# THE NATURAL HISTORY OF CHICKEN RANCH BEACH

## In the Beginning

Third Valley Creek drains a watershed of about 360 acres. An 1862 topographic map shows a long, narrow spit running parallel to the shoreline and stretching southwards towards Inverness. Behind the spit was a small shallow lagoon, into which Third Valley Creek flowed. The lagoon was connected to the bay by a channel running behind the spit.

The spit and lagoon formed as a result of rising sea levels. As sea level rose the shoreline moved landward, flooding Third Valley and creating a small bay. This formation is typical of tributaries along the shoreline of Tomales Bay. Winds blowing down the length of Tomales Bay generate waves that move sand along the beaches of the bay. When this sand reaches a discontinuity in the shoreline, such as the embayment at Third Valley, a spit is apt to form.

The Chicken Ranch Beach spit tends to elongate as sediment is eroded from its northern end and transferred to its southern end. This creates a long narrow neck that curves in towards the shoreline due to wind-generated waves approaching from the southeast and the refraction of waves along the length of the spit. This feature is known as a recurve. As more sediment becomes available, an existing recurve may be abandoned and a new recurve develop further to the south.

The lagoon was formed by the spit separating the flooded part of Third Valley from Tomales Bay. Third Valley Creek flowed into the lagoon rather than directly into the bay. As the creek entered the lagoon the slope of the bed flattened and the velocity of the flow decreased. As a result, the creek deposited sediment in the lagoon, rather than in Tomales Bay. The lagoon, therefore, acted as a buffer between the creek and the Bay, reducing flood velocities and trapping sediment. The lagoon was connected to the Bay by a tidal channel behind the spit. The tidal prism of the lagoon (the volume of water flowing in and out of the lagoon on each tide) would have kept the channel open during dry periods. Deposition of sediment along the channel resulted in the establishment of wetlands behind the spit and between the abandoned recurves.

## Change to the Natural System

In the last 150 years there have been major changes to the watershed. Activities such as logging and road construction have increased both the erosion of soils and runoff of water into the creek. The sediment supply and magnitude of floods have therefore increased. The creek channel has been separated from the floodplain, making it a more efficient conveyer of water and sediment, which are now carried straight to the creek mouth. The slope of the creek has also increased as sediment has been deposited on the creek bed. These changes, and construction of Sir Francis Drake Boulevard, caused the lagoon to fill, so that the creek now flows directly into the bay. The buffering effect of the lagoon,

capturing sediment and dissipating flood flows, has been lost. The filling of the lagoon has also reduced the tidal flow of the channel behind the spit making it less stable. In summary, today more sediment is available to be transported by the channel, floods are of greater magnitude, and the channel has become a more efficient conveyor of both water and sediment.

### The Present System

The present system functions fundamentally differently from the natural system. Without the buffering provided by the lagoon, the creek now accommodates large water and sediment discharges by changing its alignment. During floods, the creek may abandon the channel behind the spit and cut a channel further north across the beach over the low and narrow neck of the spit. The new channel is straighter and takes a more direct and hydraulically efficient route to the bay. Large volumes of water and sediment are discharged into the bay during these flood events. As the channel reaches the bay, the flow velocity decreases and the coarser sediment is deposited as a delta; the finer sediment is carried farther into the bay and is distributed by tidal currents. Such a realignment and major deposition of sediment occurred during the 1982 floods, when Third Valley Creek, cut a new northern channel, and has,occurred several times since then.,During low flow periods, the creek,may switch back to the old alignment behind the spit.

This change in the functioning of the system has important implications for the long-term management of Chicken Ranch Beach.

Wetlands: The channel flowing through the existing wetlands, behind the spit, is only occupied intermittently. If the channel remains in its northern alignment there may be opportunities to extend these wetlands, increasing their tidal flow and enhancing their drainage.

Drainage: The Third Valley Creek bed elevation is too high to drain the adjacent properties. Drainage is therefore routed in a separate channel to the bay. This smaller channel is liable to closing with consequent impacts on water quality.

Recreation: The beach has become more stable due to the presence of the delta. However, the beach is now bisected by the creek channel and ‘B’ channel.

This is an abridgment of the part of the report dealing with how Chicken Ranch Beach evolved and functions today. For more information, see the complete Chicken Ranch Beach Restoration Plan Scoping Document.