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Executive Summary

A NEW KIND OF PARTNERSHIP TO ACCELERATE CHANGE

The Natural Capital Project (NatCap) founders initiated the partnership with the objective of “aligning economic forces with conservation” late in 2005. The partnership was born just as publication of the Millennium Ecosystem Assessment helped elevate the urgency around the declining status of the world’s ecosystem services, and the consequences of losses in biodiversity and ecosystem function for human well-being. At that time, the slowly accumulating body of ecosystem service science was largely relegated to academic discussions within research institutes and policy think tanks. Very few examples demonstrated how such information could transform decisions. Decision support tools enabling incorporation of new ecosystem-service science into relevant frameworks did not exist. NatCap’s founders recognized the vital need to connect science with practice to make the emerging ecosystem services paradigm practical, operational, and sustained over time. They created NatCap as a pioneering partnership to harness the unparalleled research and thought leadership capabilities of Stanford University and the University of Minnesota with the global influence and conservation expertise of TNC and WWF.

Today, NatCap develops and maintains the world’s leading free and open-source data and analytical platform for mapping and modeling the diverse values of nature. Our InVEST software has been downloaded over 30,000 times in more than 167 countries and averages over 600 downloads per month. Approximately 6,000 people have enrolled in our on-line courses, and since 2013, we have reached 4,000 people with in-person courses on our approach and tools. Our annual symposium draws over 250 people from all over the world, helping to grow awareness, advance the science, and build a community of practice. We have worked with partners on the ground to provide solutions to real-world problems in 50 places in 24 countries around the world—building an understanding of nature’s benefits into decisions as diverse as spatial development planning, payment for ecosystem services schemes, and increasing corporate sustainability. All of this would be impossible without our large and growing collaborations with academic colleagues and partners in all types of institutions—NGOs, governments, multi-laterals, corporations, and public-private partnerships.

NATCAP’S UNIQUE NICHE

NatCap is a boundary organization operating between NGOs and universities. Unlike an NGO, it pushes the frontiers of science based on cutting edge ideas emerging from academia. Unlike a university, the research it does is developed in contact with the gritty real world of decision timelines, politics, and poor data (We Co-Create, Fig. 1). NatCap’s cadre of talented and committed young scientists and postdocs are deft at both research and working with diverse communities. NatCappers bring special skills in addition to their natural and social science expertise—listening, respect for collaborative approaches, and patience—to crafting innovative solutions based on the latest science and data (We Collaborate, Fig. 1). Our university and NGO leaders are world renowned for their work in ecosystem services and for executing on bold, ambitious ideas at the interface of conservation and human development. NatCap saves and shares its work through its Natural Capital Science and Technology Platform, containing open-source software models, global data sets, and visualization tools to imagine and map futures where both nature and people thrive (We Share, Fig. 1). The decision support tools are practical, developed by asking what decision makers need. NatCap’s training program builds capacity in people around the world to spread successful approaches and encourage further innovation (We Empower, Fig. 1). Leaders in government, multi-lateral development banks, and business who are actively advancing implementation of these ideas are seeking help from NatCap to convene others and share scientifically credible success stories to inspire faster action (We Inspire, Fig. 1).
EXECUTIVE SUMMARY

GOING FORWARD: FIVE PRIORITIES FOR THE NEXT FIVE YEARS

NatCap is now poised to build from this expertise and experience in its 10 years to activate leaders in government, business, NGOs, and the finance sector to accelerate and scale uptake of natural capital approaches. To achieve this, the NGOs and university partners comprising NatCap will work together towards these outcomes in the next 5 years (Figure 1):

1. **Sustainable Development.** Spatial planning includes credible natural capital information that motivates investments and policies with lasting benefits human well-being and biodiversity.

2. **Secure Freshwater.** Durable policy, financing, and incentives for securing freshwater and improved river basin management are supported by rigorous science, tools, and evidence.

3. **Safe, Resilient Coastal Communities.** Integrated nature-based and engineered solutions based on cutting edge science improve the resilience of coastlines and communities to coastal hazards and climate shocks.

4. **Sustainable, Livable Cities.** Policies and investments for sustainable, livable cities are informed by new science and tools that illuminate the benefits of nature in cities for improved health and equity.

5. **Standards for the Private Sector.** Private sector decision-making is enhanced through standard assessment tools and techniques for valuation of natural capital.

**Science to support these five outcomes.** NatCap will develop new approaches and tools that push the frontiers of ecosystem science. NatCap is uniquely positioned as a boundary organization to combine original cutting edge research with implementation, and to know what type of science is in the greatest demand (as opposed to what kind of science seems academically interesting). To achieve the five outcomes we seek, critical areas of research focus include:

- Building social equity and human health into the modeling as objectives of any ecosystem management, green certification, compensation scheme, or supply-chain decision;

- Next-generation scenario modeling that enables users to make more realistic predictions about future landscapes with input from both science and community engagement;

- Expanding the Natural Capital Science and Technology Platform to incorporate new science, datasets, and streamlined tools for linking ecosystem services to human wellbeing in diverse decisions; and

- Understanding and assessing impacts in order to inform design of better policy and finance interventions.

NatCap will focus efforts to **activate and accelerate uptake of natural capital approaches** in decisions through: (1) communications and outreach, (2) training and capacity-building, (3) convening leaders, and (4) partnerships for scaling. Taking advantage of our market leadership and convening power, NatCap will build a more formal learning network of those advancing ecosystem service science into practice, and extend our partnership arrangements to a wider range of institutions and individuals. We will couple our trainings to a learning network so that we keep in touch with our "alumni" and growing community of practice, using that network to disseminate, dissect, and analyze successes and cautionary tales. We will tell our stories widely to inspire transformation in decisions so nature can continue to support all life on earth.
Safe, Resilient Coastal Communities.
Integrated nature-based and engineered solutions based on cutting edge science improve resilience of coastlines and communities to coastal hazards and climate shocks.

Sustainable Development Planning.
Spatial planning includes credible natural capital information that motivates investments & policies with lasting benefits to human well-being and biodiversity.

Secure Freshwater.
Durable policies and financing for securing freshwater & improved river basin management are supported by rigorous science & tools.

Sustainable, Livable Cities.
Policies and investments for cities are informed by new science & tools that illuminate the benefits of nature for improved health and equity.

Standards for the Private Sector.
Private sector decision-making is enhanced through standard assessment tools and techniques for valuation of natural capital.

Sustainable, Livable Cities.
Policies and investments for cities are informed by new science & tools that illuminate the benefits of nature for improved health and equity.

We Co-Collaborate
We Co-Collaborate
A network of researchers & practitioners solve the important questions that arise from our interactions with decision makers.

We Share
Our data, science & tools are available to anyone through The Natural Capital Science and Technology Platform - making it easier, faster & cheaper to include natural solutions in decisions.

We Empower
Through training & guidance, we strengthen others’ capacity to map & value nature’s services, and to use natural capital understanding in decisions.

We Inspire
We convene communities of practice to disseminate & analyze successes & cautionary tales. Emerging stories inspire transformation in decisions.

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Section I: Growing Opportunity

A powerful paradigm is at the tipping point of becoming mainstream in conservation, business, and human development communities. It is focused on restoring and protecting ecosystems to benefit people and nature. This natural capital framework seeks to promote the long-term sustainability of natural systems and the human societies that need them. The approach integrates many agendas: poverty alleviation, human health and security, economic development, business value, and biodiversity conservation—with the ultimate goal of bringing together these communities in joint efforts to create a more sustainable future. There has been an explosion of experimentation with ecosystem services approaches across all sectors:

- **Governments and the global assessment community are creating necessary policy and institutional frameworks and starting to integrate ecosystem services into development decisions.** For example, the Chinese government is limiting development within 49% of its total land area to protect ecosystem functions supporting livelihoods and human health. Also, Colombia has mandated consideration of ecosystem services in diverse decisions, including those for permitting and mitigation. And in October 2015, the United States government issued a Memorandum directing all Federal agencies to incorporate ecosystem services in planning and decision making. Globally, the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) is assessing the state of biodiversity, ecosystems, and ecosystem services by connecting scientific knowledge on ecosystem services to government action worldwide. New global and sub-regional assessments initiated by IPBES will support actions to achieve the Sustainable Development Goals.

- **Multilateral development institutions are helping governments integrate the value of biodiversity and ecosystem services into infrastructure planning and loan decisions.** For example, the Inter-American Development Bank has developed guidance on including biodiversity and ecosystem services in all of their infrastructure loans. Similarly, The World Bank and Asian and African Development Banks are boldly advancing methods to connect development planning to systems of national accounts that include natural capital assets. International Finance Corporation (IFC) standards on biodiversity and ecosystem services are being translated into loan policies at The World Bank and other multi-lateral institutions.

- **Businesses and financial asset managers are starting to address the risks and opportunities arising from the natural capital they impact and depend on.** Corporations such as The Coca-Cola Company, Dow Chemical, and Unilever are integrating ecosystem service and natural capital impacts into a broad array of decisions, including supply chain sourcing and security of their physical plants. Financial asset managers such as the Norwegian Government Pension Fund are evaluating companies’ environmental and social impacts for inclusion in the fund, and are calling for transparent, scientifically rigorous assessment approaches. The draft Natural Capital Protocol, led by the Natural Capital Coalition, provides a standardized framework for business to measure and value its impacts and dependencies on natural capital and to help them integrate this into their decision making.

The world has changed dramatically in NatCap’s first 10 years. Accelerating drivers of global change—urbanization, climate shifts, globalization of markets and mobility of people—make the need for reliable, transparent information on natural capital assets and consequences for human well-being even more urgent. Along with the explosion in demand for ecosystem service information, new science emerges every day, illuminating the links between changes in ecosystems and human well-being. New observation technologies and less costly cloud computing and storage have made environmental data more easily available at much finer scales. Many non-profit and for-profit entities have sprung up to meet growing demand for assessment and valuation of ecosystem services and to support their use in public and private sector decisions. Many guidance documents, toolkits, and protocols are emerging to orient government and business decision makers to the plethora of methods, tools, guidelines, and techniques. The acute challenges we face today are to scale...
impacts from individual places and contexts, to make data and tools transparent and easy to use, and to mainstream use of natural capital information in policy and investment decisions.

All this activity has brought the field to a critical juncture, where the growing demand for information on ecosystem services across sectors is outstripping the capacity of those who are experienced in applying ecosystem service science for policy and finance decisions. In addition, as the ecosystem services paradigm evolves from novel to mainstream, there is increasingly high demand for new science and for irrefutable evidence that ecosystem service approaches are practical and make a difference for conservation and human well-being. NatCap needs to clearly define our role relative to other players in this space. The community applying ecosystem service approaches needs a strong leader with scientific credibility that can continue to deliver novel science and tools, expand global capacity to understand the need for and to apply these approaches, convene the community integrating ecosystem service science and practice, marshal compelling evidence of success and cautionary tales, and undertake a coordinated and well-resourced thought leadership campaign focused on scaling successful solutions.

The NatCap partnership has a unique opportunity to be this leader, building on its platform of achievements to date: novel science; cutting-edge practical tools and data on an open-source technical platform; a wealth of experience, expertise, and materials in training and capacity building; a growing portfolio of demonstration sites where lessons from ecosystem service approaches are emerging; and an experienced, well-respected network at the forefront of integrating ecosystem service science into practice. The field is looking to NatCap to play this vital leadership role.

In order to respond to these expectations and seize the opportunity with which it has been presented, NatCap has developed this strategic plan, which identifies the focused set of opportunities it will pursue to take the field to the next level, and describes how it will develop its organizational capacity and grow its collaborations and partners to execute this strategy.
Section II: Long-Term Strategy for a Dynamic Landscape

The Natural Capital Project partnership has shown that by developing and applying credible ecosystem service approaches and tools to link conservation and development goals, we learn what technical approaches and metrics are most influential and helpful in guiding decisions and policies. By then widely disseminating and building capacity around useful tools and lessons learned, we create an informed community of leaders and practitioners who will enable large-scale policy changes needed for securing and improving nature’s support of human well-being.

THE NATURAL CAPITAL PROJECT THEORY OF CHANGE

If:

- Robust evidence of the conditions under which ecosystem service-based policy change improves outcomes is created around high-profile issues in places of importance;
- Practical and useful ecosystem service science and tools demonstrate feasibility and are made widely available; and
- Powerful leaders at all levels are engaged and have their decision-making needs met, and a robust and collaborative community of practitioners is developed,

Then, through an iterative process:

- There will be increasing interest and willingness to test and implement ecosystem service approaches in progressively more impactful geographies and institutional levels;
- Influential institutions and players will alter their decision-making practices, policies, investments, incentives, and regulations to use ecosystem service approaches where they matter, persuading other institutions and decision-makers across the world to follow suit; and
- A critical mass of evidence and ecosystem service users/supporters will emerge,

So that, eventually:

- Investment in biodiversity, sustainable management of ecosystems, and human well-being rise dramatically; and
- The state of biodiversity and nature’s life-support systems for humans demonstrably improve.

NATCAP GOALS AND OUTCOMES

The Natural Capital Project envisions a world in which people, governments, businesses, and other institutions recognize the values of nature—embodied in Earth’s lands, waters, and biodiversity—in supporting human well-being, and routinely incorporate these values into decision-making.

Our partnership agrees to work together towards attaining five outcomes consistent with our overarching goal of integrating credible, cutting edge science into decisions that improve ecosystems and human well-being:
• Development planning includes credible natural capital information that motivates investments with lasting positive impacts on human well-being and biodiversity;

• Durable policy, financing, and incentives for securing freshwater and improved river basin management are supported by rigorous science, tools, and evidence;

• Integrated engineered and natural solutions based on cutting edge science improve resilience of coastlines and communities to coastal hazards and climate shocks;

• Policy and decision-making for sustainable, livable cities is informed by new science and tools that illuminate the benefits of nature in cities; and

• Private sector investments and practices are enhanced through standard assessment tools and techniques for valuation of natural capital.

To achieve these outcomes, we will advance the frontiers of science in the service of decisions; develop transparent, use-driven approaches to valuing nature; work closely with decision makers; and provide free, open-source ecosystem service software tools and training to a broad community of users. Our partners and leaders around the world work with us to test and demonstrate how accounting for nature's benefits can support more sustainable investment and policy decisions.

NATCAP'S UNIQUE NICHE

The community of players providing ecosystem service information and tools has grown dramatically since 2005, indicating a growing demand for such information, and providing more opportunities to test and refine approaches and applications through working collaboratively with others. In this crowded space, we see innovative, actionable science co-developed with end users as a core value proposition. NatCap is a boundary organization operating between NGOs and universities. By developing cutting edge research in contact with the gritty world of decisions, poor data, and pressing deadlines, our results are immediately relevant and used. We have a cadre of talented and committed young scientists who are deft at both research and working with diverse communities. Few other groups are working so effectively at the interface of academia and application. NatCap contributes unique added value to achieve our five outcomes through our singular combination of the following functions:

1. **Co-developing scientifically innovative approaches for including natural capital information in decisions.** In our first ten years of translating ecosystem service science into decisions in 50+ projects around the world, it has become clear that uptake of natural capital information in decisions happens through co-development of relevant science and information in an iterative engagement process between scientists, software developers, and end users. NatCap core NGO and university partners will work with collaborators in governments, multi-laterals, NGOs, and business to advance the next frontiers of science into practice for our 5 new outcomes. Through engagement in real decisions, we learn what works, and address pressing science needs in pragmatic and timely ways.

2. **Developing and testing our core technology platform.** NatCap has learned that providing transparent data and models for scientists and software developers builds rigor, trust, and uptake of natural capital information in decisions. Looking ahead to improve scaling of these approaches, we need to make it easier, faster, and cheaper for decision makers to consider natural capital information through the Natural Capital Science and Technology Platform. NatCap scientists and software engineers work closely to ensure that data and natural and social science innovations derived from real-world use cases are reflected in Platform offerings. We are committed to maintaining the open research, testing, and adaptive nature of the science-software collaborations so we and others can share new solutions for immediate use and scaling.
3. **Expanding our credibility as scientific leaders in the social and natural sciences by growing academic nodes and collaborations.** NatCap has learned in our first 10 years that the quality and quantity of science innovations demanded by decision makers will be enhanced through deeper and more diverse collaborations with academic colleagues outside of the core partners. NatCap will strengthen ties at these and other universities to increase the number of faculty, graduate students, and postdocs working on the important and interesting scientific problems and use cases emerging through our interactions with decision makers.

4. **Building capacity of core partners, practitioners, and scaling partners.** There is a growing demand for ecosystem service science, data, and tools that are field-tested, easy-to-use, and credible; and for stories, lessons on how to apply that science effectively in decisions, and change incentives or other enabling conditions for lasting, improved policy and finance mechanisms. To help meet the growing demand from end users, NatCap will work with partners to increase expert capacity by offering in-person trainings, growing educational offerings through on-line learning, and in sharing curricula for capacity-building efforts. We also will develop partnerships with consulting firms and other businesses who want to become trusted and skilled providers of spatial, quantitative ecosystem service information for current and future clients.

5. **Raising awareness of compelling stories and lessons through convening and communicating.** The steadily growing number of practitioners applying ecosystem service information in decisions is inspiring a broad, new coalition of leaders implementing novel strategies. Their collective experience can reveal what specific metrics and spatial scales resonate (and which do not) and the conditions and manner in which they successfully transform decisions. These practitioners need to share best practices and practical challenges so that new solutions are created, and uptake of natural capital information in decisions can continue to accelerate. NatCap will elevate our convening role, creating opportunities for the community of practice to join in disseminating, dissecting, and analyzing successes and cautionary tales.
Section III: The Outcomes We Seek

We have learned a lot in ten years about how to work together with partners to improve specific decisions. We not only learn what works and what enables impact, but also we discover critical frontiers that inspire the science we do, the tools we build, and the capacities we enhance. We create stories that have the power to inspire others to incorporate the values of nature into their decisions. What is needed now is a sharper focus on fewer outcomes, so we can activate leaders for change, building on both lessons to date and the promising new arenas where demand is high.

In consultation with all partners, we have identified five priority outcomes in which we plan to bring ecosystem service information to bear:

1. Sustainable Development
2. Secure Freshwater
3. Safe, Resilient Coastal Communities
4. Sustainable, Livable Cities
5. Standards for the Private Sector

Work in support of these five outcomes will focus NatCap’s effort for the next five years. To support this work, our next generation of use cases will be selected according to these criteria:

- High impact decision(s) are at stake, involving either high-risk geographies, vulnerable populations, or major investments;
- A policy or financial opportunity is ripe for rapidly demonstrating changes in decisions with natural capital and human well-being information;
- Demonstrable senior executive or community-level commitment exists to include spatially explicit natural capital and human well-being information in decisions material to the enterprise or community, and the solutions we develop are scalable to other areas; and
- The work has potential to result in a significant science advancement and contribute to the development of the shared Natural Capital Science and Technology Platform.
SPATIAL PLANNING FOR SUSTAINABLE DEVELOPMENT

Development plans and investments can play a huge role in stimulating economies, lifting people out of poverty, and improving health. We envision a world where development decisions are made in light of the contributions of natural capital to supporting livelihoods, health, and well-being. This future encourages a more comprehensive accounting of costs and benefits of development that includes natural capital and ecosystem services, resulting in truly sustainable development plans for every country that are supported by local communities, and that are well-financed, implemented, and enforced. These plans will incorporate investments and projects that improve people’s lives, while protecting the life-sustaining ecosystems upon which we all depend.

THE CHALLENGE

As the global human population nears 9 billion by 2050, more and more people will be competing for finite resources. Governments have the mandate to undertake development planning processes that zone lands and waters for specific uses, and to issue permits for projects consistent with those plans. Well-designed development plans also give private sector interests clear direction that can help reduce costly social, legal, and environmental risks. Most permitting decisions occur in silos—with, for example, road projects reviewed only by transportation authorities, rather than coordinated across other relevant sectors such as forestry, tourism, and energy. Development that goes forward without considering a fuller suite of costs and benefits to different groups can result in unintended consequences, including higher project implementation and maintenance costs, and reduced service delivery to vulnerable people. Furthermore, plans alone don’t improve lives, action does—and moving from planning to implementation can be a significant challenge.

OUR SOLUTION

The Natural Capital Project works with government planners, private sector partners, and other stakeholders to produce relevant, accessible science and tools. We collaborate to create flexible modeling and mapping capabilities that can identify where nature provides benefits now and project where they will likely be provided under future management and climate. Through software like InVEST, we empower people to develop, access, and share information about natural capital. This enables leaders to understand the full extent of their assets and to visualize trade-offs resulting from development decisions. Together with governments, communities, and private interests around the world we will expand our efforts to re-envision sustainable development planning informed by natural capital. We will both work at larger scales and in new places to support decision makers in the creation of complementary policy and finance mechanisms to ensure that development plans including benefits from natural capital are implemented and funded into the future.
A PLAN IS JUST A PLAN UNTIL IT’S FUNDED AND ENFORCED

OVER THE NEXT FIVE YEARS, WE WILL:

RE-ENVISION national and international sustainable development planning:

- Help leaders, particularly in Asia, the Arctic, and Africa, assess natural capital and ecosystem service values; and
- Guide development of national and transboundary policies and practices using this information in spatial planning, zoning, and permitting of all projects or investments affecting the use of lands and waters.

Build on our decade of expertise using natural capital in decisions to create financial and policy incentives for implementing plans, to make them more FUNDABLE:

- Provide scientific evidence to allow creation and replication of finance mechanisms that provide attractive and rewarding alternative sources of revenue (e.g., payment for ecosystem services schemes);
- Guide investments and siting of infrastructure by illuminating tradeoffs with food, water, and energy; and
- Decrease risk to potential investments by incorporating the near- and long-term costs associated with natural hazards (e.g., landslides, flooding, erosion) and climate change into designs.

Apply world-class science to transform policies and practices to make spatial development plans more EQUITABLE:

- Conduct fuller cost accounting of benefits and risks to ecosystem service delivery and human well-being;
- Develop methods and tools highlighting how decisions might affect service delivery to specific populations (e.g., poor, elderly, local, rural, urban, indigenous peoples); and
- Prioritize areas for harmonized ecosystem services and development benefits to people.

Work with partners and existing processes to make sure plans are ENFORCEABLE and REPLICABLE:

- Incorporate natural capital approaches into lending practices of financial institutions through standards;
- Expand work with countries, such as Mozambique and Myanmar, to develop and guide implementation of national ‘Green Economy’ policies and plans; and
- Build capacity within key partners to replicate approaches in new geographies.

IN ACTION

Infrastructure Siting
We’re working in Myanmar and Mozambique with government leaders to map benefits provided by nature and to help site proposed infrastructure projects (dams, roads) away from areas that would undermine ecosystem services to communities, and towards places that will improve people’s lives. We will mainstream the needed information and tools for broader uptake in governments and multi-lateral institutions.

Development Planning
We are working with scientists in China, using our flagship software InVEST to design restoration and protection of natural capital across 49% of the country. With the Belizean government, we honed new tools and approaches to create a coastal plan that allows for greater equity & increased tourism revenues while also protecting and restoring ecosystem services. Now we’re using a similar approach in The Bahamas with the IDB and the Office of the Prime Minister.

Training Program
Our training program teaches planners in specific geographies about natural capital approaches, and how to use InVEST and other software tools. We empower government planners and those who support them to lead sustainable development planning processes in their communities, so that they can envision and plan for the future they want, meeting economic, social, and biodiversity goals.
DURABLE FINANCING AND INCENTIVES TO SECURE FRESHWATER

We envision a world where all people have dependable access to clean, ample water. This future world has integrated watershed management and innovative finance mechanisms that secure long-term stewardship of forests, grasslands, agricultural fields, and other natural habitats so that they contribute to clean, dependable water supplies downstream. Also, major river basins are sustainably managed to support biodiversity, energy, and human health and livelihoods.

THE CHALLENGE

Securing clean, ample water for everyone is a multi-faceted challenge. Designing innovative, effective, and durable mechanisms to harness ecosystems to provide clean water, and incorporating the true costs and benefits to people of diverse watershed activities are sorely needed to meet the need—especially in water-scarce regions. Integrated watershed management can be an effective way to secure clean, ample water downstream. Nearly two-dozen cities have launched watershed payment schemes across Latin America, and many more have been established or are under development in places like Kenya, China, India, Nepal, and in cities across the US. Though software tools can help prioritize where, and in what activities, investments or policies are most likely to be cost effective, long-term financing for these efforts is not guaranteed. Watershed investors and planners need reliable results and clear projections of ecosystem changes and financial and social returns on which to structure financial instruments and policies to maintain clean, ample water supplies to those most in need. Detecting effects of watershed activities on ecosystem and human well-being change can be slow, and evidence of what works from monitoring can be sparse.

OUR SOLUTION

Our goal is to identify what works to improve livelihoods and natural capital essential to providing clean, dependable water and other freshwater ecosystem services—through river basin management and watershed payment schemes such as water funds. We will work to ensure that our science and tools can help support partners to further advance rapid replication and scaling of the approaches pioneered to date and to provide new information on consequences for human well-being.

With partners (e.g., TNC and the Latin American Water Funds Partnership), we developed the RIOS tool for prioritizing investments and established a network of hydrologic and socio-economic monitoring systems in six active water funds in Latin America, as part of our first efforts to understand what works, tracking social and ecological outcomes of ecosystem-based planning. More broadly for integrated watershed planning, siting activities that take into account costs and values associated with activities in different places will help drive
development and restoration projects to areas where lasting benefits to people are most likely, minimizing trade-offs to biodiversity and ecosystem services. By including other freshwater ecosystem services, such as flood control, freshwater fisheries, river tourism, and freshwater biodiversity, we will enable improved decisions and more transparent governance for river basin management and freshwater compensation schemes.

CLEAN, AMPLE WATER FOR ALL

OVER THE NEXT 5 YEARS, NATCAP WILL WORK WITH PARTNERS TO:

Build on world-class science to make watershed management using ecosystem services more CREDIBLE:

- Secure financial and policy mechanisms underlying payment schemes for watershed services by providing evidence of improved returns on investment for ecosystems and human well-being;
- Inform siting of activities by fuller accounting of costs and benefits to ecosystems and human well-being; and
- Improve river basin management by expanding our science and tools to in-stream ecosystem services.

Encourage further scaling in new geographies through innovative policy and finance mechanisms, making adopting beneficial policies EASIER:

- Provide and share evidence of improved ecosystem, human well-being, and economic returns on investment to inspire further scaling in new geographies; and
- Show what interventions work, where, and why, and build capacity to activate further uptake.

Analyze, synthesize and share data to make impacts more TRANSPARENT:

- Work with governors of watershed financing and integrated watershed planning to scale uptake; and
- Apply new science and standard approaches in software for watershed compensation schemes and river basin management.

IN ACTION

**Watershed Payment Schemes**

We seek to expand the set of livelihoods, equity, and health benefits that can be assessed in standard frameworks for securing policy and finance mechanisms for watershed payments around the world and conduct new science of drivers of land use change.

**New Science & Tools**

We are accelerating learning and adapting by incorporating new data and science into the Natural Capital Science and Technology Platform for new freshwater ecosystem services such as fisheries, flood control, and river tourism.

**Building Capacity**

We are building capacity within key partners for conducting integrated watershed management to secure clean freshwater and reduce flood hazards in new geographies and decision contexts.
e envision a future with resilient coasts, where communities thrive despite powerful storms and rising seas, and homes and businesses remain safe. We envision communities that protect and restore their coastal habitats because they understand their protective value. Our vision includes targeted, smart investments in shoreline protection—using natural habitats, such as beaches, wetlands, mangroves, and reefs—where they provide adequate protection, in combination with engineered solutions, such as sea walls and levies when necessary. As investments in green solutions rise, fish and wildlife thrive; sectors such as fisheries, recreation, and tourism flourish; and people experience a renewed connection to nature.

THE CHALLENGE

Worldwide, development has reduced coastal habitats to a small fraction of their historic extent. This loss of habitats has inadvertently exposed coastal communities to catastrophic flooding and other dangers. Unaware of the protective capacities of wetlands, reefs, mangroves, and other natural systems, people have instead been trying to protect coastlines and communities by investing in sea walls, levies, and other engineered solutions. However, developers, insurance providers, government agencies, and others are increasingly aware that traditional responses to coastal storms can be inefficient and ineffective. Rebuilding destroyed structures and adding engineered solutions can be expensive and leave communities vulnerable. Nature-based solutions, whether alone, or in concert with engineered solutions, can be cheaper, more effective, and provide long-lasting benefits that surpass what engineered solutions alone can achieve. However, planners often don’t have a systematic way of figuring out where to invest in coastal habitat restoration and conservation to maximize benefits. As a result, national, state, county, and local government agencies, urban planners, non-governmental organizations, and industry are facing hard questions about where investments in nature-based solutions can provide cost-effective benefits for people.

OUR SOLUTION

NatCap has worked with communities and governments across the US and in Belize, Canada, Mozambique, Vietnam, Barbados, and The Bahamas to advance science that shows where protected or restored coastal habitats can best provide protection from sea-level rise and storms. We’ve also developed metrics and tools to make this science accessible to decision makers, and to help people understand how much protection is provided, the economic and social values of that protection, and the diverse additional benefits that coastal habitats can provide. We will expand this work to empower public and private sector leaders anywhere to target investments in protective coastal ecosystems.
NOW THAT WE HAVE TOOLS AND APPROACHES, WE PLAN TO SPREAD THEM TO COASTS AROUND THE WORLD

OVER THE NEXT FIVE YEARS, WORKING WITH KEY PARTNERS, WE WILL:

Build on our decade of experience developing the science and tools to make information about benefits of nature-based solutions to coastal hazards more AVAILABLE:

- Work with more decision makers to integrate nature-based and engineered solutions in priority geographies; and
- Incorporate new data and science into the Natural Capital Science and Technology Platform to make it easier for public and private sector actors to make informed decisions regarding resilient coastlines.

Continue to develop world-class science that helps TARGET smart investments in nature-based and engineered solutions:

- Empower decision makers to see nature-based solutions as a viable option by quantifying the set of benefits provided by nature-based and engineered solutions;
- Expand software models linking ecosystem services and human well-being for climate and hazard resilience decisions; and
- Develop climate-smart ecosystem service tools to assess ecosystem-based approaches to climate adaptation.

Spread the word of our solutions in places like the US, The Bahamas, and Belize to INSPIRE change:

- Collect evidence and communicate specifics about improved ecosystem, human well-being, and economic returns on investment to encourage further scaling in new geographies;
- Inspire others with stories of successful incorporation of nature-based solutions into climate adaptation and hazard mitigation planning; and
- Enable replication of approaches by distributing easy-to-use software and through capacity building.

IN ACTION

Integrating Approaches
In Galveston and Freeport, Texas, we explored how a marsh would decrease the needed height for a levee, decreasing costs for protection and also benefiting the community in other diverse ways (e.g., providing opportunities for recreation, nursery habitat for fisheries, and helping regulate global climate by storing and sequestering carbon). We are extending this kind of analysis to other locations and decision makers.

Setting Priorities
We are working with TNC and other partners in the Gulf of Mexico to help target funds from the Restore Act to places where green infrastructure, or a combination of green and grey, would provide more benefit than grey alone. Our siting methods can be extended to other locations where more optimal return on conservation and restoration investment is desired.

Implementing Solutions
Now that we’ve developed the tools to show where and how coastal habitats benefit people, we will focus on making sure those tools are used in implementation of more targeted green infrastructure plans and results are tracked and shared. In this vein, we have worked with TNC and other partners to site restored oyster reefs in Alabama, where early results indicate rebounding fish populations and a rebuilding shoreline.
SUSTAINABLE, LIVABLE CITIES

We envision cities where nature is woven into everyday life and is used to reduce risk from extreme events such as floods and heatwaves. Urban trails connect networks of forested parks; densely built areas are bisected by restored streams, which help absorb rainfall; waterfronts are lined by marshes to help protect coasts from storms; urban residents reap mental and physical health benefits from green space, wherever it is found; street trees provide shade and make neighborhoods more pleasant and livable.

THE CHALLENGE

Cities around the world are growing at unprecedented rates, and in many places are becoming hotter, more polluted and crowded environments where it’s difficult for people to thrive. Growing urban populations across the globe are less directly connected to nature than their more rural counterparts, stressing their health and wellbeing, and complicating interventions to restore prosperity in urban cores. Cities depend on connections to surrounding areas for securing food, clean water, and resilience to hazards. Urban residents also depend on nature in the city for water management, temperature regulation, pollution mitigation, opportunities for recreation, and mental and physical health. Understanding how best to incorporate nature into sustainable, livable cities is a critical challenge in a rapidly urbanizing world.

OUR SOLUTION

To contribute to a widespread effort to create more sustainable, livable cities, we will build on our expertise creating credible science, decision support tools, and proven approaches to identify where and when nature can provide key benefits to people in cities. We will scale our approaches through global networks of city leaders by identifying the places where nature-based solutions are most likely to improve resilience and reduce environmental risks. We also envision new science and a suite of tools that will capture and integrate benefits for urban services such as offsetting urban warming, risk reduction from floods and other hazards, and mental health and recreation benefits. We see great opportunity for impact in our cities work in places where strong leaders are emerging, the pace of change is rapid, and connections among equity, poverty, and health can be tightly linked to environmental quality and risks.
BUILDING NATURE INTO CITIES

NATCAP WILL WORK CLOSELY WITH OUR CORE PARTNERS AND OTHERS TO INCORPORATE AND ACCOUNT FOR THE CONTRIBUTION OF ECOSYSTEM SERVICES TO HUMAN WELL-BEING IN CITIES. OVER THE NEXT FIVE YEARS, WE WILL:

Co-develop science and tools that help fundamentally change the relationship between urban-dwellers and nature, so that both can THRIVE:

- Increase cities’ resilience by more strategically targeting investments that reduce residents’ exposure to environmental risks including landslides and flooding;
- Develop and apply new science and approaches to address key urban services missing from existing assessment tools (e.g., temperature regulation, recreation, and cultural and mental health benefits); and
- Provide new human wellbeing metrics that are useful to city leaders and communities to advocate and envision the futures they want, especially for vulnerable communities (e.g., metrics of livelihoods, health, and risks).

Make green solutions for cities more AVAILABLE:

- Build new data, science, and tools into the Natural Capital Science and Technology Platform so that it is accessible to urban leaders, planners, communities, and investors for evaluating and adapting strategies;
- Incorporate evidence for the co-benefits of green infrastructure and nature-based solutions into urban decisions taken by planners, investors, city leaders, and communities; and
- Share solutions and lessons learned across urban networks.

IN ACTION

Making Cities Resilient
We are piloting a project in Minneapolis to incorporate green infrastructure solutions in mobile home communities, where people are particularly vulnerable to storm and flooding dangers.

Making Cities Equitable
We're working to improve urban planning processes by partnering with students at the Institute of Sustainability at the University of California, Los Angeles to assess how ecosystem service needs and benefits differ in wealthier and more impoverished neighborhoods, under different management and planning scenarios.

Understanding Nature In The City
We are conducting a synthesis of urban ecosystem services and sheds light on when and where they are most likely to provide substantive benefits to people. This work, together with applications in diverse cities around the world such as Durban, South Africa, will inform the development of our decision support tools for city leaders and communities.
We envision a future where widespread economic prosperity raises vulnerable populations out of poverty while safeguarding the natural and human capital upon which businesses depend and markets operate. In this vision, the private sector’s opportunity to achieve sustainability has accelerated into a global system of commodity production that does not overtax ecosystems. Economic incentives are re-aligned so that investors are rewarded for securing both natural and human capital. Businesses and innovation flourish under a more stable socio-political landscape, where communities’ needs are met and people enjoy universal access to clean air and water, and nutritious food. Companies, multi-lateral development banks, and governments work together to adopt ethical and sustainable commodity production and certification standards, so that natural capital and human wellbeing are safeguarded at every point along the supply chain and investments are secured.

THE CHALLENGE

Under the current system, short-term economic gains that deplete and degrade natural and human capital are financially rewarded, creating disincentives for long-term natural and human capital investments that are more likely to yield prosperous returns over decades. Ecosystem shocks expose commodity supply chains to risks that are often not visible to investors. The private sector is uniquely poised to respond rapidly to global environmental and socio-economic trends. Leading companies and financial institutions are better at understanding the risks, and some are making bold commitments to fair and sustainable practices. For some sectors and commodities, sustainability standards exist to shift production toward certain practices or outcomes. WWF and others have been actively involved in the development of credible, third party verified, multi-stakeholder roundtables and sustainability standards, which codify best practice into a set of principles and criteria. Yet companies and asset managers (such as those for government pension funds) that provide funding for commodity supply chain actors, and the standards organizations themselves need to be able to assess performance against promises and adapt practices for maximum benefit. Further, to drive investments in sustainable equities, bonds, and land use / management practices, the private sector needs both greater incentives and practical approaches for including natural capital and human well-being metrics in standard return-on-investment evaluations.

OUR SOLUTION

We are helping to create methods for natural capital accounting in the private sector by making relevant natural capital approaches and standards for private sector investments.
capital and human well-being information readily available. We are working to tailor this information to help advance commodity sustainability standards and guide purchasing decisions and asset fund investments for companies and investors. We will build on this work to create replicable processes to assess supply-chain impacts in sourcing regions and the degree to which commodity sustainability standards can contribute to better outcomes for ecosystem services, biodiversity, and human well-being, as well as to make recommendations for improvement. Information will be readily available to all through our growing Natural Capital Science and Technology Platform.

PRACTICAL, MEASURABLE STANDARDS

OVER THE NEXT FIVE YEARS, WORKING WITH PARTNERS, WE WILL:

Build on decades of experience to make it PRACTICAL to incorporate ecosystem service information into commodity certification and sourcing decisions:

- Expand scientific work with sugar cane standards to other commodities, such as oil palm and soy; and
- Continue piloting programs for sustainable supply-chain purchasing with major multinational companies that control a significant portion of the market for high-impact commodities.

Use world-class science and tools to make sustainability standards REPEATABLE:

- Create global and regional natural capital models, with business-relevant outputs for spatially assessing risks and opportunities under standards;
- Improve future scenario modeling, optimization techniques, and stakeholder engagement to allow for examination of indirect effects of sourcing decisions and identify cost-effective investment opportunities; and
- Develop new science and tools to incorporate transparent information into financial asset management.

Harness and share stories of the power of ethical and sustainable standards to INSPIRE TRANSFORMATION:

- Ensure widespread understanding among national governments, multilaterals, and businesses of the case for including natural capital risk and opportunity in private sector decisions.

IN ACTION

Sustainable Supply Chains
We will expand work with companies such as Coca-Cola and Unilever to others, and develop methods for rapidly assessing and adapting the natural capital impacts of decisions all along the supply chain. We will evaluate standards with Bonsucro and others, to improve sustainability outcomes within sourcing regions.

Asset Management
We will support asset managers (e.g., Norway’s government pension fund) by making it easier to make determinations about the practices of companies and their impacts and dependencies on natural and human capital.

Populating The Natural Capital Platform
We will work with networks of business and investment banks and standard-setting and evaluation bodies to shape the provisioning and sharing of actionable data, models, and interactive software.
Metrics of Success for Shared Outcomes

**SUSTAINABLE DEVELOPMENT**

1. At least five countries incorporate ecosystem service and human well-being information into high priority development and spatial planning opportunities at national, sub-national, or regional scales. Evidence for deliberate use of these analyses is found in decisions made about infrastructure, land and ocean uses, and sectoral policies. Enabling conditions contributing to uptake and to achieving desired outcomes have been evaluated across use cases to guide future engagements.

2. At least two countries establish policy and finance mechanisms that create new incentives for ecosystem service and biodiversity conservation, such as sustainable financing for protected areas and payments for ecosystem services.

3. A new science and software platform exists that incorporates new science, datasets, and tools for linking ecosystem services to human health, livelihoods, and other relevant end points for planning, development, and investment decisions.

4. At least five countries and ten key partner institutions have enhanced leadership and skills for effective use and/or improvement of NatCap tools, approaches, and science for spatial development planning (e.g., The Bahamas, Myanmar, Mozambique, Cuba, WWF and TNC national or local offices, University of Vermont, CENPAT, CGIAR).

5. Success stories and advances in the approaches, science, and tools needed to inform spatial development planning are shared widely through diverse venues, including media coverage, guidance documents (e.g., for multi-lateral development institutions), the Natural Capital Science and Technology Platform, and peer-reviewed publications.

**SECURE FRESHWATER**

1. Public and private sector leaders in at least three new priority geographies target, design, and implement long-term, durable policies and investments for integrated watershed management that incorporates ecosystem service valuation information to secure freshwater and co-benefits.

2. At least three key partners adopt water security approaches and tools that link ecosystems to human health and poverty alleviation outcomes, incorporating best practices into watershed interventions.

3. Relevant global freshwater datasets and models are easily accessible to the ecosystem services user community through the Natural Capital Science and Technology Platform.
SAFE, RESILIENT COASTAL COMMUNITIES

1. Nature-based solutions, along with existing grey infrastructure approaches, are incorporated into policies and investments to secure climate and hazard resilience in at least three priority geographies and for at least one influential decision maker in both the public and private sectors.

2. Evidence of improved ecosystem, human well-being, and economic returns on investment in nature-based solutions encourages further scaling in new geographies by diverse decision makers.

3. Improved understanding of where and when nature-based solutions are appropriate and cost-effective is built into decision support tools in the Natural Capital Science and Technology Platform to help scale integrated engineered and natural solutions that protect people and property and deliver diverse benefits to communities.

SUSTAINABLE, LIVABLE CITIES

1. At least four cities have worked with us to include nature-based solutions in planning and investments for urban challenges, including urban heat, air quality, and coastal flooding.

2. New science is made available to transform policies and investments to make cities more livable by improving urban planning to value nature and helping developers use natural capital in their daily work.

3. Solutions and lessons learned are shared across urban networks and through the Natural Capital Science and Technology Platform.

STANDARDS FOR THE PRIVATE SECTOR

1. At least two global commodity standards incorporate ecosystem service information into development or revision of the standard, and its criteria.

2. At least two leading businesses incorporate natural capital assessments into supply-chain purchasing strategies and/or in new or extended sustainability programs.

3. Global and regional natural capital models and economic data for commodity production are available in the Natural Capital Science and Technology Platform to inform spatial assessments of supply chain risk and mitigation across multiple commodities.

4. At least three new use cases exist for incorporating ecosystem service information into financial asset management decisions, and new decision support tools allow scaling beyond initial use cases.
Section IV: Science in the Service of Outcomes

NatCap’s strength lies in our ability to advance science and tools for decisions. Our value proposition emphasizes science and tools developed in situ—fundamentally we seek to empower decision makers to include credible scientific information about the effects of their decisions on critical services that underpin the well-being of their stakeholders. To do so, we identify questions critical to decision makers, we focus our science on developing the approaches required to answer those questions, and we build that science into accessible tools that enable ecosystem service understanding to inform decisions. NatCap’s proximity to world-class researchers within our academic partners facilitates collaboration with experts from diverse fields and provides a conduit for the development and application of cutting edge science. In this section, we highlight some of the science and tool development priorities emerging from our existing and envisioned use cases.

NatCap cannot—and does not want to—do this science alone. Driven by the real-world questions brought into relief while working to achieve our five core outcomes, our science is led by experts in academic institutions—both in our core partners and academic nodes. In our next phase, our efforts to answer pressing science questions will be better-coordinated across our network, continuing to build on our academic leadership in the ecosystem services field, and developing ever more useful approaches and tools to enable ecosystem service analysis.

We will pursue frontiers in science in the service of our outcomes within four central themes:

1. **Demand-Side Modeling: It's All About People**
2. **Next-Generation Scenario Modeling: Making More Realistic Predictions About Future Landscapes**
3. **The Natural Capital Science and Technology Platform: Streamlining Complex Ecosystem Service Analyses**
4. **Understanding and Assessing Impacts To Design Better Interventions**
**SCIENCE THEME**

**Demand–Side Modeling: It’s All About People**

The past 10 years have yielded significant progress in advancing the science showing how ecosystems affect people. NatCap and collaborators have quantified the contribution of pollination to nutritional health and traced changes in ecosystem services to changes in livelihoods in China and Indonesia. NatCap also has tracked impacts of development plans on coastal protection and water purification for the poor and vulnerable, and developed new techniques for valuing different benefits of water quality. While some of these advances have made their way into software, much of the above exists only as research in the peer-reviewed literature. NatCap will continue translating this work into software, so that others can access and use our approaches in their own geographies.

NatCap aims to do a better job of connecting ecosystem service analyses to more metrics that matter to communities—to engage diverse stakeholders and improve benefits to people in healthy and equitable ways. To further ensure that the decision processes NatCap supports are centered on benefiting people, a new set of tools focused on the ‘demand side’ are required for InVEST. NatCap’s five core themes will help prioritize where to start for the topics below. For example, a high priority is to link watershed activities and investments to health and livelihood outcomes for specific downstream beneficiaries.

Decision makers need tools, where possible, and scientific approaches, to do the following:

- **Map resilient ecosystem service flows:** NatCap and collaborators will expand and refine ecosystem service frameworks, models, and metrics for mapping and quantifying the interrelationship and intersections of supply and demand for all ecosystem services models in InVEST, reflecting the dynamic nature of both supply and demand in our uncertain and changing world.

- **Valuation 2.0:** NatCap will develop alternative ways to summarize and communicate ecosystem service values and connect them to well-being (monetary and non-monetary). Responding to demand from decision makers, human well-being metrics relevant to interventions for human physical and mental health and for poverty alleviation are a priority.

- **Evaluate the distribution of benefits and address health and equity:** NatCap will develop clear methods for representing distributional and equity considerations and integrate them with the new “Valuation 2.0” approaches. We will include dependencies and vulnerabilities of different demographic groups among beneficiaries of different services and identify the distribution of benefits in terms of human health and livelihoods. This information will help in developing novel ecosystem funding mechanisms and policies, as identified through use cases within our five core outcomes.
SCIENCE THEME

Next-Generation Scenario Modeling: Making More Realistic Predictions About Future Landscapes

NatCap has spent ten years exploring the consequences of land, water, and natural resource decisions—specifically, how changes in ecosystems translate to changes in benefits and value to people. Over time, demand has grown from decision makers for understanding how climate or human interventions change ecosystems in the first place, and which levers to pull to effect the changes they desire. Stakeholders need support to create scenarios—visions for the future—through a combination of community engagement and modeling. Such scenarios can enable the exploration of how policies and investments can help achieve their sustainability goals, even in the face of rapid change stemming from climate and other biophysical and socio-political forces. Decision makers need this information distilled out from academic research into a usable form, and they need it quickly to match the pace of their decisions.

Decision makers need practical tools and information to enable the following:

- **Mapping the future**: NatCap and collaborators will enhance economic modeling capabilities to support more realistic scenario generation and decision analysis by incorporating more sophisticated approaches (such as global partial and general equilibrium considerations) into the suite of scenario generation tools. These will facilitate the consideration of the drivers of land use, climate, and other anthropogenic change. These new capabilities will provide more plausible projections of background changes that can affect the outcomes of decisions and an understanding of the effects of policies, financial incentives, and regulatory action on ecosystem change and human well-being.

- **Optimization for managing ecosystem service trade-offs**: Continuing to advance optimization science, NatCap will integrate more efficient computational methods to enable the simultaneous consideration of more ecosystem service or human well-being objectives, interventions through which to achieve those objectives, and constraints on implementation. This will enhance capacity for optimizing investments in ecosystem conservation or modification to manage trade-offs between the different benefits desired from landscapes and seascapes.

- **Supporting robust decision making**: By integrating best practices in the field of decision analysis into natural capital approaches, NatCap can help decision makers and software users better understand the nature and range of uncertainty relating to their scenarios and the resulting ecosystem service and human well-being outcomes, and find the most reliable solutions to their natural resource problems.

The next major advance needed is to build a toolset within the InVEST workbench, one that will help decision makers create and understand possible scenarios of land-use change resulting from their decisions, or the potential for different financial and regulatory levers to promote desired changes in ecosystems. NatCap will develop community engagement and scientific methods and tools for translating changes in markets and policies to changes in ecosystems. NatCap has made progress in research and tools to help quantify and visualize trade-offs between multiple ecosystem services, but much work is still needed in the development and application of our optimization techniques to support a wider variety of decisions and social objectives.
SCIENCE THEME

The Natural Capital Project Science & Technology Platform: Streamlining Complex Analyses

NatCap produces a collection of free, open-source software tools that operationalize the cutting-edge ecosystem service science and analyses developed through our partnerships, and together act as a platform with which real-world decisions can be made. Making it easier, faster, and cheaper for decision makers to consider natural capital is imperative for affecting change in decisions at scale. To accomplish this, NatCap scientists and software engineers work closely to ensure that science innovations derived from real-world use cases are reflected in our core software. NatCap will maintain the open research, testing, and adaptive nature of these science-software collaborations and will improve the Natural Capital Science and Technology Platform (or ‘the platform’) to provide transparent information for use cases and the science and tools needed for other software developers to build derivative models and workflows.

Software models and data, the science behind their implementation, and their shared software infrastructure together comprise the platform. The platform centers around InVEST (Integrated Valuation of Ecosystem Services and Tradeoffs), the software currently comprised of 18 different models that map and assess ecosystem services and enable decision makers to assess trade-offs in decisions. The platform also includes other tailored software in addition to InVEST, such as RIOS—the Resource Investment Optimization System—that enables watershed managers to prioritize green infrastructure portfolios around the social, financial, and biodiversity goals and constraints of the investors. OPAL—the Offset Portfolio Analyzer and Locator—evaluates impacts to ecosystem services and potential offset areas for mitigating effects of proposed development. At the heart of these tools lies PyGeoprocessing, a spatial geoprocessing pipeline that is now available to a broader open-source software community beyond InVEST users. The platform also provides a mechanism for storing and sharing data required for running analyses in areas worldwide, and post-processing analytics and visualization of outputs to communicate and interpret results.

The platform will continue to operationalize the scientific approaches developed by NatCap:

- **Improve access to the latest science through technological innovation:** Develop and integrate the latest ecosystem service science (e.g., urban InVEST) and approaches into the software platform, making these tools and analytics available to scientists and developers through open-source APIs. Help catalyze the next generation of analyses by providing the technology through which others may create custom-built solutions.

- **Encourage more analyses through high-performance online computational infrastructure and data warehousing:** Provide global input layers for all InVEST models and enable users to seamlessly share data across trusted networks. Catalyze complex, large-scale analyses using many computational nodes.

- **Enable more complex analytics through the InVEST Workbench:** Support complex workflows addressing our five core outcomes, empowering users to evaluate trade-offs and produce standardized, informative reports. Existing workflows for specific decisions (e.g., RIOS, OPAL), will be accessible through a new InVEST workbench, as will those for new tools such as urban InVEST.
SCIENCE THEME

Understanding And Assessing Impacts To Design Better Interventions

NatCap has been working for ten years to create science and tools that make it easier for decision makers to use ecosystem service information. But we still lack sufficient understanding of the conditions that influence people to use this information to adjust intervention strategies. More critically, we don’t yet have clear metrics to show how people and nature are benefiting or losing under changed management and policy. We need a coherent and simple assessment methodology for tracking impacts of project, policy, or finance interventions on our five shared outcomes. With this greater understanding, NatCap can work with partners to design better interventions so that desired outcomes are resilient to political, socio-economic, and biophysical shocks.

NatCap will develop and apply a more systematic approach to assessing impacts in the next 5 years. This will involve engaging new partners with scientific expertise in behavioral economics, political economy, and other fields as well as those with practical experience, such as NGOs and government officials. The first step is to develop a common framework that can be applied to relatively mature decision arenas (e.g., spatial development planning and finance mechanisms to secure freshwater) and then to apply the framework in new projects going forward. NatCap will work to further articulate and test our theory of change, centered on questions such as:

- How do policy and market or finance conditions affect implementation of ecosystem-service based strategies?
- What are the outcomes of these new strategies for resilience of ecosystems and human well-being?
- What are the barriers to uptake and use of ecosystem service information and how can these be overcome?

The lessons learned in this arena will provide valuable insights that will help design better interventions. Ultimately, they can be implemented and scaled through capacity building programs, accessible guidance, and online training materials, simulation games, and software tools.
Section V: Mainstreaming in Service of Outcomes

NatCap will continue to focus on mainstreaming our work towards our five shared outcomes—advancing from isolated success stories to a fundamental transformation in how decisions are made around the world. Our work to mainstream has four primary themes:

1. Communications and Outreach
2. Training and Capacity-Building
3. Convening Leaders
4. Partnerships for Scaling

COMMUNICATIONS AND OUTREACH

The overarching objective of our Communications and Outreach work is to grow the awareness of and demand for ecosystem service approaches to achieve the five core outcomes we seek. We will focus our communications efforts on a type of person we call “the champion”—someone who has an awareness of the co-dependence of human and natural communities but is looking for credible, practical tools and approaches to make smarter decisions for a more sustainable future. We aim to highlight bright-spots showcasing where these approaches are making a difference to provide inspiration for those looking to do the same in their own sphere of influence. Some of the tactics we use to achieve this objective include:

- Publishing peer-reviewed papers, books, etc. documenting new science and progress towards outcomes; establishing our science teams as leaders in conservation science; and telling stories about how we are changing decisions for the better using credible, replicable science and tools;
- Carefully selecting partners for use cases with high likelihood of success, visibility, and replicability—and an eye to good stories;
- Participating in scientific meetings, giving invited talks, webinars, etc.;
- Presenting at international political meetings and convenings of influential leaders who are primary champions of innovative approaches (such as the Convention on Biological Diversity, World Economic Forum, WBCSD, etc.);
- Writing popular articles, blogs, etc., with a particular focus on publications read by decision makers and current and possible future “champions” of the ecosystem service approach;
- Growing our presence on the web and social media (new and evolving website, Facebook, Twitter, Google+) to become a go-to source for information on natural capital informing decisions regarding our five core outcomes; and
- Collaborating with TNC, WWF, Stanford, and UMN (supporting partner work, amplifying one another’s stories).
TRAINING AND CAPACITY-BUILDING

The overarching objective of our training program is to grow capacity within the science and practitioner community to use, test, and improve ecosystem service approaches and tools to inform decisions that will lead to progress towards our five shared outcomes. We have seen measurable, sustained increases InVEST usage after conducting in-person courses. We have found that presenting our course offerings in a graduated structure that begins with introductory material (some of which can be done on-line beforehand) and proceeds to more detailed, technical material is most effective. We are thus now categorizing all of our courses as 100-200- or 300-level. This allows for better communication of expectations with learners and allows for us to track the type of capacity we are building—from exposure to the concepts to facility with the approaches and tools. We recognize that repeat engagements and coupling our investments in capacity building with the creation of a learning network (see “convening” and “partnerships” below) is essential for scaling and truly enhancing the global capacity to incorporate natural capital understanding in decisions. Some tactics we use to achieve this objective include:

- Online courses (e.g., NCP 101 MOOC);
- Improving documentation of and user support for our software (e.g., guidance documents for our tools, NatCap Forums, concierge tool, InVEST workbench, Natural Capital Science and Technology Platform, etc.);
- Virtual support offerings (webinar, troubleshooting, screen-sharing);
- In-person courses and workshops centered upon building capacity of decision makers and their teams to achieve our five shared outcomes (trainings proceed from 100-level through upper-level courses recognizing that durable capacity is built with repeat engagements);
- Building significant expertise in our approaches and tools across a network of learners so that others can offer courses that incorporate our materials;
- Light-touch engagements with partners in which we help them scope their project, teach them to use our tools, troubleshoot remotely throughout the course of the project, and help interpret results as needed (e.g., Chiloe Island);
- Executing use-cases in partnership. High-profile, deep engagements (selected carefully for maximum impact). Teams are selected to ensure capacity-building within partners (consultants, staff, etc.); and
- Establishing “nodes”—collaborators who bring additional science capacity, fresh ideas and perspectives, and can train others.

CONVENING LEADERS

As a leader in this space, we aim to grow and strengthen our network of scientists and practitioners to enrich the dialogue and improve the ways in which ecosystem service understanding can help inform decisions that advance our shared outcomes. We aim to play a key convening role (e.g., hosting the annual Natural Capital Symposium to grow a community of practice and the Stockholm Summit on Natural Capital), showcasing stories of implementation and approaches and tools for replicating them, but also learning from others about what they have done and ongoing needs the science-to-practice network can help address. To inform our work in individual use cases, we will convene leaders to help envision and implement the use case. This will help achieve our shared outcomes, but also help spread information from early adopters to the mainstream through peer networks.
PARTNERSHIPS FOR SCALING IN NGOs AND OTHERS

We certainly can’t do this alone. The cornerstone of our identity is partnership. We look forward to achieving more with core NGO and academic partners as we better align scientific priorities with shared outcomes, build capacity within both academic and NGO partners, and find ever more productive and mutually beneficial ways to work together to advance our shared objectives.

Also, we will continue to explore relationships with multi-lateral institutions, consultants, and other for-profit entities (e.g., Abt, PWC, Downstream Strategies, Microsoft, PWC). Many of these relationships are currently in early phases, but we aim to be clear about our hypothesized “pathways to impact” with each. Also, we intend to set them up explicitly as tests, trying early courses of action, learning, adapting, and sharing lessons widely among NatCappers.

_Ultimately, we will use our network—built through outreach, courses, convenings, and partnerships—to share and synthesize lessons learned from applications around the world. Transformation requires no less._
Section VI: Organization

Successful execution of NatCap’s strategy will require the partnership to expand its capabilities and capacity, while simultaneously becoming more focused, systematic, and accountable to others. To date, NatCap’s research, software development, and use case efforts have yielded useful tools and knowledge that are being applied and tested to generate evidence that improved outcomes can be achieved with natural capital approaches. Over the next five years, NatCap’s focus on five, shared outcomes will help sharpen our science and mainstreaming efforts. To support the evolution of our strategy, NatCap will pursue deeper engagements within its four partner institutions, key nodes, and others to achieve our goals. This section is divided into two parts detailing NatCap’s governance, its responsibilities, and the core partnership processes.

I. Governance

Managing a complex partnership in a ground-breaking field, with many different stakeholders and degrees of expertise, calls for strong and well-functioning governance. Strong governance will not only ensure the efficient functioning of the partnership, but will also inspire confidence and trust among external stakeholders (e.g., funders, partner organizations).

NatCap has used a tiered governance structure with an independent Governing Committee and Advisory Committee providing oversight and guidance to staff who direct partnership activities. As we integrate more closely the priority work across the academic and NGO core partners, this governance structure will be adapted as needed to meet changing demands on how we provide resources and coordinate our work.

ADVISORY COMMITTEE

The Advisory Committee advises and assists the Governing Committee and Managing Director on matters of fundraising, outreach, communications, strategy, and substantive content areas (including science, finance, and policy). The Advisory Committee is purely advisory and does not have governing authority over NatCap or its partner organizations.

The Advisory Committee consists of exceptional individuals appointed by the Governing Committee. The Advisory Committee will be convened as a group once a year with the Governing Committee. Advisory Committee members otherwise will be engaged in sub-groups including Governing Committee and NatCap staff members organized in an ad hoc manner as needed around specific topics.

GOVERNING COMMITTEE

The Governing Committee has fiduciary and strategic responsibility for the success of NatCap. It approves NatCap’s strategic direction, budgets, and fundraising plans; appoints and oversees the Managing Director; and facilitates NatCap’s engagement and visibility within the partner organizations.

The Governing Committee will comprise two representatives from each of the partner organizations and appointed by the presidents of The Nature Conservancy (TNC), World Wildlife Fund (WWF), Stanford University, the University of Minnesota; and the Managing Director. The Chair of the Governing Committee will rotate, and will be selected by its members each year. The Governing Committee will meet quarterly for reports by the Managing Director and Leadership Team on progress in implementing NatCap’s Strategic Plan and to carry out its fiduciary and strategic responsibilities.
MANAGING DIRECTOR

The Managing Director is the chief executive officer of NatCap. The Managing Director has principal responsibility for creating and implementing the strategic plan, developing and managing key budgets, and coordinating and actively participating in fundraising efforts among the four partner organizations. The Managing Director also will oversee the mainstreaming in service of outcomes, approve the hiring of new NatCap personnel and the allocation of work assignments among existing staff, and provide general administration of NatCap. The Managing Director will submit an annual operating plan to the Governing Committee for its approval and will report on the plan's implementation progress at each meeting of the Governing Committee.

LEADERSHIP TEAM

The Leadership Team supports the Managing Director. The Leadership Team conducts and coordinates NatCap work, ensures scientific and software rigor, monitors and supports policy outcomes in field projects, facilitates effective communication and collaboration across NatCap, manages staff within their thematic area, and undertakes other activities as assigned by the Managing Director.

The Leadership Team comprises full-time NatCap staff actively leading broad areas of effort, and its members are appointed by the Managing Director. The Leadership Team will oversee the following types of tasks and decisions:

- Leading and managing teams to achieve annual milestones and five-year outcomes, including reallocation of staff time or timing of milestones;
- Implementing and reporting on progress of annual operating plans for appropriate thematic areas;
- Fundraising and coordinating teams across institutions; and
- Representing NatCap at conferences, workshops, and other internal and external meetings.

II. Partnership Processes

The unique strengths of the Natural Capital Project come from working in partnership. The assets of the four core partners—Stanford University, The Nature Conservancy, the World Wildlife Fund, and the University of Minnesota—provide world-leading scientific research and enable global reach in influencing policy and practice. In order to achieve our ambitious vision, we have found we must work with a diversity of other partners. In addition to our core partners, we collaborate with governments, corporations, universities, and other non-profit organizations to integrate ecosystem service approaches into decisions in our five core themes. Our overall goal in seeking additional partnerships is to enable NatCap to be faster, leaner, and more effective in mainstreaming ecosystem service approaches into decisions that touch our five shared outcomes around the world. To achieve this goal, we have the following objectives in seeking additional partnerships:

- Draw on needed science and policy expertise that does not exist in our core partners;
- Advance science, policy, and capacity building at research and practitioner institutions to help grow a network of experts sharing NatCap’s vision; and
- Provide independent assessment of the impact of natural capital approaches and the scientific validity of our tools and models.
To achieve these objectives, we have begun to establish partnerships in particular with new research institutions and NGOs (see ‘academic nodes’ and ‘collaborating institutions’ below). We have also had success embedding NatCap staff for several months in organizations that make significant decisions affecting ecosystem services (e.g., World Bank, Inter American Development Bank), and will continue to do so where appropriate.

**CORE PARTNERS**

Our core partners play a uniquely important role in setting the strategic priorities for the Natural Capital Project (as formalized in the Governing Committee membership and mandate—see Governance section above). In particular, World Wildlife Fund and The Nature Conservancy help set policy priorities and target outcomes by identifying decision contexts in which ecosystem service research, science, and tools are needed and can play a pivotal role in achieving transformational impacts on biodiversity, ecosystem service, and human well-being outcomes at significant scales. This helps set the agenda for research conducted by the University partners and science staff in the NGO partners, in addition to identifying priorities for decision support tool development by software staff. In turn, our scientific leaders from the University of Minnesota and Stanford help match NatCap science needs with core strengths of those two institutions, which helps to identify which new science needs should be conducted at Stanford or University of Minnesota, and which is best carried by other academic partners (nodes and collaborating institutions). This strategic role sets our core partners apart from academic nodes and other collaborating institutions.

In our next phase we intend to continue to strengthen and deepen the connections with our four core NGO and University partners. We plan to achieve this by broadening and deepening productive relationships with staff and researchers in our core partners. We will focus on those who have relevant expertise and significant influence as thought leaders, scientific experts, and policy advocates needed to achieve our five shared outcomes. As mutually desired, we will expand the number of experts at our core partner institutions who self-identify as part of—and benefiting from—the NatCap core partnership. We will do this in four ways:

1. Building the capacity and expertise of science, technical staff, and students to develop and use our tools and approaches. In some cases, we will enable staff to gain sufficient expertise to train others in those approaches (through a ‘train the trainers’ approach, such as what we have done with TNC staff in Latin America for water funds and with WWF staff in Peru for spatial planning).

2. Working closely with NGO staff who have long-standing relationships with influential decision makers in the public and private sector. We will ensure they trust, understand, and can interpret NatCap tools, approaches, and resulting ecosystem service information, and can use—and advocate for—them in their work with decision makers, stakeholders, and communities globally.

3. Seeking strategic guidance from our partners through regular updates and consultations with staff at the core partners on our shared outcomes, achievements, challenges, and annual planning priorities, to make sure our work is aligned to help meet partner objectives.

4. Drawing on the tremendous science and policy expertise that exists in all four of our partner organizations to contribute to relevant NatCap priorities, e.g., through working groups, convenings (such as the Stockholm Summit on Natural Capital), and through contributions to our annual Natural Capital Symposium. All of the above will require a significant investment in regular networking, collaborative projects, joint fundraising, and effective internal partnership communication.

**ACADEMIC NODES**

The Natural Capital Project will continue to deepen and extend its network of ‘academic nodes’, which currently includes the University of Vermont, University of Washington, and the University of California, Los Angeles.
(UCLA). These nodes advance research in areas that are part of core Natural Capital Project priorities, and through additional innovation and expertise, can contribute to our vision. Through our academic nodes we benefit from a diversified network of excellent and trusted researchers, their postdocs, and students. Each academic node has a devoted PI leader and specific focal research themes that are known and coordinated across NatCap nodes. We will increase levels of joint fundraising with academic node partners to expand research capacity, and coordination of science-to-practice opportunities across NatCap. These NatCap-dedicated people could be, for example, through postdoc positions, in areas of expertise that are not well-represented at Stanford or the University of Minnesota. We will undertake additional fundraising for lead scientist positions to help build capacity within the node and strengthen relationships with core NatCap if desired. Proposed new approaches and tools will be reviewed across the NatCap core partners, and if desired, we will work together to fundraise for analytics destined for the Natural Capital Science and Technology Platform. Academic nodes also play an important role in providing independent assessments of NatCap scientific approaches and models, building capacity and growing NatCap’s scientific credibility, evaluating the impact of the Natural Capital Project’s tools and training program, and generating and participating in use cases within our five core themes.

COLLABORATING INSTITUTIONS

Institutions in both the science and science practitioner realm are playing an increasingly important role in NatCap’s expanding network of collaborators. NatCap will continue to draw on these institutions to achieve the outcomes we seek. For example, academic collaborators (such as Miguel Pascual and colleagues at CENPAT in Argentina) provide valuable scientific expertise for developing new ecosystem service approaches and testing existing tools. In addition, our collaborations with the Inter-American Development Bank, the World Bank, CGIAR and IUCN have won us early successes in reaching new and previously untapped audiences interested in adopting natural capital approaches to decision making. Where there is mutual interest, we will prioritize collaborations with institutions who (i) expand access to stakeholders, through a broad network of researchers, practitioners, and established relationships with decision makers on the ground; (ii) support advanced capacity building through that same network, increasing the scientific quality and reach of natural capital approaches; and (iii) can lead implementation and/or measurement of outcomes on the ground so that we can better track and understand the impacts of natural capital approaches. We will explore new models for sharing postdocs through fundraising with collaborating institutions, to allow more focused and sustained research support and capacity building.
Conclusion

NatCap has come a long way. Our community has successfully raised awareness of the importance of nature's benefits, and has advanced the science and tools to a point at which people can map, measure, and value the benefits nature provides. Also, we've got some great success stories where natural capital approaches have changed decisions so the fates of both people and nature can be improved. But these examples remain isolated bright spots. We haven't yet affected a fundamental shift in decision making. We are on the cusp of that deeper, broader shift. Change is possible. It is hard, and involves major shifts in incentives and regulation for policy and finance mechanisms, and just as fundamental change in individual choices. The good news is, we have what we need to activate these changes now—awareness, science, tools, a growing set of mandates and incentives, and stories to empower and inspire.

At NatCap, we have learned a lot in our first ten years and have used that experience to shape a path forward, articulated in this Strategic Plan, that we believe has real potential to fundamentally transform decisions and lead to a more sustainable future.

Unlike an NGO, NatCap often does cutting edge basic research; unlike a university, the research it does is developed in contact with the real world of decision makers demanding answers. NatCap's unique identity emerges from our team of talented and committed young scientists, world-renowned founders and leaders, convening power, pragmatic software, collaborative culture, dedication to capacity and network building, and experience co-developing solutions in 50 decision contexts in 24 countries.

Over the next five years, we will harness the power of our partnership to achieve five priority outcomes: sustainable development; secure freshwater; safe, resilient coastal communities; sustainable, livable cities; and standards for the private sector. Achieving these outcomes will require close partnership across our teams—more fully realizing the strengths and niches of our core academic and NGO partners and across our entire network. It will require advancing critical frontiers of the science (e.g., better connecting to metrics that matter to people, making more realistic predictions about the future), building visionary tools (e.g., the Natural Capital Science and Technology Platform), and better understanding the impacts of our work and how people make decisions so that we can design better interventions. It also will require advancing this work from individual stories to fundamental transformation (or 'mainstreaming') through communications and outreach to key audiences, training and capacity-building of target audiences, convening leaders, and building a thriving network of scientists and practitioners with a shared vision. And finally, it will require good governance and a growing network; this is a complicated space and NatCap is made up of four diverse institutions—we must remain nimble and grow our network to draw out the best and the brightest within our partnership and beyond to achieve the outcomes we seek.