Aquatic Insects of the Ogeechee River

A pictorial guide to common taxa

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This project was made possible by:

The University of Georgia
Graduate School
Department of Entomology
&
Ogeechee Riverkeeper

2018

We also gratefully acknowledge the help of:
Simona Perry
Jesse Demonbreun-Chapman
Emily Markesteyn Kurilla
Keith Parsons
Fulton Love
Mickey Youmans
David Stoker
Nyree Riley
Cheryl Hudson
Nathan Driggers
Connie Shreve
Jody Slater
Arthur Benke
Bruce Wallace

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UNIVERSITY OF GEORGIA

OGEECHEE RIVERKEEPER®

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About this book

Purpose

The goal of this book is to showcase the diversity of aquatic insects living in the Ogeechee River. As these are small organisms living underwater, they often go unnoticed by humans. However, these animals are essential to food chains in the river that are so important to fish, birds, and people. They are useful to scientists in gaining understanding of the health of the river. We hope that those who use this book gain further understanding of the Ogeechee River ecosystem and enjoy getting a closer look at its smaller members.

Organization

This book gives an introduction to taxonomic groups of aquatic insects. Sections are divided by insect order, and contain photos of common genera. Most sections also contain an illustration that points out features of the insect form that are typically used for their identification in taxonomic keys. This book is not intended to serve as a key to aquatic insects or a comprehensive guide to all insects living in the Ogeechee, merely an overview of commonly found organisms.

If users would like more information about identifying aquatic insects and other invertebrates, recommended texts include: *An Introduction to the Aquatic Insects of North America* by R.W. Merritt, K.W. Cummins, & M.B. Berg (Kendall Hunt Publishing), *Dragonflies and Damselflies of Georgia and the Southeast* by Giff Beaton (University of Georgia Press), *Aquatic Entomology* by W. Patrick McCafferty (Jones & Bartlett Publishers), *Larvae of the Southeastern USA Mayfly, Stonefly, and Caddisfly Species (Ephemeroptera, Plecoptera, and Trichoptera)* by J.C. Morse, W.P. McCafferty, B.P. Stark, & L.M. Jacobus (Clemson University Public Service Publishing), and *The Water Beetles of Florida* by J.H. Epler (Florida Department of Environmental Protection).

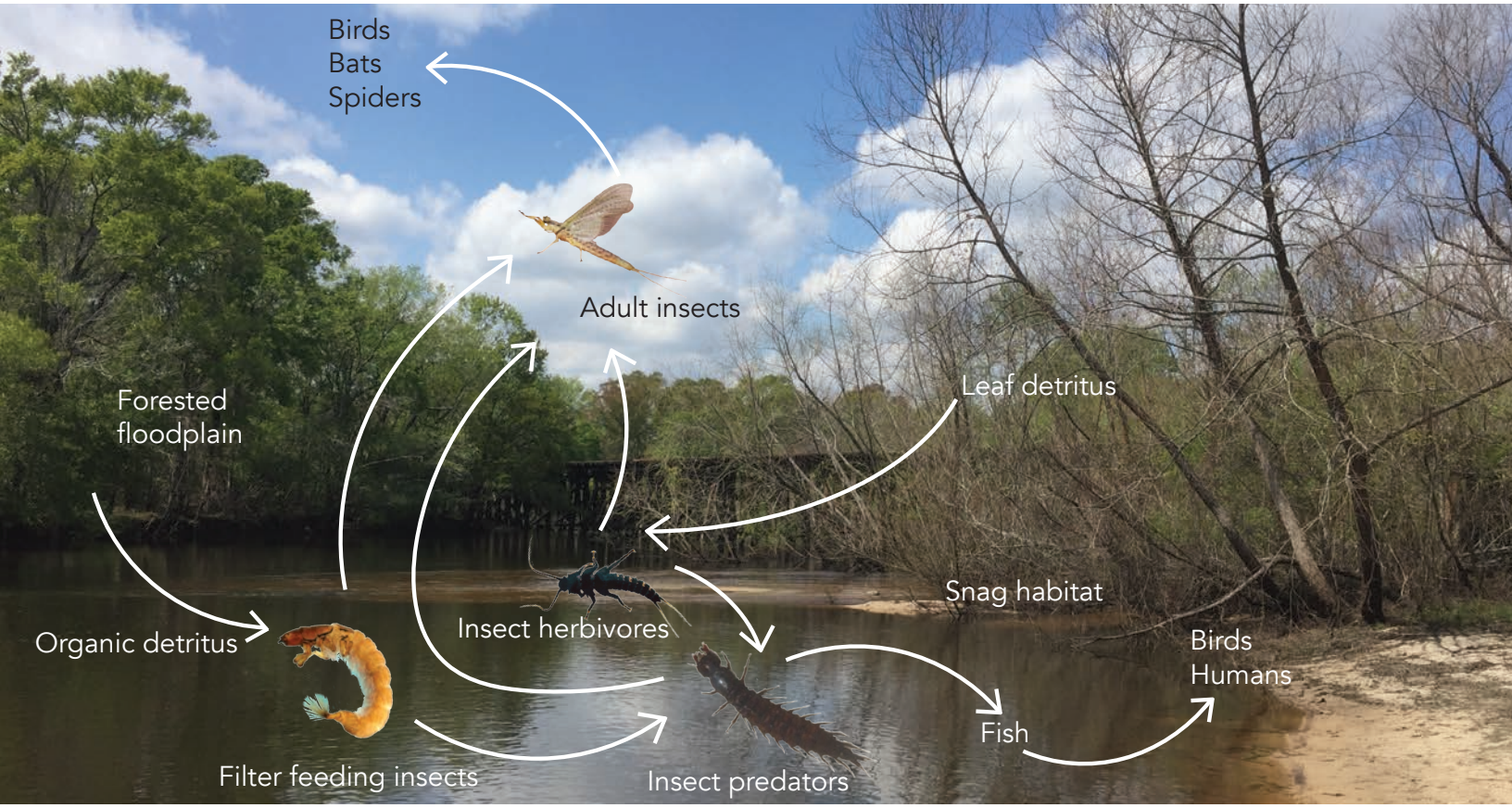
Research

Insects that were photographed for this book were collected during a research project that represented a collaboration between Ogeechee Riverkeeper and the University of Georgia Department of Entomology. Specimens were collected specifically from submerged wood ("snags") in the Ogeechee, and we compared our data to similar samples collected in the 1980s to study ecological change on the Ogeechee River. More detailed information can be made available to interested parties by contacting the Riverkeeper or the senior author.

Aquatic Insects

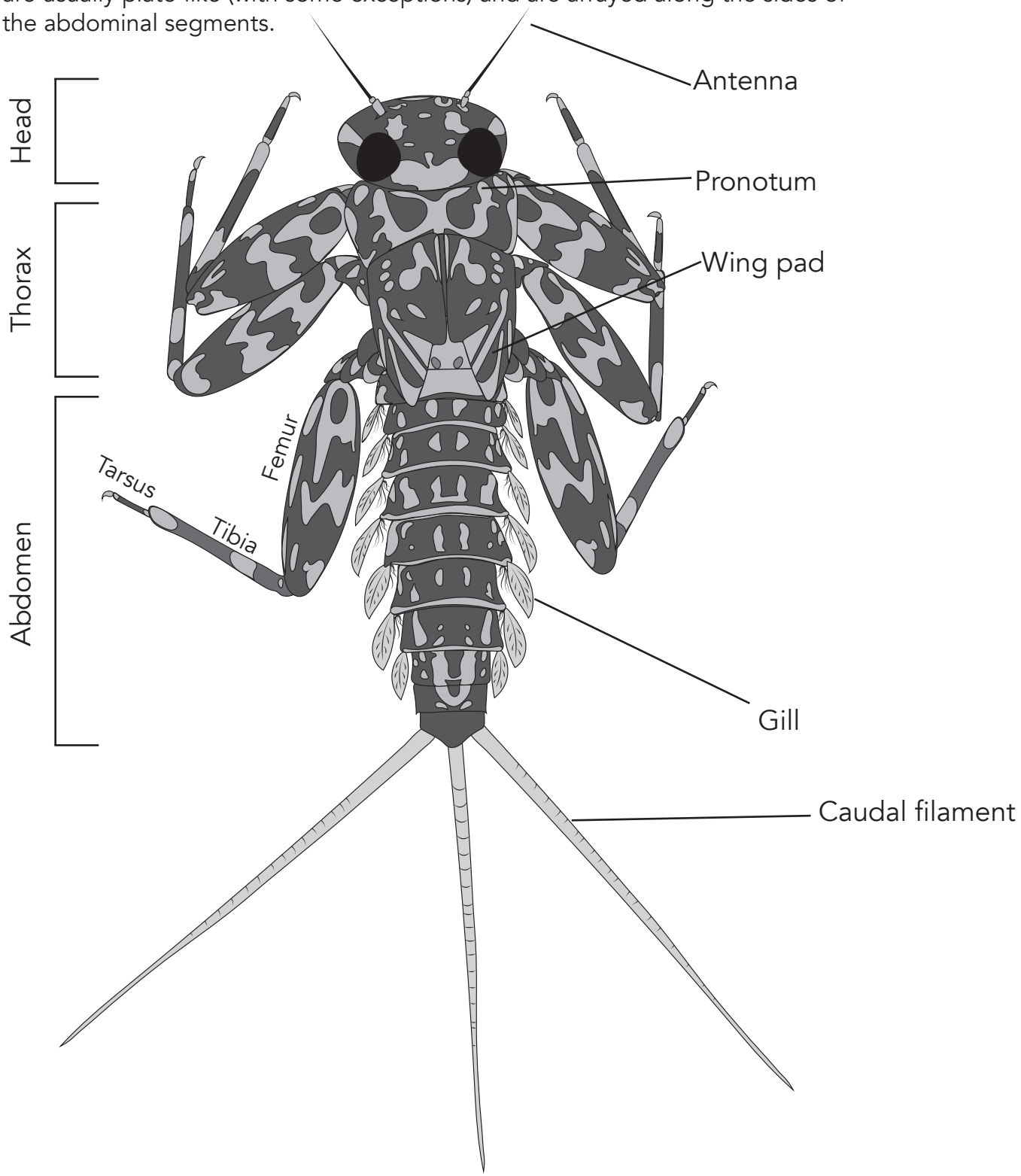
Many types of insects have an immature stage that lives in freshwater habitats, and some (like beetles) also live underwater as adults. These aquatic insects play essential roles in river ecosystems. They are eaten by fish and other vertebrates in the water. When adult insects emerge from the water and fly through the air, they are an important food resource for animals such as birds, bats, and spiders. In sandy-bottomed Coastal Plain rivers like the Ogeechee, researchers have discovered that most aquatic insects occur on "snag" habitat, which is living or dead wood that extends into the flowing water. The insects pictured in this booklet were all collected from snags, and for anyone interested in collecting their own specimens, snag habitat is the best place to look.

Different factors can affect aquatic insect populations, and unfortunately humans can cause harm to these animals by dumping chemicals and other pollutants in the river. Another way human activity affects life in the river is when the floodplain is altered. The Ogeechee River is unique because it is one of the largest rivers in Georgia without a dam controlling the amount of water in the river. As a result, the river is highly connected to the floodplain. When the river floods, organic matter from the forest flows into the main channel, and this detritus serves as an important source of food for many aquatic insects. The more that humans can protect the floodplain from pollution or deforestation, the healthier the Ogeechee River will be.



Ephemeroptera

Ephemeroptera is the order that contains mayflies. The scientific name "Ephemeroptera" refers to the ephemeral, or short-lived, nature of the adult life stage. The immature insects can live as long as a year underwater, but the adults tend to die quickly after mating and laying eggs. To differentiate families in the nymph stage, it is most helpful to observe the number and shape of the gills. Mayfly gills are usually plate-like (with some exceptions) and are arrayed along the sides of the abdominal segments.



Baetidae

Mayflies in the family Baetidae are usually relatively small. Nymphs can have 2 or 3 tails. Often, they have large eyes and long antennae. Once they are mature, the wing pads will be black in color.

Nymphs are known to be good swimmers, utilizing a fish-like strategy that make them appear like tiny minnows. The name used for these organisms by the fly fishing community is "Blue Winged Olives."

There are multiple genera present in the Ogeechee, but identification requires high microscope magnification.

Body length: ~ 6 mm

Baetiscidae

Genus: *Baetisca*

This group of mayflies is unique due to the pronotum covering the entire thorax and some of the abdomen. This feature gave these organisms the common name "armored mayflies."

It is thought that the armor protects the gills from abrasion from sand.

Baetisca specimens were found on wood snags in the Ogeechee in winter and early spring months.

Body length: ~8 mm

Caenidae

These mayflies are known as the "Small Squaregills," referring to the shape of the pair of gills on the first abdominal segment. These types of gills are called *operculate*, which means they cover other pairs of gills. Unlike other mayflies with operculate gills, these meet (but are not fused) along the midline.

Amercaenis

This genus has short setae (hair) on the posterior margin of the operculate gills and long setae on the forelegs.

Body length: ~4 mm

Caenis

This genus has longer setae on the posterior margin of the operculate gills and does not have long setae on the forelegs.

Body length: ~4 mm

Heptageniidae

This family includes the "Flathead" mayflies. Their streamlined shape and wide-set legs help them to cling to surfaces in fast river currents. These organisms consume mostly algae, which they scrape off substrate. The genera seen in the Ogeechee River have 3 long, or "well-developed," tails, though some genera in this family have only 2.

Maccaffertium

This genus is distinguished by wide, truncated gills on abdominal segments 1-6 and smaller, thin gills on abdominal segment 7.

Maccaffertium is a commonly found genus in the Ogeechee, especially during summer and fall months.

Body length: ~10 mm

Heptagenia

These mayflies look similar to *Maccaffertium*, but the main difference can be seen in the abdominal gills. *Heptagenia* has gills of similar size on segments 1-7, and they are tapered in shape compared to *Maccaffertium*.

We collected this genus most commonly in early spring months.

Body length: ~10 mm

Ephemerellidae

Genus: *Ephemerella*

The common name for Ephemerellidae is the "Spiny Crawler Mayflies."

This group of mayflies is distinguished by the lack of gills on the first (and sometimes second) abdominal segment.

There are a few other genera in this family found in the Ogeechee River, but *Ephemerella* was most abundant. *Ephemerella* was most often collected in winter and early spring months.

Body length: ~7 mm

Leptohyphidae

Genus: *Tricorythodes*

These are small mayflies that have operculate gills that are triangle-shaped (as opposed to the square-shaped gills on Caenidae mayflies). Leptohyphidae mayflies are sometimes known as "Little Stout Crawlers." They were most often collected in the summer and fall months on the Ogeechee River.

Body length: ~4 mm

Isonychiidae

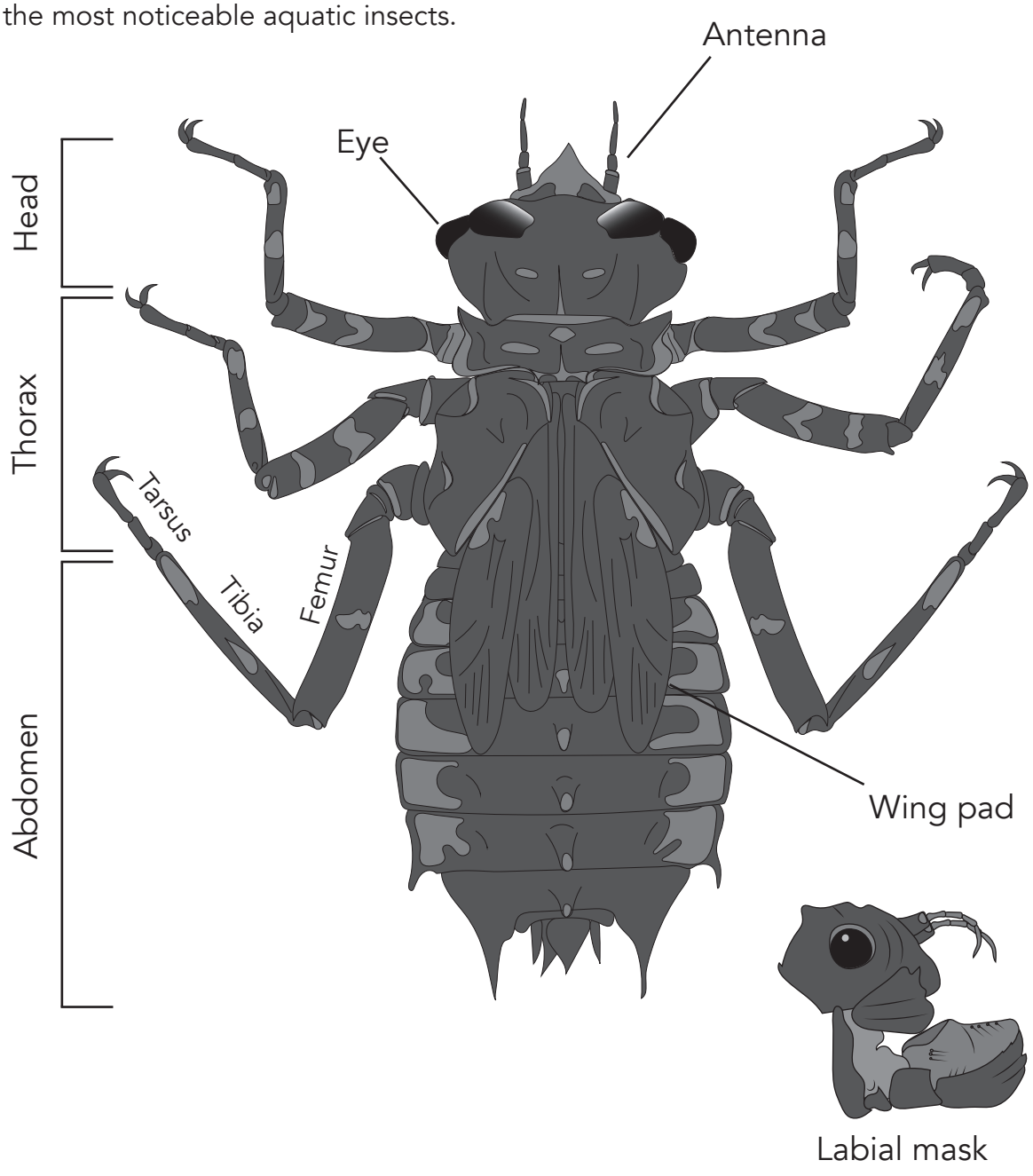
Genus: *Isonychia*

Isonychia are the largest mayflies found on Ogeechee River wood snags. They are known as "Brushlegged Mayflies" due to the long, golden-colored setae found on the forelegs. *Isonychia* nymphs use these setae as a net to catch food in the current. They are fast swimmers and appear minnow-like in the river. The fly fishing community knows these mayflies as "Slate Drakes."

Body length: ~12 mm

Odonata

Odonata is divided into two suborders. Anisoptera contains the dragonflies. These are larger and more robust organisms. As adults, they hold their large wings out to the sides. Immature dragonflies do not have visible external gills. Zygoptera contains the damselflies, which are smaller and slender-bodied, and typically hold their wings up, over their back at rest. Damselfly nymphs have leaf-like gills extending from the end of their abdomen. Both groups are predators as nymphs and adults, eating other insects and sometimes small fish! Their mouthparts are modified into a structure called a labial mask (see below) for grabbing prey. Because they are large and colorful, adult odonates are some of the most noticeable aquatic insects.



Coenagrionidae

Coenagrionidae is a family of damselflies commonly found in the river. Members of this family can be differentiated from other Zygoptera families by the size of the antennal segments (segment 1 is not much longer than other segments) and the stalk of the labial mask is not extended past the first thoracic segment. They are known as the "Narrow-winged Damselflies."

Argia

This genus is relatively stout compared to other damselflies, and the gills at the end of the abdomen are wide in lateral view. They can be found in large numbers in winter and spring months, especially on submerged roots of willow trees.

Body length: ~11 mm

Enallagma

Members of this genus are known as "American Bluets," and are more slender in shape compared to *Argia*. The caudal gills are thinner when viewed laterally and the palpal lobes on the mouthparts do not have accessory hooks. Also, the eyes usually have a distinctive pattern.

Body length: ~8 mm

Aeshnidae

Genus: *Boyeria*

The family Aeshnidae contains the dragonflies known as "darners," and they are some of the largest adult dragonflies. The name comes from the resemblance of the female's abdomen to a sewing needle while she is laying eggs.

The labial mask is flat in lateral view, in contrast to the other dragonflies shown here. The pale spot seen on the 8th abdominal segment is one identifying characteristic of the genus *Boyeria*.

Body length: ~20 mm

Corduliidae

Genus: *Neurocordulia*

Dragonflies in Corduliidae, as adults, are known as the "Emeralds" or "Green-eyed Skimmers." The labial mask of nymphs is spoon-shaped. The species of this genus most commonly observed in the Ogeechee, *Neurocordulia molesta*, has a "horn," or pointed area at the top of the head. Adults of this species are light brown in color and are also called "Shadowdragons."

Body length: ~20 mm

Macromiidae

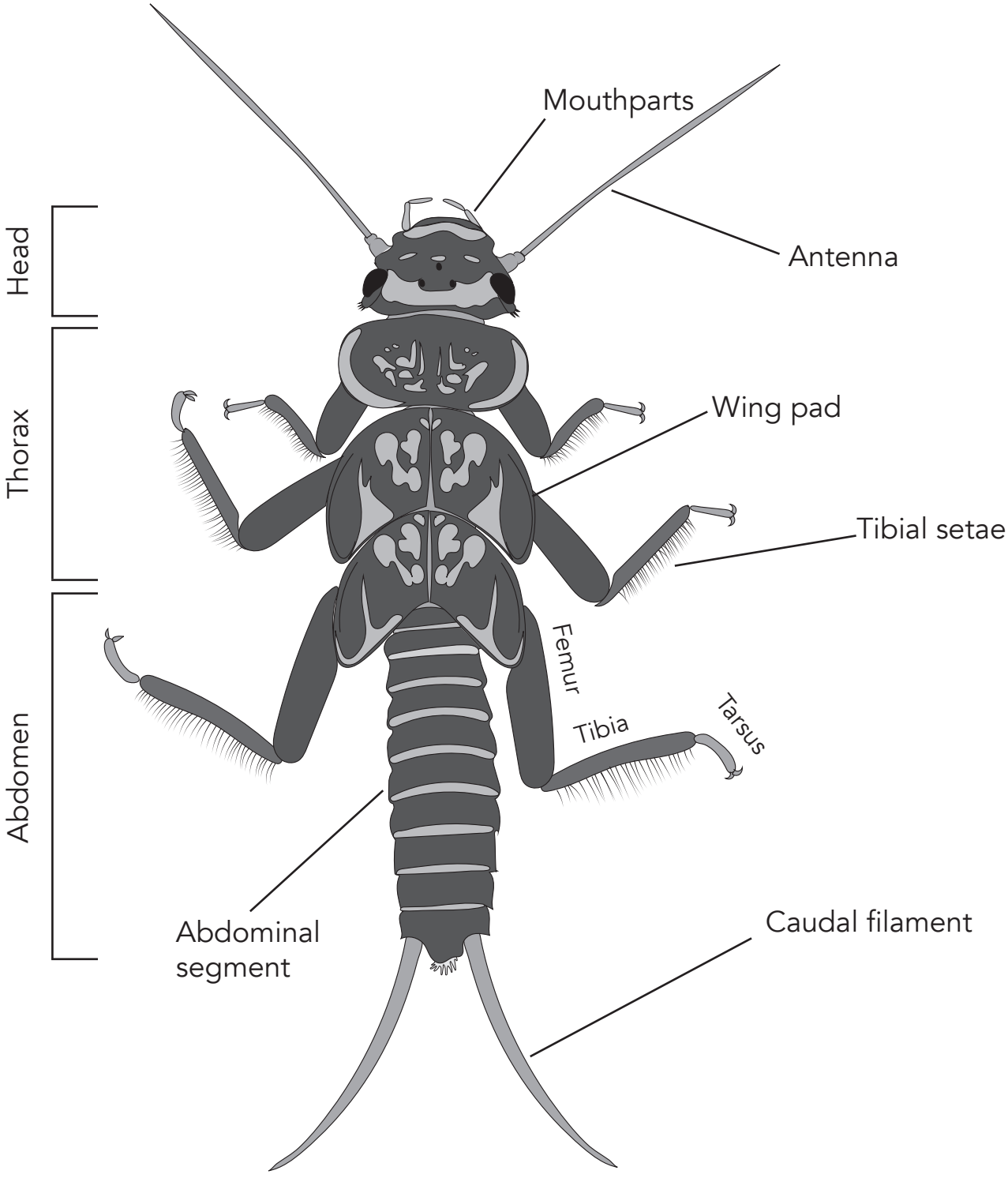
Genus: *Macromia*

Macromiidae dragonflies are known as "River Cruisers," named for their characteristic flights up and down river corridors. Like Corduliidae, the adults have bright green eyes. The nymphs are distinctive due to their very long, spider-like legs. The hind femur reaches almost to the tip of the abdomen, while Corduliidae nymphs have noticeably shorter legs.

Body length: ~15 mm

Plecoptera

Plecoptera are the stoneflies. The aquatic nymphs of these insects can be predators (feeding on other insects), herbivores (feeding on algae), or detritivores, (feeding on dead leaf litter). They are differentiated from mayflies in that they only ever have two "tails" at the end of the abdomen, and instead of plate-like abdominal gills, their gills are typically filamentous in shape and are more commonly found on the ventral (bottom) side of the thorax, if present.



Perlodidae

This family of stoneflies are known as the "Springtails" or "Yellow Stones." They are usually predators as nymphs. They do not have any visible gills on the thorax, but may have small gills visible on the underside of the head. This family is less common than other stonefly groups on the Ogeechee River.

Isoperla

Members of this genus are known as the "Stripetails," as one of the distinguishing feature of nymphs is the set of dark stripes running vertically down the dorsum of the abdomen. Some adults are yellow in color. Nymphs were most often collected from the Ogeechee in winter and early spring months.

Body length: ~ 7 mm

Hydroperla

This is an uncommon genus on Ogeechee River snag habitats. Specimens were generally larger than *Isoperla* specimens. To distinguish this genus from others in the family, close examination of the mouthparts is necessary, but observing the patterning of coloration on the head is also helpful.

Body length: ~10 mm

Perlidae

This family contains the "Golden Stones," which are predatory stoneflies. They eat other small insects. Perlid stonefly nymphs have filamentous gills on the thorax near the base of each leg. Specimens can be quite large. There are four different genera commonly found in the Ogeechee River.

Paragnetina

This genus can be identified by a straight line of short, thick setae near the back of the head behind the eyes. Specimens in the Ogeechee are typically close to being uniformly brown in color.

Body length: ~20 mm

Perlesta

Nymphs in the genus *Perlesta* are characterized by freckle-like spots scattered across the body. Like *Paragnetina*, there are setae across the back of the head, but they are in an irregular line.

Body length: ~10 mm

Acroneuria

Acroneuria is a common genus across eastern North America. This genus does not have a line of setae across the back of the head, simply a few setae scattered behind the eyes.

Body length: ~12 mm

Neoperla

This genus can be distinguished from the others in the Ogeechee in that only 2 ocelli (simple eyes on the top of the head) are visible. The other genera have 3 clearly visible.

Body length: ~6 mm

Pteronarcyidae

Genus: *Pteronarcys*

These large insects are often called "Giant Stoneflies" or "Salmonflies." They are distinguishable by their size (once fully developed as nymphs) and the presence of filamentous, fringed gills attached to the underside of the first two abdominal segments, in addition to the thoracic segments. They mostly consume leaf detritus and are long-lived in the aquatic environment relative to other insects.

Body length: ~ 28 mm

Full body image

Taeniopterygidae

Genus: *Taeniopteryx*

Stoneflies in this family emerge in winter months, rather than in the spring or summer like most insect species. If you are on the Ogeechee River in November or December, the small, darkly colored adults may be seen flying around. The hind wing pads diverge from the midline of the body, and the thorax has finger-like conical gills, near the bases of the legs.

Body length: ~8 mm

Neuroptera

Neuroptera, the order that contains lacewings, dobsonflies, fishflies, and spongillaflies, is a diverse group. Most of the species do not have aquatic life stages, but there are several families that do. Two families representing different suborders are present in the Ogeechee. The suborder Megaloptera is sometimes referred to as a separate Order in books on aquatic insects, and contains the dobsonflies and fishflies.

Megaloptera: Corydalidae

The only species in this family that was collected from snags in the Ogeechee River is the Eastern Dobsonfly, *Corydalus cornutus.* These larvae are known as "hellgrammites." They are fierce predators of other insects, including dragonfly immatures. The larvae have filaments and gill tufts extending from each abdominal segment.

Body length: ~30 mm

Full body image

Planipennia: Sisyridae

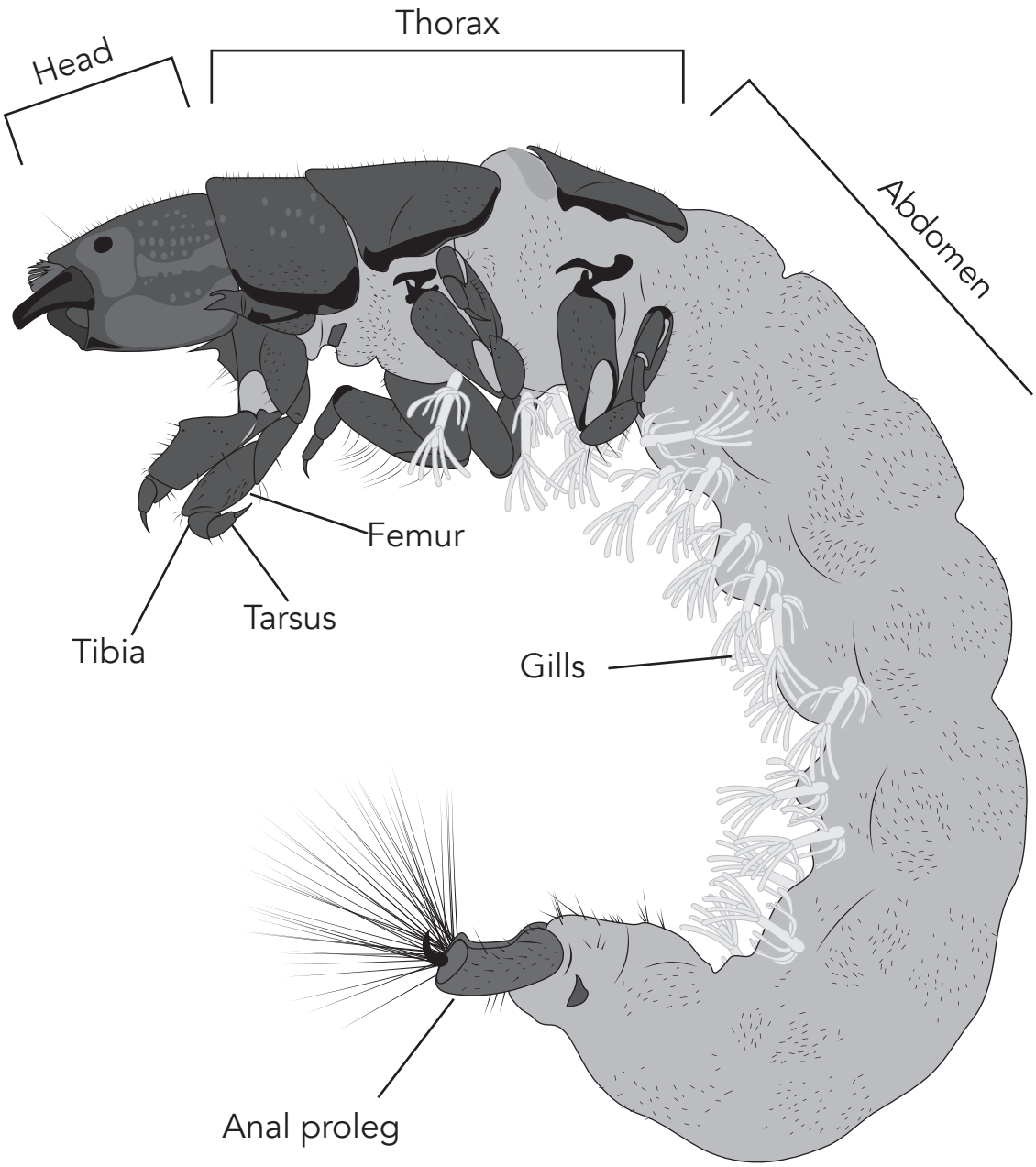
Genus: *Climacia*

This family is known as the spongillaflies. These organisms feed on freshwater sponges, which can grow on submerged wood. The mouthparts are long and stylet-shaped, resembling the antennae to a degree.

Body length: ~4 mm

Trichoptera

Members of this order are commonly known as caddisflies. The adults are usually brown or gray and resemble small moths except the wings are held tent-like instead of flat. The larvae have diverse forms and occupy many types of niches in freshwater environments. Larvae may or may not have a case built with plant or mineral materials and held together with silk around the abdomen for protection. Some without cases will spin nets to capture food in the river current.



Brachycentridae

Genus: *Brachycentrus*

This family of caddisflies is important to fly fishing, sometimes known as "Grannoms" or "Apple Caddis." The larvae are distinguished by the two sclerotized thoracic plates and the lack of membranous humps on the first abdominal segment. The case of *Brachycentrus* is also diagnostic in being square in cross-section, a form nicknamed the "log cabin" style case. They will often graze on algae, but they also use the setae on their legs to filter organic matter from the river current. It seems these caddisflies have appeared in the river recently, since they were not detected in a large survey of aquatic insects conducted in the 1980s.

Body length: ~7 mm

Hydropsychidae

This family is known as the "Net-spinning" caddisflies. They construct a fine mesh of silk to capture food particles from fast-flowing current. Filamentous gills arrayed across the ventral abdominal segments are a distinguishing characteristic, as are the three sclerotized (hardened) thoracic segments. They often appear to have a C-shaped body when preserved.

Cheumatopsyche

This genus is the smallest of the three hydropsychid caddisflies found in the Ogeechee. The head is generally darkest in color, but the quickest way to distinguish this genus is to look for a small, rounded indentation on the front margin of the head in dorsal view.

Head capsule width: ~0.5 mm

Macrostemum

These hydropsychid caddisflies are the largest of the three found in the Ogeechee, and are in a different subfamily, Macronematinae, adults of which are large relative to other caddisflies and typically have distinctly patterned wings. The *Macrostemum* larvae can be identified by a thickened ridge, or "carina," on the top margin of the head.

Head capsule width: ~1.5 mm

Hydropsyche

This genus is abundant in the Ogeechee River. The front margin of the head capsule is straight in comparison to *Cheumatopsyche*, and the head has no dorsal ridge like *Macrostemum*. Other distinguishing characteristics require a view of the underside of the head and first thoracic segment. The color patterning on the top of the head can help distinguish larval species.

Head capsule width: ~1 mm

Hydroptilidae

Hydroptilid caddisflies are the "Microcaddisflies." This name comes from the fact that, as both adults and larvae, these organisms are very tiny, often around 2 mm in total body length. They are also sometimes referred to as the "Purse-case Makers" because the case that the larvae build resembles a coin purse. They typically feed on filamentous algae in the river, making them herbivores.

Hydroptila

This genus builds a case that is open at both ends and is made out of silk, filamentous algae, and sometimes diatoms or minerals. Filamentous gills at the end of the abdomen are a distinguishing feature of this genus, as is the shape of the tibia. *Hydroptila* is a very diverse genus, with over 80 species in eastern North America.

Body length: ~2 mm

Neotrichia

Neotrichia builds a case primarily out of minerals and is tapered at the rear end. The anal prolegs at the end of the abdomen are more cylindrical and extended compared to other members of this family. Needless to say, a microscope is needed to see these features, but the shape of the case can be helpful as well.

Body length: ~1.5 mm

Leptoceridae

This group is known as the longhorn caddisflies, due to the very long antennae that adults have. The larvae also have relatively long antennae, though this length is a fraction of a millimeter. There are four different genera found within the Ogeechee River; all have two sclerotized thoracic plates.

Ceraclea

This genus is often distinguished by the presence of dark bars on the mesonotum (second thoracic segment), though it otherwise looks similar to *Oecetis*. The cases of these larvae are constructed from silk, plant material, or minerals. They often are associated with freshwater sponge aggregations in the Ogeechee River, thus are likely sponge predators.

Body length: ~7 mm

Oecetis

Individuals in the genus *Oecetis* can be found in tapered cases of either twig and wood pieces or mineral particles. These are predaceous caddisflies, primarily consuming small fly larvae in the Ogeechee River. Identification requires a view of the mouthparts, which are large and extend past the front of the head in dorsal view.

Body length: ~6 mm

Triaenodes

These caddisfly larvae build cases out of plant material in a spiraling pattern. In the Ogeechee River, all *Triaenodes* observed had used pieces of willow roots for case construction. The tibia of each hind leg has a transparent constriction.

Body length: ~8 mm

Nectopsyche

Larvae in the genus *Nectopsyche* resemble those in *Triaenodes*, but they do not have the transparent constriction of the hind tibia. *Nectopsyche* larvae often build cases with one long twig attached to the outside. Long hairs on the legs aid with swimming.

Body length: ~9 mm

Limnephilidae

Genus: *Pycnopsyche*

This is a widespread genus that lives in many different types of streams. *Pycnopsyche* are large individuals that feed on plant detritus. Individuals in this genus have different types of cases depending on the species; all those collected in the Ogeechee used small pieces of wood to construct their cases. These larvae have two sclerotized thoracic plates. Identification requires view of the antennae, which are quite small. Adults are often called "Great Autumn Brown Sedges."

Body length: ~15 mm

Philopotamidae

Genus: *Chimarra*

This family is known as the "Fingernet Caddisflies." The larvae spin nets of silk to catch food in the current. They are easily recognized by the membranous labrum (or what serves as an "upper lip" for insects). These caddisflies also have only one sclerotized plate on the dorsal part of the thorax. The genus *Chimarra* has an asymmetrical notch on the front margin of the head.

Head length: ~1 mm

Polycentropodidae

This family is similar to Philopotamidae (both only have one hardened thoracic plate), but the labrum of polycentropodid larvae is sclerotized rather than membranous. These are referred to as the "Trumpet-net Caddisflies," as they also spin nets of silk to catch organic matter in the river. These nets also serve as a retreat for larvae.

Cyrnellus

Identification of this genus and closely related taxa requires examination of the anal proleg at the end of the abdomen. In this genus, the basal part of the proleg is longer than the distal part, and there are no small spines on the inside margin of the anal claw. Larvae have been collected on snags in each season on the Ogeechee.

Head capsule width: ~1 mm

Neureclipsis

The larvae from this genus has tiny spines on the curved surface of the anal claw, only visible under high microscope magnification. Additionally, the basal and distal parts of the proleg are approximately the same length. *Neureclipsis* larvae were collected most frequently in the summer months from Ogeechee River snags.

Head capsule width: ~0.6 mm

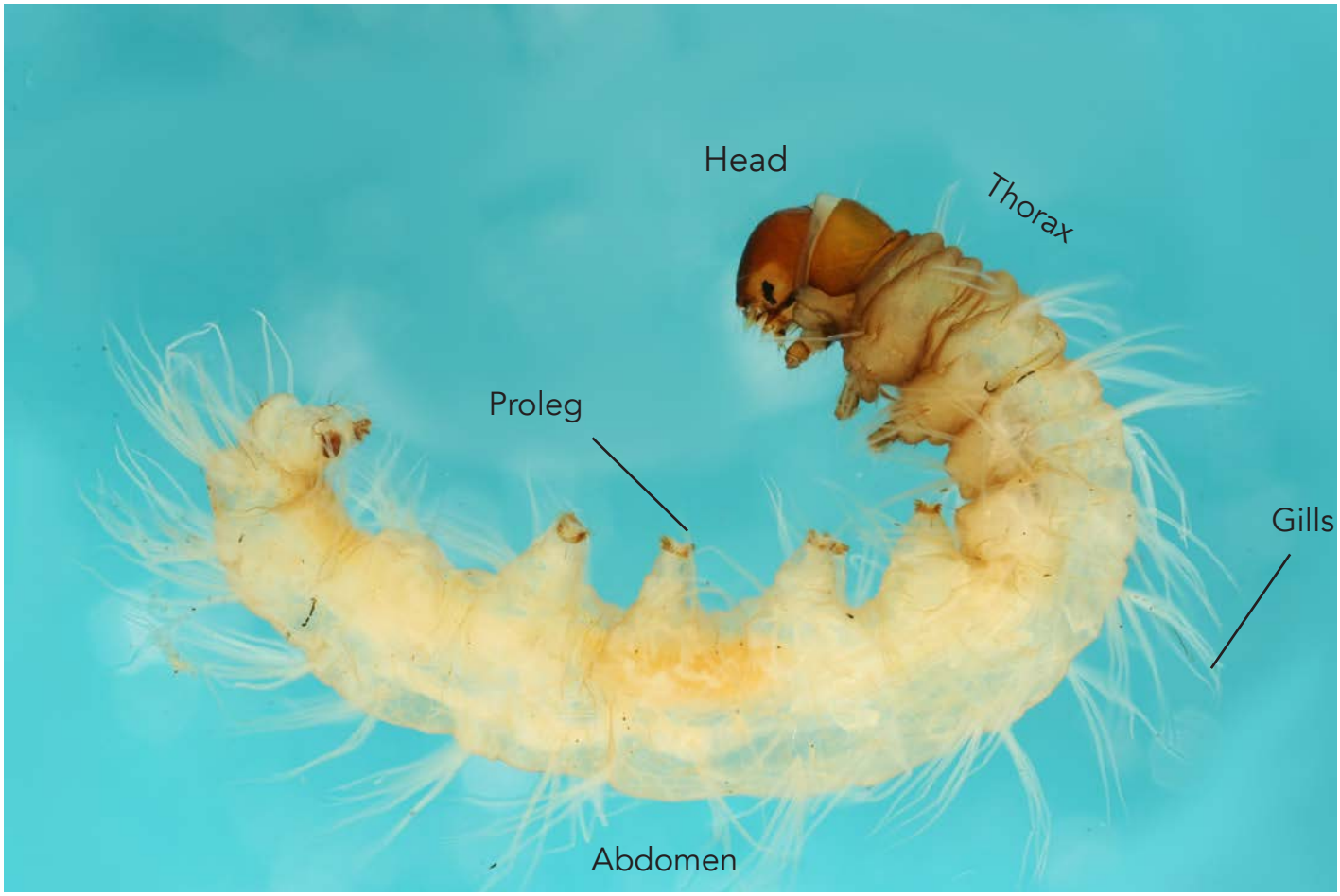
Cernotina

This genus is quite similar to *Cyrnellus*; the ratio of the anal proleg segments is similar and there are no tiny spines on the anal claw. One of the differences between specimens of these genera collected in the Ogeechee (besides other diagnostic characters on the anal proleg and claw) is that the head of *Cyrnellus* larvae is dark with light spots and the head of *Cernotina* is light with dark spots.

Head capsule width: ~0.6 mm

Lepidoptera

Lepidoptera is one of the better known insect orders, as it contains the moths and butterflies. Most of the larvae in this group are terrestrial, and some are important agricultural pests. However, there is a small portion of Lepidoptera species that have aquatic immature stages. Lepidopteran larvae are distinguished by the presence of prolegs along the abdomen that each bear a ring of tiny hooks at the apex. These prolegs aid the true legs on the thorax with locomotion.



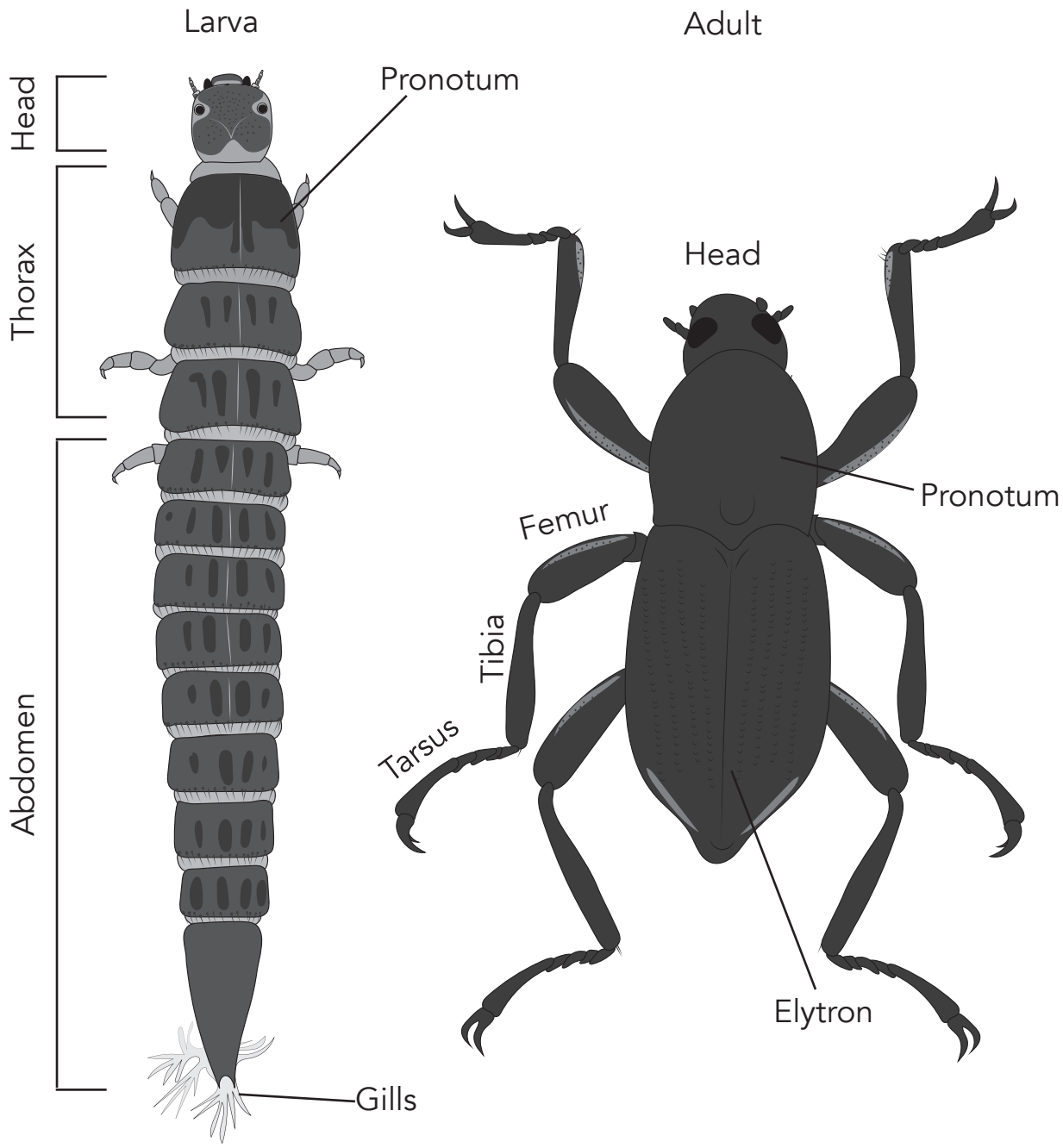
Crambidae

Genus: *Parapoynx*
This family of moths contains many terrestrial species, but *Parapoynx* is an aquatic genus. Larvae have filamentous gills arrayed across the thorax and abdomen, and are often found on aquatic plants, which they eat. They are present on snags in the Ogeechee in spring and summer months.

Body length: ~10 mm

Coleoptera

Beetles belong in the order Coleoptera. It is by far the most diverse group of all animals. Several different families are found in aquatic environments, often as both larvae and adults. Adult beetles are easily recognizable due to the modified forewings, or "elytra," covering the abdomen, often giving the organisms a smooth and rounded appearance. Aquatic beetle larvae can sometimes appear similar to Trichoptera or Neuroptera larvae, but Coleoptera larvae may have hardened plates on the abdomen. Also, beetle larvae will typically have either zero or four hooks at the end of the abdomen, and do not have a pair of prolegs at the end of the abdomen.



Dytiscidae

Larva

Genus: *Neoporus*

These organisms are known by the common name "Predaceous Diving Beetles." Both the adults and larvae live in a wide range of aquatic habitats and hunt other invertebrates. The adults have fine hairs on the legs for swimming. The genus *Neoporus* does not have a fully visible scutellum (the triangular structure between the halves of the elytra of beetles) and the 3rd segment of the fore tarsus is enlarged. Examination of other aspects of the leg morphology are also needed for this genus identification. Larvae most likely live on the floodplain rather than the main river channel.

Body length: ~2 mm

Gyrinidae

Adult

This family contains the whirligig beetles. The adults are dark in color and can be seen on the surface of many types of water bodies, usually aggregating in large groups close to the shoreline as they hunt for food. They have divided eyes that can see above and below the water surface at the same time. We did not collect the adults on snags often, but larvae were common on this habitat. The larvae are distinguished by their abdominal gills and two pairs of hooks at the end of the abdomen.

Dineutus

This genus can be differentiated by the constricted section of the head, giving a collar-like appearance.

Body length: ~18 mm

Gyrinus

The head of *Gyrinus* is not basally constricted, and the front margin has pointed projections.

Body length: ~10 mm

Elmidae

This family is known as the "Riffle Beetles," because the typical habitat of both larvae and adults is fast-moving water. The larvae have sclerotized plates on all body segments, along with an operculum that covers gills at the end of the abdomen. Adults are elongate in shape. Both life stages feed on algae and plant detritus. This is the most abundant family of beetles found on Ogeechee River snags.

Macronychus

Both larvae and adults of this genus are found on wood snags in the Ogeechee River. The area of the thorax under the first pair of legs of the larvae (can be viewed in the middle image) is not enclosed by a sclerotized plate, which is different than some other genera in the river. The adults can be identified by the shape of the coxae (globular) and their rounded body and leg shapes.

Larval body length: ~6 mm
Adult body length: ~3 mm

Ancyronyx

The larvae of this genus have a wide, flattened body, with spines projecting from the abdominal segments. Adults of *Ancyronyx* were much rarer on snags than larvae.

Larval body length: ~5 mm

Microcylloepus

This genus is one of the smallest of Elmidae taxa found in the Ogeechee River. The larvae can look similar to *Stenelmis* as they both have a closed coxal cavity on the first thoracic segment. *Microcylloepus* larvae have a pattern of parallel lines of tubercles on abdominal segments. The adults have transverse hind coxae and a carina (ridge) on each side of the pronotum.

Larval body length: ~4 mm
Adult body length: ~1.5 mm

Dubiraphia

This genus is small like *Microcylloepus*, but the adults are smoother in appearance, with no carinae on the pronotum and usually with color patterning on the elytra. Larvae were not commonly observed from snag samples in the Ogeechee River, though adults could be sporadically abundant.

Body length: ~2 mm

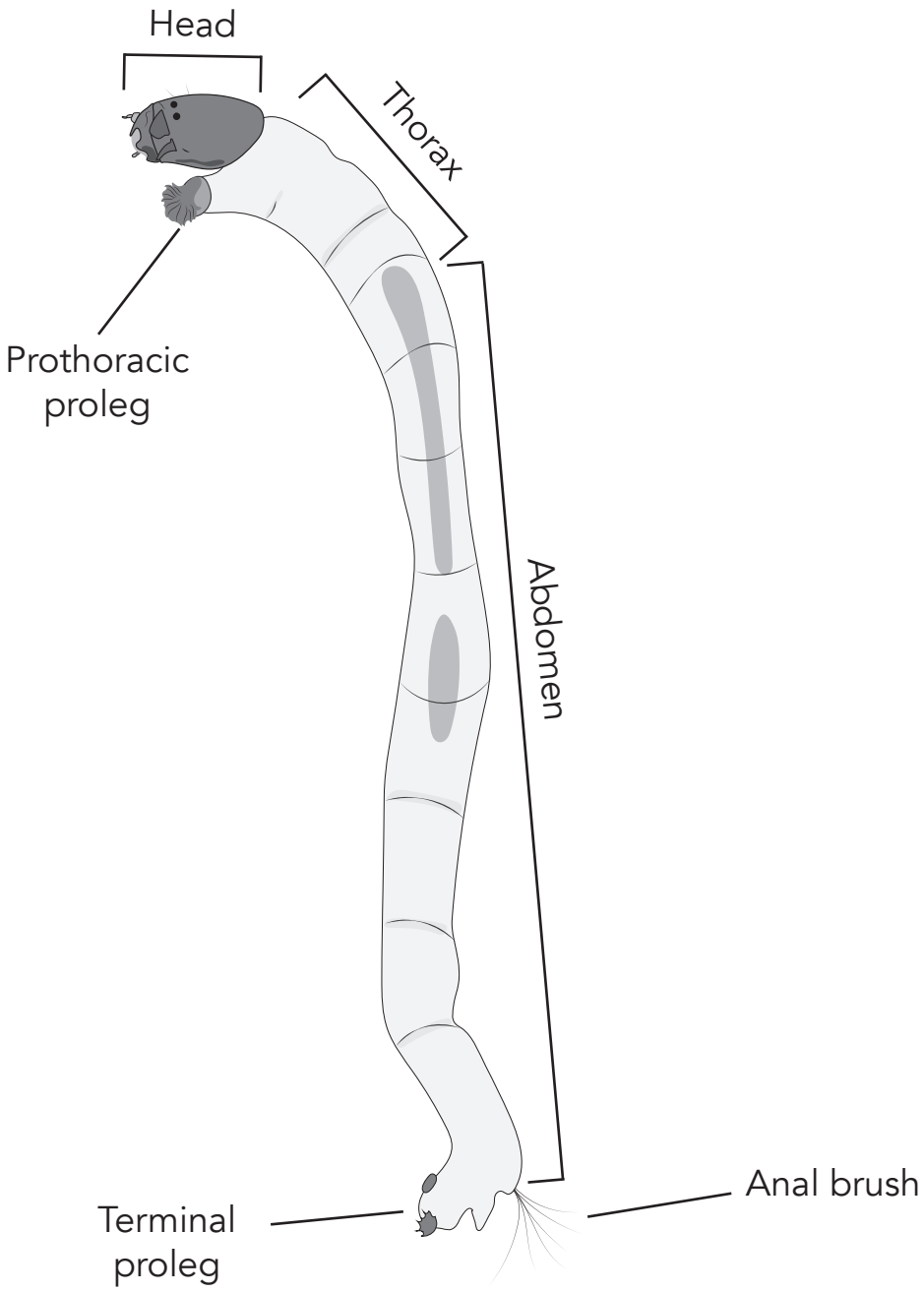
Stenelmis

This genus is quite common in the Ogeechee River as both larvae and adults. As adults, *Stenelmis* individuals are larger than *Microcylloepus*. The larvae have a closed procoxal cavity, as shown in the ventral view. There are two small spines on the end of the abdomen, on the edge of the last segment.

Larval body length: ~5 mm
Adult body length: ~3 mm

Diptera

Diptera contains the flies. Like Coleoptera, this is a diverse order with various families specializing in rivers and streams as larvae. Adults in this order are characterized by only having two full-sized wings (rather than the four on most adult insects). Freshwater dipteran species are especially important because several groups, like mosquitoes and blackflies, will bite humans and have the potential to spread disease. However, the species found on snags in the main channel of the Ogeechee River as larvae are not known to pose a threat to human health. In fact, dipteran larvae are important because they serve as the base of the river food web, becoming food for many invertebrate and vertebrate predators.



Ceratopogonidae

This family contains the "Biting Midges," sometimes referred to as "Punkies" or "No-See-Ums," which are nuisance species as adults, taking blood meals from humans. The larvae live in a variety of habitats and have diverse forms, as shown below. Only the subfamilies are indicated here.

Forcipomyiinae

This group is not extremely common on Ogeechee River snags, but it is found periodically. The larvae have both thoracic and terminal prolegs, and spines are present on the dorsal side of the body.

Body length: ~3 mm

Ceratopogoninae

These organisms are long and slender in shape, without thoracic or terminal prolegs. The head is twice as long as it is wide. This group is very common in Georgia rivers, and occurs on Ogeechee snags every month out of the year.

Body length: ~6 mm

Chironomidae

Chironomidae is the most abundant group of insects in the Ogeechee River, as it is in many aquatic systems. These "Midges" are important prey for many other aquatic insects. Identification to genus-level typically requires mounting the head capsule on microscope slides; however, one genus, *Stenochironomus* (bottom picture) is unique in body form and can be found tunneling into wood.

Body length: ~8 mm

Body length: ~15 mm

Simuliidae

These are commonly known as "Black Flies." These flies can be a major pest in other parts of North America and can spread disease in other parts of the world, but they do not cause much of a problem in the southeastern U.S.

The larvae are filter-feeders; they have specialized fan-shaped mouthparts to catch organic matter. They also attach to substrate with silk as they feed in the current.

Body length: ~5 mm

Empididae

Genus: *Hemerodromia*

Flies in the family Empididae are known as the "Dance Flies." The larvae are different than the others shown in this selection of Ogeechee River dipterans in that this group is among taxa that do not have a fully formed external head capsule.

Hemerodromia larvae can be identified by the abdominal prolegs, terminal prolegs, and terminal processes.

Body length: ~3 mm

OGEECHEE RIVERKEEPER®

To protect, preserve, and improve the water quality of the Ogeechee River watershed by building bridges between people and their local waterways.

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