

**Results of the 2006 Cactus Wren (*Campylorhynchus brunneicapillus*)  
Translocation Study in Orange County, California**

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## INTRODUCTION

Effective management of coastal populations of the Cactus Wren (*Campylorhynchus brunneicapillus*) is considered one of the great challenges in bird conservation for southern California. Loss and fragmentation of habitat due to development, agricultural displacement, and high frequency wildfire, have led to major declines in this species throughout large portions of the region. Even on protected conservation lands populations are vulnerable to local extinction, and the need for active management of this species is becoming increasingly obvious.

In a single field season, we captured, color-banded, and relocated 10 cactus wrens in order to study the biological and behavioral response of adult and juvenile wrens to translocation (Figure 1). In this study, we report on the first completed phase of post-release monitoring and use the collected information to evaluate whether translocation might be an effective tool for management of isolated populations of cactus wrens in coastal southern California.

## METHODS

Project implementation involved four stages: (1) selection of donor and receptor sites; (2) pre-capture monitoring at donor sites; (3) capturing, color-banding, and translocation of wrens to receptor sites; and (4) post-release monitoring.

We identified the donor site with assistance from The Nature Conservancy in 2005. The donor site, located in the central subregion of the Orange County Central and Coastal NCCP/HCP (Figure 1 and 2), was owned by The Irvine Company and due to be developed in late 2006. Cactus wrens occupying the donor site were present in patches of isolated southern cactus scrub separated from similar habitat by approximately 1.5 km. In spring of 2006, following receipt of approval from The Irvine Company and California Department of Fish and Game to proceed with the translocation, we selected receptor site locations in the coastal reserve of the Nature Reserve of Orange County (Figure 3). Receptor site selection was conducted after reviewing the results of concurrent efforts to map southern cactus scrub and survey for cactus wrens throughout the coastal reserve and surrounding open-space.

Pre-capture monitoring of the wrens at the donor site began in April of 2006 and involved walking surveys to identify occupied wren territories and subsequent visits to active nest locations to monitor for the presence of eggs and young (Appendix 1). Family groups of wrens were considered eligible for translocation when the nestlings were estimated to be 18 to 20 days old and were either close to fledging or had fledged and were returning to a brood nest.

We captured adult wrens using mist nets with call playback tapes. Nestlings were captured by hand inside occupied nests. Following capture, all birds were aged and sexed (if possible), weighed, measured, had plumage characteristics recorded, and color-banded prior to release. Bands consisted of a unique combination of two plastic color-bands and

one metal Fish and Wildlife Service band placed on the legs of each captured wren (Table 1). During processing wrens were held in captivity in cloth bags and, for vehicle transport to the release site wrens, transferred in a bird carrier. Upon arrival at pre-selected release locations, wrens were released by hand into the underbrush present at the site. Capture, processing, transport, and release of family groups were completed within six hours for each translocation event.

Post-translocation monitoring of the cactus wrens occurred at regular intervals (decreasing in frequency with time since release) for a minimum of 60 days post-release. Monitoring consisted of walking surveys coupled with focal observations. Following detection of a banded wren, location, identity, and bird behavior were recorded during each monitoring event.

## RESULTS

Release sites for the cactus wrens were located at Upper Newport Bay in the coastal reserve, 17 km west-southwest of the donor site (Figure 1, 3 and 10). Upper Newport Bay was selected as the location for release of wrens for three reasons: (1) high quality habitat was present at the site; (2) the site was historically occupied by wrens; and (3) no wrens were located at the site at the time of the study, thus ensuring translocation would not disrupt resident wrens and making it easier to track project outcome.

The vegetative community type at the donor sites can be classified as coast prickly-pear series according to Sawyer & Keeler-Wolf (1995) or southern cactus scrub according to Jones and Stokes Associates (1993). Prickly pear (*Opuntia littoralis*) and coastal cholla (*Opuntia prolifera*) appeared to be a conspicuous component of the vegetative cover (Figure 4, 5 and 6). Mexican elderberry (*Sambucus mexicana*), Coastal sage (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), Black sage (*Salvia mellifera*), and Lemonade berry (*Rhus integrifolia*) were also vegetative elements at all three donor sites (Appendix 2). Prickly pear and coastal cholla were also conspicuous vegetative components at the release sites, but sites 1 and 2 may not have as much relative cover of cactus as the donor sites (Figure 7, 8 and 9). California encelia (*Encelia californica*), Coastal sage (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), and Lemonade berry (*Rhus integrifolia*) were common vegetative elements at all three donor sites, but Mexican elderberry (*Sambucus mexicana*) was only at release sites 1 and 2 (Appendix 2).

In total, 10 cactus wrens (5 adults and 5 juveniles) were captured, banded, and relocated during three separate translocation events (Table 1 and 2). Translocation event 1 took place on 17 June 2006 and involved the capture, banding, and release of a single family group of wrens consisting of an adult male (band combination: M-RW), adult female (M-WO), and two juveniles (WM-W and RM-R). Translocation event 2 took place on 15 July 2006 and involved a single adult wren of unknown sex (OM-LG). Translocation event 3 took place on 18 July 2006 and involved a single family group consisting of an adult male (LBM-LB), adult female (M-WLG) and three juveniles (MW-P, MR-O, and MLG-LG).

**Table 1: Individual Cactus Wren Band Information, Age and Sex, Site Number, Capture and Release Site Locations, Translocation Date, Time Wren was Present During Monitoring Period After Release, and Number of Observation Days After Release**

					UTM Coordinates (NAD83/WGS84) Zone 11S						
					Source Site		Release Site				
FWS Band No.	Color Bands*	Age	Sex**	Translocation Event/Site No. (Figure 1)	Easting meters East	Northing meters North	Easting meters East	Northing meters North	Date Banded & Translocated	Time interval wrens were observed after Release (days)	No. of Post-Release Observations
1681-87702	RM-R	Fledgling	U	1	434068	3727316	417524	3723817	6/17/2006	0	1
1681-87703	WM-W	Fledgling	U	1	434068	3727316	417524	3723817	6/17/2006	23	8
1681-87704	M-WO	Adult	F	1	434068	3727316	417524	3723817	6/17/2006	97	21
1681-87705	M-RW	Adult	M	1	434068	3727316	417524	3723817	6/17/2006	30	15
1681-87706	OM-LG	Adult	U (M)	2	435075	3728245	418294	3723959	7/15/2006	69	12
1681-87707	MR-O	Fledgling	U	3	434923	3727975	417331	3723223	7/18/2006	7	4
1681-87708	MW-P	Fledgling	U	3	434923	3727975	417331	3723223	7/18/2006	17	7
1681-87709	MLG-LG	Fledgling	U	3	434923	3727975	417331	3723223	7/18/2006	7	4
1681-87710	LBM-LB	Adult	M	3	434923	3727975	417331	3723223	7/18/2006	66	15
1681-87711	M-WLG	Adult	F	3	434923	3727975	417331	3723223	7/18/2006	66	14

\*Bands read (Right Leg)-(Left Leg) and legs with two bands, the top band comes first followed by bottom band second. M=Metal Fish & Wildlife Service (FWS) band, P=Purple, R=Red, LG=Light Green, W=White, LB=Light Blue, O=Orange

\*\*U=Sex Unknown, F=Female, M=Male, (M)=Probably a Male

<b>Table 2: Summary of Wrens Translocated</b>	
No. of Pairs Translocated:	2
No. of Singles Translocated:	1
No. of Adults Translocated:	5
No. of Fledglings Translocated:	5
Total No. of Wrens Translocated:	10

In all three translocation events, relocated wrens stayed within 100m of their respective release sites throughout the observation period with the exception of the two adult wrens from translocation 3 that transferred between relocation sites 3 and 1, 33 days after their release (Figure 10). Adult wrens involved in translocation 1, within days following their release, were observed making territorial displays, engaging in nest building activities, foraging and feeding young. Similarly, adult wrens from translocation 3 were observed foraging and feeding young within the first few days following their release. The lone adult involved in translocation 2 was observed nest building the first week following relocation and responded aggressively to playbacks of cactus wren calls near its release site.

Of the five fledglings relocated in translocation events 1 and 3, three disappeared within the first week following release, two fledglings, WM-W and MW-P, disappeared after 23 and 17 days following release, respectively (Table 1 and Figure 11). Of the five adults, four were observed onsite throughout the monitoring period. The lone exception was the adult male from translocation event 1 who disappeared 30 days following release.

Although the fate of all missing wrens on the project is unknown, in the case of the three fledglings that disappeared within a week of release and the adult male that disappeared, we suspect predation as a possible cause. Potential predators of small birds, the Cooper's Hawk (*Accipiter cooperii*), Northern Harrier (*Circus cyaneus*), White-tailed Kite (*Elanus leucurus*), and American Kestrel (*Falco sparverius*) were routinely observed in the vicinity of the release sites. The location and linear structure of Newport Bay within a densely populated residential region may make the area prone to predation pressure from domestic and feral cats. At only 18 to 25 days old the juvenile wrens were likely too young to have dispersed on their own. In the case of the adult male, predation is also suspected as it is unusual for pairs of adult wrens to separate or abandon one another after forming a pair bond.

In the case of the two fledgling wrens last seen 17 and 23 days after release, it is plausible that the wrens dispersed after sufficient development. At the time of their last observation both wrens were approximately 35 to 43 days old. In Arizona, Anderson and Anderson (1962) found that parental dependency lasts 17 to 25 days post-fledging. Fledglings begin attempting to self-feed about 15 days post-fledging or at 35 days old. Juveniles were self-sufficient by 50 days old, but may beg up to 2 weeks longer. Also in Arizona, Anderson and Anderson (1963) documented that 41 out of 55 banded nestlings dispersed from natal site by 45 days post-fledgling or by about 65 days old. So it would

not be unlikely for the over 35 day old wrens in our study to disperse from their natal territories, especially if suitable habitat and/or food are limited.

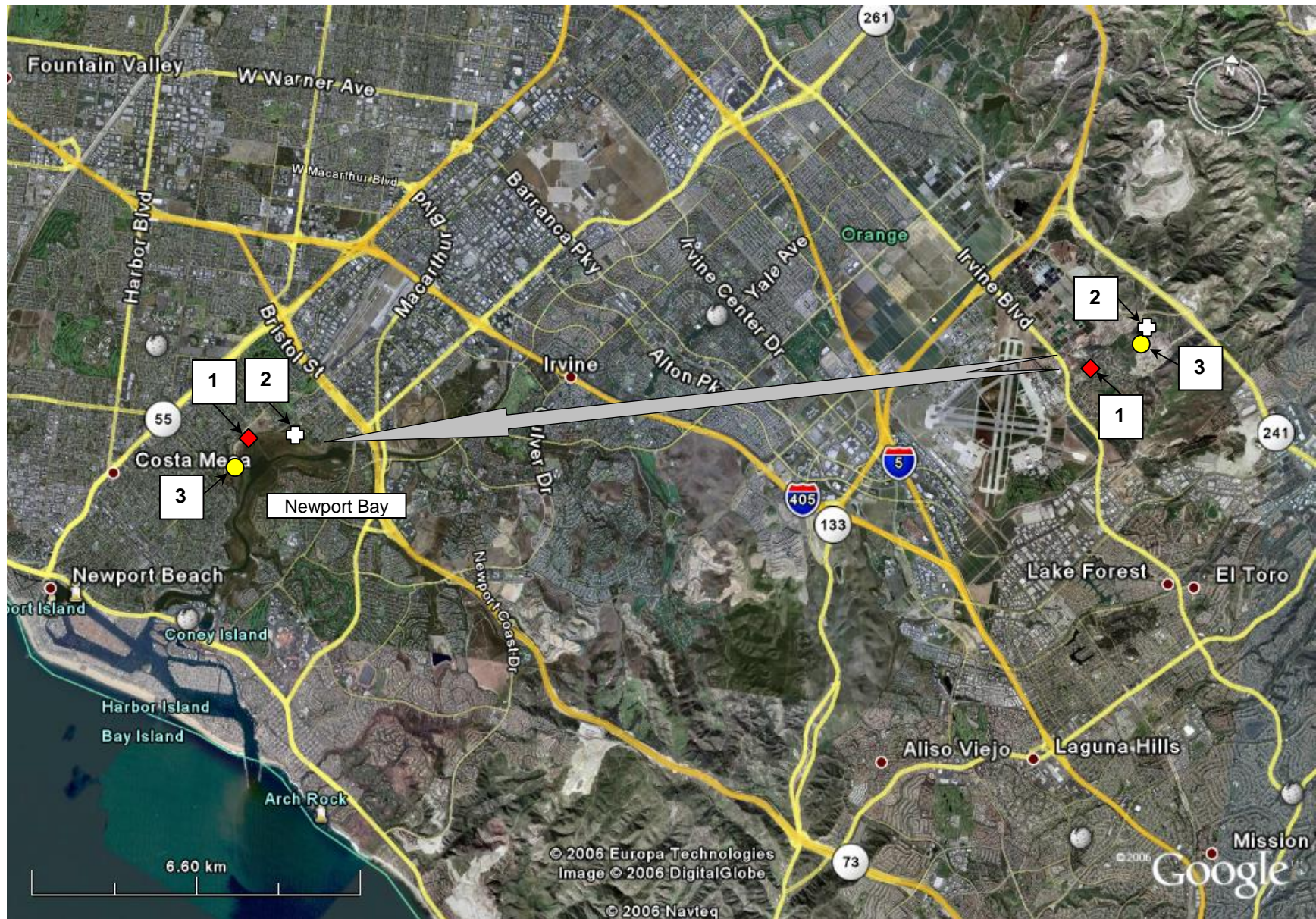
Interestingly, 33 days into the monitoring period and following disappearance of all their young, the adult pair from site 3 moved into the territory formerly occupied by both the male (missing) and female wrens from translocation event 1 (Figure 10). This transfer between sites took place approximately one month after the adult male (M-RW) was last seen at site 1 (Figure 11). The presence of the adult pair in the territory occupied by lone adult female (M-OW) initially resulted in aggressive interactions between the adult wrens, but in a matter of a weeks progressed into a mutual tolerance with the 2 females and 1 male appearing on multiple occasions together while foraging and actively nest building.

## CONCLUSIONS

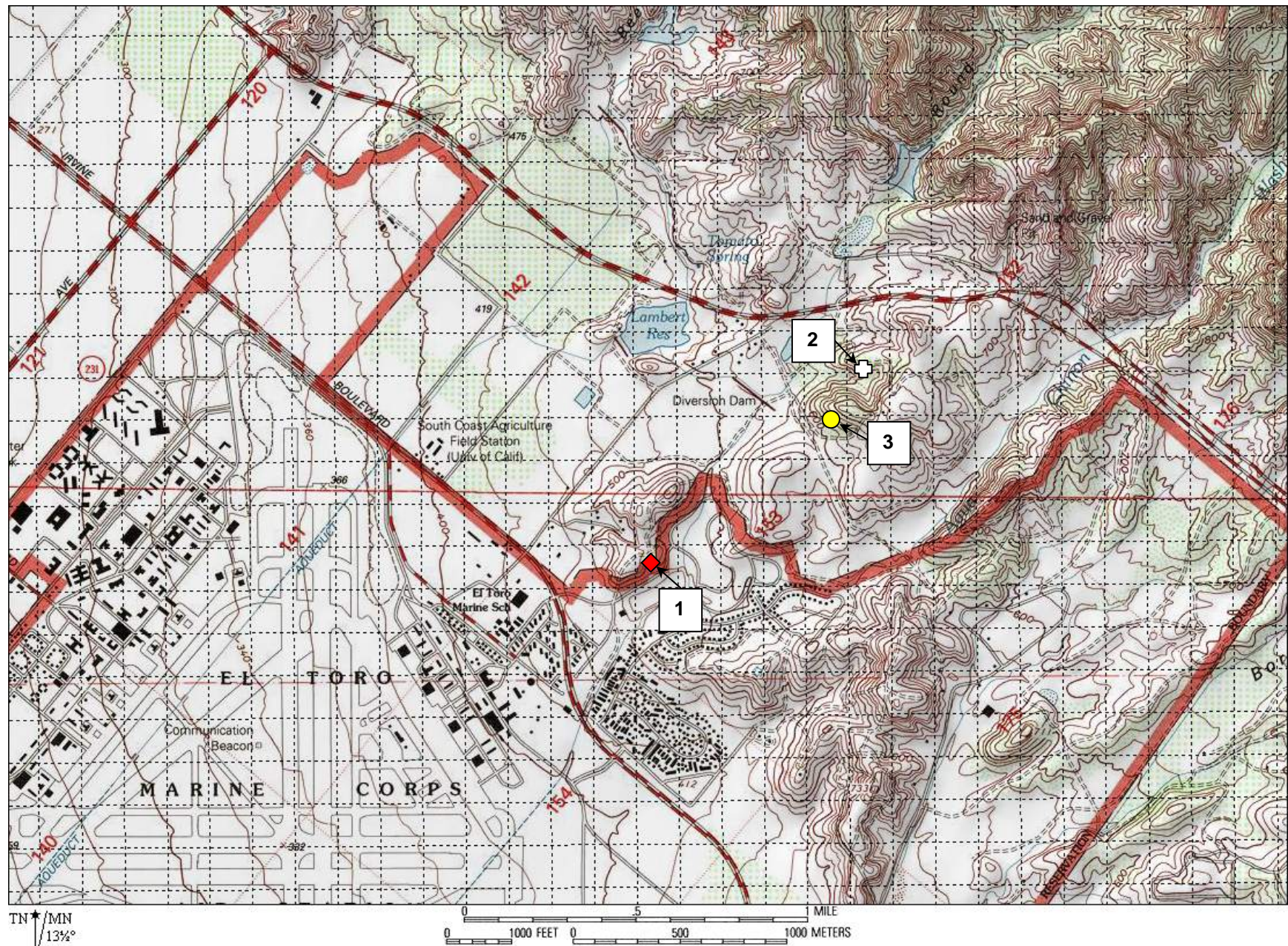
Although, one adult and all five juvenal cactus wrens disappeared during the monitoring period (probably due to dispersal or mortality), four adults were observed throughout the period and showed a great capacity to adapt quickly to their new locations. The translocated wrens appeared to remain in areas of conspicuous cactus within coastal sage scrub. The wrens clung to this habitat type whether they were translocated as pairs with fledglings to support or as a single individual (probably male). Given their adaptability yet the need to stay within a particular habitat type, it may be preferred to translocate cactus wren pairs that do not have young to feed.

The initial phase of the cactus wren translocation experiment appears to have been relatively successful; however, in order to be an effective management tool for reestablishment and bolstering isolated populations, the translocated wrens should also have a fair chance of surviving to and successfully reproducing during subsequent breeding seasons. We recommend monitoring of the color banded wrens during subsequent breeding seasons to determine whether they remain in their new locations and whether they make reproductive attempts.

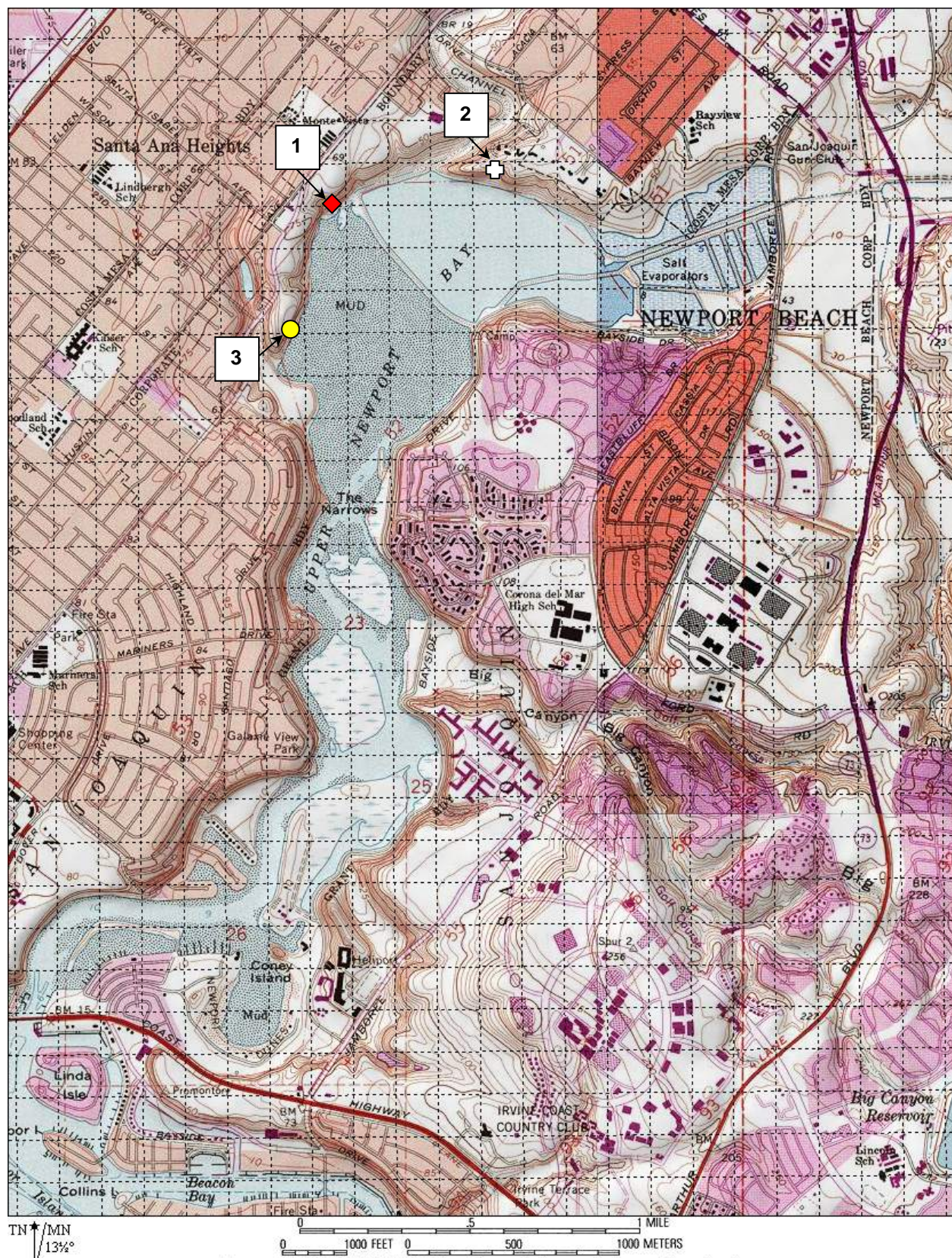
The relative success of this experiment, at least in the short term, suggests that translocation could prove to be an effective tool for managing the isolated populations of cactus wrens in coastal southern California. This is especially true if juvenile cactus wrens are dispersal limited and unable or unlikely to colonize isolated areas where suitable protected habitat still remains. Also, successful restoration and creation of cactus wren habitat would be an essential component of the management strategy for this species.



**Figure 1:** Vicinity of the cactus wren translocation project in Orange County, California. 1 – Pair with 2 fledglings, 2 – Single adult, and 3 – Pair with 3 fledglings were moved 17 km from eastern Irvine to cactus scrub in Upper Newport Bay.



**Figure 2:** Source site locations of translocated cactus wrens in Irvine, CA between Irvine Blvd. and Portola Pkwy. UTM GPS coordinates of each site (NAD83): 1) 11S 434068mE, 3727316mN; 2) 11S 435072mE, 3728231mN; 3) 11S 434923mE, 3727975mN.



**Figure 3:** Release site locations of translocated cactus wrens at Upper Newport Bay, CA. UTM GPS coordinates of each site (NAD83): 1) 11S 417524mE, 3723817mN; 2) 11S 418294mE, 3723959mN; 3) 11S 417331mE, 3723223mN.



**Figure 4:** Cactus wren source site 1 coast prickly-pear series (Sawyer & Keeler-Wolf 1995) vegetative community type.



**Figure 5:** Cactus wren source site 2 coast prickly-pear series (Sawyer & Keeler-Wolf 1995) vegetative community type.



**Figure 6:** Cactus wren source site 3 prickly-pear series (Sawyer & Keeler-Wolf 1995) vegetative community type.



**Figure 7:** Upper Newport Bay cactus wren release site 1 coast prickly-pear series (Sawyer & Keeler-Wolf 1995) is mostly limited to the bluff slope with ruderal vegetation above and disturbed saltgrass series below.



(a)

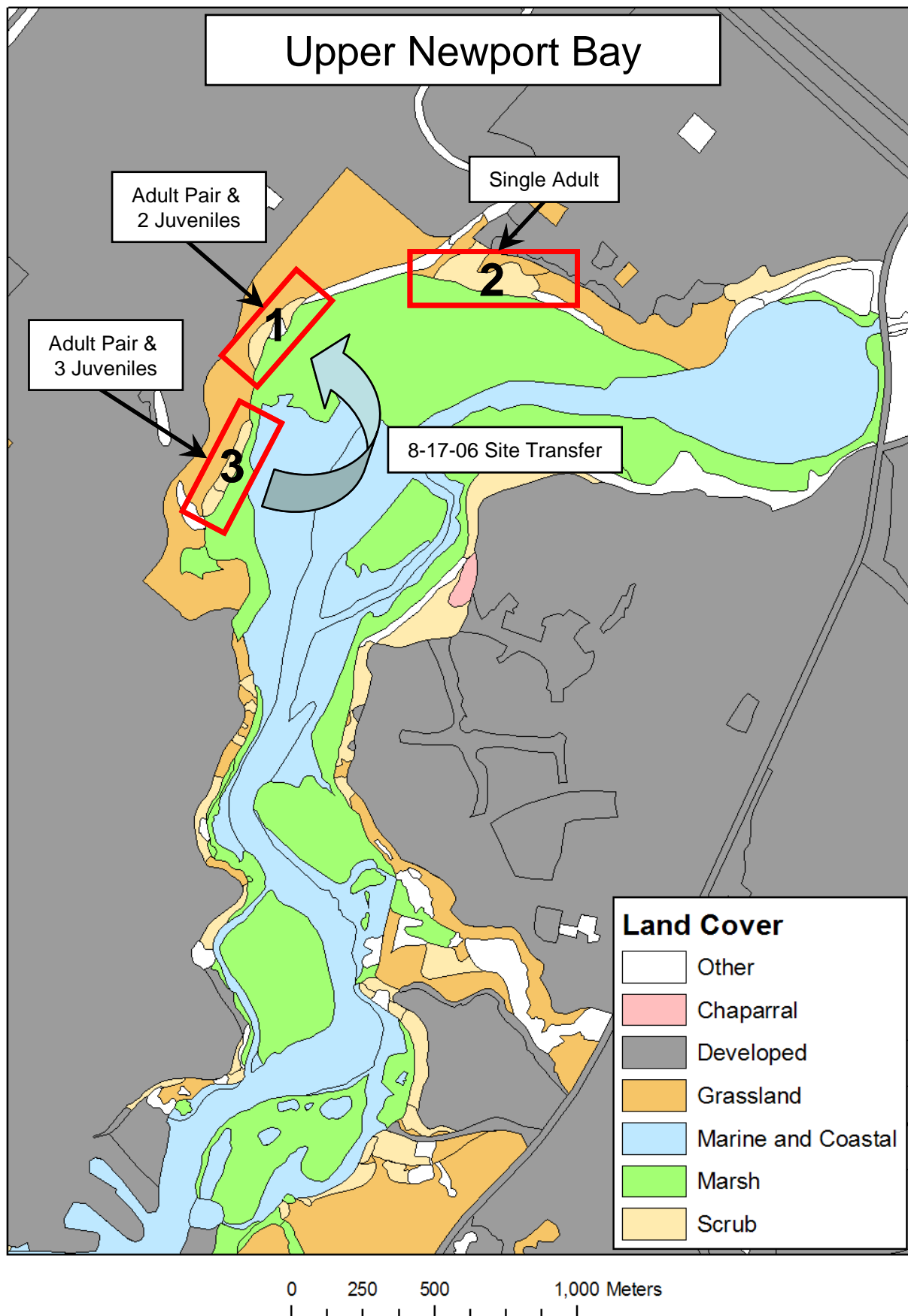


(b)

**Figure 8a and 8b:** Upper Newport Bay cactus wren release site 2 coast prickly-pear series on the west (a) is primarily Cholla (*Opuntia prolifera*) in a matrix of *Encelia californica* and *Artemisia californica*. Most observations of the single wren were towards the east end of the habitat (b) where prickly pear (*Opuntia littoralis*) is in a matrix of *Artemisia californica*.

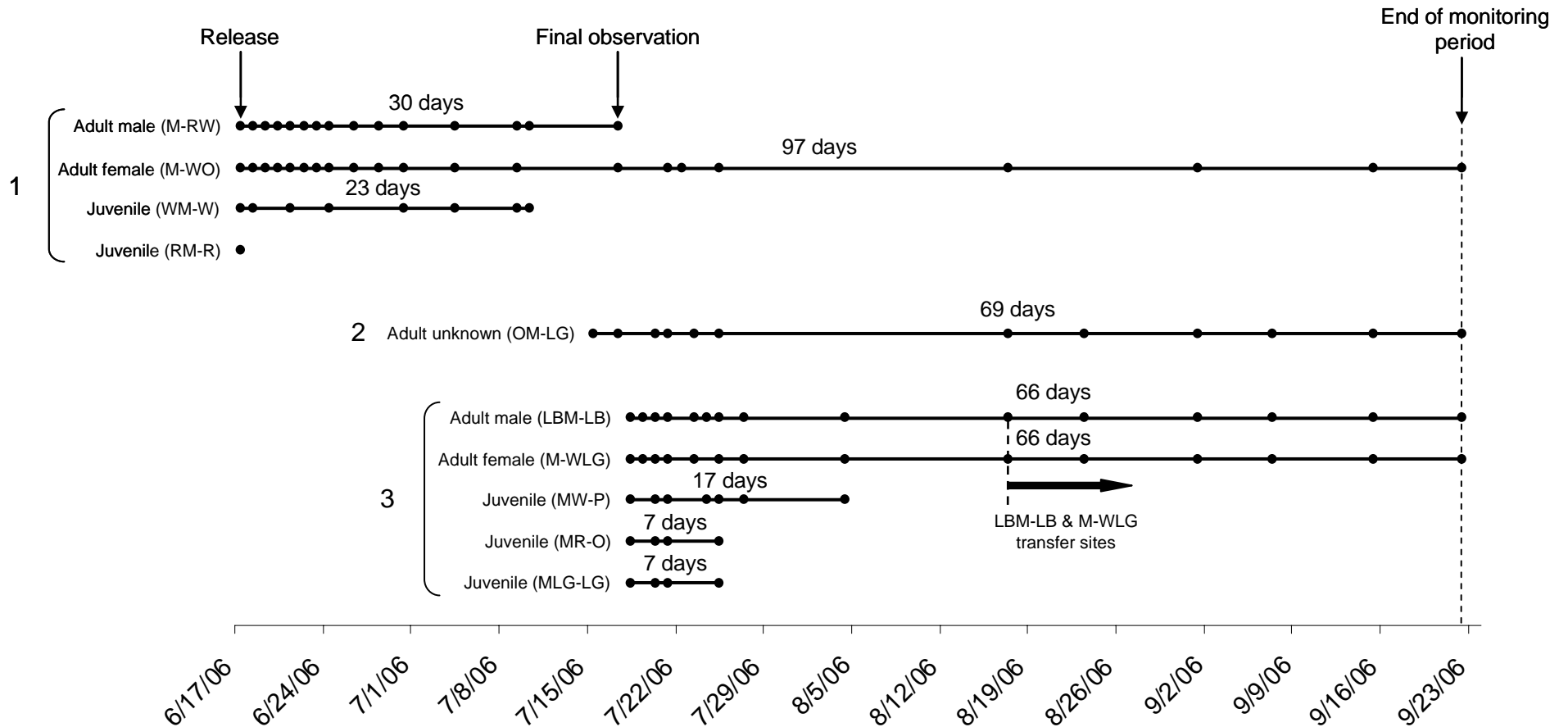


**Figure 9:** Upper Newport Bay cactus wren release site 3 coast prickly-pear series (Sawyer & Keeler-Wolf 1995) is limited to the bluff slope with ruderal vegetation above and pickleweed series below, which is regularly inundated by tidal flooding.



**Figure 10:** Plant community map of Upper Newport Bay with rectangles indicating the cactus scrub sites where cactus wren family groups were released. The curved arrow indicates that starting on 17 August, the site 3 wren pair was seen at site 1 with the remaining site 1 female.

# Cactus Wren Translocation Time Line



**Figure 11:** Cactus wren translocation time line grouped by the order each family group was translocated (vertical axis: groups 1, 2, & 3.) Horizontal lines with dots indicate amount of time birds were observed after release during the monitoring period (17 June 2006 to 22 September 2006) at Upper Newport Bay. The black dots indicate the dates wrens were observed. Number of days above each dark line indicates the total number of days the individual was seen on site. Dashed vertical lines represent end of monitoring period and date (17 August) the wren pair (male-LBM-LB & female-M-WLG) at site 3 was detected at site 1 with the remaining female (M-WO) at site 1. Refer to Table 1 for explanation of color band combinations.

## Appendix 1: Field Work Dates, Personnel, and Observations

### Field Personnel:

MM – Milan Mitrovich  
DK – Dana Kamada  
RH – Robert Hamilton

KM – Karly Moore  
MT – Matthew Teutimez

### Band Combinations of Cactus Wrens Translocated to Newport Backbay:

Bands read (Right Leg)-(Left Leg) and legs with two bands, the top band comes first followed by bottom band second.

M=Metal FWS band  
R=Red  
W=White  
O=Orange

P=Purple  
LG=Light Green  
LB=Light Blue

NB Site 1: Released 17 June 2006		
Color Band Combination	Age	Sex
M-WO	Adult	Female
M-RW	Adult	Male
WM-W	Fledgling	Unknown
RM-R	Fledgling	Unknown
NB Site 2: Released 15 July 2006		
OM-LG	Adult	Unknown (probably Male)
NB Site 3: Released 18 July 2006		
M-WLG	Adult	Female
LBM-LB	Adult	Male
MR-O	Fledgling	Unknown
MLG-LG	Fledgling	Unknown
MW-P	Fledgling	Unknown

Translocation Event 1			
Date	Observers	Site Vicinity	Notes and Observations
04/18/06	DK	Irvine Blvd	Two unbanded adult cactus wrens, presumably a pair.
05/26/06	DK	Irvine Blvd	Two adult wrens visiting a complete but empty nest in cholla.
06/05/06	DK	Irvine Blvd	Wren pair present, but no nest visits observed.
06/08/06	DK	Irvine Blvd	Wren pair building a 2nd nest in <i>O. litoralis</i> .
06/12/06	DK	Irvine Blvd	<=3 nestling 9 to 10 days old in 1st nest in cholla.
06/15/06	DK	Irvine Blvd	Nest in Cholla now empty, two ~16 day old chicks in 2nd nest in <i>O.lit.</i> about ~20m away. Adults carrying food to cactus.
06/17/06	DK, MM, KM	Irvine Blvd to Newport Bay	<u>Translocated Adult cactus wren pair (male M-RW and female M-WO) and two 18-20 day old chicks (RM-R, WM-W) to Upper Newport Bay (Site 1). The release marks the last time fledgling (RM-R) was observed.</u>
06/18/06	DK	NB Site 1	Adult male (M-RW), adult female (M-WO), and fledgling (WM-W) observed in cactus scrub within 50m of release site. Fledgling followed adult female begging for food. Both adults were observed calling during visit.
06/19/06	RH, MM	NB Site 1	Adult male (M-RW) and adult female (M-WO) observed in cactus scrub within 50m of release site. Both adults responded to recorded cactus wren call when played. Adults came together in a typical territorial defense posture, chattering and opening their wings.
06/20/06	RH	NB Site 1	Adult male (M-RW) and adult female (M-WO) observed in cactus scrub at release site. Both adults responded to recorded cactus wren call when played. Adults came together in a typical territorial defense posture, chattering and opening their wings. Adult male was observed feeding. Cooper's Hawk observed in the vicinity of the release site.

## Appendix 1: Field Work Dates, Personnel, and Observations

Translocation Event 1			
06/21/06	DK, KM	NB Site 1	Adult male (M-RW), adult female (M-WO), and fledgling (WM-W) observed in cactus scrub within 25m of release site. Adult female was observed collecting nesting material and building a nest in local patch of cholla.
06/22/06	MM	NB Site 1	Adult male (M-RW) and adult female (M-WO) observed in cactus scrub at release site. Both adults were observed calling during visit. Cooper's Hawk observed in the vicinity of the release site.
06/23/06	MM	NB Site 1	Adult male (M-RW) and adult female (M-WO) observed in cactus scrub within 50m of release site. Newly constructed nest appeared finished. Both adults were observed foraging.
06/24/06	KM, DK	NB Site 1	Adult male (M-RW), adult female (M-WO), and fledgling (WM-W) were observed in cactus scrub within 50m of release site. Adult female observed foraging and delivering beetle to cactus patch containing begging fledgling. Adult male and adult female observed collecting nesting material and building a second nest. Cooper's Hawk observed in the vicinity of the release site.
06/26/06	MM	NB Site 1	Adult male (M-RW) and adult female (M-WO) observed in cactus scrub within 50m of release site. Adult male observed nest building.
06/28/06	DK	NB Site 1	Adult male (M-RW) and adult female (M-WO) observed in cactus scrub within 50m of release site. Both adult wrens were observed foraging.
06/30/06	DK	NB Site 1	Adult male (M-RW), adult female (M-WO), and fledgling (WM-W) were observed in cactus scrub within 50m of release site. Adult female was observed foraging. Adult male was observed building a third nest.
07/04/06	DK	NB Site 1	Adult male (M-RW), adult female (M-WO), and fledgling (WM-W) were observed in cactus scrub within 50m of release site. Adult female was observed foraging and carrying a winged insect.
07/09/06	DK	NB Site 1	Adult male (M-RW), adult female (M-WO), and fledgling (WM-W) were observed in cactus scrub within 50m of release site. Both adults and fledgling were observed dust bathing. Fledgling (WM-W) was observed pecking the ground.
07/10/06	MM	NB Site 1	Adult male (M-RW) and fledgling (WM-W) were observed in cactus scrub within 50m of release site. Fledgling was observed calling. <b>This observation marked the last time fledgling (WM-W) was observed on project, 23 days after the birds' release. Estimated age of fledgling on this date was ~43 days old.</b>
07/17/06	MM	NB Site 1	Adult male (M-RW) and adult female (M-WO) observed in cactus scrub within 50m of release site. Adult female was observed foraging and carrying plant material to nest. <b>This observation marked the last time adult male (M-RW) was observed on project, 30 days after release.</b>
07/20/06	MM	NB Site 1	Not detected
07/21/06	DK	NB Site 1	Adult female (M-WO) observed in cactus scrub within 50m of release site. Adult female was heard calling.
07/22/06	MM	NB Site 1	Adult female (M-WO) observed in cactus scrub within 50m of release site.
07/23/06	DK	NB Site 1	Not detected. A pair of Cooper's Hawks were observed in the immediate vicinity of the release site.
07/25/06	RH	NB Site 1	Adult female (M-WO) observed in cactus scrub within 100m of release site.

## Appendix 1: Field Work Dates, Personnel, and Observations

Translocation Event 1			
07/27/06	DK	NB Site 1	Wren call heard within 100m of release site. A pair of Cooper's Hawks observed within 100m of the release site.
07/28/06	DK, KM	NB Site 1	Not detected
08/04/06	MM	NB Site 1	Not detected
08/17/06	DK	NB Site 1	Adult female (M-WO) being pushed to north edge of habitat by NB Site 3 pair.
08/23/06	RH	NB Site 1	Adult wren heard in cactus scrub within 100m of release site. See notes for August 23 for Translocation Event 3.
09/01/06	DK	NB Site 1	Not detected
09/15/06	MM	NB Site 1	Adult female (M-WO) interacting with Adult female (M-WLG) with no apparent conflict. One of the females was observed collecting nest material. An American Kestrel was seen.
09/22/06	DK	NB Site 1	Three cactus wren perched on cactus in response to pishing then flew in to shrubs.

Translocation Event 2			
Date	Observers	Site Vicinity	Notes and Observations
05/24/06	DK	Portola	One adult calling from upper part of draw, probably male.
06/01/06	DK	Portola	One adult calling, probably male.
06/12/06	DK	Portola	One adult calling at base of draw.
<b>07/15/06</b>	DK, MM, KM	Portola to Newport Bay	<u>Translocated wren (OM-LG) to Upper Newport Bay (Site 2). Probably male</u>
07/17/06	RH	NB Site 2	Adult wren (OM-LG) observed in cactus scrub within 50m of release site. Adult responded to recorded cactus wren call when played.
07/20/06	MM	NB Site 2	Adult wren (OM-LG) observed in cactus scrub within 50m of release site.
07/21/06	DK	NB Site 2	Adult wren (OM-LG) heard at release site.
07/22/06	MM	NB Site 2	Not detected
07/23/06	DK	NB Site 2	Adult wren (OM-LG) observed and heard within 50m of release site.
07/25/06	RH	NB Site 2	Adult wren (OM-LG) observed in cactus scrub within 50m of release site.
07/27/06	DK	NB Site 2	Not detected
07/28/06	DK, KM	NB Site 2	Adult wren (OM-LG) observed near nest in prickly pear just east of release point.
08/04/06	MM	NB Site 2	Not detected
08/17/06	DK	NB Site 2	Adult wren (OM-LG) observed in cactus scrub within 50m of release site. Adult wren was observed using a nest. A juvenile Cooper's Hawk observed near release site.
08/23/06	RH	NB Site 2	Adult wren (OM-LG) observed in cactus scrub within 100m of release site.
09/01/06	DK	NB Site 2	Adult wren (OM-LG) observed in cactus scrub within 100m of release site. Adult was observed calling and active near its nest.
09/07/06	DK	NB Site 2	Adult wren (OM-LG) was observed calling from cactus scrub within 100m of release site. Two Cooper's Hawks were observed within the vicinity of the release site.
09/15/06	DK	NB Site 2	Adult wren (OM-LG) observed in cactus scrub within 100m of release site.

## Appendix 1: Field Work Dates, Personnel, and Observations

Translocation Event 2			
09/22/06	DK	NB Site 2	Adult wren (OM-LG) observed near nest in prickly pear just east of release point.

Translocation Event 3			
Date	Observers	Site Vicinity	Notes and Observations
04/18/06	DK	Portola	One adult cactus wren observed calling.
05/25/06	DK	Portola	Two adult wrens with one wren nest building.
05/29/06	DK	Portola	1st nest does not appear very substantial. Not much material. Probably not a breeding nest.
06/01/06	DK	Portola	Wren pair detected, but 1st nest does not appear to be active.
06/08/06	DK	Portola	Wren pair building a 2nd nest in prickly pear both partially covered by Mexican elderberry.
06/12/06	DK	Portola	2nd nest in good condition. Heard a few wren calls, but did not observe any wrens visit the nest.
06/16/06	DK	Portola	Cactus wren in nest for ~20 minutes. Probably egg laying or incubating.
06/22/06	DK	Portola	Wren incubating or brooding at nest.
06/23/06	DK, KM	Portola	Wren incubating or brooding at nest.
06/24/06	DK	Portola	Incubating 4 eggs.
06/28/06	DK	Portola	Wren incubating or brooding at nest.
07/01/06	DK	Portola	Feel 2 to 4 nestlings; one about 2-3 days old.
07/04/06	DK	Portola	Wren feeding nestlings.
07/09/06	DK	Portola	Wren feeding nestlings.
<b>07/18/06</b>	DK, KM, MM, MT	Portola to Newport Bay	<u>Translocated wren pair (male - LBM-LB, female - M-WLG) and three chicks (MW-P, MLG-LG, MR-O) to Upper Newport Bay.</u>
07/19/06	RH	NB Site 3	Adult male (LBM-LB) and adult female (M-WLG) observed in cactus scrub within 25m of release site. Both adults responded aggressively to recorded cactus wren call when played. Multiple fledglings were heard but not observed.
07/20/06	MM	NB Site 3	Adult female (M-WLG), fledgling (MR-O), fledgling (MW-P), and fledgling (MLG-LG) were observed in cactus scrub within 25m of release site. Adult female was observed foraging and delivering food to young. Adult male (LBM-LB) was heard although not observed.
07/21/06	DK, RH, MM, KM	NB Site 3	Adult male (LBM-LB), adult female (M-WLG), fledgling (MR-O), fledgling (MW-P), and fledgling (MLG-LG) observed in cactus scrub within 25m of release site. Adult female observed carrying a preying mantis into cactus scrub. Adult male was seen with fledgling. Fledglings were heard calling. A Cooper's hawk was observed within the vicinity of the release site.
07/22/06	MM	NB Site 3	Wrens heard chattering, but not observed.
07/23/06	DK	NB Site 3	Adult male (LBM-LB), adult female (M-WLG), and multiple fledglings were observed in cactus scrub within 50m of release site.
07/24/06	MM	NB Site 3	Adult male (LBM-LB) and fledgling (MW-P) were observed in cactus scrub within 50m of release site. The fledgling was observed calling.
07/25/06	RH	NB Site 3	Adult male (LBM-LB), adult female (M-WLG), and multiple fledglings were observed in cactus scrub within 50m of release site. <b>This observation marked the last time multiple fledglings were observed on project, 7 days after the birds' release.</b>

## Appendix 1: Field Work Dates, Personnel, and Observations

Translocation Event 3			
07/26/06	RH	NB Site 3	Adult male (LBM-LB) in lemonade berry near release point.
07/27/06	DK	NB Site 3	Adult male (LBM-LB), adult female (M-WLG), and fledgling (MW-P) observed in cactus scrub within 50m of release site. Fledgling was observed chattering, preening and picking at things on perch. Adult female was observed feeding fledgling. Adult male and adult female were observed collecting nesting material.
07/28/06	DK, KM	NB Site 3	Adult male (LBM-LB), adult female (M-WLG), and fledgling (MW-P) observed in cactus scrub within 50m of release site.
08/04/06	MM	NB Site 3	Adult male (LBM-LB), adult female (M-WLG), and fledgling (MW-P) observed in cactus scrub within 50m of release site. Adult wrens were observed calling. One fledgling observed following both adults and begging for food. <b>This observation marked the last time fledgling (MW-P) was observed on project, 17 days after the birds' release. Estimated age of fledgling on this date was ~37 days old.</b>
08/17/06	DK	NB Site 3 & NB Site 1	Adult male (LBM-LB) and adult female (M-WLG) were observed in the cactus scrub several hundred meters away from the release site. The new location occupied by the two adult wrens was within the territory of wrens from site 1. Adult female (M-WO) was also observed to be present at the site and being harassed by the other female wren (M-WLG). A Cooper's hawk was observed within the vicinity of the release site.
08/23/06	RH	NB Site 3 & NB Site 1	Adult male (LBM-LB) and adult female (M-WLG) were observed in cactus scrub within 100m of the territory of wrens from site 1. Both adults were observed foraging and nest building in the area. A third wren was heard at site 1. A pair of Cooper's hawks were observed within the vicinity of the release site.
09/01/06	DK	NB Site 3 & NB Site 1	Adult male (LBM-LB) and adult female (M-WLG) were observed in cactus scrub within 100m of the territory of wrens from site 1. Adult male was observed foraging and adult female preening.
09/07/06	DK	NB Site 3 & NB Site 1	Adult male (LBM-LB) and adult female (M-WLG) were observed in cactus scrub within 100m of the territory of wrens from site 1. Adult male and female were observed foraging on cochineal scales on prickly pear pads.
09/15/06	MM	NB Site 3 & NB Site 1	Adult female (M-WLG) was observed in cactus scrub within 50m of the territory of the wrens from site 1. Adult female was seen interacting with adult female (M-WO) in cactus scrub. Both birds were only separated by a few meters for an extended period of time. Nest building was observed, as one of the two female wrens was observed collecting new nesting material. A new nest was observed within 10m of an old nest belonging to the wrens originally released at site 1. A third adult wren was believed to be observed during visit. An American Kestrel was seen in the vicinity of the wren locations during visit.
09/22/06	DK	NB Site 3 & NB Site 1	Three CACW observed together in cactus scrub within 50m of the territory of the wrens from site 1, no aggressive interactions observed.

## Appendix 2: Vegetative Cover

Estimated Percent Cover of Common Plant Species at Source and Release Sites of Translocated Cactus Wrens, 2006					
Plant	<5%	5-25%	25-50%	50-75%	75-100%
<b>Source Site 1 (Irvine Blvd.)</b>					
Prickly pear/cholla ( <i>Opuntia</i> spp.)					
Coastal sage ( <i>Artemisia californica</i> )					
California buckwheat ( <i>Eriogonum fasciculatum</i> )					
Black sage ( <i>Salvia mellifera</i> )					
Laurel sumac ( <i>Malosma laurina</i> )					
Mexican elderberry ( <i>Sambucus mexicana</i> )					
Lemonade berry ( <i>Rhus integrifolia</i> )					
*Black mustard ( <i>Brassica nigra</i> )					
<b>Source Site 2 (Portola Pkwy.)</b>					
Prickly pear/cholla ( <i>Opuntia</i> spp.)					
Lemonade berry ( <i>Rhus integrifolia</i> )					
Coastal sage ( <i>Artemisia californica</i> )					
Mexican elderberry ( <i>Sambucus mexicana</i> )					
California buckwheat ( <i>Eriogonum fasciculatum</i> )					
Black sage ( <i>Salvia mellifera</i> )					
White sage ( <i>Salvia apiana</i> )					
California encelia ( <i>Encelia californica</i> )					
<b>Source Site 3 (Portola Pkwy.)</b>					
Prickly pear/cholla ( <i>Opuntia</i> spp.)					
Mexican elderberry ( <i>Sambucus mexicana</i> )					
Black sage ( <i>Salvia mellifera</i> )					
Coastal sage ( <i>Artemisia californica</i> )					
California buckwheat ( <i>Eriogonum fasciculatum</i> )					
Laurel sumac ( <i>Malosma laurina</i> )					
Lemonade berry ( <i>Rhus integrifolia</i> )					
*Annual grasses					
<b>Upper Newport Bay Site 1</b>					
California encelia ( <i>Encelia californica</i> )					
Prickly pear/cholla ( <i>Opuntia</i> spp.)					
Coastal sage ( <i>Artemisia californica</i> )					
Lemonade berry ( <i>Rhus integrifolia</i> )					
Poison oak ( <i>Toxicodendron diversilobum</i> )					
Mexican elderberry ( <i>Sambucus mexicana</i> )					
California buckwheat ( <i>Eriogonum fasciculatum</i> )					
*Black mustard ( <i>Brassica nigra</i> )					
<b>Upper Newport Bay Site 2</b>					
Coastal sage ( <i>Artemisia californica</i> )					
Lemonade berry ( <i>Rhus integrifolia</i> )					
California encelia ( <i>Encelia californica</i> )					
Prickly pear/cholla ( <i>Opuntia</i> spp.)					
Mexican elderberry ( <i>Sambucus mexicana</i> )					
Bladderpod ( <i>Cleome isomeris</i> )					
*Black mustard ( <i>Brassica nigra</i> )					

## Appendix 2: Vegetative Cover

Estimated Percent Cover of Common Plant Species at Source and Release Sites of Translocated Cactus Wrens, 2006					
Plant	<5%	5-25%	25-50%	50-75%	75-100%
<b>Upper Newport Bay Site 3</b>					
Prickly pear/cholla ( <i>Opuntia</i> spp.)					
Coastal sage ( <i>Artemisia californica</i> )					
California encelia ( <i>Encelia californica</i> )					
Lemonade berry ( <i>Rhus integrifolia</i> )					
California buckwheat ( <i>Eriogonum fasciculatum</i> )					
Saltbush ( <i>Atriplex</i> spp.)					
Bladderpod ( <i>Cleome isomeris</i> )					
*Black mustard ( <i>Brassica nigra</i> )					
*Tree tobacco ( <i>Nicotiana glauca</i> )					
* - Non-native species					

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