

May 25, 2022

The Honorable Ron Wyden
Chair
Senate Energy & Natural Resources Committee
Water and Power Subcommittee

The Honorable Cindy Hyde-Smith
Ranking Member
Senate Energy & Natural Resources Committee
Water and Power Subcommittee

RE: Support for S. 3539, the “Watershed Results Act”

Dear Chairman Wyden and Ranking Member Hyde-Smith:

Thank you for the opportunity to submit testimony on the Watershed Results Act (WRA). The Freshwater Trust (TFT) strongly urges support for the WRA. Over the last 39 years, TFT has navigated the gauntlet of agency funding programs, permits, and procedure to unlock more than \$1B for optimized conservation solutions that deliver practical water solutions for farmers, cities, agencies, and rivers. We take pride in these wins but accomplishing critical work at scale shouldn’t be so hard.

Collectively, we should demand better returns on our investments. Since 1960, the U.S. has spent \$2T trying to improve water quality, and another \$2T+ recovering from natural disasters. Despite this tremendous investment, a large majority of waterways remain impaired, with accelerating drought, flood, and fire risks rapidly compounding the problem. While the U.S. is poised to make a generational infrastructure investment in water, just adding cash will not yield different results unless we also address the financial and practical barriers that currently make it so difficult to secure watershed results. Moving forward, we need to be able to combine siloed public funds into an integrated solution, direct funding toward the highest return projects identified by precision technology, and eliminate complexity for farmers. Simply put, America needs a conservation funding and implementation system upgrade that takes conservation from “retail” to “wholesale,” and that rewards results not effort.

The WRA provides that upgrade. In addition to driving better, faster, cheaper watershed results at a critical time, the WRA leverages 21st Century technology and analytics to maximize every taxpayer dollar invested, while saving on future disaster spending. The WRA approach would drive more benefits into underserved rural areas with health and income challenges, help generate durable and enriching rural jobs, alleviate municipal ratepayer pressure—including on vulnerable communities, and provide more financial options for farmers as they attempt to grow more food with less water. In a world short on winning bipartisan solutions, the WRA offers a unique pathway forward.

Importantly, these system upgrades will lead to significant benefits for Bureau of Reclamation (Reclamation) projects and programs. As Reclamation increasingly manages through severe drought and precipitation deluges, having a stronger, more integrated portfolio of watershed projects implemented on the landscape will add more resiliency to the overall water system. The tools and approach offered by the WRA will provide Reclamation more options, and help ensure that the

agricultural, environmental and community stakeholders who rely on these projects can better navigate volatility without setting up as many win-lose conflicts.

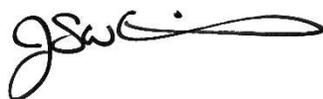
To assist the committee in its review of the WRA, TFT has provided the following written documentation. This documentation covers the current conservation system challenges, need for, and how-to of the WRA in more detail; how “precision watershed analytics” work and how they can lead to cost-effective results in WRA pilots; why the WRA’s analytics-infused, “outcomes-based” purchasing approach is inconsistent with traditional non-federal match requirements (this appendix was written in collaboration with our partners at the Environmental Policy Innovation Center); how the WRA’s accelerated resiliency approach can ultimately save the government significant money over time; and a primer on TFT and how these approaches have been infused into several successful program pilots already. These materials are organized as follows:

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TFT commends Chairman Wyden for introducing this game-changing bill and urges the Committee to continue pursuing the WRA until it becomes law. In pursuing that track, TFT also recommends that lawmakers consider the broader intent articulated in the original version of this bill (S. 2807). To have a shot in the face of all these challenges, we need the federal family all rowing in the same direction, with speed, scale, and results as the north star. Thank you again for affording us the opportunity to submit the testimony for the Subcommittee’s consideration.

Sincerely,



Joe S. Whitworth
President & CEO
The Freshwater Trust

WHY WE NEED THE WATERSHED RESULTS ACT + HOW IT WORKS

Summary: By driving better, faster, cheaper watershed results at such a critical time, the Watershed Results Act (WRA) will lead to significant benefits for Reclamation projects and programs. In addition to yielding an integrated, high-impact, cost-effective portfolio of projects across the landscape that bolsters operational resiliency for the agency, the WRA will help maximize every taxpayer dollar invested on water, while minimizing future post-disaster spending. The WRA approach to the problem would also drive more benefits into underserved rural areas with health and income challenges, help generate durable and enriching rural jobs and economic activity, alleviate municipal ratepayer pressure—including on the most vulnerable communities, and provide more financial options for farmers as they attempt to grow more food with less water. In a world short on bipartisan, win-win solutions, the WRA offers a unique pathway that helps everyone get more results.

Problem Statement: Since 1960, the U.S. has spent \$2 trillion trying to improve water quality. Despite this tremendous investment, a large majority of waterways remain impaired, with accelerating drought, flood, and fire risks rapidly compounding the problem. While the U.S. is poised to make a once-in-a-generation water infrastructure investment, just adding a bunch of project cash does not guarantee results unless we also overcome the financial and practical barriers that currently make it so difficult to concentrate public funds to the best projects at the watershed scale and eliminate complexity for participants.

There are no silver-bullet market solutions here. That means the government will need to catalyze solutions. This is true for several reasons. One is the nature of the problem. Many of the projects we must implement are small, scattered across the landscape, and often lack a compelling business case for those who must choose to participate (e.g., farmers). This means that public funds are required to make most projects viable. But these funds are too difficult to access and use. Over recent decades, a highly technical public funding and regulatory apparatus has become entrenched. In practice, funds are usually reimbursed via hard-to-access competitive programs with match funding and procedural “paywalls.” Only the most committed navigate the time, risk, and cash challenges to secure funds. Moreover, despite good intentions, dollars get stuck in program silos that focus on a sliver of the problem, making it hard to fund the right combination of projects necessary to achieve watershed resiliency. The result: fragmented public dollars move slowly to ground, project-by-project, with heavy burdens on under-capacity farmers and local groups, and no coherent watershed funding and implementation strategy. Simply put, the current funding and implementation system was not built for the urgency or size of our water challenges, and so we must update that system. Luckily, the tools for overcoming these challenges largely already exist. They just need to be better organized, simplified, and combined into an overarching watershed results framework.

Solution Principles: Moving forward will require: (1) a coordinated approach that integrates and leverages currently siloed but interrelated conservation funding sources; (2) use of [precision watershed analytics](#) to quickly identify the best combination of projects to invest in; and (3) a streamlined purchasing system that rapidly delivers funds to the ground with much less friction. The WRA connects all three of these components into a watershed solution framework.

Overview of How the WRA Works: The WRA would:

- **Direct Interior to establish an Outcomes Fund and deploy it in 2-5 pilot watersheds**
- **Complete and use “advance watershed analytics” to guide effort:** In each pilot, complete analytics to identify results targets and the best projects for hitting those targets. Examples of watershed analytics are described in more detail starting on page 6 of this testimony, but as defined in the WRA, they can be understood as the pre-investment assessment to identify potential projects, model the environmental outcomes they can produce and cost to implement, and the scenario analysis to identify the most cost-effective and feasible combinations of projects to invest in to achieve overall watershed targets. Until recent years, this work would have taken years, but with advancements in technology and computing, it is now possible to develop actionable insight at the watershed scale in weeks or months.
- **New outcomes dollars, coordinated with existing funds under a cross-agency funding plan:** The WRA provides \$15M/year/watershed (over 6 years) to buy the best project “outcomes” identified by the analytics. The WRA defines “outcomes” as quantifiable increases in surface water or groundwater quantity, measurable increases in habitat, and other readily quantifiable benefits that can be modeled using publicly available tools and data (e.g., lbs of nutrient or sediment removed, avoided thermal loading). In addition to the seed money, the WRA requires a coordinated cross-agency funding plan for each pilot, which must demonstrate how to achieve targets. As part of these plans, agencies must modify, expand, and streamline eligibility and verification for existing federal funding sources, and waive non-federal match requirements (see page 8 of this testimony for why this makes sense when purchasing outcomes and leveraging multiple funding federal sources together to secure a bigger, faster watershed solution).
- **Simple and quick purchasing tools, plus clear market signals:** Currently there is no real economy for watershed projects. To help create more market certainty, the WRA calls on Interior to set floor “outcome prices” for relevant outcomes in each pilot watershed. These signals are critical for private partners determining whether it makes good business sense to go build a project. Currently these signals do not exist with grant programs. In addition to establishing those price thresholds, the WRA calls on Interior to pay a project developer within 30 days of verifying outcomes via simple pay for performance contracts. With all these signals from the federal government, a private market economy will sprout up, with actors proactively developing good projects because it makes good business sense.

How a Watershed Outcomes Fund Works: A Fund would be a one stop “bank” for funders and farmers, with funding concentrated at the watershed level, investments prioritized by watershed analytics, simple engagement for farmers, and back-end tracking of projects, spending, and results:

- **Funding source aggregator and clearinghouse:** Instead of managing each funding source in its own silo, program funds could be pledged to an Outcomes Fund. A Fund (which can also be thought of as a “Bank”) would be housed within an agency. A Fund would serve as a clearinghouse for combining, concentrating, and quickly directing funds to the best projects, and tracking project outcomes. A Fund could leverage multiple the following types of aligned, but currently fragmented, money into a powerful, unified water outcomes purchasing machine:
 - **Congressional appropriations (like in WRA) to purchase outcomes via “pay for performance” contracts:** Specifically, where a project has been completed, and it has produced a verifiable “outcome” (quantifiable increases in surface water or groundwater quantity, measurable increases in habitat, and other quantifiable benefits like lbs of nutrient or sediment removed, avoided thermal loading), WRA Outcome Fund dollars would be available to purchase those benefits via a “pay for performance” contract, which

- the bill defines as contract to purchase successfully implemented outcomes at a negotiated per-unit price. This approach has been authorized by Congress in the Social Impact Partnerships to Pay for Results Act (SIPPRA),¹ and is a more streamlined version of a “fixed amount award.”² In contrast to typical government programs, which reimburse for expenses and effort without regard to results, this purchasing structure ensures that the government only pays once performance has been achieved.
- **Leveraging with compliance investment:** Consistent with the bill’s requirement to concentrate federal commitments from multiple agencies in a watershed pilot, EPA can use its watershed permitting authorities to ensure point sources only invest in clean water treatment technology to the “point of diminishing returns,” with remaining dollars reallocated to the Watershed Outcomes Fund. This approach would protect urban ratepayers from high costs, while directing funds to watershed projects that more cost-effectively deliver results.
 - **“Pile on” from BOR, other agencies, and the private sector:** Reclamation and other agencies can match these non-federal compliance fund pledges with commitments from current programs. Private companies/donors could also commit their funds.
- **Use Fund pledges to secure accelerating upfront financing:** In the face of so many conspiring challenges, time is at a premium. Instead of waiting on project dollars to flow out of agencies and utilities bit-by-bit via annual appropriations, these pledges—which would not need to be paid upfront, but just awarded or contracted for—would be used to secure public and/or private debt, which would accelerate implementation. To date, uncertainty and scale factors have kept most “impact capital” focused on things where there is a simple payback plan, a repeatable and certain transaction model, and centralized project scale (e.g., windfarms, wastewater). A Watershed Outcomes Fund model would overcome many of these hurdles to financing. Public water lending and guarantee programs, including the SRFs and WIFIA, could help underwrite this effort.
 - **Use precision analytics to identify the best projects, then offer “easy button” funding packages to farmers for producing “bushels of nature”:** Far too few farmers utilize conservation programs because of the complex and slow process, fund matching hurdles, and uncertainty that they will be selected. Instead of placing the burden on farmers to access funds, analytics can be used to identify the best projects. With those high-impact projects identified, simple upfront cash offers can be made to farmers to implement conservation projects, with the payment connected to the outcomes produced (e.g., \$250/lb. reduced). This streamlined approach would remove barriers to entry, increase participation, and reduce regulatory pressures through faster watershed improvement.

¹ U.S. Dep’t of Treasury, SIPPRA – Pay for Results, <https://home.treasury.gov/services/social-impact-partnerships/sippra-pay-for-results>. See 42 U.S.C. § 1397n–1397n-13.

² See 2 CFR 200.45 & 200.201(b).

HOW PRECISION WATERSHED ANALYTICS DRIVE THE WRA

Summary: The WRA calls for “advance watershed analytics.” The “advance” indicates the need for insight prior to action. The second part, “watershed analytics” (more precisely known as “precision watershed analytics, or PWA) offer an effective and targeted tool for maximizing every taxpayer dollar invested, while providing a simple way to track progress against a target. Within a watershed, PWA can evaluate project benefits and costs in uniform units, enabling comparison across multiple project types, and against big, centralized projects. PWA also provides the *lingua franca* to coordinate multi-funder investment across large geographies by allowing for a simple, objective unit for decision-making and tracking. While centralized projects remain a must, they must be complemented by many more distributed watershed projects. PWA will be key to unlocking this latter portion of the solution and ensuring that resources flow to the highest-impact combination of projects.

PWA use existing technology and publicly available data sets and models to identify the highest impact projects, develop a specific roadmap for local stakeholders to use and improve, and then identify superior funding strategies. Developing and then using PWA follows three basic steps:

1. Integrate established government models and data with satellite imagery and other public data sets, as well as machine-learning technology, to remotely survey a watershed and identify specific conservation practices that could be implemented at the field level. This work is consistent with the purposes outlined in the Geospatial Data Act of 2018.³
2. From the group of feasible practices, identify optimal combinations of practices that would produce the best ecological and economic options on the ground, and estimate costs and desired outcomes. This step also requires significant “implementability” analysis as the “best” projects may have significant social, physical, or legal obstacles.
3. Develop scenarios to identify the most efficient combination of investments to achieve watershed-level objectives (importantly, PWA can be used to solve for multiple objectives).

Examples: Numerous actors use PWA to evaluate options and maximize desired outcomes. A few of those actors include TFT, the Bureau of Reclamation, Central Oregon Irrigation District, Idaho Power Company, the City of Medford, and the Chesapeake Conservation Innovation Center.

- TFT developed the BasinScout Analytics (BSA) to identify, prioritize, and implement the most impactful and cost-effective blend of distributed projects in a watershed. First, BSA utilizes up-to-date satellite data to scan large geographies and evaluate field-level features (e.g., distance and slope relative to bodies of water, current irrigation practices, cropping). Second, BSA determines which conservation practices are feasible to implement on each field, quantifies the projected ecological improvements generated by implementing that practice (e.g., nutrient or temperature reductions, water savings), and estimates the life-cycle cost of implementing that

³ The Geospatial Data Act of 2018, 43 USC 2801-2811, aims to ensure that geospatial data from multiple public and private sources is easily integrated and accessible. The Act codifies the Federal Geographic Data Committee (FGDC). The FGDC collects geospatial data from Federal and non-Federal sources and develops a strategic plan to meet certain listed goals, such as ensuring accuracy of raw and derived statistical information and open access for the public to geospatial data. The FGDC also operates a geospatial data clearinghouse (the “Geoplatform”).

practice on each field. Third, with the ability to sort projects based on how cost-effectively they produce desired benefits, BSA generates targeted implementation recommendations to achieve watershed objectives. This analytical framework offers a specific roadmap for local stakeholders to use, and can identify superior funding strategies. To illustrate, TFT analyzed the Crooked River in Central Oregon and determined that of 4,070 agricultural fields, only 1,500 were feasible for implementing a productive conservation action (the majority of which involved converting from flood to center pivot irrigation). If all 1,500 potential fields had actions implemented, it would cost well over \$100 million. However, by pursuing the highest impact fields, it is possible to spend just \$25M and still produce 60% of the overall potential sediment and phosphorous loading reductions (see [video](#)). This means that if the right projects are not prioritized based on their relative reduction-per-dollar efficiency, we could inefficiently spend tens of millions of dollars without achieving additionally meaningful pollutant reductions.

- In converting this Crooked River analysis into the implementation realm, partners determined that the water delivery system components between district-owned infrastructure and fields would preclude many farmers from upgrading to precision irrigation even if they wanted to. TFT has been working with Reclamation, the Central Oregon Irrigation District, and Deschutes River Conservancy to co-develop a model that identifies the resulting water savings, pollution reductions, hydraulic feasibility, and economics of various potential water delivery infrastructure modernization scenarios that would connect district-owned infrastructure efforts all the way through to field-level upgrades. This “implementability” analysis helps ensure that main-line infrastructure upgrades also unlock high-impact on-farm upgrades, which when implemented together, will provide more water savings and address a major water quality impact in the basin.
- The Idaho Power Company went through 13 failed relicensing efforts for its hydropower dams in Hells Canyon (which produce 70% of the utility’s hydropower). But with PWA on its side, IPC was able to secure Clean Water Act (CWA) approval from Idaho and Oregon to implement a \$350 million [watershed stewardship program](#) that will rehabilitate hundreds of miles of riparian vegetation on tributaries, reshape the mainstem Snake River to better fit its current hydrograph, and avoid significant sediment and nutrient loading from upgraded irrigation infrastructure.
- The City of Medford (OR) had a big CWA water quality compliance challenge. Instead of installing a mechanical chiller or digging a giant cooling pit, the City relied on PWA to identify riparian revegetation projects in the [Rogue River watershed](#) that could create the most shade for the least cost. The City now uses shade from these projects to comply with its wastewater permit.
- The Chesapeake Conservancy uses precision conservation to map, target, and implement on-the-ground agricultural and conservation best management practices that provide ecosystem services and have the greatest impact. For example, the Conservancy applied [precision conservation](#) to the Chester River watershed to identify and protect the highest functioning landscapes. First, it created a high-resolution land use and land cover (LULC) dataset. This was critical because land use types are difficult to discern using imagery alone (roads, open water, and wetlands are often misclassified due to slight changes in reflectance or similarity to other classes). Second, it mapped and analyzed concentrated flow paths (CFP). It did this with remotely sensed elevation data and digital elevation models. This is central to an accurate hydrological understanding of how land use impacts water quality and how water moves across landscapes. Finally, the Conservancy combined LULC and hydrology data to prioritize and apply best management practices in the most optimal places. Overall, this approach will give managers the ability to prioritize conservation and restoration efforts and allows conservation organizations and government agencies to target efforts and outreach in priority areas.

WHY NON-FEDERAL MATCH REQUIREMENTS DO NOT FIT WITH THE OUTCOMES-DRIVEN PURPOSE OF THE WRA

Across dozens of federal grant programs, requirements for applicants to “match” the funding from the federal government with money from someone else are ubiquitous. The phrase “matching requirement”⁴ appears 15 times in the recent Infrastructure Investment and Jobs Act (IIJA), requiring funding applicants to provide non-federal match at 15% - 50% of the government request.⁵ Matching funds are also referenced in over 100 other pieces of legislation in this Congress.

Match requirements have become a default policy, often applied in a binary way without considering unintended effects. However, match requirements actually make it difficult for the federal government to catalyze solutions to big, fast-moving 21st Century environmental problems. In the face of intensifying drought, water quality issues, burning forests, and more frequent “once-in-a-millennia” flood and temperature events, the status quo approach to federal match funding must be reconsidered. The WRA—with its coordinated, prioritized, outcomes-driven approach—offers an opportunity to show how a match waiver in pilot watersheds can yield bigger, better, faster results.

But first, why does Congress care if state or local governments, nonprofits, or businesses match federal money for a project? Here are the common arguments made in defense of match requirements:

1. **Skin in the game.** The main argument for match is that it proves that an applicant has enough of a commitment to a project that they are willing to put their own money on the table to back it. The higher the percentage of applicant funding, presumably the more important it is to them and the more likely they are to believe that the project will be successful.
2. **Long-term sustainability.** A related theory underlying match is that securing it requires community engagement and buy-in, which will make the investment more successful in the long-term once the grant or subsidy is no longer available.
3. **Leveraging.** Another common consideration is that if part of a project’s funds are withheld, and an applicant has to secure other sources, money is being pulled into a project that would not have happened but for the partial federal contribution.
4. **Diversification.** There is an assumption that partially funding many projects across the landscape will make more political constituents (i.e., voters) happy than providing full funding to fewer projects.

These are important considerations and worthy goals, but the current match funding approach also has some notable downsides, which will undercut the effectiveness of the WRA. As outlined below,

⁴ Federal “match” requirements obligate a project proponent seeking federal funding to secure state, local, or private funds to unlock the federal funds. See 2 CFR 200.306. Matching requirements first started to appear in the early 20th Century.

⁵ This range is consistent with what is seen in other federal environmental programs. For example, NRCS EQIP funds require 50% non-federal match for standard projects. FEMA BRIC generally requires 25% non-federal match. 42 U.S.C. § 5193(a). CWA section 319 funds require a 40% non-federal match. 33 U.S.C. § 1329(h)(3).

match requirements impose several practical and financial barriers to speed, scale, and results. It is for these reasons that the WRA proposes a waiver in the context of the bill's broader purpose:

1. **Match requirements place agencies in the role of following, which is a challenge given the massive resource asymmetry held by the federal government.** Standard practice is to require a grant applicant to already have funds in-hand before the federal government will help. Given the massively asymmetrical resource advantage of the federal government and its ability to print money, federal dollars should be the catalyst of change, not the entity asking smaller, lesser-resourced government and non-profit entities to prove their buy-in first.
2. **Using match as an application screening tool is no longer needed with new technology.** Prior to the technological revolution, it was difficult to comparatively assess projects, and so extensive technical criteria and processes were necessary to ensure that applicants were serious and to protect agencies against fraud, waste, and abuse. But with objective project quantification technology now widely available, government agencies can objectively define their desired outcomes (e.g., lbs of nutrients removed, water of volume saved), and then just fund the projects that deliver those public benefits most cost effectively. Remote sensing technology now makes it possible to repeatedly verify the continued existence and function of projects as well. This quantified conservation approach means that agencies no longer need validation from others proven through a large financial match commitment.
3. **Match requirements slow down “public good” projects, which is the opposite of what is needed to build watershed-level resiliency in the face of climate change.** Funding for projects is slow and uncertain, each with high transaction costs. Projects often must be developed piecemeal over months or years via a combination of fundraising, competitive grants, and cost-share programs. This means that completing a single watershed project often requires under-resourced groups to navigate multiple programs with uncertainty as to whether each funding stream will be awarded. This approach to funding projects cannot drive the quantity of projects needed to secure resilient ecosystems and communities.
4. **Slow grant contracting makes it hard to keep project and funding coalitions together before federal paperwork is complete.** Federal agencies often want multiple partners to commit funds as part of an application. Even once awarded, these same agencies can take months or years to negotiate contracts. Due to these long and uncertain timelines, partners often must move on to other projects, which can scuttle previous match commitments, and leave the primary applicant scrambling to build new match sources. Because of the sunk costs of moving a federal proposal this far through the process, the applicant organization will often choose to take the federal funds and figure it out—a risk that can result in the organization having to use its own scarce operational funds as match if new partners cannot be secured.
5. **Current match approaches lead to inequitable flow of funds to bigger interests and projects.** Match requirements reward larger organizations and projects that already have high capital inflows over smaller organizations and startups. They also reward organizations that have sophisticated and creative experience in defining and applying match. All else being equal, this means that federal funding is skewed toward older and larger organizations, bigger local governments, and bigger centralized projects, leaving a less effective funding plan for the many smaller-scale, hard-to-fund, but critical projects scattered across the landscape.⁶

⁶ For example, as of 2011, As an example of this skew, of the \$139.7 billion in Clean Water State Revolving Fund (SRF) investments made from 1988 to 2020, only \$5 billion, or 3.5% was directed to nonpoint source projects. EPA, Clean Water SRF Program Summary, National Summary, at 24, 28 (2021), <https://www.epa.gov/sites/default/files/2021-02/documents/us20.pdf>. And yet approximately 75% of America's waterbodies with Total Maximum Daily Loads were

With these unintended consequences in mind, we offer the following rationales for the non-federal matching waiver in the WRA:

1. **If innovation, results, speed, or scale are at a goal of a program, Congress shouldn't require match at all, and should instead require results.** Statutory changes like those suggested in the WRA take this approach. One of the military's creative programs – DARPA – does this and has a record of producing homerun technologies that have produced broad benefits for the country.⁷ Across the country, communities need to rapidly scale up their water resiliency, and so creating leverage between the federal agencies should be the aim.
2. **If Congress wants agencies to work together, allow federal-to-federal match or explicitly require federal-to-federal match as an incentive for agencies to work together on a coordinated funding plan that concentrates their currently siloed investments into high-priority places at a meaningful enough level to secure results.** The federal government is the largest environmental spender in America, but those funds are fragmented into silos that dilute—instead of leverage—the enormous purchasing power that could come from multiple levels of government driving toward common outcomes. Under a leverage approach, each funding stream can generate co-benefits for the other federal agency, with the combined funding sources directed to the highest priority projects for multiple agencies. This approach has already been implemented. For example, in an intentional effort to pull conservation resources toward a worthwhile military goal, various Department of Defense conservation programs that help protect military bases from encircling development are allowed to count as non-federal match for USDA and Department of Interior conservation programs.⁸ Under the WRA, the goal is similarly broad and encompassing, and so cross-agency federal leverage should be incentivized so that results are concentrated and reinforcing.
3. **If disadvantaged or overburdened communities are a sought-after beneficiary of a program, eliminate match requirements fully for those communities.** Given how much time, capacity, and fundraising expertise is currently needed to secure non-federal match funds, it makes sense to pursue a consistent match approach that gets dollars quickly into struggling communities. For example, under the IIJA, EPA's State Revolving Fund offers 100% federal funding (i.e., grants without a match requirement) for toxic lead water pipe replacement in disadvantaged communities.⁹ Given the importance of getting water conservation dollars into underserved rural areas, and relieving water ratepayer pressure, the WRA match waiver is consistent with this important objective.
4. **If Congress wants non-federal leverage, it should allow private financing to count as match, or use its programs to reduce overall project cost.** Concentrated federal resources are often the best and primary source for conservation project funds. However, even when

primarily impaired by nonpoint source discharges. EPA, NATIONAL EVALUATION OF THE CWA SECTION 319 PROGRAM (2011), www.epa.gov/sites/production/files/2015-09/documents/319evaluation.pdf.

⁷ “Arguably, [DARPA] has the longest standing, most consistent track record of radical invention in history.” Regina Dugan & Kaigham Gabriel, “Special Forces” Innovation: How DARPA Attacks Problems, HARVARD BUSINESS REVIEW (Oct. 2013), <https://hbr.org/2013/10/special-forces-innovation-how-darpa-attacks-problems>.

⁸ “10 U.S.C. § 2684a(h) allows the recipient of REPI funds to use such funds as the match or cost-sharing requirement for any conservation or resilience program of any federal agency.” DOD, USING REPI PROGRAM FUNDING AS MATCH FOR FEDERAL CONSERVATION OR RESILIENCE PROGRAMS (March 2022), https://www.repi.mil/Portals/44/Documents/Resources/REPI_FactSheet_FundsAsMatch.pdf.

⁹ Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, div. J, tit. III, 135 Stat. 429, 1400 (2021), <https://www.congress.gov/117/plaws/publ58/PLAW-117publ58.pdf>.

awarded in big amounts, most federal project funds are disbursed in chunks pursuant to annual appropriation cycles or grant reimbursement practices. Given this mismatch, instead of requiring non-federal *project fund* match, Congress could instead allow federal or non-federal *project finance* as match. Just like securing a home mortgage, private financing could provide the upfront cash necessary to complete a lot of projects much faster, with payback coming from reliable sources of federal funds.

Although less efficient than a waiver, this approach is also consistent with the speed and scale purposes of the WRA, as well as the desire to pull the private sector into solving the problem. Because most conservation projects require at least one public subsidy to be viable, they are not great at producing private return. However, with multiple public funding commitments leveraged together and matched to strong projects, private investors could see a pathway to institutional scale and returns. By allowing federal agencies to participate together, Congress could then secure the benefit of speed and scale that can come from accelerating private investment.

If Congress wants to retain match requirements, there are other ways to design requirements that would better mitigate against unintended consequences. For example:

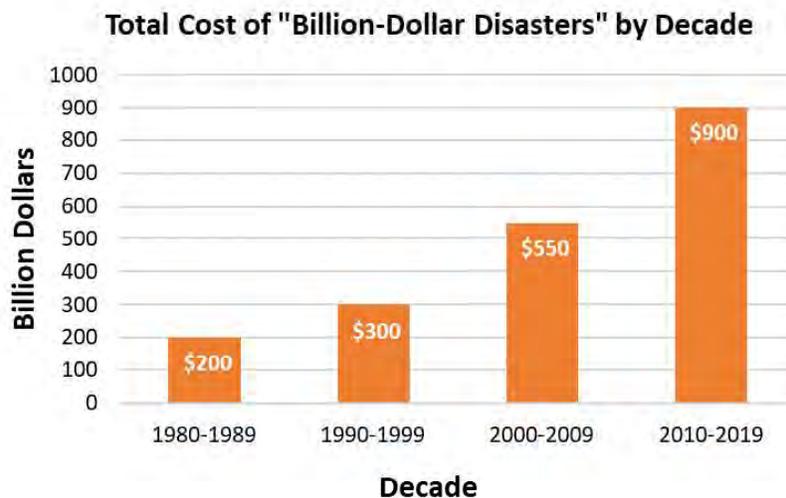
1. **Assess match secured at the end of a project.** Congress could explicitly allow agencies to count match at the end of the project rather than the beginning, with accountability like consequences for future eligibility or prioritization in grant-making, but no consequences on secured funding if the recipient fails to secure it. In this way, federal agencies could help seed new initiatives. The same approach also helps deliver real leveraging where the first-in federal money truly pulls more state, local, or private money after it. The concern that applicants (states, local government, and non-profits) would fraudulently claim match and never deliver misunderstands their long-term interests. These applicants will continue to rely heavily on federal programs to drive under-funded social initiatives, and so will work hard to avoid default on their match commitment if doing so risks future funding eligibility.
2. **Add in economic multipliers in proving match.** Most conservation funding programs were created to address public challenges. Despite this intent, much of the focus on grants ends up being on the dollars spent, not results. Understanding that these projects produce many other social, economic, and community values, the match value could be added together with other economic multiplier values generated from the work as part of the match proof.
3. **Require agencies to track match across programs not projects.** If agencies used a ranking system to score worthy applications by the magnitude of benefits the project delivered that are priorities for the program, agencies could offer individual applicants both a match percentage and a funding offer, with no- or low-match requirements for the highest-impact projects. This would allow agencies to try to hit a target match amount across a program instead of worrying about individual projects.

HOW THE WRA'S TARGETED & COORDINATED INVESTMENT APPROACH CAN HELP AMERICA SPEND LESS ON DISASTERS

Coordinated, prioritized watershed investments will result in lower disaster bills in the future, with benefits far outstripping costs. Moving forward, this reality should be factored into the economic evaluation of legislation that includes mandatory spending for natural infrastructure. While avoided future costs are not traditional spending offsets, watershed resilience investments promoted by the WRA will help the government spend a lot less over time, and so should be considered in the same way. This is especially important given how much America's post-disaster spending is increasing.

Post-disaster spending is already high and will significantly increase, putting growing financial strain and risk on the federal budget: Since 1980, the U.S. has sustained 310 climate and weather disasters, with a total cost of more than \$2.155 trillion.¹⁰ Around half of this total occurred from just 2012-2021.¹¹ As illustrated in Figure 1, that trend is worsening, with costs almost doubling each decade. More than one-third of all disaster spending since 1980 (\$764.9 billion) has occurred in the last five years.¹² This marked increase in disaster spending—\$148.4 billion per year on average over the last five years—is likely to continue its exponential growth as the U.S. adjusts to significantly more frequent and severe storms, floods, fire, and drought.

Figure 1. Total cost of billion-dollar disasters in the U.S. over time (CPI-adjusted). Adapted from NOAA NCEI (2021).¹³



¹⁰ NOAA NCEI, U.S. BILLION-DOLLAR WEATHER AND CLIMATE DISASTERS (last accessed Mar. 14, 2022), <https://www.ncdc.noaa.gov/billions>.

¹¹ NOAA NCEI, 2021 U.S. BILLION-DOLLAR WEATHER AND CLIMATE DISASTERS IN HISTORICAL CONTEXT (Jan. 24, 2022), <https://www.climate.gov/news-features/blogs/beyond-data/2021-us-billion-dollar-weather-and-climate-disasters-historical>.

¹² NOAA NCEI, CLIMATOLOGY IN U.S. BILLION-DOLLAR WEATHER AND CLIMATE DISASTERS (last accessed May 17, 2022), <https://www.ncei.noaa.gov/access/billions/climatology>.

¹³ NOAA NCEI, 2021 U.S. BILLION-DOLLAR WEATHER AND CLIMATE DISASTERS IN HISTORICAL CONTEXT.

As emphasized by the Government Accountability Office (GAO), the cost of these disasters is already a major source of federal financial exposure.¹⁴ On top of that existing exposure, the severity and frequency of extreme events is projected to significantly increase¹⁵ and become increasingly complex and more difficult to manage.¹⁶ Both the hurricane rainfall and intensity on the East Coast, as well as the frequency and severity of landfalling “atmospheric rivers”¹⁷ on the West Coast are projected to increase.¹⁸ The current Western mega-drought is now the driest period in 1200 years,¹⁹ and future droughts in most U.S. regions are projected to be stronger and likely last longer.²⁰ Western wildfire risk is also increasing, with 17 of the 20 largest California wildfires occurring since 2000.²¹ And globally, the warmest seven years on record have all occurred since 2015, with current global temperatures about 1.1° C warmer on average than pre-industrial levels.²²

The combination of two or more extreme hazard events that occur simultaneously or consecutively have a multiplying effect on the risk to water infrastructure systems, as the failure of one system can lead to the failure of interconnected systems.²³ For example, Hurricane Irma, a recent Category 5 storm, shattered the existing record for length of time over which it sustained winds of 185 miles per hours,²⁴ caused \$50 billion in damages to residential and commercial property and impacted about 85% of Florida’s drinking water and wastewater facilities.²⁵ The rainwater from Irma caused around 600 sewer overflows, which occur when wastewater treatment facilities release untreated sewage and stormwater into waterways.²⁶

The costs and losses from natural disasters are at historical highs and are expected to increase as these events become more frequent and severe. As the world moves past 1.1° C warming and towards the 2.7° C warming now projected,²⁷ continuing to deal with natural disasters after-the-fact will prove to be an increasingly expensive endeavor. To better enable these critical resiliency investments and cut down on the government’s overall disaster spending over time, it will be critical to account for and

¹⁴ U.S. GOV’T ACCOUNTABILITY OFFICE, LIMITING THE FEDERAL GOVERNMENT’S FISCAL EXPOSURE BY BETTER MANAGING CLIMATE CHANGE RISKS, <https://www.gao.gov/highrisk/limiting-federal-governments-fiscal-exposure-better-managing-climate-change-risks>; U.S. GOV’T ACCOUNTABILITY OFFICE, GAO-15-515, HURRICANE SANDY: AN INVESTMENT STRATEGY COULD HELP THE FEDERAL GOV’T ENHANCE NATIONAL RESILIENCE FOR FUTURE DISASTERS (2015), <https://www.gao.gov/assets/gao-15-515.pdf>. The GAO has recommended that the Office of Management and Budget (OMB) adopt budgeting and forecasting procedures to account for such fiscal risk, such as major disaster costs, as part of the federal budget process.

¹⁵ U.S. GOV’T ACCOUNTABILITY OFFICE, GAO-20-100-SP, DISASTER RESILIENCE FRAMEWORK: PRINCIPLES FOR ANALYZING FEDERAL EFFORTS TO FACILITATE AND PROMOTE RESILIENCE TO NATURAL DISASTERS (2019), <https://www.gao.gov/products/gao-20-100sp> citing U.S. GLOBAL CHANGE RESEARCH PROGRAM, IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT, VOLUME II (Nov. 23, 2018), https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf.

¹⁶ Intergovernmental Panel on Climate Change, *Climate Change 2022 Impacts, Adaptation and Vulnerability Summary for Policymakers*, at 20 (2022) https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf.

¹⁷ Increases in atmospheric river frequency and intensity lead to the likelihood of more frequent flooding conditions. U.S. GLOBAL CHANGE RESEARCH PROGRAM, IMPACTS, RISKS, AND ADAPTATION, at 117.

¹⁸ U.S. GLOBAL CHANGE RESEARCH PROGRAM, IMPACTS, RISKS, AND ADAPTATION, at 74.

¹⁹ A. Park Williams, Benjamin I. Cook, Jason E. Smerdon, *Rapid intensification of the emerging southwestern North American megadrought in 2020-2021*, NATURE CLIMATE CHANGE 12, at 232-234 (Feb. 14, 2022), <https://www.nature.com/articles/s41558-022-01290-z>.

²⁰ U.S. GLOBAL CHANGE RESEARCH PROGRAM, IMPACTS, RISKS, AND ADAPTATION, at 91.

²¹ NOAA NCEI, CLIMATOLOGY IN U.S. BILLION-DOLLAR WEATHER AND CLIMATE DISASTERS.

²² 2021 joins top 7 warmest years on record: WMO, (Jan. 19, 2022), <https://news.un.org/en/story/2022/01/1110022>.

²³ U.S. GOV’T ACCOUNTABILITY OFFICE, GAO-20-24, WATER INFRASTRUCTURE TECHNICAL ASSISTANCE AND CLIMATE RESILIENCE PLANNING COULD HELP UTILITIES PREPARE FOR POTENTIAL CLIMATE CHANGE IMPACTS, at 17 (Feb. 13, 2020), <https://www.gao.gov/assets/gao-20-24.pdf>.

²⁴ U.S. GLOBAL CHANGE RESEARCH PROGRAM, IMPACTS, RISKS, AND ADAPTATION, at 95.

²⁵ EPA OIG, 20-P-0001, REGION 4 QUICKLY ASSESSED WATER SYSTEMS FOR HURRICANE IRMA BUT CAN IMPROVE EMERGENCY PREPAREDNESS, at 1 (Oct. 7, 2019), https://www.epa.gov/sites/default/files/2019-10/documents/epaig_20191907-20-p-0001.pdf.

²⁶ *Id.*

²⁷ Intergovernmental Panel on Climate Change, *Climate Change 2021 The Physical Science Basis*, IPCC AR6 WGI, at SPM-18 (Aug. 7, 2021), https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf.

link watershed resiliency investments with avoided future disaster spending when evaluating the economic impacts of legislatively approved funding that will help reduce overall risk exposure.

Proactive natural resilience investments can help limit the federal government’s financial exposure by 3-6x:

Strategic natural resiliency investments made before a disaster event can significantly reduce response requirements and spending.²⁸ In its recent *Natural Hazard Mitigation Saves* publication, the National Institute of Building Sciences (NIBS) found that every dollar of federal money spent on pre-disaster mitigation will return six dollars in benefits.²⁹ These types of savings have been demonstrated in more specific contexts as well:

- **Nature-based solutions—which align with the outlined investments in the WRA—save an average of \$3.50 per \$1 invested.** Natural resilience investments reduce losses and recovery costs. For example, a 2018 study explored the cost-effectiveness of restoration of coastal wetlands, barrier islands, beaches, and oyster reefs in the Gulf Coast region.³⁰ The authors estimated that losses from storm-related flooding will increase to \$134–\$176 billion/year by 2030. The authors estimate that if nature-based resilience investments were made in this region, they could offset losses by ~\$50 billion/year with an average benefit-cost ratio of 3.5.³¹ In other words, for every \$1 spent, \$3.50 in future flood damage would be avoided.
- **Coastal wetlands avoided \$625 million in damages during Hurricane Sandy.** A 2017 study showed that areas affected by Hurricane Sandy that had healthy coastal wetlands experienced significantly less losses than areas without.³² The study found that the presence of wetlands reduced storm surge intensity, which reduced flood elevations and damages. Collectively, these wetlands reduced total losses by \$625 million.³³
- **Private companies seeing major returns from proactive disaster resiliency spending.** The private sector, too, is increasingly seeing the business case for allocating resources towards disaster resilience. FM Global analyzed nearly 100 corporate 10-K statements in the aftermath of hurricanes Harvey, Maria, and Irma. In reviewing more than 10,000 investments made by more than 1,800 companies over a ten-year period, FM Global found, for every \$1 a company spends to protect structures from hurricane, wind, and flood damage, estimated loss exposure decreased by an average of \$105.³⁴

Reducing the impact of disaster on people and small businesses will safeguard tax revenue: The true cost of disasters is much greater than cleanup costs. The cascading economic effects on people, businesses, and local governments are difficult to measure precisely, but when people can’t travel their usual routes or lose their jobs because local businesses close, there are significant economic implications. According to the Federal Emergency Management Agency (FEMA), 40% of small

²⁸ FEMA, NATIONAL MITIGATION FRAMEWORK, SECOND EDITION, at 1 (2016), https://www.fema.gov/sites/default/files/2020-04/National_Mitigation_Framework2nd_june2016.pdf.

²⁹ National Institute of Building Sciences, *Natural Hazard Mitigation Saves* (2019), <https://www.nibs.org/projects/natural-hazard-mitigation-saves-2019-report>. NIBS is an independent entity commissioned by Congress to study the return on investment to the federal government of investing in resilience.

³⁰ Borja G. Reguero et al. (2018), *Comparing the cost effectiveness of nature-based and coastal adaptation: A case study from the Gulf Coast of the United States*, PLoS ONE 13(4) (2018), <https://doi.org/10.1371/journal.pone.0192132>.

³¹ *Id.*

³² Siddharth Narayan et al., *The Value of Coastal Wetlands for Flood Damage Reduction in the Northeastern US*, Scientific Reports 7(1) (2017).

³³ *Id.*

³⁴ FM Global, *Master the Disaster: Why CFO must Initiate Natural Catastrophe Preparedness in 2019 and Beyond*, at 3, 10 (2019), <http://cms.ipressroom.com.s3.amazonaws.com/240/files/20190/Master+the+disaster+-+CFO+natural+disaster+preparedness+in+2019+and+beyond.pdf>.

businesses do not reopen after a disaster and another 25% fail within one year.³⁵ And even if the businesses persist, they often do in a weakened state. For example, two years after Hurricanes Katrina and Rita, 60% of local small businesses that remained open were earning less revenue than before the storms.³⁶ In addition to impacting communities, these major effects on small businesses affect the ability of the U.S. Treasury Department to collect business and employee income taxes.

To actually avoid future disaster spending, investments must be coordinated across federal programs, be outcomes-oriented, and leverage private investment consistent with the framework established by the WRA:

In order to minimize future disaster spending in the face of these growing stressors, the federal government must proactively and strategically invest in natural infrastructure to help make communities considerably more resilient to severe events than they currently are. The GAO, along with the Inspector Generals of several agencies, have each separately recommended three key strategies to ensure that investments in natural infrastructure and disaster resilience achieve their intent and minimize federal fiscal exposure. The WRA infuses the analytics, coordination, and leverage elements encapsulated by these strategies and so is a great framework for showing that high-impact natural infrastructure investments actually avoid future disaster spending.

Coordination across Federal Programs and Agencies

The GAO found that no federal agency, interagency effort, or other organizational arrangement has been established to implement a strategic approach to resilience investment.³⁷ The lack of a strategic approach to identifying, prioritizing, and implementing investments increases the risk that the federal government will lose key opportunities to strengthen infrastructure and resilience.³⁸

To focus federal funding on high-priority resilience projects, GAO recommends “coordinating funding provided through multiple existing programs with varied purposes.”³⁹ Even if the programs were not designed specifically for resilience, their purposes may be compatible with resilience and thus should be part of a coordinated effort.⁴⁰ Similarly, FEMA’s National Mitigation Framework states that it is critical to coordinate the planning and development of interconnected initiatives.⁴¹

With its watershed targets, cross-agency funding plan, precision watershed analytics, the WRA includes all the major elements outlined by GAO and FEMA. The Louisiana Coastal Protection and Restoration Authority (CPRA) is another prime example. Each of the high-priority resilience projects implemented by CPRA are funded by one or more federal programs compatible with the project’s purpose.⁴² CPRA identifies and prioritizes high-priority resilience projects, then coordinates existing and new federal and nonfederal funds to implement those projects.⁴³

Outcomes-Oriented Investments

To successfully orient funding in a prioritized way, the GAO recommends quantification and outcomes-oriented analytics to help decisionmakers identify potential criteria, assign weights to the criteria, visualize project trade-offs, rank proposed projects, and identify high-priority projects.⁴⁴ Quantified environmental outcomes not only help to measure and compare results, but to prioritize

³⁵ FEMA, *Ready Business Hurricane Toolkit* (2022), https://www.ready.gov/sites/default/files/2020-04/ready_business_hurricane-toolkit.pdf.

³⁶ Howe, P. *Hurricane Preparedness as Anticipatory Adaptation: A Case study of Community Business*. Global Environment Change (2011), <https://www.sciencedirect.com/science/article/abs/pii/S0959378011000239>.

³⁷ U.S. Gov’t ACCOUNTABILITY OFFICE, CLIMATE RESILIENCE at 60.

³⁸ U.S. Gov’t ACCOUNTABILITY OFFICE, HURRICANE SANDY.

³⁹ U.S. Gov’t ACCOUNTABILITY OFFICE, CLIMATE RESILIENCE at 46.

⁴⁰ U.S. Gov’t ACCOUNTABILITY OFFICE, CLIMATE RESILIENCE at 47.

⁴¹ FEMA, NATIONAL MITIGATION FRAMEWORK at 21.

⁴² U.S. Gov’t ACCOUNTABILITY OFFICE, CLIMATE RESILIENCE at 47.

⁴³ U.S. Gov’t ACCOUNTABILITY OFFICE, CLIMATE RESILIENCE at 43.

⁴⁴ U.S. Gov’t ACCOUNTABILITY OFFICE, CLIMATE RESILIENCE at 42.

amongst potential investment opportunities to maximize resilience benefits and reduce impacts of future disasters.⁴⁵ With advance watershed analytics and a focus on purchasing outcomes, the WRA likewise aligns well with this plank of GAO’s recommendations.

Leveraging the Private Sector

The GAO’s Disaster Resilience Framework also recognizes the importance of catalyzing private and nongovernmental participation.⁴⁶ According to FEMA’s National Mitigation Framework, public-private partnerships are critical for reducing long-term natural disaster vulnerability.⁴⁷ Coordinating with the private sector reduces duplication of efforts, encourages complementary efforts,⁴⁸ and maximizes the use of available resources.⁴⁹ Public-private partnerships also bring in diverse perspectives across sectors and increase the likelihood that actions will capture all aspects of natural hazard risk, mitigation, and resilience.⁵⁰ Leveraging the private sector can also accelerate progress because private investment can provide upfront capital to accelerate work. The WRA specifically includes several elements that are meant to leverage, provide certainty to, and pull in the private sector.

⁴⁵ U.S. Gov’t ACCOUNTABILITY OFFICE, CLIMATE RESILIENCE at 42.

⁴⁶ U.S. Gov’t ACCOUNTABILITY OFFICE, DISASTER RESILIENCE FRAMEWORK at 5.

⁴⁷ FEMA, NATIONAL MITIGATION FRAMEWORK at 28.

⁴⁸ FEMA, NATIONAL MITIGATION FRAMEWORK at 28.

⁴⁹ FEMA, NATIONAL MITIGATION FRAMEWORK at 22.

⁵⁰ FEMA, NATIONAL MITIGATION INVESTMENT STRATEGY at 9.



WHO ARE WE?

- Systems change-focused nonprofit that builds and deploys technical, financial, and policy tools to enable large-scale solutions that bolster watershed resiliency
- Proven collaborator with landowners, regulated entities, governments, and businesses to build, quantify, and track optimized watershed solutions
- Growing portfolio of work spans western U.S., from on-the-ground projects to precision analytics to policy efforts to improve the conservation system
- Designed and shepherded to approval over \$1 billion in new quantified watershed solution funds
- By 2030, we endeavor to drive \$1 billion/year to precision watershed analytics and outcomes-driven investments—[now is the time](#)

PRECISION INSIGHT TO SEE, DESIGN & GUIDE OPTIMAL SOLUTIONS

DEPLOYING PRECISION ANALYTICS TO HELP CORPORATIONS MEET SUSTAINABILITY PLEDGES

In 2020, TFT entered an agreement with Microsoft Corp. to help the company identify and prioritize actions for replenishing groundwater in California's heavily depleted Sacramento Valley. TFT is using its [BasinScout® Platform](#) to discover cost-effective projects that contribute to Microsoft's ambitious water stewardship strategy, including its commitment to replenish more water than it consumes by 2030. TFT is responsible for implementing groundwater replenishment contracts for Microsoft. Amazon Web Services recently joined on and will buy additional groundwater replenishment projects in the area.

ANALYTICS THAT CONNECT WATER SCARCITY

Central Oregon's Deschutes River basin is facing multiple challenges. Last year, many farmers had their water turned off due to drought, imperiled salmon died from high water temperatures, and excess nutrient runoff choked the system with harmful algae blooms. Yet all sources are in compliance. [TFT determined](#) that of 4,070 agricultural fields in a key area, only 1,500 could host a meaningful conservation action—at an estimated cost of \$130 million. However, by pursuing the top 10% of the projects with the highest impact, it is possible to remove 60% of the nitrogen runoff in the basin at a cost of \$25 million. To make these projects happen, TFT is working closely with local water users to map the full integrated system—from water delivery through to individual farms—so that partners can collectively optimize investments for water savings and runoff reductions, and gain real-time insight to support flexible transactions that keep the river and communities whole.

USING THE CLEAN WATER ACT TO CATALYZE WATERSHED-SCALE INVESTMENT AND RESILIENCE

REDIRECTING COMPLIANCE IN ROGUE BASIN TO GREEN SOLUTIONS WHILE BUILDING RESILIENT LOCAL ECONOMY

In 2011, rather than invest in chillers or a cooling pond to address a temperature compliance issue, the City of Medford, Oregon, [partnered with TFT](#) to plant native trees and shrubs in strategic places along the Rogue River and its tributaries. The new vegetation blocks solar load. Using precision insight technology, TFT quantifies the benefits of the restoration in the same units as technology solutions, and then recruits the projects that produce the most benefits for the least cost. This approach allows the City to use the projects for permit compliance, while also restoring degraded ecosystems and [supporting dozens of local contractors and jobs](#). This initial contract set the table for other entities such as the Bureau of Reclamation (ESA fish habitat program), the City of Ashland (the nation's first Clean Water State Revolving Fund loan-financed trading program), and the U.S. Forest Service to partner with TFT on aligned conservation programs.

Over a decade, TFT has catalyzed nearly \$25 million of new investment into the Rogue basin, supporting dozens of jobs and bolstering economic activity in the region.

DEVELOPING AN INTEGRATED SOLUTION FOR PUGET SOUND

In 2020, we signed on with King County, Washington, to assess the feasibility of a multiparty program to improve the water quality of the Puget Sound. Collectively, all the municipalities in the Sound are poised to invest billions on wastewater treatment technologies that will meet permit terms, but fail to yield watershed-level health. The current regulatory approach will not adequately address nonpoint sources such as stormwater, septic systems, and agricultural runoff. TFT is helping partners design watershed-based permit flexibility and supporting analytics to ensure that the right increments of dollars go to the right mix of projects (technology and distributed projects).



Rogue River basin in Southern Oregon

DEVELOPING AN INTEGRATED SNAKE RIVER BASIN SOLUTION

When TFT first started working with Idaho Power Company (IPC) in 2014, IPC had gone through 13 failed relicensing efforts for its hydropower dams in Hells Canyon (which produce 70% of the utility's hydropower). With TFT's help designing a solution, IPC received its Clean Water Act (CWA) 401 certification from Idaho and Oregon to implement a \$350 million [watershed restoration compliance program](#) that will restore hundreds of miles of riparian vegetation on degraded tributaries, reshape the mainstem Snake River to better fit its current hydrograph, and avoid significant sediment and nutrient loading from upgraded irrigation infrastructure.

To support this program, TFT built a technology system for site selection, design, permitting, implementation, monitoring, tracking, and reporting for all conservation projects. TFT is now working with IPC to develop a sediment and nutrient runoff reduction compliance program, as well as with the City of Nampa, Idaho, to design a flexible CWA compliance solution. Combined, these and other centralized sources could soon spend over \$1 billion on technology solutions that will fail to meaningfully incorporate nonpoint sources. TFT is working on behalf of these entities to coalesce an integrated watershed solution that brings all these pieces together into an optimized approach.

SECURING A SUSTAINABLE FUTURE FOR IRRIGATED AGRICULTURAL COMMUNITIES

PIONEERING WATER TRANSACTIONS THAT WORK FOR AGRICULTURE AND RIVERS

As the nation's first water trust, TFT believes working lands and healthy rivers can and must coexist. Since 1993, TFT has completed 238 instream flow restoration projects throughout Eastern Oregon, where pressure on water resources is growing. These transactions compensated landowners for leaving water instream or upgrading equipment, and restored up to 163 million gallons of water/minute each irrigation season, while also helping landowners convert their liquid assets into a critical new revenue source.

PRACTICAL SOLUTIONS TO FIX DEPLETED GROUNDWATER AND SURFACE WATER SYSTEMS IN CALIFORNIA

In 2016, TFT began working with the Sacramento Regional County Sanitation District to secure a massive state grant that would allow the District to pump recycled wastewater to a stressed basin directly south of Sacramento. Farmers there will use the recycled water to irrigate fields instead of pumping groundwater. To complement that work, TFT also designed a unique basin-scale conservation approach that will secure, protect, and enhance more than 5,000 acres of important groundwater-dependent habitat in the southern Sacramento Valley over the next 80 years. This \$600-700 million program is expected to restore groundwater to local aquifers, thus increasing drought resilience for the entire system, and benefiting irrigators, at-risk drinking water supplies, and fish and wildlife species.

PILOTING BLOCKCHAIN & REMOTE SENSING TO SUPPORT REAL-TIME WATER TRANSACTIONS

In 2019, TFT began a pilot using blockchain and remote sensing to track groundwater use in California's Solano subbasin. The project's scientists and engineers are demonstrating how a secure blockchain platform and low-cost sensors can accurately measure groundwater use transparently and in real time. Measurement and tracking lay the groundwork for being able to quickly and confidently transact water in the face of rapidly changing conditions.



Efficient irrigation in Eastern Oregon

ENSURING RURAL AGRICULTURAL COMMUNITIES THRIVE EVEN IF THEY HAVE TO USE LESS WATER

Decades ago, cities on Colorado's Front Range purchased large swaths of water rights. The cities leased the water back to farmers, but now the cities are calling in the water as their populations grow. If left to market forces alone, these calls will indiscriminately dry up fields regardless of how productive they are or how it impacts rural communities. TFT has worked closely with partners to develop analytics that illustrate how strategic approaches can get the cities the water they need without compromising the area's farm productivity or economies and, in some cases, even increase economic output. This approach will likely be required across the western United States.

RECOGNITION

- Multiple national and state USDA-NRCS Conservation Innovation Grants
- Nation's first water trust
- Recipient of United States Water Prize for innovation
- Largest restoration group in the Pacific Northwest
- Recipient of U.S. patent for StreamBank®