

# Brendan C. Ward

## Chief Software Engineer

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### WORK EXPERIENCE

**2019—present: Owner | Lead Software Engineer, Astute Spruce, LLC** Corvallis, OR

I work collaboratively with science-based organizations to develop highly-customized software solutions for real-world problems.

**2007—present: Chief Software Engineer, Conservation Biology Institute** Corvallis, OR

I lead CBI's software development team to create tools and platforms that empower the conservation community to share, visualize, interpret, and apply geospatial data. I leverage my unique talents and background at the fusion point between science and software engineering.

- Full stack software engineering across broad range of applications, using Python, modern Javascript, and Go
- Work closely with scientists and clients to co-design highly effective, intuitive, and innovative data visualization and communication applications that allow them to deliver high value information
- Contribute to CBI strategic direction and business development
- Lead [Data Basin](#), a multi-million dollar, groundbreaking geospatial data sharing and collaboration platform used by over 20k registered users
- Write successful proposals and manage multi-disciplinary projects (won projects totalling over \$500K; led projects totalling over \$1.5M)
- Recruit and supervise staff, manage team operations, and oversee staff development

**2004—2007: Biological Scientist / GIS Specialist, U.S. Forest Service** Missoula, MT

I led the team responsible for mapping and modeling historical fire regimes across U.S. as part of the LANDFIRE project.

- Added value across the entire project by contributing major improvements to data acquisition, processing, and products; these improvements saved thousands of dollars in computing and labor costs and expanded the diversity and value of project products
- Directly applied software engineering skills to improve simulation model internals resulting in major decreases in processing time, and engineer new tools to leverage machine learning for classifying and mapping vegetation types using remotely sensed imagery at landscape scales

### EDUCATION

**2004: M.Sc. Forest Ecology**

University of Wisconsin  
Madison, WI

**2002: B.Sc. Envr. Science**

Western Washington  
University, Bellingham, WA

## HIGHLIGHTED OPEN-SOURCE SOFTWARE PROJECTS

- [mbtileserv](#): lightweight map tile server written in Go
- [trefoil](#): multi-dimensional geospatial array processing and rendering library written in Python
- Core contributor to [rasterio](#): geospatial I/O and analysis library written in Python

## HIGHLIGHTED PROJECT EXPERIENCE

### **Data Basin**: Geospatial data collaboration and visualization platform (2007 - 2018)

- Architected and led development of Data Basin 1.0 platform based on Java, Javascript, and map server technologies. Personally developed large portions of the user interface and web application tiers, and contributed heavily across the entire software stack from the database and map servers on the backend to the frontend. Recruited software engineers and led the team to a successful public launch in 2010.
- Led team through re-development of Data Basin 2.0 platform based on Python, Django, Javascript, and map server technologies. Led successful progressive rollout of new platform with very minimal disruptions to existing users. Personally migrated and re-wrote hundreds of Javascript components to use latest technologies and architectures, and contributed heavily across the entire stack.
- Led team through major engineering initiatives including development of branded client-facing gateways, localization into Spanish, and client-specific feature development.
- Worked closely with internal and external project stakeholders to develop use cases, data processing pipelines, and system help / documentation. Provided direct user support for clients and general users, many of whom were surprised by my rapid and effective response to issues.
- Contributed to user outreach and business development as well as overall product strategy.

### **Paulson Institute / Chinese Ministry of Environment and Ecology**: Environmental Risk Screening Tool (2017 - present):

- Managing the overall project and leading the technical team developing an extremely ambitious project to incorporate environmental risk screening using best available data into China's major investments in infrastructure development worldwide. If successful, this tool will directly reduce the environmental and social impact of these infrastructure projects around the world.
- Directly engaging in-person and remotely with Chinese ministry officials to gather project requirements and technical specifications, use cases, and data.
- Contributed significantly to user interface design and system architecture, and facilitating technical development and communication on the overall project.

### **Peninsular Florida Landscape Conservation Cooperative (PFLCC)**: Data visualization and information sharing for several projects (2015 - present):

- Served as technical lead, project manager, and primary software engineer working closely with PFLCC to develop stand-alone data visualization applications and additional functionality in Data Basin. Personally developed the project proposal and

budget for each project. Each completed project and phase was well-received by PFLCC, who continue to specifically contract with us for additional projects.

- Led team and provided primary software engineering to deliver the [Conservation Priorities Viewer](#) through multiple major versions of the underlying data products, using Javascript (esp. D3) for the application and Python for data processing. Hosted as a static site in Amazon Web Services S3 to control costs and complexity for client.
- Developing a Climate Adaptation Explorer for Florida (to be released early 2019). This ambitious project will reshape the way the natural resources community accounts for climate change in planning and public awareness. Led a highly-effective 2 day design sprint onsite with PFLCC staff. Currently leading the user interface design, architecture, and implementation using React / Redux and modern Javascript for the frontend, and Python for data processing.

**Southeast Aquatic Resources Partnership (SARP):** Southeast Aquatic Barrier Visualization Tool (2018 - present):

- Developed a highly-performant yet cost-effective map-oriented visualization framework that allows users to interactively explore and query millions of potential aquatic barriers in the Southeastern U.S.
- Developed highly-performant data processing pipeline for calculating aquatic network characteristics of >140k aquatic barriers, as a replacement for data processing tools developed by prior partners that could not scale to quantity of aquatic network data.
- Co-designed the application through close collaboration with SARP staff.
- Created icons, graphics, and content to effectively communicate the purpose and functionality of this application to a diverse audience.

**South Atlantic Landscape Conservation Cooperative (SALCC):** Data visualization and communication for the Conservation Blueprint, a regional conservation priorities framework (2014 - 2018)

- Served as technical lead and project manager, and worked with SALCC to grow the scope, budget, and impact of our services. Personally developed the project proposal and budget for several project phases. SALCC staff were so happy with my work that they led additional clients to CBI, resulting in hundreds of thousands of dollars in new work, and contributed significantly to CBI's reputation in the conservation community in the southeastern US.
- Co-designed the application through close and very positive interaction with the SALCC, and provided nearly all software engineering on the [Conservation Blueprint Viewer](#) through several major and minor versions of the Blueprint framework using Javascript (esp. D3) for the application and Python for data processing. Hosted as a static site in Amazon Web Services S3 to control costs and complexity for client.
- Currently leading the team and providing major software engineering to upgrade the application to a responsive and mobile-specific user interfaces based on React / Redux and modern Javascript. Overhauled the data processing pipeline to use Pandas and Geopandas in order to further reduce complexity and streamline performance. Developing an innovative approach to delivering map tile data using Python and Javascript, in order to greatly expand the realtime exploration of data for individual locations on the map.

## HIGHLIGHTED DATA VISUALIZATION PROJECTS

- [Southeast Aquatic Barrier Prioritization Tool](#)
- South Atlantic Landscape Conservation Cooperative [Conservation Blueprint Viewer](#)
- Peninsular Florida Landscape Conservation Cooperative [Conservation Priorities Viewer](#)
- [U.S. West Coast Estuaries Explorer](#)