



Louisiana State University  
Museum of Natural Sciences

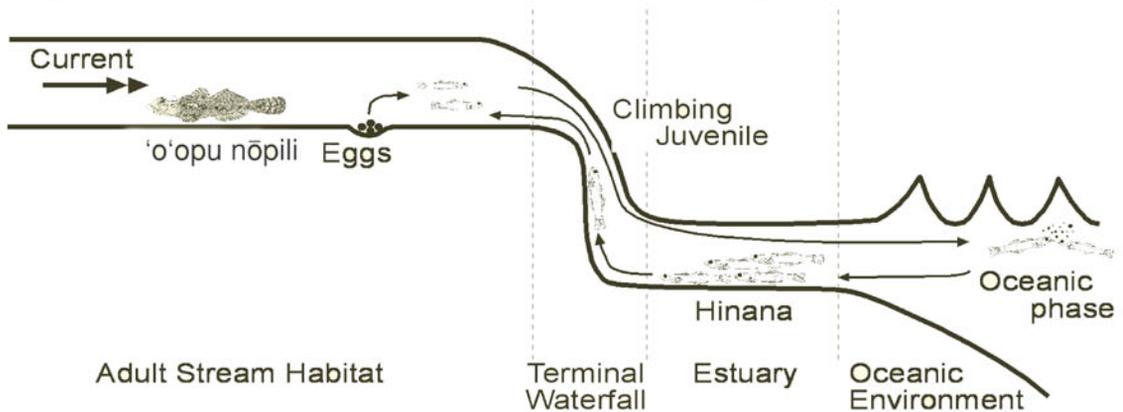


State of Hawai'i  
Department of Land and Natural Resources  
Division of Aquatic Resources



St. Cloud State University  
Department of Biological Sciences

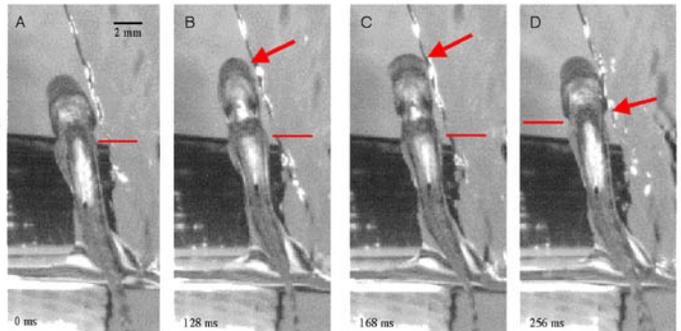
# 'O'opu nōpili and the Anatomy of its Hinana



## Life history of 'o'opu nōpili

All species of Hawaiian 'o'opu begin their life in the streams. Newly hatched larvae are swept out into the ocean, where they continue development. After about six months in the ocean 'o'opu nōpili, now called "hinana" (together with the larvae of the other four freshwater fish species), return to the streams. Before the young 'o'opu nōpili can begin upstream migration, it changes the anatomy of its head and becomes better adapted to the stream environment and the challenges that await on its way to adult habitats. 'O'opu nōpili uses its mouth as an additional sucker to aid its ventral (underside) sucking disk while "inching" up waterfalls as high as 100 ft. While in the estuaries of the stream, this change in head structures occurs rapidly (within 36 hours) and enables the fish to continue its migration upstream.

This change in head structure includes a reorientation of the mouth opening from terminal (forward), to pick plankton out of the ocean, to ventral (underside), to scrape food from rocks in the stream. 'O'opu nōpili is very vulnerable while changing its mouth position (it can not climb or feed) hence the change has to be completed quickly (see illustration below left) to allow the fish to continue the migration upstream in the safer adult feeding grounds. Different 'o'opu are found in different parts of the stream. The distribution is mainly influenced by the climbing ability of each species.



**Climbing 'o'opu nōpili**  
High speed video of the underside of climbing 'o'opu nōpili on an artificial plexiglas waterfall.



## Fish spacing in the stream

Different 'o'opu are found in different sections of the stream. The distribution is mainly influenced by the climbing ability of each species and by their ability to maintain their position against the faster currents upstream.

