Taking the "Dred" Out of Dredging



Working while daily park activities continue uninterrupted.

redging is always such a "dreaded" word. The word dredging typically induces images of heavy machinery crushing the surrounding landscape, roadways that are rutted and muddy, and the odor of organic material that can't be forgotten soon enough. But dredging doesn't always require draining the pond or lake

and destroying aquatic environments. There are basically two types of dredging when it comes to removing silt, sediment and other organic and inorganic accumula-

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tion from ponds, lakes, streams and other waterways; mechanical and hydraulic.

Hydraulic Dredging Explained

Just as the name implies, hydraulic dredging is the use of water to transport the accumulated material through a temporary pipeline, using a pumping system to basically "vacuum up the muck". Sometimes hydraulic dredging is also referred to as "suction dredging". The mixture of organic and inorganic materials along with water is referred to as "slurry" and is pumped through the pipeline to a strategically located area for dewatering. Hydraulic dredges come in all shapes and sizes from large ocean going dredge ships all the way down tractors must always determine what will happen to the material at the discharge site and how far the material must be pumped. Often circumstances such as inadequate space, permitting or aesthetics will dictate the dewatering method. Geo textile tubes (geo tubes) are often the preferred method for dewatering in residential communities, golf courses and city parks. The slurry mixture is pumped into a strategically placed geo tube where it contains the organic and inorganic dredged materials while releasing the water. The decant water is then returned to the lake either by gravity flow or a pumping system. Once the dewatering process is complete; the dried material contained inside the geo tube can be repurYorba Regional Park in Orange County California is one example of the advantages of hydraulic sediment removal over conventional mechanical dredging methods.

The Project

Yorba Regional Park is a 175 acre day use park in Anaheim, California that accommodates well over one million visitors each year. The park was developed alongside the Santa Ana River with four small lakes connected by small streams and includes bike paths that connect to the nationally recognized Santa Ana River Trail that leads some 20 miles to the Pacific Ocean. A typical day at Yorba Park may include activities like fishing, boating, cy-



Temporary pipeline with bridges across the bicycle paths. Notice the volleyball court adjacent to the dewatering bag.

to small pontoon mounted, hand dredges such as the one described in this article. When it comes to hydraulic dredging there is no "one size fits all" dredge. The size of the dredge, pump system and material agitation method are all project specific and many times require custom configurations.

Dewatering of the slurry can be handled in a variety of ways. When evaluating future projects, hydraulic dredging conposed onsite or removed from the property.

While mechanical dredging may be better suited in some situations for pond and lake dredging projects that will allow all of the water to be drained and aquatic life relocated hydraulic dredging offers a greener, cleaner alternative to sediment removal without the harsh environmental footprint left behind by heavy machinery and millions of gallons of displaced water. cling, volleyball, picnicking, horseshoes, and even horseback riding. Locals love the park and use it daily for exercise or walking the family pet. The park is plentiful in amenities such as pavilions, picnic tables, restrooms, playgrounds, bicycle and boat rentals, baseball fields and more. It is no surprise that it is one of the busiest parks in the Orange County park system; therefore, a project of any kind must take into

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consideration the impact it will have on daily park use, as well as the environmental footprint it will have.

The upper lake (.35 acres) at Yorba Regional Park was designed with a circulation pipe at the bottom/center of the lake that draws water from a well downstream and allows it to overflow to the connected lower lakes and streams. An onsite survey showed sediment accumulation in the bowl of the lake causing the circulation pipe to clog. The lake was originally designed to be five foot deep in the bowl, and the sediment depth in the bowl had reached up to three feet, leaving only two feet of

water. The nutrient-rich, shallow water had become the perfect environment for invasive vegetation including algae and chara that may have been taking up as much as 50% of the lake bottom. Through a natural process referred to as eutrophication, a thick layer of "muck" – the remains of tree leaves, grass clippings and decayed aquatic plants – has quietly settled in the pond over the years. Decomposing material consumes oxygen, which is also in short supply at the bottom of the pond making it more difficult for fish and aquatic habitats to flour-



Chara and algae overgrowth.

ish. And without oxygen, decomposition produces hydrogen sulfide and a rotten-egg smell which can cause complaints from park visitors. The pond muck also contains a high level of nitrogen, phosphorus and other nutrients that allow invasive aquatic plants such as chara to flourish. When sedimentation caused by eutrophication reaches this point, it often leads to a continuous cycle of chemical treatment to control the vegetation.

When it became apparent that dredging was needed, the goal of Supervising Park Ranger, Joanette Willert, was to leave little or no footprint on the surrounding environment, while minimizing any disruption to the daily activities of the park. According to Willert, "The community is vested in Yorba Park," and always concerned with what happens in and around the park.

Another consideration when evaluating dredging methods for this project was to be as conservative as possible with the water resources in Orange County. Draining the lake and using traditional mechanical dredging equipment was not a viable option.

Envirodredge, a company specializing in hydraulic sediment removal, was brought in to evaluate the project and offer solutions. There were many factors to consider when planning for this project:

• The upper lake had cement walls and cement throughout most of the bottom

• Limited access for equipment mobilization

Shallow water depths

• The lake was in the center of pedestrian trails, bicycle paths, picnic tables, and play-grounds

• Limited space and access for dewatering (to reach the designated geo tube de-



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watering area, the dredge discharge hose and decant return water hose must cross a heavily traveled pedestrian and bike path).

• The chosen method must be nonintrusive to park patrons and activities closing the park was not an option

• The method must be environmentally friendly with little impact on the surround-ing habitats

• Water conservation during the project must be a top priority



The Solution

After careful consideration, a small pontoon mounted hand dredging system was selected. The "hand dredge" system, which could be lifted by 2 men and placed into the lake, consisted of a 4 inch primary pump for suction and a 1.5 inch secondary



Above: Chara being removed from suction head. Left: Chara being removed by hand.

pump for hydro agitation. A suction head with 1.5 inch x 3-inch screen openings was used to prevent larger objects such as sticks, rocks and other debris from entering the suction hose and possibly damaging the pump. A pole was mounted to the suction head that allowed the operator to control the dredge depth while basically "vacuuming" the lake bottom. However, the chara that had consumed most of the lake bottom, posed a challenge for the small dredge. Chara would accumulate quickly around the suction head thereby "clogging the vacuum." To eliminate this

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JW Faircloth & Son Inc. Hillsborough, NC 27278 | 919.732.1244 | 919.732.1266 fax condition, the chara was removed by hand which provided much better access to the silt and sediment accumulation.

Using a temporary pipeline, the hand dredge system pumped the material across a heavily traveled pedestrian and bike path into a geo tube for dewatering. The decant water was contained and pumped back across the cart path to the lake. The noise level of the gas powered hand dredge system is also quite diminished in comparison to larger diesel powered hydraulic dredges, so there is minimal disturbance to park patrons and wildlife alike. During the project normal park activities continued as usual. A portable hose bridge was deployed to accommodate the dredge discharge and return water hoses so park visitors and employees could continue using the pedestrian and bike paths. Birthday parties continued uninterrupted, and a volleyball match was played next to the geo tube dewatering area. Even wildlife seemed undisturbed by the work in progress.

The project was completed on schedule and within budget with good reviews from park visitors and park management. Ranger Joanette Willert states, "We are pleased with the results, and how we were able to complete the entire project with no disruption to park activities or environment. We had a few curious people stop to inquire about the project, but again, the people are vested in their park and what goes on here."

It took five days to complete the project during the month of July, one of the busiest times of the year for Yorba Regional Park.

Now that the nutrient overload has been reduced by removing years of organic sediment accumulation, aquatic vegetation in the pond will be much easier to manage. Aeration along with a professional pond management program will keep this pond healthy and looking great for park visitors for years to come! **L&W**

by Steve Perry

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