Big T Wash Line

WINTER 2021

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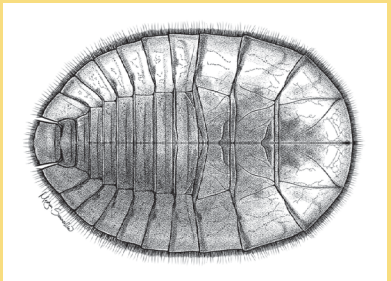
In this issue



About the Big Tujunga Wash Mitigation Area

"Big T" is a parcel of land located in the City of Los Angeles Sunland area (see Page 6).

The Big Tujunga Wash Mitigation Area (Big T) covers an area of approximately 210 acres of sensitive habitat, encompassing the Big Tujunga Wash and Haines Canyon Creek. The site was purchased by Los Angeles County Public Works in 1998 as compensation for habitat loss for other Public Works projects.

Public Works' implementation of the Master Mitigation Plan for Big T has been underway since April 2000. Big T protects one of the most rapidly diminishing habitat types found in Southern California: willow riparian woodland. The site is home to several protected species of fish, including the Santa Ana sucker, Santa Ana speckled dace, and arroyo chub. It also contains habitat for sensitive bird species such as the least Bell's vireo and southwestern willow flycatcher.

The purpose of this newsletter is to provide updates to ongoing programs and to explain upcoming enhancement measures that will be implemented on the site. Newsletters are published on a semi-annual basis in the spring and fall.

More information can be found at:
pw.lacounty.gov/wrd/projects/BTWMA

Adult mayfly - Photo by Erik Karits on Unsplash.

Aquatic Insects

Fall is upon us once again and the deciduous trees that line the banks of Haines Canyon Creek have begun to shed their leaves in preparation for winter. Much of the leaf litter produced will fall into the creek below. Woody debris and other dry plant materials will undoubtably be blown into the creek during Southern California's reliable fall windy season. Increased rain events will start to reconnect the series of standing ponds the creek has become due to severe drought conditions and will bring with them an abundance of organic material from upstream. All these allochthonous inputs (organic materials that originate from outside of an ecosystem) entering the creek mean that it's time for bacteria, fungi, and benthic macroinvertebrates to feast!

So, what is a benthic macroinvertebrate? "Benthic" is a term that describes life on, under, and around rocks and sediment on the bottom of lakes, rivers, and streams, "macro" describes life that is visible without the aid of a microscope, and "invertebrate" is the term for organisms that do not have backbones such as insects, mollusks, and worms. Rivers and streams are home to a variety of macroinvertebrate species which all have important and specialized roles in breaking down organic materials that enter the waters in which they live. These macroinvertebrates are often categorized by "functional feeding group" based the behavioral and mechanical characteristics of how they acquire their food. The major functional feeding groups in stream

Cased caddisfly larvae

Mayfly larva

systems include shredders, scrapers, collector-gatherers, filterers, and predators. Each functional feeding group is adapted to feeding on organic materials of a certain size and composition which allows for the efficient breakdown of these materials as they flow downstream. One of the most abundant and most studied groups of macroinvertebrates are aquatic insects. Aquatic insects live out most of their lives underwater in their larval and nymph stages, and only emerge from the water for a short time to reproduce in their adult form. Certain species of mayflies, for example, will spend up to two years under water as nymphs and as little as five minutes outside of the water as adults before mating, laying eggs, and dying. The mass emergence and die-off of aquatic insects provides a nutrient-rich food source for other animals such as fish, amphibians, and birds. Let's take a look at the major functional feeding groups and examples of aquatic insects that belong to each group.

Shredders

When large organic debris such as leaves and sticks first enter a stream system, shredders begin their work. Shredders are specialized to feed on coarse particulate organic matter or "CPOM". Shredders have tearing mouthparts that can rip and shred CPOM as they feed. Examples of shredders include the larvae of craneflies and caddisflies, and the nymphs of stoneflies. Though not insects, the invasive red

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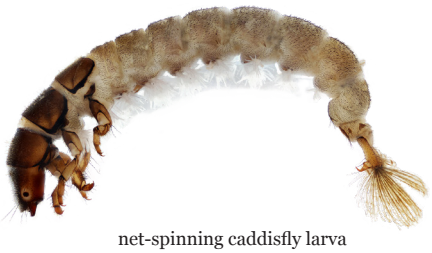
case-making caddisfly larva



net-spinning caddisfly larva

swamp crayfish that inhabit Haines Canyon Creek also belong to this group. These species breakdown CPOM into smaller particles as they feed, and expel waste in the process, which all travels downstream as fine particulate organic matter or "FPOM". Collector-gatherers and filterers have developed various strategies to feed on FPOM, further breaking down and recycling the nutrients left behind by the shredders.

Collector-gatherers

The larva of midges, stoneflies, and some mayflies/caddisflies are examples of collectors-gatherers. These species wander the stream bottom scavenging for FPOM that's made up of plant and animal detritus (organic debris) and waste materials left behind by the shredders and other organisms.

Filterers

Filterers also feed on FPOM but have evolved various ways of filtering FPOM that is suspended in the water column rather than scavenging FPOM from the stream bottom. Examples of filterers include blackfly larvae which use "cephalic fans" (fans on the sides of their head) to filter water and trap food particles, and net-spinning caddisfly larvae which construct underwater, silk nets that trap FPOM as it flows downstream. Blackfly larvae, exhibit low digestive efficiency and expel large waste pellets that still contain a fair amount of nutrients, and thus, their waste pellets are a useful resource to other organisms.

blackfly larva

Scrapers

One way that the scrapers differ from the shredders, collector-gathers, and filterers is that they feed on autochthonous inputs, or inputs that originate within their ecosystem. Scrapers use rasping mouthparts to scrape algae and biofilm (a slimy layer of microorganisms), from rocks, plants, and other underwater surfaces. Scrapers have flattened body types or utilize heavy mineral cases (protective cases constructed from sand and small gravel) which help them maintain their positions in a flowing stream. Examples of scrapers include beetle larvae such as water pennies, and mobile caddisfly larvae. As scrapers remove algae and biofilm from surfaces, some of it enters the water column to be collected by filterers or settles on the stream bottom to be consumed by collector-gatherers.

Predators

water penny beetle larva

As their name implies, predators reside at the top of the aquatic insect food chain. Examples of predatory aquatic insects include both larval and adult stages of water beetles and dragonflies, and large stonefly and dobsonfly larvae. It may come as a surprise, but the beautiful and graceful dragonfly is one of the most vicious and successful predators in the animal kingdom! It is estimated that adult dragonflies successfully capture 90 to 95 percent of the prey they hunt. Dragonfly larvae prey on other aquatic insects, mosquitos, tadpoles, small fish, and even each other! Adult dragonflies can quickly and stealthily maneuver to capture a variety of small insects including small flies, leafhoppers, beetles, mosquitoes, bees, moths, butterflies, and smaller dragonflies and damselflies, and then devour them using their tiny, serrated teeth.

dragonfly larva

While aquatic insects go about their lives largely unnoticed by humans, we have all experienced the benefit of aquatic insects when enjoying a clear-flowing stream. Without aquatic insects and other aquatic macroinvertebrates, organic materials entering waterways would decompose slowly and inefficiently, disrupting nutrient cycling, and affecting stream health and water quality. Different types of aquatic organisms including aquatic insects, can tolerate different levels of human disturbance, and thus, the variety and abundance of aquatic insects are a good indicator of the health of a stream. Keeping companion animals out of the creek, only crossing the creek at authorized crossings, and refraining from recreating or building rock dams in the creek are all ways we can help aquatic insects thrive at Big T.

Images Source:

Morse, J., Broomall, M., Wenzel, J., Kautz, A., Louw, M. (Eds) (2020) The Atlas of Common Freshwater Macroinvertebrates of Eastern North America. Available from https://www.macroinvertebrates.org, accessed October 2021

Invasive Red Swamp Crayfish

Whether you call them crayfish, crawfish, crawdads, mudbugs, ditchbugs, freshwater lobsters, or yabbies, a red swamp crayfish by any other name is still an invasive species at Big T.

Red swamp crayfish (*Procambarus clarkii*) are the most numerous species removed from the Big Tujunga Ponds and Haines Canyon Creek during exotic wildlife removal efforts. Chambers Group biologists removed approximately 14,200 larval, juvenile, and adult red swamp crayfish from the ponds and creek this year between March and October. Reducing the number of invasive species at Big T, not only benefits native wildlife, but benefits humans as well. According to the Environmental Protection Agency (EPA) "Damages from invasive species, including only those damages that can be expressed in monetary terms, have been estimated as high as $138 billion per year. These damages affect agriculture, rangeland, forests, people's homes and yards, human and animal health, food supplies, fishing and boating, outdoor recreation, and many other areas." The EPA also states that invasive species are thought to have been involved in 70% of this century's extinctions of native aquatic species, and that 42% of current endangered species are impacted significantly by invasive species. These statistics paint a clear picture of how damaging invasive species can be to ecosystems and help reinforce why controlling invasive species at Big T is so important.

How did red swamp crayfish get to Big T?

Red swamp crayfish are native to northern Mexico and the southern United States from eastern New Mexico, throughout the Gulf States, and into the Florida panhandle. However, red swamp crayfish are now present in most of the U.S. states and in at least 40 countries worldwide. The biggest driver of the spread of red swamp crayfish from their native range is their economic value as "seafood". Historically, humans have introduced crayfish to waterways outside of their native range in an effort to establish them as a harvestable population. Other common means of introduction include escape from the aquarium trade, and escape from use as live bait. The aquarium trade markets crayfish as "freshwater lobster" that can make a fun and interesting addition to freshwater aquariums; however, some aquarium owners irresponsibly dump their aquariums in waterways once the novelty of ownership wears off, or once their aquarium becomes too expensive or too much effort to maintain. Non-native aquarium species can quickly establish in temperate waterways like the Tujunga Ponds and Haines Canyon Creek. And for those who may be wondering, flushing crayfish down the toilet is not only a terrible way to treat your trusty aquarium pals, but also may not kill them! Crayfish often survive the wild ride and sanitary treatment and can become established in urban waterways and water treatment facilities.

Crayfish also get introduced to waterways while being used as live bait. Crayfish are particularly popular as a bait to capture largemouth bass, which are also an invasive species at Big T. All it takes is the escape of one gravid (carrying eggs) female crayfish to create a new invasive crayfish population. Lesser means of introduction, though still worth noting, include release or improper disposal of crayfish following classroom or laboratory use (biological supply trade), and improper use as a means of biological control of other invasive species. In this scenario, crayfish may be used to control a population of invasive snails, for example, but become established as an invasive population themselves in the process.

A red swamp crayfish removed from Haines Canyon Creek using a dip-net.

What traits allow red swamp crayfish to become invasive?

It's not the red swamp crayfish's fault it's excellent at surviving - it has been evolutionarily blessed to tolerate a wide range of environmental conditions (ecological plasticity), giving them the edge when competing against native aquatic species. Red swamp crayfish can tolerate a wide range of salinities, pH levels, oxygen levels, pollution levels, and temperatures that allow them to survive (and often thrive) under conditions where native aquatic species may struggle. For example, red swamp crayfish can tolerate water temperatures in their burrows between just above freezing and 95° Fahrenheit! The native fish species that inhabit Haines Canyon Creek would be lucky to survive temperatures above 80° Fahrenheit. Red swamp crayfish are opportunistic omnivores with a preference for plants and detritus (organic debris) but that will also eat insects, other aquatic species and their eggs including native fish and frogs, and occasionally, other crayfish. Being able to eat just about anything that comes your way is a huge survival advantage. Another trait beneficial to the red swamp crayfish and that gives them a survival edge over many native aquatic species is their ability to burrow. During times of drought or high temperatures, red swamp crayfish can burrow down to the water table to find relief from the heat and the moisture they need to survive. While

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Biologists working to capture and remove red swamp crayfish from Haines Canyon Creek.

A gravid female red swamp crayfish removed from Haines Canyon Creek using a dip-net.

A red swamp crayfish removed from the Tujunga Ponds using a seine.

many aquatic species die under severe drought conditions, the red swamp crayfish can ride-out a heat wave in its temperature-controlled underground bunker until conditions at the surface improve. Finally, red swamp crayfish exhibit high fecundity (the ability to produce an abundance of offspring) with larger females able to produce up to 500 eggs at a time. In temperate environments, females can produce and incubate eggs year-round which means a constant supply of crayfish for native species to contend with. Once hatched, red swamp crayfish can reach sexual maturity in as little as two months and can complete a full generation in as little as four and a half months!

Did you know that red swamp crayfish can negatively impact native aquatic species and humans?

In addition to predating and directly competing with native aquatic species for resources, red swamp crayfish can also be a vector for spreading or transplanting other non-native species and novel parasites via their gut that can harm native species. Red swamp crayfish can also cause adverse conditions for humans. Interestingly, one of the favorite foods of red swamp crayfish are dragonfly nymphs, and one of the favorite foods of dragonfly nymphs are mosquito larvae. Studies conducted by Bucciarelli et al showed that in waterways where red swap crayfish consume or drive away dragonfly larvae, mosquito populations boom. Conversely, where mosquito populations were low, dragonfly larvae were abundant. As mosquitos are vectors of numerous human diseases it is important to minimize the disruption of natural predator-prey relationships as much as feasible to maintain the health of natural environments, and ourselves! Red swamp crayfish can also negatively impact humans by extensive burrowing that can collapse shorelines and create erosion, and by damaging levees and dams.

While the red swamp crayfish can harm native aquatic species and disrupt ecosystems in areas where it is not native, it can also serve as an abundant food source for other wildlife such as birds, fish, and can benefit water quality by feeding on detritus. In the southern United States where the red swamp crayfish is native, it's often viewed as an indicator of good water quality and provides a valuable food source to local wildlife. All invasive species are native to somewhere and play important roles in their proper ecosystem but can be incredibly damaging to areas outside their native range. We can all help limit the introduction and spread of non-native and invasive aquatic species at Big T or any other waterways in the following ways:

- Clean all mud and plant material of from boots and outdoor gear before using your gear at another location.
- Never dump aquarium water or release any plants or animals into a waterway.
- Drain all water from equipment and boats including the motor, bilge, bladder tank, live well, and portable bait containers before leaving a waterway. Scrub the hull of the boat and if possible, rinse the boat, trailer, and equipment with high-pressure hot water.
- When fishing, dispose of any unwanted bait or fish in the water where it originated or on land but not in other waterways or down the drain.

As a reminder, fishing, boating, and dumping of any kind are prohibited at Big T.

Kid'S Corner

Match the description on the left with the stream invertebrate on the right.

My functional feeding group is the filterers. I use small fans on the sides of my head to trap fine food materials flowing through the water. I am a _____.

I'm a type of beetle larva and my functional feeding group is the scrapers. My flattened body shape helps me stay in place in a flowing stream. I use my rasping mouthparts to scrape algae and biofilm, from rocks, plants, and other underwater surfaces. I am a _____.

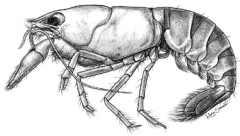
I'm very beautiful in my adult form and my functional feeding group is the predators. I use my tiny, serrated teeth to devour other insects. I'm beneficial to humans because I love to eat pesky mosquitos and their larvae. I am a_____.

I'm an invasive species at Big T, and my functional feeding group is the shredders. I'm an opportunistic omnivore with a preference for plants and detritus (organic debris) but I will also eat insects, other aquatic species and their eggs including native fish and frogs. I am a _____.

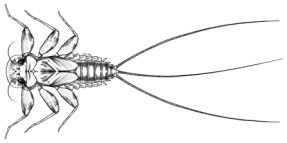
My functional feeding group is the collector-gatherers and I wander the stream bottom scavenging for fine particles of plant and animal detritus. I spend most of my life under water in my larval stage and may live as few as five minutes outside of the water in my adult stage before mating and dying. I am a _____.

Blackfly Larva

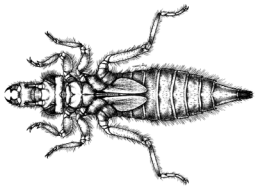
Crayfish



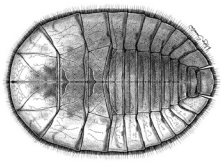
Mayfly Larva



Dragonfly Larva



Water Penny



Report emergencies and incidents such as fire call 911

- *To report minor incidents or regulation infractions contact Los Angeles County Sheriff's Department, Parks Bureau Trails Team at (323) 845-0070. (Please DO NOT use 911.)*
- *Do not attempt to enforce regulations yourself; please allow law enforcement to handle the situation or incident.*
- *For emergency follow up or to report minor incidents, obtain information, or get questions answered (8 a.m. to 5 p.m., Monday through Thursday), please contact:*

Los Angeles County Public Works
900 S. Fremont Ave
Alhambra, CA 91803
Email: BTWMA@pw.lacounty.gov
Phone: (626) 458-6158

Where is the Big Tujunga Wash mitigation area?

Downstream of Big Tujunga Canyon, right in Lake View Terrace and south of the 210 freeway, there is a native riparian (water loving plant) natural area filled with cottonwoods, willows, and pools of water that support many native aquatic species.

Check out the Big T website for more information at:

- *pw.lacounty.gov/wrd/projects/BTWMA*