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## Las Vegas Wash Invertebrate Inventory, 2000-2010

April 2011

SOUTHERN NEVADA WATER AUTHORITY

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**SOUTHERN NEVADA WATER AUTHORITY**
**Las Vegas Wash Project Coordination Team**

Prepared for:

**Research and Environmental Monitoring Study Team**
**Las Vegas Wash Coordination Committee**

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## ABSTRACT

This report summarizes previously documented, as well as undocumented, invertebrate specimens identified along the Las Vegas Wash (Wash), where this wildlife group has a significant impact on ecological components. Four of the six major environmental resource categories laid out in the Las Vegas Wash Comprehensive Adaptive Management Plan are impacted by invertebrates: water quality, soils, vegetation, and fish and wildlife. Living in both aquatic and terrestrial environments, many invertebrates serve as indicators of environmental quality in both areas. Insects are the primary pollinator for many plants along the Wash and provide many other benefits such as controlling herbivores and seed dispersal. Many insects can be primary consumers of plant material and secondary consumers of other insects. They are also the food source for a wide variety of birds, small mammals, fish, reptiles and amphibians. Cataloging these species will help researchers by providing baseline information and will provide managers' information on the species impacted by work being done. Further study of this animal group is needed to better understand their true impact on the ecological system at the Wash.

## ACKNOWLEDGEMENTS

I would like to thank those that have helped in better understanding this important animal group at the Las Vegas Wash (Wash). Specifically, Mark Nelson has provided the bulk of the documentation on many of the groups described in this document. William Wiesenborn also provided unique information that would otherwise make this report incomplete. My co-collaborator on the bat foraging study, Marissa Foster assisted in the collection of many of the insects described. I would also like to thank Keiba Crear and Seth Shanahan for the support in gaining a better understanding of this rarely documented group and for reviewing this document. Patty Emery also provided important reviews as well as editing that made this a better document. Finally, I would like to thank the Las Vegas Wash Coordination Committee for its support of research along the Wash and providing a forum where a better understanding of the Wash's ecosystem is encouraged.

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## 1.0 INTRODUCTION

The Las Vegas Wash (Wash) is currently undergoing significant changes in terms of physiognomy and ecology. The ongoing project to control erosion and improve ecological functions of the system has resulted in substantial changes in wildlife along the channel. Bradley and Niles (1973) documented many of the plants and wildlife found along the Wash. This provided a baseline for which species were present after the Wash flows had increased significantly but erosion had yet to dramatically alter the channel. After erosion control and ecological improvements began in 2000, many surveys were conducted along the Wash to catalog species occurrence (O'Farrell and Shanahan 2006, Rice 2007, Shanahan 2005a and 2005b, Eckberg 2010, and Van Dooremolen 2005). These recent studies, along with Bradley and Niles (1973), documented plants, mammals, fish, reptiles, amphibians, and birds along the Wash.

There have been few studies (Wiesenborn 2005, Nelson 2009a, Nelson 2009b) performed at the Wash specifically on invertebrates. However, those studies that have been done provide a good idea of the types of invertebrate species found in the habitats studied. This report will provide a comprehensive look at all of the invertebrates identified along the Wash since the adoption of the Las Vegas Wash Coordination Committee's (LVWCC) Comprehensive Adaptive Management Plan (CAMP). There are no known studies that documented invertebrate species along the Wash prior to 2000, when the CAMP was published.

### 1.1.1 Importance of Invertebrates

Many view invertebrates as pests or vermin and that control of them is necessary (Kim 1993). The exceptions, like many other animal groups, are those that are aesthetically pleasing or economically beneficial, such as butterflies or honeybees. Invertebrates have not been taken seriously by policy makers or even scientists involved in ecological conservation (McNaughton 1989, Hafernik 1992). Therefore, invertebrate conservation has not been given due consideration and adequate understanding of them is lacking.

Insects occupy a wide variety of important niches in how ecosystems function. They are plant pollinators, filters of contaminants and nutrients, recyclers of dead or dying plant material, decomposers of plant and animal waste, predators of other insects, and provide a food source to hundreds of higher trophic level species, just to name a few. Insects however, are also one of the least known groups of animals on the planet. There are over a million known species of insects, making this group half of the world's known animals, but this group is believed to have between six and ten million species (Chapman 2006).

### 1.1.2 Purpose and Need

The purpose of this report is to assemble the first comprehensive inventory of invertebrates at the Wash. Combining information gathered in baseline invertebrate studies at the Wash will hopefully prove useful to future researchers. This information is much needed, since by looking at the Wash invertebrate community as a whole, policy-makers can gain a better understanding of what impact specific projects have on invertebrates and their ecosystem services.

A more specific need is knowledge of the status of insects that may directly have a negative impact on other ecological components at the Wash. One species of concern currently is the

Tamarisk leaf beetle (*Diorhabda carinulata*). This beetle has been introduced in the upper Colorado River basin to control salt cedar and populations are moving south at a fast pace (Figure 1). There is concern that the defoliation of salt cedar by these beetles will leave birds, including the federally endangered southwestern willow flycatcher (*Empidonax traillii extimus*), vulnerable to predation and habitat loss.

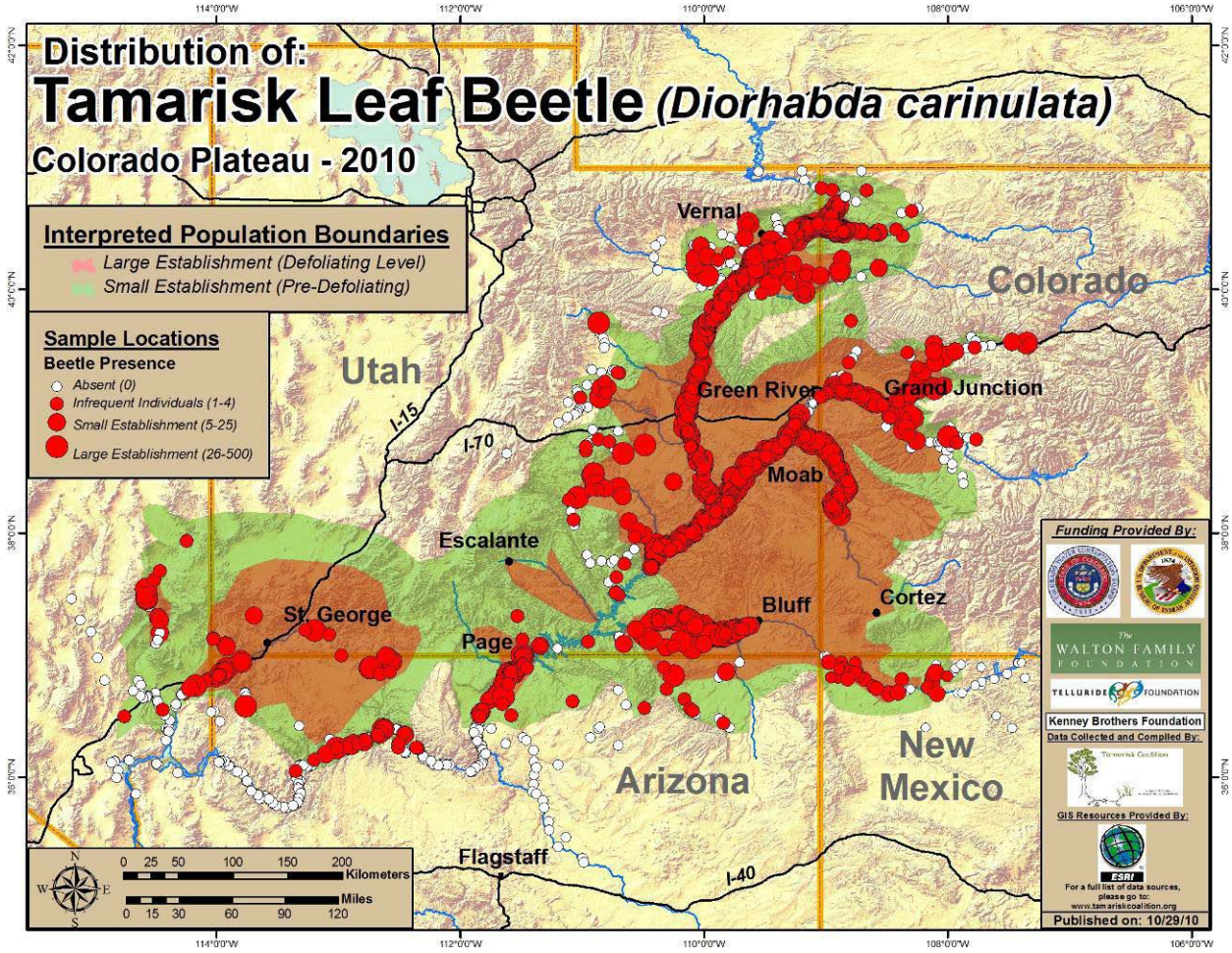


**Figure 1. Tamarisk leaf beetle distribution across the Colorado River Basin, 2010.**

## 2.0 MATERIALS AND METHODS

A list of invertebrate species was compiled from three primary sources: (1) species that were directly observed by groups other than the Las Vegas Wash Project Coordination Team (Wash Team), (2) species that were directly observed by the Wash Team during invertebrate-specific studies, and (3) species that were directly observed by the Wash Team while conducting any other activity. All of these projects primarily took place within the boundaries of the Clark County Wetlands Park (CCWP; Figure 2).

## 2.1 Literature Review

Wiesenborn (2005) conducted a study from 2002-2003 along the Wash on the biomass of arthropods on salt cedar (*Tamarix ramosissima*) branches. This study sampled arthropods from three locations along a south-north transects where surface water was present but near upland areas. The upper most location was bordered by creosote bush (*Larrea tridentata*). Arthropods were collected by placing plastic bags around salt cedar branches and cutting off the branch just outside the bag. The specimens found on the branches were later identified to the lowest taxonomic level possible.

Nelson (2009a) studied terrestrial invertebrates along the Wash by comparing the invertebrates associated with exotic vegetation such as salt cedar and common reed (*Phragmites australis*) to those sites that had been revegetated by the Wash Team. Two methods were used to catalog species found in each area. First, butterfly assemblages were identified by sight during timed searches at each of the ten sites monitored (five exotic and five revegetated). Second, other invertebrates in each site were sampled using sticky-traps. Five traps were placed along diagonal transects within each of the ten sites.

Nelson (2009b) also conducted a study to evaluate culm breakdown of three plant species along the Wash. This report described many macroinvertebrates responsible for the breakdown of nutrients in plants and the role each type of species has in this process. A litter bag technique was used to do this analysis. Standing dead culms of three plant species were first collected and then placed in mesh bags. After initial processing of the samples, invertebrates found on each sample were identified to the lowest taxonomic order possible. In addition, kick samples in the area near where the plant samples were collected increased the number of invertebrates identified.

Since 2000, the Bureau of Reclamation (BOR) has been contracted to perform aquatic macroinvertebrate sampling along the Wash and its tributaries for the purposes of monitoring changes in water quality. Nelson (2010) reports on ten years of data collected on this project. Nine sites along the Wash channel and 11 sites along tributaries and at wastewater discharge structures (the majority of inflow into the Wash) were sampled since 2003. A one-minute kick method with a D-frame net was used at these sites to sample the benthic invertebrates within a ten-meter sampling reach at each of the 20 locations. Samples were preserved and identified at a later date.

The most recent study to have components that specifically included the collection and identification of invertebrates along the Wash was done by the Wash Team. A study of bat foraging preferences in three distinct microhabitats along the Wash commenced in May of 2010 and concluded in October the same year (Eckberg and Foster in review.). Invertebrates were collected by reflecting a black light onto a white sheet which had been draped over a rope tied between two trees. Samples were collected one night a month at three sites during the six-month survey.


**Figure 2. Clark County Wetlands Park and private property boundaries.**

### 2.2 Other Data Sources

Unpublished data from studies of mosquitoes within the CCWP by Jim Pollard and Gretchen Andrew at UNLV were presented to the LVWCC at a regular meeting of the Research and Environmental Monitoring Study Team on January 7, 2009. This research was implemented to ensure safety of visitors to the CCWP by documenting the mosquito species present and their activity time and seasons. Data from unpublished aquatic invertebrate collections made by Becky Blasius are also included in this report. These data contributed unique species and confirmed three others collected by other published sources.

The Wash Team has been doing a wide variety of projects along the Wash since 2000. Since that time, numerous photographs or physical collections of invertebrates have been taken. Some invertebrates were collected incidentally during surveys for other wildlife, specifically pitfall traps during the reptile survey. Others were collected or observed while performing other survey or maintenance activities along the Wash. Photographs and collections have been identified using standard field guides (Evans and Hogue 2006, Glassberg 2001, Paulson 2009, Evans 2008, and Capinera et. al. 2004), as well as online sources such as www.bugguide.net.

## 3.0 RESULTS AND DISCUSSION

Combining the invertebrates that were detected in the various reports and other sources has resulted in at least 259 species found along the Wash (Appendix A), making it the largest number of identified species of any animal group along the Wash. The term "at least" is used because many invertebrates collected were not able to be identified to the species level; in fact some could only be identified to phylum. This means that there may be many species within a specific group collected but not identified at a lower taxonomic level. The number of contributions to the invertebrate inventory of the Wash by each source is displayed in Table 1. There may be some overlap with those collected by multiple sources.

The invertebrates identified represent 6 phylum, 14 classes, 30 orders, and 130 families. The majority of phyla are Arthropoda, which includes all true insects. Five phyla (other than Arthropoda) were all contributed by two aquatic studies (Nelson 2009b, 2010). The description of specific individuals collected is broken down through the rest of this section by taxonomic level. Overall, a wide variety of invertebrates inhabiting the Wash have been identified in all habitat types matching the wide variety of ecotypes found in the area.

### 3.1 Phylum – Arthropoda

An arthropod is an invertebrate with an exoskeleton, a segmented body, and jointed appendages. Included in this phylum are insects, arachnids, and crustaceans. This phylum makes up the majority of invertebrates cataloged at the Wash to date.

#### 3.1.1 Class – Arachnida

Arachnids are joint-legged invertebrates, all with eight legs - contrary to insects with six legs. Some species have converted the front pair of legs to a sensory, defense, or feeding function. Other traits that distinguish arachnids from insects are that arachnids do not have antennae or wings. No extant species of arachnid is aquatic, though many do live in freshwater habitats. The

| Taxonomic Level | Source | | | | | |
|---|---|---|---|---|---|---|
| | Wiesenborn (2005) | Nelson (2009a) | Nelson (2009b) | Nelson (2010) | Eckberg and Foster (in prep.) | Other |
| **Phylum** | 1 | 1 | 4 | 6 | 1 | 1 |
| **Class** | 2 | 2 | 5 | 11 | 2 | 4 |
| **Order** | 6 | 11 | 11 | 17 | 13 | 9 |
| **Family** | 28 | 16 | 21 | 41 | 46 | 24 |
| **Genus** | 31 | 34 | 33 | 51 | 60 | 35 |

**Table 1: Contribution to Las Vegas Wash invertebrate inventory by publishing source.**

Wash has 3 of the 11 arachnid orders: Araneae (spiders), Scorpiones (scorpions), and Solifugae (windscorpions).

#### 3.1.1.1 Order – Araneae

There have been 11 families of spiders identified at the Wash (one specimen identified in each), with the exception of Theridiidae which has two. The family Araneidae (orb weavers) is represented at the Wash by the genus *Metepeira*. Orb weavers are one of the most populous families of spiders, making up about 25% of spider diversity. As the name implies, species in this family create wheel-shaped webs, with a new web typically created daily.

The one species of tarantula (family Theraphosidae) found at the Wash so far is the desert blond tarantula (*Aphonopelma chalcodes*; Figure 3). The front part of its body (carapace) is densely covered in pale hairs giving this species its name. This species grows to three or four inches and are a nocturnal species only coming out of their burrows to mate or look for food.

Two species in the family Theridiidae (cobweb spiders) have been documented at the Wash, *Latrodectus hesperus* (Western black widow), and a species in the S*teatoda* genus. The diet of the Western black widow includes beetles, cockroaches, and flies. They kill their prey by injecting poisonous venom through their fangs. This species is also particularly venomous to humans, and it is the most toxic spider bite to humans in North America.

#### 3.1.1.2 Order – Scorpiones

The only scorpion identified at the Wash so far is the Arizona hairy scorpion (*Hadrurus arizonensis*). This scorpion is one of the largest in North America and is found throughout the Sonoran and Mojave deserts. It can grow to 14-15 cm in length and feeds on insects, spiders, other scorpions, and even small vertebrates like lizards and snakes.

#### 3.1.1.3 Order – Solifugae

There are about 200 species of windscorpions in North America; one has been identified at the Wash - *Eremobates*. This genus is a very fast runner and has the largest jaw size to body ratio of any creature. It is not venomous but has a very powerful and painful bite, is nocturnal, and hunts at night using its pedipalps.

**Figure 3. Desert Blond Tarantula (*Aphonopelma chalcodes*).**

### 3.1.2 Class – Entognatha

The order Collembola is made up of springtail species and is the only represented member of the class Entognatha. This group used to be part of the Insecta class but have since been moved due to having internal mouthparts (insects have external mouthparts). Springtails get their name from having a small structure called a retinaculum folded beneath the body which when released snaps against the ground causing them to flip into the air. These species are usually found in leaf litter and other decaying material where they are primarily detrivores and microbivores. They are responsible for a significant amount of the control and dissemination of soil microorganisms.

### 3.1.3 Class – Branchiopoda

One species in the class Branchiopoda has been identified along the Wash and was recorded in 2002 during a sampling of invertebrates within the Nature Preserve. The species *Daphnia pulex* (water flea) is found all over the world and is prey to a wide variety of aquatic predators.

### 3.1.4 Class – Insecta

Insects are arthropods that have an external skeleton, a three-part body, three pairs of jointed legs, compound eyes, and two antennae. They are among the most diverse group of animals and represent more than half of all known living organisms. At the Wash, they are by far the majority of invertebrates described to date. There are currently 30 orders of insects in the world; 15 of these have had specimens found at the Wash so far.

### 3.1.4.1 Order – Blattodea

The order Blattodea includes cockroaches and termites. Three of the best-known species in this order have been found at the Wash, including the American cockroach (*Periplaneta americana*), the German cockroach (*Blatella germanica*), and the Oriental cockroach (*Blatta orientalis*). These three species are associated with humans and are considered pests all over the world. None of these species are native to the United States, including the incorrectly named American cockroach which is native to Africa.

### 3.1.4.2 Order – Coleoptera

Beetles are the order that have the largest number of known species. At the Wash, it has the second largest amount of identified specimens - 36 individuals; all but one identified to at least the genus taxonomic level, representing 19 different families.

The family with the most individuals identified at the Wash is Coccinellidae (Lady Beetles) with seven. Lady beetles are typically predators of Hemiptera, such as aphids and scale insects. They are often brightly colored as a defense for predators. The color is typically red, yellow, or orange with black spots (Figure 4), although some are black, grey, or brown. The distinct colors of these species allows for easier identification than many other insect orders.

The Dytiscidae family (predaceous diving beetles), a family of water beetles, has the second most individuals found at the Wash with four. Species in this family have short but sharp mandibles and deliver digestive enzymes into their prey immediately upon biting. Three other aquatic beetle species have been cataloged at the Wash are in the family Hydrophilidae (water scavenger beetle). *Optioservus* is also found but it is the lone representative of the Elmidae family (riffle beetles) identified so far.

Two weevils in the family Curculionidae have been identified at the Wash; *Ophryastes geminatus* (desert weevil) and *Coniatus splendidulus* (splendid tamarisk weevil; Figure 5). The identification of the splendid tamarisk weevil by Eckberg and Foster (submitted) marked the state record of this species in Nevada. Previously only identified in Arizona and Southern California, this species is native to the Mediterranean region and is a natural predator of salt cedar. It is possible that this species was brought to the United States as a biocontrol measure for the invasive tree.

Another state record in the Buprestidae family, Prasinalia cuneata (Metallic wood-boring beetles; Figure 6), was identified by Eckberg and Foster (in prep.). Very similar to another Buprestid species found at the Wash, Gyascutus planicosta planicosta, this species is common to riparian areas in the southwest and it was expected to inhabit the Wash area.

### 3.1.4.3 Order – Diptera

True flies are insects in the order Diptera. Species in this order have a single pair of wings which distinguishes them from other flying insects with similar names such as mayflies, dragonflies, caddisflies, and others having two pairs of wings. There have been 26 individuals from 18 different families identified.

**Figure 4. Convergent Lady Beetle (*Hippodamia convergens)*.**

The family with the most flies is Chironomidae (midges; Figure 7). The study by Nelson (2009b) identified 12 different genera. Individuals were also collected by Eckberg and Foster (in prep.) but not identified below the family level. Chironomidae are informally known as non-biting midges to distinguish them from Ceratopogonidae (biting midges) of which three genera have been found. Midges resemble mosquitoes but lack the elongate mouthparts that mosquitoes famously have.

The family with the second most flies identified is Culicidae (mosquitoes). In studies performed by Andrew and Pollard (pers. comm) at the CCWP Nature Preserve, six species of mosquitoes were identified from four different genera, Aedes, Anopheles, Culex and Culiseta. Mosquitoes are of interest because they are known vectors of infection to humans. Both male and female mosquitoes are nectar feeders; females only take blood to help develop their eggs.

**Figure 5. Splendid Tamarisk Weevil (*Coniatus splendidulus*).**

**Figure 6. *Prasinalia cuneata.***

### 3.1.4.4 Order – Embioptera

The order Embioptera is commonly known as webspinners because species in this order are able to spin silk from their front legs. Nelson (2009a) identified individuals from this order in exotic plant species dominated areas using sticky-trap sampling.

**Figure 7. Midge (family: Chironomidae).**

### 3.1.4.5 Order – Ephemeroptera

The order Ephemeroptera includes species known as mayflies. These insects are aquatic in the immature stage of their life and last about one year in freshwater. The adults are very short-lived, from a few days to as little as a few minutes, depending on the species. The immature naiads primarily live under rocks, decaying vegetation, or in the sediment in ponds, lakes, or streams. Most species feed on algae or diatoms, with a smaller amount of species being predatory. The adult's primary function is reproduction with their digestive system filled with air and has non-functional mouthparts. Nelson (2009b) documented two species of mayflies, both in the family Baetidae (small minnow mayflies). Nelson (2010) documented an additional five genera of mayflies in two different families; Baetidae and Caenidae (small squaregilled mayflies).

### 3.1.4.6 Order – Hemiptera

The order Hemiptera is known as true bugs. As currently described, it is a combination of what was historically two separate orders - Homoptera and Heteroptera. The physical appearance of species in this order varies greatly but are classified together due to their common mouthpart physiology. The mandible and maxillae have evolved into a fused proboscis which is capable of piercing plant tissues and sucking out sap (in most cases). There have been 17 families of Hemiptera described along the Wash.

One of the most numerous Hemipteran species at the Wash are aphids. Aphids are known to be pests in gardens and agricultural areas as they are a sap sucking species that can cause damage to plants. Many species are monophagous, meaning they only feed on one plant species. At the Wash, they have been primarily observed on common reed (*Phragmites australis*).

**Figure 8. Apache Cicada (*Diceroprocta apache*).**

Another Hemipteran species that can be found in large numbers is *Diceroprocta apache* (apache cicada; Figure 8). This species has been described as a potential keystone species in riparian areas along the Lower Colorado River (Anderson 1994). The mass emergence of this species after metamorphosis has significant effects on the water transport of cottonwood and willow species as well as providing food for birds and other animals.

*Opsius stactogalus* (tamarix leafhopper) is a leafhopper that is native to Europe. This species was documented at the Wash by Wiesenborn (2005), and has been strongly associated with *Tamarix* sp. (Wiesenborn 2001, 2002). The tamarix leafhopper is a fluid-feeder and has been shown to reduce the growth of *Tamarix* when populations are of a substantial size (Liesner 1971).

### 3.1.4.7 Order – Hymenoptera

The Hymenoptera order includes wasps, bees, and ants, and includes over 130,000 recognized species. The diet of this order is very diverse. Some species feed on nectar and pollen, others are herbivorous, and still others are predatory. Fifteen families in this order have been documented along the Wash.

The honey bee (*Apis mellifera*) is native to Europe, Asia, and Africa, but can be found on every continent except for Antarctica. It is such an important and common species that it is the state insect for 17 states. Because it is used extensively in commercial agriculture throughout the United States, it's possible this is the reason it has been able to make its way to the Wash. Regardless of its origins, it is seen as a beneficial addition by being a pollinator in a system where substantial revegetation efforts are ongoing (Eckberg 2010).

There have been two species in the family Mutillidae (velvet ants) described at the Wash - *Dasymutilla creusa* and *D. gloriosa*. The name velvet ant comes from their hairy bodies and their ant-like body, though they are not true ants. Another common name for those species in Mutillidae is cow killers due to their painful sting if handled. Their life cycles are not very well understood but adults have been observed eating nectar.

**Figure 9. Tarantula Hawk (*Pepsis chrysothemis*).**

One species at the Wash that has been said to have a more painful sting than a velvet ant is the tarantula hawk (*Pepsis chrysothemis*; Figure 9). This species gets its name from the females in this genus needing a spider to serve as a host for its larvae; the tarantula is the preferred choice, although other spiders can be selected. The tarantula hawk will sting a tarantula causing paralysis and then bring the spider back to its den where it lays her eggs on the abdomen. When the egg hatches, the larva feeds on the spider.

### 3.1.4.8 Order – Isopoda

One species has been documented in the Isopoda (pillbugs) order, *Armadillidium vulgare* (woodlouse). Isopods are small crustaceans. This species is able to roll into a ball when disturbed, which gives it the other common name rollie-pollie. The woodlouse feeds on decaying plant matter, as well as lichens and algae.

### 3.1.4.9 Order – Lepidoptera

The Lepidoptera order (butterflies and moths) is the most documented order of invertebrates along the Wash having 45 species (12 moths and 33 butterflies) identified in 11 different families (4 moths and 7 butterflies). This may be a result of the Lepidoptera order being more extensively studied than most other orders, making identification easier. In addition, Nelson (2009a) described many butterflies in the only study at the Wash specifically designed to capture a specific group of insects.

Typically moths are nocturnal and butterflies are diurnal; however, not all species follow this rule all of the time. Their main physiological difference is that a butterfly's antenna has knobs at the end while moths do not. Another difference is that butterflies typically rest with their wings held up above their body while moths lay theirs out flat.

The most abundant family of Lepidoptera described at the Wash is Hesperiidae (skippers). Skippers are in the monotypic superfamily Hesperioidea and in their own lineage separate from other butterflies (Papilioneidea). They are identified by antennae clubs that are hooked backwards, as well as typically having a larger thorax similar to moths. There have been nine species of Skippers identified at the Wash, the most common of which is the Yuma skipper (*Ochlodes yuma*; Figure 10). One species that is notably absent is the MacNeil's sootywing (*Hesperopsis gracielae*). This species is a Lower Colorado River Multi-Species Conservation Program species found throughout the Lower Colorado River region whose host plants include the four-wing saltbush (*Atriplex canescens* var. *canescens*) and quailbush (*Atriplex lentiformis*). The apparent absence is most likely due to a lack of study in areas dominated by these species.

**Figure 10. Yuma Skipper (*Ochlodes yuma*).**

The family Nymphalidae (brushfooted butterflies) is the second most abundantly described family of Lepidoptera at the Wash. There have been eight species identified in this family. Species indentified to date include the famous Monarch butterfly (*Danaus plexippus*) and the Queen butterfly (*Danaus gilippus*), a mimic of the Monarch. Those identified at the Wash are likely those of the Western population passing through as part of their migration.

The largest lepidopteron along the Wash are the sphinx moths (Sphingidae) with the Western poplar sphinx (*Pachysphinx occidentalis*) being the largest with a wingspan up to 148 mm. Other species identified in this family are the White-lined sphinx (*Hyles lineata*) and the five-spotted hawk moth (*Manduca quinquemaculata*). The five-spotted hawkmoth's caterpillar is known as the tomato hornworm and is a major pest in gardens and agriculture areas feeding on various plants in the Solanaceae family.

#### 3.1.4.10 Order – Mantodea

The Mediterranean mantis (*Iris oratoria*) is the only species identified at the Wash in the Mantodea order. As the common name implies, this species is native to Europe but is found throughout Asia and the United States. Species in this order are easily identifiable by their grasping, spiked forelegs with which they catch prey. Prey for mantids is primarily other insects but can also include small lizards, frogs, birds, snakes, fish, and small rodents.

#### 3.1.4.11 Order – Neuroptera

The order Neuroptera includes insects known as net-winged insects such as lacewings, mantidflies, and antlions. The larvae of most neuropterans are predatory, feeding on other insects such as aphids. Many of the adults are also predatory but some species feed on nectar while others do not feed at all.

There have been specimens collected from four different families of Neuroptera at the Wash so far: Chrysopidae (green lacewings), Coniopterygidae (dustywings), Hemerobiidae (Brown lacewings), and Myrmelontidae (antlions). Only antlions have had a specimen identified to a lower taxonomic level than order (the genus Myrmeleon), identified by Eckberg and Foster (in prep.).

#### 3.1.4.12 Order – Odonata

The order Odonata (dragonflies and damselflies) is another well described order at the Wash with 6 families, 13 genera, and 20 individuals identified to the species level. Like Lepidoptera, this order is well studied and identification tools are more readily available making recognition of newly collected specimens easier. Odonata is further divided into two suborders: Epiprocta (dragonflies) and Zygoptera (damselflies).

So far, the largest number of Odonata identified at the Wash is in the family Libellulidae (skimmers) with a total of nine individuals. Skimmers are relatively large dragonflies that are primarily found in the New World. One common member of this family that is found at the Wash in large numbers is the flame skimmer (*Libellula saturata*). Native to the southwestern United States, this species chooses habitats consisting of warm ponds or streams. The aquatic larvae (naiad) feed on insects such as mosquito larvae, mayfly larvae, and tadpoles.

The second most abundant family identified at the Wash (eight species identified) is Coenagrionidae (narrow-winged damselflies). Within this family the most abundant genus is Agria (dancers), of which five species have been identified. This genus includes the Nevada state insect, the vivid dancer (*Argia vivida*; Figure 11).

**Figure 11. Vivid Dancer Damselfly (*Argia vivida*); photo credit: Paul Dacko.**

### 3.1.4.13 Order – Orthoptera

Orthoptera is an order of insects including grasshoppers, crickets, and locusts. One feature that all Orthopterans share is that they all have a paurometabolous life cycle, meaning that unlike most insects they do not go through a typical metamorphosis as part of their development. Instead, they go though gradual changes from nymphs to adults. Five species have been identified at the Wash from three different families: Acrididae (short-horned grasshoppers; Figure 12), Gryllidae (true crickets), and Tettifoniidae (katydids).

### 3.1.4.14 Order – Thysanoptera

Individuals in the order Thysanoptera are known as thrips. These small insects (0.5 to 14 mm in length) are considered pests in agricultural areas because they feed on many commercial plants. In addition, they are vectors for many plant infecting viruses. Nelson (2009a) provided the only documentation of this order at the Wash.

### 3.1.4.15 Order – Trichoptera

The caddisflies are the only species classified in the order Trichoptera. These flying insects appear similar to moths but have hairy membranous wings as opposed to having scales. Caddisfly larvae are aquatic, building large silk structures underwater to help catch food such as algae, invertebrates, and zooplankton. Caddisflies are commonly used in determining aquatic

**Figure 12. Cattail Toothpick Grasshopper (*Leptysma marginicollis hebardi*).**

ecosystem health because they breathe dissolved oxygen and do not cope well with low levels. In addition, many species are particularly sensitive to environmental stressors such as pollution.

While multiple studies have collected caddisflies at the Wash, only Nelson (2009b; 2010) has been able to classify specimens to the genus level. There have been four genera described: *Culoptila* (little black caddisflies; family: Glossosomatidae), *Smicridea* (netspinning caddisflies; family: Hydropsychidae), *Hydroptila* (microcaddisflies; family: Hydroptillidae), and *Nectopsyche* (longhorned caddisflies; family: Leptoceridae).

### 3.1.5 Class – Malacostraca

Three species have been identified in this class, one of which is *Procambarus clarkii* (red swamp crayfish), in the order Decapoda. Native to the Gulf Coast region in Mexico and the United States, this species is now found all over the United States, Asia, Africa, and Europe. *Procambarus clarkii* is primarily carnivorous, eating insect larvae, tadpoles, and snails. With its characteristic behavior of burrowing, it has caused negative economic impacts by damaging levees, dams, and irrigation systems. In addition, it competes with native aquatic species for food and space, making it an invasive species in most locations where it is found. The other two genera identified are *(Crangonyx and Hyalella)* amphipods in the order Amphipoda.

### 3.1.6 Class – Maxillopoda

Maxillopods are within the subphylum Crustacea and those found along the Wash were in the sub-class Copepoda. Most maxillopods are very small with the exception of barnacles and use their maxillae for feeding. Copepods are found in almost every freshwater habitat around the world and are often used as bioindicators of water quality. In addition, they are a food source for a wide variety of predators. Individual copepods were identified during sampling of water sources within the Nature Preserve in 2002.

### 3.1.7 Class – Ostracoda

Nelson (2010) collected specimens in this class as part of a report on macroinvertebrates at the Wash. This is the only record of any specimen in this order. Ostracods are sometimes referred to as seed shrimp and are crustaceans. They are typically very small (~1 mm) and are food for many aquatic species.

## 3.2 Phylum – Annelida

Individuals in the Annelida phylum are segmented worms with over 17,000 extant species. All of the annelids identified at the Wash to date are in the class Clitellata. These worms are characterized by having a clitellum, a collar that forms on their body. Individuals have been collected by Nelson (2009b; 2010) in three different orders and five families. Identification has not been possible to any lower taxonomic level.

## 3.3 Phylum – Bryozoa

Commonly known as moss animals, individuals in the phylum Bryozoa are filter feeders. They sieve food particles out of the water using a crown of tentacles lined with cilia. Although not identified as such, Bryozoa collected by Nelson (2010) are likely in the class Phylactolaemata because all other Bryozoa classes are only found in marine environments. Further, there is only one extant order in this class, Plumatellida.

## 3.4 Phylum – Mollusca

The phylum Mollusca is commonly known as mullusks and has 85,000 recognized extant species. Most of the classified species live in marine habitats. At the Wash, two classes have been documented, Bivalvia and Gastropoda. The class Bivalvia is represented at the Wash by the genus *Corbicula* in the family Corbiculidae (Basket clams). The species *Corbicula fluminea* (Asian clam) was identified by Nelson (2010) while Nelson (2009b) cataloged an unknown species in the genus *Corbicula*, possibly the same species. The Gastropoda class includes snails and slugs. At the Wash, there have been four families in two orders documented: Anculidae (limpets), Lymnaeidae (freshwater snails), Physidae (bladder snails), and Thiaridae (swamp ceriths). The species *Melanoides tuberculatus* (red-rimmed melania) in the family Thiaridae is an aquarium species that has expanded its range from its native Africa to all over the world.

## 3.5 Phylum – Nemertea

The Nemertea phylum is known as ribbon worms or proboscis worms with the majority of species being marine with fewer being found in fresh water habitats and fewer still being terrestrial forms. The one specimen found at the Wash is in the genus *Prostoma* in the class Enopla, order Hoplonemertea, and family Tetrastemmatidae. These species are predators, feeding mainly on crustaceans and worms.

## 3.6 Phylum - Platyhelminithes

The phylum Platyhelminithes are flatworms and are represented at the Wash by the class Turbellaria. These species are mainly predators or scavengers while others are symbiotes of animals such as crustaceans; some are parasites.

## 4.0 CONCLUSIONS

The five studies that collected invertebrate taxonomic information at the Wash have increased the understanding of the wide array of species and groups of species found there. The classified invertebrates along the Wash corridor fill many ecological niches and are found in many microhabitats. It is clear that they are an important component to the ecosystem and provide many benefits to the system and other living organisms living at the Wash.

Most sources from which invertebrate information has been collected for this report were targeted towards specific groups of animals. Eckberg and Foster (in prep.), which contributed the largest number of genera to this inventory, targeted nocturnal species. Wiesenborn (2005) focused on those species specifically associated with a single plant species, salt cedar. The aquatic macroinvertebrate survey (Nelson 2010), research on culm breakdown on the Wash (Nelson 2009b), as well as the information provided by Becky Blasius (pers. comm.) all focused on aquatic species. Combined, these aquatic studies provide the most comprehensive understanding of any invertebrate community along the Wash. Only Nelson (2009a) inventoried invertebrates from various habitat types with varied plant species, comparing revegetated areas and those dominated by non-native plants. There are multiple microhabitats and plant communities within the CCWP that have yet to have any invertebrate collection performed.

## 5.0 RECOMMENDATIONS

While there have been more invertebrates documented at the Wash than any other animal group, it is likely that only a small fraction have been identified. It is recommended that additional invertebrate monitoring surveys be conducted, in addition to the ongoing benthic macroinvertebrate surveys. Some invertebrates can be surveyed simultaneously with other surveys, i.e. pit-fall traps used for reptile surveys also capture many invertebrates that could also be collected and identified. All of the invertebrate studies so far have focused on the riparian or aquatic habitats. There are many species found in upland areas that have significant impacts on the entire ecosystem; studies should be conducted to inventory saltbush and creosote dominated areas.

Many inventory surveys can be implemented to target specific invertebrate groups that require relatively few resources (staff time and money). These include sticky traps for small flying insects, black-light traps for nocturnal insects, dish traps for beetles, ants and flies, and color traps for pollinating insects. All of these can be set up in very little time, require minimal money to construct, and can provide significant results in terms of number of individuals collected.

Surveys of salt cedar areas should be conducted regularly to monitor the movement of the tamarisk beetle. This species may have a significant impact to the habitat along the Wash and surrounding areas. During these surveys, additional data can be collected on the current range and estimated populations of the splendid tamarisk weevil identified by Eckberg and Foster (in prep.) and the tamarisk leafhopper found by Wiesenborn (2005). While the ecological impact of these species is not believed to be as significant as the tamarisk beetle, they may have an impact. Only continual monitoring can ensure that future impacts are not left undiscovered.

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**Appendix A**

Invertebrates documented at the Las Vegas Wash

Specimens identified to any taxonomic level already described to a lower taxanomic level are excluded from this list

| Phylum | Class | Order | Family | Family Common Name | Genus | Scientific Name | Common Name |
|---|---|---|---|---|---|---|---|
| Annelida | Clitellata | Haplotaxida | Enchytraeidae | Potworms and Iceworms | | | Potworms and Iceworms |
| | | | Lumbricidae | Earthworms | | | Earthworms |
| | | | Naididae | Oligochaete worms | | | Sludge Worms |
| | | Lumbriculida | Lumbriculidae | Oligochaete worms | | | Small Worms |
| | | Rhynchobdellida | Glossiphoniidae | Freshwater jawless leaches | | | Freshwater jawless leaches<br>Leeches |
| Arthropoda | Arachnida | Araneae | Araneidae | Orb Weavers | Metepeira | Metepeira sp. | Orb Weaver |
| | | | Corinnidae | Antmimics and Ground Sac Spiders | Trachelas | Trachelas pacificus | Sac Spider |
| | | | Dictynidae | Mesh Web Weavers | | | Mesh Web Weaver |
| | | | Gnaphosidae | Ground Spiders | Micaria | Micara sp. | Ground Spider |
| | | | Lycosidae | Wolf spiders | Pardosa | Pardosa sp. | Thinlegged wolf spider |
| | | | Philodromidae | Running Crab Spiders | | | Running Crab Spider |
| | | | Salticidae | Jumping Spiders | Habronattus | Habronattus sp. | Jumping Spider |
| | | | Theraphosidae | Tarantulas | Aphonopelma | Aphonopelma chalcodes | Desert blond tarantula |
| | | | Theridiidae | Cobweb Spiders | Latrodectus | Latrodectus hesperus | Western Black Widow |
| | | | | Cobweb Spiders | Steatoda | Steatoda sp. | Cobweb Spider |
| | | Scorpiones | Luridae | Largetooth scorpions | Hadrurus | Hadrurus arizonensis | Arizona hairy scorpion |
| | | Solifugae | Eremobatidae | Straight-faced Solifugids | Eremobates | Eremobates sp. | Windscorpion |
| | Branchiopoda | Cladocera | Daphniidae | Water Fleas | Daphnia | Daphnia pulex | Water Flea |
| | Entognatha | Collembola | | | | | Springtails |
| | Insecta | Blattodea | Blattellidae | Wood Cockroaches | Blattella | Blattella germanica | German Cockroach |
| | | | Blattidae | Cockroaches | Blatta | Blatta orientalis | Oriental Cockroach |
| | | | | | Periplaneta | Periplaneta americana | American cockroach |
| | | Coleoptera | Anobiidae | Death-watch and Spider Beetles | Ptinus | Ptinus eximius | Spider Beetle |
| | | | Anthicidae | Antlike Flower Beetles | Ischyropalpus | Ischyropalpus sp. nr. bipartitus | Antlike Flower Beetle |
| | | | Bostrichidae | Horned Powder-post Beetles | Amphicerus | Amphicerus cornutus | Western Twig Borer |
| | | | Buprestidae | Metallic Wood-boring Beetle | Gyascutus | Gyascutus planicosta planicosta | Metallic Wood-boring Beetle |
| | | | | | Prasinalia | Prasinalia cuneata | Metallic Wood-boring Beetle |
| | | | Carabidae | Ground Beetles | Cymindis | Cymindis sp. | Ground Beetle |
| | | | | | Galerita | Galerita bicolor | False Bombadier Beetle |
| | | | | | Scarites | Scarites sp. | Ground Beetle |
| | | | Cerambycidae | Longhorned Beetles | Derobrachus | Derobrachus hovorei | Palo Verde Root Borer |
| | | | Chrysomelidae | Leaf beetles | Lema | Lema daturaphila | Three-lined potato beetle |
| | | | Coccinellidae | Lady Beetles | Coccinella | Coccinella septempunctata | Seven-spotted lady beetle |
| | | | | | Cycloneda | Cycloneda polita | Western Blood-Red Lady Beetle |
| | | | | | Hippodamia | Hippodamia convergens | Convergent Lady Beetle |
| | | | | | Olla | Olla v-nigrum | Ashy Gray Lady Beetle |
| | | | | | Psyllobora | Psyllobora vigintimaculata | Twenty-Spotted Lady Beetle |
| | | | | | Scymnus | Scymnus sp. | Lady Beetle |
| | | | | | Stethorus | Stethorus sp. nr. punctum | Spider Mite Destroyer |
| | | | Curculionidae | Snout and Bark Beetles | Coniatus | Coniatus splendidulus | Splendid Tamarisk Weevil |
| | | | | | Ophryastes | Ophryastes geminatus | Desert Weevil |
| | | | Dermestidae | Carpet beetles | Cryptorhopalum | Cryptorhopalum sp. | Carpet beetle |
| | | | Dytiscidae | Predaceous Diving Beetles | Agabetes | Agabetes sp. | Predaceous Diving Beetles |
| | | | | | Agabinus | Agabinus sp. | Predaceous Diving Beetles |
| | | | | | Agabus | Agabus sp. | Predaceous Diving Beetles |
| | | | | | Neoclypeodytes | Neoclypeodytes sp. | Predaceous Diving Beetles |
| | | | Elmidae | Riffle Beetles | Optioservus | Optioservus sp. | Riffle Beetles |
| | | | Hydrophilidae | Water Scavenger Beetles | Berosus | Berosus sp. | Water Scavenger Beetles |
| | | | | | Enochrus | Enochrus sp. | Water Scavenger Beetles |
| | | | | | Tropisternus | Tropisternus sp. | Water Scavenger Beetles |
| | | | Meloidae | Blister beetles | Eupompha | Eupompha schwarzi | Blister beetle |
| | | | | | Lytta | Lytta stygica | Blister beetle |
| | | | Melyridae | Soft-winged Flower Beetles | Attalus | Attalus sp. | Soft-winged Flower Beetle |
| | | | Mordellidae | Tumbling Flower Beetles | Modellistena | Mordellistena sp. | Tumbling Flower Beetle |
| | | | Nitidulidae | Sap-feeding Beetles | Cybocephalus | Cybocephalus californicus | Sap Feeding Beetle |
| | | | Scarabaeidae | Scarab Beetles | Diplotaxis | Diplotaxis knausii | Scarab Beetle |
| | | | | | Phyllophaga | Phyllophaga sp. | May Beetles |
| | | | Staphylinidae | Rove Beetles | | | Rove Beetles |
| Diptera | | | Agromyzidae | Leaf Miner Flies | Liriomyza | Liriomyza sp. | Leaf Miner Fly |
| | | | Asilidae | Robber Flies | | | Robber Flies |
| | | | Bombyliidae | Bee Flies | Neodiplocampta | Neodiplocampta sp. | Bee Fly |
| | | | Ceratopogonidae | Biting Midges | Bezzia/Probezzia | Bezzia/Probezzia sp. | Biting Midges |
| | | | | | Culicoides | Culicoides sp. | Biting Midges |
| | | | | | Dasyhelea | Dasyhelea sp. | Biting Midges |
| | | | Chironomidae | Midges | Chironomus | Chironomus sp. | Midge |
| | | | | | Cladotanytarsus | Cladotanytarus sp. | Midge |
| | | | | | Cricotopus | Cricotopus sp. | Midge |
| | | | | | Dicrotendipes | Dicrotendipes sp. | Midge |
| | | | | | Endotribelos | Endotribelos sp. | Midge |
| | | | | | Pentaneura | Pentaneura sp. | Midge |
| | | | | | Polypedilum | Polypedilum sp. | Midge |
| | | | | | Pseudochironomus | Pseudochironomus sp. | Midge |
| | | | | | Rheotanytarsus | Rheotanytarsus sp. | Midge |
| | | | | | Thienemanniella | Thienemanniella sp. | Midge |
| | | | | | Xestochironomus | Xestochironomus sp. | Midge |
| | | | Culicidae | Mosquitoes | Aedes | Aedes vexans | Inland Floodwater Mosquito |
| | | | | | Anopheles | Anopheles franciscanus | Mosquito |
| | | | | | | Anopheles freeborni | Western malaria mosquito |
| | | | | | Culex | Culex erythrothorax | Tule mosquito |
| | | | | | | Culex quinquefasciatus | Southern house mosquito |
| | | | | | | Culex tarsalis | Encephalitis mosquito |
| | | | | | Culiseta | Culiseta inornata | Winter marsh mosquito |
| | | | Dolochopodidae | Longlegged Flies | | | Longlegged Flies |
| | | | Empdidae | Dance Flies | Hemerodromia | Hemerodromia sp. | Dance Flies |
| | | | Ephydridae | Shore Flies | Brachydeutera | Brachydeutera sp. | Shore Flies |
| | | | Muscidae | House Flies | Limnophora | Limnophora sp. | House Flies |
| | | | Psychodidae | Moth Flies and Sand Flies | | | Moth Flies and Sand Flies |
| | | | Sciomyzidae | Marsh Flies | | | Marsh Flies |
| | | | Simuliidae | Black Flies | Simulium | Simulium sp. | Black Flies |
| | | | Stratiomyidae | Soldier Flies | | | Soldier Flies |
| | | | Syrphidae | Syrphid Flies | Copestylum | Copestylum sexmaculatum | Syrphid Fly |
| | | | Tabanidae | Horse and Deer Flies | | | Horse and Deer Flies |
| | | | Tachinidae | Tachina Flies | | | Tachina Flies |
| | | | Tipulidae | Crane Flies | Limonia | Limonia sp. | Limoniid Crane Fly |

| Phylum | Class | Order | Family | Family Common Name | Genus | Scientific Name | Common Name |
|---|---|---|---|---|---|---|---|
| | | Embioptera | | | | | Webspinners |
| | | Ephemeroptera | Baetidae | Small Minnow Mayflies | Baetis | Baetis sp. | Small Minnow Mayflies |
| | | | | | Callibaetis | Callibaetis sp. | Small Minnow Mayflies |
| | | | | | Camelobaetidius | Camelobaetidius musseri | Small Minnow Mayflies |
| | | | | | Fallceon | Fallceon quilleri | Small Minnow Mayflies |
| | | | Caenidae | Small Squaregilled Mayflies | Caenis | Caenis sp. | Small Squaregilled Mayflies |
| | | | Siphlonuridae | Primitive Minnow Mayflies | Siphlonurus | Siphlonurus sp. | Primitive Minnow Mayflies |
| | | Hemiptera | Aphididae | Aphids | | | Aphids |
| | | | Berytidae | Stilt Bugs | Pronotacantha | Pronotacantha annulata | Stilt Bugs |
| | | | Cicadellidae | Leafhoppers | Exitianus | Exitianus exitosus | Gray Lawn Leafhopper |
| | | | | | Homalodisca | Homalodisca liturata | Smoketree Sharpshooter |
| | | | | | Opsius | Opsius stactogalus | Tamarix Leafhopper |
| | | | Cicadidae | Cicadas | Diceroprocta | Diceroprocta apache | Apache Cicada |
| | | | Corixidae | Water Boatmen | | | Water Boatmen |
| | | | Diaspididae | Armored Scale Insects | Chionaspis | Chionaspis sp. | Chionaspis scale |
| | | | Geocoridae | Big-eyed Bugs | Geocoris | Geocoris pallens | Western Big-eyed Bug |
| | | | Lygaeidae | Seed Bug | Nysius | Nysius sp. | Seed Bug |
| | | | | | Xyonysius | Xyonysius californicus | Seed Bug |
| | | | Mesovellidae | Water Treaders | | | Water Treaders |
| | | | Miridae | Plant Bugs | Atomoscelis | Atomoscelis onustus | Plant Bugs |
| | | | | | Phytocoris | Phytocoris sp. | Plant Bugs |
| | | | | | Trigonotylus | Trigonotylus caelestialium | Rice Leaf Bug |
| | | | Notonectidae | Backswimmers | | | Backswimmers |
| | | | Pentatomidae | Stink Bugs | Brochymena | Brochymena sulcata | Rough Stink Bug |
| | | | Pentatomidae | Stink Bugs | Chlorochroa | Chlorochroa uhleri | Uhler's Stink Bug |
| | | | Reduviidae | Assassin Bugs | Rasahus | Rasahus thoracicus | Western Corsair |
| | | | Rhopalidae | Scentless Plant Bugs | Liorhyssus | Liorhyssus hyalinus | Hyaline Grass Bug |
| | | | Saldidae | Shore Bugs | | | Shore Bugs |
| | | | Veliidae | Small Water Striders | | | Small Water Striders |
| | | Hymenoptera | Apidae | Cuckoo,Carpenter,Digger,Bumble, and Honey Bees | Apis | Apis Mellifera | Honey Bee |
| | | | Bethylidae | Bethylid Wasps | Goniozus | Goniozus sp. | Bethylid Wasp |
| | | | Ceraphronidae | | Ceraphron | Ceraphron sp. | Ceraphron |
| | | | Dryinidae | Dryinids | Gonatopus | Gonatopus sp. | Dryinids |
| | | | Eulophidae | Chalcidoid Wasps | Miotropis | Miotropis sp. | Miotropis |
| | | | Formicidae | Ants | Formica | Formica xerophila | Ant |
| | | | | | Leptothorax | Leptothorax sp. | Ant |
| | | | | | Posonomyrmex | Pogonomyrmex sp. | Harvester Ant |
| | | | Halictidae | Sweat Bees | Lasioglossum | Lasioglossum sp. | Sweat Bee |
| | | | Mutillidae | Velvet ants | Dasymutilla | Dasymutilla creusa | Velvet ant |
| | | | | | | Dasymutilla gloriosa | Velvet ant |
| | | | Mymaridae | Fairyflies | Polynema | Polynema saga | Fairyfly |
| | | | Platygastroidae | | | | |
| | | | Pompilidae | Spider wasps | Pepsis | Pepsis chrysothemis | Tarantula hawk |
| | | | Pteromalidae | Pteromalids | Pachyneuron | Pachyneuron sp. | Pteromalid |
| | | | | | Pteromalus | Pteromalus sp. | Pteromalid |
| | | | Sphecidae | Thread-waisted Wasps | | | Thread-waisted Wasps |
| | | | Trichogrammatidae | Chalcidoid Wasps | Ufens | Ufens sp. | Ufens |
| | | | Vespidae | Yellowjackets, paper wasps, and hornets | Polistes | Polistes aurifer | Paper wasp |
| | | Isopoda | Armadillidaiidae | Pillbugs | Armadillidium | Armadillidium vulgare | Woodlouse |
| | | Lepidoptera | Crambidae | Crambid Snout Moths | Lygropia | Lygropia octonalis | Eight-barred Lygropia |
| | | | | | Petrophila | Petrophila jaliscalis | Hodges #4775 |
| | | | Erebidae | | Notarctia | Notarctia proxima | Mexican Tiger Moth |
| | | | Hesperiidae | Skippers | Erynnis | Erynnis funeralis | Funeral duskywing |
| | | | | | Heliopetes | Heliopetes ericetorum | Northern white skipper |
| | | | | | Hesperopsis | Hesperopsis alpheus | Saltbush sootywing |
| | | | | | | Hesperopsis libya | Mojave sootywing |
| | | | | | Hylephila | Hylephila phyleus | Fiery skipper |
| | | | | | Lerodea | Lerodea eufala | Eufala skipper |
| | | | | | Ochlodes | Ochlodes yuma | Yuma skipper |
| | | | | | Pyrgus | Pyrgus communis | Common checkered-skipper |
| | | | | | | Pyrgus scriptura | Small checkered-skipper |
| | | | Lycaenidae | Blues, coppers, hairstreaks, and harvesters | Brephidium | Brephidium exilis | Western pygmy-blue butterfly |
| | | | | | Echinargus | Echinargus isola | Reakirt's blue butterfly |
| | | | | | Hemiargus | Hemiargus ceraunus | Ceraunus blue |
| | | | | | Leptotes | Manduca quinquemaculata | Marine blue |
| | | | | | Plebejus | Plebejus acmon | Acmon blue |
| | | | | | Strymon | Strymon melinus | Grey hairstreak |
| | | | Noctuidae | Owlet moths | Noctua | Noctua pronuba | Large Yellow Underwing |
| | | | | | Ponometia | Ponometia elegantla | Arizona Bird Dropping Moth |
| | | | | | Schinia | Schinia deserticola | Hodges #11134.2 |
| | | | | | Spaelotis | Spaelotis bicava | Hodges #10926.1 |
| | | | | | Trichocosmia | Trichocosmia inornata | Hodges #10219 |
| | | | Nymphalidae | Brushfooted butterflies | Danaus | Danaus gilippus | Queen butterfly |
| | | | | | | Danaus plexippus | Monarch |
| | | | | | Junonia | Junonia coenia | Buckeye |
| | | | | | Libytheana | Libytheana carinenta | Snout butterfly |
| | | | | | Nymphalis | Nymphalis antiopa | Mourning cloak |
| | | | | | | Nymphalis californica | California tortoiseshell |
| | | | | | Vanessa | Vanessa atalanta | Red admiral |
| | | | | | | Vanessa cardui | Painted lady |
| | | | Papilionidae | Swallowtails and parnassins | Papilio | Papilio polyxenes | Black swallowtail |
| | | | | | | Papilio polyxenes coloro | Desert Black Swallowtail |
| | | | | | | Papilio zelicaon | Anise swallowtail |
| | | | Pieridae | Whites, sulphers and yellows | Colias | Colias eurytheme | Orange sulphur |
| | | | | | Eurema | Eurema nicippe | Sleepy orange |
| | | | | | Nathalis | Nathalis iole | Dainty sulphur |
| | | | | | Pieris | Pieris rapae | Cabbage white |
| | | | | | Pontia | Pontia protodice | Checkered white |
| | | | | | Zerene | Zerene cesonia | Southern dogface |
| | | | Riodinidae | Metalmarks | Apodemia | Apodemia mormo | Mormon metalmark |
| | | | Sphingidae | Sphinx moths | Hyles | Hyles lineata | White-lined Sphinx |
| | | | | | Manduca | Manduca quinquemaculata | Five-spotted Hawk Moth |
| | | | | | Pachysphinx | Pachysphinx occidentalis | Western poplar sphinx |
| | | Mantodea | Tarachodidae | Mantids | Iris | Iris oratoria | Mediterranean Mantis |

| Phylum | Class | Order | Family | Family Common Name | Genus | Scientific Name | Common Name |
|---|---|---|---|---|---|---|---|
| | | Neuroptera | Chrysopidae | Green Lacewings | | | Green Lacewings |
| | | | Coniopterygidae | Dustywings | | | Dustywings |
| | | | Hemerobiidae | Brown Lacewings | | | Brown Lacewing |
| | | | Myrmeleontidae | Antlions | Myrmeleon | Myrmeleon sp. | Antlion |
| | | Odonata | Aeshnidae | Darners | Anax | Anax junius | Common green darner |
| | | | | | Rhionaeschna | Rhionaeschna multicolor | Blue-eyed Darner |
| | | | Calopterygidae | Broad-winged damselflies | Hetaerina | Hetaerina americana | American rubyspot |
| | | | Coenagrionidae | Narrow-winged damselflies | Argia | Argia alberta | Paiute Dancer |
| | | | | | | Argia moesta | Powdered dancer |
| | | | | | | Argia sedula | Blue-ringed dancer |
| | | | | | | Argia sp. | Dancers |
| | | | | | | Argia vivida | Vivid Dancer |
| | | | | | Enallagma | Enallagma civile | Familiar Bluet |
| | | | | | Ischnura | Ischnura cervula | Pacific Forktail |
| | | | | | | Ischnura denticollis | Black-fronted Forktail |
| | | | Corduliidae | Emeralds | | | Emeralds |
| | | | Gomphidae | Clubtails | Erpetogomphus | Erpetogomphus compositus | White-belted ringtail |
| | | | Libellulidae | Skimmers | Erythemis | Erythemis collocata | Western Pondhawk |
| | | | | | Libellula | Libellula comanche | Comanche Skimmer |
| | | | | | | Libellula luctuosa | Widow Skimmer |
| | | | | | | Libellula saturata | Flame skimmer |
| | | | | | Orthemis | Orthemis ferruginea | Roseate Skimmer |
| | | | | | Pantala | Pantala hymenaea | Spot-winged Glider |
| | | | | | Sympetrum | Sympetrum corruptum | Variegated Meadowhawk |
| | | | | | Tramea | Tramea lacerata | Black Saddlebags |
| | | | | | Tramea | Tramea onusta | Red Saddlebags |
| | | Orthoptera | Acrididae | Short-horned Grasshoppers | Leptysma | Leptysma marginicollis hebardi | Cattail Toothpick Grasshopper |
| | | | | | Melanoplus | Melanoplus yarrowii | Yarrow's Spur-throat Grasshopper |
| | | | | | Trimerotropis | Trimerotripis pallidipennis | Pallid-winged Grasshopper |
| | | | Gryllidae | True Crickets | Miogryllus | Miogryllus lineatus | Western Striped Cricket |
| | | | Tettigoniidae | Katydids | Neoconocephalus | Neoconocephalus triops | Broad-tipped Conehead |
| | | Thysanoptera | | | | | Thysanoptera |
| | | Trichoptera | Glossosomatidae | Little Black Caddisflies | Culoptila | Culoptila sp. | Little Black Caddisflies |
| | | | Hydropsychidae | Netspinning Caddisflies | Smicridea | Smicridea sp. | Netspinning Caddisflies |
| | | | Hydroptillidae | Microcaddisflies | Hydroptila | Hydroptila sp. | Microcaddisflies |
| | | | Leptoceridae | Longhorned Caddisflies | Crangonyx | Crangonyx sp. | Amphipod |
| | Malacostraca | Amphipoda | Crangonyctidae | | Hyalella | Hyalella sp. | Amphipod |
| | | | Hyalellidae | | Nectopsyche | Nectopsyche sp. | White Miller |
| | | Decapoda | Cambaridae | Crayfish and crayfishes | | | Copepods |
| | Maxillopoda | | | | Procambarus | Procambarus clarkii | Red swamp crayfish |
| | Ostracoda | | | | | | Seed Shrimp |
| | | | | | | | Moss Animals |
| | Bivalvia | Veneroida | Corbiculidae | Basket Clams | Corbicula | Corbicula fluminea | Asian Clam |
| Bryozoa | | | | | Corbicula | Corbicula sp. | Basket Clam |
| Mollusca | Gastropoda | Basommatophora | Ancylidae | Limpets | | | Limpets |
| | | | Lymnaeidae | Freshwater Snails | | | Freshwater Snails |
| | | | Physidae | Bladder Snails | | | Bladder Snails |
| | | | Physella | Bladder Snails | Physa | Physa sp. | Bladder Snails |
| | | Neotaenioglossa | Thiaridae | Swamp Ceriths | Melanoides | Melanoides tuberculatus | Red-rimmed melania |
| Nemertea | Enopla | Hoplonemertea | Tetrastemmatidae | | Prostoma | Prostoma sp. | Freshwater Nemerteans |
| Platyhelminth | Tubellaria | | | | | | Flatworms |