

ALIEN INVADERS OF THE BROADS!



FAMILY ACTIVITY BOOKLET





Welcome to this Family Activity Booklet!

By completing these activities, you will discover and learn about the environment in the Broads, while exploring the importance of protecting this wetland from invasive non-native species..... AKA alien invaders!

How does it work?

1. Complete all the activities in this booklet.
2. With the help of an adult check your answers on the back of the booklet.
3. Take your completed booklet to any of the Broads Authority Visitor Centres
4. A list of participating Tourist Information Centres are available on the RINSE website at www.rinse-europe.eu
5. Alternatively, you can send us your answers by post to RINSE at Environment, Transport and Development, Norfolk County Council, County Hall, Martineau Lane, Norwich NR1 2SG or by email at nnsi@norfolk.gov.uk and we will send the sticker to you!

Image credits: All booklet illustrations by Tekura Maeva (www.tekuramaeva.com)
Puzzle devised and illustrated Ruth Murray (www.ruthmurray.net)

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Brought to you by:

RINSE – Reducing the Impact of Non-native Species in Europe
www.rinse-europe.eu



We need your help to track down invasive non-native species! With our free 'That's Invasive!' app you can identify and report 35 different invasive species using information on their biology, ecology and impact on the environment – all at the touch of a button!



RINSE





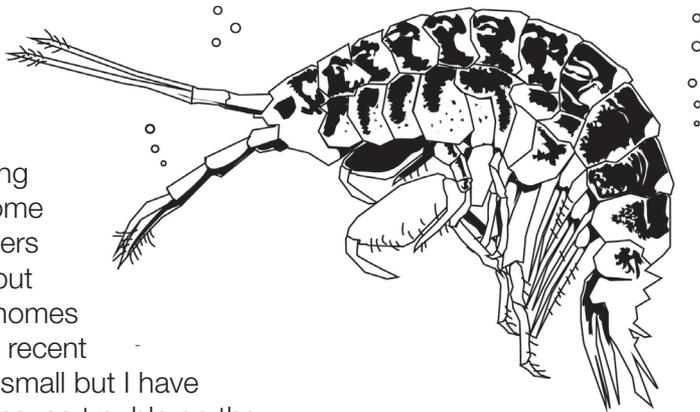
What are Invasive and Non-native Species?

Native species are plants or animals that are naturally found in an area. Non-native species have been introduced by people; they come from different regions, countries or even continents and have been moved to our area by accident or on purpose.

While most non-native species are harmless, some of them are damaging and upset the ecological balance because they are bigger, more aggressive and grow faster than our native species. These are invasive non-native species and they are **ALIEN INVADERS!**

In this activity you'll meet one troublesome invasive alien species, one harmless alien species and one threatened native species – which all live in the Broads. See if you can work out which is which!

1. "I am new to the Broads, arriving here in 2010. I come from faraway waters close to Russia, but have made new homes all over Europe in recent years. I might be small but I have a big appetite - I cause trouble on the Broads by eating lots of fish eggs! Everybody is worried that I might spread further because I like to hitch-hike – I'm good at hiding on boats, fishing equipment and clothes – which I plan to do! I am good at breeding, so there are lots of us. If no one stops us we're going to take over the Broads and disrupt local food chains





2. “I am a small round mammal with chestnut-brown fur and a tail. I have lived on the Broads for a very long time, so I am a local celebrity. I became even more famous across Britain after one of the characters in ‘The Wind in the Willows’ was based on me. They called me ‘Ratty’ - but I’m not actually a rat! I like to eat native plants, but I make sure I leave enough for everyone to eat so that I don’t hurt my local ecosystem. I am a really good swimmer and used to be seen swimming in and out of my burrows all over the Broads. These days my friends and I are not seen very often – our habitat has changed so much and one of our new invasive neighbours the Mink is very unfriendly and sometimes tries to eat us”.

3. “I first came to Britain a long time ago and I liked it so much I have stayed. In the spring I like to show off my magnificent white flowers and big green leaves. In autumn my leaves turn golden yellow and red and I grow big beautiful shiny brown seeds which I hide in a spiny green case. I get on well with my native neighbours and especially children because they like to collect my seeds to play a game called conkers”.





Problem Plants

Over 840 alien plants species have already arrived in Great Britain! Many have pretty flowers or leaves and are planted in gardens where they cause no harm - but some escape into the wild. Here they become invasive aliens and can cause damage to native wildlife. Invasive plants can cause three different types of harm:

- 1) Environmental
- 2) Economic
- 3) Human health

Read the stories about four invasive plants which you can find in the Broads. Label each plant with the type of harm it causes. Watch out – one plant is so bad it has TWO main impacts!

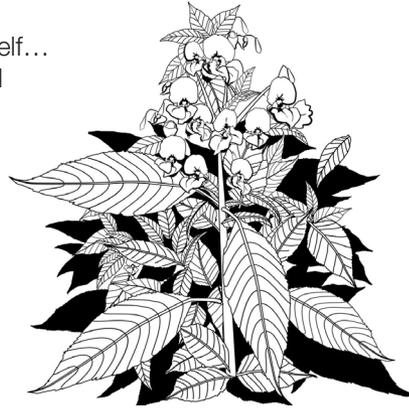
1. “I came to the UK when I was planted in a garden because of my impressive size. I can grow up to 5 metres tall - that’s as big as a double-decker bus! I have big jagged leaves and a flower head shaped like an umbrella and I can make nearly 50,000 seeds. If you see me, don’t touch me! I have toxic sap which can burn your skin!”

Did you know?
The roots of the Japanese knotweed can remain alive underground for up to 20 years!



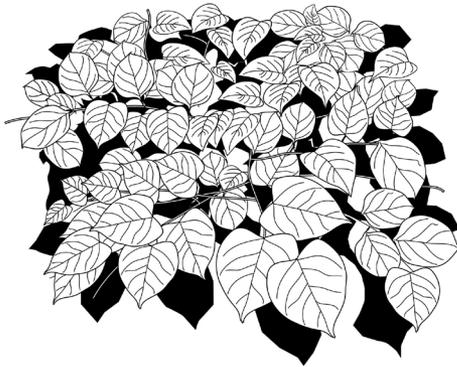


2. "I am a beautiful plant, if I may say so myself... I have bright pink and purple trumpet-shaped flowers – no wonder they imported me! Once I escaped from gardens, I quickly took over all the river banks as I have a fondness for damp environments. I bully other plant species away by blocking out sunlight so they can't grow. My roots are not as deep as native plant species so I cause soil to be washed away in winter."

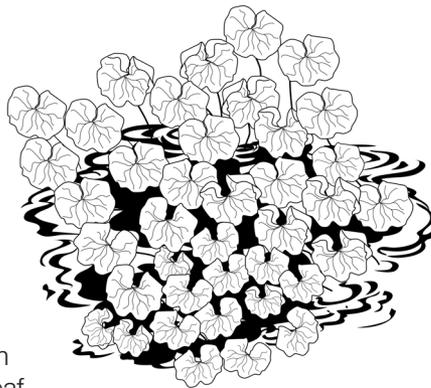


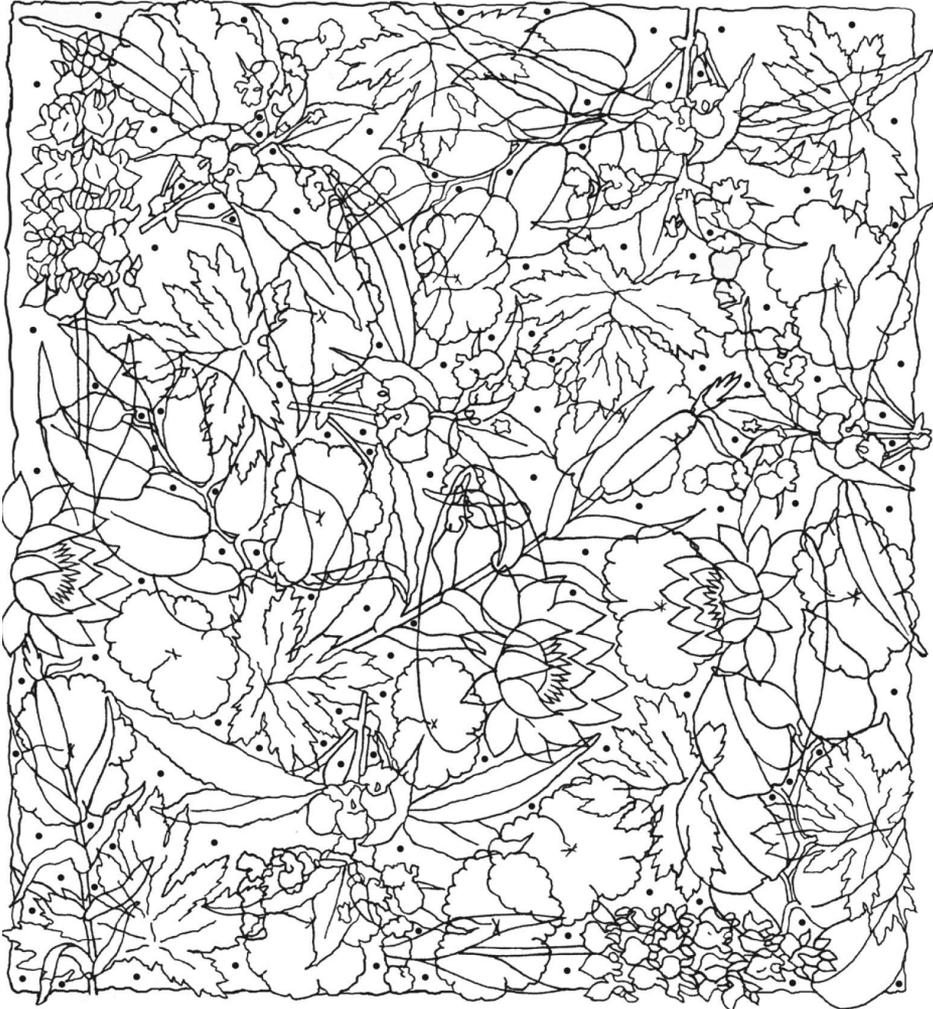
3. "I am a very exotic plant. People often say my purple-speckled stems look like bamboo. My leaves are yellowish green and shaped like a shield with a flat base.

I am one of the most aggressive invaders – it is really difficult and VERY expensive to get rid of me – I can cost you a lot of money if you find me near your house! I can spread naturally by my roots or you can help me if you accidentally move a piece of my root to a new area."



4. "I am a troublesome water plant. I grow very quickly – up to 20 cm every day and my kidney-shaped leaves float on water, making a thick blanket. This stops sunlight getting to other plants and makes it difficult for boats to move. I can cause drastic changes to the water quality, damaging the aquatic ecosystem. I am able to re-grow from tiny pieces of a leaf – good luck getting rid of me!"

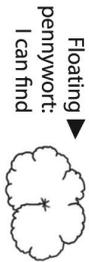
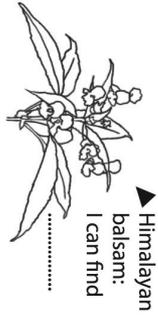




Find the Troublesome Aliens!

How many of each of these plants can you find amongst the native plants in the jumble picture?

Hint: Colour in the dotted areas first.



Puzzle devised and illustrated by Ruth Murray





Mystery Message

People often help to spread invasive species without knowing – by accidentally moving them from one place to another. In the anagrams below there are six invasive species that could be spread about the broads by anyone!

Complete each of the anagrams to reveal the names of the six invasive species. You can look back through this booklet for clues to help you work them out!

1. NATTERING WOLF PONY

2. EGGHEAD IN TOW

3. AWAKENED JEEP SNOT

4. HER SKILL PRIM

5. BAA ANIMAL HAM SLY





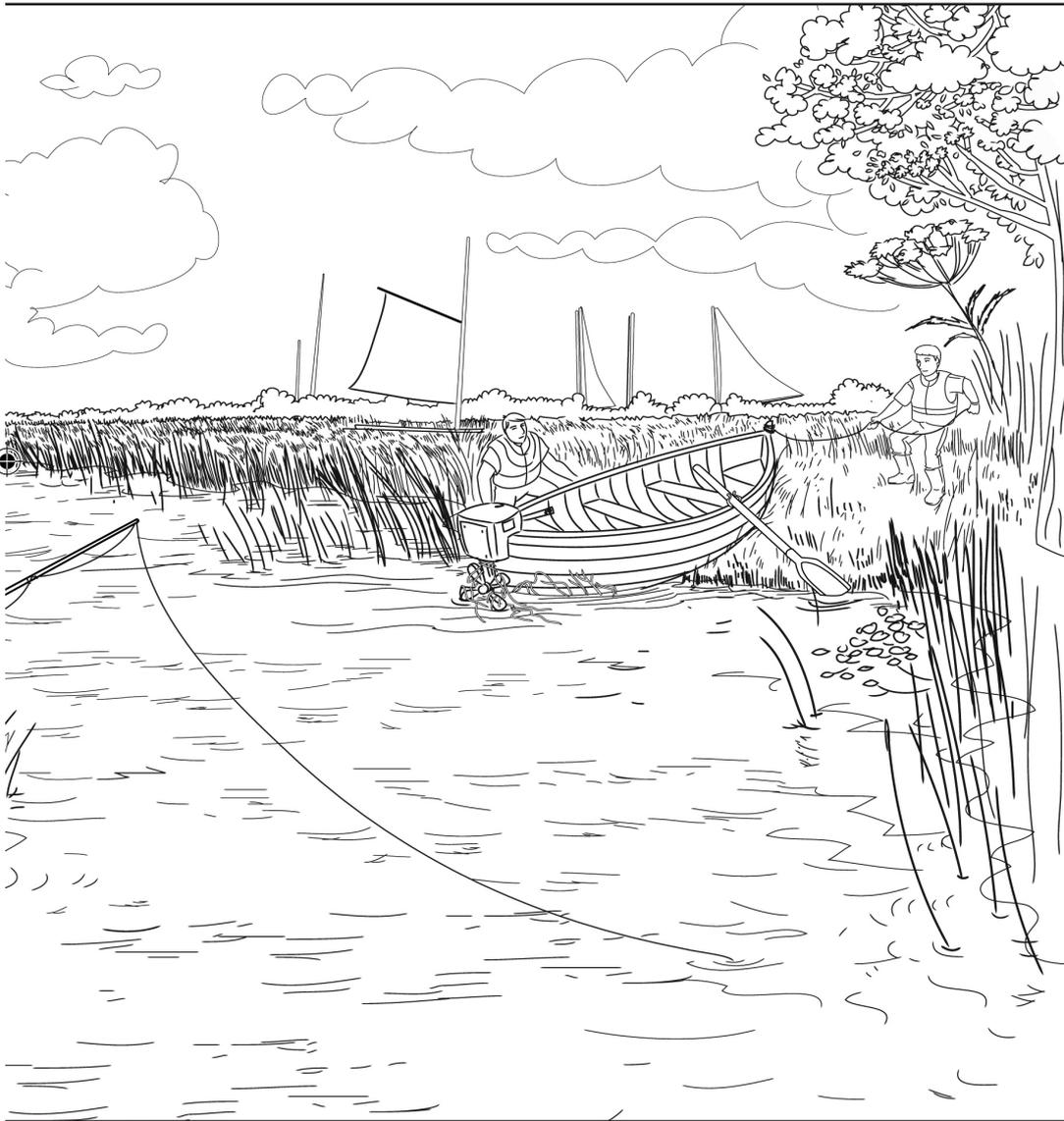
Pathways to Problems

Although some invasive species are deliberately brought to the UK, many are introduced by mistake! We accidentally help to spread invasive species during holiday or weekend activities like walking, fishing, sailing and canoeing.





Use your arty skills to colour in this scene from the Broads. After you've finished colouring, circle the places where you think invasive species might be hiding! **DON'T FORGET** - aquatic invasive species like the killer shrimp that you met earlier, can hitch-hike and hide on nearly anything!

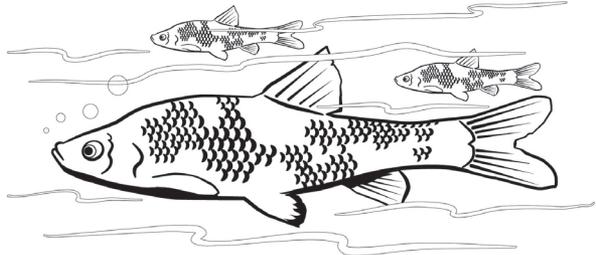




A Sneaky Spreader

The Broads is a very important landscape for wildlife and the UK's largest protected wetland. There are over 60 man-made broads many connected by over 200 km of waterway. This makes the Broads the perfect place for a boating holiday, but also highly vulnerable to invasion by non-native species!

One invasive alien we don't want to see in the Broads is the topmouth gudgeon. Its home is in East Asia, but the topmouth gudgeon was accidentally introduced to the UK in 1990.



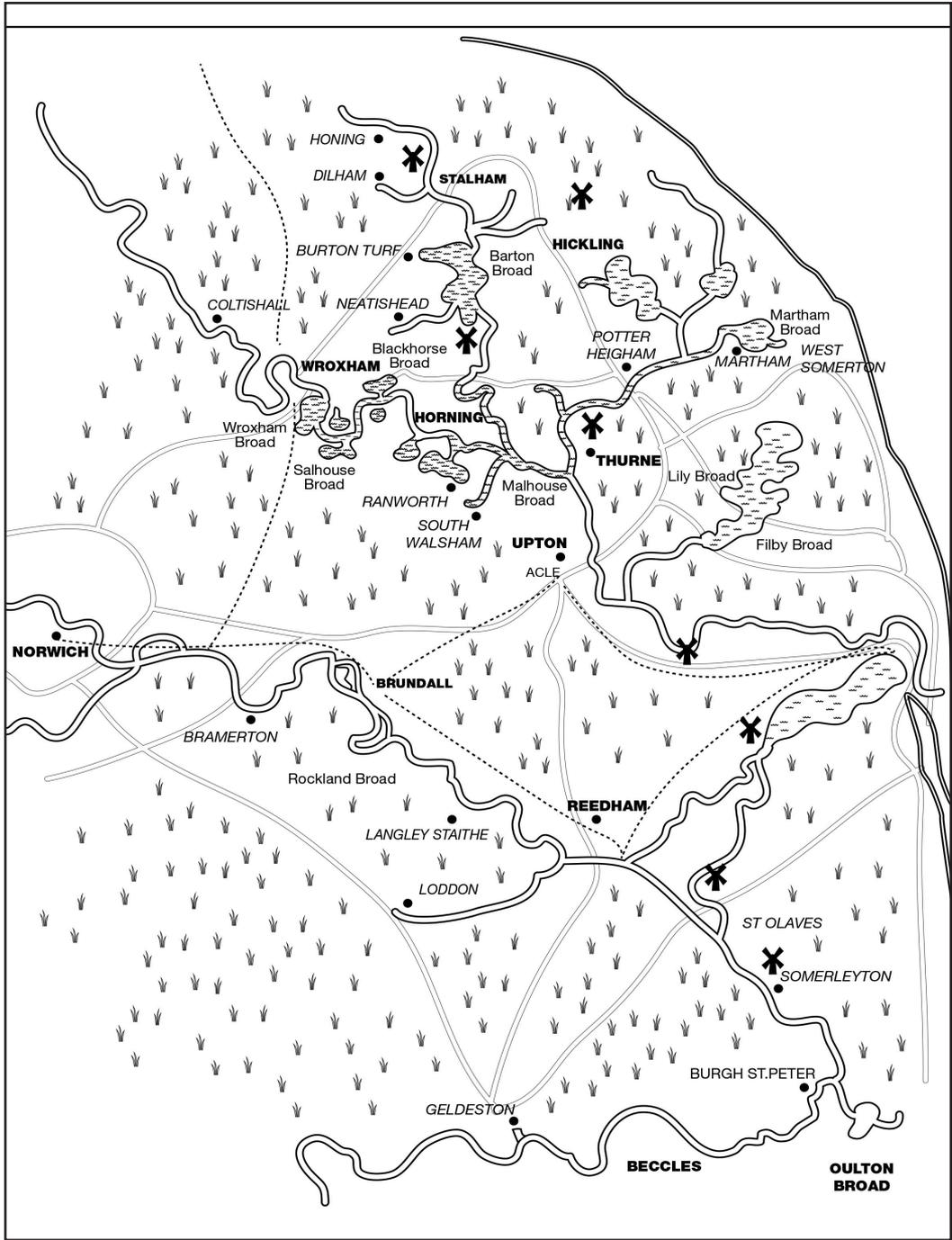
This fish may be tiny, but it is a huge threat to our freshwater habitats and the angling industry because it steals food and breeding space from our native species. Even worse, the topmouth gudgeon is host to deadly parasites and diseases which are dangerous to other fish in the Broads

Luckily this fish has not yet arrived here in the Broads – and we want keep it that way! Below you can see a map of the Broads. Now imagine that someone illegally introduced topmouth gudgeon into Lily Broad – can you work out how far would it spread?

Use the map across the page to answer the questions below.

1. How many broads (or lakes) could be invaded by the top mouth gudgeon?
2. How many Broads will be safe from this fishy alien?
3. Which Broad is most likely to be invaded because of its position and river connections?



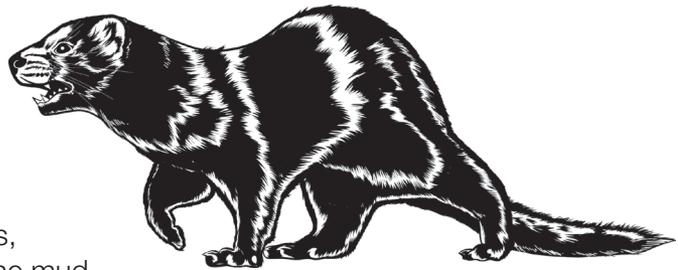




Nature Detectives

Some invasive species are very sneaky. They like to hide so that you never see them 'in the flesh'. The American mink is one of the sneakiest species on the Broads. This clever semi-aquatic mammal has a soft glossy brown coat, a slender body and a long tail. It might look cute and cuddly – but don't let it fool you! The mink is a top predator and its favourite foods are small birds, fish and small mammals. Thanks to the mink, the harmless little water vole has disappeared from most of the UK but in the broads they are protected from the mink by a volunteer trappers.

The mink might be sly, but we can outsmart it! We can tell where a mink lives because of the clues it leaves behind. American mink leave distinctive footprints, which are often seen in the mud along river banks. Its droppings are also very recognisable! These signs help us to outsmart the mink so that we can tell when they've been sneaking around causing trouble!

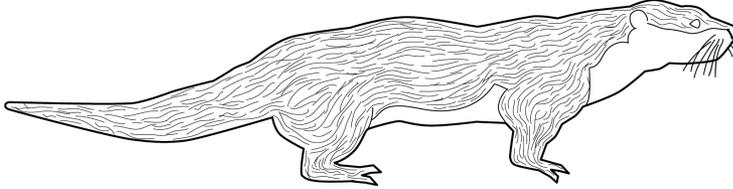
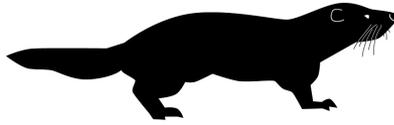


American Mink Droppings



Otter Droppings





Use these sketches to identify where a mink has been. Many people confuse the mink with our native otter – but the otter is **much bigger**. If you find a footprint, use the ruler at the edge of this page to measure the size – can you tell the difference?



Otter Foot Print _____ cm



American Mink
Foot Print _____ cm





Word Search Page

There are already more than 2000 non-native species established in the UK – with many more on their way from countries close by! Unless we act fast, these alien species will soon invade and cause problems for our native wildlife.

In the word search below are the names of 12 invasive species which are on their way...can you find them all?

Racer goby Japanese sea star Asian clam Red fire ant
Blady grass Emerald ash borer Sacred ibis Kudzu
Amur sleeper Nomad jellyfish Sea walnut Asian hornet

j	e	u	c	g	s	q	k	d	v	k	a	r	i	n
a	p	j	b	c	v	k	e	r	z	g	s	c	o	s
p	t	g	x	y	d	m	f	e	a	q	z	m	a	e
a	r	e	p	e	e	l	s	r	u	m	a	q	x	a
n	f	q	n	r	c	q	w	o	k	d	w	s	p	w
e	k	a	a	r	p	g	w	b	j	o	i	t	n	a
s	r	l	s	g	o	r	s	e	q	g	a	n	e	l
e	d	g	c	i	g	h	l	s	i	r	c	a	j	n
s	j	h	e	d	a	l	n	d	z	a	l	e	g	u
e	q	z	m	z	y	n	e	a	c	s	w	r	e	t
a	s	h	y	f	i	r	c	y	i	s	g	i	f	u
s	t	e	i	f	c	p	k	l	e	s	w	f	z	a
t	j	s	t	a	p	p	o	v	a	r	a	d	j	m
a	h	r	s	y	d	a	l	b	p	m	u	e	r	q
r	a	c	e	r	g	o	b	y	b	k	x	r	r	d





Poster Competition!

Now that you've learnt all about invasive non-native species and the damage these aliens can cause, you'll understand why it is so important to prevent them spreading across the Broads. There are lots of things you can do to help stop them – check out our Top Tips for Invasive Species on the back page!

We'd like you to design a poster for one of our Top Tip messages, encouraging people to help to stop the aliens invading! You'll find a poster template on the back of this page – ask an adult to help you cut this out and you can start drawing right away!

DON'T FORGET to take your poster to your local Broads Authority Visitor Centre so we can display it for everyone to see!

Make your poster stand out – You could win Broads Boat Trip for you and your family!

Make sure you write your name and contact details on the back of your poster to be included in the prize draw!

You can also send your finished poster to RINSE at:
Environment, Transport and Development, Norfolk County Council,
County Hall, Martineau Lane, Norwich, NR1 2SG to be included in the prize draw.

Participating centres include: *Whitlingham Broad, How Hill and Hoveton*

Thank you for helping protect our native wildlife and we look forward to seeing your posters!





Name:.....Age.....

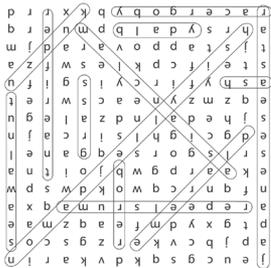
City/Town.....





Terms and Conditions for Poster Competition:

1. Participation in this poster competition is restricted to children under the age of 16.
2. To enter the competition, participants must submit their posters to RINSE, either in person to one of the participating Broads Authority Information Centres listed below, or by post at this address: RINSE, Norfolk County Council, Environment Room 301, County Hall, Martineau Lane, Norwich, NR1 2SG. Entrants will not be accepted by any other means.
3. Entries must be relevant to the RINSE Project, depicting invasive non-native species. Please refer to the suggested key messages in the Family Activity Booklet for guidance.
4. Posters submitted must be the work of the individual.
5. By entering the competition, you grant Norfolk County Council a licence giving the right to use, the winners or any other entrant's work, in any media or publicity in relation to promotion of the RINSE project, including post promotion.
6. The closing date for entries is 30th September 2014. Entries received after this date will not be considered for the prize draw, however may still be displayed at the TIC.
7. The winner shall be awarded a voucher for a family boat ride on one of the Broads Authority's own boats.
8. Winners will be identified by their preferred contact means which they are to specify when submitting their design.
9. The winning entry will be that which is judged to be most visually appealing, informative and contain key messages on the control of invasive non-native species. The winner will be notified 14 days after the competition closes.
10. Prizes are not transferrable, nor can be exchanged for any other goods and there is no cash alternative for winners.
11. If any winners are unable to be contacted after reasonable attempts have been made, Norfolk County Council reserves the right to either offer the prize to a runner up or re-offer the prize in any future competition.
12. Nothing shall bind Norfolk County Council to make any award of the prize and Norfolk County Council reserves the right not to award the prize.
13. UK law applies and the exclusive jurisdiction of the UK courts shall prevail.
14. Norfolk County Council reserves the right to withdraw this competition at any time or alter any of these terms and conditions at any stage, if deemed necessary in its opinion, and if the circumstances arise outside of its control.



Activity 9: Species Search
Completed Wordssearch

- Answers
- Activity 1: Native, Non-native or Invasive?**
 1. Killer Shrimp 2. Water Vole - Native 3. Horse Chestnut 4. Killer Shrimp 5. Himalayan balsam
- Activity 2: What's my Impact?**
 1. Giant hogweed: Human Health and environmental
 2. Himalayan balsam: Environmental
 3. Japanese knotweed: Economic
 4. Floating pennywort: Economic
- Activity 3: Spot the Invasive**
 1. 5 Himalayan balsam
 2. 13 Giant hogweed
 3. 8 Japanese knotweed
 4. 3 Floating pennywort
- Activity 4: Mystery Message**
 1. Floating pennywort 2. Giant hogweed 3. Japanese knotweed 4. Killer shrimp 5. Himalayan balsam
- Activity 5: Pathways to Problems**
 Invasive species could have been hiding in these locations: Canoe, fishermen waders, boat engine propellers, fishermen's bucket, balsam
- Activity 6: Sneaker Spreader**
 1, 10 (2), 2 (3), Filby Broad
- Activity 8: Nature Detectives**
 Mink footprint: Width: 2-4cm
 Otter footprint: Width: 5-6cm
 Other differences include: different snout; white chin (mink), white under belly (otter).





Top Tips for Invasive Species

Check Clean Dry! Boats and fishing equipment can hold standing water which helps invasive species to travel between rivers and lakes. Always Check, Clean and Dry your equipment before going to another site.

Be Plant Wise Aquatic plants can be invasive – taking over your pond and damaging the environment. So choose your plants wisely and remember to go for native species!

Know What You Grow Many exotic invasive plant species escaped from peoples gardens. Do your bit and grow native!

Say No to Hitchhikers! Invasive species are sneaky! Check for stowaways in seeds and soil before travelling.

Spot Them to Stop Them! The best way to stop invaders is to spot them early. Keep this booklet to remind you of the worst invasive species and let us know when you see them.

Get Involved! We need YOUR help to make a difference! Volunteer with your local conservation group or report invasive non-native species using our smartphone app “That’s Invasive!”

**Thank you for helping protect our native wildlife.
We look forward to seeing your posters!**



Broads Authority
The Broads - a member of the
National Park family



Norfolk County Council

