

**ESTABLISHING INTERNATIONAL SCIENTIFIC COLLABORATIONS:
LESSONS LEARNED FROM THE GLOBAL BIODIVERSITY INFORMATION FACILITY**

Prepared by Mr. Eric James for the OECD Global Science Forum

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1. Introduction

The process of establishing the Global Biodiversity Information Facility (GBIF), beginning with a scientific concept and concluding with a functional organisation, followed a route that may have features common to many international scientific collaborations. A wide range of issues arose and these were resolved through a series of discussions and negotiations. It may be useful to document some of these issues, so that proponents of future collaborations, including those that arise from the work of the Global Science Forum, may anticipate them and perhaps avoid some potential difficulties and delays.

2. GBIF's mission and some key features

2.1 Introduction

GBIF's mission is to make biodiversity data and information available worldwide, making use of the scientific discipline of informatics¹. The growth of computing and communications capabilities makes it likely that collaborations of a similar nature, based on networking distributed facilities, will become more common in future. In order to judge the relevance and usefulness of the GBIF experience to any future collaboration, it is necessary to look briefly at GBIF's role and identify its key features.

2.2 An inherently international project

From its very beginnings, GBIF was conceived by its proponents as inherently international, i.e. not as an extension of any national activity. Thus, the project itself, and the extensive discussions that led up to it, were conducted on the basis of equality by representatives of interested countries. As is always the case with any worthwhile project, a small number of individuals, backed up by their domestic institutions, emerged to provide ideas, drive and vision. Nonetheless, GBIF does not represent the interests or agenda of any particular country. The international consultations and discussions began under the aegis of an established international organisation (OECD) and, once removed from that organisation, were pursued on a multilateral basis. Meetings took place at various international venues.

Inherently international projects are, in general, more difficult to organise and implement. On a national level, there are many established precedents, channels, procedures and funding sources. Sometimes, international partners can be brought in under the terms of national projects. On the international level, there are few established pathways for setting up international scientific projects². Typically, each proposed project, even if it is merely bilateral, has to be negotiated individually, as was the case with GBIF. It is hoped that this report can assist those embarking on a similar endeavour in the future, and that the final GBIF founding documents can be a useful template for new collaborative projects.

¹ For details see the GBIF Web-site at www.gbif.net Development of the Web-site was supported by the German Federal Ministry of Education and Research (BMBF) and the State Museum of Natural History (SMNS), Stuttgart, Germany.

² There are important exceptions, such as the regional programmes of the European Commission, or special-purpose arrangements such as the Human Frontier Science Programme (HFSP).

2.3 *Coordinating independent distributed projects*

GBIF has features that are unusual for a scientific facility, and these influenced decisions about its structure and method of operation. Perhaps the most important is that its principal task will be to coordinate work funded and carried out by other organisations. Its own activities will be modest in scale and designed to encourage and support work performed elsewhere. For example, GBIF will develop and promote voluntary database standards for improved interoperability of existing and new biodiversity databases. The draft GBIF Business Plan³ lists seven ‘thematic program areas’ for the facility, with estimated annual costs of US\$43 million. Very little of that money, however, will be provided through GBIF. Instead, GBIF will be linked closely with established programs and organisations that compile, maintain and use biological information. Resources and funding will be provided through existing national and international mechanisms. The governments of GBIF member countries will continue to control the funding of their national organisations and those organisations will then work with and through GBIF on a voluntary basis. The success of this approach depends upon the GBIF Secretariat building effective working relationships with national and international bodies, so that GBIF is able to work with a wide range of separate programs and projects. Initial contacts with other bodies (including Diversitas, Species 2000, the US Integrated Taxonomic Information System and the Clearing House Mechanism (CHM) of the Convention on Biodiversity (CBD)) were made even as GBIF was being set up, and relationships with these and other programs will be developed further.

2.4 *A wide range of activities*

GBIF is also unusual in the wide range of activities in which it intends to become involved. The draft Business Plan lists four strategic areas of work for the facility. As a scientific facility, GBIF will augment existing international biodiversity projects aimed at promoting data interchange and research into biodiversity by providing new algorithms, methods and software, as well as setting standards and identifying best practices. It will also contribute to scientific knowledge in the enabling discipline of biological informatics. As an outcome of this work, by improving access to biodiversity information at a global level, GBIF will provide natural resource managers and decision-makers with scientific information to underpin policy decisions about managing and preserving biodiversity resources. It will provide users and policy makers with data on particular species and thereby assist in resolving issues surrounding access and ownership. In this latter respect, GBIF will complement and support the work of the CHM and go some way towards providing the tools and information required by that body. As a further strategic objective, GBIF will meet the needs of developing countries for training programs and capacity building for curation, taxonomy and information management. GBIF therefore has both scientific and social objectives, a characteristic that may become more common as international collaborations deal increasingly with the application of science to global-scale issues, as well as the traditional acquisition of new knowledge. The socio-political elements of GBIF’s activities have attracted the widest range of interest and have given rise to the most contentious issues.

2.5 *Planning for a finite lifetime*

A further characteristic of GBIF that influenced discussion of its structure is the limited time that it may remain in existence. This is a characteristic GBIF shares with many collaborations that have clearly defined objectives. GBIF is at the beginning of its mission and a vast amount of work lies ahead of it. Nevertheless, once it has achieved its objectives, and a fully interoperable, global system for the exchange

³ Business Plan for the Global Biodiversity Information Facility, Discussion Draft version 5, prepared by an Australian drafting group for the Interim Steering Committee meeting in September 2000.

of biodiversity data has been created and it has become accepted practice to access biodiversity data through that system, there may be no further need for GBIF. There may be a need for continuing work in informatics, but the relevance of GBIF to future developments in that discipline cannot be foreseen. It has been assumed, therefore, that GBIF will be needed for about ten years and detailed planning has been focussed on the first five years. A limited lifetime has clear implications for the nature of any organisation that is created and it is generally considered to be good practice to include review and 'sunset' provisions in the founding documents of a collaboration. A clear view of the length of time needed to achieve an objective may influence many decisions. For example, it may mean that it is better to use an appropriate existing organisation to undertake collaborative work, rather than create a new one, although that was not the solution adopted in the case of GBIF.

3. The establishment process

3.1 Introduction

The establishment process for a scientific collaboration can generally be divided into three stages: building consensus about possible and desirable scientific outcomes, the design of an organisation that could achieve those outcomes, and an implementation stage when the design is put into practice. A consensus amongst scientists is necessary to convince political decision-makers that a new priority or capability has emerged and should be considered seriously. A detailed planning stage is needed to ensure that all foreseeable issues have been considered and that a sound design exists. As with any undertaking, a champion or champions, prepared to devote substantial time and effort to convincing others of the need for the new organisation or facility, are vital to ultimate success.

3.2 The role of the OECD as an incubator for GBIF

The starting point for establishing GBIF was an acceptance by scientists that technical developments in computing and communications had made it possible, in principle, to share biodiversity-related data and information in ways and on a scale that would significantly enhance scientific, social and economic progress. The goal was to create a practical means for making effective use of this new capability. These concepts had been discussed and broadly accepted with the scientific community as early as the mid-1980s⁴.

The first stage of the process that led to the establishment of GBIF was principally a scientific debate about how best to take advantage of technical developments in the new enabling discipline of informatics. Once this debate was concluded, proponents of GBIF faced the challenge of setting up a robust, adequately funded, international scientific collaboration that would have the support of governments. The alternative was to organise a network of like-minded researchers and institutions that could pursue the goals of GBIF as their existing time and resources allowed. A large number of such informal and semi-formal networks exist in numerous scientific fields. They usually involve some degree of task-sharing and coordination, as well as meetings and conferences, and exchanges of researchers, data and equipment. A network is relatively easy to set up, since no incremental funds or formal agreements are needed. Unfortunately, their effectiveness is limited for the very same reason. In the case of GBIF, the need for a dedicated formal arrangement was seen to be sufficiently compelling to justify raising the issues to an inter-governmental level, despite the anticipated difficulties and delays.

⁴ For example, at a meeting of the Taxonomic Databases Working Group held in Geneva in 1985 and at a symposium on Design for a Global Plant Species Information System held in Delphi in October 1990.

Unfortunately, there are few established mechanisms for bringing important scientific priorities to the attention of governments. One such mechanism is the OECD Global Science Forum (formerly the Megascience Forum). This intergovernmental committee provides a venue for discussions among senior science policy officials of the OECD countries. The Forum is a subsidiary body of the OECD's Committee on Scientific and Technological Policy. It meets twice a year and authorises subsidiary activities as needed across a wide range of scientific disciplines and generic issues relating to international cooperation. In January 1996, on the initiative of the U.S. delegation, the Forum established a Working Group on Biological Informatics. Three sub-groups were set up, one on biodiversity informatics, one on neuroinformatics and the other on intellectual property rights and ethics. Discussions took place between April 1996 and September 1998. The Working Group published a report containing the findings and recommendations of the sub-groups in January 1999⁵.

The report outlined the opportunities presented by biological informatics and identified both scientific and infrastructure issues that needed to be resolved. It also offered some guidance on how to proceed. Many of the key features of GBIF as it now exists, including the Governing Board and the Secretariat, were described in the report, and an Action Plan covering five years of activity was prepared.

Two of the issues debated in the Sub-group on Biodiversity Informatics were re-examined a number of times during the establishment process. The first was the degree of independence that would be appropriate and the second was the extent to which GBIF would act as a source of funds for the work it was promoting. These issues are examined in Sections 4 and 6 respectively.

This stage of GBIF's development illustrates the value of a forum within which scientific ideas can be discussed, and a consensus reached on the best way either to acquire new knowledge or to take advantage of a significant scientific development. Discussions of this type can benefit from being conducted, at least initially, within an existing organisation that has both resources and credibility. The initiative of the OECD's Committee on Scientific and Technological Policy in setting up the Megascience Forum, and its current successor the Global Science Forum, has provided an effective means of assessing the level of support for new scientific collaborations, of bringing together related proposals and of developing detailed plans that can then be taken up by interested countries.

3.3 *The detailed design stage of GBIF*

The scientific and technical discussions in the Megascience Forum were followed by a design stage, as proponents sought to address administrative, legal and political issues. An *Ad Hoc* Meeting on Implementation of the Global Biodiversity Information Facility took place in March 1999, still under the auspices of the OECD. It reached agreement in broad terms on the form and operational characteristics of the future GBIF⁶. The *Ad Hoc* Meeting agreed that detailed work should be continued in an Implementation Steering Committee, a name that was changed later to Interim Steering Committee (ISC).

A significant outcome from the *Ad Hoc* Meeting was a proposal that a forthcoming ministerial meeting of the OECD Committee on Science and Technology Policy issue a communiqué on GBIF. OECD science ministers, or their representatives, met in June 1999 and issued a communiqué endorsing a recommendation of the *Ad Hoc* Committee that GBIF be established as a body in its own right with open-ended membership⁷. As will be related below, a further endorsement by member countries and

⁵ Final Report of the OECD Megascience Forum Working Group on Biological Informatics, January 1999.

⁶ Ad Hoc Meeting on Implementation of the Global Biodiversity Information Facility (GBIF), March 24-25 1999, OECD Paris, Minutes of the Meeting.

⁷ The text is on the GBIF Web-site.

organisations was needed at the end of the establishment process. However, ministerial endorsement may have played a valuable role even after the discussions moved away from the OECD by keeping governments involved during difficult stages of negotiations, when they might otherwise have chosen not to continue active involvement.

Other important outcomes from the *Ad Hoc* Meeting were a proposal that an agreement to establish GBIF be based on the model of the Implementing Agreement of the OECD International Energy Agency (IEA), and a proposed scale of financial contributions. These are discussed in Sections 4 and 6.

The ISC carried the establishment process forward to the point where, fifteen months later, all the countries and intergovernmental organisations taking part reached agreement and endorsed a final set of documents. This was done at a formal intergovernmental meeting, hosted by the Danish Government and attended by delegates accredited by their governments. The principal document that emerged from this process was a non-binding Memorandum of Understanding (MOU) that set out the structure and method of operation of GBIF, its Governing Board and Secretariat, and defined the role of a Secretariat Host. The ISC also prepared a draft Business Plan, a Request for Proposals, which provided information for those countries intending to bid to host the GBIF Secretariat, and various letters and papers that were used to make governments aware of GBIF and invite their participation.

The final stage in the establishment process concluded in the Autumn of 2001. Denmark was selected as the host country for the GBIF Secretariat and an agreement was signed by the Danish Government and the Chair of the GBIF Governing Board. The Executive Secretary has been hired, and substantive work will begin before the end of 2001.

3.4 *Issues for consideration in international collaborations*

Could the process have been completed more quickly?

The whole establishment process has taken over five years. That is longer than many of the original proponents either wished or thought likely. The ISC intended initially to meet only once or at most twice. It took longer than expected to reach agreement, however, and the committee held four meetings between September 1999 and December 2000. Although ultimately successful, the ISC encountered some difficult and frustrating issues.

Looking back, it is possible to see ways in which time could have been saved, but these were not apparent in the early stages of the process. Even with the benefit of hindsight, it might not have been possible to compress the process by much. Governments need time to consider the issues that a new international collaboration raises, particularly when it is to operate in an area of political sensitivity, as is the case with biodiversity. Indeed, it has been said⁸ that the establishment process, particularly the work of the ISC, was commendably quick, given the political sensitivity of biodiversity and the failure of other biodiversity-related negotiations being conducted at the same time⁹.

Reconciling views

A factor that made the work of the ISC difficult and led to extended negotiations was the political sensitivity of any discussion of biodiversity. GBIF is not just a scientific collaboration, and work on biodiversity is not the preserve of wealthy countries, as is often the case for collaborations in other fields of

⁸ Views put by the French delegate at the third meeting of the GBIF Governing Board, Paris, September 2001.

⁹ For example, the Cartagena conference on the Biosafety Protocol.

science, such as astronomy or physics. While GBIF's work will be technical, the use that will be made of the biodiversity data and information that it will make available will be at least as much political, social and commercial as it will be scientific. The consequence of this was that the work of the ISC was of interest to sectors of government that would not normally intervene in a debate about scientific collaboration.

Early discussions in the ISC were complicated by the fact that some delegations were composed of scientists, while others included diplomats and other government officials. These people brought different perspectives and priorities to the debate. It is difficult to generalise, and many delegates had an excellent overall appreciation of the issues. Nevertheless, there was a tendency for the scientists to see issues in terms of what was needed to make GBIF work, while some of their non-scientific colleagues were concerned to ensure that GBIF complied with accepted rules and practices on matters such as, for example, voting rights for intergovernmental organisations.

Later in the process many delegations included representatives from areas of government responsible for science, the environment and foreign policy, and it is probable that most delegations carried briefings from all those areas of their governments. Assembling and reconciling views within countries may have been at least as difficult as reaching agreement in the ISC, and that needs to be borne in mind in considering the time taken.

A related factor that extended the time taken to complete negotiations was the large number of countries that participated, itself a consequence of widespread interest in biodiversity. Twenty countries and the European Commission took part in discussions in the Working Group on Biological Informatics. The *Ad Hoc* Meeting consisted of representatives of many of the same countries (thirteen of the original twenty, plus three new participants, together with the EC). Representatives of thirteen countries and intergovernmental organisations attended the first meeting of the ISC, but this number rose to twenty-eight by the fourth meeting. This is an unusually large number of countries or organisations to be involved in any single scientific collaboration. One consequence was to prolong discussion of almost every issue since, inevitably, new delegates raised issues that had already been extensively discussed in previous meetings. Simply allowing every participant to be heard led to extended debate at each meeting and the range of views presented took time to reconcile.

GBIF has been established despite this complicating factor. However, proponents of future collaborations should consider carefully whether it would be better for them to proceed, at least initially, with a smaller number of participants. A process of negotiation involving, say, a dozen delegations might be used to draw up the essential terms of an international scientific collaboration. These delegations might establish principles, procedures and documents that would then be acceptable to an arbitrary number of countries that subsequently decide to become involved in the work.

Issues likely to be of widespread interest should be identified as early as possible in a collaboration and a strategy should be developed to ensure that the views of interested parties are heard and taken into account. One approach is to involve all interested parties in negotiations to establish a collaboration. However, as suggested above, this may make the process unwieldy and other ways of consulting and securing support may be more efficient. GBIF addressed this issue to a degree by moving from a scientific debate to an intergovernmental process, initially making use of the OECD as a venue for scientific discussions with a policy dimension. Later it made use of Convention on Biological Diversity (CBD) processes to inform and seek views from a wide range of countries, including developing countries.

Should GBIF have been set up earlier as a pilot project?

Frustration at these probably unavoidable delays led to suggestions on a couple of occasions that GBIF should be established initially as a relatively short term pilot or demonstration program, so as to get some scientific activity underway while legal and institutional issues were sorted out. These suggestions were strongly resisted by some delegates, who felt that momentum would be lost, and unresolved issues could drag on indefinitely. This seems to have been a sound judgement towards the end of the process, when there is little doubt that much of what had already been agreed would have unravelled if an interim arrangement had been put in place. However, there is a question whether a different approach could usefully have been adopted much earlier, say by the *Ad Hoc* Meeting. One of the original members of the Megascience Working Group might have offered to set up a pilot program and GBIF could have been established in 1998 or early 1999 with a five-year mandate that included negotiations with all interested countries on the role and structure of a permanent or longer-term arrangement.

This is not an approach that would be appropriate or even possible for many types of international collaboration. For a telescope or a particle accelerator there may be no question of a pilot facility, but for collaborations based on networking and data sharing, and there may be an increasing number of these in future, a pilot or demonstration program may be an effective way of moving ahead quickly. One substantial advantage would be that the jurisdiction of location would be known and an agreement could be drafted, based on the domestic laws of that jurisdiction. A possible disadvantage is that other countries would not be strongly motivated to join a collaboration on terms defined by just one country, or a very small group of countries. Potential participants would also probably expect the host country to provide the bulk of funds for the project for an indefinite period.

Complexity and detail

The number of documents produced by the ISC was a concern to some delegates, who thought that inadvertent inconsistencies in wording between, say, the GBIF Memorandum of Understanding, the Declaration of Intent and the Letter of Invitation might lead to future disputes about the rights and commitments of participants in GBIF. Towards the end of the establishment process, efforts were made to simplify the documents and to use the same words throughout. It may be that all the documents were needed. Nevertheless, there is a lesson here for future collaborations. The need for each separate document should be examined critically and only those that have a clear place in the establishment process should be allowed.

Another way in which the process of establishing a scientific collaboration may be accelerated is by reducing the amount of detail that is included in the documentation. In GBIF's case, the process began with a document (the IEA's draft Implementing Agreement) that was already long and detailed. Much of the material in the Implementing Agreement was carried over into the draft GBIF Memorandum. At times, the Memorandum contained a great deal of detail about, for example, the way the Governing Board would conduct its business. Later in the ISC's discussions it was accepted that rules of procedure were best left for the Governing Board itself to decide.

The value of this later approach is given added weight by the fact that many of the details of the way the Secretariat will operate will flow from the domestic law of the country in which it is located. Some delegates were aware of this and there were suggestions from time to time that consideration of a number of matters should be postponed until the host jurisdiction had been chosen and domestic lawyers had drawn up a plan of what was possible. In fact that is what eventually happened. Towards the end of the debate on the GBIF Memorandum, text was included to allow some flexibility in meeting what had previously

been expressed as firm requirements¹⁰. This allowed bidding countries to set out in their bids the way in which GBIF's objectives would be met and the Secretariat would operate and be given legal identity in the bidding country. The ISC's deliberations might have been completed more quickly if there had been a wider and earlier acceptance of this approach.

As noted above, the main reason that the GBIF Memorandum was long and detailed, and arguably too prescriptive, is that it was based on the text of an IEA Implementing Agreement. The IEA has a responsibility for any work conducted under its auspices and, probably rightly, it places strict and detailed controls on the way in which the work is organised. If the GBIF Memorandum had been drafted *de novo*, or based on some other source document, it might have been less detailed and have left more matters to the judgement and discretion of the Governing Board.

The GBIF draft Business Plan is worth a special comment. This document was intended to provide a comprehensive description of GBIF: its origins, objectives, operational procedures and programs. In the event, very little use was made of the Business Plan. It was not discussed in any substantial way at meetings of the ISC and it was not updated during the concluding stages of the negotiations. Seemingly, this reflected a view within the ISC that time and effort were better spent on the Memorandum. However, proponents of future collaborations may do well to consider the value of having a single source document and using it as a reference point for the production of all other material. In principle this should be an aid to achieving consistency and ensuring that all relevant aspects of a collaboration have been addressed. Indeed, it has been suggested that more detail of the workings of GBIF would have been helpful, for example, in defining complementary roles for GBIF and other related initiatives¹¹.

Language issues

The negotiations to establish GBIF were conducted in English and all the documents are in that language. The question of alternative languages was raised several times in the ISC. There are two issues to be considered. The first is whether the business of a collaboration should be conducted in more than one language. This is normal practice in intergovernmental organisations such as the OECD, but probably not in scientific collaborations. The use of multiple languages adds considerably to the cost of running an organisation and for this reason it was not agreed to for GBIF.

The second issue is whether the founding documents should be in more than one language. In the case of GBIF, all formal documents, including the Memorandum and the Host Country Agreement, are in English. This has created some difficulty for at least one member country¹². Proponents of future collaborations might usefully anticipate this issue and consider whether a small number of key documents should be produced in more than one language.

¹⁰ See, for example, Paragraph 5.2(c) of the GBIF Memorandum, which says in part 'The bidders ... will be required to demonstrate their capacity to provide for institutional arrangements that conform to the closest extent possible, under their respective domestic law, with the criteria ... outlined in this MOU ...

¹¹ Private communication from the Inter-American Biodiversity Information Network (IABIN).

¹² The French delegate at the third meeting of the GBIF Governing Board, Paris September 2001 reported that his government has difficulty ratifying an agreement for which there is no formal French text.

4. The legal status of the organisation

4.1 The requirement for a legal identity

A key requirement in any complex international scientific collaboration is a body with a legal identity, able to undertake or manage the work program. Features of the work program that may require legal backing include employment of staff, purchase of goods and services and ownership of property. The ability to sue and be sued is generally necessary. Legal arrangements may also be thought desirable, if not strictly necessary, to ensure that participants make their agreed financial contributions and that the work is carried out in accordance with the participants' wishes. In the case of GBIF, the ownership and management of intellectual property is likely to require legal backing.

The way in which these legal requirements are met may be the most important factor in determining the structure of the organisation that is created, although other factors will also have to be taken into account. In the case of GBIF, questions of independence, effective control of programs and other activities, size, cost and effectiveness were woven into the debate about a suitable structure.

4.2 Ways of providing a legal identity

There are several ways in which the requirement for a body with a legal identity can be met. A new body can be established for the purpose of the collaboration by a legally binding agreement amongst the participants. If the participants are countries, this generally means a treaty-level agreement and the body created is an international organisation¹³. In most countries, treaty-level agreements must be ratified by the parliament or its equivalent and this can involve complex and time consuming procedures. A special purpose body may also be created by a civil contract amongst the participants. In this case, the body will probably be created in the country of one of the participants and be subject to the laws of that country¹⁴.

Alternatively, an existing body may take responsibility for the work. This leads to further options. The existing body may undertake the work itself, perhaps as an extension of its own scientific activities, it may contract the work out to one or more other organisations with the necessary facilities and competence, or it may establish a subsidiary body especially for the purpose. Successful examples of all of these approaches can be found.

There are practical advantages in making use of an existing organisation, either as a parent body, or to actually conduct the scientific work. Setting up a completely new organisation will always be a substantial task, the more so when a number of participants have to reach agreement on every aspect of its structure and operation. Using an existing legal identity, which already has the ability to employ staff and carry out a range of other functions, will often be an easier and quicker option.

4.3 The arrangement adopted for GBIF

In the negotiations to establish GBIF, several of these possibilities were considered. The model finally adopted provides a legal framework for GBIF's activities and responsibilities and it incorporates desirable features of both a new independent body and reliance on an existing organisation.

¹³ Examples of this are the OECD, and the various UN bodies. In the scientific domain, examples are provided by European bodies such as CERN, ESA, ESO.

¹⁴ An example of this type of arrangement is the European Synchrotron Radiation Facility, which has been established by several countries as a 'société civile' in France.

The Sub-group of the Megascience Forum showed a preference for a body with a link to the OECD, at least until GBIF was established and operating. The Sub-group was told that the OECD would be prepared to consider such an arrangement, subject to the agreement of member governments and to arrangements for funding that were independent of the regular OECD budget¹⁵.

The *Ad Hoc* Meeting considered three options: a new independent international entity, which would have required an inter-governmental or inter-agency agreement; a new working party of the OECD, and an activity based on an implementing agreement, modelled on the agreements used by the International Energy Agency. The last option was described as having an optional link to the OECD, although it should be noted that a link to some existing organisation is an essential feature of this model. The *Ad Hoc* Meeting reached tentative agreement on the third option, partly because it thought that this would be easier to implement than the first option and partly because it shared the view of the Sub-group of the Megascience Forum that there would be an advantage in retaining a link to the OECD, which could provide support in the early years. The second option seems not to have been supported by any participant.

The arguments for independence

As debate continued in the ISC, participants supported the view that GBIF needed to be an independent body. While they recognised the practical difficulties of setting up a completely new, independent international organisation, having to fend for itself from the outset, they held reservations about all proposed forms of dependence on an existing organisation.

Independence was an issue of particular importance and sensitivity for GBIF. A large part of all biodiversity data is held in OECD countries and they are the owners of biological collections that contain most of the world's biological specimens, while most of the species represented in those collections have come from non-OECD countries. The current world-wide debate about the conservation of biodiversity involves questions of ownership and rights of exploitation. The ISC believed that GBIF would be unlikely to win the wide support it needed if it was perceived to be associated solely with OECD countries. It was thought that such an association could make participation unattractive to developing and least developed countries, many of which could be both contributors to and beneficiaries from GBIF's activities. This line of reasoning is specific to GBIF and may not apply to other collaborations. However, political sensitivities could be relevant to other areas of science and this issue should at least be considered in every case.

Binding and non-binding agreements

Once it was decided that GBIF should be an independent organisation, not linked to any existing body, the implementing agreement ceased to be an appropriate model. However, much of the text of an implementing agreement had already been negotiated. So that this work should not be wasted, the text was carried over into a new document. The question then arose as to what type of document it should be. Arguments were presented for it to become a binding agreement in the form of a treaty between the governments of participating countries. This would have been structurally simple and the existing wording was appropriate for a binding agreement. As explained above, this would have led to the creation of GBIF as an international organisation and, as such, it would have had the legal powers needed to perform all its functions. Some countries, however, felt that the difficulty of securing ratification of a treaty, particularly in such a sensitive area as biodiversity, made this an undesirable course to pursue. The ISC decided, therefore, to proceed with a non-binding agreement, and to address the issue of legal identity in another way. The draft agreement was renamed a Memorandum of Understanding and text was added in an attempt to make it clear that it would not be legally binding on those countries that choose to sign it. This issue is addressed again below.

¹⁵ Reported in the minutes of the seventh meeting of the Biodiversity Sub-group, 4-6 September 1998.

Creating a legal identity

The need for a body with a legal identity and the wish to make GBIF independent were both addressed in the Memorandum. The Memorandum describes three bodies: the Governing Board, the Secretariat Host and the Secretariat. The Secretariat Host is an existing body with a legal identity. Its role is to provide the location, facilities and services needed by the Secretariat and it must obtain or provide legal status for the Secretariat¹⁶. The Secretariat requires a legal identity because it is the body that employs the staff, holds GBIF's funds and other assets and enters into financial contracts with participants guaranteeing their contributions. Some flexibility in implementing this arrangement is provided by allowing the Secretariat to be created either within the Secretariat Host or as a separate organisation and for the Secretariat to transfer responsibility for some of its tasks to the Secretariat Host. GBIF proponents resisted the notion of having the Secretariat Host undertake all of the legal responsibilities (as is the case in the IEA Implementing Agreements) because they wanted the GBIF Secretariat to have greater independence as a truly international operation.

As it turned out, all the countries that submitted bids to host the GBIF Secretariat chose to offer a Secretariat separate from the Secretariat Host. This common interpretation of the Memorandum was probably prompted by a view within the ISC that GBIF's activities should, as far as possible, be determined only by the wishes of the Governing Board and should not be influenced by the host country or the Secretariat Host. It is not clear whether this view would apply to other collaborations, or whether the ISC was particularly sensitive to the possibility of host country influence.

4.4 *Issues for consideration in international collaborations*

The solution adopted by GBIF provides the convenience of working through an existing body, the Secretariat Host, while creating an independent Secretariat, responsible solely to the Governing Board for the execution of the work program. The process of negotiating this arrangement raised a number of issues that should be considered carefully if a similar arrangement is contemplated in the future.

Legal identities in different jurisdictions

Although all four bidding countries offered a separate legal entity, the types of entities proposed differed. The successful Danish bid provides for the Secretariat to be established as an independent, international, non-profit tax-exempt organisation. According to Danish law it is possible to grant such a status (as well as accompanying immunity) to an international organisation that receives its income through membership fees from member states and which does not perform commercial activities. Other bidders proposed bodies established under their domestic laws without international status, although with certain taxation exemptions. Arrangements will always depend on the laws of the host jurisdiction and what is possible in one may not be so in others. There is, therefore, a case for deciding the host jurisdiction as early as possible in the establishment process, allowing agreements and other documents to be drafted in the knowledge of the law that will apply to them. In GBIF's case, while this argument was made in some of the early discussions, ultimately greater importance was attached to an open bidding process once all other matters had been settled.

¹⁶ In the event, legal status for the Secretariat and also for the Governing Board has been provided by the Danish Government, rather than by the Secretariat Host.

Drafting and interpreting agreements

The question of what constitutes a binding agreement is complex and the meaning of the term may vary from one country and legal jurisdiction to another. Even if consideration is limited to agreements between governments, there is a range of possibilities. An agreement that is accorded the status of a treaty, requiring the approval of parliament, in one country, may be approved by executive action in another. An agreement that is seen by one country as committing it only to use its best efforts to comply may be interpreted elsewhere as having much greater force. This needs to be borne in mind in drafting and negotiating text. In GBIF's case, not all countries regarded the Memorandum as non-binding. Some decided that it still required some form of official ratification. For this reason, the final meeting of the ISC was an 'accredited meeting'. As described above, this meant that the governments of participating countries had to provide official advice to the government hosting the meeting (in this case, Denmark) nominating their delegate and empowering the delegate to agree to the text of the Memorandum.

Whatever options are adopted, drafting any international agreement is a complex task. This is true of both binding and non-binding agreements. Although GBIF used an existing text as its starting point, considerable time and effort were needed to convert the draft Implementing Agreement into a suitable non-binding document. In planning any future collaboration, adequate time should be allowed for drafting and negotiating the text and provision should be made for expert legal advice at all stages of the process.

5. Governance and the structure of GBIF

5.1 Factors influencing decisions on structure

The previous section has described the influence of legal requirements on the structure of the organisation. It was noted (in Section 4.1) that other factors were taken into account in deciding the structure and some of the more important of these are considered here. The structure adopted and set out in the GBIF Memorandum has already been referred to briefly in the discussion of creating a legal identity (Section 4.3). The Memorandum describes three bodies: the Governing Board, the Secretariat Host and the Secretariat. It also describes and assigns responsibilities to an Executive Secretary. These are discussed in more detail below and some issues of general relevance are brought out.

5.2 The Governing Board

The GBIF Governing Board provides the means for Participants to make collective decisions on all matters relating to GBIF¹⁷.

The powers of the Governing Board

The Governing Board has been established and conducts its business in accordance with provisions in the GBIF Memorandum. However, this is a non-binding agreement and it confers no actual legal powers on the Governing Board. There are other examples of collaborative activities, including international collaborations, governed by a body that has no ultimate authority to enforce its decisions¹⁸. This arrangement works as long as participants continue to share common goals and objectives, and to provide the needed funds. It can be argued that, if that commitment is lost, the collaboration is at an end no matter what power the governing body may have. On this view, the essential requirement is not that the

¹⁷ Memorandum of Understanding, Paragraph 4.1.

¹⁸ See, for example, the Intelligent Manufacturing Systems program or the Human Frontier of Science Program.

governing body have power, but that the operating agency, in this case the Secretariat, be responsive to the wishes of the governing body and have, itself, the legal power to carry out the functions for which it was established.

In the case of GBIF, an agreement has been entered into by the host country, Denmark, and the Governing Board¹⁹. This confers legal status on the GBIF Secretariat (Article I) and provides GBIF itself, acting through the Secretariat, with a juridical personality and capacity (Article III). This agreement is to be supplemented by one between the Secretariat Host and the Governing Board, covering the provision of services to the Secretariat. These agreements appear to give the Governing Board all the power that it will need to direct GBIF's affairs. In addition to this, a legally binding relationship between individual participants and the Secretariat will be established by contracts covering financial contributions to GBIF.

There are other ways in which the Governing Board could have been given power to direct GBIF's activities. For example, the Australian bid proposed to establish the Secretariat as a company under Australian law, with the individual members of the Governing Board being appointed as directors of the company. The board of directors would then have been a surrogate for the Governing Board. Other bidders may have intended to put in place arrangements that would have achieved the same effect.

Membership of the Governing Board

The Governing Board has several categories of membership. While these have been developed to meet the particular needs and circumstances of GBIF, other collaborations may have occasion to make similar arrangements. The Governing Board consists of one representative of each Participant, where a Participant is defined in the GBIF Memorandum as 'the country, economy, organisation or inter-governmental organisation, or the entity designated by a country, economy or inter-governmental organisation, that has signed this MOU and has expressed its intention to observe the provisions herein'. A distinction is made between Voting Participants and Associate Participants, where Associate Participants are those that 'have not decided to make a financial contribution'. This definition could include those countries etc. that have decided not to make a financial contribution (i.e. they intend never to contribute), as well as those that have not yet decided whether to make a contribution (i.e. they are assessing whether or not to become voting members). Associate Participants may not vote on the Governing Board.

There is a further category for Additional Participants. This is to include a non-voting representative of the Secretariat of the Convention on Biological Diversity (CBD). It may also include representatives, voting or non-voting, of other organisations invited by the Governing Board to take part in its deliberations. The relationship with the CBD is worth comment as it was referred to at various times throughout the meetings of the ISC. There was a range of views within the ISC as to how closely GBIF should be associated with the CBD. Some countries wanted GBIF to work alongside the Secretariat of the CBD, particularly with the CBD's Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) and the Clearing House Mechanism (CHM). Others were concerned that GBIF could be caught up in political issues if it became too involved with the CBD to the detriment of its scientific mission.

A close and supportive relationship with the CBD was a feature of the negotiations to establish GBIF. A representative of the CBD's Clearing House Mechanism attended early meetings of the ISC and a number of opportunities were used to inform and win the endorsement of CBD agencies and member countries. Representatives of GBIF made presentations at the fifth and sixth meetings of the SBSTTA in January 2000 and March 2001, and at the fifth meeting of the CBD Conference of the Parties in May 2000. The

¹⁹ Agreement between the Government of Denmark and the Governing Board of the Global Biodiversity Information Facility relating to the location of the Secretariat of the Global Biodiversity Information Facility in Copenhagen, done and signed in Paris on 11 September 2001.

discussions at SBSTTA5 were particularly productive and led to a reference to GBIF in a SBSTTA recommendation to the CBD on cooperation with other bodies²⁰. Representatives of the SBSTTA Bureau attended later meetings of the ISC, thereby ensuring that the views of developing countries were taken into account as final changes were made to the GBIF Memorandum.

The category of Additional Participants can include non-government organisations and a number of such bodies²¹ have accepted invitations to become Associate (i.e. non-paying and non-voting) Participants. These include some major organisations whose cooperation is likely to be vital to GBIF's success.

Voting procedures

As noted above, a collaboration in which membership is voluntary has to proceed largely by consensus. It follows that detailed arrangements for voting on different types of issues may not be necessary. The ISC spent some time debating the levels of voting support that would be appropriate for decisions of the Governing Board. At one stage in its development, the GBIF Memorandum set out in detail the votes that would be needed for many of the Governing Board's functions: a simple majority for some, a super-majority (two thirds of those present and voting) for others and unanimity for the most important. The final version of the Memorandum is more sparing in its directions, but contains an overarching direction that the Governing Board 'should strive to work by consensus whenever possible'. This direction is repeated in the section of the Memorandum that deals with the Governing Board, with the qualification 'Except where mandated that the decision must be made by consensus, if consensus cannot be reached after reasonable attempts have been made, then approval by super-majority of those present and voting is required'.

Two considerations led the ISC to move away from detailed directions on voting procedures. The first was a recognition that participants with shared objectives should have a common view on most of the issues they have to address, or at least be able to reach a common view after reasonable discussion. If they do not, there is a serious problem and, given that membership is voluntary, the collaboration may be in danger of dissolving.

The second consideration that led the ISC to drop directions on voting on most issues was the view that a planning body such as the ISC should not prescribe in undue detail the operating procedures of the organisation it is designing. It was argued that the Governing Board itself should be allowed to decide its own rules. There was a good deal of support for this view and it led to substantial parts of early drafts of the Memorandum being excised and transferred to draft rules of procedure, which were then left for the Governing Board to consider and amend as it saw fit. This is a principle that might guide the development of other collaborations.

The most significant vote taken by the Governing Board so far was that on the selection of a Secretariat Host. The Memorandum does not specify the majority needed to make this selection and so, technically, the stated objective of seeking to reach a consensus applied. However, although this was an important decision, it was never likely that consensus would be reached and there were no expectations that it would be. For this decision, the Governing Board agreed that a super (two-thirds) majority would suffice. The Danish bid was approved by twelve votes to six, meeting this requirement. It will be interesting to see what levels of agreement are achieved on matters where there should be something close to a common view, such as the work program and the budget.

²⁰ SBSTTA 5 sent the following recommendation to the CBD: (to) encourage the development of GBIF in conformity with CBD, asks the CBD to participate in GBIF's implementation, and invites GBIF to include as many countries as possible in its development and implementation.

²¹ See the GBIF web-site for current membership.

5.3 *The Secretariat Host*

A continuing motivation of participants in the various negotiating meetings was to create the minimal new structure that would accomplish the scientific goals. Throughout their discussions there were references to the need for a lean and efficient organisation, able to achieve GBIF's objectives at the lowest possible cost. This was seen as requiring a small, dedicated secretariat team of full-time professional staff, under the direct control of the participating countries.

In order to allow the staff of the Secretariat to concentrate their efforts on scientific rather than administrative matters, it was decided to make use of a Secretariat Host, an existing organisation with the capacity to provide personnel, finance, accommodation and maintenance services, either directly or through contracts with third parties.

The GBIF Memorandum specifies that the Secretariat Host will provide the location, facilities and services agreed to in an arrangement between it and the Governing Board²². Some flexibility is allowed by saying that the services may cover staff management, financial management, accountancy, legal assistance, etc. There is also some flexibility allowed in providing accommodation and obtaining or providing legal status for the Secretariat.

This arrangement is a departure from the implementing agreement model proposed by the *Ad Hoc* Meeting. Setting aside the proposed role of the OECD as the equivalent to the IEA, the implementing agreement would have provided for an Operating Agent as the organisation that accepted and held the financial contributions of the participants and managed the work program. In the IEA model, the Operating Agent may be a new body created for the purpose, but is almost invariably an existing organisation that takes on additional responsibilities for an agreed period of time. IEA collaborations are generally smaller than GBIF and their work is completed more quickly than the ten years envisaged for GBIF to complete its programs. It is therefore generally not worth creating a new body.

The agreement entered into by the host country, Denmark, and the Governing Board creates a new international organisation, the GBIF Secretariat. This arrangement emphasises the independence of the Secretariat and places it at arm's length from the Secretariat Host, the Zoological Museum of the University of Copenhagen.

A further advantage of having both a Secretariat and a Secretariat Host lies in the perception, and possibly greater assurance, of independence from the host country. The proponents of any future collaboration who choose to draw on GBIF's experience should consider carefully whether the factors that led to this separation of functions in GBIF apply in their case.

5.4 *The Secretariat and the Executive Secretary*

The Secretariat consists of an Executive Secretary, who acts as the chief executive officer of GBIF, and sufficient staff to undertake the GBIF work program. It has direct responsibility, through the Executive Secretary, to the Governing Board²³.

Although the idea that the Secretariat should be as small as practically possible and not burdened by administrative responsibilities was a constant theme throughout the negotiations to establish GBIF, when the time came to bid to host the Secretariat there was still some latitude in both the Memorandum and the

²² Memorandum of Understanding, Paragraph 5.1.

²³ Memorandum of Understanding, Paragraphs 6 and 7.

draft Business Plan, and bidding countries interpreted the requirements in slightly different ways. There is no simple answer to the question of how much work the Secretariat should undertake itself and how much it should leave to other organisations, relying on its ability to coordinate the work of those other organisations.

The size of the Secretariat was a factor that differentiated the competing bids to host the organisation. The opposing arguments were that the Secretariat should be as small as possible, so as to create the largest possible pool of seed funds to support the work program, and that the Secretariat should have some capacity to undertake research, a capacity that GBIF needs if it is to influence the direction of biological informatics elsewhere. Both approaches are defensible. The first allows GBIF to leverage sources of funding in member countries and in that way to exert influence over the work that is done and the access that is granted to it. This is an approach used by many research-granting schemes. The other argument is also sound and there are legitimate concerns about the ineffectiveness of some existing international secretariats that have only administrative capabilities.

5.5 *Issues for consideration in international collaborations*

A central or a distributed secretariat?

A threshold question considered by the *Ad Hoc* Meeting was whether there was a need for a central secretariat. Given that GBIF is to be a distributed facility, with nodes in each member country and organisation, it would have been possible to provide secretariat services in a number of locations, perhaps working through the nodes or a series of regional secretariats. The *Ad Hoc* Meeting discussed this issue and there was general support for setting up a single body, at least initially. The possibility of spinning off projects from the secretariat was noted and there was a suggestion that the secretariat might be moved from time to time. The ISC did not question the need for a central secretariat and did not pursue the idea of a rotating location²⁴.

For other collaborations that involve networking, a distributed secretariat may be a better option. The key factor in deciding this issue may be the extent to which relevant facilities already exist in all or most of the participating countries. Part of the reason for establishing GBIF is to encourage the creation of a biological informatics capacity in countries that do not already have this, so the case for distributing secretariat support is not strong. That may not be the case for other international collaborations and the advantages and disadvantages of such an arrangement should be examined carefully case by case.

6. Funding

6.1 *Introduction*

Science budgets are tight in all OECD countries, and it is always difficult to find funds for new projects. Nonetheless, it was felt that GBIF was not worth establishing if it could not have sufficient resources to finance a small full-time secretariat and a modest initial work program. The discussions focussed on two key interlinked issues: how big should the initial budget be, and how should the contributions be assessed among the participating countries?

²⁴ There are precedents for rotating the location of a secretariat amongst members. See, for example, the Intelligent Manufacturing Systems program.

6.2 *The size of the GBIF budget*

It was agreed from the outset that GBIF would coordinate activities being conducted by other agencies or by countries, but there was debate as to whether this should be its sole function. One option was for GBIF to rely entirely on its ability to persuade other agencies to adopt its objectives. An alternative was for GBIF to provide funding for work to be conducted elsewhere. In the latter case, there were choices between GBIF serving as a major funding agency for biodiversity informatics throughout the world, or serving only as a source of limited seed funding. The preference in early discussions was for the seed-funding model and this view persisted, largely unchallenged, throughout subsequent negotiations.

The Working Group on Biological Informatics made some broad suggestions as to the cost of operating GBIF. It estimated that US\$3.0 million a year would be needed for the salaries and direct operating costs of the Secretariat and suggested that approximately another US\$4.0 million a year be taken from a range of existing and planned international programs and administered by GBIF in the form of seed money and peer-reviewed grants. The *Ad Hoc* Meeting accepted this estimate and debated ways in which US\$30 million might be contributed over five years (it was assumed that the full US\$7.0 million would not be needed in the first few years).

In the ISC, the overall budget for GBIF was debated several times. It was agreed eventually that the minimum commitment needed to start GBIF would be US\$2.0 million a year²⁵. GBIF is an unusual project in the amount of flexibility that attaches to the necessary or desirable level of funding. Although the GBIF Secretariat and its work program constitute a medium-scale collaboration, as discussed above the intention is for GBIF to take an active role in coordinating a number of much larger activities. Estimates of the cost of all the work to be performed over ten years in biodiversity informatics are of the order of US\$500-750 million, with GBIF involved in or associated with a large part of this work. Other international scientific projects form small parts of large scientific undertakings, but GBIF is different in that its rationale is that it will be able to influence a large amount of work for which it will not be directly responsible. It follows from this that GBIF could be as small or as large as its participants wish to make it. It could be just a secretariat of no more than half a dozen people, relying on persuasion to develop a consensus within the biodiversity community to allow it to coordinate other national and international programs. Alternatively, it could be a much larger activity, with its own in-house capacity to develop software tools and manage databases. The estimate of US\$7.0 million a year made by the Working Group and accepted by the *Ad Hoc* Meeting included seed money and grant funds. The level of funding to be provided for these purposes is entirely at the discretion of GBIF members. Clearly, this condition may not apply to other collaborations.

As of late 2001, it appears that GBIF will receive income of significantly more than US\$2.0 million a year. This income may well increase substantially once GBIF commences operation and the benefits of membership can be demonstrated. The Governing Board will have to decide how to allocate the additional funds. Presumably it will be guided by earlier proposals based on an income of US\$7.0 million a year, although an alternative would be a further reduction in the level of some or all the contributions.

²⁵ Paragraph 11.1 of the GBIF Memorandum says 'GBIF will come into existence ... when at least ten Participants have signed the MOU and the sum of the contributions they have pledged totals at least 2 million US dollars (a year).

6.3 *Contributions to the budget*

Sharing the cost

There is no single best way of dividing contributions to international collaborations between countries. The options include flat fees and sliding scales based on GDP with and without caps on the maximum contribution of any one country and with and without a flat basic component. The *Ad Hoc* Meeting considered all of these. The flat fee option received little support and discussion then focussed on various forms of sliding scales. The *Ad Hoc* Meeting eventually agreed to break the sliding scale into five discrete levels of contribution, ranging from US\$50,000 to US\$700,000 a year, each applicable to a range of GDPs. The sliding scale of contributions was to apply only to OECD countries. The minutes of the meeting record that non-OECD countries could be Associate Members with a vote by paying the smallest amount, or Associate Members without a vote by maintaining a national node for GBIF and participating in GBIF-linked activities²⁶.

The ISC made substantial changes to the scale of contributions proposed by the *Ad Hoc* Meeting. Apart from concerns about the overall cost of GBIF, arguments were advanced that the scaling proposed was inappropriate and imposed an undue burden on medium-sized economies. Clearly, rates of contribution, and particularly relative levels, can be contentious and time consuming to resolve.

Matching income to needs

Consideration was given to expressing contributions as a percentage of the GBIF budget, rather than as dollar amounts. This approach, which would have been consistent with practice in many international organisations, has the advantage that income and expenditure are always in balance. There was support for this approach in the ISC and some delegations felt that GBIF should move to such an arrangement in a few years' time. Initially, however, with no clear indication of the number of countries that would join GBIF, it would have created considerable uncertainty as to the amount members would have to pay, and hence difficulty in seeking funds from government or other sources, and it was decided to stay with fixed contributions.

6.4 *Other sources of income*

GBIF has other sources of income, both actual and potential. Countries bidding to host the Secretariat were expected to meet part of the cost of doing so. The successful Danish bid included in-kind contributions in the form of serviced and maintained accommodation. This was not assigned a precise monetary value in the Danish bid, but it will be an important contribution to the total operating costs of the Secretariat. Other countries were willing to offer substantial amounts (up to a million dollars a year) for the privilege of hosting the Secretariat because of perceived benefits to domestic scientific activities. All members of GBIF are committed to establishing nodes and bidding countries may have felt that the national node of the host country would benefit from working closely with the GBIF Secretariat. More generally, bidders felt that there would be stimulating interaction between Secretariat staff and local scientists and information technologists. This may be a general conclusion. An international collaboration will almost always benefit the host country and it is reasonable to expect that a premium be paid, above the level of contribution that would otherwise apply, in recognition of this.

²⁶ The meaning of the term 'Associate Member' changed during the course of negotiations. The GBIF Memorandum does not recognise a category 'Associate Member with a vote'.

The GBIF Memorandum provides for members to make additional contributions. These may be reserved for designated purposes, such as supporting travel by representatives of developing countries to Governing Board meetings. At this early stage there is no indication whether this provision will be used. GBIF is expected to seek additional funding for its programs from foundations, international organisations and other sources.

6.5 Issues for consideration in international collaborations

The value of seed funding

The question whether a facility should provide seed funding will not arise in the case of collaborations based on substantial new equipment or facilities, but the concept of leveraging activity through the selective and judicious use of small amounts of funding might have wide application when use can be made of existing facilities. The effective use of seed funding may well be the key to GBIF's success, as it will allow the organisation to leverage much larger sums of money through major national and international research programs.

In-kind contributions

Participants in scientific ventures commonly make in-kind contributions. Such contributions were discussed by the ISC, where it was asked whether this would be an acceptable way for members to meet part of their financial obligations. Several delegations expressed strong reservations. The main concern was that GBIF might find itself without sufficient cash to meet the cost of maintaining the Secretariat. It was also pointed out in the ISC that it is difficult to place an accurate value on an in-kind contribution and this could result in members not meeting their full commitments. There is no provision in the Memorandum for in-kind contributions.

For GBIF, salaries and staff related costs such as travel will form a major component of the budget. For other collaborations this may not be the case and the question of how much can be accepted in the form of in-kind contributions will have to be decided case by case.

7. Intellectual Property Rights

Intellectual property rights (IPR) are of particular relevance to an organisation that deals primarily in data and information and in computer software. This was recognised at the outset and IPR was one of the first subjects chosen for detailed development. An informal discussion paper was prepared by the delegation of the European Commission for the *Ad Hoc* Meeting addressing data ownership, access and contractual arrangements. Legal experts in Australia developed a further paper providing advice on these and other issues for the ISC and a section of the GBIF Memorandum was drafted to reflect this advice.

Some important issues were raised and addressed in these discussion papers. The interaction between IPR and biodiversity has been controversial and GBIF will have to operate in a full knowledge and understanding of the difficulties that have arisen in the past, as these could affect its own activities. A positive view of this situation, however, is that GBIF has the potential to make a useful contribution to improving relations between owners or providers, and users of biodiversity data. It could do this by facilitating an equitable sharing of the benefits of biodiversity, already part of its objectives, and by acting as an example of good practice in its own management of IPR.

GBIF may be involved in IPR at several levels. It will deal primarily with databases and software tools. The databases that it deals with may be the subjects of IPR or other forms of protection (e.g. the EU

database directive, US legislation or a possible WIPO database treaty) and the data contained in the databases may, separately, also be the subjects of IPR. In most if not all cases, however, the databases and the data they contain will have been developed by other organisations. GBIF's role is to encourage and facilitate their free dissemination, and to do that it should not need to assert any IPR in such material. GBIF should, if possible, know what protection applies and it will be important for GBIF to make clear to its users that providing them with access to data or databases does not imply any right to make use of them without the permission of the data owner. GBIF may develop or commission software tools. It may commission or itself create new databases. It may possibly commission the collection of data. Consistent with its mission, in these cases it will seek to place the material in the public domain. These conclusions are reflected in the approach set out in the GBIF Memorandum and this forms an excellent example for other collaborations to follow.

8. Relationships with other bodies with related interests

There are many opportunities for helpful cooperation between GBIF and other bodies with interests in biodiversity, biological informatics and various aspects of biological research, particularly in the area of taxonomy. Creating effective relationships between GBIF and other bodies with related interests was recognised as an important issue early in the establishment process, and efforts were made to identify such bodies, to inform them of GBIF and provide opportunities for their views to be heard and considered in its development. A paper listing and describing some of the bodies known to have related interests was prepared and this served as a useful reference document for the ISC²⁷. Membership in GBIF is open to intergovernmental and non-governmental organisations and their designated entities, and already several such bodies have taken up associate, non-voting membership of GBIF²⁸.

The relationship with the Convention on Biological Diversity (CBD) is particularly important and is referred to above in the discussion of membership of the Governing Board (Section 5.2) and again immediately below in the account of the involvement of developing and least developed countries (Section 9). Representatives of the CBD and its agencies attended meetings of the ISC; and representatives of the ISC (and, more recently, the Governing Board) have attended meetings of the CBD and its agencies. Discussions have been successful and have strengthened the activities of both GBIF and the CBD²⁹. As more intergovernmental and non-governmental organisations become members of GBIF, the opportunities for such mutually beneficial cooperation will increase.

The relationships that have been established with other bodies are specific to GBIF and will not necessarily be relevant to other international collaborations. They are therefore not described in any detail here. The general point may be made, however, that no area of science exists in isolation from all others and any international collaboration is likely to have interests in common with some, perhaps many, national and other international bodies and programs. A useful and indeed vital task in any collaboration is to identify and communicate with as many as possible at an early stage. Properly managed, this process will avoid duplication and wasteful competition and maximise the opportunities to gather support and assistance.

²⁷ This document appears on the GBIF Web-site.

²⁸ They include the Association for Biodiversity Information, BioNET-International, the Expert Centre for Taxonomic Identification, the Integrated Taxonomic Information System, the Inter-American Biodiversity Information Network, the Ocean Biogeographic Information System, Species 2000, the UNESCO Man and the Biosphere Programme and the United Nations Environment Programme. A current list is maintained on the GBIF Web-site.

²⁹ Reported by the delegate of the CBD Global Taxonomy Initiative at the third meeting of the GBIF Governing Board, Paris, September 2001.

9. Involvement of developing and least developed countries

GBIF is an unusual collaboration in that its subject matter closely affects the interests of developing countries and least developed countries (DCs and LDCs): countries that are not often involved in scientific projects. This characteristic of GBIF led to prolonged debate about issues of access, membership, voting rights and financial contributions. The Working Group on Biological Informatics recommended that GBIF be established and supported by OECD member countries, while being 'open to participation and benefit by all countries'. This recommendation was based on a view that GBIF could be established most quickly and efficiently if the task were left to a small number of countries with adequate resources and experience in developing scientific projects and collaborations. However, an alternative view of what was needed for GBIF to be a truly global organisation and to win the support of countries outside the OECD was developed and eventually prevailed.

The alternative view was adopted by the *Ad Hoc* Meeting, which decided that 'all countries should be able to be members of GBIF, and all members should have a seat on the Governing Board'. The argument was reopened, however, by the ISC. Some delegates sought to restrict membership, either for the reasons of practicality and efficiency that had influenced the Working Group, or on grounds of equity. Some participants held the view that control of GBIF (i.e. voting membership) should be in the hands of those countries that were to meet the major part of the cost.

The position that eventually prevailed was that positive action should be taken to involve DCs and LDCs and to make it possible for them to afford voting membership. One argument presented was that active participation by DCs and LDCs would be essential to GBIF's goal of providing access for these countries to the data in developed countries' databases and collections.

A second argument presented to the ISC was that the proponents of GBIF, still principally developed countries and members of OECD, should ensure that DCs and LDCs share appropriately in the benefits arising from the work undertaken by GBIF. As well as reflecting a desire for fairness, this argument was derived from the political reality of debate within the Convention on Biological Diversity (CBD). It was said that any attempt to establish GBIF without involving DCs and LDCs would create suspicion and mistrust, which might influence discussions in other international forums, with GBIF being portrayed as another aspect of bio-piracy and the exploitation of third world resources.

Initially, discussion of this issue in the ISC focussed on membership: how to make it possible for DCs and LDCs to become voting members of GBIF. The *Ad Hoc* Meeting had already provided a concession to poorer countries in its proposed scale of fees by suggesting that GDP per capita be taken into account as well as total GDP. After prolonged debate in the ISC and examination of the contributions made to other international organisations, the ISC settled on an additional category in the scale of fees. Countries with a GDP of less than US\$25 billion a year would pay a fee of US\$500 a year. Although a small amount by comparison with the fees of richer countries, this is still several times the amount some DCs and LDCs pay to be members of the United Nations and some of its agencies, including the CBD. Furthermore, the membership fee is only part of the conditions of entry to GBIF. A member country is expected to establish a node (a computing gateway) for GBIF and agree to share data with other members. This could be a difficult and expensive condition for some DCs and LDCs to meet.

Part of the way through the deliberations of the ISC, a second issue relating to DCs and LDCs emerged. Attention moved from the fees to be paid by DCs and LDCs to a view that they should be involved in the design and development of GBIF, or at least be offered an affordable opportunity for involvement. Several actions were taken to allow the views of DCs and LDCs to be heard and taken into account. Presentations on GBIF were made at a meeting of the Conference of the Parties to the CBD and the SBSTTA Bureau was involved in discussions and invited to attend meetings of the ISC (see Section 5.2). This additional

phase of consultation slowed down the work of the ISC, but may well have been worthwhile in the longer term. Measures of its success will be the number of DCs and LDCs that take advantage of the training and capacity development program that GBIF will implement once it commences operation and the amount of information that is provided to DCs and LDCs through the GBIF infrastructure.

10. How well will GBIF work?

The question whether GBIF will be successful in making biodiversity data and information readily available to users throughout the world, cannot yet be answered. The most that can be said is 'so far, so good'. The establishment process has produced the type of organisation that the participants wanted. There is reasonable assurance that it will be run effectively. The level of support, in terms of the number of countries and intergovernmental organisations that have taken up membership is encouraging. It will be some years, however, before any judgement can be made about GBIF's success. A third-year review has been agreed to and that will probably be the first opportunity to assess whether the objectives are being achieved, and to make any adjustments to those objectives or to the way in which they are being pursued. Ultimately, however, the success of GBIF will be measured not so much by the work of the Secretariat and the Governing Board, but by the effect GBIF has in creating cost-effective collaboration between scientific groups around the world.

It has been noted above that the management of biodiversity, including biodiversity data, is a sensitive political issue. Hopefully, this will not affect the operations of GBIF, and that it will be seen as a scientific facility, open to membership and use by all countries and organisations. The third year review will allow judgements to be made about both the effectiveness of GBIF's scientific efforts and the transparency of its dealings with politically sensitive issues.

Sources and bibliography

This report draws heavily on unpublished material, including private notes and correspondence. Material that is in the public domain, or may be available to members of the Global Science Forum, includes the Final Report of the OECD Megascience Forum Working Group on Biological Informatics, January 1999; the Minutes of the *Ad Hoc* Meeting on Implementation of the Global Biodiversity Information Facility, 24-25 March 1999; and the minutes of the four meeting of the Interim Steering Committee of GBIF.

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