

Appendix G. WILDLAND FIRE MANAGEMENT PLAN

KEĀLIA POND NATIONAL WILDLIFE REFUGE

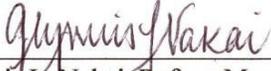
Kīhei, Maui, Hawai‘i



2004

2004 WILDLAND FIRE MANAGEMENT PLAN

KEĀLIA POND NATIONAL WILDLIFE REFUGE

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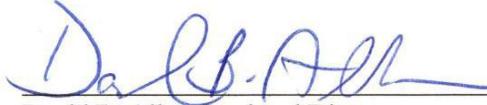
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INTRODUCTION

This document will establish a Fire Management Plan for Keālia Pond National Wildlife Refuge (NWR), of the Maui NWR Complex. This plan will meet the requirements of the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA) and the National Historic Preservation Act (NHPA). Compliance with NEPA was met through a Categorical Exclusion and associated Environmental Action Statement (Appendix D). For ESA Section 7 compliance, informal consultation with Ecological Services led to May Affect, Not Likely to Adversely Affect determination (Appendix E). Compliance with the NHPA will be accomplished at the project level through submission of a Request for Cultural Resources Compliance form (Appendix F) to the Regional Archaeologist.

This plan is written as an operational guide for managing the refuge's wildland fire and prescribed fire programs. It defines levels of protection needed to provide for safety, protect facilities and resources, and restore and perpetuate natural processes, given current understanding of the complex relationships in natural ecosystems. It is written to comply with a service-wide requirement that refuges with burnable vegetation develop a fire management plan (620 DM 1).

This plan will outline a program of suppression of all wildland fires and pile burning (as a limited form of prescribed fire). These piles will be generated from habitat enhancement and maintenance activities covered within the refuge's ESA documentation.

There is no dedicated fire management staff on the refuge. Fire Management oversight is provided by the Regional Office located in Portland. Day-to-day fire management responsibilities are provided by the Refuge Manager located onsite. Suppression of wildland and structural fires on the refuge will be provided by Maui County Fire Department, Kahului Station, based on County of Maui emergency policy.

COMPLIANCE WITH USFWS POLICY

Keālia Pond National Wildlife Refuge was established in 1992 to provide nesting and maintenance habitat for three native Hawaiian endangered waterbirds as well as migratory waterfowl and shorebirds. The endangered waterbirds include Hawaiian stilt (*Himantopus mexicanus knudseni*), Hawaiian coot (*Fulica alai*), and Hawaiian duck (*Anas wyvilliana*).

This plan meets NEPA / NHPA compliance and will be implemented in cooperation with the Endangered Species Act of 1973, as amended, and will take appropriate action to identify and protect from adverse effects on any rare, threatened, or endangered species. Compliance with NEPA was met through a Categorical Exclusion and associated Environmental Action Statement (Appendix D). For ESA Section 7 compliance, informal consultation with Ecological Services led to a “May Affect, Not Likely to Adversely Affect” determination (Appendix E). Compliance with the NHPA will be accomplished at the project level through submission of a Request for Cultural Resources Compliance form (Appendix F) to the Regional Archaeologist.

At this time, no Master Plan or Comprehensive Conservation Plan (CCP) exists for the Refuge. Development of a CCP for the entire complex is scheduled to begin in 2006. An interim Management Plan for Keālia Pond National Wildlife Refuge was developed in 2001 (U.S. Fish and Wildlife Service 2001) that identified the goals of the Refuge, objectives supporting those goals, and strategies addressing each objective. The Refuge purpose and goals can be found in the Maui National Wildlife Refuge Complex’s Refuge Management Information System, and are as follows:

REFUGE PURPOSE

- “to conserve (A) fish or wildlife which are listed as endangered species or threatened species...or (B) plants.” 16 U.S.C. § 1534 (Endangered Species Act of 1973).

REFUGE GOALS

- **Endangered Species:** Promote the conservation of endangered species, especially native Hawaiian coot and Hawaiian stilt through healthy functioning of this wetland floodplain.
- **Habitat:** Optimize water levels for maximum habitat size and value for endangered, resident, and migrating waterfowl and shorebirds while reducing the growth and reproduction of problematical exotic species.
- **Visitor Use:** Expand understanding and appreciation of the environment through wildlife-oriented educational opportunities. Provide opportunities for quality, wildlife-dependent recreation, education, and research to enhance public appreciation, understanding, and enjoyment of refuge wildlife and habitats.
- **Habitat Restoration:** Restore and maintain the diversity and abundance of native species naturally occurring on the Refuge.

Authority and guidance for implementing this plan are found in:

- Protection Act of September 20, 1922 (42 Stat. 857; 16 U.S.C.594): authorizes the Secretary of the Interior to protect from fire, lands under the jurisdiction of the Department directly or in cooperation with other Federal agencies, states, or owners of timber.
- Economy Act of June 30, 1932: authorizes contracts for services with other Federal agencies.
- Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 67; 42 U.S.C. 1856, 1856a and b): authorizes reciprocal fire protection agreements with any fire organization for mutual aid with or

without reimbursement and allows for emergency assistance in the vicinity of agency lands in suppressing fires when no agreement exists.

- Disaster Relief Act of May 22, 1974 (88 Stat. 143; 42 U.S.C. 5121): authorizes Federal agencies to assist state and local governments during emergency or major disaster by direction of the President.
- National Wildlife Refuge System Administrative Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd et seq.: defines the National Wildlife Refuge System as including wildlife refuges, areas for the protection and conservation of fish and wildlife which are threatened with extinction, wildlife ranges, game ranges, wildlife management areas and waterfowl production areas. It also establishes a conservation mission for the Refuge System, defines guiding principles and directs the Secretary of the Interior to ensure that biological integrity and environmental health of the system are maintained and that growth of the system supports the mission.
- Federal Fire Prevention and Control Act of October 29, 1974 (88 Stat. 1535; 15 U.S.C.2201): provides for reimbursement to state or local fire services for costs of firefighting on federal property.
- Wildfire Suppression Assistance Act of 1989. (Pub.L. 100-428, as amended by Pub.L 101- 11, April 7, 1989).
- Departmental Manual (Interior), Part 620 DM, Chapter 1, Wildland Fire Management: General Policy and Procedures (April 10, 1998): defines Department of Interior fire management policies.
- Service Manual, Part 621, Fire Management (February 7, 2000): defines U.S. Fish and Wildlife Service fire management policies.
- National Environmental Policy Act of 1969: regulations implementing the National Environmental Policy Act (NEPA) encourages the combination of environmental comments with other agency documents to reduce duplication and paperwork (40 CFR 1500.4(o) and 1506.4).
- Clean Air Act (42 United State Code (USO) 7401 et seq.): requires states to attain and maintain the national ambient air quality standards adopted to protect health and welfare. This encourages states to implement smoke management programs to mitigate the public health and welfare impacts of Wildland and prescribed fires managed for resource benefit.
- Endangered Species Act of 1973.
- U.S. Fish & Wildlife Service Fire Management Handbook.

The authority for funding (normal fire year programming) and all emergency fire accounts is found in the following authorities:

- Section 102 of the General Provisions of the Department of Interior's annual Appropriations Bill provides the authority under which appropriated monies can be expended or transferred to fund expenditures arising from the emergency prevention and suppression of wildland fire.
- P.L. 101-121, Department of the Interior and Related Agencies Appropriation Act of 1990, established the funding mechanism for normal year expenditures of funds for fire management purposes.
- 31 US Code 665(E)(1)(B) provides the authority to exceed appropriations due to wildland fire management activities involving the safety of human life and protection of property.

Authorities for procurement and administrative activities necessary to support wildland fire suppression missions are contained in the Interagency Fire Business Management Handbook.

FIRE MANAGEMENT OBJECTIVES

The overall objective for fire management on Keālia Pond NWR is to promote a program to provide for firefighter and public safety, reduce the incidence of human-caused fires, and ensure appropriate suppression response capability to meet expected wildland fire complexity. Wildland fire potential exists on the refuge due to the proximity to sugar cane operations along the north side of the refuge and beach sites along Ma'alaia Flats. Specific fire management objectives are:

- Promote a fire management program and control all wildland fires.
- Provide for the protection of life, property, and resources from wildland fires at costs commensurate with resource values at risk.
- Use appropriate suppression tactics and strategies that minimize long-term impacts of suppression actions.
- Use pile burning to safely and efficiently remove debris from resource management activities and reduce hazardous fuels.

DESCRIPTION OF REFUGE

GENERAL DESCRIPTION

Keālia Pond National Wildlife Refuge is located adjacent to Ma'ālea Bay, along the south central coast on the Island of Maui, Hawai'i (Figure 1). The 700-acre refuge is a naturally formed wetland within the isthmus separating the West Maui Mountains and Haleakala. The property is bisected by North Kihei Road (Highway 31), separating the main pond from the coastal dune and mudflats habitat. The nearest community, Kihei, is located southeast of the refuge boundary.

The refuge is comprised of approximately 200 acres of open water (Keālia Pond proper), 350 acres of mudflats and 200 acres of scrub-shrub and upland habitats bordering the wetlands. In 1970, aquaculture ponds (25 acres) were constructed at the north side of the main pond where the refuge office is located. The aquaculture operation terminated in 1995 and the ponds (Kanuimanu Ponds) are now managed for waterbird and visitor use.

CLIMATE

The refuge receives five to 20 inches of rain annually. Mean monthly rainfall averages less than five inches. Mean maximum daily temperatures are in the high 70s and 80s (°F). The average annual temperature is approximately 74°F with August to October having the warmest months of the year. Warmest weather occurs with "Kona" weather. Seasonal and diurnal variability in cloud cover occur with clouds tending to be more abundant during the day. Average daily relative humidity ranges from 65% to 90%.

VEGETATION

The vegetative communities of the refuge vary from wetland to upland habitats. Vegetation is primarily non-native, invasive plants which have formed large, monotypic stands. Mudflats are predominantly pickleweed (*Batis maritima*), which forms dense, tall mats of old growth. Moist soil areas along the dikes have dense coverage of Indian marsh fleabane (*Pluchea indica*), and upland areas along the north boundary consist of kiawe or mesquite (*Prosopis pallida*), common ironwood (*Casuarina equisetifolia*), Australian saltbush (*Atriplex semibaccata*), castor bean (*Ricinus communis*), koa haole (*Leucaena leucocephala*), and various grasses (*Brachiaria mutica*, *Cenchrus ciliaris*, *Cynodon dactylon*, and *Leptochloa uninervia*). Large stands of American mangrove (*Rhizophora mangle*) and California bulrush (*Schoenoplectus californicus*) occur along the eastern edge of the wetland. The weather conditions on Maui promotes year-round growing season resulting in dense understory in most areas.

FISH AND WILDLIFE

Keālia Pond NWR was established to protect and manage endangered waterbird populations (Hawaiian stilt and Hawaiian coot) and their habitats. The pond is one of the last natural wetlands remaining within the Hawaiian islands and is also host to more than 20 species of migratory waterfowl, including Northern shoveler (*Anas clypeata*), Northern pintail (*Anas acuta*), scaup (*Aythya* spp.), and American wigeon (*Anas americana*), and shorebirds including wandering tattler (*Heteroscelus incanus*), sanderling (*Calidris alba*), and ruddy turnstone (*Arenaria interpres*). The Refuge also contains populations of other native species including black-crowned night heron (*Nycticorax nycticorax*) and short-eared owl or pueo (*Asio flammeus sandwichensis*), and non-native cattle egrets (*Bubulcus ibis*). Numerous non-native passerines are present within the upland habitat, including spotted doves (*Streptopelia chinensis*), zebra doves (*Geopelia striata*), common myna (*Acridotheres tristis*), Northern cardinal (*Cardinalis cardinalis*), house finch (*Carpodacus mexicanus*), orange-cheeked waxbill (*Estrilda melpoda*), and gray francolin (*Francolinus pondicerianus*).

Fish population consists of predominantly introduced tilapia (*Tilapia spp.*), and mosquito fish (*Gambusia sp.*). Mammals found on the refuge are all non-native and include black rat (*Rattus rattus*), Norwegian rat, feral cats, and mongoose, all of which are controlled to protect endangered waterbirds.

THREATENED AND ENDANGERED SPECIES

Endangered waterbirds at Keālia Pond NWR include the Hawaiian stilt, Hawaiian coot, and historically, the Hawaiian duck. The latter species has hybridized with local mallards (non-migratory) resulting in physical characteristics that are difficult to distinguish; therefore, it is possible the pure species is present but not nesting on the refuge. Depending upon water levels Hawaiian stilts and coots use a majority of the main pond and mudflats. Hawaiian stilts are limited to shallow water (approximately seven inches or less) and nest (April through August) on the ground adjacent to water and vegetation. Hawaiian coots prefer deeper water (18 inches or less) for nesting (December through March/April) but are also present in shallow water along the water’s edge. The critical period for both waterbirds is from December through August during their breeding season.

The endangered hawksbill sea turtle (*Eretmochelys imbricata*) is known to nest on the adjacent Keālia Beach, but is not found on the refuge. Nesting season occurs from May through September/October.

A majority of the vegetation present on the refuge is non-native, invasive species; there is no threatened or endangered plant species recorded. The refuge does not contain designated Critical Habitat or portions thereof, does not possess any areas designated as Critical Habitat.

Table 1. Threatened and Endangered Species Found at Keālia Pond NWR.

Common Name	Scientific Name	Federal Status
Hawaiian Duck	<i>Anas wyvilliana</i>	Endangered
Hawaiian Coot	<i>Fulica alai</i>	Endangered
Hawaiian Stilt	<i>Himantopus mexicanus knudseni</i>	Endangered
Hawksbill Sea Turtle*	<i>Eretmochelys imbricata</i> *	Endangered

* Nests on adjacent Keālia Beach, but not found on the refuge.

CULTURAL RESOURCES

The Service has not conducted a comprehensive archaeological survey on the refuge; however, small sites have been surveyed and evaluated by the State Historic Preservation Office prior to construction of visitor service facilities (Keālia Coastal Boardwalk) and an area adjacent to the entrance road off Mokulele Highway. Other site-specific surveys will be conducted prior to any land-altering activities on the refuge.

As well as being an important source of salt, Keālia Pond was once used as a fish pond. About 400 years ago, the people living around the bay built ditches and sluice gates through the coastal dune, allowing nearshore fish into the pond. A rock platform near the refuge may once have been a heiau or fishing shrine.

During World War II, 5000 soldiers of the 2nd and 4th Marine Divisions used the area as a training site. Remnants of a firing range and airstrip lie just outside the refuge boundary. In 1943 and 1944, in

preparation for the Marianas campaign, amphibious landings using LSTs were practiced on the refuge beachfront and mudflats.

PHYSICAL RESOURCES

Elevation of Keālia Pond National Wildlife Refuge ranges from sea level to 10 feet. The soils are poorly-drained and have a high salt content. A majority of the soil has been characterized as a Keālia silt loam and contains relatively high salt content. During periods of heavy rain and surface runoff, ponding occurs in many areas. When dry, salt crystals accumulate on the surface. Soil profiles indicate a dark reddish-brown silt loam in the top three inches and stratified layers of silt loam, loam, and fine sandy loam below. Mean annual soil temperature is approximately 75°F.

Wind conditions on the refuge are relatively constant. Due to the refuge's location between the mountains, a vortex and funneling occurs with trade winds typically blowing from the northeast side of the island. South winds ("Kona") occur periodically throughout the year. Wind speed ranges from eight to 12 knots (9-14 miles per hour), typically less in the early morning hours.

The topography of the entire refuge ranges from sea level to no more than ten feet elevation that acts as a settling basin for approximately 56-square miles of the West Maui Mountains. Water from this watershed sheetflows into the refuge from three streams: Pohakea, Paleaahu, and Waikapu. Two streams, Pulehu and Kolalau, enter the refuge from Haleakala; however, streamflow is infrequent (one to two times per year). All these streams are diverted into reservoirs or ditches for agricultural purposes (primarily sugar cane which is adjacent to the refuge's northern boundary). The typical hydrology of the refuge is characterized by high water conditions (maximum 4.8 feet above sea level) during winter months (November-March) and shallow water during summer, with lowest water levels in September-October. In most years, supplemental pumping of water is performed beginning in August to provide shallow water feeding conditions for waterbirds and minimize wind blown sediment to the adjacent community.

STRUCTURES AND FACILITIES

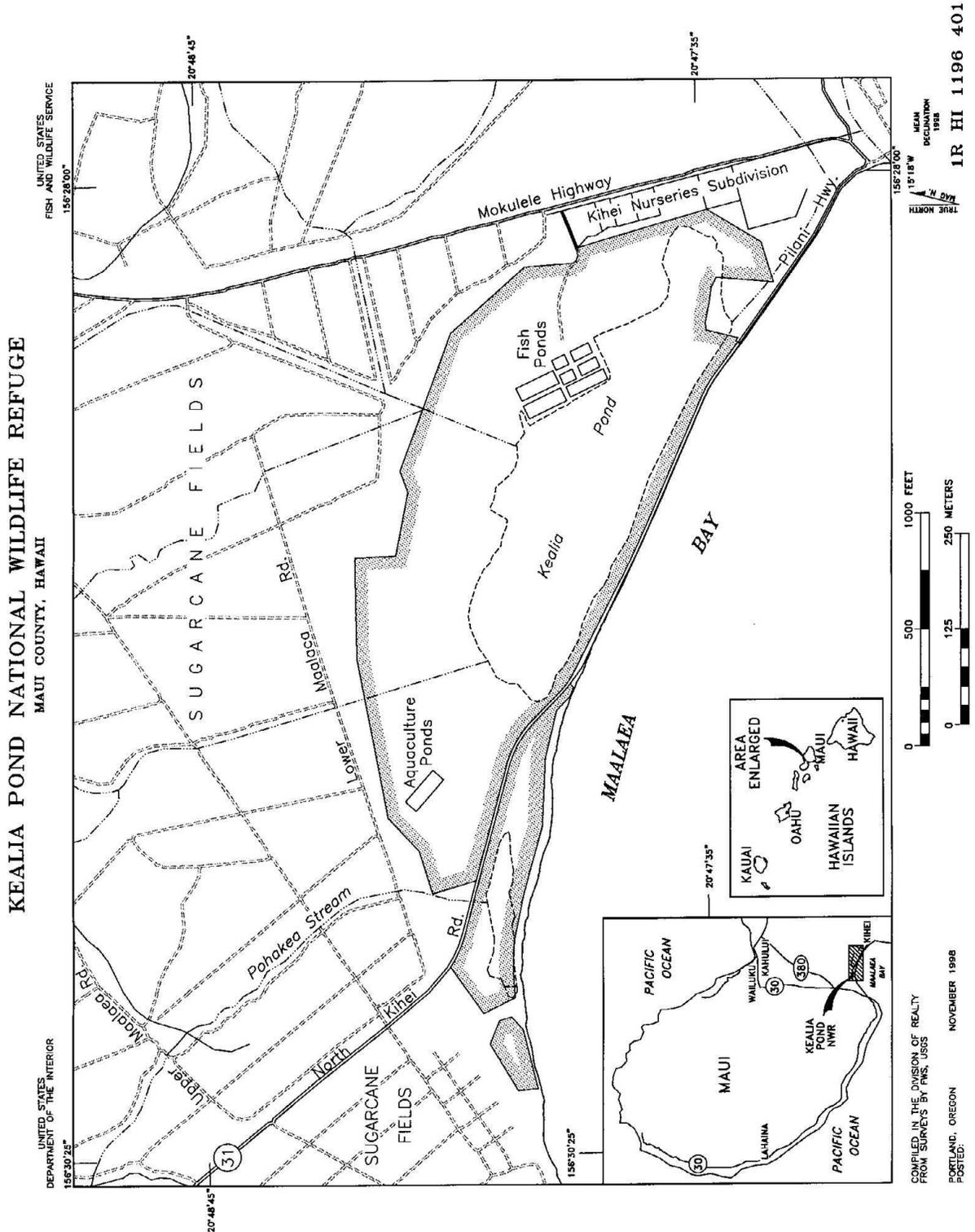
The Refuge Headquarters is situated on the north side of the Kanuimanu ponds and consists of an elevated, double-wide (56 ft x 38 ft) trailer building. Above-ground holding tanks are located under the building. The maintenance area is located off Mokulele Highway (Highway 311) approximately 0.2 mile along the entrance road. This area contains metal storage containers (2 at 30 ft x 12 ft and one at 50 ft x 12 ft) and parking area for Refuge vehicles (5) and equipment (bobcat, tractor, portable pump, 14-ft boat and trailer). A greenhouse is located across the maintenance area.

Structures are also located at the old baitfish ponds on the northeast side of the refuge and include one metal container for storage, one wooden building for environmental education, and one aluminum storage shed. Other facilities on the Refuge include three pumps with miscellaneous valves on groundwater wells, two of which have wooden roofs, various water distribution pipes (PVC and transite), and recycled materials for fencing (installed at Ma'alaea Flats and stored at Baitfish pond site). The public use areas include the refuge office and a 2,200 feet elevated boardwalk. The latter facility is located at Ma'alaea Flats on the south side of North Kihei Road (Highway 31).

PUBLIC USE AND ACCESS

A majority of the Refuge is inaccessible for vehicles due to the flooded and/or moist soil conditions. Vehicle use and the general public are limited to levees of the Kanuimanu Ponds. Hiking is allowed on designated trails. Hunting, fishing, camping, and off-road vehicles are prohibited at all times.

Figure 1. Keālia Pond National Wildlife Refuge.



WILDLAND FIRE MANAGEMENT SITUATION

HISTORIC ROLE OF FIRE

Historic natural fires on Maui have been limited to volcanic eruptions and lightning and are very infrequent. In general the native vegetation is not well adapted to fire disturbances. Non-native (invasive) species typically colonize burned areas to the exclusion of native species.

Pre-settlement Fires

There is no clear indication that fire was an integral part of the native ecosystem. There are no records indicating fire frequency prior to settlement, although rare fire events likely occurred as a result of volcanic activity and lightning.

Post-settlement Fire History

In the 10 year history of the refuge there have been four known wildland fires. Three of these fires were due to sugar cane operations adjacent to the refuge and one was the result of beach activity. The largest of the four known fires was 47 acres in September of 2001; the fire was caused by an escaped cane burn. All fires required assistance from Maui County. Throughout the state, fire season is considered by the Hawaii Department of Forestry and Wildlife (DOFAW) to occur during a three-month period in late summer. However, given the extreme variability of weather in Hawaii, fires may occur at any time during the year. There is no clearly-defined fire season for the refuge.

Prescribed Fire History

There is no history of prescribed fire use on the refuge. Prescribed burns (piles) will only be performed in September when endangered waterbirds are not breeding and before the influx of migratory shorebirds and waterfowl.

RESPONSIBILITIES

Keālia Pond NWR does not have a dedicated fire management organization. The Project Leader and Refuge Manager are responsible for planning and implementing the fire management program on the Refuge. Staff from the Regional Office in Portland will act as the Zone Fire Management Officer (FMO), and are responsible for fire management program oversight. The Project Leader will assign fire management responsibilities as collateral duties to staff who possess appropriate training, experience, and incident qualifications. Preparedness planning and work is accomplished by Refuge staff in accordance with national and regional fire management direction under guidance from the Regional Office. Emergency fire management actions will be handled by Refuge staff according to training and incident qualifications. The Regional Office will be immediately notified of all emergency actions. Additional information and direction is included in the Fire Dispatch Plan (Appendix C).

Refuge Manager

- Is responsible for implementation of all fire management activities within the Refuge and will ensure compliance with Department and Service policies.
- Selects the appropriate management responses to wildland fires.
- Approves any Pile Burn Plan.
- Coordinates Complex programs to ensure personnel and equipment are made available and utilized for fire management activities.
- Ensures that the fire management program is considered during refuge-related planning and project implementation.
- Acts as the primary Resource Advisor during fire management planning and operations.
- Coordinates with cooperators to ensure adequate resources are available for fire operational needs.

Biologist

- Coordinates through Project Leader to provide biological input for the fire program.
- Participates, as requested in fire suppression and rehabilitation projects according to level of training and qualifications.
- May act as primary Refuge Resource Advisor for the Project Leader.
-

Zone Fire Management Officer

- Responsible for all fire-related planning for the Refuge.
- Solicits program input from the Project Leader and Biologist.
- Coordinates fire related training.
- Coordinates with cooperators to ensure adequate resources are available for fire operational needs.
- Is responsible for preparation of fire reports following the suppression of wildland fires.
- Prepares an annual report detailing fire activities undertaken in each calendar year. This report will serve as a post-year's fire management activities review, as well as provide documentation for development of a comprehensive fire history record for the Complex.
- Submits budget requests and monitors FIREBASE funds.
- Maintains records for all personnel involved in related activities, detailing each individual's qualifications and certifications for such activities.

Incident Commander

Incident Commanders (ICs) of any level use strategies and tactics as directed by the Project Leader and WFSA where applicable to implement selected objectives on a particular incident. A specific Limited Delegation of Authority (Appendix I) will be provided to each Incident Commander prior to assuming responsibility for an incident. Major duties of the Incident Commander are given in the National Wildfire Coordinating Group (NWCG) Fireline Handbook, including:

- Brief subordinates, direct their actions, and provide work tools.
- Ensure that safety standards identified in the Fire Orders, the Watch Out Situations, and agency policies are followed at all times.
- Personally scout and communicate with others to be knowledgeable of fire conditions, fire weather, tactical progress, safety concerns and hazards, condition of personnel, and needs for additional resources.
- Order resources to implement the management objectives for the fire.
- Inform appropriate dispatch of current situation and expected needs.
- Coordinate mobilization and demobilization with dispatch and the Zone FMO.
- Perform administrative duties, i.e., approving work hours, completing fire reports for command period, maintaining property accountability, providing or obtaining medical treatment, and evaluating performance of subordinates.
- Assure aviation safety is maintained to the highest standards.

Resource Advisor

The Resource Advisor (RA) is a technical specialist appointed by the Agency Administrator and reports to the IC or designee and provides guidance for natural and cultural resource protection from suppression operations. The RA provides input to the IC in the development of fire suppression strategies and tactics to minimize or mitigate the expected impacts of fire and fire and fire suppression actions upon natural and cultural resources. The RA also provides input required for the development of rehabilitation plans.

Resource Advisor responsibilities include (NWCG 1996):

- Provides analysis, information, and advice to fire managers for areas of concern, including critical watersheds, riparian areas, fisheries, and water sources; threatened or endangered species;

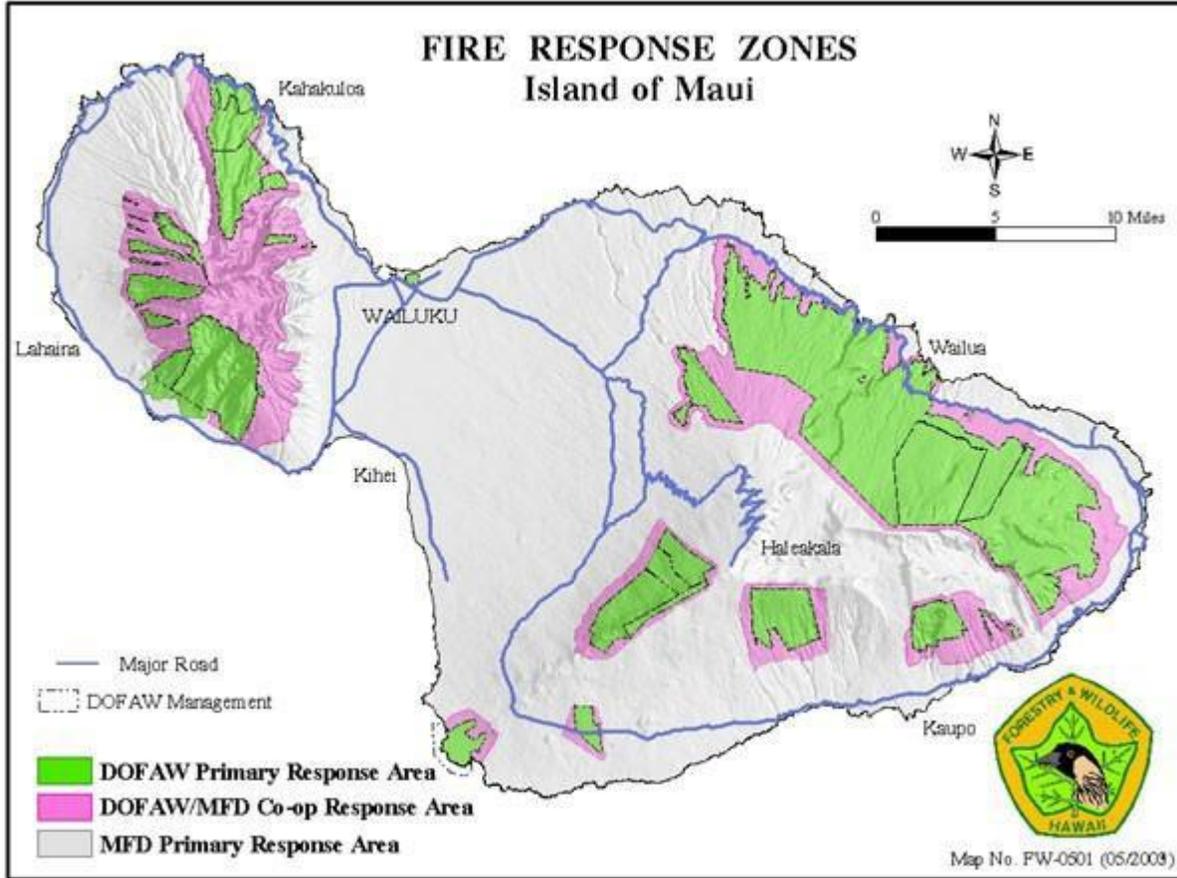
- prehistoric and historic archaeological sites and cultural landscapes; fuel breaks B locations and specifications; urban interface impact B structures and improvements; and hazardous materials
- Assists the planning function in developing fire maps and identifying areas of concern
- Determines environmental restrictions commensurate with FMP resource protection in the fire area
- Provides recommendations to fire management personnel and agency administrators for fire suppression rehabilitation needs
- Documents potential and actual suppression/fire-related resource impacts and the rationale for protection of priority areas
- Provides resource information to local initial attack ICs, dispatchers, or other fire personnel during pre-season training and planning meetings.

INTERAGENCY OPERATIONS

Maui County Fire Department (Kahului Station) will provide initial attack response to wildland and structural fires on the refuge (Figure 2). If qualified resources are not available, resources will be ordered through proper dispatch procedures (Appendix C). The Hawaii Department of Fish and Wildlife (DOFAW) would be able to respond to fires in the white areas of the figure below only under specific conditions (i.e., extreme threats to public safety, local resources fully committed, extreme fire behavior, etc.). In this case, the request for assistance must come from the County Fire Department through the County Civil Defense to State Civil Defense. No formal cooperative agreements exist with these agencies. When they are developed, they will be added to Appendix G.

Keālia Pond will use the Incident Command System (ICS) as a guide for fireline organization. Qualifications for individuals are per DOI Wildland Fire Qualifications and Certification System, part of NIIMS and the National Wildland Fire Coordination Group (NWCG) Prescribed Fire Qualification Guide. Depending on fire complexity, some positions may be filled by the same person.

Figure 2. Fire Response Zones for the Island of Maui.



PROTECTION OF SENSITIVE RESOURCES

Resource advisors will be required for all wildland fires on the refuge. The advisor will work with the suppression resources to limit environmental impact.

The Regional Archaeologist will work with fire staff, Project Leaders, and Incident Commanders to ensure that cultural resources are protected from fire and fire management activities. The “Request For Cultural Resource Compliance” (RCRC) form (Appendix F) will be used to inform the Regional Archaeologist of impending activities, thereby meeting the regulations and directions governing the protection of cultural resources as outlined in Departmental Manual Part 519, National Historic Preservation Act (NHPA) of 1966, Code of Federal Regulations (36CFR800), the Archaeological Resources Protection Act of 1979, as amended, and the Archaeological and Historic Preservation Act of 1974. The NHPA Section 106 clearance will be followed for any fire management activity that may affect historic properties (cultural resources listed or eligible for listing on the National Register of Historic Places).

Impacts to archaeological resources by fire resources vary. The four basic sources of damage are (1) fire intensity, (2) duration of heat, (3) heat penetration into soil, and (4) suppression actions. Of the four, the most significant threat is from equipment during line construction for prescribed fires or wildfire holding actions (Anderson 1983).

The following actions will be taken to protect archaeological and cultural resources:

Wildland Fires

- Minimum impact fire suppression tactics will be used to the fullest extent possible.
- The Resource Advisor will inform fire suppression personnel of any areas with cultural resources. The Resource Advisor should contact the Regional Archaeologist for more detailed information.
- Foam use will be minimized in areas known to harbor surface artifacts.
- Mechanized equipment should not be used in areas of known cultural significance.
- The location of any sites discovered as the result of fire management activities will be reported to the Regional Archaeologist.
- Rehabilitation plans will address cultural resources impacts and will be submitted to the Regional Archaeologist using the RCRC.

Pile Burns

- The refuge fire staff will submit a completed RCRC to the Regional Archaeologist as soon as the burn area is identified (i.e., as soon as feasible).
- Upon receipt of the RCRC, the Regional Archaeologist will be responsible for consulting with the Zone FMO and evaluating the potential for adverse impacts to cultural resources.
- When necessary, the Regional Archaeologist will coordinate with the State Historic Preservation Officer (SHPO). The SHPO has 30 days to respond. The Refuge will consider all SHPO recommendations.
- Mechanized equipment should not be used in areas of known cultural significance.
- The location of any sites discovered as the result of fire management activities will be reported to the Regional Archaeologist .

WILDLAND FIRE SUPPRESSION ACTIVITIES

Fire program management describes the operational procedures necessary to implement fire management at Keālia Pond. Program management includes fire prevention, preparedness, emergency preparedness, fire behavior predictions, fire detection, minimum impact fire suppression, minimum impact rehabilitation, and documentation.

All fires not classified as prescribed fires are wildland fires and will be appropriately suppressed. Maui County will provide wildland fire suppression resources under most circumstances. Most suppression activities will necessitate the use of heavy equipment to create firebreaks or allow the fire to burn to the water.

There is no clearly defined fire season for the refuge and records show that fires may occur at any during the year.

FIRE MANAGEMENT STRATEGIES

Although resource impacts of suppression alternatives must always be considered in selecting a fire management strategy, managing fire for resource benefit is not authorized on this refuge. Appropriate suppression action will be taken to provide for firefighter safety, public safety, and protection of resources.

Critical protection areas, including all refuge structures and facilities, will receive priority consideration in fire control planning efforts. In all cases, the primary concerns of fire suppression personnel will be safety. If needed, all individuals not involved in the suppression effort will be evacuated.

Suppression strategies should be applied so that the equipment and tools used to meet the desired objectives are those that inflict the least impacts upon the natural and cultural resources. Minimum impact suppression tactics (MIST) will be employed to protect all resources. Natural and artificial barriers will be used as much as possible for containment. When necessary, fire line construction will be conducted in such a way as to minimize long-term impacts to resources. Sites impacted by fire suppression activities or by the fire will be rehabilitated as necessary, based on an approved course of action for each incident.

Specific wildland fire management and suppression strategies for Keālia Pond are:

- All wildland fires will be controlled using the appropriate suppression strategy which considers safety, property, natural and cultural resources, and economics.
- Mechanical treatment will be used to reduce hazardous fuels around structures and improvements.

PREPAREDNESS

Preparedness is the work accomplished prior to fire occurrence to ensure that the appropriate response, as directed by the Fire Management Plan, can be carried out. Preparedness activities include: budget planning, equipment acquisition, equipment maintenance, dispatch (initial attack, extended, and expanded), equipment inventory, personnel qualifications, and training. The preparedness objective is to have a well trained and equipped fire management organization to manage all fire situations within the monument. Preparedness efforts are to be accomplished in the time frames outside the normal fire season dates.

Historical Weather Analysis

There is no clearly defined fire season for the refuge and records show that fires may occur at any during the year.

General fire weather information can be obtained through the National Oceanic and Air Administration (NOAA) at fire.boi.noaa.gov. Keālia Pond NWR is located in the area serviced by the National Weather Service (NWS) office in Honolulu, Hawaii. The Fire Weather section of the Honolulu NWS website, www.prh.noaa.gov/hnl/pages/firewx.php, contains zone maps, fire weather forecasts, and instructions for requesting a spot weather forecast. The refuge falls within the Maui Central Valley (019) Fire Weather Zone.

Fire Prevention

An active fire prevention program will be conducted, as needed, in conjunction with other agencies to protect human life and property, and prevent damage to cultural resources or physical facilities.

A program of internal and external education regarding potential fire danger may be implemented. Visitor contacts, bulletin board materials, handouts and interpretive programs can be utilized to increase visitor and neighbor awareness of fire hazards.

During periods of extreme or prolonged fire danger area closures or emergency restrictions regarding refuge operations may become necessary. Such restrictions, when imposed, will usually be consistent with those implemented by cooperators.

Hazard Reduction for Structure Protection

Hazard reduction is conducted to prevent wildland fires from spreading onto structures owned by the FWS and adjacent landowners. All vegetation around FWS buildings and storage containers is trimmed to a minimum of two feet from the structure. Currently, trimmings are disposed of by way of Maui Disposal to the County of Maui's green waste facility. Non-FWS structures include privately-owned condominiums located along the southeast boundary; however, North Kihei Road would provide sufficient protection from a wildland fire under most normal circumstances.

Staffing Priority Levels

No dedicated fire staff exists on the refuge. If drought conditions require additional fire preparedness and funding, addition qualified fire personnel may be assigned to the refuge.

Training

Departmental policy requires that all personnel engaged in suppression and prescribed fire duties meet the standards set by the National Wildfire Coordinating Group (NWCG), in addition to Service-specific standards. Kealeia Pond NWR will conform strictly to the requirements of the wildland fire management qualification and certification system and USFWS guidelines.

Basic wildland fire training refreshers are offered annually for red-carded firefighters through surrounding agencies, and records are kept in a centralized database. Additional training is available from surrounding agencies in pump and engine operation, power saws, firefighter safety, fire weather and fire behavior, helicopter safety and prescribed fire objectives and activities. On-the-job training is encouraged and will be conducted at the field level. Whenever appropriate, the use of fire qualification task books will be used to document fire experience of trainees. The Zone FMO will coordinate fire training needs with those of other nearby refuges, cooperating agencies, and the Regional Office.

The refuge supports the development of individual Incident Command System (ICS) overhead personnel from among qualified and experienced refuge staff for assignment to overhead teams at the local, regional, and national level.

Fire suppression is an arduous duty. On pile burns, personnel may be required to shift from implementation and/or monitoring activities to suppression. Poor physical condition of crew members can endanger safety and lives during critical situations. Personnel performing fire management duties will maintain a high level of physical fitness. This requires successful completion of a fitness pack test. Personnel must complete a three mile hike with a 45 pound pack in less than 45 minutes. Employees participating in any wildland fire activities on Fish and Wildlife Service or cooperators= lands will meet fitness requirements established in PMS 310-1, except where Service-specific fitness requirements apply.

Supplies and Equipment

Currently, the refuge does not possess any fire equipment or maintain a fire cache. Equipment and supplies are available through the interagency cache system.

DETECTION

Fires are generally reported by the public to the Maui County Fire Department. The Fire Department notifies refuge staff of any suppression operations on the refuge.

COMMUNICATIONS

Currently, refuge communications are limited to telephones (Appendix C). No personnel will be on-site at a wildland fire without direct communications with the suppression resources.

PRE-ATTACK PLAN

Upon discovery of a fire, all subsequent actions will be based on the following:

- The Incident Commander (IC) will locate, size-up, and coordinate suppression actions. The IC will complete the pre-attack planning checklist.
- Provide for public safety.
- Considering the current and predicted fire conditions, the Incident Commander will assess the need for additional suppression resources and estimate the final size of the fire. The potential for spread outside of the refuge should be predicted, as well as the total suppression force required to initiate effective containment action at the beginning of each burning period.
- The Incident Commander will assess the need for law enforcement personnel for traffic control, investigations, evacuations, etc., and make the request to the FMO.
- Document decisions and complete the fire report (DI-1202).
- Should a wildland fire move into an extended attack a Delegation of Authority will be invoked. Once a Delegation of Authority has been authorized the Incident Commander will make the final decisions pertaining to the fire. A copy of the Delegation of Authority is in Appendix ?.

FIRE MANAGEMENT UNITS

Fire Management Units (FMUs) are areas on a refuge which have common wildland fire management objectives and strategies, are manageable units from a wildland fire standpoint, and can be based on natural or man-made fuel breaks. Keālia Pond NWR will be managed as a single FMU.

Due to staff limitations, relatively small land management parcels, long response times, valuable resources, and values at risk on neighboring lands, this plan does not authorize managing wildland fire for resource benefit. Wildland fires will be suppressed using the appropriate suppression response. Pile burning, as a limited form of prescribed burning, will be used to reduce hazardous fuels and to meet resource management objectives.

FUELS AND FIRE BEHAVIOR

Fuel Types and Fire Behavior

There are two general fuel types on the refuge. These fuel types correspond to Anderson’s (1982) Fuel Models 3 and 6 (Table 2). These types of fuels promote rapid spread and flame heights that may exceed 20 feet, thus causing control problems. Steady trade winds help promote rapid fire growth.

Table 2. Habitat types and fuel models on Keālia Pond NWR.

Habitat Type	Fuel Model*	Acres
Wetlands	1/3	500
Uplands	6	200
Open Water/Roads	N/A	200

* NFFL Fuel Model (Anderson 1982)

Fuel Model 3. The 300 acres of wetlands (excluding open water) on the refuge are characteristic of Fuel Model 3. Mudflats surrounding the open water are comprised of *Pluchea indica* and a diversity of herbaceous species (*Atriplex spp.*, *Sonchus oleraceus*, *Verbesina encelioides*, and *Batis maritima*), grasses (*Brachiaria mutica*, *Cenchrus ciliaris*, *Cynodon dactylon*, and *Leptochloa uninervia*) and sedges (*Bolboschoenus maritimus* and *Cyperus laevigatus*). Depending on flooding and climatic conditions, the vegetation in some areas of this pond may be shorter and more closely resemble Fuel Model 1. In September 2001, a prescribed burn in the cane fields passed the fire break and entered the refuge through the upland habitat into the mudflats where vegetation (which contained over 90% *Batis maritima*) burned readily and intensely, and displayed a high rate of spread under the influence of wind. Wind may drive fire into the upper heights of the vegetation and across small areas of standing water. Table 3 shows predicted flame lengths and rates of spread in Fuel Models 1 and 3 under varying conditions from an old burn plan for the former Hawaiian Wetlands NWRC. These predictions are only for backing fires, which assumes no wind. Wind will cause heading fires and may significantly increase flame lengths and rates of spread for these fuel models.

Fuel Model 6. The refuge’s 200 acres of uplands are covered with dense stands of koa-haole (*Leucaena leucocephala*), kiawe trees (*Prosopis pallida*), and Indian marsh fleabane (*Pluchea indica*). Fires carry through the shrub layer, but this requires moderate winds. Fire will drop to the ground at low wind speeds or at openings in the stand. With winds of 5 miles/hour, dead fuel moisture content of 8%, and live fuel moisture content of 100%, predicted flame length is 6 feet, and rate of spread is 32 chains/hour (Anderson 1982).

Table 3. Backing fire behavior predictions for Keālia Pond NWR in Fuel Models 1 and 3.

Parameter	Fuel Model 1		Fuel Model 3			
20-ft Windspeed	0-10 mi/hr		0-10 mi/hr			
Effective Midflame Windspeed*	0 mi/hr		0 mi/hr			
Time of Day	0800	1000	0800	0800	1000	1000
Cloud Canopy Cover (%)	Clear	Clear	Clear	Clear	Clear	Clear
Temperature (°F)	70	90	70	70	90	90
Relative Humidity (%)	65	20	65	65	20	20
Dead Fuel Moisture (%)	12	5	12	13	5	6
Slope (degrees)	Flat	Flat	Flat	Flat	Flat	Flat
Flame Length (ft)	0	1	2	2	3	3
Rate of Spread (ch/hr)	0	5	4	3	5	5

* Backing fire assumes effective mid-flame wind speed = 0.

Fire Effects

Fire can promote non-native species, but can be an effective management tool to reduce the density and complexity of these species and enhance endangered waterbird habitat. If a wildland fire were to occur on the refuge, other than short-term impacts, no negative ecological impacts would be anticipated from either suppression methods or the fire itself. A fire during peak Hawaiian stilt or coot nesting could account for some nesting failure; however, the benefits to waterbirds of reducing coverage by rank stands of non-native species would outweigh any immediate negative effects.

SUPPRESSION TACTICS

Suppression involves a wide range of possible tactics from the initial attack to final control. To this end, all wildland fires will be suppressed in a safe, aggressive, and cost-effective manner to produce efficient action with minimal resource damage and limit smoke impacts to local communities.

Typically, initial attack suppression actions are conducted by the Maui County Fire Department. All fires will be assessed by the initial on-scene Incident Commander and attacked using minimum impact fire suppression tactics for the Refuge. Roads and natural barriers will be used as much as possible to reduce fireline construction. Fireline and mop-up through riparian areas should consider long-term damage to vegetation. Unnecessary cutting and bucking should be replaced with alternative actions whenever possible. Where wildland fires cross roads, the burned area adjacent to the road should be mopped up and dangerous snags felled.

A Resource Advisor should be assigned to the incident from the beginning to assist with on-the-ground tactical decisions and to document rehabilitation needs. There will be only one Incident Commander who will be responsible to the Refuge Project Leader. The Incident Commander will designate all overhead positions on fires requiring extended attack. Reference should be made to a Delegation of Authority (Appendix G).

Suppression Conditions

A full suppression alternative was selected for this refuge which requires containment and control of all wildland fires. Wildland fires will not be managed to achieve resource objectives, although impacts to resources may be considered in selecting suppression strategies. Suppression guidelines and restrictions (Table 4) were developed for this refuge to protect natural and cultural resources. These guidelines will be discussed annually with Maui County Fire Department to ensure their compliance. The Refuge Manager should review these guidelines annually and document any changes.

A Resource Advisor will be used to ensure impacts to natural and cultural resources are minimized. The use of heavy, ground-disturbing equipment (including bulldozers) is prohibited for normal fire suppression operations. The use of foams and retardants is also prohibited due to the presence of endangered waterbirds and extensive wetlands. Off-road travel, firelines constructed with hand tools and/or chainsaws, and the use of low-flying aircraft must be approved by the Resource Advisor at all times. Helicopter water drops and hose lays from engines must be approved by the Resource Advisor from April through August due to the presence of nesting endangered waterbirds; the Incident Commander has approval authority all other times.

Table 4. Keālia Pond NWR Wildland Fire Suppression Guidelines.

Keālia Pond National Wildlife Refuge – Wildland Fire Suppression Guidelines	
NOTE: If human life is threatened, the Incident Commander has the authority to order any suppression strategy or tactic available to mitigate the threat.	
	FIRE MANAGEMENT UNIT – Keālia POND NWR
FMU Description	All lands within Keālia Pond National Wildlife Refuge, Maui, Hawaii.
Special Considerations	<ul style="list-style-type: none"> • Smoke/fire may cause a health hazard to neighboring communities. • Endangered waterbirds present in wetlands.
Preferred Suppression Strategies	Aggressively suppress fire, holding it to the fewest burned acres possible within safety constraints, with minimal effect on endangered species and their habitats.
TACTIC	MUST BE APPROVED BY:
Hand line/Chainsaws	Resource Advisor
Heavy Equipment	Prohibited
Off-road Travel	Resource Advisor
Hose Lays	Resource Advisor (April-August); Incident Commander otherwise
Foam/Retardant	Prohibited
Water Drops	Resource Advisor (April-August); incident commander otherwise
Helicopters, other AC	Resource Advisor
Safety Considerations	High rates of fire spread, especially in windy conditions.

Wildland Fire Situation Analysis

For fires that cannot be contained in one burning period, a Wildland Fire Situation Analysis (WFSA) must be prepared. In the case of a wildland fire, the Project Leader, in conjunction with the Zone FMO, will prepare the WFSA. Approval of the WFSA resides with the Project Leader.

The purpose of the WFSA is to allow for a consideration of alternatives by which a fire may be controlled. Damages from the fire, suppression costs, safety, and the probable character of suppression actions are all important considerations.

Public safety will require coordination between all refuge staff and the IC. Notices should be posted to warn visitors, trails may be closed, traffic control will be necessary where smoke crosses roads, etc. Where wildland fires cross roads, the burned area adjacent to the road should be mopped up and dangerous snags felled. Every attempt will be made to utilize natural and constructed barriers, including changing fuel complexes, in the control of wildland fire. Rehabilitation efforts will concentrate on the damages done by suppression activities rather than on the burned area itself.

Aircraft Operations

Aircraft may be used in all phases of fire management operations. All aircraft must be Office of Aircraft Services (OAS) or Forest Service approved. An OAS Aviation Policy Department Manual will be provided by OAS. As in all fire management activities, safety is the primary consideration. Qualified aviation personnel will be assigned to all flight operations.

Helicopters may be used for reconnaissance, bucket drops and transportation of personnel and equipment. Natural helispots and parking lots are readily available in most cases. Clearing for new helispots should be avoided where possible. Improved helispots will be rehabilitated following the fire.

BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION

There are three methods of repairing damage caused by wildland fires and wildland fire suppression activities – emergency stabilization, rehabilitation, and fire suppression activity damage repair.

Policy and Implementation Guidance

Departmental policy for emergency stabilization and rehabilitation (ESR) on Service lands following wildland fire, including objectives, implementation, plan submittal, monitoring, and funding, is found in the Department Manual (620 DM 3). Service ESR supplemental policy can be found in the Service Manual (095 FW 3.9), with policy implementation guidance provided in Chapter 5 of the FWS Fire Management Handbook. More detailed guidance can be found in the Interagency Burned Area Emergency Stabilization and Rehabilitation Handbook (2002) and Technical Reference (2002). The Service maintains an internet web site (<http://fire.fws.gov/ifcc/rehab/>) that provides access to these and several other guidance documents.

Any treatment or activity will have an approved plan developed prior to implementation. Monitoring specifications will be included in the plan for each treatment or activity. Emergency stabilization and rehabilitation treatments and activities will be written in separate plans. The Project Leader, Biologist, and Zone FMO will review all plans. The final plans will be submitted to the Region for review prior to submission to the Washington Office.

Compliance

Implementation activities will be conducted in a manner that is compatible with long-term goals and approved land management plans (e.g., Comprehensive Conservation Plan, Habitat Management Plan, Fire Management Plan), in compliance with applicable law and policy, including the National Environmental Policy Act, Endangered Species Act, Clean Water Act, and National Historic Preservation Act.

REQUIRED REPORTING

The IC will be responsible for documenting decisions and completing the fire report (e.g., ICS-214, DI-1202). The Zone FMO will be responsible for any additional required reports.

FIRE INVESTIGATION

Fire management personnel will attempt to locate and protect the probable point of origin and record pertinent information required to determine fire cause. They will be alert for possible evidence, protect the scene and report findings to the fireline supervisor.

Prompt and efficient investigation of all suspicious fires will be carried out. However, fire management personnel should not question suspects or pursue the fire investigation unless they are currently Law Enforcement Commission qualified.

Personnel and services of other agencies may be utilized to investigate wildland fire arson or fire incidents involving structures. All fire investigations should follow the guidelines outlined in the Fire Management Handbook (2004).

HAZARD FUEL REDUCTION

Hazard fuel is vegetation which presents a risk of ignition and sustaining spread of a wildland fire in relationship to a threat to some value. Hazard fuel reduction is both a fire prevention activity and a wildland fire protection measure. The objectives of this activity are:

- Reduce the hazard risk to service structures and facilities from an approaching wildland fire.
- Reduce the risk of fire spreading to the wildland from a fire originating in a Service owned structure or facility.
- Provide defensible space and safety to personnel at those facilities during a wildland fire.
- Meet federal, state and local fire hazard reduction ordinances.

HAZARD FUEL REDUCTION STRATEGIES

Strategies include mechanical treatment of the hazard fuels and the debris disposal. Mechanical treatment is accomplished using normal maintenance procedures. Currently, due to limited staff and equipment required to accomplish clearing of large areas, hazard fuel reduction is a result of general habitat management activities which consists of mechanical (tractor mower, tracked bobcat, weedwacker) and chemical (herbicide) treatments to clear dense areas suitable for waterbird habitat and promote growth of non-woody vegetation. A majority of this activity occurs along the north mudflats of the main pond, typically during August-October when water level has receded and the areas are accessible by the tractor and/or bobcat. The upland areas of the Refuge are not cleared of vegetation for the purpose of hazard fuel reduction. Cutting by chainsaw is only performed if truck access is needed. Vegetation along the office building is cleared approximately 2 feet from the building.

Debris must be disposed of to complete the mitigation of the hazard. Debris disposal may be accomplished by scattering, chipping or pile burning. The quantity of vegetation, diameter size, crew availability, and logistical support will dictate the method used. If scattering of cut vegetation is used, an evaluation of the overall fuel loading needs to be considered so as to not add to the hazard fuel problem.

PILE BURNING GUIDELINES

When planning to dispose of debris by pile burning, specific guidelines must be followed in order to provide for safety and reduce the escape potential. General guidelines for pile burning are the same as for prescribed burning. Service guidelines are found in the FWS Fire Management Handbook, Section 2. This section of the Fire Management Plan is for the purpose of outlining the steps to take when conducting pile burning only. No prescribed burning of standing vegetation will be conducted. References to a burn plan and burn boss are only for the purpose of pile burning.

Pile burning will be used to dispose of cut vegetation resulting from refuge activities such as annual hazard reduction around structures. Limbs and branches of overhanging trees and brush will annually need to be trimmed back. At times trees may have been blown down during storms which will require debris removal. The most economical and expedient method is through burning of the piled vegetation on site. Pile burning is typically rated as complexity level 3 due to the low risk of escape, limited control forces, and time of year conducted. Safety concerns are still present even at the low complexity level. Careful consideration must be given to smoke management, escape potential and resource benefit when planning and rating the pile burn. The complexity of each pile burn would be evaluated using the NWCG Prescribed Fire Complexity Rating System Guide.

Pile Burn Plan

A Burn Boss will conduct a field reconnaissance of the proposed pile burn location with the Refuge Manager to discuss objectives, special concerns, and gather all necessary information to write the burn plan. After completing the reconnaissance, a qualified Burn Boss will write the Pile Burn Plan.

All pile burning will have a Pile Burn Plan. The Pile Burn Plan is a site-specific action plan describing the purpose, objectives, prescription, and operational procedures needed to prepare and safely conduct the burn. The project area, objectives, and constraints will be clearly outlined. No piles will be ignited unless all prescriptions of the plan are met. Fires not within those parameters will be suppressed. Pile Burn Plans will follow the format found in the FWS Fire Management Handbook, Section 2.2. Pile burning is considered a complexity level 3 prescribed burn (in most cases) and should use the plan format contained in Appendix C. Each burn plan will be reviewed by the Project Leader, Refuge Manager, Refuge Biologist, Zone FMO, and Burn Boss. The Project Leader has the authority to approve the burn plan.

The Pile Burn Plan requires the following items to be completed prior to ignition:

- Contingency plan
- Complexity analysis
- Review and approval signatures
- Go/no go checklist
- Spot weather forecast

Pile Burning Strategies and Personnel

Pile burning will only be executed by qualified personnel. Pile burning requires a qualified Burn Boss. The Burn Boss will fill all required positions to conduct the burn with qualified personnel. All positions listed in the burn plan must be available for the duration of the pile burn or it will not be initiated.

Weather and fuel moisture conditions must be monitored closely in the project area to determine when the prescription criteria are met. A belt weather kit may also be utilized to augment monitoring.

When pertinent prescription criteria are within the acceptable range, the Burn Boss will select an ignition time based on current and predicted weather forecasts. A thorough briefing will be given by the Burn Boss on the day of the burn and specific assignments and placement of personnel will be discussed. An updated spot weather forecast will be obtained on the day of ignition and all prescription elements will be re-checked to determine if all elements are still within the approved ranges. If all prescription elements are met, a test fire will be ignited to determine on-site fire behavior conditions as affected by current weather. If conditions are not satisfactory, the test fire will be suppressed and the burn will be rescheduled. If conditions are satisfactory, the burn will continue as planned.

Maui County Fire Department will be made aware of any planned burn. If the burn pile escapes the predetermined burn area, all further ignition will be halted except as needed for suppression efforts. Suppression efforts will be initiated, as discussed in the pre-burn briefing. The Zone FMO will be notified immediately of any control actions on a prescribed burn. If the burn exceeds the initial suppression efforts, the burn will be declared a wildland fire and suppressed using guidelines established in the burn plan. A WFSA will be completed and additional personnel and resources ordered as determined by the Incident Commander. If the fire continues to burn out of control, additional resources based on the contingency plan will be called from the local cooperating agencies via the servicing dispatch. A management overhead team may be requested to assume command of the fire if necessary. Each Pile Burn Plan will detail the contingency plan with identified resources for suppression. This plan will serve as the incident action plan during the initial attack phase of an escape.

Monitoring and Evaluation

During pile burns, monitoring can serve as a precursor to invoking suppression action by determining if the burn is in prescription, assessing its overall potential, and determining the effects of the pile burn. Pile burning does not usually require extensive monitoring. Weather, fire behavior, and smoke management are elements that require monitoring. The Burn Boss will assume responsibility for coordinating and implementing this section. Personnel may be assigned specific tasks such as weather monitoring to document these elements and keep the Burn Boss informed of conditions. Special situations or projects may dictate more extensive monitoring and evaluation.

Required Reports

All forms will be completed as outlined by the Pile Burn Plan. Accomplishments, costs, fire report (DI-1202), weather data, and first order fire effects monitoring are the responsibility of the Burn Boss. The Burn Boss may prepare a final report on the project for the Refuge Manager as requested. Information should include a narrative of the burn operation, a determination of whether objectives were met, weather and fire behavior data, number of work hours, and final cost of the burn.

AIR QUALITY / SMOKE MANAGEMENT GUIDELINES

An annual burn permit is required by the State of Hawaii, Department of Health for each prescribed burn. This permit process evaluates the burn in relation to emissions and local air quality standards. Typically, smoke from fires does not significantly affect air quality standards. The Refuge is required to report the schedule of each burn to the Department of Health and is also required to follow permit conditions provided by the Department of Health that are designed to minimize effects on air quality. These conditions include a specified time period when burns are permitted and attention to not burning on specified “no-burn” days for specified islands as provided on or before 1600 hr by radio broadcast through the National Weather Service, or other appropriate means, applicable for the succeeding day. The State of Hawaii, Department of Health, Agricultural Burn Permit along with an approved Prescribed Burn Plan for the refuge are maintained in the Refuge Complex office. The Agricultural Burn Permit must be renewed annually and in possession at the burn site while burning.

FIRE RESEARCH

There are no ongoing fire research projects at Keālia Pond NWR.

PUBLIC SAFETY

Keālia Pond is dedicated to ensuring the safety of each visitor and to all residents and property adjacent to the refuge's boundary. The refuge will be closed to the public during suppression and possibly during pile burn activities.

Areas of fire activity may be clearly signed at the refuge entrance gate. Residents adjacent to the refuge (Appendix C, Table 3) will be notified in advance of any pile burn and if any fire poses a threat to burn outside the refuge boundaries.

During pile burns at least one burn team member will have first aid training. A first aid kit will be on-site for prescribed burns as well as wildland fires. The local police, fire, and emergency medical services will be notified prior to the ignition. They will also be notified of the location of any wildland fires.

PUBLIC INFORMATION AND EDUCATION

Educating the public on the value of fire as a natural process is important to increasing public understanding and support for the fire management program. The refuge will use the most appropriate and effective means to explain the overall fire and smoke management program. This may include supplemental handouts, signing, personal contacts, auto tour routes, or media releases. When deemed necessary, interpretive presentations will address the fire management program and explain the role of fire in the environment.

The public information program will be developed as follows:

- The fire management program may be incorporated into visitor contacts. Particular attention will be given when fires are conspicuous from roads or visitor use areas.
- News releases will be distributed to the media as appropriate.
- The public information outlets of neighboring and cooperating agencies and the regional office will be provided with all fire management information.
- The fire management program will be discussed in informal talks with all employees, volunteers, residents, and neighbors.

As outlined in the prevention section, emergency closures or restrictions may become necessary during periods of extreme or extended fire danger.

FIRE CRITIQUES AND ANNUAL PLAN REVIEW

FIRE CRITIQUES

Fire reviews will be documented and filed with the final fire report. The Refuge Manager will retain a copy for the refuge files.

ANNUAL FIRE SUMMARY REPORT

The Refuge Manager will be responsible for completing an annual fire summary report. The report will contain the number of fires by type, acres burned by fuel type, cost summary (pile burns and wildland fires), personnel utilized, and fire effects.

ANNUAL FIRE MANAGEMENT PLAN REVIEW

The Fire Management Plan will be reviewed annually. Necessary updates or changes will be accomplished prior to the next fire season. Any additions, deletions, or changes will be reviewed by the Project Leader to determine if such alterations warrant a re-approval of the plan.

CONSULTATION AND COORDINATION

The following agencies, organizations and/or individuals were consulted in preparing this plan.

Bruce Babb, Wildland/Urban Interface Coordinator, Pacific Region, USFWS, Portland, OR.

Forrest Cameron, Refuge Supervisor, USFWS, Portland, OR.

Jerry Leinecke, Project Leader, Hawaii/Pacific Islands NWR Complex, Honolulu, HI.

Amanda McAdams, (former) Fire Ecologist, Pacific Region, USFWS, Portland, OR.

Mike Nishimoto, Wildlife Biologist, Maui NWR Complex, Kihei, HI.

James Roberts, Fire Planner, Pacific Region, USFWS, Portland, OR.

Linda Watters, Assistant Refuge Supervisor, USFWS, Portland, OR.

APPENDICES

APPENDIX A: REFERENCES CITED

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Appendix B: Definitions

Agency Administrator. The appropriate level manager having organizational responsibility for management of an administrative unit. May include Director, State Director, District Manager or Field Manager (BLM); Director, Regional Director, Complex Manager or Project Leader (FWS); Director, Regional Director, Park Superintendent, or Unit Manager (NPS), or Director, Office of Trust Responsibility, Area Director, or Superintendent (BIA).

Appropriate Management Action. Specific actions taken to implement a management strategy.

Appropriate Management Response. Specific actions taken in response to a wildland fire to implement protection and fire use objectives.

Appropriate Management Strategy. A plan or direction selected by an agency administrator which guides wildland fire management actions intended to meet protection and fire use objectives.

Appropriate Suppression. Selecting and implementing a prudent suppression option to avoid unacceptable impacts and provide for cost-effective action.

Bureau. Bureaus, offices or services of the Department.

Class of Fire (as to size of wildland fires).

Class A - 3 acre or less.

Class B - more than 3 but less than 10 acres.

Class C - 10 acres to 100 acres.

Class D - 100 to 300 acres.

Class E - 300 to 1,000 acres.

Class F - 1,000 to 5,000 acres.

Class G - 5,000 acres or more.

Emergency Fire Rehabilitation/Burned Area Emergency Rehabilitation (EFR/BAER). Emergency actions taken during or after wildland fire to stabilize and prevent unacceptable resource degradation or to minimize threats to life or property resulting from the fire. The scope of EFR/BAER projects are unplanned and unpredictable requiring funding on short notice.

Energy Release Component (ERC). A number related to the available energy (BTU) per unit area (square foot) within the flaming front at the head of a fire. It is generated by the National Fire Danger Rating System, a computer model of fire weather and its effect on fuels. The ERC incorporates thousand hour dead fuel moistures and live fuel moistures; day to day variations are caused by changes in the moisture content of the various fuel classes. The ERC is derived from predictions of (1) the rate of heat release per unit area during flaming combustion and (2) the duration of flaming.

Extended Attack. A fire on which initial attack forces are reinforced by additional forces.

Fire Suppression Activity Damage. The damage to lands, resources and facilities directly attributable to the fire suppression effort or activities, including: dozer lines, camps and staging areas, facilities (fences, buildings, bridges, etc.), handlines, and roads.

Fire Effects. Any consequences to the vegetation or the environment resulting from fire, whether neutral, detrimental, or beneficial. **Fire Intensity.** The amount of heat produced by a fire. Usually compared by reference to the length of the flames.

Fire Intensity. The amount of heat produced by a fire. Usually compared by reference to the length of the flames.

Fire Management. All activities related to the prudent management of people and equipment to prevent or suppress wildland fire and to use fire under prescribed conditions to achieve land and resource management objectives.

Fire Management Plan. A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational procedures such as preparedness plans, preplanned dispatch plans, prescribed fire plans and prevention plans.

Fire Prescription. A written direction for the use of fire to treat a specific piece of land, including limits and conditions of temperature, humidity, wind direction and speed, fuel moisture, soil moisture, etc., under which a fire will be allowed to burn, generally expressed as acceptable range of the various fire-related indices, and the limit of the area to be burned.

Fuels. Materials that are burned in a fire; primarily grass, surface litter, duff, logs, stumps, brush, foliage, and live trees.

Fuel Loadings. Amount of burnable fuel on a site, usually given as tons/acre.

Hazard Fuels. Those vegetative fuels which, when ignited, threaten public safety, structures and facilities, cultural resources, natural resources, natural processes, or to permit the spread of wildland fires across administrative boundaries except as authorized by agreement.

Initial Attack. An aggressive suppression action consistent with firefighter and public safety and values to be protected.

Maintenance Burn. A fire set by agency personnel to remove debris; i.e., leaves from drainage ditches or cuttings from tree pruning. Such a fire does not have a resource management objective.

Natural Fire. A fire of natural origin, caused by lightning or volcanic activity.

NFDRS Fuel Model. One of 20 mathematical models used by the National Fire Danger Rating System to predict fire danger. The models were developed by the U.S. Forest Service and are general in nature rather than site-specific.

NFFL Fuel Model. One of 13 mathematical models used to predict fire behavior within the conditions of their validity. The models were developed by US Forest Service personnel at the Northern Forest Fire Laboratory, Missoula, Montana.

Prescription. Measurable criteria which guide selection of appropriate management response and actions. Prescription criteria may include safety, public health, environmental, geographic, administrative, social, or legal considerations.

Prescribed Fire. A fire ignited by agency personnel in accord with an approved plan and under prescribed conditions, designed to achieve measurable resource management objectives. Such a fire is designed to produce the intensities and rates of spread needed to achieve one or more planned benefits to

natural resources as defined in objectives. Its purpose is to employ fire scientifically to realize maximize net benefits at minimum impact and acceptable cost. A written, approved prescribed fire plan must exist and NEPA requirements must be met prior to ignition. NEPA requirements can be met at the land use or fire management planning level.

Preparedness. Actions taken seasonally in preparation to suppress wildland fires, consisting of hiring and training personnel, making ready vehicles, equipment, and facilities, acquiring supplies, and updating agreements and contracts.

Prevention. Activities directed at reducing the number or the intensity of fires that occur, primarily by reducing the risk of human-caused fires.

Rehabilitation. Actions to (1) limit the adverse effects of suppression on soils, watershed, or other values, or (2) to mitigate adverse effects of a wildland fire on the vegetation-soil complex, watershed, and other damages.

Suppression. A management action intended to protect identified values from a fire, extinguish a fire, or alter a fire's direction of spread.

Unplanned Ignition. A natural fire that is permitted to burn under specific conditions, in certain locations, to achieve defined resource objectives.

Wildfire. An unwanted wildland fire.

Wildland Fire. Any non-structure fire, other than prescribed fire, that occurs in the wildland.

Wildland Fire Situation Analysis (WFSA). A decision-making process that evaluates alternative management strategies against selected safety, environmental, social, economical, political, and resource management objectives as selection criteria.

Wildland/Urban Interface Fire. A wildland fire that threatens or involves structures.

Appendix C: Fire Dispatch Plan

**2004 Fire Dispatch Plan
Keālia Pond National Wildlife Refuge**

FIRE SIZE-UP

Use the following or the card, pocket guide, fireline handbook or red book guides.

Reporting party's name and phone number: _____

Time discovered: _____

Location of smoke or fire (plot on map; legal description): _____

Fire Behavior: ___Smoldering ___Creeping ___Running ___Crowning ___Spotting

Estimated size (acres): ___Spot ___1/4-1/2 ___1/2-3/4 ___1 ___1-5 ___5+

Wind (midflame speed & direction): _____

Dry Bulb Temperature (°F): _____ Relative Humidity (%): _____

Fuel Type: ___Grass ___Brush ___Timber ___Slash

Adjacent Fuels: ___Grass ___Brush ___Timber ___Slash

Aspect: _____ Percent Slope: _____

Additional Resources Needed: _____

Special Considerations: _____

NOTIFICATION

Upon report of a wildland fire, follow these procedures:

1. Call Maui County Fire Department (911) – request response, ambulance if necessary, traffic control.

2. Notify Refuge Manager/Resource Advisor, Glynnis Nakai, at the Refuge Office (808-875-1582), residence (808-878-3269), or cell phone (808-281-9698). Assignments will be made at this time to notify other personnel and agencies.

3. Notify other Refuge personnel at the Refuge Office (808-875-1582) or at their residence:

Mike Nishimoto, Wildlife Biologist/Resource Advisor	Residence: (808) Cell: (808)
Calvin Willis, Maintenance Worker	Residence: (808) Cell: (808)
Pat Savino, Admin. Support Asst.	Residence: (808)

4. Notify Project Leader, at the Hawaiian and Pacific Islands NWRC Office in Honolulu (808-792-9540)

5. Contact one of the following Regional FWS Duty Officers:

Pam Ensley – Regional Fire Management Coordinator	Work: Cell:
---	----------------

Roger Spaulding – Regional Fire Management Officer	Work: Cell:
--	----------------

(vacant) – Regional Prescribed Fire Specialist	Work: Cell:
--	----------------

Bruce Babb – Fire Management Specialist/Regional WUI Coordinator	Work: Cell:
--	----------------

ESTABLISHED SUPPRESSION GUIDELINES

A full suppression alternative was selected for this refuge which requires containment and control of all wildland fires. Wildland fires will not be managed to achieve resource objectives, although impacts to resources may be considered in selecting suppression strategies. Suppression guidelines and restrictions (Table 4) were developed for this refuge to protect natural and cultural resources. These guidelines will be discussed annually with Maui County Fire Department to ensure their compliance. The Refuge Manager should review these guidelines annually and document any changes.

A Resource Advisor will be used to ensure impacts to natural and cultural resources are minimized. The use of heavy, ground-disturbing equipment (including bulldozers) is prohibited for normal fire suppression operations. The use of foams and retardants is also prohibited due to the presence of endangered waterbirds and extensive wetlands. Off-road travel, firelines constructed with hand tools and/or chainsaws, and the use of low-flying aircraft must be approved by the Resource Advisor at all times. Helicopter water drops and hose lays from engines must be approved by the Resource Advisor from April through August due to the presence of nesting endangered waterbirds; the Incident Commander has approval authority all other times.

Keālia Pond National Wildlife Refuge – Wildland Fire Suppression Guidelines	
NOTE: If human life is threatened, the Incident Commander has the authority to order any suppression strategy or tactic available to mitigate the threat.	
	FIRE MANAGEMENT UNIT – Keālia Pond NWR
FMU Description	All lands within Keālia Pond National Wildlife Refuge, Molokai, Hawaii.
Special Considerations	<ul style="list-style-type: none"> • Smoke/fire may cause a health hazard to neighboring communities. • Endangered waterbirds present in wetlands.
Preferred Suppression Strategies	Aggressively suppress fire, holding it to the fewest burned acres possible within safety constraints, with minimal effect on endangered species and their habitats.
TACTIC	MUST BE APPROVED BY:
Hand line/Chainsaws	Resource Advisor
Heavy Equipment	Prohibited
Off-road Travel	Resource Advisor
Hose Lays	Resource Advisor (April – August); Incident Commander otherwise
Foam/Retardant	Prohibited
Water Drops	Resource Advisor (April – August); Incident Commander otherwise
Helicopters, other AC	Resource Advisor
Safety Considerations	High rates of fire spread, especially in windy conditions.

COMMUNICATIONS

Currently, refuge communications are limited to telephones. No personnel will be on-site at a wildland fire without direct communications with the suppression resources.

Currently, refuge communications are limited to telephones. No personnel will be on-site at a wildland fire without direct communications with the suppression resources.

CONTACT LIST

Table 5. Maui National Wildlife Refuge Complex Staff.

Maui NWRC	P.O. Box 1042 (Mile 6 Mokulele Hwy.) Kihei, HI 96753	Phone: (808) 875-1582 Fax: (808) 875-2945
Refuge Complex Manager		Work: (808) Cell: (808) Home: (808)
Wildlife Biologist		Work: (808) 875-1582 Cell: (808) Home: (808)
Maintenance Worker		Work: Cell: Home:
Administrative Officer		Work: (808) 875-1582 Home:
		Work: Cell: Home:

ADJACENT LANDOWNERS

Table 6. Landowners adjacent to Keālia Pond NWR.

Landowner	Address	Phone Number
Alexander & Baldwin Properties, Inc.	33 Lono Ave., Ste. 400, Kahului, HI 96732	(808)
Hawaiian Commercial & Sugar Co.	P.O. Box 266, Puunene, HI 96784	(808)
Maui Humane Society	Mokulele Highway, Kihei, HI 96753	(808)
Maui Electric Company	210 W. Kaahumanu Ave., Kahului, HI 96732	(808)
Puanani o Kula Nursery	Mokulele Hwy., Kihei, HI 96753	(808)
Keālia Resort	191 N. Kihei Rd., Kihei, HI 96753	(808)
Sugar Beach Resort	145 N. Kihei Rd., Kihei, HI 96753	(808)
Kihei Sands	115 N. Kihei Rd., Kihei, HI 96753	(808)
Nani Kai Hale	73 N. Kihei Rd., Kihei, HI 96753	(808)
Kihei Kai Resort	61 N. Kihei Rd., Kihei, HI 96753	(808)
Maalaea Surf	12 S. Kihei Rd., Kihei, HI 96753	(808)

APPENDIX D: NEPA COMPLIANCE

UNITED STATES FISH AND WILDLIFE SERVICE

ENVIRONMENTAL ACTION STATEMENT FOR CATEGORICAL EXCLUSION

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act of 1969 (NEPA), and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record and determined that the action of:

Implementation of the 2004 Wildland Fire Management Plan for Keālia Pond National Wildlife Refuge, which includes guidance for wildland fire suppression, hazard fuel reduction, and pile burning as a limited form of prescribed fire

Check One:

- X Is a categorical exclusion as provided by 516 DM 6, Appendix 1.4. No further NEPA documentation will be made.
- _____ Is found not to have significant environmental effects as determined by the attached Environmental Assessment and Finding of No Significant Impact.
- _____ Is found to have significant effects and, therefore, further consideration of this action will require a notice intent to be published in the *Federal Register* announcing the decision to prepare an environmental impact statement.
- _____ Is not approved because of unacceptable environmental damage, or violation of Fish and Wildlife Service mandates, regulations, or procedures.
- _____ Is an emergency action within the context of 40 CFR 1506.11. Only those actions necessary to control the immediate impacts of the emergency will be taken. Other related actions remain subject to NEPA review.

Proposed Action and Alternatives: Use of prescribed fire to reduce fuels, restore the natural processes and vitality of ecosystems, improve wildlife habitat, remove or reduce non-native species and noxious weeds, and/or conduct research.

Categorical Exclusions: The specific categorical exclusions from NEPA allowing for this action pursuant to 516 DM 6, Appendix 1.4 are:

- B.(4) The use of prescribed burning for habitat improvement purposes, when conducted in accordance with departmental and Service procedures.
- B.(5) Fire management activities, including prevention and restoration measures, when conducted in accordance with departmental and Service procedures.

Permits/Approvals: The Wildland Fire Management Plan for Keālia Pond National Wildlife Refuge must be approved by the Refuge Manager, Project Leader, Regional Fire Management, and Regional Director. All prescribed fire projects require a burn plan approved by the Project Leader.

Public Involvement/Interagency Coordination: Maui County Fire Department Kahului Station is notified prior to any prescribed burning.

Supporting Documents:

- 2004 Wildland Fire Management Plan for Keālia Pond National Wildlife Refuge.
- ESA Section 7 Biological Evaluation for pile and debris burning for refuges within the Maui National Wildlife Refuge Complex (Keālia Pond NWR and Kakahaia NWR) (Appendix E of this FMP).

Signature Approval:



Jerry Leinecke, Project Leader
Hawaiian and Pacific Islands National Wildlife Refuge Complex

9/23/04
Date

APPENDIX E: ESA SECTION 7 COMPLIANCE

INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION

**Pile and Debris Burning for refuges within the Maui National Wildlife Refuge Complex
(Keālia Pond NWR and Kakahaia NWR)**

Originating Person: Glynnis Nakai
Telephone Number: (808) 875-1582
Date: July 13, 2003

I. Region: Pacific (Region 1), Portland Oregon.

II. Service Activity:

Pile and debris burning as a marsh vegetation management technique at Keālia Pond National Wildlife Refuge on Maui and Kakahaia National Wildlife Refuge on Molokai.

III. Pertinent Species and Habitat:

A. Listed species and/or their critical habitat within the action area:

Hawaiian coot (*Fulica alai*) – Endangered

Hawaiian stilt (*Himantopus mexicanus knudseni*) – Endangered

B. Proposed species and/or proposed critical habitat within the action area: NONE

C. Candidate species within the action area: NONE

IV. Geographic area or station name and action:

Refuges of this Complex are located in the state of Hawaii, County of Maui: Keālia Pond NWR on the island of Maui and Kakahaia NWR on the island of Molokai.

Pile and debris burning to control and remove non-native vegetation in wetland marsh and mudflats.

V. Location (attach map):

A. County and State: Maui County, State of Hawai'i

B. Distance (miles) and direction to nearest town:

Ma'alaea is 1.5 miles southwest of Keālia Pond NWR

Kaunakakai is approximately 5.5 miles northeast of Kakahaia NWR.

VI. Action Objectives:

Pile and debris burning will be conducted on these wetland refuges as a means of controlling noxious and exotic vegetation that interferes with nesting and maintenance of endangered and migratory waterbirds. Control of the establishment and spread of these species is required to provide secure, viable, adequate habitat for endangered waterbirds, migratory waterfowl and shorebirds. Specific goals include: providing open water areas interspersed with escape, nesting, and maintenance cover; limiting predator cover and access; providing mudflat areas for nesting (Hawaiian stilts) and feeding; and promotion of desirable wetland plant species with water areas for Hawaiian coot nesting and maintenance.

VII. Explanation of Impacts of Action:

This action will result in enhanced wetlands for endangered and other species using the refuge. Undesirable plant species will be controlled encouraging growth of more beneficial species. Dense predator concealment cover will be reduced making it more difficult for predators to prey on endangered species and allow waterbirds to detect predators at a greater distance, reducing predation. Increased habitat for a diversity of species, both resident and migratory, will be made available. The ratio of open water to vegetation will be altered to provide additional habitat diversity within the wetlands.

All burns will be conducted outside major endangered species nesting seasons. Burns will normally be conducted between August and October. Burns will not be initiated when pre-fledgling birds are present. A check of each burn site will be made to determine the presence of waterbirds, young, and/or nests. If any of the above are discovered, no burning in that area of the wetlands will be undertaken. To provide necessary foraging habitat while burning, not all areas will be drawn down or dry at the same time. Wetland habitat on the refuge will continue to be provided for endangered and other waterbirds to utilize until worked ponds are re-flooded.

VIII. Effect determination and response requested: **[* = optional]**

A. Listed species/designated critical habitat:

<u>Determination</u>	<u>Response requested</u>
No effect/no adverse modification	____*Concurrence
May affect, but is not likely to adversely affect species/adversely modify critical habitat	<u> X </u> Concurrence
Hawaiian coot (<i>Fulica alai</i>) – Endangered Hawaiian stilt (<i>Himantopus mexicanus knudseni</i>) – Endangered	
May affect, and is likely to adversely affect species/adversely modify critical habitat	____Formal Consultation

B. Proposed species/proposed critical habitat: NONE

C. Candidate species: NONE

IX. Signature

Glynnis Nakai, Refuge Manager
Maui National Wildlife Refuge Complex

Date

X. Reviewing ESO Evaluation:

A. Concurrence _____ Nonconcurrence _____

B. Formal consultation required _____

C. Conference required _____

D. Informal conference required _____

E. Remarks (attach additional pages as needed):

Field Supervisor
Ecological Services, Pacific Islands Field Office

Date

Appendix F: Request for Cultural Resource Compliance

REQUEST FOR CULTURAL RESOURCE COMPLIANCE

Project Name: _____

USFWS Unit: _____

Org Code: _____

Ecoregion: _____

(By ARD; CBE, IPE, KCE, NCE)

Program: _____

(Partners, WSECP, Refuges, Hatcheries, Jobs, Federal Aid, Other)

Location: _____

(nearest town)

County: _____

State: _____

Township(s): _____ **Range(s):** _____ **Section(s):** _____ **Meridian:** _____

7.5' USGS Quad(s): _____

(Name, Date)

Project acres or linear meters/feet: _____

Date you want to start the project: _____

Date of this request: _____

USFWS Contact: _____

Phone: _____

Address: _____

Fax: _____

Directions to project (if not obvious):

Attach to this form:

- A **project (sketch) map** showing the Area of Potential Effect with locations of specific ground altering activities (*required*).
- A **photocopy** of the **USGS quad** clearly marking the project area (*required*).
- A **photocopy** of an **air photo** showing the project may be attached (*if available*).

Return form and direct questions to:

USFWS Region 1 Cultural Resources Team
c/o Tualatin River NWR
20555 SW Gerda Lane
Sherwood, OR 97140
Phone: (503) 625-4377
Fax: (503) 625-4887

NHPA COMPLIANCE

Appendix _____ Item _____
of the Programmatic Agreement applies.

36CFR800.4 to 800.6 applies.

Cultural Resources Team

Date

The Undertaking: *Describe the proposed project and means to facilitate it (e.g., provide funds to revegetate 1 mile of riparian habitat, restore 250 acres of seasonal wetlands, and construct a 5-acre permanent pond). How is the project designed (e.g., install 2 miles of fence and create approximately 25 feet of 3 foot high check dam)?*

Area of Potential Effect: *Describe where disturbance of the ground will occur. What are the dimensions of the area to be disturbed? How deep will you excavate? How long is the ditch, fence, etc? Where will fill be obtained? Where will spoil be dumped? What tools or equipment will be used? Are you replacing or repairing a structure? Are you moving dirt in a relatively undisturbed area? Will the project reach below or beyond the limits of prior land disturbance? Differentiate between areas slated for earth movement versus areas to be inundated only. Is the area to be inundated different from the area inundated today, in the recent past, or under natural conditions? Provide acres and/or linear meters or feet for all elements of the undertaking.*

Environmental Setting: *Describe the environmental setting of the Area of Potential Effect. A) What was the natural habitat prior to modifications, reclamation, agriculture, settlement? B) What is the land-use history? When was it first settled, modified? How deep has it been cultivated? Grazed? etc. C) What is the land-use and habitat today? What natural agents (e.g., sedimentation, or vegetation) or cultural agents (e.g., cultivation) might affect the ability to discover cultural resources? D) Do you (or does anybody else) know of cultural resources in or near the project area?*

APPENDIX G: INTERAGENCY AGREEMENTS

No interagency agreements have been developed. When completed, they will be added here.

APPENDIX H: PILE BURN PLAN TEMPLATE

REFUGE OR STATION:	UNIT:
---------------------------	--------------

Prepared By:	 _____	 _____
	Prescribed Fire Specialist	Date
Reviewed By:	 _____	 _____
	Refuge Biologist	Date
Reviewed By:	 _____	 _____
	Prescribed Fire Burn Boss	Date
Reviewed By:	 _____	 _____
	Fire Management Officer	Date
Reviewed By:	 _____	 _____
	Biological Investigation Unit	Date
Reviewed By:	 _____	 _____
	Refuge Manager	Date
<p>The approved Pile Burn Plan constitutes the authority to burn, pending approval of Section 7 Consultations, Environmental Assessments or other required documents. No one has the authority to burn without an approved plan or in a manner not in compliance with the approved plan. Pile burning conditions established in the plan are firm limits. Actions taken in compliance with the approved Pile Burn Plan will be fully supported, but personnel will be held accountable for actions taken which are not in compliance with the approved plan.</p>		
Approved By:	 _____	 _____
	Project Leader	Date

PILE BURN PLAN

Note: This plan is intended for burning debris and piles (activity fuels) from refuge operations such as fuel break construction and hazard reduction. This plan format should only be used outside of declared fire season for the area considered. THIS PLAN IS FOR COMPLEXITY LEVEL 3 PILE BURNING.

Refuge:	Refuge Burn Number:
Substation:	Fire Number:
Name of Area:	Unit Number:
Legal Description: T____ R____ S____ Meridian: _____ Latitude: _____ Longitude: _____	
County:	State:

Checklist:

1. EA optional.
2. Resource objectives.
3. Less than 1 ton per pile, completely dried.
4. Has minimum resources (equipment & personnel) required.
5. Has weather parameters been established.
6. Low potential for escape. Good clearance.
7. No fire behavior prediction required
8. Can be written to be good up to 3 years per site, with annual review.
9. Burn day required.
10. Less than (<) one acre in size.
11. Complexity level should rate as level 3
12. Intended for admin sites, campgrounds, occupancy trespass, etc.

Environmental Assessment Met (where documented): _____

Estimated Cost: _____ 1202: _____ Funding Code: _____

Project Area Description (Attach Map of Burn Area)

Burn Objectives:

Number, Species, and Size of Piles:

Adjacent Fuel Description:

Weather Forecasts

The Pile Burn Boss is responsible for weather being taken every hour while burning to ensure prescription compliance. Contact the Emergency Communications Center (ECC) for weather forecasts and burn day designation. Contact ECC by radio when ignition is starting, giving legal description of area burning; and when burning is over, giving number of acres or piles burned.

Prescription: _____

Season of Burn (Fall, Spring, Summer, Winter): _____

	Acceptable Range	Desired
Air Temperature	_____	_____
Relative Humidity	_____	_____
Wind Speed	_____	_____
Fuel Moisture 1 Hour T.L.	_____	_____
10 Hour T.L.	_____	_____
100 Hour T.L.	_____	_____
Adjacent Live Fuel Moisture	_____	_____
Wind Direction Preferred	Acceptable: _____	Unacceptable: _____

Smoke Management

Permitting Agency:

Total Tons Per Acre Emissions:

Distance and Direction from Smoke Sensitive Area(s):

Necessary Transport Wind Direction(s):

Visibility Hazard(s) (i.e., roads, airports, etc.):

Actions to Reduce Visibility Hazard(s):

Can Residual Smoke Be a Problem?

Other Considerations:

Special Constraint(s)/Consideration(s):

Firing Technique:

Holding Force Instructions:

Mop Up Instructions

Contact Plan

Who will notify the following and when?

Key People:

Local Landowners:

Private Land Within Proposed Burn (Identify on Map):

Fire Protection Agencies:

Dispatcher:

Public Affairs Officer:

News Releases to Local Papers and News Media:

Safety Plan

All line employees involved in the actual burning of standing and/or piled fuels will have on their person and use as necessary the following protective clothing:

- Hard hat
- Goggles
- Gloves
- Fire resistant pants
- Fire resistant shirt
- Fire shelter
- Laced boots as used in fire suppression

Employees involved in a project with an assignment not related to actual burning should have with them all of the above safety equipment and be so equipped if their unplanned duties expose them to line work and/or the actual burning.

Each burning plan will designate fire safety responsibility. This designation should include the following considerations:

- Escape routes
- Safety areas
- Closest recognized burn treatment facility and specific methods of travel to burn center or hospital

Hospitals

Center Name	Address	Travel Time Air/Ground	Phone	Helipad Yes/No	Burn Yes/No

Medical Emergency Procedures

- Give First Aid at scene.
- Contact Maui County Fire Department
- Make transportation arrangements.

Comments:

Debris & Pile Burning Checklist

A “NO” response to any item means STOP!

	YES	NO
1. Are all fire prescriptions met?		
2. Has dispatch been notified?		
3. Is it a permissive burn day?		
4. Is fire weather forecast favorable?		
5. Are all personnel required in the burn plan on site?		
6. Have all personnel been briefed on the burn plan requirements?		
7. Have all personnel been briefed on safety hazards, escape routes and safety orders?		
8. Is all the required equipment in place and in working order?		
9. Are all personnel aware of mop up requirements before abandonment?		
10. Are all answers to all the above questions “Yes”?		

If all ten questions have been answered “Yes”, you may proceed with lighting

Appendix I: Delegation of Authority

DELEGATION OF AUTHORITY

Region 1, U.S. Fish and Wildlife Service

Maui National Wildlife Refuge Complex

_____, you are assigned as Incident Commander of the _____ Incident on the _____ National Wildlife Refuge. You have full authority and responsibility for managing the fire suppression operation on this incident within the framework of legal statute, current policy, broad direction, and the Wildland Fire Situation Analysis (WFSA). Your primary responsibility is to achieve complete control of the fire by organizing and directing the fire suppression organization in an effective, efficient, economical and most importantly, safe manner.

You should be guided in your duties by the fire job descriptions relating to Incident Commander, as found in the Fireline Handbook. Strongly consider long-term ecosystem health, and the effects of suppression actions in the development of appropriate suppression responses. These issues are to be addressed and documented in the WFSA.

You are accountable to the Refuge Manager, _____ of the Maui National Wildlife Refuge Complex, who is the Line Officer. _____ may serve as the Line Officer Designee for this incident.

You will immediately notify me in person in the event of:

- (1) a serious injury or fatality,
- (2) threat to private property,
- (3) if the incident exceeds the limits of the selected alternative of the WFSA.

Much of the Refuge Complex is home to endangered species. Your job as Incident Commander is critical, as you must minimize damage to the habitats, as well as provide for firefighter safety. Minimum environmental suppression tactics shall be used, commensurate with forecasted and threatened resource values.

You are to be guided by the Wildland Fire Situation Analysis, approved by _____, Project Leader.

The Resource Advisor assigned to your incident will be _____.

Glynnis Nakai, Refuge Manager
Maui National Wildlife Refuge Complex

Date

Appendix J: Wildland Fire Situation Analysis

WILDLAND FIRE SITUATION ANALYSIS

Incident Name: _____

Jurisdiction: _____

Date and Time Completed: _____

I. WILDLAND FIRE SITUATION ANALYSIS	
A. Jurisdiction(s)	B. Geographic Area
C. Unit(s)	D. WSFA #
E. Fire Name	F. Incident #
G. Accounting Code: _____	
H. Date/Time Prepared: _____ @ _____	
I. Attachments: _____	
Complexity Matrix/Analysis * _____ Risk Assessment/Analysis * _____ Probability of Success * _____ Consequences of Failure * _____ Maps * _____ Decision Tree ** _____ Fire Behavior Projections * _____ Calculations of Resource Requirements * _____ Other (specify) _____	
* Required ** Required by FWS	

This page is completed by the Agency Administrator(s)

II.

OBJECTIVES AND CONSTRAINTS

A. Objectives (must be specific and measurable)

1. Safety
 - Public

 - Firefighter

2. Economic

3. Environmental

4. Social

5. Other

B. Constraints

This page is completed by the Agency Administrator(s)

III. ALTERNATIVES			
	A	B	C
A. Wildland Fire Strategy			
B. Narrative			
C. Resources Needed			
Handcrews	_____	_____	_____
Engines	_____	_____	_____
Dozers	_____	_____	_____
Airtankers	_____	_____	_____
Helicopters	_____	_____	_____
D. Final Size			
E. Estimated Contain/ Control Date			
F. Costs			
G. Risk Assessment			
Probability of Success	_____	_____	_____
Consequences of Failure	_____	_____	_____
H. Complexity			
I. Attach maps for each alternative			

This page is completed by the Agency Administrator(s) and FMO/Incident Commander

IV. EVALUATION OF ALTERNATIVES			
A. Evaluation Process	A	B	C
Safety			
Firefighter	_____	_____	_____
Aviation	_____	_____	_____
Public	_____	_____	_____
<i>Sum of Safety Values</i>			
Economic			
Forage	_____	_____	_____
Improvements	_____	_____	_____
Recreation	_____	_____	_____
Timber	_____	_____	_____
Water	_____	_____	_____
Wilderness	_____	_____	_____
Wildlife	_____	_____	_____
Other (specify)	_____	_____	_____
<i>Sum of Economic Values</i>			
Environmental			
Air	_____	_____	_____
Visual	_____	_____	_____
Fuels	_____	_____	_____
T & E Species	_____	_____	_____
Other (specify)	_____	_____	_____
<i>Sum of Environmental Values</i>			
Social			
Employment	_____	_____	_____
Public Concern	_____	_____	_____
Cultural	_____	_____	_____
Other (specify)	_____	_____	_____
<i>Sum of Social Values</i>			
Other			

This page is completed by the Agency Administrator(s) and FMO/Incident Commander

V. ANALYSIS SUMMARY			
Alternatives	A	B	C
A. Compliance with Objectives			
Safety	_____	_____	_____
Economic	_____	_____	_____
Environmental	_____	_____	_____
Social	_____	_____	_____
Other (specify)	_____	_____	_____
B. Pertinent Data			
Final Fire Size	_____	_____	_____
Complexity	_____	_____	_____
Suppression Cost	_____	_____	_____
Resource Values	_____	_____	_____
Probability of Success	_____	_____	_____
Consequences of Failure	_____	_____	_____
C. External/Internal Influences			
National & Geographic Preparedness Level: _____			
Incident Priority: _____			
Resource Availability: _____			
Weather Forecast (long range): _____			
Fire Behavior Projections: _____			

This page is completed by the Agency Administrator(s) and FMO/Incident Commander

VI.

DECISION

The Selected Alternative is: _____

Rationale: _____

Agency Administrator's Signature

Date/Time

This page is completed by the Agency Administrator(s) or designate

VII. DAILY REVIEW									
To be reviewed daily to determine if still valid until containment or control									
			P R E P A R E D N E S S L E V E L	I N C I D E N T P R I O R I T Y	R E S O U R C E A V A I L A B I L I T Y	W E A T H E R F O R E C A S T	F I R E B E H A V I O R P R O J E C T I O N S	W F S A V A L I D	
Date	Time	By							
IF WFSA IS NO LONGER VALID, A NEW WFSA WILL BE COMPLETED!									

This page is completed by the Agency Administrator(s) or designate

VIII. FINAL REVIEW		
The elements of the selected alternative were met on:	_____	_____
	Date	Time
By: _____ Agency Administrator(s)		

INSTRUCTIONS

Section I. WFSA Information Page

- A. Jurisdiction(s): Assign the agency or agencies that have or could have fire protection responsibility, e.g., USFWS, BLM, etc.
- B. Geographic Area: Assign the recognized "Geographic Coordination Area" the fire is located in, e.g., Northwest, Northern Rockies, etc.
- C. Unit(s): Designate the local administrative unit(s), e.g., Hart Mountain Refuge Area, Flathead Indian Reservation, etc.
- D. WFSA #: Identify the number assigned to the most recent WFSA for this fire.
- E. Fire Name: Self-explanatory.
- F. Incident #: Identify the incident number assigned to the fire.
- G. Accounting Code: Insert the local unit's accounting code.
- H. Date/Time Prepared: Self-explanatory.
- I. Attachments: Check here to designate items used to complete the WFSA. "Other" could include data or models used in the development of the WFSA. Briefly describe the "other" items used.

Section II. Objectives and Constraints

- A. Objectives: Specify objectives that must be considered in the development of alternatives. Safety objectives for firefighter, aviation, and public must receive the highest priority. Suppression objectives must relate to resource management objectives in the unit resource management plan.

Economic objectives could include closure of all or portions of an area, thus impacting the public, or impacts to transportation, communication, and resource values.

Environmental objectives could include management objectives for airshed, water quality, wildlife, etc.

Social objectives could include any local attitudes toward fire or smoke that might affect decisions on the fire.

Other objectives might include legal or administrative constraints which would have to be considered in the analysis of the fire situation, such as the need to keep the fire off other agency lands, etc.

- B. Constraints: List constraints on wildland fire action. These could include constraints to designated wilderness, wilderness study areas, environmentally or culturally sensitive areas, irreparable damage to resources or smoke management/air quality concerns. Economic constraints, such as public and agency cost, could be considered here.

Section III. Alternatives

- A. Wildland Fire Management Strategy: Briefly describe the general wildland fire strategies for each alternative. Alternatives must meet resource management plan objectives.
- B. Narrative: Briefly describe each alternative with geographic names, locations, etc., that would be used when implementing a wildland fire strategy. For example: "Contain within the Starvation Meadows' watershed by the first burning period."
- C. Resources Needed: Resources described must be reasonable to accomplish the tasks described in Section III.B. It is critical to also look at the reality of the availability of these needed resources.
- D. Final Fire Size: Estimated final fire size for each alternative at time of containment.
- E. Estimated Contain/Control Date: Estimates of each alternative shall be made based on predicted weather, fire behavior, resource availability, and the effects of suppression efforts.
- F. Cost: Estimate all incident costs for each alternative. Consider mop-up, rehabilitation, and other costs as necessary.
- G. Risk Assessment - Probability of Success/Consequences of Failure: Describe probability as a percentage and list associated consequences for success and failure. Develop this information from models, practical experience, or other acceptable means. Consequences described will include fire size, days to contain, days to control, costs, and other information such as park closures and effect on critical habitat. Include fire behavior and long-term fire weather forecasts to derive this information.
- H. Complexity: Assign the complexity rating calculated in "Fire Complexity Analysis" for each alternative, e.g., Type II, Type I.
- I. A map for each alternative should be prepared. The map will be based on the "Probability of Success/Consequences of Failure" and include other relative information.

Section IV. Evaluation of Alternatives

- A. Evaluation Process: Conduct an analysis for each element of each objective and each alternative. Objectives shall match those identified in Section II.A. Use the best estimates available and quantify whenever possible. Provide ratings for each alternative and corresponding objective element. Fire effects may be negative, cause no change, or may be positive. Examples are: 1) a system which employs a "-" for negative effect, a "0" for no change, and a "+" for positive effect; 2) a system which uses a numeric factor for importance of the consideration (soils, watershed, political, etc.) and assigns values (such as -1 to +1, -100 to +100, etc.) to each consideration, then arrives at a weighted average. If you have the ability to estimate dollar amounts for natural resource and cultural values, this data is preferred. Use those methods which are most useful to managers and most appropriate for the situation and agency. To be able to evaluate positive fire effects, the area must be included in the resource management plan and consistent with prescriptions and objectives of the Fire Management Plan.

Sum of Economic Values: Calculate for each element the net effect of the rating system used for each alternative. This could include the balance of pluses (+) and minuses (-), numerical rating (-3 and +3), or natural and cultural resource values in dollar amounts. (Again, resource benefits may be used as part of the analysis process when the wildland fire is within a prescription consistent with approved Fire Management Plans and in support of the unit's Resource Management Plan.)

Section V. Analysis Summary

- A. Compliance with Objectives: Prepare narratives that summarize each alternative's effectiveness in meeting each objective. Alternatives that do not comply with objectives are not acceptable. Narrative could be based on effectiveness and efficiency. For example: "most effective and least efficient," "least effective and most efficient," or "effective and efficient." Or answers could be based on a two-tiered rating system such as "complies with objective" and "fully complies with or exceeds objective." Use a system that best fits the manager's needs.
- B. Pertinent Data: Data for this Section has already been presented, and is duplicated here to help the Agency Administrator(s) confirm their selection of an alternative. Final Fire Size is displayed in Section III.D. Complexity is calculated in the attachments and displayed in Section III.H. Costs are displayed on page 4. Probability of Success/Consequences of Failure is calculated in the attachments and displayed in Section III.G.
- C. External and Internal Influences: Assign information and data occurring at the time the WFSA is signed. Identify the Preparedness Index (1 through 5) for the National and Geographic levels. If available, indicate the Incident Priority assigned by the MAC Group. Designate the Resource Availability status. This information is available at the Geographic Coordination Center, and is needed to select a viable alternative. Designate "yes," indicating an up-to-date weather forecast has been provided to, and used by, the Agency Administrator(s) to evaluate each alternative. Assign information to the "Other" category as needed by the Agency Administrator(s).

Section IV. Decision

Identify the alternative selected. Must have clear and concise rationale for the decision, and a signature with date and time. Agency Administrator(s) is mandatory.

Section VII. Daily Review

The date, time, and signature of reviewing officials are reported in each column for each day of the incident. The status of Preparedness Level, Incident Priority, Resource Availability, Weather Forecast, and WFSA validity is completed for each day reviewed. Ratings for the Preparedness Level, Incident Priority, Resource Availability, Fire Behavior, and Weather Forecast are addressed in Section V.C. Assign a "yes" under "WFSA Valid" to continue use of this WFSA. A "no" indicates this WFSA is no longer valid and another WFSA must be prepared or the original revised.

Section VIII. Final Review

This Section is completed by the Agency Administrator(s). A signature, date, and time are provided once all conditions of the WFSA are met.

A GUIDE FOR ASSESSING FIRE COMPLEXITY

The following questions are presented as a guide to assist the Agency Administrator(s) and staff in analyzing the complexity or predicted complexity of a wildland fire situation. Because of the time required to assemble or move an Incident Management Team to wildland fire, this checklist should be completed when a wildland fire escapes initial attack and be kept as a part of the fire records. This document is prepared concurrently with the preparation of (and attached to) a new or revised Wildland Fire Situation Analysis. It must be emphasized this analysis should, where possible, be based on predictions to allow adequate time for assembling and transporting the ordered resources.

Use of the Guide:

1. Analyze each element and check the response "yes" or "no."
2. If positive responses exceed, or are equal to, negative responses within any primary factor (A through G), the primary factor should be considered as a positive response.
3. If any three of the primary factors (A through G) are positive responses, this indicates the fire situation is, or is predicted to be, Type I.
4. Factor H should be considered after all the above steps. If more than two of these items are answered "yes," and three or more of the other primary factors are positive responses, a Type I team should be considered. If the composites of H are negative, and there are fewer than three positive responses in the primary factors (A-G), a Type II team should be considered. If the answers to all questions in H are negative, it may be advisable to allow the existing overhead to continue action on the fire.

GLOSSARY OF TERMS

Potential for blow-up conditions - Any combination of fuels, weather, and topography excessively endangering personnel.

Rate or endangered species - Threat to habitat of such species or, in the case of flora, threat to the species itself.

Smoke management - Any situation which creates a significant public response, such as smoke in a metropolitan area or visual pollution in high-use scenic areas.

Extended exposure to unusually hazardous line conditions - Extended burnout or backfire situations, rock slide, cliffs, extremely steep terrain, abnormal fuel situation such as frost killed foliage, etc.

Disputed fire management responsibility - Any wildland fire where responsibility for management is not agreed upon due to lack of agreements or different interpretations, etc.

Disputed fire policy - Differing fire policies between suppression agencies when the fire involves multiple ownership is an example.

Pre-existing controversies - These may or may not be fire management related. Any controversy drawing public attention to an area may present unusual problems to the fire overhead and local management.

Have overhead overextended themselves mentally or physically - This is a critical item that requires judgment by the responsible agency. It is difficult to write guidelines for this judgment because of the wide differences between individuals. If, however, the Agency Administrator feels the existing overhead cannot continue to function efficiently and take safe and aggressive action due to mental or physical reasons, assistance is mandatory.

FIRE COMPLEXITY ANALYSIS

A. FIRE BEHAVIOR: Observed or Predicted **YES/NO**

1. Burning Index (from on-site measurement of weather conditions) predicted to be above the 90% level using the major fuel model in which the fire is burning. _____

2. Potential exists for “blowup” conditions (fuel moisture, winds, etc.). _____

3. Crowning, profuse or long-range spotting. _____

4. Weather forecast indicating no significant relief or worsening conditions. _____

Total _____

B. RESOURCES COMMITTED

1. 200 or more personnel assigned. _____

2. Three or more divisions. _____

3. Wide variety of special support personnel. _____

4. Substantial air operation which is not properly staffed. _____

5. Majority of initial attack resources committed. _____

Total _____

C. RESOURCES THREATENED

1. Urban interface. _____

2. Developments and facilities. _____

3. Restricted, threatened, or endangered species habitat. _____

4. Cultural Sites. _____

5. Unique natural resources, special designation zones, or wilderness. _____

6. Other special resources. _____

Total _____

D. SAFETY

YES/NO

- 1. Unusually hazardous fire line conditions. _____
- 2. Serious accidents or fatalities. _____
- 3. Threat to safety of visitors from fire and related operations. _____
- 4. Restricted and/or closures in effect or being considered. _____
- 5. No night operations in place for safety reasons. _____

Total _____

E. OWNERSHIP

- 1. Fire burning or threatening more than one jurisdiction. _____
- 2. Potential for claims (damages). _____
- 3. Conflicting management objectives. _____
- 4. Disputes over fire management responsibility. _____
- 5. Potential for unified command. _____

Total _____

F. EXTERNAL INFLUENCES

- 1. Controversial wildland fire management policy. _____
- 2. Pre-existing controversies/relationships. _____
- 3. Sensitive media relationships. _____
- 4. Smoke management problems. _____
- 5. Sensitive political interests. _____
- 6. Other external influences. _____

Total _____

G. CHANGE

YES/NO

- 1. Change in strategy to confine/contain to control. _____
- 2. Large amount of unburned fuel within planned perimeter. _____
- 3. WFSA invalid or requires updating. _____

Total _____

H. EXISTING OVERHEAD

- Worked two operational periods without achieving initial objectives. _____
- Existing management organization ineffective. _____
- IMT overextended themselves mentally and/or physically. _____
- Incident action plans, briefings, etc. missing or poorly prepared. _____

Total _____

I. SIGNATURE

Name and Title

Date and Time