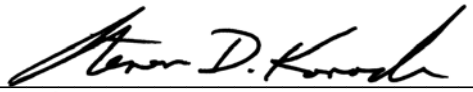
Innoko National Wildlife Refuge
2005 Fires
BURNED AREA EMERGENCY RESPONSE PLAN

UNIT: Innoko National Wildlife Refuge

LOCATION: McGrath, Alaska

DATE: 1 December 2005

PREPARED BY: Steven Kovach, Wildlife Biologist, Innoko NWR
Karen Murphy, Fire Ecologist, Region 7

Submitted By:  Date: 1 December 2005
Wildlife Biologist, Innoko National Wildlife Refuge

EXECUTIVE SUMMARY

Introduction

This Burned Area Emergency Response Plan has been prepared in accordance with Department of the Interior and US Fish and Wildlife Service policy. This plan provides emergency stabilization recommendations for lands burned within the 2005 fire perimeters within the Innoko National Wildlife Refuge (Innoko NWR) and for two fires that burned onto the Innoko NWR; the US Fish and Wildlife Service administers public lands within the exterior boundary of Innoko NWR. The primary objectives of the Innoko NWR 2005 Fires Burned Area Emergency Response Plan are:

- Prescribe cost effective post-fire stabilization measures necessary to protect human life, property, and critical cultural and natural resources.
- Promptly stabilize and prevent further degradation to affected cultural and natural resources on lands within fire perimeters or downstream impact areas on Innoko NWR in accordance with approved land management plans and policies, and all relevant federal, state, and local laws and regulations.

This plan addresses emergency stabilization assessments and treatments. The treatments are only very briefly outlined as staff have been unable to assess the effects of each fire, or their actual extent due to dense smoke and adverse weather conditions making aerial work unsafe; additionally, aircraft availability impacted staff's ability to access the refuge prior to the first snowfall of the season. These conditions resulted in delaying full field assessments until spring/summer 2006. Preliminary extent of each fire presented in this plan is based on data obtained from Alaska Fire Service.

Preliminary assessments of fire impacts were based on: a 1km resolution GINA satellite image from 1 September 2005 while most fires were still active; 1980 and 1981 color infrared (CIR) photographs (0.5m ground resolution); land cover maps of the refuge (1986 and 1996; 30m ground resolution); moose census and nesting waterfowl data; moose browse study site locations and data; historic sites and trail location GIS coverages; and consultations with research biologists, fishery biologists, hydrologists, and contaminants specialists.

The individual emergency stabilization treatments specifications including effectiveness monitoring identified in the assessments can be found in Part F. A summary of the costs is in Part E. Appendix II contains the National Environmental Policy Act (NEPA) compliance documentation summary. Appendix III contains the Burned Area Emergency Response Plan maps. Appendix IV contains photo documentation. Appendix V contains supporting documentation.

Fire Background

The intent was to monitor all fires on a weekly basis. However, extreme smoke and low clouds prevented normal monitoring. Monitoring happened sporadically and incompletely. All fire sizes reported below are rough estimates due to smoke and weather conditions. All fires are believed to have been ignited by lightning strikes. The Alaska Fire Service provided acreage estimates; these will be compared against data derived from LANDSAT imagery taken 2 September 2005. Several of the fires burned through September so final acreage estimates will not be available until next summer when new LANDSAT imagery can be obtained.

One fire (Dishkakat) began in May 2005, 3 fires (Hammer Creek #1, Hammer Creek #2, and Camp Creek) began in June 2005, 4 fires (Papa Willie Creek, Menotl East, Little Mud River #1, and Tlati Hills) began in July 2005, and 3 fires (Hammer North, Chick Mountain, and Yetna) began in August 2005. Based on Alaska Fire Service records: the Papa Willie Creek and Menotl East fires merged; the Little Mud River #1 and the Tlati Hills fires merged; and the Camp Creek fire merged with the East Fork Yuki fire. Preliminary sizes of these fires place them between 10 and 121,000 acres. These fires burned an estimated 6% of the Innoko NWR.

Fire Damages and Threats to Human Safety and Natural and Cultural Resources

No damage was caused by suppression activities, as the only activity was occasional aerial monitoring.

Human safety threats are unknown at this time but could include hazard trees adjacent to and down trees obstructing seasonally used historic trails.

Damage caused to natural resources is not fully known at this time, but potentially include impacts to critical winter moose habitat, furbearer habitat, and nesting waterfowl habitat. Additionally, an unknown number of bald eagle and osprey nest trees are believed to have been lost.

Impacts to cultural resources are unknown at this time, but may include impacts to the Gold Rush era site of Dishkakat and sections of the historic Iditarod Trail.

Individual emergency stabilization treatments have not been formulated at this time due to our inability to do on-ground investigations, as outlined above. Similarly, individual resource burned area assessments have not been fully prepared as well; preliminary information on water quality and fish habitat impacts are provided.

Innoko National Wildlife Refuge Management Requirements

Innoko NWR was created in December 1980 with the passage of the Alaska National Interest Lands Conservation Act (Public Law 96-487). Innoko NWR encompasses 3.8 million acres in western Alaska (see Appendix III). Habitats are typical of the transition between boreal forests and tundra. The Yukon River forms the western boundary. The Innoko River is the primary water course through the central portion of the refuge; major tributaries to the Innoko River include the Iditarod River, Dishna River, Hather Creek, and Mud River. Major purposes of the refuge include: 1) the conservation of "fish and wildlife populations and habitats in their natural diversity including but not limited to, waterfowl, … other migratory birds, black bear, moose, furbearers, … and salmon."; 2) fulfill international treaty obligations with respect to fish and wildlife and their habitats; 3) provide opportunities for continued subsistence uses by local residents; and 4) ensure water quality and quantity within the refuge. The Innoko Wilderness Area encompasses approximately 1.24 million acres in the south-central portion of the refuge (see Appendix III). The refuge has seven Gold Rush era sites within its boundaries, and another two sites just outside its boundaries. Several sections of the historic Iditarod Trail are also located on the refuge.

No threatened or endangered species are known to occur on the Innoko NWR.

The Innoko NWR Comprehensive Conservation Plan (CCP) was finalized and approved by the Regional Director in October 1987. Management concerns specifically identified in the CCP include maintaining adequate information on the status of fish and wildlife populations and their habitats (CCP, page 16). Habitat quality has a direct impact on population responses, which in turn impacts the refuges' ability to fulfill international treaty obligations (CCP, pages 4, 16). Information on wildlife populations and habitat interactions was also identified as a management concern (CCP, page 17). Preliminary information indicates that habitat recovery from fire may be prolonged compared to eastern interior Alaska. Additionally, preservation of the Iditarod Trail, designated by Congress as a National Historic Trail under the National Trails System Act, is an important stewardship task of the refuge (CCP, page 32).

The Innoko NWR Fire Management Plan (FMP) was rewritten and approved in October 2005. Page 67 of the FMP, under the Emergency Stabilization and Rehabilitation section states "To determine … if stabilization efforts are required to prevent the further degradation of natural resources." It goes on to state, "To determine what actions of a non-emergency nature are required to rehabilitate a resource whether man-made or natural." The FMP recognizes the unique nature of each fire and recommends that emergency stabilization and rehabilitation "monitoring elements should be determined by incident specific attributes". On page 69 of the FMP, both "post wildland fire monitoring" and "fire research and monitoring" activities are identified as needed on Innoko NWR.

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PART A - FIRE LOCATION AND BACKGROUND INFORMATION

The Papa Willie Creek Fire (Fire # B13V) was first discovered on 26 July 2005. This fire grew and overtook the Menoti East Fire (Fire #B13Y) on or before 6 August 2005. As of September 30th, the Papa Willie Creek fire is estimated at 121,600 acres and is believed to have burned critical winter moose, furbearer, and waterfowl nesting habitats.

The Chick Mountain Fire (Fire #B2VK) was first discovered on 1 August 2005. This fire is estimated to be over 83,200 acres. A wide variety of habitats were impacted, including waterfowl nesting habitat, furbearer habitat, and important moose winter habitat along the Iditarod River. This fire appears to be wholly contained within the Innoko Wilderness Area. This fire is near, but is believe not to have impacted the Gold Rush era site of Dikeman along the Iditarod River. This fire appears to have burned over sections of the Historic Iditarod Trail.

The Little Mud River #1 Fire (Fire #B10P) was first discovered on 25 July 2005. This lightning strike fire started in low growing tundra, but spread to an estimated 35,600 acres potentially impacting critical moose, furbearer, and waterfowl habitats. This fire grew and overtook the Tlatl Hills Fire (Fire #B18J) on or before 27 August 2005.

The Hammer North Fire (Fire #B21N) was another lightning strike fire in tundra was first discovered on 2 August 2005. Detection aircraft declared this fire administratively out on 27 August 2005 after burning 300 acres; refuge personnel believed that this fire reignited for a time in September and October, however. While resources affected are unknown at this time, it may have impacted sections of the Historic Iditarod Trail as well as waterfowl nesting habitat.

The Hammer Creek #2 Fire (Fire #BUL2) was first discovered on 15 June 2005. This tundra and black spruce fire burned approximately 2,000 acres; detection aircraft declared this fire administratively out on 27 August 2005; refuge personnel believed that this fire reignited for a time in September and October, however. While resources affected are unknown at this time, it may have impacted sections of the Historic Iditarod Trail as well as waterfowl nesting habitat.

The Dishkakat Fire (Fire #BS3J) was first discovered on 29 May 2005. This fire burned approximately 20 acres and was declared administratively out on 15 July 2005 by detection aircraft; smoke was again observed by refuge personnel in September, however. This fire was near the Gold Rush era site of Dishkakat and may have impacted archeological resources, sections of the Historic Iditarod Trail, as well as critical winter moose habitat.

The Yetna Fire (Fire #B3HV) was first discovered on 2 August 2005 just south of the Innoko NWR boundary and burned onto the Innoko Wilderness Area portion of Innoko NWR. This fire is estimated at 46,000 acres; however, final perimeters are not yet available to determine how much burned on the Innoko NWR. The fire was declared administratively out on 5 September 2005 by detection aircraft; refuge personnel were never able to observe this fire later in September, so it is unknown if it also reignited. This fire appears to have impacted critical winter moose habitat as well as critical furbearer habitat. The fire burned headwater areas that could have downstream impacts to waterfowl nesting habitats.

The Camp Creek Fire (Fire #BW1K) was first discovered on 28 June 2005 just upstream from the northeast corner of Innoko NWR. It grew to approximately 14,000 acres and merged with the East Fork Yuki River Fire (Fire #B2MH) on or before 27 August 2005, and burned onto the Refuge. Like the Yetna Fire, final perimeters are not yet available to determine the extent that burned on Innoko NWR. This fire appears to have burned headwater areas of the Innoko River that could have downstream impacts to furbearer habitats as well as critical winter moose habitat.

Summary of fires included in the Innoko National Wildlife Refuge 2005 Fires Burned Area Emergency Response Plan

Fire Name	Papa Willie[a]	Chick Mtn	Little Mud River #1[b]	Hammer North	Hammer Creek #2	Dishkakat	Yetna	Camp Creek[c]
Fire Number	B13V	B2VK	B10P	B21N	BUL2	BS3J	B3HV	BW1K
Agency Unit	FWS	FWS	FWS	FWS	FWS	FWS	FWS	FWS
Region	7	7	7	7	7	7	7	7
State	AK	AK	AK	AK	AK	AK	AK	AK
County(s)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ignition Date/Cause	07/26/05, lightning	08/01/05, lightning	07/25/05, lightning	08/02/05, lightning	06/15/05, lightning	05/29/05, lightning	08/02/05, lightning	06/28/05, lightning
Zone	Galena	Galena	Galena	Galena	Galena	Galena	Galena	Galena
Date Fully Contained[d]	09/31/05	09/31/05	09/31/05	09/31/05	08/27/05	07/15/05	09/05/05	09/31/05
Jurisdiction(s)	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
US Fish and Wildlife Service	Unknown at this time	Unknown at this time	35,600	300	2,000	20	Unknown at this time	Unknown at this time
other jurisdictions	Unknown at this time	Unknown at this time					Unknown at this time	Unknown at this time
Total Acres	122,000	83,200	35,600	300	2,000	20	46,000	14,000[e]

[a] Combined with Menoti East Fire (Fire #B13Y)
[b] Combined with Tlati Hills Fire (Fire #B18J)
[c] Combined with East Fork Yuki River Fire (Fire #B2MH)
[d] As listed by Alaska Fire Service
[e] Combined acreage approximately 50,000

PART B - NATURE OF PLAN

Type of Action (check one box below)

X	Initial Submission
	Amendment to the Initial Submission

PART C - EMERGENCY STABILIZATION ASSESSMENT

Emergency Stabilization Objectives

- Locate and stabilize severely burned conditions that pose a direct threat to human life, property, or critically important cultural and natural resources.
- Recommend post-fire emergency stabilization prescriptions that prevent irreversible loss of natural, historic, and cultural resources.
- Develop monitoring specifications designed to document relative effectiveness of emergency stabilization treatments or whether additional emergency stabilization treatments are required.
- Document presence of non-native invasive plants adjacent to areas of human use and develop eradication plans as appropriate.

PART D - TEAM ORGANIZATION, MEMBERS, AND RESOURCE ADVISORS

I. Burned Area Emergency Response Team Members:

Position	Team Member (Agency)
Team Leader	Steven Kovach (FWS)
Fire Ecologist	Karen Murphy (FWS)
Operations	William Schaff (FWS)
Wildlife Biologist	Steven Kovach (FWS)
Wildlife Biologist	Robin Corcoran (FWS)
Vegetation Specialist	TBA
Fire Management Specialist	Robert Lambrecht
GIS Specialist	Steven Kovach (FWS)
Documentation/Computer Specialist	TBA
Other Technical Specialists	Randy McKinley – EROS data center

II. Resource Advisors: (Note: Resource Advisors are individuals who assisted the burned area emergency response team with the preparation of the plan. See Part H for a full list of agencies and individuals who were consulted or otherwise contributed to the development of the plan.

Name	Affiliation
Randy Brown	Fishery Biologist, Fairbanks Resource Office, FWS
John Trawicki	Hydrologist, Water Resources Division, Alaska RO, FWS
Deborah Corbett	Archeologist, Alaska RO, FWS
Carl Key	Research Biologist, USGS-BRD, West Glacier, MT
Keith Mueller	Contaminants Specialist, Fairbanks Resource Office, FWS
Kevin Keeler	Historic Iditarod Trail Coordinator, Alaska State Office, BLM

PART E - SUMMARY OF ACTIVITIES AND COSTS

The summary of activities and cost table below identifies emergency stabilization costs proposed for funding from subactivity 9142 funding sources.

Emergency Stabilization Activities Cost Summary Table – Innoko NWR 2005 Fires

Spec #	Title	Unit	Unit Cost	# of Units	Work Agent	Cost
1	Cultural Resources Assessment	Site	$ 7,811.00	1	FA & SC	$15,258.00
2	Invasive Plant Species Assessment	Acre	$ 15.35	500	FA, SC, & V	$21,026.00
3	Plan Development and Assessment	Acre	$.04	303,120 acres	FA	$17,695.00
					TOTAL COST	$ 53,979.00

Work Agent: CA=Coop Agreement, FA=Force Account, G=Grantee, P=Permitee, SC=Service Contract, TSP=Timber Sales Purchaser, V=Volunteer

PART F – INDIVIDUAL SPECIFICATIONS

TREATMENT/ ACTIVITY NAME	Cultural Resources Site Stabilization and Protection	**PART E SPECIFICATION #**	1
NFPORS TREATMENT CATEGORY*	Heritage Resources	**FISCAL YEAR(S) (list each year):**	2006
NFPORS TREATMENT TYPE *	Site Stabilization	**WUI? Y / N**	
IMPACTED COMMUNITIES AT RISK	None	**IMPACTED T&E SPECIES**	None

* See NFPORS Restoration & Rehabilitation module.

WORK TO BE DONE:

Number and Describe Each Task:

A. General Description: Implement emergency stabilization measures on protect known cultural resources within the burned area to minimize cultural resource degradation until additional long-term cultural resource management strategies can be developed and implemented.

B. Location/(Suitable) Sites: The gold rush era site of Dishkakat within (or adjacent to) the Dishkakat fire.

C. Design/Construction Specifications: Conduct emergency stabilization measures on known sites during spring/summer 2006.

1. In consultation with the Regional 7 Historic Preservation Officer (RHPO) review known cultural site documentation (e.g., refuge Cultural Resource Management Plan; refuge, RHPO and THPO and SHPO cultural resource records including systematic inventory findings and 36 CFR 800 compliance determination; and all Cultural Resource Management Reports) to determine site locations, identified cultural resource management standards, wildfire problems possibly affecting particular resource(s) and those specific emergency stabilization measures that can alleviate or minimize degradation until additional long-term cultural resource management strategies can be developed and implemented. In addition develop NHPA appropriate site inspection protocols. Also in consultation with the RHPO and using information from the aerial assessment develop NHPA appropriate emergency stabilization treatments for each site identified as needing stabilization.
2. Acquire resources needed to address the likely cultural resource issues and anticipated emergency site stabilization actions.
3. Visit each known site identified as needing an emergency stabilization treatment and implement the RHPO approved treatment.
4. Document emergency stabilization measures taken and additional unanticipated emergency stabilization actions needed.
5. Follow-up on any unanticipated emergency stabilization actions no later than 1 year following wildfire containment (requires a plan amendment).

D. Purpose of Treatment Specifications: Stabilize known cultural resource sites.

E. Treatment Effectiveness Monitoring Proposed: All treated sites will be will be monitored annually through FY2009 or until additional long-term cultural resource management strategies can be developed and

implemented (which ever is sooner) to ensure that treatments are still in place and effective. Monitoring results are reported annually and summarized in NFPORS.

ANNUALLABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	**COST / ITEM**
GS-12 Archaeologist @ $48/hour X 80 hours X 1 Fiscal Year	$ 3,840
GS-07 Biological Technician @ $19.40/hour X 8 hours X 1 Fiscal Year	$ 155
GS-12 Pilot @ $51/hour X 3 hours X 1 Fiscal Year	$ 153
TOTAL PERSONNEL SERVICE COST	$ 4,148
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	**COST / ITEM**
OAS charges for C-185 @ $145/hour X 3 hours X 1 Fiscal Year	$ 435
Kodak P850 5 mp digital camera @ $400 X 2 X 1 Fiscal Year	$ 800
Accessories for Kodak P850 digital camera @ $315 X 2 X 1 Fiscal Year	$ 630
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	$ 1,865
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	**COST / ITEM**
AvGas fuel @ $4.50/gal X 54 gal X 1 Fiscal Year	$ 243
Miscellaneous office and GIS supplies @ $250 X 1 Fiscal Year	$ 250
Miscellaneous field supplies @ $250 X 1 Fiscal Year	$ 250
TOTAL MATERIALS AND SUPPLY COST	$ 743
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	**COST / ITEM**
Commercial transport between Anchorage and McGrath @ $385/round trip X 1 X 1 Fiscal Year	$ 385
Travel per diem @ $135/day X 2 days X 1 Fiscal Year	$ 270
Field camp food @ $200 X 1 Fiscal Year	$ 200
Field per diem @ $3/day X 3 days X 2 X 1 Fiscal Year	$ 18
TOTAL TRAVEL COST	$ 873
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	**COST / ITEM**
TOTAL CONTRACT COST	$ 0

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY-06	01/01/2006	10/01/2006	F & S	sites	$381.45/acre	est. 20	$ 7,629
FY-07	01/01/2006	10/01/2006	F & S	sites	$381.45/acre	est. 20	$ 7,629
FY-08							

FY-09	
TOTAL	$ 7,629

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	C
2. Documented cost figures from similar project work obtained from local agency sources.	E, M, C
3. Estimate supported by cost guides from independent sources or other federal agencies	T
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-Reference Location within the Accomplishment Report.

TOTAL COST BY JURSIDICTION

JURISDICTION	UNITS TREATED	COST
FWS	est 20 acres	$ 7,629
	TOTAL COST	$ 7,629

TREATMENT/ ACTIVITY NAME	Invasive Species Control	**PART E SPECIFICATION #**	2
NFPORS TREATMENT CATEGORY*	Invasive Species	**FISCAL YEAR(S) (list each year):**	2006
NFPORS TREATMENT TYPE *	Hand Treatment	**WUI? Y / N**	N
IMPACTED COMMUNITIES AT RISK	None	**IMPACTED T&E SPECIES**	None

* See NFPORS Restoration & Rehabilitation module.

WORK TO BE DONE:

A. General Description: Implement emergency stabilization measures to control and eradicate invasive species where ground wildfire suppression actions were taken and in the vicinity of public use and access areas.

This work will utilize volunteers for the site visits. These volunteers will already be on Innoko NWR conducting non-native plant inventories under another project.

B. Location/(Suitable) Sites: Ground wildfire suppression area and public use and access areas in the 2005 burned areas. Including: the Yukon River corridor and Papa Willie Creek corridor portions of the Papa Willie Creek Fire, the Iditarod River corridor portion of the Chick Mountain Fire, and the Dishkakat Fire.

C. Design/Construction Specifications:
1. Utilize 2005 wildfire suppression, first order fire effects monitoring records and information in the aerial assessment, to locate priority assessment and treatment areas (i.e., areas were human use has potentially introduced nonnative vegetation).
2. Identify likely invasive species issues and cost effective eradication treatments (chemical, cultural, biological).
3. Acquire resources needed to address the likely invasive species issues and anticipated control actions (e.g., pesticide use permits, FWS approved herbicides, mechanical control equipment, etc.).
4. Plan to visit each identified site at the most ecologically appropriate time (i.e., when the anticipated invasive species is easiest to detect and control).
5. Travel to, inspect and implement the appropriate invasive species control treatments at least once in FY2006.
6. Document control actions taken and additional control actions needed. A report will be prepared for all sites searched and findings will be incorporated into the Alaska Exotic Plant Information Clearinghouse database.
7. Follow-up on any additional actions no later than 1 year following wildfire containment.

D. Purpose of Treatment Specifications: Control and eradicate invasive species within the burned area within the initial year after wildfire containment.

E. Treatment Effectiveness Monitoring Proposed: All treated area will be will be monitored (at least on the ground visits at the most ecologically appropriate time) through FY2008to ensure that treatments are still in place and effective or additional burned area rehabilitation invasive species control treatments are needed. Monitoring results are reported annually and summarized in NFPORS.

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	**COST / ITEM**
GS-12 Wildlife Biologist @ $48/hour X 40 hours X 1 Fiscal Year	$ 1,920
GS-12 Pilot @ $51/hour X 8 hours X 1 Fiscal Year	$ 408
TOTAL PERSONNEL SERVICE COST	$ 2,328
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	**COST / ITEM**
OAS charges for C-185 @ $145/hour X 8 hours X 1 Fiscal Year	$ 1,160
Trimbel GeoXT pocket PC/GPS @ $4,200 X 2 X 1 Fiscal Year	$ 8,200
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	$ 9,360
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	**COST / ITEM**
AvGas fuel @ $4.50/gal X 144 gal X 1 Fiscal Year	$ 648
Jet-A fuel @ $4.50/gal X 120 gal X 1 Fiscal Year	$ 540
Miscellaneous office and GIS supplies @ $500 X 1 Fiscal Year	$ 500
Miscellaneous field supplies @ $500 X 1 Fiscal Year	$ 500
TOTAL MATERIALS AND SUPPLY COST	$ 2,188
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	**COST / ITEM**
Field per diem @ $3/day X 5 days X 2 volunteers X 1 Fiscal Year	$ 30
Field camp food @ $500 X 1 Fiscal Year	$ 500
TOTAL TRAVEL COST	$ 530
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	**COST / ITEM**
Helicopter time @ $3,120/day X 1 day X 1 Fiscal Year	$ 3,120
Barge transport of fuel to field camp (note: this 1-time cost covers the portion of the $17,500 barge fee for all the specifications that require helicopter and fixed-wing aviation fuel) X 1 Fiscal Year	$ 3,500
TOTAL CONTRACT COST	$ 6,620

SPECIFICATION COST SUMMARY

FISCAL YEAR	**PLANNED INITIATION**	**PLANNED COMPLETION**	**WORK AGENT**	**UNIT S**	**UNIT COST**	**PLANNED ACCOMPLISHME**	**PLANNED COST**

	DATE (M/D/YYYY)	DATE (M/D/YYYY)				NTS	
FY-06	06/01/2006	09/01/2006	F, S, V	acre	$ 42.05	500 acres	$21,026
FY-07							
FY-08							
FY-09							
						TOTAL	$ 21,026

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	E, M, C
3. Estimate supported by cost guides from independent sources or other federal agencies	T
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-Reference Location within the Accomplishment Report.

TOTAL COST BY JURSIDICTION

JURISDICTION	UNITS TREATED	COST
FWS	500 acres	$ 21,026
	TOTAL COST	$ 21,026.00

TREATMENT/ACTIVITY NAME	Plan Development and Assessment	**PART E SPECIFICATION #**	3
NFPORS TREATMENT CATEGORY*	Planning	**FISCAL YEAR(S) (list each year):**	2006
NFPORS TREATMENT TYPE *	Prescription and Design	**WUI? Y / N**	
IMPACTED COMMUNITIES AT RISK	None	**IMPACTED T&E SPECIES**	None

WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:

A. General Description: Gather necessary information concerning resources at risk (i.e., cultural resource sites, invasive species, and FWS minor facilities [trails, campgrounds, etc.]) to develop the necessary Burned Area Emergency Response and Burned Area Rehabilitation Plans for the 2005 fires.

B. Location/(Suitable) Sites: 2005 burned areas with anticipated emergency stabilization or burned area rehabilitation issues.

C. Design/Construction Specifications: (Note: many of these costs have been incorporated into the project specifications.)

1. Review refuge land/fire management plans (i.e., CCP, HMP, FMP, etc.), 2005 wildfire suppression and first order fire effects monitoring records relative to the above resources at risk in the burned areas. Based on the approved land management plans, identify what constitutes "fire damage", to what resource management standards will the fire damage need to be addressed, and are there administrative constraints that need to be addressed. Specifically:
    - What can realistically be done to each known cultural resource sites to minimize further degradation until additional long-term cultural resource management strategies can be developed and implemented?
    - What are the refuge winter trails and native use campground public use safety standards?
    - What is the approved refuge trail marking method.
    - What are the anticipated invasive species issues and where are the most likely locations for invasive species establishment? What invasive species control method are approved (i.e., approved pesticides).
3. Locate (map) resources at risk.
    - Known cultural resource sites.
    - High priority invasive species invasion sites in the burned area (e.g., public access points, winter trails, ground suppression locations, etc.).
    - FWS minor facilities (e.g., trails, campgrounds, fish monitoring sites, etc.).
4. Aerially assess each specific refuge resource at risk to preliminary determine whether any treatment is needed and, if so, the type and degree of treatment needed. Specifically identify:
    - Fire damage to known cultural resource sites containing combustible materials. Unstable culture resource sites or as site exposed by the wildfire and susceptible to erosion or looting.
    - Fire damage to refuge facilities that will need to be repaired or replaced.
    - Visible location of winter trails and the possible need for trail markers.
    - Tree mortality along winter trails creating unacceptable (based on refuge approved land management

plan standards) public safety standards.
- Fire damage to winter trails or native use campgrounds requiring rehabilitation to refuge approved land management plan standards.
- Significant ground disturbance (high burn severity or suppression actions) creating the potential for invasive plant establishment.

5. Record findings for plan preparation..
6. Prepare Burned Area Emergency Response and/or Burned Area Rehabilitation Plans to address each individual resource treatment issue.

D. Purpose of Specification: Develop specific treatment specifications

E. Treatment Effectiveness Monitoring Proposed: None

LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item):	**COST / ITEM**
GS-13 Refuge Manager @ $57/hour X 8 hours X 1 Fiscal Year	$ 456
GS-12 Wildlife Biologist/GIS Specialist @ $48/hour X 140 hours X 1 Fiscal Year	$ 6,720
GS-12 Fire Ecologist @ $48/hour X 20 hours X 1 Fiscal Year	$ 960
GS-11 Fire Management Officer @$40/hour X 40 hours X 1 fiscal year (salary covered through 9131 fund)	$ 0
GS-12 Pilot @ $51/hour X 24 hours X 1 Fiscal Year	$ 1,224
TOTAL PERSONNEL SERVICE COST	$ 5,040
EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.	**COST / ITEM**
OAS charges for C-185 @ $145/hour X 24 hours X 1 Fiscal Year	$ 3,480
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	$ 3,480
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):	**COST / ITEM**
Miscellaneous office and GIS supplies @ $300 X 1 Fiscal Year	$ 300
AvGas fuel @ $4.50/gal X 430 gal X 1 Fiscal Year	$ 1,935
TOTAL MATERIALS AND SUPPLY COST	$ 2,235
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):	**COST / ITEM**
Commercial transport between McGrath and Anchorage @ $365/round trip X 1 X 1 Fiscal Year	$ 365
Travel per diem @ 176/day X 5 days (travel to Anchorage) X 1 Fiscal Year	$ 880
Commercial transport between Galena and McGrath @ $700/round trip X 1 X 1 Fiscal Year	$ 700
Travel per diem @ $135/day X 5 days (travel to McGrath) X 1 Fiscal Year	$ 675
TOTAL TRAVEL COST	$ 2,620
CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):	**COST / ITEM**

TOTAL CONTRACT COST	$ 0

SPECIFICATION COST SUMMARY

FISCAL YEAR	PLANNED INITIATION DATE (M/D/YYYY)	PLANNED COMPLETION DATE (M/D/YYYY)	WORK AGENT	UNITS	UNIT COST	PLANNED ACCOMPLISHMENTS	PLANNED COST
FY06	03/21/2006	06/21/2006	F	acres	$.06	303,120 acres	$17,695
						TOTAL	$17,695

Work Agent: C=Coop Agreement, F=Force Account, G=Grantee, P=Permittees, S=Service Contract, T=Timber Sales Purchaser, V=Volunteer

SOURCE OF COST ESTIMATE

1.	Estimate obtained from 2-3 independent contractual sources.	
2.	Documented cost figures from similar project work obtained from local agency sources.	
3.	Estimate supported by cost guides from independent sources or other federal agencies	T
4.	Estimates based upon government wage rates and material cost.	P
5.	No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-Reference Location within the Accomplishment Report.

TOTAL COST BY JURSIDICTION

JURISDICTION	UNITS TREATED	COST
FWS	303,120 acres	$ 17,695
	TOTAL COST	$ 17,695

PART G - POST-EMERGENCY STABILIZATION REQUIREMENTS

Post-emergency stabilization, implementation, operation, maintenance, monitoring, and evaluation actions after three years from the control of the fire to ensure the effectiveness of initial investments will be identified in an amendment to this initial submission after assessments have been completed. Estimated annual costs and funding sources will be indicated.

PART H - CONSULTATIONS

U.S. Fish and Wildlife Service
- Jeff Adams, Fishery Biologist
- Randy Brown, Fishery Biologist
- Deborah Corbett, Archeologist
- Keith Mueller, Contaminants Specialist
- John Trawicki, Hydrologist

Bureau of Land Management
- Randi Jandt, Alaska Fire Service, Fire Ecologist
- Kevin Keeler, Historic Iditarod Trail Coordinator

US Geological Survey, Biological Resources Division
- Carl Key, Research Biologist

Shageluk Traditional Council
Grayling Traditional Council
Anvik Traditional Council

APPENDIX I - BURNED AREA ASSESSMENT REPORTS

The fires on the Innoko Refuge continued to burn through September and were inaccessible for refuge personnel to conduct assessments before snowfall occurred. As a result, this section includes outlines of assessment reports expected to be completed through the specifications described in this plan. Preliminary information has been incorporated where it was available.

- *Wildlife Resources Preliminary Assessment*
- *Cultural Resources Damage Assessment Report*
- *Vegetation Damage Assessment Report*

INNOKO NATIONAL WILDLIFE REFUGE 2005 FIRES

WILDLIFE AND FISHERIES RESOURCES DAMAGE ASSESSMENT REPORT

I. Objectives

- Assess effects of fires on wildlife, with an emphasis on moose (*Alces alces*), black bear (*Ursus americanus*), furbearers, and waterfowl.

II. Issues

- Adverse effects to critical moose winter spring calving habitats
- Adverse effects to black bears from changes in summer habitats and associated redistribution of vertebrate prey items.
- Adverse effects to critical furbearer habitat
- Adverse effects to waterfowl nesting and molting habitat.
- Adverse effects to fish habitat resulting from wildfires.

III. Observations

A. Background Information

The purpose of this Burned Area Emergency Stabilization & Rehabilitation Plan (BAER) wildlife assessment is to determine and document the effects of the 2005 wildfires may have on wildlife through habitat alterations or displacement due to loss of habitat, especially as it relates to moose, black bear, furbearers, and waterfowl.

Wildlife Habitat

Fires result in changes in vegetation that influence wildlife distribution and site utilization. Patchy fires created by varying severity produce a mixture of habitat types that meet the needs of a wide variety of wildlife. Small mammals, such as taiga voles (*Microtus xanthognathus*) often flourish after fires, creating large colonies in the partially burned duff and feeding on the young herbaceous vegetation of light to moderately burned areas (Swanson 1997). In one study, snowshoe hares (*Lepus americanus*) utilized the shrub and dense sapling stages that follow intense burns (Keith and Surrendi 1971). The abundance of these small herbivores provides increased food for a wide range of predators ranging from owls and hawks to fox (*Vulpes vulpes*) and martin (*Martes americana*). Fire killed trees provide an insect food source for woodpeckers and nesting habitat for a wide variety of hole-nesting birds. Some species of willows (*Salix* spp.), favored by moose for winter browse, appear to be much more productive 3-4 years following a fire compared to pre-burn productivity (Wolff 1978).

Effects of Wildland Fire on Moose

On a landscape level basis, winter abundance of female moose was found to be positively related to the presence of 11-30 year old fires near rivers in interior Alaska (Maier et al. 2004). Conversely, radio transmittered moose on Innoko NWR did not select burned over areas for

summer use until those burns reached an age of 30 years (Innoko National Wildlife Refuge, unpublished data).

Most moose populations in interior Alaska, where wildland fires are the primary disturbance factor affecting the boreal forest, naturally occur at low densities and may be limited by predation. In these situations, improved forage quality or quantity resulting from fire may have no discernible effect on moose abundance. However, human decisions that limit the renewing influence of fire disturbance on the landscape reduce the potential for future population increase when the limiting effect of predation diminishes either naturally or because of management efforts to reduce predation. Additionally, burned areas may change predation rates. For example, wolves are not able to run through downed debris as easily as the longer-legged moose and black bears tend to avoid large open areas, preferring to remain in the relative safety of the forest. Research is needed to ascertain whether these suspected influences actually have a significant population level effect.

Fires generally benefit moose because the herbaceous plants, shrubs and saplings, on which moose feed, become more abundant in post-fire seral communities. The onset and duration of this benefit depends largely on burn severity. In low burn severity areas, top-killed willows, aspen, and birch, quickly grow new shoots from either their root crowns or roots, depending on the species. Each plant can produce many new stems, but distribution and abundance is limited by the pre-burn distribution of these species in the stand.

In more severely burned areas, exposed soil provides a suitable substrate for plants to re-establish through seeding. Thus, many more species are able to establish than in more lightly burned areas where new growth is limited to sprouting, and typically a much higher stem density of shrubs and saplings results. Revegetation of severely burned areas is slower to be realized but lasts longer and carries potential for substantial type change from the preburn vegetation.

Habitat for moose is generally improved for about 30 years following fire depending on the severity of the burn and other factors affecting plant succession Moose primarily benefit from an increase in forage quantity, not quality. Forage quality and palatability is greatly improved initially, but declines quickly after the first growing season.

Effects of Wildland Fire on Furbearers

Keith and Surrendi (1971) found that subadult snowshoe hares were displaced from their study area the summer following an intense spring fire. Two summers following the fire, Keith and Surrendi (1971) found that the snowshoe hare population had increased over the previous summer by 63%, but was still below the population highs recorded 5 years prior to the fire.

Effects of Wildland Fire on Fisheries

Short-term increases in stream turbidity, siltation, and temperature from loss of vegetative canopy cover, as well as changes in water pH can be expected to occur to fish habitat (R.J. Brown, Fishery Biologist, US Fish and Wildlife Service, Personal Communication, 2005; J. Adams, Supervisory Fishery Biologist, US Fish and Wildlife Service, Personal Communication,

2005). Sight feeding fish such as grayling (*Thymallus arcticus*), dolly varden (*Salvelinus malma*), and rainbow trout (*Oncorhynchus mykiss*) have been known to leave streams where turbidity was excessive (R.J. Brown, Fishery Biologist, US Fish and Wildlife Service, Personal Communication, 2005). Spawning gravels, used by a variety of species, could become unavailable should excessive siltation result.

These fires will have short and long-term effects on stream ecosystems and water quality (Spencer et al. 1991, Minshall et al. 2001). Little is known in Alaska about the cumulative ecological impacts of fires. Biological oxygen demand may increase in streams in the burned areas, and physical habitat changes may be both positive and negative. One of the last studies in Alaska on wildfire impacts on water quality was done in the late 1960's after the 1966 Chicken Fire (Lotspeich et al. 1970). Long range studies of water quality, benthic community changes, and physical habitat alterations were recommended by Lotspeich et al. (1970), but never conducted. Such studies would provide a better understanding of fire effects on streams in the taiga of Alaska, and provide important information to resource managers making decisions about prescribed burns or other restoration activities.

B. References

Keith, L.B., and D.C. Surrendi. 1971. Effects of fire on a snowshoe hare population. Journal of Wildlife Management 35:16-26.

Maier, J.A.K., J.M. Ver Hoef, A.D. McGuire, R.T. Bowyer, L. Saperstein, and H.A. Maier. 2004. Distribution and density of moose in relation to landscape characteristics: effects of scale. Final Report for AKCFWRU Research Work Order 108. 28 pp.

Swanson, S.A. 1997. Yellow-cheeked voles and fire along the upper Kobuk River Valley, Alaska. Arctic Research of the United States 11:45-49.

Wolff, J.O. 1978. Burning and browsing effects on willow growth in interior Alaska. Journal of Wildlife Management 42:135-140.

INNOKO NATIONAL WILDLIFE REFUGE 2005 FIRES

CULTURAL RESOURCES DAMAGE ASSESSMENT REPORT

I. Objectives

- Assess effects of fires on Gold Rush era site of Dishkakat, the historic Iditarod Trail, seasonal use trails, and subsistence activities.

II. Issues

- Loss of historic structures and artifacts, as well as exposure of additional artifacts at Dishkakat.
- Exposure of artifacts along the historic Iditarod Trail and loss of landmarks to locate the trail in winter.
- Reduction of ability of subsistence users to obtain resources.

III. Observations

A. Background Information

B. Reconnaissance Methods

C. Findings

IV. Recommendations

A. Management (specification related)

B. Specification Monitoring (specification related)

C. Management (non-specification related)

V. Consultations

VI. References

APPENDIX II - ENVIRONMENTAL COMPLIANCE

U.S. FISH AND WILDLIFE SERVICE, REGION 7
STATEMENT OF COMPLIANCE

Project Name: Burned Area Emergency Stablization Plan. Innoko National Wildlife Refuge.

Location: Papa Willie Creek Fire, Chick Mountain Fire, Little Mud River #1 Fire, Hammer North Fire, Hammer Creek #1 Fire, Hammer Creek #2 Fire, Dishkakat Fire, Cabin Creek Fire, and Yetna Fire.

Description: The U. S. Fish and Wildlife Service proposes to conduct remote sensing, aerial observation flights, and limited ground investigations to determine the extent and nature of impacts to critical wildlife resources, plant communities, subsistence resources, seasonal use trails, historic sites and trails, detect new occurrences of noxious plant species, and propose more intensive emergency stabilization activities where necessary as a result of fires occurring on Innoko NWR in 2005.

National Environmental Policy Act: The Service has determined that implementation of the specifications of the plan for the proposed project qualifies as a categorical exclusion under 516 DM 6, appendix 1, C (4), to the National Environmental Policy Act of 1969 (see attached Qualification for Categorical Exclusion).

Endangered Species Act: The proposed action will not affect listed, proposed, or candidate species or adversely modify critical habitat.

Coastal Zone Management Act, Section 307: The Alaska Coastal Management Program (ACMP) has concurred with National Weather Service's negative determination, and that a ACMP review is not required for this project.

Telecommunications Act of 1996, Section 704: Not applicable.

Coastal Barrier Resources Act, Section 6: Not applicable.

Subsistence Evaluation and Finding, Section 810 - Alaska Lands Act: Subsistence uses of the area will not be impacted by the proposed action. Subsistence user access and availability of subsistence resources will not be affected by the proposed action and competition for resources will be unchanged.

National Historic Preservation Act, Section 106: The Service's Regional Archaeologist has determined that this action will have no effect on historic properties following regulations at 36 CFR 800.5(b).

Executive Order 11988 - Floodplain Management: Not applicable.

Executive Order 11990 - Protection of Wetlands: No wetlands areas will be affected by the proposed project.

Executive Order 12372 - Inter-governmental Review of Federal Programs: Inter-governmental review was accomplished during formal review by the State of Alaska through the Alaska Coastal Management Program.

Refuge Compatibility Determination: This use has been determined to be compatible with purposes for which the Innoko National Wildlife Refuge was established (see attached compatibility determination).

Public Participation: Due to the lack of potential adverse effects, and lack of controversy surrounding the proposed project, public participation activity was limited to that associated with the refuge compatibility determination, including posting a public notice and draft compatibility determination on the Service's compatibility web site, and at the refuge headquarters.

Prepared by: _____ Date: 1 December 2005
Wildlife Biologist

Reviewed by: _____ Date: 1-13-2006

Approved by: _____ Date: 1 December 2005
Refuge Manager

Attachments

COMPATABILITY DETERMINATION ADVANCE PLANNING SHEET

Refuge: Innoko NWR, McGrath Alaska	Date of the Last CD that Evaluated the Primary Use: 1987	
Title of CD:	Research	
Primary Use:	Research	Any Concerns with Compatibility? □ Yes X No
NEPA Requirements Addressed In:	X Original CCP □ Revised CCP □ Separate EIS □ Categorical Exemption □ Step-Down Plan(Title): □ Other(List):	
Level of Controversy:	□ Significant X Moderate □ Low	

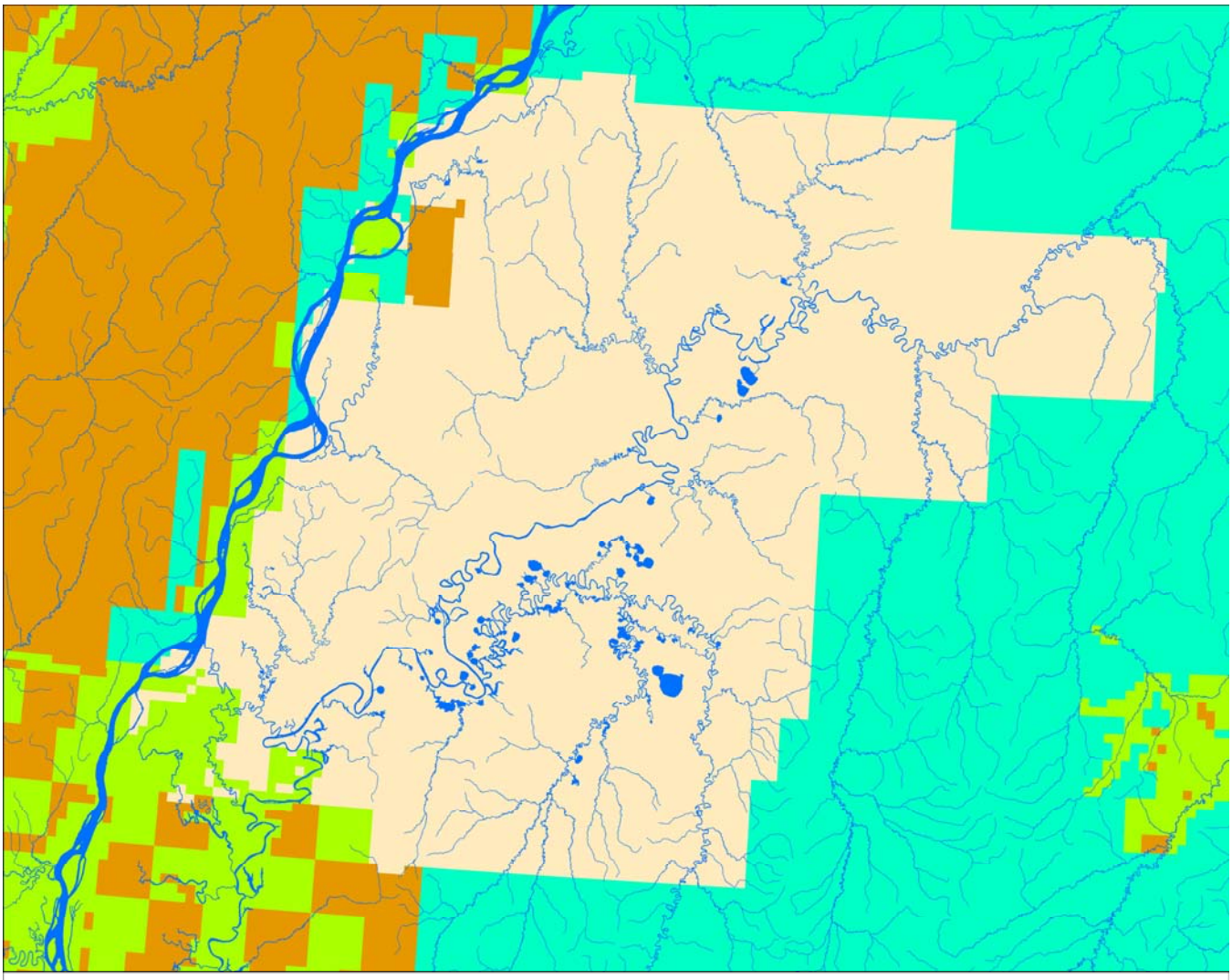
Supporting Uses That Will Be Addressed in this CD

Mark with "✓" each of the Supporting Uses you think the analysis may find Compatible
Mark with "X" each of the Supporting Uses you think the analysis may find Incompatible
Circle each use that has a commercial component.
Delete the uses that do not apply if you complete this form electronically.

□ Agriculture, aquaculture, or silviculture (other)	□ Geocaching	□ Photography, video, filming, etc.
□ Amateur radio	□ Geothermal energy	□ Photography…etc. (news/educational)
□ Amateur radio (DXpeditions)	□ Grazing	□ Picnicking
□ Amateur radio (HF Pack)	□ Haying or ensilage	□ Plant control (other)
□ Animal control (other)	□ Hazardous fuels reduction	✓ Plant gathering
□ Aquaculture	✓ Helicopters	□ Predator management
□ Bee keeping	□ Hiking and	□ Research
□ Bicycling	□ Horseback riding	□ Residential (other)
□ Boating (airboats and hovercraft)	Hunting (big game)	□ Rights-of-way (other)
□ Boating (electric and wind-driven)	□ Hunting (big game - guiding and outfitting)	□ Rights-of-way (road)
✓ Boating (human-powered)	□ Hunting (other - guiding or outfitting)	□ Rights-of-way (trail)
✓ Boating (motorized)	□ Hunting (other migratory birds)	□ Rights-of-way (utility)
□ Boating (other)	□ Hunting (other)	□ Rock collecting
✓ Cabins	□ Hunting (special events)	□ Sale of animals
✓ Camping	Hunting (subsistence)	□ Saltmaking
□ Caving. Cave exploration	□ Hunting (tournament)	□ Scientific collecting
□ Cemetery	□ Hunting (upland game - guiding or outfitting)	□ Sewage discharge
□ Commercial/industrial (other)	Hunting (upland game)	□ Skating (ice)
□ Competitive sporting event	□ Hunting (waterfowl - guiding or outfitting)	□ Skating (other)
□ Concessions	Hunting (waterfowl)	□ Snorkeling or scuba diving
□ Cross-country	□ Hydroelectric energy	Snowmobiles
□ Disease management	□ Interpretation (By Others)	□ Snowshoeing
Dog sledding & Ski Jouring	□ Interpretation (By NWRS)	□ Solar energy
□ Dog training, including field trials	□ Jogging and walking	□ Subsistence (other)
□ Downhill skiing or snow boarding	□ Leeching	□ Surveys. Scientific inventory or monitoring
□ Dredge or fill	□ Military activities (other)	□ Swimming and beach use
□ Energy (other)	□ Military facilities	□ Technical climbing
✓ Environmental Ed (By Others-students)	□ Military training	□ Tent Platform
✓ Environmental Ed (other)	□ Mineral exploration	Transport (air & boat taxi)
□ Envir ed (teaching students)	□ Mining	Trapping
□ Envir ed (teaching teachers)	□ Moorage	Trapping (subsistence
□ Farming	□ Mosquito management	✓ Tree harvest (firewood)
□ Fishery enhancement	□ Natural Res. collecting (other)	□ Tree harvesting (Christmas)
□ Fishing (commercial)	□ Natural resource dev. (other)	□ Tree harvesting (other)
✓ Fishing (general)	□ Navigation	□ Uses (other)
□ Fishing (guiding and outfitting)	□ Off-road vehicles (other)	□ Water extraction
□ Fishing (other)	□ Oil or gas development	□ Water skiing.
□ Fishing (special events)	□ Oil or gas exploration	□ Weed management
□ Fishing (subsistence)	□ Outdoor recreation (other)	✓ Wildlife observation
□ Fishing (tournament	□ Pack animals	□ Wildlife obser. (Commercial)
✓ Fixed-wing aircraft	□ Personal watercraft	□ Wind energy
□ Flowage easements	□ Pets	□ Other (Describe):
□ Fossil collecting	✓ Photography (wildlife)	
□ Gathering (subsistence)		

APPENDIX III - MAPS

- **Innoko NWR**
- **1986 Land Cover**
- **Land Status**



Legend

- Innoko NWR
- Bureau of Land Management
- Private
- State
- Rivers/Lakes

0 4 8 16 24 32 40 Miles

N

Innoko National Wildlife Refuge
Land Ownership Status