PRINTING GUIDELINES

When sending to your printer for production, please specify the following:
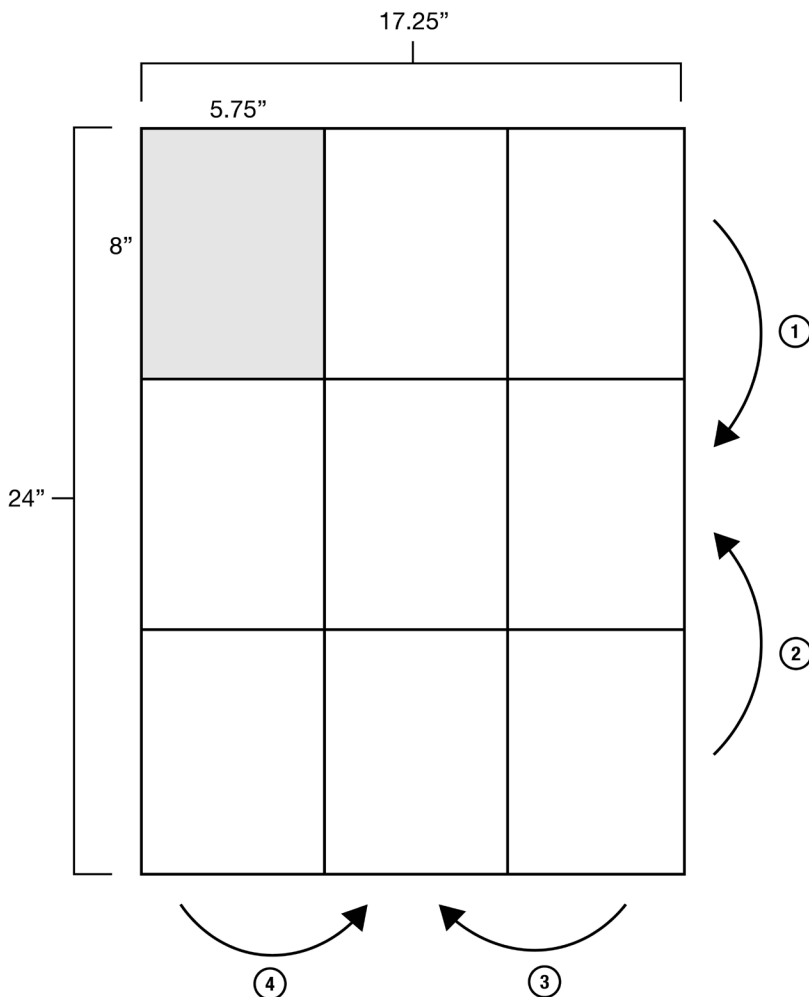
Printing Specs

Size (flat): 17.25" x 24"

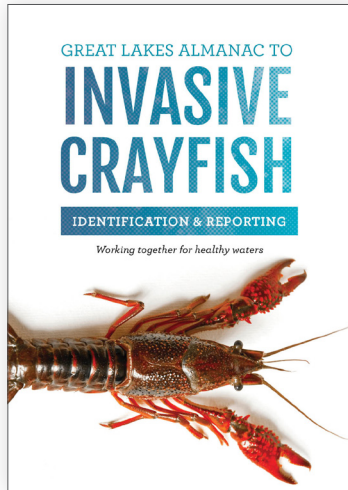Size (finished): 5.75" x 8"

Printing: CMYK + aqueous coating on 80lb dull text

Folding Guide

Unfolding Views

VIEW 1

GREAT LAKES ALMANAC TO

INVASIVE CRAYFISH

IDENTIFICATION & REPORTING

Working together for healthy waters

VIEW 2

WHAT'S THE PROBLEM?

Crayfish are popular aquarium pets and used frequently in classrooms. Well-meaning people sometimes release unwanted non-native crayfish into waterbodies, where they can become invasive and harmful to our environment. They rapidly reproduce, outcompeting our native species for food and habitat. Some invasive crayfish make deep burrows, which at high population levels cause damage to infrastructure and excessive erosion. It is expensive to manage invasive crayfish once they are established in a waterway and eradicating them is challenging.

Several crayfish species sold in retail outlets are appearing in waterways far outside their natural ranges. Aquarium retailers, suppliers, and hobbyists are therefore in a unique and powerful position to assist scientists in the detection and prevention of invasive crayfish by following the guidelines in this pamphlet.

DID YOU KNOW?

- There are over **670 crayfish species** worldwide, and they are important members of aquatic ecosystems.

- **Crayfish should never be released into the environment.** This includes those sold as pets, food, and for classrooms.

- Non-native crayfish are **a major threat to native aquatic species and can cause undesirable environmental changes** such as bank erosion and destruction of important aquatic plants.

- Retail crayfish have been bred by hobbyists and culturists around the world to have **diverse colors, color patterns, and shapes** which can make identification difficult.

Both images are of Procambarus clarkii aka red swamp crayfish

VIEW 3

WHAT'S THE PROBLEM?

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CRAYFISH OF CONCERN

In the Great Lakes region, these four kinds of crayfish species are most likely to appear in trade: rusty crayfish (*Faxonius rusticus*), red swamp crayfish (*Procambarus clarkii*), marbled crayfish (*Procambarus virginalis*), and Australian crayfish (*Cherax* species). Information presented in this pamphlet will help you determine if you're in possession of one of these non-native crayfish.

Rusty crayfish

Red swamp crayfish

Marbled crayfish

Australian crayfish

It is not guaranteed that the information in this pamphlet will help retail stores detect all instances of invasive crayfish. The goal is to provide both biological and identification information to prevent future introductions.

FOUND A SUSPECTED INVASIVE CRAYFISH? TAKE THESE STEPS:

Regardless of the legality of crayfish retail and possession, any suspected invasive crayfish should be removed from stock and reported. Follow these steps.

1. Take multiple, high resolution photos including close-up shots from different angles and a full body shot from the topside and underside of the crayfish. Report it to your state's natural resource agency (DNR, DEC, etc.).

2. Euthanize the crayfish by placing it in a freezer overnight.

3. Do not use live, suspected invasive crayfish to feed other aquarium fish species. You may be asked to retain the carcass for further identification.

PHOTO TIPS: Shoot on a solid colored background. Make sure there are no harsh glares or shadows. Prop your arm on a solid surface to ensure a steady hand (any blurring can make it hard to identify!)

Unfolding Views

VIEW 4

PRO TIPS:

Inspect and report any shipments that may include invasive crayfish.

- Regulations concerning the sale of crayfish exist only as state-level laws and vary widely, which causes confusion among wholesalers who ship nationwide.
- This makes it easy for retailers to unintentionally receive invasive species of crayfish.
- Become familiar with the laws regulating species in your state by checking with your natural resource agency.

Don't release crayfish into the wild!

Use physical features instead of color or the labelled name to decide if it's an invasive crayfish.

Crayfish can have many names, which allow invasives to slip past regulators and sellers. Always get the scientific name from suppliers.

WE'RE ASKING PURELY FOR SCIENCE!

It's ok if an invasive crayfish found it's way to your tank, we just ask that you report it to your state's natural resource agency.

Common yabby

Red claw (female)

All female Australian crayfish lack the sperm pouch that North American species have (see the marbled crayfish for comparison).

In the male red claw crayfish, the outer finger of the claw generally has a soft, bright colored red patch. Several other Australian species may also have this patch but in white.

Red claw (male)

This species has a distinct marbling pattern, but other species may look similar. Male crayfish with this pattern are not marbled crayfish.

To determine if its a female, look for a round pocket-like feature located on the underside between the last pair of walking legs. This is the sperm pouch (called an 'annulus ventralis').

GOT A SUSPECT? >>>>
1. Take multiple, high resolution photos of the crayfish and report it to your state's natural resource agency.
2. Euthanize crayfish by placing it into a freezer and leaving it overnight.
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VIEW 5

INVASIVE CRAYFISH TO WATCH OUT FOR

HOW TO USE THIS IDENTIFICATION GUIDE:

Check your crayfish against these four species using the highlighted anatomical features.

If all the anatomical features match, it is possible the crayfish is invasive.

In addition to these four species, there may be more crayfish that your state is concerned about. Contact your natural resource agency for a current list and identification resources.

Ornamental red swamp crayfish are bred in a wide variety of colors (white, purple, blue). Their claws usually have a 'sabre-like' shape and have bumps all over. These bumps are dark red in wild red swamp crayfish. Ornamental varieties may have different colored bumps but if examined closely, there may be a red tint to the bumps.

Red swamp crayfish typically have a 'closed areola', meaning the two inward curving lines on the back of the head touch each other.

Red swamp crayfish | *Procambarus clarkii*

Native to parts of the southern United States, the red swamp crayfish is the world's most intensely aquacultured crayfish species. The species is sold under many names including red crawfish, Louisiana crayfish and tri-color ghost lobster.

Rusty crayfish | *Faxonius rusticus*

Native to the Ohio River basin, rusty crayfish were traditionally most prevalent in the bait trade but can still be found in the aquarium trade.

Rusty crayfish usually have a brown 'rust' patch near the last 2 pairs of walking legs and black bands around the claw tips.

Rusty crayfish have a distinct narrowing at the base of the horn on the head.

Australian crayfish | *Cherax*

Australian crayfish are not native to North America. In the United States, concern exists for common yabbies (*Cherax destructor*) and red claw crayfish (*Cherax quadricarinatus*). Australian crayfish species are sometimes only labeled "yabby". These species may be found in the pet trade and are noted for their large size. Some closely resemble their lobster relatives.

Marbled crayfish | *Procambarus virginalis*

Marbled crayfish (or marmorkrebs) originated in the aquarium trade and are often called the self-cloning crayfish. All marbled crayfish are female and the offspring are clones. This species is of high concern because a single individual can produce an entire population in a short time.

All male Australian crayfish species lack hard reproductive parts on their undersides, but have a small bump protruding from the edge of the base of the last pair of walking legs called the 'genital papilla'.

Common yabby

Red claw (female)

All female Australian crayfish lack the sperm pouch that North American species have (see the marbled crayfish for comparison).

In the male red claw crayfish, the outer finger of the claw generally has a soft, bright colored red patch. Several other Australian species may also have this patch but in white.

Red claw (male)

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