

**CADDISFLIES:** Six legs, often in a hardened case of mineral or organic matter, may be 'free living' and not in a case. Head distinctly hardened and often patterned, hooks at the end of body, may or may not have gills along abdomen.

**FREE LIVERS**

**11. Net Spinning Caddisflies:** 'C' shaped in the pan, bushy gills underneath body and at tail, builds a retreat to hide in (commonly silken nets with wood or gravel anchors). Net spinners have a head as wide as the thorax of the body.

**12. Small Head Caddisflies:** These insects resemble net spinners, but have no gills under the body and a much narrower head. They may be white, green or brown, with a fat body and rapid 'inch-worm' movement.

**ORGANIC CASE**

**13. Stick Bait Caddisflies:** 1" – 3" including case, dark brown spots on their yellowish heads. These caddis may be distinguished from other wood and stick cased caddis by the prominent 'ballast' pieces of sticks that are attached to the sides of the case.

**14. Square Log Cabin Caddisflies:** Cases are stouter than other square cases, constructed from wound strips of wood fibers, as opposed to fragments of leaves. Insects greenish or cream colored, prominent brushes of seta on the first pair of legs.

**15. Sand and Stick Case Caddisflies:** Cases constructed from both mineral and organic materials belong in this category and may be a variety of shapes and sizes.

**16. Vegetated Case Caddisflies:** This category is for all caddisflies with organic cases that do not fit the other categories above. These insects have a variety of sizes shapes and habitat preferences.

**MINERAL CASE**

**17. Gravel Coffin Case Caddis:** Coffin or saddle shaped case of gravel particles, may be aggregated in large clusters. Cases mostly closed, with only a small portion of space free for the insect to feed or be observed (not round hole at end).

**18. Sand Snail Shell Caddis:** Coiled mineral fragment case strongly resembles a snail shells (which are solid and not made of mineral fragments).

**19. Sand and Mineral Case Caddisflies:** This category includes any caddisflies with cases fabricated from small mineral particles or sand which did not fit above categories.

**BEETLES:** Insect with six legs (adults with shell extending over middle thoracic segments, no tails; larvae six legged, gills or not, no tails, tougher bodied than free living caddisflies)

**20. Water Penny:** Water pennies stick to rocks and leaves and have circular outline for their body. Legs and body of insect are visible underneath the penny-like shell.

**21. Predator Beetle Larvae:** Usually strong biting mouthparts and sometimes feathery gills or appendages. These insects are larvae of other types of beetles (not riffle beetles), some are not truly aquatic.

**22. Adult Riffle Beetles:** Beetles collected from moving water are generally placed into this category (make sure you don't accidentally collect beetles from anywhere but the water!), many patterns, generally dark colors.

**23. Larval Riffle Beetles:** Larva of riffle beetles do not resemble the adults, but may slightly resemble caddisflies. The body of larval riffle beetles has no gills and is tougher than caddisflies, and often has a triangular 'keel' along the abdomen.

**MEGALOPTERANS:** Family name of fishflies, alderflies and hellgrammites. Insects darkly colored and possess strong mouthparts. Appendages on side of body resemble legs but have no joints. Gills present or not.

**24. Hellgrammite:** ¾" – 3", aggressive predator, tufted gills on the underside of the abdomen, two tails and two abdominal hooks at the end of the body.

**25. Fishfly:** ½" - 1 ½", lighter colored than the giant tufted dobsonfly, but has two tails and no gill tufts underneath the body.

**26. Alderfly:** ½" – 1 ½", one tail instead of two at the end of the body, no gill tufts and no hooks at the end of the abdomen.

**27. Oligochaete:** ¼" – 2", Oligochaetes are worms and not insects. They resemble thin pink or red earthworms and have no hard parts or legs.

**28. Leech:** ¼" - 2", relatively uncommon and rarely parasitic to humans in our area. These slimy organisms have sucker pads at the ends of the body.

**DIPTERANS (True Flies):** Soft bodied insects, worm like, with-out legs but may have various types of appendages.

**29. Watersnipes:** Feathery leg-like appendages and/or 'horns' at the rear of the body, cream to greenish colored.

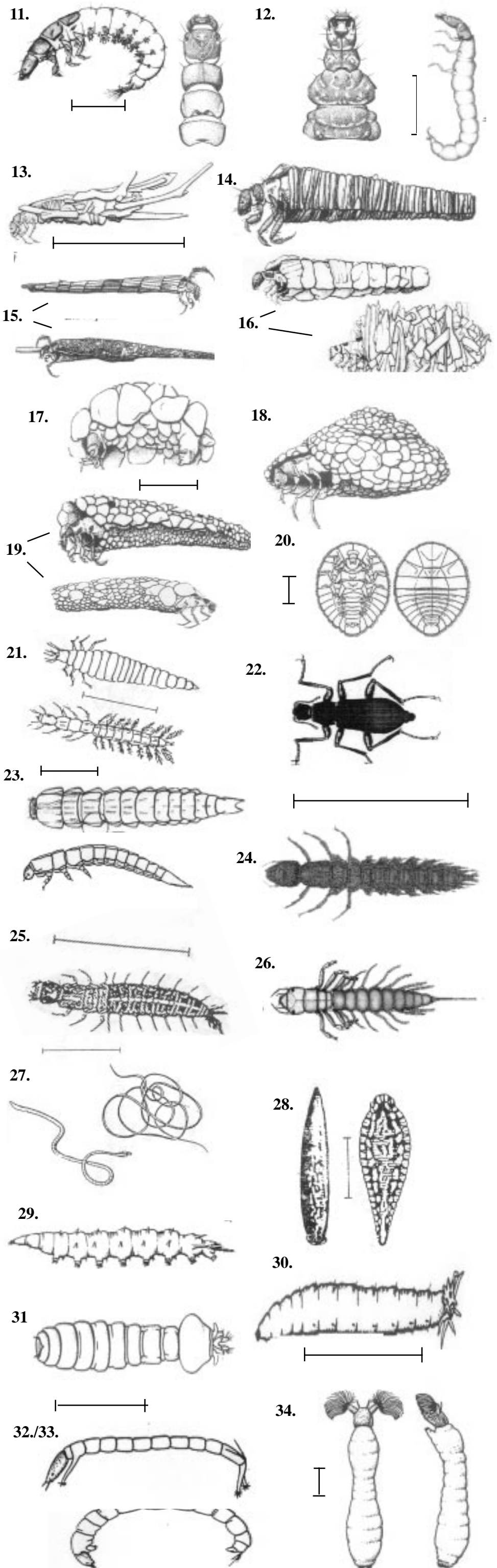
**30. Water-worm:** ½" – 2", found in leafpacks, cream to brown colored, usually larger than the Fat Headed Crane fly, caterpillar like segmented body with no bulbous tip, gills tentacle like at end of body.

**31. Fat Headed Crane fly:** ½" – 1", smaller than Water-worm with round or swollen segment at the end of the body, gills tentacle like at end of body.

**32. Chironomid Midge:** Often C-shaped, head visible, prolegs (not real legs) visible, one pair at head and one at end of insect. Resembles Caddisfly or Riffle Beetle Larva, which have six legs.

**33. Red Midge:** Insect the color of bright blood, due to the presence of a hemoglobin-like molecule in the insect. Otherwise resembles Chironomid Midge.

**34. Blackfly:** up to ½", Blackfly larvae resemble bowling pins with furry ears (ears may be hard to see), often found in large numbers fastened tightly to rocks, leaves or logs with suction pad.



# Guide To Aquatic Macroinvertebrates Of Southern Appalachians

**STONEFLIES:** Always with two 'tails', no gills on back (although may be around legs), two pairs of wing pads, feet always with two claws.

**1. Giant Shredder:** 1"-2", stout, cylindrical bodied dark colored stonefly. Slow crawler, found in leafpacks. Bushy gills along thorax and under body near legs.

**2. Roach Shredder:** ½"-1", brown or black, moves quickly, resembles a cockroach (body somewhat rounded or teardrop shaped), abundant in leafpacks.

**3. Quick Crawling Predator:** ½"-2", brown, black or gold colored, fast crawlers, stout bodied. Some may be slightly flattened, others more rounded. Many boldly patterned and/or have obvious gills around legs (thorax).

**4. Fragile Detritivore:** ¼"-1", long and thin abdominal segments, dull colored with little or no patterning, fragile insect.

**MAYFLIES:** Usually with three 'tails', gills along back or sides, one pair of wingpads, feet with one claw.

**5. Flattened Scrapers:** light brown to black, patterned. Body compressed (flattened), broadened fore legs, large eye spots, circular heads, either two or three tails.

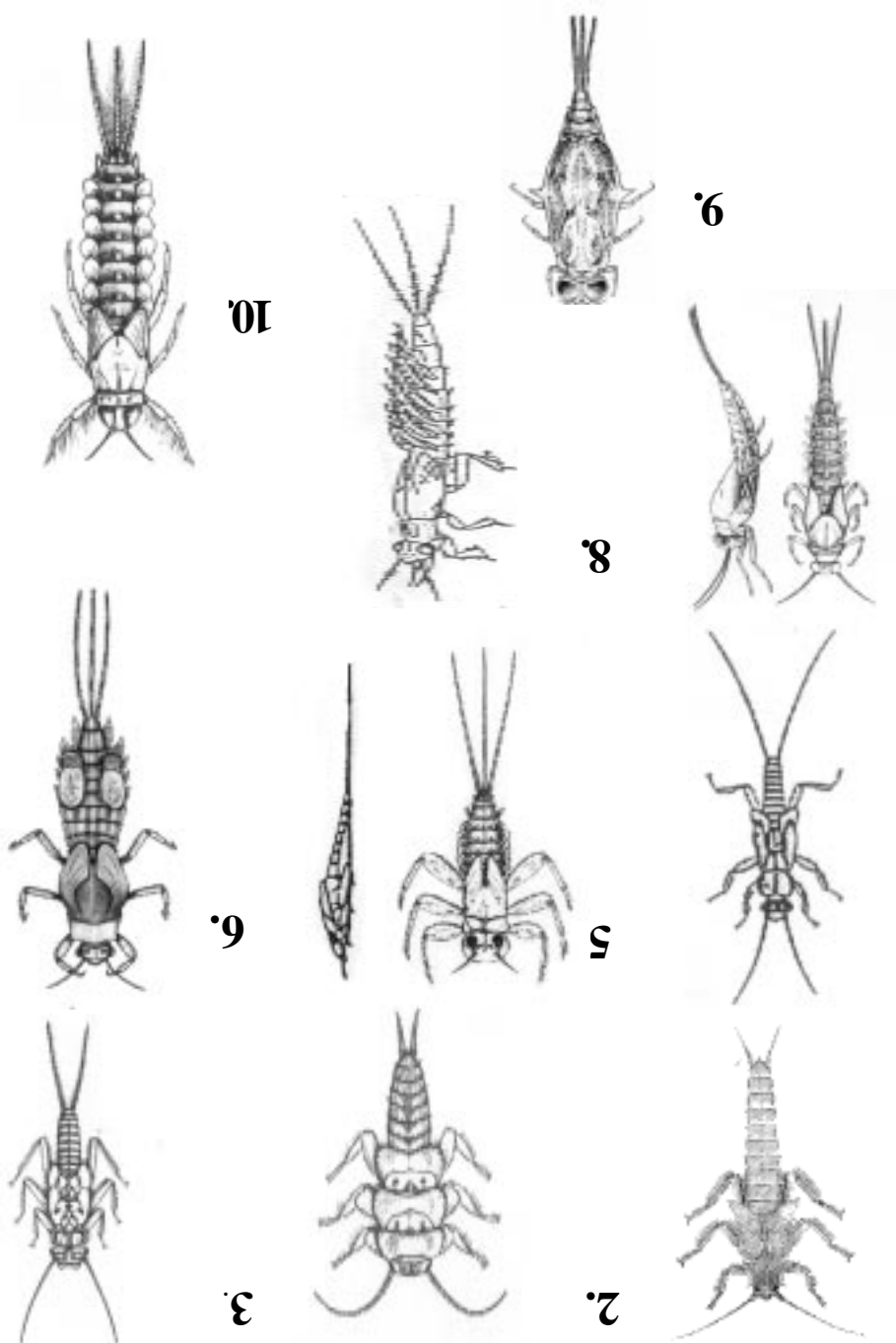
**6. Spiny Crawlers:** Generally stouter bodied than flattened scrapers, with spines or sharp points along bodies and legs, sometimes brushes of hairs (setae) mark the tails. Insect if body is flattened, then insect has 'hammer head' and broad, spiny fore legs. Insect may arch body scorpion-like when provoked.

**7. Round Headed Swimmers:** fragile, long thin legs, round head (not circular), drably colored but a few may have markings or patterns. Swimming behavior resembles a dolphin or porpoise, and is accomplished by undulating the body segments in short bursts.

**8. Burrowing Mayflies:** often large and stout bodied, prominent gills arranged along the back in bushy tufts (not on sides), forelegs adapted for digging in sandy sediments, mandibular tusks sometimes observable on the head.

**9. Spiny Turtle Mayflies:** enlarged spiny shell covering the majority of the middle of the animal, resembling a turtle shell, may cover gills.

**10. Filter Mayfly:** Darkly colored very active insect. Most commonly found in summer, has brushes on fore legs, fast swimmer, prominent circular gills on sides of abdomen.



## CRUSTACEANS

**35. Crayfish:** Crayfish are many sizes and colors and resemble lobsters (two large claws).

**36. Sowbug (Isopod):** Dark colored, more than six legs, long antenna, body 'I' shape (facing insect), resemble wood lice or pillbugs found on land.

**37. Scud (Amphipod):** Light colored, more than six legs, resemble small shrimp, body 'A' shape (facing insect), fast swimmers or crawlers.

## SNAILS

**38. Coiled Left Face Snails:** These snails breathe atmospheric oxygen and not water. When facing the opening of the shell, the shell will open to the left. This snail is generally more tolerant of pollution than the right face.

**39. Coiled Right Face Snail:** Resembles left face snail, but when facing you the shell opens to the right. These snails have gills and breath oxygen from the water, and are sensitive to pollution.

**40. Rounded Right Face Snails:** These snails also breathe oxygen from the air and are pollution tolerant. The shell is coiled in a single plane (like a rolled up garden hose).

## 41. Mussels and Clams

**ODONATES:** Six jointed legs, large eyes, three flat paddles or points at rear of body, extendable mouth parts, use 'jet propulsion' to aid movements (look for water moving at rear of insects, near points or paddles).

**42. Damselflies:** six legs, two or three blade like appendages at the end of the abdomen, often thin bodied and slow moving.

**43. Dragonflies:** stout bodied, six legs, three points on last body segment, body oval, rounded or elongated.

