

STRI's research vessel and equipment, and money from the World Wildlife Fund, Guzman has replenished three coral reefs along the Eastern Pacific Coast in Panama, by transplanting corals. In January and February, he plans to replenish coral on six more reefs in Costa Rica and Colombia.

Restoration on the reefs in Panama started more than four months ago. Three volunteers worked for eight days, spending 147 hours underwater as they transplanted and distributed coral fragments over 1 3/4 hectares of dead reef. Divers spent hours underwater literally pounding stakes wired with finger-sized fragments of the indigenous coral *Pocillopora* into the dead reef's framework. The divers staked about 1,000 fragments to each reef, for a total of 2,980.

However, because it is time consuming to stake fragments to reefs, the divers also tried another method known as "replenishment." They scattered 26,200 coral fragments on the reef, with hope that the coral will cling to the substrate and grow. The fragments have a better chance of attaching to some Eastern Pacific reefs where wave action is less violent, Guzman said.

Because he is artificially reviving the reefs, Guzman said he expects some controversy concerning the ethics of "playing God" with nature.

One scientist questioning the reef revitalization said if the coral reefs were dying solely from natural causes, then they should be left alone. However, he added, if the loss was a result of human pollution or destruction, then he agreed that something should be done to reconstitute the reefs.

Answering to critics who fear that the gene pool of reefs will be contaminated by transplanting, Guzman said he only plants the species that once thrived on the reef.

"I'm not introducing any weird species," he said.

Though Guzman agrees with criticism that new genetics within the same species could be introduced, he says there isn't time to study the genetics of each reef. If he did, Guzman added, the reefs would all be dead before transplanting could begin.

In reviving the reefs, Guzman said he uses various indigenous species with different genetic compositions to provide balance in the new reef structure. Also, he is collecting samples of reefs from the Pearl Islands in the Bay of Panama to determine how they vary genetically.

"But in the meantime, we should increase populations," he said.

Guzman started his transplanting project with a reef near Caño Island along Costa Rica's Pacific Coast, where stripping reefs to sell novelties to tourists is common.

After much observation, he attempted regeneration by attaching fragments of an indigenous coral species. Eighteen months later Guzman returned to the reef and found that the fragments had bloomed into colonies 120 to 150 centimeters in diameter, a size sufficient for likely survival, he

said. Though the reef hasn't completely recovered, at least it is supporting life, he said. A similar, smaller-scale experiment to restore some of the reefs affected during the oil spill in the Bahia Las Minas may start next year, provided there is funding, Guzman said.

Through his restoration efforts, Guzman also hopes to increase awareness by teaching people to appreciate and respect the reefs - not destroy them.

"I want to take it to a scale where it will make a difference."

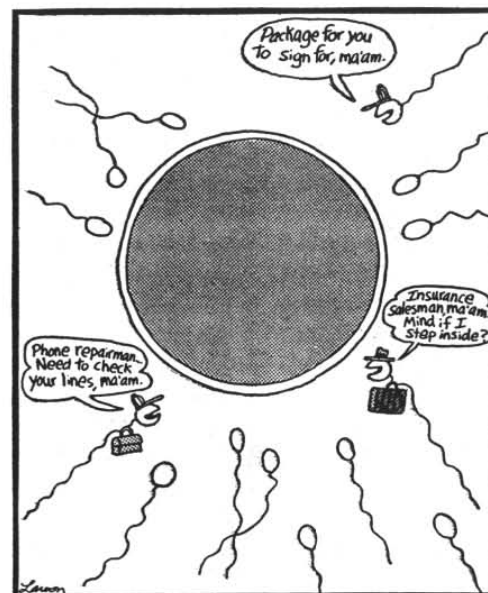
OSP VISIT

Ardelle G. Foss, director of the Office of Sponsored Projects, will be visiting STRI from Dec 2-9. Her office identifies potential sources of funding for projects; provides pre-proposal advise; develops, processes, and approves proposals; negotiates and accepts awards; and provides administrative and accounting mechanisms to support and manage the research while complying with sponsor requirements. OSP assists at the earliest stages of proposal development and continues its work throughout the lifetime of grants and contracts. During her visit to STRI she will give the following presentations. Scientific staff members are urged to attend. Fellows are also welcome.

Dec 3, Tupper Exhibit Hall, 1:45pm.

Dec 4, BCI Conference Room, 2pm.

Dec 5, Naos Meeting Room, 10:30am.



How the human egg is often deceived.

Departures

- Jeanne and David Zeh, Nov 26-Dec 3, will spend a week in Costa Rica visiting several parks and consulting with Dr. William Eberhard.

THINGS YOU SHOULD KNOW

DECEMBER 1991						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

December Calendar

Dec 1: Special Visitor: Ardelle Foss, director, SI Office of sponsored Projects.

Dec 9: Mother's Day in Panama is a STRI Holiday.

Dec 10: Scientific Staff Meeting

Dec 25: Christmas Day. STRI Holiday.

For Supervisors ••• Para Superiores

December 8th is Mother's Day in Panama, and recognized as an additional holiday in the SSH1100, Chapter 213, Smithsonian Institution Excepted Service in Panama. Since this year Dec 8th falls on a Sunday, Monday Dec 9 will be a STRI holiday. However, since it is a Panamanian holiday, payment of that day will be on a regular basis, and if someone works that Monday, the employee should take the time on a "compensatory time" basis. Those who work on Sunday, Dec 8, will not be eligible to receive compensatory time ••• *El 8 de diciembre es el Día de la Madre en Panamá, y se reconoce como un día de fiesta adicional en el artículo SSH1100 Capítulo 213 del Servicio Especial de la Institución Smithsonian en Panamá. Ya que este año el 8 de diciembre cae en domingo, el lunes 9 será feriado. Pero, ya que se trata de un día de fiesta panameño, este día será pagado de manera regular, de modo que si alguien trabaja ese lunes, tomará su tiempo en calidad de "compensatorio". Aquellos que trabajen el domingo 8 no serán elegibles para recibir tiempo compensatorio.*

Attention Tupper Center Users ••• Atención Usuarios del Centro Tupper

This weekend the air-conditioning system will be turned off at the Tupper Center from 7am Saturday, Nov 30, through Sunday evening, Dec 1. This will be necessary to install new valves in the water circulation system ••• *Este fin de semana no habrá aire acondicionado en el Centro Tupper desde las 7am del sábado, 30 de noviembre, hasta la tarde del domingo, 1ero de diciembre. Esto será necesario para instalar nuevas válvulas de paso de agua.*

New Office

Steve Paton's office is now located in the former Reading Room (709) ext. 346.

Tupper Center Events

- Dec 3 Administrative Meeting, Large Meeting Room, 9:30 am-12m.
TREC Meeting, Small Meeting Room, Gloria Maggiori, 1-3 pm.
USMA Visit, STRI Exhibit, 2-4 pm.
- Dec 4 COABIN Meeting, Small Meeting Room, 9 am-12m.

ANNOUNCEMENTS**December Birthdays**

Dionisio Osés	4
Nicolás Almanza	6
Luis Castillo	6
Luis Cruz	13
Andrés Ramos	17
Ira Rubinoff	21
Yira Ventocilla	22
José Nuñez	22
Anibal Velarde	22
Raul Ríos	25
Mario Santamaría	27
Marissa Crespo	31

**Christmas Contribution for the Children of the Parque Nacional Soberania Communities ••• Contribuciones Navideñas para los Niños de las Comunidades del Parque Nacional Soberanía**

The Director of Parque Nacional Soberanía has requested contributions of toys, dry food and clothing in good condition for the children in the communities around Parque Nacional Soberanía. There are approximately 400 children between the ages of 1 to 10. María Morello will have a box in her office where donations can be placed. Please do not send cash ••• *La Directora del Parque Nacional Soberanía ha pedido contribuciones en juguetes, comida seca y ropa en buenas condiciones para los niños de las comunidades cercanas al Parque. Hay aproximadamente 400 niños entre las edades de 1-10 años. María Morello tendrá una caja en su oficina para recoger las donaciones. Se le agradecerá no enviar efectivo.*

Book Contributions

If you have books in Spanish in good conditions you wish to give away, please send to Lizzy Leigh.

For Sale

- Toyota Landcruiser, 1982, 4WD, 6cyl, gas. \$3500. Call Akimi Adler, Tel: 56-6713.
- Four-piece living room set for \$300. If interested call Mercedes Arosemena, Tel: 64-7384.

RESEARCH UPDATE

Coral Reef Restoration by Hector Guzman

by Gretchen Sotomayor

Imagine a community as diverse as a tropical rainforest—that lives underwater.

Coral reefs, the largest biological structures of the sea, are the backbone of this community, but they are in danger. Though they support a plethora of life and can live for hundreds or thousands of years, many are dying.

Along the coasts of Panama and Costa Rica, more than 50 coral reefs are dead or dying, and many more are threatened throughout Central and South America.

At STRI, scientists are nearly finished with a five-year study of the 1986 Bahia Las Minas oil spill, the largest spill in a sheltered coastal habitat in the tropical Americas, according to STRI scientists. More than eight million liters leaked from a ruptured storage tank at an oil refinery near the Caribbean entrance to the Panama Canal, devastating coral reefs.

Within three months of the spill, the heavily oiled Galeta reef had lost 76 percent of its total coral cover in water no deeper than three meters. In depths of three to six meters, effects of the oil destroyed 56 percent of the coral cover.

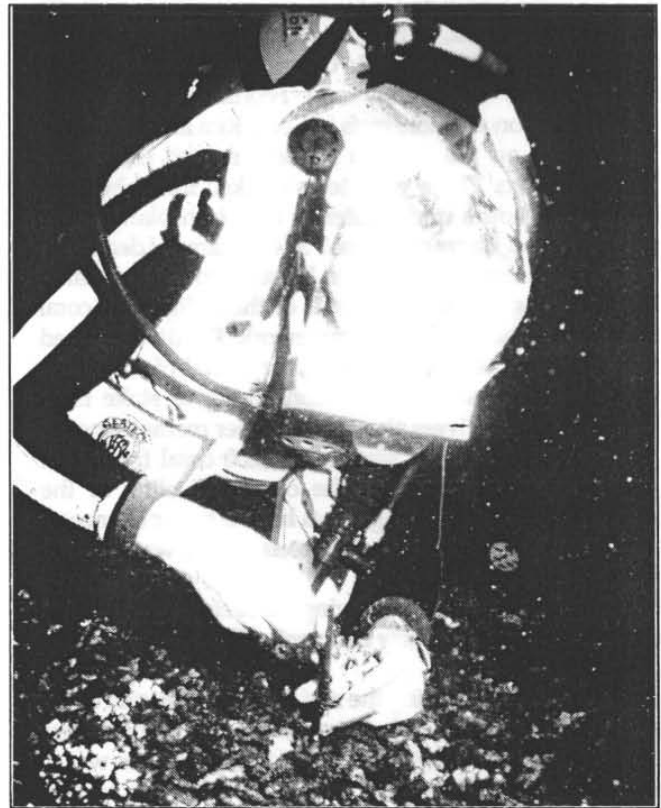
Though other populations, such as certain algae and invertebrates, experienced relatively rapid recovery since the oil spill five years ago, coral species are still showing little or none. One type of coral, *Acropora palmata*, was practically eliminated from the Galeta reef after the spill, though it thrived on four unoiled reefs during the same year, increasing its colonies by 38 percent.

Scientist Hector Guzman, a member of the oil spill research team, has studied and monitored coral reefs for several years. Unfortunately, he says, he has also witnessed the loss of many reef environments and fears for the future of others.

"I study things, they die and do not recover," he said.

The oil spill near Colon joins other phenomena of the decade that have degraded the fragile existence of coral reefs. According to Guzman, the decline of coral reefs started in 1982-83, when the severest El Niño in recorded history struck. El Niño, a warming event that occurs in the Eastern Pacific Ocean, held temperatures unseasonably high for more than nine months. That alone weakened the resistance of coral reefs to fend off secondary disturbances, such as the smothering 'red tide' plankton blooms or the increased pollution and silt in the ocean.

Troubled by what he was seeing, Guzman started monitoring reefs and charting their degradation. He



Héctor Guzmán

(Photo by Marco Díaz)

discovered that they weren't recovering from the effects of recent natural and manmade events. Such disturbances, in addition to El Niño, include continual unmonitored dumping of heavy metals and human waste in the oceans, extraction of coral sold for souvenirs and an increase in sedimentation from eroding soils associated with deforestation.

All of these have contributed to the environmental stress on coral reefs as "secondary disturbances," Guzman said. Reefs, consisting of living organisms that build calcareous skeletons with their accumulated deposits, need clear, warm and shallow water and light to survive. Pollutants in the water place stress on the reefs' organisms by forcing them to expend more energy filtering impurities.

"We can't say now that there is a place free of pollution. We cannot afford to continue to look at that without doing nothing. We have to act," Guzman said.

So he did. Guzman mounted a one-man campaign to resurrect life in the graveyards of coral reefs. As a result, he reports signs of new life on some damaged reefs and has also received some financial aid and volunteer assistance.

With the help of STRI volunteer divers, the use of