

# Mosquitoes and Wetlands

## Physical Control

A habitat can be modified to reduce standing water so mosquito larvae and pupae do not develop.

## Biological Control

Natural beneficial insects such as backswimmers, beetles, and dragonflies can help to control mosquito pupae and larvae. Mosquitofish can also be introduced to feed on immature mosquito stages.

## Larvicides

When natural predators and other methods cannot reduce mosquito populations environmentally compatible materials are applied. Such soft pesticides include: a bacterial protein crystal (Bti) and an insect growth regulator (methoprene). Although expensive, these materials target mosquito larvae and are generally friendly to the environment.

## Mosquito-Borne Diseases

### Encephalitis (sleeping sickness)

This virus can cause inflammation of the brain. Encephalitis is a flu-like illness with a high fever. Severe cases can result in mental retardation, motor impairment, or death. Mosquitoes become infected while feeding on birds that harbor the virus. They can then transmit the virus to other animals.

## Malaria

This is a protozoan (single-celled organism) that attacks red blood cells. Malaria is a chills/fever/sweating flu-like illness that reoccurs every 2-3 days. The malaria parasite can cause liver and kidney damage or death. Mosquitoes become infected while feeding on other humans that harbor the parasite.

## Personal Protection From Mosquitoes

- Reduce outdoor activities during peak feeding periods (1 to 2 hours after dark)
- Wear long pants and sleeves
- Apply insect repellent (Follow label directions carefully)

## First Aid for Mosquito Bites

- Wash Bite with soap and water
- Apply anti-itch medication
- Apply cold cloth for swelling
- Watch for secondary infections

For more information call:

## Shasta Mosquito and Vector Control District

19200 Latona Road  
Anderson, CA 96007  
(530) 365-3768

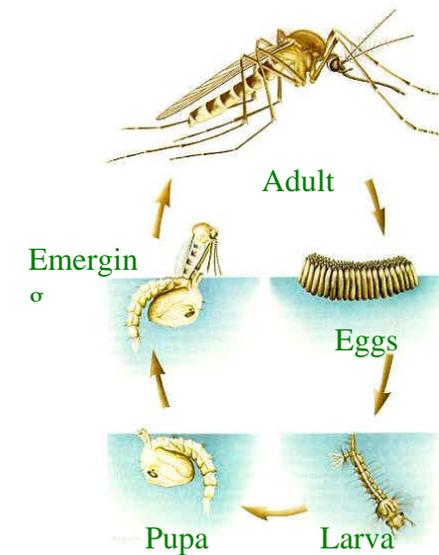
[shastamosquito.org](http://shastamosquito.org)  
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Wetland habitat is an environment that supports plant and animal life and requires surface water to survive. It is among the most valuable of natural resources as it provides for a great diversity of wildlife. Unfortunately, mosquito breeding is also associated with wetland habitat.

Mosquitoes are blood-sucking insects. Their biting habits can be irritating and often make outdoor activities unenjoyable. Mosquitoes are important because some types can transmit organisms that can cause diseases in pets, domestic animals, wildlife, and humans.

Mosquitoes have four life stages: egg, larva, pupa, and adult. Immature mosquitoes need standing water to complete their life cycle. The adult females require a blood meal in order to lay her eggs. The adult males only eat plant juices.



### Common Mosquitoes found in Wetlands

There are approximately fifty types of mosquitoes in California. Many of those species develop in wetlands habitat.

#### Encephalitis mosquito (*Culex tarsalis*)

This mosquito can transmit the encephalitis virus (sleeping sickness) to humans. It is distributed through California. Immature stages develop in wetlands, irrigated crops, and rainwater sources.

#### Western malaria mosquito (*Anopheles freeborni*)

This mosquito can transmit malaria to humans. It is common in rice growing regions of California. Immature stages develop in wetlands, duck clubs, and sunlit ponded areas.

#### Floodwater mosquito (*Aedes vexans*)

This mosquito is a terrible daytime pest that actively feeds on humans. It is a widespread mosquito that develops in shaded areas that frequently flood.

#### Woodland malaria mosquito (*Anopheles punctipennis*)

This mosquito can transmit malaria to humans. It is common throughout California. Immature stages develop in cool shaded wetlands and pools.

### Natural Predators of Mosquitoes

Many aquatic insects and invertebrates that feed on mosquito larvae are present in wetlands.

#### Backswimmers

An aquatic insect 1/2 to 3/4 inches in length. They float upside down below the water surface. Backswimmers use piercing sucking mouthparts to extract body fluids from mosquito larvae that it captures with its forelegs.

#### Dragonflies

Immature stages of dragonflies are aquatic. Adults remain near wetlands during summer months. Immature dragonflies (called naiads) prey on mosquito larvae with a pair of



Backswimmer



Dragonfly Nymph



Dragonfly



Predaceous Beetle Larva



Predaceous Beetle

moveable "jaws." Adult dragonflies capture adult mosquitoes during flight with legs held like a "basket".

#### Beetles

Immature stages of the predaceous diving beetle, water scavenger beetle, and whirligig beetle are aquatic. They swim through the water returning to the surface for air. Beetle larvae use piercing-sucking mouthparts to extract body fluids from mosquito larvae.

### Mosquito Control

When mosquito numbers become high or there is a disease threat, local mosquito abatement districts control the immature mosquito stages in the water.