



Wetland Notes

A Publication of Zentner and Zentner

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GIANT GARTER SNAKE MITIGATION PLAN

Effective November 19, 1993, the giant garter snake (*Thamnophis couchi gigas*, 'GGS') was listed by the US Fish and Wildlife Service (Service) as threatened under the Endangered Species Act (ESA). Under the terms of the ESA, any Federal actions, such as Section 404 (wetland) permits, that result in impacts to the GGS then require consultation with the Service pursuant to Section 7 of the ESA.

The GGS is a large, aquatic garter snake which inhabits slow-moving creeks and similar areas, such as rice field ditches. The Service concluded that it required protection due to habitat loss and continued threats.

The requirements of Section 7 consultations were described in winter 1995 edition of the Wetland Notes (please call if you need a copy) and will not be repeated here. Essentially, applicants for 404 permits from the Corps of Engineers for projects affecting GGS habitat must develop a mitigation plan for review and approval by the Service.

The GGS was listed after Zentner and Zentner had processed a 404 permit for a project on Elk Grove Creek, but before project construction began. Required to complete a Section 7 consultation with the Service, we developed a revised mitigation plan with the following elements:

1. Construction of 5 acres of perennial marsh, the preferred habitat for the GGS.
2. Construction of a 150-foot buffer (average width) to be planted with native grasses and shrubs.
3. Construction of approximately 10-12 refugia, rockfilled depressions for GGS habitat.

Figure 1 shows a plan view and section of a GGS refuge. With these elements, the Service approved the mitigation plan, making this the first successful Section 7 consultation for the GGS in the Sacramento region.

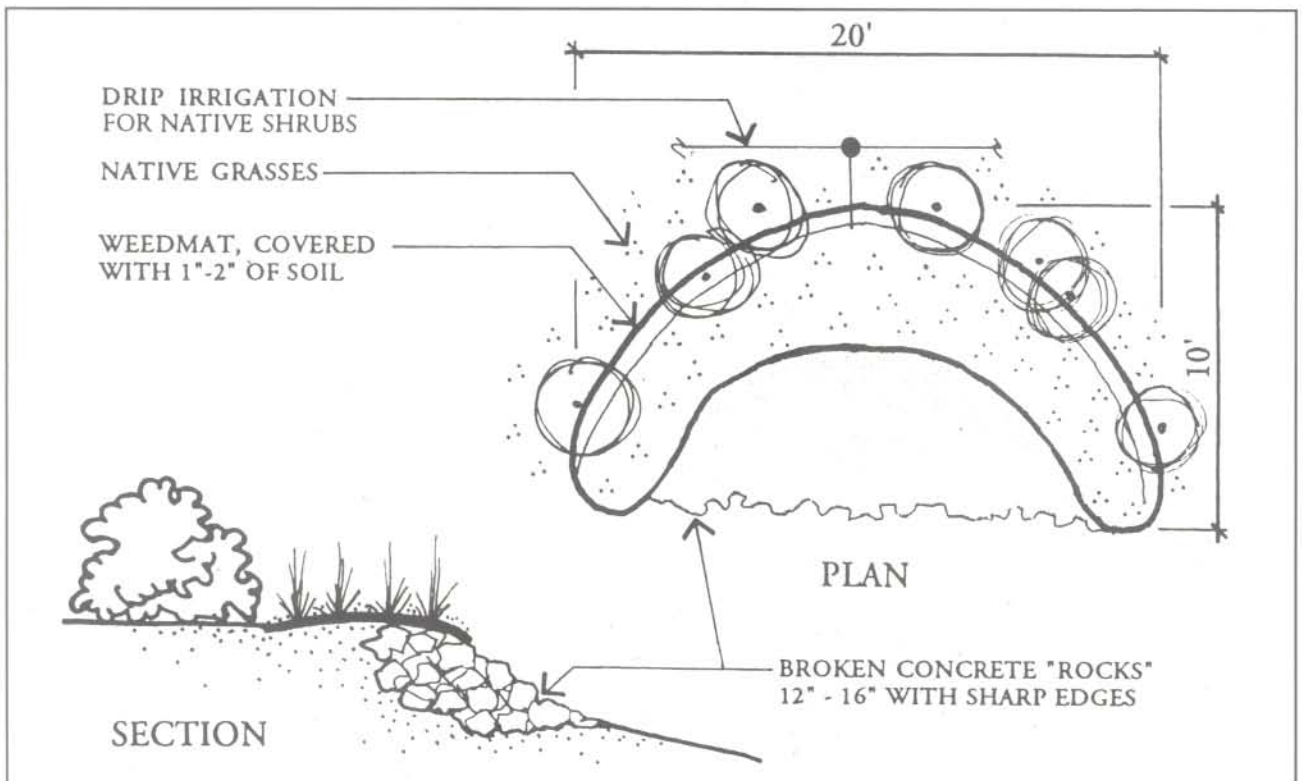


FIGURE 1 -GIANT GARTER SNAKE TERRESTRIAL REFUGE

FLOODING RESULTS ON LAGUNA CREEK

The Laguna Creek project, built by the City of Sacramento in 1988, was one of the first drainage projects in California to contend with new, more stringent wetland regulations of Section 404 of the Federal Clean Water Act. These requirements and innovative planning led to the creation of a restored creek corridor which would also meet flood control requirements. Today, almost 6 years after construction, this project has met almost all environmental performance standards and continues to meet drainage objectives.

Laguna Creek flows for approximately 25 miles through Sacramento County, CA. In 1988, the City completed final plans for converting almost one mile of the creek, then a channelized ditch, into a broad corridor to accept local flooding and allow drainage from and development on almost 700 acres in the southern portion of the City. Corps wetland permits required the City to preserve 33 acres of the wetlands and build almost 138 acres as compensation for the loss of 65 acres of wetlands. In essence, the City had committed to creating a complete native landscape within a flood channel, including vernal pools, freshwater marshes, and oak woodland. Further, the performance of these habitats would be evaluated through specific standards with potentially expensive remedial actions required should the project fail to meet these standards.

Wetlands and flood channels are often incompatible, though. The dense plant growth characteristic of many wetlands greatly increases

channel roughness and flood elevations. Research done by Zentner and Zentner and Bill Gill of Gill Water Resource Engineering found that the most problematic species, primarily willows and cottonwoods, were found only below the mean annual flood line in this region due to soil and seed viability factors. Accordingly, the creek corridor was designed to maximize the relatively open vernal pool and seasonal marsh zone, provide for a substantial amount of open oak woodlands, a lesser amount of perennial marsh and to greatly limit the riparian woodland zone. Figure 1 provides a cross-sectional view of the proposed creek corridor.

The wetlands were monitored for 5 years after construction, including assessments of water depths, plant cover and species richness in the vernal pools, health and height of the planted trees and shrubs, bird use and other elements. At the fifth year performance review, 45 of the 62 built vernal pools (73%) met all performance standards. The unsuccessful pools were almost all in one portion of the project site that did not have suitable soils for vernal pools, illustrating the need for good soils data prior to construction. The constructed freshwater marsh and riparian woodlands satisfied completely all performance standards. The extent and value of these habitats was significant; in addition to supporting more than 100 species of birds (compared to 8 prior to construction), they created habitat for a wide variety of wildlife, including the Federally-listed giant garter snake (*Thamnophis couchi gigas*).

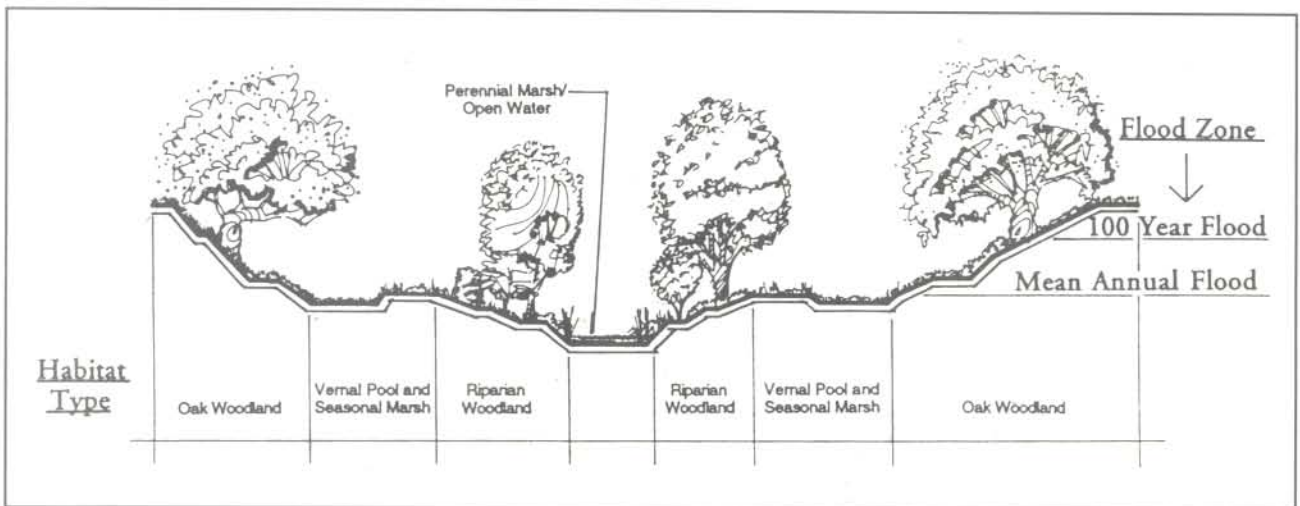


FIGURE 1 - LAGUNA CREEK FLOOD CHANNEL DESIGN

LAGUNA CREEK, cont.

Perhaps more importantly, pre-construction predictions with regard to flood heights and roughness values have been verified. Figure 2 shows normal conditions along Laguna Creek. Figure 3 is a photograph of the channel 6 years after construction during the recent floods. Compare this with the channel design, shown in Figure 1. The riparian woodland has been successfully confined to a relatively narrow band near the center of the creek, not through yearly maintenance but through appropriate design. This portion of Laguna Creek was one of the few streams in this region that did not experience out-of-bank flooding.

Prior to construction, the project site was characterized by degraded marshes and vernal pools; Laguna Creek was a channelized ditch which promoted flooding. The City has successfully created wetland and riparian woodland habitats that did not exist on-site prior to construction and a large area of vernal pools. Wetland functions and values such as flood reduction, habitat diversity, fisheries habitat, nutrient production and export, wildlife habitat, shoreline protection, and erosion control have all been significantly increased by the project while still providing flood protection for adjacent homes and businesses.

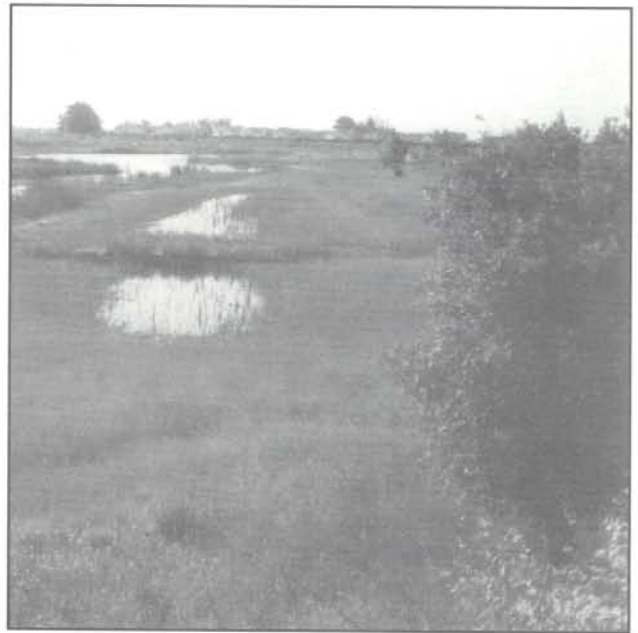


FIG. 2 - LAGUNA CREEK NORMAL CONDITIONS

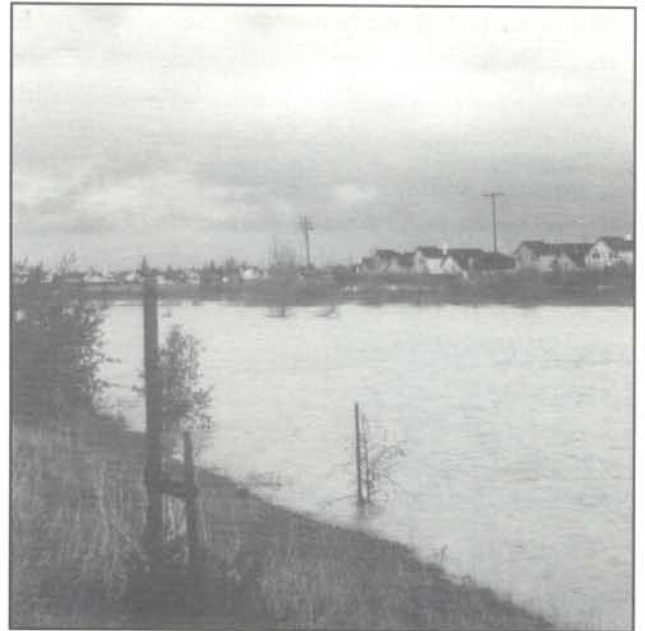


FIG. 3 - LAGUNA CREEK DURING FLOODING

SEA RANCH GOLF LINKS STARTS CONSTRUCTION

Construction has started on the nine hole expansion of the golf course at Sea Ranch, CA. The first nine holes were constructed in 1974. Both sections of the golf course were designed by Robert Muir Graves (RMG). The new nine holes have been designed to avoid all of the wetlands on the site. Zentner and Zentner, working closely with RMG, designed and is implementing a native grassland restoration plan for the site. Large expanses of turf will be minimized, and the greens, tees and fairways will be surrounded by native species such as Pacific Reed Grass, Hair Grass and California Fescue. The entire golf course will be irrigated with treated wastewater. The project should be completed and open to the public in Summer 1996.