

PAY-FOR-SUCCESS

ANALYZING AND EVALUATING AN EMERGING WAY OF
GOVERNMENT CONTRACTING FOR ENVIRONMENTAL PROJECTS



Applied Policy Project Report

Prepared By: Alex Moisa, Christian Lua,
Ethan Ellis, Iris Li, Mutsuki Sakai
Advisor: Dr. Helmut Anheier



ENVIRONMENTAL POLICY
INNOVATION
CENTER

UCLA

Luskin
School of Public Affairs

TABLE OF CONTENTS

ACKNOWLEDGEMENT	3
DISCLAIMER	3
EXECUTIVE SUMMARY	4
GLOSSARY	5
INTRODUCTION	6
Pay-for-Success (PFS) Contracts	6
Client Information	7
Policy Questions	8
PROBLEM IDENTIFICATION	9
Background	9
Pay-for-Success Contracting Process	10
Motivation and Challenges	11
METHODOLOGY	14
Research Design and Data Collection	14
Interviews	14
Qualitative Analysis	15
Quantitative Analysis	16
POLICY OPTIONS AND CRITERIA	17
Formation of Criteria	17
Policy Options	18
Outline of Policy Options	21
POLICY EVALUATION	22
Evaluation Criteria	22
Option Rating and Score Card Design	23
Evaluation Results	25
Policy Option Explanation By Criteria	26
POLICY RECOMMENDATION	31
Potential Practices For Policy	31
LIMITATIONS AND CONCLUSION	33
Limitations	33
Conclusion	33
BIBLIOGRAPHY	35
APPENDIX	40
Evaluation Samples	40
Case Studies	53
Interview Template	61
Interview Summary	63
Cost Savings Under PFS	93
Internal Notes for Management Evaluation	94

ACKNOWLEDGEMENT

This report would not have been possible without the help of Dr. Helmut Anheier, who provided us guidance through the origins of Pay-for-Success and challenged us to produce the most comprehensive report possible. We are also grateful to Grace Edinger and Harry Huntley of the Environmental Policy Innovation Center. They generously devoted their time and effort to assist us throughout this process and remained available to help address our questions and concerns. We are thankful to all of the individuals from the government agencies, academic institutions, and firms listed below whose knowledge, data, and insight on government contracting and implementation helped us produce a robust and comprehensive report on Pay-for-Success.

Anne Arundel County, MD, Watershed Protection Program, San Diego County, CA, Maryland Department of Agriculture, California Department of Water Resources, University of Maryland Center for Environmental Studies, Michigan State University Institute of Water Research, Virginia Tech Department of Agricultural and Applied Economics, Environmental Incentives, GreenVest, Ecosystem Investment Partners, Community Infrastructure Partners, Wildlands, Resource Environmental Solutions, Qualified Ventures, Ecological Restoration Business Association, WesterVelt Ecological Service

Lastly, we want to thank Professor Kimberly Murtaugh, Connie Kwong, Diana Escamilla, Chen Wang, Dan Erhart, and Ziyi Meng for taking the time to peer review our report and giving us their feedback and advice.

Disclaimer

This report was prepared in partial fulfillment of the requirements for the Master in Public Policy degree in the Department of Public Policy at the University of California, Los Angeles. It was prepared at the discretion of the Environmental Policy Innovation Center as a policy client. The views expressed herein are those of the authors and not necessarily those of the Department, the UCLA Luskin School of Public Affairs, UCLA as a whole, or the client.

EXECUTIVE SUMMARY

Pay-for-Success (PFS) is a government contracting model whereby the commissioning agency pays out the full contracted costs for a project to a firm when the project is completed. PFS-based contracts for environmental outcomes have recently started rolling out in the United States, but the main idea behind the model is that it incentivizes the contracted firm, having signed on to work on this project for the agency, to complete the project much faster at a lower cost and with less risk to the agency.

Across the U.S., PFS is emerging as a way to contract for environmental projects. Examples abound across the country, from the East Coast in Anne Arundel County, Maryland, to the West Coast in Sacramento County, California, for projects involving land restoration, mitigation banks, and stormwater management. Some governments and organizations view PFS as a means of generating the most cost-effective environmental benefits, and ultimately creating a cleaner and better-managed environment.

To see how accurate this assessment is and as a way to showcase the overall results of PFS, the Environmental Policy Innovation Center (EPIC) connected with us back in October about conducting an analysis on this topic. Thus, taking this into account, the policy question the team worked to address is: What benefits PFS contracts bring for states or municipalities that utilize them, and how they generate more benefits (Whether it be in costs saved or environmental outcomes) than the traditional design-bid-build method?

What benefits PFS contracts bring for states or municipalities that utilize them, and how they generate more benefits (Whether it be in costs saved or environmental outcomes) than the traditional design-bid-build method?

This report was put together after conducting a host of interviews with experts in the field of PFS and government contracting. By speaking with academics who specialize in evaluating this work, firms who carry out projects under it, and agencies who manage these programs, a picture of the positives and negatives of PFS is developed. Overall, we spoke to 17 different organizations and 20 interviewees on PFS and other alternative contracting models, their work being conducted under PFS, and what the future of contracting will look like. In addition, our team was able to get access to contracts and Requests for Proposals (13 documents in total) that cover a wide variety of projects. The overall data and information collected and analyzed forms the basis of our evaluation on the comparison of PFS and other potential contracting methods.

Given the unorthodox nature of PFS, the analysis conducted in this report focuses on the risks that agencies and firms must deal with when it comes to government contracting. From the interviews conducted and contracts reviewed, a major emphasis was placed in these main criteria:

- ▶ **Financial:** Overall costs and cost-savings of the project;
- ▶ **Time:** Involving time spent on the project and if it was completed under the set deadline;
- ▶ **Outcome:** What goals were achieved and did the firm complete what it set out to do;
- ▶ **Reputation:** How did the agency and firm look coming out of this project;
- ▶ **Management:** Did oversight and implementation of the contract satisfy everyone and lead to a successful performance result.

By comparing PFS with the traditional reimbursement method for government contracting, along with two hybrid versions of PFS involving third-party investors and stepwise payments, PFS is the most effective contracting method. For a government agency, the cost savings generated from PFS means that an agency can pay 63% less than what was paid under the original contracting method over a 5 year time frame (See Appendix 5). PFS also helps the agency hold out from having to pay the contracted firm until a satisfactory job is completed, gets the project done efficiently, generates optimal outcomes, and creates the least administrative burden on the agency. For expanding the use of PFS in the future, this report recommends that the state statutes be amended to rectify the legal ambiguity of agency participation in PFS contracts. Additionally, this report recognizes the need for model PFS contracts customized to fit specific project types and state laws. This report recommends streamlining the contract design to reduce the upfront administrative burden of local agencies who lack the technical knowledge or capacity to design PFS contracts.

While these results are limited by time and data constraints, this report does generate a framework for evaluating government contracting models in a way that is designed to lower the risks an agency faces and see if they can achieve the performance results that they are looking for. It follows then that for future environmental projects governments are pursuing, such as cleaning water by the state of Maryland or reducing the amount of phosphorus in the Great Lakes region, PFS may be the contract model more states and even the federal government will use. Moving forward, with more data coming out on PFS, the overall cost savings of this method can be quantified with greater certainty while agencies can help build the best contract model for PFS if they want to reduce the risks and workforce required for a project while still getting the outcomes they desire.

Glossary

Pay-for-Success (PFS): Contracts that are structured such that payment is based upon successful delivery of outcomes. We are assuming that the PFS model we are working with here is based on an ex post facto payment scheme and not around bonds.

Case Studies and Data: This refers to specific cases of cities or states utilizing PFS and what their final results are in terms of what the project is for, how much they spent for it, and what benefits were produced from said project.

Cost Savings: One of the main ways we are measuring the success of the PFS Model. The focus is on seeing how much government entities save in terms of dollar amount and time spent contracting out for services when compared to the reimbursement contract model.

Green Infrastructure: Primarily planned networks of natural and semi-natural related areas and enhanced assets that incorporate green spacing and other physical features. EPIC wants to look into what are the environmental benefits that coincide with PFS procedures.

Habitat Restoration: Recovery of ecosystems and the returning of natural functions to a degraded native habitat.

Pay for Performance (PFP): See Pay-for-Success definition above. Seemingly a true synonym. Additionally, employee payscale programs also use this term to refer to wage raises given based on predetermined performance metrics.¹

Water Mitigation: Maintaining practices to prevent water damage and stabilizing clean water uses to avoid future water damage.

Environmental Impact Bond (EIB): An Environmental Impact Bond (EIB) is a type of bond (often a municipal bond) which signals to investors that the issuer has market-leading ESG transparency and accountability in their bond. It uses Pay-for-Success to provide up-front capital from private investors for environmental projects such as green stormwater infrastructure or forest restoration.

¹ Edinger, Grace. "What's in a Name? One Writer's Frustration with Technical Term Redundancy." Environmental Policy Innovation Center. August, 2022. <https://www.policyinnovation.org/blog/whats-in-a-name-one-writers-frustration-with-technical-term-redundancy>

INTRODUCTION

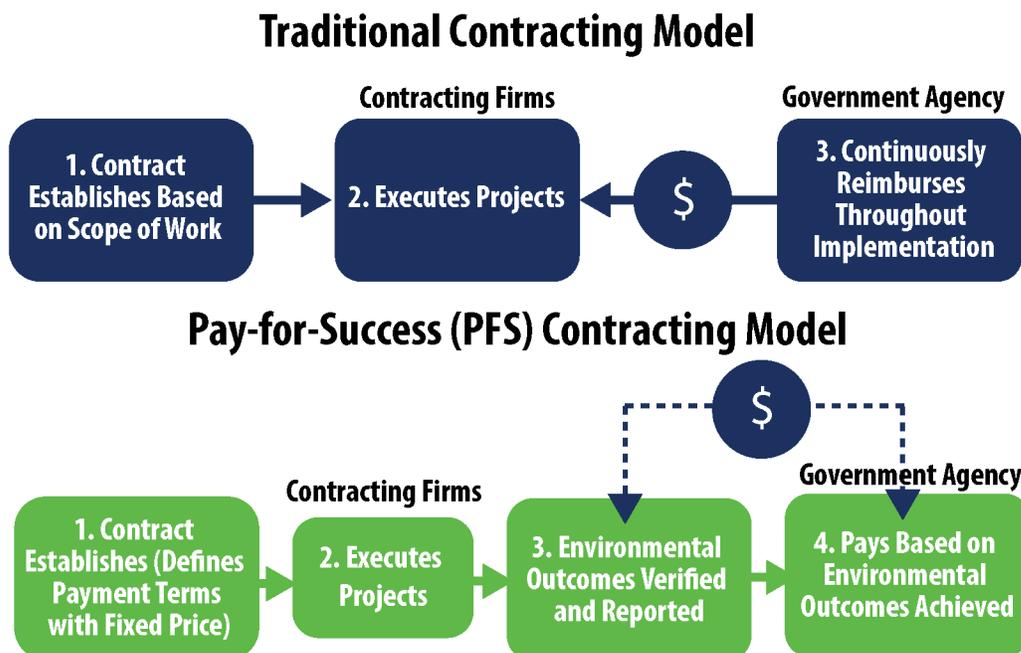
Pay-for-Success (PFS) Contracts

Pay-for-Success procurement strategies have the potential to increase the efficiency of conservation and environmental restoration projects while reducing costs and risk for the commissioning agencies. Governments pay a contracted firm a fixed payment per unit of outcomes only after the firm meets minimum targets. In all PFS cases, a significant portion of the payment is secured only after the project is completed. For the funding agency, this strategy avoids the costs of paying upfront and shields it from the financial risks of project failure. The contracting party takes on most risks, which is meant to incentivize a quicker and more cost-efficient project.

The Traditional Reimbursement methods, mainly known as design-bid-build, involve having the agency design the projects and issue multiple contracts or RFPs for large environmental projects that are bid on by firms, creating delays in starting the project. They also require government employees to serve as project managers. On the other hand, PFS allows firms to provide the expertise in project design, implementation, land buying, and other project aspects. The Lookout Slough Tidal Restoration project would never have been completed in the required 5 year time frame had not the contracted firm taken over the land acquisition process and sped up the process (See Project 2 Appendix 1). Projects carried out through firms may also save time by avoiding lengthy government procurement processes. Thus, there is an assumption that major environmental-based projects could be started and completed in a quicker turnaround period at an affordable price with PFS procurement.

Private businesses that carry out environmental projects can profit as long as they reduce the cost by being more efficient. The implementation parties planning on conducting environmental projects can have their project costs covered as they receive a fixed price for the project stated in the contract. In essence, the PFS contract model would create a win-win situation for both parties. In this research,

Figure 1.1. Traditional Contract Model v.s. Pay-for-Success (PFS) Contract Model



we investigated the effectiveness as well as the advantages and disadvantages of the contracting model for both parties.

There is much to learn on the full benefits of PFS but the existing literature highlights that the main benefits are potential cost savings and increased effectiveness. PFS is supposed to protect the contracting entity (usually the government) because it helps ensure delivery of the agreed-upon results. PFS has also promoted environmental outcomes including ecosystem services that are easy to quantify, nutrient reduction, land area, and environmental policies, such as carbon sequestration.² While many case studies strongly suggest that the use of PFS can result in significant cost savings and improved outcomes, implementation varies widely across the country.³ As a result, there currently needs to be more data analysis that would contribute to the implementation, such as quantifying the average percentage of cost savings.

Client Information

The Environmental Policy Innovation Center (EPIC) is a non-profit organization based in Washington D.C. The mission of EPIC is to build policies to speed up environmental progress. EPIC uses procurement and finance to accelerate environmental conservation and restoration. Their focused strategies are:

- ▶ Improving policies by allowing private sector funding or private sector financial stewardship;
- ▶ Improving policies to expand environmental work or charitable conservation work;
- ▶ Transforming policies to focus on outcomes with more flexible process;
- ▶ Eliminating organizational barriers that prevents public agencies from adapting to more innovative approaches and solutions.

EPIC expects the implementation of PFS in environmental policy to be an innovative approach for the agencies that adopt it. As a client, EPIC seeks a comprehensive evaluation of PFS as an option in procurement methods.

Policy Questions

The goal of this research is to provide EPIC with a comprehensive report on the PFS contract model that highlights its strengths and weaknesses, what challenges it faces, and why and under what conditions state and local governments should consider it over a traditional reimbursement model for environment-based projects. The potential cost savings and program efficiency of PFS emerge thanks to a set of criteria designed within PFS contracts that emphasizes speed and results in order for a contracted firm to get paid. When compared to a traditional reimbursement model, we will see if the benefits and costs of PFS are a possible option for a government entity to make the switch. Thus, our policy question is as follows:

What benefits does the PFS Contract Model bring for states or municipalities that utilize them? What about different forms of PFS? And how does it generate more benefits (Whether it be in costs saved or environmental outcomes) than the traditional method?

² Environmental Incentives (November, 2019). "Pay-for-Performance: A Guide for Conservation Buyers in California."

³ Environmental Policy Innovation Center (EPIC), Nature, Paid on Delivery: Leadership by Louisiana, California, Maryland and Nevada in creating outcome-based opportunities for private investment in natural resource restoration and protection, EPIC, 2017

Important information to take into consideration are:

- ▶ How government funds for projects should be used between the traditional method or the PFS model so that the contracted firm is incentivized to get the job done sooner and under set requirements by the contract in order to get paid
 - ◇ Faster project completion times with strong results by incentivizing firms is seen as a core strength of PFS
 - ◇ Ill-designed contracts that understate risks and lead to project failure can jeopardize the attractiveness and even credibility of the process
 - ◇ Measuring the effectiveness and long-term outcomes of PFS projects needs indicators to check the performance to compare contracting methods
- ▶ How the contracted firm deals with the risk brought about by PFS contracts
 - ◇ The clear lack of initial funding and high amount of risk a firm takes on forms the main weakness of PFS, as these concerns make state and local governments hesitant to start using PFS for fear of scaring away any potential bidders for a project
- ▶ How the contract budgets and payments for these projects are designed by third-party actors, like environmental non-profits, to best deal with state actors wary of switching to a new government contract model and agencies who are concerned about the risk they are taking by beginning one of these projects, all for the goal of seeing better results from this model for their programs
 - ◇ By gathering assistance for these PFS contracts, governments are given new opportunities to apply PFS and test out the contract model to see if the supposed benefits emerge

PROBLEM IDENTIFICATION

Background

Pay-for-Success has the potential to deliver promising benefits for agencies that engage in environmental projects. By improving program efficiency and generating verified outcomes, PFS could help alleviate the resource constraints that such agencies often face, potentially resulting in lower costs. Public agencies undertaking large scale environmental projects often face a number of challenges. Management of land and natural resources is often distributed across multiple government agencies with overlapping or competing responsibility for environmental mandates, so there may be unclear jurisdiction. Securing various regulatory permits also complicates and slows projects, especially when jurisdiction⁴ is spread across agencies (see the interview notes with Charlotte Biggs of the California Department of Water Resources in Interview 14 Appendix 4).⁵

Moreover, as environmental systems are often shaped by threshold effects, achieving measurable environmental benefits from restoration projects typically requires a significant level of investment.⁶ Yet the funding available to many agencies is often low and must be acquired through multiple sources. Public land acquisition, which requires navigating a significant amount of red tape, can also be quite complex. As a result, these projects are implemented over very long timeframes, sometimes over the span of decades.⁷

These difficulties are well illustrated by the case of California's EcoRestore habitat restoration in Sacramento – San Joaquin Delta (see Project 1 Appendix 2). The state struggled to acquire Delta land as the state's oversight agencies appraised land value at lower than market values. The permitting process was also governed by multiple state-agencies, and was ill-designed for restoration projects.⁸ The state's adoption of a hybrid PFS model solved some of these issues. Most notably, as some of our interviewees such as WesterVelt noted, private firms could successfully acquire land more quickly than the state by avoiding regulations imposed on agencies.

Agencies also face contract-related challenges in environmental contracting. The norm in environmental contracting is where agencies typically pay a uniform amount to firms over the contract period.⁹ For large-scale restoration projects, as with all government projects, agencies usually hire different firms for each stage in a process known as "design-bid-build", where the designing and implementing firms may differ.¹⁰ However, PFS contracting offers a more efficient and cost-effective alternative by bundling multiple project stages into a single contract, as demonstrated in the EcoRestore case (see Project 1 Appendix 2). The traditional contracting method is less efficient and riskier for the agency, making PFS contracting a potentially more beneficial option for delivering greater environmental benefits while saving time and costs.

4 U.S. Government Accountability Office. Fragmentation, Overlap, and Duplication: An Evaluation and Management Guide." April 2015. <https://www.gao.gov/assets/gao-15-49sp.pdf>.

5 Fitzer, Chris and Ramona Swenson, PhD. "Finding Common Ground to Advance Restoration in California's Delta and Beyond." Environmental Science Associates. September 16, 2019. Accessed April 8, 2023.

6 Balboa C M 2016. Accountability of Environmental Impact Bonds: the future of global environmental governance? Global Environ. Polit. 16 33

7 Environmental Incentives (November, 2019). "Pay-for-Performance: A Guide for Conservation Buyers in California."

8 Fitzer, Chris and Ramona Swenson, PhD. "Finding Common Ground to Advance Restoration in California's Delta and Beyond." Environmental Science Associates. September 16, 2019. Accessed April 8, 2023.

9 Schilizzi, Steven & Breustedt. "Does Tendering Conservation Contracts with Performance Payme." Working Papers. University of Western Australia, School of Agricultural and Resource Economics, February 18, 2011. <https://ideas.repec.org/p/ags/uwauwp/100883.html>.

10 Grace Edinger, Harry Huntley. 2023. "Purchasing Environmental Progress: Some state programs have fully bought into innovation, others are stuck writing paper checks." Environmental Policy Innovation Center, Washington D.C.

Pay-for-Success Contracting Process

1. Requests For Proposals (RFPs) and Selection of Firm

To entice bids from firms and agencies, the initial phase of the contracting process involves the solicitation of a request for proposal (RFP). In the RFP, the agency states the objectives of the project and the criteria used to select a firm. As opposed to the “design-bid-build” approach RFP, which contracts for each step in the project, it is often more common under a RFP for PFS to propose a full delivery project, that is for one firm who designs and implements the entire project. The firm may employ subcontractors that they cooperate with, but overall, PFS provides more space for firms to decide the details.

To attract bids from firms while ensuring project objectives are met, an agency must carefully determine the terms and conditions of a contract. This includes defining clear project goals and developing appropriate and measurable metrics for performance evaluation, which is crucial for the success of a Pay-for-Success (PFS) contract that ties payment allocation to performance outcomes.¹¹ Well-defined metrics help attract firm bids and project funding from investors. While an agency may save significantly in total utilizing a PFS contract (see Appendix 5), there are some administrative costs associated with developing a contract of this nature and initiating a performance-based payment project.¹²

2. The Implementation and Assessment Stage

The flexibility provided to firms is a significant factor in the potential success of PFS contracts. Both parties typically benefit from allowing firms the freedom to innovate. PFS offers an advantage to agencies by enabling them to possibly realize greater efficiency without putting taxpayer money at risk. To achieve cost or efficiency savings, firms require flexibility to adopt cost-saving practices to earn the surplus profit necessary to repay investors. However, there is a risk involved for both parties if the fixed price in the contract does not accurately reflect the project’s actual cost. The firm runs the risk of overbearing management and stipulations from the agency. For a contract to be effective, the agency must provide sufficient oversight to ensure that its objectives are met.¹³ This approach can be beneficial for the firm as it helps to prevent project changes at a later stage. However, excessive control exerted by the agency can make it more challenging for the firm to achieve a sufficient profit. Similarly, for the agency, there is a risk that the firm may overpromise or misrepresent their performance. However, this is probably less likely under a PFS contract compared to other public-private partnerships as there is limited to no financial incentive to underperform. In fact, there are often rewards for over performing expectations.

Agencies frequently rely on the expertise and technical knowledge of firms since they possess a level of proficiency not found in-house. In the case of Pay-for-Success contracts, agencies face lower financial or political risks, making them less inclined to restrict firms from pursuing riskier projects in less familiar ways. Experienced firms usually find this risk manageable, as the only uncontrollable risks they face are “acts of god” such as unforeseeable natural disasters. As Stephenson points out, firms mitigate these risks through the negotiation on the price of outcomes. Though typically, potential risks are taken into account during the contracting phase and included in the cost to mitigate future risks.

11 Edinger, Grace. “Common Pay for Success Contracting Pitfalls and How to Avoid Them.” Environmental Policy Innovation Center. Environmental Policy Innovation Center, October 14, 2022. <https://www.policyinnovation.org/blog/common-pay-for-success-contracting-pitfalls-and-how-to-avoid-them>.

12 <https://spia.princeton.edu/sites/default/files/content/Social%20Impact%20Bonds%202014%20Final%20Report.pdf>

13 Environmental Incentives. Pay For Performance: A Guide For Conservation Buyers In California. November 2019

2.1 Critical Issues and Risks of Different Contract Stages

PFS phase	Critical Issues Arising and Potential Impact
RFP and contractor selection phase	<ul style="list-style-type: none"> ▶ RFP too generic without details for accountability purposes, potential risks not included in the contract ▶ Firm overpromise a time frame that is not realistic ▶ Project request too specific resulting in few interested parties to apply, as they are worried about the costs of delivering the project
Contracting phase	<ul style="list-style-type: none"> ▶ RFP too generic without details for accountability purposes, potential risks not included in the contract ▶ Firm overpromise a time frame that is not realistic ▶ Project request too specific resulting in few interested parties to apply, as they are worried about the costs delivering the project
Implementation phase	<ul style="list-style-type: none"> ▶ Cost overrun as certain situation happens (e.g. natural disaster) ▶ Unforeseen changes in external conditions that affect performance ▶ Failure of securing funding or proper financing ▶ Innovative approach couldn't reach proposed outcomes
Assessment phase	<ul style="list-style-type: none"> ▶ Ambiguous target measures resulting in difficulty of assessment ▶ Unreliable or incomplete performance data ▶ Lack of transparency in the assessment process ▶ Conflicts over contract terms.

Motivation and Challenges

Motivation to Adopt PFS for Agencies

1. PFS May Lower Probability of Sunk Costs and Project Failure

One of the significant risks that the traditional contracting model poses to the public is that the agency is obliged to pay firms irrespective of the eventual project outcomes. If a firm fails to achieve the anticipated outcomes at any point in the project, it could lead to cost overruns and project delays, with agencies required to extend the project and spend more to attain project objectives. In the worst-case scenario, agencies may have to abandon an incomplete project with sunk costs. In a design-bid-build process, any unforeseen circumstance that necessitates a project redesign may require the drafting of a new contract, resulting in increased costs and delays. However, with the PFS model, payment is only made upon meeting specific criteria, saving public funds in the event of project failure. This arrangement helps to avoid unexpected costs saddled on the public, as payment for services would be estimated beforehand to minimize risks and avoid sunk costs.

2. Pay-For-Success Shifts Risks and Speeds Up Project Process

The traditional contract model suffers from a moral hazard problem inherent in the nature of

the contract's design.¹⁴ As firms are paid regardless of the progress made on achieving project objectives, there is incentive for them to underperform. The urgency of meeting environmental mandates and the risk of failure also motivates the agency to be risk averse and avoid using innovative methods to achieve project objectives. Conversely, by transferring risk from agency to firm, PFS creates incentive for firm efficiency and innovation.

Potential Drawbacks and Challenges of PFS for Agencies

1. High Cost and Implementation Difficulties at Initial Adopting Stage

There are a few factors which create obstacles for PFS adoption amongst public agencies. Firstly, Pay-for-Success is a new contracting model which agencies may be hesitant to adopt given administrative norms and ethos accustomed to traditional procedures. Relatedly, given the novelty of PFS, there is ambiguity in some state statutes regarding the legality of agencies entering into PFS contracts.¹⁵

Secondly, high initial costs during the early stages of implementation could act as a disincentive for agencies. Agencies must possess the necessary technical knowledge, capacity, and access to a predictable funding source to facilitate an administrative change.

Relatedly, agencies must take on some administrative burden to develop metrics by which to measure project performance.¹⁶ For environmental outcomes to be attributed to the actions undertaken by the firm, any prospective project must have well-defined and approved methodologies for defining credits and measuring performance. Private investors require clarity and certainty in performance metrics to make informed investment decisions.

Motivation for Firm to Adopt PFS

1. More Flexibility In Project Design to Conduct Innovative Projects

Traditional contracting models can be quite inflexible for firms. Agencies have greater control over the design of the project compared to the PFS model. Additionally, under the design-bid-build process, as each stage of the project could be designed and carried out by a different firm, there is a risk of poor project implementation caused by a lack of clear communication in project design. In contrast, the PFS model grants firms greater autonomy. This means that a firm can employ innovative, potentially cost-saving practices that might not be feasible in a conventional contracting model. As a result, the firm can achieve time and cost savings, leading to increased profitability. According to our interview with Erik Michaelson, Deputy Director, Bureau of Watershed Protection and Restoration, Anne Arundel County, Maryland (see Interview 1 Appendix 4), the projects undertaken by the Watershed Protection & Restoration Program (see Project 4 Appendix 2) have seen a successful in reducing the cost per acre for stormwater treatment. Michaelson tied these cost reductions to the flexibility allotted to firms in project management.

2. Pressure to Economize and Diversify Risks

As many of our interviewees noted, including Michealson, there is a potential for a high financial reward for the firm if their project is implemented in a highly efficient manner (as opposed to grant funding which does not offer this outcome). Firms may achieve cost-efficiency in many ways. Our interviewees noted the time efficiency gained through the technical expertise of the firm. Taking advantage of economies of scale is additionally particularly important to drive efficiency, a point noted

14 Schilizzi, Steven & Breustedt. "Does Tendering Conservation Contracts with Performance Payme." Working Papers. University of Western Australia, School of Agricultural and Resource Economics, February 18, 2011. <https://ideas.repec.org/p/ags/uwauwp/100883.html>.

15 Edinger, Grace "Hey H2Oho- buy outcomes, not practices! — Environmental Policy Innovation Center." (2023). <https://www.policyinnovation.org/blog/hey-h2ohio-buy-outcomes-not-practices>

16 Caggiano, T. and Male, T. (2017) Conservation and Impact Investment Leadership by Louisiana, California, Maryland and Nevada in creating outcome-based opportunities for private investment in natural resource restoration and protection. Environmental Policy Innovation Center.

by Brian Monaghan of Wildlands (see Interview 8 Appendix 4). When delivering multiple projects at once for the agency, much of the costs are constant. Entering into a PFS model that offers a fixed cost helps provide space for additional earnings as constant costs are shared among projects. The economy of scale also drives down cost which results in risk diversification. As one of interviewees, Shawn Kerachsky President & CEO, Community Infrastructure Partners (CIP) additionally noted, firms can also bundle design, engineering, construction, and management together to drive down costs, a process not possible under the traditional “design, bid, build” model.

Potential Drawbacks and Challenges of PFS for Firms

1. Upfront Costs and Financial Risk

Under a PFS model, since firms will not be paid until the terms of the contract are successfully met, upfront costs of land sorting, lawyer fees, permitting fees, and others would be the firm’s responsibility. If the firm is not able to ensure a stable short-term and long-term funding source, it would face the risk of cost overrun. If the firms underestimate the costs of the project, it may put itself in a cost overrun situation.

It is crucial for firms and agencies to thoroughly assess the possible risks and expenses associated with all aspects of designing and managing the project. Once a contract is executed, most of the risks are transferred from the agency to the firm. The firms meticulously evaluate and mitigate the risk before committing to a contract, but certain risks cannot be easily minimized. For example, several interviewed firms expressed concerns about the significant risks posed by natural disasters or severe weather conditions (see in Appendix 3). Despite being accounted for in contracts, these risks cannot be completely mitigated. They can have a detrimental impact on projects and often necessitate firms to modify their plans.

Table 2.2. Motivations and Drawbacks for the Different Parties

	Motivation and Incentives	Potential Drawbacks & Challenges
Government Agency/Buyer	<ul style="list-style-type: none"> ▶ Significant risks can be shifted to the firm ▶ Fewer short-term budget trade-offs ▶ Less pressure from opposing constituencies ▶ Potential of lower budgeting costs (based on project type) ▶ Lower probability of sunk costs (in the case of project delay or failure) 	<ul style="list-style-type: none"> ▶ Conflicts with contractor in estimated costs or contract details ▶ Reputation risks through failed PFS projects ▶ High costs and difficulty in the initial adopting stage
Firm	<ul style="list-style-type: none"> ▶ More autonomy and flexibility in project design and implementation ▶ Contributes to economies of scale which drives down cost by sharing constant costs among projects ▶ More space of carrying out innovative projects 	<ul style="list-style-type: none"> ▶ Takes on nearly all risks, including ensuring funding and financing ▶ Cost overruns due to failure in initial cost estimation

III. METHODOLOGY

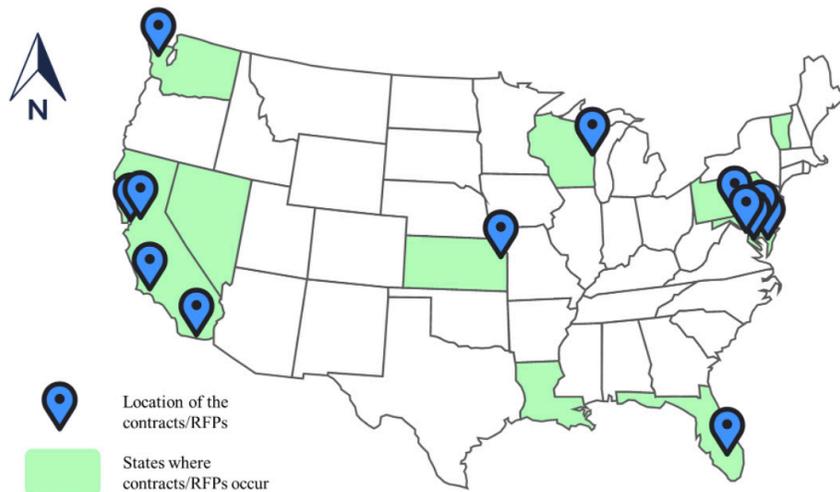
Research Design and Data Collection

We used a mixed-methods approach with qualitative and quantitative analysis to investigate the cost-saving and environmental benefit-increasing effects of PFS. Each government’s procurement strategy through PFS in environmental policy is based on project type and state or local law. In addition, each procurement strategy is accountable to the public, but is not generally publicly available. It is also difficult to conduct a comprehensive quantitative analysis using publicly available data because there are different project scales. For this reason, data collection was conducted with the assumption that both qualitative and quantitative analysis would be adopted.

We designed the research with the following methods to collect the data:

1. Review on similar Pay-for-Success projects in the form of: Reports, Articles, Blogposts
2. Interviews with experts and participants of Pay-for-Success and other government contracting models
3. Collecting Contracts and Requests for Proposals (RFPs) and references with interviews

Figure 3.1 The Location of the Collected Samples and States Referred to in the Study



These surveys will not be conducted independently of each other, but in parallel, so that the findings from each will be reflected in the policy evaluation. Figure 3.1 below shows the project locations of the RFPs and Contracts collected, and the state of the case referred to.

Interviews

We conducted interviews with states that have adopted PFS forms of contracting, private sector firms that have entered into such contracts, and academic experts with deep insight into PFS. We asked clients to help connect us to interviewees and asked interviewees to suggest other potential interviewees, using the snowball sampling approach. Information of the interviewees the team had spoken to are shown in Table 3.1.

Table 3.1. Interviewee List

Date	Attribute	Organization
11.30.2022	Government	Anne Arundel County, Maryland
12.15.2022	Academic	University of Maryland Center for Environmental Studies
01.05.2023	Firm	Environmental Incentives
01.16.2023	Firm	GreenVest
01.20.2023	Firm	Ecosystem Investment Partners (EIP)
01.26.2023	Firm	Community Infrastructure Partners
01.30.2023	Academic	Institute of Water Research, Michigan State University
02.01.2023	Firm	Wildlands
02.02.2023	Firm	Resource Environmental Solutions
02.02.2023	Government	Watershed Protection Program, San Diego County
02.13.2023	Organization	Ecosystem Investment Partners
02.13.2023	Firm	Department of Agricultural and Applied Economics, Virginia Tech
02.16.2023	Government	Maryland Department of Agriculture
02.16.2023	Government	California Department of Water Resources
02.23.2023	Firm	Qualified Ventures
02.27.2023	Firm	Ecological Restoration Business Association
03.01.2023	Firm	WaterVelt Ecological Service

During the interviews, we collected the parties' views on the PFS contract. In addition, we requested materials and contract data pertaining to PFS case studies. A template format for the interviews is provided in Appendix 3. Detailed interview summaries can be found in Appendix 4.

Qualitative Analysis

We summarized the results of the interviewees and performed a comparative analysis. We kept track and highlighted which attributes that could be compared, such as whether the interviewees were more concerned about the environment or cost reduction. The results of the comparative analysis for each attribute are presented to verify under what circumstances the PFS is effective.

Analyzing results from interviews conducted in this “comparative analysis” would help set a foundation of how PFS contracts work and form an understanding between both sides of the contract (Agency and Firm). In a deductive approach, each interview was compared to note any common attributes, general themes and categories, such as whether the interviewees were more concerned about the environment or cost reduction or if public agencies are concerned of satisfying and complying mandates. The results of the comparative analysis for each interview conducted would help verify under what circumstances the PFS model is effective.

Our final results on PFS will be organized and analyzed through a SWOT analysis, whereby we will go over PFS's strengths, weaknesses, opportunities, and threats to see if the overall strengths and benefits from the program outweigh the weaknesses and major concerns people have over the

program. Some examples of each element based on a literature review prior to conducting interviews and qualitative analysis would be as follows:

Table 3.2. SWOT Analysis for PFS

Strengths	Weaknesses
<ul style="list-style-type: none"> ▶ Incentivizes major environmental projects to be completed in a shorter timeframe and for a lower cost ▶ PFS offers greater project flexibility and diversity, allowing private sector actors to utilize their expertise more freely ▶ Low risks for funding agencies if a project fails to deliver 	<ul style="list-style-type: none"> ▶ The cost savings from PFS may not be immediately evident to a government entity as it may require an upfront investment ▶ Using PFS as the primary contract model may limit the firms willing to work with the government entity ▶ The contracting agency may have less control over the project with PFS
Opportunities	Threats
<ul style="list-style-type: none"> ▶ Creates opportunities for projects that would have otherwise never been undertaken as that state and local governments can offset the risk of funding and planning a new project to the firm ▶ Through risk mitigation, PFS encourages innovative projects in terms of service delivery ▶ Conditions in longer term contracts could provide continued project operations and maintenance at a lower cost 	<ul style="list-style-type: none"> ▶ Will firms be willing to take on the initial starting costs for a project and the planning for it? ▶ While the majority of the risk is borne by the firm, the agency still faces the possibility of losing valuable time if a project fails ▶ It may be challenging to mitigate the risk of project failure, particularly in the case of natural disasters

Quantitative Analysis

In this study, we built our own database based on the collected business requests for proposals (RFPs) and contracts and using these pieces of information to help in our analysis. In order to have a better foundation of the contracts as a whole, we conducted a “quota analysis.” This analysis helps investigate overlapping traits and address any inherent biases. The main reason for using this type of analysis is because not each contract has the same award amount, project size, or project type. Some of these projects include green infrastructure improvements, water quality improvements, habitat restorations, and community-based partnerships. Through this “quota analysis”, we analyzed the pros and cons of each contract involved in terms of the risk to the entities involved in the contract, and in sections pertaining to economics, time, results, reputation, and management quality. The RFPs/contracts used in the policy evaluation are numbered in Appendix 1.

Lastly, a Criteria Alternative Matrix (CAM)/Goeller Scorecard is utilized to evaluate our policy options in terms of the perspective of the agency. This will include a qualitative analysis within this quantitative analysis, evaluating and analyzing all the information and data we have which includes the requests for proposals (RFPs), contracts, case studies, and interviews from academic experts, government agencies, and organizations who have knowledge and experience utilizing PFS.

IV. POLICY OPTIONS AND CRITERIA

Formation of Criteria: Who's Taking on the Risk?

In reviewing the potential of Pay-for-Success, many criteria have emerged that have shaped the strengths and weaknesses of PFS when compared to other potential models that can be pursued. After conducting a literature review and holding interviews with over a dozen experts in the field, we deduced that one major criterion that forms the basis of this analysis is the **risk factor**, which essentially means how much one party is putting on the line to get the project done.

In the interviews, contracting firms like EIP and WesterVelt continuously mentioned the significant financial and human resources needed upfront when planning and applying for PFS contracts (See Interviews 5 and 17 Appendix 4). They also considered the opportunity costs relative to existing or potential other, more conventional projects. In addition, the other component of risk that weighed upon them was whether or not they would get reimbursed for their efforts; fear of the commissioning agency pulling out for some unforeseen reason was always an issue they had to consider. Thus, could they stand whatever risks that a project could create and incorporate it in the fixed price listed in the PFS contract would determine if a firm wanted to work under the PFS model.

For the commissioning agency, the government entity putting the PFS contract together, one major risk factor they took into account is whether they can trust the firm to do the job requested of them adequately or not. While they do hold the payment or credits that the firm needs, how the money is spent is not the only risk they are facing. The agency has to consider the time and labor required to complete a project. They must also carefully calculate how a project can be completed, if at all, while achieving the required standards that are placed upon them by federal or state agencies. Just being able to credibly commit to those further up in the government bureaucracy that this project could be done and pursued to begin with all form the uncertainties that a commissioning agency must consider when starting out a PFS contract.

Based on the risk factor considerations with PFS, there are four other risk criteria and one evaluation criteria that should be highlighted when considering the Policy Options. The first is **financial**, typically relating to trying to stay within cost estimates for a given project. For the commissioning agency, that means how much money they will have to spend to get the project completed. For the contracted firm, it means how much of their own resources needs to be spent before they expect to be reimbursed for their work.

Second is the **time** factor, which for the agency means how long they must wait for a project to be completed, whether it be in the allotted time frame they set up in the contract, and how much staff time they must dedicate in order to get the project completed. For the firm, time means how much actual time they can spend devoting themselves to the project and if they can fully address everything asked of them in the contract under the allotted time frame. Ultimately for everyone involved, time and money are intertwined and the longer they take to complete a project means that the firm will lose out on other opportunities to make a profit.

Third, there are the overall **outcomes** of a project. For the commissioning agency, that means seeing that the firm completed their work and achieved the desired specifications asked for them under the contract. For example, had they cleaned up/restored the amount of acres requested of them or did they mitigate the necessary amount of phosphorus or carbon in a mitigation bank based on standards set by entities like the Environmental Protection Agency. For the contracted firm, when it comes to outcomes, the main focus is making sure they hit the benchmarks required of them by the contract so that they can get paid.

Fourth, there is the **reputational risk** in play when it comes to pursuing a project. An agency will lose

legitimacy in the eyes of their constituency and their superiors in office if they put time and resources into a project that is not completed or failed to hit the benchmarks they set for themselves. That can lead to a loss of funding in the future and more oversight on their work by another agency. For the firm, failing to complete a project or doing so inadequately means a loss in business standing among their peers and potential employers. If a firm cannot get a project done, then that failure will always be on their record and may make other firms and agencies unwilling to work with them.

Lastly, when it comes to the overall implementation of the project, a focus on **management** is important, especially in regards to measuring the overall performance of a project. Ensuring that the overall implementation process of the contract for the agency and firm goes well ensures that the overall result of the project and everything stated in the contract was satisfied and that the overall process of completing the project was satisfactory to both parties. For the agency, that means that the administrative burden of the project was not too heavy in making sure the project was completed and addressing all concerns. For the firm, that means making sure their performance addressed everything stipulated in the contract and that they did everything they said they would do without feeling burdened by the demands of the agency.

Policy Options

Based on the literature surrounding the government contracting system and the interviews with people in this field, we have finalized on four potential policies to review when the implementing parties decide whether to pursue a project under PFS or not. They are:

1. **Traditional Reimbursement Model (Design-Bid-Build)**; also known as the status quo option of Conventional Procurement, whereby the commissioning agency assumes most of the risk.
2. **Pay-for-Success Model (PFS)**; whereby the contracted firm takes on most of the risk.
3. **Environmental Impact Bonds (EIB)**; whereby the agency issues a bond to attract Third Party Investors, who assume most of the financial risk for the project in the hopes of seeing a return on their investment and achieved environmental outcomes.
4. **Stepwise Payments-for-Success Model (Milestone Payment)**; whereby during the progress of a project is completed through a series of set payments upon completion of agreed-upon project components.

Option #1: Traditional Reimbursement Model/Design-Bid-Build

The Traditional Reimbursement Model is the status quo since most contracting for environmental projects today fall under this model. The way it works is that the commissioning agency itself, having decided to pursue a new project based on goals/deadlines established by state law or federal agencies, must plan out and manage a project and then contract out the work to a firm or multiple firms for implementation. As the contracted firm works to execute the work, they are continually reimbursed for the work they do at set stages based on the contract.¹⁷ By the end, the agency holds full control over the finished project and then maintains the operations and maintenance from there on out.

When it comes to the risk factor, most of the burden is placed upon the agency in this model. It is their staff that has to come up with the design and goals for the project as well as conduct outside work like land acquisition.¹⁸ In addition, they must maintain oversight of the contracted firm when they are doing the work to make sure it falls under the agency's model. It is a time-consuming process that takes up a lot of the agency's workforce to complete. Potential risks also arise if the project falls behind due to unforeseen factors. Because payments are scheduled regularly based on the contract, they must continually pay the firm on the set time intervals; sometimes these payments will occur even if the firm falls behind in their work; although most contracts have clauses put in place to halt payment if nothing is getting done. If the agency also falls short on their payments or loses

17 Environmental Incentives (November, 2019). "Pay-for-Performance: A Guide for Conservation Buyers in California," 4.

18 Environmental Incentives (November, 2019). "Pay-for-Performance: A Guide for Conservation Buyers in California," 5.

funding, the whole project may be stopped until payments can occur again.¹⁹ Still, there are penalty clauses within these contracts if issues do emerge, as the implementing firm may be held liable if a project fails; thus, the commissioning agency can avoid the worst-case scenario of having to pay for an incomplete or unsatisfactory project. The biggest risk, however, is that the project fails after completion or doesn't hold up a short time after the firm has finished. While achieving some restitution for that failure is possible, usually the agency will be stuck with a failed project for some time.

The contracts and requirements themselves can also be burdensome for the firms who take them on, as the contracts tend to require a host of information and paperwork that delays the start of a project. However, the regular payments guarantee that the firm will gain something from working on these projects, and thus many firms continue to contract under this model. Overall, while the agency can dictate the full process behind any project under this model, they bear the financial costs, time, and put their own reputation on the line to ensure the project gets completed.

Option #2: Pay-for-Success

Under the Pay-for-Success (PFS) model, also known as Pay-for-Performance or Outcomes-Based procurement, most of the risk is shifted from the agency to the firm as more of the work and design of a project falls onto the firm. A project an agency wants to pursue with a specified outcome is thought out, but the actual design, building, and approach to achieve the outcome of the project are contracted out to a firm that takes on all of the major work. In the end, the firm will not get paid until the project is complete and that the outcomes generated from it are examined and matched up with what the agency is looking for.

Under PFS, the contracted firm takes on almost all of the risk of the project, having to bear the burden of costs and time in order to get paid. Even during the bidding process, the firm must put together the basic design and implementation strategy of the project before they get the contract, and will not be reimbursed for those costs until everything is completed.²⁰ Thus the firm relies upon their own source of funds, typically coming from investors or their past revenue streams, to cover their design, building, and implementation costs up until the project completion, and can suffer a heavy loss if the project does not work out. Still, the idea behind it is to incentivize the firm to complete the project in the quickest amount of time while generating the necessary outcomes from it to appease the agency and get paid for their work.

Under the PFS model, the firm has more space for design flexibility to complete the project, without stringent government oversight across the whole project. Typically, when speaking with firms that conduct these projects, they tend to have the expertise to trust their work and ensure their payment at the end. Still, the risk they carry is high because if something goes wrong with a project, their revenue stream could become disrupted and will eat into the firm's profit margin, thus making it difficult for the firm to give their investors their proper return.

For the agency contracting out this entire process, they benefit from the reduced role they have under PFS and are able to allocate human resources to other projects that they prioritize more. They see projects being completed faster and avoid fewer funding issues. They can pay for the whole project after it is completed with the outcomes fully realized rather than in stages where the funding process could potentially be disrupted.²¹ The agency does hold less sway in determining how the project is completed, as the firm is responsible for the creation and implementation of a project and the agency has less oversight over that process. However, even if a firm abandons the project or does not generate the results necessary for completion, the agency only loses out on time and not funding for a failed project. In fact, even with that risk, some agencies like this model because it guarantees that a project that an agency could not complete on its own time is pursued and completed (See Interview 3 Appendix 4).

19 Environmental Incentives (November, 2019). "Pay-for-Performance: A Guide for Conservation Buyers in California," 5.

20 Grace Edinger, Harry Huntley (2023). "Purchasing Environmental Progress: Some state programs have fully bought into innovation, others are stuck writing paper checks," Environmental Policy Innovation Center, Washington D.C, 4.

21 Grace Edinger, Harry Huntley (2023). "Purchasing Environmental Progress: Some state programs have fully bought into innovation, others are stuck writing paper checks," Environmental Policy Innovation Center, Washington D.C, 4.

Option #3: Environmental Impact Bonds (EIB)

Other strategies for implementing a hybrid approach to PFS also exist, which have typically been designed to reduce the financial risk for the commissioning agency and the contracted firm. An Environmental Impact Bond (EIB) works towards reducing risk to the commissioning agency and contracted firm by having a third party investor involved in the process to provide capital for the firm before a project begins. A typical strategy for this would involve an agency opening out project ideas to investors, such as private equity groups, about the potential benefits that the project would create and then issuing a municipal bond to generate the funds for a project.²² By securing funds early on, the agency faces less of a funding burden, as a non-government entity will provide the money needed for a project's completion. Lastly, the focus of an EIB is for environmental projects, like those used for stormwater restoration in the Chesapeake Bay, as investors seek a strong rate of return on their investment while achieving environmental goals for society's betterment.²³

Still, maintaining payment and funding for these projects under this method does have some drawbacks. In order to pursue a project, the agency has to commit time and resources to pitch potential investors on a wide variety of projects that they would like to pursue. Of course, what they pick, and what agencies will ultimately have to take and issue bonds for, is limited to what the investors are looking for. For example, in an interview with a representative from Quantified Ventures, the environmental projects most investors are looking towards right now involve carbon reduction or green infrastructure, rather than dealing with issues like water quality or habitat restoration.

Ultimately, generating support for EIBs from third party investors typically limits what projects can be done based upon what investors want to see. While agencies can pitch interested parties on what they want to pursue, they become dependent on investors to fund their projects and if the funding is not there, nothing will be done. In addition, more oversight than in a typical PFS contract will be required as investors will want to see if the projects they are funding are actually generating outcomes.²⁴ This creates a massive time burden for the agency because they lack the financial incentives for getting the firm to complete the project in the direction that the agency would like while taking their own time to monitor the project. They also have to deal with a third party who must be satisfied first as failure to generate the return on investment could mean that less investors are willing to provide funds for the bonds in the future. Thus, the time it takes to complete a project will increase as the agency has staked its reputation on what an investor is willing to pursue.

Option #4: Stepwise Payments-for-Success Model

The other hybrid version of PFS pushed in recent years has been defined by our group as the Stepwise Payments-for-Success Model. Also known as the Partial Pay-for-Performance method, it follows that the agency will provide funds in the beginning of a project for the contracted firm, typically used to cover the initial starting costs of the project and the time needed to design and model it.²⁵ Following that, the firm will get paid as before under the PFS model at the end of the project's completion. However, there will also be a secondary payment some time after completion of the project based on the project's outcomes and if it achieved the goals the agency was pursuing. This method is designed to motivate the contracting firm by reducing their financial risk in order to achieve the best possible outcomes through additional payments.

22 Chesapeake Bay Foundation "Environmental Impact Bonds," Chesapeake Bay Foundation, accessed April 4, 2023, <https://www.cbf.org/how-we-save-the-bay/programs-initiatives/environmental-impact-bonds-eib.html>.

23 Grace Edinger (August, 2022). "What's in a Name? One Writer's Frustration with Technical Term Redundancy." Environmental Policy Innovation Center.

24 Grace Edinger (August, 2022). "What's in a Name? One Writer's Frustration with Technical Term Redundancy." Environmental Policy Innovation Center.

25 Environmental Incentives (November, 2019). "Pay-for-Performance: A Guide for Conservation Buyers in California," 14.

For the commissioning agency, Stepwise PFS can seem more costly than the traditional PFS model as they have to put up more funds than they would initially expect in a typical PFS contract, thus reducing the cost savings they would anticipate from PFS. Agencies also bear the risk of losing money if the project fails after they have already paid the firm for their partial outcome. Ultimately, agencies and firms will have to come together under this model to develop a proper way to measure the environmental outcomes of a project, as this will determine if the firm gets a second payment from their work.²⁶ Thus, more labor and time is required under this method since a surplus of money is at play.

Outline of Policy Options

Table 4.1. outlines the four policy alternatives and the preliminary rankings in terms of the risk factors (Financial, Time, Outcomes, and Management) described throughout this section. They can vary between low, medium, and high amounts of risk in that field placed upon the agency or firm depending on the policy alternative. This table is based on the team’s preliminary assumptions of how much risk each alternative will generate for the agency and firm based on the literature review and early interviews.

Table 4.1. The Four Policy Alternatives and Preliminary Rankings for Risk Factors for Agencies and Firms

Risk	Actor	#1	#2	#3	#4
		Traditional Reimbursement Method	Pay-for-Success	EIB	Stepwise PFS
Financial	Agency	High	Low	Low	Medium
	Firm	Low	High	Low	Low
Time	Agency	High	Low	High	Medium
	Firm	Low	High	Medium	High
Outcome	Agency	High	Medium	High	Medium
	Firm	Low	High	High	High
Management	Agency	High	Medium	High	Medium
	Firm	Medium	High	Medium	Medium

26 Environmental Incentives (November, 2019). “Pay-for-Performance: A Guide for Conservation Buyers in California,” 14.

V. POLICY EVALUATION

In this section, we'll be evaluating the four options of government environmental project contracting and the existing processes of PFS models. Through data and case studies gathered from interviews, contracts and RFPs, criteria are determined and categorized. The criteria evaluation will be from the government agency's perspective. With these criteria, we are able to rate each policy option and understand the potential risks and performance (outcome) that come along with the benefits. The risks could be on either or both sides of the contracting party; in the table shown later in this chapter, the scores and colors will also show which party bears the risks.

Evaluation Criteria

Below are the criteria defined:

Table 5.1. Criteria and Definition

Criteria	Evaluation Description
Financial	The possibility of losing any monetary value, investment or business venture. Was the funding secured and if the contract amount was used wisely or was enough to cover the project. The overall cost-savings of the project
Time	Total time of the contract amount including potential delays that account for the project timeline. Including the time needed for environmental improvements.
Outcome	Whether the contracts provide specific and observable results in performance that is supported by a specific measure.
Reputation	Perception of how the firm, agency, or company operates.
Management	Was the quality of management good for the project? Including the level of government administrative ease and if the implementing party is capable of doing what they promised to do (stated in the contract).

Table 4.1 from the Policy Options section mentions what could be the potential level of risks per option; however, in terms of what exists in PFS contracting, it's critical to understand who holds the most responsibilities or who would bear the most potential risks. Furthermore, the importance of analyzing performance metrics is to have a comprehensive understanding of how well these contracts were executed.

Option Rating and Score Card Design

This analysis uses the same evaluation criteria above with more specific factors. The management evaluation is based on the existing and completed PFS contracts (sample size of 4). This first sub-evaluation will evaluate the timeline, compliance with mitigation standards, and milestones. The risk evaluation (second sub-evaluation) is based on existing and ongoing PFS RFPs and contracts (sample size of 13). Financial risks take into account who is responsible for paying taxes and fees, who needs to hold insurance, and who is responsible for any invoicing procedures. Time risk generally includes who is responsible for any delays in the project and if the project is going to provide positive environmental outcomes. Outcome risks include risks in operations, such as land transfers and project management and who would hold the responsibilities for meeting requirement mandates or standards. Lastly, specific standards for reputation would include the risks in full ownership of the project, qualifications, and indemnification.

Table 5.2. shows that the completed PFS contracts tend to have good management quality. For example, Contract/RFP #7 has helped produce milestones that satisfy the respective county's permit requirements while providing the agency credit towards stormwater regulatory needs. Furthermore, similar projects have ensured best management practices and provided many positive milestones such as future maintenance that will continue to ensure future mandates and outside the contract scope of work such as creating local benefits of business developments and jobs.

Table 5.2. Quota Sample: Management Evaluation of Completed Contracts

	Contract/RFP Number				Legend	
Management Metric	7	2	8	12	Y	Yes
Completed within the contract timeline?	U	Y	Y	U	N	No
Ensured goals and mitigation standards?	Y	Y	Y	Y	S	Somewhat
Provided milestones?	Y	Y	Y	Y	U	Unknown

Note: Additional information on validating the reasons for this quota evaluation is provided in Appendix 6.

As per each criterion (without management), the risk evaluation shows that many of the risks are either placed on the firms or shared between both the firm and the agency. Agencies do not inherit risk in most criteria as shown on Table 5.3. This is due to the nature of the PFS model, as firms choose to participate to gain revenue as they deliver environmental outcomes. From our interviews, WesterVelt, EIP and other firms are willing to take on the risks because they are confident in their capability and expertise of delivering the project.

Table 5.3. below shows a general summary of which side would primarily hold what risk based on the criteria.

Table 5.3. Quota Sample: Summary of Responsible Risks per Sector

Risk		Contract/RFP Number												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Financial	Taxes and Fees	F	NS	B	NS	F	B	F	F	NS	F	B	F	B
	Insurance	F	F	B	NS	F	B	F	F	NS	F	F	F	NS
	Invoicing	F	F	F	NS	B	A	F	F	B	F	F	F	B
Time	Delays	B	F	F	F	A	B	F	F	NS	F	F	F	B
	Improvements	F	B	F	B	B	B	F	NS	NS	F	B	B	B
Outcome	Operations	A	F	B	F	F	B	F	B	F	A	B	F	B
	Compliance	F	B	F	B	B	B	B	B	NS	B	B	B	B
Reputation	Ownership	F	B	A	B	A	B	A	A	A	B	B	F	B
	Qualifications	B	B	A	F	F	F	F	F	F	F	B	F	B
	Indemnification	B	F	F	NS	NS	F	F	F	F	F	NS	F	NS

Legend			
Firms	Agency	Both	Not Stated

According to the analysis, the plurality of the risks tend to go towards the firms, based on the responsibilities stated in RFPs and contracts. There are some risks that the agency may have, but because of the way how the language was stated in these contracts, there is some type of comparative risk between the two sides. The table below displays the risk percentages of who would bear the risks. According to our analysis, firms would generally account for approximately 46% of the risks while the agency would generally account for 7% of the risks. Although the risks for agencies are extremely low, they would also hold shared risks with the firm. Shared risks between the agency and firm would generally account for 33% of existing PFS contracts. The 11% signifies that no responsibilities have been stated or mentioned, so that means it is unknown who the risks apply to. Table 5.4. below shows the summarized percentages of risks in this quota sample analysis.

Table 5.4. Percentage of Risks

Legend	Percentage
Firms	46%
Agency	8%
Both	34%
Not Stated	12%

Understanding that these existing risks go towards the firms, this will help set a better understanding of comparing the policy option utilizing the same criteria. The criteria of financial, time, and outcomes are all measured the same weights because they all interact with each other when it comes to the procurement and executing these contracts. Each is valued at 20% and management valued at 30% as it evaluates the overall performance of project execution. As per measuring and reputation, reputation is simply an externality that can arise as these contracts are executed, so this would be weighted at 10%.

Table 5.5. Policy Option Criteria-Based Evaluation

		Policy Options			
Weight	Criteria	Traditional Reimbursement Method	Pay-for-Success	EIB	Stepwise PFS
0.2	Financial	1	2	3	2
0.2	Time	1	3	1	2
0.2	Outcome	2	2	3	3
0.1	Reputation	2	2	1	2
0.3	Management	1	3	2	2
	Total	1.30	2.50	2.10	2.20

Scale		
Good	Average	Poor
3	2	1

Evaluation Results

After evaluating the policy options with the scorecard above, we ranked the policy options as below:

- 1st Best Option: Pay-for-Success**
- 2nd Best Option: Stepwise Pay-for Success**
- 3rd Best Option: Environmental Impact Bonds (EIB) Model**
- 4th Best Option: Traditional Reimbursement Method**

With the score given to each criterion, it seems that the Pay-for-Success (PFS) method would be the best option out of all the other options. In the sections below, the reasons for the above score will be explained.

Policy Option Explanation By Criteria

Option 1: Status Quo/Traditional Reimbursement Model

Rank: 4th Best Option.

The Traditional Reimbursement Model requires a contract that places a heavy burden on the agency and firm following the bidding process. It requires that the agency creates the design and goals of a project while the firm executes and manages the project.

Financial Risks Observed:

Score: **High Risk**

With the traditional reimbursement model, costs usually go up as government agencies face more barriers in resource allocation which creates inefficient results. Since the traditional reimbursement model pays not based on outcome but contracted timelines, there are potential risks of spending more money than budgeted. The scope of the project may change and costs may also increase correspondingly. Government entities must continually pay the contracting party on the set time intervals, even if the firm falls behind in their work.

Time Risks Observed:

Score: **High Risk**

Usually, there is a high risk in project timeline delays since government agencies usually lack expertise in land sorting, acquisition, or other implementing sectors. Also, with the internal administration process, lots of paperwork must be completed before stage approval, and allocating resources takes time as these projects won't always be the first priority of the government agency. In addition, invoicing procedures must be followed, which increases the time cost an agency must dedicate to one project. Completing a project also requires consensus and cooperation among offices and governing authorities, which creates barriers and reduces efficiency.

Outcomes Risks Observed:

Score: **Moderate Risk**

In the traditional model, there is a comparatively high risk of failure that could be due to lack of expertise from the public sector or due to private firms delaying projects with more costs than expected. In the case where costs exceed the estimated amount, there are risks of not enough cash flow and pause in project implementation. If penalty clauses are not clear enough in the contract, the risks of failing to deliver the outcomes will be mainly on the government entity. However, the government has almost full control on project outcomes, including project design and final deliverables.

Reputation Risks Observed:

Score: **Moderate Risk**

The traditional reimbursement model tends to give agencies a poor reputation since this method has the highest potential for delayed timelines to emerge. The California Department of Water Resources continuously had to deal with delays in their habitat restoration projects that made their overall bidding process for contracts weak since few firms wanted to work with them (See Interview 12 Appendix 4). However, since it is so widespread, most firms know how to navigate it and can still work with agencies that have suffered from this delay before. In addition, the negative public image that comes from a delay is mostly on the private entity side as the private sector has a high potential of failing to deliver on time due to lack of motivation under this model.

Management Evaluation:

Score: **Low Result**

Under the traditional model, government agencies face the highest chance of dealing with poor performance because the overall management and burdens of running a project fall onto them. They have the undue burden of organizing, managing, and maintaining a project once completed, and should something go wrong, the firm will look to them to solve it. Lastly, the Traditional Reimbursement Model has long been criticized as being inefficient because the outcomes can sometimes be delivered late and not within the budget and the timeframe.

Option 2: Pay-for-Success

Rank: 1st Best Option.

Seemingly, the existing Pay-for-Success model would be the best option with majority of the risks gearing towards the firms (based on the quota sample analysis).

Financial Risks Observed:

Score: **Moderate Risk**

Under the Pay-for-Success (PFS) model, the government entity is the buyer using government program funds or funds from department budgets as the main source to pay firms. In many cases, government agencies create restoration grants or other programs to dole out money to nonprofits/firms that work on restoration activities, and agencies can claim credits for reaching the compliance goal once a project is completed. Still, agencies must state in the contracts the costs for implementation, additional maintenance, and operation costs to reflect the actual costs. If they fail to do so, firms may bear more costs than they will receive, and therefore may hesitate on taking on the project. Lastly, PFS can offer cost savings to an agency, ranging from 56%-63% over a 5 year time frame, thus creating a financial benefit for them to utilize this model but only if they are willing to dedicate themselves to this system over this time frame (See Appendix 5).

Time Risks Observed:

Score: **Low Risk**

PFS has one firm takeover the whole project, which improved the time efficiency and reduced the risks of project delay. During our interviews, Charlotte Biggs from the California Department of Water Resources emphasized that projects under PFS are usually more time-saving as compliance mandates could be satisfied with less time, and that for agencies time has generally been seen as a cost given the work they had to put into a project. For example, in the San Diego County Rainbow Creek Project, the county originally tried to seek lands along the creek but wasn't able to engage the current landowners properly, thus delaying the project. After Resource Environmental Solutions (RES) stepped in they were able to reach out to landowners with the human resources they have and gather participants, which saved time overall for the land sorting process.

Outcome Risk Observed:

Score: **Moderate Risk**

Government agencies are looking for fully implemented restoration projects that they can take credit for towards regulatory needs (stormwater, land restoration, conservation...etc.) that have been designed, permitted, built and completed. Under this model, most risks are outsourced from the purchase. In cases when landowners back-out, the firms bear their own costs as responsibilities are borne by the implementing entity. With most risks being outsourced, even though government entities may lose a certain degree of design control, the outcome is usually guaranteed. Firms usually minimize their risks in failing to deliver outcomes by having expertise. In the interview with Ecosystem Investment Partners (EIP), it was mentioned that it is vital for them to set success program criteria

and acceptable expectations. Under the PFS model, risks in outcomes are shifted from government entities to firms.

Reputation Risk Observed:

Score: **Moderate Risk**

As per the existing contracts and RFPs, the reputation of the agency and firm varies depending on the type of project, whether it's habitat restoration or water quality, that determines who the agency is willing to work with based on which firm has the expertise needed for these projects. The agencies also face less risk in this area since the burden of completing the project falls onto the firm. Still, there can be additional requirements within contracts that require third parties to come in and verify the project outcomes, thus requiring the agency to maintain credibility with outside parties so that they can be trusted to measure the overall outcomes correctly.

Management Evaluation:

Score: **High Result**

Under PFS, all of the management and organizational issues revolving around a project fall to the firm and not the agency. The agency's prime concern in this field is merely organizing the bidding process for the contract and keeping in contact with the firm during the project's construction. If a quality project is not produced by a firm, then the agency can easily back out from paying them and take their funds elsewhere.

Option 3: Environmental Impact Bonds (EIB)

Rank: 3rd Best Option

This option places an equal burden on the agency and firm when the bonds are issued and limits what sort of projects agencies can pursue due to the introduction of a third-party investor into the agency's side of the project.

Financial Risks Observed:

Score: **Low Risk**

Under this policy option, private equity firms or investors fund restoration and environmental projects (e.g. Ecosystem Investment Partners (EIP), Quantified Ventures). Most major projects in this vein are carried out through mitigation banks, and credits are generated to offset mandates. While private investors take their capital and identify a stream or wetland that needs to be restored, the firm works with agencies to make sure the projects qualify for credit generation and that the agency chooses to issue the bond in the end. Then the agency may choose to sign on and work with the firm. In the process, investors provide the funding to firms but are not involved in the actual implementation of the project. There is an additional cost involved under the EIB as additional returns need to be paid back to investors, which count towards costs. Risks take place when the project doesn't meet standards and the agency fails to pay back the investors in time, as the financial risks are mainly carried by the investors.

Time Risks Observed:

Score: **High Risk**

Under the EIB model, there is pressure for the agency as they'll need to pay back the investors. From the investors' perspective, the timeline of the project is influenced by their projected revenue stream. Referencing data from the interview with EIP, it is estimated that the investment cycle is around 10-12 years, with 5-6 years to invest, and 5-6 other years to get the return. Most environmental contracts the firms enter into need to be engineered, designed, constructed, implemented and getting the return in the 10-12 years window. After project delivery, agencies and firms can sell the earned credits and hopefully rotate the revenue for other project use. Risks in time still exist, as agencies are in charge

of many operations that could accumulate time in the project such as permitting processes with the respectable jurisdictions.

Outcomes Risks Observed:

Score: **Low Risk**

More oversight than in a typical PFS contract will be required as investors will want to see if the projects they are funding are actually generating outcomes. With mitigation banking, firms identify targets for the success metrics, and won't get the payment until the work is successful. In Maryland's stormwater credit case, after the project is delivered, for around 5-7 years, each year credit or money will be released if performance matrices are met. In the case of State of Florida's wetland project, EIP needs to show the actual reduction and successful operation to get paid each year. Depending on the contract, there are certain processes and procedures to follow, such as land transfers, risk transfers, and any responsibilities for closing escrow. Also generating support for EIB from third party investors typically limits what projects can be done based only on what investors want to see.

Reputation Risk Observed:

Score: **High Risk**

Under this model, both contracting sides have a level of comfort of what impacts are being mitigated. Similar to the previous policy option, real estate experts, lawyers, environmental planners and land specialists provide value and reputation to projects. The expertise ensures additional predictability to outcomes and efficiency in project implementations. Both parties understand what the needs are, and because private funds enter as a third party, that increases the need for both sides to maintain their reputation. Risks may still be on the agency in this case as they will need to ensure cash flow and pay back the investors.

Management Evaluation:

Score: **Medium Result**

Through EIB, the management of a project for the agency becomes more constrained than under PFS because the agency must stay in contact with both the firm and the investors to see how the project is being completed. In addition, project feasibility goes down in this model because firms will only work with agencies for projects that third party investors deem worthy. Thus, the results they will see and how firms will deal with them are constrained by these outside parties.

Option 4: Stepwise Payments-for-Success Model

Rank: 2nd Best Option

In theory, the Stepwise Payments-for-Success Model seems to be a good option to incentivise the implementing party. However, the government will bear more risks compared to the Pay-for-Success model, which hurts its overall score.

Financial Risks Observed:

Score: **Moderate Risk**

Under this model, agencies will provide funds in the beginning of the project for the contracted firm, usually to cover the initial starting costs, then firms get paid in the end based on the PFS model. Looking into the California Lookout Slough project that EIP carried out, with California Department of Water Resources as the funder and EIP being the delivering partner, EIP was paid by performance milestones along the project timeline. Under this model, risks are more neutralized as firms secure partial payments with delivered outcomes. They can use the revenue earned to invest in next steps or other projects in hand. For the commissioning agency, they are taking on more financial risks as they put out partial funds in the initial planning phase.

Time Risks Observed:

Score: **Moderate Risk**

Under the Stepwise PFS model, payments help secure a continuous cash flow, which helps avoid delay as firms can put less effort in fund gathering. There are still potential risks of doing so as firms lose a certain degree of urgency in completing the project in a shorter timeline. However, firms will need to take a long-term view of said project thanks to the potential of receiving more credits sometimes after a project is completed, assuming they satisfy all the outcomes the agency contracted them for.

Outcomes Risks Observed:

Score: **Low Risk**

Under the Stepwise Payments-for-Success model, performance milestones were set at the beginning of the project. Examples of milestones are getting permitting, getting land, securing finances, and the like. With this mix payment system, it is easier to incentivize participants compared to a pure PFS payment system. In the San Diego Rainbow Creek Project, the county structured the contract with milestones (5 milestones including the final payment). Since land sorting gets 10% as a milestone, there is a potential risk of the county losing 10% of the payment in the case of project failure. Hence, the government agency still tries to reserve most payments in the end to ensure a successful outcome.

Reputation Risk:

Score: **Moderate Risk**

In the long run, there will be trust between the private and public sectors if the completed project achieves all of the outcomes asked for within the contract. The step-wise payment structure also creates a good reputation and public impression on both sides assuming timeline is followed, thus allowing for future work to be conducted by both sides now that a good impression between agency and firm has been established.

Management Evaluation:

Score: **Medium Result**

Under Stepwise PFS, agencies have to deal with more management issues because this model requires more of an agency's time and attention than under PFS. They must constantly manage and oversee if the firm is hitting performance benchmarks and qualifying for funding that they usually would not receive until the end of the project. Thus, while the basic ideas from PFS hold here, the agency must put in more effort in overseeing the project to make sure that the firm is doing what they said they would do given the increased financial incentives involved.

VI. POLICY RECOMMENDATIONS

Based on our findings, we find that the Pay-for-Success contracting model is the most optimal for environmental projects. Despite the great amount of risk transferred from agencies to firms compared to the traditional contracting model (especially in terms of the time and financial criteria), Pay-for-Success creates positive outcomes for both parties. Notably, this contracting method scores above the others in terms of performance in our evaluation. Based off our interviews and review of contracts/ case studies, our SWOT analysis of Pay-for-Success emphasizes the following points:

Table 6.1. SWOT Analysis for PFS

Strengths	Weaknesses
<ul style="list-style-type: none"> ▶ Incentivizes major environmental programs to be completed in a shorter timeframe and for a lower cost ▶ PFS offers greater project flexibility and diversity, allowing private sector actors to utilize their expertise more freely ▶ Low risks for funding agencies if a project fails to deliver 	<ul style="list-style-type: none"> ▶ The cost savings from PFS may not be immediately evident to a government entity as it may require an upfront investment ▶ Using PFS as the primary contract model may limit the firms willing to work with the government entity ▶ The contracting agency may have less control over the project details with PFS
Opportunities	Threats
<ul style="list-style-type: none"> ▶ Creates opportunities for projects that would otherwise never been undertaken at that state and local governments can offset the risk of funding and planning a new project to the firm ▶ Though risk mitigation, PFS encourages innovative projects in terms of service delivery 	<ul style="list-style-type: none"> ▶ Will firms be willing to take on the initial starting costs for a project and the planning for it? ▶ While the majority of the risk is borne by the firm, the agency still faces the possibility of losing valuable time if a project fails ▶ It may be challenging to mitigate the risk of project failure, particularly in the case of natural disasters

Potential Practices For Policy

The PFS model has several strengths. Through the transfer of risk from the agency to the firm, and conditional payments tied to performance, PFS incentivizes shorter project timeframes and cost savings. The success of these contracts depends on a certain level of independence granted to the firm in terms of project design and management, which is possible due to the reduction of risk on the agency's side. Through the transfer of financial risk, firms are able to be innovative and efficient in their management. When executed appropriately, these contracts enhance service delivery and offer opportunities to execute projects that were previously deemed infeasible.

However, there are some key weaknesses of PFS. When transitioning from traditional contracting to PFS, agencies may need time to develop sufficient institutional knowledge of best practices, resulting in delayed returns in terms of performance and time savings. The adoption of this new approach may involve significant upfront costs, which may take some time to recoup through improved outcomes and cost savings. Therefore, it may require patience and commitment to fully realize the potential benefits of PFS contracting. If these weaknesses are improperly addressed, PFS may result in poor project planning. There may be too few benefits for firms to be willing to take on the bulk of the financial, time, and outcome risk. The risk of project failure would result in lost time for agencies.

In reference to the preliminary SWOT analysis, the PFS contracting method could be optimized if certain strengths of the model are bolstered and weaknesses mitigated. We believe certain best practices could be enacted to realize the potential opportunities and mitigate the threats we foresee with the model.

1) There must be a sustained commitment to PFS contracting on the part of the contracting agencies.

Successfully transitioning from a traditional contracting to a performance-driven one demands a patient approach. As noted by many of our interviewees, efficiency gains are not realized immediately. Erik Michaelson noted in our interview that Anne Arundel County's Restoration Grant Program did not see a reduced cost per acre for stormwater treatment in the first year of the program (see Project 4 Appendix 2 and Interview 1 Appendix 4). This sentiment was similarly noted by Chad Praul and Katie Riley from Environmental Incentives in our interview. In order to achieve optimal outcomes, public agencies must develop the technical capacity required. The process of market adaptation and firm capability development to offer competitive bids may span multiple years or funding cycles.

2) Agencies should consider pilot testing larger-scale PFS projects.

While the PFS model incentivizes the best performance outcomes, there remains institutional hesitancy within many public agencies to experiment with alternative approaches to contracting. Some interviewees noted the historical norms and ethos within agencies which can disincentive innovation. The utilization of a pilot phase can help assess the effectiveness of a program's design and reveal opportunities for improvement while reducing the stakes for agencies. The information gained from these pilots can guide agencies if they move forward with the program or explore PFS contracting in the future further.

3) Maintaining a streamlined administrative process is essential for the benefit of both parties.

Administrative burden creates inefficiencies and frustrates potential firms, complicating efforts to attract bidding firms and produce positive project performance. For example, Brian Monaghan noted in our interview that agency review time is the primary source of delays for his firm's projects (See Interview 8 Appendix 4).

4) Relatedly, it is often advantageous for agencies and firms to bundle as much of the project under a single contract.

For agencies, this reduces administrative burden and the cost and time required to complete projects. For firms, this creates opportunities for increased efficiency and cost savings, as noted by some of our interviewees (see Appendix 4). Agencies should carefully consider which stages of the project benefit from PFS contracting.

5) For long-term contracts, there should be significant attention paid to the inclusion of operation and maintenance (OMN) requirements.

Ongoing performance-based payments to firms to steward fully implemented projects should be explored as a means to reduce future OMN costs. Michael Hare from Resource Environmental Solutions noted in our interview that public agency OMN budgets are vulnerable to cuts or underfunding (see Interview 9 Appendix 4). So it is advantageous to establish contracts with these costs built in from the beginning.

As stated previously, agencies may be hesitant to experiment with new contracting models due to historical administrative norms and practices. To encourage agency experimentation, policymakers could explicitly permit Pay-for-Success (PFS) as an acceptable form of procurement in state codes.

Given the novelty of PFS, there is ambiguity in some state statutes regarding the legality of agencies entering into PFS contracts, which further complicates agency experimentation with this contracting model. By adding PFS as an acceptable form of procurement in state code (for example as was done by Maryland's Conservation Finance Act), some of the institutional hesitancy that holds back greater agency adoption of this contracting method could be lifted.

Additionally, since PFS is a relatively new concept, many agencies lack the technical knowledge or capacity to design PFS contracts. To overcome this challenge, model contracts could greatly assist state and local agencies in launching their projects. These models would need to be customized to fit specific project types, such as long-term or short-term projects, single-purpose or bundled multipurpose projects, among others. Furthermore, language in these models may vary depending on state laws. Policy efforts to create models for state agencies would further incentivize PFS projects by reducing the upfront administrative burden taken to agencies to develop contracts from scratch.

VII. LIMITATIONS AND CONCLUSION

Limitations

1. Obtained Data

Each procurement strategy is not publicly available, making it difficult to conduct a comprehensive quantitative analysis. In addition, it was impossible to collect projects under similar conditions because not many PFS contracts are being conducted in the U.S. This forced us to focus our analysis on schemes and frameworks that we could gain access to. Overall, we succeeded in contacting approximately thirty organizations over a three-month period, conducting seventeen interviews and collecting thirteen RFPs/contracts. However, we had to set aside many quantitative analysis methods, such as cost-benefit analysis, due to the small sample size.

2. Interpretation of Interview Responses

The majority of interviewees comprised academic institutions conducting PFS research or organizations/firms who are already operating within the PFS contract structure. Therefore, it must be acknowledged that respondents' perceptions are prone to a certain bias that may favor the PFS. Thus, we attempted to mitigate this limitation by avoiding the inducement of responses by preparing open-ended interview questions and by focusing on the contractual aspect of the actual policy evaluation.

3. The Evaluation Framework

There are limitations in evaluating a wide range of PFSs, such as the use of credits and the EIB, based on a single set of criteria. Also, it is difficult to conduct an elaborate comparison of options based on qualitative interview results and a relatively small sample size. We mitigated these limitations by developing risk and management criteria and using a large framework to conduct a generalized policy assessment. In fact, conclusions can vary greatly depending on what a government values and what method of PFS it chooses to use.

This developed risk and management criteria for evaluating PFS policy options based on the concept that the PFS should be evaluated both at the time of contract and at the time of contract completion since the contract amount is paid at the time of project completion. However, PFS, which still has a small number of completed projects overall in the U.S., requires more detailed data collection and analysis to evaluate actual performance outcomes, broader than management aspect, rather than just the risk perspective. Our project addressed these issues by observing management criteria in a less resolved framework than risk. However, a deeper dive into the performance section would be essential to make a more refined assessment.

Conclusion

With a focus on environmental policy, this report analyzes elements such as the circumstances under which PFS is adopted, contract structure, benefits and potential risks, and financial modeling through 13 contracts from seven states and 17 interviews with governments, environmental organizations, businesses, and academics. Based on the analysis results, we were also able to create a strong evaluation criteria framework based on the following five issues: financial, time, consequential, and reputational risks and management evaluation. As a result, we succeeded in proposing policies that should be recommended for government agencies to adopt when it comes to conducting environmental projects based on these evaluation criteria. In particular, from a risk perspective, PFS was able to confirm better cost reduction and outcome enhancement effects compared to traditional contracting methods.

In this report, we use the framework we developed to offer one main policy recommendation, PFS, for government agencies to adopt. Each of the three options for PFS covered in this report, as well as the traditional contract method, have the potential to become best practices in the governments' specific contexts, yet from what has been covered, PFS has the potential to be the best method that government agencies can utilize for future projects. Overall, this report does offer the risk and evaluation framework that can provide new policy recommendations for PFS based on what policymakers value based on the criteria set up in the evaluation.

Recently, the U.S. government signed the Inflation Reduction Act (IRA) with many renewable incentives, and the Environmental Protection Agency (EPA) announced its final Good Neighbor Plan, which aimed to cut nitrogen oxide (NOx) emissions. It is clear that the Federal, as well as State governments, are setting more ambitious environmental targets and mandates. As carbon taxes, Renewable Energy Certificates (RECs) and other environmental credits increase in popularity and demand for government agencies to fulfill environmental mandates, PFS will be a suitable solution to achieve the outcome as it has the least risks and negative externalities attached to it.

In the midst of these trends, we hope that the framework developed in this study will serve as a prototype for a robust framework for future research and analysis and guide the implementation of PFS. We are also confident that this framework can ease the psychological barriers to introducing PFS as a new procurement strategy on the part of the ordering party. As mentioned in the introduction, environmental projects have a high affinity with PFS regarding cost reduction and increased effectiveness. The proper assessment of risk and performance using this framework will make PFS a mainstream part of environmental policy procurement strategies in the years to come.

VIII. BIBLIOGRAPHY

Anne Arundel County, Maryland, Office of Central Services, Request for Proposal for Turnkey Water Quality Improvements

Anne Arundel County, Maryland. "Anne Arundel County's Watershed Protection & Restoration Program: MS4 Permit Update," August 17, 2018, <https://www.mdcountries.org/DocumentCenter/View/2824/Stormwater-Surge---Anne-Arundel-County-MS4-Permit---Erik-Michelsenpdf>.

Balboa, Cristina M. "Accountability of Environmental Impact Bonds: The Future of Global Environmental Governance?" *Global Environmental Politics* 16, no. 2 (2016): 33-41. muse.jhu.edu/article/617392.

Barnow, Burt S., et al. *Social Impact Bonds: A New Tool for Social Financing*. Princeton University, Woodrow Wilson School of Public and International Affairs, 2014, <https://spia.princeton.edu/sites/default/files/content/Social%20Impact%20Bonds%202014%20Final%20Report.pdf>.

Belinsky, Michael. "Social Impact Bonds: Lessons from the Field." *Stanford Social Innovation Review*, 2012. <https://doi.org/10.48558/NE60-4C70>.

Bouchard, Katelyn, et al. *Is A Community-Based Public-Private Partnership Right For Your Community? A Guide For Municipal Stormwater Managers in Washington State*. Department of Commerce, State of Washington, 2020, <https://enviroaccounting.com/wp-content/uploads/2020/12/CBP3-for-Stormwater-Managers-in-Washington-State.pdf>.

Brand, M W et al., "Environmental Impact Bonds: A Common Framework And Looking Ahead". *Environmental Research: Infrastructure And Sustainability*, vol 1, no. 2, 2021, p. 023001. IOP Publishing, doi:10.1088/2634-4505/ac0b2c.

Caggiano, Thomas. and Male, Timothy. *Conservation and Impact Investment Leadership by Louisiana, California, Maryland and Nevada in creating outcome-based opportunities for private investment in natural resource restoration and protection*. 2017. Environmental Policy Innovation Center.

California Department of Water Resources, California, Request for Proposal for Habitat Restoration in the Sacramento River Basin

California National Resource Agency. *DWR Seeks Proposals for Habitat Restoration Projects in the Sacramento-San Joaquin Delta*. December 2016. <https://resources.ca.gov/Initiatives/California-EcoRestore/Initiatives-Newsroom/Page-Content/News-List/DWR-Seeks-Proposals-for-Habitat-Restoration-Projects-in-the-Sacramento-San-Joaquin-Delta>.

Chesapeake Bay Foundation "Environmental Impact Bonds," Chesapeake Bay Foundation, accessed April 4, 2023, <https://www.cbf.org/how-we-save-the-bay/programs-initiatives/environmental-impact-bonds-eib.html>.

Chester, Pennsylvania, Request for Proposal for Community Based Public Private Partnerships for City of Chester, PA Stormwater Authority

Climate Policy Initiative. Results-Based Financing Blueprint: A Guide to Results-Based Financing for Climate Mitigation and Adaptation. Climate Policy Initiative, May 2021, <https://www.climatepolicyinitiative.org/wp-content/uploads/2021/05/Results-Based-Financing-Blueprint-May-2021.pdf>.

Coastal Protection and Restoration Authority, “2017 Coastal Master Plan.” 2017, <https://coastal.ca.gov/our-plan/2017-coastal-master-plan/>.

Department of Water Resources, California, EIP Habitat Restoration Project Agreement - Lookout Slough Tidal Habitat Restoration Project

Dey, Colin, and Jane Gibbon. “New Development: Private Finance over Public Good? Questioning the Value of Impact Bonds.” *Public Money & Management* 38, no. 5 (2018): 375–78. <https://doi.org/10.1080/09540962.2018.1477676>.

Edinger, Grace, and Phoebe Higgins. “Delivering Faster Restoration.” Ecosystem Policy Innovation Center, 2022, https://static1.squarespace.com/static/611cc20b78b5f677dad664ab/t/62a34676ebd6c6530cdcb3b7/1654867581335/FasterRestoration_EPIC.pdf.

Edinger, Grace. Huntley, Harry. “Purchasing Environmental Progress: Some state programs have fully bought into innovation, others are stuck writing paper checks,” Environmental Policy Innovation Center, 2023.

Edinger, Grace. “Common Pay for Success Contracting Pitfalls and How to Avoid Them.” Environmental Policy Innovation Center. Environmental Policy Innovation Center, October 14, 2022. <https://www.policyinnovation.org/blog/common-pay-for-success-contracting-pitfalls-and-how-to-avoid-them>.

Edinger, Grace. “What’s in a Name? One Writer’s Frustration with Technical Term Redundancy.” Environmental Policy Innovation Center. August, 2022. <https://www.policyinnovation.org/blog/whats-in-a-name-one-writers-frustration-with-technical-term-redundancy>

Edinger, Grace “Hey H2Ohio - Buy Outcomes, Not Practices!” Environmental Policy Innovation Center. <https://www.policyinnovation.org/blog/hey-h2ohio-buy-outcomes-not-practices>

Environmental Finance Center at the University of North Carolina. “Environmental Impact Bonds: Where are they now?” Environmental Finance Center at the University of North Carolina, 2020, <https://efc.web.unc.edu/2020/07/02/environmental-impact-bonds-where-are-they-now/>.

Environmental Incentives. Pay For Performance: A Guide for Conservation Buyers in California. November 2019

Environmental Policy Innovation Center, Nature, Paid on Delivery: Leadership by Louisiana, California, Maryland and Nevada in creating outcome-based opportunities for private investment in natural resource restoration and protection, EPIC, 2017

European Commission. “Agri-environmental payments: overview.” European Commission, 2022, https://ec.europa.eu/environment/nature/rbaps/articles/1_en.htm.

Fisher, Kristin A. et al. Pay-For-Performance Conservation: A How-to Guide. Winrock International, 2016, <https://winrock.org/wp-content/uploads/2016/02/PfP-How-To-Guide-Final.pdf>.

Fitzer, Chris and Ramona Swenson, PhD. "Finding Common Ground to Advance Restoration in California's Delta and Beyond." Environmental Science Associates. September 16, 2019. Accessed April 8, 2023.

Fox, C., Morris, S., 2021. Evaluating outcome-based payment programmes: challenges for evidence-based policy. *J. Econ. Policy Reform* 24 (1), 61–77. <https://doi.org/10.1080/17487870.2019.1575217>. Prince George County, Maryland, Request for Quote for Urban Retrofit Program Public Private Partnerships - Prince George County

Heinrich, Carolyn J., and Sarah E. Kabourek. "Pay-for-Success Development in the United States: Feasible or Failing to Launch?" *Public Administration Review* 79, no. 6 (2019): 867–79. <https://doi.org/10.1111/puar.13099>.

Howard County, Maryland, Maryland Department of Transportation (DOT) - Stream Restoration Services

Huntley, Harry. "ICYMI: Pennsylvania Passed Clean Water Procurement Program." Environmental Policy Innovation Center, August 8, 2022. <https://www.policyinnovation.org/blog/icymi-cwpp>.

Huntley, Harry. Maryland Clean Water Commerce Act explainer, 2022

Maryland Department of Agriculture. "Maryland Agricultural Certainty Program." Resource Conservation, Maryland Department of Agriculture, 2022, https://mda.maryland.gov/resource_conservation/pages/macs.aspx.

Maryland Department of the Environment, MWIFA Clean Water Commerce Act & Conservation Finance Act Update, 2022

Milwaukee, Wisconsin, Request for Proposal for Milwaukee Project on Community-Based Green Infrastructure

Montgomery County, Maryland, Request for Proposal - Montgomery County Impervious Acre Credits

Nguyen, Huy Q., and Kenichi Matsuura. "Pay-for-success contract implementation in public agencies: Factors affecting innovation adoption." *Journal of Physics: Conference Series*, vol. 1972, no. 1, 2021, p. 012009. doi: 10.1088/2634-4505/ac0b2c.

Nicola, D., & Clark, C. (2013). Bringing Social Impact Bonds to the Environment. *Stanford Social Innovation Review*. <https://doi.org/10.48558/2PWT-4995>

Okeechobee County, Florida, South Florida Water Management District Contract

Organisation for Economic Co-operation and Development. Making Agri-Environmental Payments More Cost-Effective. OECD Publishing, 2018. doi: 10.1787/9789264086843-en.

Organisation for Economic Co-operation and Development. Understanding Social Impact Bonds: A Conceptual Framework for Social Outcomes Contracts. OECD Publishing, 2018. doi: 10.1787/9789264297067-en.

Organisation for Economic Co-operation and Development. Financing Climate Futures: Rethinking Infrastructure.” OECD. Accessed April 7, 2023. <https://www.oecd.org/environment/cc/climate-futures/>.

Resource Environmental Solutions, LLC, “Maryland Department of Transportation, State Highway Administration Full Delivery Stream Restoration Services.”. <https://res.us/projects/maryland-department-of-transportation-state-highway-administration-full-delivery-stream-restoration-services/>.

Restore the Mississippi River Delta “Pay-for-Performance: Bringing the Best of the Private Sector to Realize Wetland Restoration, <https://mississippiriverdelta.org/pay-performance-bringing-best-private-sector-realize-wetland-restoration/>

Riverside County, California, Agreement: “Project” Wildland’s Source
San Diego County, CA, Request for Proposal for San Diego County - Rainbow Creek Stream Restoration

Schilizzi, Steven & Breustedt. “Does Tendering Conservation Contracts with Performance Payme.” Working Papers. University of Western Australia, School of Agricultural and Resource Economics, February 18, 2011. <https://ideas.repec.org/p/ags/uwauwp/100883.html>.

Seattle Public Utilities, Request for Proposal for City of Seattle: RainCity Partnerships, 2021, <https://www.risc.solutions/wp-content/uploads/2022/05/Seattle-RainCity-Partnership-RFP-July-2021.pdf>

State of Nevada. Nevada Conservation Credit System Manual, January 2022

State of Nevada. Nevada Conservation Credit System, <https://sagebrushco.nv.gov/CCS/ConservationCreditSystem/>.

State of Vermont, Vermont Pay for Performance Program Agency of Agriculture Food and Markets. <https://agriculture.vermont.gov/VFPF>

Tan et al. (2021) Widening perspectives on social impact bonds, Journal of Economic Policy Reform, 24:1, 1-10, DOI: 10.1080/17487870.2019.1568249

T

he White House President Barack Obama. “Pay for Success: An Opportunity to Find and Scale What Works.” National Archives and Records Administration. National Archives and Records Administration.

Tiikkainenn O, Pihlajamaa M, Åkerman M, Environmental impact bonds as a transformative policy innovation: Frames and frictions in the construction process of the Nutrient-EIB, Environmental Innovation and Societal Transitions, Volume 45, 2022, Pages 170-182, ISSN 2210-4224, <https://doi.org/10.1016/j.eist.2022.10.006>.

U.S. Department of the Interior, “Bipartisan Infrastructure Law Supports Ecosystem Restoration.” May 12, 2022. <https://www.doi.gov/priorities/investing-americas-infrastructure/ecosystem-restoration/projects>.

U.S. Government Accountability Office. Fragmentation, Overlap, and Duplication: An Evaluation and Management Guide.” April 2015. <https://www.gao.gov/assets/gao-15-49sp.pdf>.

Vermont Agency of Agriculture, Food & Markets, Vermont Pay for Phosphorus Program, https://agriculture.vermont.gov/sites/agriculture/files/doc_library/VPFP_OnePager.pdf.

Vermont Agency of Agriculture, Food & Markets. “Vermont Proctor-Pittsford Farmer Partnership (VPFP) - One-Pager.” Vermont Agency of Agriculture, Food & Markets,

Wyandotte County/Kansas City, Kansas, Department of Public Works, Request for Proposal for Stormwater Utility Community Based Partnership

VIII APPENDIX

Appendix 1. Evaluation Samples: RFPS/Contracts

Project #1	RFP for City of Seattle: RainCity Partnerships
Location	Seattle, Washington
Project Type	Green Infrastructure
Project Goals	Provide best management practices in green stormwater infrastructure within a community based partnership.
Agency	Seattle Public Utilities
Firm	Not Stated in Request for Proposal
Project Timeline	Shall not exceed 5 years (Phase I and II) from contract execution unless amended by written agreement.
Contract Amount	Not clarified but ensure \$100 million over a 20 year period.
Project Summary	This request would require that the respective firm would provide green stormwater infrastructure retrofits to existing impervious services on private property. The main goal of this project is to reduce scaling green infrastructure improvements throughout Seattle and aim to manage 700-million-gallons of runoff annually by 2025. This project is more for local firms in Seattle to ensure equitable practices within a community-based public private partnership.
Complexities	Firm (Project Manager in terms of this respective contract) must follow procedures in the agreement. Firm is mainly in charge of many of the procedures in the agreement such as complying with proprietary and confidential information, indemnification, addressing corrections, coordination, insurances, audits, and subcontracting. Debarment procedures and other miscellaneous provisions vary on federal and city policies.

Appendix 1. Evaluation Samples: RFPs/Contracts

Project #2	EIP Habitat Restoration Project Agreement - Lookout Slough Tidal Restoration Project
Location	Cache Slough Complex, California
Project Type	Habitat Restoration
Project Goals	Maintain and restore tidal habitats for endangered delta smelt and other species
Agency	California Department of Water Resources
Firm	Ecosystem Investment Partners (EIP)
Project Timeline	5 years (2018 - 2023)
Contract Amount	\$96,999,875
Project Summary	This habitat restoration project, in partnership with Ecosystem Investment Partners and California Department of Water Resources, is to create creditable acres in the Cache Slough River Complex in Solano County, California. Main purpose is to maintain tidal habits for endangered species and delta smelt. Agreement took effect in October of 2018 and the maximum amount of the agreement was \$96,999,875.
Complexities	Meeting CEQA (California Environmental Quality Act) and NEPA (National Environmental Policy Act) may be complex and wearisome. Closing escrow will require clearances, completion of all environmental permitting, and meeting all CEQA, NEPA, and Department of Water Resources (DWR) requirements. If there is an unsuccessful close of escrow, then all permits not previously listed with DWR as the Co-Permittee will be transferred to DWR. The firm will have to purchase, at its sole cost and expense, a payment bond and performance bonds.

Appendix 1. Evaluation Samples: RFPS/Contracts

Project #3	South Florida Water Management District Contract with EIP
Location	Okeechobee County, Florida
Project Type	Water Quality
Project Goals	Ensure water quality in the lower Kissimmee Basin.
Agency	South Florida Water Management District
Firm	Ecosystem Investment Partners (EIP)
Project Timeline	Whichever occurs first: 7 years after start of "Operations Period; or; Upon completion of 5 successful operational years. There are 3 phases (Phase 1A, Phase 1B, and Phase 2)
Contract Amount	Not to Exceed \$300,000,000
Project Summary	This stormwater treatment project is to ensure water quality in the lower Kissimmee Basin. Project partnership was between the South Florida Water Management District. The total contract amount should not exceed \$300,000,000.
Complexities	Split into different phases. The second phase will only start after the District (Agency) accepts any construction completion documentation required under the Statement of Work and any "milestones" provided. The firm holds the majority of the Stipulated Payments and other related procedures. The firm holds a lot more accountability towards risk insurances.

Appendix 1. Evaluation Samples: RFPs/Contracts

Project #4	RFP for Milwaukee Project on Community Based Green Infrastructure (CBGI)
Location	Milwaukee, Wisconsin
Project Type	Community-Based Green Infrastructure
Project Goals	Meet current and future municipal Separate Storm Sewer System Permit Requirements and to bring out cost-effective, large scale increase in green infrastructure implementation and aim for a project delivery model that would help develop lower cost implementation of green infrastructure.
Agency	Milwaukee Metropolitan Sewerage District
Firm	Not Stated
Project Timeline	5 years but the contract is mainly for Phase I (Out of Four)
Contract Amount	Not Stated in RFP
Project Summary	The aim of this green infrastructure project is to achieve 20 million gallons of capture capacity in clean water. Additionally, this project would help the agency achieve compliance with the Wisconsin Pollutant Discharge Elimination and Municipal Separate Storm Sewer System permit requirements. This project encourages diversity within firms such as partnerships with small, veteran, women, and minority businesses to be part of the project implementation.
Complexities	Phase I includes the visioning and analysis of how to develop packages of green infrastructure alternatives to achieve the minimum of 20 million gallons and program frameworks, to which Phase I is a plan that will dictate how the future phases will go.

Appendix 1. Evaluation Samples: RFPS/Contracts

Project #5	RFP for Habitat Restoration in the Sacramento River Basin
Location	Sacramento and San Joaquin County, California
Project Type	Habitat Restoration
Project Goals	Ensure that obligations are met with BiOp/State Water and other obligations with the US Bureau of Reclamation
Agency	California Department of Water Resources
Firm	Not Stated in RFP
Project Timeline	5 years
Contract Amount	\$42.5 Million
Project Summary	This habitat restoration project ensures that the California Department of Water Resources would meet the obligations with the BiOp/State Water and other obligations with the United States Bureau of Reclamation. Additionally, this project was to restore or create 8,000 acres of tidal wetlands for endangered species and Delta Smelt. The contract amount was to utilize 42.5 million dollars within a 5 year period.
Complexities	Project must ensure multiple compliances with other programs other than BiOp/State Water obligations such as the Fish Restoration Program Agreement Implementation Strategy and Suisun Marsh Preservation Agreement.

Appendix 1. Evaluation Samples: RFPs/Contracts

Project #6	RFP for Stormwater Utility Community Based Partnership
Location	Wyandotte County and Kansas City, Kansas
Project Type	Green Infrastructure and Water Quality
Project Goals	Fix aging and deteriorating infrastructures, improve water quality, and protect downstream drinking water.
Agency	Department of Procurement and Contract and Contract Compliance - Unified Government of Wyandotte County/Kansas City, Kansas Department of Public Works
Firm	Not Stated in RFP
Project Timeline	5 years (March 2023 - December 2029)
Contract Amount	\$150 million
Project Summary	This project in Wyandotte County and Kansas City, Kansas is to update infrastructure that is aging and failing while trying to improve water quality and protect downstream drinking water. The contract amount is to not exceed \$150 million while trying to ensure healthy communities through residential revitalization efforts and to achieve community redevelopment to ensure affordable watershed transformations.
Complexities	The project size will focus on 5 watersheds however they need to be within the Water Infrastructure Finance Innovation Act. The firm must secure insurance coverages that are required by the Agency and the Board of Public Utilities. Firms, according to the RFP, "...may be required to perform additional work within the general scope of the initial contract in case there are contract changes".

Appendix 1. Evaluation Samples: RFPS/Contracts

Project #7	RFP for Turnkey Water Quality Improvements
Location	Anne Arundel County, Maryland
Project Type	Water Quality
Project Goals	Provide the most cost-effective pollutant reduction and equivalent "impervious acres treated" on private lands throughout the county.
Agency	Anne Arundel County
Firm	Not Stated in RFP
Project Timeline	2021 - Not Stated
Contract Amount	\$1,700,000
Project Summary	This project in Anne Arundel County, Maryland relies on a template of using private-public partnerships. The main project goal is to provide the most effective pollutant reduction method to treat "impervious acres" on private lands throughout the county. The contract amount for this specific agreement is \$1,700,000.
Complexities	The agency and firm, as stated in the original RFP, "... may not resell or use credits in any way in relation to another permit requirement, as compensation for another resource, or to satisfy the requirements of any other program". Since the project will be on private lands, as stated in the original RFP "...the firm shall be responsible for obtaining all the necessary access rights by all applicable owners of any private property where the work is to be completed".

Appendix 1. Evaluation Samples: RFPs/Contracts

Project #8	RFP for San Diego County - Rainbow Creek Stream Restoration - County Contract Number 567336
Location	San Diego County, California
Project Type	Habitat Restoration and Water Quality
Project Goals	Meet the county's total load reduction requirements.
Agency	County of San Diego
Firm	HGC, LLC dba RES Environmental Operating Company, LLC
Project Timeline	5 years
Contract Amount	"Preferred Vendor would be awarded a contract at the unadjusted price of \$100,000"
Project Summary	The goal of this stream restoration project, which included turf replacement and other structural projects, is to meet the county's total nitrogen load reductions requirements. The contract amount was \$200,000 in which helped to restore at least 800 linear feet of stream channel. Additionally, it also helped out with future funds such as endowments for any future maintenance after the contract time.
Complexities	If the firm needs additional outside work, they cannot exceed costs of \$50,000 or 25% of the full award amount. In terms of indemnification, the firm has all the fault if something goes wrong or bad; however in terms of damages, the county will be in charge of taking care of problems or delays caused by the firm.

Appendix 1. Evaluation Samples: RFPS/Contracts

Project #9	RFP 1138686 - Montgomery County Impervious Acre Credits - Contract #1150283: Manchester Farm Submerged Wetland Retrofit and Stream Restoration
Location	Montgomery County, Maryland
Project Type	Stormwater and Green Infrastructure (Farming Related)
Project Goals	Provide cost effective best practices to ensure 300 to 350 impervious acre credits.
Agency	Montgomery County Government
Firm	Not Stated in RFP
Project Timeline	5 years (2021 - 2026)
Contract Amount	\$5,000,000
Project Summary	This Pay-for-Performance water quality improvement and stormwater restoration project will focus on creating "impervious acre credits". This project just received submissions and the project completion, including closeout processes and compensation activities, should be set for October 1, 2026.
Complexities	The firm must not resell or use the work, including the impervious acre credits generated by the contract; explicitly stated in the respective RFP "...in any way in relation to another permit requirement, as compensation for another source, or satisfy the requirements of any other program". The firm must comply with all project permits and any necessary approvals in its performance of the contract work.

Appendix 1. Evaluation Samples: RFPS/Contracts

Project #10	Maryland Department of Transportation (DOT) - Stream Restoration Services
Location	Howard County, Maryland
Project Type	Transportation and Stream Restoration
Project Goals	Meet Clean Water Act Requirements
Agency	Maryland Department of Transportation
Firm	Resource Environmental Solutions (RES)
Project Timeline	5 years (March 2023 - December 2029)
Contract Amount	Not Stated. As long as it does not exceed the contract size of \$500,000
Project Summary	There are different phases for these interdisciplinary projects such as focusing on establishing a high-quality stream restoration project in order to meet Clean Water Act requirements. The firm in this project is Resource Environmental Solutions (RES) and the project size is within multiple counties in Maryland; hoping to provide construction improvements within transportation and to restore a total of approximately 28,130 linear feet of streams, without trying to exceed a contract amount of \$500,000.
Complexities	If there is any project failure, then the agency holds no responsibility, no matter what phase of the project. The design-build portion of the project will require many different types of engineers which include: highway, pavement, structural, traffic, and geotechnical engineers. Obtaining permits from different required agencies can be time consuming such as obtaining permits from the Federal Emergency Management Agency (FEMA) and the Restoration Site Review Permit (from Maryland Department of Natural Resources, DNR)

Appendix 1. Evaluation Samples: RFPs/Contracts

Project #11	RFP/RFQ for Community Based Public Private Partnerships for City of Chester, PA Stormwater Authority
Location	Chester, Pennsylvania
Project Type	Green Infrastructure
Project Goals	As stated in their respective RFP/RFQ, the project goals are to "...manage and maintain integrated green infrastructure-driven stormwater controls to meet regulatory mandates for improving water quality". Furthermore to "...provide green infrastructure best management practices along with achieving and maintaining compliance with the Clean Water Act (CWA) National Pollutant Discharge Elimination System".
Agency	Stormwater Authority of the City of Chester (CSWA)
Firm	Not Stated in RFP
Project Timeline	30 year contract
Contract Amount	Not Mentioned in RFP/RFQ
Project Summary	The project was based on community-based private public partnerships to ensure community benefits such as economic development growth and urban environmental improvements such as cleaning up approximately 27,500 gallons of debris (with the help of local residents).
Complexities	The program partnership will work with CSWA (Agency) and other local partners and jurisdictions and other agencies as stated in the respective RFP/RFQ "...the DEP (Pennsylvania Department of Environmental Protection) and USEPA (United States Environmental Agency) to define acceptable BMPs as well as develop technology considerations for addressing all applicable Total Maximum Daily Loads".

Appendix 1. Evaluation Samples: RFPS/Contracts

Project #12	RFQ for Urban Retrofit Program Public Private Partnerships - Prince George County
Location	George County, Maryland
Project Type	Stormwater and Green Infrastructure
Project Goals	To achieve compliance with the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permits and the Chesapeake Bay Watershed Implementation Plan (WIP) and to restore the water quality of urban waterways in the manner required by the county.
Agency	Prince George County
Firm	Corvias (Stated in Another Source/Not Stated in RFP)
Project Timeline	3 years (2014-2017)
Contract Amount	\$80 million
Project Summary	This project in Prince George County, Maryland included successful practices of using a public-private partnership model. The goal was to retrofit at least 8,000 acres of green infrastructure with a contract amount of \$1.2 billion. Some of the outcomes so far included economic, social, health and safety benefits.
Complexities	County (Agency) is in charge of the procurement process. The Agency is the applicant for any required permits necessary or amendments to permits related to NPDES MS4. The Firm and the Agency will be jointly responsible for the developing engineering and other related materials required to support the permits.

Appendix 1. Evaluation Samples: RFPS/Contracts

Project #13	"Agreement"
Location	Riverside County, California
Project Type	Habitat Restoration
Project Goals	Establish environmentally friendly outcomes for ecosystems that include endangered plants and species.
Agency	Not Stated in Contract due to Confidential Information
Firm	Not Stated in Contract due to Confidential Information
Project Timeline	Not Stated in Contract due to Confidential Information
Contract Amount	Not Stated in Contract due to Confidential Information
Project Summary	An executed contract that establishes environmentally friendly outcomes for an ecosystem that includes endangered plants and species. This is most information that our team can provide due to privacy concerns of the firm.
Complexities	If land transfers or "closing of escrow" fails, remedies include an immediate return of deposits from the escrow or have the land (mitigated parcels) returned to the property owner. If there are disapprovals of the FAPCL (Formal Acquisition Proposal for Compensation Lands) and "anonymous" Step-In Rights then the agency or firm (unknown due to confidential information) shall have the right to terminate the agreement (project) and are entitled to keep the deposit or work done in the project.

Appendix 2. Case Studies

Project 1	[California] ECORestore Habitat Restoration Projects in the Sacramento-San Joaquin Delta
Period	2017
Budget	Approximately \$12 million
Purpose	Creation of tidal wetland habitat for the endangered Delta Smelt
Area	Sacramento-San Joaquin Delta, CA
Unit price	\$18 thousand / acre (calculation)
Structure	California is working to provide water supplies and support a growing population by 2060 by managing two water systems. To offset the impacts of water infrastructure on habitat and endangered fish, the Department of Water Resources has funding to restore 8,000 acres of tidal wetlands. Working with other state agencies, DWR has entered into an agreement to acquire the land, design and construct the project in a single package, purchase the completed tidal flat habitat credits, and make payments based on performance and verification of results. The contract offers a hybrid of traditional financing and Pay-for-Success and reduces taxpayer risk by having the private sector take on the risk and shifting fiscal risk away from the government. This contract could speed up restoration in the Bay-Delta and serve as a model for future proposals.
Result	650 acres of habitat were restored in the project's first year. The state adopted the same model the following year to recruit more habitat. Note that the RFP has undergone several revisions, including public comments and reissues.
Reference	<p>Pay For Performance: A Guide for Conservation Buyers in California¹</p> <p>California National Resource Agency. DWR Seeks Proposals for Habitat Restoration Projects in the Sacramento-San Joaquin Delta (reposted RFP). December 2016. (reposted RFP). December 2016.²</p> <p>Environmental Policy Innovation Center. "Nature, Paid on Delivery". 2017.³</p>

1 Environmental Incentives. Pay For Performance: A Guide For Conservation Buyers In California. November 2019

2 DWR Seeks Proposals for Habitat Restoration Projects in the Sacramento-San Joaquin Delta (reposted RFP). <https://resources.ca.gov/Initiatives/California-EcoRestore/Initiatives-Newsroom/Page-Content/News-List/DWR-Seeks-Proposals-for-Habitat-Restoration-Projects-in-the-Sacramento-San-Joaquin-Delta>.

3 Environmental Policy Innovation Center, Nature, Paid on Delivery: Leadership by Louisiana, California, Maryland and Nevada in creating outcome-based opportunities for private investment in natural resource restoration and protection, EPIC, 2017

Appendix 2. Case Studies

Project 2	[Maryland] Clean Water Commerce Act 2.0
Period	2023-2032 (up to 2042)
Budget	\$20 million (in total)/year
Purpose	Reductions in nitrogen, phosphorus, and sediment pollution
Area	Chesapeake Bay Watersheds
Unit price	-
Structure	<p>RFP was released on June 10, 2022. Received 35 applications</p> <p>The program is the result of 2017 legislation first developed and subsequently amended and reauthorized during the 2021 legislative session.</p> <p>35% (\$7M) for agricultural practices, with priority for fixed natural filters and ditch management</p> <p>20% (\$4M) for projects in Environmental Justice Communities, including stormwater management and green infrastructure projects</p> <p>10% (\$2M) for nonagricultural landscape restoration projects</p>
Result	-
Reference	<p>Maryland Department of the Environment, MWIFA Clean Water Commerce Act & Conservation Finance Act Update, 2022</p> <p>Maryland Department of the Environment, CWCA explainer</p> <p>Pay For Performance: A Guide for Conservation Buyers in California¹</p> <p>Environmental Policy Innovation Center. "Nature, Paid on Delivery". 2017.²</p>

¹ Environmental Incentives. Pay For Performance: A Guide For Conservation Buyers In California. November 2019

² Environmental Policy Innovation Center, Nature, Paid on Delivery: Leadership by Louisiana, California, Maryland and Nevada in creating outcome-based opportunities for private investment in natural resource restoration and protection, EPIC, 2017

Appendix 2. Case Studies

Project 3	[Maryland] Stream Restoration
Period	2023-2032 (up to 2042)
Budget	-
Purpose	High-quality stream restoration
Area	River across Maryland
Unit price	-
Structure	The Maryland Department of Transportation (MDOT) State Highway Administration was required to perform 100,000 linear feet of stream restoration to meet Clean Water Act requirements. Payments were made at various milestones, with the largest single payment (30%) contingent on completion of the project and transfer of the land to the state, and an additional 35% contingent on successful project monitoring and achievement of ecological milestones. Maryland uses the Stream Restoration Credit Protocol as a transparent metric for measuring stream habitat and environmental benefits, allowing agencies, firms, and the public to understand the value of restoration projects.
Result	Complete restoration of over 22,000 linear feet of the stream on six private properties.
Reference	Pay For Performance: A Guide for Conservation Buyers in California ¹ RES, "Maryland Department of Transportation, State Highway Administration Full Delivery Stream Restoration Services" ²

¹ Environmental Incentives. Pay For Performance: A Guide For Conservation Buyers In California. November 2019

² "Maryland Department of Transportation, State Highway Administration Full Delivery Stream Restoration Services." Resource Environmental Solutions, LLC. <https://res.us/projects/maryland-department-of-transportation-state-highway-administration-full-delivery-stream-restoration-services/>.

Appendix 2. Case Studies

Project 4	[Maryland] Watershed Protection & Restoration Program in Anne Arundel County
Period	2014 - 2019
Budget	\$4 ~ 5 million in fiscal year
Purpose	Develop green infrastructure projects that improve water and stormwater quality
Area	Anne Arundel County, MD
Unit price	\$5.5 million for 300 acres (by 2018)
Structure	The firms are paid upon completion and delivery of the project outcomes. The county requires a financing plan to cover up-front costs and has conducted nitrogen, phosphorus, and sediment testing to ensure reduction goals are met. No new dischargers are allowed unless there is a de-listing plan. Payments to the firms will be made in two phases, with an initial payment upon completion of the project installation, and the remaining funds disbursed after a two-year monitoring period. The successful treatment of impervious acres and reduction of nitrogen, phosphorus, and sediment levels will result in water quality credits. At the end of the project, the land will be transferred to the county for perpetual ownership and maintenance.
Result	The first two cycles of funding have created projects that treated a total of 301 acres, costing \$5.5 million. The projects have been successful in reducing the cost per acre for stormwater treatment.
Reference	Pay For Performance: A Guide for Conservation Buyers in California ¹ Anne Arundel County, Maryland. "Anne Arundel County's Watershed Protection & Restoration Program: MS4 Permit Update" ²

1 Environmental Incentives. Pay For Performance: A Guide For Conservation Buyers In California. November 2019

2 "Anne Arundel County's Watershed - Mdcountries.org." Accessed February 10, 2023. <https://www.mdcountries.org/DocumentCenter/View/2824/Stormwater-Surge---Anne-Arundel-County-MS4-Permit---Erik-Michelsenpdf>.

Appendix 2. Case Studies

Project 5	[Pennsylvania]Clean Water Procurement Program
Period	2023
Budget	\$22 million
Purpose	Reductions in nitrogen, phosphorus, and sediment pollution
Area	Chesapeake Bay Watersheds, Pennsylvania
Unit price	-
Structure	The Clean Water Procurement Program in Pennsylvania will use state funding to buy pollution reductions in nitrogen, phosphorus, and sediment in the Chesapeake Bay. The program requires clear environmental outcomes, agreement on measurement, technical assistance flexibility, transparent priority system, verification, and first payment conditions. The program is important because it makes the best use of tax dollars for safeguarding and restoring waterways. The Pennsylvania Infrastructure Investment Authority will release a request for proposals for reducing pollution, and contracts will be awarded based on scoring criteria. The projects will be paid for based on actual reductions, with no cost overruns.
Result	-
Reference	Environmental Policy Innovation Center. "Buying Environmental Outcomes in Pennsylvania". Environmental Policy Innovation Center. "ICYMI: Clean Water Procurement Program Signed into Law 1 Month Ago Today" ¹

¹ Huntley, Harry. "ICYMI: Pennsylvania Passed Clean Water Procurement Program." Environmental Policy Innovation Center. Environmental Policy Innovation Center, August 8, 2022. <https://www.policyinnovation.org/blog/icymi-cwpp>.

Appendix 2. Case Studies

Project 6	[Vermont] Pay for Phosphorus Program
Period	2023
Budget	\$4.9 million across 4 years
Purpose	Phosphorus reductions on farms
Area	Vermont
Unit price	\$15 per restarted acre, \$100 per pound of eligible phosphorus reductions per year
Structure	The Clean Water Procurement Program in Pennsylvania will use state funding to buy pollution reductions in nitrogen, phosphorus, and sediment in the Chesapeake Bay. The program requires clear environmental outcomes, agreement on measurement, technical assistance flexibility, transparent priority system, verification, and first payment conditions. The program is important because it makes the best use of tax dollars for safeguarding and restoring waterways. The Pennsylvania Infrastructure Investment Authority will release a request for proposals for reducing pollution, and contracts will be awarded based on scoring criteria. The projects will be paid for based on actual reductions, with no cost overruns.
	The Vermont Pay for Phosphorus Program provides farmers with performance-based payments for reducing phosphorus losses from their fields, based on improvements from the management assumed in the Lake Champlain Basin Total Maximum Daily Load. Enrolled farms can receive a data entry payment of \$15 per acre up to \$4,000, and technical assistance is available. Farms with entered data can also participate in a competitive pool for annual phosphorus reduction payment contracts, with a payment of \$100 per pound of eligible reductions and an annual cap of \$50,000.
Result	-
Reference	Vermont Agency of Agriculture, Food & Markets, Vermont Pay for Phosphorus Program ¹ State of Vermont, Vermont Pay for Performance Program ²

1 "VPFP Vermont Pay for Phosphorus Program - Vermont Agency of Agriculture ..." https://agriculture.vermont.gov/sites/agriculture/files/doc_library/VPFP_OnePager.pdf.

2 Vermont Pay for Performance Program." Agency of Agriculture Food and Markets. <https://agriculture.vermont.gov/VPFP>.

Appendix 2. Case Studies

Project 7	[Nevada] Nevada Conservation Credit System
Period	2016 - present
Budget	-
Purpose	Sage-grouse habitat protection
Area	Nevada
Unit price	Market value, 4380 credits for 22603 acres
Structure	The process includes steps such as habitat improvement, credit quantification, management plan creation, financial assurances, and a participant contract. The sale price of credits is based on market value and determined through private negotiations, and the landowners must maintain performance standards for the project for at least 30 years while still being able to conduct compatible agricultural and livestock operations. As the credit system gains momentum, it is expected that the efficiency and effectiveness of the program will improve for both firms and agencies.
Result	About 22,600 acres of habitat are protected based on the transaction history published on the government website as of February 2023,
Reference	State of Nevada. Nevada Conservation Credit System ¹ Pay For Performance: A Guide for Conservation Buyers in California ² State of Nevada. Nevada Conservation Credit System Manual ³

1 "Nevada Conservation Credit System." ConservationCreditSystem. <https://sagebrushco.nv.gov/CCS/ConservationCreditSystem/>.

2 Environmental Incentives. Pay For Performance: A Guide For Conservation Buyers In California. November 2019

3 Nevada Conservation Credit System." Conservation Credit System Manual ver 1.7., January 2022

Appendix 2. Case Studies

Project 8	[Louisiana] Coastal Restoration Project
Period	2017 - 2022
Budget	-
Purpose	Coastal protection and restoration
Area	Louisiana
Unit price	-
Structure	<p>Louisiana is facing land loss due to subsidence, erosion and storm surges, and has passed a bill to authorize performance contracts for coastal protection projects. The bill requires 75% reimbursement based on defined performance metrics and a competitive bidding process, with funding from sources such as British Petroleum and a potential state bond. The new law allows for cost-effective and efficient project processes. Because payments will be ongoing for several years, the state may be able to work with investors to prepay more of the restoration costs than the state can afford.</p> <p>The development of innovative financing tools that incorporate outcome-based performance contracts has attracted private capital, built projects efficiently and effectively, and lowered the cost of remediation.</p>
Result	Out of 209 evaluated projects, 124 high-performing projects were selected and recommended in the 2017 Coastal Master Plan. These projects aim to build or preserve 800 square miles of land and have the potential to reduce flood-related economic damage by over \$150 billion in the next 50 years.
Reference	<p>Coastal Protection and Restoration Authority¹</p> <p>Pay For Performance: A Guide for Conservation Buyers in California²</p> <p>Restore the Mississippi River Delta “Pay-for-Performance: Bringing the Best of the Private Sector to Realize Wetland Restoration”³</p>

¹ 2017 Coastal Master Plan.” Coastal Protection And Restoration Authority. <https://coastal.la.gov/our-plan/2017-coastal-master-plan/>.

² Environmental Incentives. Pay For Performance: A Guide For Conservation Buyers In California. November 2019

³ “Pay-for-Performance: Bringing the Best of the Private Sector to Realize ...” Accessed February 13, 2023. <https://mississippiriverdelta.org/pay-performance-bringing-best-private-sector-realize-wetland-restoration/>.

Appendix 3. Interview Template

Interview Template (Private Sector)

Date:

Platform: (zoom, phone call, etc.)

Interviewee Name:

Interviewee Position and Organization:

Interviewers' Names:

Pre-Interview Statement and Questions

- Data gathered will not be published individually, but will contribute to an overall calculation, unless specified.
- Would you like the contribution to be anonymous?

Questions:

Project Questions

- What is the program name? If there were multiple projects would you mind stating them? What is/are the project type(s) and where is/are the project based?
- Which office/department/government agency did your organization/company work with?
- Could you tell me a bit about your PFS program/projects as a whole?
 - Dig into their contract structure
- What is the cost savings of the program/project? If still in development, what is the anticipated cost savings? What was your most recent unit price for a PFS contract (or what do you anticipate it being)?
 - Is that on par or cheaper than traditional procurement?
- Did you have any issues securing investments to pay for the project costs? What are some of the challenges the program/project face?
- Are there any past programs/projects done in a different way your organization/company worked on which could serve as a comparison?
- Do you have any contracts we could review? These will only be for research use, and we can redact sensitive information you do not want to share as well.. We're particularly interested in the payment structure and agreed upon unit costs
- Why are you procuring these outcomes? Is it a program specifically to improve the environment or to meet a permit requirement?

Evaluation Questions

- Why do you use PFS procurement? What do you think about PFS procurement?
 - What have you seen as the major benefits of PFS so far? What are the environmental benefits? Does using PFS procurement take less labor? [record other benefits they list so we have that info as well]
 - *If the project is not done with a Pay-for-Success contract, ask how they think the project outcome will be different if done it that way
- What are some restrictions or constraints when using PFS procurement?

Others

- Is there anyone else you know that you think I should speak to?
- Overall, did you think the process was worth it or not?
- Is there anything we didn't cover that you think we should know?

Appendix 3. Interview Template

Interview Template (Public Sector/Government)

Date:

Platform: (zoom, phone call, etc.)

Interviewee Name:

Interviewee Position and Organization:

Interviewers' Names:

Pre-Interview Statement and Questions

- Data gathered will not be published individually, but will contribute to an overall calculation
- Would you like the contribution to be anonymous/confidential?

Questions:

Project Questions

- What is the program name? If there were multiple projects would you mind stating them? What is/are the project type(s) and where is/are the project based?
- Which organization/company(s) or government entities did your office/department work with?
- Could you tell me a bit about your PFS program/projects as a whole?
 - Dig into their contract structure
- What is the cost saving of the program/project? If still in development, what is the anticipated cost savings? What was your most recent unit price for a PFS contract (or what do you anticipate it being)?
 - Is that on par or cheaper than traditional procurement?
- Are there any past programs/projects done in a different way your office/department had which could serve as a comparison?
- Do you have any publicly available contracts we could review? We're particularly interested in the payment structure and agreed upon unit costs

Evaluation Questions

- Why do you use PFS procurement? What do you think about PFS procurement?
 - What have you seen as the major benefits of PFS so far? What are the environmental benefits? Does using PFS procurement take less labor? [record other benefits they list so we have that info as well]
 - *If the project is not done with a Pay-for-Success contract, ask how they think the project outcome will be different if done it that way
- What are some restrictions or constraints when using PFS procurement?

Others

- Is there anyone else you know that you think I should speak to?
- Overall, did you think the process was worth it or not?
- Is there anything we didn't cover that you think we should know?

Appendix 4. Interview Summary

Interview 1. Erik Michelsen	
Interview Date	11.30.2022
Organization	Department of Public Works, Deputy Director, Bureau of Watershed Protection and Restoration, Anne Arundel County, Maryland
Attribute	Government
Program Names and Details	<ul style="list-style-type: none"> • Restoration Grant Program (refer to as Full Delivery Approach/Pay-for-Performance): the program helped county to dole out money to nonprofits that work on restoration activities and county can claim credits for it to reach compliance goal • Goal of the county: Focus on clean water effort (primarily storm water), associated with State and Federal permits that the county holds
Contract Model/ Payment Model	<ul style="list-style-type: none"> • Pay-for-Performance contract: contracting with private sector to outsource all the risks from the purchase, looking for fully implemented restoration projects that county can take credit for towards storm water regulatory needs that have been designed, permitted, built and completed • Development of proposals: internally drafted with the law office, worked with the purchasing department mainly to refine the Request for Proposals (RFPs) • Refine based on what to “buy”, which is usually the credits of the delivered projects
Funding Resource/ Financial Details	<ul style="list-style-type: none"> • Program funded through a local stormwater utility fee which is an annual fee that is from residential, commercial and industrial properties. Local special revenue generated within the county, and fund all the county capital project works
Cost Savings and Measuring Method	<ul style="list-style-type: none"> • Measuring method of the program: storm water permit and credit through state is issued through EPA, which is acre-treated
Benefits of PFS	<ul style="list-style-type: none"> • The approach enables manageable components of a program to be tackled incrementally. • It is scalable based on success or failure, and virtually all risk is outsourced to the bidder, with the loss of time being the primary risk to the solicitor. • This approach appears to be a viable strategy for driving down costs, particularly if the credit-generating activity is sufficiently broad. • It has the potential to disrupt markets that may have otherwise become complacent. • All responsibilities are beared by the implementation entity. If landowners back-out, the firms bear their own costs. County’s risks are constrained by how much they’re willing to pay for the product • Almost no risks on the county part (at least finance risks), the only risks is that project fail to complete in time to reach the restoration goal • High financial reward if the firm can deliver the result in a highly efficient manner (grant funding doesn’t have this feature)

Appendix 4. Interview Summary

Limitations of PFS	<ul style="list-style-type: none">• Projects need to be done on private property because property access is an issues• Some law suits design control in the traditional way of doing it, the consultant designs the project to make sure the county gets exactly what they want. Once the contract is rewarded, the actually implementation is on the other party's hands• Siting: stormwater permit applies county-wise, but if the county would like to have a project at a given site, it can be done through this mechanism, but the more constraints to put in the request for proposals, the costs may go up, and will limit numbers of bidders• The risk of losing design control is a possibility.• A lack of rigor in technical review of the crediting process could result in subpar work that meets only the minimum requirements.• Identifying a highly refined solicitation may require multiple iterations.
Perspectives on Traditional Payment Model	<ul style="list-style-type: none">• Conventional government procurement (design bid-build process): one hired consultant design, permit the project and put it out to bid• Risk on the government agency side, give out money to non-profit, but there is risk of failure in execution. If failed there are no easy mechanisms to recover
Other Notes	N/A

Appendix 4. Interview Summary

Interview 2. Dan Read	
Interview Date	12.15.2022
Organization	Postdoctoral Researcher, University of Maryland Center for Environmental Studies
Attribute	Academic
Program Names and Details	<ul style="list-style-type: none"> • Federal and State program (in Maryland): incentivise farmers to install conservation practices on land, hundreds of different kinds of practices (planting trees, planting crops to prevent erosion or soil run-off...etc) • Program Type: Tax credit programs • Program Location: Maryland, Virginia and Pennsylvania (tax credit programs) government have similar programs • Timeline of the application/reimbursement: complicated project: 2-5 years; small projects: within a year • Delays happen due to season, firms, and others
Contract Model/Payment Model	<ul style="list-style-type: none"> • Predominant model: reimbursement model (tax credit programs): farmers work with government agencies or nonprofit to file out application for funding • The application has the plan of what to install on the farmland and the estimated cost. Applications are prioritized based on cost-effectiveness analysis (e.g. how much runoff can this project prevent using this amount of money). Once a project is selected, the farmers pay for the upfront (tools, construction...etc), once the project is in place, the government will come out and evaluate. If the project meets the standard, the government will distribute reimbursement up to 75% or more to cover the cost and reimburse the project. Percentage of reimbursement is due to category/practice, which should be listed on gov website • Farmers can also go through reimbursement programs by non-profit or non governmental, it'll be more flexible and faster, but the reimbursement amount won't be as much
Funding Resource/Financial Details	<ul style="list-style-type: none"> • The funds come from taxpayers
Cost Savings and Measuring Method	N/A
Benefits of PFS	<ul style="list-style-type: none"> • Create a win-win situation that government get their projects done, and farmers get huge percentage of the project reimbursed

Appendix 4. Interview Summary

Limitations of PFS	<ul style="list-style-type: none">• The specification that need to be designed for the application may make cost higher than they need to be• The process takes too long for the farmers
Perspectives on Traditional Payment Model	N/A
Other Notes	N/A

Appendix 4. Interview Summary

Interview 3. Chad Praul and Katie Riley	
Interview Date	01.15.2023
Organization	Environmental Incentives
Attribute	Firm
Program Names and Details	<p>1. Federally sponsored research: procurement format, developed concepts of pay-for-performance, which developed into a tool kit. The tool kit helped people to do RFPs and full delivery contracts</p> <ul style="list-style-type: none"> • Link to the pay-for-performance toolkit: https://enviroaccounting.com/ <p>2. Written RFPs for San Diego County</p> <ul style="list-style-type: none"> • Delivery of a stream restoration at Rainbow Creek: took bids from the private sector to the county for designing projects to restore stream and reduce nitrogen, not paid until those results (in pounds) are verified through modeling system • Maintenance is done on the project and developed into long-term ownership. County never took ownership of the land, but got the credits of reduce nitrogen <p>3. Department of Commerce in Washington State: create guidebook for counties in Washington</p> <ul style="list-style-type: none"> • Community-based public-private partnership • Thought piece, policy-directed <p>4. EIP and California Sacramento</p> <ul style="list-style-type: none"> • Overseeing the flood risk with EIP as the delivering partner and California Water Resource being the funder. • Program Type: leverage to private sectors to work on projects and apply payment terms accordingly; private-public partnership • Program Location: San Diego County, Washington, Sacramento
Contract Model/ Payment Model	<ul style="list-style-type: none"> • Paid by performance milestones along the way. Performance milestones were set beginning of the project • Multiple rounds of contracting are needed to see big enhancements
Funding Resource/ Financial Details	N/A
Cost Savings and Measuring Method	<ul style="list-style-type: none"> • Reduction and risks are huge for county (more than cost) • County's RFPs won't work if they don't have a cost-benefit models available to the proposers • Maybe not be cost saving, but efficiency can be an incentive

Appendix 4. Interview Summary

Benefits of PFS	<ul style="list-style-type: none">• Implementation flexibility, private sector can access land more easily• County earn credit but don't need to include land in their inventory
Limitations of PFS	<ul style="list-style-type: none">• First time implementing PFS is a pain, county need to come up with a new way of doing it and it won't be cheaper for the first time• County like how their procurements are working, and it's hard for them to change their way of doing things• Not always the cheapest option, but risk mitigation can be an incentive• Sometimes the firm can't hit the goal either• Take effort to convince people
Perspectives on Traditional Payment Model	N/A
Other Notes	N/A

Appendix 4. Interview Summary

Interview 4. Doug Lashley	
Interview Date	01.16.2023
Organization	Chief Executive Officer, GreenVest
Attribute	Firm
Program Names and Details	<ul style="list-style-type: none"> • GreenVest develops mitigation project, projects include: wetland mitigation, stream projects, alternative energy projects - using the surplus land - license others to construct solar energy (passive use to highlands), stormwater and flood attenuation work • Science oriented business: have the technology that has to be applied to water quality and other systems • GreenVest is an environmental restoration business, try to undo what men have done in the last hundred years and reverse some of that or do it in a more environmentally friendly fashion (mining, farming, building...etc) • Projects mostly in water quality side (Mid-Atlantic on the East Coast), not a lot of species protection • GreenVest do option agreements: wetland restoration, stream projects, ocean-front
Contract Model/ Payment Model	<ul style="list-style-type: none"> • GreenVest gives a fix price (listed in contracts), government has nothing at risk, assuming GreenVest being competent • GreenVest can buy land in a shorter time frame (15-45 days) but takes government maybe years due to procurement requirements • GreenVest looks at government agencies' mandate and design and carry out the projects. Making sure that risks are avoided with the expertise
Funding Resource/ Financial Details	<ul style="list-style-type: none"> • GreenVest need to finance the projects since won't get paid until project implemented • If GreenVest borrows money to fund the projects, they'll have to pay interest. Not from conventional banks though, but from banks that fund green infrastructure • The interests will be a line item in the contract when signing with government agency as part of the cost
Cost Savings and Measuring Method	N/A
Benefits of PFS	<ul style="list-style-type: none"> • No Scope creeps under PFS, as if scope of the project changes and cost changes, which is possible to happen in the traditional contract models. Under PFS model this can be avoided (at least under GreenVest) - since it's fixed price • There will be more time-saving, as time is money. Satisfy compliance mandate with less time, which saves the cost which may occur if the time is not saved

Appendix 4. Interview Summary

Limitations of PFS	• Potential failed projects: environmental disaster. Warranty/insurance needed when things happen. May not fail the project but cause risks
Perspectives on Traditional Payment Model	N/A
Other Notes	N/A

Appendix 4. Interview Summary

Interview 5. Kyle Graham	
Interview Date	01.20.2023
Organization	Senior Program Manager, Ecosystem Investment Partners (EIP)
Attribute	Firm
Program Names and Details	<p>1. Maryland: Stormwater Credit</p> <ul style="list-style-type: none"> • There was a need for nitrogen reduction (in pounds), based on EPA • Project price defined based on nitrogen reduction. In the contract, stated that after construction of the project how much nitrogen should be reduced, get 50% of the money/credits for this contract. After that for 5-7 years, each year if the performance matrix are met, credits/money will be released each year <p>2. California: Lookout Slough</p> <ul style="list-style-type: none"> • Wetland restoration project in Sacramento. Largest wetland restoration project in California, the State was sued before this project by the environmental groups over rerouting of water • Before the project, the habitat and endangered species were being damaged. To make up for it, State need to develop a 300 acre habitat for the endangered species • State has been doing this for over 15 years, and weren't able to get all the acres. the State then put out an RFP asking for help develop the project • EIP designed the project for the habitat, and get paid based on the acres of habitat delivered <p>3. State of Florida: Basin management action plan</p> <ul style="list-style-type: none"> • State water quality goal: set TMDL goals for water, phosphorus and nitrogen reduction goal (metric tons) to improve water quality • EIP entered into a contract lasting 3 years on wetlands. Develop a huge constructed wetland and EIP will need to show the actual reduction per year, only get paid in years that reach the target of 15 metric tons of reduction • Project timeline: timeline ties to the revenue stream EIP has. In the investor perspective, they have 10-12 years of money (5-6 years to invest, 5-6 years to get the return). Most contracts EIP enter into, need to be able to be engineered, designed, constructed, implemented and getting the return in the 10-12 year window • EIP put together the expertise to decide that are good metrics of evaluating success, what is achievable, and matching up with the restoration technique to know what the level of risk is

Appendix 4. Interview Summary

Contract Model/ Payment Model	<ul style="list-style-type: none"> • EIP identifies targets for the success matrix , all of the contracts are performance based • The Army Corp handles the permits, they set up a structure that incentivise private investors (like EIP) to generate credits ahead of the impact • Inside the contracts: operation and management maintenance manual that both sides agreed to (it's an if then agreement: if...then...). EIP uses this tool to minimize the risk
Funding Resource/ Financial Details	<ul style="list-style-type: none"> • EIP sets up a framework called mitigation bank, where private investors (like EIP) take their capital and identify a stream or wetland that needs to be restored. Then the investors work with Army Corp and other agencies to make sure they like the project and agreed to the type of project • In mitigation bank: takes 3 years to set up mitigation bank and approved by regulatory folks, that gets the credit to markets. EIP gets credits in the first two years, and have around 9 years to sell the credit • Credits will be received based on the type of restoration that is carried out. Government provides a credit release schedule over time, and EIP gets certain milestones to the project development (e.g. once purchase the land and put it on conservation usage gets 25% of the total credits; finish construction: 35% of the credit; success milestones after construction based on evaluation matrix get the rest of the credit) • EIP bring all the credits ahead to all the agencies and regulatory folks, and agree on what level of work that needs to be done, and the amount of credits that will be released when hitting milestones
Cost Savings and Measuring Method	<ul style="list-style-type: none"> • Phosphorus and nitrogen reduction (in metric tons/pounds)
Benefits of PFS	<ul style="list-style-type: none"> • Don't have discrete moments that need to oversee everyone in the team (traditionally, when submitting a request for payment, submit huge invoices with all the expenses and all the hours of work. but in this case they payment request is easier) • The pace at which projects get delivered is faster since they request less paper-work • With the cost the contract listed (or fix payment amount) and the requirements, it's easier to design projects (more directions)
Limitations of PFS	<ul style="list-style-type: none"> • Constantly need change to plan based on environmental change and others (as long as the risks and potential costs are included in the contracts the risk can be reduced) • Need to understand the risk of the rewards and take everything into consideration • Additional cost of PFS: pay additional returns to the investors

Appendix 4. Interview Summary

Perspectives on Traditional Payment Model	<ul style="list-style-type: none">• Depending on the project, Carolina has different kinds of projects. Sometimes if government can do it themselves they do it need to have the flexibility• Outcome-based-performance contract in Louisiana, sometimes found that the state can probably do it cheaper as the government doesn't need to do the financing and don't need the cost to pay the return. Private entity may be more expensive as they need to go through a bond around 95% -98% of the budget is on dredge itself and maybe 2% of the total contract• Division of mitigation services in Maryland: instead of going to mitigation bank, they take their own money for state projects and they have a timeline to implement the restoration
Other Notes	<ul style="list-style-type: none">• Lots of conservation projects and restoration projects can't be retouched once restored, it goes into preserve and on the deed with third parties of trust oversee it• The right of the land could be sold to a hunting entity that would use it as a hunting lease. Conservation agreement still exists and hunting entity can still use the land, just limited to what they can do• Land ownership: Florida, Maryland government owns it at the end of the day, the turnover happens during the project. In California, government purchases the land once the private entity sorts it or when project finish the design phase

Appendix 4. Interview Summary

Interview 6. Shawn Kerachsky	
Interview Date	01.26.2023
Organization	President & CEO, Community Infrastructure Partners (CIP)/Corvias
Attribute	Firm
Program Names and Details	<ul style="list-style-type: none"> • For CIP, since the PFS contract takes forever to get through, currently doesn't have any partnership. • CIP is doing more on the implementation and full delivery • CIP is doing what the EPA defined as community based private-public partnership model: how do you tie incentives that the private entity gets paid for delivering things that are most important to the community partners • CIP is trying to evolve the model in the way that, if the public side with these kinds of outcomes, then CIP is willing to take on the risk by tying the compensation to that, so as a private entity they can ensure the public sector gets what they are expecting
Contract Model/ Payment Model	N/A
Funding Resource/ Financial Details	<ul style="list-style-type: none"> • CIP's model has only applied it to stormwater restoration in a disaggregated structure. Not procuring one of the projects at a time. Designers and engineers, construction, managing all those things all at once. Get efficiency of scale by bundling all these things together drives down cost • CIP looks at the cost of previous projects, and dive into the details with the local partners (national engineering firms, or whoever the subject matter experts are), and see if they can reduce the cost or be more efficient. Leaving it broad enough in terms of the geography, gives them enough space and room to be able to figure out how to work with that and the metrics. Prioritize the neighborhoods and be specific
Cost Savings and Measuring Method	N/A
Benefits of PFS	<ul style="list-style-type: none"> • Community benefits: community benefit is unique to each particular community • CIP shifts the risks to their contracting parties • mitigate the risk by working with good partners that have the technical expertise that CIP rely on to understand what type of risk they're taking (measure risk accurately)

Appendix 4. Interview Summary

Limitations of PFS	<ul style="list-style-type: none">• Convincing municipalities to enter into some kind of agreement like this takes a long time. There is continuous evolution of how to de-risk this kind of program
Perspectives on Traditional Payment Model	<ul style="list-style-type: none">• In history the private-public partnership has a bad reputation. The belief is that the private sector is always getting more through contracting, and private sector doesn't deliver, and public side will have to kind of wrap up the project
Other Notes	<ul style="list-style-type: none">• Incentive for the private sector to take the risk and hoping that those projects get developed and funded don't always make sense if the public entity is too demanding

Appendix 4. Interview Summary

Interview 7. Jeremiah Asher	
Interview Date	01.30.2023
Organization	Institute of Water Research, Michigan State University
Attribute	Academic
Program Names and Details	<ul style="list-style-type: none"> • No current PFS projects ongoing, working on creating the framework and tool development • Pay for Out-come Based: a project conducted by Nature Conservancy which uses online tool sets to quantify the impacts of their activities • The toolset development: great lake watershed management toolset. Have been using this for other sub-watersheds for model building. Utilize outputs of the model to feed back into the model structure. Online toolset help with streamlining the process and make it customized <ol style="list-style-type: none"> 1. Great Lakes Restoration Project <ul style="list-style-type: none"> • Funding source of the Nature Conservancy Project • Looked at reduction of sentiments. Used an online toolset to estimate the reduction of sentiment from different agricultural conservation practices in the watersheds. Quantify what the reduction would be 2. Great Lakes Restoration Initiative (GLRI)-Southeast Michigan <ul style="list-style-type: none"> • Applied through the same funding source (as above) for this project. Focus on reduction of phosphorus using different conservation practices • Build upon the same framework of the toolset that is used by the Nature Conservancy
Contract Model/ Payment Model	N/A
Funding Resource/ Financial Details	N/A
Cost Savings and Measuring Method	<ul style="list-style-type: none"> • Model beforehand to see which method/combination of practices will give the greatest amount of participation, then look at equal payment rate to estimate where the payment threshold will occur. Then take everyone into the program who are within the threshold. If a later-on participant has a higher cost they can still participate but receive reduced payment. Which is a threshold approach compared to a randomized approach. 7 times more cost-savings, \$26-\$27/pounds for phosphorus reduction

Appendix 4. Interview Summary

Benefits of PFS	<ul style="list-style-type: none">• Farmers preferred it as there's less paperwork compared to other programs. Streamline application procedure developed with farmers easier to participate• Most people are open as it has lower level of entry and requires less time in application procedure
Limitations of PFS	<ul style="list-style-type: none">• In one location it may be utilized perfectly, but in another watershed it may not be the case• Really about the conservation technicians working locally with the farmers. Enrollment depends on if there's good partnership with local technicians
Perspectives on Traditional Payment Model	N/A
Other Notes	N/A

Appendix 4. Interview Summary

Interview 8. Brian Monaghan	
Interview Date	02.01.2023
Organization	Wildlands
Attribute	Firm
Program Names and Details	<ul style="list-style-type: none"> • Mitigation solution projects, take out the permit obligations from public to private and help offset the impact • Public don't want to own habitat land but that's Wildlands' business. • Real estate experts, lawyers, environmental planner and land specialists. True value provided to the community projects. Which provides efficiency as Wildland can provide all these expertise, provides additional predictability on costs and risks, and charge not on an hourly basis, but outcome per/acre • Usually lands are not for sell, but Wildlands acquire lands through negotiation and by knowing what the community wants • Third party non-profit will oversights the projects due to government request, and the third party will keep Wildlands accountable
Contract Model/ Payment Model	• Function of price: land cost, management obligations and budgeted entitlement, which is how much you'll need to put down upfront
Funding Resource/ Financial Details	<ul style="list-style-type: none"> • Prefer organic capital over private capital funds. Organic capital uses the funds from one project and move on to use it in another, which is responsible financing • Eco-assets are more complicated and eats into the cost, unpredictable because dealing with government agencies
Cost Savings and Measuring Method	N/A
Benefits of PFS	<ul style="list-style-type: none"> • Gives both sides a level of comfort that impacts are being mitigated • Efficiency and expertise saves time • Economics of scale saves the "constant cost"
Limitations of PFS	<ul style="list-style-type: none"> • Agency review time can't really be estimated, which is the primary delays • Natural disasters happen from time to time. Include it in the contract to minimize risk. Even though sometimes projects are destroyed by natural disaster, Wildlands still try to wrap up the project instead of abandoning it
Perspectives on Traditional Payment Model	N/A
Other Notes	N/A

Appendix 4. Interview Summary

Interview 9. Michael Hare	
Interview Date	02.02.2023
Organization	Resource Environmental Solutions (RES)
Attribute	Firm
Program Names and Details	<ul style="list-style-type: none"> • RES is an operating company on the implementation side. RES has more restoration/conservation projects compare to others in the private sector • Mitigation bank MBI process: find a piece of land and mitigation MBI signed by all agencies, which serves sort of as a contract for RES to use the land. RES has a 10-15 year period to meet ecological goals and matrices in a certain period of time. RES doesn't get money but gets credit once a project is built, the credits could be sold to others. And there will be year 1, 5 , 10 of monitoring • Restoration RES do: public good that has the mitigation model • RES believes a completed project should be a complete one that should be able to take care of itself, fully functioning natural system that no longer needs human interference
Contract Model/ Payment Model	N/A
Funding Resource/ Financial Details	<ul style="list-style-type: none"> • The fund comes from the balance sheet and loans, hard cash generated from projects • Have capital during the short time period and have to take stewardship of the project and land, have that credit earned invest into later on projects
Cost Savings and Measuring Method	<ul style="list-style-type: none"> • Outcome based contracts help solve finance problems and risk problems. However it's hard to solve both problems at the same time with low cost. If RES thinks that "we can do it cheaper", it's hard to achieve, as risks will be included in costs. Government doesn't think through the true cost of O&M and stewardship
Benefits of PFS	<ul style="list-style-type: none"> • Risks can be shifted

Appendix 4. Interview Summary

Limitations of PFS	<ul style="list-style-type: none">• Gov agencies try to use money to conduct env projects, they are not familiar enough with the business. They thought their outcome would be sure to be delivered. They don't want to pay for construction or in stages and want to see the outcome and just pay once for the final result.• Risks are on RES, and sometimes government's request is unrealistic• RES is capable of taking on the risks with expertise. RES has no choice but to take on the risk on their side, as mitigation bank is a financial model they're familiar with. RES also take on the risk as they're aiming to hit the highest yield (outcome) on the operation side• Natural disaster/extreme weathers cause great harm to projects especially in the initial and contraction stage• Supply problem: hard to get labor to work on those projects. Ecologist, biologists are easier to have as they work in office, but construction workers are hard to find• Design and construct are not done by the same team, there may be a mismatch
Perspectives on Traditional Payment Model	<ul style="list-style-type: none">• Traditional method usually fails as it is less efficient and not utilizing the budgets well
Other Notes	N/A

Appendix 4. Interview Summary

Interview 10. Scott Norris and Jamie Milani	
Interview Date	02.02.2023
Organization	Watershed Protection Program, San Diego County
Attribute	Government
Program Names and Details	<p>1. Rainbow Creek project</p> <ul style="list-style-type: none"> • first stream restoration project using this contract model in the county, lots of questions from the legal team and other teams working on the project • The team demonstrated that they're buying water quality, compliance and credits, demonstrated there's net benefit to local community • Questions asked internally: <ol style="list-style-type: none"> 1. How can the county do this if they own the land, what type of easement will be appropriate in the long term? 2. What is the best vehicle to motivate O&M after project completion? 3. How long should the agreement be? Usually contracts can't be more than 5 years, what should the county do after the contract expires? • Project contracts for 800 linear feet of Rainbow Creek to restore endangered species and connect the flood plane to the stream again so nitrogen and phosphorus can be reduced • Direct agricultural input in the area makes it difficult for the project to meet water quality as there was constant input. Intensive agriculture on both sides of the creek • Regulators agreed to give compliance credits for the restoration project (by inviting them to participate in decision making) • SD County is not doing O&M, private party need to demonstrate they are capable of stewardship • RES took on the Rainbow Creek project with third parties validation/assessment. Setting milestones help with this to do checks and contract monitoring. • Additional requirement from the county for third parties to come in and verify the benefits/outcomes. Initial credit verification in year 3, third party will go and check, then the change has to be maintained for 2 years. In year 5 the third party will go check again and make the final payment
Contract Model/ Payment Model	<ul style="list-style-type: none"> • RFPs required to submit: land control agreements, which is one of the biggest barriers for the bidders • PFS doesn't pay money to the real end, County structured it with a milestone (5 milestones with the final payment): land sorting gets 10% (potential risk of project failure, county will be out of the 10%). Most money are reserved for the final payment • Future contracts will hope to shift most payments to the end. However, more advantageous for now to pay with the milestone to work with the current county system

Appendix 4. Interview Summary

Funding Resource/ Financial Details	<ul style="list-style-type: none"> • SD County doesn't have a stormwater fund, they are just funded by general funds (not specifically for stormwater). In this case there's no funds they can run over for future projects
Cost Savings and Measuring Method	<ul style="list-style-type: none"> • SD County doesn't have cost-saving as their top priority. Timing is the main motivating factor with private sector's efficiency • It's hard as water quality vary so much due to all sorts of factors so SD county need to think of the measuring method to be the most fair (e.g. 30 days average...etc)
Benefits of PFS	<ul style="list-style-type: none"> • Allow private entity to innovate, and give them flexibility to perform • Private corps have the benefit of fast track compared to the County. The county can focus on team power to get things done as there is no monitoring components in the Rainbow Creek project
Limitations of PFS	<ul style="list-style-type: none"> • Potential of failure
Perspectives on Traditional Pay- ment Model	N/A
Other Notes	N/A

Appendix 4. Interview Summary

Interview 11. Kurt Stephenson	
Interview Date	02.13.2023
Organization	Department of Agricultural and Applied Economics, Virginia Tech
Attribute	Government
Program Names and Details	<ul style="list-style-type: none"> • Looking into alternatives that can incentivize projects • Conclusion: there's no single best option of programs as different programs have different outcomes, and really depends on project type and size (e.g. State of VA coastal plain will be different from inland restoration) • Credits as outcome has lineup buyers. Which is a buyer and seller system. Usually buyer lineup before implementation party work on projects
Contract Model/ Payment Model	<ul style="list-style-type: none"> • Really need to mix the payment system as the pure PFS payment system can't incentivize. Government agencies need to cover some risks upfront by changing payment structure at least in the case of individual farms or landowners.
Funding Resource/ Financial Details	N/A
Cost Savings and Measuring Method	<ul style="list-style-type: none"> • In PFS they try to look at Best Management Practice (BMPs) to measure, and there are a lot of accounting problems with that as outcomes are hard to measure
Benefits of PFS	<ul style="list-style-type: none"> • Potentially being more efficient
Limitations of PFS	<ul style="list-style-type: none"> • Outcome based means significant performance risks. Lots of these systems (PFS) share risks with landowners
Perspectives on Traditional Payment Model	N/A
Other Notes	N/A

Appendix 4. Interview Summary

Interview 12. Glen Williams	
Interview Date	02.13.2023
Organization	Ecosystem Investment Partners (EIP)
Attribute	Firm
Program Names and Details	<ul style="list-style-type: none"> • Lookout Slough Restoration Project: The main driver for this project was the relationship with DWR (Department of Water Resources). There was a lawsuit in early 2000s, as State moved water from Delta to Central Valley and SoCal, which harmed endangered species. • Lawsuit result: DWR needs to create 8000 acres of wetlands. However, DWR tried on their own but didn't get any of the acres restored, so they put it out for private sector to take on
Contract Model/ Payment Model	<ul style="list-style-type: none"> • Most of the government contract prices are based on costs, generally a good guess, but really depends on change, could be inaccurate • EIP is selling the state "credits"
Funding Resource/ Financial Details	N/A
Cost Savings and Measuring Method	N/A
Benefits of PFS	N/A
Limitations of PFS	<ul style="list-style-type: none"> • Lots of mitigation needed, • Need to be careful where the CEQA lawsuit may come from, and public impacts. (e.g. local water districts sued DWP under CEQA; impact to bank fishing by the public - the slough being included in the restoration and public lose access) • Need to consider nesting seasons of animals • Potential delay from sub-contractor or others
Perspectives on Traditional Payment Model	N/A
Other Notes	<ul style="list-style-type: none"> • The public-private cooperation has been good. EIP included DWP in most discussions

Appendix 4. Interview Summary

Interview 13. Jason Keppler	
Interview Date	02.16.2023
Organization	Conservation Grants Program Manager, Office of Resource Conservation, Maryland Department of Agriculture
Attribute	Government
Program Names and Details	<p>1. Maryland Water Quality Cost-Share Program</p> <ul style="list-style-type: none"> • program website: https://mda.maryland.gov/resource_conservation/Pages/macs.aspx • Maryland, Pennsylvania and Virginia work together on Chesapeake Bay water quality, through local conservation district offices working with the farmers • Annual budget of 10 M dollars, funded through bond sales from State level • Application process for farmers focused on soil and water conservation plan, usually the local office will assist the farmer to plan out. Farmer chooses to move forward with the recommendations. Then there will be experts, engineers that start work on project design (make sure it meets the requirements of MACS). If farmers want to proceed, the local office will work with them and fill out the application, providing different finance/funding options. A lot of work is done on the local district office side and farmers review the paperwork. Then present projects to the Board of public works, the board will review and approve then implementation can start. • When a project is approved, the farmer has a year to implement it. District office will check if the project hasn't started construction within a year. May provide a 6 month extension in some situations. If after 6 month, will probably ask the farmers to withdraw so they can redistribute funding to other projects • Maryland has good partnership with Federal agency partners and farmers, this help pushing the work forward • Maryland farmers are progressive, usually willing to take up conservation/restoration projects. Generally there is strong participation in programs • Last year there are projects worth 9.7 M sent to the Board, all program combined about 40 M dollars for conservation projects
Contract Model/ Payment Model	See above
Funding Resource/ Financial Details	See above
Cost Savings and Measuring Method	N/A

Appendix 4. Interview Summary

Benefits of PFS	N/A
Limitations of PFS	<ul style="list-style-type: none">• 40% of the farmlands are rented land, which conflict with landowners. Farmers don't want to put their own money into a land they don't own• Maryland is now encouraging long-term lease agreements to help landowners to understand those projects• Climate change: salt water intrusion and sea level rise. Impacts agricultural land as certain crops can't grow
Perspectives on Traditional Payment Model	N/A
Other Notes	N/A

Appendix 4. Interview Summary

Interview 14. Charlotte Biggs	
Interview Date	02.16.2023
Organization	California Department of Water Resources
Attribute	Government
Program Names and Details	<ul style="list-style-type: none"> • Habitat restoration projects • Original plan: sort land, design, and have the department implement those projects. Later realized there are complications, land use changes challenges and just a long time to complete those considering administrative costs, time cost...etc • Alternative option: PFS option, which went through competitive bids and seek proposals. Private sector pitch for projects. • Largest title wetland project in California done through public-private partnerships. Worked with EIP (EIP pitched for the project), and took around 5 years to complete. Even with partnership, there are still good amount of work for oversight, but in general saved lots of time and human resources compared to the traditional way of doing so
Contract Model/ Payment Model	<ul style="list-style-type: none"> • Department has sensitivity in partnering • Pushbacks of having “outsiders” do the design and engineering. Traditionally there will be consultants or experts that help out “partial” projects, but not outsourcing the whole thing. EIP do the whole project and departments are not used to it, resulted in lots of resistant
Funding Resource/ Financial Details	N/A
Cost Savings and Measuring Method	<ul style="list-style-type: none"> • Tough to compare between projects. For Lookout Slough (flood & title wetland): \$32 k/acre; past projects (not same type): \$40 k/acre or more, but some may be less. • Specifically saved on land-owner costs • How are prices determined: for Lookout Slough Restoration Project, EIP made a proposal on how much the project will cost, and decided what the cost is for a price per acre basis. The State then compare with past projects and include all the costs in contracts
Benefits of PFS	<ul style="list-style-type: none"> • For the state they can’t hire and dismiss people just for a project, so more efficient to work with outside firms (scale up or down in regards of staff) • Department having oversight on project but not the one implementing
Limitations of PFS	<ul style="list-style-type: none"> • Always a ton of risks, internal and external pushback • Lots of permits and approvals needed. Extra investigation/research needed to get some permits • Opposition from the public and potential of being sued under CEQA

Appendix 4. Interview Summary

Perspectives on Traditional Payment Model	N/A
Other Notes	<ul style="list-style-type: none">• Future projects: Restoration Multi-Benefit Program• The department has more need in restoration, so future projects will probably use this model• Also working with Westervelt, department want to make sure the firms they co-operate with has stable cash flow

Appendix 4. Interview Summary

Interview 15. Jason Lee	
Interview Date	02.13.2023
Organization	Qualified Ventures (QV)
Attribute	Firm
Program Names and Details	<ul style="list-style-type: none"> • QV matchmaking projects with the right investor • Stormwater projects- state revolving funds are sometimes used for water projects as the returns are rather low (1-2%) • Projects in Colorado River Basin: projects on water quantity saving. Farmers proposing projects to save water and government will pay them • Timeline: need at least 2 years to make concepts into a scalable project/product. R&D work in this period to build everything before bringing in capital. Sometimes will find that science aren't there yet, so hard to get people pay if outcomes are hard to measure
Contract Model/ Payment Model	N/A
Funding Resource/ Financial Details	<ul style="list-style-type: none"> • Funds are different from financing. QV is trying to move capital, either it's funds or investments • PFS framework is a tool QV uses. Outcome-based financing define as can you leverage outcome in some way • Funds revolve within QV to build financial model and find outcome buyers
Cost Savings and Measuring Method	• Cost savings and returns vary among projects. Fix costs: administrative, staffs, experts...etc
Benefits of PFS	N/A
Limitations of PFS	• Need to find the right investor. PFS is about how to get investors to pay upfront, and need to find investors that are not just looking for financial impact. If investors don't understand the value chain, they'll ask for a higher return
Perspectives on Traditional Payment Model	N/A
Other Notes	• Takeaway: find the right people to work with

Appendix 4. Interview Summary

Interview 16. Sara Johnson	
Interview Date	02.27.2023
Organization	Ecological Restoration Business Association (ERBA)
Attribute	Firm
Program Names and Details	<ul style="list-style-type: none"> • A Volunteer board formed, National Mitigation Bank Association (starting 1998), just on the Clean Water Act projects originally. Membership shifted over the years, more land operating firms and specialization organizations. Members shrinking to certain extent and limited of number of players qualify as smaller companies don't have the infrastructure • ERBA using PFS in all sorts of environmental projects as boards sets a series of priorities. Industry divided into 2 markets: 1. existing market - driven by current regulations (e.g. species mitigation policy, restoration...etc); 2. emerging market - where PFS fits in (e.g. put out RFPs to select eligible participants) • All the initiatives start with the Board and different committees will develop different positions. The Board looks into the difference if that conflicts with ERBA's core principle. Usually disagreements happen when it comes to strategies • PFS is a novel approach for government agencies, see breakthroughs but no systematic embracement. For FEMA and other gov agencies, PFS can be really novel and hard to initiate • motivation of firms: environmental perspectives. Env benefit along with the business benefits
Contract Model/ Payment Model	<ul style="list-style-type: none"> • There's a playing field that some companies have more capital as they can put in more ambitious proposals • It is important how government agencies structure the PFS contracts, it determined who the participants could be to certain extent • Rewards sooner in the process help with the cash margins
Funding Resource/ Financial Details	N/A
Cost Savings and Measuring Method	N/A
Benefits of PFS	<ul style="list-style-type: none"> • Depends on the contract structure. In most scenarios companies are willing to take all the risks as this is the selling point of the contract model and firms are confident in their own expertise
Limitations of PFS	<ul style="list-style-type: none"> • Different governing authorities, different offices of councils, which prevent PFS from happening • Different offices interpret outcomes differently

Appendix 4. Interview Summary

Perspectives on Traditional Payment Model	N/A
Other Notes	N/A

Appendix 4. Interview Summary

Interview 17. Travis Hemmen	
Interview Date	03.01.2023
Organization	President/General Manager, Westervelt Ecological Services
Attribute	Firm
Program Names and Details	<ul style="list-style-type: none"> Identifying landscapes that are good for restoration Full-delivery project: secure the project with a fixed payment. Firm has the financial capacity to do it, but the contract can be abusive and unfair to the firms. Usually liability projection for the state overdone
Contract Model/ Payment Model	<ul style="list-style-type: none"> Capital model: delivering project to the market 1. through banking program (mitigation bank - given credits): easy to sell the credits thank to regulation, easily recognized 2. full-delivery projects: full level of design, implementation, construction with large financial input
Funding Resource/ Financial Details	<ul style="list-style-type: none"> WesterVelt's project usually has super long life cycles. If taking over-aggressive money with a short life cycle there's high risk. Do have to pay back investment but more manageable since the money given by the parent company is at a low rate. Parent company also has a good understanding of the long return cycle Average life cycle is between 8-10 years, but 15-35 years is fine sometimes as well
Cost Savings and Measuring Method	<ul style="list-style-type: none"> Cost savings and returns vary among projects. Fix costs: administrative, staffs, experts...etc
Benefits of PFS	<ul style="list-style-type: none"> Usually shorter timeline if firms do it. Bio studies, land sorting and other technical works. When agencies do that they'll have to send everything out to bid and usually sign people into order (in many cases need to take the low bid too)
Limitations of PFS	<ul style="list-style-type: none"> Sometimes state asked firms to have more insurance on properties, from firms' perspective could be unnecessary adding those additional insurance and it is a waste of public money Travis has not seen a perfect contract. Legally language in the contract can be scary, but since WesterVelt is performing anyway, usually it's fine For WesterVelt, they know the land and can be the landowner sometime, but State don't understand what the real cost is for full delivery
Perspectives on Traditional Payment Model	<ul style="list-style-type: none"> State usually want to take 2 paths 1. real estate transaction: in reality CA doesn't want the land, just wants the set of deliverables that happen on the land that are approved by agencies getting to recognizable credits. Not realistic 2. service contract: pay like a firm, giving a rate payment. Not going to work either cuz it's hard to calculate when land sorting or other services are involved
Other Notes	N/A

Appendix 5. Cost Savings Under PFS

Contracts	Money Saved	Years post Project Completion	Percentage (Money Saved/Original Total)
CalDWR for Land Restoration and Mitigation Project	PFS Cost (per acre): \$34,000 Money Saved: \$26,000 Original Total: \$60,000	5 Years	43.3% (\$5,200 per Year)
Anne Arundel County on Stream Restoration Projects	PFS Cost (per Restoration Project): \$90,000 Money Saved: \$160,000 Original Total: \$250,000	5 Years	64% (\$32,000 per Year)
Maryland Department of Natural Resources on Nitrogen Reduction	PFS Cost (per pound of Nitrogen Reduced): \$4,000 Money Saved: \$6,000 Original Total: \$10,000	5 Years	60% (\$1,200 per Year)
Great Lakes Restoration Initiative for Phosphorus Reduction	PFS Cost (per pound of Phosphorus Reduced): \$26 Money Saved: \$155 Original Total: \$181	1 Year	85% (\$26 per Year)

Cost Saving average created by averaging out the percentage total of the 5-Year Period between all 4 projects. The 4th project is subject to removal given its lack of applicability in this case with only a 1-Year estimate.

56% - 63% of an agency's usual cost for a project will be cut over a 5 Year Period.

Note: This number is not entirely accurate and based upon the data we had access to. A more accurate picture can be created with more data and a proper cost-benefit analysis.

Appendix 6. Internal Notes for Management Evaluation

Contract #7		RFP for Tunkey Water Quality Improvements - Anne Arundel County
Management Metric	Quota Reported	Reason
Completed within contract timeline?	Unknown	Could not be verified in the existing RFP/Information Presentation provided from the client.
Ensured goals and mitigation standards?	Yes	Interviewee Mr. Eric Michaelsen mentioned that it provided a savings of 60% for the county and helped dole out money to nonprofits. Furthermore, it provided the county credit towards stormwater regulatory needs.
Provided milestones?	Yes	In a presentation from the client, the project helped engage manageable components of a program at a time and produced 300 treated impervious acres for \$5.5 million. Furthermore, it is on pace to satisfy the county's MS4 (Municipal Storm Sewer System) permit requirements.

Contract #2		EIP Habitat Restoration Project Agreement - Lookout Slough Tidal Habitat Restoration Project
Management Metric	Quota Reported	Reason
Completed within contract timeline?	Yes	This information was verified in an information pamphlet from the California National Resources Agency (https://resources.ca.gov/CNRALegacyFiles/docs/ecorestore/projects/Lookout-Slough-Tidal-Habitat-Restoration-Flood-Improvement.pdf) Timeline information was provided about the project mentioned that the end of construction period was Fall 2021.
Ensured goals and mitigation standards?	Yes	This Environmental Impact Report (EIR)(https://water.ca.gov/~media/Dwr-Website/Web-Pages/Programs/Environmental-Services/Restoration-Mitigation/Compliance/Files/Lookout-Slough-FEIR_DES-v1_11032020_ay11.pdf) noted that it met the mitigation standards.
Provided milestones?	Yes	Interviewee Mr. Glen Williams discussed that the project provided tidal connectivity and increased flood storage.

Contract #12		RFQ for Urban Retrofit Program Public-Private Partnerships - Prince George County
Management Metric	Quota Reported	Reason
Completed within contract timeline?	Unknown	No source was able to verify this information.
Ensured goals and mitigation standards?	Yes	According to a policy brief from the University of North Carolina Environmental Finance Center (https://efc.sog.unc.edu/wp-content/uploads/sites/1172/2021/07/Prince20Georges_Final_WEB1.pdf), it mentioned that it ensured best management practices (BMP's) that covered 2,000 acres, and including a possibility of expanding up to 4,000 acres.
Provided milestones?	Yes	According to a powerpoint presentation from the Clean Water Partnership (https://thecleanwaterpartnership.com/wp-content/uploads/2016/01/CWP-Urban-Retrofit-Model.pdf) it mentioned that provided local benefits of business developments, jobs, and community wealth.

Contract #8		RFP for San Diego County - Rainbow Creek Restoration
Management Metric	Quota Reported	Reason
Completed within contract timeline?	Yes	Interviewees Scott Norris and Jamie Milani discussed that the contracts should not exceed more than 5 years.
Ensured goals and mitigation standards?	Yes	Interviewees Scott Norris and Jamie Milani verified that regulators agreed to give compliance credits for restoration.
Provided milestones?	Yes	<p>Interviewees Scott Norris and Jamie Milani verified that the 800 linear feet was retired and would guarantee future of 41kg/year based on their Powerpoint presentation provided.</p>  <p style="text-align: center;">Before & After</p>