

### **1.5.3 Surface Water Resources**

Most runoff that affects Yolo County, favorably and unfavorably, originates outside the County. As defined by DWR, Yolo County is just 3.8% (1,034 square miles) of the large Sacramento Hydrologic Region, or watershed, which covers 26,960 square miles of land.

The principal watersheds that affect Yolo County are briefly described below. A more detailed discussion of these watersheds, including descriptions of the drainage systems, flooding/flood management, water availability, water quality, and erosion and sedimentation for each watershed, is presented in Appendix A (Chapter 4).

#### **Yolo Bypass**

From a flood hydrology standpoint, the Yolo Bypass is an integral part of the Sacramento River system and plays a major role in providing flood protection for the City of Sacramento. It is a component of the Sacramento River Flood Control Project that was constructed between 1917 and 1924. It consists of a 41-mile-long swath of agricultural land bounded by levees that are 7,000 to 16,000 feet apart and convey floodwater to the Sacramento-San Joaquin Delta near Rio Vista. An 8-mile segment along the western boundary of the Yolo Bypass immediately south of Putah Creek has no levee because ground elevations are high enough to contain floodwater within the Yolo Bypass, except during extremely large flood events. While the Bypass supports several land and resource functions such as agricultural production, aquatic and terrestrial habitat diversity, and regional recreational public access, it's principal purpose is to serve as a floodway. Any land uses proposed or already managed in the Yolo Bypass must not inhibit the movement of flood waters through the Bypass. The major inflows to the Yolo Bypass are from the Sacramento River at the Fremont and Sacramento weirs. Other local tributaries include the Colusa Basin Drain (via the Knights Landing Ridge Cut), Cache Creek, Willow Slough, and Putah Creek

## **4.4 Flood Management and Storm Drainage**

### **4.4.1 Flood Management and Storm Drainage Findings**

1. Much of Yolo County is a natural floodplain.
2. Four primary geographic regions with flooding issues: Cache Creek basin/Woodland, Sacramento River corridor, and Western Yolo floodplain (Madison, Esparto, Airport Slough, etc.) and Yolo County land west of the unleveed part of the Yolo Bypass south of Putah Creek.
3. Regions have unique circumstances but share common issues.
4. The unincorporated area of Yolo County near Cache Creek, as well as parts of the City of Woodland, have only 10-year flood protection according to the Federal Emergency Management Agency (FEMA).
5. Yolo County contains 215 miles of levees as part of the Sacramento River Flood Control Project, including the Yolo Bypass.
6. Geotechnical studies are necessary to determine whether some of Yolo County's Sacramento River levees are subject to underseepage or other potential causes of levee failure.
7. In 2004, FEMA released new guidelines that will require Yolo County to submit hydraulic and geotechnical studies of specific Sacramento River levees to achieve 100-year flood protection certification during FEMA's 2006 remapping process. If Yolo County does not submit the hydraulic and geotechnical studies supporting the attainment of the FEMA 100-year levee standard for certification, FEMA will decertify the levees.
8. Yolo County, 13 reclamation districts, one levee district, one drainage district, and the California Department of Water Resources have responsibility for maintaining Yolo County's Sacramento River Flood Control Project levees.
9. During the past 10 years, there has been increasing pressure in the Central Valley to build in floodplain areas. Yolo County has restricted growth in the floodplains in the unincorporated areas, but many residential, industrial, and residential structures continue to be built by cities in the floodplain.
10. The Yolo Bypass does not and has not functioned at design flow capacity for many years. This poses a threat to Yolo, Solano, and Sacramento Counties' citizens if future flood events exceed Bypass capacity.

#### 4.4.2 Flood Management and Storm Drainage Issues

1. Through-seepage and underseepage threats to Sacramento River levees.
2. Erosion threats to Sacramento River levees.
3. Inadequate funding for geotechnical studies to determine erosion, stability, and seepage threats to Sacramento River levees and subsequent repair projects.
4. Inadequate public outreach (need for flood insurance, understanding of evacuation plans, etc.).
5. Inadequate emergency preparedness plans for levee failures.
6. Need to evaluate development in the floodplain (the more development, the greater the risk to public safety).
7. Inadequate compensation to Yolo County for providing the City of Sacramento with flood protection. Failure of the State and Federal governments to equitably address the Sacramento River Flood Control Project induced flood risks within and adjacent to the Yolo Bypass.
8. Inadequate flood protection from existing Cache Creek levees.
9. Erosion of existing Cache Creek levees.
10. Inadequate vegetation removal on Cache Creek (impedes capacity).
11. Insufficient understanding of the risk of Cache Creek flooding.
12. Inadequate levees to protect Madison and Esparto from Lamb Valley Slough flooding.
13. Inadequate flood protection at the airport.
14. Future urbanization upstream of the Yolo Bypass, and potential land use changes in the Bypass must be closely monitored to ensure that potential additional flood flows from upstream tributaries (including the Sacramento River), in concert with flow impediments within the Bypass do not further minimize Bypass capacity. All current and future land uses in the Bypass must be consistent with flow capacity requirements and subject to consistent State Reclamation Board enforcement. There should be no redirected hydraulic impacts as a result of the project operations, upstream development or in-bypass projects.
14. Lack of flood easements on lands west of the Yolo Bypass and south of Putah Creek where the Yolo Bypass west levee ends.



### **5.3.3 Flood Management and Storm Drainage**

A total of XX individual, potential flood management and storm drainage actions and conceptual actions were identified (Table 5-4 *Table needs to be revised by WRA to reflect input from Yolo Bypass Working Group IRWMP Subcommittee*). Several flood management and storm drainage actions focus on Cache Creek and form the corner stone of the Cache Creek Flood Management Integrated Project (see Section 5.4 “Integrated Actions”). When implemented, these actions would achieve a reduction of the flood risk in the City of Woodland, and other parts of Yolo County near Cache Creek. Together, the Dunnigan Area Storm Drainage/Flood Management Project (FM21) and water supply actions form the core of the Dunnigan Integrated Project. Several potential flood management actions would be taken on the west bank of the Sacramento River and these actions form the core of the Sacramento River (West Bank) Integrated Project. Several conceptual ideas have been prepared for the Yolo Bypass Integrated Project regarding expanded flood management capacity and innovative flood management options. The Yolo Bypass Working Group IRWMP Subcommittee will work with associated stakeholders to expand and advance these conceptual ideas in subsequent quarterly iterations of IRWMP actions.

### **5.3.4 Aquatic and Riparian Ecosystem Enhancement**

A total of XX potential individual wetland, aquatic and riparian ecosystem enhancement actions were identified. Together with potential flood management actions, these potential enhancements play a defining role in the Putah Creek Integrated Project.

It should be noted that several potential ecosystem enhancement actions are identified in two actions: the Yolo Bypass Wildlife Area Ecosystem Restoration Project (AR41) and the Yolo Bypass Conceptual Aquatic Restoration Opportunities (AR ?). Regarding AR41, these ecosystem restoration elements are all part of the same Land Management Plan for the Yolo Bypass Wildlife Area. All these actions are subject to the same initial environmental review and public involvement process, and have therefore been treated as a single action. AR? reflects a list of restoration concepts that has been prepared by a partnership of State and Federal agencies and has been initially discussed with Bypass stakeholders through Yolo Bypass Working Group meetings.

### **5.3.5 Recreation**

A total of 25 potential water-related recreation actions were identified (Table 5-6). The Cache Creek area is the geographic where the most recreation actions have been identified (11 potential actions). Although only one potential action was identified for the Yolo Bypass Wildlife Area that action includes many components that are all part of the Land Management Plan and will require partnerships between diverse stakeholders and DFG.

## **IRWMP Section 5.4.8 (excerpt)**

### **Yolo Bypass Integrated Project**

#### **Location**

Yolo Bypass

#### **Theme**

The principal function of the Yolo Bypass is flood management and to convey project design flood flows. The theme of the Yolo Bypass Integrated Project is to enhance opportunities for agricultural operation, wildlife habitat, native resident and anadromous fish rearing and migration, and public recreation in a manner compatible with the Bypass as a flood management facility. These opportunities will be created by building and enhancing flood management, agricultural, and recreational facilities, restoring appropriate habitat in appropriate locations, conducting biological research and hydraulic/hydrologic modeling to quantify natural resource conditions in the Bypass, and enhancing stakeholder interaction and outreach.

#### **Relevance to Goals and Objectives**

Seeks to enhance aquatic and wetland habitat, and recreational opportunities through actions consistent with IRWMP objectives and with flood management responsibilities related to:

- Ensuring open and frequent communication with the public.
- Integrating water resource planning and land use planning.
- Maximizing the extent to which statewide priorities are met.
- Enhancing the aquatic and riparian environment.
- Maintaining viable agricultural use.
- Providing educational opportunities.
- Providing recreational opportunities without adversely impacting private property owners.
- Providing adequate flood control for the citizens of Yolo County, consistent with recommendations of the State's Floodplain Management Task Force.

#### **Potential Component Actions**

Most current and future actions in the Bypass take place in the context of a extensive set of overlapping planning activities and local jurisdiction policies including the following items:

- Yolo County General Plan
- City of Davis General Plan
- City of Davis Comprehensive Bicycle Plan
- City of West Sacramento General Plan
- City of West Sacramento Access and Bike Plan
- Delta Protection Commission
  - a. Delta Recreation Plan
  - b. Delta Mercury Collaborative
  - c. Land Use and Resource Management Plan for the Delta Primary Zone
- North American Waterfowl Management Plan
- Central Valley Habitat Joint Venture
- Yolo County Habitat Conservation Plan / Natural Communities Conservation Plan
- Agricultural / Irrigated Lands Conditional Waiver Program (Ag Waiver)
- Sacramento Area Council of Government's Regional Bicycle, Pedestrian, and Trails Master Plan
- Lower Putah Creek Watershed Management Action Plan
- Sacramento River Flood Control Project
- California State Plan of Flood Control (pending)
- Yolo Bypass Wildlife Area Land Management Plan

The individual actions to be considered in this integrated project represent a range of project readiness. Some potential projects are at a full proposal stage and await funding. Others are at a preliminary level and require further development. Another group of projects are highly conceptual but represent ideas that Bypass stakeholders feel are reasonable for future development and consideration. Excluding the Foundational Actions (as described in Section 5.2), the following list (and Tables 5.X and 5.X respectively) presents projects for current and future consideration in the Bypass.

#### Current Projects

- Yolo Bypass Mercury Best Management Practices Development Project (WQ16)
- Yolo Bypass 2-D Hydraulic Modeling Project (FM3)
- Yolo Bypass Conceptual Aquatic Restoration Opportunities (AR ?)
- Yolo Bypass Wildlife Area Ecosystem Restoration Project (AR41)
- Yolo Bypass Working Group Funding (AR47)
- Yolo Bypass Wildlife Area Public Access, Outreach, and Interpretation Program (R12)
- Deep Water Ship Channel Trail Project (R13)
- Davis Wetlands Public Access Improvement Project (R31)
- Levee Public Access Improvements Project (R32)

- Public Access Trails Along Existing Storm Water Conveyance Channels Project (R33)
- Colusa Basin Drain Water Supply Project (WS22)
- Yolo Bypass Sediment Removal Project (FM33)

#### Future Projects

- Project addressing Liberty Island and potential flood impacts (benefits and/or detriments) associated with levee removal (may be coordinated with the Lower Yolo Bypass Collaborative Planning Project).
- Develop non traditional “multi-use” levees that provide flood protection and compatible habitat components.
- Conduct a full Bypass Bio-Inventory expanding beyond current inventory of riparian habitats to include all other Bypass habitats.
- Develop a Wildlife Evaluation and Monitoring Program, providing benefit to landowners by defining species information on their properties, and tools for best business decisions on private and public lands
- Build a cross-Bypass, at-grade bike trail linking Davis and West Sacramento including options to bridge the existing Tule Canal / Toe Drain, and options to address flood damages, user safety concerns, and waste/refuse management. Might be linked to Delta Trails project. Also addressed in Recreation project – R12
- Develop Yolo Bypass levee and channel improvements to increase flood flow conveyance and reduce flood stages in the Bypass.
- Expand outreach and involvement of Bypass subsistence anglers, particularly among diverse ethnic cultures not generally accessed through conventional outreach methods
- Develop a multiagency Yolo Bypass flood readiness and response plan.

In addition to the list above, there are more than 80 other projects under consideration in the IRWMP process that may have a direct impact on the Yolo Bypass. These projects cover the full range of water management categories and are located directly on, or are on tributaries of Putah Creek, Cache Creek, Willow Slough, the Colusa Basin Drain / Knights Landing Ridge Cut, and the Sacramento River. Each of these waterways flows into the Bypass and can have direct or indirect effect on Bypass conditions.

In support of the Yolo County IRWMP, the Yolo Bypass Working Group (Working Group), with support from DWR and as sponsored by the Yolo Basin Foundation (Foundation), has created an IRWMP Subcommittee (Subcommittee) to review, prioritize, and recommend project ideas on a quarterly basis. The Subcommittee functions under a specific set of operating rules and has a structured consensus-seeking decision process that relies on “consensus with accountability”

wherein all participants have committed to seek to reach consensus. In the event a participant must reject a proposal, that participant must provide a counter proposal that legitimately attempts to achieve their interest and the interests of the other participants. The Subcommittee is made up of a representative and equitable cross-section of affected private and public Bypass landowners, and likely public and non-governmental organization project implementers.

The Subcommittee has identified the level of project readiness for each current project (see Table 5.X). Based on preliminary factors, the Subcommittee has also organized current projects into prioritization categories of *high*, *medium*, and *low* status for the initial iteration of the IRWMP. In subsequent work, the Subcommittee intends to create a more comprehensive rationale for project prioritization. Said rationale may reflect the key interests of the diverse Subcommittee membership. The Subcommittee also expects to devote significant time to further review of the current and future projects and expects subsequent (quarterly) prioritization results to reflect additional project details, project partnering, and other changes.

## **Description**

Actions identified in the IRWMP must reflect the primary role of the Bypass as floodway. Ideally however, the goal is to create a suite of projects that reflects management of the Yolo Bypass as a multi-function floodway. These actions are based upon stakeholder input and are consistent with the ongoing local management planning process. The integrated action aims to improve existing facilities and establish new ones that enhance flood management, irrigation, habitat values, recreation and education. Planning and implementing this action will be closely coordinated with local stakeholders and local, state and federal agencies that have jurisdiction over flood management and resources in the Yolo Bypass.

The Yolo Bypass performs multiple functions. It is a key component of the Sacramento River Flood Control Project, provides thousands of acres of productive and diverse publicly and privately managed wetland habitat, an important stop-over on the Pacific Flyway for wintering waterfowl, shorebirds and neotropical songbirds, a productive agricultural area, an important rearing habitat for floodplain dependent fish species, a migration route for anadromous fish and provides important educational and recreational opportunities. Many of these functions reach far beyond Yolo County.

The flood management function of the Yolo Bypass is critical in protecting the cities of Sacramento and West Sacramento and other parts of Sacramento, Solano, and Yolo Counties from flooding. The Yolo Bypass is a critical link in the Sacramento flood control system. Flood conveyance through the Yolo Bypass works to prevent large scale flooding in upstream areas for the entire Sacramento Watershed. The flood management function puts important constraints on other uses of the Yolo Bypass. Hydraulic roughness needs to be maintained below the level where vegetation would increase water surface elevations or flow velocities along structures. Late flooding of the Yolo Bypass in spring may shorten the growing season for crops, and eliminates recreational access to the Bypass.

The Yolo Bypass provides farmers opportunities for a variety of crops including rice, wild rice, tomatoes, beans, melons, and safflower. Farming practices are instrumental in keeping hydraulic

roughness of the Yolo Bypass low, because plant species that cause obstructions to flow, such as willows are controlled. The farmland also provides important habitat for waterfowl and other wildlife.

The Yolo Bypass has international significance as a waterfowl and shorebird wintering area, but also provides habitat for a diversity of wildlife through the entire year. The Yolo Bypass Wildlife Area is owned and managed by the California Department of Fish and Game (DFG). It was dedicated and opened for public access in 1997, and covers approximately 16,000 acres. Management of the Yolo Bypass Wildlife Area explicitly addresses the needs of flood management and agriculture in the Yolo Bypass. It is managed for a variety of habitats including seasonal and permanent wetland and riparian and upland areas. An extensive public use program already exists on the Wildlife Area. Habitat restoration and agricultural activities are jointly managed throughout the area. The DFG land management plan for the Wildlife Area is under development. The planning process has included an extensive public involvement process.

Studies by the California Department of Water Resources (DWR) and UC Davis have found that the Yolo Bypass is an important nursery area for salmon and other floodplain dependent species. Juvenile salmon that migrate out through the Yolo Bypass have been shown to grow larger than juveniles that migrate out through the channel of the Sacramento River. Data have also been collected that suggest that survival is higher in the Yolo Bypass. The Yolo Bypass floodplain also provides habitat for other native fish species. The Toe Drain along the eastside of the Yolo Bypass provides habitat for important non-native game fish including striped- and largemouth bass. In 2006, DFG, DWR, National Marine Fisheries Service, and the U.S. Fish and Wildlife (the CALFED Ecosystem Restoration Program Implementing Agencies) formed the Yolo Bypass Interagency Working Group (YBIWG) and evaluated the feasibility of implementing a set of aquatic ecosystem restoration opportunities in the Bypass. The primary goal of the YBIWG is to:

- 1) improve conditions for native fish species (particularly State and federal Threatened and Endangered fish species and species of special concern) in the Bypass, enhancing populations and recovery efforts, and
- 2) Keep users of the Yolo Bypass whole by maintaining or improving existing conditions.

The YBIWG has identified the following potential sequential aquatic enhancement opportunities for further evaluation and discussion with stakeholders:

- Putah Creek – Lower Putah Creek stream realignment and floodplain restoration for fish passage improvement and multi-species habitat development on existing public lands.
- Lisbon Weir – Improve the structure for fish, wildlife and agriculture; reduce maintenance.
- Additional multi-species habitat development – Provide for controlled localized seasonal inundation on more frequent intervals; identify areas of opportunity only on: the Wildlife Area; other existing public lands; and private lands where cooperative agreements with willing land owners provide mutual benefits.

- Tule Canal connectivity – Identify passage impediments (example: road crossings and impoundments); work with land owners to develop the best options for improving fish passage and ensuring water diversion capability.
- Multi-species fish passage structure– Investigate the redesign of the existing fish ladder; evaluate the feasibility of constructing a new fish passage structure, operated to ensure: continued maintenance of flood conveyance capacity; no substantial changes in timing, volume, and/or duration of flow; and minimal disturbance to existing land use and agricultural practices.

Project development will include the creation of conceptual restoration opportunities, stakeholder input to guide further actions, and the development of (in concert with stakeholders), an appropriate restoration plan that maintains or improves conditions in the Yolo Bypass for flood control, native fish and Bypass users.

The Yolo Bypass Working Group is an important forum for stakeholder input to the planning and management of the Yolo Bypass. It includes representatives of the local landowners, State, local, and Federal flood and resource management agencies, the conservation community, local governments, academia, and a number of other participants. It is sponsored by the Yolo Basin Foundation (with funding that ended in December 2006 from CALFED). The Foundation is a community-based organization originally founded to assist with the establishment of the Yolo Bypass Wildlife Area. It remains an important force in environmental education and community-based planning, working closely with the DFG and other agencies. The Foundation sponsors an extensive educational program associated with the Wildlife Area. Over 4,000 K-12 students from throughout the region visit the Wildlife Area annually. Other public access programs sponsored by the Foundation include public tours, teacher workshops an extensive volunteer program and a public lecture series. In 2001 the Foundation, on behalf of the Working Group published: the *Yolo Bypass Management Strategy*, is a locally-based concept for the future of the Yolo Bypass, resulting from the Working Group's efforts.

Recreational opportunities in the Yolo Bypass include hunting, fishing, and wildlife viewing. Close proximity to Sacramento, West Sacramento, Davis, and Woodland, and easy access via Interstates 5 and Interstate 80, increases the importance of the area for recreation. The only public recreation access in the Bypass is on the Wildlife Area. DFG manages a large hunting program at the Wildlife Area during the fall and winter months and maintains hiking trails, an auto tour, and fishing dock opportunities. Several trails and cycling advocates have proposed recreational trails concepts in and adjacent to the Bypass. These ideas require further development to appropriately integrate with current Bypass land uses but they are consistent with adjacent local government recreation plans and warrant consideration by the Subcommittee.

## **IRWMP Section 6.3.2 (Integrated Action excerpt)**

### **IA7. Yolo Bypass Integrated Project**

As described in Section 5, the Yolo Bypass Integrated Project (YBIP) focuses on multiple related improvements, including improvements in water quality, public and private wetlands, aquatic and riparian habitats, education and recreation in the Yolo Bypass, all in the context of maintaining and enhancing the function of the Bypass as a floodway.

Since 1997 the Yolo Bypass Working Group (Working Group), a Bypass-wide stakeholder information sharing entity, has been the primary forum for multiple stakeholders and agencies to share information, receive feedback on proposed actions, and coordinate oversight of projects and studies throughout the Bypass. Yolo Basin Foundation (Foundation) has served to coordinate the efforts of the Working Group through a multi-year grant from CalFed, which expired in December 2006. Currently the Working Group is being supported with funds from the WRA of Yolo County and the consolidated mercury study funded by the State Water Board.

The YBIP includes 12 potential component actions in various stages of project readiness, and an additional 7 conceptual-level project ideas that require significant development before they are given further consideration. Many actions have multiple objectives and benefits, including floodway management, water quality, mosquito control, ecosystem enhancements, and recreation. Some of these actions are included in the Draft Yolo Bypass Wildlife Area (Wildlife Area) Land Management Plan (LMP) (EDAW 2006) a CEQA equivalent document, prepared on behalf of DFG, with the support of the Foundation and the Working Group. A two dimensional floodplain hydraulic model was developed recently by the US Army Corps of Engineers (Corps) under a CalFed grant administered by the DWR. The Foundation coordinated a stakeholder group that worked with the Corps in assessing modeling needs and approaches. Some proposed actions may therefore be ready for implementation. Other actions may however require preliminary studies and stakeholder outreach programs prior to implementation.

#### **Lead Agency, Partners, and Stakeholders**

Many wetland, fisheries, and riparian habitat enhancement and restoration projects in the Yolo Bypass, on public and private lands have been implemented in recent years, or are in the planning or design stages. Improvements to visitor access and nature education have been progressing at the Wildlife Area. The Yolo Bypass Interagency Working Group prioritized fish habitat improvement projects for the Yolo Bypass and conducted preliminary public outreach in Fall 2006. They made presentations to the Yolo Bypass Working Group and the Lower Putah Creek Coordinating Committee. Development of all future projects plans and potential project implementation will be discussed with the Yolo Bypass Working Group. Future projects and management programs considered for the Wildlife Area will also be consistent with the soon to be completed LMP.

There is no one lead agency with responsibility for overall management or sponsorship of projects for implementation of the Yolo Bypass Integrated Project. As described in Section 5, DWR has recently funded the development of a consensus-seeking IRWMP Subcommittee of the

Working Group. The Subcommittee will prioritize and coordinate projects under the YBIP. The Subcommittee is made up of the following participants:

Yolo Basin Foundation (1 representative)  
DFG -Yolo Bypass Wildlife Area (1 representative)  
DFG Environmental Services / Fisheries Staff (1 representative)  
DWR Division of Environmental Services (1 representative)  
DWR Division of Flood Management (1 representative)  
Local Reclamation District (1 representative)  
Private agricultural landowners (3 representatives)  
Private wetland manager / hunting club landowners (3 representatives)  
California Waterfowl Association (1 representative)  
Ducks Unlimited (1 representative)  
Yolo County (1 representative)

Potential implementation partners and the potentially affected / associated stakeholders related to YBIP concepts include (but are not limited to):

➤ Implementation Partners

- Yolo Basin Foundation  
Yolo Bypass Interagency Working Group  
DFG -Yolo Bypass Wildlife Area and Regions 2 and 3  
US Fish and Wildlife Service  
National Marine Fisheries Service  
Dixon Resource Conservation District  
DWR  
USACE  
RWQCB  
CalFed  
Sacramento and Yolo Mosquito & Vector Control District  
SAFCA  
Local Levee and Reclamation Districts  
Yolo Bypass private landowners (agricultural and hunting interests)  
California Waterfowl Association  
Ducks Unlimited

➤ Affected / Associated Stakeholders

- California Waterfowl Association  
County of Solano (Putah Sinks & lower Bypass)  
County of Yolo  
City of Woodland  
City of Davis  
City of West Sacramento  
Ducks Unlimited

UC Davis  
LPCCC  
Delta Protection Commission  
Local Levee and Reclamation Districts  
Yolo Basin Foundation  
Bypass agricultural landowners and water districts  
Bypass duck clubs  
Yolo Audubon  
Putah Creek Council  
Tuleyome

## **Prerequisite Tasks**

A number of studies, hydraulic models and investigations have been completed, many of which have continued relevance to components of the YBIP. A matrix is presented on Figure 6-14 which illustrates the relationship between the respective component actions and the pre-requisite studies or preliminary tasks essential to enlist stakeholder and agency support in advance of phased implementation of the integrated action. Planning, feasibility analysis, and design could be completed within the first two years in the case of many actions; and implementation can potentially be completed within five years if adequate funding is secured.

Brief descriptions of prerequisite studies and best practice approaches regarding future Bypass actions are presented below. Many of these initial studies and practices would need to take place on private lands and can only be conducted with willing landowners. Pursuit of these studies and practices should be continually communicated with interested and affected stakeholders, preferably through the Yolo Bypass Working Group. A general schedule and time frame and budget for completing the respective studies are presented on Figure 6-15.

### Prerequisite Studies

1. Map, survey & monitor invasive plants in the Bypass, and their effects on agriculture, floodway and ecosystem functions

There has not been a comprehensive survey, evaluation, and mapping of the extent and distribution of invasive, non-native plants in the Bypass. These undesirable plants can reduce flood flow capacity, cause local erosion, and displace native plants, fish and wild life. Study results will be used to determine priorities for the eradication or control of the spread of noxious plants, principally false bamboo (Arundo), tamarisk, star thistle, water hyacinth, water primrose, pepperweed (whitetop) and other herbaceous species that harbor mosquito larvae.

2. Perform Aquatic, Wetlands, and Riparian Habitats Assessment

There is a need for a comprehensive survey, ecological evaluation, and mapping of the extent, quality, and distribution of all existing natural habitat types in the Bypass.

Study results will be used to determine opportunities for expansion or enhancement of suitable habitat types which are compatible with other Bypass land uses (e.g. agriculture) functions (e.g. flood conveyance), and with statewide and regional ecological priorities. Numerous studies have been completed by various agencies and this assessment should use these studies as a starting point.

3. Conduct comprehensive survey and needs assessment of all recreational uses throughout Yolo Bypass

There have been cursory recreational survey efforts of the Yolo Bypass conducted by the Delta Protection Commission and the City of Woodland. The DFG has included extensive recreational opportunities in their draft Land Management Plan for the Yolo Bypass Wildlife Area, the only significant parcel of public lands in the Bypass (with the exception of flood management levees). Beyond those efforts no documentation of the full extent and types of recreational uses, and the extent of public access on publicly owned lands in the Bypass have been conducted. Should additional public lands feasible for public access be identified, this survey would be helpful in the planning and implementation of new, expanded recreational use and facilities. Current use is primarily fishing, waterfowl, pheasant and dove hunting, motorized and non-motorized boating, hiking, bird watching, watchable wildlife programs, and environmental education. However, public access and access facilities are limited, and there is a need to identify potentially suitable access sites and user amenities.

4. Evaluate causes, effects, and management alternatives of "nuisance" flooding in Bypass from westside tributaries

The Fremont Weir is overtopped by the Sacramento River on average every 2/3 years, flooding much or all of the Bypass during peak river stages. However, more frequent, smaller, site-specific inundation in the Bypass occurs as a result of high winter flows from Westside tributaries and drainage canals: Knights Landing Ridge Cut, Cache Creek, Willow Slough, and Putah Creek. There is a need to evaluate the causes of nuisance inundation from tributary inflows and the effects of inundation on land in the Bypass to determine if flood flow measures can reduce adverse effects on existing land management.

5. Establish periodic "State of the Bypass" summit to share information & assess Bypass health for all beneficial uses

Convene a "State of the Bypass" summit every 3-5 years to share information and assess Bypass uses, ecosystem functions, and resources for all identified beneficial uses. The Working Group could potentially be responsible to convene this effort.

6. Complete mercury methylation studies of Bypass management alternatives; identify sources outside Bypass

The DFG managers of the Yolo Bypass Wildlife Area are cooperating with the Central Valley RWQCB to conduct studies to more fully describe the role of managed wetlands in the methylation of mercury within the 16,000 acre Wildlife Area. The primary sources of mercury in the Sacramento San Joaquin Delta arrives via the Yolo Bypass, originating from mercury-laden sediment in Cache Creek and, to a lesser degree, from the Sacramento River. Study results will be used to begin to develop BMP's (Best Management Practices) to reduce the methylation of mercury in wetlands. There is a large consolidated grant made by the State Water Quality Control Board to the USGS, DFG, and Yolo Basin Foundation to study mercury methylation and demethylation in Yolo Bypass Wildlife Area wetlands and rice fields.

7. Evaluate feasibility of regional, multi-county and state-wide projects to modify and improve flood management system

Yolo County, other counties, SAFCA, and other participants have periodically met to consider a range of conceptual alternatives to improve flood management in the greater Sacramento region. Conceptual measures discussed have included modifications to the Bypass system within and upstream of Yolo County, and re-operation of Folsom Dam and the Sacramento Weir. These inter-region collaborations should recommence and continue to develop viable solutions to improve regional flood management.

8. Conduct the Lower Yolo Bypass Collaborative Process

This new stakeholder forum, funded by the DFG and sponsored by the Delta Protection Commission and the Yolo Basin Foundation is focused on specific issues and needs of Bypass lands and Delta Islands at the southern end of the Bypass. The goal of this proposed collaborative process is to develop a consensus based Management Plan for the Lower Yolo Bypass.

9. Evaluate mosquito management needs on a Yolo Bypass wide scale

Yolo Bypass Wildlife Area and SYMVCD are engaged in an evaluation of specific BMP's to reduce mosquito larvae production within the managed wetlands of the Yolo Bypass Wildlife Area. A similar study and implementation plan has begun for all managed wetlands, drainage networks, idle ground, and agricultural lands in other parts of the low-lying Bypass (e.g. irrigated pasture, rice fields).

10. Determine water quality suitability effects on agriculture & ecosystem of the conceptual proposal to route Colusa Basin Drain water into the Bypass.

A concept plan has been raised to consider routing tailwater and flood water from the Colusa Basin Drain as a supplemental water supply within the Bypass. Agricultural tailwater from the Basin may have poor water quality that could be unsuitable for irrigation use in the Bypass. It could also have potentially adverse effects on aquatic and wetlands ecosystems, and could exacerbate mercury methylation processes

because of its high mercury content and high levels of suspended organic matter. If the water supply concept advances to a planning feasibility stage, the water quality risks must be evaluated early in the feasibility assessment process. This project was initiated in 2005 but is indefinitely on hold, pending further decisions / prioritization by the project proponents. Subsequent work is expected to be coordinated with and through the Working Group.

## Best Practices

1. Coordinate all public agency and private lands Bypass projects with the Yolo Bypass Working Group

The Yolo Bypass Working Group has broad stakeholder and agency participation, with credibility and respect established over many years of dialogue and project review. To be successful, future projects and management plans affecting or occurring within the Bypass should be coordinated through meetings of the Working Group. This will ensure that projects and programs are understood and refined in ways that generate public and interagency support, and are more likely to be funded and implemented.

2. Integrate Yolo County HCP/NCCP with Bypass habitat enhancements and Bypass populations of listed species

The Yolo County HCP/NCCP emphasizes species conservation dependent on wetland and riparian habitats. These vegetation types are extensive in the Bypass, including both seasonal and perennial wetlands, and there is a potential for expansion of these habitats which support listed species. Integration of the NCCP implementation with the ongoing planning, restoration, and management of ecosystems in the Bypass should continue. This will ensure that the use of Yolo Bypass lands for NCCP purposes is compatible with other Bypass land uses and functions.

3. Communicate about the balance of and beneficial / detrimental impacts of all land and water uses in the Bypass

The Yolo Bypass is a complex system of variously competing or compatible beneficial uses and their associated infrastructures and management procedures. New projects or management programs to benefit one resource may affect the balance of other resource uses, or conflict with the primary function of the Bypass as the floodway routing high flows in the Sacramento River and adjacent tributaries. There is a continual need for transparent, publicly available discussions about this ever changing balance and associated impacts. This function has been and should continue to be fulfilled by the Working Group.