

# ENVIRONMENTAL BUSINESS JOURNAL®

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Infrastructure, the BIL & the Environmental Industry Environmental Business International Inc.

## FEDERAL INFRASTRUCTURE FUNDING A GENERATIONAL OPPORTUNITY FOR THE ENVIRONMENTAL INDUSTRY

*Less than half the trillion dollars of infrastructure funding has been spent — but BIL and IRA program funds are expected to last into the 2030s.*

Halfway in to the 2022-2026 funding cycle authorized by the November 2021 Infrastructure Investment and Jobs Act, also known as the Bipartisan Infrastructure Law, nowhere near half the more than trillion dollars lumped into the funding package has been dolled out, much less spent on shovel-ready or boots-on-the-ground projects. While it can be argued that much the first half of the money has gone to formulaic programs like state-managed highway funds and water programs and that agency overload has led to delays in awards in a number of competitive bid and grant programs, this means that there is some pretty heavy backlog to be worked through for the next few years.

Economic and industry analysts warn of a labor and materials supply crunch that will only further delay implementation or substantially raise the costs of a number of programs. However, delays may be beneficial in programs seeking to make generational investments in clean energy, the electricity grid, energy storage, carbon capture and other rapidly changing segments of the energy transition — not to mention innovations in transportation from electrification and the incumbent manufacturing, supplying and recycling of vehicles and batteries and all the specialty materials that go with it — but also optimizing the charging network and balancing private and public interests therein. And let's not forget the once more popular concept of a more ubiquitous autonomous driving network that many still believe is more likely in our future than 100% renewables or colonizing Mars.

And whereas power and transportation are the largest slices of federal funding from the BIL and 2022's IRA, environmental industry players are already lined up for a larger share of programs in water, remediation and resilience that arguably have a more short-term engineering focus and less of a transformational challenge than the other forms of infrastructure, and are likely to proceed at a more uniform pace. While this review understandably focuses

on the generational opportunity of the BIL and IRA, we felt it appropriate to reflect on perspectives from the past and share pages from EBJ's 2020 review of infrastructure at the end of this 2024 edition. Industry fundamentals have not changed much, but circumstances have, so how, and how fast, infrastructure evolves remains a challenge to predict, but its at least a future in which the environmental industry is increasingly playing a role.

With Congress' authorization of the monumental commitments of the BIL and IRA, the trillion dollar challenge of our generation is indeed how to make a truly lasting impression on U.S. infrastructure.

### Inside EBJ: Infrastructure & the BIL

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A lasting impression on the roadways & waterways and highways & byways of all 50 states. A lasting impression on the interconnectivity and resilience of the electricity grid, the independent system operators and electricity generation assets both centralized and distributed that feed into and balance the grid for safe, accessible, affordable and sustainable power supply.

A lasting impression, or at least some kind of momentum shift, in public transportation that is suffering from decades of mostly misguided policy, chronic underfunding and a series of setbacks due to the pandemic of the 2020s. A lasting impression on a private and public national network of charging apparatus for electric vehicles available at a reasonable cost for residential, commercial, institutional and government usage.

A lasting impression on the supply chain, manufacture and domestic production of electric vehicles, batteries, solar panels, wind turbines, heat pumps, biogas, modular nuclear generation and safety infrastructure, hydrogen and its distribution and storage, carbon sequestration infrastructure, Rare Earth metals, and other elements of the energy transition crucial to atmospheric equilibrium — and that leads to global geopolitical balance and counterbalance with partners and adversaries.

A lasting impression on the sustainability, quantity and quality of our water supply (managed by green and gray infrastructure) with an emphasis on regional and local resiliency in the face of drought, flood and extreme weather,—all the while assuring it's affordability yet signaling to the consuming population it's true value through appropriate pricing and subsidies.

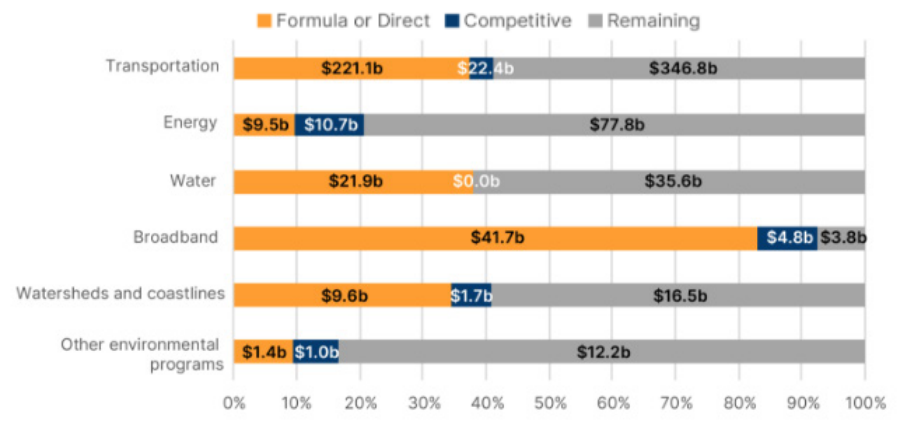
A lasting impression on internet access and more widespread availability of broadband, or subsequent generations of the instruments of digital connectivity governed for the benefit of society and human social interchange, and not to further divide and isolate individuals or the communities to which they belong.

A lasting impression on disadvantaged and marginalized communities that lack access to adequate infrastructure in the

### Mid-Term IJA Report Card

Halfway through the five-year Infrastructure Investment and Jobs Act (IIJA, passed into law in November 2021) in June 2024, just 38% of funding has been announced, according to White House project funding and program allocations tracking. The 38% announced was a 13% increase in the 6 months to June 2024, an indication that the funding process was ramping up, but still lags what some had expected. At the middle of 2024, \$454 billion of the IIJA's \$1.2 trillion has been announced for a range of projects. The late July 2024 update of the most comprehensive database on federal funding that includes IIJA, Inflation Reduction Act and the CHIPS and Science Act (both passed into law in August 2022) total \$840 billion in spending. The \$840 billion is summarized by EBJ in the charts accompanying this review, and the project category summaries of the largest funded projects in resilience, climate resilience and water are derived from the same source. Announced project funding, captured mostly from agency reporting and press releases, is preliminary and non-binding, whereas awarded funding represents actual obligations, per the White House tracking of the IIJA or Bipartisan Infrastructure Law (BIL). The White House continues to release updated maps of the more than 56,000 projects and awards identified or underway at 4,500-plus localities around the country as of July 2024, a number up 40% from 40,000 projects in November 2023. The mid-August 2024 update has 68,000 project records. Outside the formula funding like DOT highway and EPA water funds, over half of IIJA's competitive awards are under \$1 million and another 29% of awards between \$1-\$10 million.

#### Progress & Remaining IJA Funds: End of November 2023



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## GZA ASCENDING LEADER CHALLENGES HERSELF & HER FIRM; CONTINUES ACADEMIC RESEARCH ON DAM REMOVALS

**GZA GeoEnvironmental Inc.** (GZA) is a multidisciplinary consulting firm that employs over 700 engineers, scientists, and technical support staff across 32 offices nationwide. GZA is 100% employee-owned. GZA has grown both organically and through acquisition of key firms throughout a geographic footprint in New England, the Mid-Atlantic, Great Lakes, and Southwest. Acquisitions have supported and expanded our technical practice areas which include geotechnical, water resources, civil and environmental engineering, hazardous waste assessments and remediation, environmental review and permitting, and construction design-related services. GZA cross trains staff across disciplines leading to creative and informed problem solving to benefits clients. GZA services clients in the energy, real estate, industrial and government sectors.

**Adrienne Dunk, Project Manager.** Ms. Dunk works at the intersection of ecology and environmental planning. With early career experience in river-health related field work and implementation of federal endangered species protection plans, Ms. Dunk joined GZA as an ecologist focused on rare species work and wetland delineations. Over time, as Ms. Dunk developed a strong understanding and appreciation for how environmental protections and regulations drive project design and implementation, she was able to assist on more complex projects. These project opportunities led Ms. Dunk to work on environmental planning at the earliest phases of project conceptualization which helped to design projects that met or exceed applicable requirements. With a continued focus and love for water resources, Ms. Dunk is currently primarily focused on riverine systems with a focus on dam rehabilitations and removals.

### **EBJ: Can you describe the key experiences and decisions that led you to your current role at GZA?**

Dunk: I've been very fortunate to have mentors and champions within GZA that have helped me turn challenges into opportunities. I started on a newly-established and very small ecology team at GZA. Instead of being in a traditional new/junior employee role, my supervisor brought me in to work on everything he was working on, including meeting clients and regulators, writing contracts and agreements, and presenting to potential clients and local stakeholders. At the time, these assignments were outside my comfort zone, but they rapidly shaped my understanding of the various pressures and peculiarities of consulting in the environmental field and set me up to professionally advance quickly as I developed and honed my technical skills. Often, we focus on an employee's technical skills and slowly introduce the business skills later. I benefited by developing both in tandem.

Another benefit of working on a small team was that it necessitated that I develop cross-office and cross-discipline relationships within GZA. These experiences provided new opportunities for me to grow my project management and client development skills while also exposing me to many styles and approaches to work. At times, it felt like I had been thrown in the deep end, but I had mentors within GZA who let me struggle (where the most learning happens) but provided enough support that I had a safety net in place.

Finally, the best decision that has led to my current role at GZA was transferring offices to Springfield, MA. The ecology team and water resource teams are much larger within this office. Joining this team with my past experiences and connections opened doors to managing larger and more complex projects, created teaming opportunities between offices and teams, and positioned me to capitalize on opportunities to rapidly advance to a Project Manager position.

### **EBJ: What specific leadership roles or projects have been most instrumental in your development as a leader within GZA?**

Dunk: Early in my career, I had the opportunity to work on and help develop a solar siting assessment report that combined a desktop GIS review with a limited field assessment. By developing this work product, I had the opportunity to demonstrate my facility at learning various state's regulations and to "sell" this product internally to other GZA colleagues who had solar projects. Because of this solar siting experience with multiple large clients across the Northeast, I became involved in GZA's internal Solar Steering Committee, which positioned me as a leader within the company and provided me with direct access to senior staff who continue to be mentors and leaders to me.

For the last several years at GZA, I have told my colleagues that my favorite projects are the unusual or hard ones. While sometimes a bread-and-butter assignment is nice, advocating for complex and challenging projects has forced me to dig deep into regulations and environmental laws and has led to me being considered a regulatory expert and internal leader at GZA. Some of these opportunities included providing significant permitting support for a large utility upgrade project when I had only been working in Massachusetts for a handful of months, navigating the implementation of MEPA Environmental Justice policy implementation, and working with a State Agency to re-permit an annual winter drawdown of a large recreational lake. I treat projects as a puzzle to solve which helps keep a positive attitude when it looks like there is only a narrow path forward.

### **EBJ: What unique skills do you believe have accelerated your career progress in the environmental sector?**

Dunk: Approaching challenges as a puzzle instead of a headache and seeking my own solutions have been instrumental to my career progress. While in high school and undergrad, I did a lot of computer programming and theatrical set design and construction. These may seem like very

different activities, but they both take creativity and dedication to make something out of raw materials and they don't come with directions. I take the same approach to new projects, new regulations, and new challenges. I strongly believe that there is a solution to just about everything, and it's ok if the solution takes some sleuthing, trial and error, and planning. I think that this attitude has accelerated my career because I don't look for pat answers, involve others in problem solving with me in targeted and productive ways, and generally maintain a positive attitude.

I also believe in continuous, incremental improvement and self-reflection. Throughout and after projects, I think about what went right, wrong, or could have been done more smoothly. I use these reflections to build tools for myself and others to avoid avoidable mistakes and share what I've learned with others. I've also learned that being perfect is impossible. Missteps are where we learn the most, so they shouldn't be feared, but they also shouldn't be repeated.

**EBJ: How do you foster innovation and create efficiencies within your team and projects at GZA?**

Dunk: In 2019, I read about how Elizabeth Warren had streamlined her closet to reduce the mental energy she spent on getting ready for the day so that she could spend that effort on more important decisions. This took more effort up front (to decide what goes in the closet, buy the clothes, etc.) but it saves her a little time and effort every day.

While I haven't streamlined my closet, I do use this mentality when approaching work and it has created efficiencies which create room for innovation. I have created tools and structures that I and other team members can lean on to simplify many of the easier decisions that we make every day. These tools allow us to get the "easy" work done and while doing it, we can define the challenges and unknown, and use our energy and effort to develop solutions. Every project has unique elements, but they also generally share significant commonalities. By reducing the mental load to make the easier decisions and creating a situation

where we're making progress on a project we approach the unknowns from a place of confidence, primed to find solutions. I find that starting from the unknowns can be discouraging which can undercut creativity and innovation.

I also think that it is really important to remember that I have a lot of knowledge and an increasing amount of experience, but I in no way can know everything. That means I also don't always know the best way to solve a problem. I try to define the solution to my team but allow for flexibility and innovation from others about how to get to the solution. Being open and recognizing that there are many types of knowledge and "smarts" in the world helps team members volunteer information that may turn out to be critical to a project or how we approach work.

**EBJ: Can you tell us about the thesis research that you are currently working on?**

Dunk: My thesis research, "Quantifying Wetland Change Following Small Dam Removals in Massachusetts" really stemmed out of my work related to dam removal projects. I have always had an affinity for streams and rivers, and dams—especially obsolete dams with no real human purpose—present ongoing safety hazards and ecological impairments to streams. Increasingly, dam owners are choosing to remove these dams, and dam removal as an ecological restoration practice is increasingly common. Although the understanding of the benefits of these removals is gaining traction, dam removals remain challenging to permit.

I seek to generate peer-reviewed data and literature about how dam removals in Massachusetts alter open water and wetland habitat, and my hope is that this data can be used by regulators and practitioners throughout the Commonwealth to more expeditiously advance dam removal projects.

I am conducting a retrospective aerial interpretation of vegetated wetlands and open water resources at dam removal sites within Massachusetts. I reviewed each dam removal site using State issued ortho-imag-

ery and satellite images to assess the area and configuration of wetlands and open water upstream of the impoundment, within the impoundment area, and downstream of the dam. I complete this review of images prior to dam removal, and then at 2-, 5-, and 10-years following dam removal to document changes. Based on the removal year, I can also evaluate some sites at 15- and 20-years after removal to extend the time series.

Eventually, I hope to be able to answer the following questions:

- Are open water areas in the impoundment converted to wetlands? Do wetlands form elsewhere along the waterway?
- How quickly do the wetlands form, and do they continue to change in their area and configuration over time?
- Do other watercourses or waterbodies that may share a groundwater connection but have no surface water connection change following dam removal?
- What, if any, landscape factors (i.e., geology, watershed slope, drainage area, other dams in the watershed, etc.) affect wetland formation following dam removal?
- What, if any, dam removal practices (i.e., time of year of removal, duration or timing of drawdown prior to removal, length of removal construction, etc.) affect wetland formation following dam removal?

I am still in the data-collection phase of my research and therefore don't have too many details to share; however, very initial findings indicate that the former impoundment area converts to wetlands, though there is little evidence of changes to wetlands upstream or downstream of the impoundment. The wetlands appear to form quickly and be relatively stable in their extent and location. Finally, there do not appear to be changes to other waterbodies or watercourses that may share a groundwater connection and have no surface water connection with the dam removal watercourse. No data is available yet regarding questions 4 and 5.

**EBJ: What do you consider your most impactful leadership achievement at GZA so far?**

Dunk: I consider my most impactful leadership achievements to be when I can connect colleagues across teams and offices. I strongly believe that we all do our best work when it is work that we care about, and we are working with people that we respect and whose style we find complimentary. Having a strong team is a critical component to set ourselves and others up for success – both for projects and for long term job satisfaction and performance. Consulting firms, like GZA, are only as strong as their employees, so creating strong working relationships is pivotal to our continued success and growth. When I can be a matchmaker between team members and then they go on to do great work together, that creates a lasting positive impact on the organization and individuals, regardless of if I continue to be involved in the relationship or project.

**EBJ: Looking ahead, what are your long-term goals within GZA or the broader environmental sector?**

Dunk: Long term, I plan to continue to work closely with our water resource engineering staff and natural resource practitioners and I hope to continue building and expanding the core team with deep expertise in river restoration projects. There are a lot of specifics to understand in how these projects are approached, designed, and implemented. Continuing to build that team of experienced practitioners who understand the needs and points of view of our colleagues can streamline GZA's internal work so that we can take dams down and restore free flowing rivers better and faster. There is a lot of work to do to protect ourselves and ecosystems from climate change, so finding these efficiencies and delivering on river restoration projects is fulfilling both professionally and personally.

**EBJ: Can you describe the type of projects that you work on related to the following Natural Resources Areas?**

**Federal Permitting and Planning:**

Our projects that involve work in wet-

lands and waterways always have an element of federal permitting from the United States Army Corps of Engineers (USACE). Specifically, I am currently working on a dam removal project where the dam spillway structure is listed on the National Register of Historic Places, which necessitates additional consultation between the project proponent, USACE, and the State Historic Preservation Officer to satisfy federal consultation requirements under Section 106: National Historic Preservation Act of 1966, and to be a good steward of the environment and the cultural history of the community.

I am also working on a National Environmental Policy Act (NEPA) review of an arts center expansion in rural Massachusetts using funding from the United States Department of Agriculture (USDA) Rural Development. These reviews ensure that federal funding will advance the stated purpose (rural development) while avoiding impacts on natural, historic, or other protected resources.

GZA has been working with General Aviation (GA) airports in Massachusetts, which are typically municipally-owned facilities, Massachusetts Department of Transportation, and the Federal Aviation Administration (FAA) to bring airports into safety compliance and/or expand their facilities. I am currently working to permit and implement a GZA-developed (and FAA-required) Vegetation Management Plan to manage airspace obstructions along its approach and transition services. We are working with another GA airport to expand its taxiway. Based on the project designs and applicable review criteria, GZA will be completing both the federal NEPA review, and the state Massachusetts Environmental Policy Act (MEPA) review, as applicable.

The availability of federal funds over the past few years has increased the demand to complete NEPA reviews as a component of project planning and design.

**Data Mapping / Visualization (GIS):**

We use data mapping extensively for large field efforts such as a recent 41-mile long utility transmission upgrade project. The data mapping provided publicly avail-

able data such as street names/locations, soil types, federally and state-mapped wetlands and streams, and rare species areas to field crews to help guide their field work. Crews recorded their data in real time to the cloud so office staff could see and review progress along the right-of-way, and manage data throughout the field effort. The real-time data was also shared between field teams, allowing for vehicle staging and sharing across multiple teams to reduce or eliminate time spent backtracking along the right-of-way to the morning access point. The vehicle sharing also reduced overall driving which decreased our team's vehicle emissions while completing the work.

I have used GIS to support solar clients in several ways. We have supported site selection by developing GIS tools that process publicly available data to identify properties that are likely to meet a solar developer's requirements such as relatively flat, previously disturbed/developed sites with limited wetland areas and no rare species. The power of this tool is that a million properties can be assessed to develop a list of 200 that are more likely to be suitable. This list can then be sorted, filtered, and further evaluated to find amenable landowners and development opportunities.

We have also worked with large landowners and solar developers to assess a portfolio of properties to identify a development envelope that avoids and minimizes impacts to the environment. For example, an owner of several landfills had GZA evaluate 7 closed landfills and develop concept maps for where solar panels or wind turbines could be installed that would be protective of the landfill cap, avoid wetlands, and comply with local zoning and building requirements.

Finally, I have used GIS to support a municipality that was grappling with protecting their natural resources while incentivizing solar development commensurate with their current emissions. They wanted to contribute "their fair share" of renewable electricity to the grid. We conducted a more academic assessment to understand how much solar capacity the town could theoretically support while complying with existing land use and protection

requirements. We evaluated the town at a fine grain (using 30'X30' grid square) and assessed the feasibility of solar development on each grid square. Ultimately, this effort provided decision makers with an understanding of the total area available for solar development, the proportion of underlying land use (agriculture, impervious/developed, etc.), and a relative understanding of development challenge throughout town. These decision makers could then work with the community to prioritize and incentivize solar in line with community values to reach their renewable energy generation goal.

**EBJ: In which ways has data mapping and visualization evolved over the past 5 years?**

Dunk: Data mapping and visualization have expanded significantly over the past 5 years. The availability and reliability of publicly-accessible data has exploded and can provide so much project relevant information before even going into the field. While site visits remain a critical component of site assessment for wetlands, rare species, and other needs, we now can know so much before we head outside.

In terms of data visualization, the increase in online tools that integrate geographic and tabular data with written information has made planning information, public input gathering, and municipal inventory data so much more accessible. While not quite behind us, the days of a firm like GZA conducting an ecological inventory for a municipality or developing a land use plan or hazard mitigation plan and writing a 300+ page report are increasingly out of date. This is fantastic news for members of the interested public. We are increasingly converting these large documents into online, interactive tools including interactive PDFs, StoryMaps, and other media. These tools improve public engagement and increase accessibility.

**EBJ: What new tools are coming out?**

Dunk: We will continue to see improvements in our mapping and interface tools which will expand the conversion of our work products to interactive online

formats. We are also seeing artificial intelligence being used in the mapping software and image review to improve remote wetland delineation and site conditions and simplify workflows.

We are also seeing more applications of unmanned vehicles including drones that are used for surveys, LiDAR data collection, site-specific photography and

assessment, and repeated drone use for time-lapse recordings and construction compliance matters. Underwater remotely operated vehicles are also used for bathymetric data collection and inspection of underwater structures, including inside dam structures. Using these devices increases the quality of our data and keeps our staff safe. ▣

**Adrienne Dunk a 2024 EBC-NE Ascending Leader**

2024 marks the eighth year of the Ascending Leader Award program by **Environmental Business Council of New England**, EBC Ascending Leader Award recognizes professionals in the energy and environmental sectors demonstrating exceptional leadership and industry involvement early in their careers. Each December EBJ co-hosts a one-day New England Environmental Industry Summit in December. The 2024 date is December 5th at Brown Rudnick in downtown Boaton.

Adrienne Dunk, WPIT, Project Manager, **GZA GeoEnvironmental Inc.** is a Project Manager in GZA's Ecology and Natural Resources discipline. She joined GZA in the Fairfield, NJ office in 2018 after a three-year stint as a fisheries technician and biologist for the US Forest Service and National Park Service in the western US. She moved to GZA's Springfield, MA office in May 2020, rapidly undertaking leadership roles in projects and initiatives there, often creating efficiencies and innovations in the work of GZA's Natural Resources and Permitting Department. Adrienne's areas of specialization include: State and Federal Permitting and Planning, Community Engagement, Technical Reporting, and Data Mapping/Visualization (GIS).

She is currently completing her M.S. degree in Environmental Conservation with a focus on Wetland and Watershed Management from the University of Massachusetts, Amherst. Her thesis, titled "Quantifying Wetland Change Following Small Dam Removals in Massachusetts," seeks to document the conversion of regulated resources following dam removals to support the ongoing effort to streamline dam removal authorization. Adrienne received grant funding from the Society of Wetland Scientists, New England Chapter to pursue this research. She is also certified as a Wetland Professional in Training (WPIT) and FEMA Public Assistance Program Delivery Manager.

Adrienne frequently works with colleagues across GZA's 32 offices, contributing planning and permitting skills to projects in other locations and as a member of internal GZA committees. She has contributed to GZA's Solar Energy Steering Committee and is the only non-Principal involved in GZA's Land Use and Planning Steering Committee. She was also invited by the Lead of GZA's Dams, Levees and Hydropower Group to help launch a multi-disciplinary training program focusing on technical best practices for dam maintenance/operations and wetland permitting. This training initiative will help GZA to better navigate the challenges of ever evolving dam regulations and continue to provide GZA's clients a high level of service. Collaboration with other GZA offices and practice areas, as well as her leadership roles, contribute to Adrienne frequently being a "matchmaker" by connecting colleagues with teammates or resources in other offices and being sought after for advice on a planning or permitting aspect of a project she's not directly involved in. In the Springfield office, she supervises junior staff members and serves informally as a mentor to others.