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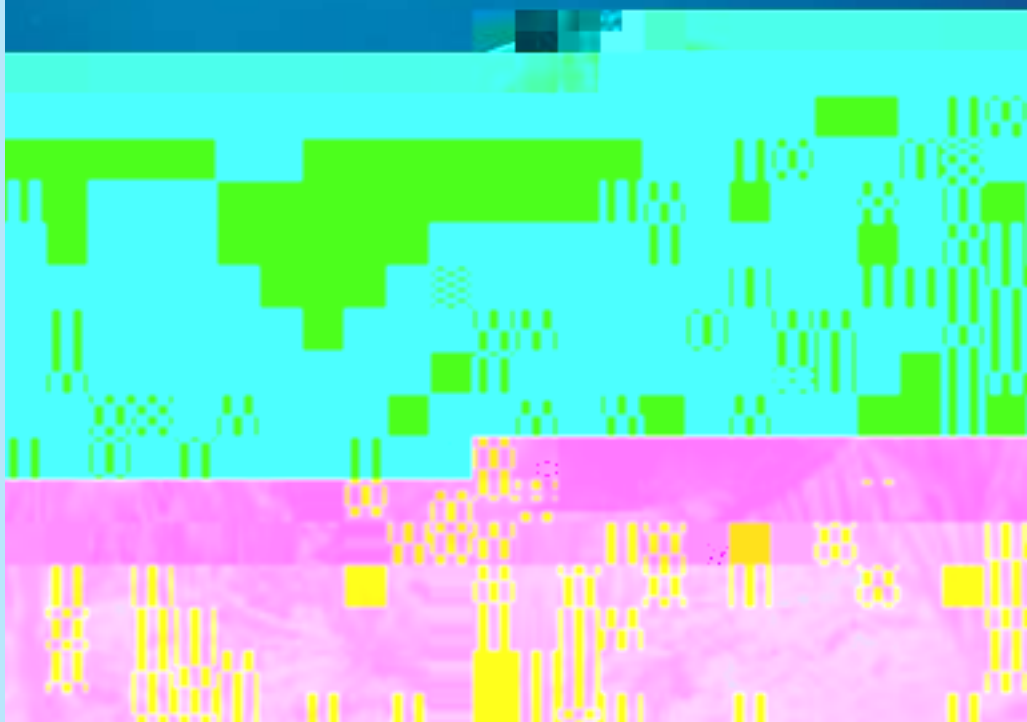
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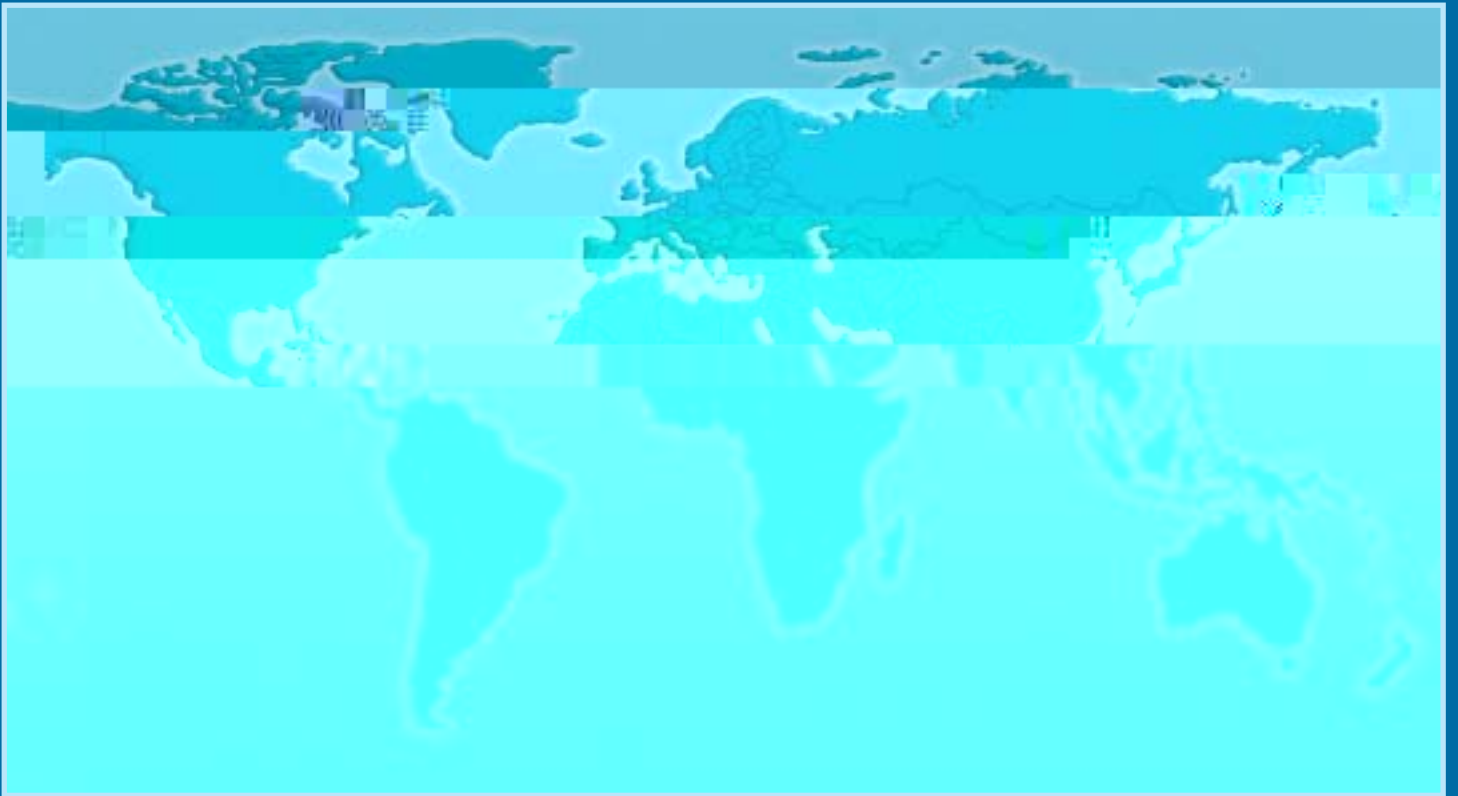
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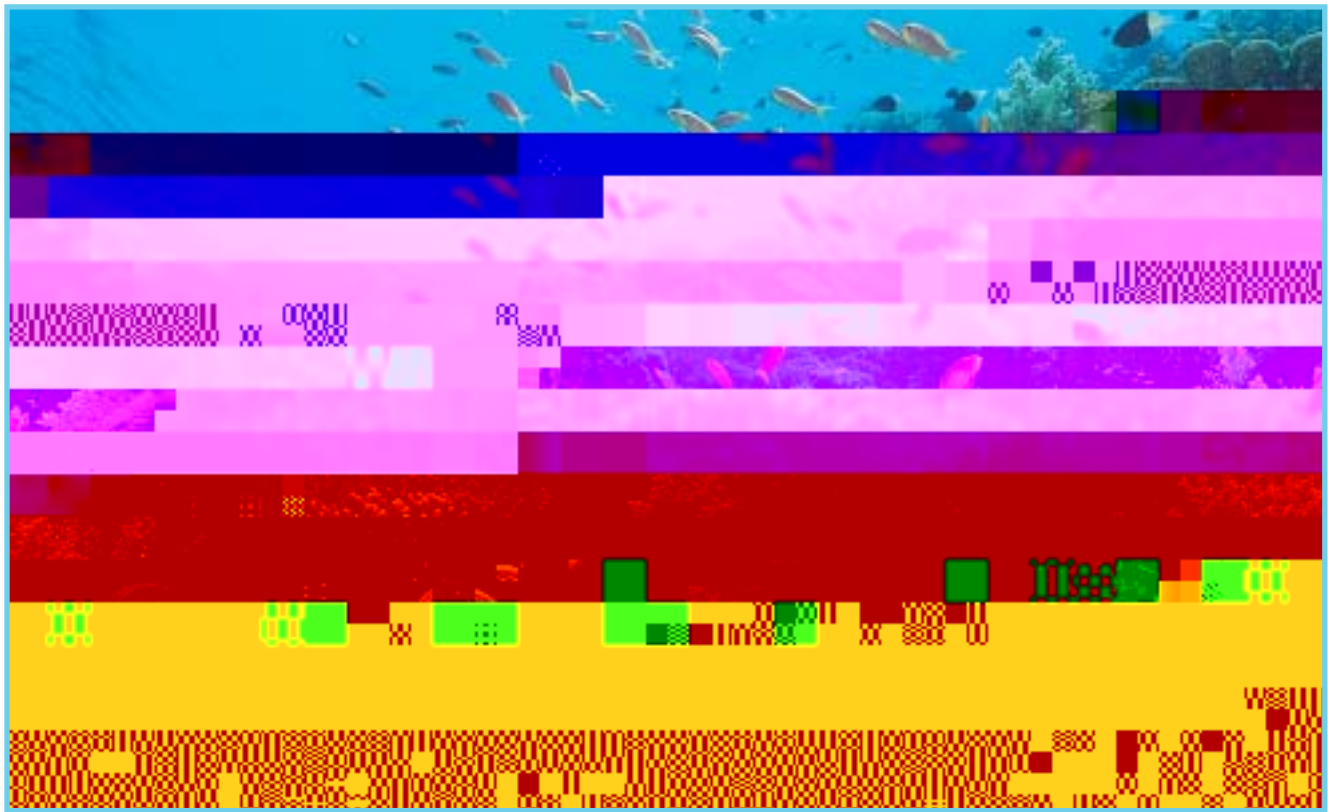
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Monitoring an ecosystem, and how people use that system, is critical for conservation and sustainable management. Unfortunately, effective monitoring information is often not sufficiently included in marine management planning and this can undermine many of the subsequent efforts and strategies. Successful environmental monitoring is the aim behind the partnership between the GCRMN, Reef Check, ReefBase and CORDIO. These partners are also active participants in the International Coral Reef Action Network that seeks to mobilize resources to conserve coral reefs around the world. The GCRMN, Reef Check, ReefBase and CORDIO partnership has two principal objectives: to provide data and information on the status and trends in coral reefs and their use; and to raise awareness amongst all stakeholders of the need for conservation management of these valuable resources.

In partnership with IUCN and The Nature Conservancy, the GCRMN highlighted several reasons for monitoring in the 2003 publication *Monitoring Coral Reef Marine Protected Areas*:

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Diver collecting monitoring data on the Great Barrier Reef in Australia



Training course in GCRMN coral reef monitoring methodology

The GCRMN and Reef Check seek to encourage and coordinate monitoring in over 80 countries by linking the countries into independent clusters, termed Regional Nodes, which coordinate training, monitoring and databases, and report writing within participating countries and institutes. The CORDIO network, a Swedish and IUCN initiative, assists three of these Nodes (Eastern Africa, Southwest Indian Ocean Islands, South Asia) in the Indian Ocean and links the Nodes with activities in the Middle East. The GCRMN places equal emphasis on gathering ecological and socio-economic data, and to that extent has produced manuals and protocols in both (see *Survey Manual for Tropical Marine Resources* by English *et al.* (1997) and *Socioeconomic Manual for Coral Reef Management* by Bunce *et al.* (2000)).

GCRMN also produces the *Status of Coral Reefs of the World* report every two years. These are regarded as sources of the most up-to-date global information on coral reef health, in addition to providing overviews on global and local initiatives being implemented to arrest damage, conserve coral reefs, and establish more protected areas. This report is commonly used to promote sound coral reef policy development in the tropics.

In India, Maldives and Sri Lanka, the GCRMN has developed into a regional information network of skilled people and institutions to support sustainable and equitable coral reef management. With dedicated funding and technical assistance from the United Kingdom Department for International Development and IOC/UNESCO respectively, GCRMN South Asia has equipped regional researchers and managers with the expertise and tools to collect, integrate and use the ecological and socio-economic information that is required to effectively inform and influence management planning and decision making. Socio-economic assessments, at sites where ecological

monitoring is ongoing, have provided new insight into the complex relationships between reef dependent communities and sustainable reef use. A regional information dissemination system is in development, and GCRMN South Asia, recognising the importance of long-term institutional partnerships and capacity enhancement, has supported the Indian Ministry of Environment and Forestry in establishing an Indian Coral Reef Monitoring Network, and formed nation-wide Coral Reef Fora in Sri Lanka and Maldives, bringing together key national stakeholders to collectively address sustainable and equitable coral management and policy development.





Global warming and increased shipping and travel have engendered new and different threats to coral reefs. During the 1980s and 90s mass coral reef bleaching was observed repeatedly throughout the Atlantic, Pacific and Indian Oceans, and in the Caribbean Sea. Invasive species and coral diseases have emerged as additional threats, adding to the growing environmental stress facing coral reef communities. These combined threats have the potential to degrade large areas of coral reef on a global scale. IUCN, with a range of government and non-governmental partners, is continuing to identify, monitor and mitigate emerging threats to coral reefs and to develop new management tools that respond to these threats. Furthermore, IUCN is working to influence regional and international policy to articulate the need and value of managing coral reefs for these emerging threats.





In the 1997/98 El Nino event the Western Indian Ocean suffered the most severe coral bleaching event in its recorded history, losing an estimated 30% of corals regionally, and up to 90% of corals in the most highly affected sites (e.g. Maldives lost 95% of its coral cover at monitored reefs). With countries of the Western Indian Ocean highly dependent on reef- and beach-based tourism, and their coastal populations dependent on small-scale and commercial fisheries, it was suddenly a high priority to understand the impacts of coral bleaching and reef loss on human societies. To build technical capacity within the region to study and mitigate these impacts of coral bleaching and other more localized threats, the CORDIO programme was initiated in 1999 through support from the Swedish government and the World Bank.

CORDIO operates in East Africa, the Indian Ocean islands and South Asia, with coordination offices in each subregion, thus overlapping with IUCN's regional offices in Eastern Africa and South Asia. CORDIO, IUCN and GCRMN have established a joint position at the IUCN Regional Office in South Asia in Colombo, Sri Lanka. In East Africa, CORDIO and IUCN are working in partnership to support and coordinate activities, including the Socio-Economic Monitoring Programme (SEMP) and the Coral Reef Health Check (CRHC).

INDIA:

Islands along the Tuticorin coast in the Gulf of Mannar, India have been seriously affected by illegal coral mining and destructive fishing, resulting in a declining fish catch. Since early 2002, CORDIO has supported a reef restoration project, which focuses on coral transplantation carried out by local fishing communities. In addition, alternative livelihood activities are under development: women from the local fishing communities have been encouraged to engage in handicraft and fattening projects; and farming has improved by teaching compost techniques. By 2003, approximately 20 fisher families were gaining significant financial benefits from these activities.

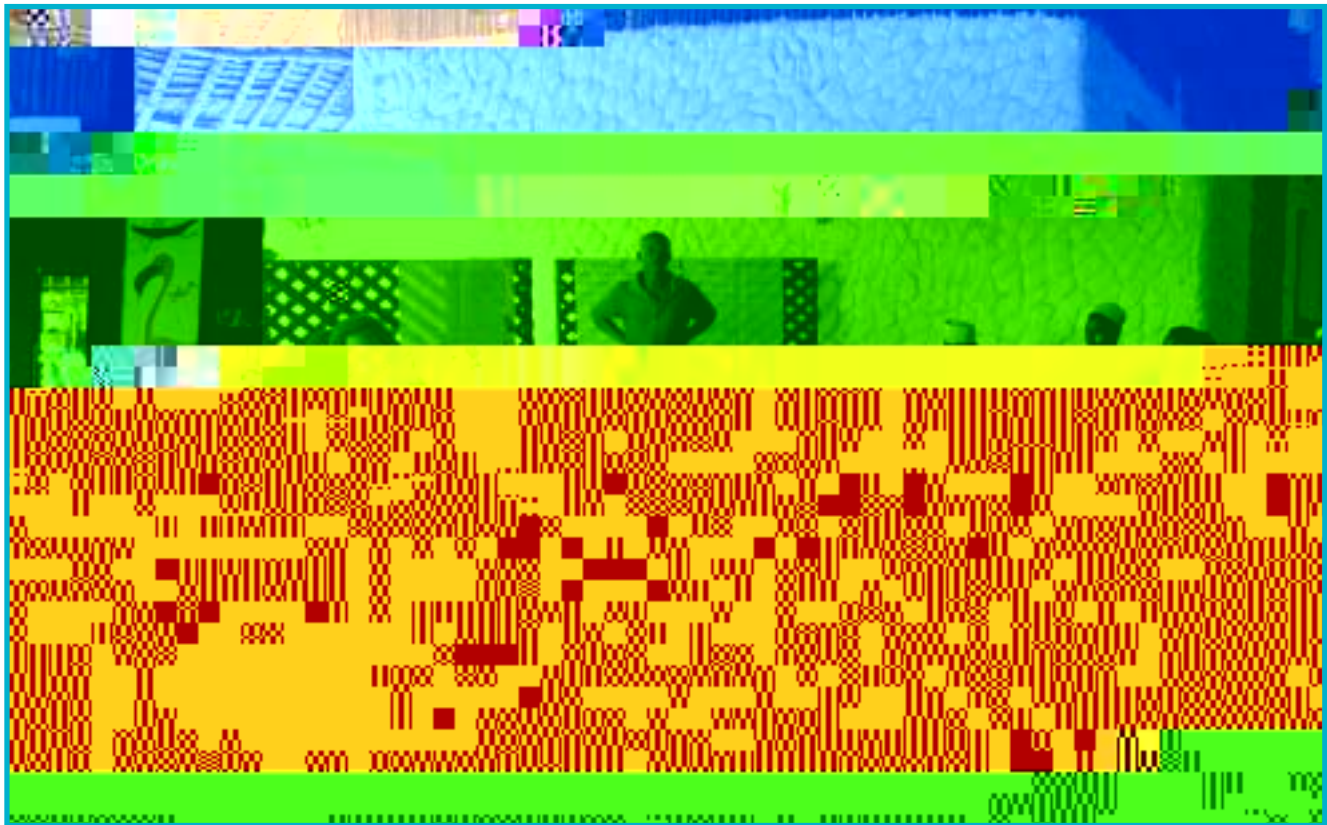
INDIA - CEAS:

The Marine National Parks of the Seychelles were badly affected by the 1998 coral bleaching event, with coral mortality as high as 90% on many reefs. Reefs in this area are important to the tourism economy, therefore it is imperative to speed the recovery of damaged reefs by minimizing ongoing threats. CORDIO is helping to support collaborative research projects run by the Seychelles Centre for Marine Research and Technology-Marine Parks Authority that investigate coral recovery and propose recommendations for improved management of marine parks.

EAST AFRICA:

CORDIO's Socio-Economic Monitoring Programme was set up in East Africa to respond to the need for practical and affordable socio-economic monitoring as a tool for coastal and fisheries resource management.

CORDIO-East Africa

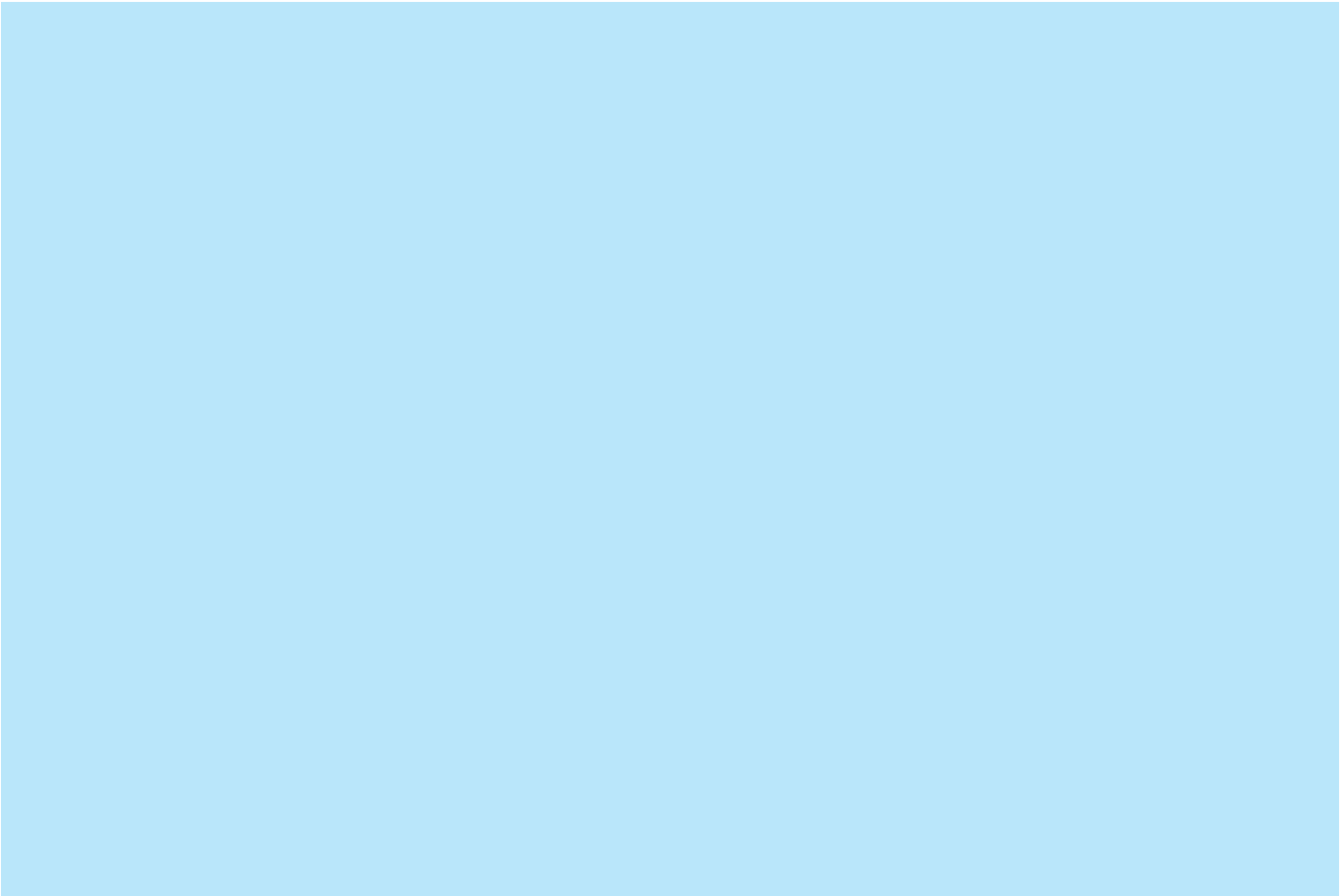


CORDIO - East Africa

East African scientists and data collectors discussing and analysing information on coastal resources

Against a backdrop of more conventional threats like pollution and destructive fishing, coral bleaching and other climate-related impacts have emerged to increase uncertainty about the future of reefs. In many regions, coral reefs have already experienced extensive mortality as a result of coral bleaching. Climate-related impacts, including coral bleaching, are predicted to worsen in coming decades, posing a daunting challenge for coral reef management. Unlike locally-mediated threats such as anchor damage or over-fishing, at first climate change seems to lie well beyond a manager's control.

However



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As fisheries and other pressures increase their impact on marine species and habitats, the IUCN Species Survival Commission (SSC) is accelerating its efforts to identify those that are threatened with extinction. The SSC has been active in recent years in developing both its network of marine experts and a marine programme of work, a good deal of which relates to coral reef ecosystems. Currently, the coral reef-related SSC Specialist groups focus on marine turtles, sharks, groupers and wrasses, and coral reef and Caribbean fishes. Threatened marine species, identified by these and additional SSC experts, are included in the **IUCN Red List of Threatened Species**™, the world's most authoritative and comprehensive list of species at risk of extinction. There is an urgent need to expand this work not only to identify those species in need of conservation action but also to elucidate the current and potential future impact of coral bleaching events and other stressors on coral reef species and ecosystems.



Endemic Reef Fishes

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Longnose hawkfish (*Oxycirrhites typus*, family Cirrhitidae)

Robert F. Myers

Coral reef fish species that are exploited for food or trade are vulnerable to population depletion and may be vulnerable to extinction. However, the concept that species of diverse and abundant fish faunas found on typical reef systems are vulnerable to local or global extinction has not been widely accepted by resource managers, user groups or the general public. The IUCN SSC has recognised the urgent need to heighten awareness and concern about the real survival risks that many coral reef fishes face – and to translate that concern into proactive management.

Many reef fish species exhibit specific biological traits that render them susceptible to extinction from over-exploitation, habitat loss or other negative impacts. These include:

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Robert F. Myers



Cocos-Keeling Angelfish (*Centropyge colini*, family Pomacanthidae)

It is estimated that 80-90% of all coral reef fish species exhibit one or more of these characteristics. It is critical to determine how many species meet more than one of these criteria so as to identify those species most in need of conservation action. These determinations will be made through the Red List assessment process and will come from comparative studies of life-history patterns using predictive methods, including a Susceptibility Matrix currently under development by the SSC that will screen potentially vulnerable species for more in-depth analysis.

The SSC Coral Reef Fishes Specialist Group (CRFSG) focuses on coral reef fish species, and those living in associated habitats. The CRFSG is currently developing a collaborative, multi-institutional project, the Global Assessment of Reef Fishes (GARF), to determine the IUCN Red List, or threatened, status of several thousand species. This project will include the creation, maintenance and use of a database on life history, ecological and behavioural characteristics, exploitation levels and threats, and other variables for use in making assessments. This database will be built using existing data sets, and newly acquired data from recent or current field studies conducted by Group members and their colleagues. The GARF will also map species distributions (in concert with other fish specialist groups), which will be essential for making Red List assessments.

Through CRFSG members at the University of East Anglia (UK), the CRFSG is creating a web site to provide information about the CRFSG's activities and findings.



The Guam damselfish (*Pomachromis guamensis*, family Pomacentridae) is a species endemic to Mariana and Ogasawara Islands

Robert F. Myers

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In response to growing concern about the impact of fisheries on shark and ray populations, the IUCN SSC



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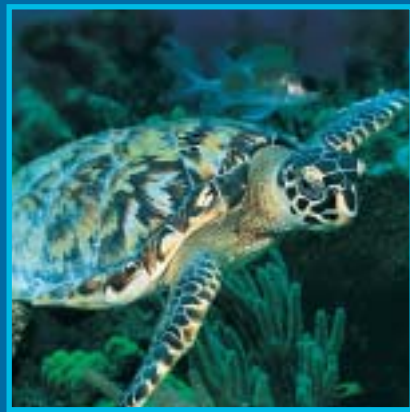
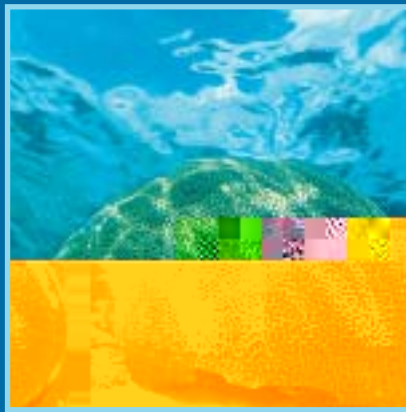
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