

The Economic Impact of a proposed

# Mariana Trench Marine National Monument

An Exploratory Study

Thomas Iverson, Ph D.  
Tom Iverson & Associates

June 30, 2008

# TABLE OF CONTENTS

Abbreviations and Acronyms.....	ii
Acknowledgments .....	iii
Executive Summary.....	iv
Preface .....	vi
Introduction.....	1
Assumptions.....	4
Method.....	5
Comparison with the Papahānaumokuākea Marine National Monument (PMNM) and NOAA’s Sanctuary Program .....	6
The “Value” of the MTMNM.....	8
Benefits to the CNMI of the MTMNM.....	10
Costs to the CNMI of the MTMNM.....	13
Discussion and Recommendations .....	17
Postscript .....	18
References.....	20

# ABBREVIATIONS AND ACRONYMS

AG – CNMI Attorney General’s office

AMP – American Memorial Park (Saipan, Commonwealth of the Northern Mariana Islands)

CBA – Cost Benefit Analysis

CNMI – Commonwealth of the Northern Mariana Islands

DFW – CNMI Department of Fish and Wildlife

EEZ – Exclusive Economic Zone

FY – Fiscal Year

MTMNM – Mariana Trench Marine National Monument

MVA – Marianas Visitors Authority

NOAA – National Oceanic and Atmospheric Administration

PMNM – Papahānaumokuākea Marine National Monument

TEV – Total Economic Value

USFWS – US Fish and Wildlife Service

WPA – Willingness to Accept

WTP – Willingness to Pay

# ACKNOWLEDGEMENTS

This study was funded by The Pew Charitable Trusts' Ocean Legacy Program. The analyses and opinions herein do not necessarily represent the opinions of The Pew Charitable Trusts, but are solely the viewpoints of the author.

The author would like to thank Jay Nelson, Angelo Villagomez, Laurie Peterka and other representatives of the Pew Environment Group for their assistance in data collection and providing open access to their wealth of information. Frank discussions with academic leaders at the Northern Mariana College were helpful, and I appreciated the insights of Carmen Fernandez and Samuel McPhetres and the probing questions of Eric Plinske. Representatives of the CNMI departments of Commerce and Finance were quick to provide current data and reports. Ken Kramer and Ruth Tighe provided helpful comments on the final draft.

While this was not an official University of Guam project, I would like to thank Dr. Anita Enriquez, director of the School of Business and Public Administration, for her aggressive support of faculty consulting within the proper context, particularly when it enriches our teaching and involves our students. The public presentation of the draft report was greatly enhanced by the involvement of my colleague, Dr. John Salas.

# EXECUTIVE SUMMARY

- A decision will be made, in 2008, regarding whether or not President George W. Bush will consider designating a vast ocean area, in the northernmost part of the CNMI archipelago, as a U.S. National Monument. For the purposes of this report, the proposed name of the area is the Mariana Trench Marine National Monument (MTMNM).
- The area of the MTMNM is about the size of the state of Arizona. The islands surrounded by the waters of the Monument are currently uninhabited and are protected under the CNMI constitution. While the land mass of the three islands is within the CNMI jurisdiction, current case law places the EEZ surrounding the islands in federal jurisdiction. Any economic activity within the EEZ, therefore, would be subject to federal law but could potentially be shared with the CNMI through negotiated agreements.
- This study was commissioned in April of 2008 to ascertain, quickly, a profile of the economic benefits and costs of the MTMNM in relation to the economy of the CNMI. As most federal monuments are land-based, the recent designation of the Papahānaumokuākea Marine National Monument (PMNM) provides the best base of comparison, particularly since the PMNM is administered, along with over a dozen marine sanctuaries, by the National Oceanic and Atmospheric Administration (NOAA). These sanctuaries range from a single bay in American Samoa, which is funded at approximately half a million dollars each year, to the PMNM, which attracts almost \$10 million in basic annual funding. As the largest of these sanctuaries, the PMNM attracted global media attention when it was announced in 2006.
- The MTMNM would be the second-largest marine preserve in the world and would attract substantial media attention if designated by President Bush. This is because a moniker, the “Blue Legacy,” would be promoted in recognition of several efforts by President Bush to preserve ocean resources. The subsequent publicity would instantly create an image for the CNMI as one of the world leaders in oceanic environmental protection. Within this context, the Ocean Legacy program, a consortium led by the Pew Environment Group, commissioned the current study to provide substantive economic analysis to the citizens of the CNMI.
- Economic benefits accruing to the CNMI were estimated from the contributions of a) federal funding to support the monument activities (enforcement, education, etc.), b) the increase in visitor arrivals due to the immediate and continued media attention, and c) the natural increase in federal and NGO funding that typically follows such a designation. Relatively conservative assumptions were made regarding the scale of the federal operation of the MTMNM and the growth in visitor arrivals. For example, the base budget for the MTMNM was estimated at about 25 percent of the FY 2007 budget for the PMNM. Due to time constraints, estimates were not separately calculated for the likely spending of research scientists and high-end nature tourists who might actually visit the site, perhaps through a staging area on Pagan or other CNMI islands closer to the site (Saipan is approximately 300 miles from the MTMNM). Still, by assuming federal funding below the average of NOAA-administered sanctuaries and a 2 percent increase in visitor arrivals, the MTMNM would generate in excess of \$10 million in spending, over \$14 million in sales (via the sales multiplier), almost \$5 million in tax revenues and account for almost 400 jobs.
- Estimating the opportunity costs of the MTMNM is more difficult. Since there currently is no economic activity in the area, one must speculate about future potential. Some potential projects would not be compatible with the current constitutional protection or the MTMNM designation, such as mineral extractive leases.

Fishing leases could possibly be negotiated with foreign fleets, but would not be allowed in the monument area under the typical management regulations for sanctuaries, so these must be viewed as opportunity costs. Other potential revenues could possibly come from activities that might be compatible with the MTMNM regulations, such as pharmaceutical bio-prospecting. Job analysis is also awkward here, as foregone jobs due to a fishing ban in the MTMNM waters would be offset by additional jobs necessary to co-manage the monument.

- Understanding that some of the benefits and costs could not be estimated, those that remain would likely result in annual benefits of approximately \$10 million in spending in comparison with annual costs of perhaps \$1 million. If one assumes that fishing operations would be sustainable and the Monument would continue to attract nature tourists, these benefits and costs would continue, much the same as annuities. Discounting these flows into the present, with a 3 percent cost of capital, would result in present values for the benefits in the area of \$333 million and the costs, perhaps \$33 million.
- A different perspective was generated by asking the question: What value of leases for non-compatible activities would be necessary to shift the balance? In other words, how much money would have to accrue through extractive mineral leases to compensate the people of the CNMI for giving up their option value for future generations and exploiting the area? Using the same assumptions as the prior models, a value of just over \$7 million in leases with an aggressive growth rate of 10 percent over fifteen years would be required to equal the perceived benefits of the monument designation. To be clear, what is considered here is the abandonment of the constitutional protection of the three islands and selling off the resources to mineral or bio-prospectors. To compare with the revenue stream of a working monument, the leases for these extractive activities would have to be in the neighborhood of \$7 million over fifteen years, with a 10 percent growth rate each year. But at that point the resource may be depleted and revenues would stop. The MTMNM benefits, in contrast, would be provided in perpetuity.
- All economic analyses require assumptions and incorporate uncertainty, and the estimates in this report are particularly sensitive to assumptions. The models remain quite simple in structure and may be easily modified by substituting one's own assumptions.
- Some of the issues raised in the CNMI regarding this proposal are concerns about the timing and intentions of the federal government. Understanding these concerns is one thing, but modeling them in economic analysis is very difficult. It would require extensive surveys that would be quite expensive and would produce results subject to a wide range of interpretation. In a qualitative sense, though, these concerns should be considered as costs.
- The economic benefits to the CNMI have a wide range of possibilities and are dependent on the ability of the relevant institutions to make the most of the prospect. The Marianas Visitors Authority could consider the re-branding of the CNMI, or the need to promote outside traditional market segments to maximize the tourism potential. Government agencies would want to ensure that they had a seat at the table in a co-management scheme. The executive and legislative branches would need to see what resources they could devote to leveraging this status into economic opportunities for local people – the staff who could earn federal salaries and benefits, the bus drivers and tour operators who would bring both tourists and local school children to the educational displays at the visitors center, the support staff and new tourism businesses that would cater to the research scientists and high-end tourists, and so forth. The ultimate economic impact to the CNMI would depend on the ability of these actors to support and leverage the opportunity.

This study was commissioned in April of 2008 to ascertain, quickly, a profile of the economic benefits and costs of the MTMNM in relation to the economy of the CNMI.

# PREFACE

In 1995, a blue-ribbon panel of economists from MIT, Harvard, and other major universities and institutions, led by the distinguished Kenneth Arrow (then at Stanford), met to discuss the role of economic analysis in the field of environmental, health, and safety regulation. Like the proposed national ocean monument in the CNMI, the impact of regulations cannot be predicted with any certainty. Nonetheless, benefit-cost analysis “...can help illustrate the tradeoffs that are inherent in public policymaking as well as make those tradeoffs more transparent” (Arrow et. al, 1996, p. 1). However, they note that:

“Not all benefits or costs can be easily quantified, much less translated into dollar terms. Nevertheless, even qualitative descriptions of the pros and cons associated with a contemplated action can be helpful.”  
(Ibid, p. 2).

It is thus important to list and specify important factors which, for various reasons, may not be measurable but still important to a decision. These economists were emphasizing the reality that economics is both art and science, and one should not expect certainty:

“In many cases, benefit-cost analysis cannot be used to prove that the economic benefits of a decision will exceed or fall short of the costs. There is simply too much uncertainty in some of the estimates of benefits and costs to make such statements with a high degree of confidence.”  
(Ibid, p. 3, emphasis added).

But this does not diminish the role of benefit-cost analysis:

“The estimation of benefits and costs of a proposed regulation can provide illuminating evidence for a decision, even if precision cannot be achieved

because of limitations on time, resources, or the availability of information.”

(Ibid, pp. 3-4).

Properly viewed, then, benefit-cost analysis is a tool that aids decision-making. The group of scholars went on to address the scale of such a study:

“A full-blown benefit-cost analysis, however, can be costly. Therefore, the agency should not perform the analysis unless there is some likelihood that doing so will actually inform the regulatory decision.”  
(Ibid, p. 5).

Also, in discussing a preliminary benefit-cost analysis (such as this report), they argue:

“Such a benefit-cost analysis will, of necessity, be quite rough since it is difficult to estimate the economic impact of a proposed law before the regulations based on the law are written. Although a full-blown benefit-cost analysis may not be warranted in many cases, a rough benefit-cost analysis will often be quite useful.”  
(Ibid, p. 6).

This was the spirit in which this work was undertaken. Time was limited, but secondary analysis of existing data could provide a framework for discussion of the economic impacts of the proposed Mariana Trench Marine National Monument.

# INTRODUCTION

Most of the 96 national monuments designated under U.S. law are on land. The majority are managed by the National Park Service, though some are administered by the Bureau of Land Management and other agencies. At this point neither the name of the proposed Mariana Trench Marine National Monument (MTMNM) nor the management structure has been determined. For guidance one could review the process of the recently designated Papahānaumokuākea Marine National Monument (PMNM), which is placed within the purview of the National Oceanic and Atmospheric Administration (NOAA) for budgetary purposes.

While disconcerting to many, the administrative details of a monument are not completely worked out prior to designation. In the case of the PMNM and a NOAA-administered sanctuary program in American Samoa, a Memorandum of Agreement (about 10 pages) was created to establish co-management procedures. For PMNM, the U.S. Fish and Wildlife Service (USFWS) is also a co-manager, along with the State of Hawaii. The jurisdiction of the proposed monument would likely be shared to some degree among the Department of Commerce’s NOAA, the Department of Interior’s USFWS, and the CNMI. For budgetary purposes Hawaii’s PMNM falls into the NOAA-administered Sanctuary Program, so that framework will be used in this report.

The objective of this study is to outline the economic impact of a proposed marine national monument, consisting of the waters around the three northernmost islands of the archipelago known as the Commonwealth of the Northern Mariana Islands (CNMI). The three islands, Farallon de Pajaros (also known as Uracas), Maug, and Asuncion, belong to the CNMI and are currently protected by the CNMI constitution. They are uninhabited, and landing on them without a permit is prohibited.

Figure 1 shows a regional view of the CNMI, which is about 1,400 miles south of Japan. The proposed monument would be approximately 115,000 square miles, making it the second-largest marine sanctuary in the world. The area is similar to that of the state of Arizona and greater than the area of Nevada or Colorado.

Uracas, Maug and Asuncion are uninhabited and more than 300 miles away from the population centers of Saipan, Rota, and Tinian. There is no commerce, transshipment, or other use of these islands; instead, they are preserved under the CNMI constitution:

*“The islands of Maug, Uracas, Asuncion, Guguan, and other islands specified by law shall be maintained as uninhabited places and used only for the preservation and protection of natural resources, including but not limited to bird, wildlife, and plant species” (CNMI Constitution, Article XIV, Section 2).*



Figure 1. Regional view of the CNMI, which is about 1,400 miles south of Japan.

The economic impact of the “Monument” designation would primarily occur in Saipan and to a lesser extent in Rota and Tinian, assuming future expansion of visitors centers in those locations. Each of the NOAA-administered marine sanctuaries conducts visitor education activities, sometimes in cooperation with other agencies. Consider-

## A Presidential declaration of a new national monument would receive worldwide attention.

ing the remote nature of the MTMNM (300-400 miles from Saipan), the visitors center would be the primary interface for those interested in learning more about the Monument. There could also be an impact on Pagan, or another of the islands closer to the proposed monument, which could be used as a “staging area” to bring scientists and high-end tourists to view the ocean monument.

The main body of this report begins with brief sections that describe the assumptions made in conducting the study and the methods used in the analyses. Then some comparisons with existing marine sanctuaries are made. These existing

models are then used to estimate an appropriate scale for the proposed Mariana Trench Marine National Monument (MTMNM). Administrative offices and a visitor education center would constitute the primary infrastructure. This permits an estimate of the Annual Federal Commitment to the MTMNM, which is one of the components of the economic impact.

A Presidential declaration of a new national monument would receive worldwide attention. When the Papahānaumokuākea Marine National Monument was designated, all major news services around the globe picked up the story. While the MTMNM would be the second-largest preserve, the connection to the well-known Mariana Trench and global interest in President Bush's role may add to the allure. The estimation of the economic impact of this media exposure is error-prone, as it is very difficult to forecast the impact of unique events. Nonetheless, there are some measures that can result in an approximate valuation of the media exposure.

The collage features several newspaper clippings:

- Cyber Dive News Network** (June 15, 2006): "Northwestern Hawaiian Islands to become world's largest marine reserve".
- AMERICANWAY** (March 7, 2007): "Monumentally deep".
- THE AUSTRALIAN** (June 16, 2006): "Hawaiian islands become huge sanctuary and a US monument".
- BBC**: "Bush creates new marine sanctuary".
- THE TIMES** (June 16, 2006): "Marine animals given biggest playground as Bush turns greener".
- The China Post** (June 16, 2006): "Bush creates Hawaiian marine sanctuary".

Each clipping includes headlines, sub-headlines, and short paragraphs of text, often accompanied by small images of marine life or maps of the islands.

Media coverage from the designation of the Marine National Monument in the northwestern Hawaiian Islands.

Media exposure does not have economic impact, though, unless it is acted upon. “Conversion studies” attempt to identify those who have been targeted by advertising programs to see what portion of them actually act on the advertising message. Such a study is not very accurate, a priori, but assumptions may be made about potential increases in visitor arrivals to the CNMI due to the publicity associated with the Monument and, with some speculation, in future years due to the announcement of scientific discoveries. Readily available data on visitor spending in the CNMI may be used to approximate the Increased Visitor Spending impact.

While some of the visitors would be researchers, the economic impact of the scientific component of the MTMNM is discussed separately, along with the high-end tourism. These are quite speculative, as early discoveries could spur a growth in activities. Current grants and research are quite small, and it is not hard to imagine substantial increases in funding from federal agencies and NGOs. An estimate of new research funds coming to the CNMI is provided as Scientific and Ecotourism Spending.

Costs of the proposed MTMNM generally fall into two areas. Foregone opportunities, while minimal due to the existing constitutional protection of the three islands, are mainly seen in the possible loss of fishing lease revenues. Other costs would occur as a by-product of the economic expansion, including government officials to “sit at the table” in co-management, additional health and public safety officers, and so forth. It must be noted that this site is very unusual in that there is no economic activity to “trade off” against the MTMNM proposal. There is no habitation, no industry, no commerce, and little visitation. Thus, where other jurisdictions have had to weigh, say, the loss of a timber industry to preserve a forest, there is no economic activity of any nature to lose if the islands are declared a monument. Where some studies would attempt to measure the “bequest value” of the islands, even this is moot since they are being preserved for future generations.

While some studies attempt to measure the “Total Economic Value” of natural resources (e.g., reefs), the more common approach for parks and monuments is to measure spending and the consequent multiplier effects within the economy. After summarizing the benefits and costs of the MTMNM, some recommendations are made for maximizing the potential to the CNMI.

## Caveat

Secondary analysis relies on prior studies and current economic data. While all states have econometric models of some degree, and many have regional economic models, the territories have been somewhat neglected in the funding and the prioritization of economic modeling. A reasonable summary statement, written earlier this year, demonstrates the caveat required when interpreting CNMI data:

### Summary of Current Economic Conditions in CNMI

The CNMI does not yet have in place macroeconomic data collection and accounting systems technology capable of generating information on total output and its components on a monthly or quarterly basis. As a result, there is not a way to provide objective measures of productive capacity, capacity utilization, employment, wages or unemployment rates. The Census Bureau’s International Programs Center, with the participation of staff from the CNMI Department of Commerce, works on estimates of GPD for the CNMI; however, these estimates have not yet been released. In the absence of complete and accurate macroeconomic data, there is no objective method to gauge the level of aggregate economic activity, the level of employment it supports, or other important measures such as total personal income, consumption, savings and other metrics that explain the well-being of the population and the average citizen. The information vacuum continues to be an obstacle to an objective and comprehensive assessment of the economy and its productive capacity. The lack of such data are especially a barrier to assessing the current and future impact of the recent and scheduled increases in the minimum wage.”

*Impact of Increased Minimum Wages on the Economies of American Samoa and the Commonwealth of the Northern Mariana Islands*, prepared by the Office of the Assistant Secretary for Policy, U.S. Department of Labor, January, 2008, p. 35.

# ASSUMPTIONS

**“It is very important in conducting a benefit-cost analysis that agencies spell out all key assumptions clearly and highlight uncertainties.”**

(Arrow et. al, 1996, p. 10).

Forecasting the future is subject to errors due to unique events, such as natural disasters, and complicated by non-linear growth and decay patterns. Economic projections must be based on assumptions regarding various states of being. Otherwise one would engage in endless “what if?” games and end up in a quagmire. An advantage of explicitly stating the assumptions for this report is that one might adjust the figures if things change. The primary benefit is to forestall arguments for costs or benefits that are purely speculative in nature.

## 1. Revenues from extractive activities (mining, leasing rights to pharmaceutical companies) are not estimated in this study.

These issues have been raised, however, and should be included in the discussion in a qualitative sense. The technology of sea mining is still quite primitive but at least one company (Nautilus Minerals) will be testing the marketplace with an extractive operation in Papua New Guinea, with some evidence of commercial success by, perhaps, 2010. U.S. waters would probably not be the first targets for this type of operation, other things equal, due to the more restrictive regulatory burden in comparison with developing countries. Assuming this technology would be commercially viable, there is the potential for the CNMI to forgo this potential revenue source in the waters around these three remote islands. Extractive activities in the sea bed in these waters would not be compatible with the preservation concept of the MTMNM, so this possibility must be considered as an opportunity cost of the MTMNM designation in a qualitative sense. Some estimates of the lease value required to offset potential MTMNM benefits are possible and will be discussed later.

Bio-prospecting is not as clear in the sense of conflicting with the preservation provisions and conceivably could be conducted within the framework of a management scheme for the Monument. Ownership remains an issue, as the current legal status places these assets in the portfolio of the U.S. government.

These things change, so there is some probability that discoveries could be made, that sustainable practices could extract wealth from the MTMNM, and that CNMI could negotiate for a portion of that income. This is highly speculative but will be addressed in the benefit-cost summary in a qualitative sense.

## 2. The CNMI has no jurisdiction over the EEZ surrounding the proposed monument, thus fishing leases would have to be negotiated with the U.S. government.

This is based on United States (U.S.) District Court for the Northern Mariana Islands: Commonwealth of the Northern Mariana Islands v. United States of America, No. 99-0028 (Aug. 7, 2003). This is an important assumption because of the concern that some important property rights may be “lost” if the MTMNM is put into place.

For the purposes of the study, the assumption is that a renewable resource, such as the fishery, might be leased out, in accordance with the Magnuson-Stevens Fishery Conservation and Management Act, and a somewhat arbitrary percentage of that lease would accrue to the CNMI through good-faith negotiation with the U.S. government:

“It is recommended that the CNMI pursue full exploitation of pelagic resources within the CNMI’s Exclusive Economic Zone (EEZ) upon resolving its jurisdictional dispute with the federal government...to allow Japanese longline and pole-and-line vessels access to the EEZ...in return for regular annual payments amounting to approximately \$500,000. However access should be limited to the EEZ seaward of 50 miles to ensure the preservation of some pelagic resources for use by the domestic commercial, charter boat, recreational, and subsistence fishers.”

*An Economic Study for the Commonwealth of the Northern Mariana Islands* (1999), p. 8

Note that if a 3-mile or 12-mile zone were established for CNMI, this would not affect the analysis for a fishing lease, as the recommendation is to confine this to “seaward of 50 miles.”

## 3. Inflation and linearity.

Precise studies would take into account the effects of inflation and the non-linearity of most spending flows. The estimates in this study are quite speculative, so ‘fine tuning’ them in this regard is not very productive. For example, economic models of fisheries show cycles of overfishing with consequent bans that allow the stock to rebuild, and so forth. These complex models may not be fitted with CNMI data, as it does not exist, so linearity is generally assumed.

# METHODS

**Literature Review** A wide range of literature was reviewed, including documents from the existing sanctuaries, publicly available data from the CNMI, and books and articles specific to marine resource valuation.

**Desk Review** The desk review was quite expedited, while thorough, and completed in three weeks. It should be noted, though, that the researcher has recently reviewed books in this area and has a comprehensive set of economic modeling literature specific to the Micronesian region.

**Internet Search** The Internet was used to capture common definitions and to obtain evaluation methodologies specific to parks and monuments. The specialized list server TRINET was used to poll the leading tourism researchers in the world.

**Secondary Data Analysis** There was no primary data collection for this project. Secondary data analysis was conducted on CNMI government documents and recent economic reports. In the case of economic multipliers, some adjustments were made to what were considered overly optimistic or poorly constructed measures of the multiplier effect.



Maug Island. Photo courtesy of NOAA, Pacific Islands Fisheries Science Center, Coral Reef Ecosystem Division. Photographer: Russell Moffitt.

**Model Building and Refinement** Simple models were constructed to examine the direct, indirect, and induced effects of the potential spending. Some adjustments to existing models were made where they appeared to overstate the benefits to the CNMI of visitor and other “outside” spending.

**Existing Plans and Economic Environment** To the extent feasible, the models developed were viewed in relation to current economic plans for the CNMI, such as the Strategic Initiatives for 2006-2010 (Strategic Economic Development Council – May 2006). Current data on the structure of the CNMI economy were used to ensure that future activities were in concert with current labor conditions and overall economic trends.

# COMPARISONS with the Papahānaumokuākea Marine National Monument (PMNM) and NOAA's Sanctuary Program

A useful starting point, to position the MTMNM, is to compare the proposed monument with existing marine sanctuaries and monuments. The Papahānaumokuākea Marine National Monument (PMNM), designated a monument by President Bush in 2006, is the largest protected marine area in the world. It is administered in a co-management operation with two federal agencies and the State of Hawaii. The MTMNM would be the second-largest protected marine area in the world and, if designated by President Bush, would attract significant media attention for CNMI.

The Northwestern Hawaiian Islands were first designated an ecosystem reserve by President Clinton in 2000. When President Bush declared the area to be a monument, in 2006, MSNBC News reported that:

“National monument status would provide much stronger, and nearly permanent, protection. Unlike the area’s current ecosystem reserve status, monument status comes with permanent funding and cannot be easily changed or revoked by a new president.” (emphasis added).

A comparison of the two monuments is provided in Table 1. If these ocean preserves were compared to the fifty states, both would be in the top 10 in terms of area. While the waters of the MTMNM are relatively unexplored, there has been considerable research conducted in the PMNM. The Monument supports more than 7,000 marine species, and at least a quarter of these are unique to Hawaii. Researchers have identified important habitat for endangered species, including Hawaiian monk seals and hawksbill, leatherback, and green sea turtles. It is a nesting area and feeding area for an estimated fourteen million Pacific seabirds.

With an area four-fifths the size of PMNM, one would expect that unique species and new discoveries will be highlighted in the early scientific exploration of MTMNM. More important, though, may be the location of the MTMNM along the Marianas Trench, famous for being the deepest part of the ocean and the deepest location on the surface of the Earth’s crust.

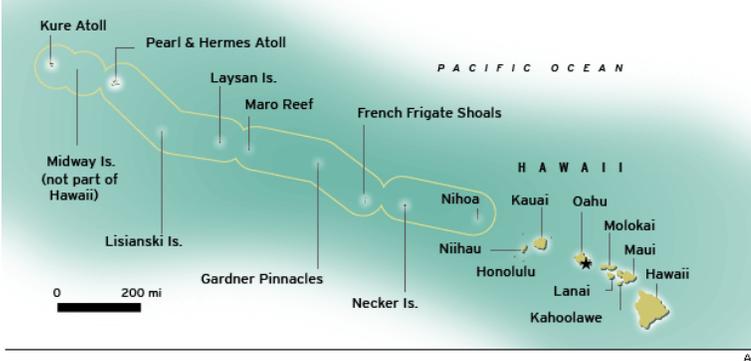
TABLE 1

## Comparison of PMNM and MTMNM

Papahānaumokuākea	MTMNM
139,000 square miles	115,000 square miles
7,000 species	? (Mariana Trench)
Size of California (Third largest US state)	Size of Arizona (Sixth largest US state)
The area was named by the U.S. television show Good Morning America and newspaper USA Today as one of the “New Seven Wonders of the World.”	Media Coverage for the second largest marine preserve?

### Preserving Hawaii's remote coral reefs

The Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, a pristine natural area, is home to species of seabird, fish and marine mammals unique to Hawaii.



Comparison is tricky, in this sense. “Number 2” never seems to have the status of “Number 1,” but the scientific discoveries along the Mariana Trench may be more newsworthy and, in the long run, attract more scientific attention than the PMNM.

Administratively, one would place the MTMNM in the framework of sanctuary management as administered by the Department of Commerce’s National Oceanic and Atmospheric Administration (NOAA). While the PMNM is co-managed by NOAA, the U.S. Department of Interior’s Fish and Wildlife Service (USFWS), and the State of Hawaii, for budgetary purposes the PMNM is included in

the NOAA-administered Sanctuary Program. Table 2 shows the existing sanctuaries, plus PMNM and the average of the field site budgets.

**TABLE 2**

**Regional Budgets for the NOAA-administered Sanctuary Program\***

REGIONS/FIELD SITES	FY 2008
Northeast & Great Lakes Region	\$ 492,000
Thunder Bay	2,473,000
Stellwagen Bank	1,820,000
Monitor	981,000
Southeast & Gulf of Mexico Region	631,000
Gray's Reef	1,171,000
Florida Keys	5,480,000
Flower Garden Banks	1,902,000
West Coast Region	1,007,000
Channel Islands	2,342,000
Monterey Bay	5,420,000
Gulf of Farallones	2,636,000
Cordell Bank	1,427,000
Olympic Coast	1,747,000
Pacific Islands Region	564,000
Fagetele Bay	410,000
HI Humpback Whale	3,325,000
Papahānaumokuākea Marine Nat'l Monument	7,050,000
<b>Average of all field sites</b>	<b>\$2,727,429</b>
Mariana Trench Marine National Monument	(proposed) \$1,670,000

\* Excluding headquarter funding (training, technical assistance, etc.)

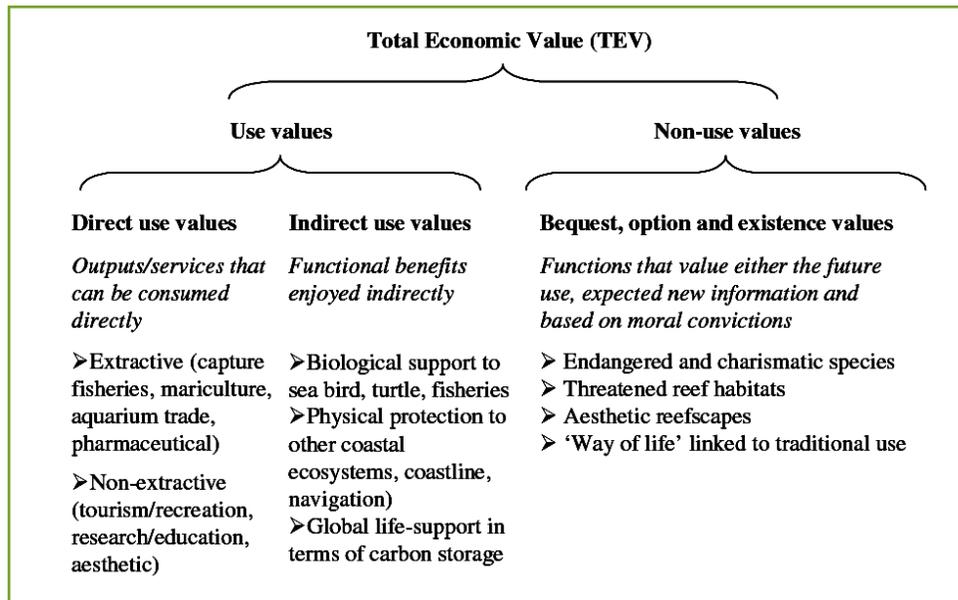
The MTMNM would be administratively within the Pacific Islands Region of the National Marine Sanctuary Program, which currently includes one sanctuary and one monument in Hawaii and one sanctuary in American Samoa. Administration of the MTMNM would be in the CNMI, most likely on Saipan. Note that the Pacific regional office in Hawaii has its own budget; some of these funds would most likely be spent in the CNMI.

Where would the budget for the MTMNM fall within this framework? Some are of the opinion that the second-largest sanctuary should receive at least 50 percent of the budget of the PMNM. However, even though the budget for these programs has been increasing in recent years, the political situation may put a damper on these expectations.

With the dual pressures of the Iraq War and the rising cost of fuel and basic commodities, there is quite a bit of pressure on the federal budget. CNMI, in comparison to Hawaii and the other sanctuaries, has much less political “clout” when funding is on the table. Thus, while it is a judgment call, the estimate here is for a conservative placing in the bottom half of the list, with initial funding of \$1,670,000. It must be noted, though, that the FY 08 budget allocation does not represent the total funding of the sanctuaries. Other funds from co-managers and other federal budgets are likely to bring the total to \$3,000,000 or so. This budget and projected future annual budgets to support the MTMNM are summarized as the Annual Federal Commitment. Before turning to benefits and costs, though, it is useful to discuss what some term the “economic value” of the MTMNM.

# THE "VALUE" OF THE MTMNM

Some economists would measure the total value of a natural resource in this framework:



*The economic value of Guam's coral reefs*  
(Beukering et. al 2007)

Note that use values include extractive activities. Fisheries, ocean mining, and bio-prospecting would also fall into this category. If ocean mining becomes more economically feasible in the future, the remote location of the MTMNM and the U.S. federal regulatory agencies would likely deter potential mining operations. However, both mining and pharmaceutical "options" have some value. Bio-prospect-

ing for unique and/or highly valuable species would be more compatible with the design of the MTMNM and not necessarily prohibited. The improved access to the waters of the MTMNM could lead to important new discoveries in this area. Ownership is an impediment still, as the current legal status places this undiscovered wealth within the property rights of the United States government.



Underwater habitat of Maug Island. Photo courtesy of NOAA, Pacific Islands Fisheries Science Center, Coral Reef Ecosystem Division. Photographer: Russell Moffitt.

Non-extractive uses may be valued by comparison with the PMNM, which allows limited research under a strict permitting system and tightly controlled tourism. It is important to note that the educational use of the monument does not require visitation, and instead could be constructed on Saipan, Rota, and Tinian in the form of visitor education centers. Unfortunately, the PMNM is still evolving and formal studies of the spending or discoveries by on-site researchers there have not been published.

Indirect uses are more difficult to measure, but there is evidence that deep sea fisheries, for example, require more time to regenerate: "As a result of their slow growth and low reproductive rates, deep-sea fish are the most vulnerable of all fish to over-fishing" (Gordon et. al, 1995). There is a value associated with a fishing ban in the Monu-

ment area. Sanctuaries, in other words, support fisheries by offering a refuge that increases the fish stock, which might then migrate into areas that allow extractive activities. While important, these values are difficult to measure.

The framework above was designed for coral reef evaluation, thus physical protection of coastal assets was included. The MTMNM has no coastal assets (buildings) and not very much reef, so this item is not relevant.

The value of the very deep waters in the 115,000-square-mile area in terms of carbon storage could certainly be significant, but the valuation of this asset is beyond the scope of this report. One could imagine some sort of valuation through contributions to the Monument as carbon offset for some other activity, so this could be a way to raise revenue for the monument, but this is speculative.

The non-use values were clearly in the minds of the drafters of the CNMI constitution when Article XIV was formulated. While difficult to measure, it is this bequest value, or the value of keeping one's options open, that is at the core of much of the preservation demonstrated by the designation of parks, sanctuaries, and monuments. In the PMNM, there was a conscious effort by indigenous Hawaiians to trade off some limited revenues from fishing for the future preser-



Close-up of bubbles at the Champagne vent site located more than a mile below sea level in the Northern Mariana Arc. It is one of the few places in the world known to vent bubbles of liquid carbon dioxide. Image courtesy of the NOAA Submarine Ring of Fire 2006 Exploration and the NOAA Vents Program.

vation of the species within their monument. This sacrifice (of the fishing revenues and livelihoods of eight fishermen, some indigenous Hawaiians) provides at least a minimum valuation of the bequest value held collectively by the broader Hawaiian population.



Green sea turtle. Photo courtesy of NOAA.

Several methods have been used to value natural resources, each with their critics and shortcomings. Surveys of citizens may attempt to measure their “Willingness to Accept” (WTA) compensation for the destruction of natural resources. Similarly, some surveys will measure “Willingness to Pay” (WTP) to generate the funds to preserve an area.

These WTP measures are not relevant to the MTMNM because it is assumed that the citizens of the CNMI, for the most part, will not have to pay for the operation and management of the Monument, as the federal government will assume this responsibility in the same manner that it has budgeted for the other sanctuaries. Likewise, the WTA measures are not relevant because there is no proposed damage or deterioration of the natural resource under the proposal. Instead, it is assumed that the resource may actually improve (for example, the PMNM program removes debris as one of its activities).

Thus the “value” of the MTMNM is not the crux of the issue regarding economic impact. Instead, the economic benefits and costs will mainly accrue to Saipan and, to a lesser degree, Rota and Tinian, since the expenditures will take place in those locations.

# BENEFITS TO THE CNMI OF THE MTMNM

The benefits to the CNMI would include, but not be limited to: 1) the annual federal commitment to the monument, as evidenced by other monuments and sanctuaries, 2) the media attention and consequent increases in visitor arrivals, 3) the visits by research scientists and high-end tourists who might enter the monument waters and 4) NGO and federal funds that will be attracted to “piggyback” on the monument designation, particularly in the areas of environmental education and discovery.

**1. The annual federal commitment would perhaps start at \$1.67 million or so for an annual operating budget.** Additional appropriations are typically made for one-off projects, such as the construction of a new visitors center or the renovation of an existing building. The initial activities of monument staff would include enforcement, advising research scientists regarding permitting processes and logistics, providing a discovery center or educational exhibits, and general administration.

Initially a leased building might accommodate the start-up staff. In some locations synergy is created with historic preservation objectives by renovating an historic building for an interpretative center. Construction of a new building is typically done in the early growth period, within the first few years; alternatively this is done when a center becomes more established. The focus for this report will be on the Annual Federal Commitment.

The injection of new funds in this manner creates three impacts. The direct impact (e.g., wages and salaries of employees), the indirect impact (as the Monument budget is used to purchase locally-sourced products), and the induced impact, as workers spend their money in the economy and create additional income. The 1999 Economic Study produced an output multiplier of 1.34 for the visitor industry and an income multiplier of 2.10 (using a rather unorthodox definition of “total labor income generated in the economy per dollar of labor income in the industry”). A conservative estimate of the labor component of the MTMNM was made at (14 staff x average salary of \$40,000).

Table 3 shows an example budget of \$1,670,000 in annual funding. These funds would generate total sales of \$2,237,800 and total tax revenues of \$843,478; plus create total income in the CNMI economy of \$1,176,000 and creating total of 25 jobs. These multipliers and revenues are based on the ratios established in the Strategic Initiatives plan (2006). These are economy-wide values and do not address distributional issues. There would be localized impacts such as the initial charter of vessels to visit the area and some synergies with efforts to develop the islands north of Saipan. In other words, travel that currently is not economically viable might be so if it were combined with MTMNM efforts in the northern waters. Such benefits are not addressed in this report, as there was not sufficient data.

**TABLE 3**

## MTMNM Annual Budget Estimate\*

Personnel + Equipment	\$1,500,000
Office Space (2400 sq.ft)	\$50,000
Annual Operating Costs	\$120,000
Annual Total	\$1,670,000
Sales Multiplier	1.34
Total Sales (Revenue)	\$2,237,800
Tax Revenue*	\$843,478
Number of Direct Jobs	14
Average Salary	\$40,000
Labor Income	\$560,000
Labor Income Multiplier	2.1
Total Income Generated	\$1,176,000
(Indirect and Induced portion)	\$559,986
Employment Multiplier	1.79
Total Jobs (including MTMNM)	25

\* Strategic Initiatives (2006)

## 2. The Media Attention and the Consequent Increase in Visitor Arrivals

Economists generally recognize that it is not possible to closely measure the impact of media exposure, though it is possible to learn quite a bit in the effort. It is actually easier to measure the negative effects of media (the Bali Bombing, SARS, and so forth).

The advertising measures of the CPM (cost per thousand) and CPP (cost per point) may be used to measure the exposure to thousands of viewers (listeners) or to measure the cost of reaching one percentage point of the target audience. “Conversion studies” are then conducted to measure the response of the audience to the message (e.g., Did they come to Saipan after seeing the ad?).

One good example of this sort of study was conducted by Angelou Economics, as they measured the economic impact of a major film and music festival in Austin, Texas. With the luxury of actually measuring the participation at the events, the firm found direct expenditures of about \$12 million dollars and a total impact on the economy of about \$18 million dollars.



Congress appropriated \$1,786,000 in the fiscal year 2008 for the Hawaiian Islands Humpback Whale National Marine Sanctuary Kihei Facilities Project in Maui, Hawaii.

Another study was conducted in the same region, estimating the economic impact of the proposed George Walker Bush Presidential Library. Ignoring the construction costs (which are significant), the operating budget is projected to be about \$5 million per year. Central Texas has a much higher multiplier than CNMI, resulting in a total impact of about \$14 million per year. A factor considered important in estimating their attendance was the “remoteness” of the location; this is an important consideration for the MTMNM. The primary economic contribution (after the initial construction) of this library, similar to the MTMNM, is the visitor spending that will result.

The Saipan *Tribune* (May 22, 2008) reported that *Golf Digest* magazine would be producing a story about Saipan for their Japanese readers. The value of this advertising was estimated to be \$140,000. A major announcement by the President

of the United States concerning an ocean preserve would likely appeal to the sizeable “dive” market in Japan and the inbound tourism markets. Put differently, the monument designation would “put CNMI on the map” to many who might know of the Mariana Trench but had not considered visiting CNMI. The unique nature of the CNMI political status could attract more curiosity and attention than Hawaii did with the PMNM. This broad appeal to nature tourists, adventure tourists, scientists, and family groups could probably be valued in the millions of dollars in “media attention.” This value, though, is not the same as the economic impact. The question remains: What portion of this publicity would be converted into visitation and new spending?

While this is obviously speculative, it is common for a sharp growth stage to be followed by a “settling down” to a stable steady state of increased visitation when a new attraction is provided. A reasonable estimate might be a 2-5 percent increase in visitor arrivals in the first year, spiking to 10 percent in the second year through a snowball effect of word of mouth, and a reversion to a steady state increase of 5 percent over current arrivals. Since the current visitor arrivals are about 400,000 per year, a model of this might look as follows (1 percent and 10 percent figures provided for reference).

A 2-5 percent increase would add 8-20 thousand visitors with direct spending of \$5-13 million. Through the multiplier effect this would create sales of \$7-17 million and tax revenues of \$2-5 million. Using a jobs/\$million ratio calculated from the 1999 Economic Study, this increased visitation would create about 174-436 jobs.

Some would argue that this is a conservative estimate, that at least 40,000 additional visitors would come who otherwise would not have come. This figure is less than annual visitation at some of the larger sanctuaries but seems extreme for a small island like Saipan. Table 4 shows different ranges for comparison.

**TABLE 4**

**Increased Visitor Expenditures Due to the MTMNM Publicity**

Percent Increase	Visitors per year	Additional Visitors	Average (\$)*	Direct Spending (\$)	Total Sales	Tax Revenues*	Total Jobs**
(base)	400,000				(multiplier 1.34)		
1	404,000	4,000	650	2,600,000	\$ 3,484,000	\$ 980,000	87
2	408,000	8,000	650	5,200,000	\$ 6,968,000	\$ 1,960,000	174
5	420,000	20,000	650	13,000,000	\$ 17,420,000	\$ 4,900,000	436
10	440,000	40,000	650	26,000,000	\$ 34,840,000	\$ 9,800,000	871

\* adapted from Strategic Initiatives (2006)  
 \*\* ratios from 1999 Economic Impact Study

**3. Visits by research scientists and high-end tourists are also difficult to estimate.** The PMNM approved approximately 38 permits in 2007. Information on expenditures and average party size is not available. Small groups of tourists are currently permitted within the PMNM at Midway island. A group of 15 people at their current price (\$5,000 / head) would generate \$75,000 in sales. Ideally, much of this could be locally provisioned and thus generate a relatively high multiplier effect.

There is some evidence that divers and nature tourists would love to take a submersible into the Monument. A study by Wood and Zeppel (2008) found that, ignoring costs, 58 percent of the respondents would like to ride in a submersible. These high-end excursions cost in the neighborhood of \$5-10,000 per person. A good demand estimate, though, is beyond the scope of this report, so this category is included into the next.

**4. NGO and federal funds will be attracted to “piggyback” on the monument designation, particularly in the areas of environmental education and discovery.** There is already a considerable amount of research interest in the reefs of

Saipan, for example. The value of this was estimated at \$788,722 (REEF, p. 26). If this is the current interest, it might make sense to conservatively estimate a five-fold increase in funding for the second-largest marine sanctuary in the world. This would amount to about \$4 million per year. This value would also include expeditions and high-end tourism. These activities are often combined and have variations such as training and leisure components. These funds would go through the same multiplier process and result in sales and jobs as indicated in Table 5.

**TABLE 5**

<b>MTMNM Research &amp; High-end Tourism</b>	
Annual Total	\$4,000,000
Sales Multiplier	1.34
Total Sales (Revenue)	\$5,360,000
Tax Revenue*	\$2,020,308
Number of Direct Jobs	100
Employment Multiplier	1.79
Total Jobs (including MTMNM)	179

\* adapted from Strategic Initiatives (2006)

To summarize the potential benefits of the proposed MTMNM, the following categories have been discussed (note: selecting the 2 percent growth figure for visitor arrivals):

**TABLE 6**

<b>Summary of Benefits</b>				
<b>Category</b>	<b>Direct Spending</b>	<b>Total Sales</b>	<b>Tax Revenues</b>	<b>Total Jobs</b>
Annual Federal Funding	\$ 1,670,000	\$ 2,237,800	\$ 843,478	25
Increase in Tourism (2%)	\$ 5,200,000	\$ 6,968,000	\$1,960,000	174
Research and High-end Tourism	\$ 4,000,000	\$ 5,360,000	\$2,020,308	179
Totals (with 2% visitor growth)	\$10,870,000	\$14,565,800	\$4,823,786	378

# COSTS TO THE CNMI OF THE MTMNM

Three areas of cost are considered here: potential fishing leases, the possibility of volunteer time being diverted to MTMNM activities, and government employees necessary to co-manage the site. A potential fishing lease will be discussed first.

The 1999 Economic Impact Study recommended that the CNMI government should implement the provisions of the Magnuson-Stevens Act which allow Pacific Insular Area Fishing Agreements (PIAFAs). These would charge fees for the establishment of a Western Pacific Sustainable Fisheries Fund to be used for managing the program and for conservation and management objectives in the western Pacific. The figure of \$500,000 was recommended by the authors of the 1999 study.



Uracus Island. Photo courtesy of NOAA, Pacific Islands Fisheries Science Center, Coral Reef Ecosystem Division. Photographer: Russell Moffitt.

The question remains: What portion of the CNMI fishing lease would be attributed to the MTMNM? Pelagic surveys actually show that the fish stock is quite sparse in the Monument area. Since there are transshipment possibilities in Saipan, one could imagine a Japanese fleet off-loading in Saipan, which would provide additional economic impact

for local stevedores, etc. Of course, ships based in Saipan would find it less cost-effective to travel as far as the MTMNM due to the cost of fuel and the smaller frequency of fish found there. Studies in Hawaii found that the remote PMNM waters did have a few permitted fishing operations, but the quality of the product was suspect due to the time it took to bring it in to Oahu. In estimating the effect of the PMNM ban on fishing (to take effect in 2011), researchers found that restaurants and other retailers of the fish would be relatively unaffected, as these businesses were used to substituting other fresh fish or frozen imported fish, since the PMNM supplies were not consistent. Kim and Coffman (2008) found that "...the NWHI bottomfish amounts to about 0.001 percent of the state's economy. Other commercial fishing, about sixty times larger than the NWHI fishery, is still only about 0.062 percent of the state's economy." Still, this resulted in about a loss of about \$1.14 million to the state economy and about 36 (mostly part-time) jobs.

To summarize the value of the fishing rights to the MTMNM:

1. Take the \$500,000 recommendation of the 1999 Economic Study.
2. Consider that possibly one-third of this could come from the MTMNM waters and that CNMI could successfully negotiate for all of these revenues.
3. Add potential transshipment value to the CNMI (jobs and tax revenue)

It is understood that the decision United States (U.S.) District Court for the Northern Mariana Islands: Commonwealth of the Northern Mariana Islands v. United States of America, No. 99-0028 (Aug. 7, 2003) held that the U.S. government controls the entire EEZ. Thus, any fishing rights lease would have to be negotiated with the U.S. government.

## Costs of enforcement, co-management

It is helpful to review the activities carried out by Monument staff in other areas to gain an idea of the effects on the job market and the supply of labor. These duties might be characterized as 1) enforcement, including monitoring devices; 2) education, including organizing volunteers; 3) technical assistance, including permitting for eco-tourism and scientific research; and 4) general administration.

1. Regarding enforcement, if violators are caught breaking the law in the MTMNM, this would result in in-

creased costs of legal proceedings and court time. These are difficult to measure at this stage, and instead the recommendation is to ensure that appropriate fines could be levied to recover these costs.

2. As the MTMNM recruits volunteers, one might find that the volunteer pool will be diverted somewhat to MTMNM activities; this could result in reductions in volunteer activities for other worthwhile causes. Again, this is difficult to measure and could be obviated with an increased willingness of citizens to support the new Monument.
3. The exact nature of the permits is not yet clear, but the PMNM process requires co-managers to review permits for appropriateness and cultural concerns. This would require assistance from the CNMI DFW or other agencies with the technical expertise, if they have co-management responsibilities. Modest requests could be absorbed into current duties, but expansion of the MTMNM would require additional personnel at some point.
4. While general administrators would be federally funded, co-management agreements, such as in the PMNM, would require CNMI officials to “sit at the table.” One could imagine an impact on the staff of DFW, AG, and other agencies to provide input and to participate in decision-making. Initially these activities might be absorbed into existing positions, but expansion of monument activities might necessitate adding staff across the board. Fortunately for the CNMI, much of these costs may be reimbursed by the regional administrators.

To summarize these costs, they would be proportional to the scale of the educational center and the number of

permit applications. For a relatively small scale operation, most agencies could most likely absorb the additional work with existing staff. If high-end estimates of visitor arrivals, research permits, and so forth were actualized, additional government funding would be necessary, but these additional activities would also generate tax revenues and, as in the case of the PMNM, the federal government compensates local government for the extra costs.

Would there be other costs? Another view of the MTMNM declaration is that it would represent an opportunity to re-image the CNMI. The global coverage of the Monument might be augmented with a clever marketing campaign by the MVA. As visitors arrive, they want to have the conveniences of (broadband) Internet, cable television, stable power and water, and so forth. The conversion of the publicity to satisfied visitors is not accomplished simply, but requires a coordinated effort if sustainable repeat visitation is to be achieved. Repeat visitation is widely viewed as a strong indicator of competitiveness and destination quality. Maui, for example, attracts over 60 percent repeat visitors, while on Guam the figure is less than 30 percent.

These issues are not tied (solely) to the MTMNM but are actually broader tourism issues, and sustainable development issues. The purpose of noting them here is that these infrastructure, health and safety, and social issues would affect the small increase in MTMNM visitors along with all other visitors.

Quantitative estimates of these costs are beyond the scope of this study, but it is important to recognize them within the framework of the CNMI economy. While incomplete, in that some costs are simply listed, Table 7 shows the cost summary.

**TABLE 7**

**Summary of Costs**

Category	Salaries	Tax Revenues	Lost Jobs	Jobs Gained
Annual Fishing Lease		\$ 166,667	4	
Transshipment Opportunity	\$ 100,000	\$ 12,000	10	
Additional Government Staff	\$ 360,000			12
Option Value, mining pharmaceuticals (not estimated)				
Volunteer Time shifted from other activities (not estimated)				
<b>Totals</b>	<b>\$ 460,000</b>	<b>\$178,667</b>	<b>14</b>	<b>12</b>

Comparing the benefits and costs shows a quite favorable benefit/cost ratio. Approximately \$10,000,000 in direct spending could be attributed to the MTMNM on an annual basis, while the explicit costs are well under \$1,000,000. Adding volunteer time and other unforeseen costs, these could total over \$300,000 and there still would be less than \$1 million in total costs. \$1 million will be used for comparison purposes.

The benefits could be considered like an annuity. A simple formula for computing the present value of these benefits would adjust for inflation by using a relatively low discount rate (i.e. it is not necessary to adjust the benefits for inflation if the discount rate does not include an inflation premium).

The Present Value of the benefit stream would appear as:  
 $PV = B/i$   
 Where PV = present value of benefit stream  
 B = annual benefits, and i = discount rate  
 The present value of the benefits would then be:  
 $PV = \$10,000,000 / .03 = \$333,000,000$   
 Similarly, the present value of the costs would be:  
 $PV = C/i$   
 Where C = annual value of the opportunity costs of the MTMNM  
 Again, using the rather loose estimate of \$1 million, one would find:  
 $PV = \$1,000,000 / .03 = \$33,000,000$

Another way to view this difference is to specify how much the potential mineral or pharmaceutical leases would need to be to give up the MTMNM status for the option value to pursue these extractive activities. Simply put, a firm would have to offer more than \$333 million to the CNMI to forgo the opportunity of the MTMNM. In practical terms, though, one might imagine a 15-year contract to lease the sea beds and water resources for extractive activities.

Table 8 shows a model that would discount future benefits and costs for the time value of money and assumes that a lease could be negotiated for mineral or pharmaceutical products. Inflation for the benefit stream is estimated at 3 percent, but the lease value is inflated at a more aggressive 10 percent per year. This optimistic growth rate argues for continued discoveries and expanded production through the fifteen-year period, after which it is assumed that the value is depleted.

In this scenario, a lease that begins in 2011 at \$1 million and grows to almost \$4 million over the fifteen years would still fall short of the expected benefits of preserving the area in the MTMNM.

What if more valuable discoveries were made? Using the same model, one could image a \$5-million initial lease,

**TABLE 8**

**Benefits Net Costs with \$1 million Extractive Lease at 10 growth for 15 years**

Year	MTMNM Spending	Fishing Lease*	Extractive Lease**	Spending Minus Leases	Discounted Value
2008	0	0	0		
2009	10,000,000	166,700	0	9,833,300	9,546,893
2010	10,300,000	171,701	0	10,128,299	9,546,893
2011	10,609,000	176,852	1,000,000	9,432,148	8,631,752
2012	10,927,270	182,158	1,100,000	9,645,112	8,569,557
2013	11,255,088	187,622	1,210,000	9,857,466	8,503,137
2014	11,592,741	193,251	1,331,000	10,068,490	8,432,202
2015	11,940,523	199,049	1,464,100	10,277,374	8,356,446
2016	12,298,739	205,020	1,610,510	10,483,209	8,275,542
2017	12,667,701	211,171	1,771,561	10,684,969	8,189,139
2018	13,047,732	217,506	1,948,717	10,881,509	8,096,865
2019	13,439,164	224,031	2,143,589	11,071,544	7,998,319
2020	13,842,339	230,752	2,357,948	11,253,639	7,893,076
2021	14,257,609	237,674	2,593,742	11,426,192	7,780,681
2022	14,685,337	244,805	2,853,117	11,587,416	7,660,647
2023	15,125,897	252,149	3,138,428	11,735,320	7,532,455
2024	15,579,674	259,713	3,452,271	11,867,690	7,395,552
2025	16,047,064	267,505	3,797,498	11,982,061	7,249,344

Present Value of the Net Benefits (@3%) 139,658,500

\* assuming 3% inflation

\*\* assuming a growth rate of 10% each year

growing at the same aggressive 10 percent per year over fifteen years; this would still not create enough revenue to outweigh the estimated MTMNM spending (detail not shown).

Using this model in “what if” scenarios, one could calculate the value of the initial lease that would result in a “break even” situation. The value under these assumptions is just over \$7,169,000, as shown in Table 9. To clarify, the amount was selected to drive the Discounted Value close to zero, so the leases would approximately cancel out the MTMNM spending benefits.

In summary, unless one imagines a very selective and sustainable bio-prospecting model that would be compatible with the MTMNM preservation objectives, extractive options would be considered as a “trade off” with the monument designation. It would take a fifteen-year lease in excess of \$7 million with a growth rate of 10 percent to secure revenues roughly equal to the perceived benefits of the sanctuary status of the MTMNM. However, it is important to note that the resource may then be depleted, while the MTMNM would yield benefits in perpetuity.

**TABLE 9**

**Benefits Net Costs with Extractive Lease Equal to Benefit Stream**

Year	MTMNM Spending	Fishing Lease*	Extractive Lease**	Spending Minus Leases	Discounted Value
2008	0	0	0		
2009	10,000,000	166,700	0	9,833,300	9,546,893
2010	10,300,000	171,701	0	10,128,299	9,546,893
2011	10,609,000	176,852	7,169,000	3,263,148	2,986,243
2012	10,927,270	182,158	7,885,900	2,859,212	2,540,373
2013	11,255,088	187,622	8,674,490	2,392,976	2,064,202
2014	11,592,741	193,251	9,541,939	1,857,551	1,555,670
2015	11,940,523	199,049	10,496,133	1,245,342	1,012,577
2016	12,298,739	205,020	11,545,746	547,972	432,575
2017	12,667,701	211,171	12,700,321	-243,791	-186,845
2018	13,047,732	217,506	13,970,353	-1,140,127	-848,361
2019	13,439,164	224,031	15,367,388	-2,152,255	-1,554,835
2020	13,842,339	230,752	16,904,127	-3,292,540	-2,309,321
2021	14,257,609	237,674	18,594,540	-4,574,605	-3,115,084
2022	14,685,337	244,805	20,453,994	-6,013,461	-3,975,606
2023	15,125,897	252,149	22,499,393	-7,625,644	-4,894,611
2024	15,579,674	259,713	24,749,332	-9,429,371	-5,876,072
2025	16,047,064	267,505	27,224,266	-11,444,706	-6,924,235

Present Value of the Net Benefits (@3%) 454

\* assuming 3% inflation

\*\* assuming a growth rate of 10% each year

# DISCUSSION AND RECOMMENDATIONS

Estimating the benefits and costs of a proposal is quite complex, particularly when decisions are made in advance of a management agreement. This is also the case with new government regulations so the comments provided in the Preface are particularly worth emphasizing.

From the beginning of this study it was clear that the costs of designating the waters around the islands of Maug, Uracas, and Asuncion as a new U.S. National Monument could only be those costs foregone through some other use. There is no development, no habitation, no industry in the existing land area. This is quite unlike most sites, where some trade-offs exist, e.g., losing a timber industry to save a forest.

The option value of future use of the islands is fraught with speculation. The existing legal framework places the three islands in constitutional protection as reserves, and the recent court decision places the 200-mile EEZ within the jurisdiction of the federal government. This would seem to limit the current options to significantly impact the revenues of the CNMI and its people.

Prior studies estimate that the fishing industry, currently providing well under 1 percent of the CNMI gross island product, could be exploited through a lease with a foreign fishing fleet. However, it is unlikely that the revenue would be a dramatic new source of revenue above that currently enjoyed. Possible mineral deposits could ultimately be mined in the sea bed. Pharmaceutical companies could bio-prospect and provide payments for new medical discoveries.

Of these, the only estimate found for the CNMI was a recommendation to establish a fishing lease. Considering the remote nature of the proposed MTMNM, it is not likely that local (Saipan-based) fishermen could bring back quality fish at a reasonable price (particularly with fuel as a major input cost). A fishing lease outside of the Monument waters, but within the 200-mile EEZ, could be negotiated to produce a modest amount of revenue. The loss of the Monument portion of that lease would be perhaps one-third of the value.

The benefits of a new Monument are still speculative, but estimation is facilitated by the existing Sanctuary Program administered by NOAA. It is reasonable to estimate that close to \$2,000,000 in annual support funding would be provided by the federal government. Administrative offices would be leased or built on Saipan, and some type of public visitor education center would be likely. These activities would, in turn, probably attract considerable increases in other federal funding and grants or projects funded by NGOs.

By putting CNMI on the map, so to speak, the publicity of this designation could lead to significant increases in visitor arrivals. This would include a general increase in the mass tourist market, as those curious would investigate current package trips, and in the new markets of research scientists and high-end nature tourists. An established visitors center would provide another attraction to cater to the family-travel segment. Even conservative estimates of 2 percent visitor growth produce sizeable benefits in spending and tax revenues.

Finally, a “what if” scenario was created that sought to measure the value of extractive leases necessary to counteract the revenues of the proposed MTMNM. In addition to the possibility of a fishing lease, other leases would have to total at least \$7 million dollars and grow at a 10 percent rate for fifteen years. However, the result would be depleted resources versus the MTMNM benefits in perpetuity.

Doubts will most likely remain for many in the CNMI, as the speculation in this report is centered on those things that may be quantified. Some will feel that this is a unique opportunity to re-brand the visitor industry and capitalize on the Mariana Trench theme and the publicity. Others will find this to be just speculation. Some may be intrigued by the possibility of selling or leasing potential assets in the proposed area, even given the current legal impediments to doing so.

The perspective of this report is that economic analysis is a decision aid; it can only support decisions that are made in a broader political and social context. All attempts have been made to be open to suggestion (particularly regarding costs) and to avoid extreme evaluations, in terms of discount rates, growth potential, inflation, and so forth. More importantly, the models provided are easily adapted to alternative assumptions so that it is not necessary to agree with the ones stated.

## POSTSCRIPT

The draft report was presented on June 17-18, 2008, to the Saipan Chamber of Commerce, the Saipan Rotary Club, Samuel McPhetres's class on Social Issues at Northern Marianas College, Harry Blalock's Island Issues radio show, through a personal visit to Lt. Governor Timothy P. Villagomez, and in a two-hour public forum.

Dr. John Salas, former president of the University of Guam and a former senator in the Guam Legislature, assisted the author with meetings at the Saipan Chamber of Commerce, the Rotary Club and the public forum. Dr. Salas responded to questions in the Chamorro language and provided his perspective as a tourism educator. Fear of change and mistrust of the federal government were themes expressed by several participants. Views opposing the MTMNM were often based on misinformation or, in some cases, disagreements with assumptions used in the study.

In previous public reaction, some opponents wrote letters to the governor and the local newspaper using rhetoric that was quite divisive and judgmental even though few facts about the proposed Monument had been provided. The obvious comparison with the PMNM in Hawaii also led to some scaremongering. For example, John Gourley, in the May 23, 2008 Saipan *Tribune*, wrote: "This is the same media tactic that Pew, their advocates, and paid consultants, including Mr. Scott Foster and the W&CPN members, used when they took the Northwestern Hawaiian Islands away from the Hawaiian people." This letter was written at a time when the tri-partite co-management plan for the PMNM had already been worked out, including provision for a 'seat at the table' for the State of Hawaii.

Thus, instead of the proper view of intergovernmental relations between the federal and local governments, many critics shifted the emphasis to an outside force (Pew) without a complete understanding of the Ocean Legacy program and the intent of the sponsoring foundations. Feedback from the forum presentation indicated that the argument of "losing the islands" was one factor causing opposition to the Monument. Also, some felt that the CNMI owns the submerged lands and the EEZ, in spite of the Supreme Court decision to the contrary. One student commented that the proposal for the monument would have been more acceptable if it had originated within the CNMI.

Some forum participants criticized the study's consideration of extractive activities. In their view, this activity would not be allowed under the CNMI Constitution, so it should not have been addressed in the report. The presenters explained that observations about possible mineral deposits, including manganese nodules, had been mentioned, without any evidence of proposals, bids, or any other documentation of po-



tential revenue sources. The presenters acknowledge that, in an attempt to be inclusive of potential revenue streams, though, the idea of extractive mineral leases may have been over-emphasized.

While some of the misconceptions were addressed in the public discussions, others remained simply because the process typical of federal monument funding and management was not clearly understood. One respondent asked if the Monument funding would be abandoned after President Bush left office. In retrospect, the discussion of federal commitments that ensued led to a topic that was probably the

biggest omission of this brief study – an examination of the economic impact of the CNMI American Memorial Park (AMP). At the forum to present this study, Chuck Sayon provided a synopsis of the funding history of the park, which is summarized herein.

The AMP is a 133-acre (54-hectare) parcel of land that was dedicated in 1975 to the U.S. and Marianas soldiers who fought in World War II. Its initial funding came from a \$2-million trust fund, but the early stages of the park’s development were quite rocky, moving in fits and spurts of activity with uncertain ongoing funding. Nonetheless, the park now includes a 1.5-mile walking path, tennis courts, a 1,200-seat amphitheater, and recent additions of a research library, a visitor center, a WWII exhibition hall, and a 120-seat audio-visual theater.

Review of the documents provided by Mr. Sayon revealed two very relevant facts. One was that the local government operates a public marina within the AMP (evidence of successful co-management with the federal and local governments). In one survey several years ago, one million visitor-use days were tracked for the marina during the CNMI’s peak visitor periods (C. Sayon, personal communication). Simply put, this experience might reassure the residents who distrust the federal government.

The other interesting trend was the manner in which the federal commitment to the AMP increased over time. As mentioned above, funding was not initially steady or assured, and there were periods where little funding progress was made. From 1996 to 2006, however, the funding increased from \$149,000 to \$1,120,000 per year (C. Sayon, personal communication). Some of this funding kept salaries competitive and some enabled increased duties, such as additional enforcement. In addition to the annual increases, there were over \$12 million in construction projects by 2004.

The experience of the AMP might advise caution in regard to the “Annual Funding Commitment” described in the benefits portion of the current study. If the initial funding, projected at \$1,670,000 per year, increased at the same rate as the AMP funding from 1996 to 2006, the budget in the eleventh year would be \$12,553,020.

In a similar vein, a discussion about the MTMNM Visitor Center revealed another potential weakness of the

current study. Some respondents felt that the current study may have underestimated the tourism potential or the “traffic” of the proposed center, meaning that its initial plan was under scale.

If there was a personal bias in the study, it was to avoid exaggerating the economic benefits. This was based in part on the author’s experience of viewing many proposals for the region’s economic development that did just that—using multipliers that were too high or unrealistic estimates of visitor spending. The author attempted to be careful in this regard to produce benefit estimates that could be justified and were, if anything, at the lower end of a range of possibilities. As some respondents pointed out, this restraint might serve to diminish the attractiveness of the MTMNM proposal in the face of estimates of other development proposals, which, if inflated, only obfuscate the genuine prospects for economic benefit. In this manner, the political capital of the MTMNM—which was presented with realistic expectations—may not be viewed as equally attractive.

As the public presentations encouraged, the reader should re-visit the models in the report. What if tourism growth were 10 percent instead of 2 percent? What if the Annual Federal Commitment followed the path of the AMP and grew exponentially? What if NGOs and federal agencies found new interest in funding projects related to the MTMNM? Combinations of these effects could lead to benefits exceeding the roughly \$15 million per year that are described in this study. The relatively conservative estimation process should be seen as a sensible and appropriately careful approach that gives the project’s supporters a solid basis for their enthusiasm in seeing it completed.

Despite several calls for criticism and, particularly, for evidence of additional costs that were overlooked, no significant errors of commission or omission were reported within the requested one-week review period other than those discussed here. However, the draft report was circulated only a day or two before the presentations, so other evaluations may still be forthcoming. The author fully accepts responsibility for errors or oversights that remain.

# REFERENCES

- Arrow, K.J., Cropper, M.L., Eads, G.C., Hahn, R.W., Lave, L.B., Noll, R.G., Portney, P.R., Russell, M., Schmalensee, R., Smith, K.V. and Stavins, R.N. (1996). *Benefit-Cost Analysis in Environmental, Health, and Safety Regulation: A Statement of Principles*.
- Barrowclough, D. (2007). Foreign Investment in Tourism and Small Island Developing States. *Tourism Economics*, 13(4): 615-638.
- Bell, Frederick W. (1987). *The Economic Impact and Valuation of the Recreational and Commercial Fishing Industries of Lake Okeechobee, Florida*. Florida Game and Freshwater Fish Commission and Florida Department of Environmental Regulation, October 1.
- Bull, Adrian (1991). *The Economics of Travel and Tourism*. Pitman Publishing: Melbourne.
- Bush creates world's biggest ocean preserve*. [www.msnbc.msn.com/id/13300363/](http://www.msnbc.msn.com/id/13300363/) (retrieved April 27, 2008).
- Cohen, D. B. (2007). Statement of David B. Cohen, Deputy Assistant Secretary of the Interior for Insular Affairs, before the House Committee on Natural Resources: Subcommittee on Insular Affairs, regarding Current Economic, Social and Security Conditions of the Commonwealth of the Northern Mariana Islands, April 19.
- Commonwealth of the Northern Mariana Islands 2004 Fishery Statistics. Compiled by Division of Fish and Wildlife and the Western Pacific Fishery Information Network, June.
- CNMI Economic Indicators*, First Quarter CY 2006, CNMI Department of Commerce.
- Emergency Air Service Meeting (2007). Tourism & Business Leaders Summit, Saipan Grand Hotel, April 11.
- Hamnett, M. and Pintz, S. (1996). *The contribution of tuna fishing and transshipment to the economics of American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam*. [www.soest.hawaii.edu/PFRP/economics/pintz.html](http://www.soest.hawaii.edu/PFRP/economics/pintz.html) (retrieved April 21, 2008).
- How Much is this Beach Worth? Calculating the Value of the Environment*. [www.csc.noaa.gov/magazine/2001/01/worth.html](http://www.csc.noaa.gov/magazine/2001/01/worth.html) (retrieved May 9, 2008).
- Kelly, T. (2005). *The economic impact of the George Walker Bush Presidential Library Center on the Central Texas Region*. Baylor Center for Business and Economic Research, Spring.
- Kim, K. and Coffman, M. (unpublished manuscript): *The Economic Impacts of Banning Commercial Bottomfish Fishing in the Northwestern Hawaiian Islands*.
- McPhee, M.D. et. al (1999). *An Economic Study for the Commonwealth of the Northern Mariana Islands: Executive Summary*. Business Development Center, Northern Mariana College, October.
- Morato, T. et. al (2004). *Vulnerability of seamount fish to fishing: Fuzzy analysis of life-history attributes*. pp. 51-60 in T. Morato and D. Pauly, eds. *Seamounts: Biodiversity and Fisheries*.
- National Marine Sanctuary System* <http://oceanservice.noaa.gov/topics/oceans/nms/welcome.html> (retrieved April 27, 2008).
- Seidl, A. and Weiler, S. (2001). *Economic impact of National Park designation of the Black Canyon of the Gunnison on Montrose County, Colorado*. Department of Agricultural and Resource Economics, Colorado State University Cooperative Extension, November.
- Strategic Initiatives for 2006-2010* (2006), prepared for the Office of CNMI Governor by the Ad Hoc Tourism Committee, Strategic Economic Development Council, May.

Stynes, D.J. and Sun, Y. (2005). *Impacts of Visitor Spending on Local Economy: Capulin Volcano National Monument, 2003*. Department of Park, Recreations and Tourism Resources, Michigan State University, January.

*SXSW 2007 Economic Impact Analysis* (South by Southwest Music, Film and Interactive Conferences and Festivals), Angelou Economics, Austin, Texas.

Van Beukering, P. (ed.) (2006). *The Economic Value of the Coral Reefs of Saipan, Commonwealth of the Northern Mariana Islands, March*. Report funded by the U.S. Department of the Interior and National Ocean Atmospheric Administration.

Vanhove, N. (2005). *The Economics of Tourism Destinations*. Elsevier, New York.

Walsh, R.G. (1984). *Recreation Economic Decisions*. Department of Agricultural and Natural Resource Economics, Colorado State University. Citizens Printing: Fort Collins, Co.

White House Press Briefing by George Frampton: Establishment of the Giant Sequoia National Monument, April 15, 2000. [www.sierraclub.org/ca/sequois/monument/frampton\\_press\\_briefing.htm](http://www.sierraclub.org/ca/sequois/monument/frampton_press_briefing.htm) (retrieved April 7, 2008).

Whitmarsh, D. (1995). *Richer Harvests: a CAI Approach to Teaching Fisheries Economics*. Journal of Economic Education, Fall, pp. 336-351.

Wood, Peter and Heather Zeppel (2008). *The Preferences of Potential Marine Research Tourists for Different Marine Research Tourism Products in Australia* (draft manuscript).

WPRFMC, 2005. *Fishery Ecosystem Plan for the Mariana Archipelago, Western Pacific Regional Fishery Management Council, Honolulu, Hawaii*. December 1.



Global Ocean Legacy is an initiative of the Pew Environment Group in partnership with the Oak Foundation, the Robertson Foundation and the Sandler Family Supporting Foundation. Its goal over the next five years is to work with local citizens and governments to secure designation of three to five very large, world-class, no-take marine reserves that will provide ecosystem-scale benefits and help conserve our global marine heritage.