

McNabney Marsh
2017 Nesting Bird Surveys



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INTRODUCTION

The Mt. View Sanitary District (MVSD or the District) requested that a seventh annual nesting bird survey be conducted in McNabney Marsh (Marsh) during the 2017 breeding season. The survey was intended to collect data on nesting species for comparison with data collected in 2002–2004 and 2011–2016. The 2017 survey is the seventh consecutive annual survey documenting nesting bird activity since tide gate operations began in 2009.

Since the tide gates on Peyton Slough began operations in June 2009, the Marsh has experienced significant impediments to drainage. Stagnation is confounding the management of algae growth, water quality, nuisance odors, nesting bird reproduction, and other factors related to marsh health. One potential contributing factor in the poor drainage of the Marsh is a possible constriction on Peyton Slough at a Union Pacific Railroad (UPRR) bridge. Several engineering reports consider the bridge as a contributing factor to the constriction—preventing free flow. Analysis of the hydrology of Peyton Slough as it affects water exchange in the Marsh was conducted in 2013 and 2014 by HDR, Inc. A Draft Analysis Report was completed by HDR in September 2014. The general-consensus is that a combination of factors is moderating flows into and, more importantly, out of the Marsh, including a possible constriction at the railroad bridge and/or timing and degree of control of the tide gates in Peyton Slough. Whatever the cause(s), the pumped-up¹ water levels create challenges for ground-nesting species that have depended on the Marsh for nesting habitat for decades.

The District is aware of these challenges and, in an effort to manage these unnatural effects on nesting birds, artificial nesting rafts, which are unaffected by water levels, were constructed and deployed (2012-2016). A variety of substrates (vegetation, gravel, and sand) were added to the rafts, as well as rocks of various sizes, turf grass, branches, and other cover objects, in hopes of attracting nesting waterfowl and shorebirds species. Eight 3'x5' rafts were deployed in 2012; twelve 16" x 30" rafts in 2013; eight 4'x10' rafts in 2015, and eight additional 4' x 10' rafts were deployed through 2016 (Figure 1). The sixteen 4'x10' rafts are currently the only functional artificial nesting habitat that is maintained in McNabney Marsh.

EcoServices has operated the tide gates on Peyton Slough with the primary goal of watering a downstream pickleweed (*Salicornia* sp.) mitigation site (South Marsh) on the north side of Waterfront Road. As it has since 2013, MVSD supplied daily water-level data in McNabney Marsh to EcoServices, which has used the data to determine the extent and duration of tide gate manipulation. However, unlike previous nesting seasons, this data was provided via a HydroVu continuous monitoring device providing real-time water level data 24 hours per day. *Note:* the HydroVu device levels reported here have not been correlated to any known elevation metric and are simply treated as relative levels. As of this writing, MVSD is investigating the possibility of converting the HydroVu readings to NAVD 88.

¹ Pumped-up refers to a relative imbalance between inflow and outflow from McNabney Marsh. This imbalance results in more water flowing in than flowing out of the marsh. The result is that McNabney Marsh can increase in volume during every tidal cycle, despite water flowing out of the tide gates when the gates are closed.

Figure 1. Two 4'x 10' single rafts covered with sand and gravel were moved into the south end of McNabney Marsh in January 2015 and 2016.



In previous years, MVSD and EcoServices elected to maintain water levels at or below 2.5 feet (data were measured using the staff gauge at the East Channel tide gate) with no mandated minimum water level. In 2017, however, high rainfall in December and January as well as construction project needs at Moorhen Marsh resulted in the tide gates being closed January through March/April. By this time period, nesting was well underway in McNabney Marsh and tide gate operations became further constrained. EcoServices continued to pop the gates (open all three bi-directional flow gates at high tide for 1-2 hours) which resulted in flooded nests in late April. The tide gates were ordered closed (including popping of the gates) on 01 May 2017, for the duration of the nesting season, by the CDFW Game Warden, Nicole Kozicki. This prolonged period of gate closure resulted in much less open water and more exposed mud flat and bare ground in the Marsh.

METHODOLOGY

The Wildlife Project continued survey efforts during the seventh year of a multi-year nesting bird survey in McNabney Marsh. This work included studying previous nesting bird data provided

by MVSD (i.e., 2002–2004 and 2011–2016) and conducting field surveys for nesting activity throughout the Marsh in 2017.

Visual encounter surveys included three pre-established transects and four pre-established observation points in order to create repeatable data collection locations that could be compared over time. Transects were located along the northern, eastern, and southern shoreline borders of the Marsh (Figure 2). Observation points were located in appropriate areas for clear viewing, and a spotting scope and/or binoculars were used to scan larger areas for nesting birds, and for determining breeding and nesting behavior.

Surveys began during the second week of March 2017 and were conducted every other week through 26 July 2017. Transects and observation point surveys were organized in such a way that all data could be collected before noon each day. Surveyors typically walked transects while collecting data on birds observed, nests observed, nesting activity, chicks hatched, chicks fledged, etc. Counts at observation points were typically conducted in conjunction with the associated transects. All nests of birds observed were identified to species and mapped.

RESULTS

The HydroVu unit indicated that water levels were at 1.8 feet (approximately 2.8' NAVD88) at the onset of the bird nest monitoring period (08 March 2017). Because the tide gates were closed (except for popping events) water levels gradually decreased in the Marsh during the nesting season. On several occasions, popping did raise Marsh water levels, including on 23 April, where water levels were increased by of 0.43 feet and resulted in a loss of five ground nesting bird nests [1 American Avocet (*Recurvirostra americana*), 4 Black-necked Stilt (*Himantopus mexicanus*)]. Following the loss of these five nests, the Game Warden instructed EcoServices to close the gates (including popping) until the end of the nesting season in McNabney Marsh. With closed gates and the cessation of all tide gate popping events, the Marsh drained to a level of 0.59 feet which exposed subsurface mudflats across approximately 40% of the southern half of the Marsh. This condition began in late April/early-May and continued through the end of nesting season (26 July 2017). Between 26 and 30 July the tide gates were opened and the Marsh water level raised 1.7 feet to 2.4 feet.

Coincident with water level monitoring, field surveys for nesting birds began after the first detected nest was reported. Transects surveys were conducted from 08 March to 26 July, 2017, resulting in an average of 18 species observed per survey (range = 11–24). Total numbers of individual birds ranged from 100 to 574 (mean = 272/survey). This count was approximately 7% lower than the average number of birds observed in 2016.

Nesting was initially observed on 08 March, with Canada Goose (*Branta canadensis*) and Mallard (*Anas platyrhynchos*) being the earliest nesting species observed. Nesting activity peaked in early June; approximately four weeks later than in 2016 and approximately the same week as 2015 (Figure 3). It should be noted that the peak in detected nests has a high level of inter-annual variability and shows no real pattern of occurring earlier or later over time. This variability may or may not be related to the significant changes in hydrology and vegetation decreases that the Marsh experiences year-to-year.

Figure 2. Location of 3 transects and 4 observation points used to document migratory bird nesting in McNabney Marsh, Martinez, CA.



Seven ground-nesting species were observed nesting during the 2017 season: Canada Goose, Mallard (*Anas platyrhynchos*), Killdeer (*Charadrius vociferous*), Black-necked Stilt, American Avocet, and Suisun Song Sparrow (*Melospiza melodia maxillaris*). Two additional bird species that regularly nest in the Marsh were also observed nesting in 2017: Tree Swallow (*Tachycineta bicolor*), and Red-winged Blackbird (*Agelaius phoeniceus*). The composition of nesting species in 2017 has decreased from previous years. Three species, in particular, which nested regularly in McNabney Marsh [i.e., Great-tailed Grackle (*Quiscalus mexicanus*), Marsh Wren (*Cistothorus palustris*), and San Francisco Common Yellow-throat (*Geothlypis trichas sinuosa*)] were not detected nesting in 2017 and were rarely observed in the marsh foraging.

Mute Swan (*Cygnus olor*), which was observed in 2016, was never observed during nesting transect surveys, but were observed anecdotally. Two adults and at least two cygnets were observed in the Marsh early in the nesting season (April). Thereafter, this species was not noted in McNabney Marsh either during nesting bird transect surveys or during anecdotal observations.

The first observed chicks were recorded on 20 April 2017 (Killdeer) and the last chicks observed were from surveys on 18 July 2017 (Black-necked Stilt). At least 40 chicks were observed but not all reached the fledgling stage during the 2017 survey period (Figure 4).

DISCUSSION

The 2017 nesting season for migratory birds in McNabney Marsh appeared to begin during the second week of March and extended into late July—similar to previous years, but fluctuations on the timing of nesting activity, of a week to a month, appear to be normal at this site. The number of fledglings observed during the 2017 monitoring year appears to be equal to the average number of fledglings observed over the last four years (i.e., 23 fledglings). Although the nesting rafts were not used in 2017, greater natural nesting habitat (dry, bare ground over 40% of the southern portion of the Marsh) was available and used extensively.

The 2017 monitoring year marks the first year during the 7-year monitoring period when a typically very common nester, the Marsh Wren, was not detected nesting. Additionally, two species that were common in the Marsh, and nested annually, were also nearly absent from McNabney Marsh in 2017, and did not show signs of nesting—San Francisco Common Yellow-throat, and Great-tailed Grackle. The absence of nesting for the former species is of significance because the species is considered a California Species of Concern by the California Department of Fish and Wildlife (Shuford and Gardali 2008). We speculate that changing conditions in vegetation (i.e., decreasing vegetative density and species composition) may be providing less suitable habitat and microhabitat to these three species and others.

The non-native Mute Swan successfully nested in the Marsh for the first time in 2016. However, the exposed mudflats and shallower water in the Marsh appeared unsuitable for the species in 2017. Cygnets that hatched were thought to be predated relatively early in their development and adults either moved to another site or were also predated.

Figure 3. Observations of active nests detected during surveys for nesting birds in McNabney Marsh, Martinez, CA, 2017.

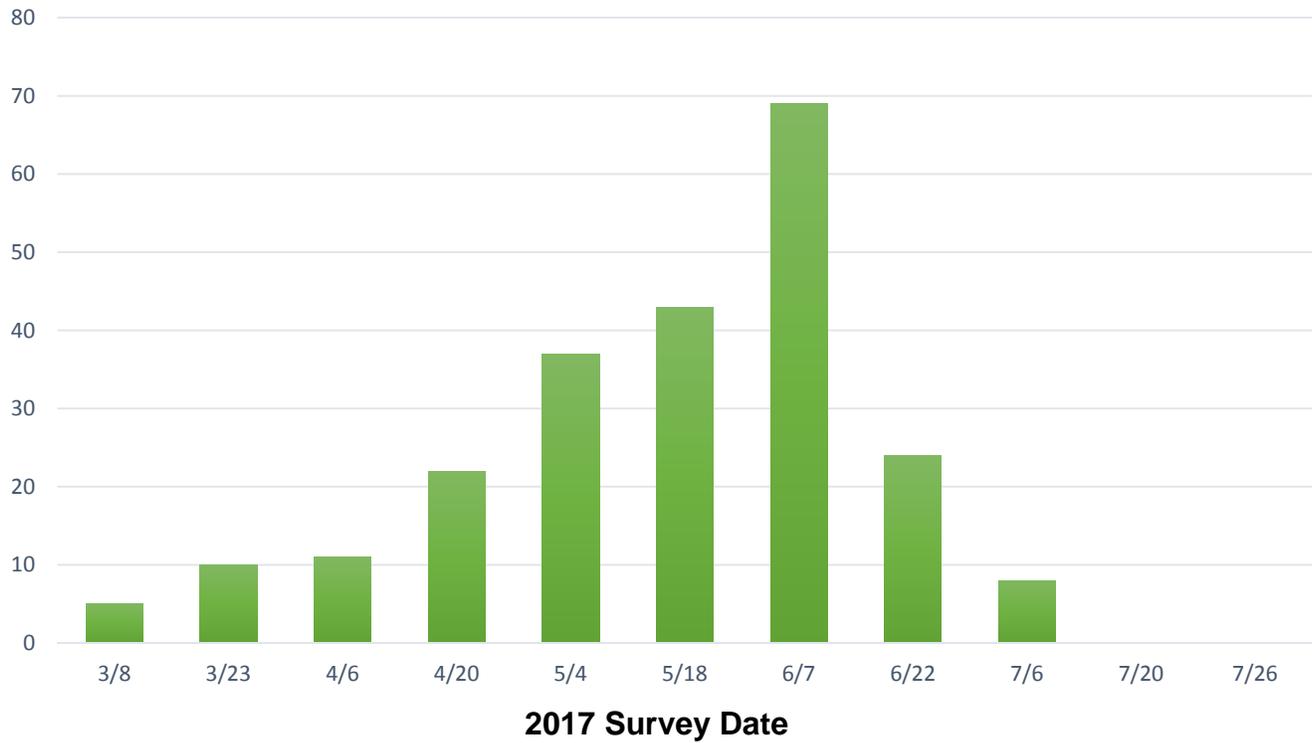
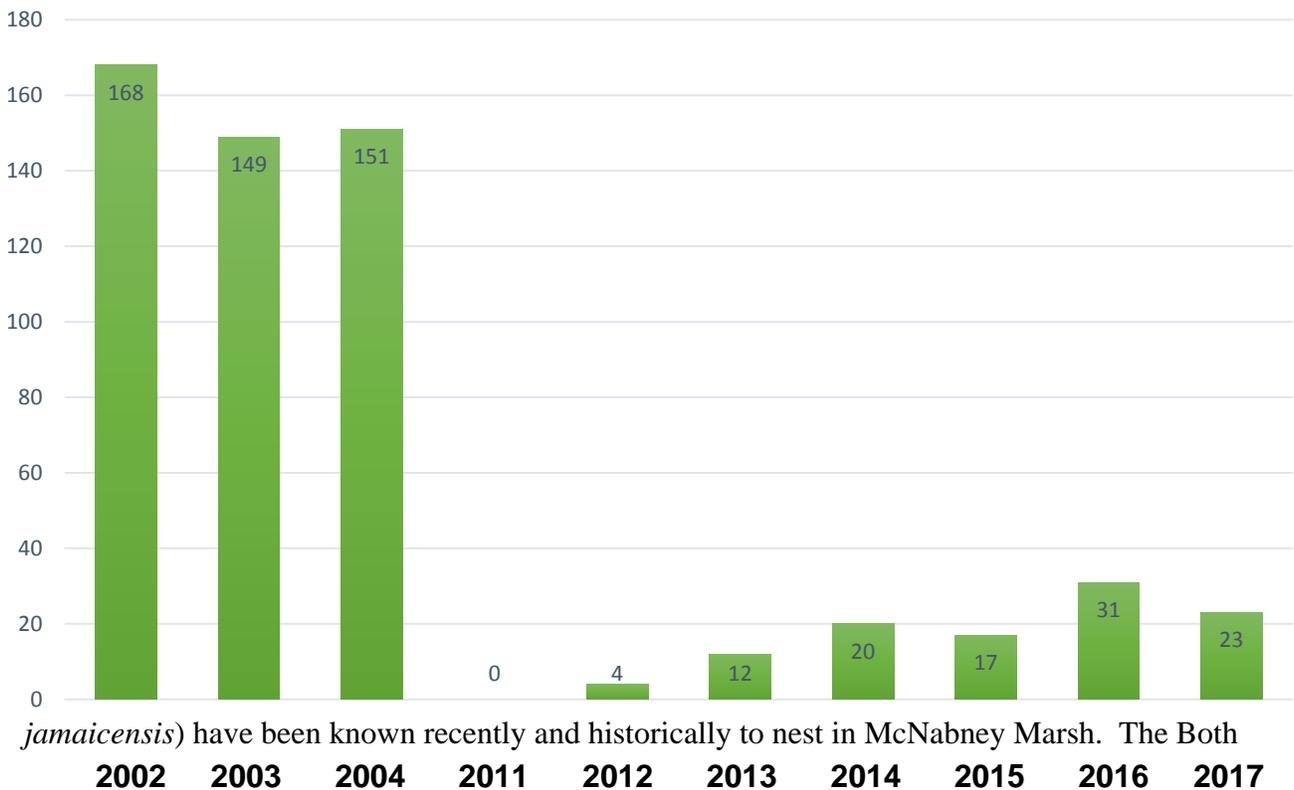


Figure 4. Number of observed fledglings in McNabney Marsh 2002–2004 and 2011–2017.



jamaicensis) have been known recently and historically to nest in McNabney Marsh. The Both

Ridgway's (= Clapper) (*Rallus logirostris obsoletus*) and Black Rails (*Laterallus jamaicensis*) have been known recently and historically to nest in McNabney Marsh. Significant reduction in emergent vegetation in the Marsh is likely decreasing their numbers. If increases in emergent vegetation occur in the Marsh, both Ridgway's and Black Rails may again utilize the site. Presence of these species should be considered possible.

Floating rafts were unused during the 2017 monitoring season likely for a variety of reasons. (Table 1). The extent and availability of dry, bare ground, which is suitable to most ground nesting birds likely contributed to the lack of use in 2017.

At least 69 nests resulted in a minimum of 40 chicks hatched in McNabney Marsh in 2017—a significant increase (more than doubled) from 2016 ($n = 23$). However, 2017 produced only 23 fledglings, a decrease from 2016 ($n = 31$). It is impossible to know precisely what caused the decrease in fledgling numbers, but anecdotal evidence suggests that a lack of vegetative cover increased the rate of chick predation. Surveys during 2016 indicated that fledglings were produced from eight different species (i.e., Canada Goose, Mallard, Northern Pintail, Cinnamon Teal, Gadwall, Killdeer, Black-necked Stilt, and American Avocet). The 23 fledglings observed in 2017 were from only six species: Canada Goose, Mallard, Killdeer, American Avocet, Black-necked Stilt, and Suisun Song Sparrow.

Our surveys focused primarily on ground-nesting birds that might be impacted by hydrologic management changes. Water level management in 2017 was greatly different from any year previously monitored. The closure of tide gates increased site suitability substantially for ground nesting species. However, longer-term decreases in vegetation (i.e., *Typha*, *Schoenoplectus*, *Phragmites*, etc.) from changes in tide gate operations since 2009, may be creating conditions that are less suitable for nesting habitat for Marsh Wren, San Francisco Common Yellow-throat, and Great-tailed Grackles, among other species.

MANAGEMENT RECOMMENDATIONS

The prolonged closure of the Peyton Slough tide gates throughout the 2017 nesting bird season (excluding tide gate popping events) provided insight into the value of bare-ground habitat for ground nesting birds. Although significant changes in the Marsh have occurred since 2009 that could not be modified by a single season of reduced water levels (i.e. the loss of much of the emergent vegetation that provides habitat for Marsh Wren and San Francisco Common Yellow-throat), the return of some bare ground nesting habitat demonstrated the benefits of this limited resource to nesting birds when tide gate management is used to more effectively to drain McNabney Marsh. The reduced water levels may have also contributed to failed nests and loss of suitable habitat for the invasive Mute Swan at this site.

It is highly recommended that MVSD actively pursue a change in tide gate operations that result in lower water levels that will help to create less open water and increase nesting microhabitat (i.e., more mud flat, bare ground, and vegetated marsh habitats). Such microhabitat diversity would likely increase nesting bird success for waterfowl, shorebirds, and other wetland species that depend on emergent vegetation for nesting habitat.

Table 1. Usage and success on nesting rafts in McNabney Marsh 2013–2016. Not all rafts were used every year, and some were reused; only those used are listed below.

Year of use	Raft size	Species utilizing rafts	Result
2012	36" x 60"	Canada Goose	Nest & eggs, no fledglings
	36" x 60"	Canada Goose	Nest & eggs, no fledglings
	36" x 60"	Canada Goose	Nest & eggs, no fledglings
	36" x 60"	Canada Goose	Nest & eggs, no fledglings
	36" x 60"	Canada Goose	Nest & eggs, no fledglings
	36" x 60"	Canada Goose	Nest & eggs, no fledglings
2013	16" x 30"	Black-necked Stilt	Nest only
	36" x 60"	Canada Goose	Nest & eggs, no fledglings
	36" x 60"	Canada Goose	Nest & eggs, no fledglings
2014	36" x 60"	Black-necked Stilt	Nest, presumed fledgling
2015	4' x 10'	Black necked Stilt	Nest, presumed fledgling
	4' x 10'	American Avocet	Nest, one fledgling
	4' x 10'	Black necked Stilt	Nest presumed failed
	4' x 10'	Black necked Stilt	Nest presumed failed
	4' x 10'	American Avocet	Nest presumed failed
	4' x 10'	American Avocet	Nest presumed failed
2016*	4' x 10'	Black necked Stilt	Nest, presumed fledgling
		Black necked Stilt	Nest
		American Avocet	Nest
		American Avocet	Nest
	4' x 10'	American Avocet	Nest, presumed fledgling
		American Avocet	Nest
		American Avocet	Nest
	4' x 10'	Black necked Stilt	Nest
		American Avocet	Nest
	4' x 10'	American Avocet	Nest presumed failed
	4' x 10'	American Avocet	Nest presumed failed
	4' x 10'	American Avocet	Nest presumed failed
	4' x 10'	American Avocet	Nest, presumed fledgling
	4' x 10'	American Avocet	Nest, two fledglings
2017	any size	no use	none

*Some nesting platforms had multiple nests or multiple nest attempts with either one or two species

All of the species documented as nesting in McNabney Marsh are protected by the Migratory Bird Treaty Act, and thus afforded a level of protection that prohibits take of the individual birds, nests, eggs, or parts thereof. Therefore, it is highly recommended that significant and dramatic changes in water levels—via tide gate operations including popping—be avoided during the nesting season in the Marsh (typically between 01 March to 31 July).

The sixteen 4'x10' nesting rafts in McNabney Marsh went unused in 2017, when water levels were at or around 0.6 feet (about 1.6 feet NAVD 88), but were very commonly used in 2016 when water levels were managed at or near 2.5 feet (about 3.5 feet NAVD 88). This observation suggests that MVSD should invest in additional nesting rafts *only* if lower water levels cannot be successfully managed in McNabney in 2018 and beyond. If tide gate operations return to water levels managed above 2.0 feet (about 3.0 NAVD 88), nesting rafts could provide the most useful nesting habitat for shorebirds in the marsh. Continuing or even expanding the program should be considered under these circumstances.

The use of vegetated nesting rafts utilizing living cattail or bulrush should be explored to off-set emergent vegetation loss in McNabney Marsh and to benefit species such as Marsh Wren and San Francisco Common Yellow-throat.

Because water level management and tide gate operations are still in a state of flux, annual nesting bird surveys should continue in the Marsh for the foreseeable future following the methodology provided above. Data should be compared year-to year and made available to all interested parties.

LITERATURE CITED

Shuford, W. D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Wildlife, Sacramento.