Community Marketplace Working Group Report

Wildfire Science & Technology Commons
October 2025

Executive Summary

The Community Marketplace Working Group is focused on defining a vibrant hub for community-contributed, ready-to-use, and well-documented tools and building blocks for scientific and operational workflows. Convened monthly from February through October 2025 to discuss a framework for badging, reviewing, and promoting Community Catalog listings through the Community Marketplace. Key discussions focused on best practice examples within the community (e.g., HuggingFace, AWS Registry of Open Data, etc.), and ideating around what information and governance structure would best facilitate badges, reviews, and promotion.

Working Group Members:

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- Nick Maggio, University of Oregon, Oregon Hazards Lab
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Working Group Analysis

<u>What gaps or unmet needs does the Marketplace fill?</u>

- Discoverability: Tool silos & brittle integrations: Agencies and vendors ship great solutions that are not easily discoverable in one single location or have badging and reviews in a common space that would enable easy decisionmaking. Vendors also rebuild what others have already solved. The Marketplace can assist with the public registry by providing badges around available solutions, and utilizing a standard way to share information about solutions.
- Non-reproducible workflows: Today, a gap exists with operating system versatility and version control (e.g., It worked on X's laptop or in last year's incident, but tools and results can't be replayed or audited. The Marketplace could help with examples of solutions in a public demonstration way that also explains how the solutions are managed to yield repeatable and understood pipelines.
- Interagency coordination barriers: Different jurisdictions, policies, and vocabularies stall joint ops. The Marketplace can help with common ways to display information through the use of the Community Catalog and governance to create a lingua franca across partners.
- Data manipulation overload: Organizations repeat ETL and reprojection processes multiple times because of inconsistent metadata, units, or CRS. The Community Catalog could facilitate shared data conventions and standard conversion blocks that remove duplicated prep work and inconsistencies

due to unit transformations and reprojections. Which in turn, the Marketplace can facilitate as the place of discovery of these products and their data.
- Benchmarking real-world value (ROI/impact): It is hard to quantify operational gains across utilities, insurers, and fire agencies, and for which operational use cases different tools are most beneficial. With common KPIs (latency, detection/forecast skill, mitigation ROI), the Marketplace could help with reporting uniformly across blocks and recipes, and identifying optimal solutions based on requirements and use cases.
- Opportunity for growth: the Marketplace will also help facilitate identification of gaps in the current wildland fire landscape around innovation and need.

What do other similar efforts to the Marketplace do well that we could learn from?

- AWS Data Exchange: Treat APIs and datasets as products with machine-readable specs (OpenAPI downloads), versioned revisions, and procurement hooks—useful for enterprise adoption.
- Hugging Face Hub: a public place where models, datasets, and tiny demo apps live as versioned repos with clear info pages ("cards"), tags, and licenses. You can search by task, preview many models in the browser, and copy ready-made code snippets to use them—while trust signals (downloads, maintainers, benchmarks) help you pick. Behind the scenes it's all git, so versions are pinned and results are reproducible, and teams collaborate with issues and org accounts. For your wildfire Marketplace, the takeaways are: require concise cards, strong tagging, and versioning; offer try-before-adopt demos and copy-paste usage; support org pages and leaderboards; and expose everything via APIs for automated installs and evaluations.
- Open Geospatial Consortium: OGC publishes open standards so maps, geo-data, and geo-APIs from different vendors work together. Older "OGC Web Services" (e.g., WMS for map images, WFS for vector features, WCS for rasters, WMTS for tiles) are widely supported. Newer OGC API standards are REST/JSON/OpenAPI style building blocks—e.g., OGC API-Features (query/edit features), OGC API-Tiles (web tiles), and OGC API-Processes (run geoprocessing jobs). For IoT, SensorThings API standardizes sensor/observation data. For portable files, GeoPackage is the SQLite-based OGC format. Using these lets agencies and vendors plug tools together without custom adapters.
- W3C PROV: is the Web standard for describing provenance—who/what/when produced a dataset or result, what inputs and steps were used, and who is responsible—so others can judge quality, trustworthiness, and reproducibility. It defines a common data model and serializations so different systems can exchange provenance uniformly.
- Github: Ability to share open code within a repository and ability to share private or restricted access code as well; open source code has usually a lower maturity and privatized code is higher maturity (validation for both); Github has a tracker for forking and illustrating use of code which is an opportunity for the Marketplace to illustrate use through reviews and workspace use.

What partnerships or collaborations could the Wildfire Commons pursue to launch the Marketplace

Launching and scaling the Wildfire Commons Marketplace will depend on forming strong academic, federal, and industry partnerships. Academic collaborators like the Sage Continuum, National Research Platform (NRP), and ACCESS bring world-class expertise in edge AI, distributed computing, and data-intensive science. These partnerships can accelerate innovation by enabling real-time sensor integration, scalable analytics infrastructure, and training programs that build technical capacity among researchers, agencies, and communities.

Federal partners such as the National Interagency Fire Center (NIFC) and the National Oceanic and Atmospheric Administration (NOAA) provide the operational backbone and authoritative data essential for wildfire planning and response. NIFC's coordination networks and incident data can help the Community Catalog and Marketplace align with national operational needs, while NOAA's weather, climate, and satellite data can drive predictive modeling and real-time analytics to support decision-making. These collaborations would ensure that the Marketplace is both scientifically rigorous and operationally relevant.

Industry partners, particularly utilities like PG&E, SDG&E, and PacifiCorp, offer critical opportunities for applied innovation and field deployment. With substantial investments in wildfire mitigation and situational awareness, these utilities can leverage the Marketplace for grid risk forecasting, operational dashboards, and real-time decision support. In turn, their infrastructure and operational data can help refine models and pilot advanced capabilities such as edge AI for early detection and risk assessment.

Together, these partnerships create a synergistic ecosystem that blends academic research, federal data and coordination, and industry operational needs. By aligning innovation with practical applications, the Wildfire Commons Marketplace can evolve into a repository of trusted modular, ready-to-deploy innovation blocks for wildfire resilience. Supporting the Wildfire Commons ability to be the space for wildfire innovation; accelerating collaboration, improving decision-making, and ultimately reducing wildfire risk across communities and critical infrastructure.

<u>What trends or changes could benefit the development of the Marketplace</u>

Shift Toward Open Science and Open Data: Federal agencies (e.g., NSF, NOAA, NASA) are increasingly mandating open access to datasets, models, and tools. This cultural and policy shift creates fertile ground for a community-driven Catalog which feeds into the Marketplace with transparent, reproducible contributions.

Growth of AI/ML and Model Sharing Platforms: The wildfire community can build on lessons from HuggingFace and other model hubs, where researchers now expect versioned, documented, and reusable components. As wildfire modeling grows more data- and compute-intensive, a shared Marketplace lowers barriers for communities to adopt advanced analytics.

Federal and State Wildfire Resilience Investments: Significant funding is flowing into wildfire prevention, response, and resilience under initiatives like the Bipartisan Infrastructure Law and Inflation Reduction Act. This creates both demand and resources for tools that are validated, discoverable, and field-ready, key functions of a Marketplace.

Community-Driven Innovation & Citizen Science: Growth of low-cost sensors, open-source geospatial tools, and community fire adaptation programs has expanded grassroots innovation. The Marketplace can serve as a trusted venue to surface and validate these community-contributed solutions.

Advances in Edge and Cloud Infrastructure: Cloud-native workflows, serverless compute, and edge AI capabilities are maturing rapidly. These make it feasible to deploy Marketplace tools in both enterprise-scale operations (utilities, agencies) and in resource-constrained environments (volunteer fire districts, community groups).

Priorities for Next Phase of Working Group

Priority #1: Define Marketplace Use and Adoption/Use Criteria

Review the examples of other Marketplaces (e.g. HuggingFace, etc.) and assess what adoption or defined use fields are crucial to list for each listing to complete. Additionally, recommend what is the minimum amount of information a listing should include to be deemed useful to the community for how a member of the community can use the listing while being compliant with any licenses or policies defined by the organization. Impacts include a well rounded process for intake listings in the Marketplace and better community use of the Marketplace.

Priority #2: Community Marketplace Identification & Implementation

The Wildfire Commons brings three pillars to every resource: **tagging for discoverability, badging for trustability, and community ratings for user feedback.** Activities include: Polish user experience related to tagging for search; Define the badges, criteria for each badge, and automated assignment processes; and finalize community rating mechanisms and feedback systems. Impacts would include a community that can easily filter and recognize high quality and high compliance listings.