

# The Montrose Story:

Its Scientific, Environmental, Legal  
and Political Legacies

Robert W. Risebrough

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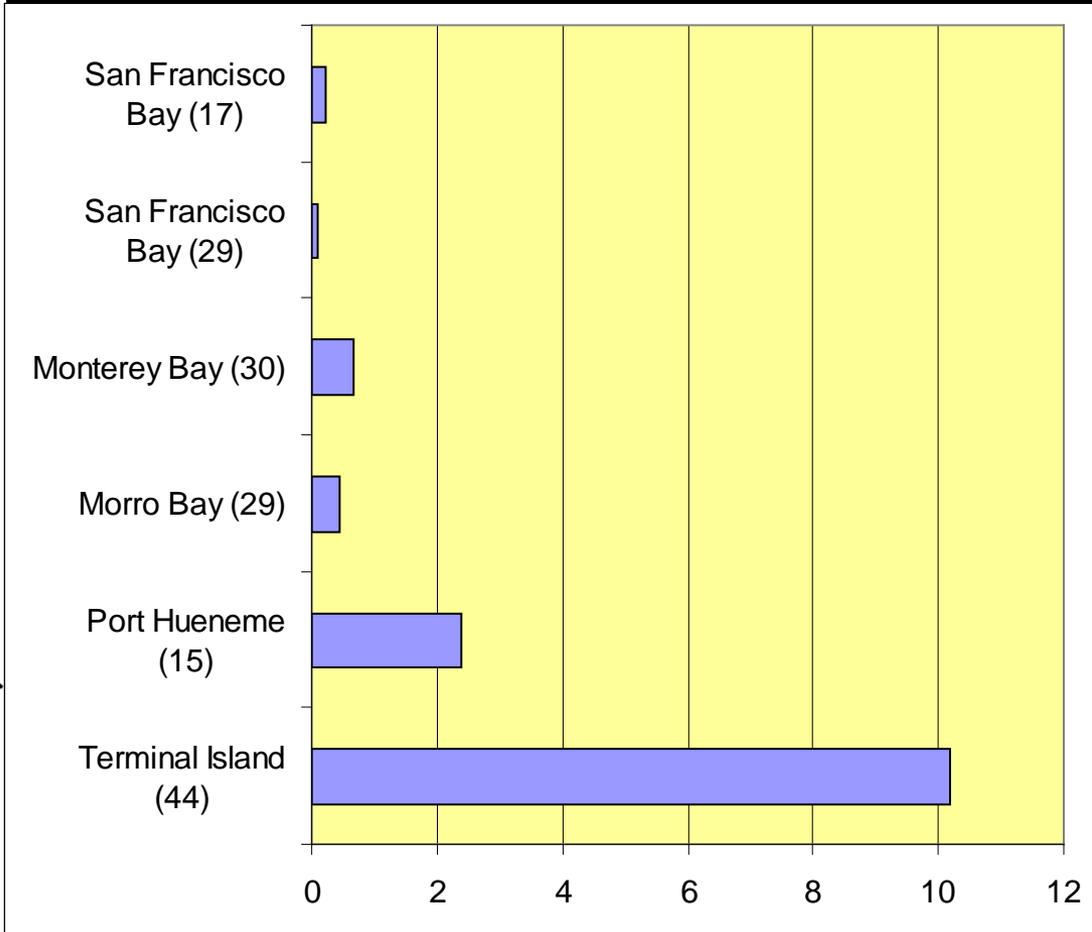
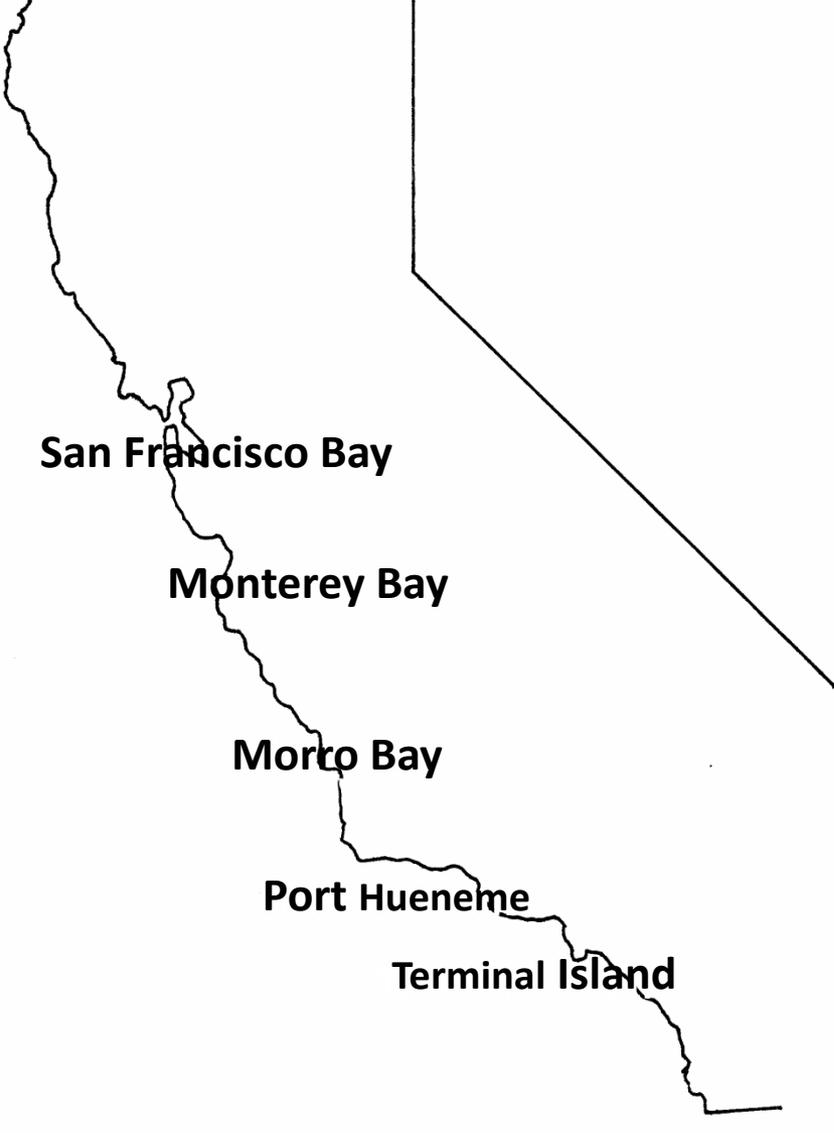
The Montrose Story is but one chapter of the definitive Story of DDT, a story yet to be written. Future generations of environmental scientists, lawyers, activists and regulators, will encounter environmental problems of equal or greater magnitude. What might they learn from the Montrose and DDT Stories and what should we do now to help them ?

As long as there are controversies not yet resolved, there will not be a definitive Montrose or DDT story. But surely the future generations, which will in any case make their own decisions, would benefit more from descriptions of past controversies, what generated them, and how they were resolved than from textbook decisions of past events.

The history that is emerging from my own compilation of Montrose-related information tells a story very different from that told on the websites of the agencies participating in the Montrose Settlements Restoration Program.

What, whom are these future generations to believe?

**The Montrose Chemical Corporation, at one time the world's largest producer of DDT, operated its factory in Torrance in southern Los Angeles from 1947 to 1982. Over its 35 years of operation, it produced an estimated total of 800,000 tons of DDT. A major portion of the factory wastes was initially dumped at sea near Santa Catalina Island; later, the alkaline wastes were discharged into the wastewater system of Los Angeles County.**



ppm wet weight  
(N) number of fish

# DDE in northern anchovies, 1965

NATURE VOL.216, NOVEMBER 11. 1967

**DDT Residues in Pacific Sea Birds: A  
Persistent Insecticide in Marine Food Chains**

R.W. Risebrough, D.B. Menzel,. D.J. Martin Jr.  
& H.S. Olcott

Institute of Marine Resources,  
University of California, Berkeley.

# DDE and PCB Concentrations in Shearwaters

Monterey Bay, 1 November 1966

Parts per million of the wet weight, whole bodies

Species	DDE	PCBs
Sooty Shearwater	11.6	1.2
Sooty Shearwater	8.9	0.9
Slender-billed Shearwater	29.4	2.1

**But the highest DDE concentration, 77 ppm, was in the breast muscle of a brown pelican, prompting a search for nesting colonies in California**



PEREGRINE  
FALCON  
POPULATIONS



THEIR BIOLOGY AND DECLINE  
EDITED BY JOSEPH J. HICKEY



**These are adult Brown Pelicans. In 1968 Schreiber and DeLong recorded an absence of young pelicans in southern California just after the breeding season.**

**Anacapa Island has long been a traditional nesting site for brown pelicans in California. Most of the pelicans along our coast, however, breed in Mexico**



**In March, 1969,  
the Coreopsis  
were in full bloom**

**The brown pelican  
colony was upslope  
to the left**





**None of the 298 nests  
contained a healthy egg**











**We ended up with 65 broken, crushed, or deformed eggs from Anacapa and 28 from the Coronados, and 16 intact eggs from the islands further to the south. Ralph Schreiber brought a total of 87 eggs from colonies in Florida. Anticipating a confrontation with the pesticide companies and with Monsanto, manufacturer of the PCBs, at a meeting that summer in Corvallis, with the help of six volunteers I operated the lab with many 24 hour days, analyzing them for DDT compounds, the PCBs and other chlorinated hydrocarbons.**

The primary question to be addressed was whether there was a relationship between the thinning and any of the pollutants we were measuring, particularly DDE, the principal DDT compound in the environment. We soon established a highly significant relationship between DDE and the thinning.

The relationship between DDE and thinning in the west coast eggs, with DDE concentrations several times higher than those of the PCBs, was the same in the Florida eggs, with concentrations of the PCBs several times higher than those of DDE. PCBs were not contributing to the thinning.

**At that time, in 1969, the agricultural areas of California, particularly those growing cotton, were the only plausible source of the DDT entering the marine food web that supported the pelicans.**

**In the following year we learned from a report in the Los Angeles Times that the DDT contamination had not been coming from the cotton fields or from the global circulation of DDT in the atmosphere. In response to the publicity about high levels of DDT contamination in fish and pelicans, the Los Angeles County Sanitation Districts (LACSAN) established a laboratory in 1969 to monitor DDT compounds in the wastewaters entering their treatment plant. From December 1969 to April 1970 a total of 143 analyses were undertaken, showing that an average of 290 kg of DDT per day was entering the plant from a source in their system. The source was determined to be the Montrose Chemical Corporation, at the time the largest manufacturer of DDT in the world.**

**LACSAN then issued an order to Montrose requiring the company to cease any discharge into the wastewater system. By 1971 Montrose had fully complied with this ultimatum. Elimination of the source of contamination resulted in the recovery of normal eggshell thickness of all of the species affected, the bald eagle excepted, without any action of government agencies. Recovery of the Brown Pelican was particularly rapid**

## **Brown Pelicans: Improved Reproduction off the Southern California Coast**

*Abstract. Although still about 30 percent too low for population stability, productivity of California brown pelicans at their two northern colonies has improved significantly since 1971. Numbers of adults breeding probably reflect food supplies and recruitment from more successful colonies to the south, but improving fledging rates (up to 0.9 young per nest in 1974) reflect better egg survival and improving eggshell condition, with declining DDE contamination in anchovies, their major food source.*

**LACSAN was rewarded for this prompt and effective action in the public interest by being sued, first by the Environmental Defense Fund, and 20 years later by the U.S. Department of Justice.**

"Dr. Robert Risebrough, who has made a career of campaigning against DDT, going back to the Wisconsin hearings in 1968-69 and those in Washington in 1970-71, appearing as the principal witness for the Environmental Defense Fund."

Samuel Rotrosen, President, Montrose Chemical Corporation of California.

Inter-Office Correspondence, 5 March, 1985

*(Reprinted from Nature, Vol. 220, No. 5172, pp. 1098-1102, December 14, 1968)*

# Polychlorinated Biphenyls in the Global Ecosystem

by

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Polychlorinated biphenyls are widely dispersed in the global ecosystem, and are powerful inducers of hepatic enzymes which degrade oestradiol. Together with other chlorinated biocides, such as DDT, they could account for a large part of the aberration in calcium metabolism which has been observed in many species of birds since the Second World War.

JANUARY-FEBRUARY 1970

# ENVIRONMENT

Volume 12, Number 1, 95 cents

**MORE LETTERS IN THE WIND**



**SHELL THINNING IN EGGS OF THE COMMON MURRE, *Uria aalge*,  
FROM THE FARALLON ISLANDS, CALIFORNIA**

**FRANKLIN GRESS, ROBERT W. RISEBROUGH, and FRED C. SIBLEY**

**Condor 73:368-369 (1971)**

**Five eggs obtained in 1968 averaged 13% shell thinning, associated  
with 297 ppm DDE lipid weight and 38 ppm wet weight.**

**SHELL-THINNING IN EGGS OF THE ASHY PETREL  
(*Oceanodroma homochroa*) FROM THE FARALLON ISLANDS**

**MALCOLM C. COULTER AND ROBERT W. RISEBROUGH**

**The shell thickness index of nine eggs obtained in 1969 was reduced by 9 %, associated with 390 ppm DDE lipid weight and 47 ppm wet weight.**

**DDE and PCB concentrations in whole bodies of Storm-Petrels, 1968-1971. Parts per million of the wet and lipid lipid weights in parentheses.**

<b>Species</b>	<b>Locality</b>	<b>N</b>	<b>Year</b>	<b>DDE</b>	<b>PCBs</b>
<b>Ashy Storm-Petrel</b>	<b>Farallon Islands</b>	<b>9</b>	<b>1969</b>	<b>73 (456)</b>	<b>32 (202)</b>
<b>Black Storm-Petrel</b>	<b>Gulf of California</b>	<b>8</b>	<b>1968</b>	<b>7.5</b>	<b>1.0</b>
<b>Least Storm-Petrel</b>	<b>Gulf of California</b>	<b>3</b>	<b>1968</b>	<b>2.7</b>	<b>0.3</b>
<b>Wilson's Storm-Petrel</b>	<b>Palmer Station</b>	<b>9</b>	<b>1970</b>	<b>8.1</b>	<b>33</b>
	<b>Cape Hallett</b>	<b>10</b>	<b>1971</b>	<b>0.4 (2.2)</b>	<b>2.1(11)</b>

In the mid-1980s, Allan Chartrand of the Los Angeles Regional Water Quality Control Board compiled all available information about the dumping of Montrose wastes in the San Pedro Channel in 1947-1961. These wastes contained an estimated 350 - 700 tons of DDT

Chartrand, A.B., S. Moy, A.N.Safford, T.Yoshimura & L.A. Schinazi(1985). Ocean dumping under Los Angeles Regional Water Quality Control Board permit: A review of past practices, potential adverse impacts, and recommendations for future action. California Regional Water Quality Control Board, Los Angeles. 36 pp + 2 appendices.

From the dumpsites and from nearby reference sites, Chartrand obtained samples of benthic fish and sediments. From stations throughout the Bight, including coastal Los Angeles, he obtained samples of sediments, water-column fish and mussels which were analyzed in my laboratory for organic contaminants.

A Montrose 'signature', characterized by a high DDTs/PCBs ratio, a high p,p'-DDT/p,p'-DDE ratio, and a ratio of o,p'-DDT/p,p'-DDT that in some samples was higher than 1.0 was recorded in samples from the dumpsites. The o,p'-DDT/p,p'-DDT ration in technical DDT is about 0.15; to my knowledge there have no analyses of the 'acidic wastes', all of which were dumped at sea until 1961 and thereafter taken to a landfill for hazardous wastes.

A very different 'Montrose signature' with a DDE/PCBs ratio about 10 and a very low ratio of p,p'-DDT/p,p'-DDE was recorded in two sediment samples from the Palos Verdes Shelf, in agreement with the many analyses of these sediments by the Sanitation Districts and USGS.

A similar ratio in some of the kelp bass from coastal Los Angeles indicating that some of the DDTs in the sediments were entering the local food web.

Throughout the 1980s we had been analyzing blood samples from the bald eagles reintroduced to Santa Catalina by the Institute for Wildlife Studies (IWS) and, in the late 1980s, remnants of yolk from their broken eggs.

The very high concentration of 470 ppm lipid weight in the first egg produced by the reintroduced Bald Eagles in 1987 was about four to six times higher than concentrations previously shown to significantly reduce the reproductive success of Bald Eagles.

The estimated DDE/PCBs ratio was 3.6, indicating that most of the DDE had not recently emerged from the Palos Verdes sediments. We assumed therefore that it was a remnant of the estimated 2,000 tons of Montrose DDT that had entered the water column food web of the Southern California Bight. A similar ratio was recorded in the eggs we later analyzed and in those analyzed by USFWS in the 1990s.



NO TRASPASANDO  
FAGOR DE NO TRASPASAR

Prohibido el acceso a este sitio.  
No se permite el ingreso de vehículos.  
No se permite el ingreso de personas.  
No se permite el ingreso de animales.  
No se permite el ingreso de maquinaria.  
No se permite el ingreso de materiales.  
No se permite el ingreso de residuos.  
No se permite el ingreso de otros materiales.  
No se permite el ingreso de otros residuos.  
No se permite el ingreso de otros materiales.  
No se permite el ingreso de otros residuos.

MONTROSE  
SUPERFUND  
SITE  
20201 NORMANDIE AVENUE  
TORRANCE, CA



In 1990 the U.S. Department of Justice and the California Attorney General, on behalf of several federal and state agencies, filed suit under the federal Superfund law against the Montrose Chemical Corporation, the Westinghouse Electric Corporation, the Potlatch-Simpson paper company and the Los Angeles County Sanitation Districts. The suit alleged that the wastewaters of these companies, discharged into the Southern California Bight, contained sufficient DDTs and PCBs to harm wildlife. The governments alleged that LACSD did not remove all the DDT and PCBs from the wastewaters it discharged.

**NOAA had invited several of us who had undertaken studies of wildlife in the Southern California Bight to participate in the preparations for a trial and to be witnesses. Colleagues included Lloyd Kiff, Dan Anderson, Frank Gress, Wally Jarman, Brian Walton, Michael Fry and Bob DeLong. In the early 1990s I withdrew from further participation, although I was later to rejoin the group.**

# LOS ANGELES TIMES: \$45.7-Million Settlement Okd for Coastal Pollution

April 27, 1993

A Los Angeles federal court gave final approval Monday to a \$45.7-million settlement in the nation's largest offshore chemical contamination case. The money will be used to either remove or treat underwater sediments off the Palos Verdes Peninsula, which were contaminated with toxic industrial chemicals, or to restore wildlife. The settlement stems from a suit filed in 1990 by the National Oceanic and Atmospheric Administration, among other agencies, against Montrose Chemical Corp.

But in the mid 1990s the case was thrown out of court. Statute of Limitations. A quarter of a century had passed since the last DDT molecule had entered LACSAN from the Montrose factory.

But just offshore, 100 tons of DDT, about 5 % of the Montrose waste DDT that had entered the Bight, lay buried in the sediments. Entry of some of this DDT into the water column food web had been documented.

EPA then enlarged the Superfund Site that had earlier been created at the site of the DDT factory to include a large underwater area of the contaminated Palos Verdes Shelf.

# Court Reinstates Lawsuit on DDT

January 18, 1997 | HENRY WEINSTEIN, TIMES LEGAL AFFAIRS WRITER

In a major victory for the government and environmentalists, a federal appeals court in San Francisco on Friday reinstated a massive lawsuit against several chemical companies that dumped millions of pounds of the pesticide DDT into the ocean off the Palos Verdes Peninsula. The ruling paves the way for a trial jointly prosecuted by federal and state agencies, which are hoping to recover millions of dollars in damages to help restore the area.

## **PERCENT BY WEIGHT OF PCB CONGENER 153 IN AROCLORS**

**Aroclor 1242: 0.68; Aroclor 1254: 4.26; Aroclor 1260: 10.8**  
**Schulz et al. 1989**

## **RATIOS OF DDE TO PCB CONGENER 153**

**PV sediment reference sample:  $159.9 \pm 3.0$  (S.D.)**  
**3 replicates**

**Unhatched eggs of Bald Eagles  $17.1 \pm 6.6$**   
**Santa Catalina, 1989-1987, n = 14**

"Approximately \$30 million from the settlement, filed in U.S. District Court in Los Angeles, will be spent to restore natural resources, the largest sum ever paid for environmental injuries resulting from pollution other than oil. Another \$43 million from the settlement will be available to clean up the offshore contamination."

Press Release, U.S. Department of Justice.  
19 December, 2000

## HYPOTHESIS ! (Not yet, if ever, a conclusion)

Given that: 1) Reproductive success of Brown Pelicans and Double-crested Cormorants recovered as DDE contamination of the water-column food web declined after 1971; 2) injury to these species was not a consideration in the Montrose et al. trial; 3) injury to Bald Eagles would not have been a factor if their recovery had happened in 1999 rather than in 2007; 4) injury to the eagles was by far the most important rationale for the case; 5) the case would have been lost if evidence was presented that the sediments were not a significant source of the DDE in the eagles; 6) lawyers are paid to win case; and 7) the government lawyers successfully suppressed evidence that the PV sediments were not a source of the DDE in the eagles,

the hypothesis if not a conclusion emerges that winning the case required a violation of scientific integrity. The programs of the Montrose Trustees and the Environmental Protection Agency have therefore been based on the verdict of a judge rather than on a scientific consensus.

Stay tuned! A next step will be a dialogue with the lawyers I worked with in 2000. Meanwhile, please advise of any errors committed or facts not considered.

In 2001, NOAA and other federal and state agencies reached a settlement with the polluters, establishing the **Montrose Settlements Restoration Program (MSRP)**. MSRP restores four main resources that were harmed by these chemicals: Fishing and fish habitat; Bald Eagles; Peregrine Falcons; Seabirds

<http://www.justice.gov/enrd/us-v-montrose-chem-corp>



Restoring Natural Resources  
harmmed by DDTs and PCBs

**The logo of the restoration program includes a silhouette of a bald eagle with the words 'Restoring Natural Resources harmed by DDTs and PCBs.'**

# Notice of Determination

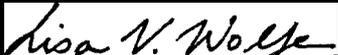
TO: State of California

Office of Planning and Research 1400 Tenth Street, Room 121  
Sacramento, California 95814

FROM: Department of Fish and Game

Office of Spill Prevention and Response 1700 K Street, Suite 250

Date Received for filing and posting at QPR: MARCH 24 , 2006

  
Signature: Lisa V. Wolfe

Office of Spill Prevention and Response  
Public Agency

## ***Project Location***

Coastal regions of Southern California, the Channel Islands, and the greater Southern California Bight including Baja California Pacific Islands

## ***Description of Nature, Purpose, and Beneficiaries of Project***

The MSRP Final Restoration Plan Programmatic EIR/EIS describes a course of action to address the restoration of The MSRP Final Restoration Plan Programmatic EIR/EIS describes a course of action to address the restoration of natural resources injured by past releases of DDTs and PCBs into Southern California coastal waters. The restoration actions address fish/fishing, seabirds, eagles and peregrine falcons over a broad geographic area including most of the Southern California Bight.

INTERIM RECORD OF  
DECISION

PALOS VERDES SHELF

OPERABLE UNIT 5 OF  
MONTROSE CHEMICAL CORPORATION  
SUPERFUND SITE

LOS ANGELES COUNTY, CALIFORNIA

SEPTEMBER 2009

Region IX  
United States Environmental Protection Agency San Francisco, California

“PV Shelf poses an unacceptable risk to human health and the environment; therefore, a remedy is needed.”

“Reduce to acceptable levels the risks from DDTs and PCBs to the ecological community (i.e., benthic invertebrates and fish) at the PV Shelf.”

“The Natural Resource Trustees through the Montrose Settlements Restoration Program (MSRP) are actively involved in restoring wildlife harmed by DDTs and PCBs. Programs to enhance fish habitat and restore sea birds and bald eagles are well underway. EPA can contribute to these efforts by its remedial actions on PV Shelf. Although PCB concentrations in sediment, water and fish do not appear to pose a threat to ecological receptors, DDT levels continue to pose a threat, particularly to piscivorous birds.”

**“Seeking to undo the damage caused by DDT and restore ecological balance to the Channel Islands, a multi-agency effort was launched in 1980 to restore bald eagles on Catalina Island.”**

**“As part of the Montrose Settlements Restoration Program, the Trustee Council initiated a feasibility study in 2002, to determine if bald eagles reintroduced to some of the northern Channel Islands that are farther away from the source of contamination might have greater reproductive success than the birds on Catalina Island. “**

**Annie Little, Environmental Contaminants Program and Montrose Settlements Restoration Program, Carlsbad, California.**

**<http://www.fws.gov/contaminants/examples/rachelstories1.html>**

*“The most rewarding experience to me is seeing the restoration concepts we developed during the writing of the MSRP Restoration Plan evolve into full-fledged projects that are making measurable impacts. I will never forget that day we first saw a little Bald Eagle chick in the nest at Pelican Harbor on the webcam—seeing the pair of eagles on Santa Cruz Island hatching a chick without human intervention was the moment I knew we were making a real impact.”*

Jennifer Boyce  
MSRP Program Manager

<https://darrp.noaa.gov/hazardous-waste/montrose>

Zeeman, C., F. Gress, S. Taylor and C. Gorbics. 2010. Temporal changes in contaminant levels in brown pelican eggs collected in 1993 and 2005 from West Anacapa Island, California. Final Report. U.S. Fish and Wildlife Service, Carlsbad Fish and Wildlife Office, Carlsbad, California. 55 pp.



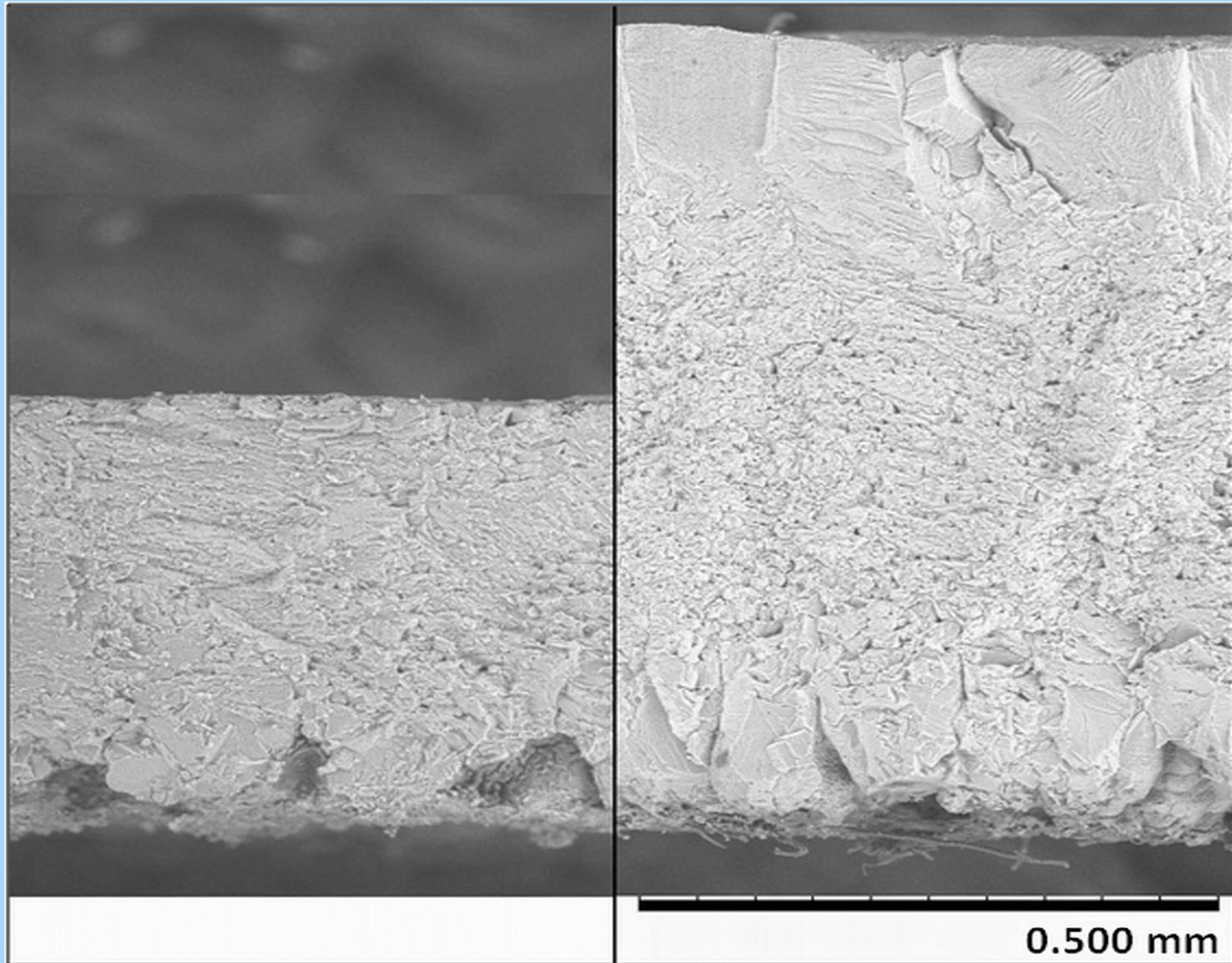


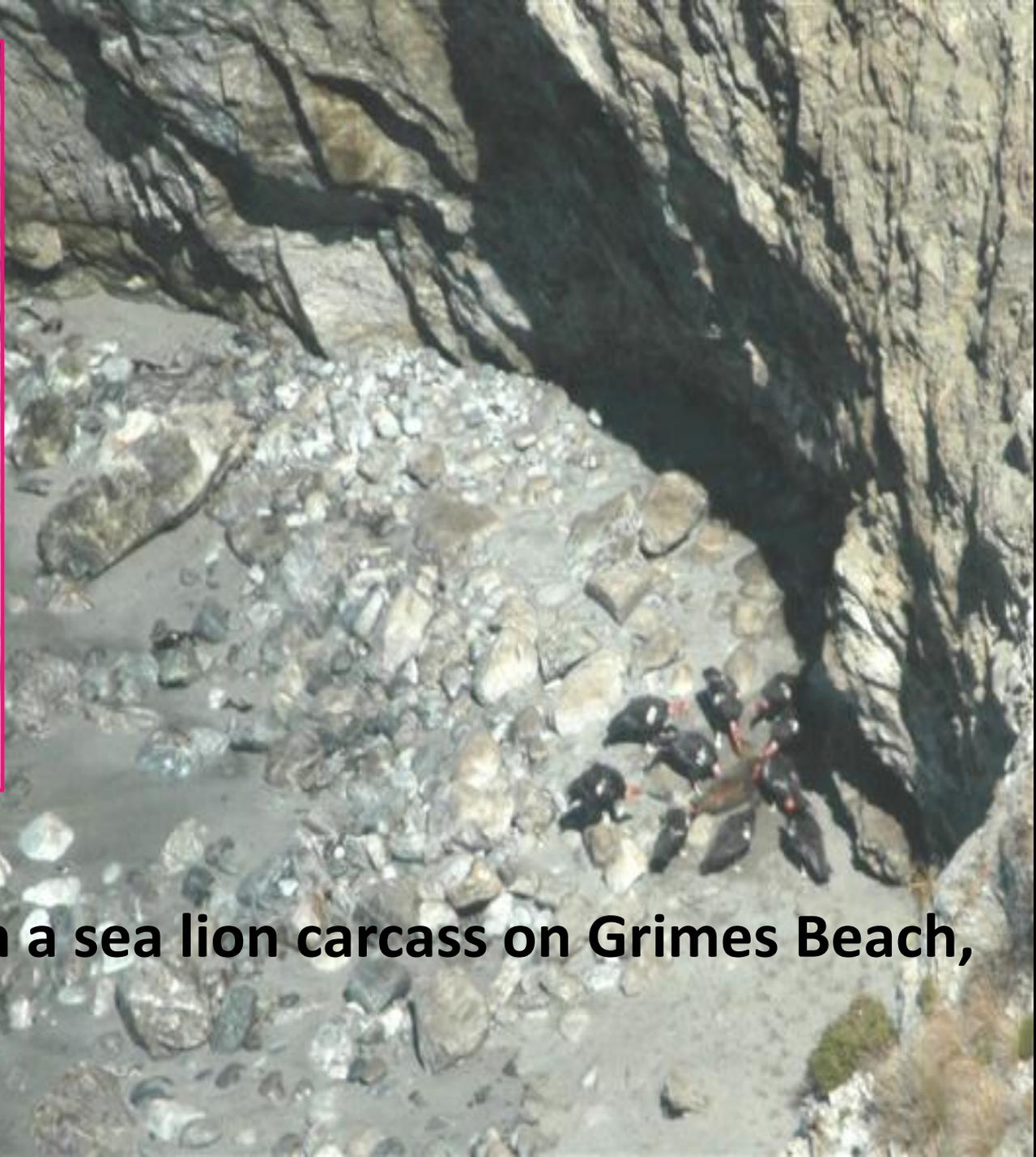
First nesting in  
many years of  
California  
Condors in  
central  
California,  
2006.

Photo by Joseph Brandt



**Scanning electron microscopy photomicrographs of eggshell fragments from coastal central California (left) and from interior southern California (right)**





**Condors feeding on a sea lion carcass on Grimes Beach,  
Big Sur coast.**

2011-2015	Southern California	Central California	P Values
Mean Eggshell Thickness (mm)	0.68 mm (n= 10)	0.51 mm (n=17)	<i>P</i> <0.000
% Hatch Success	69% (n=35)	46% (n=41)	<i>P</i> <0.000
DDE Lipid Wet Wt. (ppm)	0.31 (n=8)	17.8 (n=5)	<i>P</i> <0.002

- Central CA eggs were 25% thinner; DDE levels were 57 times higher
- Concentrations of PCBs in the central California eggs measured to date, however, have been below threshold levels of effect

Finkelstein, M. E. and C. Kurle (2014). Examining long-range transport of Montrose DDE via marine mammals: evaluating risks to California condors. Final Report to the Montrose Settlements Restoration Program Trustee Council. 36 pp. This study was supported by the Montrose Trustees and the U.S. Fish & Wildlife Service

“Based on the data evaluated for this study, both newly generated and published, the evidence does not support the use of the ratio of sum DDTs (or DDE) to sum PCBs as a reliable indicator of Montrose-related contamination.”

The controversies continue.

# LEGACIES

1) Scientific

2) Environmental

3) Legal

4) Political

***Science, Biology, History, People - FrontPage Magazine:  
Rachel Carson's Ecological Genocide. Argues that "Silent  
Spring" resulted in countless deaths from malaria ...***

***Oct 19, 2007 – Rachel Carson – Environmentalist Queen of  
Green Genocide ...hysterically screaming campaign begun  
by Silent Spring to stop the use of DDT ...***

***Silent Spring did for the environmental movement what  
Upton Sinclair's The Jungle ...and Mao's little red book as  
the greatest works for genocide ever created.***

Cohn, B. A., M. La Merrill, N. Y. Krigbaum, G. Yeh, J. S. Park, L. Zimmermann, and P. M. Cirillo. 2015. DDT Exposure in Utero and Breast Cancer. *J Clin Endocrinol Metab*: jc20151841.

“Maternal o,p'-DDT predicted daughters' breast cancer (odds ratio fourth quartile vs first = 3.7, 95% confidence interval 1.5–9.0). Mothers' lipids, weight, race, age, and breast cancer history did not explain the findings.”

“Conclusions: This prospective human study links measured DDT exposure in utero to risk of breast cancer. Experimental studies are essential to confirm results and discover causal mechanisms.”

