

Civil–Security Forces Environmental Cooperation in Central America and the Caribbean

July 21-24, 2003



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Additionally, the editors wish to thank the team from the Belize Department of the Environment, especially Icilda Humes, Anoida Colman, and Celi Cho, and the staff from the Belize Defence Force led by Lieutenant Virginia Nicholson for their assistance in planning and running this conference.

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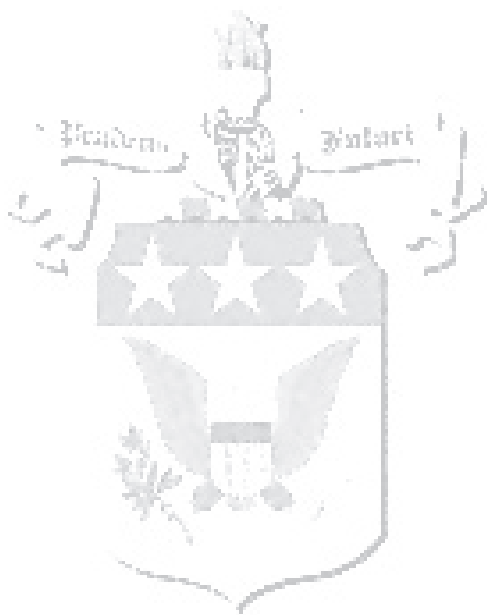
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Foreword

This conference is the fourth in a series of conferences sponsored by the U.S. Southern Command in Central America. As such, it built upon the relationships and programs initiated in earlier conferences. The purpose of these conferences is to support three growing realizations: that the protection of the environment is critical to the sustainable development of the entire region, which is, in turn, critical to regional stability; that environmental issues are best dealt with on a regional basis; and that military and security forces have a vital role in the process of resolving environmental issues.

Given the disparate stakeholders in the environment, it is difficult enough to arrive at a common strategy within any given nation. Yet these conferences seek an even higher aim, to devise a common regional strategy for environmental security for Central America and, beginning with this conference, the Caribbean basin. Progress is already being made. In 2004, a training program, developed and validated through the agency of these conferences, will provide training on environmental issues to thirty-five military and security officers who will, in turn, take that training back to their respective units: the “train the trainer” methodology. As a result of this conference, the participants plan to exploit the networking and collaboration capabilities of the U.S. Department of Defense DENIX network to maintain the momentum for planning, and there is consideration for a small-scale demonstration project.

Certainly, issues remain. First, is the issue of resources. Initially, at least, there is little hope that there will be significant increases in budgeting that would support such efforts. This means that the solutions must reflect innovative usage of the resources already available, including resource sharing—information, technology, specialized equipment, and even manpower—between nations. Second is the issue of identity; while the participation in these conferences continues to grow, as yet, it remains

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only a series of conferences. To gain traction with the many organizational stakeholders, the effort will need to coalesce into an organization with a mission, a vision, and terms of reference. Finally, there is the issue of leadership, which must take into account the sovereignty of any participating nation. As environmental problems are transnational, they require a regional response; a regional response requires regional leadership. Such leadership, can either come from inside this group of participants or from outside. That is, the participants can either organize themselves and select their own leadership, or they can seek to be recognized by a regional, transnational organization. In either case, it will require leadership to determine a mission, create a vision, and establish terms of reference to convert these conferences into future action.

These issues and more will certainly be topics of future conferences. The wheels of international cooperation grind slowly, but thanks to the outstanding efforts of the many participants of this conference and those that preceded it, the hardest part is done. A start has been made, and this bodes well for every citizen of the region and, indeed, of the world.

Professor Douglas B. Campbell
Director, Center for Strategic Leadership
U.S. Army War College

Executive Summary

The Conference on Civil-Security Forces Environmental Cooperation in Central America and the Caribbean held in Belize City, Belize, from 21 to 24 July 2003. The objectives of the conference were:

- To share successful regional approaches to implementing recommendations for civil-security forces environmental cooperation developed at the May 2001 Ministerial Conference held in San Jose, Costa Rica.
- To identify how security forces and environmental and forestry authorities can work together to protect people from environmental threats to regional stability;
- To investigate innovative ways to use security forces to promote sustainable economic development.

More than 90 participants representing the Ministries of Defense, Interior, and Environment attended the conference. Security forces, academia, and representatives of the industrial, technology, and education communities were also present and contributing.

The Conference Plenary had five sessions designed to inform the participants about successful regional actions and programs, and to stimulate discussions on potential opportunities for future cooperation. These sessions were: Security Forces Support to the Environment; Defense of Coastal and Maritime Resources; Ideas for Partnerships; Defense of Terrestrial Resources; and Military Civil Interface.

The final half-day of the conference was dedicated to a Workshop wherein working groups on Training, Marine Resource Cooperation, and Terrestrial Resource Cooperation met and developed policy recommendations:

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TRAINING: One of the most successful areas of Central American-Caribbean multilateral defense cooperation is that of training. Two previous workshops, one at the Tropical Agriculture Research and Higher Education Center (CATIE), in Turrialba, Costa Rica, and a follow-on workshop hosted by the Pan American School of Agriculture in Zamorano, Honduras, agreed on the importance of the military role in dealing with environmental security issues, and shared best practices for conducting environmental training. The Belize Training Workgroup identified several specific areas for enhanced training: Environmental Law; water resources; forest fires; natural disaster response; and prevention and control of illegal activities. They also recommended that a regional or national organization such as the Comisión Centralamericana de Ambiente y Desarrollo (CCAD), the USAID Office of Foreign Disaster Assistance (OFDA), or The World Conservation Union (IUCN) to take the lead.

ECONOMIC VALUE OF MARINE RESOURCES: Regional governments are now aware of the economic importance of marine resources to struggling economies, and are seeking new means with which to preserve them. The conference identified multiple areas of environmental threats, such as illegal fishing and the introduction of destructive, non-indigenous species, and cholera from the discharge of ballast water. The Maritime resources workgroup addressed these issues and chose five priority actions: Protection of Marine Regional Marine Resources, Strengthening of Local Capacity, Identification of Common Interests, and Training. The group recognized that within the various governments there could be different responsible agencies, and this complicates cooperation among the regional states. Nevertheless, the workgroup stated that the economic importance of marine resources was critical to the region, and recommended that regional workshops be held to develop further military support of marine resource conservation efforts.

PREVENTION OF DISASTERS: The Terrestrial Workgroup identified Mitigation and Prevention of Natural Disasters, Control of Trafficking in Endangered Species, Protection of Remote Wildlands and Border Areas, and Prevention of the Introduction of Endangered Species. Like the Training Group, this group identified a number of potential regional agencies to take the lead. Specifically to be considered were SICA, CARICOM, and CCAD.

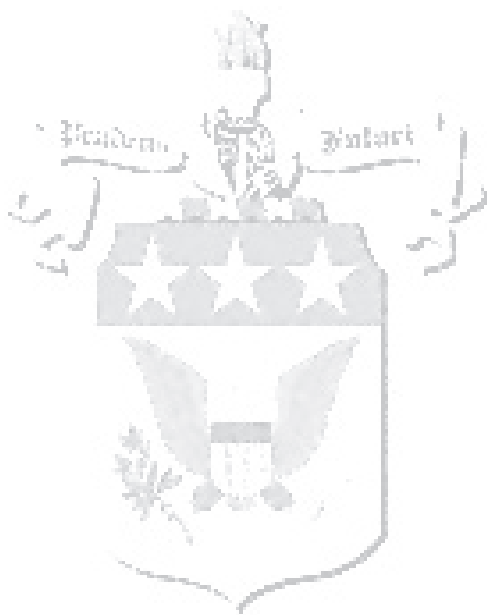
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The three groups presented their results in a Plenary Session. This produced some excellent ideas for future efforts in the arena. Of these, the following were generally acclaimed to be worthwhile:

- The already existing structure and capacity of the DENIX system should be used in this effort. The representative of Florida International University offered to conduct needs analyses within the regional nations to determine what IT investments would be required to make this a workable option for all of the regional players.
- It was confirmed that the University for Peace should continue with its efforts to establish the CATIE training program as validated in Turrialba, Costa Rica, in 2002.
- It was recommended that CCAD be approached at the Ministerial level to determine how these efforts could be integrated with their plans. A CCAD representative agreed to take on this task, and it was agreed that the best approach would be to establish a pilot project to prove out the concept on a small scale before engaging in any large-scale undertakings.

The conference concluded with the compliments of Major General Cedric Borland, Commander of the Belize Defence Force, and Mr. Curtis Bowling, Deputy Under Secretary of Defense of the United States.

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Chapter 1: Opening and Introduction

*Colonel Arthur Bradshaw,
U.S. Army, Retired*

Facilitator

The conference on Civil-Security Forces Environmental Cooperation in Central America and the Caribbean was held in Belize City, Belize, from twenty-one to twenty-four July 2003. The conference had three objectives:

- to share successful approaches to implement civil-security forces and armaments cooperation in the region based on results from the May 2001 ministerial conference held in San Jose, Costa Rica;
- to explore how all security forces, environmental, and forestry authorities can work together to protect people from environmental threats and to promote regional stability;
- to investigate innovative ways to use security forces to promote sustainable development.

The conference was attended by more than eighty participants representing fourteen countries, their militaries and departments of the Interior and of the Environment. Security forces, academia, and representatives of industry, technology, and education were also present and contributing.

The keynote speaker was Ms. Pat Mendoza, the Chief Executive Officer of the Belizan Ministry of Natural Resources. She welcomed the participants in the name of the honorable John Briceño, the Deputy Prime Minister and Minister of Natural Resources, the Environment, and Industry of Belize, who sent his apologies as his duties prohibited his attendance.

Ms. Mendoza emphasized three points. First, she pointed out that protecting the environment was particularly critical to Belize, which has been blessed, as it says in the Belizan national anthem, with “wealth untold.” She noted that forty-two percent of the national territory of Belize—including coastal and marine resources such as the Great Barrier Reef—has been

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protected and is currently being jointly patrolled by representatives of the Belize Defense Force, her Ministry, and others. Secondly, she noted that another critical aspect of civil-military cooperation had been demonstrated in the outstanding and full cooperation of the Belize Defense Force in responding to several natural disasters. Finally, she emphasized her belief that we have entered a new era of environmental stewardship that requires new partnerships, because it is only through collectivity—through strategic efforts and alliances—that we can successfully manage both the environment and national defense.

After noting that peace and development are indivisible, Ms. Mendoza closed her speech by reminding the participants that environmental protection is everyone's business, and that she believes that such regional meetings are the key to protecting our common patrimony for future generations.

Mr. Bob Brown the Deputy Engineer for the U.S. Southern Command (SOUTHCOM), spoke next. Citing the professionalism of both the environmental and defense communities in organizing and executing events such as this one, he said his expectations for this meeting were very high. He echoed Ms. Mendoza's sentiments about the need for collaboration and coordination between all sectors of government and the military to ensure sustainable development through the protection of natural resources. He also noted that soldiers are also residents and that they have a stake in the security of their natural surroundings. Mr. Brown went on to discuss the role of SOUTHCOM and the possible roles for the military in protecting the environmental resources of the region.

The world is changing, and Central America lives today in an era of relative peace. Thus the question becomes, what is the role of the military and what is the best use of military expertise and resources such as transportation communications and command and control that have applications and uses other than war? The roles should be more than merely a police force; rather, the military should act as managers, and as significant providers of intelligence. As an example, a unit conducting exercises in the forest is in an excellent position to provide useful information for the management of that forest. It is also possible to train the military for specific roles; Mr. Brown cited the specific example of training military units to combat forest fires.

The role of SOUTHCOM varies based on the circumstances and the capabilities and needs of the nation in question. For example, in Belize, environmental protection is an integral task of the Belize Defense Force;

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while in other countries, the environmental role of defense forces is limited to disaster response.

Mr. Brown ended his briefing by noting that, post 9-11, the U.S. Department of Defense had reassessed all of its missions and priorities. Obviously, the first priority is the defense of the U.S. homeland and the Global War on Terrorism. While the Department of Defense has not forgotten about the environment, the priority of missions and resources have necessarily been changed.

Dr. Thomas DeKay of the United States Environmental Protection Agency (EPA) opened his remarks by extending greetings from the Acting Administrator of the EPA, Marianne Lamont Horinko. Beginning with the important concept that the environment has no borders, Dr. DeKay presented the interests of the EPA in the Central American region.

The EPA is the oldest environmental agency in the world and, therefore, has a responsibility to share its successes and failures. This is a wealth of information, and Dr. Kary emphasized that this information is not a commodity, but is, rather, a resource to be shared by all concerned with the defense of the environment. No agency can do the job alone. He stressed that it is preferable, based on cost alone, to prevent damage to the environment rather than clean up afterward because the cost of remediation is staggering.

Today there are many international issues concerning the environment: water pollution, waste, endangered species, invasive species, traffic in endangered species, the illegal drug trade, and the methods of conducting manufacturing and business.

Dr. DeKay briefed the participants of the CLU in web site (<http://clu-in.org>), which is available in both English and Spanish. Through this web site, the EPA offers training on environmental issues and has, to date, trained more than ten thousand people around the world. He closed his remarks by noting that, in this conference, the participants have come together to learn from one another. As citizens of the hemisphere, linked by our cultures, our traditions, and our dedication to the future, all of us must take account of our actions to insure the future of our environmental legacy.

Mr. David Alarid, the Director of the U.S. State Department's Central American and Caribbean Environmental Hub, opened his remarks by

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thanking the participants and the organizers of the meeting on behalf of the Department of State and the Regional Environmental Hub for Central America and Caribbean. Mr. Alarid noted that this was not the first time that many of the participants had met to discuss these issues. In San José in 2001, the U.S. Southern Command had sponsored the first regional conference, entitled “Enhancing Defense Environmental Cooperation for Central America and the Caribbean.” As a result of that conference, CATIE, the Tropical Agricultural Research and Higher Education Center in Costa Rica had developed a project proposal entitled “Central American Environmental Defense Program in the Mesoamerican Biological Corridor,” which was designed to improve the training capacity of the Central American region’s security forces in the technical aspects of environmental defense and protection. SOUTHCOM had recognized the merits of this proposal and, together with the Center for Strategic Leadership of the U.S. Army War College, hosted a validation workshop at Turrialba, Costa Rica, in June 2002. That validation workshop was followed up with a project development workshop in September of last year in Zamorano, Honduras. This project continues to enjoy the support of U.S. SOUTHCOM and now has a new partner, the University of Peace, based in San José, Costa Rica. The University of Peace will implement the second phase of this project throughout 2003 and 2004.

Central America and the Caribbean are uniquely blessed with a wealth of biodiversity, natural resources, and unsurpassed natural beauty. These resources, this diversity, faces serious threats from the excessive depletion and contamination of its water and soil, inappropriate and unsustainable uses of land and resources, forest fires, and other natural disasters, all resulting in human and environmental impoverishment. No one country, government, or sector of society has the capacity to deal with all of these issues. Responsible management of natural resources requires the efforts of all sectors, including security forces, and at the local, national, regional, and international levels. The participants in San José, Torrialba, and Zamorano learned that the region’s security forces, who have a long history of providing humanitarian assistance and disaster relief and of promoting security and good governance, have also demonstrated a clear interest and commitment toward environmental security and protection.

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Mr. Alarid concluded by stating that the Regional Hub for Central America and the Caribbean is pleased to be able to provide a platform that promotes and facilitates both dialogue and actions in the field of regional environmental cooperation and security, a platform with the goal of taking some positive steps toward concrete actions and partnerships in support of biodiversity conservation and sustainable natural resource management in Central America and the Caribbean.

Mr. Edgar Embry, the Economic and Political Officer of the United States Embassy in Belize, began his presentation by extending his personal welcome and that of the staff of the American Embassy to all in attendance. He then thanked the Government of Belize, the Office of the Deputy Under Secretary of Defense for Environmental Security, Southern Command, the Army War College and the Center for Strategic Leadership, the Department of State's Environmental Hub for Central America and the Caribbean, and everyone else, including each participant, who made the conference possible. He expressed the regrets of the United States Ambassador to Belize, Russell Freeman, who would have liked to attend the conference, but was out of Belize on a long-planned trip.

Mr. Embry offered a portrait of Belize as an ideal setting for a conference on protecting the environment. It is a marvelous country, from the islands and barrier reef offshore to the Maya ruins, caves, waterfalls, and mountains of the interior. It has a larger percentage of its national territory in protected areas than any other country.

He expressed his hope that all of the visitors, especially those visiting for the first time, would have the opportunity to see something of its beauty and to experience the warmth of its people. However, he added, while enjoying the beauty of the barrier reef, remember how fragile it is, how easy it would be for man to destroy it, and how long it takes nature to build a barrier reef. The reef depends on us for its continued survival. While enjoying the silence and solitude of the rainforest, remember the ongoing decline of rainforests, mainly through the harmful activities of man.

Mr. Embry then presented for consideration the story of Caracol. The ancient Maya city of Caracol is in one of the more remote and harder to

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reach areas of Belize. Belize was much more densely populated at the height of the Maya culture than it is now. Archaeologists estimate that Caracol's population at the height of the city's influence was between 150,000 and 200,000 people. The population of all of Belize today is about 260,000. Today, standing atop the Cana, or Sky Palace—the highest point in Caracol and still the tallest building in Belize—one sees nothing but jungle stretching to the horizon in every direction. There is no sign of human habitation. Yet that area, now so desolate as far as human habitation is concerned, must once have been filled with villages and fields.

After building a civilization that dominated Middle America for over a thousand years, the Maya saw their civilization collapse. They abandoned their great cities. Nature reclaimed their fields and villages and eventually came into their great cities and buried them in jungle so completely that even the memory of most of them was forgotten for over a thousand years.

In conclusion, Mr. Embry noted that, while watching archaeologists dig a once-great and populous city like Caracol from the jungle may inspire confidence in the resilience of nature, none of us wants to see our own civilization end with our great cities buried by forest, even their memory forgotten. While man is perhaps the only animal that can cause serious and sustained damage to the environment, he is also the only animal capable of intelligently protecting it and restoring it. We have the ability to live in harmony with our environment. All we need is the will to do so. Conferences like this, and the cooperation and programs they foster, help to build that will.

Mr. Curtis Bowling of the Office of the Secretary of Defense of the United States greeted the participants on behalf of the U.S. Secretary of Defense, Donald Rumsfeld, and thanked the hosts and organizers.

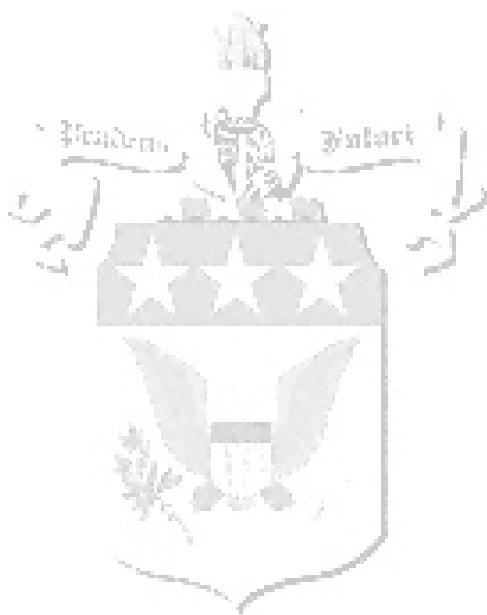
Mr. Bowling began by noting that, in May 2001, he had attended the conference “Enhancing Defense Environmental Cooperation in Central American and the Caribbean” in Costa Rica. That conference was attended by one hundred and twenty-five individuals from thirteen nations of Central America, the Caribbean, and Mexico. The participants included ten ministers and six vice ministers of defense and of the environment. As a result of that conference, the attendees listed six major regional threats: compliance and enforcement, natural disasters, deforestation, coastal area deterioration, fisheries depletion, and oil spills. The attendees then outlined four potential solutions and recommended regional action to strengthen

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bonds between security forces, the environmental communities, and the public. These solutions included both national and regional approaches to improving training and awareness, supporting contingency planning, and developing prevention strategies and improved communication coordination mechanisms.

These actions build on conclusions reached in Costa Rica: regional militaries should assist civil authorities with environmental threats because they bring to bear trained and disciplined control structures with the resources and permanent leadership to plan, and to execute or supervise a response. Sustainable development requires a balance between social, economic, and the informal sectors; national and regional security must be part of the calculation. As environmental threats often expand beyond borders and, in some cases, even have global dimensions, collective analysis of environmental information through civil-military partnerships can help to identify what threats exist and to assist policy makers in developing informed decisions.

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Chapter 2: Security Forces in Support to the Environment

Lieutenant Colonel George Lovell
Acting Deputy Commander of the Belize Defence Force

Moderator

The first session of the conference, Security Forces in Support to the Environment, was held in the morning of the first day. The moderator was Lieutenant Colonel George Lovell, Acting Deputy Commander of the Belize Defence Force. The objective of the session was to present case studies of successful environment and security initiatives. Three presentations were made; these presentations are summarized in this chapter.

Environmental Security in Central America

Brigadier General Marco A. Rosales,
Honduras

Defense Network Information Exchange (DENIX)

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Belize Case Study: British Army Training Support Unit Belize (BATSUB)

Major Steven Bowkett
Officer Commanding, British Army Training Support Unit

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Environmental Security in Central America

Brigadier General Marco A. Rosales,
Honduras

General Rosales began by noting that one excellent sign of the heightened consciousness of the importance of the environment was the increase in participation seen at this meeting. He went on to present a history of the effort to create environmental security consciousness in the region and to create programs that would involve the military in cooperative efforts in environmental security within the region.

He described the Mesoamerican Biological Corridor effort and noted that this region had become so important that Mexico had recently established its own program to focus on the corridor. This effort, which began in Turrialba Costa Rica in June of 2002 and continued with a second meeting, held in Honduras, which established the basis for such following activities as this conference in Belize. As a result of that process, CATIE developed a training program for military personnel on environmental security. This program was presented and validated at the Costa Rica meeting.

The purpose of that first meeting held in CATIE was to begin an important regional process for the development of a program that seeks to include all of the military forces and police forces of all countries in training that will contribute to the protection and conservation of our natural resources and the environment of our region—in particular, the Mesoamerican Biological Corridor. After hearing several presentations by various individuals representing various agencies and nations on how they are working to protect and defend the environment and their respective countries, a framework for a program was established. The participants determined a course of action based on five points, as shown in figure 2-1.

The second workshop was held in September of 2002 in Zamorano, Honduras. This workshop further developed the goals for the training of military and security officials. In particular it determined that such training must have elements related to ecology, politics, the environmental management of protected areas, and the control of illegal traffic in flora and fauna. One important aspect to be addressed was the relationship illegal abuse of the environment and illegal trafficking in drugs, people, and arms. Finally, he noted that Central America as a region suffers not only from

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- Distribute the program in the military and police schools and academies in the region in order for a comparative analysis of contents of related subjects imparted there to be performed in them.
- Plan meetings between countries which share borders to coordinate activities moved to program support and environmental protection in general.
- Pay special attention to the sensitization and consciousness-raising of the mid-range officers, taking into account their important role in the internal communications of the armed forces and police institutes.
- The importance of officers who are trained as Master trainers possessing an environmental education and/or vocation, teaching experience, permanence, and leadership was reiterated. In general terms, the profile of these Master trainers was defined as officers with the rank of captain or major. For trainers at the national and local level, with the grade of second lieutenant, police sergeant, or their equivalent.
- For the Master's level, the indicated profile corresponds to that of senior officers with university degree related to the topic.

**FIGURE 2-1: COURSE OF ACTION FOR ENVIRONMENTAL TRAINING, AS ESTABLISHED BY
THE COSTA RICA CONFERENCE.**

human exploitation of nature, but from the devastating effects of nature—hurricanes, earthquakes, landslides, and so on—on the human population.

General Rosales closed by stating that it is imperative that the nations cooperate against these threats as part of the effort of protecting the environment.

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Defense Network Information Exchange (DENIX)

Ahne Hall,
Project Coordinator, Technology TEAM Inc.

The second presentation of this session was a review of the U.S. Department of Defense's web-based information exchange tools, in particular the Defense Environmental Network and Information Exchange (DENIX) System <www.denix.osd.mil> and the Partnership for Peace Information Management System (PIMS) <www.pims.org>. Ms. Hall began by defining an information exchange tool as a worldwide web site that serves as a central communications platform for the exchange and dissemination of information between the Department of Defense, federal and state agencies, international governments, and the general public. It includes valuable information, resources, and customized communications capabilities that facilitate collaborative development. Such tools can increase effectiveness by providing access to information at the user's desktop, avoid costs by eliminating redundancies and centralizing the data source, and allow the user to stay current with news and events by providing access to the latest information. It also allows the user to interact with other professionals in the field, providing a platform for discussion, customizable working group areas, and other resources that allow information to be disseminated quickly. This includes news and publications and subject area pages for such areas as conservation, explosive safety, hazardous substances, occupational safety and health issues, pollution prevention, recycling, water, and waste.

The DENIX site also provides a U.S. Department of Defense policy index that includes Department of Defense Directives and Instructions, Army Regulations, Air Force Instructions, and Navy Instructions. It also provides federal legislation and regulations, including Public Law, U.S. Code, and Executive Orders. Finally, DENIX provides customized capability tools such as a calendar of civil security events, conference support and agendas, briefings and proceedings, discussion fora, a search tool, feedback forms, various templates, and private or open electronic working groups.

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Ms. Hall closed her presentation by noting that DENIX could serve as an excellent means of maintaining the energy and momentum generated by this meeting.

Belize Case Study: British Army Training Support Unit Belize (BATSUB)

Major Steven Bowkett,
Officer Commanding, British Army Training Support Unit

The final presentation of this session was made by Major Stephen Bowkett, Second-in-Command of the British Army Training Support Unit, Belize, or BATSUB. Major Bowkett explained that Belize kindly extends the right to the British Army to train in Belize, and that the British military in Belize applies the same standards of conservation of the environment as they do in the United Kingdom.

Major Bowkett then briefed on the Estate Management Strategy of the British Ministry of Defence (MOD). He began by noting that cooperation between those charged with preserving and conserving the resources—both natural and archaeological and cultural—of a nation and those who must use those resources is critical. The British army has been interested in this topic for many decades, but until June of 2000 and the promulgation of the Estate Management Strategy, the military had no overall plan. The Estate Management Strategy establishes that the conservation of natural and cultural heritage is in the interests of Defence. This policy engenders a creative tension: while training must continue, it must be sustainable. The operating concept is that planning and training can achieve sustainable use, which in turn pays benefits as good custodianship, particularly, in good public relations.

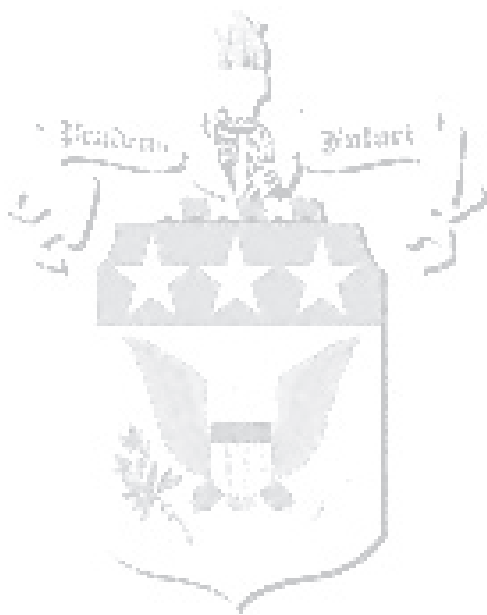
The strategy covers a huge range of activities in numerous large land holdings dating back to the First and Second World Wars. In fact, the Ministry of Defence is the largest land holder in the United Kingdom. To meet the goals of this strategy, there is a need to balance the needs of conservation, public access, and training on thousands of acres that include moorland, wetlands, coastal regions, farmland, and many redundant airfields that are being returned to agricultural or wild lands use.

In conclusion, Major Bowkett noted that the reality of the situation on these lands challenges the long-held assumption that use of the land by the military is bad for the environment. Actually, many species flourish on military held lands that do not flourish or even survive in the surrounding area. He proposed five reasons that the military was an intrinsically good

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custodian of natural land: the principle of dispersion reduces the damage done to any one location, training events are ephemeral and transitory, military units are trained to leave as little trace of their passing as possible, it is in the military's best interests to preserve the training area in as natural a condition as possible, and soldiers and officers often share a common awareness of the value of outdoor resources.

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Chapter 3: Defense of Coastal and Marine Resources

Ms. Imani Morrison

***Chief Executive Officer, Coastal Land Management Authority of
Belize***

Moderator

The second session, Defense Of Coastal And Marine Resources, was held in the afternoon of the first day. The moderator was Ms. Imani Morrison, Chief Executive Officer of the Coastal Land Management Authority of Belize. The objective of this session was to develop a broader awareness of coastal and marine resources conditions apropos for defense cooperation. Three presentations were made; these presentations are summarized in this chapter.

Pollution Prevention and Response

Ms. Sandra León

Marine Chemistry Laboratory Coordinator, Universidad Nacional, Costa
Rica

Watershed Management

Mr. Matt Wilburn

Sea Grant Program, United States National Oceanographic and
Atmospheric Administration (NOAA)

Mesoamerican Barrier Reef Systems Project

Mr. Noel Jacobs
Director

Pollution Prevention and Response

Ms. Sandra León,
Marine Chemistry Laboratory Coordinator, Universidad Nacional, Costa
Rica

The presentation on Pollution Prevention and Response emphasized the complexity of the water system as a whole. The speaker defined maritime pollution as any deterioration or degradation of the maritime environment. Maritime pollution may result from the direct or indirect introduction of substances and energy. It is generally human generated, but may have a natural origin. Its effects are detrimental to human health and the management of marine activities such as fishing and recreation.

There are several forms of contamination: nutritive elements such as nitrogen and phosphorus; bacterial and viral pathogens, toxic algae such as red tide; heavy metals; organic and synthetic waste; petroleum and pesticides; and radioactive waste. As an example of the relationship of maritime pollution to human health, red tide, which can lead to paralytic shellfish poisoning (PSP) in humans, has been linked to excess nitrogen and phosphorus.

Maritime pollution also has significant economic effects. Any change in the seascape and beauty of the area may result in a reduction of the tourist value of the area. Worldwide, ninety percent of the species pursued by marine fisheries reproduce in coastal habitats; seventy-seven percent of commercial fishing depends on these fish. While many people are concerned over the loss of biodiversity, most of the attention is on macroscopic species. It is important to extend that concern to the unseen, the microscopic, species, which are vital to the health of the marine environment.

The health of the marine environment also has an effect in combination with natural disasters; for example, pollution resulting in changes to the natural dynamic of sediments and nutrients can further increase the vulnerability of the environment to natural disaster. Another complication is a demographic explosion that has resulted in an indiscriminate move to populate coastal regions. This, in addition to tourism, has a serious impact on the coastal environment that can eventually have a negative effect on tourism.

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Many instruments of government exist to deal with these issues. These can be classified as mechanisms of command-and-control, mechanisms of economic incentive, and government-directed measures. Mechanisms of command-and-control consist of regulations that direct the conduct of economic agencies—both producers and consumers—and the relationship of their actions with their effects on the environment. Mechanisms of economic incentive consist of measures designed to induce producers to take appropriate measures to protect the environment during production processes. Measures directed by the government are designed to change values and perceptions, including education. Of particular interest is a move toward what is known as “clean production,” which refers to practices that minimize the production of short and long-term waste in the production process. The minimization of waste can actually generate savings for the producer.

Noting that there is much at stake as environmental impacts are evaluated, Ms. León closed by stating that the best course of action is for those who regulate the environment to work more closely with those who generate pollution; the relationship should not be adversarial, but rather cooperative in a search to find mutual benefits.

Watershed Management

Mr. Matt Wilburn.

Sea Grant Program, United States National Oceanographic and
Atmospheric Administration (NOAA)

Mr. Wilburn's presentation was a case study of the Gulf of Fonseca (figure 3-1). The Gulf of Fonseca is a complicated and complex region shared by Nicaragua, Honduras, and El Salvador. It includes 261 km of coastal land, including mangroves, lagoons, and estuaries, and it is home to more than seventy species of migratory birds and more than twenty-two species of mammals and reptiles. It comprises twenty-two percent of the mangrove coast along the Central Pacific coast of Central America, and it has been directly linked to ninety percent of the fish production in the region. The Gulf serves to stabilize soils, protect the coast, and trap nutrients.

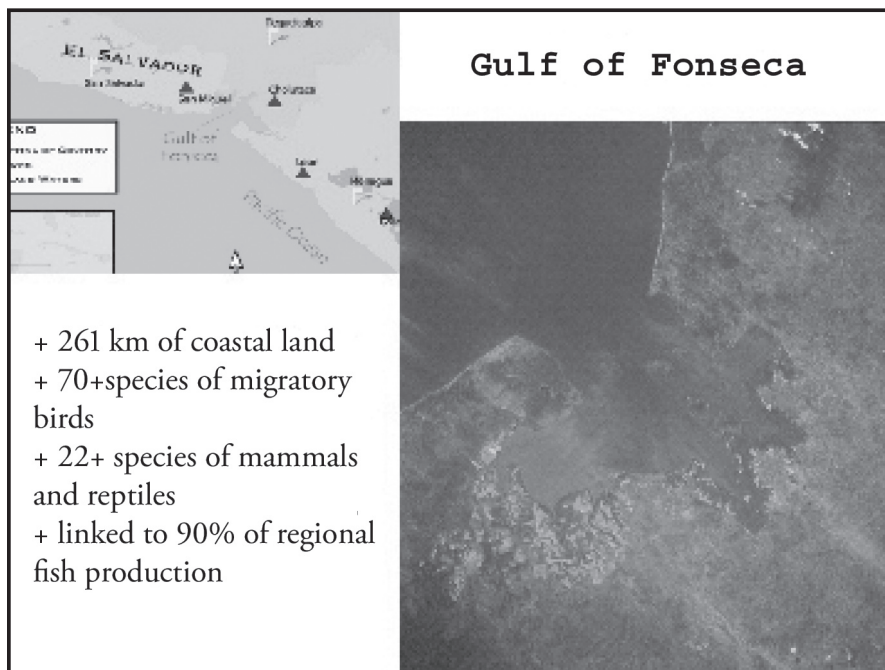


FIGURE 3-2: THE GULF OF FONSECA

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The problems of the Gulf of Fonseca begin in the upper watershed with deforestation and land tenure issues. There are several environmental threats to the watershed, including deforestation, soil instability and sedimentation, land tenure issues, agrochemical runoff, human waste, and dams.

The economic stability of the region and of each country depends upon the products they glean from natural resources, and maintaining and improving natural systems emerges as the region's single most important priority. The current population is directly dependent on the environment for sustenance. Negative impacts on the region can cause problems in tourism and agriculture, shrimp farming, and the growing of melons, sugarcanes, and cashews.

The NOAA program in the Gulf of Fonseca is supported by a U.S. Department of State Oceans, Environment and Science Initiative Grant to assess the applicability of the Sea Grant model to a Latin American/Caribbean context and to lay the foundation for a regional Latin American Sea Grant network that will focus on marine and coastal resource issues. The Sea Grant model is a university-based research, extension, and education program that links local resource users to sound science-based information and key decision makers. The extension system was originally developed by the U.S. land grant colleges. The goals of the extension system are to provide an effective, two-way communication between the users and producers of knowledge by communicating the results of scientific research to those who will apply them and communicating the problems and needs of user groups to the researchers.

The National Sea Grant program is almost thirty years old and involves three hundred universities in thirty states. The extension system is a time-tested model that can deal efficiently and effectively with a wide range of marine coastal issues. It provides a government system in regions that lack a system for resolving environmental conflicts, and it can be tailored to the needs of other nations and cultural and political settings. It promotes public participation on critical coastal and marine issues, and it can serve as a powerful tool for gaining access to international resources. The desire is for the Sea Grant program to “contribute to political stability by enhancing the capacity of governance at the local programmatic and policy levels.” It is designed to establish linkages and to build a regional network focused on the Gulf. This network would act as a means to connect to programs in each

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country, as well as to have them serve as future program models for other countries and regions.

It is important that an extension program be tailored to the culture in the region, and it is also important that the program take into account what is already being done and what capabilities already exist. Such extension programs can make approximately three thousand of scientists available to the region.

In the area of civil-military cooperation, Mr. Wilburn made several suggestions for efforts that could be appropriate for the military: continue increasing communication as appropriate within each country, continue using environmental liaisons to work with civil society organizations at the local, national, and international level to identify projects, continue to identify critical watersheds that feed reservoirs that are essential for irrigation, hydroelectricity, and municipal water supplies, build and repair terraces and small scale irrigation systems, and reforest denuded watersheds.

Mesoamerican Barrier Reef Systems Project

Mr. Noel Jacobs,
Director

Mr. Jacobs began by listing the objectives of marine protection as follows:

- To maintain physical integrity
- To maintain biological richness
- To protect ecological processes
- To ensure sustained exploitation
- To optimize the economic benefits
- To achieve national and regional security, and
- To maintain the peace

He noted that there are many threats to the marine environment, such as the deposit of toxic substances, uncontrolled marine transport, bio-prospecting, disasters resulting from petroleum extraction, nonsustainable exploitation of species, land-based sources of pollution, and most importantly a lack of an implementable integrated coastal zone management plan. The most important factor that is driving the agenda and the requirement for marine protection is the maintenance of biodiversity. Although there are various policy and legal framework at the international regional and national level, (see figure 3-2). The problem is that there are insufficient resources available at any level to adequately enforce these regulations.

Mr. Jacobs reported that, overall, the status of marine protection in the region was generally below the minimum level required. There is frequent habitat destruction, many marine species of be are being overexploited, illegal substances are being transported, and there is ongoing traffic in endangered species—particularly since the CITES treaty is only international and does not affect what can be done within a nation to exploit endangered species—illegal extraction and exportation of marine products, and poor port security. As a result, there are serious social and economic consequences that could threaten national and regional security.

The basic issue is the monitoring and surveillance and enforcement are virtually absent in many areas; as an example, MARPOL is not being enforced. In conclusion he made the following recommendations for areas in which improvements and cooperation could be made: investments in

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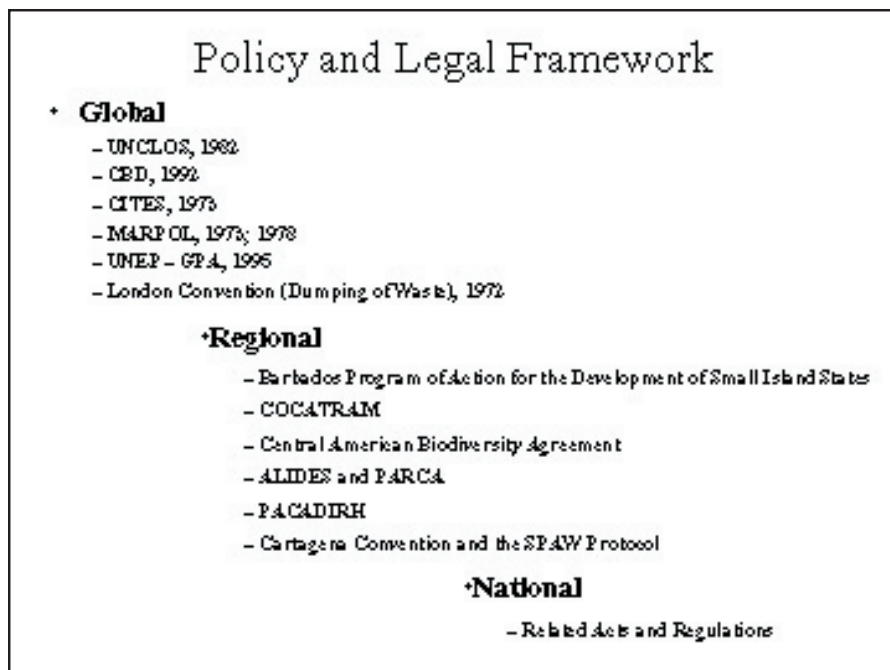


FIGURE 3-2: A THREE-TIERED POLICY AND LEGAL FRAMEWORK IS IN PLACE FOR PROTECTION OF MARITIME ENVIRONMENTS.

human resources; investments in infrastructure, training, and monitoring and surveillance techniques, the exchange of intelligence data; training and data interpretation; modification of policy and legal free-market political and regional levels; and the development and implementation of joint monitoring and surveillance programs.

Chapter 4: Ideas for Partnership

Mr. David Alarid

United States State Department Regional Environmental Hub

Moderator

The third session of the conference, Ideas for Partnership, was the last session of the first day. The moderator was Mr. David Alarid of the U.S. State Department's Regional Environmental Hub. The objective of this session was to identify opportunities for regional and bilateral civil-military environmental cooperation. Five presentations were made; these presentations are summarized in this chapter.

White Water to Blue Water Initiative

Ms. Kathy Bentley, Ocean Affairs Office, United States Department of State

Training in Environmental Conservation and Protection

Mr. Ronnie de Camino-Velozo, Department of Natural Resources and Peace, University for Peace, Costa Rica

Small Valleys Disaster Mitigation Project

Mr. Pedro Bastidas, Specialist, Natural Hazards Project, Unit for Sustainable Development and Environment, Organization for American States (OAS)

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Natural Disasters Prevention

Mrs. Maria Luisa Alfaro, Office of Foreign Disasters Assistance, USAID/
OFDA

**USAID’s Role in Environmental Security: Opportunities for
Alliances to Reduce Environmental Threats and Promote
Regional Stability**

Ms. Carey Yeager, Senior Regional Environment and Climate Change
Advisor, USAID/Guatemala-Central American Programs

White Water to Blue Water Initiative

Ms. Kathy Bentley,
Ocean Affairs Office, United States Department of State

The White Water to Blue Water Initiative was announced in Johannesburg in 2002. Its goal is to stimulate partnerships to promote integrated watershed and marine ecosystem-based management in support of sustainable development. The initiative is meant to involve government and private sector actors, such as tourism and manufacturing, academia, and non-governmental organizations. Its initial focus is on the wider Caribbean region. Sustainable development in the wider Caribbean region, which includes the Gulf of Mexico, can only occur if there are integrated watershed and marine ecosystem-based management programs. However, there are challenges—in particular, the probability of limited future availability of funding for such programs—and progress will rely on leveraging existing funds and new partnership opportunities. Ms. Bentley described the White

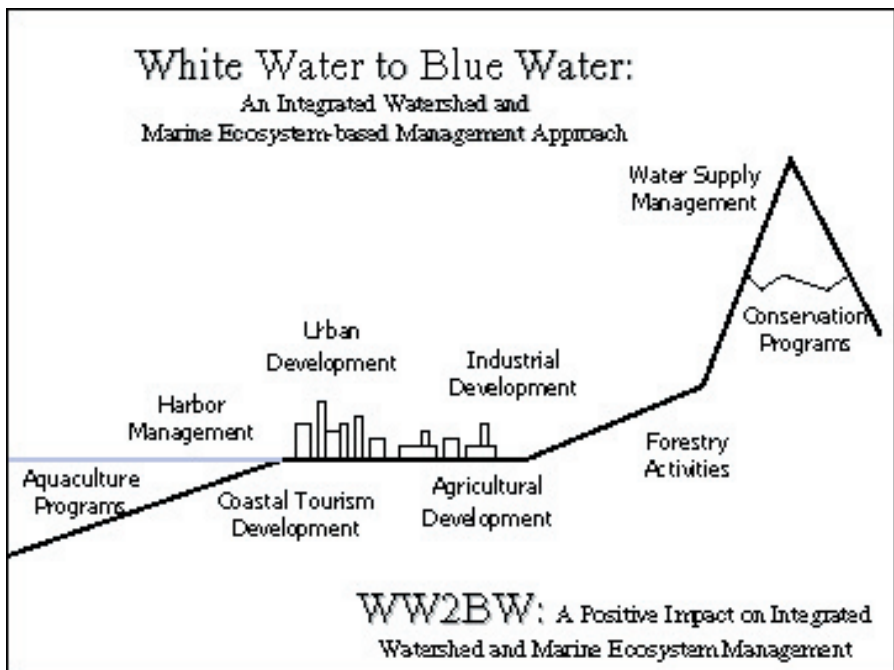


FIGURE 4-1: THE WHITE WATER TO BLUE WATER INITIATIVE: FROM THE
MOUNTAINTOPS TO THE SEA

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Water to Blue Water Initiative, a synergistic initiative to protect the marine environment—from the mountaintops to the deep sea—from all land-based sources of pollution (Figure 4-1).

The initiative was begun in reaction to major ecosystem changes. Coastal ecosystems are undergoing large-scale changes resulting from human activities and multiple stressors. The loss of ecosystem function has environmental, economic, and social impacts. Ms. Bentley noted that, globally, 80% of marine pollution is derived from land-based sources, such as increased sedimentation and nutrient deposition from deforestation and agricultural practices, habitat destruction, and urban and waste water runoff. In addition, there are many negative impacts on fisheries and marine ecosystems, including over fishing, poorly managed aquaculture, and such destructive practices as the use of explosives, unintentional by-catch, and bottom trawling. Other damage results from operational impacts of marine transportation, including anchor damage, noise, and damage resulting from wake or propulsion systems. Additionally damage is caused by accidental impacts such as oil spills, invasive species, and damages resulting from collisions and groundings. Finally, although tourism holds much economic promise for the region, it can also have negative effects resulting from the discharge of sewage and waste water, loss of habitat and biodiversity, increased erosion, and damage to coral reefs. Confronting these challenges will require the following:

- Awareness of the linkage between land-based activities and coastal health
- National and regional capacity to practice integrated watershed and marine ecosystem-based management
- Science-based decision making
- Coordination between local, regional, and international long-term strategies
- Engagement of business partners to promote best practices and to support regional activities
- Active promotion of successful strategies

The White Water To Blue Water Initiative is meant to be a catalyst for change and to improve collaboration between governments, international organizations, non-government organizations, and the private sector at the national and regional level.

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The next major event will be the Stakeholder’s Conference to be held in Miami, Florida, from 21 to 26 March 26, 2004. The conference will have four themes: marine ecosystem-based management, environmentally sound transportation, sustainable tourism and integrated watershed management.

International Visitor Teams will visit the invited nations prior to the Miami Conference to work with the national points of contact. The concept for the conference is that each nation shall send a team representing the stakeholders in that nation. These country teams will be asked to focus on six tasks:

- to identify needs, capabilities, and national plans prior to the conference,
- to showcase existing partnerships during the conference,
- to explore new ways to link management strategies from the tops of mountains down to the coastal environment,
- to develop new cross-sectoral partnerships for action
- to provide post conference feedback for use in future efforts in different regions, and
- to remain engaged in activities and continue to advocate for integrated watershed management strategies.

Ms. Bentley closed her presentation by inviting the participants to take best advantage of this initiative.

Training in Environmental Conservation and Protection

Mr. Ronnie de Camino-Velozo,
Department of Natural Resources and Peace, University for Peace, Costa
Rica

After a brief introduction by Dr. Victor Valle, the Dean of Academic Administration for the University for Peace, the second presentation was given by Professor Ronnie de Camino-Velozo of the Department of Natural Resources and Peace, University for Peace, Costa Rica. His presentation, *Support to Environmental Protection and Conservation in Central America*, was a proposal for a training course for instructors and military and police academies in Central America. As a representative of the University for Peace, he stated that he believes education is the key to the process of inculcating an ethos of environmental protection and conservation in the military and police forces of Central America, and that the University for Peace, as the only United Nations postgraduate school—offering five masters degrees—is unique in its ability to provide such education. Professor Camino discussed the different approaches concerning environmental conservation and protection, and he requested input from the various participants in helping to define the program.

He went on to discuss the legal framework and regional issues that must be addressed in any such training program and the social and environmental impacts the decisions on natural resources make. The program must also address the role of the military and police in intervening in disasters and providing humanitarian aid. This could include training on risk vulnerability and mitigation, primary causes of disaster, the major natural and manmade threats to the area, and regional and national strategies for mitigation and recovery. The University for Peace intends to implement the program as outlined by CATIE and validated in the workshop in Costa Rica.

The program is based on a five step process. The first step will be programming of the training course, wherein the instructors will prepare the course, gathering the necessary conceptual and technical support, and working in teams with organizations and specialists from the civil society in each country. Then the university will consult with the future participants. After consultation, the draft training manual will be prepared. Once the training manual is complete, the University will conduct a first course in Costa Rica; after which they will review and prepare the final version of the

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Manual. In the first half of 2004, the University expects to train thirty-five individuals who, it is hoped, will then spread the training that they have received through the professional education program of their respective organizations.

Small Valleys Disaster Mitigation Project

Mr. Pedro Bastidas,
Specialist, Natural Hazards Project, Unit for Sustainable Development and
Environment, Organization for American States (OAS)

The Flood Vulnerability Reduction and Local Alert System in Small River Valleys Program (SVP) was implemented by the Unit for Sustainable Development and Environment (USDE) of the Organization of the American States (OAS). The SVP is a program in the Central America region that develops low-technology early warning systems for floods; these systems are directly managed by the local communities in small valleys. The SVP also provides information to local governments and to a variety of local groups to plan their development while reducing their vulnerability to floods.

The SVP represents the contribution of a variety of disciplines, sectors, institutions, and organizations that work in topics related to water and climate. The focus is on atmospheric and meteorological events that are predictable flood hazards and that pose long-term risk to sustainable social economic development in small valleys. To implement the SVP in a specific small valley, an SVP technical team is organized to work on specific programs of vulnerability reduction to floods in the valley—particularly those programs related to poverty issues—to develop locally controlled flood early alert systems, and to prepare flood emergency response programs. These teams produce the technical information related to the three modules that cover the thematic areas of the SVP:

- a. Community organization and training for flood emergencies response,
- b. Local flood early alert systems implementation, and
- c. Flood vulnerability analysis and mitigation measures implementation.

Currently, the SVP has dual objectives:

- a. Continue to work at the national level in each country to create a cadre of knowledgeable and experienced professionals from the public and private sector who can assist local municipalities in setting up and implementing the SVP.

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- b. Create and develop a platform for a regional small valley flood alert and vulnerability reduction movement responsible for supporting national and local actions through regional training, technology transfer, and technical assistance.

Since 1995, SVP activities, supported by different agencies, have been developed in five phases as follows: Phases I and II of the Flood Hazard Mapping and Local Alert System Project in Honduras, and Phases III, IV, and V in all countries of Central America. The current Phase VI, based on activities executed in previous phases, consists of the development of a Regional Platform for the SVP.

The SVP Regional Platform is a dialogue to support local communities in developing and implementing early alert systems for floods, reduce the vulnerability of the local economic and social infrastructure, and organize and train the community on flood emergency management in the context of the Dialogue on Water and Climate (DWC). The SVP Regional Platform supports Central American emerging national and local groups of small valley floodplain integral management through training, technology transfer and technical assistance as well as implementing SVP activities. The Platform will permit the incorporation of flood early alert and vulnerability reduction components into local development, small valley integrate management, and development activities based on community participation models, programs, and projects. The initial scope for the SVP Regional Platform includes training, technology transfer, and technical assistance to local groups working in small valley floodplain integrate management in Central America and encompass the three thematic areas of the SVP.

Natural Disasters Prevention

Mrs. Maria Luisa Alfaro,
Office of Foreign Disasters Assistance, USAID/OFDA

Mrs. Alfaro began by describing the role of OFDA in responding to disasters outside of the United States. The OFDA mandate is to save lives, alleviate suffering, and reduce the socio-economic impact of disasters. OFDA responds to all types of natural disasters, outbreaks of disease, and accidents and other manmade catastrophes.

In regard to forest fires, Mrs. Alfaro identified four factors that effect fire preparedness and response in the region. First, at the institutional level, the regional response system for fires is extremely weak. Second, few Central American and Caribbean countries have a forest fire policy in place. Third, as more land is cleared, more farmland—where fire is historically used as a tool—comes in contact with the forests, increasing the likelihood that fires set for agricultural purposes will spread into the forests. Finally, much of the use of the forests is unsustainable; and even where laws exist to promote sustainable forestry, enforcement is lax, which leads to forests more prone to disastrous fires.

The effort to control forest fires must begin with prevention and planning; once the fire is set, there is very little time in which to mount an adequate response that will prevent excessive damage. Control must include actions before, during, and after the fire season. Appropriate measures to undertake beforehand include planning, improving the skills of personnel, coordination between agencies, gathering the materials and resources that will be needed, and educating the general public. A vital part of these efforts is an analysis of susceptibility, as shown in figure 4-2.

During the fire season, the emphasis should be on detection and warning systems, radio communications, and planning, particularly coordinating for the possibility of reinforcement should the fire develop beyond the means of any one organization to control. This is an excellent way to involve the military, as military organizations are usually possessed of superior communications equipment and have a wealth of experience in planning the movement and support of large organizations.

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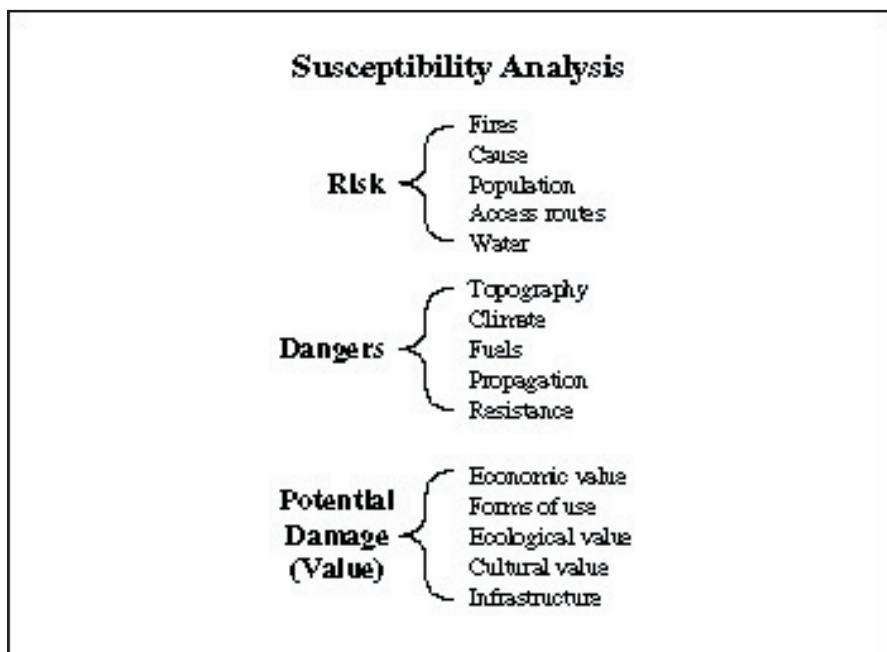


FIGURE 4-2: AN ANALYSIS OF SUSCEPTIBILITY IS A VITAL PART OF THE EFFORT TO CONTROL FOREST FIRES.

Afterwards, efforts should focus on evaluating the causes and losses and the effectiveness of the equipment and the overall effort, gathering the lessons learned, and beginning the planning progress for the next season.

Each nation should develop a national forest fire strategy that includes putting together the right team and the right equipment and establishing an effective relationship with environmental agencies. Mrs. Alfaro further recommended more education, the integration of local communities in programs for the prevention and control of forest fires, and the establishment of regional forest fire centers.

In closing, Mrs. Alfaro recommended seven specific actions:

- Development of policies, strategies, and plans in those countries that do not have them
- Implementation of the already existing plans
- Strengthen the remote sensing system and early warning systems
- Strengthen the environmental education campaigns

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- Strengthen the training programs at the community and armed forces level
- Development of action procedures for incident management (forest fires hazardous waste spills, etc.)
- Organizational strengthening for incident management

She stated that OFDA can help, but it was up to the individual nations to develop their own capability.

**USAID’s Role in Environmental Security: Opportunities for
Alliances to Reduce Environmental Threats and Promote
Regional Stability**

Ms. Carey Yeager,
Senior Regional Environment and Climate Change Advisor, USAID/
Guatemala-Central American Programs

In Central America and the Caribbean basin, USAID undertakes activities to reduce environmental threats and to promote regional stability. Activities designed to reduce environmental threats include developing and promoting best management practices in forestry, marine and coastal management, agriculture, and industry to reduce environmental degradation. Additionally, USAID participates in monitoring land use and forest cover change in order to help assess the impact of various programs and enforcement operations as well as modeling the possible impacts of climate change and developing strategies to reduce the environmental impacts of future climate change. Other programs involve the training of port and customs officials and assisting in the train of the agricultural private sector and laboratories to comply with food safety, animal, and plant health regulatory requirements—particularly as they apply to counter-terrorism and the reduction of the environmental damage caused by introduced species.

Activities promoting regional stability includes those that help to resolve land tenure in natural resource management issues, to develop and promote equitable, democratic, and transparent natural resource management policy, to promote the adoption of participatory conflict resolution mechanisms, and to attempt to harmonize informal regulations and increase the capacity to implement international conventions.

In 1994, the Declaracion Conjunta Centroamerica-USA (CONCAUSA) was signed by the heads of state of Central America and the U.S. government. In Central America; the agreement was modified in 2000. The CONCAUSA agreement embraces four common themes: Biodiversity Conservation, Environmental Legislation, Energy, and Sustainable Economic Development. The vehicle for USAID’s support of these themes is PROARCA II, which is currently involved in four sites in cross-border areas in Central America. A new site, the Usamacinta watershed, will soon be added to this program.

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As an organization, USAID states in goals in terms of “intermediate results” (IR). There are four IRs that are pertinent to environmental security in Central America and Caribbean: IR 1, improved protected area management in the Mesoamerican biological corridor; IR 2, expanded market access for environmentally sound products and services; IR 3, harmonization of environmental regulations; and IR 4, increased use of less polluting technologies.

USAID is in the process of beginning new programs in Central America. In partnership with NASA, they are developing a regional Global Information System (GIS) network to provide Central American countries with information needed to monitor and predict environmental change and to simulate climate change scenarios in order to assess the environmental. Another future activity includes expanding the the Famine Early-Warning System database and predictive model (MFEWS) to cover the Caribbean and Central American regions.

Dr. Yeager concluded her presentation by noting that several opportunities existed for cooperation in the region. She listed several ways that the military and civilian communities of the region, the governments and non-governmental organizations, can take advantage of these opportunities: facilitation, networking, coordination, information sharing, joint programming and work planning, and participation in Global development Alliances. However, she cautioned that there constraints on how much assistance USAID could provide to these efforts. USAID is in general, restricted from providing assistance (funding) to host country police or to the military to implement activities; there are, primarily in the case of natural disasters and health crises, limited exceptions.

Chapter 5: Defense of Terrestrial Resources

Ms. Jean Weaver
U.S. Geological Survey

Moderator

The fourth session of the conference, Defense Of Terrestrial Resources, was held in the morning of the second day. The moderator was Ms. Jean Weaver, of the U.S. Geological Survey. The objective of this session was explore land-based environmental issues that require support from security forces. Four presentations were made; these presentations are summarized in this chapter.

Sustainable Forestry Resources

Mr. Oswaldo Sabido
Chief Forest Officer, Ministry of Natural Resources, Belize

Prevention of Illegal Trafficking in Wildlife

Mrs. Yolanda Matamoros
Mesoamerican and Caribbean Coordinator for the IUCN Specialty Group
on Conservation and Reproduction of Endangered Species

Dealing with Invasive Species

Claudine Sierra
World Conservation Union (IUCN)

Land Use Planning on a Regional Basis

Mr. Ovidio Ribero
U.S. Geological Survey

Sustainable Forestry Resources

Mr. Oswaldo Sabido
Chief Forest Officer, Ministry of Natural Resources, Belize

Mr. Sabido, noting that the forests are a valuable resource, began his presentation by quoting Gifford Pinchot, recognized as the founder of Forestry as it is practiced in the United States, on the value of natural resources in general:

“The rightful use and purpose of our natural resources is to make all the people strong and well, able and wise, well taught, well fed... full of knowledge and initiative, with equal opportunity for all and special privilege for none.”

Forestry can be defined in different ways. For any definition, the common denominator of effective forest management is the providing of resources for the welfare of the society today and in the future. The first issue, therefore, is to determine the various goods and services that may be derived from the forest. Goods and services may be either tangible or intangible.

Tangible products include lumber, extracts (resins, glues, tannins, etc.), food from plants (fruits, nuts, roots, etc.), and resources derived from hunting. Services are often intangible, and include tourism, commercial recreation, and similar uses. Additional value is provided by such intangibles as natural beauty, which affects the tourist value of an area, the protection of biodiversity, educational and research value, flood prevention, carbon sequestration, water and soil conservation, and noise reduction. Some values may be defined as option values, resources that may be reserved for use in the future; a prime example is the possible benefits of bio-prospecting, which may be better reserved for the future.

Sustainable forestry, therefore, is essential to sustainable development. Any plan for sustainable forestry must begin with the establishment of criteria and indicators (C&I) for evaluating the state of the forest. These criteria and indicators must address the following:

- Socioeconomic Benefits
- Biodiversity
- Productive Capacity

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- Forest Health
- Soil and Water Quality
- Carbon Sequestration

Criteria and indicators are not value-neutral; instead, they reflect a vision of an ideal world. Since wealth stratification is a feature of most human societies, if great care is not taken, the C&I may end up primarily reflecting the interests of the wealthier and more powerful members of the society.

Central America has abundant natural wealth, but this wealth is threatened by the socio-economic reality of the region:

- 60% live in poverty—40% in extreme poverty
- More than 10 million people have no access to health care
- 40% do not have potable water
- In indigenous and rural populations, 33% of the people over 15 years of age are illiterate
- The population has grown from 11 million to 34 million in the last half century

As a result, the forest suffers from deforestation, fires, pests and disease, irrational use, weak land tenure systems, and a lack of clear land use policy. Additional pressures are brought to bear from outside the region.

In closing, Mr. Sabido reminded the participants that all forests have an intrinsic value even where no immediate payoff is apparent. Meetings, such as this meeting in Belize, and other cooperative efforts, offer the best approach to meeting the challenges of forestry in Central America in a regionally effective manner.

Prevention of Illegal Trafficking in Wildlife

Mrs. Yolanda Matamoros,
Mesoamerican and Caribbean Coordinator for the IUCN Specialty Group
on Conservation and Reproduction of Endangered Species

The prevention of the illegal trade in species, in violation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), has become increasingly important. The three most profitable illegal trade activities in the world are illegal weapons, illegal drugs, and illegal animals and plants. All three of these trade activities are closely interrelated—particularly illegal drugs and illegal trade in species. In the last three years, the illegal trade in animals and plants has been considered the most profitable.

The trade began with foreigners who make contact with indigenous people in the interior of the region. It utilizes the same routes as narco-traffickers to evade border controls and police. The trade in illegal species, in general, is a low priority for local officials with limited law enforcement resources. The risk of getting caught is relatively low, and the risk of serious punishment is low as well. Thus, with limited risk, the trafficker in illegal species can earn an 800% return. In many cases, plants and animals are used to pay wages and bribes and as a means of money laundering. With prices as high as \$40,000 dollars for a jaguar, and \$20,000 for a jaguarundi, the profit potential is very high, and money earned in the drug trade is now being used to help finance the trade in endangered species.

The primary tool for the interdiction of the illegal trade in plants and animals is the CITES treaty. Signed in 1973, the CITES treaty deals only with trade between nations; it does not govern trade within a nation. While CITES has done an excellent job in interdicting traffic at ports and airports, as the traffic in illegal species becomes more aggressive, the enforcement effort will need to evolve. In the future, the effort will require more customs personnel and the ability to monitor sites where animals are held in captivity and plants are held out of their wild environments.

Since it is not illegal to hold wild animals in captivity in most Central American countries, it is difficult to establish provenance for any specific animal or plant. Currently there is estimated to be a wild animal in one of every four households in Costa Rica alone: over 1 million wild animals. The

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scope of the problem becomes even larger when consideration is given to the thousands of endangered plants, particularly orchids, that are also traded illegally.

Protocols have been established under the IUCN for the confiscation of illegally traded animals (see www.iucn.org/themes/ssc/pubs/policy/confiscated/confguideenglish.pdf). Three options are available for final disposition of the animal: Liberation into the environment, captivity, and euthanasia. Each option has its drawbacks. Liberating the animal back into the wild can spread diseases and parasites picked up in captivity, the majority of the animals die, and—if not properly—monitored, the animals will be returned to the illegal trade rather than actually released. Captivity—in zoos and wildlife parks, for example—is expensive, and such facilities can actually create a market for endangered species. The last option, euthanasia, which may be the best from the standpoint of not encouraging illegal traffic in any way, is bad for public relations.

In order to reduce or eliminate the illegal international traffic in endangered species, national and regional organizations must establish controls on hunting and on places where illegal species are held—legally or illegally—in captivity and on liberation and reintroduction programs for confiscated animals. More knowledge must be available for those responsible for controlling this traffic, in particular, databases on the species involved, information on managing those species in the wild and in captivity, and information on pertinent national and international laws.

Finally, Mrs. Matamoros noted that it is imperative that all organizations tasked with dealing with the problem of illegal traffic in endangered species maintain a close liaison with the CITES Secretariat to ensure that the most up-to-date information is shared by all.

Dealing with Invasive Species

Claudine Sierra,
World Conservation Union (IUCN)

Increased volumes and speed in the transport of people and goods over the last centuries have thrown down the geographic barriers of oceans and mountain massifs. At the same time, the introduction of exotic species has begun to threaten biodiversity at a global scale.

Invasive Introduced Species are defined as organisms that were transported by humans, either intentionally or unintentionally, to locations they could not have reached by themselves, where they are out of control and are causing environmental and economic damage. They dominate, alter, compete, depredate, hybridize, or spread diseases among native species. They also alter communities by modifying the soil, water, and light supplies, frequency of fires, or the landscape structure.

Ecologists classify biological invasions as the second cause of loss of biodiversity after loss of habitat. Biological invasions are basically a human phenomenon caused by our economic activity and our choices as consumers, travelers, gardeners, pet owners, fishermen, and so forth.

Trade and tourism provide the means of transport for most invasive species, whether intentionally or unintentionally. Movements of troops, aircraft, ships, equipment, and food in times of war have also introduced a large number of invasive species. Nevertheless, military organizations and operations can be used to help to minimize the risk of introduced species invasion.

Ms. Sierra close by noting that the military can also contribute to controlling the damage caused by invasive species by assisting with non-specialized control and eradication tasks. It must be noted, however, that control and eradication techniques are varied and expensive, and some countries have already decided to invest in prevention and quarantine, thus protecting their borders from certain unwanted organisms. Border protection may be another area in which a well-trained military resource could be valuable to these efforts.

Land Use Planning on a Regional Basis

Mr. Ovidio Ribero,
U.S. Geological Survey

Two major natural disasters have given impetus to the use of GIS technologies in the Central American and Caribbean region in the past five years: Hurricane Mitch in 1998 and the El Salvador Earthquakes of 2001. The U.S. Geological Survey, together with other U.S. government and international agencies was funded by the United States Congress to assist in the reconstruction activities of both events. As a result of these activities, the U.S. Geological Survey (USGS) has developed a series of GIS data products and applications that are currently being used for multiple purposes. These products and applications are mainly targeted to preparing for natural hazards and preventing the loss of life, but they are having an impact in regional and land use planning in the region.

As local needs were assessed right after Hurricane Mitch, the need to protect critical infrastructure surfaced as one of the most important concerns. The enlargement and modernization of stream gage networks in Honduras and El Salvador became an essential part of the reconstruction efforts. Other initiatives included the creation of a comprehensive groundwater resources database of Honduras, landslide and flood hazard studies in El Salvador and Nicaragua, and damage assessments to mangroves and shrimp farming in Honduras. As these efforts progressed, the need for up-to-date geospatial data became evident, as most maps of a scale adequate for assessing localized damages, such as landslides and floods, proved to be out-of-date, and very few aerial photographs of the affected areas existed. The host countries and the USGS decided to collaborate in the creation of current digital datasets.

The Muni-GIS project was developed as a way to make the basic geospatial data needed to conduct natural hazard planning activities accessible to medium and small municipalities. The Muni-GIS project integrated a comprehensive set of newly developed GIS data with customized tools to input cadastral records in an easy-to-use, low-cost desktop-GIS format. Each Muni-GIS location received computer hardware, software, and GIS training for land managers, planners, and technical staff. Seventy municipalities in affected communities throughout Nicaragua, El Salvador, Guatemala, and Honduras participated in this project. The Muni-GIS proved so useful that, after the El Salvador earthquakes of 2001, it was expanded to

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an additional six locations. As of 2002, over three hundred people from the four host countries have been trained in GIS.

The Muni-GIS datasets provided to each municipality consisted mainly of topographic base data, aerial photography, and natural hazard data. The topographic data was acquired from the most current paper or digital maps available, mostly by agreement with the official mapping agency of each country. Contractors took the aerial photography at 1:40,000, with ground control fieldwork performed by USGS and local government staff. The final digital orthophotos have a spatial resolution of .5 meter to 1 meter equivalent with a final scale of approximately 1:6,000, suitable for detailed mapping of both urban and rural areas. Hazard maps for selected areas were produced by the USGS in cooperation with local agencies and integrated in the final Muni-GIS set-up.

In addition to the datasets the municipalities received a computer, an ArcView software license and a customized application designed to create cadastral records. Final datasets will be available through the USGS as a set of seventy-four Muni-GIS CD publications, of which sixteen volumes have been published. Individual datasets can be found by searching the network of regional GIS clearinghouses and the USGS, EROS Data Center.

The USGS continues to develop projects directly related to natural hazards mitigation and regional planning. One project that has been proposed to the US Department of State, Office of Foreign Disaster Assistance (OFDA) is designed to develop high precision digital terrain models for use with hurricane storm surge modeling in four Caribbean nations: the British Virgin Islands, St. Lucia, Grenada, and critical coastal areas of Belize.

GIS technologies are an invaluable tool to address issues such as hazards mitigation and preparedness, water resource management, sanitation, cadastral and tax information management, and urban development.

With proper training, national agencies and local governments are capable of operating, maintaining, and expanding GIS installations and developing new applications, but further application development depends upon improved GIS databases. Future projects will require high-precision local-scale data, close participation of cooperating agencies and the ability to exploit information exchange tools such as the Internet.

Chapter 6: Military-Civil Interface

Mr. Robert L. Brown

Environmental Engineer, United States Southern Command

Moderator

The fifth session of the conference, Military-Civil Interface, was held in the morning of the second day. The moderator was Mr. Robert L. Brown, Environmental Engineer for the U.S. Southern Command. The objective of this session was clarify areas for enhanced military-civil interface on environmental issues. Two presentations were made; these presentations are summarized in this chapter.

Environmental Issues of the Law of the Sea Convention

Commander Carmen Castro

Environmental Department Chief, Costa Rican Coast Guard

The Non-Governmental Organization Role

Ms. Diane Wade-Moore

Director of Advocacy, Belize Audubon Society

Environmental Issues of the Law of the Sea Convention

Commander Carmen Castro,
Environmental Department Chief, Costa Rican Coast Guard

Several international agreements have direct implications for the marine environment: the International Convention for Preventing Ships from Polluting the Sea (MARPOL 73/78), the Convention for the Safety of Marine Life (SOLAS, 1974), the Convention for the Disposal of Dredged Materials (OSPAR, 1992) and chapter 17 of Agenda 21 (1992) executed as an action plan for the United Nations Conference on the Environment and Development.

The framework convention is the Marine Rights Convention signed in 1982 (effective since 1994). Classified as the constitution of the oceans, it brings together the principles shared by the world's nations regarding marine rights. It is far reaching, and it outlines the governments' duties and rights (Coastal, Flag and Port) relative to many activities in the maritime jurisdiction areas (Inland Waters, Territorial Sea, Contiguous Zone, Exclusive Economic Zone [EEZ], Continental Platform, High Seas and the zone defined as the ocean bottom and its subsoil outside the national jurisdiction limits). Its principles demand a dynamic vision of the domestic seas' condition, the formulation of objectives, selection of strategies to be used, clear identification of appropriate authorities and the limits of their authority, adoption of a coordination mechanism between the economic and environmental sectors, implementation of evaluation measures, and sectorial management of the various maritime space activities. Several of the most pertinent parts of the Convention include the following:

Environment (Part XII). States have the obligation to protect and preserve the marine environment under their jurisdiction [Arts. 56 and 192], ensure that the laws and related regulations are enforced and take “all possible measures...” that are necessary to prevent, reduce, and control pollution of the marine environment, using the most viable means available, and to prevent and reduce the introduction of exotic species into that environment [Arts. 194(1) and 196].

The Convention encourages international cooperation among nations. Some examples of this are notifying them immediately when an incident is reported that could affect them [Art. 198], the development of contingency

plans to deal with incidents of marine pollution [Art. 199] and other legal protection regarding environmental and legislative aspects [Arts. 206-211].

The appropriate authority must establish rules in order to protect the natural resources of the area, prevent damage to marine life, and protect against marine pollution from mineral exploration and exploitation related activities [Art. 145].

Fishing and Aquaculture (Parts V, VII, IX). The Convention radically changed the legal fishing regulations. It recognized the right of the coastal State to a fishing jurisdiction of 200 miles. It also imposed rigorous obligations on the sustainable management of living resources, administration (concession of licenses to fishermen or ships), conservation (regulation of fishing seasons) and exploitation (type and size of tackles and fishing boats, as well as their number) in the EEZ, conferring sovereignty rights upon them for these purposes [Arts. 56, 61 and 62]. It also establishes important restrictions on the concept of freedom to fish on the high seas subject to international obligations and the rights and interests of other coastal States in the case of shared populations or highly migratory species [Art. 116]. For this there are complementary agreements such as the Agreement relative to the Conservation and Ordering of the Transzonal Fish Populations and the Highly Migratory Fish Populations (1995). This puts forward the development of effective regulations for conservation and management of international fish populations; especially the transzonal populations, essentially high seas populations also found within the EEZ's of the coastal States. Finally it forces the coastal State to establish the necessary means for the conservation of the high seas living resources [Art. 117].

Minerals (Parts V, VI and XI). In the EEZ, the coastal State exercises sovereign rights over the continental platform with the purpose of exploring and exploiting its natural resources (minerals from the subsoil and sea bed) and authorizing and/or regulating drilling in the continental platform [Arts. 77(1) and 81], as well as the exclusive right to authorize the construction of installations for these purposes [Art. 60]; provided that their operation does not unjustifiably disturb the shipping rights of other States. In addition, it creates regulations for mining exploitation in the Zone whose resources (solid, liquid or gaseous minerals in situ, including polymetallic nodules) are part of the world's common heritage or *res communis* [Art. 136] and the

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Authority shall act on its behalf [Art. 140]. For this reason, no State shall be able to exercise sovereign rights over the Zone or its resources [Art. 137].

Scientific Research (Part XIII). The Convention establishes the general parameters of marine scientific research as having peaceful purposes without interfering with other legitimate uses of the sea, respecting protection of the environment. It fosters international cooperation, the publication and dissemination of information resulting from its research programs and it establishes responsibilities for marine pollution resulting thereof [Arts. 240-265].

In its territorial sea, the coastal State has the exclusive right to regulate scientific research [Art. 245], with little variation for the EEZ and the continental platform where the coastal State has the right to regulate scientific research activities [Art. 246]. It establishes the liberty of scientific investigation on the high seas [Arts. 87 and 257] and in the Zone [Arts. 143 and 256], provided that the research team does not block the established shipping routes [Art. 261].

Technology (Part XIV). Promotes the development and transfer of marine technology.

Marine Transportation and Ports (Parts II-V, VII, X-XII). Regulates aspects thereof.

Coastal Development and Tourism (Part XII). The Convention does not make direct reference regarding pollution from land but rather it implies so [Arts. 194, 207 and 213].

Formation of Human Resources. The Convention promotes coordination between the sectors that exercise authority over domestic maritime space as well as the integration of all disciplines involved such as Marine Environmental Science, Law, Safety and Defense, Politics, Tourism and Marine Transportation that promote professionalization of human resources.

In this last regard Costa Rica has promoted a change in the administration pattern of the National Coast Guard thanks to mechanisms such as its Creation Law (Number 8000, year 2000), creation of the Environmental and Legal Departments, implementation of its Academy, Bilateral Agreement of Joint Patrol CR–USA, seminars with district attorneys and judges, improvement of the Interinstitutional Coordination, participation in steps

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toward new legislation, Environmental Education for communities and institutions, Control and Protection, development of alternatives in work areas and promotion of active community participation.

In conclusion, Commander Castro stated that the challenge for a nation working toward sustainable development is to attain integrated management of its marine and coastal zones, considering several elements: the evaluation of marine resources and ecosystems; an inventory of current use of maritime space; the identification of conflicts, problems, and their impacts; a clear identification of the authorities and their authority over the activities within this space; a dynamic vision of the long term desired condition for the ocean; the formulation and prioritization of domestic objectives and strategies (zoning and extraction limits), and resources. This is all necessary in order to administer the institutional and economic sectors so that their activities may be compatible with the nations sustainable development objectives.

The Non-Governmental Organization Role

Ms. Diane Wade-Moore,
Director of Advocacy, Belize Audubon Society

In the past, civil-military relations within the region have been focused on stabilization of democracy and ensuring that basic human rights are upheld. The roles of Non-Governmental Organizations (NGOs) and Civil Society Organizations (CSOs) in these situations are clearly defined. These roles focus around the empowerment of civilians to overcome existing socio-economic inequalities and to actively participate in their own governance.

The roles of NGOs and CSOs in civil security forces environmental cooperation are less distinct than the roles of Government and Security Forces groups. However, the field of environmental management in Belize represents an area of great success in regards to the inclusion of civil society in participatory and policy-influencing roles. Several NGO and CSO entities in Belize play important roles in environmental monitoring and management.

NGO and CSO groups of Belize are empowered by the Government of Belize to act in the capacity of Natural Resource Managers. Recent data suggests that approximately 45% of Belize's National Lands are currently under protected areas status; of this total, approximately half of the acreage is managed by either NGO or CSO entities. In Belize, groups such as Belize Audubon Society, Programme for Belize, Friends of Nature, and the Toledo Institute for Development and Environment play integral roles in the management of Belize's protected areas. The need for this approach to natural resources management is rooted in the government's current inability to single-handedly manage all of the designated areas, as a result of constraints in financial and human resources. In taking this mandate, NGOs and CSOs provide a support structure for governmental sectors.

Environmental monitoring is commonly done in relation to protected areas management. This monitoring of resources is carried out in an effort to identify activities that are potentially threatening to the integrity of the environment. Initiatives exist where monitoring remains the focus of the non-governmental organizations.

As they are in many cases the primary implementing agencies responsible for the monitoring and the day-to-day management of Belize's

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natural resources, NGOs and CSOs also play a crucial role in the setting of national agendas. As primary implementers, NGOs and CSOs are faced with leveraging their resources to fit the national need to alleviate the pressures on an already-stressed protected areas system. Their participation in policy-making bodies and on various national advisory committees allows for important input in the development of national management strategies and in the attainment of national biodiversity and resource management goals.

Apart from the day-to-day management of Belize's Natural Resources, NGOs and CSOs play a crucial role in community relations and environmental education. True environmental conservation is unattainable without the acceptance and support of the general public and, most importantly, acceptance and support from by those communities that buffer protected areas and utilize their resources. As a result, NGOs and CSOs involved in natural resource management have traditionally complimented their natural resource management program with environmental education initiatives. Environmental education initiatives are normally rooted at the community level and radiate outwards to encompass a broader national audience. In Belize, Environmental Education has its base in the early works of such entities as the Belize Zoo and the Belize Audubon Society.

For many, NGOs and CSOs remain a non-threatening face in communities. They are often perceived as the "big brother" element, a non-biased, non-partisan, non-military entity with the ability to act as a catalyst for change in attitudes and approaches to environmental conservation. NGOs and CSOs are capable of developing "trust relationships" through a non-aggressive approach. These "trust relationships" result in the development of capacity and structure within the communities, empowering them to actively participate in natural resources management.

NGOs and CSOs play a key role in the building of confidence measures across disputing boundaries. Trans-boundary protected areas management by non-governmental organizations allows for more effective resource management, as political disputes are, in most cases, not the priority of managers in the day-to-day management of the resources that they were entrusted to manage. Although agreements between managers are usually informal in nature, they are however, usually well defined and provide set procedures or protocols for activities that allow for quicker and more efficient exchange of information and technical expertise, providing a support system that is independent of diplomatic channels and political red tape.

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It has been the experience of those managers of border parks that participation and collaboration of non-governmental organizations across political borders attain greater results than initiatives attempted with the involvement of governmental sectors. Non-governmental interactions are perceived as being less intrusive, and the lines of interaction as being less complicated and more easily accepted by the parties involved.

Initiatives such as the Tri-national Association for the protection of the Gulf of Honduras (TRIGOH) have created many successes. The most important is a forum for NGOs from Belize, Guatemala, and Honduras to discuss the management of shared resources of the region and to attempt the development of complementary regulations for the management of these resources. Informal agreements between Programme for Belize and the Maya Biosphere Reserve also exist as a tool to share information about threats to the systems.

The sensitive issues of drug trafficking, illegal resource trade, and border incursions across trans-boundary parks also offer NGOs and CSOs with a unique opportunity to work with security forces. As NGO managers have the on-site knowledge of the areas under their management, they play a role in intelligence gathering efforts and also have a responsibility to share resources in protection of these areas. A good example of this type of relationship is seen in the collaborative actions between the Belize Defense Force and Programme for Belize, the managers of Rio Bravo Conservation and Management Area. Programme for Belize uses its GIS expertise to identify areas of incursions and illegal activities during standard patrols of the area that they manage. These points are forwarded to the relevant security agencies for their follow-up. Programme for Belize also funds three aerial recognizance surveys, in conjunction with the Defense Force, on an annual basis.

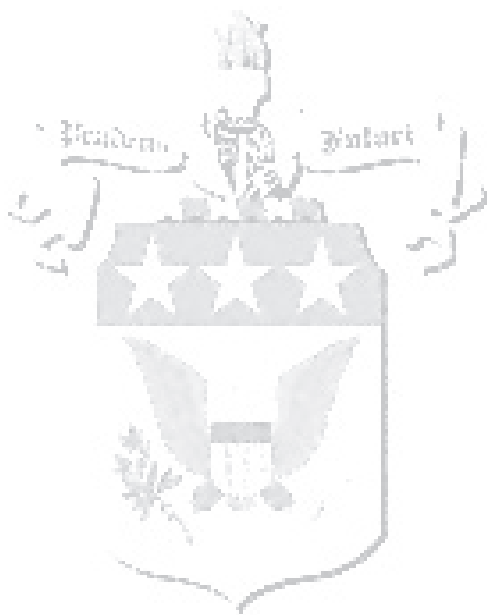
As most NGO and CSO groups are not given administrative/legal authorities over the areas they manage and do not have the capacity to deal with some of the more sensitive matters referred to previously, a gap exists as to enforcement and management of these areas. This gap can be effectively filled by the inclusion of national security forces in certain aspects of resource management. The role of security forces should complement the efforts of local NGO or CSO managers; whilst NGOs and CSOs should, wherever possible, facilitate the activities of national security forces through resource allocation.

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While the overriding role of NGOs and CSOs is the management of the natural resources contained in the various protected areas, there are many external factors that affect their effective implementation of management programs. On many occasions, these Protected Area Managers are drawn into activities that are not directly related to their biodiversity program, but have serious repercussions for the resources if not addressed. These are often illegal in nature and range from illegal collection of the resources to using the protected areas as drug-trafficking routes. Since NGOs and CSOs seldom have the authority or the capacity to deal with these sensitive and dangerous issues, they often require security or military support. In fact, it is the norm that illegal issues within the protected areas are directed to the relevant security forces rather than to the park staff to address. The common roles of security forces within the present management structures include patrol support, protected areas border monitoring and demarcation, and the use of security resources such as updated maps and aerial photography in more effective management planning.

Ms. Wade-Moore concluded by noting that the roles of NGOs and CSOs in environmental management within the Belizean context remain integral to the protection of Belize's Environment. With the evolution of environmental management in Belize and the development of more formalized structures in which the NGOs and CSOs are to operate, it is expected that the roles of NGOs and CSOs will be strengthened and more clearly defined.

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Chapter 7: Workshop Reports

The final session of the conference was dedicated to a Workshop wherein three working groups met to discuss approaches along three respective themes: Training, Marine Resource Cooperation, and Terrestrial Resource Cooperation.

The group on training identified several specific areas for training (e.g., environmental law, water resources, forest fires, natural disaster response, and prevention and control of illegal activities) and attempted to identify a possible regional or national body to take the lead; these included the Central American Commission on Environment and Development (CCAD), the U.S. Agency for International Development (USAID) Office of Foreign Disaster Assistance (OFDA), the Regional Committee on Hydraulic Resources from the Central America Integration System (CRRH-SICA), the Central American Institute for Business Administration (INCAE), the Caribbean Disaster Emergency Response Agency (CEDERA), and the Coordination Center for the Prevention of Natural Disasters in Central America (CEPREDENAC).

The maritime group likewise chose five priority actions: Protection of Marine Regional Marine Resources, Strengthening of local Capacity, Identification of Common Interests, and Training. This group identified who should be responsible within the various governments for each task (Defense, Justice, Environment, etc.) but did not identify any regional lead agencies.

The Terrestrial group identified Mitigation and Prevention of Natural Disasters, Control of trafficking in Endangered Species, Protection of Remote Wildlands and Border areas, and Prevention of the Introduction of Endangered Species. Like the Training Group, this group identified a number of potential regional agencies to take the lead: Central American Commission on Environment and Development (CCAD), the U.S. Agency for International Development (USAID) Office of Foreign Disaster Assistance (OFDA), the Regional Committee on Hydraulic Resources from the Central America Integration System (CRRH-SICA), the Central American Institute

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for Business Administration (INCAE), the Caribbean Disaster Emergency Response Agency (CEDERA), and the Coordination Center for the Prevention of Natural Disasters in Central America (CEPREDENAC), the Central America Integration System (SICA), the Caribbean Community and Common Market (CARICOM), and CCAD.

The three groups presented their results in a plenary session. This session produced some excellent ideas for future efforts in the arena. Of these, the following were generally acclaimed to be worthwhile:

- The already existing structure and capacity of the DENIX system should be used in this effort.
- The representative of Florida International University offered to conduct needs analyses within the regional nations to determine what IT investments would be required to make this a workable option for all of the regional players.
- It was confirmed that the University for Peace should continue with its efforts to establish the CATIE training program as validated in Turrialba, Costa Rica in 2002.
- It was recommended that CCAD be approached at the Ministerial level to determine how these efforts could be integrated with their plans.
- It was agreed that the best approach would be to establish a pilot project to prove out the concept on a small scale before engaging in any large-scale undertakings.

The conference concluded with the compliments of Major General Cedric Borland, Commander of the Belize Defence Force, and Mr. Curtis Bowling, Deputy Under Secretary of Defense of the United States.

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Appendix A: Agenda

**Civil –Security Forces Environmental Cooperation
in Central America and the Caribbean**

Belize City, Belize

July 21-24, 2003

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Meeting Objectives:

Share successful approaches to implement the civil-security forces environmental cooperation in the region based on the results from the May 2001 Ministerial Conference held in San José, Costa Rica. Explore how, security forces, environmental and forestry authorities can work together to protect people from environmental threats and promote regional stability. Investigate innovative ways to use security forces to promote sustainable development.

Conference Agenda

Day 0 (21 July 2003)

All Day	Arrival of Conference Representatives to Belize
2100-2100	Registration at the Radisson Fort George Hotel
1900-2100	Icebreaker Reception at the Hotel, Santa Rita Room

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Day 1 (22 July 2003)

0830-1000 Opening Ceremony: Caracol Room

**Welcome remarks: The Honorable John Briceño,
Deputy Prime Minister and Minister of Natural
Resources, the Environment and Industry, Belize**

- SOUTHCAM view of Military Environmental Role: Mr. Robert L. Brown, Environmental Engineer, United States Southern Command
- Dr. Thomas De Kay, Technology Innovation Office, United States Environmental Protection Agency
- Mr. David Alarid, Director, United States Department of State Regional Environmental Hub, Costa Rica
- Mr. Edgar Embrey, Chargé d’Affairs, Embassy of the United States, Belize
- Mr. Curtis Bowling, Deputy Under Secretary of Defense of the United States

1000-1015 Break

**1015-1130 Session One - Security Forces Support to the
Environment** *(Moderator: Lieutenant Colonel
George Lovell, Belize Defence Force)*

Objective: Present Case Studies of Successful
Environment and Security Initiatives

- Environmental Security in Central America: Brigadier General Marco A. Rosales, Honduras
- DENIX Presentation: Ahne Hall, Project Coordinator, Technology TEAM Inc.

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- Belize case study: British Army Training Support Unit
Belize-BATSUB

1130-1330 Lunch

**1330-1500 Session Two - Defense of Coastal and Marine
Resources**

*(Moderator: Imani Fairweather-Morrison, Chief
Executive Officer, Coastal Zone Management, Belize)*

Objective: Develop a Broader Awareness of Coastal
and Marine Resource conditions apropos for Defense
Cooperation

- Pollution Prevention and Response: Ms. Sandra León,
Marine Chemistry Laboratory Coordinator, Universidad
Nacional, Costa Rica
- Watershed Management: Mr. Matt Wilburn, NOAA's
Sea Grant Program, United States National Oceanic and
Atmospheric Administration (NOAA)
- Mesoamerican Barrier Reef Systems Project: Mr. Noel
Jacobs, Director, MBRS

1530-1545 Break

1545-1745 Session Three - Ideas for Partnership

*(Moderator: Mr. David Alarid, Regional
Environmental Officer, United States Department of
State)*

Objective: Identify Opportunities for Regional and
Bilateral Civil-Military Environmental Cooperation.

- White Water to Blue Water Initiative: Ms. Kathy Bentley,
Ocean Affairs Office, United States Department of State

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- Training in Environmental Conservation and Protection: Mr. Ronnie de Camino-Veloza, Department of Natural Resources and Peace, University for Peace, Costa Rica
- Small Valleys Disaster Mitigation Project: Mr. Pedro Bastidas, Specialist, Natural Hazards Project, Unit for Sustainable Development and Environment, Organization for American States (OAS)
- Natural Disasters Prevention: Mrs. Maria Luisa Alfaro, Office of Foreign Disasters Assistance, USAID/OFDA
- Regional Stability: Ms. Carey Yeager, Senior Regional Environment and Climate Change Advisor, USAID/ Guatemala-Central American Programs

1745-1800 Closing of Day's Session

CIVIL–SECURITY FORCES ENVIRONMENTAL COOPERATION IN CENTRAL
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Day 2 (23 July 2003)

**0830-0845 Opening and Administrative Announcements:
Caracol Room**

0845-1015 Session Four - Defense of Terrestrial Resources

(Moderator: Jean Weaver, U.S. Geological Survey)

Objective: Explore Land Based Environmental Issues
that Require Support from Security Forces

- Sustainable Forestry Resources: Mr. Oswaldo Sabido, Chief Forest Officer, Ministry of Natural Resources, Belize
- Prevention of Illegal Trafficking in Wildlife: Mrs. Yolanda Matamoros, Mesoamerican and Caribbean Coordinator for the IUCN Specialty Group on Conservation and Reproduction of Endangered Species
- Dealing with Invasive Species: Claudine Sierra, World Conservation Union (IUCN)
- Land Use Planning on a Regional Basis: Mr. Ovidio Ribero, U.S. Geological Survey

1015-1030 Break

1130-1130 Session Five – Military Civil Interface

(Robert L. Brown, SOUTHCOM Environmental Engineer)

Objective: Clarify Areas for Enhanced Military-
Civil Interface on Environmental Issues.

- Environmental Issues of the Law of the Sea Convention: Commander Carmen Castro, Environmental Department Chief, Costa Rican Coast Guard

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- The Non-Governmental Organization Role: Ms. Diane Wade-Moore, Director of Advocacy, Belize Audubon Society

**1130-1200 Workshop Introduction: Dr. Kent Butts, Center
for Strategic Leadership, U.S. Army War College**

1200-1330 Lunch

1330-1530 Session Six – Breakout Workshops

- Group One: Training as a means to improve Environmental Protection and Sustainable Development
- Group Two: Opportunities for Marine Resource Cooperation
- Group Three: Opportunities for Terrestrial Resource Cooperation

1530-1600 Break

**1600-1700 Breakout Workshops: Reports and
Recommendations**

1700-1715 Executive Summary

1715-1730 Closing Remarks:

- **Brigadier General Cedric Borland,
Commandant, Belize Defence Force**
- **Mr. Curtis Bowling, Deputy Under Secretary of
Defense of the United States**

1730 Conference Closes

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Day 3 (24 July 2003)

0800-1700 Tour

**1930-2200 Official Dinner and Cultural Event, Colonial
Garden, Radisson Hotel**

Day 4 (25 July 2003)

All Day Departure of Conference Representatives

CIVIL–SECURITY FORCES ENVIRONMENTAL COOPERATION IN CENTRAL
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Appendix B: Participants List

Civil –Security Forces Environmental Cooperation
in Central America and the Caribbean

Belize City, Belize

July 21-24, 2003

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CIVIL–SECURITY FORCES ENVIRONMENTAL COOPERATION IN CENTRAL AMERICA AND THE CARIBBEAN

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