") embodies a theory that children who lose the connection with nature exhibit a variety of behavioral problems more so than children who get out into nature. As our landscape becomes more urbanized and we have more technological diversions, our children have less opportunity and spend less time interacting in a natural environment. Reestablishing natural creeks in an urban setting will increase opportunities for children to interact with nature in an otherwise paved or manicured/structured environment.

- Community Involvement – The community has an opportunity for citizens to get involved in creek related activities, such as clean-ups, water quality monitoring and fish surveys, or for youth groups to help actively manage portions of the creek by, for example, removing invasive species, or by developing watershed plans. These activities increase citizen involvement and increase their sense of community.

- Development of "Green Jobs" – The community can develop and retain a skilled workforce restoring and maintaining public and private natural creeks. This could include re-vegetation and soil bioengineering project work, water quality monitoring, and coordination of erosion prevention/stabilization on private property and stream stewardship training for private property owners. These would be new jobs for the community that can't be outsourced overseas, which helps the community's economic sustainability.

Outreach

Successful long-range planning and implementation will require active support from and partnerships with many agencies, groups and individuals. The Flood Control District will need to outreach to many different groups to increase awareness, enlist support and develop partners to initiate and sustain a long-range plan. For Contra Costa County this would include the following groups:

- Public Managers Association
- City/County Engineering Advisory Committee
- City Councils
- Watershed Forum
- Non-profit organizations
- Regulatory agencies

Developing a brochure ("The 50 year plan-A future for our Children") or short, concise informational piece would be very helpful to communicate the concept and opportunity of this approach to infrastructure replacement.

Roles and Responsibilities

If we are to embrace this approach to infrastructure replacement, what should the role of the Flood Control District be? And what of our partners, the cities, the non-profit groups (NGO's), the regulatory agencies, what role should they play?

- Flood Control District – The Flood Control District must be a cheerleader for the 50-year plan. We need to provide outreach information on the benefits and

value added by this approach. By long practice and political prudence we do not conduct activities within a jurisdiction without that jurisdiction's approval. We must work hard to enlist the support of the public and the communities within which these projects and activities would occur. The root issue for the Flood Control District is funding. How can we obtain community support for funding capital replacement of flood protection infrastructure and then fund its ongoing maintenance? The average household spends maybe $700 per year on potable water and over $300 per year on wastewater treatment. In contrast, the average Contra Costa household spends about $30 per year on water quality (NPDES) and less than $70 per year on flood protection maintenance and improvements, depending on the specific watershed (see footnote 1). As a society, do we spend enough resources on stormwater management, does the general public understand the benefits and value of stormwater management and the flood protection system? Everyone uses the water supply system every day; everyone uses the waste water system every day. If a flood protection system is viewed as providing solely flood protection, then it is used only during heavy storm events. Even though a flood protection system saves a community from disastrous economic losses from rare storm events, it is never foremost in people's minds. If a flood protection system embodies a natural creek that has habitat value, recreational elements and opportunities for children to interact with nature, then it will be used on a more frequent basis and be viewed with more importance in relation to other necessary societal expenditures.

- Cities – Cities must take a leadership role in establishing the vision for their community for flood protection infrastructure. Cities must define the goals for a Creek Enhancement Plan. Cities must support the objectives of a 50-year plan if it is to be successful, and these objectives must be incorporated into the city's General Plan to ensure long-term commitment and provide the opportunities for eventual implementation through future land use decisions.

- Community Based Organizations/Non-Governmental Organizations/Non-Profit Groups – These community groups can play a key role in adding benefit and value to a community's Creek Enhancement Plan. For example, community organizations may harness the energy of volunteer citizens to monitor the health of the natural creek after it's converted from a concrete channel. Another group may partner with the Flood Control District to help maintain some of the features of a natural channel using youth labor, which benefits the community by providing work for a segment of the community and provides activities for them after school. Community groups will be natural and necessary partners to communicate and outreach to the public about the overall benefits of a Creek Enhancement Plan and watershed based community planning processes. The Resources Conservation District has a long history in assisting community groups in these efforts.

- Regulatory Agencies – Regulatory agencies must invest time up front in the planning process to make sure the Creek Enhancement Plan includes the proper balance of habitat for the natural creek system. The regulatory agencies must also be flexible when the only way to implement a more natural system is by "shoehorning" it into an urban environment and compromises on everyone's part are required to meet the sometimes daunting constraints involved. Balancing community use of the creek as a public open space with habitat needs for species will be especially tricky.

Challenges

There are challenges to every endeavor in life, and addressing creek issues is no different.

- Jurisdictional Boundaries – It will be a challenge to develop watershed management plans in watersheds that span several jurisdictions.

- Form and Function – Unfortunately a concrete channel is much more efficient at moving flood waters than a natural creek. As a result, a natural creek needs to have more room (perhaps several times the width!) than a flood control channel. There are solutions to this, but coming to a consensus or collective agreement will be difficult.

- Conflicting Interests – Finding solutions that meet the concerns of the environmental and regulatory community for habitat preservation, the concerns of the neighborhood for aesthetics, the concerns of property owners on the floodplain for flood protection and the concerns of those property owners who front on the creek will be difficult.

- Political Leadership – It will also be difficult to develop 50 year plans for creek enhancement in a political environment that cycles on a four year period.

- Unified Vision – It will be a challenge for some communities to establish a collective vision for their creek, and to determine how to make their creek a resource and amenity for the community.

- Funding – A list of challenges would not be complete without funding. Funding, of course, seems to be an issue wherever we turn, and creek issues are no different. Along with any long-range plan for creek enhancements must be a plan to fund the improvements and the ongoing maintenance.

- Climate Change – This will result in increased storm runoff and flooding, and increased water surface elevation at a creek's mouth, which will result in more

property in the floodplain. However, this may be a trigger for comprehensive watershed based planning around creeks.

The Flood Control District will continue to provide the best service to the cities, the county, and their residents, for the needs of today and of the future. To be successful, we feel this will require a long-term, multi-objective approach on a watershed basis with community-based planning. Some effort to better define the potential costs and constraints to implementing more natural flood protection needs to be done. Creek issues can be resolved and challenges can be overcome, if there is a desire on everyone's part to focus on common goals and work together.

Footnote 1

Revenue for constructing flood protection projects and maintaining existing flood protection facilities comes from a portion of the 1% ad-valorem property tax on parcels within a flood control zone. A flood control zone is a major watershed area within the county; for example, flood control zone 1 is the Marsh Creek watershed and flood control zone 9 is the Pinole Creek watershed. Prior to Proposition 13 in 1978, each year flood control zones established their budget needs for the upcoming year and recommended a tax rate to fund the budget. The budget and recommended tax rate was developed through a community-based advisory committee within the watershed. After Proposition 13 was passed in 1978, the tax rate was locked in and the total property tax collected was reduced to 1% of assessed value. In 1978 some flood control zones had a reasonable tax rate based upon projects that were underway. Other flood control zones had reduced tax rates because the zone had a surplus or there were no pending projects. As a result, today the revenue within flood control zones throughout the county vary significantly, with as low as a zero tax rate in Zone 9 (Pinole Creek watershed). This results in a zero annual investment per residential parcel in the Pinole Creek watershed for flood protection, $35 annual investment per residential parcel in the Walnut Creek watershed and a $70 annual investment per residential parcel in the Marsh Creek watershed.

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