**NASA Biological Diversity and Ecological Forecasting Programs:**

**White Papers on Important Questions**

The NASA Biological Diversity and Ecological Forecasting programs have established a Working Group to support development of a report exploring the questions, challenges and opportunities for these programs over the next decade. The purpose of this report is to:

* Collect community input
* Identify the key scientific and applications questions relevant to the programs
* Suggest programmatic approaches to achieving these questions
* Convey (to all stakeholders) what these programs do

The report will be developed by a small and diverse group of experts based on input from the broad community. A key component of that input will take the form of brief “White Papers.” Although each of these is limited to a single page they are intended to reflect deeper thinking; the single page format will facilitate focused responses and will enable the group to assimilate the many submissions expected.

*The core of the report will consist of a small number of key, overarching questions that the two programs could address to advance the understanding and conservation of life on this planet.* Each question will be annotated with supporting information such as why addressing it is important, what observations and data products are needed, and the likely challenges.

*We are soliciting your ideas for these key questions.* Please use the attached template. You are welcome to submit more than one White Paper but **please limit each paper to only one question**.

Note also the following guidelines that define the “Parameter Space” within which your submissions should stay. This is important because the questions and how they are addressed need to be something NASA to which can respond.

**White Paper Parameter Space**

This parameter space provides the context within which the programs operate.

* NASA data: Because these are NASA programs their work must utilize NASA observations and model outputs
* Ecosystems covered: terrestrial, freshwater, and marine
* Biodiversity levels: ecosystems, species, and genes
* Impact: Each question should be central to our understanding of the natural world; for more applied questions, addressing them should lead to better decision making, management, and policy
* Risk: Thinking Big is good and thoughtful risks are fine and encouraged; high-risk activities may not make good candidates unless the potential value is also high
* Program relevance: ideally, questions should be relevant to both the Biological Diversity and Ecological Forecasting programs

**Background information:**

**The NASA Biological Diversity and Ecological Forecasting Programs**

These programs are focused on understanding and saving life on Earth. In case you are not familiar with them this summary will provide some context for the White Paper submissions.

*Biological Diversity Program.* The Biological Diversity research program uses NASA observations and models to improve our understanding of biological diversity, how and why it is changing, and its effects on and interactions with the Earth system. NASA explores patterns of biological diversity on land and in water using observations from satellites, airborne and seaborne platforms, and *in situ* surveys. These observations are well-suited for detecting such patterns, especially at the ecosystem level, but also at finer community and species levels. Through a combination of observations and models, NASA further seeks to identify the geophysical and ecological processes that result in the patterns of biological diversity our observations detect. This process-oriented research aligns the Biological Diversity research program with activities of other NASA Earth Science programs, such as efforts to track the biogeochemical cycling of elements like carbon and studies of the water cycle.

*Ecological Forecasting Program.* The Ecological Forecasting applications program promotes the use of Earth observations and models to analyze and forecast, with uncertainties captured, the impact of natural and human-caused changes affecting ecosystems, species, and genes. Primary users of program outputs are natural resource managers (freshwater, marine, and terrestrial) and people and organizations involved in conservation and ecosystem management. The program utilizes information from the physical, biological, and social sciences to develop products and tools that support effective resource management and improved resource policies. A key aspect of these products and tools is that they are specifically designed to be consistent with the target user’s needs and level of expertise, leading to an understanding of the root cause of change and facilitating an appropriate response.

**Instructions:**

* The template is mostly self-explanatory (questions? Please send to [gary.n.geller@jpl.nasa.gov](mailto:gary.n.geller@jpl.nasa.gov)). But a key aspect of every submission is to be both brief and focused.
* One question per submission, but you are welcome to make multiple submissions.
* If you prefer to remain anonymous, leave your name off the submission form. Although your name may be visible in your email response, the Working Group that assimilates the responses will only have access to the submitted form.
* If there are multiple authors and you cannot fit them in the space provided, include the author list in the cover email.
* Keep the “parameter space” in mind so that your thoughts and suggestions are something NASA can respond to.
* **Please respond by 14 December 2018** by forwarding your submission to nasawhitepaper@jpl.nasa.gov

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**White Papers on Important Questions**

Send submissions to nasawhitepaper@jpl.nasa.gov by 14 December 2018

*One question per submission; overall limit of one page, 10 pt font or larger. Multiple submissions okay.*

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| **Descriptive Title** *(100 characters max)***:** |
| **Author(s) and Affiliations:** |
| **Keywords to categorize the question:** |
| **The question** (*succinctly and carefully stated):* |
| **Objectives** *(what does the answer tell us that we need to know?):* |
| **Justification** *(why is answering this question important? What is its relevance to society and the program?):* |
| **Users and beneficiaries** *(who would use the answer and benefit from it?):* |
| **What is needed to answer the question** *(measurements, derived products, activities, outside dependencies…Be sure to keep within the “Parameter Space” described earlier. Please use bulleted list.):* |
| **Challenges** *(what could make it hard to do, e.g., algorithm maturity, accuracy, quantifying uncertainty, obtaining sufficient field data, sustainability, etc. Why has it not been done before? Please use bulleted list.):* |
| **Anything else** *(include any other thoughts or comments here):* |