

# GREAT RIVERS PARTNERSHIP PHASE II

BUSINESS PLAN 2013-2017  
**EXECUTIVE SUMMARY**

January 2013





“The central idea behind the Great Rivers Partnership is stunning in its simplicity: As different as great rivers around the world might be in some ways, the problems they face are remarkably similar. By sharing information and experience across rivers in many countries, we can accelerate their conservation. It seems obvious now, but it didn’t when we started the Great Rivers Partnership seven years ago.”

– Brenda Shapiro,  
Trustee, *The Nature Conservancy*,  
Great Rivers Partnership and Illinois Chapter

**INSET** Brenda Shapiro © Lloyd DeGrane  
**BACKGROUND** A farmer stops water in an irrigation canal  
© Ami Vitale

# Great Rivers Partnership

The Great Rivers Partnership is a global community with a common vision: secure the health of the world’s Great Rivers for the benefit of people and nature.

These are the large, iconic rivers that sustain entire nations with food, water, energy and more. We are bound to them and they bind us to each other. They are key to building stable and equitable economies, feeding growing populations and improving the health and well-being of people, especially the poor.

Yet the dream of integrating and balancing the many ways we use our Great Rivers has been elusive. Too often we make shortsighted choices, face competing priorities and send problems downstream.



*Propelling a canoe in the Magdalena River Basin*  
© Bridget Besaw

The Great Rivers Partnership (GRP) was founded in 2005 with the conviction that profound progress can be made simply by bringing together the ideas, research and experiences of a myriad of people who in different ways depend upon these vital natural systems.

With more than \$70 million contributed from donors and partners thus far, we have leveraged six times that amount to test innovative strategies, achieve on-the-ground results and share knowledge to create lasting changes in policy, management and funding.

Today, thanks to all who have made these investments, unlikely allies are collaborating for the first time to find shared solutions to shared challenges. New science is enabling better decisions about how to reduce flood risk, generate energy and protect water quality.

Our work together has touched the lives of many, from family farmers in Brazil who are planting trees to keep erosion out of the Paraná River, to dam engineers in China who control the fate of fisheries that feed millions, to small business owners who depend on nature-based tourism along the Mississippi River.

We stand on the shoulders of decades of hard-won achievements by countless groups large and small, and are grateful for the privilege of helping support, promote and replicate these successes.

We are ready to do more. We have developed a road map for the next five years to accelerate progress on additional Great Rivers. We will reach out to connect more rivers, expand our community, and mobilize smart investments that harness and preserve the benefits that nature provides.

We thank the John D. and Catherine T. MacArthur Foundation for their support of this planning effort, and commend this business plan for Phase II to the extended GRP community of friends and partners.

All of us, in every generation, share an awesome responsibility to ensure that those who come after us inherit healthy, productive rivers, and the tools and alliances necessary to keep them healthy. To succeed we must do nothing less than change how the world uses these Great Rivers. We believe that together we can. In fact, we already are.

We thank all of you for your partnership and invite you to continue on this exciting journey with us.

Michael A. Reuter  
Director, North America Freshwater Program and Great Rivers Partnership  
The Nature Conservancy



Mississippi River © Robert J. Hurt

# The Challenge

The Great Rivers of the planet are in trouble. Entire economies depend on them, yet they increasingly show symptoms of collapse under strain. We rely on their waters to produce our food and energy, yet these resources now trigger fierce competition in much of the world. Our cities, old and new, depend on sufficient and secure supplies of clean water—supplies that are increasingly at risk from deteriorating quality and unpredictability of flows. Ecosystems essential for the health of Great Rivers for future generations are declining under the weight of overuse and pollution.



Water quality sampling of the Upper Mississippi River System  
© Erika Nortemann/TNC



Niger River © oversnap/iStock photo

## Some GRP highlights 2005-2012...

### 2005

First staff exchange between the Mississippi and Brazil's Paraguay-Paraná rivers takes place.

Using protocols from the Upper Mississippi River, GRP staff lead a study to identify lands and waters critical to biodiversity along China's Yangtze River.



Mississippi River  
© Jim Brekke

### 2006

The Nature Conservancy (TNC) and GRP host Chinese officials to study hydropower and ways to minimize its environmental impacts on the Savannah and Columbia rivers.

Congressional authorization for Water Resources Development Act includes \$1.7 billion for ecosystem restoration in the Upper Mississippi and Illinois rivers.

TNC and partners reforest a watershed that supplies water to 8.8 million people in São Paulo, Brazil.

### 2007

GRP and Changjiang Water Resources Commission sign an MOU for the sustainable management of the Yangtze River.

Marking the first Water Fund Project in Brazil, the Piracicaba-Capivari-Jundiá Watershed Committee announces \$260,000 to compensate upstream landowners for conserved or restored forests, which help improve water quality.

### 2008

GRP and U.S. Army Corps of Engineers host delegates from Colombia to help advance the sustainable management of the Magdalena River.

GRP initiates and funds two exchanges between the Mississippi and Yangtze rivers to develop a monitoring program for the Yangtze. As a result (in 2009), China's government provides \$1.9 million to incorporate the program.



## Great River Partnership's Mission

The mission of the Great Rivers Partnership is to bring together diverse partners and best science to expand options for achieving the sustainable management and development of the world's Great Rivers and their basins. We seek shared solutions to common land- and water-use dilemmas, recognizing the inescapable linkages that connect our economy, well-being and ecosystem sustainability.

We are under no illusion: achieving GRP's mission will not be easy. Based on the successes and experience of the last seven years, however, we have cause for optimism. Examples are emerging—such as the work of the International Commission for the Protection of the Danube River—that demonstrate how complex river basins can be managed as integrated systems. Within GRP, initial efforts have helped produce freshwater conservation plans, such as conservation blueprints in China and Colombia; policy initiatives that foster balanced ecosystem restoration and infrastructure development projects on the Mississippi River; and sustainable agriculture programs and water funds in Brazil.

### 2009

The Mississippi River Basin Initiative is launched, providing \$320 million over four years to improve water quality in watersheds with the highest nutrient loads. Initial funding includes \$12.7 million for projects where TNC is the lead or a partner.



Water monitoring equipment  
© Jennifer Filipiak/TNC

### 2010

GRP selects eight proof-of-concept projects in the Mississippi River Basin linked to large-scale U.S. river policy outcomes that pertain to agriculture, floodplains and infrastructure.

Continued GRP science exchanges ultimately form the basis for a U.S.-China Eco-Partnership in 2011.

### 2011

GRP helps launch America's Great Watershed Initiative (AGWI), wherein collaborative and diverse stakeholders help address management challenges within the Mississippi River watershed.

GRP technical and policy support helps initiate a whole-basin management plan for the Magdalena River, which includes support from Colombia's government.

GRP establishes an International Steering Committee to evaluate new global rivers for inclusion in the next phase of GRP.

### 2012

GRP forms a network that includes globally influential organizations and collaborates with them to draft an agreement for potential partners committed to sustainable river management.

The AGWI Summit in St. Louis draws more than 140 diverse stakeholders to advance an integrated approach to the management of the Mississippi River watershed.

GRP launches a news website, [GreatRiversPartnership.org](http://GreatRiversPartnership.org). The site, along with other increased online media outreach, has an estimated exposure of 88 million viewers/readers each year.



Mekong River in Vang Vieng, Laos © worakit\_/iStock photo

## Potential Global Outcomes

Great Rivers of the world, like the Mississippi and Mekong, are dynamic, complex systems. GRP has the potential to influence the future of such rivers and the millions of people who depend upon them around the world, as we are focused on tangible and scalable outcomes resulting from on-the-ground projects that solve common dilemmas. For example:

### **Energy**

More sustainable approaches to hydro-power development and operations can provide low-carbon energy while safeguarding important rivers and floodplains.

### **Food & Water**

Improved agricultural production practices in river basins that provide food, fiber and energy products can also safeguard water quality and supply.

### **Industry & Economy**

Smarter infrastructure development can support growing economies while sustaining multi-billion-dollar fisheries that provide income and the primary source of protein for some of the world's poorest people.

### **People & Nature**

Protecting and restoring critical wetland habitats and integrating “green” infrastructure and flow management strategies could decrease flood risk and save billions of dollars in property losses.

## River Basin Management— An Integrated Approach

Because Great Rivers are so vital for our well-being, we are demanding more

and more from them. This challenges managers to find more effective and lasting solutions to the inherent conflicts and trade-offs. The Integrated River Basin Management (IRBM) process holds great potential for developing collaborative, system-wide approaches as a way to meet this challenge. While the process explicitly calls for the inclusion of fundamental environmental protection as part of the solution, this has not typically been the case in the past.

GRP partners bring distinct capabilities to help advance IRBM that fully incorporates environmental sustainability. As a leader in this effort, The Nature Conservancy (TNC) has strong relationships and diverse partnerships throughout the public and private sectors, a 60-year record of delivering pragmatic results on the ground, and a global reach. Building on these strengths, GRP is well positioned to



IRBM is the collaborative process of integrating conservation, management and development of water, land and related resources across sectors within a given river basin to improve the economic and social benefits derived from water resources in an equitable manner while preserving and, where necessary, restoring freshwater ecosystems.

*Adapted from Global Water Partnership Technical Advisory Committee, 2000, Integrated Water Resources Management, Background Paper, No 4.*

support bringing together diverse partners with the best science to explore options and help execute environmentally, socially and economically sound solutions.

GRP promotes three tightly linked strategies to deliver results. First, GRP supports multi-stakeholder partnerships at the basin level, where key actors come together to define goals, commit resources, develop opportunities and influence major decisions. Second, GRP accelerates the transfer of lessons and successes across participating basins. Third, GRP scales up the impact of basin programs by engaging in a global network of river management institutions and working to influence major public and private policy and investment decisions.

## The Tale of Two Floods

In 1927, an epic flood struck the lower Mississippi River. In more than 100 places, floodwaters gushed over or through levees, inundating a vast area and displacing 700,000 people. Estimates of the death toll are in the thousands.

In 2011, an even larger volume of floodwater flowed through the lower Mississippi River. This time, no levees failed, no lives were lost and no land flooded that was not intended to be flooded. That last phrase—*intended to be flooded*—holds the key to the dramatically different outcomes between the two floods.

Before 1927, management of the Mississippi River was fragmented, with different counties, towns, and landowners overseeing various flood-protection schemes. They were united, however, in their faith that levees alone could protect them from floods. The 1927 flood exposed both the fallacy of this belief and the vulnerability of fragmented management.

In response, the U.S. Army Corps of Engineers implemented a plan to manage the lower Mississippi as an integrated system, which included standards for levees, setting many of them back to give the river more room. It also featured eight locations where water could move onto portions of historic floodplains and reduce pressure on levees. Failure in 1927 and success in 2011 underscore the importance of managing river basins as whole systems.

What happened in 2011 is not a story of complete success, though. Today's system was designed to optimize mainly two benefits—flood control and navigation. We now know that floodplains are the most important habitat in a river system for supporting fish populations. Additionally, floodplain wetlands can remove excess nutrients or sediment from rivers, thereby improving water quality, which reduces costs at treatment facilities. Increasing demands and potential synergies like these drove the development of a shared vision among a broader coalition of stakeholders through the formation of America's Great Watershed Initiative.

Such lessons could prove pivotal for those working to shape the future of other Great Rivers. Floods devastated Colombia in 2011 and decision makers there now have a chance to plot the future of the Magdalena, their "national river," which is the country's principal source of inland fisheries and provides water for more than 30 million people. Learning from a system designed 85 years ago for the Mississippi, and seeing the achievements made when multiple stakeholders are brought together to solve complex problems, Colombians can obtain greater balance across a broader range of issues and, in turn, demonstrate to the rest of the world the value of managing Great Rivers and their basins as whole systems.



*Conservancy staff members and partners from USACE and Cormagdalena visit a canal in New Orleans, Louisiana © Erika Nortemann/TNC;*

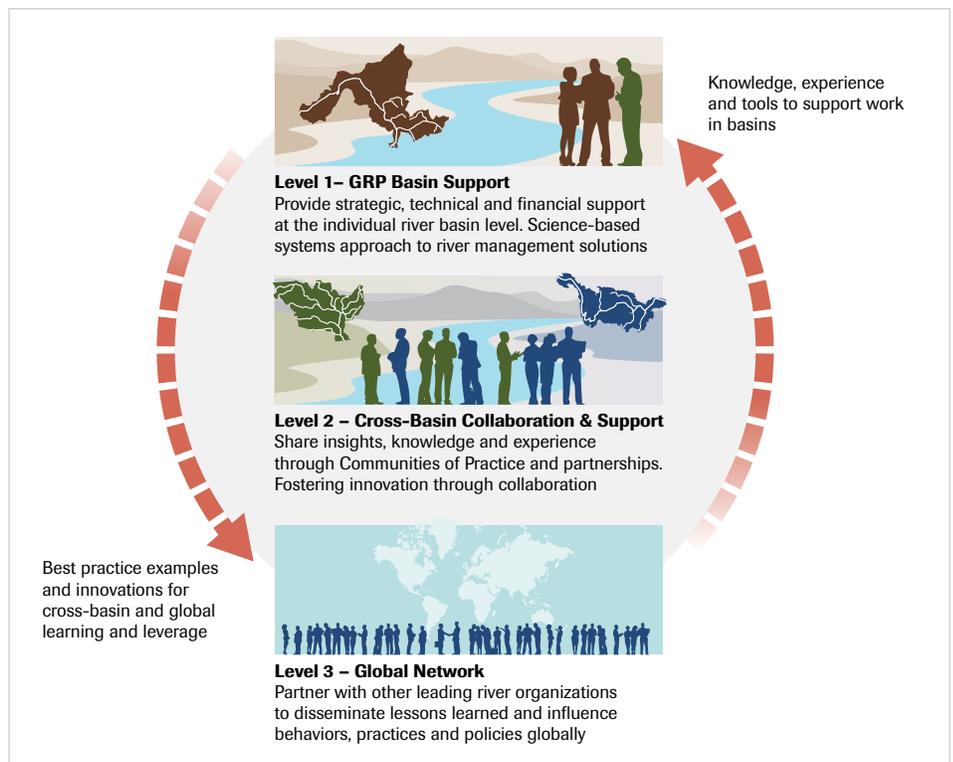


Fisherman at dusk on the Mekong river, Vietnam © pcruciatti/iStock photo

## Theory of Change: How GRP is Making a Difference

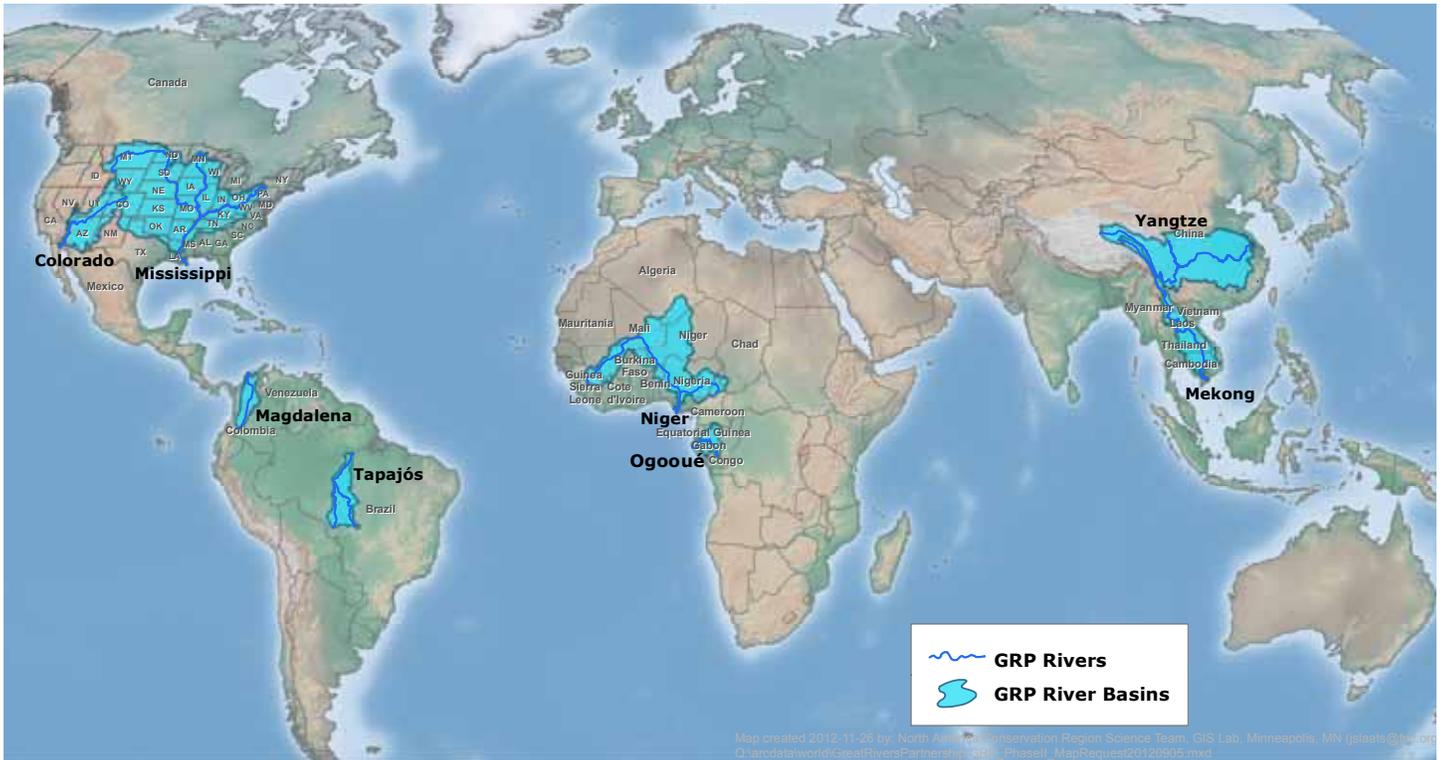
### Integration of basin-wide and global efforts greatly increases the potential for success at both scales.

While environmental and socio-economic settings vary extensively around the world, Great Rivers and their basins face a set of similar management challenges. It is these similarities that form the opportunity and basis for GRP's theory of change. The structure of GRP combines partners and networks and focuses their collective efforts on achieving innovative solutions that result in tangible, balanced outcomes. Promoting IRBM at the basin scale makes those outcomes more durable and widespread. Leveraging both on-the-ground and basin-scale IRBM gains through a global network helps advance sustainable management of river basins far beyond those in which GRP is working directly.



Graphic © The Nature Conservancy.

## Great Rivers Partnership River Basins



Map © The Nature Conservancy.

## The Eight River Basins



Floating market on the Mekong River © filmlandscape/iStock photo

**These rivers are the economic, environmental and cultural hearts of their regions. Continued fragmentation and failure are not an option.**

Eight river basins have been selected to be included in the next phase of the GRP: Colorado, Magdalena, Mekong, Mississippi, Niger, Ogooué, Tapajós, and Yangtze. These eight basins harbor some of the most important freshwater systems in the world. They represent a diverse mix of geographies, politics, issues, threats and levels of development—and some of our richest cultures and ecosystems. The partners engaged in management of each of these rivers are resolving challenges to the sustainability of these systems, using an IRBM approach to augment institutional capacity and achieve enduring outcomes.

# Great River Basins: Opportunities, Strategies, & Partners



## **Africa: Niger**

Africa's third longest river interlinks nine countries of West and Central Africa, spanning a wide range of climatic and economic zones. The Niger's water resources are at the core of development of this dynamic region. They face tremendous pressures and rapid depletion from a growing urban population, increasing food production in rural areas, climate change, and growing energy & navigation needs. The challenge is to sustain the river's natural resource base while satisfying development needs under harsh climatic conditions. The partnership is led by the International Union for the Conservation of Nature (IUCN) and the Niger Basin Authority, and includes the national institutions in charge of water and land management. GRP partners aim to: help develop water governance policies and sub-basin IRBM organizations; improve knowledge of river-related services and secure their sustainability; and build a sustainable finance mechanism.

## **Africa: Ogooué**

This great river, almost totally within the borders of Gabon, demonstrates how economic development opportunities can be pursued in a vibrant economy, while resources are protected for people and nature. Hydropower & infrastructure projects and mining & forestry operations are expanding, while the Government of Gabon is developing national climate and land-use plans. Its proactive approach presents a tremendous opportunity to test and perfect an IRBM approach. Major partners include TNC, World Wide Fund for Nature (WWF) and the Government of Gabon. This partnership focuses on building capacity for IRBM and freshwater science, managing protected areas that provide economic and biodiversity benefits, and initiating sustainable development techniques from the site to basin scale.

## **Asia: Mekong**

One of the most bio-diverse river systems in the world, the Mekong is relatively undeveloped, free flowing through the lower basin countries. The river is at great risk from hydropower development, with 88 projects in the pipeline (12 on the mainstem), with potentially catastrophic impacts on people and fisheries. Decisions on these dams will be made in the next 3-5 years, presenting an opportunity to influence the way development occurs. WWF and IUCN have drawn together a large group of basin partners that support and complement work of the Mekong River Commission and national agencies. GRP partners intend to: create a knowledge database and assess hydropower trade-offs; influence hydropower development plans; and develop basin-wide freshwater protection measures.

## **Asia: Yangtze**

The third longest river in the world and one of China's "mother rivers," the Yangtze sustains over 400 million people in its basin. While the river has played a key role in the rapid development of China, it has suffered from resulting pollution and man-made changes. Today the Yangtze is facing enormous pressure from infrastructure and hydroelectric development. Led by TNC's China Program, GRP partners in the basin are collaborating on an IRBM initiative ("Safe River, Clean Energy, Healthy Environment") to manage extreme flood risks, obtain sustainable energy from the river, promote clean water and healthy fishing, encourage shared responsibility for investments, and establish a Yangtze Hydropower Sustainability Fund.



### **North America: Colorado**

The Colorado River, an iconic symbol of the American West, descends from high mountains into deep canyons and deserts. The ecological and economic vitality of this river system is at risk from rapid population growth, climate change, increasing demand and diminishing supply of water. Drought and over-allocation are causing conflict among farmers, cities and environmental interests. The impending crisis presents opportunities for reforms in policy and practice that could allocate water more equitably. The basin team, led by TNC and its state chapters, includes many public and private agencies and proposes to address three areas: integration of environmental flow needs into water planning & management; establishment of water banks for healthy flows & water security; and exchanges of interstate & international water rights.

### **North America: Mississippi**

The Mississippi River basin is the third largest watershed in the world, draining 41 percent of the continental U.S. and supplying 92 percent of U.S. agricultural exports. However, the needs of nature have not been integrated into planning decisions, leading to significant degradation of the environment and its services. Costs have skyrocketed for dredging, repairing levees, and providing water for competing uses. A broad group of stakeholders created America's Great Watershed Initiative (AGWI) to integrate basin-wide management approaches. TNC is working with the U.S. Army Corps of Engineers and other public and private partners to: form a basin-wide structure guided by sustainable use; improve agricultural production with best practices; protect floodplains; and incorporate environmental needs in infrastructure decisions.

### **South America: Magdalena**

Colombia's longest river supports some of the most productive ecosystems in South America as well as 80 percent of Colombia's people and economic activity. The Magdalena's vitality is jeopardized by rapid land-use changes and the proliferation of infrastructure. Opportunities for IRBM arise from an existing basin-scale blueprint for freshwater conservation and several basin-scale planning processes just getting under way. The lead organization, TNC, already has collaborative relationships with key agencies. As part of GRP, the partners will help protect critical conservation areas, develop science-based decision-support systems, expand Water Funds, and promote IRBM policies such as infrastructure compensation & licensing.

### **South America: Tapajós**

One of the largest tributaries to the Amazon River, the Tapajós traverses Brazil from the central savanna to lowland rainforest. The basin contains 30 conservation reserves and 42 indigenous lands. The two most immediate threats to the river systems are hydro-power development (90+ dams proposed) and expansion of agriculture for export. Despite these threats, the Tapajós provides an opportunity for development of IBRM as a model for other Amazon tributaries and rivers in tropical forests. Led by TNC's Amazon Conservation Program, efforts include many partners from state governments and NGOs including WWF. GRP partners aim to: help develop & strengthen a conservation blueprint; encourage bilateral agreements on infrastructure with Peru & Bolivia; and develop a plan for watershed management.

# Cross-Basin Connections

The evolution of GRP from promoting discrete strategies, such as wetland restoration or floodplain reconnection, toward addressing rivers as whole systems requires leaders from an array of sectors to share knowledge. A new GRP Global Practices Team will catalyze a multi-directional flow of knowledge and experience among the eight river basins, and the broader community of river basin managers, practitioners, funders, and scientists.

## Basin Support

Many basins are confronting common challenges and have proposed similar strategies to address them. The Global Practices Team will support the eight basin teams with additional capacity, expertise and experience to help implement their strategies—both through direct support and by linking basins to external sources of expertise.

## Cross-Basin Exchanges and Collaboration

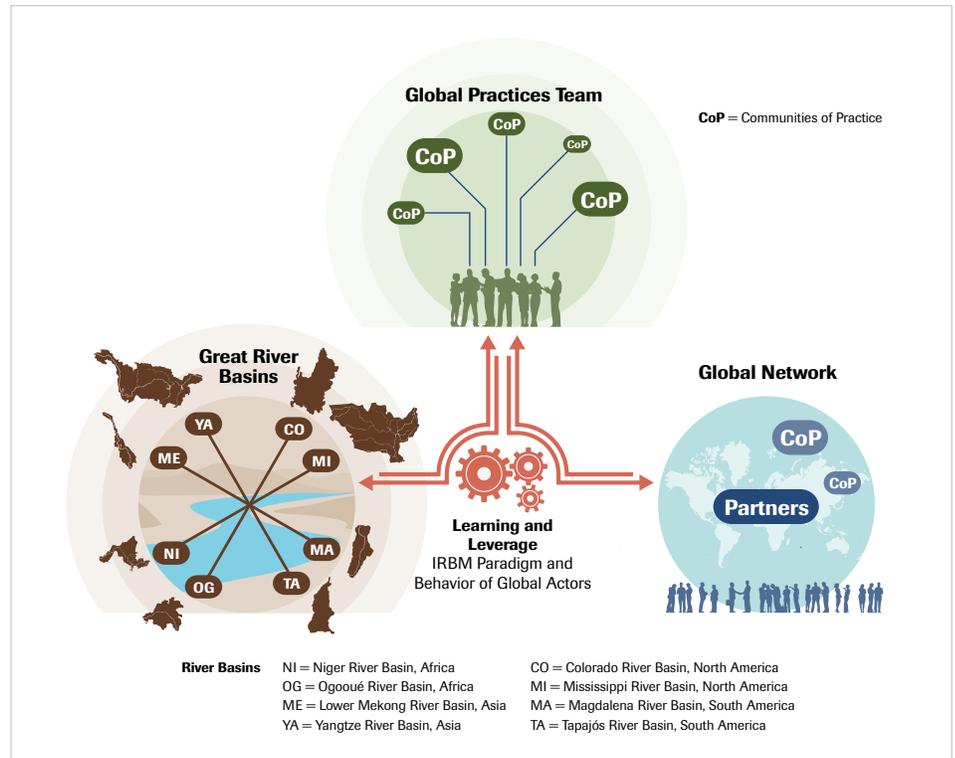
Cross-basin exchanges and other interactions will facilitate learning and collaboration among the basins. Several “Communities of Practice” based on

cross-basin themes will be developed and maintained to serve as sources of expertise and primary audiences for results and advances within GRP basins.

## Measuring Results

GRP will measure results at multiple

scales and provide appropriate information to a range of audiences. Consistent reporting across basins and the ability to aggregate results will be ensured by a measures framework designed to track three categories: outputs, outcomes and impacts.



Graphic © The Nature Conservancy.



Tapajós River © International Rivers via creative commons license

# Global IRBM Network

An extensive existing network of organizations, practitioners and affiliated communities of practice comprise the global IRBM community, which is making a concerted effort to foster more sustainable development trajectories for river basins.

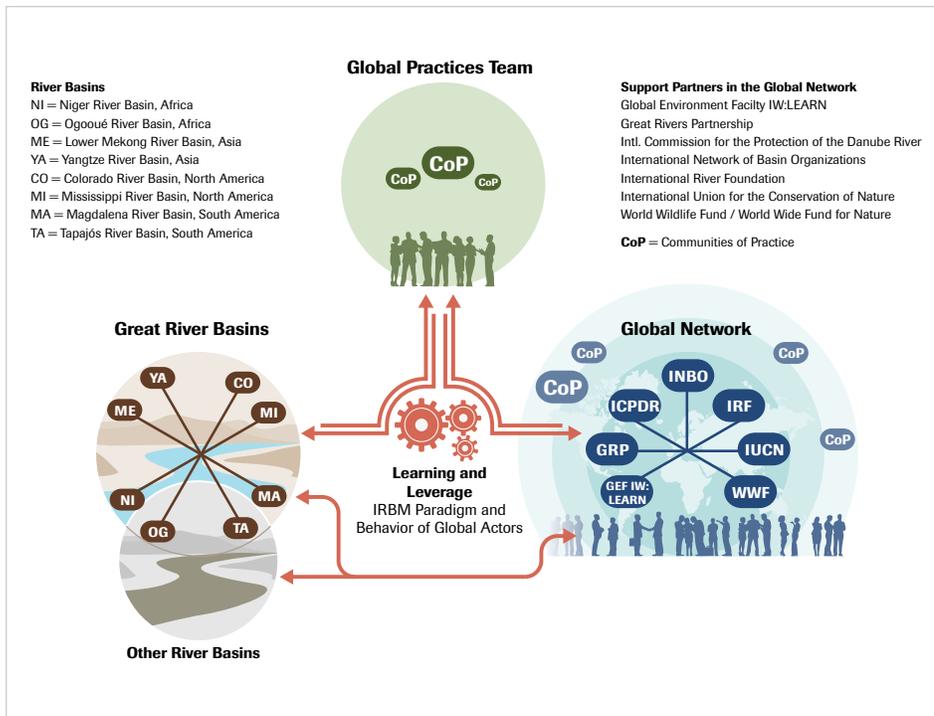
## Support Partners

A cluster of international bodies within this broader global network, the Support Partners (of which GRP is one) have recognized they share a

common vision and aspirations for the future of river basin management. They aim to help facilitate the emergence of effective and efficient water governance and of sustainable development of water resources, through the implementation of IRBM. Objectives include:

- To catalyze and foster an open learning exchange,
- To build synergies among organizations and practitioners and to leverage resources.

The Support Partners are working together, committing their own internal resources, under a set of basic principles for collaboration that will be formalized through a Memorandum of Understanding. The Memorandum provides an overall framework and will enable each organization to add value to its existing programs and engage a wider range of stakeholders than would be possible through its individual efforts. The partners also expect to see benefits from this collaboration extending to the wider community of practitioners, such as capacity development, educational opportunities and increased public exposure and recognition. The unified efforts of the partners will better leverage resources to help more river basins find solutions to development challenges and implement IRBM.



Graphic © The Nature Conservancy.



Mississippi River Valley © Mark Godfrey/TNC



Hoover Dam on Colorado River © 4nadia/iStock photo

## Governance and Management

GRP is designed and implemented as a global partnership, convened and supported by TNC, but comprised of other major international conservation organizations, donors and basin stakeholders as equal partners in managing plans and commitments. Creating a multi-organizational, multi-level structure with a high level of collaboration and shared leadership is easier said than done. The proposed structure for GRP's second phase is a starting point for discussion with potential partners and donors and is intended to evolve during its implementation.

The core components will be a Leadership Council, Donors Committee and GRP team. A managing director will direct collaborative execution of GRP's Business Plan and support the Council and Committee. The GRP team will support leadership at the regional and basin levels responsible for implementing the ambitious work plans outlined in the basin profiles.

**Leadership Council**—leads development and implementation of GRP goals, shapes and promotes inter-organizational commitments and goals, establishes effective Communities of Practice, and supports progress in the GRP basins.

**Donors Committee**—provides funding to support GRP strategies and work plans, prioritizes investments, mobilizes additional resources when needed, and oversees those investments. Members may also be part of the Leadership Council.

**GRP Team**—supports Leadership Council and Donors Committee, facilitates global partnerships and connections across multiple regions and basins, and collaborates with basin teams to build Communities of Practice and to support the execution of work plans identified in the basin profiles.

### COMMUNICATIONS: CREATING AN EXPERT VOICE

The expansion of GRP across numerous geographies representing some of the most significant freshwater challenges in the world presents a wide variety of new opportunities for communication about river basin management. Over the next five years, GRP will support specific conservation, policy and funding goals while also building a new GRP Communications Leadership Team and other permanent mechanisms to bring many voices together with a shared message.

One of GRP partners' most important roles, that of an "expert voice" on whole-basin solutions, will be communicated by: 1) equipping key messengers with tools and capabilities to make a credible case; 2) raising awareness of GRP partners' successes to heighten visibility; and 3) creating effective global communications systems.

## Shared Value and Financial Leverage

### Annual Expenditures

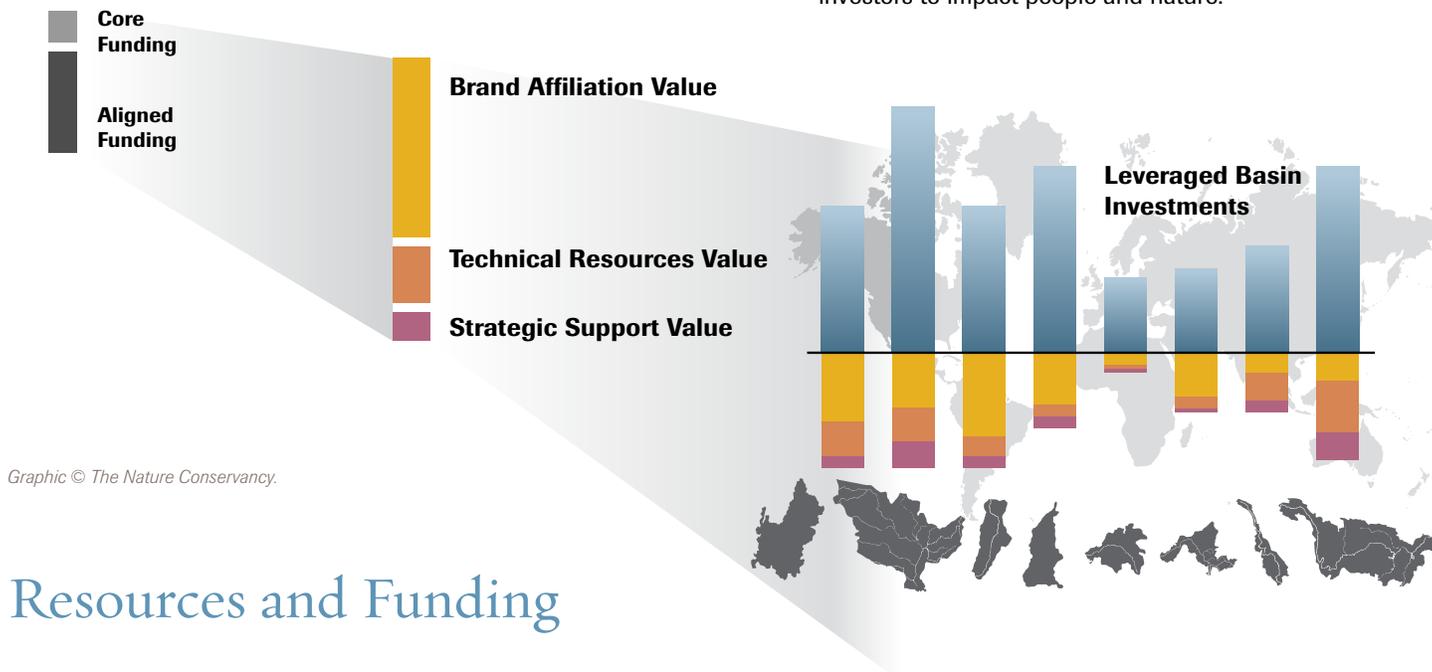
A proportionally small investment...

### Shared value created

...brings a number of shared value benefits from participation in GRP...

### Global impact

...and leverages much greater investments by basin governments, multilaterals, philanthropic and private investors to impact people and nature.



Graphic © The Nature Conservancy.

## Resources and Funding

Big visions call for big investments. The GRP vision of reconciling the competing and growing demands on the world's great rivers is a monumental task. In addition to the significant, committed support it has already received, GRP will require considerably more resources to realize this ambitious, long-term vision. With outstanding leadership, experience and scale, GRP's partners are ideally positioned to inspire and mobilize significant investments and build the momentum they need to be successful.

The projected overall five-year financial need for GRP is estimated to be \$197 million. During its first phase from 2005-2011, more than \$70 million in private funds were raised. Based on anticipated future support from some of these same funding sources and an expanded set of prospects, the goal is to raise \$85 million from private sources through 2017.

A vertically aligned funding strategy has been identified that provides coordination at the global and basin scales along with flexibility for funders to engage at whatever geographic scale and funding level best matches their interests:

**Core Funds**—support core management and functions of GRP at basin and global levels (Five-year need of \$45 million)

**Aligned Funds**—support actions in the river basins aligned directly to their GRP work (Five-year need of \$152 million)

**Leveraged Funds**—typically public funds that result from leverage through strategies and outputs in the GRP basins, but are not carried out by the GRP team.

"We're proud that the Caterpillar Foundation's investment to establish the Great Rivers Partnership has enabled freshwater projects on the three major river systems to collaborate across boundaries, leveraging best practices, enhancing outcomes and making long-term sustainability possible."

*Douglas R. Oberhelman,  
Chairman and CEO, Caterpillar Inc.*



The Nature Conservancy  
Protecting nature. Preserving life.

**For more information and to contact us,  
please visit [GreatRiversPartnership.org](http://GreatRiversPartnership.org).**

**COVER** (top to bottom): Mississippi River © Robert J. Hurt, Fisherman in lower Magdalena basin © Bridget Besaw, Floating market on the Mekong River © hadynyah/iStock photo, Niger River © oversnap/iStock photo, Colorado River horseshoe bend © BeauSnyder/iStock photo, (background) Jinsha River at headwaters of Yangtze River © Scott Warren