

# Recovery of banded birds from the Santa Clara River oil spill 1991

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## ABSTRACT

Six band returns were presented to the International Bird Rescue Research Center (IBRRC) over a 4 year period from waterfowl oiled in the 1991 Santa Clara River Oil Spill in Southern California. This large number of band returns over such a period of time is not usually seen. This data demonstrates that some oiled birds do survive in the wild after being oiled and rehabilitated, and even migrate normally when released. The events and variables that affected the survival of these birds will be discussed in this paper.

## INTRODUCTION

This paper examines the case histories of six oiled waterfowl from the 1991 Santa Clara River Oil Spill. This oil spill occurred in early February 1991 when a pipeline carrying San Joaquin heavy crude oil ruptured in Valencia, CA spilling oil down the Santa Clara River for several miles. San Joaquin heavy crude is a highly viscous oil that contains a high percentage of sulfur and selenium. The International Bird Rescue Research Center began field collection of birds within 24 hours of the pipeline rupture. Of the 166 live birds admitted to the rehabilitation facility, 123 were released. Subsequently, there have been six band returns. These returns include two adult male mallard ducks (*Anas platyrhynchos*), two adult male and one adult female American widgeon (*Mareca americana*) and one adult male gadwall (*Anas strepera*). The recovery of bands occurred over a period from 10 months to 3.9 years post release. It is not often that IBRRC has six band returns, and especially six long-term returns, from the same oil spill. The data collected during the rehabilitation of these birds included the packed cell volumes (PCVs), buffy coats (BCs), total proteins (TPs) read by refractometer method, weights of birds and the number of times each bird was washed. This paper presents: the average values at the time of intake, at the time of release and the values overall; the number of times the birds were washed; the average number of days the birds were in a rehabilitation facility; the average number of days the birds survived post-release; the distance from the release sites and the estimated locations where these birds were shot and killed.

## DATA

The normal PCV for Anseriformes is between 40 and 50 percent and the normal TP is 3.5-4.5 gm/dl (1). A normal range for the BC is unavailable. IBRRC's "normals" for blood values are based on information on those of similar species, clinical observation and recapture data. IBRRC considers most waterfowl to be within normal range with a PCV of 40 percent or greater, BC 1.0 or less and a TP of 3 to 6 gm/dl. The information in Table 1 indicates the overall state of the study birds throughout the rehabilitation process. The PCV on average does

not vary significantly for the time the birds were in captivity, though some individuals did experience hemolytic anemias.

<b>Table 1</b>							
	<b>N</b>	<b>XPCV (%)</b>	<b>Range</b>	<b>XBC (%)</b>	<b>Range</b>	<b>XTPgm/dl</b>	<b>Range</b>
Within 2 days of admission	6	43.2	39.0-49.0	0.4	0.3-0.5	4.75	3.20-5.70
For entire length of stay	6	41.1	34.1-46.5	0.6	0.4 -0.8	5.30	4.60-5.80
Within 2 days of release	5	42.2	30.0-51.0	0.8	0.3-1.0	6.34	5.30-7.00

At the time of the 1991 spill it was not always possible to take a blood sample on initial intake due to the number of birds admitted, availability of qualified staff at time of admittance, or other complicating factors. However, most birds had a sample of blood taken within the first 48 hours.

The average length of stay at the rehabilitation facility was 22 days. The range of stay was between 13 and 53 days. The average length of time that the six released birds were in the wild was 1,006 days or 2.7 years. The number of days varied from 256 to 1,417 days in the wild. All birds were shot and killed by hunters.

Table 2 lists the days in the rehabilitation center, the approximate distances that birds traveled from the release sight to the location where they were shot, years in the wild, and the site and date released, and the site and date recovered.

<b>Table 2</b>								
<b>Federal Band #</b>	<b>Species</b>	<b>Days in captivity</b>	<b>Years In wild</b>	<b>Distance from release</b>	<b>Release Date</b>	<b>Release Location</b>	<b>Recovery Date</b>	<b>Recovery Location</b>
896-32088	Mallard	17	3.7	65 miles	2-19-91	Long Beach, CA	10-28-94	Castaic Lake, CA
896-32038	Mallard	13	3.9	90 miles	2-15-91	Long Beach, CA	1-3-95	Desert Hot Springs, CA
896-32042	Wigeon	14	.7	377 miles	2-17-91	Long Beach, CA	10-31-91	Sacramento, CA
896-32049	Gadwall	15	2.9	429 miles	2-18-91	Long Beach, CA	1-5-94	Gridley, CA
896-32117	Wigeon	19	1.8	430 miles	2-24-91	Long Beach, CA	12-30-92	Lambertville, CA
896-32541	Wigeon	53	3.5	630 miles	3-29-91	Berkeley, CA	10-12-94	Bear River Refuge, UT
	<b>Averages</b>	<b>22</b>	<b>2.8</b>	<b>337 miles</b>				

## DISCUSSION

Within 24 hours of the pipeline break, IBRRC was contacted, mobilized and collecting birds in the field. The birds that were oil affected were beginning to succumb to hyperthermia as daytime temperatures reached 80 to 90 degrees F. Hypothermia at night was another concern and was evident in birds captured early in the day as evening temperatures dipped to 30 to 40 degrees F. Predation by raptors and carnivorous mammals was evident and many oiled birds were lost in this manner. Many more birds would likely have perished if such an immediately aggressive approach to search and collection had not been mounted.

The facility used to rehabilitate these birds was located in Long Beach, CA, at Terminal Island. It was a prefabricated structure within a large warehouse used to repair boats. It had recently been used for another spill and was ready to house birds within 48 hours. Water for an immediate rehabilitation response was available due to pre-existing water heaters and water softeners. Outdoor pens suitable for dabbling species were constructed and functional as soon as the birds were ready to be placed out-of-doors. This sort of immediacy is rarely attainable for rehabilitation following an oil spill. Most scenarios see the initial stabilization and care of birds in unsuitable facilities. There is generally water, electrical and ventilation problems, all of which extend the amount of time the birds will remain in-house. This great reduction in logistical problems may have been a contributing factor to the successful rehabilitation of these birds.

The stress on oiled wildlife during the rehabilitation process is immense. In considering the six recovered banded birds, it is important to note the amount of stress they underwent during the rehabilitation process. San Joaquin oil is particularly viscous and covered the birds entirely. In some cases, the oil even impinged movement of wings and/or feet. Though these six birds had normal blood values upon admittance, it was important, and is IBRRC's established policy, to stabilize all birds prior to washing. When birds are presented at admittance it is essential to first get a core temperature, of the bird. While getting the temperature the general condition of the bird can be noted. If, and only if, the temperature reads 100 degrees Fahrenheit or greater should a thorough examination be given and a blood sample taken. Pedialyte (Ross Products, Columbus, Ohio) and Toxiban (VET-A-MIX, Inc, Shenandoah, Iowa) are administered following the exam. Pedialyte is an oral electrolyte solution that rehydrates the birds and Toxiban is an activated charcoal suspension, used to adsorb and move the toxins through the intestinal tract. The bird is then placed in a warm ventilated pen. The degree of oiling should be noted as well as the volatiles given off by the oil. Should the amount of oil impinge movement or pose a respiratory threat to the bird a "quick" wash should be considered. Only birds with normal blood values, temperature and body weight should undergo a quick wash. A quick wash means washing the bird quickly usually within 5 minutes, to remove just enough oil so the bird can be properly stabilized. By no means is a quick wash meant to rid the bird of all the oil. The bird is given a diet based on the results of the initial exam and re-evaluated in 24 hours. If all the blood parameters look adequate and the bird's behavior is normal after 24 hours it is regarded as stable and may be considered for the washing process.

In order to be considered for washing, a bird must meet certain criteria. The bird should be at a normal weight or be gaining weight and close to normal, the blood parameters should be PCV of 25 or greater, BC of 2 or less, TP of 3 to 5gm/dl. Any exceptions need the veterinarian's

approval prior to washing. It has been found that an unacceptably high mortality will result when birds are washed at substandard levels. These birds were subjected to an average of three washing sessions each during the rehabilitation process. A washing session consists of putting the oiled bird through a series of warm water baths with a one percent Dawn (Proctor & Gamble, Cincinnati, Ohio) dishwashing solution. The water must be between 104 and 106 degrees F for all baths and for rinsing. As many as 15 baths may be used per session. The wash session is concluded with a thorough hot water rinse, using a high-pressured water nozzle. Birds were washed at least twice and as many as four times before they achieved a state of water repellency. It is highly unusual to need more than one washing session; this is attributed to the viscosity of San Joaquin heavy crude oil. When the birds had completed their first washing session, there remained some residual oil. The washing process is one of the most stressful procedures that a bird undergoes during rehabilitation. It was necessary to limit the amount of time the birds were subjected to this stress. San Joaquin crude oil is extremely difficult to wash out of the bird's feathers using conventional methods. It was decided that the birds would benefit most by two or more regular washing sessions as opposed to one very lengthy one. The bird is clean only when the oil no longer discolors the bath water. IBRRC has since developed an alternative to multiple washes in dealing with San Joaquin crude. This entails using heated low viscosity mineral oil or olive oil and working it into the crude oil. The low viscosity mineral oil loosens up the crude oil, enabling the washer to get all the oil off of the bird using warm water and Dawn in far less time. Methelolate has also proven to be very effective in getting difficult to remove oils out of the feathers in a shorter amount of time than traditional methods.

The birds were periodically weighed, and blood was taken every 3 to 5 days. They were housed indoors until they were completely clean and water repellent. They were then placed with conspecifics in outdoor caging. IBRRC's criteria for release is based on the overall health and behavior of each bird. A thorough physical exam is given and a blood sample is taken. The blood parameters for release vary from species to species. For dabbling ducks, the PCV should be close to 40 percent, the BC should be trace to 1.5 percent, and the TP should be between 4 and 6 gm/dl. The bird should show normal behavior in an outdoor setting with conspecifics and be well fleshed. However there are some circumstances where birds may be released at substandard blood values. The staff veterinarian in conjunction with the wildlife rehabilitation staff evaluates the condition of the bird. They may determine that it is in the bird's best interest to be released at slightly lower values than to remain at the center, where it will be subjected to captive stresses. These stresses may result in secondary care problems such as keel lesions, swollen joints, or bumble foot. This was the situation for bird 896-32541. Though its PCV was low (30%), the decision to release the bird was determined to be in the best interest of the bird. The birds were released within 24 hours of the final evaluation.

The large number of long-term band returns for this spill may be attributed to the species being rehabilitated. There were a large percentage of game birds in this particular spill. Unlike coastal or pelagic species that are generally inaccessible to people, these birds were all inland species that pass through heavily hunted areas during migration. The few seabirds that are found after a spill effort seem to show up on beaches frequented by the public on weekends, vacations or fair weather days. Such returns are far too random to accurately assess the long-term survivability of oil-rehabilitated sea birds.

## **CONCLUSION**

The length of time that these birds survived after being oiled and rehabilitated is of particular interest. These birds were heavily oiled and experienced stressful procedures throughout the rehabilitation process. The bird's blood work did not deviate significantly from the normals for their species during the rehabilitation process. Upon release these birds were able to survive reintroduction to the wild and migrate out of the area before falling prey to hunters. An immediate response and good facilities are factors that may have contributed to this success. All six of the birds were shot and killed by hunters so it is not possible to know how long they may have survived in the wild. However, these band returns give only a little information about the post-release movements of these six birds. Many questions remain unanswered. Did these birds breed and were they successful? What were their movements before being shot? What were the long-term internal effects, if any, of the oil? Based on the band return data, we do know that all of the birds had successfully migrated at least once before they were shot. These band returns point to the need for further post-release studies of oiled wildlife. Perhaps we can then begin to answer some of the more difficult questions regarding the effects of oil on wildlife.

### **Literature Cited**

1) Ritchie, Harrison and Harrison. 1994. Avian Medicine: Principles and Application. Pp.1343. Wingers Publishing, Inc., Lake Worth, Florida.

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