







Washington SRC trading program

A stormwater credit market to encourage green infrastructure development

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Summary

The District of Columbia's Stormwater Retention Credit (SRC) Trading program, initiated in 2013 along with new stormwater regulations for real estate developments, represents a pioneering market-based mechanism designed to mitigate stormwater runoff by incentivising green infrastructure. The business model leverages stormwater regulations to encourage private sector investment in green infrastructure by enabling private developers to meet retention standards either on-site (i.e., by building green infrastructure) or off-site through purchasing credits on the SRC market from SRC generators (SRC Aggregators). By offering regulated developments the opportunity for off-site compliance with retention requirements, the District encourages the dispersal of green infrastructure as much as possible to areas where untreated stormwater drains directly to District water bodies. The District's stormwater regulations and SRC Trading program are key components of broad efforts to improve the water quality of its water bodies.

The SRC Program's success lies in its ability to harness the regulated community's need for compliance flexibility within stormwater regulations to create incentives for green infrastructure development in highpriority areas. This has created a dynamic market in which the supply of and demand for SRCs increases each year. A critical success factor and de-risking mechanism for the supply side of the SRC market is the SRC Price Lock program, which allows SRC Aggregators to sell credits to the DOEE at a fixed price. An important demand-side limitation is the SRC Trading Program's voluntary nature, which encourages, but does not require, private developers to choose to meet stormwater requirements off-site. The transferability of the SRC trading model to other territories hinges on the alignment of program mechanics with existing regulations, a large enough scale, and the development of an informed and engaged market of participants. The program underscores a strategic shift from public to private investment in stormwater management, emphasising cost-efficiency and environmental stewardship.

Keywords: stormwater credits, stormwater regulations, water quality, green infrastructure, incentives,

Actors interviewed: (I) Branch chief of the DOEE's Green Infrastructure Incentives and Assessment Branch; (II) Lead for the off-site compliance portion of the SRC program; (III) lead of the SRC Price Lock program.

Cover photos: American Rivers (top photo); © The Nature Conservancy (middle photo); Urbanstrong (bottom photo)

Further reading: Establishing a stormwater volume credit trading program. A practical guide for stormwater practitioners

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Best practice information card

Table 1. Washington	Stormwater	Retention	Credit	Trading	program.	Information	card
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Location	Washington D.C., USA
Population size	678,972 (2023)
Project area size	177 km ²
Area type	Urban
Climate challenge	Climate change causes increased rainfall, which increases stormwater runoff and untreated discharges into water bodies because of Washington's high share of impervious surfaces and the limited capacity of the sewer system. More untreated discharges into water bodies increases water pollution and therefore negative environmental impacts in the Chesapeake Bay.
Key Community System(s)	Water management, health and human well-being
Objectives	Reduce stormwater runoff to improve water quality in waterbodies
Climate challenge solution	Stormwater regulations and a stormwater retention credit trading program to incentivise the construction of green infrastructure, including green roofs covered with vegetation, rain gardens, wetlands, cisterns, bioretention installations, permeable paving material, or landscaped bioswales.
Key benefits	Reduced stormwater runoff and increased water quality, more green spaces for local communities with social and health benefits, creation of jobs and added value to the economy.
Implementation status	The stormwater retention credit system was implemented in 2013 and is still operational.
Investment volume (\$)	No data about investment costs. 4,702 green infrastructure projects have been developed between 2015 and 2020 the new stormwater regulations and the SRC program.
Key financing barriers	Lack of public financial means (annual budget of the DOEE)
Financial model	Stormwater regulations with a Stormwater Retention Credit (SRC) trading program, a market in which private actors can trade stormwater retention credits to meet retention requirements.
Financial sources	Private investors: project developers, NGOs Households: property owners Public: regional agencies
Financial instruments	Incentives: stormwater credit sales Fees/user charges: stormwater/wastewater fees ('stormwater impervious surface fee') Risk mitigation: SRC purchase guarantees (SRC Price Lock Program) Non-financial instruments: regulations and mainstreaming (stormwater regulations), subsidies (subsidy program)





Overview and timeline

Like many urban areas in the USA, Washington D.C. is characterised by a high share of impervious area (43% of the District). In areas with high impervious cover, less rainfall infiltrates into the soil, and runoff flows quickly across the landscape into city sewer systems, picking up toxins and trash along the way. Pollutants in stormwater may include hydrocarbons and heavy metals from vehicles, nutrients from fertilisers (e.g., nitrogen and phosphorus), pesticides, bacteria from pet waste, and sediment from erosion and inadequate construction site practices. Stormwater draining from Washington D.C. and the six states within the Chesapeake Bay watershed is one of the highest and fastest growing sources of water pollution in the Chesapeake Bay, an important estuary in the eastern USA. The Chesapeake Bay generates billions of dollars every year because of various ecosystem services that support tourism, aquaculture, and fishing. Climate change already causes intense rainfall, and greater volumes of stormwater runoff are expected, threatening to further impair water quality in the Chesapeake Bay.

Washington manages stormwater runoff with two different sewer systems. The **combined sewer system (CSS)**, which collects and transports stormwater with household and industrial wastewater (i.e., sanitary sewage) to the wastewater treatment plant in one pipe network, serves the central core of the District (one-third of the District by area). During heavy rainfall, the combined volume of stormwater runoff and sanitary sewage can exceed the capacity of the CSS, resulting in untreated discharges into rivers and streams. The District water and sewer authority, DC Water, is building the Clean Rivers Tunnel Project, a multi-billion-dollar grey infrastructure project consisting of three underground storage tunnels that will reduce combined sewer overflows by 96%.

The **municipal separate storm sewer system (MS4)** serves the outer regions of the District (two-thirds of the District by area), which developed more recently than the downtown core. The MS4 has two pipe networks: one that conveys household and industrial wastewater to the water treatment plant and one that discharges untreated stormwater runoff directly into rivers and streams. Green infrastructure is the primary strategy to capture and treat runoff to restore and protect District water bodies. Nevertheless, a high percentage of impervious surfaces and projected increases in precipitation are expected to increase volumes of untreated stormwater runoff entering water bodies with negative environmental impacts.

The District grappled with the need to manage stormwater runoff in the MS4 area despite having a fraction of the local funds needed to meet water quality goals with public green infrastructure retrofits. The District, therefore, sought to adopt retention standards that would require large development and redevelopment projects to retain stormwater runoff. Early iterations of the retention standard faced significant resistance from the regulated community, which contended that requirements to build green infrastructure would be overly burdensome, particularly in highly constrained, ultra-urban areas. As DOEE reimagined policy solutions to manage stormwater runoff, it recognised the need to provide multiple compliance pathways and the potential to leverage regulatory flexibility to increase water quality outcomes.

In July 2013, DOEE adopted new stormwater regulations requiring new development projects of 5,000 square feet (464 square metres) or more and large renovation projects to meet annual retention requirements. Retention requirements for each project are based on project disturbance area and changes in land cover types (e.g., addition of impervious area). Considering 90%-95% of all land in US urban and suburban areas is privately owned, the regulations are an effective measure to reduce stormwater runoff while at the same time shifting the costs for green infrastructure retrofits to private developers.

As part of the 2013 stormwater regulations, DOEE also launched the **Stormwater Retention Credit (SRC) Trading program**, a first-of-its-kind program in the USA. The 2013 regulations provided developers with regulatory flexibility by allowing them to meet 50% of a project's retention requirement on-site using green infrastructure; the remaining 50% could be achieved off-site each year by purchasing stormwater retention credits (SRCs). SRCs could be generated from green infrastructure projects built elsewhere in the District that either 1) exceeded retention requirements (i.e., regulated green infrastructure built to provide more retention than required, up to a ceiling), or 2) were built voluntarily (i.e., not built to comply with stormwater management requirements for a regulated project). One SRC is equivalent to one gallon (3.79 litres) of stormwater retention capacity for one year. With the SRC program, DOEE created a market in which private actors could buy SRCs to meet on-site retention requirements, increasing the amount of private funding used to construct green infrastructure (e.g., green roofs covered with vegetation, rain gardens and bioretention practices, wetlands, cisterns, permeable pavement, and landscaped bioswales).

In 2020, DOEE amended its stormwater regulations to increase green infrastructure implementation in MS4 areas and flexibility for projects in certain areas of the CSS. Green infrastructure has the greatest impact on stormwater runoff and water pollution when it is installed in the MS4 area, where untreated stormwater flows either directly into, or discharges from the storm sewer system into, District water bodies. The regulatory change required regulated projects with off-site retention requirements located in certain areas of the District to purchase SRCs generated from green infrastructure projects installed in the MS4 area. Additionally, the amended regulations waived a 50% on-site requirement for projects in areas of the CSS that will be served by DC Water's Clean Rivers Tunnel project, allowing them to meet retention requirements 100% off-site if they



use MS4 SRCs. The 2020 amendment increased demand for MS4 SRCs, strengthening the incentive to build SRC-generating green infrastructure projects in MS4 areas. This has increased retention in the MS4 and has helped maximise water quality outcomes in the District.

Table 2. Washington Stormwater Retention Credit Trading program. Timeline with key moments

Date	Key moment
2013	Washington D.C. launches new stormwater regulations and the Stormwater Retention Credit trading program. The new regulations required developments to meet 50% retention standards on-site and 50% retention standards off-site by purchasing stormwater retention credits (SRCs).
2014	First trade in Stormwater Retention Credit trading program
2020	Regulation amendments require developers to meet off-site retention standards in MS4 areas. Developments in CSS areas are allowed to meet 100% of the stormwater retention standards off-site.

Governance and key stakeholders

Figure 1 illustrates both the organizational and financing and funding structure. We limit ourselves here to describing the actors and their main roles. The numbered steps outlined on the figure are detailed in the financial model.

DOEE (the Department of Energy and Environment), the agency designated with primary responsibility for stormwater management in the District, regulates and administers the SRC Trading program. DOEE initiated the program as part of the 2013 stormwater regulations, which went through a regulatory process involving other District departments or agencies. The Attorney General verified the legal sufficiency of the proposed regulations. The scope and innovativeness of the program demanded engagement with other parties, including District government sister agencies and environmental stakeholders like the US Environmental Protection Agency (USEPA). Once the program was approved and launched, DOEE was responsible for managing the program, including tracking the compliance of regulated sites and SRC-generating sites, reporting on outcomes related to stormwater reduction and generation and use of SRCs, and publicly listing SRCs available for sale.

The three main stakeholders involved in the SRC Trading Program are **SRC Aggregators**, **regulated project developers**, and **investors**.

- SRC Aggregators generate and sell SRCs by installing voluntary green infrastructure projects (i.e., not built to meet on-site stormwater regulations) in the MS4 areas. This ensures an ample supply of MS4 SRCs available on the SRC market, enabling regulated project developers to purchase SRCs to meet their off-site retention volume. The Nature Conservancy, the first supplier of SRCs in the market, developed the first voluntary SRC-generating green infrastructure projects. This helped provide a proof of concept for the SRC market and grow the SRC Aggregator community. In addition to SRC Aggregators, which are dedicated exclusively to voluntary green infrastructure development in the MS4, some developers of regulated projects can also generate and sell SRCs by retaining stormwater in excess of their post-project retention requirements (up to a ceiling).
- **Regulated project developers** buy SRCs to meet off-site retention requirements, creating the SRC market demand. Purchasing SRCs allows developers to avoid the direct costs and opportunity costs associated with building and maintaining on-site green infrastructure and drives private investment in green infrastructure in priority areas of the District.
- Investors play a passive role and provide capital, usually in the form of loans and revolving loan facilities, to finance green infrastructure project developments. The SRC Price Lock program (see Financial Model section), is a key enabling factor for financing green infrastructure projects. In recent years, the DC Green Bank, which mixes public and private funds to finance projects that benefit the District, has begun to play an increasingly important investor role in the SRC program.

Stakeholder	Туре	Role and responsibilities
Department of Energy and Environment (Washington D.C.)	Public (regional government agency)	 Established and currently administers the SRC Trading program. Tracks compliance of regulated sites and SRC-generating sites, Reports outcomes related to stormwater reduction, generation and use of SRCs,

Table 3.	Washington	Stormwater	Retention	Credit [®]	Trading progr	am. Key s	stakehold	ers and the	eir respon	sibilities
or roles										

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Figure 1. Organizational, financing and funding structure of the District's Stormwater Retention Credit Trading program (source: author).

Business model & financial model

Business model

The SRC Trading program has helped drive positive water quality outcomes while balancing the needs of all parties involved. Firstly, it provided the necessary flexibility that enabled the framework DOEE uses to regulate development and redevelopment projects. This has increased the management of runoff from impervious surfaces in the District, even though a high percentage of land is privately owned and therefore unavailable for DOEE-led green infrastructure (GI) retrofits. In addition, SRC trading has helped distribute the environmental and community benefits of GI more widely across the District, rather than solely increasing GI in areas with the most regulated development.

The 2013 stormwater regulations required private development to retain stormwater, while **the SRC Trading program offers private developers flexibility** in how to meet those regulations. This **increased private investment in GI**. Private developers can choose to meet stormwater requirements on-site through green infrastructure, off-site by purchasing SRCs, or by paying an in-lieu fee to DOEE (most developers purchase SRCs because the in-lieu fee is a much more costly option). Since the 2020 amendments, developers in CSS areas can even choose to meet stormwater requirements entirely off-site. This system allows project developers to choose the most cost-effective solution for them. Meeting stormwater requirements off-site may be more cost-effective because it reduces design, construction, and maintenance costs of green infrastructure while at the same time freeing up space for amenities with higher returns, like parking or rooftop patios.

At the same time, the SRC Trading program **encourages private investment in stormwater mitigation**, because green infrastructure developers earn revenue by generating and selling SRCs. The regulation





amendments of 2020 also ensure that **green infrastructure is built in places where it is needed most**. The SRC Trading program and current regulations facilitate the dispersion of green infrastructure programmes in MS4 areas. Credits generated in MS4 areas are called High-Impact SRCs because they accelerate DOEE's restoration of District water bodies in areas where water flows directly into streams and rivers. In conclusion, the SRC Trading program shifts the financial payment from the public to the private sector while facilitating green infrastructure development in areas where it is most needed and providing compliance flexibility to project developers.

The SRC Trading program and the development of green infrastructure has **multiple monetary and societal values** for the District and its communities, project developers, and land owners of green infrastructure:

- Green infrastructure captures stormwater runoff, allowing it to infiltrate and treat it before it flows into the District's waterbodies. This reduces overall water pollution in streams, rivers, and eventually the Chesapeake Bay.
- SRC Trading helps distribute GI across a broader area in the District, enabling the capture of runoff from more drainage areas and increasing the annual volume of stormwater retained.
- Green infrastructure has many co-benefits, including an increase in wildlife habitat, improved aesthetics for local communities and visitors, reduced heat island effect, improved air quality, reduced flooding, and overall increased climate resilience.
- Property developers and owners can reduce the cost of stormwater management requirements by purchasing credits while maximizing the buildable area on-site.
- · Landowners of green infrastructure projects can receive a reduction on their water bill.
- Developers of green infrastructure projects can get financial compensation from selling stormwater credits.

Around 2015, the District calculated the cost of retrofitting the entire region with green infrastructure at \$7 billion. We know that the SRC program and stormwater regulations make for a more cost-efficient system, especially with the introduction of High-Impact SRCs in 2020. We have no data about the actual cost savings nor about the investment cost of individual green infrastructure projects. DOEE estimated that the **cost savings for project developments in CSS areas at \$350,000 in the case of 50% off-site stormwater retention, and at \$565,000 in the case of 100% off-site stormwater retention.** The calculations incorporated a variety of assumptions under ideal circumstances and are based on the 20-year purchase cost of SRCs, the 20-year cost to build and maintain green roofs, and the 20-year revenues for alternative amenities. Actual cost savings may vary significantly depending on siting and design constraints, material and labour costs, and SRC market conditions.

Financial model

In 2016, DOEE established the **SRC Price Lock Program** to "jumpstart" the SRC supply by de-risking private investment in voluntary green infrastructure in the MS4 with **purchase agreements**. Only projects building new, voluntary green infrastructure in the MS4 area are eligible to apply. The SRC Price Lock program gives SRC Aggregators the option to 1) sell SRCs on the market at privately negotiated rates or 2) sell credits directly to DOEE at guaranteed, fixed prices for twelve years of participation. When projects are accepted to the SRC Price Lock program, DOEE reserves the funds needed to purchase SRCs for twelve years of participation in an escrow account, ensuring that there will be sufficient funds to purchase SRCs if needed. SRC purchase prices vary depending on where the project is located in the MS4 area, emphasising the greater positive impact (and value) of increased stormwater retention higher up in the watershed compared to that lower in the watershed: DOEE offers the following terms (2023 prices):

- Non-Tidal MS4: Years 1 through 6: \$2.03 | Years 7 through 12: \$0.42;
- Tidal MS4: Years 1 through 6: \$1.77 | Years 7 through 12: \$0.42.

In 2020, DOEE added a subsidy to the SRC Price Lock program. When SRC Aggregators with purchase agreements sell SRCs on the market, DOEE pays a portion of the SRC sale price, ranging between \$0.20 and \$0.80 per SRC. The subsidy amount increases as the SRC sale price decreases and as the number of SRCs sold in a transaction increases. This encourages large transactions at an affordable price per SRC. In addition, SRC Aggregators applying to the program can also sign a subsidy-only agreement instead of a full purchase agreement. Subsidy and purchase guarantees help incentivise and de-risk investment in new, voluntary green infrastructure in the MS4, but the former allows DOEE to reserve less funding upfront, avoid the full cost of purchasing the SRCs outright, and recirculate unspent funds that had previously been reserved to purchase credits. The subsidy program also increases the availability of affordable SRCs on the market, helping reduce costs for buyers, and enables SRC Aggregators to earn revenue while gaining valuable experience and connections as SRC market suppliers.

The **financing and funding structure** of the SRC trading program will now be explained following the numbered steps in Figure 1:



- Sign a purchase agreement or subsidy agreement. SRC Aggregators planning to build new, voluntary green infrastructure in the MS4 can apply to the SRC Price Lock program. At a minimum, project proposals must include at least a 30% concept design, demonstrate property owner commitment, and provide a feasible budget and schedule. SRC Price Lock purchase agreements give SRC Aggregators the option to sell SRCs to DOEE at guaranteed fixed prices or to non-DOEE buyers (i.e., on the SRC market) at market prices with an additional DOEE subsidy. DOEE also signs subsidyonly agreements that provide SRC Aggregators with payment for market sales but do not offer a DOEE purchase guarantee.
- Investors provide a loan for project delivery (optional). SRC Aggregators typically need external sources of funding and/or financing to implement green infrastructure projects. SRC Price Lock agreements help de-risk investment in green infrastructure projects, enabling SRC Aggregators to get a loan from investors.
- 3. **Build green infrastructure.** Once SRC Aggregators secure financing, they construct green infrastructure. From the perspective of regulated project developers (i.e., SRC buyers), this is an off-site project.
- 4. Generate SRCs. Once construction of the green infrastructure project is complete, the project must pass a DOEE inspection. SRCs can be certified for a maximum of three years at once. The choice for a one-, two-, or three-year certification period lies with the SRC Aggregator. Each SRC counts for one retention capacity volume unit (gallon) for one year. For example, if a project has a retention capacity volume of 100 gallons in excess of stormwater requirements or a site's baseline retention, it has an SRC eligibility of 100 SRCs/year and can generate 300 SRCs at once for a three-year certification period. The SRC certification can be renewed endlessly as long as the green infrastructure is maintained properly. SRC Aggregators sign a maintenance agreement which is part of the application to certify SRCs. SRC generation is voluntary, and SRC Aggregators can decide to maintain and certify SRCs after each certification period.
- 5. **Payout scenario 1.** Sell SRCs to regulated developments regulated developments purchase SRCs from SRC Aggregators. DOEE pays a modest subsidy when SRC Aggregators sell SRCs from Price Lock projects. DOEE will subsidise market sales for the first six years of a Price Lock agreement. Project developers of regulated developments can decide to purchase SRCs from SRC Aggregators to meet requirements off-site instead of meeting stormwater requirements on-site or paying an inlieu fee to DOEE. A regulated site must begin to comply with its off-site retention volume as of the date of its final construction inspection and every year thereafter, meaning the number of SRCs that must be purchased for every year is equal to the off-site retention volume. SRCs can be purchased annually or in bulk for a limitless number of years. Most purchases are made for one year. The responsibility for purchasing credits lies with the owner of the development. The developer is responsible for at least the first year after construction.
- 6. Use SRCs to meet off-site retention volume. Regulated developments that meet DOEE's stormwater regulations off-site must do so by purchasing SRCs as described in step 5.
- 7. **Payout scenario 2.** If the SRC Aggregator has a purchase agreement with DOEE through the Price Lock Program, SRCs can be sold to DOEE over the course of twelve years.
- 8. **Repay Ioan (optional).** If the SRC Aggregator got a loan to finance the green infrastructure, it repays the loan to the investor.
- 9. The SRC Aggregator submits an application to DOEE to certify SRCs every three years. DOEE does monitoring and tracks compliance.
- 10. **Reduction on the water bill.** Landowners of green infrastructures are eligible for a water bill reduction based on the increased amount of retention volume. Landowners and SRC Aggregators can be the same stakeholder, but this is often not the case. The Nature Conservancy, for example, does not own the land where the SRCs are generated but partners with private landowners (individuals or organisations, e.g., faith-based organisations) to develop green infrastructure on their land. In this case, the landowner receives the discount on their water bill.

The main **financial instrument** of the SRC program is **stormwater retention credits**, with the private aggregators and developers of regulated developments being the source of credit generation and trading. Credits that are purchased from aggregators by the DOEE through the Price Lock Program, or sales that are subsidised through the subsidy program, are funded by a specific fund that is privately financed by landowners through the DOEE's **stormwater impervious surface fee**. From this fund, the DOEE has invested at least \$11.5 million in the Price Lock Program with the lion's share going to SRC purchases, and an additional \$500,000 is reserved to support technical and outreach work by SRC generators to identify cost-effective green infrastructure sites.

Enabling conditions

DOEE has several **resources** that are required for the SRC program to function properly:

• DOEE developed a **credit trading marketplace** and **SRC registry**. The SRC registry is a publicly available roster of all credits that have been certified, their sewershed location, the number of SRCs





each seller has on sale, and a point of contact for each seller. The tracking registry is part of a larger database that DOEE uses to track SRC certification, sales, and use, and stormwater compliance.

- DOEE has staff dedicated to **engagement activities** with the real estate development sector, landowners, and SRC Aggregators to encourage market participation.
- DOEE reduces transaction costs for participants by providing sample contracts and financial return calculators. DOEE also provides grants to help SRC Aggregators with technical design work and outreach efforts.
- DOEE has a strong **inspection and enforcement capability** to regularly inspect stormwater management BMPs installed on-site, both upon completion and during their functional lifespan.

The **legal process** to develop the SRC program as part of the 2013 stormwater regulations was time-intensive. As with all other new regulations, the proposed 2013 stormwater regulations were subject to an evaluation of the legal sufficiency by the District's Attorney General. The process of establishing the retention-based stormwater regulations and SRC Trading Program took about five years.

The SRC Price Lock program (established in 2016) and the subsidy (established in 2020) are important **derisking mechanisms**. Both provide an incentive for SRC Aggregators to develop green infrastructure. SRC Price Lock purchase agreements guarantee revenue generation, a key concern for investors, and subsidies allow SRC Aggregators to reduce the market price per credit for buyers. This increases the chance for SRC Aggregators to sell their credits on the market and reduces the need to sell credits to DOEE.

Outcomes

The most recent data available about SRC transactions is from the calendar years 2023 and 2024 and are shown in Table 4 and Table 5. This data was provided to us by DOEE and is not yet publicly available. Banked SRCs are not made available for sale on the registry but are banked by developers so they can use the credits on future projects to meet off-site retention requirements. The SRC market and off-site programs grew substantially in 2023 and 2024. The total number of SRC trades in 2023 was the highest of any prior year, and each year has had more trades than the year before. The program also passed 2 million total SRCs traded in 2023. The significant increase of SRCs generated in MS4 sewershed areas in 2024 compared to 2023 indicates that DOEE's efforts to incentivise GI in the MS4 through regulation amendments in 2020 are working. More SRCs are generated in MS4 areas, where they have a higher impact on stormwater runoff and water quality.

	2023	2024 (year to date)
SRC Trading		
# Transactions	66	31
# SRCs traded	426,686	164,550
Average SRC price (\$)	\$1.43	\$1.36
SRC Certifications		
SRC certification applications	36	19
SRCs for sale	328,656	150,300
SRCs banked	487,095	300,943
Total SRCs generated	815,751	451,243
SRC Distribution by Sewershed		
MS4 sewershed	68%	94%
CSS sewershed	32%	6%

Table 4. SRC market activity

Table 5. Average Price of SRCs Traded in 2023 and 2024 (year to date), Grouped by Size of Trade

# of SRCs Traded	Number of Trades	Average # SRCs per Trade	% High-Impact SRCs	Average Price per SRC		
2023						
Under 1,000	22	425	30%	\$1.45		
1,000 - 9,999	35	3,064	20%	\$1.43		
10,000 - 19,999	2	12,138	0%	\$1.20		
20,000 +	7	40,833	65%	\$1.44		
2024 (year to date)						



Under 1,000	16	410	35%	\$1.48
1,000 - 9,999	12	3,555	22%	\$1.42
10,000 - 19,999	0	0	0%	\$0.00
20,000 +	3	38,445	52%	\$1.32

The District has seen ten times more area developed under the stormwater management regulations, including properties that comply on-site and through the SRC program compared to historical DOEE investments. Additionally, there has been significant green infrastructure investment in disinvested areas, creating more greenspace and stormwater retention capacity in areas experiencing little development. **Between 2015 and 2020, 4,702 green infrastructure projects had been developed**. DOEE's Water Quality Division has noticed gradual improvement in the health of water bodies, which can be attributed to multiple programmes, including the stormwater regulations and the SRC Trading program.

Increased dispersion of green infrastructure via the SRC program has **broad impacts beyond increased stormwater retention**, **including social**, **economic**, **and health benefits**. One study estimated that, between 2015 and 2020, the stormwater regulations and the SRC program led to the creation of 589 jobs on average, \$60 million (2023 US Dollar) in labour income, over \$80 million (2023 US Dollar) in value added to the economy, and over \$122 million (2023 US Dollar) in economic output per year for the metropolitan area of Washington D.C. (Galvin and BenDor, 2023).

Lessons learned

Successes and limitations

The increase of SRC transactions and green infrastructure development can be attributed to several **success** factors as stated by the interviewees and described in a practical guide for stormwater practitioners (Odefey et al., 2019).

- The interviewees stated that the SRC Price Lock Program significantly reduced investment risk for
 program participants and facilitated a steady increase in available credits since 2016, also increasing
 trust in the market system. As the SRC program has matured, DOEE has had to buy fewer and fewer
 credits. This is perceived as the most critical success factor for a long-term market supply of SRCs
 from new, voluntary green infrastructure projects.
- The interviewees furthermore stated that the stormwater regulations and SRC program offer **flexibility** to project developers. Project developers can choose between on-site and/or off-site compliance. For off-site compliance, they can also choose the number of years at a time (one or more) that SRCs are used to meet off-site requirements.
- Existing and new regulated developments with off-site retention requirements must comply every year. The way the stormwater regulations are structured creates a positive feedback mechanism in which increases in demand encourage more voluntary green infrastructure to be built to supply SRCs, causing the market to grow each year.

One important **limitation** of the regulations and SRC program is its voluntary nature, as stated by the interviewees. While compliance is required, choosing to have an off-site retention requirement is optional. DOEE encourages project developers (particularly in areas of the CSS where grey infrastructure is used to control stormwater runoff) to purchase SRCs from the MS4 to incentivise green infrastructure construction where it is most needed. Currently, 14.7% of regulated developments meet retention requirements off-site instead of on-site. DOEE is exploring incentive mechanisms to increase that number. A second limitation is that green infrastructure investments may potentially contribute to increased property values, and associated **gentrification and displacement of established**, **lower-income residents**. Evidence for this was not found in this case, but it is mentioned as a risk in a practical guide for stormwater practitioners (Odefey et al., 2019).

Transferability conditions and potential

Since the SRC Trading program began in Washington, D.C., stormwater credit trading programs have been implemented in other US cities. Considering several **conditions**, stormwater credit trading could be implemented in European territories too:

- Stormwater regulations and an accompanying credit trading program must align with building and design codes and standards in a city or region.
- Certifications are usually generated to ensure that the projects meet design, construction, and maintenance standards before the credits can be sold.
- Stormwater credit programmes are more beneficial when greater numbers of smaller sites are constructed as most storms generate only small amounts of runoff. Programmes should limit the





incentive for developers to over-construct green infrastructure, as the extra retention capacity provided is only used during large and statistically infrequent storms.

- Stormwater credit trading programs should be adaptively managed. For example, DOEE adjusted its
 incentives and rules governing credit trading (e.g., requiring the purchase of SRCs from the MS4 and
 allowing CSS projects to choose 100% off-site compliance if they use SRCs from the MS4) as the SRC
 market has matured. The program must be flexible to enable continuous adaptations and regulation
 amendments.
- A stormwater credit market will be more efficient the bigger it can become. This means that the success of this mechanism may be limited in small geographical areas or in areas with low development pressure. Likewise, the development of a stormwater credit program requires specialised skills that are usually not available in smaller municipalities. Smaller areas could be integrated into a regional stormwater credit market where a regional government agency with sufficient staff and skills manages the program.
- Keeping regulations and guidelines simple is key.
- Potential participants of a stormwater credit program must be continuously well informed to facilitate their engagement. Outreach, education, training, and supportive materials are important resources that help reduce transaction costs for participants.

Related factsheets

The factsheets of the Clean Water Partnership (ID 02) and Resilient Hampton (ID 08) also discuss the challenge of water pollution (and to a lesser extent flooding) in the Chesapeake Bay Area under the federal Clean Water Act, but those areas use other adaptation funding and financing solutions to direct money to green-blue infrastructure. In Prince George's County, the Clean Water Partnership is a community-based public-private partnership, whereas Resilient Hampton uses an environmental impact bond.

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