FIVE YEAR STATUS REPORT

I. COMMON NAME: Shasta Salamander
SCIENTIFIC NAME: Hydromantes shastae
CURRENT CLASSIFICATION: Threatened

II. RECOMMENDED ACTION:

Retain Threatened classification.

III. SUMMARY OF REASONS FOR RECOMMENDED ACTION:

The Shasta Salamander (SS) was originally listed as a rare species because of its limited range and disjunct populations (Figure 1). Eight additional populations have been identified since its original listing, and each population appears to be genetically unique. Although the majority of known populations occur on public land (Shasta-Trinity National Forest) and are protected by current management practices, human activity within limestone areas could adversely modify SS habitat. Enlarging Shasta Lake by raising the dam 200 ft would cause the loss of hundreds of acres of SS habitat, and substantially effect at least one known population.

SUPPORTING INFORMATION

IV. NATURE AND DEGREE OF THREAT:

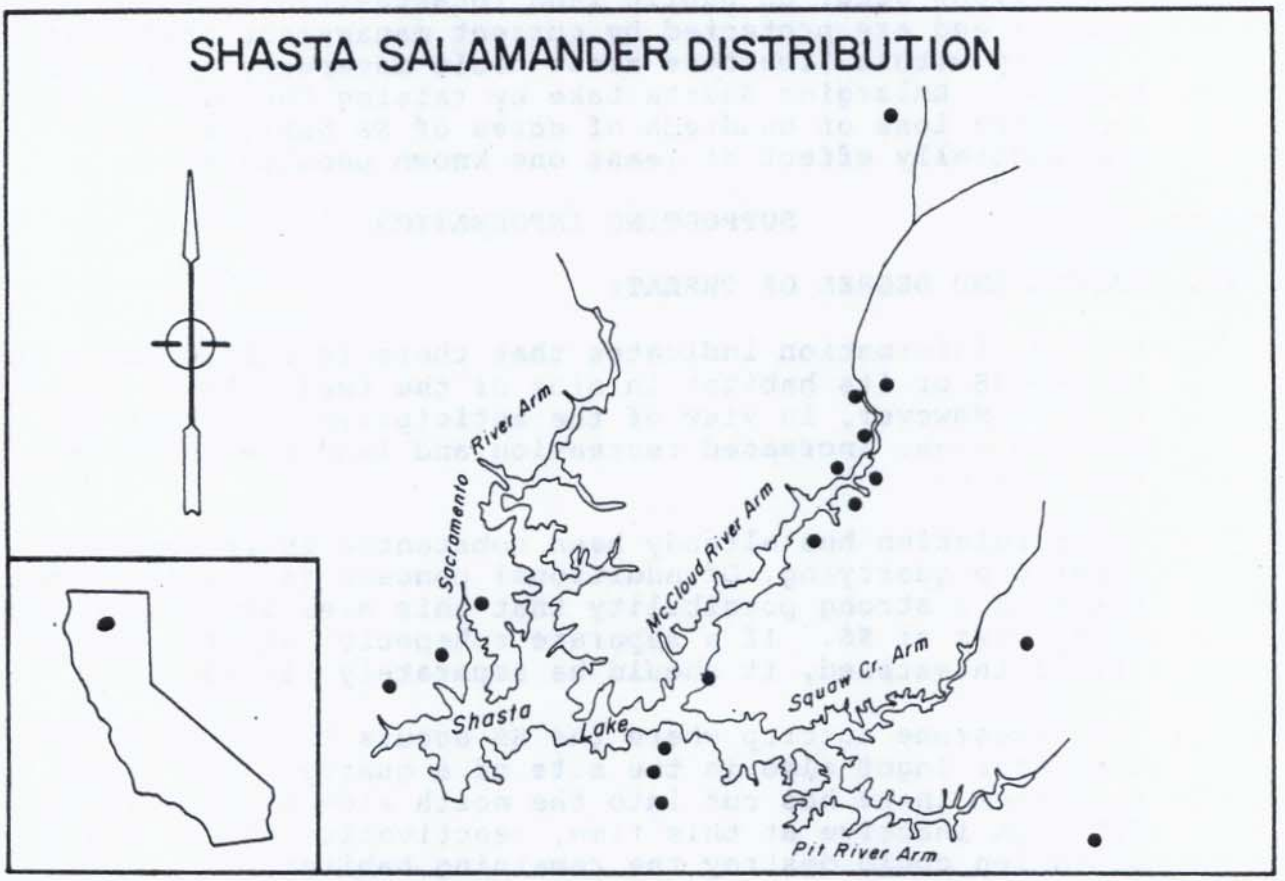
Current information indicates that there is little human impact on the SS or its habitat in nine of the twelve known population areas. However, in view of the anticipated growth of the Redding area, increased recreation and land use could occur in the future.

One population has already been substantially reduced by limestone quarrying. Of additional concern is the fact that there is a strong possibility that this area supports a separate subspecies of SS. If a separate subspecies exists, and is itself threatened, it should be separately listed.

The limestone outcrop where the SS occurs in the Cedar Creek area near Ingot also is the site of a quarry. The quarry operation there has cut into the north side of the deposit. Although inactive at this time, reactivation of the quarry operation could destroy the remaining habitat.

The raising of Shasta Dam by 200 ft would adversely effect this species. The Backbone Ridge habitat would be greatly reduced in size. In addition, there would be habitat loss at Dekkas Ranch and the Hirz Mountain area.

FIGURE 1



At The Crossroads, 1980. Calif. Dep. of Fish and Game.

V. HISTORIC AND CURRENT DISTRIBUTION:

Historic

The historical range of the SS was probably reduced by the filling of Shasta Lake after its completion in 1949. However, prior to 1975 the SS was known to occur at only a few localities in two limestone areas of Shasta County; the east side of Squaw Creek from Low Pass Creek to Brock Mountain, and at locations along the east and southeast sides of the McCloud Arm of Shasta Lake all above lake level.

Current

There are now twelve known populations of SS, all in Shasta County. Nine are within the boundary of the Shasta Lake Ranger District of the Shasta-Trinity National Forest, one is located on Bureau of Land Management land, and two are on private land (Papenfuss and Brouha 1979).

Shasta-Trinity National Forest

Brock Mountain Habitat Area. This area consists of the extensive Hosselkus Limestone Belt (15,600 acres). Rugged, exposed limestone outcrops extend for several miles in a north-south direction from just northeast of the Squaw Creek Fire Control Station past Low Pass Creek to Devil's Rock, then south to Grey Rocks east of Madison Canyon. From Grey Rocks, the exposed limestone extends downstream along Brock Creek to the Pit River Arm of Shasta Lake and on the west side of the Pit River Arm between Brock Creek and Susanville Creek. SS are common throughout the Hosselkus Limestone Belt. The entire area is honeycombed with caves which provide a refuge for these salamanders during the dry season.

Potter Creek/Marble Creek Habitat Area. Approximately 7,000 acres of suitable habitat are included in this area. Habitat consists of the large Potter Creek Cave and limestone outcroppings situated at the extreme southeast side of the McCloud River Arm. In addition, a population of SS was discovered in a small limestone outcrop at the abandoned Shasta Iron Mine located one-half mile south of Potter Creek Cave.

Campbell Creek Habitat Area. Limestone outcrops start on the south slope above Campbell Creek and extend along the ridge facing the McCloud Arm of Shasta Lake to the slope above the north side of Green's Creek. There are about 120 acres of suitable habitat. This locality fills in a previous gap in SS distribution between the Potter Creek and Marble Creek habitat area to the south and the Dekkas Creek habitat area to the north. It is likely that SS occurs in every limestone outcrop along the McCloud Arm of Shasta Lake.

Dekkas Creek Habitat Area. Dekkas Rock, an isolated limestone outcrop located on the north side of Dekkas Creek at its junction with the McCloud Arm of Shasta Lake, is the major limestone outcrop in this area. Up the McCloud Arm from Dekkas Creek, there are no limestone outcrops for more than three miles, until north of Nosoni Creek. It is unlikely, therefore, that the Dekkas Rock population is continuous with the Bollibokka Mountain population. The McCloud Arm now separates the Dekkas Rock population from the Hirz Mountain population. However, during the drought of 1977 when the McCloud Arm was dry this far north, it became evident that the Dekkas Rock limestone is continuous with limestone outcrops on the west side of the McCloud Arm at Dekkas Rock Campground in the High Mountain Habitat Area.

Bollibokka Mountain Habitat Area. The habitat here is extensive (6,400 acres), extending along the McCloud River from one mile above the McCloud Bridge south to Nosoni Creek. The vicinity of Samwell Cave is the only area where salamanders seem to occur under oak logs more commonly than under rocks.

Hirz Mountain Habitat Area. Extensive limestone outcrops occur in this (13,600 acres) area. The limestone occurs on the west side of the McCloud Arm of Shasta Lake from the vicinity of Dekkas Rock Campground north to at least one mile above the McCloud River Bridge. SS have been found at sites along Gilman Road including Dekkas Rock campground, Moore Creek, Jennings Creek, Ellery Creek, Cavieye Creek, and along the dirt road leading to the Bollibokka Club from McCloud Bridge.

Grey Rocks Habitat Area. This area is south of Shasta Lake at the Calaveras Cement Plant quarry located at Grey Rocks, two miles NNE of Mountain Gate. Most of the estimated 1,375 acres of suitable habitat has been destroyed by limestone mining. Only a small part of the limestone outcrop is on National Foerst land. The salamanders occur in small forested strips of exposed limestone about 100 yards wide and 400 yards long which extend from the north rim of the quarry in a northeast direction towards Allie Cove. An additional population occurs in a limestone outcrop one and one-half miles south of the quarry.

Backbone Ridge Habitat Area. This isolated population is located seven miles west of Potter Creek. The habitat is limited to approximately 109 acres of limestone outcrops one and one half miles long and only a few hundred feet wide. The limestone starts at the junction of Upper Limestone Valley Creek and Backbone Creek Inlet of Shasta Lake and extends along the western edge of Backbone Ridge to a point about one mile southeast of Lower Limestone Valley Creek. Since there are no forested areas around the limestone, the salamanders are undoubtedly restricted to the immediate vicinity of the outcrops.

Bureau of Land Management

Mountain Gate Habitat Area. The extent of the suitable habitat here is estimated to be less than two acres and consists of several low (less than 20 ft high) volcanic outcrops surrounded by rock rubble. The SS population here is the only one known that is not restricted to limestone, but the deep cracks in the volcanic outcrop and the piles of rock apparently provide sufficient shelter for the SS during the dry season. In addition, these deep cracks may lead to limestone deposits (Papenfuss and Cross 1980).

Private Property

Ingot Habitat Area. This limestone outcrop is located along Highway 299, 6.6 miles by road northeast of Ingot. The outcrop is divided by both the highway and Cedar Creek into north and south parts. Most of the limestone deposit is in the south part. This limestone deposit is both the largest and the furthest east along Cedar Creek between Ingot and Round Mountain. There has been extensive mining of limestone in the part of the outcrop north of the Highway. There is also evidence of an old quarry at the west end of the south outcrop. SS occur throughout both outcrops and even along the highway road cut in the north outcrop.

Mammoth Butte Habitat Area. Two small populations of SS have been located on the slopes of Mammoth Butte. One population occupies the small limestone outcrops on the northeast side of Little Backbone Creek, at both the abandoned quarry of the Golinsky Mine, and at a small outcrop on the slope below the Golinsky Mine facing the Backbone Inlet of Shasta Lake. A second population exists at a limestone outcrop at the head of Butcher Creek. The total area of limestone habitat on Mammoth Butte is estimated to be less than 25 acres.

Ringtail Cave Habitat Area. This small limestone cave is located on the Nature Conservancy's McCloud River Preserve above a spring which flows into Dutch Creek.

VI. HISTORIC AND CURRENT ABUNDANCE:

Historic and current abundance information is not available for the SS.

It is extremely difficult to estimate the abundance of SS because of their underground niche. Papenfuss communicated to the USFS that an accurate population census is impossible as there is no way to establish a relationship between the number found and the actual number present (USFS 1979).

VII. DESCRIPTION AND BIOLOGY

The SS is a small (3-4 in) dusky brown-colored salamander. The coloration on the dorsal side is gray-green, beige, tan or reddish, and usually yellow on the tail. The ventral surface is dark with white flecks or blotches. The young are gray-green, olive, tan, or reddish on the body and yellowish on the tail (Department of Fish and Game 1980). In adults, the tips of the toes of adpressed limbs commonly overlap 1/2 to 1 1/2 intercostal folds, the light and dark markings are less contrasting and mottlings generally less coarse (Stebbins 1954).

During the winter and spring, the salamanders can be found on the surface at night and under rocks and logs during the day. The SS are nocturnal and wander around on damp nights feeding on insects and small invertebrates. During the hot, dry summer they retreat into limestone caves and cracks where it is cool and damp. The females lay their eggs in mud tunnels on the damp undergroud walls during the late summer. Nine to twelve eggs are laid in a cluster and the female curls around them until they hatch. There is evidence that skin secretions from the female prevent the eggs from getting moldy. If the female is disturbed while tending the eggs, she may leave and the eggs may fail to hatch. According to Gorman (1956), most eggs have outer capsular strands at each end which are intertwined at the center of the cluster. The eggs are ovoid measuring .28 to .31 in by .31 to .35 in and have two jelly envelopes. The gills of the developing embryos are relatively small, rounded, and weakly biloped. Recently hatched young measure about .9 in in total length. Normally, the young salamanders hatch in the late fall in time to come to the surface to feed when the ground is cool and moist from winter rains (Papenfuss and Brouha 1979).

VIII. HABITAT REQUIREMENTS

All populations (except Mountain Gate) occur in rugged and exposed limestone formations. The salamanders are found below the 3,000 ft elevation where the summer climate consists of a completely dry ground surface with daytime temperatures often exceeding 100°F. It would be impossible for SS to survive if it were not for the limestone fissures and caves where the microhabitat remains cool and damp throughout the year. Since salamanders are good climbers, the slope of the outcrop is not important. They are found from flat ground to vertical cliffs. They occur in a variety of vegetation types, from exposed digger pine-chaparral, to sheltered canyons of Douglas fir. They are most common in areas where there is a light oak cover among limestone rocks. This type of preferred habitat is usually found on north and east facing sides of outcrops below 2,000 ft. Although SS come to the surface during the winter when the ground is moist, they do not leave the vicinity of the limestone. They may be found under logs on the forest floor, but have never been found more than 50 ft from the nearest outcrop (Papenfuss and Brouha 1979).

IX. CURRENT AND RECOMMENDED MANAGEMENT:

Thirteen different population of the SS have been documented. Externally, all SS look the same; however, biochemical techniques used to examine differences in the body proteins indicate that most populations differ from one another genetically. The salamanders do not migrate from one locality to another because the populations are now separated by Shasta Lake. Because of possible subspecies differences and restricted movement, it is necessary to protect each locality from habitat destruction and possible subsequent population extinction. Currently, the most threatened of the salamander habitat localities is probably the Ingot habitat area as there is the possibility that the currently inactive quarry may be reactivated.

The majority of the known SS habitat is protected by a comprehensive species management plan implemented by the Shasta-Trinity National Forest in 1979. It states that any activity within limestone areas that would modify or change the vegetative cover or disturb the soil may adversely affect SS. Therefore, rocky outcrops, caves, and ravines with limestone deposits must be protected from disturbance. It further recommends that vegetative ground cover, leaf mold, downed logs, and surface rocks should be left undisturbed within approximately 300 ft of limestone deposits.

Current information indicates that there is little impact on SS habitat and populations occurring from human activities in most of the population areas. However, increased recreation and land use will probably occur in the future. Specific recommendations for the habitat areas on U.S. Forest Service Land are included in their Management Plan.

Seven acres of habitat adjacent to the Calaveras Cement Plant quarry in the Grey Rock Habitat Area have been protected by a conservation easement since 1980. The habitat in private ownership along Mammoth Butte Road at the head of Butcher Creek and the limestone outcrop at Cedar Creek near Ingot, which is the site of the Holly Sugar Quarry, should be purchased and placed in ownership to ensure protection of the SS populations present in these areas.

BLM should designate the Mountain Gate Habitat as an Area of Critical Environmental Concern.

X. INFORMATION SOURCES:

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Stebbins, R.C. 1954. Amphibians and Reptiles of Western North America. McGraw-Hill Book Company, Inc., New York.

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