

Spawning Gravel Introduction, Tuolumne River, La Grange

(AFRP Annual Work Plan 2000 A-13)

Cooperator: California Department of Fish and Game (DFG)
Region 4
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Scope of the Project -

The purpose of the project is to restore the course sediment supply to the Tuolumne River by introducing clean gravels into the river between La Grange Dam and Old Basso Bridge. Increased and improved chinook salmon spawning habitat can be expected.

This project, implemented in phases, would distribute a large volume of gravel (approximately 25-30,000 cubic yards) at key sites within the upper 4 miles of anadromous salmonid habitat on the Tuolumne River. Clean, sized river run gravels, purchased from local sources, would be transported and placed into or on the bank of the river at several appropriate sites. The gravel mixture would be sized smaller than the gravel currently existing on the bed surface and appropriate for salmon spawning use. The project assumes gravel movement over time. The gravel would mobilize, deposit as bars and spawning habitat, and redeposit over time. All the gravel placed during the project would be moved downstream by the flow of the Tuolumne River, mimicking the natural process of course sediment transport. The project would provide a gravel source so that the river would be dynamic (transports gravel) but with a roughly constant in stream storage (equilibrium).

Gravel addition in this reach is planned for multiple phases. Phase I added approximately 12,500 cubic yards below the La Grange Bridge in 1999. Monitoring is presently on-going. This project constitutes Phase II and will add gravel above and below the old La Grange Bridge over the course of a two to three year period. Matching funds will be provided through the Tracy Delta Pumps mitigation agreement over a two year period. Based on monitoring of these projects and related studies, a continued, maintenance program of annual gravel addition would then be developed to replenish gravel transported out of the area by existing flows.

The California Department of Fish and Game is the primary partner for implementation of this project. The DFG has the clerical, fiscal and contractual personnel necessary to support the biological and technical experts administering this project. The DFG have also taken into

consideration information and recommendations obtained from the watershed analysis being conducted by the Tuolumne River Technical Advisory Committee (contracted consultants) and other sources to complete this project. Funding for Phase I of this project has been provided by CALFED, and construction was completed in 1999.

The land adjacent to the gravel introduction sites is owned by Stanislaus County and the State of California. Access would be from county owned land and would pose no problem; unimproved "roads" already exist. Long term plans for the property adjacent to the river include a "river parkway" and recreational area which would insure long term access. Permitting for the project would be completed by DFG employees. A Negative Declaration is the appropriate documentation.

Justification and Benefits of the Project.

Construction of La Grange Dam in 1893 ended coarse sediment supply from the Tuolumne River watershed upstream of the town of La Grange. Since its construction, sediment transported during high flows have come from the bed itself or limited floodplain deposits. Elimination of upstream sediment supply has caused bed particle coarsening in the spawning reach near La Grange. This deterioration of salmon spawning habitat has been identified in the CALFED process as a primary stressor of salmon and steelhead trout. Gravel supplies are a critical part of salmonid restoration efforts and long-term maintenance of these gravels is necessary. This project would mimic the natural process of coarse sediment supply and transport and would help increase and improve degraded spawning habitat in the upper reach of the designated spawning area (Fish and Game Code 1505) heavily used by fall-run and late-fall-run chinook salmon and steelhead. The size mix of gravel will also provide spawning material for resident rainbow trout.

Gravel replenishment projects can produce direct and immediate benefit to returning adult salmon. Use of the replenished areas by adult spawners will be measured beginning the spawning season following the gravel addition. Although the results are not guaranteed, similar gravel replenishment projects on the Merced River have resulted in immediate use by spawning adults. Monitoring of physical attributes of the channel will provide a measure of the increased spawning habitat available. The duration of the benefit of gravel addition has not been quantified. However as natural transport moves gravel from the introduction site it will be re-deposited in riffles downstream, improving the functionality of the river system for anadromous salmonids as well as other riparian functions.

As identified in the Revised Draft Restoration Plan for the AFRP (1997) this project supports Tuolumne River Action 2 and 6, both high priority actions and a high priority watershed. Additionally, this project provides a potential location for mitigation of Tracy Pumping Plant operations (CVPIA 3406 (b)(4)), beyond the existing mitigation agreement, and implements CVPIA 3406(e)(6).

Monitoring and Data Evaluation

The two objectives of this project would be to reestablish substantial in stream storage of spawning sized gravels, and to maintain this storage by adding gravels into the river at a rate roughly equal to in stream transport during high flow events. Monitoring and data evaluation would determine and evaluate whether these objectives were being satisfied by the proposed activities. For example, if the monitoring plan documents that in-stream storage decreases, then the yearly gravel introduction volume would need to be increased accordingly.

Three physical monitoring techniques would be used:

- Cross sections surveys: Several (2-4) cross sectional surveys would be taken through the introduction site before spawning gravel is added to the site to determine baseline information. In addition, several (2-4) cross sectional surveys at appropriate places downstream and a longitudinal survey of the reach would be taken. This information would provide the pertinent baseline hydrological information necessary to adequately, answer the monitoring objectives. Subsequent cross sectional surveys at these same places immediately after gravel placement and 1 and 2 years after project construction would document changes in morphology (overall gain or loss of gravel storage) at each introduction site. Spatial differences in morphological adjustment would be evaluated by comparing trends in cross sections in the downstream direction (e.g., are upstream reaches degrading and downstream reaches aggrading with gravel). Cross sections would be the primary technique to evaluate changes in gravel storage year to year.
- Tracer gravels: Tracer gravels (painted gravels) would be placed in gravel introduction deposits to document bed mobility thresholds and travel distance during high flow events. This technique would provide addition information to meet the monitoring objectives.
- Scour chains or cores: Either scour chains or cores would be placed in gravel introduction deposits to document the depth of gravel scour and redeposition during high flow events (gravel flushing).

The Tuolumne River Technical Advisory Committee (TTAC) has established various monitoring programs for the Tuolumne River independent of this project. Bedload transport sampling and reference cross sectional surveys on the Tuolumne River have been taken and will continue to be taken by several consulting or public agencies. Several of these monitoring programs are being funded by CALFED and the Anadromous Fish Restoration Program is funding a coarse sediment management study (FY 2000). This information will be available to supplement the monitoring of the La Grange gravel addition project. Conversely, inferences from monitoring this project can be used to refine a long-term sediment management plan. Utilizing all monitoring information available would provide an estimate of gravel transport as a function of discharge and would be used to help quantify how much gravel should be introduced into the Tuolumne River on a yearly basis.

Biological monitoring of the annual fall-run chinook salmon escapement is currently the responsibility of DFG's Region 4 personnel. DFG is required under FERC License 2299 to annually estimate and monitor the adult chinook salmon escapement in the Tuolumne River. Data currently gathered includes (a) a mark/recapture study to estimate population size, fish lengths and sex, (b) scale and otolith sampling to age fish and estimate hatchery contributions, and (c) estimation of the number and temporal distribution of redds per each riffle.

These escapement surveys will continue and this data would be utilized to evaluate the biological changes associated with the gravel introductions. Redd mapping of the affected gravel bars (riffles) would also be conducted to help evaluate the biological impacts.

Work To Be Performed and Deliverables -

Task 1. Obtain all necessary permits and CEQA Documentation. Work will be done by DFG staff in coordination with FWS NEPA compliance staff. By September 1, 2000 the following permit applications and CEQA Negative Declaration will be submitted to the appropriate agencies:

- 1) DFG 1600 Agreement (no fee)
- 2) State Lands Permit (\$1850 fee)
- 3) Reclamation Board (no fee). Note that a HEC-2 model may be necessary as part of the permitting process. If required, a DWR, San Joaquin District engineer will complete the work under an Interagency Agreement. The \$2000 cost for the model will come from the project's contingency funds.
- 4) USACOE Nationwide Permit (no fee)
- 5) RWQCB Water Quality Certification (\$500 fee)
- 6) CEQA and CESA compliance (\$1250 fee to DFG as the lead agency)
- 7) Stanislaus County (an informational letter to the Planning Department will be submitted).

In addition, the local land owners will be contacted for written permission for access across their land. A town meeting was held in La Grange in the fall of 1998 to inform the citizens about the project and to answer their questions. A follow-up town meeting to inform citizens of the progress of this project will be scheduled before June 2001.

Schedule: September 2000 through December 2000

- Deliverables: (1) Copies of the draft permits submitted to the agencies; September 1, 2000
(2) CEQA documentation submitted to the State Clearinghouse; 9/30/00 (3) Final copies of all permits; December 31, 2000.

Task 2. Complete all bid packages/contracts necessary to purchase construction material

DFG staff will develop specifications and prepare a bid package for purchase of necessary materials (gravel), open bids, and complete a contract for the purchase of approximately 10,000 cubic yards of gravel per year. Standard State contracting procedures will be used.

Schedule: September 2000 through June 2002

- Deliverables: (1) Copy of the bid package and successful bid; October 1, 2000 and 2001.

Task 3. Monitoring.

DFG staff in conjunction with DWR San Joaquin District, will modify the existing interagency agreement for Phase I physical monitoring. The amendment will define the monitoring responsibilities to be completed by DWR staff for Phase II. It is anticipated that the monitoring and evaluation contract will include Channel cross sections, Tracer gravel monitoring and Scour chains or cores as described above. Additional monitoring may also be completed under the contract. DFG staff will conduct escapement surveys as required under FERC License 2299 for biological monitoring.

Schedule: Physical Monitoring: September 2000 to December 2000 (for modification of the Interagency Agreement). Note that the monitoring will take place over three years: 2000 - 2002.

- Deliverables: (1) Monitoring plan; January 1, 2000 (2) Interagency Agreement amendment; December 31, 2000 (3) Final Report and Recommendations; June 30, 2003.

Biological Monitoring: Escapement surveys will occur annually from October through December for at least three years following the gravel placement.

Deliverables: Escapement Survey Reports will be produced by September 1 the following year, respectively.

Task 4. Construct project.

The DFG R-4 Habitat Crew will first secure an access road(s) to the site and then will place approximately 10,000 cubic yards of spawning sized gravels (1/4 inch to 6 inch) into the Tuolumne River within the four mile reach upstream and downstream of the Old La Grange Bridge per year for a two to three year period. If the additions are done over a three year period, it is anticipated that placement of gravel would likely be performed in two of the three years, allowing for one evaluation year if monitoring suggests it is appropriate. Gravel from local sources would be purchased, transported and placed in the addition sites. Gravel addition sites selection would be dependent upon their biological potential to support spawning, geomorphic and hydrological conditions, access and their overall state of implementability in the year of addition.

Schedule: September 2000, 2001 & 2001

Deliverable: A written summary (including final costs) and a short video or photo essay describing the project construction; October 30, 2000 & 2001.

Schedule Summary

| TASK | DESCRIPTION | QUARTER TO 9/00 | QUARTER 10-12/00 | QUARTER 1-3/01 | QUARTER 4-6/01 |
|------|----------------|-------------------|------------------------------|--------------------------|----------------|
| 1 | Permitting | X | X | | |
| 2 | Materials Bids | | report | | |
| 3 | Monitoring | | IA Ammend-ment / bio monitor | Physical Monitoring Plan | <monitor> |
| 4 | Construct | X | report | | |
| | | QUARTER TO 9/01 | QUARTER 10-12/01 | QUARTER 1-3/02 | QUARTER 4-6/02 |
| 2 | Materials Bids | | report | | |
| 3 | Monitoring | Escapement Report | <monitor> | <monitor> | <monitor> |
| 4 | Construct | X | report | | |
| | | QUARTER TO 9/02 | QUARTER 10-12/02 | QUARTER 1-3/03 | QUARTER 4-6/03 |

| | | | | | |
|---|------------|-------------------|-----------|-----------|---|
| 3 | Monitoring | Escapement Report | <monitor> | <monitor> | <monitor> Final report and recommendations |
|---|------------|-------------------|-----------|-----------|---|

Budget and Cost-share

The following costs are associated with this project.

| | Direct Labor Hours | Direct Salary Benefits | Admin. @ 18.3% ^{/A} @25% | Service Contract | Acquisition | Miscellaneous | TOTAL (By Fund) |
|---|--|----------------------------------|---|-----------------------------------|---|--|---|
| Monitoring Phase 2 | 80 ES III | 2,893* | 14,721^{/A} | 68,000^{/A} | | | 82,721^{/A} 2,893* |
| Permits Phase 2 | 160 ES III 160 OA 2 | 5,786* 3,352* | 900 | | Permit Fees 3,600 | | 4,500 9,138* |
| Construction Phase 2 | 80 HS 80 F&W Asst. 2 160 Temp. | 2,191* 1,617* 3,360 | 27,090 19,632^{/A} | | Up to 20,000 yd. processed material 65,000 87,647^{/A} | Tractor Rental (20,000/yr) 40,000 | 135,450 107,279^{/A} 3,808* |
| Reporting | 160 AFB | 2,809* per yr. X 3 yr | | | | | 8,427* |
| Contingency | | | | | | 50,000 | 50,000 |
| TOTAL ^{/A} AFRP *DFG Tracy | | 24,266* 3,360 | 34,353^{/A} 27,990 | 68,000^{/A} *** | 87,647^{/A} 68,600 | 90,000 | 190,000^{/A} 24,266* 189,950 |

ES III - Environmental Specialist III
 AFB - Associate Fishery Biologist
 OA 2- Office Assistant
 HS- Habitat Specialist
 F&W Asst - Fish and Wildlife Assistant

* in-kind - CDFG
^{/A} AFRP funds
 Tracy Funds- no mark

The majority of project costs will be for the purchase, processing, and transporting of materials. Phase 2 introduction would utilize screened gravels (likely dredger tailings) from nearby sources.

The budget proposed is estimated based on best available information at this time. Costs may vary when actual work begins or contracts are developed. There are no O&M costs associated with this project.