	Yes	Maybe	No
important examples of the major periods of California history or prehistory?			X
b. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time while long-term impacts will endure well into the future.)			X
c. Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on [illegible] is [illegible] but where the effect of the total of those impacts on the environment is significant.)			
d. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			X

III. Discussion of Environmental Evaluation
(Narrative description of environmental impacts.)

See Attachment II

IV. Determination
(To be completed by the Lead Agency.)

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared. [X]

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION WILL BE PREPARED. [ ]

I find the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required. [ ]

Date 3/7/89

Signature [signature]

For Dept. Fish + Game

(Note: This is only a suggested form. Public agencies are free to devise their own format for initial studies.)

Proposal for Improving Angling Opportunities Near Carlsbad, California by Artificial Reef Construction

BACKGROUND

Since the late 1950's the California Department of Fish and Game (CDFG) has been successfully enhancing sportfishing success in southern California by construction of artificial reefs. Such reefs are an increasingly important fisheries management tools by which CDFG can significantly impact fishing success. Recent reef construction has provided opportunities for marine scientists to investigate fisheries/reef interactions and better understand benthic community development on such habitat. Results of these studies have advanced the Departments local sport fisheries management potential and suggested new improved, reef designs.

Observations of fishes inhabiting artificial reef suggest that they react differently to varied physical characteristics in reef design. Studies indicate fish "size grading" on reefs can be influenced by rock size and, perhaps, water depth. A series of fishing reefs has been constructed from San Diego to Santa Monica Bay. These reefs include built-in experimental designs that will allow future investigation of these, and other, questions while providing increased sportfishing opportunity and success.

PROPOSED REEF

We propose to build a 10,000 ton quarry rock fishing reef off the coast of Carlsbad, California that will increase local sportfish catch and allow us to further refine our knowledge of the relationships between some sportfish species and artificial reefs. The Carlsbad area (Figure 1) offers an opportunity, perhaps unique, to investigate the interaction between reef construction and nearshore sportfish populations beyond the expected fishery benefits.

The artificial reef proposed for Carlsbad differs in design from previous reefs built by CDFG. The reef will consist of a series of rock piles, or modules, forming four lines perpendicular to shore (Figure 2). Large rocks (4'-6') will be used to build half of the modules, small rocks (1'-3') will be used on the other.

The proposed design will act as an excellent fishing reef. However, the future opening of Bataquitos Lagoon presents a unique opportunity to increase our knowledge of the behavior of nearshore fishes on such reefs. The "size grading" phenomenon mentioned above, could facilitate movements of small or juvenile fishes into, and out of, the lagoon along the lines of modules comprised of smaller rocks. It has been suggested that the population declines appearing in several of southern California's most popular sportfish species can be attributed, in part, to the loss of wetlands and embayments. If this is the case, and such habitat is critical to juvenile and larval fish, the Bataquitos Lagoon opening will represent a small but significant change in direction for southern California coastal management. The proposed reef is designed to take advantage of such a development and provide shelter to juvenile fish entering and leaving the lagoon.

The site chosen for the reef, directly in front of the proposed lagoon opening, is located between two areas that have historically supported stands of Macrocystis (giant kelp). Macrocystis does not grow in the proposed site, and is precluded by the sand layer covering rock basement in the area. Since the reef will be in relatively shallow water (30 to 57 ft) and proximal to existing kelp forests, Macrocystis is expected to recruit successfully onto the rock substrate provided by the reef. This will increase primary productivity and provide additional habitat.

The fisheries management value of the reef is independent of the Bataquitos lagoon opening. The reef's sportfishing potential is excellent. A rock pile artificial reef constructed in nearby Oceanside has been very successfully fished by sport anglers from skiffs and from commercial sportfishing charter boats. However, little such relatively rugose rocky substrate is available in that section of coast and the Carlsbad reef will provide another site for sportfishing effort.

Oceanographic studies conducted by Tech-Marine indicate no sand transport or burial problems for the reef as designed and sited (see attached). No significant resources will be negatively impacted by the construction.

The City of Carlsbad is a beach community of 60,000. It covers 45 square miles including 6.5 miles of beach front. Within the city boundaries are 3 lagoons including the now closed Bataquitos Lagoon. Due to the shelf/sand nature of nearby subtidal substrate there are no particularly successful fishing sites within the city limits. The construction of Carlsbad Artificial Reef will provide such a site with no significant negative environmental impacts.

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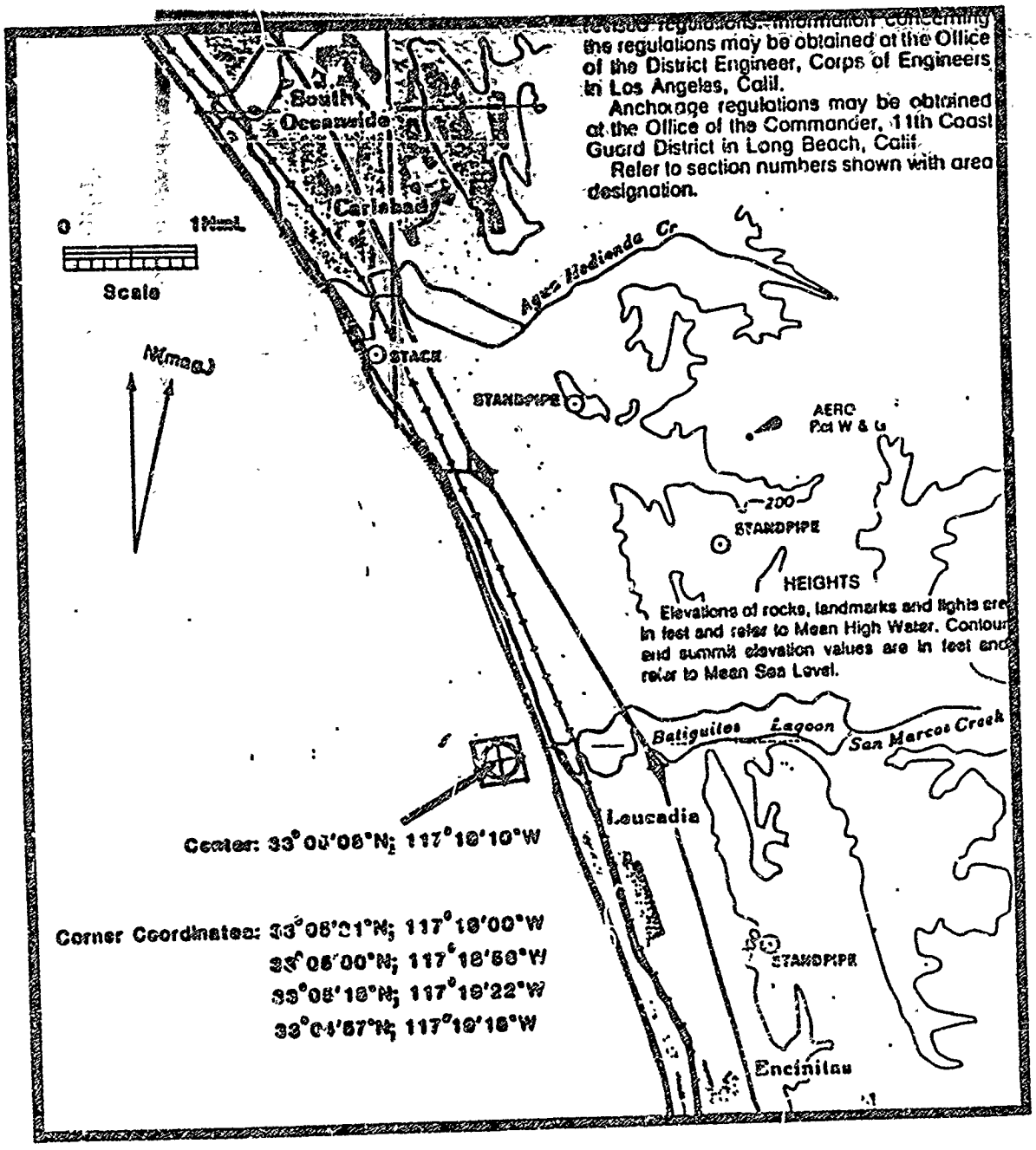

Figure 1. Proposed Carlsbad Artificial Reef

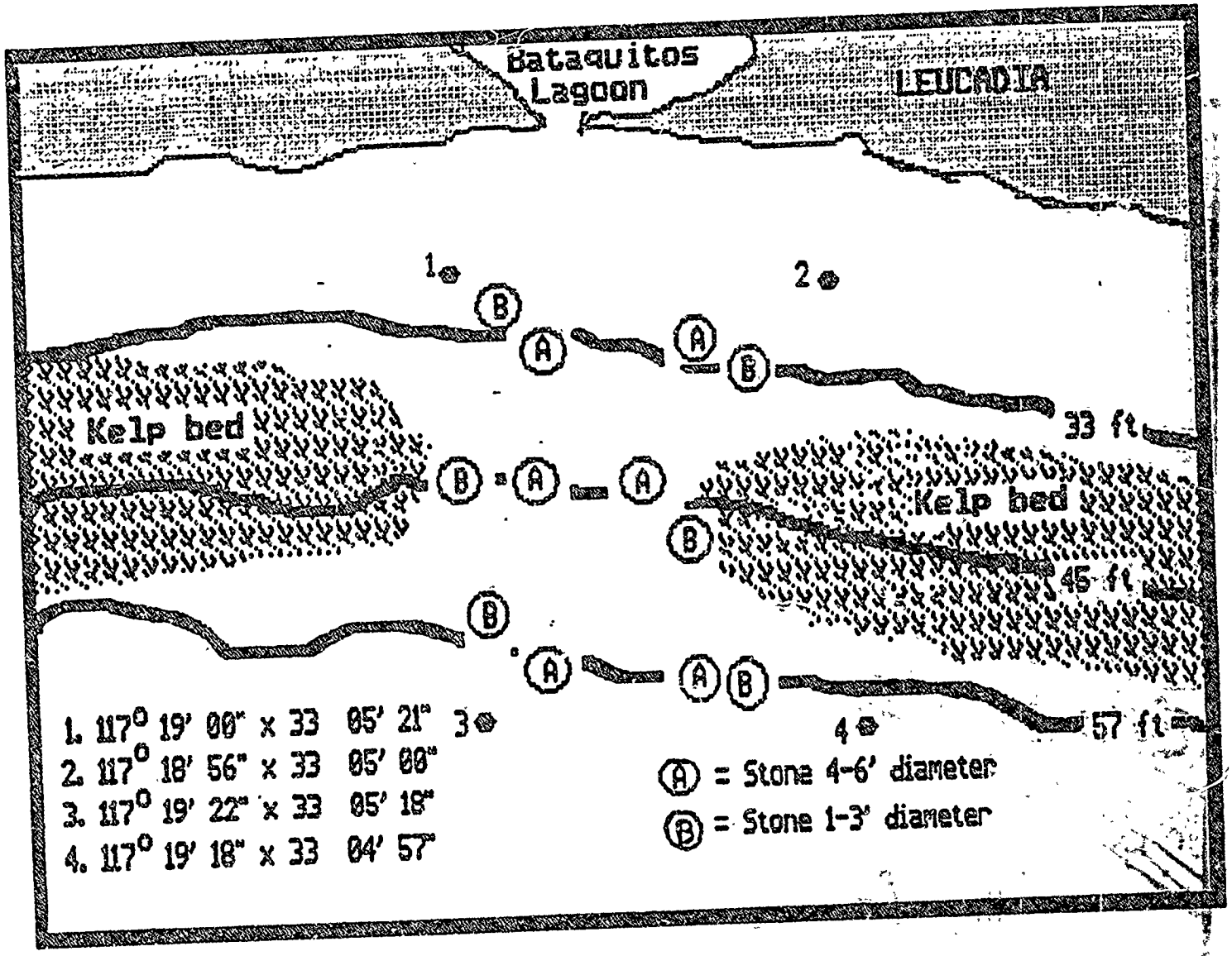

Figure 2. Carlsbad Artificial Reef – Relative location of reef modules

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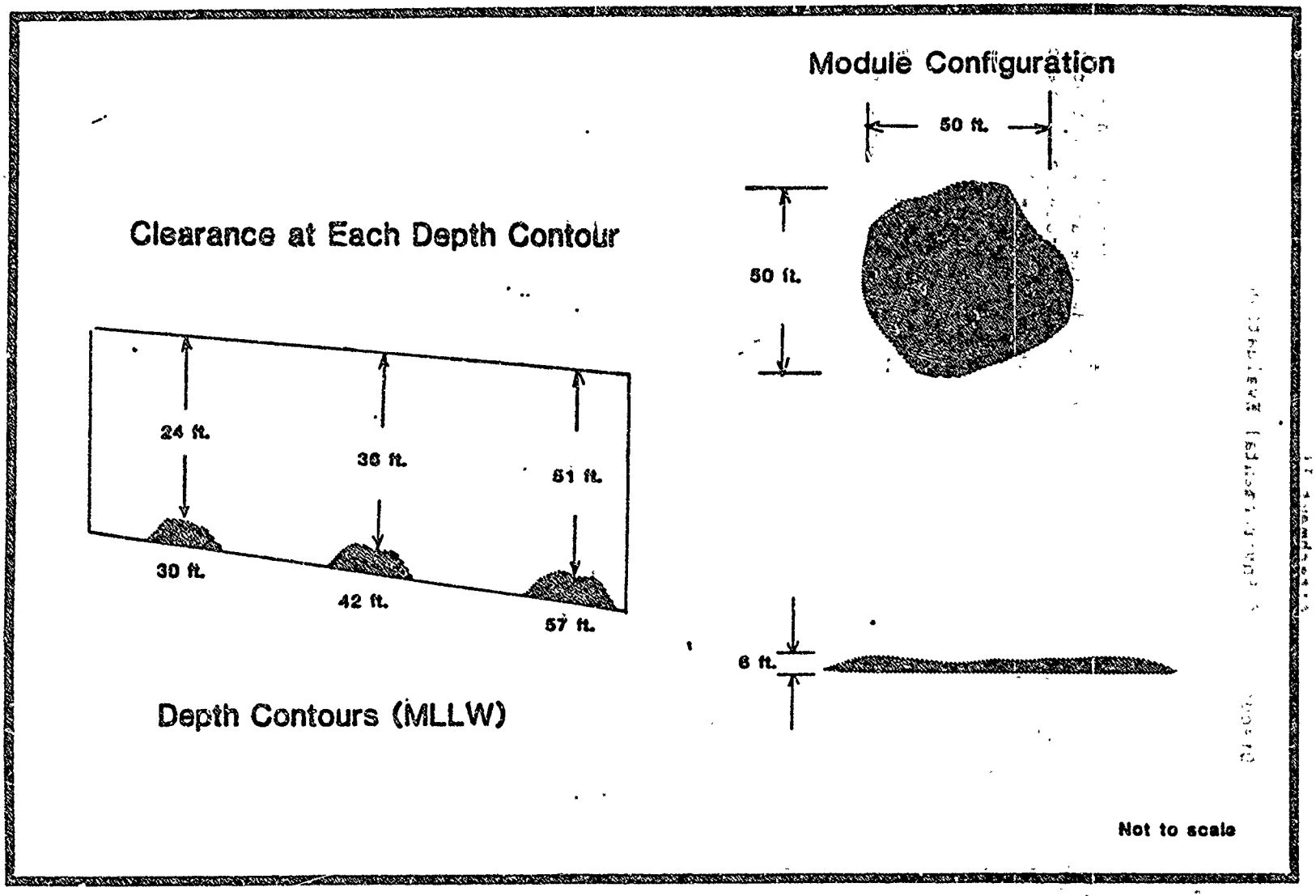

Figure 3. Clearances and configuration of Carlsbad Artificial Reef modules

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Attachment II

Discussion of Environmental Evaluation

Initial Study

WATER

3a. There will be very minimal and localized changes in water movvments around the rock piles. All modules will be outside the active littoral transport zone, so there will be no impact on coastal processes. There should also be no impact on wave patterns or recreational water activities (see enclosed TEKMARINE Report).

PLANT LIFE

4a. There will be an increase in numbers and diversity of aquatic plants as a result of the reef. Kelp plants will recruit to and grow on the rock piles.

ANIMAL LIFE

5a. There will be increases in the diversity and numbers of plants, invertebrates, and fish as a result of the reef construction. The present substrate is a dynamic, thin sand overlay covering a table rock-cobble bottom. There are very low numbers of the ornate tubeworm (Diopatra ornata) in the sand areas between the exposed rock, and occasional sand stars (Astropecten sp.) and Kellets whelks (Kelletia kelletia) on the more permanent sandy patches. Most species of the nearshore kelp bed-associated fishes probably move through the proposed site in transit to the two adjacent kelp beds. The placement of the 30,000 square feet of rock will, of course, remove an equal amount of the existing substrate by burial. However, this relatively unproductive area will be enhanced by the rugose and complex rock piles. Similar artificial reefs in the Southern California Bight have been very successful in increasing numbers and diversity of nearshore species of fish and invertebrate.

5d. As mentioned in 5a., above, the placement of the rock piles will cover 30,000 square feet of sand/rock substrate. However, the substrate in question is not very productive, perhaps due to the slight amount of sand that seasonally overlays the basement rock/cobble bottom. The transient nature of this thin (0-2 ft) layer of sand prohibits the development of either a stable sand or rock-dwelling community. The increase in biota resulting from the rock placement and subsequent colonization and use by benthic organisms will more than replace any organisms lost to burial.

NATURAL RESOURCES

9a. There may be an increase in the rate of use of natural resources resulting from increased recreational fishing pressure. This is difficult to assess since much of the pressure on artificial reefs is from anglers redirecting their efforts to the reefs from other traditional sites. Fish are attracted to artificial reefs and are, in theory, more vulnerable to take by fishing pressure. However, the reef

design is similar to that which has proven successful in increasing production in nearby areas, such as Pendleton Artificial Reef, and should function equally well here. Also, the placement of this reef at this site could provide significant overall increases in young fish survival if the proposed opening of Batiquitos Lagoon becomes a reality. The reef design is based upon reef studies that suggest fish segregate by size onto artificial reefs of different size rocks. We are investigating the potential for providing recruitment habitat and pathways for young and small fish to move into, and out of, the lagoon. Recent evidence suggests that such coastal lagoons provide critical habitat for young fish species that have suffered significant population declines coincident with loss of such habitat. If this experiment is successful, we may be able to develop a valuable tool for managing some nearshore sportfish populations. While we believe any increased use of the local sportfish populations will be minimal, the benefits of the project could be significant in terms of development of new management techniques.

TRANSPORTATION

13e. There will be some increase in water-borne traffic in the immediate area of the reef, particularly when it is first constructed. It should be noted, however, that the overall traffic in the area will not be significantly increased. There will be no increased use of adjacent harbors.

RECREATION

19. The proposed reef will have a positive impact on both the quality and quantity of existing recreational opportunities. The area around the proposed site has numerous very low relief, small natural reefs. The proposed reef would provide a substantially higher relief target for sport fishing.

DEPARTMENT OF FISH AND GAME

Marine Resources Division
330 Golden Shore, Suite 50
Long Beach, CA 90802

CALIFORNIA ENVIRONMENTAL QUALITY ACT

NEGATIVE DECLARATION

CEQA Guidelines

AGENCY
California Department of Fish and Game

PROJECT TITLE
Carlsbad Artificial Reef

PROJECT LOCATION
within area described by corner coordinates:
33° 05' 21"N x 117° 19' 00"W
33° 05' 00"N x 117° 18' 56"W
33° 05' 18"N x 117° 19' 22"W
33° 04' 57"N x 117° 19' 18"W

PROJECT DESCRIPTION:
Construction of artificial reef from 10,000 tons of quarry rock (SEE ATTACHMENT I)

NAME AND ADDRESS OF APPLICANT
California Department of Fish and Game
330 Golden Shore, Suite 50
Long Beach, California 90802

FINDING:

The Nearshore Sportfish Habitat Enhancement Project of the Department of Fish and Game has determined that this project will not have a significant effect on the environment for the following reasons:

The Reef will have no significant impact on the existing marine environment. any changes that do occur will be beneficial in that there will be an increase in numbers and diversity of the nearshore species of fish and invertebrates.

▶ SEE ATTACHED SHEET(S) FOR ANY MITIGATION MEASURES IMPOSED.

THE INITIAL STUDY PREPARED FOR THIS PROJECT IS ATTACHED.

NAME OF PERSON PREPARING THIS FORM	TITLE	TELEPHONE NUMBER
John J. Grant	Marine Habitat Development Coordinator	(213) 590-5180

ADDRESS	SIGNATURE (Official)	DATE
California Department of Fish & Game 330 Golden Shore, Suite 50 Long Beach, California 90802		2/27/89

TEKMARINE

November 8, 1988
Ref: TCN-138/1

Mr. John Grant
Department of Fish and Game
330 Golden Shore
Suite 50
Long Beach, CA 90802

Subject: Carlsbad Artificial Fishing Reef

Dear John:

On behalf of the City of Carlsbad, we have reviewed your proposed site and design for the Carlsbad artificial fishing reef (CAR, see Attachment 1) from an oceanographic and engineering perspective. Our review comments are detailed below. In summary, we endorse the proposed site and design with the exception that we recommend siting the shallow water modules at the sediment transport closure depth of 30 ft, MLLW (see Attachment 2) to minimize inundation resulting from seasonal beach profile changes.

Site Evaluation

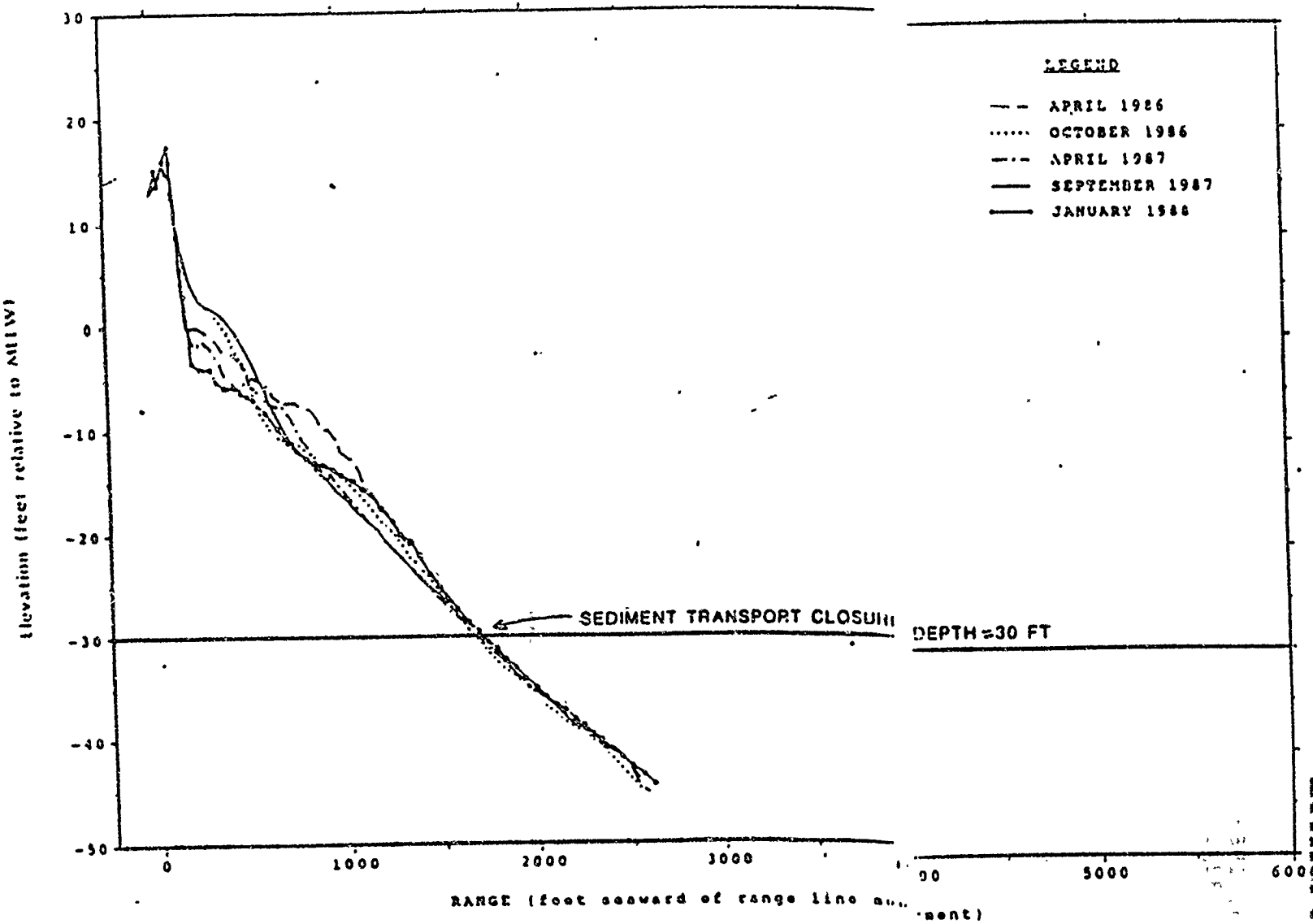
It is our understanding that the site selection was limited to the area offshore of Batiquitos Lagoon because of the proposed lagoon opening and the potential for biological interaction between the reef and lagoon. As indicated in our meeting of October 4, 1988, our primary concern with this site is the potential for siltation resulting from the opening of the lagoon and nourishment of the adjacent beaches. To evaluate this site and, in particluar, address the foregoing concern, we conducted a literature review and on-site inspection.

Our literature review concentrated on the results of Tekmarine's evaluation of sites, extending from mid-Carlsbad to Camp Pendleton, for the Oceanside fishing reef (December, 1985). Findings relevant to the siting of CAR include the following:

- The area has a relatively straight shoreline and uniform bathymetry indicating that differences in oceanographic considerations will be subtle.
- Sediment supply due to discharges of coastal rivers is greatest near the San Luis Rey River, suggesting that turbidity will be reduced at sites farthest from the river.

Cont'd

TEKMARINE, INC. 572 EAST GREEN STREET PASADENA, CALIFORNIA 91101
TELEPHONE: (818) 405-9111 TELECOPIER: (818) 405-0691 TELEX: 753709 TEKMARINE UD



ATTACHMENT 2: NEARSHORE PROFILES AT BA QUITOS LAGOON

SOURCE: US ARMY CORPS OF ENGINEERS COAST OF CALIFORNIA ORM AND TIDAL WAVES STUDY

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VIBRACORE LOG

Core number: 1435 Date: 2/81

Total core length (cm): 73 Sheet 1 of 1

Number of core sections: 1

Water depth (ft): 42 Vertical scale: 1 cm = 25 cm

Distance in cm from top of core	Description	Log
0-73	Sand: very fine grained, ranges from silt to fine sand from 0-65 cm., moderately well sorted; medium sand to gravels from 65-73 cm. with abundant clasts (1-5 cm. dia.), poorly sorted; olive gray (5 Y 4/1) grading to olive black (5 Y 2/1); apparently massive; highly micaceous grading downward to slightly micaceous.	

SOURCE: OSBORNE, R. H. et al, JUNE 1983, 'REPORT OF POTENTIAL OFFSHORE SAND AND GRAVEL RESOURCES OF THE INNER CONTINENTAL SHELF OF SOUTHERN CALIFORNIA', UNIV. OF SOUTHERN CAL., prepared for STATE OF CAL. DEPT. OF BOATING AND WATERWAYS

ATTACHMENT 3: VIBRACORE LOG OFF BATIQUITOS LAGOON

- The potential for sediment movement (scour and deposition) exists throughout the study area due to wave and current action. However, the potential decreases with water depth.

- The seafloor sediments in the area are uniformly graded silty sands suitable as a foundation for a quarrystone reef.

- Traces of sewage in the surface sediments are weak throughout the area.

Additional data sources consulted included the nearshore bathymetric survey data base (U.S. Army Corps of Engineers Coast of California Storm and Tidal Waves Study) and a report on sand and gravel resources of the nearshore area of southern California (Dept. of Boating and Waterways, June 1983). Site-specific findings relevant to the proposed CAR location included the following:

- Seasonal on- offshore sediment transport is limited to a depth of approximately 30 ft, MLLW (see Attachment 2).

- The seafloor sediments consist of a thin veneer of fine sand (0-2 ft thick) overlying medium sand and gravels, based on a vibracore log in a water depth of 42 ft (see Attachment 3).

Based on the findings of our literature review, we had no reason to suggest an alternative site off of Carlsbad. However, a dive inspection was made on October 19, 1988 to investigate the potential for siltation resulting from the Batiquitos Lagoon enhancement plan. The objective of the inspection was to compare seafloor conditions at the proposed CAR site with those directly offshore of the discharge outlet of Agua Hedionda Lagoon. The rationale for this objective was based on the assumption that the conditions at Agua Hedionda (beach nourishment adjacent to the outlet) may be somewhat analagous to those proposed at Batiquitos Lagoon, and, therefore, it may be possible to draw inferences based on existing relative conditons. In fact, the conditions at the Agua Hedionda discharge outlet may be worse because the flow is essentially unidirectional while at Batiquitos the flow direction will change with the tide.

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The dive inspections were conducted at depths of 30 and 60 ft, MLLW off of Batiquitos Lagoon and depths of 15 and 35 ft, MLLW off of Agua Hedionda Lagoon. During each dive the following activities were performed: 1) a visual inspection of seafloor conditions, 2) grab sampling of sediments for subsequent sieve analysis, and 3) seafloor probing with a hand-held rod.

Results of the inspections were remarkably similar at all dive sites: the bottom was essentially a featureless fine-grained sand plain with some evidence of bottom-founded marine life. The seafloor was probed 2-3 ft except at the 60 ft site where only a thin veneer of sand several inches thick covered gravel and cobble.

If the seafloor off of Agua Hedionda had been coarse sand, cobbles or rock, it could have been concluded that siltation was not occuring. Conversely, if the seafloor had been a desert of silt-sized sediments, it could have been concluded that siltation was occuring. The existence of some bottom-founded marine life and fine-grained sediments similar to those off of Batiquitos Lagoon suggests that heavy sedimentation is not a problem off of Agua Hedionda and may not be a problem off Batiquitos Lagoon.

Based on our literature review and site inspections, our only recommendation concerning the proposed site of CAR is that the shallow-water modules be sited at the sediment transport closure depth of 30 ft to minimize temporary inundation during seasonal beach profile changes.

Reef Design

Our primary concern in reviewing the reef design was to assess the potential for impacts on natural coastal processes and coastal recreational activities, e.g., sediment transport and surfing. Assuming the shallow-water modules are sited at 30 ft, MLLW, all of the modules will be outside of the active littoral transport zone and there should be no impact on coastal processes. Furthermore, because the overall dimensions of the modules are small relative to the length of typical waves in the area, there should be no impact on wave patterns or recreational water activities.

Cont'd

The reef design was also reviewed for structural integrity, i.e. rock stability. A cursory evaluation of rock stability based on rock size, water depth, and wave conditions indicates the rocks are adequately sized.

Should you have any questions regarding our review or if we can assist in expediting the permitting process, please feel free to call.

Very truly yours,
TEKMARINE, INC.

Chris C. Butcher, P.E.
Senior Engineer

xc: Mr. John Cahill, City of Carlsbad

Attachments: as stated

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OF POOR QUALITY 3538

EXHIBIT "C"

NOTICE OF DETERMINATION

TO: X Office of Planning and Research
1400 Tenth Street, Room 121
Sacramento, CA 95814

___ County Clerk
County of _____

FROM: (Public Agency)
Department of Fish and Game
330 Golden Shore, Suite 50
Long Beach, CA 90802

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

Project Title
Carlsbad Artificial Reef Construction

State Clearinghouse Number (If Submitted to Clearinghouse)	Contact Person	Area Code/Number/Extension
SCH #89030821	John Grant	(213) 590-5180

Project Location
Offshore Carlsbad, CA Orange Co. within area described by: 33°05'21"Nx117°19'00"W 33°05'00"Nx117°18'56"W 33°05'00"Nx117°18'56"W 33°04'57"Nx117°19'18"W

Project Description

10,000 ton Quarry Rock Artificial Reef

This is to advise that the Department of Fish and Game (Lead Agency or Responsible Agency) has approved the above described project on 6/13/89 (Date) and has made the following determinations regarding the above described project:

1. The project ___ will, X will not have a significant effect on the environment.
2. ___ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
   X A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures ___ were, X were not made a condition of the approval of the project.
4. A Statement of Overriding Considerations ___ was, X was not adopted for this project.

This is to certify that the final EIR with comments and responses and record of project approval is available to the General Public at:

Department of Fish and Game, Region 5 and MRD, 330 Golden Shore, Suite 50
Long Beach, CA 90802

Date Received for Filing and Posting at OPR _____

Signature (Public Agency) — Chief Deputy Director — Title

FILED AND POSTED BY
Governor's Office of
Planning and Research

JUN 14 1989

Revised March 1986

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