FISHERIES POLICY AND LEGISLATION

Conservation Strategies

Human modifications to the environment, overexploitation, habitat loss, exotic species and others factors are greatly threatening aquatic biodiversity. Ecosystems and species important in sustaining human life and the health of the environment are disappearing at an alarming rate. In order to preserve these threatened areas and species for future generations, immediate action in the form of aquatic biodiversity conservation strategies are necessary.

Aquatic conservation strategies support sustainable development by protecting biological resources in ways that will preserve habitats and ecosystems. In order for biodiversity conservation to be effective, management measures must be broad based. This can be achieved through many mechanisms including:

- **Marine Reserves:** A marine reserve is a defined space within the sea in which fishing is banned or other restrictions are placed in an effort to protect plants, animals, and habitats, ultimately conserving biodiversity. Marine reserves can also be used for educational purposes, recreation, and tourism as well as potentially increasing fisheries yields by enhancing the declining fish populations. Marine reserves are also very similar to marine protected areas, fishery reserves, sanctuaries, and parks.

- **Bioregional Management:** Bioregional management is a total ecosystem strategy, which regulates factors affecting aquatic biodiversity by balancing conservation, economic, and social needs within an area. This consists of both small-scale biosphere reserves and larger reserves. Biosphere reserves, generally small in scale, have a strong conservation focus, and consist of one or more protected central habitats and surrounding buffer zones. In these bioresevation units, activities such as fishing, hunting, harvesting, and development activities are strictly limited. In contrast, nonbiosphere reserve areas encompass much broader ranges, and many more habitat types (e.g., the Florida Keys National Marine Sanctuary).

- **Threatened or endangered species designations:** The World Resources Institute documents that the designation of a particular species as threatened or endangered has historically been the primary method of protecting freshwater biodiversity. Threatened species include organisms likely to become endangered if not properly protected. Endangered species are plants and animals that need protection in order to survive, as they are in immediate danger of becoming extinct. Once species are "listed," they become subject to national recovery programs and will be placed under international protection. Severe monetary penalties can occur if threatened and endangered species regulations are broken, and can even result in jail sentences.

- **Local watershed groups:** Rivers and streams, regardless of their condition, often go unprotected since they often pass through more than one political jurisdiction, making it difficult to enforce conservation and management of resources. However, in recent years, the protection of lakes and small portions of watersheds organized by local watershed groups has helped this situation.

- **EPA's Healthy Watersheds Initiatives:** Once healthy watersheds or healthy components of watersheds are identified, a variety of conservation and protection approaches are available. See examples of conservation and protection approaches and tools. These approaches are generally site-specific and tailored to the particular situation. Watershed managers are encouraged to use these examples as guidance in developing their own conservation and protection strategies. A combination of approaches has been found to be most effective at maintaining watershed health and integrity.
- **Specialized Programs:** Many specialized programs have been instituted to protect biodiversity. For example, the USDA Forest Service initiated Bring Back the Natives EXIT Disclaimer, a cooperative state-federal program. The goal of this program is to restore the health of riverine systems and associated species. Areas targeted for this program include lands managed by the U.S. Forest Service and the Bureau of Land management.
- **Research:** Various organizations and conferences that research biodiversity and associated conservation strategies help to identify areas of future research, analyze current trends in aquatic biodiversity, even conduct specialized studies. Examples of such organizations include the Nature Conservancy EXIT Disclaimer, Natural Heritage Network EXIT Disclaimer, World Conservation Monitoring Centre EXIT Disclaimer, World Resources Institute EXIT Disclaimer, NOAA Fisheries Office of Protected Resources , and Convention on Biological Diversity (CBD) .
- **Increase Public Awareness:** Increasing public awareness is one of the most important ways to conserve aquatic biodiversity. This can be accomplished through educational programs, incentive programs, and volunteer monitoring programs. For example, the State of Delaware has an Adopt-a-Wetland Program EXIT Disclaimer designed increase public awareness as to the value and of wetlands and the need for conservation. The EPA developed a site with links to organizations that teach the public how to become involved in volunteer monitoring programs. Read about how fish and freshewater mussels are used as environmental indicators to protect aquatic biodiversity.
- **Restoration/Mitigation Efforts:** Aquatic areas that have been damaged or suffered habitat loss or degradation can be restored. Even species populations that have suffered a decline can be targeted for restoration (e.g., Pacific Northwest salmon populations). Some management practices such as the establishment of riparian buffer zones and the restoration of natural flow patterns and discharge regimes are being applied to riverine areas. Recently, habitat restoration has also been performed in various areas to replace losses from dredging projects and in many wetland habitats. Learn about the Great Lakes Restoration Initiative, Cheseapek Bay restoration, and River Corridor and Wetland Restoration.
- **Regulatory Measures:** This may include wastewater discharge regulations like NPDES or fishery conservation measures, fisheries management councils, even fishery bans. For example, the Magnuson-Stevens Fishery Conservation and Management Act EXIT Disclaimer of 1976 and the associated 1996 Sustainable Fisheries Amendment require

the conservation and management of the marine fishery resources in the United States, predominately managed by NOAA's National Marine Fisheries Service (NMFS). This creation of sustainable fisheries is largely completed through regulatory actions including the collection of the best scientific data available. Learn more about EPA's efforts to protect our oceans, coasts, estuaries and beaches.

- **Local community actions:** The demand for freshwater - and the threats to its health - originate from the actions of millions of people. To solve these challenges also requires actions of many. State and federal governments, and many local governments and public agencies, are already at work. So, too, are numerous citizen volunteers. Any individual can take steps to make healthy water a welcome part of everyday life. Learn how **you** can make a difference.

Fishes exhibit enormous diversity in size, shape, biology and in the habitats they occupy. The great majority comprises bony fishes, mainly teleosts. In addition, there are around 800 species of cartilaginous and 70 of jawless fishes (lampreys and hagfishes). It is believed that out of 4000 species of vertebrate recognised world over 22000 are fish species; of which 8411 are fresh water while 11650 are marine. As per the report more than 24500 fin fish species exist throughout the world. However, there is prediction of around 28500 fish species representing more half of the vertebrate diversity. They surveys emphasised that there could well be at least 5000 species more to be discovered.

In India 2163 species of finfish have been recorded from upland cold (157; 7.26%), warm waters of the plain (454; 20.99%), brackish water (182; 8.41%) and marine environment (1370; 63.3%).In terms of habitat, fishes live in almost all conceivable aquatic habitats, ranging from Antarctic icecap to hot springs as well as fresh to saline waters. As per the FAO, a sustainable fisheries development envisages an eco-friendly, equitable mode of development that can sustain livelihood over generations. An attempt has been made to assess the current status of fish biodiversity, delineate the threatened species of India vis-a - vis their causative factors to formulate appropriate strategies for their conservation and rehabilitation.

Due to factors such as human modifications to the environment, overexploitation, habitat loss, exotic species and others, aquatic biodiversity is greatly threatened. Ecosystems and species important in sustaining human life and the health of the environment are disappearing at an alarming rate. In order to preserve these threatened areas and species for future generations,

immediate action in the form of aquatic biodiversity conservation strategies are necessary. In general, aquatic conservation strategies should support sustainable development by protecting biological resources in ways that will preserve habitats and ecosystems. In order for biodiversity conservation to be effective, management measures must be broad based.

Since maintenance of fish biodiversity along with other biotic resource has been viewed as prerequisite for the well being of even human beings, it is essential to prevent further decline of fish resources by devising all possible measures of conservation and rehabilitation. The conservation policy should promote the management practices that maintain integrity of aquatic ecosystem, prevent endangerment and enhance recovery of the threatened species. Five principal elements or tasks in the recovery programmes have been to be identified as

(i) Habitat management

(ii) Habitat development and maintenance

(iii) Native fish stock

(iv) Non native and sport fishing

(v) Research data management and monitoring

The main goal in a conservation programme is to conserve the genetic diversity. The fish genetic resources can be conserved by protecting an ecosystem which is broad-based, on-specific, cost effective and relatively simplistic in approach .It may aim in general or at specific species like endangered or threatened ones. This can be achieved through many mechanisms including *in situ* and *ex situ* methods

Insitu conservation

In situ conservation of fish as landraces and wild relatives is useful where genetic diversity exists and where wild forms are present. This is done through their maintenance within natural or man - made ecosystem in which they occur. The major advantages of insitu conservation to co-evolve with other forms, providing the breeders with a dynamic source of resistance that is lost in ex situ

conservation and (ii) natural parks and biosphere reserves may provide less expensive protection for the wild relatives than ex situ measures.

Ranching:

Stock enhancement through ranching is feasible only (i) if there is incomplete colonization of available carrying capacity.

It is felt that restocking programmes involving hatchery stocks are unlikely to fully solve the problem since these stocks were selected for adaptation to hatchery conditions and not to the natural environments. The hatchery stocks, in addition, may be even inbred. Two strategies could be implemented in restocking programmes (i) stocking spawners of domestic strain (preferably of sex) for interbreeding with the resident population or (ii) direct stocking of crossbred fry. However, in absence of facilities, we start with fingerlings from the hatchery avoiding inbreeding.