

# Tuolumne River restoration strategies

Rivers are resilient ecosystems with enormous capacity for self-rejuvenation. However, given that land-use practices and water regulation and diversion will continue, the river cannot recover in a reasonable timeframe without help. The Restoration Plan recommends several strategies to initiate recovery, such as filling mining pits, introducing spawning gravels, lowering selected floodplains to allow inundation, and re-planting native riparian vegetation. Equally important, flood and gravel management will help re-establish processes to maintain restored areas and improve other areas.

The Restoration Plan recommends general restoration strategies for different reaches along the river, as well as specific restoration projects within those reaches. Inherent with any restoration plan of this scale is some degree of uncertainty regarding the effectiveness of specific restora-

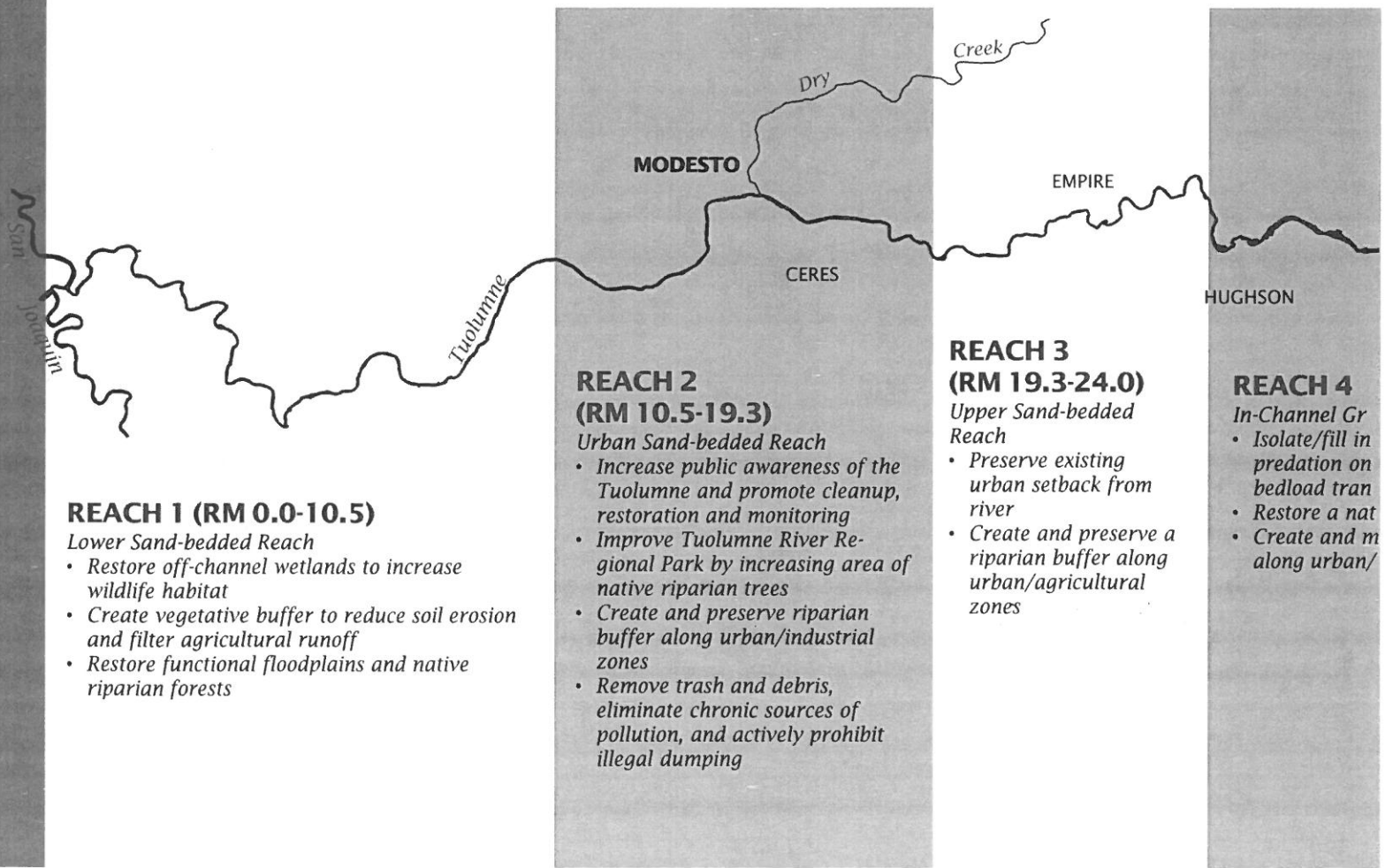
tion actions. Therefore, an adaptive management program would require 1) monitoring restoration sites, 2) evaluating restoration success against desired conditions, and 3) improving restoration strategies. This will ensure progress toward recovery goals.

Implementation of any restoration project will be subject to prior environment review by local, state, and federal regulatory agencies. The TRTAC participants recognize that decisions affecting the Tuolumne River are influenced by diverse policies relating to land use, water supply and use, water quality, flood control, fish and wildlife, and recreation, and are not governed solely by habitat considerations. Additionally, the TRTAC recognizes the importance of cooperation and participation from private landowners, the local business community, and the general public.

## Long-term restoration recommendations

### SAND-BEDDED ZONE (RM 0.0 TO RM 24.0)

- Restore floodway capacity to 15,000 cfs or greater above Dry Creek and 20,000 cfs or greater below Dry Creek
- Reduce urban and agricultural encroachment to create/maintain a 500-2,000 ft or greater floodway width
- Remove rip-rap and berms where feasible to restore floodplains and to allow migration within the floodway
- Seek conservation easements and/or land acquisitions (especially of flood-prone lands) from willing landowners
- Remove exotic plants within riparian corridor and replant native species
- Secure protection for existing mature valley oaks and Fremont cottonwoods
- Improve water quality by managing urban, agricultural and industrial runoff into the river and into Dry Creek



#### REACH 1 (RM 0.0-10.5)

Lower Sand-bedded Reach

- Restore off-channel wetlands to increase wildlife habitat
- Create vegetative buffer to reduce soil erosion and filter agricultural runoff
- Restore functional floodplains and native riparian forests

#### REACH 2 (RM 10.5-19.3)

Urban Sand-bedded Reach

- Increase public awareness of the Tuolumne and promote cleanup, restoration and monitoring
- Improve Tuolumne River Regional Park by increasing area of native riparian trees
- Create and preserve riparian buffer along urban/industrial zones
- Remove trash and debris, eliminate chronic sources of pollution, and actively prohibit illegal dumping

#### REACH 3 (RM 19.3-24.0)

Upper Sand-bedded Reach

- Preserve existing urban setback from river
- Create and preserve a riparian buffer along urban/agricultural zones

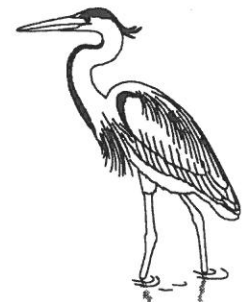
#### REACH 4

In-Channel Gr

- Isolate/fill in predation on bedload tran
- Restore a nat
- Create and m along urban/

## RIVER-WIDE RESTORATION GOALS

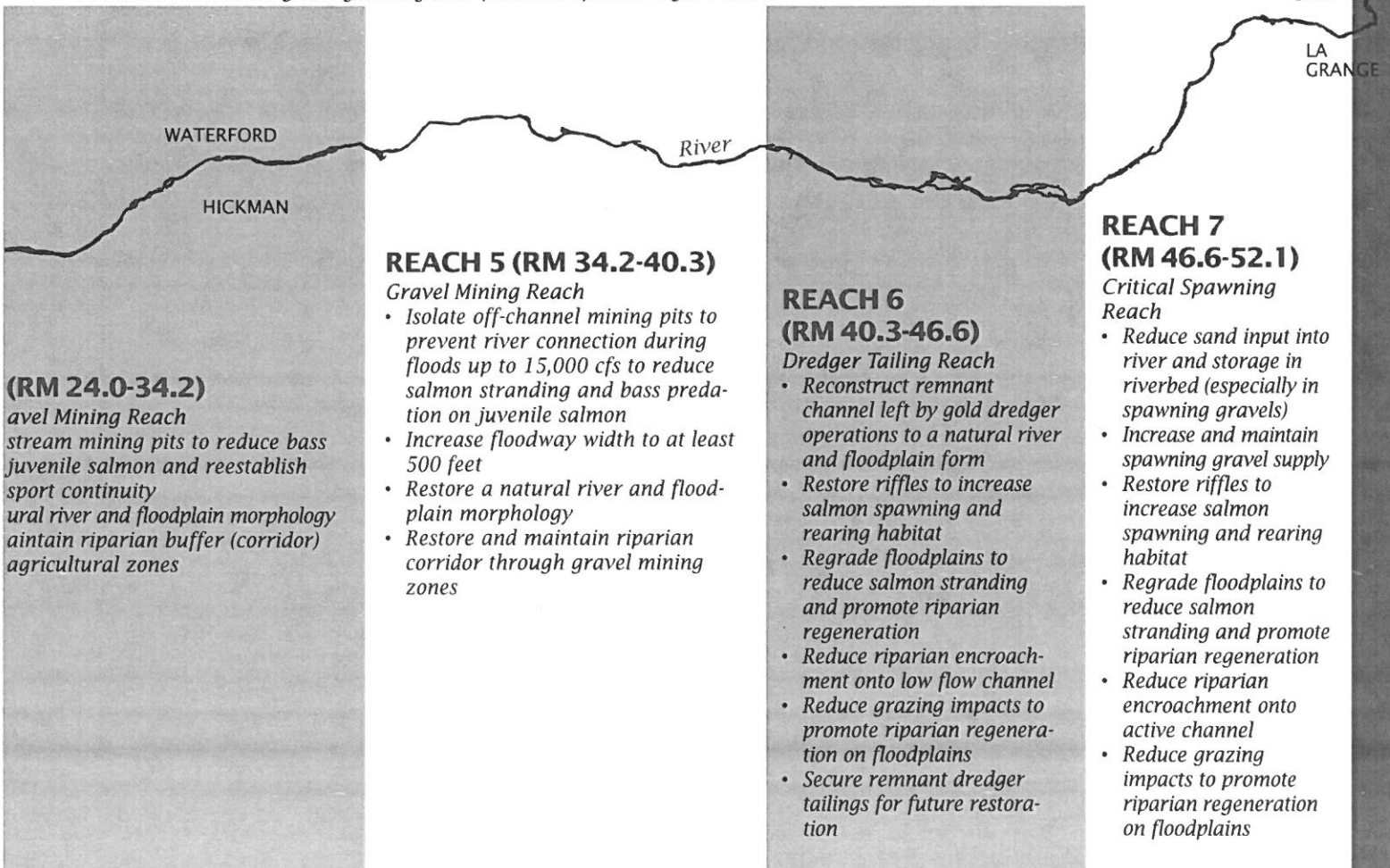
- Chinook salmon habitat maintained by natural processes, sustaining a viable, naturally reproducing chinook salmon population
- Adequate quantity of high quality gravel, maintained by periodically replacing gravels transported downstream by high flows
- A dynamic river channel, maintained by floods of variable magnitude and frequency that periodically initiate critical channel processes
- A continuous river floodway and riparian corridor from La Grange Dam to the confluence with the San Joaquin River
- Increased extent of naturally regenerating native riparian stands and decreased extent of exotic plants
- Adaptive management program that continually reviews and refines restoration and management activities, and addresses areas of scientific uncertainty that will improve our understanding of river ecosystem processes
- Improved water quality through urban and agricultural runoff management programs
- Increased public awareness and involvement in the Tuolumne River restoration effort



Great Blue Heron

## GRAVEL-BEDDED ZONE (RM 24.0-52.1)

- Increase gravel supply throughout the zone and increase the frequency of gravel movement
- Reduce fine sediment supply and storage
- Restore floodway capacity to 15,000 cfs or greater
- Reduce agricultural and mining encroachment to create/maintain a 500 ft or greater corridor width
- Remove rip-rap and berms where feasible to restore floodplains and to allow migration within the floodway
- Manage flood control releases to initiate bed movement and other dynamic channel processes
- Restore a continuous corridor of native riparian vegetation
- Improve habitat quality of off-channel wetlands
- Seek conservation easements and/or land acquisitions (especially of flood-prone lands) from willing landowners
- Remove exotic plants within riparian corridor and replant native species
- Introduce alternative grazing strategies to promote riparian regeneration



### (RM 24.0-34.2)

**Gravel Mining Reach**  
 Isolate stream mining pits to reduce bass juvenile salmon and reestablish sport continuity  
 Restore natural river and floodplain morphology  
 Maintain riparian buffer (corridor)  
 Restore agricultural zones

### REACH 5 (RM 34.2-40.3)

#### Gravel Mining Reach

- Isolate off-channel mining pits to prevent river connection during floods up to 15,000 cfs to reduce salmon stranding and bass predation on juvenile salmon
- Increase floodway width to at least 500 feet
- Restore a natural river and floodplain morphology
- Restore and maintain riparian corridor through gravel mining zones

### REACH 6 (RM 40.3-46.6)

#### Dredger Tailing Reach

- Reconstruct remnant channel left by gold dredger operations to a natural river and floodplain form
- Restore riffles to increase salmon spawning and rearing habitat
- Regrade floodplains to reduce salmon stranding and promote riparian regeneration
- Reduce riparian encroachment onto low flow channel
- Reduce grazing impacts to promote riparian regeneration on floodplains
- Secure remnant dredger tailings for future restoration

### REACH 7 (RM 46.6-52.1)

#### Critical Spawning Reach

- Reduce sand input into river and storage in riverbed (especially in spawning gravels)
- Increase and maintain spawning gravel supply
- Restore riffles to increase salmon spawning and rearing habitat
- Regrade floodplains to reduce salmon stranding and promote riparian regeneration
- Reduce riparian encroachment onto active channel
- Reduce grazing impacts to promote riparian regeneration on floodplains