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6.2(d)

☐ UNCLASSIFIED ☒ CONFIDENTIAL ☐ SECRET ☐ _____ (specify)

3.3(h)(2)

REQUEST TO PROCUREMENT DIVISION FOR SERVICES

(other than property or building maintenance and repairs) ORN 484806

OFFICE/DIV/BR	REQUEST NO.	DATE OF REQUEST	I CERTIFY THAT FUNDS IN THE ESTIMATED AMOUNT OF $ 25,000 ARE AVAILABLE CHARGE TO FAN 262-4848
LS/ORD/DD/S&T	62-8013-73	June 1973	

PROJECT TITLE	PROJECT OR CONTACT OFFICER	EXTENSION	DATE
Migratory Bird Sensor System		B-3658 R-	6/5/73

CONTRACTOR (if known)	PROPOSAL NO. AND DATE	CONTRACT & TASK ORDER NO. (if known)
Department of Interior Division of Wildlife Research	Work Statement Attached	

TYPE OF SERVICE REQUESTED

- X RESEARCH/DEV
- GRANT
- REPAIR
- MAINTENANCE
- MODIFICATION

TRANSFER OF FUNDS TO OTHER GOVT. AGENCY *(specify if applicable)*: Dept. of Interior Div. Wildlife Res.

APPLICABLE ONLY TO REPAIRS AND MODIFICATIONS

TECHNICAL INSPECTION IS REQUIRED BY ☐ RECEIVING DEPOT T & I ☐ TECHNICAL MONITOR

☐ ITEMS TO BE PICKED UP OR ☐ SERVICES PERFORMED AT:

ITEMS TO BE REDELIVERED TO:

STERILITY	CONTRACT CLASSIFICATION	WORK CLASSIFICATION	HARDWARE CLASSIFICATION	REPORTS CLASSIFICATION
SC 0 / X SC 1 / SC 2	confidential	unclassified	unclassified	unclassified

SHORT SUBSTANTIVE TITLE AND/OR DESCRIPTION OF SERVICE TO BE PERFORMED

The Division of Wildlife Research, Department of Interior, will select Western Hemisphere migrating birds which are optimal analogs to birds known to migrate to or through specified Eurasian target areas. A statistical analysis will be made of computerized bird banding data to determine flyways and distribution patterns of the analog birds.

WARNING NOTICE
SENSITIVE INTELLIGENCE SOURCES AND METHODS INVOLVED

CLASSIFIED BY
EXEMPT FROM GENERAL DECLASSIFICATION SCHEDULE OF E. O. 11652, EXEMPTION CATEGORY: § 5B(1), (2), (3) or (4) (circle one or more)
AUTOMATICALLY DECLASSIFIED ON
TBD DET
(unless impossible, insert date or event)

DD/S&T# 1872-73/1

ORD 2382-73/1

(See reverse for specific information required on R&D requests.)

APPROVAL

DESIGNATION	SIGNATURE	DATE
D/ORD	Sayre Stevens	20 JUN 1973
DD/S&T	Carl E. Duckett	23 JUN 1973

PROCUREMENT DIVISION USE

DATE RECEIVED IN PD	RECORDED BY	SECTION ASSIGNED TO	NEGOTIATOR

FORM 2420 3-67 REPLACES FORMS 2420 AND 2416 WHICH MAY BE USED. ☐ UNCLASSIFIED ☒ CONFIDENTIAL ☐ SECRET ☐ _____ (specify) (B-12-58)

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☐ UNCLASSIFIED ☒ CONFIDENTIAL ATTACHMENTS OR STATEMENTS ☐ SECRET ☐ _____ (specify)

1. JUSTIFICATION FOR SOURCE SELECTION

This is a transfer of funds to another Government Agency. The Division of Wildlife Research, Department of Interior is the only organization possessing sufficient valid data to conduct the analysis required.

2. PROPOSAL

See attached.

3. DELIVERABLE ITEMS

REPORTS REQUIRED 5 NO. OF COPIES ☐ MONTHLY ☒ INTERIM Status ☐ QUARTERLY ☒ FINAL

HARDWARE *(state type and number)*

OTHER N/A

4. GFE REQUIRED

N/A

5. SPECIAL INSTRUCTIONS

The only classification of this work effort will be Agency association, hence, the SC-1 classification. It is of extreme importance that Agency support of Department of Interior activities not become public knowledge.

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Approved for Release: 2019/07/30 C06638333

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Attachment

STATEMENT OF WORK

I Evaluate existing report from Phase I contract in terms of:

a. species selection

b. characteristics of selected species

II Update or supplement existing report in terms of a and b above.

III The sponsor will designate target area. Western Hemisphere analogues to Eurasian birds known to frequent the target area will be selected. The Wildlife Research Division of the Department of Interior will evaluate existing bird banding data to provide statistical pattern analysis of banding and release (initial) major and secondary flyways and distribution at destination. Relevant variables would ~~be~~ include, but not be limited to, age, sex, flight time, nesting, molting, and other relevant factors available from the computerized bird banding records.

IV On the basis of available knowledge concerning migratory flyways, nesting, and wintering habits of birds visiting the target area, the contractor will indicate probable similarities and differences that might be expected between birds utilized in the western analog analysis and the same species in the target area.

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SENSITIVE NOTICE
SENSITIVE INTELLIGENCE SOURCES
AND METHODS INVOLVED

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Attachment #1

UTILIZATION OF MIGRATORY BIRDS AS BIOSENSORS

A presentation was made to the PRB concerning the use of migratory birds as direct in vivo sensors or as sensor emplacement vehicles. The background of the original ORD research effort in this area, which involved migratory characteristics of selected bird species nesting or wintering in the vicinity of ten target areas, was outlined. Approval was requested for transfer of funds to the Department of Interior, in the amount of $25K, for an analysis of existing bird banding data to establish the flight and residing distribution patterns of western analogs to the Eurasian birds. The PRB recommended that prior to approval of fund expenditures, a meeting be held with cognizant personnel to discuss specific target requirements, energy, or substances to be detected and technical approaches for accomplishment.

As per PRB request, a meeting was held 13 April 1973 to discuss the questions posed above. It was the concensus of opinion that, for the present time, the project goal should not include utilization of birds as package emplacement vehicles, but rather as in vivo biological sensors. Further, it was decided that CW degradation products would constitute the signal substance and that CW test area at Shikhany would serve as the designated target.

Subsequent to the above discussion, the question arose as to the probability of in vivo detection of CW signatures at the concentrations to which the birds would be exposed. Although specific tests have not been directed toward the solution of this particular problem, the available evidence, as cited below, indicates a high probability of detection at the concentrations to be expected. In addition, numerous bird species migrate to the Shikhany Volga River Basin and are accessible from undenied areas. This general question may best be approached in terms of its components, i.e., in view of normal safety and security precautions, can we expect CW products in the target area which will be ingested by the migrating birds;

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UTILIZATION OF MIGRATORY BIRDS AS BIOSENSORS (continued)

are the CW degradation products retained in the organism and detectable by available techniques; and do we have access to birds migrating from the target area.

Considering these component questions in sequence we may ask:

(a) Can we expect CW contamination in the target area?

Assuming other countries exercise safety and security precautions equal to that of the U.S., available evidence indicates a high probability for the presence of CW material or degradation products. This statement is substantiated by the current LS/ORD research program: organophosphorus compounds were detected in soil samples surrounding a VX plant in Newport, Indiana, which has been inoperational for over a four-year period; soil samples taken from Rocky Mountain Arsenal showed GB traces four years after test cessation; recent analysis of soil and water samples from the Cold Creek Organic plant in Alabama indicated contamination in surrounding areas and more than a mile downstream from the plant. FI/DDP are sufficiently interested in this finding to warrant possible application to [redacted] R&D operations. Inasmuch as the Shikhany target is a CW test area, as opposed to a production or storage area, one would expect significant levels of CW material.

(b) Are the CW products of sufficient concentration to be retained in the organism and be detectable by available analytic techniques?

Voluminous research data from the Environmental Protection Agency and the Department of Interior indicate that birds and other wildlife absorb and retain infinitesimal amounts of toxic products which are readily detectable by x-ray spectrometric and emission spectrometric analysis, neutron activation and atomic absorption techniques, as well as via the more traditional wet chemistry laboratory analysis. The extent to which the organisms

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environment provides detectable chemical clues to its habitat is evidenced by an investigation which demonstrated that coho salmon, "had natural chemical tags that could be directly related to their rivers of origin."[1] Numerous other studies are cited in the literature which demonstrate the capability to differentiate the habitat of identical wildlife species on the basis of tissue analysis. For instance, aligators reared in Florida show a different neutron activation signature than those reared in Louisana; two populations of snow geese in the Hudson Bay area could be differentiated on the basis of emission spectrometric analysis; Oregon geese can be differentiated from Colorado geese on the basis of manganeese content of the liver. An organism is what it has eaten. Most of the research relevant to our immediate CW problem is concerned with the effects of insecticides and pesticides on wildlife. These compounds are detectable at levels of 6-10 parts per million in the bird population. Examples of such research findings are as follows:

> In a general survey of the pesticide pollution problem it was concluded that, "all mallards, black ducks, and starlings tested in recent years contained DDT or its derivitives DDE or DDD. Starlings carried a much heavier concentration, probably reflecting their feeding habits."[2] In an experimental program at the Patuxent River Wildlife Research Station, sparrow hawks were fed dietary dosages of DDT and dieldrin and "for the first time provided statistically demonstrable proof of a cause and effect relationship between ingestion of these pesticides and eggshell thinning and associated deletious effects on reproduction."[3] The Denver Wildlife Research Station reports "Semidomesticated mallards were treated with 0,4, 10, and 30 parts per million of dieldrin to learn if the pesticide would effect the chromosomes of bone marrow and lymphocytes. The mitotic index, the number of cells undergoing mitosis per 1000 cells examined, was reduced more than five times in birds treated with 30 ppm dieldrin."[4] Since the publication of The Silent Spring

Approved for Release: 2019/07/30 C06638333

Approved for Release: 2019/07/30 C06638333

and the growth of the ecology movement, the literature is saturated with evidence of the lasting effects of minute quantities of chemical substances on wildlife health and survival. Of more immediate relevance to the CW problem are studies concerned with the organophosphate-type pesticides. Although the literature is considerably less voluminous in this area, there is evidence of bird uptake, retention, and laboratory detectability of the substances. The effects of organochlorine and organophosphate pesticides on the ring necked pheasant population were studied in Canyon County, Idaho. Exposed to very minute quantities of the material, the birds exhibited symptoms of organophosphate poisoning and modified cholinesterase levels.[5] A study in Dawson County, Nebraska, showed that a mere eight fluid ounces of malathion (an organo-phosphate pesticide) dispersed over an acre of land had a significant detrimental effect on the wildlife of the area.[6] A study is currently underway at the Patuxent River Wildlife Research Station to determine the relative lethal toxicities of ninety different pesticides, including the organophorphous compounds, on four species of birds. Initial data show detectable signatures of the organophorphous compounds.[7] A preliminary study with [redacted], sponsored by LS/ORD, in which mice were exposed to CW degradation products substanciates the Bureau of Wildlife research findings.

The research programs cited above were not directed toward the problem of CW detection. To arrive at a more definitive conclusion, a specific project should be initiated in which target analog birds are provided dietary intake of appropriate CW substances in concentrations that might be expected at the Shikhany test site. Appropriate chemical analysis over varying periods of time would then demonstrate the presence and degree of CW signatures existing in the organism. However, considering the chemical similarity of the pesticide-insecticide compounds with the CW agents, it is logical to assume from existing data that migratory birds residing in the target area would incorporate CW signatures in detectable amounts and provide a qualitative and quantitative index of CW activity at that site.

Approved for Release: 2019/07/30 C06638333

Approved for Release: 2019/07/30 C06638333

(c) Species and distribution of birds in target area and access for analysis during migratory cycle --

The above question was posed to the Office of Basic and Geographic Intelligence. Their response constitutes Attachment II. In brief, large numbers of migratory birds temporarily reside in the Shikhany area. Considering the nature of the terrain, a river basin with large reservoirs, one would expect a significant bird population. Fortunately, many of the species present are those for which western analog bird banding data exists, i.e., mallard, teal, merganser, osprey, etc. During the winter months, the birds migrate to the warmer climates of the Caspian Sea, Iran, Iraq, Turkey, India, and other undenied areas in which they would be accessible for capture. Many of the species are hunted birds and are of concern to international wildlife protection groups so that capture for "tagging" or biological study should not arouse undue concern.

4. The preceding discussion of available research data indicates that a migratory bird biosensor system would be feasible in terms of probability of CW signature detection. However, as stated previously, a definitive answer to the question would require definitive research. This does not imply that the proposed migratory distribution pattern analysis should be postponed to await the results of a long-term CW signature study. Although both types of data are required for the specific Shikhany CW project, bird migration pattern analysis has many more applications than this particular requirement. It is a fact of nature that migratory birds constitute a multitude of ready-made vehicles which circumvent the globe in predictable patterns and are readily available for intelligence utilization by ourselves and others. It would seem essential that an R&D organization, anticipating future requirements, should have available data concerning the distribution pattern characteristics of selected species. Such data would be applicable to future intelligence requirements in South America, Africa, or other parts of the world not currently considered as threats to our national security. The development of atomic weapon capability in the Third World areas may produce intelligence requirements that could be

Approved for Release: 2019/07/30 C06638333

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supported through signature analysis of migratory birds. The voluminous research programs conducted by the AEC contain positive proof of wildlife adsorption of radio active materials. Utilizing immunological memory techniques, it is quite possible that migratory birds could be used to detect the presence of any substance to which the bird develops an antibody defense system. Probably the most significant threat to our national welfare would be the use of migratory birds as vehicles for the spread of human, livestock, and plant diseases. A migrating bird is the ideal host and vehicle for such purposes. Considering the tremendous influx of seasonally migrating birds into the U.S. from Central and South America, it would seem essential that the CIA establish the techniques and plans for selected bird distribution pattern analysis to support countermeasures for such a threat. If we delay analysis of existing data for intelligence purposes until the threat has materialized, it will be too late to institute effective countermeasures. If such a hostile action has not been anticipated by the Agency and an effective detection and countermeasures plan placed on file in the archives, immediate program action should be initiated regardless of the relative merit of the minor $25K project support requested for the subject investigation.

5. The basic and primary consideration regarding the use of migratory birds as emplacement vehicles; as biosensors for nuclear, CW, and other products; or as hosts and transport vehicles for bacterial dissemination is the reliability of the bird vehicle. Such questions as the following must be addressed: how many birds that depart from point A arrive at point B? What proportion return to point A? What is the bird distribution pattern around the target area? What is the mortality and distribution pattern along the flyway from point A to point B? Knowing the migratory paths and the statistical distribution pattern in the target area, how many birds would have to be captured and analyzed to provide a reliable index of biological signatures? Obviously, the proposed project will not answer all of these questions for all potential requirements. However, a statistical pattern analysis of the existing Department of Interior bird banding computerized records, utilizing western analogs for the Shikhany target area, will provide crucial data concerning migratory bird reliability as sensor vehicles to meet this requirement. In addition, such a study will provide data and a model for determination of migratory bird utilization to serve future requirements or to counteract such action by others.

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