

Chapter 6 Highlights

1. Water-based navigation, including the groundbreaking Erie Canal, played a central role in the economic and political development of the US in the nineteenth century. The use of water for moving goods is still important along certain waterways, but for the US as a whole it is a distant fourth to trucks, rails, and pipelines.
2. To facilitate navigation, many rivers have been extensively modified through **channelization** and damming, with significant impacts on river geomorphology and ecology.
3. **Hydro-mechanical** power has been used for millennia and played an important role in the Industrial Revolution. The development of **hydroelectric** power at the beginning of the twentieth century revolutionized water and energy management.
4. There are three kinds of modern hydropower projects: **run-of-river**, **storage**, and **pumped-storage**. Run-of-river projects are sometimes—but not always—less harmful to rivers than storage projects. Pumped-storage accounts for the majority of power storage in the US, and is becoming even more important as the electric grid transitions to more-variable renewables.
5. There is currently a boom in construction of large hydropower dams in LMICs, often in places where they will significantly impact biodiversity and indigenous groups.
6. Hydropower is often considered a renewable energy source that can play an important role in the transition to a carbon-free energy system. However, hydropower has major impacts on rivers and communities, and at some locations can produce emissions of greenhouse gases (especially **methane**) that are even greater than fossil fuel alternatives. There is increasing interest in finding ways to make hydropower more sustainable.
7. Fishing has long been a part of the human relationship to water, but native fish populations have plummeted in many locations due to a host of insults: dams, habitat destruction, over-harvesting, **non-native invasive species**, and climate change. Attempts to recreate native fish runs using **hatcheries** have been largely unsuccessful.
8. Water-based recreation can be an important source of revenue to rural areas, but can also raise social and ecological issues.