

# California Rapid Assessment Method for Wetlands (CRAM)



## Episodic Stream Photo Dictionary



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Central Coast Wetlands Group  
at Moss Landing Marine Labs



## ABUNDANT WRACK or ORGANIC DEBRIS IN CHANNEL OR ALONG SHORELINE

Definition: Wrack is an accumulation of natural floating debris along the high water line of a wetland. Organic debris includes loose fallen leaves and twigs not yet transported by stream processes. This patch type does not include standing dead vegetation. The organic debris must be free of its original growth position. Senesced plant material that is still attached to the parent plant does not count (for example, last year's annual grass thatch)



## ANIMAL MOUNDS AND BURROWS

Definition: Burrows are holes excavated in banks and surfaces, and can be common in undisturbed surfaces, especially in soft substrate. Many vertebrates make mounds or holes as a consequence of their foraging, denning, predation, or other behaviors. Animal mounds can include those made by insects (ants, termites, etc.) The resulting soil disturbance (bioturbation) helps to redistribute soil nutrients and influences plant species composition and abundance. To be considered a patch type there should be evidence that a population of burrowing animals has occupied the Assessment Area. A single burrow or mound does not constitute a patch.



## BANK SLUMPS OR UNDERCUT BANKS

Definition: A bank slump is a portion of a bank that has broken free from the rest of the bank but has not eroded away. Undercuts are areas along the bank that have been excavated by flowing water. These areas can provide habitat for invertebrates and vertebrates. For the bank slump to be counted as a patch type the slump (i.e. fallen material) must still be present onsite.



## BIOTIC/ALGAL SOIL CRUSTS

Definition: Biotic soil crusts are soft, puffy, dark-colored growths (resembles popcorn) of algae, fungi, lichens or mosses which live within or in the top of the uppermost millimeters of soil. Biological soil crusts perform important ecological roles including carbon fixation, nitrogen fixation, soil stabilization, alter soil albedo and water relations, and affect germination and nutrient levels in vascular plants. Biotic crusts occur predominantly on fluvially-undisturbed surfaces, such as dunes, alluvial slopes, and other areas that do not pond water. Algal crusts are similar but occur predominantly in areas prone to water ponding.



## COBBLES AND BOULDERS

Definition: Cobbles and boulders are rocks of different size categories. The intermediate axis of cobble ranges from about 6 cm to about 25 cm. A boulder is any rock having an intermediate axis greater than 25 cm. Exposed cobbles and boulders provide roosting habitat for birds and shelter for amphibians. They contribute to patterns of shade and light and air movement near the ground surface that affect local soil moisture gradients, deposition of seeds and debris, and overall substrate complexity.



## DEBRIS JAMS

Definition: A debris jam is an accumulation of driftwood and other flotsam across a channel that partially or completely obstructs surface water flow and sediment transport, causing a change in the course of flow.



## LARGE (OR COARSE) WOODY DEBRIS

Definition: A single piece of woody material, greater than 30 cm in diameter and greater than 3 m long.



## PANNES OR POOLS ON FLOODPLAIN

Definition: A panne is a shallow topographic basin lacking vegetation. Pannes fill with water at least seasonally due to overland flow. They commonly serve as foraging sites for waterbirds and as breeding sites for amphibians.



## PLANT HUMMOCKS/SEDIMENT MOUNDS/DUNES

Definition: Hummocks are mounds along the banks and floodplains of fluvial systems created by the collection of sediment and biotic material around plants. Sediment mounds are depositional features that lack plant cover and are formed from repeated flood flows depositing sediment on the floodplain. Dunes are formed by the accumulation of wind-blown sand around and beneath vegetation. Hummocks, sediment mounds, and dunes are typically less than 1m high.



## POINT BARS AND IN-CHANNEL BARS

Definition: Bars are sedimentary features within fluvial channels. They are patches of transient bedload sediment that can form along the inside of meander bends (point bars) or in the middle of straight channel reaches (in-channel bars). They sometimes support vegetation. They are convex in profile and their surface material varies in size from finer on top to larger along their lower margins. They can consist of any mixture of silt, sand, gravel, cobble, and boulders.



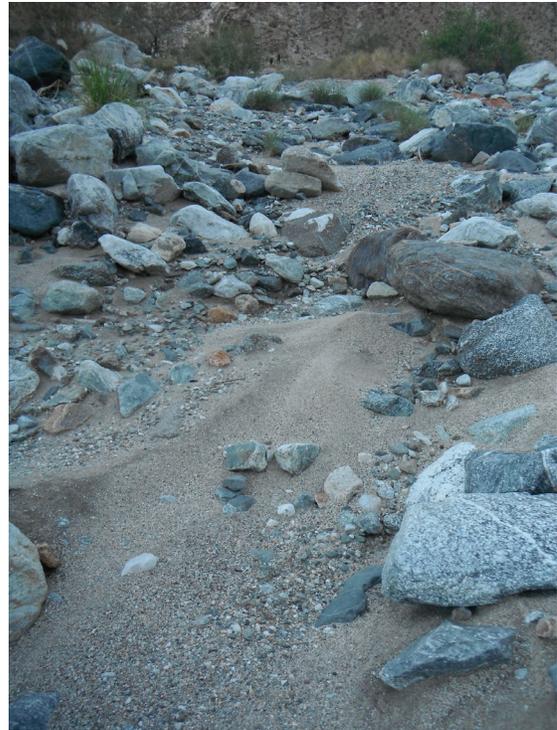
## POOLS OR DEPRESSIONS IN CHANNEL

Definition: Pools are areas along fluvial channels that are much deeper than the average depths of their channels and that tend to retain water longer than other areas of the channel during periods of low or no surface flow.



## RIFFLES OR RAPIDS

Definition: Riffles and rapids are areas of relatively rapid flow, standing waves and surface turbulence in fluvial channels. A steeper reach with coarse material (gravel or cobble) in a dry channel indicates presence. Riffles and rapids add oxygen to flowing water and provide habitat for fish and aquatic invertebrates.



## RIPPLES

Definition: Relatively small bed forms formed by lower-intensity fluid movement that are exposed on bed surfaces of modern sediments and bedding plane surfaces of sedimentary rocks due to the interaction a moving fluid (air or water) with a mobile substrate comprised of mostly sand-size particles smaller than 0.7 mm (Schindler and Robert 2004). May be localized within or extend laterally across the bottom of low-flow channel feature(s) of a stream channel. Ripples are an important geomorphic indicator of fluvial and eolian processes. They can provide habitat for terrestrial invertebrates and vertebrates.



## SECONDARY CHANNELS ON FLOODPLAIN

Definition: Channels confine riverine flow. A channel consists of a bed and its opposing banks, plus its floodplain. Rivers and streams can have a primary (low flow) channel that contains flowing water the most frequently, and one or more secondary channels of varying sizes that convey flood flows. Secondary channels (also known as overflow or high flow channels) are topographically higher channels that carry water only during higher flows. The systems of diverging and converging channels that characterize braided and anastomosing fluvial systems usually consist of one or more main channels plus secondary channels. Tributary channels that are part of the same drainage network and only convey flow between the floodplain and the primary channel are also regarded as secondary channels. For example, short tributaries that are entirely contained within the CRAM Assessment Area (AA) are regarded as secondary channels.



## SOIL/MUD CRACKS or MUD CURLS

Definition: Repeated wetting and drying of fine grain soil can cause the soil to crack and curl. Shrinkage or dessication cracks form deep fissures that increase the mobility of heavy metals, promote oxidation and subsidence. Mud curls are dessicated upward curled sheets of fine silt and sand formed from suspended sediment (mainly clay) is deposited on bottom by infiltration and evaporation of water. Both can provide habitat for amphibians and macroinvertebrates. Cracks must be a minimum of 1 inch deep to qualify as a patch type for CRAM.



## STANDING SNAGS

Definition: Tall, woody vegetation, such as trees and shrubs, can take many years to fall to the ground after dying. These standing “snags” provide habitat for many species of birds and small mammals. Any standing, dead woody vegetation within the AA that is at least 3 m tall is considered a snag.



## SWALES ON FLOODPLAIN

Definition: Swales are broad, elongated, vegetated, shallow depressions that can sometimes help to convey flood flows to and from vegetated marsh plains or floodplains. But, they lack obvious banks, regularly spaced deeps and shallows, or other characteristics of channels. Swales can entrap water after flood flows recede. They can act as localized recharge zones and they can sometimes receive emergent groundwater. Swales are broad, elongated, sometimes vegetated, shallow depressions that can sometimes help to convey flood flows to and from floodplains to channels. However, they lack obvious banks, regularly spaced deeps and shallows, or other characteristics of channels. Swales can entrap water after flood flows recede. They can act as localized recharge zones and they can sometimes receive emergent groundwater.

## VARIAGATED, CONVOLUTED, OR CRENULATED FORESHORE

Definition: As viewed from above, a stream channel can be mostly straight, broadly curving (i.e., arcuate), or variegated (e.g., meandering). In plan view, a variegated shoreline resembles a meandering pathway. Variegated shorelines provide greater contact between water and land. This can be viewed on a scale smaller than the whole AA (2-3 m). Large boulders, exposed tree roots, and fallen vegetation along the shoreline can contribute to variegation.



## VEGETATED ISLANDS (Exposed at high water stage)

Definition: An island is an elevated body of land that is periodically surrounded by and isolated from the upland landscape by water. The unique habitat they provide are defined and generally formed by the water that surrounds shapes, and interacts with them. Islands differ from hummocks and other mounds by being large enough to support trees or large shrubs.

