CITY OF SANTA BARBARA

PARK AND RECREATION COMMISSION REPORT

AGENDA DATE: January 23, 2008

TO: Park and Recreation Commission

FROM: Administration Division, Parks and Recreation Department

SUBJECT: Andree Clark Bird Refuge Update

RECOMMENDATION:

That the Commission receive a staff report regarding water quality management issues for the Andree Clark Bird Refuge.

DISCUSSION:

Background

The Bird Refuge presents a number of water quality management challenges including the lack of natural fresh water, low water levels, poor circulation, excessive sedimentation, and high nutrient levels. High levels of nutrients often lead to algal blooms and the depletion of oxygen.

Management of the Bird Refuge has been a challenge since it was constructed. Prior to the rerouting of Sycamore Creek in the 1880s, the area had previously been a salt marsh that received creek and ocean water. The City dredged the area in 1929 to create the 29-acre lake, and the lake was fed by well water until the early 1970s. It currently only receives fresh water from rain events and when the City discharges potable water in the summer. A weir gate prevents ocean water from entering the lake. The City commissioned a study to identify management alternatives in 1985, but none were implemented due to cost. At that time, it was assumed that the first 18" of sediment would have to be removed. The depth of sediment is not known. The water depth ranges from 1 to 5 feet.

Summer 2007

In summer 2007, there were significant algal blooms at the Bird Refuge. In addition to the impact to aquatic habitats, algal blooms are a result of high levels of nutrients and contribute to low levels of dissolved oxygen and associated noxious odors (due to degassing hydrogen sulfide). These conditions were particularly poor in summer 2007 due to the lack of rain for a number of years. Beginning in July, extended periods of warm

weather and windy conditions resulted in increased water evaporation, rapid and extensive algal blooms, and the corresponding noxious odors.

In response to these conditions, the Department used a small boat to try to aerate the water and discharged 15,132 units of potable water into the Bird Refuge. This is equivalent to 11,318,736 gallons of water. The discharge of water occurred for a total of 24 days between July 6, 2007, and September 14, 2007.

Management Options

The Department also began exploring a number of management options that could reduce sediment and nutrient levels, reduce odor, and improve water quality.

The first method is the use of microorganisms to reduce nutrient levels in the sediment and water. The Department has been discussing this method with Ecological Laboratories, Inc., which is based in New York. The microorganisms would be applied from 33-gallon drum attached to a boat. Monthly applications would be required after an initial application period. The lack of circulation in the Bird Refuge presents a key challenge to the potential effectiveness of this method. Unfortunately, these microorganisms have not been used in a large lake, so there is not a similar reference site. The initial cost to pursue this method is estimated to be $70,000. Each year there would be ongoing costs, depending on application rates.

Another method is the use of a solar powered circulation system called the Solar Bee. The Solar Bee system is used in a variety of settings, including fresh water lakes. Water circulation increases oxygen levels and contributes to the reduction of organic levels in sediment. Solar Bee technology is currently being used in 3 areas in California, including Camp Pendleton, Palmdale, and Mountain View. The Department will be conducting site visits to learn about the effectiveness of the system in these locations. The low depths of water and sediment levels present key challenges for the placement of the Solar Bee system in the Bird Refuge. It is estimated that the cost to purchase and install 3 Solar Bees would be $135,500.

Next Steps

Additional work is needed to evaluate the efficacy and cost of both of these methods, determine permitting requirements, and project the long-term benefits for water quality. Regardless of the method selected, it is anticipated that potable water will continue to be needed to manage water quality. In the interim, the Department is hoping that a healthy wet weather season will reduce the potential for significant water quality problems in summer 2008.

At the same time, there are other management considerations for the Bird Refuge that also need to be addressed, including vegetation, mosquito abatement, and the function of the weir gate. There is $60,000 in the Fiscal Year (FY) 2008 Capital Program to

develop plans to address these issues and develop water quality management solutions. It is anticipated that the scope of work and a schedule will be developed during the remainder of FY 2008.

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