Original Draft: May 22, 2010
Latest Revisions:

WORK PLAN FOR ESTIMATING MORTALITY OF BIRDS USING BEACHED BIRD SURVEYS IN LOUISIANA FOR THE MISSISSIPPI CANYON 252 OIL SPILL

(Bird Study #1A-LA)

Prepared by: G. Vernon Byrd, Carolyn Marn, and Kim Trust
U.S. Fish and Wildlife Service
Contact:
[redacted]

and

Jeff Wakefield, Entrix
[redacted]

INTRODUCTION

On April 22, 2010 the Mississippi Canyon 252 oil spill began. Injury to wildlife is one of the concerns related to this spill. For purposes of gathering data on beached carcasses, all beach habitat between Hancock County Mississippi east through Florida and up the Atlantic coast to Merritt Island, Florida and between Corpus Christi, Texas east to the Louisiana border were included in a separate workplan (Bird Study #1). This workplan is identical in scope to Bird Study #1 but addresses beach habitat in Lousiana. Marsh habitat will be addressed in a separate plan.

Obviously mortality of birds occurs from causes other than oil spills and this is referred to as "background" mortality. It is important to estimate this rate because the background mortality ultimately needs to be separated from spill-caused mortality. One approach to estimating background is to sample beaches for carcasses before effects of oil are detected. Entrix conducted surveys on many beaches during the second week of May to document numbers of carcasses of various species that had accumulated on beaches in this region. It is also possible that beach surveys in part of the study area currently relatively distant from the oil can still be used for background mortality.

The specific objective of this plan is to estimate the rate of spill-related carcass deposition throughout the spill area. Since carcass deposition continues over time, periodic surveys of the same beaches is used to estimate the deposition curve for carcasses over the life of the spill. The first protocol listed here is for these beach surveys. Appendix A contains a protocol for localized studies designed to estimate rates of scavenging and loss of carcasses to rewash (i.e., carcass persistent rate), and Appendix B addresses estimating the detection probability of carcasses on beaches (i.e., searcher efficiency).

STUDY AREA

The study area is the coastal shoreline area with beaches that could be affected by the oil spill in Louisiana.

STUDY DESIGN FOR CARCASS SURVEYS

Sampling Universe.—Initially, samples will be selected from all beaches, including barrier islands, within the study area that are not placed off limits because of disturbance to nesting birds or breeding turtles, sensitive plants, military security concerns or beaches that are groomed by resorts, or other sensitive areas as delimited by land management agencies.

Target Population.—All species of birds that occur in the vicinity of the oil spill would potentially be found on beaches. Specifically all dead birds observed will be recorded on each beach surveyed.

Sample Units.--Sample units are approximately 1000-m long stretches of beach corresponding to named segments delineated by the oil spill response Incident Command

(Figure 2). The width of the sample units will be variable, extending from the water line to the high-high tide line which is identified by the wrack line. If this is not apparent, the inland edge is defined as 50 m inland from the water or the vegetation line, whichever comes first.

Specific sample sites on areas administered by the National Park Service (NPS), areas within military bases, and those in National or state wildlife refuges, will require consultation with those agencies to identify sensitive areas that should not be surveyed, to acquire appropriate permits, and to determine if crews need to be accompanied by agency personnel during surveys.

Stratification. — Post stratification will be considered after evaluating difference among types of beaches and geographic locations.

Sample Selection. — Sample beaches will be selected with a systematic random approach and implemented by randomly selecting a start point within the sampling universe and selecting every other beach segment in both directions to the edges of the sampling universe.

Sample Size. — Approximately 50% of the available segments (those not identified as off limits).

Data Collection.—Crews of two will search sample beaches on foot by zigzagging to get complete coverage (if carcasses are found above the wrack line they can be collected, but not counted as if they are in the sample unit—just note in comments on the form that they were out of the plot). Personnel will wear appropriate personal protective equipment when handling wildlife: at a minimum, disposable gloves (latex or nitrile are preferred) and dedicated clothing will be worn on oiled beaches. Each carcass will be identified to species if possible, described as specified on the attached form (Attachment 1) and bagged with other carcasses from the particular beach (be sure to label the bag with location and date). These bags will be turned into the appropriate wildlife intake center using methods recommended by the wildlife recovery unit. Initially selected beaches would be surveyed every other day but carcass persistence studies (see below) might serve to modify the sampling schedule to less frequent.

Survey Frequency and Duration.—Initially beaches will be surveyed every 3 days but this interval may be altered if the carcass persistence study (see below) indicates that less frequent sampling is adequate. Sampling will be initiated as soon as possible and continue until it is agreed that the effects of the oil have subsided.

Data Analysis.—Data will be collected in a manner that will support the Beach and Bird Model, if that modeling approach is selected.

Equipment Budget: Beached Bird Surveys, Beach Habitat
Date: May 22, 2010 1400

EQUIPMENT	Cost	Units	Total
ATV Trailers*	$1,500	1	$1,500
ATVs*	$5,000	2	10000
Safety Equipment for ATV*	$250	2	500
Gas for ATVs Cost/Gallon	$3	100	300
Garmin E-Trex H GPS Unit*	$250	2	500
Samsung Digital Camera w/ GPS *	$350	2	700
Spotting Scopes & Tripod *	$260	2	520
Freezer*	$500	1	500
SUPPLIES			
Field Expendables: Tags, Gloves, Bags, Writing Instruments, Stakes, AA Batteries-24 pk, Waterproof paper, Memory cards, cables, chargers, etc.	$2,000	1	2000
Backpacks*	$140	2	280
TRANSPORTATION			
Vehicles (mileage or rental for 4 wks)	2200	4	8800
Gas estim. 1000 mile/wk x 4 wks @$3/g	$900	4	3600
TOTAL			$29,200

*Expected One time purchase depending on duration of spill and need. Additional items could be needed if/when study is expanded.

These costs are estimated for approximately one month of implementation assuming 2 teams. Additional equipment will be necessary depending upon duration and extent of data collection period.

The bird injury group currently expects BP to purchase equipment directly.

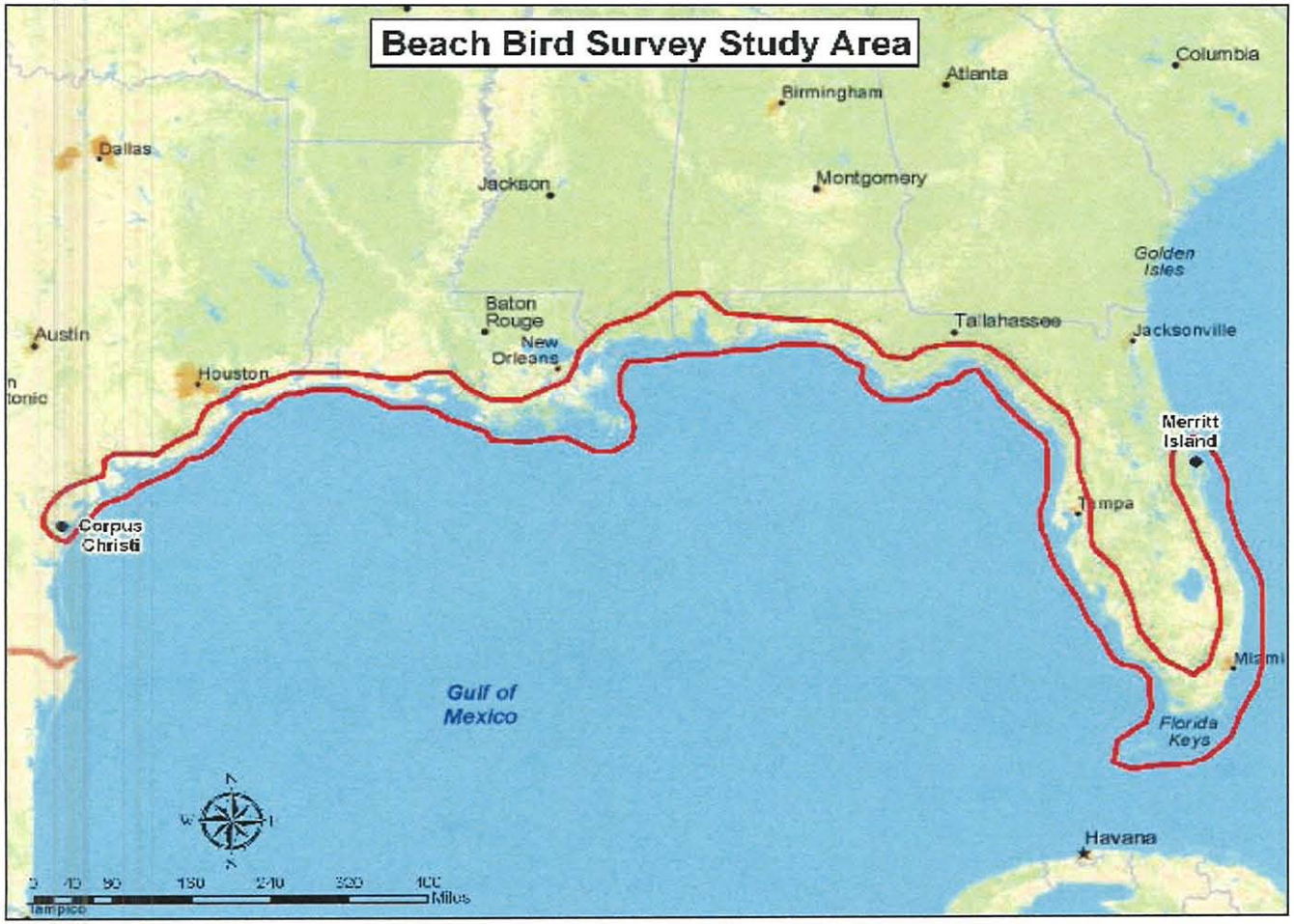

Figure 1: Beach bird survey study area associated with the Mississippi Canyon 252 Incident

Deepwater Horizon (MC 252)

BIRD SEARCH EFFORT and BIRDS COLLECTED DATA FORM

Please: Only one beach/marsh/mangrove segment per form. Complete form even if no birds are collected.

EVIDENCE SEIZURE TAG NUMBER: _____ NRDA (Yes or No)?_____

Date: _____ Survey Crew Members (Print AND sign names): _____ Contact Info: _____

Division/Segment Name: _____ Segment Beginning Lat/Long[1]: Lat: _____ Long: _____
(or geographic landmark)

_____ Length of surveyed segment (km) Segment Ending Lat/Long[1]: Lat: _____ Long: _____
(or geographic landmark)

_____ % of segment surveyed (approximate)

Survey Mode[2]: _____ Survey: 1 pass or roundtrip (*circle one*) Wind Speed/Direction: _____ **Start Time (24-hour clock):** _____ **End Time:** _____

LIVE / DEAD BIRDS COLLECTED *(one bird per line; use additional sheets if necessary)*

Species Code[3]	GPS Lat/Long[1] (dd.mmmmmm°)	ID#	Live or Dead	Time Collected (24-hour)	Tag #[4]	Position relative to high tide line[5]	Oiling[6]	Scavenging[7]	Age[8]	Photo (ID No.)	Disposition (LE or Rehab Center)	Comments

[1] **All Lat/Long:** Decimal degrees, WGS 84
[2] **Survey Mode: F** = Foot, **A** = Airboat, **B** = Boat, **V** = Vehicle, **O** = Other (specify)
[3] **Species Code:** Bird 4-letter species code; **"UNK"** for unknown; **"NONE"** if no birds found; **"fish"** for fish
[4] **Tag:** For live birds only. Attach a tag with a unique identification number to each bird collected. "**N/A**" (***or blank***) for dead birds.
[5] **Position: U** = Upper **W** = Wrack **L** = Low (wash zone)
[6] **Oiling: 0** = not visibly oiled; **1** = <2% of body; **2** = 2-25% of body; **3** = 25-50% of body; **4** = 50-100% of body; **X** = not evaluated or unknown
[7] **Scavenging: F** = freshly dead whole carcass with little or no scavenging, **L** = lightly scavenged, **H** = heavily scavenged, **M** = mummified or skeletal; **X** = not evaluated
[8] **Age: HY** = Hatch Year **JUV** = Juvenile **AD** (***or blank***) = Adult

Entered By (print and sign): _____ Date Entered: _____

[Continuation]

LIVE / DEAD BIRDS COLLECTED *(one bird per line; use additional sheets if necessary)*

Species Code[3]	GPS Lat/Long[1] (dd.mmmmmm°)	ID#	Live or Dead	Time Collected (24-hour)	Tag #[4]	Position relative to high tide line[5]	Oiling[6]	Scavenging[7]	Age[8]	Photo (ID No.)	Disposition (LE or Rehab Center)	Comments

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Data Entered By: _____ Date Entered: _____

APPENDIX A. CARCASS PERSISTENCE EXPERIMENT

The persistence of carcasses once they wash onto a beach will be evaluated by either marking or leaving a sample of marked unoiled carcasses or by placing unoiled carcasses on beaches.

Timing of Experiment. — *Unoiled* carcasses for this study will consist of carcasses previously archived from current background mortality studies, obtained from rehab centers, and from frozen specimens previously salvaged by resource agencies. Birds that had been euthanized using chemical agents other than inhalant anesthetics will not be placed on beaches, nor will specimens from disease-related wildlife mortality events. This persistence study will be initiated after a sufficient number of carcasses are accumulated.

Site Selection.—Study sites will be randomly chosen from the sample of beaches selected above. The number of beaches and replicate trials will be based on the number of carcasses available, and ideally will be continued throughout the period when mortality is occurring from the spill and across the geographic extent of the affected areas. If possible, the same species found in the spill area will be used in the persistence study. If sufficient numbers of carcasses from local carcasses are not available, similar-sized carcasses from non-local species will be used.

Sample Size.—Each trial will contain at least 30 carcasses, ideally with equal numbers for each of three size classes (e.g., small shorebirds and seabirds, medium seabirds and ducks, large waders and seabirds). Carcasses will be deployed in densities similar to those found on beaches in recent surveys. For instance if the density of carcasses in early surveys is 10 birds per km of beach, this density would be deployed over about 3 km of beach. The number of trials will depend upon the number of available carcasses, but at least 5 trials should be conducted during the study. The first trial should occur early in the spill event to help inform the interval of beach carcass searches which should be no longer than the persistence of at least some of the carcasses from the previous search.

Carcass Placement.--Carcasses used in the persistence study will be uniquely marked and placed on beaches scattered from just above the water line to the high-high tide line. Each carcass will have a small numbered plywood piece placed under it. The plywood will be smaller than the carcass do preclude attracting the attention of scavengers. If carcasses disappear during the study but the board remains, a scavenger is suspected. If the board and carcass disappear, the carcass likely rewashed (see Fig. 2.1).

Data Collection.—Beaches with carcasses will be checked daily until all carcasses are removed or until no removal occurs for 3 consecutive days. Data will be recorded on the persistence form (see Attachment 2).

Data Analysis.—If persistent rates are calculated, they will be calculated using existing methods.

Carcass persistence protocol for deploying salvaged specimens.

Equal numbers of small, medium, and large carcasses (species based on availability) will be distributed on selected beaches in an array that simulates the range of locations relative to the high-high tide line where carcasses would normally be initially deposited (see below).

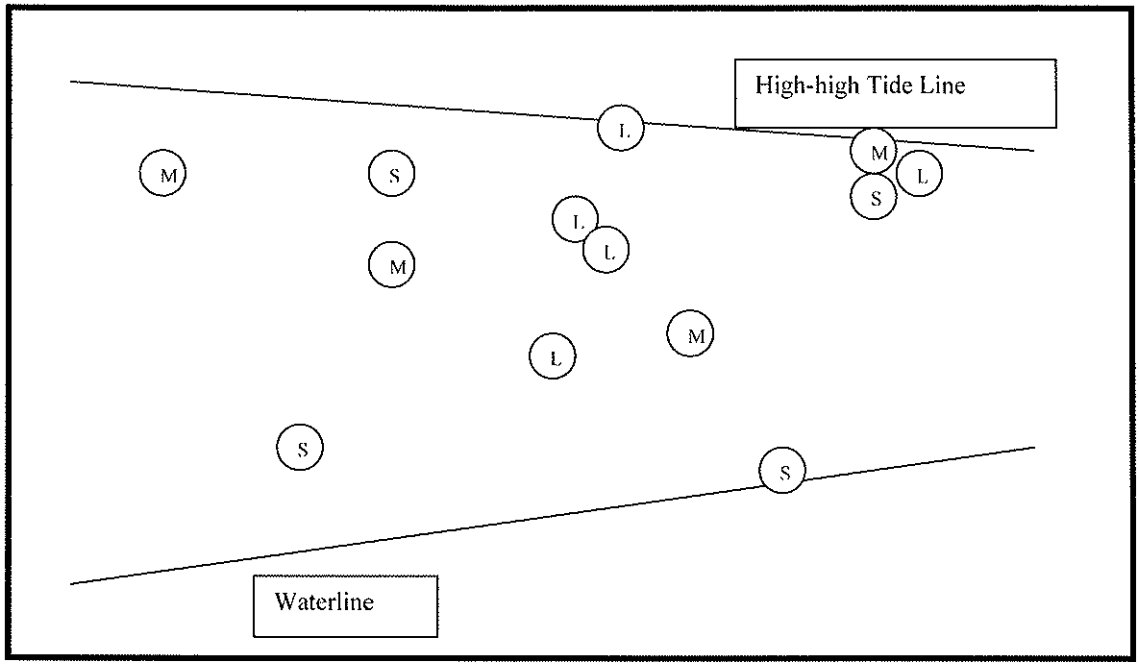


Figure 2.1. Example of different sized carcasses deployed on a sample beach.

An example of this approach is specified in Ford and Zafante (2009): "We set out 25 carcasses at each of the 10 sites, for a total sample size of 250 carcasses. Each carcass was placed between 0 m and 200 m from the previous carcass, based on a uniform random distribution; so that the mean distance between carcasses was 100 m...Carcasses were placed in randomized locations between the wrack line and the top of the beach. In a few cases in which waves came all the way to the base of the low sandy bluffs that formed the beach back, we placed carcasses on the bluff face or on the bluff top so that they would be beyond the reach of the tide. To avoid providing accidental cues to the scavengers, we set out carcasses during a rising tide, walking below the wrack line whenever possible so that any tracks would be washed away by the waves. The total length of all study beaches was about 25 km."

Beach Survey Data Form (Persistence)	Surveyors:	Page:

Location:	Beach:	Length:
Recent Wind Sp/Dir:	Beach type:	
Start Time: GPS:	Stop Time: GPS:	
Comments:		

Carcass #	Board #	Date 1*	Date 2	Date 3	Date 4	Date 5	Date 6	Date 7	Date 8

*Record whether the carcass and board are still present

APPENDIX B. DETECTION PROBABILITY (SEARCHER EFFICIENCY) STUDY

Beaches will be surveyed on foot primarily, but other types of searches may also be conducted with land management agency approval (e.g., using 4 wheelers). Crews using different approaches likely will detect different proportions of carcasses so searcher efficiency will be estimated for each search type/ major habitat (e.g., barrier beach, beach by marsh) combination. Searcher efficiency will be estimated by the following method. A different method may be used if more carcasses are present as described below.

Detection Rate (using carcasses placed on beaches by researcher)

Timing of Experiment. — While beach surveys are underway, searcher efficiency will be studied for a sample of crews searching beaches on foot and any additional methods used by shoreline carcass surveyors.

Sample Units.—Beaches within the larger sample selected for carcass surveys.

Carcass Placement. — A person who is not part of the beach survey crews will place whole and partially-scavenged bird carcasses of representative sizes and colors on selected beaches just before beach crews conduct a survey and mark each location with a GPS. Beach survey crews will not know when and where this will happen. The number of carcasses will be decided after initial data from beach searches are evaluated. The carcasses will be placed randomly along sample beaches at densities similar to those that are being found within the spill area.

Data Collection. — Beach searchers will conduct normal surveys and the number of carcasses found will be compared with the known numbers of placed carcasses. All carcasses will be recovered at the end of the day's experiments.

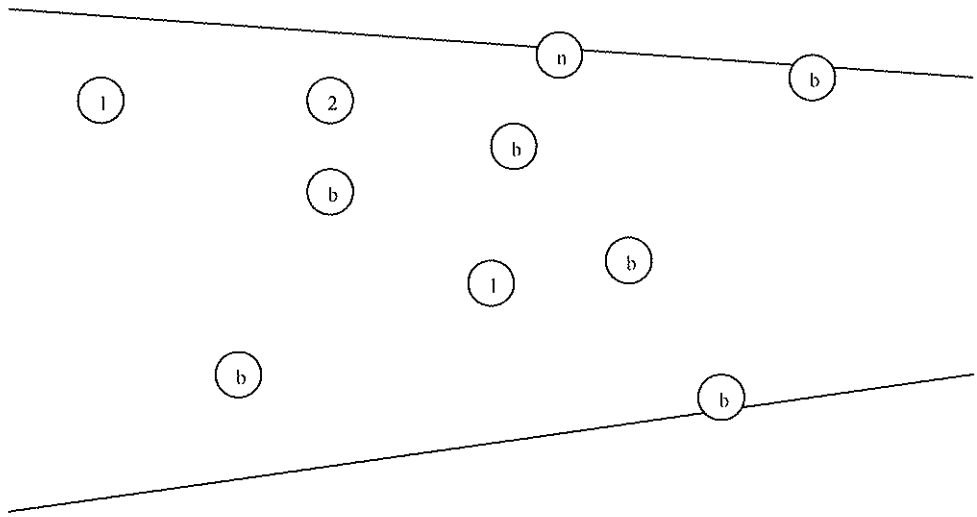
Data Analysis. — The ratio of carcasses found to carcasses remaining after the survey will be used to estimate searcher efficiency in a manner that controls for potential removal by scavengers during the experiment. Typically these ratios are calculated for small, medium, and large carcasses and are specific to the habitat and the configuration of the search team.

Detection Rates (using carcasses washing up on beaches)

Usually some carcasses will be missed during beach searches and it is important to estimate the average detection rate to extrapolate for total carcasses. Therefore, at least once each on stretches of sand beach and other substrates with carcasses (doesn't have to be the entire length of a beach but should include water to high-high tide line on the stretch selected) one team (or one observer if only 2 people are in the search team) would search the stretch while the other is not looking. The first team or observer subtly marks each carcass they find (e.g., with a small tag underneath the carcass or with a GPS). Then the second team or observer searches the stretch and marks each carcass they find.

Following the search by the second team or observer, both teams or observers go back over the stretch together and record for each carcass whether it was: 1. Marked by the first observer only, 2. Marked by the second observer only, 3. Marked by both observers, 4. Marked by neither observer but found after the initial searches. Data for carcasses would be recorded normally on beach survey forms but the results of the detection rate study would be attached.

An example follows:



Marked by the first team or observer (1) only: = 2
Marked by the second team or observer (2) only = 1
Marked by (b)oth teams or observers = 6
Marked by (n)either team or observer but found after the initial searches = 1

LITERATURE CITED

Byrd, G.V., J.H. Reynolds, and P.L. Flint. 2009. Persistence rates and detection probabilities of bird carcasses on beaches of Unalaska Island, Alaska, following the wreck of the M/V Selendang Ayu. Marine Ornithology 37:197-204.

Brownie, C. J.E. Hines, J.D. Nichols, K.H. Pollock and J.B. Hestbeck. 1993. Capture-recapture studies for multiple strata including non-Markovian transitions. Biometrica 49: 1173-1187.

Flint, P.L. and A.C. Fowler. 1998. A drift experiment to assess the influence of wind on recovery of oiled seabirds on St. Paul Island, Alaska. Marine Pollution Bulletin 36: 165-166.

Flint, P.L., A.C. Fowler, and R.F. Rockwell. 1999. Modeling bird mortality associated with the M/V Citrus oil spill off St. Paul Island, Alaska. Ecological Modeling 117: 261-267.

Ford, R.G. and M.A. Zafante. 2009. Scavenging of seabirds at oil spill sites in California and Oregon. Marine Ornithology 37:205-211.

Fowler, A.C. and P.L. Flint. 1997. Persistence rates and detection probabilities of oiled king eider carcasses on St. Paul Island, Alaska. Marine Pollution Bulletin 34: 522-526.

Nichols, J.D., J.E. Hines, J.R. Sauer, F.W. Fallow, J.E. Fallon, and P.J. Heglund. 2000. A double observer approach for estimating detection probability and abundance from point counts. The Auk 117: 393-408.

Page, G.W., H.R. Carter, and R.G. Ford. 1990. Numbers of seabirds killed or debilitated in the 1986 Apex Houston oil spill in central California. Studies in Avian Biology 14: 164-174.

Parrish, J.K. and P.D. Boersma. 1995. Muddy waters. American Scientist 83: 112-115.

Piatt, J.F., C.J. Lensink, W. Butler, M. Kendziorek, and D.R. Nysewander. 1990. Immediate impact of the 'Exxon Valdez' oil spill on marine birds. Auk 107: 387-397.

Piatt, J.F and T.I. Van Pelt. 1997. Mass-mortality of guillemots (*Uria aalge*) in the Gulf of Alaska in 1993. Marine Pollution Bulletin 34: 656-662.

Piatt, J.F. and R.G. Ford. 1996. How many seabirds were killed by the Exxon Valdez Oil Spill? American Fisheries Society Symposium 18: 712-719.

Van Pelt, T.I. and J.F. Piatt. 1995. Deposition and persistence of beachcast seabird carcasses. Marine Pollution Bulletin 30: 794-802.

Wells, P.G., J.N. Butler, and J.S. Hughes (eds). 1995. Exxon Valdez Oil Spill: Fate and Effects in Alaskan Waters. American Society for Testing and Materials.

Wiese, F.K. 2003. Sinking rates of dead birds: improving estimates of seabird mortality due to oiling. Marine Ornithology 31: 65-70.

****Approval of this work plan is for the purposes of obtaining data for the Natural Resource Damage Assessment. Parties each reserve its right to produce its own independent interpretation and analysis of any data collected pursuant to this work plan****

APPROVAL

Daniel Welsh (USFWS)
Trustee NRDA Bird Group Lead

Date 5/24/10

Louisiana Trustee Representative FOR ROLAND GUIDRY

Date 5/25/10

Ralph Markarian (Entrix)
Responsible Party Representative
(on behalf of British Petroleum)

Date 5/24/10