

Abbreviations and acronyms

AAC	All American Canal	MWD	Metropolitan Water District of Southern California
AUM	Animal Unit Months	NADBank	North American Development Bank
BECC	Border Environment Cooperation Commission (Comisión de Cooperación Ecológica Fronteriza)	NAFTA	North American Free Trade Agreement
CNA	National Water Commission, Mexico City Office (Comisión Nacional del Agua)	NGO	Non Governmental organisation
CVWD	Coachella Valley Water District	NEPA	U.S. National Environmental Policy Act
DBCP	Dibromochloropropane	NIB	Northerly International Boundary
DOF	Federal Official Gazette, Mexico (Diario Oficial de la Federación)	NWL	National Water Law
DWA	Desert Water Agency	OECD	Organisation for Economic Co-operation and Development
EIS	Environmental Impact Statement	PES	Payment for Environmental Services
EPA	U.S. Environmental Protection Agency	PROCAMPO	Program for Direct Assistance in Agriculture
ESA	U.S. Endangered Species Act	PVID	Palo Verde Irrigation District
FWS	U.S. Fish and Wildlife Service	SAGARPA	Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food, Mexico (La Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación)
GEF	Global Environment Facility	SEDESOL	Secretariat of Social Development (Secretaría de Desarrollo Social)
GIWA	Global International Waters Assessment	SEMARNAT	Department of Environment and Natural Resources (Secretaría del Medio Ambiente y Recursos Naturales)
IBWC	International Boundary Water Commission	SIB	Southerly International Boundary
IID	Imperial Irrigation District	SLRC	San Luis Rio Colorado
IMADES	State of Sonora Institute for the Environment and Sustainable Development (Instituto del Medio Ambiente del Estado de Sonora)	TDS	Total dissolved solids
INE	National Institute of Ecology, Mexico (Instituto Nacional de Ecología)	TSH	Thyroid Stimulating Hormone
INEGI	National Institute of Statistics, Geography and Information, Mexico (Instituto Nacional de Estadística, Geografía, e Informática)	TSS	Total Suspended Solids
ISC	Interim surplus criteria	UGC	Upper Gulf of California
LCRB	Lower Colorado River Basin	UNEP	United Nations Environment Programme
LROC	Long Range Operating Criteria	USBR	United States Bureau of Reclamation
MEXUS	Mexico-United States	USGS	United States Geological Survey
MODE	Main Outlet Drain Extension Canal	WMIDD	Wellton-Mohawk Irrigation and Drainage District
MTBE	Methyl tertiary-butyl ether	WWF	World Wildlife Fund

List of figures

Figure 1	<i>The Gulf of California region.</i>	19
Figure 2	<i>The Colorado River Basin</i>	20
Figure 3	<i>Colorado River annual flow.</i>	21
Figure 4	<i>Water consumption along Colorado River.</i>	30
Figure 5	<i>Flow of the Colorado River below Hoover Dam 1905-2003.</i>	33
Figure 6	<i>Elevation of the static levels of the Mexicali Aquifer from 1957-1994.</i>	35
Figure 7	<i>Concentrations of total dissolved solids in the Mexicali Aquifer with and without lining of the All American Canal.</i>	36
Figure 8	<i>Re-initiation of the commercial harvest for the Gulf curvina (<i>Cynoscion othonopterus</i>) in the Upper Gulf of California.</i>	48
Figure 9	<i>Rafting in the Colorado River.</i>	49
Figure 10	<i>Totoaba fishery in the late 1940s.</i>	50
Figure 11	<i>Escalation of fishing vessels for the shrimp industry in the Upper Gulf of California 1965-1998.</i>	50
Figure 12	<i>Totoaba fishery annual yield and Colorado River flows to Mexico 1930-1975.</i>	51
Figure 13	<i>Pangas fishing in the Upper Gulf of California.</i>	51
Figure 14	<i>Specific and total catches of shrimp landed in the Port of San Felipe, Baja California, in the seasons from 1976/1977 to 1995/1996.</i>	51
Figure 15	<i>Shrimp fleet in San Felipe.</i>	55
Figure 16	<i>Linkages between GIWA concerns.</i>	58
Figure 17	<i>The Colorado River Delta.</i>	60
Figure 18	<i>Peak flows of the Colorado River near Grand Canyon.</i>	66
Figure 19	<i>Hoover Dam.</i>	68
Figure 20	<i>Causal chain diagram illustrating the causal links of Freshwater shortage in the Colorado River Delta.</i>	69
Figure 21	<i>Colorado River Delta and the Upper Gulf of California.</i>	72
Figure 22	<i>Irrigation system, California, U.S.</i>	75

List of tables

Table 1	<i>International rivers in the Gulf of California region.</i>	20
Table 2	<i>Sediment delivery for the Colorado River.</i>	22
Table 3	<i>Annual water applied for irrigation in the Colorado River Delta region's major irrigation districts.</i>	24
Table 4	<i>Livestock grazing on public lands.</i>	25
Table 5	<i>Gross domestic product by sector in United States and Mexico 1999.</i>	26
Table 6	<i>Change in real gross state product by sector in the Colorado River Basin 1999-2000.</i>	26
Table 7	<i>Water resources and dams in the Colorado River Basin.</i>	27
Table 8	<i>Water withdrawals and uses in the Colorado River Basin.</i>	28
Table 9	<i>Water allocations in the Colorado River Basin.</i>	29
Table 10	<i>Scoring table for the Colorado River Basin region.</i>	32
Table 11	<i>Estimated Colorado River budget.</i>	33
Table 12	<i>Salinity in the delta region.</i>	34
Table 13	<i>Changes in relative abundance of penaeid postlarvae during a 5 year period in the Upper Gulf of California.</i>	34
Table 14	<i>Water balance in the Mexicali Aquifer with and without lining of the All American Canal.</i>	35
Table 15	<i>Saturation rates for softeners, dispensed and filtered water usage at different TDS levels, as well as the incremental costs per additional mg/l of TDS in southern California.</i>	36
Table 16	<i>Increased leaching for ornamental crops, economic impact and equivalent crop salinity relationships.</i>	37
Table 17	<i>Total consumption and electrical costs of pumping 158 wells operating in the area of the All American Canal.</i>	37
Table 18	<i>Variables considered in the effect of lining the All American Canal.</i>	37
Table 19	<i>Annual phosphorus and nitrogen load of the Salton Sea.</i>	40
Table 20	<i>Concentrations of selenium in biota in the Colorado River Delta.</i>	40
Table 21	<i>Salinity impacts on crop yields.</i>	42
Table 22	<i>Costs associated with treatment of process water.</i>	42
Table 23	<i>Volume of sediment and estimated cost of dredging operations 1997.</i>	43
Table 24	<i>Fishes of the Colorado River in the Grand Canyon, and their status.</i>	47
Table 25	<i>Estimated by-catch in the Upper Gulf of California.</i>	52
Table 26	<i>Trash species caught and discarded in the shrimp industry.</i>	52
Table 27	<i>Average annual catches by fishery 1994-2000.</i>	53
Table 28	<i>Economic value and capture by species in Baja California and Sonora.</i>	54
Table 29	<i>Spatial distribution of fishing capture by economic importance in the Upper Gulf of California 1998.</i>	54
Table 30	<i>Population growth in the Colorado River Delta region.</i>	61
Table 31	<i>Cost, use and value of water in the Imperial and Mexicali Valleys.</i>	63

Table 32	<i>Electrical costs for pumping water for agricultural uses.</i>	65
Table 33	<i>Freshwater shortage in the Colorado River Delta: percentage contribution of issues and immediate causes of the impacts.</i>	65
Table 34	<i>Major dams in the Lower Colorado Basin and Mexico.</i>	65
Table 35	<i>Annual water use in the Lower Colorado Basin 1990-1996.</i>	66
Table 36	<i>Average annual population growth rates, Imperial Valley and Mexicali, 1940-1995.</i>	67
Table 37	<i>Price of leasing compared to purchasing rights.</i>	78
Table 38	<i>Sensitivity analysis of purchase/lease allocation in the Wellton-Mohawk and Mexicali/San Luis Rio Colorado districts.</i>	78

List of boxes

Box 1	<i>Human impacts in the Gulf of California.</i>	56
Box 2	<i>Recently approved reforms to the Mexican Water Law.</i>	64