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Chinese study abroad students conduct research on cigarette butt pollution in residential, boardwalk, and sandy beach areas of Santa Monica

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SANTA MONICA, CA – August 9, 2013
Last Sunday and Monday (8/4 - 8/5), eight students from Beijing, China investigated cigarette butt pollution in Santa Monica. Following a real scientific protocol using belt transects, their study compared the number of cigarette butts found in commonly littered areas of a residential neighborhood, beach boardwalk, and open sandy beach. In total, 1,922 butts were counted and collected from the three study sites. The beach boardwalk study site, specifically along the boardwalk-sand interface between the Santa Monica Pier and Ocean Park Blvd, contained the highest abundance of butts (Figure 1) with an average of 1 butt found every 2 square meters. The residential study site, specifically along the sidewalk-street interface of Bay St, Bicknell Ave, and Pacific St between 3rd St and Main St, possessed slightly fewer butts with an average of 1 butt found every 3 square meters. The sandy beach site between Bay St and Hollister Ave had a comparatively small abundance with an average of 1 butt found every 13 square meters, although hidden cigarettes buried in the sand were not included in visual surveys.

Breaking the boardwalk data down by zone revealed that cigarette butt abundance is 3-4 times higher closer to the Santa Monica Pier than in zones further from the Pier (Figure 2), likely a result of more people/foot-traffic in this zone. Furthermore, in all three zones, the one meter strip of sand bordering the concrete boardwalk contained 5-8 times more butts than the equivalent spatial area of boardwalk itself, with average abundance as high as 1 butt per square meter of sand.

Closer examination of the residential data revealed that streets of similar length possessed highly varied cigarette butt abundance (Figure 2), with Bicknell Ave leading as most polluted, possibly due to the presence of more multi-unit complexes. Butt abundance on Bicknell Ave was higher in the one meter strip of street bordering the curb compared to the same surface area of sidewalk/parkway. Conversely, Bay St had more butts on the sidewalk/parkway than in the street. Breaking the data up per residence, the multi-unit building at 229 Bicknell Ave was the record polluter with 77 butts, 97% of which were found in the street within one meter of the curb. Corner residences that merge with Main St had the next highest abundances ranging from 17 to 46 butts per property.

Local teacher and scientist, Benjamin Kay, concludes, “Based the students’ data, we can definitively identify a ‘community ashtray’ - the one meter wide strip of sand adjacent to the boardwalk, especially between the Casa Del Mar Hotel and the Santa Monica Pier. There were also notable hotspots of residential cigarette pollution, like 229 Bicknell Ave. Like many complexes, this condominium building is smoke-free, so residents appear to smoke in front of the building where there are no permanent trash cans or cigarette receptacles. Thus, there is a great opportunity for the city to respond with strategic placement of litter abatement devices, which would greatly reduce cigarette butts that end in the ocean.”

The eight student team, aged 12-13, were among 26 Chinese middle and high school students taking part in a new environmentally-themed international summer science program called Splash in Science, founded and directed by SMC and Samohi science teacher, Benjamin Kay. Other student projects, which focused on plankton, shore birds, and sand crabs, were led by Samohi teacher, Ingo Gaida, and marine scientist and Get Inspired Inc. founder, Nancy Caruso. Students presented their research to all program participants and SMMUSD school board member, Ben Allen. Splash into Science’s three teacher team was contracted by Sunny International Exchange Inc., which establishes and facilitates youth study abroad and professional development programs between China and the US.

Splash Into Science 2013 - Outside the Aquarium of the Pacific by Long Beach Harbor. Photo by Derek Ren

Cigarette butt research team holds up 1,922 cigarettes collected from residential, boardwalk, and sandy beach (left to right, respectively). American names of students, from left to right, Joy, Mike, Kevin, Peter, Ellie, Andy, Mona, Arielle. Photo by Benjamin Kay

SMMUSD board member, Ben Allen welcomes Chinese students prior to student research presentations in classroom.
Photo by Benjamin Kay

Residential cigarette butt research team mentored by educational intern and Samohi Team Marine member, Katie Oran.
Photo by Derek Ren

Boardwalk cigarette butt research team collecting data along boardwalk-sandy beach interface. Photos by Benjamin Kay

Sandy beach cigarette butt research team collects data using belt transect method. Photos by Derek Ren

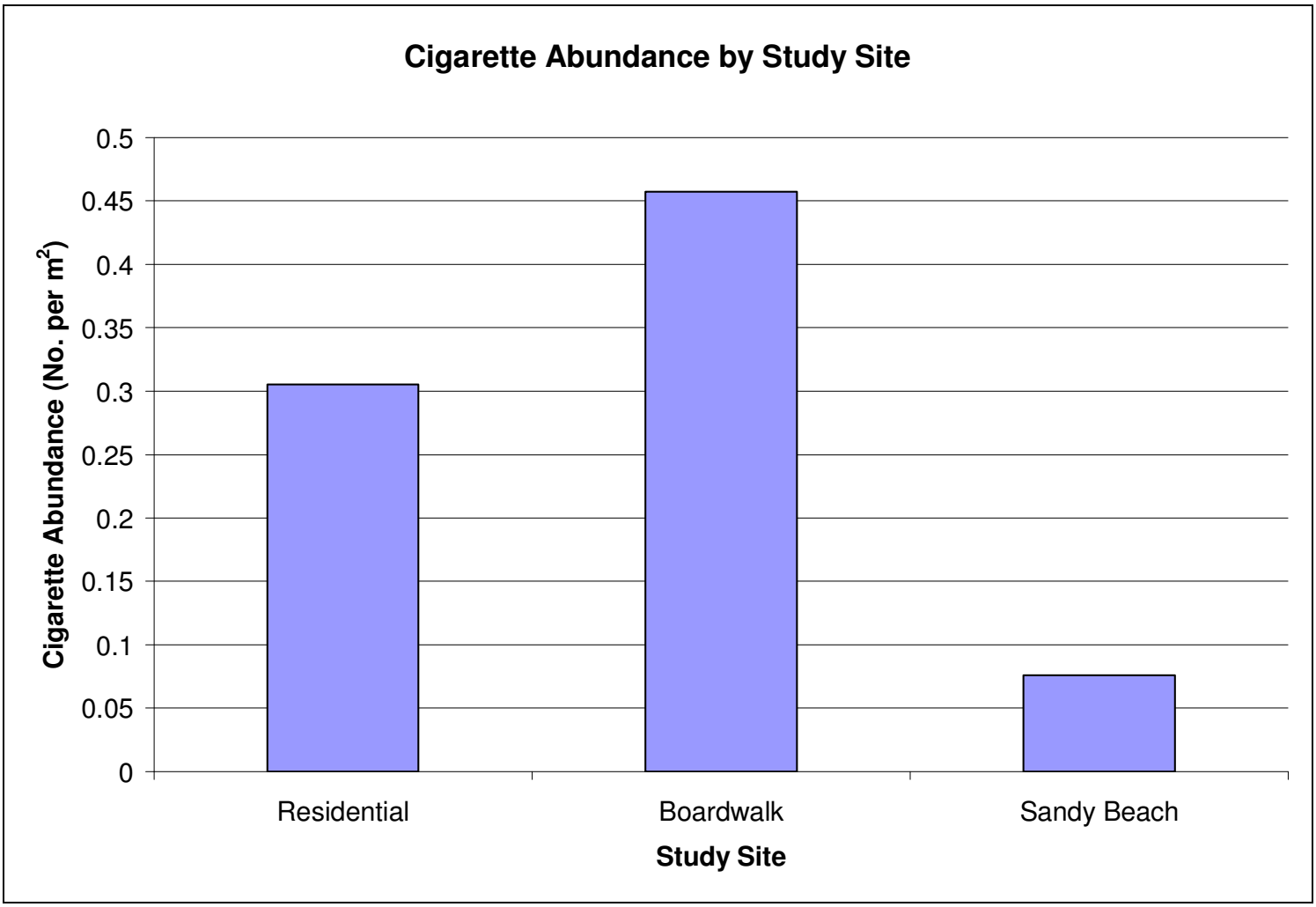
Cigarette Abundance by Study Site
Cigarette Abundance (No. per m2)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Residential
Boardwalk
Sandy Beach
Study Site

Figure 1.

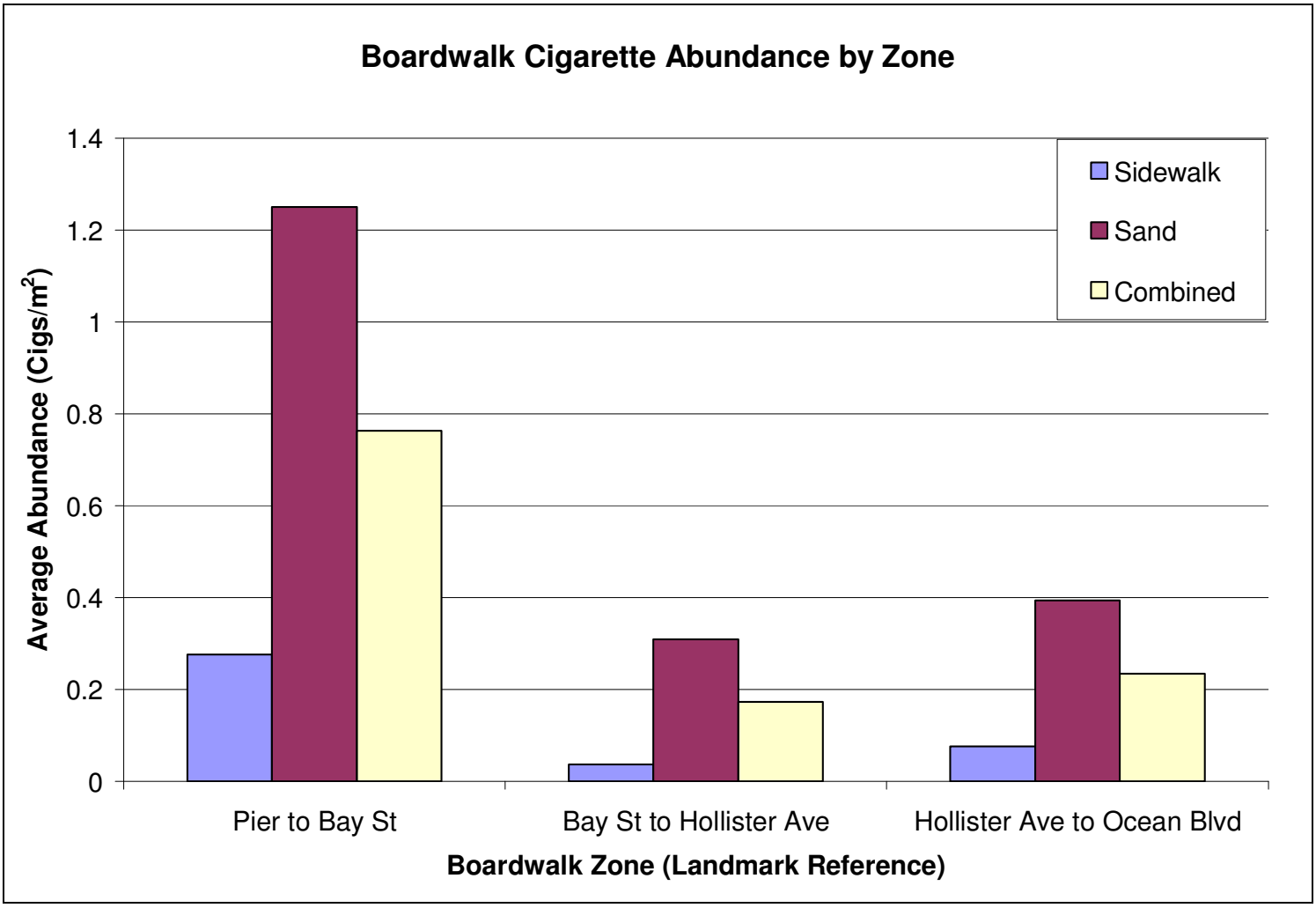
Boardwalk Cigarette Abundance by Zone
Average Abundance (Cigs/m2)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Sidewalk
Sand
Combined
Pier to Bay St
Bay St to Hollister Ave
Hollister Ave to Ocean Blvd
Boardwalk Zone (Landmark Reference)

Figure 2.

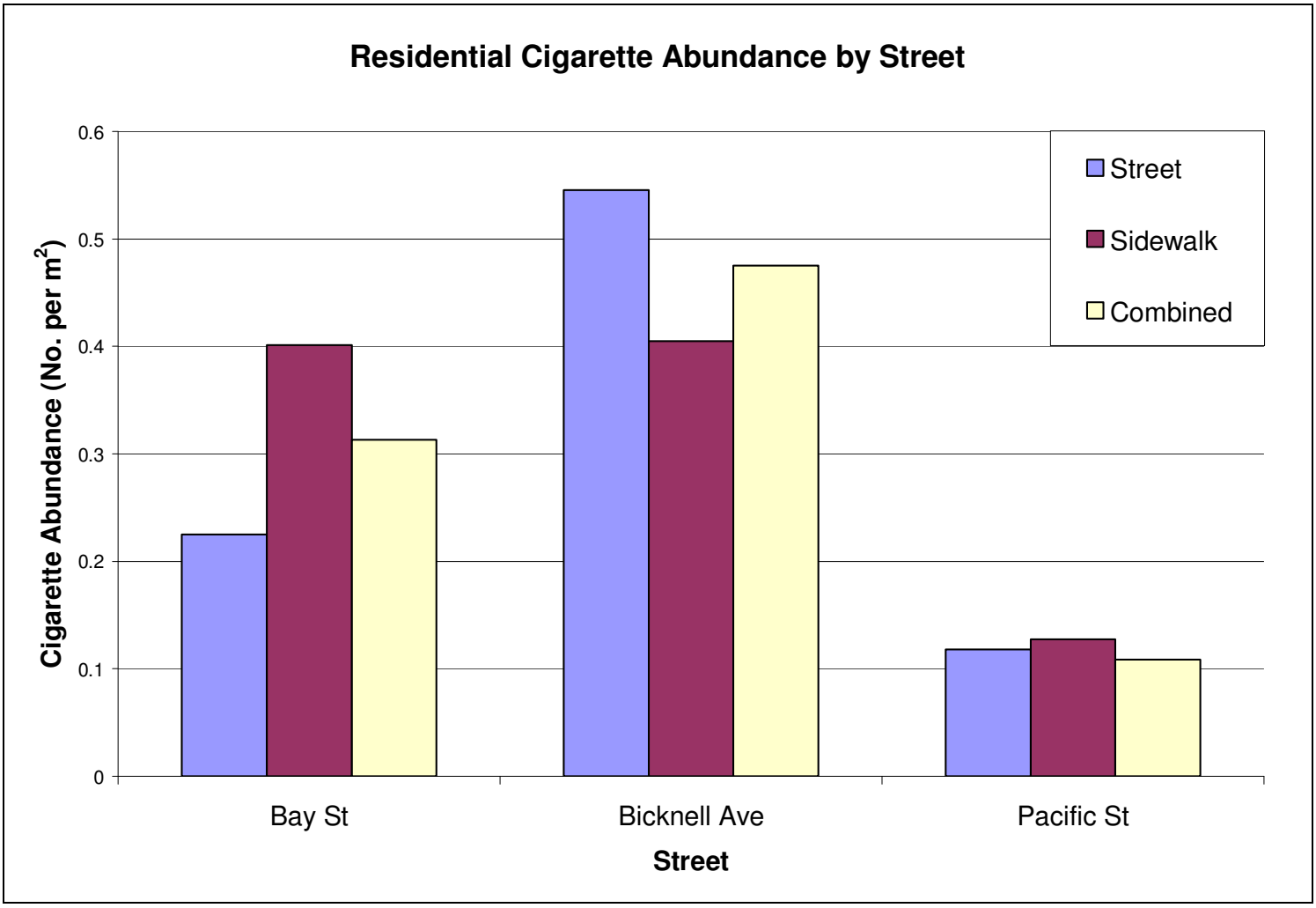
Residential Cigarette Abundance by Street
Cigarette Abundance (No. per m2)
0.6
0.5
0.4
0.3
0.2
0.1
0
Street
Sidewalk
Combined
Bay St
Bicknell Ave
Pacific St
Street

Figure 3.