California Department of Fish and Game
Surveillance and Response Plan for the Occurrence of
Highly Pathogenic Avian Influenza in Wild Birds

2006
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Executive Summary

There is public concern worldwide over the potential for Highly Pathogenic Avian Influenza (HPAI H5N1) to develop into a human disease pandemic. Much of the current focus is centered on detecting the virus if it is brought to North America. Possible transmission methods include the shipment of infected poultry or through the migration of wild birds from infected areas.

“Avian influenza” is a general term applied to type A viruses that are normally carried by wild birds without causing illness but are often fatal among domestic birds. HPAI H5N1 is the subtype of avian influenza that has been transmitted from birds to humans in Asia, Europe and Africa. As of Jan. 9, 2007 there have been 263 confirmed cases of human transmission, including 157 human deaths.

The responsibility for monitoring for the prevalence and spread of HPAI H5N1 is shared among human health, agricultural, and wildlife agencies. This document addresses the role of the California Department of Fish and Game (DFG) in monitoring for the presence of HPAI H5N1 in California wild birds and responding to a detection of the virus in California. As of March 10, 2007, HPAI H5N1 has not been detected in California wild birds.

The DFG worked closely with the U.S. Departments of Interior and Agriculture, and other state and federal agencies, to develop this surveillance and detection plan for HPAI H5N1 in California wild birds. The plan lays out a sampling strategy that prioritizes bird species based on the likelihood that they would intermingle with infected wild birds from other parts of the world. Sampling efforts will focus on areas with the highest concentration of these priority species and will include: (1) live birds, (2) hunter-harvested wild birds, (3) environmental sampling, and (4) wild birds involved in morbidity and mortality events.

Samples are gathered and processed using the sampling protocols and diagnostic laboratories identified and utilized by all agencies and organizations involved in HPAI H5N1 surveillance in North America. The data collected from the samples are shared with all cooperating agencies.

This plan also includes notification and response protocols that will be followed if HPAI H5N1 is detected and confirmed in a sample submitted from California. Key individuals/organizations will be immediately contacted, and the DFG will establish an Incident Command System (ICS). ICS is a system designed to identify and mobilize all of the personnel, equipment and other resources needed to respond to an incident in the most organized and efficient manner possible.

Objectives of the DFG’s response plan include: (1) safety of response personnel, (2) controlling movements of affected wildlife, (3) assessing the risk of wildlife-associated human activities, (4) monitoring the spread of HPAI H5N1 within California, and (5) communicating information to the public.
Public health officials, agricultural agencies, poultry producers, and wildlife professionals from around the globe are currently establishing detection and surveillance strategies to respond to the persistence and spread of a highly pathogenic avian influenza (HPAI) virus in Asia, Europe and Africa. This HPAI is classified as subtype H5N1, hereafter referred to as HPAI H5N1 (also known as “Bird Flu”), has been detected in many wild bird species. This virus is causing high mortality in domestic poultry in the affected countries. The pathogenicity ascribed to an avian influenza virus is dependent upon the virus’ ability to cause illness or death in domestic chickens. A HPAI virus causes illness or death in greater than 75% of the chickens exposed to the virus, whereas a low pathogenic avian influenza (LPAI) virus affects less than 75% of exposed chickens.

Low Pathogenic Avian Influenza (LPAI)
LPAI viruses are endemic to most wild bird species, and in most cases, cause minor sickness or no noticeable signs of disease. LPAI strains are not a human health concern. LPAI H5N1, also referred to as “North American” H5N1 has been present in North America for years, and recent expanded efforts have confirmed (as of December 2006) this LPAI H5N1 in eight states, including: Illinois (mallard, green-winged teal), Maryland (mallard), Michigan (mallard, green-winged teal, mute swan), Montana (northern pintail), Missouri (northern shoveler), New York (mallard), Ohio (northern pintail), and Pennsylvania (mallard). In California, LPAI H5N1 was detected in a healthy wild mallard captured in Butte County in 2005. This LPAI virus is not closely related to the HPAI H5N1 circulating in parts of Asia, Europe and Africa and poses no risk to human health.

Highly Pathogenic Avian Influenza (HPAI)
The detection of this HPAI strain in wild birds is disconcerting in that the potential for the dispersal of this virus over large distances exists. There is the potential that this HPAI H5N1 virus could spread to North America through the movements of migratory water birds. Other potential methods by which this virus could be transported to North America include: the movement of infected poultry, exotic birds, bird products, or by infected humans. Although the United States has banned the importation of birds or bird products from countries affected with HPAI H5N1 virus, introduction by birds or bird products could occur through illegal importation.
To date, HPAI H5N1 has not been found in North America. This virus was first detected in domestic poultry in China (Guangdong Province) in 1996 and later spread to Hong Kong in 1997 where it developed the ability to infect humans, resulting in the deaths of 6 people. At the beginning of 2004, HPAI H5N1 became a regional issue as it spread to more than 10 Asian countries within several months with devastating consequences to the poultry sector. HPAI H5N1 has been identified in wild birds across Asia, but not until 2005 at Qinghai Lake Nature Reserve in China, had it been known to cause a large mortality event in wild birds. Although more than 6,000 wild birds died, subsequent reports indicated the presence of captive-reared waterfowl that may have been the initial source of the virus rather than the wild birds.

HPAI H5N1 is categorized as a “Foreign Animal Disease” (FAD) since it is not known to exist in the United States. FADs are typically highly contagious diseases that spread rapidly, have the potential to devastate large populations of animals, and, in some cases, may pose a threat to human health. Many local, state and federal agencies have already developed emergency response plans for FADs which could be used in the event that HPAI H5N1 is detected in North America.

Public health officials are particularly concerned because this virus has been transmitted to humans by close contact with sick or dead infected poultry. As of Jan. 9, 2007, the cumulative number of confirmed human cases of HPAI H5N1 was 263, and of those, 157 resulted in death (World Health Organization website). The movement of the Asian HPAI H5N1 virus to different countries, its pathogenic behavior in different host species, and its ability to move from one host to another – both within and among species – are being monitored to address worldwide public health and socioeconomic concerns. Of the documented human cases, perhaps only one or two have been tentatively ascribed to wild birds; most human infections have been the result of intense human contact with domestic poultry.

If movement of HPAI H5N1 from the infected regions to North America occurs through wild birds, most likely it will occur in the Pacific Flyway, in association with the fall migration of waterfowl and shorebirds. The Pacific Flyway is a migratory corridor for wild birds that stretches along the Pacific Coast from Mexico north to Alaska and into Siberia, Russia. It is feasible that migratory birds that summer in Alaska or Siberia could co-mingle with HPAI H5N1-infected wild migratory birds from Asia and become a point of transmission of this virus. Although there is limited evidence to suggest that wild migratory birds carry the virus during their migrations, the scientific community now recognizes it as a possibility that needs to be monitored.

Due to the increased concern that HPAI H5N1 could spread to North America and cause large numbers of wild bird mortality and severely impact California’s large domestic poultry industry, the DFG has enhanced its investigation of wild bird mortality events and is working collaboratively with many partner agencies and organizations to implement a coordinated early detection program for HPAI H5N1.

Surveillance and detection of HPAI H5N1 in wild birds in California will be a cooperative effort by the DFG, the U.S. Department of Agriculture (Wildlife Services), the U.S. Fish and Wildlife Service (USFWS), and the U.S. Geological Survey (USGS) because of their specialized expertise on California wildlife, as well as other entities. The DFG has legal mandates as the lead state trustee agency for fish, wildlife and their habitats (Fish and Game Code Sections 1802 and 711.7) and is mandated to monitor and investigate wildlife mortality events (Fish and Game Code Section 1008).

Purpose of the Plan

This plan provides guidance to DFG personnel in the implementation of a detection effort and guidelines for a response strategy for HPAI H5N1 should it be detected in wild birds in California. Other state and federal agencies have prepared similar plans in their areas of expertise. The plan addresses goals established by the DFG in planning for HPAI. These include:

- Implement an early detection strategy; identify target species and data sources, and develop sampling protocol standards.
- Anticipate, prepare and implement responses to HPAI H5N1 detection.
- Prepare for response to the detection of HPAI H5N1 within the Incident Command System (ICS).
- Develop a coordinated communications plan to inform and respond to our employees and the public.
- Establish safety protocols for personnel and the public.
- Coordinate with external research efforts.

The plan is based on the following key principles:

- Identification of functionality and the need to provide sufficient detail for the Incident Commander (under ICS) in an emergency response.
- Identification of our approach, surveillance sampling effort, response actions, safety standards, communications protocols, and potential research collaborations.
- Identification of primary staff contacts, roles, and responsibilities.
- Inclusion of figures (maps) and tables to generally identify initial surveillance area, sampling intensity and locations.
- Inclusion of appendices to provide added details of protocols and other necessary information.

Above: Mallards © Paul B. Johnson
Approach

As part of the multi-state and federal agency effort to coordinate detection of HPAI H5N1, the DFG developed a conceptual approach (Figure 1) that identifies the most important factors in a comprehensive plan. The DFG convened an inter-agency meeting of scientists and resource managers (February 2006) to present this approach and to receive input. The participants agreed on the general approach that emphasized preparedness for five key objectives: surveillance/detection, response, safety, communications, and research. Subsequently, these objectives were organized into working subgroups to coordinate and help provide initial input to the DFG for preparing an early detection and response plan that would be consistent with other national and state efforts.

Given the State of California’s mandate to respond to emergencies within the ICS (Government Code Section 8607), the details of the plan must be functional under this operational process. Immediate training and equipment needs required under this process have been met.

The DFG’s Wildlife Investigations Laboratory (WIL) in the Wildlife Branch was established in the 1940s and is mandated to study wildlife disease and to respond to and investigate wildlife morbidity and mortality events. The WIL is staffed with Senior Wildlife Veterinarians that serve as technical experts and coordinate biological sampling efforts, evaluate/interpret sample test results, and serve as a focal point of contact both internally and externally with other agencies. Staff of the WIL, in conjunction with other expert DFG staff and interagency partners, will serve as the DFG’s Risk Assessment Team to evaluate anticipated scenarios and help provide guidance to the ICS Incident Commander for response to HPAI H5N1 detections. Currently, the WIL is coordinating detection sampling and is reporting sampling results on a weekly basis.

Communications, Safety, and Incident Command function are critical responsibilities that will be lead by the DFG’s Office of Communications, Education and Outreach, the Human Resources Branch Safety Officer, and the Law Enforcement Division, respectively.

Pre-Detection: Surveillance

This document is a step-down from the U.S. Interagency Strategic Plan (An Early Detection System for Highly Pathogenic H5N1 Avian Influenza in Wild Migratory Birds) and the Pacific Flyway Plan (Surveillance for Early Detection of Highly Pathogenic Avian Influenza H5N1 in Wild Migratory Birds: A Strategy for the Pacific Flyway, 2006). The DFG’s Waterfowl Coordinator participated in the preparation of both of these plans. The two plans provide the basis for early detection strategies, species prioritization, sampling protocols, and other supporting information. The goal of the national and the Pacific Flyway strategies is the early detection of HPAI H5N1 in wild migratory birds – not to assess its prevalence over time, monitor its rate of movement, or investigate the ecology of the disease.

Species Prioritization

During development of the U.S. strategic plan, state and federal wildlife agencies and wildlife organizations created the Interagency HPAI Early Detection Working Group to establish monitoring priorities among migratory bird species. These priorities were based on the relative probability that species could be exposed to, or infected with, HPAI H5N1 based on their breeding sites and migratory movement patterns. The Pacific Flyway Council subsequently developed a list of surveillance candidates for the Pacific Flyway that reflected both “primary” species that could come directly from breeding grounds in Asia, and “secondary” species that would likely intermingle with Asian migrants. Speculatively, these “secondary” species could be subject to virus transmission from primary species or enhance existing knowledge about avian influenza ecology in waterfowl.

Above: Cinnamon teals © Paul B. Johnson
This plan’s sampling strategies are focused on primary and secondary species occurring in California (Table 1), considering the national and Pacific Flyway strategic plan priorities and updated information on recent duck species found to be infected with HPAI H5N1 in Europe and Asia. Sampling effort, number, and locations were determined through coordinated planning among Pacific Flyway states.

### Sampling Effort and Area

Currently, there is no information on the prevalence of HPAI H5N1 in wild bird populations. Waterfowl have probably always carried influenza viruses and are known to carry viruses of the H5 and H7 subtypes, but usually in the low pathogenic form. Based on standard statistical theory and several key assumptions, the national and Pacific Flyway plans calculate that a minimum of 200 samples would be required to detect (with 95% probability) one positive HPAI H5N1 sample in a defined population with >1,000 individuals if the virus had a prevalence of only 1.5%. Statistically, sampling rates need to be higher with a lower prevalence of HPAI H5N1. This hypothetical approach to sample size determination assumes that the population of interest is homogenous and entirely accessible for sampling; that HPAI H5N1 is uniformly distributed within that population; and that representative sampling can be done in a random or otherwise unbiased manner, which is not the expected case in wild migratory water birds. Because of these factors, sampling intensity will be increased over the 200 bird minimum for large populations of wild birds occurring in California (e.g. Northern pintail, > 90% of the Pacific Flyway wintering population occurs in California) that can be sampled efficiently with available resources.

Although not part of the DFG’s or its partners’ sampling efforts under the national and Pacific Flyway plans, researchers from the University of California, Davis (UCD) will be collecting samples for avian influenza (AI) testing in California from selected wildlife rehabilitators, county mosquito vector control districts, as well as from researchers with ongoing banding projects. In addition, county public health agencies in Los Angeles and San Diego counties are currently sampling birds collected during mortality and morbidity events for AI. All of these external research entities have agreed to follow the sample processing and reporting standards established by the federal and state governments.

### Sampling Methods

Several methods designed in the context of regional, flyway and national efforts, utilizing available funding to provide efficient surveillance for HPAI H5N1 in California’s wild migratory waterfowl and shorebirds. Four sampling methodologies will be used in California by the DFG and its partners: (1) live birds, (2) hunter-harvested birds, (3) environmental sampling, and (4) wild birds involved in mortality events. The general distribution of sampling effort is presented in Table 2.

If HPAI H5N1 is carried to North America by migratory birds moving through Alaska, it could move south in the Pacific Flyway with about 150,000 swans, 1 million geese, and 12 million ducks that leave Alaska beginning in August (>60% oriented toward the Pacific Flyway), or with hundreds of thousands of autumn migrant shorebirds that begin arriving in California between July and October. Many of these birds pass through and/or winter in California. The challenge will be to mount a detection network in California of sufficient geographic coverage and sample sizes to detect wild birds infected with HPAI H5N1, including a relatively small number of Asian migrants, secondarily infected birds, and locally produced birds that may acquire the virus.

#### Table 1. Primary and secondary candidate waterfowl and shorebird species for HPAI H5N1 surveillance in California.

<table>
<thead>
<tr>
<th>Primary Candidates</th>
<th>Secondary Candidates</th>
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<tr>
<td>Northern Pintail</td>
<td>Greater and Tule White-fronted Goose</td>
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<tr>
<td>Tundra Swan</td>
<td>American and Eurasian Wigeon</td>
</tr>
<tr>
<td>Pacific Black Brant</td>
<td>American Green-winged Teal</td>
</tr>
<tr>
<td>Aleutian Canada goose</td>
<td>Northern Shoveler</td>
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<tr>
<td>Long-billed Dowitcher</td>
<td>Mallard</td>
</tr>
<tr>
<td>Dunlin</td>
<td>Short-billed Dowitcher</td>
</tr>
<tr>
<td>Ruddy Turnstone</td>
<td>Red Knot</td>
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<td>Western Sandpiper</td>
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#### Table 2. A summary of state and federal agency (USDA, USFWS, and DFG) planned sample sizes by sampling methodology in California, 2006. (See Appendix 1 for time and area details.)

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<th>Sampling Method</th>
<th>Species</th>
<th>Total</th>
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<tr>
<td>Live bird</td>
<td>Mallard, northern pintail, Aleutian goose, long-billed dowitcher, western sandpiper dunlin, red knot, short-billed dowitcher</td>
<td>3,600</td>
</tr>
<tr>
<td>Hunter-killed</td>
<td>Northern pintail, green-winged teal, American wigeon, Eurasian wigeon, northern shoveler, black brant, white-fronted goose, Aleutian goose</td>
<td>3,500</td>
</tr>
<tr>
<td>Environmental</td>
<td>Waterfowl</td>
<td>2,400</td>
</tr>
<tr>
<td>Mortality &amp; Morbidity</td>
<td>Primarily priority species</td>
<td>1,000</td>
</tr>
<tr>
<td>Total Planned Samples</td>
<td></td>
<td>10,500</td>
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**Sampling Live Birds**

In California, bird banding programs will provide access to large numbers of waterfowl. AI sampling during ongoing and new banding operations will focus on Northern pintails (primary species) because small numbers of them breed in Asia (Siberia), and on mallards (secondary species) which are year-round California residents that will intermingle with wintering, potentially infected Asian migrants.

Resident birds that bred and molted in California in 2006 (e.g., mallards) were not likely to have had exposure to HPAI H5N1 until they mingled during the fall and winter with Asian/Alaskan migrants. These resident wild birds can act as sentinels to detect the arrival of HPAI H5N1 after migrants from Alaska have arrived. In addition, mallards are excellent sentinels for AI viruses based on findings that: (1) mallards are known reservoirs of LPAI viruses with higher prevalence rates than other bird species, (2) juvenile ducks have the highest prevalence of LPAI among North American surveys, and (3) the rate of virus shedding is high during late summer and early migration staging. Mallards were captured and sampled for AI in the summer 2006 since HPAI H5N1 could have already been introduced during the 2005 fall migration. No HPAI H5N1 was detected. Assuming funding levels and sampling design are similar in the future, this sampling effort will continue.

As a group, the shorebirds also represent an important potential source of information regarding the early detection of HPAI H5N1 in California. The DFG-developed sampling plan, in consultation with the USFWS, USGS, Point Reyes Bird Observatory, and other Pacific Flyway states, included sampling of long-billed dowitcher, short-billed dowitcher, dunlin and western sandpipers in California from July through November 2006. Birds captured and sampled for AI were banded to document recaptures. All tested birds were negative for the presence of HPAI H5N1. Assuming funding levels and sampling design are similar in the future, shorebird sampling will be continued.

**Sampling Hunter-Harvested Waterfowl**

California waterfowl hunters harvest on average 1,000,000 ducks and 100,000 geese annually. Approximately 20% of this harvest occurs on managed public hunting areas, which presents an opportunity to access and sample a large number of harvested birds at check stations operated by the DFG during hunting seasons (October through January) throughout California.

The DFG’s hunter-harvested sampling strategy is designed to test both migratory waterfowl from the north and sample local duck populations that may be harvested in the early part of waterfowl hunting seasons. Sampling of hunter-harvested birds will focus on species that: (1) are most likely to be exposed to HPAI H5N1 in Asia, (2) have relatively direct migratory pathways from those areas to the U.S. via Alaska or directly to the Pacific Coast, or (3) mix in Alaska staging areas with species that could bring the virus from Asia. These priority species include: Northern pintail, white-fronted geese (both Pacific and Tule populations), Pacific black brant, mallard, northern shoveler, American green-winged teal, and American/Eurasian wigeon. Some geographical areas will have species priority sampling based on relative abundance and overall sampling of a group of birds in the entire flyway.

**Environmental Sampling**

AI viruses are released by infected waterfowl through the intestinal tract and viable virus can be detected in both feces and the water in which the birds swim, defecate and feed. (Testing methodology for AI viruses in water is not currently available, but may become available in the future.) Environmental sampling will consist of sampling freshly deposited avian feces in areas of waterfowl concentrations. Some fecal sampling occurred in 2006 before the fall migration since HPAI H5N1 could have been introduced during the previous year’s fall/winter migration. Areas in California with the highest relationships of wetlands to urban areas, and perhaps commercial poultry operations, as well as areas that provide good opportunities for environmental sampling will be a priority. Our approach to establishing environmental sampling sites is described in Appendix 2.

**Sampling of Birds Involved in Morbidity and Mortality Events**

According to the national strategic plan, the systematic investigation of morbidity (sickness) and mortality (death) events in wild birds to determine if the HPAI H5N1 is playing a role in causing illness and death offers the earliest and highest probability of detecting the virus if it is introduced by migratory birds into North America. Each year, sick and dead migratory birds are recovered in California by state and federal agency personnel and private citizens. Common causes of morbidity or mortality in wild birds include: avian botulism, avian cholera, pesticide and contaminant poisoning, aspergillosis, salmonellosis, lead poisoning, food source disruption, and power line collisions.

Generally, most reporting of wild bird die-offs (mortality events) are for small mortality events, but larger mortality events, sometimes in the tens of thousands, also occur in California. While wild bird mortality events will continue as expected events, sampling for HPAI H5N1 during these events will be an important sampling component in California’s detection and surveillance strategy.

An enhanced surveillance and reporting network for wildlife mortality events has been developed by the DFG in cooperation with USDA, USFWS, and USGS. Dedicated staff and resources have been stationed strategically in California, based on the regional operational plans, to perform routine surveillance of mortality events. Additional staff has been hired to respond to reports of certain wild bird losses.

The DFG will conduct aerial swan mortality surveillance consistent with surveillance that had been conducted for approximately 20 years until 2001. This will be done in conjunction with scheduled aerial surveys for population level information. Aerial transects of known waterfowl wintering concentrations will be sampled at low elevations, the location of carcasses will be noted, and follow-up work on the ground will be conducted to collect carcasses for necropsy.

Response protocols have been in place for wild bird mortality events (Appendix 3) since it has long been a responsibility of the DFG to respond. Responses rely on information provided to the WIL from the DFG regional staff, other agencies, and the public. All cases are evaluated by the DFG’s Senior Wildlife Veterinarians or designated disease specialists for proper and appropriate investigation and sample collection.
Response criteria will emphasize primary and secondary species identified in the national and Pacific Flyway strategic plans. Although priority will be given to primary and secondary species, additional migratory bird species will be sampled on an opportunistic basis depending on their likelihood of interaction with primary and secondary species passing through Alaska from Asia. Birds of any species or number exhibiting clinical signs for AI infection (respiratory or neurological) will also be sampled following initial evaluation. Sample submission may involve shipping swab samples or entire carcasses for analysis. The DFG’s Senior Wildlife Veterinarian will be the primary person for making decisions on wild bird sampling, processing, and submission to a diagnostic laboratory.

When a mortality event is reported to the DFG, the situation will be triaged by a DFG regional field biologist, or designated wildlife area personnel, in collaboration with the Senior Wildlife Veterinarian or designated disease specialist. If the mortality event appears to involve wild birds exhibiting signs of respiratory or neurological disease suggestive of AI, the DFG will implement a rapid field response to investigate and collect appropriate samples for diagnostics using safety protocols developed by the DFG Safety Officer.

When responding to a mortality event, strict adherence to hygiene and sanitation practices is required for all operations, regardless of the risk of HPAI H5N1 presence. Appropriate personal protection equipment (PPE) will be used to minimize potential exposure of DFG personnel to a disease agent. The Personnel Safety section of this document should be referred to when responding to a wild bird mortality event.

If there is a high degree of suspicion that HPAI H5N1 is the cause of a particular mortality event, or if HPAI H5N1 has already been detected in North America, greater risk is assigned and a greater level of PPE must be used as noted in the Personal Safety section.

A “Dead Wild Bird Questionnaire” (Appendix 4) must be completed and submitted to the WIL for each morbidity/mortality event reported to DFG. In addition a “Wildlife Disease Incident and Submission Form” (Appendix 5) will be completed and sent to the WIL with any carcasses or other specimens submitted to a diagnostic laboratory. Important field observations and proper specimen collection during the field investigation will be recorded by the field investigator (Appendix 6). Every effort will be made to determine the cause of any mortality event. Often, however, mortality events are discovered days to weeks after they occur, and no diagnostic samples are available for testing.

Following the field investigation and specimen collection, carcasses and other specimens will be submitted to the WIL or a diagnostic laboratory for evaluation. The WIL (916-358-2790) must be contacted to determine the appropriate diagnostic lab to be used.

**Laboratory Resources and Diagnostics**

Four diagnostic laboratories play a key role in the AI testing of samples collected by the various state and federal agencies within California. These include: the California Animal Health and Food Safety Lab (CAHFS; Davis, CA), the National Wildlife Health Center (NWHC; Madison, WI), the National Wildlife Research Center (NWRC; Ft. Collins, CO), and the National Veterinary Services Lab (NVSL; Ames, IA).

Wild bird carcasses involved in a mortality event will be submitted to either CAHFS, a USDA-accredited diagnostic lab, or the NWHC for thorough necropsy and diagnostic testing for AI and a multitude of disease agents that can cause mortality in birds. In addition, CAHFS will conduct AI testing for all DFG-funded sampling and all USDA-funded live bird and hunter-harvested bird AI sampling. A schematic illustrating laboratory processes and timelines is provided in Figure 2.

The NWRC will conduct AI testing for all USFWS-funded live bird and hunter-harvested bird AI sampling and all USFWS mortality event response on the national wildlife refuge system lands. The NWRC will conduct AI testing of all environmental samples collected by the DFG and Wildlife Services. The NVSL must receive all AI samples that have tested positive for H5 or H7 to confirm the result, perform specific testing for N1, and to conduct further testing.

**Data Protocols and /Database Entry**

The U.S. Interagency Early Detection System for Highly Pathogenic Avian Influenza H5N1 in Wild Migratory Birds introduced the web-based HPAI Early Detection Data System (HEDDS) as a means for allowing all of the partnering agencies to enter data into one nationally accessible database. However, funding sources other than from Wildlife Services have their own requirements for data entry and management. The DFG is involved in collecting samples using several different funding sources.

Live bird, morbidity and mortality, and hunter-harvested samples are being collected with USFWS, Wildlife Services, and DFG primary funding sources. The data collected from samples primarily
funded by the USFWS will be entered by DFG personnel and forwarded electronically to the NWHC. The NWHC will be responsible for uploading this information into the HEDDS database. Data records from samples collected primarily with Wildlife Services funding will be entered according to a three phase data management plan outlined in the Wildlife Services and State/Tribal Cooperators Avian Influenza Procedure Manual (July 2006). Data collected from samples funded solely by the DFG will be directly uploaded into HEDDS by WIL personnel.

Communication/Public Education
The DFG communicates with constituent groups and the public through the news media to provide accurate and timely information about its AI surveillance efforts (Appendix 7). Californians should be made aware of the risks involved with HPAI H5N1 and how to minimize the risk of disease transmission in poultry and in humans, as well as in wild birds. The DFG is educating constituent groups, especially those that have regular contact with wild birds through hunting or wildlife rehabilitation, through the news media, the DFG Web site, publications and presentations.

Hygiene and Sanitation Practices
The health and safety precautions including PPE, work practices, and personal hygiene practices depend on the prevalence of the HPAI H5N1 virus in the area, the potential for aerosolization of virus-containing matter, and the nature of the task being performed. Appendix 8 provides the current recommended PPE for protection against the HPAI H5N1 virus for various tasks performed by DFG personnel.

If DFG employees are in doubt as to whether HPAI H5N1 has been found in their area, or are performing tasks that may generate airborne particulates, an N95 respirator, gloves and Tyvek® suit are available for personal protection. In addition to the PPE worn, proper work practices, including decontamination and personal hygiene, essential measures to aid in the protection against the HPAI H5N1 virus, are included in Appendix 8. Guidance on PPE will continue to be reevaluated by the DFG Safety Officer as more information becomes available and as the characteristics of the pathogen are better defined. Strict adherence to hygiene and sanitation practices is required for all operations.

These precautions are based on protecting individuals involved in the response to an outbreak of HPAI H5N1 from illness and the risk of viral reassortment (i.e., mixing of genes from human and avian viruses). Although the health risk to humans from LPAI viruses is less well established but likely to be lower, it is considered prudent to take all possible precautions to the extent feasible when individuals have contact with birds infected by any AI virus as part of control and eradication activities. Because of this, some precautions should be taken even for birds that appear healthy.

The risk of contracting AI and consequent PPE recommendations are dependent on the suspected presence of the HPAI H5N1 virus in the wildlife being handled. For example, if the virus has not yet been detected in the birds in the continental United States, then normal protective measures, such as requiring the use of protective gloves, will suffice. However, if a suspect bird species is expected to migrate into an area directly from areas where HPAI H5N1 is known to occur, even though the virus has not yet been detected in the U.S., additional protective measures should be taken.

CDC recommends that unvaccinated field staff should receive the current season’s influenza vaccine to reduce the possibility of dual infection with avian and human influenza viruses (Interim Guidance for Protection of Persons Involved in U.S. Avian Influenza Outbreak Disease Control and Eradication Activities). There is a small possibility that dual infection could occur and result in reassortment. CDC does not recommend prophylactic use of antiviral medications for work involving handling of wild birds suspected or confirmed to be infected with HPAI H5N1.

Hygiene and Sanitation Practices
Field staff should not eat, drink, or smoke, or engage in any other activity (such as handling equipment, using cell phones, and etc.) that puts their hands in or near their eyes, nose, or mouth while handling animals until hands can be washed. Unnecessary contact with animals or animal tissue should be avoided.

It is important for employees to be educated about the importance of hand washing in controlling disease transmission. Hands should be washed after contact with contaminated surfaces, after removing gloves, after sneezing, using the bathroom, handling garbage, contact with wildlife, soils and similar activities, and before preparing or eating food, smoking, drinking, applying cosmetics, lip balm, or lotions.
Proper hand washing:
- Wet hands and apply liquid soap.
- Rub hands vigorously together and scrub all surfaces.
- Continue for 10-15 seconds. It is the soap combined with the scrubbing action that helps dislodge and remove germs.
- Rinse well and dry hands.
- Alcohol-based sanitizing hand rubs or sanitizing cloths may be used as a temporary solution when hand washing facilities are not available. Portable field hand washing facilities are easily rigged and transported.

**Medical Evaluation**

For those in direct contact with live or dead wildlife or with materials contaminated by sick or dead wildlife secretions, and who have questions regarding AI and public health, can contact a medical provider for a consultation. DFG regional offices will provide the telephone numbers of the physicians/HMO’s on the DFG preferred medical provider list for their geographical area.

Employees should be vigilant for symptoms of fever, respiratory symptoms, and/or conjunctivitis (i.e., eye infections) for one week after last exposure to avian influenza-infected or exposed birds or to potentially avian influenza-contaminated environmental surfaces. Individuals who become ill should seek medical care. They should notify their health care provider that they may have been exposed to avian influenza prior to arrival. In addition, employees should notify their health and safety representative. They should limit contact with others if at all possible. People who have been in close contact with the symptomatic employee should be informed. The symptomatic individual should wear a disposable facemask and practice good respiratory and hand hygiene to reduce the transmission of aerosolized droplets while in transit.

**Research**

The DFG recognizes that an optimal surveillance and sampling effort would require expert input and encourages communication and collaboration among research entities. Given that a substantial amount of research will occur outside of management agencies, this research objective will help identify applied research needs by agencies, helping to facilitate collaboration and identify funding needs.

The U.S. Interagency Strategy Plan and the Pacific Flyway Plan encourage state wildlife agencies to develop appropriate detection and surveillance systems and outline a general plan for sampling, identify priority (focal) species, and provide important recommendations for sampling and surveillance protocol standards. These initial surveillance strategies are designed around the most important objective of detecting HPAI H5N1 in wild birds. Due to the many unknowns regarding the status and distribution of AI viruses in wild birds, these initial surveillance strategies are built on many assumptions.

The initial participants in the DFG research subgroup included scientists from the USGS, the UCD Wildlife Health Center, the USFWS, and the DFG. Further input was received from the UCD’s CAHFS and Department of Population Health and Reproduction. Several university collaborations have already been organized that are dedicated to a greater understanding of AI viruses, and will provide valuable resources for expertise and focal research projects. For example, a program entitled “Prevention and Control of Avian Influenza in the US” (AICAP) has the major goal of developing a collective network research structure that establishes the basis for a better understanding of AI (www.agnr.umd.edu/aicap). Additionally, “The Center for Rapid Influenza Surveillance and Research” (CRISAR) is a multi-university collaborative addressing surveillance, epidemiology, evolution, and pathogenicity of AI viruses.

Due to the necessity of immediately implementing HPAI H5N1 surveillance and detection programs, most states have initiated efforts by taking advantage of sampling opportunities utilizing hunter-harvested birds, live caught wild bird banding efforts, and environmental sampling in areas identified as high risk for HPAI H5N1. As these sampling efforts are initiated, important principles of disease surveillance will need to be considered to refine existing and future efforts. These include:

1) Conduct surveillance in an adaptive management context – analysis and evaluation of surveillance for feedback to management efforts.
2) Continue to enhance collaboration and coordination among research entities through future review meetings to report on the progress of surveillance and detection efforts.
3) Identify and prioritize important research questions and projects with emphasis on applied (immediate short-term) research.
4) Integrate important research questions (assumptions and uncertainties) into early surveillance wherever feasible.
5) Plan for post-outbreak surveillance sampling by updating objectives and information needs as circumstances change.

Given the rapid sample processing and mandatory reporting requirements, coordination and collaboration with research entities will be an important priority. The following tenets have been identified as essential to promoting an optimal research effort between wildlife agencies and research institutions to address important management and safety concerns: 1) facilitate data sharing (samples and results); 2) establish consistent sample collection and processing protocols; and 3) funding sources.

Through preliminary scoping meetings with the University of California, the USFWS, and the USGS, the following research topics have been identified as priorities:

1) Develop a GIS risk model to predict the higher probability zones for detecting HPAI H5N1 in wild birds.
2) Study the disease ecology of AI viruses endemic to North America as a predictive model for understanding the distribution and disease ecology of HPAI’s.
3) Improve diagnostics for AI testing from various species, sample types, and environments.
4) Develop rapid AI field detection protocols.
5) Determine host and environmental factors that affect prevalence and viral load/shedding in wild birds.
6) Identify key parameters associated with disease transmission and persistence.
7) Determine wild bird species specificity (mortality and testing assumptions of initial efforts)
8) Develop associations between status of AI viruses and wild bird demographics. Identify influential covariates.

Preliminary work has started on the first four topics, but further progress on these and others will depend on funding constraints.
Risk Model

The DFG has developed a preliminary risk model that identifies higher probability zones for detecting HPAI H5N1 in wild birds. This preliminary GIS model was developed using wetland habitat, wild bird species abundance, proximity to poultry, and past occurrences of AI detections in poultry (Appendix 2). The DFG will continue to encourage collaboration to optimize internal and external resources in detecting and responding to HPAI H5N1.

Post-Detection: Response to a Finding of HPAI H5N1 in California

Initial Actions

Viruses isolation (VI) is the definitive test to confirm a positive HPAI H5N1 diagnosis; however, since VI requires from 2 to 12 days to complete, it is advantageous to communicate a presumptive HPAI H5N1 result based on preliminary tests for avian influenza viruses and subtype H5 and N1 to facilitate a rapid response for disease control and communication issues.

If a presumptive or confirmed HPAI H5N1 result in wild birds is received by the DFG, key personnel from the following agencies will be immediately notified: California Department of Food and Agriculture (CDFA), California Department of Health Services (CDHS), Resources Agency, Office of Emergency Services (OES), USDA/Animal and Plant Health Inspection Service/Veterinary Services and Wildlife Services, the USFWS, and National Park Service (NPS) (Appendix 16). The initial actions to be carried out by the DFG are summarized in Figure 3.

Field Response

The DFG will manage a multi-agency response to a confirmed HPAI H5N1 in wild birds by utilizing the Incident Command System (ICS). California state law mandates that all first responders are trained in ICS and shall use ICS during emergency operations (CCR T-19; Division 2, Chapter 1, Article 4, Section 2405(a). ICS was originally developed to allow responders from different jurisdictions and disciplines to cooperatively and effectively respond to manmade and natural disasters. ICS benefits include a unified approach to incident management; standard command and management structures; and emphasis on preparedness, mutual aid, and resource management. The ICS is consistent with California’s Standardized Emergency Management System (SEMS) and the National Incident Management System (NIMS).
The ICS organizational structure typically includes the Unified Command and the Operations, Planning, Logistics and Finance Sections. In California, response actions concerning the protection, identification, rescue, capturing, processing and biological sampling of wildlife are performed by the ICS Wildlife Branch (commonly referred to as Wildlife Operations), a branch in the Operations Section within the Unified Command (Figure 3).

Appendix 8 describes the responsibilities and capabilities of the Wildlife Operations branch of the Operations Section within a Unified Command, and describes procedures to be used along with personnel and equipment needed to meet wildlife protection responsibilities of federal and state governments during an occurrence of HPAI H5N1 in California.

Barring any unusual circumstances, a DFG employee will assume the role of Wildlife Operations Director. Although Wildlife Operations is integrated into the ICS, it is self-directed in many ways and self-contained with regard to wildlife response resources (both staff and equipment). Wildlife Operations gathers much of its own incident information through wildlife reconnaissance, has pre-trained experts on staff (e.g. wildlife veterinarians, wildlife biologists, wildlife capture experts, biological sampling staff, sample processing staff), and prepares its own sections of the Incident Action Plan for the Planning Section.

**Personnel and Equipment**

The Wildlife Operations will include a director that represents the ICS Wildlife Branch, one or more wildlife biologists, the state wildlife liaison officer and field personnel. State Wildlife Liaison Officers are assigned by their respective state wildlife agency director and are trained in the identification of and response to emergency diseases (e.g., FADs). Field personnel will be selected from state or federal wildlife agencies or other sources at the discretion of the Wildlife Operations Director and State Wildlife Liaison Officer.

Wildlife surveillance requires persons trained and proficient in wildlife capture, collection, and restraint. Wildlife surveillance also requires that specialized experience in handling wildlife be combined with all other aspects of the response, including specimen collection and processing and biosecurity. All Wildlife Operations activities will be conducted within federal, state, and local laws under the direction and authority of the Incident Commander. Wildlife Branch activities will be highly coordinated with other elements of the emergency response including diagnosis and investigation, disposal, cleaning and disinfection, and biosecurity and must be in compliance with all protocols.

**Quarantines and Movement Control for Wildlife**

The geographic area and migratory bird flyway(s) in the vicinity of an infected location (premises) will be identified and assigned a status relative to quarantines and movement control of the human transport of birds and bird products. Wildlife Operations activities will be conducted in these same identified quarantine areas, and all policies and procedures relative to quarantine and movement control will be followed.

**Wildlife Risk Assessment**

If a detection of HPAI H5N1 occurs in domestic birds, an initial objective of the Wildlife Operations is to determine if there is a risk for HPAI H5N1 infection spreading to wildlife. This risk will be dependent upon the wildlife species present, susceptibility of these species to the HPAI H5N1 virus, and the level of potential exposure in the detection area. It will be critical to compile all available information regarding wildlife in the affected area. The situation may require that surveys are conducted to determine the abundance and species of wildlife. Wildlife surveillance will be implemented when there is a potential for spread of the HPAI H5N1 virus to susceptible wildlife. Surveillance of other potential wildlife vectors, including mechanical vectors, may also be implemented, but will be secondary to surveillance of susceptible wildlife.
Wildlife Surveillance

The protocol for surveillance of wildlife for HPAI H5N1 will be adapted to the prevailing circumstances in the affected area. Wildlife surveillance may include active and passive methods deemed appropriate by the Wildlife Operations Director and partners and approved by DFG. Active surveillance methods may include collection of susceptible wildlife, carcass searches, and road-kill surveillance. Passive surveillance may include investigation of reports of wildlife morbidity or mortality events.

Other Wildlife-Associated Activities

Field trials, bird watching, waterfowl hunting and many other outdoor activities involving direct or indirect contact with wildlife occur throughout California. Wildlife Operations will identify all such activities, and determine whether they involve susceptible or non-susceptible species. Information regarding these activities will be provided to the Quarantine and Disease Control Sections, and the Wildlife Operations will assist in communicating with the affected groups.

Communication/Public Education

Media Communication

Post-detection media efforts will focus upon risk communication, public safety, wildlife response, surveillance, testing results and any die-off responses. Should a die-off occur, the communications team will move into crisis communication mode, with an intense effort to support the responders by establishing a JIC, working with federal and state partners, and maintaining information flow with the public. An incident information reporting form has been developed along with phone tree protocols for sharing information statewide.

Community and Constituent Education

Post-detection education will focus upon the specific communities where AI is discovered (in the event of a die-off or hunter harvest bird), and an intensive effort with targeted constituents. Statewide education efforts will focus on safety and preventing exposure. Trainings, events, public meetings, displays and other activities may be required and will be addressed as needed.

The full Avian Influenza Communications Plan provides specific messages, protocols, and other information for education and media efforts. Scenario specific responses for media and education efforts are available in the full Communications Incident Action Plan which is an addendum to the Communications Plan.

Scenario-Based Responses to HPAI H5N1 Detection

Potential entry of HPAI H5N1 into our wild bird populations in California may occur through various routes. The four most likely scenarios for an initial detection in birds coincident with the detection network include: (1) wild migratory waterfowl or shorebirds, (2) semi-domesticated waterfowl and shorebirds associated with parks and ponds in urban settings, (3) backyard poultry, or (4) commercial poultry operations. State agencies have jointly outlined their respective response activities and recommendations for the public based on what is currently known about HPAI H5N1 virus.

The following scenario-based state agency responses to a detection of HPAI H5N1 were developed by a multi-agency working group. The developed scenarios focus on state policies and responsibilities and offer an overview of issues to assist in agency planning and response efforts. Also included are suggested messaging “themes” and simplified messaging for local agencies to consider in developing general public talking points.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Actions by the DFG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection of HPAI H5N1 in Wild Waterfowl or Shorebirds in a Natural Setting</td>
<td>- DFG will immediately communicate with all appropriate federal, state and local governments regarding the detection of HPAI H5N1. - Immediately assess risk to wild bird populations. - Enhance HPAI H5N1 testing (surveillance) of susceptible species of wild birds in the affected area. - Enhance testing of wild bird mortality in the affected area. - Consider restricting access to recreational facilities based on risk assessment. - Issue public service announcements emphasizing hunter safety information and public safety recommendations. - Issue guidelines to hunters on the care and cleaning of hunter-harvested birds. - Communicate with bird rehabilitators and increase testing of wild birds in rehabilitation facilities. - Ensure DFG personnel are familiar with health risks, proper work practices to minimize exposures, and procedures to follow in case of exposure to ill birds.</td>
</tr>
<tr>
<td>Detection of HPAI H5N1 in Semi-domesticated Waterfowl in Urban Parks and Ponds</td>
<td>- Immediately assess risk to wild bird populations. - Enhance HPAI H5N1 testing (surveillance) of susceptible species of wild birds in the affected area. - Enhance testing of wild bird mortalities in the affected area. - Communicate with bird rehabilitators in the area and increase testing of wild birds in rehabilitation facilities. - Issue guidelines to hunters on the care and cleaning of hunter-harvested birds.</td>
</tr>
</tbody>
</table>

Other Wildlife-Associated Activities

Potential entry of HPAI H5N1 into our wild bird populations in California may occur through various routes. The four most likely scenarios for an initial detection in birds coincident with the detection network include: (1) wild migratory waterfowl or shorebirds, (2) semi-domesticated waterfowl and shorebirds associated with parks and ponds in urban settings, (3) backyard poultry, or (4) commercial poultry operations. State agencies have jointly outlined their respective response activities and recommendations for the public based on what is currently known about HPAI H5N1 virus.

The following scenario-based state agency responses to a detection of HPAI H5N1 were developed by a multi-agency working group. The developed scenarios focus on state policies and responsibilities and offer an overview of issues to assist in agency planning and response efforts. Also included are suggested messaging “themes” and simplified messaging for local agencies to consider in developing general public talking points.
### Detection of HPAI H5N1 in Backyard Domestic Poultry

The California Department of Food and Agriculture (CDFA), is the lead agency in response to a finding of HPAI H5N1 in backyard poultry. CDFA will initiate an immediate response to confine and eliminate the identified flock and suppress potential spread to other bird populations. The size and complexity of the response will be incident dependent and may involve other local, state and federal agencies.

<table>
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<tr>
<th>Scenario</th>
<th>Actions by the DFG</th>
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</table>
| Detection of HPAI H5N1 in Backyard Domestic Poultry | - Immediately assess risk to wild bird populations.  
- Perform wildlife inventory in the affected area.  
- Enhance HPAI H5N1 testing (surveillance) of susceptible species of wild birds in the affected area.  
- Enhance testing of wild bird mortalities in the affected area.  
- Communicate with bird rehabilitators in the area and increase testing of wild birds in rehabilitation facilities. |

### Detection of HPAI H5N1 in a Commercial Poultry Setting

The CDFA is the lead agency in response to a finding of HPAI H5N1 in commercial poultry. CDFA will initiate an immediate response to confine and eliminate the identified flock and suppress potential spread to other bird populations. The size and complexity of the response will be incident dependent and may involve other local, state and federal agencies.

<table>
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<th>Scenario</th>
<th>Actions by the DFG</th>
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| Detection of HPAI H5N1 in a Commercial Poultry Setting | - Immediately assess risk to wild bird populations.  
- Perform wildlife inventory in the area of affected premises.  
- Enhance HPAI H5N1 testing (surveillance) of susceptible species of wild birds in the area of the affected premises.  
- Enhance testing of wild bird mortalities in the area of the affected premises.  
- Communicate with bird rehabilitators in the area and increase testing of wild birds in rehabilitation facilities. |

### Literature Cited

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Appendix 2: Avian Influenza Environmental Sampling Site Selection
Appendix 3: DFG Response to Wild Bird Mortality Events
Appendix 4: Dead Wild Bird Questionnaire
Appendix 5: Wildlife Disease Incident and Specimen submission Form
Appendix 6: General Information on the Field Investigation of Wild Bird Mortality Events
Appendix 7: DFG H5N1 Avian Influenza Communications Plan
Appendix 8: Employee Health and Safety for Avian Influenza Surveillance and Control Activities
Appendix 9: ICS Based Wildlife Operations in Response to a Detection of HPAI H5N1
Appendix 10: Avian Influenza Sampling Protocol
Appendix 11: Instructions for Packaging, Shipment and Submission of Specimens to the Wildlife Investigations Lab
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APPENDIX 1

Proposed Operational Plan for Avian Influenza Sampling in Wild Birds in California

Live Bird Sampling

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subtotals                  0   800   1,325   1,175   0   300   0   3,600

Hunter-killed Bird Sampling

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subtotals                  3,305
## Environmental Sampling

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<th>Oct</th>
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### Mortality Events

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<th>Aug</th>
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<th>Dec</th>
<th>Jan</th>
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### APPENDIX 2

#### Avian Influenza Environmental Sampling Site Selection

This model was developed to identify areas with the highest probability of detecting HPAI H5N1 in wild birds. In order to prioritize environmental sampling efforts, the following criteria were examined: average harvest of four species of waterfowl, wetland acreage, commercial poultry production, game bird breeders and clubs, and areas with LPAI H5N1 occurrences.

#### Average Harvest by County

Data were considered for target species, northern pintail, American green-winged teal, American wigeon, and northern shoveler. These species were identified by the Interagency Asian H5N1 Early Detection Working Group as primary and secondary candidates for surveillance in the Pacific Flyway. Data included in model consisted of the highest harvest by county for each species. Harvest number were averaged and ranked as high, medium and low for each species. These ranks were then compiled to identify counties with the highest potential for sampling these species.

---

**Legend**

ACGO – Aleutian Canada Goose  
AGWT – American Green-winged Teal  
AMWI – American and Eurasian Wigeon  
DUNL – Dunlin  
GWFG – Greater and Tule White-fronted Goose  
LBDO – Long-billed Dowitcher  
MALL – Mallard  
NOPI – Northern Pintail  
NSHO – Northern Shoveler  
RUTU – Ruddy Turnstone  
SBDO – Short-Billed Dowitcher  
WESA – Western Sandpiper  
UNK – Unknown
Wetlands

Wetland data were summarized by acreage within a 10 kilometer hexagon grid for the State. Wetland data were ranked High (greater than 1000 ac), Medium (600 – 1000 ac) and low (less than 600 acres).

Hydrologic data included wetland types: seasonally flooded palustrine emergents, seasonally flooded estuarine emergents, open water, permanently flooded estuarine emergents and permanently flooded palustrine emergents, as well as lakes, reservoirs and major rivers.

Commercial Production, Breeders and Clubs

These data summarize the number of commercial poultry operations, licensed game bird breeders and licensed game bird clubs with a 10 kilometer hexagon grid. These data were ranked high (5-8 locations), medium (3-4), or low (1-2). Data received from CDFG License and Revenue Branch and California Department of Food and Agriculture.

Previous Low Path H5N1

These data show previous documented low pathogenic avian influenza outbreaks by zip code within the state. These data were all ranked high. Datasets received from CDFA.

Ranked variables were combined and then clipped to the extent of the counties identified in the waterfowl harvest data. The resulting grid shows areas with the highest combination of variables (see attached map). Public lands with potential with waterfowl habitat were identified, some of these areas will be sampled through hunter killed birds and live trapping efforts. The list below identifies a few public areas that may have suitable habitat and sites that allow sampling to be conducted under the established environmental sampling protocol.

Obviously, coordination with managers to determine access and flood regimes will establish the suitability for sampling during different times of the season.

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</tr>
<tr>
<td>Colusa &amp; Glenn: Colusa Bypass WA, Sacramento NWR Complex</td>
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<td>Solano: Grizzly Island, Cordelia Slough (Garibaldi Unit)</td>
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<table>
<thead>
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<td>Imperial: Imperial WA</td>
</tr>
<tr>
<td>Fresno: Mendota WA</td>
</tr>
<tr>
<td>Siskiyou: Shasta Valley WA</td>
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<td>Sutter: Sutter Bypass WA</td>
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</table>

<table>
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<th>Lower Risk County: Suggested Sample Site</th>
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<td>Yolo: Yolo Bypass WA</td>
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<td>Kern: Kern NWR</td>
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APPENDIX 3

DFG Response to Wild Bird Mortality Events

Introduction

The DFG’s Wildlife Investigations Lab (WIL), located in Rancho Cordova, is routinely involved with and investigates unusual cases of mortality (death) and morbidity (sickness) and disease outbreaks in wild birds and mammals statewide as mandated in Fish and Game Code Section 1008. Due to the emergence and spread of a highly pathogenic avian influenza virus (HPAI) subtype H5N1 in Asia, Europe and Africa during the past several years and elevated concerns that this virus could potentially be transported into North America by migratory waterfowl, WIL is implementing an enhanced response strategy for reporting, surveillance, and investigation of wild bird mortality events. A web-based database, Wildlife Disease Tracking Database, is being operated by the DFG’s Information and Technology Branch (ITB) to facilitate the recording of these events.

Background on Avian Influenza Viruses

Avian influenza (AI), or bird flu, is a virus typically found in wild birds, especially waterfowl and shorebirds. The virus is only found in a small percentage of wild birds, and generally does not cause clinical signs of disease in these birds. The AI virus is shed in fecal droppings, saliva and nasal discharges of infected birds. Since 1997, a particularly virulent strain of this virus has emerged in Asia – the HPAI H5N1 virus.

This HPAI H5N1 virus most likely originated from domestic poultry in that region and is of concern because: 1) it poses a threat to domestic poultry, especially chickens (>200 million domestic poultry have died as a result of HPAI H5N1 in Asia and Europe); and 2) it has caused illness in more than 6 humans worldwide resulting in the deaths of at least 157 (58% mortality rate) people as of January 2007 in Asia, Egypt, and parts of Europe. Most human cases are thought to have become infected with the virus through direct handling of infected poultry, consumption of uncooked poultry products, or contact with virus-contaminated surfaces or materials. However, to date, the risk of HPAI H5N1 transmission to people through direct contact with infected poultry remains very low. Probable, limited person-to-person transmission of H5N1 viruses in a small number of cases has been reported.

There is an increasing number of reports that HPAI H5N1 is infecting and causing death in wild birds, including some migratory species (e.g., bar-headed geese). These events and the associated spread of the HPAI H5N1 virus to new geographical areas in Asia, Europe, and Africa have created concerns about the possibility that this HPAI H5N1 virus could be carried into North America in migratory birds.

Because situations can change quickly, recommendations are included in Appendix 7 (Employee Health and Safety for Avian Influenza Surveillance and Control Activities) for the safe handling of wild birds in the event that HPAI H5N1 is detected in North America in the future. There is limited documentation that HPAI H5N1 has been transmitted from wild birds to humans; however, a cluster of human cases may have arisen from the removing of feathers from dead infected swans in Asia. Wild birds can be infected with disease agents other than this virus, some of which are currently of more concern to human health in North America than HPAI H5N1; therefore, precautions should always be taken to minimize the exposure to zoonotic disease agents when handling wild birds.
Reporting Protocol and Notification of the Wildlife Investigations Lab
A *Wild Dead Bird Questionnaire* form (Appendix 4) should be completed for each morbidity/ mortality event reported. The completed questionnaire should be faxed to the WIL at (916) 358-2814 or e-mailed (pswift@dfg.ca.gov) as soon as possible so that the data can be entered into the Web-based Wildlife Disease Tracking Database. The data collected from the reporting party can be input directly into the database by a DFG employee. The questionnaire should be completed for all dead bird reports received by the DFG which fit the following criteria:

- ≥5 dead wild birds within a short period of time (days) of the same or different species
- single death of an AI priority migratory bird species (waterfowl & shorebirds)
- sick wild birds exhibiting clinical signs of respiratory disease (coughing, sneezing, difficulty breathing)
- any unusual mortality event as determined by the regional biologist in consultation with the WIL.

If a significant mortality event is reported or discovered after regular office hours or during a holiday and the DFG field investigator feels it necessary to discuss the situation with the WIL personnel, contact either Dr. Pam Swift or Dr. Ben Gonzales.

Systematic Response to Mortality Events
When a mortality event is reported to the DFG, the questionnaire is completed, and the situation is to be triaged by the regional field biologist, scientific aid or the designated wildlife area personnel in collaboration with the WIL veterinarian/disease specialist to determine the response to the event. In most cases, regional field personnel will be the responder if a field investigation is warranted. If birds involved in a mortality event exhibit clinical signs suggestive of avian influenza (e.g., coughing, sneezing, or difficulty breathing), regional personnel will implement a rapid field response to investigate and collect appropriate samples for diagnostics using safety protocols developed by the DFG Safety Officer (Appendix 7). Appropriate personal protection equipment (PPE) must be used to minimize the potential exposure of DFG personnel to a disease agent. A *Wildlife Disease Incident and Submission Form* (Appendix 5) must be completed and accompany any carcasses or other specimens submitted to a diagnostic laboratory. Refer to Appendix 6 for information on the recording of important field observations and proper specimen collection during the field investigation.

Following the field investigation and specimen collection, carcasses and other specimens will be submitted either to the WIL, the California Animal Health and Food Safety Lab (CAHFS), or the National Wildlife Health Center (NWHC) for evaluation. Contact the WIL to determine the appropriate diagnostic lab to be used.

Contact Phone Numbers

**Department of Fish and Game**
- Wildlife Investigations Laboratory: (916) 358-2790
- Dr. Pamela Swift: (916) 358-1462
- Steve Torres: (916) 358-1987
- Dr. Ben Gonzales: (916) 358-1464
- WIL Scientific Aids: (916) 358-1510
- Wildlife Branch: (916) 445-3406
- Eric Loft, Chief: (916) 445-3555
- Dan Yparraguirre, Waterfowl Coordinator: (916) 445-3685

**USDA/APHIS/Wildlife Services**
- Craig Coolahan: (916) 979-2030 ex. 102
- Jerry Wiscomb: (916) 979-2030 ex. 105

**California Animal Health & Food Safety Lab**
- CAHFS, Davis Laboratory: (530) 752-8700
  - West Health Sciences Drive
  - Davis, CA 95616
- CAHFS, San Bernardino Laboratory: (909) 383-4287
  - 105 West Central Avenue
  - San Bernardino, CA 92412
- CAHFS, Turlock Laboratory: (209) 634-5837
  - 1550 North Soderquist Road
  - Turlock, CA 95381
- CAHFS, Tulare Laboratory: (559) 688-7543
  - 18830 Road 112
  - Tulare, CA 93275
- CAHFS, Fresno Laboratory: (559) 498-7740
  - 2789 South Orange Avenue
  - Fresno, CA 95725

**National Wildlife Health Center**
- 6006 Schroeder Road
  - Madison, WI 53711
APPENDIX 4

DEAD WILD BIRD QUESTIONNAIRE

Date of Report ____________________ Did RP Contact the West Nile Hotline? Yes____ No____
Name ___________________________ Phone number __________________________
City ___________________________ County ________________________________
Location of Loss If Different From Address __________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
Habitat at mortality event location (orchard, field, road, park, backyard, ranch, marsh, pond, lake, river, coastal shoreline, residential, rural)

<table>
<thead>
<tr>
<th>Bird Species Involved</th>
<th># Sick Birds</th>
<th># Dead Birds</th>
<th># Birds at Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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</tbody>
</table>

When did the birds die? (<2 hours, < 24 hours, > 24 hours) ______________________________
Circumstances surrounding the mortality __________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

Any visible lesions observed by RP? (crusting around eyes, beak or legs; diarrhea; feather loss; lacerations, fractured bones, etc.) ______________________________

Any sick birds observed? Yes____ No____ Describe bird’s behavior __________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

Actions taken by DFG:
□ report only
□ initiate investigation/date: _______ – field investigator ___________________________
□ pickup carcass or sample
□ collect tracheal/pharyngeal/cloacal samples
□ lab submission
□ necropsy; name of lab ___________________________
□ receive diagnostic results
□ additional testing
□ close investigation; date ___________________________

Cause of Mortality: presumptive diagnosis/final diagnosis ___________________________

Comments and/or more details on the morbidity/mortality event __________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

Fax completed questionnaire to: (916) 358-2814
APPENDIX 5

WILDLIFE DISEASE INCIDENT AND SPECIMEN SUBMISSION FORM

California Department of Fish & Game
Wildlife Investigations Laboratory
1701 Nimbus Road, Suite D, Rancho Cordova, CA 95670
(916) 358-2790 phone / (916) 358-2814 fax

<table>
<thead>
<tr>
<th>Accn #</th>
<th>Rec’d by</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

Date of loss: __________________________ Date of loss: __________________________

Nearest town: __________________________ County: __________________________

Specific location of loss: __________________________

Loss first reported by:

Name: __________________________ Phone #: __________________________ Date: __________________________

Address: __________________________ City: __________________________ Zip code: __________________________

CDFG investigator: __________________________

Outline circumstances and suspected cause of loss (additional space on back):

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

Wildlife Loss Information

<table>
<thead>
<tr>
<th>Species</th>
<th># Individuals Died</th>
<th># Individuals Sick</th>
<th># Individuals at Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Wildlife/Specimen Submission Information

<table>
<thead>
<tr>
<th>Specimen ID</th>
<th>Species</th>
<th>Sex</th>
<th>Age</th>
<th>Date Died</th>
<th>Specimen Type</th>
</tr>
</thead>
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</table>

Report Prepared By: __________________________ Phone: __________________________ Date: __________________________

Factual Diagram/Narrative

Narrative:

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

PROCEDURE FOR SUBMITTING SAMPLES TO WIL:

1. Record all pertinent data on a Wildlife Disease Incident and Specimen Submission Form. Record anything that may be of importance in making a diagnosis, i.e., species, sex, and age of animal(s); where the animal was found -- location and county; the habitat type; date and time it was found. If the animal is dead, note when it died; if there were other animals of the same or different species sick in the same area, how they were behaving; if a flock of birds is involved, note how many birds are at risk; name, address, and phone number of the person who reported it; and if rabies is suspected, whether or not there was human exposure.

2. Use adequate safety precautions when handling dead or diseased animals. Always wear gloves when handling a dead or diseased animal.

3. When submitting tissue samples, place samples into appropriate containers, plastic whirl-pak bags, or vials. Submit whole carcasses individually wrapped in plastic bags and labeled. In the event of a die-off involving birds, try to submit two or more fresh carcasses to confirm cause of die-off.

4. Place the carcass or sample container into a Styrofoam ice chest with enough ice packs, or water frozen in plastic bottles (not glass) to keep chilled during transport (it is difficult for WIL to return ice packs and ice chests).

5. Seal ice chest in a sturdy cardboard box. Be sure to include the completed Wildlife Disease Incident and Specimen Submission Form.

6. Ship container to: Wildlife Investigations Lab, Dept of Fish and Game, 1701 Nimbus Road, Suite D, Rancho Cordova CA 95670

7. Call the WIL at (916) 358-2790, prior to sending samples, to notify personnel as to the estimated time of arrival.
What Information Should Be Collected

What seems irrelevant in the field may be the key to a diagnosis; therefore, be as thorough as possible. Avoid preconceptions that limit the information collected and that may imperceptibly bias the investigation. Critical pieces of information include a good description of unusual behavior or appearance, a list of species were affected, and the number of animals that died. Send specimens and the written history to the laboratory as soon as possible. Photographs can be helpful if they convey specific information, such as environmental conditions during a die-off and the appearance of sick wildlife or gross lesions. The following sections note basic information that is helpful for diagnosing the cause and assessing the severity of a wildlife health problem.

Environmental Factors

It is important to determine if the start of mortality coincided with any unusual event. Environmental changes such as storms, precipitation, and abrupt temperature changes are potential sources of stress that can contribute to disease outbreaks. A food shortage may degrade the condition of birds and increase their susceptibility to disease. Water-level changes in an area may concentrate or disperse birds, alter the accessibility of toxins in food or water, or cause an invertebrate die-off that could lead to an avian botulism outbreak. It is also important to attempt to determine whether or not biting insect populations have increased or if such insects are present, because some insects are carriers of blood-borne infections in waterfowl. The quality of the water used as a source for an impoundment may contribute to disease or mortality; for example, poor water quality may contribute to avian botulism or may be a primary cause of mortality if water contamination by toxic materials and substances such as oil, which can affect the integrity of feathers, is severe. Additionally, recording recent pesticide applications and other habitat or crop management practices, as well as previous disease problems in the area, provides valuable information.

Estimating Disease Onset

When estimating the onset of disease, consider: (1) the earliest date when on-site activities could have resulted in the detection of sick or dead birds, if they were present, and the actual date when deceased birds were first seen, and (2) the proportion of fresh carcasses compared with the number of scavenged and decomposed carcasses. The abundance and types of scavengers and predators can be used to predict how long carcasses remain in the area. Other useful information about the onset of mortality can be gained from noting any differences in plumage, including stage of molt, if present, between live and dead birds. Size differences between live and dead nestlings and fledglings may also provide useful information for comparison with known growth rates. Also, air, water, and soil temperatures will affect the speed of decomposition, and they should be considered in assessing how long birds have been dead. Include these observations in the history. The field investigator may use photography to illustrate field observations associated with the wildlife mortality event.

Species Affected

Much can be learned by knowing what species are dying. Those species present, but unaffected, are especially important to note, because some diseases infect a narrow host range and others infect a wide variety of species. For example, duck plague affects only ducks, geese, and swans, but avian cholera affects many additional species of water birds as well. Species with similar feeding habits may be dying as a result of exposure to toxins, while birds with different food requirements remain unaffected.

Age

Some disease agents may kill young birds, but leave adults unaffected because of age-related disease resistance; other diseases kill birds of all ages, although young or old birds may be more susceptible because of additional stress placed on these age groups. When toxins are involved, differences in food habits may result in exposure of young birds, but not of adult birds, or vice versa.

Sex

Sex differences in mortality events may be apparent in colonial nesters where females are incubating eggs, or in other situations where the sexes are segregated.

Number Sick/Number Dead

The longer a disease takes to kill, the more likely it is that significant numbers of sick birds will be found. For example, more sick birds will probably be observed during an avian botulism die-off than during an outbreak of a more acute disease such as avian cholera.

Clinical Signs

When observing sick birds, the field investigator must describe the clinical signs in as much detail as possible. Include any abnormal physical features and describe unusual behaviors, such as a sick bird’s response to being approached. Photographs of various behaviors or conditions associated with a disease can be especially useful and should be included with the history.

Population at Risk

It is important to determine what species, and how many of each species, are in the vicinity of the mortality event. This information can provide clues about the transmissibility of disease, and it may be useful during control efforts.

Population Movement

Recent changes in the number of birds and species in the area is important to record. In particular, note the presence of endangered species in the area. If bird numbers have increased, try to determine where they came from; if bird numbers have decreased, attempt to determine where they have gone. This can often be accomplished when population movements are being monitored for census, hunting forecasts, and other purposes. State, federal, and private refuge personnel and other natural resources managers are good primary sources of information.

Specific Features of Problem Areas

Describing the location of a morbidity/mortality event so that a relatively specific area can be identified on a road map is critical. Also include any available precise location data, such as global positioning information or data that will facilitate entering of specific locations into geographical information system databases. Be sure to describe the area in terms that are sufficiently graphic so that someone with no knowledge of it can visualize its major characteristics, such as topography, soil, vegetation, climate, water conditions, and animal and human use.
It is also important to identify where sick and dead birds are found, especially noting the locations of groups of dead birds and any differences of habitat where dead and sick birds are found. Birds found in agricultural fields may be dying of pesticide exposure, birds with more chronic toxicoses usually seek dense cover, and birds dying of acute diseases may be found in a variety of situations. Check any relation between specific bird use of the area and the location of affected birds, such as roost sites, loafing areas, and feeding sites. If follow-up investigations are conducted after specimens have been submitted, summarize the findings and observations of those investigations in a supplemental report to the original history. Both reports should contain the dates of the investigations, whether air or ground searches were performed, the number of investigators and the time spent on the investigation, the weather conditions, and the time of day when the site was investigated. The insight provided by good specimen history data and by field observations is invaluable to disease specialists. This information enhances understanding of the ecology of disease, thereby serving as a basis for developing ways to prevent future morbidity/mortality events or to reduce the magnitude of losses that might otherwise occur.

**Example Description of Die-off Location**

The following narrative is a good example for recording field information:

“The problem area is a 10-acre freshwater pond located in Teno County, North Carolina, 1/2 mile east of County KV, 5 miles north of Highway 43. The pond has an average water depth of 6–12 feet and a sandy substrate. Vegetation around the pond border is bullrush and reed canary grass. The surrounding uplands are essentially flat for one-half mile in all directions and lie fallow, covered with grasses and some shrubs. The area is coastal with enough relief to prevent saltwater intrusion into the pond even during major storms. Weather for the past 2 weeks has been pleasant and there has been no precipitation. Daytime temperatures are currently in the mid-80s (°F) and evening temperatures in the 70s. This is an isolated body of freshwater with good clarity, and sustains several hundred waterfowl, gulls, and small numbers of wading birds and shorebirds, and healthy warm water fish and amphibian populations. Cattle graze the adjacent area. There are no residential or industrial buildings within 1 mile of the site. Human visitation is frequent for bird watching, fishing, and hiking. Companion animals such as dogs are allowed on the area.”

**Specimen Collection and Preservation**

Specimens are used to provide supporting information leading to the diagnosis of a cause of disease or death. A specimen may be an intact carcass, tissues removed from carcasses, parasites, ingested food, feces, or environmental samples. The specimen should be as fresh and undamaged as possible.

**Choosing a Specimen**

An entire, fresh carcass is the best specimen to submit to the laboratory for diagnosis. This allows the diagnostician to assess all of the organ systems and to use appropriate organs for different diagnostic tests. Obtain the best specimens possible for necropsy; decomposed or scavenged carcasses are usually of limited diagnostic value. A combination of sick animals, animals that were euthanized after clinical signs were observed and recorded, and some of the freshest available carcasses compose an ideal specimen collection. The method of euthanasia should not compromise the diagnostic value of the specimen (see Chapter 5, Euthanasia). More than one disease may be affecting the population simultaneously, and the chances of detecting multiple diseases will be maximized if both sick and dead animals are collected. Specimens submitted should be representative of the species involved. If more than one species is affected, collect several specimens of each species; try to obtain a minimum of five specimens per species.

**Tissue Collection**

The primary consideration when collecting carcasses or tissues for diagnosis should be personal safety. Some wildlife diseases are transmissible to humans, and every carcass should be treated as a potential health hazard. Always use the appropriate personal protection equipment depending on the situation and the level of risk.

In the area where carcasses are being collected, it is recommended to double-bag used gloves and coveralls, and disinfect boots and the outside of plastic bags with a commercial disinfectant or a 5 percent solution of household chlorine bleach. Also, it is recommended to double-bag specimens in plastic before removing them from the area. These precautions will help protect the people in the field and minimize transmission of disease to unaffected wildlife populations. If it is impossible to submit an entire carcass for diagnosis, appropriate organs must be removed from specimens. Contact the WIL prior to the field necropsy of any bird.

**Specimen Collection and Preservation**

If gloves are not available and you must collect dead birds or small mammals, use a plastic bag to protect hands from direct contact with animal tissues during the collection of specimens. Grasp the bag at the bottom and with other hand pull the bag’s open end down over hand holding bag. Repeat for the “unbagged” hand. Reversing this process when handling small specimens will automatically place specimens in the bag, which then need only be sealed and put into a second bag for packaging and shipment.

**Labeling Specimens**

Proper labeling, maintaining label readability, and preventing label separation from specimens are as critical as proper specimen selection and preservation. The label should be as close to the specimen as possible; for example, a label should be attached to a carcass, attached to a tube of blood, or placed within the vial of preservative with a parasite. Double labeling, or placing a label on the outside of a plastic bag holding the specimen is recommended. The double labeling prevents confusion and potential errors in specimen records at the diagnostic laboratory when specimens are received from multiple carcasses. Manila tags can be used, but must be protected from moisture. Use soft lead pencil or waterproof ink on these tags; do not use ballpoint pen, nonpermanent ink, or hard lead pencil.

**Carcass**

Identifying each carcass with a tag fastened with wire or string to a leg is the preferred practice. If tags are not available, use a 3 x 5-inch card placed inside a plastic bag within the bag holding the carcass. Information on the tag should include the name, address, and telephone number of the submitter, collection site, species; whether the animal was found dead or was euthanized (indicate method); and a brief summary of any clinical signs. Once this is completed, place each tagged carcass in a separate plastic bag and seal the bag.

**Tissues and Organs**

When a specimen is in a plastic bottle or jar, wrap a piece of adhesive or masking tape entirely around the container and use an indelible marker to write on the tape. List the type of animal from which the sample was taken, the kind of tissue, and the date the sample was taken. When plastic bags are used as the first containers for tissues, they should be labeled with the same information directly on the bag. Do not insert tags inside containers with tissues and organs collected for microbiological or chemical analyses because the tag or the ink on it may contaminate the specimen.

**Specimen Preservation**

Depending on how long it will take to ship to a diagnostic laboratory, it may be necessary to chill or freeze specimens. Freezing reduces the diagnostic usefulness of carcasses and tissues, but if specimens must be held for 2 or more days, freezing the specimens as soon as possible after collecting them minimizes their decomposition.

Background

Highly pathogenic H5N1 avian influenza (HPAI H5N1) is primarily a bird disease that is particular to domestic poultry, but can also infect most other birds both domestic and wild, and to a lesser extent, mammals. Public health officials, agricultural agencies, poultry producers, and wildlife professionals from around the globe have taken a keen interest in the HPAI H5N1 virus currently spreading in other part of the world due to the high pathogenic nature of the virus. Thus far, most cases of transmission to humans have been from close contact with sick or dead infected poultry, and not from human to human contact, which is an important distinction. The movement of HPAI H5N1 to different countries, its pathogenic behavior in different host species, and its ability to move from one host to another, both within and among species, is being effectively monitored.

The HPAI H5N1 virus that is causing high mortality in poultry and wild birds in other countries has been identified in Asia, Africa, India, and Europe, but to date has not been found in North America.

This HPAI H5N1 virus may eventually spread to North America either through infected wild migratory waterfowl, infected humans, or by the movement of infected poultry, exotic birds or bird products. Although the United States has banned the importation of birds or bird products from countries affected with HPAI H5N1, introduction by birds or bird products could occur through illegal importation. The California Department of Fish and Game (DFG) routinely monitors wild bird die-offs and, due to increased concern that HPAI H5N1 could spread to North America and cause wild bird death, has enhanced its investigation of wild bird die-offs.

One of the most widely held speculations on the movement of the virus to North America is through wild migratory birds, particularly waterfowl and shorebirds in the Pacific Flyway. The Pacific Flyway is a migratory corridor for birds. It stretches along the Pacific Coast from Mexico north to Alaska and into Siberia, Russia. It is feasible that a HPAI H5N1-infected wild migratory bird in Asia may pass the virus to another wild migratory bird in Siberia, and eventually end up in North America, and ultimately in California. Evidence of wild migratory birds carrying the virus during their migrations exists elsewhere around the world, especially in Europe. The scientific community now recognizes movement of the virus via migratory birds as a very real possibility. However, this risk from migratory birds is still less likely than the risk of the disease entering North America, and cause wild bird death, has enhanced its investigation of wild bird die-offs.

The purpose of developing a communications plan is to create a consistent message within DFG for those who will handle the bulk of any public calls or media inquiries and to have a consistent message developed if HPAI H5N1 virus is confirmed in California, whether in wild or domestic birds.

Education

Californians should be made aware of the risks involved with the HPAI H5N1 avian influenza and how to minimize the risk of disease in poultry and in humans, as well as in wild birds. The DFG is educating constituent groups, especially those that have regular contact with wild birds through hunting, game bird breeding, or wildlife rehabilitation (working with sick and injured wild birds).

The HPAI H5N1 virus is primarily a bird disease. However, mutations and the exchange of genetic material with other influenza viruses increases the chance that the HPAI H5N1 virus could adapt to humans and spread from human to human, leading to an influenza pandemic.
Any wild bird morbidity (sickness) or mortality (die-off) event, regardless of the cause, will be of significant interest to media. Wild bird morbidity and mortality events are often noticed initially by members of the public who then report the dead birds to a wildlife rehabilitator or to DFG. Responsive action by DFG experts will be necessary to prevent speculation that the mortality event is related to or caused by the HPAI H5N1 virus. Since the field investigation and the diagnostic testing may require several days to complete, DFG is prepared to work closely with reporters to provide information as soon as it is available.

DFG Surveillance for Avian Influenza

The DFG is implementing a surveillance program for wild migratory birds in California in cooperation with the Pacific Flyway Council. The surveillance will be based on recommendations contained in the United States Interagency Strategic Plan entitled An Early Detection System for Asian H5N1 Highly Pathogenic Avian Influenza in Wild Migratory Birds. Produced by the U.S. Department of Agriculture and the U.S. Department of Interior, this plan focuses on the early detection of the HPAI H5N1 avian influenza virus in migratory birds. Biologists and wildlife veterinarians from state and federal wildlife agencies in Alaska are gearing up for a massive sampling effort for summer 2006. Data from that sampling effort is expected to provide better predictions for the rest of North America.

Risk Assessment of HPAI H5N1 Spreading to North America

The HPAI H5N1 avian influenza virus could eventually spread to North America through one or more methods. Migratory wild birds, the movement of infected poultry or captive exotic birds, or the movement of contaminated bird products, could bring the virus into California. Infected birds could be illegally smuggled into the state via illegal cock fighting rings. Anyone who enters California on direct airplane flights from areas where H5N1 is prevalent could potentially transport the virus. There will be a focus on preventing transmission of the disease from wild birds to humans as several of DFG’s constituent groups have regular contact with wild birds.

Public Contact with Wild Birds

Risk of transmission of the HPAI H5N1 virus from wild birds to humans is considered very low for people who have limited contact with wild birds. There have only been a few cases documented of the HPAI H5N1 virus being transmitted from wild birds to humans. In those cases, the people were exposed to the virus by collecting and de-feathering dead wild swans infected with HPAI H5N1. Such exposure is unlikely if a member of the public simply leaves the dead bird where found and reports it appropriately. Currently, when a member of the public contacts DFG after finding a sick or injured bird, they are referred to a wildlife rehabilitation center. Additional procedures have been developed for use in the event that the HPAI H5N1 virus is identified in California.

“Avian Influenza” versus “Bird Flu”

“Bird Flu” is a non-scientific phrase used to describe the entire class of avian influenza viruses. It is a term often used incorrectly to describe the highly pathogenic H5N1 avian influenza virus. The term “bird flu” should not be used by the DFG in communication with the public. When referring specifically to the highly pathogenic H5N1 avian influenza virus, the entire phrase should be used to prevent misunderstanding. Newspaper reporters will often shorten the phrase to its acronym HPAI H5N1. “H5N1 avian influenza” is an acceptable phrase when working with broadcast media although it should be explained that there is the possibility of low pathogenic H5N1 avian influenza.

Key Messages

What to advise the public to do about sick, injured, or dead birds found in the wild

• Individual sick or injured birds in the wild should be left untouched where they are found and be reported to the local DFG office, the dead bird hotline (916-358-1510) and/or wildlife rehabilitation centers: http://www.dfg.ca.gov/comed/living.html. Except for unusual circumstances, callers will be referred to a wildlife rehabilitator.
• Individual dead birds (less than five) in the wild should be reported to the West Nile Virus Hotline at 1-877-WNV-BIRD (1-877-968-2473) or the Web site: http://vector.ucdavis.edu/cmf/deadbird.cfm
• Groups of sick or dead birds (five or more) should be reported to the nearest local DFG office or the dead bird hotline (1-800-491-1899)
• Single dead water bird (waterfowl and shorebird) should be reported to the nearest local DFG office or the dead bird hotline (1-800-491-1899)

What to advise members of the public who have regular contact with wild birds regarding sick, injured, or dead birds

Each of the constituent groups listed below has an elevated risk of coming into direct contact with infected wild birds. In addition to an effective reporting process, DFG’s goal is to prevent human infection that could increase the chance of HPAI H5N1 avian influenza mutating into a pandemic disease. Constituent groups will be provided with information indicating risks they face, ways to mitigate the risks, and ways to prevent exposure. The goal is to increase awareness and provide education. In addition, these groups need to be informed about signs to look for in wild birds, and the process for reporting suspected cases of HPAI H5N1 avian influenza.

Groups with increased risk due to increased contact with wild birds
• Hunters
• Wildlife rehabilitators
• Gamebird breeders
• Licensed game bird clubs
• Falconers
• Scientific collectors
• Backyard bird feeders
• Zokeepers
• Field biologists

Persons should follow the above mentioned contact protocol in “What to advise the public to do about sick, injured, or dead birds” if any non-domestically reared bird found in the wild, either sick, injured, or dead. Removal and handling of domestically reared sick birds or birds that have died from any disease should be coordinated through the California Department of Food and Agriculture (CDFA) hotline at 1-800-491-1899 or 1-909-947-4462. CDFA has extensive information about what to do if domestically reared birds become sick on their Web site at: http://www.cdfa.ca.gov/ahfsis/ah/avian_health_program.htm

Current facts about HPAI H5N1 Avian Influenza in North America

• Part of DFG’s regulatory responsibility is to monitor bird diseases in California, including the HPAI H5N1 virus. Constituent groups are being asked to cooperate with monitoring and surveillance efforts. Hunters may be asked to submit their birds for AI testing. Licensed game bird breeders and wildlife rehabilitation centers are asked to cooperate with wildlife officials.

Current facts about HPAI H5N1 Avian Influenza in North America
The HPAI H5N1 avian influenza virus has caused mortality in more than 60 species of wild birds since April 2005. In the United States, there is currently no known risk of being exposed to the HPAI H5N1 virus through contact with wild birds. There is currently no evidence to suggest that the HPAI H5N1 virus is present anywhere in North America. However, it could eventually arrive via migratory wild birds, illegal importation of infected poultry or captive exotic birds, or from infected travelers and/or their contaminated belongings entering California on direct flights from regions where the HPAI H5N1 virus is prevalent.

When handling wild birds, basic hygiene is always necessary. For hunters, field dressing practices should include using disposable gloves, washing hands, proper food preparation, and thorough cleanup including disinfecting all cookware, tables, counters, and tools that have come into contact with the bird. Smoking, eating or drinking while handling wild birds should be avoided.

There are many subtypes and strains of avian influenza viruses in poultry and wild birds currently present in North America. An avian influenza virus may or may not make a particular bird sick, depending on its pathogenicity.

The HPAI H5N1 avian influenza virus is more pathogenic in domestic chickens than it is in wild waterfowl. The domestic poultry system in the United States is monitored to keep it disease free.

Avian disease outbreaks are a naturally occurring event in California; causes of wild bird disease die-offs include: avian botulism, avian cholera, salmonellosis, trichomoniasis, and mycoplasmosis.

Wild waterfowl are the predominant natural reservoirs for avian influenza viruses. These birds carry the virus in their intestines and shed it in their feces. Susceptible birds become infected by contact with infected feces and avian influenza virus-contaminated water. Most avian influenza viruses have been isolated from water birds, specifically Anseriformes (ducks, geese, swans) and Charadriiformes (gulls, terns and shorebirds), and to a lesser extent, Passeriformes (perching birds that make up about 60 percent of all bird species). In ducks, AI infection peaks in the late summer and early fall and in gulls and shorebirds, peak infection rates are associated with spring migration.

The current outbreak of HPAI H5N1 virus has caused die-offs of wild birds in Asia and Eastern Europe. It has also caused the largest and most severe outbreaks in domestic poultry on record. Presence of the virus was suspected, but not confirmed in wild birds by the World Health Organization until July 2004.

DFG has no plans to restrict migratory bird hunting seasons, hunts, or hunt locations due to avian influenza.

The HPAI H5N1 avian influenza virus has caused mortality in more than 60 species of wild birds since April 2005.

Long-term surveillance of more than 30 years by the U.S. Geological Survey and U.S. Fish and Wildlife Service in cooperation with the DFG, has not established the presence of any HPAI virus in North America. Surveillance has targeted not just avian influenza viruses, but monitoring for many avian diseases.

Messages if HPAI H5N1 is identified in North America

DFG will alert constituent groups about the presence of the HPAI H5N1 virus, if and when it appears, and the precautions necessary to limit transmission among wild birds and prevent transmission from wild birds to humans. Recommendations will be made for handling game birds, i.e., field dressing with gloves, cleaning tools, etc. For the general public, the following messages should be delivered.

- The HPAI H5N1 avian influenza virus is not easily transmitted to humans. According to the World Health Organization, as of Mar 24, 2006, 186 cases have been documented with 105 of them fatal. Most of those were in close contact with infected domestic poultry or the poultry’s feces.

- The HPAI H5N1 avian influenza is not the same as Pandemic Influenza. For this virus to be considered Pandemic, human to human contact would have to be established. Easy human to human transmission has not been established.

- Deflocking, or killing off entire populations of birds, is a practice used to combat avian influenza outbreaks in domestic poultry. It is not a practical tool for wild populations.

- Avoiding contact between pet birds and domestic poultry with wild birds will be necessary to prevent the spread of the avian influenza virus. Wild birds should not eat from, or defecate into domestic birds’ food and water bowls. Avian influenza viruses are present in the feces and respiratory secretions of infected wild birds and poultry. If pet or domestic birds are housed outdoors, the enclosure must prevent wild birds from entering (for example, standard chicken wire is not sufficient – small wild birds can fly through the holes.) Any outdoor enclosure for birds should also have a solid roof to prevent wild birds from defecating into the enclosure. The California Department of Food and Agriculture (CDFA) should be contacted for information in this area.

DFG Web Site Development

The DFG maintains an Avian Influenza page at www.dfg.ca.gov/avianflu/index.html with information based upon the key messages section of the Communications Plan.

Facts specific to DFG constituent groups

- Avian influenza is spread through respiratory secretions, feces, and carcasses, in that order of severity. Infected live birds pose the greatest risk through respiratory secretions.

- For licensed game bird breeders, outdoor flocks are at higher risk as they have greater potential for contact with wild birds. Avian influenza cannot be cured. Prevention is the key and requires separating captive birds from wild birds.

- Human protection includes wearing eye protection, gloves, and masks when working in rehabilitation centers or gamebird farms. If working with potentially infected birds, such as during depopulation efforts after a positive confirmation of the high pathogenic virus, workers must be trained and equipped with advanced protective clothing to prevent exposure to the virus.

- Biosecurity is the best defense for domestic flocks of all types. Minimize vehicle and human traffic around the birds and game farms to prevent inadvertent spread of disease.
### APPENDIX 8

**Employee Health and Safety for Avian Influenza Surveillance and Control Activities**

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>CONDITIONS &amp; RISK</th>
<th>PPE REQUIREMENT</th>
<th>WORK PRACTICE</th>
</tr>
</thead>
</table>
| 1) Handling apparently healthy birds (including birds at hunter check stations) | HPAI H5N1 not suspected in continental U.S.  
No increase in avian influenza risk | none | Follow work practices for normal operations.  
1) If working indoors, work in well-ventilated areas.  
2) When working outdoors, work upwind of animals, to the extent practical, to decrease the risk of inhaling airborne particulate matter such as dust, feathers, or dander. |
| 2) Handling sick birds | HPAI H5N1 not suspected in continental U.S.  
No increase in avian influenza risk |  
- pvc or nitrile gloves  
- safety eyewear  
- voluntary use of NIOSH approved N-95 respirator*  
- disposable Tyvek coveralls  
- rubber boots or boot covers | Use basic precautions when working with any avian disease to protect employees.  
Do not touch any part of exposed body (especially the face) with gloved hands. If gloves are torn or damaged:  
1) Carefully remove them in the proper manner.  
2) Thoroughly wash hands with soap & water (or alcohol based hand gel if soap & water not available).  
3) Don a fresh pair of gloves after hands are dry.  
Remove PPE in the following order:  
1) If wearing outer gloves, remove these first.  
2) Carefully remove coveralls and boot covers, and discard as contaminated material if disposable.  
3) Remove inner gloves and immediately wash hands thoroughly with soap and water (or an alcohol based hand gel when soap and water are not available).  
4) Remove eye protection and place in designated receptacle for subsequent cleaning and disinfection.  
5) Remove N-95 disposable respirator and discard.  
6) Immediately after all PPE has been removed, wash hands thoroughly a second time. |
### ICS Based Wildlife Operations in Response to a Detection of HPAI H5N1

#### Wildlife Branch (Wildlife Operations) Objectives

- Assess the potential for spread of the HPAI H5N1 virus to wild birds if the source is determined to be domestic birds
- Determine if wildlife surveillance is needed
- Determine if HPAI H5N1 has spread to wildlife
- Determine if HPAI H5N1 is spreading via wildlife
- Minimize risk of dispersal of wildlife from infected premises or area
- Implement measures to prevent mechanical spread of HPAI via wildlife
- Develop information on epidemiology of HPAI H5N1 in wildlife
- Protect wildlife and habitats from viral contamination

To ensure these objectives are achieved with maximum efficiency, the Wildlife Branch Director coordinates and manages the activities of all personnel in the Wildlife Branch who fall under the authority of the Unified Command during a HPAI H5N1 detection response. These include Federal, State, and local agencies along with commercial and non-profit organizations performing wildlife protection and management.

#### ICS Based Response Resources

Pursuant to ICS, activation of personnel and equipment is based on a number of variables, but primarily on anticipated adverse effects that exposure to the HPAI H5N1 will have on wildlife. The development of the Wildlife Branch initial response strategies and their re-evaluation throughout the HPAI H5N1 detection response is an iterative, dynamic process that calls for current and accurate information, knowledge, experience, and judgment.

DFG has developed a Wildlife Operations Resource table (Table 4) to be used as a guide to meet a variety of emergency incidents and Wildlife Branch needs. Three levels of Wildlife Branch personnel and equipment response are shown in Table 4 based on the anticipated need for resources. Most often the Wildlife Branch will mobilize personnel and equipment at the lowest level, (i.e., Level I). Response for each incident should be tailored on a case-by-case basis. An extraordinary circumstance (e.g., the detection of HPAI H5N1 in a large mortality event involving hundreds to thousands of wild birds) would justify Level II (highest) mobilization at the outset. The Wildlife

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#### Table: Work Practices

<table>
<thead>
<tr>
<th>Work Practice</th>
<th>Requirements</th>
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<tbody>
<tr>
<td>Handling dead birds</td>
<td>Use of tight-fitting, approved N95 respirator or better.*</td>
</tr>
<tr>
<td>Handling dead birds</td>
<td>Use of disposable Tyvek coveralls</td>
</tr>
<tr>
<td>Handling dead birds</td>
<td>Use of rubber boots or boot covers</td>
</tr>
<tr>
<td>Handling dead birds</td>
<td>Use of nitrile or vinyl gloves</td>
</tr>
<tr>
<td>Handling dead birds</td>
<td>Use of safety eyewear</td>
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</table>

#### Table: PPE Requirement

<table>
<thead>
<tr>
<th>PPE Requirement</th>
<th>Conditions &amp; Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>N95 respirator or better*</td>
<td>Low risk of aerosolization of contaminated particles</td>
</tr>
<tr>
<td>N95 respirator or better*</td>
<td>Increased risk of aerosolization of contaminated particles</td>
</tr>
<tr>
<td>N95 respirator or better*</td>
<td>Determined to be domestic birds</td>
</tr>
<tr>
<td>N95 respirator or better*</td>
<td>Determined if HPAI H5N1 has spread to wildlife</td>
</tr>
<tr>
<td>N95 respirator or better*</td>
<td>Determined if HPAI H5N1 is spreading via wildlife</td>
</tr>
<tr>
<td>N95 respirator or better*</td>
<td>Minimize risk of dispersal of wildlife from infected premises or area</td>
</tr>
<tr>
<td>N95 respirator or better*</td>
<td>Implement measures to prevent mechanical spread of HPAI via wildlife</td>
</tr>
<tr>
<td>N95 respirator or better*</td>
<td>Assess the potential for spread of the HPAI H5N1 virus to wild birds</td>
</tr>
<tr>
<td>N95 respirator or better*</td>
<td>Protect wildlife and habitats from viral contamination</td>
</tr>
</tbody>
</table>

#### Table: Corrivan & Risk

<table>
<thead>
<tr>
<th>Activity</th>
<th>Conditions &amp; Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collecting single dead bird individually</td>
<td>Unknown avian influenza condition</td>
</tr>
<tr>
<td>Handling birds captured or observed</td>
<td>Low risk of aerosolization of contaminated particles</td>
</tr>
<tr>
<td>Handling birds captured or observed</td>
<td>Increased risk of aerosolization of contaminated material</td>
</tr>
<tr>
<td>Handling birds captured or observed</td>
<td>Determined to be domestic birds</td>
</tr>
<tr>
<td>Handling birds captured or observed</td>
<td>Determined if HPAI H5N1 has spread to wildlife</td>
</tr>
<tr>
<td>Handling birds captured or observed</td>
<td>Determined if HPAI H5N1 is spreading via wildlife</td>
</tr>
<tr>
<td>Handling birds captured or observed</td>
<td>Minimize risk of dispersal of wildlife from infected premises or area</td>
</tr>
<tr>
<td>Handling birds captured or observed</td>
<td>Implement measures to prevent mechanical spread of HPAI via wildlife</td>
</tr>
<tr>
<td>Handling birds captured or observed</td>
<td>Assess the potential for spread of the HPAI H5N1 virus to wild birds</td>
</tr>
<tr>
<td>Handling birds captured or observed</td>
<td>Protect wildlife and habitats from viral contamination</td>
</tr>
</tbody>
</table>

#### Table: Surveillance and Response Plan for the Occurrence of Highly Pathogenic Avian Influenza in Wild Birds

<table>
<thead>
<tr>
<th>APPENDIX 9</th>
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</thead>
</table>

| SURVEILLANCE AND RESPONSE PLAN FOR THE OCCURRENCE OF HIGHLY PATHOGENIC AVIAN INFLUENZA IN WILD BIRDS | 56 |
| SURVEILLANCE AND RESPONSE PLAN FOR THE OCCURRENCE OF HIGHLY PATHOGENIC AVIAN INFLUENZA IN WILD BIRDS | 57 |

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California Department of Fish and Game
Branch will notify the Unified Command immediately of changes in the deployment of personnel and equipment as they occur. As the Unified Command gets established the Wildlife Branch will be integrated.

This table should be used as a general guide for Wildlife Operations resource needs during the initial response to an outbreak of HPAI. This table has been developed based on experience gained by the DFG's Oil Spill and Response Program from past oil spill incidents. This table lists the recommended equipment and staffing to be provided by DFG and other natural resource trustee agencies. DFG will work collaboratively with other trustees and land managers to decide levels of response, resources needed, and resources available. Wildlife Operations resources should be tailored specifically to meet the needs of each incident.

<table>
<thead>
<tr>
<th>LEVEL I – Incidents where Wildlife Operations projections are for dozens of water birds involved in an outbreak of HPAI H5N1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Staff</strong></td>
</tr>
<tr>
<td>Wildlife Branch Director</td>
</tr>
<tr>
<td>Wildlife Reconnaissance Group Supervisor</td>
</tr>
<tr>
<td>Wildlife Reconnaissance Group Staff</td>
</tr>
<tr>
<td>Disposal Unit Staff</td>
</tr>
<tr>
<td>Airboat Unit Staff</td>
</tr>
<tr>
<td>Shoreline Survey Unit Staff</td>
</tr>
<tr>
<td>Wildlife Risk Assessment Group Supervisor</td>
</tr>
<tr>
<td>Wildlife Risk Assessment Group Staff</td>
</tr>
<tr>
<td>Wildlife Capture and Sampling Group Supervisor</td>
</tr>
<tr>
<td>Wildlife Capture and Sampling Group Staff</td>
</tr>
<tr>
<td>Wildlife Capture Unit Leader</td>
</tr>
<tr>
<td>Wildlife Capture Unit Staff</td>
</tr>
<tr>
<td>Wildlife Sampling Unit Leader</td>
</tr>
<tr>
<td>Wildlife Hazing Group Supervisor and Staff</td>
</tr>
<tr>
<td>Volunteer Coordinator</td>
</tr>
<tr>
<td>Facilities Coordinator</td>
</tr>
<tr>
<td>Administrative Coordinator</td>
</tr>
<tr>
<td>GIS Technical Specialist</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LEVEL II – Incidents where Wildlife Operations projections are for hundreds to thousands of water birds involved in an outbreak of HPAI H5N1. All of the resources shown in Level I plus:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Staff</strong></td>
</tr>
<tr>
<td>Deputy Wildlife Branch Director</td>
</tr>
<tr>
<td>Deputy Wildlife Capture &amp; Sampling Staff</td>
</tr>
<tr>
<td>Wildlife Veterinarian</td>
</tr>
<tr>
<td>Wildlife Pathologist</td>
</tr>
<tr>
<td>Administrative Staff</td>
</tr>
<tr>
<td>Wildlife Disposal Unit</td>
</tr>
<tr>
<td>Aerial Survey Unit</td>
</tr>
<tr>
<td>Sample Collection Team</td>
</tr>
<tr>
<td>Sample Processing Team</td>
</tr>
</tbody>
</table>

Table 4. Wildlife Operations Branch Resource Table - Recommended Tiered Level Response of Personnel and Equipment for Wildlife Operations

Wildlife Operations Branch Organization

Within the ICS the response organizational structure and the response itself grow to fit the level necessary for each specific incident. For that reason, in the following sections when a specific ICS position is discussed, readers should realize positions and duties may be combined (or may be eliminated if not needed).

The Wildlife Branch includes the following Groups: Wildlife Reconnaissance, Wildlife Hazing, Wildlife Surveillance and Risk Assessment, which operate under the direction of the Wildlife Branch Director. Figure 4, shows the relationship of the four Groups within the Wildlife Branch, along with the units and teams that operate under each Group.
Duties and issues that relate to a specific position are listed under that position in the sections that follow. General duties that apply to the Wildlife Branch Director and each Group Supervisor and Unit Leader include but may not be limited to:

- Oversee safety of personnel
- Implement check-in and check-out procedures (includes identifying check-in location(s))
- Receive briefings from immediate supervisor and acquire work materials
- Provide information for wildlife response planning
- Implement the assignments of the current Incident Action Plan
- Develop the section-specific portion of the Incident Action Plan for the next operational period (ICS forms 204 and 215).
- Supervise the operations (organize, assign and brief subordinates)
- Administrative support
- Documentation
- Establish and disseminate communications protocols for timely information gathering and reporting
- Determine resource needs and communicate to the Logistics Section through the Wildlife Branch Director, and confirm dispatch and estimated time of arrival of staff and supplies
- Assemble and disassemble Strike Teams and Task Forces as necessary
- Identify resources that can be released and develop/implement Wildlife Demobilization Plan as directed
- Maintain Unit and Activity Logs (ICS 214)

Wildlife Branch Director Duties

All California Wildlife Operations during an incident response are directed by the Wildlife Branch Director, who supervises Wildlife Branch Operations. The Wildlife Branch Director should be a representative of one of the wildlife resource trustee agencies. In addition to the general duties listed above, the Wildlife Branch Director’s duties include, but are not limited to:

- Supervising the four Groups within the Wildlife Branch: Wildlife Reconnaissance (coordinating aerial and on-water wildlife surveys); Wildlife Hazing; Wildlife Care and Processing (vet services, establishing rehabilitation center(s) and logging in); and Wildlife Recovery and Transportation (coordinating search and collection and transportation of wildlife),
- Updating the Unified Command, Operations Chief, Environmental Unit (Planning Section), Information Officer, and Liaison Officer of wildlife at risk and incident related wildlife statistics (e.g., numbers of dead/live birds),
- Coordinating with the Sampling/Forensics Specialist in the Planning Section, Environmental Unit regarding wildlife samples being collected by Wildlife Operations personnel,
- Coordinating with the various land managers and/or trustee agencies
- Identifying methods to minimize collateral damage to wildlife and habitat from recovery, transportation, and reconnaissance operations,
- Updating the media as requested by the Unified Command, and
- Providing input at the Pre-Tactics meetings.

Details of Principal Duties

Safety – The Wildlife Branch Director oversees personnel safety and is ultimately responsible for ensuring that each Wildlife Operations Branch task is performed safely and properly by qualified personnel. Because wildlife and habitat resources are sensitive and because there are potential dangers when working with contaminated, dead, injured and/or sick animals, all Wildlife Branch personnel must receive specialized training, on such topics as animal handling and airboats training, so they may safely and competently complete of their assignments.

Staffing and Resources – The Wildlife Branch Director must determine resource needs and communicate those needs through the Operations Chief to the Logistics Section and the Resources Unit in the Planning Branch (refer to Table 4, Wildlife Operations Resource Table, for staffing recommendations). The Wildlife Branch Director must prepare information needed for work order forms (ICS 215 and 204) for Incident Action Plan (IAP) preparation and logistics tracking. Form 215 is usually started in the Pre-Tactics Meeting, and is finalized at the Tactics meeting. The information from the 215 form is summarized in the ICS 204 form when the Planning Section prepares the IAP. When submitting 215 forms, the Wildlife Branch Director must clearly indicate which resources are already procured (e.g. resources provided by DFG, public health agencies, and etc.) or are on order, and provide estimated time of arrivals.

Even in a HPAI H5N1 detection event, the Wildlife Branch Director should request a GIS Specialist early in the response to provide the maps depicting operational divisions and recovery points. These maps will assist the Wildlife Branch Director in identifying and ranking wildlife response strategies.

Information Flow – The Wildlife Branch Director must update the Incident Command, Operations Chief and Planning Section (Situation Unit and Environmental Unit) of adversely affected wildlife and wildlife at risk. This includes keeping the Incident Command informed, through the Situation Unit in the Planning Section, about the status of wildlife. This information is also relayed to the Liaison Officer to keep other agencies updated and the Public Information Officer to be used in press releases.

The Wildlife Branch Director can quickly relay wildlife statistics by using the Wildlife Care and Processing Daily Report or similar form to summarize the numbers of processing personnel on scene, numbers of live and dead animals observed and recovered. The Wildlife Branch Director must develop communication protocols to ensure information gets exchanged between the Wildlife Branch Director and Group Supervisors prior to each daily planning meeting.

Coordination within ICS – The Wildlife Branch Director may need to attend tactics meetings, planning meetings, and Incident Command briefings. The Wildlife Branch Director may also need to report on special activities, events, laboratory results, and occurrences to Operations Section Chief and the Situation Unit in the Planning Section. The Wildlife Branch Director must coordinate with the Air Operations Branch Director regarding any wildlife overflights. The Wildlife Branch Director must also coordinate with Logistics Branch for any materials needed.

The Wildlife Branch Director must coordinate with the Resources at Risk Specialist in the Planning Section’s Environmental Unit to provide the Specialist with information the Planning Section
can use to help make decisions about detection and response strategies. The Wildlife Branch Director can provide the Planning Section staff with any known wildlife concerns and with wildlife reconnaissance data.

Information received from aerial, boat or ground based surveillance teams can be provided to a GIS specialist (usually in the Planning Section). This information should be used by the Planning Section for strategic assessment and for planning response strategies. The Planning Section should also use this information to evaluate potential effects of different response countermeasures and response strategies.

The Wildlife Branch Director must also coordinate with local land managers and trustees regarding access, wildlife recovery efforts, and response actions. Ideally, land managers and trustees may be integrated with wildlife recovery and reconnaissance.

Developing Incident Action Plan

The Wildlife Branch, supervised by the Wildlife Branch Director, develops the Wildlife Operations portion of the IAP for a response, usually on a daily basis; ICS 04 and 215 forms are usually required for this purpose. Upon incident notification, the Wildlife Branch Director must evaluate a rapidly-changing situation and develop an initial action plan, often literally while on the way to the incident site. Often, the only source of information is the reporting party’s initial report of what was observed, sampled, or detected. This section describes some of the information and variables that the Wildlife Branch Director must consider for establishing the Wildlife Branch and for preparing IAP’s.

The Wildlife Branch Director must evaluate the situation in light of available personnel, equipment and deployment options. Many factors will influence the response, and must be considered in order to determine which resources to mobilize. Some of these factors include:

- Geographic area
- Weather and time of day
- Wildlife observations
- Concentrations of wildlife in the detection area
- Human health hazards (Site Characterization)
- Time of Year/Season (i.e., presence of migratory or breeding birds and mammals
- Land management status (e.g., urban pond, sanctuary, wilderness area, ecological reserve)

The Wildlife Branch Director should review the relevant factors listed below with Wildlife Branch and Planning Section personnel:

- Resources at risk
- Wildlife Branch resource needs
- Available wildlife personnel and equipment resources

When the review is completed the Wildlife Branch Director can formulate the initial Wildlife Operations portion of the IAP.

After the initial ICS 204 forms for each Wildlife Operations Group are prepared, the Operational Planning Worksheet (ICS 215 form) is prepared to identify resources required, acquired and still needed. The ICS 215 form is presented at the Tactics meeting and when finalized, is provided to the Logistics Section. Resources to be provided by DFG and other trustee agencies must be clearly articulated on the 204’s and 215 forms and provided to the Logistics Section for tracking purposes so that Logistics understands they’re already on order or in service, and does not procure these resources again. The Wildlife Operations portion of the IAP should include, in priority order: the response objectives, equipment, Group and Unit designations, and task assignments. In addition to the ICS 204 form, an expanded Wildlife Operations Plan can be prepared to provide more details regarding objectives, responsibilities, assignments, and more specifics for each Group. More details can be provided on work locations for teams, surveillance protocols, equipment needed, safety issues, sensitive species information, communication protocols, disposal issues, division maps, forms, disinfection procedures, and etc.

Demobilization of Wildlife Operations

Upon conclusion of Wildlife Operations, its activities are demobilized, following standard checkout procedures identified through the ICS and coordinated with the Incident Command. Wildlife Operations demobilization occurs only after a conclusive determination by the Wildlife Branch Director and other trustee agencies that the response efforts are no longer needed.
### UNIT LOG

<table>
<thead>
<tr>
<th>Incident Name</th>
<th>Date Prepared</th>
<th>Time Prepared</th>
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<tr>
<td>Operations Personnel</td>
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#### Personnel Roster Assigned

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<th>ICS Position</th>
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#### Activity Log

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<th>Major Events</th>
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#### Division/Group Communication Summary

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<th>Function</th>
<th>Frequency</th>
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<td>Command</td>
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<td>Logistics</td>
<td>King NFC</td>
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<td>Tactical Div/Group</td>
<td>King NFC</td>
<td>Air to Ground</td>
<td>King NFC</td>
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Prepared by (Resource Unit Leader) | Approved by (Planning Section Chief) | Date | Time |

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ICS 204 | NFES 1328 | ICS 214
## INCIDENT ACTION PLAN SAFETY ANALYSIS

<table>
<thead>
<tr>
<th>Division or Group</th>
<th>Potential Hazards</th>
<th>Mitigations (e.g., PPE, buddy system, escape routes)</th>
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Prepared by (Name and Position)

## OPERATIONAL PLANNING WORK SHEET

<table>
<thead>
<tr>
<th>Division or Group</th>
<th>Work Assignment</th>
<th>Accountability Type</th>
<th>Time Required</th>
<th>Total Resources - Single</th>
<th>Total Resources - Strike Teams</th>
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Prepared by (Name and Position)
APPENDIX 10
Avian Influenza Sampling Protocol

I. Live Bird and Hunter-harvested Bird AI Sampling (healthy birds)

**Cloacal Sampling** – The virus isolation media must be kept cold at all times. In the field, collect a cloacal swab sample from the captured wild bird as demonstrated below. The swab is gently inserted into the cloaca of the bird and twisted several times making sure that contact is made with the lining of the cloaca. Once swabbing is completed, remove swab from cloaca, place in the virus isolation media and rotate swab numerous times. Finally, squeeze the swab against the side of the media container to be sure to transfer the swab’s contents. You can snap off the swab and leave in vial.

1) Fill out the Field Data Sheet using the number on the media tube as the identification #. Fill out all the information requested to the best of your ability; please don’t guess. Include the band #, if appropriate, as well as any additional comments.

2) Keep the inoculated media completely chilled while in the field. The inoculated media can be kept chilled (refrigerated) for only 2 days after sampling before shipment to the lab. If there is a need to hold it longer than 2 days, the inoculated media may be frozen until shipped. Ship the samples in the ice chest provided with the ice pillows (frozen, of course) to either:
   1) California Animal Health and Food Safety Laboratory, University of California, West Health Sciences Drive, Davis, California 95616
   2) National Wildlife Health Center, 6006 Schroeder Road, Madison, Wisconsin 53711

**Cloacal Swabbing Procedure:** Identify cloaca; insert dacron portion of swab into cloaca; twist swab to obtain contact with inside lining of cloaca.

II. Dead Bird AI Sampling (mortality events; unhealthy birds)

Whenever possible submit whole fresh carcasses for necropsy in a die-off situation. However, in some cases the die-off location, timing, or carcass size may prevent shipment of whole carcasses to a diagnostic lab. In these cases, field personnel should obtain permission from WIL staff to submit freshly dead birds for Avian Influenza sampling. Field personnel may also be asked to submit dead birds in addition to the shipping carcasses in large die-off situations where there is an abundance of fresh carcasses. Both cloacal and tracheal swabs will be collected from these carcasses.

**Cloacal Sampling** – Follow above protocol as in live bird sampling.

**Tracheal Sampling** – This technique involves the insertion of the swab directly into the trachea. Be sure that you understand or have been shown the difference between the tracheal and the oral-pharyngeal opening.

1) Pinch both sides of the head of bird near the base of its beak forcing it to open and exposing the oral cavity.
2) In most cases, you can open the trachea by gently pushing upwards on the neck just below the lower bill.
3) Insert the swab into the trachea while gently twisting several times making sure that contact is made with the lining of the trachea.
4) Once swabbing is completed, remove swab from trachea, place in the virus isolation media and rotate swab numerous times. Finally, squeeze the swab against the side of media container to be sure to transfer the swab’s contents. You can break off the swab and leave in vial.

Keep the inoculated media completely chilled while in the field. The inoculated media can be kept chilled (refrigerated) for only 2 days after sampling before shipment to the lab. If there is a need to hold it longer than 2 days, the inoculated media may be frozen until shipped. Ship the samples in the ice chest provided with the ice pillows (frozen, of course) to either:

1) California Animal Health and Food Safety Laboratory, University of California, West Health Sciences Drive, Davis, California 95616
2) National Wildlife Health Center, 6006 Schroeder Road, Madison, Wisconsin 53711

III. Environmental Sampling

**Fecal Sample Collection**

1) Locate a group of 50 or more birds on land or clumps of raised vegetation.
2) Identify the three most numerous species prior to flushing the group.
3) Feces must be less then 24 hours old; obtaining the freshest sample possible is critical for detection of virus; only soft and/or moist feces should be collected.
4) A sub-sample of feces is collected using a sterile swab. For solid feces, drag the swab over the surface of the feces and then insert the swab into the feces. For less solid feces, swirl the swab through the feces until the head of the swab is well coated with feces.
5) Place the swab into a vial containing transport media, point swab, liquid and vial away from your face in case splashing occurs, break the swab handle at the lip of the vial. Collect 20-30 fecal samples from each sampling site.
6) Label the vial and data sheet with the corresponding barcode label. Ensure barcode is placed on vial lengthwise, otherwise the scanner will be unable to read it.
7) Return vials to freezer until they can be shipped on blue ice via FedEx to ginger Young at the National Wildlife Research Center, 4101 La Porte Avenue, Fort Collins, CO 80521-2154.
APPENDIX 11
Instructions for Packaging, Shipment and Submission of Specimens to the Wildlife Investigations Lab

Fresh Chilled Tissue

- Contact the WIL prior to collecting specimens to determine the best specimens and to receive specific packaging, shipping, or submission instructions and supplies.

- This includes an entire bird carcass and fresh tissue samples. In mortality events in which many wild birds are involved, select a minimum of 5 dead or freshly killed birds (except in cases of suspected avian botulism) that include representatives of all groups involved in the mortality event since more then one disease may be affecting the population simultaneously. Obtain good specimens for necropsy – make sure the selected carcasses are freshly dead. Carcasses that are decomposed or scavenged are usually of limited diagnostic value. Ideally, one should collect a combination of freshly dead animals and animals that were euthanized after their behavior is observed and recorded.

- Tag and bag each individual specimen. Information on the tag should be written in indelible ink and include location, date, species, collector, and other comments such as method of euthanasia, nasal discharge, unusual behavior, etc.

- Combine all specimens in a secondary container such as a garbage-size plastic bag. An inexpensive shipping container can be made by placing a styrofoam ice chest within a cardboard box or by lining a cardboard box with 1-inch thick pieces of styrofoam. Unprotected styrofoam chests will break during shipment and are not acceptable. Pack boxes with newspaper or similar absorbent material to avoid damage to the carcasses and to absorb any liquids that escape from the plastic bags. Include ice packs to chill specimens during shipment.

- Unfrozen carcasses are preferred if they can be received within 48 hours, since freezing and thawing can make isolation of some bacteria difficult and cause tissue damage that interferes with histological examination.

- On occasion, WIL will instruct field investigator to submit carcasses or samples directly to an outside diagnostic laboratory such as California Animal Health and Food Safety Lab (CAHFS) or the National Wildlife Health Center (NWHC); however, the field investigator must obtain approval from WIL prior to submitting specimens to any outside lab as special arrangements must be made by WIL; lack of approval will result in the investigator's unit being responsible for all lab charges.

- Complete the Wildlife Disease Incident and Specimen Submission Form (Appendix 5) and submit with the specimens.

Formalin-fixed Tissues

- These are tissue specimens collected during a necropsy and placed in formalin. Many CDFG field biologists have received specialized field necropsy training; however, in cases of suspected HPAI H5N1, it is preferable to have the entire carcass submitted to WIL or to an outside diagnostic lab. For those mortality events in which there is no suspicion that AI is the cause, and a trained biologist is available to collect tissue specimens, a field necropsy may be performed. It is recommended that formalin-fixed tissue is submitted directly to WIL by CDFG personnel rather than shipped through the mail. Contact WIL if this is not possible.

General Information

- Guidance on freezing samples will be provided by the WIL on a case-by-case.

- Ship all carcasses and fresh chilled tissue specimens by Federal Express one-day air service to the appropriate laboratory. Contact WIL for details on this procedure.
APPENDIX 12

1 Options for Disposal of HPAI H5N1 Affected Avian Carcasses

Effective eradication of HPAI H5N1 virus requires the timely and safe disposal of avian carcasses, which in turn reduces the risk of disease spread within bird populations and eliminates the presence of HPAI H5N1 virus in the environment. A strategy for large-scale carcass disposal must be in place well in advance of a domestic or foreign animal disease emergency to maximize the efficiency of response.

The most effective disposal strategy is one that uses the most suitable disposal options available. The decision on which disposal strategy to use must be based on many local and case-specific factors. Disposal methods can be evaluated using several factors:

- Effective – Minimizes potential for spread of pathogen (to animals or humans)
- Environmentally sound – Minimizes environmental impacts
- Rapid – Facilitates completion of disposal within 24 hours of euthanasia
- Acceptable to stakeholders – Minimizes impact to poultry operations
- Low cost - Minimizes need for labor, equipment, chemicals, utilities, and fuel

All disposal options should remain open prior to evaluation of a specific situation. Differences in site-specific characteristics and conditions, and the capacity of a given disposal method relative to the volume of carcasses to be disposed, will greatly influence the final choice of a disposal option.

Disposal Methods

Available disposal methods for HPAI H5N1 affected avian carcasses can be divided into two categories: on-site or off-site.

- On-Site
  1. composting2
  2. treatment (mobile incinerators, mobile digesters)
  3. burial

- Off-Site
  1. composting
  2. landfilling
  3. treatment (rendering, incineration, digestion)

The efficacy of each carcass disposal method depends on the field conditions at a specific site, including but not limited to: climate; time of year; soil type; depth to groundwater; development density of property; distance from other poultry operations; distance to offsite disposal/treatment facilities; local environmental regulations; and public perception. Site managers must ultimately make decisions regarding the appropriate disposal method based on the unique factors of that site.

Disposal Preferences

Although off-site disposal may be the best option available in some circumstances, preference will generally be given to on-site methods as they facilitate the containment of virus spread. On-site carcass disposal, assuming sufficient land area and availability of labor, may be the most efficacious method to reduce the risk of spread of HPAI H5N1 virus because off-site transport of carcasses is eliminated. The overall order of preference for the various disposal alternatives when dealing with HPAI H5N1 affected carcasses is:

1) On-site composting
2) On-site treatment (mobile incinerators, mobile digesters)
3) On-site burial
4) Off-site composting
5) Off-site landfill or off-site treatment (rendering, incineration, digestion)

More information on the characteristics of the various disposal methods is given in the following table.

Characteristics of Disposal Method Options for HPAI H5N1 Affected Avian Carcasses

<table>
<thead>
<tr>
<th>Method / Technology</th>
<th>On-Site vs. Off-Site</th>
<th>Capacity Tom/day (TPD)</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composting</td>
<td>On-Site or Off-Site</td>
<td>Potentially large (location dependent)</td>
<td>Destroys virus, if done properly.</td>
<td>- Possible spread of the virus (aerosol, vectors) if pile not covered adequately prior to virus inactivation. - Possible groundwater or surface water contamination if pile not adequately insulated. - Not rapid.</td>
</tr>
<tr>
<td>Incineration:</td>
<td>On-Site or Off-Site</td>
<td>Variable</td>
<td>Destroys virus. - Relatively inexpensive and rapid, if equipment readily available.</td>
<td>- Potentially expensive, especially if equipment not readily available. - Residue issues; potential for air, surface water, or groundwater contamination. - Ability to use is site specific. - Requires skilled operators. - May be difficult to efficiently incinerate avian carcasses.</td>
</tr>
<tr>
<td>Air Curtain Incinerators</td>
<td>On-Site or Off-Site</td>
<td>Variable</td>
<td>Destroys virus. - May be relatively rapid.</td>
<td>- Availability and capacity of units. - May require air monitoring. - Public perception. - Potentially expensive. - Requires skilled operators. - May be difficult to efficiently incinerate avian carcasses.</td>
</tr>
</tbody>
</table>


2 A study by the University of Delaware and the University of Maryland has shown that composting temperatures reach approximately 140 F after 2 to 3 days. Senne et al. (1994) found that HPAI virus was inactivated at the end of the first 10 days of composting.
## Characteristics of Disposal Method Options for HPAI H5N1 Affected Avian Carcasses

<table>
<thead>
<tr>
<th>Method / Technology</th>
<th>Capacity Tons/day (TPD)</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burial</td>
<td>On-Site</td>
<td>- Relatively rapid.</td>
<td>- Virus will remain viable in ground for some period.</td>
</tr>
<tr>
<td></td>
<td>Potentially large (location dependent)</td>
<td>- Requires proper site and lining/capping to minimize environmental impacts.</td>
<td>- Specific situation (e.g., frozen ground) may prevent/impede.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Equipment may not be available locally.</td>
<td>- Owner/operator concerns regarding liability and other economic impacts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Public perception.</td>
<td>- Public perception.</td>
</tr>
<tr>
<td></td>
<td>Off-Site</td>
<td>- Virus will remain viable in landfill for some period.</td>
<td>- Owner/operator concerns regarding liability and other economic impacts.</td>
</tr>
<tr>
<td></td>
<td>Up to 1,000 TPD</td>
<td>- Relatively wide availability.</td>
<td>- Pre-negotiated contracts possible.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Sites constructed to minimize environmental impacts.</td>
<td>- Risk of viral spread during off-site transport.</td>
</tr>
<tr>
<td>Landfilling</td>
<td>Off-Site</td>
<td>- Viruses that cause low morbidity or mortality in birds</td>
<td>- Viruses that cause high mortality in domestic poultry (75 percent or more of the infected birds die), spread quickly, and cause severe depression and decrease in food and water intake.</td>
</tr>
<tr>
<td>(Municipal Solid Waste)</td>
<td>Up to 1,000 TPD</td>
<td>- Destroys virus.</td>
<td>- Requires proper site and lining/capping to minimize environmental impacts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Destroys virus.</td>
<td>- Relatively rapid.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Destroys virus.</td>
<td>- Requires proper site and lining/capping to minimize environmental impacts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Destroys virus.</td>
<td>- Relatively rapid.</td>
</tr>
<tr>
<td>Rendering</td>
<td>Off-Site</td>
<td>- Destroys virus.</td>
<td>- Destroys virus.</td>
</tr>
<tr>
<td></td>
<td>Up to 1,000 TPD</td>
<td>- Destroys virus.</td>
<td>- Destroys virus.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 50 TPD: Hazardous waste incinerators</td>
<td>- Public perception.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 20 TPD: Medical waste incinerators</td>
<td>- Permit considerations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Destroys virus.</td>
<td>- Potentially expensive.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Destroys virus.</td>
<td>- Disinfection of unit exterior.</td>
</tr>
</tbody>
</table>

## APPENDIX 13

### Definitions

**Adaptation** – Progressive genetic mutations in a virus strain that result in increased efficiency to reproduce in a host.

**Avian** – Relating to or characteristic of birds.

**Epidemic** – An outbreak of a contagious disease that spreads rapidly and widely.

**Endemic** – Prevalent in or peculiar to a particular locality or region.

**Highly Pathogenic Avian Influenza (HPAI)** – Viruses that cause high mortality in domestic poultry (75 percent or more of the infected birds die), spread quickly, and cause severe depression and decrease in food and water intake.

**Incident Command System (ICS)** – a management system used within the United States to organize emergency response and was designed to offer a scalable response to incidents of any magnitude. Incident Management Teams (IMT), are combined crews of multi-agency staff that use the concepts outlined within the Incident Command System to react to an emergency situation. ICS has become the National Incident Management System (NIMS) and is designed to grow and shrink along with the incident, allowing more resources to be smoothly added into the system when required, and also the smooth release of resources when no longer needed.

**Infectivity** – Ability of a virus to infect and replicate in a host.

**Low Pathogenic Avian Influenza (LPAI)** – Viruses that cause low morbidity or mortality in birds (Less than 75 percent of infected birds die); may be asymptomatic or not cause any sign of disease; waterfowl are natural reservoirs for AI viruses, most of which are low pathogenic.

**Morbidity** – Sickness of an animal or of a large group of animals.

**Mortality** – Death of an animal or death of a large group of animals.

**Mutation** – A sudden structural change in the genetic makeup of an organism resulting in the creation of a new trait not found in the parent organism.

**Pacific Flyway** – A major north-south route of travel for wild migratory birds in the Americas that stretches along the Pacific Coast from Mexico north to Alaska and into Siberia, Russia. Every year, wild migratory birds travel some or all of this distance both in spring and in fall, following food sources, heading to breeding grounds, or traveling to overwintering sites. Along the Pacific Flyway, there are many key rest stops where birds of many species gather, sometimes in the millions, to feed and regain their strength before continuing. Some species may remain in these rest stops for the entire season, but most stay a few days before moving on.

**Pacific Flyway States** – In the U.S., these states are: Alaska, Arizona, California, Idaho, Nevada, Oregon, Utah, Washington, and those portions of Colorado, Montana, New Mexico, and Wyoming west of the Continental Divide.

**Pandemic** – Epidemic of an infectious disease over a wide geographic area and affecting a large proportion of the human population.

**Pathogenicity** – Ability to produce lesions, disease and/or death in a host.
APPENDIX 14

Acronyms Used in the DFG Surveillance and Response Plan

AAF – amnio-allantoic fluid
AAE – Associate Deputy Administrator
ADAE – ADA, Emergency Management and Diagnostics (VS)
ADAHPP – ADA, National Animal Health Policy and Programs (VS)
ADARA – ADA, Regional Affairs (VS)
ADMIN – Administrator
AgComm – Agriculture Commissioner
AI – avian influenza
APHIS – Animal & Plant Health Inspection Service
AO – Administrator’s Office
ARD – Associate Regional Director
AESP – Aquaculture, Swine, Equine and Poultry (NAHPP)
AVC – Area Veterinarian in Charge
BB – Blackberry report
CAHFS – California Animal Health and Food Safety Laboratory
CalOSHA – California Occupational Safety and Health Administration
CDC – Centers for Disease Control and Prevention
CDFA – California Department of Food and Agriculture
CDHS – California Department of Health Services
COS – Chief of Staff
CVO – Chief Veterinary Officer
CWA – California Waterfowl Association
DA – Deputy Administrator
DFG – California Department of Fish and Game
Dir – Director
DOI – Department of Interior
DVV – Diagnostic Virology Laboratory (NVSL)
FADD – Foreign Animal Disease Diagnostician
EM&D – Emergency Management & Diagnostics
EMLT – Emergency Management Leadership Team
EMRS – Emergency Management Response System
FWS – Fish and Wildlife Service (DOI)
GIS – Geographic Information System
HPAI – highly pathogenic avian influenza
HPAI H5N1 – subtype of highly pathogenic avian influenza
H – hemagglutinin
HP – highly pathogenic
ICS – Incident Command System
IT – Information Technology
JWG – Joint Working Group (USDA)
LIMS – Lab Information Management System
LP – low pathogenicity
LPA – Legislative and Public Affairs (APHIS)
LPAI – low pathogenic avian influenza
M – matrix
MRP – Marketing and Regulatory Programs
N – neuraminidase
NAHPP – National Animal Health Laboratory Network
NAI – Notifiable Avian Influenza
NAIHO – National Assembly of Chief Animal Health Officials
NASAHO – National Academy of Science
NASDA – National Association of State Directors of Agriculture
NCAI – National Center for Animal Health
Emergency Management
NCC – National Chicken Council
NCIE – National Centers for Import and Export
NE – National Egg Exchange
NIMS – National Incident Management System
NPS – National Park Service
NSU – National Surveillance Unit (VS)
NTF – National Turkey Federation
NVSL – National Veterinary Services Laboratories (VS)
NWDC – Nat’l Wildlife Disease Coordinator (WS)
NWRC – National Wildlife Research Center
OES – Office of Emergency Services
OIE – Office international des epizooties (French for “International Epizootic Office”; now known as the World Organisation for Animal Health)
OEMHS – Office of Emergency Management & Homeland Security (APHIS)
PA – Public Affairs (LPA)
PIC – Preparedness and Incident Coordination
PRBO – Point Reyes Bird Observatory
RD – Regional Director
RF-PCR – real time reverse transcription polymerase chain reaction
SD – State Director (WS)
SEMS – State Emergency Management System
SEFGD – State Fish and Game Director
SOP – Standard Operating Procedure
SV – State Veterinarian
UEP – United Egg Producers
US – Undersecretary
USAPEEC – USA Poultry & Egg Export Council
USD – U. S. Department of Agriculture
USGS – U. S. Geological Survey (DOI)
V – virus isolation
VS – Veterinary Services
WAC – Wildlife Area
WDER – Wildlife Diseases & Emergency Response
WIL – Wildlife Investigations Laboratory
WS – Wildlife Services

APPENDIX 15

Internal USDA/APHIS Communication Protocol for Presumptive and Confirmed Positive H5 or HPAI AI Samples in All Bird Species

A. Background:

Virus isolation (VI) is the definitive test for confirming a positive H5/H7 avian influenza (AI) diagnosis, but because of the time required to perform virus isolation (2-12 days) it is advantageous to communicate H5/H7 presumptive results based on RT-PCR tests for matrix, H5, and H7, and N1 to facilitate a rapid, appropriate response for disease control and eradication.

B. Criteria for a presumptive H5/H7 diagnosis in any (poultry, wild, etc.) bird

1. Report by the National Veterinary Services Laboratory (NVSL) or a National Animal Health Lab Network (NAHLN) lab approved by the NVSL to conduct AI diagnostics, of any matrix and H5/H7 RT-PCR positive bird or environmental specimen. The term “NAHLN lab” in this document includes AI-approved State veterinary diagnostic NAHLN labs, the National Wildlife Health Center (DOI-USGS NWRC), and the National Wildlife Research Laboratory (APHIS/Wildlife Services/NWRC), all of which perform the AI RT-PCRs. “Poultry, ‘wild birds’, and ‘NAI’ are defined in the 2006 OIE Chapter 2.7.12.1.

2. ‘Clinical case definition of HPAI’ is as defined by the National Surveillance Unit (NSU; Veterinary Services) and described in the August 2006 Draft Summary of the National Highly Pathogenic Avian Influenza Response Plan (see http://www.aphis.usda.gov/newsroom/hot_issues/avian_influenza/avian_influenza_summary.shtml).

C. Criteria for Reporting and Notification of Presumptive H5/H7 Cases

1. Cases that meet both criteria (B.1. & 2.) above -- these cases will be considered presumptive HPAI H5 or H7 and will be rapidly reported to OIE, trade partners, other Federal agencies, States and industry, regardless of bird type or category. Appropriate Federal-State-industry response and containment measures would be initiated while confirmation is underway at NVSL.

2. Cases that only meet the rRT-PCR criteria in (B.1.) above

i. Domestic poultry positive for H5 or H7 by rRT-PCR without clinical signs will be considered presumptive LPAI and sequencing attempted from the swab and/or amnio-allantoic fluid (AAF) submitted. Subtyping and VI will follow. Chicken pathogenicity testing will occur based on OIE guidelines. If confirmed by USDA/Veterinary Services (VS) as LPAI, results will be reported according to VS Memo 565.14, and if determined to be HPAI, immediately reported to OIE, etc. (see C1).

ii. All non-poultry birds that are positive for H5 or H7 rRT-PCR without clinical signs will be considered presumptive LPAI and not requiring immediate OIE notification.

These presumptive LPAI cases will be confirmed by gene sequencing, VI, and chicken pathogenicity testing when required by USDA and OIE guidelines. If confirmed as VS LPAI, results will be reported according to VS Memo 565.14, and if determined to be HPAI, immediately reported to OIE, etc. (see C1).
D. Criteria for Accelerated Testing and Sitrep Preparation

All matrix+/H5+ and those matrix+/H7+ samples fitting criteria C1 are tested by NVSL ‘high priority with accelerated schedule’ and will have sitreps prepared. All matrix+/H5+ samples fitting criteria C2 are tested by NVSL with high priority and accelerated schedule, but only those from poultry and wild bird samples of special interest require a sitrep. matrix+/H7+ samples fitting criteria C2 are tested and reported using a separate protocol, and matrix- or matrix+/H5-,H7- are not forwarded to NVSL and are not tested further. All wild bird matrix+/H5+ and matrix+/H7+ are assumed to be LPAI unless indicated otherwise by mortality or HPAla clinical signs.

E. Communication Protocol for Presumptive H5/H7 or HPAI Cases

1. Sample Collection
Sample is collected and epidemiologic information available (including unique site identification) is entered into a hardcopy submission form(s) (VS 10-4, WS ‘NAHLN lab submission form for AI samples, or the equivalent DOF form) and sent with the samples to the NAHLN lab.

2. Testing at NAHLN Laboratory
Sample is tested at NAHLN lab using matrix, H5, and H7 rRT-PCR assays according to approved SOP. Any H5+ or H7+ samples are forwarded to NVSL with notification.

3. NAHLN Lab Notification Process for Submission to NVSL
   a. Call NVSL with (presumptive positive) results, providing the NAHLN lab internal referral number and FedEx tracking number for shipment (priority 1 or A). No FADI number is needed.
   b. Call State Veterinarian (SV) and USDA Area Veterinary In Charge (AVIC) of submitting state and NAHLN lab state (if State NAHLN lab).
   c. Fax all submission forms (VS 10-4, WS ‘NAHLN lab submission form for AI samples’ or equivalent; note 10-4 required for shipment to NVSL) and lab results sheets (LIMS result printout or other) to: NVSL DVL - 515 663 7348; NVSL Receiving - 515 663 7359; WS Fort Collins - 970 266 6089 (if WS wild bird sample); and AVIC of submitting state.

4. Notice of Pending Submission from Laboratories
   a. NVSL emails Emergency Management and Diagnostics (EM&D), Legislative and Public Affairs (APHIS/LPA), and for any wild bird submission USDA/Wildlife Services (WS) that there will be a submission. NVSL emails scan(s) of all submission forms to EM&D. Note, there is no NVSL accession number at this point so NVSL will reference NAHLN, WS, etc. numbers.
   b. Emergency Management and Diagnostics (EM&D) contacts AVIC for the sample collection state only if information needed from them. If a poultry case, the AVIC for the sample collection state initiates an Emergency Management Response System (EMRS) record and forwards the number to EM&D (wild bird cases may rarely be entered into EMRS later if an investigation results).

5. Sitrep Report Preparation and Distribution
   a. EM&D prepares sitrep based on information provided by WS (wild bird) and AVIC (poultry) using the sitrep template, submission forms, EMRS record, NVSL results, and shared NVSL and WS Information Technology (IT) drives.
   b. EM&D e-mails sitrep (first one provides notice and ties field info to a reference number) to Sitrep List.
   c. Sitreps for those cases cited in 5a are completed each calendar day. They include the previous day’s test results for next-morning briefings, so target issuance is early in business day. They are issued until testing is complete or investigation is closed. Verbal reports on the cases are given to AI JWG as needed.

6. Notice of sample arrival at NVSL
   NVSL e-mails report receipt (Blackberry; BB) to EM&D on sitrep samples, and to WS for any wild bird sample, using the NVSL Accession number and NAHLN lab referral number for future reference and cross-reference. For DOI samples, email is also sent to NWHC. EM&D forwards e-mail to sitrep list.

7. RT-PCR results at NVSL
   NVSL reports Matrix, H5, H7, WI N1 and WHO N1 results as a batch.
   a. If the sample is H5 and N1 positive, NVSL first phones results (with any interpretation) to VS DA and VS ADAEM. NVSL then e-mails (BB) results to EM&D, and to WS for any wild bird sample. For DOI samples, e-mail is sent also to NWHC. Upon release by the VS DA, EM&D forwards the BB e-mail to sitrep list, who forward as in (5). 
   b. If the sample is H5 and N1 positive, NVSL first phones results (with any interpretation) to VS DA and VS ADAEM. NVSL then e-mails (BB) results to EM&D, and to WS for any wild bird sample. For DOI samples, e-mail is sent also to NWHC. Upon release by the VS DA, EM&D forwards the BB e-mail to sitrep list, who forward as in (5). During the period between phone notice and sitrep distribution, the VS DA calls the VS DA (if wild bird sample), APHIS Admin (who notifies the MRP US as needed), AO COS, and LP A. ADAEM notifies ADARA and ADANAHPP, who may further selectively notify according to 8aii below if needed under close hold guidance. The ADAEM may initiate a conference call per VS Memo 580.4 (4.B.5) with the VS DA Office, RD, AVIC, FADD, SV, appropriate lab personnel, and the EMLT for future action planning. NVSL may contact the submitting State NAHLN or NWHC lab if publication of the result is anticipated. Also during the phone sitrep interim, if a DOI sample, NVSL calls one NWHC contact, and APHIS Admin calls USGS and USEFWS Directors. If domestic poultry, VS DA may hold a call with industry and the NACAHO and the APHIS Admin may hold a call with NASA. Close hold guidance applies.
   b. If non-H5N1, NVSL e-mails results (BB) to the VS DA, ADAEM, EM&D, and WS for any wild bird submission. If a sitrep sample, NVSL calls the VS DA and ADAEM prior to e-mailing the results. For DOI samples, e-mail is sent also to NWHC. EM&D includes the results of such cases in brief fashion at bottom of the daily sitreps. VS notifies WS SD and NWRC if they were the submitting lab. NVSL contacts the submitting lab if State NAHLN. If a DOI sample, NVSL notifies NWHC prior to e-mailing to EM&D and WS. NWHC contacts the SFGD and collector (if agency or university) if DOI sample.
   c. These and subsequent (steps 8-10) results are entered into the NVSL results spreadsheet on the accessible drive when validated.

8. H cleavage site sequencing at NVSL
   Estimated test on/off dates/times will be provided with H5/7 and N1 results for positive H5s.
   a. If HPAI or Asian H5N1 HPAI strain consistent, NVSL first phones results to the VS Deputy Administrator (DA) and VS Associate Deputy Administrator Emergency Management Diagnostics (ADAME). NVSL then e-mails them to EM&D and WS if wild bird submission. Upon VS DA release, EM&D forwards e-mail to sitrep list, who forward as in (5). During the phone-sitrep interim,
      i. VS DA calls: APHIS Admin, who calls MRP US, State AgComm, DOI FWS and USGS
Dir. and national Industry; Canadian and Mexican Chief Veterinary Officers (CVOs); LPA (who contacts USDA OC); and WS DA, who calls State Fish and Game Director (SFGFD) and WS State Director (SD).

ii. VS ADEAM calls: VS ADARA, who calls RD, who calls AVIC(s), State Vet(s), and ARDEM; VS ADANAHPP, who calls ASEP and NCIE Dir.; PIC Dir.; OEHMC Dir.; and may initiate a conference call according to VS Memo 580.4, (see 7a). Close hold guidance applies.

b. If LPAI consistent, NVSL emails results to the VS DA, ADEAM, EM&D and WS if wild bird sample. If a sitrep sample, NVSL calls the VS DA and ADEAM prior to emailing the results, and EM&D forwards results email to sitrep list, who forward as in (5). VS DA notifies parties (and they notify others) as described under 8a as needed, (many contacts are on sitrep list), but more often by email. NVSL contacts the submitting lab if State NAHLN or NWHC.

c. Results are released via press release or web posting by LPA (coordinating with USDA OC, State PIOs, Industry PIOs, and DOI as needed).

9. H and N subtyping at NVSL
Estimated test on/off dates/times will be in end of day test report for sitrep samples.

Regardless of results (consistent with PCR, inconsistent, etc.), only H5 and H7 results (with N results) are e-mailed as the results are found to EM&D and WS if wild bird sample, and when final then to the submitting lab. EM&D forwards e-mail to the sitrep list. Other H subtype results are released through daily sitrep. EM&D works with LPA to determine timing of public notice of subtyping results of H5N1 cases.

10. Chicken pathogenicity testing at NVSL
Estimated test on/off dates/times will be in end of day test report for sitrep samples.

a. If HPAI consistent, NVSL first phones results to the VS DA and VS ADEAM. NVSL then e-mails them to EM&D and WS if wild bird sample. Upon VS DA release, EM&D forwards e-mail to sitrep list, who forward as in (5). In the phone-sitrep interim, VS DA and ADEAM notify parties (and they notify others) as described under 8a. Final (NVSL LIMS) results are provided to AVIC, submitting lab, and PIC Dir. Close hold guidance applies.

b. If LPAI consistent, NVSL e-mails results to EM&D and WS if wild bird submission. If a sitrep sample, EM&D forwards e-mail to sitrep list, who forward as in (5). Final (NVSL LIMS) results are provided to AVIC, submitting lab, and PIC Dir.

c. If it is determined that it is not necessary to perform chicken pathogenicity testing on a sample (see C.2.ii.), that will be reported in the end of day test report and reflected in the daily sitrep. Final (NVSL LIMS) results are provided to AVIC, submitting lab, and PIC Dir.

d. Results are released via press conference, press release or web posting prepared by LPA working with OC, OA, OS, State PIOs, Industry PIOs, and DOI as needed. EM&D will work with LPA to determine timing of public notification of pathogenicity results of H5N1 cases.

Notes:
For those samples designated H5/H7 or HPAI presumptive based on clinical signs and tested first by NVSL, the notification steps would skip from sample collection (1) to notification by NVSL (4). Also, some NAHLN-submitted samples may be swab material, and some may be AAF (sample already egg passaged), which can influence the timing between steps (e.g., H5N1 known, but LP/HP sequence results not known).

In the case of wild bird samples, WS and DOI will provide notification for their respective samples to the submitting state SFGD, collectors, etc. In the case of non-DOI samples, the WS NWRC Dir will share NVSL results received with USGS Assoc Dir of Biology, NWHC Dir, and FWS Dir. WS is the primary APHIS liaison with DOI (although limited lab-to-lab communication will occur between NVSL and NWHC). WS will share results with WS RDs, WS SDs, according to the WS protocol. AVICs and WS SDs should communicate with one another and provide information with their state counterparts to ensure that all are working from a common operating picture.

On all result notices/sitreps, the AO COS forwards to Acting Admin or DA as needed, VS DA Spec Asst notifies Acting DA or ADAs as needed, ADEAM COS notifies Acting PIC Dir as needed, VS ADA NAHPP notifies acting NAHPPS Dir as needed, and the VS RD notifies the Acting AVIC or ARDs as needed. AVICs extract the state-specific cases and forward to SVs and the local poultry industry; NVSL forwards laboratory-specific case information to submitting laboratory, and WS forwards to WS SD, who for WS samples notifies SFGD. Summaries rather than individual case/results reports may be appropriate for some external communications. NAHLN labs should contact NVSL for technical information, and AVICs or SVs for policy information.

Close-hold guidance - Information distributed in e.g., 7a (and to any others with VS Deputy permission) prior to wide distribution of the sitrep or a Federal or State press/public release should only be shared with those needing it to conduct the investigation or take control actions unless otherwise notified.

Groupings Cited:
EM&D - ADEAM, PIC Dir, and EM&D COS
LPA - LPA DA, ADA, and Dir Public Affairs
NWHC - Avian Diagnostic Virologist, Branch Chief, and Center Director
Sitrep List - AHPIS Admin, VS DA, ADEAM, ADARA, ADANAHPP, ASEP Dir, NCIE Dir.; NVSL Dir, DVL Dir, NAHLN Coordinator, PIC Dir, AO COS, VS DA Spec Asst, VS ADEAM COS, RD, the 3 ARDs, AVIC, WS DA, WS NWDC, WS WDER, LPA Deputy, LPA ADA, and Dir PA.
Industry – US commercial poultry industry, represented nationally by e.g., NCC, NTF, UEP, USAPEEC, and locally by local chapters of same.
Wild bird samples of special interest - those identified by USDA Secretary, MRP US, AHPIS Admin, VS or WS DA, EM&D, or WS
WS - WS DA, NWDC, and WDER
APPENDIX 16
Department Internal Presumptive & Confirmed HPAI H5N1
Contact Protocol
CONFIDENTIAL*
December 2006

I. Initial Contact
Bernadette Fees
Alexia Retallack

II. Executive Contacts
Ryan Broddrick
Sandy Cooney
Sonke Mastrup
John McCamman
Greg Hurner
Rob Floerke
Nancy Foley

III. Program Staff Contacts
Dr. Pamela Swift
Steve Torres
Dan Yparraguirre
Assist. Chief Steve Edinger

IV. Region Contacts
Don Koch
Sandy Morey
Chuck Armor
Bill Loudermilk
Larry Eng
Curt Taucher

V. External State Interagency Contacts
Office of Emergency Services
Gail Lockhart
Department of Food and Agriculture
Dr. Richard Breitmeyer
Dr. Annette Whiteford
Dr. Dennis Wilson
Department of Health Services
Dr. Mark Starr
Terri Stratton
Holly Sisneros
Dr. Ben Sun
Department of Parks and Recreation
Roy Stearns

VI. Federal Interagency Contacts
U.S. Fish and Wildlife Service
Brad Bortner
Richard Hadley
USDA/APHIS/Veterinary Services
Dr. Kevin Varner
Dr. Scott Beutelschies
USDA/APHIS/Wildlife Services
Craig Coolahan
Jerry Wiscomb
National Park Service
Sarah Allen

*Confidential contact has been deleted from this appendix for public distribution.