TRUSTEE COUNCIL RESOLUTION 10-3
ADOPTED April 15, **2010**

MONTROSE TRUSTEE COUNCIL RESOLUTION REGARDING
Funding for the Montrose Settlements Restoration Program: Examining Long-range Transport of Montrose DDE via Marine Mammals

1. The National Oceanic and Atmospheric Administration (NOAA); the State of California acting through the State Lands Commission, the Department of Parks & Recreation and the Department of Fish & Game; and the Department of the Interior, acting through the U.S. Fish & Wildlife Service and the National Park Service are the natural resource trustees (Trustees) for natural resources injured by releases of DDT and PCBs into the Southern California Bight.

2. Sums recovered in the civil action *United States, et al. v. Montrose Chemical Corp., et al.*, No. CV 90-3122-R (C.D. Cal. 1990) are being held in the Department of the Interior Natural Resource Damage Assessment and Restoration Fund (DOI Restoration Fund).

3. The Trustees have entered into a memorandum of understanding (MOU), as modified, that establishes a Trustee Council (Montrose Trustee Council) composed of one voting member for each trustee agency. Under the terms of that MOU, the Montrose Trustee Council is authorized to disburse funds for activities related to the damage assessment and restoration process.

4. In December 2009 the U.S. Fish and Wildlife Service proposed a project to evaluate DDE-associated risks to California condors and other scavengers from transport of DDE by marine mammals migrating from the Southern California Bight to the central and northern coasts of California and Oregon. A group of Trustee Council members and MSRP fulltime support staff offered to advise the Service on development of a proposal.

5. On February 25, 2010, the advisory group discussed via conference call a proposal outline prepared by the Service and U.C. Santa Cruz. The study proposal was entitled "Examining long-range transport of Montrose DDE via Marine Mammals: Evaluating Risks to California Condors". The project description includes a literature review and coordination with marine mammal researchers, identification of data gaps, targeted sample analysis using existing marine mammal tissue archives, and data interpretation and condor risk assessment modeling. The study has a cost of $67,726, plus 6% Service indirect, for a total cost of $71,790. The study would be managed by the Service via a cooperative agreement with U.C. Santa Cruz, as authorized by the existing California Cooperative Ecological Studies Unit (CESU) agreement.

6. The advisory group considered the proposal sufficiently developed to be reviewed by agency legal representatives and considered for approval by the Trustee Council.

7. This Trustee Council Resolution memorializes the Trustee Council's approval on March 18, 2010, to allocate $71,790 to the U.S. Fish and Wildlife Service to implement the study proposal described above. A copy of the final study proposal is attached to this resolution.

8. The effective date of this Resolution shall be the date on which the last trustee signs this document.

CONCURRED in by the following who are the duly authorized Montrose Trustee Council Representatives:

Jennifer Boyce National Oceanic & Atmospheric Administration	3/31/10 Date
James Haas U.S. Fish & Wildlife Service	Date
Kate Faulkner National Park Service	Date
Jennifer Lucchesi State Lands Commission	Date
Suzanne Goode Department of Parks & Recreation	Date
Patricia Velez Department of Fish & Game	Date

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Jennifer Lucchesi State Lands Commission	Date
Suzanne Goode Suzanne Goode Department of Parks & Recreation	4-15-10 Date
Patricia Velez Department of Fish & Game	Date

FROM : FAX NO. :8188806165 Apr. 15 2010 03:07PM P2

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Suzanne Goode Department of Parks & Recreation	Date
Patricia Velez Department of Fish & Game	4-5-10 Date

Examining long-range transport of Montrose DDE via marine mammals: Evaluating risks to California condors.

Jim Haas and Myra Finkelstein
2/05/10; revised 3/23/10

Background:

Marine mammals, particularly California sea lions, beach-cast on the Central coast are a potential source of food for reintroduced California condors. However, DDE concentrations in sea lion carcasses are high enough to cause eggshell thinning and embryo mortality in condors, hypothetically due to exposure in the Southern California Bight, making a sustainable population in that area unlikely in the near-term. While marine mammal carcasses can reduce the need for supplemental feeding, future condor reintroductions into coastal areas need to be focused on locations that are relatively free of highly contaminated marine mammals. Areas along the coast of northern California and Oregon are being considered as additional reintroduction areas. It is important to evaluate the risk of DDE exposure via marine mammal carcasses before additional reintroductions are made.

We propose to examine the risk to scavenging animals (e.g., California condors) from DDE discharged by Montrose and transported via marine mammals along the California coast in two stages:

I) Evaluate potential for DDE discharged by Montrose to be transported via marine mammals.

The DDE:PCB ratio was used by Fry (1994) in his injury report on seabirds to show that the ratios in eggs of various species of seabirds in the SCB were different from areas south and north of the SCB. Comparing ratios in bald eagle eggs from the SCB to those from the Columbia River (reported by Buck et al. 2005) showed Columbia River eagle eggs with DDE:PCB ratios considerably lower than the Channel Islands eagle eggs. The usefulness of the marker is due to the fact that in most places outside the SCB, DDE concentrations are roughly equivalent to PCBs, or lower.

Hypotheses:
(1) A high DDE:PCB ratio can be used to track marine mammals from the SCB that are highly contaminated with DDE from Montrose.

(2) California sea lions carry DDE northward along the coast during migration. DDE concentrations and DDE:PCB ratios should continue to reflect a Montrose source. Harbor seals are also contaminated, but reflect local sources of DDE. With distance from the SCB, DDE concentrations in harbor seals should drop and DDE:PCB ratios should decrease.

Objectives:

(1) In the first six months of the study we will determine the feasibility of using the DDE:PCB ratio, in conjunction with movement analysis, as a marker for Montrose contamination in marine mammals. In addition, Dr. Finkelstein will evaluate the feasibility of combining the DDE:PCB with other makers of contamination such as long-chain alkylbenzenes to track Montrose DDE contamination in marine mammals.
(2) Given the long half-lives of DDE and PCBs, we anticipate that any samples collected within the past 5 years will be comparable; archived tissues can represent current conditions well if they are first evaluated for species, location of recovery, and time of recovery. Priority species are sea lions, harbor seals, and elephant seals (the predominant species in grounding data). The general approach will be: (a) evaluate data available in published literature; (b) evaluate data available through unpublished sources; (c) develop matrix of available data for different coastal areas, stratified by time and species, and identify data gaps; (d) evaluate records of marine mammal tissue archives to identify samples that would fill the data gaps based on species identification, time of collection, and area of collection; and (e) analyze selected samples. Minimum adequate sample sizes will be estimated using previously-published reports.

(3) We will evaluate carbon and nitrogen stable isotopes in conjunction with contaminants in the marine mammal tissue samples to help elucidate foraging patterns of individual animals (Burton and Koch 1999). In addition,

isotopic data will be used in related projects to help assess dietary exposure of California condors based on egg and/or plasma concentrations compared to sources of marine mammal tissue.

(4) Use California Sea Lion foraging and movement behavior to estimate how far animals from the Southern California Bight travel and percentage of time spent outside of the area. There is current research underway that involves tracking sea lions and other species for the Channel Islands as part of the Tagging of Pacific Predators (TOPP) program (for example, see Costa *et al.* 2010). Available marine mammal movement information will be integrated into the data analyses through coordination with TOPP participants at UC Santa Cruz.

II) Evaluate the risk from Montrose DDE to animals that scavenge along the California coast such as California condors.

Hypotheses:

(1) Seal lions, harbor seals and northern elephant seals comprise on average about 90% of beach-cast marine mammals reported in California; of those species, sea lions predominate (63%). Harbor seals and northern elephant seals comprise only 13% and 15%, respectively, of reported carcasses. Harbor seals become the predominant pinniped reported on the Oregon/Washington Coast (67%), with California sea lions and northern elephant seals comprising only 14% and 2%, respectively, of reported carcasses. The percentages of California sea lions, harbor seals, and northern elephant seals among beach-cast marine mammals should approximate continua of change moving from south to north. If harbor seals from a given location are less contaminated than seal lions, the shift from California sea lion carcasses to harbor seal carcasses could reduce the potential dietary exposure of condors to DDE.

(2) Marine mammal carcasses are not randomly distributed along the west coast; carcasses are more likely to be found near rookeries and haul outs, and in locations where the prevailing currents typically deposit debris. Historic recovery records should indicate where these areas are, and the species typically recovered. Some locations in Northern California and Oregon will have less likelihood of carcasses being deposited and could be targeted as condor reintroduction sites if contaminants in marine mammals remain a problem in more northern coastal areas.

Objectives:

(1) Evaluate risk of DDE exposure to California condors in proposed reintroduction areas based on the likelihood of encountering a marine mammal carcass in a given area, the probable species, and probable DDE concentration. We anticipate a probabilistic approach using data on condor foraging habitat, along with the historic records of the Marine Mammal Stranding Network, overlain with known marine mammal haul outs and rookeries. Probable DDE concentrations will be estimated as the average of tissues from the area, weighted by species. We will most likely use estimated dietary exposure to evaluate reproductive impairment via DDE in eggs. We will use existing data, such as the relationships between diet, plasma, and egg concentrations reported for kestrels by Henny and Meeker (1981) and the risk of reproductive failure estimated based on egg concentrations for eagles by Wiemeyer *et al.* (1993), until a large enough data set of condor egg analyses vs. reproductive success is available to know how comparable they are to other species. Estimated productivity data will used in a condor population viability model.

(2) Evaluate data gaps and uncertainties with respect to assessing exposure risk:

This feasibility study has two purposes. One is to determine how far outside the SCB Montrose DDE is being carried by migrating marine mammals; the other is a preliminary evaluation of risk to California condors if they are introduced to coastal areas in Northern California. Problematic or relatively clean areas identified through this process will likely need additional evaluation before condors are introduced.

(a) Although less commonly beach-cast than pinnipeds, some cetacean species such as killer whales and harbor porpoises can be highly contaminated with organochlorines and pose a potential risk to scavengers. A smaller

set of cetacean samples will be recommended for analysis, if appropriate based on numbers and recovery locations, to help characterize this risk.

(b) Natural variability in the parameters discussed above might be too high for a meaningful evaluation of risk to condors; if this proves to be the case, we will consider whether additional data will acceptably reduce uncertainty. Evaluating DDE in eggs or blood plasma of surrogate species such as turkey vultures or bald eagles could be used to refine condor exposure estimates in specific geographic areas, and will be recommended if appropriate. However, that work is not included in this proposal.

(c) Marine mammals might be expanding or moving ranges in response to climate change or other factors; changing sea levels might result in relocation of current rookeries and haul out sites. Any current patterns discernable in existing data will be evaluated. Additional data collection or GIS analyses might be recommended if warranted.

Approximate timeline and budget:

Stage 1: Months 1-6
Evaluate potential for DDE discharged by Montrose to be transported via marine mammals.

Budget item	Description	Cost
Personnel	*see below for task breakdown*	
Myra Finkelstein	Assistant Researcher (50% 2010)	$20,343
Graduate student	3 months support (50% 2010)	$5,015
Sample analysis – 20 samples		
Sample collection	vacutainers, trace clean jars, vials, labware	$200
Carbon and nitrogen	combine with movement/contaminant data	$500 ($25/sample)
OC analysis	Dave Crane - OSPR analytical facility	$20,000 ($1000/sample)
Misc.		
Shipping	fed-x charges for shipping samples	$125
Office	photocopying, etc.	$100
Travel	sample collection, meetings	$500
Total for months 1-6		**$46,783**

Breakdown of tasks to be preformed by personnel in months 1-6

Person	Task
Dr. Finkelstein	a) Review literature, assess tissue/data availability, set up collaborations with researchers, develop marine mammal tissue sampling plan based on available tissue samples. Estimated work hours: 80 (equivalent to 1 month at 50% time) b) Acquire tissues and existing data. Estimated work hours 40 (equivalent to 0.5 month at 50% time) c) Investigate tracers for detecting Montrose DDE in marine mammals. Estimated work hours 40 (equivalent to 0.5 month at 50% time) d) Oversee sample analysis for OCs, carbon and nitrogen stable isotopes. Estimated work hours 40 (equivalent to 0.5 month at 50% time) e) Oversee graduate student for coordinating with TOPP and develop plan to collect and analyze data marine mammal movement data that will be complementary to current research efforts. Estimated work hours 80 (equivalent to 1 month at 50% time) f) Evaluate and interpret contaminant, isotope, and movement data. Estimated work hours 120 (equivalent to 1.5 months at 50% time) g) Write up report summarizing findings are provide list of recommendations which include data gaps and uncertainties. Estimated work hours 80 (equivalent to 1 month at 50% time)
Graduate Student	a) satellite tracking data of California sea lions from Channel Islands

Deliverables for stage 1:

1) Report that summarizes research findings on the potential for DDE discharged by Montrose to be transported via marine mammals.
2) List of recommendations which includes summary of data gaps and uncertainties on the potential to track Montrose contamination via marine mammals.

Stage 2: Months 7-12

Evaluate the risk from Montrose DDE to animals that scavenge along the California coast such as California condors.

Budget item	Description	Cost
Personnel	*see below for task breakdown*	
Myra Finkelstein	Assistant Researcher (50% 2010)	$20,343
Misc.		
Office	photocopying, etc.	$100
Travel	meetings/present results and recommendations	$500
Total for months 7-12		**$20,943**

Breakdown of tasks to be preformed by personnel in months 7-12

Person	Task
Myra Finkelstein	a) Develop general risk assessment modeling framework to evaluate exposure risk from Montrose contamination to marine and coastal species via marine mammals. Estimated work hours: 240 (equivalent to 3 months at 50% time) b) Modify general model to assess risk for California condors. Estimated work hours: 160 (equivalent to 2 months at 50% time) c) Write up project results and provide recommendations for assessing risk from Montrose DDE to animals that scavenge along the California coast such as California condors. Estimated work hours: 80 (equivalent to 1 month at 50% time)

Deliverables for stage 2:

1) General risk assessment modeling framework to assess exposure risk to marine and coastal species from Montrose contamination via marine mammals.
2) Modified risk assessment for California condors
3) List of recommendations which includes summary of data gaps and uncertainties on assessing risk from Montrose contamination via marine mammal ingestion
4) Peer-reviewed publication on the long-range transport of persistent pollutants via marine mammals and consequences for marine and coastal species. Target Journal of submission: *Environmental Health Perspectives.*

Project Total Cost: $67,726

Proposal Citations:

Buck *et al.* 2005. Changes in productivity and contaminants in bald eagles nesting along the lower Columbia River, USA. *Env. Contam. Toxicol.* 24:1779-1792.

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Bibliography ***(a representation of available information relevant to proposed work)*:**

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