Light-footed Ridgway's rail (*Rallus obsoletus levipes*; formerly light-footed clapper rail, *Rallus longirostris levipes*)
[Light-footed Clapper Rail Recovery Plan (1985)]

Original Approved: July 1979
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Revision Approved: June 1985

RECOVERY PLAN AMENDMENT

We have identified best available information needed to amend recovery criteria for light-footed Ridgway's rail (*Rallus obsoletus levipes*). In this modification, we synthesize the adequacy of the existing recovery criteria, show amended recovery criteria and the rationale supporting the recovery plan modification, and discuss current threats to the subspecies. The modification is shown as an addendum that supplements the recovery plan, superseding only Part II, Recovery (p. 22) of the recovery plan.

For
U.S. Fish and Wildlife Service
Region 8
Carlsbad, California

September 2019

METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

We updated the recovery criteria for this addendum through internal coordination with staff and through external coordination with our partners. Downlisting and delisting criteria were updated to provide quantitative criteria. We coordinated with partners to discuss the species' needs and information regarding recovery goals. The Service made a draft version of this document available for public comment to ensure the best possible scientific and practical data support the criteria described herein. In addition, this document has also undergone peer review. These coordinated efforts help to develop new quantitative criteria for the recovery plan that will better serve us as we work to recover the light-footed Ridgway's rail (Appendix C).

ADEQUACY OF RECOVERY CRITERIA

Section 4(f)(1)(B)(ii) of the Endangered Species Act (Act) requires that each recovery plan shall incorporate, to the maximum extent practicable, "objective, measurable criteria which, when met, would result in a determination…that the species be removed from the list." Legal challenges to recovery plans (see Fund for Animals v. Babbitt, 903 F. Supp. 96 (D.D.C. 1995)) and a Government Accountability Audit (GAO 2006) also have affirmed the need to frame recovery criteria in terms of threats assessed under the five factors.

Recovery criteria should also address the biodiversity principles of representation, resiliency, and redundancy (Shaffer and Stein 2000, p. 307) as these concepts relate to abundance, distribution, and diversity. Representation involves conserving the breadth of the genetic makeup of the subspecies to conserve its adaptive capabilities. Resiliency involves ensuring that each population is sufficiently large to withstand stochastic events. Redundancy involves ensuring a sufficient number of populations to provide a margin of safety for the subspecies to withstand catastrophic events.

Recovery Criteria

See previous version of criteria in recovery plan (USFWS 1985, p. 22; ECOS).

Synthesis

The light-footed Ridgway's rail (*Rallus obsoletus levipes*; formerly the light-footed clapper rail, *R. longirostris levipes*) was first listed as federally endangered in 1969 (USFWS 1969, p. 5034) and state endangered in California in 1971, prior to the Endangered Species Act. The original listing rule provided no background information. Therefore, the following information on the biology and life history, distribution, abundance and population trends, genetics, and habitat conditions summarize information available at the time of listing, recovery plan, and 5-year review, as well as incorporating some other information from reports, publications, and consultation with experts.

The taxon now recognized in the scientific community as the light-footed Ridgway's rail (*Rallus obsoletus levipes*) was first listed in 1969 as the light-footed clapper rail (*Rallus longirostris levipes*) under the Endangered Species Preservation Act of 1966 (USFWS 1969, 34 FR 5034). Since the species was listed, phylogenetic analysis has revealed the rails of California as distinct from the clapper and king rails of the East Coast, leading to a taxonomic name change (Maley and Brumfield 2013, p. 326; Chesser *et al.* 2014, p. 5; Eddleman and Conway 2018, unpaginated). As such, we follow the best available scientific information and now recognize this taxon as the light-footed Ridgway's rail (*Rallus obsoletus levipes*; for a more thorough discussion of the taxonomic history of the species, please refer to Appendix A). This name change in the scientific literature in itself does not affect the listed entity for the purposes of the Act. Though the list of threatened and endangered animals (50 CFR 17.11) does not reflect this name change as of the writing of this document (2019), we use "light-footed Ridgway's rail," or simply "rail" throughout this document for consistency with the currently accepted taxonomy.

The light-footed Ridgway's rail (*Rallus obsoletus levipes*; rail) is a reclusive marsh bird that generally resides in coastal marshes of southern California and northern Baja California, Mexico (Thelander and Crabtree 1994, p. 161; USFWS 2009, pp. 3–4). Occasionally, observers have also noted the rail from inland freshwater sources (Willett 1906, p. 151; Cooke 1914, p. 18; Grinnell 1915, p. 46; Bent 1926, p. 273; AOU 1957, p. 153). Coastal marshes are dynamic habitats that change with the tides, and rails adjust their behavior within these dynamics. During low tide, rails take advantage of the foraging opportunity provided in the lower marsh and mudflat edges (Meanley 1985, p. 8). During high tide, rails seek refuge in the upper marsh vegetation, which provides further foraging opportunity and protection from predation (Zembal *et al.* 1989, p. 42). Rail habitat is a saltwater marsh system composed of dense *Spartina foliosa* (cordgrass) in the low littoral zone. Zedler (1993, p. 123) defined suitable *S. foliosa* for rails as a density of at least 100 stems /m^2 with at least 90 percent of stems ≥ 60 cm in height and 30 percent ≥ 90 cm in height. Upper marsh habitat includes sufficient cover of prevalent *Salicornia pacifica* (pickleweed), *Limonium claifornicum* (California sealavender), *Juncus actus leopoldii* (southwestern spiny rush), and *Triglochin maritima* (arrowgrass). Though *S. pacifica* had historically been widely used for nesting by the rail (Bent 1926, pp. 273–274) and still dominates upland habitats, *J. a. leopoldii* is now also recognized to be critically required for high-marsh nest placement (Zembal *et al.* 2017, p. 11).

Estuarine vegetative habitats like those marshes used by the rail, have precipitously declined (approx. 75–91 percent) in California since 1850 (Powell 2006, p. 198; Stein *et al.* 2014, p. 25). Concordantly, range contraction has occurred and the rails have not been reported from Santa Barbara County since 2004 (USFWS 2009, p 5) and only rarely documented in Los Angeles County (Zembal *et al.* 1985, p. 169; Figure 1). However, rails appear to be adaptable as use of inland freshwater sources (i.e., lagoons, creeks, and lakes up to 32 km [20 miles] from the coast) have been recently increasingly reported, including in LA county (Baxter and Garrett 1983, p. 11; Zembal *et al.* 1985, p. 169; Zembal *et al.* 2007, p. 17; Konecny 2008, p. 3; Nordenberg 2009, p. 1; Zembal, Hoffman, and Konecny 2016, pp. 24–29; Zembal *et al.* 2017, p. 30; Figure 1). Willett (1906, p. 151) described freshwater nesting to include tule stalks and reeds and more recently, rail nests have been found in *Typha* spp. (cattails), *Scirpus* spp. (bulrush) and *J. acutus* (spiny rush; Konecny 2008, p. 1; Zembal *et al.* 2007, p. 5; Zembal, Hoffman, Gailband *et al.* 2016, pp. 24, 32). The birds generally forage in dense plant cover and are generalist scavengers. In upland habitats surrounding fresh (or salt) -water, rails are known to forage on snails, spiders, beetles, crane flies, mice, seeds, pickleweed, elderberry fruits, etc. (Zembal and Massey 1986, p. 20). Rails also forage in the freshwater inlets to coastal marshes. These habitats have potential to hold promise for the future of the rail, as sea level rise threatens coastal marsh

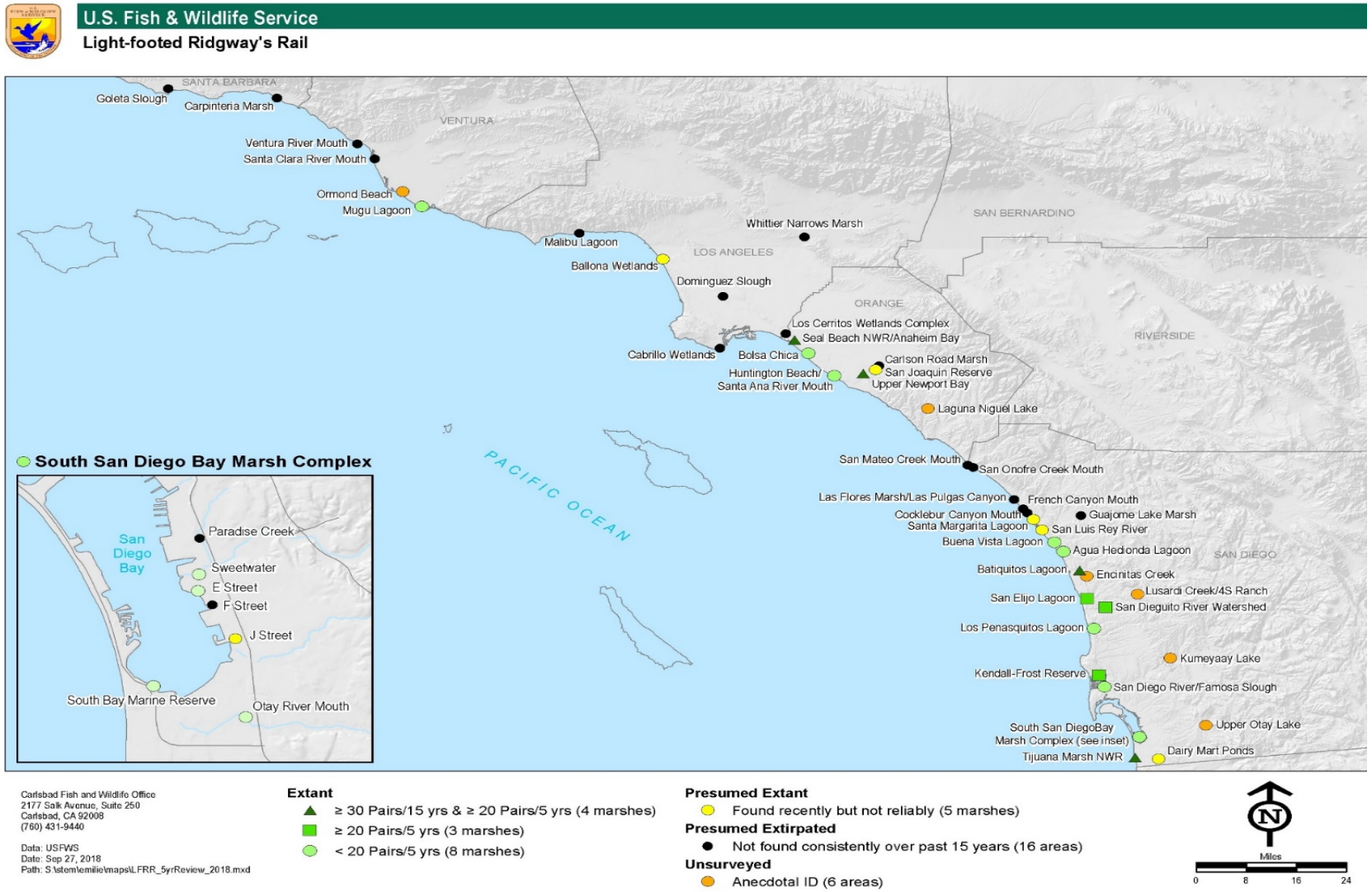

Figure 1. Locations and number of breeding pairs reported in light-footed Ridgway's rail surveys between 1980–2018 (extant), historically known or potentially restorable locations (presumed), and anecdotal identification report locations (unsurveyed). Though displayed numbers include recent augmentations, extant groups comprising an average of 20 or more pairs over 5 years would otherwise contribute to meeting downlisting criteria E1, and those comprising an average of 30 or more pairs over 15 years would otherwise contribute to meeting delisting criteria E5. See Appendix B for a site list and annual survey numbers.

systems. Little work exists, however, to identify freshwater habitat characteristics required by the rail to sustain a population.

It is presumed that rails maintain small home ranges once a territory is established (Zembal *et al.* 1989, p. 41). One study recorded distances travelled within-marshes to be generally less than 400 m (1.3 km) (Zembal *et al.* 1989, p. 40). However, records of several young birds have shown that they may disperse long distances across the historical range, including a maximum-recorded distance of 257 km (160 miles; Zembal *et al.* 1985, p. 169; Zembal *et al.* 2010, p. 18; Zembal *et al.* 2017 p. 3637). These long-distance movements may be vital in maintaining genetic diversity and therefore adaptive capacity in the subspecies (Grant *et al.* 2007, p. 434).

Upon listing of the light-footed Ridgway's rail in 1970 there was no statewide abundance estimate available. In 1980, annual surveys of up to 39 sites using a call-response technique began (Figure 1). In that year, those surveys counted 203 pairs across 11 marsh sites. Since that time, naïve (unadjusted) counts have fluctuated between 142 pairs in 1985 to 656 pairs in 2016 (Figure 2; Zembal *et al.* 2017, p. 13; Appendix 2). In 2018, five of the marsh areas surveyed contained more than 30 pairs each, accounting for 74.7 percent of the total detections (Zembal 2018, p. 16; Appendix 2). Though the carrying capacity for rails in marsh habitats is unknown, the highest number of detections recorded was in 2015 when annual surveys counted 234 pairs in 105 ha (260 acres; Zembal *et al.* 2015, p. 12). One study regarding the efficacy of call-response survey techniques has suggested that it could underestimate rail numbers by as much as 60 percent; however, the study also noted the need for a broader investigation across more sites to determine if survey adjustments are needed (Bui *et al.* 2015, pp. 232–234). Further, the study noted that call-response is useful to gather an index of population trends, thus we used the survey information gathered as the basis for the information presented here.

The Recovery Plan (USFWS 1985) outlined downlisting conditions for the rail as when the breeding population is increased to at least 800 pairs through the preservation, restoration and/or creation of approximately 4,000 ha (10,000 acres) of adequately protected, suitably managed wetland habitat consisting of at least 50 percent suitable marsh vegetation, in at least 20 marsh complexes (USFWS 1985, p. 22). In the 5-year review, the predominant factors identified as limiting rail abundance were small population sizes, isolation, and habitat quality (USFWS 2009, p. 18). Though these threats remain, predation and habitat degradation are now the most imminent threats to the rail (Casazza *et al.* 2016, p. 230; Zembal *et al.* 2017, pp. 17–18). Conservation efforts for the rail have been in effect since 1979 (annual population surveys, habitat restoration, predator control, development of captive breeding program, construction of nesting rafts, etc. [Zembal *et al.* 2017, p. 5]), but the most recent recovery document, the 5-year review, recommend no status change (USFWS 2009, p. 19). Below is a synthesis of past and current threats to rail that are the basis for its listing and protection under the Act.

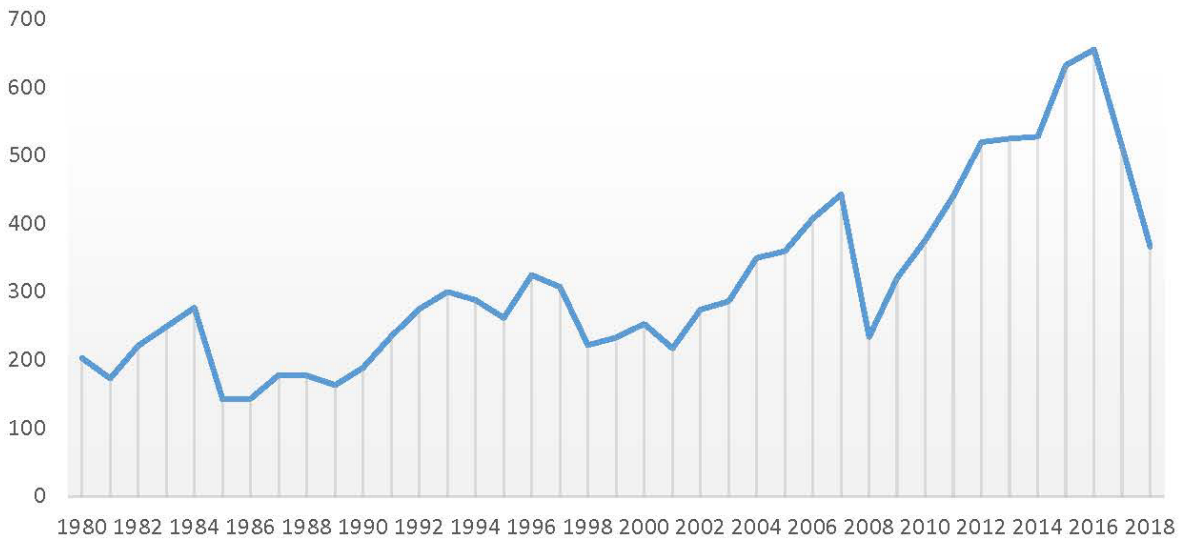

Figure 2. Estimated number of breeding pairs detected during light-footed Ridgway's rail breeding surveys each year across all surveyed sites in US. Data amassed from 1980–2018 annual survey reports by Richard Zembal et al. Data represented are unadjusted for estimated probability of detection rates. See Appendix B for a site list and annual survey numbers.

THREATS:

Below we summarize threats to light-footed Ridgway's rail as identified in the Recovery Plan (USFWS 1985) and the 5-year review (USFWS 2009).

Factor A: Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

The recovery plan (USFWS 1985) identified anthropogenic destruction of suitable habitat as the major threat to the light-footed Ridgway's rail. The 2009 5-year review (USFWS 2009, p. 11) stated that the destruction of suitable habitat was no longer the primary threat as many salt marsh habitats had gained protection from land-use conversion. Acts such as the California Coastal Act of 1976 and the Clean Water Act of 1972 have effectively protected supportive habitat for the rail. However, the 5-year review identified that habitat degradation (e.g., siltation, altered freshwater and tidal hydrology, contaminants, etc.) and loss of high marsh habitat (which may be extremely important in reducing mortality during high tides) are now the main concern.

Saltmarsh habitat is threatened by a combination of development, erosion, contaminant leaching, alteration of hydrology and sediment transport, and sea level rise (Stedman and Dahl 2008, p. 7; Gedan *et al.* 2009, p. 119). In Mexico, appropriate rail habitat is threatened by agriculture and the development of desalination plants, including in one of the largest remaining areas that support rails, San Quintin. These pressures have led to fragmentation and reduction of rail habitat that has exacerbated the subspecies' vulnerability both during high tide and to predation (USFWS 2013, p. 113).

Spartina foliosa (cordgrass), an important vegetative species for the rail, needs freshwater influence to grow tall and thick enough to support rail nests at high tide while still providing cover (Phleger 1971; Parrondo *et al.* 1978). Concordantly, marshes with lower salinity have taller, lusher *S. foliosa* stands (Massey *et al.* 1984). However, continued channelization and diversion of freshwater systems stunts its growth and the siltation of lagoons and estuaries leads to the conversion of low marsh cordgrass habitat into high marsh. Inlet closure limits tidal flushing and is a regular issue at some of the occupied marshlands, causing recent declines in rail populations (Zembal *et al.* 2017, p. 18). Additionally, there is some evidence that scale insects (*Haliaspis spartina*) may negatively affect *S. foliosa* growth (Boyer and Zedler 1996, p. 1; Boyer and Zedler 1998, p. 693).

Impacts to rails from contaminants are a potential range-wide risk, similar to a stochastic event. Rails may be exposed to contaminants from urban runoff, offshore spills, and oil or chemical spills from vehicles on highways that cross through marshes. These contaminants have the potential to attach to sediment and affect the food sources of the rail leading to biomagnification that may decrease the bird's reproductive success (Goodbred *et al.* 1996, pp. 2, 22–23).

The 5-year review identifies climate change as a threat to the rail from habitat loss through sea level rise, and altered tidal flow patterns (USFWS 2009, p. 17). Model projections across the historical range of the rail suggest that within 30 years, the sea surface level will have risen 1–3 feet, and up to 5 feet within 70 years (OPC-SAT 2018, pp. 65–79). In addition, at least one occupied site is experiencing ground subsidence causing the site to experience sea level rise three times higher than similar sites (Takekawa *et al.* 2013, p. 6). In several rail sites, complete tidal inundation occurs, causing rails to enter surrounding, often urban, areas with little cover and adjacent to busy roads (Zembal *et al.* 2017, p. 19). These sites may be a prelude to the future of sea level rise; as most salt marshes in southern California abut urban development, leaving little to no potential for inland migration of coastal habitat in many areas. Artificial nesting rafts have been deployed at several sites to increase nesting habitat at high tide, but this is a temporary fix and not always used by the rails (Zembal *et al.* 2017, p. 8). Therefore, inland freshwater systems may become increasingly important for the rails as seal level rise continues to impact rail habitat.

Factor B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

At the time of listing and subsequently in the recovery plan, collection of the rail had been noted. However, in the 5-year review and through to current, no known threats exist under this factor.

Factor C: Disease or Predation

From the time since listing through the last 5-year review in 2009, no diseases are known to be threats to the rail. However, predation has been a threat, vacillating in intensity, locations, and predatory species over the years. Primarily, raccoons depredate light-footed Ridgway's rail nests, and chicks to adults are vulnerable to predation by red foxes, feral cats, dogs, and raptors (Zembal *et al.* 2008, pp. 2 & 5; Soulé *et al.* 1988, p. 84). Implementation of predator control programs (e.g., for red fox and raccoons) and the deployment of artificial nesting rafts correlated with an increase in numbers of rails counted (USFWS 2009, Zembal *et al.* 2017, p. 32). However, since high tides force rails out of wetland vegetative cover, raptor predation may be

the next largest threat for the rail (Zembal *et al.* 2008, pp. 14–17). Counted in the hundreds at a single site in 2017 (Zembal *et al.* 2017, p. 20), avian predators have miles of power lines and poles that serve as nesting and hunting perches. This represents an anthropogenic change in the habitat structure that historically would not have threatened species such as the rail (Knight and Kawashima 1993, p. 268; Lammers and Collopy 2007, p. 2752).

Factor D: Inadequacy of Existing Regulatory Mechanisms

The original recovery plan did not list any Factor D threats; however, the 2009 5-year review included a discussion on this topic. Several State and Federal laws and regulations are pertinent to federally listed subspecies, each contributing to the conservation the light-footed Ridgway's rail. These laws, most of which have been enacted in the past 30 to 40 years, have greatly reduced or eliminated the threat of destruction and alteration of coastal wetland habitat. The Act is the primary law that provides protection for this subspecies. Other Federal and State regulatory mechanisms provide discretionary protections for the subspecies based on current management direction, but do not guarantee protection for the subspecies absent its status under the Act.

Factor E: Other factors affecting continued existence

The 1970 listing rule (USFWS 1970, p. 16047) did not identify any Factor E threats. The 5-year review identified small population size, isolation, automobile strikes, and possible habitat alteration from climate change as threats to the light-footed Ridgway's rail.

The lack of genetic variability suggests the rails are at risk of bottlenecks, inbreeding depression, and inability to adapt to potentially changing habitat. Small populations have higher probabilities of extinction because low numbers make them susceptible to inbreeding, loss of genetic variation, high variability in age and sex ratios, and stochastic events (e.g., wildfires, floods, droughts, disease epidemics, etc.; Shaffer 1981, pp. 131–134; Soulé 1987, pp. 1–189; Meffe and Carroll 1997, pp. 159–233). Small, isolated populations are vulnerable to extirpation when opportunities for reproduction diminish because of reduced opportunity of individuals to find each other (Allee 1931, pp. 1750; Courchamp *et al.* 2008, pp. vi–216). Isolated populations are more susceptible to long-term/permanent extirpation by accidental or natural catastrophes because the likelihood of recolonization following such events is negatively correlated with the extent of isolation (i.e., colonization is less likely as isolation increases; Wilcox and Murphy 1985, pp. 879887; Meffe and Carroll 1997, pp. 285–302). Urbanization and alteration of wetlands have fragmented the range of the rail. Remaining occupied marsh habitats function more independently, making birds more isolated where formerly they had access to other proximal marsh habitat. This reduced population redundancy and resilience increases the rail's susceptibility to localized extirpation events.

The 2009 5-year review first discussed threats due to small and isolated populations for the light-footed Ridgway's rail. The rail exhibits extremely low levels of genetic variability as determined by randomly amplified polymorphic DNA (RAPD) analysis and microsatellite DNA comparison (Nusser *et al.* 1996, p. 469; Fleischer *et al.* 1995, p. 1240). According to Fleischer (1995, p. 1240), the lack of variation exhibited in the rail population matches or nearly matches

those of highly inbred species. There is evidence that the southernmost US population has more heterozygosity due to breeding with birds from the Mexican population (Nusser *et al.* 1996, p. 470). A breeding program for the rail was initiated in 1998, which has bred, hatched, and released 464 individuals as of 2017; eggs have also been translocated between marshes for genetic and demographic augmentation of smaller marshes (USFWS 2017, p. 20; Zembal *et al.* 2017, p. 31).

AMENDED RECOVERY CRITERIA

Recovery criteria serve as objective, measurable guidelines to assist in determining when an endangered species has recovered to the point that it may be downlisted to threatened, or that the protections afforded by the Act are no longer necessary and the light-footed Ridgway's rail may be delisted. Delisting is the removal of a species from the Federal Lists of Endangered and Threatened Wildlife and Plants. Downlisting is the reclassification of a species from an endangered species to a threatened species. The term "endangered species" means any species (species, subspecies, or DPS) which is in danger of extinction throughout all or a significant portion of its range. The term "threatened species" means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Revisions to the Lists, including delisting or downlisting a species, must reflect determinations made in accordance with sections 4(a)(1) and 4(b) of the Act. Section 4(a)(1) requires that the Secretary determine whether a species is an endangered species or threatened species (or not) because of threats to the species. Section 4(b) of the Act requires that the determination be made "solely on the basis of the best scientific and commercial data available." Thus, while recovery plans provide important guidance to the Service, States, and other partners on methods of minimizing threats to listed species and measurable objectives against which to measure progress towards recovery, they are guidance and not regulatory documents.

Recovery criteria should help indicate when we would anticipate that an analysis of the species' status under section 4(a)(1) would result in a determination that the species is no longer an endangered species or threatened species. A decision to revise the status of or remove a species from the Federal Lists of Endangered and Threatened Wildlife and Plants, however, is ultimately based on an analysis of the best scientific and commercial data then available, regardless of whether that information differs from the recovery plan, which triggers rulemaking. When changing the status of a species, we first propose the action in the *Federal Register* to seek public comment and peer review, followed by a final decision announced in the *Federal Register*.

We provide both downlisting and delisting criteria for the light-footed Ridgway's rail, which will supersede those included in the Light-footed Clapper [Ridgway's] Rail Recovery Plan, as follows:

Downlisting Recovery Criteria

The Service will consider downlisting the light-footed Ridgway's rail to threatened when all of the following criteria are met:

Factor A: Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

A1: Coastal marsh areas utilized by light-footed Ridgway's rail are conserved and managed to maintain sufficient tidal flushing and freshwater influence to sustain rails' food and habitat resources.

A2: Occupied marsh areas maintain at least 50 percent appropriate marsh vegetation in the low littoral zone and include upper marsh habitats with sufficient cover to support rails year-round. These marsh areas have buffer zones to accommodate at least a century of projected sea level rise and have adjacent and appropriate high-water refugia and foraging habitat. At least 20 separate marsh areas of above-described suitable habitat or suitable freshwater habitats, are conserved, managed, occupied, and comprise a total minimum of 4,000 ha (9,884 acres) to provide redundancy and the ability to withstand catastrophic events.

A3: Water is maintained within both occupied and sufficient suitable, unoccupied habitat such that siltation does not significantly change the vegetation community or that contaminants do not measurably affect the benthic community (forage) or health of light-footed Ridgway's rail.

A4: The status and distribution of light-footed Ridgway's rails in Mexico is understood and suitable habitat has been sufficiently conserved and protected from land use changes such as agriculture, and desalination plants. These protections include upland habitat to allow for marsh retreat in response to sea level rise.

Factor B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

There are no known current threats under this factor; therefore, no criteria are necessary.

Factor C: Disease or Predation

C1: Impacts from nonnative and/or subsidized predators (e.g., feral cats, raccoons, domestic dogs, avian predators, etc.) are sufficiently minimized or managed through ongoing predator management. Management is funded in perpetuity such that predation no longer poses a threat to the persistence of light-footed Ridgway's rail.

Factor D: Inadequacy of Existing Regulatory Mechanisms

No known threats exist under this factor; therefore, no criteria are necessary.

Factor E: Other Natural or Manmade Factors Affecting Its Continued Existence

E1: At least 800 breeding pairs can be detected, rangewide in the United States, for a minimum of 5 years to increase subspecies' resilience (or as indicated through population modeling to support resiliency of the species). At least 10 of the protected marshes comprise a minimum average of 20 breeding pairs (i.e., not including newly augmented populations) over at least 5 years.

E2: Light-footed Ridgway's rail are distributed across sites in each of the U.S. counties historically occupied (Santa Barbara, Ventura, Los Angeles, Orange, and San Diego) and Baja California, Mexico to provide redundancy and retain representation to be able to adapt to environmental changes and ensure there is sufficient genetic diversity to avoid potential inbreeding depression.

E3: An outreach program is implemented in coordination with Federal and State agencies, partners and communities to educate the public about the plight of, and conservation efforts for, light-footed Ridgway's rail.

Delisting Recovery Criteria

The Service will consider the light-footed Ridgway's rail for delisting when the criteria for downlisting light-footed Ridgway's rail are met along with the following additions:

Factor A: Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

A5: Occupied and sufficient suitable, unoccupied habitat is conserved and managed (including maintaining tidal influence of saltwater marshes, ensuring adequate forage in freshwater marshes, adequate and appropriate vegetation, and adjacent upland habitat refugia) to maintain and increase, where possible, the carrying capacity of marshes to ensure resiliency of the rail and meet demographic goals.

A6: Conserve and manage three freshwater systems to support three separate populations of light-footed Ridgway's rail (each with at least 30 actively breeding pairs) within the historical range.

A7: Occupied habitat, sufficient suitable unoccupied habitat, and adjacent upland habitat in Mexico is adequately conserved and protected from future land use changes to support resiliency of the rail and increase redundancy.

Factor B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

There are no known threats under this factor; therefore, no criteria are necessary.

Factor C: Disease or Predation

No further threats to the subspecies due to disease or predation are currently known beyond what is stated above. Therefore, no further criteria are necessary.

Factor D: Inadequacy of Existing Regulatory Mechanisms

No known threats exist under this factor; therefore, no criteria are necessary.

Factor E: Other Natural or Manmade Factors Affecting Its Continued Existence

E4: At least 20 of the protected marshes (from A2 and A5) have a minimum average of 30 breeding pairs over 15 years, with a combined minimum of 100 pairs in each of the five counties across light-footed Ridgway's rail's historical range (Santa Barbara, Ventura, Orange, LA, and San Diego). These figures provide sufficient redundancy to prevent extinction due to catastrophic events and sufficient representation to help promote adaptation to shifting environmental pressures.

E5: The overall population is self-sustaining and growing, without augmentation from captive rearing, such that monitoring detects a statistically significant upward trend in adult population numbers over the course of at least 15 years.

Rationale for Amended Recovery Criteria

These amended criteria provide updated benchmarks that clearly link and address current threats to the light-footed Ridgway's rail. These criteria ensure that the underlying causes of declines of the populations are addressed and mitigated, providing a distinct path to recovery.

Factor A threats are addressed to ensure habitat loss and degradation from past events (e.g., development and agriculture use) and current threats (e.g., siltation, subsidence, contamination, inlet closure, lack of freshwater, lack of appropriate vegetative cover, and deficient upland refugia) are properly ameliorated. Maintaining adequate breeding and non-breeding season habitats are critical for redundancy and resiliency of the subspecies. The percentage and height of appropriate vegetation within the conserved habitat (50 percent at 60 cm or higher) is based on the knowledge that the birds require this habitat type for nesting and nest protection (from flooding and overhead predators) and utilize tidally-exposed mudflats (Zedler 1993). Since many of the occupied marsh areas are circumscribed by development (cannot be expanded) and are too small to support many rails at once, multiple locations are needed to cumulatively comprise enough total individuals for subspecies viability. Every known population is at risk to local extirpation due to a variety of factors that may occur concurrently. Therefore, there need to be enough areas dispersed across the range, close enough together, and with sufficient population sizes to allow populations to rebound and recolonization to ensure resiliency and redundancy.

Factor C threats are addressed to ensure predation is sufficiently controlled to minimally affect the persistence of light-footed Ridgway's rail populations. Predation by resource-subsidized predators such as raccoons and red-tailed hawks has had a measurable, negative impact on both the reproductive success and adult rails. This kind of reduction in resiliency threatens the rail's continued existence, necessitating the criterion included here.

Factor E threats associated with a relatively sedentary subspecies and small population sizes (limited number of breeding pairs, low genetic diversity, inbreeding depression, susceptibility to local extirpation during stochastic or catastrophic events, etc.) are addressed through minimum

numbers of breeding pairs, continued population management (breeding program or nest manipulations), and investigations into expansion to freshwater areas. Minimum population sizes need to be large enough to ensure resiliency.

The recommendation of 20 separate marsh areas with at least 30 breeding pairs and at least 100 individuals in each county was determined considering decades of observation of population trends, movement capabilities, and life-history strategy (i.e., rails reproduce in large numbers and can recover in number relatively quickly, but are thought to be short-lived). The small populations at the limited marsh habitats often blink out and take years of management to revegetate and recolonize. These numbers address the need to ensure (1) representation or genetic makeup for the conservation of adaptive capacity, (2) resiliency or that each population is sufficiently large to withstand stochastic events, and (3) redundancy to ensure that there is a sufficient number of populations such that extirpated occurrences can be recolonized by nearby dispersal events. Once monitoring has been able to detect a relatively stable upward trend, we should feel confident that these criteria were sufficient to recover the subspecies.

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APPENDIX A — TAXONOMY

The taxon now recognized as the light-footed Ridgway's rail (*Rallus obsoletus levipes*) was first listed in 1969 as the light-footed clapper rail (*Rallus longirostris levipes*) under the Endangered Species Preservation Act of 1966 (USFWS 1969, p. 5034). This taxonomic combination (the trinomial) was the result of a long, convoluted history—and another chapter was added in 2013 after a genetic analysis of the clapper rail-king rail species complex. We refer to the clapper rail-king rail species complex as "large *Rallus*" in the following summary of the taxonomic history of the light-footed Ridgway's rail. While we have omitted some of the complexities for this summary, we have also retained many of the details because they inform both the taxonomic history and the varying geographical limits attributed to this subspecies though time, which in turn has implications in our understanding of the current range of the light-footed Ridgway's rail.

First Discovery to Science

When Henshaw (1876, p. 273) first found a population of large *Rallus* in southern California in 1875, he identified them as a king rails (*Rallus elegans*), consistent with the then-accepted identification of the large *Rallus* on the Pacific Coast (Newberry 1857, p. 96; Ridgway 1874, p. 111). Up until Henshaw's discovery in "certain marshy spots close to the sea at Santa Barbara," Santa Barbara County, all previous Pacific coast large *Rallus* specimens reported in the literature were from the greater San Francisco Bay area.

Soon after Henshaw's discovery, the prominent ornithologist Robert Ridgway, Curator of Birds at the United States National Museum (USNM) (part of the Smithsonian Institution), reviewed the large *Rallus* specimens from California. While Ridgway had initially classified the large *Rallus* in California as a subspecies of the king rail, *Rallus elegans* [] *obsoletus* (Ridgway 1874, p. 111), he subsequently elevated the taxon to the rank of species, *Rallus obsoletus* (Ridgway 1880, p. 139). The American Ornithologists' Union (AOU), the generally accepted authority on avian taxonomy and nomenclature in North America, recognized and accepted Ridgway's latter combination (AOU 1886, p. 140; AOU 1895, p. 77).

Ridgway (1880, p. 139) also pinned the common name "clapper rail" to the coastal California large *Rallus* taxon because of its affinity with salt water. "Clapper rail" was a term applied at the time to several salt-water-inhabiting large *Rallus* taxa, distinguishing them from the similar-looking, freshwater-inhabiting king rail. Despite the overall resemblance among the members of the clapper rail-king rail complex, the Pacific Coast large *Rallus* have richly colored neck and breast plumage (among other phenotypic characters) and thus appear to some to be more like king rails, whereas "clapper rails" from elsewhere are more dull-colored.

Shortly after Ridgway's publications, Belding discovered several large *Rallus* along the coast of the Baja California Peninsula, Mexico and sent specimens to the USNM. Ridgway diagnosed the birds from the south end of the peninsula as separable (although, as he reports, not without some misgivings), describing these southern birds as a new species, *Rallus beldingi* (Ridgway 1883, pp. 345–346). The large *Rallus* that Belding collected in Bahía de San Quintín, Baja California, were identified as *Rallus obsoletus* (Belding 1883, p. 529), extending the range of the California species southward to about 30° 30' north latitude.

Subsequently, Bangs (1899, entire) recognized the southern California large *Rallus* as being separable from the northern California large *Rallus*, describing the southern California birds as a new species, *Rallus levipes*. This combination was accepted by the AOU (1910, p. 102), which noted the range of *Rallus levipes* was from Santa Barbara to Bahía de San Quintín. In the literature, this species was referred to by the common name light-footed rail or light-footed clapper rail. Grinnell would later reaffirm the range of *R. levipes* as extending along the Pacific Coast from Santa Barbara in the north (Grinnell 1915, p. 46) to Bahía de San Quintín in the south (Grinnell 1928, p. 86). Grinnell (1928, p. 86) also ascribed northernmost limit of *R. beldingi* on the Pacific Coast to 28° north latitude (which is roughly at Laguna Ojo de Liebre, at the border between Baja California and Baja California Sur, Mexico).

Reconsiderations and Revisions

Over time, other similar-looking large *Rallus* had been discovered in North and South America, including along the Pacific Coast of mainland Mexico. During the early twentieth century, various authorities were reconsidering the taxonomic affinities of the many large *Rallus* populations. Van Rossem (1929, entire) concluded that the large *Rallus* of California and the Baja California Peninsula were diagnosable to the subspecies rank, rather than the species rank, but still separable from other large *Rallus* species. Thus, van Rossem (1929, p. 214) described the large *Rallus* of the Pacific coast of southern California as *Rallus obsoletus levipes*. However, van Rossem (1929, entire) noted the range for this subspecies included only southern California; he diagnosed the large *Rallus* from Bahía de San Quintín southward as *Rallus obsoletus beldingi* (and he did not mention the Baja California coast between Bahía San Quintín and the U.S. border). The AOU (1931, p. 95) accepted van Rossem's taxonomic treatment but noted the range for *R. o. levipes* as extending "from Santa Barbara . . . south to San Diego and probably Ensenada [Baja California, Mexico]."

Less than a decade later, Oberholser (1937, entire) reassessed the whole clapper rail-king rail complex, encompassing what he identified as 27 "forms" of large *Rallus* rails from across the Americas (Oberholser 1937, p. 314). In accord with most of the preceding taxonomic treatments, he kept the two king rail forms as one species (comprising two subspecies); however, in a sweeping move, he combined the remaining 25 forms into one highly polytypic species, the clapper rail, *Rallus longirostris* (Oberholser 1937, p. 315). Under his structure, the form from the Pacific coast of southern California and northwestern Baja California became *Rallus longirostris levipes*, the light-footed clapper rail (Oberholser 1937, p. 338). He defined the range of this subspecies as being from Santa Barbara to Bahía de San Quintín (Oberholser 1937, p. 339). The AOU (1957, p. 153) accepted Oberholser's taxonomic treatment.

Then, several decades later, Banks and Tomlinson (1974, entire), using traditional mensural and visual comparisons, reaffirmed and refined the subspecific circumscriptions of the large *Rallus* of western mainland Mexico, fleetingly acknowledging *R. l. levipes* in the process but not addressing the other subspecies of the Baja California Peninsula.

Eventually, new analytical techniques became available, spurring additional inquiries, but even then those efforts were initially more species-level explorations of the king rail-clapper rail complex. Avise and Zink (1988, pp. 516–528), in an analysis of the genetic structure of mitochrondrial DNA (mtDNA) and allozymes, found the king rail and the clapper rail to be

closely related species; however, the taxonomic application of their results was ambiguous. Moreover, none of their samples were from western North America; as such, their work did not address Pacific coast large *Rallus* populations at all. Olson (1997, pp. 93–111), using detailed morphometric data and other lines of evidence, suggested king and clapper rails were distinguishable at the species rank, and (like some other authors before him) he suggested that the large *Rallus* taxa from western North America were more closely allied with king rails.

In contrast to these species-level reviews, Fleischer *et al.* (1995, entire) analyzed genetic data to assess (in part) the very geographically narrow question of differentiation between coastal *Rallus longirostris levipes* and the inland-nesting *R. l. yumanensis* (known primarily from the Colorado River and surrounding environs). Fleischer *et al.* (1995, p. 1241; see also Chan *et al.* 2006, p. 60), found that mtDNA data showed virtually no differentiation between *R. l. levipes* and *R. l. yumanensis* (nor several other clapper rail subspecies). However, using minisatellite DNA, they noted there had been little gene exchange between *R. l. levipes* and *R. l. yumanensis* over the recent past, suggesting that they were separate populations. Nusser *et al.* (1996, entire) had similar results when they examined these two subspecies using minisatellite and randomly amplified polymorphic DNA, although their focus was not a between-subspecies comparison. Despite being limited in their geographic and taxonomic scope, these studies showed that more work was needed to clarify the subspecific relationships among all of the large *Rallus* of western North America.

Modern Review

Eventually, Maley and Brumfield (2013, entire; see also Maley 2012) brought more advanced genetic techniques to bear on the clapper rail-king rail complex and made the most significant species-level changes since Oberholser (1937, entire). They concluded that there were five taxa of species rank in this complex rather than the previously recognized two; the Pacific coast large *Rallus* (from California to Nayarit, Mexico, and including the lower Colorado River watershed) were not king rails or clapper rails (*sensu stricto*), but instead were members of a distinct and separate species. They resurrected the combination *Rallus obsoletus* for this group and, in recognition of Ridgway's early work on the Pacific coast large *Rallus*, they recommended the common name Ridgway's rail (Maley and Brumfield 2013, p. 326). The AOU subsequently accepted this treatment (Chesser *et al.* 2014, entire).

Maley and Brumfield's (2013, entire) work was at the species-level and did not address subspecies *per se*. After 1957, the AOU (which, in 2016, became the American Ornithological Society) and its associated North American Classification Committee (NACC) "reluctantly excluded treatment of subspecies" for "reasons of expediency," but the NACC "continues to endorse the biological reality and practical utility of subspecies as a taxonomic rank" (NACC 2019, unpaginated). Instead, for information on avian subspecies, the NACC refers readers to (among others) the respective species account in the *Birds of North America* series (in this case, Eddleman and Conway 2018, entire). Eddleman and Conway (2018, unpaginated) recognized the large *Rallus* of southern California as *Rallus obsoletus levipes*. However, they ascribed its range as extending from Santa Barbara in the north to "at least" Estero de Punta Banda, Baja California in the south (about 31° 42' north latitude; just south of Ensenada and roughly 97 km (60 miles) south of the border); they consider the large *Rallus* in Bahía de San Quintín to be *R. o. beldingi*.

It is unclear how Eddleman and Conway (2018, unpaginated) came to this geographically reduced conclusion. It differs from the range these same authors presented for the subspecies in the earlier edition of the species account (Eddleman and Conway 1998, p. 4), which adopted the traditional Bahía de San Quintín location as the southern limit. Although there are some sources in the literature that also suggest the Ensenada–Punta Banda region as the southern limit, many others identify Bahía de San Quintín as the southern limit for the subspecies (see above).

Detections of Ridgway's rails from several other locations along the north Pacific coast of Baja California (Hamilton *et al.* 2002, p. 361; see also the Spatial Distribution section in the 5-year review) suggest that the Ridgway's rail population in Bahía de San Quintín may not be as isolated from the Ridgway's rail population in the Punta Banda region if one were to consider those two locations alone. Indeed, the Ridgway's rails from the Río del Rosario (Hamilton *et al.* 2002, p. 361), which is about 42 km (26 miles) south of Bahía de San Quintín, would be more likely to have affinities with the populations to the north than they would with population of Ridgway's rails in Laguna Ojo de Liebre, some 250 km (155 miles) to the south. At this point, we consider the Río del Rosario to be southern limit of the light-footed Ridgway's rail, *Rallus obsoletus levipes.*

Thus, the range of the light-footed Ridgway's rail as reported in the scientific literature is unclear, as are the range limits of the various other Ridgway rail subspecies. A taxonomic assessment using modern techniques (such as, by conducting a full genomic assessment) from populations at various points throughout the Ridgway's rail's range—from northern California to Nayarit, Mexico, and including the lower Colorado River watershed—would help inform the taxonomic status and geographic range of each of the subspecies currently recognized in the literature.

Regulatory Recognition

As noted above, the taxon now recognized in the scientific literature as the light-footed Ridgway's rail (*Rallus obsoletus levipes*) was first listed in 1969 as the light-footed clapper rail (*Rallus longirostris levipes*). It continued to be recognized as such through the subsequent iterations of the list of endangered and threatened wildlife up through the time of this recovery plan addendum (2019).

Starting in 2016, we decided to rely, to the extent practicable, on the Integrated Taxonomic Information System (ITIS) to determine a species' scientific name (50 CFR 17(c) (2016)). The current (2019) entry in the list of endangered and threatened wildlife comports with how ITIS recognizes the taxon (ITIS 2019, entire), which is to say that neither ITIS nor the list of endangered and threatened wildlife reflect the recommendations made by Maley and Brumfield (2013, entire) and the subsequent recognitions in the scientific literature (Chesser *et al.* 2014, entire; Eddleman and Conway 2018, unpaginated). Thus, ITIS and the list of endangered and threatened wildlife should be updated to agree with the current scientific literature.

Despite our reliance on ITIS, we are not locked into the nomenclature recognized by that system. We also stated in 2016, "[i]n cases where taxonomy is in dispute or there is a newly described taxa that might not be updated in ITIS, we will use our own best professional judgment and the expertise of the scientific community" (USFWS 2016, p. 51555). Therefore, based on the

recommendations of Maley and Brumfield (2013, entire) and the subsequent recognitions in the scientific literature (Chesser *et al.* 2014, entire; Eddleman and Conway 2018, unpaginated), we recognize the taxon as the light-footed Ridgway's rail (*Rallus obsoletus levipes*).

APPENDIX B — LIGHT-FOOTED RIDGWAY'S RAIL ANNUAL SURVEY

Table B1. All light-footed Ridgway's rail sites as displayed from north to south in Figure 1. Data displayed by year represent breeding pairs detected during annual surveys from 1980 to 1989.

County	Surveyed?	Marsh Name	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Santa Barbara	Yes	**Goleta Slough**	0	0	-	0	-	-	-	-	0	0
Santa Barbara	Yes	**Carpinteria Marsh**	16	14	20	18	26	7	4	5	2	0
Ventura	Yes	**Ventura River Mouth**	-	-	0	0	-	-	-	-	-	0
Ventura	Yes	**Santa Clara River Mouth**	-	-	0	-	-	-	-	-	-	0
Ventura	No	**Ormond Beach**	-	-	-	-	-	-	-	-	-	-
Ventura	Yes	**Mugu Lagoon**	-	0	-	1	3	7	6	7	7	5
Los Angeles	No	**Malibu Lagoon**										
Los Angeles	Yes	**Whittier Narrows Marsh**	-	-	-	nb	0	-	-	-	-	0
Los Angeles	Yes	**Ballona Wetlands**	-	-	-	-	-	-	-	-	-	-
Los Angeles	No	**Dominguez Slough**	-	-	-	-	-	-	-	-	-	-
Los Angeles	Yes	**Cabrillo Wetlands**	-	-	-	-	-	-	-	-	-	-
LA & Orange	No	**Los Cerritos Wetlands**	-	-	-	-	-	-	-	-	-	-
Orange	Yes	**Seal Beach NWR and Anaheim Bay**	30	19	28	20	24	11	5	7	14	6
Orange	Yes	**Bolsa Chica**	0	0	0	0	-	-	-	nb	0	Nb
Orange	Yes	**Carlson Road Marsh**	-	-	5	4	2	0	0	1	0	0
Orange	Yes	**San Joaquin Reserve**	-	-	5	4	1	2	1	0	0	0
Orange	Yes	**Upper Newport Bay**	98	66	103	112	112	87	99	119	116	116
Orange	Yes	**Huntington Beach & Santa Ana River**	-	0	-	-	-	-	0	0	0	0
Orange	No	**Laguna Niguel**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**San Mateo Creek Mouth**	-	-	0	0	-	-	0	-	0	0
San Diego	Yes	**San Onofre Creek Mouth**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**Las Flores Marsh/ Las Pulgas Canyon**	-	-	0	0	0	-	0	-	0	0
San Diego	Yes	**French Canyon Mouth**	-	-	-	0	0	-	-	-	-	0
San Diego	Yes	**Cocklebur Canyon Mouth**	-	-	1	0	0	-	-	0	0	0
San Diego	Yes	**Guajome Lake Marsh**	-	-	0	1	2	0	0	0	0	0

County	Surveyed?	Marsh Name	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
San Diego	Yes	**Santa Margarita Lagoon**	0	0	2	1	2	1	1	1	1	0
San Diego	Yes	**San Luis Rey River**	-	-	0	0	-	-	0	0	0	0
San Diego	Yes	**Buena Vista Lagoon**	0	0	0	nb	0	-	-	-	0	0
San Diego	Yes	**Agua Hedionda Lagoon**	1	2	1	7	6	1	0	0	0	0
San Diego	Yes	**Batiquitos Lagoon**	0	0	0	0	0	-	-	-	-	0
San Diego	No	**Encinitas Creek**	-	-	-	-	-	-	-	-	-	-
San Diego	No	**Lusardi Creek/4S Ranch**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**San Elijo Lagoon**	-	5	4	4	10	1	0	2	5	7
San Diego	Yes	**San Dieguito River Watershed**	-	-	-	-	-	-	-	nb	0	0
San Diego	Yes	**Los Penasquitos Lagoon**	-	0	-	0	0	-	0	-	1	0
San Diego	No	**Kumeyaay Lake**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**Kendall-Frost Reserve**	18	16	6	20	24	17	12	6	4	4
San Diego	Yes	**San Diego River/Famosa Slough**	-	3	1	2	2	1	0	0	1	0
San Diego	No	**Upper Otay Lake**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**South San Diego Bay Marsh Complex**	14	17	20	14	25	7	13	7	11	10
San Diego	Yes	**Paradise Creek**	1	2	3	1	1	0	0	0	0	0
San Diego	Yes	**Sweetwater**	4	5	7	6	14	3	9	5	5	5
San Diego	Yes	**E Street**	3	1	3	3	2	2	2	0	1	0
San Diego	Yes	**F Street**	-	1	1	0	1	0	0	0	0	0
San Diego	Yes	**J Street**	-	1	0	0	-	0	0	0	0	0
San Diego	Yes	**Otay River Mouth**	3	4	5	3	5	1	1	0	0	0
San Diego	Yes	**South Bay Marine Reserve**	3	3	1	1	2	1	1	2	5	5
San Diego	Yes	**Tijuana Marsh NWR**	26	31	25	41	38	0	2	23	14	15
San Diego	Yes	**Dairymart Ponds**	-	-	-	-	-	-	0	nb	1	up

nb = non-breeding rail detected during surveys; up = unpaired rail detected during surveys.
- = Indicates no breeding survey was conducted.

APPENDIX II — LIGHT-FOOTED RIDGWAY'S RAIL ANNUAL SURVEY

Table B2. All light-footed Ridgway's rail sites as displayed from north to south in Figure 1. Data displayed by year represent breeding pairs detected during annual surveys from 1990 to 1999.

County	Surveyed	Marsh Name	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Santa Barbara	Yes	**Goleta Slough**	0	0	0	0	-	-	0	0	-	-
Santa Barbara	Yes	**Carpinteria Marsh**	0	0	0	nb	0	2	3	5	3	2
Ventura	Yes	**Ventura River Mouth**	0	0	0	0	0	0	0	-	0	-
Ventura	Yes	**Santa Clara River Mouth**	0	0	0	0	0	0	0	-	0	-
Ventura	No	**Ormond Beach**	-	-	-	-	-	-	-	-	-	-
Ventura	Yes	**Mugu Lagoon**	6	4	5	5	6	5	3	4	4	4
Los Angeles	No	**Malibu Lagoon**										
Los Angeles	Yes	**Whittier Narrows Marsh**	-	-	-	0	0	-	0	0	-	-
Los Angeles	Yes	**Ballona Wetlands**	-	-	-	-	-	-	-	-	-	-
Los Angeles	No	**Dominguez Slough**	-	-	-	-	-	-	-	-	-	-
Los Angeles	Yes	**Cabrillo Wetlands**	-	-	-	-	-	-	-	-	-	-
LA & Orange	No	**Los Cerritos Wetlands**	-	-	-	-	-	-	-	-	-	-
Orange	Yes	**Seal Beach NWR and Anaheim Bay**	16	28	36	65	66	51	52	37	16	15
Orange	Yes	**Bolsa Chica**	up	nb	up	up	nb	nb	nb	nb	nb	0
Orange	Yes	**Carlson Road Marsh**	0	0	0	0	0	0	0	0	-	up
Orange	Yes	**San Joaquin Reserve**	0	0	up	0	0	0	0	0	0	0
Orange	Yes	**Upper Newport Bay**	131	128	136	142	129	114	158	149	105	104
Orange	Yes	**Huntington Beach & Santa Ana River**	0	0	0	0	0	0	0	0	0	-
Orange	No	**Laguna Niguel**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**San Mateo Creek Mouth**	0	0	0	0	0	0	0	-	-	-
San Diego	Yes	**San Onofre Creek Mouth**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**Las Flores Marsh/ Las Pulgas Canyon**	0	0	0	0	0	0	0	-	-	-
San Diego	Yes	**French Canyon Mouth**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**Cocklebur Canyon Mouth**	0	0	0	0	0	0	0	0	0	0
San Diego	Yes	**Guajome Lake Marsh**	0	0	0	0	-	0	0	0	-	-

County	Surveyed	Marsh Name	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
San Diego	Yes	**Santa Margarita Lagoon**	0	0	0	up	0	0	0	up	0	0
San Diego	Yes	**San Luis Rey River**	up	0	1	0	-	0	0	0	0	0
San Diego	Yes	**Buena Vista Lagoon**	up	2	5	2	3	1	6	7	4	5
San Diego	Yes	**Agua Hedionda Lagoon**	0	0	0	0	0	0	0	1	1	0
San Diego	Yes	**Batiquitos Lagoon**	up	up	0	1	1	up	2	2	1	3
San Diego	No	**Encinitas Creek**	-	-	-	-	-	-	-	-	-	-
San Diego	No	**Lusardi Creek/4S Ranch**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**San Elijo Lagoon**	5	5	4	6	1	3	3	8	3	5
San Diego	Yes	**San Dieguito River Watershed**	0	0	0	0	0	0	0	0	0	-
San Diego	Yes	**Los Penasquitos Lagoon**	0	up	up	up	1	1	1	2	2	2
San Diego	No	**Kumeyaay Lake**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**Kendall-Frost Reserve**	5	9	11	5	5	4	1	2	2	4
San Diego	Yes	**San Diego River/Famosa Slough**	2	5	1	5	5	6	5	5	4	3
San Diego	No	**Upper Otay Lake**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**South San Diego Bay Marsh Complex**	7	7	9	5	7	11	14	8	9	6
San Diego	Yes	**Paradise Creek**	0	0	1	0	0	1	2	0	0	0
San Diego	Yes	**Sweetwater**	2	4	4	3	7	7	8	3	4	3
San Diego	Yes	**E Street**	0	1	1	1	up	2	1	1	1	2
San Diego	Yes	**F Street**	0	0	0	0	0	0	0	0	1	0
San Diego	Yes	**J Street**	0	0	0	0	0	0	0	0	0	0
San Diego	Yes	**Otay River Mouth**	0	0	0	0	0	1	3	3	2	1
San Diego	Yes	**South Bay Marine Reserve**	5	2	3	1	0	0	0	1	1	0
San Diego	Yes	**Tijuana Marsh NWR**	17	47	67	63	64	61	77	77	68	80
San Diego	Yes	**Dairymart Ponds**	up	up	up	1	0	-	-	-	-	-

nb = non-breeding rail detected during surveys; up = unpaired rail detected during surveys.
- = Indicates no breeding survey was conducted.

APPENDIX B — LIGHT-FOOTED RIDGWAY'S RAIL ANNUAL SURVEY

Table B3. All light-footed Ridgway's rail sites as displayed from north to south in Figure 1. Data displayed by year represent breeding pairs detected during annual surveys from 2000 to 2009.

County	Surveyed?	Marsh Name	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Santa Barbara	Yes	**Goleta Slough**	-	0	0	0	-	-	-	-	0	0
Santa Barbara	Yes	**Carpinteria Marsh**	1	1	2	up	up	0	0	0	0	0
Ventura	Yes	**Ventura River Mouth**	-	-	0	0	-	-	-	-	0	-
Ventura	Yes	**Santa Clara River Mouth**	-	-	0	0	-	-	-	-	0	-
Ventura	No	**Ormond Beach**	-	-	-	-	-	-	-	-	-	-
Ventura	Yes	**Mugu Lagoon**	7	7	10	14	19	14	17	15	5	9
Los Angeles	No	**Malibu Lagoon**										
Los Angeles	Yes	**Whittier Narrows Marsh**	-	-	0	-	-	-	-	0	-	0
Los Angeles	Yes	**Ballona Wetlands**	-	-	-	-	-	-	-	-	-	-
Los Angeles	No	**Dominguez Slough**	-	-	-	-	-	-	-	-	-	-
Los Angeles	Yes	**Cabrillo Wetlands**	-	-	-	-	-	-	-	-	-	-
LA & Orange	No	**Los Cerritos Wetlands**	-	-	-	-	-	-	-	-	-	-
Orange	Yes	**Seal Beach NWR and Anaheim Bay**	10	11	24	23	16	15	21	24	17	19
Orange	Yes	**Bolsa Chica**	0	0	nb	0	0	0	nb	nb	nb	nb
Orange	Yes	**Carlson Road Marsh**	up	0	0	0	-	0	0	0	0	0
Orange	Yes	**San Joaquin Reserve**	0	0	0	0	-	0	0	0	nb	0
Orange	Yes	**Upper Newport Bay**	150	124	129	144	165	174	158	165	88	148
Orange	Yes	**Huntington Beach & Santa Ana River**	-	0	0	0	0	0	4	4	1	5
Orange	No	**Laguna Niguel**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**San Mateo Creek Mouth**	0	0	0	0	0	-	-	-	0	-
San Diego	Yes	**San Onofre Creek Mouth**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**Las Flores Marsh/ Las Pulgas Canyon**	0	0	0	0	0	-	-	-	0	-
San Diego	Yes	**French Canyon Mouth**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**Cocklebur Canyon Mouth**	0	0	0	0	0	-	-	-	0	-
San Diego	Yes	**Guajome Lake Marsh**	0	-	-	0	-	-	0	0	0	-

County	Surveyed?	Marsh Name	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
San Diego	Yes	**Santa Margarita Lagoon**	0	0	1	2	1	2	1	1	1	-
San Diego	Yes	**San Luis Rey River**	0	0	0	0	0	0	0	0	0	0
San Diego	Yes	**Buena Vista Lagoon**	5	3	6	5	5	6	8	8	9	9
San Diego	Yes	**Agua Hedionda Lagoon**	2	2	1	4	5	4	7	4	7	6
San Diego	Yes	**Batiquitos Lagoon**	2	3	3	5	11	16	19	22	22	26
San Diego	No	**Encinitas Creek**	-	-	-	-	-	-	-	-	-	-
San Diego	No	**Lusardi Creek/4S Ranch**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**San Elijo Lagoon**	1	1	2	7	7	6	15	12	5	8
San Diego	Yes	**San Dieguito River Watershed**	0	0	0	0	6	12	31	15	21	12
San Diego	Yes	**Los Penasquitos Lagoon**	1	1	2	1	2	2	7	12	2	4
San Diego	No	**Kumeyaay Lake**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**Kendall-Frost Reserve**	4	4	5	6	14	14	5	4	2	7
San Diego	Yes	**San Diego River/Famosa Slough**	3	4	6	6	8	5	4	6	4	3
San Diego	No	**Upper Otay Lake**	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**South San Diego Bay Marsh Complex**	6	4	5	3	3	2	9	8	3	7
San Diego	Yes	**Paradise Creek**	0	0	0	0	0	0	0	0	0	0
San Diego	Yes	**Sweetwater**	2	3	3	1	3	1	4	4	3	5
San Diego	Yes	**E Street**	2	0	1	1	0	0	2	1	0	0
San Diego	Yes	**F Street**	0	0	0	0	0	0	0	0	0	0
San Diego	Yes	**J Street**	1	0	0	1	0	0	0	0	0	0
San Diego	Yes	**Otay River Mouth**	1	1	1	0	0	1	2	1	0	1
San Diego	Yes	**South Bay Marine Reserve**	0	0	0	0	0	0	1	2	0	1
San Diego	Yes	**Tijuana Marsh NWR**	61	52	78	64	87	87	102	142	47	57
San Diego	Yes	**Dairymart Ponds**	-	-	-	2	1	1	0	1	-	0

nb = non-breeding rail detected during surveys; up = unpaired rail detected during surveys.
- = Indicates no breeding survey was conducted.

APPENDIX B — LIGHT-FOOTED RIDGWAY'S RAIL ANNUAL SURVEY

Table B4. All light-footed Ridgway's rail sites as displayed from north to south in Figure 1. Data displayed by year represent breeding pairs detected during annual surveys from 2010-2018 and summary data.

County	Surveyed?	Marsh Name	2010	2011	2012	2013	2014	2015	2016	2017	2018	5-yr mean	15-yr mean
Santa Barbara	Yes	**Goleta Slough**	0	-	0	0	0	0	0	0	-	0.0	0.0
Santa Barbara	Yes	**Carpinteria Marsh**	0	0	0	0	0	0	0	0	0	0.0	0.0
Ventura	Yes	**Ventura River Mouth**	-	-	0	0	0	0	0	0	0	0.0	0.0
Ventura	Yes	**Santa Clara River Mouth**	-	-	0	0	0	0	0	0	0	0.0	0.0
Ventura	No	**Ormond Beach**	-	-	-	-	-	-	-	-	-	-	-
Ventura	Yes	**Mugu Lagoon**	12	16	22	23	16	12	16	12	7	12.6	14.3
Los Angeles	No	**Malibu Lagoon**											
Los Angeles	Yes	**Whittier Narrows Marsh**	0	-	-	-	-	-	-	-	-	Unknown	Unknown
Los Angeles	Yes	**Ballona Wetlands**	-	-	-	-	-	-	up	-	up	Present	Present
Los Angeles	No	**Dominguez Slough**	-	-	-	-	-	-	-	-	-	-	-
Los Angeles	Yes	**Cabrillo Wetlands**	-	-	-	-	-	-	-	-	-	-	-
LA & Orange	No	**Los Cerritos Wetlands**	-	-	-	-	-	-	-	-	-	-	-
Orange	Yes	**Seal Beach NWR and Anaheim Bay**	25	34	42	40	49	66	60	60	43	55.6	35.4
Orange	Yes	**Bolsa Chica**	1	nb	nb	1	2	7	9	7	6	6.2	3.7
Orange	Yes	**Carlson Road Marsh**	0	0	0	0	0	0	0	0	0	0.0	0.0
Orange	Yes	**San Joaquin Reserve**	up	2	1	2	1	1	up	0	0	0.5	0.6
Orange	Yes	**Upper Newport Bay**	131	137	165	191	222	234	202	161	76	179.0	161.1
Orange	Yes	**Huntington Beach & Santa Ana River**	6	6	6	7	9	12	12	3	4	8.0	5.3
Orange	No	**Laguna Niguel**	-	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**San Mateo Creek Mouth**	-	-	-	-	-	-	-	-	-	Unknown	0.0
San Diego	Yes	**San Onofre Creek Mouth**	-	0	-	1	-	0	-	-	-	Unknown	0.3
San Diego	Yes	**Las Flores Marsh/ Las Pulgas Canyon**	-	0	-	0	-	0	-	-	-	Unknown	0.0
San Diego	Yes	**French Canyon Mouth**	-	-	-	-	-	-	-	-	-	Unknown	Unknown
San Diego	Yes	**Cocklebur Canyon Mouth**	-	0	-	0	-	0	-	-	-	0.0	0.0
San Diego	Yes	**Guajome Lake Marsh**	-	-	-	-	-	0	0	0	0	0.0	0.0

County	Surveyed?	Marsh Name	2010	2011	2012	2013	2014	2015	2016	2017	2018	5-yr mean	15-yr mean
San Diego	Yes	**Santa Margarita Lagoon**	-	2	0	0	-	3	-	-	-	3.0	1.2
San Diego	Yes	**San Luis Rey River**	2	3	3	4	5	3	0	0	0	1.6	1.3
San Diego	Yes	**Buena Vista Lagoon**	6	3	9	2	4	10	4	7	9	6.8	6.6
San Diego	Yes	**Agua Hedionda Lagoon**	2	7	9	8	6	8	4	9	4	6.2	6.0
San Diego	Yes	**Batiquitos Lagoon**	36	43	43	45	40	45	52	41	16	38.8	31.8
San Diego	No	**Encinitas Creek**	-	-	-	-	-	-	-	-	-	-	-
San Diego	No	**Lusardi Creek/4S Ranch**	-	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**San Elijo Lagoon**	15	15	31	20	30	60	70	68	54	56.4	27.7
San Diego	Yes	**San Dieguito River Watershed**	28	12	45	37	23	15	15	26	31	22.0	21.9
San Diego	Yes	**Los Penasquitos Lagoon**	9	12	11	12	5	5	21	19	5	11.0	8.5
San Diego	No	**Kumeyaay Lake**	-	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**Kendall-Frost Reserve**	10	19	16	8	23	33	20	18	9	20.6	13.5
San Diego	Yes	**San Diego River/Famosa Slough**	7	6	6	10	9	11	20	17	15	14.4	8.7
San Diego	No	**Upper Otay Lake**	-	-	-	-	-	-	-	-	-	-	-
San Diego	Yes	**South San Diego Bay Marsh Complex**	10	11	10	9	9	10	14	13	15	12.2	8.9
San Diego	Yes	**Paradise Creek**	0	0	0	0	0	0	-	0	0	0.0	0.0
San Diego	Yes	**Sweetwater**	6	7	4	4	4	5	7	7	8	6.2	4.8
San Diego	Yes	**E Street**	2	1	1	1	1	1	1	1	2	1.2	0.9
San Diego	Yes	**F Street**	0	0	0	0	0	0	-	0	0	0.0	0.0
San Diego	Yes	**J Street**	0	1	1	1	1	1	2	0	0	0.8	0.5
San Diego	Yes	**Otay River Mouth**	1	1	1	1	1	1	0	3	2	1.4	1.1
San Diego	Yes	**South Bay Marine Reserve**	1	1	3	2	2	2	4	2	3	2.6	1.6
San Diego	Yes	**Tijuana Marsh NWR**	76	113	101	105	75	98	127	53	62	83.0	88.8
San Diego	Yes	**Dairymart Ponds**	0	-	0	-	0	-	-	0	-	0.0	0.3

nb = non-breeding rail detected during surveys; up = unpaired rail detected during surveys.
- = Indicates no breeding survey was conducted.

APPENDIX C — SUMMARY OF PUBLIC, PARTNER, AND PEER REVIEW COMMENTS RECEIVED

Summary of Public Comments

We published a notice of availability in the *Federal Register* on June 27, 2019 (84 FR 30760–30764) to announce that the draft light-footed Ridgway's rail recovery plan addendum was available for public review and to solicit comments from the scientific community, State and Federal agencies, Tribal governments, and other interested parties on the general information base, assumptions, and conclusions presented in the draft revision. The Service posted an electronic version of the draft Light-footed Ridgway's Rail Recovery Plan Addendum on the Service's Species Profile website (Light-footed Ridgway's Rail Draft Recovery Plan Addendum). We also developed and implemented an outreach plan that included (1) sending specific notifications to Congressional contacts in Districts 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, and 53 and (2) sending specific notifications to key stakeholders in conservation and recovery efforts. These outreach efforts were conducted in advance of the *Federal Register* publication to ensure that we provided adequate notification to all potentially interested audiences of the opportunity to review and comment on the draft light-footed Ridgway's rail recovery plan addendum.

We did not receive any public comments in response to our request.

Summary of Peer and Partner Review Comments

We solicited independent peer review between the draft and final revision in accordance with the requirements of the Act from U.S. Geological Survey (USGS), Orange County Water District, San Diego Zoo Global, and various universities. Criteria used for selecting peer reviewers included their demonstrated expertise and specialized knowledge related to coastal bird species, propagation and reintroduction of various bird species including the light-footed Ridgway's rails, and management and monitoring of light-footed Ridgway's rails and other similar species. The qualifications of the peer reviewers are in the decision file for this recovery plan amendment.

In total, we solicited review and comment from three peer reviewers and four partner agencies. We received comments from one peer reviewer and three partner reviewers. Peer reviewers that responded included representatives from San Diego Zoo Global, a not-for-profit organization. Partner reviewers that responded included representatives from California Department of Fish and Wildlife, and United States Geological Survey (USGS). In general, the draft recovery plan revision was well received by the peer and partner reviewers and garnered positive comments.

We considered all substantive comments, and to the extent appropriate, we incorporated the applicable information or suggested changes into the final revised recovery plan. Below, we provide a summary of specific comments received from peer and partner reviewers with our responses; however, we addressed many of the reviewers' specific critiques and incorporated their suggestions as changes to the final revised recovery plan. Such comments did not warrant an explicit response, and as such, are not addressed here. We appreciate the input from all commenters, which helped us to consider and incorporate the best available scientific and commercial information during development and approval of the final revised recovery plan.

Peer Review:

Peer Review Comment (1): What was the context and criteria used for establishing 800 pairs as the threshold for downlisting?

Response: This number of pairs reflects the target established in the 1985 light-footed clapper rail plan.

Peer Review Comment (2): Has the Service considered conducting a Population Viability Analysis for the species?

Response: Thank you for the suggestion. This had been considered as an important action and we have now modified our criteria to incorporate population modeling to help determine a threshold for recovery.

Peer Review Comment (3): The habitat occupied by the secretive rails is difficult to navigate. Is the Service confident that methods used during the annual surveys is accurate?

Response: We agree that these methods could be improved. In coordination with our partners, a monitoring protocol is being developed in order to more accurately estimate population abundance that will be compatible with the North American Marsh Bird Monitoring Protocol (Conway 2011).

Peer Review Comment (4): Is there a benefit to using telemetry technology to assess both wild rail populations and rails being released from the rearing program to determine effectiveness post-release?

Response: Yes. Our partners, in coordination with the Service, have planned a telemetry study of both captive bred and wild caught rails and are working on securing funding for implementation.

Peer Review Comment (5): Genetic relatedness within a specific marsh population can be a limiting factor involving recovery. The breeding and release program, translocations and egg management will be more important factors for managing a sustainable population under the current constraints.

Response: Yes, we agree that the breeding and release program, along with egg translocations, are important for management of this species. The eventual goal for recovery is to allow this species to be self-sustaining without the need for supplementation from the breeding and release program.

Peer Review Comment (6): The current outreach program needs to be designed and coordinated between agencies, partners, and communities to enhance greater public awareness for this secretive species.

Response: Yes, we agree that outreach should be a coordinated effort with the Service, our partners, and the communities in which this species lives.

Peer Review Comment (7): It seems the lack of adequate and continued funding to inform and educate the policy agencies, government officials and the general public is a potential factor B threat.

Response: No, we do not think that lack of adequate funding is a threat to the light-footed Ridgway's rail. While funding is an important part of management for any species, Factor B threats specifically refer to threats from activities such as collection (whether for commercial or scientific purposes), or harm from recreational activities. In our threats analysis, we did not determine lack of adequate funding to be a current threat facing the species.

Peer Review Comment (8): Although it is difficult to predict risks from disease, constant threats exist such as virulent New Castle disease, avian influenza, and West Nile virus. Should plans be developed in case this species becomes affected by such diseases?

Response: Yes, we agree that risks to a species from disease are important to consider. However, there have been no reported cases of Newcastle disease or West Nile virus affecting light-footed Ridgway's rail. The recovery criteria for this taxon will be revised as necessary if disease is found to be a threat in the future.

Peer Review Comment (9): The conservation rearing and release program has been beneficial to increase the wild population. Fragmentation of habitat has reduced the ability for the genetics and demographics to be distributed naturally; therefore, it may be difficult to discontinue this program.

Response: Yes, we agree that the rearing and release program has been beneficial for the management of this species and there is much to accomplish before it is no longer needed. The goal of recovery is to assist the species to become self-sustaining without artificial augmentation. This criterion requires that the species has sufficiently recovered such that reintroductions are no longer necessary in the future.

Peer Review Comment (10): Climate change, sea level rise, animal to rail conflicts and rail to human conflicts, and limited funding have been the most detrimental factors regarding recovery.

Response: Yes, we agree that these are important factors to consider for recovery of the light-footed Ridgway's rail. Additional modeling efforts are also needed to determine the future impacts from a changing climate. Keeping our recovery plans up to date can help serve as a guide to direct activities and help work with partners to procure funding in ways that benefit the species in the future.

PARTNER REVIEW:

Partner Review Comment (1): The survey methods used do not incorporate detection probability making it difficult to achieve a true estimate of population size. More effective survey

techniques should be developed so that we can know how many rails there are and conserve them.

Response: Yes, we agree that better survey methods are needed to estimate population size more effectively. In coordination with our partners, a monitoring protocol is being developed in order to more accurately estimate population abundance in the future. This will be compatible with the North American Marsh Bird Monitoring Protocol (Conway 2011).

Partner Review Comment (2): The criteria do not include unoccupied but suitable habitat. It would be disappointing to see unoccupied habitat destroyed – that would lead to eventual extirpation of the species. These areas should be included as part of the recovery criteria so that as metapopulation dynamics occur suitable habitat for the rail is not lost.

Response: Yes we agree that suitable habitat that may not be occupied in a given year may still be important. We have updated our recovery criteria to include suitable, unoccupied habitat.

Partner Review Comment (3): Rail habitat in Mexico faces threats such as agricultural development and desalination plants. These areas are important for the species and may be more resilient to climate change as there is more availability for upland retreat. Efforts to conserve these areas should be included in the recovery criteria to ensure they are not lost.

Response: Yes, we agree that habitat in Mexico is important for the conservation of this species; we have updated our criteria to include habitat protections in Mexico.

Partner Review Comment (4): Has any recent genetic work been done on this species to assess genetic fitness and population connectivity?

Response: Our partners, in coordination with the Service, have planned a study to assess the genetic diversity and connectivity of the Rail populations in southern California and are working on securing funding for implementation.

Partner Review Comment (5): [In response to criteria C1] it seems difficult to measure the success of predator management, especially given the secretive nature of the rail. How can you be sure that this criterion is met if you are unable to measure it?

Response: Predator control involves monitoring for signs of potential predators, especially during nesting season, and implementing control measures as necessary. Continued monitoring of both predator and rail abundance can help us ensure that an excess of predators are not present. Continued monitoring for predator presence can also allow us to identify a potential predator problem before it elevates.

Recovery Plan Amendments for 5 Pacific Southwest Species

The U.S. Fish and Wildlife Service has identified best available information that indicates the need to amend recovery criteria for the species listed below. Each amendment is recognized as an addendum that supplements the specific portions of the existing recovery plans.

Recovery Plan for White River Spinedace (*Lepidomeda albivalis*)	
Original Recovery Plan Approved:	1994
Page(s) Superseded:	iii; 22-23
Species Included:	White River spinedace
Recovery Plan for Delhi Sands Flower-loving Fly (*Rhaphiomidas terminatus abdominalis*)	
Original Recovery Plan Approved:	1997
Pages superseded:	17
Species Included:	Delhi sands flower-loving fly
Recovery Plan for Light-footed clapper rail (*Rallus longirostris levipes*)	
Original Recovery Plan Approved:	1979
Pages Superseded:	22
Species Included:	Light-footed clapper rail
Recovery Plan for the Endangered and Threatened Species of the California Channel Islands	
Original Recovery Plan Approved:	1984
Pages superseded:	105-107
Species Included:	San Clemente Island loggerhead shrike, San Clemente Island woodland star

For
U.S. Fish and Wildlife Service
Pacific Southwest Region
Sacramento, CA

September 2019

Approved: _____
Acting Regional Director, U.S. Fish and Wildlife Service
Pacific Southwest Region

Date: 10/4/19