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No.12

パラオ共和国

珊瑚礁保全研究センター建設計画

事前調査資料

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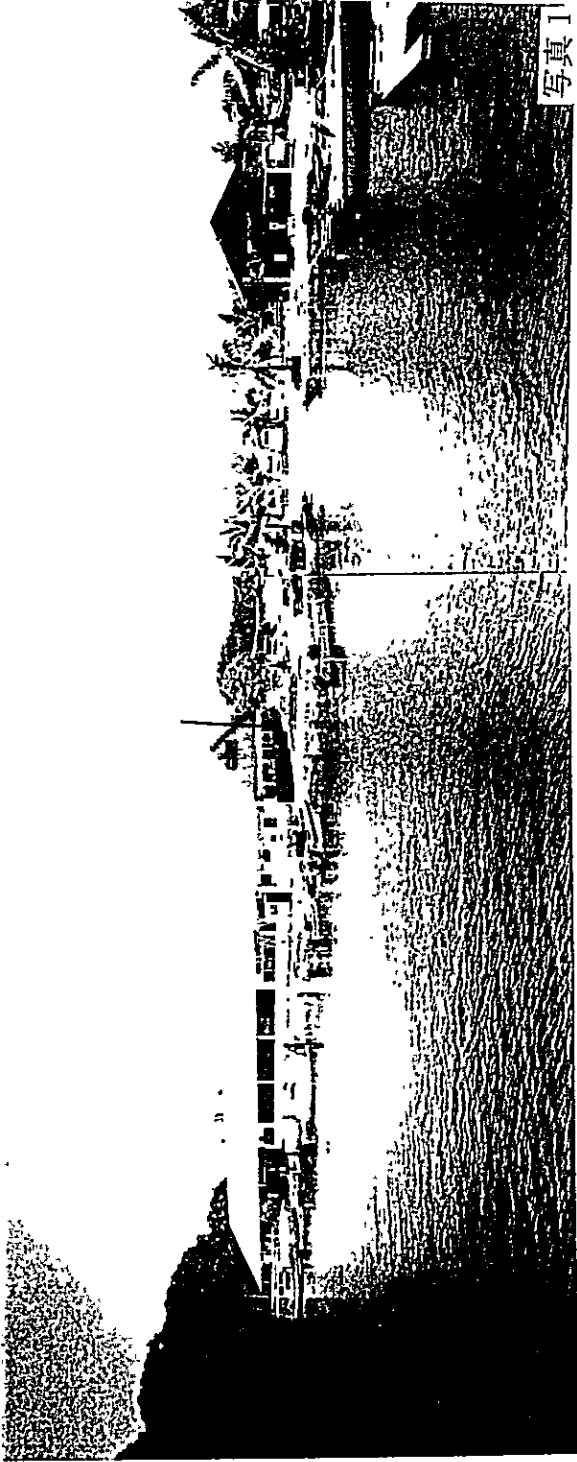
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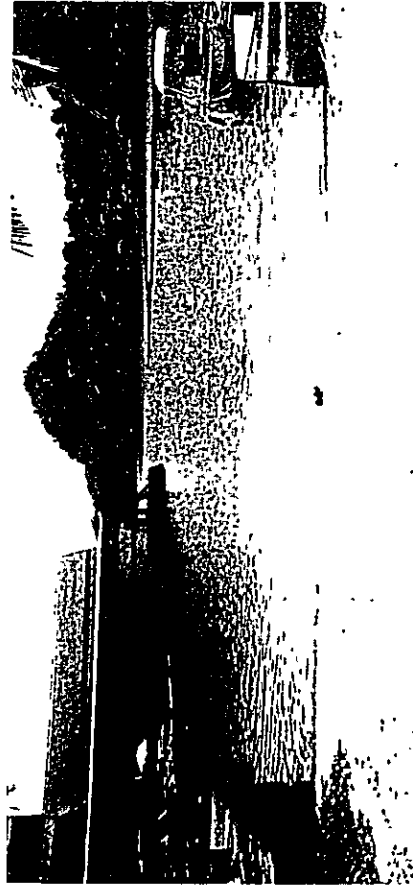
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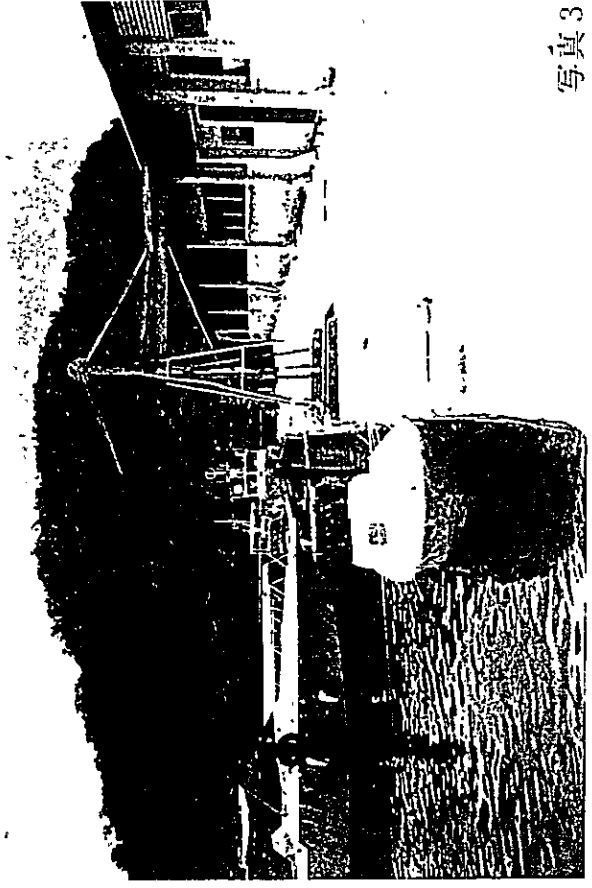
PS 96-20-2



敷地 (M-DOCK) 全景



敷地南側 既存スリップウェイ



敷地南側護岸 (1)

写真3



1154147 [1]



敷地南側護岸 (2)

写真4



敷地南西角の護岸

写真5



敷地西側護岸 (1)

写真6



敷地西側護岸 (2)

写真7



写真 8

敷地北西角の護岸

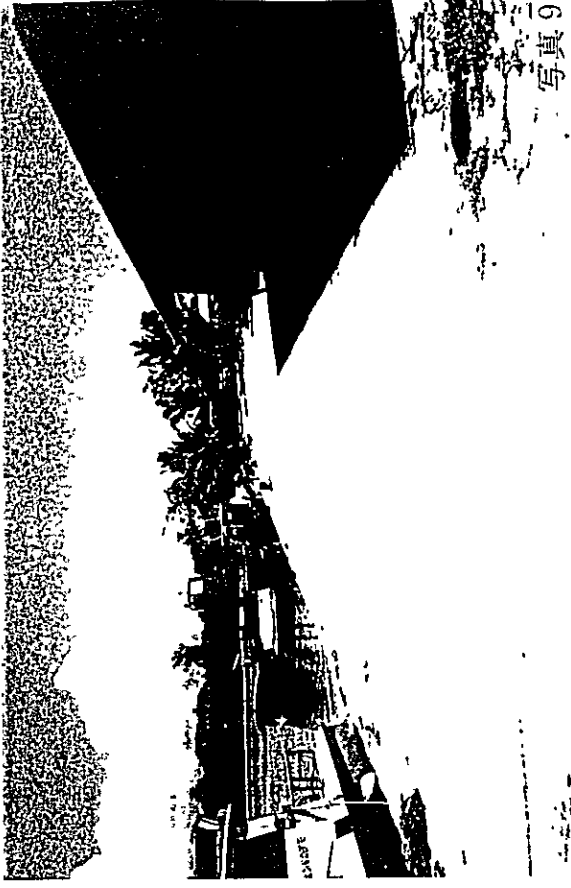


写真 9

敷地北側護岸 (1)

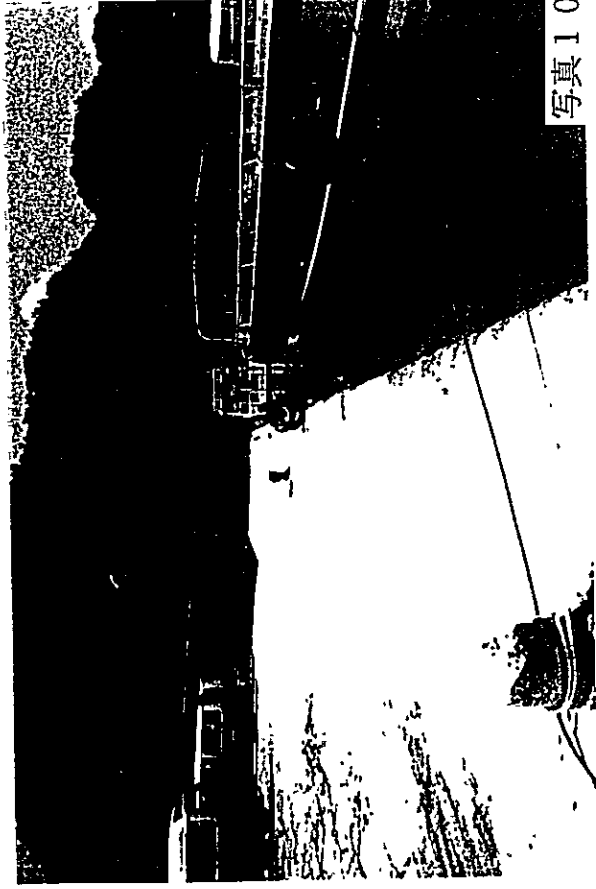


写真 10

敷地北側護岸 (2)

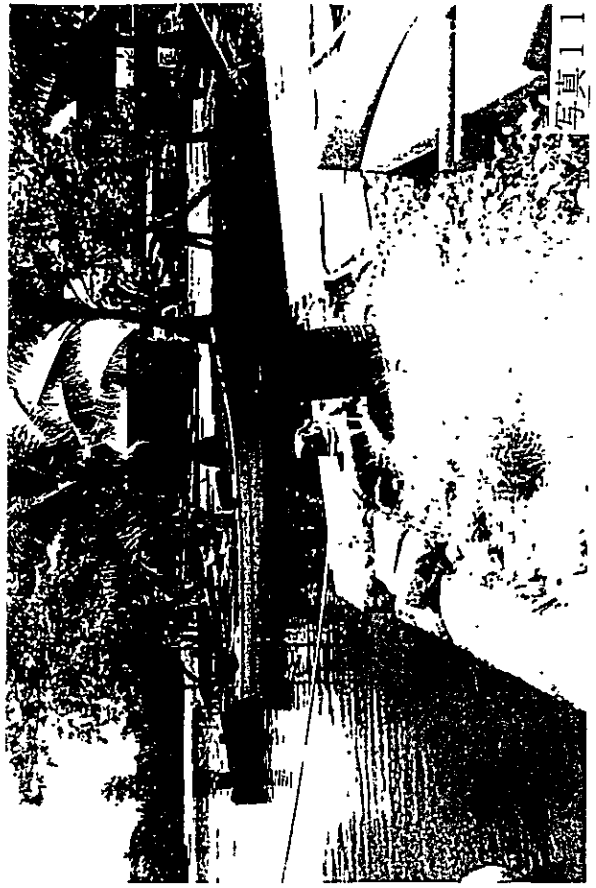


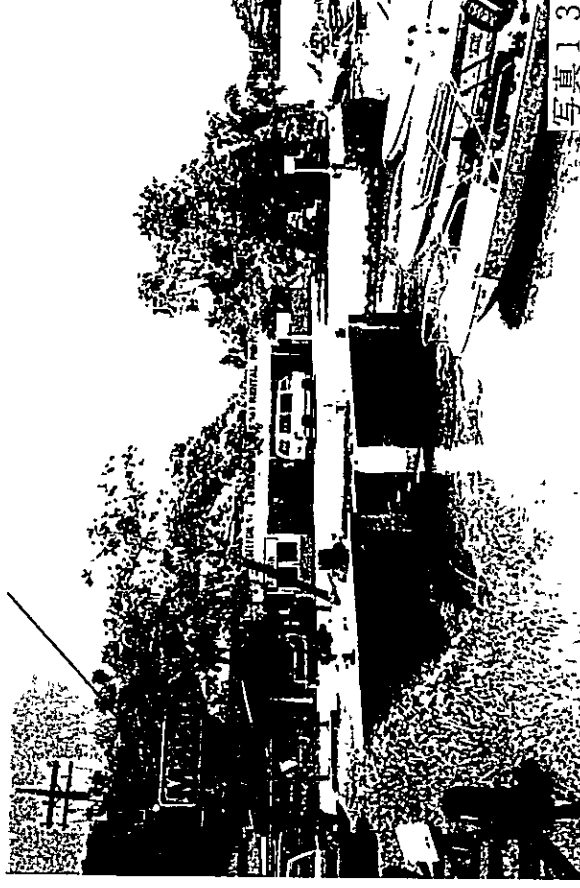
写真 11

敷地北側護岸 (3)



敷地北側護岸 (4)

写真12



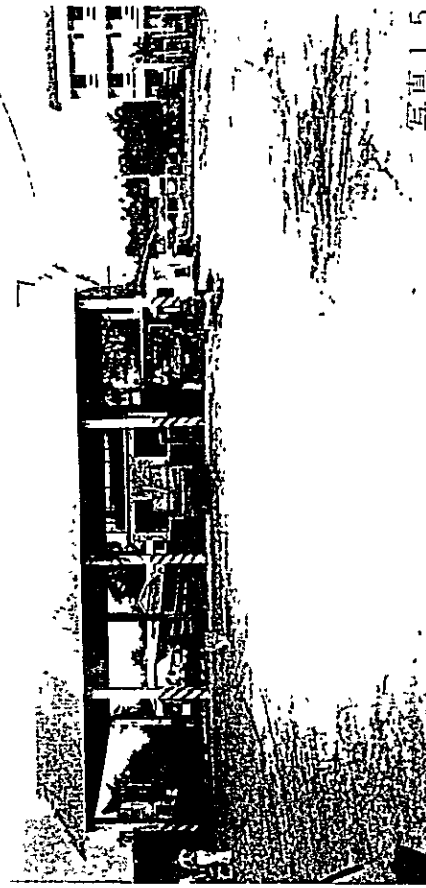
敷地東側の小規模民間施設

写真13



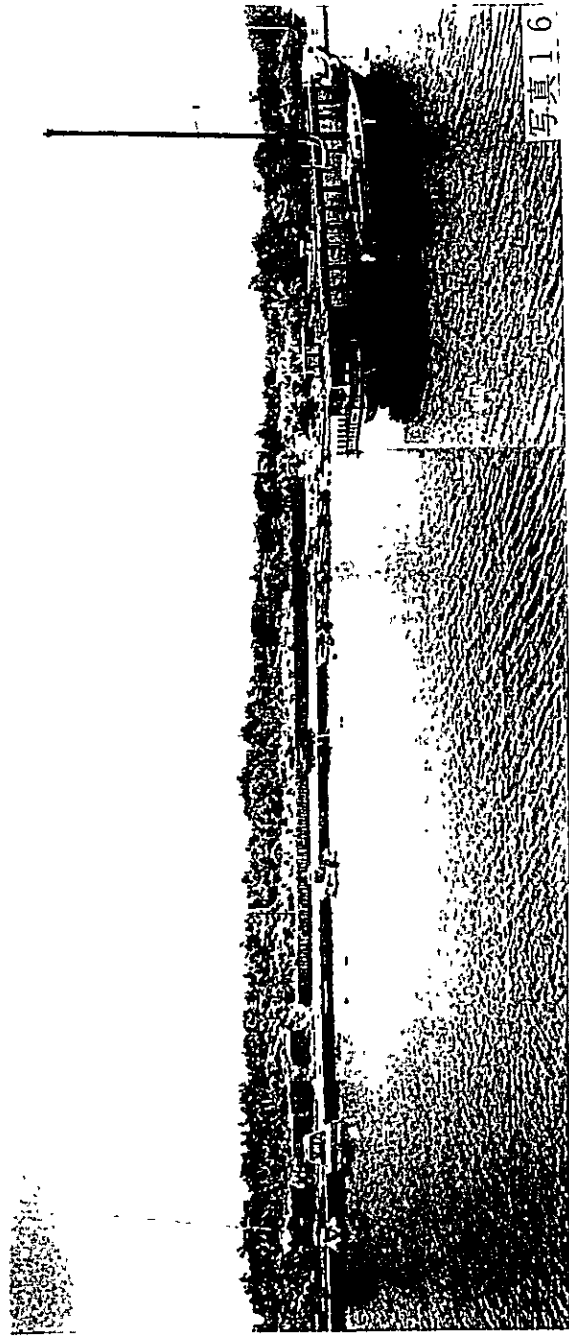
敷地内既存修理工場 (1)

写真14



敷地内既存修理工場 (2)

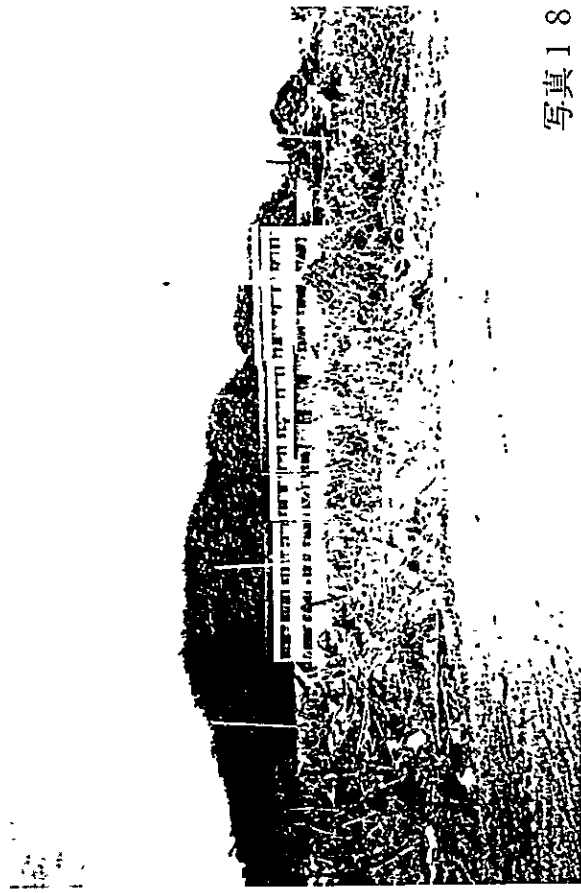
写真15



ゴミ処分場（最終処分場）全景



敷地（M-DOCK）への取付道路。
右側囲いの内側がごみ捨て場。



ごみ捨て場から敷地（M-DOCK）に隣接する
マリーナホテルを望む。

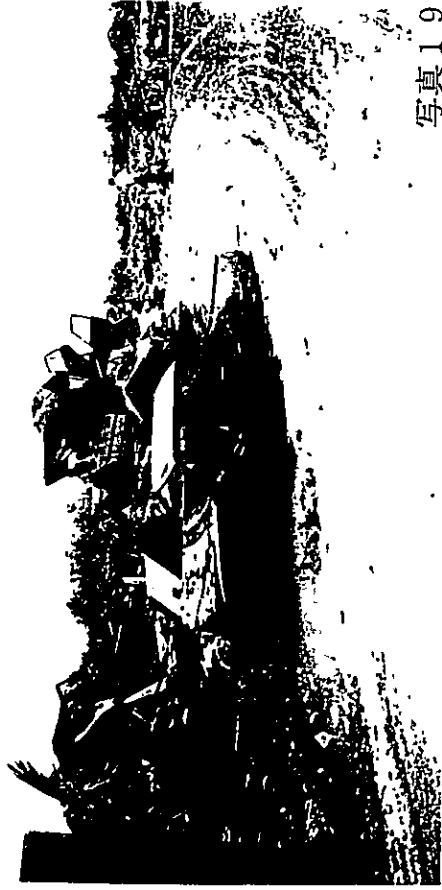


写真 1 9

ゴミ処分場（最終処分場）風景 (1)



写真 2 0

ゴミ処分場（最終処分場）風景 (2)

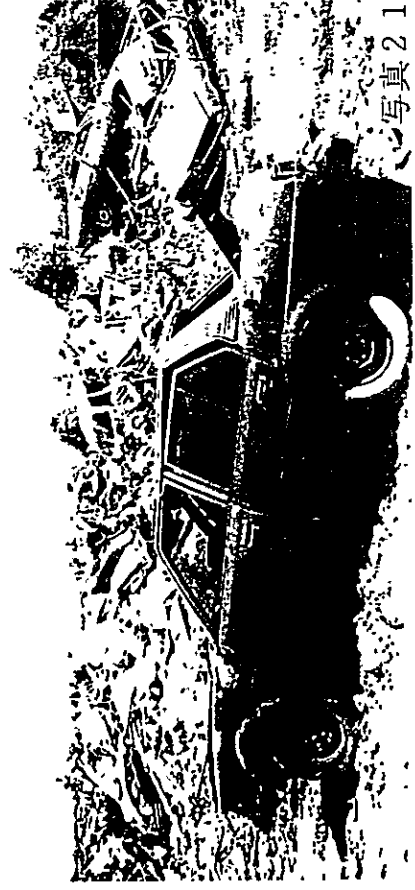


写真 2 1

ゴミ処分場（最終処分場）風景 (3)



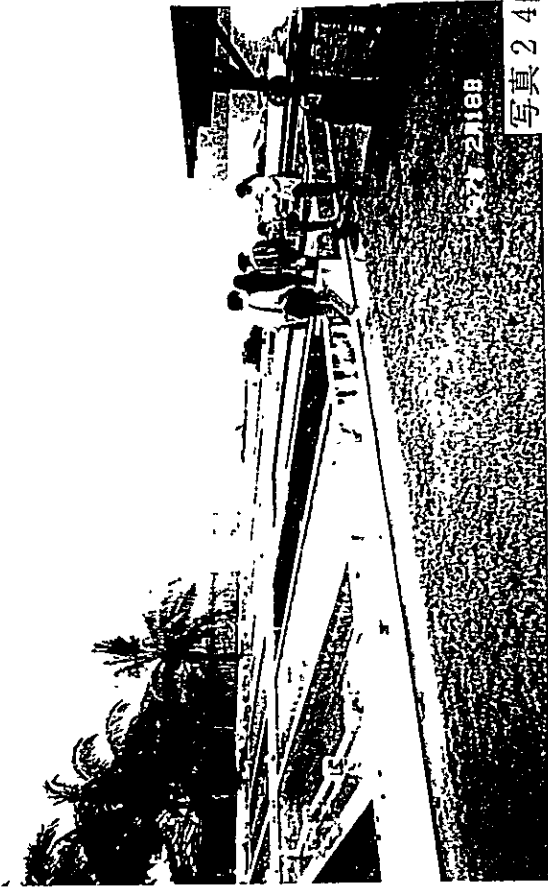
写真 2 2

ゴミ処分場（最終処分場）風景 (4)



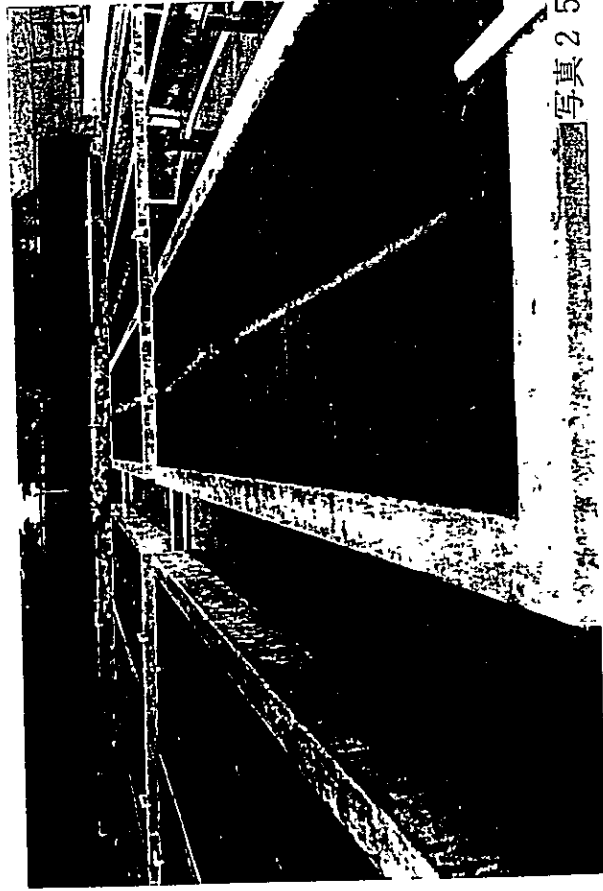
PMDC魚介類飼育場

写真 2 3



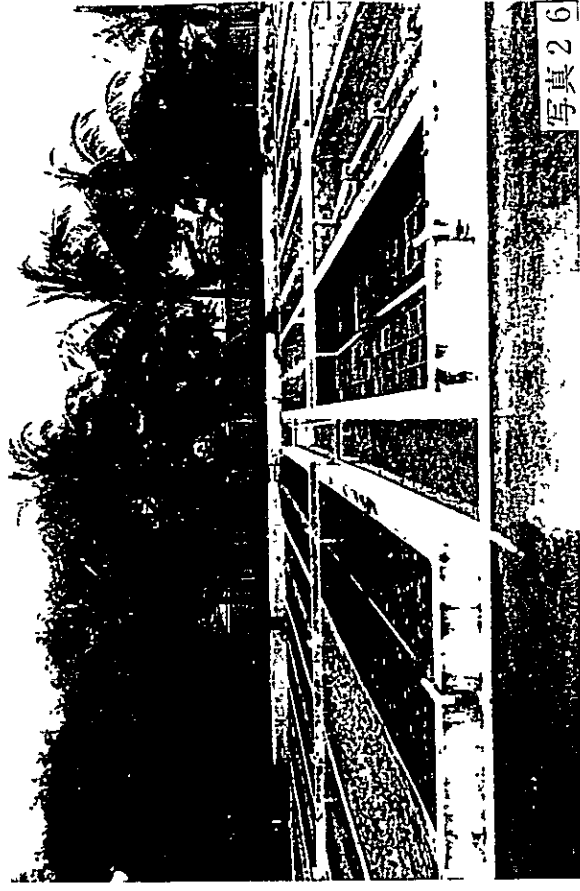
PMDCシヤコガイ養殖池 (1)

写真 2 4



PMDCシヤコガイ養殖池 (2)

写真 2 5



PMDCシヤコガイ養殖池 (3)

写真 2 6

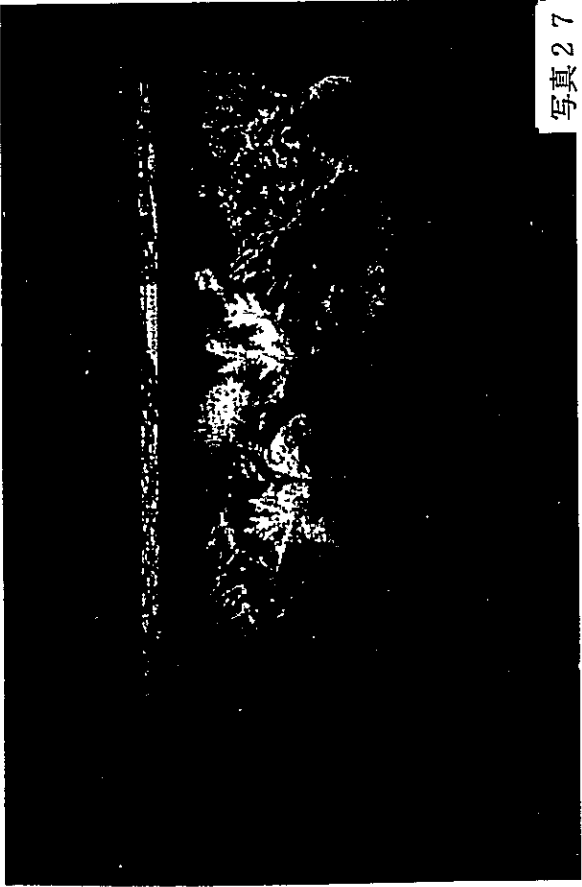


写真 27

PMDC内ミニ水族館 (1)



写真 28

PMDC内ミニ水族館 (2)

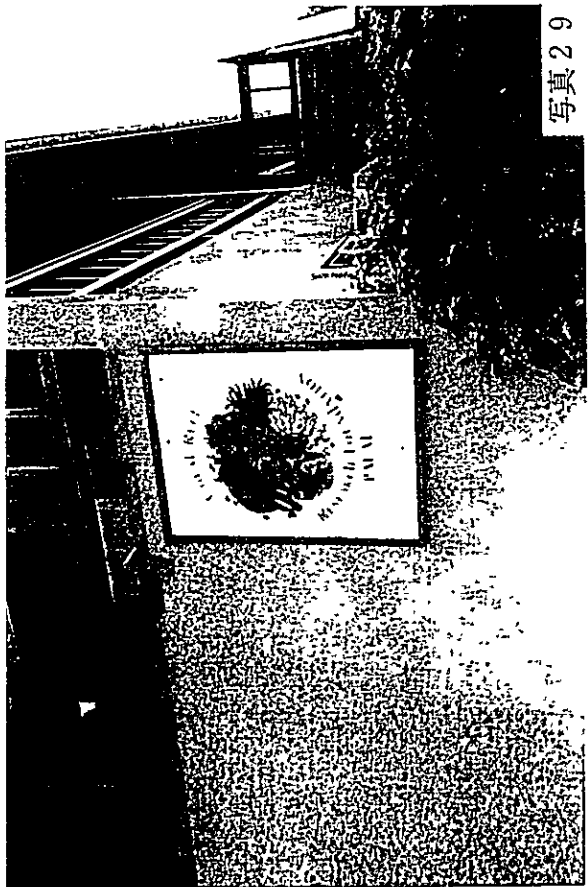


写真 29

CRRF風景 (1)

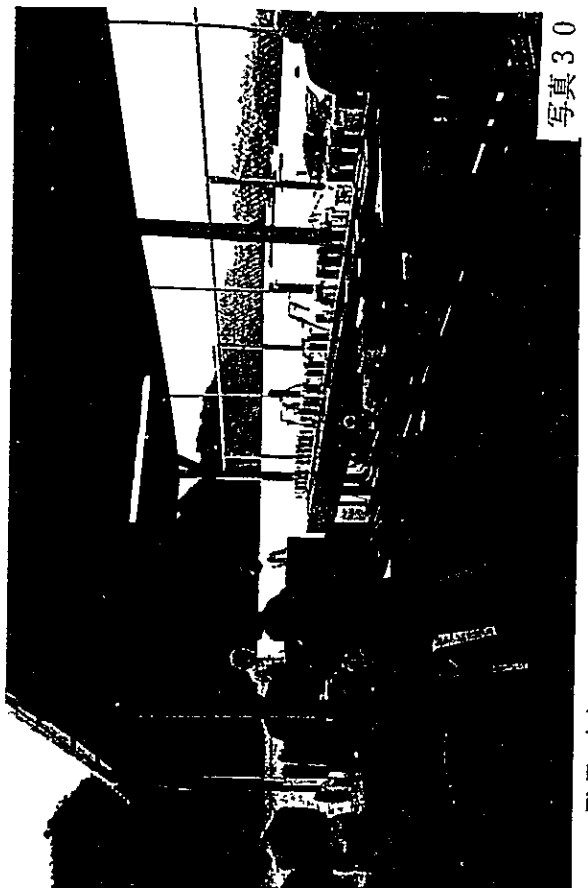


写真 30

CRRF風景 (2)

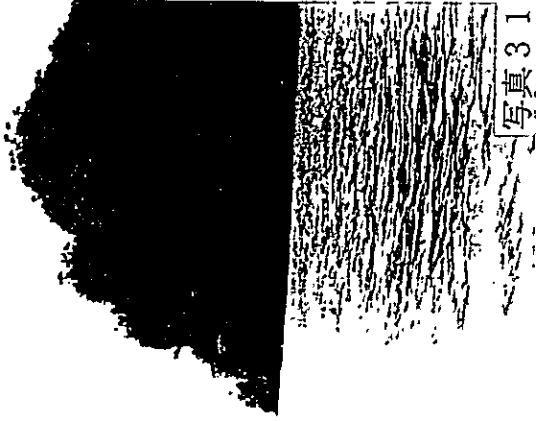


写真 3 1

Rock islands (保護地区) 風景 (1)

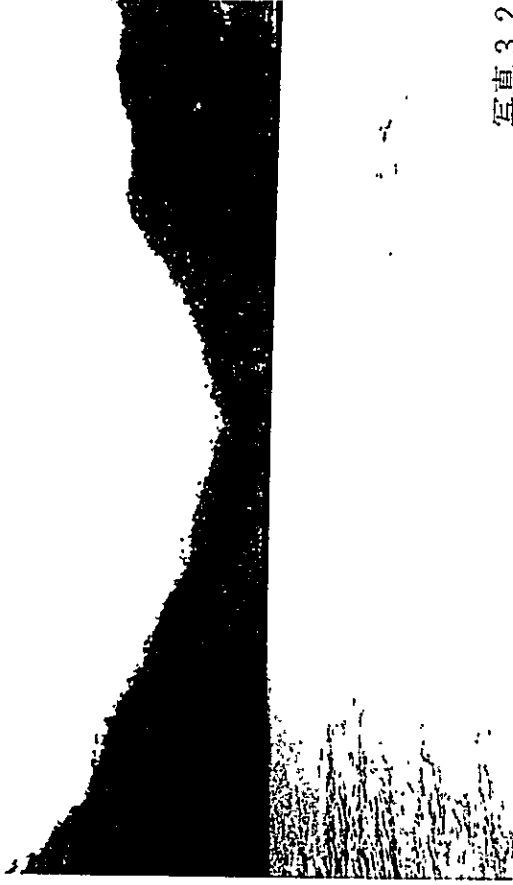


写真 3 2

Rock islands (保護地区) 風景 (2)



写真 3 3

Rock islands (保護地区) 風景 (3)



写真 3 4

Rock islands (保護地区) 風景 (4)



写真35

Rock islands (保護地区) 風景 (5)

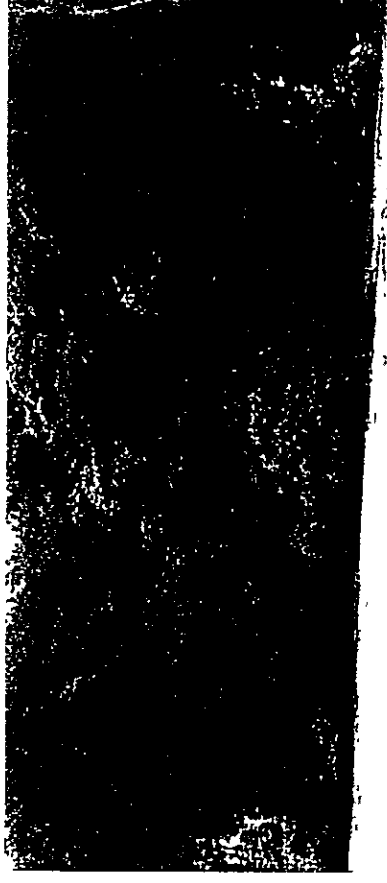


写真36

Rock islands (保護地区) 風景 (6)

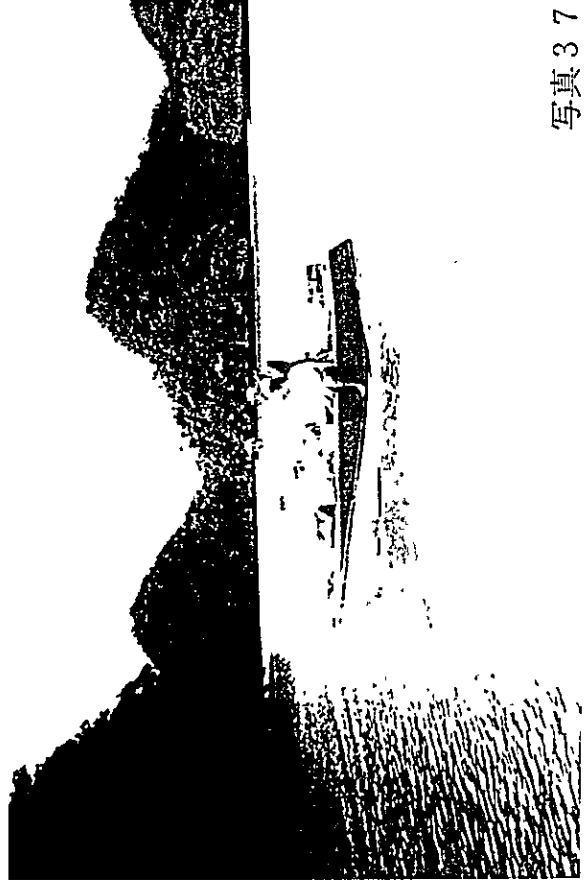


写真37

Rock islands (保護地区) 風景 (7)

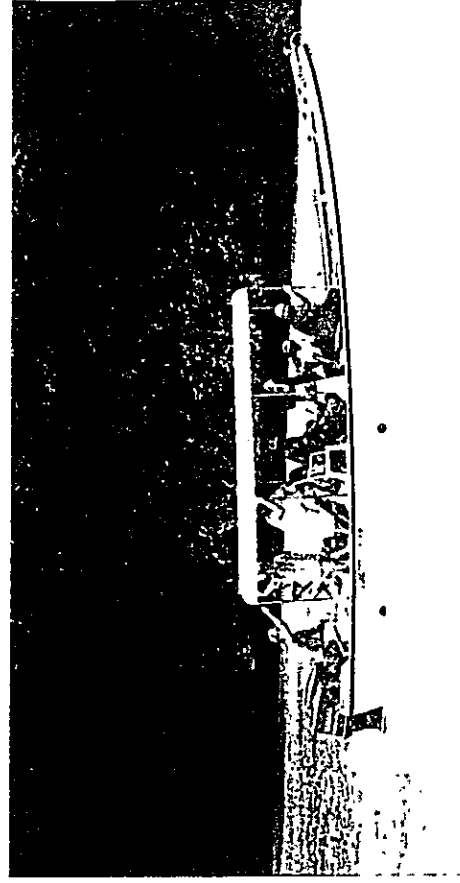


写真38

Rock islands (保護地区) 風景 (8)

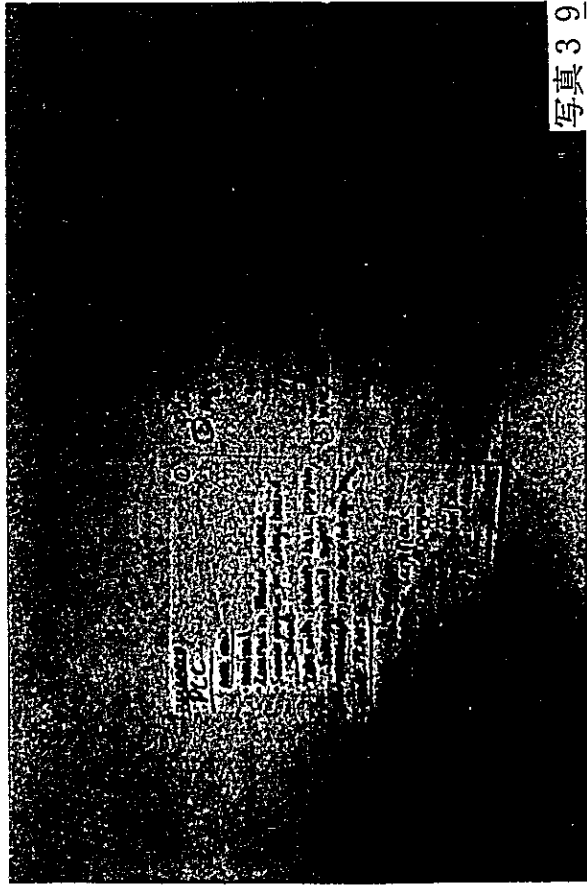


写真 3 9

分科会議事風景 (1)

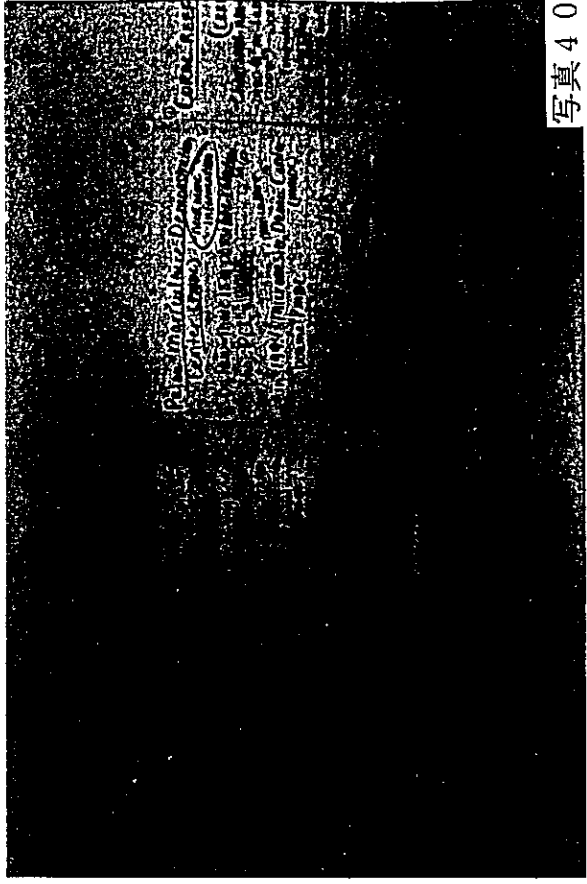


写真 4 0

分科会議事風景 (2)

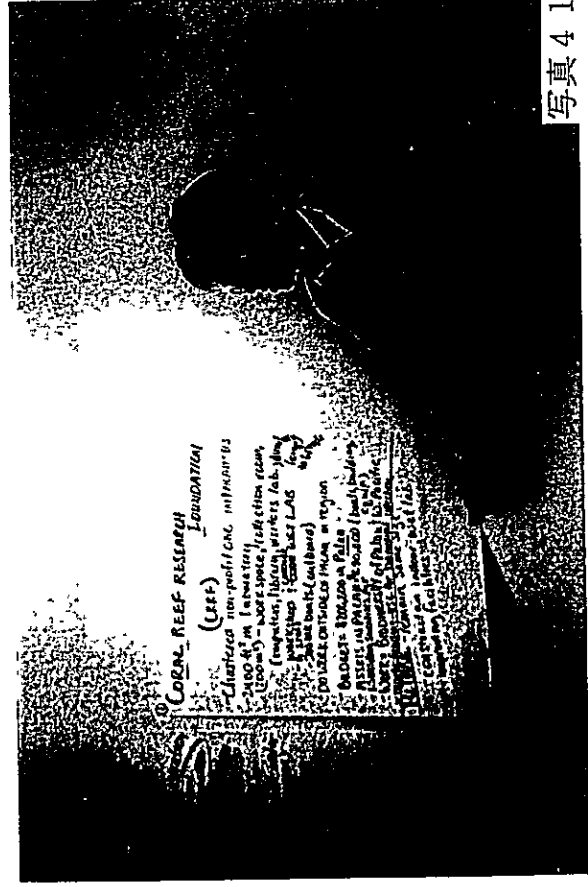


写真 4 1

分科会議事風景 (3)

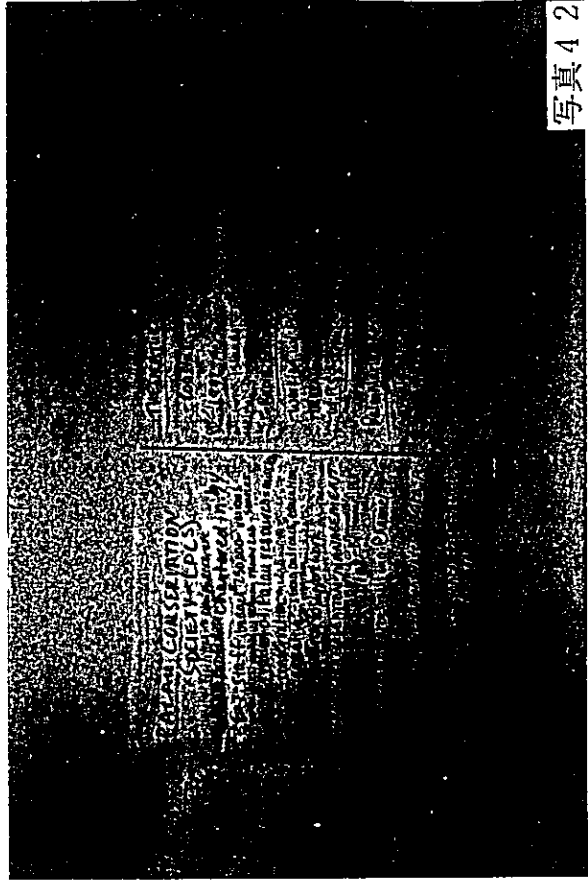


写真 4 2

分科会議事風景 (4)

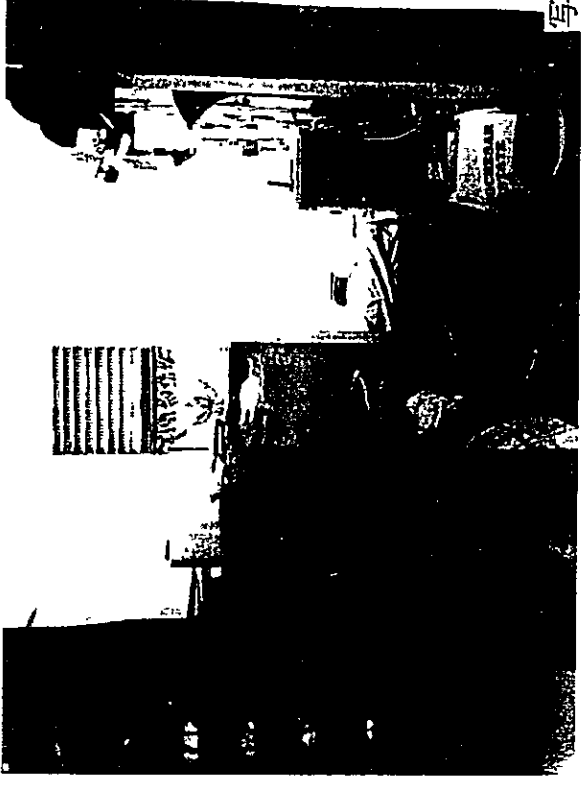


写真 4 4

PCC 寄宿舎 内観



写真 4 6

コロール市内ホテル建設現場風景 (2)

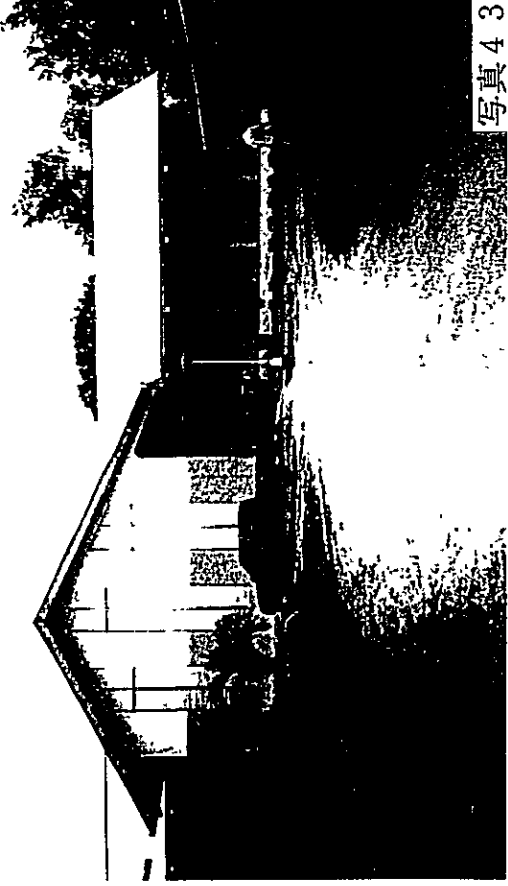


写真 4 3

PCC 寄宿舎 外観

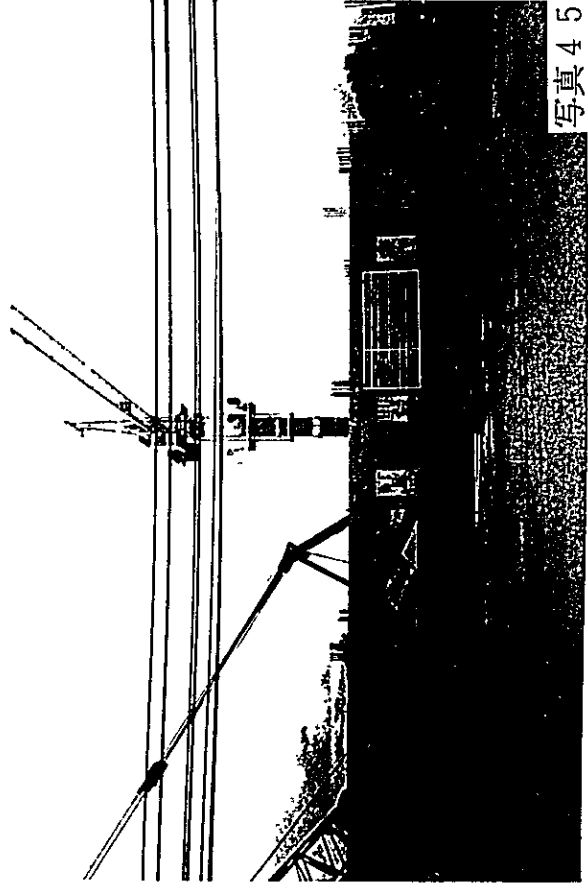


写真 4 5

コロール市内ホテル建設現場風景 (1)



写真 47

副大統領表敬

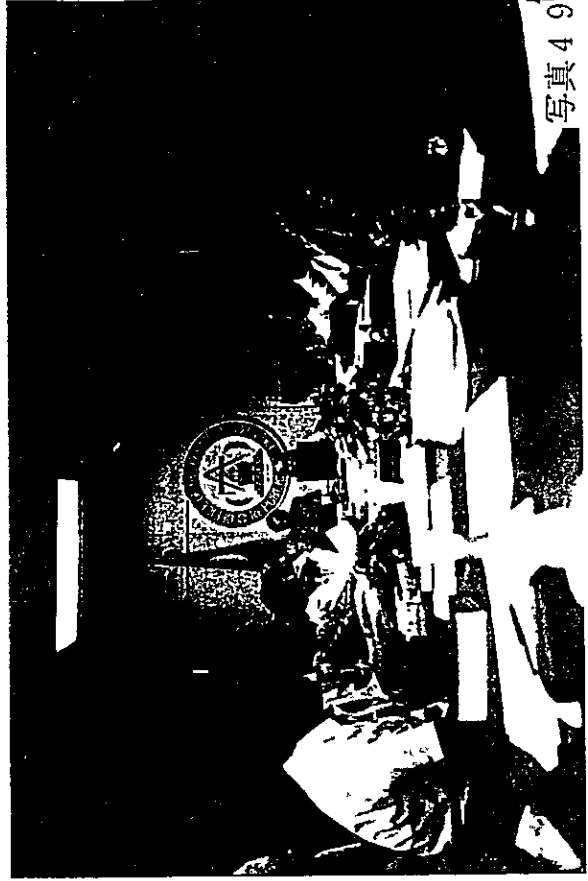


写真 49

日・パ・米3国合同会議風景 (2)

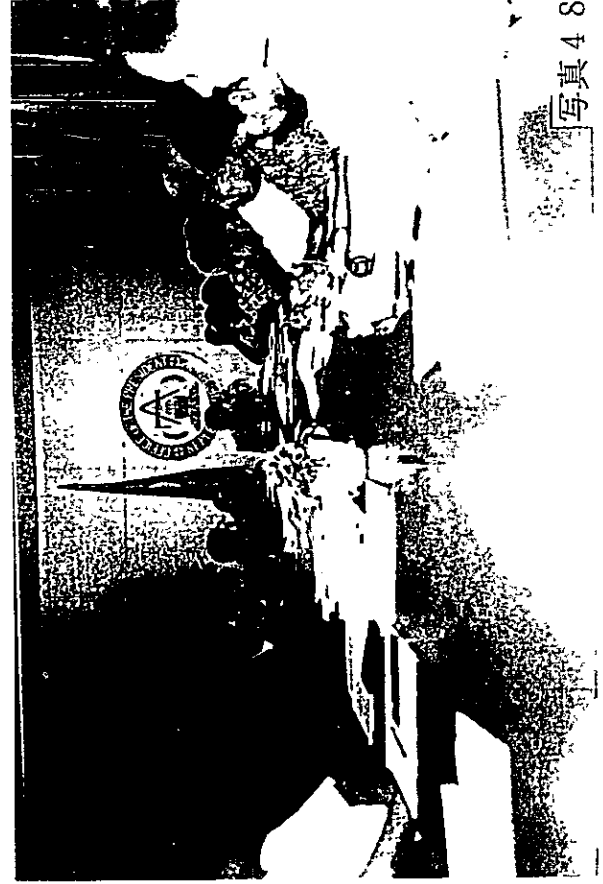


写真 48

日・パ・米3国合同会議風景 (1)



ミニッツ署名風景 (1)

写真50



ミニッツ署名風景 (2)

写真51



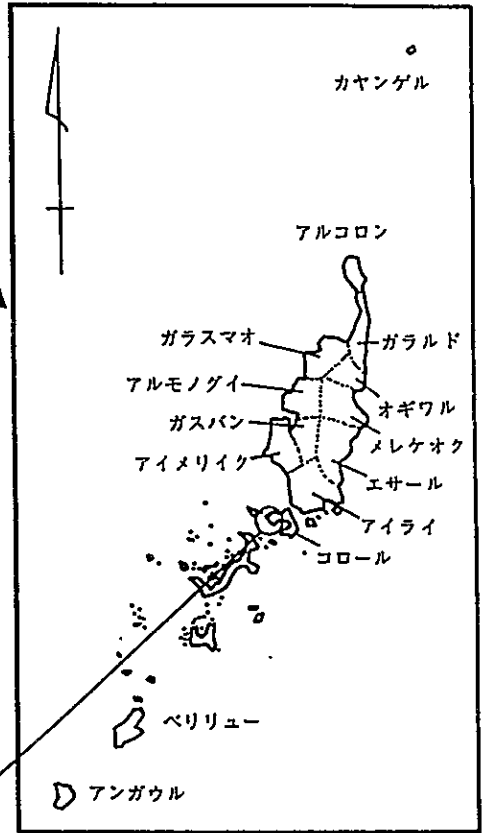
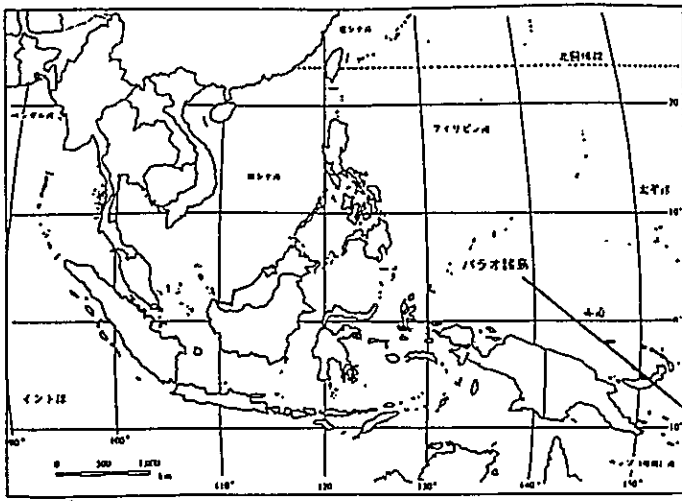
ミニッツ署名風景 (3)

写真52

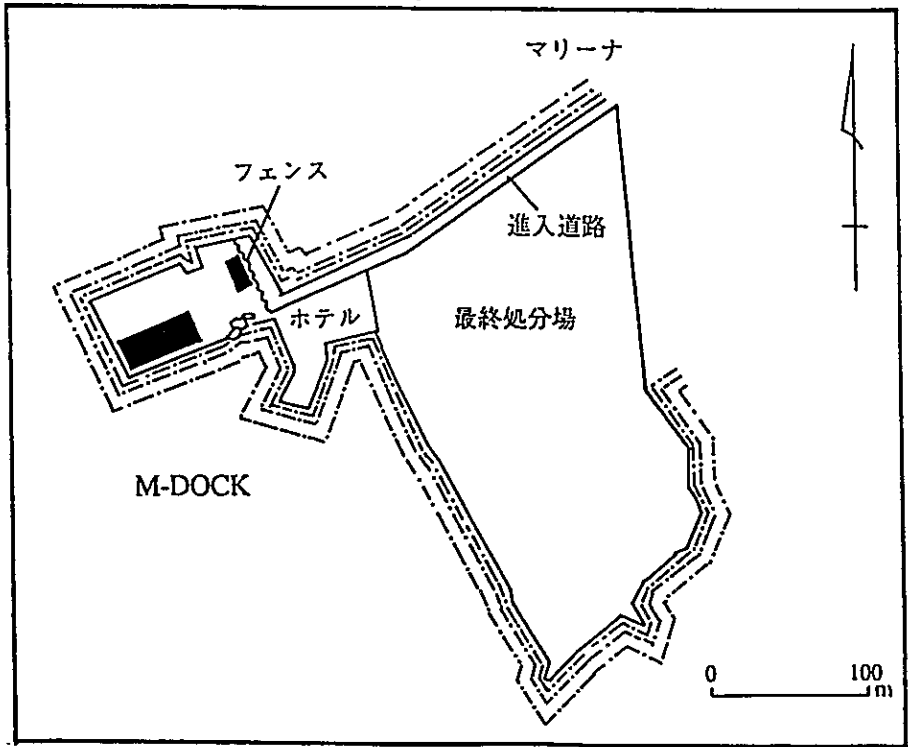


ミニッツ署名風景 (4)

写真53



パラオ共和国



計画対象地図

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1. 当該セクターの概況

平成6年（1994年）5月に日本政府ならびに米国政府両国は、環境と開発に関する国連会議における「海洋環境保護」の決議に基づき、日米コモンアジェンダを提唱した。これは、太平洋地域の珊瑚礁を含む海洋生態系の保全のための施設をパラオ共和国（以下「バ」国とする）に建設することを目的としている。この日米コモンアジェンダに従い、本計画は「バ」国内に海洋生態系の恒久的保全のための研究、教育、人材養成、および啓発活動の促進のための珊瑚礁保全研究センターを建設し、「バ」国のみならず、地球規模での海洋環境保護を目指すものである。

現在「バ」国にて海洋環境に関する研究、教育活動を行っている機関としては以下の組織が存在し、それぞれ独自の活動を行っている。しかし、これらは皆、基礎的な技術機関であり、本計画実施を受け入れることのできる研究員及び教員等の要員を確保していない。

- 1) Palau Community College (PCC)
- 2) Palau Mariculture Demonstration Center (PMDC)
- 3) Coral Reef Research Foundation (CRRF)
- 4) Palau Conservation Society (PCS)
- 5) The Nature Conservancy (TNC)
- 6) Belau Marine Resource Institute
- 7) UCLA Biology
- 8) UC San Diego
- 9) University of Guam Marine Laboratory
- 10) Environmental Quality Protection Board (EQPB)
- 11) University of Hawaii Sea Grant
- 12) Marine Resources Division of Palau
- 13) Entomology and Conservation Division
- 14) Ministry of Education
- 15) U.S. Department of Interior
- 16) U.S. Department of Agriculture

また、「バ」国には、展示・社会教育施設として小規模な博物館（民族資料博物館と貝の博物館）が2施設存在するのみで、「バ」国民や観光客等に自然環境の保護の必要性を訴える水族館等の啓発施設も存在しない。そのため「バ」国政府は、水族館の建設を強く希望しているが、「バ」国政府の財政難から建設計画は実現化されていない。

2. 調査実施に必要な条件

2-1 事業計画対象地の自然条件

(1) 国土

「バ」国は、太平洋南西部のカロリン諸島西端の北緯7度20分、東経134度29分に位置し、大小200以上の島々からなる。これらの島々は火山性の島、隆起珊瑚礁の島、環礁の島等形成過程の異なった島々から構成されており、熱帯太平洋域で典型的な島嶼形成形態を持つ。これらの島の周囲には珊瑚礁が発達し、その総面積はおおよそ507km²に達する。珊瑚礁はその構造的特徴から裾礁・堡礁・環礁等に区別でき、地形的にも変化に富んでいる。海岸付近にはマングローブと海草藻場が発達しており、熱帯性海域の代表的な生態系が存在する。更に、「バ」国はロックアイランドにある塩水湖 (Marine lake) のような、他に類例を見ない極めてユニークな地形形態も有する。このような多彩な環境が多様な生物の生息をもたらし、魚類では1,300種以上、造礁サンゴでは420種以上の生息が報告されており、「バ」国は海洋生物の多様性が最も特徴的な地域の一つとなっている。

「バ」国の自然環境を要約すれば、以下の4項目が特徴づけられる。

- ①多彩な熱帯性海域の自然環境がコンパクトに詰め込まれていること
- ②インド洋・太平洋域における生物分布の中心付近に位置していること
- ③これらの2点から生物の多様性が高いこと
- ④豊かな自然環境が現在もなお保たれていること

これらのうち①は、研究拠点から調査対象地点へのアクセスが容易であるという点で、他地域に類を見ない利点がある。

(2) 気象条件

本計画敷地のある首都のコロール市 (コロール島) は、北緯7度20分、東経134度29分に位置し、熱帯海洋性気候で高温・多雨・多湿の気候条件を有する。季節は7月～11月までの雨期と12月～6月までの乾期に区別されるが、年間を通じ月雨量に大きな差はなく、降水のほとんどは短時間に集中するスコールによりもたらされる。この30年間の平均年間降水量は3,763mmに達し、気温は年間を通じ27℃前後で、湿度、風速ともに季節変動が小さい。ただし実際には、降雨は各月毎あるいは各年毎に変化しており、まれに台風の襲来もある。

過去30年間の気象は表-1のとおりである。

表-1 気象データ

項目	月	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	平均
平均最高気温 (°C)		30.5	30.5	30.9	31.3	31.4	31.0	30.6	30.6	30.9	31.0	31.3	31.0	30.9
平均最低気温 (°C)		23.9	23.8	24.0	24.3	24.5	24.1	24.1	24.2	24.5	24.3	24.4	24.2	24.2
平均気温 (°C)		27.2	27.2	27.5	27.8	28.0	27.6	27.3	27.5	27.7	27.7	27.9	27.6	27.6
平均降水量 (mm)		280.1	211.0	214.9	229.2	323.3	419.0	443.7	386.3	320.3	340.7	284.4	308.8	3762.7
平均湿度 (%)		84.0	83.0	83.0	82.0	85.0	85.0	85.0	84.0	83.0	84.0	84.0	84.0	84.0
平均風速 (m/s)		3.6	3.6	3.6	3.2	2.8	2.6	2.8	3.0	3.0	3.1	2.7	3.1	3.1
平均風向		北東	東北東	北東	東北東	東	東	北西	南西	西	西	北東	東北東	北東
最大風速 (m/s)		19.8	17.2	19.4	15.8	20.2	25.5	23.8	22.9	22.9	22.4	36.5	18.0	36.5

出典：質問書回答

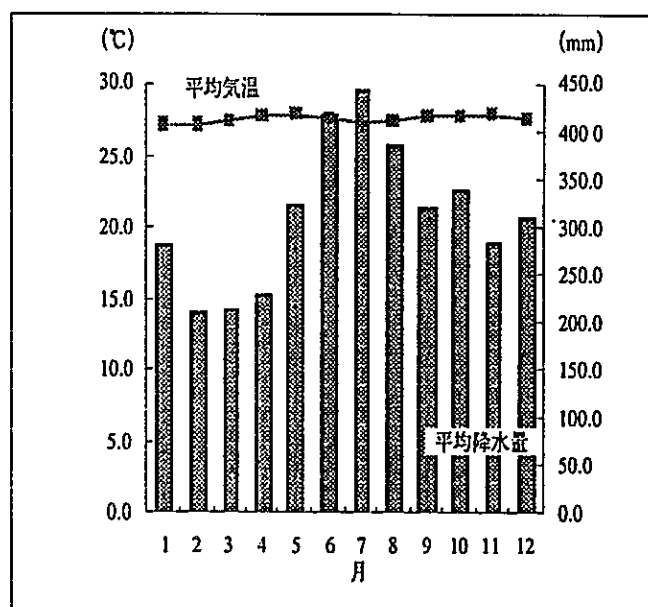


図-1 対象地域の気象特性

(3) 水象・水質・潮位

敷地周辺の水象としては、正面（西側）に水深の深い水路（海峡）があるため潮通しが良く、水質は良好である。潮位（別添資料参照）については、干満の差が最大で約2m程度あり、また、今までの経験で最大の満潮時には現在の護岸を越えて敷地の一部が水に浸るまで水位が上昇したことが報告されている。したがって、本計画では敷地地盤のかさ上げが必要であると同時に、海水取水口のレベルにも注意が必要である。

(4) サイト状況

本計画の対象敷地は、コロール島の西端に位置する埋め立て地（M-DOCK）に建設される予定である。この敷地は、戦前日本の統治時代にサンゴ礁、粘土、玄武岩碎石等で埋め立てられ、現在は公共事業局の自動車整備修理工場、道路計画事務所、ガソリンスタンドとして利用されている。これらの施設はネットフェンスおよびゲートで仕切られているが、敷地の入口周辺にはダイブショップ、フィッシュマーケット、ボート用給油施設等の小規模な民間施設が存在する。公共事業局が現在使用している用地の他にこれら民間施設を含めてM-DOCKと総称することから、本計画の対象敷地はこれら民間施設を含めたM-DOCK全域なのか、あるいは現在公共事業局が使用している部分、すなわちネットフェンスの内側のみに限るかは不明である。そのため、基本設計調査の際、再度確認する必要がある。M-DOCK全域の場合その敷地面積は8,248m²であるが、現在公共事業局が使用している部分のみの場合は約6,000m²程度となる。

なお、現在公共事業局が使用している施設は、本計画の実施が決定され次第、閉鎖・解体されることとなっている。

(5) サイト周辺状況

本計画敷地の東側には、マリーナ・ホテルが隣接し、さらにその東側に約2haのゴミ処分場が存在する。このゴミ処分場はパラオ唯一の最終処分場であり、生ゴミから自動車などの大型廃棄物等様々な廃品が処分される。このゴミ処分場による海水の汚染が懸念されるが、周辺水域は透明度も高く、魚も生息しており、現状では海水の汚染は確認されていない。なお、このゴミ処分場は5年以内に別の場所に移転される計画であり、コロール州政府により跡地は市民公園として整備される予定である。

(6) 公共設備状況

市内の幹線道路から敷地までは、完全舗装道路により整備されている。公共事業局よりは、この道路に沿って、電気、給配水、排水および電話の公共設備が配備されていることである。ただし、排水施設に関しては、地中排水に必要なマンホールが存在しないこと、また、幹線道路から敷地まで緩傾斜道路となっているにも関わらず、ポンプ等の揚水施設の設置が見られないこと、から実際に配水施設が整備されているのか懸念も生じる。そのため、これら公共施設の整備状況については基本設計時に再度調査する必要がある。

2-2 当該セクターに関する技術等の概要

「バ」国政府では、本計画完成後の当該セクターにおける研究員および指導員となるような高等教育を受けた人材は確保されていない。また、国内に短大クラスのバラオ・コミ

ユニティーカレッジ (Palau Community College) の一教育機関が存在するのみで、現在のところ「バ」国独自に人材を養成することは不可能な状況下にある。

「バ」国において大学以上の高等教育を希望する者は、グアム大学やハワイ大学等の外国の大学に進学する事になるが、卒業後の「バ」国内での就職先が限られていることもあり、優秀な人材の多くは国外に流出している。本計画により珊瑚礁保全研究センターの建設が予定されれば、その研究員になることを志す者も出る可能性もあるが、完成に先立ち予め人材を養成・帰国させておく必要がある。また、大学院修了直後の若手のみではセンターでの研究の統括や推進に支障をきたすことから、センター完成後においても日本からの専門家派遣等の技術移転も検討する必要がある。

「バ」国における海洋生物を飼育している施設として、PMDC (シャコガイが主で魚類数種とウミガメ)、CRRF (小型無脊椎動物) 及びPPR (パラオ・パシフィック・リゾートホテル) (海水池で魚類飼育) などの施設が存在する。しかし、これらは飼育技術も初歩的なものであり、現段階で水族館等に必要と高度な飼育技術者は皆無の状態にあると思われる。飼育技術者については、1996年に2名及び1997年に1名が我が国で技術研修を行い、技術取得させることとなっているが、過去の状況から、彼ら研修員の帰国後の去就が懸念される。技術を習得した要員を「バ」国水族館に定着させ、勤労意欲を持たせるためには、身分の保証 (政府所属あるいは公社の職員とする) と海外研修のほか、開館後も米国あるいは我が国の水族館経験者が半年から1年間程度の期間で、現地にて技術指導及び移転を行うのが最も有効な手段であると考えられる。

なお、展示水族の採集に関しては、将来的には飼育員が行うのが理想的であるが、現地には採集業者も存在するので、当初は業者への委託が可能である。

2-3 事業計画に関連する法律・諸基準

(1) 施設・設備

本計画実施に関する建設許可、環境基準等については次の3事項に注意を払い、「バ」国関係機関より許可を受けて建設することが必要である。

- ① 施設の建設に関しては他の国と同様に建設許可を取得する必要がある。「バ」国では建設許可 (Building Permit) の他に、環境評価 (Environmental Impact Assess) および土砂移動許可 (Earth Moving Permit) を取得しなければならない。土砂移動許可は、掘削、浚渫等で土砂が発生する場合には、いかなる場合であろうとEQPB (Environmental Quality Protection Board) の許可を取得することが義務付けられている。これは、環境保護の観点から工事中の土砂が海へ流れ込んで環境が破壊されるのを防止するための法律である。
- ② 環境評価に関しては、米国のEPA (Environmental Protection Agency) の基準が適用される。

また、建築基準については「バ」国独自の法律が存在しないので、米国のUBC (Uniform Building Code) が適用される。地震、風等の基準についても同書の規定に準ずる。

- ③ 非常用自家発電施設に関連した燃料、及び研究用の特殊な薬品（有機溶媒などの危険物）などの貯蔵に関して法的な規制があれば配慮が必要である。また、研究施設からは特殊な廃液が生じるので、一般的な排水に加えてこれら廃液に対する法的な制約への注意が必要である。

(2) 機材

本計画機材の基本設計を行うにあたって留意すべき法律・諸基準は存在しない。

2-4 設計・積算に関する条件

(1) 施設・設備

① 水族館の展示内容

研究内容あるいは水族館の展示内容等は、直接的に施設の構成、形状、設備等に影響するものであり、それなくしては施設の設計はできないものである。それゆえ、施設設計をはじめの前に研究内容あるいは水族館の展示内容等について、「バ」国の珊瑚礁に精通した専門家による指導のもと、そのコンセプトおよび具体的内容を十分検討し、合意を得ることが最重要である。なお、展示内容については参考までに、次項でその案を示す。

② 建築資材および設備機器

海水を使用する施設であることから、建築資材および設備機器とも腐食しにくい材料を使用する必要がある。建築資材については特に外壁部分および屋根部分に使用する資材については腐食防止処理を施すこと。また、設備機器としては、ポンプ類は海水用、照明器具は防水加工されたもの、また、漏電に配慮した電気配線とする。

③ 空調設備

研究用機材の保護のため、研究施設には空調設備を備える必要がある。その際、空調設備は個別対応方式とし、セントラル方式としない。セントラル方式の場合、一カ所のみ故障発生でも全体の機能が停止してしまうため、維持管理の点から問題が発生しやすく、個別対応方式とするのがよい。

④ 自家発電設備

水族館の維持管理のために自家発電設備は必要不可欠である。発電機は停電時に自動切り替え可能なものとする。

⑤ 特殊廃液処理施設

研究施設で薬液を使用する場合は、薬液処理のため特殊廃液処理槽を設ける。

⑥ 浄化施設

「バ」側から提出された資料では、本計画対象地に8インチの排水管が取り付けられていることになっているが、仮に排水管が敷設されていない場合は敷地内に浄化槽を設ける必要があるため、現地にて再確認をする必要がある。浄化槽を設置する場合は、周辺環境を保護するため高度処理をする必要がある。

⑦ ソーラー・システム

本計画は地球環境保護を目指したプロジェクトであることから、環境にやさしいソーラーシステム等の採用が討議されたが、ソーラー・システム等のハイテク機器は故障した場合修理ができないことから放置される可能性が高く、本計画にはあまり推奨できない。但し、環境問題はエネルギー問題でもあることから、省エネルギー対策については十分考慮する必要がある。

⑧ 敷地

施設の計画に際しては、将来の拡張余地を考慮すること。

⑨ 障害者への設計配慮

研究、展示内容等に興味のある者はだれでも利用できる施設とするために、障害者の利用を考慮した設計を行なう。

(2) 水族館施設、展示内容

① 飼育水と循環方式

建設予定地のM-DOCKの100mほど沖には水道（潮流）があつて水循環が良く、予定地周辺の水温をはじめとした水質は年間を通じて極めて安定した状態にある。この点は調査の時点で観察された魚類をはじめとする生物相からも窺われた。従って、飼育水の循環方式は基本的には流水方式とし、エアーによる底面ろ過方式を併用する。このエアーによる底面ろ過方式の併用は、魚病発生時に治療を容易にすること、また万が一取水に汚れが出た場合でも展示水槽水を清澄な状態に保持できるなどの利点をもつ。

② 展示内容案

当初「バ」国側からジュゴンやウミガメの飼育が要望されていたが、これらは餌の補給や水質汚染の点で飼育は困難と考えられる。また、回遊性が強く大型となるアジ、サバ類は多量の餌料を必要とする点と水槽の大きさが制限される点で困難である。従って、展示水族としては珊瑚礁を生活基盤として美しくしかも全長が20cm未満の大きさのチョウチンヨウオ類、スズメダイ類、ベラ類、ハゼ類、ハナダイ類、イトウダイ類、タツノオトシゴ類、ネンブツダイ類や大きさが30cm未満のカワハギ類、ミノカサゴ類、キンチャクダイ類等の魚類。それにウニ類、ヒトデ類、エビ類、カニ類、クラゲ類などの無脊椎動物が妥当と考えられる。これらの水族は展示効果があり、飼育も比較的容易で摂餌量も少なくて済み、経済効果も大きい。

また、「バ」側の要望書にもある生きた珊瑚とシャコガイの展示に関しては、両種ともにその成長と生存を共生藻に負う点が大きいため、良好な状態で飼育するためには自然光あるいは強力な人工光が不可欠である。従って、建設及び維持・管理経費を考慮するとこれらの水槽は屋外に設置すべきものとする。

なお、展示物として珊瑚の骨格標本をとの意見も出されたが、これらは観覧室内の中央付近に展示が可能であり、パネル解説あるいはVTR等の機器による解説も考えられる。

③以下に水族館に必要と思われる施設につき概略する。

- ・券売所
- ・土産物売場
- ・観覧室
- ・展示水槽
- ・バックヤード内に餌料保管用冷凍室
- ・餌料調理場
- ・予備水槽（500～1000ℓ容量のFRP製、ポリカーボネイト製簡易水槽）
- ・飼育員休憩室
- ・飼育具器材室
- ・応接・休憩室
- ・潜水具等収納室
- ・実験研究室等
- ・水族館屋外での珊瑚とシャコガイの同居展示水槽

(3) 付帯工事

① 護岸整備

現在M-DOCKの護岸は一部崩壊した状態にあるので、本計画を実施する場合は護岸整備は必要となる。その際、潮位を考慮した本計画対象地の地盤のかさ上げを考慮する必要がある。

② 取水・排水口の位置

海水の取水・排水（特に取水）口の位置およびレベルについては、潮の流れや潮位を考慮して決定する必要がある。潮位については、干満の差が2m強あることから取水口のレベルには十分注意すると同時に、取水位置での水質についても再調査する必要がある。

③ 基準点の決定

潮位については収集資料としてデータを入手してあるが、基準点（水準点）が不明である。また、本計画対象地の地盤高も不明であるので、両者に共通する基準点に基づいて正確にレベルを調査する必要がある。

④ボート係留施設

現在M-DOCKの護岸には数多くのボートが係留されているが、本計画実施後にどれだけのボートの係留設備を設ける必要があるかは未定である。必要な係留設備に合わせた栈橋の設置を考える。

(4) 機材

研究所の規模・研究内容などに応じて更に詳細に検討する必要があるが、最低限必要と思われるものを以下に挙げる。

- 1) 調査用船艇、大（GPS・魚探・ウインチ・船舶電話・高圧コンプレッサー・110v交流電源などを備えるもの）、中（屋根付で10人程度のダイバーを運べるもの）、小（3～4人乗りのゾディアックで可）を各1隻。グラスボートは既に民間業者によるサービスが存在することより、別途慎重に検討する必要がある。
- 2) 車輛（小型マイクロバス・4WDワゴン・トレーラ等）
- 3) バックアップ電源（最低限、コンピューター・飼育装置・気象観測装置には必要）
- 4) 水槽各種（20ℓ～20t、小型の恒温水槽を含む）
- 5) 海水給水施設、ろ過・未ろ過の2系統
- 6) エアレーション用給気施設
- 7) ディープフリーザー、2～3段階の温度の異なるもの
- 8) 冷凍冷蔵庫
- 9) 生物顕微鏡、実態顕微鏡、それぞれの撮影装置と照明装置
- 10) 分光光度計
- 11) 純水製造装置
- 12) 潜水器材（タンク・レギュレータ・BCD・ウエイト・ダイブコンピュータ・等。コンプレッサーは別途施設が必要）
- 13) 多項目水質計（海洋観測用）
- 14) 採水器
- 15) プラントネット各種
- 16) 各種メモリー式水質計（水温・DO・塩分等）
- 17) 各種水質計測器（水温・DO・塩分・pH等）
- 18) 自記録式気象観測装置（表面海水温を含む）
- 19) 光量子計（データロガーを含む）
- 20) 遠心分離器
- 21) ろ過器
- 22) インキュベータ
- 23) オートクレーブ

- 24)低温乾燥機
- 25)電気炉
- 26)クリーンベンチ
- 27)実験台
- 28)天秤類
- 29)ドライキャビネット
- 30)各種カメラ、ビデオカメラ等の映像記録装置
- 31)OHP、スライド映写機、テレビ、ビデオデッキ等
- 32)ファクシミリ
- 33)コンピュータ・プリンタ・スキャナ等
- 34)コピー機
- 35)無線機
- 36)研究・教育・啓蒙活動用各種図書

(5) その他

水族館を含む展示スペースの展示物に対する費用負担について、日・パ・米3国にてどのように分担するかを討議することになっているので、その結果を積算に反映させる。

2-5 調達・現地建設業者について

(1) 施設・設備

① 建設資材の調達

「パ」国は小さな島国で、なんら生産設備を持っていない。したがって建築資材、設備機器とも全て輸入品である。唯一国内で生産されているものはコンクリートブロックのみである。本計画建設工事の際は、ほとんどの資機材が日本あるいは第三国から持ち込まれることになるが、特に設備機器および機材については将来のメンテナンスを考慮して、現地小売店にて購入可能なもの、あるいは互換性のあるものを調達することが望まれる。

② 現地建設業者

現地建設業者は、小規模ながら多数存在する。「パ」国は観光が主要産業の一つであることから、市内の数カ所でホテルの建設が進められており、それらを見る限り技術的になんら問題はないと思われる。本計画施設はそれほど大規模の施設ではなく、水族館施設の一部工事については日本からの責任施工になるが、それ以外については通常の工法で建設可能であることから、現地建設業者をサブコントラクターとして使用することは十分に可能である。

(2) 機材の調達

研究用の顕微鏡や分析機器等については、現地に製造業者ならびに販売業者が存在しないので、日本またはグアムを経由してアメリカなどの第三国から調達する必要がある。

2-6 環境配慮

(1) ゴミ処分場（最終処分場）閉鎖に伴う適切な処置

対象地域周辺海域は海水の透明度が高く、珊瑚礁の形成、マングローブ、貴重魚種も多数生息しており、学術的価値も高い。このような地域で本計画対象敷地に存在するゴミ処分場では、生ゴミから自動車などの大型廃棄物等様々な廃品が処分されており、海水の汚染が懸念される。現状では海水の汚染は確認されていないが、将来的に海水汚染等の影響の発生も考えられることから、ゴミ処分場の閉鎖に当たっては適切な処理が必要である。

(2) 排水及び土砂流出

「バ」国は年間を通じて非常に多くの降水がもたらされる地域に位置することから、計画対象地の地表面仕上げに注意するとともに、雨水排水設備を設け、土砂が海に流れ込むことのないような設備の建設を検討する必要がある。

(3) エネルギー配慮

環境問題はエネルギー問題でもあることから、施設および機材の設計に際しては省エネルギー対策を考慮し、広い意味での環境配慮に心がける。

(4) 廃液処理

研究施設からは、アルコールやアセトン等の有機溶媒を含む廃液、酸・アルカリ性廃液、ホルマリン廃液、重金属を含有した廃液等の特別な配慮を要する廃液が生じる。従って、これらの処理について法的な規制を守るだけでなく、研究・飼育用の海水を地先から取水することになるので、廃液の処理は施設外の遠隔地で行い、近隣に処理水を排出しないようにすることが必要である。また、センターの建設目的に環境保全が掲げられているので、単に法律を遵守するだけにとどまらず、より高度な廃水処理を行うことが望ましい。

(5) 浄水処理

水族館施設では当初計画されていたものに比べて、規模、展示水族量ともに縮小されるので、水族の排泄物や残餌が直接環境汚染の原因にはなり得ないが、魚病等で薬品を使用する点を考慮して、排水部に珊瑚砂を使用したろ過槽を設置し、排水は全てこのろ過槽を通した後に排水する配慮が必要である。

なお、本計画実施におけるスコーピング結果を表-2に示す。

表-2 スコーピングチェック

環境項目		内容	評定	備考(根拠)	
社会環境	1	住民移転	用地占有に伴う移転(居住権、土地所有権の移転)	D	本計画建設敷地に居住者はいない。ただし、ゴミ処分場の移転が必要である。
	2	経済活動	土地等の生産機会の喪失、経済構造の変化	D	本計画敷地内の経済活動はそれほど大きくない。
	3	交通・生活施設	渋滞・事故等既存交通や学校・病院等への影響	D	研究センター、水族館の建設であり、変化なし。
	4	地域分断	交通の阻害による地域社会の分断	D	同上
	5	遺跡・文化財	寺院仏閣・埋蔵文化財等の損失や価値の減少	D	周辺域に遺跡等は存在しない。
	6	水利権・入会権	漁業権、水利権、山林入会権等の阻害	C	周辺海域は漁業域に利用されており、工事中に影響が考えられる。
	7	保健衛生	ゴミや衛生害虫の発生等衛生環境の悪化	C	ゴミ処分場移転の際、残存廃棄物の処理が必要である。
	8	廃棄物	建設廃材・残土、一般廃棄物等の発生	C	計画付近の海域は学術的価値が高いため、建設時に配慮が必要である。
	9	災害(リスク)	地盤崩壊・落盤、事故等の危険性の増大	D	大規模な地下水揚水等の災害を引き起こすような要因はない。
自然環境	10	地形・地質	掘削・盛土等による価値のある地形・地質の改変	C	建設工事において、地盤のかさ上げ、及び護岸工事等で大量の土砂が必要となるため、土砂の供給地の決定に配慮が必要。
	11	土壌浸食	洪水時の洗掘等	C	護岸工事を実施することにより対応が必要である。
	12	地下水	掘削に伴う排水等による涵濁	D	周辺域での地下水の揚水はない。
	13	湖沼・河川流況	埋め立てや排水の流入による流量、河床の変化	D	周辺地域に湖沼及び河川は存在しない。
	14	海岸・海域	埋め立てや海況の変化による海岸浸食や堆積	C	海岸地域の工事であり、特に配慮が必要である。
	15	動植物	生息条件の変化による繁殖阻害、種の絶滅	C	貴重な動植物の生息域である。
	16	気象	大規模造成や建築物による気温、風況の変化	D	建設による気象の変化は発生しない。
公害	17	景観	造成による地形変化、構造物による調和の阻害	D	大規模な変化は発生しないが、デザイン等には配慮が必要である。
	18	大気汚染	車輛や工場からの排出ガス、有害ガスによる汚染	D	建設に伴う有害ガス等の排出はない。
	19	水質汚濁	土砂や工場排水等の流入による汚染	C	施設からは、アルコール、ホルマリン溶液等の廃液が生じるため、排水には特別の配慮が必要となる。
	20	土壌汚染	粉塵、農薬、アスファルト乳剤等による汚染	C	同上
	21	騒音・振動	車輛等による騒音・振動の発生	D	施設の建設に伴う変化はない。
	22	地盤沈下	地盤変状や地下水位低下に伴う地表面の沈下	D	周辺域での地下水の揚水はない。
	23	悪臭	排気ガス・悪臭物質の発生	D	悪臭の発生はない。

評価区分 (A:インパクト大、B:インパクト小、C:不明(再検討が必要)、D:インパクトなし)

2-7 他の援助機関との関連

本計画に係る他の援助国としてはアメリカのみである。しかし、計画の具体的内容については確定にいたっていない。このため、現在のところ本計画と施設建設面での重複は存在していない。

「バ」国における環境保全分野での代表的な3機関は以下の通りである。

(1) CRRF (Coral Reef Research Foundation ; 珊瑚礁研究財団)

1991年のアメリカ信託統治領時代にカルフォルニア州と「バ」国政府との合意で設立された研究財団である。海洋生物・微生物学者の集団で珊瑚礁研究に資金を募ったものであるが、現在の主たる事業はワシントンのNCI (国立ガンセンター) との契約による「ガンとエイズに対する抗体を海中動植物から発見する」ための標本採取である。珊瑚や軟体動物の種別・サンプルは既に3,500余り採取されている。

もう一つの事業はミクロネシア諸島の科学的航空写真の作成とCD-ROM化であるがこれはハワイ大学のSea Grant Programからの助成金で実施されている。

目下取り組んでいるのは環礁に生息する魚類生態学でUCLAと共同で実施している。

施設としては研究所の2階が所長住宅になっており裏側に小型水槽8基を持つ簡単なものである。人員は所長、副所長、マネージャー、現場主任他計7名となっている。この体制で人件費込みの年間経費は約25万ドルで、その収入の殆どは米国諸機関よりの委託調査料である。援助機関というより米国研究機関の出先機関である。

(2) T.N.C (The Nature Conservancy)

T.N.Cは1951年にエコロジストの職業集団として設立された米国の環境NGOである。個人会員828人、地域・法人会員1,385人からの会費及び寄付金、各種財団からの助成金を活動資金としている。

T.N.Cの「バ」国での活動は1990年6月SPREP (South Pacific Regional Environment Program 南太平洋地域環境計画) に米国政府と一緒に参加したことから始まる。活動は、環境保全のための生態学的アセスメントに関して世界各地で開催されている各種会議での助言・アドバイスが主であり、組織自体が援助機関になったり、訓練や技術移転を自ら実施することはない。

(3) P.C.S. (Palau Conservation Society)

P.C.S.は1994年6月にパラオ人10名が発起人となって環境保全のためのNGOとして設立されたもので、会長は日系の医師である。専務理事は元資源開発省の役人である。

現在、スタッフは6名、うち技師エキスパート3名、事務職3名、年間事業費25万ドル。その財源は、「バ」国政府からの委託調査料10万ドル、日本の経団連からのECO基金3万ドル、JFGEからの助成金2万ドル、他に260人の会員からの寄付金2万ドルが主たるものでT.N.Cからの財務支援はない。

P.C.S.の活動範囲に制約はないが、組織の資金と要員が限られているため、現在は珊瑚礁と水質の2分野に重点をおき活動している。主な活動項目は以下の通りである。

- ① 「バ」国政府への技術的助言
- ② 調査・研究活動
- ③ 保全・保護教育

当該分野における研究ならびに活動のデータベースになる施設が「バ」国に存在しないことから、P.C.S.の本計画に対する期待は大きい。

この団体が運営経費を助成することは不可能であるが、本計画により建設されたセンターが公社として運営される場合は、P.C.S.が運営の主体に代わって国内・海外の助成金の受け皿団体となることも考えられる。

3. 調査実施上の留意点

3-1 研究および水族館の展示内容

研究内容あるいは水族館の展示内容等は、直接的に施設の構成、形状、設備等に影響するものである。そのため、施設設計を実施する前に研究内容・コンセプトと水族館の展示内容等について、具体的内容を十分検討し、「バ」国政府より合意を得ることが必要である。

3-2 ゴミ処分場（最終処分場）の閉鎖

本計画を実施するに当たり、現在計画敷地内で稼働しているゴミ処分場（最終処分場）の閉鎖が前提となる。対象地域周辺海域は海水の透明度が高く、珊瑚礁の形成、マングローブ、貴重魚種も多数生息しており、学術的価値も高い。そのためゴミ処分場の閉鎖に当たっては適切な処理を行い、周辺海域へ悪影響がないよう配慮する必要がある。

3-3 周辺海域の水質調査

M-DOCK周辺の水質について「バ」国政府よりは良好である旨報告されているが、基本設計調査において水質調査を実施し、研究・展示用への使用に問題がないか検討する必要がある。

3-4 施設建設に係る法的手続き

本計画敷地の地盤のかさ上げを行なう場合、必要となる土砂の量、質およびその確保について事前に「バ」国関係機関と協議を行なう必要がある。前述したように、パラオでは環境保護の観点から土砂の移動に関しては土砂移動許可（Earth Moving Permit）の取得が義務付けられており、許可取得のための条件を早めに確認する必要がある。

3-5 護岸工事に係る法的手続き

本計画対象地の護岸改修についても、前記と同様多量の土砂の発生が予想されることから、同様の措置を早めにとる必要がある。

3-6 計画規模

現時点では、本計画で建設予定の珊瑚礁保全研究センターの研究内容について検討されておらず、計画内容について明確になっていないが、水族館に関しては展示水族の採集に十分な配慮が必要となる。即ち、本センターが珊瑚礁保全を主目的とする限り、必要以上の生物の採集は極力避け、自然保護、資源保護を啓蒙できる姿勢が望まれる。

MINUTES OF DISCUSSIONS
PRELIMINARY STUDY ON THE PROJECT
FOR
ESTABLISHMENT OF THE CORAL REEF RESEARCH CENTER
IN
THE REPUBLIC OF PALAU


In response to a request from the Government of the Republic of Palau, the Government of Japan decided to conduct a Preliminary Study on the Project for Establishment of the Coral Reef Research Center (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA).

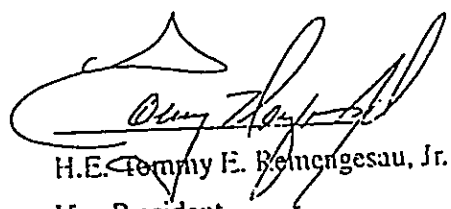
JICA sent to Palau a study team, which is headed by Mr. Hiroshi Chayama, Oceania Division, European and Oceanian Bureau, Ministry of Foreign Affairs and is scheduled to stay in the country from February 17 to March 6, 1997.

The team held discussions with the officials concerned of the Government of Palau and conducted a field survey at the study area.

As a result of discussions and field survey, both parties confirmed the main items described on the attached sheets. JICA will conduct a Basic design Study on the Project, including the dispatch of a survey team to Palau, on condition that the Government of Japan approves the implementation of the Study.

Koror, February 26, 1997


Mr. Hiroshi Chayama
Leader
Preliminary Study Team
JICA
Japan


H.E. Tommy E. Remengesau, Jr.
Vice President
of the Republic of Palau

ATTACHMENT

1. Objective
The objective of the Project is to establish the Coral Reef Research Center for research, education, training and public awareness toward sustainability of marine ecosystem.
2. Project Site
M-Dock, Koror Island (see ANNEX-I)
3. Implementing Agency
The Government of Palau will take necessary steps to clearly designate agencies responsible for the implementation of the Project. The Government of Palau will inform the Government of Japan of the name and the structure of such agencies before a Basic Design Study team is dispatched.
4. Items Requested by the Government of the Republic of Palau
The Government of Palau expressed its view that the requested items will be in line with the recommendations made by the tripartite experts team which met in Koror in February 1997 (see ANNEX-II).
5. Japan's Grant Aid System
 - (1) The Government of the Republic of Palau has understood the system of Japan's Grant Aid explained by the team, as described in ANNEX-III.
 - (2) The Government of the Republic of Palau will take necessary measures, described in ANNEX-IV for smooth implementation of the Project, on condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.
6. Other Relevant Issues
 - (1) The Government of Palau requested assistance from the Government of Japan for the capping of the dump site by incorporating it into the Project itself in order to ensure the appropriate appearance and water quality in the proximity of the Center.
 - (2) In clearing the site, the Government of Palau is prepared to clear the surface in preparation for the Project. It requested the Government of Japan to undertake necessary improvements to make the site suitable for the design of the Center, such as breakwaters and filling or excavating.

H.C.

ON JAPAN'S GRANT AID PROGRAM

1. Japan's Grant Aid Procedures

(1) The Japan's Grant Aid Program is executed by the following procedures.

- **Application** (request made by a recipient country)
- **Study** (Preliminary Study Basic Design Study conducted by JICA)
- **Appraisal & Approval** (Appraisal by the Government of Japan and Approval by the Cabinet of Japan)
- **Determination of Implementation** (Exchange of Notes between both Governments)
- **Implementation** (Implementation of the Project)

(2) Firstly, an application or a request for a project made by the recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to see whether or not it is suitable for Japan's Grant Aid. If the request is deemed suitable, the Government of Japan entrusts a study on the request to JICA (Japan International Cooperation Agency).

Secondly, JICA conducts the Study (Basic Design Study), using a Japanese consulting firm. If the background and objective of the requested project are not clear, a Preliminary Study is conducted prior to a Basic Design Study.

Thirdly, the Government of Japan appraises to see whether or not the Project is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA and the results are then submitted for approval by the Cabinet.

Fourthly, the Project approved by the Cabinet becomes official when pledged by the Exchange of Notes signed by both Governments.

Finally, for the implementation of the Project, JICA assists the recipient country in preparing contracts and so on.

2. Contents of the Study

(1) Contents of the Study

The purpose of the Study (Preliminary Study / Basic Design Study) conducted on a project requested by JICA is to provide a basic document necessary for appraisal of the project by the Japanese Government. The contents of the Study are as follows:

- a) to confirm background, objectives, benefits of the project and also institutional capacity of agencies concerned of the recipient country necessary for project implementation,
- b) to evaluate appropriateness of the Project for the Grant Aid Scheme from a technical, social and economical point of view,
- c) to confirm items agreed on by both parties concerning a basic concept of the project,
- d) to prepare a basic design of the project,
- e) to estimate cost involved in the project.

Final project components are subject to approval by the Government of Japan and therefore may differ from an original request.

Implementing the project, the Government of Japan requests the recipient country to take necessary measures involved which are itemized on Exchange of Notes.

H.C.

(2) Selecting (a) Consulting Firm(s)

For smooth implementation of the study, JICA uses (a) consulting firm(s) registered. JICA selects (a) firm(s) through proposals submitted by firms which are interested. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference made by JICA.

The consulting firm(s) used for the study is(are) recommended by JICA to a recipient country after Exchange of Notes, in order to maintain technical consistency and also to avoid possible undue delay in implementation caused if a new selection process is repeated.

(3) Status of a Preliminary Study in the Grant Aid Program

A Preliminary Study is conducted during the second step of a project formulation & preparation as mentioned above.

A result of the study will be utilized in Japan to decide if the Project is to be suitable for a Basic Design Study.

Based on the result of the Basic Design Study, the Government would proceed to the stage of decision making process (appraisal and approval).

It is important to notice that at the stage of Preliminary Study, no commitment is made by the Japanese side concerning the realization of the Project in the scheme of Grant Aid Program.

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non reimbursable funds needed to procure facilities, equipment and services for economic and social development of the country under the following principles in accordance with relevant laws and regulations of Japan. The Grant Aid is not in a form of donation or such.

(2) Exchange of Notes (E/N)

The Japan's Grant Aid is extended in accordance with the Exchange of Notes by both Governments, in which the objectives of the Project, period of execution, conditions and amount of the Grant, etc. are confirmed.

(3) "The period of the Grant Aid" means one Japanese fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedure such as Exchange of Notes, concluding a contract with (a) consulting firm(s) and (a) contractor(s) and a final payment to them must be completed.

(4) Under the Grant, in principle, products and services of origins of Japan or the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant may be used for the purchase of products or services of a third country origin.

However the prime contractors, namely, consulting, contractor and procurement firms, are limited to "Japanese nationals". The term "Japanese nationals" means Japanese physical persons or Japanese juridical persons controlled by Japanese physical persons.)

(5) Necessity of the "Verification"

The Government of the recipient country or its designated authority will conclude into contracts in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. The "Verification" is deemed necessary to secure accountability to

Japanese tax payers.

(6) Undertakings required to the Government of the recipient country

In the implementation of the Grant Aid, the recipient country is required to undertake necessary measures such as the following:

- a) to secure land necessary for the sites of the project and to clear and level the land prior to commencement of the construction work,
- b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,
- c) to secure buildings prior to the installation work in case the Project is providing equipment,
- d) to ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,
- e) to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,
- f) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

(7) Proper Use

The recipient country is required to maintain and use facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for their operation and maintenance as well as to bear all expenses other than those to be borne by the Grant Aid.

(8) Re-export

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

(9) Banking Arrangement (B/A)

- a) The Government of the recipient country or its designated authority shall open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by Government of the recipient country or its designated authority under the contracts verified.
- b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to pay issued by the Government of the recipient country or its designated authority.

H.C.

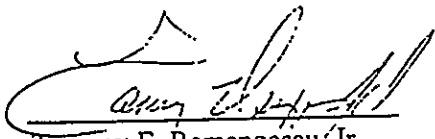
Necessary measures to be taken by the Government of Palau in case Japan's Grant Aid is executed.

1. To secure land necessary for the site of the Project and to clear, level and reclaim the land prior to commencement of the construction.
2. To provide facilities for the distribution of electricity, water supply, telephone, drainage, sewage and other incidental facilities in and around the site.
3. To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
4. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in Palau with respect to the supply of the products and services under the verified contracts.
5. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
6. "Proper Use"
The Government of Palau is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expense other than those covered by the Grant Aid.
7. The products purchased under the Grant Aid must not be re-exported from Palau.

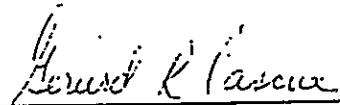
Documentation

From February 20 - 26, 1997, a tripartite team of financial experts met in the Republic of Palau to study the proposed Palau International Coral Reef Center with a view toward its sustainability. The team, which consisted of experts from Palau, Japan, and the U.S., was a followup to the June 1996 mission. Working together, the tripartite team produced a series of recommendations incorporated into a report. The report is to be reviewed in respective capitals.

Signed this the 26th day of February, 1997:



Tommy E. Remengesau, Jr.
Vice President of Palau
and Chairman of the
Technical Working Group



Gerard Pascua, Chargé d' Affaires
U.S. Embassy in Palau



Hiroshi Chayama, Team
Leader, Japan Experts Team

**Draft Recommendations of the Tripartite Team of Experts
From Japan, the United States and Palau
with Respect to the Palau International Coral Reef Center Project
February 20 - 26, 1997**

MISSION STATEMENT

The Palau International Coral Reef Center mission is to become a center of excellence for marine research, training and educational activities.

BACKGROUND

In June 1996, a joint delegation from the Government of Japan and the Government of the United States met with the Technical Working Group on the Coral Reef Center in the Republic of Palau. Whereas the talks proved to significantly advance the cooperative understanding of the three parties, upon their conclusion the Palau side stated that Palau would submit a formal request to the Government of Japan regarding the establishment of the Coral Reef Center in Palau, hereafter referred to in this report as the Center. This was done and forwarded to the Government of Japan via airmail on August 16, 1996.

On February 17, 1997, the GOJ sent a seven-member preliminary study team to Palau headed by Mr. Hiroshi Chayama of the Oceania Division, European and Oceanian Bureau, Ministry of Foreign Affairs. On February 20 they were joined by a 14-member financial experts team from the U.S. headed by Mr. Gerard Pascua, Chargé d' Affaires of the U.S. Embassy in Palau, for the purpose of meeting with Palau to study the financial sustainability aspects of the Center. The following report details the discussions and recommendations of the tripartite consultations with respect to seven terms of reference which were agreed to at the outset of the talks as the focus of the joint team's study efforts:

1. Palau National Master Development Plan
2. Research and Other Center Facilities
3. Aquarium/Visitor's Center
4. Education, Public Awareness and Training Activities
5. Marine Park
6. Other Income Sources for the Center
7. Legal Structure

After a plenary session, it was decided that in order to make the best use of the limited amount of time available, the terms of reference should be combined where there were overlapping or complementary issues to be discussed. Thus participants worked in four subgroups: Group A concerned with the National Master Plan and Marine Parks; Group B to encompass the research and other facilities, the aquarium/visitor's center and the education, public awareness and training activities; Group C addressing income sources; and Group D focusing its attention on the legal structure. Membership lists of all the Groups are included in Annex II.

Group A Report on the Master Development Plan and Marine Parks Issues

PALAU NATIONAL MASTER DEVELOPMENT PLAN

In all grant aid schemes, Japan's Ministry of Foreign Affairs collects and studies data pertaining to the requested project. In general, this study examines the project's position in the national development plan and makes sure that attainable objectives as well as expected results are clear. Palau's National Master Development Plan (NMDP) provides a strategic framework for achieving sustainable human development for the Palauan people. Specifically, the Master Plan aims to "substantially enhance the quality of life of Palauans and future generations of Palauans by: 1) increasing real economic growth on a sustained basis; 2) sharing the benefits of economic growth on an equitable basis...; 3) enriching and enhancing confidence in the Palauan culture; 4) raising national consciousness; and 5) protecting the natural environment." The Coral Reef Center as presently envisioned will be able to help Palau implement its Master Development Plan with respect to each and every one of its stated aims. The NMDP and the National Environmental Management Strategy (NEMS) each recognize the importance of sustainable development which will not outpace the replenishment of renewable resources and sound policies which will protect non-renewable natural resources. A major role envisioned for the Coral Reef Center will be to reinforce an eco-sensitive approach to development.

Broadly, the NMDP points to three primary development areas available to Palau - tourism, fisheries, and agriculture. All of these options depend upon sustained exploitation of Palau's limited and extremely fragile environmental resources. For this reason, the future viability of Palau as a nation and the sustained well-being of the Palauan people is dependent upon environmental preservation. The NEMS recommends that population growth be controlled in accordance with the "carrying capacity" of Palau's environment. However, at the national "macro-level," the concept of "environmental carrying capacity" is a difficult one because it requires: (1) a great deal of information about ecological processes (much of which has yet to be gained), and (2) assumptions about the level of infrastructure and technology which can be tapped to mitigate man's impact on the environment. A top quality coral reef center with a strong research component is clearly needed for monitoring environmental conditions, conducting the necessary surveys, gathering data and formulating assumptions about environmental carrying capacity of Palau's marine resources. The Japanese team members representing JICA indicated that they were quite satisfied that the proposed Center fits well within the framework of Palau's National Master Development Plan.

It is well worth mentioning that the NMDP makes assumptions that efforts will be undertaken to limit rapid or unsustainable growth and that tourism policies will contain growth in the tourism sector to recommended levels. If all the development projects currently under consideration were allowed to proceed, Palau could have in excess of 6,000 hotel rooms by the year 2010 and be hosting more than 400,000 visitors annually. In 1996, Palau experienced an unprecedented 30 percent increase in visitor arrivals. However, it should not be assumed that visitor arrivals will be allowed to continue to increase at such a rate. The NMDP "low growth model" recommends a 9 percent per annum increase in visitors, requiring 1,633 total hotel rooms by the year 2010 and hosting 122,000 visitors annually. Planners deriving projections for anticipated revenues from visitor admissions to the Palau International Coral Reef Center are urged to work within the assumptions of the Master Plan.

MARINE PARK

At one point in previous discussions, the Government of Palau indicated its interest in establishing one or more national protected areas or marine parks in conjunction with the development of the Center. Article I, Section 2 of the Palau Constitution states, "Each state shall have exclusive ownership of all living and non-living resources, except highly migratory fish, from the land to twelve nautical miles seaward from the traditional baselines; provided however that traditional fishing rights and practices shall not be impaired." Such areas would serve to provide for pristine working conditions for Center researchers while contributing to the conservation of Palau's marine resources. In order for such areas to be designated for Center use, memoranda of understanding would have to be developed with the respective State Governments. To date, several initiatives have been undertaken by State governments to establish protected marine-related areas in Palau, most notably the declaration by the Kayangel State Legislature and Traditional Leaders that Ngeruangel Reef shall become a Marine Preserve in which all fishing activity will be severely restricted. While there may be some supportive actions that can be taken at the National Government level, the Center, as a public corporation, will certainly play a key role in accelerating the State's efforts to examine their marine resources and to designate specific areas for careful monitoring and management.

The Government of Palau has reiterated its commitment to assist State Governments in working with the Center to achieve those objectives which may be held mutually with the Center. In this vein, Subgroup A has put forth several suggestions for how this goal might be accomplished.

While a "marine park" issue did not evolve during the previous mission, the issue of how the proposed "marina" and "park" adjacent to the M-Dock site would impact upon the Center was a definite concern. As indicated in Annex III, Map 15 of the National Master Development Plan, the area to the right extending from the causeway approaching M-Dock, across the mud flat and up to the Happy Landing boat marina has been proposed by Koror State Government as a development area for marina-related small businesses. This development area would be created through dredging and filling.

The M-Dock site selected for the Center also happens to be in close proximity to the current waste landfill. It was previously agreed by the Government of Palau that the dump would have to be removed both for appearance sake and to minimize impacts on water quality of the area. In fact, Koror State Government, as owner of the dump site, has already proposed the entire dump area for reclamation to serve as a public park. To this end, a preliminary study was undertaken with funding from the U.S. Environmental Protection Agency and submitted to KSG in 1995. Following that, a landfill relocation study was contracted by KSG to Winzler and Kelly Engineering Firm for \$250,000. Most recently, a Land Settlement Agreement executed on February 3, 1997, between the Republic of Palau (ROP) and the Palau Public Lands Authority on the one hand and the Koror State Government (KSG) on the other hand, clearly states the requirement for the Government of Palau to completely vacate the Dump Site within five years. The Agreement furthermore establishes a Joint Task Force which was directed to report to ROP and KSG within 60 days its recommendations for a plan of action to "clean and close the dump site." Specific recommendations stemming from these actions were presented by Subgroup A.

GROUP A RECOMMENDATIONS

I. There is certainly no need to identify additional areas as potential sites for consideration as marine protected areas (marine parks). Group A strongly advises the Republic of Palau to implement the recommendations of section 12.6.6.1 of the National Master Development Plan which sets aside parts of the Rock Islands and Kayangel as protected marine-related areas, i.e., marine parks. In addition, the following laws reinforce the recommendation of the NMDP:

- Kayangel Public Law 7/2/96 - Kayangel
- Koror State Law 74-97 - Rock Islands
- 24 Palau National Code Annotated Chapter 30 Ngerukewid
- 24 Palau National Code Annotated Chapter 31 Ngerumekaul

II. Having regard to the social, economic and ecological characteristics of the priority areas recommended by the NMDP as marine parks, the States are encouraged to allow the Center access to all such areas for research and to undertake educational activities.

III. Several revenue generation options were discussed; however, the discussion ultimately focused on the need to establish a memorandum of understanding between the Center and the participating States of Palau, to determine a shared user fee structure that can be applied to specific marine parks.

IV. Once established as a functioning organization, the Center should enter into negotiations with the States of Palau to identify and plan for the restoration of degraded marine habitats.

V. The Center should also seek to establish a regional focus and can pursue this objective by establishing a marine park training program for local and regional participants. Similarly, the Center should work with interested Palauan States and other regional governments to develop protected area management plans and programs on a reimbursable basis. In the case of Palauan States, the plans should incorporate watershed management planning as a requirement.

VI. Any further development in the M-Dock area such as the proposed marina should be designed and constructed in a manner which minimizes ecological impacts in waters adjacent to the Center.

VII. The Government of Palau should seriously consider negotiating with the U.S. Corps of Engineers regarding potential use of excess soil from the Palau Compact Road Project for use as capping and lining material to facilitate closure of the dump site and identify a suitable site for temporary stockpiling of soil material for future use.

VIII. All reports of the Joint KSG/ROP Task Force (see KSG/ROP Land Settlement Agreement, February 3, 1997) to clean and close the dump site should be forwarded to the Vice President as Chairman of the Technical Working Group on the Center, the Ministry of Foreign Affairs of the Government of Japan, and the U.S. Embassy in Palau. It should be noted that the Government of Palau welcomes financial assistance to undertake such a project. It should also be noted that it is the responsibility of the Government of Palau to assure that the dump site will be relocated. In this context, it is recommended that the Government of Palau initiate discussions with the Government of Japan, the Government of the United States, and other potential donors based on forthcoming studies and cost estimates related to closure and reclamation of the dump site.

Group B Report on the Research and Other Center Facilities; Aquarium/Visitor's Center; and the Education, Public Awareness and Training Activities

Group B was tasked with:

- evaluating the existing marine facilities and programs in Palau related to research, education, and visitor information services, and,
- recommending the facilities components for the Coral Reef Center.

The group reviewed existing programs (see attached) and then identified the research needs that the Center could address, the potential users for each of the Center's components, and the facilities needed to meet those needs and serve those users. This resulted in the following site recommendations, with related cost estimates:

Education: 35-student classroom, experiment area, library, etc. 2,000 sq feet (200 sq m)
[EST @ \$100 per sq ft for building and basic fixtures = \$200,000]

Research: Exterior area 9,800 sq ft (980 sq m)

Building:

Labs @ 300 sq feet per lab X 7 labs 2100 sq ft (210 sq m)
 Commons area..... 500 sq ft (50 sq m)
 Directors Office..... 200 sq ft (20 sq m)
 Office space @150 sq feet per office X 10 offices . 1500 sq ft (150 sq m)
 Instrument room..... 150 sq ft (15 sq m)
 Administrative office 150 sq ft (15 sq m)
 Supply storage/copying & fax room 40 sq ft (4 sq m)
 Library - combined with education center 600 sq ft (60 sq m)
 Conference room (24 X 40) 960 sq ft (30 sq m)
 Specimen room 400 sq ft (40 sq m)
 Misc.(toilets, break room, etc.)..... 500 sq ft (50 sq m)
 TOTAL..... 8500 sq ft/850 sq m

[EST \$150/sq ft (building and basic fixtures) = \$850K -1.2 mil]

Living quarters X 4 units @ 150 sq ft per room 600 sq ft
 [EST \$100/sq ft (building and basic fixtures) = \$60,000] 0K-180K

Visitors: Total area..... 12,000 sq feet/1,200 sq m

Waikiki Aquarium is an hour experience. If you want people to stay longer, you need more exhibits. Need 5600 sq ft for 60 exhibits for a one hour experience. If you have a 10-15 minute video (which will also cost \$15K to produce), you can use of 10 minutes of that time. A 200-seat (3000 sq ft/300 sq m) auditorium (multi-purpose room) would be a good addition to Palau anyway. Could be rented out for other groups, facilities. If you have 30 exhibits, some live, some "museum". At a basis of 10 live exhibits, at 20 museum exhibits, need about 6000 sq ft/600 sq m. Exhibit area costs about \$200/sq ft

Generally speaking, you would devote 50% to exhibit space and 50% to support space.

Gift shop.....	400 sq feet/40 sq m (including vending machines)
Inventory (storage).....	100 sq ft/10 sq m
Workshop (mechanic, carpentry, etc)	200 sq ft/20 sq m
Freezer.....	100 sq ft/10 sq m
Quarantine.....	200 sq ft/20 sq m
Food prep	50 sq ft/5 sq m
Offices.....	4 at 100 sq ft = 400 sq ft/40 sq m
Dive locker/shower	100 sq ft/10 sq m
Public toilet/staff restrooms	300 sq ft/30 sq m
Executive Director's office	200 sq ft/20 sq m
Cashier/business office	100 sq ft/10 sq m

Shared: darkroom, pump station, dive lockers, etc.

Totals (these are rough estimates):

Construction	\$3.6 million
Site preparation	2.0 million
Equipment/vessels	3.0 million
<u>Planning & design</u>	<u>1.2 million</u>
SUBTOTAL	\$9.8 million

Rule of thumb is 10% for operating cost (or \$1 million) for operations

Both numbers are very close to what has been developed from the subgroups, previous teams, etc. For instance, previous architect came up with 1500 sq m for research, 800 sq m for visitors center, for a total of 2300 sq m.

Numbers should be considered MINIMUM . We don't have confidence in these numbers because we may not have the right expertise in these cost areas.

RESEARCH NEEDS

The group first identified research needs relevant to Palau, and secondly those topics that are of interest to researchers in a more global or regional perspective.

For Palau:

Palau is interested in research that helps Palauans sustainably manage their marine resources. It should be applied and practical, focusing on surveying resources, determining their economic or ecological significance, and helping Palauans understand the dynamics of the marine ecosystem. Research should also identify possible sustainable uses of these marine resources for economic and social well-being (such as aquaculture to enhance resources and for economic

benefit), determine and monitor the impacts of development and other resource use, and identify the best management practices for those resources. In addition, research should help define what legislation needs to be developed to protect and manage marine resources.

Academic Research Interests

These research areas include general scientific, individual research interests; research that includes Palau in global and regional research; chemical and physical oceanography studies; climate change studies; research focused on overall benefit to humanity (e.g., bioprospecting); and specimen collection focused on Palau so that organisms can be studied elsewhere.

II. POTENTIAL USERS OF RESEARCH FACILITIES AT THE CENTER

Users of the Coral Reef Center would include both resident researchers (those located at the Center and those from other agencies or organizations in Palau), as well as visiting scientists from outside of Palau, including visiting graduate students, research ships, and aquariums or other non-profit organizations collecting live specimens for educational purposes. Students would also utilize the center for seminars, lectures, and laboratory work, including internships with researchers. Additionally, commercial users, such as private companies could pay to utilize the research facilities at the Center.

III. POTENTIAL FACILITY COMPONENTS NEEDED FOR RESEARCH ACTIVITIES

The group identified detailed facility components that would be needed at the Coral Reef Center in order for it to serve the identified users. Components included would be administrative and staff offices; laboratories for both visiting and resident staff with a sea water system; space for support facilities and services such as equipment, computers, library, and workshop; dormitories; and outdoor support facilities for boats and physical plant needs.

IV. POLICIES NEEDED TO FACILITATE RESEARCH AT THE CENTER

If the Center is going to be able to function as a world-class center of excellence in coral reef research, several issues, policies, and accompanying legislation need to be addressed in order to facilitate the research:

- policy and legislation regarding agreements with all researchers in order to protect the biodiversity and economic development rights of Palau. An example might be made for bio prospecting but should be extended to all research since social/economic benefits are not known in advance.
- possibly a blanket collecting and export research permit for researchers at the Coral Reef Center for research approved by the Center, or at least streamlining the permit process so that it is easily followed by visiting and resident researchers. This needs to be coordinated with all of the states.
- immigration status for researchers for visits over period for normal visa (1 month).
- develop research reserves that are areas protected for research projects, and
- develop an oversight and review system by the Center to determine appropriateness of research proposed by the researchers.

V. VISITOR CENTER USERS

Visitor Center users will include those from outside of the Palauan community, such as tourists, other visitors, and student groups from foreign institutions. The other main focus group for the Center is the Palauan community, including Palauan students of all ages, the general public, and families. The group emphasized that ALL facilities, including those for research, education and the Visitor Center should be handicapped-accessible to ensure that all interested people could go to the Center.

VI. EDUCATION, TRAINING AND PUBLIC AWARENESS PROGRAM USERS

Similar to the Visitor Center, the users of the educational programs of the Coral Reef Center will be both the Palauan community and outside visitors. Complemented by the Visitor Center, and in collaboration with other Palauan agencies and organizations, this will be an active program focused on building the awareness of the Palauan public about the importance of coral reefs and the marine ecosystem, including the sustainable use of those resources. These will include

- Lectures by visiting professors and scientists for both student groups and open to the public
- Teachers receiving training, seminars, and tours focusing on ecology and marine biology,
- Community leaders and groups
- Student interns from Palau and region
- Pacific islanders training in coral reefs, marine resources
- Visiting scientists giving lectures, seminars to teachers
- families
- tourism guides/operators
- resource managers
- volunteers who can assist in managing the visitor center

VII. POTENTIAL FACILITIES NEEDED FOR A VISITOR CENTER

Facilities needed for the Center will include an exhibit area including live fish tanks, photo displays, video/audio displays; and auditorium and classroom; a gift shop; and support facilities for the Center, including staff offices and outdoor facilities including a glass-bottom boat. For the aquarium component, specialized facilities would be needed, including sea water, drainage, and aeration systems; specific support areas for the aquarium care and maintenance; and tanks and other exhibit areas.

VIII. POTENTIAL FACILITIES NEEDED FOR EDUCATIONAL/TRAINING/PUBLIC AWARENESS ACTIVITIES

For the educational component of the Coral Reef Center, additional classroom, staff, and laboratory space would be needed.

IX. EXISTING RESEARCH, EDUCATION ACTIVITIES, AND RESOURCES CURRENTLY IN PALAU

Palau Community College:

- 2 year institution serving Pacific region
- About 300-400 students currently enrolled

1. Available Now:

- minimal facilities and programs
- 2 courses in Marine Science
- summer program for college-bound students
- Labs with students - basic programs, basic equipment, supplies
- Microscopes, other basic lab equipment

2. Future Programming Plans:

- a. Marine Tourism
 - Tour Guide Certificate
 - Diving Certificate Program
 - Taxi Driver Training
 - Safety Course for boat operators
 - Environmental & Culture Training
- b. Aquaculture & Reef Enhancement
 - Existing spp.
 - New spp. Research
 - Training, including business training
- c. Marine Resources Management
 - Applied Research
 - Training
 - Environmental Impact Assessment, CZM
 - Community Education
 - Short Courses

6. Present Resources

- Staff: 4 people in teaching and extension
- Facilities:
 - Belau Science Demonstration Center, responsible for science fair, educational programs for H.S. and elementary classes, teacher training (cooperatively with Minister of Education)
- PCC overall budget is \$2 million dollars
- Computer lab with internet access

7. Planned resources and programs

- May 97 (coral reef monitoring training project (\$22,000 grant from SPREP)
- Marine Resources Center planned to house 2-year marine resources program and aquaculture program
- Aquaculture researcher being hired through PCC-Cooperative Research and Extension (Land Grant)
- Joint educational and research programs between PCC, Land Grant, with other regional organizations

PALAU MARICULTURE DEMONSTRATION CENTER (PMDC)

Note: more information is needed about facilities, current activities, and future plans of PMDC

- In 1994 MMDC was renamed as the Palau Mariculture Demonstration Center (PMDC), although whether it will be held to the same statutes and structure as MMDC is not clear yet.
- By law, there is a possible relationship between PCC and MMDC

- 60 (?) raceways
- Office
- Laboratory
- Fresh and sea water systems
- Boat
- Dormitory (very old, not very functional)
- Currently producing and selling clams, holding fish for display
- Uncertain about the budget, current stock and research, and future plans

CORAL REEF RESEARCH FOUNDATION_(CRRF)

Currently:

- Chartered, non-profit organization in Palau and U.S.
- Work focuses on studying the biodiversity of Palau and the Western Pacific
- Major funding source is the U.S. Government for biomedical collection of marine organisms
- 2400 ft² (200 m²) includes:
 - workspace
 - collection room
 - computers
 - library
 - visitors laboratory
 - dormitory for up to 6 people
 - 6 staff
 - 3 work outboard boats
- Also works outside of Palau, in region and wider
- Provide learning opportunities for students, teachers through laboratory and research activities
- Budget = \$200,000 for Palau activities
- Internships for students
- Assets in Palau = \$250,000 (boats, building, equipment)
- Have about 15 visiting scientists per year

Future:

- Remain same size
- construct an indoor wet laboratory
- improve facilities, but not expand them

PALAU CONSERVATION SOCIETY

- Non-profit, chartered in 1994
- Mission: Conservation of Palau resources, focusing on
 - conservation - provide technical assistance to develop conservation areas, including monitoring
 - education - strong outreach, educational program
 - applied research to support conservation and educational activities

- 7 staff
- 2 small boats
- budget = \$250,000 from various sources
- no facilities, some basic equipment such as computers
- cooperative research with The Nature Conservancy and the University of Guam Marine Laboratory
- provide internships, training in office
- Projects:
 - Grouper aggregation management
 - Water circulation studies planned with UCLA and CRRF
 - Conservation areas in Ulong Channel
 - Land use study of Babeldaob comparing maps from 1947, 1976, and 1992
 - Dive site management study
 - monitoring sediment rate with EQPB and PCC
 - Sportfishing development

THE NATURE CONSERVANCY

- Palau program is part of TNC's Coastal and Marine Program
- 1992 aerial photography of islands with U.S. DOI \$200,000 grant
- Rapid Ecological Survey, also with DOI support
- Working with PCS on research projects
- In region, including Palau: Groupers and live fish trade
- With PCS, survey, management plans

BELAU MARINE RESOURCE INSTITUTE

- Works with Japanese Marine Biotechnology Institute
- Offers scholarships to Palau B.S. students to do Master's programs
- No facilities, just a contact office currently from the Marine Biotechnology Institute

UCLA BIOLOGY (Dr. William Hamner)

- Marine Lakes program
 - 2 staff (graduate students)
 - plans to continue work in Palau using "big" jellyfish lake study site
- Harbor sewage work with PCS and CRRF

UC SAN DIEGO

- Marine natural products chemistry studies (renting facilities at CRRF)

UNIVERSITY OF GUAM MARINE LABORATORY

- Marine lab has very qualified coral reef researchers that have been working with various Palau agencies for many years
- Historical collection of data and information about Palau reefs

ENVIRONMENTAL QUALITY PROTECTION BOARD (EQPB)

- Environmental protection agency for Palau
- \$400,000 budget/year, currently 50% funding from U.S. Government, 50% from Palau Government
- 18 staff with 4 laboratory people working on monitoring of water quality
- 2 boats, 3 vehicles, radio system, monitoring stations all over Palau
- responsible for:
 - monitoring/classification of marine and fresh water
 - enforcement agency for Palau, including pesticide and chemical use
 - permitting agency for all construction activities
 - educational programs with PCC, PCS, and others focusing on public awareness

UNIVERSITY OF HAWAII SEA GRANT

- Cooperative outreach and research programs with PCC and formerly with the Division of Marine Resources with a focus on marine resources conservation, sustainable economic development including tourism, aquaculture extension, and support for aquaculture research
- Support for aquaculture research with MMDC over last 20 years on giant clam and trochus culture, plus current technical assistance available for culture of regional species.
- Links at University of Hawaii to international informational databases available to Palau
- Cooperative agreement with PCC as part of a regional aquaculture agreement to focus on research, culture, business development, and extension of culture of clams, pearl oysters, aquarium fish, and sponges

MARINE RESOURCES DIVISION OF PALAU

With Japanese funding:

- fisheries development
- training
- culturing corals

ENTOMOLOGY AND CONSERVATION DIVISION

- conservation area program

MINISTRY OF EDUCATION

- responsible for Kindergarten through 12th grade students (not college level)
- develop frameworks for all subject areas, but have not completed that for science
- teacher training, jointly with PCC
- Science is required for all H.S. students
- New building with science laboratory just built at H.S.
- 5 science teachers at H.S.
- Work with Belau Science Demonstration Center
- Plan to improve facilities and complete science curriculum to include marine science and conservation

U.S. DEPARTMENT OF INTERIOR

- Through the Palau Lands and Survey Division, completing land surveys including coastal areas
- Equipped Division office with computerized map drawing and database capabilities

U.S. DEPARTMENT OF AGRICULTURE

- Natural Resources Conservation Service
- Prepared soil survey of Palau
- Conducted several watershed assessments in Palau
- Provides advisory assistance in erosion control and vegetation establishment to Division of Agriculture & Forestry in Palau
- Proposes to establish an office in Palau and provide assistance to private land users on proper land management.

EXISTING VISITORS CENTERS

- Belau Museum
- PMDC has very limited marine organism display
- proposed private museum with artifacts
- crocodile farm (not sure if functioning)

Group C Report on Income Generation

INCOME SOURCES

The team members generated a list of several potential income sources. Each was examined through group discussion. Those deemed most likely to succeed, with rough estimates of gross revenue, are:

<u>Activities</u>	<u>Gross Revenue</u>
Visitors Center --	
Admission	
-Number of visitors.....	20-40,000 people/yr
-Income generated	\$200-400,000 based on \$10/person fee
Gift Shop/Souvenirs	
-Income generated	\$290-580,000 (based on \$13/tourist)
Glass Bottom Boat	
# of visitors.....	10,000 people/yr
Income generated	\$250-400,000 based on \$25-40/person
Research/Education	
Bench fees @ 40/day	\$24,000/yr
Undergrads.....	\$56,000/yr
Projects (Bilateral aid)	\$250,000/yr
Taxes	
3% Diving tax	\$13,000/yr
5% Hotel tax.....	\$50,000/yr
Membership Fees	\$10,000/yr
TOTAL:.....	\$1,043,000/yr

Associated costs, derived both by estimating specific expense categories and by taking approximately 10% of total construction costs, came to approximately \$1,000,000 per year. (See appendix * attached. for specific cost estimates.) In deriving figures, the team used low-end estimates in generating income figures and high-end estimates for generating costs.

While the group estimated potential admission fees and gift shop generated income, these figures may need to be raised in light of further discussions. There was a request from the Palauans for U.S. Government assistance to visit model facilities to accomplish that. (See detailed discussion of Waikiki Aquarium experience in appendix *.)

The potential of mariculture as an income generating source may be affected by the legal structure of the center: a government agency might not be able to serve as a certifying body for eco-labeling. Normally this function is left to the private sector and non-governmental organizations. The Center could still play a role in providing brood stock, technology transfer, research, and outreach or extension, although extension may be best accomplished through PCC.

Tourism was an important consideration underlying most income generating sources. In 1996, Palau had approximately 62,000 visitors. This represented a 30% increase from 1995. Tourism generated from Taiwan now represents the single largest category. Tourists to Palau tend to be traveling without family and in groups larger than 20. The Palau National Development Plan calls for annual increases of 9%. Environmentally friendly tourism is a key goal for the Center to address.

As proposed earlier in this section, the facilities design would lend itself to several income generating mechanisms. The Group identified a plan of action for steps that could be taken even before the physical structure is completed:

1. Draft the mariculture plan in conjunction with various partners (PCC, PCS, etc.) and identify donors who may support the program; submit proposals;
2. Investigate the UNDP funding (e.g., Capacity 21 Fund) identified by the previous mission and develop a plan for its use, including possible trust fund arrangement; access funds and begin such capacity building now;
3. Research the legislation existing/necessary re: ecolabeling, monitoring and certification of environmental products;
4. Develop a "virtual center" - a Website about the Coral Reef Center to let people know about it and its progress;
5. Begin education/public relations program in Palau to keep Palauans informed about the Center's developments; allow opportunity for input
6. Identify training needs for staff to be employed at the center and, if funding is available, begin the training programs.

Group D Report on the Legal Structure

LEGAL STRUCTURE MISSION

Group D, in making its specific recommendations, recognized four primary missions:

1. The long term sustainability of the Palau Coral Reef Research Center;
2. The accountability of the Government of Palau for the long term success of the Center;
3. The long term commitment to a local, regional and international scope for the Center; and
4. The long term commitment to the provision of-incentives to private and public support groups, foundations and agencies.

PRELIMINARY CONSIDERATIONS

1. Draft Terms of Reference

Pursuant to the Terms of Reference for this 1997 Coral Reef Research Center meeting between the governments of Palau, Japan and the United States, eight working groups would be created to discuss developmental aspects of the research center project. One of these groups was defined as the Legal Structure Group which was assigned the task of recommending an appropriate legal structure. The specific language of the terms of reference were as follows:

“Recommendations for legal structures which would make the Center attractive to the greatest variety of potential participants while fostering economic viability and allowing for sufficient oversight. The team must obviously take into account any legal requirements of the Republic of Palau for institutions such as the Center and any legal requirements from the donors that condition their assistance.”

Although the number and structure of other Groups were altered to better meet the needs of participating delegations, the structure of the Legal Structure Group was maintained by the three delegations.

2. Technical Group's Concept Paper

The Group met recognizing that the Technical Working Group which was created by Executive Order No. 144 had developed its *Concept Paper*, which was provided by the Government of Palau to both the United States Government and the Government of Japan. Section 3 of this concept paper dealt with legal structure as follows:

It is recommended that the Center be established by Palauan national law as a Public Corporation and be subject to the corporate laws of the Republic of Palau to the extent such laws do not conflict with the law creating the Center or in any way distort the public character of the corporation. As a public corporation, the Center should be exempted from all national and state taxes or fees, though employees of the Center

ands suppliers and independent contractors of the Center should not be exempted from their tax obligations. The Center should also be liable for employers' contributions to the Social Security System and the Civil Service Pension Plan of the Republic in a manner provided by law.

The affairs of the Center shall be directed and its corporate powers exercised by a Board of Directors. The enabling legislation for the Center may consider other criteria for the composition of the Board, such as representation by government and non-government organizations and the expertise of its directors. It is the strong recommendation of the Technical Working Group that the Board be structured in such a way that there will be Palauan control in the development of policy and decision-making, but that international links are assured. The Board should be granted the power to establish whatever advisory committees it feels may be needed to provide expertise lacking on the Board.

The Board shall appoint and hire a Director with appropriate training and experience as the Center's chief executive officer and to serve as a non-voting members of the Board. The Director, in accordance with the policies established by the Board, will have responsibility for operation and maintenance of the facilities, programs and construction of any additions and modifications to the Center's facilities. Additionally, the Director will have the authority to recruit, select, hire and terminate the employees of the Center, as well as to contract for professional, legal, accounting, management, training, concessionaire, and technical advisory services.

3. Memorandum of Understanding

Palau's commitment to the mission and development of the Center as outlined in the concept paper was reinforced through signing by the leadership of Palau of a Memorandum of Understanding agreed to by the Olbiil Era Kelulau and the President on June 7, 1996. The memorandum set forth the following general guidelines for the legal structure of the Center:

...the parties to this Memorandum further agree that the Center be established by Palauan National Law as a Public Corporation with the following structural guidelines:

- a) Organized under the corporate laws of the Republic of Palau, such Center should be exempt from national and state taxes and fees, although its contractors should be subject to such taxes and fees;
- b) The Center should be directed and managed by a Board of Directors to be structured to insure Palauan control of the development of policy and decision-making while assuring the maintenance of international links and involvement;
- c) The Center should be directly managed, operated and maintained by a Director with appropriate training and experience as the Center's Chief Executive officer and non-voting member of the Board;
- d) The Center's Board should be assisted by a Scientific Advisory Council, which Council, as approved by the Board should be

comprised of scientists from Palau, Japan, the United States, Australia and other countries;

e) The mechanism of the Center for funding should stress on-going international assistance and self-sufficient revenue generation policies; and

f) The Center should seek to establish guidelines which establish relationships with public agencies and organizations currently conducting research in marine technology and resource management, private companies and entities directly involved in marine-related activities and public and private educational and research institutions whose missions and activities are in line with those of the Center.

III. LEGAL STRUCTURE OF THE CENTER

1. Structure of Discussion

In arriving at its recommendations, the Legal Group, recognizing the preliminary considerations discussed above, followed a rather informal agenda which focused upon each nation's priority concerns regarding the project. Because the Center is intended to be a Palauan owned entity under the Japanese grant aid scheme, the group recognized that Palau would determine its ultimate legal structure within the parameters of following a grant aid procedure acceptable to Japan. The Japanese delegation also wanted it recorded that they did not bring a lawyer with their group and that the scope of the legal discussion was something for which they were not prepared to get into at this time. Thus, Japanese group's involvement was limited to clarifying the requirements for Japan's grant aid scheme. The following points of discussion and resulting recommendations follow the course of these discussions.

2. Implementing Agencies

The Japanese delegation strongly stressed the need to clearly define the agencies within the Palauan governmental structure that shall be responsible for the implementation of the project from this point until completion of construction. This concern for the institutional capacity of the Republic resulted in the following recommendations:

a) The Group recommends the signing by the President of the Republic of Palau of the attached Executive Order No. 152 which clearly sets forth the implementing agencies within the Republic's governmental structure responsible for each phase of this project. Briefly, the Executive Order directs the Ministry of Administration to be the primary agency responsible for the initial implementation phase of the project up until construction begins. When construction is initiated, the Executive Order then calls for the Ministry of Natural Resources and Development to take over direction of the project. Finally, upon completion of the project, the Executive Order calls for the new public corporation recommended to be established by law

b) In order to clarify Palau's position with regard to the successful long-term implementation of this project, the Group also recommends sending the attached letter from the President of the Republic to Japan. The letter essentially provides the Republic's continuing commitment to pursue this project to completion, to confirm the Republic's ownership of the project, both in terms of the actual infrastructure facility and the processes and governmental structures that guide its future operation and to guarantee the funding, by the Government of Palau, of the project well into the future. The official communication also refers to the commitment to follow the steps required by the Japanese Aid program.

3. Public Corporation

The Group held a lengthy discussion on the best structure available to insure the future success of the Center while also guaranteeing the ownership of the same by the Republic of Palau. Of primary concern in this discussion was the ability of the Center to access international funding sources and thereby guarantee its future financial stability. The group initially wrestled with the concept of structuring the Center as a Non-governmental Organization (NGO), which structure the United States felt would better elicit funds from international foundations. However, the Group ultimately concluded that in order to best meet the needs of Japan for Palau to guarantee ownership by Palau into the future and for Palau to maintain its own future control of the Center's future policy directions, the Center should be legally structured as a public corporation as envisioned in the prior mentioned Concept Paper and the Memorandum of Understanding.

a) Mission Statement -- The Group recommends that very specific mission statements of the Center be delineated in the legislative findings and purpose statement of the proposed public corporation bill which is to be written. The Group believes that such specificity of purpose will assist in gaining outside funding sources and successfully guide the corporation in its early years of operation. The Group suggests review of the Concept Paper mission statements in this effort.

b) Non-Profit Status -- Recognizing the need for outside funding, it is recommended that the planned legislation clearly state the Center's non-profit status.

c) Board of Directors -- In terms of the specific leadership structure of the Corporation, the Group recommends that members of the Board be appointed by the President and confirmed by the Senate with the assistance of, and recommendations by, the Technical Working Group (After the sitting of the first Board, such recommendations should come from a Science and Policy Advisory Committee). The Group believes that the legislation should stress the maintenance of international links and involvement through a process that includes international membership on the Board. The Group therefore recommends the establishment of very specific criteria for Board Membership which is related to the mission of the Center. The Group further recommends that the Republic consider the requirement that a minority number of Board Directors be reserved for international participants who meet the highest standards in relevant technical areas. In order to foster the independence of Board members the Group recommends that board positions be staggered and that the removal of Board Members be allowed only by a 75% vote of the Board. Finally, to protect the Board members from harassment, the Group recommends giving Directors indemnification from legal suit.

d) The Chief Executive Officer -- Understanding that the success of any enterprise rests with its management capability and further recognizing that the perceived independent status of the Center can be directly impacted by the perception that a strong CEO is in place, the Group recommends the creation of a strong CEO position. In order to accomplish this, the Group recommends that the CEO hire all employees and officers of the corporation. The group also believes that the Scientific and Educational aspects of the Center should be segregated from the day to day management of the facility. Consequently, the Group recommends the hiring of a semi-dependent Science and Education manager to coordinate the Center's fundraising and research project selection. Finally, the Group recommends that all decisions by the CEO and the Science and Educational manager be made considering the recommendations of a Science and Policy Advisory Committee.

e) Corporate Powers -- Recognizing that the Center's success will largely depend upon its ability to conduct business like a private corporation, the Group recommends providing the Corporation with those powers normally exercised by a private corporation. The Group would like to emphasize that the corporation's future success will also hinge upon its ability to attain financial independence and that international funding sources will be best marshaled through very liberal relations with regional and international non-governmental organizations. The Group therefore strongly recommends creatively enacting legislative provisions which give the future Board and the CEO options in making corporate decisions. In order to ensure the Japanese understanding and to protect the long term existence of the Center, the Committee would recommend that the proposed legislation include language that disallows subleasing of the Center Facility to another entity.

f) Science and Policy Advisory Committee -- The Group recommends the appointment, pursuant to bylaws, of a Science and Policy Advisory Committee to make science and educational recommendations to the Board, the CEO and the Science and Education Manager. This Committee should be internationally based and have membership from the business and scientific community. It is believed that the existence of such a committee would not only strengthen the decision-making process of the Center, but also enhance fund-raising capacities.

g) Exemptions from Taxation -- The Group recommends making the appropriate tax exemptions which meet the criteria of Japanese aid project. The Group also recommends consideration of providing the Center itself with tax exemptions at least during its formative years.

h) Tax Incentives -- Because the creation, development and continuation of outside funding sources is essential to the success of the Center, the Group recommends that language appear in the legislation which protects private donors from negative tax consequences.

i) Agreements between National Government and the States -- The Group recommends that the Center's relationship, in terms of regulation, taxation and fees be formulated within the context of a memorandum of understanding with participating States of Palau.

j) Foreign Investment Exemption -- Because of the intended international character of the Center, the Group recommends exempting all business transactions of the Center from applicable foreign investment permit processes.

k) Bid Process -- The Group recommends that the Center be exempted from any governmental bid processes in order to act more like a private enterprise. However, the subgroup recognizes the need for certain bid requirements to ensure a fair and equitable process of contract and proposal selection. The Group therefore recommends that a provision requiring bids for large projects (\$50,000 and up) be implemented with local bid preference clause which takes into account the ultimate success of the missions defined for the Center.

l) Financial Management -- Recognizing that the Center should maintain a private character, The Committee recommends that the Center be separate and exempt from the Government's financial system. However, in order to insure the appropriate expenditure of funds, the Committee recommends that i) the Center maintain a system of accounting which is in accordance with generally accepted accounting principles, ii) which employs a firm of independent certified public accountants who report yearly to the Board and iii) a requirement that the Center be audited by the Public Auditor annually.

m) Personnel Management -- The Group, supporting the independence of this public corporation, recommends that the Center be exempt from the Republic's Public Service System. However, once again recognizing its public component, the Group recommends that the Board adopt its own manual of Administration to include provisions governing the selection, promotion, performance evaluation, demotion, suspension, dismissal and other disciplinary rules for the employees of the Corporation.

n) Governmental Powers in Relation to the Center -- Responding to the Japanese concern that a continuing commitment to the Center be made by the Republic, the Committee recommends that governmental powers available to the Republic to assist the Center be specifically referenced in the legislation. Powers should include the right to dedicate, sell, convey and lease real and personal property to the Corporation, to incur expenses on behalf of the Center, to lend, advance or grant money, and to do all things necessary to aid or cooperate in the planning or carrying out of the duties, powers and obligations of the Center.

o) Protection of Work Product -- Because the Corporation will be involved with scientific and educational efforts that result in unique products and reports, the Group recommends that appropriate patent and copyright provisions be placed in the legislation giving the Center ownership of its work product. The Group recognizes, however, that the issue of intellectual property rights, because of its complexity, may have to be dealt with in separate piece of legislation. The issue of down-stream revenues from discoveries made through the efforts of the Center will also have to be researched and may require a separate piece of legislation. The Group therefore recommends investigations into these issues. The Group also recommends a provision which deals with the requirement of research entities to provide Palau with copies of their work.

IV. CONCLUSIONS OF THE GROUP

In the development of its recommendations, the Group was mindful that the conclusions of other Groups may require the alteration of its recommendations. Future communications with the Government of Japan and the United States may also bring forth better ideas on the center's future structure. The Group therefore recommends that the ultimate legislation drafted to meet these recommendations be circulated to all participating members for comment.

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- 4) Mr. Patrick L. Colin, Director
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- 8) Mr. Jack Kuhn
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- 12) Mr. William C. Williams
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- 14) Mr. John C. Walch
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3. Palau Technical Working Group on the Coral Reef Research Center

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- 3) Judy Dean, Office of the Vice President
- 4) Demei Otobed, Bureau of Natural Resources and Development
- 5) Andres Uherbelau, Ministry of State
- 6) Emil Ramarui, Ministry of Education
- 7) Alonz Joseph, Ministry of Commerce and Trade
- 8) Lucio Abraham, EQPB
- 9) Itaru Kishigawa, Palau Visitors Authority
- 10) Hideo Rdialull, Palau Fishing Authority/PFFA
- 11) Ben Roberto, The Senate - OEK
- 12) Del. Thomas Patris, The House - OEK
- 13) Adalbert Eleldui, Koror State Government
- 14) Elia Yobech, Palau Sportfishing Association
- 15) Noah Idechong, Palau Conservation Society
- 16) Carol Emaurois, Palau Community College
- 17) John Vogt, Technical Advisor

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GROUP B APPENDIX

Attendance & Admission Revenue

Estimating revenue for a new facility such as a Visitor Center is always difficult, and is especially so in Palau since there are so few examples to look to for comparative data and performance. One approach would be to look at various levels of penetration of the visitor market combined with varying levels of admission fees charged per person. Assuming that the admission fee might be as low as \$5.00 per person or as high as \$10.00 per person, and assuming that market penetration might range from a low of 30% to a high of 70%, then the following revenue projections emerge:

	<u>Admission Fee</u>		
	<u>\$5.00</u>	<u>\$8.00</u>	<u>\$10.00</u>
30%	\$75,000	\$120,000	\$150,000
50%	\$125,000	\$200,000	\$250,000
70%	\$175,000	\$280,000	\$350,000

In Hawaii with high competition for visitor interests, a 30% penetration rate would be considered excellent. Likewise, in the United States, visitors are not likely to be willing to voluntarily spend more than about \$5.00 for a 30-minute experience (as has been recommended for the Palau Visitor Center). By Hawaii criteria, a visitor center would be likely to earn only \$75,000 per year from admission fees.

However, there are really no competing attractions in Palau (other than the "main attraction" which is the coral reef), and the majority of the visitors are likely to be from Japan and other Asian countries where a fee higher than \$5.00 might not be considered "exorbitant". The Palau Visitor Center might be able to charge as much as \$8.00 or perhaps \$10.00, and, because of the lack of competing attractions, might be able to attract more than 30% of the visitor market.

It is instructive to note that the PMDC has apparently attracted as many as 12,000 visitors per year with minimal marketing effort and an admission fee of only \$2.00. The PMDC was not established as a Visitor Center suggests that the Palau Visitor Center should be able to easily outperform the PMDC. If the visitor market is considered to be 50,000 visitors per year, then 30% would represent only 15,000 patrons to the Palau Visitor Center -- or approximately what the PMDC receives. 50% penetration may be possible if the Palau Visitor Center is considered to be a "quality attraction" and if it receives marketing/advertising support.

If attendance to the PVC is made "mandatory" then a penetration rate of 70% or perhaps higher may be realistic -- as well as the higher revenue numbers. Without this provision, it would not be wise to anticipate market penetration above 50%. Pricing will also affect attendance if it is voluntary. A \$10.00 admission price will probably not be considered a reasonable value by American visitors -- this segment of the market will probably not attend unless the visit is mandatory OR unless the quality of the exhibits and the experience is of a very high caliber.

Giftshop Revenue

The Giftshop ought to be considered a separate entity within the management structure of the PVC. It might be run by an outside operator under contract to the PVC, or run directly by the PVC. In either case, its operations and books ought to be maintained separately from the operations of the PVC. A percentage of the revenue generated by the Giftshop should be earmarked to support the mission of the PVC. At the Waikiki Aquarium, 20% of the GROSS revenue generated by the giftshop is returned to the institution for education programs and other operating expenses.

Per capita spending at small aquarium giftshops in the United States is only \$0.90. At the Waikiki Aquarium it is higher at \$1.50 per capita. The Waikiki Aquarium giftshop generates about \$550,000 in sales per year from an attendance base of about 350,000. If the PVC giftshop offers unique items, a wide selection of items, with a floor space of at least 400 square feet, and a mark-up of at least 100% it may do better than \$1.50 per capita. However, projections of \$10.00 per capita or more may be unrealistic as starting projections based on experience in Hawaii and elsewhere.

Given per capita spending of \$2.00, \$5.00, and \$10.00, and market penetration (attendance) of 30% (15,000 people), 50% and 70%, with 20% of the gross receipts returned to the visitor center, then the following revenue could be generated in support of the center:

	\$2.00	\$5.00	\$10.00
30%	\$6,000	\$15,000	\$30,000
50%	\$10,000	\$25,000	\$50,000
70%	\$14,000	\$35,000	\$70,000

In Hawaii, 30% and a \$2.00 per capita would be considered very good. Palau is of course not Hawaii and the competition and the visitor market are different. Nonetheless, caution should be exercised in projecting visitor spending at too high a level.

Notes of Working Group C: Other income sources

Hamasaki, JICA
Ichihara, Environment Agency
Yokochi, Tokai
Walch, Aquatic Wildlife Company
Vogt, Palau Technical Working Group
Remengesau, Budget Officer/Ministry of Administration
Demei, Palau National
Kishigawa, PVA
Ueki, PCS
Joseph, Econ Development
Vosseler, Counterpart Int'l.
Forman, TNC

Brainstorm Session

Visitor Center - admission fees
Environmental Tax - visitors upon entrance into Palau (Japan)
Mariculture (including aquarium trade)
Souvenir - gift shop sales
Ecotourism/glass bottom boats
Restaurant/food service
Certification fees
Research fees / education / training, including dormitories
Samples - marine life
Contracts
Foundations
Multilateral/bilateral project aid
Membership
Publications
Licensing technology

Discussion on which would take place at the center -- basically all but the tax. Glass bottom boat is considered a "research vessel" and Hamasaki says GOJ plans to cover the cost of such a boat in the aid package.

Walch discussed mariculture and the example of the Caymans. \$15/person at the turtle farm there -- 75% of the visitors go to this place. Even more money made from the gift shop and the restaurant. PMDC gets 12K visitors annually, at \$2 a head, and it isn't even set up for visitors really.

Mariculture: giant clams to start with. Aquarium industry is dying for cultured products - hard and soft corals, etc. We need to determine what can be cultured. Green naphthia, easy to culture, can easily sell 500 a week. Can be grown in a community, center will grade, pack and ship. On marine ornamental fish, Palau makes an excellent place to raise marine fish that haven't been

raised before. Hard corals can be cultured very easily; even the ugly corals can be sold for food for fish in the aquarium. Revenues go to the farmers, and the Center for functioning as the grading/marketing facility. Center would also be featured in the product (e.g. send a brochure with the product). Top of head estimate \$500K gross, FOB annual industry, plus another \$500K air freight commodity. Note that the retail value of live aquarium specimens in the United States is estimated to be in the range of \$250 - 700 million per year.

Vogt spoke briefly of the history of mariculture in Palau. Law has changed reactively. With the public entity, it might be a way for Palau to ease back into this industry.

Clams, hard and soft corals technology exists. For new fish species, research may be needed at the center.

Hamasaki asked re: relationship of PMDC to the Center. Remengesau believes that mariculture is a good revenue source, but not clams. Walch says there are at least 500 other products that can be sold. Excellent opportunity to tie in this revenue source with training, research, etc. The actual mariculture takes place in the village, while the center is the place for grading, marketing, etc.

Walch says now is the time to get into this field -- two years from now there will be other competitors. Need to stake the flag for this position now.

Yokochi agrees with general idea. Hamasaki asked how much size, personnel need to be devoted to this. Walch says a storage facility, a tank facility about 15X30 feet, is all that is needed. Hamasaki just wants to make sure they don't construct another PMDC. Walch envisions most of the mariculture in the ocean, not in tanks on the land.

Species for mariculture at the center should be restricted to those related to native to this area, and those which are under treat. Vosseler doesn't think it should be limited, except to native species.

Visitor related activities: Size of M-Dock approximately 5000 square meters. Within the center, see:

- "educational style" aquarium
- gift shop
- restaurant / more like a staff lounge - cafeteria
- audio-visual room/classroom
- tour use of glass bottom boat

Check with Bruce Carlson re: the revenue potential of a gift shop. In US, based on \$6/hour. So if it takes 3 hours to go through the facility, you'd charge them \$18. Kishigawa thinks Taiwanese is the bigger market, since they don't dive or swim.

There was some discussion of the restaurant, since the GOJ representatives think that selling the idea of a restaurant to ODA will be difficult. Demei suggested more of a "cafeteria" or staff lounge.

Glass bottom boats needs good instructors. Possibly use students. PCC teach a class on science and interpretation. PCC currently teaches computer, carpentering, electricians, etc. They were initially a vocational trade school. Now including a college-prep liberal arts program. Discussing about tourism industry to be taught in the program. Developed a strong plan in marine resources management. See a great tie-in to PCC and the center, both for the vocational tourism curriculum and to the marine science curriculum.

Existing Tax Based Revenue

- * diving tax - \$15/diver/month - KSG
- * Rock Island visitor fee - KSG - \$15/mo or \$100/yr
- * sport fishing license fee - KSG
- * departure tax - 70% PVA & 30% Nat Gov't (\$1.1m/annum)
- * fishing rights license (foreign) - 85%- states & 15% Nat Gov't (\$1.5m/annum)
- * fish export tax - 100% Nat gov't (\$300k/annum)

Potential Tax Revenue

- * marine products export tax
- * portion of existing taxes
- * environment tax dedicated to center, collected at airport, in lieu of mandatory environmental training for tourists at Center
- * increase the hotel tax (currently 10%)
- * surcharge on travel agents for bookings in Palau

Demei suggested dedicating some of the existing fishing rights tax (depending upon how it is currently used), but only if it is taken from the ROP portion, not from the states.

Vosseler suggested a hotel tax might not be popular. Vogt said conservation preserves the resources that bring the visitors (hotel guests) here, so everyone should kick in. Vosseler's point is that taking out of someone else's pot creates enemies, so maybe best done by adding, and by spreading it around -- not just goring one ox.

Fee for service may be a more direct method, than a tax. For instance, taking 5% of revenues from marine products for "green certification" of those products, more if they market it, too.

Certification fees: Environmental education, boat safety etc. to take people out to Rock Islands, etc. PCC, PVA and others have a plan. Certification for tour operators. Needs to be coordinated between PVA, PCC and the center. Possibly not a huge income source, once split between all these sources. Optional "certifications" for visitors, etc. Get a "merit badge" or a stamp.

Research fees/dormitory/education fees: Education fees where undergraduates pay fees to conduct field courses. Bench fees for research are considered standard practice and would be billed accordingly (possibly different than the fees for undergraduate students).

Forman suggested that just paying your way in isn't enough, but that research programs (a) be consistent with the Center's research agenda, (b) be done on an application basis, reviewed in a regular basis, (c) include Palauan student/researcher counterparts, (d) be required to give public presentations and leave a copy of their research behind. Walch suggested that there is one daily rate for basic use of the facility. Then they pay extra for boats, staff assistance, diving, lodging, etc.

Question of IPR raised, as who benefits from value of research. If something is discovered in Palau, does the center get any benefit? Discussion centered on leaving that to a contractual agreement discussed and signed at the beginning of each contract.

Marine sampling: Requests often come for samples of marine life - mostly from US, France and Japan. Can apply the same IPR arrangements re: the economic value of anything found from those samples.

Contracts/consulting fees: Appears to be a market for this. Arrangements can be made to contract with them, on availability basis, to have a contract. Present EIA regulations require a third-party conduct of the assessment, so if it impacted the reef, then perhaps center staff would be hired to be part of these teams.

Multilateral/bilateral project aid: For instance, registration with ADB to conduct technical assistance or training programs. Also discussed was using the UNDP Capacity 21 programming in an endowment concept, not as direct funding.

Licensing technology: This is similar to IPR, but a little different. In this case, if the center staff discovered/developed a new technology, and it has a commercial value, then it can be leased to the private sector for a fee. For instance, Walch pays \$10-20K a year, plus 1% off the top, to the Smithsonian. It is kind of like a patent. Palau government can decide to have differential pricing, charge more for exclusivity, etc.

Foundations: Applying for grants to interested organizations. Walch noted you can get grant writers that work for a percentage of the grant. Forman suggested this doesn't have to be off line, given the high quality of proposal developed by PCS. Center director/CEO would be tasked to search for grants, and be recruited with those skills.

Discussion of the name to drop the "research" word because: (a) doesn't fully reflect the full functions of the center (in which case it should be "Palau Coral Reef Conservation, Research, Education, Training, Visitors Center and Aquarium"), (b) having "research" in the name conflicts with the existing CRRF, (c) having "research" in the name limits the number of

foundations interested, as not all fund research. Example cited in PNG, where the name is a local word. Ueki raised the idea of putting "international" or "Pacific" in the title, which generated discussion on regional vs. bilateral nature of the project.

Note was made that some foundations will not fund a government-related facility, no matter how remote the relationship to the government (public corporation, etc.) In those cases, doing joint projects with true NGOs (OISCA, PCS, etc.) may be the route, where those organizations make the applications for the grant, and work in tandem with the center (on mutually -agreed upon projects).

Since we had time, Walch brought up a revised explanation of the mariculture concept. As written out for presentation by Vosseler, the key is Village Based Mariculture, where the role of the center is limited to:

- Monitoring
- Training
- Management Plan Design-- based on combining traditional with modern systems
- Data Collection & Analysis
- Certification Stamping -- accreditation as a certifier could come from the developing Marine Stewardship Council (a la the Forest Stewardship Council) - locally backed up by advisory committee

For these services, the center receives:

Monitoring Fee:	10-15% of gross retail and wholesales sales (local and international) accompanied by Certification Stamp of Sustainability (Green Reef)
Training Fee:	For the conduct of training programs for buyers and aquatic gardeners (resource owners)
Management Plan:	For the development of management plans (could be included as part of training program fee. Not a profit source but run as cost recovery exercise - \$ to be made from monitoring fees.

Note that in this scenario, the center gets out of the buying and selling function - doesn't handle money, stock, etc., but takes on more monitoring functions. While total market may remain the same (\$500K gross annually), the amount going through the center will be reduced (as the workload will also be reduced).

Numbers:	Gross Revenue
Visitors Center --	
Admission	
-Number of visitors	20-40,000 people/yr
-Income generated	\$200-400,000 based on \$10/person fee
Gift Shop/Souvenirs	
Income generated	\$290-580,000 (based on \$13/tourist)
Glass Bottom Boat	
# of visitors	10,000 people/yr -
Income generated	\$250-400,000 based on \$25-40/person
Mariculture	
By year 4	\$250,000/yr (conservative) - from monitoring, etc. role
Year 1-3	Income from industry, donors)
Research/Education	
Bench fees @ 40/day	\$24,000/yr
Undergrads	\$56,000/yr
Projects	\$250,000/yr
Taxes	
3% Fish Export Tax	\$40,000 not feasible
3% fishing rights	\$ 41,000 not feasible
3% departure tax	\$33,000 not feasible
3% diving tax	\$13,000 feasible
3% trvl agent surcharge	\$900 not feasible
5% hotel tax	\$50,000 feasible
Membership Fees	\$10,000
Certifications	

PLAN OF ACTION

- write out mariculture plan - identify donors - submit proposals
- check on UNDP fund (get inf. on Japan pledge to team)
- Legislation re: ecolabelling
 - monitoring
 - certifying
- Virtual Center: website - home page
- Awareness/Education re: plans in Palau - PR
- Identify training needs for staff-to-be -

Monday, February 24
GROUP C Meeting, continued

1. Review of Friday's notes included input from Connie Arvis' note:
 - More discussion on other mariculture options-food,
 - Firm up income generation options
 - Firm up cost/income figures

2. Review of possible income options, in light of legal structure
 - *admission fees*, still okay to collect

 - *gift shop/souvenirs*, okay

 - *glass bottom boat*: recommend competitive bid for private sector concession to run the boat. Fee paid to center (which owns the boat), but concessionaire responsible for maintenance, etc. (all part of RFP)

 - *mariculture*: it was felt that the center should not be involved directly in the production of mariculture products -- better left to private sector -- with R&D at the Center. What are the options? Vosseler notes that government can't certify or green mark these products (at least in example of Sustainable Forestry Council). Walch notes that the research for spawning of certain species is very expensive, but we note that such research is highlighted in the Palauan concept paper.

Discussed that all but the "certifying" component could still be performed (and revenues recouped) by the Center. So the training fees, costs of brood stock, and extension could be performed by the Center. However, the monitoring/certifying function needs to be performed by an independent organization / NGO, so those costs/revenues would be incurred by an independent organization. So the Center's revenues would be "break even", but that's what self-sustaining is about.

Hamasaki raised question if Palauans would want to really do this kind of work -- what kind of demand is there for this? The sense is, assuming if you can demonstrate it works, that there will be high demand, particularly for the ornamentals which don't require a lot of work (feed stock like grouper, nori, etc., where you have to feed it everyday).

- *projects*: now switches to bilateral or multilateral aid, or in partnership with NGOs.

COSTS/OPERATING EXPENSES (all figures annual and USD)

Note: Figures come from Palauan calculations, rate basis, etc.

Personnel (3 components)	\$350,000
5 Professional Level -salaried (CEO, manager, research director, education director, aquarium director)	
4 Facilities Maintenance-Paluan income based	
6 Administrative	
(high figure-presumes initially some expats)	
Visitor Center	
inventory	\$97,000-193,000
1/3 cost of estimated income based on income figures	
Utilities (solar?)	\$200,000-500,000 - electricity
	\$16,000 - LP
	\$1,000 - water
Communications	\$36,000
(@\$3,000/mos)-internat,fax,telephone	
Contract expenses-(accounting, legal)	\$10,000?
ask PUC; may be free if Gov't body	
-use gov't employees to do	
Vehicle/fleet maintenance	\$50,000
petrol, repair, maintenance (40 cents/mi)	
2 Boats w/ motors	
1 Sedan	
3 Trucks/vans	
Travel accommodation, per diem, transport :	
Intl/staff travel -	\$20,000
Domestic/staff travel -	\$3,000
Board/Advisory travel -	\$17,000
Subscriptions	\$1000
Supplies	
Office -	\$4,000
Lab -	\$12,000
Training/Extension -	\$2,500
Center/Equipment Maintenance --	\$80,000 (10% of other costs)
TOTAL	\$880,000

\$1,043,000 Income (using most conservative of yesterday's figures and new assumptions re: mariculture structure/revenues); Center stands at break even with numbers used, and assuming strong management to keep expenses under control and meet income projections.

MONDAY, FEBRUARY 24, 2:00 pm: Joint meeting between Groups B&C

Idechong began the meeting with review of what is available in Palau currently.

Agencies and organizations that have research:

Palau Community College
Palau Mariculture Demonstration Center
Coral Reef Research Foundation
Palau Conservation Society
The Nature Conservancy
Palau Marine Resources Institute
University of California/Los Angeles
University of California/San Diego
University of Guam
Environmental Quality Protection Board
University of Hawaii/Sea Grant
Marine Resources Division
Entomology & Conservation Division
Ministry of Education
US Dept of Interior

Existing "visitor facilities" and programs:

Belau Museum
PMDC
Proposed artifacts museum
Crocodile farm

Potential users of research facilities, visitor facilities also discussed. Potential physical needs of each facility also discussed (see group B notes). Policies needed (e.g. to coordinate research topics, requests), also discussed.

Vogt summarized Group C discussions (see notes). While Friday's discussion focused on potential revenues, Monday included a look at costs.

Carlson noted that his calculation had a few more staff (21) but nearly the same budget for personnel. He suggested various "redundancies" to deal with issues of in case someone is sick, travelling, etc. He also has questions on the income -- for instance, says the Honolulu Aquarium only gets \$1.50/visitor average from the gift shop.

Colin asked how much money was available for the construction/equipment? Hamasaki says they cannot say right now -- will be based on Palau's request. Discussion ensued on whether or not the previous blueprints are valid (described as "benchmarks"). Current Japan team thinks the size of the previous blueprints are too large, but declined to say by how much.

Idechong went through the history, and the five previous options for size. Palau is thinking of an \$800,000 to \$1 million operating cost figure.

Carlson asked if visitors will be "forced" to go, or if it has to stand on its own in the marketplace. Might have to give two sets of numbers on revenue, based on mandatory vs. voluntary.

Kanayama feels that core is the research center. Colin suggested 1000 sq meters, for a \$1 million for construction and basic equipment. This does not include dormitories, classroom, visitors center, etc.

Discussion ensued on how these numbers were developed, which appears to be still at a wish list stage. There needs to be a discussion between the two groups to come up with some finer details. Idechong suggested a small group. Walch suggested we talk about some items together.

Kanayama said research was the point of the center. Forman disagreed and pointed out the tripartite purpose that has always been in the substance of the program: research, education/training, outreach (visitors).

FACILITIES:

TOTAL APPROXIMATELY 24,000 sq ft/2,400 sq m

Education - 35 student classroom, experiment area, library, etc. 2,000 sq feet/200 sq m
(approx. \$100 sq ft for construction and basic fixtures)

Research center - 9,800 sq ft/980 sq m

2100 sq feet/210 sq m total (300 sq feet/30 sq m per lab, seven labs)

common area - 500 sq feet

10 offices @150 sq feet/office - 1500 sq feet

instrument room - 150 sq feet

administrative office - 150 sq feet (plus fax, copy, etc.)

library - combined with education center (600 sq ft total)

conference room - 300 sq ft

specimen room - 400 sq ft

misc - 500 sq feet

research director office, toilets, etc.

TOTAL - 8000 sq ft/800 sq m

EST \$100-150/sq ft (building and basic fixtures) = \$800K -1.2 mil

4-6 visiting scientist rooms - 150 sq ft/room = 1800 sq ft

@ \$100 / sq ft for these = approx \$150K-180K

Visitor center - 12,000 sq feet/1,200 sq m

Waikiki Aquarium is an hour experience. If you want people to stay longer, you need more exhibits. Need 5600 sq ft for 60 exhibits for a one hour experience. If you have a 10-15 minute video (which will also cost \$15K to produce), you can use of 10 minutes of that time. A 200-seat (3000 sq ft/300 sq m) auditorium (multi-purpose room) would be a good addition to Palau anyway. Could be rented out for other groups, facilities.

If you have 30 exhibits, some live, some "museum". At a basis of 10 live exhibits, at 20 museum exhibits, need about 6000 sq ft/600 sq m. Exhibit area costs about \$200/sq ft

Gift shop - 400 sq feet/40 sq m (including vending machines)
 Inventory (storage) - 100 sq ft/10 sq m
 Workshop (mechanic, carpentry, etc) - 200 sq ft/20 sq m
 Freezer - 100 sq ft/10 sq m
 Quarantine - 200 sq ft/20 sq m
 Food prep - 50 sq ft/5 sq m
 Offices - 4 at 100 sq ft = 400 sq ft/40 sq m
 Dive locker/shower - 100 sq ft/10 sq m
 Public toilet/staff restrooms - 300 sq ft/30 sq m
 Executive Director's office - 200 sq ft/20 sq m
 Cashier/business office - 100 sq ft/10 sq m

Shared: darkroom, pump station, dive lockers, etc.

Total numbers look something like:

Construction	\$3.6 million
Site preparation	2.0 million
Equipment/vessels	3.0 million
Planning & design	1.2 million
SUBTOTAL	\$9.8 million

Rule of thumb is 10% for operating cost (or \$1 million) for operations

Both numbers are very close to what has been developed from the subgroups, previous teams, etc. For instance, previous architect came up with 1500 sq m for research, 800 sq m for visitors center, for a total of 2300 sq m.

A discussion ensued on who was responsible for what on site prep. Palau is responsible for clearing the site. The additional "landscaping" (breakwaters, etc.) can be in the request.

Numbers should be considered MINIMUM . We don't have confidence in these numbers because we may not have the right expertise in these cost areas.

COMBINED SUBGROUPS B & C: Last cut at numbers
Tuesday, 25 February 1997 1345 hrs

To be determined this afternoon: dormitory and aquarium/visitors' center parameters. Session opened by Ueki; turned over to Idechong for opening.

Aquarium

Palau up to this point is still pretty vague on the idea of the aquarium. Conceptualization on our side is not very clear. Have looked at Waikiki Aquarium, but would also like to visit different aquariums -- in Japan, Caribbean, etc. Palau has previously requested assistance from the USG re: this trip. Group asks Bruce to give us more info on the Waikiki Aquarium, and solicits names, suggestions of other sites they should visit.

Dormitory

PMDC had a dormitory at one time. Selection of M-Dock for this center was in part due to proximity to PCC, which has dorms but might need renovation. Since GOJ not willing to assist with renovation of PCC rooms, then the idea of a Center-related dormitory is back on the table. On Palau side, definitely see the need for the dorm in light of above. Discussion:

- dorms can be revenue generating
- important to be on site for 24-hour-a-day experiments
- advantages include: control food quality (assuming food service or kitchen) which affects morale, contains people on site and keeps them focused and on time, don't make friendships in other facilities because they are just strangers, easier to control security, disruptive to PCC to have strangers come in, center controls the fee structure, etc.
- UCLA spends \$70K annually for courses (32 people over 10 weeks) including travel (but that was low-cost nearby travel)
- having a third party involved (e.g. PCC) that wants to make money can affect the overall price structure of a program, and may make people go elsewhere
- previous letter indicates that UCLA would pay \$50K a year for this. Charge them \$2,500 a quarter for room and board (\$36/day). Plus a flat fee for the lab charges. Students do the own laundry, janitorial, cooking, etc. No service staff, just a facilities manager to make sure they don't burn the building down.

- these numbers are models. Is the market big enough? you need to advertise the facility and what it has, etc. Hamner feels it would be easy to fill a fall, summer and spring teaching program.
- numbers discussed earlier have incorporated sufficient lab space (don't need much, out it in the field). Field surcharges (boats/fuel, etc.) are additional.

Idechong closed the discussion noting that we have heard the pros. Question to GOJ is will they entertain the request for this expense. Hamasaki asked if these were single rooms. Ziegler suggested double rooms, 10x15, for 15 rooms: 2250 sq ft/225 sq m additional for the rooms. Plus an additional room for kitchen, cafeteria, bathrooms, showers, etc. If total is 3500 sq ft/350 sq m. Can be high ceilings, flow through air not air conditioned. At \$100/sq ft estimated cost is \$350,000. .

Carlson asked for benchmark of PMDC's dormitory, etc. Idechong noted that Palau has a different idea, of using facility for conferences, training, etc., not just for UCLA or Tokai students.

Carlson asked a question of who will pay for exhibits? GOJ has this under advisement, but cannot say right now. GOJ also suggests that USG look at this. GOJ may be able to pay for books for the library.

Vogt will provide the information on the center maintenance costs (not included above). Carlson has provided background information on Waikiki Aquarium, which he recognizes is different than Palau. However, it is illustrative perhaps as background information. Strongly recommended that gift shop be operated separately -- at least with separate books. To run as a retail center, and then make a donation of revenues back to the Center. In Waikiki, 20% of gross sales goes back to support the aquarium. With these calculations and looking at ranges, he comes up with gift shop revenues that range from \$6-70K.

Kanayama thinks 6,000 sq ft aquarium is too much for this country's first attempt at running an aquarium. He thinks it should be smaller -- "small, but beautiful". Carlson noted that 6,000 figure included the work areas, freezers, etc. and the exhibition area is smaller. Floor space of exhibits is about half that. Kanayama thinks exhibit should only focus on coral and coral reef related exhibits. Carlson noted the importance of sunlight for corals and clams, so a second-story would block the sun and raise the costs. For the aquarium component at least, allow natural sunlight.

Draft Terms of Reference
for the
Japan - U.S. - Palau Experts Team of February 1997

Background

The Governments of Palau (GOP), Japan (GOJ) and the United States (USG) (hereafter referred to as the "Parties") have been working towards the establishment of a Coral Reef Conservation, Research and Education Center (Center) in Palau.

The Center and its functions have not yet been fully defined as the project identification and formulation process is at an early stage, but prior discussions among the three governments have agreed that the project will have three key components:

a research function that will involve both academic and practical research on Palau's coral reefs and marine environment - research that will produce visible results and benefit for the people of Palau;

a public awareness and education function that will provide Palau's school children, citizens, tourists and other visitors with information about Palau's coral reefs and marine environment and that will promote broad-based action; and

a cooperation function that will involve Center links with government and private research, education, business and other institutions on Palau and elsewhere to assure support for the Center as it seeks to research, conserve, educate and promote sustainable use of Palau's coral reefs and marine environment (this includes participating in the International Coral Reef Initiative Global Network) and developing sister institution relationships.

This mission stems from the GOJ and USG work since 1994 to incorporate coral reef preservation and research into the U.S. - Japan Common Agenda, and it specifically builds on two prior U.S. - Japan missions to Palau, November 1995 and June 1996.

During the June 1996 mission, the three governments agreed to constitute a tripartite financial experts team tasked with generating reliable cost estimates to contribute to design decisions and facilitate understanding about the financial sustainability of the Center as the next step in the development of this proposed Common Agenda project.

During that mission, the Government of Palau's Technical Working Group, created by Executive Order No. 144 issued by the Honorable Kuniwo Nakamura, President of the Republic of Palau, and chaired by the Vice President of the Republic, agreed to secure rights to the M-Dock site prior to the next mission. The Technical Working Group also agreed to submit an official request to the Government of Japan for the Center project at the appropriate time. The rights to M-Dock have been obtained (see attached letter).

General Procedures

The tripartite Palau - Japan - U.S. team (Team) will consist of a group of experts appointed by the three governments. Team members will be divided into subgroups by expertise. All issues identified in this scope of work will be the concentrated focus of a team subgroup. Each group will be formed by agreement of the three governments based on the specialties of their respective members. Not every subgroup will have the representation of all three Parties.

Each subgroup will submit a draft report on its task to all Parties by the end of the Team visit. These reports will be compiled into a comprehensive draft report. This draft report will be summarized, reviewed and approved by appropriate representatives of the three governments as soon as possible after completion of the Team visit.

Scope of Work

The joint Team will address the areas listed below in this combined Scope of Work. The work scope was developed in a collaborative process and takes into account the requirements of all three Parties.

The areas are not listed in any special order but they are divided into two related categories: a) information about constructing and equipping the Center facility; and b) information about the possible size and nature of the Center and its activities. These two categories are intimately connected as the Center is shaped by the nature of the site itself and by the issues surrounding operational costs and financial sustainability.

The GOP will be considered to be a participant on all subgroups since it is the host and recipient country. Japan and the U.S. are visitors with a limited number of team members so this TOR will indicate "Japan" or "U.S." to indicate where one or the other has a predominant interest in or need for the information sought.

1. National Development Plan (Japan)

The Republic of Palau's National Development Plan will be reviewed to identify its major areas of emphasis and the relationship between different areas of the Plan, and to determine how the proposed Center project "fits" within the National Development Plan.

Result Sought: A link will be sought between the goals, objectives, and priority programs of the Government of Palau as outlined in its National Development Plan and the goals and objectives of the proposed Center.

2. Research and Other Center Facilities - U.S. and Japan

The income and costs associated with establishing and supporting the Center will be impacted by the nature and size of facility, the physical aspects of the proposed site, the kind of equipment made available to the Center, and other factors.

In determining the type of research and other facilities required by the Center, the team should keep in mind the kinds of research likely to be most appropriate and the status of existing facilities and equipment on Palau. The team should determine the current demand for related services and on existing equipment (PMDC and CRRC) and identify what their relationship will be to the proposed Center. It should estimate possible Center revenue from research and other fees and it should seek to establish the overall cost-effectiveness of alternative kinds and sizes of facilities.

The possibility of utilizing existing facilities rather than funding new construction should be explored as should the cost and feasibility of renting and/or refurbishing/upgrading an existing facility on Palau.

Results sought: (1) A review of existing research facilities and equipment on Palau and a determination about their availability to the Center; and (2) A recommendation, or alternative recommendations, on optimal laboratory equipment with preliminary cost estimates.

Because Japan will assume the cost of construction and equipping the Center (if that option is pursued), it has specific information requirements as follow-up to previous visits and as a prelude for upcoming project design missions. This information, noted below, will be sought simultaneously with the broader work just discussed and it will be sought jointly with the U.S. where U.S. team expertise and interest permit.

Affirmation of the Feasibility of the Center:

- Japan will reexamine the necessity and appropriateness of the Center, (including the examination of possible use of existing facilities, with or without upgrading). A review will also be made with the other two partners on the appropriate scale of the facility and the type of equipment that may be needed (also discussed above).*
- A joint review will be made of potential research areas and ways that the Center can be involved in education, public awareness and information dissemination (including its future participation in the International Coral Reef Information Network); and*
- Data and information will be collected which is necessary to determine other appropriate directions and activities for the Center.*

Site Studies:

- *Data will be collected by Japan on geological and climatological conditions of the area surrounding the M-Dock site;*
- *The probable influence of proposed construction of private facilities in the M-Dock area will be studied and the need for compulsory excavation will be considered;*
- *The need for additional land fill, banks and other ground work will be determined;*
- *Plans to move the adjacent dump will be reviewed and the extent of current and future ocean contamination in and around the M-Dock site will be studied;*
- *Any other existing situations at the M-Dock site will be researched and possible Center design concepts will be considered based on specific characteristics of the site; and*
- *Japan will review the kind of environmental assessments that might be required in order to construct a facility at the proposed site.*

Facility Construction and Equipment Provision:

- *The availability of local subcontractors and their technical capacity will be assessed;*
- *Possible construction equipment suppliers, local or third party, will be explored; and*
- *Access to a dependable supply of water, sewage services, electricity and other requirements necessary for the operation of the Center will be assessed.*

3. Aquarium Size and Concept - U.S. and Japan

An aquarium for public access associated with the Center represents both a source of costs (construction, maintenance, electricity, salaries) as well as a potential source of revenue (income from visitors). Clearly, size, location, and complexity of design will directly impact both costs and revenues.

Results sought: (1) A recommendation, or alternative recommendations, on optimal sizes for the planned aquarium based on projected usage and upkeep fees. (2) Specific cost and revenue estimates are to be a part of this recommendation.

Because Japan will assume the cost of aquarium construction, it has some specific requirements to review as follow-up to previous visits and as a prelude for its upcoming basic project design mission. The information will be simultaneously with the broader studies indicated above and will include U.S. team members where expertise and interest dictate.

- *The technical capacity of local contractors for aquarium construction will be assessed;*
- *Supply sources for aquarium construction materials will be evaluated; and*
- *Other aspects of aquarium size, equipment, needs, and estimated costs of these inputs will be sought jointly with the other team members.*

4. Education, Public Awareness and Training Activities - Japan and the U.S.

Education, public awareness and training activities of the Center are important. They link the Center with the local community, school children, tourists and other visitors, with local businesses and with the scientific and research community. As such, they can generate extremely important local, regional, and international support for the Center.

Depending on organization and distribution, these activities could be either income drains or income sources for the Center. Keeping costs in mind, the team will evaluate the types of coral reef and other marine environment educational programs that could be most successful, cost-effective and revenue enhancing.

Specifically, the team should consider whether an ecotourism training course or certification process is a possibility.

Japan will support the Center, in part, through its technical cooperation program. For this purpose, Japan will seek to determine the kinds and number of staff required for Center operations so that it can begin to plan what kind of training activities will be required and how this training will be carried out (training in Japan, sending technical advisors to Palau, etc.).

The U.S. proposes to support staff training and joint research through the use of a number of U.S. Government and private agency cooperation programs. The USG team members should begin to list the kinds of possible collaboration areas that are relevant and should outline a strategy for how the USG will assure that opportunities are identified and captured.

Result sought: (1) *Evaluate the educational, training, and other programs that are accessible or may be available to the Center either directly or through electronic linkages. (2) Prepare a recommendation, or alternative recommendations, for education programs the Center should initiate either independently or in conjunction with existing programs of marine-related institutions or community educational facilities. (3) Identify potential training and support activities (including joint research and sister institution relationships) that might be promoted and supported by the U.S., Japan and others.*

5. Establishment of an Associated Marine Park - (U.S.)

A marine park associated with the Center could increase the Center's access to marine biodiversity, enhance the Center's overall value and viability, and it could possibly be a source of revenue for the Center. It could also be a potential income drain on the Center. On the positive side, revenues could come from park user fees such as a mooring buoy program or dive trail fees. On the negative side, costs could originate from acquisition fees for the park, initial clean up of the park site, personnel salaries, and indefinite upkeep requirements.

Results sought: Working with the assumption that the GOP will identify a limited number of potential sites, the team would (1) identify the characteristics - including conservation goals for a productive marine park; (2) investigate the marine park potential of available sites - particularly in light of ecosystems critical to the South Pacific region and existing Palauan protected area regulatory and management frameworks; (3) determine the kinds of revenue generating programs that could be developed; and (4) calculate the costs that might be associated with each potential park site.

(The marine park may be an area of interest to Japan as well. To the extent that Japanese team members have the time and expertise, they should participate in this aspect of the study.)

6. Foundation Support for the Center: - U.S. and Japan

Both the U.S. and Japan are attempting to recruit foundation members for their teams. Private foundations are a source of funding for specific projects and could play an important role in the future sustainability of the Center, especially in its early years.

If successfully recruited, the Foundation members of the Team should review the specific foundations that are active in the Pacific and likely to contribute to this Center, examine the criteria used by those foundations to make funding decisions, and review the types of projects of interest to those foundations.

If the Center's mandate is generally complementary to the area of interest of foundations, then the team should outline the kinds of steps the Center should consider to make itself attractive to foundation funding.

Results sought: (1) A recommendation on the feasibility and desirability of attracting foundation support. (2) If foundation participation in the Center is recommended, an outline of steps the Center should consider should be prepared to foster such participation. (3) Potential Center projects of particular interest to foundations and a list of foundations that might be of interest to the Center should be prepared.

7. Other Income Sources for the Center - U.S. and Japan

The Center has the opportunity to attract private sector interest and funding for activities that sustainably use Palau's marine environment. Because tourism to Palau is largely marine-centered, tourists and ecotourism activities represent a major potential source of income for the Center. Giant clam culturing, pearl culturing, glass-bottom boat tours to the coral reef areas as part of the Center's educational programming, and other activities also offer income generating opportunities.

The Team should consider, based on available resources and domestic, regional and international supply and demand, the types of activities that might have potential for income generation and Center involvement. For instance, Center research might help to identify better ways to culture giant clams or a better way to market or package the clams. Conducting educational tours to the reefs or at the aquarium, or establishing diving trails, education programs and licensing procedures for divers are other possible ways that the Center could earn income to help offset operational costs.

The Government of Palau contributions to the operational costs of the Center are an important base which must first be understood by the team as it seeks to identify what the "gap" might be and how it should be met.

Results sought: *(1) Based on estimates of potential operating costs of the Center and estimates of potential GOP budgetary outlays for the Center, identify potential income generating activities that sustainably use Palau's marine resources (2) Japan has shown special interest in collecting statistics of tourism, including the number of visitors by country, purposes, revenues, types of gifts and souvenirs purchased, and in developing an overall profile of the tourism business in Palau. (3) Provide an overview of income-generating areas, including tourism, and indicate potential costs, revenues, and if applicable, potential markets. (4) Suggest mechanisms where the Center could play a productive role in fostering income-generating activities and receive economic benefit within the rules governing the institution and its supporters. (5) Outline a plan of action on specific activities that can earn income and help offset operation costs.*

8. Legal Structure - U.S. and Japan

The legal aspects of ownership, operation and management of the Center will affect the Center's ability to attract, generate, and sustain funds. Legal mechanisms should be explored that allow local oversight while incorporating international participation.

Result sought: *Recommendations for legal structures which would make the Center attractive to the greatest variety of potential participants while fostering economic viability and allowing for sufficient oversight. The team must obviously take into account any legal requirements of the Republic of Palau for institutions such as the Center and any legal requirements from the donors that condition their assistance.*

(DRAFT)

Executive Order No.152

RE: The identification of implementing agencies for each stage of the Coral Reef Research Center Project.

Whereas, Executive Order No.144 created the Coral Reef Research Center Project Technical Working Group in order to develop a mission statement for the proposed Coral Reef Research Center and to propose the center's management and operational structure; and

Whereas, the Technical Working Group consists of broad representation from various relevant agencies and organizations in Palau, both governmental and non-governmental, including the Office of the Vice President/Ministry of Administration (and designating the Vice President to chair the Group), Ministry of Resources and Development, the Ministry of State, the Ministry of Education, the Ministry of Commerce and Trade, the Environmental Quality Protection Board, Palau Community College, Palau Visitors Authority, Palau Fishing Authority, the OEK, the Koror State Government, and the Palau Federation of Fisherman's Association, the Palau Boaters Association, the Palau Sports Fishing Association, the Palau Conservation Society and the Chamber of Commerce; and

WHEREAS, the execution of the project further requires that specific agencies within the government of the Republic of Palau be identified to administer and oversee implementation of each phase of the project in order to successfully coordinate the specific stages of the project with the government of Japan; and

NOW, THEREFORE, by the authority vested in me as the President of the Republic, pursuant to the Constitution and laws of the Republic of Palau, do hereby declare the following:

(1) The entire Technical Working Group as organized under the Chairmanship of the Vice President and with the administrative support of the Office of the Vice President/Ministry of Administration shall be the primary agency of the republic of Palau responsible for the preliminary implementation phase shall conclude when a final commitment to fund and construct the center has been

made by the government of Japan. The Vice President/Minister of Administration or his designated shall be the primary contact with the government of Japan during this preliminary implementation phase.

(2)The Ministry of Resources and development (R&D), reporting to the Vice President as Chairman of the Technical Working Group, shall be the primary agency of the Republic of Palau responsible for the Basic Design Study phase of the Coral Reef Research Center Project. The Minister of R&D shall work closely with the other members of the Technical Working Group for clarification about the goals and objectives of the center as relates to facilitates construction and design considerations. The Minister of R&D or his designated shall be the primary contact with the government of Japan during this Basic design Study phase.

(3)The Ministry of State, reporting to the Vice president as chairman of the Technical Working Group, shall be the primary agency of the Republic of Palau responsible for the Exchange of Notes (E/N) phase of the Coral Reef Research Center Project. The Minister of State shall be responsible to work closely with the Vice President and with the other members of the Technical Working Group to review the E/N, to brief the president of the Republic of Palau on the details of the Project as outlined in the E/N, and to arrange with the appropriate Japanese officials for the signing of the E/N.

(4)In keeping with his authority as the designated Procurement Office of the Republic of Palau to approve all construction contracts, the Director of Public Works under the Ministry of R&D shall be responsible for tendering and concluding of contracts as outlined in paragraphs 3 and 4 of E/N. The Director of Public Works shall present the contracts to the Vice President/Chairman of the Technical Working Group for review as to whether: 1)their contents conform to the Group's mission, goals and objectives for the Center, and 2)they are within the guidelines for procurement under the Japanese Grant. Upon such verification by the Vice President of Palau, the contracts, once approved by the Director of Public Works, will be submitted by him through the Vice President to the Minister of state for formal transmission to the Government of Japan.

(5)The Ministry of Administration shall be the primary agency of the republic of Palau responsible for concluding a banking arrangement with an authorized foreign exchange bank in Japan to open a special account for the purpose of receiving funds granted by the Government of Japan for the Center. The Director of Bureau of the National Treasury shall be the primary contact with the government

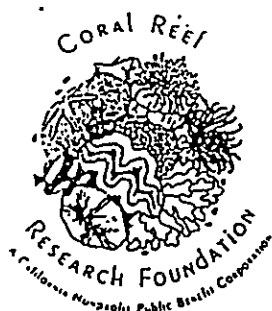
of Japan in developing and executing the banking arrangements. Under the banking arrangement, an Authorized to Pay will be issued through the Ministry of Administration as requested by the Minister of R&D for each verified contract. Every Authorization to Pay will be approved by the Vice President/Minister of Administration in his capacity as Chairman of the Technical Working Group.

(6)The Ministry of R&D shall be the primary agency of the Republic of Palau responsible for the site preparation and construction phases of the Coral Reef Research Center Project. The Ministry of R&D or his designee shall be the primary contact with the government of Japan during throughout this phase until completion of the construction of the Center.

(7)The public corporation created to operated to the Coral Reef Research Center (as identified by the Memorandum of Understanding of June 7,1996,between the Olbiil Era Kelulau and the Vice President/Chairman of the Technical Working Group) in the form that it takes under law shall be the primary agency of the Republic of Palau responsible for the operation of the Coral Reef Research Center. The Chief Executive Officer of the Board of Directors of the Corporation shall be the primary contact with the government of Japan during the follow-up cooperation phase of the project.

IN WITNESS WHEREOF, I have hereunder set my hand and affixed my official seal this _____ day of _____,1997,the state of Koror, Republic of Palau.

Kuniwo Nakamura
President of the Republic of Palau



Coral Reef Research Foundation

P.O. Box 1765
Koror, Palau 96940
Tel: 680-488-5255
Fax: 680-488-5513

Information Flyer

The Coral Reef Research Foundation (CRRF) is a non-profit organization (501(c)(3)) incorporated in the State of California and the Republic of Palau whose purposes are research and education on coral reefs and other tropical marine environments. CRRF was founded in 1991 by a group of marine biologists as a vehicle to increase human knowledge of reef environments, their inhabitants and their relationship to man. In addition to our staff, CRRF has a group of 12 research associates, prominent University scientists who have previously worked in Palau, who form a group interested in the scientific development of the Palau laboratory and future research in Palau.

CRRF now has its main base in the Republic of Palau, Western Caroline Islands, although it was previously located in Chuuk, Federated States of Micronesia. A new laboratory and residence building has been completed on Malakal Island, Koror and is a self-contained marine research facility with laboratory, shops, running sea water aquaria, storage, dock, boats and accommodations for visiting scientists. With completion of the Palau laboratory CRRF is starting a number of new research and educational programs, while continuing other ongoing projects.

One major activity of CRRF is the collection and identification of marine organisms for anti-cancer and anti-AIDS screening tests by the U.S. National Cancer Institute (NCI). This is part of a world-wide effort by NCI to find new treatments for cancer and AIDS from organisms in nature (natural products). The NCI Natural Products research program is examining terrestrial plants and marine organisms from around the world. Their plant samples come principally from rain forest areas with two contractor organizations (the Missouri Botanical Garden and the New York Botanical Society). Marine collections come principally from the tropical Indo-Pacific region with CRRF as the sole collector organization.

As NCI's contractor to provide marine organisms, CRRF sends small samples (usually 1 kilogram) of frozen marine invertebrates and plants to NCI. The actual laboratory testing is carried out at NCI's Cancer Research and Development Center in Frederick, Maryland, USA. CRRF does not collect samples for any organization (such as a pharmaceutical company) other than NCI.

For each species that CRRF collects, in addition to the frozen samples, we photograph the species underwater, take a number of voucher specimens for reference and identification purposes, and record full data as to the location and environment the species inhabits. Our collections are not limited to Palau. During the past four years CRRF has collected samples in the Federated States of Micronesia, Republic of Palau, Commonwealth of the Northern Marianas, Papua New Guinea, Indonesia, the Philippines, Hong Kong, Bahrain and Zanzibar. Voucher samples, photographs and records of all samples are deposited at the CRRF laboratory in Palau. CRRF works with specialist taxonomists from the international community to identify the collected organisms. Approximately half of the species collected are new to science and will be catalogued and described by CRRF and these taxonomists.

Member of the Western Association of Marine Laboratories

In mid-1994 a survey of the marine invertebrate fauna of the marine lakes of Palau began. CRRF is presently undertaking a complete marine faunal survey of all Palau marine environments, a project it will take several years to complete. This program is an outgrowth of the NCI screening project and will result in the eventual publication of complete volumes covering the marine invertebrates of Palau and the western Pacific. Other projects on the oceanography of reef fish spawning and marine lakes biology are just beginning.

Vertical color aerial photography for habitat mapping was completed in 1995 for the entire Chuuk Atoll and many of the outlying atolls and islands of Chuuk State using a light aircraft. Most of the reefs of this region have never been photographed from the air in color and these photographs, with base line ground truth data, will be archived to CD and published through a grant from the University of Hawaii Sea Grant program as a CD-ROM set, "The Reefs and Islands of Chuuk State" for use of government, students and scientists. Similar treatment will be undertaken for reefs in Palau starting in late 1996 and will take several years to finish.

The service-related activities of CRRF in Palau can be summarized as 1) education and 2) technical and scientific assistance. We are developing an education program in Palau, which will involve teacher training and direct interaction with students. We are hosting student interns each summer from the University of Hawaii MASSIP (Micronesia American Samoa Student Internship Program) and other local interns. We are assisting with the Community College of Palau summer marine science workshop, providing access for field trips and sea water aquaria. We also plan to offer a work study program to students. Technical and scientific assistance are offered to any government or private agency in Palau.

FACILITIES

A new laboratory building in Palau was completed in early 1996. The laboratory has offices, a voucher collection room for scientific specimens, general laboratory area, conference room, visitor's lab, and a workshop. It also has a covered area with tanks and a running sea water system. There are two dormitory rooms on top of the laboratory for scientific visitors. CRRF has three work boats for research: a 24 ft Yamaha boat with 140 HP outboard, 26 ft Marine Six boat with twin 80 HP outboards and a 21 ft Boston Whaler Outrage with a 130 HP outboard.

CRRF PERSONNEL:

Patrick L. Colin, Director/President
A. Charles Arneson, Vice President
Lori J. Bell Colin, Laboratory Manager
Larry Sharron, Chief of Field Operations
Mat Mesubed, Boatman/Collector
Emilio Basilius, Collector
Carla Salii, Collection Manager

**CRRF can be contacted in the USA at Fax: 619-464-6490.

**Summaries of Coral Reef Research Foundation
Research Program**

1996

1) National Cancer Institute (NCI) Marine Collections Program.

CRRF is the sole marine collections contractor for the U.S. National Cancer Institute drug discovery and development program whose aim is to discover new anti-cancer and anti-AIDS compounds from the natural world. CRRF is in its fifth year of this program and has collected nearly 3500 marine samples from the Pacific and Indian Oceans for screening by NCI. About 600 samples from Palau have been sent for screening with the Palau National Government fully informed of collection data and testing results. A number of promising leads have been identified from Palau and elsewhere and investigation of these for potential drug development is ongoing.

As part of its responsibilities to NCI and host country governments, CRRF documents each sample in great detail and has expert taxonomists identify each to species. Our work has resulted in a great many new discoveries in marine biodiversity and biogeography. The detailed specimens collected by CRRF has provided material which taxonomists will be using to define and identify species and their geographic distributions for many years to come.

2) Marine biodiversity of the western tropical Pacific.

As an outgrowth of the NCI marine collections program, CRRF has launched a project to document the species-level marine biodiversity of marine invertebrates the western Pacific region. This program is based in Palau and will emphasize that area, but the overall scope includes many nearby regions, including the rest of Micronesia, the Philippines and Papua New Guinea. CRRF has approximately 32 different taxonomists working on materials from the NCI collections and these researchers are presently producing a large number of new species descriptions and other treatments from the NCI samples. In addition, CRRF has several taxonomists already working on "complete" faunal surveys within their specialty groups. These will be published as a series of readily accessible volumes and CD's. Present works are in preparation on the sponges (M. Kelly-Borges and J. Hooper), ascidians (F. and C. Monniot) and bryozoans (W. Banta). Projected publication of these works is still 2-4 years away.

CRRF is presently applying to the National Science Foundation for funding to increase the scope of our marine biodiversity work considerably beyond that supported by the NCI.

3) Archiving and CD-ROM of reef photographs from Chuuk State, Federated States of Micronesia.

CRRF has a grant from the Pacific Island Program of the University of Hawaii Sea Grant to scan to CD a collection of over 2,000 vertical and oblique aerial photographs of reefs and islands of Chuuk State, FSM. The end result of this project will be a CD-ROM called "The Reefs and Islands of Chuuk State" which will be distributed to government, planners, schools, scientists and other interested individuals. The CD-ROM will contain high resolution aerial photos of the entire reefs and islands of Chuuk Atoll, plus selected islands and reefs elsewhere in Chuuk State.

4) Reef fish spawning biology and oceanography.

CRRF is studying the relationship between the spawning of reef fishes with planktonic eggs (most of the larger reef fishes) and physical/biological factors. This includes basic work on the times, places, modes, and mechanics of spawning for a large number of species. Physical factors being considered include the role of temperature, lunar phase, reef morphology, tides and currents in influencing spawning. The relative importance of modes of reproduction, such as migration and aggregation in various species, plus early life history studies both in the field and laboratory, are also under investigation. Fishes under study include wrasses, parrotfishes, groupers, carangids (jacks), surgeonfishes, angelfishes, butterflyfishes, and a number of lesser families. Support is anticipated from the National Geographic Society for this work.

5) Palau Marine Lakes Studies.

CRRF is undertaking to document the entire species-level marine biodiversity of the numerous marine lakes of Palau. This builds upon previous work for the NCI and has already included definitive surveys of the sponge faunas of several marine lakes, plus general collections in nearly all lakes. We are preparing a joint proposal with UCLA on the marine lakes, with CRRF emphasizing the species diversity and UCLA examining the limnology of the lakes, plus aspects of the physiology of lake organisms.

T. N. C.

About the Nature Conservancy

"Nature's real estate agent." That's The Nature Conservancy. Among environmental organizations, we fill a unique niche: preserving habitats and species by buying the lands and waters they need to survive.

The Nature Conservancy operates the largest private system of nature sanctuaries in the world--more than 1,500 preserves in the United States alone. Some are postage-stamp size, others cover thousands of acres. All of them safeguard imperiled species of plants and animals.

Come visit.
Walk quietly.
Listen carefully. . .
You'll see and marvel at the astounding diversity of life.

By protecting habitat, The Nature Conservancy preserves plants, animals, and natural communities. But we couldn't do it without you --literally. Through annual membership dues and special appeals such as "Adopt an Acre" or Rescue a Reef, people like you help us continue our important work.

How The Nature Conservancy Identifies Land for Protection

How rare?
How threatened?

We answer those questions in a scientific inventory so we can decide which pieces of land to buy and protect. The inventory indicates the relative rarity of plant and animal species and whether or not they are protected. Once species are identified and ranked, the areas that shelter critically threatened species become the target of Conservancy projects.

How The Nature Conservancy Protects Habitat

The Conservancy works only with willing sellers and donors. We protect land through gifts, exchanges, conservation easements, management agreements, purchases from the Conservancy's revolving Land Preservation Fund, debt-for-nature swaps, and management partnerships. The Conservancy manages the resulting preserves with the most sophisticated ecological techniques available.

Sometimes we restore habitat by prescribed burnings.
Another route is removing alien species.

Sometimes we use reforestation or fencing--or whatever technique will maintain the preserves and encourage the growth of endangered plants and animals that live there. Most Conservancy preserves are open to the public for hiking, nature study, bird watching and photography.

How The Nature Conservancy Got Started

Today, the Conservancy has protected more than 9 million acres of ecologically significant land. That tradition started with a modest 60-acre land purchase in New York state back in 1955. The Nature Conservancy emerged in 1951 from a professional association of ecologists seeking to turn their knowledge of nature into positive action for conservation.

You can download a video about how the Conservancy got started.

The Conservancy's International Program

Operating in the United States for the past 45 years, the Conservancy also has launched programs in Latin America, the Caribbean and the Pacific.

The Pacific program, headquartered in Hawaii, is identifying and protecting threatened areas in Indonesia, Melanesia and Micronesia. In Latin America, the Conservancy has joined forces with more than 45 organizations covering 22 countries to provide community development, professional training and funding for legally protected areas. The Conservancy has pioneered debt-for-nature swaps in Latin America.

The Nature Conservancy: A Scorecard

(as of December 1995)

Acres Protected in the U.S. since 1953: 9.5 million

Acres Protected outside the U.S. with TNC Assistance: 42 million

Acres Managed: 1.3 million (acres the Conservancy owns or has under conservation easement)

Membership: 828,000

Corporate Associates: 1,385

Preserves Under Conservancy Management: 1,500

Natural Heritage Inventory Programs and Conservation Data Centers: 86

How You Can Support The Nature Conservancy

As a nonprofit, tax-exempt organization, The Nature Conservancy depends on individual and corporate contributions, foundation grants, and membership dues. For more information, visit our online membership area

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The Rescue the Reef Program

Did you know...

- * Coral reefs are considered the "rainforests of the ocean"?
- * Corals are animals, not plants, made up of thousands of living organisms called polyps?
- * Corals produce a natural sunscreen which chemists are developing to market in Australia?
- * Corals' porous limestone skeletons have been used for bone grafts in humans?

The sad news is...Reefs are being destroyed by pollution, over-fishing, anchor damage, and destructive fishing practices like dynamiting and use of toxic chemicals. This fragile environment is sending an SOS to anyone who will listen. Fish populations are already down. Coral growth is slowing. If we don't help them, they'll be lost...forever.

How can you help? Join the Rescue the Reef program.

RESCUE THE REEF 10 MOST ASKED QUESTIONS

1. Why does The Nature Conservancy sponsor reefs for adoption?

Marine reefs are a beautiful and very important marine ecosystem which, like rainforests, protect a wide diversity of species. Reefs are home to one quarter of all marine species and we are still learning about the importance of reefs to land and human life. The Rescue the Reef program permits individuals to do something direct and positive to protect our reef habitats. It puts into action the Conservancy's message that there are real opportunities for individuals to make a difference. By establishing the connection between concerned individuals and the area they want to protect, The Nature Conservancy offers the opportunity to save threatened reefs.

2. May I visit the reef habitat I protect?

The Nature Conservancy is working to protect reefs around the world, and we will tell you where your reef habitat is located. While reefs such as the Florida Keys are easily accessible, others are in remote areas of the world and may be ill-equipped for visitors - so it is not always possible to visit the region. In addition, the health of an ecosystem is often dependent on its inaccessibility. The Nature Conservancy does, however, sponsor a wide range of trips to reefs and other ecosystems. You may contact the Conservancy for information about our International Trips Program.

3. How will my money be used?

The money you send for Rescue the Reef will be used to protect selected threatened reef habitats. Funds go to coral protection work in the Florida Keys, the Caribbean and the Pacific, including the costs of scientific and diver programs to identify and save rare species. In addition, a wide range of activities are financed, from installing mooring buoys to reduce boat damage, to hiring and training park rangers, conducting environmental education programs, and developing environmentally compatible methods of resource use that do not destroy the reef. Your contribution to Rescue the Reef signifies a commitment to finance the crucial protection of these areas. Your gift is tax-deductible.

4. Who will own or manage the reef habitat?

The Nature Conservancy never takes reef habitat out of local control. We are committed to developing the local capacity to manage natural ecosystems and the resources to permanently protect areas that are threatened. All conservation programs we support are monitored by the Conservancy and are carried out by local conservationists in private and public conservation

organizations. The reef you protect will be managed by a local private conservation group or may become part of a marine park or reserve protected by the government.

5. What does my Deed signify?

It is an honorary deed only. It does not signify ownership but something much more important: your commitment to do something specific and tangible to save a critical and threatened ecosystem: the coral reef communities of tropical waters.

6. How can I find out about the reef I protect?

Once you protect a reef, The Nature Conservancy will send you information about the area where it is located. This will include information about new discoveries of marine plants and animals, as well as the work being done to protect the area. Two or three times a year, you'll receive a Reef Brief written by our local conservation partners describing the focus and successes of their conservation activities.

7. How can I be sure that the reef I rescue is really being protected?

The Nature Conservancy works hard to carefully choose the projects and partners we work with. The reef you protect is located in a key area where a real opportunity exists to identify endangered species and establish lasting protection. In the Reef Brief, you will be able to read about the actual results that are being achieved with your investment. If the Conservancy is working there, you can be sure there is an excellent chance of success.

8. How did you arrive at \$35 for rescuing a reef habitat?

We have developed a specific budget for each Rescue the Reef site. Each budget includes the expenses for the project such as: scientific and diver programs, mooring and coral protection safeguards, community education and reef management. Analyzing the budgets of past and current successful projects, we have calculated the median figure for funding protection efforts for a "typical" reef habitat.

新資料の
保全費。

9. How does Rescue the Reef differ from other marine protection efforts?

Ocean reef destruction is caused by so many different factors - many of them originating on land - that a wide variety of efforts are needed to fight the problem. Lobbying, education and public awareness have all been utilized to attack reef destruction, and many other kinds of efforts are needed. The Rescue the Reef program has one main purpose: to provide funds to actively protect threatened coral reefs and the species that depend on them.

10. Why should we care about reefs?

We are only just learning how much we rely on ocean reefs and other natural ecosystems. We know that reefs are an important human food source and provide at least ten percent of all fish consumed by people. Reef species are being widely researched as the basis for important medical products, especially for cures of diseases like cancer and AIDS. Reefs also provide barriers from coastal erosion and provide key recreation and vacation areas. Reefs are often home to as many plants and animals as are rainforests, and reef habitat is being destroyed at an alarming rate.

Yes! I'd like to join the Rescue the Reef Program

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Help Preserve Palau's Natural Resources for our Children

Join The Palau Conservation Society Today!



Yes! I want to help Palau grow wisely in the years ahead. Enclosed are my membership dues for this year.

___\$100 Associate Member ___\$30 Regular Member ___\$10 Student or Senior Citizen

Name: _____ Date: _____

Address: _____

Phone: _____ Organization Affiliation: _____

Membership is now open to the public. If you are interested, please fill out the application above and return it to the PCS office in the Fujiwara building on the road to M-dock or contact Noah Idechong or Lucia Tabelual for more information:

Palau Conservation Society P.O. Box 1811 Koror, Republic of Palau 96940 Phone: (680) 488-3933 / Fax: (680) 488-3990

By joining PCS now, you will help ensure that constructive development of our islands preserves the beauty, serenity and economic viability of Palau for ourselves, our children and all who visit our islands.



BOARD OF DIRECTORS

- Dr. Minoru F. Ueki, *Chairperson*
- Maura Gordon, *Vice-Chairperson*
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- Maura Gordon
- Dr. Minoru F. Ueki
- Noah Idechong
- Sandra S. Pierantozzi

CONTACT:

Noah Idechong, Executive Director
P.O. Box 1811
Koror, Palau 96940
Tel. (680) 488-3993 / Fax (680) 488-3990



Palau Conservation Society

Promoting a Sustainable Future

The History

Palau Conservation Society was incorporated on June 16, 1994 in order to encourage and facilitate community participation in decisions that affect Palau's environment.

This new non-government organization is working to protect Palau's environment through public awareness, research, and the promotion of sustainable development policies.

The success of PCS can be traced to its non-confrontational approach and to its strong partnerships with local communities, government agencies, and the international scientific community.



One of the many natural scenes the Palau Conservation Society is working to preserve.

Children at Harris Elementary School enjoy a Palau Conservation Society puppet show and learn about conservation at the same time.



Mission

The mission of the Palau Conservation Society is to work with the community to preserve the nation's unique natural environment and perpetuate its conservation ethic for the economic and social benefit of present and future generations of all Palauans and for the enjoyment and education of all who visit our islands.

Goals

- To preserve the unique natural environment of Palau
- To build local community support and public awareness about the benefits derived from protecting Palau's natural systems and environment
- To develop and promote desirable economic development

Activities

- **Public awareness:** PCS is conducting a conservation awareness campaign centered around Palau's national bird, the *biib*. Using puppet shows, school songs, music videos, and posters that have touched virtually every school child in Palau, the project aims to foster pride in the national bird and to highlight the values of the environment on which the bird depends.
- **Research:** As part of a research team that includes government agencies, international scientists, and local communities, PCS is studying the timing and behavior of grouper spawning aggregations so that the populations of these important food fishes can be easily monitored in the future. PCS is also part of a coral reef monitoring program aimed at tracking the rate of sedimentation on the reef and assessing the effects of sedimentation on coral reef health.
- **Resource Management:** PCS is assisting several states in the management of their marine resources, including the establishment of conservation areas in the Rock Islands. PCS is promoting the development of an inshore tourist-based sport fishery in order to gain a greater return from these resources.
- **Policy Development:** Working closely with state and national leaders, PCS is promoting policies that will encourage the best use of Palau's limited natural resources. The most critical current issues relate to Palau's economic development, including tourism, fishing, and the pace of physical development. The environmental effects associated with road building, sewage, and solid wastes, for example, are of particular concern to PCS.

収集資料リスト

1. 1995年 州別所得分布表
2. 1993～1996 入国者数統計
3. 1992～1996 関係省庁予算及び公共事業局組織図
4. 環境保全令
5. 気象条件データ
6. パラオ共和国諸島図

