

6. Land Use and Environmental Resources

Prior to European settlement, these Regions were primarily floodplain areas with a plethora of habitat for fish and wildlife species. As humans settled and developed in the floodplain area, this led to a reduction of floodplain associated species and habitats. The existing aquatic and riparian habitats within and along rivers provide habitat for many special status species and provide important ecological resources for the region. This section describes the existing species and habitat in the region, and the restoration opportunities and constraints, with a focus on riparian corridors. This includes context related to flood system impairments and existing and future goals for natural environment rehabilitation.

6.1. Existing Landscape

6.1.1. Existing Habitats and Threatened and Endangered Species

There are many natural habitat areas within the region that support threatened and endangered plants and animals (Table 6-1). Primarily, these areas exist along the Sacramento River corridor where valley foothill riparian occurs adjacent to the river channel throughout parts of the planning area. In addition, freshwater emergent marsh exists in the Regions immediately west and north of the Sutter Buttes, and a matrix of annual grassland is found throughout (Table 6-1). The Regions has suffered significant loss of habitat for special status species with land use conversion and alteration of natural fluvial geomorphic processes. For example, the construction of levees has separated the river from its floodplain and reduced important fish rearing habitat and productivity of food webs. A significant amount of historical rearing habitat for Chinook salmon has been lost in the Sacramento Valley due to alterations in flows and the separation of rivers to floodplains due to levees (NMFS 2014).

Despite this loss, some areas that have been converted to rangeland and cultivated agricultural areas that dominate the existing landscape within the Regions help support some species of threatened and endangered plants and animals. For example, rice fields can provide habitat for giant garter snake during their active summer season and alfalfa fields provide foraging habitat for Swainson's hawk.

Table 6-1. Existing California Wildlife Habitat Relationship (CWHR) Type in the MUSR RFMP Regions

CWHR Type	Acres	% of mapped area
Cropland	479,815	79.4%
Fresh Emergent Wetland	54,680	9.0%
Valley Foothill Riparian	22,770	3.8%
Annual Grassland	21,624	3.6%
Urban	14,115	2.3%
Open Water	8,486	1.4%
Barren	1,673	0.3%
Blue Oak Woodland, Blue Oak-Foothill Pine	940	0.2%
Scrub	132	<0.1%
Eucalyptus, Urban	85	<0.1%
Alkaline Desert Scrub, Saline Emergent Wetland	27	<0.1%
TOTAL	604,352	100.0%

Source: Regional Flood Atlas Database, DWR 2013.

Notes: Vernal Pool/Swale habitat type occurs within the Regions, though it was not mapped in this data set. “Coastal scrub” was changed to “scrub” vegetation for accuracy purposes. Habitat layer includes data gaps in an area that appears to be primarily dominated by agriculture/cropland immediately south of Chico. Percentage shown refers to percentage of land cover type within the area with mapped habitat data.

While the dominate CWHR type in the mapped area is cropland (479,815 acres), there are also over 100,000 acres of non-urban land cover types that provide habitat for listed species. Within the MUSR Regions, over 80 State and federally listed species are known to occur (see Appendix D). While these species primarily depend on natural aquatic habitats, there are also two listed bird species that use croplands including Swainson’s hawk (e.g. alfalfa), and the greater sandhill crane (e.g. corn) Within the region, there are over 84,000 acres that are designated as conservation lands. These conservation lands include areas designated and managed as wildlife refuges or ecological areas that are owned by California Department of Fish and Wildlife (CDFW) or the United States Fish and Wildlife Service (USFWS), as well private conservation lands held by organizations such as The Nature Conservancy, Westervelt Ecological Services, Wildlands, and River Partners. It also includes privately held lands that are under a conservation easement. USFWS lands include the Colusa National Wildlife Refuge, Delevan National Wildlife Refuge, Sacramento River National Wildlife Refuge, and Sutter National Wildlife Refuge. CDFW lands wildlife oriented properties include Collins Eddy Wildlife Area, Colusa Bypass Wildlife Area, Gray Lodge Wildlife Area, Sacramento River Wildlife Area, Sutter Bypass Wildlife Area, and Upper Butte Basin Wildlife Area.

6.1.2. Habitat Mitigation and Restoration

Historically, as humans settled in the Regions, they experienced an increase in flood risk and began developing a system of flood protection. The resulting flood system of levees, weirs and bypasses was largely developed as a ‘single purpose’ system with the goal to reduce flooding

and flood damages. Much of the system was overlaid on historical river alignments but didn't always accommodate the natural river processes or habitat for species that rely on floodplain habitats. Since development of the system, new laws such as the Endangered Species Act, and changes in societal aspirations for preservation of the natural environment, have created challenges and conflicts in managing, operating and improving the flood control system. In response to the reduction of floodplain habitat, there have been several restoration or mitigation projects implemented in the region, which aimed to increase the area and extent of floodplain habitat and improve conditions for threatened and endangered species. Often these projects entail converting agricultural lands back to native vegetation and altering hydrologic regimes in order to enhance or create habitat for native species including federally listed fish species Chinook salmon (*Oncorhynchus tshawytscha*) (Sacramento River winter run and Central Valley Spring run Evolutionarily Significant Units) and steelhead anadromous (*O. mykiss*) and Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*).

While restoration projects are often implemented simply for the goal of creating habitat, mitigation projects are developed to offset impacts to or loss of habitat in order to address adverse effects on listed species and/or their habitats from project impacts, as required by state and federal law. Mitigation generally includes the protection, enhancement or rehabilitation of habitat in specific ways, to offset an impact caused by a project or action. Mitigation may include planting of vegetation, allowing or restoring natural river processes, grading and contouring of the land surface and/or adjusting the hydrologic regime of the area through irrigation or management of drainage. This may at times involve the conversion of agricultural lands to habitat area. These mitigation areas are frequently located away from the project's site of impact, and the land use changes associated with the habitat mitigation have an influence on the properties adjacent to the mitigation site.

Many projects within the river and its adjacent riparian corridor have potential to impact listed species and/or their habitats, either through the construction process or because a component of the project will influence a species and/or habitat. For example, levee setbacks may impact the habitats or species where the new levee is located. Mitigation for any identified impacts could be completed on site or off site, depending on specific site attributes, species needs, and design considerations. Offsite mitigation may not be possible if mitigation banks do not exist within the project service area. Likewise, onsite mitigation may not be possible for certain species or habitats if the ecological conditions are not appropriate (e.g. no clay pan soils for vernal pools). Importantly, mitigation also can be integrated into a project itself, with the result of project activities resulting in a net improvement for the affected species in question. For example, a levee setback or rock revetment removal project may create sufficient new habitat such that any adverse impacts are mitigated by the project actions themselves. Integrating mitigation into a project can reduce the overall cost and permitting efficiency of the project (e.g., no added mitigation costs).

Similar, but importantly different, are habitat restoration projects, planned and implemented by a variety of organizations and government agencies with the goal of restoring the habitat for species recovery and human recreation and enjoyment. While the actual changes to the landscape stemming from mitigation and restoration projects are essentially the same, the difference

between mitigation and restoration are largely a legal construct. There are legal requirements for mitigation (establishment of an endowment and easement holder, etc.) whereas restoration projects are largely completed based on the aspirational goals of various agencies and organizations, and legal mandates of resources agencies to recover listed species and improve habitat, which were set based on societal value of these natural resources.

Confusion between these two project types can and does occur. This is largely because the visible changes to the landscape are so similar; however, the “driver” (mitigation or restoration) may not be evident to an outside observer. Regardless of the project type, there can be benefits, and detriments for landowners to be adjacent to habitat restoration or mitigation projects. Potential benefits can include reduced pesticide need, increase of beneficial insects and pollinators. In addition, native habitat can support raptors which feed on burrowing mammals, which may in turn reduce the need for levee repair/maintenance related to burrowing mammals’ damage.

Despite these potential benefits, landowners have concerns with being adjacent to habitat projects including potential for depredation of crops; instances of increased trespass, the potential incidental take of an endangered species that may now be located closer to their property; increased potential for fire; and a host of other concerns related to the management of these habitat areas. Agencies responsible for operation, maintenance, and management of the flood control system also are concerned that these changes to the landscape hinder the original purpose of the flood control system, and diminish the flood risk reduction benefits for which the system was initially designed to provide.

6.1.3. The Value and Importance of Preserving Agriculture

The Mid and Upper Sacramento River Regions have rich alluvial soils and relatively-secure and abundant water supplies that, when combined with efficient farming practices, contributes greatly to the Regions’ ability to generate a significant portion of the nation’s food production. This robust agricultural industry contributes a large portion of the economic base for the regions in the form of employment and local taxes. As discussed previously in Chapter 2, the agricultural industry accounts for more than \$3.3 billion of the economies within the MUSR Regions. This value does not account for the indirect impacts from local "business-to-business" transactions necessary to support the agricultural industry (i.e., the local purchase of farm machinery, pesticides etc.), nor does it account for the induced impacts generated by the direct and indirect economic activity (i.e., when agricultural laborers or farm proprietors use earnings to purchase food, clothing, automobiles, real estate, education, and health and social services), which are vital to the Regions’ economy.

The Regions also have a rich cultural heritage of farming, which for some farms spans multiple generations. Managing flooding and preserving the agricultural landscape are intertwined and inseparable. They are integral parts of the cultural heritage of the Regions. Working and living in this rural setting creates a strong sense of identity with the land and the agricultural lifestyle. Sustaining this agricultural heritage and social fabric is a very important view to many living in the Regions. During development of the MUSR RFPM, regional stakeholders have made it clear

that they expect that any proposed changes to the flood control system within the Regions must fully evaluate and consider the potential impacts and consequences for the agricultural landscape. Therefore to be successful, any strategies and approaches proposed and pursued to enhance habitat, must recognize the value and importance of preserving agricultural within the Regions.

6.1.4. The Value of Incorporating Riparian and Floodplain Habitat

The primary purpose of the MUSR RFMP is to develop strategies for improving flood management within the Regions. An important component of the MUSR RFMP will be development of a list of projects that will help achieve flood management improvements. This planning process provides an opportunity to develop and include in that project list *multi-benefit* projects that reduce flood risk while also protecting, enhancing and restoring habitat for threatened and endangered species. Some multi-benefit projects take advantage of natural processes enabled by changes in floodway constriction, enabling a sustainable ecological system with appropriate habitat structure and river process. Multi-benefit projects may also lead to a financial benefit as projects that reduce flood risk may also reduce the need for spending more money on maintaining flood infrastructure (i.e. levees). Multi-benefit projects may also be viable for funding from sources unrelated to flood management (i.e., funding sources dedicated to ecosystem projects), thus tapping into alternative funding sources that hereto were not viable funding mechanisms for flood projects. These projects also provide for the recovery of threatened and endangered species, which supports delisting of species and an appurtenant reduction in regulation to landowners. These sorts of projects may also be used to (self) mitigate for any impacts of the flood project itself, for other flood projects in the region, or for projects or conservation/mitigation goals outside the region. Overall, including appropriately planned, implemented and managed riparian and floodplain habitat into the Regions' landscape matrix ultimately contributes to a resilient and sustainable ecosystem on a long term time scale and may provide opportunities at the landowner and regional levels for opportunistic financing. More information on multi-benefit projects, including examples, potential restoration opportunities, land stewardship opportunities, and potential landowner participation incentives are described in Section 6.4.

6.2. Conservation Goals

There are several agencies and non-governmental organizations that have been involved with conservation planning in the Regions, and some also own and manage lands as well as implement environmental enhancement projects within the Regions. These include USFWS, CDFW, DWR, TNC, River Partners, American Rivers, Westervelt Ecological Services, and Wildlands. Other landowners and cooperating agencies/organizations may also have goals and objectives relevant to the ecosystem and land management. In addition, three Natural Community Conservation Plans/Habitat Conservation Plans (NCCPs/HCPs) are underway in the Regions and they each include goals and objectives relevant to the RFMP (more details on these HCPs are included in Section 6.2.2). During development of the MUSR RFMP, these and other

organizations provided the following input, as related to their goals and objectives for the conservation within in the Regions:

- Give the river more room to move. Restore natural river process by removing revetment where possible (without impacts to infrastructure), especially in areas where the levees are set back and rock is on the bank, not the levee. This may also include levee realignments. In certain instances, this may provide an opportunity to consolidate or modernize infrastructure. For example, a setback may allow for consolidation and modernization of agricultural diversions.
- Pursue ways to provide adequate water in the streams and rivers at the appropriate times of year (for food web production, as habitat for aquatic species, and for natural river process to refresh banks, cottonwood regeneration, etc.)
- Develop landowner incentives to restore native vegetation and allow erosion of river bank through easements or other cooperative programs. Incentive programs could also include protection of property owner's crops via fencing as deer may increase with increase of native riparian habitat.
- Increase inundation of floodplains at appropriate times, longer duration, and increased frequency by lowering or reconnecting floodplains.
- Retain existing and increase amount of shaded riverine aquatic (SRA) habitat, especially SRA that includes natural bank, not planted rock whenever possible.
- Promote increased complexity and diversity of vegetation seral stages. Having all mature "riparian jungle" is not desirable or sustainable. Many species need different age classes of riparian and grasslands, oak woodlands, etc. This will also enhance public use where compatible and may create buffers to keep native wildlife in protected areas to reduce their impact on private lands.
- Continue CDFW's surveying of the Sacramento River deer population with the hope that a special hunt program may be developed to manage that population and decrease depredation impacts to private landowners.
- Conduct complete property line surveys and sign posting on private lands to assist CDFW enforcement staff in helping to keep the public off of private lands adjacent to CDFW owned or managed lands.
- Promote an upland connection for wildlife to provide refuge during flood events.
- Encourage and participate in efforts to protect, improve, restore, and create new habitat for species (listed and native) in the area, including salmonids, green sturgeon, bank swallow, giant garter snake, western yellow-billed cuckoo, Swainson's hawk, deer, bats, and other native fish, birds, mammals and rare plants.
- Encourage projects that incorporate ecosystem restoration of tributary streams to the Sacramento River (such as Colusa Canal, Sycamore Slough, Cache Creek, and other canals for water transport).

- Support establishment of native vegetation buffers between existing agriculture and tributary streams to provide corridors for wildlife, improve water quality, and decrease costs and conflicts associated with channel maintenance.
- Address fish stranding at the weirs that feed the bypasses (i.e., Fremont, Tisdale, etc.) and the screening of all unscreened diversions on the Sacramento River and its tributaries. Incorporate these actions into the plan and encourage collaboration to correct these issues.

6.2.1. Environmental goals of the CVFPP and Enabling Legislation

The preparation of the CVFPP is legally mandated based on Senate Bill 5 (Chapter 364, filed with the Secretary of State on October 10, 2007, codified at Water Code Section 9600 et seq.). It specifies that the CVFPP shall include descriptions of both structural and nonstructural means for improving the performance and eliminating deficiencies of levees, weirs, bypasses, and facilities (including those of the State Plan of Flood Control). It also states that these activities should strive to meet multiple objectives, including (but not limited to):

- Promote natural dynamic hydrologic and geomorphic processes;
- Increase and improve the quantity, diversity, and connectivity of riparian, wetland, flood plain, and shaded riverine aquatic habitats, including the agricultural and ecological values of these lands;
- Minimize flood management system operation and maintenance requirements; and
- Promote the recovery and stability of native species populations and overall biotic community diversity.

DWR's FESSRO has been charged with supporting developing the Central Valley Flood System Conservation Strategy, a mechanism by which mitigation or repairs and improvements to the SPFC can be (pre-) mitigated and the charge of SB 5 met. The Conservation Strategy is intended to be the document that looks at the system as a whole and provides a strategy for meeting the conservation goals of the Central Valley Flood Protection Plan and the Central Valley Flood Protection Act of 2008. Details of the conservation strategy, including numerical habitat targets, are forthcoming, likely for release in late 2014.

The USFWS and NOAA have species recovery plans (National Marine Fisheries Service, 2014) for some of the federally threatened or endangered species and habitats in the Regions, supporting decision making, but are not legally binding requirements of projects. These species and habitats include the Chinook salmon, Central Valley steelhead, valley elderberry longhorn beetle, giant garter snake and the vernal pools ecosystem. NMFS' also has Draft Recovery Plan for the Evolutionarily Significant Units of Sacramento River winter-run Chinook salmon and Central Valley spring-run Chinook salmon, and the distinct population segment of California Central Valley steelhead. CDFW also has a recovery plan for the state-threatened bank swallow.

6.2.2. Existing Habitat Conservation Plans/Natural Community Conservation Plans (HCPs/NCCPs), RAMP and other Plans

HCPs are planning documents prepared by non-federal parties as part of an application for an incidental take permit for listed species, when take of such species may occur from projects or other activities (i.e., maintenance). "Take", per Fish and Game Code, means hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill. An HCP assesses the impacts of a proposed action on species, proposes measures to monitor, avoid, minimize, and mitigate these impacts, and analyzes action alternatives. On approval of an HCP, the USFWS and NOAA issue an incidental take permit, which allows the non-federal party to legally proceed with an activity that otherwise may result in unlawful take of a protected species. An NCCP essentially is the California state equivalent of a federal HCP for species listed under the California Endangered Species Act (CESA).

These HCP/NCCP efforts take a broad-based ecosystem approach to planning for the protection and perpetuation of biological diversity. Therefore, an HCP/NCCP can identify and provide for the regional protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity.

There are three Natural Community Conservation Plans/Habitat Conservation Plans (NCCP/HCP) that have planning areas which overlap with the MUSR RFMP boundary. These plans include the Butte Regional Conservation Plan (BRCP), Yuba-Sutter Regional Conservation Plan (YSRCP), and Yolo Natural Heritage Program (YNHP). All three plans are both federal HCPs and state NCCPs. The BRCP, YSRCP, and YNHP will help to streamline the environmental permitting process to reduce permitting costs, improve certainty regarding regulatory requirements, provide local control through consolidation and streamlining of the permitting process, improve habitat, and protect property rights (BRCP 2014; YSRCP 2014; YNHP 2014). The most direct influence of these plans on the MUSR RFMP would be for any activities recommended by this plan to be covered as a part of the HCPs/NCCPs. An incidental impact, and one harder to assess, is the potential for these plans to preclude the MUSR RFMP from taking advantage of certain mitigation opportunities that the HCPs/NCCPs might otherwise develop beforehand

The BRCP is being coordinated by the Butte County Association of Governments on behalf of the cities of Chico, Oroville, Biggs, and Gridley, Butte County, Caltrans District 3, the Western Canal Water District, the Richvale Irrigation District, the Biggs west-Gridley Water District, the Butte Water District, California Department of Fish and Wildlife (CDFW), and the U.S. Fish and Wildlife Service (USFWS). The draft BRCP and Environmental Impact Statement/Environmental Impact Report (EIS/EIR) are scheduled to be released in early to mid-2014. According to the draft BRCP, the plan does not include coverage for maintenance of levees or other flood control facilities that may be maintained by DWR as DWR is not a permit applicant and its activities are not covered under the BRCP. The draft BRCP does include coverage for these activities for County Service Areas (Butte), but not other LMAs.

The YSRCP is being prepared through a partnership between Sutter and Yuba counties, Yuba City, Wheatland, Live Oak, Caltrans, CDFW, and USFWS. Initial concepts for the NCCP/HCP

have been developed and further preparation of the plan as well as an EIS/EIR is expected to begin in 2014. According to the draft YSRCP, the plan does not include coverage for maintenance or construction related to flood control projects and other stream-related facilities. LMAs are not participating in the plan and currently these activities are not recommended for coverage for the participating counties' activities.

The YNHP is run by the Yolo County NCCP/HCP Joint Powers Agency (JPA), which includes representatives from Yolo County; the cities of Davis, Woodland, West Sacramento, and Winters, and UC Davis. The first administrative draft NCCP/HCP, called the Yolo County Natural Heritage Program Plan, was posted on the program website on July 1, 2013. Actions covered in the plan include residential industrial, institutional, and commercial development; transportation projects; utility projects; recreational facilities; solar energy development projects; flood control and water conservation improvements; and aggregate mining, including O&M activities associated with each of these types of projects. The draft YNHP includes the following as covered activities:

- Installing geomorphic controls (such as vanes, weirs, walls, step pools, or other features) in conveyance channels to control grade, velocity, or channel migration; such controls would be designed, to the extent allowable by site constraints and functionality, to mimic features of natural channels.
- Installing gates, checks, culverts, road crossings, or other flow control features in channels.
- Establishing flood flow corridors to train out-of-bank flows into low impact areas that are designed, to the extent feasible, to sustain shallow water depths and slow velocities.
- Installation of ponds, retention basins, or micro-reservoirs that provide operational flexibility (i.e., capacity to adjust timing or amount of delivered water) or flood risk reduction.
- The draft YNHP also states that flood pathways may be implemented to improve flood conveyance and minimize periodic damage to infrastructure and agricultural lands.

The 2012 CVFPP includes Attachment 9A, Regional Advance Mitigation Planning (RAMP). RAMP is an effort to provide a method to achieve faster, less expensive, and better mitigation for unavoidable impacts associated with infrastructure projects proposed within the State. RAMP can be integrated with and add benefits to conservation planning efforts such as HCPs/NCCPs, which are also attempting to address impacts in advance. The RAMP Work Group formed in 2008 and includes DWR and Caltrans—the main potential users of the RAMP in terms of mitigation of potential impacts—as well as the United States Environmental Protection Agency (USEPA), USFWS, CDFW, California State Parks, the National Oceanic and Atmospheric Administration, USACE, California Regional Water Quality Control Boards, The Nature Conservancy, Wildlife Conservation Board, UC Davis, Resources Legacy Fund, and the Federal Highway Administration.

Within the greater Sacramento River Valley and Sacramento and San Joaquin River Delta, multiple demands for water use, and oftentimes other competing interests, influence water management—with significant social, economic and environmental implications. To help guide

future management decisions, several relatively recent water management plans and studies have been completed or are in progress. Some of these plans encompass a more integrated approach to cover a wide variety of water needs from viability of supply, quality, ecosystem enhancement and flood control. Most of these more current plans recognize the value in working across jurisdictional boundaries to better align spatially with natural water systems. There are inherently similar goals with each of these planning efforts, such as the recognition of the importance of agricultural production, water quality and environmental improvements.

As discussed earlier, the Northern Sacramento Valley Integrated Regional Water Management (NSVIRWM) area covers a similar area to this planning region and includes six counties of Shasta, Tehama, Butte, Glen, Sutter, and Colusa. The NSVIRWM aims to collaboratively identify the water-related needs and develop goals and recommend projects and programs to include in a planning document. The NSVIRWM released a Revised Final Draft in February 2014 which provides the foundation and rationale for the recommended projects and an implementation strategy.

A multi-agency effort composed of the California Natural Resources Agency, California Department of Food and Agriculture (CDFA), and California Environmental Protection Agency (CAL/EPA) at the direction of the Governor, released a Public Review Draft of the California Water Action Plan on January 27, 2014. This plan identifies ten general actions to be taken in the next one to five years aimed at improving the vitality of water supply and restore and preserve critical habitat.

6.3. Challenges

Challenges for ongoing land and conservation management in the Regions (and specifically, along waterways and in riparian areas) may be broken into three categories:

- Physical considerations—these are land management challenges associated with maintaining existing infrastructure and allowing natural fluvial river processes, which often come into conflict.
- Socio-economic considerations— these considerations revolve around the local cultural heritage of farming and the strong sense of identity with the land and the agricultural lifestyle, which may be in conflict with some conservation stewardship approaches pursued by resource agencies and other organizations within the Regions.
- Increased environmental and permitting regulations.

The following sections explore the various challenges and considerations facing land and environmental management in the Regions.

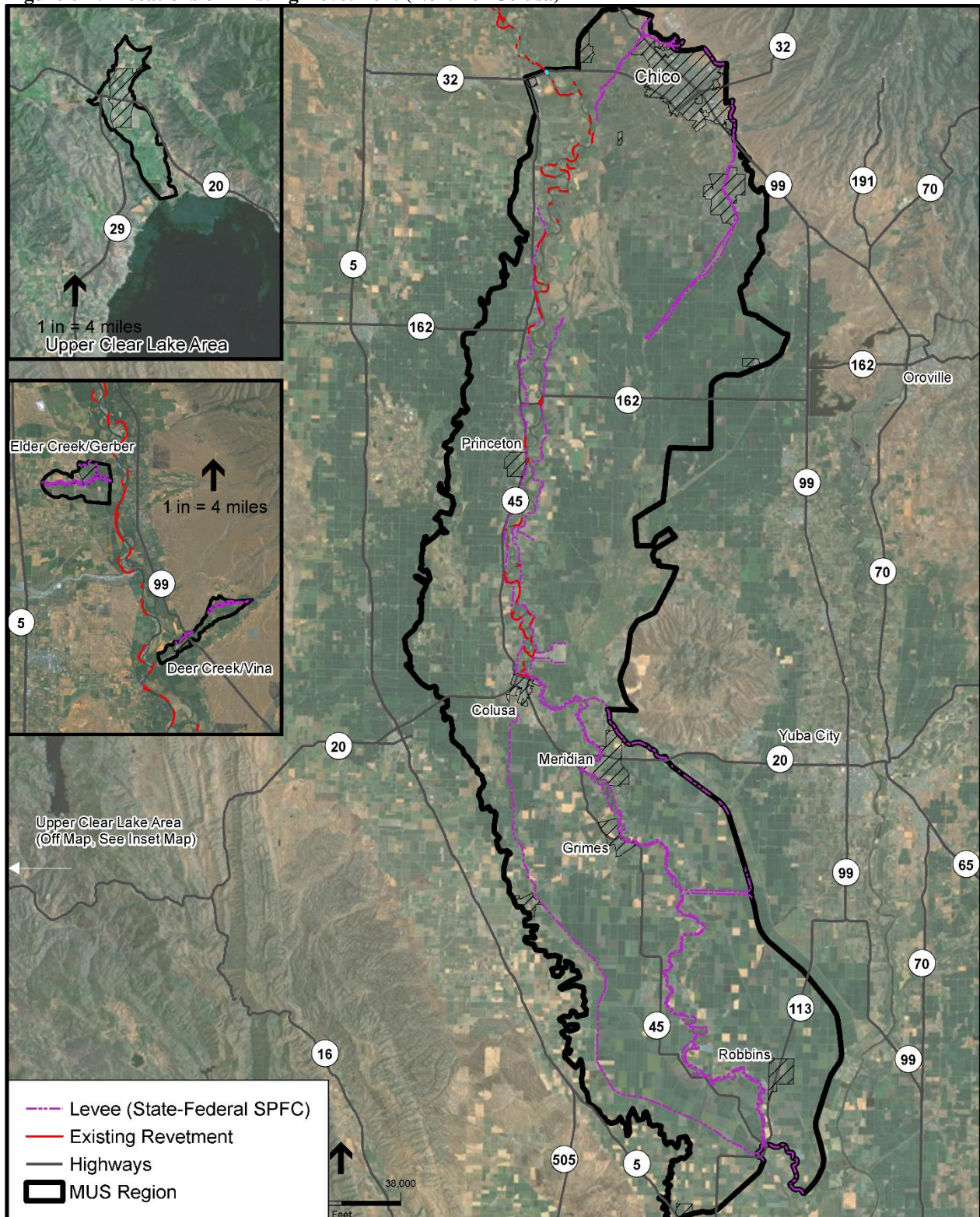
6.3.1. Physical Considerations

Revetment and Limited Channel Migration

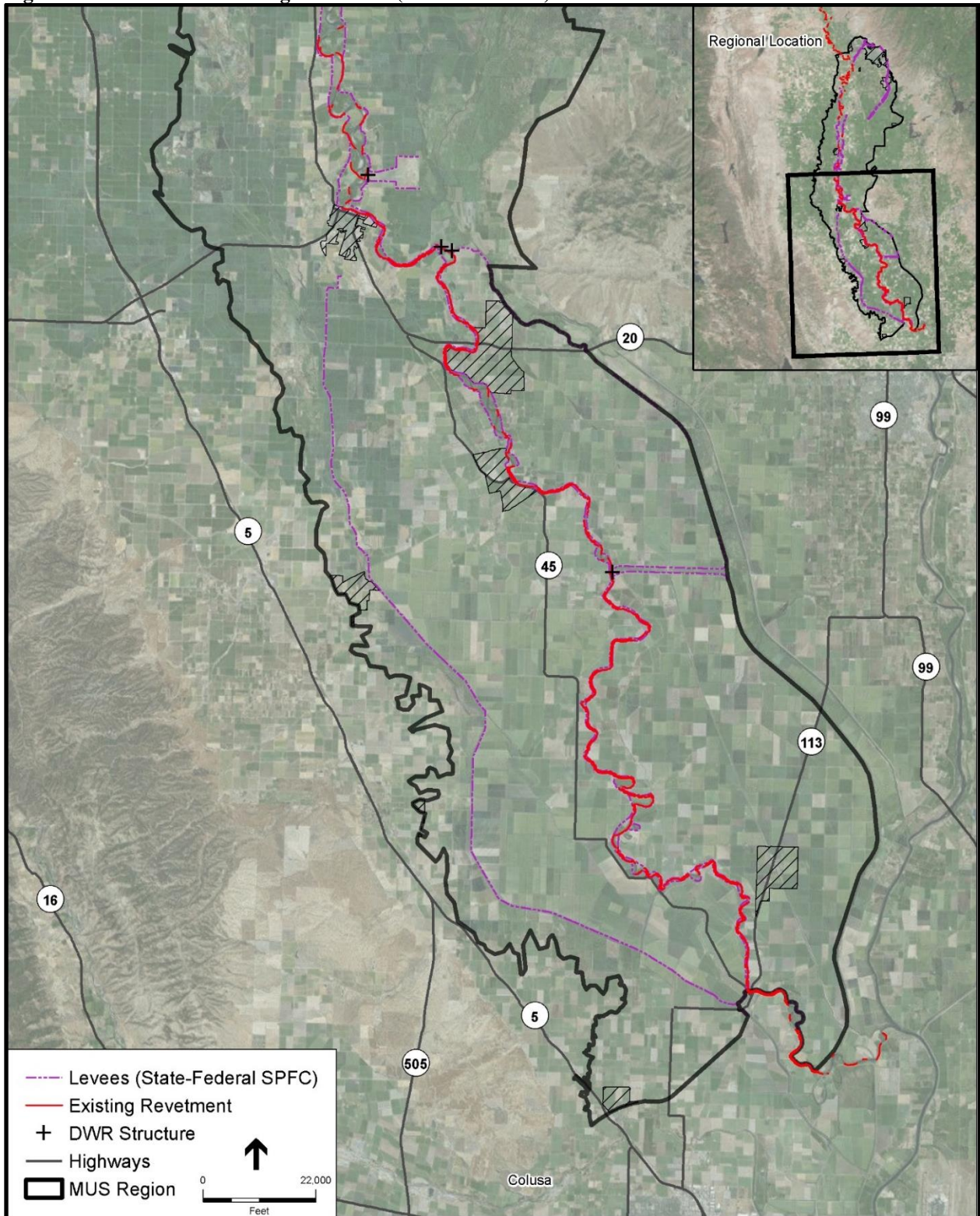
Natural alluvial rivers of the size and slope that characterize the Sacramento River have channels that migrate across their floodplains over the course of time. This channel movement may occur through the relatively-slow process of channel meander, wherein during floods the outside bank on a river bend erodes, the inner bank has sediment deposition, and through time the channel meanders across the landscape. Also, during a flood the bends of the river may become too sharp, and the river avulses, jumping to a new channel location and potentially cutting a new channel path or reoccupying an old location. In either event, maintaining the scour and depositional processes that occur in unrestricted floodplains is an important component in creating and maintaining habitats for the native species that evolved in these environments. When channel migration processes pose a risk on human infrastructure and business enterprises, a typical solution is to place bank revetment along the river to limit channel movement. In some cases, revetment has been placed in areas without levees, where flood risk is lower. These may be good opportunity areas to remove revetment and restore natural channel migration processes.

Apart from the obvious considerations noted above, there are also several challenges related to restoring river process. The first is that there are miles of near-channel levees and bank revetment which exist along the Sacramento River within the Regions (See Figure 6-1 and Figure 6-2).

Figure 6-1. Locations of Existing Revetment (North of Colusa)



1 **Figure 6-2. Location of Existing Revetment (South of Colusa)**



2

These structures control the width, depth, gradient and velocities of flows and prevent channel migration and the secondary benefits of channel migration as described above. The flood control levees and revetment are also within state or federal jurisdiction (Project Levees and Sacramento Bank Protection Project [Sac Bank], respectively) and the majority of the lands within the Regions are protected by State Plan of Flood Control levees. This may restrict the possibility for channel migration because agencies are mandated to maintain these structures, and removal or modification of a federal project requires approvals at a USACE division level.

Topographic, Hydrologic, Hydraulic, and Infrastructure Limitations

Physical conditions exist within the Regions that limit the ability to implement habitat and flood projects. Challenges range from the altered natural hydrograph and geomorphic conditions, to the requirement to maintain specific levels of flood flow conveyance, to the need to protect critical infrastructure. For example, because reservoir operations have reduced the magnitude and altered the timing and duration of spring flows, floodplain inundation and related ecological processes are limited. Because residences and infrastructure are located adjacent to flood control levees, options for new flood footprints are constrained. Such limitations challenge both flood projects (trying to keep flows inside the managed floodway) and ecosystem projects (trying to inundate floodplains and invigorate river processes within the floodway). Indeed, the two may be at odds with the ecological process of floodplain inundation exactly the opposite of the desires of many adjacent landowners and flood managers, which is to convey flood flows at the lowest stage possible. Conversely, lowering and reconnecting floodplain could reduce stage and provide other flood/water supply benefits (transitory storage, water quality, etc.).

Channel & Bypass Conveyance

As mentioned earlier, the current flood system of levees, weirs and bypasses was largely developed as a 'single purpose' system with the goal to reduce flooding and flood damages, and did not account for species and habitats dependence on a functioning river ecosystem, future habitat restoration opportunities or potential entrainment of aquatic species. Furthermore, recent flood events and system technical reevaluations have shown that in many areas, the original system design did not properly account for levee safety issues such as levee underseepage and erosion. Without careful and proper planning, implementation and management, mitigation and restoration efforts have the potential to further exacerbate these levee safety concerns.

6.3.2. Socio-economic Considerations

Land Use Stewardship Philosophies

Most parties with vested interest in the river corridor share a common interest of reducing flood risk and generally improving the overall health of the river system. However, differences of opinions reside in how to manage land along the river corridor. Particularly in deciding when it may be appropriate to restore habitat for targeted species or ecosystem function, versus when it might be appropriate to manage lands for agricultural purposes.

Also, differences exist how to manage areas within flood bypasses which were originally built to increase flood conveyance and reduce flood risk. Under existing conditions, these flood bypasses provide habitat to native fish and wildlife species. Managing the flood bypasses for

flood conveyance and for habitat can result in conflicts and currently no comprehensive management plan is in place which could help resolve these conflicts (see Chapter 10 for additional discussion).

Increased Regulatory Compliance and Permitting & Associated Timeframe and Costs

There are a variety of permits and approvals that must be attained in order to complete many types of projects and flood system maintenance that may impact river habitats and associated species. These requirements remain in affect whether the purpose of the project is to restore the ecosystem, to build a shopping mall, or to upgrade a levee with slurry wall. Further, while the project may have a relatively-small footprint and/or be of relatively-low cost, it still must adhere to the same governing laws and regulations. Many stakeholders believe that these conditions are difficult because they require significant timelines and there are considerable costs, to complete them. Approaches for accelerating and streamlining some of these processes are included in Section 6.4.

There are also concerns amongst some stakeholders that increased public ownership of land and increased areas of privately- and publicly-owned wildlife habitat may result in increased regulation of other neighboring properties by state and federal agencies. These concerns primarily relate to regulations that pertain to special status species, restrictions on the use of pesticides and herbicides, etc. Section 6.4 outlines potential landowner incentives to address some of these concerns, such as safe harbor agreements.

6.4. Potential Enhancements

The following sections outline potential enhancements for the Regions. These enhancements take the form of potential management actions, specific projects, programs, best management practices, approaches to improve the permitting and regulatory compliance process for the Regions, and funding options.

6.4.1. Strategies to Support River Process

This section provides an overview of potential concepts and management actions that can support restoration of riverine processes that create and maintain the habitat of listed species that may require mitigation from impacts related to flood projects contemplated in this plan. The following sections outline concepts and management actions that can be completed on their own as mitigation or restoration projects—or can be integrated with flood management objectives (see Chapter 9) to potentially generate multi-benefit projects.

While specific multi-benefit projects and related opportunities are discussed in more detail later in this chapter, the 2012 CVFPP identifies several areas along the Sacramento River with “meander potential” which could be appropriate places to create river migration corridors and increase flood conveyance. These areas were identified by defining a natural and existing meander zone, with the difference between the two zones representing the area of meander potential that “have been lost because of engineered, permanent features, such as levees, bank

revetments, structures and roads” (DWR, 2012). However, there are local concerns that without careful and proper planning, implementation and management, these efforts have the potential to further exacerbate levee safety concerns. There are also concerns as to how the scope and scale of this concept could impact the Regions’ agricultural economy and character.

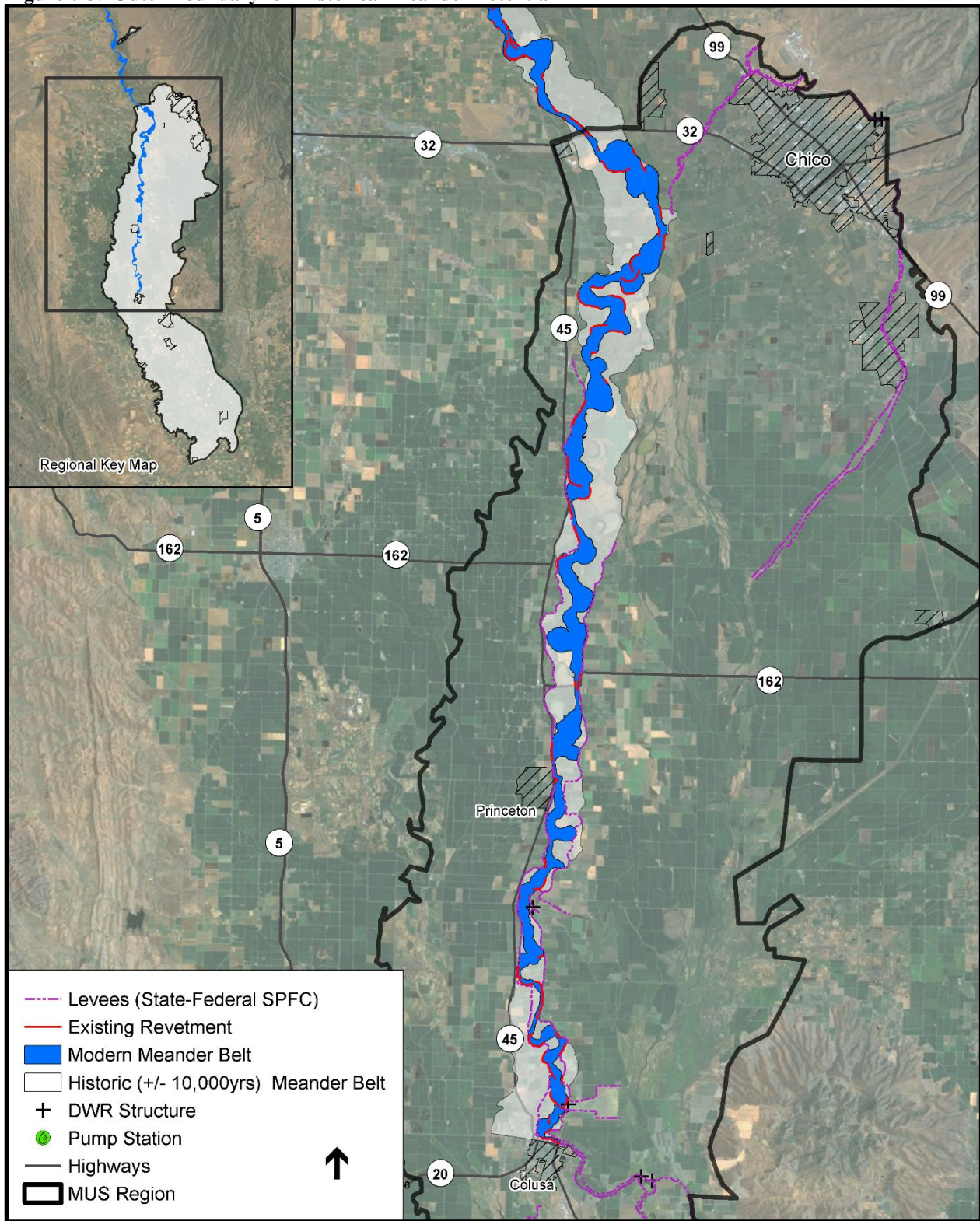
Over a decade ago, the Sacramento River Conservation Area Forum (SRCAF), identified potential locations with meander potential as an “inner river zone” (Sacramento River Advisory Council 2003). The historical 100-year meander belt, combined with projected erosion locations 50 years in the future, defines the potential meander locations in the “inner river zone.” All areas considered as opportunities for any multi-benefit projects to increase habitat values and reduce flood risk must be done with consideration to existing infrastructure and land uses, and with respect for private property rights.

Opportunities to enable channel migration upstream and downstream of revetment areas must consider compromising the integrity of these structures and the planform and channel profile ramifications of “releasing” the channel when other parts of the river have evolved while the revetment has been in place. In addition, a study of existing geology within the Regions indicates that there are several areas with erosion resistant Pleistocene alluvial geologic formations (Singer and Dunne, 2001), that have shown resistance to lateral migration of the Sacramento River Channel. This resistance to lateral migration is illustrated in Figure 6-3 as the outer boundary of the historical meander belt.

Revetment removal

Certain existing revetment within the plan region may provide minimal flood management function and yet may be both required to be maintained (i.e., part of a federal project) and also cost prohibitive to maintain. Also the original need for the revetment may no longer exist due to changes in land use (e.g., an area which was converted from agriculture to a habitat area after the revetment was installed). Removal of these revetments allows for potentially significant enhancement to geomorphic processes and habitat creation. Revetment removal should only be considered where there are willing landowners whom are supportive of the concept, and where there are probable positive or at least neutral outcomes on both flood risk and ecosystem function. DWR has assessed rock revetment along the Sacramento River that may be appropriate for future removal; it is anticipated that this information will be included in DWR’s Conservation Strategy.

Figure 6-3. Outer Boundary for Historical Meander Potential



Floodplain Lowering

Floodplain-lowering is a strategy to reconnect a river to its floodplain by lowering the floodplain elevation and/or modifying floodplain topography to reconnect swales and other low points to the river. Floodplain lowering generally leads to increased duration of inundation and increase channel flow area. This strategy benefits flow conveyance with larger flow areas which can lead to an increased extent of riparian and marsh habitat in new flow/floodplain area. In addition, floodplain lowering would lead to an increase in the frequency and timing of floodplain inundation, potentially creating depths suitable for juvenile salmonid rearing habitat.

Levee Relocation

This potential action involves relocation of a levee to enhance system flood conveyance and/or resolve a levee safety issue such as under seepage, erosion, etc. In reaches where levees closely follow sinuous river channels, relocating levees provide opportunities for significantly reducing overall levee length, which may reduce overall maintenance costs. This can also generate opportunities for improving ecosystem function and increasing habitat extent, quality, and connectivity. The expanded floodway creates space for river meandering, sediment erosion and deposition, natural ecosystem disturbance processes, and a healthy diversity of riverine habitat. Relocating levees is typically applicable in opportunistic conditions where the repair of an existing levee reach may be cost prohibitive, and adjacent and neighboring landowners are in support. In addition, levee relocation may reduce the flood stage during high flow events at the location of the setback and up- or downstream of the setback, depending on the size of the setback.

Vegetative flow and erosion management

In select conditions, the use of vegetation can reduce bank erosion, reduce flow velocities of flood flows at applicable locations, and reduce sediment depositions in agricultural lands. The use of vegetation has a long history of use and success in the Sacramento Valley at specific locations (DWR, 2012) and serves as a potential multi-benefit flood management strategy. The use of vegetation and wetlands can also improve water quality. Riparian (Shaded Riverine Aquatic Habitat-SRA) vegetation is beneficial to aquatic species, providing shade and large woody debris.

Flowage Easements

Purchasing easements can be valuable for a variety of purposes, including reducing the risk of future major flood consequences by retaining rural land uses, maintaining viable agricultural productivity, and creating important habitat. To be most useful for environmental purposes (not just floodway conveyance), these easements, where applicable, would allow for the following:

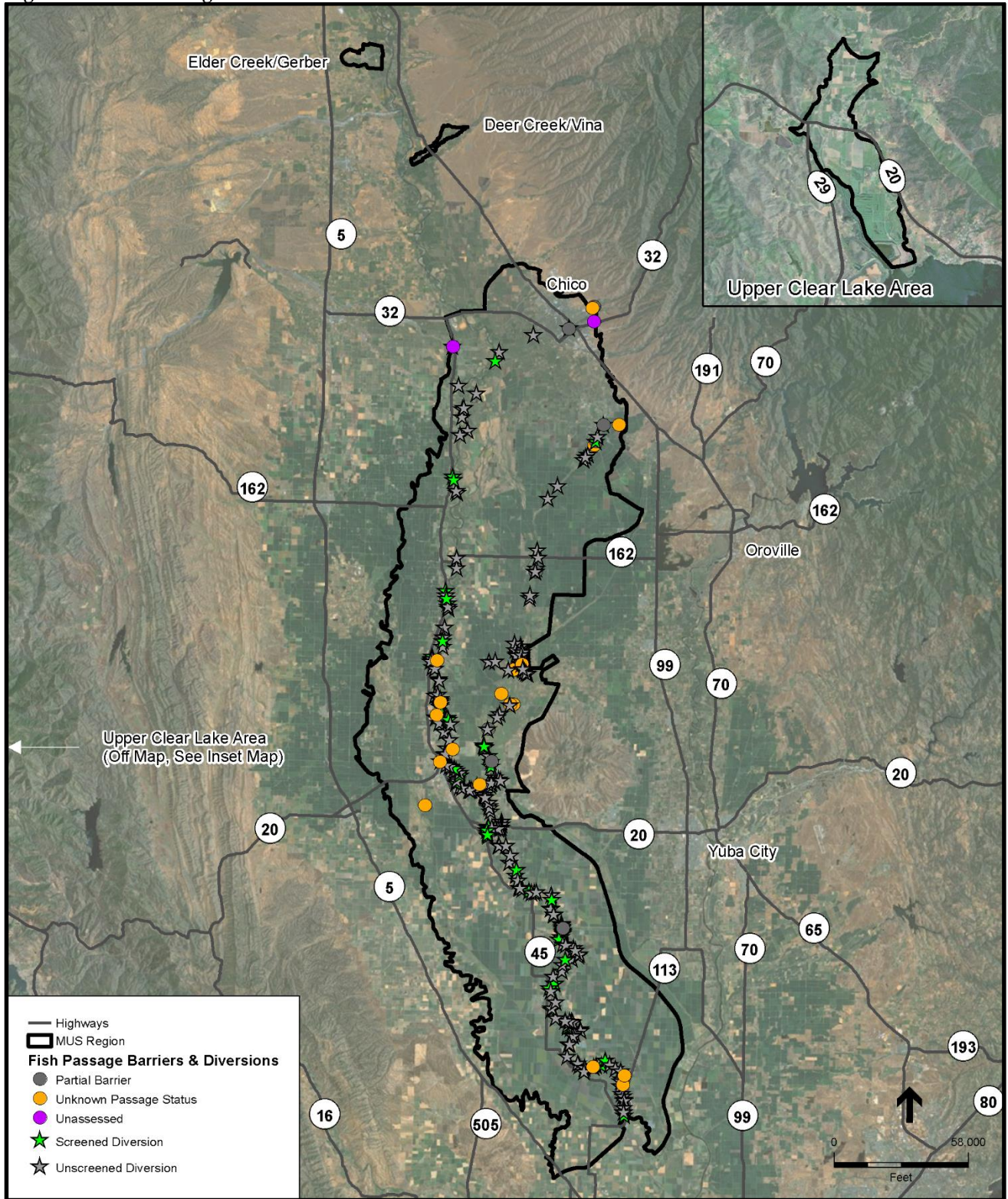
- Periodic inundation and soil saturation important for the ecological functioning of floodplains (i.e., increasing aquatic ecosystem productivity, allowing sediment deposition on floodplains, and supplying large woody materials to aquatic ecosystems).
- Allowing natural riverine processes to occur thereby allowing more natural flows, and erosion and deposition of sediment.

Flowage Easements are explored further in Chapter 10.

Fish Passage and Fish Screens

Removal of fish passage barriers at diversions may afford migratory fish access to habitat that can potentially be used for spawning and rearing of juvenile fish. Figure 6-4 illustrates known fish passage barriers and helps identify potential diversions that may benefit from installation of fish screens.

Figure 6-4. Fish Passage Barriers and Diversions



Multi-Benefit Projects

Multiple benefit, or multi-benefit, projects are a key part of the 2012 Central Valley Flood Protection Plan (CVFPP) as well as the planning efforts that are currently underway that will support the preparation of the 2017 CVFPP. The primary goal of the CVFPP is to improve flood risk management. One of the four supporting goals of the CVFPP is to promote multi-benefit projects along with improving operations and maintenance, promoting ecosystem functions, and improving institutional support. The guiding strategy for reducing flood risk in the 2012 CVFPP is based on the State Systemwide Investment Approach (SSIA), a multi-benefit and integrated flood management approach. CVFPP Section 4.7.1 indicates that the State, in funding for the SSIA, will place a priority on funding projects that provide multiple benefits and goes on to cite California Water Code Section 12585.7, which indicates that the State “will pay up to 20 percent more” for multiple-benefit projects. Also, projects that incorporate ecosystem restoration and recreation components may be eligible for alternate sources of funding that is not available for single-purpose flood management projects. In addition to funding, a key value of a multi-benefit project that incorporates ecosystem restoration components is that it can be self-mitigating; speeding up the project process. (A multi-benefit project could only be potentially self-mitigating if the ecosystem improvements offset and were in-kind to the impacts. A self-mitigating project could only be multi-benefit if the ecosystem improvements were above and beyond mitigation since mitigation alone cannot count as the ecosystem restoration portion of a multi-benefit project.)

As described by multibenefitproject.org, multi-benefit projects are “designed to reduce flood risk and enhance fish and wildlife habitat by allowing rivers and floodplains to function more naturally” (multibenefitproject.org, 2014). If properly developed, planned, managed and implemented, these projects create additional public benefits such as improving water quality, increasing groundwater recharge, and providing public recreation opportunities, or any combination thereof” Well-developed multi-benefit projects have the advantage of being able to access different types of funding sources. Multi-benefit programs are similar to multi-benefit projects in that they focus on providing benefits to more than one area of water, flood, and resource management.

An example multi-benefit project is the Princeton-Codora-Glenn & Provident Irrigation Districts (PCGID-PID) Pumping Plant/Fish Screen Facility and the Llano Seco Riparian Sanctuary Unit of the Sacramento River National Wildlife Refuge. Prior to acquisition by the USFWS, rock revetment was placed on the north end of the Llano Seco Riparian Sanctuary Unit by DWR in 1985 and 1986. The rock was placed in order to hold the planform alignment of the Sacramento River in place, ensuring that flood flows would continue to be diverted from the Sacramento River through the Goose Lake overflow structure and into the Butte Basin. Since the placement of rock revetment in 1986, the natural riverbank that is south of the revetment eroded approximately 600 feet. The erosion on refuge property is directly across from the PCGID-PID pumping plant and fish screening facility. In 1999, the PCGID-PID consolidated three pumping plants into one new facility equipped with state-of-the-art fish screens. The fish-screening efficiency of the new PCGID-PID pumping plant is now endangered by the bank erosion on the refuge property and the migration of the Sacramento River. Although the rock revetment on the north edge of refuge property is decades old and eroding, it plays a key role in protecting the

PCGID-PID pumping plant. As the bank erodes, the angle of flow and velocity of the water passing the screens will change, trapping fish against the screen rather than sweeping them past. Without some type of protection, it is likely the bank will continue to erode and the pumping plant facility will fail to meet NOAA and CDFW guidelines for operation of the pumping-plant fish screens.

The preferred alternative includes installation of approximately 1,990 feet of traditional riprap along the Sacramento River bank on the northwest bank of the Riparian Sanctuary, including a low berm along the gravel bar and a toe trench just off the gravel bar; removal of upstream rock; and site-specific plantings on the Riparian Sanctuary. An estimated 10,781 cubic yards of rock along 2,220 feet of the upstream bank would be removed to an elevation of about 80 feet (just below the summer mean water surface). A Federal Record of Decision for the project was issued in December, 2013. This relocation and repurposing of rock illustrates a project where adaptation of existing methods for changing conditions is resulting in infrastructure protection and habitat restoration.

The MUSR RFMP process provided the opportunity for stakeholders to collaborate on developing new multi-benefit projects that advance the goals and objectives of the RFMP and the 2012 CVFPP. In the fall of 2014, two workshops were held at which provided stakeholders and project proponents worked together to try to find ways to package projects together to develop new and more complete multi-benefit projects. This is discussed in greater detail in Chapter 11.

6.4.2. *Strategies for Preserving Agriculture and Enhancing Habitat and for Reducing Flood System Maintenance*

The following sections provide an overview of potential strategies to preserve agriculture production while enhancing habitat and to reduce conflicts between flood and conservation management. Strategies to reduce flood system maintenance, which could be formulated to include some agricultural maintenance practices, are also presented.

Agricultural Lands Stewardship

Agricultural Land Stewardship planning and strategy is an integrated and collaborative approach for addressing impacts created by the conversion of farmland to open space uses. In October 2013 the DWR Agricultural Lands Stewardship Workgroup released a draft discussion paper <https://agriculturallandstewardship.water.ca.gov/>, which presents a framework with various potential strategies focused on maintaining agricultural and economic viability which may be considered by decision makers regarding mitigation measures. The framework was developed for the Sacramento-San Joaquin Delta (Delta) and in some instances is specifically tailored to address unique aspects related to management in the Delta; however, the vast majority of the framework may be applied to the Regions. The document and framework are structured around four main groups of potential strategies. An overview of these strategy sets are provided in the following sections. Additional information and detail are included in the draft discussion paper.

1. Strategies to help maintain farming

This set of strategies discusses a number of approaches for technical and financial assistance for agriculture, including for flood protection, control of terrestrial weeds, water management, water quality improvements, sediment removal, and water supply reliability. It also includes a discussion of a “good neighbor” policy, the use of conservation easements on agricultural land; the Williamson Act and options for an *in lieu* tax revenue. One example of a technical approach is Stormwater Attenuation / Runoff and Discharge Management (Section 0), as described below.

2. Strategies that provide incentives for conservation on farmland

These strategies offer ways to enhance environmental quality on farmland, including wildlife-friendly agriculture, management of farmland for habitat purposes, and establishment of habitat features by farmers that can be offered for sale as credits in a market based conservation program.

3. Strategies to manage land for purposes other than conventional crop production

These strategies offer ways for landowners and lessees to earn income from growing crops other than food and fiber, mainly floodplain plants. There could be a direct payment for such floodplain habitat services and/or flowage easements provided for these types of strategies. Growing crops other than food or fiber could provide an economic return for its role in sequestering carbon and mitigating greenhouse gas emissions or helping meet environmental permitting requirements.

Working Landscapes

Another strategy first developed in the Delta is the Delta Working Landscapes Program (Working Landscapes). The purpose of Working Landscapes is to encourage farmers to invest in habitat on farmland in a manner that is mutually beneficial to production agriculture and the ecosystem. Working Landscapes is a group of projects which demonstrate how farmers can integrate habitat restoration into farming practices. The objectives are to improve the environmental quality of existing landscapes; coordinate programs with local farmers; understand the social, economic, environmental and governmental policy hurdles and/or incentives to perform conservation practices; and communicate to farmers the advantages of implementing wildlife friendly agricultural practices. Project types for the program in the Delta included planting of native grasses and hedgerow along ditch banks and levees to provide habitat, improve quality of agricultural drainage water, provide levee stability, and retard levee erosion; and establishment of permanent and seasonal wetlands to provide waterfowl habitat for brooding and serve as a food source. Sponsored by a grant, the Working Landscapes program produced a document that may serve as a reference for establishing public/private partnerships for such programs in the Regions.

Stormwater Attenuation / Runoff and Discharge Management

Storage of floodwater, whether in foothill reservoirs or in floodplains and natural overflow basins (e.g. the Butte Basin) throughout the Regions, is a valuable tool for managing flood risk. This strategy may also generate opportunities to integrate and benefit water supply (including groundwater recharge and conjunctive use), water quality, ecosystem conservation and restoration, agricultural conservation, and recreation. These strategies reduce peak run-off by

land use/ vegetative modifications, increased infiltration/ detention and integrated watershed and water planning.

Related in practice and in some installations, but separate in terms of management focus, are means for managing runoff and discharge, particularly from agricultural operations. A variety of best management practices are available to assist property owners, including hedgerows of native vegetation along and in canals of various sizes and along property boundaries. Benefits include:

- Reduces cost for herbicides. Less use of herbicides also reduces the potential impacts to aquatic species.
- Eliminates need to reshape canal, which is generally needed every 2 to 5 years in unvegetated canals, depending on bank slope.
- Provides bank stabilization and reduced erosion.
- Provides habitat for beneficial insects: pollinators and predators of agricultural pests, birds, and other wildlife.
- Reduces long-term O&M costs once native vegetation is established along canals, minimal maintenance would be required including weed control and bank stabilization. In addition, the initial investment may be covered through grant funding and other sources.

Agricultural and Habitat Conservation Easements

Another agricultural preservation tool is the agricultural conservation easement, a voluntary program that places deed restrictions on specific properties restricting land use to only agriculture, for the life of the property. Such easements permit continuation of agricultural use, commonly subject to the provision that the land not be developed for more intensive use with a lower habitat value. This strategy is a part of DWR's Agricultural Lands Stewardship Workgroup's draft discussion paper and also is a part of the Conservation Framework of the CVFPP (DWR, 2012). Habitat conservation easements essentially restrict land use to only certain types of habitat, for the life of the property.

Conservation easements involve the transfer of certain, specified property rights. The landowner retains fee title ownership of the property and all the property rights that are not sold as part of the transaction. The provisions of conservation easements can vary depending on the objectives of the transaction parties. Generally, conservation easements commit the landowner to maintain the agricultural uses (or habitat values, for that type of easement) of the subject property. For example, a property that is in riparian habitat would typically be kept in that habitat under a conservation easement. All transferred rights, which become permanent binding limitations on the fee title ownership, are specified in the easement deed. The holder of the easement is normally given the right to access the property and verify that the easement provisions are being met.

Issues identified with conservation easements during the MUSR RFMP process include a lack of flexibility to allow farming methods to adapt to changing conditions. Therefore, agricultural conservation areas should be defined as rural areas negotiated and mutually agreed to as permanently suitable and designated private property(ies), which have been identified with

concurrence of the property owner(s) as utilized only for agricultural and/or farming purposes in exchange for fair value and forgoing development rights on the specified property.

The creation of agricultural conservation areas is a concept that has embraced the idea of the “sale of development rights.” These areas may not necessarily be pre-determined to flood in a large flood event and may include areas protected by a lower standard-of-performance levee system. Embracing this concept would help ensure that areas susceptible to high flood risk remain rural and in agricultural production. The benefits could be valued and paid-for in exchange for the designation similar to the Williamson Act, but which would be applied to eligible areas protected by the State Plan of Flood Control. Landowners eligible for this type of program could engage in long-term (or permanent) agreements for the sale of their development rights in exchange for yearly payments. These payments would encourage the current landowners to stay in business versus the one-time payment that could cause the landowner to stop farming and sell the land.

Landowner Incentive Programs

Some landowners with conservation interests may be more attracted to participating in incentive programs than to selling easements. The State and federal governments offer a variety of incentives, including legal and statutory incentives; market-oriented institutions; financial incentives; public tax incentives; and educational, technical assistance, administrative, and recognition incentives. A national review of these programs (Casey *et al.*, 2006) provides a useful economic and policy assessment of these incentive mechanisms. Some specific example programs are those managed by the U.S. Department of Agriculture’s Natural Resources Conservation Service and Farm Service Agency (such as the Wetlands Reserve Program and the Conservation Reserve Program) and the CDFW Landowner Incentive Program.

Three programs (CDFW’s Voluntary Local Program and Safe Harbor Agreement Program and the USFWS Safe Harbor Agreement Program) encourage landowners to enhance habitat for threatened and endangered wildlife, while maintaining viable agricultural operations. These programs allow landowners to remove the habitat enhancements with no penalties. These programs provide flexibility for landowners and flood managers but do not provide assurances of long-term habitat conservation.

Safe Harbor Agreements

A Safe Harbor Agreement is a voluntary agreement between any non-federal property owner(s) and the USFWS or the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (collectively, the Services) whereby performing actions that contribute to the recovery of listed species and fulfilling the conditions of the Safe Harbor Agreement, the property owner(s) will receive formal assurances from the Services that they will not require any additional or different management activities by the parties without their consent. A Safe Harbor Agreement allows neighboring landowners to join, establish a baseline and enjoy endangered species protections. Thus if a restoration project or any other occurrence results in an increase of listed species on a property, the landowner will not be subject to regulatory limitations. Additionally, at the end of the agreement period, participating property owners may return the subject property to the previous condition that existed at the beginning of the Safe Harbor

Agreement. This may be an attractive opportunity for property owners where operations are in potential conflict with a listed species.

Re-Investment in the Williamson Act

The Williamson Act is a voluntary program that provides reduced property taxes on qualifying agricultural lands in exchange for abstaining from commercial and residential land development. A large portion of the agricultural lands within the state and particularly in this Regions are covered under the Williamson Act and the act has been a valuable incentive in preserving agricultural lands. However, during State budget cuts in 2009, subvention payments (monies provided to local government agencies to compensate for lost property tax revenues) have been significantly reduced, leaving participating local agencies fiscally challenged or potentially unable to continue the program. Without this incentive, the agricultural community will be more prone to develop their lands, and some may be in flood prone areas. Reinstatement of subvention payments is needed to re-incentivize local agencies to continue this agriculture preservation resource.

Good Neighbor Policy

The Sacramento River Conservation Area Forum (SRCAF) adopted its Good Neighbor Policy on March 15, 2007. The Policy was adopted after a multi-year process involving many different interests. It focused on an effective communication process, monitored by the SRCAF, where neighboring landowners are expected to work cooperatively to identify concerns and resolve problems. This SRCAF Good Neighbor Policy (GNP) was set forth to outline an approach that all landowners (new, existing, and absentee) should follow in order to comply with the intent and spirit of the SRCAF Handbook. The goal of the GNP is to avoid negative impacts, address and resolve unavoidable impacts, and foster good communication and relationships among neighbors and communities. The GNP applies to land management activities within or affecting the Sacramento River Conservation Area, including changes in land use where habitat is actively developed, or develops naturally. The GNP does not apply to those cultural practices normally used in farming or habitat conservation operations or to the normal maintenance practices required of public entities for public safety, as long as those practices are undertaken within the law, and with reasonable consideration to prevent impacts to others. The existence of the GNP and adherence to it can provide a sound foundation to managing flood and conservation/land use issues in the Regions.

6.4.3. Strategies for Streamlining Flood Projects and Maintenance

As discussed previously, the concept of streamlining regulations is a key element that cuts across development of all project types: residential or commercial development, flood, and even restoration projects. The Sacramento River corridor is a rich but fragile ecosystem that is affected by numerous regulations designed to protect air quality, water quality, public health and wildlife. These standards are administered by many different agencies; and meeting these various regulations can be complex, time consuming and expensive. Compliance with these standards influences agriculture, flood control, water supply, and recreation and conservation restoration. A number of regulatory consistency/streamlining strategies are available to address:

permitting application and mitigation requirements; interagency consistency; and mitigation banking.

Corridor Management Plan

The Corridor Management Plan (CMP) approach involves developing a plan for improving flood management and ecological conditions long a corridor, at scales that are both manageable and implementable, and which are flexible enough to meet multiple needs. In the case of the MUSR, a CMP would build upon the vision and strategies developed during the RFMP process, moving them closer towards implementation. The CMP would incorporate the MUSR RFMP strategies for managing flood protection facilities, conveyance channels, floodplains, and associated uplands, and could include components such as a maintenance plan; a restoration plan; and policies for compatible land uses such as agriculture and recreation within the corridor. In addition to addressing habitat restoration and flood facility maintenance, CMPs can be a foundation for securing programmatic regulatory agency approvals for ongoing maintenance activities and habitat restoration. For MUSR, a CMP would build upon the coordination, collaboration, and cooperative working relationships developed during the RFMP between interested parties and stakeholders, State, federal, and local agencies, NGOs, maintenance districts, agricultural interests, and landowners,.

CMP development involves assessing the current biological and physical conditions of the proposed management plan coverage area in greater detail than with the RFMP. The information collected is used to create a mapped inventory of existing vegetation, hydrology, land uses, public land ownership and other relevant resource information. This baseline information is then used to identify localized facility maintenance needs, assess the probability of occurrence of special-status plants, fish, terrestrial wildlife and habitats, and identify restoration opportunities in the study area. Additional hydraulic modeling is often necessary to determine channel conveyance and sediment transport patterns, hydraulic impacts, channel and flow constrictions; and to identify opportunities to improve capacity and transitory storage in the system through the construction of setback levees, sediment removal, or other methods.

An inclusive planning process engages stakeholders, regulatory agency staff, and other interested parties to work with flood management agencies, maintenance districts, and resource and regulatory agencies in the project design process. Collaborating with biologists, hydrologists, and hydraulic modelers, the CMP team can determine an appropriate spatial arrangement of habitat types to be created and restored within a corridor in a manner that meets flood conveyance needs; considers adjacent land uses, hydraulic, hydrologic, regulatory and other constraints; minimizes ongoing maintenance needs; and maximizes habitat values.

By addressing what are often competing resource issues and stakeholder concerns on a regional basis, CMPs help meet regulatory mandates requiring maximum avoidance and minimization of project effects to sensitive resources. Additionally, CMPs may identify target areas for providing onsite compensatory mitigation for unavoidable impacts to sensitive resources such as wetlands and State-listed and federally listed species. CMPs thereby set the stage for programmatic approvals by State, federal, and local agencies, and provide the foundation for integrated, streamlined permitting processes.

CMPs provide a process for reevaluating and potentially restructuring existing flood management practices and policies implemented within a given management area to benefit and enhance the environment without compromising actions required by practices and policies. CMPs effectively support the objectives of the CVFPP in establishing an integrated management plan to reduce flood risk, improve ecosystem function, and create a more sustainable flood management system that allows for ongoing O&M of flood management facilities. DWR has initiated development of a CMP on a 20-mile long reach of the lower Feather River (from Yuba City to the Sutter Bypass). A CMP for DWR and/or LMAs in the region may be a strategy that could serve as a foundation for other aspects of regulatory compliance streamlining.

Advanced Regional Mitigation Banks

Advanced mitigation of flood management improvements provides a means of making flood maintenance less expensive and timelier by offering landowners a streamlined mitigation process in advance of project impacts. In addition, advanced mitigation offers potential ecological benefits. For instance, mitigating before the impact reduces the temporal loss of habitats. Further, pooling resources can often provide mitigation that is more ecologically meaningful by site selection, size, or regional association with other habitats and landscapes. A mitigation bank is a resource area that has been restored, established, enhanced, or preserved to a certain condition for the purpose of providing compensation for unavoidable impacts to similar resources. A mitigation bank is established when an entity undertakes restoration, preservation or enhancement activities under a formal agreement (bank instrument) with a regulatory agency establishing liability, performance standards, management and monitoring requirements and the terms of bank credit approval. Based on the spatial extent and other factors, each bank receives a certain amount or number of credits for use (or sale) to provide mitigation credits for projects that disturb similar resources as those covered by the bank. Traditionally, mitigation banks are used on a project by project basis with purchase of compensatory mitigation credits from the bank by a project sponsor that has need for these credits because a project will impact a resource. Mitigation banks may be third-party in nature, where the owner is responsible for developing and crediting the habitat with the regulatory agencies, as well as maintaining the mitigation lands in perpetuity. Banks may also be developed by partnerships of agencies and municipalities, with agreements in place for use of the credits and costs and management associated with development and maintenance of the bank. If project types and locations—as well as the types and approximate levels of impact—are reasonably foreseeable, then developing advance mitigation and/or using a bank is a good strategy for accelerating the project toward implementation. Section 6.2 describes DWR and Caltrans's Regional Advance Mitigation Planning (RAMP) approach to advanced mitigation, and RAMP is an example of a flood and infrastructure-focused effort to provide a method to achieve faster, less expensive, and better mitigation for unavoidable impacts associated with projects.

Regional Permitting

Traditional project-by-project environmental permitting has resulted in several shortcomings, both for project proponents and conservation interests. These shortcomings can include time-consuming negotiations for each project to identify, where required, suitable offsite mitigation areas as compensation for habitat losses, project delays, establishment of small, isolated restoration areas that are difficult to manage, and temporary losses in habitat while compensation

sites are restored. Several new regional permitting methods have been developed in the past 20 years to solve these permitting and conservation challenges, and local governments in California have been using these approaches to both permit land development and maintain healthy ecosystems. These methods include regional programmatic ESA Section 7 consultations, Regional General Permits for Clean Water Act (CWA) section 404 and River and Harbors Act (RHA) section 10; and NCCPs/HCPs. New methods to support these regional permitting approaches include CMS (Section 0) and RAMP (Section 6.2.2). Attachment 9G (Regional Permitting Options) to the CVFPP provides more detailed information about the types of flood management activities that could potentially be covered under regional permits; describes and evaluates several options for developing regional permits for the flood management system; and summarizes important environmental regulations that apply to flood management projects.

Regional General Permits (RGPs)

A Regional General Permit (RGP) is issued by a USACE district or division and authorizes a class of activities within a geographic region that are similar in nature and have minimal individual and cumulative environmental effects. RGPs may be used to collectively meet permitting needs for multiple projects, over longer planning horizons, while also consolidating mitigation and conservation efforts into larger, more viable conservation areas. Overall RGPs streamline the USACE permitting process by avoiding the need to obtain separate permits on a project-by-project basis. To qualify for authorization under an RGP permit, applicants must meet the general and special conditions established for that RGP. Once an RGP is issued, applicants can use the permit, if the stated conditions are met.

Section 404 of the Clean Water Act (CWA) prohibits the discharge of dredged or fill materials into waters of the United States without USACE authorization. Section 10 of the Rivers and Harbors Act of 1899 (RHA) requires USACE authorization for the construction of any structure or work in or over any traditional navigable waters of the United States. The USACE can develop an RGP under the authority of CWA section 404 (33 U.S. Code [USC] section 1344) and RHA section 10 (33 USC section 403), in accordance with provisions of *Regulatory Programs of the Corps of Engineers*, 33 Code of Federal Regulations (CFR) section 323.2(h) for activities that are substantially similar in nature and cause only minimal individual and cumulative environmental impacts. Additionally, the USACE must be in compliance with federal regulations, including those identified below, and documentation by USACE is required before issuance of the RGP:

- Federal and California Endangered Species Act (ESA)
- National Environmental Policy Act (NEPA)
- Section 106 of the National Historic Preservation Act (NHPA)
- Section 401 of the CWA (certification could be provided on a project-by-project basis if the RWQCB does not certify an RGP)
- Bald and Golden Eagle Protection Act (BGEPA)
- Fish and Wildlife Coordination Act (FWCA)
- Magnuson-Stevens Fishery Conservation and Management Act (MSA) for Essential Fish Habitat;
- Marine Mammal Protection Act (MMPA)

- Migratory Bird Treaty Act (MBTA)

Activity-Specific Programmatic Permitting

In scenarios where a similar activity will be implemented multiple times, developing some type of program level permitting can be an effective streamlining approach compared to repeating permitting processes each time the activity is undertaken. DWR is testing this approach with the Small Erosion Repair Program (SERP). The SERP is intended to provide a streamlined process for DWR to identify, obtain regulatory authorization for, and construct small levee repairs on levees maintained by DWR within the Sacramento River Flood Control Project (SRFCP) area. Several flood risk reduction features within the RFMP area are included in the SERP project area. (see <http://www.water.ca.gov/floodmgmt/fmo/msb/smallerosionrepairs.cfm#dpeir>) The SERP uses programmatic authorizations, issued by federal and state agencies that typically have regulatory authority over levee erosion repair projects, to streamline the process for implementing small erosion repairs in accordance with conservation-based design and monitoring standards established in the SERP Manual. Projects that qualify under the SERP are eligible to receive authorization within a shortened time frame because they are designed to minimize effects on fish and wildlife resources, including listed species, and to protect and enhance the existing aquatic and riparian habitats comprising the riverine corridor.

Authorizations streamlined under the SERP consist of Clean Water Act permits from USACE, ESA compliance with USFWS and NMFS, streambed alteration agreements from CDFW, and water quality certification with the RWQCB. For activities in the RFMP that are repeated numerous times, such as operations and maintenance or similar new infrastructure elements that are constructed in multiple locations, a programmatic permitting regime similar to the SERP could be beneficial. An LMA could use the SERP program as a model to coordinate with regulatory agencies to develop a process for streamlined approval for qualifying projects or activities.

Master Lake and Streambed Alteration Agreement (LSAA)

If the MUSR RFMP includes similar repeated activities that require a Lake and Streambed Alteration Agreement (LSAA) from CDFW (Fish & Game Code section 1600), and obtaining a LSAA is not included in a program similar to the SERP, there are options for obtaining an LSAA that would prevent the need to repeatedly apply for an obtain separate agreements for individual projects or activities.

A Master LSAA (Master Agreement) may be obtained to cover a large, multi-phased project consisting of smaller specific projects for which detailed project plans are not available at the time the SAA is applied for. The LSAA process would then be streamlined as each smaller future project is implemented. Master LSAAs can have durations longer than the 5-years typical of Standard Agreements.

Program EIR

Section 15168 of the State CEQA Guidelines describes the uses of a program EIR. A program EIR is typically considered when a series of actions that can be characterized as one large project are related either:

- Geographically
- As logical parts in the chain of contemplated actions
- In connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program
- As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects, which can be mitigated in similar ways

In addition, when information on future elements of the larger project is not sufficiently developed to support a project level EIR analysis, the future activities may be evaluated at a more general programmatic level using a program EIR.

When subsequent activities considered in the program EIR are ready for implementation, a checklist may be used to determine whether the environmental effects of the activity were covered in the program EIR. If it is found that the subsequent activity has no new effects not already identified in the program EIR, and no new mitigation would be required, the subsequent activity can be approved as being within the scope of the project covered by the program EIR, and no new CEQA document would be required. If there are new effects or new mitigation measures are needed, a CEQA document addressing the subsequent activity may focus solely on the new effects or mitigation that had not been considered before.

NCCPs/HCPs

As described earlier, NCCPs/HCPs are planning documents prepared by non-federal parties as part of an application for an incidental take permit for listed species, when take of such species may occur from projects or other activities (i.e., maintenance). An HCP assesses the impacts of a proposed action on species, proposes measures to monitor, minimize, and mitigate these impacts, and analyzes action alternatives. On approval of an HCP, the USFWS and NOAA issue an incidental take permit, which allows the non-federal party to legally proceed with an activity that otherwise may result in unlawful take of a protected species. An NCCP essentially is the California state equivalent of a federal HCP for species listed under the California Endangered Species Act (CESA).

While there are three NCCPs/HCPs that have planning areas that overlap with the MUSR RFMP boundary, these plans are limited in their ability to cover flood- and habitat-project related activities. Furthermore, there is no HCP that covers Tehama County. When projects are being developed for the Regions, use of an NCCP/HCP may be merited if there is sufficient project need and agreement and coordination between project sponsors can be attained.