PLANETARY INTELLIGENCE

Research and Reflection

Planetary Intelligence and Bioregional Practice

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Summary

Life's capacities for sensing, coordination and adaptation are giving researchers new ways to investigate intelligence beyond individual brains. Whether these processes amount to intelligence at the scale of the whole Earth remains unresolved. Meanwhile, AI is becoming more capable of interpreting environmental data and assisting research. Its contribution to ecological health depends on how people use and govern it.

This issue connects those scientific questions with bioregional practice. It examines emerging projects, recent evidence about AI's influence on human judgment, and the material costs of computation. It also introduces a November 6 roadmap for ecological AI models. Our central proposal is to test whether transparent, locally governed AI improves collective decisions and ecological outcomes beyond what well-supported communities can achieve without it.

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1 Defining planetary intelligence

In their 2022 paper, Adam Frank, David Grinspoon and Sara Walker proposed that collective knowledge could become integrated into the functioning of planetary systems. Their framework distinguishes a technological civilization that controls its environment through a potentially mature technosphere that helps sustain the conditions for its own continuation. This is an evolutionary framework, not an established destination for humanity.[1]

Our initiative asks how biological, human and technological forms of intelligence might interact to help sustain a living planet. It also asks whether some capacities we hope to develop are already present in the biosphere. That possibility deserves investigation without assuming that planetary regulation implies a planetary mind.

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[1] Compiled by GPT-6. Edited by Jonathan Cloud. ©Possible Planet Lab & Institute for Planetary Intelligence 2026

For scientific purposes, we need to identify observable capacities such as information processing, memory, learning and coordinated response. **Intelligence, consciousness, and wisdom need be distinguished.** And intelligence cannoy be defined simply as whatever produces outcomes we favor; that would make the thesis difficult to falsify. Our commitment to serving life is an ethical orientation, alongside the empirical questions.

The urgency is concrete. The 2026 Planetary Health Check reports that seven of nine planetary boundaries have been transgressed. These boundaries indicate increasing risks to Earth-system stability. This finding strengthens the case for learning to respond more effectively.[2]

2 Learning and agency in living systems

The legacy of Lovelock's Gaia hypothesis directs attention to relationships between life and the maintenance of a sustainable environment. Didi Pershouse's February essay, "Layers of Intelligence in Living Systems," extends this attention to the ways living systems select, exchange, and respond to information. Her interpretation is a useful provocation: human judgment may depend on the health of relationships and environments that our institutions often disregard. It remains an interpretive essay rather than an experimental demonstration of planetary intelligence.[3]

Michael Levin's work offers a biological research program focused on collective cellular behavior, including the bioelectric coordination involved in development and repair. His 2025 synthesis explores how these processes can be understood through the language and methods of diverse intelligence. The biological phenomena and the broader interpretation should be evaluated separately; evidence of cellular coordination does not automatically establish ecosystem cognition.[4]

At the planetary scale, an August paper by Sergio Rubin and colleagues models a simplified biosphere–climate system using active inference, a mathematical approach to adaptive behavior. Under the model's assumptions, interactions between the biosphere and climate can maintain particular climate trajectories through disturbance. This is a proof of concept for minimal agency, not a finding that the actual Earth thinks or has intentions. A crucial next question is whether the framework makes testable predictions that distinguish it from alternative accounts of regulation.[6]

Attractive stories require scrutiny too. Karst and colleagues' analysis of forest fungal networks showed how selective citation and overinterpretation can turn limited findings into expansive claims. Recognizing living systems' sophistication should increase our curiosity without lowering our standards of evidence.[5]

3 AI for Earth observation and ecological prediction

AI is increasingly being connected to observations of the physical world. Google Research's October 14 account of its experimental geospatial agent describes a system that combines Earth models, spatial tools and planning to conduct multistep analyses and train predictive models. Four benchmarks and testing with a small group of partners support claims about analytical capability. These developer evaluations do not establish ecological benefits, and access remains experimental.[7]

A new November 6 Perspective in Nature Machine Intelligence proposes ecological foundation models. These would learn across different kinds of ecological evidence, potentially connecting species observations, genetic information, imagery and environmental measurements with ecological theory. Gardiner and colleagues emphasize evaluation, uncertainty and governance as part of the research

roadmap. They propose a direction for development, rather than reporting a completed model that understands ecosystems.[8]

A November 3 study offers a useful reality check. Wang and colleagues used AI-assisted geodesign to identify habitat and conservation priorities in Illinois. Their modeled plant component showed statistically significant but modest agreement with observations at 542 field sites. This is progress in connecting models to field evidence, while illustrating why impressive maps need independent ecological validation.[9]

A related One Earth proposal calls for more timely planetary-boundary indicators built from Earth observations and geospatial AI. Its emphasis on validation and uncertainty is essential. A regional model also needs to reveal what its data omits, where it performs poorly, and whether a prediction remains reliable under changing conditions.[10]

4 Bioregional intelligence in practice

For this initiative, **bioregional intelligence** means the capacity of people and institutions within an ecological region to combine scientific knowledge with knowledge gained through living and working in a place, make accountable decisions, and learn from their consequences for human communities and other life. Connected watersheds, habitats and cultural relationships can help define the region. Its boundaries should not conceal harms displaced elsewhere.

BioFi's November 3 "Beyond Extraction" event brought four approaches into the same conversation. The organizer's brief framed it as exploration rather than a showcase of finished solutions.[11]

Initiative	Contribution	Evidence boundary
Planet Labs	Satellite observations and machine learning to track environmental conditions.	Observation supports decisions; ecological benefit still depends on subsequent action.[11,16]
Regen Network	Compass is intended to connect ecological information with bioregional planning and investment.	A developing approach whose decision and ecological outcomes require evaluation.[11]
GainForest	Community observations, biodiversity monitoring, AI and funding for stewardship.	Project documentation describes community data governance; lasting outcomes need independent assessment.[12]
COBALT	A Living Atlas joining ecological knowledge, governance and local experience, initially for seagrass restoration.	Described as conceptual development and early prototyping.[13]

GainForest describes options for communities to host their own data or govern it through an elected data council. This is a concrete design choice about authority. More generally, a bioregional dashboard becomes useful only when people can act on its findings, contest its assumptions, and revisit decisions. A wetland map cannot determine who has rights to the land or who will pay for restoration.[12]

5 AI capability and independent human judgment

Two recent findings matter well beyond environmental applications. First, AI is becoming part of the process of developing AI. METR's November 5 assessment concludes that Anthropic's capability improvements on well-specified tasks are likely proceeding at roughly twice their March 2024–October 2025 rate. METR judges that AI-assisted research probably explains much of this acceleration, with substantial uncertainty. This is evidence from one laboratory, not proof of autonomous RSI (recursive self-improvement).[14]

The assessment also illustrates a governance tension. Independent evaluators obtained extensive internal access, but substantial evidence was redacted from the public report. Outside scrutiny is valuable; the ability of others to examine its evidential basis matters too. Capability acceleration increases the importance of evaluation without resolving how sufficiently independent oversight should work.[14]

Second, AI assistance can shape the judgments people believe are their own. In an October 27 Anthropic study, 50 professional analysts used an agent on a fictional agricultural policy task. The agent was secretly assigned preferences among defensible analytical choices. Analysts matched those preferences 86% of the time across four choices. Because researchers deliberately strengthened the agent's preferences, this is not an estimate of everyday deference. It does show why a human reviewer's presence alone cannot guarantee independent judgment.[15]

For a bioregional project, the practical response is to record people's initial criteria, show alternative assumptions, preserve disagreements, and check important conclusions against sources and field observations. More capable assistance should make reasoning easier to inspect, not merely easier to accept.

6 Aligning AI with life

Environmental understanding does not by itself determine what a system will pursue. Planet Labs' vision essay speculates that richer engagement with the physical world might help ground AI in care for life. That possibility should remain a hypothesis. A model could accurately describe ecosystem damage while helping an operator carry it out more efficiently.[16]

There are efforts to broaden the aims of AI. A September paper by Laurens Bliek and Elizabeth O'Neill considers how automated machine learning could incorporate interests extending beyond humans. Its contribution is theoretical. It helps articulate a design problem, but does not show that AI can already resolve conflicts among biodiversity, animal welfare, livelihoods and climate objectives.[17]

For our work, alignment with life means an explicit commitment to ecological functioning, human rights, and accountable decision-making. Communities must have influence over the questions, data and actions involved. Indigenous knowledge traditions should be engaged on their own terms, with authority over whether and how knowledge is shared. Adam Fish's research on space and energy infrastructures reinforces the need to examine how planetary ambitions interact with local rights and power.[18]

The material costs belong in that assessment. The IEA's October report finds that nearly 40% of identified AI-dedicated data-center capacity is located in areas with high or extremely high baseline water stress. This is a measure of location and capacity, not water consumption. Electricity, cooling and infrastructure

choices can impose costs beyond the region benefiting from an application. Any claim of regeneration needs to account for those effects.[19]

We should also challenge the assumption that better intelligence is the missing ingredient. Communities may already understand ecological problems but lack money, rights or political power to respond. AI may help organize knowledge without changing those constraints. A serious program must be able to recognize when the needed intervention is institutional or material.

7 A research commons and a first experiment

Possible Planet Lab's research agenda and the Institute's framing point toward a shared research commons: a network connecting scientists, restoration practitioners, communities and AI researchers. It could preserve sources, assumptions, predictions, disagreements and outcomes so that learning accumulates across projects. Access to community knowledge would remain subject to the authority of those who hold it.[20,21]

The Genesee–Finger Lakes bioregion offers a possible setting for an initial study. A willing local partnership could select a consequential watershed decision, such as where to prioritize riparian planting or wetland restoration within a real budget. This is a proposal for a pilot, not a report of one already operating.[21]

The hypothesis: adding a transparent, locally governed AI assistant to a well-supported participatory process improves ecological forecasts and decision quality beyond what the same process achieves without AI. This tests AI's additional contribution, separately from the benefits of convening people and supporting their work.

Start with comparable decision exercises, randomly assigning AI access where feasible while holding data, facilitation, time and budgets comparable. Specify success criteria and meaningful effect sizes before reviewing results. Assess forecast accuracy, errors, uncertainty, whose knowledge influences decisions, and whether participants can explain and challenge the reasoning. Independent reviewers should assess plans without knowing which process produced them.

If the approach proves useful, proceed to field trials with baseline measurements and credible comparisons. Track implementation, ecological indicators, livelihoods and costs over a period appropriate to the intervention. Publish failures and null results. If forecasts improve but decisions do not, investigate constraints on action; if AI adds no value, revise or reject the benefit claim.

Local success would still leave open whether learning transfers between bioregions and whether benefits persist. A network could share methods while retaining local authority, but coordination across boundaries would require its own tests. Our invitation is to identify a consequential decision in your region, the knowledge missing or excluded, and the evidence that would persuade you to change course.

Sources and further reading

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Related recording: BioFi Deep Dive Beyond Extraction. Project descriptions above are based on the organizer's brief and project documentation.

About Possible Planet Lab and the Institute

Possible Planet Lab is an inquiry and prototyping initiative of CRCS/Possible Planet exploring how AI can support ecological regeneration, community well-being, and responsible collective decisions. Its work includes AI integrity, regenerative livelihoods, and bioregional learning.

The Institute for Planetary Intelligence is a developing initiative incubated under Possible Planet and the Center for Regenerative Community Solutions. It seeks to connect scientific inquiry, ethical governance and practical demonstrations of intelligence in service to life. Researchers, practitioners, communities and supporters are invited to help shape this work. Contact us at our websites:

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