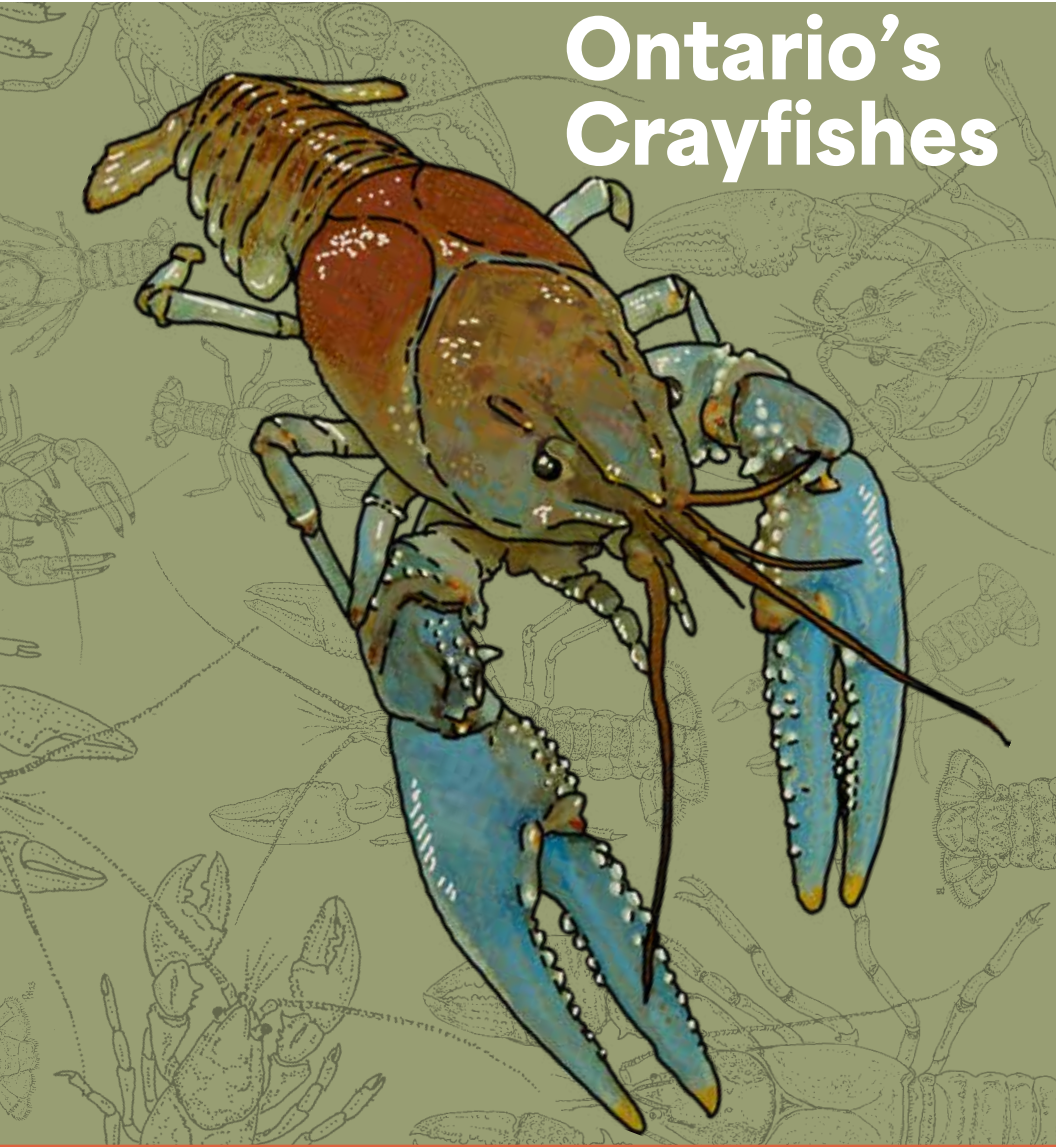


GUIDE TO Ontario's Crayfishes



Second Edition, 2025

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NOTE:

At the time of writing (March 2025), we are providing you with the most up-to-date information on the status of crayfishes in Ontario, including biological, geographic, and regulatory. It is important to understand that scientific names, establishment status, geographic ranges, regulatory status, etc. may change over time.

CONTENTS

INTRODUCTION TO CRAYFISHES OF ONTARIO AND CANADA

What are Crayfishes?	5
Distribution of Crayfishes in Canada.....	5
Habitats of Crayfishes	7
Canadian Status of Crayfishes	9
Anatomy of Crayfishes	9
Differentiating between Male & Female Crayfishes	10
Crayfish Rostrums & Areolas	12

NATIVE CRAYFISH PROFILES

Big Water/Robust Crayfish (<i>Cambarus robustus</i>)	14
Calico/Papershell Crayfish (<i>Faxonius immunis</i>).....	16
Digger Crayfish (<i>Creaserinus fodiens</i>)	18
Eastern/Brook/Common Crayfish (<i>Cambarus bartonii</i>).....	20
Great Plains Mudbug (<i>Lacunicambarus nebrascensis</i>).....	22
Northern Clearwater Crayfish (<i>Faxonius propinquus</i>).....	24
Paintedhand Mudbug (<i>Lacunicambarus polychromatus</i>)	26
Virile Crayfish (<i>Faxonius virilis</i>)	28

INVASIVE CRAYFISH PROFILES

Common Yabby (<i>Cherax destructor</i>)	30
Everglades/Electric Blue Crayfish (<i>Procambarus allenii</i>).....	32
Marbled Crayfish/Marmorkrebs (<i>Procambarus virginialis</i>).....	34
Obscure/Allegheny Crayfish (<i>Faxonius obscurus</i>).....	36
Red Swamp/Louisiana Red Crayfish/Crawfish (<i>Procambarus clarkii</i>)	38
Rusty Crayfish (<i>Faxonius rusticus</i>)	40
Signal Crayfish (<i>Pacifastacus leniusculus</i>)	42
Spiny-Cheek Crayfish (<i>Faxonius limosus</i>)	44
White River Crayfish/Crawfish (<i>Procambarus acutus</i>).....	46

HOW TO SAMPLE FOR CRAYFISHES

Site Inspection & Selection	48
Materials Needed to Sample	49
In-Water Sampling: Shallow Sites	50
In-Water Sampling: Deeper Sites	52
How You Can Help	54
How to Report Invasive Crayfishes in Ontario	56
How to Photograph Crayfishes for Reporting	57

TAXONOMIC KEY TO CANADIAN CRAYFISHES

How to Use the Taxonomic Key	58
Taxonomic Key	59
Crayfish Species Line Drawings	61
Crayfish Genera Gonopod Drawings	70

GLOSSARY OF TERMS, DEFINITIONS AND CHECKLIST

Glossary of Terms & Definitions	69
Personal Crayfish Checklist	76



INTRODUCTION TO CRAYFISHES OF ONTARIO AND CANADA

WHAT ARE CRAYFISHES?

Crayfishes are within the order *Decapoda*, which includes both freshwater and marine animals (e.g., lobsters, crabs, crayfishes, and shrimp). In Canada, there are two native families of crayfishes: *Astacidae* and *Cambaridae*. They usually only live a handful of years (3-4 years, but can be longer in the burrowing species) and mate from the spring to early summer (e.g., *Cambarus*). Crayfishes are generally omnivorous, foraging on aquatic and terrestrial invertebrates as well as vegetation. They also consume dead and decaying plants and animals, including animals that are higher in the food chain, such as fishes and amphibians. Using gills to breathe under water, they can sometimes be seen crawling on land when migrating in search of food or better habitat. Though timing varies, crayfishes cannot survive out of water for an extended period of time. As omnivorous foragers, they use their antennae to sense and locate food in the water and like their lobster cousins, crayfishes will moult (shed their exoskeleton) many times as they grow. Young crayfishes, for example, will moult much more often than adults, who will typically only shed once or twice per year. Crayfishes are an important link in aquatic and terrestrial food chains as they are consumed by a wide variety of predators, such as game fishes, frogs, snakes, turtles, and various species of birds and mammals (and even other crayfishes!). Minks and raccoons are particularly fond of crayfishes, and the former tends to leave small piles of crayfish parts on the rocks of their favourite hunting areas.

DISTRIBUTION OF CRAYFISHES IN CANADA

The general distribution of crayfishes in Canada ranges from Nova Scotia (where they have been introduced) in the east to British Columbia in the west and to the James Bay drainage in the north. In Canada, there are presently 15 species of freshwater crayfishes in six genera and two families. Five of these species are introduced from the United States, while the remaining 10 are thought to be native. Crayfishes have been

recorded from all provinces, except for Prince Edward Island, the Northwest Territories, Nunavut, and the Yukon. Of all the provinces, Ontario has the richest diversity with 13 confirmed species, of which, five have been introduced. Additionally, it is suspected that the spiny-cheek crayfish (*Faxonius limosus*) has entered eastern Ontario via the St. Lawrence and Ottawa rivers from Québec, where it has been introduced.

In Ontario, crayfishes are found far north all the way to rivers running into Hudson Bay, but their diversity decreases as you move from east to west. The true burrowing chimney builders, the digger crayfish (*Creaserinus fodiens*), paintedhand mudbug (*Lacunicambarus polychromatus*), and the great plains mudbug (*L. nebrascensis*), are also restricted to southern Ontario (below Lake Huron and Georgian Bay) by past glaciation and cold temperatures in the north as well as the absence of clay soil, which they prefer to burrow in. Moreover, northern watersheds, such as Lake of the Woods, has seen the introduction of the rusty crayfish (*F. rusticus*).



Figure 1—Dr. Premek Hamr with the world's largest crayfish species, Tasmania's giant freshwater crayfish (*Astacopsis gouldi*) (L. Hamr)

Worldwide, there are more than 640 species of crayfishes, with the world's largest crayfish, Tasmania's giant freshwater crayfish (*Astacopsis gouldi*) having the capability of reaching 6 kg, though 2-3 kg specimens are now considered large (Figure 1).

HABITATS OF CRAYFISHES

While many of us have fond childhood memories of catching or seeing crayfishes, most people today encounter crayfishes in running clear waters near shore under rocks and logs in lakes, rivers, and streams. However, their preferred habitats are wide-ranging and include wetlands, wet meadows, stagnant waters, ponds, ditches, reservoirs, lakes, seasonal as well as permanent streams, and large rivers. They exist in these habitats in urban, agricultural, as well as natural areas. Not all crayfishes, however, are found in open water as three of our native species, the digger crayfish (*C. fodiens*), the great plains mudbug (*L. nebrascensis*), and the paintedhand mudbug (*L. polychromatus*) construct extensive burrow networks, sometimes well away from permanent water, that go down to the water table often more than a metre deep into the ground.

The burrows made by these species, which are constructed to help them overwinter or survive periods of drought, may have several entrances that are capped by a carefully stacked pelleted chimney (Figure 2). These chimneys afford some protection and help in the ventilation of the networks. Whereas the calico crayfish (*F. immunis*) is often found in stagnant waters and is also capable of constructing burrows with chimneys. As many species create chimneys, it makes it difficult to identify which species is hiding in the burrow unless you dig it out with a shovel or spade. All four of these species will survive the winter by burrowing below the frost line and waiting out the winter months. Similarly, open water species will move away from the shoreline into deeper waters or dig deep burrows into the embankment of the river, lake, or stream to avoid freezing (Figures 2, 3, & 4 for burrowing examples).



Figure 2—Digger crayfish burrow with a pelleted chimney (P. Hamr)



Figure 3—A red swamp crayfish in a newly dug burrow (Brocken Inaglory, Wikimedia Commons)



Figure 4—White River crayfish burrow without chimney (B. Schryer)

CANADIAN STATUS OF CRAYFISHES

At the time of writing, each of the native species presented in this guide have an International Union for Conservation of Nature Red List rating of “Least Concern.” This label is reserved for species that are considered widespread and abundant. Visit www.iucnredlist.org for more information. Interesting to note, each of our native crayfishes in Canada have native distributions within the United States as well. Whereas, the same can not be said for crayfishes that are native to the United States, which includes many invasive species to Ontario and Canada.

Additionally, Environment and Climate Change Canada lists almost two-thirds of Canadian crayfishes as ‘Secure’, while three species are ‘Sensitive’ (e.g., digger crayfish, calico/papershell crayfish, and great plains mudbug).

ANATOMY OF CRAYFISHES

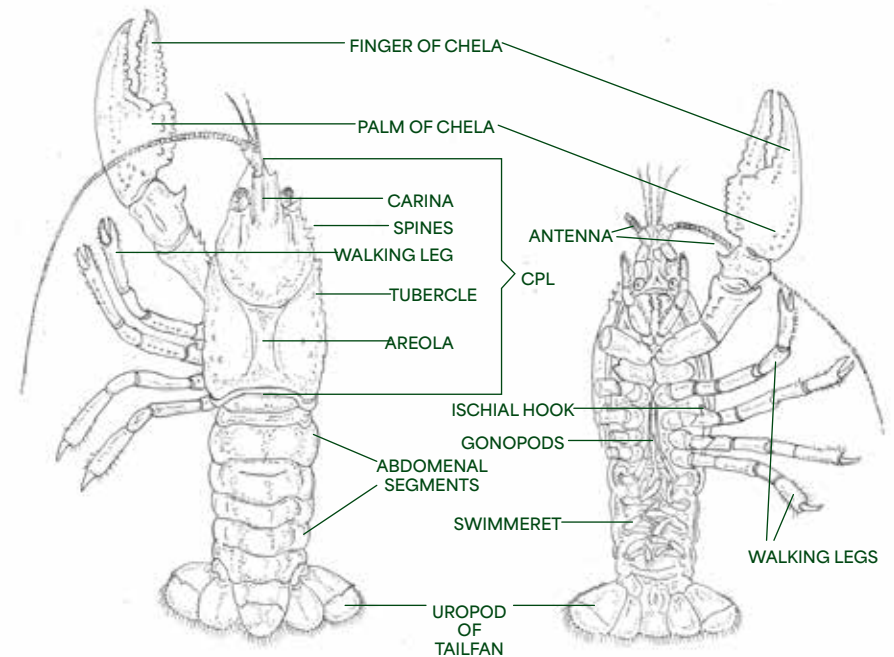


Figure 5—Anatomy of Crayfishes (P. Hamr)

DIFFERENTIATING BETWEEN MALE & FEMALE CRAYFISHES

Male and female crayfishes are relatively simple to tell apart. From the top of the crayfish, mature females generally have smaller claws and wider tails when compared to males. While on the underside (Figure 6), males have the first two pairs of swimmerets (on the abdomen) modified into copulatory structures (the gonopods or male reproductive organs), while females have a seminal receptacle (female reproductive organ) at the base of the fourth pair of walking legs as well as oviduct openings on the bases of the third pair.

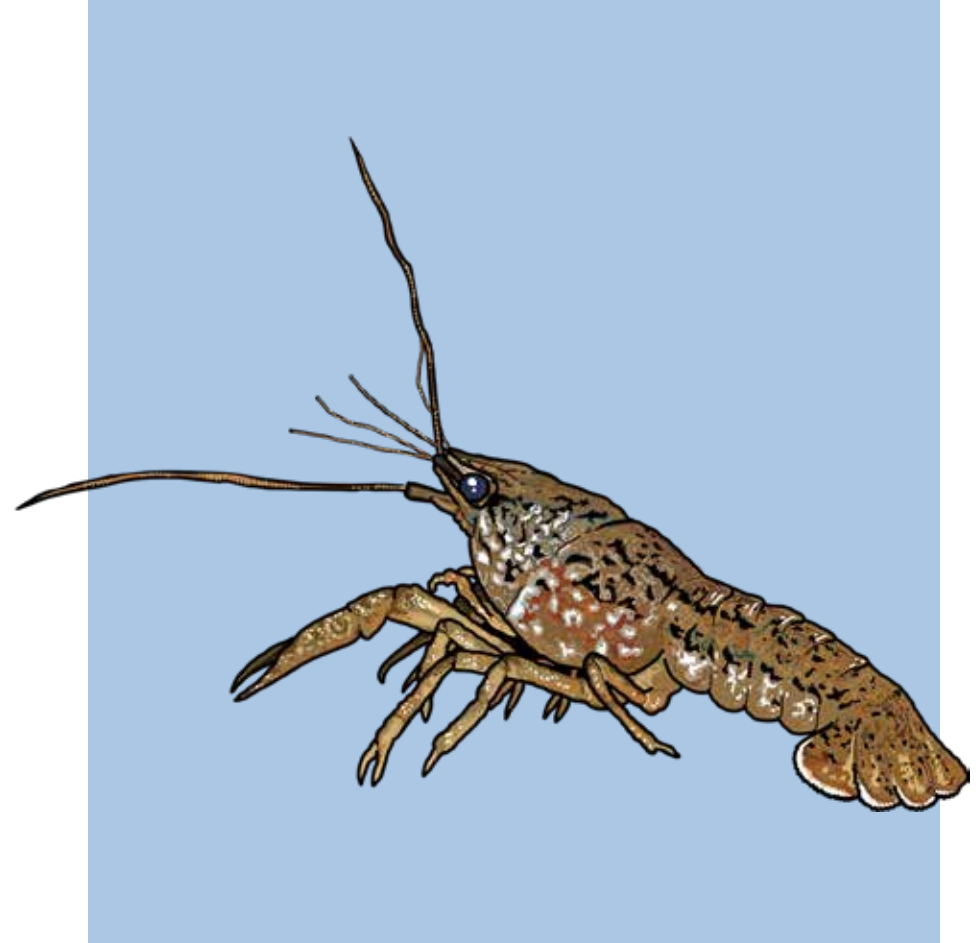


GONOPODS OF
MALE CRAYFISH

SEMINAL RECEPTACLE OF
FEMALE CRAYFISH

Figure 6—Northern clearwater male (left) and female (right) (P. Hamr)

When it comes to telling species apart, things get somewhat more complicated, however. When identifying crayfish species, it is best to look at large male specimens. The shapes of the gonopods of males in mating form are characteristic of each species and can be reliably used to separate them. Colour in crayfishes is not always a reliable identification characteristic to use as there can be significant variation between populations and even individuals within the same species. In some circumstances, patterns or markings can be used, a few good examples include the rusty spots on the sides of the carapace in the rusty crayfish (*Faxonius rusticus*) and the double row of spots on the abdomen of the virile crayfish (*F. virilis*).



CRAYFISH ROSTRUMS & AREOLAS

Rostrums and areolas can act as important identifying features when attempting to differentiate between species. Here, we are demonstrating some of the rostrums of different genera. An especially important feature to look for when differentiating between the native northern clearwater crayfish (*Faxonius propinquus*) and the invasive rusty crayfish (*F. rusticus*) is the presence of a carina, or ridge-like structure running parallel to the sides of the rostrum in between the eyes. Note that the northern clearwater has a carina (Figure 8), while a rusty crayfish does not (Figure 10). Though hybrids of these two species may have more subtle signs of a carina.

Areolas, on the other hand, can help us differentiate between species such as the invasive red swamp crayfish (*Procambarus clarkii*; Figure 12) and the invasive White River crayfish (*P. acutus*; Figure 13).



Figure 8—Northern clearwater crayfish (*F. propinquus*) rostrum



Figure 7—Eastern/brook common crayfish (*Cambarus bartonii*) rostrum



Figure 9—Red swamp crayfish (*P. clarkii*) rostrum



SMOOTH, CONCAVE,
PINCHED ROSTRUM

Figure 10—Rusty crayfish (*F. rusticus*) rostrum

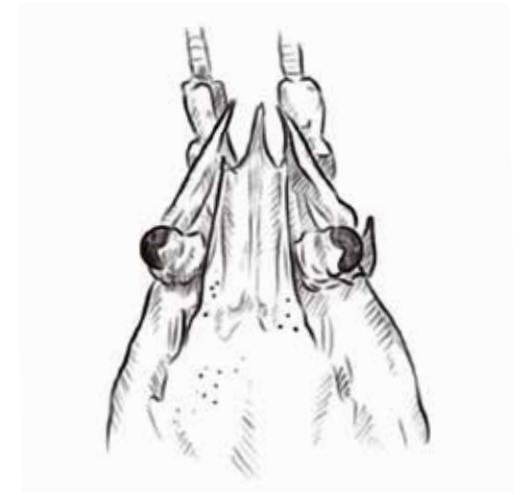
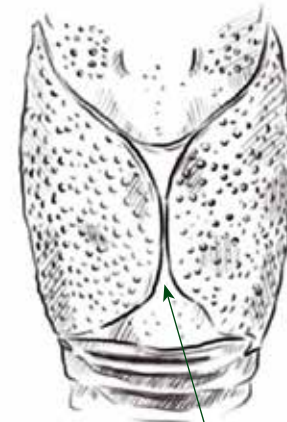
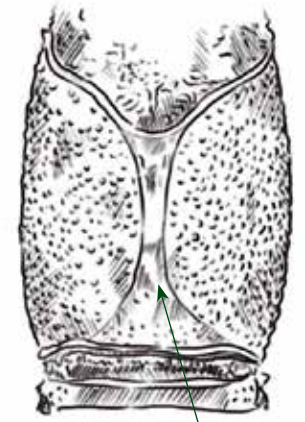


Figure 11—Signal crayfish (*Pacifasticus leniusculus*) rostrum



CLOSED
AREOLA

Figure 12—An example of a closed areola on the red swamp crayfish (*P. clarkii*)



OPEN
AREOLA

Figure 13—An example of an open areola on the White River crayfish (*P. acutus*)

NATIVE CRAYFISH PROFILES

BIG WATER/ROBUST CRAYFISH

(*Cambarus robustus*)

ONTARIO STATUS: NATIVE; SECURE

FAMILY: *Cambaridae*

SIMILAR SPECIES: Eastern/brook/common crayfish (page 20)

DISTRIBUTION: Found throughout southern and central Ontario and as far north as Wanapitei Lake, just northeast of Sudbury, Ontario.

HABITAT: The big water crayfish is found in lakes, rocky streams, and rivers often associated with swift flows, such as rapids, locks, and waterfalls.



Figure 14–Big water crayfish on a rocky substrate (P. Hamr)



Figure 15–Big water crayfish from the Credit River, Ontario (P. Hamr)

BASIC IDENTIFICATION:

- Ontario's largest crayfish (6-12 cm total length).
- Their claws are large, not curved inwards, with large tubercles (bumps) on fingers and top edge of palm.
- Overall body colour is greenish-brown.

ADVANCED IDENTIFICATION:

- Rostrum is more elongated with a single apex with no lateral spines.
- The areola is open (Figure 13).
- Their gonopods are sickle-shaped directed ventrally at 90 degrees (Figure 82).

CALICO/PAPERSHELL CRAYFISH

(*Faxonius immunis*)

ONTARIO STATUS: NATIVE; SENSITIVE

FAMILY: *Cambaridae*

SIMILAR SPECIES: Virile crayfish (page 28), marbled crayfish (page 34)

DISTRIBUTION: Found throughout Ontario up to the Lake Nipigon drainage.

HABITAT: The calico crayfish is found in a wide variety of habitats, ranging from slow-flowing or seasonal streams, marshes, and ditches to fast-flowing, rocky, clear streams. In seasonal waterbodies, it will construct deep burrows that are sometimes capped with chimneys.

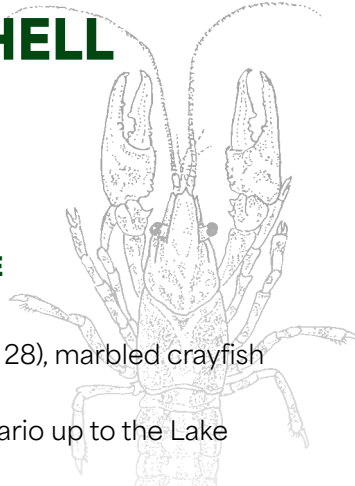


Figure 16—Calico crayfish from White Duck Lake, Ontario (P. Hamr)



Figure 17—Calico crayfish from Desert Lake, Ontario (salamandersearcher, iNaturalist)

**HOURGLASS
PATTERN ON
DORSAL SURFACE OF
CARAPACE AND TAIL
SEGMENTS**

BASIC IDENTIFICATION:

- Medium-sized crayfish (6-10 cm).
- Slender pointed claws with a clear notch in the movable finger.
- Key identification feature is the “hourglass” pattern on carapace and tail segments (Figured 16 & 17).

ADVANCED IDENTIFICATION:

- Rostrum pointed with weak lateral spines.
- Gonopods forward facing but bent (Figure 81).

DIGGER CRAYFISH

(*Creaserinus fodiens*)

ONTARIO STATUS: NATIVE; SENSITIVE

FAMILY: *Cambaridae*

SIMILAR SPECIES: Great plains mudbug (page 22), paintedhand mudbug (page 26)

DISTRIBUTION: Found throughout southwestern and southern Ontario from Windsor as far east as Lindsay and north to Severn Sound.

HABITAT: The digger crayfish is a semiterrestrial burrower that builds extensive and sometimes very deep burrows far from permanent water with multiple entrances capped with chimneys made of mud pellets (Figure 2 & 19). Their habitats include marshes, wetlands, permanent and seasonal streams, ponds, canals, and roadside ditches. They are occasionally found in open water in the spring or during flooding periods.



Figure 18–Digger crayfish from Norval, Ontario (P. Hamr)



Figure 19–Digger crayfish at the top of its burrow with a chimney (P. Hamr)

BASIC IDENTIFICATION:

- Small to medium-sized crayfish (6-8 cm).
- Their antennae are short.
- They create pelleted burrows, sometimes far away from water.

ADVANCED IDENTIFICATION:

- Carapace is laterally compressed with a closed areola (Figure 12).
- Their rostrum is bent downwards with a single apex and no lateral spines and their suborbital angle on the front of their carapace is absent (Figure 68).
- Their gonopods are sickle-shaped.
- Opposable margin of dactyl of chela has an angular notch.

EASTERN/BROOK/COMMON CRAYFISH

(*Cambarus bartonii*)



ONTARIO STATUS: NATIVE; SECURE

FAMILY: *Cambaridae*

SIMILAR SPECIES: Big water/robust crayfish (page 14)

DISTRIBUTION: Found throughout Ontario, as far north as the James Bay drainage. This species is also native to New Brunswick and Québec.

HABITAT: The brook crayfish is found mostly in rocky streams and rivers as well as northern lakes, often in swift flowing habitats, such as rapids and waterfalls. Given their preferred habitat, they often burrow deep into rocky substrates.



Figure 20–The brook crayfish from Cavan Creek, Ontario (P. Hamr)



Figure 21–The brook crayfish found in Solanum Creek, Cavan, Ontario (P. Hamr)

BASIC IDENTIFICATION:

- Small to medium-sized crayfish (6-8 cm).
- Its claws are smooth with its 'finger' tips curved inwards.

ADVANCED IDENTIFICATION:

- Its areola is open (Figure 13).
- It has a relatively short rostrum with single apex and no lateral spines (Figure 7).
- Its gonopods are sickle-shaped and directed ventrally at 90 degrees (Figure 82).

GREAT PLAINS MUDBUG

(*Lacunicambarus nebrascensis*)

ONTARIO STATUS: NATIVE; SENSITIVE

FAMILY: *Cambaridae*

SIMILAR SPECIES: Digger crayfish (page 18), paintedhand mudbug (page 26)

DISTRIBUTION: Found in southwestern Ontario as well as the Bruce and Niagara peninsulas.

HABITAT: The great plains mudbug is a semiterrestrial burrower that builds extensive and sometimes very deep burrows with multiple entrances often capped with chimneys made of mud pellets. Their habitats include marshes, wetlands, wet meadows, ponds, canals, and roadside ditches.

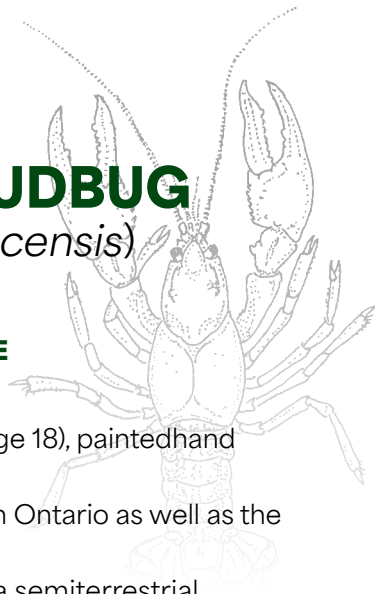


Figure 22–The great plains mudbug from Long Point, Ontario (J. Mitchell)



Figure 23–The great plains mudbug from Lake Ontario (Samuel Brinker, iNaturalist)

BASIC IDENTIFICATION:

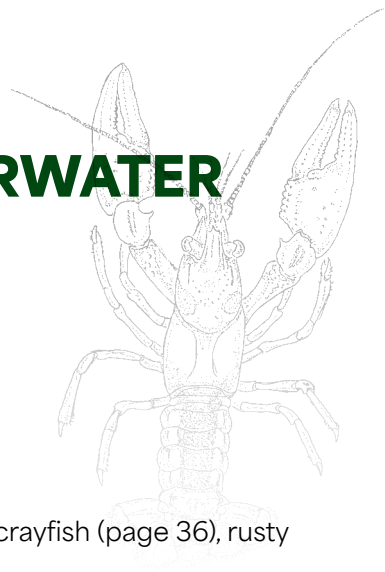
- Large-bodied crayfish (8-12 cm).
- Its claws have tubercles (bumps) forming two rows and are usually greenish brown or brown.

ADVANCED IDENTIFICATION:

- It has a closed areola (Figure 12).
- Their rostrum is deep with a single apex and no lateral spines.
- Its facial structure is identified by its suborbital angle that is acute (Figure 68).
- Its gonopods are sickle shaped (Figure 82).

NORTHERN CLEARWATER CRAYFISH

(*Faxonius propinquus*)



ONTARIO STATUS: NATIVE; SECURE

FAMILY: *Cambaridae*

SIMILAR SPECIES: Obscure/Allegheny crayfish (page 36), rusty crayfish (page 40)

DISTRIBUTION: Found throughout Ontario, including in the far-north to the James Bay drainage. It is also found in Québec. Also found in northwest Ontario in the Winnipeg River, which may represent an invaded range.

HABITAT: The northern clearwater crayfish is often found in rocky or soft substrates in streams, rivers, and lakes.



Figure 24–Northern clearwater crayfish from Balsam Lake, Ontario (P. Hamr)



DARK STRIPE

Figure 25–Northern clearwater crayfish from Silent Lake, Ontario (P. Hamr)

BASIC IDENTIFICATION:

- Small to medium-sized crayfish (5-7 cm).
- A distinct characteristic of northern clearwater crayfish is the dark stripe found on the abdominal segments of its tail (Figures 24 & 25).

ADVANCED IDENTIFICATION:

- Its rostrum is three-pronged with straight sides and a median carina (Figure 8). The presence of the carina is key in differentiating this species from rusty crayfish (*F. rusticus*) as the rusty crayfish lacks a carina (Figure 10). However, the two species are known to hybridize and if you suspect a hybrid, check for a carina, look for rusty patches on the carapace, and if all else fails, check the gonopods. If a carina and rusty patches are both present, you most likely have a hybrid (*F. propinquus x rusticus*).
- The male gonopods have two forward facing elements of equal length, whereas the rusty gonopods are different lengths (Figure 81).

PAINTEDHAND MUDBUG

(*Lacunicambarus polychromatus*)

ONTARIO STATUS: UNKNOWN—POSSIBLE NATIVE OR INTRODUCED SPECIES

FAMILY: *Cambaridae*

SIMILAR SPECIES: Digger crayfish (page 18), great plains mudbug (page 22)

DISTRIBUTION: Found only in far south-western Ontario in the Detroit River catchment in Windsor. First detected via iNaturalist in 2016.

HABITAT: The paintedhand mudbug is a semiterrestrial burrower that builds extensive and sometimes very deep burrows with multiple entrances often capped with chimneys made of mud pellets. Their habitats include wetlands, wet meadows, stream banks, and roadside ditches.



Figure 26—A paintedhand mudbug from Windsor, Ontario (C. D. Jones, MNR)

TUBERCLES (BUMPS)



Figure 27—A paintedhand mudbug chela with reddish tubercles (C. D. Jones, MNR)

BASIC IDENTIFICATION:

- Medium-bodied crayfish (8-10 cm).
- The claws have numerous round tubercles (bumps) that do not form a row (Figure 27).
- The colour of the body is greenish and has characteristic red or orange highlights on rostrum and orange-blue hues on the claws.

ADVANCED IDENTIFICATION:

- The rostrum is strongly bent downwards with a single apex and no lateral spines and it has an acute (less than 90 degrees) suborbital angle (Figure 68).
- Their gonopods are sickle shaped (Figure 82).



Figure 28—A paintedhand mudbug from Adrian, Michigan (mdraud, iNaturalist)

VIRILE CRAYFISH

(*Faxonius virilis*)

ONTARIO STATUS: NATIVE; SECURE

FAMILY: *Cambaridae*

SIMILAR SPECIES: Calico/papershell crayfish (page 14), marbled crayfish (page 34)

DISTRIBUTION: Found throughout Ontario, as far north as the James Bay drainage. It is also found in New Brunswick, Québec, Manitoba, Saskatchewan, and Alberta. It is invasive to British Columbia as well as Europe.

HABITAT: The virile crayfish is commonly found in streams, rivers, ponds, and lakes, as well as slower flowing habitats like swamps, alongside aquatic vegetation.

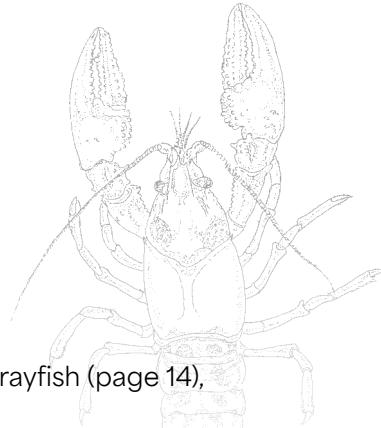


Figure 29–Virile crayfish from Lake Simcoe, Ontario (P. Hamr)

DOUBLE SPOT PATTERN



Figure 30–Virile crayfish from the Credit River (P. Hamr)

BASIC IDENTIFICATION:

- Medium to large-bodied crayfish (8-11 cm).
- Their claws are green/blue with prominent yellow bumps (Figure 29).
- They possess a double spot colour pattern on abdominal/tail segments (Figures 30 & 71).

ADVANCED IDENTIFICATION:

- Their rostrum is three-pronged without a carina.
- The male gonopods have two slightly bent forward facing elements of unequal length (Figure 81).

INVASIVE CRAYFISH PROFILES

COMMON YABBY (*Cherax destructor*)

ONTARIO STATUS: INVASIVE; NOT CURRENTLY KNOWN IN ONTARIO; PROHIBITED UNDER THE INVASIVE SPECIES ACT

FAMILY: *Parastacidae*

SIMILAR SPECIES: Signal crayfish (page 42)

DISTRIBUTION: The common yabby is native to Australia but has been present in the aquarium trade for many years.

HABITAT: The common yabby prefers ponds, lakes, slow flowing rivers, and streams. In Australia where it is native, it burrows extensively and can destabilize the shorelines of waterbodies.



Figure 31—The common yabby on the edge of a pond in Tasmania (P. Hamr)



Figure 32—The common yabby in captivity (OpenCage, Wikimedia Commons)

LONG PALM

SHORT, STOUT FINGERS

BASIC IDENTIFICATION:

- Large-bodied crayfish (10-25 cm).
- Its carapace and claws are smooth, and the claws are broad with long palms and short, stout fingers.

ADVANCED IDENTIFICATION:

- The rostrum has smooth edges meeting at the apex.
- The male gonopods and female seminal receptacles are both absent.

For more information on the common yabby, including impacts, scan the QR code provided:



EVERGLADES/ELECTRIC BLUE CRAYFISH

(*Procambarus alleni*)

ONTARIO STATUS: INVASIVE; NOT CURRENTLY KNOWN IN ONTARIO; PROHIBITED UNDER THE INVASIVE SPECIES ACT

FAMILY: *Cambaridae*

SIMILAR SPECIES: Red swamp/Louisiana red crayfish (page 38), White River crayfish (page 46)

DISTRIBUTION: It is native to Florida and has been introduced to Tennessee and Virginia. It is presently not found in the wild in Ontario or any other Canadian provinces, but has been popular in the aquarium trade for many years.

HABITAT: The Everglades crayfish is tolerant of a wide range of seasonal and permanent wetlands, marshes, flood plains, roadside ditches, and small streams. It favours waterbodies that are still/sluggish, or shoreline areas that periodically dry out due to seasonal droughts, during which time, it burrows.



Figure 33–Everglades crayfish in captivity (Carnat Joel, Wikimedia Commons)



Figure 34–Everglades crayfish in captivity (Nathan Daly, Wikimedia commons)

BASIC IDENTIFICATION:

- Medium to large-bodied crayfish (6-12 cm).
- Cultured specimens of the Everglades crayfish are blue, but wild specimens can be blue, brown, or red.
- They have characteristic dark, circular areas, referred to as “headlights.” These headlights are found at the base of both antennal glands.

ADVANCED IDENTIFICATION:

- Their areola, like the White River crayfish, is open (Figure 13).
- Their gonopods have a single terminal curved element and long setae.

MARbled CRAYFISH/ MARMORKREBS

(*Procambarus virginalis*)

ONTARIO STATUS: INVASIVE; PRESENT; PROHIBITED UNDER THE INVASIVE SPECIES ACT.

FAMILY: *Cambaridae*

SIMILAR SPECIES: Calico/papershell crayfish (page 16), virile crayfish (page 28)

DISTRIBUTION: The marbled crayfish is an asexually reproducing species that originated in the aquarium pet trade and has established in the wild in several Asian and European countries as well as the island of Madagascar. A reproducing population has been found in Burlington, Ontario.

HABITAT: The marbled crayfish can be found in a variety of habitats, including ponds, lakes, rivers, streams, canals, and ditches. Where it is found, it creates cryptic burrows without chimneys.



Figure 35—Marbled crayfish with eggs from Burlington, Ontario (P. Hamr)



Figure 36—Marbled crayfish captured from Burlington ponds (P. Hamr)

BASIC IDENTIFICATION:

- Small-bodied crayfish (4-7 cm).
- They have a characteristic marbling pattern on their carapace, abdomen, and small elongated claws.

ADVANCED IDENTIFICATION:

- Only asexually reproducing females are present in the population, so check specimens for a seminal receptacle (see Differentiating between Males and Females on page 10).
- Their rostrum is elongated with smooth sides terminating in a single point or apex.

For more information on the marbled crayfish, including impacts, scan the QR code provided:



OBSCURE/ALLEGHENY CRAYFISH

(*Faxonius obscurus*)

ONTARIO STATUS: INVASIVE; ESTABLISHED

FAMILY: *Cambaridae*

SIMILAR SPECIES: Northern clearwater crayfish (page 24), rusty crayfish (page 40)

DISTRIBUTION: Introduced from the United States. Found throughout southern and central Ontario.

HABITAT: The obscure crayfish prefers rivers, lakes, and streams and are generally found amongst rocky substrates.



Figure 37—An obscure crayfish from Aylen Lake, Ontario (P. Hamr)



Figure 38—An obscure crayfish from Aylen Lake, Ontario (P. Hamr)

TUBERCLES (BUMPS)
ON FOREARMS

BASIC IDENTIFICATION:

- Small-bodied crayfish (4-8 cm).
- They have strong, forward-facing tubercles (bumps) on their forearm portion of their claw arms.

ADVANCED IDENTIFICATION:

- Their rostrum has straight sides without a carina.
- Their gonopods are straight with elements of equal length, but with a distinct shoulder at the base of a projection.

RED SWAMP/LOUISIANA RED CRAYFISH/CRAWFISH

(*Procambarus clarkii*)

ONTARIO STATUS: INVASIVE; PRESENT; PROHIBITED UNDER THE INVASIVE SPECIES ACT

FAMILY: *Cambaridae*

SIMILAR SPECIES: Everglades crayfish (page 32), White River crayfish (page 46)

DISTRIBUTION: Widely introduced species (e.g., Europe, Asia, Africa, and large portions of the United States). Recently detected in southwestern Ontario near Tilbury in the fall of 2024. It has been reported on the shores of Lake Erie, Ohio. There are established populations reported from Nova Scotia and British Columbia and a single record from Newfoundland.

HABITAT: The red swamp crayfish prefers swamps, ditches, ponds, lakes, and slow flowing streams. It constructs extensive burrows without chimneys that can destabilize the shorelines of waterbodies, similar to the White River crayfish.



Figure 39–Red swamp crayfish dorsal view.
Notice the closed areola on its carapace
(Photo M. Glon, @mgglon)



Figure 40–Red swamp crayfish from Sonoma County, CA, USA (Don Loarie, iNaturalist)

BASIC IDENTIFICATION:

- Large-bodied crayfish (7-25 cm) that typically has a very reddish body and claws.
- Its body and claws are covered by short light-coloured tubercles (bumps) and their claws are long and narrow.

ADVANCED IDENTIFICATION:

- This species has a closed areola, whereas its lookalike, the White River crayfish, has an open (Figures 12 & 13) .
- Their gonopods have two short terminal elements: one pointed and one blade-like (Figure 83).

For more information on the red swamp crayfish, including impacts, scan the QR code provided:



RUSTY CRAYFISH

(*Faxonius rusticus*)

ONTARIO STATUS: INVASIVE; ESTABLISHED

FAMILY: *Cambaridae*

SIMILAR SPECIES: Northern clearwater crayfish (page 24), obscure/Allegheny crayfish (page 36). The rusty crayfish and the northern clearwater crayfish hybridize readily and as a result, different combinations of physical characteristics can be present in each population where the rusty crayfish has invaded. See the northern clearwater advanced identification section on page 25 for more details.

DISTRIBUTION: Suspected to have been introduced from the state of Ohio, the rusty crayfish is now found throughout Ontario, including regions such as Thunder Bay and the Rainy-Lake of the Woods watershed.

HABITAT: The rusty crayfish is commonly found in rivers, streams, and lakes. They prefer rocky substrates but can still be found in soft substrate environments.



Figure 41—Rusty crayfish in a bucket (P. Hamr)

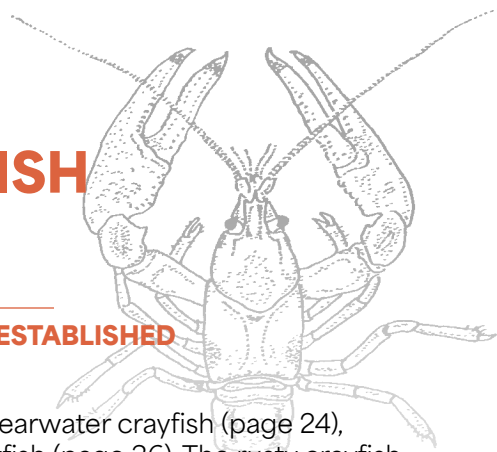


Figure 42—Rusty crayfish from Lake Simcoe, Ontario (P. Hamr)

RUSTY PATCH

BASIC IDENTIFICATION:

- Medium-sized crayfish (5-10 cm).
- Its defining characteristics are the rusty spots on the sides of its carapace as well as the rusty stripes on its abdomen.
- Their claws are tear-drop shaped when closed and typically possess black bands, including orange tips.

ADVANCED IDENTIFICATION:

- Their rostrum is pinched and without a carina, unlike some lookalikes that have a carina (Figure 10).
- Their gonopods are forward facing with two elements of clearly unequal length, whereas its lookalike, the northern clearwater crayfish's gonopod tips are of equal length (Figure 81).

For more information on the rusty crayfish, including impacts, scan the QR code provided:



SIGNAL CRAYFISH

(Pacifastacus leniusculus)

ONTARIO STATUS: INVASIVE; NOT CURRENTLY KNOWN IN ONTARIO; PROHIBITED UNDER THE INVASIVE SPECIES ACT

FAMILY: Astacidae

SIMILAR SPECIES: Common yabby (page 30)

DISTRIBUTION: The signal crayfish is native to British Columbia, including Vancouver Island and the lower mainland of the province. Historically, it was introduced to Europe where it is a prolific invader and has displaced native species. It was recently detected in a lake in Minnesota, representing the first record of this species east of the Rockies.

HABITAT: The signal crayfish prefers to live in the rocky and soft substrates of streams, rivers, lakes, reservoirs, and ponds.



Figure 43–Male signal crayfish. Note the white patch on its claws near the movable finger (P. Hamr)

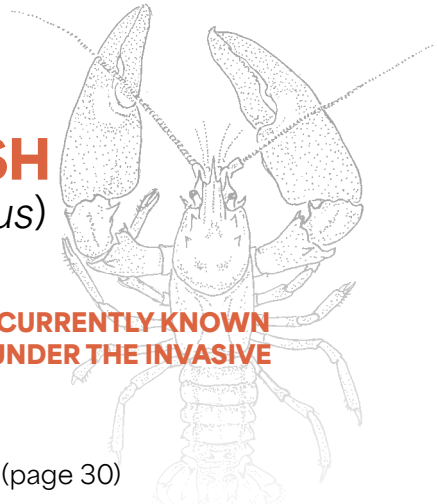


Figure 44–The signal crayfish in amongst some grass (P. Hamr)

WHITE PATCHES

BASIC IDENTIFICATION:

- Large-bodied crayfish (12-16 cm).
- Its carapace and claws are smooth, without the presence of noticeable tubercles (bumps).
- The signal crayfish has distinctive white patches on its claws near the base of the movable finger.

ADVANCED IDENTIFICATION:

- Its rostrum is deep, three-pronged, and straight-sided with a discernible carina and sharp pointed apex (Figure 11).
- The male gonopods are tubular, not alternating in form, while females lack a seminal receptacle (Figure 84).

For more information on the signal crayfish, including impacts, scan the QR code provided:



SPINY-CHEEK CRAYFISH

(*Faxonius limosus*)

ONTARIO STATUS: INVASIVE; NOT CURRENTLY KNOWN IN ONTARIO

FAMILY: *Cambaridae*

SIMILAR SPECIES: Rusty crayfish (page 40)

DISTRIBUTION: The spiny-cheek crayfish has expanded into or was introduced to New Brunswick and Québec from the United States. It was also introduced to Nova Scotia (Cape Breton) and has been found to be expanding into the St. Lawrence and Ottawa river drainages.

HABITAT: Spiny-cheek crayfish is known to occur in lakes, rivers, and streams and it can be found on both soft and rocky substrates.



Figure 45—Spiny-cheek in a silty substrate (P. Kozak, natur.cuni.cz)



Figure 46—Spiny-cheek crayfish from the Ottawa River (Jean-Marc Vallières, iNaturalist)

SPINES ON CHEEK

BASIC IDENTIFICATION:

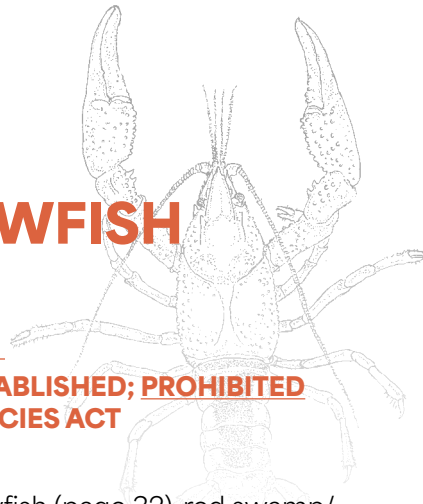
- Medium-sized crayfish (6-12 cm).
- It has red-brown stripes on its tail or abdomen segments, which may be confused for the virile crayfish (page 28). To differentiate between the two species, look for the presence of the spines on the cheek.

ADVANCED IDENTIFICATION:

- Its rostrum is three-pronged.
- Its areola is open (Figure 13).
- Its gonopods are forward facing (Figure 81).

WHITE RIVER CRAYFISH/CRAWFISH

(*Procambarus acutus*)



**ONTARIO STATUS: INVASIVE; ESTABLISHED; PROHIBITED
UNDER THE INVASIVE SPECIES ACT**

FAMILY: *Cambaridae*

SIMILAR SPECIES: Everglades crayfish (page 32), red swamp/
Louisiana red crayfish (page 38)

DISTRIBUTION: The White River crayfish has established breeding populations on Pelee Island (Lake Erie), in a pond in Thornhill, and in the Port Severn area, including Six Mile Lake and the connected MacLean Lake. The suspected vector of introduction is by anglers using them as bait from the United States.

HABITAT: The White River crayfish prefers canals, ponds, lakes, rivers, and streams. They are found in a wide variety of substrates ranging from soft to rocky. They will construct large burrows, without chimneys, which can destabilize the shorelines of waterbodies (Figure 4).



Figure 47–White River crayfish from Port Severn, Ontario (B. Schryer)



Figure 48–White River crayfish (Emilio Concari, iNaturalist)

**DARK WEDGE
SHAPE ON
ABDOMEN**

BASIC IDENTIFICATION:

- Large-bodied crayfish (7-16 cm).
- They possess long, narrow claws.
- Their carapace and claws are covered by short dark tubercles (bumps).
- Their colour varies from dark red to beige-brown and they possess a dark wedge-shaped stripe present on their abdomen (Figure 48).

ADVANCED IDENTIFICATION:

- Their areola is open, which distinguishes it from the red swamp/Louisiana red crayfish (Figures 12 & 13).
- Their gonopods have four short terminal elements (Figure 83).
- It possesses a triangular rostrum tapering anteriorly to a single point (Figure 9).

For more information on the White River crayfish, including impacts, scan the QR code provided:



HOW TO SAMPLE FOR CRAYFISHES

SITE INSPECTION & SELECTION

When determining where to look for crayfishes, sites should be selected according to habitat suitability for crayfishes. Shallower areas with natural covers, such as rocks and logs are the best habitat for open water species, such as *Faxonius* and *Cambarus* crayfishes. When surveying for introduced species, you should consider where these species may have been introduced. For example, areas frequented by anglers (popular fishing spots, public boat ramps, picnic areas, marinas etc.) should be targeted as they have the highest probability of harbouring crayfishes introduced through bait fishing (e.g., bait bucket releases and live bait escapees from lines baited with crayfish).



Figure 49—An example of a live crayfish being affixed with a hook for fishing (P. Hamr)

Prior to sampling at each site, you should inspect the shorelines for crayfish burrows. Burrows appear as circular openings at or above the water line. Burrows will be more common where the substrate has few natural shelters, such as rocks or submerged logs. Most crayfish species in Ontario construct their burrows near or in open water, so in the circumstance that you find one far from water (it will most likely be capped with a pelleted chimney like in Figure 2), it will be one of the three burrowing native species.

It is recommended that a minimum of 20 metres of shoreline is surveyed at each site to determine the presence of burrows. Once this is done, you should put in the effort to sample all the various habitats at a given site, e.g., riffles, pools, submerged vegetation, etc. Each site should also be inspected for crayfishes from shore as they can often be seen foraging in the open during the day or resting at the entrance of their burrows. Often, if you're surveying a rocky shoreline, their claws or antennae can be seen sticking out from beneath or in-between rocks.

MATERIALS NEEDED TO SAMPLE

- Valid conservation or sports fishing license and/or Scientific Collector's Permit (contact your local MNR office for details)
- Notebook, pencil (to record carapace length, water temperature, date, time, etc.)
- Vernier callipers (to measure carapace)
- Waders, rubber boots, and water shoes
- Bucket(s) with lid(s)
- Flat bottomed dip net and a large/aquarium net (Figure 50)
- Minnow trap with enlarged opening to 40 mm (Figure 52) and bait to entice crayfishes. For bait types, see page 54
- Shovel, spade, or garden trowel (for burrowing crayfish)

OPTIONAL MATERIALS (for ecological/life history measurements)

- Plastic covered metal wire hoop of a diameter of 75 cm
- Thermometer or electronic temperature probe
- Velocity, pH, oxygen, and conductivity electronic probes
- Sample jars
- 80% ethanol



Figure 50—
Large dip net
and smaller
aquarium net
(P. Hamr)



Figure 51—Crews from the OFAH, Department of Fisheries and Oceans, and Dr. Premek Hamr sampling for crayfishes, Burlington, Ontario
(J. Berthelette)



Figure 52—
Baited minnow
trap with
enlarged
openings
(40mm) for
crayfishes
(B. Schryer)

IN-WATER SAMPLING: SHALLOW SITES

When monitoring for crayfishes, do your best to minimize sediment disturbance/turbidity as this will make visual sampling of crayfishes nearly impossible. To minimize this, it is always best to work upstream if you are in a river or stream (Figure 53). Crayfishes can be collected by hand (Figure 54) or by using a flat bottomed dip net or aquarium net (for small crayfishes in the shallows; Figure 50).



Figure 53—Dr. Premek Hamr using a dip net while flipping rocks working upstream to minimize loss of vision due to turbidity
(J. Hamr)



Figure 54—How to catch crayfish by hand (P. Hamr)

If crayfish are seen in the open, they should be approached from downstream and caught by hand or scooped with a dip net. When catching crayfish by hand, they should be approached from behind,

if possible, initially very slowly and then caught rapidly between the thumb and index fingers of the preferred hand (Figure 54). Since crayfishes prefer to hide under structure on the substrate, rocks and logs are the best targets for sampling. Lifting rocks must be done very slowly and carefully, to avoid accidentally crushing crayfishes or other organisms. Rocks with crayfish burrows can sometimes be identified as they have semicircular areas of excavated gravel or sand along one margin (Figure 55).



Figure 55—Sand and gravel excavated from underneath of a rock by a crayfish (P. Hamr)

Most crayfishes prefer large flat rocks as they generally make the most desirable shelters. The rock should be lifted slowly if it is small, or tipped onto its upstream edge, if it is large. A dip net should be placed downstream of the rock you are sampling, especially in areas of moderate to high flow. Crayfishes tend to either remain in the excavation under the rock or escape downstream along the rock's lateral edges. Once the sediment has settled, the excavation under the rock can be inspected and the crayfish can be picked up by hand or scooped with a dip or aquarium net.

Young of the year crayfish can be found from late May onwards in southern Ontario, while this may be later the farther north you go in the province. They are usually found near shore, in very shallow water (depth less than 10cm) and can be collected by carefully and slowly lifting small rocks. Once the sediment settles, the small crayfishes can be collected

using an aquarium net placed behind them and scooping them up or very slowly directing them into the net with your free hand. They usually measure from one to two cm in total length and can be difficult to see.

If no rocks or logs are present, crayfishes may be burrowed directly into the soft substrate or hide in submerged vegetation (Figure 56). In such habitats, crayfishes have to be excavated from burrows or caught using a dip net by sweeping through the submerged vegetation, if present (Figure 51).



Figure 56—Rusty crayfish in a burrow on soft bottomed substrate (P. Hamr)

IN-WATER SAMPLING: DEEPER SITES

In deeper sites where the water depth is too great to allow for hand sampling in boots or waders, snorkelling can be employed, or passive minnow traps can be set (Figure 52). Alternatively, a long-handled dip net can also be used from shore but this usually yields limited results.



Figure 57—Snorkelling technique for crayfish sampling (J. Hamr)

If you have decided to deploy baited traps, two or three traps should be set per sampling area. Catch per unit effort is best when traps are set in rocky areas with good cover. Types of baits can include liver, fish, fish flavoured cat food, or hot dogs (most economical). The catch can be reduced when traps are set in areas of little or no cover and when fishes are able to enter the traps. These baited traps can be set during the day or at night and should be left for a minimum of 30 minutes, or up to 24 hours. Overnight trapping is recommended if time permits and traps should be checked periodically.

All crayfishes that are captured should be identified to species, sexed, and classified according to mating and moulting condition, if possible. Invasive crayfishes should be photographed and reported (pages 56 & 57). Freshly moulted crayfishes are clean and feel soft to the touch as their exoskeletons have not fully hardened. The carapace length (CPL) of each crayfish should be measured to the nearest millimetre using a Vernier calliper (Figure 58). Several reference photographs can be taken together with location coordinates.



Figure 58–
Measuring
carapace length
(CPL) of crayfish
with Vernier
callipers
(P. Hamr)

HOW YOU CAN HELP

- **Learn** how to identify invasive and native crayfishes.
- If you want to use crayfishes as bait in Ontario or elsewhere, know your local rules for doing so. In Ontario, you can use them as bait, but only within the waterbody where they were captured. You cannot transport them over land, alive or dead, invasive or native. For more information on using crayfishes as bait or consuming crayfishes in Ontario, refer to the Ontario Fishing Regulations.
- If you have any information about the release of invasive species, such as crayfishes, report it immediately to the **MNR Tips line at 1-877-847-7667** (toll-free any time), or contact your local MNR office (Ontario.ca/mnroffices). You can also call Crime Stoppers anonymously at **1-800-222-8477**.

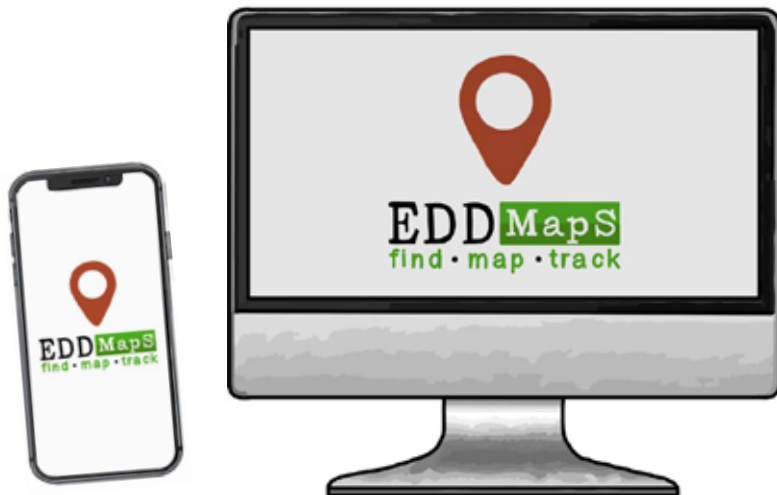


HOW TO REPORT INVASIVE CRAYFISHES IN ONTARIO

In Ontario, it is important that if you encounter any of the invasive crayfishes presented in this guide, that you report it via one of the following methods:

1. **CALL** the Invading Species Hotline:
1-800-563-7711 (Monday to Friday, 9am-5pm)
2. **EMAIL** photos and location to:
ISAP@ofah.org
3. **REPORT** by creating a profile and uploading a report to
www.EDDMapS.org or www.iNaturalist.org

Early detection is key to preventing the spread and/or new introduction of an unwanted invasive species. If allowed to enter and establish, aquatic invasive species become nearly impossible to eradicate.



HOW TO PHOTOGRAPH CRAYFISHES FOR REPORTING



Figure 59–Underside to see reproductive organs (B. Schryer)



Figure 60–Dorsal view, including rostrum (B. Schryer)



Figure 61–Lateral view (side of carapace) (B. Schryer)



Figure 62–Gonopods of a male crayfish (J. Berthelette)

TAXONOMIC KEY TO CANADIAN CRAYFISHES

HOW TO USE THE TAXONOMIC KEY

If this is your first time using a taxonomic key, you will start at the top at 1a, or beginning of the list. Check to see if the description applies to your organism. Based on your answer, if yes, it will give you an answer, or direct you to the next step. This will continue this way until you reach an endpoint, or name of the organism.



TAXONOMIC KEY

- 1a. Males lacking ischial hooks on second through fourth pereopods;
Tip of gonopod of male rolled into a cylinder
(never demonstrating cyclic dimorphism), female lacking
seminal receptacleFamily *Astacidae*
Genus *Pacifastacus*
P. leniusculus
- 1b. Males with ischial hooks on second through fourth pereopods;
Tip of male gonopod complex demonstrating cyclic dimorphism,
females with seminal receptacle Family *Cambaridae*
- 2a. Rostrum with lateral spines, male gonopods directed forward.
..... 9. Genus *Faxonius*
- 2 b. Rostrum without lateral spines, gonopod elements directed at 90
degrees or short3.
- 3a. male gonopods sickle-like, directed ventrally at 90 degrees.....5.
- 3b. male gonopods with more than 2 short elements, frequently with
long setae 4. Genus *Procambarus*
- 4a. Areola open.....*P. acutus*
- 4b. Areola closed.....*P. clarkii*
- 5a. Areola open..... 8. Genus *Cambarus*
- 5b. Areola closed.....6.
- 6a. Opposable margin of dactyl of chela with angular notch in
proximal half.....Genus *Creaserinus*
Suborbital angle on front of carapace absent, carapace laterally
compressed, antennae short..... *C. fodiens*
- 6b. Opposable margin of dactyl of chela without angular notch
in proximal half, suborbital angle on front of
carapace present 7. Genus *Lacunicambarus*
- 7a. Palm of chela with few tubercles, uniform brown-green
colour pattern *L. nebrascensis*
- 7b. Palm of chela with numerous tubercles, colour pattern with
orange-red and blue highlights on chela *L. polychromatus*

- 8a. Inner margin of palm of chela with one row of tubercles, tips of chela slightly incurved.....*C. bartonii*
- 8b. Inner margin of palm of chela with two rows of tubercles chela more flat, not incurved at tip*C. robustus*
- 9a. With central carina/ridge on rostrum*F. propinquus*
- 9b. Without central carina/ridge on rostrum.....10.
- 10.a Dactyl of chela with notch at base, setae on base of immovable finger of chelae, distinct "hourglass" pattern dorsally on carapace and abdomen, gonopods weakly curved ventrally but longer and narrower than in *Cambarus**F. immunis*
- 10b. Dactyl of chela without notch at base 11.
- 11a. With numerous prominent spines on carapace under orbit and in front of cervical groove *F. limosus*
- 11b. Without row of spines in front of cervical groove..... 12.
- 12a. Rostrum sides concave/pinched, distinct lateral rusty spots on side of carapace, fingers of chela long and narrow, gonopods straight and clearly of unequal length*F. rusticus*
- 12b. Rostrum sides straight 13.
- 13a. Rostrum sides straight, chela broad and tuberculate, carapace without rusty spots, abdomen with pattern of double row of spots, gonopods tips slightly bent and clearly of unequal length.....*F. virilis*
- 13b. Rostrum sides straight, no lateral spots on side of carapace or abdomen, chela smooth, gonopods tips of equal length with distinct right-angled shoulder on anterior margin.....*F. obscurus*

CRAYFISH SPECIES LINE DRAWINGS

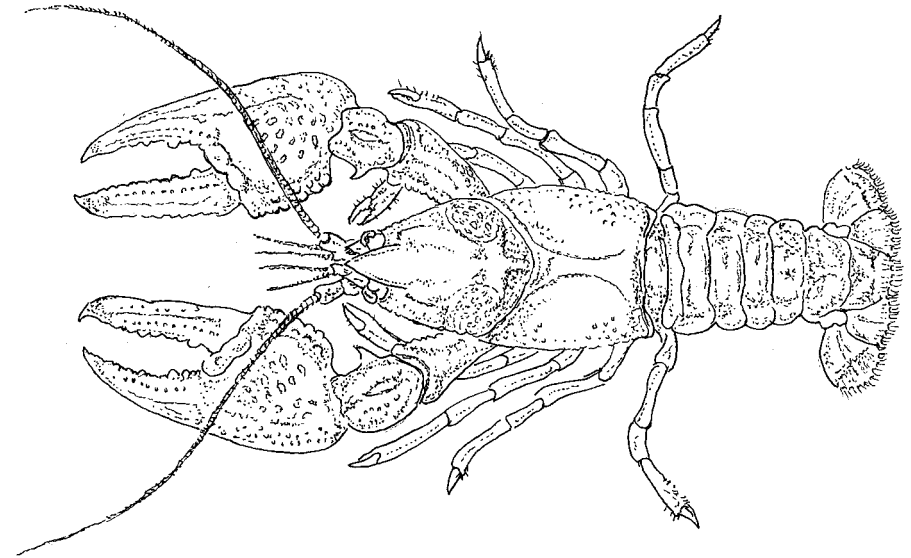


Figure 63—Big water/robust crayfish (*Cambarus robustus*)

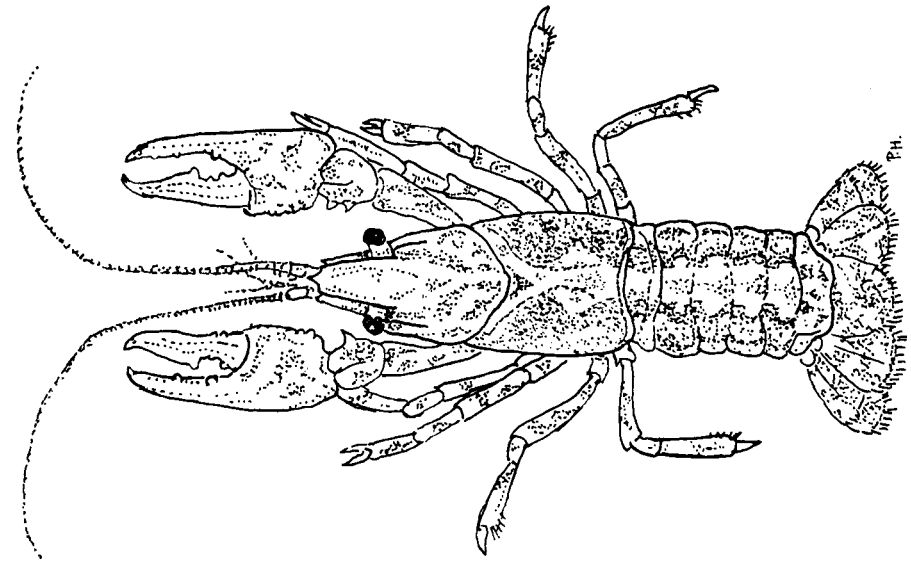


Figure 64—Calico/papershell crayfish (*Faxonius immunis*)

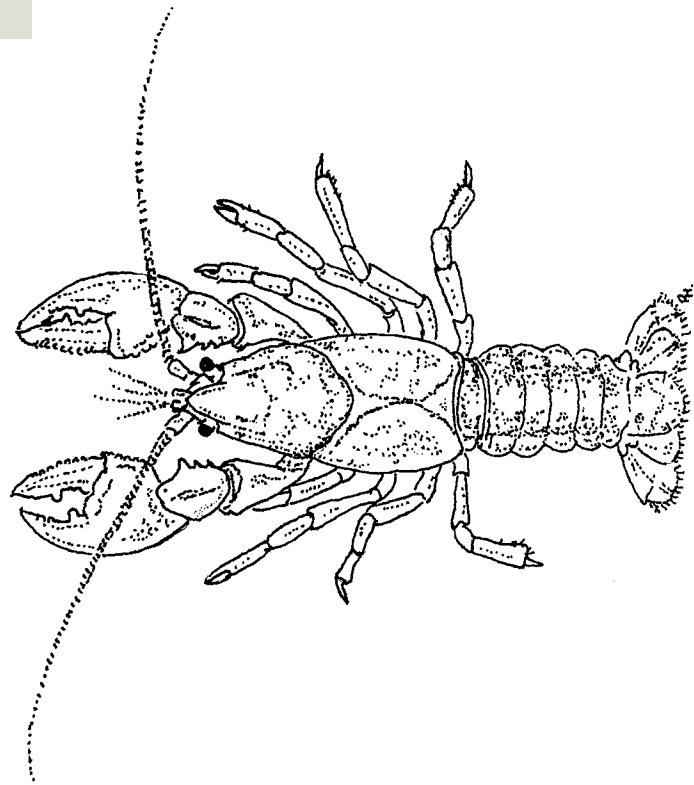


Figure 65—Digger crayfish (*Creaserinus fodiens*)

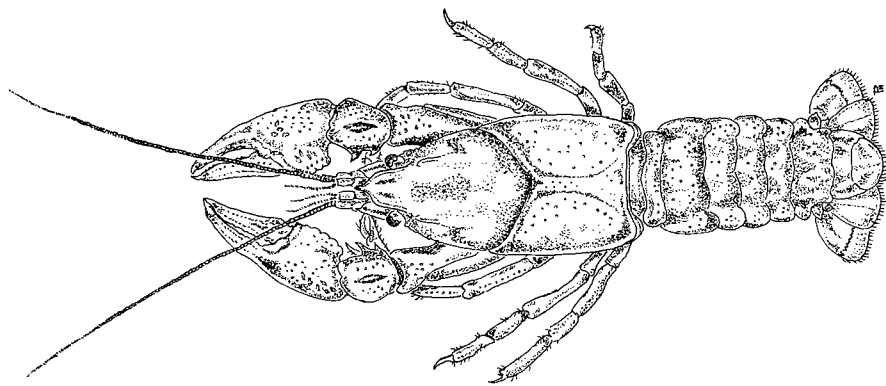


Figure 66—Eastern/brook/common crayfish (*Cambarus bartonii*)

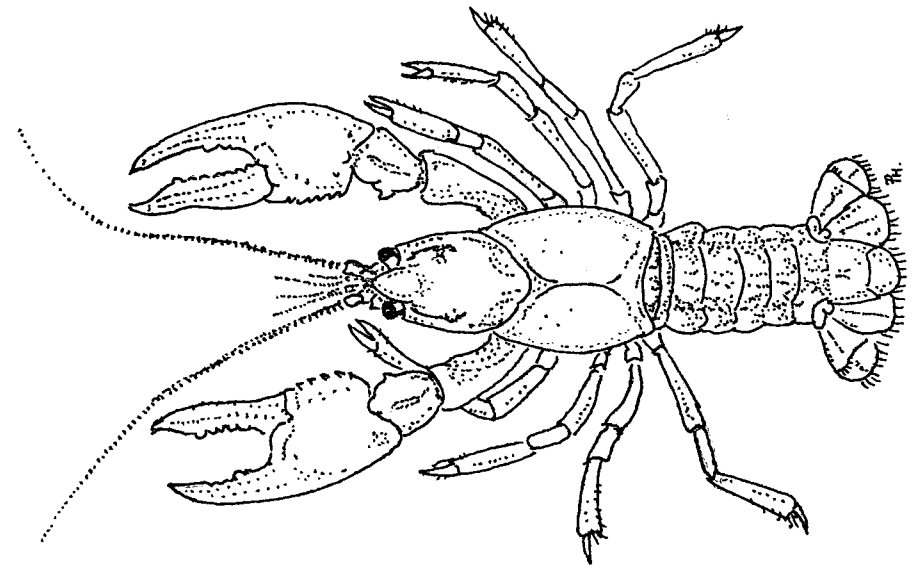


Figure 67—Great plains mudbug (*Lacunicambarus nebrascensis*)

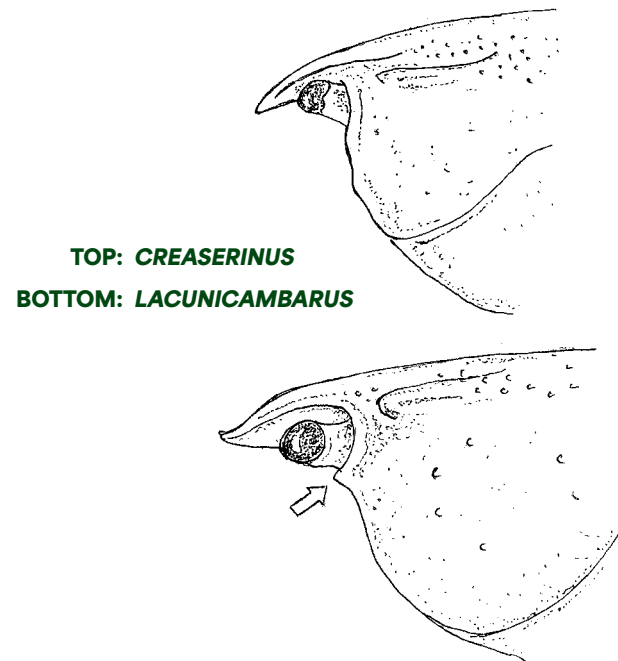


Figure 68—Comparing the suborbital structure of digger crayfish to great plains mudbug and paintedhand mudbug.

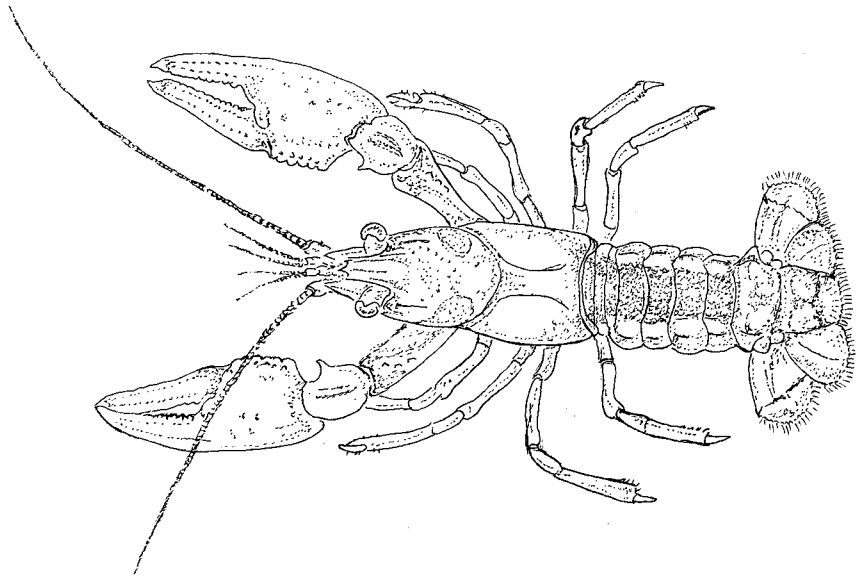


Figure 69–Northern clearwater crayfish (*Faxonius propinquus*)

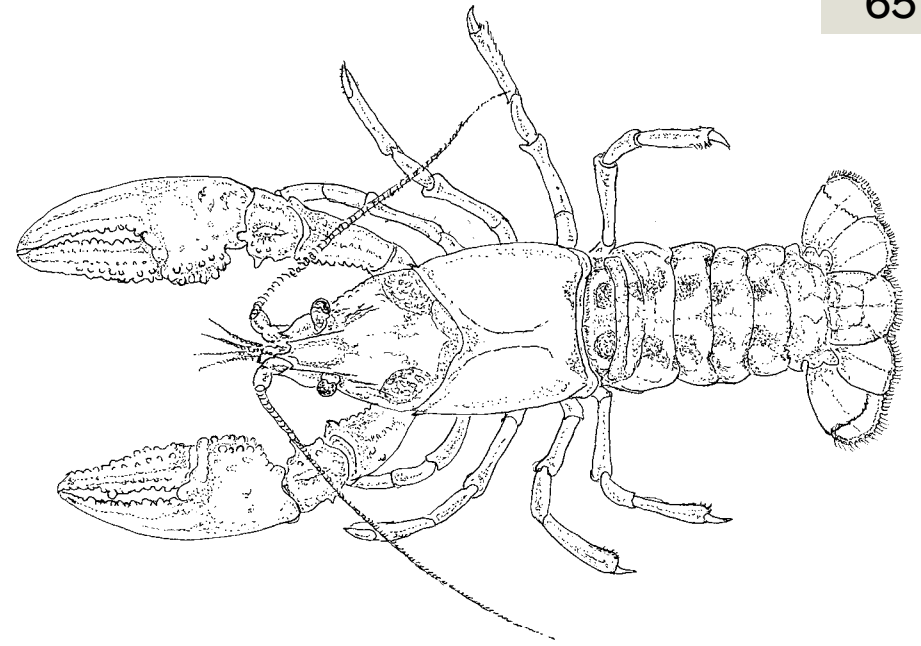


Figure 71–Virile crayfish (*Faxonius virilis*)

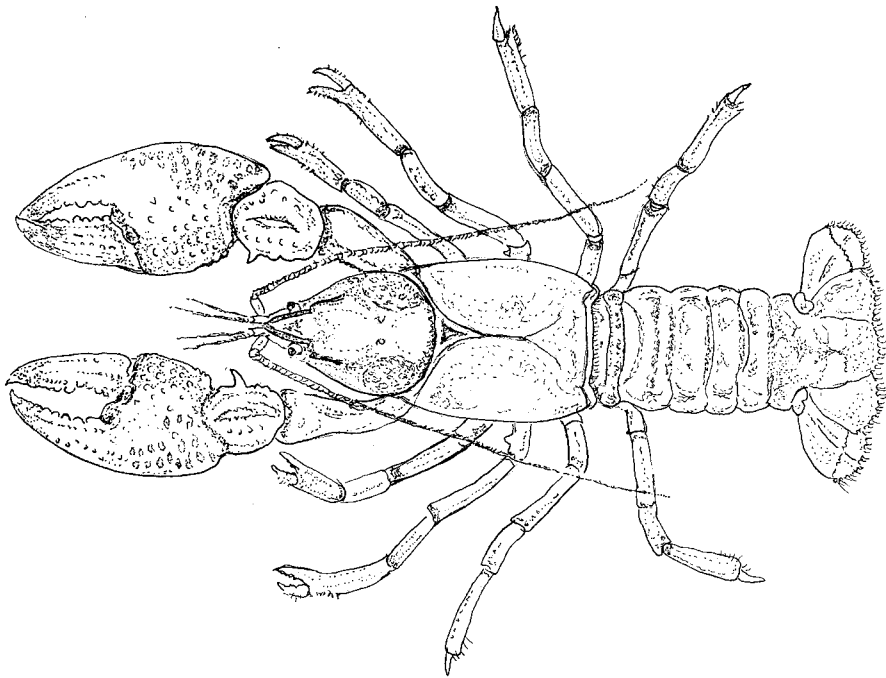


Figure 70–Paintedhand mudbug (*Lacunicambarus polychromatus*)

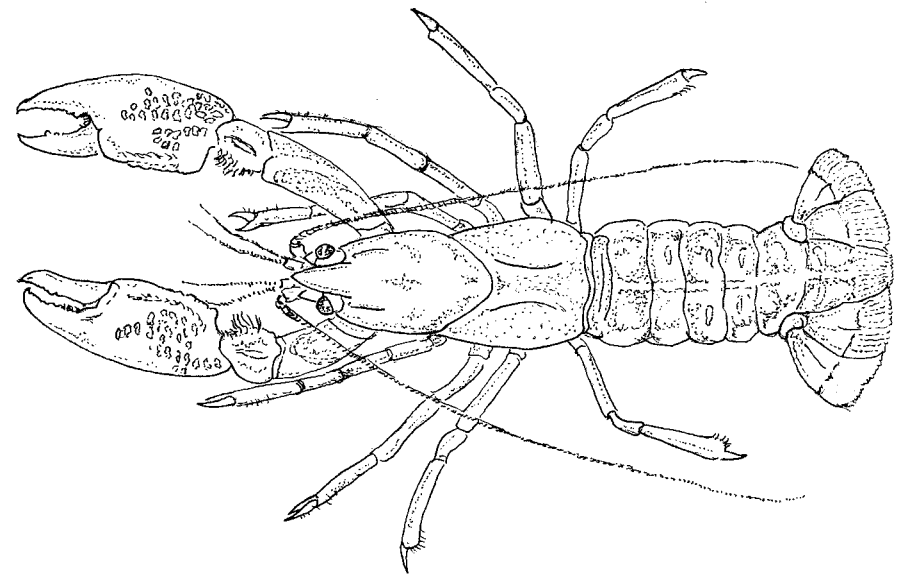


Figure 72–Common yabby (*Cherax destructor*)

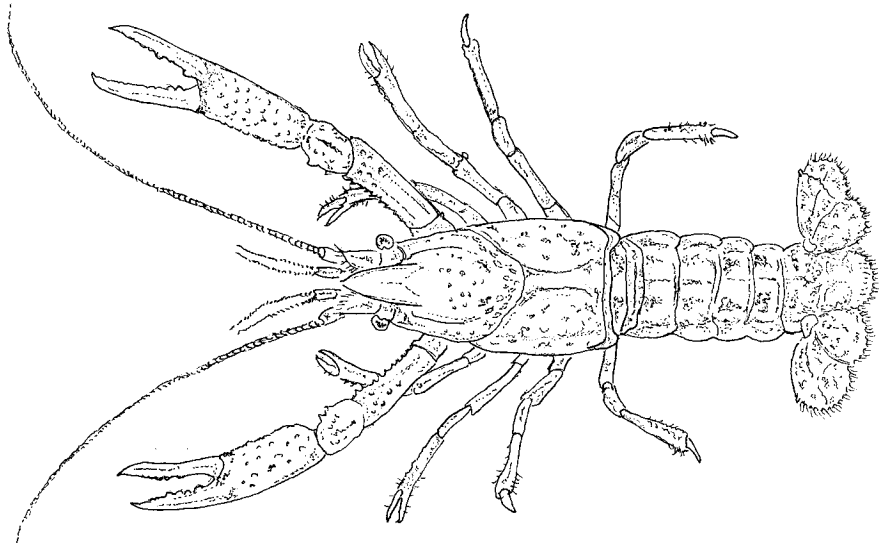


Figure 73—Everglades/electric blue crayfish (*Procambarus alleni*)

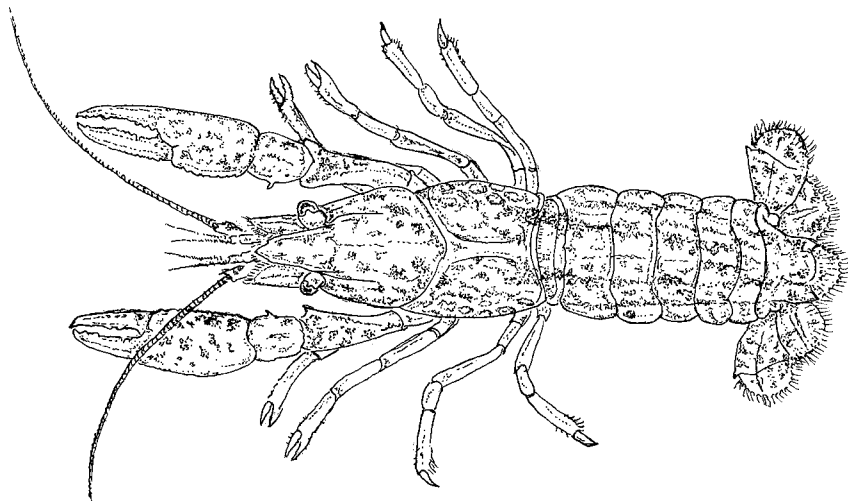


Figure 74—Marbled crayfish/marmorkrebs (*Procambarus virginalis*)

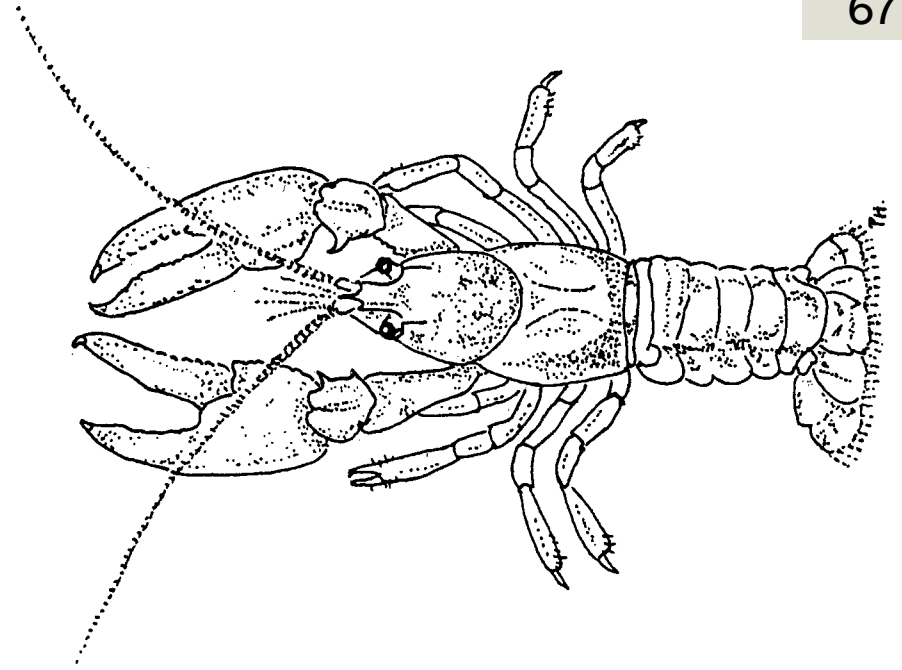


Figure 75—Obscure/Allegheny crayfish (*Faxonius obscurus*)

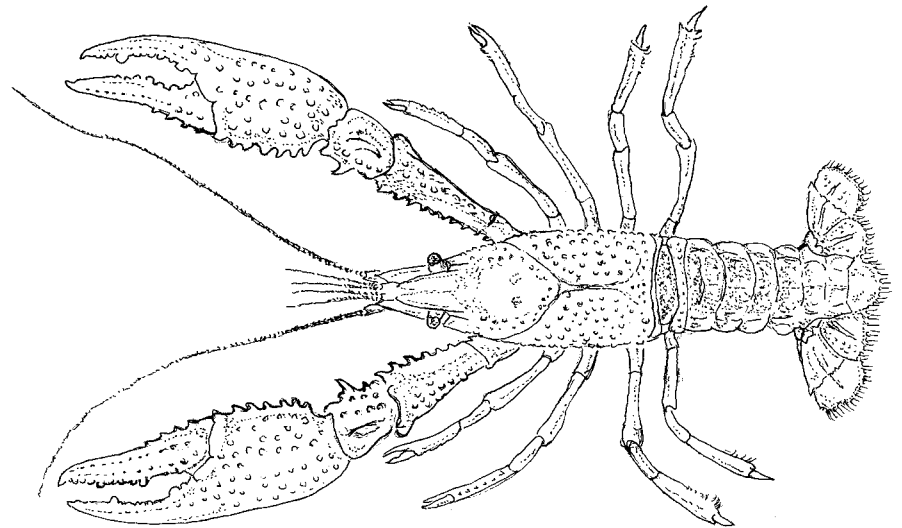


Figure 76—Red swamp/Louisiana red crayfish (*Procambarus clarkii*)

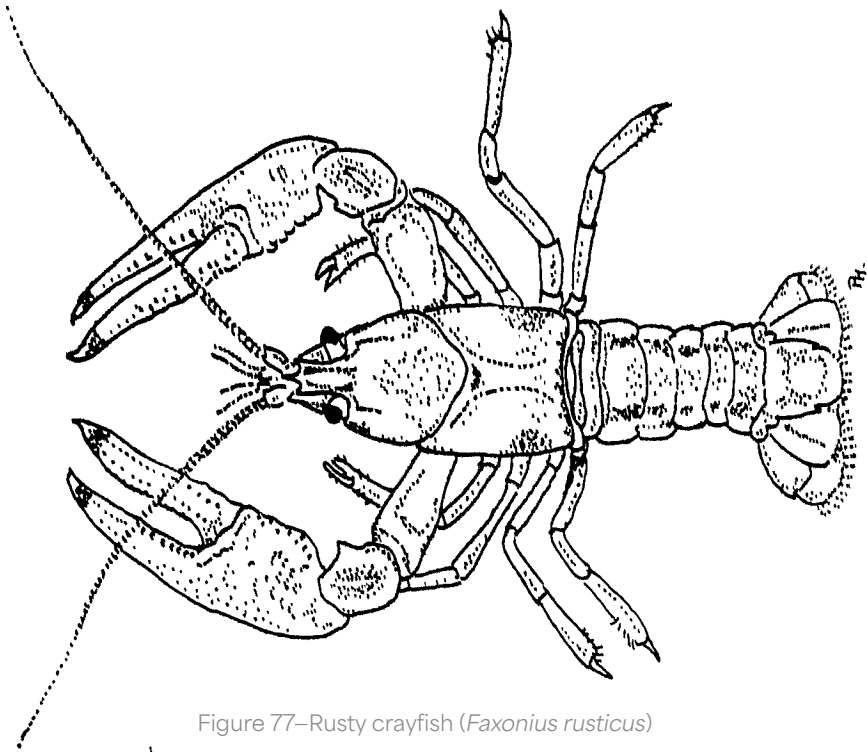


Figure 77—Rusty crayfish (*Faxonius rusticus*)

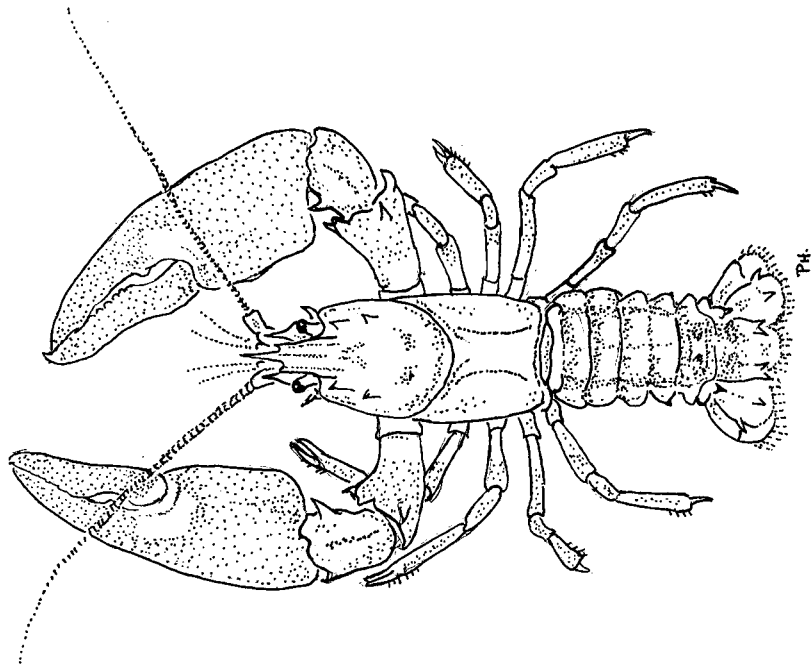


Figure 78—Signal crayfish (*Pacifastacus leniusculus*)

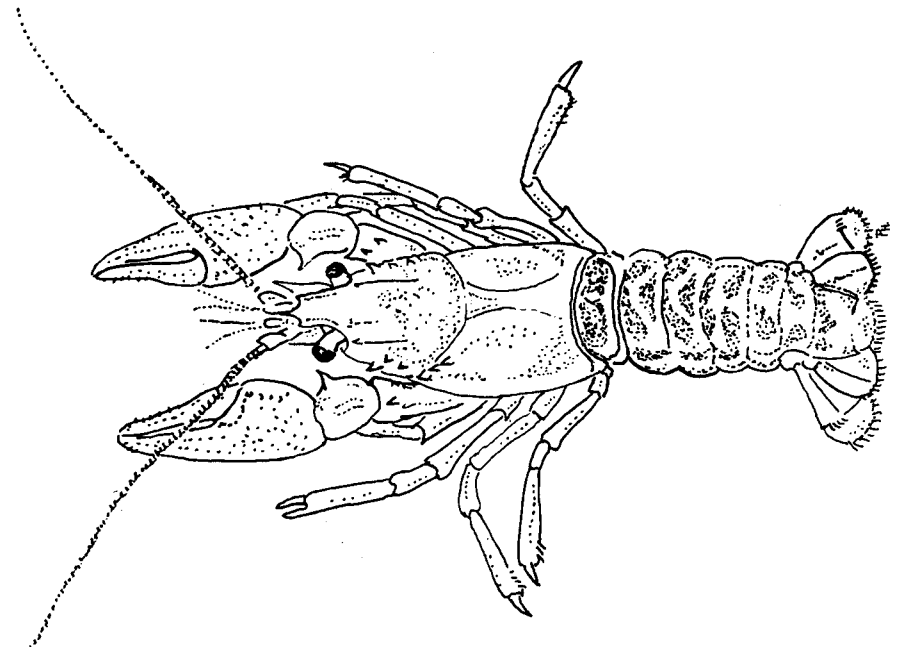


Figure 79—Spiny-cheek crayfish (*Faxonius limosus*)

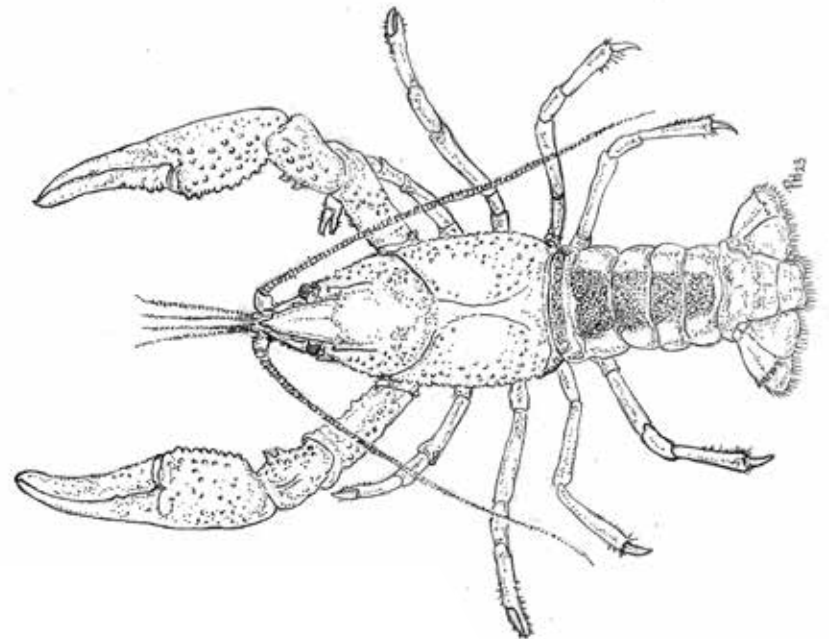


Figure 80—White River crayfish (*Procambarus acutus*)

CRAYFISH GENERA GONOPOD DRAWINGS

The gonopod is the male reproductive structure on crayfishes. Male crayfishes will moult in and out of mating form (Form I) to a non-mating form (Form II). This is the case with *Faxonius*, *Cambarus*, *Creaserinus*, *Lacunicambarus*, and *Procambarus* species, but is not the case with *Pacifasticus*.

In some species (e.g., rusty crayfish & northern clearwater crayfish), it's important to look at the gonopods to confirm identification.

In this section, we demonstrate the different forms of gonopods for the genera highlighted in this guide.

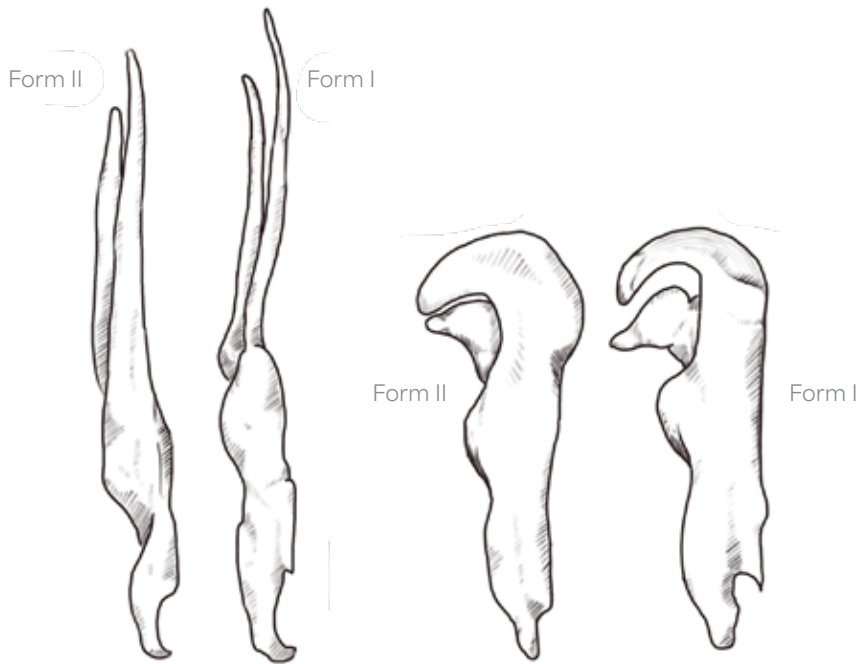


Figure 81—*Faxonius* gonopods

Figure 82—*Cambarus* gonopods

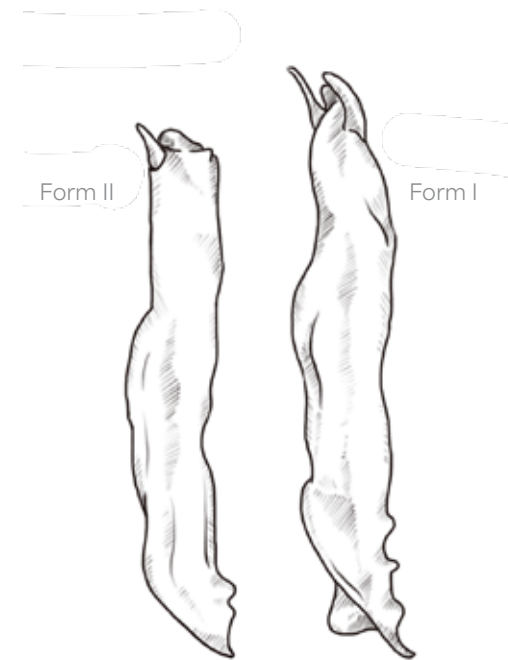


Figure 83—*Procambarus* gonopods



Figure 84—*Pacifasticus* gonopods (Distal and lateral view of gonopod. *P. leniusculus* does not alternate between forms)



Figure 85—First White River crayfish captured in-land in Ontario.
Left: Jeff Berthelette , centre: Dr. Premek Hamr, right: Brook Schryer (B. Schryer).

| GLOSSARY OF TERMS AND DEFINITIONS

ACUTE: refers to the angle; less than 90°.

AREOLA: area on the dorsal surface of carapace, behind the head portion, made up of two arching grooves. These can be open (grooves have a distinct gap between them) or closed (the grooves in the centre of the carapace).

ANTERIOR: situated before or at the front of.

APEX: in biology, the term 'apex' refers to the narrowed or pointed end of the anatomical structure (e.g., rostrum apex, claw apex).

ASEXUAL(LY): independent of sexual processes, especially not involving the union of male and female germ cells.

CARAPACE: hard unsegmented covering of the head and thorax.

CARINA: a keel-shaped anatomical part or ridge that is found on the rostrum of the crayfish.

CERVICAL GROOVE: is a transverse line that separates the head (cardiac) and thorax (gastric) regions of the crayfish. It is located between the head and thorax on the underside of the body.

CHELA(E): Claws of crayfish; these are modified first pairs of pereopods.

CONCAVE: hollowed or rounded inward like the inside of a bowl.

CYCLIC: revolving or recurring in cycles; characterized by recurrence in cycles.

DACTYL: in biological sciences, this refers to an organism's digit like a toe or finger.

DIMORPHISM: the occurrence of two distinct forms in structure, colouration, etc. among animals of the same species.

DORSAL(LY): situated on or toward the upper side of the body, equivalent to the back, or posterior, in humans.

GONOPOD: refers to the male copulatory or reproductive organs; modified first and second pleopods/swimmerets on underside of abdomen.

ISCHIAL HOOKS: hooks on bases of the second and third walking leg, present in mating males.

LATERAL: of or relating to the side of something (e.g., lateral spines on rostrum are found on the side of the rostrum, whereas the tip is called the apex).

LATERALLY COMPRESSED: flattened from side to side.

ORBIT: the bony cavity of the skull that contains the eye; eye socket.

OVIDUCT: located at the base of the third pair of walking legs on female crayfishes. This is where eggs will be shed by the female crayfish during reproduction. The eggs will then be held by her swimmerets.

PEREIOPODS: walking legs, first pair is modified into chela.

SEMINAL RECEPTACLE: is a circular structure located between the bases of the last two pairs of walking legs on female crayfish. It is used to store sperm from the male crayfish during mating.

ROSTRUM: sharp, dorsal extension of carapace between the eyes.

SETAE: a stiff structure resembling a hair or a bristle, especially in an invertebrate.

SICKLE: refers to the shape of some male gonopods in crayfishes. These gonopods are curved and shaped similar to that of the sickle tool.

SUBORBITAL: situated beneath the eye or the orbit of the eye.

SWIMMERETS: are small appendages located on the underside of the crayfish nearest the tail. They function to hold their eggs, movement, aiding in bringing oxygenated water to the gills, etc.

TUBERCLES: raised bumps on claw and/or body.

VENTRALLY: situated on or towards the lower abdominal plane of the body; equivalent to the front, or anterior, in humans.

Personal Crayfish Checklist

Species	Date	Location	CPL	Sex	Water temp	Weather
Notes						

Species	Date	Location	CPL	Sex	Water temp	Weather
Notes						

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