ENVIRONMENTAL POLICY
INNOVATION
CENTER

SANDBOXING NATURE

How Regulatory Sandboxes Could Help Restore Species, Enhance Water Quality and Build Better Habitats Faster

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The mission of the Environmental Policy Innovation Center (EPIC) is to build policies that deliver spectacular improvement in the speed and scale of conservation. We focus on a narrow set of strategies:

- Improving policies that allow private sector funding or stewardship to expand or supplant public or charitable conservation work.
- Transforming government policies to focus on what matters—outcomes.
- Eliminating the organizational barriers that prevent public agencies from adapting to 21st century solutions.

We believe that innovation and speed are central to broadening efforts to conserve wildlife, restore special natural places, and to deliver people and nature with the clean water they need to thrive. To achieve those goals, conservation programs must evolve to accommodate our modern understanding of human behavior and incentives, and the challenges posed by humanity's expanding footprint. We embrace experimentation with novel ideas in conservation policy, to learn quickly from mistakes and iteratively design effective approaches to be even more successful.

EPIC is a fiscally sponsored project of Sand County Foundation. Sand County Foundation is a non-profit conservation organization dedicated to working with private landowners across North America to advance ethical and scientifically sound land management practices that benefit the environment.

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BREAKING THE RULES TO BUILD THE FUTURE

Late in 2017, the United Kingdom's energy regulator, Ofgem, gave fast approval for a new project allowing residents to buy and sell renewable energy from solar panels and batteries within their own apartment buildings. Normally, this would not be legal since UK energy rules dictate that locally generated energy can only be used by the owner or sold back to the grid at a relatively low price. However, the earlier establishment of a regulatory sandbox for such energy delivery modernizations created a path to try something new and get it approved quickly. In April 2018, only a few months after project initiation, **the first peer-to-peer energy trades** within apartment complexes started.

Energy policy is not the only space where rules need fast modification to make allowances for all the novelty arising in the world today.

The protection and restoration of our water, healthy soil and wildlife resources are static processes, starved for creativity. A **United Nations' panel** recently reported on the extinction risks that face more than one million species around the globe. In a **2009 National Rivers and Streams Assessment**, the EPA reported that 46 percent of U.S. waterways were in 'poor' biological condition, and more than 40 percent were polluted with high levels of nitrogen or phosphorus.

Innovators have big ideas that could help with these problems, but ponderous regulatory systems and older generations of bureaucrats aren't used to the fast pace of new technologies, tools and products. Often, it is a simple thing—one word or phrase in a policy or regulation—that is a barrier to a new technology or technique being widely used. However, one sentence can be just as hard and slow to change as a whole law. Rather than simply accept this regulatory status quo, we believe in the need to find, nurture and learn from new concepts even when it means deliberately breaking old rules.

Regulatory sandboxes like the one in the United Kingdom open the door to testing new approaches within a controlled environment. While they don't ensure success, they make it possible for new technologies and tools to be explored in real-world settings. Not just so that innovators can learn, but also to allow government bureaucracies to catch up to the present and adapt to the future. Our planet and country need more opportunities to do this. For example, we see policy barriers to experimentation with any of the following, but the possibility for each to yield breakthroughs for a better future for the planet:

- Can cities achieve their stormwater-related water quality goals faster and more cost-effectively by paying for water quality improvements on farms? Could a testing program be approved in three months so they can find out?
- Could the Forest Service revise a National Forest management plan in two years instead of six years by applying machine learning and artificial intelligence tools to public comment processes?

- Would private landowners sign up to restore endangered species under a Safe Harbor Agreement if they could be approved in two months (instead of the usual three-four year wait) with a three-year grace period to complete a long-term application and permit?

- Could private landowners achieve species recovery with more flexible outcome-oriented support from the U.S. Fish and Wildlife Service, in collaboration with the agriculture sector?

- Would farmers and ranchers rather get paid for soil health improvements when they achieve them using methods of their choice rather than follow **the conservation practices USDA dictates?** Does this approach achieve better and faster soil health benefits?

- If regulators established 2020 as a "zero year" for environmental service credits, such that anyone using an accepted model or data set could demonstrate measurable improvement over the 2020 baseline, would investors put more private money into conservation?

In this paper, we explain the potential benefits of applying a regulatory sandbox to test out ideas and technologies for ecological, water and soil restoration. We provide an overview of regulatory sandboxes around the world, including their unique features and lessons learned. Then we offer some of our best ideas for how to design regulatory sandboxes for nature that could speed up progress for some of America's most important conservation goals.

Photo by Abraham Barrera

WHAT IS A REGULATORY SANDBOX?

A regulatory sandbox creates a carve out from existing government rules around permitting, licensing or approvals—i.e. it intentionally breaks a regulatory barrier—in order to encourage testing of new products that benefit consumers. Sandboxes aim to clear regulatory barriers that prevent new approaches from being tested and pave the way for cheaper, more effective products to reach the market. Sandboxes provide increased certainty about the future to encourage goodwilled companies or actors to contribute to a public goal or development of a service or product.

Regulatory sandboxes typically operate under these constraints:

- Limiting the time products are tested.
- Limiting scale of product testing.
- Creating space for small startups to test ideas in a system designed for big, well-staffed and resourced established players.
- Clearly defining outcomes.
- Rapidly approving or rejecting proposals to participate.
- Limiting and disclosing risks to consumers.

Regulatory sandboxes originated in the highly regulated sectors of banking, finance and energy. The matrix of regulation in these industries has enormous benefits to consumers and community prosperity, but when technology and culture change, those regulatory systems are slow to adjust. That slowness and conservatism impacts the abilities of businesses to test new technologies, limits entrepreneurship and hampers opportunities to create benefits for the public. The regulatory sandbox arose as a mechanism for a more rapid response.

Regulatory sandboxes encourage startups to enter the marketplace with new products. For example, for the financial tech (fintech) industry sandboxes have **allowed the introduction of products** that help consumers cost-effectively manage their finances.

They also allow technology products to launch where there is little to no regulatory framework. Via the sandbox, controlled tests of a range of new products can happen in a safe and bounded environment outside of the standard finance industry regulatory framework.

Just as important, a well-staffed agency operating the regulatory sandbox changes the nature of the relationship between the regulator and the regulated into a more open and adaptive relationship defined by outreach and collaboration as opposed to silos and formality.

Around the world, regulatory sandboxes have been established administratively or by legislatures. Typically, their authorization creates a process and directs a government official to let projects "enter" the sandbox. From there, officials monitor and track sandboxed projects to learn from them, and, after a few years or less, projects leave the sandbox. For entrepreneurs, their

projects leave as failures, learning opportunities for a changed product or as successes. The sandbox helps them overcome uncertainty from government decisions, reduces procedural and government approval costs and time and allows companies to test and fine-tune new products. For the public, regulatory sandboxes allow government to better help bring useful, new technologies and tools to customers. For regulators, it's a chance to learn about and adapt to developments at the innovative edge of their field.

This figure depicts the process of applying and entering a sandbox:

The Sandbox Journey

| Innovator proposal | | Sandbox accepts/denies* | | Agree on sandbox test approach | | Testing occurs, with monitoring and reporting | | Innovator exits sandbox; decides whether to pursue solution further |

*if denied, innovator can pursue standard regulatory approval

SANDBOXES ENCOURAGE LEARNING BY DOING

Regulatory sandboxes are developed specifically to help regulators and entrepreneurs learn how to manage and process new things. So it's not a surprise that agencies charged with administering them have been fast to report on the details they have learned. Although sandbox programs are only five years old, several programs have already adapted their approach. A great example is the UK's Financial Conduct Authority **report** on their experiences and observations gleaned through the first two annual cohorts on sandbox participants. These are some of the most valuable lessons from energy and fintech regulatory sandboxes that we believe apply to regulatory sandboxes for nature:

1. **Sandboxes can support a competitive marketplace for innovation, which means more cost-effective products for consumers.** This is a key reason to start taking a sandbox approach to restoring nature. The more opportunity offered for creative problem solving, the better and more cost-effective solutions we will find. However, this means that regulators and entrepreneurs need to have good information and insights into approaches that aren't cost-effective today. By being more transparent about what is working, what is not working and what is costly or slow, government can help nonprofits, for-profits and investors see the desirability of solving these challenges. The old framing is, "look at how expensive this is... this is why we need more government funding." The new framing would say, "Look at how much money can be saved if..."

2. Participating in the sandbox helps start-ups access funding. Companies that enter a sandbox are considered lower risk by investors. This is promising for nature because it demonstrates how to move beyond what investors or donors view as un-investable, experimental pilot projects that can't be replicated. By contrast, sandbox participants are recognized both for their cutting-edge approach and for the validation that comes from having a government agency 'accept' it. Regulators can deliberately design sandboxes—and communications about them—so that projects within the sandbox get higher visibility and thus have better future access to private capital or government funding.

3. Sandboxes reduce the cost of launching a product. Related to the first finding above, sandboxes are a valuable testing ground for new products or management approaches. For conservation, sandboxes that reduce permitting and government approval timelines to a few months instead of a few years could create enormous opportunities to initiate change, especially on private lands where landowners frequently decline to take an interest in conservation initiatives because of the one-seven year permitting/approval timeline. In a field as capital-constrained as conservation, cost savings to get new approaches underway can be the difference between the life and death of an idea.

4. Fail fast. Participants and oversight agencies learn how to better design key products and regulations based on what works and what doesn't during a sandbox trial. In contrast, America's environmental regulations create a highly risk-averse environment. For example, it took seven years for America to build its first offshore wind farm—new technology in a new environment, constrained by old rules that were never designed to consider such an installation. By controlling the effect of a failure—limiting the scale and scope of risk—sandboxes might help us more quickly find breakthroughs in policy and management of our natural environment.

REGULATORY SANDBOXES AROUND THE WORLD

The first regulatory sandbox was set up by in the Office of Innovation at the **U.S. Consumer Financial Protection Bureau in 2012** to promote consumer-friendly product development. America stopped there—no more federal sandbox programs have been established. But the rest of the world has taken off with this approach, especially in fintech and energy services. **Over 20 countries** have adopted some form of fintech or energy regulatory sandbox.

- The **U.S. Consumer Financial Protection Bureau** has two sandbox-like initiatives. They issue regulatory waivers for trials of financial disclosures that aim to improve the delivery of information. It's **first 'no action' letter** was released for a credit underwriting tool in 2017. Second, they have proposed to operate a sandbox to allow testing of new consumer financial products and services.

- **Singapore** has developed an energy regulatory sandbox that allows testing of new approaches to energy efficiency in power generation, energy storage, demand management and electricity futures. It was one of the first countries after the United Kingdom to use regulatory sandboxes.

- In 2017, Ofgem, the UK's energy regulator, created and staffed **a new sandbox** for energy innovation. An example project accepted into the sandbox involves an energy company **piloting neighbor-to-neighbor trading of power using blockchain technology** that allows residents in apartment buildings to buy and sell power to each other through the work of Repowering London.

- Australia's Securities and Investment Commission has **established a sandbox** to test new products or services without a government license because they have statutory authority to issue such exemptions. They are using their sandbox to facilitate the use of products such as gift cards, prepaid accounts and vouchers of under $1,000.

- Most European Union countries have established 'innovation facilitators' for Fintech. This government office serves as a point of contact for innovators to get non-binding guidance and problem-solving assistance from the appropriate regulatory agency. Staff exclusively focus on this problem-solving and collaboration role, rather than filling both a regulatory and facilitation role. Five of these countries have regulatory sandboxes that work in concert with the innovation facilitators.

America's First State Regulatory Sandbox...and second, third, fourth….

In March of 2018, **Arizona** became the first U.S. state to enact **legislation permitting a regulatory sandbox** for the fintech industry. Arizona's Attorney General, who helped design the program, began recruiting applications for testing financial products and services in August 2018. Once a company is accepted into the sandbox, it has two years, with a potential one-year extension, to test its technologies and move toward licensing and securing normal authorizations. The sandbox allows fintech companies to carry out initial product testing despite extensive and outdated regulations originally written for the paper-based banking industry. Illinois legislators have also proposed the creation of a regulatory sandbox, but the **legislation** did not pass before the close of the 2019 legislative session.

Arizona's first approved sandbox participant is testing technology that allows hotel and spa guests to pay for services via their bank account on a mobile phone without credit cards. Once the technology is proven effective and receives regulatory approval, they will be able to rapidly scale up to all customers in the state.

Arizona's legislation doesn't get too prescriptive about what kind of technology should be tested[1]. Mobile phone-based banking apps are a key testing ground. Technology that could be tested in this sandbox might allow customers to sign up for banking services directly from their phone, make money transfers and, perhaps, even tap robo-advisors to help with their financial planning. With machine learning and artificial intelligence (AI), fintech has the potential to save customers time and take some of the cost and human error out of financial services administration.

Wyoming enacted a fintech regulatory sandbox law in February 2019. Early 2019, Utah's legislature signed into law another regulatory sandbox for fintech innovation to be operated by the Utah Department of Commerce. In March 2019, Kentucky established the **first U.S. regulatory sandbox for insurance**. In June, **Vermont also established a new sandbox** for insurance. **Washington DC's mayor directed** a new commission to provide recommendations on development of a fintech sandbox for the city.

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[1]*The law simply refers to "the use or incorporation of new or emerging technology or the reimagination of uses for existing technology to address a problem, provide a benefit or otherwise offer a product, service, business model, or delivery mechanism that is not known by the Attorney General to have a comparable widespread offering in this state."*

SIDEBOARDS TO PROTECT CONSUMERS

Risk is a fundamental design feature of a sandbox: You can't speed up progress and product testing without taking on some additional uncertainty. For instance, fintech mobile apps make it easy for customers to sign up and link their bank accounts, which could leave them vulnerable to fraud, high fees or risk from taking on more debt. A Singapore company is using its sandbox to support development of an app that allows customers to get digitized access to their insurance policies from different companies in one place, with automatic reminders of fee deadlines—this creates consumer risk if the company is wrong about the billing dates.

In response to concerns about maintaining consumer protections, some systems have been put into place to reduce risk, but never try for the impossible goal of eliminating it. For example, **Arizona's sandbox law** places a few sideboards on their program. In order to enter the Arizona sandbox, firms must apply and be approved through the Attorney General's office, have a location the Attorney General can visit in person, demonstrate how their product will benefit and protect consumers if the product fails and limit the test to 10,000 consumers. Tests are permitted to last for just two years and consumers are notified when they are participating in the test. Australia's sandbox allows testing for just 12 months and strictly limits the number of retail consumers targeted. Participants in their sandbox must have a plan for dispute resolution and comply with rules of conduct. The UK's fintech sandbox assigns caseworkers to each sandboxed company in order to tailor consumer protection features where necessary.

Regarding risk, two fundamental questions arise with regulatory sandboxes. First, is the need or opportunity so great that we are justified in taking on risks we might otherwise avoid? Second, is the status quo approach appropriate? Or would it be better to reflect the diversity of real world situations and create a safe space—i.e. the sandbox—to adapt the regulatory context to that diversity?

SANDBOXES WORK FASTER THAN PILOTS

Pilot projects and sandboxes are similar tools. However, the sandbox model allows projects to move forward that would not under existing laws or regulations without a permit or authorization. Sometimes, the time and cost of the regulatory process is the barrier, especially for smaller companies or project teams. On the other hand, a pilot project is a way to test a new approach allowed under a recently passed law or revised regulation or to demonstrate the success of an idea before considering how to scale it. The term 'pilot' is often used to describe the first time something is tried. Therefore, pilot projects rarely have any deliberate structure or feedback loops intentionally designed to make the replication more likely or more successful.

A regulatory sandbox is explicitly built for speed, and there are tradeoffs that are consciously designed into sandbox operations. For example, rather than aiming to correct any problems via a lengthy application process, regulatory sandboxes provide problem-solving-oriented staff whose job is to help applicants efficiently. Pilots often take a long time to get started and a long time to show results—sandbox projects don't. (This doesn't mean that the approaches being tested in the sandbox haven't already been through pilots or won't still face them.)

Sandboxes require risk identification and mitigation, clear outcomes, objectives and outputs and feedback loops to ensure that participants and the public learn from and can adapt to the success or failure of the novel approach.

Pilots vs. Sandboxes

	Pilot	Sandbox
Tools for testing new ideas	X	X
Exemption from specific regulations		X
Intentionally short timeframe		X
Clear Objectives	?	X
Plan for exit	?	X
Inclusive, with standardized rules and similar access for all potential participants		X

SANDBOXES FOR NATURE

The planet is changing fast due to human actions and inaction. But our work to protect and restore nature is not keeping up. With more than 1,000,000 plant and animal species at risk of extinction, clean water in diminishing supply and challenges in feeding the planet's current and future population, we need to consider approaches that let us speed up the work of conservation.

Regulatory sandboxes started with energy and fintech, but the approach has enormous potential to allow new conservation ideas to be beta tested and deployed quickly.

There are many reasons why natural resource restoration and protection policies should take inspiration from other industries. Reasons iclude testing new approaches for more quickly and successfully improving water quality, reducing nutrient runoff, restoring valuable habitat and financing nature conservation. Just as Arizona's Attorney General's office set out to make sandbox participation easier for fintech startups blocked by regulatory compliance obstacles, sandboxes for nature could help conservation startups, academics and investors experiment with conservation innovation.

Some argue that the only problem with the pace of conservation is a lack of funding. Yes, the current decline of our natural resources is due in part to the lack of adequate funding for conservation. However, many barriers to faster or more effective restoration and protection come from the very laws and regulations designed to benefit nature in the first place. For example,

- Land use planning requirements prevent prescribed burns in forests or grasslands that are **needed to maintain endangered species populations** and to lower future wildfire risks to communities.

- USDA's Conservation Reserve Program **is estimated to be 45% less effective** at conservation, using USDA's method of enrolling properties based on highly erodible soils, than if properties were ranked for enrollment based upon their potential to generate crop insurance savings. Using insurance losses rather than soil information would be a better way to implement the program but doing so would be inconsistent with the program's statutory authorization and policies and regulations.

- It has been decades since some environmental protection regulations, like the Endangered Species Act of 1973, were updated. The internet didn't exist the last time the law was reauthorized. Laws and policies like this carry anachronisms in them that simply make it harder to use today's technologies and data tools.

These are just a few examples where today's environmental regulations play a big role in reducing environmental problems, but also hamper creativity, leaving us with fewer solutions than might otherwise be available.

WATER POLLUTION & BIG DATA

EPA-approved water quality testing typically involves taking a sample of water, shipping it to a distant, certified-lab, and waiting for the result. In some circumstances, our water quality regulations only require one sample per year to be tested. However, new technologies will increasingly make it possible to provide nearly continuous monitoring of water quality and contaminants within a pipe and send that data wirelessly to the operator of a water treatment plant. In other words, to provide hundreds or thousands of data points from a water pipe. These technologies could transform what we know about our water, consumer confidence in it, and allow operators to have nearly immediate responses to contaminants that suddenly appear in the system.

Federal **Part 136 regulations** on test procedures for the analysis of pollutants already create a process for approval of **alternative test procedures for limited use.** EPA has published more than **300 pages of protocol guidance** creating requirements for approval of alternative testing. **Other regulations** for the National Pollutant Discharge Elimination System put in place permit conditions that require operators to send all data, and especially all detections of unacceptable levels of contaminants, to regulators. New data-centric technologies create potential problems under all these regulations because regulators may have no means to receive and store thousands of electronic data points on sampling. And there may be no way to deal with differences in how to address and communicate about positive contaminant detections: in other words, there should be a difference in response when 1-in-15,000 data points shows an unacceptable contaminant versus 1-in-5 samples.
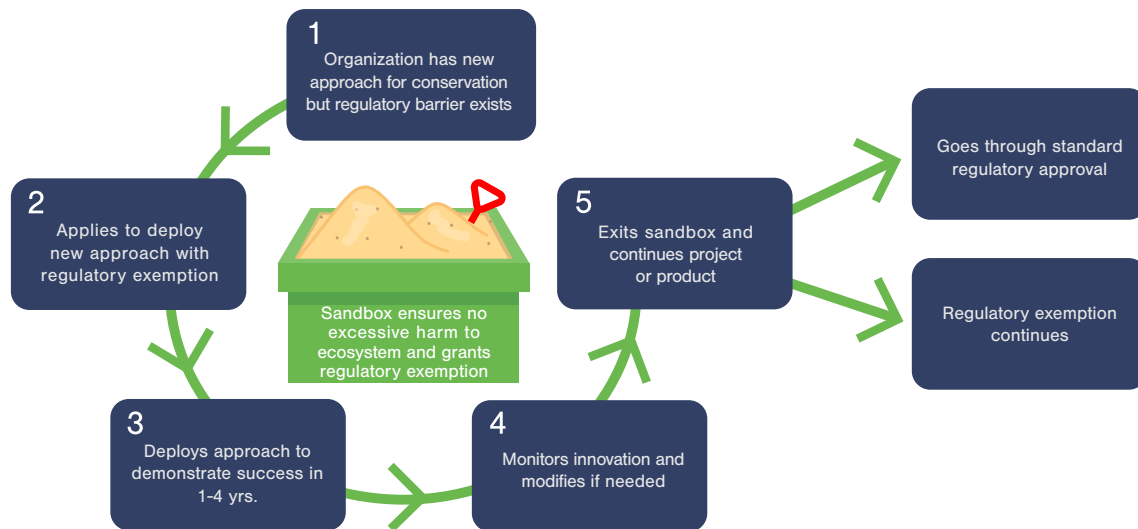
This is an example where a regulatory sandbox could allow and incentivize experimentation with new technologies that dramatically increase water quality sampling. EPA could establish a sandbox to facilitate rapid, limited scale uses of new alternative test procedures and staff it with people who would actively problem solve for sandbox projects the regulatory challenges that impede their use and help the agency learn more about the potential for these new technologies to deliver better water quality to America.

As environmentalists, the simple questions we ask are:

• Do we have a culture of innovation in the management of natural resources in America that includes speed in experimentation and deployment of new ideas?

• Do we need more effective approaches and technologies to achieve our national conservation goals?

For us, the answer to both questions is yes. Adopting a sandbox approach to environmental work across America's natural resource agencies could foster a creative culture to help speed up conservation and restoration agendas.

1 Organization has new approach for conservation but regulatory barrier exists

2 Applies to deploy new approach with regulatory exemption

3 Deploys approach to demonstrate success in 1-4 yrs.

4 Monitors innovation and modifies if needed

5 Exits sandbox and continues project or product

Sandbox ensures no excessive harm to ecosystem and grants regulatory exemption

Goes through standard regulatory approval

Regulatory exemption continues

IDEAS FOR IMPACT: SANDBOXING NATURE

America's existing management systems for permitting positive (or negative) changes to natural resource conditions are quite involved. They tend to attract parties with financial and technical resources, and the approval processes they create are lengthy. For example, in the case of fisheries, it is almost definitely more work to apply for an Exempted Fishing Permit (EFP) than to simply go fishing in compliance with the existing rules. For progress to happen, regulators need to be more open to recognizing the value of taking a proactive approach and encouraging creativity and risk-taking. Building on the ideas of other sandboxes and innovation in America's conservation space, we can open the door to new conservation approaches.

There are many areas where sandbox-like tests could advance the way we protect nature in America:

1. Measuring environmental outcomes. Once measurable environmental outcomes are agreed upon (e.g. TMDLs for water quality, acres of habitat restoration, fish stock recovery targets), what often slows down progress is disagreement over the best way to measure and account for achieving those outcomes. Regulators should consider a sandbox approach to approvals of technology that enables measurement of key environmental outcomes. Rather than putting that technology through a full approval process, priority should be given to allowing for a testing phase that demonstrates the technology is effective while also contributing to real on-the-ground projects with new measurement approaches.

2. Testing technology. There is a range of approaches to protecting species, improving water quality, preventing flooding and restoring landscapes that could be accelerated through technological experimentation and regulatory flexibility. Satellite imagery, remote sensing, machine learning and AI are all gaining attention for their potential to accelerate restoration through efficient, cost-effective measurement.

3. Demonstrating effective modeling. Water quality trading markets have remained relatively nascent, in part because regulators want to account for uncertainty in models that predict nutrient reductions. Yet, they have not proposed exactly how to account for this uncertainty, often leaving potential water quality trading participants without a clear path forward. A sandbox could open the door for technology trailblazers to demonstrate that nutrient reduction modeling is sufficiently accurate for nonpoint source nutrient credits from restoration projects. The outcomes of a successful sandbox would be to (1) verify that models can be relied on to calculate credits and (2) demonstrate that regulators will honor those credits even if regulations change. Habitat restoration tools like the **Nutrient Tracking Tool (NTT)**, **COMET-farm** and the **Habitat Quantification Tool (HQT)** have already brought us a long way.

4. Diversity and Inclusion. Many rules are set up to advantage bigger organizations and therefore are less inclusive of small, often women- and minority-owned businesses. In the way fintech regulatory sandboxes harness **the ability of innovation to improve financial inclusion**, a conservation sandbox could be set up to deliver better ways of addressing environmental justice issues like high rates of pollution and lack of green space in minority communities, or participation by those communities in the work of solving environmental challenges. By designing the sandbox applications process to attract a broad and diverse range of applicants, rather than through personal networks or pre-existing connections and business relationships, agencies could bring new ideas to their work for the environment.

There are countless other opportunities to bring a novelty and testing mindset to conservation and restoration: new or better ways to do wetland mitigation, testing machine learning approaches to managing a broad range of environmental impacts, modeling how dam removal can be done more efficiently and testing new opportunities for the highly regulated field of water reuse and recycling. Below we offer some suggestions on how to get started doing so.

HOW TO DEVELOP A REGULATORY SANDBOX FOR NATURE

We believe that regulatory sandboxes should be established wherever a wide-ranging environmental law or policy is an umbrella for a large volume of conservation projects and transactions: the Clean Water Act, National Environmental Policy Act, Marine Mammal Protection Act, Endangered Species Act, 2012 Forest Planning Rule and U.S. Farm Bill. The purpose behind establishing the regulatory sandbox is to allow experimentation with how new approaches can achieve desired outcomes instead of trying to shoehorn those approaches into the existing regulatory or legal structure.

Below, a simple roadmap for developing a sandbox for nature shows the process from identification of opportunity to sharing results with the public.

How to Develop a Regulatory Sandbox for Nature

1
Identify where there's willingness to develop solutions.

3
Create a regulatory sandbox administered by senior government official.

5
Develop 3-month process for enrolling annual cohorts of projects.

2
What is preventing solution development? (bureaucracy, regs, statutes)

4
Staff the new sandbox with creative, collaborative problem solvers.

6
Learn, share lessons with the public, improve related programs & policies.

HALFWAY TO REGULATORY SANDBOXES FOR NATURE

This idea isn't so crazy. In fact, a few slow versions of sandboxes have already been put to use, even though they aren't called this. These existing programs containing sandbox-like features. For example, the organization Sustainable Conservation, **has compiled a California-focused catalogue** of more than ten simplified permitting steps that have reflected past efforts to solve similar problems to those that could fit a sandbox. But these programs could be improved and unencumbered to behave more like sandboxes with better staff support, limited paperwork, briefer timeframes and clear exit strategies.

Below are three examples:

1. Sustainable Fishing Innovation: Exempted Fishing Permits (EFPs)
Since 1976, America's fisheries have been governed by the Magnuson Stevens Fishery Conservation and Management Act (MSA). NOAA Fisheries is the authority that manages the regulations originating from MSA, including the ability to allow special permits for the $144 billion commercial fishing industry to test new kinds of fishing techniques with the goal of improving either/both environmental and economic performance of fisheries. Through a process of approving Exempted Fishing Permits (EFP) submitted through the regional fishery management council process, fishermen, scientists and researchers may propose testing of new gear types, modifications to gear or fishing areas, technological advancements and other research. If

approved by the regional management council and NOAA, the permitted project proceeds, typically for one or two years, with periodic reports back to regulators. EFPs that demonstrate their intended success may initiate a change to the regulation that governs the fishery in question, usually through a fishery management plan amendment process.

In federally managed coastal waters off the U.S. West Coast of Washington, Oregon and California, two relatively recent EFPs are generating progress in two areas: (1) electronic monitoring of fishing activity for the groundfish trawl fishery, and (2) the adoption of a new low-impact fishing gear called deep-set buoy gear for swordfish. The first EFP tested cameras that could capture similar catch accounting data to human observers in order to reduce costs and increase reliability of the monitoring program for the multi-species groundfish fishery.

Another recent example of an EFP demonstrated that swordfish fishing could occur essentially without bycatch, which had become problematic with gillnet fishing gear. In collaboration with researchers from the PIER, a group of fishermen began **testing deep-set buoy gear** under a research permit issued by NOAA, which did not allow them to keep and sell any swordfish. With those results, they then applied for and received an EFP in which the fishermen themselves demonstrated the success of the new gear at harvesting swordfish without interacting with marine mammals, turtles and other species. They were also able to sell their catch under the EFP, create a separate market for their catch and earn a much higher premium for 'buoy-caught swordfish'.

EFPs are both similar to and different from sandboxes: Despite their success, EFPs are time- and work-intensive. EFPs often don't even occur until an extensive period of testing under a research permit. Fishermen typically work with academic or nonprofit partners to submit applications and conduct reporting in relation to their EFPs. The approval process is extensive and done on a case-by-case basis, usually with rather lengthy public comment and review periods. Those fishermen who do not engage specialized partners for assistance are often not accepted into the program due to incomplete applications, as NOAA does not have staff available to help applicants ensure complete applications. In particular, the slow process of approving EFPs—due to public comment and infrequent application windows—distinguishes them from a regulatory sandbox.

2. Endangered Species Conservation: Safe Harbor & Candidate Conservation Agreements

Since the late 1990s, two approaches administered by the U.S. Fish and Wildlife Service (FWS) and the National Oceanographic and Atmospheric Administration (NOAA) have provided unique regulatory assurances to landowners, developers or companies seeking ways to benefit endangered wildlife and plants which look a little bit like the 'no enforcement' letters used in some international sandboxes. These two programs lower regulatory uncertainty for participants and some now have regulatory coverage or are guided by established policy.

Federal wildlife agencies can provide regulatory assurance to private landowners and others who engage in voluntary habitat protection or restoration activities with a goal of achieving net conservation benefits that help species recover. The agreements—called 'Safe Harbors'—allow a

lot of flexibility in how the benefits for wildlife are provided, and the regulatory assurance is a form of insurance from landowners being harmed throughout the project. In effect, the agreements allow wildlife managers and nonprofits to experiment with wildlife restoration, often in ways that provide other economic benefits. In exchange for undertaking conservation activities, the FWS offers private landowners full assurance that no use restrictions will be required even if more species are attracted to their land or incidentally impacted. Safe Harbor Agreements can be renewed but landowners may also elect to let them expire, at which point the government's assurances are revoked.

In the 1990s, these agreements could have been developed using more of a sandbox approach, but instead they have evolved into a permit approach that is slow, costly and has many procedural requirements. Many interested parties walk away because of the length of the review and approval process. They are not set up to provide feedback to the agencies, for example, on how to amend their regulations to incentivize more conservation. No staff are on hand to help assist landowners through the application process or to make necessary changes mid-stream. Had they instead created a fast approval process—with a testing phase open to a limited number of participants who could get a provisional permit with all of its regulatory assurances and a process for applicants to use that testing period to secure a long-term permit for more participants—we would likely have seen far more use of this conservation tool. A similar tool called a Candidate Conservation Agreement with Assurances provides essentially the same function for private landowners and wildlife, but for wildlife that are at a lower risk of extinction.

An example where sandboxes could facilitate wildlife conservation innovation concerns endangered species recovery plans. Recovery plans should focus on overall goals for the species (e.g. how many populations, of what size, in which locations, by when) and gave states, companies, nonprofits and private landowners more flexibility to figure out how to achieve them by proposing recovery projects through an annual sandbox application process for each species.

3. Sustainable Agriculture Innovation
Conservation Innovation Grants were first authorized by Congress in 2002 and have provided approximately $30 million in funding per year for local or regional projects where farmers, ranchers and their partners test approaches to soil health, water management and other natural resources that differ from the standard ways that the USDA tries to achieve these goals. USDA has a relatively fast process of approving projects and a lot of flexibility in what they fund, funding activities that are quite distinct from what their authorizing statute, regulations and policy normally support. However, projects are rarely tied to any plan to scale up the effort.

These examples show that there is already some comfort with making special exemptions from laws like the Endangered Species Act in order to proactively protect species and their habitat. They recognize that in order for habitat restoration to take place, landowners must have some confidence that their efforts will be supported even in the face of unforeseen circumstances.

TURNING SLOW RESEARCH INTO FAST SANDBOXES

Programs like EFPs, SHAs and CIG's could behave more like sandboxes with some modifications to their structure and approach. It's possible they could facilitate faster testing of new ideas and open the door to innovations that address wildlife, fisheries management and agricultural practices with less bureaucracy. Here are some ideas for speeding up the kind of innovation that these programs have the potential to promote:

PRIORITIZE OUTCOMES OVER PAPERWORK

These programs could be tweaked to encourage applicants to focus more directly on demonstrating that their innovations achieve specific outcomes, like less bycatch from fishing operations or measurably better habitat. At the same time, the goal should be to simplify the application process to keep the focus on outcomes.

OPEN CALLS AND COHORTS

Publicly advertising program objectives and timelines has the potential to engage more participants than just those who are "in the know" about government initiatives. A cohort approach establishes a clear timeline for the testing period and reduces work for agency staff by putting everyone on the same schedule.

PROVIDE DEDICATED STAFF SUPPORT

Dedicated staff could ensure outcomes are measured and promising sandbox projects are shepherded through the pipeline. Agencies could play a bigger role in communicating directly with innovators, answer clarifying questions and collaborate where possible to track lessons learned and ensure good outcomes.

FEWER COOKS IN THE KITCHEN

Sandboxes are really about limited testing of ideas, not total policy overhauls. Therefore, program management and decision making could be limited to fewer people or departments, not in order to keep projects out but to streamline the process for welcoming projects in.

FOCUS PUBLIC COMMENT ON WHAT COMES NEXT

By definition, sandboxes are meant to allow learning and experimentation with approaches that few people – even experts – know much about. So public comment is unlikely to capture anything other than people's worst hypothetical fears about what could go wrong. Sandbox programs should use public comment to focus on what was learned through a project, sharing monitoring and outcome reports and asking for public input, rather than asking for public comment on the projects before they have happened. When it comes to questions about societal value and ethics of sandboxes, **Participatory Technology Assessment (pTA)** would be an effective way to solicit the public's feedback regarding establishment of a sandbox in the first place.

RIGHTSIZING RISK

A concern about regulatory sandboxes is the risk of negative impacts on nature. Reducing harm from failure should be a key goal of any sandbox program design, but, at the same time, sandboxes are about accepting the risk that comes with creating change. The point is not to eliminate risk but to elucidate it—to take risks with eyes open. Doing so is critical to achieving the flexibility and speed that are major purposes of establishing a regulatory sandbox. There is a similar or greater cost to nature from going slowly.

NEXT STEPS

Federal and state agencies can take a page from the regulatory sandbox playbook by creating opportunities for a testing environment that is more straightforward and inclusive than established regulatory channels. It should be simpler to test out technology that aids conservation than to go through the traditional approval processes to design and initiate a project or release a product that requires a technology component. This likely necessitates policy change in a few areas.

Agencies interested in trying out a sandbox should take advantage of the range of resources referenced in this paper and reach out directly to established agency sandbox teams around the world. We called the Arizona Attorney General's office to ask about their program and heard back immediately. The UK's Financial Conduct Authority has already released a "lessons learned" **report** and provides contact information on their **website**.

Since speed is of utmost importance for successful sandboxes, delegating just a single agency and very small group of decision-makers helps keep things moving forward quickly. Agencies that want to test a sandbox should make it easy to apply and easy to understand the requirements for participation. Similarly, setting expectations up front is key. Sandboxes should have a clear objective, but not be overly prescriptive about the approaches that can be accepted for testing. It's up to the sandbox participants to come up with the best ways to meet the sandbox objective.

In the U.S., we can do a better job of recognizing where outdated environmental laws are lacking and look for ways to launch transformation. If the regulatory structure is not helping us restore species or habitat, testing new approaches that incorporate the latest technology, even if they don't fit under current regulation, is worth trying. We owe it to ourselves and our planet.