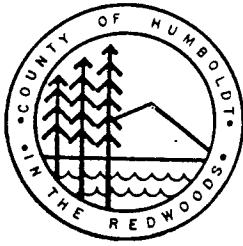


Appendix L

NOP



PLANNING DIVISION
OF THE PLANNING AND BUILDING DEPARTMENT
COUNTY OF HUMBOLDT

3015 H STREET
EUREKA, CALIF. 95501-4484 PHONE (707) 445-7541

NOTICE OF PREPARATION

TO: _____
FROM: Sidnie L. Olson
Senior Planner
Planning Department
3015 H Street
Eureka, CA 95501

SUBJECT: NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT

The Humboldt County Planning Department will be the Lead Agency and will prepare an Environmental Impact Report for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the Environmental Impact Report prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the probable environmental effects are contained in the attached materials. A copy of the Initial Study is not attached.

Due to time limits mandated by State Law, your responses must be sent at the earliest possible date, but not later than 30 days after receipt of this notice.

Please send your response to Sidnie L. Olson at the address shown above. We will need the name of a contact person in your agency.

PROJECT TITLE: THE SURFACE MINING OF SAND AND GRAVEL ON THE MAD RIVER.

PROJECT DESCRIPTION: The annual extraction of up to 510,000 cubic yards of sand and gravel from the Mad River from the old Swasey Dam site downstream to the Railroad Bridge, which is downstream of the Highway 101 Bridge. Attachment 1 illustrates the existing and proposed surface mining sites (See Table 1) in the study area.

The sand and gravel is generally removed by skimming off the gravel bars at a grade between 2% and 3% upward from the live channel. In addition, gravel may be removed by trenching or pitting techniques. Gravel may be stockpiled up on the river bank, out of the 25-year flood plain. Gravel processing facilities including jaw crushers and conveyor belts may be located near the gravel stockpiles.

Summer bridges may be placed or constructed over the live channel to provide access for gravel removal equipment. Gravel is removed from various river bars and stockpiled generally between June 1st and October 1st of each year. Gravel is retrieved from stockpiles, crushed, sorted, and processed year round.

A Memorandum of Agreement, Attachment 2, is in place for the extraction season of 1992. Techniques to be employed in the 1992 extraction season have been determined by a scientific team of 4 individuals with the concurrence of the California Department of Fish & Game. The Scientific Studies are included herein as Attachment 3.

PROBABLE ENVIRONMENTAL EFFECTS: The EIR will analyze potential impacts and cumulative effects of sand and gravel mining on:

- Water quality and biological productivity of the river channel;
- Fish spawning, rearing habitat and maintenance of an adequate fish passage;
- Sport fishing in the area;
- Riparian vegetation from lowered water surface elevations;
- Wildlife;
- River morphology;
- Noise from the extraction and processing operations, and along access and haul routes;
- Public access and passive recreation;
- River view aesthetics;
- Flood hazards;
- Traffic circulation;
- Sediment size distribution;
- Degradation of the Mad River at the Mad River Hatchery weir;
- Recruitment potential;
- Degradation of the streambed near or so as to affect adversely the Highway 101, Highway 299, Railroad and Blue Lake Boulevard bridges;
- Streambed degradation and water surface elevation at the Humboldt Bay Municipal Water District's Ranney well collector and direct river diversion.

TABLE 1 - OPERATIONS INCLUDED IN EIR


Operations with Required County approvals:

Operator	Location (Attachment 1)	Maximum Annual Extraction Amount
Mad River Sand & Gravel	Site No. 1	200,000 c.y. Use Permit
Redwood Empire Aggregates	Site No. 2 Emmerson Bar	50,000 c.y. Vested
Redwood Empire Aggregates	Site No. 3 Blue Lake Bar	50,000 c.y. Vested
Eureka Sand and Gravel	Site No. 4 Christie Bar	50,000 c.y. Use Permit
Mercer Fraser, Co.	Site No. 6 Essex Bar	40,000 c.y. Vested
Arcata Read-Mix	Site No. 7	80,000 c.y. Vested

Operations with approved reclamation plans and with vested right claim pending:

Operator	Location (Attachment 1)	Proposed Maximum Annual Extraction Amount
Redwood Empire Aggregates	Site No. 5 Johnson Bar	30,000 c.y. Vested Right Claim
Redwood Empire Aggregates	Site No. 8 Graham Bar	10,000 c.y. Vested Right Claim

Date: August 11, 1992


 Sidnie L. Olson
 Senior Planner

REDUCED (65%)

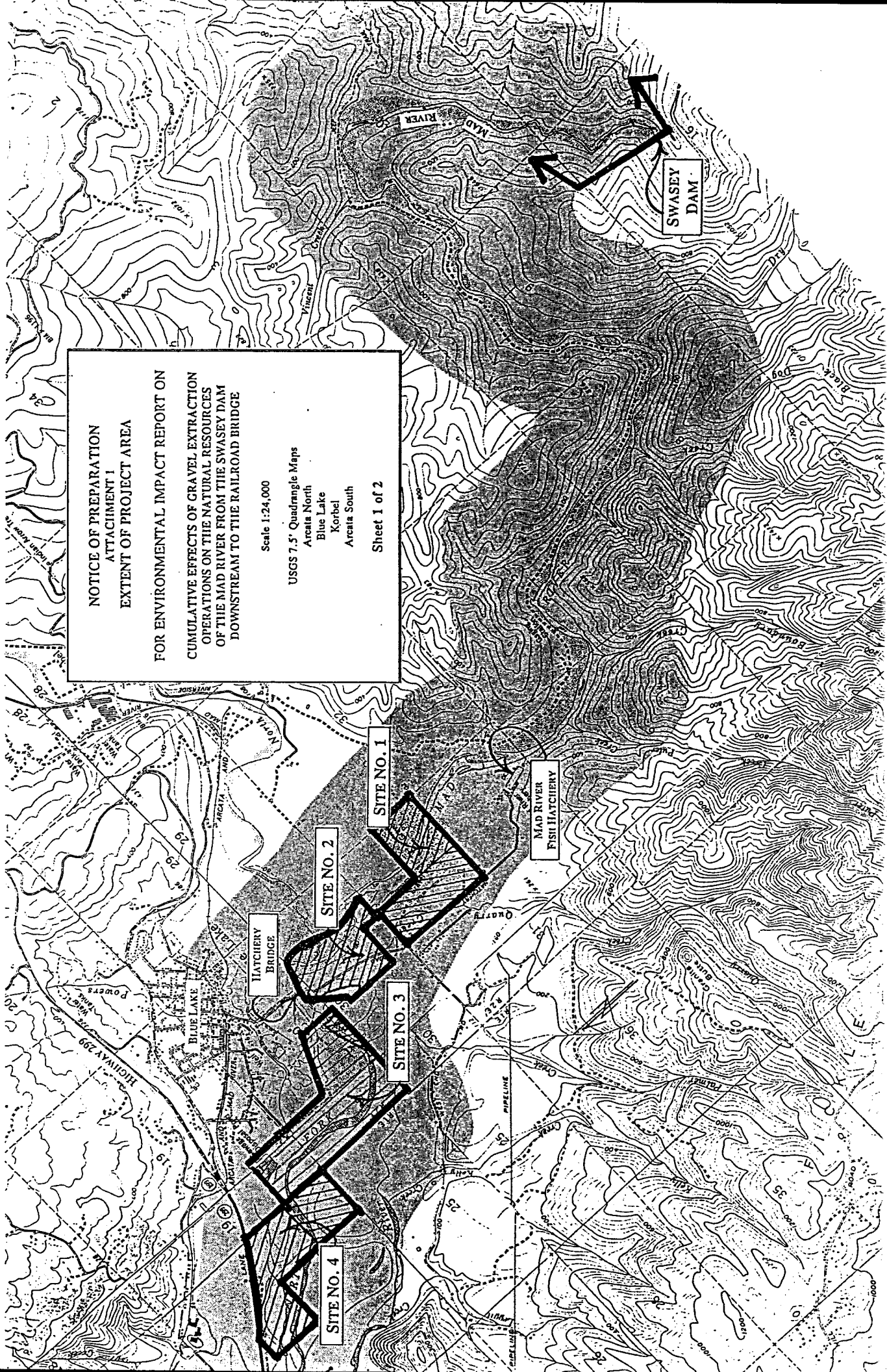
NOTICE OF PREPARATION
ATTACHMENT I
EXTENT OF PROJECT AREA

FOR ENVIRONMENTAL IMPACT REPORT ON
CUMULATIVE EFFECTS OF GRAVEL EXTRACTION
OPERATIONS ON THE NATURAL RESOURCES
OF THE MAD RIVER FROM THE SWASEY DAM
DOWNSTREAM TO THE RAILROAD BRIDGE

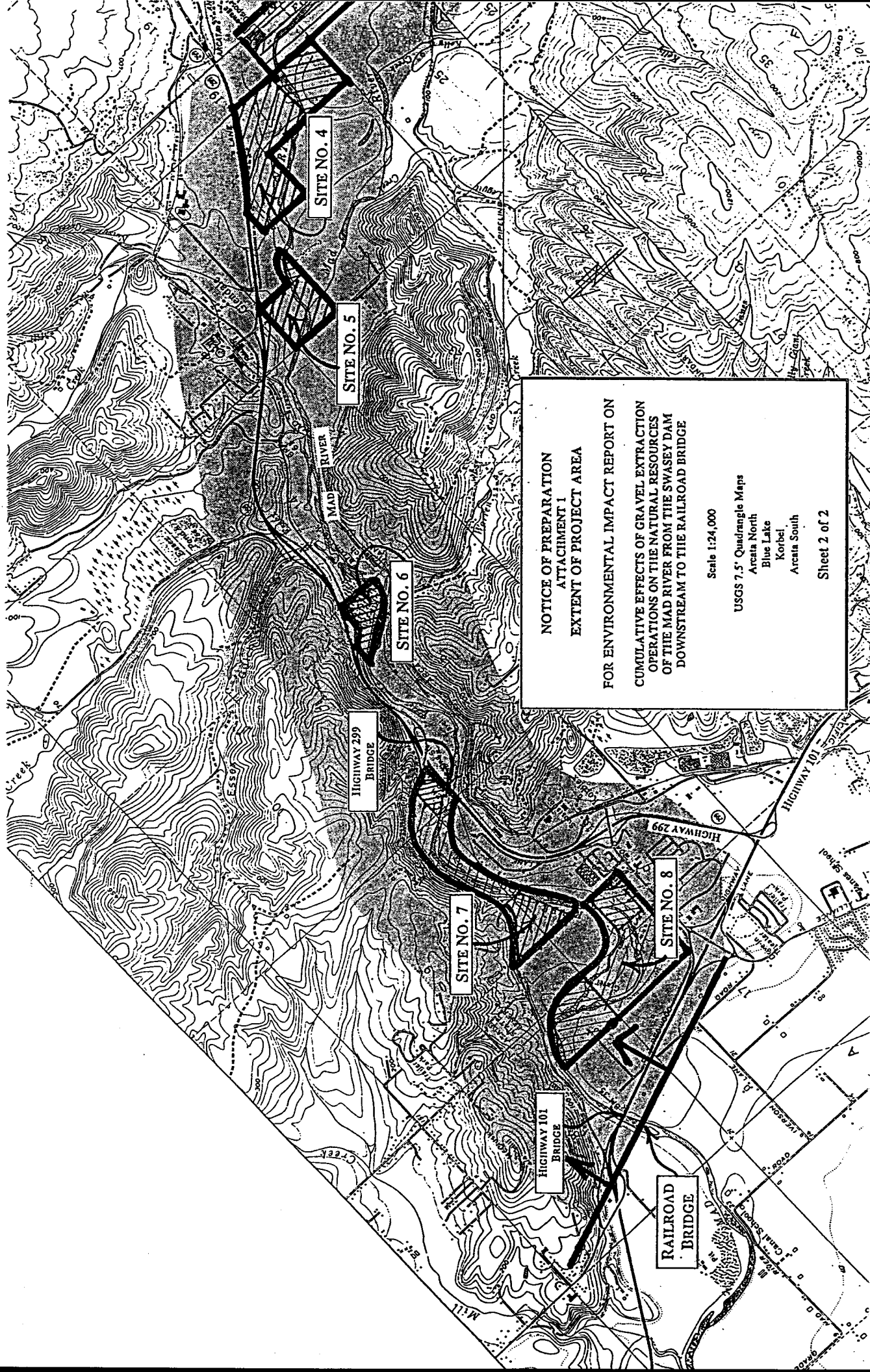
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USGS 7.5' Quadrangle Maps
Arcata North
Blue Lake
Korbel
Arcata South

Sheet 1 of 2



REDUCED (65%)



NOTICE OF PREPARATION
ATTACHMENT I
EXTENT OF PROJECT AREA

FOR ENVIRONMENTAL IMPACT REPORT ON
CUMULATIVE EFFECTS OF GRAVEL EXTRACTION
OPERATIONS ON THE NATURAL RESOURCES
OF THE MAD RIVER FROM THE SWASEY DAM
DOWNSTREAM TO THE RAILROAD BRIDGE

Scale 1:24,000
USGS 7.5' Quadrangle Maps
Arcata North
Blue Lake
Korbel
Arcata South

Sheet 2 of 2

Notice of Preparation
Attachment 2
Memorandum of Agreement

MEMORANDUM OF AGREEMENT

concerning

GRAVEL EXTRACTION OPERATIONS ON THE MAD RIVER

IN HUMBOLDT COUNTY
DURING 1992

I. PURPOSES AND INTENTION OF MOA

Whereas, the Mad River ecosystem located within Humboldt County contains valuable high quality natural resources, including but not limited to spawning and rearing habitat for anadromous fish that supports a commercial and recreational fishery, gravel resources used for local construction activities, and riparian and wetland habitat supporting wildlife, all of which contribute to the local economy and quality of life.

Whereas, the undersigned parties recognize the need for a full evaluation of the short-term and the long-term environmental effects of various activities, including the cumulative impacts of gravel extraction operations, on the natural resources of the Mad River, and also recognize the need to obtain gravel for use within the County during 1992;

Whereas, gravel extraction operations must comply with all applicable permit and approval requirements of state and local agencies, and state and local agencies must comply with the applicable provisions of the California Environmental Quality Act;

Whereas, although in areas which are not subject to tidal influences the State holds fee title in trust for the public to rivers and streams below their ordinary low watermarks and holds an easement termed the public trust easement over the areas between the ordinary high and ordinary low watermarks of rivers and streams, the precise location of the low water and high water boundaries on the Mad River has not been determined as of the date of this agreement;

Whereas, in order for gravel extraction from the Mad River which will not result in significant adverse environmental effects to proceed in 1992, pending a full evaluation of the cumulative, longterm impacts of existing and proposed activities on the natural resources of the Mad River, it is necessary and appropriate to develop special operating conditions and to coordinate state and local agency proceedings concerning gravel extraction operations in 1992;

Whereas, the undersigned parties desire to expedite and to work cooperatively in assessing environmental impacts, both from individual projects and cumulatively, and in processing applications for approval related to gravel extraction operations on the Mad River;

Whereas, the undersigned parties desire also to avoid and to reduce duplication and potential conflict in the processing by state and local agencies of applications for gravel extraction operations and reclamation plans on the Mad River;

Whereas, the undersigned parties do not by this agreement waive or intend to waive, nor shall this agreement be construed to waive, any rights, claims, or statutory responsibilities of any of the parties hereto.

BASED UPON AND FOR THE REASONS SET FORTH ABOVE, THE UNDERSIGNED PARTIES AGREE AS FOLLOWS:

II. SCOPE AND APPLICABILITY OF THIS MOA

A. AGENCY ROLES AND RESPONSIBILITIES

Humboldt County (hereinafter "County") is the lead agency for purposes of compliance with the California Environmental Quality Act (CEQA, Public Resources Code Section 21000 et seq.) in adopting a general plan and ordinances and in issuing conditional use permits (CUPS) and other county permits, entitlements, or approvals for gravel extraction operations; and is the lead agency for purposes of the Surface Mining and Reclamation Act (SMARA), as certified by the Mining and Geology Board.

The Resources Agency (hereinafter "Agency") provides state agency coordination for activities which may affect the free-flowing and natural character of the state's designated wild and scenic rivers, adopts the state CEQA Guidelines and coordinates various inter-Department issues.

The Mining and Geology Board (hereinafter "Board") and the Department of Conservation are the state agencies with responsibility for implementing SMARA (Public Resources Code Section 2710 et seq.). Pursuant to SMARA the Board establishes standards for reclamation plans, has certified the County's ordinance governing reclamation of mining sites, and exercises continuing review authority with regard to lead agency compliance with SMARA. Pursuant to SMARA and CEQA the Department of Conservation (hereinafter "DOC") reviews and submits comments on proposed reclamation plans for gravel extraction operations, monitors compliance with approved reclamation plans, and monitors lead agency implementation of SMARA.

The Department of Fish and Game (hereinafter "DFG"), as the state trustee agency for fish and wildlife (Fish and Game Code Sections 711.7 and 1802) and pursuant to CEQA, reviews and submits comments on projects which may affect fish and wildlife resources, reviews projects which may adversely affect the free-flowing and natural character of designated wild and scenic rivers, enters into agreements pursuant to Fish and Game Code Section 1600 et seq., and is responsible for administering Section 1505 of the Fish and Game Code.

The State Lands Commission (hereinafter "Commission") administers lands and resources owned by the state and public trust easements overlying such lands and resources, submits comments pursuant to CEQA on projects which may affect state lands or public trust easements, and collects royalties for the removal of mineral resources from state fee-owned lands.

B. GRAVEL EXTRACTION OPERATIONS

This agreement shall apply to all surface mining operations (hereinafter "Operators") which are in the bed or within one-half (1/2) mile from the center line of the Mad River; which receive or have received county authorization applicable to 1992 extraction operations; and which have signed this agreement. These operators may include, but are not limited to, the following companies: Eureka Sand and Gravel, Mad River Sand and Gravel, and Redwood Empire Aggregates.

C. OTHER AGENCY PARTICIPATION

The public agencies below are agencies interested in, and possess subject matter expertise related to, and may submit comments pursuant to CEQA on the gravel extraction operations which are the subject of this agreement.

(1) The California Department of Transportation (Caltrans) submits comments pursuant to CEQA and SMARA (Public Resources Code Section 2770.5) on projects which may affect Caltrans facilities, including bridges crossing the Mad River.

(2) The North Coast Regional Water Quality Control Board submits comments as an interested or responsible agency on projects subject to CEQA which may affect water quality, and assists in developing monitoring plans to meet water quality objectives adopted pursuant to the Porter-Cologne Water Quality Control Act (Water Code Section 13000 et seq.).

(3) The Humboldt Bay Municipal Water District operates wells and provides water supplies which draw on the Mad River and its underlying aquifers, and submits comments as an interested agency on proposed projects subject to CEQA which may affect the volume or the quality of its water supplies.

(4) The federal agencies which may comment and provide information concerning the impacts of proposed gravel extraction operations include the U.S. Environmental Protection Agency, the U.S. Army Corps of Engineers, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service.

IV. SHORT TERM OPERATIONS

The parties agree that the following provisions shall apply to all gravel extraction activity which occurs on the Mad River in 1992. These provisions are intended and understood to apply as conditions to gravel extraction in 1992, pending the completion of the environmental impact report described below in Section V which is to address the cumulative effects of gravel extraction operations on the Mad River.

A. On behalf of the undersigned parties, a Technical Committee, comprised of the persons listed on Attachment 1, is established and has provided direction, as set forth in a letter dated June 12, 1992, which is incorporated herein as Attachment 2, to the Scientific Committee which is established pursuant to paragraph IV. B. below.

B. A Scientific Committee is established for the purposes of conducting a review of the current condition of natural resources of the Mad River and providing recommendations to public agencies concerning the volumes, methodologies and sites of potential, environmentally safe gravel extraction operations, if any, for 1992 on the Mad River. The Scientific Committee consists of the following four members:

Douglas Jager, CSU at Humboldt

William Trush, River Institute

Andre Lehre, Pacific Southwest Range and
Experiment Station

Randall Klein, National Park Service, Redwood
National Park

(1) Each member of the Scientific Committee shall disclose for the period from January 1, 1990 through the present, all economic interests in and income from (including income of more than \$250 from any single source) any business or activity which is related in any way to gravel extraction operations in Northern California. Disclosure shall be accomplished by filing a statement of economic interest at the Office of the County Clerk, Humboldt County, and at the Office of the Secretary for Resources in Sacramento, as soon as possible after the effective date of this agreement.

(2) Pursuant to the guidance and direction received from the Technical Committee and based on its review of the present condition of the natural resources of the Mad River, the Scientific Committee shall provide recommendations to the undersigned public agencies concerning gravel extraction operations which may occur in 1992, if any, without significant environmental harm or risk of such harm.

(3) The Scientific Committee shall provide its recommendations, along with a succinct statement of supporting facts and reasoning, in writing to the undersigned public agencies. The written report shall be submitted within 15 calendar days after receiving a written request and direction from the Technical Committee; provided, however, that the Scientific Committee may request an extension of time, if necessary, to complete its evaluation and recommendations.

(4) If significant new or additional information which may affect the recommendations of the Committee is submitted to one or more of the undersigned public agencies, the new information shall be referred immediately to the Scientific Committee for evaluation. Upon completing its evaluation, the Scientific Committee shall promptly submit to the undersigned agencies such further written recommendations as may be appropriate.

C. The parties agree that the following standard conditions shall be included in all permits, amendments, approvals, and Section 1603 agreements issued by state and local agencies which apply to surface mining activities on the Mad River in 1992.

(1) Authorizations shall be issued for and apply to gravel extraction operations in 1992 only. Before commencing mining in 1992, each operator shall have both a reclamation plan and financial assurances approved by the County in compliance with requirements of SMARA.

(2) The locations, depths, methods and volumes of allowed gravel extraction shall not exceed the levels or alter the methods recommended by the Scientific Committee. In accordance with the recommendations of the Scientific Committee, gravel retention requirements may be specified as percentage (%) of annual recruitment at specified sites, as necessary for downstream recruitment, stream restoration or other resource protection purposes, pending the completion of the EIR described in Section V below.

(3) Each operator shall create and maintain a written record of gravel extraction during 1992 which contains at least the following information for each surface mining site: a site description, boundary lines, baseline cross-section or transect data, the estimated mineral volume (cubic yards) removed during each day of operations, ending cross-section or transect data,

riverbed depth at close of 1992 operations, and the estimated total mineral volume (cubic yards) removed in 1992.

(4) Appropriate monitoring requirements shall be included for each gravel extraction operation, and shall require each operator to submit to the County no later than November 15, 1992, a written report containing the results of required monitoring and the information required by paragraph (3) above. The County shall provide copies of monitoring reports to the undersigned public agencies.

(5) Recognizing the claim to jurisdiction of the State Lands Commission regarding state owned lands and resources, pending and subject to the final determination of the ordinary low water boundary of the Mad River, (a) the existing low flow riverbed channel shall be treated administratively by the parties to this agreement as belonging to the State, and the remainder of the riverbed up to the ordinary high watermark shall be treated as subject to a public trust easement held by the State; and (b) gravel extraction operations shall be approved only in those areas which are above the presently existing low watermark.

D. The operators agree as follows to provide funding for the preparation of the EIR as described below in Section V. Each operator agrees to deposit in an interest bearing trust account established by the County the sum of \$5,000.00 within 10 days of signing this agreement, and to deposit funds monthly, after removing the first 5,000 cubic yards of gravel in 1992, in amounts equal to \$1.00 per cubic yard of gravel removed in 1992. Any balance of funds which is not needed for and remains after the completion of the EIR shall be returned to the operators in amounts proportional to their contributions.

E. Each operator agrees to provide the following information to the County within two weeks after the end of 1992 operations:

- (1) wildlife observed during operations;
- (2) recreational uses observed nearby;
- (3) number of trucks per day that used access and haul routes;
- (4) noise levels measured at 50 feet for 10-yard dump trucks, front-end loader and gravel crusher; and, noise levels measured at the exterior wall of the nearest occupied residence;
- (5) acres of bar vegetation removed;
- (6) sieve analysis of at least three bed samples taken

at the start and three more bed samples after completion of operation;

(7) a record of fish use of the River by snorkeling and visual analysis of the low flow channel and related pools for each gravel mining site at least three times during the gravel removal season; and

(8) black and white aerial photographs at 1" = 500' taken after the end of the 1992 operating season, but before the first rain in 1992.

F. The County shall review each reclamation plan and financial assurances for operators on the Mad River after the close of 1992 operations, and, before any 1993 operations may begin, shall determine such revisions as may be necessary to address the operations and the current riverine conditions in compliance with SMARA.

G. To the maximum extent feasible and practicable all affected state and local public agencies shall review and evaluate proposed gravel extraction operations based upon the same information and documentation.

V. LONG TERM EVALUATION OF THE RESOURCES

The County shall prepare, or cause to be prepared under contract to it, a programmatic EIR to evaluate the cumulative effects of gravel extraction operations on the natural resources of the Mad River from the Swasey Dam downstream to the railroad bridge which is downstream of the Highway 101 Bridge.

(1) The County agrees to commence the preparation of this EIR upon the effective date of this agreement, and to pursue the completion of the EIR in accordance with the schedule set forth in Attachment 3, which is incorporated herein by this reference.

(2) Except for the normal costs of administrative processing, which shall be borne by the County and shall include providing public notice, circulating draft documents, collecting comments, and holding public meetings, the costs of the preparation of the draft and the final EIR shall be borne by and shared among the Operators with authorizations for extraction in 1992, and shall be allocated in proportion to the gravel volumes extracted. The signature of an Operator to this agreement shall signify agreement to bear a proportionate share of the preparation costs for the EIR described herein.

(3) Each signatory state agency shall designate a person to provide technical advice and assistance through consultation with the County concerning the EIR. These representatives, along with

the representatives of interested state agencies, shall serve as a State Agency Technical Advisory Committee to the County with regard to the preparation of the EIR.

(4) The County shall request comments from the County Advisory Committee, which is presently being formed and appointed by the County Board of Supervisors, regarding the preparation of the EIR.

VI. EFFECTIVE DATE, IMPLEMENTATION AND TERMINATION

A. For purposes of implementing this agreement, each state and local agency described in Section II. A. above shall designate a contact person for consultation and coordination with other agencies, and shall inform the Resources Agency and the County of the designated person's name, phone number, facsimile number, and business address. Each interested agency described above in Section II. C. is encouraged likewise to designate a contact person.

B. This agreement shall be effective upon its execution by the state agencies listed below, the County, and the Operators listed below. This agreement may be executed in any number of counterparts, and each executed counterpart shall have the same force and effect as an original instrument and as if all of the parties to the counterparts had signed the same instrument.

C. Each party agrees to implement, to monitor compliance with, and to cooperate in the enforcement of the terms of this agreement.

D. This agreement shall terminate upon whichever of the two following dates occurs first, the date the notice of determination is filed for the final EIR described above in Section V or June 15, 1993.

ATTACHMENTS INCORPORATED IN THIS MOA BY REFERENCE

Attachment 1 -- Technical Committee Membership List

Attachment 2 -- Technical Committee letter of June 12, 1992, to the Scientific Committee

Attachment 3 -- Schedule for EIR Preparation

SIGNATURES

DATE: _____

Chairman, Board of Supervisors
Humboldt County

DATE: _____

Approved as to form:
County Counsel, Humboldt County

DATE: _____

Secretary for Resources
California Resources Agency

DATE: _____

Executive Officer
Board of Mining and Geology

DATE: _____

Director, Department of Conservation

DATE: _____

Director, Department of Fish and Game

DATE: 7-23-92



Executive Director, State Lands Commission

DATE: _____

Eureka Sand and Gravel

DATE: _____

Mad River Sand and Gravel

DATE: _____

Redwood Empire Aggregates

MOU GRAVEL EXTRACTION OPERATIONS - MAD RIVER TECHNICAL COMMITTEE

Name	Address	Telephone
* Ms. Bonnie Neely, Supervisor Humboldt County	825 Fifth Street, Room 111 Eureka, California 95501	(707) 445-7694
* Mr. Banky Curtis Regional Manager Department of Fish and Game	601 Locust Redding, California 96001	(916) 225-2363
Mr. Larry Preston Associate Fishery Biologist Department of Fish and Game	619 Second Street Eureka, California 95501	(707) 445-6493
Ms. Karen Kovacs Associate Wildlife Biologist Department of Fish and Game	619 Second Street Eureka, California 95501	(707) 445-6493
Ms. Anna Sparks, Supervisor Humboldt County	825 Fifth Street, Room 111 Eureka, California 95501	(707) 445-7694
Mr. Don Tuttle Environmental Services Manager Department of Public Works Humboldt County	1106 Second Street Eureka, California 95501-0579	(707) 445-7741
Mr. Bill Davis Dun & Martinek Attorneys at Law	730 Seventh Street, Suite B Eureka, California 95501	(916) 442-3791
Mr. David Krueger Environmental Concerns	Box 649 Arcata, California 95521	(707) 839-5971
Mr. Tom Conlon Planning Director Humboldt County	3015 H Street Eureka, California 95501	(707) 445-7541
Ms. Cathy Crosssett Hydraulic Engineer Department of Transportation	P.O. Box 942874 Sacramento, California 94274-0001	(916) 327-3218
Ms. Diana Jacobs Staff Ecologist State Lands Commission	1807 13th Street Sacramento, California 95814	(916) 445-5034
* Co-Chair Persons		

DEPARTMENT OF FISH AND GAME

1416 NINTH STREET

P.O. BOX 944209

SACRAMENTO, CA 94244-2090

(916) 225-2363



June 12, 1992

Mr. Randy Klein
Consultant
1360 Stromberg Avenue
Arcata, California 95521

Dr. Andre Lehre
Humboldt State University
2335 Grace Avenue
McKinleyville, California 95521

Dr. Doug Jaeger
Humboldt State University
349 Stagecoach Road
Trinidad, California 95570

Dr. Bill Trush
Humboldt State University
Arcata, California 95521

Dear Mr. Klein and Drs. Lehre, Jaeger, and Trush:

Potential for Gravel Extraction on the Mad River in 1992

It is my understanding that you have all been contacted by Mr. Tom Conlon, Humboldt County Planning Director, and have agreed to participate as members of the scientific team for assessing the potential for environmentally safe gravel extraction on the Mad River in 1992. As co-chairman of the task force charged with the establishment of a Memorandum of Understanding (MOU) between the Resources Agency, State Lands Commission, Humboldt County, California Department of Fish and Game, and the gravel operators on the Mad River, I want to thank you for your willingness to participate in this process.

I understand that you will meet soon and discuss the protocol and scheduling for your task. On behalf of Ms. Bonnie Neely and myself as co-chairs of the technical committee, I want to be sure you are apprised of the objectives that were agreed upon by the various agencies and other representatives at the May 22, 1992 meeting in Eureka.

The primary question that needs to be addressed is -- how much, if any, gravel could be extracted from sites with all the necessary county permits on the Mad River in 1992 without resulting in significant adverse environmental impact in the near term and without long-term damage to the natural resources of this river system? This assessment should also include recommendations for methods of extraction and methods, sites, and amounts of gravel that need to be maintained in the river to begin the restoration process.

Priority should be given to the sites of Arcata Readimix, Eureka Sand and Gravel, Mercer Fraser, and Mad River Sand and Gravel companies, which are currently the operations with the necessary legal entitlements except for required agreements under Section 1603 of the Fish and Game Code.

Potential gravel extraction sites should also be assessed in the same manner on four Redwood Empire Aggregates' parcels which do not currently have the necessary county permits. The Department of Fish and Game and the Resources Agency may agree to consider, as part of the proposed MOU, a conditional one-season permit and reclamation plan for Redwood Empire Aggregates' sites provided the county completes an adequate CEQA document and agrees to complete an EIR for all gravel extraction on the Mad River prior to the 1993 gravel extraction season.

Your assessment should embrace the concerns of all agencies and special service districts. These concerns are:

- 1) Fish spawning and rearing habitat and maintenance of an adequate fish passage.
- 2) Degradation of the Mad River at the Mad River Hatchery weir.
- 3) Degradation of the streambed near or so as to affect adversely the Highway 101, Highway 299, Railroad and Blue Lake Boulevard bridges.
- 4) Streambed degradation and water surface elevation at the Humboldt Bay Municipal Water District's Ranney well collector and direct river diversion.
- 5) Impact to riparian vegetation from lowered water surface elevations.
- 6) Recruitment potential to downstream areas.
- 7) Bank failure, riparian loss, and increases of instream sedimentation.

We appreciate your acceptance of this challenging task, and we believe that you are collectively the most qualified team to make this assessment and submit recommendations to the decision making agencies. Please conduct your field assessment and provide us your recommendations as soon as possible.

Please contact me if you have any questions. My address is Department of Fish and Game, 601 Locust, Redding, California 96001, telephone (916) 225-2363.

Sincerely,

COPY Original signed by
Banky Curtis

Banky E. Curtis
Regional Manager
Region 1

cc: Mr. William Davis
Dun & Martinek
Attorney at Law
730 Seventh Street, Suite B
Eureka, California 95501

Ms. Christine Sproul ✓
Assistant Secretary, Legal Affairs
Resources Agency
1416 Ninth Street, 13th Floor
Sacramento, California 95814

Ms. Bonnie Neely, Supervisor
Humboldt County
825 Fifth Street, Room 111
Eureka, California 95501

Ms. Sandra Corcoran
District Office Field Representative
Assemblyman Dan Hauser's Office
510 O Street, Suite G
Eureka, California 95501

Mr. Dennis O'Bryant, Chief
Office of Mine Reporting and Reclamation Compliance
Department of Conservation
801 K Street, MS 09-06
Sacramento, California 95814

Mr. Lance Kiley, Senior Staff Counsel
State Lands Commission
1807 13th Street
Sacramento, California 95814

Mr. Art Bolli, General Manager
Humboldt Bay Municipal Water District
P.O. Box 95
Eureka, California 95502

cc: (Cont.)

Mr. David Krueger
Environmental Concerns
Box 649
Arcata, California 95521

Mr. Jerry Haynes, Deputy District Director
Project Development
Department of Transportation
P.O. Box 3700
Eureka, California 95501

Mr. Don Tuttle, Environmental Services Manager
Department of Public Works
Humboldt County
1106 Second Street
Eureka, California 95501-0579

Ms. Cathy Crossett, Hydraulic Engineer
Department of Transportation
P.O. Box 942874
Sacramento, California 94274-0001

Ms. Diana Jacobs, Staff Ecologist
State Lands Commission
1807 13th Street
Sacramento, California 95814

Ms. Anna Sparks, Supervisor
Humboldt County
825 Fifth Street, Room 111
Eureka, California 95501

Mr. John Hannum
Senior Water Resources Control Engineer
Regional Water Quality Control Board
5550 Skylane Boulevard, Suite A
Santa Rosa, California 95403

SCHEDULE FOR EIR PREPARATION AND COMPLETION

- (A) On or before August 12, 1992, issue Notice of Preparation.
- (B) On or before September 1, 1992, select technical consultant(s) and execute contracts between County and consultant(s).*
- (C) Hold scoping meeting(s) between August 15, 1992 and September 1, 1992.
- (D) On or before September 1, 1992, gather from all affected state and local agencies technical comments regarding the scope of the EIR, existing research data and other relevant information to be taken into consideration in drafting the EIR. This information shall include any needed subsurface geology data, which is to be obtained as soon as possible by Caltrans, near and underlying the footings of the Highway 101 and Highway 299 Bridges; fisheries and hydrology data from DFG; water quality and flow data from the Humboldt Bay Municipal Water District and the North Coast Regional Water Quality Control Board.
- (E) On or before September 15, 1992, request comments from the State Agency Technical Advisory Committee regarding the scope of the EIR.
- (F) On or before September 15, 1992, request comments from the County Public Advisory Committee, which is presently being formed and appointed by the County Board of Supervisors, regarding the scope of the EIR.
- (G) On or before December 15, 1992, provide notification of the availability of the draft EIR for public review and of the public comment period, which shall close no earlier than sixty (60) days after issuance of the notice of availability.
- (H) Prepare final EIR.
- (I) Certify and adopt the final EIR by May 1, 1993.

* The schedule may be extended accordingly should County be required to solicit proposals for contracted work regarding the EIR.

7
Dr. Douglas Jager
349 Stagecoach Road
Trinidad CA 95570
707-677-0604

Ms. Bonnie Neely, Supervisor
Humboldt County
825 Fifth Street, Room 111
Eureka CA 95501

June 24, 1992

Dear Ms. Neely:

Enclosed you will find a report prepared by the Mad River MOU scientific team with recommendations for 1992 gravel extraction at the first priority bars. Our team will add a short supplement to this report with recommendations for the priority two bars soon after we receive additional cross section and map information. We anticipate receiving this additional information in the next few days.

I have sent a copy of this report to Mr. Banky Curtis. He should receive his copy on June 25th. We have not released this information to any other parties.

If you have questions please call me.

Sincerely,



Dr. Douglas Jager

cc: Banky Curtis

RECEIVED
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GRAVEL EXTRACTION TECHNICAL COMMITTEE
REPORT OF THE SCIENTIFIC TEAM
RECOMMENDATIONS FOR CURRENTLY PERMITTED BARS

Doug Jager
 Randy Klein
 Andre Lehre
 Bill Trush

23 June 1992

Notice of Preparation
 Attachment 3
 Technical Studies

INTRODUCTION

Charge to the Scientific Team

The specific charge to the Scientific Team is given in Banky Curtis' letter of 12 June 1992 (Attachment 1). This letter indicates that priority should be given to the four sites which had county permits as of 12 June 1992 (Attachment 1, paragraphs 3 and 4). We were also asked to investigate extraction potential at four other currently unpermitted sites (Attachment 1, paragraph 5). However, as of 19 June 1992 the scientific team had not been provided with current maps, cross-sections, or plans for these additional sites. Thus, in the interest of timeliness, we address in this report only the four permitted sites (Guynup, Christie, Essex, and Johnson-Spini bars). The scientific team will address four priority two (REA) sites soon after the required maps and cross-sections are made available.

Personnel and Individual Responsibilities

The scientific team consists of Dr. Doug Jager, Mr. Randy Klein, Dr. Andre Lehre, and Dr. Bill Trush. Doug Jager, forester and hydrologist, is professor of forestry and watershed management at HSU. Randy Klein, hydrologist, is an independent consultant as well as a watershed hydrologist at Redwood National Park. Andre Lehre, geomorphologist and hydrologist, is professor of geology at HSU. Bill Trush, fisheries biologist and fluvial geomorphologist, is both an independent consultant and lecturer in fisheries at HSU.

The team spent 2.5 days together in the field investigating the four permitted gravel extraction sites, the Highway 299, Railroad, and Blue Lake bridges, and the HBMWD intake reach; 0.75 day meeting in Eureka with concerned individuals: Art Bolli, Harold Hunt, and Lloyd Hecathorn, HBMWD; Dennis McBride, CalTrans; and Supervisors Stan Dixon and (briefly) Anna Sparks; and 1 day in the office establishing design criteria, studying cross-sections and airphotos, reviewing available data, finalizing prescriptions, and revising this report. In addition, individual team members were assigned the following responsibilities: Doug Jager was liaison with the various governmental and private entities and individuals. Randy Klein calculated our proposed extraction volumes from the cross-sections, maps, and airphotos. Andre Lehre computed estimated bedload recruitment from hydraulic data and wrote this report. Bill Trush evaluated the effects of extraction plans on the fisheries and riparian/wetland resources and suggested designs for mitigation.

GENERAL OVERVIEW OF THE PROBLEM

Significance of the bed degradation problem

Over the past ten to fifteen years, the bed and bars of the Mad River have in general degraded (lowered) significantly. While this general bed lowering affects the entire channel downstream from the hatchery to the mouth, it is especially obvious in the reach between Blue Lake and the Highway 299 bridge, and has reached the point where it is seriously affecting the Railway bridge, the 299 bridge, and the HBMWD intakes. We list several observations below that indicate the extent of this problem.

- Comparison of channel cross-sections surveyed in July 1991 by Andre Lehre and Tom Lisle with original construction cross-sections show maximum local bed lowering of 4.5 ft at the Blue Lake bridge since 1982 and 14 ft at the 299 bridge since 1960. Average bed lowering (across the entire channel width) at these sites is 1.6 ft and 8 ft respectively. At the 299 bridge the footings of pier 4 have been exposed and the concreted right bank at pier 5 has been undercut.
- The footings of the northern pier of the Railway bridge are virtually completely exposed and appear to be undermined. We were able to thrust a stick 4-5 feet under the NE corner of the pier without encountering anything solid! A willow growing on the south side of this pier marks a fairly recent position of the old ground surface; the willow's base is now about eight feet above the current bed surface.
- The HBMWD Ranney collector towers have been increasingly exposed; one tower has had to have two additional lengths of ladder welded on, indicating 8 - 10 feet of bed lowering. Such bed lowering reduces filtration effectiveness of the collectors. Bed lowering at pump station 6 (which supplies the Samoa mills) has brought the pumps to within 0.5 - 1 foot of sucking air at low water.

In addition, CalTrans has expressed concern about substantial bed lowering and potential pier undermining at the Highway 101 bridge.

Causes of bed degradation

The gravel resource stored in any reach of a river can be visualized as a bank account. The capital in the account is contained in the bed, and in the bars and banks along the channel. Deposits are made naturally into the account as new gravel is brought in (recruited) from upstream. Natural withdrawals from the account occur as gravel is transported downstream out of the reach by the river. Checks are written on the account as gravel is extracted by man. As with any bank account, if deposits exceed withdrawals, the capital in the account will increase, that is, the river will raise its bed (aggrade) and build up the bars. On the other hand, if withdrawals and checks exceed the deposits, the balance in the account will diminish; in the case of a river, this means lowering of the bed (degradation) and widening of the channel.

The river as a whole can be looked at as a string of serially linked adjacent bank accounts (reaches), whereby the natural withdrawals (outflows) of bed material from each account provide the natural deposits (inflows) to the account immediately downstream. Thus deposits to any downstream account reflect the cumulative effects of all upstream actions. In particular, if upstream reaches intercept most of the natural gravel recruitment (i.e., the cash flow to downstream accounts is reduced), deposits to reaches farther downstream can only come by reducing the capital in the intervening accounts, i.e., by eroding the bed and banks.

The persistent general bed lowering in the lower Mad River described above has been caused by 1) low rates of recruitment of new bed material from upstream (because of a succession of dry years with low peak flows) combined with 2) substantial extractions from the channel by gravel consumers. In order to determine the contributions of each cause to the observed bed lowering we would need for several years: 1) measurements the rate of transport of bed material through the reach; 2) accurate and complete records of the amounts of gravel extracted yearly; and 3) repeated detailed topographic maps and cross-sections of the channel. None of these exist. We can, however, use historical data to make some extremely crude estimates of new gravel recruitment, and compare this with proposed extractions.

Brown (1973) made nine measurements of bedload transport on the Mad River at Arcata (just upstream of the Highway 299 bridge) and five on the Mad River at Kneeland in water year 1972-73. He plotted bedload transport rate against water discharge to create bedload transport curves for the two sites (Brown, 1973, figs. 9 and 10). From these curves and the 1971-72 water discharge records, he estimated the 1971-72 bedload discharge at Arcata as 60,000 tons (74,000 cu. yd. using Brown's unit weight of 60 lb/cu. ft) and 170,000 tons (210,000 cu. yd.) at Kneeland (Brown, 1973, p. 18 and p. 25). It must be emphasized that these estimates are quite crude, since his bedload transport curves are defined by very few points. These estimates of recruitment should be compared with the 200,000 - 500,000 tons/yr (247,000 - 618,000 cu. yd./yr) that he estimates were extracted in the years 1961-70 (Brown, 1973, p. 55), which is 4 to 10 times the estimated transport at Arcata, and 1.2 to 3 times that at Kneeland. It should be noted that water year 1971-72 was a fairly wet year with substantial peak flows, so Brown's transport estimates are optimistic ones.

Lacking any better data, we applied Brown's sediment transport curve for Arcata (his fig. 9) to hourly flow data at the Arcata gage (obtained from the Department of Water Resources) for water year 1990-91 (1 Oct. 1990 - 30 Sept 1991), and for the current water year through May (1 Oct. 1991 - 31 May 1992). Our calculations yielded 10,300 tons (12,700 cu. yd.) for water year 1990-91, and 7,500 tons (9,300 cu. yd.) for the current water year. These quantities are far less than the proposed extractions. Even if our estimates are low by a factor of 3 to 5, which is certainly possible, the estimated yearly recruitment is much less than the yearly extraction.

From the above calculations, it seems likely that gravel extraction significantly in excess of replenishment has played an important role in recent bed degradation on the lower Mad River. Thus one of our highest priorities is to ensure that future extraction is managed in such a way that newly recruited material has a reasonable opportunity to reach degraded sites downstream.

BASIS FOR THE RECOMMENDATIONS

Our recommendations are guided by the following unanimously agreed-upon objectives:

- a. maintenance of a reasonably well-defined and stable mainstem channel at low and moderate discharges;
- b. maintenance of downstream and cross-stream bar and bed slopes sufficient to allow transport of gravel to downstream sites; and
- c. avoidance of extractions, such as trenching, which could trap excessive gravel, or through headward erosion, undermine upstream structures.

If bars are skimmed too flat and too close to the low-water surface, at slightly higher stages the river will tend to spread across the bars, reducing the depth of flow, and the channel may both migrate rapidly and break into a number of shallow channels or threads. Such sites will tend to trap gravel which would otherwise move downstream.

Trenching should be avoided in reaches immediately downstream of threatened structures. The increased bed gradient at the head of a trench, together with the increased depth of water downstream tends to cause headward (upstream) scour.

SITE-SPECIFIC RECOMMENDATIONS FOR PERMITTED BARS

These site-specific recommendations are only for the four currently permitted bars. Please note that these recommendations are specifically for 1992 and were made under the assumption that the coming water year will be no wetter than the past few have been. This is a reasonable and conservative assumption, as dry years tend to occur in groups. If water year 1993 is much wetter and leads to substantial recruitment of new gravel, our prescriptions in the following year would change.

GUYNUP BAR (MAD RIVER SAND & GRAVEL)

Prescription

We recommend that gravel be extracted in 1992 by bar skimming according to the following specifications:

- a. Gravel removal is to begin one (1) foot in elevation above the water surface as defined in cross-sections 1-8 surveyed by Ormsberg & Co. in April 1992 (xs sheets 1 and 2).
- b. The extraction is to grade upslope away from the river at 3% for fifty (50) horizontal feet, and then to grade away at 2% to daylight or to our limit of extraction (see c below), whichever comes first.

- c. The limits of extraction vary from cross-section to cross-section as specified in the table below. These limits refer to the horizontal distance scales shown on the Ormsberg cross-sections.

XS	riverward limit ft	landward limit ft	extraction width ft
1	177	323	146
2	330	690	360
3	340	648	308
4	85	395	310
5	346	696	350
6	493	538	45
7	460	560	100
8	537	712	175

The limit of extraction *between* cross-sections is defined by a smooth curve connecting the extraction limits at the adjoining cross-sections (See Fig. 1).

Amount of Extractable Gravel (1992)

We estimate that this prescription will yield approximately 33,000 cubic yards on the upper bar and 9000 cu. yd. on the lower bar (including 1000 cu. yd. on the downstream end of the lower bar on the Emerson property), for a total of 42,000 cu. yd. at this site.

Rationale

This bar, the first below the hatchery, is particularly crucial in permitting transport of bed sediment (gravel and coarse sand) downstream. In view of the small recruitment of new gravel from upstream during these dry years, we consider it especially important that 1) no trenching be allowed at this site, and 2) that the river be kept more confined here in order to allow some fraction of the newly recruited bed material to pass downstream.

Our observations in this reach showed that last year's trench had nearly filled with new gravel. The next trench downstream (Emerson Bar) had only slightly filled, however, suggesting that most of the newly recruited gravel had been retained in the upstream trench. While this may be good for the Guynup bar, it is certainly deleterious for resupply of the bars and bed farther downstream. Hence we recommend against any further trenching here.

We also recommend against excessive flattening and lowering of the Guynup bars, which could lead to channel widening or braiding and retention again of most newly recruited gravel at this site. The objectives of the one-foot vertical offset and the 3%→2% slope change are to maintain flow confinement at low to moderate discharges and to facilitate transport of bed sediment through the reach to supply downstream areas.

Our placement of the outer limit of extraction is designed 1) to preserve the zone of early (3-5 yr) successional riparian vegetation and 2) to leave gravel available for transport at higher flows.

CHRISTIE BAR (EUREKA SAND & GRAVEL; EUREKA READYMIX)

Prescription

We recommend that gravel be extracted in 1992 by a combination of skimming on the lower portion of the bar and a limited pit excavation on the five-year terrace.

Skimming should be conducted according to the following specifications:

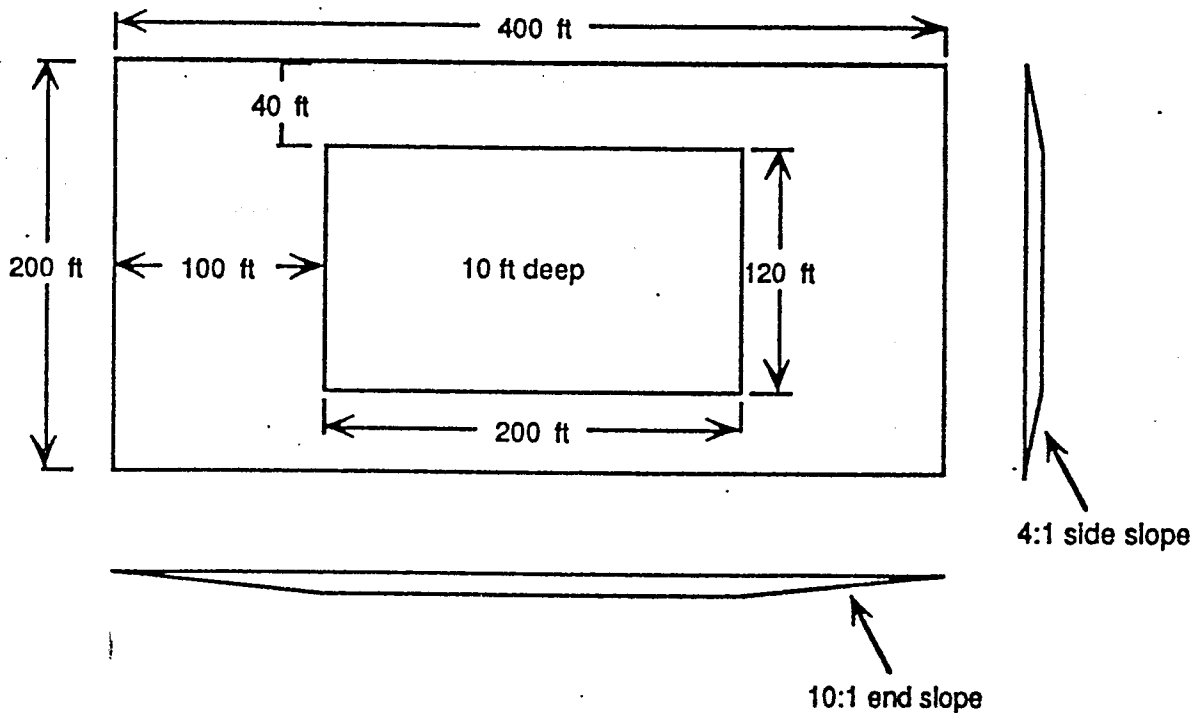
- a. Gravel removal is to begin one (1) foot in elevation above the water surface as defined in the Pacific Affiliates cross-sections surveyed May 13 1992.
- b. The extraction is to grade upslope away from the river at 2% to daylight.
- c. The limits of extraction vary from cross-section to cross-section as specified in the table below. These limits refer to the horizontal distance scales shown on the Pacific Affiliates cross-sections of the site. Pacific Affiliates set the zero distance in each cross section at their baseline and scaled

distances away from it in either direction . In order to distinguish the two directions, we indicate distances on the *riverward* side of the baseline as *positive* (+) and those on the *landward* side as *negative* (-)

XS	riverward limit ft	landward limit ft	extraction width ft
0+00	+235	+80	155
6+67	+300	+100	200
13+33	+225	-20	245
20+00	+40	-65	105
22+84	+80	-75	155

The limit of extraction between cross-sections is defined by a smooth curve connecting the extraction limits at the adjoining cross-sections (See Fig. 2).

The pit should be located on the five-year terrace approximately 200 ft NE of station 2+00 on the baseline (see Fig. 2). We recommend a pit 200 ft wide by 400 ft long with a maximum depth of 10 ft oriented as shown in Fig. 2. Our proposed design is shown below:



It is important that the corridor of riparian vegetation on the streamward side of the pit be preserved as shown in Fig. 2.

We carefully selected the pit site so as to avoid 1) significant adverse impacts on wildlife, 2) permanent changes in the landscape, and 3) changes in land use of agricultural areas located on high terraces near the river. This pit will be subject to occasional flooding and is likely to be obliterated by a large (e.g. 20 year) flood.

Our pit design is based on the assumption that the summer water table lies within about six feet of the present bar surface. If the water table is significantly lower than six feet, our design may have to be modified to encourage the growth of wetland vegetation such as cattails and horsetails. If necessary, any member of the scientific team can easily modify the design during excavation.

The gentle side and endslopes of the pit are designed to enable creatures to enter or leave the water body and to enhance the development of a wide band of nearshore wet site riparian vegetation such as cattails and horsetails.

The silty overburden should be stockpiled during excavation. To enhance revegetation after excavation the stockpiled overburden should be spread over disturbed areas adjacent to the pit.

Amount of Extractable Gravel (1992)

We estimate that this prescription will yield approximately 20,000 cubic yards from bar skimming and 9,000 cu. yd. from the pit, for a total of 39,000 cu. yd. at this site.

Rationale

The objective of the 1 foot offset and 2% slope for bar skimming is to provide both channel confinement and transport capacity through the reach while allowing limited deposition in this extremely wide cross-section. Such deposition will ultimately enhance confinement and transport capacity downstream. We recommend against any channel or bar trenching for the same reasons as at the Guynup site: it would intercept too much gravel recruitment from upstream.

We observed partial refilling of last year's trenches at the Christie site. The emptiness of the trenches between the Blue Lake bridge and the Guynup site indicates that this refilling resulted from local redistribution of gravel from the bed and bar upstream, rather than new recruitment.

The Christie bar is very wide and has a substantial area that is flooded only at infrequent (e.g., 5 - 50 yr) intervals. Extracting gravel using a pit on the 5-year terrace (i.e., the surface which is just inundated by the 5-year flood) should not inhibit bedload transport to downstream areas at frequent flood flows. Although the 5-year flood may leave silt and organic debris in the pit, large magnitude flood flows (e.g., the 20-year flood) will rework the entire bar and will refill the pit with merchantable gravel.

Although the proposed pit will destroy some young riparian forest, our pit design will replace it with quality wetland. In any case, the riparian forest at the pit site is low enough on the bar that it is likely that it will be removed by floods before it can grow very old. Because the 5-year terrace will only infrequently be covered with water (once in *any* five-year period on the average), problems of fish entrapment should be minimal.

ESSEX BAR (MERCER-FRASER)

Prescription

We recommend that no gravel be extracted from this bar in 1992 due to its proximity to 1) the Humboldt Bay Municipal Water District intakes and 2) the Highway 299 bridge downstream. Both these sites are suffering from marked bed degradation (lowering) and it is important to facilitate gravel recruitment to them.

Amount of Extractable Gravel (1992)

None

Rationale

The amount of gravel available here above the 2% slope needed for transport is minimal. Since the bar is immediately upstream from important sites suffering from significant bed degradation, it is very important that transport be maintained through the reach.

JOHNSON-SPINI BAR (ARCATA READYMIX)

Prescription

We recommend that no gravel be extracted from this site in 1992 due to its proximity to the Highway 299 bridge a short distance upstream.

Amount of Extractable Gravel (1992)

None

Rationale

This bar has already been skimmed flat enough and low enough that there are currently minimal opportunities for further skimming. Trenching is not an option here because of the likelihood that leadward migration and scour would further undermine the bridge.

Examination of older (pre-1988) airphotos shows the central bar downstream of the 299 bridge formerly extending under the middle bridge pier, presumably protecting and supporting for the pier. It is important to foster accumulation of gravel under the bridge, and to re-establish the bar.

GENERAL RECOMMENDATIONS

Preparation of Cross-Sections and Site Plans

The work of the scientific team was significantly hampered by the generally inadequate and poor-quality data provided on the geometry of the bars and of proposed extractions. For example, cross-sections commonly: 1) did not cross the entire channel or did not show the channel bed; 2) did not have end points located on the maps; 3) were insufficiently detailed; and 4) were inconsistently oriented or mislabeled, while the cross-section locations and proposed extractions were shown on out-of-date air photos. We spent much time and effort in the field trying to relocate the cross-sections and relate what we could see on the ground to the maps given us. Adequately located and surveyed cross-sections and current photos would have cut our field time by at least 30% and would permit far better estimates of the volume of gravel which can be extracted.

In light of the inadequacies and inconsistencies of the current data, we recommend that, in the future, *all* cross-sections and maps submitted by gravel extractors on the Mad River meet the following specifications:

- a. Cross-sections to extend completely across the river channel and to terminate on banks with mature riparian vegetation (e.g., 10-15 year old alders.)
- b. Cross-sections to include the river bottom (especially location of the thalweg) as well as the water surface. Water surface elevation alone is insufficient; the bed *must* be included!
- c. All site maps to be prepared on the most recent (preferably post-extraction) air photo base. A current photo base is essential!
- d. Cross-section endpoints and tie points to be clearly monumented and labeled in the field and accurately located on current airphotos and maps. A common color of flagging to be used to mark cross-sections at all sites.
- e. Cross-sections for planning extractions to be surveyed in late May of the year in which extraction is proposed.
- f. Cross-sections to be resurveyed from the same endpoints each year and the previous year's cross-section to be superimposed on the current one. New cross-sections to be added as necessary as the river's course shifts, and to be oriented approximately normal to the channel.
- g. Cross-sections at all sites to be plotted at the same simple, usable vertical and horizontal scales. We suggest a horizontal scale of 1 inch = 50 feet and a vertical scale of 1 inch = 5 feet.
- h. Cross-sections to be surveyed and drafted consistently so that the right bank (RB) of the river as you face downstream is at the right side of the drafted cross-section.
- i. Zero (0) distance in cross-sections to be at the left (LB) endpoint as you face downstream.
- j. Cross-sections to be tied to a common vertical and horizontal control datum among all extraction sites.

In addition, we urge that cross-sections be required across the upstream and downstream limits of each extraction reach.

Future Monitoring

Cross-sections have traditionally been prescribed for monitoring changes in channel morphology. However, recent advances in surveying technology have made three-dimensional channel surveys with a total station a superior monitoring tool. Use of a total station would:

- 1) provide a much better representation of bed and bar morphology;
- 2) allow quick and accurate assessment of extraction and replenishment volumes
- 3) reduce costs over traditional cross-section surveying.

Because of the downstream interconnection between bars, we strongly recommend that the entire channel be surveyed, not just whatever bars happen to be undergoing extraction at the time. Only by monitoring both active and inactive bars can the routing of bed material downstream be addressed and the successes or shortcomings of prescriptions be assessed.

REFERENCES CITED

Brown, William M. III, 1973, Sediment transport, turbidity, channel configuration, and possible effects of impoundment of the Mad River, Humboldt County, California: *U.S. Geological Survey Water Resources Investigations 26-75*, 63 p.

DEPARTMENT OF FISH AND GAME

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June 12, 1992

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Dear Mr. Klein and Drs. Lehre, Jaeger, and Trush:

Potential for Gravel Extraction on the Mad River in 1992

It is my understanding that you have all been contacted by Mr. Tom Conlon, Humboldt County Planning Director, and have agreed to participate as members of the scientific team for assessing the potential for environmentally safe gravel extraction on the Mad River in 1992. As co-chairman of the task force charged with the establishment of a Memorandum of Understanding (MOU) between the Resources Agency, State Lands Commission, Humboldt County, California Department of Fish and Game, and the gravel operators on the Mad River, I want to thank you for your willingness to participate in this process.

I understand that you will meet soon and discuss the protocol and scheduling for your task. On behalf of Ms. Bonnie Neely and myself as co-chairs of the technical committee, I want to be sure you are apprised of the objectives that were agreed upon by the various agencies and other representatives at the May 22, 1992 meeting in Eureka.

The primary question that needs to be addressed is -- how much, if any, gravel could be extracted from sites with all the necessary county permits on the Mad River in 1992 without resulting in significant adverse environmental impact in the near term and without long-term damage to the natural resources of this river system? This assessment should also include recommendations for methods of extraction and methods, sites, and amounts of gravel that need to be maintained in the river to begin the restoration process.

Mr. Randy Klein, et al.
June 12, 1992
Page Two

Priority should be given to the sites of Arcata Readimix, Eureka Sand and Gravel, Mercer Fraser, and Mad River Sand and Gravel companies, which are currently the operations with the necessary legal entitlements except for required agreements under Section 1603 of the Fish and Game Code.

Potential gravel extraction sites should also be assessed in the same manner on four Redwood Empire Aggregates' parcels which do not currently have the necessary county permits. The Department of Fish and Game and the Resources Agency may agree to consider, as part of the proposed MOU, a conditional one-season permit and reclamation plan for Redwood Empire Aggregates' sites provided the county completes an adequate CEQA document and agrees to complete an EIR for all gravel extraction on the Mad River prior to the 1993 gravel extraction season.

Your assessment should embrace the concerns of all agencies and special service districts. These concerns are:

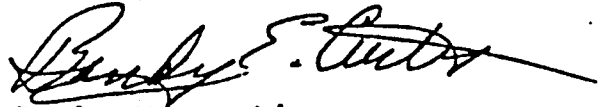
- 1) Fish spawning and rearing habitat and maintenance of an adequate fish passage.
- 2) Degradation of the Mad River at the Mad River Hatchery weir.
- 3) Degradation of the streambed near or so as to affect adversely the Highway 101, Highway 299, Railroad and Blue Lake Boulevard bridges.
- 4) Streambed degradation and water surface elevation at the Humboldt Bay Municipal Water District's Ranney well collector and direct river diversion.
- 5) Impact to riparian vegetation from lowered water surface elevations.
- 6) Recruitment potential to downstream areas.
- 7) Bank failure, riparian loss, and increases of instream sedimentation.

We appreciate your acceptance of this challenging task, and we believe that you are collectively the most qualified team to make this assessment and submit recommendations to the decision making agencies. Please conduct your field assessment and provide us your recommendations as soon as possible.

Mr. Randy Klein, et al.
June 12, 1992
Page Three

Please contact me if you have any questions. My address is
Department of Fish and Game, 601 Locust, Redding, California 96001,
telephone (916) 225-2363.

Sincerely,



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Regional Manager
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Mr. Randy Klein, et al.
June 12, 1992
Page Four

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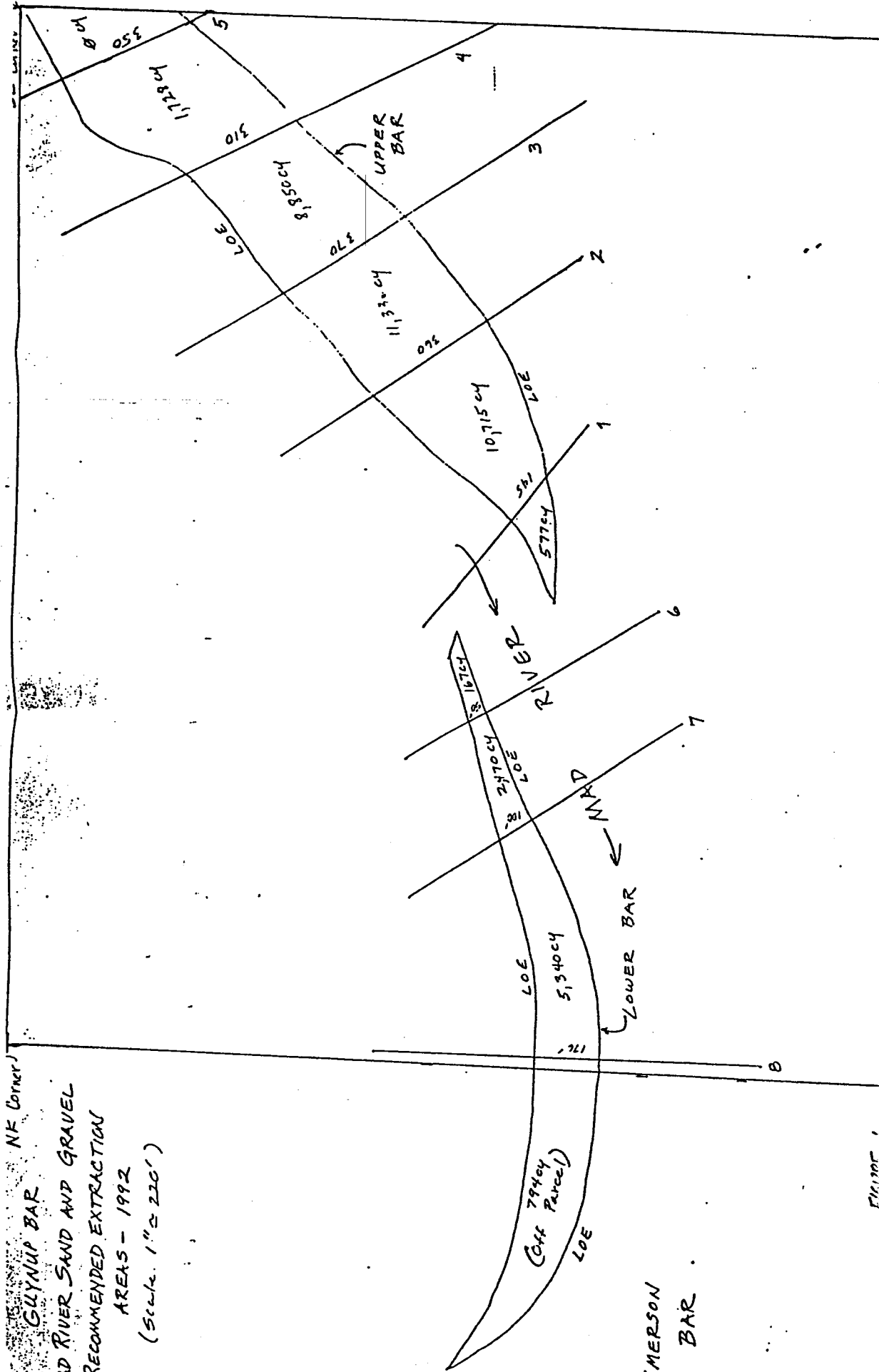
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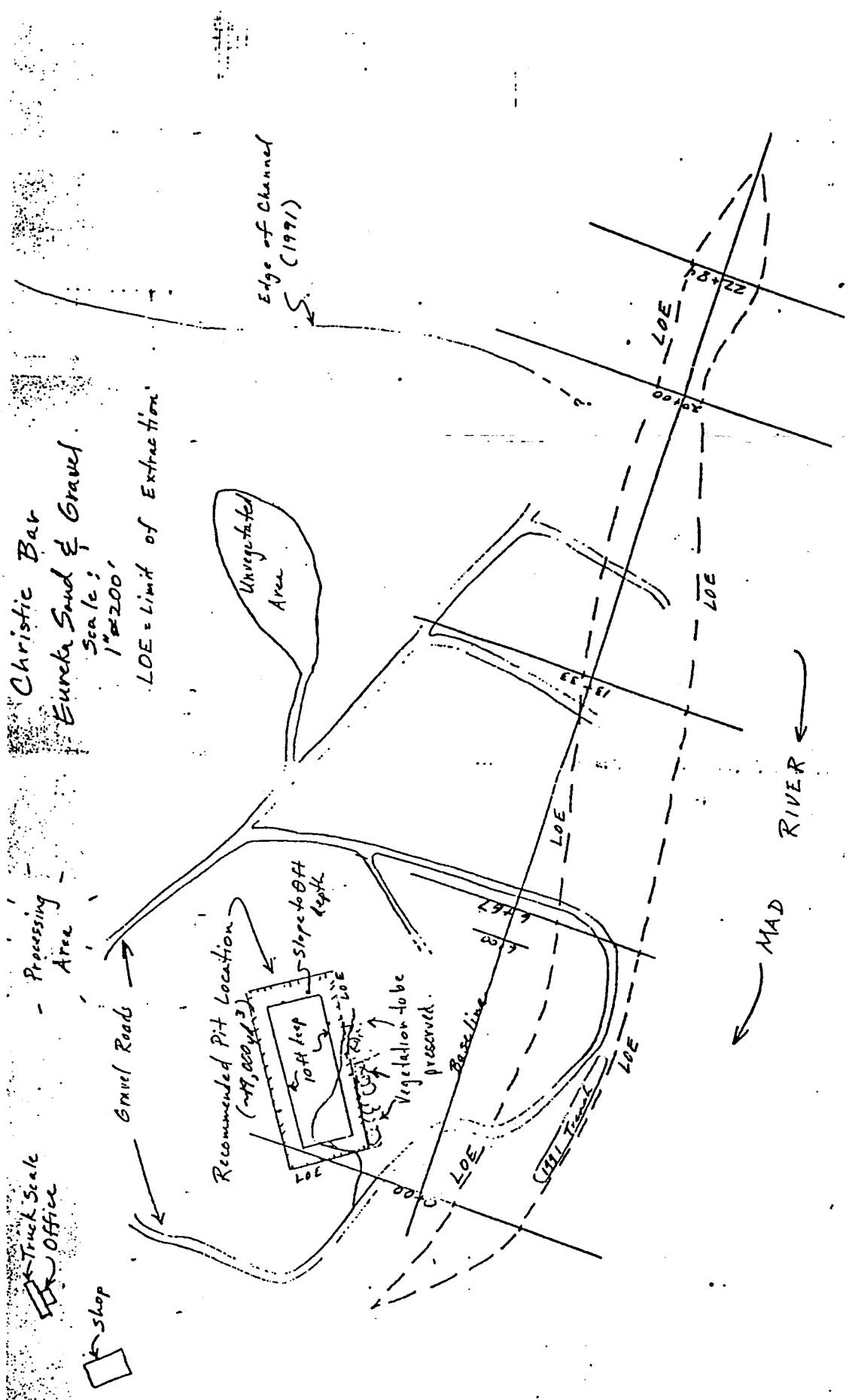
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GLYNNUP BAR
 MAD RIVER SAND AND GRAVEL
 RECOMMENDED EXTRACTION
 AREAS - 1992
 (Scale: 1" = 230')



Christic Bar
Eureka Sand & Gravel
Scale: 1"=200'

LOE = Limit of Extraction

Edge of Channel
(1991)

Unvegetated
Area

Recommended Pit Location
(104' x 104', 100,000 yds³)
Slope to Off
Depth

Vegetation to be
preserved.

Baseline

MAD RIVER

Truck Scale
Office

shop

Gravel Road

Processing
Area

FIGURE 2

NOTE: 1991 photo enlargements borrowed from

GRAVEL EXTRACTION TECHNICAL COMMITTEE**REPORT OF THE SCIENTIFIC TEAM****ADDENDUM: RECOMMENDATIONS FOR ADDITIONAL BARS**

Doug Jager
Randy Klein
Andre Lehre

14 July 1992

INTRODUCTION

This report is an addendum to our original report of 23 June 1992 and covers the four REA bars (Emmerson, Blue Lake, Johnson, and Graham bars) which we were asked to address in Banky Curtis' letter of 12 June 1992. We were given the necessary current maps and cross-sections of the sites on 13 July and conducted our field investigation that afternoon.

The team spent 0.5 days together in the field investigating the REA gravel extraction sites and developing prescriptions. Due to other commitments, Bill Trush was unable to go out in the field with the group or participate in the development of the report. In addition, Randy Klein calculated our proposed extraction volumes from the cross-sections, maps, and airphotos, while Andre Lehre wrote this report.

This report covers only our prescriptions for the four REA bars. For details on the bed degradation problem, our methodology, and the general basis for our recommendations, the reader should refer to our original report.

SITE-SPECIFIC RECOMMENDATIONS FOR PERMITTED REA BARS

These site-specific recommendations are only for the four currently permitted REA bars. Please note that these recommendations are specifically for 1992 and were made under the assumption that the coming water year will be no wetter than the past few have been. This is a reasonable and conservative assumption, as dry years tend to occur in groups. If water year 1993 is much wetter and leads to substantial recruitment of new gravel, our prescriptions in the following year would change.

EMMERSON BAR (REDWOOD EMPIRE AGGREGATES)**Prescription**

We recommend that gravel be extracted in 1992 by bar skimming according to the following specifications:

- a. Gravel removal is to begin at the riverward limit shown on the Pacific Affiliates cross-sections (undated; photo date 4-1-92).
- b. The extraction is to grade upslope away from the river at 3% to daylight or to our limit of extraction (see c below), whichever comes first.

- c. The limits of extraction vary from cross-section to cross-section as specified in the table below. These limits refer to the horizontal distance scales shown on the Pacific Affiliates cross-sections.

XS	riverward limit ft	landward limit ft	extraction width ft
1+00	none	none	0
6+00	none	none	0
11+00	340	235	105
15+00	370	305	65
18+38	385	175	210
23+00 LB bar	190	15	175
23+00 RB bar	none	none	0
27+00	315	500	185
30+00	480	660	180

The limit of extraction *between* cross-sections on each bar is defined by a smooth curve connecting the extraction limits at the adjoining cross-sections (See Fig. 3).

Amount of Extractable Gravel (1992)

We estimate that this prescription will yield approximately 7000 cubic yards on the downstream left bank bar and 3000 cu. yd. on the upstream right bank bar, for a total of 10,000 cu. yd. at this site. Note that 1000 cu. yd. on the right bank (upstream) bar was included in our estimate for the Guynup bar in our previous report (see p.5 of that report) and should not be double-counted. We revised our estimate upward based on the newly supplied cross-sections.

Rationale

This bar, the second below the hatchery, is quite important in allowing transport of bed sediment (gravel and coarse sand) downstream. In view of the small recruitment of new gravel from upstream during these dry years, we consider it especially important that 1) no trenching be allowed at this site, and 2) that the river be kept more confined here in order to allow some fraction of the newly recruited bed material to pass downstream.

Our observations in this reach showed that last year's trench had only slightly filled with gravel, suggesting that most of the newly recruited gravel had been retained in the Guynup trench upstream. Hence we recommend against any further trenching here.

We also recommend against excessive flattening and lowering of the Emmerson bars, which could lead to channel widening or braiding and retention of most newly recruited gravel at this site. The objectives of the riverward extraction limit and the 3% slope are to maintain flow confinement at low to moderate discharges and to facilitate transport of bed sediment through the reach to supply downstream areas.

Our placement of the landward limit of extraction is designed 1) to preserve the zone of early (3-5 yr) successional riparian vegetation and 2) to leave gravel available for transport at higher flows.

Because the left bank (LB) bar lies immediately upstream from the Blue Lake bridge which has experienced an average bed lowering of about 1.6 ft since 1982 (and a maximum point lowering of 4.5 ft), it is particularly important to 1) encourage transport through the reach and 2) to leave gravel available for transport at higher flows.

BLUE LAKE BAR (REDWOOD EMPIRE AGGREGATES)

Prescription

We recommend that gravel be extracted in 1992 by a combination of skimming on the lower portion of the bar and a limited pit excavation on the three to five-year terrace.

Skimming should be conducted according to the following specifications:

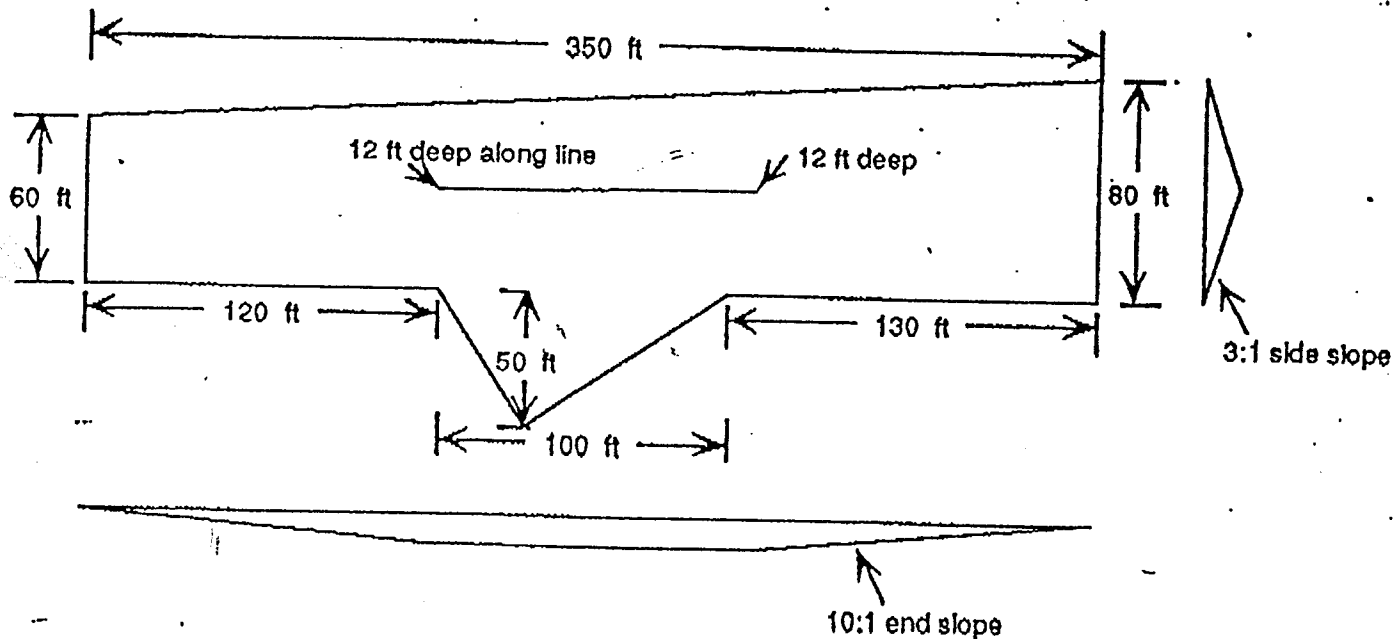
- a. Gravel removal is to begin one (1) foot in elevation above the water surface as defined in the Pacific Affiliates cross-sections (undated; photo date 4-1-92).

- b. The extraction is to grade upslope away from the river at 2% to daylight.
- c. The limits of extraction vary from cross-section to cross-section as specified in the table below. These limits refer to the horizontal distance scales shown on the Pacific Affiliates cross-sections of the site.

XS	riverward limit ft	landward limit ft	extraction width ft
0+00	0	0	0
10+00	195	375	180
20+00	445	640	195
30+00	385	480	95
38+00	none	none	0
42+00	none	none	0

The limit of extraction between cross-sections is defined by a smooth curve connecting the extraction limits at the adjoining cross-sections (See Fig. 4).

The pit should be located on the three to five-year terrace approximately 100 ft NW of the north end of cross-section 20+00 (see Fig. 4). We recommend a pit averaging 70 ft wide by 350 ft long with a maximum depth of 12 ft oriented as shown in Fig. 4. Our proposed design is shown below:



It is important that the corridor of riparian vegetation on the streamward side of the pit be preserved as shown in Fig. 4.

We carefully selected the pit site so as to avoid 1) significant adverse impacts on wildlife, 2) permanent changes in the landscape, and 3) changes in land use of agricultural areas located on high terraces near the river. This pit will be subject to occasional flooding and is likely to be obliterated by a large (e.g. 20 year) flood.

Our pit design is based on the assumption that the summer water table lies within about seven feet of the present bar surface. If the water table is significantly lower than seven feet, our design may have to be modified to encourage the growth of wetland vegetation such as cattails and horsetails. If necessary, any member of the scientific team can easily modify the design during excavation.

The gentle side and endslopes of the pit are designed to enable creatures to enter or leave the water body to enhance the development of a wide band of nearshore wet site riparian vegetation such as cattails and horsetails.

Fine silty overburden should be stockpiled during excavation. To enhance revegetation after excavation the stockpiled overburden should be spread over disturbed areas adjacent to the pit.

Amount of Extractable Gravel (1992)

We estimate that this prescription will yield approximately 20,000 cubic yards from bar skimming and 4000 cu. yd. from the pit, for a total of 24,000 cu. yd. at this site.

Rationale

The objective of the 1 foot offset and 2% slope for bar skimming is to provide both channel confinement and transport capacity through the reach while allowing limited deposition in this extremely wide cross-section. Such deposition will ultimately enhance confinement and transport capacity downstream. We recommend against any channel or bar trenching for the same reasons as at the Guynup site: it would intercept too much gravel recruitment from upstream.

We observed slight refilling of last year's trenches at the Blue Lake site. The emptiness of the trenches at the Emerson site indicates that this refilling resulted from local redistribution of gravel from the bed and bar upstream, rather than new recruitment.

The Blue Lake bar is very wide and has a substantial area that is flooded only at infrequent (e.g., 5 - 50 yr) intervals. Extracting gravel using a pit on the 3 to 5-year terrace (i.e., the surface which is just inundated by the 3 to 5-year flood) should not inhibit bedload transport to downstream areas at frequent flood flows. Although the 5-year flood may leave silt and organic debris in the pit, large magnitude flood flows (e.g., the 20-year flood) will rework the entire bar and will refill the pit with merchantable gravel.

The proposed pit lies in a currently barren area at the back of the bar. Our pit design will replace it with quality wetland. Because the 3 to 5-year terrace will only infrequently be covered with water (once in any three to five-year period on the average), problems of fish entrapment should be minimal.

JOHNSON BAR (REDWOOD EMPIRE AGGREGATES)

Prescription

We recommend that no gravel be extracted from this bar in 1992 due to its proximity to 1) the railway bridge and 2) the Humboldt Bay Municipal Water District intakes downstream. Both these sites are suffering from marked bed degradation (lowering) and it is important to facilitate gravel recruitment to them.

Amount of Extractable Gravel (1992)

None

Rationale

The amount of gravel available here above the 2% slope needed for transport is minimal. Since the bar is immediately upstream from important sites which are suffering from significant bed degradation, it is very important that transport be maintained through the reach.

GRAHAM BAR (REDWOOD EMPIRE AGGREGATES)

Prescription

We recommend that no gravel be extracted from this site in 1992 due to its proximity to the Highway 101 bridge a short distance downstream.

Amount of Extractable Gravel (1992)

None

Rationale

This site is immediately upstream of the Highway 101 bridge which, according to CalTrans, is threatened by significant bed degradation. Any removal of gravel in a site so near the bridge may exacerbate the situation. Gravel accumulation in the reach should be encouraged.

GENERAL COMMENT ON EXTRACTION VOLUMES

Our estimates of the extractable gravel volumes at the Emmerson and Blue Lake bars are based on the cross-sections and maps we were provided by Pacific Affiliates. We are uncertain as to the correctness of these documents, however. Specifically:

- 1) On both maps, the positions of the cross-sections along the baseline as drafted were not consistent with the map scale of 1 in = 400 ft. That is, the distances between the cross-sections as shown on the map are not consistent with the surveyed distances based on the station numbers. To the extent that these positions are incorrect, our volume estimates will be incorrect.
- 2) The lengths of the cross-sections as drafted on the map are not consistent with the lengths as shown in the cross-sections. We extended the cross-sections based on the map scale using the water's edge as a common reference point.
- 3) Some water surfaces shown on the plots seemed to be lower than we observed in the field, and on several cross-sections the water surface sloped significantly from one bank to the other when it should have been more nearly flat. Thus we are uncertain as to what the true water surface elevation was. When there were ambiguities, we chose the more conservative estimate (higher water surface elevation) which, of course, yields less gravel.
- 4) The base line (the line connecting the cross-sections on the map) was not shown in any of the cross-sections, making it difficult to locate the limits of extraction on the map. It also made locating in the field more difficult.

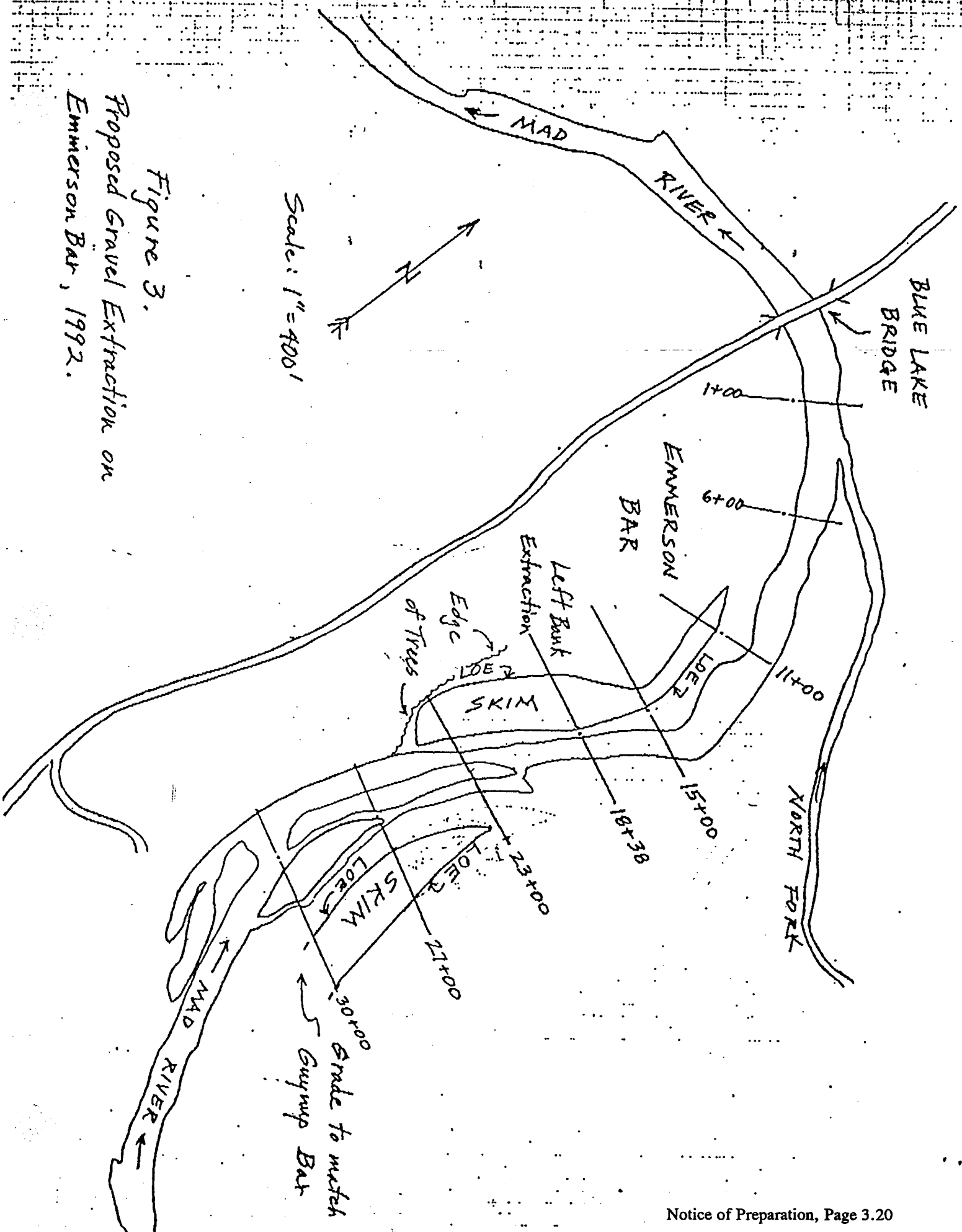


Figure 3.
 Proposed Gravel Extraction on
 Emerson Bar, 1992.

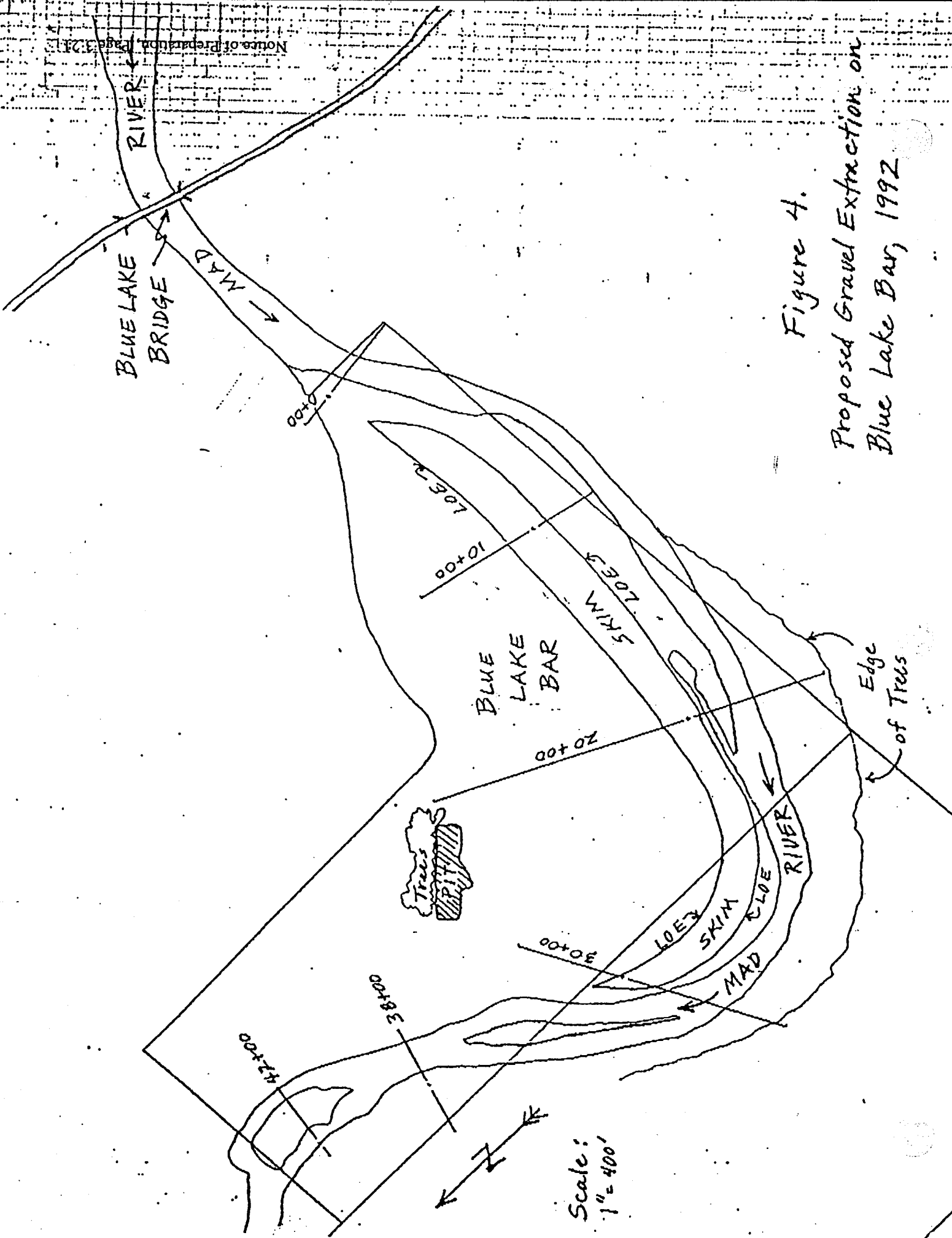


Figure 4.
Proposed Gravel Extraction on
Blue Lake Bar, 1992