To Dig or Not to Dig?

Criteria for determining the suitability or acceptability of mineral exploration, extraction and transport from ecological and social perspectives

A discussion paper for WWF

Published by WWF International and WWF-UK

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January 2002

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The authors and WWF would be pleased to receive any comments about the content and opinions expressed in this paper and on suggestions for how future editions could be strengthened and improved. Please send comments to WWF as above and to equilibrium@compuserve.com and to clive.wicks@virgin.net.

To Dig or Not to Dig?

Criteria for determining the acceptability of mineral exploration, extraction and transport from ecological and social perspectives

Summary

This paper describes criteria and indicators for helping to make decisions about the suitability of prospecting for, extracting, transporting, processing and disposing of oil and other minerals in sensitive environments.

We propose a decision tree consisting of three filters, focusing on (i) protection status, (ii) potential threats to biodiversity and the environment at both the site and landscape (downstream) level, and (iii) potential threats to vulnerable human communities.

WWF believes that before any mineral activity – including initial prospecting and exploration – takes place, a full environmental and social assessment should be carried out and further action halted if the assessment suggests that subsequent activity is likely to damage environmental or human wellbeing.

We suggest criteria for (i) a veto on mineral activity, (ii) a veto on mineral activity unless maintenance of critical ecological and social values can be maintained at site and landscape level, and (iii) conditions in which mineral extraction and related activities could proceed under conditions of responsible management.

WWF suggests that mineral activity should *not* take place in the following places:

- **Highly protected areas** (IUCN categories I-IV, marine category I-V protected areas, UNESCO World Heritage sites, core areas of UNESCO biosphere reserves, and Natura 2000 sites in European Union countries);
- **Proposed protected areas within priority conservation areas** selected through ecoregional planning exercises;
- **Areas containing the last remaining examples of particular ecosystems or species** even if these lie outside protected areas; or
- **Places where mineral activities threaten the wellbeing of communities** including, particularly, local communities and indigenous people.

We use the term "mineral activity" to denote all levels of activity – prospecting, extraction, processing, transport and decommissioning – related to either fossil fuels or minerals, metals or building materials.

This paper explains the thinking behind the decision tree and defines the conditions and terms used therein.

Preface

WWF

WWF is extremely concerned that the extractive industries oil, gas and mining have often failed to make a contribution to sustainable development and to protect the environment adequately. The extractive industries are now moving into remote fragile eco-systems and areas of unique biodiversity where governments often have limited capacity to protected the environment or the people who live there.

Our publication "To Dig or not to Dig" is designed to help the Industry conserve biodiversity and protect the rights of the people who depend upon it for survival.

WWF requests the Industry as a first step to respect the IUCN Amman 2000 Resolution, which calls on the Industry to stay out of categories 1-4 Protected Areas. These only cover 4% of the terrestrial area. The industry must also help to conserve critical areas of high biodiversity where ever they are found."

Dr Claude Martin
Director General of WWF International

UNEP

"I would like to commend WWF for its initiative in preparing this paper outlining criteria the mining industry needs to consider before developing new Greenfield mining projects. It presents a number of innovative ideas, and certainly will be most valuable to the international work that is ongoing and to which UNEP actively contributes. UNEP will be happy to widely distribute this paper through its mining dedicated website (www.mineralresourcesforum.org)."

Jacqueline Aloisi de Larderel
Assistant Executive Director

Contents

Background

Oil and gas extraction, and mining, together create most of the energy and resources needed to run our society. They also result in a range of present and future environmental and social costs, both direct and indirect, which need to be balanced against the benefits they bring.

The world is highly dependent on oil – a non-renewable resource that we use at a rate of 100 million barrels a day. Oil powers our transport, heats our homes, creates industrial and domestic chemicals and provides the feedstock for many of the materials we use and wear. Transport uses 60 per cent of oil production, mostly to fuel cars and light vehicles.

Unregulated actions by the oil industry destroy habitats and damage biodiversity. Oil spills at sea have damaged coral reefs and fisheries, both through major accidents and regular leakage from tankers and drilling platforms. "Low-energy habitats" such as mangroves, salt marshes and polar coastal wetlands can be seriously damaged by quite small amounts of oil[1]. Onshore, drilling can harm ecology and open up wilderness areas. Drilling in Ecuador's Oriente, for example, has threatened the Yasuni National Park[2]. Impacts can occur before drilling begins. Seismic exploration involves clearing narrow strips through vegetation, and in tropical forests peasants and miners have used these as migration routes, resulting in major deforestation as in Rondonia, Brazil[3]. Transport of oil is also implicated in ecological damage: for example, there were an estimated 16,000 spills during construction of the Trans-Alaskan pipeline[4] and the construction of infrastructure such as roads and ports can create problems in wilderness areas.

Mining can carry similar environmental and social costs. Current annual production of raw metals approaches a value of US$100 billion, with around a quarter coming from gold. Problems can result from land clearance, particularly in the case of strip mining, processing and from the "tailings" or waste products that many mines produce. Many protected areas are affected by mining, including World Heritage sites in Australia, Côte d'Ivoire, Democratic Republic of Congo, Guinea, Indonesia, the Russian Federation, Spain, Thailand, and Venezuela. For example, in 1998 a tailings dam burst at the Los Frailes mine in Spain, spilling 5 million m^3 of toxic waste into the river near the Doñana National Park and World Heritage Site. Flooding affected 5,000-7,000 ha of farmland and marsh, killing 26 tonnes of fish[5]. Some forms of processing can spill cyanide and mercury into water systems, and this has caused problems in the Amazon catchment among other places. Leaching of contaminants into surface and ground waters aggravates supply problems, especially in water-scarce areas.

However, it is not only "unregulated" actions that cause the problems. Most regulatory frameworks start at mitigation of operations and do not provide clear guidelines for whether or not mineral activity should be taking place at all. Environmental groups want some areas to be set aside from mineral activity and some governments have already done this. Not surprisingly, oil and mining companies want to limit these areas and have requested guidance on when environmental NGOs consider mineral activity to be acceptable or unacceptable. They would ideally like guidelines that can be used by non-experts because commercial confidentiality sometimes limits the use of external specialists.

To some extent the industry may be hoping for a black and white answer to issues that may often inevitably be cast in various shades of grey. The increasing move to employ people with ecological expertise in mineral companies is welcome and will help implement these criteria and indicators. The guidelines focus on the control of activities relating to extraction of minerals: such actions need to be accompanied by a wider strategy to reduce reliance on non-renewable resources, including energy conservation, renewable energy, recycling and a reduction in consumption.

For many mining and energy companies, the key issue is about equitability. They are reluctant to agree to restrictions that could be flouted by competitors who could gain a market advantage. They therefore want any restrictions to apply to all players.
However, there are also benefits to being industry "leaders" in good practice, through an enhanced reputation that may help gain market access and facilitate the easier granting of permits in the future.

Outline of the guidelines

This report provides guidelines for mineral extraction companies and conservation groups. They aim to help make decisions about *whether or not* to proceed with mineral activity rather than providing guidance about *how* to proceed. We use the term "mineral activity" to denote all levels of activity: prospecting, extraction, processing, transport and decommissioning.

Application of the guidelines assumes that other land-use and development options have been strategically assessed as part of a national/regional planning and consultation process.

The guidelines are based on a decision tree comprising three criteria or "filters":

- Protection status;
- Potential threats to biodiversity and the environment, including downstream impacts;
- Potential threats to human wellbeing.

Each of these is defined by using a number of indicators. Protection status is frequently the simplest and quickest to determine, often being set in law[1].
Biodiversity issues are covered separately because only a small proportion of the world's important and/or threatened biodiversity is within protected areas.
For protected areas and biodiversity, three responses are proposed:

- A complete veto on mineral activity;
- A veto on mineral activity unless maintenance of critical ecological and social values can be guaranteed;
- Conditions in which mineral extraction and related activities can proceed under conditions of responsible management.

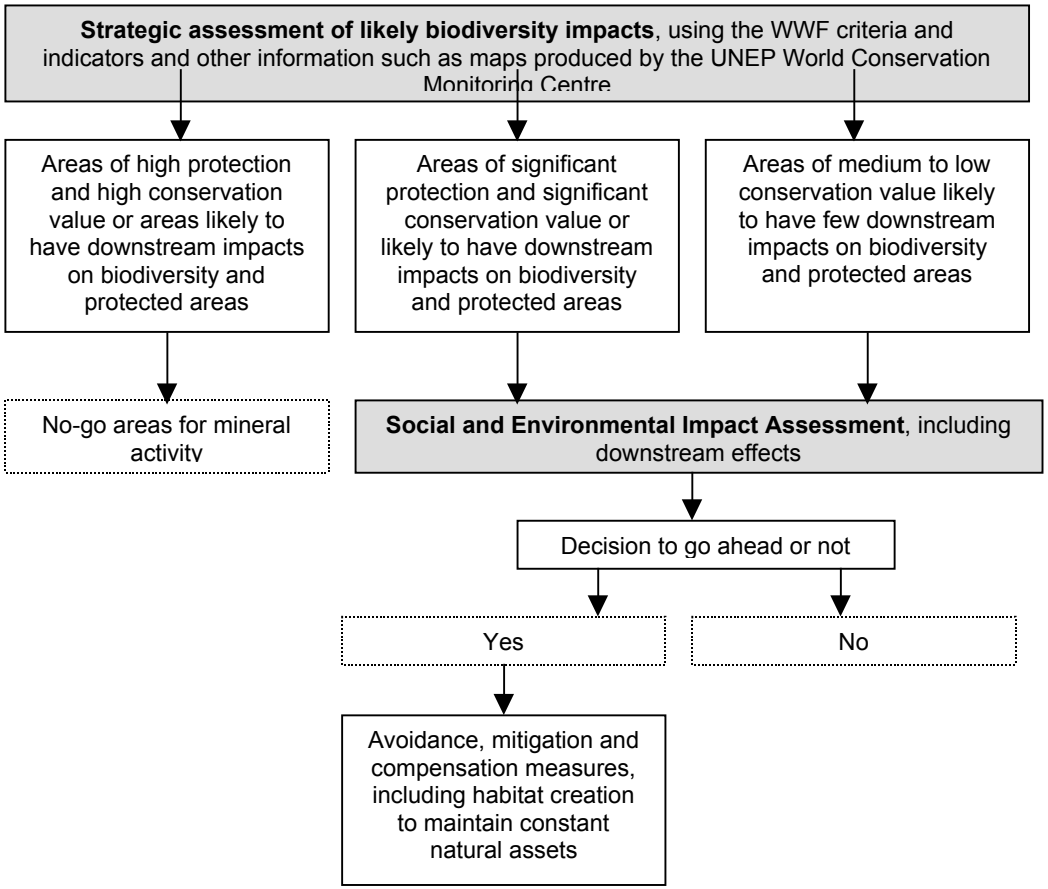
[1] Some national laws allow mineral exploration and extraction within protected areas. We suggest that these guidelines follow the spirit of the World Commission on Protected Areas guidelines, which state clearly which areas the Commission sees as being unacceptable places to carry out industrial activities.

For issues relating to human wellbeing, the need for a complete social and environmental assessment is identified, providing the third and essential filter.

The guidelines therefore propose a two-stage approach:

- A strategic assessment, using existing information wherever possible, to ascertain in broad terms the suitability of a particular site from a biodiversity perspective;
- A social and Environmental Impact Assessment to ascertain whether mineral activity is compatible with human wellbeing and environmental protection.

This relationship is shown in the diagram below.



The availability of information will vary between indicators and protection status and is probably the least open to interpretation. In some cases, responsible decisions may require new data collection (and the expense of this may count against mineral activity in these regions). The link between the Smithsonian Institution and Shell in the Lower Urubamba region of Peru is an example of data collection[6] and BP has committed to use biodiversity surveys when these are needed. The guidelines include additional information and resources relating to each of the indicators in tabular form, resources relating to best practice in mineral activity and illustrations of what the indicators mean in practice.

Part 1: A decision tree for deciding the suitability of mineral activity

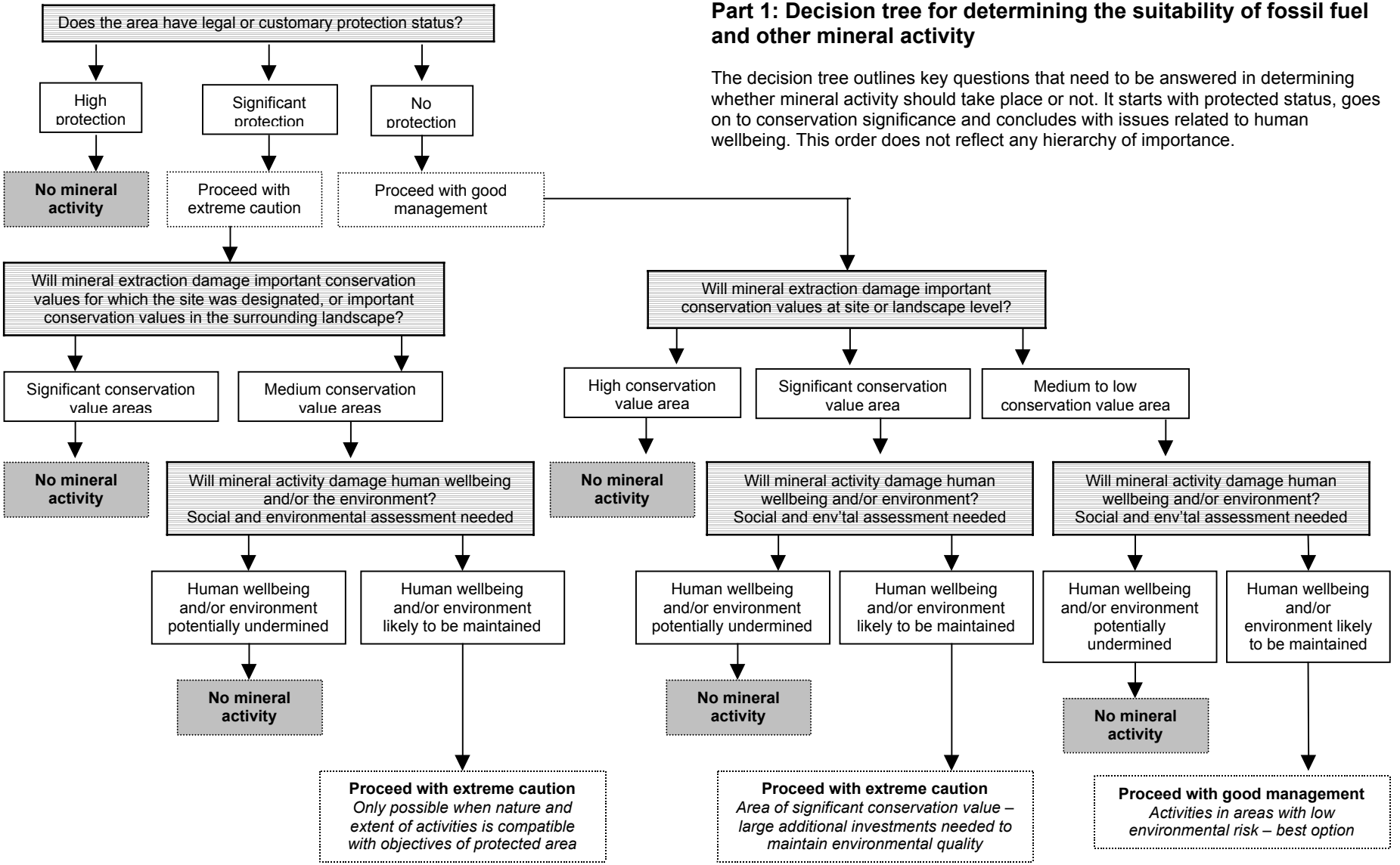
The following section outlines options for deciding when and where mineral activity is acceptable. It is based around the precept of avoiding "permanent loss", referring to losses of both ecosystem and cultural elements and potential losses in terms of options for making conservation gains (i.e. areas of high conservation value). It is not only the potential loss of a species or a community assemblage that should lead to a decision to avoid mineral activity, but also loss of options to maintain ecological integrity or functional connectivity of landscapes (i.e. to complete a representative network of protected areas by natural region). The aims of the guidelines are to ensure:

- Maintenance or improvement of biodiversity in the landscape, including downstream;
- Maintenance of environmental services at both site and landscape level;
- Maintenance of human wellbeing, particularly for local communities.

The steps proposed for making decisions are summarised in a matrix. Making decisions based on the matrix and decision tree will usually require information collection and assessment, and we suggest that a Strategic Environmental Assessment provides an ideal toolkit to help reach decisions about suitability of particular sites.

Part 1: Decision tree for determining the suitability of fossil fuel and other mineral activity

The decision tree outlines key questions that need to be answered in determining whether mineral activity should take place or not. It starts with protected status, goes on to conservation significance and concludes with issues related to human wellbeing. This order does not reflect any hierarchy of importance.



Decision-making matrix for direct and downstream impacts of fossil fuel and other mineral activity

Question	Responses		
	No mineral activity	No mineral activity unless maintenance of critical ecological and social values can be guaranteed	Proceed with responsible management
Does the area have protection status?	**Highly protected areas** • IUCN category I-IV protected areas • UNESCO World Heritage Sites • UNESCO Biosphere reserve core areas • Category I-V marine reserves	**Areas with significant protection** • Other IUCN category V-VI protected areas • UNESCO biosphere reserves beyond core area • Buffer zones of protected areas • Other official protection status (e.g. fishing reserves, forests protected for watersheds) • Ramsar sites that are not already Protected Areas I-IV • Natura 2000 sites	**Areas with no protection status**
Will mineral extraction damage important conservation values at site or landscape level?	**High conservation value sites outside protected areas with a serious risk of permanent loss in the event of mineral activity** • Priority areas for future protected areas selected in an ecoregion visioning process • Last remaining populations, highly endangered or endemic species • Extraction involving the riverine disposal of tailings and/or waste rock	**Significant conservation value sites inside or outside protected areas that risk serious long-term impacts in the event of mineral activity** • Presence of populations of threatened species • Serious risk of soil, watershed or pollution damage (including of surface/ground waters) • Serious risk of knock-on effects such as land invasion • Areas of high marine biodiversity and critical fish breeding grounds • Lack of knowledge of biodiversity	**Medium to low conservation value sites where few landscape-level impacts are likely from mineral activity** • No threatened species • Low risk of pollution or hydrological impacts • Good opportunities to prevent knock-on effects

Question	Responses	
	No mineral activity	Proceed with responsible management and any precautions identified in the social assessment
Will mineral extraction damage the wellbeing of human communities?	**Serious risk of permanent losses to human wellbeing identified by a social assessment** • Serious threats to human wellbeing • Presence of indigenous and other people opposed to mineral activity • Land for mineral activity owned by, under traditional tenure of or land claim by those opposed to activity	**Little possibility of serious disruption and long-term impacts to human wellbeing identified by the social assessment** • Few risks to human wellbeing • Support for mineral activity by the large majority of local inhabitants • Areas where there is no land tenure disputes

Using information in the matrix to make decisions is possible by deploying the accompanying decision tree and the following set of explanations of the indicators

Part 2: Explanation of each of the indicators

Indicators	Details	Sources
The World Conservation Monitoring Centre is developing overlay maps of areas potentially used for mineral activity, with data on forests, ecoregions, priority conservation areas, IUCN Centres of Plant Diversity, protection status and key species. Although incomplete, this should provide a first reference point for those assessing potential sites		
Does the area have protection status?		
Criterion 1: Highly protected areas = no mineral activity		
IUCN Category I-IV protected area	IUCN's World Commission on Protected Areas divides protected areas into six categories. Four refer to more strictly protected areas and IUCN policy is that these should not be used for mineral extraction. "Exploration and extraction of mineral resources are incompatible with the purposes of protected areas corresponding to IUCN Protected Area Categories I to IV, and should therefore be prohibited by law or other effective means." IUCN defines a protected area as *an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.* The five most strictly protected categories are defined below. • ***Category Ia*: Strict nature reserve/wilderness protection area managed mainly for science or wilderness protection:** an area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring; • ***Category Ib*: Wilderness area: protected area managed mainly for wilderness protection:** a large area of unmodified or slightly modified land and/or sea, retaining its natural characteristics and influence, without permanent or significant habitation, which is protected and managed to preserve its natural condition. • ***Category II*: National park: protected area managed mainly for ecosystem protection and recreation:** a natural area of land and/or sea designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area, and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible. • ***Category III*: Natural monument – protected area managed mainly for conservation of specific natural features:** an area containing specific natural or natural/cultural feature(s) of outstanding or unique value because of their inherent rarity, representativeness or aesthetic qualities or cultural significance. • ***Category IV*: Habitat/Species Management Area - protected area managed mainly for conservation through management intervention:** an area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats to meet the requirements of specific species	Anon (1994); *Guidelines for Protected Area Management Categories*, IUCN Commission on National Parks and Protected Areas with the assistance of the World Conservation Monitoring Centre, Cambridge, UK The IUCN position was agreed at the World Conservation Congress in Amman in October 2000 **Contact:** http://wcpa.iucn.org
UNESCO World Heritage sites	World Heritage Areas are suggested by governments and selected by UNESCO as outstanding areas from a cultural or natural perspective. To be included on the World Heritage List, a site must satisfy selection criteria adopted by the Committee. A natural site may exemplify **major stages of the Earth's history, or represent ongoing ecological and biological processes, or contain the natural habitats of endangered animals, or it may be a scene of exceptional beauty**. When a site on the List is seriously endangered, it may be inscribed on the List of World Heritage in Danger, which entitles it to special attention and international assistance. Several World Heritage sites are affected by mineral mining operations.	Anon (1999); *Operational Guidelines for the Implementation of the World Heritage Convention*, UNESCO,
UNESCO	UNESCO biosphere reserves consist of a strict core nature reserve and a wider area where sustainable development is	Anon (2000); *The*

Indicators	Details	Sources
Biosphere reserve core areas	encouraged. While mineral activity might in some circumstances be permissible in the latter, the strictly protected core areas should remain protected. General criteria for an area to be qualified for designation as a biosphere reserve are as follows: • It should encompass a mosaic of ecological systems representative of major biogeographic regions, including a gradation of human interventions; • It should be of significance for biological diversity conservation; • It should provide an opportunity to explore and demonstrate approaches to sustainable development on a regional scale; • It should have an appropriate size to serve the three functions of biosphere reserves; • It should include these functions, through appropriate zonation, recognising: (a) a legally constituted core area or areas devoted to long-term protection, according to the conservation objectives of the biosphere reserve, and of sufficient size to meet these objectives; (b) a buffer zone or zones clearly identified and surrounding or contiguous to the core area or areas, where only activities compatible with the conservation objectives can take place; (c) an outer transition area where sustainable resource management practices are promoted and developed.	*World Network of Biosphere Reserves*, UNESCO, Paris **Contact**: mab@unesco.org
Criterion 2: Areas with significant protection = No mineral activity unless maintenance of critical ecological values can be guaranteed		
IUCN Category V-VI protected areas	IUCN's less strictly protected areas may be suitable for mineral extraction in certain circumstances. The IUCN policy accepted at the 2000 World Conservation Congress states: "In Categories V and VI, minimal and localised extraction is acceptable only where this is compatible with the objectives of the protected area and then only after the assessment of environmental impacts and subject to strict operating and after use conditions". The categories are as follows: • ***Category V*: Protected Landscape/Seascape - protected area managed mainly for landscape/seascape conservation or recreation:** an area of land, with coast or sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance and evolution of such an area. • ***Category VI*: Managed Resource Protected Area - protected area managed mainly for the sustainable use of natural resources:** an area containing predominantly unmodified natural systems, managed to ensure long-term protection and maintenance of biological diversity, while also providing a sustainable flow of natural products and services to meet community needs.	Anon (1994); *Guidelines for Protected Area Management Categories*, IUCN Commission on National Parks and Protected Areas with the assistance of the World Conservation Monitoring Centre, Cambridge, UK
UNESCO biosphere reserves outside core areas	In biosphere reserves, mineral activity *may* be suitable in the less strictly protected areas: i.e. in certain cases in a buffer zone or zones and more commonly in the outer transition area where sustainable resource management practices are promoted and developed.	Anon (2000); *The World Network of Biosphere Reserves*, UNESCO, Paris
Buffer zones of protected areas	Areas immediately surrounding protected areas will only be suitable for mineral activity if there is a reasonable assurance that this activity will not impact on the protected area in terms of pollution, disturbance or increased illegal use.	Sayer, Jeffrey (1991); *Rainforest Buffer Zones*, IUCN, Gland
Ramsar sites	The Ramsar List was established in response to the Convention on Wetlands: "Each Contracting Party shall designate suitable wetlands within its territory for inclusion in a List of Wetlands of International Importance, which is maintained by the Bureau	Anon (2001); *List of Wetlands of*

Indicators	Details	Sources
	established under Article 8. Wetlands included in the List acquire a new status at the national level and are **recognised by the international community as being of significant value not only for the country or countries in which they are located, but for humanity as a whole**." The Convention establishes that *"wetlands should be selected for the List on account of their international significance in terms of ecology, botany, zoology, limnology or hydrology*". Although listing an area does not preclude changes, implicit within the convention is that any changes or uses should not damage the ecological character of the site, and Parties are encouraged to undertake a comprehensive EIA to assess and identify whether a proposed development would lead to such damage. If such a change in character takes place, is taking place or is likely to take place, the Party is required to advise the Bureau without delay (Article 3.2). Parties are encouraged to list such a site on the Montreaux Record (a record of Ramsar sites facing particular stress), and may request the Ramsar Bureau to mount an Advisory Mission to provide international expert advice on the management of sites facing such change in character. Many Ramsar sites are already Category I-IV protected areas and would thus fall into the more strictly protected category outlined above.	*International Importance*, Ramsar Bureau, Gland **Contact** ramsar@ramsar.org
Natura 2000 sites	Natura 2000 is a pan-European protected area network of Special Areas of Conservation (SACs) for species and habitats listed in the EU Habitats and Species Directive (92/43/EEC) and Special Protection Areas (SPAs) for birds listed in the EU Birds Directive (79/409/EEC). Member states are obliged to propose a list of SACs to the European Commission, which is then approved for designation. Within Natura 2000 sites, member states must take appropriate steps to avoid the deterioration of habitats and species, and disturbance of species, for which sites have been designated. When proposed mineral activity is likely to have a significant effect on a Natura 2000 site, an appropriate assessment must be carried out, which will assess the impact of that project on the integrity and conservation objectives of the site. If it is concluded that mineral activity will have a negative impact on the site, the activity may be allowed if there are "imperative reasons of overriding public interest" and there are no alternative solutions. Where a negative impact is predicted for sites hosting priority habitats or species (as identified within the Directive), the activity may only be allowed if there are reasons of human health or public safety or of beneficial consequences of primary importance to the environment. Where permission is given for mineral activity, compensatory measures will be required to ensure the overall coherence of the Natura 2000 network. For mineral activity which has already been authorised and which is likely to have a significant effect on Natura 2000 sites, the Habitats Directive requires that this authorisation is reviewed, according to the above appropriate assessment procedures and public interest test. Permission may then continue, or be revoked or modified, depending on the impacts.	
Other official protection status	A proportion of land is under protection status that falls short of, or is aimed at different needs to, a protected area as defined by IUCN. This includes, for example, areas set aside to conserve marine or freshwater fish stocks, forests protected to maintain hydrological systems in watersheds, erosion control areas or areas set aside to maintain traditional cultural techniques such as extensive farming. Some – but not all – such areas may be suitable for mineral activity.	National governments, local authorities
Criterion 3: Areas with no protection status = proceed with responsible management		
Will mineral extraction damage important conservation values?		
Criterion 1: High conservation value sites outside protected areas, with a serious risk of permanent loss in the event of mineral activity = no mineral activity		
Priority conservation areas selected in an ecoregion visioning process	Conservation organisations working on broad-scale conservation initiatives are carrying out ecoregion conservation planning exercises. An initial phase in this work is the development of ecoregional visions, working with specialists and experts (including traditional knowledge) from an ecoregion, to identify *priority landscapes* within an ecoregion that have outstanding conservation values (implicitly these should, in whole or part, be protected areas in the future). In addition, systematic conservation planning can assign priority status to landscapes in order to meet targets for ecological representation in a	Ecoregion planning programmes at WWF, The Nature Conservancy and Conservation

Indicators	Details	Sources
	protected areas network. These areas therefore require particular management – either the creation of new protected areas or forms of sustainable management, depending on local conditions and opportunities. In ecoregions where such prioritisation exercises have taken place, priority landscapes are those identified as having the highest conservation value and therefore should be deferred from mineral activity until protected areas decisions are finalised through appropriate analysis. Priority conservation areas have been set only for a few ecoregions, but this situation is changing fast. The Nature Conservancy intends to complete plans for all US and South American ecoregions by 2005, and WWF and Conservation International are also working in other regions. Information from other prioritisation exercises – such as WWF's Global 200 list, the IUCN *Centres of Plant Diversity*, BirdLife International's *Endemic Bird Areas of the World* and Conservation International's hotspots data – also help identify these potential protected areas.	International www.panda.org www.wildlife.org For information on centres of plant diversity: ahamilton@wwf.org.uk www.rbgkew.org.uk
Last remaining populations of species and highly endangered or endemic species	Species that are critically endangered, or extremely fragile, and that could face real threats of extinction as a result of mineral activity, constitute the third reason for avoiding all mineral activity outside protected areas in terms of threats to high conservation value sites. WWF suggests using categories agreed and monitored internationally by IUCN's Species Survival Commission as the best source of consistent information on this indicator. In time, the Species Survival Commission will have GIS-based maps of endangered species that could be overlaid onto proposed sites of mineral activity. For now, knowledge about the presence of species in proposed sites can be used in conjunction with threat ratings by SSC to provide guidance. We suggest that presence of **critically endangered** species in criteria (b), (c) and (d): • (b) Extent of occurrence estimated to be less than 100 km^2 or area of occupancy estimated to be less than 10 km^2 along with estimations of fragmentation, decline or extreme population fluctuations; • (c) Populations estimated to number fewer than 250 mature individuals and declining; • (d) Populations estimated to number fewer than 50 mature individuals. **Endangered** species under the same criteria should probably also constitute sufficient reasons not to undertake mineral activity, because of the high risk of causing extinction: • b) Extent of occurrence estimated to be less than 5,000 km^2 or an area of occupancy estimated to be less than 500 km^2 along with estimations of fragmentation, decline or extreme population fluctuations; • (c) Populations estimated to number fewer than 2,500 mature individuals and declining; • (d) Populations estimated to number fewer than 250 mature individuals. Also **vulnerable** populations in criterion d(2): Populations characterised by an acute restriction in their area of occupancy (typically less than 100 km^2) or in number of locations (typically fewer than 5)	National and international red lists, Species Survival Commission **Contact**: redlist@ssc-uk.org
Criterion 2: Significant conservation value sites that risk serious long-term impacts in the event of mineral activity = No mineral activity unless maintenance of critical ecological values can be guaranteed		
Presence of threatened species	Species listed as **vulnerable** under the SSC should constitute conditions in which extreme care is practised (and vulnerable under criterion d(2) may constitute sufficient reason to avoid all mineral activity – see above).	National/international Red Lists, Species Survival Commission
Serious risk of soil, watershed or	Special precautions are needed when mineral activity takes place in salt or freshwater, near important watersheds or in places where pollution could reach groundwater sources. Information on likely aquatic or hydrological impacts should be a standard	

Indicators	Details	Sources
pollution damage	part of any Environmental Impact Assessment. Mineral activity near freshwater that is important for biodiversity or for local or national fisheries requires particular precautions. Oil drilling and the tailings from mining operations are likely to cause particular problems in this respect. Mineral activity near freshwater that is important for biodiversity or for local or national fisheries requires particular precautions. Oil drilling and the tailings from mining operations are likely to cause particular problems in this respect. Groundwater contamination, once occurring, is difficult and costly to remedy.	
Serious risk of knock-on effects such as land invasion	This factor is likely to be a particular problem in areas with high human population pressure, a history of land invasions and where mineral activity could open up areas to illegal exploitation: in the past, even the seismic lines cut to explore for oil have been used as invasion pathways. Special precautions are therefore needed in these areas including closure of all routes cut into forest areas and careful management of labour camps to avoid disturbance and exploitation of local people.	
Lack of knowledge of biodiversity	Our understanding about biodiversity remains very low in relation to some areas, particularly tropical rainforests and deep ocean communities. In these situations, decisions about mineral activity should be conditional on undertaking basic biodiversity surveys as part of the Environmental Impact Assessment. However, these will of necessity often remain cursory: where mineral activity occurs in areas with low data on biodiversity, particular precautions will be required.	
Areas of high marine biodiversity and critical fish breeding grounds	Particular care is needed in areas of marine upwellings, sea mounds and sea mounts (e.g. the Darwin Mounds off the coast of the UK), representative active hydro-thermal vents, deep trenches, coral reefs including deep-water coral outcrops and critical fish breeding and nursery grounds. Disposal of drill cuttings should only take place on abyssal plains and only when disposal is carried out below the third cline (or preferably the permanent thermo cline), and only then after adequate research has been carried out.	
Criterion 3: Medium to low conservation value sites where few landscape-level impacts are likely from mineral activity = proceed with responsible management		
No threatened species	No species identified as being under threat in national or international red lists – or in other sources if no national Red List has been prepared.	Species Survival Commission
Low pollution risk	Land-based drilling in areas without significant hydrological systems or groundwater supplies.	
Low risk of knock-on effects	Areas of low population density, secure land tenure and a strong rule of law.	
Has the area undergone a full social assessment?		
This issue creates serious challenges in terms of a quick assessment. There is not, in contrast with biodiversity, any accepted “list” of human communities at risk and only in a few cases are there areas where people receive special protection (e.g. indigenous people’s “reserves”, some communities within protected areas). It is similarly difficult to find indicators of human wellbeing that can be applied simply by non-experts. The possibility of mineral activity in an area is likely to create a range of responses, depending on the perceived costs and benefits. There are also important questions about where responsibility for any “veto” should lie and how, for example, the wishes of those immediately adjacent to a proposed site are balanced with the wishes of other communities in the neighbourhood (and indeed with wider society aims and desires). Decisions therefore will inevitably rely on careful studies by professionals trained in the necessary skills and on proper, informed consultation with communities likely to be affected. WWF suggests that a parallel set of guidelines should be developed in association with development and human rights organisations that give a more complete framework for addressing these issues. The notes below constitute an initial set of suggestions for what might be included in a social assessment.		

Indicators	Details	Sources
Studies and consultation to consider likely impacts on human wellbeing should consider the following: • Impact on material wellbeing (food, health, welfare, economics); • Impact on social wellbeing (cultural impacts, long-term social changes); • Thorough consultation including identification and contact with all relevant stakeholder groups, provision of particular help to weaker groups and the opportunity for local communities to give informed consent or opposition; • Completion of mutually satisfactory negotiation of land rights with all relevant parties; • Completion of mutually satisfactory negotiation of full compensation for any costs occurred with all relevant parties; • Participatory planning regarding mineral activities, controls, benefit sharing; • Opportunity for local communities to give informed consent or opposition (see ILO Convention 169); • Analysis of legal controls on land and ownership of land; • Third party facilitation of subsequent consultations and negotiations; • Plans for mitigation of possible impacts on wellbeing; • Policies for minimising the impacts of a sudden influx of outside workers; • Transparent and public reporting; • A particular focus on indigenous people and other vulnerable communities.		International Labour Organisation Convention 169

Part 3: Implications of the decision tree

The decision tree presents three options. The implications of each are summarised below.

Decision	Implications
No mineral activity	◆ No exploration ◆ No drilling or other forms of extraction ◆ No transport (pipelines, tankers etc)
No mineral activity unless maintenance of critical ecological values can be guaranteed	Likely to be an expensive option, involving for example: ◆ Preliminary biodiversity surveys ◆ Detailed environmental and social impact assessments ◆ Public consultations ◆ Special remedial and management expenses
Proceed with responsible management	Proceed with agreed standards of assessment, consultation and management

It is not the aim of this paper to suggest best practice – this has been done elsewhere. However, in the box below, some useful sources on best practice and responsible management are listed. This does not imply that WWF and its partners are uninterested in what happens after mineral activity has begun, but that these issues have been addressed in other publications from our own organisations and from other industry and NGO sources.

Some resources to help policy-makers and managers ensure highest operation standards

Anon (1992); *Earth Summit Agenda 21: The United Nations Programme of Action from Rio*, United Nations, Geneva and New York

Anon (1994); *Convention on Biological Diversity: Text and Annexes*, Interim Secretariat, Geneva

Anon (1996); *Case Studies Illustrating Environmental Practices in Mining and Metallurgical Processes*, UNEP and the International Council on Metals and the Environment

Driver, Paul (1997); *BP/WWF: Environmental, Social and Economic Principles and Codes of Conduct for the Oil Industry*, internal report to BP and WWF

Finger, Andréa (1999); *Metals from the Forest*, IUCN and WWF, Gland, Switzerland

ICEM [International Council on Metals and the Environment] (undated); *Sustainable Development Charter*, www.icme.com or info@icme.com

IPIECA [International Petroleum Industry Environmental Conservation Association] (1997); *The Oil Industry: Operating In Sensitive Environments*, London

IPIECA [International Petroleum Industry Environmental Conservation Association] (2000); *Biodiversity and the Petroleum Industry — a Guide to the Biodiversity Negotiations*, London

Minerals Policy Institute (1998); *Principles for the Conduct of Company Operations within the Minerals Industry – by Australian Non-governmental Organisations*, Australia Asia-Pacific Mining Network

Prescott-Allen, Robert (1991); *Caring for the Earth: A Strategy for Sustainable Living*, IUCN, UNEP and WWF, published in association with Earthscan, London

Rae, Michael and Andrew Rouse (2001); *Mining Certification Evaluation Project*, WWF Australia, Melbourne

Rosenfeld, Amy B, Debra L Gordon and Marianna Guerin-McManus (1997); *Re-Inventing the Well: Approaches to Minimising the Environmental and social Impact of Oil Development in the Tropics*, Conservation International, Washington DC

Sweeting, Amy Rosenfeld and Andrea P Clark (2000); *Lightening the Lode: A Guide to Responsible Large-scale Mining*, Conservation International, Washington DC

Part 4: Appendix 1: Some examples of what the indicators would mean

Indicator	Example
Does the area have protection status?	
Highly protected areas = no mineral activity	
IUCN categories I-IV protected areas	Cradle Mountain/Lake St Clair National Park, Tasmania
Core areas of UNESCO biosphere reserve	Mangrove area of Sian Khan Biosphere Reserve, Mexico
UNESCO World Heritage area	Greater St Lucia Wetland Area and World Heritage Site, South Africa – World Heritage status was given partly to prevent mining
Areas with significant protection = No mineral activity unless maintenance of critical ecological values can be guaranteed	
IUCN category V-VI protected areas	Nature parks of Italy and Spain
UNESCO biosphere reserves outside core areas	Northern Karelia, Finland
Buffer zones of protected areas	Large areas of Kamchatka peninsula, Russian Far East – gold mining takes part at the edge of protected areas
Ramsar site	Severn estuary, UK
Other official protection status (e.g. fishing reserves, forests protected for watersheds)	Protected water catchment around New York, US
Will mineral extraction damage important conservation values?	
High conservation value sites outside protected areas with a serious risk of permanent loss in the event of mineral activity = no mineral activity	
Priority areas selected in an ecoregion visioning process	Minshan watershed, forests of the Upper Yangtze River, Sichuan, China
Last remaining populations and highly endangered or endemic species	Mount Nimba, border of Guinea and Côte d'Ivoire, where many endemic species are threatened by mining
Significant conservation value sites that risk serious long-term impacts in the event of mineral activity = No mineral activity unless maintenance of critical ecological values can be guaranteed	
Presence of populations of threatened species	Kalimantan, island of Borneo
Serious risk of soil, watershed or pollution damage	Highland areas of Papua New Guinea (e.g. in the case of gold mining) or the Niger delta in Nigeria
Serious risk of knock-on effects such as land invasion	Frontier regions of the Brazilian Amazon where previous oil exploration activities have led to invasions
Lack of knowledge of biodiversity	Large areas of the Congo Basin, Africa, where not even distribution of elephants and other megafauna is known
Will mineral extraction damage vulnerable human communities?	
Serious risk of permanent losses to vulnerable communities = no mineral activity	
Land for mineral activity owned, under traditional tenure or under land claim, by those opposed to activity	Northern areas of Guatemala where oil drilling has occurred on indigenous people's land without them being informed

Appendix 2: Resolution on mining passed at the IUCN World Conservation Congress 2000

Recommendation 2.82, adopted at the IUCN Second World Conservation Congress, Amman, Jordan, in October 2000,

The Protection and Conservation of Biological Diversity of Protected Areas* from *the Negative Impacts of Mining and Exploration, October 2000

CONSIDERING that protected areas of various definitions and categories are home to a substantial portion of the earth's biological diversity, threatened species, indigenous communities, lifestyles, and cultures;
NOTING that protected areas act as an important natural system for the regulation of the world's climate balance;
RECALLING that a large majority of State members of IUCN are signatories to the Convention on Biological Diversity;
ACKNOWLEDGING that many of IUCN's State members have established national systems of protected areas to guarantee the conservation of biological diversity;
CONCERNED by the negative social and environmental impacts associated with the rapid growth of mining and mineral exploration activities world wide with particular reference to the risks posed to the preservation of biological diversity in protected areas;
RECOGNISING that the positive endeavours of States, environmental groups, and threatened communities require strong legislative instruments to strengthen their efforts for nature conservation;

The World Conservation Congress at its 2nd Session in Amman, Jordan, 4-11 October 2000:

1. INVITES all governments and corporations to promote and implement best practice in all aspects of mining and mineral extraction, from first exploration through to decommissioning and subsequent land use;
2. CALLS on all IUCN's State members to prohibit by law, all exploration and extraction of mineral resources in protected areas corresponding to IUCN Protected Areas Management Categories I to IV;
3. RECOMMENDS that:

(a) in categories V and VI, exploration and localised extraction would be accepted only where the nature and extent of the proposed activities of the mining project indicates the compatibility of the project activities with the objectives of the protected areas;
(b) authorization for localised exploration and mining require an Environmental Impact Assessment (EIA) of the project and approval by the relevant competent authority and stakeholder groups after public disclosure of the EIA draft document; and
(c) authorized exploration and mining projects be subject to strict planning, operating, monitoring, and post-use restoration conditions;

4. URGES that proposed changes to the boundaries of protected areas, or to their categorization, to allow for the exploration or localized extraction of mineral resources, should be subject to procedures at least as rigorous as those involved in the establishment of the protected area in the first place;
5. RECOMMENDS that exploration and extraction of mineral resources and allied infrastructure development work, which is outside of a protected area, but which may negatively affect the values for which the protected areas were established, should be subject to:

(a) EIA preparation and approval from relevant competent authority and stakeholder groups after public disclosure of the EIA draft document; and
(b) strict planning, operating, monitoring, and post-use restoration conditions.

This Recommendation was adopted by a show of hands. The delegation of the State member United States made a formal Statement for the Record indicating that it had opposed and voted against the Recommendation, noting that mining policy is an internal matter for sovereign states, and reiterating that, "in the US, management of parks and requirements for environmental assessments are based on domestic laws and regulations, not a global framework. In this context, the US Government has acted strongly to limit mining where it is not appropriate". The full Statement is reproduced in the Congress Proceedings.

References

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2 Kimmerling, Judith (1992); *Amazon Crude*, National Resources Defense Council, Washington DC

3 Mallingeau, J P, R D'Achuna and C Justine (1992); Future operational monitoring of tropical forests: An Alert Strategy, *Proceedings of the World Forest Conference*, San Jose dos Campos, Brazil, Joint Research Centre CEC, Ispra, Italy

4 US Fish and Wildlife Service (1987); *Comparison of Actual and Predicted Impacts of the Trans-Alaska Pipeline Systems and Prudhoe Bay Oilfields of the North Slope of Alaska*, Fairbanks Fish and Wildlife Enhancement Office, Fairbanks, Alaska

5 Finger, Andréa (1999); *Metals from the Forest*, WWF and IUCN, Gland, Switzerland

5 Dallmeier, Francisco and Alfonso Alonso [editors] (1997); *Biodiversity Assessment and Monitoring of the Lower Urubaumba Region, Peru*, Smithsonian Institute, Washington DC

WWF is the world's largest and most experienced independent conservation organization. It has 4.7 million regular supporters and a global network active in 96 countries.

WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by:

- conserving the world's biological diversity
- ensuring that the use of renewable natural resources is sustainable
- promoting the reduction of pollution and wasteful consumption.