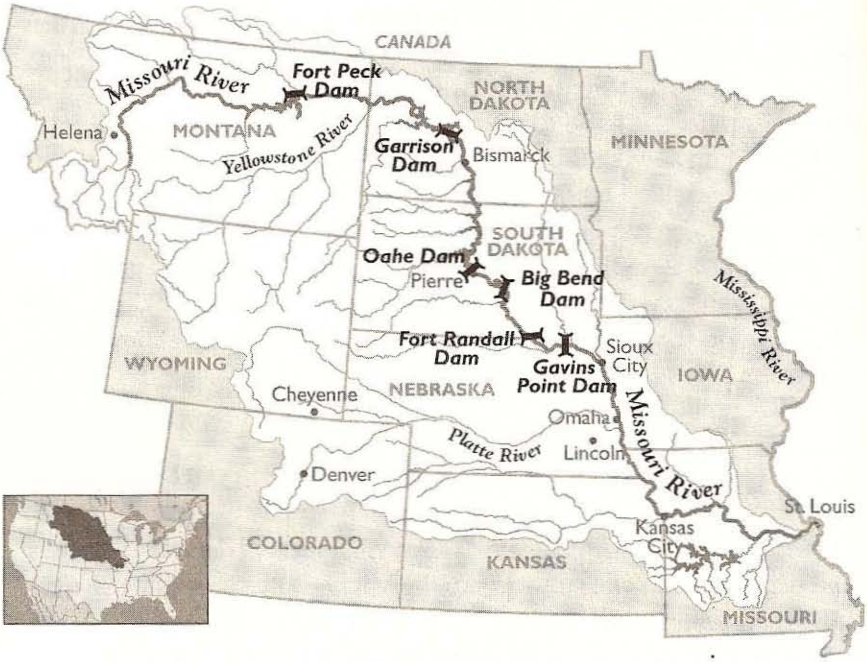

FIGURE 4-1. The Missouri River Basin.

an ecologically impoverished river working almost exclusively for the human economy. Within just the last few years, however, there has emerged some hope that at least portions of the Missouri River system may be revived. Scientists, conservation organizations, water managers, and regional river interests are engaged in a laborious, often acrimonious, and as-yet unresolved attempt to see if the use and management of this great river can be rebalanced enough to restore some of its ecological health and to give its nonhuman communities a chance to bounce back.

Like many large rivers in Europe, Australia, the United States, and other industrialized countries, the Missouri has been altered substantially from its natural state. The lower third of the river, a total of 1,212 kilometers, is no longer connected to its floodplain at all: engineers have deepened and straightened its channel to enable barges to run to and from the ports at St. Louis, where the Missouri joins the Mississippi. Instead of the naturally variable flow of the river, this channelized stretch now gets a discharge controlled by upstream reservoirs. Naturally low flows from August through January no longer occur, because barges need a water this process. One thing is certainly clear: with no changes to dam and reservoir operations, the river will continue its downhill ecological slide.

Some actions are already under way or planned to revive the Missouri. In May 2002, the Corps had planned to release higher and warmer spring flows from Montana's Fort Peck Dam to attempt to provide hydrologic and temperature cues for the endangered pallid sturgeon. Unfortunately, an upper-Midwest drought caused the Corps to delay this test, probably for at least two years. Scientists are now gathering background information in preparation for a later test.

Mother Nature also has provided some impetus for restoration. Heavy midwestern precipitation caused record flooding in the lower Missouri in 1993, 1995, and 1996. As the river breached levees in various locations, it reconnected with its floodplain—affording researchers an opportunity to observe how habitats, species, and ecosystem dynamics might recover if such a reconnection was made more permanent. They found that a variety of plants and animals immediately took advantage of the river-floodplain reconnection. For example, after the flooding, sixty-one different fish species occupied wetlands that were connected to the river channel, while only twenty-six species were found in unconnected areas. The variety of plants and aquatic insects was also richer in connected versus isolated zones.[14]

Overall, these recent flooding events suggest that a return to a more natural flow regime would benefit a wide variety of species by creating a richer mosaic of habitats and by reestablishing conditions that are critical to their life cycles. In addition to changes in dam operations, this requires dedicating more land adjacent to the river as working floodplain. The 1986 Water Resources Development Act authorized the Corps to create habitat on 7,365 hectares of existing federal and state land on the floodplain, as well as to purchase 12,100 additional hectares from willing sellers. After the mid-nineties flooding, a number of property owners became interested in selling, and so far 9,530 hectares have been acquired. A 1999 federal water act authorized acquisition of an additional 48,000 hectares over the next thirty-five years, but to date no funds have been appropriated for the estimated $750 million cost of these purchases.[15]

The U.S. Fish and Wildlife Service has also purchased floodplain land as part of The Big Muddy wildlife refuge. In one meander bend, the river had breached levees a dozen times between 1943 and 1986. Finally, after irreparable damage from the 1993 flood, the agency acquired the land for the river's use as active floodplain. A major secondary channel has formed provided service with a technological or human-engineered solution. For some of nature's services, such estimates are readily at hand. For example, civil and environmental engineers are trained to calculate the cost of treating pollutant loads in treatment plants in order to achieve high-quality drinking water. If a healthy watershed is providing this clean water for free, its water purification value is equal to the cost of building and operating the treatment plant that would be needed if the watershed stopped functioning properly. The value of other services—such as the provision of fish and wildlife habitat or the delivery of freshwater flow to productive estuaries—may be more difficult to estimate and require other methods.[15]

Investing in nature's way of providing a service—whether it be flood control, water purification, or fish production—is often far less expensive than a technological approach. But if the providers do not benefit economically from sustaining the service, they will in all likelihood stop providing it. Fortunately, some new models for investing in natural assets and for linking the beneficiaries of ecosystem services with the providers are now emerging. To date, most of these deal with water supply and water purification services and primarily involve land-use decisions in watersheds. Since healthy watersheds can help protect river flows, and because these models may be applicable to the protection of other ecosystem services, they are worth a look.

New York City derives most of its drinking water from reservoirs in the Catskill Mountains in the central and northern part of the state. As this region has become more developed, the quality of the city's drinking water has begun to deteriorate. Faced with the prospect of having to build a $6–8 billion filtration plant that would require an additional $300 million a year to operate, the city has decided instead to invest on the order of $1.5 billion to restore and protect the watershed that had previously kept its water pure enough to drink. Using proceeds from an environmental bond issue, the city bought land in and around the watershed, improved local sewage treatment, and paid farmers $250 to $370 per hectare to forgo growing crops or grazing cattle right next to streams. As a result of these measures, farmers' incomes increased in some areas, and many watershed communities experienced improvements in their quality of life—significant side-benefits to investing in natural assets rather than technological ones. As the city's environmental commissioner remarked at the time of the decision: "All filtration does is solve a problem. Preventing the problem, through watershed protection, is faster, cheaper, and has lots of other benefits."[16]