

The Importance of Off-Channel Ponds to Wintering Waterbirds along the American River in Sacramento, California: An Initial Assessment

Daniel A. Airola¹, Maureen Geiger², and Susan Goodrich³

¹*Conservation Research and Planning, Sacramento, CA. d.airola@sbcglobal.net*

²*Sacramento Audubon Society, Sacramento, CA. mkgeiger@comcast.net*

³*Sacramento Audubon Society, Rocklin, CA. magiclab@comcast.net*

ABSTRACT

We studied waterbird use of ponds adjacent to the Lower American River in Sacramento County, California during the winters of 2021–2022 and 2022–2023. We surveyed waterbirds at Arden and Urrutia ponds, the two largest ponds along the river, which have been proposed at various times for elimination or modification to mitigate for impacts of riverine flood control work. We summarized numbers recorded at Urrutia Pond during 2010–2017 Christmas Bird Counts (CBCs) and compared numbers of waterbirds using ponds to the numbers recorded during 2014–2022 counts of the entire Lower American River. Our surveys showed that the ponds were used by a high diversity and abundance of waterbirds, including geese, ducks, cormorants, coots, and a newly established pair of Bald Eagles (*Haliaeetus leucocephalus*). The CBCs recorded an average of >2,000 Canvasbacks (*Aythya valisineria*) at Urrutia Pond, nearly the entire population on the Lower American River. Our surveys found that high numbers of diving ducks moved daily from daytime foraging areas on the river to ponds for night-roosting, presumably to conserve energy and avoid predation. Peak numbers of the Bufflehead (*Bucephala albeola*), Common Goldeneye (*B. clangula*), and Common Merganser (*Mergus merganser*) on ponds represented 91–134% of the total populations of these species counted on the entire Lower American River. Our results are preliminary because of the relatively few surveys over only a few years but they suggest that the currently proposed elimination of Urrutia Pond has the potential to affect the Lower American River populations of diving ducks and other waterbirds. Retention of Arden Pond and a portion of Urrutia Pond, would reduce the potential for impacts to diving ducks and other waterbirds that currently use the ponds.

The Lower American River in Sacramento County supports a diverse and abundant waterbird population that has not been extensively studied. Two off-channel water bodies, Arden and Urrutia ponds, were created by past aggregate mining and receive substantial use by waterbirds, but this use has not been well-documented. The ponds are recognized as two of the few large calm water bodies along the American River and have been identified as possible important roosting areas for waterfowl, especially diving ducks, that feed diurnally on the American River.

The Lower American River supports runs of anadromous steelhead (*Ochorynchus mykiss*) and fall-run Chinook salmon (*O. tshawytscha*). As part of mitigation for effects of ongoing American River flood protection activities on these fish, the U.S. Army Corps of Engineers (Corps) and the Sacramento Area Flood Control Agency (SAFCA) have, at various times, proposed to modify Arden and Urrutia ponds to create salmon spawning and rearing habitat (U.S. Army Corps of Engineers 2020, ESA 2021, K. Sorgen, pers. comm.).

Modification of the off-channel ponds along the American River has raised concerns because of their rarity and the potential effects on wintering and breeding waterbirds. Use of calm-water areas for night-roosting by waterbirds that forage in the American River during the daytime suggest that they may be important in minimizing energy expenditure and reducing predation risk, especially for diving ducks (subfamilies Aythyinae, Merginae, Oxyurinae). These concerns, however, have been based on anecdotal observations of waterbird use, many of which have been recorded in eBird (ebird.org) but not summarized or analyzed. We were particularly interested in patterns of pond use by diving ducks that commonly use the American River for foraging during the day, including the Bufflehead, Common Goldeneye, and Common Merganser (scientific names of major waterbird species are in Table 2).

The Corps' proposals to modify off-channel ponds prompted us to collect available and new information on waterbird use of the Arden and Urrutia ponds. We particularly focused on documenting pond use by night-roosting birds because of its potential importance to the American River waterbird population. Objectives of the study were to quantify diurnal and nocturnal use of the ponds by wintering waterbirds and use this and other available information to evaluate the importance of pond habitat to waterbirds of the American River and the potential effects of the proposed mitigation program.

STUDY AREA

We studied waterbird use at the two larger ponds along the Lower American River, Sacramento County that the Corps has proposed modifying at various times recently to mitigate for impacts of flood control projects on

anadromous fish, riparian birds, and the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*).

Lower American River

The Lower American River flows 37 km west from Folsom Dam and then through Lake Natoma to its confluence with the Sacramento River, passing through the cities of Folsom, Rancho Cordova, and Sacramento, and unincorporated areas of Sacramento County (Figure 1). The river is leveed for flood control to protect the surrounding residential, commercial, and industrial development. Flow volumes in the American River vary during winter based on precipitation and upstream reservoir operations at Folsom Dam. Lands immediately adjacent to the river form the American River Parkway (hereafter, “the Parkway”), a 1,950-ha property managed by the Sacramento County Department of Parks and Open Space that supports a variety of woodland, shrub, and herbaceous plant communities and a high level of recreational use. The river is used for spawning and rearing by anadromous fish species, including the green sturgeon (*Acipenser medirostris*) and Central Valley population of steelhead (both federally threatened), and fall-run Chinook salmon.

Arden Pond

Arden Pond is within the William B. Pond Recreation Area, a portion of the Parkway on the north side of the American River (Figure 1). The 13.3-ha pond was created by past aggregate mining. It supports an elongated 0.36 ha island that is separated into more islands at low water and inundated during high water. A diverse mix of aquatic habitats is present, including open and vegetated shoreline, shallow waters, and deep water (>2.3 m; ESA 2021). The pond is connected to the American River, with low or subsurface flow entering during low river flows and higher through-flow when the river is at higher flow stages. The pond is well known as an area where waterbirds concentrate (<https://ebird.org/barchart?r=L225812&yr=all&m=>; see RESULTS). A large rookery about 200 m east of the pond is used mainly by Great Blue Herons (*Ardea herodias*), Great Egrets (*A. alba*), and a few Double-crested Cormorants.

Urrutia Pond

The 22.5-ha Urrutia Pond is upstream of Discovery Park on the north side of the American River near its confluence with the Sacramento River (Figure 1). The pond was created by aggregate mining and was privately owned during our surveys but was subsequently purchased by the SAFCA for use in mitigating impacts of flood control work along the Lower American River. The pond is mostly steep-sided and deep (>6m) with a narrow fringe of riparian and wetland vegetation. It is fed by subsurface flow from the American River but is not directly connected to the river except during infrequent high-water

events. Due to restricted public access, information on bird use of the pond has mostly been limited to twice-annual December surveys conducted for the Sacramento Christmas Bird Count (CBC) and the American River Natural History Association's (ARNHA) wildlife count (see RESULTS) and our recent surveys. General public access is prohibited and with strict enforcement.

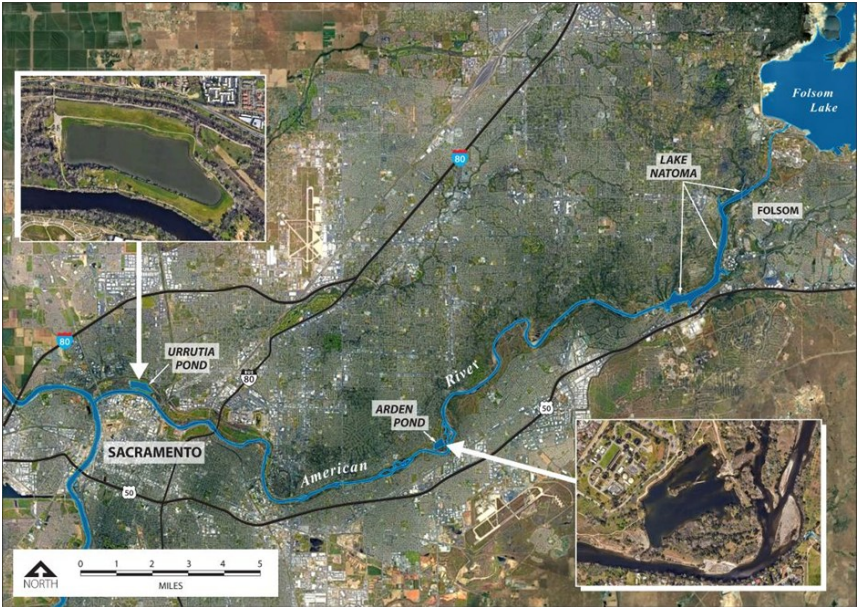


Figure 1. The American River and off-channel Urrutia and Arden ponds, and other lacustrine areas.

METHODS

Daytime and Nighttime Surveys

We counted waterbirds during the daytime and at dusk (“nighttime surveys”) at Arden and Urrutia ponds to quantify daytime and night-roosting use. The term *Waterbirds* is broadly defined here to include waterfowl, wading birds, gulls, shorebirds, grebes, cormorants, coots, Bald Eagles, and Belted Kingfishers (*Megaceryle alcyon*). It was impractical to conduct nighttime surveys to record night use of the ponds by waterbirds, but we believe that our counts at dusk reflect nighttime use for diving ducks (except for possible undercount due to inability to count arrival under darkening conditions) based on several lines of evidence. Both the Common Goldeneye and Common Merganser typically feed during the daytime (Eadie et al. 1995, Pearce et al. 2015). Also, we received reports of Common Goldeneyes flying from off-channel ponds to the American River in the early morning,

suggesting that they remained on ponds through the night (L. Douglas, pers. comm.). Although Buffleheads have been reported to feed at night in winter (Gauthier 2014), we do not believe that they were doing so within the Lower American River.

Surveys were conducted by walking portions of the shoreline as needed to have a full view of the water surface. M. Geiger and S. Goodrich conducted nine surveys at Urrutia Pond (accompanied by D. Airola on three surveys) from 10 November 2022 to 26 January 2023 (see Appendix 1 for survey dates and daily results). Daytime and nighttime surveys were conducted on different days except for one pair of daytime and nighttime surveys conducted on 19 December 2022. We could not survey at Urrutia Pond after the end of January due to flooding. D. Airola conducted 16 wintering waterbird surveys over two winters at Arden Pond including six dates during January and February 2022 (five each of daytime and nighttime surveys) and six surveys (three each of daytime and nighttime surveys) on four dates over November 2022 to February 2023 (see Appendices 2 and 3 for survey dates). Paired surveys were conducted in the afternoon and at dusk on four days in early 2022 and two days during 2022–2023.

We compared the average (\bar{x}) numbers of birds of each species recorded during daytime and nighttime surveys to determine if differences in numbers existed, and especially to identify the extent of night-roosting use. In some cases, our counts are underestimates of the numbers of night-roosting birds because we could hear birds arriving after it was too dark to identify the species or to count individuals.

Other Available Data Sources

Christmas Bird Counts. We summarized data available from the Sacramento CBC (also recorded in eBird) recorded at the Urrutia Pond by M. Geiger from 2010 to 2017. These surveys were conducted between 12:15 and 14:45, thus representing daytime waterbird use levels.

American River Natural History Association Data. ARNHA has organized an annual count of birds and other wildlife along the entire Lower American River since 1984. The Parkway is divided into sections that are assigned to small groups who attempt to count all species. We summarized numbers reported on the survey from 2014 to 2022 and compared the average numbers of waterbirds on the ARNHA counts to those we made at Urrutia and Arden ponds to determine the relative importance of the ponds to populations of key waterbird species and groups that use the Lower American River. Notably, surveyors conduct ARNHA counts on each side of the river and so may be counting the same waterbirds on the river. The counts are not screened for duplication (J. Langham, pers. comm.), so reported numbers may be overestimates.

We did not use the large number of eBird records available (other than those from the CBCs, ARNHA counts, and our surveys) because we did not know if the numbers reported complete counts.

Water flows

We characterized water levels based on heights reported at the Fair Oaks gauge (<https://waterdata.usgs.gov/monitoring-location/11446500/#parameterCode=00065&period=P365D>) located about 11 km upstream of Arden Pond.

RESULTS

River Conditions during Surveys

Water elevations and resulting habitat conditions in the American River and at Arden Pond differed substantially during the two winter periods we surveyed. Based on observations made during surveys and river elevation measures, flows were moderate in early 2022 (2.1–3.0 m), with a small amount of water flowing into and out of the pond. Flows were much higher (2.3–5.4 m) in January 2023, which created fast-moving flows in the river and a substantial flow of fast-moving water through the south side of the pond.

Urrutia Pond

2010–2017 CBC Counts. Daytime counts conducted in December for the Sacramento CBC at Urrutia Pond showed substantial numbers of all waterbirds (\bar{x} = 2,503 per survey), waterfowl (2,369), and diving ducks (2,269; Table 1). The most abundant species by far was the Canvasback which numbered 2,000–4,500 individuals in four of seven years. Although species' use levels were variable, high peak daytime numbers were recorded for Canada Geese (119), Common Goldeneyes (80), Common Merganser (121), Ruddy Ducks (60), American Coot (132), various gulls (200), and Double-crested Cormorants (140). No Bald Eagles were observed during these surveys.

2022–2023 Winter Waterbird Surveys. We observed a total of 27 waterbird species during daytime and nighttime surveys at Urrutia Pond, with nearly equal numbers of species during each period (Table 2; Appendix 1). In contrast to past years (Table 1), few Canvasbacks were seen during our surveys, but substantial numbers of other waterbirds used Urrutia Pond for roosting at night. The average number of waterbirds occurring at night was at least 62% higher than during the daytime, with over three times as many diving ducks using the pond for night roosting than during the daytime.

Major increases in numbers between daytime and nighttime occurred for Common Goldeneye (nearly 1000%), Bufflehead (233%), and Common Mergansers (85%), as well as substantial proportional increases in the less-

Table 1. Numbers of waterbirds observed during the daytime Christmas Bird Counts at Urrutia Pond, 2010–2017.

Species ¹	12/26 2010	12/1 2012	12/7 2013	12/6 2014	12/5 2015	12/27 2015	12/17 2017	Average
Canada Goose	123	35	71	119	95	139	24	87
Mallard	33	0	36	30	0	6	11	17
Green-winged Teal	0	0	0	5	2	2	0	1
Canvasback	3	3	2,000	4,000	4,500	4,500	50	2,151
Bufflehead	5	0	0	6	20	20	0	7
Common Goldeneye	36	0	80	15	21	1	1	22
Common Merganser	1	5	121	2	72	0	79	40
Ruddy Duck	0	0	24	33	60	40	35	27
Other waterfowl species	1	2	18	7	46	32	12	17
American Coot	8	0	15	59	100	132	7	46
Gulls	1	0	1	0	36	20	200	37
Double-crested Cormorant	4	80	34	3	15	4	140	40
Bald Eagle	0	0	0	0	0	0	0	0
Other waterbirds	8	5	9	3	33	13	5	11
Total Waterbirds	223	130	2,409	4,282	5,000	4,909	564	2,503
Total Waterfowl	202	45	2,350	4,217	4,816	4,740	212	2,369
Total Diving Ducks	45	10	2,201	4,023	4,642	4,529	130	2,226
Waterbird Species	15	7	12	17	26	19	14	
Waterfowl Species	7	4	6	11	11	11	6	

¹Scientific names in text or Table 2.

abundant Green-winged Teal, Ruddy Ducks, and “other waterfowl species” (Table 2). The recorded numbers are underestimates of true values because an unknown number of unidentifiable species were seen returning after it was too dark to identify and count them. Conversely, Double-crested Cormorants used the pond only during the day, presumably for feeding and resting (Table 2). At least some of the cormorants that use the Lower American River roost at night in trees 5 km downstream from Arden Pond (D. Airola, eBird data, <https://ebird.org/hotspot/L4406789>).

Table 2. Summary of numbers of waterbirds during five daytime and five nighttime surveys at Urrutia Pond from 10 November 2022 to 26 January 2023. See Appendix 1 for survey dates and numbers recorded for all species.

Species/Group	Average Number		% difference
	Daytime	Nighttime	
Canada Goose (<i>Branta canadensis</i>)	20	25	24%
Mallard (<i>Anas platyrhynchos</i>)	15	6	-57%
Green-winged Teal (<i>Anas crecca</i>)	1	23	2175%
Canvasback (<i>Aythya valisineria</i>)	4	0	-100%
Bufflehead (<i>Bucephala albeola</i>)	13	42	233%
Common Goldeneye (<i>Bucephala clangula</i>)	15	166	992%
Common Merganser (<i>Mergus merganser</i>)	23	43	87%
Ruddy Duck (<i>Oxyura jamaicensis</i>)	2	18	629%
Other waterfowl species	4	37	825%
American Coot (<i>Fulica americana</i>)	21	23	6%
Gulls	10	6	-40%
Double-crested Cormorant (<i>Nannopterum auritum</i>)	102	0	-100%
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	2	2	-6%
Other waterbirds	9	2	-74%
Total Waterbirds	239	391	63%
Total Waterfowl	96	359	273%
Total Diving Ducks	57	268	372%
Total Waterbird Species	25	24	-4%
Total Waterfowl Species	12	12	0%

Bald Eagles began constructing a nest at Urrutia pond in fall of 2022 in a large western sycamore (*Platanus racemosa*) that had been previously used as a rookery tree by Great Blue Herons. The eagle pair were seen regularly during both daytime and nighttime surveys (Table 2). Numbers of Canada Geese, Mallards, coots, gulls, and other species were low and relatively similar during day and night.

Arden Pond

We recorded 20 waterbird species during winter 2021–2022 and 2022–2023 waterbird surveys at Arden Pond, with slightly more species observed during daytime than nighttime surveys (Table 3, Appendices 2 and 3). Total waterbirds were 1.5 times as abundant at night than during the day in 2021–2022 but were 4.5 times more abundant in nighttime surveys in 2022–2023. All waterfowl and diving ducks were substantially more abundant at night than during the day, but especially in December and early January when river flows were higher (Appendix 3).

Waterbird use was lower during the day in 2021–2022 than in 2022–23, but numbers were substantially higher at night in 2022–2023, especially on those days when flows were high in the American River. Nighttime numbers were over six times higher at night in 2022–2023 than in 2021–2022. Substantially more individuals occurred at night than during the daytime for Common Goldeneye (by 11 times and 8.6 times over 2021–2022 and 2022–2023, respectively), Bufflehead (2.2 and 2.3 times more), and Common Mergansers (5 and 2.5 times more), as well as substantial increases for all other less abundant waterfowl species (Table 3). Pond use by Common Goldeneye was especially high during 2022–2023 high water conditions in the American River, with the highest individual nighttime count at 385 individuals (Appendix 3). Night-roosting diving ducks concentrated in the deepest, south-central part of the pond, at least 40 m from the nearest shoreline area.

Other waterbird species appeared to have relatively equal abundance during the daytime and nighttime. The lower number of coots observed in nighttime surveys were likely underestimates due to low light, distance, aggregation of individuals, or use of vegetative cover, as we never observed coots leaving the pond.

Comparison of Waterbird Abundance at Arden and Urrutia Ponds

Waterbird use of Urrutia and Arden ponds showed both similarities and differences. Most of the species recorded used both ponds, and both had substantially more bird use at night than during the day. Most use of both ponds was by the Common Goldeneye, Bufflehead, and Common Merganser, with the goldeneye as the most abundant species. The occurrence and abundance of some species differed between the two ponds. Double-crested Cormorants were abundant during the daytime at Urrutia Pond, with a peak

Table 3. Summary of waterbird use at Arden Pond during the daytime and nighttime over two winter survey periods.

Species	Daytime		Nighttime		% change between daytime and nighttime	
	2021-2022	2022-2023	2021-2022	2022-2023	2021-2022	2022-2023
Canada Goose	8	14	32	27	310%	95%
Wood Duck	11	1	13	6	21%	467%
Mallard	11	14	18	28	72%	100%
Bufflehead	6	13	20	42	227%	234%
Common Goldeneye	3	24	36	232	1107%	867%
Common Merganser	1	1	7	5	500%	250%
Ruddy Duck	0	0	0	0	0%	0%
Other Waterfowl	1	5	0	1	-67%	-90%
American Coot	111	21	103	56	-7%	165%
Gulls	0	0	0	13	0%	100%
Double-crested Cormorant	2	1	0	1	-100%	0%
Other Waterbird	5	8	5	2	4%	-74%
Total Waterbirds	158	94	234	551	48%	488%
Total Waterfowl	40	67	126	482	214%	623%
Total Diving Ducks	11	38	63	410	496%	970%
Total Waterbird Species	14	15	12	12		
Total Waterfowl Species	9	8	7	7		

number of 300 on 10 November 2022, but no more than six were seen at Arden Pond. Wood Ducks (*Aix sponsa*) were relatively common at Arden Pond but not seen at Urrutia Pond. Bald Eagles were seen only at Urrutia Pond.

Proportional Use of Off-Channel Ponds by Waterbirds Using the Lower American River

The proportion of the total counts of waterbird species on the Lower American River that used Urrutia and Arden ponds varied substantially among species (Table 4). A high proportion of the Lower American River populations of diving ducks and the Double-crested Cormorant occurred at the two off-channel ponds. Although we did not record Canvasbacks during our surveys, the average number from CBC counts (Table 1) at Urrutia Pond is nearly identical to that recorded during the ARNHA count, indicating that nearly all the Canvasbacks seen along the American River occur at that pond. Compared to average numbers, high proportions of Lower American River Buffleheads (48%), Common Goldeneye (42%), and Common Merganser (32%) used the two off-channel ponds. Compared to the average annual ARNHA counts, the high counts from our pond surveys exceeded the total Lower American River population for the Bufflehead (134%) and nearly equaled the total count for the Common Goldeneye (96%) and Common Merganser (91%). Average counts at the ponds showed that they supported a high proportion of Lower American River populations of Double-crested Cormorants (56%, almost entirely at Urrutia Pond during the daytime) and American Coots (55%, mainly at Arden Pond; Table 4).

Relatively low proportions (<10%) of some species' Lower American River populations used the off-channel ponds, including Canada Goose, Wood Duck, gulls, other waterfowl, and other waterbirds. The population of Green winged Teal on off-channel ponds exceed ARNHA counts for the entire Lower American River, but numbers still were low ($\bar{x} = 26$ birds). The proportion of Ruddy Ducks using ponds also was high (63%), but their total number on ponds was small (47 individuals).

DISCUSSION

Importance to Waterbird Species

Diving Ducks. Our study demonstrates that off-channel ponds are important waterbird habitats for birds along the American River, especially for night-roosting by Common Goldeneyes, Buffleheads, and Common Mergansers. Night use of ponds presumably benefits diving ducks by reducing energy expenditure, providing protection from predation, or both, compared to remaining on the flowing American River. The ecology of these species in winter is poorly understood but recognized as a time when survival may be strongly influenced by habitat quality and the effects of environmental stress (Eadie et al. 1995).

Table 4. Comparison of waterbird use of Arden and Urrutia Ponds and total populations recorded on the American River Natural History Association's annual December wildlife count.

Species/Group	ARNHA Count Average	Arden 2021-2023		Urrutia 2022-2023		% of ARNHA Total in both ponds
		Average ^a	%	Average ^a	%	
Canada Goose	911	21	2%	25	3%	5%
Wood Duck	135	12	9%	0	0%	9%
Mallard	548	28	5%	15	3%	8%
Green-winged Teal	7	0	0%	23	321%	321%
Canvasback	2106	0	0%	4	0%	0%
Bufflehead	146	28	19%	42	29%	48%
Common Goldeneye	707	128	18%	166	23%	42%
Common Merganser	149	4	3%	43	29%	32%
Ruddy Duck	29	0	0%	18	62%	62%
Other waterfowl	392	3	1%	37	9%	10%
American Coot	238	107	45%	23	10%	55%
Gulls	1926	7	0%	10	1%	1%
Double-crested Cormorant	185	1	1%	102	55%	56%
Bald Eagle	2	0	0%	2	86%	86%
Other waterbirds	348	5	1%	9	3%	4%
Total Waterbirds	7830	344	4%	519	7%	11%
Total Waterfowl	5130	224	4%	373	7%	12%
Total Diving Ducks	3136	160	5%	273	9%	14%
Total Diving Ducks without Canvasback	1030	160	16%	269	26%	42%

^aNumbers show the highest of the average value of either the daytime or nighttime counts at each site

Night-roosting behavior and habitats used by the Common Goldeneye, Bufflehead, and Common Merganser, the three principal diving duck species, has received little or no attention (e.g., by Erskine 1971, Bellrose 1976, Gauthier 2014, Pearce et al. 2015). Eadie et al. (1995) reported that ocean-wintering Common Goldeneyes congregated offshore at night, and movements to calm nighttime roosting areas has been reported for the Long-tailed Duck (*Clangula hyemalis*; Allison et al. 2009). We have been unable to locate documentation of movements by these species between riverine habitats during the day to congregate at ponds at night, although such use is not unexpected.

The use of Urrutia Pond by large numbers of Canvasbacks is of regional importance. The species has declined substantially through much of its range, although populations have recently stabilized or increased somewhat (U.S. Fish and Wildlife Service 2023). Canvasbacks are relatively uncommon in the Central Valley, so remaining use areas are important to the species. Canvasbacks rest together in groups in deep-water areas (Cogswell 1977) consistent with their use of Urrutia Pond. Their behavior (i.e., resting or foraging) when they were present in large numbers at the pond is unreported. Factors responsible for the annual variability in use of Urrutia Pond by Canvasback are unknown but fluctuations could result from changes in availability of suitable habitat in the Central Valley or elsewhere as a result of weather conditions or habitat management at wildlife refuges and duck hunting clubs (Fleskes et al. 2018).

Urrutia and Arden ponds appear to be regionally important to diving ducks, which comprise only 3% of the total number of wintering waterfowl in the Central Valley (Fleskes et al. 2018), although larger numbers of goldeneyes and Buffleheads occur in San Francisco Bay and off the California coast (Erskine 1971, Bellrose 1976, Cogswell 1977). It appears likely that the two off-channel ponds we studied serve as roost sites for most of the divers using the adjacent section of the American River, although a small contingent of 30–60 goldeneyes and other divers appear to fly nightly 1.6 km south to roost on ponds at Granite Regional Park (D. Kopp, pers. obs.) and some also appear to use ponds at Cal Expo at night (L. Douglas, pers. comm.).

Bald Eagle. The Bald Eagle nest at Urrutia Pond is the first nest established on the lower portion of the American River below Lake Natoma. Reasons why the eagles selected the area adjacent to Urrutia Pond cannot be known with certainty, but likely factors may include the presence of a suitable large nest tree, availability of both riverine and lacustrine water for foraging, the presence of waterbird concentrations on the pond, and low human disturbance due to enforcement by private ownership. At least one member of the pair of eagles that nested in 2023 was believed to be a five-year-old bird in its first breeding season, based on the presence of a bird in four-year-

old plumage in the area in 2022 (K. Kayner, pers. comm.). Successful nesting in its first year suggests that the site was at least moderately suitable for the species.

Other Waterbirds. Urrutia and Arden ponds provide important habitat for birds that use it diurnally or continuously. Many Double-crested Cormorants foraged at Urrutia Pond, but left at night, presumably to roost in trees, as has been observed downstream of Arden Pond (D. Airola, unpub. data). American Coots occurred on both ponds in moderate abundance. Many other species were seen on ponds in low numbers. These individuals contribute to regional populations and to the value of the American River as a source of wildlife viewing recreation.

Potential Impacts of Proposed Habitat Changes

Specific plans for use of off-channel ponds have not been made available to the public by the Corps, thereby impeding the ability to evaluate potential impacts of the proposed American River Bank Protection and its mitigation measures. Based on discussions with Sacramento County Regional Parks Department staff (K.C. Sorgen, pers. comm.), the proposed plan to create spawning and rearing habitat at Arden Pond (ESA 2021) is in hiatus. The specifics of proposed plans at Urrutia Pond apparently do not match the plans released in 2008 (City of Sacramento 2008). The reported focus on mitigation needed for impacts to rearing habitat for anadromous fish, the valley elderberry longhorn beetle, and Yellow-billed Cuckoo (*Coccyzus americanus*) has led to a plan to fill Urrutia Pond to create seasonally flooded riparian wetland habitat and upland. Therefore, we briefly describe the potential impacts of changes to ponds on waterbirds species to inform the impact assessment in environmental documents.

Removal of pond habitat by filling to create seasonally flooded habitat would eliminate night-roosting habitat for diving ducks and other waterbirds. The level of impact depends on the amount of pond habitat removed but also the size and configuration of a residual pond. Considering that diving ducks selected areas within Arden Pond at least 40 m from the shoreline, the evaluation of project effects should consider shoreline areas as unsuitable for night-roosting in both the existing pond and any pond considered in the mitigation design.

It is unknown to what extent existing populations using Urrutia and Arden ponds depend upon this habitat to maintain their populations. The fact that use levels are similar to the total counts made for the Common Goldeneye and other diving duck on the ARNHA Wildlife Count suggests that Arden and Urrutia ponds serve species' needs better than other potential alternative roosting habitat. This may be particularly true in high flow conditions, when use levels increased at Arden Pond (Urrutia Pond could not be surveyed under high water conditions). It is possible that the proportional loss of the

available off-channel pond habitat could result in a proportional reduction in population of diving ducks that use the American River. If so, the elimination of the 22.5-ha Urrutia pond would eliminate at least 43% of off-channel pond habitat suitable for night-roosting and potential loss of similar proportions of diving duck populations through displacement to less suitable habitats with resulting mortality. Such population losses could result in unknown ecosystem consequences and would reduce wildlife viewing recreation value.

The proposed mitigation needs for the Corps and SAFCA's American River flood control project apparently could be met using only a portion of the Urrutia property, especially if upland elderberry mitigation were moved elsewhere (K.C. Sorgen pers. comm.). Sacramento County Regional Parks has suggested an alternative plan for the Urrutia property that would meet the mitigation needs and reduce impacts to Parkway resources. The plan would retain a smaller pond of about 12 ha on the west side of the property. While this plan would likely reduce waterbird use of the site, if it were optimally configured (i.e., roughly circular to minimize the amount of shoreline area that is avoided by diving ducks), it could partly reduce the substantial effects of eliminating pond habitat. It would certainly have more value to the species that use Urrutia Pond than the proposed complete pond elimination. Retention of some pond habitat on the Urrutia property and all of Arden Pond would also reduce potential burdens on the Corps to provide new mitigation elsewhere to offset the effects of removing Urrutia Pond on diving ducks and other waterbird species if these effects are determined to be significant.

Study Limitations

This study was a pilot project intended to provide timely information from which to evaluate potential effects of proposed pond elimination on waterbirds. Although we have demonstrated the substantial value of off-channel ponds to wintering waterbirds, we consider this a preliminary study because of several limitations. First, surveys were conducted only over two years at Arden Pond (16 surveys) and over one year at Urrutia Pond (9 surveys in addition to previous CBC surveys there). Numbers of waterbirds using the off-channel ponds likely vary annually due to a wide variety of factors, including species populations, differences in seasonal movement patterns, and availability of alternative resting habitat as affected by rainfall and river operations. Although our surveys encompassed substantial variability in numbers (Tables 1–4 and Appendices 1–3), it is possible that more surveys would have changed the numbers from what we reported.

A second limitation involves assumptions regarding the timing of species movements and the timing of our surveys. We generally conducted daytime surveys in the afternoons but did not verify that the birds we observed there had spent most of the daytime at the ponds. It is possible that some birds we

counted in daytime counts had recently returned to ponds for the evening. If so, our diurnal counts were inflated. We believe the incidence of early arrival was not substantial but did not verify that assumption. Also, as noted, we did not verify that the birds we observed arriving at ponds at dusk remained there for the night, but we believe that this is highly likely.

Another limitation is that we did not survey all potential off-channel habitats along the American River or the impounded Lake Natoma at the east end of the Lower American River. A few smaller ponds along the river include Bushy Lake (4.6 ha), Cal Expo Pond (4.5 ha), Sacramento Bar (4.1 ha in 4 ponds), and Sailor Bar (3 ha among 4 ponds). Although our observations of avoidance of shoreline areas suggest that small ponds may receive lower night-roosting use, we did not verify that. The nighttime use of slow-moving sections of river, such as between Estates Drive and Rio Americano High School, and ponds at Granite Regional Park 1.6 km south of the river, at the Cal Expo Racetrack, and across from the Sacramento-American River confluence in West Sacramento, also deserve further study.

Finally, more study is warranted of the differences in the patterns of the availability and waterbird use of off-channel pond habitat during various river stages. While we observed higher diving duck use at Arden Pond when flows were high, high flows often follow heavier precipitation, which may inundate temporary pond habitats in other areas that birds may use. Responsibility for fully assessing the waterbird use of off-channel pond habitat and potential impacts of proposed elimination of this habitat should rest with the responsible agencies, the Corps and SAFCA.

ACKNOWLEDGEMENTS

We thank Vic Urrutia and Tim Flock for permission to access the Urrutia Pond to conduct surveys and Troy Perez for onsite assistance. Chris Conard provided information and useful advice. We thank Jaqueline Ramirez for providing ARNHA count data, Jeri Langham for information on ARNHA count procedures, Kathy Kayner for information on the Bald Eagles at Urrutia Pond, and Cliff Feldheim for peer review comments. Dan Kopp provided information on movements of diving ducks to other areas. K.C. Sorgen provided information on the Corps mitigation proposal. Thanks to Lily Douglas for ably serving as the guest editor for peer review of this paper.

LITERATURE CITED

Allison, T.D., S. Perkins, and M. Perry. 2009. Determining Night-time Distribution of Long-tailed Ducks Using Satellite Telemetry. MMS Contract 0106PO39637, Massachusetts Audubon Society.

Bellrose, F.C. 1976. Ducks, Geese and Swans of North America. Stackpole Books, Harrisburg, PA.

City of Sacramento. 2008. Draft Urrutia Site Restoration and Enhancement Project, North Bank of the American River, Sacramento, California CEQA PLUS Document. http://sacramento.granicus.com/MetaViewer.php?view_id=22&clip_id=1587&meta_id=155038

Cogswell, H.L. 1977. *Water Birds of California*. University of California Press, Berkeley, CA.

Eadie, J.M., M.L. Mallory, and H.G. Lumsden. 1995. Common Goldeneye (*Bucephala clangula*), version 2.0. In *The Birds of North America* (A.F. Poole and F.B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bna.170>

Erskine, A.J. 1971. *Buffleheads*. Canadian Wildlife Service Monograph No 1. Ottawa.

[ESA] Environmental Science Associates. 2021. American River Watershed Common Features Water Resources Development Act of 2016, American River Contract 2. Supplemental Environmental Impact Statement/ Supplemental Environmental Impact Report. U.S. Army Corps of Engineers Central Valley Flood Board and Sacramento Area Flood Control Agency, Sacramento, California.

Fleskes, J.P., M.L. Casazza, C.T. Overton, L.L. Matchett, and J.L. Lee. 2018. Changes in the abundance and distribution of waterfowl wintering in the Central Valley of California 1973–2000. P. 50–74 *in*: *Trends and Traditions Avifaunal change in western North America* (W.D. Shuford, R.E. Gill Jr. and C.M. Handel (Eds.)). *Studies of Western Birds* 3. Western Field Ornithologists, Camarillo, CA.

Gauthier, G. 2014. Bufflehead (*Bucephala albeola*), version 1.0. In *Birds of the World* (A.F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bow.buffle.01>

Pearce, J., M.L. Mallory, and K. Metz. 2015. Common Merganser (*Mergus merganser*), version 1.0. In *Birds of the World* (S.M. Billerman, Editor). Cornell Lab of Ornithology, Ithaca, NY.

U.S. Army Corps of Engineers. 2020. Notice of Intent to Prepare a Draft Supplemental Environmental Impact Statement/Environmental Impact Report for the American River Common Features Project, American River Erosion Protection and Arden Pond Mitigation Components (Sacramento County, California), as Authorized Under the Water Resources Development Act of 2016. Federal Register 85 FR 46074–46075.

U.S. Fish and Wildlife Service. 2023. *Waterfowl Population Status, 2023*. U.S. Department of the Interior, Washington, DC. <https://www.fws.gov/library/collections/waterfowl-population-status-reports>

Appendix 1. Numbers of waterbirds during daytime and nighttime surveys at Urrutia Pond during winter 2022–2023.

Species	Daytime Surveys				
	11/10	12/2	12/9	12/19	12/26
Greater White-fronted Goose					
Canada Goose	32	8	37		22
American Wigeon	2				
Gadwall			4		
Mallard	20	2	15	16	20
Green-winged Teal					5
Canvasback	3				15
Ring-necked Duck	1			7	
Lesser Scaup	4				
Bufflehead	1		7	20	35
Common Goldeneye	36			34	6
Hooded Merganser				2	
Common Merganser			2	107	6
Ruddy Duck				11	1
Duck sp.					
Pied-billed Grebe	2				
American Coot	1	8	25	38	34
Killdeer		3		1	
Greater Yellowlegs					
Ring-billed Gull			1		1
California Gull	25	12	3		1
Herring Gull	1				
Double-crested Cormorant	300	110	90	1	11
Great Blue Heron	1	1	1	1	
Great Egret	8	1	1		
Osprey	1				
Bald Eagle	2	2	1	2	1
Belted Kingfisher	1		1		
Total Waterbirds	441	145	188	240	158
Total Waterfowl	99	10	65	197	110
Total Diving Ducks	45	0	9	181	63
Number Waterbird Species	18	8	13	12	13
Number Waterfowl Species	8	2	5	7	8

Appendix 1. (cont.) Numbers of waterbirds during daytime and nighttime surveys at Urrutia Pond during winter 2022–2023.

Species	Nighttime Surveys			
	12/12	12/19	1/1	1/26
Greater White-fronted Goose	30		1	
Canada Goose		36	2	60
American Wigeon				2
Gadwall				
Mallard	3	16	6	
Green-winged Teal			80	11
Canvasback				
Ring-necked Duck		7		
Lesser Scaup	2			
Bufflehead	1	33	120	14
Common Goldeneye	100	294	200	70
Hooded Merganser	2	2		
Common Merganser	30	107	18	15
Ruddy Duck	24	11	35	60
Duck sp.	100			
Pied-billed Grebe			2	
American Coot	27	38	25	
Killdeer		1		2
Greater Yellowlegs				1
Ring-billed Gull				20
California Gull	3			
Herring Gull				
Double-crested Cormorant		1		
Great Blue Heron		1		
Great Egret	1			
Osprey				
Bald Eagle	1	2	1	2
Belted Kingfisher				1
Total Waterbirds	324	549	490	258
Total Waterfowl	292	506	462	232
Total Diving Ducks	159	454	373	159
Number Waterbird Species	10	12	8	12
Number Waterfowl Species	8	7	8	7

Appendix 2. Numbers of waterbirds during daytime and nighttime surveys at Arden Pond during winter 2021–2022.

Species	Daytime					Nighttime				
	1/9	1/14	1/19	2/3	2/23	1/9	1/14	1/19	1/26	2/23
Canada Goose	4	5	9	7	14	25	35	22	31	47
Wood Duck	6	28	19	0	0	25	27	4	7	1
Mallard	10	9	11	15	8	30	21	11	19	10
Northern Shoveler	0	0	2	0	0	0	0	0	0	0
American Wigeon	0	0	1	0	0	0	0	0	0	1
Bufflehead	6	4	9	7	4	25	17	20	17	19
Common Goldeneye	4	4	2	4	1	67	45	24	27	18
Common Merganser	0	0	2	4	0	2	22	2	10	0
Ruddy Duck	1	0	1	0	0	0	0	0	0	1
American Coot	110	60	110	105	170	130	40	60	145	140
Pied-billed Grebe	1	3	5	4	4	1	2	2	2	4
Double-crested Cormorant	2	6	3	0	1	0	0	0	0	0
Great Blue Heron	0	1	1	1	0	1	4	1	3	1
Great Egret	1	2	0	0	0	1	1	0	1	0
Total Waterbirds	145	122	175	147	202	307	214	146	262	242
Total Waterfowl	31	50	56	37	27	174	167	83	111	97
Total Diving Ducks	11	8	14	15	5	94	84	46	54	38
Number Waterbird Species	10	10	13	8	7	10	10	9	10	10
Number Waterfowl Species	6	5	9	5	4	6	6	6	6	7

Appendix 3. Numbers of waterbirds during daytime and nighttime surveys at Arden Pond during winter 2022–2023.

Species	Daytime			Nighttime		
	11/9	12/28	1/8	12/28	1/6	2/21
Canada Goose	20	19	2	40	20	20
Wood Duck	3	0	0	0	6	11
Mallard	19	11	12	75	3	6
Northern Shoveler	14	0	0	0	0	0
American Wigeon	0	0	0	0	0	0
Ring-necked Duck	0	1	0	0	0	0
Bufflehead	5	1	32	75	40	12
Common Goldeneye	0	9	63	385	305	6
Common Merganser	2	0	2	2	12	0
Ruddy Duck	0	0	0	1	0	0
Pied-billed Grebe	10	2	2	1	0	1
American Coot	0	42	21	90	47	30
Spotted Sandpiper	2	0	0	0	0	0
Ring-billed Gull	0	0	0	0	0	40
California Gull	0	0	1	0	0	0
Double-crested Cormorant	2	0	0	0	0	2
Great Blue Heron	0	0	0	0	1	1
Great Egret	2	0	2	1	1	0
Belted Kingfisher	2	0	1	0	0	0
Total Waterbirds	81	85	138	670	435	129
Total Waterfowl	63	41	111	578	386	55
Total Diving Ducks	7	11	97	463	357	18
Number Waterbird Species	11	7	19	9	9	10
Number Waterfowl Species	6	5	5	6	6	5