

FLOOD CONTROL

WETLANDS “HOLD” HEAVY RAINFALLS, preventing possible flooding downstream. By storing the water in the soil or retaining it in the surface waters of lakes, marshes, etc., wetlands reduce the need for expensive engineered structures. Wetland vegetation also plays a role in slowing down the flow of flood water. A recent study in the USA estimated that 0.4 hectares of wetland can store over 6,000 cubic metres of floodwater.

The “value” of this function is not often assessed in economic terms, although where efforts are made the value proves considerable: the intact 3,800 hectares of wetlands along part of the main stream of the Charles River in the USA have been valued at US\$ 17 million per year, the estimated cost of flood damages that would result if they were drained. More readily available are figures on the cost of flood damage after this function has been lost or seriously eroded by unsustainable development.



Flooding caused by heavy rain and destruction of the floodplain, Frankfurt, Germany.

Photo: WWF-Canon/Hartmut Jungius

In Brief

- ✓ **Wetlands often play a crucial role in flood control. Loss of floodplains to agriculture and human habitation has reduced this capacity. Construction of levees and dams on rivers to improve flood control have often had the reverse effect.**
- ✓ **Floodplain restoration and removal of structures is providing a partial solution in many countries.**
- ◆ **Economic losses in the 1998 floods in China amounted to US\$ 32 billion.**
- ◆ **The 1993 floods along the Mississippi caused US\$ 12-16 billion in damages.**
- ◆ **3,800 ha of intact wetlands on the Charles River have been valued at US\$ 17 million per year in terms of flood protection alone.**

The Chinese have suffered an increasing frequency of devastating floods since the turn of the last century. Their worst floods occurred in 1998, affecting several rivers including the Yangtze. The statistics were appalling – 230 million people affected, 20 million people displaced, over 3,500 killed, 7 million homes destroyed, 15 million farmers suffering loss of their crops; the estimated total economic losses exceeded US\$ 32 billion. Analysis of the causes identified increasing population as the root problem, fuelling many environmental changes: an increase in settlements in low-lying areas subject to floods; reclamation of the wetlands around lakes and rivers for cultivation to feed the growing population, thus reducing their flood absorption capacity; serious deforestation in the upper reaches of the rivers for

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Floodplain forest in the Czech Republic "holds" heavy rainfall preventing flooding downstream.

Photo: Petr Macháček

further agricultural production, causing heavy silting in the lower reaches (in lakes, rivers and other wetlands) and reducing flood absorption capacities in both areas. These problems are mirrored in other countries. The long-term response to the calamity in China was swift, with plans both to restore reclaimed land around lakes and rivers to wetland areas and to cease logging in the upper and middle reaches of rivers, turning many of the loggers to afforestation projects to protect the watershed.

Such catastrophes may not generate quite the same level of human suffering in countries with a more developed infrastructure for dealing with them, but they are nonetheless devastating in terms of the costs involved. The Mississippi River has been the subject of numerous engineering projects over a 150-year period to control floods and improve navigation, with the construction of thousands of levees, the creation of deep navigation channels, and the destruction of 6.9 million hectares of wetlands. Measured in constant dollars, damages from three major floods in the Mississippi in 1927, 1973 and 1993, were US\$ 236 million, US\$ 425 million and US\$ 12-16 billion respectively. Similar problems have plagued the mighty 1,320 kilometre Rhine river in Europe, which runs through four countries. In both cases the governments are resolving the problem through the expensive process of restoring the floodplains and managing the river basins as an ecosystem. This will not only help to reduce the huge costs of flooding events but also restore other ecological services such as purifying water and recharging aquifers. ◆



CONVENTION ON WETLANDS
CONVENCIÓN SUR LES ZONES HUMIDES
CONVENCIÓN SOBRE LOS HUMEDALES
(Ramsar, Iran, 1971)

Wetland Values and Functions

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