

APPENDIX C

2017 Wharf Nesting Bird Survey

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2017 Santa Cruz Wharf Spring Bird Surveys

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SUMMARY

Kittleson Environmental Consulting (KEC) and partner Bryan Mori Biological Consulting Services conducted baseline spring bird surveys at the City of Santa Cruz Municipal Wharf from April through July, 2017. The goals of the study are to document all nesting bird species, assess relative abundances, and characterize patterns of use and distribution through the 2017 spring breeding period.

The surveys consisted of avian inventories focused on the Municipal Wharf structure and the area within approximately 100 meters of the wharf pilings and buildings. A total of 8 surveys were done in April, May, June and July 2017 to characterize bird use at the municipal Wharf structure. All surveys were conducted during daylight hours. During 3 surveys, efforts were made to sample both sides of the wharf concurrently to adequately capture the widest range of species and account for the patterns of bird use through and under the project area. Two of the surveys were conducted by kayak under the wharf to locate and confirm pigeon guillemot nest locations.

The study team observed 27 bird species in the project area during April, May, June and July 2017. A total of 1007 birds were identified and counted, representing a relatively limited range of expected species. Common rock pigeons, western gulls and pigeon guillemots made up the bulk of the birds observed. Rock pigeons were encountered throughout the study area and their numbers were roughly estimated rather than precisely counted.

Common, Pacific, and red-throated loons; Clarks and western grebes; and Caspian and elegant terns were observed on the water nearby and under the wharf. Brown pelicans were present in the project area. A single rhinoceros auklet was seen late in July. During the study period the wharf was also visited by rare fork-tailed storm petrels that resulted in numerous additional bird observations around the general study area by local birders.

Western gulls, pigeon guillemots and common pigeons nested on the wharf during the study period.

All study data was compiled in the online Ebird public database and is available to the general public and all Ebird users. Summary results and Ebird data plots are discussed below and are attached in Appendix A

STUDY AREA

The 2017 Santa Cruz Municipal Wharf Spring Bird Survey study area is located in the northern Monterey Bay near the outlet of San Lorenzo River watershed. The Municipal Wharf is located between Cowell Beach and the Main Beach and Boardwalk. It was built in 1914 as a City facility to be publicly owned and operated by local government for the transfer of agriculture, lumber, leather, lime and other products, from land to water and from ship to rail.

The Wharf is a timber pier, constructed of wood and supported by 4,445 Douglas Fir pilings and miles of structural timber caps, corbels, and braces. The pilings, supporting structures, and utility conduits create a complex avian habitat above the water. The Wharf extends from the

beach to 35 feet in depth at its far end. It is notable as the longest timber pile-supported pier structure in the United States and one of the longest in the world.

All bird surveys were conducted during daylight hours and observations were limited to birds on or within approximately 100 meters of the wharf structure.

FIGURE 1. Project Location

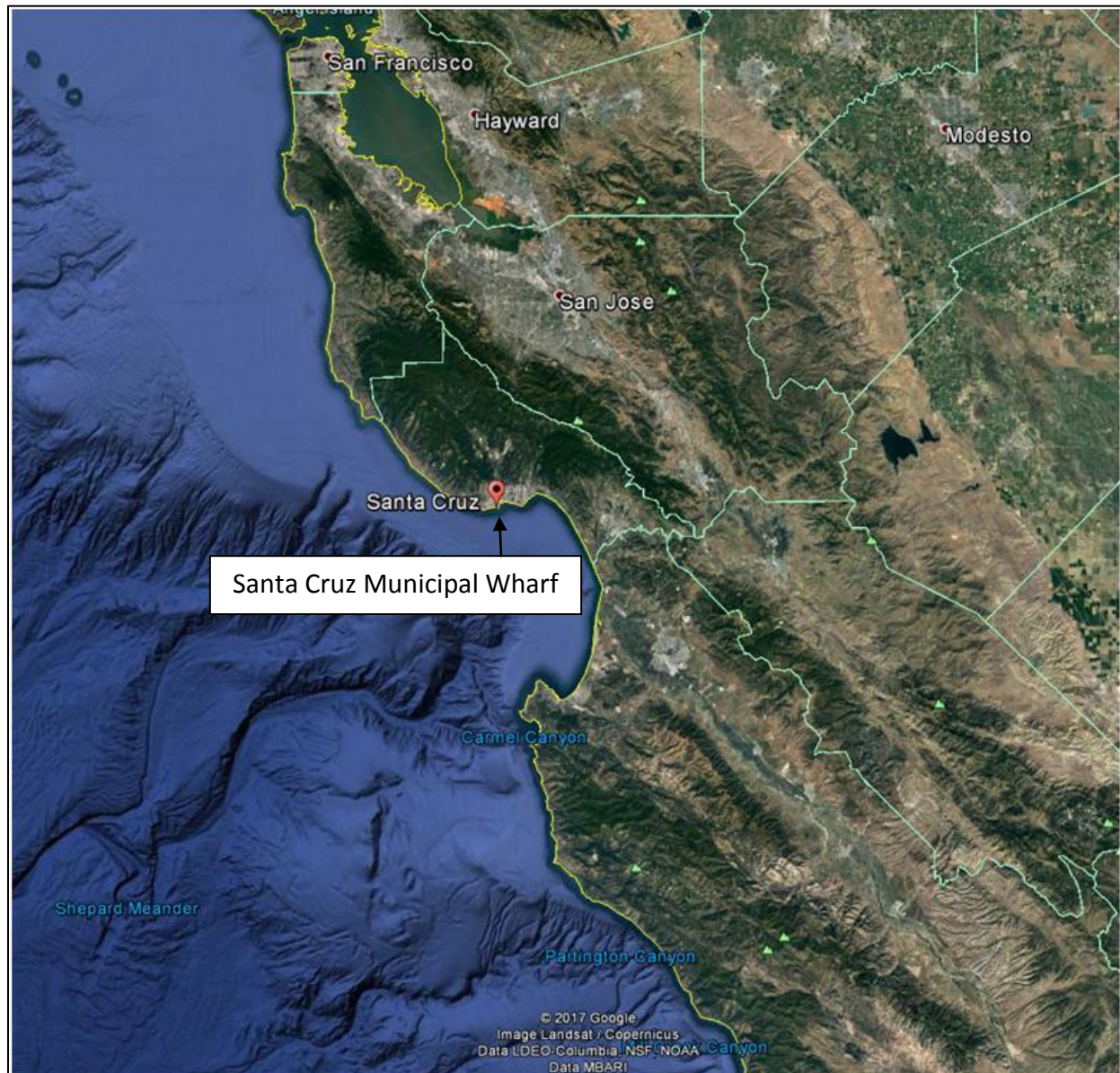
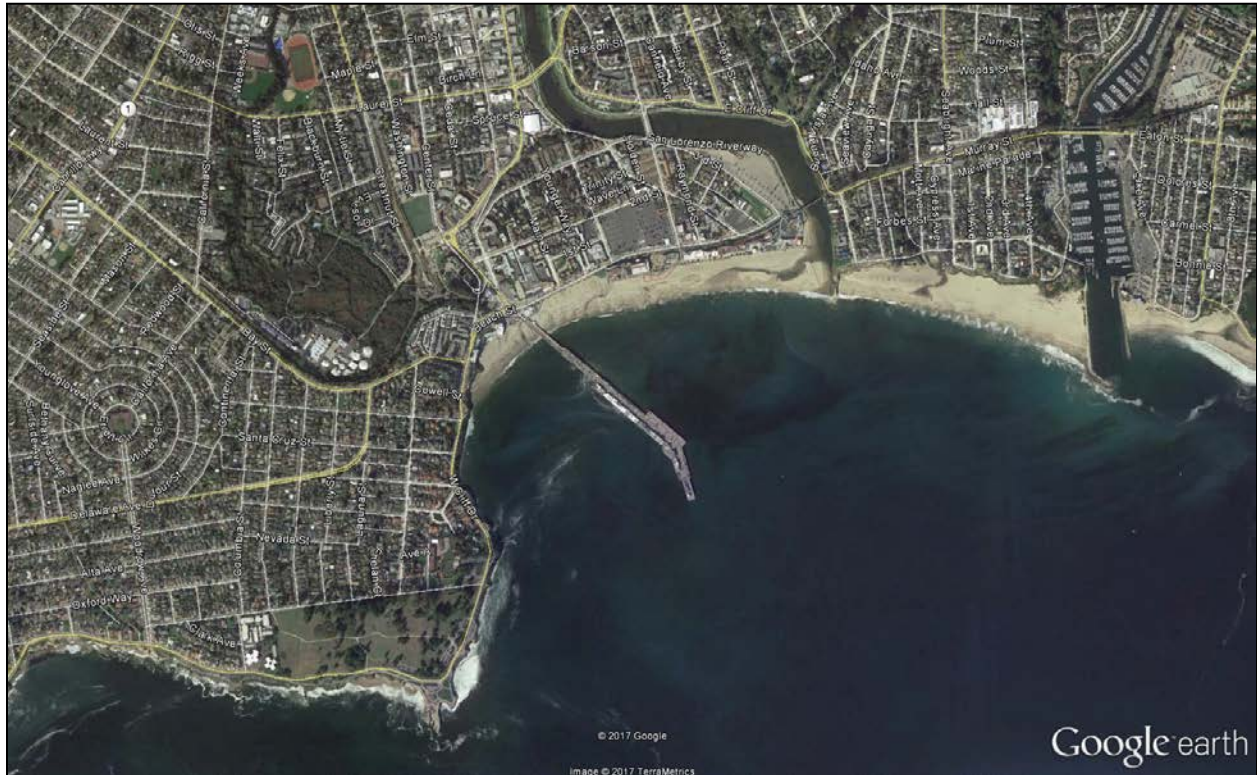


FIGURE 2. Santa Cruz Municipal Wharf and Vicinity



SURVEY METHODS

Daytime avian surveys were conducted from the accessible walkways, boat landings and kayak. Walking surveys were performed using binoculars while walking the two sides of the wharf from end to beach. Total length of the walking surveys is approximately 1 mile (the wharf is 0.5 miles long). Kayak surveys were done from the Venture Quest Kayak Rental landing dock. Surveys were conducted by Gary Kittleson and Bryan Mori.

During each site visit, all visible and audible bird species within 100 yards of the wharf were identified, counted and logged in field books. Observers communicated from opposite sides of the wharf by phone and text during the surveys to minimize potential double-counting of birds flying under and over the wharf. Each day's observations were then compiled into an Excel spreadsheet and entered as Hotspot Checklists into Ebird (<http://ebird.org>). The Ebird Hotspot for the study area is known as the *Santa Cruz Municipal Wharf* location.

LIMITATIONS

All bird surveys were conducted during daylight hours and observations were limited to birds within approximately 100 meters from the wharf structure. Flyover species were included in the observations, but birds beyond 100 meters on the open ocean and on neighboring buildings and beaches were not counted in this effort. Birds outside of the project limits and gulls not identifiable at high altitude were not counted.

Surveys occurred during the spring nesting season and observed species were a mix of resident and migratory species. The results represent only those birds observed on and near the 1/2 mile long wharf structure and do not reflect the overall fluctuations of spring migration in local coastal waters and beaches.

Visibility under the wharf is limited due to the density of pilings and the complexity of the wood structure itself. Observations from the wharf surface and kayak were made in an attempt to adequately cover the full extent of the wharf's potential nesting areas. The far end of the wharf was under-sampled during kayak surveys due to the constant presence of resting sea lions. Additional pigeon guillemot nesting may occur in that area, which was avoided to minimize sea lion disturbance, based on consistently audible guillemot calls.

Gull nests on rooftops were also difficult to spot from the wharf walkways and parking lot areas.

All nest locations were identified and mapped with handheld Garmin GPS units with an accuracy of +/- 3m on the wharf surface to +/- 10m under the wharf.

FIGURE 3. Santa Cruz Municipal Wharf Structure



RESULTS AND DISCUSSION

Twenty seven bird species were observed and positively identified by the study team during the study period. The full list is included in Table 1. The most common species were rock pigeon, western gull, and pigeon guillemot. All three of these species nested on the wharf in 2017. Appendix A includes the study period totals.

A cumulative total of 123 bird species (and 15 other taxa) have been recorded in the general wharf project area, based on Ebird data and local records. Appendix B includes all historically reported bird observations for the wharf area. The 2017 breeding season surveys documented approximately 22% of the recorded species for the site. The focus on the wharf structure in the 2017 study greatly limited the survey extent. Many of the 123 species cumulatively recorded off the wharf have been observed with spotting scopes out in open ocean conditions or aloft, well beyond the study area limits.

Table 1. Species Observed April-July, 2017

Red-breasted Merganser - <i>Mergus serrator</i>
Red-throated Loon - <i>Gavia stellata</i>
Pacific Loon - <i>Gavia pacifica</i>
Common Loon - <i>Gavia immer</i>
Pied-billed Grebe - <i>Podilymbus podiceps</i>
Western Grebe - <i>Aechmophorus occidentalis</i>
Clark's Grebe - <i>Aechmophorus clarkii</i>
Brandt's Cormorant - <i>Phalacrocorax penicillatus</i>
Pelagic Cormorant - <i>Phalacrocorax pelagicus</i>
Double-crested Cormorant - <i>Phalacrocorax auritus</i>
Brown Pelican - <i>Pelecanus occidentalis</i>
Snowy Egret - <i>Egretta thula</i>
Whimbrel - <i>Numenius phaeopus</i>
Common Murre - <i>Uria aalge</i>
Pigeon Guillemot - <i>Cepphus columba</i>
Rhinoceros Auklet - <i>Cerorhinca monocerata</i>
Heermann's Gull - <i>Larus heermanni</i>
Ring-billed Gull - <i>Larus delawarensis</i>
Western Gull - <i>Larus occidentalis</i>
Caspian Tern - <i>Hydroprogne caspia</i>
Elegant Tern - <i>Thalasseus elegans</i>
Rock Pigeon - <i>Columba livia</i>
American Crow - <i>Corvus brachyrhynchos</i>
European Starling - <i>Sturnus vulgaris</i>
Brewer's blackbird - <i>Euphagus cyanocephalus</i>

The three species of birds observed actively nesting on the wharf structure use were observed during all visits. Recent efforts to physically exclude pigeon nesting in the beach and shallow water areas have effectively reduced potential nesting areas. Further out on the wharf, however, pigeons were found nesting throughout the under-structure.

FIGURE 4. Pigeon Screening to Reduce Available Nesting Habitat



Western gull nesting was observed on buildings and on the inaccessible walkways on the western (Cowell Beach) side of the wharf. Ten western gull nest sites with young were counted. Western gulls were observed roosting everywhere on the wharf structure, including the underside timbers, rails, walkways and rooftops. A map of confirmed western gull nest sites is included in Figure 5. Photos of western gull nests and young are included in Figures 6-9.

Pigeon guillemot courtship and nesting activity was observed during all visits and 9 active nest cavities were documented. Pigeon guillemot nest locations are also mapped in Figure 5, below. No young of the year guillemots were observed in nest cavities or on the water, but adults carrying food to nest sites continued through July 2017.

FIGURE 5. Confirmed Western Gull and Pigeon Guillemot Nests



FIGURE 6. Western Gull with Juvenile



FIGURE 7. Western Gull Nests with Juveniles on the Miramar Roof



FIGURE 8. Western Gull Nests with Juveniles on Closed Walkway



FIGURE 9. Western Gull with Juveniles on the Dolphin Restaurant



Guillemots usually arrive in the Santa Cruz area in March for nesting. In the project area during the study period, pigeon guillemot numbers ranged between 6 and 27 individuals. The peak number at the wharf occurred in late May when pairs were actively calling and surveying potential nest cavities. Typically we observed 15-18 guillemots per visit once nesting activities started in earnest. Guillemots were gregarious and vocal throughout the study period.

Pigeon guillemots were observed actively feeding under and around the wharf pilings, as well as along the cliffs from Steamer Lane to Cowell Beach. Guillemots were observed on the open ocean from Seabright Beach to well beyond Lighthouse Point although they were only counted in the limited extent of the wharf project area.

Guillemots were observed roosting on and traversing horizontal structures at all levels under the wharf from the waterline at low tide to the uppermost cavity spaces between the wharf deck and timber stringers and headers. Pigeon guillemots were also observed at the wharf deck level on the western side where no public access is allowed and the existing walkways are gated. Figures 10-16 illustrate the different pigeon guillemot niches and use of the wharf structure. It was noted repeatedly during nesting season observations that pigeon guillemots often require multiple attempts at landing in the confined cavity spaces under the wharf before successfully reaching their destination. These multiple attempts made precise counting of guillemots difficult at times as the birds circled and flew under the wharf during aborted attempts at landings.

Pigeon guillemots usually nest on rocky cliffs along the coast. They feed primarily on fish and can range widely in search of food. Figure 17 shows an adult guillemot bringing a fish from the open ocean to a nest site under the wharf. Adults were first observed bringing food into nest sites on 6/22/2017. Feeding activity at nest sites continued throughout the June and July study period.

FIGURE 10. Typical pigeon guillemot roosting and nesting habitat under wharf



FIGURE 11. Pigeon guillemot roosting under wharf



FIGURE 12. Pigeon guillemot in cavity space under wharf deck



FIGURE 13. Pigeon guillemot on wharf edge at closed west walkway



FIGURE 14. Pigeon guillemot in cavity under wharf



FIGURE 15. Pigeon guillemot in cavity under wharf



FIGURE 17. Pigeon guillemot carrying fish to young on nest



REFERENCES

eBird. 2012. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: <http://www.ebird.org>. (Accessed: Date [e.g., February 2, 2012]).

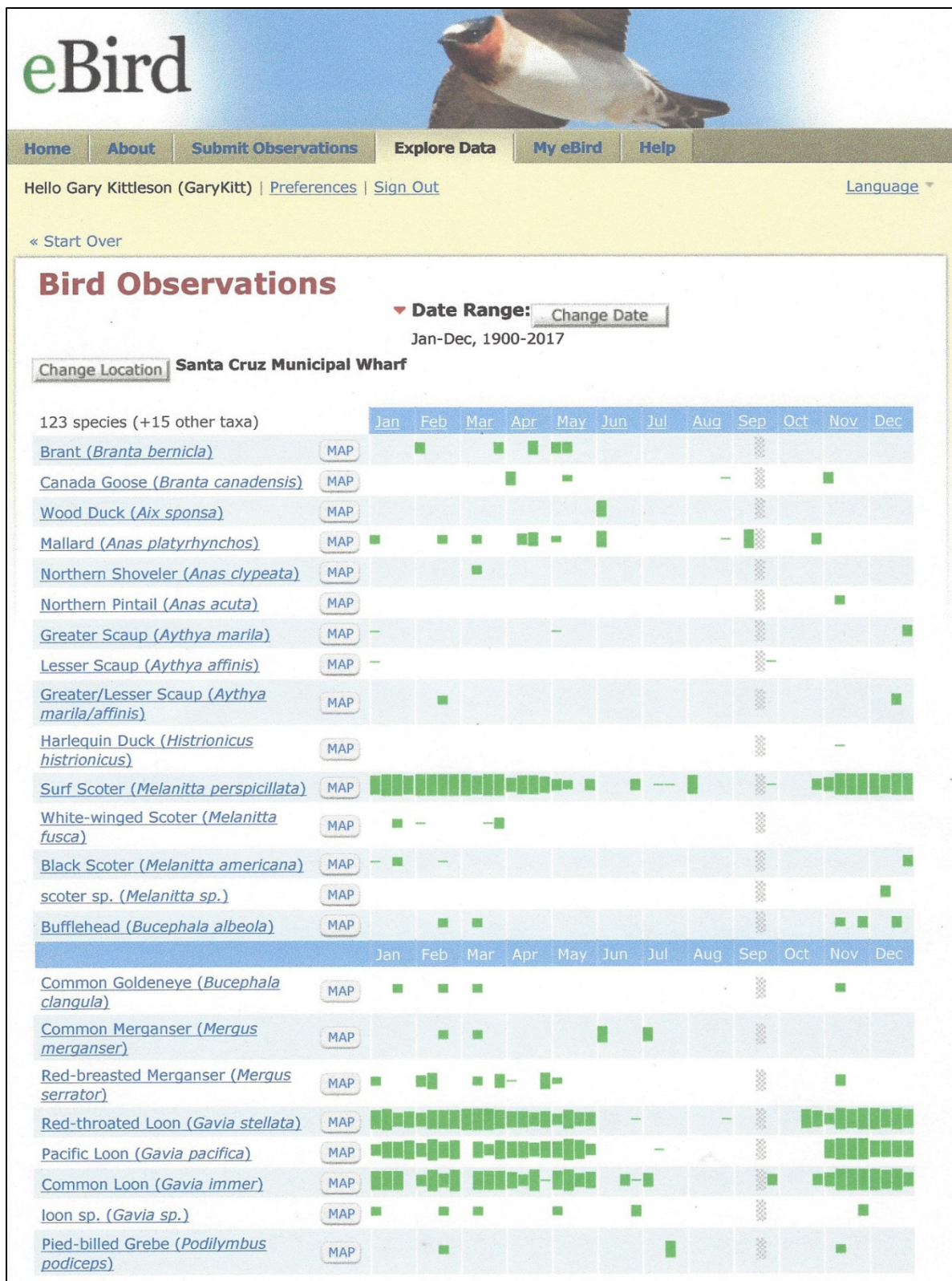
Santa Cruz Wharf Master Plan Report. 2014. Prepared for the City of Santa Cruz by Roma Design Group.

APPENDIX A: 2017 Survey Results - Species Totals by Month

Date range:	Apr 1, 2017 - Mar 31, 2018				Total # of Species:		27						
					Total # of Checklists:		7						
Location(s): Santa Cruz Municipal Wharf													
Summary													
	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017	Oct 2017	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	
Number of Species	15	8	10	13	--	--	--	--	--	--	--	--	
Number of Individuals	236	167	350	254	--	--	--	--	--	--	--	--	
Number of Checklists	2	1	2	2	--	--	--	--	--	--	--	--	
Total Number of Birds (sample size)													
Species Name	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017	Oct 2017	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	
Red-breasted Merganser (<i>Mergus serrator</i>)	1 (1)	--	--	--	--	--	--	--	--	--	--	--	
Red-throated Loon (<i>Gavia stellata</i>)	1 (1)	5 (1)	--	--	--	--	--	--	--	--	--	--	
Pacific Loon (<i>Gavia pacifica</i>)	3 (2)	1 (1)	--	--	--	--	--	--	--	--	--	--	
Common Loon (<i>Gavia immer</i>)	--	1 (1)	--	--	--	--	--	--	--	--	--	--	
Pied-billed Grebe (<i>Podilymbus podiceps</i>)	--	--	--	1 (1)	--	--	--	--	--	--	--	--	
Western Grebe (<i>Aechmophorus occidentalis</i>)	6 (2)	--	--	--	--	--	--	--	--	--	--	--	
Clark's Grebe (<i>Aechmophorus clarkii</i>)	1 (1)	--	--	--	--	--	--	--	--	--	--	--	
Brandt's Cormorant (<i>Phalacrocorax penicillatus</i>)	9 (1)	8 (1)	--	4 (2)	--	--	--	--	--	--	--	--	
Pelagic Cormorant (<i>Phalacrocorax pelagicus</i>)	--	4 (1)	2 (2)	--	--	--	--	--	--	--	--	--	
Double-crested Cormorant	2 (1)	--	1 (1)	2 (2)	--	--	--	--	--	--	--	--	

(<i>Phalacrocorax auritus</i>)												
cormorant sp. (<i>Phalacrocoracidae</i> sp.)	--	--	6 (1)	--	--	--	--	--	--	--	--	--
Brown Pelican (<i>Pelecanus occidentalis</i>)	--	--	24 (2)	42 (2)	--	--	--	--	--	--	--	--
Snowy Egret (<i>Egretta thula</i>)	6 (1)	--	--	--	--	--	--	--	--	--	--	--
Whimbrel (<i>Numenius phaeopus</i>)	10 (1)	--	--	--	--	--	--	--	--	--	--	--
Common Murre (<i>Uria aalge</i>)	--	--	--	1 (1)	--	--	--	--	--	--	--	--
Pigeon Guillemot (<i>Cepphus columba</i>)	22 (2)	27 (1)	32 (2)	33 (2)	--	--	--	--	--	--	--	--
Rhinoceros Auklet (<i>Cerorhinca monocerata</i>)	--	--	--	1 (1)	--	--	--	--	--	--	--	--
Heermann's Gull (<i>Larus heermanni</i>)	--	--	4 (1)	14 (2)	--	--	--	--	--	--	--	--
Ring-billed Gull (<i>Larus delawarensis</i>)	1 (1)	--	--	--	--	--	--	--	--	--	--	--
Western Gull (<i>Larus occidentalis</i>)	77 (2)	41 (1)	116 (2)	95 (2)	--	--	--	--	--	--	--	--
Caspian Tern (<i>Hydroprogne caspia</i>)	1 (1)	--	--	8 (2)	--	--	--	--	--	--	--	--
Forster's Tern (<i>Sterna forsteri</i>)	2 (1)	--	--	--	--	--	--	--	--	--	--	--
Elegant Tern (<i>Thalasseus elegans</i>)	--	--	--	3 (1)	--	--	--	--	--	--	--	--
Rock Pigeon (<i>Columba livia</i>)	94 (1)	80 (1)	160 (2)	48 (1)	--	--	--	--	--	--	--	--
American Crow (<i>Corvus brachyrhynchos</i>)	--	--	4 (1)	--	--	--	--	--	--	--	--	--
European Starling (<i>Sturnus vulgaris</i>)	--	--	1 (1)	--	--	--	--	--	--	--	--	--
Brewer's Blackbird (<i>Euphagus cyanocephalus</i>)	--	--	--	2 (1)	--	--	--	--	--	--	--	--

APPENDIX B: Ebird Observations - All Species (1900-2017)





123 species (+15 other taxa)		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Red-shouldered Hawk (<i>Buteo lineatus</i>)	MAP												
Red-tailed Hawk (<i>Buteo jamaicensis</i>)	MAP												
American Coot (<i>Fulica americana</i>)	MAP												
American Avocet (<i>Recurvirostra americana</i>)	MAP												
Black-bellied Plover (<i>Pluvialis squatarola</i>)	MAP												
Snowy Plover (<i>Charadrius nivosus</i>)	MAP												
Whimbrel (<i>Numenius phaeopus</i>)	MAP												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Long-billed Curlew (<i>Numenius americanus</i>)	MAP												
Marbled Godwit (<i>Limosa fedoa</i>)	MAP												
Black Turnstone (<i>Arenaria melanocephala</i>)	MAP												
Surfbird (<i>Calidris virgata</i>)	MAP												
Sanderling (<i>Calidris alba</i>)	MAP												
Dunlin (<i>Calidris alpina</i>)	MAP												
Least Sandpiper (<i>Calidris minutilla</i>)	MAP												
Red-necked Phalarope (<i>Phalaropus lobatus</i>)	MAP												
Red Phalarope (<i>Phalaropus fulicarius</i>)	MAP												
Spotted Sandpiper (<i>Actitis macularius</i>)	MAP												
Willet (<i>Tringa semipalmata</i>)	MAP												
Pomarine Jaeger (<i>Stercorarius pomarinus</i>)	MAP												
Parasitic Jaeger (<i>Stercorarius parasiticus</i>)	MAP												
jaeger sp. (<i>Stercorarius sp. (jaeger sp.)</i>)	MAP												
Common Murre (<i>Uria aalge</i>)	MAP												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pigeon Guillemot (<i>Cepphus columba</i>)	MAP												
Marbled Murrelet (<i>Brachyramphus marmoratus</i>)	MAP												
Ancient Murrelet (<i>Synthliboramphus antiquus</i>)	MAP												
murrelet sp. (<i>Brachyramphus/Synthliboramphus sp.</i>)	MAP												
Cassin's Auklet (<i>Ptychoramphus aleuticus</i>)	MAP												
Rhinoceros Auklet (<i>Cerorhinca monocerata</i>)	MAP												
Horned Puffin (<i>Fratercula</i>	MAP												

123 species (+15 other taxa)		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
alcid sp. (<i>Alcidae</i> sp.)	MAP												
Black-legged Kittiwake (<i>Rissa tridactyla</i>)	MAP												
Sabine's Gull (<i>Xema sabini</i>)	MAP												
Bonaparte's Gull (<i>Chroicocephalus philadelphia</i>)	MAP												
Laughing Gull (<i>Leucophaeus atricilla</i>)	MAP												
Heermann's Gull (<i>Larus heermanni</i>)	MAP												
Mew Gull (<i>Larus canus</i>)	MAP												
Ring-billed Gull (<i>Larus delawarensis</i>)	MAP												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Western Gull (<i>Larus occidentalis</i>)	MAP												
California Gull (<i>Larus californicus</i>)	MAP												
Herring Gull (<i>Larus argentatus</i>)	MAP												
Thayer's Gull (<i>Larus thayeri</i>)	MAP												
Glaucous-winged Gull (<i>Larus glaucescens</i>)	MAP												
Western x Glaucous-winged Gull (hybrid) (<i>Larus occidentalis</i> x <i>glaucescens</i>)	MAP												
Larus sp. (<i>Larus</i> sp.)	MAP												
gull sp. (<i>Larinae</i> sp.)	MAP												
Caspian Tern (<i>Hydroprogne caspia</i>)	MAP												
Common Tern (<i>Sterna hirundo</i>)	MAP												
Forster's Tern (<i>Sterna forsteri</i>)	MAP												
Elegant Tern (<i>Thalasseus elegans</i>)	MAP												
Rock Pigeon (<i>Columba livia</i>)	MAP												
Band-tailed Pigeon (<i>Patagioenas fasciata</i>)	MAP												
Eurasian Collared-Dove (<i>Streptopelia decaocto</i>)	MAP												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mourning Dove (<i>Zenaida macroura</i>)	MAP												
Anna's Hummingbird (<i>Calypte anna</i>)	MAP												
Rufous/Allen's Hummingbird (<i>Selasphorus rufus/sasin</i>)	MAP												
Belted Kingfisher (<i>Megasceryle alcyon</i>)	MAP												
American Kestrel (<i>Falco sparverius</i>)	MAP												
Merlin (<i>Falco columbarius</i>)	MAP												
Peregrine Falcon (<i>Falco peregrinus</i>)	MAP												
Black Phoebe (<i>Sayornis nigricans</i>)	MAP												
Say's Phoebe (<i>Sayornis saya</i>)	MAP												



