BIN 1: Habitat Functionality, Connectivity, Quality

Action	**Construct pilot projects that will test and refine (Green Infrastructure) management measures for infrastructure left in the Hazard Zone**. Multi-benefit restoration designs resilience strategies need to be piloted to understand how they perform, refine their design and demonstrate their applicability. Examples of pilot project already in the Bay include: • Aramburu Island beach restoration, • Living Shorelines project, • Oro Loma Seepage Slope project, • Numerous tidal marsh restoration projects undertaken over the last 40 years. Examples of future pilots could be thin-layer augmentation of marshes, emulation of alluvial fan sedimentation, mudflat recharge, etc. Lessons learned should be incorporated in regular updates of regional reports such as TBI and SCC's *Design Guidelines for Tidal Wetland Restoration in San Francisco Bay*.	**Owner/Administrator** BCDC, SCC, SFEP
Output/ Outcome	Identify, design, permit and implement three additional pilot projects in the Bay. Update regional design guidelines.	
Why?	We have a lot more experience with tidal wetland restoration than we do with the other elements of the Baylands (e.g. transitional zone, mudflat, subtidal). We also have comparatively little experience creating resilient shorelines with multiple objectives. We need to start learning now if we are to implement our "green infrastructure" vision in a reasonable time. Pilot projects help promote conversations and breed even more ideas.	**Submitter:** Jeremy L. Korie S.

Action	**Restore Tidal Marsh and Associated Subtidal Habitat in the Delta and Suisun Marsh** (referred to as "Baylands (tidal marsh and tidal flat)" in the 2011 *State of the Bay* report; new name may be needed for 2015 *State of the Estuary* report). Tidal habitat restoration projects will be developed in priority areas, including Suisun Marsh, Cache Slough Complex, Yolo Bypass, and Cosumnes-Mokelumne Confluence. These projects should be based on the best available science and have clear adaptive management plans aimed at improving outcomes and providing lessons for the development of future restoration projects.	**Owner/Administrator** Under the BO, DWR and the U.S. Bureau of Reclamation. Other agencies and orgs, such as the CA DFW, the State and Federal

Output/ Outcome	The measurable output for this performance measure is identified in the U.S. Fish and Wildlife Service's delta smelt 2008 biological opinion (BO) for the operation of the state and federal water projects: restoration of 8,000 acres of intertidal and associated subtidal habitat, with a target date of ten years from the date the BO was signed (2018).	Contractors Water Agency, The Nature Conservancy, and private mitigation bank developers are also engaged.
Why?	This action is a priority identified in the Delta Plan because it will restore habitat and restore the structure of the food web for listed fish species, including delta smelt and longfin smelt. It will also contribute to the overall health of the estuary by supporting a wide variety of species and ecosystem functions.	**Submitter:** Jessica D.

Action	**Achieve Integrated Flood Management and Habitat Enhancement in the Yolo Bypass** (related to "Flood Events" indicator in *State of the Bay* report) Flood management agencies, resource agencies, permitting agencies, local governments and stakeholders will collaborate on achieving an integrated, multi-objective project to both enhance fish habitat and improve flood management while maintaining waterfowl habitat, agricultural sustainability and recreational opportunities in the Yolo Bypass.	**Owner/Administrator** The U.S. Bureau of Reclamation and DWR are responsible for implementing the changes to the Yolo Bypass called for the BO. The California Natural Resources Agency is coordinating the development of an integrated, multi-objective project.
Output/ Outcome	Desired outcome is implementation of changes in the Yolo Bypass that meet the requirements of both the NOAA Fisheries biological opinion (BO) for salmonids, i.e., enhancement of 17,000 to 20,000 acres of floodplain habitat, and the Central Valley Flood Protection Plan. The target date completion of the actions is ten years from the date the BO was signed (2019).	
Why?	The Delta Plan prioritizes habitat enhancement in the Yolo Bypass to improve foraging opportunities and reduce barriers to migration for listed salmonids. The Delta Plan also requires reducing conflicts with existing and planned land uses where feasible as part of restoration planning, and recommends protecting existing and providing new recreation opportunities whenever feasible.	**Submitter:** Jessica D.

Action	**Integrated Flood Control and Habitat Restoration** – flood management agencies, stormwater entities, and watershed groups will collaborate on integrated (multi-objective projects to both improve flood management and restore natural habitat. By 2020, the regional entities will develop an overall strategy and track progress (EXAMPLE)	**Owner/Administrator** BAFPAA, BASMAA, and BAWN
Output/ Outcome	Increased number of integrated projects effectively implemented along with regional strategy and tracking. Long term outcomes should show improved watershed health and improved flood management	
Why?	Id'd as [priority in 2013 IRWMP (obj. 4-3). Concept included in Prop 1 IRWMP - $200M statewide for stormwater multi-benefit projects	**Submitter:** Harry S.

Action	**Delta Restoration** Delta restoration – *Comprehensive "IRWMP" for Delta? Integrate flood and habitat*	**Owner/Administrator** DWR, DFW, Delta Conservancy
Output/ Outcome	Implementation of the biological opinion objectives and early implementation of restoration projects that incorporate adaptive learning and restore high priority ecosystem function. *Acreages of habitat – different type of habitats than measured in Bay*	
Why?	This is a tough one with BDCP still in play, the Delta Plan finalized, the Biological Opinions being implemented (8,000 acres of tidal habitat and 19,000 of seasonally floodplain habitat) and now Prop. 1. Need to restore the Delta is recognized in at least a dozen plans (BDCP, Delta Plan, ERP Stage 2 Strategy, Delta Conservancy Strategic Plan, State Water Action Plan, etc…..) *Existing legal requirement – as baseline?*	**Submitter:** Campbell Ingram (Water Subcommittee)

BIN 2: Habitat Diversity, Abundance, Quantity

Action	**Promote Subtidal and Intertidal Sand Flat Creation and Replenishment Projects** that use clean, maintenance-dredged sediments where possible and in areas where sand is naturally deposited (*perhaps another similar for mudflats*)	**Owner/Administrator** Corps, BCDC?
Output/ Outcome	*Need to look to others for what's reasonable*	
Why?		**Submitter:** Korie S.

Action	**Protect existing (no net loss) and increase native eelgrass populations using a phased approach**	**Owner/Administrator** NMFS and others
Output/ Outcome	10 acres in 5 years	
Why?		**Submitter:** Korie S.

Action	**Protect existing (no net loss) and increase native oyster populations using a phased approach**	**Owner/Administrator** CA Coastal Conservancy??, NERR?
Output/ Outcome	10 acres in 5 years	
Why?		**Submitter:** Korie S.

BIN 3: Sustainability, Resiliency, Drivers of Change

Action	**Develop a Regional Watershed Monitoring program by 2018 and begin implementation by 2019**	**Owner/Administrator** SFEP, SFEI, RWCQB, DWF, SCC and EPA collaboratively working with local watershed groups
Output/ Outcome	Desired Outcome is a regional watershed monitoring program that can assess the health of watersheds on a consistent and cost effective basis. The initial output would be the proposed program.	
Why?	State of the Bay Report has identified watershed health as a priority. Prop 1 has identified categories of funding for watersheds that could fund Bay Area projects- SCC ($ 100.5 m,) watershed protection and restoration ($285 m –DFW), enhanced stream flows ($ 200m – WCB), stormwater-multi benefits ($ 200 m–IRWM). Prop 1 also states that up to 10 % of funds can be used for planning or monitoring- -for the successful design, selection, and implementation of the projects authorized under that program. Can we develop a "regional" approach that could be funded from federal and state funds from multiple agencies?	**Submitter:** Harry S.

Action	**Develop and implement a comprehensive regional program by (date?) that supports habitat enhancement and sea Level rise adaptation throughout the bay incorporating the ecotone (or horizontal levee) concept for both large and small scale projects.**	**Owner/Administrator** BCDC, SFEP, RWQCB, EPA, TBI, BAFPAA
Output/ Outcome	Desired outcome is greater resiliency to sea level rise and enhanced habitat function. Output is the regional program.	
Why?	This is a clear priority for Bay Area IRWM efforts (a project concept was developed for round 2 funding and was put aside when it became a "drought" round).	**Submitter:** Harry S.

Action	**Create a "green infrastructure" vision for the Baylands** that embodies both the natural values and evolution of the Bay and the manmade needs and constraints of urban development. We need to take account of the variability around the Bay, dividing it up into appropriate geomorphic and ecological behavioral units. We already have a starting point in the vision developed for BEHGU which already include: • restore estuary-watershed connections; • design complexity and connectivity into the Baylands landscape; • restore and conserve complete tidal wetlands systems. However BEHGU was not meant to take full account of other users of the ecosystem services – such as flood risk management – which I think is the next step for creating a resilient Bay shore. It should include the shoreline change analysis being undertaken by SFEI to illustrate the dynamism of the landscape coupled with a landscape ecology analysis describing ecosystem connectivity and complexity for the region.	**Owner/Administrator** SFEP, Coastal Conservancy, universities (e.g. CRI), SFEI, BAECCC, TMC, BCDC, NGOs, RWQCB, FWS, FRM agencies, land trusts, etc
Output/ Outcome	Create a Bay-wide vision for the Baylands, building on BEHGU but incorporating flood risk management, water quality, sediment, etc.	
Why?	We need joined up thinking in the Baylands as changing environmental variables create more pressure (increasing risk) on limited resources (space, sediment, water, money).	**Submitter:** Jeremy L.

Action	**Strategize the removal of key constraints out of the Baylands hazard zone.** We talk a lot about restoration but each site is constrained by utilities, roads, landfills, houses etc. Managed retreat to allow the transgression of marshes won't work unless we also retreat the built structures from the Baylands. "Make way for the Bay" may be the cry, but we cannot move everything and we don't need to do it all at once. We do need to see where significant opportunities for ecosystem restoration may be gained and an idea how that might be achieved.	**Owner/Administrator** BCDC, Utilities, Caltrans, railroads, WWTP, cities, counties, businesses etc
Output/ Outcome	Identify opportunities for moving constraints over the next century – particularly tied to capital improvement plans when refurbishment or replacement is planned.	
Why?	Relocating existing infrastructure could have multiple benefits but needs to be done over a long time – having a document that provides a rationale and show the benefits of moving may help decisions that benefit the Baylands to be made.	**Submitter:** Jeremy L.

Action	**Develop "green infrastructure" management measures for infrastructure left in the hazard zone** and an adaptation strategy for the "mainstreaming" of these measures. We can't move everything out of the way, in some parts the Bay is going to have to go around. We need to identify measures that best protect the unmovable infrastructure and have ecological benefits.	**Owner/Administrator** BCDC, SFEP, universities (e.g. CRI), SFEI, TNC, BAECCC, Utilities, Caltrans, railroads, WWTP, Cities, counties, businesses etc
Output/ Outcome	Identify measures that could be added to the restoration "toolkit" that help achieve CCMP goals. Look for ideas beyond the Bay. Identify places in the Bay where such measures may be appropriate and where they are not.	
Why?	It will take time to understand and refine measures. We then need to understand the regulatory impactions. We are building on a wealth of existing knowledge but we need to focus on specific issues and ideas.	**Submitter:** Jeremy L.

Action	**Develop and sustain collective leadership.** We need collective leadership if we are to develop and agree on solutions for problems held in common. Create standing subregional leadership groups of stakeholders (10?) to address adaptive management of the Baylands from the ecological, flood risk management and water quality viewpoints in light of climate change and other drivers. It is important to create standing groups who understand not just the shoreline but the issues facing the other stakeholders. The creation of shoreline resilience strategies (see *Undertake Subregional Vulnerability Assessments*… below) will be made more meaningful if it is done by a knowledge group. Examples of embryonic groups are: • HASPA/ART (Hayward shoreline), • EBDA climate resiliency workshops (San Leandro to Fremont), • CHARG (SF Bay), • SBSP stakeholder group (South Bay), • Highway 37/Novato Creek working group (San Pablo Bay)	**Owner/Administrator** SFEP, BAECCC
Output/ Outcome	Identify stakeholders and group of leaders for each subregion. Provide logistical support to allow the subregional leadership groups to meet on a regular basis to facilitate the development, implementation and reassessment of subregional vulnerability and adaptation.	
Why?	Climate change is all-pervasive and ongoing. We need strong collective leadership to develop multi-objective solutions. The Baylands raises many complex issues and will require input from many stakeholders over a long period of time. By creating a standing group of leaders we can start to be more creative – working through constraints and maximizing opportunities.	**Submitter:** Jeremy L.

Action	**Undertake subregional vulnerability assessments and develop adaptation (shoreline resilience) strategies.** The vulnerability of the natural and built environment should be assessed on a regular basis taking into account the latest projections of drivers of change. This will allow the setting or confirming of goals and objectives, the identification of opportunities and constraints and the (re)assessment of shoreline resilience strategies. *Green Infrastructure Management Measures for Hazard Zones* and *Construct Pilot Projects* Actions would be combined into shoreline resilience strategies for different Bay settings (based on the *Green Infrastructure Visioning for the Baylands* action), dividing the Bay into geomorphic and ecological units and identifying locally appropriate strategies. These strategies would be informed by the availability of land, water, sediment, money, and permits (see *Subregional water and Sediment Management Plans; Think Creatively of New Ways of Financing;* and *Update Bay Plan, LTMS, WQ Regulations and ESA*) – the strategies developed must be feasible and so have to take into account cost, availability and competition for resources. These strategies would require a timeline with phasing of responses depending on triggers and thresholds (Plan A, Plan B, Plan C etc).	**Owner/Administrator** SFEP, Coastal Conservancy, universities (CRI), BAECCC, BCDC, NGOs, RWQCB, FWS, FRM agencies, land trusts, cities, counties, businesses etc
Output/ Outcome	Complete the first round of subregional vulnerability assessments and shoreline resilience strategies. Begin implementing the strategies.	
Why?	We need to develop good framework to implement individual projects. This needs to be in the form of an adaptive management cycle which we need to start sooner rather than later.	**Submitter:** Jeremy L.

Action	**Write subregional water and sediment management plans** to provide the natural resources to implement the strategies. To implement the subregional strategies developed in action #7 will require space, sediment, water, money and permits. We should develop more joined up thinking in the use of sediment and water on the shoreline and in relation to other needs that society has for them. Planning the best use of limited resources will be key to the feasibility of some measures. For example, the demand for sediment may be greater than the supply. Dredge material may be generated in quantities and frequencies that do not align with the need. The cost of placing the material on the marsh may be excessive. Different grades of sediment will be required in different places. The EBDA climate resiliency project is an example of planning the future use of water on the shoreline which is complicated by seasonal factors and decadal variations in supply and need.	**Owner/Administrator** BCDC, USACE, dredging industry, FRM agencies, ports

Output/ Outcome	Complete the first round of subregional water and sediment management plans. Begin implementing the strategies.	
Why?	We need to make best use of our resources, competition will increase. If the Baylands is one of the places to use these resources then we need a plan of how and where to use them. We need to match supply and need in terms of quality, volumes and timing. At some point we need to rename the "dredging" industry the "placing" industry!	**Submitter:** Jeremy L. Korie S.

Action	**Think creatively of new ways of financing** (subregional vulnerability assessments; adaptation strategies; water and sediment management plans; green infrastructure visioning; GI management measures for hazard zone infrastructure and pilot project construction; and collective leadership), particularly through multiple benefits to other sectors and by mainstreaming. By creating immediate co-benefits for a range of stakeholders, public and private, we should be able to access more financial capital and political leverage to get projects built one way or another. Compelling, transparent, independent economic analysis of strategies is going to be critical – how much is at risk, how much will it cost and how much could be avoided if we did A rather than B. Private-public partnerships and non-traditional sources should be more important.	**Owner/Administrator** SFEP, TBI, Save the Bay, TNC
Output/ Outcome	Undertake economic analysis of shoreline resilience strategies. Engage with businesses and other revenue generators. Identify sources of financial and political capital within the stakeholder group.	
Why?	We need to make best use of our resources, competition will increase. If the Baylands is one of the places to use these resources then we need a plan of how and where to use them. We need to match supply and need in terms of quality, volumes and timing. At some point we need to rename the "dredging" industry the "placing" industry!	**Submitter:** Jeremy L.

Action	**Update the Bay Plan, LTMS, WQ regulations and the Endangered Species Act to maintain the protection of the environment and wildlife while accommodating adaptation strategies.** In creating a resilient shoreline we must not compromise the values that the regulators have protected over the last 50 years. There should be open dialogue to develop regulations that accommodate a changing environment while protecting the qualities we desire in the Bay.	**Owner/Administrator** SFEP, BCDC. RWQCB, USACE, FWS
Output/ Outcome	Develop an ongoing dialogue through inclusion in subregional leadership groups as observers or participants.	

Why?	We need regulations to protect the Bay. We need resilient shorelines. We need to work together to make permittable projects.	**Submitter:** Jeremy L.

Action	**Implement and monitor the shoreline resilience strategies**	**Owner/Administrator** SFEP, Coastal Conservancy, universities (e.g. CRI), SFEI, BAECCC, TMC, BCDC, NGOs, RWQCB, FWS, FRM agencies, land trusts, etc; USACE, TBI, Save the Bay, TNC, BCDC, dredging industry, ports, cities, counties, businesses etc; Utilities, Caltrans, railroads, WWTP
Output/ Outcome	We need a 5 year review of progress for the adaptive management cycle.	
Why?	We're getting started but there is a long way to go.	**Submitter:** Jeremy L.

Action	**Reduce or Reverse Subsidence and Sequester Carbon while Creating Habitat** (related to "Ecological Processes: Climate Change") The California Department of Water Resources (DWR) and others will increase the extent of their subsidence reversal and carbon sequestration projects in the deeply subsided western and central Delta. A group of agencies and organization will complete the CA Wetland Protocol (covering managed wetlands and rice in the Delta, and coastal wetlands) and submit it to the American Carbon Registry and subsequently to the California Air Resources Board for approval.	**Owner/Administrator** DWR, Delta Conservancy and partners.
Output/ Outcome	Desired outcome is to achieve 5,000 acres of land converted to address subsidence reversal and carbon sequestration by January 1, 2017. Between 2008 and 2011, 905 acres were converted – these acres will be included towards the target.	

Why?	This goal is included in the Delta Plan and the Delta Conservancy Strategic Plan. The CA Global Warming Solutions Act of 2006 provides for the development of a carbon market program. Approval of the CA Wetlands Protocol is expected to create opportunities for Delta farmers to sell offset credits for growing plants that promote subsidence reversal and sequester carbon. Also, subsidence reversal helps reduce flood risk in the Delta.	**Submitter:** Jessica D.

Action	**Climate Change Resiliency** 1. Increase or preserve open space at Bay edge by _____ acres (% shoreline?) by 2020.To achieve this, create a draft municipal/county ordinance that creates an "amenity" credit for developments that provide a buffer from development at the Bay/Delta edge and penalizes through fees developments that extend to the edge. Then fees can be used to purchase land for buffers elsewhere or maintain buffers that exist. 2. Initiate a regional Benefit Assessment District or similar (like LMD – Risk Reduction District?) for those areas within the potential sea-level rise impact zone by 2020 to offset the costs of projects and on-going maintenance for shoreline and infrastructure protection.	**Owner/Administrator** Local city/county, ABAG, Open Space Council, BCDC ABAG, SFBRA, or new JPA
Output/ Outcome	Number of local districts formed?	
Why?	1) If needed, encourage the Governor's office or legislators to provide support for "sea-level rise" buffer requirements. The benefits of these buffers is that sediment and aquatic plants are necessary for the health of the Bay/Delta complex and may also support filtering species like mussels and clams that help to entrain toxins. 2) A benefit assessment type funding source could help offset the costs of large-scale shoreline improvements that benefit the urban zone closest to the Bay/Delta, including critical infrastructure. The benefits to water quality could include reduced shoreline erosion, increased trash management, and reduced risk of accidental wastewater releases.	**Submitter:** Carol Mahoney (Water Subcommittee)