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Artificial Intelligence & State Environmental Protection Agencies: Opportunities, Risks, Actions

Kurt Rakouskas, Executive Project Manager
Ben Grumbles, Executive Director

Executive Summary

Many state environmental agencies are evaluating artificial intelligence (AI) tools to boost staff productivity, increase regulatory efficiency, and enhance their response to complex environmental challenges. States are exploring the potential to use AI for improved internal operations, permitting workflows, inspection prioritization, public engagement, and other processes.

While AI offers meaningful opportunities to improve efficiency, consistency, and environmental outcomes, it also raises important questions and risks related to transparency, data quality, and accountability. States are generally taking cautious, incremental approaches to AI adoption within their agencies, focusing primarily on productivity and human oversight.

Note: While not the focus of this article, states are also facing the separate and high-profile challenges of environmental impacts and regulatory permitting of data centers and related infrastructure to support the exponential growth of AI. This includes addressing energy demand, water consumption (particularly from aquifers), air quality and the use of backup generators, noise, open space and habitat depletion, and related local land use decisions.

Background and Context

AI is a broad term that encompasses a range of technologies that use large datasets to simulate human intelligence. These technologies apply algorithms and specialized models to find patterns in information and make probabilistic predictions that mimic human abilities to communicate, solve problems, and create content. In the context of environmental protection, AI is emerging as a potential tool to augment agency capacity and improve workflows for staff, the regulated community, and the public.

Uses and Benefits for State Environmental Agencies

Improving Internal Operations and Productivity

Many agencies are beginning their AI journeys with internal-facing applications such as drafting emails, summarizing technical documentation, or translating website content into different languages. With a human carefully reviewing any AI-generated material, this offers agencies an opportunity to try the technology, test its capabilities, and help staff learn how to appropriately use it. In times of stretched resources, AI tools can help agencies increase productivity and ease administrative burdens on their staff.

Permit Streamlining and Efficiency

Agencies are also investigating AI as a tool to improve permitting processes and support higher quality permit applications that are less burdensome to review and more protective of the environment. Chatbots and other AI tools can help applicants better understand permit requirements and generate more complete applications. That frees up highly skilled agency engineers and permit writers to focus on their technical work rather than flagging administrative errors and navigating avoidable delays. If properly trained on pertinent rules and examples of highly effective permits, AI may also help agency staff efficiently generate high-quality draft permits or focus on complex permit applications that may require additional scrutiny.

Enhancing Public Engagement

AI also has potential to improve public comment processes and enhance community engagement. AI tools trained to recognize and process written text can efficiently categorize high volumes of comments or analyze them for key themes. This administrative assistance frees up additional staff time to perform more thoughtful analysis and consideration of public input on rules and other agency actions. Agencies may also be able to deploy AI-powered chatbots to help the public navigate web content, understand regulatory requirements, or access environmental data.

Environmental Monitoring and Compliance Assistance

Some states are using techniques in machine learning and predictive analytics to improve their environmental monitoring, compliance assurance, and enforcement capabilities. Data models can analyze compliance history to identify facilities that may be at greater risk of experiencing a future violation. That insight helps agencies prioritize their inspection resources and potentially prevent environmental harm before it happens. Similarly, states can use AI to analyze satellite imagery and help delineate sensitive environments such as wetlands. Program staff could also deploy the technology to detect data anomalies that may indicate unpermitted emissions or other types of non-compliance, leading to swifter and smarter enforcement actions.

Emergency Planning and Response

AI tools also hold significant promise for supporting emergency planning and response—critical needs that will continue to grow with increased climate- and weather-related extreme events. By integrating historic and real-time information with predictive models, agencies may be able to improve their ability to forecast wildfire smoke, assess flood risk, and plan for spills or other contamination events. Improved situational awareness helps emergency managers more effectively deploy resources to protect the environment and human health.

Risks, Limitations, and Challenges

Agencies that implement AI tools have the potential to increase operational efficiency, maximize limited resources, and support more effective regulatory processes. Despite its upside, AI presents some significant risks and challenges for the public sector. AI-based tools depend on access to high-quality data. Inaccurate, unrepresentative, or incomplete data inputs can lead to misleading or biased outputs. Use of AI to support government deliberation or decision-making raises important legal, procedural, and security questions. Public agencies must grapple with concerns about the transparency and accountability of commercial AI models, many of which function in the manner of a “black box”.

Policy and Management Considerations for States

States should adopt and operate AI tools with appropriate safeguards, policies, and staff training to ensure that a human remains “at the helm” and responsible for approval of final agency products and decisions. Agencies should document their use of AI tools to support transparency for regulated entities and the public. States may also benefit from developing metrics to evaluate whether AI tools are improving efficiency as well as other outcomes.

Conclusion

When used in conjunction with strong policies and governance, AI can be a powerful productivity tool and workforce multiplier to help states meet today’s environmental challenges with limited resources. AI cannot replace the scientific expertise, regulatory judgment, or public accountability of state agency staff. Agencies should always retain final decision-making authority and ensure that AI outputs supplement rather than supplant the judgment, technical expertise, and legal review of professional staff.

More Information

- Watch www.ecos.org in 2026 for ECOS’ forthcoming report on state AI adoption, including a selection of featured agency case studies.
- ECOS’ Digital Business Workgroup is helping states share AI implementation strategies and lessons learned. Learn more at www.ecos.org/areas-of-focus/environmental-data.
- ECOS and states are partnering with U.S. EPA and tribal agencies through *E-Enterprise for the Environment* to share experiences with AI adoption and data center permitting. Visit www.e-enterprisefortheenvironment.net to learn more.