

# Hop To It Frog Book

Survey Frogs and Become  
a Citizen Scientist

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The Common Frog (*Rana temporaria*) is Ireland's only species of frog. Citizen science is the collection of data from the natural world by members of the public. Beginning in 1997, the Hop To It Frog Survey, co-ordinated by the Irish Peatland Conservation Council, is Ireland's longest running frog survey. This book explores the fascinating world of frogs and encourages you to record frogs in your locality and become a citizen scientist.

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Image: E. Delaney



Image: E. Delaney

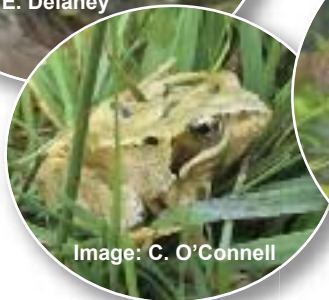


Image: C. O'Connell



Image: C. O'Connell

# Amphibians in Ireland



Amphibians were the first group of animals with a back bone to live on land. Most Amphibians spend the first part of their lives in water, swimming and breathing like fish. As adults, they can move between land and water. They are cold blooded animals, which means that their body temperature changes as the temperature of their surroundings changes. It is thought that Amphibians arose over 350 million years ago from a fish-like ancestor. They can, in general, move, feed and breathe equally well on land and in fresh water, but nearly all Amphibians return to water to breed. Amphibians are divided into three groups:

- \* Urodela (newts and salamanders)
- \* Apoda (worm-like caecilians)
- \* Anura (frogs and toads).

Found worldwide the Anura group (meaning tail-less) are the largest Amphibian group with over 3,500 species.

Four different species of Amphibian have been recorded in Ireland:

## Native Irish Amphibians

- \* Natterjack Toad (*Bufo calamita*)
- \* Smooth Newt (*Triturus vulgaris*)
- \* Common Frog (*Rana temporaria*)

## Non Native Amphibian

- \* Common Toad (*Bufo bufo*)

Common Frogs and Smooth Newts are found nationwide. Natterjack Toads are found in Counties Kerry and Wexford (introduced by the National Parks and Wildlife Service to Raven Point, Co. Wexford in the 1990's). In 2011 the Common Toad was first recorded in the Republic of Ireland in Long Lough, Rathmullan, Co. Donegal. This toad is believed to have been introduced and is the only Amphibian in Ireland that is non native. It is a crime to introduce non native Amphibians to Ireland under the Wildlife Act. If the Common Toad was to become established in Ireland there is concerns that it could result in displacement, reduction, or elimination of the native Natterjack Toad.

# The Common Frog



Image: T. Whyte

The Common Frog has smooth, moist skin and powerful hind legs that make it possible for them to jump great distances. Frogs begin their lives as eggs, known as frog spawn. In Spring after the eggs hatch tadpoles emerge. Tadpoles live in water and breathe through gills. As they grow their bodies undergo many changes so that by the time (early Summer) they have become adult frogs, they are able to live on land and breathe air through lungs. The great change that takes place during the development of a frog is known as metamorphosis.

## **Common Frog Food**

Tadpoles begin their lives as vegetarians but as they grow their feeding habits change and frogs are carnivores. Frog tadpoles eat algae, helping regulate blooms in ponds. Frogs feed mainly at night

around the edges of ponds, using their long, sticky tongues to capture flying insects and beetles, or to ensnare slugs and snails - their staple food.

## **Habitat of the Common Frog**

Frogs like natural damp habitats in woodlands, bogs, fens and gardens. They need freshwater to breed and prefer ponds which have good plant cover and shallow water at the edge so that they can easily climb out unseen. But they also use streams, bog pools, drains and ditches as breeding sites. The terrestrial habitat of frogs is important. The land around the breeding site needs to be rough with long grass and some woodland scrub to give cover for foraging. Frogs also require habitats for hibernation. Large stones, old logs, piles of autumn leaves and compost heaps are perfect.

### Sight

Large eyes bulge out of the top of the head so the frog can keep a sharp lookout for food and danger. The eyes are very sensitive to movement. When frogs leap they draw their eyes back into their sockets to protect them from damage. Each eye has special glands which produce moisture to stop it getting too dry in the air.

### Permanent markings

Dark bars behind and in front of the eyes are the only regular markings.

### Hearing

Frogs have good hearing. Just behind the eye is a large eardrum which leads to the rest of the ear inside the head.

### Breathing

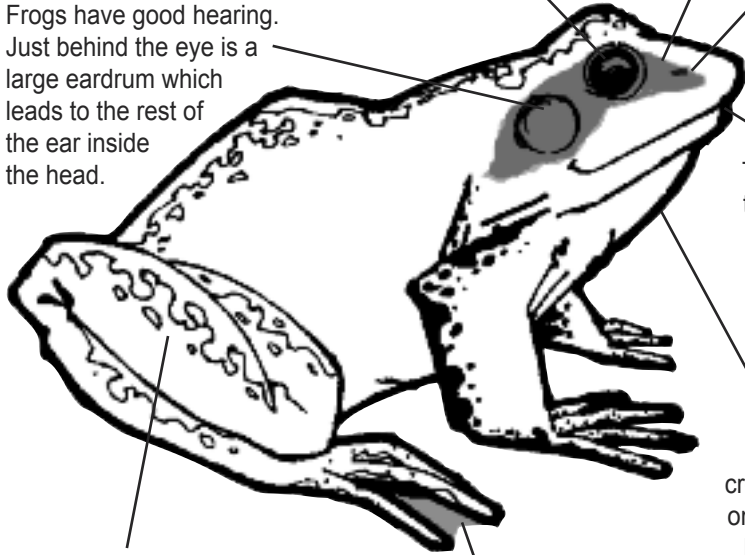
Nostrils for breathing air when the frog is on land.

### Sticky tongue

The frog's long sticky tongue is attached to the front part of the mouth, so that it can flick out to catch flies.

### Vocal sac

Each time the frog croaks, this loose skin on its throat expands. Frogs make lots of different sounds, especially in the breeding season.



### Strong muscles

The frog's hind legs are used for swimming in the water and leaping on land.

### Webbed feet

These are like flippers and help the frog to swim away from danger very fast.

### Coat of many colours

The colourful patterns on the frog's skin help to disguise it from enemies such as rats, herons and hedgehogs. A frog can also make its skin become darker to match its surroundings. This colour change takes about two hours to effect.

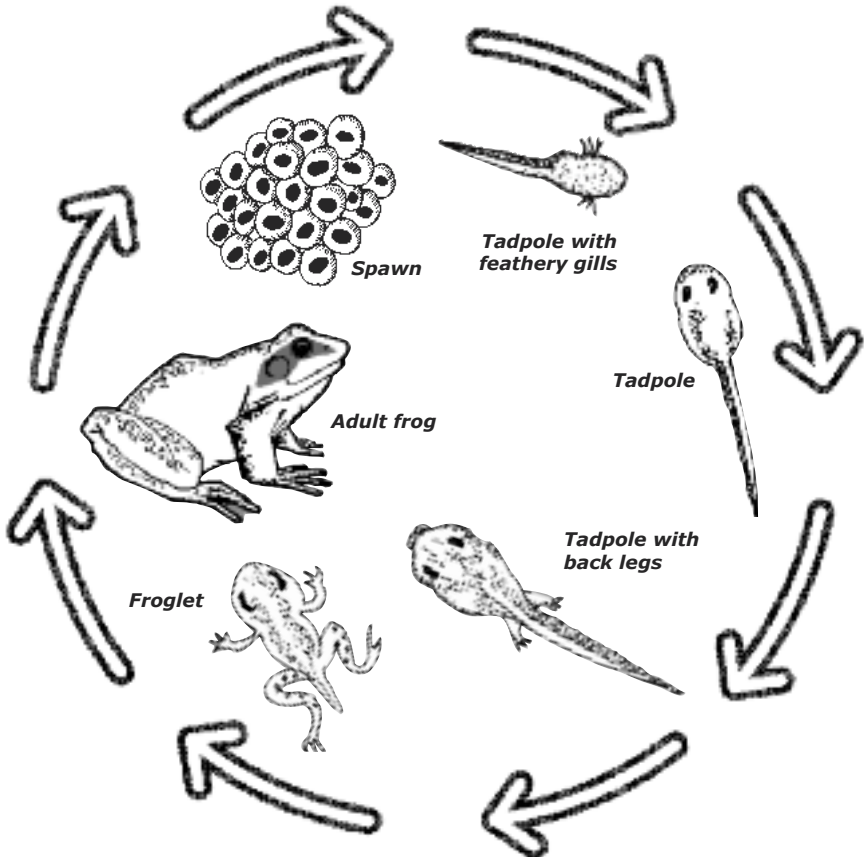


Frog camouflage in action  
Image: N. Madigan

# Frog Life-Cycle

When adult frogs emerge from hibernation they migrate and congregate in large numbers at various breeding sites. They may travel up to 1km to find the same pond year after year. The males always arrive first and strike up a chorus of loud croaking to attract females. Frogs do not have any elegant courtship rituals; the eager male simply grabs the nearest female as she arrives at the spawning site. Jumping onto the female's back, the male wraps his

forelimbs around her body and grips using nuptial pads, on the fore limbs - a position called amplexus. Spawning can take place any time during amplexus and lasts only a few seconds. As the female lays up to 4,000 black eggs the male releases sperm. The eggs are fertilised immediately before their gelatinous capsules absorb water, swell and rise to the surface.



Growing up - from egg to adult, the life cycle of the Common frog (*Rana temporaria*) takes over a year to complete.



Male frogs gather in a pond in spring and begin croaking to attract females.  
Image: E. Delaney



Adult frog with spawn.  
Image: A. Murphy



A clump of frog spawn.  
Image: L. Tisjima

### Eggs & Jelly Babies

Known as frog spawn, frog eggs are 2-3mm in diameter and are surrounded by jelly. When the eggs are deposited in the water the jelly swells to a diameter of 8-10mm insulating the egg from the water. The egg develops into a tadpole in 10-21 days (the higher the temperature of the water, the shorter the development time).

### Tadpole Terrors

The tadpole digests the spawn jelly using a special secretion and hatches. Specific adhesive organs fasten the newly hatched tadpole to other spawn or plants in the pool. At this early stage tadpoles have no mouth, and until it's mouth organs form it feeds on an internal yolk sac attached to its stomach. At approximately 2 days old the external gills, mouth and eyes are formed. At this stage the tadpole moves like a fish and begins to eat algae. At 12 days spiracles and internal gills are formed. At 5 weeks the hind legs are showing and the

lungs are forming. It then has to swim to the surface of the water to gulp air. The tadpole has fleshy lips with rows of teeth for rasping away at water plants and by seven weeks it also eats insects and even other tadpoles.

### Froglet

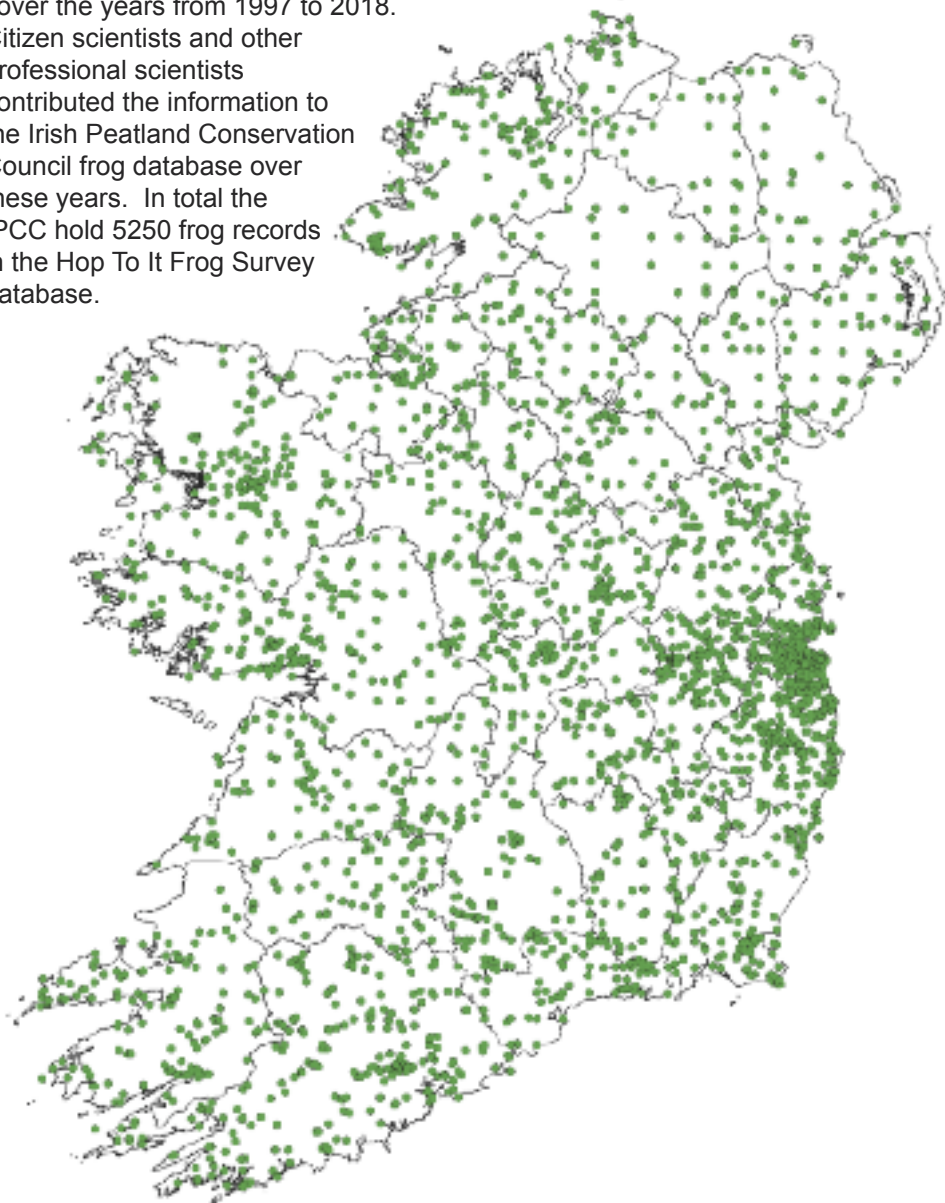
At 10 weeks the forelegs are growing. The hind legs are fully grown and the tail is reducing. At 14 weeks the tail is nearly fully absorbed. At this stage the froglets are usually starting to spend time on rocks or in nearby damp grass. Many are eaten by predators before they are fully grown. In winter frogs hibernate in frost-free refuges, under tree stumps, in compost heaps, in stacks of turf, in leaf piles or in rock piles where they enter torpor until the following spring.

Young frogs usually double in size by the following autumn and they reach sexual maturity in their third year. They can live for 7-8 years.

# Frog Distribution in Ireland

This map shows the distribution of the Common Frog in Ireland. Frogs are found in every county in Ireland. The frog records used to compile this map cover the years from 1997 to 2018. Citizen scientists and other professional scientists contributed the information to the Irish Peatland Conservation Council frog database over these years. In total the IPCC hold 5250 frog records in the Hop To It Frog Survey database.

The Common Frog is a protected species in Ireland and is listed in Annex V of the European Union Natural Habitats Directive.





# What Threatens Amphibians?

Amphibians are indicator species. This means that they are very sensitive to changes in the environment around them such as pollution and global warming. They make good indicator species because they live in two environments - land and water, and have thin skin that they can breathe through. Their skin can absorb toxic chemicals and diseases. If Amphibians disappear from an ecosystem it may be a sign that it has become polluted. Likewise, if there are lots of Amphibians in an area it means the ecosystem is healthy.

☞ Amphibians are an important source of food for predators including birds, fish, fox and otter. They are not threatened by natural predators provided their populations remain in balance.

☞ Over 50% of Ireland's Amphibian wetland habitats have been lost to drainage, industrial peat extraction, pollution and natural degradation in the past 100 years.

☞ A danger to Amphibians is from accidental/deliberate burning of their habitats such as bogland.

☞ Exposure to chemical fertilisers, pesticides, herbicides and heavy metals can poison Amphibian populations.

☞ Herpetologists blame increasing UV radiation levels and the resulting

damage to the ozone layer for world wide Amphibian declines since 1989. UV radiation damages DNA causing cell mutations and death.

☞ During a few warm, damp nights in spring, thousands of Amphibians follow traditional migration routes on their way back to spawning ponds. Unfortunately, hundreds can be squashed and killed by traffic on intervening roads as they make for the pond in which they were born.

☞ The fungus *Batrachochytrium dendrobatidis* parasitises Amphibians and has caused frog and toad population declines throughout the world since the 1980's. Several mass deaths of frogs have been blamed on a disease known as "red leg". A British study has uncovered a new virus - *Ranavirus* which is responsible for killing frogs.

☞ It takes 14 weeks for a tadpole to develop and emerge onto land. Summer drought and extreme weather events caused by climate change reduces breeding success.

☞ Keeping exotic frogs as pets are a danger to native species if they escape or are introduced to the wild. Report sightings to [www.biodiversityireland.ie](http://www.biodiversityireland.ie).



Frogs are dying from the effects of pollution, climate change and habitat loss.

# Frog Friendly Gardens



Ragged Robin  
Image: C. O'Connell



Bog Bean  
Image: C. O'Connell



Flag Iris  
Image: A. Butler

Frog-friendly Pond.  
Image: C. O'Connell

The best way to make your garden frog friendly is to provide a garden pond. Immature and female frogs hibernate under logs, piles of stones and amongst leaves under hedges, so don't be too tidy in the garden and the frogs will thank you for it. Here are some tips to help you keep your garden pond frog friendly.

- 1 The pond should have an irregular perimeter and the sides should be very shallow so frogs can get in and out easily.
- 2 There needs to be plenty of algae for tadpoles to eat. Don't include fish because they eat tadpoles.
- 3 There must be plants near the edge of the pond for spawn to be laid in and for tadpoles to hide and feed in.
- 4 One part of the pond should be at least 60cm deep so that hibernating frogs won't freeze to death.
- 5 The pond should be dug in October/November in a sunny, open place away from trees, because tadpoles need warm water to develop into frogs. Don't have the pond too near your house as the constant movement of people will disturb frogs and wildlife.
- 6 If there are young children around, incorporate protective grilling just under the water surface of the pond.
- 7 Let the grass grow long around the edge of the pond because froglets need long grass to hide in when they first emerge from the pond.
- 8 Plant the pond from mid Spring to Summer with insect-loving plants to attract insects for feeding frogs and other animals.

## Frog Friendly Plants

- 9 Introduce wildlife two weeks after planting e.g. water snails, pond skaters, dragonflies, flatworms.
- 10 Collect a bucket of water and associated wildlife from an established pond, canal or stream to start you off.
- 11 If the pond freezes for a long time in winter, frogs may suffocate. This can be rectified by using a pan of water to melt the ice - smashing the ice can cause shock waves and harm the pond's inhabitants.
- 12 Top up the pond regularly with small volumes of rain water from a water butt in dry weather.
- 13 Provide hibernating sites for frogs and other pond animals in the garden surrounding the pond such as a log pile, compost heap, pile of stones or autumn leaves.
- 14 Avoid using chemicals and non-organic fertilisers in and around your garden as they may harm frogs who drink and breathe through their skin.

**Submerged:** grow under water e.g. water starwort, hornwort, willow moss

**Floating:** drift on pond surface e.g. frogbit, duckweed, water soldier

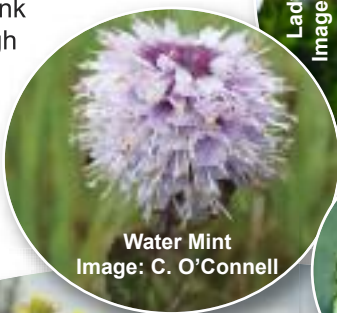
**Deep Water:** roots on pond floor with leaves floating on pond surface e.g. water violet, yellow pond lily, white water lily, pond weed.

**Marginal:** grow in the shallows e.g. marsh marigold, yellow flag iris, bog bean, water mint, water plantain.

**Marsh:** grow in waterlogged ground e.g. bugle, ragged robin, lady's smock, meadow sweet, valeriana, purple loosestrife.



Lady's Smock  
Image: N. Madigan



Water Mint  
Image: C. O'Connell



Yellow Water Lily  
Image: C. O'Connell



Marsh Marigold  
Image: C.O'Connell

# Amphibian Facts

- ☛ People who study Amphibians are called Herpetologists. Herpetology is the study of Amphibians and Reptiles.
- ☛ Amphibians must shed their skin as they enlarge in size. The old skin is discarded like a piece of clothing that has become too tight. Usually the shed skin is eaten.
- ☛ Amphibians eyes come in all shapes and sizes. Some even have square or heart shaped pupils. But Amphibians only see in black or white.
- ☛ Under the water, a frog's eyes are protected by an extra transparent eye lid called a nictitating membrane.
- ☛ Frogs cannot live in the sea or any salt water.
- ☛ Frogs are found in every continent of the world except Antarctica. Tropical regions have the greatest variety of species.
- ☛ There are 4,000 types of Amphibian in the world, but Europe only has 45 species.



**Frog bones form a growth ring every year when the frog is hibernating. Scientists can count these rings to discover the age of the frog.**

- ☛ Frogs absorb water through their skin so they don't need to drink.
- ☛ Frogs lay up to 4,000 eggs at one time. The jelly around the eggs helps to keep them warm. The temperature inside a clump of eggs is often much higher than the temperature of the pond water around them.
- ☛ The eyes and nose of a frog are on top of its head so it can breathe and see when most of its body is under the water.
- ☛ Frogs can live equally well in water or on land.
- ☛ Some frogs can survive in conditions well below freezing. The Grey Tree Frog can survive even though its heart stops. It does this by making its own antifreeze which stops its body from freezing completely.
- ☛ IPCC's species adoption scheme lets you symbolically adopt a frog. This helps IPCC protect peatland habitat for frogs and carry out the Hop To It Frog Survey each year. Frog adoption costs €20. You receive a thank you card, an adoption certificate with your name plus some frog postcards to send to family and friends. Visit [www.ipcc.ie](http://www.ipcc.ie), call 045-860133 or email [bogs@ipcc.ie](mailto:bogs@ipcc.ie).



# Spot The Difference



Common Frog  
Image: N. Madigan



Smooth Newt  
Image: N. Madigan



Natterjack Toad  
Image: M. Mahony



Common Toad  
Image: Niall M.

Here are some helpful tips to help you identify between Amphibians found in Ireland:

- \* Common Frog (Loiscán)
- \* Smooth Newt (Earc Sléibhe)
- \* Natterjack Toad (Cnádan)
- \* Common Toad (Buaf coitianta)

## Movement

The Common Toad and Smooth Newt move by crawling. Common Frogs can jump and crawl while Natterjack Toads run and crawl.

## Body Size

Common Frog and Natterjack Toad bodies are 60-80mm long, A Smooth Newt's body length can be up to 100mm long while the body of a Common Toad is 110-170mm.

## Courtship Rituals

Male Common Frogs croak to attract females from late January. Male Smooth Newts perform a courtship dance underwater to impress females from March. Similar to Common Frogs male Natterjack Toads croak loudly from March onwards. While between March and June Common Toads fight to secure dominance and breeding opportunities with females.

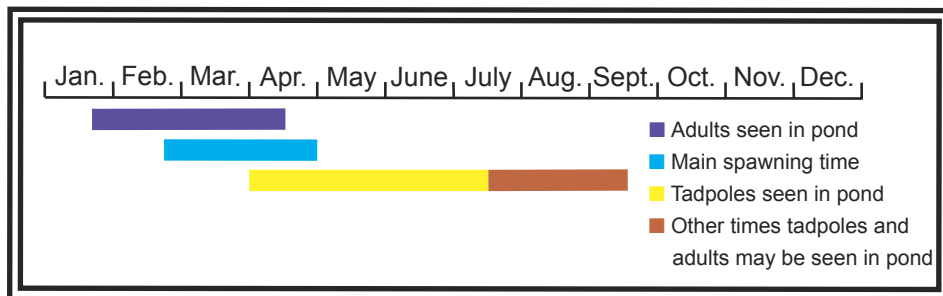
## Tail or Not

The Smooth Newt is the only Amphibian in Ireland with a tail.

## Skin

The Common Frog has smooth, moist shiny skin, whereas both the Common and Natterjack Toads have warty skin. Smooth Newts have smooth skin in water and rough skin on land.

# How to Frog Watch



Here are 8 tips to help you find and record frogs safely.

- 1 Young people should always go frog watching with a parent or guardian. Make sure you are dressed for the weather. Ponds can be cold and deep so be careful. Don't stand or wade into water. Never splash other people. Cover any cuts or scratches with waterproof plasters. Don't get water, or anything that has been in the water in your mouth. It could make you ill. Take all litter home with you.
- 2 You should start looking for frog spawn from the middle of January onwards. Small tadpoles can be found from the end of February onwards.
- 3 Ponds, pools and stagnant water are the best places to look for frog spawn - but you could find it in streams, bog pools or even in an old bath tub.
- 4 When you find spawn or tadpoles, fill in the frog survey from opposite and post it to IPCC, Lullymore, Rathangan, Co. Kildare R51 V293. Remember to tell us where and when you found the different stages in the life-cycle of the frog.
- 5 So that we can see how successful different places are for breeding frogs we would like you to re-visit (if possible) the place where you found spawn and tell us if tadpoles develop and what stage they reach. Even if no froglets or tadpoles are seen we would like you to tell us on the survey sheet - it will help us to decide which are the best and worst breeding habitats for frogs.
- 6 You can visit and record more than one pond - just make a photocopy of the survey sheet opposite for each site you visit.
- 7 If you want the latest information about the Hop To It Irish Frog Survey please visit [www.ipcc.ie](http://www.ipcc.ie). You can print off extra survey sheets and access a lot more information about frogs on the web site. You can also submit your frog records online.
- 8 Take Care of Frogs - don't move frogs or frog spawn from one pond to another. This can transfer disease. Take care not to disturb the edge of the pond - it's the frog's home.

# Hop to It Irish Frog Survey Recording Sheet

Become a Citizen Scientist. Please tell us where you have seen frogs or any of the stages in the frog's life-cycle for our on-going Hop To It Irish Frog Survey. Please photocopy a new page and complete for every site where you find frogs. Thank you.

**Name of Frog Site Location:**.....

**Nearest Town:** ..... **County:** .....

**Grid Reference for Site:** ..... (Can be found on [www.biology.ie](http://www.biology.ie))

**Location of Frog Site:**  inner city  city suburb  country

**Numbers Seen:** Please record the date and the number of clumps of frog spawn, individual tadpoles, froglets and adult frogs seen using the following codes:

**A:** 1 **B:** 2-9 **C:** 10-29 **D:** 30-100 or more

Frog Life Cycle Stage	Date	Number Seen
1 Frog spawn clumps		
2 Swimming tadpoles		
3 Tadpoles with back legs		
4 Froglets with four legs and stumpy tail		
5 Adult Frogs		

**Type of Site:**

- Pond (please give diameter: ..... m)
- Bog Pool
- Ditch or Drain (please indicate whether water is  still or  moving)
- Stream
- Other .....(please specify)

**Habitat Surrounding Breeding Site:**

- Garden/Park  Woodland/Forest  Sand Dune
- Farmland/Grassland  Bog/Heathland  Lake/Marsh
- Other .....(please specify)

**Potential Threats:**

- Predation  Pollution
  - Habitat drying out  Fire (e.g. deliberate burning of bogs)
  - Habitat loss  Evidence of disease/infection
- Tick if this is the first record you are sending in for this site.**

**Name:**.....

**Address:**.....

**E-mail:**.....

**Telephone:**.....

**Tick if you would like to receive a digital Hop to It Citizen Scientist certificate of participation**

Please return to IPCC, Lullymore, Rathangan, Co. Kildare R51 V293 or submit your record online at [www.ipcc.ie](http://www.ipcc.ie)

Have you seen a  
frog or any of  
the stages of  
its life-cycle?

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Image: T. Whyte

Its time to join  
Ireland's Hop To  
It Frog Survey

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Comhairle Contae an Chláir  
Cavan - County Council



Comhairle Cathrach  
& Contae Luimnigh  
Limerick City  
& County Council



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Hop To It Frog Book - Survey Frogs & Become a Citizen Scientist

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bogs@ipcc.ie. Cover Image: © Common Frog by C. Connolly

The Irish Peatland Conservation Council is a national charity that works towards the conservation of a representative sample of Irish peatlands for people to enjoy now and in the future. Set up in 1982 the charity's longest running campaign 'Save the Bogs' includes conservation, restoration, management, monitoring, community engagement and raising awareness of the beauty and value of Ireland's wet and wild peatland habitats. The Save the Bogs Campaign supports the United Nations Sustainable Development Goals. Follow Irish Peatland Conservation Council at [www.ipcc.ie](http://www.ipcc.ie) or on social media

