

I. Executive Summary

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Project Title: Analysis of Sequential Fall Flooding of Wetland and Rice Habitat in the Sacramento Valley

Applicant: Ducks Unlimited, Inc.

Project Description: This project will analyze fall flooding patterns of seasonal wetlands and rice in the Sacramento Valley. Modeling will be performed to estimate area and distribution of shorebird and waterfowl populations under various hydrologic conditions. This project will consist of three phases: 1) analysis of fall flooding 1986-96 (based on single satellite scene each year); 2) analysis of seasonal variability in wetland/rice habitat (from August 1996 – March 1997); 3) based on flooding chronologies, modeling of potential shorebird and waterfowl population distributions across the Sacramento Valley, under dry, medium, and wet winter hydrologic conditions.

Approach/Tasks/Schedule: This project will be completed by: acquiring and classifying Landsat Thematic Mapper satellite imagery and digitally recording the location and extent of fall and winter flooding. The project will begin in 1997 and will be completed by the end of 1999. Products will be digital maps of the Sacramento basins, tables and figures describing flood chronologies, and interactive GIS models of shorebird and waterfowl distributions based on hydrologic conditions.

Justification: This project will reveal timing and extent of seasonal fall flooding by specific location and basin within the Sacramento Valley. These data will provide better management capabilities for waterbird habitat under various hydrologic years, as well as potentially reduce diversions where waterbird habitat needs are not high. This may have important implications for native fish species, especially during dry years.

Budget Costs and Third Party Impacts: Total funding requested is for \$435,410. Partial cost break down includes (1) analysis of fall flooding (1986-1996): \$138,270; (2) analysis of flooding Aug 96 – March 97: \$119,200; (3) modeling of waterbird distributions under varying hydrologic patterns: \$150,980; (4) final products: \$26,960.

Applicant Qualifications: Ducks Unlimited is a nationally recognized authority on wetlands and waterbird use. The Western Regional Office has full GIS capabilities and has mapped over 70 million acres of habitat in California, Alaska, the Pacific Northwest, and Canada in the last 10 years.

Monitoring and Data Evaluation: This project is an evaluation project and accuracy of the mapping will be assessed.

Support/Coordination: Previous winter rice habitat mapping has been supported by Bureau of Reclamation, Central Valley Habitat Joint Venture, California Department of Fish and Game, EPA, U.S. Fish and Wildlife Service, NASA, and California Rice Industry Association. These data sets will be used with other analyzed images for the

model development. The shorebird macro-habitat model will be conducted by Drs. Michael Reed and Chris Elphick at Tufts University.

II. Title Page

Title of Project:

Analysis of Sequential Fall Flooding of Wetland and Rice Habitat in the Sacramento Valley

Name of Applicant:

Ducks Unlimited, Inc.
Western Regional Office
3074 Gold Canal Drive
Rancho Cordova, California 95670-6116
Tel (916) 852-2000 Fax (916) 852-2200 email: wroducks@gte.net

Principal Investigators: Robb Macleod, GIS Manager
Frederic Reid, Ph.D., Director of Conservation Planning

Type of Organization and Tax Status: Non Profit (501-C3)

Tax Identification Number: 13-5643799

Participants: Ducks Unlimited and Tufts University

RFP Project Type: Monitoring, Assessment, and Reporting

III. Project Description

Project Description and Approach

Drastic reductions in the natural wetlands of the Central Valley have stimulated efforts to restore seasonal wetlands and enhance agricultural land to provide habitat for waterfowl and other wildlife. The winter flooding of rice fields and other crop types has played an increasingly important role in providing supplementary winter habitat. Resource agencies, conservation organizations, local governments, as well as agricultural interests require accurate, up-to-date information on the location and extent of the seasonally flooded habitat for use in planning, protecting and mitigating land use actions and the impacts to wildlife. However, the highly variable nature of the seasonally flooded habitat makes it difficult to quantify and monitor. Flooded habitat changes in response to precipitation, management decisions, availability of water, and agricultural markets. Differences are observed from one year to another as well as from week to week within a single fall/winter season. In order to understand the impact of these diversions on the Delta and other waterbodies within the Sacramento watershed, information is needed on quantity and location of water that is diverted. The purpose of this project is to use satellite imagery to map and analyze changes in the location and extent of fall flooding in the Sacramento Valley and northern Delta. This project will consist of 3 phases:

1. **Analysis of Fall Flooding 1986-1996** – One satellite image collected during the early fall (Oct-Nov) of each year from 1986 to 1996 will be acquired and classified to identify the location and extent of fall flooding. This period will be indicative of diverted water, prior to winter rain period December – February. The resulting digital maps will be used for change detection to identify general trends and changes in the location and extent of seasonally flooded habitat in the Sacramento Valley and northern Delta from 1986-1996.
2. **Analysis of Seasonal Variability in Availability of Wetland Habitat (August 1996 – March 1997)** - Thirteen satellite images collected approximately every two weeks from August 1996 to March 1997 will be acquired and processed to assess changes in the availability of flooded habitat over the course of one fall/winter season. In addition, precipitation data from the fall/winter of 1996-97 will be compiled and analyzed in conjunction with the classified 1996-97 winter imagery to assess the role of natural vs managed flooding in the availability and location of seasonally flooded habitat.
3. **Combining depletion modeling to predict how changes in food supply are associated with different management methods with hydrologic patterns will reveal strategies to maximize waterbird (waterfowl and shorebird) habitat yet minimize diversions where waterbird use is low.**

For each phase the winter satellite imagery will be classified to identify flooded vs non-flooded land cover. A satellite image from each corresponding summer will also be classified to produce a map of general land cover classes (rice, other agriculture,

wetlands, ...). The summer land cover map will then be combined in a GIS overlay procedure with each of the classified winter images to apply land cover / habitat labels to each flooded area based on the pre-flooding land cover class. This will provide for the separation of classes such as seasonally flooded wetlands from seasonally flooded agricultural lands and will therefore provide a more accurate description of the type and quality of habitat that is available. Change detection will then be performed with each sequential pair of classified images to determine the extent of change in winter flooded habitat from year to year (Phase 1) and within one year (Phase 2). As part of Phase 2, daily precipitation totals will be compiled and compared with the changes in flooded habitat to evaluate the role of natural vs managed flooding in the availability of seasonally flooded habitat. Waterbird distribution information will be modeled against hydrologic patterns and compared in sensitivity analyses to judge model behavior.

Location and/or geographic boundaries of project

This project will focus on the Sacramento Valley, the major rice producing area of the Central Valley. Specifically, the project area will be defined by the 300-foot contour interval to the east and west and will extend from Chico in the north to the upper reaches of the Sacramento/San Joaquin River Delta in the south. In all, the project area will encompass over two million acres and will include all or portions of six of the Central Valley Habitat Joint Venture basins. (See attached figure.)

Expected benefits

There is concern that diversions of fall water may impact native fisheries runs. In response to that concern, this project will provide data on the extent and sources of fall flooding in agriculture and seasonal wetlands in the Sacramento Valley. Avian species that use historic floodplain habitat include a variety of waterbirds, numbering over sixty species. Species of major use include: Northern pintail, white-fronted goose, sandhill crane, long-billed dowitcher, dunlin, and western sandpiper. The habitats created by this flooding include flooded rice and seasonal and semi-permanent wetlands. The benefits will be provided in terms of a better understanding of where and when such fall flooding occurs.

Background and Biological/Technical Justification

Satellite imagery provides a relative inexpensive means for inventorying seasonally flooded habitat and monitoring changes in it over time. Several past Ducks Unlimited projects have involved mapping seasonally flooded habitat using one date of winter imagery. While useful in a general sense, these past mapping efforts need to be analyzed within a broader context to determine long-term trends and changes in the availability of seasonally flooded habitat. Furthermore, these single-date projects have been unable to take into account the within-season variability in habitat availability caused by changes in precipitation, regional farming trends, availability of water, and other factors. Thus, it is difficult to get a true picture of the quantity and quality of habitat that is available for waterfowl and other wetland-dependent wildlife. This project proposes to apply the

methods used in past projects to imagery collected from multiple years and multiple dates within a single year for a more detailed analysis of seasonally flooded habitat. The results of this project will provide for a thorough analysis of variability in the availability and quality of winter flooded habitat. With this information, resource managers can identify trends in the availability of seasonally flooded habitat and identify areas of inadequate habitat that can be targeted for restoration and enhancement efforts.

Proposed Scope of Work

Phase 1: Analysis of Fall Flooding 1986-1996

- a) Data Acquisition – Eleven Landsat Thematic Mapper satellite images from late October/November 1986 to 1996 will be acquired for the project. This date was selected in order to reduce the effect of flooding from winter rainfall and thus highlight flooding due to fall water diversions. Landsat Thematic Mapper satellite imagery is collected approximately every 16 days and has a pixel resolution of 30 meters squared. Data is collected from 7 different bands of the spectrum, including 3 near-infrared bands which are particularly sensitive to water and soil moisture. Table 1 lists the dates of imagery that will be acquired.

Table 1. Phase 1 Imagery

Nov. 16, 1986	Oct 18, 1987	Oct 20, 1988	Nov 16, 1989
Oct 26, 1990	Nov 22, 1991	Oct 15, 1992	Nov 19, 1993
Nov 22, 1994	Nov 24, 1995	Nov 11, 1996	

- b) Image Processing - All images will be loaded, checked for data quality and registration, and subset to the project area. The three NIR bands will then be subset and classified using an unsupervised classification approach to produce a map of flooded vs non-flooded land cover for each of the 11 dates of fall imagery.
- c) Change Detection and Analysis - After the individual fall images have been classified, change detection will be performed to determine the location and extent of change in flooded habitat between each sequential pair of classified images. The change in acreage will be tallied and reported for each basin. In addition, hardcopy maps and an ArcView GIS project will be produced to illustrate the changes in fall flooding patterns from 1986 to 1996.

Phase 2: Analysis of Seasonal Variability in Availability of Wetland Habitat (Oct 1996 – March 1997)

- a) Data Acquisition - Ten Landsat Thematic Mapper satellite images and 2 RADARSAT radar images from August 1996 to March 1997 will be acquired for the project. Radar can penetrate cloud-cover and therefore will be used to fill the gaps when cloud-free Thematic Mapper imagery was not available. Radar is also extremely

sensitive to the presence of water. Table 2 lists the imagery that will be acquired for this project.

Table 2. 1996/1997 Imagery to be Acquired

<u>Date</u>	<u>Satellite Sensor</u>
August 7, 1996	Thematic Mapper (TM)
September 8, 1996	TM
October 10, 1996	TM
October 26, 1996	TM
November 11, 1996	TM
November 27, 1996	TM
December 13, 1996	TM
January 14, 1997	TM
January 28, 1997	RADARSAT
February 8, 1997	RADARSAT
February 15, 1997	TM
March 3, 1997	TM

b) Image Processing - The fall and winter TM images will be processed as described above in Phase 1 to produce a map of flooded vs non-flooded land cover for each date of imagery. The radar images, which consist of a single band, will be filtered to reduce the speckle that is inherent in radar data and then level-sliced to identify flooded vs non-flooded land cover. In addition, the August 1996 TM image will be classified into 8-10 broad classes representing pre-flood land cover. Once the summer image has been classified, it will be overlaid with the winter flooding images to apply a land cover label to each flooded area in order to separate seasonally flooded wetlands from seasonally flooded agriculture or other flooded land covers.

c) Change Detection and Analysis - Change detection will be performed to determine the location and extent of change in flooded habitat between each sequential pair of classified images. The change in acreage will be tallied and reported for each basin. In addition, hardcopy maps and an ArcView GIS project will be produced to illustrate the changes over the course of the season. The result will be a picture of the within-season variability of flooded habitat for the 1996-1997 winter season.

d) Precipitation Analysis - Daily precipitation data from the winter of 1996-1997 will be compiled and compared with the changes in flooded habitat to evaluate the role of rainfall vs diverted water in the availability of seasonally flooded habitat.

Phase 3: Waterfowl and Shorebird Distribution Modeling

Modeling of waterfowl and shorebird populations to energetic data from habitat and hydrologic patterns under various water years. A landscape spatial model will be the result.

Phase 4: Final Products

A number of final products will be prepared to describe and illustrate the results of the Phase 1-3 analyses. The final products will include the following:

- Digital GIS datalayer of flooded vs non-flooded land cover for each of the individual images classified for Phase 1 and Phase 2.
- A multimedia presentation illustrating the results of the change detection performed in Phase 1 and Phase 2.
- Acreage statistics and hardcopy maps illustrating the changes.
- Models for the relationship of waterbird abundance and hydrologic features.
- A final report describing the procedures used and the results of the analysis.

Written quarterly reports on project progress and expenses to date will be provided. These reports will consist of a brief description of the project status, a list of completed task, and an assessment of progress in meeting the scheduled deadlines.

Monitoring and Data Evaluation

This project will provide an evaluation of fall and winter flooding patterns in the Sacramento Valley as well as monitoring of potential waterbird habitat.

Implementability

This project will have substantial outreach use. All software licenses are in force. DU has an excellent track record in timely completion of projects. Useable satellite scenes are documented.

IV. Costs and Schedules to Implement Proposed Project

Budget Costs

Phase 1: Analysis of Flooding 1986-1996

Project Phase and Tasks	Direct Labor Days	Direct Salary & Benefits	Overhead Labor	Service Contracts	Material & Acquisition Contracts	Misc & other Direct Costs	Total Cost
1a) Data Acquisition	10	\$2,210			\$77,580		\$79,790
1b) Image Classification	185	\$40,865			\$6,475	\$1,000	\$48,360
1c) Change Detection and Analysis	20	\$4,420			\$700		\$5,120
Subtotal			\$5,000				\$138,270

Phase 2: Analysis of Flooding Aug 1996 - March 1997

Project Phase and Tasks	Direct Labor Days	Direct Salary & Benefits	Overhead Labor	Service Contracts	Material & Acquisition Contracts	Misc & other Direct Costs	Total Cost
2a) Data Acquisition	10	\$2,210			\$55,500		\$57,710
2b) Image Classification	180	\$39,150			\$5,600	\$1,000	\$45,750
2c) Change Detection and Analysis	20	\$4,420			\$700	\$500	\$5,820
2d) Compile Precipitation Data	10	\$2,210			\$350		\$2,560
2e) Precipitation Analysis	10	\$2,210			\$350		\$2,560
Subtotal			\$5,000				\$118,200

Phase 3: Modeling of Waterbird Distribution Under Varying Hydrologic Patterns

Project Phase and Tasks	Direct Labor Days	Direct Salary & Benefits	Overhead Labor	Service Contracts	Material & Acquisition Contracts	Misc & other Direct Costs	Total Cost
3a) Shorebird Pop. Modeling	220	\$45,200			\$14,200	\$3,000	\$62,400
3b) Waterfowl Pop. Modeling	220	\$45,200			\$13,900	\$3,500	\$62,600
3c) Develop Multimedia Presentation	40	\$12,630			\$3,050		\$15,680
Subtotal			\$10,300				\$158,980

Phase 3: Final Products

Project Phase and Tasks	Direct Labor Days	Direct Salary & Benefits	Overhead Labor	Service Contracts	Material & Acquisition Contracts	Misc & other Direct Costs	Total Cost
4a) Prepare imagery for delivery	10	\$2,210			\$350		\$2,560
4b) Develop Multimedia Presentation	30	\$6,630			\$3,050		\$9,680
4c) Produce Report for Publication	20	\$6,400			\$8,800		\$13,200
Subtotal			\$1,520				\$26,960

TOTAL \$435,410

Schedule Milestones:

Project Phase and Task	Start Date	Completion Date
Data Acquisition	Jan-98	Mar-98
Phase 1: Analysis of Fall Flooding 1986-1996	Mar-98	Dec-98
Phase 2: Analysis of Flooding Oct 1996 - Mar 1997	Jan-99	Aug-99
Phase 3: Waterbird and Shorebird Pop. Modeling	Jan-98	Mar-99
Final Products	Sep-99	Dec-99

V. Applicant Qualifications

Ducks Unlimited, Inc. has been involved in GIS/Remote Sensing projects for over 10 years. Initially, these efforts concentrated on using satellite imagery to inventory and monitor waterfowl habitat. Notably, DU developed sophisticated software to inventory and compile wetland acreage statistics for the Prairie Potholes region using over 30 Landsat Thematic Mapper scenes. More recently, DU has directed the mapping of over 40 million acres of landcover in Alaska as well as mapping the whole Central Valley of California using a combination of summer and winter satellite imagery. Currently, DU is continuing to inventory landcover throughout the United States and is working in cooperation with other agencies to develop GIS databases and models for use in identifying and prioritizing potential wetland restoration and enhancement sites.

Currently, DU has six full time GIS/Remote Sensing Analysts and one GIS intern on staff with a wide range of skills and extensive project experience. This experience includes all aspects of data acquisition, field sampling, GIS database design, image processing, GIS modeling, and programming. To support their work, the DU GIS section is equipped with state-of-the-art hardware and software, including 5 NT workstations, 2 SUN UNIX workstations, a large-scale inkjet plotter, a full-size digitizing tablet, and writable CD-ROM drives. Software includes ARC/INFO and ArcView GIS software, ERDAS IMAGINE image processing software, Sybase SQL Anywhere database software, and Visual Basic programming software. These resources will be available as needed for the project.

The staffing for this project will consist of Director of Conservation Planning, GIS Manager, Project Manager/Analyst, Remote Sensing Analyst/Programmer, a GIS intern, and fourteen biological support staff. The Director of Conservation Planning will direct the biological support for the project. The GIS Manager will oversee the contract and administrative aspects of the project, and will provide oversight for the general project design and implementation. The Project Manager will be responsible for the specifics of the project design and for successful guidance of the project to completion. The Remote Sensing Analyst/Programmer and GIS intern will work under the direct supervision of the Project Manager.

Frederic Reid - Ph.D., Director of Conservation Planning. Dr. Reid has nearly 20 years experience with wetland and waterbird management, especially on migration and wintering areas. He has coordinated biological aspects of multiple GIS projects in Alaska and California for the past six years. He has published over 50 manuscripts on wetland related issues and he has extensive experience in the Central Valley system.

Robb Macleod - GIS Manager. Mr. Macleod oversees all the GIS personnel and projects in the DU Western Regional Office. He has over five years experience in GIS and

Remote Sensing. Mr. Macleod has managed and completed six landcover projects in Alaska and California covering over 30 million acres. He has extensive field experience and has used numerous types of remotely sensed data, including: Landsat TM, SPOT XS, ERS-1 RADAR, ADAR digital airborne, and CIR aerial photography.

Ruth Spell - Project Manager. Ms. Spell has worked with DU on GIS and Remote Sensing projects for the past 3.5 years. Her experience includes land cover mapping of the Lower Columbia River basin, Willapa Bay, WA, and Grays Harbor, WA. She was the project manager and senior analyst on a project developed in joint participation with the California Resources Agency, California Department of Fish and Game, Wildlife Conservation Board, and US Bureau of Reclamation to develop a wetland and riparian inventory for the Central Valley of CA using satellite imagery. Most recently, she has been involved in the development of a Wetlands Restoration Site Suitability model using Visual Basic programming language and ArcView GIS software.

Jing Huang – Remote Sensing Analyst/Programmer. Mr. Huang is in the process of completing a Ph.D. in Forest Ecology from Oregon State University. His work there included in-depth remote sensing and GIS research and analysis as well as extensive programming experience in support of that work. Mr. Huang has over six years experience in the remote sensing and GIS field with extensive experience with spatial database design and landscape modeling. He will provide the primary programming expertise for the proposed project.

Michael Reed, Ph.D. – Asst. Professor, Tufts University. Dr. Reed has nearly 20 years experience with waterbirds and their habitats. He has over 50 published papers, extensive experience on western wetland complexes, and excellent quantitative skills.

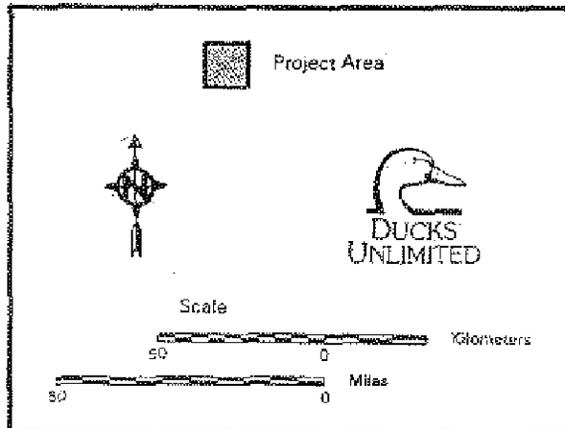
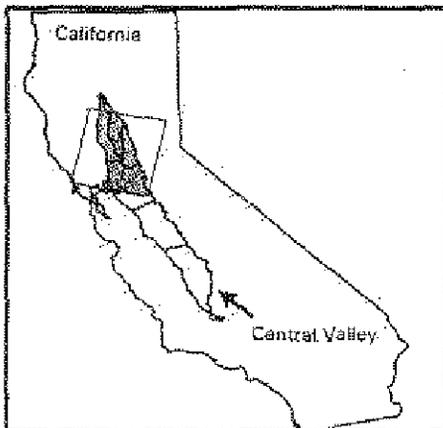
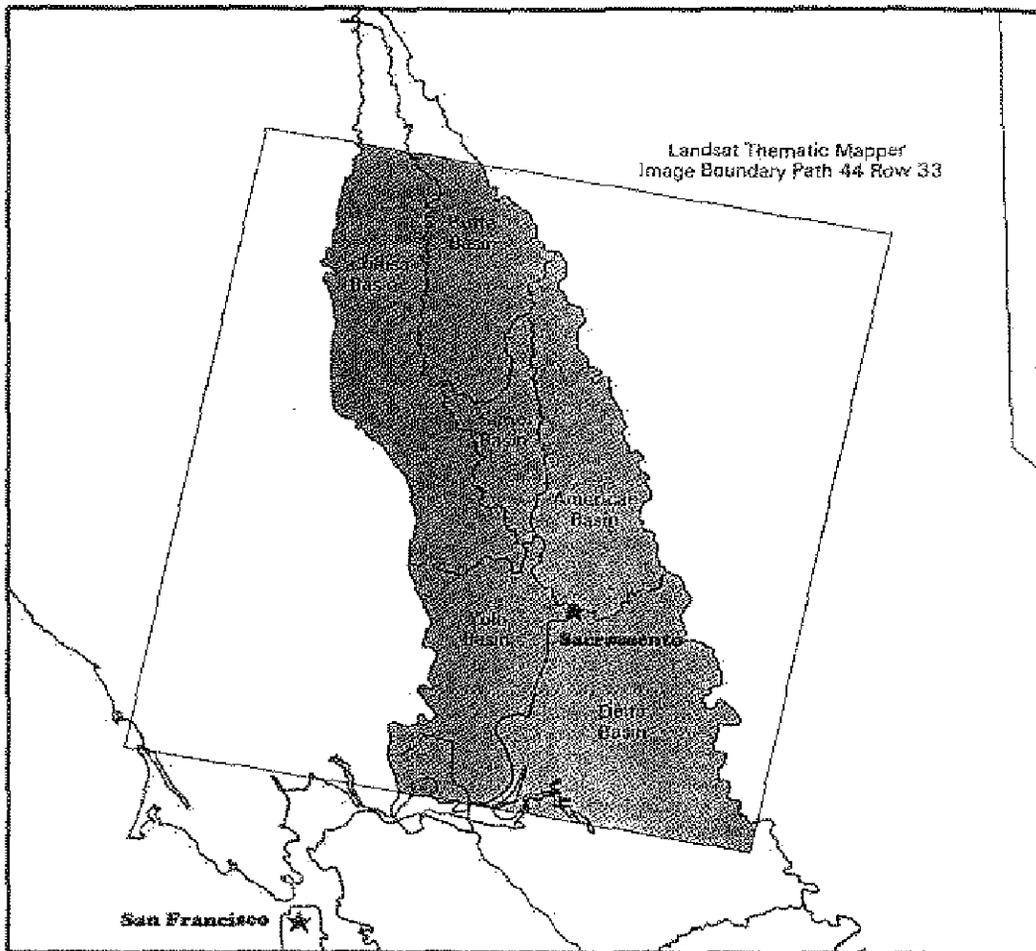
Chris S. Elphick, Ph.D. – Post-Doc., Tufts University. Dr. Elphick has extensive experience in landscape-level analysis of bird distribution and computer modeling of population dynamics.

Mark Petrie, Ph.D. – Research Scientist, DU. Dr. Petrie is an accomplished researcher in waterfowl energetics and wetland ecology. He has modeled waterfowl distribution with habitat resource data and flooding regimes.

VI. Compliance with Standard Terms and Conditions

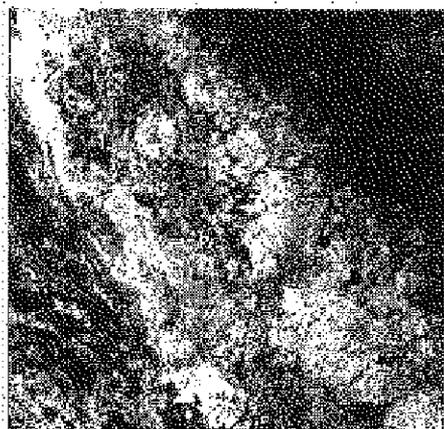
DU has administered multiple government contracts with applicable compliance standards.

Analysis of Sequential Fall Flooding of Wetland and Rice Habitat in the Sacramento Valley

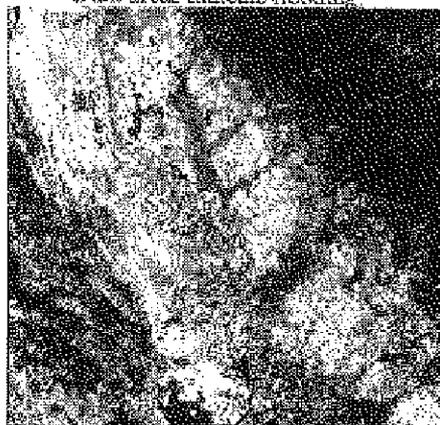


Landsat Thematic Mapper Scenes - Sacramento Valley

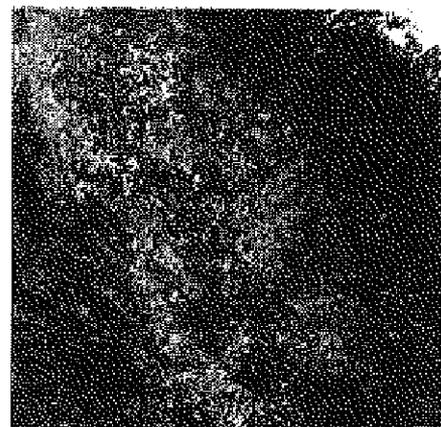
Dark areas indicate flooding



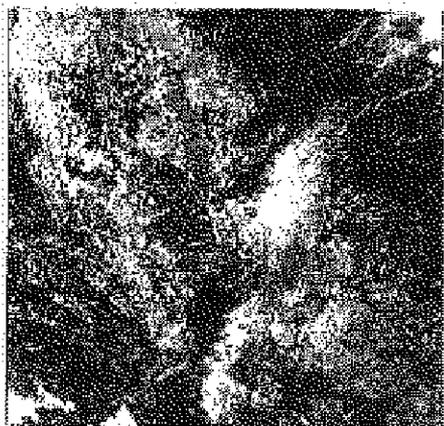
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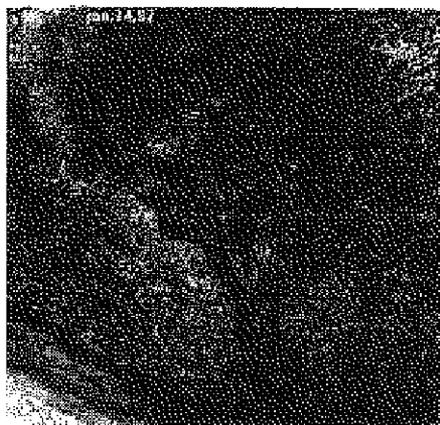
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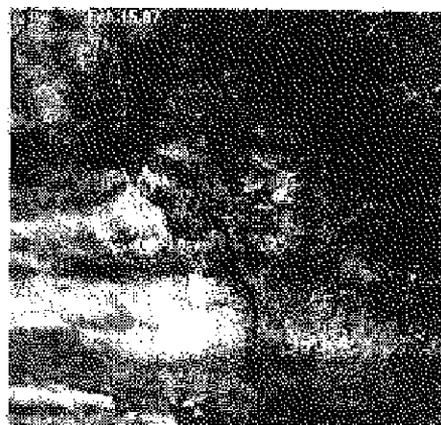
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2/15/97

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restoration and perpetuation of wild ducks and other wild waterfowl on the North American continent; and no part of the income from the same shall inure to the benefit of any private shareholder or individual; provided, however, that reasonable compensation may be paid to an officer, member, or employee for services actually rendered the corporation.

FIFTH: The property of the officers, trustees and members of this corporation shall not be subject to or chargeable with the payment of corporate debts or obligations to any extent whatsoever.

SIXTH: The Board of Trustees shall have the power to make, alter, change, and amend by-laws for the government of the corporation and for the admission and withdrawal of members thereof.

SEVENTH: The meetings of the members and of the Trustees of this corporation may be held in the District of Columbia, or elsewhere within or without the confines of the United States or its possessions.

EIGHTH: The number of Trustees of the first Board of Trustees of this Corporation shall be FIVE, with power to change or increase and add to their number in accordance with provisions of the By-Laws.

The Board of Trustees shall have the power to appoint from their own members an Executive Committee consisting of all of the officers of the corporation including all vice presidents, all living past presidents and such other persons as may be designated by the Board of Trustees, five of whom, or such other number as may be specified by the By-Laws, shall constitute a quorum, who, when the Board of Trustees is not in session, shall have and shall exercise all the powers of the Board of Trustees, unless otherwise provided in the corporation's By-Laws. The Board of Trustees shall elect at its first meeting from its own members a President, and shall appoint a Treasurer and a Secretary and such other officers as may be provided for by the By-Laws, who need not be members of the Board. The Board of Trustees shall at such meeting select from their number, one-fifth of the number thereof to serve for one year, one-fifth to serve for two years, one-fifth to serve for three years, one-fifth to serve for four years, one-fifth to serve for five years; and each subsequent election of Trustees shall be for a period of one year or until their successors are duly elected and qualify. Vacancies occurring by death, resignation, or otherwise shall be filled by the remaining Trustees in such manner as the By-Laws shall prescribe and the persons so elected shall thereupon become Trustees.

NINTH: The names and post-office addresses of the Trustees until the first meeting are:

Arthur M. Bartley
500 Fifth Avenue, New York, N.Y.
Dr. John A. Hartwell
2 East 103rd Street, New York, N.Y.
Newbold L. Herrick
25 Cedar Street, New York, N.Y.
John C. Huntington
500 Fifth Avenue, New York, N.Y.
Wayne Johnson
50 Broadway, New York, N.Y.

TENTH: The Registered Office of this corporation in the District of Columbia shall be at 918-16th Street, N.W., in care of CT Corporation System, the corporation's Registered Agent, Washington, D.C.

WITNESS our hands and seals this 29th day of January One Thousand Nine Hundred and Thirty-Seven.

CHRISTABEL E. HILL

(Witness)

DISTRICT OF COLUMBIA: ss:

I, CHRISTABEL E. HILL, a Notary Public in and for the District of Columbia, do hereby certify that ERNEST O. PALAND, WINSTON E. HOBBS, and JOSEPH V. McBRIDE, parties to a certificate of incorporation bearing date of January 29th, 1937, and hereto annexed, personally appeared before me in said District, the said ERNEST O. PALAND, WINSTON E. HOBBS and JOSEPH V. McBRIDE being personally known to me as the persons who executed the said certificate of incorporation and acknowledged the same to be their act and deed.

GIVEN under my hand and seal this 29th day of January, 1937.

CHRISTABEL E. HILL

Notary Public

DISTRICT OF COLUMBIA

My Commission Expires July 15, 1940

ERNEST O. PALAND (SEAL)

WINSTON E. HOBBS (SEAL)

JOSEPH V. McBRIDE (SEAL)

CHRISTABEL E. HILL

Notary Public

NONDISCRIMINATION COMPLIANCE STATEMENT

STD. 18 (REV. 3-95) FMC

COMPANY NAME

Ducks Unlimited, Inc.

The company named above (hereinafter referred to as "prospective contractor") hereby certifies, unless specifically exempted, compliance with Government Code Section 12990 (a-f) and California Code of Regulations, Title 2, Division 4, Chapter 5 in matters relating to reporting requirements and the development, implementation and maintenance of a Nondiscrimination Program. Prospective contractor agrees not to unlawfully discriminate, harass or allow harassment against any employee or applicant for employment because of sex, race, color, ancestry, religious creed, national origin, disability (including HIV and AIDS), medical condition (cancer), age, marital status, denial of family and medical care leave and denial of pregnancy disability leave.

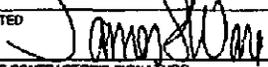
CERTIFICATION

I, the official named below, hereby swear that I am duly authorized to legally bind the prospective contractor to the above described certification. I am fully aware that this certification, executed on the date and in the county below, is made under penalty of perjury under the laws of the State of California.

OFFICIAL'S NAME

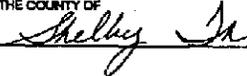
James L. Ware

DATE EXECUTED



12/18/95

EXECUTED IN THE COUNTY OF



PROSPECTIVE CONTRACTOR'S SIGNATURE

Senior Group Manager

PROSPECTIVE CONTRACTOR'S TITLE

Ducks Unlimited, Inc.

PROSPECTIVE CONTRACTOR'S LEGAL BUSINESS NAME

PERSONNEL POLICIES AND PRACTICES

EQUAL EMPLOYMENT OPPORTUNITY

Statement of Policy

At Ducks Unlimited, Inc. it is our policy to recruit and hire employees without regard to or discrimination because of age, race, creed, color, national origin, sex, handicap or veteran status. This policy of nondiscrimination applies to all phases of employee relations – hiring, compensation, performance rating, promotion, transfer and other personnel matters.

Our employment objective is to select individuals who meet the organization's high standards of character, education and occupational qualifications; who can carry out the organization's work competently; who have capacity for growth; and, who will become an active part of our organization.

We know that our strength and future growth depend directly upon the contribution made by each person within our organization. Productivity and efficiency result from real job satisfaction and from the opportunity each person has for his or her individual self-development. Our employment policy is designed to:

- Place each employee, insofar as practicable, in a position which best suits the individual's natural and acquired aptitudes and skills.
- Offer each employee opportunity for self-development and advancement through training and on-the-job experience.
- Accord fair and equitable treatment to every employee at all times.
- Recognize the importance of the work of each employee to the overall success of the organization.

SEXUAL HARASSMENT

Statement of Policy

Ducks Unlimited, Inc. maintains a strict policy against sexual harassment. **Simply put, sexual harassment will not be tolerated on the part of any employee.** All employees are responsible for assuring that the workplace is free from sexual harassment. Sexual harassment is defined as unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature, where:

- Submission to the advances is made either explicitly or implicitly a term or condition of employment.
- Submission to or rejection of the advances is used as the basis for making employment decisions.
- Such conduct interferes with an individual's work performance or creates an intimidating, hostile or offensive working environment.

All employees should avoid any action or conduct that might be viewed as sexual harassment. Approval of, participation in, or acquiescence in conduct constituting sexual harassment will be considered a violation of this policy. If any employee believes that he or she has been subject to sexual harassment at work by anyone, including supervisors, co-workers or visitors, he or she should report this immediately to his or her immediate supervisor or Human Resources. Sexual harassment complaints will be handled with as much confidentiality as possible. There will be no retaliation against any employee who reports a claim of sexual harassment or against any employee who is a witness to the harassment. An immediate investigation will be conducted in an attempt to determine all the facts concerning the alleged harassment. In making this investigation, every effort will be made to be fair to all parties involved. If it is determined that sexual harassment has occurred, corrective action will be taken, up to and including reprimand, discharge, or other appropriate action.

If it is determined that no sexual harassment has occurred, or there is not sufficient evidence to conclude that harassment has occurred, this determination will be communicated to the employee who filed the complaint.

DRUG FREE WORKPLACE PROGRAM

Statement of Policy

Because substance abuse poses a serious threat to our employees, their families and to the entire organization, Ducks Unlimited has established this policy in an effort to promote and maintain a drug-free work environment.

The ultimate goal of this policy, however, is to balance respect for individual privacy with the organization's need to maintain a safe, productive, drug-free work environment for all employees; maintain safety and security at DU's community-based events, as well as at the facilities and properties in the communities where we are located; and, provide a quality of service to the organization's members, as well as non-members and visitors, in a fashion consistent with the high standards set by the Board of Directors of Ducks Unlimited, Inc.

Standard of Conduct

As a Standard of Conduct for employees of Ducks Unlimited, employees will not be permitted to possess, consume, or distribute drugs, controlled substances or abuse alcohol in the workplace or report to work or perform their duties under the influence of alcohol or with drugs present in their system. To allow otherwise jeopardizes the safety of our fellow employees, our members, our facilities, and the communities which we rely upon for support. Any employee determined to be in violation of this policy or standard will be subject to disciplinary action, which may include termination, even for the first offense.

Drug and Alcohol Abuse Screening/Testing

Ducks Unlimited recognizes that carefully selected tests and testing procedures have a proper role in any comprehensive substance abuse program, as do properly conducted searches of the effects, vehicles and persons of employees, contractors or visitors.

• Job Applicants

As a condition of regular employment all applicants must complete a drug screen test. If test results are confirmed positive, the employment offer will be withdrawn.

• Current Employees

The Company utilizes screening practices to identify employees who use illegal drugs or abuse alcohol. It is a condition of continued employment for all employees to submit to a drug screen test when:

- a. there is sufficient cause to believe an employee is under the influence of alcohol or has drugs present in their system; or,
- b. there is any mishap or accident involving an employee during business hours or while on Company business in which injury to individuals or damage to property occurs as a result of the impaired employee's involvement.

Failure to submit to required medical or physical examinations/tests is considered misconduct, and as such, grounds for disciplinary action, including termination.

General Procedures

Any employee reporting for work visibly impaired is unable to properly perform required duties and will not be allowed to work. If, in the opinion of the employee's supervisor the employee is considered impaired, the employee will be transported by taxi or an alternative safe transportation mode to his/her home or a medical facility. **An impaired employee will not be allowed to operate or drive any vehicle during business hours or while on official Company business, or any vehicle rented, leased, owned or otherwise intended for Company use or business.**