

WorldFish Center

WorldFish is a natural resource management (NRM) oriented research center which predicated all of its work on the maintenance of ecosystem health and services through sustainable use and biodiversity conservation. Over 35% of our projects are being conducted within the global center for aquatic biodiversity (South-east Asia and Western Pacific). The Center's site-based work on coral reefs and associated ecosystems is located entirely within the "Coral Triangle", a globally acclaimed area of mega-diversity and high vulnerability.

Global Initiatives

At a global level the Center has established two award-winning knowledge systems (FishBase and ReefBase) which have explicit biodiversity conservation objectives. FishBase is the only comprehensive global repository for information on fish species, including taxonomic status, biological attributes, distribution and conservation status. It is a key tool for the development of biodiversity monitoring, threat assessment, and management plans. The database includes information in 12 languages for over 30,000 species. Associated projects, which are linked to Fishbase and which the Center is involved in, include SeaLife Base, INCOFISH, PROFISH and Species 2000. All of these initiatives are aimed at cataloguing biodiversity for ongoing conservation and management.

ReefBase is a global knowledge base on coral reef management and conservation. Through partnerships with the Global Coral Reef Monitoring Network (GCRMN), Reef Check, the World Conservation Monitoring Center and the International Coral Reef Action Network, ReefBase provides access to data and comprehensive reports on the status of coral reefs, current threats and management effectiveness. The database provides centralized access to maps and databases of information on nearly 100 reef countries and territories. With content support from the U.S. NASA and the U.S. NOAA, users can draw on resources such as full-resolution maps of all the world's coral reefs derived from Landsat satellite images, as well as the most authoritative data available on coral bleaching, which is a critical threat to reef systems worldwide and is likely to increase as a result of climate change. ReefBase has also worked with the French government and to develop COREMO, a coral reef monitoring and assessment tool which allows researchers to use standard techniques to enter survey data on coral reef invertebrates and fish, to analyze these results and to store them securely.

ReefBase is a key tool in natural disaster situations. For example following the Asian tsunami, scientists relied heavily on ReefBase for assessments of environmental damage to coral reefs and impacts on affected coastal communities. Coral reef managers can also use ReefBase to access information on other major coral reef management projects (most with explicit biodiversity objectives), download best practices and lessons learned from these projects and participate in a global information exchange network of reef managers. In partnership with Japan, ReefBase developed the first regional database on coral reef Marine Protected Areas in Southeast Asia. Additional work on Marine Managed Areas (MMA) at a global level was conducted in 2007 in partnership with Conservation International. This work investigated how ecological, socioeconomic and governance factors interact during the MMA planning and design process, as well as during MMA implementation, to effect MMA performance.

In 2007 the Center worked with NOAA to capture the key outcomes of a Belagio conference on sea turtle conservation, and to collect data on fisheries and sea turtles to estimate the status of sea turtles and other relevant endangered species.

Regional and National Projects

Under the Coral Reef Initiative for South Pacific, the first regional focused sub-component of ReefBase is being developed to strengthen information access and dissemination with the aim to protect biodiversity, sustain local livelihoods and integrate coral-reef conservation efforts among developing and developed countries. This project encompasses 10 countries and 3 territories.

In the Solomon Islands WorldFish has developed innovative strategies to allow coral reef biodiversity to be sustainably marketed through the culture of reef invertebrates (hard corals, soft coral, clams, shrimp) for sale to the aquarium market in the USA. In 2007 the Center also carried out biodiversity surveys of mangroves, sea grass and macro algae for WWF at its Darwin Initiative sites in the Solomon Islands. The Darwin Initiative is a small grants program, administered by the UK Department for Environment, Food and Rural Affairs, that aims to promote biodiversity conservation and sustainable use of resources around the world.

In Indonesia, two projects are working to restore sustainable livelihoods to victims of the Asian tsunami. The approach includes a diagnosis of ecological, social and economic attributes which will ensure that fisheries and fishing communities are resilient to future shocks. Maintenance of healthy, diverse reef systems is a key component of this resilience.

In the Philippines, WorldFish is implementing a project to enhance management effectiveness of marine protected areas targeting for the Calamianes Islands by developing and testing a suite of biophysical, socioeconomic and governance indicators appropriate to regional/local conditions that influence the performance of MPAs. The work is part of the USAID-funded project "Fisheries Improved for Sustainable Harvest" (FISH) with Palawan State University.

In the Greater Mekong region WorldFish is actively engaging with the Wetlands Alliance which will engender greater cooperation between key NGO partners and strengthen capacity for poverty-focused action based on the improved management of wetlands and aquatic resources. This project is closely linked to the Mekong Wetlands Biodiversity Program which receives logistic support from the Center.

In Africa WorldFish is engaged in helping poor African farmers benefit from genetically improved farmed tilapia (GIFT) while at the same time protecting the aquatic biodiversity upon which such genetic improvements is based, WorldFish has implemented a strategy whereby, while making more productive strains available to poor farmers, it is done in a responsible manner so that valuable wild populations are not put at risk. WorldFish's policy with respect to the transfer of GIFT to Africa was approved by its Board of Trustees in 2007. WorldFish also works with NARs in trying to build capacity to manage the issue. WorldFish has also participated in the preparation and dissemination of a recently published book on the risks associated with fish transgenics and in the soon to be produced FAO technical guidelines on management of aquatic genetic resources. Plans have been made to begin assisting the FAO to develop and disseminate genetically improved tilapias among poor farmers in the Volta basin, while at the same time identifying and protecting genotypically important wild populations.

In Malawi and Mozambique, WorldFish has developed a GIS-based approach for linking land use, soil erosion and river discharge to fish production and species diversity. The Center's work indicates that intensification of agricultural practices, loss of forest cover and destruction of marshes has resulted in the low abundance of large cyprinids in Lake Chilwa influent rivers and reduces nursery areas for small cyprinids. This work makes a strong case for conservation of marshes and adoption of sustainable agricultural and forest practices in the catchment for the recovery of large cyprinids and the conservation of fish biodiversity.

In Malawi, a review by WorldFish on the collapse of its most important fishery, the Chambo fishery, indicated that the collapse which reduced per capita fish consumption by more than half also threatens the biodiversity and ecological integrity of Lakes Malawi and Malombe. With the decline, species composition has shifted to small species and the populations of predatory species have declined, signaling a looming ecological crisis. A restoration plan has been developed to restore the fisheries of Lake Malawi but it flounders on an inability to assess the status of stocks. In the case of Lake Malombe gastropod mollusk populations have boomed following the collapse of the chambo fisheries and work is planned with the University of Minnesota to reconstruct the biomass trajectories of snails and fish to better understand the consequences of fisheries collapse on biodiversity.

Working with partners, the Center is also studying environmental and social impacts of cage aquaculture in Lake Malawi, which has begun to assume importance in African lakes and reservoirs, with large scale

operations in Lakes Kariba, Victoria, Malawi and Volta. Much is now known about the environmental impacts of cage aquaculture, which include the impacts of demands on natural resources (e.g. feed and construction materials) and on environmental services required to disperse and assimilate wastes. Of key concern in the present context are the impacts of escaped farmed fish on biodiversity and of fish farm wastes on lake nutrient status and aquatic food web structure (biodiversity) and function.

The WorldFish Center in Central and West Africa is partnering a range of institutions including USAID (CARPE), IRD, IUCN, WWF, AWF, WCS, the World Bank and the National Geographic Society to establish baseline biodiversity and fisheries data for direct use in both environmental risk assessment and the development of alternative fisheries-based livelihoods strategies for rural populations affected by slash-and-burn agriculture, deforestation, dam construction and the establishment of national parks and game reserves. The mostly riverine ecosystems of Central Africa represent a biodiversity hot-spot with over 1000 species of fish, a large percentage of which are endemic. Specific research activities include studies of:

- Biogeography of fishes in the Lower-Guinea rainforest.
- Population genetic studies of fish biodiversity in Southern Cameroon and the Volta basin.
- Traditional fisheries in Southern Cameroon and the central Congo River basin.
- Aquaculture and fisheries management alternatives to the bush meat trade for Central African rainforest communities.
- Baseline fisheries data for use in environmental impact assessment of dam construction.
- Threats to livelihoods and biodiversity associated with rural development.