Comments for State Wildlife Action Plan 2015 Update

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Comments/ Issues:

I am a Professor of Biology at Pepperdine University. I have evaluated the endemic marine silverside fish *Leuresthes tenuis*, the California grunion, according to the NatureServe Conservation Status Assessment Methodology and Factors for Assessing Extinction Risk. I believe this species should be included as a species of greatest conservation need, both as an endemic species and as one exposed to many stressors and threats because of its unique reproductive behavior and habitats.

California grunion *Leuresthes tenuis* are endemic to the west coast and rely on a declining habitat that is critical to their survival. These marine silversides live in the ocean and spawn on sandy beaches in California and northern Baja California, Mexico. The amazing behavior of these watchable wildlife and their unparalleled accessibility have inspired public programs, cultural celebrations, and works of art including film, music, television, poetry, and sculpture.

California Grunion are found only in coastal California and northern Baja California. Over 95% of the species population resides between Pt. Conception and the Mexican border. Small disjunct populations are occasionally found in bays to the north. In the majority of coastal southern California, the beaches where California grunion spawn are heavily impacted by human development and recreation.

In the marine environment, California grunion are an important part of the food web for numerous predators including seals, sea lions, dolphins, brown pelicans, least terns, great blue herons, skimmers, night herons, elegant terns, halibut, corbina, leopard sharks, great white sharks, shovel-nose guitarfish, Humboldt squid, and other species.

Grunion eggs are preyed upon by many terrestrial and avian predators. Shorebirds including migrating birds such as the ruddy turnstone, horned lark, curlews, godwits, willets, sanderlings, snowy plovers, and urban birds such as pigeons and crows prey on nests, along with ground squirrels and raccoons.

Data to assess this species include:

RARITY: California contains probably 95% or more of the entire global habitat range for this species. This species has very specific requirements (environmental specificity) for breeding areas, including substrate grain, slope, wave energy, width of beach, and tidal reach.

TRENDS: Population data are available for the past dozen years rangewide.

THREATS: Anthropogenic impacts are numerous, extensive, and affect the majority of breeding areas. These include fishing, coastal armoring and construction, oil spills, severe storms, habitat destruction or loss, and other ecosystem modifications.

Changing temperature regimes may shift the spawning season so that the fixed times of the closed season do not protect the largest runs. Recently grunion were seen in Monterey Bay, San Francisco Bay, and Tomales Bay, but in these northern areas, the populations were very small, the spawning season was very short, and spawning started so late the closed season of April and May did not protect these fish from capture during their peak reproductive season. Populations of *L. tenuis* appeared at three northern locations between 2001 and 2005, and all disappeared by 2008, indicating vulnerability to local extirpation.

OTHER FACTORS OF INTEREST: There are no captive populations. This species does not survive well in

captivity, even in the hands of large professional public aquariums.

STRESSORS:

1) Construction and coastal armoring. Upper beach habitat has been reduced historically by construction of houses, port facilities and other structures. This has been more carefully regulated since the Coastal Act, but seawalls to protect existing structures have narrowed areas that were formerly grunion spawning habitat so that they can no longer be used. Seawalls, revetments and related structures cover habitat and alter coastal processes along 27% of the southern California coast.

2) Sand supply. Southern California has experienced a 50% reduction in the supply of sand to its beaches because of the construction of dams and sand mining. Beaches have narrowed and lost habitat.

3) Beach sand manipulation. A) Mechanical beach grooming removes kelp wrack and disturbs habitat on 45% of southern California beaches. If raking and grooming occur in the habitat zone of the grunion eggs, they are destroyed. B) Although beach sand replenishment may increase the width of beaches and habitat area temporarily, typical practices result in large disturbance to fauna. Recovery may take several years. If replenishment is repeated at shorter intervals, full recovery may not be achieved. Grunion eggs that are buried under too much sand, either by direct grading or by increased sand transport by waves as the new sand settles, cannot hatch and will not survive. C) Winter berm deconstruction by bulk movement of sand: pushing down berms may affect grunion eggs hidden under the surface of the sand.

4) Off-road vehicle use including lifeguard trucks, vendors, public safety, and recreational vehicles can trample and crush grunion eggs or kill adult fish. When vehicles drive over nest sites, buried grunion eggs can be killed by crushing or drying out after being turned up at the surface.

5) Pollution from oil spills harms adult, larval, and embryonic grunion. Plastic trash that washes in on a beach can smother nest sites. Harmful algal blooms may cause disorientation and death in grunion.

6) Artificial lights increase vulnerability of grunion to nocturnal predators, including dogs and feral cats. Natural terrestrial predators include raccoons, herons, skunks, and coyotes.

7) Fishing: California Grunion are particularly vulnerable to fishing pressure from the unique recreational fishery that targets their spawning runs on sandy beaches. These fish come fully out of water and can be caught by hand. A closed season does not cover the peak spawning season in some locations.

The last time that the fishing regulations for this species were revised was 1949, when the human population was much smaller, following a war period when human presence on beaches at night was very low. Although gear restrictions and a closed season offer some protection, enforcement of laws on dark deserted beaches rarely occurs.

Recreational fishing is intense on spawning populations during open season. There is no bag limit for this species. Beaches often have more people than fish on shore, and every grunion that approaches the beach is caught, so none are able to reproduce. Because fishing occurs on the species while it is actively spawning, the potential impact to the population is large.

8) Impingement: California grunion are vulnerable to impingement and entrapment by power plant intake structures.

9) Grunion eggs are sensitive to changes in salinity; discharge of brine from desalination plants on the coast could be harmful or fatal to embryonic grunion.

LIFE CYCLE VULNERABILITIES:

Because of their beach spawning habits, California Grunion are vulnerable to habitat loss. Subject to terrestrial and marine influences, this critical habitat is the edge between both. California grunion only spawn on sandy beaches. Buried under the sand, the nests are not visible from the surface.

Grunion eggs are deposited are in a narrow band under sand between the mean high tide line and the highest high tide line. According to the Regional Profile, the South Coast District of California contains approximately 380 linear miles of sandy beach shoreline. The grunion nesting zone is sometimes only a few inches wide, but no more than 4 meters wide, and it shifts as the beach face changes over time. Thus, the total area of critical reproductive habitat available along the entire South Coast, with more than 95% of the population of this endemic species, can be calculated. At best 4 m = 0.0025 mile wide, along 380 linear miles, equals 0.95 square miles of total critical habitat, less than one square mile of beach in all of California for grunion nests.

I would be very happy to work with California Department of Fish & Wildlife to put together more information for a clear assessment of the conservation status of California Grunion so this species will continue to charm Californians into the next century. Thank you for your interest and concern for California's natural treasures.

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