

Color Key for Verbs in the Present and General Truth Time Frames

simple present

present progressive

present perfect

verb with present modal

New life for S.F. lakes

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GOLDEN GATE PARK RENOVATION **INCLUDES** REPAIRS TO RUN-DOWN RETREATS

By Lisa M. Krieger
Mercury News

The lakes of Golden Gate Park in San Francisco **have helped** make it one of America's great urban treasures.

But years of neglect and abuse **have caused** the historic lakes to deteriorate. They **are** polluted and filled with sediment. Shorelines **are eroding**. They **leak** large amounts of water into the underlying sand. Invasive species, both plants and animals, **dominate** their waters.

With worrisome regularity, large numbers of dead fish **float** to the surface of the lakes' waters.

A major infusion of money **is helping** change all of that. A large, expensive and creative repair job **is** under way at the lakes, all made between 69 and 122 years ago.

The first and most dramatic reconstruction **can be seen** near the intersection of Fulton Street and 43rd Avenue. North Lake, once one of the oldest and sickest

lakes in the park, **has been transformed** into a picture of health.



Discovered when the lake was drained were a 13-pound carp, two eels, an exotic fish called an alligator gar and four scared soft-shell turtles. The lake was also home to several automated teller machines, parking meters and a motorcycle frame.

"To remake a lake of this magnitude, in a highly urban setting, **has been** a challenge," said landscape architect Dan Mauer of the San

Francisco Recreation and Park Department, project manager of the lake renovations.

"It **is** a sanctuary," he said. "But it also **has to be** useful."

For decades, Golden Gate Park was on the city's low-priority list, ignored by a series of mayors. Then in 1992, frustrated park officials appealed directly to city voters with a \$76 million bond measure to renovate the park. Voters passed the measure by an overwhelming 73 percent.

The lakes **are** among the most needy beneficiaries. Some, such as North Lake, **are undergoing** a drastic overhaul. Others, such as Stow, will receive a more subtle face-lift. Landscaped out of sand dunes, all of the lakes will retain the early visions of Golden Gate Park designers William Hammond Hall and John McLaren.

The goal **is** to keep the lakes natural, so they **fit** into the park landscape as if they had always

been there. They **must** not only **be** lovely, but **offer** recreation and relaxation. They also **support** birds, fish, turtles and amphibians.

Although the lakes **are** linked, each **is** unique and **has** a separate restoration plan.

They **share** several major problems:

Invasive plant and animal species Non-native blackberries and other overgrown plants **have been pulled** from North Lake's edges. They **are replaced** by new landscaping, installed by Bauman Landscaping of Richmond, that **is** two-thirds native species and one-third ornamental species.

A total of 107 turtles were captured at the lake by biologists at May & Associates of Walnut Grove, using a combination of nets and traps. Then they were wrapped in newspaper, stacked in layers of two or three, placed gently in boxes and driven to the Castro Valley home of Gary and Ginger Wilfong, who **run** Bay Area Turtle & Tortoise Rescue.

Biologists found four soft-shell turtles, ornery creatures that **look** like big leathery pancakes, and **are** native to the coastal plains between Alabama and South Carolina.

But most of the turtles were yellow-bellied sliders or red-eared sliders, popular with children -- until they **get** too large.

"They weren't mean. They were scared," said Ginger Wilfong. She found new homes for all of them.

Wildlife biologist Loran May said they trapped 12 different fish species in North Lake -- of which only three were native to California. She estimated that between 2,500 and 3,000 pounds of carp were removed in one day. California law required that the fish be humanely killed to prevent non-native species from spreading.

Among the fish were an African creature called tilapia, which **is** very hardy, **eats** almost anything and **tolerates** poor water. Also **found** **was** a long alligator gar, which **inhabits** sluggish pools and backwaters of large rivers, swamps, bayous and lakes of Louisiana.

At Spreckels Lake, biologists **caught** fish just to reduce the population.

"The lake **is** at carrying capacity," May said. "It's totally maxed out. We took the pressure off.

"We **know** people will bring them back. The

lakes **are** a much-loved amenity of the park. The goal **is** to make them a healthier environment."

Thick bottom sediments Erosion and silt deposits **have caused** sediment to collect in the lake bottoms, reducing depths. The sediment **contains** soil, leaf debris and other organic matter. Such sediment **leads** to poor water quality, the overgrowth of algae and suffocation of fish.

Sediment **is being removed** from lakes with the greatest accumulations through dredging. At North Lake, a five- to eight-foot-deep layer of silt, sand and muck was dredged and hauled away. At Stow Lake, when the water level dropped, it became too shallow for boating.

Leaky lake liners Because the lakes **are built** on sand, it **is** essential to have strong liners to prevent drainage. If left in their natural state, they probably would have become dry beds, as the city's groundwater table has subsided during the past century.

Elk Glen, Middle and North lakes were probably natural groundwater ponds that were deepened at the turn of the century and never sealed. Attempts to seal them with bentonite

in the 1980s were unsuccessful.

These and other lakes constructed with clay-lined bottoms **have developed** significant leaks. A whopping 560,000 gallons of water **is lost** every day, drained to the aquifer under the park. The exception **is** Lily Pond, an old shale quarry with a natural seal.

A goal of reconstruction **is** to line the lakes with clay to hold the water and create natural-looking edges. Clay **is** the preferred material because it **is** natural and impenetrable to water. It also **preserves** the historic design of the lakes. At North Lake, a new two-foot-thick clay layer **has been installed**.

Deteriorating lake edges

When well-maintained, a soil edge **supports** marsh and riparian plants that **hold** the soil and provide wildlife habitat.

But the lakes' **edges have eroded** due to varying water levels, wind-generated waves, steep bank conditions, ducks and human activity. Some of the edges **are** overgrown with non-native vegetation.

The project will ensure that all lake levels **are controlled** automatically to minimize sudden variations in levels. In

North Lake, a major new overflow channel **prevents** the sudden rise and fall of water, reducing edge damage.

When feasible, edges **are designed** to be accessible by wheelchair. New paths and benches will be built at some lakes.

New plantings on the edges will improve wildlife habitat. Plantings **include** native specimens such as California buckeye, Pacific wax myrtle, arroyo willow and California bay laurel.

Poor Water quality

Storm drainage runoff **has** traditionally **flowed** into the lakes, laden with erosion sediments, debris, gardening residue, automobile discharges and animal waste.

Mallard, Metson and North lakes **have** the least flow, and the poorest water quality. Their shallow lake depths, made worse by bottom sediment, **have created** warm water and over-rich nutrients. This **causes** algae growth, reduced oxygen -- and dead fish.

"Last year we kept seeing dead fish wash up ashore. There was an algae bloom and more than 100 died," said Nancy DeStefanis, director of San Francisco Nature Education.

During reconstruction, drainage **is changed** so that roadways **don't empty** into lakes. All of the lakes will share a new irrigation water supply using clean well water, with centralized pumping facilities. A new circulation system will improve water flow.

North Lake, the lowest of all the Golden Gate Park lakes, needed a formal overflow canal, where water could escape from the main lake. On an island created by the canal, water-loving trees like swamp cypresses were planted. "They're basically **sitting** in a big bathtub," Mauer said.

Stow Lake **is** already cleaner, DeStefanis said. "It had this terrible lime-green color. It was putrid," she said. "There **is** already improvement."

The lakes of Golden Gate Park -- and the wildlife they support -- **have created** a close-knit community of people, DeStefanis said.

"It **creates** a whole microcosm of the city," she said. "People who were strangers **talk** to each other because they're interested in what's **going on**."

"The restoration **is** not only **improving** the quality of the lakes, but also **preserving** the beauty of them," she said