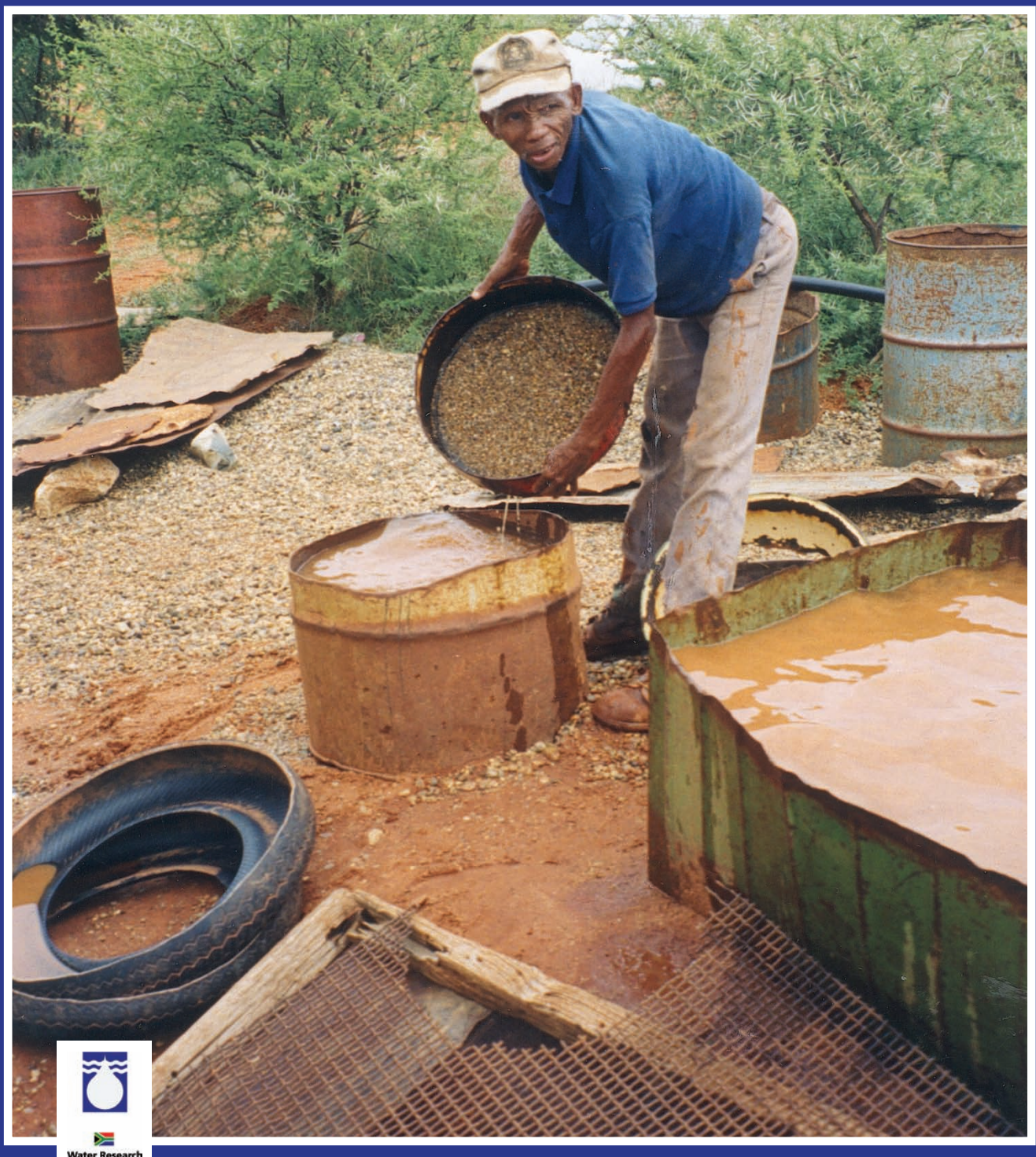
ENVIRONMENTALLY RESPONSIBLE MINING

Water management guidelines for small-scale mining



Water Research Commission

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Water management guidelines for small-scale mining

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What can this book do for you?

This book has been written for small-scale miners in South Africa. The book is designed to help you, the small-scale miner, to think about some of the issues around water quality, to help you understand some of the regulations and do what the regulations ask. It is not just an information booklet. It is also a tool to help you work out how your mining activities might be damaging the environment, our water and our health and to do something about those problems.

It is very important for you, a small-scale miner, to be more environmentally-friendly. This is because if our water, soil and living things keep being damaged through your activities, then our children and our children's children will find it more and more difficult to make a living.

ARE YOU A SMALL-SCALE MINER?

A small-scale miner can range from someone who works alone as a subsistence miner (sometimes called an artisanal miner) to someone who runs a small operation that employs less than 50 people. A small-scale miner uses mainly hand tools or basic equipment like a truck, a front-end loader or a mechanical pan or mechanical washer. Another definition of a small-scale miner is someone who moves less than 600 000 tonnes of material per year or whose activities do not cover more than about 10 hectares of land.

Small-scale mines include a variety of types, for example, diamond diggings, sand winning, coal mining, gold mining and panning, clay mining, peat extraction and extraction of precious stones.

Small-scale mining can sometimes cause damage to rivers, plants alongside rivers, and the water that flows in rivers and below the surface of the ground. All of this can harm the environment and our health and make it more difficult for people nearby to get clean and safe water.

HOW CAN SMALL-SCALE MINING AFFECT WATER QUALITY?

The photographs on these pages show some of the problems that can be caused by mining activities. You can find out more about these problems in the rest of this book.

1. Bank erosion and sedimentation

When the banks of a river are disturbed and when the vegetation is no longer there to hold them, soil particles get washed into the river. The water becomes dirty and the soil particles or sediment flows downstream. When the river slows down, this sediment settles. The sediment piles up and can either block the river or make it shallower. Sedimentation and bank erosion also damages plants and animals (like fish) and makes floods much worse, so people's land and homes are in more danger than before.

Bank erosion and sedimentation

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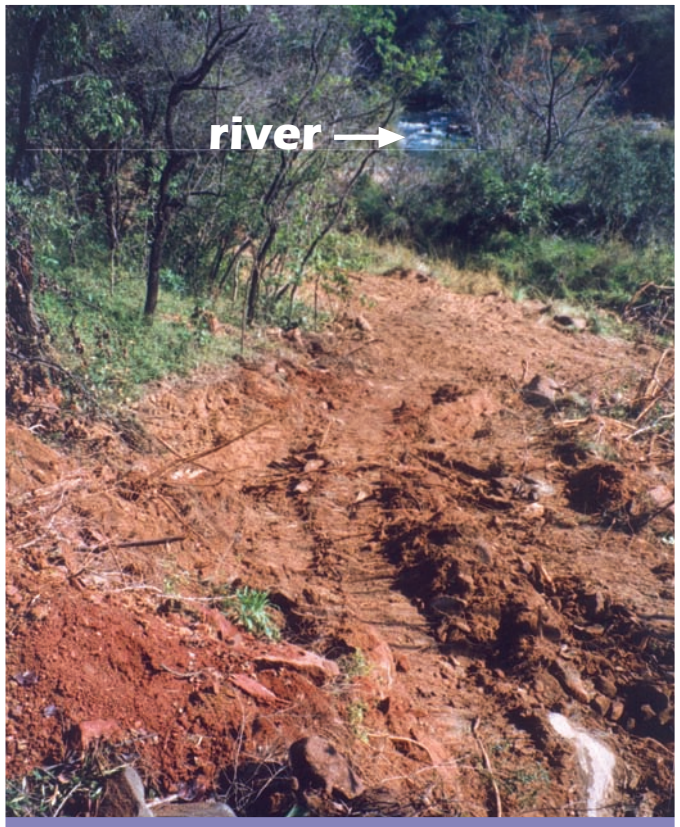
2. Loss of riverbank vegetation

This photo shows what can happen when the vegetation on a riverbank is removed. The riverbank becomes less stable and increases the chances of flood damage. When there is less riverbank vegetation there is also less shade, so the temperature of the water increases, and there are fewer safe areas for the fish to breed.

3. Ponding

Soil and rock that is dug up creates hollows. These hollows fill up with water. The quality of the water becomes bad and smelly and the area becomes unattractive. The hollows are also dangerous because people and animals can fall into them and drown.



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Loss of riverbank vegetation

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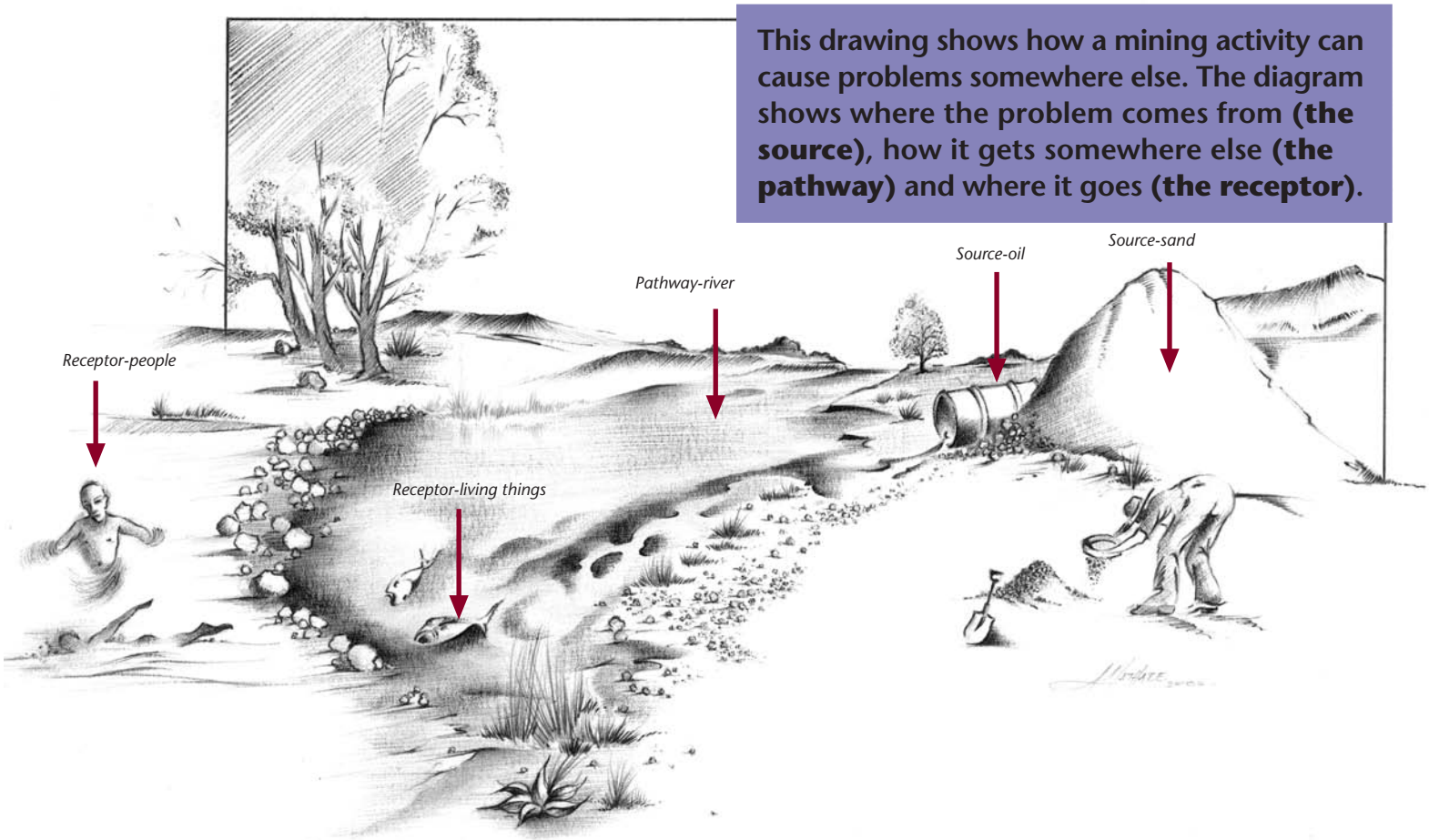
What you can find out in the rest of this book

Pages 4 and 5 give you information about how mining activities in one area can cause problems in other areas, or sometimes nowhere near the mine, or sometimes many years later.

To learn more about the three examples shown on these pages, turn to pages 6 and 7 for bank erosion and sedimentation, pages 8 and 9 for loss of riverbank vegetation, and pages 10 and 11 for ponding.

HOW DOES MY MINING ACTIVITY AFFECT PEOPLE IN OTHER PLACES?



This drawing shows how a mining activity can cause problems somewhere else. The diagram shows where the problem comes from **(the source)**, how it gets somewhere else **(the pathway)** and where it goes **(the receptor)**.

Find the sources, pathways and receptors in these photos

Look at the pictures below for examples of sources, pathways and receptors. The pictures are not in any order so you will have to look carefully.

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Bernd Drechsler ITDG-Southern Africa

Bernd Drechsler ITDG-Southern Africa

Mineral Energy Policy Centre

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Think or talk about these questions

- How many of the examples of sources, pathways or receptors that you can find in these pictures have you seen yourself? How many of the problems can be found in your mine?
- In the rest of this book you will find out more about these problems and what you can do to avoid them.

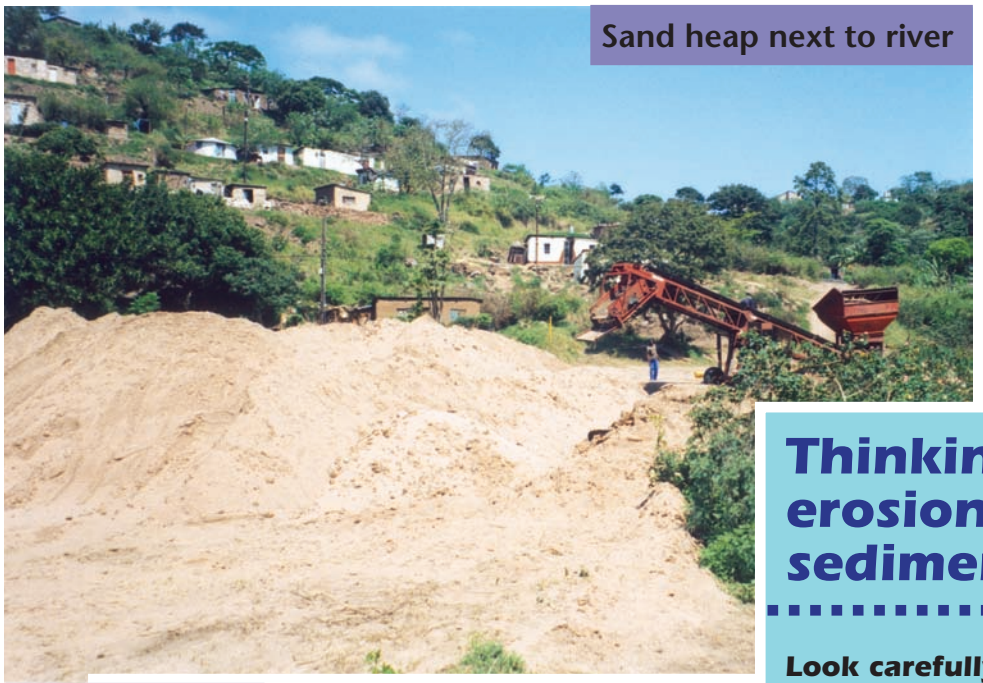
Some answers for this activity are on page 16.

Bank erosion and sedimentation

CASE STUDY 1:

Many small-scale miners are involved in sand winning. They take sand from a riverbed or from the area next to the river and usually sieve it, dry it and sell it to building contractors. Sometimes they have their own trucks to take it to a storage and sales area, or sometimes people come to the site with their own trucks.

Sand winning is usually done with front-end loaders, or sometimes with draglines. Sand winning becomes easier if the river can be blocked off or diverted with a berm. However, blocking off or diverting a river causes problems.



Sand heap next to river

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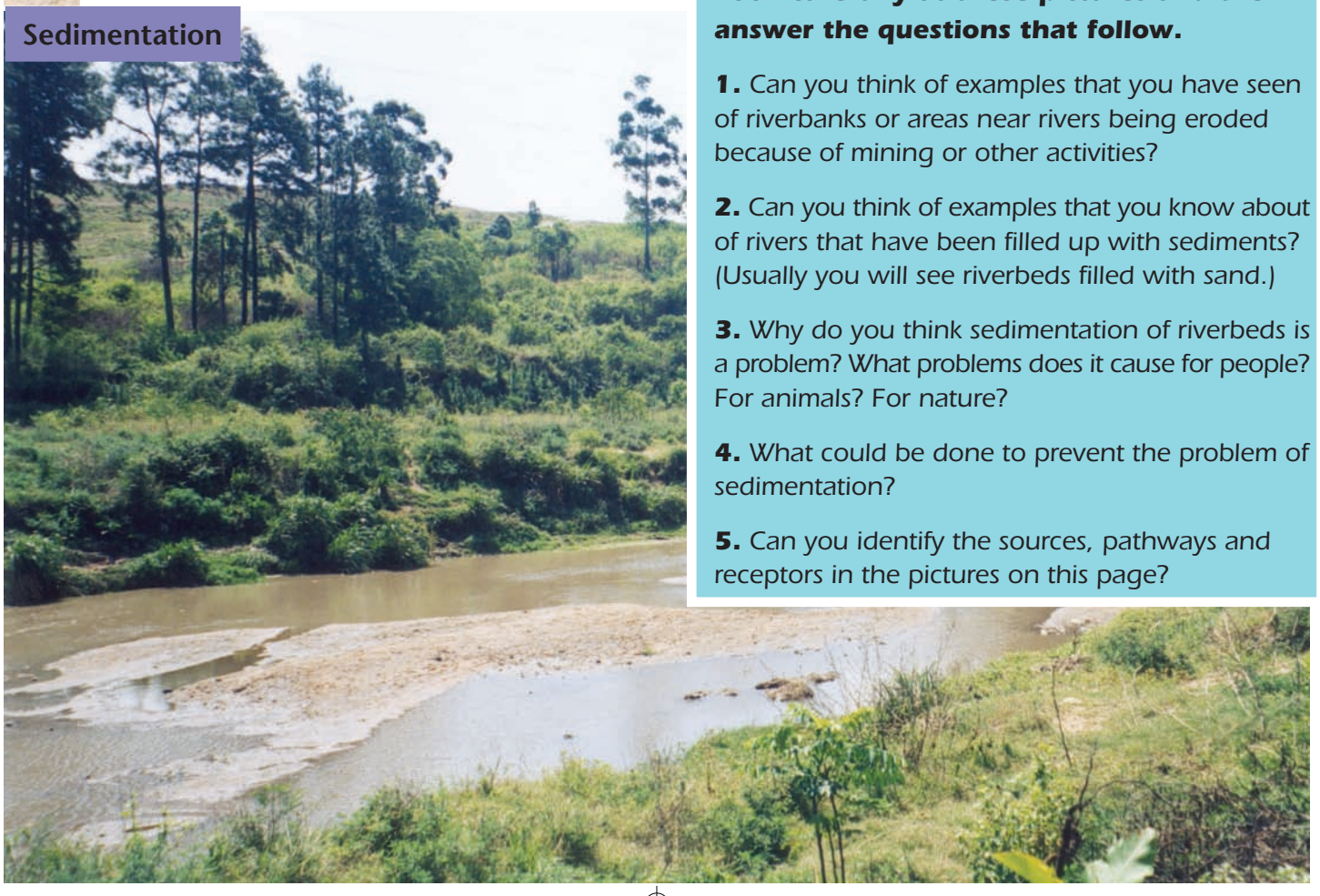
These pictures show that when riverbanks and the areas next to rivers are damaged, the soil that is washed away is deposited in the riverbed further downstream (sedimentation).



Sedimentation

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Thinking about bank erosion and sedimentation

Look carefully at these pictures and then answer the questions that follow.

1. Can you think of examples that you have seen of riverbanks or areas near rivers being eroded because of mining or other activities?

2. Can you think of examples that you know about of rivers that have been filled up with sediments? (Usually you will see riverbeds filled with sand.)

3. Why do you think sedimentation of riverbeds is a problem? What problems does it cause for people? For animals? For nature?

4. What could be done to prevent the problem of sedimentation?

5. Can you identify the sources, pathways and receptors in the pictures on this page?

A HEALTHY ENVIRONMENT IS IMPORTANT

We all need a healthy natural environment for us to have healthy lives. Without this we would soon run out of water, good soil, food and clean air, and life would become much more difficult, even for those whose lives are already difficult. And we need to look after our natural resources so that not only we, but our children's children can live well.

A healthy river normally has clean water in it and it can support many kinds of plant life and animal life. A healthy river is important for people too, because they can harvest things like reeds, can catch fish, and, most importantly, they can get water. A river that is in bad condition can run out of water much sooner than a healthy river. And we need to look after our natural resources so that not only we, but also our children's children, can live well after we are gone.

EXPLAINING BANK EROSION AND SEDIMENTATION

When soil next to a river or sand in a river is disturbed, the river banks can collapse into the water, fine (clay) particles can be washed into the river and the water can become muddy. Muddy water can kill fish, sunlight is less able to shine through the water, and many plants will die. This can reduce the amount of oxygen in the water and can make the water unhealthy, smelly, taste sandy and unsafe for humans.

When sediments are washed into a river, they flow downstream for some distance and then are deposited in the riverbed when the river flow slows down. The sandy particles and larger stones and rocks are deposited in the riverbed and fill it up (we call this sedimentation). Eventually, instead of a flowing river of water, we end up with a river with more sand than water in it. If this happens more and more, we will steadily make our country a drier place, where water is more difficult to find.

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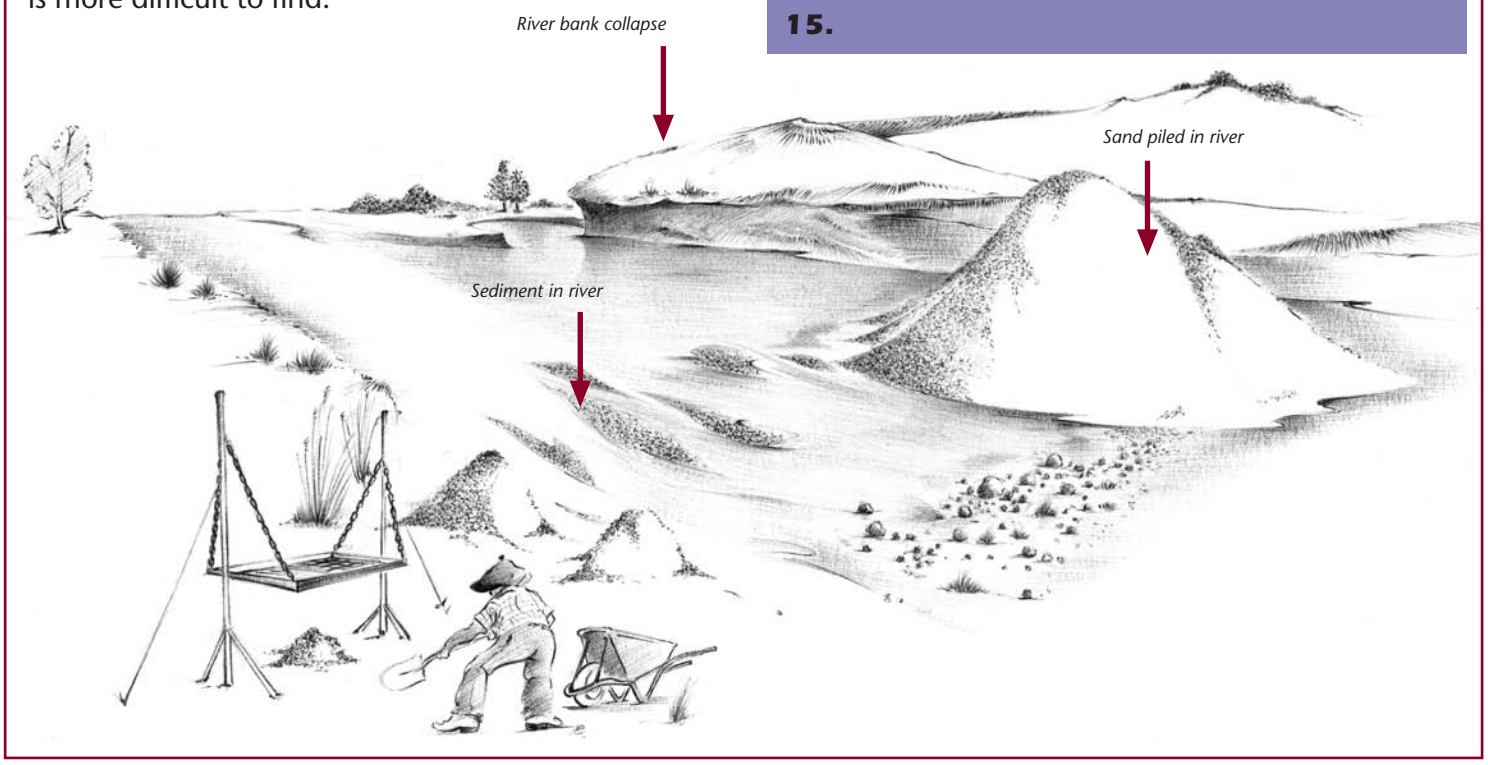
What can you do about sedimentation?

Spend some time thinking or talking about what you could do in your mining activities to prevent the problems of sedimentation.

For more information about preventing or repairing this problem, turn to pages 12 to 15.



Damaging the vegetation along riverbanks

CASE STUDY 2:

In parts of the country like Mpumalanga, gold particles have washed down rivers and have collected in the sand and soil along rivers. To get this gold small-scale miners take the soil and wash it in pans. The gold is much denser than the soil, so it falls to the bottom of the pan and remains there while the miners allow the soil to wash out of the pan. This gold is then taken away to be processed using chemicals to clean and consolidate it.

Some alluvial gold miners use front-end loaders to gain access to the river and then take soil from rivers. This is very destructive. The soil that is washed then goes back into the rivers and causes sedimentation and makes the water very muddy.

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This photo shows damage by alluvial gold miners in Mpumalanga Province. There used to be vegetation all along this section of the river until the mining activities damaged it.

The chemicals used for processing the gold are either mercury, which is very poisonous, or chloride. When this is done by the miners who are working on the river banks it can be dangerous to the health of the miners and can cause serious chemical pollution.

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Thinking about riparian vegetation

Vegetation that grows along a river is called **riparian vegetation.**

Look at the pictures and think or talk about these questions:

1. What was useful about the riparian vegetation before it was removed?

2. What do you think would happen here if the river flooded?

3. What will happen to the floodwaters now that there is no vegetation to slow it down?

4. When there is rain, the rainwater flows along the surface and runs into the river. What will that running water do to the uncovered soil?

5. Where will loose soil and sand end up when it is washed into the river?

6. Can you identify the sources, pathways and receptors in these pictures?

7. How do your mining activities impact on riparian vegetation?

Some answers to these questions are provided on page 16.

EXPLAINING THE VALUE OF RIPARIAN VEGETATION

Riparian vegetation is there mainly because of the extra water near the river and because there is usually deep, fertile soil along a river. Riparian vegetation is very important because it holds the soil with its roots and prevents the soil from being washed away. It also slows down the rainwater that runs into the river. This protects the soil and holds back some floodwater so that floods are less severe. The water that is held back can then flow slowly into the river and feed it for a longer time. This means the river can flow for longer before it stops running in the dry season.

All of this helps people because they can get water from the river even during the dry season, and when it floods, it is less dangerous. When the fertile soil alongside rivers is washed away, people living there can no longer use that area for growing crops. The area is also less beautiful.

Sometimes riparian vegetation includes some very valuable or rare plants. Removing this vegetation can reduce the variety of plants in the world. Plants that try to re-grow in the spaces that miners have cleared are often alien plants (plants that are not from South Africa). The loss of variety and the growth of alien plants are both big problems that we should try to avoid.

What can you do to prevent damage to riparian vegetation?

Spend some time thinking or talking about what you could do in your own mining activities to prevent damage to riparian vegetation.

For more information about preventing or repairing damage, turn to pages 12 to 15.

CAN ONLY ONE SMALL-SCALE MINER REALLY CAUSE SO MUCH DAMAGE?

These pictures show that one person, on his or her own, is not causing very much damage to the environment. But when many people do the same, major destruction can be caused. We call this a cumulative effect.

One small-scale miner's impact

Minerals and Energy Policy Centre

The impact of many small-scale miners

Bernd Drechsler ITDG-Southern Africa

Ponding

CASE STUDY 3:

A small-scale coal mine has been operating here. To get the coal out the miners needed to dig pits into the ground. The material that they dug out was put into piles next to the pits. The miners did nothing to replace this removed material, so now the place looks unattractive, and the pits have filled up with water and have formed ponds.

Thinking about ponding

Think about what problems can be caused by what you have seen and read about here.

1. Why are these ponds dangerous for people and animals?

2. In what ways are these human-made ponds different from natural pans or lakes?

3. What should be done about the piles of material that are taken out of pits?

4. Why are ponds like this usually not attractive or pleasant?

5. How can ponding cause problems for nature?

6. Have you seen problems like this?

7. What do you think could be done to prevent problems like this?

8. Can you identify the sources, pathways and receptors in these pictures?

Some answers to these questions are provided on page 16.

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After mining operations were carried out, these ponds of water and piles of rock were left behind

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EXPLAINING PONDING

Ponds are holes in the ground that have filled up with water. There are many causes, for example, digging of pits like the ones shown on the previous page, digging holes to put waste or mine tailings into, or diverting rivers into pools where miners can wash minerals out of the material they have mined.

Some distance below the surface of the ground the soil or rock is wet. We call this water groundwater. Sometimes miners dig down to the groundwater zone, and this water soaks into the hole they have dug. While they are mining they have to pump the water out, but when they leave, it fills up the hole.

WHY IS PONDING A PROBLEM?

Ponds can be dangerous because people (especially children) and animals can fall into them and drown. An area that has had pits dug into it and the material left in piles looks very unattractive.

Usually, mines produce some form of waste. This can be general waste from the camp (e.g. garbage, sewage or wash-water), or it can be chemicals used for processing (e.g. chloride or mercury from concentrating processes,or oil or diesel), or it can even be chemicals released from rocks that have been broken or crushed. When there are ponds, this waste can be washed into the water. From there it can soak into the ground and pollute the groundwater.

Fish and other freshwater animals can get stuck in ponds without being able to get back to the river or dam where they came from. They cannot breed in these ponds and usually die. People nearby who use shallow wells or boreholes might find that their drinking water becomes dangerous to use.

What can you do about ponding?

Spend some time thinking or talking about what you could do in your mining activities to prevent the problems of ponding, including the problem of groundwater pollution.

For more information about preventing or repairing these problems, turn to pages 12 to 15.

What must I do to be an environmentally responsible miner?

There are regulations that you need to know about, and application forms from the Department of Minerals and Energy (DME) that you need to fill in to get a permit to start prospecting or mining. The next four pages of this book give you information about these regulations and give you an idea of what you need to do to be a better miner.

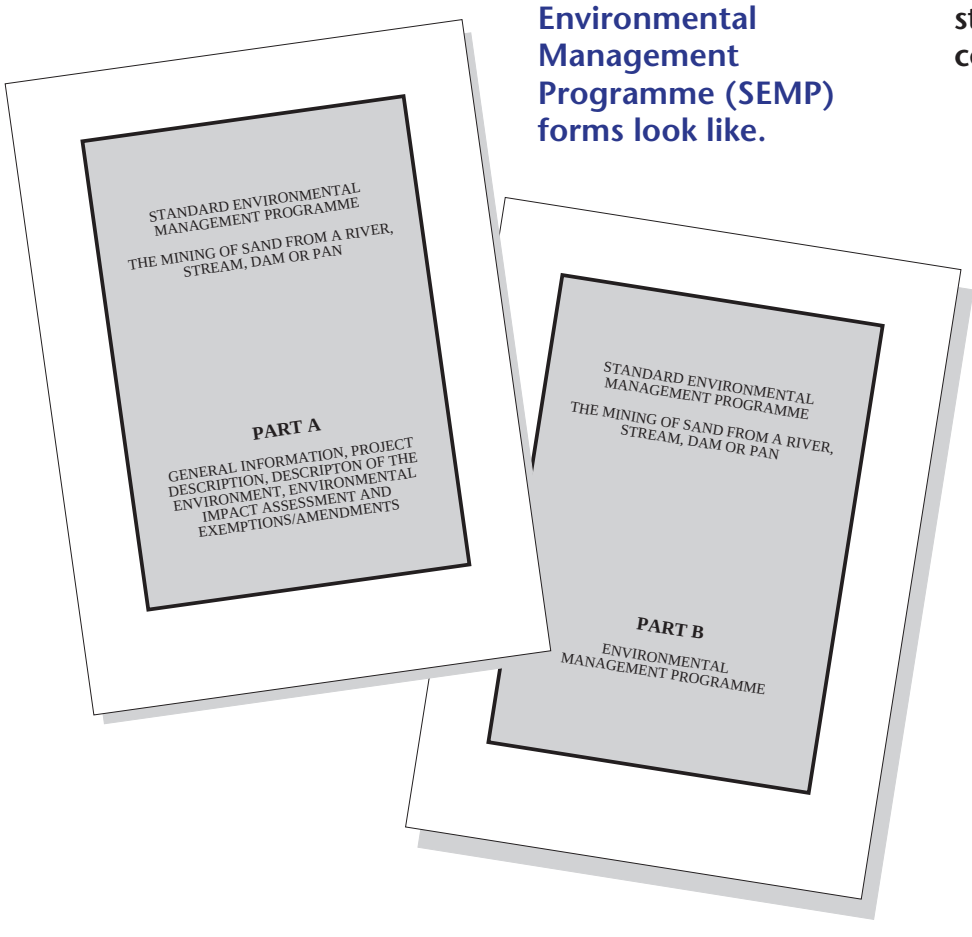
THE STANDARD ENVIRONMENTAL MANAGEMENT PROGRAMME (SEMP) FORMS

You can get these forms from the DME offices in your area. There is an advice officer in most of the regional offices who will help you with the forms. You will find contact details for the regional offices on page 16.

Part A of the form asks for information about you and what you are planning to do. Part B contains guidelines, procedures and other requirements about what you have to do to prevent environmental damage.

Once your application in Part A is approved, the information in Part B becomes binding on you. If you don't carry out the environmental management activities in Part B your mining permit can be taken away from you.

The next few paragraphs tell you more about the environmental management activities that you need to carry out. The SEMPs have much more information than you will find here.



This is what the front covers of the Standard Environmental Management Programme (SEMP) forms look like.

The two forms shown here are for the mining of sand from a river, stream, dam or pan. Other forms cover:

- **land-based precious stones (e.g. diamonds)**
- **gravel, sand and clay quarries for road-building purposes**
- **prospecting**
- **prospecting/mining of gold deposits in magmatic reefs or of an alluvial/colluvial nature**
- **crusher operations at waste rock dumps**
- **prospecting/mining of precious stones in the concession area and surf zone**
- **salt**

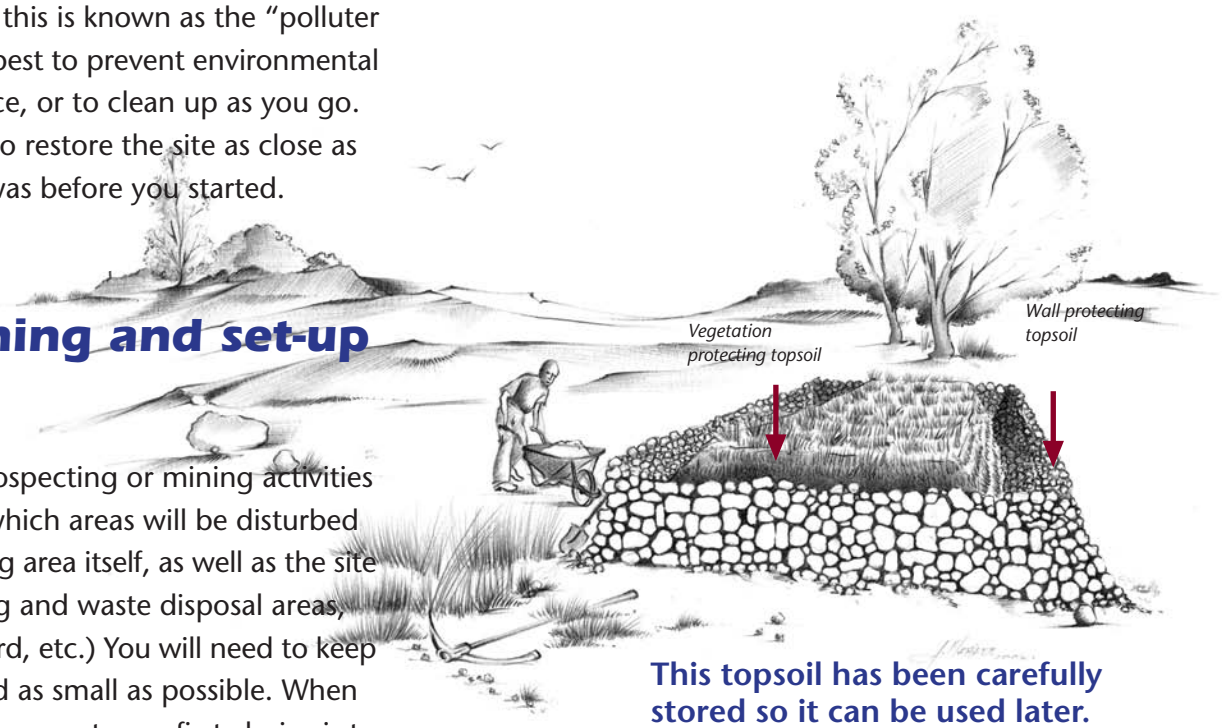
ENVIRONMENTAL MANAGEMENT ACTIVITIES THAT YOU MUST CARRY OUT

The first thing that you must understand is that the law now says that if you caused the pollution, you must fix the problem – this is known as the "polluter pays" principle. So it's best to prevent environmental damage in the first place, or to clean up as you go. You are also expected to restore the site as close as possible to the way it was before you started.

1. The planning and set-up phase

Before you start any prospecting or mining activities you first need to plan which areas will be disturbed (for example, the mining area itself, as well as the site office, camp, processing and waste disposal areas, vehicle maintenance yard, etc.) You will need to keep the area to be disturbed as small as possible. When it comes to water management your first choice is to make sure that you do not pollute the water bodies (rivers, streams) on or near the site. You need to make sure that rainwater does not pass through the mine diggings where it will get dirty but is directed to go around it. Put any rock or sand dumps in a safe area away from the river or streams so that they will not be washed away or cause seepage into the ground.

It is not always possible to avoid pollution completely, but you must at least try to keep pollution to a minimum. You also need to use as little water as possible by recycling or reusing the water for different things.



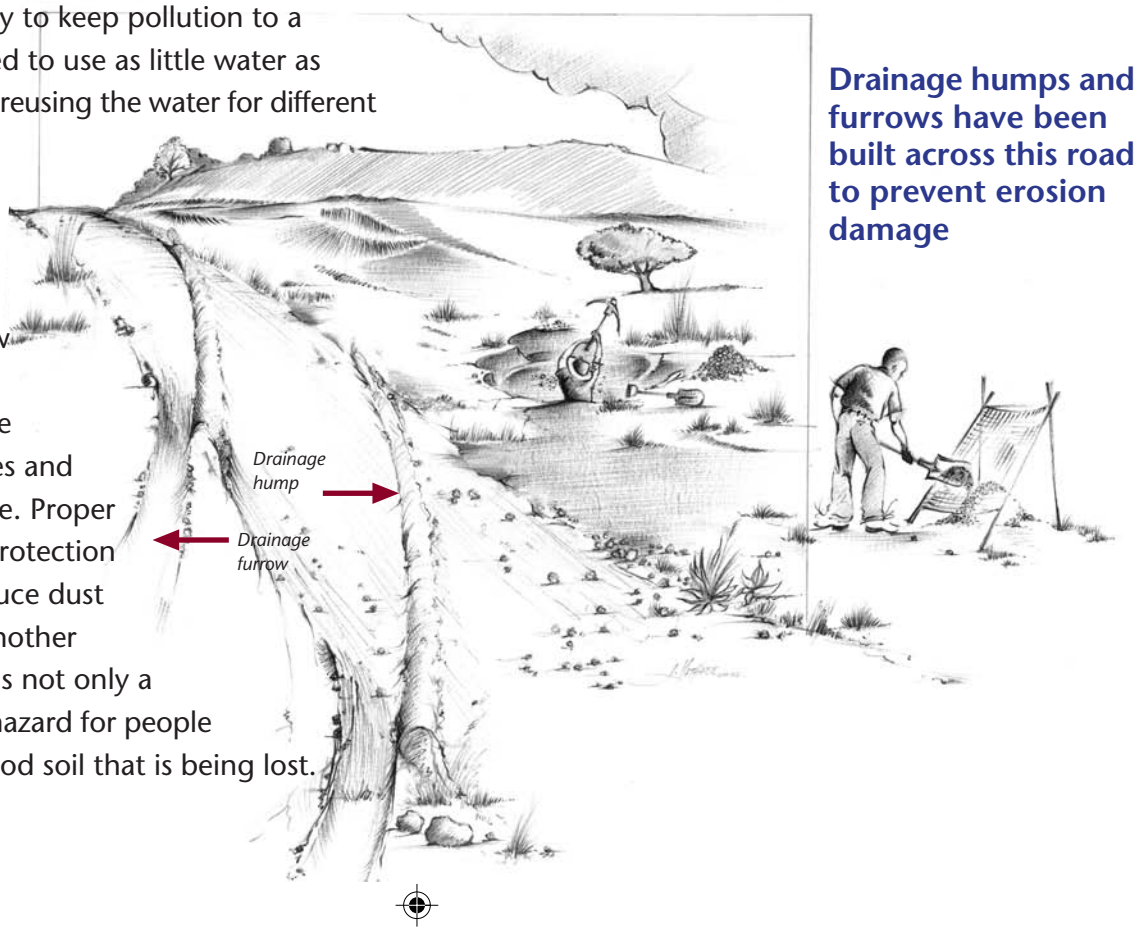
This topsoil has been carefully stored so it can be used later.

Topsoil storage and replacement

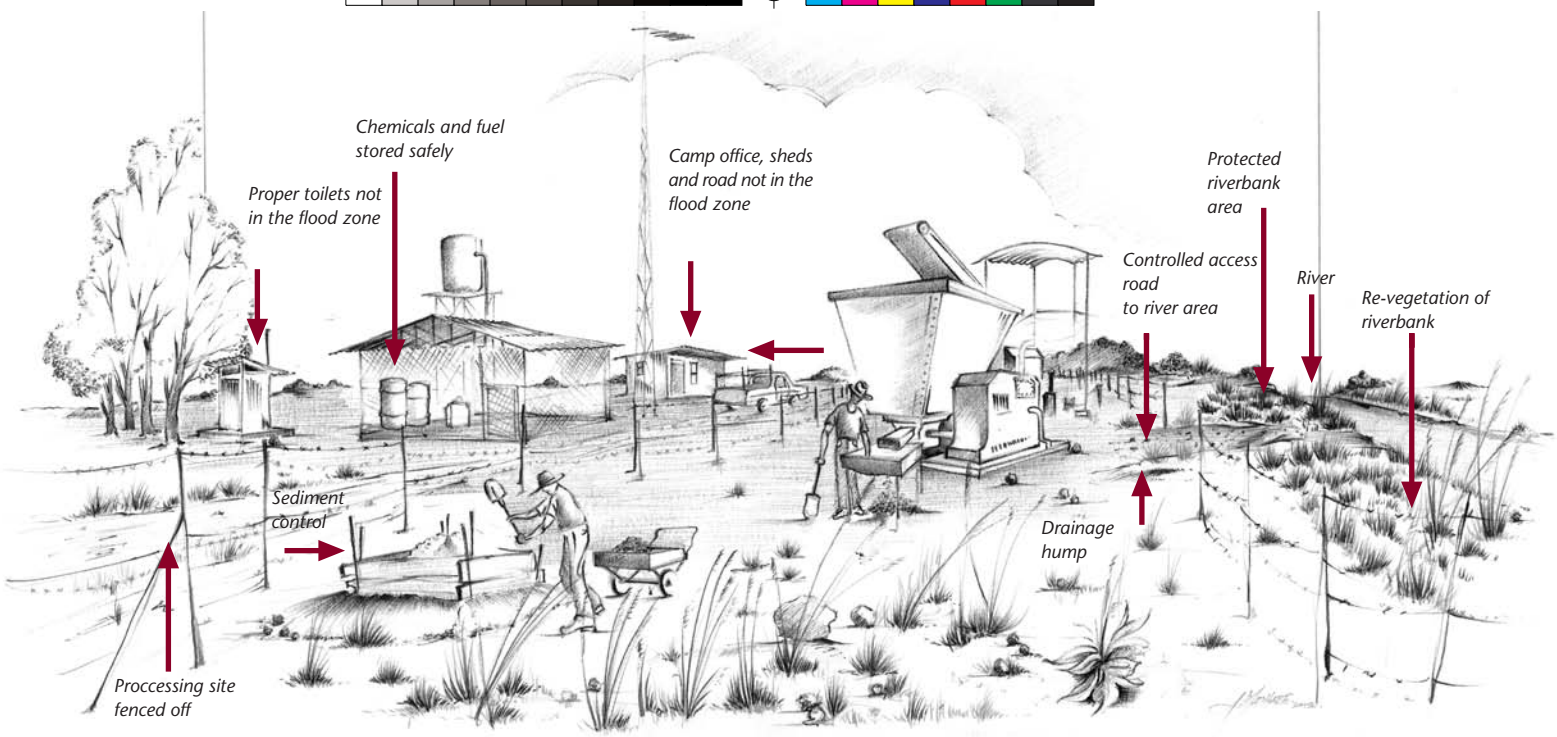
If you have to remove the topsoil from these sites do this only a short time before you will be using that area, not a long time beforehand. Store the topsoil carefully in an enclosed area where it cannot be washed away, because you will need to put it back when you rehabilitate the sites.

Roads and access

Use existing roads wherever possible. If new roads have to be built, these must cause as little damage to bushes, trees and watercourses as possible. Proper drainage and erosion protection must be provided. Reduce dust by watering or using another suitable method. Dust is not only a nuisance and a health hazard for people nearby, but it is also good soil that is being lost.



Drainage humps and furrows have been built across this road to prevent erosion damage



Camp or office site, toilets, wastewater and refuse, processing areas, vehicle maintenance yard and workshops

The camp or office site, vehicle maintenance yard and workshops and other facilities must be placed outside the flood plain or buffer zone of a river (or other water body) so that minimal damage is caused. Any refuse, oils, fuels or other possible pollutants should be stored in suitable containers (for example, a drum, or a lined tank) and be disposed of at a recognised waste disposal facility such as a municipal hazardous waste site. Domestic type wastewater can be allowed to run into a French drain.

The processing areas should be as close as possible to the mining areas so that once the processing has taken place the waste (gravel or processed rock material) can be dumped back into the hollows at a later stage. This also reduces the area that is affected by mining.

Toilets connected to municipal sewerage systems are preferred, or else chemical or septic tank systems. Pit latrines and French drains should be situated at least 50m from any watercourse, well or borehole to minimise groundwater pollution. In all cases proper hygiene facilities (hand washing after using the toilet) should be provided.

2. During mining operations

The main idea is to stay out of the buffer zone or flood plain as far as possible. However, in many cases, this is not possible, so minimising damage and rehabilitating carefully afterwards become very important.

Minimise potential sources of sedimentation – disturb as small an area as possible, disturb that area only when you actually need it, and keep the exposed surfaces protected. Any area that has to be disturbed should be kept stable to reduce dust and erosion. You can do this by watering, or by applying a protective blanket of straw, wood chips, shredded bark, or even gravel.

Minimise potential pathways for problems such as erosion, sedimentation and pollution - control the amount of run-off, divert flows that can carry sediment, capture sediment before it leaves the site, and prevent pollution of groundwater.

Mining in the river area, access to the river bed, dams or pans

A lot of small-scale mining does take place close to a river. It is not always possible to stay out of the buffer zone. Permits to operate in the buffer zone can be obtained, but there are strict conditions. Some of these conditions are:

- **Any activities in a riverbed should not alter the flow of the river, and damming upstream of your activities should not be done. If canalising has to be done it must not cause erosion of the riverbank.**
- **Choose river-crossing points where erosion of the banks and the riverbed are minimised, or if possible, build a temporary bridge or ford across the river.**

- **Avoid working in the river area in the rainy season, and remove equipment before it gets washed away.**
- **Minimise damage to riparian vegetation by removing only what you really have to remove. As far as possible do not remove the vegetation right on the riverbanks. This is especially important. If you have to remove riparian vegetation, leave strips about half a metre wide to help hold the soil and reduce flood damage.**

Rehabilitate as you go

It is very important to rehabilitate as you work and not to wait until the end. As soon as you have finished in a particular area, rehabilitate it before you move on. For example, if it is a berm in the river, remove it and restore the vegetation before you continue somewhere else. If it is a processing area, fill up holes, cover the area with topsoil and re-vegetate it before opening up a new processing area.

It is actually in your interest to rehabilitate as you go because at the end of all mining, final rehabilitation is required before you can be given a closure certificate by the Department of Minerals and Energy.

3.Final rehabilitation and closure

When you have completed all mining operations in an area, the entire site must be rehabilitated fully.

Any buildings and structures must be completely removed (unless new uses of the buildings have been agreed) and the site should be fully rehabilitated.

Use processed rock or gravel to fill up holes or pits, level the area and spread topsoil from the storage area over the surface. You may have to re-seed the topsoil with seed from local plants to make sure that vegetation re-grows quickly.

Roads that will no longer be used must be ripped up and be rehabilitated with topsoil and re-vegetated.

Final rehabilitation is required by the regulations in order for you to close your mine successfully. As part of your application for a prospecting or mining permit you would have had to pay a financial provision to make sure that you do rehabilitate fully at the end. If you do not complete final rehabilitation you can be prosecuted and will not get your financial guarantee back. Closure means leaving the mining area looking like it did before the mining started.

The rehabilitation process should start when you start mining and closure should take place as you finish mining in an area.

Minerals and Energy Policy Centre

Answers to questions

Pages 4 & 5: Find the linkages in the photos

Photo 1:
Sources: The destroyed vegetation, the loose sand and the ponded water.
Pathways: Surface water that washes the sand into the river and the ponded water allows polution to soak into the ground.
Receptors: The river and the groundwater.

Photo 2:
Sources: The soil that the man is washing and the damaged riverbank.
Pathways: Water washing away the river bank and the river carrying the sediment.
Receptors: The river here and downstream, and the man who is working in unhealthy conditions.

Photo 3:
Sources: Pit in ground allows pollution to soak in, dust and pollution cause unhealthy conditions for the women.
Pathways: Rainwater flowing into pit.
Receptors: Groudnwater, people.

Photo 4:
Source: Disturbed sand.
Pathways: Rainwater, surface water flow.
Receptors: Nearby river, tree that will soon die.

Photo 5:
Sources: Pit, loose soil and rock.
Pathways: Pit allows polluted water to collect and soak in.
Receptors: groundwater, people.

Photo 6:
Sources: The destroyed riverbank vegetation, the loose sand and the ponded water.
Pathways: River flow that washes the sand further into the river. The ponded water allows polution to soak into the ground.
Receptors: The river and the groundwater, living things and people.

Pages 6 & 7: Thinking about bank erosion and sedimentation

3. Sedimentation of rivers is a problem because when sediments settle on the riverbed the river gets much shallower and the water slows down or changes direction. Less water therefore flows down the river; some creatures get smothered and die, fish gills get clogged, preventing them from breathing and they die; the water gets very muddy so that sunlight cannot shine through to the plants and they die;, the water also gets polluted so it becomes unsafe for people to drink.

4. Sedimentation can be prevented by protecting the riparian vegetation as much as possible, by diverting water flow away from mining areas, processing areas, piles of sand or processed material, by slowing down water flow and catching sediments while they are still on the land surface by using berms or strips of vegetation. Miners should also uncover just the areas they want to work on, and leave other areas undisturbed as long as possible. They should also rehabilitate as soon as they are finished working in an area.

5. In the first picture the sand heap is now a source of sediment because riparian vegetation has been destroyed. Rain and running water are pathways for the sediment to get into the river. The river is the receptor. In the second picture a sedimented river is a source of damage to river flow, to life in the river and to water users downstream. The river is the pathway and nature and people are receptors of problems caused by the sedimented river.

Pages 8 & 9: Thinking about riparian vegetation

1. The riparian vegetation prevented bank erosion or bank collapse and slowed down the rainwater rushing into the river.

2. The exposed riverbanks will be washed away, the floods will not be slowed down because the riparian vegetation is gone, sedimentation will occur in the river.

3. River water will not be slowed down, so the force of the flood will be worse, water will flow more rapidly, so less will soak into the soil and the river might dry up in the dry season; the river will not get any shading.

4. The rainwater will wash the soil into the river, causing damage to the topsoil and sedimentation in the river.

5. The loose soil and sand will end up in the river here and downstream.

6. The source is the exposed soil, the pathway is the flowing rainwater across the banks and the receptor is the river, its plants and animals (like fish).

Pages 10 & 11: Thinking about ponding

1. People and animals can fall in them and be injured or drown.

2. Fresh water cannot flow into the ponds or out of them so they become stagnant very quickly. Natural ponds and lakes usually formed over hundreds or thousands of years. In these ponds there is no balance of nature yet.

3. They should be put back into the pits during rehabilitation.

4. They begin to smell and the water goes green and ugly.

5. Ponding can cause water to become polluted from the exposed earth or rocks, it can cause pollution from the surface workings to soak into the groundwater, it can cause fish and other water animals to be cut off from rivers and die.

7. Pits should be filled with the old gravel and processed material and be fully rehabilitated with topsoil and new vegetation.

8. Sources and pathways are not clear in these examples. The pits and the water in them are both a kind of source, the water is a pathway ; a leak from the pit is a pathway, the ground underneath is a pathway where polluted water flows downwards. The receptor is the pond and any living things in it, as well as the groundwater or boreholes in the area.

Glossary of terms

Sedimentation: The process whereby suspended solid particles in water are allowed to settle out to the bottom of a pond, river or tank, as a result of gravity acting on the particles.

Cumulative: Increasing, growing; building up.

Buffer zone: A strip of indigenous vegetation that separates the river from the land near the river .

Berm: A narrow earth ridge built across roads or trails to divert water off and away from the roads into vegetated areas to prevent the water from causing erosion. Logs can be used to reinforce the berm if required.

Riparian vegetation: The vegetation growing along rivers or on riverbanks.

Audit Checklist

This checklist will help you to avoid or reduce damage to the environment and our water resources at all stages of your mining activities

1. Have you implemented environmental management plans for the most critical impacts? ☐

2. Does your Mining Development Plan show a planned sequence of stripping, location of berms and vegetation protection strips, drainage etc.? ☐

3. Have you taken steps to reduce dust:
- in the mining area? ☐
- the plant area? ☐
- at stockpiles? ☐
- on the roads? ☐
- in loading areas? ☐ ☐

4. Have you taken steps to minimise disturbance or damage to:
- the river ☐
- the riverbanks ☐
- the area 50 metres each side of the river? ☐ ☐

5. Is there a scrap and waste disposal procedure? ☐

6. Is all general waste removed from the premises and taken to an approved site for disposal? ☐

7. Is all hazardous waste removed from the premises and taken to an approved site for disposal? ☐

8. Are hazardous substances stored safely and in a clearly marked area? ☐

9. Has topsoil been removed and stored before working in an area? ☐

10. Is topsoil stored separately from overburden (the subsoil and deeper material)? ☐

11. Are you rehabilitating areas as soon as they have been closed? ☐

12. Have non-invasive and indigenous plants been used for rehabilitation or landscaping? ☐

13. Is there financial provision for proper closure of the mining site? ☐

14. Are there steps taken to prevent soil erosion? ☐

15. Is water run-off from the area controlled? ☐

16. Is water conservation (including re-use and recycling) being carried out? ☐

17. Is wastewater being treated before it is discharged? ☐

18. Is wastewater being reclaimed? ☐

19. Is water quality being monitored above and below the mining operation? ☐

20. Do you have clean and hygienic sanitation facilities (toilets and hand washing)? ☐

21. Do your workers understand the importance of protecting water resources and how to do so? ☐

22. Has any environmental training been provided for workers? ☐

23. Have you applied for a water use licence as required by the National Water Act (Act 36 of 1998) ☐

Who to contact?

For mining permits and SEMPs - Department of Minerals and Energy

Head Office
Private Bag X59
PRETORIA 0001
Tel: (012) 317 9000
Fax: (012) 322 3416

Eastern Cape region
Private Bag X6076
PORT ELIZABETH 6000
Tel: (041) 585 3862
Fax: (041) 585 3881

Free State region
Private Bag X33
WELKOM 9460
Tel: (057) 352 8235
Fax: (057) 357 1241

North West region
Private Bag A1
KLERKSDORP 2570
Tel: (018) 464 1631
Fax: (018) 462 9036

Mpumalanga region
Private Bag X7279
WITBANK 1035
Tel: (013) 656 1448
Fax: (013) 656 0932

Gauteng region
Private Bag X5
BRAAMFONTEIN 2017
Tel: (011) 358 9700
Fax: (011) 339 1858

KwaZulu-Natal region
Private Bag 2014
DUNDEE 3000
Tel: (034) 212 1807
Fax: (034) 212 2721

Northern Province region
Private Bag X9467
PIETERSBURG 0700
Tel: (015) 291 1917
Fax: (015) 291 1757

Western Cape region
Private Bag X9
ROGGEBAAI 8012
Tel: (021) 419 6105
Fax: (021) 419 6260

Northern Cape region
Private Bag X6093
KIMBERLEY 8300
Tel: (053) 830 0800
Fax: (053) 832 5631

Private Bag X14
SPRINGBOK 8240
Tel: (027) 712 1957
Fax: (027) 712 1959

For water use licences - Department of Water Affairs and Forestry

National
Private Bag X313
PRETORIA 0001
Tel: (012) 336 7500
Fax: (012) 326 2715

Eastern Cape
Private Bag X7485
KING WILLIAM'S TOWN 5600
Tel: (043) 642 1045
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PO Box 528
BLOEMFONTEIN 9300
Tel: (051) 430 3134
Fax: (051) 430 8146

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Private Bag X995
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PO Box 1018
DURBAN 4000
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NELSPRUIT 1200
Tel: (013) 759 7303
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MMABATHO 2735
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Fax: (018) 384 0913

Northern Cape
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KIMBERLEY 8300
Tel: (053) 831 4125
Fax: (053) 831 4534

Northern Province
Private Bag X9506
PIETERSBURG 0700
Tel: (015) 290 1200
Fax: (015) 295 3215

Western Cape
Private Bag X16
SANLAMHOF 7532
Tel: (021) 950 7100
Fax: (021) 946 3666

For technical, business and financial support - National Small-scale Mining Development Framework

Private Bag X59
PRETORIA 0001
Tel: (012) 317 9412
Fax: (012) 320 4268

Endorsed by the National Government
Departments of Minerals and Energy (DME)
and Water Affairs and Forestry (DWAF).

Small-scale mining has in the last few years been formally recognised as a sector that offers new employment opportunities, rural development and economic growth. Now, aspirant small-scale mining entrepreneurs have the opportunity to operate within the formal economy.

This book has been written for small-scale miners who are concerned about the impacts of their work on water, health and the environment and who want to become more environmentally friendly.