

FLOOD PROTECTION PROJECTS & THEIR REGULATORY PROCESS: **AN ANALYSIS**

Regulatory Challenges & Opportunities Inherent to
Flood Control Projects in Sensitive Habitats



San Francisco Bay
Conservation & Development
Commission



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**FLOOD
CONTROL 2.0**



Flood Protection Projects & The Regulatory Process

Flood Control 2.0: Rebuilding Habitat and Shoreline Resilience through a New Generation
of Flood Control Channel Design and Management

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I. Flood Control 2.0 Regulatory Analysis

The combination of aging infrastructure, dynamic changes in the environment and the realization of the benefits of improved riparian and tidal systems offers significant opportunities to improve the health of the built community and the ecosystem of the Bay Area. But these opportunities do not come without challenges. In a region where multiple regulatory and resource agencies share jurisdictions, changing business as usual, especially when there is significant uncertainty and even when the changes will produce long term benefits, will require significant effort on the part of project proponents and agencies. The sense of urgency – both due to the impending next flood and the increasing rate of sea level has raised the stakes for the region, including the natural world. Knowledge of the shortcomings of the existing systems, perpetual limited funding to maintain and improve it, and the need to meet increasing regulatory requirements have increased the tension between public agencies – those that are charged with protecting life and property and those charged with protecting the environment and the animals and plants that inhabit it.

Can the Bay Area flood protection, regulatory and resource agencies develop a regional approach to flood protection that: reduces flood damage; protects wildlife; minimizes impacts to habitat, and; improves water quality, riparian and tidal wetlands. In doing this, can the regulatory process become more efficient, provide certainty and reduce costs of monitoring and mitigation or provide better outcomes for the money expended?

The opportunity presented involves taking a step back, rethinking, re-engaging and changing practices and relationships in order to have better outcomes for the region. This requires people from all sides of the issues to participate and collaborate to create a better future while looking to achieve multiple benefits. That means that there will likely be areas of compromise and the need to work with uncertainty, which makes both flood protection and regulatory and resource agencies uncomfortable. This is not new to any of the players but the level of uncertainty and the risks seem greater. A particular challenge for regulators is to work in this challenging environment and still adhere to the state and federal laws and policies. The Bay Area is beginning a new journey, with a new paradigm, but the innovative spirit that inhabits this region is a tool in a very large toolbox that will serve it well. It is also important for all to recognize that change is likely necessary – in practice, policy and perhaps even laws. In order to work well together it will be necessary to establish common goals. But first it is important to understand the system that exists, and how the region is currently functioning.

This report explores the regulatory issues in the realm of current flood protection projects and the future adaptation of regulations and/or permits as agencies pivot to

respond to the challenges of climate change, sea level rise, changes in precipitation patterns, and storm surge events predicted in the coming decades. This broad analysis made use of case studies on specific flood protection projects, interviews with agency staff, meetings and conference presentations, as well the review of a number of permits, planning and regulatory documents on the subject of flood protection and resource protection, as well as the laws, policies and regulations that govern them. This report and analysis was conducted in an effort to discover underlying challenges to an efficient permitting process and provide recommendations for improvement to all parties.

II. Overview of Flood Protection in the Bay Area

People have been working to contain creeks and rivers since the early European settlement nationally and the 1850's in the Bay Area. Land around the Bay was developed first for agriculture and housing, and then over time to create the towns and cities we recognize today. After World War II, the Bay Area experienced tremendous growth in the low-lying flood plains of rivers and creeks around the Bay. As a result of major flooding Congress issued the Flood Control Act of 1936. Additional flood events in California the 1950's and the need to protect people and development ushered in the era of flood control and dams. Creeks and streams were dammed, realigned into channels, and confined by levees and other flood control structures to provide space for agriculture, housing and development, thus reducing the frequency of flooding impacts to these developed lands and reducing the chances of periodic natural stream and river avulsion occurring.

Public projects and infrastructure were constructed to provide water security to people moving to and settling in different parts of the Bay Area. A number of dams, water control structures, levees, and channels were constructed to contain and direct the water resources within various watersheds. As public infrastructure was put in place, it provided resource stability and economic opportunities for more people to move to the region. The channelization and rerouting of the creeks and streams facilitated even greater urban development. This stabilization of the environment created economic opportunity in the region now freer from constant recovery from destructive flooding events of the past. In the process, however, the creeks and rivers that made up the Bay watershed were highly modified and some were lost altogether. Based on historical mapping, 353 historical creeks were identified around San Francisco Bay. Of these, 47% drained directly onto tidal marshlands, 24% were disconnected from the tidal environment and dissipated on alluvial plains, 18% connected to a tidal channel network within tidal marshlands, and 11% entered directly into the Bay (SFEI, 2016). Today, only 12% of these remain in their somewhat natural form, 29% have been lost altogether, 51% now flow into tidal channels adjacent to diked or filled historical marshes, 6% flow into diked baylands and bay fill, and the remaining 2% were re-routed and are now

tributaries to other channels (SFEI, 2016). Today, 33 of these channels are actively managed for flood control purposes and drain about 70% of the Bay Area watersheds. The success of the flood control infrastructure also created a sense of security that the waters within the creeks had been contained and that residents were completely protected from flooding. As development encroached upon the creeks/streams, the citizens looked to the federal and local government to provide public safety, a sense of security, and to protect property owners from the damages of flooding. The region has also benefited from periods of mild weather patterns, punctuated every decade or two with strong El Niño winters, and the occasional atmospheric river storm, but not the severe storms that were seen earlier in the century or in the mid 1800's.

Many of the original flood control projects were designed by the US Army Corps of Engineers (USACE) and included straight, wide, trapezoidal, concrete channels with bed slopes sometimes greater than the channel's natural slope. Channels were typically bordered by levees/floodwalls and eliminated many of the natural characteristics of the stream/creeks. This system was designed to move floodwaters down to the Bay as efficiently as possible and to protect people living along waterways from storms that would produce a 100-year flood event (a flood that has a one percent chance of occurring each year). Some of these trapezoidal channels widened into broader floodplains in tidal reaches, while others were channelized right up to the interface with the Bay.

The original trapezoidal channel designs often resulted in a gradual accumulation of sediment in the channel during smaller flood events, but it was thought that these designs would allow sediment to be flushed out of the channel during larger flood events. In practice, flood control districts found that they required significant and regular sediment removal to maintain proper function and flood protection capacity for adjacent communities, increasing the projected cost of maintaining the system. In addition, some of the channels interface with the Bay at elevations below sea level, creating a situation where Bay sediments can travel upstream and be deposited in the channel, further reducing capacity.

While maintenance of the channels was a necessary activity, there was limited regulatory oversight in the 1960s and prior to the National Environmental Protection Act (NEPA). Sediment removed from the channels was side casted or placed nearby and there was little consideration of the disruption to habitat. As migratory anadromous fish populations dwindled, more concern was expressed over changes in rivers and streams used by salmon and steelhead. In the late 1960s and 1970s, state and federal environmental regulations were enacted, including the Clean Water Act, Porter-Cologne Act, McAteer-Petris Act, Wildlife Coordination Act and Endangered Species Acts to protect particular species, their habitats, and environmental resources. The enactment of these and other laws, and their associated regulations, required that flood protection agencies obtain permits for flood control capital improvements and maintenance projects from multiple agencies at the state and federal level. Local flood protection

agencies and public works became subject to these regulatory requirements for both maintenance and capital improvement projects. In the Bay Area, eight agencies have oversight of flood protection projects – the USACE, US Environmental Protection Agency (USEPA), National Marine Fisheries Service (NMFS), US Fish and Wildlife Service (USFWS), San Francisco Bay Regional Water Quality Control Board (Water Board), San Francisco Bay Conservation and Development Commission (BCDC), California Department of Fish and Wildlife (CDFW), and when owned by the State of California, the State Lands Commission (SLC). In some instances, local governments may also have regulatory authority over projects. Local jurisdiction over flood control channels has typically been based upon geographic boundaries of the city and/or county. In many cases, these are unrelated to watershed boundaries, sometimes creating responsibilities that cross municipal boundaries.

A. Flood Protection Agencies

In the Bay region, there are multiple flood protection agencies; some are county and others are city agencies or part of the local Public Works Departments. In addition, some flood protection agencies are combined with water districts, while others are their own entity. As municipal agencies, they are locally funded, and have annual budgets to maintain the flood protection infrastructure and property they own. Capital projects require fund raising efforts that are most frequently accomplished through municipal bonds that are voted on by residents of their service area. They generally own the land on which the infrastructure resides, and several have responsibility for the stewardship of the watershed. They have limited easements along the side of the creeks and channels in which to complete maintenance or capital project activities.

There is a diversity of flood protection systems in the region, including those that are heavily constrained with concrete lined channels in high-urbanized areas with little remaining natural creek habitat. On the other end of the spectrum, some watershed and flood protection systems are in a more natural state and have more available land in which to manage floodwaters. As with the infrastructure itself, there is a variety of thought and approaches to flood protection systems in the region, with some agencies moving towards a more natural, or watershed, approach to flood protection, others who are more focused on a traditional approach, and others who are interested in a hybrid system where some aspect of each approach is feasible.

The Bay Area Flood Protection Agencies Association (BAFPAA) was established to coordinate and provide mutual support in planning and implementing flood protection services amongst the flood protection agencies in the Bay Area. BAFPA provides a unified voice for Bay Area flood protection agencies in developing and implementing regional plans and working with other regional agencies at the state and federal level.

B. Maintaining Aging Infrastructure and Adapting to a Dynamic Future

1. Existing Infrastructure

Based on interviews with five of the nine Bay Area Flood Protection Agencies and information reviewed, it is understood that much of the existing flood protection infrastructure in the Bay Area is in need of repair and updates, and in many cases the infrastructure may not be able to fully meet the needs of its service area during high storm events. In some cases, the structures have outlived their original design lifespan, and in other cases improvements are needed to address changes in the environment, including increased development and precipitation patterns. The agencies also note that lack of funding and staff shortages have led to deferred maintenance of stormwater facilities and subsequent decline in service. Flood protection agency annual reports and capital improvement project descriptions list examples of aging infrastructure including:

- Stormwater pump stations are aged and/or undersized, need maintenance, upgrades, or replacement of worn-out mechanical and electrical equipment to increase capacity to handle 50-100-year level storms
- Levees protecting subsided neighborhoods need maintenance, with special attention to earthen levees that have been eroded or penetrated by rodent burrows and roots
- Earthen channels need maintenance, including bank stabilization and regular inspections for channel incisions, erosion, or accretion of sediment within the channels
- Dams need maintenance, dredging, and/or raising; damaged dam spillways need repair
- Deteriorated concrete floodwalls or channel linings
- Channel walls are too low to contain 50-100-year flood levels
- Tide gates are corroded or otherwise inoperable.

a) Annual and Inter-Annual Maintenance

In addition to flood protection components that may be beyond their designed lifespan, there is maintenance of the system that is undertaken on an annual and inter-annual basis. In order to determine maintenance work needed the flood protection agencies identify and note in each agency's system management plan regular inspection, assessment and maintenance of the following facilities:

- Pump stations, large intercepting drains, storm drains and culverts
- Earthen channel maintenance, erosion protection and bank stabilization
- Inspection for channel incisions, as well as erosion or accretion of sediment within the channels
- Maintenance and evaluation of water diversions structures in channels
- Water quality inspections, especially behind dams and in concrete channels
- Levee inspections and maintenance
- Trash and debris removal

- Vegetation management, including downed tree and invasive plant species removal
- Revegetation projects
- Data collection from gauges and stream measurement instruments

The information gathered about maintenance needs is then incorporated into the flood protection agency's work program for the upcoming season, year, or alternating year. These activities (replacing, repairing or maintaining flood infrastructure) are authorized through regulatory and resource agency permits and biological opinions because they: 1) involve fill in an aquatic setting; 2) have potential impacts to resources (habitat and species); 3) involve discharges or changes in water quality, and/or; 3) affect the beneficial uses of the water body associated with the work.

Separately from the flood protection agencies, CalTrans inspects and assesses bridges crossing creeks (in their purview) and channels every two years for their physical and functional condition as well as adequacy of the bridge conditions. While CalTrans may conduct work associated with a creek, channel, or flood protection feature, it is permitted separately from the flood protection agencies' projects.

b) Sediment and Vegetation Removal

All flood protection agencies report sediment and vegetation management as an ongoing concern. However, presently there is no systematic survey of flood control channels that allows the accurate identification and mapping of deposited sediment in the region (SFEI 2016). Sediment accretion can occur anywhere along the channel reaches depending on topography, hydrology and channel characteristics. Loss of channel and tidal prism reduces the flood capacity of the channel and encroaching vegetation can cause further sediment accretion within the riparian channels and where they meet the Bay. Most sediment (72%) between 2000 and 2013 has been removed from tidal reaches and likely is very fine grained characteristic of silts and clay (SFEI 2016). Vegetation can also colonize the channel bed or mouth, create organic debris, trap trash, and physically block channel flow. Both the sediment lining the channel beds and the vegetation growing there have habitat value as well as water quality implications, and therefore represent a permitting challenge when either is proposed for reduction or removal. Because both sediment and vegetation build up over time, the need to remove it is a regular and repeated activity. Most sediment removed between 1973 and 2013 came from channels that were dredged on average at least once every five years but frequencies vary, in response to and following flood events, to annually or biannually (SFEI 2016). Sediment and vegetation removal events that restore flood water capacity in a limited system can also disrupt habitat and species, reducing habitat value each time the action occurs and resulting in cumulative effects over time.

Once sediment is removed from channels, it needs to be disposed of or used. This occurs in several ways depending on a number of factors. Sometimes sediment is reused, sometimes the sediment is left in a pile for others to harvest it as needed, and some sediment goes directly to landfill. Many flood protection agencies include

beneficial reuse of sediment for levee maintenance in their sediment management plans. These sediment management plans target sediment removed from channels as material that can be used to maintain existing levees, as is done along Novato Creek. Use of the sediment in habitat restoration projects is not a frequent practice, in some cases because the coarser grain size of channel material does not match with the needs of tidal restoration sites. In addition, pathways to transport and deliver the sediment are not well established. When the sediment is proposed for use in an aquatic setting, sediment testing may be required to ensure that it doesn't contain elevated levels of contaminants.

Over the past several decades, reasonably large and active programs of sediment removal have occurred in Alameda Creek, Walnut Creek, Petaluma River, Gallinas Creek, Novato Creek, San Tomas Aquino Creek, Napa River, Old Alameda Creek, and Sunnyvale East Channel; a wide spatial distribution around the Bay (SFEI, 2016). Although there is some existing re-use of sediment for levees and limited restoration, greater than 60% of this sediment was disposed of as waste (SFEI, 2016). Sediment removal from flood protection channels has cost \$115M (not adjusted for inflation) or about \$2.8M per year since 1973. Costs per channel area vary between channels ranging from \$1,225,000 to \$5,459,000 per square mile of channel dredged per year (average cost is \$720,000) (SFEI 2016). Currently these costs are borne solely by the flood protection agencies through annual funding from the communities they serve.

c) Rehabilitation of Existing Channels

In efforts to maintain and improve the existing flood protection levels, flood protection agencies have short and long term plans to improve their channels. These include finding ways to increase the tidal prisms, reconnect the streams to adjacent flood plains, and create containment basins and habitat features, among others. Approaches being considered include: levee remediation, stabilization and raising; dredging of channels and debris removal; reconsidering connections where natural creeks meet concrete channels; fish ladders, and; addressing water quality issues. These larger, systemic considerations offer an opportunity to rethink flood protection in the Bay Area. In some areas, like the Living River project in Napa, major rehabilitation and realignment of flood protection features provided multiple benefits to the community far beyond flood protection measures, but was an expensive and lengthy undertaking that required support from multiple partners in the community and government and has been underway for 16 years.

Although many of the creeks/streams around the Bay Area are leveed and confined into specific channel orientations, flooding remains a significant issue in the Bay Area. Today, increased urban runoff, decreased channel capacity from sedimentation in the channel, and highly urbanized areas that crowd the streams and confine the creeks can exacerbate the flooding in some areas. Flood protection managers around the Bay Area and the State of California are trying to identify funding to improve their flood control systems and adapt to future changes. In planning for a future with climate change, the

Bay Area is reassessing traditional flood control methods in favor of multi-benefit projects that include restoration or creation of natural elements that provide habitat and leverage the services provided by these natural landscapes.

2. Addressing Climate Change

In considering flood protection in the Bay Area, it is important to think systemically, rather than by a single repair, maintenance project, or given year. It is equally important to consider the watershed within which the project is situated. In the Bay Area, the watersheds have been fundamentally changed such that sediment that was once supplied to the Bay is trapped behind dams, is dredged out, or the flow is reduced to such an extent that perhaps only about 70% of the sediment that could pass through to the Bay actually reaches the Bay. The amount of sand and gravel that is trapped or removed upstream is proportionally greater (SFEI 2016). Climate change is likely to cause significant changes in precipitation patterns, with more rain and less snow forecasted and greater potential for prolonged droughts that may put new strain on water management in the region. In addition, sea level is rising more rapidly than it has since settlement of the Bay Area. Rising water levels in the Bay, in combination with higher tides and larger storm surges, require consideration of Bay waters and sediment flowing upstream further than previously experienced. In addition, communities now need to consider tidal flooding from the Bay rather than just riverine flooding during storms. In many areas, flood protection agencies do not have the jurisdiction or authority over Bayside properties owned by others, leaving individual property owners responsible. All of these factors create significant uncertainty for both the flood protection managers and the regulatory and resource agencies that exercise oversight of the projects.

In addition to the fundamental physical process changes that have taken place over time, habitat for native species has been significantly reduced, especially riparian corridors and at the river-Bay interface. This reduction in habitat has caused a reduction in abundance and diversity of wildlife within the region. Some species, especially those dependent on transitional habitats such as intertidal zones, brackish water, riverine deltas, and flood plains, have declined so significantly that they are listed as threatened, endangered, and require special protections and efforts to stabilize the populations (i.e., Ridgway's rail, tiger salamanders, red legged frogs, Chinook salmon, salt marsh harvest mouse and others).

In recognition of the historic role that flood protection practices have played in reducing fresh water and sediment flows increasing impacts to riparian and intertidal habitats, and considering future impacts of rising sea levels, flood protection and regulatory and resource agencies have begun to reconsider traditional flood protection measures in the Bay Area. Further, people have started to reconsider the assets creeks and rivers can offer to their neighborhoods and cities. This awakening has created more civic involvement, with concerns over necessary flood protection coupled with environmental and community benefits. These benefits include improved water quality,

open space, educational opportunities, wildlife habitat, recreation, aesthetics, reduction of flood risks, carbon sequestration, etc.

III. Regulatory Framework

A. Laws, Policies, and Agencies

Federal, state, and local regulatory agencies authorize and condition maintenance and construction of flood protection projects and related infrastructure. In the Bay Area, the primary permitting agencies for flood protection projects are the USACE; the Water Board; the CDFW, and BCDC, though on many projects BCDC's jurisdiction is limited. The US Environmental Protection Agency (EPA) has oversight authority over the Water Board and the USACE. SLC provides leases and makes public trust determinations when state property is involved. In addition, USFWS, NMFS and CDFW review projects for their potential impact to listed species. Table 1 includes a list of the agencies, and the respective laws and policies that each agency implements. In addition, flood protection projects in many cases are subject to USACE flood control requirements and guidance under the Flood Control Act of 1965, as amended, and the Federal Emergency Management Agency (FEMA)'s requirements to be included in the Federal Flood Insurance Program (NFIP).

Each of these agencies has individual authority to regulate activities within its jurisdiction based on the enacting state or federal law and policy. Agencies consider human safety elements when reviewing projects and require the development to meet certain standards, though the majority of the agencies focus their review on reducing impact to natural resources. Each of the agencies have similar abilities to protect water quality, wildlife, habitat (specifically wetlands), and physical and biological processes, as well as the ability to limit fill in State or Federal Waters including jurisdictional wetlands and riparian habitat. These overlapping authorities vary slightly to significantly in how they are implemented, sometimes resulting in conflicting requirements that the flood protection agencies must wade through in order to comply with the requisite permits. This presents a challenge both to the regulatory and resource communities and the project proponents. While each of the agencies has their respective roles in project review and permitting, there is no defined hierarchy of the agencies, in that none has authority that trumps the others. Generally, agencies with more specific responsibilities and expertise are relied on by agencies that have less specific authorities. However, if a project or requirement conflicts with another policy the agencies may have to seek a separate remedy or not authorize the project. In some limited instances, there can be conflicting requirements between the agencies due to the often more stringent requirements of the State. In these instances, coordination is necessary to resolve the issue and move the project forward.

In some cases, the agencies have formally recognized the overlap in authorities and agreed to coordinate with one another on specific issues, especially where one agency

may have greater authority, more specific laws and policies, and/or expertise. One example of this acknowledgement is BCDC's Water Quality Policies, which specifically direct the Commission to seek the advice and rely on the decisions of the Water Board. The two agencies also created a Memorandum of Understanding (MOU) to further agree and document how the agencies will work together. These coordination features improve outcomes for both the agencies and the permittee.

An area where there is significant overlap between agencies is when a project proposes to fill an aquatic environment, whether it be "fill in the Bay" as BCDC defines it, "fill in Waters of the State" per the Water Board, or "fill in the Waters of the United States" as the USACE defines it. Each of the agencies define this issue differently due to the intricacies of their individual statutes, but in general the goal is to prevent or to reduce the amount of fill to the minimum necessary for the project, if the project necessitates fill in an aquatic setting. For example, the USEPA, the USACE, and the Water Board cannot authorize fill when (1) a practicable alternative exists that is less damaging to the aquatic environment or (2) the jurisdictional waters would be significantly degraded, per the Clean Water Act. BCDC's laws and policies have similar goals, but allow for fill that is the minimum necessary for the project if it has no upland alternative and serves a water-oriented use.

The State of California adopted a further refinement of policies regarding aquatic environment, the California Wetlands Conservation Policy, which seeks to "achieve a long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship, and respect for private property." This policy, also termed the "no net loss of wetlands" policy is administered primarily by the State and Regional Water Boards, though CDFW also implements this policy through their regulations.

Table 1: Regulatory and Resource Agencies and their respective laws and authorities. Please see actual laws and regulations for specific language and requirements.

| Regulatory Agency | Authority | Law | Legal Mandate |
|---|------------------|--|--|
| USACE | Federal | Flood Control Act of 1965 | Regulates placement of dredged or fill material into waters of the U.S. |
| | | Federal Clean Water Act | |
| | | Rivers and Harbors Act of 1899 | |
| FEMA | Federal | Robert Stafford Disaster Relief and Emergency Assistance Act of 1988 | Coordinating government-wide disaster relief and preparedness efforts |
| USEPA (Oversight and Enforcement) | Federal | Federal Clean Water Act | Establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters |
| BCDC | Federal | Coastal Zone Management Act | Protect and manage coastal zone resources |
| | State | McAteer-Petris Act | Minimize Bay fill, maximize public access to the Bay |
| | | Suisun Marsh Protection Act | Specific provisions to protect Suisun Marsh |
| San Francisco Bay Regional Water Quality Control Board | State | Porter-Cologne Water Quality Control Act | Protects the beneficial uses of waters of the state, establishes water quality objectives, and provides implementation plans (“Basin Plans”) |
| | | State Clean Water Act | Implements federal CWA at state level, regulates discharges to the waters of the state. |

| Resource Agency | Authority | Law | Legal Mandate |
|---|------------------|--|---|
| USFWS | Federal | Federal Endangered Species Act | Protection of federally listed species and their critical habitat |
| | | Wildlife Coordination Act | Prevents loss wildlife and their habitat by requiring consultation with federal and state wildlife agencies when a water body or stream is modified |
| | | Migratory Bird Treaty | Protects migratory birds and their habitat |
| NMFS | Federal | Federal Endangered Species Act | Protection of federally listed species and their critical habitat |
| | | Magnuson-Stevens Fishery Conservation and Management Act | Protection and management of essential fish habitat |
| | | Marine Mammal Protection Act | Protection of whales, dolphins, porpoises, seals and otters |
| California Department of Fish and Wildlife | State | California Endangered Species Act | Protects state listed species and their habitat |
| | | Fish and Game Code | Protects the beneficial uses of waters of the state. Requires lake and streambed alternation permits |

| Land Manager | Authority | Law | Legal Mandate |
|--|------------------|--|---|
| California State Lands Commission | State | California Constitution, California Code of Regulations Public Trust Doctrine | Leases state owned, tidelands Administers the Public Trust |

The State Water Board has implemented a phased approach to wetland protection throughout the state, and importantly adopted a policy statement with the goal of protecting all waters of the state using a watershed approach protecting both water quality and the beneficial uses. This policy relies on a sequential approach of avoidance, minimization and mitigation of impacts, similar to that of the State and Federal Endangered Species Act. This policy is meant to protect the functionality of wetlands and riparian areas throughout the state. As a result, flood protection projects are being required to take a watershed approach in designing their projects.

Habitat and species protection is another area where several agencies have authority and policies that are intended to reduce or eliminate impacts if possible. As with fill, both federal and state agencies have regulatory requirements, but because the resource agencies generally have more expertise and more stringent laws, the USACE, Water Board, and BCDC may seek the advice and expertise of NOAA Fisheries, the USFWS, or CDFW. Further, when a project would result in a “taking” of listed species or impacts to its critical habitat, these agencies would not permit a project without a take authorization from the appropriate resource agency. In recognition of the need for coordination, the resource agencies’ laws and policies direct staff to provide technical advice to other regulatory agencies and conversely some agencies’ policies direct staff to seek the advice of the resource agencies when listed species occur at a project site.

The last significant area of overlapping authorities is in water quality. Nationally, the USEPA administers the Clean Water Act, covering protection and restoration of the nation's waters. The EPA has delegated much of its programs to the Water Board and the USACE, but retains oversight of many of the policies and programs. The Water Board issues 401 certifications and the USACE issues 404 permits with the EPA’s oversight. The USACE relies on the Water Board’s 401 certifications in its permitting process. In this way the federal and state water quality activities and regulations are coordinated, reducing overlap of the Clean Water Act between these three agencies. BCDC also has water quality policies and the authority to regulate these issues under the McAteer-Petris Act, but these policies are directly linked to the Water Board findings and similarly allow for significant coordination.

B. Federal Emergency Management Agency (FEMA)

While not a regulatory agency per se, FEMA plays a large role in flood protection development and management throughout the region and nation. FEMA is part of the Department of Homeland Security and responsible for supporting citizens and first responders so that the communities and states are prepared, protected against, and ready to respond to all hazards that may occur, including flooding. Additionally, in a presidentially declared disaster, FEMA provides financial and physical support for the area devastated by the disaster. To assist state and local governments with preparedness, FEMA assists in comprehensive disaster preparedness plans, assists in

intergovernmental coordination and provides financial assistance due to loss during a disaster. Specifically related to flood risk, FEMA is responsible for identifying for the public those areas where there may be risk associated with the levee systems, whether the levees have been certified or not. FEMA is also mandated with managing the National Flood Insurance Program (NFIP). This is the primary intersection of FEMA's responsibility with the local flood protection agencies. FEMA is responsible for identifying flood hazards and assessing flood risk associated with these systems. The local flood protection agencies, along with the USACE when applicable, are responsible for the construction, maintenance, and/or certification of levee systems, dams, and/or floodwalls within their region.

FEMA is specifically concerned with identifying the areas at risk of a greater than 1-percent-annual-chance flood. FEMA also establishes the flood insurance premium rate zone designations landward of levees. FEMA relies on the adjacent communities and levee managers to hire a professional engineer or federal agency to provide evidence that the levee condition meets the regulatory requirements of the NFIP regulations (minimum 1-percent-annual-chance flood). And only after receiving this certification and reviewing the material will FEMA accredit the levee system. It is this certification process that allows communities to have access to federal relief funds for loss during a flooding event. If the area does not have levee certification through FEMA, property owners must purchase expensive flood insurance to cover the loss during a flood event.

Local communities participate in the NFIP through adoption and enforcement of floodplain management ordinances. FEMA provides federally backed flood insurance for members of the community. Additionally, communities can bolster their floodplain management activities beyond the minimum requirements of the NFIP to further reduce the insurance premium rates as a result of the reduced flood risk to properties behind levees. Areas identified as high-risk and not protected by the levees from the 1-percent-annual-chance flood are considered to be in Special Flood Hazard Areas (SFHAs) and require flood insurance for any mortgage that is federally backed, regulated or insured.

1. FEMA Mapping Process

FEMA produces the Flood Insurance Reference Maps (FIRM) using the most up to date and available data. Communities and levee managers provide the necessary levee condition data and information to FEMA for incorporation into their FIRM. If a levee had previously been designated as providing appropriate flood protection, but is in the process of gathering new condition information, then the area behind the levees may be classified as a provisionally accredited levee (PAL) and designated as a medium-risk area similar to the designated associated risk for accredited levee systems. However, on the FIRM, additional information will be added to indicate that this is a PAL area so that property owners and communities can proceed accordingly and understand the associated flood risk. A majority of the levees within the national levee system (USACE Levee Safety Program) are locally owned and maintained.

FEMA established the Code of Federal Regulations (Title 44, Chapter 1, Section 65.10) detailing requirements for levee systems to meet the NFIP design, operations, and maintenance and for mapping on the NFIP flood maps. These requirements for levee certification include: (1) maintaining sufficient freeboard; (2) opening and closure areas with sound engineering practices; (3) embankment protection from erosion given local conditions; (4) assessed settlement rates and sufficient maintenance schedule, and; (5) meeting certification requirements set forth in CFR Chapter 44, Section 65.10 (See Appendix B for more details). Further, vegetation is allowed on portions of levees, but USACE guidance suggests vegetation free zones at the toe of both the waterside and landside levees to allow for required maintenance and inspection of the levees. These certification requirements guide the design and maintenance of most levees within the Bay Area flood protection agencies' jurisdictions in order to meet FEMA requirements and maintain flood insurance for the local communities.

C. USACE Flood Control Program

The U.S. Army Corps of Engineers (USACE) has a long history with national flood protection through the Flood Control Act of 1936, and subsequent Acts, and plays an important role in flood control projects. Not only does USACE construct federal flood protection projects, it also partners with local sponsors in building, improving, or expanding their systems. Authorized to help with flood damages, USACE provides technical manuals for operations and maintenance, as well as disaster preparedness. USACE also assists the local sponsors of non-federal flood control systems of all sizes throughout the country in the form of guidance on the proper operations and maintenance of the systems. USACE can help these local sponsors before, during, and after a flood, and more importantly can explain the minimum standards necessary for non-federal projects to remain eligible for USACE rehabilitation services post-flood. Upon agreeing to partner in a flood control project with USACE, the local sponsor of the project agrees to maintain the USACE built infrastructure (levees, channel) as specified in the project's Operations and Maintenance Manual (OMM). USACE Operations and Readiness Branch provides the OMM and evaluates if the maintenance performed is adequate and adheres to its designs. Older OMMs are engineering based with no/little reference to environmental values of the facility.

Once constructed, the levees and channels undergo routine and periodic inspections to identify any areas of noncompliance. Such deficiencies need to be addressed in order for the flood control system to benefit from federal flood control disaster rehabilitation and repair programs. Both routine and periodic inspections incorporate a consistent inspection checklist that applies to all USACE constructed levees, regardless of setting, and result in a levee system rating for operation and maintenance of the project. This rating determines if a levee system is included as active in the USACE's national Levee Safety Program. Active levees in the Rehabilitation and Inspection Program are eligible for federal rehabilitation funds for damages caused by a flood event. Because of the

potential for rehabilitation funds after a flood, flood protection managers are careful to manage their levees in compliance with this program unless it becomes infeasible.

D. Jurisdictions

In addition to policy overlap, regulatory and resource agencies also have overlapping jurisdictions. Jurisdictional boundaries, whether defined by the natural environment (e.g. the presence or absence of a species, the extent of a hydrodynamic regime) or the anthropogenic construct (e.g. city limits, county limits), often determine a project’s interest groups and regulatory requirements. When a project is within the purview of multiple jurisdictions, as is often the case, it must simultaneously meet the requirements associated with each – a challenge, when jurisdictional mandates are not coordinated (at best) or conflict (at worst).

Table 2: San Francisco Bay Area Regulatory and Resource Agency Jurisdictions.

| Agency | Jurisdiction |
|---------|--|
| USACE | Waters of the US, including navigable waters, interstate waters, territorial waters, tributaries (ditches), wetlands, and “other waters” |
| USEPA | Waters of the US, including navigable waters, interstate waters, territorial waters, tributaries (ditches), wetlands, and “other waters” |
| BCDC | Bay (which includes tidal marsh and sloughs), 100 feet inland of Mean High Tide, salt ponds, managed wetlands, named sloughs, certain waterways, tidal portions of rivers and creeks, and priority use areas |
| SFRWQCB | Waters of the state, including any surface water or groundwater, including saline waters, within the boundaries of the state |
| USFWS | Bay and tributaries |
| NMFS | Bay, streams that support salmonids, green sturgeon |
| CDFW | Bay and tributaries |
| SLC | Submerged lands -all land below the water of a navigable lake or stream |

Note: These jurisdiction descriptions are generalized, please see the agencies’ laws and policies for definitive descriptions.

1. Multiple Local Government Jurisdictions

Creeks and watersheds often flow through various municipalities and across artificially constructed boundaries, necessitating multi-tiered local government coordination for the coordination, design, and execution of large-scale projects. As an example, the San Francisquito Creek Flood Control Project crossed three cities, one county, and one water management district. The project proponents resolved potential conflicts and confusion on the lower San Francisquito Creek project through the formation of the San Francisquito Creek Joint Powers Authority (SFCJPA). The SFCJPA is a composite entity

charged with planning and executing a flood control channel redesign effort that balances the needs of each member agency. The SFCQPA also made discussions on funding different portions of the overall project more straightforward and provided a forum in which the municipal agencies could regularly meet and keep abreast of progress.

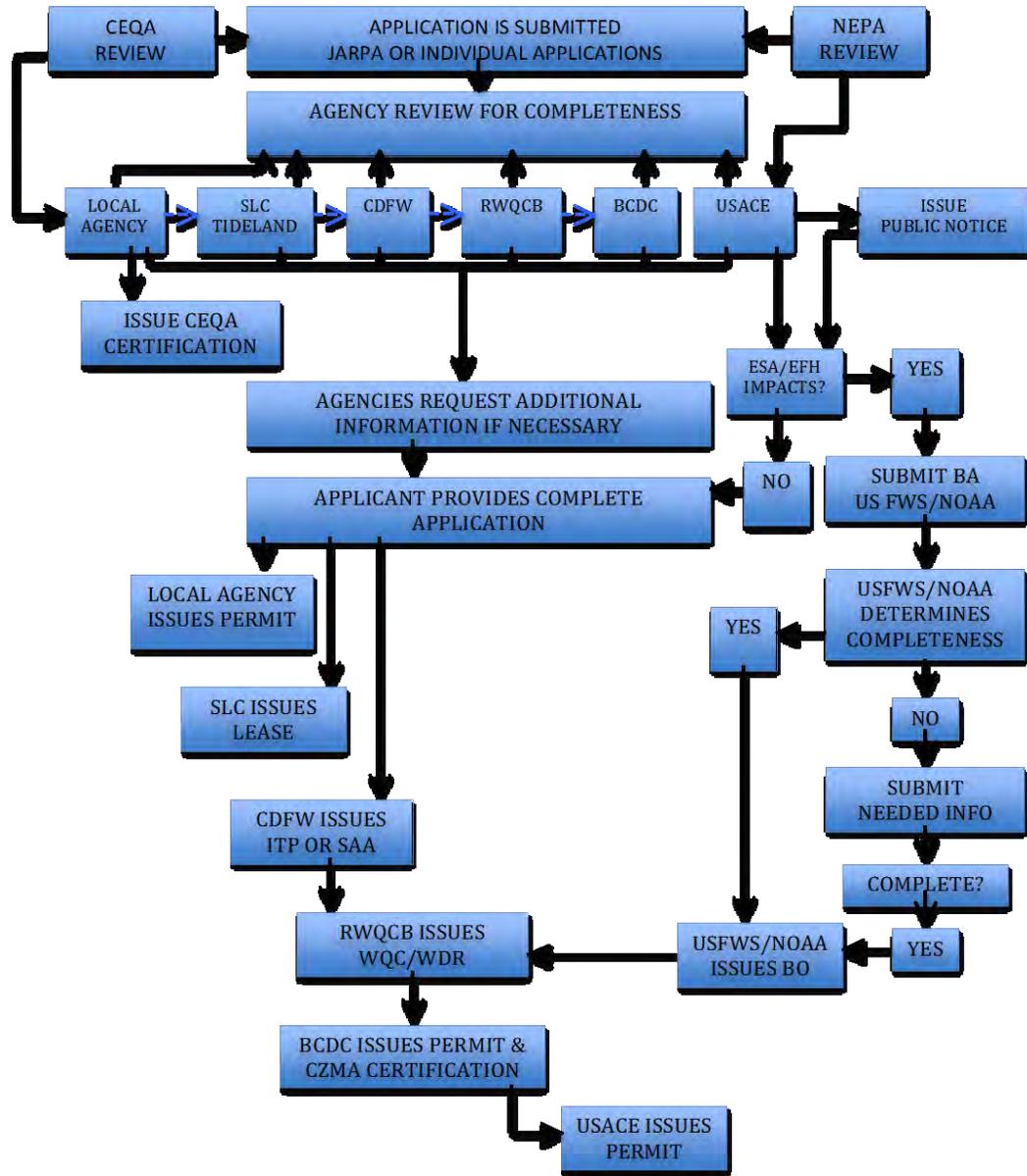
2. Asset-Related Jurisdictions

In addition to regulatory and resource agency jurisdictions, there are also number of potential requirements of any given location related to assets adjacent to or within project sites. Two particularly challenging asset related jurisdictions include those of airports and railroads. Among other assets, these two have specific safety, right of way, and access limiting requirements. For example, being adjacent to an airport limits a project in areas of safety, particularly when including project components that may increase the number of waterfowl that may interface with planes landing and taking off. Similarly, railroads have access limitations and right of way requirements that can limit project components by being a virtually permanent physical barrier to water flow, as well as the need to keep people away from moving trains for safety.

IV. Permitting Process

Flood protection projects are required to apply for and receive permits before work can commence. Projects that might affect riparian habitat, wetlands, or other aquatic habitat include those that change hydrology or drainage such as flood protection, dams, abutments, piers, pilings, riprap, retaining walls, culverts, or outfalls, those that fill wetlands, and restoration projects. As described above, multiple agencies are involved in permitting, from planning to environmental review through permitting and construction. Depending on the size and complexity of the project, the permitting process can last multiple years. In addition, as “systems thinking” and multi-benefit projects becomes more necessary and commonplace, the permit analysis becomes more intricate. Because these projects are highly complicated and involve, in many cases, alteration of a waterway, coordinated permitting is a highly desired but elusive undertaking. Understanding the permitting system is key to taking advantage of efficiencies where they are available. The discussion below of the necessary permits is generalized. For more details of the specifics for each agency or a project level discussion, please contact the individual agencies. The agencies are listed in the order that permitting often occurs, as one permit maybe required of another agency to file a complete application.

San Francisco Bay Region Permit Process



A. California Environmental Quality Act (CEQA) and National Environmental Protection Act (NEPA) Review

Undertaking environmental review is considered the first step in the regulatory process as many permit applications cannot be completed and filed without a CEQA/NEPA review. The review can be relatively simple for small or minor projects, using a Statutory or Categorical Exemption or a Negative Declaration, more complex when using a Mitigated Negative Declaration, or highly complex with a full Environmental Impact Statement (NEPA) or Environmental Impact Report (CEQA).

NEPA and CEQA come into play when a project may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment. The latter requires a discretionary approval (meaning that the agency has the authority to deny the requested permit or approval) from a government agency. Under CEQA, at a minimum an initial review of the project and its environmental effects must be conducted. Depending on the potential effects, a further and more substantial review may be conducted in the form of an environmental impact report (EIR) that includes an analysis of alternatives. The CEQA review process is generally conducted by the first agency acting with discretionary authority, in conjunction with the project proponent. The lead agency for the CEQA review process is generally the first action agency or the agency with the most authority over the project in question, and is often the county in which the activity will take place or a state agency, such as the State Lands Commission or the Water Board, when the county does not have discretionary authority.

Similar to the CEQA process, the NEPA process begins when a federal agency develops a proposal to take a major federal action (new and continuing activities, including projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies). The environmental review under NEPA can involve different levels of analysis than CEQA, but the two primary types of review include: an Environmental Assessment (EA), which is used to determine whether or not the action has the potential to cause significant environmental effects; or an Environmental Impact Statement (EIS) if a proposed action is determined to significantly affect the quality of the human environment. An EIS, like an EIR, would include an analysis of alternatives. It is possible for a project/action to need an EIR from the state's perspective and only an EA from the perspective of the federal government. The NEPA process is generally undertaken by the federal agency performing the action or reviewing the project under its regulatory authority.

Agencies that have reviewing authority over the project but are not the acting agency are responsible agencies. The responsible agencies have a duty to provide comments during the review process, which often state the likely concerns or issues that the permittee will face during the permit process. Therefore, it is important both for the agencies to provide comments and the project proponents to work together through

the CEQA process to identify the project alternative that has the least impacts to the environment, but still meets the basic project purpose.

Through this process, the lead agency and the project proponent should determine the least environmentally damaging practicable alternative (LEDPA), which in most cases is adopted by the project proponents and/or the lead agencies as the preferred alternative. When this is the case, the project proceeds more smoothly through the permit process. In some cases, the conclusion of the review includes findings of overriding consideration, which may allow a project that is not the LEDPA to proceed, but may be controversial. Further, if during the environmental review process an agency finds that the preferred alternative is not the LEDPA, and overriding considerations cannot be made, the proposed project may not be approved as proposed by the permitting agencies.

B. Applying for a Permit

Each regulatory agency has its own application form that can be obtained on its website or at the agency office. In order to receive a permit, the applications must be fully filled out, and provide additional information necessary to understand the project and its consistency with the agency's laws and policies. Once the application is filled out and provided, each agency will respond with a request for additional information or clarifications, and once an application is filed complete, it is processed by each agency individually under its laws and authority. An application fee is generally required by most of the regulatory agencies prior to processing the application.

When applying for a permit from multiple agencies in the Bay Area, a project sponsor can use the Joint Aquatic Resource Permit Application (JARPA) and provide it to each agency to begin the permit process. JARPA is a permit application form that consolidates federal, state, and local permit applications and simplifies the permit process for applicants proposing construction, fill placement, public access impingement, or other development activities in or near aquatic environments and wetlands in the San Francisco Bay Area. JARPA reduces paperwork and processing time for applicants, and improves applicant knowledge of permit requirements and provides the same information to all the regulatory and resource agencies. This improves coordination among agencies and reduces the number of permit revisions and delays. This form can be used in place of individual agency applications for the SLC, RWQCB, BCDC, the USACE, NMFS, USFWS and CDFW. Once a JARPA is submitted the agencies review the application for its level of completeness and if needed, communicate to the applicant the steps necessary to complete it. Use of the consolidated form is voluntary.

1. State Lands Commission Lease

As described in the jurisdiction table, the State Lands Commission holds in the public trust submerged lands and all land that lies below the water of a navigable lake or stream. If a project is proposed on state lands it would require a SLC lease. In processing

a SLC lease, the Commission considers whether the project has significant environmental harm and seeks to reduce impacts through minimization and mitigation measures. The Commission also has the ability to require monitoring of the project for compliance with the lease, as well as effectiveness of minimization measures and mitigation requirements.

An important part of the SLC process is determining whether the project is consistent with the Public Trust Doctrine and the public trust uses of state lands. These public trust uses include: navigation; commerce; fisheries; boating; recreation; natural habitat protection; and to preserve lands in their natural state for protection of scenic and wildlife habitat values. The SLC can make this determination through specific findings or through issuance of a lease (though this method is currently under legal challenge). The project must be found to be consistent with public trust needs in order for the Commission to issue a lease. Because the SLC is often the first agency with discretionary approval authority, it is often the CEQA lead for a project.

Obtaining a SLC lease takes approximately three to four months from the date of submission of a complete application (exclusive of the CEQA process), though more complicated projects can take longer to process. The SLC meets regularly, approximately every three months, depending on the agency workload and availability of the Commissioners.

2. Streambed Alteration Agreement (SAA)

The CDFW Fish and Game Code (Section 1602) requires that a project that would divert or obstruct the natural flow of any river, stream or lake; change or use any material from the bed, channel or bank of any river, stream, or lake; or deposit materials in a waterway obtain a Streambed Alteration permit. Most, if not all, flood protection projects are subject to SAA permits.

To receive a SAA, the project sponsor provides information to CDFW through a notification form. The form can be found on CDFW's website or obtained at their offices. Required information generally includes a project description, location, duration, affected species and habitat, and specific information regarding sand or gravel removal, timber harvesting, water diversions and periodic maintenance if planned. In reviewing the notification, CDFW may suggest modifications to the project that would eliminate or reduce adverse impacts to fish and wildlife, thereby reducing the need for a SAA. However, CDFW will require a SAA if they determine that the project may substantially adversely affect existing fish or wildlife resources, and require minimization measures necessary to protect the existing fish and wildlife resources. SAAs do not authorize take of any state or federally listed species. When a proposed project may affect a Fully Protected Species, a SAA is generally required to reduce any potential impacts to eliminate harm or take of these species (see Fully Protected Species discussion below).

3. San Francisco Bay Regional Water Quality Control Board (Water Board) "Waters of the State" are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. Flood protection projects fall within the definition and jurisdiction of the Water Board's authority under the Federal Clean Water Act (CWA) and the Porter-Cologne Water Control and Quality Act (Porter-Cologne). As part of the permit review process the Water Board protects the beneficial uses of the State's Waters and manages the "discharge of waste." The Porter-Cologne Act broadly defines the discharge of waste to include fill, any material resulting from human activity, or any other "discharge" that may directly or indirectly impact Waters of the State.

The State Water Board and its Regional Boards have the ability to approve, with or without conditions, or deny projects that may impact Waters of the State, including wetlands through: (1) the Federal Clean Water Act, under Section 401; (2) the Porter-Cologne, through Waste Discharge Requirements (WDRs); (3) the San Francisco Bay Basin Water Quality Control Plan (Basin Plan); and (4) the 1993 State Wetland Conservation Policy, which calls for no net loss of wetlands in the State. The San Francisco Basin Plan is the guiding document specific to the San Francisco Bay Region. It is important to note that the State Water Board is undergoing a public process to develop Procedures for Discharges of Dredged or Fill Material to Waters of the State, for inclusion in the Water Quality Control Plan for Inland Surface Waters and Enclosed Bays and Estuaries and Ocean Waters of California. These procedures may affect the processing of Water Board permits once completed.

The Water Board uses a watershed approach to flood protection projects, examining the entire watershed as a system that influences and contributes to the beneficial uses of State waters and contains a significant percentage of the State's remaining wetlands. This approach allows the Water Board to protect the health and integrity of the watershed rather than one small portion of it. In addition, the Water Board uses the avoidance, minimization, and mitigation method when analyzing potential adverse impacts to water quality and identifying feasible alternatives to the project or some of its components. When impacts cannot be avoided or significantly reduced, compensatory mitigation for both wetlands and streams is required by CWA Section §401 water quality certification. These regulations also state that for both individual and cumulative impacts, applications for water quality certifications must include the proposed amount of Waters of the State that will be restored, enhanced, or created, or for which mitigation bank credits will be purchased. Mitigation requirements are developed by the Water Board to fully replace the wetland functions, values, and acreage of the affected habitats.

The Water Board, or its executive officer, issues 401 certifications under the CWA, and the Board issues 404 waste discharge certifications under Porter-Cologne. Projects that must go before the Water Board take more time to prepare and process due to the additional requirements of staff reporting, public hearings and associated votes.

To initiate the permitting process it requires project proponents to submit a complete application. For a 401 certification or 404 waste discharge one application should be completed and include: a full project description; the certified CEQA document; a description of potential impacts to water quality; any discharges to waters of the State (sediments or effluent); and if applicable, its SLC lease, biological opinion(s) and an ITP or SAA from CDFW (The Water Board's application has a complete list of filing requirements). The Water Board staff review the application for completeness and notify the project proponent of additional information needs. Once the completed application is received, the Water Board notifies the applicant and the USACE of the completed application, then has 60 days to evaluate the application and issue a WQC or request a time extension if needed. As with the other agencies, complex projects often require additional time to complete the review process due to resources and workload issues.

Each 401 certification issued by the Water Board incorporates WDRs under State Water Resources Control Board Order No. 2003-0017-DWQ, "General Waste Discharge Requirements for Dredge and Fill Discharges that have Received State Water Quality Certification". WDRs are more frequently used for flood protection projects as they present a long term potential to affect water quality and beneficial uses of Waters of the State.

4. San Francisco Bay Conservation and Development Commission (BCDC) BCDC's authority stems from the state's McAteer- Petris Act and the federal Coastal Zone Management Act (CZMA). The two primary goals of the McAteer- Petris Act are to prevent unnecessary filling of the Bay, and to maximize public access to the Bay. Under this statute, the San Francisco Bay Plan (Bay Plan) was developed and contains the Commission's policies for governing activities within the Bay and shoreline. Over the 50 years that BCDC has existed, additional policies have been developed and include policies related to resource protection (tidal marshes, subtidal areas, water quality, fish and wildlife) and policies related to development (such as shoreline protection, airports, tidal barriers, recreation, safety of fill, etc.). Projects proposed within the Commission's jurisdiction must be fully consistent with the Commission's laws and policies. The Bay Plan is also the Coastal Zone Management Plan for San Francisco Bay, and therefore, federal projects must be consistent with the Bay Plan, though depending on the type of federal project (funding, permitted, or constructed, etc.), federal projects may be consistent to the "maximum extent practicable" in fulfilling their Coastal Zone Management Act compliance (Federal Consistency with CZMA is not discussed further in this document).

In order to receive a BCDC permit, a permit application is submitted which describes the project, the project purpose, its potential impacts, and consistency with the Bay Plan policies. The BCDC permit application includes specific questions about Bay Fill, the types of fill (solid, shading, cantilevered, etc.), and where the fill be placed and in what part of the Commission's jurisdiction. The McAteer-Petris Act, and associated Bay Plan

policies include a series of tests that the fill is compared to, such as is it the minimum amount necessary for the project? Is there an alternative upland location? Is it for a water-oriented use? This is similar to, but functionally different than, CWA fill analysis.

The extent of BCDC jurisdiction and types of jurisdiction is often confusing to applicants. The Commission has jurisdiction over tidal waters of the Bay, and into the mouths of many creeks that join the Bay, noted in the McAteer-Petris Act as “Bay jurisdiction.” Bay jurisdiction along the shoreline is defined as an elevation where the mean high tide meets land, or in areas with marsh vegetation at 5 feet above mean sea level or where marsh vegetation ends (tidal marsh is considered Bay in BCDC lexicon). Adjacent to Bay jurisdiction is the shoreline band jurisdiction, which is limited to 100 feet inland from the Bay jurisdiction. It is important to note, especially for flood protection projects, that where the Bay jurisdiction lies within the channel, there is shoreline band jurisdiction on either side of the channel as well as where the Bay jurisdiction ends. In addition to Bay and shoreline band jurisdiction, BCDC also has a third type of jurisdiction that often impacts flood protection projects, known as certain waterway jurisdiction. Certain waterway jurisdiction areas are listed in the McAteer-Petris Act and are described geographically where they exist. An example is the certain waterway jurisdiction of the Napa River, where the Bay jurisdiction ends at the Highway 37 crossing, but then certain waterway jurisdiction continues on to the northernmost point of Bull Island. In areas with certain waterway jurisdiction, there is no adjacent shoreline band jurisdiction, so the Commission’s jurisdiction ends at mean sea level, or five above mean sea level where marsh vegetation exists. Not as significant for flood control channels, the Commission also has jurisdiction over salt ponds and managed wetlands. It does not have jurisdiction over seasonal wetlands as the other agencies do. Because the Commission’s jurisdiction is complicated, it is always helpful and advised to contact staff when there are questions.

Another area of the Commission’s authority that can be challenging is the public access requirement. Any development in the Bay or on the shoreline must provide maximum feasible public access except where such access would be inconsistent with the project due to public safety concerns or due to significant use conflicts (including adverse effects on Bay natural resources). Agreeing on the amount of public access that constitutes the maximum feasible can be a challenge, depending on the project design and project motivations. A significant challenge can be identifying how best to fulfill this public access requirement and how to incorporate the public access in the project design, especially when there are habitat and species present that may be impacted by the presence of humans. Flood protection projects have been required by BCDC to provide public access, which has often occurred on levee tops, bridges over waterways and viewing areas.

When an application is received, BCDC reviews and responds to the application, notifying the applicant of additional information needs within 30 days. To file an application as complete, BCDC must receive: documentation of valid title to the land

(often from SLC); an Incidental Take Permit or Biological Opinion, if applicable; and a Water Quality Certification or Waste Discharge Requirements; along with the information needed to analyze the project for consistency with the Bay Plan. This often means that BCDC is working with other agencies to understand their requirements and waiting for them to act prior to finalizing the application. BCDC integrates the information contained in other agencies' permits and decisions into its overall project review. Staff often uses existing conditions of other agencies to satisfy the Commission's laws and policies, which is possible in many cases due to early coordination. This practice is also a way to incorporate agency advice and technical expertise, as well as to reduce the potential for conflicting permit conditions. In some cases, however, the Bay Plan policies may conflict with other agencies' requirements, which may lead to significant challenges for the permittee.

Once the requested information is provided and the application is filed as complete, a permit will be issued within 90 days. As with the Water Board, the degree of impacts may raise the project from being reviewed and a permit issued administratively to one being heard by the full Commission. If the project is raised to the Commission, a public hearing and vote of the Commission is necessary to issue the permit.

As part of its Coastal Zone Management Act duties, the Commission certifies whether or not a project is fully consistent with the Coastal Zone Management Plan for the Bay (the Bay Plan). This certification can be found in the findings section of BCDC's permit. Until the Commission makes this determination, the USACE cannot (with the exception of Nationwide permits) issue its permit for activities in San Francisco Bay.

5. United States Army Corps of Engineers (USACE)

The USACE draws its regulatory authority from Section 404 of the Clean Water Act and Section 10 of federal Rivers and Harbors Act of 1899, and assists the resource agencies in administering the federal Endangered Species Act (ESA). Section 404 of the CWA establishes the regulation of discharges, including sediment or fill into Waters of the US. This section of the CWA requires that a USACE permit is issued before dredged or fill material may be discharged into Waters of the United States. In addition, Section 10 of the Rivers and Harbors Act requires that a project that would excavate, fill, or alter the water course (harbor, river, navigational waters, etc.) obtain a permit from the USACE. The EPA has oversight authority of the USACE's implementation of the CWA, and enforcement authority should there be a violation.

The Waters of the United States are defined as "waters of the United States, including the territorial seas." USACE regulations define "waters of the United States" as traditional navigable waters, interstate waters, all other waters that could affect interstate or foreign commerce, impoundments of waters of the United States, tributaries, the territorial seas, and adjacent wetlands. However, it should be noted that a recent ruling on the definition occurred in 2015 and the USACE and EPA are currently reviewing the ruling and developing guidance on this subject.

Under these authorities, the USACE issues two types of permits: Individual Permits, for projects with significant impacts; and Nationwide Permits (NWPs) for categories of routine projects with less significant impacts. Individual Permits are only issued by the USACE after the Water Board has issued its WQC and BCDC has certified that the project is consistent with the Bay Plan (CZMA's SF Bay Management Plan). NWPs may be issued prior to the Section 401 and Bay Plan certification, but they are not valid without the certification of both the Water Board and BCDC.

To obtain a USACE permit, the applicant should submit the USACE application form (found on their website) with: descriptions of the proposed project's purpose; reasons for the proposed changes to the waterway/flood protection channel; for any discharge or proposed discharge, the type and amount of fill being placed in cubic yards; surface areas of wetlands/waters filled; assessment of the impacts of the project, specifically to listed species; any avoidance and minimization measures; and the names and addresses of adjacent property owners. In addition, the application package must include at a minimum, a vicinity map, plan view, or a typical cross section map. The basic premise of the program is that no discharge of dredged or fill material may be permitted if: (1) a practicable alternative exists that is less damaging to the aquatic environment (LEDPA) or (2) the nation's waters would be significantly degraded by the project. Therefore, the project should include measures to avoid impacts to wetlands, streams, and other aquatic resources, including wildlife; that potential impacts have been minimized; and that compensation would be provided for remaining unavoidable impacts. Along with this information, the permittee should provide to the USACE a copy of the Water Board's Water Quality Certification or Waste Discharge Requirements and BCDC permit prior to issuing its permit. Similarly, through coordination with the Resources Agencies (described below) the USACE also obtains the biological opinions from USFWS and NMFS prior to issuing its permit. Once this information and review is complete, the USACE issues its permit. However, the permittee must review and sign and return the USACE permit prior to receiving final USACE approval and signature. In part because of the need for the participation and approval of agencies prior to the USACE issuing its permit, the process can be lengthy.

C. Listed Species and Critical Habitat

The State and Federal Resource Agencies review projects under the authority of the State and Federal Endangered Species Acts. Both of these laws focus the review on specific species (both plants and animals), population levels, and critical habitat rather than through a multi-species or habitat lens. Essential Fish Habitat looks through a habitat based lens.

1. Federal Endangered Species Act (ESA)

The USFWS and NMFS maintain a list of federally threatened, endangered, and candidates for listed species by geographic area. In addition to this list, there are species accounts that describe the various life stages of each species; the habitat that is crucial

to their survival, and in many cases, species recovery plans. The term “critical habitat” means the specific locations within the geographical area occupied by the species, at the time it is listed. Critical habitats include the physical or biological features essential to the conservation of the species and may require special management considerations or protection. When a project has the potential to “take” a federally listed species, consultation with the appropriate resource agency is required. The term “take” as defined by the federal ESA means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

The USFWS and NMFS are the primary agencies responsible for administering the ESA and per their expertise in species life history and needs, also are charged with managing the species and their recovery. All federal agencies are required to comply with federal law, and therefore, the USACE regulatory program consults directly with the resource agencies when permitting a project that may affect a listed species. The process in which these agencies administer the ESA is through issuance of a biological opinion.

In general, the process for flood protection projects includes the applicant providing a thorough project description to the USACE. The USACE, with the assistance of the applicant develops a biological assessment that describes the project; its potential impacts to the species and its critical habitat; and any avoidance, minimization, and/or mitigation measures to reduce or mitigate for the project impacts. This document is submitted to the appropriate resource agency for review and consultation, resulting in a biological opinion. The resource agencies can request additional information regarding the project prior to accepting the biological assessment as complete, and it is sometimes helpful to provide a draft document prior to submitting the final document for official review. Under the ESA, the biological opinion should be issued 135 days from receiving a complete biological assessment and any additional information needed to assess the project’s potential effects on listed species. Unfortunately, due to workload and lack of resources, the process often takes longer than anticipated.

The USACE, if appropriate, can make a “No Effects Determination” that the project will not affect listed species or its habitat, and the resource agency can agree or further raise issues.

The resource agency can respond to a biological assessment with a “not likely to adversely affect” or provide an incidental take statement when impacts are anticipated. When impacts are anticipated, the biological opinion would also include the terms and conditions which are mandatory for the project; and conservation recommendations that USACE (or other agencies) can accept or decline with appropriate response to the acting resource agency. If the USACE decides to accept the conservation recommendations, these, like the terms and conditions, become conditions of the USACE permit.

When project impacts are significant enough to the species or their habitat that the population may become extinct, the resource agencies can issue a jeopardy opinion. A

jeopardy opinion generally means that the project cannot go forward as proposed. At this point, the project can be redesigned to reduce impacts to listed species and resubmitted, or the project can be abandoned.

Once biological opinions are completed, they are distributed to the permitting agencies as part of completing the application process. The Water Board, BCDC and the USACE generally will not issue a permit until a biological opinion has been completed, as it is considered a filing requirement as well as the instrument that authorizes incidental take of listed species. Without this document, regulatory agencies will not authorize any take of listed species.

2. California Endangered Species Act (CESA)

In addition to the federally endangered species, there are state listed species, including fully protected species, endangered, threatened and candidate species. CDFW is responsible for protecting and managing species and their habitat listed by the state.

- **Fully Protected Species.** In the 1960's, prior to the passage of the CESA, the state identified and provided protection to those animals that were rare or faced possible extinction, including fish, mammals, birds, amphibians and reptiles. The species on this list are designated as "Fully Protected Species" and may not be taken or possessed at any time and no licenses or permits may be issued for their take (except for scientific collection and livestock protection). Examples of these species in the Bay Area include: Ridgway's rail (formerly California clapper rail); salt marsh harvest mouse; peregrine falcon; the California condor; and several others. The CDFW uses the SAA permit to require avoidance measures when these species are present at a project site.
- **Candidate, Threatened and Endangered Species.** The goals of protecting threatened and endangered species, including plants, under ESA and CESA are similar, but there are variations in how the species are listed and the measures taken to protect them and their habitat. A significant difference is how the state and federal resource agencies define "take" of a species. The definition of "take" under CESA is "to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Notably, under CESA, harass is excluded.

While the federal ESA considers the population of a species throughout its range nationally, the CESA considers the population of a species within the state and the condition of its habitat within the state. This has led to some species being listed differently under ESA and CESA, with some species being listed as threatened under ESA and endangered under CESA, or not listed at all under ESA. In other cases, species such as the Delta smelt are listed by both the federal and state resource agency at the same level of concern, in this case endangered.

As with the ESA, flood protection projects often have state listed species or critical habitat within the project site and therefore may incidentally take a species listed. Therefore, it is necessary for the applicant to obtain an incidental take permit (ITP) from CDFW. As part of the application process, the applicant provides CDFW with a complete description of the proposed activity, which should include an analysis of

whether and to what extent the proposed activity could result in the taking of species; how it would impact the species and the overall population; and whether the project would jeopardize the continued existence of the species. Any measures that can avoid or minimize taking of the species should be discussed. Different from the federal ESA, CESA requires the applicant to fully mitigate for the take proportionally to the extent of the impact. The applicant will also need to provide assurances, in the form of an endowment, that adequate funding is available to implement avoidance and minimization measures, and successfully complete the mitigation. Monitoring of the project site and mitigation is often required as part of the ITP.

CDFW responds to applications within 30 days of receipt and notifies the applicant of any missing information or other needs. Once an application is complete, it issues the ITP for a lawful activity if they concur with the applicant's analysis and find that the proposed activity will not jeopardize the continued existence of the species. The ITP will include conditions to implement minimization and mitigation measures. This part of the process generally takes from three to five months depending on the complexity of the project.

Once the ITP is completed, it is distributed to the permitting agencies as part of completing the application process. The Water Board, BCDC and the USACE generally will not issue a permit until an ITP has been completed, as it is considered a filing requirement as well as the instrument that authorizes incidental take of state listed species. Without this document, regulatory agencies will not authorize any take of listed species.

3. Essential Fish Habitat (EFH)

Under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the NMFS consults on projects that have potential to impact essential fish habitat (EFH) of its managed commercial fisheries. EFH are those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity. Within San Francisco Bay, there are three managed fisheries, including pelagic, ground fish, and salmonid fisheries. All of San Francisco Bay has been designated as EFH.

Within each managed fishery, there is a group of fish that are considered rather than single species. In addition, rather than considering the impacts to individual organisms, the species population, and its critical habitat, as in the state and federal ESA, the impacts considered are to the habitat and its function. For example, dredging activities may impair foraging function of benthic habitat for ground fish such as English sole. NMFS would consider the potential impacts to the substrate and benthic community, and would make recommendations to reduce or mitigate for the impacts to habitat. Because most flood protection projects have impacts within a stream or river, the EFH analysis maybe somewhat limited, however, waterways that support salmonids would be of particular concern, as would the areas immediately adjacent to the mouth of the stream at the Bay.

When permitting a project within the Bay, the USACE consults with NMFS regarding potential impacts much like they do for ESA, and generally the two consultations are incorporated in the biological assessment and the corresponding biological opinion. NMFS provides the USACE with EFH Conservation Recommendations to avoid, minimize, mitigate, or otherwise offset those adverse effects. The USACE generally incorporates the recommendations into its permit conditions. If the USACE disagrees with the recommendations, it provides a detailed written explanation to NMFS describing which recommendations, if any, it has not adopted. State agencies have the ability to incorporate conservation recommendations in their permits, using the consultations as a means of receiving NMFS advice, as well as in assessing impacts to beneficial uses of the Bay or for protecting native wildlife.

D. Post-Permitting Requirements

Once the permits are issued, the project proponent can move forward with the project as authorized and conditioned. With each permit or action, each agency will likely include conditions that the Permittee must comply with or risk potential enforcement action from the regulatory agencies. These post-permit requirements fall into a few categories: plan review; best management practices; minimization measures; including seasonal work windows; monitoring; performance measures; mitigation; adaptive management; and public access. These conditions are designed to ensure the project is: constructed as authorized; meets the expectations and goals of the project; does not unduly harm the environment; mitigates for impacts; and is able to adjust to changing conditions.

V. The Challenges

Given the complexity of the laws, policies and regulations governing flood protection projects in the Bay Area, the importance of waterways and the habitat they include, and the intricacies of the projects themselves, challenges arise for both the project proponent and the regulators when seeking permits for flood protection projects. In recent years, these challenges have led to increased tension on all sides of the issues. In fact, what has previously been simply challenging, has now at times led to outright conflict. In seeking to understand these tensions, various staff members from regulatory and flood protection agencies were interviewed, files reviewed, and case studies were developed to better understand the drivers for when this discord has appeared.

A. Issues and Perspectives

In reviewing existing permits and processes, attending meetings, and interviewing flood protection managers, several different concerns and points of view became apparent.

From the perspective of flood protection managers, they are extremely committed to protecting life and property of the communities they serve. They believe that because of their role in protecting communities, as enduring landowners and stewards, they should be treated as partners of the regulatory agencies rather than an entity that must yield to regulatory authority without significant input. Further, flood protection managers believe that they are treated as developers by the regulatory and resource agencies rather than public agencies fulfilling a civic duty. Flood protection throughout the region is underfunded, and therefore priorities must be fully considered, and requirements that drive up costs are a challenge. And lastly, many, but not all managers have embraced taking a multi-benefit, watershed approach to flood protection systems, improving habitat features and water quality, especially in light of climate change. Those who have not yet joined this endeavor may need assistance in visualizing how this could be accomplished in their service area, need further support to bring the communities they serve along, or might need to see better documentation of other successful projects in the region. Nonetheless, multi-benefit projects appear to be a key feature of BAFPAA's current and future efforts. When speaking about the permit process and working with agencies, they report anecdotes of regulatory staff idiosyncrasies, inconsistencies in approach and/or regulatory interpretation, lack of transparency, and permitting delays that put projects behind in construction schedules and endanger existing funding commitments or future funding allocations by their Boards.

In the same review of files, meeting attendance, and interviews of regulatory staff of various agencies, overarching findings are remarkably similar in that the regulatory community is a dedicated group of professionals who are committed to upholding environmental laws and regulations for the good of the community. While their work includes public health and safety, their focus is on resource protection, improving development projects, improving water quality, reducing environmental impacts, creating and preserving open space, and retaining species and habitat for this and future generations. Because regulatory agencies have been institutionally developed over time

to respond to environmental issues and concerns, they are more reactive in nature than proactive in many cases. They are also underfunded and short staffed, and have to respond to legal deadlines which often set their priorities for project review. Many have additional priorities, such as species recovery plans, which are also underfunded and require partnerships to accomplish. In requiring conditions of projects, they are sensitive to the costs of the requirements, but by law are required to balance impacts with mitigation. Multi-benefit projects are highly regarded, though some agencies with single focus regulations have more difficulty in linking the benefits to the impacts for their issue, or do not have a mechanism to account for additional benefits. Regulators are aware of and apologetic for permitting delays when delays are due to understaffing, but also have reported that applicants often do not provide complete information for review, and often change the project components during processing. They also strive for transparency in process, but as the process is not formulaic, this goal is often difficult to achieve.

Considering that there are many common threads to this challenge as viewed from both sides of the “regulatory divide,” it may be possible to align the commonalities to improve the process, the current system, and relationships. Examining the situation, there are two main elements: the regulatory system and the human factor. All parties have a role in either making the process better or worse, and based on the assertion that all involved are dedicated professionals and have a common goal of getting good projects permitted and constructed, it can be assumed that both would strive for improvement.

Before the permitting issues can be addressed, a misunderstanding needs to be deciphered. There is a pervasive feeling from the flood protection community that they are “being treated as developers.” This is a phrase that is often used in meetings with and discussions about regulatory and resource agencies. From the regulatory community’s perspective, this phrase is perplexing, and leads them to question what is the “treatment” being referred to. This statement needs to be unpacked, because without a common understanding of how flood protection fits into the regulated lexicon and environmental restoration, other issues cannot be resolved.

One interpretation of the phrase is that there are flood protection projects generate public benefits and should be regulated differently from other types of development projects. However, developers would take issue with this statement and would argue that many types of development has societal benefits, whether it is housing, parkland, or generating revenue for the region.

Another interpretation is that the difference may lie in for profit ventures versus not for profit ventures, in that most, if not all, flood protection projects are sponsored by public agencies, with specific responsibilities and requirements to be met and are reliant on limited municipal revenue to accomplish the work. There is no financial gain from these projects. In most cases, there are extremely limited ways for these agencies to raise

additional funds, outside of applying for grants, or going to the voters to request tax increases. Further, because the funds are public, when the regulatory and resource agencies require financial assurances, as in endowments, project funding is removed. Similarly, restoration projects undertaken by state and federal agencies, as well as not for profit non-governmental organizations (NGOs) are in a similar situation.

However, current laws, policies and regulations do not take into consideration the type of applicant, or the applicant's resources when a project is proposed, but rather whether or not the project has environmental impacts and is consistent with those laws and policies. Further, if potential impacts exist, these same laws and policies direct staff to first avoid, then minimize and finally, where impacts are unavoidable, mitigate. This practice is consistent from the California Environment Quality Act through each of the agencies' laws and policies. In this way, regulatory programs are blind to the different applicant's organizational structure and resources, and are focused on impacts reduction.

If basis of the analysis is focused on potential impact, projects with little or no impact would have little or no minimization or mitigation measures, and likely move through the regulatory process more quickly than projects with significant impacts. Projects that have significant impacts take longer to analyze, have more requirements applied, including mitigation and obligatory monitoring to ensure that measures taken to reduce impacts and improve the environment after the project has occurred require more funds to design, construct, mitigate, and monitor the project. Flood protection agencies are square in this category. The Bay's watersheds are limited and high value habitat, not easily mitigated for, and these projects have significant uncertainty associated with restoring the lost habitat value due to construction and maintenance activities. Add to this situation the limited public funds associated with this work and the challenges become apparent.

Analysis by regulatory agencies regarding impacts to riparian and wetland areas has evolved over time. Where small repairs and maintenance was previously permitted on a more individual project basis, agencies are now looking at the watershed as a whole, and considering cumulative impacts of multiple small projects more so than in the past. This has evolved as science has focused on whole systems as more is learned about the interconnectedness of natural systems. While this leads to better outcomes for the watershed and likely the flood protection program, it takes longer to develop, plan, permit and implement than smaller, individual fixes. In response, some flood protection agencies have moved towards watershed planning with multiple benefits over significant periods of time with interim steps towards long-term goals while planning is underway.

VI. The Analysis

In order to answer these questions, managers and agency staff from all sides of the regulatory process were asked to identify the barriers that currently exist to permitting flood protection projects. The responses varied from the mundane and obvious to some unexpected issues. As summarized here, they are not separated into applicant and agency concerns as there were similar issues pointed out from various contributors. In the following section, the issues identified are contained in text boxes, while the discussion regarding these issues continues in the narrative style of the document, followed by summarized “take away” thoughts for the reader to consider. The recommendations that have evolved from this work can be found in the companion document, *“Improving the Current Regulatory & Flood Protection System, Guidance Document (November 2016).”* The recommendations provide guidance in ways to resolve the issues to the extent that they can be resolved.

The following sections examine topics where issues have been raised. It begins with the project itself, as project design, philosophy, and goals play a significant role in how regulatory and resource agencies respond and how projects are built. The project and response puts into motion the permit process, its requirements, and mitigation.

A. Project Design and Limitations

There is no avoiding that flood protection projects occur in sensitive habitats that are easily disturbed, disrupted, and destroyed. Because of this sensitivity and limited availability of this habitat in the region, resource and regulatory agencies pay special attention to projects proposed in riparian and wetland areas. Flood protection managers are aware of this sensitivity, as well as the challenges of working in a wet environment, but yet must maintain and improve the system. Managers report that work periods are constrained to non-breeding seasons as well as dry periods of the year, which very often overlap, further restricting work. In addition, flood protection activities are often in a highly urbanized environment where there is little available space laterally from the creeks and channels, and property ownership further confounds operations, with limited easements and right of way. In response, flood protection agencies carefully organize and carry out maintenance activities annually with little room for delay or variance from permitted schedules. From the BAFPA perspective, flood control is vital life safety infrastructure that occurs on land

Project Impact Concerns

- Projects can limit wildlife access to fresh water and creates barriers to movement within the landscape
- Sediment removal is an impact to habitat and water quality due to physical and biological processes that are interrupted
- Vegetation removal requires time to regrow and without vegetative cover, foraging, nesting, roosting, and refugia are not available leading to indirect impacts and direct mortality
- Listed species lose critical habitat
- Riparian and wetland habitat is very limited and cannot be easily replaced or mitigated

that the managers steward. They work hard to minimize impacts in all the work that is undertaken, but cannot do this critical work without impacting the sensitive environment in which their projects exist. They are also focused on long term sustainability of the flood protection system, as well as the creeks and rivers they manage. As public lands owners, particularly those that area also water districts, flood protection managers have a vested interest in well-functioning watersheds that provide ecological benefits and protect the community from flood damage.

Understanding the regulatory and resource agencies concerns over habitat, water quality, and species, and the flood protection agencies' commitment to improving the ecological and flood protection function of the system, options are available that may reduce regulatory opposition through informed decision-making outside of the permitting process when a project is initially being examined. Any option selected would need to be feasible from the construction, financing, and available land perspective, and should take into consideration components that would meet multiple goals and benefits for the flood protection agencies, the regulatory and resource agencies, and the communities in which they are located. At a very broad level, current "gray," "green," and hybrid options for flood protection in the Bay Area may include:

- Maintain existing infrastructure on an as-needed basis
- Maintain concrete trapezoidal channels
- Raising existing flood levees and walls to contain more flow
- Analyze complete watershed, or large sections of watershed for improved function within existing alignment
- Remove concrete and hardened structures to allow for a more natural system
- Plant native vegetation on banks to reduce runoff and improve water quality
- Include vegetation, riparian and wetland habitats to improve habitat in these areas for species living along the river
- Create flood storage basins
- Remove waterway constrictions that reduce flow and cause sediment deposition
- Widen floodplains to reduce stream incising and create a geomorphologically correct low flow channel and habitat terracing
- Improve habitat connectivity and heterogeneity along the creek/river system
- Incorporate wetlands and water retention basins to provide capacity for the creeks/ivers and reduce upstream floodwater elevations
- Reconnect sediment to tidal marshes to feed the marshes (allow them to prograde as sea level rises) for both future shoreline protection and habitat
- Realign creeks and channels throughout system to create a more natural system

When analyzing options, flood managers have to consider costs, available space, property ownership, and flood benefits. But these are not the only considerations that flood managers make. Because the flood channels, creeks, and tidal marshes are sensitive habitat and home to native and special status species, maintenance, repair, and realignment of this infrastructure requires consideration of potential impacts and

ways to reduce or mitigate for them. Managers also seek to improve and create habitat where feasible. However, managers may be reluctant to increase ecological features if by their incorporation, ability to maintain flood protection is impacted by excessive requirements into the future. If regulatory and resource agencies aspire to restore habitat and species within flood protection channels, areas of common ground must be identified in order to move towards mutual goals.

One way to begin this process is to define a mission and goals to guide the flood protection program within each agency or for the region. BAFPPA is an excellent forum to have this discussion and seek agreement of the flood protection agencies. The Santa Clara Valley Water District (SCVWD) provides an example with the mission and goals it adopted in its Flood Protection Master Plan that broadly define their overall intentions and approach to their work. The mission is a healthy, safe, and enhanced quality of living in Santa Clara County through watershed stewardship and comprehensive management of water resources in a practical, cost-effective, and environmentally sensitive manner for current and future generations.

By having a mission and goals, intentions are clearly understood, and can be referred back to with supporting actions. Having goals that are aligned with regulatory and resource agency needs and goals creates an atmosphere of shared purpose and provides guidance for approaching challenging projects.

SCVWD Healthy Watershed Goals

- Inventory and understand natural flood protection needs and opportunities
- Reduce potential for flood damages
- Healthy creeks and bay ecosystems: improving riparian habitats; fisheries; and tidal and freshwater wetlands
- Clean safe water in our creeks and bays through: pollution reduction; improving impaired water bodies; and trash and litter reduction
- Trails and open space opportunities

In discussions with the agencies, recognizing that it would take significant effort, the ideal approach to flood protection would involve full watershed planning that would incorporate habitat benefits, from the headwaters of creeks to the tidal connection at the Bay. None would expect the plan to be developed instantaneously, as there would be many steps involved, including inventorying the existing system, modeling, designing habitat components, engineering, property ownership and infrastructure identification, etc. However this is likely the best approach to obtain multiple benefits and adapt to changes associated with climate change. Some of the benefits one might expect in examining and restoring the historical physical processes of the creeks and streams,

where possible, would include: the ability for flood managers to reduce floodwater elevations; allow water and sediment to naturally meander in areas with land use flexibility; restoration of riparian habitats and creation of transition zones; reconnection of flood waters across tidal marshes allowing sediment to deposit; and re-establishing connections that have been lost.

Some flood protection agencies have already moved in this direction by either evaluating entire watersheds, or large portions of them. They recognize that this is a long-term planning process with project development taking a significant amount of time. This planning work is taking place in parallel with maintenance plans that address immediate needs. It is critical that agencies continue to permit maintenance activities to keep the system functioning as planning efforts are underway. Incorporating watershed features as maintenance occurs can build portions of the new system while planning occurs.

Similarly, the resource agencies have undergone long term planning for recovery of listed species and their critical habitat. In creating these plans, the agencies have identified system-wide improvements that are needed for the recovery of specific species, but they have not abandoned short term, project-by-project, measures that target the longer-term goals. In reviewing recovery plans, there are portions of the plans that if incorporated into flood protection projects, would benefit listed species and ease concern when being reviewed by resource and regulatory agencies, potentially resulting in a more efficient permit process. The following overview of these regional plans is included here to provide insight that may be helpful in understanding the goals of the resource and regulatory agencies and opportunities for flood protection agencies to improve projects as they are developed.

1. Draft Salmonid Recovery Plan

The recovery plan recognizes multiple benefits of improved creeks and rivers: “Habitats restored to properly functioning conditions offer enhanced resource values and provide substantial benefits for human communities. These benefits include improving and protecting the quality of important surface and groundwater supplies, reducing damage from flooding resulting from floodplain development, and reduced expenditures on bank stabilization or flood control actions. Restoring and maintaining healthy watersheds also enhances important human uses of aquatic habitats, including outdoor recreation, ecological education, field-based research, aesthetic benefits, and the preservation of tribal and cultural heritage.” NMFS’ strategy in providing this plan is to connect landowners and agencies with salmonid life history requirements to coordinate efforts across interconnected freshwater, estuarine, and ocean environments.

The San Francisco Estuary and its watersheds play a key role in the various life stages for many salmonid species. In assessing the current status of salmonids in California, NMFS has stated, “Freshwater and estuarine habitat degradation, significant flood events (e.g., 1955 and 1964), dams and stream flow diversions, and more recently, poor conditions in the marine environment, have all contributed to the low abundance [of salmon].” NMFS

has reported that mortality rates for salmonids can be substantially high in freshwater habitats and for some, the highest mortality occurs in freshwater environments. For this reason, flood protection channels, creeks, and rivers play a significant role in salmon recovery.

The Recovery Plan states that returning the habitat functions of rivers and streams by allowing for natural floodplains along the creeks/rivers and in conjunction reducing development in the floodplain will improve salmon growth rate, and thus their survival. Further it asserts that, in re-creating wider flood plains the costs associated with bank stabilization, levee construction and maintenance, and other flood protection actions may be reduced while improving habitat and resource values along creeks/streams. The plan also discusses various habitats features along streams and rivers which provide salmonids with a variety of different areas (habitat heterogeneity) necessary for breeding, escaping predation, obtaining food, areas for growth and increasing fitness, and areas that can provide refuge to salmonids from high temperatures or during periods of high flow within the stream channels. Lower San Francisquito Creek realignment project, for example, incorporated high flow refugia areas to allow steelhead areas of respite from rushing waters during storm flows. This one habitat feature, along with many others upstream, help juvenile salmonids grow in size, and a larger size upon entering the ocean greatly influences their chances of survival. Simple inclusion of habitat features within streams, watershed and at the mouths of creeks/streams increases the survival of individual salmonids, but also enhance the viability of entire populations. Habitat features such as pools or deeper-water areas during dry months and the inclusion of riparian vegetation along the river can regulate temperatures within the streams and decrease mortality. Maintaining adequate flows throughout the year and well-oxygenated waters can also enhance survival of salmonids, and this can be accomplished through development of appropriately sized channels. Providing off-channel habitat features, such as floodplains, alcoves, backwaters and side channels, allows for refuge areas during high water flows and during migration out to the estuary and eventually the ocean.

Many of these habitat features can serve multiple functions. For example some in-channel features such as rootwads, can provide bank stabilization and refuge areas from predators. Pools, or undercut banks can also provide refugia, reduce water temperatures and improve water quality. The inclusion of floodplains serves the dual purpose of providing habitat for salmonids, but also decreases the chances of flooding adjacent properties by providing a larger area for floodwaters to expand. Including some of the these habitat features and utilizing planning practices to reduce floodplain development can benefit human communities within the watersheds, provide benefits to listed salmonids, and improve the consultation process.

2. USFWS Tidal Marsh Recovery Plan

Similar to NMFS, in 2014, the USFWS developed the Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California (Marsh Recovery Plan), which updated

The California Clapper Rail and Salt Marsh Harvest Mouse Recovery Plan (U.S. Fish and Wildlife Service 1984). The main goal of the plan is to improve the status of federally-endangered species (including Suisun thistle, soft bird's-beak, California sea-blite, Ridgway's rail, salt marsh harvest mouse), and the delisting of species of concern (including salt marsh wandering shrew, Suisun shrew, San Pablo vole, California black rail, Alameda song sparrow, Suisun song sparrow, San Pablo song sparrow, saltmarsh common yellowthroat, old man tiger beetle, Delta tule pea, and Pacific cordgrass). The Marsh Recovery Plan focuses efforts on comprehensive, ecosystem-wide tidal marsh habitat restoration, ecosystem management, and implementation of regional recovery strategies for habitats that benefit many species within different geographic areas. The Recovery Plan encourages maintenance of existing habitat functions to protect extant populations of these species within their ranges and emphasizes the restoration and management of lands acquired over the last 25 years designated for habitat restoration to improve the status of listed species. This plan is relevant to flood protection projects that include tidal marsh and tidal channels within their project footprint.

“The early 19th century tidal marsh, before substantial human impact, is estimated to have been approximately 190,000 acres” (Bayland Habitat Goals Project 1999). Today, only about 40,000 acres of tidal marsh remain, much of which occur along the bayward fringes of levees along the former edges of large tidal channels or mudflats. (Marsh Recovery Plan). The Marsh Recovery Plan identifies the main threats to the five USFWS federally-endangered species as: historical and current habitat loss and fragmentation from urban development, agriculture, and diking related to duck hunting; altered hydrology and salinity; non-native invasive species; inadequate regulatory mechanisms; disturbance; contamination; risk of extinction due to small population size; and the future threat of sea level rise due to climate change. The Marsh Recovery Plan acknowledges that, “maintaining well-distributed populations throughout the geographic range of each species is necessary for the long-term recovery of the listed species covered in this recovery plan.” The Marsh Recovery Plan focuses on restoration of large blocks of tidal marsh to maximize the habitat benefits for multiple species, evolving from previous efforts that focused on methods of achieving individual species recovery. The Marsh Recovery Plan discusses many of the specific benefits of large restoration areas, which include: increased distances from upland predator den/nest sites that impedes terrestrial predators; larger restoration areas are more efficient than smaller efforts, and provide larger net benefits to species; and a number of other benefits.

The Marsh Recovery Plan assessed the future conditions of various sites and includes restoration maps that account for anticipated sea level rise and maps that provide a vision of how recovery may be achieved and advanced with an emphasis on larger marsh areas within the region. The maps delineate current understanding of the highest priority areas for protection or restoration of tidal marsh and adjacent habitats. Three of the five recovery units selected by USFWS are relevant to the San Francisco Estuary, including Suisun Bay, San Pablo Bay, and Central/South San Francisco Bay with

prioritized restoration areas and management strategies. Maps of the recovery units are split into segments of the Bay shoreline that depict the extent of tidal marsh today, near-term restoration areas, and potential future tidal marsh and ecotone restoration areas. For each of the recovery units, USFWS identified specific techniques, and considerations or management strategies that can be implemented to improve tidal marsh habitats and the status of protected species within the recovery units. Long-term recovery actions focus on increasing habitat suitability and abundance in an appropriate distributional pattern around these geographic areas.

The USFWS found that numerous routine human activities can cause disturbance to sensitive species, including: maintenance activities for levees, flood protection, dredge locks, pipelines, and utility rights-of-way; vegetation control; and recreational uses. More specifically, diking and artificial channelization, where natural drainage and flood flows are constricted by levees and directed in straightened, shortened, and deepened channels and conveyed to the Bay has reduced complexity of natural creek channels in remaining tidal marsh and has contributed to habitat fragmentation for many tidal marsh species.

The Marsh Recovery Plan strategy has five elements and provides specific steps and actions that can be implemented to achieve the recovery of the listed species and species of concern. There is a section focused on flood protection improvements that would aid in the recovery of species and tidal marsh habitat, such as: placing levees closer to development edges and away from tidal marsh areas to reduce the probability of predation; adding buffer areas between tidal marsh habitat and development or conflicting land uses; utilizing gentle slopes with upland refugia habitat along levees; allowing room for marsh habitats to migrate inland as sea level rises; and planning for a range of sea level rise scenarios. The Marsh Recovery Plan provides specific recommendations within the recovery units to preserve specific habitat types, and restore habitat connectivity and ecosystem functions where appropriate. These are actions that can be incorporated into flood protection projects and watershed planning. The Marsh Recovery Plan also emphasizes that adaptive management plans should be prepared for all tidal areas under conservation management to ensure the future success of these areas and species.

Implementing the recommendations and recovery strategy is entirely voluntary, and relies upon the willing participation of current and future public and private partners to achieve the recovery goals. However, it is likely that flood protection projects would see conservation recommendations and terms and conditions that incorporate these concepts, strategies and actions if not proposed as part of the project description in tidal areas. A project that incorporates marsh protection, connectivity to flood protection channels and creeks, and conservation measures in the planning stages, as well as guidance from the Marsh Recovery plan, rather than waiting for such strategies to be required would likely save time and costs by reducing changes to the project once it is in the permitting phase.

3. Baylands Ecosystem Habitat Goals Project Update

The Baylands Ecosystem Habitat Goals Science Update (2015) (Science Update) was prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project as an update to the original 1999 *Baylands Ecosystem Habitat Goals* (Habitat Goals Project), which presented regional restoration goals for the San Francisco Bay. While not a single agency plan, these two documents represent a consensus of multiple scientists, managers, regulators and resource agency staff on how best to restore the Bay's baylands (lands that lie between the elevations of the high and low tides) in an effort to improve the Bay's ecological health through restoring over 100,000 acres of tidal marsh. The Science Update specifically focused on potential impacts of climate change on Bay tidal marsh ecology. The Science Update states, "Neither our critical human-built infrastructure nor the remaining natural habitats are expected to be resilient to coming changes without significant new investment in adaptation and resilience strategies." It found that restoring a functioning baylands ecosystem is critical to shoreline resilience and coping with impacts from climate change and rising sea levels. The Science Update did not change the restoration goals set forth in the Habitat Goals Project, but found it is necessary to shift from a static planning approach to a dynamic one that responds to the

future uncertainties of climate change. The Update provides scientific, consensus-driven recommendations that will help meet state and federal conservation objectives for listed species, while also implementing federal strategies (Tidal Marsh Ecosystem Recovery) and state plans (Safeguarding California) to minimize the potential local and regional impacts of climate change. The Science Update includes currently used restoration strategies, but also calls for innovative actions beyond the conventional scope. "The Science Update is a non-regulatory, voluntary

Design and Project Limitations

- Flood protection work is highly complex, and work in wet environments is difficult
- Projects may not take the watershed into account, or only address a portion of watershed issues
- Long-term planning and project development take significant amounts of time while immediate needs are not addressed
- Many watersheds are physically constrained by urban development and property ownership issues
- Realigning flood protection channels, widening flood plains and creating habitat features may require additional land purchases, removal of homes or business, and/or moving infrastructure such as gas, water or electrical lines
- Periods of dynamic change affect the certainty of success, and it is difficult to assess how habitats and flood protection projects will respond over time and the benefits of specific actions
- Challenging to identify ways to beneficially reuse sediment in habitat-based projects

effort to point the Bay Area toward a more resilient future, with strategies that were developed over several years by several hundred experts and practitioners in the region.”

While the Science Update and the Baylands Goals Project are both non-regulatory documents, they are widely considered central to the environmental work of the region. Because they represent the consensus of scientists and managers, projects that can integrate elements of the Goals Update and Project will inherently be furthering regional ecosystem goals. Like the Salmon and Tidal Marsh Recovery Plans, the Science Update recognizes certain features of the baylands provide important ecosystem services, including buffering inland areas from storm impacts, improving water quality by improving contaminant loads in the water, and habitat for biological communities within the Bay. The Science Update makes recommendations pertinent to flood protection projects, including: restoring watershed connections and the physical processes that sustain them; allowing floodwaters to move across the tidal marsh plains during low tides and into diked areas during high tide; the incorporation of transition zone habitats where appropriate, and; setting levees back to make room for enhanced flood capacity and transition zone migration as sea level rises. The Science Update also states, “Watershed-based sediment management, as envisioned for rivers and streams impaired by fine sediment, should consider the effects of sediment management on the riverine transition zone and other components of the baylands.” This recommendation is focused on allowing sediments to flow to areas of need, rather than limit them in the watershed.

The Science Update further emphasizes that plans for realignment of flood control infrastructure should be integrated across multiple project areas, and considers retreat of particular land uses along channels and creeks to provide space for flood water and transition zones laterally from the channels. It also includes profiles of shoreline segments within San Francisco Bay, and visions and recommended actions that can be implemented in each specific segment to sustain and restore baylands habitats for healthy communities, restore ecosystem services within each segment, and become more resilient to climate change impacts. In considering this document, flood protection managers can target regional goals that fit within their geographic area, as they seek to improve flood management practices. It goes further to suggest that cities and counties consider allowing flood control managers to implement nature-based flood-protection solutions at opportune moments following flooding events or damage resulting from coastal hazards in their general or master planning documents.

B. Adaptation

In all three regional planning documents, there is an emphasis on the need for adaptive management in working with the species and habitats and climate change. As flood protection managers look to the future, they must ready an aging system for a new era of more dynamic change. The physical and biological conditions of the Bay are changing. Flood protection managers and agency staff realize this and are looking for

opportunities to use innovative methods to enhance flood protection, while also ensuring the protection of wildlife and certain habitats into the future. For infrastructure remaining in place past mid-century, an adaptive management plan must be prepared to address long-term impacts of future sea level rise.

Adaptive management relies on the best available science during the design phase of a project and plans for project adjustments over time in response to new data and information and changing conditions. Within the Bay, large shoreline projects are required to prepare a risk assessment to understand potential future inundation, degrees of uncertainty, consequences of defense failure, and risks to adjacent habitats at mid-century and end-of-century. Projects identified as vulnerable to future flooding are required to have adaptive management plans/strategies to ensure public safety and success in the face of future conditions.

Currently, flood protection infrastructure is typically designed to reduce the chances or risk of flooding conditions on specific properties in accordance with FEMA. Infrastructure is not designed to completely prevent flooding, but rather to reduce the risk to a level where flooding is likely to occur infrequently. The system is designed based on predictive modeling of the 100-year flood. The historic response to increased flooding has been to harden channels further, move water off the land faster and increase the heights of floodwalls and levees, leaving human populations and wildlife vulnerable when flood protection measures are exceeded. However, with sea level rising and the recognized need to reconnect the watersheds and Bay system, this approach needs to be adapted.

Adaptive management, in the scientific sense, designs an iterative project or system in which there are a series of questions that can be tested, studied and resolved as the project is managed, with alternative responses according to the outcome of study. In contrast to adaptive management, some projects are built with the assumption of success, without monitoring and an iterative feedback loop that can inform management as conditions change over time. A “one size fits all” type of design solution that doesn’t consider the nuances and differences that exist at different sites falls into this category. It does not test hypotheses, nor propose alternative actions based on outcomes. Because the Bay is in a state of dynamic change, there are multiple scenarios that should be accounted for, and different management actions needed to address these scenarios. Failures of flood protection systems have significant consequences.

Adaptively managing a flood protection system may look different than in a restoration project where experimental processes can be better controlled, though some portions of these projects may fit well. In larger systems, adaptive management may mean creating additional features that are activated in extreme flow situations that occur once a decade or less often to prevent catastrophic flooding. Creating an adaptive management plan for sea level rise includes features to be implemented over time, thus allowing the flood protection managers to plan ahead, build capacity and not be

reactionary to future conditions. Adaptive management coupled with watershed planning creates an end product that is a well thought out, future oriented plan with incremental steps taken as conditions change, and property and funding become available.

The Napa River Project created a multi-benefit flood protection system that can be adaptively managed depending on the needs. The Novato Creek Vision document developed with Marin County describes a realigned flood protection system that is adaptive to sea level rise other City of Novato needs, and looks out over a 50-year planning horizon. While the Napa River Project has been undertaken over many years and was an expensive undertaking, the benefits to the community have been remarkable. A new recreational amphitheater along the river doubles as a flood basin; the flood water bypass is used for a public market and walkway; a downstream marsh has been restored and can absorb additional floodwaters; and obstructions in Napa Creek have been removed and habitat restored using salmon friendly features.

The Novato Creek Vision document reroutes flood waters into a basin that will double as marsh; sediment dredged from the creek would be reused to create seasonal wetlands and transitional habitat; and marshes along Novato Creek will be reconnected, creating a large floodplain and reducing upstream flooding. Both of these projects have long term visions that allow a stepwise approach to improving flood protection for the community while providing additional benefits including recreation, habitat expansion, and water quality improvements. They also allow for adaption to sea level rise by making more room for the river, setting back flood levees and opening areas that have been diked off from the Bay, river or creek, as well as moving infrastructure.

However, both of these projects had some advantages that not all flood protection agencies have. Both projects have considerable space available, or made available, for flood protection. Both of these areas are less urbanized than the South and East Bay, though sacrifices were made. In the Napa River Project, homes along the river were purchased, some after long, difficult discussions. If the Novato Creek project goes forward, wastewater spray fields will be used to increase the floodplain of the river. In both instances a railway was (would have to be) moved or elevated. Both benefit from occurring within a single county with only one city involved, and the city and county agencies worked together towards the common goal. In other areas, watersheds cross over multiple municipal boundaries and jurisdictions, creating need for additional coordination. San Francisquito Creek resolved this issue by creating a Joint Powers Authority that shares decision-making, costs and planning expertise. In the case of Napa and Novato, both have significant stakeholder involvement and support in project development, including regulatory and resource agencies, and a strong outreach program to keep residents informed of progress. San Francisquito Creek had strong community support from project initiation and used standard and existing required public outreach forums, such as noticing and scoping, and alternative review per the CEQA/NEPA process.

Take Away: *In reviewing the variety of flood protection projects in the Bay Area, it is clear that aging systems, physical settings, adjacent development, property ownership, and funding represent significant constraints to improving flood protection systems. It is also evident that flood protection managers from different regions have different perspectives and abilities to move towards a more ecologically based flood protection system, partially due to physical constraints, but also due to local ordinances and preferences for different engineering and flood protection practices. As a result, there is considerable variety in proposed flood protection projects, with some embracing or moving towards a watershed approach and others not.*

The regulatory and resource agencies' laws and policies, when considered as a whole, favor a watershed approach to flood protection, and inclusion of riparian and tidal habitat features within that system. Undertaking a watershed or habitat-based approach in a system already developed and constrained is challenging and would require a multi-year approach, significant funding, and planning. Realigning existing flood protection systems and inclusion of habitat-based features would require short-term losses but would likely provide longer-term gains. These types of projects would necessitate a significant permitting effort and support from the regulatory and resource agencies. Projects that are based on a watershed approach can support species, and create habitat and connectivity, but still require maintenance. If there is overall improvement in habitat throughout the system, there is also potential to minimize the impacts as a whole. The flood protection managers should be provided with incentives to undertake watershed improvements. However, the current regulatory system as it functions may create disincentives because disturbance of habitat in construction phase and maintenance may require significant mitigation, even though the long term gains for the system are evident.

While planning for a new generation of flood protection projects is undertaken, it is essential that maintenance and repair of the existing infrastructure continue and future maintenance is incorporated into the planning process. As the overall approach is developed, maintenance and repair projects can incrementally improve habitat function assisting in obtaining the overall goals. As planning identifies components to improve the system, phases of the plan can be implemented over time, taking advantage of available funding, providing improved flood protection, adaptation to changing conditions, and improved conditions within the watershed.

C. The Permit Process

In the Bay Area, activities that are undertaken in and adjacent to, or discharge to, aquatic environments require permits from a number of agencies to comply with local, state and federal laws, policies and regulations. The permit process was instituted to protect human health and safety, to prevent and reduce harm to communities, and to protect the environment, habitat and species. Yet no one likes having to obtain a permit. As previously described, in the Bay Area, a flood protection project can require as many as seven licenses, certifications, biological opinions and permits from the SLC, Water Board, BCDC, CDFW, USFWS, NMFS and USACE prior to initiating construction. These seven agencies are responsible for determining whether the project is consistent with multiple laws and policies and impacts to natural resources are minimized and mitigated. As a result of this complexity, preparing materials for a permit application and obtaining a permit can be intensive, time-consuming and expensive.

The question has been often asked, why are so many permits or authorizations required? The answer is that there is significant overlap in jurisdictions and authorities in the region, particularly when it comes to aquatic areas. This overlap came about as federal and state laws were instituted in response to the industrial era and the subsequent rise of the environmental movement. Federal laws are often reinforced by state laws, though California state laws are often more stringent than the federal counterparts. In addition, these seemingly similar authorities have nuanced differences that can lead to different protections when combined. While there is some potential to reorganize how the state and federal agencies interact and implement their separate authorities to create efficiencies, it is beyond the scope of this analysis to undertake that task. However, examining processing of

Permit Processing Concerns

- Permits take too long to process
- Multiple agencies have overlapping jurisdiction, which causes confusion
- Jurisdiction is difficult to determine
- Lack of coordination during the project planning phase of the project when input is more easily assimilated
- Applications lack details and are not complete when submitted
- Projects continue to evolve or change during permit processing
- Applicants are slow to respond to information requests
- The project schedule often does not allow sufficient time for permit processing
- Applications are submitted when timing has become critical
- Agency staff may not understand each other's role and needs in the permit sequencing
- Modeling approaches are not consistent, so staff has to learn different modeling techniques, which slows project analysis

permits under these existing authorities has revealed some areas where improvements to the process may be possible.

The most frequent concern expressed is that permits take too long to be issued. Three areas that delay permit issuance have been identified: staff workload, information provided, and dependencies between agency actions.

1. Workload and Staffing

Workload and staffing may be the central factor in timely issuance of permits. Most public agencies (public agencies in this context refers to municipal, state and federal agencies) have undergone budget cuts during the past eight to ten years due to the economic recession, state budget crisis and federal sequester. Further, because public agencies are chronically underfunded and subject to political priorities, projects and initiatives suffer from lack of consistent and adequate resources. In addition, older employees who delayed retirement due to the recent economic recession are retiring in significant numbers now leaving vacancies that need to be filled. New staffs need time to learn the laws, policies and practices of the new agency and to get up to speed on projects and permitting actions. Lastly, the drought, California's Water Fix, climate change, and the potential extinction of listed species, (Delta and longfin smelt) are of such high priority that existing staff time is focused and spent on these large and complicated issues that have wide ranging implications for the region, leaving less staff time available for other projects.

Public agencies cannot hire new staff on an as needed basis to address the workload issue if positions or funding are not included in agencies' structure and budgets. In order to address staffing shortfalls, management must develop a rationale for and request additional staff, and seek approval for new positions. The request is reviewed and approved or denied at higher levels in the local, state and federal government, and can take one or more budget cycles to secure both the funding and the positions to address the staffing issue. Organizations outside of the agencies can call attention to the staffing shortfall and support increases in budget and staffing. If undertaken, these types of requests should be discussed with agency management to ensure that the effort to gain additional staffing is approached in a collaborative fashion. This is a long-term issue that will likely need sustained support in order to be resolved.

Along with having staff available to handle the workload and provide the necessary attention to these projects, having sufficient staff expertise can also play into how a permit application is processed. When people from diverse backgrounds, professional or otherwise, must work together they bring with them varying levels of experience and knowledge. They also may bring with them assumptions (founded or unfounded), about those they work with. One such assumption is that others understand or have the same depth of knowledge that you do, and because of that assumption, we often do not take the time to explain purposes, issues, challenges, or processes. Through discussions with both flood protection agency staff and regulatory and resource agency staff, it is clear that regionally there is significant lack of understanding of policies and practices of each

group. In regulatory and resource agencies, there is more expertise regarding laws, policies and impacts from actions on habitat and species. In flood protection agencies there is more expertise in engineering, water conveyance techniques, the local regulations and flood protection system, FEMA and existing conditions. Regionally and nationally, there is expertise on watershed ecology, restoration and function (this is not to say that this expertise is not within the agencies). Lastly, within the local and regional agencies, there is also considerable planning expertise that may not be fully utilized for flood protection and watershed activities. Currently, there doesn't appear to be a formal mechanism to share or build this expertise in the region.

2. Applications and Submittals

Currently, many projects within a watershed of flood protection systems are submitted on a project-by-project basis without linkages to activities within the larger watershed. Agencies that receive the applications also process the projects on an individual project basis as the context of the greater watershed is generally not part of the application form. This is in part due to the application forms themselves. The forms, in an effort to be as efficient as possible, break projects down into succinct pieces, such as the volume of fill, or impacts to specific species. While this may be efficient for incorporating quantities and facts into a permit or analysis, the project context may be lost in the process. If the agencies do not ask, and the project proponents don't provide the context for the project (whether it is part of an overall watershed improvement program or part of meeting a larger goal), the projects are considered only on an individual basis and the benefits of a larger approach are lost. A tool that may help remedy this issue is the concept of a vicinity map. Vicinity maps were originally designed to provide regional context for a project, but can be expanded to include not only geographic context, but also a descriptive project context of how (if applicable) it fits into watershed goals and improvements. The California EcoAtlas, which provides free online maps and data on aquatic resources, is another tool that can begin to add context and identify how the project fits into the watershed and activities there. Including a project context section in the application form could be a useful way to help the analyst better understand the project framing. In addition, a discussion of project framing should be part of meeting agendas between agencies and project proponents.

Beyond understanding the context of a project, the application forms, whether using the JARPA or individual agency form, could be improved for a better permitting process. The current permit application forms are generic, and not geared towards any specific type of project. In an effort to capture all the information needed for any type of project, they lack the specificity that would facilitate the applicant in providing information that clearly describes a flood protection project, not to mention its watershed context. A revision to the permit application form may improve the permitting process. If the application questions were tailored to flood protection projects, with sections for maintenance activities and capital improvements, better information would likely be provided, and with better information, the permit process may be more efficient. If the application form is improved, applicants may be able to

provide the information in a way that both clearly shows the benefits of project and ways the project reduces impacts to the extent feasible. It may also help applicants tailor the information they provide so that the analyst can more quickly identify the policy consistencies and conflicts.

There is also a tendency of some applicants to provide too much or too little information during the application process. Too much information has the effect of overwhelming the analyst with information, causing confusion and delays simply due to the volume of material that needs to be reviewed, sorted through, and finally selected for inclusion in reports and permits. Too little information leads to extensive information requests that the applicant must respond to in order for the application to be filed as complete. Providing the right amount of information is a skill that should be cultivated and shared among BAFPAA members and associated municipal agencies. The regulatory and resource agencies must improve their ability to communicate the information that is needed. Information requested by agencies can sometimes be puzzling to applicants, who don't see the information as relevant to their project. Agency staff does not always communicate clearly the need for the information or the policy implications of certain aspects of the proposed project. This makes it difficult for applicants to appropriately address the concerns.

At times, it also appears that applicants are anxious about providing information that may trigger additional analysis. For example, one agency may have identified an issue of concern, but the applicants may not share the identified concern with other agencies. This may lead to the concern being identified later in the process for another agency that could have been worked through collaboratively sooner. Also, when agencies are aware of each other's concerns, it gives them the opportunity to discuss potential remedies that will work for others, rather than individual responses that may not be consistent across the project.

Working together to better communicate the project, tailor for specific information during project analysis, and improve the application would likely make the permit process more timely and efficient.

3. Jurisdictions

Clarifying agency jurisdictions is another area where better information would be helpful in the permit process. Because there is overlap in and different ways of defining jurisdictions between agencies, some flood protection managers have difficulty in defining which parts of the project are in which agency's jurisdiction. The result is applications that have critical errors in descriptions of project components within each agency's jurisdiction. While some agencies' jurisdictions can be diagrammed, BCDC's jurisdiction is particularly challenging because it is an elevation defined by sea level, and in some areas by marsh vegetation, text in the law, or individual site determinations that adjust over time as sea level rises. Having staff available to assist in determinations is helpful, but further guidance in making jurisdictional determinations would save time in preparing maps and calculating acreage and fill within different jurisdictions.

Improvements in understanding jurisdictions would aid the applicants in providing accurate information to each agency regarding the portions of the project within its respective jurisdiction and save time and energy as the permit is being processed.

4. The “Black Box” of Permit Analysis

Once an application is received, it is logged in, and assigned to an analyst. It is important to note that even when a complete application is submitted, the analyst must assimilate the new application into existing workload, noting legal deadlines associated with the existing applications and the new application. There is rarely, if ever, an analyst who can immediately process a new application and issue a permit. For larger projects with significant impacts, several of the agencies must bring them to a Board or Commission for public hearing and a vote. In addition, sometimes projects are given higher priority within an agency or agencies due to regional need, public health and safety, or political reasons. The analyst’s job is to review the application and supplemental materials for completeness. If the application is complete, the analyst proceeds to analyze the project and its components for consistency with the agencies’ specific laws and policies.

In reviewing the application, the analyst reads the information provided and notes where information is missing, needs clarification or presents a policy issue for its agency. The analyst then drafts a response to the applicant, or in the case of the federal resource agencies, to the USACE, outlining the information needs to file the completed application. Once prepared, the request for information is sent to the applicant for a response. The agencies have legal deadlines by which they must provide a written response to the application. Once provided, the analyst generally waits for the requested information to be submitted, and the time clock for issuing the permit within the legally allowable period is stayed. The exception to this is if the information requested by the analyst is not necessary for filing the application complete. If the information is delayed significantly, applications can be returned, without prejudice, unfiled due to lack of information.

In most instances, applications that are submitted are incomplete. This is partially due to applicants not providing all of the necessary information in the initial submittal. When this is the case, applicants can take significant time to gather or prepare the necessary information and to respond to the information request. During this time, the permit analyst may do limited work on the project, but if significant information is missing the application becomes dormant while staff attends to other applicants.

5. Permit Sequencing

The delay in providing requested information is also due the application requiring leases, certifications, incidental take permits, and biological opinions to be filed complete. This creates a challenge for the applicant in that when s/he receives the other permits is not within his/her control. Further, because many of the agencies’ workloads are backlogged, the period to receive these “permits” is often lengthy.

This dependency creates a challenge for the analyst because one agency's analysis of specific technical information, such as impacts to endangered species or water quality, may influence the analysis of another agency. For example, several agencies will not issue a permit for a project that has potential impacts to endangered species without the incidental take permit/authorization from the appropriate resource agency, as required by law. While this makes logical sense, it tends to slow down the overall permit process. This is where agency coordination can be helpful. Understanding each other's issues and potential remedies helps other agencies understand the likely outcome and allows them to move forward with analysis to some extent on the specific issue. It also helps agencies understand how one agency's work impacts another agency's work, which is not always understood. Without understanding other agencies perspectives and requirements, permits from the agencies have the potential to conflict, which can result in conflicting permit conditions.

Once the application is complete, the agencies move forward with analysis and permitting of the project. This period is generally constrained by legal deadlines to issue the permit once an application is complete. It is during this period that agencies may engage in negotiation with the applicant. Negotiating may be necessary to align projects with laws and policies of the respective agency, or to identify permit requirements that are appropriate given the potential impacts of the project and proposed outcomes. Monitoring, mitigation and certainty of success are often sticking point during the negotiations with agencies often wanting more and applicants wanting less. In most instances an agreement is reached and the permit issued in a timely manner. In some instances, agreements are difficult to reach and negotiations draw out the permitting process. In these instances, the applicant is asked to extend the legal deadlines, to allow negotiations to continue. The risk of not extending the deadline is that the permit could be denied and the process would either begin anew or the proposed project may need to be redesigned. The agencies' preference is that proposed projects that are submitted are consistent with laws, policies and regulations and impacts are minimized or mitigation for to the extent that the project can move expeditiously through the permit process.

6. Other Issues Associated with the Permit Process

In interviews and discussions, a few specific issues were raised that create a challenge during the permit process. One is the timing of submittal of the application. In some instances, project proponents will apply for "permits" when the project is close to final design, or more challengingly, after construction bids have been solicited or accepted. This practice increases tension in the permitting process because of the lack of flexibility for project changes and time constraints. Project changes may be necessary to meets laws and policies. It is better to request permits earlier in the project design when changes in project design and approach are still possible. Another issue that raises concern is some applicants do not appear to include time for permitting and responding to request for information in the project schedule. This leads to frustration during the permit process when the agencies take the time needed to conduct their work. The

project schedule should include permitting periods that can be verified with agency staff.

Likely the most challenging issue for applicants occurs when the project's chosen alternative comes into question during the permit process. This occurs sometimes as a result of the more detailed information that is provided in the permit stage, rather than the EIS/EIR stage of project development. In the worst case, the chosen alternative is determined to be not the preferred alternative or an additional alternative that was not vetted comes to light. Another reason this happens is because different staff may participate in the permit process, adding "fresh eyes" to the project, or more expertise. In these cases, projects can be sent back to the design phase where additional vetting is needed. In addition, an agency may not have had the resources to fully participate in the CEQA/NEPA review and is examining the project for the first time. None of these situations are good, and the result is additional time and money spent in project development, analysis and permit review. Fortunately, these occurrences are fairly rare, but when they do happen, the regulatory agencies are highly criticized and management is often brought in to help resolve the issue.

7. Modeling

In flood protection projects, modeling is often incorporated into development of project design with certain assumptions made and models run. Modeling can be extremely helpful in testing concepts and different alternatives for the project. The challenge for the agencies is that different models and modeling approaches are used throughout the region. Because regulatory and resource agencies generally do not have modeling expertise, using different models requires that the analyst learns about each model used, its benefits and short comings, as well as the assumptions made for the model runs. This takes considerable time and experts in order to be able to properly analyze the utility and veracity of the model outcomes. Flood protection agencies should consider whether selecting a specific model would be appropriate for regional use, or if some other remedy maybe appropriate to use to evaluate flood protection projects.

Take Away: *The permit application process can be daunting, particularly when describing large, multi-benefit projects that extend into multiple jurisdictions and across municipal boundaries. There are specific areas in this process that can be fairly easily improved, such as developing a flood protection project specific application and guidance on agency jurisdiction that is more clear and more definitive. The pace at which permits are issued has multiple drivers, including limited number of staff, their experience, and workload of the analyst that receives the project as well as the quality, completeness and timeliness of the applicants' submittals and follow up. Staffing is the tougher issue to resolve as agency budgets and staffing take multiple years and considerable effort to increase (this is true of both flood protection agencies and regulatory and resource agencies). This is an area where outside support is likely needed.*

The information that is submitted for projects can also be improved. This can happen through revising the applications, providing guidance, working together as the project and information is developed, and through discussions about policies and regulation needs. Creating clarity about what is needed and why can help the project proponent acquire and provide the information needed for analysis. Hydraulic modeling is a technical issue that could clearly use a regional workshop to further explore. The regulatory and resource agencies can also improve the interagency communication and understanding of the dependencies of each others "permits," which would help with applicants complete their application. Finally, in planning the project, the permitting process should be included in the schedule, and given sufficient time for the agencies to complete their work.

D. Permit Requirements

As the analyst completes the permit, conditions are added to ensure compliance with the authorization; to modify a project for consistency with a law or policy; to assist in determining project success; and to cope with uncertainty. Some conditions are fairly routine – plan reviews and submittal of more specific

Monitoring Concerns

- Drives up cost of project
- Too many monitoring requirements
- Required for too long of a time period
- Too short of time period, given sea level rise and dynamic changes
- Unclear what it is being used for
- Inconsistent between agencies and projects
- An item to check off rather than a tool

details on project components that further define the authorization. Others require best management practices while the work is undertaken, including items such as erosion control measures and hazardous materials containment, to reduce potential impacts from the authorized activity. As land stewards, many of these conditions are consistent with the practices of flood protection agencies and are readily complied with. Others require the permittee to modify or undertake additional activities that may not have been anticipated. This can lead to work delays and extra costs. Two specific areas of concern with permit requirements were repeatedly noted in discussions on the subject – monitoring and mitigation.

1. Monitoring

Flood protection managers do routine monitoring as part of their annual work to understand the status of the system. The monitoring includes sedimentation in channels, vegetation growth, structural integrity, water flow, and other items. This monitoring has a clear nexus to satisfying a management need. It appears that some managers do not find the same clarity of purpose for monitoring required in permits and consider it more like an item to be checked off a list rather than a tool to be used. It is also possible that since much of the required monitoring is biological in nature or assists in understanding water quality, the monitoring may not appear useful to engineers and managers whose main purpose is flood protection. However, if the goal of the manager is also to understand watershed health or progress of a restoration project in reaching the targeted ecological functions, then these monitoring requirements might be viewed as more practical, as they would be serving a similar purpose to monitoring necessary to maintain and improve the physical system. From the regulatory and resource agency perspective, the monitoring is necessary to understand the status of the ecological processes within the watershed, and, when habitat features are included in the project,

the progress in reaching the targeted goals. It also assists in understanding the success of mitigation requirements when part of the permit.

As stewards of the watershed, both flood protection managers and the regulatory and resource agencies have a stake in a practical monitoring program that provides useful data. Current monitoring requirements may not have clear linkages between metrics and desired outcomes. An examination of the monitoring that is currently being conducted for maintenance purposes may identify areas where biological or project success monitoring could be combined, additional measures could be incorporated, and unnecessary measures could be eliminated, thereby reducing the need for additional monitoring days. Further, the flood protection engineers would benefit from the input of biologists in both monitoring and assessing data to inform health, species diversity and richness as well as ecological functions of habitat.

As the monitoring is primarily focused on biological and physical process metrics – vegetation development, species use, water quality –for projects that disrupt habitat and seek to restore or enhance it, it is necessary to monitor over significant periods of time to ensure continual health. Initial monitoring may capture early production as the first colonizing species establish in the disturbed/restored area, but longer term monitoring is intended to inform whether community diversity and richness is developing appropriately, indicating maturity of the habitat. As the climate changes, the longer term monitoring can also signal changes that may need to be addressed.

If the flood protection manager viewed monitoring as an informative tool rather than a burden, it may allow for some innovation. If all parties begin to think differently about monitoring, it may lead to a more practical and advantageous use of information collected. If monitoring moves in that direction, the stakeholders and agencies may also want to consider how the measurements and data can be standardized and used across watersheds, to provide a more meaningful picture of regional watershed health, and comparisons of like habitats between watersheds and between watersheds as a whole where appropriate. Once standardized, data collected would be more useful if it was accessible in a database, such as those managed by the San Francisco Estuary Institute or

Minimization and Mitigation Measures

- Increase the cost of the project and slow construction
- Required for each temporal impact of maintenance activities
- Opportunities for in-kind mitigation are limited
- One agency may not be satisfied with the mitigation requirements from another agency
- Requirements seek creation of the same type of habitat disturbed and new creeks cannot be created
- Should not be required when the short-term impacts will result in long-term improvements to habitat and water quality

the US Geological Survey. Accessible data would allow scientists and stakeholders to use the data, and provide additional feedback to the agencies on physical and biological health of the watersheds, and the Bay that is currently largely unavailable. By standardizing and sharing information, long term cost savings may be an additional benefit.

2. Minimization Measures and Mitigation Requirements

In addition to monitoring requirements, the agencies regularly require minimization and mitigation measures for impacts to habitat, species, water quality, etc. The agencies follow a sequence of impact reduction that is familiar to the flood protection managers. They seek to first avoid impacts, then to minimize, and finally, if avoidance and minimizing measures do not sufficiently reduce the impacts, to mitigate for loss.

In many cases, minimization and mitigation measures are required as part of the CEQA/NEPA review process to reduce significant impacts to less than significant under those laws. Inclusion as a requirement of that process does not necessarily fulfill the requirements of the state and federal agencies' laws and policies when the project is reviewed at the more detailed level in the permit process. Agencies often incorporate the CEQA/NEPA measures into the permit because at a minimum they reduce the level of impacts. However, the regulatory and resource agencies may find that additional minimization and mitigation measures are necessary. For example, impacting critical habitat that cannot be avoided may require contribution to a mitigation bank, or placement of fill may require the removal of an equal volume of fill to balance the impact to the Bay. Generally the agencies seek to identify in-kind, on site mitigation measures using a mitigation ratio. In the event that this is not feasible, they will often pursue in-kind but off site, preferably nearby mitigation, and then look to the purchase of in-kind mitigation bank credits for the loss. This becomes particularly challenging when in-kind mitigation is not possible or an in-kind mitigation bank for the impact type or species does not exist. The agencies then need to consider out of kind or in lieu mitigation, which may result in requirements that seem inappropriate given the impact that is being mitigated for.

When working in areas with threatened and endangered species, loss of individual animals can result in serious consequences to the survival of the species. Having already survived the perilous juvenile phase of life, healthy, breeding adult species are key to the survival of listed species. These adults contribute additional individuals to the population each breeding season and over time. Providing additional habitat for the species that are habitat limited is another key aspect of moving listed species to thriving populations, hence the need and requirement to mitigate for loss of habitat when it occurs.

Identifying mitigation for impacts to creeks, streams, channels, and watersheds is particularly difficult. This is partly due to the unique physical settings and processes that constitute tributaries. Creeks and streams require specific geomorphology and hydrologic conditions, and therefore cannot be created where they have not or do not

exist. Because human development has literally covered and buried large portions of the system, resurrecting the historic features and flows prove very difficult. Further, flood protection agencies are somewhat limited to the land they currently own and steward.

Additional challenges flood protection activities face can be further elucidated by splitting the projects into maintenance activities and capital projects. Maintenance activities are by their nature repetitive and can consist of repairing an aging or broken structure; replacing broken concrete or riprap; or returning flood capacity to a channel via sediment and vegetation removal. Repairing and maintaining structures may be fairly straightforward and have little impacts. But they may sometimes require disrupting stream processes due to the need to dig in and around the area, or suspend water flows while work is occurring. Sediment and vegetation removal, while routine for the flood managers, not only disturbs wildlife but also removes habitat that takes time to reestablish or may require replanting to recover. When large sections of habitat are removed, animals can be directly affected, resulting in physical harm and death; or be indirectly affected through loss of a food sources, resting, nesting or ability to hide from predators. While some species are mobile and can relocate, their relocation can cause competition for limited resources and territorial disputes. The carrying capacity of adjacent habitat, if it exists, may not be sufficient for addition animals. Others with less mobility cannot relocate to adjacent habitat, so removal of habitat for these species can lead to direct mortality fairly quickly.

Capital projects can have similar effects, often on a larger scale, but on a one-time or once in several decades basis. As flood managers seek to improve the system, even when the goal is to restore habitat and watershed functions, the impacts can be significant for the wildlife that currently inhabits the area. In contrast to maintenance work, capital project impacts tend to be over a larger area and continue for a few years, while the project is being completed. This often requires stopping stream flow and removal of larger areas of vegetation followed by a period of restoration activity as habitat features are rebuilt and restored.

Because of the scale of these types of projects and their impacts, the long-term benefits can get lost in the permitting process even when the larger goals include restoring watersheds and the habitat they encompass. In both maintenance and capital projects, physical and biological processes are interrupted and have to reestablish once the activity is completed.

As can be ascertained from examining the goals of flood protection managers and those of the regulatory and resource agencies, mitigation is an area of disparity and conflict. Flood protection managers are required to provide appropriate flood capacity with their system. Some have the space available - particularly those agencies that are also water districts, and are working within a larger watershed. Others have more constrained systems or limitations on their ability to provide resource benefits in their projects. Regulatory and resource agencies are required to reduce impacts and when they cannot, to account for and replace loss through restoration or purchase of credits. While agencies support projects that provide long-term gains, they need to balance the loss with benefits on a shorter timeframe to allow and support resource recovery.

Both flood protection managers and regulatory and resource agencies make use of minimization measures to reduce impacts. Some of these measures are fairly standard, while others are created on a project-by-project basis depending on the circumstances of the project. Development and adherence to these minimization measures may slow down the permitting process, project construction and add expense. Developing a work program that includes routine maintenance activities and periodic repair needs, along with best management practices that can be adhered to, may improve the permitting process for this type of work. Mitigation will likely continue to be required for temporal impacts to vegetation and sediment resources within the system. Because these activities are necessary for flood conveyance, managers may want to consider ways to provide these resources in adjacent areas that serve only a habitat-based purpose. In this way, wildlife would have an area of respite during maintenance activity. Further, regulatory and resource agencies should consider whether mitigation for downstream impacts could be accommodated in upstream reaches. In this way, upstream areas where poor management results in downstream sedimentation can be improved for the health of the watershed. This type of mitigation may result in an overall reduction in maintenance needs, and thereby less impacts overall. Other opportunities may be found in areas where buried or culverted streams can be “daylighted” to allow physical processes to reestablish.

Flood protection managers may have, or could develop, lists of opportunities within the watershed and community they serve that could be used as mitigation, somewhat like a wish list for the watershed. In this way mitigation projects can contribute to the overall goals of the flood protection agencies and meet the requirements of the various agencies.

Similarly, in larger capital projects, identifying beneficial features that support physical and biological resources and function as a response to the impacts may help the agencies see the project as self-mitigating. Building features such as in-channel refugia for fish, in-stream wetland terraces and low flow channels that require less maintenance, and describing them in the context of the overall watershed and habitat needs of specific species helps the agencies make the connections necessary to make this determination. An example of this can be found in the San Francisquito Creek

project was the inclusion of flow refugia areas for migrating salmonid and higher areas of marsh within Faber Tract for high tide refugia. Both of these features required fill in the Water Board, BCDC and the USACE's jurisdictions, where there are regulatory requirements to minimize fill. However, understanding that the fill was linked to improved habitat for various listed species, another goal and consistent with other policies of the agencies, this activity was permitted without further mitigation requirements for the fill. It is these types of features that can compensate for habitat loss and reduce need for unplanned mitigation requirements. Working with the agencies as the project is being designed can facilitate identification of these types of remedies and align requirements for such mitigation, and potentially reduce the need for additional mitigation outside the proposed project.

In projects where significant impacts occur that cannot be self-mitigated, compensatory mitigation is required by the agencies. The mitigation required is commensurate with the level of impact, and then in some instances a ratio is applied to account for the time necessary for habitat to develop to maturity. Temporal impacts as well as permanent impacts are often mitigated for, though often at different rates. The mitigation required by each agency may vary both in the type of loss that is mitigated for and the amount required. This leads to confusion among the flood protection community and it is sometimes unclear whether once agency "counts" another agency's mitigation as their own or whether additional mitigation is being required for the same impact.

In addition, after experiencing poor performance by public agencies nationally, the USEPA and the USACE jointly promulgated regulations on mitigation in 2008. According to these regulations, compensatory mitigation means the restoration, establishment, enhancement, and/or in certain circumstances preservation of wetlands, streams and other aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved (USEPA). When implemented, these requirements favor the use of mitigation banks first, in lieu fees next, and then on site mitigation under the control of the project proponent. This program also requires financial assurances and conservation easements over the land that is being used as mitigation. This program is implemented in the opposite fashion of some state agencies that seek on-site mitigation first, then adjacent mitigation, then in lieu fees, and finally mitigation banks when the other options are not available.

Coordination on this issue with all the agencies present to discuss and develop mitigation for impacts may prove to be better than working with individual agencies in a sequential fashion for this issue. It may result in a mitigation package that clarifies how each of the impacts are mitigated for and lessen the chance of "mitigating for mitigation measures" that has occurred on occasion.

3. Endowments

In instances where additional mitigation is required, another related issue comes to the forefront. When some agencies require mitigation, they also require that the permittee

provide an endowment for the maintenance of the mitigation site into the future. An endowment is a significant sum of money set aside in an interest bearing account, whose interest is then used for maintenance of the site in perpetuity. Enough funds must be set aside to cover the cost of annual maintenance, thus reserving millions of dollars of public funds that could otherwise be used for much needed public projects. While initial review of this practice seems to be a reasonable way to ensure funding is available to maintain the mitigation site, a closer examination reveals it may be unnecessary and the cause of delay in important work. Endowments are necessary when a reliable funding source is not available, or when there is potential for the owner of the property to sell the land after the permitted activity is complete, such as hotel or housing development. Flood protection programs are funded by annual taxes, and have a reliable funding source. Further, flood protection lands are owned by the flood protection agency and they cannot sell the land in which the permitted activity takes place. Lastly, they are responsible for the upkeep of the land that they own, and therefore an endowment for maintenance is not necessary.

The issue of requiring endowments is particularly sensitive for the flood protection community as it significantly limits the work that they can undertake due to funding constraints. Because the flood protection system is necessary for public safety and damage reduction, the risk from not accomplishing the work is high. Not all agencies require endowments – some understand that public agencies are not likely to sell the property or develop it, and have less concern that they will not maintain the mitigation site. Others have specific policies in place that make it more difficult to not require endowments or other financial assurances. The state legislation that established the endowment program and subsequent regulations include flexibility for implementing agencies, which may allow a different approach for public agencies.

The USACE had a pilot project in which they allowed funding assurances for maintenance of only three years rather than in perpetuity. This was a more manageable program for the flood protection agencies. However, USACE's pilot program does not appear to be in operation at this time. This issue is significant for the flood protection agencies.

Take Away:

When agencies issue permits, they include conditions and requirements that the project proponent must abide by in constructing the project, and then monitoring its success. Some of these requirements are from the project description as minimization measures or project features that the acting agency has included to ensure the project is constructed as planned and described in the application. Others are included, generally, as protective measures, mitigation and monitoring requirements. It is understood that these measures add expense to the project, but are considered necessary to meet the laws, policies and regulations of each agency. It is important that the requirements are commensurate with and have a nexus to the impacts that would occur.

Flood protection projects are some of the most challenging to permit simply because they occur in some of the most sensitive and limited habitat in the region and because of physical landscape features and hydrologic conditions that created them, they are very difficult to mitigate for when there is a loss, either in capital projects or maintenance work. Mitigation requirements would be best if they were allowed to be within the watershed, and building towards an increase in its biological and physical functioning. If projects were designed in such a way that they included habitat features supportive of listed species, there is potential to create self-mitigating projects, but this would take advance work with the regulatory and resource agencies to reach agreement on a proposal. Further, some work and coordination between agencies on how mitigation is implemented may help establish the best method for mitigation in different circumstances, be it mitigation banking or on-site mitigation.

Like mitigation, monitoring is a regular component of flood protection permits. As discussed it is required to provide updates on the project progress and to confirm successful implementation and reestablishment of habitat damaged by the project (the same is true for mitigation sites). There is significant potential to standardize monitoring for flood protection projects across the region, as there are common metrics that would be required. If a standard monitoring program were created, there would be more consistency and certainty on what would be required. Having a common data set would also allow for comparisons of projects in the region. Having the data set available as an open source would facilitate better management of the resource as well as potential for additional research from institutions that would use them.

Lastly, endowments and other forms of financial securities that compound large sums of money are a very serious issue for the flood protection managers because they cannot use this money for necessary public services. Regulatory and resource agencies believe this is necessary by law and regulations, and past performance of public agencies. It is unclear how to resolve this issue, but alternate methods for ensuring compliance with mitigation and maintenance of mitigation sites should be the subject of a well-researched, facilitated discussion with all necessary parties participating.

E. Agency Consistency and Effectiveness

An area of some sensitivity is the effectiveness of the regulatory and resource agencies. No one would argue that getting well-designed and environmentally responsive flood protection projects through the regulatory process quickly is important. Evidence of the value of these projects and their role in creating a healthy ecosystem can be found in agency planning work, including the Water Board's Watershed Management Initiative (Appendix A), NMFS' Salmonid Recovery Plan, and the USFWS's discussion of the lower part of the watershed in the Tidal Marsh Recovery Plan. These planning level documents have not necessarily translated into the actions proposed and considerations during permitting of the projects. Part of the answer lies in the project-by-project permitting

approach, staffing issues, the agencies' culture, and partly because as region, a unified vision has not been elucidated by the flood protection agencies.

- Seemingly similar projects have different permit requirements, which creates the appearance of inconsistent policy application
- Better coordination on projects would provide more consistent outcomes and requirements
- Agencies have variable analytical approaches, leading to confusion for applicant
- Staff turnover causes delays to projects for both flood protection and regulatory/resource agencies
- When analysts change, it does not appear that project status is summarized, causing repeat questions and time lost
- Inconsistency in approach and outcomes creates a lack of trust
- Lack of certainty causes agencies to take a conservative approach, requiring more study and can delay projects

Regulatory and resource agencies, specifically the permitting and enforcement sections are responsive by nature, meaning that when a request for a meeting or application comes in, they respond to that request. They do not seek out a programmatic approach or suggest changes to normal business practices. This is an institutional construct built by regulations developed to prevent harm and reduce impacts, not necessarily to improve systems. It is considered by some to be beyond an agency's role to provide guidance on what "should" be done, or look beyond the proposed project boundaries. In fact, when this does happen, it is often the applicant whom insists the analyst stay within the bounds of the proposed project. There are a few analysts who will expound on the potential of connecting systems or additive features that might create a better project overall from the resource perspective. It is these pro-active regulators that might be engaged to develop a more cohesive regulatory program for flood protection projects. The time and space for this to occur would need to be supported from the agencies' management, with the

support of stakeholders and outside of a specific project being permitted.

The way work is distributed within some agencies may be another area that prevents efficient permitting of similar projects. Some agencies distribute work as it comes in and by determining who has available workload capacity. Experience with the specific type of project may not be the defining criteria for who is assigned the task. Other agencies distribute work by county, and then by capacity within the county team. Others dispense applications within broad categories of work and have technical expertise within that category. This creates a variety of expertise and familiarity among permit analysts handling flood protection projects. Analysts that are assigned to projects that they are familiar with, the applicants they are familiar with, or the county in which it occurs tend to be able to more quickly understand and better navigate the project assigned than ones that are unfamiliar with the project types, landscape or applicants.

There is also the issue of staff turnover and assigning of new analysts to projects that are ongoing in the permit development. This sometimes has the effect of a new set of eyes and ideas on a project that has moved through significant portions of the design, environmental review and permitting process. When information transfer does not occur, it falls to the project proponent to bring the new analyst up to speed on the work to date and progress with other agencies. When no one works with the new analyst on the history of the project and permit process to date, it tends to take longer to work out application issues and reach resolution, causing delays in the permit issuance.

Project proponents have raised the issue of seemingly similar projects having different permit requirements. In looking closer these projects are often in a different location or setting that elicited a different response, such as higher up in a smaller channel. It is extremely rare that two projects have identical conditions or components. However, it is always important for the agency to be able to clearly explain the nexus for the requirement to the policy and impact. When similar and regular activities occur, such as maintenance work, it would be helpful to have a set of best management practices and corresponding standardized conditions in permits for these activities. Further, providing a level of certainty in requirements may help the project proponent plan and budget for the project. Just as standardized best management practices can be helpful to the project proponent, they can be helpful and reduce workload for the analyst when applied properly.

Just as intra agency coordination is important, so is interagency coordination. Regulatory agencies have different mandates and responsibilities for management of California's natural resources. They may identify project design aspects which are incompatible, incongruent, or in opposition to their laws and policies. In some instances, a project design aspect that satisfies a requirement of one agency may introduce a policy challenge for another, which can result in conflicting requirements within the permit. This uncertainty creates a situation where flood protection agencies become fearful of investing too much time and funding in developing a project to submit for permitting because the agency's requirement may be significant enough to necessitate redesign of major project components. These types of issues can be resolved with interagency coordination during the permit process. These conversations can also enable conversations that offer different approaches to solving problems, exchange of information and gaining of expertise through exposure to others' thoughts.

Currently, there is no regional road map for either the flood protection or the regulatory and resource agencies to follow for flood protection projects. While watershed-scale planning seems ideal for project planning, it can be achievable only if it includes real world constraints of the different regions. Consideration must be given to issues such as land ownership and jurisdictional boundaries, and current land use when developing such a road map, as well as the desires of advocacy groups with specific interests. Understanding the unique issues of each watershed would be necessary to tailor the approach for each, but can allow for milestones along the way. If a framework were

created that was realistic and achievable within each area, agencies could use this structure to include permitting requirements that help meet those goals. Thus creating more certainty as the region progresses forward. This work could not be accomplished without significant coordination and agreement on the desired outcomes, as well as investment of time and energy on the part of all parties.

In the meantime, smaller steps can be taken to improve the outcomes of the permitting process, including revising the applications for the projects, development of common goals, best management practices and more standard permit requirements, all of which will take coordination.

Take Away:

Regulatory and resource agencies have numerous projects to respond to, and their workload is high. Measures that reduce workload but produce comparable or improved protections for the resources and more timely permits may be obtainable, but would likely require some reorganization of work within the agencies. In addition, expanding upon the agency staff expertise to include more flood protection related topics may be helpful in creating efficiencies. Developing appropriate standardized tools, practices, and even permit requirements could be effective. Lastly increasing interagency coordination and creating a vision for the future of flood protection in the region would likely take significant initial effort, but would be worth the work if better watershed and flood protection function and habitat protection and restoration were the results. If management supported such an effort, there are likely candidates within each of the agencies' planning and regulatory staff that could assist in creating the vision.

F. Coordination Opportunities and Examples

Coordination between the agencies is necessary to align permit authorizations and requirements and reduce inconsistency in the application, permitting process, and resultant permit conditions, and is beneficial to all involved. Many of the issues examined in this review could be assisted by better coordination, either on the part of the agencies, the managers, or both. Several coordination efforts exist throughout the region. In seeking efficiencies in the regulatory process several different approaches were examined.

1. CEQA/NEPA Analysis

As part of many projects, particularly those with impacts to public resources, a CEQA/NEPA analysis is a necessary part of the permitting process. Although not typically thought of as a coordinated effort, this process does provide a common understanding of a project and its potential impacts to the environment. If this process is used to its fullest potential, and has good participation from the responsible agencies, it can and should lead to the least environmentally damaging practicable alternative for a project.

This is an important first step in coordination on a project, providing the basis from which the permits and opinions will flow.

The scoping meeting held at the beginning of the CEQA/NEPA process is the earliest opportunity for coordination on the project. However, staffing is limited and that leads to meetings that are not well attended. The next opportunity is the comment period, which many agencies participate in after reading about the project, but primarily through written comments. These comments highlight areas of concern, but many times do not provide potential solutions. For projects requiring an EIS/EIR, public meetings are held, and are normally well attended by the agencies, but open discussions often do not occur due to the nature of the process and format of the meetings.

Regulatory and resource agencies may not fully participate in the CEQA/NEPA process due to workload, but this creates a missed opportunity for the agencies and causes project delays down the road. Delays may occur when agencies provide input only in the permitting process at a time that is difficult to make changes to the project. Early agency participation and comments allow the project proponents to provide needed information and/or adjust the project when it is in the planning stages, when it is most effective and efficient to do so. Developing necessary information and receiving feedback during the planning phase often works better for the project proponent because consultants assisting in the project are available to do this work.

2. Joint Aquatic Resource Permit Application (JARPA)

This application is a coordination effort to provide the same information to each permitting agency at the onset of the application process. While the joint application does not necessarily result in project specific meetings or more significant coordination, it does allow for coordinated permit activities because the agencies are working from the same project description and plans, impacts analysis and proposed avoidance, minimization and mitigation measures. This joint application is an important tool to create a common understanding of the project and initial analysis, as well as a way to reduce the workload of the project proponent when applying for multiple permits. However, it is a one application fits all projects document, and not specific to flood protection projects. In addition, no one entity is currently responsible for keeping the application up to date as individual agency policies change over time.

3. Informal Agency-to-Agency Coordination

Often times, when a project presents issues of concern for an agency, they will contact another agency with similar concerns, both to vet initial considerations and possible avoidance, minimization or mitigation measures, as well as potential project modifications. This type of agency to agency coordination is helpful, particularly when agencies have overlapping jurisdictions, authorities or responsibilities for resource protection. This generally occurs through phone conversations or emails, and provides an avenue for sharing expertise and consistency in regulatory actions. These informal discussions happen on a case-by-case basis, and are often the result of professional relationships that were built over time as agency staff gain experience with one another.

These conversations often occur outside of public meetings or meetings with applicants, when agency staff can speak candidly with each other. Both federal and state law and policy allow for this activity in that they specify that agencies consult with each other, provide technical advice or expertise, or to seek the advice of agencies with certain expertise.

4. Permittee Initiated Coordination

In some instances, project proponents either recognize that the proposed project has significant barriers that must be overcome to succeed, have been advised to or choose to work collaboratively in the regulatory process, or have had experiences that have led them to early discussions with the regulatory and resource agencies. Regardless of the motivation, some project proponents initiate agency coordination activities early in the planning process. Two projects, Colma Creek and Belmont Slough flood protection projects, were examined that appear to have initiated interagency coordination outside of any organized coordination process. Belmont Slough also took advantage of the USACE Interagency Coordination Meeting during the period of the examination.

In both examples, the project proponents, Belmont Creek (Norvartis Pharmaceutical, Cities of Belmont, San Carlos and San Mateo County) and Colma Creek (San Mateo County, Department of Public Works), hired consultants to assist in the project development and coordination with the agencies. Both projects were in the early stages of project development and are within multiple jurisdictions, have public and private property ownership, and have adjacent properties that are affected by flooding.

The coordination efforts are centered around development of project alternatives, information, and studies necessary to evaluate the potential impacts, flooding reduction options, and habitat restoration and/or enhancement opportunities/mitigation. Both cases were initiated prior to the development of a CEQA/NEPA document and a few years in advance of submitting an application for permits. The early coordination was an effort to identify permitting agencies' preferred alternatives and potential areas of conflict with regulatory laws and policies, and to gain support for the eventual project. In both cases, the regulatory and resource agencies were present and provided feedback during meetings. In addition, the project proponents provided memorandums of discussions and study results on a periodic, but not greater than a biannual, basis. With each set of outcomes a meeting was set to discuss the findings and to seek additional input on project design as a result of the findings.

These meetings were well attended by the resource and regulatory agencies, with representation from each agency. The conversations at the meetings, while not binding, were thoughtful and candid about the potential challenges of different alternatives. Agencies and project proponents appeared open to suggestions of different techniques for approaching the flooding issue. Agencies provided guidance on minimization measures and information that would be needed in the permit process.

Keys to successful coordination at this level appear to be agency participation, third party support of the coordination effort, early input opportunities for project design and components, and clear communication on information needs.

5. County Based Coordination

Cities and counties often have public projects that require multiple permits. In addition, cities and counties often permit projects within their jurisdiction that are proposed by private project proponents or organizations. A few of the counties have developed a county specific interagency meeting that occurs periodically, and on an as needed basis. For example, in Marin County, the Marin County Stormwater Pollution Prevention Program (MCSTOPPP), a division of the Department of Public Works, organizes and hosts monthly Project Coordination Meetings. This allows regulatory and resource agencies to provide early informal advice to project proponents during the conceptual development stages. The standard agency participants are Marin County, the RWQCB, USACE and CDFW. The County reaches out to other agencies to request their participation when a project is within that agencies' jurisdiction, or may affect a managed species. The project proponents can request specific agencies attendance as well. The projects presented generally include creek and wetland projects within Marin County, and include both public and private projects. Meetings are non-binding, informal and not public. The project proponents have 30 minutes to present their projects, and are encouraged to bring plans and maps to help facilitate the discussion. This type of meeting, in the early planning stages, can help build relationships between the project proponents and agencies. In addition, they provide an opportunity to modify projects in the early stages of development so that the project avoids and minimizes impacts. It also provides awareness to the project proponent about hurdles that may occur during the permit process.

As another example of coordination efforts, the Santa Clara Valley Water District (SCVWD) has a post permit issuance annual coordination meeting with the seven regulatory and resource agencies involved in its Stream Maintenance Program. This coordination effort was the result of the permitting process and an effort to manage the multiple requirements of the seven "permits." In developing the coordination, agencies agreed on a number of items where coordination should occur, including: providing all documents and reports to all agencies, regardless of limitations of jurisdiction or authority to provide transparency; two reporting periods per year, notification of projects to be undertaken during the year, and those completed in the previous year; an annual lessons learned meeting to review areas for improvement from all sides; and an annual field trip to view proposed projects for the upcoming year. This coordination allows for a very large and diverse project to move forward in a more streamlined process, keeps everyone informed, and provides an easily accessible and organized set of reports that are comparable between the agencies.

6. USACE Interagency Coordination Meeting

The USACE hosts a monthly meeting for project proponents to meet with the agencies and receive feedback on the project, its components, and potential avoidance,

minimization and mitigation measures. The meeting is held once a month, and an agenda and invitation to the meeting is sent to the agencies one week in advance. Agencies are encouraged to attend, but not required. The project proponents are scheduled for an hour, including both presentation and discussion. Multiple projects of different types can be on the agenda. The project proponent must provide a project summary, with specific information, maps, and site plans, two weeks in advance of the meeting to be placed on the agenda. This allows the agencies time to review the information prior to the meeting. Project proponents can request to be placed on the agenda before or after submitting an application to the agencies.

This interagency coordination is more regular and structured than some of the previously described efforts described above in that it has specific requirements for the agenda, amount of time dedicated to each project during the meeting and attendance of the regulatory and resource agencies. Regarding participation from the agencies, it is voluntary, and based on the interest of the agencies in the projects on the agenda. Different agency staff may attend based on project assignment, interest or “territory” covered by the individual staff member.

7. Dredged Material Management Office (DMMO)

Four agencies, the USACE, the USEPA, the Water Board, and BCDC issue permits for dredging in the San Francisco Bay Region and are part of the Long Term Management Strategy for Dredging (LTMS). In addition, to these four agencies, the three resource agencies the USFWS, the NMFS, and the CDFW have issued programmatic biological opinions for dredging and dredged sediment disposal or beneficial reuse, or have concurred with the biological opinions. The DMMO is an interagency office with standing representatives from each LTMS agency. It is in charge of reviewing and making determinations regarding sediment quality and appropriate placement of dredged sediment, as well as assisting dredging project proponents with questions and permitting activities. Among the representatives on the DMMO are the permit analysts who draft and issue the dredging permits for each agency. This group meets twice a month, on Wednesdays from 11:00 am to 4:00 pm. The meeting is public and the notices are provided on the DMMO website and sent to the regulatory and resource agencies as well as interested parties. Project proponents must submit a sampling and analysis plan, sampling and analysis report, or an application one week in advance of the meeting to each agency to be placed on the agenda. This information can be submitted through the DMMO Database website: <https://www.DMMOsfbay.org>. If a project proponent simply wants to discuss a project and request feedback from the agencies, they can request to be placed on the agenda for discussion only.

The resource agencies attend the DMMO on a limited basis, and usually when the DMMO has flagged a project with an issue of specific concern. While this may appear to be a limiting factor in the coordination, the resource agencies have entrusted the DMMO agencies with the tools to protect listed species within the parameters of the

LTMS program, and the establishment of specific protocols in the event that a project cannot work within the program.

Of the coordination efforts reviewed above, this program is the most structured. The components that make it so consistent include:

- Limited scope of the work (only projects with dredging components are reviewed)
- DMMO Memorandum of Understanding
- Partner agencies providing dedicated staff to the program
- DMMO staff also issue the permits for the project, or work with other staff within each agency to provide guidance on the dredging component of the project

Because dredging project proponents do routine dredging over many years, this group of applicants is very familiar with the regulatory process and the DMMO requirements. They have also built up a relationship with the agencies over many years. In addition, this program has a high profile within each agency and a vertical structure of management, with management and executive level involvement in the LTMS program.

Take Away:

There are common characteristics and practices that provide for a smoother working relationship between the agencies and the applicants. These include:

- *Common Understanding*
- *Early Input*
- *Dedicated Time Management*
- *Coordination and Collaboration*
- *Participation*

- ***Common understanding of the project components is the first key to success in moving a project forward.*** If the agencies have different or incomplete sets of information, it leads to confusion among the agencies. The JARPA application does a good job of consolidating the information needed for each agency. An important factor to consider as additional information is developed, is to provide updates to all agencies about changes or additions to the project.
- ***Early input is also key to a more efficient permitting process.*** Several coordination efforts occur even prior to the development of a set of alternatives for the project, or the development of a CEQA/NEPA analysis of the proposed project. While this is likely a very good time to seek input and coordination, it is not always possible to do so at this stage of the project. Additional milestones along the project planning phase should be considered for agency coordination efforts. A good opportunity is while the design is still in the early stages and impacts can be minimized by design changes that may be less easy to make as the project proceeds into construction drawings. Waiting to submit an application even at the 65% design level may present challenges when changes are needed to satisfy regulatory requirements. In addition, it is vitally important to a good coordination process that participants approach projects from a collaborative perspective, being willing to listen to and consider different viewpoints. Particularly with flood protection projects it is necessary to

understand the parameters within which each entity must work. Particularly, when working in the dynamic fluvial tidal interface, considerations must be given to challenging working conditions as well as the uncertain future the region faces with climate change. There is more opportunity to take an open position on a project when it is examined in the early stages, and participants can both provide perspective and be flexible in the response to those perspectives.

- ***A good coordination process includes having a dedicated time to meet and discuss the project.*** This can occur at different intervals, as project needs dictate, but providing a reasonable and reliable schedule of coordination efforts is extremely important, helps set expectations, and sends the message that everyone's time is respected. Setting meetings, providing information and having expected outcomes for each meeting is very important and allows staff to plan for the necessary project review and time commitment. In cases where projects of similar types need frequent attention, standing meetings like the Marin County project coordination, the USACE Interagency, and DMMO meetings can be a helpful forum to discuss project issues.
- ***Having the right people in the room may be the most important element in the coordination effort.*** This may mean having people with expertise, appropriate level of authority, the specific analyst that will ultimately work on the project, or some combination. When developing the "project team" it is important to consider who you are inviting to participate. Some agencies may have different staff that work on CEQA/NEPA review and final regulatory analysis, or may not be at the appropriate level to make the ultimate decision on the project, but may have the expertise to develop a good project that will survive regulatory scrutiny, or can provide advice to the analyst who works on the permitting aspect of the project. From the project proponents' perspective, it is important to have participation from members of the team who have the expertise to answer and discuss questions, the ability to think holistically about the projects, and who will be working directly with the agencies and have the ability to affect decisions about the project design. It is important from both the regulatory and project perspective to think strategically about who should participate in coordination efforts.
- ***Agency participation is critical.*** In designing coordination meetings, it is important to recognize the milestones and decision points that will influence project design and regulatory requirements. At these junctures, all agencies should be present, even if it means delaying the meeting to get the necessary participation. If agencies can't participate in all meetings, reaching out in between meetings to bring the staff member up to speed and discuss outcomes of missed meetings is extremely helpful and appreciated, especially when the outcomes provide full disclosure of status, positions, and potential changes and requirements. In the event of a staff change during the project development and permitting process, it is important to recognize the change. Set up a time to bring the new staffer up to speed and provide time for

them to ask questions. While, making these efforts is additional work, it will increase the agency participation overall and throughout the process.

VII. The Human Factor

The final challenge facing the future of flood protection in the Bay Area is one that is more difficult to both describe and to resolve, the “human factor.” This is to say that people, in one way or another, contribute to the problems and the potential solutions for regulation of flood protection projects. Nearly every person that was interviewed had an anecdote to tell about one person or another that they had come across in their years of work in this arena. Some human nature stories were funny and puzzling, but in one way or another they highlighted our humanness, and occasional failures in communication or professional relationships. It may be instructive to consider a few.

A. Speaking in Code - Translation Please!

In many cases, the stories related about the regulatory process seemed to be of people who were trying to communicate in different languages and not being understood. For example, regulators can ask seemingly peculiar questions trying to identify specific information for policy analysis without explaining why they need the information and the connection to a specific law or policy. This leaves the other person confused and bewildered as to why the information is necessary or why it has to be in a particular format/unit, etc. Another example is that engineers tend to speak in precise terminology and tend to think about the physical aspects of a project, which are governed by mechanical hydrodynamic laws that results in potential for associated risks and certainty of outcomes. Biologists can't as easily predict outcomes with certainty due to the fact that they are dealing with living creatures affected by multiple uncontrollable factors. That is just the beginning, as some people think in great detail, while others are big picture or high level thinkers. All of this variety creates challenges when trying to communicate an idea consistently to a group of people with different expertise.

In our current high-speed, instantaneous response, high demand, overworked world, we tend to forget to think about how others may be receiving the information provided. Slowing down, asking questions and expecting an iterative process would help move projects forward. Further, because many people associated with the flood protection world (regulators and managers alike) have been working in the field for some time, assumptions are made that there is a common understanding of current circumstances, when there isn't. Lastly, people may paraphrase things, rather than saying the full extent of what is meant, which also leads to lack of understanding. For example, many people say “BCDC doesn't allow fill,” when in fact, BCDC does authorize fill for projects that are water oriented uses, and have no upland alternatives, so long as the fill is the minimum amount necessary for the project. The exact language in the law is actually

much longer than this paraphrasing. This is a very different meaning when the speaker takes the time to say all of the words necessary to get the meaning across. It is important to remember that words truly do matter, and how and why they are spoken is important.

B. Picking Sides

It appears that in the realm of flood protection there are small groups that have formed. In trying to affect change, people are talking within their own groups rather than across the groups and with each other. This tends to perpetuate and reinforce positions held by each group rather than build bridges. It also leads groups to demand things of one another rather than talking through issues. This is particularly unfortunate in the world of flood protection because nearly all parties involved are public servants and have an important role to play in protecting society, which includes the environment. Reaching out and discussing issues is far better than letting concerns build up until there is resentment, frustration, or anger. Among all of the people interviewed, there is not a single person who would be unwilling to have a conversation and try to talk through a problem rather than have a battle. It is essential to find a common ground towards resolutions.

C. When Things are Complicated

Many of the projects undertaken by flood protection agencies are extremely complicated and take significant amounts of time to plan, permit, and execute. In complex projects that may span several years, there are many opportunities for errors, miscommunications, and misunderstandings. There are also a number of participants that may come and go during the process. These complex projects may benefit the most from using a trained facilitator. A facilitator's role is very specific and useful and includes: developing appropriate meeting formats and agendas; maintaining the flow of meetings; making sure everyone in the room has an opportunity to be heard; and strategizing the process of getting from planning to execution with the right number of meetings, follow-up discussions, re-routing of activities as necessary, etc. Using a facilitator also allows project managers to focus on the content of the meeting, and what is being said and responses to information. It reduces the responsibility of the project manager and allows them to fully participate rather than have to manage the meeting and the meeting's participants.

Trained facilitators can also help manage conflict when it occurs. Because they are an outside observer, they can listen to comments without bias. They can also suggest ways to rephrase or reframe conversations to reach resolutions rather than roadblocks. Many large projects proceed without significant disagreements; but when disagreements do occur, getting an outside person who can assist in solving the projects can be successful.

D. Moving the Ball Forward

A high level and broad conversation needs to be fostered about the future of flood protection and the Bay's watersheds. There are people in different positions who can help move it forward. This is a conversation that should happen with the managers of

the regulatory and resource agencies outside of the context of permitting projects, but rather on a regional visioning level. In addition to high-level conversations, these ideas should be introduced and pursued with the staff as well, creating investment in the process from the top and within the ranks of the agencies.

E. Roles We Play

In talking with several of the people involved in this process, we gained some perspective on how people involved see themselves. Flood protection managers really see themselves as the first line of defense in a pending disaster that could happen at any time. They feel responsible for protecting the life and property of the communities in which they work. Similarly, the regulatory and resource agencies see themselves almost as the last ones standing between extinction of species, poor water quality and other environmental harm. It has been suggested that they see themselves as the guardians for those who cannot speak on their own behalf, a.k.a. the natural world. All of this work deserves respect and understanding. After some compromise and accommodations, it appears everyone is on the same side.

F. Relationships, Partnering, Collaborating, and Coordinating

Throughout this review, it has been said many times that the flood protection agencies want to be and should be partners with the regulatory and resource agencies. It is likely that such a collaborative partnership would be a good thing, and produce healthier watersheds over time. It is also important to think about how an individual's or agency's role may change depending on the circumstance. For example, agencies that often partner with another agency providing leadership and vision to the region can find themselves under the authority of the other, as in a permitting situation. When one party is used to being an equal and now has to comply with requirements of the other it creates a difficult situation for all involved. The best that can be done is to work with each other with compassion and respect.

Notwithstanding the somewhat unique situation of partners receiving permits, the question remains whether creating a partnership would be valuable. Partnering, in the true sense of the word, means establishing a long-term, win-win relationship and must be based on mutual trust and teamwork, and includes sharing of both risks and rewards. Collaborating is a slightly different relationship in which two or more parties create a cooperative arrangement to work jointly towards a common goal. Coordinating is a voluntarily arrangement in which two or more entities engage in a mutually beneficial exchange instead of competing.

Cooperation can happen where resources adequate for both parties exist, or are created by their interaction. It may be possible to create a partnership in the region for flood protection, but trust would need to be established, as at this time, it is limited with the parties involved. Further, all of the agencies involved would need to seek the

benefits and rewards of such an arrangement. However, the risks of not partnering, or to a lesser degree collaborating, seem clear in the Bay Area at this time.

Take Away:

In examining all the discussions that have occurred around and about the regulatory process in relation to flood protection projects, how people related to each other and talk to each other can have an impact on the permitting process. Creating a regional framework and partnership on flood protection can be accomplished, but it will take effort from all parties to create it and will necessarily include understanding each other's perspective and roles in the process. Breaking down some of the "groups" and positions that have built up between these groups are important and will require thoughtful communication and discussions. If this coordination effort is undertaken, a skilled facilitator would likely be worth the investment.

VIII. Summary

In completing this review of flood protection projects in the Bay Area and the process to obtain all regulatory and resource agency approvals – or “permits,” it is clear that the work and the process is extremely challenging. Many flood protection projects are located in the most sensitive and limited habitats in the region.

The creeks and streams in some areas have been reduced to constrained channels, separated from their flood plains and the Bay by infrastructure and development. The flood protection systems are aging and in need of repair and adaptation to a changing climate and rising Bay waters. The resources that once existed within these creeks and streams have been reduced in most areas to a thin strip of habitat where threatened and endangered and other native species struggle to survive.

The flood protection community is facing the need for massive rebuilding, and with this comes the opportunity for realignment and rehabilitation of the watersheds that once were well connected to the surrounding landscape and ultimately the tidal marshes and the Bay itself. At the same time, the regulatory and resource agencies have turned to a watershed approach in their thinking about flood protection, resource management, and habitat and species recovery. There are plans available that can be used as a

resource and a road map for restoring waterways, not only for the natural world, but for the human communities that enjoy them. The work to rehabilitate these flood control systems will take time, and can be accomplished in a stepwise fashion if vision and goals are developed and supported by the agencies.

The regulatory process has specific laws and policies that must be met. The way the agencies work within this framework is flexible and there are improvements to the regulatory program for all parties involved; from the information provided; through permitting and monitoring process; mitigation requirements; and final execution of the projects themselves. There is no one party who is responsible for the challenges of the process, but all parties have a role to play in creating a better process. Part of that effort may lie in creating a regional program where flood protection agencies and regulatory and resource agencies can join together in creating common goals that reduce flood damage, increase resilience of communities and provide habitat and natural systems that the communities can enjoy and steward.

IX. Who We Are

This document was developed through Flood Control 2.0: Rebuilding Habitat and Shoreline Resilience through a New Generation of Flood Control Channel Design and Management, an EPA-funded partnership of the San Francisco Bay Conservation and Development Commission (BCDC), the San Francisco Estuary Partnership (SFEP), the San Francisco Bay Joint Venture (SFBJV), and the San Francisco Estuary Institute (SFEI). This document was only possible through the cooperation of the flood protection, regulatory and resource agencies whom candidly provided their thoughts and suggestions on flood protection projects and the regulatory process in the San Francisco Bay Region. The primary author for this paper is Brenda Goeden, Sediment Program Manager at the San Francisco Bay Conservation and Development Commission, with coauthors Anniken Lydon, and Pascale Soumoy on the Sediment Management Team. For information about this document or the findings please contact Brenda Goeden at 415.352.3600.

More information about the Flood Control 2.0 project is available at floodcontrol.sfei.org

Appendix A

The State Water Resources Control Board's Watershed Initiative

Within the Water Board's programs is the Watershed Management Initiative (Initiative), which outlines the need and rationale for developing watershed management plans. A major goal of this initiative is to develop a stream protection policy and incorporate it into its planning and regulatory work. This protection policy is in development, but the work on the Initiative through the State and San Francisco Bay Regional Board provides priorities and goals that can be considered for flood protection projects. It first recognizes that:

"Wetlands and streams (which include rivers, creeks, sloughs, intermittent and ephemeral drainages; ...) are closely linked both in topographic location and in ecological function. In turn, streams and wetlands are physically and biologically linked to the adjacent uplands."

As with all of the Water Board's work, the focus on watershed management is an effort to protect beneficial uses of waters of the state. This Initiative also recognizes that more knowledge is needed to improve management of the "functions of, and links between, streams, wetlands, and uplands. In examining the linkages to beneficial uses of waters of the State, the Water Board identified land use changes in the Bay Area that have impaired water bodies, including the conversion of woodlands and open space to residential and commercial development and viticulture and hydromodification of streams and wetlands for flood control and development. In doing this, The Water Board also identified the adverse impacts of these conversions. They include:

- "1) Elimination of natural channels, including loss of wetlands, wildlife, fisheries and riparian habitat;
- 2) Increased sedimentation due to construction activities and land clearing;
- 3) Unmitigated changes in hydrology that upset the geomorphic equilibrium of streams, causing destabilization and erosion of channels, and more frequent flooding;
- 4) Increased pollutant loads associated with urban activities;
- 5) Impairment of fish habitat from water diversions and fish passage barriers due to construction of in-channel reservoirs and diversion structures; and
- 6) Increased pollutant loads associated with agricultural activity."

To address these impacts, the Water Board has increased efforts to encourage watershed planning with a focus on protecting stream function, emphasizing riparian corridors, floodplains, buffer zones, instream structures, and changes in the hydrograph of the stream or waterway. The Water Board is working with local flood protection agencies to identify management activities that have minimal impacts on streams, water quality, and beneficial uses, to develop a definition of acceptable streams and creek modifications that protective or enhance stream function.

In further self examination of regulatory practices, the Water Board found two areas that should be improved when working with flood protection projects. The first is reviewing many small projects on a case-by-case basis, which limits protections for the stream or creeks, and watershed as whole. The Water Board also noted that measuring these projects on a fill basis rather than a linear foot basis disproportionately affected the small creeks representing a large percent of the watershed. This has led to extensive filling, channelizing and ditching important parts of the watershed, and impacting function significantly. The second significant finding was that required mitigation was often in small patches, often focused solely on revegetation, which resulted in loss of function, such as water quality, flood water retention, sediment transport, connectivity and water conveyance capabilities. The Water Board also found that county and municipal agencies often do not understand the linkages between the different parts of the watershed and impacts up and downstream that occur when the system is modified. One example of improved stream and creek function that resulted from collaborative efforts to identify and remedy these issues is the Santa Clara Valley Water District's watershed plan.

Appendix B

Code of Federal Regulations Title 44, Chapter 1, Section 65.10 Levee System Design & Certification

FEMA established the Code of Federal Regulations detailing requirements for levee systems to meet the NFIP design, operations and maintenance and for mapping on the NFIP flood maps. Requirements for levee certification (design specifications):

1. Freeboard: levees are required to have a minimum three feet of freeboard. In some special cases, a freeboard less than three feet may be approved. However, in no circumstances will levees with two feet of freeboard be certified
2. Closures: levee systems may include opening and must have closure devices that are structural parts of the levee system and are designed according to sound engineering practices
3. Embankment protection: Assessment indicating that no significant erosion on the embankment is expected during the base flood and that any anticipated erosion will not result in failure of the levee. Need an assessment of expected flow velocities, wind and wave action, ice loading, debris, slope protection techniques, embankment and foundation materials, levee alignment, etc.
4. Embankment and foundation stability: required to provide an engineering analysis of the levee embankment, including an analysis showing that the expected seepage conditions associated with the base flood elevation will not jeopardize the stability of the levee system. Can also show that the levee adheres to the USACE "Design and Construction of Levees" (EM 1110-2-1913, Chapter 6, Section II) and is constructed for stability against loading conditions during earthquakes
5. Settlement: Need an analysis of the expected settlement and the magnitude of the lost freeboard and an analysis indicating that the minimum required freeboard will be maintained. Levee Maintenance must be under the jurisdiction of a Federal or State agency, agency created by law, or an agency of a community participating in the NFIP. Must have a levee maintenance program/plan that will be administered by the agency
6. Certification requirements: Levees must adhere to the specific structural requirements set forth in CFR Chapter 44, Section 65.10 and the data must be certified by a registered engineer. Or, a Federal agency responsible for levee design can certify that the levee is adequately designed to protect against the base flood. There are certification of the data collection, certifications of structural integrity, and certification of the "as-built" conditions
7. Vegetation is allowable on certain portions of levees however, USACE guidelines (EM 1110-2-301) suggest that vegetation-free zones be on the toe of both the riverside and landside levees to allow for required maintenance and inspection of the levees

Appendix C

Potential Funding Opportunities

During this review, a few funding opportunities were identified for flood protection agencies working to restore ecosystem function within the watersheds.

Two programs specifically support salmonid habitat and others include:

1. The State of California Fisheries Restoration Grant Program (FRGP). FRGP focuses on projects associated with Southern Oregon/Northern California Coast Coho salmon, Central California Coast Coho salmon, and Central California Coast steelhead, which occur in San Francisco Bay
2. The Pacific Coastal Salmon Recovery Fund (PCSRF) contributes to restoration and conservation of Pacific salmon and steelhead populations and their habitats. Previously funded projects included fish passage, water conservation, improving in-stream habitats, watershed monitoring, education and organizational support to watershed groups

Other funders who support watershed improvements include the: NOAA Restoration Center; USEPA; USFWS; Natural Resource Conservation Service; State Coastal Conservancy; Wildlife Conservation Board; San Francisco Bay Water Quality Control Board; California Department of Parks and Recreation; and the Sea Grant Program. The U.S. Fish and Wildlife Service has several programs (e.g., Partners for Fish and Wildlife, Coastal Program), which provide partnership and/or funding opportunities to private entities to manage habitat to the benefit of listed species. The USEPA's water quality improvement program may be a good fit for innovative flood protection projects.

A comprehensive California Watershed Funding Database may be accessed at <http://calwatershedfunds.org/index.php>

Funding source links for grants and loans, including State Revolving Fund Loans, may be found on the State Water Resources Control Board (SWRCB) website at <http://www.waterboards.ca.gov/funding/index.html>

In the Bay Area, PROPOSITION AA funds include flood protection as funded able projects, and prioritize those that incorporate habitat benefits. The State Coastal Conservancy will begin to distribute these funds in 2018.

Appendix D

References

Goals Project. 2015. *Baylands and Climate Change: What We Can Do*. *Baylands Ecosystem Habitat Goals Science Update 2015* prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. California State Coastal Conservancy, Oakland, CA.

U.S. Fish and Wildlife Service. 2013. Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California. Sacramento, California. xviii + 605 pp.

NMFS Draft Salmonid Recovery Plan.

Code of Federal Regulations (Note sections)

California's Code of Regulations (Note sections)

State of California Executive Order W-59-93: Comprehensive Wetlands Policy

State Water Resources Control Board Resolution No. 2008-0026; Development of a Policy to Protect Wetlands and Riparian Areas in Order to Restore and Maintain the Water Quality and Beneficial Uses of the Waters of the State

Surviving the Storm, Bay Area Economic Forum 2015

United States Executive Order 11988: Floodplain Management

FEMA: National Flood Insurance Program and Levees: An Overview

Case Studies

- Napa River Project
- San Francisquito Creek
- Novato Creek
- Walnut Creek

Websites to Visit:

NOAA National Marine Fisheries: <http://www.noaa.gov/>

US Fish and Wildlife Service: <https://www.fws.gov/>

California Department of Fish and Wildlife: <https://www.wildlife.ca.gov/>

San Francisco Bay Conservation and Development Commission:
<http://www.bcdc.ca.gov/>

State Water Resources Control Board: <http://www.swrcb.ca.gov/>

San Francisco Bay Regional Water Quality Control Board:
<http://www.waterboards.ca.gov/sanfranciscobay/>

US Environmental Protection Agency: <https://www3.epa.gov/>

US Army Corps of Engineers:
<http://www.spn.usace.army.mil/Missions/Regulatory/Regulatory-Overview/Interagency-Meetings/>