# Seasonal Wet meadow

**The delta historical ecology report description of seasonal wet meadows**

“Temporarily or seasonally flooded, with herbaceous communities characterized by poorly drained clay rich soils at the upland edge of perennial wetlands. Seasonal wet meadows are distinguished from freshwater emergent wetlands in part by a lack of dominance of tall emergent monocots such as tules and cattails. They usually lie adjacent to freshwater emergent wetlands within the upland ecotone. One common soil type used to determine likely areas of wet meadow or seasonal wetland is adobe clay, described as sticky when wet. Wet meadows are complex, integrading with grassland, ponds, and patches of tule. The ecotone, or zone of transition, between the tule (freshwater emergent wetland edge) and seasonal wetlands was likely complex depending on local topography and soil moisture regimes.”

**Capturing character and heterogeneity**

Seasonal wet meadows were common historically in the north west and east of the delta, and there was a small area where they mixed with alkali wet meadow in the south delta. This habitat type has been virtually entirely destroyed, and is therefore one of the most difficult to re-create since we do not have good modern locations that we can use as reference sites. Therefore, we have brought together some google earth imagery from four sites in other parts of the state that we feel incorporate elements of how the habitat might have looked, but no one location includes everything, and no location is entirely representative either of species composition or of structural complexity. We are also including some photos from on the ground for these same locations so you can link them to each other, and get a sense of what they look like both close up and from the air.

There are several variables to include that capture the heterogeneity of what wet meadows probably looked like.

1. **Perennial to seasonal wetland gradient:** As you move from the perennial emergent wetland in the core of Delta, there was probably a region of gradual transition from more wetland vegetation to more upland vegetation. The tules did not stop abruptly, and as you move into the seasonal wetland area away from perennial wetland, tules can be represented as gradually thinning, and then finally disappearing.

*From the Delta Historical Ecology Report* - “The boundary between perennial and seasonal wetlands was not a smooth line: patches of tule were found within seasonal wetlands and vice versa. An example of this comes from detailed descriptions in Sutter land case testimony concerning the native vegetation patterns where Sacramento now stands. Scattered patches of tule were found just below the city (Colby 1860). Tule also continued as a narrow strip “as high as Q street” (Keeseberg 1860) and “tongues of tule coming up in some cases as far as K street” (McClatchey 1860).”

“Also indicative of the complexity of the edge is testimony concerning “short tule mixed with grass was about a foot high, and rather more grass than tule” at this transition (Keseberg 1860), which is also mentioned by other witnesses (Rhoads 1860). Drier expanses more characteristic of grasslands were covered in annual forbs (Sanford 1860) and perennial  
needlegrass (Kyburg 1860).”

1. **Wetland/upland gradient:** Within seasonal wetlands, there was probably also a gradient from more to less wet as you move away from the core of the delta or away from channel edges. This transition would be associated with changes from more wetland plants (e.g. various species of Juncus) to more upland/grassland species (e.g. *Festuca microstachys*, *Plantago erecta*).
2. **West Delta - Channel edges gradient:** Similar to the wetland/upland gradient, there was probably also a gradient from vegetation associated with wet areas to upland/drier vegetation as you move away from channel edges. This is especially true in the western portion of the north delta (north of Jepson prairie) where the DHE report documents that there was a complex of parallel blind channels feeding out into wet meadows. One note here is that the transition from channel edges to drier upland vegetation should not be abrupt, as it is in riparian areas. This transition would have been gradual, and we are including an example google earth image from a montane wet meadow to highlight how this transition might have looked.

*From the Delta Historical Ecology report* - “On the west side of the Delta along the Yolo Basin edge, vernal pool complexes were common within other seasonal wetlands and grasslands – what early travelers referred to as a treeless plain. Extensive oak woodlands not evident in this area.”

“Seasonal wetland complexes were quite variable in character at the local scale, following small scale changes in hydrology, topography and soils. The land was temporarily or seasonally flooded by the intermittent streams that lost definition before reaching the wetlands.”

“On the western side of the delta, the Yolo Basin edge was ‘so largely made up of branching and interlacing channel ridges that they form a distinct type of alluvial slope which may be called a channel-ridged plain”. Dense, generally parallel network of intermittent streams mapped along the western edge. This pattern can be seen most clearly in the google earth marker for Grass Lake. Though this area is a montane meadow, we think this is the closest we will get to how this channeling within seasonal wet meadow might have looked.”

1. **South Delta - alkali soils:** Alkali soils were most strongly present in the South Delta. There is a small strip of seasonal wet meadow in the south delta that intermixes with grassland and alkali wet meadow. In this area, seasonal wetlands should include *Distichlis spicata* at relatively high densities, and should exclude *Plantago erecta, Juncus mexicanus,* and *Festuca microstachys* which are not salt tolerant species.

**Google earth image locations**

Because the wet meadows have been largely eliminated from the Delta, it is difficult to find modern analogs for this habitat type that provide a good current example. Using input from wetland experts at SFEI, we are providing google earth locations for four representative wetlands that capture some of the variation we think would have been present historically. For each location, we are also including photographs taken from the ground that highlight some of the same features you can see from google earth. The locations include:

1. **Arroyo de la cruz** – In this location, still images from the ground show the bunchiness of *Juncus effuses* and *Juncus articus* that is probably occurred along transition zones between wetter and drier areas along the wetland/upland gradient. This patchiness can also be seen in Google earth, where dark green bands show *Juncus*, intermixed with lighter green and red/brown vegetation that are more characteristic of upland vegetation (though the specific species in this case were probably not present in the historic delta).
2. **Mackerricher** – In this location, mixtures of *Juncus* and other vegetation are probably representative of the heterogeneity that would have existed in the north delta along the wet/upland gradient, where *Juncus* dominates the wetter areas of wet meadows (along channels, and in the areas closer to the core of the Delta where perennial freshwater emergent wetland is present), and in drier areas, more species typical of grassland/upland areas are present.
3. **San Simeon** – In this location, high cover of *Distichlis spicata* is probably representative of wet meadows in the south Delta where alkali soils predominate. In Google earth, the green areas show *Distichlis*, and the red/brownish areas are a mix of other vegetation characteristic of alkali meadows. This heterogeneity shows a good example of how seasonal wet meadows probably mixed with alkali meadows in the south delta.
4. **Grass lake - montane wet meadow with channel** – This montane meadow has a channel running through it that shows how it might have looked in the west delta, where many blind channels would have made their way through seasonal wet meadows, finally dead-ending in meadows and upland areas. This meadow shows how the transition from wetter vegetation along channel edges to upland vegetation would have been gradual, occurring probably within 50 to 100 meters away from channel edges, depending on local conditions.