CALIFORNIA – THE RESOURCES AGENCY PETE WILSON, *Governor*

CALIFORNIA COASTAL COMMISSION

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STAFF RECOMMENDATION
REGULAR CALENDAR

APPLICATION NO.: **E-95-5**

APPLICANT: **Marine Forests Society**

AGENT: Rodolphe Streichenberger, President

PROJECT LOCATION: The project is located on a 10-acre sub-tidal parcel, approximately 300 yards offshore the Balboa Peninsula, Newport Beach, Orange County (Exhibit 1).

PROJECT DESCRIPTION: An after-the-fact permit request for an existing, artificial marine habitat experiment. The development includes the placement of a variety of materials on the sea floor, including but not limited to: (1) scrap automobile tires; (2) PVC pipe; (3) plastic mesh; (4) netting; (5) plastic jugs; (6) nylon rope; (7) polyurethane foam; (8) iron rod; and (9) concrete blocks. (See Section 2.1.3)

SUBSTANTIVE FILE DOCUMENTS: See Appendix A

SYNOPSIS

Staff recommends denial of this project on the basis that it is inconsistent with the Chapter 3 policies of the Coastal Act and because feasible and less environmentally damaging project alternatives that meet the objectives of the Marine Forests Society project currently exist.

The Marine Forests Society (MFS) project consists of the placement of a variety of structures on the sea floor as a basis to examine the technical feasibility of large-scale marine habitat enhancement utilizing plastic structures, tires, and other materials. The development was conducted between 1988 and 1993, and is described by the applicant in the following manner:

1. approximately 2000 "kelp bio-structures," installed in 1988-1989, each consisting of an air-filled, one-gallon, plastic jug which is wrapped with plastic mesh, floating

approximately 12 feet above the sea floor, and moored with 1/4-inch-diameter, nylon rope and a plastic anchor;

2. approximately 100 "mussel columns," installed in 1988-1989, each consisting of a 20-foot-long, 6-inch-diameter, polyvinylchloride (PVC) pipe, filled with air and capped in order to be suspended vertically in the water column, and moored 15 feet below the water surface with 5/8-inch-diameter, nylon rope and a plastic anchor;
3. approximately 15 "tire ribbons," installed in 1993, each consisting of approximately 100 scrap, automobile tires, tied together with nylon rope, and moored with 3/8-inch-diameter, nylon rope and plastic anchors, totaling approximately 1500 tires;
4. four, "plastic tube and net habitats," installed in 1989, consisting of 20-foot-long, PVC pipes, nylon ropes, and nylon nets;
5. two "pyramid habitat," made of iron rods with nylon mooring line, three feet high;
6. one "bundle habitat," made of iron rods with nylon mooring line, three feet high;
7. four "plastic boulder habitats," described as 4 feet high, made of polyethylene mesh;
8. three "concrete block habitats," each consisting of eight, hollow, concrete blocks;
9. five "tire columns," installed in 1991, made of an unspecified number of automobile tires filled with polyurethane foam; and
10. two "unrelated experimental habitats," described as consisting of plastic substrates, floats and anchors.

The staff recommends that the Commission deny the MFS permit application for the following reasons:

- The project is sited in an area of degraded water quality, increasing the risk of harm to marine organisms and of human exposure to contaminants in conflict with Coastal Act sections 30230 and 30231.
- The use of automobile tires posses an unacceptably high risk of release toxic compounds into the marine environment in conflict with Coastal Act sections 30230 and 30231.
- The project is sited within the littoral zone and may therefore contribute to beach erosion. Because it is not sited in a location that would avoid this adverse effect, the project is in conflict with Coastal Act section 30233 which prohibits fill in open coastal waters that does not incorporate the least environmentally damaging feasible alternative.
- The project uses low density materials which are unlikely to remain in place during periods of heavy seas, and the project does not provide for maintenance of the site. Project components will eventually become loose debris, with the potential to harm marine organisms, interfere with navigation, degrade the aesthetic quality of nearby beaches, create a hazard to beach users, and become a public liability in conflict with Coastal Act sections 30210, 30211, 30230, and 30231.
- The project is inconsistent with Coastal Act section 30233 because feasible project alternatives are available which would lessen the environmental impacts resulting from the project, and because the project fails to provide feasible mitigation measures which would lessen its adverse effects to coastal resources.

Table 1 summarizes the basis for the staff recommendation for coastal development permit denial. Reference citations and in-depth analysis's of each issue area are included in Section 2, Findings and Declarations, of this report.

Table 1. Issue Summary: Potential Project-Related Impacts

Issue	Analysis
Sewage Outfall	The proposed project is located within a shellfish harvesting exclusion zone due to its proximity to an Orange County Sanitation District sewage outfall. Artificial reefs are designed to attract and/or produce fish and invertibrates and to enhance sport fishing opportunities. The siting of an artificial reef in an area of degraded water quality increases the risk that marine life attracted to the area will be adversely affected by exposure to contaminants. Recreational anglers may catch and consume fish contaminated with *E. coli* and other pathogens associated with the sewage outfall. The Marine Forests Society (MFS) CDP application states that recreational divers may harvest shellfish from the project site. Siting the MFS project at this location is not consistent with the marine resource protection policies of Coastal Act sections 30230 and 30231.
Toxic Leachates from Tires	Tires contain compounds that are harmful to some organisms and acutely toxic to other organisms. Studies conducted by the Ontario Ministry of the Environment and for the Maryland Department of Natural Resources indicate that tires submersed in water release toxic chemicals. Additionally, used automobile tires are contaminated with road debris, dirt, oil, and other substances. These contaminant materials pose a risk to marine life and compromise water quality. Analysis regarding bio-accumulation of chemical compounds and the resultant impacts have not been completed. The impacts associated with the concentration of these noxious substances resulting from the placement of tires into the marine environment is potentially significant. The staff of the Santa Ana Region Regional Water Quality Control Board does not recommend approval of the MFS project due to their concerns regarding the release of toxic compounds from the tires and the bio-accumulation of these substances. California Department of Fish and Game biologists believe that surface toxicity may interfere with the ability of marine species to attach to tire surfaces. The use of automobile tires for the MFS project posses an unacceptably high risk of release of toxic substances into the marine environment in conflict with the requirement of Coastal Act sections 30230 and 30231 to protect the biological productivity and quality of coastal waters.
Marine Debris	The materials used for the MFS project, including used automobile tires, plastic jugs, PVC pipe, plastic mesh, netting, nylon rope, Styrofoam, and a variety of other, man-made materials, are not sufficiently dense to remain in place on the sea floor under heavy storm and wave conditions. The project structures are anchored to the sandy bottom by means of small plastic anchors and 1/4-inch-diameter, nylon rope. The MFS states that it does not intend to maintain the project site and has in fact already abandoned in-place several past experiments. For example, in 1988 the MFS installed 2000 "kelp bio-structures", each consisting of 12-foot-long, 1/4-inch-diameter anchoring lines, protruding above sand level, topped by a one-gallon plastic jug wrapped in plastic mesh. When it cancelled the kelp experiment, the MFS abandoned the plastic jugs, ropes, and mesh netting in-place. During site inspections in September 1993, and October 1995, only a few of the original 2000 deflated plastic jugs were observed. Past experience demonstrates that project structures will eventually break loose from their moorings and become marine debris. At sea, discarded plastics create problems for both marine life and human activities. Drifting plastics can foul props and jam cooling intakes of small vessels. Beaches become cluttered with discarded materials. Sea life dies from eating plastics or from entanglement. PVC piping is shattered and moved about by rough ocean waters. Discarded netting and rope

	assemblies can trap fish and marine mammals long after they are abandoned. Abandoning project components in-place constitutes ocean dumping. The use of the such materials for artificial reef construction is inconsistent with public access and marine resource protection policies contained in Coastal Act sections 30210, 30211, 30230 and 30231.
Beach Erosion	The MFS project is located within nearshore waters, at depths of -30 to -40 feet, in an area known as the littoral zone. Sediment deposition within the littoral zone affects the rate and force with which ocean waves contact the shoreline. When sand is trapped by structures placed within the littoral zone and not allowed to complete its natural migratory cycle, shoreline sand deposition and beach erosion both up-coast and down-coast can be altered. Consequently, the dynamics of beach erosion and accretion can be altered by structures within the littoral zone. As sand is lost from the littoral zone in one area, the ocean waves will break closer to shore and increase shoreline erosion. The Balboa Peninsula is losing sand at a retreat rate of about 5 feet per year. The MFS project is designed to trap and hold sand and probably has affected local sediment transport. This adverse environmental impact could have been avoided by locating the MFS project in deeper water, outside of the littoral zone. The project is therefore inconsistent with Coastal Act section 30233 and the California Environmental Quality Act (CEQA).
Project Alternatives	Using materials more suitable for the marine environment, using a more reliable anchoring system, locating the project outside of the littoral zone, and locating the project in an area of higher water quality are all feasible alternatives that would substantially lessen the adverse effects of the MFS project to coastal resources. Because it is not the least environmentally damaging feasible alternative, the proposed project is inconsistent with Coastal Act section 30233 and the CEQA.
Mitigation	Feasible mitigation measures that would lessen the project's impacts to coastal resources include: (1) a mechanism for long-term financial security for proper cleanup and/or removal of project materials; (2) a monitoring, mitigation and reporting plan which examines impacts to water quality, marine organisms and shoreline erosion; and (3) a long-term monitoring and maintenance program for the physical condition of the anchoring system and the structural integrity of the various project components. The MFS project should also include a well thought experimental methodology and a quantifiable measure of success. Because it does not incorporate such measures, the MFS project is inconsistent with Coastal Act section 30233 and the CEQA.

1.0 STAFF RECOMMENDATION

Denial

The staff recommends that the Commission adopt the following resolution:

The Coastal Commission hereby denies a permit request for the Marine Forests Society project on the grounds that the development does not conform with the provisions of the Chapter 3 Policies of the California Coastal Act of 1976 and that feasible alternatives and mitigation measures are available which would substantially reduce significant adverse impacts on coastal resources within the meaning of the California Environmental Quality Act.

2.0 FINDINGS AND DECLARATIONS

2.1 Project Location and Background

2.1.1 Location

The project is located on a 10-acre, sub-tidal parcel in the Pacific Ocean, approximately 300 yards offshore of the Balboa Peninsula, Newport Beach, Orange County. The parcel is located on tidelands granted to the City of Newport Beach, and has an approximate latitude of 33° 35' 37" north and longitude of 117° 35' 37" west (see Exhibit 1).

2.1.2 Background and History

The Marine Forests Society (MFS) corporation is a non-profit organization, mainly staffed by volunteers, whose stated purpose is to demonstrate new possibilities in marine sciences, techniques, and economics to develop life in the sea. The MFS project is intended to demonstrate how scrap tires and other readily available discarded materials can be formed into productive artificial marine habitats and how successfully using tires as an artificial reef substrate can help alleviate solid waste disposal problems. The MFS project is additionally intended to determine the biological, technical and economic feasibility of using scrap tires and other discarded, man-made materials as artificial reef substrate.

In April 1987, the MFS applied for and received a conditionally approved aquaculture lease from the California Fish and Game Commission (CF&GC). Appendix B, CF&GC Lease History, summarizes the aquaculture lease agreement chronology. Consistent with CDFG's aquaculture program to promote aquacultural development in the State, the lease specified that the MFS must either enter into a production agreement with the CF&GC and meet minimum planting and production requirements after five years of operation in order to renew the lease or abondon the lease site and remove the development. Condition G of the lease agreement explicitly requires the lessee to obtain Coastal Commission regulatory approval prior to proceeding with the project. In conflict with this requirement, the MFS undertook the project without notifying the Coastal Commission or obtaining a coastal development permit or regulatory approval from other interested agencies. Thus, an environmental analysis to identify project-related impacts, as required by the Coastal Act and the California Environmental Quality Act was avoided. According to Rodolphe Streichenberger, President of the MFS, the MFS knowingly chose not to pursue regulatory approval from the Coastal Commission.[1]

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[1] Personal communications between Rodolphe Streichenberger, MFS, and Darryl Rance, Coastal Analyst, California Coastal Commission, June 14, 1995, and October 23, 1995.

The lessee (MFS) did not fulfill the minimum aquaculture production requirements. In fact, the MFS had no production (sales of products) from the lease. The project therefore failed to qualify as an aquaculture operation. More importantly, the project is located in an area where mariculture (marine aquaculture) of shellfish is prohibited due to potential contamination from the nearby Orange County Sanitation District wastewater out-fall and local marinas (see Section 2.2.5, California Department of Health Services). In October 1994, the CF&GC declared Lease No. M-738-02 abandoned by mutual agreement between Rodolphe Streichenberger and the CDFG.[2]

Condition "F" of Aquaculture Lease M-738-02 required that all project-related improvements be salvaged and removed within 90-days of the termination of the lease. The MFS has not removed any project-related materials. The CDFG has taken no action to enforce the removal requirement of the aquaculture lease during the MFS's pending pursuit of an after-the-fact CDP for the project. All project related materials remain on the site today or have been carried away by ocean currents.

2.1.3 Related Projects

The coastal permit application states that the MFS's aim is to establish financially profitable methods for creating artificial marine habitats. As discussed in greater detail in this report, the MFS proposes that if the project is a technical and economic success, large portions of California's sandy ocean bottoms can be used to create reefs composed of waste tires. The CDP application presents the MFS project as one that will lay the groundwork, and set precedent for similar future projects. According to the Marine Forest Society's 1993 Business Plan,

> *"after the expected success of the MFS project, the MFS will transfer the acquired knowledge to entrepreneurs willing to participate in the fifty tire reef/marine forest program that the MFS has promised to California ... the habitats will be built and exploited for profit by private entrepreneurs."*

2.1.3.1 MFS Tire Reef Demonstration Project

In March 1995, the City of Newport Beach granted a Harbor Permit to the MFS for a separate, different project consisting of the construction of an artificial reef using 30,000 scrap tires adjacent to the location of the project discussed in this report. At the same time, the City also issued a Negative Declaration for the proposed "tire reef demonstration project" (TRDP). In June 1994, the MFS submitted an incomplete CDP application for the TRDP.

2.1.3.2 Nautilus Farms Tire Reef

On March 16, 1994, Nautilus Farms Inc., secured a conditional aquaculture lease for a aquaculture/artificial reef project from the Fish and Game Commission. The Nautilus Farms Tire Reef project proposal consists of the construction of a scrap tire reef consisting of three million tires. The issuance of the CDFG aquaculture lease agreement is contingent upon: (1) obtaining a lease agreement for the sub-tidal lands upon which the project is proposed; (2) obtaining a CDP from Coastal Commission; (3) agreement to an aquaculture planting and production plan; (4) and the preparation of an Environmental Impact Report to assess and mitigate impacts associated with the placement of tires into the marine environment. The Nautilus Farms project is proposed to

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[2] Letter from Robert Treanor, Executive Director, California Department of Fish and Game to Rodolphe Streichenberger, MFS, October 19, 1994.

closely follow the design and operational techniques established by the MFS. The EIR required for the Nautilus Farms project has not been completed.

2.1.4 Project Description

2.1.4.1 Purpose

The MFS describes the purpose of its project as an attempt to demonstrate the technical feasibility and financial profitability of creating large-scale, artificial, marine habitats with used tires and other, man-made materials, stating:

> *"[t]ires are a major component of solid waste generated throughout the world with some 28,500,000 used tires produced annually in California. Tire disposal is a major solid waste problem. The MFS project is intended to show how miscellaneous discarded materials and scrap tires can be formed into a productive reef. If the project is an economic success and technical success, the MFS has proposed that large portions of California's sandy ocean bottoms may be used to create habitats composed of waste tires."*

The MFS specifies that while it is conducting aquacultural research, the project does not include the harvest of any aquacultural product for human consumption. However, the MFS permit application states that recreational divers may collect shellfish from the project site.

2.1.4.2 Structures

The permit application proposes after-the-fact CDP authorization of a variety of structures installed during 1988, 1991 and 1993, described as:

1. approximately 2000 "kelp bio-structures," installed in 1988-1989, each consisting of an air-filled, one-gallon, plastic jug which is wrapped with plastic mesh, floating approximately 12 feet above the sea floor, and moored with 1/4-inch-diameter, nylon rope and a plastic anchor;
2. approximately 100 "mussel columns," installed in 1988-1989, each consisting of a 20-foot-long, 6-inch-diameter, polyvinylchloride (PVC) pipe, filled with air and capped in order to be suspended vertically in the water column, and moored 15 feet below the water surface with 5/8-inch-diameter, nylon rope and a plastic anchor;
3. approximately 15 "tire ribbons," installed in 1993, each consisting of approximately 100 scrap, automobile tires, tied together with nylon rope, and moored with 3/8-inch-diameter, nylon rope and plastic anchors, totaling 1500 tires;
4. four, "plastic tube and net habitats," installed in 1989, consisting of 20-foot-long, PVC pipes, nylon ropes, and nylon nets;
5. two "pyramid habitat," made of iron rods with nylon mooring line, three feet high;
6. one "bundle habitat," made of iron rods with nylon mooring line, three feet high;
7. four "plastic boulder habitats," described as 4 feet high, made of polyethylene mesh;
8. three "concrete block habitats," each consisting of eight, hollow, concrete blocks;
9. five "tire columns," installed in 1991, made of an unspecified number of automobile tires filled with polyurethane foam; and

10. two "unrelated experimental habitats," described as consisting of plastic substrates, floats and anchors.

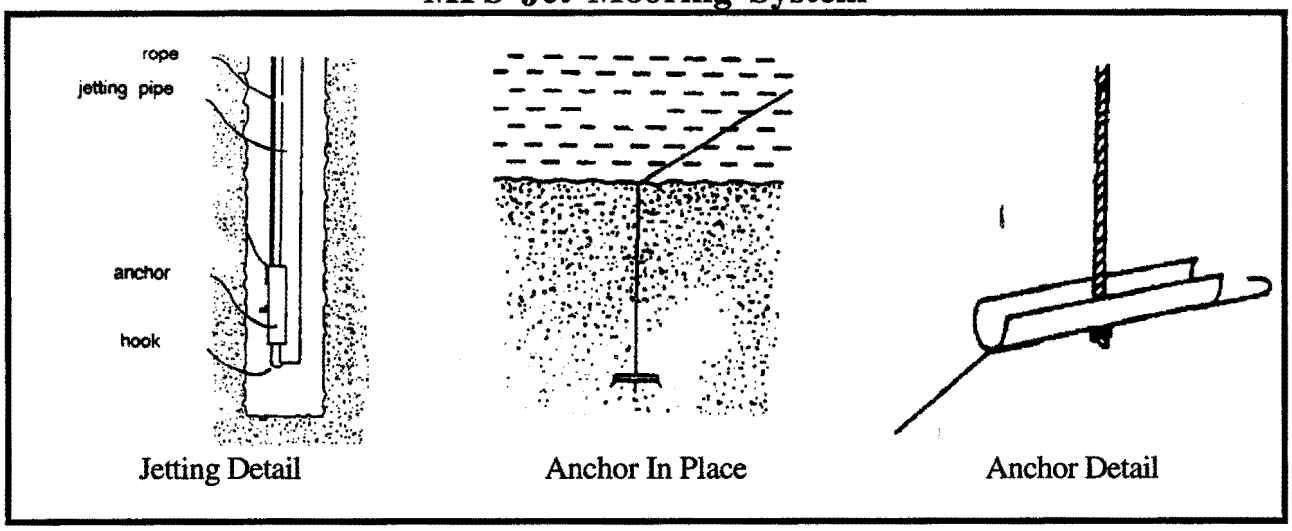
See Exhibit 2 for schematic diagrams of the project structures. The MFS identifies items 4-10 above as "miscellaneous units of canceled past experiments," and has not specified the exact materials, designs, locations and installation dates of these structures. The MFS administration encouraged volunteer participants to experiment with a full range of materials without administrative oversight or coordination. In response to the Commission staff's request to provide specific information concerning this development, the MFS responded:

> *"As a sacred rule and to develop creativity, the largest initiative was permitted and even recommended to the volunteers. The intellectual properties of inventions that occurred were ruled to remain the intellectual property of the individual inventors and not the MFS."*

2.1.4.3 Anchoring System

The MFS employs a "water jet mooring system" to anchor the various project components to the sea floor. The anchoring system consists of nylon rope secured to a short piece of PVC pipe which is split lengthwise and buried in the sandy bottom with a water jet (see Figure 1 below).

Figure 1.
MFS Jet Mooring System



The MFS has provided the following specifications for the anchors:

> *"Kelp substrate anchors were made of split pvc pipe, Diam. 1.4", Length 4.5" with a quarter inch mooring line.*
>
> *Mussel column anchors were made ... of 2 superimposed split pvc pipes, I.D. 2", Length 7".*
>
> *Tire ribbon anchors, placed every 100 tires i.e. 100 feet, were made of 2 superimposed split pvc pipes, Diam. 2.5", Length 7".*
>
> *All anchors were water jetted 9 ft deep below sand surface."*

The MFS has not provided technical information concerning the mooring capacity or longevity of this anchoring system, stating in response to staff's requests for such information that:

> *"The mooring capacities of the anchoring systems have been calculated in 1987 according to the indications of Dr. Jacques Savel, Professor of Material Resistance at the School of Architecture of the University of Nantes, France. Unfortunately, these indications cannot be located anymore in the files of the Marine Forests Society."*

2.1.4.4 Maintenance

The project description includes several cancelled, past experiments which have been abandoned in-place in accordance with the MFS's "lay-it-flat" technique. The "lay-it-flat" technique consists of deflating or not maintaining the air that keeps the project components buoyant and allowing them to fall to the ocean floor and be covered and/or moved about by the migrating sandy substrate. The MFS provides the following information concerning these abandoned structures.

Kelp bio-structures (approximately 2000 installed):

> *"The kelp experiment was abandoned because of fragility of kelp growth due to unfavorable natural conditions."*

Plastic tube and net habitat (four installed):

> *"This type of bottom habitat was abandoned because better results were obtained with tire-made bottom habitats."*
>
> *"At experiment's end (unconclusive) the net-made volumes were detached from the structures by divers and dropped on the bottom where they stay now incorporated in a mussel layer."*

Pyramid and Bundle Habitats (3 structures installed):

> *"At experiment's end (unconclusive) the pyramids [and bundles] disassembled and got buried into the sand."*

Plastic boulder habitat (four installed):

> *"At experiment's end (unconclusive) the boulders disassembled and got buried into the sand."*

Tire columns (five installed):

> *"Their floatation assured by plastic foam degraded after 6 months. Their stability when lying on the sea bottom and filled with sand led to the invention of the self anchored tire-ribbons."*

Cement block and plastic mesh habitats (three installed):

> *"At experiment's end (unconclusive) the blocks subsided into the sand."*
>
> *"Miscellaneous experiments with cement blocks and aquaculture mesh were soon abandoned because of poor stability."*

2.2 Other Local, State and Federal Agencies

2.2.1 City of Newport Beach

The MFS development is located on submerged lands granted to the City of Newport Beach. As such, the City has authority concerning the MFS development as: (1) the local government within whose regulatory jurisdiction the project is located; (2) the owner of the property upon which the development is located; and (3) the "Lead Agency" for the project under the California Environmental Quality Act (CEQA).

2.2.1.1 Local Approval

On March 27, 1995, the Newport Beach City Council granted a Harbor Permit to the MFS for a proposal to place 30,000 used tires 500-1000 feet offshore Newport Beach in water 60 to 110 feet deep (hereinafter "TRDP"). The Harbor Permit states that one of the parcels on which the proposed TRDP would be located, "contains a variety of experimental reef projects consisting of pipes, tires, and floats." However, the findings for the approval of the permit address only the placement of the proposed TRDP in water 60 to 110 feet deep. The Harbor Permit does not analyze the effects of placing the MFS development in shallower water (30-40 feet) or the use of any materials except for tires as artificial reef substrate. Despite the obvious differences between the existing MFS development and the proposed TRDP, it is the City's intention that the Harbor Permit, as conditioned, should serve as local regulatory approval for both projects.[3]

2.2.1.2 Property Owner

The MFS development is located on submerged lands statutorily granted by the State of California to the City of Newport Beach. Pursuant to the terms of the State's tide and submerged lands grant to the City (Ch. 74 of Laws of 1978), the City is authorized to: (1) grant franchises for wharves and other public uses; (2) lease the lands at fair market value for uses consistent with the terms of the grant; and (3) transfer portions of the lands to the state for lease to the Department of Fish and Game for an ecological reserve, wildlife refuge, and/or other compatible uses. No other conveyances are allowed. The grant further specifies that any leases granted by the City must first be approved by the State Lands Commission. The lease specifies that the lands shall be used by the City and its successors for purposes in which there is a general statewide interest, as follows: (1) public harbors and related improvements; (2) public beaches, marinas, aquatic parks and other public recreational facilities; and (3) preservation, maintenance, and enhancement of the lands in their natural state, and the re-establishment of the natural state of the lands.

The City indicates that it has authorized the MFS to use lands subject to the above described tide and submerged lands grant pursuant to the aforementioned Harbor Permit.[4]

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[3] Letter from Tony Melum, Deputy Chief, Marine Division, City of Newport Beach, to Darryl Rance, Coastal Analyst, California Coastal Commission, July 9, 1996. Letter from Chris Kern, Coastal Analyst, California Coastal Commission, to Robin Clauson, Assistant City Attorney, City of Newport Beach, October 18, 1996. Personal communication between Melum, Clauson and Kern September 30, 1996. Personal communication between Clauson, and Kern, October 21, 1996.

[4] See Footnote No. 3, supra.

2.2.1.3 California Environmental Quality Act

On March 27, 1995, at the same time that it granted the Harbor Permit, the Newport Beach City Council also adopted a Negative Declaration for the proposed TRDP. The project description for the negative declaration states:

> *"The proposal is a demonstration project funded in part by the California Integrated Waste Management Board to determine the feasibility of using scrap tire to create artificial reefs. Approximately 30,000 tires in "ribbons" would be anchored in two 10-acre parcels to create enhanced habitat for marine resources."*

The only mention of the existing MFS development contained in the negative declaration is the statement on page 13 of the document that one of the parcels on which the TRDP would be located, "contains a variety of experimental reef projects consisting of pipes, tires, and floats." The document does not consider the environmental effects of the existing MFS development. The City received a number of comment letters from Responsible Agencies concerning the proposed TRDP in response to the Draft Negative Declaration. However, none of the comments addressed the existing MFS development.[5] The City acknowledges that the environmental document includes no analysis of the existing MFS development, but states that the document is intended to satisfy the environmental analysis requirements under CEQA for the existing development as well as for the proposed TRDP.[6]

2.2.2 County of Orange

The Orange County Environmental Management Agency expressed several areas of concern with the proposed TRDP which are paraphrased below and include: (1) biological effects to the local marine community; (2) increased beach and shoreline erosion; (3) inadequate experimental methodology; and (4) the eventual failure of the MFS anchoring system and resulting marine debris.[7] Although these concerns are expressed in the context of the proposed TRDP, and not the existing MFS development described in this permit application, the issues raised are relevant to the Commission's consideration of this after-the-fact CDP request. Furthermore, because the aforementioned Negative Declaration for the TRDP does not properly identify the existing MFS development, none of the comments on the document pertain directly to the project currently before the Commission.

1. The release of toxic chemicals from tires may cause long-term, adverse impacts to the food chain due to bio-accumulation of these substances. The MFS should test the organisms living in and on the reef to determine if the project has introduced toxins into the food chain, and clean road debris and other hazardous materials (e.g. oil, gas, metals etc.) from the tires prior to placement in the marine environment.

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[5] Although the comment letters concerning the Draft Negative Declaration for the TRDP do not directly address the existing MFS development described in this permit application, they do discuss issues concerning the use of automobile tires for constructing artificial reefs, and the expected durability of the MFS "jet mooring system." Because these issues are relevant to the Commission's consideration of this permit application, the comments are discussed in this report.

[6] See Footnote No. 3, supra.

[7] Letter from Kari Rigoni, Acting Manager, Orange County Environmental Planning Agency to John Douglas, the City of Newport Beach, April 3, 1995.

2. The Preliminary Coast of California Storm and Tidal Wave Study has shown that the Balboa Peninsula is losing sand at a retreat rate of about 5 feet per year. The Beach profile analysis in the vicinity of Balboa Pier shows that the depth at which any sand passes will not return to the littoral zone is in the range of -30 to -40 feet MLLW. Coastal structures within the littoral zone affect long-shore and offshore sediment transport. The MFS project has most likely exacerbated the on-going erosion of the shoreline in the project area.

3. The MFS project does not include a scientific measure of "success" and is seriously lacking in experimental methodology, (e.g., there is no control group designated for qualitative or statistical comparison). The project description discusses visual inspection to determine success but provides no quantitative means for assessing it. There are no provisions for a regulatory agency to inspect the project to verify the claim of success or failure.

4. The County believes that the MFS anchoring system will eventually fail. The project includes no provision to assure that loose tires and other project components will be collected and properly disposed of.

2.2.3 California Regional Water Quality Control Board -- Santa Ana Region (RWQCB)

The RWQCB denied clearance for the TRDP project due to: (1) lack of evidence showing that the project would not affect water quality; (2) the absence of a monitoring program to assess water quality and biological communities; and (3) the absence of any meaningful monitoring done on previous experiments.[8] The RWQCB staff does not recommend approval of the existing MFS development because of concerns regarding the release of toxic substances from tires into the marine environment and the bio-accumulation of such compounds.[9]

2.2.5 California Department of Health Services (CDHS)

Health and Safety Code Section 112170 authorizes the California Department of Health Services (CDHS) to conduct surveys of any proposed shellfish growing areas to determine if it meets bacteriological, chemical, and toxicological standards prescribed by regulation. If the water in the growing area is found to be in compliance with the required standards, a certificate attesting to said compliance will be issued.[10]

The CDHS has determined that the MFS project site lies within two safety zones drawn around the large un-disinfected ocean outfall of the Orange County Sanitation District and the marinas in Newport Bay, an area in which mariculture of shellfish is prohibited due to high concentrations of *E. coli* bacteria and other contaminants. Harvesting shellfish for human consumption is prohibited in this area under the National Shellfish Sanitation Program.[11] Consequently, the CDHS could not issue a Shellfish Growing Area Certificate for the project site under any conditions, and the sale of, or the offer, or hold for sale for human consumption of any shellfish from the MFS project is

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[8] Letter from Joanne E. Schneider, Environmental Program Manager, Regional Water Quality Control Board, to Rodolphe Streichenberger, MFS, May 19, 1995.

[9] Letter from Joanne E. Schneider, Environmental Program Manager, Regional Water Quality Control Board, to Susan Hansch, California Coastal Commission, August 31, 1995.

[10] California Code of Regulations, Title 17, § 7760.

[11] The National Shellfish Sanitation Program is a voluntary program administered by the U.S. Food and Drug Administration involving State shellfish control agencies, the shellfish industry, and other Federal agencies.

prohibited. The CDHS staff have offered the MFS assistance to find a more suitable location for their project.[12]

2.2.6 California Department of Parks and Recreation (CDPR)

The Orange Coast District of the CDPR identified several concerns in response to the Draft Negative Declaration for the TRDP.[13] These concerns are paraphrased below and include: (1) shoreline erosion; (2) scrap tire suitability for brown algae growth; and (3) the questionable strength and longevity of the nylon rope and plastic pipe anchoring system. Although these concerns are expressed in the context of the proposed TRDP, and not the existing MFS development described in this permit application, the issues raised are relevant to the Commission's consideration of this after-the-fact CDP request. Furthermore, because the aforementioned Negative Declaration for the TRDP does not properly identify the existing MFS development, none of the comments on the document pertain directly to the project currently before the Commission.

1. Location of the MFS development in water 30 to 40 feet deep could affect wave refraction and concentrate wave energy on local beaches exacerbating localized erosion.
2. Past reports show that tires are not suitable for most brown algae that provide a basis for kelp forests and provides for true increases in species diversity.
3. The nylon ropes used to secure and anchor the bio-structures will be exposed to ocean wave and current forces, resulting in stress, chafing and ultimately leading to failure. The rope attachments are of questionable strength and design. At some point, the attachments will break and allow tires to migrate under wave and current action. Additionally, an artificial reef will attract fisherman to the site. Fishing boat activity in the area will increase the potential of snagging the MFS development with anchors. These impacts will add to failure rates of the nylon ropes from both individual and cumulative anchor snagging occurrences. During the stormy winter of 1983 at Huntington Beach, thousands of tires washed up onto the shore from a CDFG tire reef experiment. The inevitable large storm episode will move the MFS tires. Tires do become buried in inshore sand creating visitor use hazards. Sand temporarily filling 40-60% of the tire cavities will not guarantee their attachment to the sea floor. Oceanographic literature is rife with examples of even the largest and best designed man-made structures failing in storm episodes.

2.2.7 California Department of Boating and Waterways (CDBW)

The CDBW has identified the following concerns regarding the proposed TRDP:[14]

1. Development should be placed no shallower than -60 feet (MLLW) so as not to obstruct the on-off movement of sand and to avoid adverse effect on beach equilibrium profile. Careful consideration should be given to locating the tires into deeper water. Relocating the tires

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[12] Letter from Kenneth Hansgen, California Department of Health Services, to Rodolphe Streichenberger, MFS, June 22, 1993.

[13] Letter from Jack Roggenbuck, California Department of Parks and Recreation (CDPR) to Nadell Gayou, The Resources Agency, March 3, 1995 and letter from David Pryor CDPR Resource Ecologist, to Gayou, March 3, 1995.

[14] Letter from John R. Banuelos, Director of the Department of Boating and Waterways, to Nadell Gayou The Resources Agency, March 7, 1995.

will most likely increase the life of the structures due to decreased effects of wave and swell energy.

2. Tires placed partially above the ocean bottom could entangle or snag boat anchors. If the vessel is powerful enough, it could break tires loose from their respective anchor and rope toggles. Therefore, the CDBW also suggest that the development should be noted on nautical charts and included in a "Notice to Local Mariners" to help avoid any hazards relating to anchoring in, or near these areas.

Although these concerns are expressed in the context of the proposed TRDP, and not the existing MFS development described in this permit application, the issues raised are relevant to the Commission's consideration of this after-the-fact CDP request. Furthermore, because the aforementioned Negative Declaration for the TRDP does not properly identify the existing MFS development, none of the comments on the document pertain directly to the project currently before the Commission.

2.2.8 California Department of Fish and Game (CDFG)

The California Legislature formalized the CDFG's status as the principal agency in the State's artificial reef building process by passage of Assembly Bill 706 (Fish and Game Code, Article 2, §§ 6420-6425). This legislation authorized the CDFG to investigate efforts to enhance marine species through the placement of artificial reefs and implement a program of artificial reef research and development, including reef design, placement, and monitoring.

As the principal agency for the construction of artificial reefs offshore California, CDFG biologists have been involved in the planning, construction and monitoring of over 30 artificial reefs. Through this working experience, the CDFG has established the following guidelines for artificial reef materials: [15]

1. The material must be persistent. It must be hard, but may not be so brittle that collisions with other materials, or boat anchors would tend to shatter it. It must remain essentially unchanged after years of submersion in salt water;
2. The material must have a specific gravity at least twice that of sea water. The material must be dense enough to remain in position during strong storm events, even in water depths as shallow as 30 feet;
3. The material must not contain potentially toxic substances. The CDFG preferred artificial reef materials include quarried rock and high density concrete; other materials are considered on a case by case basis.

The materials utilized in the MFS project do not meet the material specifications of the CDFG's Artificial Reef Program and are not suitable for long-term use in the marine environment. In that regard, the CDFG staff have stated that they are not convinced that the benefits that can be reasonably be expected to result from tire reef construction and PVC structures will outweigh the environmental hazards to California's marine resources.[16]

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[15] California Department of Fish and Game, Marine Resources Division, Material Specifications and Notification Procedures -- Surplus Materials for Augmentation To Artificial Reefs, November 15, 1991.

[16] Letter from Rolf E. Mall, Chief, Marine Resources Division, California Department of Fish and Game, to Darryl Rance, California Coastal Commission, June 29, 1995.

On October 12, 1995, the CDFG staff inspected the MFS project site, reporting: (1) the PVC columns, with their high-vertical relief and dense mussel growth typical of pier pilings, are providing some habitat value to fishes; (2) the fish-related habitat value of the tire-ribbons, in absence of the PVC columns, is questionable; (3) several of the PVC columns have sunk to the bottom and assorted other webbing/netting structures are scattered about the area in various states of disrepair.

The CDFG has identified three main areas of concern regarding the existing MFS development, which are paraphrased below.[17] These concerns include: (1) no demonstration of the comparative value of tires as a material for artificial reef construction; (2) the high probability that project materials and structures will eventually be moved from the site; and (3) the abandonment of unsuccessful experiments/unwanted materials creates hazards and represents a form of ocean dumping.

1. The MFS has not presented any documentary evidence to support its claims that tire ribbons are highly productive. Based on past artificial reef experiments with tires, the CDFG regards tires as an inferior material for the attachment and development of a complex reef community. The tire reef will continue to lack many large invertebrates like rock scallops, giant keyhole limpets and sea urchins due to insufficient algae and a lack of a suitable substrate/habitat. Further, there is no evidence that mussels have or will become established on the tire substrates. Low relief, susceptibility to sand scour and predation appear to be working against mussel colonization of tires. In contrast, the PVC columns are supporting dense mussel colonies.

2. The MFS project site has attracted a number of fish, but is unlikely to provide the resources to increase local fish production. Any structure in nearshore waters will attract fish, but the CDFG believes it is important for an artificial reef to increase productivity of fish populations by providing permanent habitat and not merely to concentrate them. Lack of adequate cover and high numbers of predators will make it difficult for the young-of-the-year fish to recruit and survive on the tire reef. The sparsely attached community growing on the tires will provide little additional food for fish, thus limiting any potential increase in resident fish stocks.

3. During a recent inspection of the project site, some tire ribbons were completely buried while others were almost completely exposed. The majority of the tires were half buried in the sand. Although most of the tires have remained in place, they may not survive strong storms like those that damaged or destroyed breakwaters and piers in the Los Angeles and Orange counties during the 1980's. Some of the lines holding the tire ribbons showed wear. Without continued maintenance, these lines will eventually wear away. Storm wave activity could dislodge the tires and scatter or wash them ashore. The PVC columns and their mooring lines will also require continued maintenance. PVC columns that break free may become hazards to boaters and/or may wash ashore. Mussels will not survive if the PVC columns sink to the bottom where predators and sand scour are present. The various materials abandoned from previous unpermitted MFS experiments currently serve no purpose. These materials are being covered with sand or moved about by ocean currents. This is not an acceptable way to deal with waste materials. The exact amount of this material is not known since some of the materials may have been scattered or buried.

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[17] Letter from David O. Parker, Senior Biologist, California Department of Fish and Game, to Darryl Rance, California Coastal Commission, November 27, 1995.

2.2.9 U.S. Army Corps of Engineers (ACOE)

The MFS project requires review and approval by the ACOE. Pursuant to the Federal Coastal Zone Management Act (CZMA), any activity authorized by a permit issued by a federal agency that affects the coastal zone of a state, must be consistent with a federally approved coastal zone management program. Under the CZMA, the ACOE cannot issue a permit until the Coastal Commission concurs with a federal consistency certification or issues a Coastal Development Permit for the project. The ACOE has opened a violation file for the existing MFS development.

2.3 Coastal Act Issues

2.3.1 Marine Water Quality and Marine Resources

Coastal Act section 30230 states:

> *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in such a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organism adequate for long-term commercial, recreational, scientific, and educational purposes.*

Section 30231 states in part:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible restored through, among other means, minimizing adverse effects of waste water discharges...*

2.3.1.1 Site Selection

As previously stated, the MFS development is located within a prohibited harvesting zone for bivalve shellfish for human consumption established under the National Shellfish Sanitation Plan. This zone was established around the outfall of the Orange County Sanitation District Ocean Discharge and the local marinas to provide a buffer zone from the bacterial and environmental contaminants associated with these facilities. The CDHS has stated that it could not issue a Shellfish Growing Certificate for the project site under any conditions. [18]

Artificial reefs are designed to attract and/or produce fish and enhance sport fishing opportunities. The siting of an artificial reef in an area of degraded water quality raises concerns regarding the marine life attracted to the area, and human consumption of contaminated fish and shellfish. By attracting and congregating fish in this area, the MFS development increases the risk that recreational anglers may catch and consume fish contaminated with *E. coli* and other pathogens associated with the sewage outfall. The MFS CDP application states that recreational divers may harvest shellfish from the project site.

In its action on the Federal Consistency Certification for the Point Loma Artificial Reef (PLAR), the Commission considered the potential impacts on the reef of sewage discharges from the outfall

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[18] See Footnote No. 12, supra.

from the proposed International Wastewater Treatment Plant in San Diego.[19] The planned sewage outfall would discharge treated wastewater into the area proposed for the placement of the PLAR. The Commission examined the proposed location of the PLAR to determine if the reef site would be adversely affected by future discharges from the sewage outfall. A site originally selected for the PLAR was found to be located too near the sewage outfall, thus increasing the potential that discharges from the outfall would accumulate near the reef.[20] Consequently, the USEPA recommended locating the reef farther from the sewage outfall.[21] The Commission ultimately approved a new location for the reef away from the sewage outfall.

Conclusion: Site Selection

The location selected for the MFS project is inappropriate given its proximity to the Orange County Sanitation District sewage outfall, local marinas and the corresponding exclusion zone established under the National Shellfish Sanitation Plan which prohibits harvesting shellfish for human consumption. A Shellfish Growing Certificate could not be issued for the project site under <u>any</u> conditions. The project will result in adverse impacts from degraded water quality to marine organisms attracted to, or cultured at the site. Siting the project in this area increases the risk of human exposure to *E. coli* bacteria and other contaminants. The Commission therefore finds that MFS project has been carried out in a manner that <u>does not</u>: (1) sustain the biological productivity of coastal waters and maintain healthy populations of all species of marine organism adequate for long-term commercial, recreational, scientific, and educational purposes in conflict with Coastal Act section 30230; and (2) maintain the biological productivity of coastal waters to maintain optimum populations of marine organisms and for human health in conflict with Coastal Act section 30231.

2.3.1.2 <u>Toxic Leachates</u>

Tires contain compounds that are harmful to some organisms and acutely toxic to other organisms. When placed in water, tires release these toxic hydrocarbon by-products into the local environment.[22] Studies conducted by the Ontario Ministry of the Environment and for the Maryland Department of Natural Resources indicate that tires submersed in water release toxic chemicals , including the following compounds: Quinoline, Naphtalene, I-methylnaphthalene, Dibenzothiophene, and Pyrene.[23] These compounds are primarily hydrocarbon by-products that are generally associated with petroleum based products. Additionally, used automobile tires are contaminated with road debris, dirt, oil, and other substances. These contaminant materials pose a risk to marine life and compromise water quality. The extent of toxicity is extremely variable depending on the animal or plant species being tested. For example, in freshwater rainbow trout are killed but flathead minnows and <u>Daphnia</u> appear unaffected.[24] Similar analysis regarding bio-accumulation of chemical compounds and the resultant impacts have not been completed. The impacts associated with the concentration of these noxious substances resulting from the placement of large numbers of tires into the marine environment is potentially significant.

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[19] Coastal Commission Consistency Certicication CC-38-91.

[20] Engineering Science Tiajauna Oceanographic Engineering Study, 1988, (CC-38-91).

[21] Letter from Keith Taka, USEPA, to Colonel Charles S. Thomas, ACOE, June 7, 1991, (CC-38-91).

[22] <u>The Effects of Scrap Automobile Tires In Water</u>, Robert M. Kellough, Ontario Ministry of the Environment, December, 1991.

[23] <u>Toxicity of Scrap Tire Leachates in Estuarine Salinities</u>, Special Report for the Maryland Department of Natural Resources, Hartwell, S.I. Et al. 1994.

[24] Letter from S. Ian Hartwell, Maryland Department of Natural Resources, to Rodolphe Streichenberger, MFS, March 23, 1995.

The CDP application contains a letter from S. Ian Hartwell of the Toxic Aquatic Contaminants Program, Maryland Department of Natural Resources which states that there has been only one other study examining tire leachates in marine environments, the identity of chemicals causing toxicity in various tests were not known, chemicals causing toxicity in fish were shown to be persistent for at least 60 days in fresh water, and that the use of scrap tires for artificial reefs was not a formally endorsed policy of the Maryland Department of Natural Resources due to concerns with toxicity. Mr. Hartwell's personal opinion is that the use of scrap tires in the marine environment will not result in acute toxic effects. However, his statement is very clear that the Maryland Department of Resources has not established an official policy regarding the safety of using scrap tires in marine applications. In fact, the Fisheries Division of the Maryland Department of Natural Resources will not consider using scrap tires in Chesapeake Bay until more information on potential secondary effects to fisheries is available. Mr. Hartwell also states that the identification of the toxic chemicals in the leachates is not fully understood. No assessment has been made regarding the persistence, fate, and transport and possible bio-accumulative effects of the toxic leachates on marine species.[25]

As discussed in Section 2.2.3 of this report, the RWQCB staff does not recommend approval of the existing MFS development due to their concerns regarding the release of toxic compounds from the tires and the bio-accumulation of these substances.

The CDFG's experience with tire reefs constructed in the 1970's indicated that the use of tires for reef material did not produce a high quality reef structure and consequently, such use was abandoned. Tire reef efforts by the CDFG indicate lower levels of development over a longer period of time than could be expected using quarry rock or high-density concrete rubble. It is the position of CDFG biologists that this reduced invertebrate and algae community attachment may be attributed to surface toxicity. Surface toxicity may interfere with the ability of marine species to attach to tire surfaces.[26] The tire reef projects coordinated by the CDFG during the 1970's were undertaken prior to the passage of the Coastal Act and were implemented without a high degree of environmental review. Further study is clearly necessary to establish the extent of compatibility of scrap tires in the marine environment.

Conclusion: Toxic Leachates

The use of automobile tires for the MFS project posses an unacceptably high risk of harming marine organisms and of reducing the biological productivity of coastal wates due to the release of toxic substances into the marine environment. The persistence, fate, transport and possible bio-accumulative effects of these toxic leachates on marine species has not been adequately studied. The Commission therefore finds that MFS project has been carried out in a manner that does not: (1) sustain the biological productivity of coastal waters and maintain healthy populations of all species of marine organism adequate for long-term commercial, recreational, scientific, and educational purposes in conflict with Coastal Act section 30230; and (2) maintain the biological productivity of coastal waters to maintain optimum populations of marine organisms and for human health in conflict with Coastal Act section 30231.

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[25]See Footnote No. 24, supra.
[26] Letter from John Turner, Chief of the Environmental Services Division, CDFG, to John Douglas, City of Newport Beach Planning Department, March 9, 1995.

2.3.1.3 Project Materials

The MFS project is intended to demonstrate: (1) how used tires and other readily available, man-made materials can be formed into productive artificial marine habitats; and (2) how successfully using tires as an artificial reef substrate can help alleviate solid waste disposal problems. In addition to used automobile tires, the MFS project uses PVC pipe, plastic mesh, netting, plastic jugs, Styrofoam, concrete blocks, various ropes and anchoring devices, and other miscellaneous materials. The MFS administration has placed no guidelines on the type of materials utilized in the project and have ardently encouraged volunteer participants to experiment with a full range of materials. The MFS does not known exactly what materials have been placed on the project site. These proposed materials were selected because they were available to the MFS at little or no cost. According to the applicant, scrap tires could provide the MFS with a $0.25 to $2.00 ea. disposal fee, whereas the acquisition and transportation materials such as quarry rock would increase project cost.

The CDFG has experimented with a variety of materials, including scrap automobile tires, to determine their suitability for artificial reef construction. The experimental tire reefs broke apart and were either moved about or washed onto the shore during storm events in 1977 and 1983 which resulted in major beach cleanup efforts. Based on these experiences and the potential that toxic substances may leach into the marine environment from tires, the CDFG determined that tires are unsuitable for the construction of artificial reefs. As discussed in Section 2.2.8 of this report above, the CDFG has developed criteria for evaluating the suitability materials used to construct artificial reefs. These criteria consider a material's density relative to seawater, persistence in the marine environment, and potential toxicity. Below is an evaluation of the materials used for the MFS project pursuant to the CDFG artificial reef materials criteria.

Persistence

Some of the materials used in the MFS project, including tires, may meet this criteria, although it is believed that tires will eventually deteriorate after long exposure in the marine environment. However, other materials used (e.g., PVC pipe which is too brittle and nylon rope which abrades and deteriorates) are not persistent in the marine environment.

Johnson's Oyster Farm, an aquaculture operation in Tomales Bay, Marin County, utilizes sections of PVC pipe as a substrate for the culture of oysters. Although Johnson's aquaculture facility is located within the semi-sheltered environment of Tomales Bay, tidal currents have broken-up and carried many sections of the PVC pipe out to sea. Eventually, some of the PVC pipe washed up on beaches along the Point Reyes National Seashore and beyond. According to a personal conversation with John Del Osso, Ranger, at the Point Reyes National Seashore, PVC pipe is easily moved about by ocean forces. Once in the surf zone, the PVC can be broken up by the forces of the crashing waves. PVC pipe has been the source of on-going clean-up within the Point Reyes National Seashore.

Density

With the exception of the concrete block used to construct the "cement block habitat," none of the materials used in the MFS project are dense enough to remain in position during strong winter storms. The MFS alleges that the materials are permanently anchored to the sea floor, and that material density is therefore not an issue. The MFS anchoring system consists of small plastic anchors and 1/4-inch nylon rope to secure project components to the ocean floor. The MFS expects the nylon, mooring line to last approximately 20 years in the marine environment and that

the anchoring system is sufficient to assure that the project components remain in place during severe winter storms, stating:

> *"No storm ever in nine years pulled any MFS structure out of the sea bottom. If in the past such a thing occurred it was because of unpermitted boat anchoring or vandalism."*[27]

The CDP application states that "the lifetime of the anchoring system is expected to be a minimum of 20 years." The staff has requested the documentation necessary to analyze the long-term compatibility of the anchoring system in the marine environment. In response to this request the CDP application states:

> *"...the mooring capacities of the project anchoring systems were calculated in 1987... however, these calculations are not available for review."*

The long-term capacity of the anchoring system cannot be verified. It is reasonable to expect that the nylon rope used for project moorings will chafe and wear in the turbulent nearshore environment and eventually fail.

If the MFS project included regular maintenance and replacement of the anchoring system components, it is possible that the materials would remain in place. However, the MFS states that it does not intend to maintain the project site, and the project description includes several failed, past experiments which have been abandoned in-place. When an experiment fails to meet the applicant's objective, it is abandoned in-place in accordance with the MFS's "lay-it-flat" technique. The MFS's "lay-it-flat" technique consists of deflating or not maintaining the air that keeps the project components buoyant and allowing them to fall to the ocean floor and be covered and/or moved about by the migrating sandy substrate. For example, in 1988, the MFS installed 2000 "kelp bio-structures," each consisting of 12-foot-long, 1/4-inch-diameter anchoring lines, protruding above sand level, topped by a one-gallon plastic jug wrapped in plastic mesh. When the kelp experiment failed, the plastic jugs, ropes, and mesh netting were abandoned in-place. During site inspection in September 1993 and October 1995, only a few of the original 2000 deflated plastic jugs were observed, and they were providing little or no habitat value. Without maintenance, it is likely that the low-density materials used for the MFS project will eventually become marine debris.

The lack of an adequate long-plan to secure project components in-place, presents a long-term maintenance dilemma. The potential for tires washing onto the beach is significant as evidenced by the failure of the Huntington Beach Tire Reef (HBTR) project. The HBTR project was funded by the Los Angeles Rod and Reel Foundation, a non-profit organization, at no initial cost to the State. However, during the 1977 storms, large numbers of tires from the reef washed onto shore, resulting in a major clean-up effort.[28] According to a personal communication with Dennis Bedford of the California Department of Fish and Game's (CDFG) Artificial Reefs Program, the Los Angeles Rod and Reel Foundation failed to assume responsibility for the clean-up, and,

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[27] This statement is contained in a supplement to the MFS project description dated July 31, 1995. At that time, the oldest project components had been in place for approximately seven years, according to the project description, and the tire ribbons had been in place for two years. In accordance with the installation dates provided by the MFS, none of the project components had been in place for nine years at the time that the MFS made this claim regarding the longevity of the mooring system. See section 2.3.1.4 of this report for additional discussion of the anchoring system.

[28] R.D. Lewis and K.K. McKee, 1989, A Guide To Artificial Reefs of Southern California, California Department of Fish and Game.

instead, CDFG removed the tires at public expense. Similarly, the Marine Forest Society is an organization whose continued operation and financial accountability is not guaranteed. Project site and beach clean-up consideration must be approached with caution to avoid making beach clean-up and/or project site remediation a financial burden to the public.

At sea, discarded plastics create problems for both marine life and human activities. The small vessel operator experiences fouled props and jammed cooling intakes from drifting plastics. Beaches become cluttered with discarded materials. Sea life dies from eating plastics or from entanglement. PVC piping is shattered and moved about by violent ocean waters. Discarded netting and rope assemblies can trap fish and marine mammals long after they are abandoned. Consequently, some of the MFS project materials (e.g., plastic bottles, nets, tires, PVC pipe, various rope assembles etc.) continue to create potential hazards for marine life and are not compatible for long-term use in the marine environment. Abandoning project components in-place constitutes ocean dumping.

Toxic Substances

As further discussed in section 2.3.1.2 of this report, tires contain hydrocarbon compounds that are harmful to some organisms and acutely toxic to other organisms. These contaminant materials pose a potential risk to marine life and compromise water quality. The MFS project will attract fish and marine mammals to the project site to forage on organisms that attach themselves to or seek shelter in the scrap tires. Toxic compounds released from the tires may accumulate in these organisms, increasing the potential for toxins to be passed up the food chain.

Conclusion: Project Materials

The materials used for the MFS project do not meet the CDFG's criteria for materials used for the construction of artificial reefs. The MFS project materials are not dense enough to remain in place during heavy seas, many of the materials used are not persistent in the marine environment, and the tires used release toxic substances into the marine environment. Calculations and quantifiable documentation to support the mooring capacity and the life expectancy of the anchoring system have not been provided. The applicant proposes to abandon project components in-place, and does not intend to provide long-term maintenance of the project site. The Commission therefore finds that the MFS project is not consistent with Coastal Act sections 30230 and 30231 because the materials used for the project pose a significant risk of harm to marine resources and to the quality and biological productivity of coastal waters.

2.3.2 Filling of Coastal Waters

Coastal Act Section 30108.2 defines "fill" as:

> *"Fill" means earth or any other substance or material, including pilings placed for purposes of erecting structures thereon, placed in a submerged area.*

The MFS project includes the placement of various "experimental" materials, including scrap automobile tires, PVC pipe, plastic mesh, plastic jugs, various ropes and anchoring devices, and other miscellaneous materials on existing sand substrate. As such, the MFS project constitutes "fill" within the meaning of Coastal Act Section 30108.2.

Coastal Act Sections 30233(a) provides in applicable part:

> *(a) The diking, filling, or dredging of open coastal waters,.. shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:*
>
> *...(8) Nature study, aquaculture, or similar resource dependent activities.*

Coastal Act section 30100.2 adopts for purposes of the Coastal Act the definition of aquaculture contained in section 17 of the Fish and Game Code. In relevant part, section 17 defines "aquaculture," in the following manner:

> *"Aquaculture" means that form of agriculture devoted to the propagation, cultivation, maintenance, and harvesting of aquatic plants and animals in marine, brackish, and fresh water.* (Emphasis added.)

The MFS project involves the placement of structures in the ocean, some of which have increased the local production of and/or attracted naturally occurring aquatic plants and animals, and might therefore be associated with the propagation of such species. It does not however include cultivation, maintenance or harvesting of these organisms. The MFS project does not therefore qualify as aquaculture under section 17 of the Fish and Game Code and thus under the Coastal Act. Nevertheless, the project can be characterized as a resource-dependent activity similar to aquaculture or nature study. Accordingly, the purpose of the MFS project qualifies as an allowable fill under Coastal Act Section 30233(a)(8).

However, the MFS project does not meet the remaining criteria as outlined in Coastal Act section 30233(a). Coastal Act Section 30233(a) requires that there are no feasible less environmentally damaging alternatives and that feasible mitigation measures have been provided to minimize adverse environmental effects.

2.3.2.1 Project Location

Sediment Transport and Beach Erosion

The project site is located in the littoral zone, at depths of -30 to -40 feet MLLW. Within the littoral zone, sediments are moved by waves and currents, with parallel (longshore transport) and perpendicular (on-offshore transport) to the shore. Structures placed within the littoral zone affect the movement and deposition of sediment. When sand is trapped by structures placed within the littoral zone and not allowed to complete its transport, shoreline sand deposition and beach erosion both up-coast and down-coast can be altered.

By letter to MFS President Rodolphe Sreichenberger dated May 5, 1995, Coastal Engineer David Skelly states that: "At a depth of 40 feet the tires [of the existing MFS development] are essentially outside the littoral zone." Skelly's letter concludes: "There is absolutely no basis for expecting the MFS tire experiment to have any impact on the sand deposition at the shoreline."(See Exhibit 5.)

As previously stated in this report, the Preliminary Coast of California Storm and Tidal Wave Study (Wave Study) has shown that the Balboa Peninsula is losing sand at a retreat rate of about 5 feet per year. Contrary to Skelly's statement above, the Wave Study beach profile analysis in the vicinity of Balboa Pier shows that the depth at which any sand passes will not return to the littoral

zone is in the range of -30 to -40 MLLW -- the depth at which the MFS project is located. The MFS project is designed to trap and hold sand. Site inspections conducted in September of 1994 and October of 1995 revealed that many of the tires are either partially buried or completely buried in sediment. The burial status of the tires affirms that they are located within littoral zone. Although larger scale development (e.g., the proposed 30,000 tire TRDP) would cause a more immediate and measurable effect on local sediment transport, the existing MFS development has likely contributed to and exacerbated the existing beach erosion problem in the project area. Thus, the location of the MFS project may adversely affect local sand supply given its proximity to the nearshore environment and the active littoral zone.

As discussed in Section 2.2.1 of this report, the City of Newport Beach has granted a permit for a proposed MFS tire reef located in water -60 to -110 deep, which is outside of the littoral zone. Evidently, the MFS believes that it is feasible to construct a tire reef at such depths. The MFS project location, approximately 300 yards offshore Newport Beach and at water depths of -30 to -40 feet, was chosen for its accessibility. It does not appear that site specific constraints were taken into consideration when locating the MFS project.

Sewage Outfall

The MFS development is located within a shellfish harvesting exclusion zone due to its proximity to an undisinfected sewage outfall and to local marinas. As discussed in Section 2.3.1.1 of this report, siting an artificial reef within an area of degraded water quality may be harmful to marine organisms produced at and attracted to the artificial habitat. Siting the project at this location increases the risk of human exposure to *E. Coli* bacteria and other pathogens through consumption of fish attracted to the site. The MFS has presented no evidence that the project could not be located outside of this area.

Conclusion: Project Location

Siting the MFS project outside of the littoral zone and in an area of higher water quality are feasible, less environmentally damaging alternatives. The Commission therefore finds that the MFS project is inconsistent with Coastal Act section 30233(a) because as sited the project is not the least environmentally damaging feasible alternative.

2.3.2.2 Project Materials

As discussed Section 2.3.1.3 above, the materials used for the MFS project do not meet the CDFG's criteria for materials used for the construction of artificial reefs. The MFS project materials are not dense enough to remain in place during heavy seas, many of the materials used are not persistent in the marine environment, and the tires used release toxic substances into the marine environment. Calculations and quantifiable documentation to support the mooring capacity and the life expectancy of the anchoring system have not been provided. The applicant proposes to abandon project components in-place, and does not intend to provide long-term maintenance of the project site.

The use of these materials in the marine environment creates a significant risk of harm to marine resources and to the quality and biological productivity of coastal waters. Feasible, less environmentally damaging alternative materials such as high-density concrete rubble and quarry rock are available. By using materials that meet the CDFG's recommended guidelines for artificial reef construction, the MFS project would be less environmentally damaging. The Commission

therefore finds that the MFS project is not consistent with Coastal Act section 30233(a) because the materials used for the project are not the least environmentally damaging feasible alternative.

2.3.2.3 Feasible Mitigation

The MFS project does not incorporate adequate and feasible mitigation to lessen impacts to coastal resources. Feasible mitigation measures which would lessen the project's impacts to coastal resources include: (1) a mechanism for long-term financial security for proper cleanup and/or removal of project materials; (2) a monitoring, mitigation and reporting plan which examines impacts to water quality, marine organisms and shoreline erosion; and (3) a long-term monitoring and maintenance program for the physical condition of the anchoring system and the structural integrity of the various project components. The MFS project should also include a well thought experimental methodology and a quantifiable measure of success. The Commission therefore finds that the MFS project is not consistent with Coastal Act section 30233(a) because the project does not incorporate feasible mitigation measures to minimize adverse environmental effects.

Conclusion: Filling of Coastal Waters

Section 30233(a) of the Coastal Act requires that filling of open coastal waters shall be permitted where there is no feasible, less environmentally damaging alternatives and where feasible mitigation measures have been provided to minimize adverse environmental effects. As discussed above, there are feasible less environmentally damaging alternatives to the MFS project as sited, constructed, and operated, and the project does not include feasible mitigation measures to minimize its adverse environmental effects. The Commission therefore finds that the MFS project is not consistent with Coastal Act section 30233(a).

2.3.3 Recreation -- Public Access

Coastal Act Section 30210 states:

> *In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.*

Coastal Act Section 30211 states:

> *Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.*

The MFS project has the potential to adversely impact recreational opportunities. Consistent with experience using such materials in the marine environment, it is likely that materials used for the MFS project, including scrap tires and PVC pipe will eventually wash up onto nearby beaches. As discussed in Section 2.3.1.3 above, PVC pipe from the Johnson's Oyster Farm is a source of on-going beach debris within the Point Reyes National Seashore. A second example, discussed in greater detail in Section 2.3.3.2 of this report, is the failure of the Huntington Beach Tire Reef

project. The California Department of Parks and Recreation states that tires buried in inshore sand are hazardous to beach users.[29]

The limited life expectancy of the anchoring system, the lack of monitoring and maintenance of the project, and the planned in-place abandonment of project components, all increase the potential that materials from the MFS project will litter nearby beaches, resulting in aesthetic degradation and user hazards. The Commission finds therefore that the MFS project is not consistent with Coastal Act sections 30210 and 30211.

2.3.4 Violation

Commencing in 1988, the development referenced herein was performed, without coastal development permit approval and thus appears to be in violation of the Coastal Act. Although the development occurred prior to the submission of a CDP application, the analysis contained in this report is based solely upon the project's consistency with the Chapter 3 policies of the Coastal Act. Commission action on an after-the-fact permit application does not constitute a waiver of any possible legal action with regard to the alleged violation nor does it constitute an admission as to the legality of any development undertaken on the subject site without a coastal development permit.

3.0 California Environmental Quality Act

Section 21080.5 (d)(2)(i) of the California Environmental Quality Act (CEQA) states:

> *The rules and regulations adopted by the administering agency shall require that an activity will not be approved or adopted as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse impact which the activity may have on the environment.*

The MFS project, as discussed herein, would have significant adverse environmental impacts to coastal resources. Project alternatives and mitigation measures are available which would substantially lessen these adverse environmental impacts, as discussed in Sections 2.3.1 and 2.3.2 of this report. The Commission therefore finds that the MFS project is not consistent with section 21080.5 (d)(2)(i) of the CEQA.

---

[29] Letter from Jack Roggenbuck, California Department of Parks and Recreation (CDPR) to Nadell Gayou, The Resources Agency, March 3, 1995 and letter from David Pryor CDPR Resource Ecologist, to Gayou, March 3, 1995.

Appendix A

Substantive File Documents

Applications

Marine Forests Society, "Application for Coastal Development Permit" from California Coastal Commission for mussel reef aquaculture project, June 4, 1993.

Marine Forests Society, "Tire Grant Application Supplement--Work Statement" from the California Integrated Waste Management Board for demonstration project for a tire mussel reef, faxed to CCC August 11, 1993.

See also addition of MFS Business Plan

Correspondence

Letter from Robson Collins, CDFG, to Shelly Liberto, Nautilus Farms, March 4, 1993.

Letter from Thomas Dietsch, CIWMB, to Rodolphe Streichenberger, June 11, 1993.

Fax from Cy Oggins, CCC, to Bruce Henderson, ACOE, June 16, 1993.

Fax from Cy Oggins, CCC, to Jane Smith, SLC, June 17, 1993.

Letter from Susan Hansch and Cy Oggins, CCC, to Rodolphe Streichenberger, MFS, June 18, 1993.

Fax from Rodolphe Streichenberger, MFS, to Ken Hansgen, DHS, June 21, 1993.

Letter from Susan Hansch and Cy Oggins, CCC, to Gordon Anderson, RWQCB, et al., June 21, 1993.

Letter from Kenneth Hansgen, DHS, to Rodolphe Streichenberger, MFS, June 22, 1993.

Letter from Joanne Schneider, RWQCB, to Rodolphe Streichenberger, MFS, June 23, 1993.

Memorandum from Jane Smith, SLC, to Cy Oggins, CCC, June 25, 1993.

Letter from Rodolphe Streichenberger, MFS, to Susan Hansch and Cy Oggins, CCC, July 8, 1993.

Letter from Allen Salter, RWQCB, to Cy Oggins, CCC, July 14, 1993.

Letter from Cy Oggins, CCC, to Rodolphe Streichenberger, MFS, July 19, 1993.

Letter from Cy Oggins, CCC, to Rodolphe Streichenberger, MFS, August 12, 1993.

Letter from Cy Oggins, CCC, to Rodolphe Streichenberger, MFS, August 13, 1993.

Letter from Robert Treanor, CDFG, to Rodolphe Streichenberger, MFS, August 26, 1993.

Letter from Michele Waltz, ACOE, to Cy Oggins, CCC, August 31, 1993.

Letter from Peter Douglas, CCC, to Rodolphe Streichenberger, MFS, September 10, 1993.

Letter from Rodolphe Streichenberger, MFS, to Michael Contreras, CIWMB, October 12, 1993.

Letter from Michael Contreras, CIWMB, to Rodolphe Streichenberger, MFS, October 22, 1993.

Letter from Rodolphe Streichenberger, MFS, to Michael Contreras, CIWMB, November 3, 1993.

Letter from John Gill, ACOE, to Rodolphe Streichenberger, MFS, January 24, 1994.

Letter, from Vincent Paul, CIWMB, to Robson Collins, CDFG, February 24, 1994.

Letter from Cy Oggins, CCC, to Robson Collins, CDFG, March 4, 1994.

Letter from Cy Oggins, CCC, to Rodolphe Streichenberger, MFS, March 4, 1994.

Letter from Robert Treanor, CDFG, to Rodolphe Streichenberger, MFS, October 19, 1994.

Letter from Tony Melum, City of Newport Beach, to Rodolphe Streichenberger, MFS, November 3, 1994.

Letter from Rodolphe Streichenberger, MFS, to Michael Contreras, CIWMB, November 13, 1994.

Letter from Cy Oggins, CCC, to Rodolphe Streichenberger, MFS, November 18, 1994.

Fax from Rodolphe Streichenberger, MFS, to Susan Hansch, CCC, December 1, 1994.

Letter from Michael Contreras, CIWMB, to Darryl Rance, CCC, December 2, 1994.

Letter from Darryl Rance, CCC, to Rodolphe Streichenberger, MFS, December 13, 1994.

Fax from Jane Smith, SLC, to Darryl Rance, CCC, December 15, 1994.

Fax from Rodolphe Streichenberger, MFS, to Darryl Rance, CCC, January 19, 1995.

Letter from Darryl Rance, CCC, to Rodolphe Streichenberger, MFS, January 24, 1995.

<u>Environmental Documents, Studies, Reports</u>

Donald Y. Aska, ed., State University System of Florida and Florida Sea Grant College, "Artificial Reefs in Florida" (Proceedings of a conference held June 10 and 11, 1977 at the University of South Florida, St. Petersburg; Report No. 24), May 1978.

Notice of Preparation of a Draft Environmental Impact Report, CDFG (Robson Collins, contact), January 31, 1994.

Supplemental Documents, Articles

MFS, "Mussel Reefs, Ecosystems of the Future" brochure [no date given].

U.S. Environmental Protection Agency and Pacific Environmental Services, Noyes Data Corporation (Park Ridge, NJ), *Scrap Tire Technology and Markets* [no date provided].

Integrated Waste Management Board, "California Tire Grant Program, 1992-93 Information and Application Instructions," January 1993.

"State Oks OC sea farms to grow kelp and mussels," *The Orange County Register*, February 5, 1993.

"State grant will allow Newport Beach group to build up mussels while sinking used tires," *The Orange County Register*, June 2, 1993.

"Grant Will Build Mussel in Used Tires," *Los Angeles Times*, June 26, 1993.

The Marine Forester, Exploring the Oasis of Life in the Sea, Vol. 1, No. 1, March 1993 and Vol. 1, No. 2, August 1993.

"Plan for man-made kelp forest sunk for now despite its champion's zeal," *The Orange County Register*, May 9, 1994.

"Plan to make kelp bed with tires is way off schedule," *The Orange County Register*, May 9, 1994.

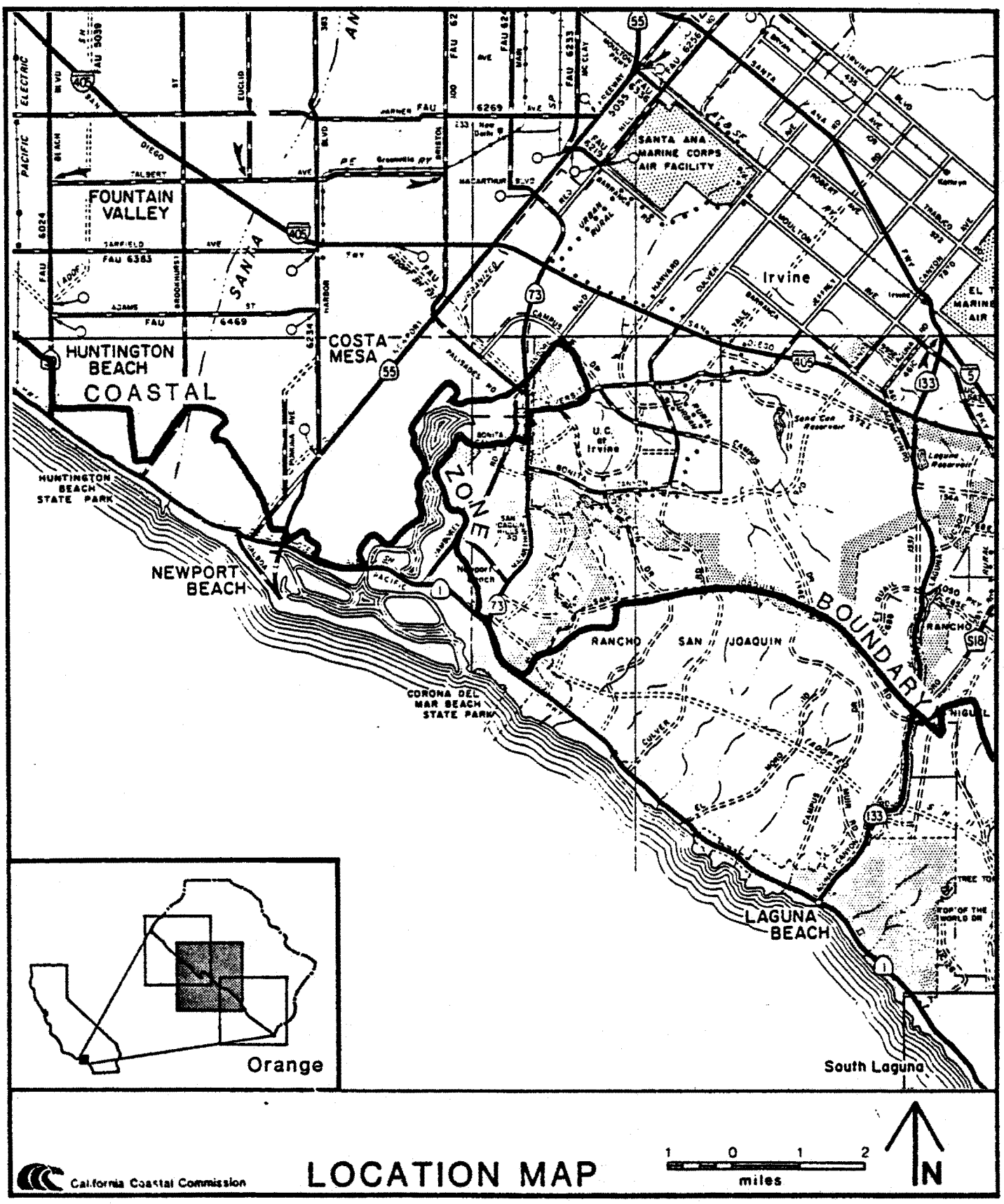
State/Local Government Actions

Fish and Game Commission, agenda for meeting of August 5, 1993.

Appendix B

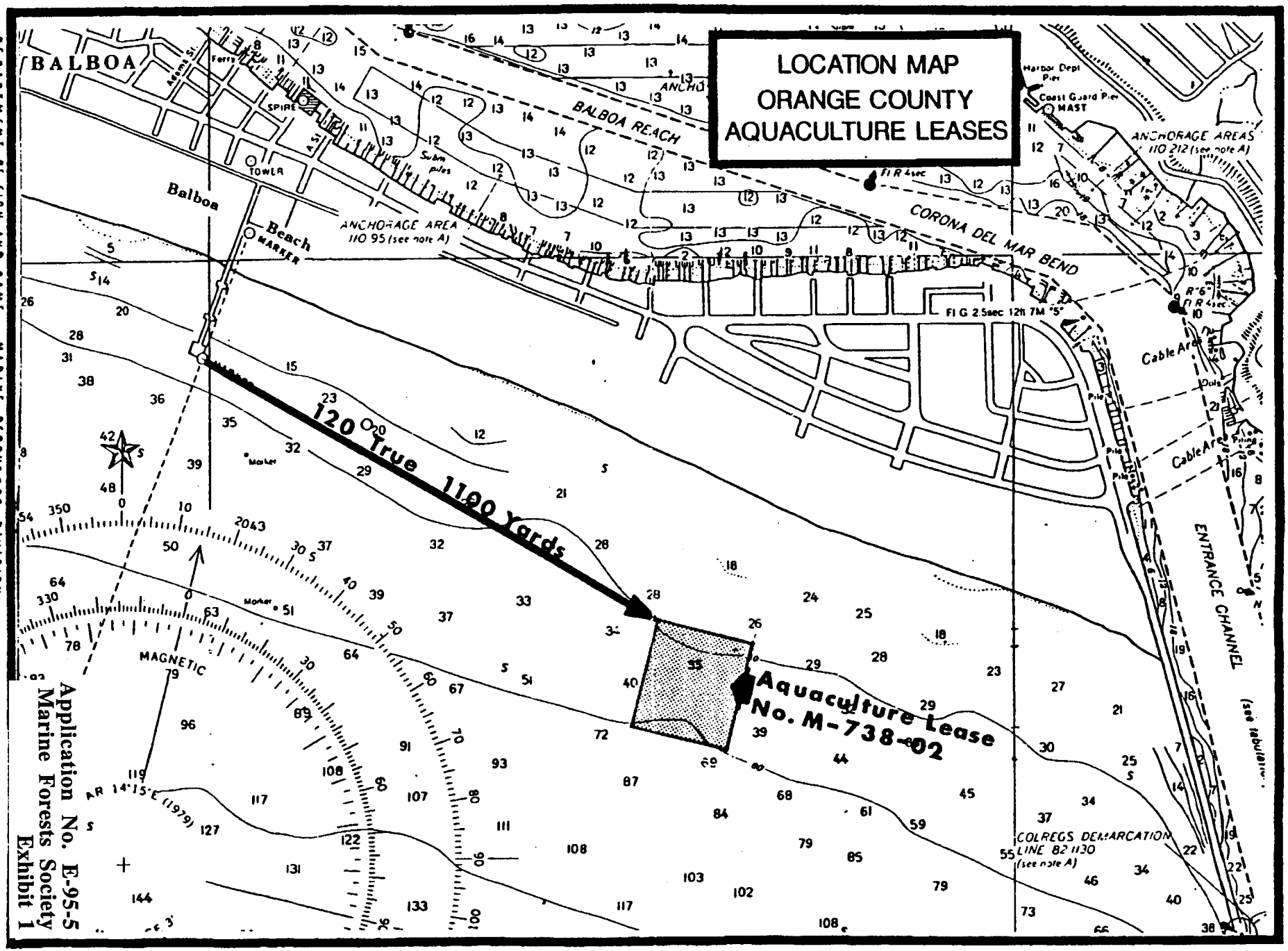
CF&GC Lease History

Date	Action
April 1987	The California Fish & Game Commission (CF&GC) conditionally approved an aquaculture lease (No. M-738-01) on approximately 10 acres of sub-tidal lands. The purpose of the aquaculture lease was specifically to experiment with "bio-structures" (9-foot lengths of rope anchored in the sea floor with plastic anchors) and support buoys as artificial substrates for the attachment of kelp and shellfish (scallops and mussels). The lease was issued subject to several terms, conditions, and covenants. Condition G of the lease specifically required the lessee to comply with the rules and regulations of, and obtain permits from the Coastal Commission (*Lease No. M-738-01, Section G).* The MFS did not notify the Coastal Commission of the proposed development and did not obtain a CDP or regulatory approval from other agencies. According to a personal communication with Rodolphe Streichenberger, President of the MFS, the MFS did not to pursue regulatory approval from the Coastal Commission because "it was a relatively small project and the permitting process would be bureaucratic and cumbersome (pers. comm. with Rodolphe Streichenberger, MFS, October 23, 1995).
April 1988	The original conditionally approved lease was superseded by another lease (No. M-738-02) which authorized movement of the site to a different 10-acre parcel located 1,100 yards further northeast, with abandonment of the original lease site once the move was approved and completed. No new modes of operation or culture methods were authorized. As in the original lease, the lessee was to observe and comply with all rules and regulations promulgated by any governmental agency having authority by law, including the Coastal Commission, and obtain any other permits or licenses required by such agencies. (*Lease No. M-738-01, Section G).*
October 1988	The CF&GC amended the lease to allow placement of 50 mussel bio-structures (as defined in the original lease, 9-foot lengths of rope anchored in the sea floor with plastic anchors and support buoys), and again in February 1993 to allot ten additional acres of State water bottoms for aquaculture purposes. The additional allocation was consolidated under the existing lease to comprise a single lease of two parcels. The boundaries of the aquaculture lease sites were subsequently amended several times to experiment with different near-shore environments.
August 1993	The CF&GC amended the conditionally approved lease to authorize use of "tire mussel ribbon" (TMR) structures in cultivating mussels. The use of tires was contingent upon (1) the MFS securing a bond for the clean-up requirement, and (2) the preparation of an environmental document for the proposed TMR project that the CF&GC could certify. This was the first time the CF&GC considered the use of tires as an artificial reef substrate; however, the MFS had already placed 1,500 tires on the lease site in 1993 without CF&GC or Coastal Commission approval.
October 1994	The CF&GC declared Lease No. M-738-02 abandoned by mutual agreement between Rodolphe Streichenberger and the CDFG, as aquaculture operations at the lease site did not materialized.



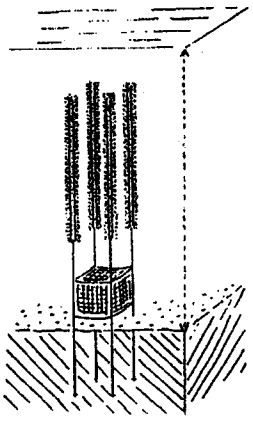
County of Orange

Application No. E-95-5
Marine Forests Society
Exhibit 1

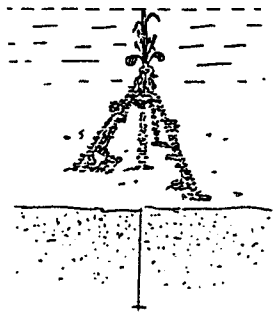


DEPARTMENT OF FISH AND GAME MARINE RESOURCES DIVISION

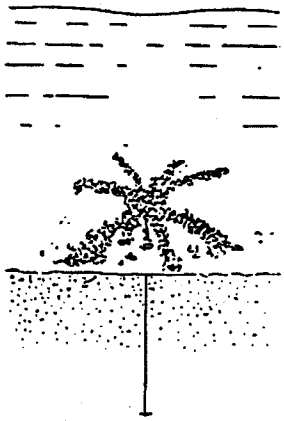
Application No. E-95-5
Marine Forests Society
Exhibit 1



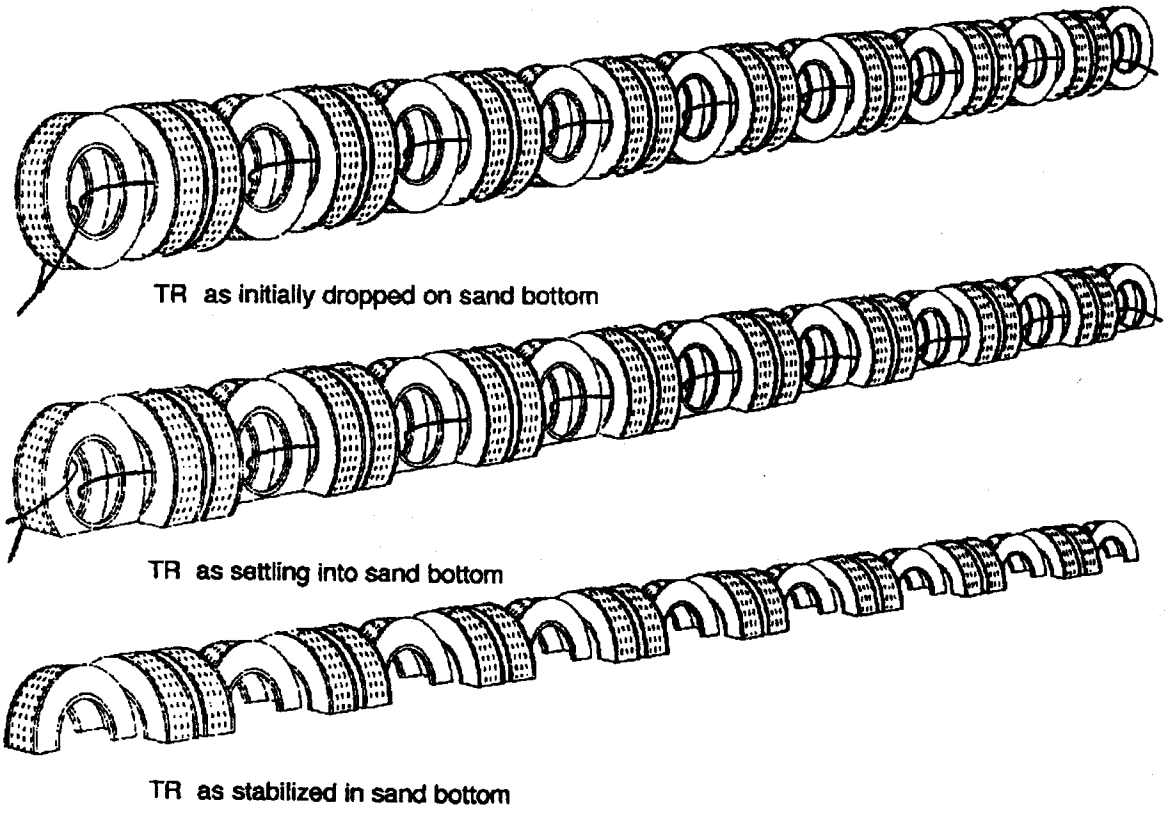
Net and Tube Habitat



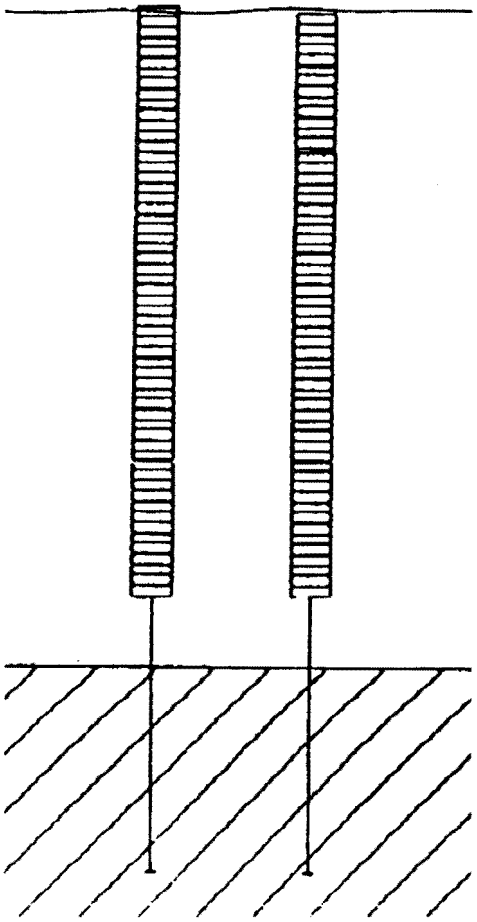
Pyramid Habitat



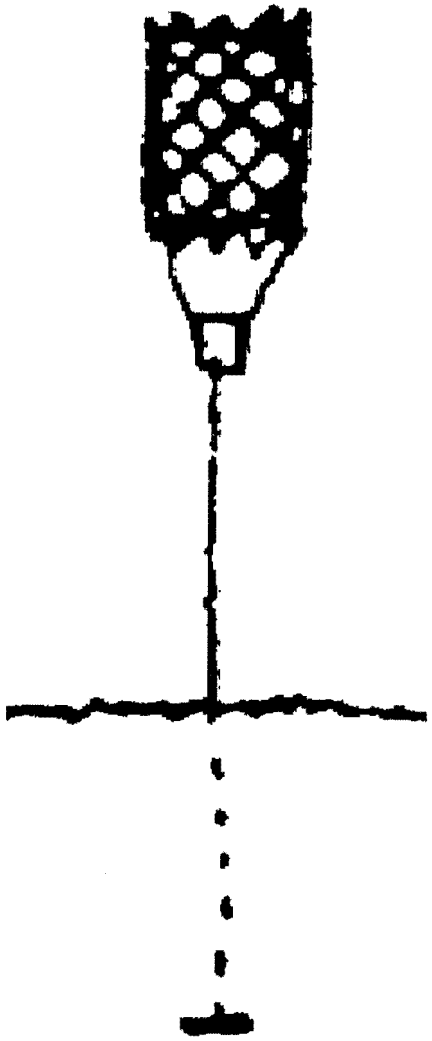
Bundle Habitat



Tire Mussel Ribbons



Tire Columns



Kelp Bio-structure

WHEELER J. NORTH

March 18 1995

Rodolphe Streichenberger, President
Marine Forests Society
P.O. Box 5843
Balboa Island
California 92662

Dear Rodolphe,

This responds to your request for a letter of endorsement for the experimental tire reef project being proposed by Marine Forests to the City of Newport Beach. It is my understanding that the proposed reef will consist of 30,000 tires deployed over ten acres of sandy bottom, to provide an overall coverage of about 20 percent. The tires will be assembled by the methods already proven successful by means of your small tire reef experiment.

The small tire reef experiment has demonstrated several important facts:

1. The system design is stable and has survived winter storms here.
2. The tires resemble natural hard bottom sufficiently well so that they become encrusted by various sessile animals including mussels.
3. The artificial reef structure attracted motile animals such as fishes that commonly associate with rocky bottom and kelp beds.
4. Your project shows that your group has the capability of designing, constructing, installing and monitoring tire reefs.

It seems to me that Marine Forests on a small scale has developed a system with good potential for turning a liability (scrap tires) into an asset (enhancing marine life). The logical next step is to repeat the effort on a significantly larger scale to determing whether unanticipated differences might occur as the size of the activity is expanded. To me, the project appears to have value and I hope that you will be successful in obtaining regulatory approval to conduct the follow-on study.

Sincerely,

Wheeler J. North

Wheeler J. North
Prof. of Environmental Science Emeritus

Application No. E-95-5
Marine Forests Society
Exhibit 3

CALIFORNIA INSTITUTE OF TECHNOLOGY

KERCKHOFF MARINE LABORATORY
101 DAHLIA STREET
CORONA DEL MAR, CALIFORNIA 92625

TELEPHONE (714) 673-9894

September 22 1989

TO WHOM IT MAY CONCERN

This letter describes and endorses the accomplishments and activities of Rodolphe Streichenberger. Mr. Streichenberger and I have been exchanging scientific ideas and information since 1984 and he spent a year at my laboratory in 1986. Our collaborative studies during this period resulted in an invention that permitted easy and inexpensive implantation of solid objects such as kelp and shellfish substrates on a sedimentary bottom. The new technique opened up a significant potential for commercial cultivation of living marine resources in coastal sedimentary areas which are usually desertlike in that attached plants and animals are scarce or absent. Mr. Streichenberger's concept of thus enriching marine habitats is called Sea Biostructuring.

Observations of development of fish populations in waters that had been artificially structured with inert or living materials led Mr Streichenberger to conclude that:

1) Available nutrients are sufficiently plentiful in coastal waters and can be stored and recycled provided the habitat is sufficiently structured.

2)Underwater structures for fixation of sessile organisms are the first element required for the process of enhancing development by sea life.

3) Function of the structure is greater than a simple thygmotaxic effect. The most important function is provision of a foundation for growth.

Mr. Streichenberger has continued his research and development activities here in southern California from 1987 onward. In 1988 he installed the first "marine forest" on a sandy plain lying just west of the entrance to Newport Harbor. He and his associates are continuing to augment this unique facility by transplanting additional kelp and shellfish-culturing substrates. This is a first-of-its-kind advance in marine utilization.

Mr. Streichenberger must be credited for pioneering work in a difficult but promising research and development program in marine science.

Sincerely,

Wheeler J. North

Wheeler J. North
Professor of Environmental Science

Application No. E-95-5
Marine Forests Society
Exhibit 4

SE SKELLY ENGINEERING
DAVID W. SKELLY COASTAL ENGINEER

May 5, 1995

Mr. Rodolphe Streichenberger
Marine Forests Society
P.O. Box 5843
Balboa Island, CA 92662

COMMENTS ON POTENTIAL FOR SHORELINE EROSION FROM MFS PARCEL 1

1. The majority of sand movement along the shoreline is within the surfzone. The surfzone very seldom extends out to water depths greater than 20 feet. At a depth of 40 feet the tires are essentially outside the littoral zone.

2. The average depth of closure for the seasonal profile change in this area is less than 40 feet. Closure in the Oceanside Littoral Cell is at depths of about 30 feet.

3. The parcel has been in place for several years and there is absolutely no evidence of any impact on the shoreline. The depth contours in the lee (shoreward) of the installation show no changes. If the tires were having any effect on the distribution of sand it would be measurable in the vicinity of the tires.

4. The tires are very close to the bottom (1 to 2 feet) and do not effect incoming waves, at all. The tires should not be compared to nearshore and shoreline structures, such as jetties, piers, groins etc. These structure are in the active littoral zone and take up the entire water column.

There is absolutely no basis for expecting the MFS tire experiment to have any impact on the sand deposition at the shoreline.

Respectfully,

David W. Skelly

David W. Skelly MS,PE
RCE #47857

619 S. VULCAN AVE, #214B ENCINITAS, CA 92024 PHONE/FAX 619 942-8379

Application No. E-95-5
Marine Forests Society
Exhibit 5

D.I.V.E.R.S.

Divers Involved Voluntarily in Environmental Rehabilitation and Safety

April 19, 1995

To whom it may concern,

The Marine Forest Society's Tire Reef Demonstration Project should not be permitted anywhere along our coasts because of the impact it will have on the environment. An Environmental Impact Report was advised for this project by the California Department of Fish and Game and the California Coastal Commission yet, the Marine Forest Society has bypassed their recommendation by submitting a negative declaration to the City of Newport Beach. This negative declaration did not include any scientific results that prove the impact would be insignificant to the underwater parcels. It also did not prove with any scientific documentation that the project is feasible. The declaration also did not state any impact the project will have on the Pismo Clams' environment, which will obviously be affected. Divers have noticed a repopulation of the clams since their disappearance ten years ago. The tires' toxicity, their inability to act as a good substrate, and the sand area they will occupy will all have a detrimental effect on the Pismo Clams' recovery. The California Department of Fish and Game no longer consider tires to be a suitable material for creating artificial reefs because of their risk of breaking free and coming ashore, which they have experienced in the past. For these obvious reasons we, the undersigned, support any and all opposition to the Balboa Marine Forest Artificial Reef Project. We are too busy cleaning up other underwater debris and do not wish to retrieve more trash that could be avoided.

Sincerely,

Divers Involved Voluntarily in Environmental Rehabilitation and Safety

Application No. E-95-5
Marine Forests Society
Exhibit 6

P.O.Box 4393, Costa Mesa, Ca 92628-4393

The Marine Forest Society's Tire Reef Demonstration Project should not be permitted anywhere along our coasts because of the impact it will have on the environment. An Environmental Impact Report was advised for this project by the California Department of Fish and Game and the California Coastal Commission yet, the Marine Forest Society has bypassed their recommendation by submitting a negative declaration to the City of Newport Beach. This negative declaration did not include any scientific results that prove the impact would be insignificant to the underwater parcels. It also did not prove with any scientific documentation that the project is feasible. The declaration also did not state any impact the project will have on the Pismo Clams' environment, which will obviously be affected. Divers have noticed a repopulation of the clams since their disappearance ten years ago. The tires' toxicity, their inability to act as a good substrate, and the sand area they will occupy will all have a detrimental effect on the Pismo Clams' recovery. For these obvious reasons we, the undersigned, support any and all opposition to the Balboa Marine Forest Artificial Reef Project.

NAME	ADDRESS	PHONE #	SIGNATURE
Kelly Bracher	17050-H San Mateo	714-964-3726	Kelly M. Bracher
Lawrence Marasio	S.L.C. UT 84117 1046 E Olympus Ridge Circ #101	(801) 265-3921	[illegible]
Dana Woods	2181 State Ave, C.M.	714 722-1930	Dana Woods
Melinda Kirk	126 Loralyn Dr, Arcadia, CA 91006	(714) 859-8617	Melinda Kirk
Charles Dickson	12831 Aspenwood Garden Grove	7505112	[illegible]
Amy Sypherd	624 Candlewood Ave Placentia	(714) 524-1355	Amy Sypherd
Gary Cornell	3339 Olinda Lan Anaheim	714 822 3804	Gary Cornell
Tony Navarro	9140 Larkspur Dr, Westminster	(714) 898-5194	[illegible]
Richard Carr	1848 Tedmar Anaheim	(714) 535-0786	Richard [illegible]
Jeff J Jewell	12841 Charloma Tustin	7148381447	Jeff J Jewell
Karen Withey-Smith	1685 Hay Dr Chino Hills Ca	714)5246306	Karen H Withey-Smith
Dawn Marcova	16 Via Lantana RSM Ca	9,4858 1364	D Marcova
Tony Marcova	16 Via Lantana RSM CA	(914) 858 1364	[illegible]
Wesley Williams	1930 Stevely Ave	(310) 4309916	Eugene W. Williams
Gracely Castellon	8516 Emil [illegible] HB	516 [illegible] 1671	[illegible]
[illegible] Kindhart	2038 Golden Ave Long Beach		
Frank Kindhart	2038 Golden Ave	Long Beach Calif.	
Patricia D. Ray	4918 Oregon Ave, Apt. A. Long Beach, CA 90805		Patricia D. Ray
Mike Jones	17991 Baron Cir #3 Huntington Beach 92647		
Nancy Hall	1915 S. Denton San Gabriel 91776		
Eugene Anderson	11533 Woodbluff Garden Grove 92643		
Don Davis	2100 1/2 Olympic Blvd MBO Ca 19069		
Anthony Totton	267 W Fairview Glendale CA 91202		
Phil Rock	26964 Bolan In. Rolling Hills CA 90274		

The Marine Forest Society's Tire Reef Demonstration Project should not be permitted anywhere along our coasts because of the impact it will have on the environment. An Environmental Impact Report was advised for this project by the California Department of Fish and Game and the California Coastal Commission yet, the Marine Forest Society has bypassed their recommendation by submitting a negative declaration to the City of Newport Beach. This negative declaration did not include any scientific results that prove the impact would be insignificant to the underwater parcels. It also did not prove with any scientific documentation that the project is feasible. The declaration also did not state any impact the project will have on the Pismo Clams' environment, which will obviously be affected. Divers have noticed a repopulation of the clams since their disappearance ten years ago. The tires' toxicity, their inability to act as a good substrate, and the sand area they will occupy will all have a detrimental effect on the Pismo Clams' recovery. For these obvious reasons we, the undersigned, support any and all opposition to the Balboa Marine Forest Artificial Reef Project.

NAME	ADDRESS	PHONE #	SIGNATURE
Elizabeth Flanagan	1075 Camino Magenta TO CA 91360	(805) 498 2502	[signature]
TESS FITZPATRICK	5904 TIPAM WAY	(213) 255-1666	[signature]
John Edwards	501 Herondo St. 33 Hermosa Beach 90254	310 318-1820	[signature]
Howard Fisher	541 Rialto Ave Venice, CA 90291		[signature]
HELEN ATCHECK	1714 STONER LA 90025	310 826 6078	[signature]
Cherylynn Brown	248 Hollywood Way Burbank CA 91505		[signature]
BRIAN HILL	POB 729 Petaluma CA 94953		[signature]
Michael C.	4264	837-8072	[signature]
Bruce Olson	1274 CHESHIRE RIALTO	421-0308	[signature]
Andrea Lussie	18964 Callieri St. Tarzana Ca. 91356		
Tammie Briney	941 W. 35th	213 740 1877	[signature]
Jennifer Britton	7200 Fashion Ave	(310) 492-6489	[signature]
Georgina Briney	8702 Brookview	213 403 9975	[signature]
Francis Salbro	3236 Sam Ave Los Angeles CA 90034	(310) 202 0512	[signature]
Jay Shapiro	14003 Candlewood Dr. Sylmar CA 91342		[signature]
DON TAYLOR	234 CALLE PLUMA SAN CLEMENTE 92673		
ANGEL RODRIGUEZ	320 N.O. ALEXANDRIA # L.A. CA 9004		[signature]
M Boden	757 OCEAN AVE S.M. CA 90402		[signature]
Dawn Miller	R522 Erwin Ln. Santa Ana Ca. 92705		
Deborah Compton	851 1/2 HORNER LOS ANGELES, CA 90035		[signature]
Angela Sanchez	637 Summer Dr #104 Ventura CA 93003		[signature]
Maria Bolton	21272 Lycoming Walnut CA 91797		
Bill Stroup	PO Box 991 Redondo Beach CA 90277		
Werner Scheer	309 NORUMBEGA Dr MONROVIA CA 91016		

The Marine Forest Society's Tire Reef Demonstration Project should not be permitted anywhere along our coasts because of the impact it will have on the environment. An Environmental Impact Report was advised for this project by the California Department of Fish and Game and the California Coastal Commission yet, the Marine Forest Society has bypassed their recommendation by submitting a negative declaration to the City of Newport Beach. This negative declaration did not include any scientific results that prove the impact would be insignificant to the underwater parcels. It also did not prove with any scientific documentation that the project is feasible. The declaration also did not state any impact the project will have on the Pismo Clams' environment, which will obviously be affected. Divers have noticed a repopulation of the clams since their disappearance ten years ago. The tires' toxicity, their inability to act as a good substrate, and the sand area they will occupy will all have a detrimental effect on the Pismo Clams' recovery. For these obvious reasons we, the undersigned, support any and all opposition to the Balboa Marine Forest Artificial Reef Project.

NAME	ADDRESS	PHONE #	SIGNATURE
Annette Matsuda	1111 W. Sepulved. Bl. Torrance CA.		Annette Matsuda
Linda Mensioter	PO Box 922092	Sylmar, Ca 91392	Linda Mensioter
Kevin Seyle	545 Howell Mtn Rd N	Angwin 707 965 0137	Kevin Seyle
Ken Doom	1444 S. Gaffey Ave #307,	LA CA 90025	
Carolina Galvez	1109 E. Mendocino St.	Altadena CA 91001	818 3484305 Carolina Galvez
Eric Bradley	same	1109 E. Mendocino ST Altadena CA 91001	(818) 398-4306 Eric Bradley
Vanessa Arons	636 Beverly Dr.	Arcadia CA 91006	(818) 574-5957 (818) 574-5915
Elena Allen	628 16th St	Santa Monica	Elena Allen
Mark Black	2407 20th	Santa Monica 90405	Mark Black
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Dijender Stringer	4100 Arch Dr. #12A	Studio City CA 91604	
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Sarah Meyers	1475 N Mills Ave.	Claremont CA 91711	Sarah Meyers
Chris Ramsey	215 E. Orangethorpe Ave #207	Fullerton CA 92632	
Claudia Muniz	220 Maple Place	Montebello CA 90640	Claudia Muniz
David Campbell	2908 Richard	Redondo Beach CA 90278	
Adam Shyu	437 Macalester dr.	Walnut, 91789	909-468-5538
Regina A. Mann	903 Royal Palm Dr. #F	Sarasota, FL 34234	813 355-1079
Brandon Oballorain	3525 Maplewood	LA CA 90005	Brandon Oballorain
Deborah Ofarrell	100 Sunridge	Playa del Rey Ca 90293	Deborah Ofarrell

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Brian Barand[illegible]	3672 North 'F' Street San Bernardino CA 92405		
Karen George	1505 Northpark Blvd. Apt 133 San Bernardino, CA 92407		Karen George
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Rachel Bopp	19557 Eagle Ridge Ln. Northridge CA 91326	[illegible]	[signature]
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JACOB LEWIS	4375 LEMP AVE	(818) 508-0096	[signature]
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