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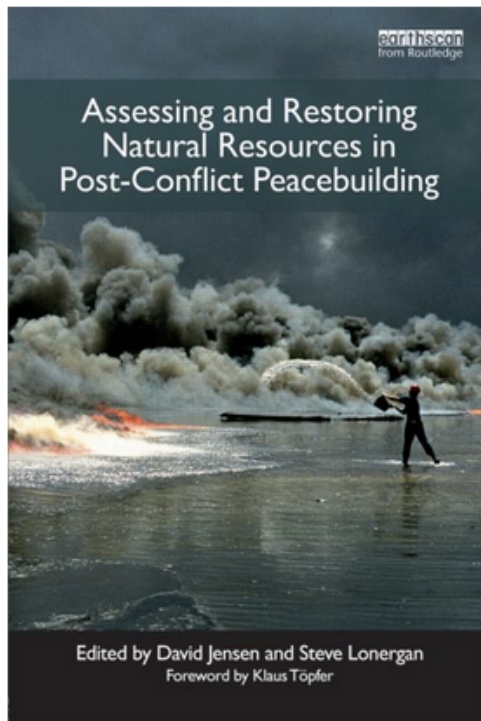
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Ecological restoration and peacebuilding: The case of the Iraqi marshes

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Ecological restoration and peacebuilding: The case of the Iraqi marshes

Steve Lonergan

The marshes of southern Iraq—often called the Iraqi marshlands or the Mesopotamian marshlands—were once among the largest wetlands in the world, covering more than 10,000 km² (roughly the size of Lebanon) and supporting diverse flora and fauna and a human population of approximately 500,000 (Coast 2003). Fresh water for the marshes came almost entirely from the two major rivers of the region—the Tigris and Euphrates—and their tributaries. Both rivers have their source in southeast Anatolia in Turkey and eventually flow into Iraq, coming together in the marshes to form the Shatt al-Arab River. The Shatt al-Arab then flows through the city of Basra into the Persian Gulf (see figure 1).

Eighty-eight percent of the runoff that contributes to the flow of the Euphrates comes from Turkey; the rest, from Syria. Turkey supplies 42 percent of the flow of the Tigris; Iraq, 32 percent; Iran, 26 percent; and Syria, less than 1 percent (Altinbilek 2004). Iraq, including the marshes, is almost completely dependent on the two river systems for its water. The ecology of the marshes requires periodic flushing from floodwaters to remove pollutants and sustain the wetlands.

Historically three marshes merged during times of high water: the Central Marshes (between the two rivers), Hawizeh Marsh to the northeast, and the Hammar Marsh to the southwest (see figure 2). The marsh dwellers depended on a healthy marsh ecosystem for fishing, agriculture (including livestock), building materials, drinking water, and transportation—all intricately linked to fresh water. The marshes were also home to a variety of wild plants, birds, and animals, including endangered migratory birds and many fish that provided sustenance for marsh dwellers and the broader Iraqi population. Prior to 1990, 60 percent of the fish consumed in Iraq came from the marshes (Ochsenschlager 2004; Tkachenko 2003).

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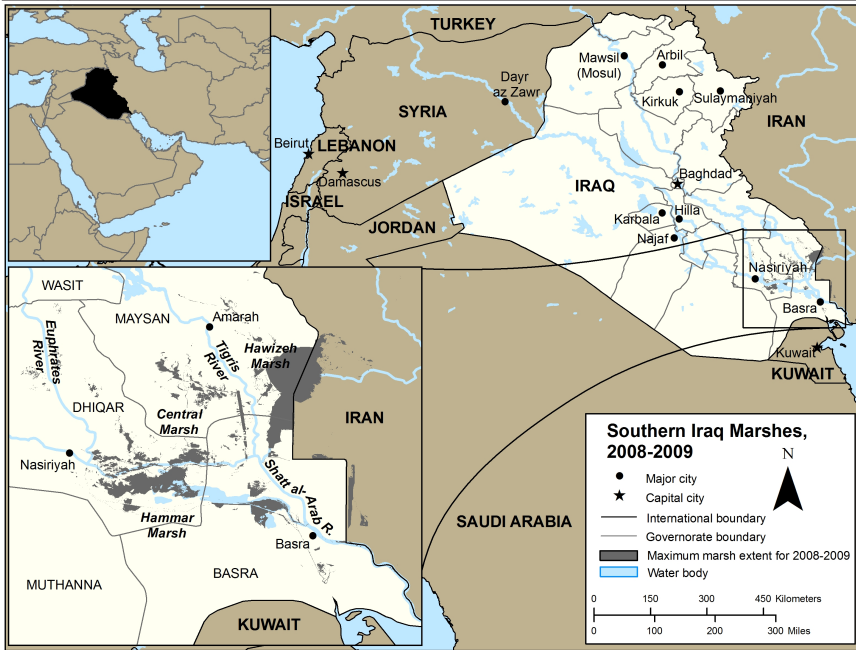


Figure 1. Location of the southern Iraq marshes, 2008–2009

Source: CIMI (2010).

The importance of the marshes and the surrounding area goes far beyond the borders of Iraq. Many consider the marshes the cradle of civilization and the site of the biblical Garden of Eden. They are close to cultural and religious centers, such as Sumer, Babylon, and Najaf, and their historical, cultural, and ecological importance is unquestioned. Nevertheless because of security issues and the difficulty of traveling to or within the marshes, few outsiders have spent time in the region in the past thirty years.¹

In addition to their historical and ecological significance, the marshes have been of strategic interest to the government of Iraq, particularly since 1980. During the 1980s, much of the fighting in the Iran-Iraq War was in the marshes, and subsequent invasions by the United States and its allies in 1991 and 2003 went through them. Basra, Iraq’s second largest city, located just south of the marshes, was the center of protests against the government of Saddam Hussein and pro-Iranian sympathy in the early 1990s. Although the security situation in

¹ For historical readings on the marshes, see Maxwell (1957); Sluglett (2003a); Thesiger (1964); and Young and Wheeler (1977).

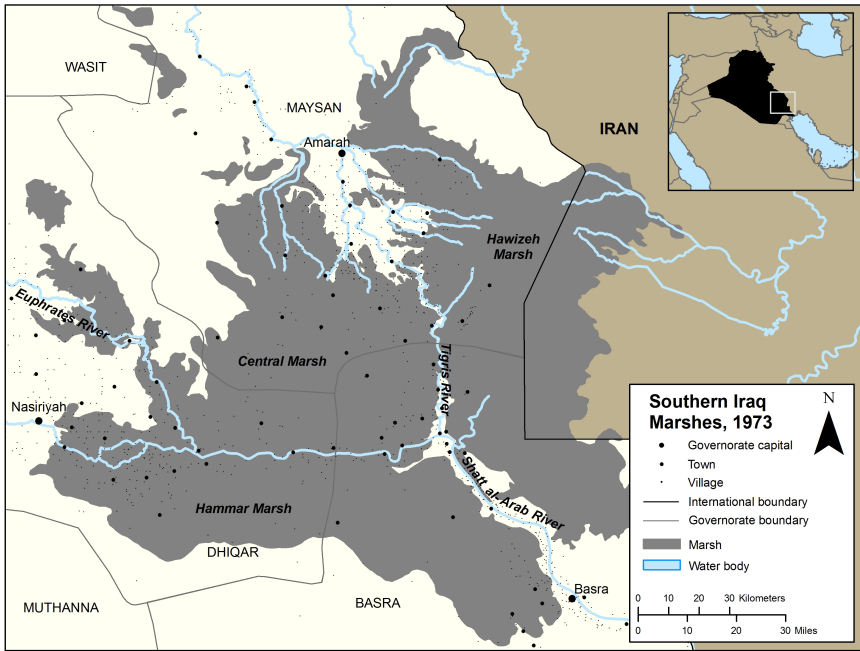


Figure 2. Marshes of southern Iraq, 1973

Source: CIMI (2010).

the marshes is relatively stable, there are independent militia operating in and around them, and conflict may erupt at any time.²

This chapter identifies factors that have imperiled the Iraqi marshlands, from Saddam Hussein’s systematic draining of the marshes in the 1990s to a severe drought in 2009 to infrastructure projects and changes in land use in the Tigris and the Euphrates basins. The chapter reviews the varying extent of Iraqi marshlands from 2002 to 2009, as compared to the boundaries of the marshes in 1973, and provides three scenarios for the future of the marshes, based upon ten recommendations put forth by the Canada-Iraq Marshlands Initiative. The chapter examines international restoration efforts and regional cooperation attempts among Iraq, Iran, Syria, and Turkey—the neighboring riparian states. It concludes with lessons learned and discusses the connection between ecological restoration and peacebuilding.

² Information on activities in the marshes came from Iraqi participants in the Canada-Iraq Marshlands Initiative, a three-year project to restore the marshes. Meetings were held twice a year with local sheikhs, university researchers, governorate officials, and national ministry representatives. For more information, see www.iraqimarshlands.com or CIMI (2010).

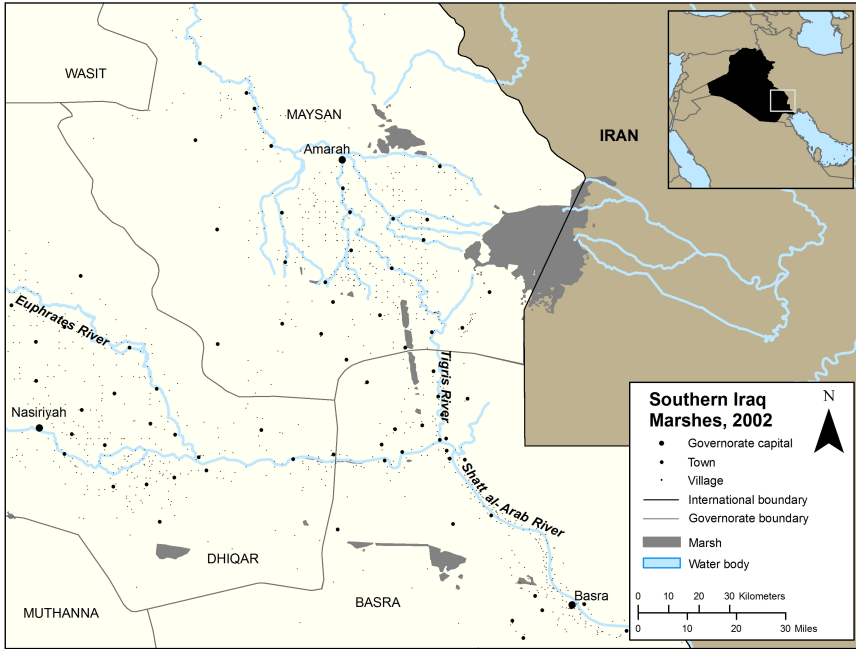


Figure 3. Marshes of southern Iraq, 2002
 Source: CIMI (2010).

DRAINING THE MARSHES

In 1951, the British developed a plan to drain the marshes to reclaim land for agriculture. When Turkey, Syria, and Iraq began a series of irrigation and hydro-electric projects in the 1980s, human activities started to have a negative impact on the region. Despite the potential for decreased water flow in the Euphrates (less so in the Tigris), the primary concern of the Iraqi government in the 1980s was the Iran-Iraq War (Sluglett 2003b). The marshes remained relatively healthy and were allocated ample water to make entry of Iranian troops difficult.

Following the 1990–1991 Gulf War, the situation changed dramatically. The government of Saddam Hussein began a systematic effort to destroy the marshes and the people living there, initially through aerial bombing and burning villages. When the United Nations resisted, the government brought forth a plan to drain the marshes and displace the population, ostensibly to reclaim them for agriculture. With the construction of major drainage canals linked to the Euphrates and Tigris, by 2003, the marshes were reduced to less than 10 percent of their pre-1990 size (see figure 3), and the population declined to fewer than 80,000 (France 2006). Satellite photos showed the extent of the destruction, and reports from refugees documented the hardships endured by local residents. The UN and the World Bank identified the draining as a major environmental and humanitarian disaster (Partow 2001).

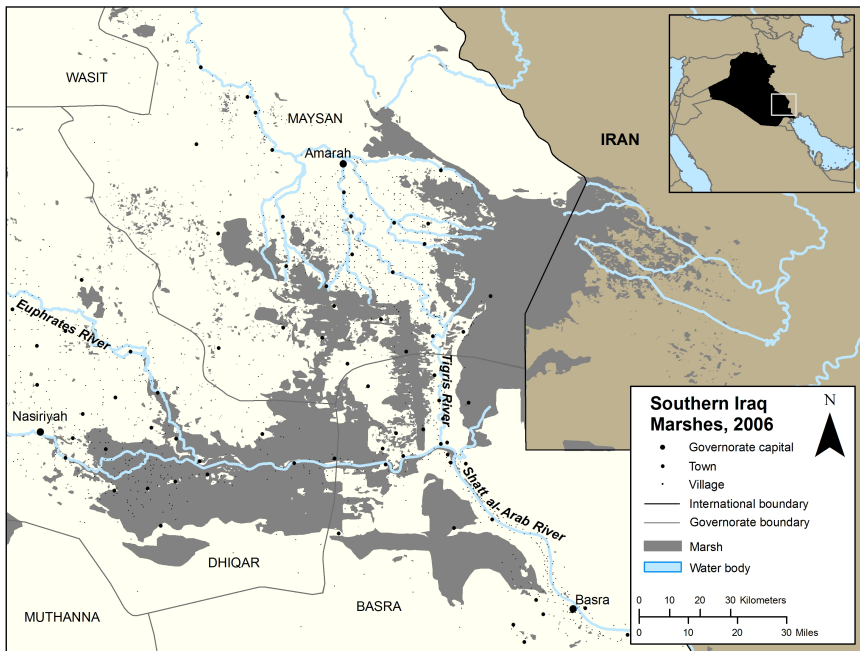


Figure 4. Marshes of southern Iraq, 2006

Source: CIMI (2010).

MARSH RESTORATION

The fall of Saddam Hussein's regime in 2003 allowed assessment of damage to the marshes and restoration efforts. The United States, Japan, Italy, and Canada, along with the United Nations Environment Programme (UNEP), and subsequently the United Nations Development Programme, promoted ecological restoration, funded new development programs, and provided basic services. In all cases, the focus was on building a sustainable peace through marsh rehabilitation. Efforts included facilitating multi-stakeholder processes, engaging the international community through environmental agreements, and inviting other riparian states, particularly Turkey and Iran, to discussions. Initial assessments showed that the reduced size of the marshes, poor water quality, saline soils, and pollution from industries and leftover military ordnance would make full restoration difficult, if not impossible. The conversion of marsh to agricultural land, oil under the marshes, and significant growth in upstream impoundments in Turkey, Syria, and Iraq worsened matters. Nevertheless ad hoc efforts by local residents, who destroyed some of the earthen dams, and ample rain and snowfall in the mountains of Turkey and northeastern Iraq markedly improved the extent of the marshes and water volume by 2006 (see figure 4). Many migratory birds returned, and there was some cause for optimism that ecological restoration would be successful (Richardson and Hussain 2006). But four troubling issues remained.

First, very few former residents had returned to the marshes. Although the evidence is anecdotal and drawn largely from discussions with sheikhs and local government officials, the ongoing security problems in the region and the lack of economic opportunities had made return unattractive. In addition, there were few basic amenities, including drinking water. Many former residents had re-established their families in urban centers such as Basra or Nasiriyah. The number of returnees may be no more than 40,000—less than 10 percent of those originally displaced (CIMI 2010).

Second, the three marshes had been reduced to two; the Central Marshes had completely disappeared, and there was no connection between the remaining wetlands, even during times of high water. (The government hopes to reintroduce water to the Central Marshes but has not.) In addition, the health of the remaining marshes was very poor in certain places, particularly in the Hammar Marsh, southeast of Nasiriyah. Soil salts had reached the surface through capillary action, and farther downstream, tidal flow had polluted a large part of the area.

Third, agricultural land now occupied a significant part of the former wetlands, so reflooding them would have lowered economic output from a region that was already poor.

Fourth, and most important, upstream infrastructure projects and increased demand for water for nonagricultural uses had severely reduced the flow of water to the marshes. With more dams in Turkey and new dams and dikes under construction in Iran, some stakeholders had turned their attention from ecological restoration to modifying local and regional expectations for the marshes.

Current conditions

Draining by Saddam Hussein's regime had a catastrophic impact on the marshes' ecology, hydrology, and people. Despite this destruction, hopes were raised that at least a partial restoration would be possible when the marshlands expanded from 9 to 10 percent to roughly 35 percent of their 1973 size between 2003 and 2006. However, these expectations were soon lowered due to the effects of infrastructure projects in the Tigris and the Euphrates basins and severe drought conditions in 2008–2009. By the fall of 2009, with a severe drought affecting the entire country, the marshes' size had approached that of 2002.

Perhaps more importantly, information on infrastructure development in Iran came to light. Since 2006, Iran has dammed many of the small rivers that provided water to the Hawizeh Marsh. Even more devastating was Iran's construction along its border with Iraq of a six-meter-high dike, which effectively divided the Hawizeh Marsh into two, when it was completed in the spring of 2009. The dike in Hawizeh restricted water flow into the Iraqi part of the marsh. Security—against the drug trade—was Iran's primary justification for construction of the dike, although drilling for oil and the desire to reduce water flow into Iraq may have played a role. Iran held no discussions with Iraq prior to building the dike and even installed guard towers.

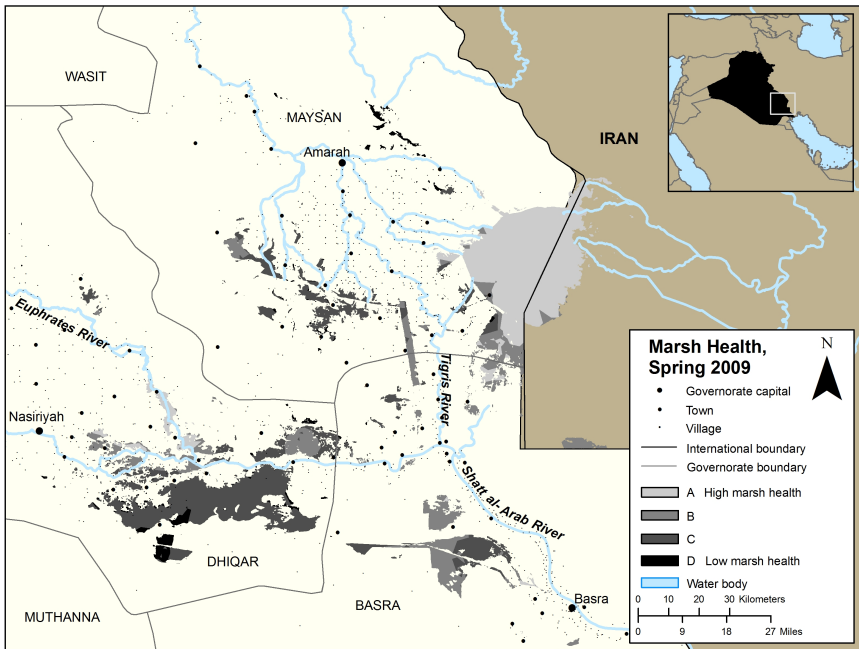


Figure 5. Health of southern Iraqi marshes, spring 2009

Source: CIMI (2010).

The marshes now suffer from three conditions: First, the low, 2002 level of the marshes is no longer strictly the result of political factors; infrastructure development, changes in land use, and climate change are also responsible. Second, the marshes have become very fragmented. Ecological fragmentation threatens the survival of many species, the health of the marshes, and the people, whose livelihoods depend on the environment. Third, the Hawizeh Marsh, which is now a Ramsar site,³ has been badly affected and will only suffer more from the Iranian dike along the border.

The health of the ecosystem is related to the marshes' size. Detailed water sampling and analysis conducted since 2005 demonstrate that only a portion of the remaining marshes is healthy enough to support flora and fauna and provide drinking water for humans and animals. Lack of periodic flushing, continued encroachment of salt from tidal flow, and agricultural runoff have adversely affected the ecosystem of much of the region (see figure 5). The marshes could recover but not without return to the flow regime that existed prior to 1990.

³ In early 2008, Iraq became a party to the Convention on Wetlands of International Importance, commonly known as the Ramsar Convention. The Hawizeh Marsh is listed as a site of international importance under this convention. For the complete text of the convention, see www.ramsar.org/cda/en/ramsar-documents-texts-convention-on/main/ramsar/1-31-38%5E20671_4000_0__.

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The Iraqi government continues to talk about the importance of restoring the marshes for ecological and humanitarian reasons. It allocated US\$300 million to the new Ministry of State for the Marshlands to improve infrastructure and support basic services for marsh residents. But the government is paying little attention to the ecology of the marshes and the resources they provide. Acknowledging that there may never be enough water to restore the wetlands, the Ministry of Water Resources proposes adhering to the 1973 boundaries of the marshes, disallowing existing and future agricultural and oil development, and labeling the remaining land and wetlands the “marshes” (CRIM 2009). Division within the national government, lack of intergovernmental coordination, and emphasis on economic development and growth have made the marshes a low priority in the future of Iraq.

Future of the marshes

Internal and international discussions now refer to the marshes’ survival as much as to their restoration. Like many ecological and social systems, the marshes have been remarkably resilient to external stresses, climate or security related. But deliberate draining and reduced water flow from upstream have overcome their natural resiliency. In the absence of significant management interventions, the marshes will only exist during years of high rainfall. In dry years, the marshlands will diminish, continuing only as a small, brackish water marsh in the southern part of the original marshes. The following ten recommendations put forth by the Canada-Iraq Marshlands Initiative in its 2010 report “Managing for Change: The Present and Future State of the Iraqi Marshlands” (CIMI 2010) will be required to protect even the healthiest and most permanent areas of the marshes.

1. Reaching agreement with Turkey and Syria regarding upstream withdrawal and ensuring that a minimum flow of water enters Iraq.

Although Syria and Iraq signed a treaty (consisting of joint minutes of a meeting) in 1979, Turkey has been recalcitrant to discussing water allocations—from either the Tigris or Euphrates rivers. Discussions on economic cooperation between Iraq and Turkey did not cover water, and the Iraqi parliament has resisted signing any agreement unless water is explicitly addressed. There is little question that the large irrigation and hydroelectric projects in Turkey have affected, and will increasingly affect, the flow of the two rivers.

2. Reaching agreement with Iran regarding dams and, in particular, the dike in Hawizeh to ensure survival of the Hawizeh Marsh.

In recent years, Iran has dammed some of the streams and rivers that flow into the Hawizeh Marsh. To make up for the dams, in fall 2009, Iran began trucking water to Basra to help Iraq deal with drought. Discussions between the two countries about Iran’s dike in the Hawizeh Marsh have been unproductive.

3. Rationalizing the upstream withdrawals and storage of water within Iraq to ensure that a minimum flow of water reaches the marshes.

Dam construction within Iraq has also reduced the flow of water to the marshes. The demand for electricity and irrigation in the northern and central regions of the country continues to affect the amount of water reaching the marshes.

4. Reducing tidal flow to the southern areas of the marshes.

The health of the marshes is dependent on periodic flushing by floodwater from the north. The flushing keeps tidal water from the Persian Gulf from moving into the southern marshes, which are, for the most part, below sea level. The desiccation of the marshes has allowed tidal flow to move farther north, resulting in higher salinity levels in the southernmost sections of the marshes.

5. Reducing the flow of untreated wastewater and pollution into the marshes.

The lack of strong regulations on wastewater treatment and discharge and the relaxed enforcement of existing regulations further threaten the quality of water in the marshes. As the Iraqi economy expands, more attention must be focused on controlling the movement of wastes into the marshes.

6. Addressing competition for water.

Agriculture, industry, and domestic users compete for water from the marshes. As the sectors grow, so will their water demands, leaving little in the marshes.

7. Reducing the negative impact of drought.

Because many residents of the marshes lack basic services, long-term climate change is understandably not a high priority. But the severe drought of 2009 revealed the need for a drought-management strategy that addresses the magnitude and frequency of drought and other extreme weather events, which are expected to increase according to all projections of global warming. Long wet and dry periods will affect all aspects of marsh ecology and society.

8. Promoting better community stewardship of water resources within and adjacent to the marshes.

In the past, periodic flushing and the overall size of the marshes made the wetlands resistant to most human activities, such as fishing with poisons and waste disposal. Best management practices need to be introduced and implemented by villagers and the general population.

9. Ensuring that economic development in the region does not negatively affect the marshes.

The main economic driver in Iraq is oil, and much of the country's reserves lie in the marshes. The sensitive ecology of the region will likely not be a factor in decisions to drill for oil. Accordingly steps must be taken to ensure that the effects of drilling and transportation—and other economic activities—are minimal. Environmental impact assessments are now required for all projects in the marshlands, although how seriously resulting recommendations will be taken remains unclear.

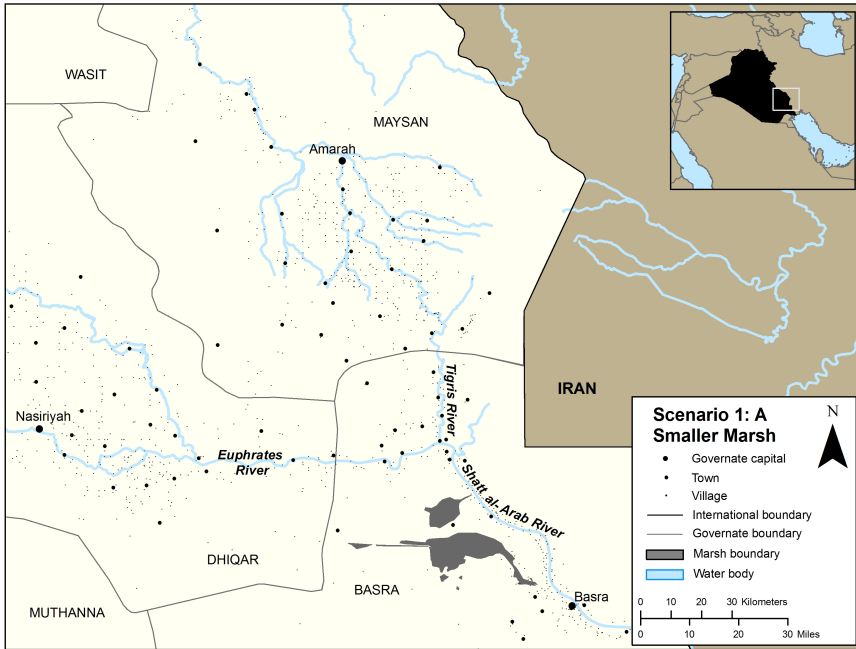


Figure 6. Scenario 1: A smaller Iraqi marsh

Source: CIMI (2010).

10. Developing a land use strategy to ensure the sustainability of the marshes.

Land use activities may greatly affect the sensitive wetlands ecosystem. For its survival, a land use strategy must be developed to minimize negative impacts. Despite the designation of the marshes as a Ramsar site, and its status as a proposed World Heritage site and protected area, activities within and adjacent to the marshes may still destroy them.

The Canada-Iraq Marshlands Initiative used the ten recommendations to develop scenarios for the future of the marshes (CIMI 2010). Without a managerial intervention and some progress on the first, second, and third issues, the marshes will probably not survive, except as brackish wetlands north of Basra, fed by backflow from the Shatt al-Arab (see figure 6). When the scenario was presented to marsh residents and representatives from local and national governments, there was general acceptance that the near-complete drying of the marshes was a real possibility.

A second, and more optimistic, solution includes protecting the healthiest sections of the marshes (for example, Hawizeh) and addressing most of the factors above to ensure the survival of smaller marshes that might expand over

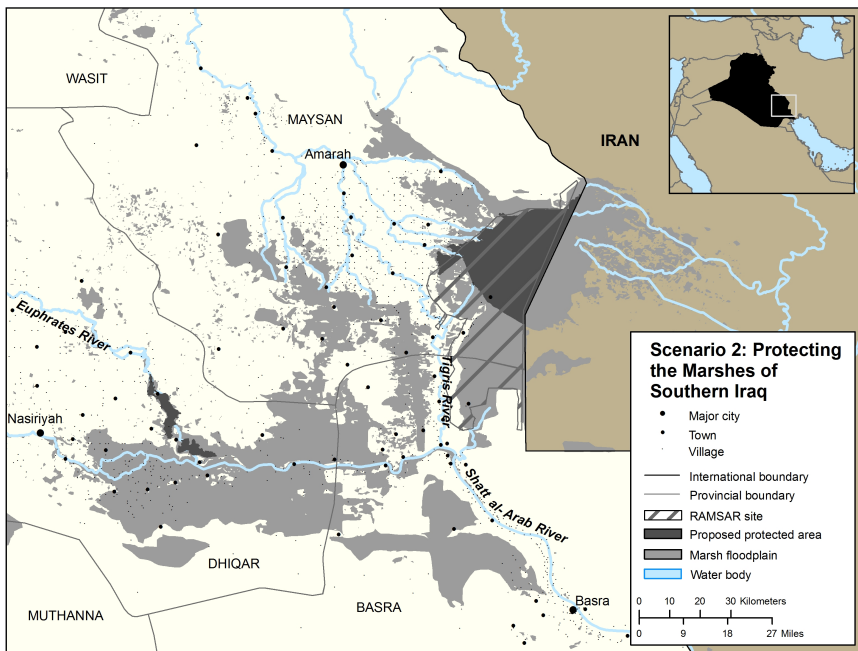


Figure 7. Scenario 2: Protect the healthy portions of the Iraqi marshes

Source: CIMI (2010).

Note: This scenario would lead to the survival of approximately 20 percent of the original marshes.

time to support many flora and fauna. Roughly 20 percent of the original marshes would remain (see figure 7).

A third scenario (see figure 8), which the Iraqi government promotes, is quite remote, particularly given the existing and future land uses and the amount of water available to the marshes (CIMI 2010). The government hopes that engineering solutions—constructing more dams and canals—will lead to the survival of up to 70 percent of the original marshes.

Despite the optimistic assessment of the Iraqi government and the efforts of donor agencies and countries to restore the marshes, the future of the wetlands and the society and culture that are based on them is dire. Water is a necessary—but not necessarily sufficient—condition for the survival of the marshes. The ten recommendations listed above pose tremendous challenges to the future of the marshes. Despite some reflooding after 2003 and an increase in native and exotic plant and animal species, the wetlands remain extremely vulnerable to further disruptions in water flow, chemical pollution, and saltwater intrusion. Reflooding of the marshes does not necessarily mean restoration of the wetlands environment. In some cases, reflooding has released toxins from chemical pollution and military ordnance in the soil. Water quality and ecosystem health have declined.

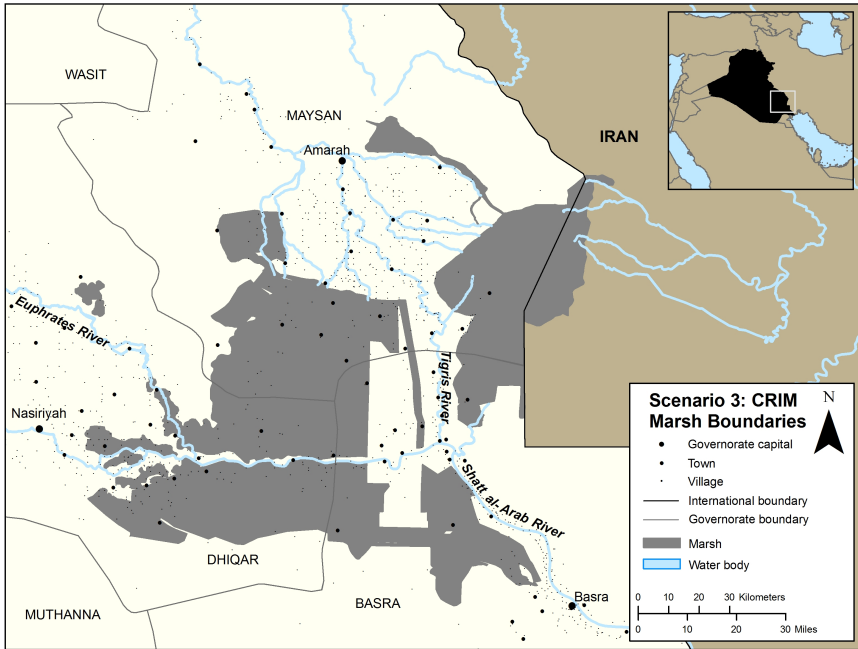


Figure 8. Scenario 3: Boundaries proposed by the Center for Restoration of the Iraqi Marshlands

Source: CIMI (2010).

Note: This scenario would lead to the survival of up to 70 percent of the original marshes.

Ongoing restoration efforts

A few countries and UN agencies remain committed to the restoration of the marshes. As early as 2001, UNEP began monitoring changes using satellite data and established the Iraq Marshlands Observation System to provide information to the international community (UNEP 2006). Subsequent efforts by UNEP, funded mostly by Japan, focused on improving water supply to marsh residents using environmentally sustainable technology. They also conducted studies of a drainage canal, which was constructed by Saddam Hussein’s regime, to determine whether the water was suitable to redirect to the marshes (Aoki, Kugaprasatham, and Al-Lami 2013). Work is underway to help treat the canal water before it enters the marshes.

The Italian government has spent considerable funds on hydrological modeling to determine the amount of water necessary to sustain a marsh of reduced size. Its analysis has been incorporated into plans of the Ministry of Water Resources, but insufficient water and little consideration of social and economic factors weaken the hydrological and engineering modeling (Iraqi Ministries 2006).

The U.S. and Canadian governments have focused on training Iraqi students and professors in water-quality monitoring and analysis and geographic information

systems to improve wetlands science and basic understanding of the marshes. Although educational programs have been successful, insufficient access and government and academic capacity have hampered full implementation of water resource management of the marshes. Restoration is further hindered by the absence of a coordinated approach.

Regional cooperation

By almost any measure, most countries in the Middle East are water scarce. Wealthy countries, such as Saudi Arabia, can afford expensive desalination, but managing water demand and investing in regional solutions are required to protect the Nile River Basin, the Jordan River, and the Tigris and Euphrates rivers. International and regional conflicts often have devastating planned and accidental impacts on water and sanitation infrastructure and water quality. But despite the rhetoric, there has been little evidence—since the 1950s—that the region will engage in conflict over water.

After the fall of Saddam Hussein's regime in 2003, there was some optimism that international furor over loss of the wetlands would set the stage for regional cooperation between Turkey, Syria, Iraq, and Iran, resulting in peace initiatives. In 2004, UNEP opened dialogue between Iraq and Iran, which share the marshes. (See Muralee Thummarukudy, Oli Brown, and Hannah Moosa "Remediation of Polluted Sites in the Balkans, Iraq, and Sierra Leone," in this book.) The catalyst was a UNEP study that demonstrated that over 90 percent of the marshlands had dried into salt pans, which had grown quickly because of construction of extensive drainage works (UNEP 2006). Iran and Iraq requested that UNEP facilitate dialogue between them.

The process began at a seminar on integrated water resource management at a neutral venue in Geneva, where parties studied best practices in transboundary water management. The meeting was exclusively technical, and the outcome was left completely open. The agenda moved from basic concepts of water management to best practices from around the world and the case of the marshlands. By progressing from the broad to the specific, the meeting encouraged dialogue between the parties before sensitive issues were discussed. Prior to hearing formal presentations from both sides, UNEP presented technical details from its assessments of water consumption in the area and focused on rapid changes, including degradation, reflooding problems, and emerging threats. UNEP experts noted challenges and possibilities for restoration on both sides of the border. The independent analysis placed indisputable facts on the table that could become the basis for joint problem solving.

Only after the technical priming were the delegates asked to express their countries' water-related concerns. The Iraqi side emphasized restoration and the need for a regional approach. In contrast, the Iranians advanced a nationalist view, including plans to build a dam and dike across the transboundary marsh. The diverging visions revealed the urgency of continuing the dialogue and improving technical cooperation on both sides of the border. Although additional

meetings were planned, dialogue was eventually placed on hold following the deterioration of the security situation in Iraq and diplomatic challenges following the Iranian presidential elections in 2005. Even though talks over a shared environmental problem can initiate cooperation, sustainability can be a major challenge when larger political or security issues are at play.

Despite the lack of cooperation during the UNEP discussions, Iraq moved forward and in early 2008 became a party to the Convention on Wetlands of International Importance (Ramsar Convention) (Rubec 2008). International cooperation, one of the three pillars of the convention, obligates countries to consult each other when wetlands extend across international borders, as in the case of Iran and Iraq, and to “endeavour to co-ordinate and support present and future policies and regulations concerning the conservation of wetlands.”⁴ Although the convention cannot force parties to cooperate, it can be used to apply “moral pressure” when conflicts arise (Dudley 2008, 73). But, on the marshes, the response from Iran has been minimal.

Iraq has also been working with the United Nations Educational, Scientific and Cultural Organization and UNEP to have portions of the marshes designated a World Heritage site—a natural and a cultural treasure—and has become a party to the Convention on Biological Diversity.⁵ Still discussions with Iran on cooperative management of the marshes have been unsuccessful.

The situation between Iraq and its neighbors, Turkey and Syria, regarding the flow of the Euphrates and Tigris into Iraq is more promising because it only indirectly involves the marshes. A 1990 Iraqi protocol ratified the minutes of a meeting with Syria on the provisional division of Euphrates waters and provided Iraq with 58 percent of the Euphrates water entering Syria from Turkey (Wolf 2010). The UN Convention on the Law of Non-Navigational Uses of International Watercourses—the only global freshwater convention—was adopted by the UN General Assembly in 1997 and obligates parties to “cooperate on the basis of sovereign equality, territorial integrity, mutual benefit and good faith in order to attain optimal utilization and adequate protection of an international watercourse.”⁶ Although Syria and Iraq have ratified the convention, Turkey and Iran have not. Only sixteen of the thirty-five countries needed for the convention to enter into force have become parties. Economic diplomacy between Iraq and Turkey has not touched on water flow from the Tigris or the Euphrates. Iraqi parliamentarians have insisted that water allocations be a component of any agreement (CIMI 2010).

Despite the need for a continuous flow of water to sustain the marshes and the hopes of many that discussions over the future of the marshes might stimulate further cooperation and peacebuilding between riparian states, there has been

⁴ Art. 5, para. 2.

⁵ For the complete text of the convention, see www.cbd.int/convention/text/.

⁶ A/RES/51/229, art. 8, para. 1. For the convention, see http://untreaty.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf.

little productive discussion, let alone action, by basin states. Indeed there is more dam construction, and water flow into the marshes continues to decrease.

LESSONS LEARNED

The Iraqi marshes have changed drastically since 1991, first because of politics and later because of infrastructure developments upstream. The Iraqi government has converted many of the wetlands into agricultural land, and there are plans to develop oil resources under some of the existing and former marshes. The government has identified the areas leftover as marshlands, whether they contain water or not. But it has not explained the strategy to the local population. The tribes and local residents—at least those who remain in the marshes—still expect their lives to return to the way they were prior to the 1990–1991 Gulf War.

Four lessons have emerged from the case of the Iraqi marshes:

1. Restoration efforts must consider environmental changes caused by conflict and involve local communities. Restoration to the marshes' original condition and peacebuilding may be incompatible. Raising expectations for the marshes that existed for thousands of years may inhibit peacebuilding.

2. Ecosystem resilience has a limit. Even if all the water were available and there were no other activities on land, the marshes' resiliency might be exhausted. There is some indication that small sections of the marshes, which were reflooded after 2003, are recovering naturally. Pollutants were flushed from the system; native reeds returned; and biodiversity increased. The natural resiliency of the wetlands was very much intact. Yet other areas changed into a brackish water marsh. Nonnative species that thrive under stress (such as catfish) are outcompeting native species for food, and the natural flushing of the marshes' floodwaters has been permanently disrupted.

3. Although environmental agreements, such as the Ramsar Convention, endorse multilateral discussions, they cannot force parties to meet, even when environmental damage might affect all parties. When countries want to cooperate, the conventions provide a useful institutional structure. But when they do not want to cooperate, environmental conventions are little incentive for discussion.

4. Many governments in post-conflict situations have limited capacity to implement broad change, particularly when it requires collaboration. The Iraqi national government remains fragmented, and corruption is rife. There is little cooperation between levels of government despite assurances that decision making will be more decentralized in the future. In the case of the marshlands, the US\$300 million initially allocated to the governorates for restoration were withdrawn and given to the new Ministry of State for the Marshlands, ostensibly because the governorates were using the funds to support urban activities outside the marshes.

CONCLUSIONS AND STEPS FORWARD

The winter rains of late 2009 and early 2010 increased water flow into the marshes, which cover roughly 20 percent of the area they did in 1973—far less than in 2006. The government has redirected the flow of the Main Outflow Drain, south of Nasiriyah, into the Hammar Marsh, even though it is still studying the effect on marsh health. The Ministry of Water Resources is considering the construction of more impoundments and regulators to facilitate the flow of water into the marshes.

Despite the efforts, the long-term outlook for the marshes appears dim. First, further controlling the flow of water upstream eliminates the annual pulse of water that cleansed the marshes of salts and other pollutants. Second, the reduced flow of water from Iran poses increasing problems to the extent and health of the Hawizeh Marsh. The long-term effects of the Iranian dike and other dams are uncertain, but there are already signs of a reduction in the extent and volume of the marsh. Third, there is a strong likelihood that climate change will cause longer and more severe droughts in the region, further shocking an already-vulnerable ecosystem. Fourth, agricultural development and oil drilling are higher priorities for the Iraqi government than ecosystem restoration. Although economic development and marsh restoration are not incompatible, the present course makes it unlikely that the marshes will be able to provide the renewable resources they once did.

Partly due to the lack of interest of neighboring states, problems will probably remain unaddressed. There can only be ecological reconciliation, a coming to terms with new wetlands. The Iraqi government should designate Hawizeh (and possibly other areas) as a protected area and restrict development to at least establish a front against further deterioration of the wetlands. Still some agreement with Iran is essential to ensure a healthy flow of water into Hawizeh.

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