



March 18, 2016

To: State Water Resources Control Board
From: Randall Mutters, University of California Cooperative Extension

RE: 2016 Sacramento River temperature management planning in relation to rice production

The successful planting, cultivation, and harvest of a productive rice crop is a well-orchestrated sequence of events. Preparation for planting begins in March, well before any soil is tilled. Currently at the farm level, seeds and other inputs like fertilizers are being ordered. Land leases are negotiated, equipment rentals are arranged, and seasonal employees are being hired. There are financial commitments, sometimes irreversible, currently being undertaken. In preparation for the season, allied industries have ordered and received large quantities of supplies that will be needed for the upcoming season. This supply line and its on-farm deliver infrastructure operates at a capacity to accommodate a normal planting season length of about six weeks beginning in mid-April. Components of the supply line could not accommodate a planting season compressed into a couple weeks in June include. For example, fertilizer delivery, seed soaking and delivery, airplane applications, and water delivery – just to mention a few.

In preparation for seeding, rice fields are cultivated 3 to 4 times, land planed, fertilizer applied, and ‘rolled’ to create the final seed bed. The field is then flooded with water to a depth of about 4 inches in preparation for aerial seeding. Returning to one of the supply line components, before planting seeds are soaked in large tanks (65 cubic feet) for 24 hours then drained. The pre-germinated seeds are then transported to the field in large trucks. The seeds must be planted within a day, otherwise the temperature due to seed respiration will rise to a seed lethal level. Planting is very time critical. Even if the seeds could be prepared in time, it is unlikely that there would be enough airplanes and pilots to plant the large number of impacted acres in the highly compressed planting season.

Another consideration is the delivery of water. Rice is overwhelming irrigated with surface water supplied by irrigation districts. At the beginning of the season this complex network of canals must be filled (‘charged’) to establish adequate hydraulic pressure to ensure uniform distribution. Large districts, such as GCID, require about 2 weeks to charge. Once the water is delivered to a rice field, it takes about 5 days to flood the field for seeding. Consider the first field on the water supply line and a water diversion date of June 1. The earliest that that field could be planted is June 19. The remainder of the fields would come later. According to the UC studies rice planted at that late date will suffer substantial yield reductions. <https://watershed.ucdavis.edu/library/agricultural-and-economic-impacts-yolo-bypass-fish-habitat-proposals>.

The yield reductions are primarily a result of delayed maturity in the fall. The most widely planted varieties of rice in California require 145 days mature. The time to maturity is temperature driven. Late planted rice would be maturing under cooler autumn temperatures. Consequently a time interval greater than 145 days to harvest is expected, if in fact there is adequate thermal units for the crop to reach maturity at all. Late immature rice would require harvesting at a high grain moisture content, which leads to higher drying costs and poor milling quality.

As proposed, delaying water delivery until June 1 would undoubtedly result in fewer acres of rice with substantial yield reductions in areas that are planted late.