



Global International Waters Assessment



Eastern Equatorial Pacific

GIWA Regional assessment 65

Permanent Commission for the South Pacific (CPPS)

Global International Waters Assessment

Regional assessments

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Executive summary

Regional Definition

The GIWA Eastern Equatorial Pacific region extends along the west coast of Central America from the Colombian-Ecuador border in the south to northern Central Mexico. It includes El Salvador and the Pacific coastal areas of seven other countries – Mexico, Guatemala, Honduras, Nicaragua, Costa Rica, Panama and Colombia. The region was divided into three sub-systems – Southwest Mexico, Central Equatorial Pacific and Pacific Colombian. The GIWA assessment focuses predominantly on the Central Equatorial Pacific sub-system as it includes most of the significant and reported transboundary issues.

The Southwest Mexico sub-system extends along 1 800 km of Mexico's Pacific coast from the border between the states of Nayarit and Sinaloa in the north to the border with Guatemala in the south. The Central Equatorial Pacific sub-system includes the western part of the Central American isthmus and extends along 3 870 km of Pacific coast from the Guatemala-Mexico border in the north to the Panama-Colombia border in the south. The Pacific Colombian sub-system's coast extends for 1 300 km from Colombia's border with Panama in the north to its border with Ecuador.

The climate of the Southwest Mexico sub-system ranges from tropical (in the lower-lying coastal areas) to warm temperate. The climate of the Central Equatorial Pacific sub-system is tropical to temperate with a winter dry period, when drought conditions occur in a corridor extending from Guatemala to the northern part of Costa Rica; also affecting parts of Panama. Drought conditions are intensified during El Niño events. The Pacific Colombian sub-system is wet tropical, influenced by the Intertropical Convergence Zone, its proximity to the ocean, and the El Niño climatic events.

The region's marine area is influenced by three major current systems – the California Current from the north, the Humboldt Current from

the south and the Equatorial Counter-current from the west. The interactions of these currents result in zones of upwelling with productive fisheries. There are extensive lakes in the region, notably in Nicaragua. Two Guatemalan rivers discharge through neighbouring countries – the Suchiate in Mexico and the Paz in El Salvador. In El Salvador, transboundary rivers include the Paz, shared with Guatemala, and the Gosgocaran, shared with Honduras. Honduras also shares Nicaragua's Negro River.

Agriculture is the main economic activity in the region, providing employment for around half of the economically active population. Coastal and artisanal fisheries have a high socio-economic significance, employing around 500 000 fishermen and processing plant operators. Aquaculture, particularly of shrimps, is growing in the region, with 70% of Central America's total production coming from Honduras and Panama. Tourism is also growing, accounting for some 30% of GDP, making it the region's second most important economic activity. Except in Colombia and Mexico, industry is underdeveloped, contributing only 15% to the regional GDP. There is intensive shipping throughout the region including an intercontinental maritime route and, notably, the Panama Canal. Mining of the region's rich mineral resources produces significant proportions of the world's totals, especially silver, lead and zinc.

Assessment of the Southwest Mexico sub-system

Pollution was considered to be the priority concern of this sub-system. The enormous amount of untreated wastewater entering the aquatic environment is deteriorating the environmental quality of the sub-system's water bodies. In Mexico, two thirds of wastewater is discharged into the Pacific Ocean. Microbiological pollution on Mexican beaches has been identified as a priority by Mexican authorities due to the potential effects on human health and tourism. Fertiliser use in Mexico has increased considerably, causing eutrophication in many water bodies, notably Lake Chapala where there is a proliferation of

algae and invasive aquatic weeds. Closed seasons during HAB events have resulted in economic losses of 200 million USD to the fisheries industry. Mexico uses more pesticides than any other country in the GIWA Eastern Equatorial Pacific region. However, DDT application has decreased considerably since the 1960s. Heavy metal contamination is particularly high in the Lerma River basin and Lake Chapala, causing toxicological induced mutations in some fish species. The water bodies of the sub-system carry large amounts of suspended solids which are causing severe sedimentation in lakes and coastal wetlands.

Freshwater shortage was considered to be the second priority concern of the Southwest Mexico sub-system. Although the rivers are highly dynamic and characterised by significant inter-annual fluctuations, discharges have shown a decreasing trend over the past 40 years, largely due to increased abstraction. The availability of water suitable for human consumption has declined due to contamination by the discharge of untreated wastewater. The aquifers in the Lerma-Santiago-Pacifico basin have been overabstracted mainly to supply water for agriculture. The depletion of groundwater supplies is concerning given that 70% of the basin's population obtain their water supply from aquifers.

Assessment of the Central Equatorial Pacific sub-system

Freshwater shortage was considered to be the priority aquatic concern. Although water resources are abundant they are unevenly distributed, some areas suffering shortages during the dry season. Pollution, deforestation and inappropriate soil management are adversely affecting downstream transboundary aquatic ecosystems by changing the dynamics of accretion and erosion, the supply of nutrients and the patterns of flooding, as well as by reducing the availability and quality of water resources. Areas deficient in water are generally the more densely populated with the greatest concentration of economic activity. Continuing population growth and economic development will increase the demand for water, increasing the extent and severity of water shortages. Excessive groundwater abstraction is threatening aquifers and resulting in acute water shortages for populations

services has not matched population growth and urban development. As a consequence, water-related diseases are increasingly prevalent. Acute diarrheic disease is the main cause of morbidity and infant mortality. Pesticides and fertilisers are used intensively in agriculture. They are responsible, together with domestic wastewater, for causing eutrophication in coastal areas, which is impacting the food security of the coastal population. Pollution of groundwater, a major source of water for coastal communities, is increasing; higher demand has led to increased abstraction, leading to saline intrusion. Groundwater is also being polluted by urban and agricultural run-off.

Assessment of the Pacific Colombian sub-system

The unsustainable exploitation of fish and other living resources was the principal concern of the sub-system. Despite most of the fisheries in Colombia being small scale and/or subsistence, the current level of exploitation is unsustainable; catches of some traditionally targeted species such as mackerel and sharks have declined. Similarly, stocks of freshwater commercial species are significantly depleted. Although there have been no studies of the level of by-catch in the Pacific Colombian, based on studies in territories within close proximity of the sub-system, it is believed that large quantities of fish are caught as by-catch in the shrimp trawling industry and the majority are discarded.

Pollution was considered by the regional team to be the second priority concern. The Pacific Colombian sub-system has the highest rate of fertiliser consumption on the Pacific coast of South America resulting in some areas, such as Tumaco and Buenaventura, having eutrophic conditions. Variable concentrations of pesticides have been found in water, sediment and organisms at different sites in Colombia. Concentrations of DDTs in surface sediments exceed international and national standards. Extensive deforestation has exacerbated erosion, increasing the amount of sediments entering the rivers. Unplanned urban development has resulted in wastes being disposed of inappropriately. Localised oil spills from exploitation, refining and transport activities have been reported.

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