SUPPLEMENTARY ADVICE FACTSHEET

Designing wildlife ponds in areas with public access

MILLION PONDS PROJECT
Pond Conservation

A 50-YEAR PROJECT TO CREATE A NETWORK OF CLEAN WATER PONDS FOR FRESHWATER WILDLIFE

1. The value of wildlife ponds

Ponds are fantastic places for wildlife. They support a multitude of freshwater plants and animals, including many which are nationally and internationally threatened. In urban areas and amenity parklands they can be an oasis for wildlife, buzzing with life, and can provide important refuges and stepping stones for species through the urban environment.

Ponds also provide a valuable link between people and wildlife. In the local park, village green or school wildlife corner - ponds are a place to watch dragonflies, dip for tadpoles or simply relax (Figure 1). The number of good wildlife ponds has declined due to changes in the way we manage our countryside and increasing pressures within our towns and cities. By creating new wildlife ponds we can help to reverse these declines.

2. Design principles for wildlife ponds in areas with public access

Ponds with the greatest wildlife value have a clean water source and are allowed to develop naturally, free from undue disturbance. In areas of public access there can be many different user groups, not all of which are compatible with good wildlife ponds. There are a few key design principles that can help ensure that people and freshwater wildlife can happily coexist.

- **Consider creation of multiple ponds for different users groups.** Dogs enjoy a swim and people enjoy recreation activities around ponds such as fishing, feeding ducks, boating and paddling. **BUT** these ponds are usually poor for wildlife because of the high levels of disturbance they produce. If you have the space, consider creating more than one pond, each with a different function – some for recreation, others for wildlife.
- **Keep wildlife ponds disturbance free – pond location.** Locate ponds in areas of the site which are less well used by the public or behind natural barriers such as scrub, reed and wet fences such as boggy ground and ditches to deter people and dogs from disturbing wildlife ponds. Consider how spoil from pond creation can be used to create a barrier to channel visitors away from new ponds.
- **Keep wildlife ponds disturbance free – pond design.** In larger ponds restrict access to a specific area of the pond allowing wetland plants to develop in other areas. Provide people with easy access e.g. viewing platforms or low, flat-topped, vertical banks at the pond edge. Keep vegetation in front of these access points low to allow views across the pond. Protect some ponds or some areas of the pond using natural or artificial barriers.

What's in this factsheet?

Figure 1. A wildlife rich village pond in the village of Friston, East Sussex.

3. Problems to avoid

To achieve the best wildlife ponds, make sure that they have a **clean water source** and limit the amount of disturbance as much as possible. If the pond is to be located within an urban environment or in an area of open public access, think carefully about the likely impact. The main issues are: water quality, dogs, ducks, fish and introduction of invasive non-native species.

Water quality

Making sure that your pond has a clean source of water, free from excessive nutrients and pollution from urban drainage, will be the biggest single factor to determine how good your pond will be for wildlife.

- **The best sources of water for ponds** are usually (a) groundwater or (b) rain and surface water draining off non-intensively managed areas surrounding the pond (see *Pond Creation Toolkit Factsheet 2* for more advice). In parks and local amenity areas ensure that the surrounding grassland is not fertilised as excess nutrients will drain into the pond resulting in blooms of algae.
- **Avoid stream, ditch or drain inflows into ponds**. Streams, ditches and drains will bring in silt which will rapidly fill the pond, reducing its lifespan (Figure 2). Even tiny trickles and seasonal ditches will do this. In urban areas, road drains linked to the pond will bring in pollutants including oil and salt which will reduce the quality of the pond for wildlife.
- **Constant dredging to remove silts is costly and churns up sediments.** If the pond is filling up with sediment or experiencing algal blooms it is better to work out and deal with the cause of the problem rather than only treating the symptoms. Ponds fed by a clean water source will be relatively self-sustaining and need little management.
- **Ponds are vulnerable to litter dumping.** In towns and cities a pond can sometimes become a focus for illegal dumping. A 'Friends of' group can be useful to help monitor the situation and organise work parties to clean-up the pond in conjunction with the local council (Figure 2).

Figure 2. Problems for ponds in urban areas. Left: a road drain connected directly to a village pond in Hampshire. This has resulted in a polluted pond, full of silt, in which only a few hardy plants and animals survive. Right: illegal dumping in a pond in Lancashire. The pond has now been cleaned-up and restored by a local group to create an area for learning and relaxation.

Dogs

As a nation of dog lovers we want to be able to enjoy the countryside with our pets. Many dogs love to wade into shallow ponds and have a splash about – not a problem if this happens only very occasionally. However, in areas with public access many dogs can visit a single pond over the course of the day, every day. This continual disturbance churns up the bottom sediments, making the water murky and the wildlife value of the pond declines (Figure 3).

Figure 3. Two ponds with different end uses in Farnham Park – a historic deer park and Local Nature Reserve on the doorstep of a busy market town. The pond on the left is provided for dog walkers, the pond on the right is fenced to prevent dogs from entering the water. The difference in water clarity and in the diversity and abundance of wetland plants is very noticeable. At Farnham Park, the provision of a dog walker's pond and a separate pond for wildlife satisfies both user groups and freshwater wildlife.

Ducks

Wildlife ponds often support a small number of ducks and other water birds. But, in a similar way to dogs, too many ducks will damage the wildlife value of a pond. Feeding ducks can be great fun and helps to bring people, and especially children, into contact with wildlife. However, regular feeding will attract more birds than the pond can happily support, they create disturbance, add excessive nutrients to the pond and strip all the plants. In addition, unused feed will sink to the bottom of the pond adding excessive nutrients and as a result the wildlife value of the pond declines (Figure 4).

Dealing with dogs and ducks

- Zone the site to create different ponds for different end users. Make ponds for duck feeding or ponds which dogs can use in areas with good access and those for wildlife in parts of the site used less often.
- Consider the use of signs to deter swimming dogs or duck feeding on wildlife ponds.

Figure 4. Great fun feeding ducks, but the pond in the background shows the impact this can have when their numbers increase beyond the level which the pond would naturally support. The water remains permanently green and soupy, and few plants – even the tough ones - are able to grow.

Fish

Bigger ponds, especially ponds located on the river floodplain will support natural populations of fish, including species such as Eel, Three-spined Stickleback and Crucian carp. Some animal species such Common Toad and some invertebrates are also happy to live alongside fish as part of a wildlife rich pond. However many other animals cannot easily tolerate fish, and prefer fish-less ponds. If fish are present in high numbers they also stir up silt, add nutrients to the pond with their faeces, uproot and eat submerged water plants and can decimate the populations of smaller animals. These problems are often made worse when the pond is stocked with non-native, bottom-feeding fish such as Mirror Carp and Goldfish. It is ***illegal*** to release any fish into ponds or other waterbodies, unless you have consent from the Environment Agency www.environment-agency.gov.uk, except for garden ponds which have no connection to other waterbodies so fish are not able to escape.

- **As a rule: don't add fish to wildlife ponds**. If you find that someone has added *non-native fish* contact the Environment Agency to get them removed.

Angling is one of the most popular sports in the UK and many ponds around the country have been created for coarse fishing. Most of these ponds are not ideal for wildlife: angling can cause problems with protein-rich baits like ground bait, boilies and meats adding unwanted nutrients to the pond leading to algal blooms or excessive duckweed growth. Clearance of weed, including use of herbicides, to create swims for the fish, can also adversely affect wildlife, not to mention problems with discarded line, hooks and litter. To maximise the potential for fishing ponds to support wildlife:

- **Create undisturbed, shallow areas** which will develop stands of emergent vegetation. On larger, well-managed fishing ponds, these have been shown to be excellent for wildlife. They also provide nursery areas for fish, by providing protection from predation by their larger relatives.

Invasive non-native species

Invasive non-native species can be a significant concern in ponds because they are often more aggressive than our native plants and animals and can rapidly take over, reducing the pond's wildlife value. There is particular concern about plants like New Zealand Pygmyweed *Crassula helmsii*, Floating Water Fern *Azolla filiculoides*, Floating pennywort *Hydrocotyle ranunculoides* and Parrot's Feather *Myriophyllum aquaticum* to name just a few. There are also problem non-native animals including non-native crayfish and goldfish.

The primary route of introduction for these species is by deliberate release by people into the ponds. Ponds in areas of public access are very vulnerable to people releasing plants and animals into the wild from their garden ponds. In addition, accidental transfer can occur through dirty fishing gear, and through contaminated soil when ponds are planted-up, introducing seeds or small fragments of the non-native invasive plants (Figure 5). To prevent these problems:

- **Don't plant up ponds** - the early stages of a ponds life are very short and native plants and animals will begin to colonise very rapidly on their own. This will prevent non-native plants being introduced into the pond by accident.
- **Use signs** to inform members of the public about the pond creation scheme and to deter people from adding plants or animals like fish (both native and non-native) to a new pond. Visit the Be Plant Wise campaign for more information www.beplantwise.direct.gov.uk/index.html.
- **Remove non-native plants as soon as they appear –** don't wait until they cause a problem, by that time removal is often too difficult and expensive. For more information on identification and treatment of invasive non-native plants visit the CEH Aquatic Plant Management Group www.ceh.ac.uk/sci_programmes/AquaticPlantManagement.html.

Figure 5. The problem with invasive non-native plants

This pond creation scheme had great wildlife potential: it was a shallow pond, with gentle margins, fed by clean water. But the pond was planted-up to make it attractive to the many walkers and picnickers who visit the area for recreation. In doing so, non native plants were introduced, which soon took over and now cover the majority of the pond. Whilst native species are holding on, they do not have the space to thrive as they would have done if the pond had been allowed to develop naturally.

Species like Yellow Flag-iris ***Iris*** *pseudacorus* were deliberately planted to "speed-up" the development of the pond. Unfortunately three non-native species were also introduced.

Curly Waterweed *Lagarosiphon major* – often introduced as a pond oxygenating plant but quickly develops into a thick blanket of vegetation.

Parrot's Feather *Myriophyllum aquaticum* - widely grown in small garden ponds and sold by aquatic garden centres it grows from stem fragments and can easily be transported in the pots of other plants.

New Zealand Pigmyweed *Crassula helmsii* – highly invasive this non-native plant can regenerate from a 2mm fragment of stem and form thick mounds which limit the space available for native species to grow.

4. Case study: Multiple recreation activities impact on a pond which was once wildlife rich

The pond below is an example of how people can have a negative impact on wildlife ponds. It was created in the early 1960's and prior to 1975 was a well vegetated, diverse pond, with emergent, floating and submerged species. The water was clear and the pond supported numerous dragonflies and other plant and animal species.

A catalogue of human interference has resulted in a pond which is now so turbid and degraded that only a little marginal vegetation remains and the value of the pond for wildlife is very poor. Many people enjoy the pond for what it is, however the pressures on the pond mean it will never again be a rich wildlife habitat.

But, it isn't all bad. The pond does act as a honey pot, drawing visitors to this site and reducing pressure on more sensitive wildlife ponds in the surrounding landscape.

Non-native plants. The invasive plant Curly pondweed *Lagarosiphon major* was intentionally planted in the pond and by the 1980s was a major problem outcompeting native plants.

Fishing using bait bomb and loose feed was allowed at the pond over a number of years. Disturbance from bottom feeding fish and uneaten bait have seriously polluted the water in the pond.

Today fishing is banned but the public still throw in loaves of bread to feed the large population of mirror carp – leading to a poor water quality and loss of wetland plants.

Visitor pressure has eroded the bank and removed **ALL** bankside vegetation.

Duck feeding encourages unnaturally high numbers of ducks and geese. Uneaten bread and droppings sink to the bottom of the pond increasing pollution and turbidity still further.

5. Wildlife pond designs in areas with public access

Ponds which have the greatest value for wildlife in areas with public access use pond location, natural barriers and pond design to integrate the needs of the multiple user groups with those of wetland plants and animals.

Pond location

- **Provide different ponds for specific user groups.** Ponds close to paths are more likely to be used by people for feeding ducks and as dog swimming ponds. Use interpretation boards to direct people to ponds for these and other uses (e.g. boating, fishing, etc.) making it clear which ponds should not be disturbed because they have been created for wildlife (Figure 6).
- **Locate some wildlife ponds away from public areas.** In wooded or waterlogged sites people are less likely to stray far from the path or bridleway. Ponds adjacent to car parks, paths and bridleways are likely to be more heavily disturbed than those in inaccessible areas.
- **Use paths to channel people away from sensitive areas.** Around larger ponds, ensure that paths don't circle the entire pond, to provide some areas with less disturbance. Ideally re-route paths to create disturbance-free zones.

Natural and manmade barriers

In addition to pond location, either natural or manmade barriers can be used to channel people away from sensitive sites and newly created ponds. Natural barriers are often more effective than manmade structures as they are less prone to vandalism and can blend into the surrounding habitat.

- **Dense spiky vegetation**. At some sites, such as rough grassland, brambles and scrub can be used to create an excellent deterrent to people and their dogs.
- **Wet fences** such as ditches and streams between the pond and the path can prevent public access, but still allow people to enjoy views over the pond. Ponds in wetlands are more difficult to access than ponds in drier habitats. Boggy ground and dense stands of tall grasses and rushes can also deter people from leaving the pathway.
- **Spoil** from the pond can be used to hide newly created ponds by putting the bund on the side adjacent to public paths whilst keeping access clear for grazing animals. This will help to reduce disturbance in the early years.
- **Fences** can act as a barrier to disturbance, but these will also act as a barrier to grazing livestock which can be very important in the management of the pond. Consider partial fencing on the side of the pond adjacent to the path to restrict public access, or be prepared to install gates or to remove fencing periodically to allow access for management.

Figure 6. Simple temporary interpretation at Farnham Park to inform walkers about a newly created pond, asking them not to disturb or add plants to the site (left). Permanent interpretation at a dew pond in Sussex gives interesting information about how the pond was created and why it is fenced to prevent disturbance (right).

Ponds designs in areas with public access

On some sites it may be desirable to create ponds which people can have access to, but which also cater for wildlife, especially on sites where it is not possible to create multiple ponds for different user groups. It is possible to design ponds which reach a good compromise between visual amenity and conservation.

- **Zone areas with clear view and dense vegetation.** People like to have a clear view across the pond in order to watch wildlife, but well vegetated ponds with a margin of emergent plants are the most wildlife rich. To achieve a compromise:
  - Provide access points to channel visitors to specific areas of the pond. People trampling sections of the pond margin in low numbers can be beneficial and will create areas of bare ground adding variety to the pond margin.
  - On sites with heavy visitor pressure consider creating platforms to channel visitor pressure to certain areas of the pond and to reduce pressure on the remaining pond margin (Box 1).
  - Create some viewing areas with vertical banks over shallow margins which are permanently covered with water (~0.3m deep). This will deter most emergent plants from growing and keep vistas open. People also find a clear edge easier to see than sudden changes in bank slope (see health and safety issues and Figure 7 below).
  - Don't create long islands in the middle of the pond, which will block long views. Consider creation of wide spits instead of islands in large ponds, to provide people with better access, and more interest, and will also increase the perimeter of the pond margin.
- **Keep disturbed ponds shallow**. Many *emergent* plants put their roots in the substrate but have leaves above the water surface. This type of plant is often less dependent on clean, clear water than plants which have *submerged* leaves. A well-vegetated pond will provide better habitat for pond animals than a bare one. So if the water quality is poor, create shallow ponds that fill with emergent plants and can still provide habitat for animals like water beetles, snails and some amphibians.
- **Create wildlife refuges.** In ponds created for fishing, make ponds with a complex margin with lots of very shallow water. These areas can provide a refuge for other pond species, such as amphibians and invertebrates. Well vegetated shallow water will also provide nursery areas for fish fry, away from predation by their larger relatives.

Box 1. Good designs for viewing and dipping platforms

Viewing and dipping platforms have often been used to reduce visitor pressure on ponds and to increase visitor access. However, not all designs help to achieve these goals.

- **Good viewing platforms will**:
  - be located close to the pond margin to provide visitors with a sense of connection to the pond, reducing the desire to by-pass the platform and damage other areas of the pond margin.
  - retain low vegetation height in front of the platform allowing views across the open water.
  - have decent barriers to prevent people falling or jumping into the water and provide a ramp, rather than steps to allow wheelchair access.
- **Good dipping platforms will**:
  - lie as close to the water as possible. Leaning over barriers or reaching down to get nets into the water will increase the risk of falling in.
  - only extend over shallow water. This is where the majority of pond life is found, dipping in deeper water is generally less productive, unless the pond supports abundant submerged vegetation.
  - where possible, include at least two platforms to alternate dipping between years giving the pond a chance to recover.
  - be large enough to ensure that the majority of the site is not always disturbed, so that an interesting range of animals is maintained for the dipping exercise.

6. Health and safety issues

Even with the strength of positive feeling towards ponds, there are concerns over safety. For detailed information on health and safety around open water visit the website of The Royal Society for the Prevention of Accidents, ROSPA www.rospa.com.

What are the issues

- **Danger of drowning**: This is particularly relevant to very young children between the age of one and three as they have difficulty righting themselves, even in shallow bodies of water. They also have high mobility and can escape supervision very quickly.

  In public areas it can be advisable to create shallow wildlife ponds (<0.5m). Water greater than 1m deep often adds little value for native plants and animals. Only young children will find it difficult to stand up in this depth of water. Shallow water is also less appealing to 'thrill seekers'.

- **Hidden obstacles**: Underwater features such as sudden changes in bank slope, underwater bars and shoals, deep silts and submerged roots can all cause unexpected hazards to people entering the water.

  Avoid any sudden changes in depth below the water and always design ponds which have gently shelving shallow margins below the water where there is easy public access to provide an easy exit for people and animals (Figure 7).

- **Hazards adjacent to the pond**: Steep banks adjacent to water (e.g. those created by aggregate extraction operations) can be a hazard for both people and livestock - if they accidentally fall into the water they may be unable to get out. Other hazards adjacent to the pond such as wet muddy slopes and tree branches may also result in slips and falls if people approach the pond to 'take a closer look'.

  Always ensure that the pond is not surrounded by steep banks on all sides, this will provide an exit route and prevent animals becoming trapped. Ensure that any steep banks above deep water are located on the side of the pond furthest from public access and allow scrub including bramble and emergent vegetation to create a natural barrier to access.

- **Disease risks**: Water borne diseases can pose a health risk particularly to young children or the elderly.

  Weil's disease (Leptospirosis) is spread by rats which can be attracted to ponds, particularly where ducks are fed or fish bait thrown into the water. However, clean-water ponds without these problems are a much lower risk. Even people which are regular users of still waterbodies such as fishermen are at very low risk of catching Weil's disease (less than 1 in 10 million according to www.nhs.uk).

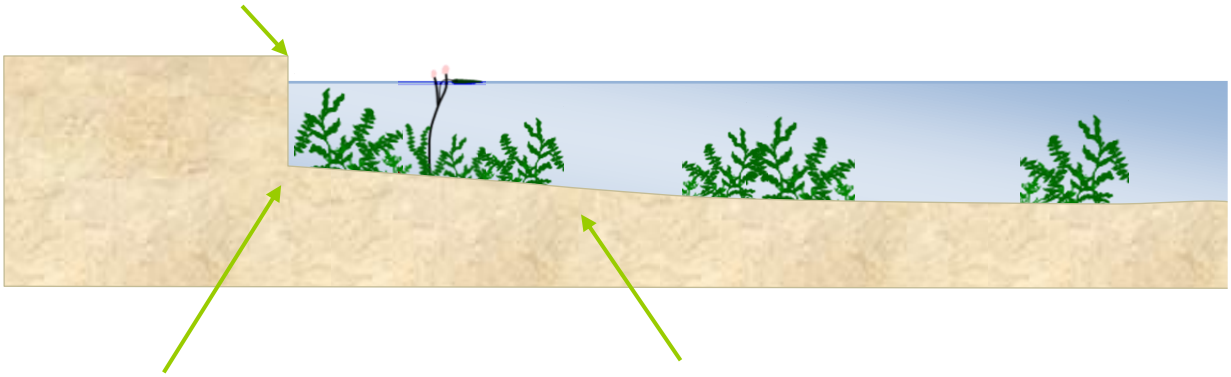
  In ponds polluted by high levels of nutrients, blooms of toxic blue-green algae may develop in warm weather. However, clean water ponds are much less susceptible to such risks.

Figure 7. Pond margins to maximise safety

POND PROFILE

Viewing point created where path runs adjacent to the pond margin. If visitor traffic is low and the substrate firm, the bank may not need any artificial reinforcement.

Distance from maximum water level to bank top 10-30 cm.



A vertical bank into shallow water (~0.5m deep) reduces the cover of emergent plants which would block views.

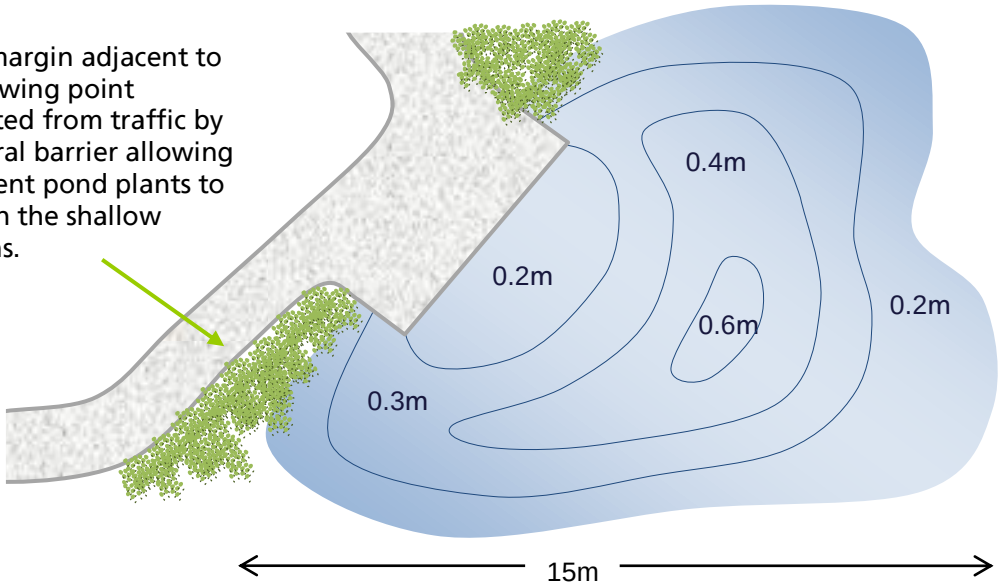
The bank also provides a clear edge to the pond and the shallow depth an easy exit for animals and people if they fall in (See *Top down view*).

Pond profile below the water level is very gentle without sudden changes in depth.

TOP DOWN VIEW

Pond depth in front of platform ~0.2m deep, and shelves evenly to provide an easy exit route for people and animals if they fall in.

Pond margin adjacent to the viewing point protected from traffic by a natural barrier allowing emergent pond plants to grow in the shallow margins.



6. Planning for pond creation in areas of public access

People often have strong feelings and opinions about management works which take place on sites adjacent to where they live or where they regularly visit. Many problems can be resolved before pond creation works begin:

- It is important to recognise that there are no recipes – designs should be adapted to local circumstances and will depend on how much the site is used and by which user groups.
- Work out how people are likely to use the site before pond creation work begins – this will help you to reduce the number of problems later on.
- Contact existing user groups to explain the purpose of the pond creation scheme, and ask for their opinions on likely issues with your wildlife pond plans (Box 2).
- Work with local parish councils as key local administrative bodies.
- Prepare paperwork in advance of pond creation, including design plans, a timetable of works and risk assessments. There is simple guidance on a sensible approach to risk management and carrying out risk assessments on the Health and Safety Executive (HSE) website at www.hse.gov.uk/risk/index.htm (see *Pond Creation Toolkit Factsheet 6* for more information).
- Publicise widely, highlighting the purpose of the pond creation scheme – using site notices, leaflets, local press and the internet. Consider running a guided walk to highlight the issues with interested users.
- Contact or create a 'Friends of' group. They will be on the front line and can help to identify problems before they escalate.

Box 2. Ponds for People

Ponds for People was a project developed by Pond Conservation which helped people with a wide range of pond projects, providing advice and hands-on support to create and manage ponds. Go to www.pondconservation.org.uk/aboutus/ourwork/pondsforpeople for more information.

Pond Close, Tarleton, Lancashire. The ponds had a problem with goldfish and invasive non-native plants. These local authority rangers and volunteers removed both to benefit the local Great Crested Newt population.

The Friends of Sunnyhurst Wood restored an old pond - the Ellis Gibson Fish Pond - in Sunnyhurst Wood, Lancashire and created a small dipping platform for visiting school groups.

For further information about the Million Ponds Project and to consult other factsheets in the Pond Creation Toolkit, please visit *www.pondconservation.org.uk/millionponds* or email enquiries to *info@pondconservation.org.uk*

Pond Conservation
For life in fresh waters

NATURAL ENGLAND

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