

Butterfly *Ellipsaria lineolata*

Habitat Preference: Found in large rivers in sand or gravel.

Threats:

- Water pollution
 - Industrial discharge
 - Residential discharge
 - Siltation
 - Herbicide and fertilizer run-off
 - Agricultural runoff is known to be directly related to lower dissolved oxygen content and higher ammonia levels in water. This combination has proven to be detrimental to many fresh water mussels.
- Alterations to the natural flow of rivers due to the creation of impoundment structures
- Increased water temperatures.
- Dredging is particularly detrimental in that it kills current residents while creating an inhospitable environment that will limit recolonization.
- Invasion of non-native species.



Habitat Improvement Guidelines:

- Implement proper upland management such as contour farming and other soil erosion control methods.
 - Create buffers along water bodies to filter nutrients and sediment out of runoff before it reaches waterways.
 - Establish large shade trees such as oaks and cottonwoods along stream corridors.
 - Limit grazing, cows and pigs can destabilize banks and directly crush mussels.
 - Pesticide use should be reduced.
- Install riffles or other fish habitat components.
- Cease channelization
- Limit further construction of impoundment structures and remove existing structures when feasible.
- Create fish passageways over existing dams.
- Limit dredging to previously disturbed areas or to areas of unsuitable habitat.