

DIGITAL SERVICE FOR THE PLANET

To successfully pursue the Biden Administration's ambitious environmental agenda, the federal government needs to significantly rethink how to build, manage, and partner with the technology that supports environmental conservation. The Administration should create a "Digital Service for the Planet," modelled on the U.S. Digital Service. The Digital Service for the Planet could be established and funded as an expansion of the U.S. Digital Service, or a stand alone organization. We recommend that this organization and structure would be within the White House, with deeper digital infrastructure and technology management expertise than exists today in a mission-focused area of any environment department. This is an important step for the federal government to be a better buyer, partner, and consumer of the data technology and innovations that are necessary to support the country's conservation, water and stewardship priorities.

The blueprint for a conservation technology agenda is already taking shape through the [Executive Order on Tackling the Climate Crises at Home and Abroad](#), the [Memorandum on Restoring Trust in Government Through Scientific Integrity and Evidence-Based Policymaking, Justice40](#), and [America the Beautiful \(30x30\)](#).

However, a critical capacity gap persists for environmental agencies: across the governmental agencies that work on conservation, climate, wildlife and water, the primary technology focus is in core administrative work like human resources and financial accounting, and not on program delivery. Environmental agencies' programmatic staffing is fragmented and lacks seniority in agency hierarchies. This lack of programmatically tailored technology staffing means that the Administration and agency staff often rely on out-of-date information, operate in unnecessary silos, or suffer from an inability to collaborate due to an absence of common digital infrastructure. These are challenges that technology companies are continuously innovating around, but so are governmental organizations like the U.S. Digital Service. This also poses a unique opportunity as many programs across differing agencies have overlapping sets of data and technology infrastructure needs, but operate largely without being able to act upon it. The adoption of such tools could be instrumental in bringing natural resource planning and stewardship to the 21st century, but our government bureaucracies haven't built the staffing bench and culture to make full use of it.

The key question we ask is: How will this Administration ensure that environmental agencies can leverage the necessary technology to fulfill existing programs and new initiatives consistently and effectively?

The Obama administration made enormous progress on this challenge for social agencies by creating the U.S. Digital Service. The Biden administration has seen the potential of the U.S. Digital Service to work on environmental justice issues through the Justice40 initiative, and we believe the time is right to build on this momentum and holistically replicate this model for environmental agencies through a Digital Service for the Planet.

We call on the administration to consider three recommendations:

- **Create a Digital Service for the Planet.** The composition of the team required to deliver on technology issues critical to the environment is specialized. The Digital Service for the Planet could be established and funded as a distinct part of the U.S. Digital Service, or as a stand-alone office within the Executive Office of the President.
- **Move Chief Technology / Information Officers into mission-focused roles within agencies.** Evaluate the organization chart and placement of CTOs/CIOs and geospatial staffing and reconsider placing these offices in program- or mission-aligned hierarchies as opposed to administrative ones. This shift in CTO/CIO placement will ensure agencies have leadership and expertise to adopt and integrate technology to support their programs when necessary, and can more easily foster collaboration given common digital infrastructure needs.
- **Expand funding for digital infrastructure improvements and technology acquisition.** Task the Office of Management and Budget (or the newly created Digital Service for the Planet) with evaluating conservation technology investments across US Department of Agriculture, Department of Interior, Environmental Protection Agency, the Army Corps of Engineers, and National Marine Fisheries Service to develop coordinated recommendations for budget, software as a service, technology partnerships and staffing for technology in the FY23 budget.

More than forty environmentally-focused businesses and NGOs have signed this open letter to President Biden supporting the creation of a Digital Service for the Planet.





What is the U.S. Digital Service?

The rollout of Healthcare.gov during the Obama Administration is a prime example of a technology challenge in government agencies: government employees and senior staff are experts in their field, but are not resourced to scout technological innovations that could support their program implementation or to build ways to make use of those innovations within bureaucracies. While there were IT departments that supported day-to-day operations, there was not a team in place to help strategically plan for and identify technology solutions that would bolster and strengthen initiatives.

In 2014, the Obama Administration created the US Digital Service, and 18F (within the General Services Administration) to allow federal agencies to access on-demand expertise to design and procure technology for governmental programs. The U.S. Digital Service is seated at the White House, which creates a high-leverage opportunity to deploy its skills into meeting agencies' needs, but with engagement on administration-wide strategy that likely yields better products. It is designed to attract high-level technologists, product designers and programmers for short-term contracts, with each term lasting between 6 months and 4 years. In this way, the U.S. Digital Service does not take over core agency capacities, but rather is deployed to design and procure services that can operate independently of the U.S. Digital Service team's involvement.

The U.S. Digital Service has developed a scalable and replicable model of working across government agencies in its 7-year tenure. Its initial projects, like improving the [procurement and hiring processes](#), deploying [healthcare.gov](#) and modernizing administrative tasks for [veterans](#) and [immigrants](#), illuminate a few critical ingredients for success:

- First, the U.S. Digital Service's location within the White House enables U.S. Digital Service staff to have access to high-level government officials and execute on projects quickly.
- Second, this team is staffed by government employees to help agencies source and procure the appropriate technology. This eliminates the scrutiny and hesitancy by government regarding adoption of technology from outside vendors and facilitates creation of new technology practices that are designed to meet the government's unique needs.
- Last, it is a mission-driven team focused on diligent planning, jumpstarting and operationalizing solutions quickly, and with a narrow and well-defined project scope.

¹ Similar components have been identified at 18F.

² This paper's recommendations are not directed at the climate science and weather data innovations and technology work led by the Department of Commerce and NASA, but are focused on the Department of Interior, Environmental Protection Agency, US Department of Agriculture, National Marine Fisheries Service and Army Corps of Engineers.

The need for a Digital Service for the Planet

The U.S. Digital Service has demonstrated how the government can benefit from teams dedicated to modernizing the technological tools and digital services used for program management and implementation. Unfortunately, at a time when technology is more critical than ever in meeting the climate, resilience, water, conservation, and justice priorities of the country, its adoption and deployment in environmental agencies lags progress made at other agencies and the federal government as a whole. Although the Administration has recently tasked the U.S. Digital Service to support the Justice40 initiative, the current team does not have the set of specialized skills or capacity to address the common cross-agency digital infrastructure needs.

This is an opportunity to provide clear policy, guidance, and investment around environmentally-focused technological improvements to prevent three issues from persisting: 1) slow implementation of projects due to lack of cross-agency communication and data sharing, 2) an inability to respond in a rapid and efficient manner to challenges and adapt to changing technology services, and 3) perhaps most importantly, stymied environmental technology innovation from the private sector due to a lack of clear signals about what government wants. We do not have the time to spare for inefficient and expensive manual processes to address the scale of challenges we face, and we cannot afford to leave communities behind in the process. It is crucial that the Biden-Harris administration provide leadership and resources to further research and development where necessary, catalyze widespread adoption of proven techniques and build capacity to make sure all can benefit.

A “Digital Service for the Planet,” modelled on the U.S. Digital Service, or established and funded as an expansion of the U.S. Digital Service, would allow the federal government’s environmentally-focused departments and agencies to deploy technology innovations to inform decision making processes, better implement environment programs and support long-term stewardship. Starting with the America the Beautiful and Justice40 initiatives, and expanding to address issues from climate change planning and flood mitigation to harmful algal bloom prevention and lead service line replacements, a Digital Service for the Planet would be instrumental in ensuring the administration supports and can track progress on the goals it sets.

There have already been innovations that have the potential to revolutionize the speed and efficiency with which we evaluate, manage, and monitor natural resources, yet they are grossly underutilized. There are many examples of such innovation: sensors that can automatically collect and analyze water quality data⁴ and species’ habitats to inform rapid response and adaptive management; machine learning algorithms that provide higher accuracy water quantity predictions for dam operators to decrease costs and improve both drought and flood risk management⁵; artificial intelligence platforms that can reduce the time and energy of locating lead pipes for replacement⁶; methods to automatically track habitat loss⁷; and automated reporting data integration. There is no reason that it should not be the default expectation for agencies to incorporate and leverage these innovations to improve workflows and outcomes.

It is important, however, to make the distinction between core research and infrastructure provision capacities of agencies such as NASA, NOAA, and USGS, and the programs that the Digital Service for the Planet could provide. For example, the Digital Service for the Planet would not be tasked with climate modelling programs, but rather to partner with the private sector to provide greater access to cloud services that deliver and disseminate climate information more quickly at scale.

³ For the purpose of this paper, we will use digital infrastructure to encompass the foundational technology services from data collection, management systems, and decision support tools that could be leveraged.

⁴ [Xylem Analytics Surface Water Monitoring](#)

⁵ [Upstream Tech - HydroForecast](#)

⁶ [Wired \(2021\) “An Algorithm Is Helping a Community Detect Lead Pipes”](#)

⁷ Michael J. Evans and Jacob W. Malcom (2020). Supporting habitat conservation with automated change detection in Google Earth Engine. Society for Conservation Biology. Accessed at: <http://conbio.onlinelibrary.wiley.com/doi/abs/10.1111/cobi.13680>



Envisioning what's possible

The primary goal of the Digital Service for the Planet would be to enable agencies to quickly adopt proven, reliable, and best-available technology for planning, operations, and monitoring of natural resource programs, that could also yield the co-benefit of inter-agency collaboration. A few examples of where the Digital Service for the Planet could be widely beneficial are:

➔ **An Internet of Environmental Data for integrative planning and management**

While environmental data have been collected by agencies at all levels of government for decades, much of it is not easily findable, accessible, or usable in its current form. Furthermore, there is a lack of standardization and digital infrastructure that results in many datasets and applications being siloed within departments. There are also discrepancies between what is available to the state versus federal agencies, limiting cross-agency collaboration and coordination. In some cases these challenges result in agencies undertaking conflicting projects: one might be permitting a dam upstream while another is permitting a housing development downstream. In other cases, states often express concern that their data are not used in Endangered Species Act listing decisions by agencies like the U.S. Fish and Wildlife Service, but if the data are not known to exist or their relationship to agency data are undefined, then it's easy to see how connections are missed.

The Digital Service for the Planet could foster agency adoption of data standards, data exchange standards, and web services standards that keep data fit for scientific and regulatory purposes while also exposing it in modern ways friendly to other agencies and private sector developers. Well-designed, integrated tools that facilitate sharing of data, plans, and information between agencies and the public would be advantageous for holistic watershed management and climate-smart initiatives. The emerging [Internet of Water](#) concept provides a model for this.

➔ Tech-enabled permitting and reporting processes

Too many natural resource agencies still rely on outdated means of getting permittees, consultants, and government staff into permitting and reporting streams – relying on paper-based forms that may be emailed or in physical form – and not leveraging web-based tools for submitting applications or reporting compliance. Not only is this inefficient for staff, it introduces numerous downstream inefficiencies, such as an inability to automate tracking and reporting to provide near-real time data updating, or to integrate with other technologies like automated land cover change (see above). In addition, platforms that help document the status and location of best management practices such as forest buffers⁸ and ecosystem services create a vital data stream that can be used for accounting for public investment in water quality. The White House Council on Environmental Quality's work on NEPA and environmental impact statements is another example of a currently low technology permitting field that could be revolutionized with better digital tools. The Digital Service for the Planet could help agencies identify natural resource permitting and reporting requirements that can be readily converted to web-based tools, and do so with a strategic view toward integrating the variety of digital products that advance planetary conservation with greater efficiency and effectiveness.

➔ Better use of technology to process public comments

With the advent of web-based comment submissions on federal actions, there has been a significant increase in the volume of comments received by agencies as they seek public input, with some topics receiving millions of comments. While agencies have some basic tools to help manage this workload, more can be done to leverage technologies like natural language processing (NLP) methods to make sense of public input. For example, researchers used advanced NLP tools to evaluate millions of comments on the previous administration's reduction of key national monuments to show that while the volume of "automated" comments was very large, their sentiment was almost identical to the detailed, non-automated comments that overwhelmingly opposed changing the monuments.⁹ The Digital Service for the Planet can help agencies find such new approaches and, with due caution and oversight, test and deploy them to improve the efficiency and effectiveness of public input.



Photo courtesy of Upstream Tech

⁸ [The Commons - Field Doc](#)

⁹ MacKenzie, C., et al (2020). Recurrent neural network reveals overwhelming sentiment against 2017 review of US monuments from humans and bots. Society for Conservation Biology. Accessed at: <https://conbio.onlinelibrary.wiley.com/doi/abs/10.1111/conl.12747>

➔ Online tools for automated change detection and activity mapping on or near public lands

The Bureau of Land Management and the US Forest Service collectively manage 440.3 million acres, and the USDA Natural Resource Conservation Service easement program has a portfolio of over 5 million acres. While these agencies have a large staff who are engaged to manage these landscapes and conduct field monitoring, operating at such a large scale necessitates efficiency from the onset and throughout to comprehensively and proactively manage dynamic ecosystems. Efficiencies could be gained from online, easy-to-use interfaces for property record keeping and planning to automated, near real-time change detection from remote monitoring and machine learning. These kinds of systems would improve accessibility of information and coordination between team members for data management. Remote monitoring and change detection capabilities allow staff to monitor large, distant, or inaccessible areas, which can be difficult to consistently visit in-person. This helps staff to more quickly spot illegal human activities or sudden ecosystem changes (such as fire or pest damage to trees). It would also enable staff to strategically target field visits or interventions where necessary, ensuring tax payer dollars deliver more results per dollar spent.

➔ Intuitive planetary status-tracking “dashboards”

Understanding the status of our planet – the quality of our water, the population status of imperiled species, the intactness of natural landscapes and seascapes, among others – is an essential component of building or sustaining the political will to take action to change outcomes. Unfortunately, decision makers and the public lack access to this fundamental information, and even if it is available, too often it is buried in dense, hard to follow reports. The Digital Service for the Planet can help address this by creating simple and intuitive, web-based “dashboards” that summarize key agency data on aspects of planetary health to raise awareness and inform decision makers. From information about wetlands mitigation banking through [RIBITS](#), or locating the nearest open [National Park](#), there are quick and implementable changes that would benefit users including researchers, policy makers, practitioners and the general public alike. Further, the creation and use of these dashboards can help shape agency culture to think about how such technologies can be used to present government data in more effective, accessible, and efficient formats than in the past. The ongoing upgrade of [USGS Water Data for the Nation](#), assisted by 18F, provides a good example of how this can be done.



Photo courtesy of the Conservation Culturomics Working Group



Call to Action

The Biden-Harris administration has declared that science-based decision making is the foundation of future environmental policy. President Biden’s preliminary \$2 trillion climate action plan acknowledges improvements to water resources from built infrastructure, wetlands restoration, and irrigation as integral to fulfilling these goals. However, to achieve these goals they must recognize the critical role digital infrastructure and policies play. A Digital Service for the Planet will empower agencies to leverage the 21st century technology necessary to accelerate the rate and scale of natural resource management.

The following recommendations are interdependent and aimed at fostering US innovation and leadership around improved digital infrastructure for environmental and water stewardship.

- **Create a Digital Service for the Planet.**

The composition of the team required to deliver on technology issues critical to the environment is specialized. The Digital Service for the Planet could be established and funded as a distinct part of the U.S. Digital Service, or as a stand-alone office within the Executive Office of the President. To execute on projects quickly and effectively, it should be housed within the White House and led by a senior official.

- **Move Chief Technology / Information Officers into mission-focused roles within agencies.**

Frequently, CTOs/CIOs are within administrative areas (such as finance and human resources) of agency organizational charts. This shift in CTO/CIO placement will ensure agencies have leadership and expertise to adopt and integrate technology to support their programs when necessary, and can more easily foster collaboration given common digital infrastructure needs.

- **Expand funding for digital infrastructure improvements and technology acquisition.**

Task the Office of Management and Budget with evaluating conservation technology investments across US Department of Agriculture, Department of Interior, Environmental Protection Agency, the Army Corps of Engineers, and National Marine Fisheries Service to develop coordinated recommendations for budget, software as a service, technology partnerships and staffing for technology in the FY23 budget. This would enable departments to consistently procure the appropriate tools and services for their programs. This could be coordinated and deployed in partnership with the Digital Service for the Planet.

For President Biden, the Digital Service for the Planet could be a quick and powerful political victory to support the administration’s agenda and build a strong coalition across government, nonprofits, and industry. The time is now to focus on integrating new forms of information, creating access to modern digital infrastructure for land stewardship, and ensuring a long-term commitment for evidence based policy-making.

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Clean Up the Lake	Moonshot Missions
Climate Advisory LLC	Natel Energy
Conservation X Labs	NatureServe
Conservation Metrics	New Jersey Future
Creative Externalities	Open Environmental Data
Defenders of Wildlife	Quantified Ventures
Earthrise Media	Ramboll
Ecobot	Resilient Infrastructure for Sustainable Communities Solutions (RISC)
Ecological Restoration Business Association	SkyTruth
Ecological Services & Markets	Sudol Environmental Associates
EcoLucid	The Commons
Environmental Policy Innovation Center	The Trust for Public Land
Environmental Consulting & Technology (ECT)	The Freshwater Trust
EQO	Upstream Tech
HANA Resources	Water Foundry
	Wildnote
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