CASS Impact Framework (Version 1 final)

Purpose and Principles

The purpose of the CASS Impact Framework (IF) is to provide a uniform, but flexible approach to gathering information to help CASS and its member organizations understand the status and progress made by supported software projects and the effect those improvements have had on each product's ability to enable scientific discovery. **Our goals are to help software teams improve your products, and to identify impacts and accomplishments that we can highlight to our sponsors and to our community. We are focused on improvements in the software products over time. CASS and its member organizations recognize that software products in the ecosystem may differ significantly in many respects, and we are *not* focused on absolute metrics or comparisons between projects.**

Structure and Guidance

The impact framework consists of three categories of software stewardship: **impact, sustainability, and quality**. The lines between these categories are fuzzy, and that's okay. The table below includes some prompts to help identify targets in each category, but they're not exhaustive. The important thing is to develop a process of continuous incremental improvement for your software. You can work on any or all of the three areas, depending on your project's needs and goals for the time period in question. *With the exception of incubated software, any feature development that you are seeking should focus on direct impact on these three sets of metrics and not on significantly expanding the scope of the software.*

In the table below, we are trying to capture both **progress** from the previous period as well as **plans** for the next period. We encourage you to use the **Productivity and Sustainability Improvement Planning** (PSIP) process for both the planning and execution of your stewardship efforts. **Plans should be consistent with the level of support you're receiving from your CASS member and should target issues that are important for your project.** It is great if you're able to leverage other funding sources to make additional progress in the impact, sustainability, and quality of your software. Feel free to report that progress too, but try to disentangle the funding and give appropriate credit. Also, we don't necessarily expect everything you've planned to work out, but please be forthright in reporting about it. Part of CASS's goal with the Impact Framework is to better understand what does *and doesn't* "work" for scientific software so that we can help the community in the long run.

We also ask you to identify **metrics** to help capture your progress or plans in each category (impact, sustainability, and quality). Again, **the purpose of the metrics is to help you manage your stewardship activities**, not for comparison with other software projects. Please identify a **small number** of metrics that you believe would help to gauge the progress of your stewardship efforts. Where possible, we prefer to use objective, quantitative metrics, but subjective,

qualitative metrics can be used where they provide the best assessment of your goals. The CASS Metrics Working Group is developing a list of suggested [metrics](#) that may be helpful. The following sections of the metrics report align with the reporting categories below.

Impact framework category	Most relevant metrics report sections
Impact	4.1.1 Software Citation and Adoption 4.1.2 Field Research Impact
Sustainability	4.2.1 Codes of Conduct (CoC), Governance, and Contributor Guidelines 4.2.2 Open-Source Licensing and FAIR Compliance 4.2.3 Active Maintenance 4.2.4 Engagement 4.2.5 Outreach 4.2.6 Welcomeness 4.2.7 Collaboration 4.2.8 Financial Sustainability 4.2.9 Institutional & Organizational Support 4.2.10 Project Longevity and Community Health
Quality	4.3.1 Reliability and Robustness 4.3.2 Development Practices 4.3.3 Reproducibility 4.3.4 Usability 4.3.5 Accessibility 4.3.6 Maintainability and Understandability 4.3.7 Performance and Efficiency

The list is not exhaustive, and is a work in progress – we're open to other metrics too. If you want to use something not on the list, please include a citation or link to details of the proposed metric(s) where possible.

Take the space you need to describe your software stewardship progress and plans. But we expect that it should take about 2-3 pages in most cases.

	Progress (during last reporting period)	Plans (for next reporting period)
Product name		
CASS catalog URL	https://cass.community/software/	
CASS member		
Period described		
Downstream ("Science") Impacts What scientific results or breakthroughs have been enabled by your software? How many science papers have cited or mentioned your software? Has your software or your team received any honors or awards?		
Impact What have been the improvements to your product to increase its usefulness to the research community? What improvements have you made to facilitate the adoption of your product by science		

applications or other software that have an impact on scientific research? Have you performed any outreach or training to facilitate the use of your product by the community? What improvements have you made to increase the discoverability and accessibility of your product by the community?		
Impact metrics Please identify a small number of metrics relevant to the progress or plans identified above; e.g., citations, evidence of increased adoption, number of training events offered, new software layered on or plugging into yours, awards or recognitions, etc.		

Sustainability This may include practices and improvements such as those to make the maintenance of the software easier, to make contributions easier, and to broaden the appeal of the software to more communities.		
Sustainability metrics Please identify a small number of metrics relevant to the progress or plans identified above; e.g., code complexity metrics, test coverage, contributions processes, bus factor, etc.		
Quality What practices have you recently adopted or extended to improve the quality of your product? (e.g., verification, validation, documentation, etc.)		

Quality metrics Please identify a small number of metrics relevant to the progress or plans identified above; e.g., test coverage tools and metrics, peer code reviews, requirements to tests mapping, etc.		