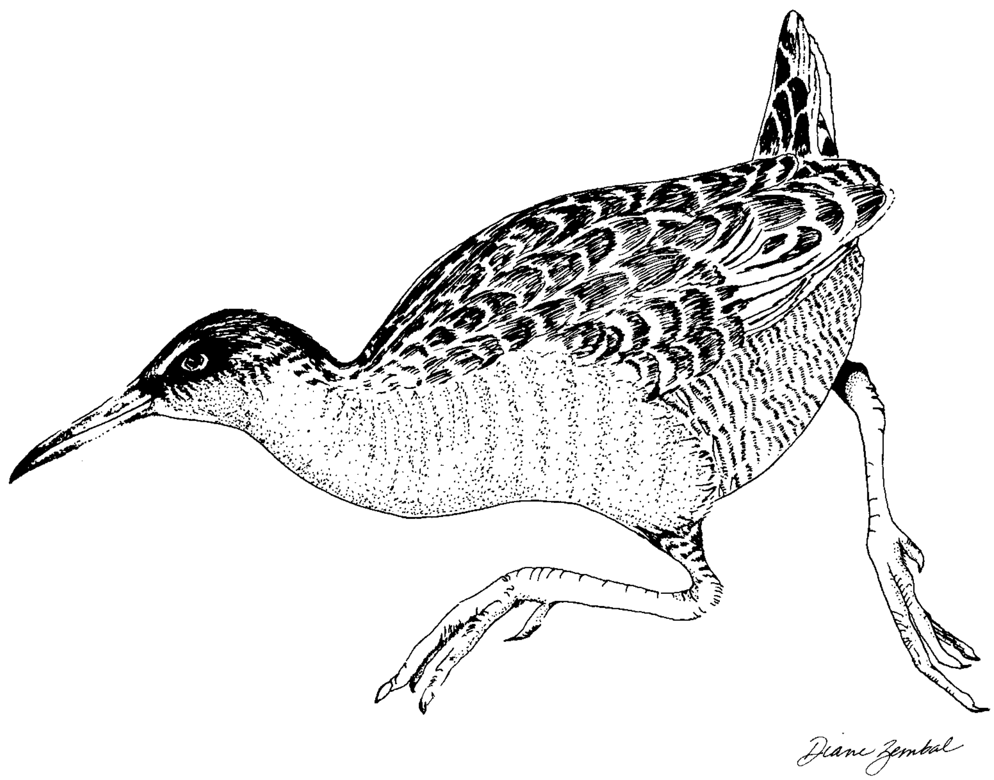
State of California   The Resources Agency   Department of Fish and Game
Habitat Conservation Planning Branch

Light-footed Clapper Rail Management, Study, and Translocation, 2003

By

Richard Zembal and Susan M. Hoffman



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LIGHT-FOOTED CLAPPER RAIL MANAGEMENT, STUDY, AND TRANSLOCATION, 2003

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ABSTRACT

The twenty-fourth annual census of the Light-footed Clapper Rail in California was conducted from 6 March – 21 June 2003. Thirty coastal wetlands were surveyed by assessing call counts from Goleta Marsh in Santa Barbara County, south to Tijuana Marsh on the Mexican border. Major effort was expended surveying marginal habitat that is not usually covered, but only 3 pairs were added to the count totals.

A total of 284 pairs of clapper rails exhibited breeding behavior in 16 marshes in 2003. Although this is 12% below the 24-year population high in 1996, it is the highest count in the 2000s so far and surpasses all of the counts done in the 1980s. The Seal Beach National Wildlife Refuge (NWR) subpopulation after doubling in size from 2001 to 2002, nearly maintained its numbers into 2003, but is still much less than half of its former high in 1994. The subpopulation in the Tijuana Marsh NWR reached its second highest recorded level in 2002 but dropped 14 pairs in 2003. The Upper Newport Bay subpopulation comprised 50.7% of the state population in 2003 at its fourth highest level since 1980. The combined number of rails in the three largest subpopulations in the state including Newport, Seal Beach NWR, and Tijuana Marsh NWR equaled 231 pairs, or 81.3% of the total breeding population.

Excluding the 4 largest subpopulations, the remaining 12 totaled 39 breeding pairs of clapper rails, 13.7% of the state total. Six wetlands held just one or two pairs each and the Sweetwater Marsh NWR subpopulation is in serious jeopardy. Without restoration and species-specific management in these wetlands, there is little likelihood of the clapper rail's survival in them.
Multiple nest searches revealed evidence of site-specific breeding activity in at least 12 of 14 territories at Point Mugu. Signs of chick rearing were observed in at least 10 of the 12

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[1] Zembal, R. and S. M. Hoffman. 2004. Light-footed Clapper Rail management, study, and translocation, 2003. Calif. Dep. Fish and Game, Habitat Conservation Planning Branch, Species Conservation and Recovery Program Report, 2004-01. Sacramento, CA. 22 pp.

territories. Although 6 egg-nests were discovered in Upper Newport Bay none was synchronous with a wild nest. However, two eggs were taken from each of two of these nests and hatched at Sea World to form an additional captive pair. No nests were found on the rafts in the Sweetwater NWR. At the Kendall-Frost Reserve there were 12 clutches of eggs on 10 rafts and 10 clutches hatched. Finally, on the Seal Beach NWR 17 of 53 rafts held 24 incubation nests, 88% of them successfully hatched. Thirteen additional brood nests were indicative of as many as 7 additional egg nests in natural cover. A nesting perch is being developed to replace the rafts in 2004 in the higher, more poorly inundated marshes.

Four captive pairs of clapper rails produced 1 – 3 clutches each resulting, in the release to the wild of 20 rails at Point Mugu, 5 rails at Kendall-Frost, and 7 youngsters went back to Seal Beach. These 7 were the survivors of a 9-egg clutch swapped with 8 eggs produced by a captive pair but hatched by wild parents. Additionally, a new captive pair was formed by two of the rails hatched from 4 eggs taken from two Newport nests. Since 1999, 15 eggs and 60 rails have been translocated into 4 target marshes.

INTRODUCTION

The Light-footed Clapper Rail (*Rallus longirostris levipes*) is a State and federally listed endangered species that is resident in coastal wetlands in southern California and northern Baja, California, Mexico. Loss and degradation of habitat threaten the continued existence of this bird, although management efforts now offer some promise of eventual recovery. The California population of this endangered rail was up to 325 pairs in 15 marshes in 1996, the largest number detected breeding since annual surveys were begun in 1980.

One of the first major clapper rail investigations identified the lack of suitable nesting habitat as a major, widespread limiting factor (Massey and Zembal 1980). Subsequent work demonstrated the need for emergency actions and recommended management strategies to stem the alarming population decline of this endangered bird in southern California. The actions taken have included habitat restoration, particularly through enhancement of tidal action to former wetlands; study and control of introduced predators and unnaturally high predator populations; provision of nesting sites in marshes with good habitat but limited options for protected nesting locations; studies that have led to adaptive management strategies, benefiting the rail and the other co-inhabitants of these biologically rich ecosystems; and annual censusing of the California population, in part to track the effects of management on annual recruitment.

Implementation of these measures has succeeded in protecting and maintaining most of the small subpopulations and in supporting the expansion of a few. However, the benefits of this attention go far beyond this single species. These endangered birds thrive in our most productive, remaining coastal wetlands. Measures that benefit the rail and its environs enhance conditions for a myriad of other species as well, including people. These places and the wildlife are cherished by hundreds of thousands of southern Californians for their inherent aesthetic, recreational, economic, scientific, educational, and ecological values. Furthermore, there are essential links between the coastal wetlands and vast acres of diverse upland habitats and wildlife located many miles from the coast (Soule et al. 1988, Zembal 1993). Consequently, restoring and maintaining the diversity and vital productivity of the coastal wetlands, while achieving the recovery of the clapper rail, may only be possible in an environment that includes coastal southern California's complete wildlife heritage.

Hundreds of wetland acres have undergone, or are being planned for restoration. However, full recovery and functionality of a coastal wetland may take decades to achieve. In the meantime, habitat suitability for the clapper rail may be quite marginal. All but a few of the current subpopulations of Light-footed Clapper Rails depend upon a marginal habitat base and are too small to be expected to maintain themselves, even in the short term. In addition, all of the subpopulations have been through recent bottlenecking. Consequently, clapper rail management in southern California now includes translocation efforts, beginning in 1999. The genetic and demographic augmentation of the smaller subpopulations in the short term may be critical to population viability in the long term. The critical partners in the development of a protocol for captive propagation have been staff of the Chula Vista Nature Center and Sea World, San Diego.

Herein are reported the results of the year 2003 management, study, and translocation efforts including participation in the development of a protocol for captive propagation.

STUDY AREAS

Descriptions of all the marshes recently occupied by Light-footed Clapper Rails are available (U.S. Fish and Wildlife Service 1985 and Zembal and Massey 1981). Three of the current principle study areas are at the Naval Base Ventura County Point Mugu (NBVC), the Seal Beach NWR and Upper Newport Bay State Ecological Reserve.

The marsh at Point Mugu is located in southeastern Ventura County on the 1,821 ha (4,500 acres) NBVC, about 13 km (8 miles) west of the Los Angeles County line. There are approximately 890 ha (2,200 acres) of jurisdictional wetlands in Point Mugu (USACOE/EPA 1994), including the largest functioning salt marsh in coastal southern California today. Considering the combined acreages of marshes that are regularly occupied, the vegetated marsh and most closely associated habitats at Mugu Lagoon represent more than 25% of the clapper rail's potential habitat base. The marsh is subject to nearly full tidal action in the central and eastern arms with an amplitude of about 9 ft. The tides are dampened by constrictions at Laguna Road and farther west, resulting in a tidal amplitude of only 4 - 5 ft. The wetland vegetation is dominated by pickleweed (*Salicornia virginica*) but scattered stands of spiny rush (*Juncus acutus* ssp. *leopoldii*) are critical for rail nest placement.

The Seal Beach NWR covers 369 ha (911 acres) of the 2,024 ha (5,000 acre) Seal Beach Naval Weapons Station in Orange County near the City of Seal Beach. About 299 ha (739 acres) of the refuge lands are subject to regular inundation by the tides. There are about 229 ha (565 acres) of salt marsh vegetation, 24 ha (60 acres) of mudflats that are exposed daily, and 46 ha (114 acres) of channel and open water. The wetlands are fully tidal, with a range of about - 0.5 m (1.7 ft) to + 2.2 m (7.2 ft) MLLW, and very productive with a high diversity and abundance of wildlife.

Upper Newport Bay is an Ecological Reserve of the California Department of Fish and Game (Department), located approximately 22 km (13.7 mi) down coast of the Seal Beach NWR. Approximately 304 ha (750 acres) are fully tidal, including 105 ha (260 acres) of marsh. The bay is bordered by bluffs, 9 - 18 m (30 - 59 ft) high, and surrounded by houses and roads. There are approximately 100 ha (247 acres) of shrublands remaining undeveloped on the edge of the wetlands and two local drainages with some cover along them coursing into the bay.

METHODS

Call Counts

The twenty-fourth consecutive annual census of Light-footed Clapper Rails in California was conducted from 6 March 6 through 21 June 2003. Thirty coastal wetlands were surveyed by mapping territorial pairs based on their calls (Zembal and Massey 1981, 1985; Zembal 1992). All of the coastal marshes with known or suspected rail subpopulations were surveyed until an evening or early morning with good calling activity was encountered. Small wetlands with no recent clapper rail sightings that again yielded negative results were surveyed at least twice, as were marsh parcels with lower than expected results on the first call count. Additionally, nesting data were considered in the assessment of the subpopulations inhabiting the 5 wetlands wherein nesting data were gathered in 2003 and a high tide count was accomplished on 26 October 2003 on the Seal Beach NWR. This NWR is the only wetland inhabited by clapper rails that is inundated thoroughly enough during a 6.5 ft. tide or higher to get a relatively complete visual survey of the rails. Clapper rail counts were conducted on 32 dates by 1 – 10 observers and approximately 340 observer-hours.

In the 4 marshes with abundant clapper rails, mapping spontaneous calls was the prevalent technique. In marshes with few rails and along long, narrow strips of habitat, playbacks of taped "dueting" were used sparingly to elicit responses. In the Tijuana Marsh NWR, enough observers were stationed within potential hearing range of any calling rail to cover the entire marsh on a single evening. However, most of the marshes were surveyed by a single observer visiting discrete patches of habitat on consecutive evenings until all available habitat had been covered. Most of the observations were those of three observers, but primarily the principal investigator. Additional observers participated primarily in three of the year 2003 counts, those at Seal Beach NWR (7 observers), Tijuana Slough NWR (10 observers) and Sweetwater Marsh NWR (5 observers).

The more movement required of an observer during a survey, the more likely that breeding, but infrequently calling, rails would be missed. Calling frequency and the detection of calls are influenced by observer's hearing ability and experience with the calls, the stage of breeding of individual pairs, rail density, and weather conditions (Zembal and Massey 1987). Many surveys attempted on stormy, windy days needed to be repeated. When calling frequency is high with many rounds issuing from the marsh as adjacent pairs respond to one another, it is possible to map the rails accurately and move on to survey more marsh. Under usual circumstances approximately 20 ha (50 acres) of marsh can be adequately covered during a single survey.

Past early morning and late evening surveys have been comparable, although evening calling by the rails is more intense and often ends with one or more flurries (Zembal et al 1989). Surveys are usually conducted in the 2 hrs before dark, but some are done at first light to about 2 hrs after sunrise.

The playback of a taped "clappering" call appears to be responded to by the rails as if a living pair is calling nearby. However, work done with Yuma clapper rails (*Rallus longirostris yumanensis*) strongly suggests that those closely related rails can become conditioned to the tape if it is used excessively (B. Eddleman, pers. comm.). During prime calling times in the evening or early morning, a playback sometimes elicits a single response or a round of calling. However, there are sometimes no vocal responses to the tape. If played at a time of day when the rails are not particularly prone to call, the only response likely to be elicited is that of the territorial pair intruded upon. Sometimes the response is non-vocal investigation by the pair or one member. Repeated playbacks are likely to elicit aggression. In one instance, a clapper rail attacked and knocked over a decoy that was set near a repeating tape. In another instance, a male attacked another rail, presumably a female, forcefully copulating with her while pecking at the head and neck, dislodging feathers. We finally disturbed these birds (RZ) to divert the male's aggression. Subsequently, playbacks are used sparingly and with caution.

Used only once per year at a given marsh and with minimal repetition, playbacks have yielded important results. Unmated clapper rails, for example, often respond at considerable distances and may approach the tape. Isolated single rails often approach very closely and remain in the vicinity unless displaced.

In assessing the rail population, duets and some single "clapperings" were treated as territories. Since advertising singles are not indicative of an occupied territory with reproductive potential at the time of the survey, they are not included in the population total. However, a single “clappering” is as good an indicator of a territory as a duet, when advertising is not heard later from the same territory. Eventually, during a 2 – 4 hr census period, pairs often dueted from territories where only single pair members called earlier. However, the fewer rails in a marsh, the more important it is to count only duets as pairs to avoid over-estimating the breeding subpopulation.

Management and Monitoring of Nesting Sites and Translocation

Recent studies demonstrated low genetic variability in the 4 subpopulations of Light-footed Clapper Rails sampled, including the three largest subpopulations and one small (Fleischer et al 1995). The authors recommended translocations from larger to small subpopulations for the inherent genetic and demographic benefits. Whether the salt marshes occupied by small subpopulations are poorly suited to occupation, having been so reduced and otherwise degraded, or the rails themselves are poorly suited to proliferate more expansively, the rails would benefit from translocations appropriately sensitive to their rarity and plight. Significant wetland restorations are progressing at their necessarily slow but regular pace. Given the current projects, and projected future results at Batiquitos Lagoon, Tijuana Marsh, Bolsa Chica, Seal Beach National Wildlife Refuge (NWR), Los Penasquitos Lagoon, Carpinteria Marsh, Mugu Lagoon, and others, there should be the habitat base, at some future date, to support a recovered Light-footed Clapper Rail population. Translocation should play an important role in the preparation of the population for significant expansion into newly suitable habitat.

A review of the literature and examination of the feasibility of translocation was completed for this rail (Hoffman 1995). A maximum of 9 males and 6 females were proposed for translocation from Newport to Seal Beach NWR. This is a lower number than usually proposed for translocation but might represent a reasonable approach, given the rarity of this clapper rail. In 1997, for example 15 rails equaled 5% of the breeding population at Upper Newport Bay (Table 1). Moving 15 adult rails from Newport to each of 5 marshes represents moving 25% of this largest subpopulation. That is more birds than should be moved in a single year. We proposed to move fewer, up to 10 rails each to as many of the target marshes as possible each year. It should be noted that there is some precedence for positive results, even with very low numbers of translocated birds. For example, translocations of red-cockaded woodpeckers have involved only 1 - 4 birds and resulted in successful breeding and recruitment (Allen et al. 1993).

Site fidelity is also a factor that could jeopardize the success of translocation efforts. The Light-footed Clapper Rail is viewed as a highly sedentary species (Zembal et al. 1983) but the reaction of an adult to being moved is unknown. Which site, old or new would be shown fidelity?

In deference to the extreme rarity of this rail and in recognition of the many potential issues, we proposed the least intrusive method of genetic and demographic augmentation we could devise. We proposed to move eggs from Upper Newport Bay, the subpopulation exhibiting the highest genetic variability of those sampled, into the smaller wetlands. Using eggs rather than adults would greatly reduce effects on the donor subpopulation and give maximum assurance of post-translocation site fidelity. One or two eggs were to be taken per nest from Newport and transported, within 24 hours in a portable incubator into nests at the same stage of incubation in Carpinteria Marsh, Mugu Lagoon, Seal Beach NWR, Kendall-Frost Reserve, and Sweetwater Marsh NWR. Translocated eggs were to be candled and floated to determine viability and stage. A maximum of 10 eggs could be moved into each of the recipient marshes per year. Eggs would be marked with indelible ink and followed to hatching. The ultimate success of translocation will be determined by comparing subpopulation size trends, before and after, aided by 20 years of annual population surveys.

Nests that receive Newport eggs are to be augmented to a maximum clutch size of 10. When adding one or two eggs would bring the total clutch to 10 eggs or more, one or two eggs would be removed when the Newport eggs are deposited. Undeveloped eggs, if present, would be removed first. Viable eggs removed from receiver marshes would be used to augment other clutches.

The maximum number of eggs taken from Upper Newport Bay during any year is not to exceed 50, approximately 5% of the total eggs in all initial clutches (based upon 1997 subpopulation size and an average clutch size of 6 - 7 eggs). However, in order to move 50 eggs, we would have to find 5 nests at the same stage of incubation at each of the 5 receiver marshes and deposit 2 eggs in each. This could not be achieved currently, because there are fewer than 5 pairs in three of the receiver marshes and because the rails in the dense Newport subpopulation are breeding later than the rails in the small subpopulations.

Egg translocation necessitated nest searching and monitoring at Upper Newport Bay and the 5 marshes to receive eggs. Nest searches and observations were begun in February and continued into August 2003. The activities were conducted as they have been in the past (Massey and Zembal 1980, Massey et al. 1984). Extreme care was taken to minimize visitation and disturbance.

Nest searches at 3 of the 6 wetlands involved in translocations were focused mostly on the artificial nesting rafts deployed in them for the rails. Three other wetlands used to have rafts deployed, maintained, and monitored annually in each but the efforts were abandoned because of low use. Point Mugu was one such marsh; 25 floatable rafts were deployed there in 1988. However, there was never any evidence that the rails used the rafts, probably because they offered no special protection under such a dampened tidal regime. Consequently, the intensive effort required to maintain and monitor them was put to other use. Although many marshes occupied by rails suffer from a poor supply of good nesting sites, artificial nesting rafts have been regularly used in only 3 of 7 marshes where they have been tried. Those three and the number of rafts in each during the 2003 season were the Seal Beach NWR with about 53 sites, Kendall-Frost Reserve with 15 rafts, and Sweetwater NWR with 21 rafts. The rafts were refurbished in February or early March and visited 3 – 4 times each during March through July. On the Seal Beach NWR, there were raft checks approximately every 3 weeks during the breeding season. Raft maintenance and monitoring involved a minimum of 450 field-hours.

Nest searches and monitoring were focused at Upper Newport Bay and Point Mugu. Searches for nests were begun at Upper Newport Bay on 27 April, with the final one on 25 July 2003. The first nest search at Point Mugu was on 14 March and the final was on 24 July 2003. Approximately 1,700 hours were spent engaged in nest searching, observations, and population surveys over 61 dates in 2003. From north to south, there were 2 dates of field activity associated with nest searching and observations in Carpinteria Marsh, involving 1 – 3 observers and 23 field-hours. There were 11 dates at Point Mugu by 1 – 5 participants and 320 hours. On the Seal Beach NWR 1 – 7 observers accumulated 211 field-hours over 11 dates. At Upper Newport Bay, 25 field-days by 1 – 5 observers resulted in 266 field-hours. There were 67 field-hours spent at the Kendall-Frost Reserve by 2 – 12 personnel over 7 dates. Lastly, at Sweetwater Marsh and the Chula Vista Nature Center, 1 – 5 observers spent a minimum of 768 hours nest searching and observing. The captive rails got attention and some observation at least twice daily.

Development of the Protocol for Captive Breeding

A wetland aviary was developed at the Chula Vista Nature Center (CVNC or Chula Vista), adjacent to the Sweetwater Marsh NWR to house clapper rails and develop a protocol for breeding (Bayfront Conservancy Trust 1995). The first pair of rails was taken into the facility in December 1998. The second pair was taken into captivity in November 2000. The third captive pair members were born in captivity in 2001 and bred in 2002. This pair was moved to Sea World where they bred in 2003. Finally, the fourth captive pair in 2003 was comprised of a male born at Sea World in 2001 and a female captured in Upper Newport Bay and taken into captivity on 20 September 2002. The first priority for the use of any eggs produced by these captive rails is in the egg translocation efforts.

Three primary observers monitored the captive rails from several minutes to many hours daily during the year 2003. In addition, several observers monitored the rails, eggs, and young at Sea World, San Diego throughout each day. Forty thousand visitors were given the opportunity to view the rails at Chula Vista, hear about their plight, and the importance of their ecosystem.

RESULTS AND DISCUSSION

Call Counts – Status and Distribution of the California Population

The twenty-fourth annual census of the Light-footed Clapper Rail in California was conducted 6 March – 21 June 2003. Thirty coastal wetlands were surveyed by assessing call counts from Goleta Marsh in Santa Barbara County, south to Tijuana Marsh on the Mexican border. Reports of additional recent sightings were solicited and two observers (John Konecny in the Dairymart Ponds, and Charles Gailband in Sweetwater Marsh NWR) added 3 pairs to the count totals.

A total of 284 pairs of clapper rails exhibited breeding behavior in 16 marshes in 2003 (Table 1). Although this is 12% below the 24-year population high in 1996, it is the highest count in the 2000s so far and surpasses all of the counts done in the 1980s. The Seal Beach NWR subpopulation after doubling in size from 2001 to 2002, nearly maintained its numbers into 2003, but is still much less than half of its former high in 1994. The subpopulation in the Tijuana Marsh NWR was up to its second highest recorded level in 2002 but dropped 14 pairs in 2003. The Newport subpopulation comprised 50.7% of the state population in 2003 at its fourth highest level; together with the next largest subpopulations at Seal Beach NWR and Tijuana Marsh NWR, a combined total of 231 pairs was tallied, or 81.3% of the total breeding population.

Very encouraging count results were obtained at Point Mugu in 2003. The Point Mugu rails now comprise the fourth largest subpopulation in the state with 14 pairs, up by 4 pairs from 2002 and double the 2001 total. This subpopulation fluctuated between 3 and 7 pairs for nearly 20 years and now it has doubled in two years. There is an efficient predator management program in place, some likelihood of a consistent rail management program (funding issues for 2004 notwithstanding), and the rails are responding. For example, for the first time in many years, rails were detected in the eastern arm of the lagoon. Intensive monitoring, demographic and genetic augmentation, and additional nesting cover should continue to foster the growth of this northern subpopulation during the current decade.

Several of the other small subpopulations are persisting at their highest recorded recent levels including Santa Margarita Lagoon, Agua Hedionda Lagoon, Batiquitos Lagoon, San Elijo Lagoon, Kendall-Frost Reserve, and San Diego River Flood Control Channel. Genetic bottlenecking, poor genetic variability due to inbreeding is undoubtedly an issue in each in these subpopulations but only one of them is eligible for and receiving translocations. It was unexpected that these little subpopulations could exist as long as they have. However, their long-term viability is highly questionable particularly of those that do not receive the intensive management they need.

The salt marsh at the mouth of the Santa Margarita River has not had two breeding pairs of clapper rails documented since 1984. As of late 2002 and through the breeding season in 2003 there is a pair at the river mouth and another between Stuart Mesa Road and the railroad tracks. Both are in brackish marsh in the midst of salt marsh patches.

The marsh at Agua Hedionda Lagoon held a maximum of 7 pairs of rails in 1983. This little subpopulation has barely been detectable since 1984 until quite recently. The 4 pairs detected in 2003 is the highest level observed since then and perhaps offers hope of additional expansion. The brackish marsh inland of the inner lagoon was greatly impacted by a change in drainage in the mid-1980s and the rails were undetected for many years. Perhaps with the recently increasing street runoff from adjacent housing tracks, the freshwater marsh between El Camino Real and the inner lagoon has rejuvenated to some extent. Two pairs of rails were found in this marsh nearest the inner edge and El Camino Real. The other two pairs were in stands of reeds bordering the inland edge of the inner lagoon.

Batiquitos Lagoon has had many recent uncorroborated sightings reported away from the consistently occupied southeast corner of the inland lagoon. Finally, in 2003 there was definitive evidence of breeding elsewhere in this restored and recovering wetland. Additionally, the count of 5 pairs plus advertising males was the highest on recent record. Batiquitos Lagoon has now been proposed as a sixth release site for captive-reared rails. This wetland is a strong candidate for augmentation since the little rail subpopulation grew very recently from presumed limited genetic stock, the restored habitat is looking better every year, and the marsh is under active management. There are cordgrass (*Spartina* sp.) stands on the central lagoon that should be able to support rails now. Batiquitos Lagoon is southern California's most promising candidate for a newly emerged, large, thriving rail population in this decade or the next.

San Elijo Lagoon has had major efforts to restore tidal function and the rails have responded in at least a minor way. There are now two pairs in the central lagoon in stands of freshwater marsh bordering the salt marsh. The other two pairs are also in freshwater marsh but nearest the inland side of the inner lagoon. No mated pairs were detected along the dike that bisects the inner lagoon where one to three pairs were routinely found in the past.

Although there were only 6 pairs of rails detected in the little Kendall-Frost Reserve, breeding activity was strong and resurgence of this subpopulation is hopefully anticipated. There was a high count of 24 pairs tallied there in the mid-1980s. Since then the cordgrass has lost some of its former vigor achieving neither the widespread height nor density that was once commonplace. For example, nearly all of the recent successful nesting appears to occur on the artificial nesting platforms provided. Although the marsh is small, totally isolated, and surrounded by urban housing, it is managed under the University of California Reserve System. The stewardship provided includes appropriate predator management, habitat restoration, and people, particularly researcher management to assure minimal disturbance to the rails and their habitat.

The San Diego River Flood Control Channel supported well-developed cordgrass-dominated salt marsh in 2003. However, it is a flood-conveyance facility that could be scoured in the first major rainfall event that hits the area. Otherwise, based upon the extent and condition of the current habitat, it should be crawling with rails in the short term. The channel would be a superior candidate for translocation efforts except that the habitat could be entirely destroyed by flood flows during any given winter.

The Newport count was the fourth highest on record but among the pairs were unmated rails. There were 3 advertising females and 15 males detected at Upper Newport Bay. The presence of unmated females probably indicates heavier than normal predation of males. Unfortunately, a red fox was sighted in Upper Newport Bay in 2002 near the upper end and this is where the unmated females were detected in 2003. All of the single males were well to the south. This was also a female year in Tijuana Marsh where 8 advertising females were encountered. This is not a good sign since the usual condition is a slight male-skew in the population and to encounter only advertising females is most certainly an indication of excessive male mortality. The final unpaired female encountered in 2003 was under the worst possible circumstance. Only an unmated female was heard in Carpinteria Marsh where she vocalized constantly with no answering call. This northern wetland is plagued with the consistent problem of domestic cats roaming the marsh, among other predators of concern. The Carpinteria subpopulation and wetland are in major need of intensive management but the wherewithal to achieve this awaits identification. Without consistent predator management, the justification for translocations into Carpinteria is poor.

All of the other marshes with unpaired rails were male-skewed in 2003, including at least 10 unmated males at Point Mugu, an incredible 17 single males on the Seal Beach NWR, 2 males in Buena Vista, 2 males in San Elijo, 2 on Escondido Creek, 1 in San Dieguito, 2 in Los Penasquitos, 5 in Kendall-Frost, 1 in the San Diego River, and 3 single males in Sweetwater Marsh. The usual condition has been a slight male bias during most years in most marshes.

Although the Seal Beach NWR subpopulation nearly maintained its size after more than doubling from 2001 to 2002, there is still major concern for this subpopulation's viability with so many competing males roaming the marsh. This is the only marsh currently occupied by clapper rails that gets fully inundated during a high tide of about 6.5 ft (MLLW), or higher. Tides of this height occur regularly in the late summer usually in darkness and in the fall or winter in the early morning. The rails are forced onto debris or to the edge of the marsh where there is little cover and busy roads just beyond. This greatly exposes the rails to potential predators and may be part of the problem at Seal Beach. However, the completeness of inundation also allows for fairly dependable surveying of the subpopulation outside the breeding season. Accordingly, the rails were counted again from canoes on 26 October 2003 and 96 individuals were sighted. Potential rail predators were also out, hunting the marsh and edges, including at least 8 Red-tailed Hawks (*Buteo jamaicensis*), 4 Northern Harriers (*Circus cyaneus*), and a Peregrine Falcon (*Falco peregrinus*). Continued upgrading and maintenance of the artificial rafts on the Seal Beach NWR is essential to the protection of the wintering rails and success of the breeding rails (see below). More than half of the rails counted in the winter were sequestered on rafts and several encountered in the water may have just vacated rafts.

Excluding the 4 largest subpopulations, the remaining 12 totaled 39 breeding pairs of clapper rails, 13.7% of the state total. Six wetlands held just one or two pairs each and the Sweetwater Marsh NWR subpopulation is in serious jeopardy. Without restoration and species-specific management in these wetlands, there is little likelihood of the clapper rail's survival in them.

Many of the other listed species in Southern California are associated with habitats that are still impacted directly by new development projects. Although the success of the resulting multitude of mitigation projects are questioned, at least there are efforts mounted for many listed species with the revenue and attention generated by development. Most of the efforts sanctioned by regulatory agencies for the clapper rail result in the expenditure of significant funds to document the indirect effects of construction activities adjacent to occupied wetlands. This adds to the small list of people watching the rail disappear but does little to benefit the clapper rail. There are only 16 little subpopulations of clapper rails, most barely hanging on to their existence. Any wherewithal generated by construction projects adjacent to habitat should be applied to managing these wetlands for the rail. Only an extremely experienced, patient, and lucky observer will successfully monitor the actual effects of construction activities on clapper rails. The funding is thus applied to comply with the letter of the law but in most cases does not benefit the rail.

Management and Monitoring of Nests and Translocation

The first clapper rail nest with eggs at Point Mugu was found on 15 May 2003. During the call count at the beginning of the breeding season, 14 breeding territories were in evidence. By the end of the nesting season, we had found evidence of breeding activity in at least 12 of the 14 territories (Table 2). There were two nests in close proximity to one another northwest of the north terminus of south J Street but two pairs shared this area and the egg dates overlapped. Eggs or evidence thereof were found in 6 territories and at least 10 territories held young.

Table 2. Clapper Rail Nesting Activity at Point Mugu, 2003.

Territory #	1	2	3	4	5	6	7	8	9	10	11	12
Cover	J	J	J	J	J	J	J	J	J	C	J	BR
Egg date	-	-	-	5-15	5-23	5-15	-	-	-	-	-	-
# eggs	-	-	-	1	8	9	-	-	-	-	1	-
Fate	F	F	F	H	?	H(7)	F	N	F	BN	H	7N
Date	5-15	5-15	5-15	5-15	6-12	6-12	5-15	5-15	5-15	5-15	7-3	5-15
# chicks	-	-	-	-	-	4	-	-	-	-	-	-
Date	-	-	-	-	-	7-24	-	-	-	-	-	-

C = Cordgrass; J = *Juncus acutus*; BR = Bulrush; H = Hatch; BN = Brood Nest; and F = Feeding of chicks; N = Nest.

A map of the locations of nesting activity was provided to the Natural Resources Manager at Point Mugu, Martin Ruane. The sites were located with a global positioning system unit and the coordinates were incorporated into the Natural Resources Geographic Information System Database.

Five breeding territories were in evidence between M and L Avenues north of Beach. Six territories were located between South L and J Avenues, 3 within 400 m of the intersection of L Avenue and Beach Road, 1 was roughly mid-marsh and 2 were nearest the main channel. The final territory was just north of Beach about 500 m east of South J Avenue. Nests were located in 8 of the 12 territories but only three of them were incubation nests found prior to hatching.

There was evidence of 10 nesting attempts discovered at Point Mugu and 2 additional nests that did not appear to be used in 2003. Chicks were directly observed in only one of the nesting territories but there was ample evidence of chick feeding in 10 territories. The territory at the corner of L Avenue and Beach Road had two successful nesting attempts. Chicks were directly observed in the late breeding season and the parents were actively defending an earlier brood in May.

It was unusual in 2002 that of 6 egg nests only the 2 in one territory were in *Juncus*; 3 were in *Salicornia*; and 1 was in *Spartina*. During most years, *Juncus* is the most frequently used nesting cover. Nine of 11 clutches of eggs were laid in nests built in spiny rush in 2000 and 2 of 3 clutches were in spiny rush cover in 2001. Given the choices available at Point Mugu, the rails selected stands of spiny rush as nesting cover for 82% and 67% of the egg nests in the two previous years but only 33% in 2002. The advantage of building a nest in spiny rush is that it provides elevated cover affording protection from high tides. Two of the 3 nests built in *Salicornia* in 2002, for example, were washed out shortly after hatching. The spiny rush spines must also afford some protection from predator attack. There was a return to the former trend in 2003 with 6 of 8 nests in spiny rush, 1 in bulrush (*Scirpus* sp.), and 1 in cordgrass.

Finding active egg nests before hatching at Point Mugu has become extremely difficult. The rails that are surviving to a second season or more may be warier of disturbance by field investigators. Several of the stands of spiny rush favored for nesting are quite thick and a nest 10 m or more into the interior of a dense stand would be extremely difficult to locate or access. Finding a nest in the pickleweed is mostly luck because there are hundreds of acres and the micro-topography of a good site is most apparent below the pickleweed canopy.

Once again the asynchrony between nesting attempts at Point Mugu and Upper Newport Bay was not conducive to translocations of eggs. The Newport subpopulation occupies the entire marsh, the rails put much more energy into territorial defense, and they breed later than the rails in the sparsely occupied wetlands like Point Mugu. Three clutches could have been augmented at Mugu in 2003 but no match was available. Instead, young of the year that were hatched and raised at the Chula Vista Nature Center and Sea World were added to the subpopulation at Point Mugu (see below).

Although artificial nesting structures were tried unsuccessfully at Point Mugu for a few years beginning in 1988, it is clear that a lack of adequate nesting cover is a problem in our largest coastal wetland. The provision of natural nesting habitat is always the preferred alternative for the rails. However, this is usually a measure that is expensive and only yields results in the long term. Although less desirable, artificial cover may be of immediate use while native cover develops. Point Mugu desperately needs additional nesting cover for the rails and it may be possible to provide this in the form of stands of spiny rush (*Juncus acutus ssp. leopoldii*). However, in most of the places where stands are needed, artificial irrigation would be required to establish them. Unfortunately, in most of these places, irrigation would probably be needed to maintain them, as well. Methods should be explored for providing additional cover immediately in strategic places. One compelling option might be stands of artificial spiny rushes as a short-term option and in locations where irrigation is impractical. Another is perch-type nesting structures that have been successfully deployed for northern clapper rails in eastern marshes.

The nest searches conducted at Upper Newport Bay for the translocation efforts revealed 6 egg nests, 2 of which had already hatched. From two to six biologists spent time on 14 dates, 27 April – 25 July 2003 locating these nests and observing. None of the 4 clutches was a good match for a counterpart at any of the marshes targeted for translocation. Nest searches at those other marshes revealed earlier egg dates than at Newport. However, two eggs from each of two nests were taken from Newport for incubation at Sea World. The unrelated progeny will be used to found at least one additional pair of captive breeders with less trauma and disturbance than caused by removing adults from the wild.

There was no nesting observed on any raft in the Sweetwater Marsh NWR in 2003. The rafts are probably not of much advantage in this high marsh because there are many potential nesting sites that are high enough to afford good protection from high tides. A design for perched nest platforms is being modified for potential trials in Sweetwater NWR in 2004.

Clapper rail reproduction was strong in the University of California's Kendall-Frost Reserve in 2003. Eleven of the 15 rafts in the Reserve had clapper rail nests on them in 2003. There were 12 clutches of eggs on 10 rafts. Seven clutches were laid in the early season and all hatched successfully. Five were later season second attempts and two were predated. One of these probable predations involved rats invading the nest, doming it over for their own use.

Although predation was not a major issue in the Kendall-Frost Reserve during the 2003 breeding season, it has been in the past. It is essential that a consistent annual predator management program be continued and that the work be initiated prior to the rails' nesting. The marsh is small, extremely isolated, and therefore plagued by mesopredator release. Furthermore, irresponsible pet owners and animal control agents have released predators at the camp ground next to the Reserve. Predator management could not be initiated just last year until 3 clutches of eggs had already been destroyed. The Reserve has great potential for rails; it was home to 24 pairs of clapper rails in 1984. Additionally, clapper rail activity has increased since 2001. This little wetland should be a focus of management efforts for rail recovery. Fund raising should be undertaken to set aside a small endowment ensuring a consistent annual predator management program.

Seventeen of the 53 rafts on the Seal Beach NWR held 24 incubation nests. Hatching success was 88%. Of the three clutches that did not hatch one was predated, one was abandoned, and one was lost to tidal over wash. There were also 13 brood nests and as many as 7 of these did not appear associated with egg nests on rafts indicating additional incubation nests in natural cover. There were two peaks in incubation activity in late March and again in late May.

Rafts were instrumental in the recovery of the Seal Beach subpopulation in the early 1990s. In 1993, for example, there were 79 nests, 73 clutches of eggs, 9 additional brood nests, and an overall hatching success of 79% on the 100 rafts available in the NWR. However, since then the subpopulation has fallen off dramatically from unknown causes. The declines have not been observed during the breeding season when most of our field observations occur. We suspect winter/fall predation, perhaps associated with the huge wintering raptor population.

Development of the Protocol for Captive Breeding

The clapper rails at the CVNC bred successfully for the first time in 2001, after bringing in a second pair of rails and switching mates. Each pair laid a single clutch, one of 8 and the other of 7 eggs. The 8-egg clutch was taken to Sea World to be hatched and reared, hoping that the pair would lay another clutch. They did not. Seven captive-reared rails were released into Mugu Marsh.

During the 2002 nesting season there were 3 pairs of captive rails at the CVNC and a lone male at Sea World. The 3 pairs produced 5 clutches of eggs. The two seasoned pairs both double clutched after losing several youngsters from their initial broods. The chick mortality was probably due to exposure during un-seasonal wet, cold weather; the autopsies were inconclusive. By the season's end 21 clapper rails were bred in captivity and released into the Sweetwater Marsh NWR (4 rails), the Seal Beach NWR (6 rails), and Point Mugu (11 rails). One of the pairs that bred in 2002 was born in captivity in 2001.

There were 4 pairs of rails in captivity during the 2003 breeding season. A new female was trapped in Upper Newport Bay on September 20, 2002 and paired with the lone male from Sea World. Since both could have been first-time breeders, they were taken to the CVNC for the stimulus and company of the other pairs. The second generation breeders, #863M and 856F were taken to Sea World to be the lone pair there. Since they bred in 2002, it was postulated that they would perhaps breed without the stimulus of other rails nearby in 2003. In addition, 4 eggs were taken from two nests in Upper Newport Bay on May 31, 2003. These eggs were incubated at Sea World and the hatchlings will be used to found a fifth captive pair in 2004.

The Sea World pair and the first-time breeders at the CVNC each produced single clutches in 2003. The Sea World pair produced 8 eggs that were exactly the same age as a 9-egg clutch under wild parents on the Seal Beach NWR. The two clutches were switched and both hatched. After fledging, the Seal Beach youngsters were returned to the NWR. The other two CVNC pairs produced a total of 5 clutches. The second clutch of one of these pairs was quickly predated by rats and they laid a third clutch. One dropped egg that survived the predation was hatched at Sea World. All but 3 of the rails (considered too imprinted) raised in captivity in 2003 were released to the wild: a new captive pair was formed from the 4 eggs taken from Newport; 20 rails went to Point Mugu; 5 rails were released into Kendall-Frost; and 7 youngsters went back to Seal Beach.

The three pairs at Chula Vista produced a total of 54 eggs, of which 43 hatched. The 12 failures were attributed to: 2 eggs missing from nests; 4 non-viable eggs (found on nests after the rest of the eggs hatched); and 6 eggs were lost in a single predatory event involving a rat. Twenty-six chicks were fledged from the 43 eggs that hatched.

The propagation program has largely been a great success to date. However, survival was extremely poor for the first broods of the 2002 and 2003 seasons. Of 17 eggs in two initial clutches in 2003 only one hand-reared rail survived to fledge and he was considered non-releasable due to human imprinting. Two eggs were undeveloped but the other 15 hatched and died at 3 – 10 days old. These deaths appeared to be the results of exposure due to poor parental care. One female in particular ignored the chicks almost immediately and prepared to lay her second clutch. Discussions are ongoing concerning the advisability of hand-rearing the first broods of the two older pairs.

Two additional aviaries, measuring approximately 80 ft X 25 ft each, were erected at Chula Vista along the outlet stream from the main exhibit, one each in 2001 and 2002 and the funding for a third is being sought. These cages are isolated from regular human visitation and serve multiple purposes. Most importantly, they serve as rearing pens for the young rails once they are large enough. The rails are fed live native foods slid down a tube by observers in an adjacent blind. The food items were mostly captured nearby, the same organisms the rails would capture and eat in the marsh. The pens on the outlet creek offer flexibility in separating broods from the adults and serve to condition the newly fledged rails for release to the wild by more fully exposing them to the marsh ambiance.

Sea World is preparing a pen dedicated mostly to Clapper Rails; their participation is instrumental in the success of this program. When there were predation problems or opportunities to maximize the output of the captive rails, the Sea World Avian Staff were there to do whatever needed to be done.

Since the captivity of the first pair of rails, there has been concern about the level of disturbance caused by visitors. Over 40,000 people go through the exhibit annually, passing within a few meters of the rail's cage. Exposure of the public to the rails, their plight, and the importance of their habitat is a top priority of this program. Although this disturbance could impact the rails, they are breeding and thriving.

The following chronology highlights the major events in captive propagation:

18 Dec 98 - First rail into captivity, #605-09841, YY(S) RT, 456 gm male, trapped on Upper Island, Upper Newport Bay (Newport) at 2 PM, to Chula Vista Nature Center by 8 PM, north pen.

19 Dec 98 - #842 captured at Newport 430 PM by JJZ, Upper Island 500 m from 841 capture site,Y Lft – Y(S) Rt, 311 gm female, to CVNC by 815 PM, north pen.

2 Nov 00 - #716-93332 captured at Newport, Shellmaker Island, creek south of Fish Pond Creek at 8 AM, R(S) Lft, Blu Rt, 465 gm male, to CVNC south pen by 1 PM.

10 Nov 00 - #605-09850 captured on Shellmaker Island in Nostril Creek at 4 PM, Blu Blk(S) Rt, 305 gm female, to CVNC south pen by 7 PM with 841. Rail #s 332 and 842 in north pen. Pairs aggressive, #841 male placed in center pen, away from #850 for 10 days.

30 March 01 - #841 X 850 copulation; #842, 332 have a nest 1 m up in corner Atriplex; new flight pen on outlet channel nearly completed.

14 April 01 – 3 eggs in 842 X 322 nest; 6 eggs by 18 April 01.

25 April 01 – 850 X 841 with 8 egg nest in center pen (hole was cut in south pen door), 850 incubating.

29 April 01 – 7 eggs from 842 X 322 nest in north pen taken to natural nest at Point Mugu; Mugu nest had been abandoned, 7 eggs plus 1 cold Mugu egg (later determined infertile) taken immediately to Sea World for artificial incubation.

8 May 01 – 2 eggs at Sea World "peeping"; 9 May 01 – 3 eggs starred; 11 May 01 – first hatch at Sea World, all 7 hatch by 715 PM, fed by puppet, avoiding imprinting on humans.

14 May 01 – 7 of 8 eggs hatched at CVNC; 15 May – 8 chicks observed at CVNC.

18 May 01 – A casualty at Sea World, duct tape accident, 6 chicks remain healthy.

25/26 May 01 – 2 chicks die at CVNC; 1 by rat attack, other by bird when chick exited little pen to center through the grating in water; remaining 6 chicks taken to Sea World.

7 July 01 – Banded 12 young rails at Sea World, #861 died in hand.

842 (old female) X 332 (new male) progeny banded:

#945-65852,	W R(S) Lft,	293 gm male (Blu Rt Sea World Band)
#945-65853,	W Blu(S) Lft,	298 gm male (Grn Rt Sea World Band)
#945-65854,	W Brn(S) Lft,	270 gm male (Y Rt Sea World Band)
#945-65855,	W W Lft,	232 gm female (O Rt Sea World Band)
#945-65856,	W Bk(S) Lft,	219 gm female (Bk Rt Sea World Band)
#945-65857,	W Y(S) Lft,	228 gm female (R Rt Sea World Band)

850 (new female) X 841 (old male) progeny banded:

#945-65858,	W Lft, W(S) Rt,	183 gm female (W Lft Sea World Band)
#945-65859,	W Lft, R(S) Rt,	236 gm male (O Lft Sea World Band)
#945-65860,	W Lft, Bu(S) Rt,	166 gm male (Bn Lft Sea World Band)
#945-65861,	W Lft, Y(S) Rt,	171 gm female (R Lft Sea World Band) DIED IN HAND
#945-65862,	W Lft, Bk(S) Rt,	160 gm male (Bk Lft Sea World Band)
#945-65863,	S Rt only, stressed.	

Eight Rails taken to conditioning pen at CVNC; rail #s 863, 856 left at Sea World in Pen 2; #854 in pen 1. Later moved to outside enclosure at Sea World together.

13 July 01 – Female #857 found dead in CVNC pen, no superficial trauma, autopsy revealed nothing significant.

11 Aug 01 – 7 Clapper Rails captured from outlet pen at CVNC at 7 AM, translocated to Mugu by 11 AM.

1 March 02 – Clapper Rail nest in exhibit A with 1 egg.

8 March 02 – 7 eggs in exhibit A.

21 March 02 – 6 eggs in Main exhibit.

6 April 02 – 3 dead and 3 live chicks in Main pen; 4 – 8, 4TH chick dies;
Second brood/hacking cage completed on the outlet stream.

2 May 02 – 1 egg of second clutch in nest in exhibit A; 3 chicks from first clutch still surviving.

7 May 02 – Nest with 4 eggs in exhibit B – both pair members were born in captivity last year, 856F X 863M.

11 May 02 – 3 chicks and 9 eggs in pen A; 7 eggs and 1 chick in Main cage; and 6 eggs in pen B.

13 May 02 – Exhibit A with 9 eggs; 7 eggs in B; 7 eggs & 1 chick in Main.
23 May 02 – 4 eggs from exhibit A moved to Sea World.

25 May 02 – A gopher snake was removed from exhibit B; no casualties.

30 May 02 – 1 of 4 eggs at Sea World dies after a power outage; 1 chick hatches, other 2 eggs pipped; these 4 eggs from CVNC exhibit A, 841M X 850F.

1 June 02 – 1 chick hatch in CVNC cage A; 1 chick in B; 5 – 6 chicks in Main.

3 June 02 – 3 chicks in A; 6 chicks in B; 5 – 6 chicks in Main; 4 juveniles eating live prey in hack cage.

12 June 02 – Clapper rail chick died in Main exhibit; autopsy inconclusive.

21 June 02 – A Sea World youngster enduring seizures is put down; 2 young remain.

13 July 02 – 4 survivors of first 2 clutches banded in CVNC hack cage; 3 were born in exhibit A of 841M X 850F:

#945-65865, w W(S) Right, (CVNC grn-grn removed)
#945-65866, w Bk(S) Rt, (CVNC y-y removed)
#945-65868, w Blu(S) Rt, (CVNC blu-blu removed)
The 4TH young rail was born in the Main exhibit of 332M X 842F:
#945-65-867, w R(S) Rt, (CVNC r-r removed)

17 July 02 – 4 captive-bred rails, 865 - 868 released into the Sweetwater NWR.

9 August 02 – Banded 16 of 17 young at CVNC.
Born in exhibit A of 841M X 850F (869 & 870 were raised at Sea World) and moved to west flight pen (all 6 males):

#945-65869, w Brn(gold)(S) Right, (CVNC blu-blu removed)
#945-65870, w Right, Brn(S) Left, (CVNC bk-bk removed)
#716-93333, w Rt, Blu(S) Lft, (CVNC grn-grn removed)
#945-65871, w Rt, R(S) Lft, (CVNC y-y removed)
#945-65872, w Rt, W(S) Lft, (CVNC red Rt removed)
#945-65873, w Rt, Bk(S) Lft, (CVNC brn Rt removed);

Born in exhibit B of 863M X 856F and moved to east (inland) flight pen:

#945-65874, w Brn(S) Rt, y Lft, (CVNC blu-blu removed)
#945-65875, w W(S) Rt, y Lft, (CVNC y-y removed)
#945-65876, w Bk(S) Rt, y Lft, (CVNC bk-bk removed)
#945-65877, w R(S) Rt, y Lft, (CVNC grn-grn removed)
#945-65878, w Blu(S) Rt, y Lft, (CVNC brn-brn removed);
#945-65884, w y Rt, W(S) Lft (banded 8-24-02)

Born in Main exhibit of 332M X 842F:

#945-65879, w Rt, y W(S) Lft
#945-65880, w Rt, y Blu(S) Lft
#945-65881, w Rt, y Brn(S) Lft
#945-65882, w Rt, y R(S) Lft
#945-65883, w Rt, y Bk(S) Lft

24 August 02 – 6 captive-bred rails from east flight pen at CVNC, #s 874 – 878 and #884, released into the Seal Beach NWR off Nasa Island.

28 August 02 – 11 captive-bred rails released at Point Mugu; 6 (#s 869 – 873 and 333) into the eastern arm and 5 (#s 879 – 883) off of South "G" Street.

12 September 02 - #872 observed in the channel between M Street and the runway.

20 September 02 – Female clapper rail trapped (but not banded) at Newport and taken to CVNC, to be paired with lone Sea World male (# 854 from 332M X 842F).

26 September 02 - #881 observed in tidal creek across the dirt road east of south G Street.

5 March 03 – 8 eggs in CVNV Exhibit A; 4 eggs in Main Exhibit.

18-19 March 03 – 6 of 8 eggs hatch in exhibit A.

21 March 03 – Sea World pair with 5 eggs.

22 March 03 – 1 of 6 chicks in Main Exhibit died.

30 March 03 – 5 chicks and 1 remaining egg in Main Exhibit.

1 April 03 – 6 chicks in Shorebird A expired due to lack of parental care.

6 April 03 – Parental care lacking, only 1 chick left alive in Main Exhibit.

7 April 03 – Sea World clutch now of 8 eggs (863M X 856F), switched with a 9-egg clutch from a wild nest on Raft #26 on the Seal Beach NWR.

16 April 03 – 7 eggs pipped at Sea World, 2 eggs non-viable.

17 April 03 – 9 eggs in A; 1 chick remaining in Main Exhibit and 1 egg of clutch #2; Sea World hatches 7 chicks.

18 April 03 – Translocated Sea World eggs hatched on the Seal Beach NWR by wild foster parents.

25 April 03 – 9 eggs in Exhibit A; Main with 7 eggs but 1 out of nest.

27 April 03 – 1 egg survives rat attack in Main, taken to Sea World for incubation.

10 May 03 – 9 chicks in A; 7 eggs in Main, this is clutch 3 plus 1 surviving chick from first clutch.

17 May 03 – Egg dropped in Main during predation event and incubated at Sea World hatched.

29 May 03 – 8 chicks, 22 days old and 2 eggs in Exhibit A; 4 eggs in B; 1 surviving chick from first brood in Main to hack pen.

31 May 03 – 4 eggs taken from two nests in Upper Newport Bay to Sea World for incubation to found fifth captive pair.

1 June 03 – 4 chicks, 2 eggs, 1 dead chick pulled from Main.

4 June 03 – 1 egg in Main non-viable; 8 chicks and 7 eggs in A; 7 eggs in B.

22 June 03 – 7 eggs hatch in B.

28 June 03 – 7 rails surviving from wild Seal Beach clutch that were reared at Sea World released back into the Seal Beach NWR, banded:

#716-93336, r R(S) Rt
#716-93337, r Blu(S) Rt
#716-93338, r Blk(S) Rt
#716-93339, r Rt, R(S) Lft
#103502227, r W(S) Rt
#103502228, r Rt, Blu(S) Lft
#103502229, r Rt, W(S) Lft

19 July 03 – 9 clapper rails raised at Chula Vista released in Mugu at south "G" St.; 8 rails from Exhibit A of 841M X 850F 1 from dropped egg in Main and raised at Sea World and banded:

#103502235, r Go(S) Rt, w Lft (CV blu-y)
#103502236, r Go(S) Rt, r Lft (CV w-r)
#103502237, r Go(S) Rt, y Lft (CV bk-bk)
#103502238, r Go(S) Rt, bu Lft (CV w/gr L)
#103502239, r Rt, r Go(S) Lft (CV y-y)
#103502240, r Rt, w Go(S) Lft
#103502241, r Rt, bu Go(S) Lft
#103502242, r Rt, y Go(S) Lft
#103502243, rw Rt, bu Go(S) Lft

15 August 03 – 5 rails from Main Exhibit (332M X 842F) release at Kendall-Frost Reserve banded:

#103502230, r W(S) Rt, y Lft
#103502231, r W(S) Rt, bu Lft
#103502232, r W(S) Rt, w Lft
#103502233, r W(S) Rt, r Lft
#103502234, r Rt, y W(S) Lft

23 August 03 – 11 rails from Exhibit A and B (854M X unbanded UNB Female captured 9-20-02) released into the eastern arm of Point Mugu, banded:

#103502244, r Bu(S) Rt, y Lft, CvyyRt
#103502245, r Bu(S) Rt, w Lft, CVpkgrL
#103502246, r Bu(S) Rt, bu Lft, CVrwL,
#103502250, r Sv(S) Rt, w Lft CvybkRt
#103502251, r Sv(S) Rt, bu Lft CvygnRt
#103502252, r Sv(S) Rt, r Lft CvpkbuL

#103502247, r Bu(S) Rt, r Lft, CVpkpkL
#103502248, r r Rt, Bu(S) Lft, CvyrR
#103502249, r Sv(S) Rt, y Lft, CvybuR
#103502253 r Sv(S) Rt, Sv Lft CVpkbkL
#103502254 r y Rt, Sv(S) Lft CvywR

Since 1999, 15 eggs and 60 young rails have been trans-located into target marshes. The egg movement has been hampered by asynchrony in the timing of egg laying at Newport compared to that at the target marshes. Four eggs went to Point Mugu, two in 1999 and two in 2000 and all of them hatched; two eggs went to Seal Beach in 1999 and 8 went in 2003 from a Sea World clutch swap; and one went to Kendall-Frost in 1999. In addition 7 fledglings were released in Point Mugu in 2001, 21 were divided into three different wetlands in 2002, and 32 rails hatched in captivity were released in 2003 (see above). These augmentations will undoubtedly take time to catalyze any significant changes in population structure. However, each of the target marshes that received augmentation prior to 2003 exhibited stable or increasing rail numbers. Point Mugu, in particular doubled in size from a maximum count for nearly 20 years of 7 nesting pairs to 14 pairs in 2003. If this kind of increase is sustained over 5 years or more, a viable subpopulation may be achievable at Point Mugu or perhaps others of the target marshes.

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