Caribbean Environmental Information Infrastructure Initiatives

The following lists present information about some of the dozens of environmental information infrastructure initiatives in the Caribbean. This report combines information collected by the team that drafted the SIDSNET proposal (Small Islands Developing States Network Proposal, September, 1994--developed as part of the Programme of Action from the SIDS Conference in Barbados, June, 1994) and data tabulated by Island Resources Foundation on Wider Caribbean information resources. The full text of the SIDSNET proposal can be found on the Small Island Information Network (at *http://www.upei.ca/~siin/index.html*) This list will be rapidly outdated. We do not recommend keeping it for more than six months from the release date of November, 1995.

The list concentrates on *infrastructure*—systems which can be used to distribute information—and only secondarily have we tried to identify many of the important environmental information sources in the region. We have attempted to limit the list to initiatives, systems, information resources, and activities which are relatively assured, rather than purely speculative projects such as the Eastern Caribbean Mapping Cooperative. We cannot, however, assure that databases mentioned here are accurate, up-to-date, or accessible. In addition, some of the project descriptions submitted to the UN investigators came from project sponsors who may have been more enthusiastic than realistic about project achievements or potential. In general, projects and systems are listed in descending order of size, history and active operations.

For newcomers to InterNet resources, a clarification of some vocabulary may be warranted. The InterNet is a worldwide network of computer communication systems which permits a variety of ways of communicating, from simple text messages to complex graphics and sound and video recordings. Until 24 months ago, virtually all of the communications on the net were in the form of text files. On-line browsing of graphics has come about because of the design of the World Wide Web specifications which were "invented" by computer scientists at CERN, the European Nuclear Research Center. In this respect, the "Web" is second generation InterNet.

As fast communication links have been installed in the Caribbean region by AT&T and Cable and Wireless, scores of WWW sites have been developed. The Caribbean region is especially attractive to web site developers because of the distinctive and colorful natural environments which can be used to attract tourist advertisers to use the net in commercial ways. It should be noted that from a technical standpoint many of the groups in this section are capable of providing the necessary networking, on-line technical support, and basic information management skills required to implement the technical elements of SIDSNET or any other regional network proposals. The decision of where to locate network resources for the Caribbean, and how they should be organized in relation to users is not based on technology. The failure to support SIDSNET will not prevent the spread of the international networking technology, although it may ensure that the benefits of the new information technologies accrue *first to the wealthiest* of the small island developing states.

The following sections of this paper are organized from the concrete to the ethereal; from stand-alone networks and websites on the InterNet, to data available on the InterNet, to important environmental information not available on the InterNet, to technical assistance efforts directed at supporting network applications. *Note that this list does* *not directly address* **information resources** *which might be useful to Caribbean environmentalists*—the bulk of which would be archives and information gateways or catalogues from sites such as Yale, Stanford, Cornell, Texas A&M, and the Smithsonian Institution.

Please send comments, corrections or updates to Island Resources Foundation at irf@irf.org.

Network and World Wide Web Initiatives

This section combines two different kind of resources: networks, such as AmbioNet and the CEPNET proposal of the UNEP Regional Coordinating Unit in Jamaica, and information initiatives which more closely resemble either card catalogues (e.g., CaribWeb) and or full-fledged libraries (SIIN). The reason for this combination is that in the world of the InterNet and especially the World Wide Web, it is difficult—and mostly irrelevant—to separate content from the media.

In this paper, all references to WWW URLs (Universal Resource Locators—the Web addresses) are *italics*

State of the Telecommunications Sector in the Caribbean

Telecommunications systems for information dissemination in the English-speaking Caribbean have achieved great advances in recent months. Current technologies available in the region match the facilities found anywhere in the developed world. The backbone of this new capacity is a web of fiber optic cables linking the islands of the Eastern Caribbean (and being extended throughout the insular Caribbean), providing high speed, large volume, cost effective transfer of voice, data and images across the region.

The London-based Cable and Wireless owns and operates the external and in some cases internal telecommunications services in most CARICOM countries. Technologies provided by Cable & Wireless range from submarine and terrestrial cable to digital microwave to satellite uplinks through Intelsat. The Caribbean falls within the footprints of several satellites and given the easy access to these facilities and the availability of relatively inexpensive appropriate technology, satellites and fiber optic cables are competitive and are playing an important role in Caribbean telecommunication activities.

Governments in general are responsible for the proper regulation of telecommunication services in the Caribbean. They work closely with telecommunication service providers. Mechanisms for regional coordination and cooperation in the telecommunications sector exist through regional organizations such as CARICOM, the Caribbean Telecommunications Union (CTU), the Caribbean Broadcasting Union (CBU), and CANTO, the Caribbean Association of National Telecommunications Organizations.

Organization of American States—Caribbean Universities Network (CUNet)

In 1991, the Organization of American States (OAS) approved the initiative entitled "Hemisphere- Wide Inter University Scientific and Technological Information Network," (RedHUCyT) with the main objective to connect member countries to InterNet for the exchange of scientific and technological information among professors, researchers, and specialists at universities in member States. This project is directed by Dr. Saul Hahn. Within this framework, the University of Puerto Rico (UPR) established a project for an electronic information network linking the universities of the Caribbean, known as the Caribbean Academic, Scientific and Technological Network (CUNet). In CUNet, which is still under construction, there are currently 25 nodes connecting 2,000 users. CUNet allows for e-mail and file transfer to the InterNet.

Twelve dial- up UUCP networks have been established at the national level for *electronic mail* to the InterNet. These CUNet nodes, which use store-and-forward routing mechanisms, interlink with the UUCP host computer at the University of Puerto Rico which provides a gateway to other networks worldwide. The CUNet nodes are installed in Antigua, Bahamas, Barbados, Belize, Dominican Republic, Grenada, Jamaica, St. Lucia, Suriname, Trinidad & Tobago, and more recently Guyana and St. Vincent and the Grenadines.

The remarkable differences between the rudimentary e-mail services of CUNet and the elaborate cross referenced graphics and mapped resources of the GEFRII project described below represent less than four years of progress in the development of the InterNet. Eighteen months ago CUNet was the dominant promoter of InterNet linkages in the region. Now CUNet is far behind the efforts of the private InterNet Service Providers, many of whom are discussed in the next section of this document.

Global Environment Facility Resources and Information Infrastructure (GEFRII)

The Global Environment Facility (UNDP Regional Bureau for Latin America and the Caribbean) is supporting a project to expand access to environmental information. A prototype for the Region has been developed and in installed on the ground in the Dominican Republic. It is hoped that the prototype will be expanded to include GEF-financed projects in the Caribbean, Cuba, and Costa Rica.

GEFRII is a set of network-based tools and methods that facilitate information flow.

Some tools already exist--for example, Web tools for home-page authoring. Some tools are new--for example, the newly designed Project Cycle framework. Others are under construction--for example, the a tool to create library/publication center, which will integrate: a virtual environmental library, a search engine, translation software, and an on-line/off-line mailer.

Some methods reflect common sense or evolving Web practice--for example, design standards for home pages. The project is developing methods and guidelines.

Basic principles for the development of GEFRII:

- Everyone within the "universe" should have access to everyone else's information
- Information should be managed at the source where it is produced
- People with sophisticated tools and high levels of communications access should design and manage information systems in way that facilitates exchange with people who have less sophisticated tools and access.

The initiative was launched by the current Deputy Executive Coordinator of the UNDP/GEF, and has been sparked and managed by the Regional Coordinators for Latin America and the Caribbean. A design team under the direction of Sheldon Annis, (annis@acs.bu.edu) has been under contract to the Regional Bureau for Latin America and the Caribbean since Spring 1995. A page with more information will be available in late August, 1995. For more information write gefrii@undp.org.

ECLAC's AmbioNet

The ECLAC/AmbioNet electronic information exchange system—the Caribbean node of UNEPNET —began operation in 1992. At present AmbioNet claims over 1,000 users throughout the Caribbean. It provides communications for access to information within and outside the region and to support the capacity-building required to achieve this. It provides e-mail, teleconferencing, file exchange services and a dial-out option which provides a gateway to other systems and services. The system has undergone a number of enhancements and major Caribbean institutions utilize its facilities to support electronic communication between their various entities.

The target group of users are: Government and institutional; INFOTERRA focal points in the Caribbean; regional and national information networks and their user groups; private sector and NGOs, and researchers, university students, individuals who demonstrate a need, and senior level secondary school students. There are, however, a number of impediments to the widespread regional utilization of AmbioNet. These include the absence of economical regional networking infrastructure and the need for full-time staff at ECLAC to adequately support the development of the system. [It is not known if AmbioNet provides usenet access for any of its members.]

In November 1994 ECLAC/AmbioNet introduced "InterNet Electronic Mail" access to all its users at a nominal fee to cover the telecommunications costs. Thirty-five institutions (including some government ministries) are provided with full-InterNet access through UNDP's InterNet node in New York, using our X-25 leased line facility. AmbioNet also offers on-line access to regional and international databases and systems through its many dial-out service connections. At present AmbioNet has over 1,000 users throughout the Caribbean.

The system can be accessed via dial-up modems (809-627-0969; 809-627-7544) and the AmbioNet X-25 leased line facility (374580930115). InterNet users can address mail to ECLAC/AmbioNet users by using the formula: <user id@eclacps.undp.org.

UNEP/INFOTERRA

UNEP/INFOTERRA, the Global Environmental Information Exchange Network, has been operational since 1977 and today has 171 National Focal Points, of which 11 are in Caribbean Small Islands Development States (SIDS): Antigua and Barbuda, Bahamas, Barbados, Belize, Cuba, Dominica, Guyana, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia.

The main task of the National Focal Points is to provide environmental information, mostly focused on the Caribbean, to anyone who makes an appeal to the National Focal Points. In addition, National Focal Points register national sources on environmental information.

For the English speaking Caribbean INFOTERRA has established a Regional Service Centre housed at the US INFOTERRA NFP at the US Environmental Protection Agency. Besides environmental information provision, the Regional Service Centre funds both training in information management and technical operations for the National Focal Points in the region and publishes a regional INFOTERRA Newsletter "Caribbean Currents." This newsletter is not available on Internet.

An important tool for information provision is the INFOTERRA International Directory of Sources, published as a printed "hardcopy" and as a database. It does not contain all the world's environmental information in itself, but is the means of access to more than 7,000 sources of information on over 1,000 environmental subjects. The sources are located in government ministries and documentation centers, research institutes, universities, non

governmental and international organisations, United Nations agencies and private consultancies. The sources can be accessed by country, by name of organization and by environmental subject-area.

To satisfy regional needs INFOTERRA creates regional directories; for the Caribbean INFOTERRA plans to make a regional inventory of environmental sources in 1996. Furthermore, INFOTERRA is organizing in autumn 1995 (29 November - 1 December 1995, Kingston) a regional meeting to enhance collaboration between information providers in the Caribbean. Participants will be representatives from governments, universities, NGOs regional organisations, as well as UN organisations.

On the CEDAR server, the (Central European Environmental Data Request Facility-this excellent service also supports the INFOTERRA and Environmental Impact Assessment mailing lists) the he following information can be found on the INFOTERRA Gopher:

- description of INFOTERRA
- subscription list: how to subscribe, archives
- Thesaurus
- Directory of Sources
- List of all national focal points

Address CEDAR:

http://www.cedar.univie.ac.at/unep/

gopher://gopher.cedar.univie.ac.at/11/unep/

Information on INFOTERRA, although less, can also be found at the URL:
http://unep.unep.no/unep/infocent/infoterr/about.htm

Available INFOTERRA e-mail addresses for the Caribbean are:

- Regional Service Centre in USA: library-infoterra@epamail.epa.gov
- National Focal Point, Saint Lucia: lcdoc@isis.org.lc
- Programme Activity Centre, Kenya: spencerl@unep.no

"Caribbean Currents," the newsletter produced by the U.S. EPA-based Regional Service Center, is not available on the InterNet.

United Nations University (UNU)—Tokyo

UNU's Small Islands Network activities will centre on three major thematic areas:

- A: Appropriate Technology Transfer and Training
- B: Impacts and capacities of physical ecosystems
- C: Environmental governance and strengthening the position of the small island States

Contacts for this network are Mr. Glen Paoletto, Network Coordinator, *paoletto@hq.unu.edu* and Mr. Eng-Leong Foo, Listowner, *foo@hq.unu.edu*. Postal address: The United Nations University, 53-70 Jingumae 5 chome, Shibuya-ku, Tokyo 150, Japan, Fax: +81-3-3499-2828

Small Islands Developing States Network—SIDSNET

SIDSNET is a product of the SIDS conference in Barbados. It currently exists as a proposal for a $30 million, five-year program to build an electronic network connecting the small island developing states. The draft of this proposal was submitted in August, 1994. After the initial injection of $20 million in donor support (to be matched by $10 million in funds from the small islands), the SIDSNET proposal looks to user fees to finance a digital communications system which would serve the need for technical cooperation among small island developing countries. Because of objections from the Association of Small Islands States, action on this proposal has been postponed pending a survey of SIDS information needs and confirmation that the financing arrangements are acceptable.

The Jamaica InterNet Project (JAMNET)

"JAMNET provides high speed connectivity between Universities, colleges, research and educational institutions and the InterNet. JAMNET has provided a full InterNet connection for Jamaica since September, 1994, using a leased 64Kbs fiber-optic link to the National Science Foundation backbone in Homestead, Florida."

University of the West Indies (UWI)

Each of the three UWI campuses has a local area network for at least some of the administrative and scientific applications. In addition, the universities are tied together through their InterNet links.

The three campuses of the University of the West Indies undertake a wide range of research pertinent to sustainable development and considerable information holdings exist in areas such as industrial atmospheric pollutants, climate change, the impact of human settlements and development upon the environment, watershed management, agro-industry and the environment, earthquake monitoring, coastal zone management, and population dynamics and behavioral ecology of coral reef fish, sea turtle conservation, and solar dryers.

There are several semi-autonomous centers of the University of the West Indies with special interests in sustainable development information. These include MAREMP in Barbados and the Center for Environment and Development at the Mona (Jamaica) campus. In addition , the University's Data Management Centre in Mona performs information management services for the CARICOMP program of marine and coastal monitoring stations throughout the Wider Caribbean.

UNEP/RCU/CEP—Caribbean Environment Programme Network (CEPNET)

CEPNET is supported by InterAmerican Development Bank funding (about $1 million over five years) to the Caribbean Environment Programme of the UNEP RCU in Jamaica for a system to tie together environmental planners and managers throughout the Wider Caribbean. There is also a technical assistance component to this project, which was originally proposed in 1989; was finally funded in September of 1994, and is supposed to start up real soon now.

Dominican Republic

There is active InterNet service being provided by three or four providers in the Dominican Republic, including a private company, AACR, two telecom operators CODETEL and TRICOM, and two supported networks: CUNet and FUNREDES. For up-to-date information about the status of networking and sub-regional telecommunications issues, especially for the Dominican Republic and Haiti, contact Daniel Pimienta at FUNREDES, for whom we have two e-mail addresses: pimienta@aacr.net and pimienta!daniel@redid.org.do.

A central event in the history of organizing information resources in the Dominican Republic was the REDALC WORKSHOP held in Santo Domingo in August 1991. REDALC (Red de America Latina y el Caribe) is a project of Union Latina, funded by European Union and with the participation of UNESCO and Funredes. The feasibility study of the project established the methodological framework for all the subsequent actions of the group. The partners will publish, by the end of the year, a comprehensive document about LA&C networking. There is no plan for execution though. The REDALC Workshop, with official guests from Dominican Rep., Haiti, Cuba and Puerto Rico had a strong Caribbean component and served as genesis for the launching of the Peruvian, Dominican and Haitian networks.

University of the Virgin Islands (UVI.NET)

UVINET (http://www.uvi.edu/) - The University of the Virgin Islands installed the InterNet connection for its campuses in St. Croix and St. Thomas using a 56Kbs dedicated link. UVINET has been providing full InterNet access to its academic and student community since April 1994. The University of the Virgin Islands also has a CD-ROM publishing capability, but this information is not yet available over the network)

[Note that the UVI network has no relationship with the USVI.NET system described below.]

UNDP/Barbados

The UNDP is seeking bids for the provision of InterNet access for its offices in Barbados. This is especially

significant because there are several other major regional and international agencies, ranging from the Caribbean Conservation Association to CariCAD to the Caribbean Development Bank which could use (and share costs for) the same link. In September, 1994, UNDP said they were connected to the Caribsurf service, but we have not been successful in communicating with this address: undp_@caribsurf.com.

GTZ Technical Cooperation with the OECS

As part of a larger technical cooperation agreement, the German Technical Assistance Agency (GTZ) supported a technical assistance officer (Herbert Donus) in the British Virgin Islands to work with the environmental agencies in the BVI to network them, and to provide them with access to regional and international environmental information networks. The technical assistant has recently returned to Germany, but InterNet access at the Lavity Stout Community College in the British Virgin Islands is maintained by Ms. Lianna Jerecki at <ljarecki@igc.apc.org>

Intergovernmental Oceanic Commission—Wider Caribbean BBS

IOC or the IOC regional program IOCARIBE is seeking to build a bulletin board for the Wider Caribbean which would handle InterNet communications for the Wider Caribbean. Early commitments have been made to collaborate with the "Gulfline II" bulletin board system (see below). The international office of IOC has an excellent homepage at *http://www.unesco.org:80/ioc*

Gulf of Mexico Program

Gulfline II is a well-designed, PC-based, dial-up bulletin board which serves the Gulf of Mexico Program (comprising the coastal programs of US Gulf Coast States, including Texas, Louisiana, Mississippi, Alabama, and Florida) from the Stennis Space Center on the Mississippi Gulf Coast. It currently has two "sub-BBSs" for the coastal programs of Florida and Louisiana, plus one for the Wider Caribbean under consideration, as well as a dozen or more different conferences for topic areas such as marine debris and freshwater inputs. This system is accessible from the InterNet via the FedWorld BBS which is on the net—the path is long, slow and uncertain., but Gulfline plans to have its own server with a direct, high-speed InterNet connection within the year. Direct dial lines for Gulfline are 800/235-4662, or 601/688-2677, for people calling from overseas without access to the toll free 800 number.

Technical information archived on Gulfline II, and the cadre of specialists listed there, are resources available to anyone who calls the Board, regardless of home island or territory.

Private Sector Network Activities

The following discussion is unfortunately short, because it is probably the efforts of private corporations — working from three different directions—who will eventually ensure that InterNet links are available for the community of sustainable development workers in Caribbean small island developing states. The three different private sources of energy for the completion of the communication revolution in Caribbean SIDS are:

- the large telecommunications companies who own much of the existing physical infrastructure of the telecommunications industry;

- entrepreneurs and innovators who are willing to invest in relatively risky new technology to increase the bandwidth and access to digital communications for the public-at-large; and

- private sector users who are willing to pay for untried technologies for unproved rewards.

One use of the InterNet is to simply exchange messages--sort of an up-to-date, desktop telex system. The "demand" for this level of service is not known, but the remarkable experience of the Virgin Islands FreeNet (enrolling 1.5% of the total Territorial population) indicates that there may be a very high demand for access to low-cost off-island information. [A paper describing the USVI.NET strategy in supporting the FreeNet model for promoting InterNet access and use can be found at the USVI.NET site*http://www.usvi.net/*]

Individual telephone and telecommunications companies in the Caribbean claim to offer, or to be about to offer, high speed connection with the InterNet.

There are several known sources of active private InterNet access providers in the Caribbean:

SIIN—Small Islands Information Network

http://www.upei.ca/~siin/index.html

In 1990 the Institute of Island Studies of the University of Prince Edward Island embarked upon two major international projects. One, entitled LESSONS FROM THE EDGE: The North Atlantic Islands Programme, is a three-year public policy initiative devoted to self-reliant economic development in the North Atlantic islands of Åland, Iceland, the Isle of Man, the Faroe Islands, Greenland, Newfoundland, and Prince Edward Island. The other is called the Small Islands Information Network or SIIN. The goal is to establish an easily accessible electronic information network to link people interested in small islands with each other and with information relevant to small islands. These World Wide Web pages are the latest stage in its development.

This web site, supervised by Peter Meincke and the dedicated island-philes at the University of Prince Edward Island in Canada is oriented to academic researchers and development types, with a mix of island interests and a large number of Caribbean references.

MicroState Resources

http://www.clark.net/pub/micros/

> *The Microstate Network is a collection of resources and services developed by Microstate Ltd. for the purpose of fostering public and private sector development in very small states, autonomous territories, colonies and similar domains where problems of scale, isolation and dependence impede balanced development.*
>
> *Utilizing the advanced information technologies, particularly the InterNet and the World Wide Web, Microstate Ltd. has developed linkages to the most critical information resources needed by small countries and others interested in their affairs. In addition, Microstate has pioneered the development of publicly accessible electronic databases and training modules specifically designed to promote economic and commercial diversification, as well as social development.*

Presently the Microstate Network includes nine divisions:

Microstate Resources—the most comprehensive site on the World Wide Web exclusively designed for small states and those interested in their affairs. This division includes a great many resources and references to Caribbean sites.

Microstate Communications—an online journal designed to address their specific concerns and smooth the transition to information-based economies.

Microstate Environment—information and links relating to the ecological concerns of the smallest countries and territories, including organizations, reports and the newest in low-cost environmental microtechnologies.

Microstate Forum—a public interactive messaging area for discussion relating to any aspect of microstate development, culture, history, etc.

Forbes' Bermuda Online!—a Bermudan resource designed to promote economic and commercial diversification, this is the most comprehensive virtual library of information presently available for any microstate.

Tonga Online—everything about Tonga and more on the way. Included is information about the islands, culture and society, links to local publications, and an interactive forum, the Kava Bowl.

Microstate InterNet Institute—training curriculum and courses in communication technology, marketing on the InterNet, and information management, specifically designed to address the needs of small states.

Microstate Consulting—specialized consulting services for both the public and private sector in the areas of trade, investment, development, education, health and technology.

Microstate Publishing—full-service publishing house specializing in electronic media, including the World Wide Web, CD-ROM, InterNet radio, etc., as well as traditional modalities.

CARIBSURF (formerly Barbados External Telecommunications—BET Ltd.)

Caribsurf—based in Bridgetown—is partially or fully owned by Cable & Wireless. Barbados External Telecommunications expects to be fully operational with a Web server on the InterNet by the middle to end of May. They plan to offer service to Barbados, Grenada, St. Vincent and points beyond.

In an imaginative use of the InterNet, the deputy governor of the Central Bank of Barbados: Dr. DeLisle Worrell (cbb.rdw@caribsurf.com), has already offered to distribute the Bank's statistical reports via the InterNet. A possible e-mail contact is for caribsurf may be: Bannister_J@caribsurf.com.

A major user of interest to readers of this message is the Barbados Coastal Conservation Unit. Major users at the Coastal Conservation Unit include:

> nurse_k@caribsurf.com
> bascom_r@caribsurf.com
> brewster_l@caribsurf.com
> coastal_stf@caribsurf.com

A recent *Caribbean Week* article (May 31, 1995, page 33) on telecommunications activities in the Caribbean also showed a domain name of "bajan.com." Nothing else is known of this service.

Cable and Wireless (Antigua)

http://www.candw.ag/

> *Antigua and Barbuda are two small islands located in the Eastern Caribbean chain approximately 400 km south-east of Puerto Rico. Antigua was first sighted by Christopher Columbus in 1493 on his second voyage to the West Indies. He named the island after Santa Maria de la Antigua, a church in Seville, Spain. Antigua was first settled by the British in 1632 and remained a colony until Independence in 1981.*

Other Cable & Wireless locations on the InterNet:

- **Anguilla** (*http://www.candw.com.ai*)

- **British Virgin Islands**(caribsurf.com—currently served out of Cable and Wireless in Barbados)

- **Barbados** (caribsurf.com)

- Cable & Wireless plc. (*http://www.cwix.com*) This is actually a server in England which outlines the overall Cable and Wireless systems.

- **Cayman Islands**(*http://www.candw.ky*)

- **Dominica** (candw.ag—this indicates this site is currently served out of the Antigua Office of Cable and Wireless).

- **Grenada**-GRENTEL (caribsurf.com)

- **Montserrat** (candw.ag)

- **St. Kitts-Nevis**- SKANTEL (caribsurf.com)

- **St. Lucia** (*http://www.candw.lc*) The St. Lucia homepage includes a directory of 192 subscribers.

- **Trinidad and Tobago**-TSTT (see Trinidad and Tobago, below)

The Antigua homepages of Cable and Wireless are created by Alan B. Scholl—InterNet Administrator. Comments or up-to-date information should be sought from Scholl at: **scholla@candw.ag**

Carib Web

http://www.caribweb.com/

The sign-on message says:

> *Welcome to this new resource for travelers and Caribophiles alike. Here you will find information from all the Caribbean Tourist board homepages and other relevant linksto the Caribbean. We have been listed amongst the top 5% of all web sites by Pointcom. Click the above Icon for more information.*

This is a good link to many of the tourist-oriented web sites.

Caribe and Latino Sites (Puerto Rico)

http://www.caribe.net/local.html

This is a bare-bones "gateway" to a variety of Puerto Rican and other Spanish Caribbean sites, including the University of Puerto Rico, and several sites in the Dominican Republic, which currently has three InterNet Service Providers.

ISIS

ISIS is a St. Lucian non-profit access provider which would like to grow its basic e-mail services in the Eastern Caribbean (eshenry@isis.org.lc).

USVI.NET—U.S. Virgin Islands Net

http://www.usvi.com/

USVI.NET has an excellent tourist-oriented homepage for the U.S. Virgin Islands, with special emphasis on local shopping resources, real estate listings, and charter boats.

USVI.NET (pdeblanc@noc.usvi.net) is also the independent provider of InterNet access services for the "Virgin Islands Paradise FreeNet." The Virgin Islands has the unique distinction that it has enrolled over 1,400 FreeNet members, out of a total population of 100,000. With its own fiber optic link to Miami, USVI.NET has said that it is looking at providing full UUNET services (basic e-mail services) to [up to] seven additional islands in the Eastern Caribbean.

ACKLEY.COM

Ackley.com is currently an e-mail relay service for commercial users in the Virgin Islands, which is widely assumed to be planning a move into SLPP service provision.

TSTT—Telecommunications Services of Trinidad & Tobago

One of the newest arrivals on the InterNet is Telecommunications Services of Trinidad & Tobago, Which began service in July, 1995. The size of the following list which comes direct from the TSTT site illustrates the wealth of relevant material accessible via the Web.

Here are links to some other Web pages of interest to people with interest in Trinidad and Tobago:

- Islanders: "*http://webcom.net/~island*"
- *Trinidad Homepage at MIT*:
  "*http://caribbean-www.lcs.mit.edu/caribbean-www/islands/tnt/tnt.html*"
- Trinidad and Tobago (*Caltech*)
  "*http://www.ugcs.caltech.edu/~benedett/trinidad/trinidad.html*"
- TSTT Homepage   "*http://www.tstt.net.tt*"
- The Trinidad and Tobago *High Commision* (Ottawa)
  "*http://www.travel-net.com:80/~tthcotta/*"
- The Interserv Web site (Westmoorings, Trinidad)
  "*http://www.trinidad.net*"
- Opus Networx   "*http://www.opus-networx.com*"
- The Trinidad and Tobago Home Page   "*http://lidar.ists.ca:8000/pasha/trini/index.html*"
- The CIA World Fact Book   "*http://www.adfa.oz.au/CS/flg/wf93/td.html*"

Anguilla and the British Virgin Islands

Just as a demonstration that everyone has a homepage these days. In fact, the British Virgin Islands Welcome pages *(http://www.caribweb.com/caribweb/bvi/index.html)* are extremely well designed (by a group based in the UK), and showcase the BVI nicely for potential tourists or companies seeking offshore registry.

There are, as of this moment, *two* web sites for Anguilla—one directed specifically at selling stamps (*http://www.offshore.com.ai/stamps*), and one which is a more conventional "tourism homepage" (but a very nicely done one) at (*http://galaxy.cau.auc.edu/anguilla/anguilla.html*)

CompuServe

CompuServe has been the most aggressive of the so-called on-line services (CompuServe, Prodigy, America on Line, Delphi, et al) to make services available in the Caribbean.

Statistical Databases, Data and Information Resources Accessible by the InterNet

A Sermon on Information Imperialism:

The InterNet provides access to significant archives of information of use in decision-making.

This access issue can work in two "directions." Outsiders—investment bankers in London, for example—can use the InterNet to pull together much more information than they every had in the past in order to evaluate investment risks, such as setting interest rates for bonds for St. Kitts. Similarly, a sub-division planner in St. Lucia can access the InterNet to have all of the latest information on, for example, how to calculate sediment loads on reefs based on development and road construction in adjacent watersheds.

In both of the examples given above, the InterNet can contribute to *either* improved decision-making—because of the ability to marshal more information at almost no cost—or to *distorted decisions* if the networks are *systematically biased* in the information they present. This is the condition often referred to by the inflammatory label of "information imperialism," especially if all of the information affecting St. Kitts' bond ratings, or St. Lucia's sub-division planning, comes only from continental or developed country sources.

It is to avoid the systematic biases introduced by "information imperialism" that Island Resources Foundation is concerned about increasing the amount of *island-based information* in the international networks. Even if all of the hardware is in place and fully functional at no cost, this is a very hard thing to do. It remains relatively costly to enter information from printed copies into computer networks; it is expensive to capture historically significant documents from the past. On the international scale *Project Gutenberg* is a worldwide project to enter all of the world's classic literature in electronic form. Thousands of students and other volunteers are typing or proofing scanned copy of the Classics to produce a massive archive of the world's most significant literature. The Westindies needs a similar initiative.

More than that, however, we need a *revolution in attitude* to accompany the revolution in information access. We need to create incentives and rewards for *sharing information*, rather than the traditional values which reward keeping information secret. This process may be much more difficult and costly than digitizing the classics.

We cannot ignore the issue, because whether the information on the network is biased or not, it is freely available, and it *will be used* in the decision-making process. (In fact, whether we know it or approve of it or not, it is being used right now for these very purposes.) Whether they are able to use the best, most locally relevant information or not, the investment banker and the sub-division planner are going to set interest rates and build sub-divisions. As information managers for the small island developing states in the Caribbean, we have an ethical obligation to ensure that information is freely available to the widest possible audience.

The following list identifies some of the environmental information resources to which planners should be looking for access via the InterNet. In the section following this one we have listed other sources of information which are not yet believed to be accessible via the InterNet.

Economic Commission for Latin America and the Caribbean (ECLAC)

Both the CARICOM and ECLAC Secretariats publish data for a number of countries. ECLAC's "Agricultural Statistics" reports on

- Population,
- Rainfall,

- Sectoral Gross Domestic Product in current and constant prices,
- Land Tenure, and
- Agricultural Production and stocks.

The hardcopy is supplemented by a diskette version, and the database will soon be hosted on AmbioNet.

Caribbean Information System for Economic and Social Planning (CARISPLAN):

CARISPLAN is an information network established by ECLAC at the request of Member States of the Caribbean Development and Cooperation Committee (CDCC) to link the libraries and documentation centers of the national planning agencies and other organizations working in the area of socio-economic development. Its target users are policy-makers, planners, technocrats and researchers. Reference services are provided mainly from a database of some 30,000 records covering Caribbean and other relevant documents. One hundred sixty libraries contributed to the database which is accessible through ECLAC/AmbioNet. Its main publications are: CARISPLAN Abstracts and Current Awareness Bulletin.

The CARISPLAN Network was the first to be established in the Caribbean and its standards and formats have been adopted by other bibliographic information systems.

The World Conservation Monitoring Centre (WCMC)

WCMC is a joint venture of three major international environmental organizations, including UNEP. It has a major digital database of information about Small Island Developing States (SIDS), including basic maps, the locations of identified protected areas, endangered species, and many other factors retrieved from standard sources such as the US Central Intelligence Agency Database. This information may be available on the new WCMC world wide web site at *http://www.wcmc.org/*. It is probably the largest , most consistent and most current worldwide data on biodiversity and protected areas. (The SIDS data was initially assembled for the SIDS Conference in 1994, but there is no known plan to keep this information up-to-date.)

Caribbean Coastal Marine Productivity (CARICOMP)

CARICOMP is a cooperative program of coastal and marine ecosystem monitoring and research based on 24 long-term monitoring sites affiliated with 17 marine laboratories in 14 Caribbean countries. CARICOMP has established Level I data collection protocols and issued a manual and standard equipment for coastal ecosystem and coral reef monitoring. A data management centre will receive, store, and disseminate data from the CARICOMP network, and facilitate exchange of information on regional oceanographic and meteorological phenomena. The Centre for Marine Studies, Mona, Jamaica is the designated site of the CARICOMP Data Management Centre.

CARICOMP data is not freely accessible over the InterNet, but on approved request, it can be sent over the network.

UNDP—Sustainable Development Network Programme (SDNP)

The UNDP has identified SIDSNET as the instrument by which it will support the introduction of digital telecommunications systems for small island systems, which are conducted worldwide under the label of the SDNP program.

Center for Marine Conservation—CARIDAT

The Center for Marine Conservation (CMC) is working with Cuba and the Dominican Republic as pilot studies for CARIDAT, a data base for natural resource management which might be an alternative to the Biodiversity Conservation Databases (BCDs) which have been developed by The Nature Conservancy.

OECS Fisheries Network

The Fisheries Data and Information System collects catch data import and export data gross domestic product providing fishing as a percentage of total, and fishing as a percentage of agriculture; landing sites common species--scientific name, common name, and local name projects in member states fisheries services.

UNEP—Global Environmental Monitoring Systems and Global Resources Information Database

GEMS and GRID (respectively) are natural resource databases which represent the "prior generation" of natural resource information. By "opening up" these data at low cost and in usable formats over the InterNet these data may finally fulfill their promise for some analytical and management purposes.

Earthmap

Earthmap is a proposed program to create a global foundation for accurate geospatial data and to facilitate GIS use for resource management at the global, national, and most importantly, local level. Earthmap is mentioned as only one of a series of new mega-decision-support systems--often geographically based--which are being planned to provided information to *those who have the information infrastructure*--both electronic and human—to take advantage of it.

The US Department of State has hosted several meetings since December, 1994, to examine the development of a global base map at scales relevant for local decision-making and compatible with Landsat and Mission to Planet Earth products. Intended as a public domain digital spatial reference similar to the Digital Chart of the World, the Earthmap Initiative will support applications in the scientific, corporate and the development communities.

This initiative is now in a pre-feasibility formative stage with funding allocated for design and promotion among stakeholders/participants. A demonstration product combining data and a prototype public domain interface may be presented with design committee findings at an Earthmap conference tentatively scheduled for the fall of 1995.

International partners may include the United Nations and International Bank for Reconstruction and Development family of agencies, as well as scientific associations such as the International Council for Scientific Unions, the International Geosphere/Biosphere Project, and the International Society for Photogrammetry and Remote sensing, among many others.

Participation and support is currently being solicited and an Earthmap listserve has been established with the help of the Open GIS Consortium. To contact the list, simply send mail to "earthmap@ogis.org." To be added to the list contact "kurt@ogis.org" stating your intention.

Information Resources Not Yet Tied to the InterNet

Government statistical offices and regional and international agencies collect and store data on socio-economic areas, demography, health, education and finance. With regard to environmental data, the SIDSNET survey revealed that there are several collections throughout the region which are scattered and poorly coordinated. In addition, the data varies greatly in type, quality, and format, depending on the purpose for which it was collected. There is a pressing need to inventory environmental data and to coordinate sources and systems and to improve accessibility.

There are several sectoral information systems and databases covering documentary material. Regional organizations played a major role in these initiatives and the strategies adopted emphasized the strengthening of national and regional information systems to support social and economic development. The distinction between information resources and statistical databases is based on ease-of-use. Statistical database are (to quote the United Nations report), "not as satisfactorily organized or accessible, and non-existent in many critical areas of sustainable development." We have tried to avoid listing non-existent statistical databases in this compilation.

The Caribbean Information System for the Agricultural Sciences (CAGRIS)

CAGRIS is an agricultural information network designed to provide ready access to agricultural information. Participating institutions are: The University of the West Indies Library, St. Augustine, which serves as the regional coordinating centre, with the libraries and documentation centers of the Ministries of Agriculture as national centers. CAGRIS provides information on WHAT has been published? By WHOM? WHEN? and WHERE?

The Regional Centre at St. Augustine provides users with summaries of papers produced in or about the region,

photocopies of the contents pages of journals, lists of references on topics of interest, photocopies of journal articles, names of researchers and institutions engaged in similar work. They also publish CAGRINDEX: Abstracts of the agricultural literature in the Caribbean; Directory of current agricultural research projects in the Caribbean region, and CAGRIS Update: an occasional newsletter. The CAGRIS database can be accessed on-line through ECLAC/AmbioNet.

The Agricultural Information System of the Association for Caribbean Transformation (ACT/AIS)

ACT/AIS focuses on the production and marketing of domestic food crops and non- traditional export crops, e.g. vegetables, root crops and tree crops. The core system comprises five database modules:

- **Commodity Prices**--wholesale and retail prices as collected in the major markets in ten Caribbean countries. It covers 42 domestic food crops and non- traditional export crops. The system aggregates the data to monthly averages and generates monthly time series on any of the crops.

- **Agricultural Input Prices**-wholesale and retail prices of agricultural inputs as obtained from the major suppliers and grouped under the categories: tools, chemicals, seeds, labor costs and major farm equipment. Data from this module can be used as an input to the cost of production module to determine the feasibility of a crop.

- **Cost of Production Estimates**--this module relates to resources used in land preparation, irrigation, harvesting, plant population per hectare, and expected yields.

- **Production Levels and Estimates of Supply and Demand**this module comprises estimates of production volumes, and import and export data.

- **Data for Trade Opportunity Identification**-the focus of this module is to identify trade opportunities.

Caribbean Energy Information System (CEIS)

CEIS is a regional cooperative network for the exchange of information on energy and its use amongst Caribbean countries. Twelve English-speaking countries and Cuba participate in the network, which was founded in 1983. The main objective of the system is to provide member countries with services which enable them to monitor developments in technologies and applications essential to programs concerned with energy supply, conversion and use.

Seven databases exist for the system, five of which can be accessed on-line. The system produces the following publications:

- *Caribbean Energy Abstracts* (Quarterly)
- *CEIS Update* (Quarterly)
- *CEIS Petroleum Update* (Bi-annually)
- Directory of Energy Research in the Caribbean (Quarterly)
- Directory of Energy Expertise in the Caribbean (Quarterly)

Caribbean Conservation Association (CCA), Barbados

The Caribbean Conservation Association has for more than 25 years, been involved in the conservation of the Caribbean's natural environment. As a major early player in environmental protection and management activities CCA's work has included advocacy, advisory, and participatory activities. CCA has been involved in environmental assessment studies, funding of conservation and education projects, and actual implementation activities.

CCA's range of activities have continually been supported by an information role, which has led to the development of a specialized collection on conservation and environmental management. These activities have generated critical environmental data.

CCA's information dissemination role has played a critical part in environmental management in the region. That role is now being strengthened by the Commonwealth Secretariat which has provided funding for an Information Management Project. This project is strengthening CCA's information handling and delivery

capability in order to provide support to sustainable development programmes in the region.

Collections

The present collection includes monographs, (books, manuals, conference proceedings, reference materials) journals, newsletters, reports, documents and audiovisual material. The collection is particularly strong in unpublished Caribbean materials.

CCA will continue to expand the Information Centre by identifying and acquiring relevant materials in new areas of focus. This development is being supported by new grants and through acquisition by gifts. The Information Centre has established databases for processing materials This is enabling improved access to the collections. The Information Centre will undertake searching of its databases in response to queries from users, to identify relevant information available.

Access to Other Information Sources

The Centre's linkages with other environmental information centres and networks regionally and internationally, will be used to retrieve information not available in-house. Users will be required to meet the telecommunications and other costs for this service.

CCA is currently the regional focal point for the INTERAISE project, an information service of the International Institute for Environment and Development, a collaborating centre for the United Nations Environment Programme (UNEP) as well as other international environmental agencies.

The Nature Conservancy—Biodiversity Conservation Databases or Conservation Database Centers (BCDs or CDCs)

The Caribbean is an active priority for the development of Biodiversity Conservation Databases by The Nature Conservancy. BCDs, arising from TNC's basic mission to conserve landscapes of special environmental quality, are designed to help in the identification and management of areas of high biological value or diversity. In addition to the national systems being implemented in Jamaica, the Dominican Republic, and Puerto Rico, The Nature Conservancy, the Eastern Caribbean Center of the University of the Virgin Islands, and the Island Resources Foundation are cooperating in an Eastern Caribbean Biodiversity Conservation Program which may eventually include regional or national BCDs. Design of the database and access provisions are still in the earliest stages.

Island Resources Foundation, St. Thomas

Island Resources Foundation, has a unique collection of some 15,000 maps, periodicals, books, documents, unpublished reports, video tapes, aerial/underwater photographs and other material that is a source of historical baseline and current information focused on the interdisciplinary aspects of insular systems and resource management, with primary emphasis on the Caribbean. The collection includes environmental impact assessments from both governmental and private sources and reports which are not often readily accessible to the average researcher. Island Resources maintains a computerized database to facilitate quick identification of and access to the documents.

A copy of a new CDS/ISIS card catalogue for the Island Resources library, financed by private US philanthropies in collaboration with ECLAC, will soon be completed and will be mounted on an InterNet server for universal access. As a by-product of producing a series of "country environmental profiles" for Antigua-Barbuda, Dominica, Grenada, St. Kitts-Nevis, St. Lucia, and St. Vincent and the Grenadines, the Foundation donated copies of all of the relevant source materials for the Profiles to leading national environmental non governmental organizations to serve as the core of a national environmental archive for each of the eight subject countries.

UNEP Regional Coordinating Unit, Caribbean Environment Programme (Jamaica)

Regional Resource Mapping

UNEP/RCU/CEP in Jamaica created a series of small scale (1:3,500,000) regional (i.e., Wider Caribbean) digital GIS coverages for the Wider Caribbean Seas Programme, including a number of factors, including protected areas,

land-based sources of pollution, and other significant regional features. It is assumed this data is not being maintained. Provisions for access to the digital information are not known.

Other Resources

UNEP Regional Coordinating Unit, Jamaica has also established a number of databases which cover: environmental institutions and experts; coastal environment management; land- based source of marine pollution; database on oil pollution, and protected areas and species.

Organization of American States (OAS), Regional Development Program

National Resources Mapping

The OAS Regional Development Department has supported the development of several island natural resource maps (Antigua/ Barbuda, St. Lucia, Jamaica), at least some of which have been digital. Some of the OAS data is maintained by the Regional Development Department as IDRISI GIS coverages. Provisions for access are not known.

Caribbean Patent Information Network (CARPIN):

This network, until recently, was coordinated by the Patent Information and Documentation Unit (PIDU) at ECLAC. The national focal points are the Patent/Registrar's Offices of the English-speaking Caribbean countries. These searches may be done in-house using CLAIMS/PATENTS CD-ROM or through assistance of the Canadian Patent Office and the World Intellectual Property Organization (WIPO);

Its main publications are:

- Caribbean Patent Index and annual supplements
- PATNEWS--a quarterly newsletter.

The National Institute of Higher Education, Research, Science and Technology (NIHERST) of Trinidad & Tobago has taken over the responsibility of regional coordinator of the CARPIN.

The Caribbean Technology Consultancy Service (CTCS)

The Caribbean Development Bank was requested to establish an information service for the implementation of technologies in developmental activities in the region. CDB provides services to users on request.

OECS INFONET

OECS INFONET is a sub-regional information network of the eight member countries of the Organization of Eastern Caribbean States. It provides a mechanism for the development of the human and technical resources of the national documentation centers of the OECS member states. A variety of data on member states has been collected by various divisions of the OECS Secretariat and it is expected that both bibliographic and statistical databases will soon be hosted on a bulletin board.

CDERA Information Systems

CDERA is involved in developing its own regional information network which will be based on a combination of packet radio, satellite terminals, low-earth-orbiting satellites and the telephone-based network. CDERA also participates in IERRIS, an International Emergency Readiness and Response Information System, based in Geneva, which links a number of independent databases maintained by various disaster management organizations.

The Caribbean Trade Information System (CARTIS)

CARTIS is a regional trade information network designed to support the development of intra- and extra-regional trade. The CARICOM Secretariat was requested by the CARICOM Council of Ministers to establish the system to link initially the CARICOM member states, and subsequently the CDCC Member states. Its users are exporters and exporting organizations, trade promotion agencies, importers and investors, researchers,

and Ministries of Trade and Commerce. CARTIS disseminates trade information from its databases covering company profiles, market opportunities, suppliers' profiles, trade documents, trade statistics.

Training and Technical Assistance Network Initiatives

European Centre for Development Policy Management (ECDPM)

The ECDPM is organizing a multilateral, multi-objective project to "enhance the utilization of information and data in environmental policy making" in developing countries, in order to improve environmental quality. This proposal, which is still in early development phases is based on the premise that we do not know enough about how environmental information is used in policy-making. It aims to develop that information and to disseminate promising ideas to people in the field. The Caribbean is to be a major focus of the activity.

UNDP—GIS Initiative

The UNDP has been providing support to a number of GIS projects, including the system in the British Virgin Islands. The regional strategy for this project, or the possibilities for providing access to these data over the InterNet is not known.

ECLAC/UNEP(ROLAC)

An ECLAC/UNEP (Regional Office for Latin America and the Caribbean) project is surveying user needs and current donor initiatives in the environmental information field in the Caribbean. The (Canadian) IDRC (International Development Research Corporation) is involved in this project, as well as the "global" FID proposal. ECLAC/UNEP (ROLAC) is also hoping to convene a regional meeting [a February date was mentioned] to discuss their survey findings and recommendations re "environmental information for decision-making".

Intergovernmental Oceanic Commission—IOC

The IOC (*http://www.unesco.org:80/ioc*) is the parent organization for IOCARIBE, which coordinates science research for the Wider Caribbean. "IOC Support for the Use of GIS in Coastal Zone Management for Small Island Developing States" was an initiative based on a workshop offered in conjunction with the 1994 SIDS meeting in Barbados, which resulted in recommendations including:

- the organization of regional training activities;
- the promotion of state-of-the-art telecommunications among SIDS and other countries; and
- demonstrations of GIS and Remote Sensing applications.

The United Nations Institute for Training and Development (UNITAR)

UNITAR has a project for an Environmental Network for the Caribbean to "build upon and strengthen the network of organizations and professional resources in capacity-building and environment: fund raising, networking, environmental information training and systems." [sic] Funding for the project is said to be under negotiation with the Inter American Development Bank (IADB), and Swedish and Danish Aid (SIDA and DANIDA). Links with other initiatives in the region, or regional institutions is not known. This program description, dated March 1995, looks very similar to the technical assistance components of the CEPNET project. The Programme Manager is Francisco Perez-Trejo.

American Association for the Advancement of Science

The AAAS has announced a study of "access to InterNet resources" by academic centers in Latin America and the Caribbean. Presumably this would be linked to subsequent policy or strategy recommendations for future systems development. Contact information for this study, which was first announced April 4, 1995, is: Helen A. Thomas, Coordinator, Western Hemisphere Project, American Assn. for the Advancement of Science, 1333 H Street, N.W., Washington, DC 20005 USA, Fax: 202-289-4958, E-mail: hthomas@aaas.org