This initial study and negative declaration has been prepared by the California Department of Water Resources, Northern District. Copies are available at the DWR Office at 2440 Main Street, P.O. Box 607, Red Bluff, CA 96080. The contact person is Doug [illegible]ton, Senior Engineer, Environmental Engineering Section at ([illegible]) 527-6530. Copies are also available at the DFG Office at 601 Locust Street, Redding, CA 96001.

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INITIAL STUDY

I. INTRODUCTION

The Sacramento River between Keswick Dam and Cottonwood Creek has been one of the most prolific producers of salmon and steelhead trout in California. However, this extremely productive spawning and rearing habitat has experienced large-scale degradation in the past 45 years, due partly to the blockage of stream gravel migration by Shasta and Keswick Dams and reduced stream bank erosion corresponding to a reduction in peak flows. Gravel mining, bank protection and levee construction have also contributed to a reduction in streambed gravel. High flows since dam construction have moved spawning-sized gravels downstream at an average rate of about one-half mile per year. This has left the upper 30 miles below Keswick Dam either deficient in spawning gravels or with large-sized gravels of marginal spawning quality.

This continuous and unreplenished downstream gravel movement has contributed to the decline of all anadromous fish using this area. The fall and late fall chinook salmon runs have dropped to around 50 percent of their historic levels, the winter run to less than one percent, and the once predominant spring run to only a few hundred. The steelhead population has declined to about a tenth of 1966 levels.

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Winter run chinook salmon were placed on the State endangered species list in 1989 and were recently placed on the federal threatened species list on an emergency basis. Most winter run spawning occurs in the upper river near Redding, where presently the quantity of suitable spawning gravels is insufficient and the quality marginal.

The few areas that contain suitable gravel and water velocity are overused. The spawning redds (nests) of one race are frequently dug up by the subsequent spawning run.

II. FISHERY RESTORATION PLANNING WORK

The recently published "Upper Sacramento River Fisheries and Riparian Habitat Management Plan" (Resources Agency, January 1989) addresses 22 anadromous fishery problems. The estimated cost of the overall Fisheries Restoration Plan is approximately $185,000,000. The recommended solution to gravel degradation is to place additional spawning gravels in the river at several suitable locations. This was the third highest priority action recommended. The overall plan is to place 1,000,000 cubic yards of spawning gravels in the river over a ten year period, at an estimated cost of $12,000,000.

The Departments of DWR and DFG have agreed to begin the urgently needed spawning gravel restoration work using funds available from the Delta Pumping Plant Fish Protection Agreement. This agreement was formulated to provide a means of offsetting the

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impacts of constructing additional water intake pumps in the southern delta. The Delta Pumping Plant Fish Protection Advisory Committee was formed to direct this fishery mitigation work.

The Advisory Committee has recommended and the Departments have approved placing 100,000 cubic yards of spawning gravel in the upper river between Keswick Dam and Cow Creek. This project, which is considered to be Phase I of the total gravel restoration effort, would be started in the summer of 1990 and completed within two years. The estimated cost is $1,650,000.

This initial study and negative declaration covers only the planning and construction activities related to placing the initial 100,000 cubic yards of gravel in the river. Based on the results gained from this prototype project, a management plan would be prepared for placement of up to 1,000,000 cubic yards of spawning gravels over a 10-year period in a longer reach of the upper river.

The Departments (DWR and DFG) are being aided by a subgroup consisting of USFWS, USBR, SRB and the Central Valley Region Water Quality Control Board (RWQCB). DWR was selected as the lead agency in conducting this project. Thirty-four potential sites were initially identified based on the following criteria: (1) proximity to Keswick Dam, (2) existing access, (3) location above and close to present, successful spawning riffles, and (4) low flood risk (i.e., areas that have high banks or good

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development setbacks, or are unpopulated). These original 34 sites have been reduced to nine for final planning purposes.

DWR consulted with NMFS, USFWS and DFG at potential restoration sites on March 9, 1990, and decided on instream work windows (timeframes) for gravel placement. The windows are September 15 to October 15 at the Salt Creek site and September 1 to October 15 at the Tobiasson and Shea Sand and Gravel sites. Gravel at these sites would be placed against banks where it would wash in at moderate to high flows. Gravel would be spread in the main channel at the remaining six sites during the months of January, February and March. There are specific criteria that must be met for individual sites, but none that would add substantially to the cost of the project. The April 3, 1990 follow-up letter on the winter run consultation is included as Attachment 1.

III. Past Restoration Work

Two small gravel restoration projects have been completed downstream of Keswick Dam within the last year and a half. In 1988, DFG placed 16,000 cubic yards at the mouth of Salt Creek about one and one-half miles below Keswick Dam and 8,000 cubic yards downstream of Keswick Dam on the south bank in 1989. USBR funded both of these projects, which cost $250,000 and $200,000, respectively. The Salt Creek gravel has been monitored by USFWS. Spawning gravel placed at this location has moved one-half mile downstream and all the way across the river bottom. It has

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provided a large area of good quality spawning habitat which fish are using. The gravel at Keswick Dam has not moved because flows have been unusually low since its placement. However, when it moves it will be easy to monitor because it contains 25 percent white tracer rock.

IV. Continuation of Restoration Work - Initial Year

The main elements of the current gravel restoration planning work are placement site identification, right-of-way acquisition, site surveying, flood risk determination, analysis of environmental impacts, acquisition of required permits, and contract preparation.

Nine sites between Keswick Dam and Clear Creek have been selected for restoration work during 1990 and 1991. Surveying at these sites has been completed to determine the gravel volumes that can be placed at each site and to insure that gravel will be placed at an elevation lower than the water level at normal low flows. This surveying will be the basis of future monitoring efforts to detect gravel movement and use. Copies of the USFWS monitoring proposal are available.

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V. Description of Initial Project Sites

During the period from September 1990 to April 1992, 100,000 cubic yards of spawning gravels would be distributed among nine sites in the Sacramento River between Keswick Dam and Clear Creek. These sites named in downstream order are:

1. Salt Creek below Keswick Dam. Sixteen-thousand cubic yards of gravel were placed here on the south bank of the river DFG in 1989. In the proposed project, 10,000 to 20,000 cubic yards of gravel will be placed here using dump trucks and a rubber-tired tractor. The work window is between September 15 and October 15.

   Access would be by Highway 299W, Iron Mountain Road, the USBR railroad grade that runs parallel to Middle Creek Road, across the Redding Pedestrian Trail and down a dirt road to the site. Between 500 and 1,000 truck loads of gravel would come to the site at a maximum rate of eight per hour. The trucks would begin arriving about September 1. They would not travel through any residential areas. Up to 5,000 cubic yards of gravel would be stockpiled at this site.

2. Diestelhorst site just downstream of the railroad trestle. This south bank site would receive up to 2,000 cubic yards. The gravel would be graded under the low-flow water surface elevation corresponding to about 3,000 cfs. The work window is between January 1 and March 31.

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Access would be by Highway 44, Market Street and Riverside Avenue. One hundred truckloads of gravel would be required at a rate of 30 per day for four days (one week). Trucks would travel through the City of Redding and a mixed residential/business neighborhood along Riverside Drive. CalTrans trucks already travel this route, so residents are accustomed to truck traffic.

3. Market Street site at the Market Street bridge. Between 5,000 and 10,000 cubic yards of gravel would be placed on the south bank just upstream and downstream of the bridge, in the same way and at the same time as at Diestelhorst.

Access would be along the same route as for Diestelhorst. Between 250 and 500 truckloads of gravel would be brought to the site at the rate of thirty trucks per day.

4. Highline site at the sewer line crossing. This north bank site would take up to 10,000 cubic yards of gravel. Access would be along Highway 44, Market Street and Park Drive. Five hundred truckloads of gravel would arrive at the site, at the maximum rate of 30 trucks per day, during one month. Trucks would pass a trailer park here, but the City of Redding already uses this road to bring equipment in. A sign warning trailer park residents of truck traffic would be placed at the entrance to the park, and residents would be notified of the project. Up to 5,000 cubic yards of gravel would be stockpiled at this site.

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5. Redding Riffle site near the Posse Grounds. Up to 10,000 cubic yards of gravel would be placed at this south bank site from January through March. Access would be by Highway 44 and Auditorium Drive. Five hundred truckloads of gravel would arrive at the site, at a rate of 30 trucks per day, during one month. Trucks would travel through a parking lot next to the Civic Auditorium. Traffic to the nearby boat ramp may be temporarily detoured through the Posse Grounds. Approximately 5,000 cubic yards of gravel will be stockpiled at this site on the north edge of the unpaved Posse Grounds parking lot.

6. Turtlebay West site upstream of the entrance to the spawning channel. This south bank site would accommodate as much as 10,000 cubic yards of gravel in the same window and manner as at Diestelhorst. Access would be the same as for the Redding Riffle site. Five hundred truckloads of gravel would arrive at the site, at a rate of thirty trucks per day, during one month. Three thousand cubic yards may be temporarily stockpiled at this site.

7. Turtlebay East site around the Highway 44 bridge abutment. This east bank site would take as much as 10,000 cubic yards of gravel in the same window and manner as at Diestelhorst. Access would be along Cypress Avenue and Rechelli Lane. This route runs through a long residential neighborhood. Five hundred trucks would arrive at this site at the much-reduced maximum rate of one every hour, totalling ten trucks per day.

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Therefore, 50 working days, or two and one half months including weekends would be required. Trucks would come to the site throughout most of the January through March work window. Five thousand cubic yards would be stockpiled at this site.

8. Tobiasson Island site just downstream of the Bonnyview bridge. This site, on an east bank terrace, is at the edge of a field presently planted in strawberries. Up to 20,000 cubic yards of gravel may be dumped over the bank here in a strip 25 feet wide, 20 feet deep and about 1,000 feet long. The work window for this site is September 1 to October 15.

Access would be by Interstate 5 and Sunnyhill Road. Up to 1,000 truckloads of gravel would come to the site, at the rate of thirty trucks per day, throughout the forty-five day work timeframe.

9. Shea levee site upstream of the mouth of Clear Creek. This east bank levee site would take up to 20,000 cubic yards of gravel in a strip 30 feet wide, fifteen feet deep and about 1,000 feet long. The work window is January 1 to March 31. Access is by Churn Creek Road and Smith Road. About thirty trucks per day would arrive at this site throughout the work window. Trucks would pass through a rural residential area, but Shea Sand & Gravel trucks already travel this route continuously.

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The Salt Creek, Tobiasson and Shea sites require only dumping gravel over the bank where high flows would distribute it. The remaining sites would require grading the gravels under the low-flow water surface elevation with a loader or dozer. The maximum placement elevation will be set so that after spawning is completed the redds won't be exposed if the flow is reduced to the near-minimum level of about 3,200 cubic feet per second (cfs).

Some gravel would need to be temporarily stockpiled near placement sites, but out of the floodway prior to the gravel placement window. This stockpiled gravel could then be quickly placed at the nearby sites while additional gravel is hauled simultaneously. This would spread the hauling over a longer period and reduce the traffic intensity and any accompanying negative impacts. Suitable stockpile areas are located around the Salt Creek, Highline, Redding Riffle, Turtlebay West and Turtlebay East sites. Agreement must be reached with property owners and the SRB before stockpiling of gravel could begin.

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Following is a summary table of site gravel quantities, construction methods and times:

Table 1. Summary of Site Statistics

Sites	Quantity of Gravel Placed (cubic yards)	Quantity of Stockpiled Gravel	Method of Gravel Placement	Work Window for Placement	Truck Travel Frequency (maximum)
Salt Creek	10,000 - 20,000	5,000	Bank Dumping	Sept. 15 - Oct. 15	8/hour
Diestelhorst	2,000	--0--	Spreading	Jan. 1 - Mar. 31	4/hour
Market Street	5,000 - 10,000	--0--	Spreading	Jan. 1 - Mar. 31.	4/hour
Highline	10,000	5,000	Spreading	Jan. 1 - Mar. 31	4/hour
Redding Riffle	10,000	5,000	Spreading	Jan. 1 - Mar. 31	6/hour
Turtlebay West	10,000	3,000	Spreading	Jan. 1 - Mar. 31	6/hour
Turtlebay East	10,000	5,000	Spreading	Jan. 1 - Mar. 31	1/hour
Tobiasson	20,000	--0--	Bank Dumping	Sept. 1 - Oct. 15	4/hour
Shea	20,000	--0--	Bank Dumping	Sept. 1 - Oct. 15	8/hour

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VI. Flood Potential Analysis

One of the issues that must be addressed before performing this work is how the addition of gravel to the river would affect the 100-year flood elevations. There are several reasons to believe that any change in flood elevations will be small:

1. Prior to construction of Shasta Dam, the river carried an estimated gravel bedload of 60,000 cubic yards peryear. After dam construction, the bedload from Keswick Dam to Clear Creek was essentially reduced to zero. Restoring bedload in this degraveled reach to a level equal to the present bedload transport capability of the river should not result in a significant increase in historic river flood levels. The planned placement of 100,000 cubic yards of gravel would be less than five percent of the estimated 2,000,000 cubic yards of bedload blocked from transport since dam construction.

2. The normal stream channel bedload of spawning size gravel (1/2" to 4") does not act as an impediment to flood flows because this material is readily moved from high carrying-capacity river reaches by flood flow velocities and deposited in shallower, slower velocity areas.

3. The potential gravel restoration sites are located in relatively unpopulated reaches of the river with low flood damage potential. No occupied dwellings are located near enough to the river in the proposed gravel placement reach to be subject to flooding.

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4. In the upper reach of the river, the river bottom has degraded as spawning-sized gravels moved downstream. Thus, gravel restoration would tend to elevate the channel bed back to past elevations.

To determine the expected change in the 100-year flood elevations due to gravel placement, we re-ran the COE "Hydrologic Engineering Center-2 (HEC-2) water surface profile model using modified 1980 river cross-sections to represent the proposed gravel placements. The results indicated a maximum rise in the 100-year flood elevations of 0.28 feet after gravel restoration work.

This analysis was sent to William Medigovich, the Chief of the San Francisco FEMA field office. DWR anticipates that FEMA will grant an exception from the "no increase in flood elevation" clause of Redding's floodplain ordinance to allow fishery restoration work on the Sacramento River.

VII. Gravel Sources

One hundred thousand cubic yards of gravel sized between 1/2 and four inches (1/2" to 4") would be required for the project. Suitable sources of spawning gravel are available from westside tributaries such as Thomes, Cottonwood and Clear Creeks. Red Bluff Rock, at Thomes Creek, supplied most of the 24,000 cubic yards placed below Keswick Dam during the last one and a half years. This gravel was purchased through a competitive bidding

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process. Based on that work and recent discussions with aggregate suppliers, the cost of gravel delivered to restoration sites is estimated to be about $17.00/cubic yard, if the source is Thomes Creek. Thomes Creek contains a large source of gravel, has the full range of required gravel sizes and does not support an anadromous fish run.

The $17.00/cubic yard ($11.65/ton) cost includes about $9.50/cubic yard to mine, screen and mix the gravel and $7.50/cubic yard to haul it. The hauling cost is approximately $0.10/cubic yard-mile. Washing the gravel is a routine and integral part of screening, and no savings would occur if the gravel were not washed. If white quartz tracer rock were added to increase underwater visibility for monitoring, the cost would be around $27.00/cubic yard for the tracer mixture.

The dredging discharge stockpile at the Glenn-Colusa Irrigation District (GCID) pumps has been suggested as a possible gravel source. However, sieve analysis of this material indicates that only about one third of this is large enough to meet spawning specifications. The extra costs of portable screening, settlement pond construction and hauling an extra thirty miles would increase the price of this gravel to over $21/cubic yard. Because of this high cost, GCID is not being considered as a gravel source for this project.

A separate contract for around $100,000 would probably be awarded to wash, transport and stockpile from 5,000 to ~~10,000 cubic yards~~ 490

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of gravel located at Cottonwood Creek. This gravel is available to DFG through negotiated gravel mining agreements with two aggregate plants on Cottonwood Creek. It would probably cost around $12.00/cubic yard because of the shorter haul distance and the lack of royalty, or ownership, charge.

VIII. Permits

Before gravel restoration work can begin, permits must be obtained from DFG, COE, SWQCB, SRB and the State Lands Commission. Agreements for right-of-ways must be reached with the City of Redding, Shasta County, and private property owners. Based on early contacts and internal consultation, it is anticipated that all required permits can be obtained.

DFG is currently working on their own 1601 agreement. SWQCB is planning to issue DWR a "Waiver of Discharge Requirements". DFG has previously been issued a regional COE permit for gravel restoration work in the Sacramento-San Joaquin Basin, and DWR expects to work under this permit. DFG expects to renew an area-wide State Lands Commission permit under which DWR can carry out the restoration work. DWR is preparing SRB permit applications for each site.

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IX. ENVIRONMENTAL IMPACTS CHECKLIST

(Explanations of all "yes" and "maybe" answers are required on attached sheets.)

	YES	MAYBE	NO
1. Earth. Will the proposal result in significant:			
a. Unstable earth conditions or in changes in geologic substructures?			X
b. Disruptions, displacements, compaction or overcovering of the soil?		X	
c. Change in topography or ground surface relief features or removal of topsoil?		X	
d. Destruction, covering or modification of any unique geologic or physical features?			X
e. Increase in wind or water erosion of soils, either on or off the site?			X
f. Changes in deposition or erosion of beach sands, or changes in siltation, deposition or erosion which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet or lake?		X	
g. Loss of prime agriculturally productive soils outside designated urban areas?			X
h. Exposure of people or property to geologic hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards?			X
2. Air. Will the proposal result in:			
a. Substantial deterioration of ambient or local air quality?			X
b. The creation of objectionable odors, smoke or fumes?			X
c. Significant alteration of air movement, moisture or temperature, or any change in climate, either locally or regionally?			X

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