

Seeing Redds:

Aerial Photo Redd Surveys as a Snapshot of Restoration Results in the Lower American River

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You Can't Make a Redd Without Adding a Few Rocks

Folsom and Nimbus dams block Chinook salmon from accessing their historic spawning grounds in the Sierra Nevada foothills while also blocking sediment (e.g. gravel used by salmon to build redds) from moving past the dams. As a result, spawning habitat is limited in the remaining accessible waters of the urbanized lower American River. Restoration projects led by the Sacramento Water Forum and the Bureau of Reclamation have sought to increase the quantity and quality of spawning habitat through augmentation of suitably-sized gravels at the appropriate water depths and velocities during flows typical of the spawning season. Design and construction of restoration projects are informed by the monitoring

We use both aerial and on-the-ground surveys to monitor salmonids in the lower American River. While redd surveys conducted by technicians in the river can provide more detailed information on redd characteristics such as depth, aerial surveys give us a picture of spawning activity in areas of the river where velocity or depth would otherwise make surveying on foot impossible. The two techniques complement each other and enable us to make informed adaptive management decisions. Our most recent restoration project at Upper Sailor Bar is a great example: this area just below Nimbus basin was restored over ten years ago and the gravel placed there had naturally been mobilized by high flows; aerial survey data showed a clear decrease in spawning activity at the site. Spawning activity increased from nearly no spawning activity the previous fall to over sixteen-hundred redds counted. In addition to aerial photographs, we documented the locations, areas, velocities, and depths of redds at the site with on-the-ground surveys. This data was used by my modelers and biologists to inform dam operators in making decisions about how best to manage flows in order to minimize redd dewatering while preserving as sizable of a cold water pool as possible in a dry year.

Sharing a Salmon Success Story

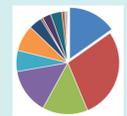
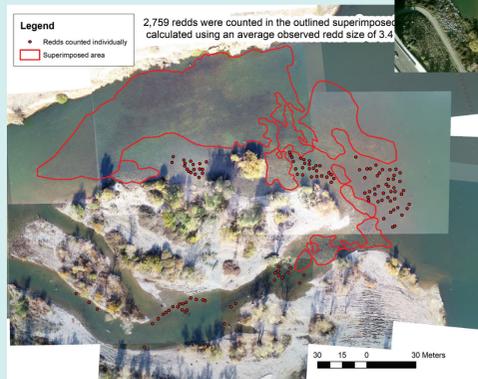
The aerial photographs of the Lower American River which we use to monitor spawning are both informative and beautiful. When accompanied by a straightforward explanation of how redds are identified, these photos make a great tool for educating the public about the value of restoration for salmon that depend on the urban lower American River to complete their life cycle.

Redd counts conducted using aerial photographs are a cost effective and reliable way to monitor Chinook salmon spawning in the lower American. Aerial photographs are informative and beautiful, and when accompanied by a straightforward explanation of how redds are identified, these photos make a great tool for educating the public about the value of restoration for the adromous native fish that depend on the urban lower American River to complete their life cycle. We shared aerial photography of spawning activity at our restoration site on Water Forum social media, as well as on local TV, newspapers and in trade publications, and received an overwhelming positive response.

Restore, Monitor, Repeat

Over the last few years we have worked at developing and permitting a long-term approach to salmonid restoration in the lower American River, yet there's still much work to be done. Spawning and rearing habitat for salmon and steelhead remains limited. Our agencies continue to push towards meeting the fish-doubling goal set up by the Central Valley Project Improvement Act, and to meet the region's commitments to do more restoration for native fish. Meeting our goal means planning to do in-river construction every fall, followed by monitoring that can inform adaptive management of the river system as a whole.

The Water Forum and the Bureau of Reclamation are planning another salmonid habitat restoration project at Ancil Hoffman Park in Fall 2020. A design team made up of fisheries biologists, hydraulic engineers and ecosystem managers facilitated by the Water Forum is working to design a project which improves rearing and spawning habitat, while balancing recreation concerns. Rather than carving out a side channel which creates an island which Park Rangers can not access, the 2020 design for Ancil Hoffman will likely create alcoves and lower elevations in the gravel bar to restore a flood plain area which becomes inundated at high flows. Not only will this project at Ancil Hoffman provide badly needed rearing habitat for salmonids, but it will give the kids who visit nearby Effie Yeaw Nature Center a change to learn about restoration.



Aerial surveys of Nimbus Basin reveal that redds at the site are often superimposed, i.e. salmon construct their redds on top of another previous constructed redd, a process which results in greater egg mortality. In 2019, spawning appeared less superimposed at the site, likely due to better weir operation. A fish ladder from the basin to the hatchery is planned for construction in 2020, which should alleviate this issue further.

