

Table 2. Resource Assessment for River System Headwaters

Headwaters	Historic Threats and Losses	Current Threats and Conditions:	Goals and Objectives:
Mining Impacts	Little to no historic impact from mining activities.	None identified	None identified
Timber and forest management impacts	Limited timber harvest during Gold Rush period, most harvested areas recovering.	None identified	None identified
Water resource Development/hydropower impacts	Some water resource development primarily for livestock grazing, limited impacts.	None identified	None identified
Agricultural conversion and irrigation impacts	Intensive and largely uncontrolled grazing historically resulted in the removal of streamside riparian vegetation, downcutting of channels, significant increases in downstream sediment load, and dewatering of some montane meadows. Intensive stocking rates may also result in significant nitrate loading of receiving waters.	Some grazing currently occurring in Headwaters region; however grazing now tightly managed. In addition, legacy degradation of montane meadows and streams is still present.	Restore montane meadow hydrology by aggrading downcut streams. Actively plant degraded stream channels with riparian vegetation.
Urban and community development impacts	Very limited historic home site development.	Some recreational site (e.g., resort) development currently occurring in this region. Some loss of montane wetland, riparian, and riverine habitat.	Seek opportunities to restore degraded reaches of headwater streams. Improve buffer conditions along streams in proximity to developed areas.
Road development impacts	Historic trail and road development followed headwater streams resulting in some riparian loss and riverine habitat degradation. Highway development further degraded riparian and riverine habitats with road runoff potentially further affecting headwater stream water quality.	Road improvements and expansions currently being developed resulting in incremental losses and degradation of remaining riverine resources.	Identify areas where highway realignments have created opportunities for riverine habitat restoration. Develop bioengineering solutions to remediate potential road runoff pollution to riverine systems.
Flood protection, levee construction and/or floodplain modification impacts	Little or no historic flood protection or floodplain modifications in this region.	None identified	None identified

Table 3. Resource Assessment for River System Tributaries

Tributaries	Historic Threats and Losses	Current Threats and Conditions:	Goals and Objectives:
Mining impacts	Historic mining resulted in significant impacts on local waters. Hydraulic mining of placer deposits resulted in significant sedimentation of tributaries and receiving waters. Road building and excavation for hard rock mining also contributed to sediment loading in waters. Legacy contaminations by Mercury and/or Arsenic are probable in receiving waters throughout historic mining areas.	Current mining activities are minimal and limited to small scale “hobby” mines or a few large scale modern pit mining operations located in arid regions (e.g. Kern County).	Historic mining in the ILF area resulted in significant landscape-level alterations to the surface drainage system of the Coast Range, Sierra Nevada, and receiving waters all the way to the mouth of the San Francisco Bay. Given the scope of scale of past mining impacts the goals and objectives for this category should be limited to efforts to reduce or minimize potential contamination of receiving waters by legacy contaminants.
Timber and forest management impacts	Historic logging was significant during the Gold Rush Period resulting in widespread deforestation concomitant erosion and increased headwater and tributary stream sedimentation. Most areas are now naturally reforested and historic sediment load has either been captured in tributary reservoirs or flushed through system. Past forest management on public and private forest lands relied on a fire suppression model rather than a managed fire approach. As a result many public and private forest areas remain heavily overstocked with timber, often with significant ladder fuel concentrations. These conditions frequently result in catastrophic wildfire that ultimately results in significant property damage and sediment loading in receiving waters. Historic road building for logging has resulted in numerous stream crossings and potential erosional areas as well as frequently altering natural drainage patterns in the watershed. Many of these roads and crossings may be continuing to contribute sediment to receiving waters.	Some logging operations are still occurring in the tributary region and are primarily limited to private timber lands. Road building for logging operations are also currently limited. Best management practices currently employed minimize many effects on aquatic resources.	Decommission roads as appropriate and restore stream crossings and other wetland crossings. Restore natural drainage patterns in the watershed. Promote forest thinning and fuel treatments where appropriate to reduce risk of catastrophic fire.
Water resource Development/hydropower impacts	Significant development for water resources and hydropower occurred historically in this region. Numerous reservoirs and water conveyance facilities developed throughout the Sierra Nevada and to a somewhat lesser extent in the Siskiyou Mountains and Coast Range Mountains. Significant impacts to aquatic resources including loss of riparian habitat and fisheries habitat. Significant alteration of natural hydrologic patterns especially natural flood regimes necessary to sustain riparian habitats and other floodplain wetlands. This hydrologic alteration has also promoted additional wetland and riparian habitat conversion to agricultural land uses.	Current operations of water resource development and hydropower projects have improved over the historical levels in that operations have been modified to some extent to benefit riverine aquatic resources (especially fish). However, natural hydrologic regimes are still significantly altered. Continued operations still limit natural regeneration of downstream riparian habitats.	Restore degraded downstream riparian and riverine habitats, restore degraded tributary stream habitats. Identify and develop levee setback projects to expand riparian habitats and add to buffers along riverine systems.
Agricultural conversion and irrigation impacts	Water diversions from tributary streams historically degraded some riverine wetland systems in this region. However, agricultural conversion in this region is minimal. Intensive and largely uncontrolled grazing historically resulted in the removal of streamside riparian vegetation, downcutting of channels, significant increases in downstream sediment load, and dewatering of some smaller tributaries. Intensive stocking rates may also result in significant nitrate loading of receiving waters.	Currently moderate levels of livestock grazing still occur in this region and legacy degradation of some riverine systems by livestock is still present.	Restore streamside vegetation through active planting projects and/or through improved livestock management practices in combination with range improvements such as fencing, alternative water supply, etc. in order to reduce livestock use/access to riverine habitats.

Urban and community development impacts	Urban and community development is historically limited to small town sites in proximity to centers of mining activity. Post Gold Rush development radiated outward from these sites with dispersed impacts to riverine aquatic resources. Domestic groundwater wells may have dewatered some smaller perennial or intermittent drainage.	Currently urban development continues in this region, albeit, at a slower pace than in the recent past. Relatively small impacts still occurring to riverine resources (primarily lower order streams) exist.	Identify and develop stream restoration projects focusing on establishing protected stream corridors with adequate streamside buffers to eliminate potential deleterious effects from future development. Identify and remediate potential sources of pollution from existing urban development projects.
Road development impacts	Historic trail and road development Followed tributary streams resulting in some riparian loss and riverine habitat degradation. Highway development further degraded riparian and riverine habitats with road runoff potentially further affecting headwater stream water quality.	Road improvements and Expansions currently being developed resulting in incremental losses and degradation of remaining riverine resources.	Identify areas where highway Realignments have created opportunities for riverine habitat restoration. Develop bioengineering solutions to remediate potential road runoff pollution to riverine systems.
Flood protection, levee construction and floodplain modification impacts	Some historic flood protection projects in this region, primarily limited to areas in close proximity to historic hydraulic mining areas. Some loss of riparian habitat occurred as a result.	None identified	None identified

Table 4. Resource Assessment for River System Mainstem and Floodplains

Floodplain	Historic Threats and Losses	Current Threats and Conditions:	Goals and Objectives:
Mining impacts	Placer (i.e., dredger) mining of historic river channels and lower river terraces removed extensive riparian habitat resources and also eliminated other floodplain associated wetlands. Diversions of water from mainstem rivers for mining also resulted in significant aquatic resource degradation.	Although placer mining for gold has ceased, mining for aggregate resources continues. In stream aggregate mining now minimal but still present (e.g., Stony Creek and San Joaquin River). Some riparian habitat loss is still occurring and in stream activities are altering flow regimes and drainage patterns.	Identify and develop restoration plans for former mining areas focused on restoring channel plan form and restoring natural drainage patterns and riparian habitat features.
Timber and forest management impacts	Timber and forest resources not historically present in the floodplain region. Riparian forest impacts are discussed under other impact mechanisms.	None identified	None identified
Water resource Development/hydropower impacts	Water resource development and hydropower impacts are discussed in the Tributary region table above.		
Agricultural conversion and irrigation impacts	The combination of historic mining activities in the upper watersheds in concert with water resource development and flood control projects resulted in nearly complete conversion of riparian habitat resources to agricultural land uses. Diversions of water from mainstem tributaries for agriculture begin to alter low-flow conditions of riverine systems in this region. Groundwater overdraft for agriculture also began to dewater some smaller river systems (e.g., Cosumnes River and west side San Joaquin Valley drainages)	Conversions of riparian habitats to agriculture are currently minimal; however, irrigation diversion and groundwater pumping continue to affect riverine habitat function.	Retire less productive farmland within the floodplain and restore to riparian habitat and other floodplain wetlands. Best accomplished in concert with levee setback projects.
Urban and community development impacts	Urban and community development impacts were significant in the vicinity of mainstem valley rivers. Many smaller streams were channelized in the process. Urban runoff altered natural hydrologic patterns and contributed pollutants to receiving waters.	Urban and community development continues in this region. Impacts to riverine resources are still occurring at low levels.	Identify and develop stream restoration projects focusing on establishing protected stream corridors with adequate streamside buffers to eliminate potential deleterious effects from future development. Identify and remediate potential sources of pollution from existing urban development projects.
Road development impacts	Historic road development occurred mostly outside of the floodplain due to historic flood conditions prior to development of upstream reservoirs. Losses of riverine aquatic resources limited to bridge crossings.	Currently there are some incremental losses of riverine resources occurring from road realignment, widening, or bridge retrofits.	Identify and develop stream restoration projects focusing on establishing protected stream corridors with adequate streamside buffers. Identify and remediate potential sources of pollution from road runoff.
Flood protection, levee construction and floodplain modification impacts	Extensive historic impacts to riverine resources from flood protection projects. Levee construction and bypass operations significantly altered function of floodplain wetlands, especially riparian habitat and natural flood basin wetlands.	Current flood protection projects continue to impact riverine resources, especially riparian habitats (e.g., Natomas Basin). Current Army Corps of Engineers regulations regarding levee vegetation may result in additional losses of remnant riparian habitat.	Identify and implement levee setback projects to restore floodplain habitats adjacent to the active channel of mainstem rivers. Retire agricultural land within the leveed flood control system and restore to riparian habitat.