Types of Information Required for Global Modeling and Forecasting

1) Physical and behavioral traits of …	
non-human living things.	
humans	… including health epidemiological reproductive metabolic linguistic other cultural [inferred] value systems
2) Human and other social groups, including cultural, social, and ethnic groups;	Social structures that define the actors of the model (cultural, social, and ethnic groups; provincial, national, international, and transnational political and economic units). Economic-political organization and behavior (including distribution of wealth and other resources).
3) Local, provincial, national, international, and transnational political and economic units;	
4) Human cultural and technological artifacts, including capital and capital infrastructure;	Human artifacts, technologies, and wealth creation potential (including capital and capital infrastructure)
5) Geophysical elements, including land masses, oceanic regions, the atmosphere, and the spatial environment of Earth;	Geological forces and conditions.
	Climatic, oceanic, and cosmological conditions.
6) Material, energy, and information flows among the elements in 2 through 5, including the movements of persons.	Interactions (material, energy, and information flows among relevant structures and elements).

In the above table, the two columns correspond to two alternative ways of subdividing / characterizing the scope of necessary for effective global modeling and forecasting.

Further discussion of information requirements

1. Improved data bases

While analytic and creative activities are essential to the aim of better forecasting, at the same time an adequate data base is a parallel and equally essential aspect. The requirements of this information aspect are, by themselves, quite demanding. They span a multiplicity of indicators for tracking a variety of global problem areas, as well as background indicators taken from six very broad substantive categories, describing continental, national, provincial, and local regions. Moreover, there is the need for indicators that are *reproducible* and *comparable* over broad spatial and temporal domains. That is, to the extent possible, we need to downplay the anecdotal and impressionistic, and to emphasize the development of information into scientific data. As these data requirements are met, the forecasting will return the favor by telling us, by its success or failure, whether the information accumulation efforts are on the right track. For this reason, the two aspects—data development and model development—are closely mingled.

2. Ecological (background) factors

There are, in addition, the great many factors that form the background or context for all the problems—facts about the world that must be taken into consideration to realistically evaluate problems and choose strategies for their alleviation. Specific facts can best be listed later, since much of what we choose will depend on what is already available, and/or the cost of acquiring them through original research. So this list should be formed as we proceed step-by-step through our own inventory of the information archives that already exist. We can, however, visualize six broad categories—the ones named in the left-hand column in the above figure—concerning:

1) Physical and behavioral characteristics of individual humans and of other living species;

2) Human and other social groups, including cultural, social, and ethnic groups;

3) Local, provincial, national, international, and transnational political and economic units;

4) Human cultural and technological artifacts, including capital and capital infrastructure;

5) Geophysical elements, including land masses, oceanic regions, the atmosphere, and the spatial environment of Earth;

6) Material, energy, and information flows among the elements in 2 through 5, including the movements of persons.

One can also observe that each nominally distinct problem areas forms a part of the context or environment for other problems, the point of the discussion about couplings.

3. Regions and other entities to be distinguished

It is wholly inadequate to maintain information only with reference to the Earth as an undifferentiated unit. One obvious reason is that conditions greatly vary from one region to another; a single global summary would conceal much of what we wish to keep track. Possibly less obvious, but equally important, is that it appears likely that *changes* in conditions significantly are driven by their *differences between one region and another*. For example, the contrast between rich regions and poor may be a powerful stimulus to the latter, in seeking to change the situation. Because, particularly in the political realm, the relevant differences in determining change often involve small regions (for instance, consider the impact of northeastern United States on the remainder of the world), and also because small neighboring areas may differ greatly in their response to change factors, it is important to subdivide the data to the greatest extent feasible, given the availability of information. (This will vary considerably, depending on the type of information. Also, the ability to benefit from information of great regional specificity will depend on the uses to which it is put.)

At a minimum, one should seek to subdivide at the level of nations and geophysical units such as islands and continents; and, where possible, this should extend to provincial and even local units. Subdivision should also be sought between differing ethnic, cultural and religious groups, even where their boundaries do not correspond to geopolitical boundaries. The implication is that well over a thousand regional subdivisions must be recognized by the Service.

4. Time period to be spanned by the information

We are accustomed to thinking that global problems are special to the present age, but are they? From medicine, we know that the symptoms of illness often appear long after the disease has begun; a period of incubation or latency must intervene between onset and outward appearance.

And we are aware that dangerous personal health practices may be continued for some time before the inherent risks produce serious results. Similarly, the present illnesses of the global system may be the culmination of a long historical period of latency or risk taking; and, in some instances, there is reason to believe that this is the case.

Getting a realistic picture of the world thus calls for the scope of information maintained by the Service to extend back into the past. This will help us identify the less obvious factors--processes, relationships, conditions, and practices --that may underlie our present difficulties. Another way of putting it is that detailed information of where the world has been will help us understand where, in detail, it is headed. Knowledge of the past will also help us identify those presently obvious factors *about which our understanding is wrong*. If we are effectively to deal with our problems, such historical insights must be part of our world picture; and the deeper the history, the more confidence we will have in the insights.

How deep is that? In part this depends on the availability and reliability of information, both of which decline rapidly prior to the present century; but availability also varies with the particular kind of information. Work at the University of Michigan has found that good quality data of use in understanding international war and peace, can be obtained from 1816 (the close of the Napoleonic Wars) onward. That information of very great historical depth is available, and may be worth having, is suggested by work done by people working in the world systems study area. See the World Systems Study entries in the Resource Directory. Data development of this depth is illustrated by the work of researchers such as Claudio Cioffi (Resource Directory, Correlates of war section) and David Wilkinson (World systems study and Homeokinetics sections).