Appendices A1-A2: Special Uses Categorical Exclusions

Appendix A1 – Previously Implemented Actions

Table 1. Projects Relevant to CE (d)(11)	
Project Name and Location	**Decision Notice Date**
Transitional Special Uses Permit *Shoshone NF, Washakie and Wind River RDs*	6/11/2014
Casa Loma Recreation Residence Permit Renewal *Cibola NF, Sandia RD*	6/19/2012

Table 2. Projects Relevant to CE (d)(12)	
Project Name and Location	**Decision Notice Date**
Projects with Survey Response	
Polka Dot Motorcycle Club, 49er Enduro Special Use Permit *Eldorado NF, Placerville RD*	2/3/2012
Cle Elum Outfitter and Guide EA *Okanogan-Wenatchee NF, Cle Elum RD*	9/26/2013
Other Projects Reviewed	
Lake Tahoe Adventures *Humboldt-Toiyabe NF, Carson RD*	2/02/2012
Apache-Sitgreaves National Forests Outfitter/Guide Permit Authorization Project *Apache-Sitgreaves NFs*	8/25/2016
Brundage Mountain Resort Cat-Ski Outfitter and Guide Permit Reissuance *Payette NF, New Meadows RD*	10/1/2012

Table 2. Projects Relevant to CE (d)(12)	
Project Name and Location	**Decision Notice Date**
Brundage Mountain Resort Cat-Ski Outfitter and Guide Permit Boundary Expansion *Payette NF*	7/14/2016
South Big Bear Lake Trails & Team Big Bear Mountain Bike Race Permit *San Bernardino NF, Mountaintop RD*	5/15/2012
Clark Fork River Outfitter Special Use Permits *Lolo NF, Plains/Thompson Falls RD*	6/17/2013
Dillon Ranger District Outfitter Guides Additional Use *White River NF, Dillon RD*	11/14/2014
Lake Superior Performance Rally *Ottawa NF, Kenton RD*	7/2/2014
Nelson Bike Shuttle Special Use Permit Request *Lolo NF, Superior RD*	10/20/2014
Transitional Special Uses Permit Project *Shoshone NF, All Units*	6/11/2014

Table 3. Projects Relevant to CE (e)(3)		
Project Name and Location	**Decision Notice Date**	**Project Acres**
<u>Projects with Survey Response</u>		
Idaho Power Company Line 328 Project *Boise NF, Cascade and Emmett RDs*	4/15/2013	329
Minnesota Department of Transportation Allied Radio Matrix for Emergency Response *Superior NF, all units*	2/21/2013	4

Table 3. Projects Relevant to CE (e)(3)		
Project Name and Location	**Decision Notice Date**	**Project Acres**
Bicknell Culinary Water System Improvement Project *Fishlake NF, Fremont River RD*	10/18/2012	2
Wood Bison Project *Chugach NF, Glacier RD*	1/29/2013	138
Questar Main Line 3, Weber Canyon Replacement *Uinta-Wasatch-Cache NF, Salt Lake RD*	9/25/2013	42
Horsethief Canyon Landfill Closure *Bridger-Teton NF, Jackson RD*	12/16/2013	18
Hunters Creek Road Right-of-Way Conveyance *Hoosier NF, Brownstown RD*	5/11/2015	14
Mountain Line Replacement Project *Wallowa-Whitman NF, Whitman RD*	7/20/2016	78
Smithers RAPRA *Hiawatha NF, all units*	7/9/2015	147
Other Projects Reviewed		
North Fork Lake Dam SUP *Tongass NF, Craig RD*	5/22/2013	39
Triangle Mountain Wireless Communications Facility *Fishlake NF, Richfield RD*	4/27/2012	9
Macks Inn Sewer Expansion *Caribou-Targhee NF, Ashton/Island Park RD*	2/7/2013	50
Recreation Residences Standards and Guidelines and Camp Cherokee Master Plan Approval *Cherokee NF, Ocoee/Hiwassee RD*	9/23/2013	14
CDOT Highway 133 Debris Dump Site and Placita Roadside Landscaping *White River NF, Aspen-Sopris RD*	9/29/2015	9
TPF II East Texas Gathering, LLC - Newfield-Huxley Gas Pipeline Special use Permit *Sabine NF, Angelina/Sabine RD*	9/16/2013	40

Table 3. Projects Relevant to CE (e)(3)		
Project Name and Location	**Decision Notice Date**	**Project Acres**
Battle Creek Canyon Culinary Water Pipeline Project *Uinta-Wasatch-Cache NF, Pleasant Grove RD*	5/12/2016	5
City of Huntsville Sewer Line *Sam Houston NF, Sam Houston NF*	1/16/2013	3
Dry Wash Reservoir and Pipeline Project *Manti-La Sal NF, Moab-Monticello RD*	7/28/2014	28
NoaNet Fiber Optic Cable Permit Issuance *Colville and Okanogan-Wenatchee NFs*	4/13/2012	77
American Transmission Company (ATC) - 6904/6905 Powerline Rebuild *Hiawatha NF, St. Ignace RD*	4/13/2012	147
Ameren Powerline Reconstruction Project *Shawnee NF, Hidden Springs and Mississippi Bluffs RD*	5/20/2015	13
Duke Energy - Hankin Line *Pisgah NF, Grandfather RD*	4/4/2013	26
APS Gray Wolf/Waste Management 12 kV power line *Prescott NF*	7/3/2012	14
Staker Relocation *Uinta-Wasatch-Cache NF, Logan RD*	8/12/2016	10
APS NO1 Youngs to Mormon Lake 69kV Power Line *Coconino NF*	11/7/2014	102
Goldfield Cellular Site *Tonto NF, Mesa RD*	7/22/2013	1
Tusayan East Wireless Communications Sites Project *Kaibab NF, Tusayan RD*	7/9/2016	1
Odell Butte AT&T Communications Facility Construction *Deschutes NF, Crescent RD*	10/17/2012	1
Questar Gas Company Feeder Line 24 Replacement Project *Uinta-Wasatch-Cache NF, Pleasant Grove RD*	7/15/2014	3

Table 3. Projects Relevant to CE (e)(3)		
Project Name and Location	**Decision Notice Date**	**Project Acres**
Energen Resources Corporation Oil and Gas Production Facility Special Use Authorization *Carson NF, Jicarilla RD*	5/18/2015	6
Enbridge Line 5 Pipeline Inspection and Maintenance Project *Hiawatha NF, Rapid River/Manistique RD*	8/14/2013	1
Toms Creek Powerline *Caribou – Targhee NF, Ashton/ Island Park RD*	6/11/2015	1
City & Borough of Juneau Snow Disposal Site analysis *Tongass NF, Juneau RD*	8/22/2012	2
Land Bridge Road, Bridge Relocation Project *Francis Marion and Sumter NFs, Andrew Pickens RD*	6/23/2014	3
Strawberry Ridge Utility Improvement Project *Dixie NF, Cedar City RD*	8/23/2012	5
Town of Payson-Cragin Water Treatment Plant and Pipeline Corridor Project *Tonto NF, Payson RD*	11/2/2011	351
Black Hills Electric Cooperative (BHEC) *Black Hills NF, Mystic RD*	6/21/2013	15
Town of Gypsum - LEDE Reservoir Enlargement *White River NF, East Zone Eagle RD*	4/24/2013	32
Southern Black Hills Water system *Black Hills NF, Hell Canyon RD*	1/27/2012	65
Intermountain Rural Electric (I-REA) Distribution Line *Arapaho and Roosevelt NFs, Clear Creek RD*	7/9/2013	10
Berkeley County Road Improvements and Powerline Relocation *Francis Marion and Sumter NFs*	9/4/2012	7
Otero County Electric Cooperative--Biscuit Hill Transmission Line *Lincoln NF, Smokey Bear RD*	6/5/2013	24
Flying H. Ranch Special Use Permit Request *Lolo NF, Superior RD*	3/1/2013	138

Table 3. Projects Relevant to CE (e)(3)		
Project Name and Location	**Decision Notice Date**	**Project Acres**
Oneok Rockies Midstream, L.L.C. *Dakota Prairie Grasslands, Mckenzie RD*	11/16/2012	24
Scott County Phase III East 80 Rural Water *Ouachita NF, Poteau RD*	7/31/2013	15
Laurel Creek Property Owners Association Access Across National Forest System Lands *NFs in North Carolina*	4/7/2016	2
Special Uses - Dutton Ditch Permit Issuance *San Juan NF, Pagosa RD*	3/5/2014	15
Bend Surface Water Improvement Project *Deschutes NF, Bend/Fort Rock RD*	11/4/2013	121
ROE Zipline; Project name change to Cascade Canopy and Zipline Tours Project *Fremont-Winema NF, Klamath RD*	9/11/2014	76
Columbia Gas Pipeline *George Washington and Jefferson NFs, Eastern Divide RD*	11/22/2013	13
Tibble Fork Dam *Unita-Wasach-Cache NF, Pleasant Grove RD*	3/11/2016	20
SUFCO Special Use Permit Modification *Fishlake NF, Richfield RD*	7/8/2014	19
Bass Lake Water Company Water Treatment Plant Project *Sierra NF, Bass Lake RD*	3/28/2016	2
Gaston-Yellow Dirt Transmission Line *NFs in Alabama, Talladega RD*	9/18/2014	12
Red Butte Cinder Pit Expansion *Deschutes NF, Bend/Fort Rock RD*	4/1/2015	16
Walnut Creek Center for Education and Research and Southwest Experimental Garden Array *Prescott NF, Chino Valley RD*	3/11/2015	10

Table 3. Projects Relevant to CE (e)(3)		
Project Name and Location	**Decision Notice Date**	**Project Acres**
Plains All American Pipeline, L.P. Line 63 Re-Route *Angeles NF, Santa Clara/Mojave Rivers RD*	3/20/2015	19
Atwood Dam Repair Project *Ashley NF, Roosevelt RD*	3/3/2015	160
Town of Mountain Village Waterline Extension Project *Grand Mesa, Uncompahgre and Gunnison NFs, Norwood RD*	4/28/2015	12
Beaver Park Reservoir *Rio Grande NF, Divide RD*	7/28/2015	18
South Central Utah Telephone Association *Dixie NF, Powell RD*	9/22/2015	9
AEP South Bluefield-Wythe 88 kV Transmission Line Rebuild *George Washington and Jefferson National Forest*	09/13/2016	14

Appendix A2 – Professional Staff and Experts

The subject matter experts and professional staff identified below provided input during development of the categorical exclusions presented in the proposed rule and/or were involved in reviewing feedback from public comments and contributing to the final CEs presented in the final rule.

NAME	TITLE	EDUCATION	YRS	AGENCIES	REGION(S)	EXPERTISE
Bruce Higgins	National NEPA Specialist	B.S. Forest Management	30	USFS – NFS	National	Environmental Compliance (NEPA)
Sam Gaugush	National NEPA Specialist	J.D. University Oregon School of Law, B.A. Sociology and Spanish	10	USFS, BLM	National	NEPA, Environmental and Natural Resources Law, Administrative Law
Jonathan Fisher	Recreation Special Uses Manager (at time of Proposed Rule) ; currently District Range	B.A. Anthropology M.S. Resource Management	15	USFS – NFS	National	Recreation, Special Uses

NAME	TITLE	EDUCATION	YRS	AGENCIES	REGION(S)	EXPERTISE
Benjamin Johnson	National Recreation Special Uses Program Lead	M.S. – Environmental Policy and Environmental Justice M.P.P – Public Policy B.A. – Environmental Studies and Spanish	6	USFS – NFS	National	Recreation Special Uses
Sean Wetterberg	National Winter Sports Program Manager	B.S. Forestry	16	USFS – NFS	National	Recreation Special Uses
Reginal Woodruff	Energy Program Manager, Lands	M.A. Political Communication	7	USFS – NFS	National	Lands Program
Elrand Denson	National Lands Special Uses Program Manager	B.S. Marketing, Minor in Forestry	29	USFS – NFS	National	Lands Special Uses
Miriam Mazel	Assistant Director, Lands and Realty Management (No longer with USDA FS)	B.A. Political Science and Journalism M.S. Rangeland Ecosystem Science J.D. Law	25	USFS – NFS NPS, USFWS, State of CO	National	Land Conservation, Land Acquisition, Land Management, Conservation Easements, Non-Recreation Special Uses
Debra Ryon	Special Uses Program Manager (Retired)	B.S. Forest Management	32	USFS – NFS	Region 2	Non-Recreation Special Uses
Mark Lambert	Public Services Staff Officer	B.S. Planning and Resource Management M.S. Environmental Policy	15	USFS – NFS BLM	Region 2	NEPA, Planning, Special Uses
Megan Healy	National NEPA Specialist	B.S – Technical and Scientific Communication M.A. – Environmental and Resource Policy	12	USFS - NFS	National	Environmental Compliance (NEPA)
Tera Little	NEPA Specialist	B.A. Communication	11	USFS - NFS	National, Regions 1, 3, and 4	Environmental Compliance (NEPA)

Appendices B1-B9: Infrastructure Categorical Exclusions CEs (e)(20-24)

Appendix B1 – Previously Implemented Actions – (e)(20)

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Projects with Survey Respondents			
Middle Citico Vegetation Management *Tellico RD*[1] *Cherokee NF*[2]	Environmental Assessment July 2013	DN / FONSI September 12, 2013	Biological Opinion, July 3, 2013; Biological Opinion Terms and Conditions, July 2013
Cave Run Nonmotorized Trails *Cumberland RD* *Daniel Boone NF*	Environmental Assessment September 2013	DN / FONSI September 25, 2013	
Lower Kern Canyon & Greenhorn Mountains OHV Restoration Project *Kern River RD* *Sequoia NF*	Environmental Assessment August 2013	DN / FONSI September 10, 2013	
Welcome Station Trail Connections *Bend-Fort Rock RD* *Deschutes NF*	Environmental Assessment March 2014	DN / FONSI July 29, 2014	
Road/Trail Decommissioning and Seasonal Closure Project *Conasuaga RD* *Chattahoochee-Oconoee NFs*	Environmental Assessment February 2015	DN / FONSI June 12, 2015	
Rennic Stark Project *Ninemile RD* *Lolo NF*	Environmental Assessment November 2012	DN / FONSI March 22, 2013	

[1] Ranger District
[2] National Forest

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Calawah Watershed Road Decommissioning *Pacific RD* *Olympic NF*	Environmental Assessment March 2014	DN / FONSI May 2, 2014	
Lolo First 50 Road Decommissioning *Lochsa RD* *Nez Perce-Clearwater NFs*	Environmental Assessment July 2014	DN / FONSI April 7, 2015	Clearwater National Forests – BMP Audits, 1990-2016
Pack II Decommissioning *Powell RD* *Nez Perce-Clearwater NFs*	Environmental Assessment March 2014	DN / FONSI May 29, 2014	
Other Projects Reviewed			
Buford/New Castle Motorized Trail *West Zone/Rifle RD* *White River NF*	Environmental Assessment June 2012	DN / FONSI June 13, 2012	
Muddy Guard Road Re-route *Powder River RD* *Bighorn NF*	Environmental Assessment May 2012	DN / FONSI May 22, 2012	
Recreation-Turkey Springs Trail Management Plan *Pagosa RD* *San Juan NF*	Environmental Assessment March 2012	DN / FONSI March 16, 2012	Appendix A: Design Criteria and Monitoring Plan
Brokenshire *Almanor RD* *Lassen NF*	Environmental Assessment July 2013	DN / FONSI September 27, 2013	
Phil's Trailhead Project *Bend/Fort Rock RD* *Deschutes NF*	Environmental Assessment April 2012	DN / FONSI April 16, 2012	Appendix A: Resource Protection Measures
Road/Trail Decommissioning and Seasonal Closure Project *Conasauga RD* *Chattahoochee-Oconee NFs*	Environmental Assessment February 2015	DN / FONSI June 12, 2015	
Elkhorn Project *Canyon Lakes RD* *Arapaho and Roosevelt NFs*	Environmental Assessment March 2014	DN / FONSI June 9, 2014	

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Dragon Project *Eagle Lake RD* *Lassen NF*	Environmental Assessment November 2013	DN / FONSI January 24, 2014	Dragon Project: Transportation Report
Wildcat Fuels Reduction and Vegetation Management *Mt. Hough RD* *Plumas NF*	Environmental Assessment November 2015	DN / FONSI August 15, 2016	
Boyden Brook Road Decommission, Watershed Restoration, and Trail Relocation Project *Rochester RD* *Green Mountain and Finger Lakes NFs*	Environmental Assessment April 2015	DN / FONSI June 22, 2015	Appendix A: Mitigation Measures
Redboat Resource Management Project *Bessemer RD* *Ottawa NF*	Environmental Assessment March 2013	DN / FONSI January 2014	

Appendix B2 – Professional Staff and Experts – (e)(20)

NAME	TITLE	EDUCATION	YRS	AGENCIES	REGION(S)	EXPERTISE
Megan Healy	National NEPA Specialist	B.S. Technical and Scientific Communication M.A. Environmental and Resource Policy	12	USFS - NFS	National	Environmental Compliance (NEPA)
Sam Gaugush	National NEPA Specialist	J.D. University Oregon School of Law, B.A. Sociology and Spanish	10	USFS, BLM	National	NEPA, Environmental and Natural Resources Law, Administrative Law

NAME	TITLE	EDUCATION	YRS	AGENCIES	REGION(S)	EXPERTISE
Jaime Schmidt	National Trail Program Manager	B.S. Wildland Recreation Management	31	USFS - NFS	National	Trail Management, Travel Management, Recreation Management, Trail Data and Information, Trail Design
Jeff Mast	Assistant National Trail Program Manager	B.A. Political Science M.C.R.P. City & Regional Planning	13	USFS – NFS DOI - FWS Local Gov't	National	Trail Management, Travel Management, Transportation Planning
Penny Wu	National Travel Management Program Manager	B.S. Recreation Mgmt.	28	USFS - NFS	National	Travel Management
Kent Wellner	Trails, Dispersed Recreation, & Travel Management Program Manager	B.S. Forest Management (U of I). M.S. Fire Ecology and Silviculture (U of I).	31	USFS - NFS	Northern	Trail Management, Travel Management, Rec Management, Rec SUP Management
Larry Velarde	Trails/Dispersed Recreation & Travel Management Program Manager	B.S. Natural Resource Outdoor Recreation Management	24	USFS - NFS	Intermountain	Trail Management, Travel Management, Dispersed Recreation
Garrett Villanueva	Regional Trail Program Manager	B.S. Geology	20	USFS - NFS	Pacific Southwest	Trail Operations, Management and Construction
Deb Schoenberg	Assistant Trails & Travel Management Program Leader	B.S. Landscape Architecture	13	USFS - NFS	Pacific Southwest	Trail Management, Travel Management, Transportation Planning, Recreation Planning
Maham Ahmed	Trails, Travel Management & Dispersed Recreation Program Manager (acting)	B.S- Earth Systems Science MPA- Environmental Science & Policy	5	USFS - NFS	Pacific Northwest	Trail Management, Environmental Compliance, Strategic Development.

NAME	TITLE	EDUCATION	YRS	AGENCIES	REGION(S)	EXPERTISE
Matthew McGrath	Pacific Northwest National Scenic Trail Program Manager	B.S – Geography and History M.S. – Recreation Management	13	USFS - NFS	Pacific Northwest	Trail Design, Construction, and Maintenance; Visitor Use Management; Recreation Planning
Rob Gillispie	Assistant National Transportation Program Manager	B.S. Civil Engineering	8.5	FHWA USFS – NFS	National	Road Design, Construction, Policy, and Oversight
Brenda Christensen	Transportation Group Leader	B.S. Civil Engineering	29	USFS – NFS	Northern Region	Transportation Design, Construction, Maintenance, Policy and Oversight
Doug Wise	Deputy Director of Engineering and Transportation Group Lead	B.S. Civil Engineering M.S. Engineering and Environmental Mgmt	30	DOD – USAF USFS – NFS	Rocky Mountain	Planning, Programming, Design, Construction, Policy, Oversight, and Environmental
Justin Humble	Transportation Group Lead	B.S. Civil Engineering Masters of Public Administration	20	Private, Local govt, DOD-USAF, USFS – NFS	Intermountain	Transportation and Environmental Planning, Programming, Design, Construction, Policy and Oversight
David Payne	National Transportation Program Manager	B.S. Geology	40	FHWA County govt VDOT USFS – NFS	Southern Region National	Design, Construction, Program Admin., Planning, Environmental, Facilities
Veronica Mitchell	Transportation Planner and Development	B.S. Civil Engineering	30	USFS – NFS	Rocky Mountain	Travel Management Planning, Environmental Compliance, Road Design, Construction, Policy and Oversight

NAME	TITLE	EDUCATION	YRS	AGENCIES	REGION(S)	EXPERTISE
Marjorie Apodaca	Transportation Group Leader	B.S. Civil Engineering	30	USFS – NFS	Southwestern	Planning, Design, Construction, and maintenance of roads and bridges
Leslie Boak	Regional Transportation Engineer	Construction Engineering Management	20	USFS – NFS	Pacific Northwest National Pacific Southwest	Transportation Design, Construction, Implementation, Maintenance, Policy and Oversight
Steve Schnetzler	Transportation Development Engineer	B.S. Civil Engineering	17	Private USFS – NFS	Southern Region	Geotechnical and Materials Engineering, Roadway Design/Construction, Geotechnical/Structures Design/Construction
Amanda Warner Thorpe	Regional Transportation Program Manager	B.S. Civil Engineering	17	BLM USFS – NFS	Alaska Pacific Northwest	Road Project Design, Construction, Program Policy, Oversight, and Management

Appendix B3 – Scientific Research and Monitoring Information – (e)(20)

RESEARCH PAPER	AUTHORS	PUBLICATION
Effects of Road Decommissioning on Stream Habitat Characteristics in the South Fork Flathead River, Montana	Magnus McCaffery, T. Adam Switalski, and Lisa Eby	Transactions of the American Fisheries Society, 136:553-561 (2007)
Influence of Road Reclamation Techniques on Forest Ecosystem Recovery	Rebecca A. Lloyd, Kehtleen A. Lohse, and TPA Ferre	Front Ecol Environ 2013; 11(2): 75-81.
Legacy Roads and Trails Monitoring Project: Road Decommissioning in the Lolo Creek Watershed, Clearwater National Forest	Richard Cissel, Tom Black, Charlie Luce	Internal USFS Monitoring Report, USDA-Forest Service, Rocky Mountain Research Station (May 2011)
Monitoring of Wildlife Habitat Restoration on the Clearwater National Forest	Adam Switalski	Wildlands CPR Monitoring Report (February 2010)
National Best Management Practices for Water Quality Management on National Forest Service Lands: Volume 1, National Core BMP Technical Guide	USDA Forest Service	USDA Forest Service, Forest Service-990a, April 2012

RESEARCH PAPER	AUTHORS	PUBLICATION
Restoration in Action: The First Five Years of the Legacy Roads and Trails Program	Wildlands CPR and The Wilderness Society	WildEarth Guardians Report (April 2013)

Appendix B4 – Previously Implemented Actions – (e)(21)

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Projects with Survey Respondents			
Historic Facilities BMP Retrofit *Lake Tahoe Basin Management Unit*	Environmental Assessment May 2014	DN / FONSI October 6, 2014	Appendix A: Project Design Features Appendix B: Best Management Practices
Airbase Expansion at Prescott Fire Center *Prescott NF*	Environmental Assessment February 2012	DN / FONSI February 28, 2012	
Crescent Ranger District Administrative Site *Crescent RD* *Deschutes NF*	Environmental Assessment April 2012	DN / FONSI April 4, 2012	
Flat Creek Buildings Disposition *Middle Fork RD* *Willamette NF*	Environmental Assessment December 2012	DN / FONSI April 2, 2013	
Bessey Complex Drainage, Warehouse, Greenhouse Construction *Bessey RD* *Nebraska NF*	Environmental Assessment March 2012	DN / FONSI March 9, 2012	
Deer River Tree Cooler *Deer River RD* *Chippewa NF*	Environmental Assessment June 2012	DN / FONSI March 28, 2013	
Enoree Range District Office Renovation Project *Enoree RD* *Francis Marion and Sumter NFs*	Environmental Assessment January 10, 2013	DN / FONSI January 16, 2013	Biological Assessment/Evaluation, August 2012

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Duchesne Bunkhouse *Duchesne RD* *Ashley NF*	Environmental Assessment September 2012	DN / FONSI September 27, 2012	
Interagency Natural Resource Center *Idaho Panhandle NF*	Environmental Assessment June 2016	DN / FONSI August 30, 2016	
Nez Perce-Clearwater National Forest Roadside, Recreation Site, and Administrative Site Maintenance Project *Nez Perce-Clearwater NFs*	Environmental Assessment June 2016	DN / FONSI August 17, 2016	
Grand Mesa Winter Recreation Improvements *Grand Valley RD* *Grand Mesa, Uncompahgre, and Gunnison NFs*	Environmental Assessment December 2011	DN / FONSI December 27, 2011	
Horn Mountain Communication Tower *Talladeg RD* *NFs in Alabama*	Environmental Assessment September 2014	DN / FONSI December 5, 2014	Memorandum of Agreement, July 2014
Other Projects Reviewed			
Supervisor's Office/Jackson District Administrative Site Conveyance *Grand Mesa, Uncompahgre, and Gunnison NFs*	Environmental Assessment October 2009, Supplement January 2012	DN / FONSI May 4, 2012	This project includes development activities separate from the conveyance – the development activities are those reviewed.
Payson Administrative Site Sale/Facilities *Payson RD* *Tonto NF*	Environmental Assessment August 2012	DN / FONSI August 9, 2013	This project includes development activities separate from the sale – the development activities are those reviewed.
Dinkey Ranger Station Buildings Decommission *High Sierra RD* *Sierra NF*	Environmental Assessment July 2012	DN / FONSI July 10, 2012	

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Kitchen Creek Helitanker Base *Descanso RD* *Cleveland NF*	Environmental Assessment April 2012	DN / FONSI April 11, 2012	
Laguna Water System Improvement *Descanso RD* *Cleveland NF*	Environmental Assessment December 2014	DN / FONSI March 5, 2015	
North Fork Pole Barn Decommissioning *Bass Lake RD* *Sierra NF*	Environmental Assessment April 2012	DN / FONSI July 9, 2012	
Pacific Heliport Reconstruction *Pacific RD* *Eldorado NF*	Environmental Assessment	DN / FONSI September 24, 2012	
William and Kent Campground BMP Retrofit and Administrative Site Redevelopment *Lake Tahoe Basin Management Unit*	Environmental Assessment February 2013	DN / FONSI February 4, 2013	Appendix A: Project Design Features Appendix B: Best Management Practices
Administrative Radio Repeater Improvement Project *White Mountain NF*	Environmental Assessment March 2015	DN / FONSI May 18, 2015	

Appendix B5 – Professional Staff and Experts – (e)(21)

NAME	TITLE	EDUCATION	YRS	AGENCIES	REGION(S)	EXPERTISE
Megan Healy	National NEPA Specialist	B.S – Technical and Scientific Communication M.A. – Environmental and Resource Policy	11	USFS - NFS	National	Environmental Compliance (NEPA)

NAME	TITLE	EDUCATION	YRS	AGENCIES	REGION(S)	EXPERTISE
Sam Gaugush	National NEPA Specialist	J.D. University Oregon School of Law, B.A. Sociology and Spanish	10	USFS, BLM	National	NEPA, Environmental and Natural Resources Law, Administrative Law
Michael Balen	National Facilities Program Manager (No Longer With the Agency)	B.S. – Geological Engineering M.S. – Engineering Management	34	DOI – US Bureau of Mines, Alaska DOT, USFS – NFS	R10, R4, R5, National	Mining and Civil Engineering, Hydrologic Design and Construction, Construction and Project Management
Savoth Hy	Assistant National Facilities Program Manager (No Longer with the Agency)	B.S. – Civil Engineering	12	USFS- NFS, VA-VHA, DOD-USACE, Local Government	National	Engineering Design and Analysis, Construction and Project Management
Emilee Blount	Director of Engineering, Technology, and Geospatial Services	B.S. – Civil Engineering M.S. – Administration	33	USFS – NFS DoD	National	Engineering, Environmental Engineering, Logistics, Fleet

Appendix B6 – Previously Implemented Actions – (e)(22)

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Projects with Survey Respondents			
Middle Citico Vegetation Management *Tellico RD* *Cherokee NF*	Environmental Assessment July 2013	DN / FONSI September 12, 2013	Biological Opinion, July 3, 2013; Biological Opinion Terms and Conditions, July 2013
Cave Run Nonmotorized Trails *Cumberland RD* *Daniel Boone NF*	Environmental Assessment September 2013	DN / FONSI September 25, 2013	
Williamson River Cliff Area *Chiloquin RD* *Fremont-Winema NF*	Environmental Assessment May 2012	DN / FONSI July 18, 2012	

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Crandall OHV Restroom *Mi-Wok RD* *Stanislaus NF*	Environmental Assessment March 2013	DN / FONSI March 19, 2013	
Seal Point Recreation Enhancement *Petersburg RD* *Tongass NF*	Environmental Assessment March 2012	DN / FONSI June 18, 2012	
Treadwell Ditch Trail Bridge Replacement *Juneau RD* *Tongass NF*	Environmental Assessment February 2016	DN / FONSI April 20, 2016	
Lower Kern Canyon & Greenhorn Mountains OHV Restoration Project *Kern River RD* *Sequoia NF*	Environmental Assessment August 2013	DN / FONSI September 10, 2013	
Eyak Boat Launch Reconstruction *Cordova RD* *Tongass NF*	Environmental Assessment October 2012	DN / FONSI February 7, 2014	Exhibit 1 – Design Features and Required Monitoring
Telephone Canyon Trails *Spring Mountains National Recreation Area* *Humboldt-Toiyabe NF*	Environmental Assessment August 2012	DN / FONSI October 3, 2012	Appendix B – Design Criteria, Mitigation, and Conservation Measures (DN)
Avalanche Campground Healthy Forest Campsite Relocation *Aspen-Sopris RD* *White River NF*	Environmental Assessment September 2014	DN / FONSI September 16, 2014	
College Campground Rehabilitation *High Sierra RD* *Sierra NF*	Environmental Assessment July 2012	DN / FONSI July 19, 2012	Appendix B: Measures Built Into the Proposed Action to Avoid or Minimize Effects Appendix C: Best Management Practices
Welcome Station Trail Connections *Bend-Fort Rock RD* *Deschutes NF*	Environmental Assessment March 2014	DN / FONSI July 29, 2014	

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Road/Trail Decommissioning and Seasonal Closure Project *Conasuaga RD* *Chattahoochee-Oconoee NFs*	Environmental Assessment February 2015	DN / FONSI June 12, 2015	
Forest-wide Unauthorized Route Decommissioning *Cleveland NF*	Environmental Assessment May 2016	DN / FONSI May 20, 2016	
Jackson Hole Mountain Resort Suite of Projects *Jackson RD* *Bridger-Teton NF*	Environmental Assessment July 2015	DN/FONSI August 31, 2015	Appendix B – Watershed Resources Best Management Practices
Recreation Residence Tract Associate Permits *Calaveras RD* *Stanislaus NF*	Environmental Assessment November 2011	DN/FONSI November 14, 2011	
Trailhead Construction Project for the Woods Ferry Horse Trail *Enoree RD* *Francis Marion and Sumter NFs*	Environmental Assessment March 2016	DN / FONSI June 10, 2016	
Other Projects Reviewed			
Clear Creek *Plains/Thompson Falls RD* *Lolo NF*	Environmental Assessment September 2014	DN / FONSI September 2, 2014	Appendix D: Resource Protection Measures and Monitoring
Emerald Creek Garnet Area Improvement *St. Maries RD* *Idaho Panhandle NF*	Environmental Assessment March 2016	DN / FONSI March 11, 2016	
Buford/New Castle Motorized Trail *West Zone/Rifle RD* *White River NF*	Environmental Assessment June 2012	DN / FONSI June 13, 2012	
Muddy Guard Road Re-route *Powder River RD* *Bighorn NF*	Environmental Assessment May 2012	DN / FONSI May 22, 2012	

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Recreation-Turkey Springs Trail Management Plan *Pagosa RD* *San Juan NF*	Environmental Assessment March 2012	DN / FONSI March 16, 2012	Appendix A: Design Criteria and Monitoring Plan
Glorieta Mesa Target Shooting Closure *Pecos-Las Vegas RD* *Santa Fe NF*	Environmental Assessment February 2011	DN / FONSI December 2, 2011	
Moon Lake Boat Ramp *Roosevelt RD* *Ashley NF*	Environmental Assessment September 2014	DN / FONSI February 12, 2015	
Brokenshire *Almanor RD* *Lassen NF*	Environmental Assessment July 2013	DN / FONSI September 27, 2013	
Rattlesnake Mountain OHV Trails *Big Bear RD* *San Bernardino NF*	Environmental Assessment February 2016	DN / FONSI April 11, 2016	Hydrology and Soils Report; Biological Assessment/Evaluation
Whitney Portal Walk-in Campground Expansion *Mount Whitney RD* *Inyo NF*	Environmental Assessment June 2012	DN / FONSI June 26, 2012	
Blue Mountain Snowpark *Blue Mountain RD* *Malheur NF*	Environmental Assessment November 2012	DN / FONSI January 31, 2013	
Phil's Trailhead Project *Bend/Fort Rock RD* *Deschutes NF*	Environmental Assessment April 2012	DN / FONSI April 16, 2012	Appendix A: Resource Protection Measures
Rim Butte OHV Jeep Trails *Bend/Fort Rock RD* *Deschutes NF*	Environmental Assessment September 2013	DN / FONSI November 15, 2013	Appendix A: Mitigation Measures and Monitoring
Clay County Shooting Range *Tusquittee RD* *NFs in North Carolina*	Environmental Assessment September 2013	DN / FONSI September 27, 2013	

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Conecuh Shooting Range *Conecuh RD* *NFs in Alabama*	Environmental Assessment April 2012	DN / FONSI April 17, 2012	
Corsair/Sand Lake *Huron Shores RD* *Huron-Manistee NF*	Environmental Assessment November 2013	DN / FONSI August 4, 2014	
Glen Ellis Falls Day Use Area Site Improvement *Androscoggin RD* *White Mountain NF*	Environmental Assessment February 2015	DN / FONSI May 15, 2015	
Island Campground Reconstruction *Greenbrier RD* *Monongahela NF*	Environmental Assessment January 2012	DN / FONSI February 13, 2012	
North Fork River Access *Ava/Casssville/Willow Springs RD* *Mark Twain NF*	Environmental Assessment March 2015	DN / FONSI May 6, 2015	Appendix B: Mitigation
Tripoli Road Campsite Relocation and Roadside Hazard Tree Removal *Pemigewasset RD* *White Mountain NF*	Environmental Assessment April 2016	DN / FONSI May 27, 2016	
White Sulphur Springs Bath House *Sitka RD* *Tongass NF*	Environmental Assessment February 2012	DN / FONSI May 29, 2012	
Bear Valley Mountain Resort Expansion *Calaveras RD* *Stanislaus NF*	Environmental Assessment September 2012	DN/FONSI September 21, 2012	
Snowmass Ski Trail Enhancements and high Alpine Chairlift Replacement *West Zone/Sopris RD* *White River NF*	Environmental Assessment December 2014	DN/FONSI April 21, 2015	Appendix A: Project Design Criteria and Best Management Practices Incorporated Into the Selected Alternative

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Mammoth Mountain Winter Recreation Projects *Mammoth and Mono Lake RDs* *Inyo NF*	Environmental Assessment August 2012	DN/FONSI September 17, 2012	
Keystone Frontside Improvements *East Zone/Dillon RD* *White River NF*	Environmental Assessment/FONSI February 2014	DN March 27, 2014	
Loon Mountain South Peak Learning Center *Pemigewasset RD* *White Mountain NF*	Environmental Assessment April 2014	DN/FONSI August 26, 2014	
Copper Mountain Improvements *East Zone/Dillon RD* *White River NF*	Environmental Assessment August 2013	DN/FONSI August 29, 2013	
Ski Hill Improvements *Wenatchee River RD* *Okanogan-Wenatchee NF*	Environmental Assessment April 2016	DN/FONSI May 20, 2016	
Second Knoll Shooting Range *Lakeside RD* *Apache-Sitgreaves NFs*	Environmental Assessment April 2013	DN/FONSI May 24, 2013	
Buttercup Ski Lift Replacements *Hood River RD* *Mt. Hood NF*	Environmental Assessment September 2013	DN/FONSI September 16, 2013	
Summit Huts Association – Weber Gulch Backcountry Hut *Dillon RD* *White River NF*	Environmental Assessment June 2015	DN/FONSI June 17, 2015	
Cabin F7 Replacement *Klamath RD* *Fremont-Winema NF*	Environmental Assessment May 2016	DN/FONSI July 7, 2016	
Snow Mass Ski Area – Burnt Mountain Egress Trail *Aspen-Sopris RD* *White River NF*	Environmental Assessment December 2014	DN/FONSI April 21, 2015	

Append B7 – Professional Staff and Experts – (e)(22)

NAME	TITLE	EDUCATION	YRS	AGENCIES	REGION(S)	EXPERTISE
Megan Healy	National NEPA Specialist	B.S. Technical and Scientific Communication M.A. Environmental and Resource Policy	12	USFS - NFS	National	Environmental Compliance (NEPA)
Sam Gaugush	National NEPA Specialist	J.D. University Oregon School of Law, B.A. Sociology and Spanish	10	USFS, BLM	National	NEPA, Environmental and Natural Resources Law, Administrative Law
Jaime Schmidt	National Trail Program Manager	B.S. Wildland Recreation Management	31	USFS - NFS	National	Trail Management, Travel Management, Recreation Management, Trail Data and Information, Trail Design
Jeff Mast	Assistant National Trail Program Manager	B.A. Political Science M.C.R.P. City & Regional Planning	13	USFS – NFS DOI - FWS Local Gov't	National	Trail Management, Travel Management, Transportation Planning
Penny Wu	National Travel Management Program Manager	B.S. Recreation Mgmt.	28	USFS - NFS	National	Travel Management
Kent Wellner	Trails, Dispersed Recreation, & Travel Management Program Manager	B.S. Forest Management (U of I). M.S. Fire Ecology and Silviculture (U of I).	31	USFS - NFS	Northern	Trail Management, Travel Management, Rec Management, Rec SUP Management
Larry Velarde	Trails/Dispersed Recreation & Travel Management Program Manager	B.S. Natural Resource Outdoor Recreation Management	24	USFS - NFS	Intermountain	Trail Management, Travel Management, Dispersed Recreation
Garrett Villanueva	Regional Trail Program Manager	B.S. Geology	20	USFS - NFS	Pacific Southwest	Trail Operations, Management and Construction

NAME	TITLE	EDUCATION	YRS	AGENCIES	REGION(S)	EXPERTISE
Deb Schoenberg	Assistant Trails & Travel Management Program Leader	B.S. Landscape Architecture	13	USFS - NFS	Pacific Southwest	Trail Management, Travel Management, Transportation Planning, Recreation Planning
Maham Ahmed	Trails, Travel Management & Dispersed Recreation Program Manager (acting)	B.S- Earth Systems Science MPA- Environmental Science & Policy	5	USFS - NFS	Pacific Northwest	Trail Management, Environmental Compliance, Strategic Development.
Matthew McGrath	Pacific Northwest National Scenic Trail Program Manager	B.S – Geography and History M.S. – Recreation Management	13	USFS - NFS	Pacific Northwest	Trail Design, Construction, and Maintenance; Visitor Use Management; Recreation Planning
Cathy Kahlow	National Recreation Sites Program	B.S-Outdoor Recreation and Natural Resource Management	31 5	USDA-NFS DOI-NPS	WO,R2,R3,R4,R5	Recreation Planning & Management District to WO, line officer
Paul E. Cruz	Rocky Mtn. Regional Recreation Business Program Manager	BS-Natural Resources Management	29 5	USDA-USFS USDA-SCS	Regional Colorado	Outdoor Rec. Planning, Dev. Rec. Facilities, Capacity Analysis
Jonathan Cook-Fisher	National Recreation Special Uses Manager	B.A. Anthropology M.S. Resource Management	15	USFS – NFS	National	Recreation, Special Uses
Benjamin Johnson	National Recreation Special Uses Program Lead	M.S. – Environmental Policy and Environmental Justice M.P.P – Public Policy B.A. – Environmental Studies and Spanish	6	USFS – NFS	National	Recreation Special Uses
Sean Wetterberg	National Winter Sports Program Manager	B.S. Forestry	16	USFS – NFS	National	Recreation Special Uses
Michiko Martin	Acting Director, Recreation, Heritage & Volunteer Resources	B.S – Oceanography M.S. – Ocean Engineering M.A. – Education Leadership	30	USFS – NFS (Previous: USFS – SPF; NOAA; DOD—Navy)	National	Recreation; Education; Protected Areas; Military Ops

Appendix B8 – Previously Implemented Actions – (e)(23 and 24)

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Projects with Survey Respondents			
Redfish Lake Complex – Road and Bridge Construction *Sawtooth National Recreation Area* *Sawtooth NF*	Environmental Assessment October 2011	DN / FONSI October 3, 2011	Monitoring Report (December 2015)
Northeast Lake *Poplar Bluff RD* *Mark Twain NF*	Environmental Assessment February 2013	DN / FONSI March 6, 2013	
Rennic Stark Project *Ninemile RD* *Lolo NF*	Environmental Assessment November 2012	DN / FONSI March 22, 2013	
Corral Creek Road Relocation and Restoration *La Grande RD* *Wallowa-Whitman NF*	Environmental Assessment December 2013	DN / FONSI February 19, 2014	2014 Project Accomplishment Factsheet
Seven Cabins Road Realignment *Smokey Bear RD* *Lincoln NF*	Environmental Assessment September 2014	DN / FONSI September 15, 2014	
Bridge Replacement and Rehabilitation on NFSR 150 *Gila NF*	Environmental Assessment February 2013	DN / FONSI September 26, 2013	
Interior Vegetation Management Project *Ottawa NF*	Environmental Assessment March 2014	DN / FONSI July 24, 2014	Appendix 1. Design Criteria and Monitoring
Fraser Flat Bridge Replacement *Mi-Wok RD* *Stanislaus NF*	Environmental Assessment February 2013	DN / FONSI April 18, 2013	

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Slack Weiss Analysis Area *Parks RD* *Medicine Bow-Routt NF*	Environmental Assessment November 2015	DN / FONSI March 22, 2016	Appendix A: Design Criteria, Mitigation Measures, and Monitoring Criteria for the Proposed Action
Land Bridge Road, Bridge Relocation *Andrew Pickens RD* *Francis Marion and Sumter NFs*	Environmental Assessment April 2014	DN / FONSI June 23, 2014	
Pole Creek Road Reroute *Sawtooth National Recreation Area* *Sawtooth NF*	Environmental Assessment May 2014	DN / FONSI June 25, 2014	BMP Evaluation – Decommissioning Pole Creek Culvert Checklist Road BMP Photos
1136 Spur Road Project *Hebo RD* *Siuslaw NF*	Environmental Assessment May 2015	DN / FONSI August 25, 2015	
Fourche Mountain Ecosystem Management Unit *Ouachita NF*	Environmental Assessment July 2016	DN / FONSI July 22, 2016	
Brown Creek-Lower Maumelle *Jessieville RD* *Ouachita NF*	Environmental Assessment May 2016	DN / FONSI May 20, 2016	
Other Projects Reviewed			
Marshall Woods Restoration Project *Missoula RD* *Lolo NF*	Environmental Assessment February 2015	DN / FONSI January 28, 2016	
Elkhorn Project *Canyon Lakes RD* *Arapaho and Roosevelt NFs*	Environmental Assessment March 2014	DN / FONSI June 9, 2014	
Aquatic Organism Passage Restoration *Trabuco RD* *Cleveland NF*	Environmental Assessment September 2011	DN / FONSI October 14, 2011	

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Dragon Project *Eagle Lake RD* *Lassen NF*	Environmental Assessment November 2013	DN / FONSI January 24, 2014	Dragon Project: Transportation Report
Soquel Ditch Bridge Replacement *Bass Lake RD* *Sierra NF*	Environmental Assessment February 2014	DN / FONSI May 12, 2014	
1900 Flood Repair *Naches RD* *Okanogan-Wenatchee NF*	Environmental Assessment January 2012	DN / FONSI April 17, 2012	
Forest Service Road 1501 Flood Repair *Naches RD* *Okanogan-Wenatchee NF*	Environmental Assessment May 2013	DN / FONSI September 24, 2013	
Forest Service Road 3300 Flood Repair *Cle Elum RD* *Okanogan-Wenatchee NF*	Environmental Assessment June 2014	DN / FONSI August 19, 2014	
Forest Service Road System 1700 Flood Repair *Naches RD* *Okanogan-Wenatchee NF*	Environmental Assessment May 2013	DN / FONSI July 3, 2013	
East Fork Ecosystem Management Unit – Compartments 264-269 *Cold Springs RD* *Ouachita NF*	Environmental Assessment January 2016	DN / FONSI April 22, 2016	
Munson Sandhills II Analysis Area *Wakulla RD* *NFs in Florida*	Environmental Assessment August 2013	DN / FONSI September 4, 2013	
Spring Creek *Ocoee-Hiwassee RD* *Cherokee NF*	Environmental Assessment June 2012	DN / FONSI August 20, 2012	
Telogia Analysis Area *Wakulla RD* *NFs in Florida*	Environmental Assessment March 2014	DN / FONSI August 11, 2014	

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Eastern Off-highway Vehicle Connector *Ottawa NF*	Environmental Assessment August 2012	DN / FONSI December 12, 2012	
Eastside Road and Trail Repairs *Pemigewasset RD* *White Mountain NF*	Environmental Assessment December 2012	DN / FONSI December 19, 2012	
Mount Avery Spur Road *Powers RD* *Rogue River-Siskiyou NF*	Environmental Assessment August 2014	DN / FONSI July 28, 2016	
Redboat Resource Management Project *Bessemer RD* *Ottawa NF*	Environmental Assessment March 2013	DN / FONSI January 2014	
Slippery Brook Road Reconstruction *Saco RD* *White Mountain NF*	Environmental Assessment May 2013	DN / FONSI May 31, 2013	
Lena Beach Recreation Area Improvement *Juneau RD* *Tongass NF*	Environmental Assessment February 2015	DN / FONSI June 30, 2015	
Improvements for Neck Lake and El Capitan Cave Roads *Thorne Bay RD* *Tongass NF*	Environmental Assessment February 2016	DN / FONSI September 7, 2016	
North Fork Access *Ava/Cassville/Willow Springs RD* *Mark Twain NF*	Environmental Assessment March 2015	DN/FONSI May 2015	
Sheep Dip Project *Cadillac/Manistee RD* *Huron-Manistee NF*	Environmental Assessment August 2013	DN/FONSI June 2014	
Bonnerdale *Caddo RD* *Ouachita NF*	Environmental Assessment February 2016	DN/FONSI April 2016	

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Buffalo Key Mountain *Poteau RD* *Ouachita NF*	Environmental Assessment August 2012	DN/FONSI September 2012	
Lower South Fork *Womble RD* *Ouachita NF*	Environmental Assessment June 2016	DN/FONSI August 2016	
Parks *Cold Springs RD* *Ouachita NF*	Environmental Assessment July 2011	DN/FONSI December 2011	
Mountain Fork Watershed *Mena RD* *Ouachita NF*	Environmental Assessment February 2012	DN/FONSI April 2012	
Little Fir Watershed Management *Womble RD* *Ouachita NF*	Environmental Assessment April 2013	DN/FONSI May 2013	
Fork Mountain Vegetation Management *Eastern Divide RD* *George Washington & Jefferson NF*	Environmental Assessment June 2015	DN/FONSI April 2016	
Rudyard *Sault Ste. Marie/St. Ignace RD* *Hiawatha NF*	Environmental Assessment June 2013	DN/FONSI May 2014	
Salmon West *Marienville RD* *Allegheny NF*	Environmental Assessment February 2013	DN/FONSI September 2013	
Bud Project *Bush Creek/Hayden RD* *Medicine Bow-Routt NF*	Environmental Assessment and FONSI September 2013	DN September 2013	
Willett Creek, Forest Service Road 226 Reroute Project *Medicine Wheel RD* *Bighorn NF*	Environmental Assessment June 2015	DN/FONSI August 2015	

PROJECT NAME & LOCATION	ENVIRONMENTAL ANALYSIS DOCUMENT	DECISION DOCUMENT	SUPPLEMENTAL INFORMATION
Deer Creek Road Realignment Project *Ketchum RD* *Sawtooth NF*	Environmental Assessment April 2016	DN/FONSI July 2016	
C63 Project *Angelina RD* *NFs in Texas*	Environmental Assessment April 2015	DN/FONSI April 2015	
Greasy Creek *Ava/Cassville/Willow Springs RD* *Mark Twain NF*	Environmental Assessment June 2012	DN/FONSI June 2012	
Smith Mountain Project *Caddo RD* *Ouachita NF*	Environmental Assessment September 2011	DN/FONSI November 2011	
Calico Rock Project *Magazine Mountain RD* *Ozark-St. Francis NF*	Environmental Assessment October 2015	DN/FONSI November 2015	
Upper Lake Winona *Winona RD* *Ouachita NF*	Environmental Assessment February 2016	DN/FONSI July 2016	

Append B9 – Professional Staff and Experts – (e)(23 and 24)

NAME	TITLE	EDUCATION	YRS	AGENCIES	REGION(S)	EXPERTISE
Megan Healy	National NEPA Specialist	B.S. Technical and Scientific Communication M.A. Environmental and Resource Policy	11	USFS - NFS	National	Environmental Compliance (NEPA)
Sam Gaugush	National NEPA Specialist	J.D. University Oregon School of Law, B.A. Sociology and Spanish	10	USFS, BLM	National	NEPA, Environmental and Natural Resources Law, Administrative Law

NAME	TITLE	EDUCATION	YRS	AGENCIES	REGION(S)	EXPERTISE
Rob Gillispie	Assistant National Transportation Program Manager	B.S. Civil Engineering	8.5	FHWA USFS – NFS	National	Road Design, Construction, Policy, and Oversight
Brenda Christensen	Transportation Group Leader	B.S. Civil Engineering	29	USFS – NFS	Northern Region	Transportation Design, Construction, Maintenance, Policy and Oversight
Doug Wise	Deputy Director of Engineering and Transportation Group Lead	B.S. Civil Engineering M.S. Engineering and Environmental Mgmt	30	DOD – USAF USFS – NFS	Rocky Mountain	Planning, Programming, Design, Construction, Policy, Oversight, and Environmental
Justin Humble	Transportation Group Lead	B.S. Civil Engineering Masters of Public Administration	20	Private, Local govt, DOD-USAF, USFS – NFS	Intermountain	Transportation and Environmental Planning, Programming, Design, Construction, Policy and Oversight
David Payne	National Transportation Program Manager	B.S. Geology	40	FHWA County govt VDOT USFS – NFS	Southern Region National	Design, Construction, Program Admin., Planning, Environmental, Facilities
Veronica Mitchell	Transportation Planner and Development	B.S. Civil Engineering	30	USFS – NFS	Rocky Mountain	Travel Management Planning, Environmental Compliance, Road Design, Construction, Policy and Oversight
Marjorie Apodaca	Transportation Group Leader	B.S. Civil Engineering	30	USFS – NFS	Southwestern	Planning, Design, Construction, and maintenance of roads and bridges
Leslie Boak	Regional Transportation Engineer	Construction Engineering Management	20	USFS – NFS	Pacific Northwest National Pacific Southwest	Transportation Design, Construction, Implementation, Maintenance, Policy and Oversight

NAME	TITLE	EDUCATION	YRS	AGENCIES	REGION(S)	EXPERTISE
Steve Schnetzler	Transportation Development Engineer	B.S. Civil Engineering	17	Private USFS – NFS	Southern Region	Geotechnical and Materials Engineering, Roadway Design/Construction, Geotechnical/Structures Design/Construction
Amanda Warner Thorpe	Regional Transportation Program Manager	B.S. Civil Engineering	17	BLM USFS – NFS	Alaska Pacific Northwest	Road Project Design, Construction, Program Policy, Oversight, and Management
Emilee Blount	Director of Engineering, Technology, and Geospatial Services	B.S. Civil Engineering M.S. Administration	33	USFS – NFS DoD	National	Engineering, Environmental Engineering, Logistics, Fleet

Appendices C1-C4 : Restoration Categorical Exclusion CE (e)(25)

Appendix C1 –Previously Implemented Actions – (e)(25)

The table below lists projects that were samples and analyzed to develop the proposed restoration categorical exclusion at 36 CFR 220.5(e)(25). An asterisk (*) in the Project Name and Location field indicates the project was subject to the questionnaire discussed in the Supporting Statement. An "X" in a Project Activity field indicates that the relevant NEPA documents did not specify acres or miles. Projects with (--) in a cell represent projects where the activity occurred but the acreages are accounted for in another activity total. Road mileages are listed in the next table.

		Acres									
Project Name and Location	Decision Notice Date	Net Vegetation Management	Net Activity	Gross Activity	Total Commercial	Net Commercial/ Non-Commercial	Net Fuel Treatment (incl. RX Burning)	Net Reforestation	Watershed Improvement	Invasive Species Control	Aquatic and Terrestrial Habitat Improvement
Arrowhawk Hazardous Fuels Reduction Project* *Humboldt-Toiyabe NF, Carson RD*	8/21/2012	3496	7500	7500	878	3496	X		118	2900	
Bald Fire Salvage and Restoration *Lassen NF Forest-wide*	7/8/2015	13946	14363	26146	8447	8447	5499	417			
Barnyard South Sheep* *Nez Perce-Clearwater NFs, North Fork RD*	7/8/2015	1590	1590	2450	1590	1590	X	--			
Bigelow-Newaygo Project* *Huron-Manistee NF, Baldwin/White Cloud RD*	9/30/2015	2767	2767	4962	2256	2956	746	--	164	108	X
Biggie Vegetation Management and Fuels Reduction Project *Tahoe NF, American River RD*	8/24/2016	2620	2791	2965	1527	2228	563				

		Acres									
Project Name and Location	Decision Notice Date	Net Vegetation Management	Net Activity	Gross Activity	Total Commercial	Net Commercial/ Non-Commercial	Net Fuel Treatment (incl. RX Burning)	Net Reforestation	Watershed Improvement	Invasive Species Control	Aquatic and Terrestrial Habitat Improvement
Black Locust Fuelwood *Huron-Manistee NF, Cadillac/Manistee RD*	1/6/2015	23	23	92	23	23	--			23	
Bucks Lake Hazardous Fuels Reduction Project *Plumas NF, Mt. Hough RD*	5/24/2012	2065	2065	2065	1291.9	1842.4	222.3				
Charlie Preston* *Idaho Panhandle NF, St. Maries RD*	2/6/2012	2089	2089	2171	850	1157	932				x
Cherokee Park Project *Arapaho and Roosevelt NFs, Canyon Lakes RD*	5/26/2015	4917	4917	5128	3124	4917					
Davy Crockett Red-cockaded Woodpecker Prescribe Burn Project *NFs in Texas, Davy Crockett RD*	4/3/2013	69000	69000	69000			69000			x	
Deep Creek Watershed Improvement Project *Caribou-Targhee NF, Westside RD*	9/15/2016	0	11	11			x			11	
Deer Pen Restoration Project *NFs in Alabama, Oakmulgee RD*	7/23/2014	536	542.5	542.5	408	536			x	6.5	X
Dry Restoration* *Okanogan-Wenatchee NF, Naches RD*	2/6/2015	748	748	748	748	748		X	X		
East Wedge *Colville NF, Three Rivers RD*	6/25/2013	10235	10235	10235	4976	5671	4564				

		Acres									
Project Name and Location	Decision Notice Date	Net Vegetation Management	Net Activity	Gross Activity	Total Commercial	Net Commercial/ Non-Commercial	Net Fuel Treatment (incl. RX Burning)	Net Reforestation	Watershed Improvement	Invasive Species Control	Aquatic and Terrestrial Habitat Improvement
Elkhorn Project *Arapaho and Roosevelt NFs, Canyon Lakes RD*	6/9/2014	4957	4957	4957	2766	2766	2192		X		
Escalante Forest Restoration Project* *Grand Mesa, Uncompahgre and Gunnison NFs, Ouray RD*	6/24/2013	22150	22150	22150	10525	22150					
French Fire Recovery and Reforestation Project *Sierra NF, Bass Lake RD*	8/26/2015	3608	5965	6640	3387	3608		3000		32	
Gooseberry Ecological Restoration *Stanislaus NF, Summit RD*	5/8/2013	2860	2860	4643	2246	2372	2271			x	
Gordon Hill Vegetation Management Project *Six Rivers NF, Gasquet RD*	6/15/2015	2749	2749	2749	1466	2654	95				
Grass Flat Hazardous Fuels Reduction and Forest Health Restoration Project *Plumas NF, Feather River RD*	9/26/2012	1662	1662	1745	200	1555	107	--	x		x
Grizzly Fire Salvage and Restoration *Idaho Panhandle NF, Wallace RD*	6/30/2016	3025	3162	4862	3025	3025		137			
Hams Fork Vegetation *Bridger-Teton NF, Kemmerer RD*	9/11/2013	8622	8622	8622	7892	7892	730				
Hopkins Prairie Fire Salvage EA* *NFs in Florida, Lake George RD*	5/9/2013	1000	1000	1000	1000	1000					

		Acres									
Project Name and Location	Decision Notice Date	Net Vegetation Management	Net Activity	Gross Activity	Total Commercial	Net Commercial/ Non-Commercial	Net Fuel Treatment (incl. RX Burning)	Net Reforestation	Watershed Improvement	Invasive Species Control	Aquatic and Terrestrial Habitat Improvement
Interior Vegetation Management Project* *Ottawa NF, Watersmeet RD*	7/24/2014	16744	16744	20419	16172	16278	3312		326		503
Iron Springs Vegetation Improvement and Salvage Project *Dixie NF, Escalante RD*	3/8/2013	4121	4275	5044	4121	4121		154			
Julius Park Vegetation Management Project *Ashley NF, Vernal RD*	5/23/2013	699	699	764	675	699					
Junction Vegetation Management Project *Deschutes NF, Bend/Fort Rock RD*	6/30/2015	21084	21084	34893	8964	12240	8844				
Keola Fuels and Forest Heath *Sierra NF, High Sierra RD*	12/8/2011	550	550	1267	371	772	484	11			
Kidhaw Wildlife Habitat Improvement Project* *NFs in Texas, Sam Houston RD*	9/26/2013	820	820	1925	560	1105	820			X	
Larson Forest Restoration Project* *Apache-Sitgreaves NFs, Black Mesa RD*	8/13/2015	26426	26426	31332	26426		--				
Lemon Butte Project Environmental Assessment *Umpqua NF, North Umpqua RD*	6/23/2016	956	1011	1011	603	646	310	55		x	x

		Acres									
Project Name and Location	Decision Notice Date	Net Vegetation Management	Net Activity	Gross Activity	Total Commercial	Net Commercial/ Non-Commercial	Net Fuel Treatment (incl. RX Burning)	Net Reforestation	Watershed Improvement	Invasive Species Control	Aquatic and Terrestrial Habitat Improvement
Lower Skokomish Vegetation Management Project* *Olympic NF, Hood Canal/Hoodsport RD*	8/23/2016	4484	4484	4484	4484	4484				X	
Macedonia EA *Francis Marion and Sumter NFs, Francis Marion RD*	7/22/2014	8121	8121	8121	8121	8121			x		
Marshall Woods Restoration Project* *Lolo NF, Missoula RD*	1/28/2016	2499	2949	2949	266	1444	1055	450			X
Martin Creek Resource Management Project *Flathead NF, Tally Lake RD*	6/29/2015	1112	1541	2041	774	1112		429			X
Middle Bugs *Nez Perce-Clearwater NFs, North Fork RD*	6/3/2013	705	705	1461	705	819	642				X
Millsteck *Allegheny NF, Marienville RD*	10/3/2012	3662	6688	6848	1989	1989	1673	2956		70	160
Mitchell Spring Vegetation Improvement Project *Dixie NF, Escalante RD*	12/10/2015	1397	1505	1505	771	1397	x	108			
Morrison Run *Allegheny NF, Bradford RD*	5/2/2012	2307	3200	3200	1401	1937	370	451	x	442	x
Mower Tract Restoration* *Monongahela NF, Greenbrier RD*	9/28/2016	6358	6412	6412		6358			54		X
North Heber Salvage Project* *Uinta-Wasatch-Cache NF, Heber-Kamas RD*	6/5/2015	3730	3730	3730	3730	3730					

		Acres									
Project Name and Location	Decision Notice Date	Net Vegetation Management	Net Activity	Gross Activity	Total Commercial	Net Commercial/ Non-Commercial	Net Fuel Treatment (incl. RX Burning)	Net Reforestation	Watershed Improvement	Invasive Species Control	Aquatic and Terrestrial Habitat Improvement
North Shore Restoration Project *Superior NF, Gunflint RD*	8/22/2014	6995	6995	6995	3190	6975	20				
Ocala Fuel Reduction Mowing *NFs in Florida, Lake George RD*	3/6/2012	352	352	352		352					
Pine Ridge Landscape Restoration Project *Nebraska NF, Pine Ridge RD*	1/12/2015	22366	22366	32744	7496	18468	10378	400			1168
Pipeline Northwest Restoration Plan *NFs in Alabama, Oakmulgee RD*	8/11/2015	2869	2869	3330	1944	2869		--	x		
Red Hill Restoration *Shasta-Trinity NF, Yolla Bolla RD*	5/29/2013	1536	1536	1536	1448	1536					
Reedy Timber Sale Project *Francis Marion and Sumter NFs, Long Cane RD*	7/30/2013	1275	1275	1275	1275	1275					
Renshaw Vegetation Management Project EA* *Colville NF, Sullivan RD*	4/14/2015	8478	8478	8478	4970	5427	3051				
Roy Creek *Huron-Manistee NF, Huron Shores RD*	9/8/2016	9165	9365	9365	1857	3583	5582			200	
Sagehen Project *Tahoe NF, Truckee RD*	5/6/2013	2627	2627	4977		2627	--				
Salmon West* *Allegheny NF, Marienville RD*	9/26/2013	2547	2547	5726	2529	3348	506	1684	x	188	X

		Acres									
Project Name and Location	Decision Notice Date	Net Vegetation Management	Net Activity	Gross Activity	Total Commercial	Net Commercial/ Non-Commercial	Net Fuel Treatment (incl. RX Burning)	Net Reforestation	Watershed Improvement	Invasive Species Control	Aquatic and Terrestrial Habitat Improvement
Sandbox Vegetation Management *Wallowa-Whitman NF, La Grande RD*	2/24/2014	10144	10144	10144	2120	2679	7465				
Shores *Hiawatha NF, St. Ignace RD*	12/19/2011	1577	1577	1577	1460	1577				X	
Smith Mountain Project* *Ouachita NF, Caddo RD*	11/15/2011	10006	10056	15961	3032	1036	8970	--	x	50	X
Soldier Bay Analysis Area *NFs in Florida, Wakulla RD*	7/18/2016	3239	3239	3482	1562	2996	243	--			
South Bridger Interface Project EA *Custer Gallatin NF, Bozeman RD*	8/8/2014	250	250	250	250	250					
South Summit Forest and Fuels II* *Okanogan-Wenatchee NF, Methow Valley RD*	7/14/2015	9780	18065	18065	2180	3180	6600	8285			
Southern Creek Ouachita River *Ouachita NF, Mena RD*	9/17/2015	5460	5460	8358	1838	2673	5460	225			
Spring Gulch Timber Sale *Kootenai NF, Cabinet RD*	4/15/2013	875	875	875	256	322	553				
Sulphur Forest Restoration Project* *Cibola NF, Sandia RD*	9/2/2014	613	613	1226	613	613	--				
Telogia Analysis Area *NFs in Florida, Wakulla RD*	8/11/2014	1708	1708	1811	1631	1708		--			

		Acres									
Project Name and Location	Decision Notice Date	Net Vegetation Management	Net Activity	Gross Activity	Total Commercial	Net Commercial/ Non-Commercial	Net Fuel Treatment (incl. RX Burning)	Net Reforestation	Watershed Improvement	Invasive Species Control	Aquatic and Terrestrial Habitat Improvement
Toll Joe *Willamette NF, Sweet Home RD*	6/6/2014	1039	1039	1083	944	1039					
Upper Lake Winona *Ouachita NF, Winona RD*	7/19/2016	15557	15557	28576	2965	11062	15959	1555	X		
Upper South Fork Skokomish Vegetation Management Project *Olympic NF, Shelton RD*	3/5/2013	880	880	880	880						
Watson Hill LLC Vegetation Management and Timber Sale Project *Francis Marion and Sumter NFs, Long Cane RD*	6/30/2015	8384	8384	8384	8116	8384					
West Slope Wildland-Urban Interface Hazardous Fuels Reduction Project *Manti-La Sal NF, Moab RD*	5/8/2015	3836	3836	3836		3836					
Westside Collaborative Vegetation Management Project *Bitterroot NF, Darby RD*	7/5/2016	2327	2327	2327	1349	2327					
Windy Project *Superior NF, Tofte RD*	3/20/2015	3434	3434	3434	2699	3248	186				

Road Activity – Miles

The table below lists the road mileages associated with the projects listed above. An "X" indicates that the relevant NEPA documents did not specify acres or miles.

Project Name	Road Decommission	Road Construction Permanent	Road Construction Temporary	Project Name	Road Decommission	Road Construction Permanent	Road Construction Temporary
Arrowhawk Hazardous Fuels Reduction Project	0	0	0	Martin Creek Resource Management Project	0	0	x
Bald Fire Salvage and Restoration	0	0	0	Middle Bugs	0	0	x
Barnyard South Sheep	75.6	0	7.8	Millsteck	0	70	160
Bigelow-Newaygo Project	0	0	0	Mitchell Spring Vegetation Improvement Project	0	0	0
Biggie Vegetation Management and Fuels Reduction Project	0	0	0	Morrison Run	x	442	x
Black Locust Fuelwood EA	0	0	0	Mower Tract Restoration	54	0	x
Bucks Lake Hazardous Fuels Reduction Project	0	0	0	North Heber Salvage Project	0	0	0
Charlie Preston	0.6	1.6	0.4	North Shore Restoration Project	0	0	0
Cherokee Park Project	23.13	0	0	Ocala Fuel Reduction Mowing	0	0	0
Davy Crockett Red-cockaded Woodpecker Prescribe Burn Project	0	0	0	Pine Ridge Landscape Restoration Project	0	0	1168
Deep Creek Watershed Improvement Project	0	0	0	Pipeline Northwest Restoration Plan	x	0	0
Deer Pen Restoration Project	0	0	2.1	Red Hill Restoration	0	0	0
Dry Restoration	0	0	3	Reedy Timber Sale Project	0	0	0
East Wedge	0	0	3.6	Renshaw Vegetation Management Project EA	0	0	0
Elkhorn Project	24.56	0.26	0	Roy Creek	0	200	0
Escalante Forest Restoration Project	x	0	0	Sagehen Project	0	0	0
French Fire Recovery and Reforestation Project	0	0	2.5	Salmon West	x	188	x

Gooseberry Ecological Restoration	0	0	0	Sandbox Vegetation Management	0	0	0
Gordon Hill Vegetation Management Proiect	0	0	2.8	Shores	0	x	0
Grass Flat Hazardous Fuels Reduction and Forest Health Restoration Project	0	0	0	Smith Mountain Project	x	50	x
Grizzly Fire Salvage and Restoration	0	0	5	Soldier Bay Analysis Area	0	0	0
Hams Fork Vegetation	0	0	4	South Bridger Interface Project EA	0	0	0
Hopkins Prairie Fire Salvage EA	0	0	0	South Summit Forest and Fuels II	0	0	0
Interior Vegetation Management Project	66	9	5	Southern Creek Ouachita River	0	0	0
Iron Springs Vegetation Improvement and Salvage Project	0	0	9.6	Spring Gulch Timber Sale	0	0	0
Julius Park Vegetation Management Project	0	0	1	Sulphur Forest Restoration Project	0	0	0
Junction Vegetation Management Project	2.62	0	0	Telogia Analysis Area	0	0	0
Keola Fuels and Forest Heath	0	0	1.5	Toll Joe	0	0	0
Kidhaw Wildlife Habitat Improvement Project	0.6	0	2	Upper Lake Winona	x	0	0
Larson Forest Restoration Project	7.5	0	0	Upper South Fork Skokomish Vegetation Management Project	0	0	0
Lemon Butte Project Environmental Assessment	0	0	3.25	Watson Hill LLC Vegetation Management and Timber Sale Project	0	0	0
Lower Skokomish Vegetation Management Project	0	x	0	West Slope Wildland-Urban Interface Hazardous Fuels Reduction Project	0	0	0

Macedonia EA	x	0	0	Westside Collaborative Vegetation Management Project	0	0	0
Marshall Woods Restoration Project	0	0	x	Windy Project	0	0	0

Appendix C2 – Professional Staff and Experts – (e)(25)

The USFS has a strong cadre of professional staff and scientists with extensive experience implementing and researching restoration activities on NFS lands. Appendix C2 has a list of professional staff and experts with knowledge of activities identified under this category of actions. These experts provide extensive experience implementing and monitoring these types of activities. Their experiences include conducting and leading interdisciplinary teams through environmental analysis on project proposals, resource specialists involved in on-the-ground implementation of these restoration activities, and program managers guiding the development and execution of restoration programs. The experience of these professional staffs is from a wide range of ecosystems across the United States including forested, grassland, and arid landscapes.

NAME	TITLE	EDUCATION	YEARS	AGENCIES	REGION(S)	EXPERTISE
Chris Carlson	Assistant Director, Water and Aquatic Resources	B.A. Physics, M.S. Environmental Science, M.S. Geology, Ph.D. Geological Science	12+ w/USFS 26+ professional	USFS	National	Hydrology, Geology (WI Lic Prof Hydrologist, WI Lic Prof Geologist)
Eric Davis	Assistant Director, Integrated Vegetation Management, Forest and Range Management and Vegetation Ecology	B.A. Biology, M.S. Biology, M.A. National Security and Strategic Studies	28	USMC, USFWS, USFS	In USFS - National	Endangered Species, Environmental Management, Logistics
Frank Fay	Applied Fire Ecologist	B.S. Forestry	33	USFS	Regions 4, 5, and 6, National	Fire, Fuels, Ecology, Planning, Silviculture, Climate Change, Remote Sensing, Risk Assessment
Sam Gaugush	Program Specialist, NEPA	J.D. University Oregon School of Law, B.A. Sociology and Spanish	10	USFS, BLM	National	NEPA, Environmental and Natural Resources Law, Administrative Law

NAME	TITLE	EDUCATION	YEARS	AGENCIES	REGION(S)	EXPERTISE
James Menakis	National Fire Ecologist	B.S. Natural Resources, M.S. Environmental Studies	30	USFS	Rocky Mountain Research Station, National Fire and Aviation Management	Fire Ecology, Fuel Treatment Effectiveness, Wildfire Risk Assessments
John Exline	Director Ecosystem Management, Pacific Southwest Region	B.A. Biology, M.F. Forest Resource Management	37	USFS	Regions 5, 6, National	Forester, Sale Preparation, Management of National Forest Service System lands
Kris Stein	District Ranger	B.S. Recreation Resource Management, M.S. Forest Management	30	USFS	Regions 3, 4, 6, 9	Management of National Forest Service System lands, and NEPA implementation
Rob Gillespie	National Program Manager, FHWA Liaison	B.S. Civil Engineering	8.5	FHWA USFS – NFS	National	Road Design, Construction, Policy, and Oversight
Steve Kuennen	Director Renewable Resources, Eastern Region	B.S. Natural Resource Management	20	USFS, Menominee Indian Tribe	Regions 1, 2, 6, 8, 9	Forester, Sale Preparation, Sale Administration, Silviculture
Tera Little	NEPA Specialist	B.A. Communication	11	USFS - NFS	National, Regions 1, 3, and 4	Environmental Compliance (NEPA)
Laura Hierholzer	Regional Environmental Coordinator	B.S. Forestry	32	USFS	Region 5	Environmental compliance, Forester, Sale Preparation, Sale Administration
Anne Ebbers	NEPA Specialist	B.A. English; M.S. Environmental Sciences & Policy	4	UFS – NFS; BLM	National	Environmental compliance (NEPA)
Robert E. Keane	Research Ecologist	B.S. Forest Engineering; M.S. Forest Ecology; Ph.D. Forest Ecology	30	USFS	Rocky Mountain Research Station	Wildland fire and fuels; ecological modeling; ecosystem restoration

NAME	TITLE	EDUCATION	YEARS	AGENCIES	REGION(S)	EXPERTISE
Sharon Hood	Research Ecologist	B.S. Forestry, Forest Management Emphasis; M.S. Forestry, Forest Biology Emphasis; Ph.D. Organismal Biology and Ecology	16 with USFS, 19 Professional	USFS	Rocky Mountain Research Station	Fire ecology, forest ecology, silviculture, plant defenses
Russ Parsons	Research Ecologist	B.S. Forestry, M.S. Forest Resources, Ph.D. Forestry	20	USFS	Rocky Mountain Research Station	Fuel/fire interactions, fuel modeling, fire ecology, fire behavior
Matt Jolly	Research Ecologist	B.A Environmental Science, Ecology Emphasis; PhD Forestry	15	USFS	Rocky Mountain Research Station	Climate/vegetation interactions, fire ecology, fire behavior
Megan Healy	NEPA Specialist	B.S. Technical and Scientific Communication M.A. Environmental and Resource Policy	12	USFS - NFS	National	Environmental Compliance (NEPA)

Appendix C3 – Select Research Papers and Supporting Documents – (e)(25)

Examples of peer-reviewed scientific analysis, research, and monitoring conducted on forest, watershed and habitat activities identified under this category of actions are listed in Appendices C3 and C4. These references document management effectiveness and mitigation of resource effects of the activities proposed under CE (e)(25). Following the public comment period, the rule writing team convened a group of scientists from the Rocky Mountain Research Station to analyze the body of literature submitted in public comments specific to the restoration CE. Additionally, the team analyzed the original literature included in the supporting statement and brought forward new literature, which is cited in Appendix C3. In response to the science team's review, modifications were made to some of the activities covered under the CE. The appendices were updated to be responsive to public comments.

RESEARCH PAPER, AUTHORS, PUBLICATION	Findings Summary
Basic principles of forest fuel reduction treatments; Agee, James, and Carl Skinner; Forest Ecology and Management, Vol 211, Issues 1–2 (2005) 83-96	This paper focuses on the drier forests that are in need of active management to mitigate fire hazard. The paper summarizes a set of simple principles important to address in fuel reduction treatments: reduction of surface fuels, increasing the height to live crown, decreasing crown density, and retaining large trees of fire-resistant species. Thinning and prescribed fire can be useful tools to achieve these objectives. Low thinning will be more effective than crown or selection thinning, and management of surface fuels will increase the likelihood that the stand will survive a wildfire. Applying treatments at an appropriate landscape scale will be critical to the success of fuel reduction treatments in reducing wildfire losses in Western forests.
The effects of three regeneration harvest methods on plant diversity and soil characteristics in the southern Appalachians; Elliott, Katherine and Jennifer Knoepp; Forest Ecology and Management, Vol 211, Issue 3 (2005) 296-317	This paper evaluated the effects of three regeneration harvest methods on plant diversity and soil resource availability in mixed hardwood ecosystems based on species diversity of overstory, understory, and herbaceous layer species was evaluated using species richness (S), Shannon–Wiener's index of diversity (H0), and Pielou's evenness index (E). The conclusion found an increase in average distance in the NMS ordination among sites in 2000 compared to 1994, which suggests greater herbaceous species diversity after harvest. However, the authors did not see a clear separation among harvest treatments in the NMS ordination.
The effects of harvest-created gaps on plant species diversity, composition, and abundance in a Maine oak–pine forest; Schumann, Martha, Alan White, and Jack Witham; Forest Ecology and Management, Vol 176, Issues 1–3 (2003) 543-561	This paper evaluates the effects of harvest-created gaps and soil moisture (as reflected by soil drainage classes) on woody and herbaceous species diversity, composition, and abundance relative to unharvested control areas. Because the vegetation was sampled in both 1993 and 1998, detection of short-term changes was possible. Conclusion: From a silvicultural perspective, the harvest gaps created sites for establishment of seedlings and sprouts of tree species, particularly early successional species. The creation of gaps met a primary objective of the harvest, to increase white pine and red oak regeneration. Silvicultural practices seeking to incorporate natural disturbances should retain late successional characteristics within managed forests (Hunter, 1990). The group-selection harvest at the HRF, while introducing early successional species, maintained late successional species as well.
Effects of thinning on soil and tree water relations, transpiration and growth in an oak forest; Bréda, N, A. Granier, and G. Aussenac; Tree Physiology, Vol 15, Issue 5 (1995) 295–306	This paper quantifies the effects of crown thinning on the water balance and growth of the stand and to analyze the ecophysiological modifications induced by canopy opening on individual tree water relations, the authors conducted a thinning experiment in a 43-year-old Quercus petraea stand by removing trees from the upper canopy level. Soil water content, rainfall interception, sap flow, leaf water potential and stomatal conductance were monitored for two seasons following thinning. Seasonal time courses of leaf area index (LAI) and girth increment were also measured. Thinning increased inter-tree variability in sap flow density, which was closely related to a leaf area competition index. Stomatal conductance varied little inside the crown and differences in stomatal conductance between the treatments appeared only during a water shortage and affected mainly the closed stand. Thinning enhanced tree growth as a result of a longer growing period due to the absence of summer drought and higher rates of growth. Suppressed and dominant trees benefited more from thinning than trees in the codominant classes.

RESEARCH PAPER, AUTHORS, PUBLICATION	Findings Summary
Salvage harvest effects on advance tree regeneration, soil nitrogen, and fuels following mountain pine beetle outbreak in lodgepole pine; Griffin, Jacob, Martin Simard, and Monica G. Turner; Forest Ecology and Management Volume 291 (2013) 228–239	This paper studies how post-outbreak timber harvest (i.e., salvage harvest) could alter future forest development, productivity and susceptibility to subsequent disturbance. This study suggests that merchantable trees can be harvested from some beetle-killed lodgepole pine forests without severely compromising potential tree regeneration and without large initial effects on soil N. This study also suggests that the window of time in which salvage harvest could reduce post-outbreak canopy fuels compared to untreated stands is short. The longer salvage harvest is delayed after beetle attack, the less effective the treatment will be for reducing canopy fuels because the red stage is ephemeral, and available canopy fuels are progressively shed from beetle-killed trees.
2016-2017 Gambel Oak Understory Study Summary; Chambers, Marin and Jeff Cannon; Colorado Forest Restoration Institute, Colorado State University, CFRI-1801, January 2018	This paper describes how Gambel oak treatments such as cutting, mowing, and prescribed fire influence Gambel oak growth and understory vegetation, particularly for the purposes of improving wildlife habitat and browse potential and to better inform the effectiveness of treatments in Gambel oak on the western slope of Colorado.
Effects of forest restoration treatments and wildfires on tree spatial patterns in the Colorado Front Range; Cannon, Jeffery, Jennifer Briggs, and Marin Chambers; 7th International Fire Ecology and Management Congress, Research Highlight, December 2017	Research study on how restoration treatments alter fine-scale forest spatial patterns and compare these outcomes to those from low- to moderate severity portions of wildfires. Conclusion: Both mechanical restoration treatments and low- and moderate severity portions of wildfires enhance the spatial mosaic present in forests by increasing coverage, size, and variability of gaps; Low- and moderate severity portions of wildfires resulted in lower canopy cover and higher gap cover than the majority of restoration treatments.
Hydrologic responses to restored wildfire regimes revealed by soil moisture vegetation relationships; Gabrielle Boisramé, Sally Thompson, Scott Stephens; Advances in Water Resources 112 (2018) 124-146	Restoration of pre-suppression forest composition and structure through a variety of management activities could improve forest resilience and water yields. The study explores the potential for "managed wildfire", whereby naturally ignited fires are allowed to burn, to alter the water balance. Little change in basin-averaged soil moisture was inferred due to managed wildfire, but the results indicated that large localized increases in soil moisture had occurred, which could have important impacts on local ecology or downstream flows.
Effects of thinning on drought vulnerability and climate response in north temperate forest ecosystems; D'Amato, Anthony, John Bradford, Shawn Fraver, and Brian Palik; Ecological Applications, Vol 23, Issue 8 (2013) 1735-1742	This study provides a critical evaluation of the long-term effectiveness of tree density management at reducing drought impacts and illustrates that the relative effectiveness of such strategies may vary depending on long-term thinning history. Findings underscore the utility of tree density reductions (via silvicultural thinning) for reducing drought vulnerability. Thinning should be viewed as a near-term solution to reducing drought vulnerability relative to longer term approaches aimed at increasing the functional diversity of forest tree communities, including greater representation of drought tolerant species.

RESEARCH PAPER, AUTHORS, PUBLICATION	Findings Summary
Fuel treatment effects on tree-based forest carbon storage and emissions under modeled wildfire scenarios; Hurteau, Matthew and Malcolm North; Frontiers in Ecology and the Environment, Vol 7, Issue 8 (2009) 409-414	This paper addresses how to manage forests with frequent fire regimes to maximize carbon storage while reducing carbon emissions from prescribed burns or wildfire. Hurteau and North modeled the effects of eight different fuel treatments on tree-based carbon storage and release over a century, with and without wildfire. Model runs show that, after a century of growth without wildfire, the control stored the most carbon. However, when wildfire was included in the model, the control had the largest total carbon emission and largest reduction in live-tree-based carbon stocks. In model runs including wildfire, the final amount of tree-based carbon sequestered was most affected by the stand structure initially produced by the different fuel treatments. In wildfire-prone forests, tree-based carbon stocks were best protected by fuel treatments that produced a low-density stand structure dominated by large, fire-resistant pines.
Fuel treatments alter the effects of wildfire in a mixed-evergreen forest, Oregon, USA; Raymond, Crystal and David Peterson; Canadian Journal of Forest Research, 35(12) (2005) 2981-2995	A rare opportunity to quantify the relationship between fuels and fire severity using prefire surface and canopy fuel data and fire severity data after a wildfire. The potential for crown fire initiation remained fairly constant despite reductions in ladder fuels, because thinning increased surface fuels, which contributed to greater surface fire intensity. Thinning followed by underburning reduced canopy, ladder, and surface fuels, thereby decreasing surface fire intensity and crown fire potential. However, crown fire is not a prerequisite for high fire severity; damage to and mortality of overstory trees in the wildfire were extensive despite the absence of crown fire. Mortality was most severe in thinned treatments (80%–100%), moderate in untreated stands (53%–54%), and least severe in the thinned and underburned treatment (5%). Fuel treatments intended to minimize tree mortality will be most effective if both ladder and surface fuels are treated.
The use of shaded fuelbreaks in landscape fire management; Agee, James, Berni Bahro, Mark Finney, Philip Omi, David Sapsis, Carl Skinner, Jan van Wagtendonk, C Phillip Weatherspoon; Forest Ecology and Management, Vo 127, Issues 1–3 (2000) 55-66	Landscape-level treatments such as prescribed fire can use shaded fuelbreaks as anchor points, and extend the zone of altered fire behavior to larger proportions of the landscape. Coupling fuelbreaks with area-wide fuel treatments can reduce the size, intensity, and effects of wildland fires.
The ecology of mixed severity fire regimes in Washington, Oregon, and Northern California; Perry, David, Paul Hessburg, Carl Skinner, Thomas Spies, Scott Stephens, Alan Henry Taylor, Jerry Franklin, Brenda McComb, Greg Riegel; Forest Ecology and Management, Vol 262, Issue 5 (2011) 703-717	This paper addresses forests characterized by mixed-severity fires occupy a broad moisture gradient between lower elevation forests typified by low-severity fires and higher elevation forests in which high-severity, stand replacing fires are the norm. Mixed-severity regimes are produced by interactions between top-down forcing by climate and bottom-up shaping by topography and the flammability of vegetation, although specific effects may vary widely across the region, especially the relation between aspect and fire severity.

RESEARCH PAPER, AUTHORS, PUBLICATION	Findings Summary
Return on investment from fuel treatments to reduce severe wildfire and erosion in a watershed investment program in Colorado; Jones, Kelly, Jeffery Cannon, Freddy Saavedra, Stephanie Kampf, Robert Addington, Antony Cheng, Lee MacDonal, Codie Wilson, Brett Wolk; Journal of Environmental Management, 198 (2017) 66-77	This paper used return on investment (ROI) analysis to quantify how the amounts and placement of fuel treatment interventions would reduce sediment loading to the Strontia Springs Reservoir in the Upper South Platte River watershed southwest of Denver, Colorado following an extreme fire event. A positive ROI after large storm events when fire mitigation treatments were placed in priority areas with diminishing marginal returns after treating >50-80% of the forested area. While analysis showed positive ROI focusing only on post-fire erosion mitigation, it is important to consider multiple benefits in future ROI calculations and increase monitoring and evaluation of these benefits of wildfire fuel reduction investments for different site conditions and climates.
Policy issues relevant to risk assessments, balancing risks, and the National Fire Plan: Needs and opportunities; O'Laughlin, Jay; Forest Ecology and Management, Vol 211, Issues 1–2 (2005) 3-14	The author discusses needs and opportunities for assessing and managing risks posed by wildfire through synthesis of natural resources agency and conservation group perspectives.
The effects of bark beetle outbreaks on forest development, fuel loads and potential fire behavior in salvage logged and untreated lodgepole pine forests; Collins, B.J.; Rhoades, C.C.; Battaglia, M.A.; Hubbard, R.M.; Forest Ecology and Management, Vol 284 (2012) 260–268.	This paper quantified how salvage logging influenced tree regeneration and fuel loads relative to nearby, uncut stands. Harvesting increased woody surface fuels more than 3-fold compared to untreated stands immediately after treatments; however, coarse fuels will increase substantially in untreated stands within three decades of the beetle infestation as dead trees topple, and the elevated fuel loads will persist for more than a century. Though salvage logging will treat a small fraction of beetle-infested Colorado forests, in those areas treatment will affect stand development and fuel loads and will alter potential fire behavior for more than a century.
Recovery of small pile burn scars in conifer forests of the Colorado Front Range; Rhoades, Charles; Paula Fornwalt, Mark Paschke, Amber Shanklin, Jayne Jonas; Forest Ecology and Management Vol 347 (2015) 180-187	The ecological consequences of slash pile burning are a concern for land managers charged with maintaining forest soil productivity and native plant diversity. Findings indicate that rehabilitation may not be required for small burn pile scars except in sensitive areas, such as those with water quality and invasive plant concerns.
Slash Pile Burning Effects on Soil Biotic and Chemical Properties and Plant Establishment: Recommendations for Amelioration; Korb, Julie E., Nancy C. Johnson, W.W. Covington; Restoration Ecology, Vol 12, Issue 1 (2004)	This study investigated the effects of slash pile burning on soil biotic and chemical variables and early herbaceous succession on burned slash pile areas. These results indicate that seed/soil amendments that increase native forbs and grasses may enhance the rate of succession in burned slash pile areas by allowing these species to outcompete exotic and ruderal species also establishing at the site through natural regeneration.
Sediment concentration and turbidity changes during culvert removals; Foltz, RB, KA Yanosek, TM Brown; Journal of Environmental Management, Vol 87 (2008) 329–340	The concentrations of sediment and turbidity in stream water were monitored during culvert removals to determine the short term effects of road obliteration.

RESEARCH PAPER, AUTHORS, PUBLICATION	Findings Summary
Reestablishing Groundwater and Surface Water Connections in Stream Restoration; Parola, Arthur A. and Hansen, Chandra; Sustain Magazine, Issue 24, Spring / Summer (2011)	This study investigated whether river restoration was successful in re-establishing groundwater–surface water interactions in a degraded urban stream. Results indicated that river restoration at the study site was indeed successful in increasing groundwater–surface water interactions.
The Stream Institute, University of Louisville's Stream and Wetland Restoration Program; Parola, Arthur C. and Biebighauser, Thomas R; Sustain Magazine, Issue 24, Spring / Summer (2011)	An article published in Sustain Magazine highlighting the U of Louisville's Stream and Wetland Restoration program.
Lost linkages and lotic ecology: rediscovering small streams; Meyer, J.L. and J.B. Wallace; The 41st Symposium of the British Ecological Society, 10-13 April (2000)	Paper examined the concepts that have shaped ecological research in flowing waters over the past quarter century and the opportunities for future advances in the field. Linking ecological, ethical, economic and legal analyses will be essential to sustain the integrity of lotic ecosystems (Meyer 1997).
Ridge Top to Valley Bottom: Restoring Whole Watersheds; USDA Forest Service; Forest Service, Pacific Northwest Region R6-NR-WFW-05-05; Portland, OR., July (2005)	A profile of completed watershed restoration efforts from the Pacific Northwest Region of the Forest Service. Projects highlighted in this report represent a variety of approaches with an array of treatment combinations—ranging from road removal to stream channel reconstruction to prescribed fires—all with a common end goal of ecosystem restoration.
Restoration in Action: The First Five Years of the Legacy Roads and Trails Program; Wildlands CPR; The Wilderness Society, April (2013)	This report highlights Legacy Roads and Trails accomplishments during its first five years. It provides a general accounting of appropriated funds and spotlights a sampling of projects from across the country. Legacy Roads and Trails was created specifically to provide crucial resources to fix and stormproof the roads we need, and to reclaim unneeded roads causing the most damage.
Kalies, E. L., and L. L. Yocom Kent. 2016. Tamm Review: Are fuel treatments effective at achieving ecological and social objectives? A systematic review. Forest Ecology and Management 375:84-95.	This review examines if fuel treatment studies also achieve ecological and social objectives besides just reducing fuel hazard. Thin + burn treatments had positive effects in terms of reducing fire severity, tree mortality, and crown scorch. In contrast, burning or thinning alone had either less of an effect or none at all, compared to untreated sites. Most studies focused on carbon storage agreed that treatments do not necessarily store more carbon after wildfire, but result in less post-wildfire emissions and less carbon loss in a wildfire due to tree mortality. Understory responses are mixed across all treatments, and the response of other ecological attributes (e.g., soil, wildlife, water, insects) to treatment post-wildfire represents an important data gap. Overall, evidence is strong that thin + burn treatments meet the goal of reducing fire severity, and more research is needed to augment the few studies that indicate treatments protect human lives and property.

RESEARCH PAPER, AUTHORS, PUBLICATION	Findings Summary
Martinson, E. J., and P. N. Omi. 2013. Fuel treatments and fire severity: a meta-analysis. Res. Pap. RMRS-RP-103WWW. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station. 38 p. 103.	This is a meta-analysis that synthesizes the effects of fuel treatments on fire intensity and severity. The authors found that the overall mean effect of fuel treatments on fire responses is large and significant. However, fuel treatments can vary widely in effectiveness, which is largely explained by vegetation and treatment type.
Leverkus, A. B., J. M. Rey Benayas, J. Castro, D. Boucher, S. Brewer, B. M. Collins, D. Donato, S. Fraver, B. E. Kishchuk, and E.-J. Lee. 2018. Salvage logging effects on regulating and supporting ecosystem services—A systematic map. Canadian Journal of Forest Research 48:983-1000.	This paper provides a global review of salvage logging studies to determine knowledge gaps and future research needs.
Elliot, W.J., 2004. WEPP INTERNET INTERFACES FOR FOREST EROSION PREDICTION 1. *JAWRA Journal of the American Water Resources Association*, *40*(2), pp.299-309.	Sediment production associated with road construction is a primary concern in fuel treatment planning. However, calculation of how much erosion might occur is complex. This citation documents the updating of the Water Erosion Prediction Project (WEPP), the primary model used to evaluate road-related erosion. WEPP is often used in conjunction with analysis of potential erosion that might arise in a specific area, and how those rates of erosion might increase either from road building or other restoration activities.
Salis, M., Laconi, M., Ager, A.A., Alcasena, F.J., Arca, B., Lozano, O., de Oliveira, A.F. and Spano, D., 2016. Evaluating alternative fuel treatment strategies to reduce wildfire losses in a Mediterranean area. Forest Ecology and Management, 368, pp.207-221.	This citation describes a simulation study carried out for the Italian island of Sardinia, which has a fire regime, vegetation and similar WUI/ fire management concerns to southern California. The study used fire modeling very similar to that in the US to explore different levels of treatments and different sets of fire weather. They found that landscape scale fuel treatment effectiveness increased with proportion of area treated, and that for several indicators, effectiveness performance increased with fuel treatments spatially located closer to roads. However, whether this is true for other landscapes would likely depend on the specific distribution of roads within that landscape and related topographic and weather patterns.
Bradford, J. B., and D. M. Bell. 2017. A window of opportunity for climate-change adaptation: easing tree mortality by reducing forest basal area. Frontiers in Ecology and the Environment 15:11-17	This paper provides evidence that proactively reducing basal area in dry forests types of the western US may ameliorate tree mortality from climate change and drought.
BROWN, R. T., J. K. AGEE, and J. F. FRANKLIN. 2004. Forest Restoration and Fire: Principles in the Context of Place. Conservation Biology 18:903-912	This paper describes the importance of historical fire regime context when describing appropriate use of fuel treatments.

RESEARCH PAPER, AUTHORS, PUBLICATION	Findings Summary
Churchill, D. J., A. J. Larson, M. C. Dahlgreen, J. F. Franklin, P. F. Hessburg, and J. A. Lutz. 2013. Restoring forest resilience: From reference spatial patterns to silvicultural prescriptions and monitoring. Forest Ecology and Management 291:442-457.	This paper proposes a method to use reference conditions to guide restoration treatments to increase forest resilience.
Collins, B. M., S. L. Stephens, J. J. Moghaddas, and J. Battles. 2010. Challenges and Approaches in Planning Fuel Treatments across Fire-Excluded Forested Landscapes. Journal of Forestry 108:24-31Crotteau, J., C. Keyes, S. Hood, and A. Larson. 2019. Vegetation dynamics following compound disturbance in a dry pine forest: fuel treatment followed by bark-beetle outbreak. Ecological Applications.	This paper describes management constraints to fuel treatment implementation and decisions relating to treatment placement, type, size, and intensity.
Fulé, P. Z., J. E. Crouse, J. P. Roccaforte, and E. L. Kalies. 2012. Do thinning and/or burning treatments in western USA ponderosa or Jeffrey pine-dominated forests help restore natural fire behavior? Forest Ecology and Management 269:68-81.	This is a systematic review of fuel treatment effectiveness at reducing fire behavior in ponderosa and Jeffrey pine forests. Many of the studies were modeling studies rather that based on empirical results. The review found thinning coupled with prescribed burning is typically the most effective restoration treatment.
Hood, S., S. Baker, and A. Sala. 2016. Fortifying the Forest: Thinning and Burning Increase Resistance to a Bark Beetle Outbreak and Promote Forest Resilience. Ecological Applications 26:1984–2000.	This study examined the effects of fuel treatments to a subsequent mountain pine beetle outbreak. Treatments involving thinning dramatically reduced mortality from bark beetles, while prescribed burning provided additional physiological improvements to tree defense.
Hurteau, M. D., S. Liang, K. L. Martin, M. P. North, G. W. Koch, and B. A. Hungate. 2016. Restoring forest structure and process stabilizes forest carbon in wildfire-prone southwestern ponderosa pine forests. Ecological Applications 26:382-391.	This modeling study shows that carbon storage studies must account for disturbance regime. It found forest restoration treatments in southwestern pine forests increased carbon balances.

RESEARCH PAPER, AUTHORS, PUBLICATION	Findings Summary
Jain, T. B., M. A. Battaglia, H.-S. Han, R. T. Graham, C. R. Keyes, J. S. Fried, and J. E. Sandquist. 2012. A comprehensive guide to fuel management practices for dry mixed conifer forests in the northwestern United States. Page 331. USDA Forest Service Rocky Mountain Research Station RMRS-GTR-292, Fort Collins, CO.	This summary addresses three fuel treatment approaches: mechanical, herbicides, and targeted grazing.
Keane, R. E., P. F. Hessburg, P. B. Landres, and F. J. Swanson. 2009. A review of the use of historical range and variation (HRV) in landscape management. Forest Ecology and Management 258:1025-1037.	Applications of the HRV concept have specific contexts, constraints, and conditions that are relevant to any application and are influential to the extent to which the concept is applied. These conditions notwithstanding, we suggest that the HRV concept offers an objective reference for many applications, and it still offers a comprehensive reference for the short-term and possible long-term management of our nation's landscapes until advances in technology and ecological research provide more suitable and viable approaches in theory and application.
Parks, S. A., C. Miller, L. M. Holsinger, L. S. Baggett, and B. J. Bird. 2016. Wildland fire limits subsequent fire occurrence. International Journal of Wildland Fire 25:182-190	This study evaluates whether or not wildland fire regulated the ignition and spread (hereafter occurrence) of subsequent fire. Results clearly indicate that wildland fire indeed regulates subsequent occurrence of fires ≥ 20 ha in all study areas. Authors also found that wildland fire limits subsequent fire occurrence for nine years in the warm/dry study area in the south-western US and over 20 years in the cooler/wetter study areas in the northern Rocky Mountains. The findings expand upon our understanding of the regulating capacity of wildland fire and the importance of wildland fire in creating and maintaining resilience to future fire events.
Reinhardt, E. D., R. E. Keane, D. E. Calkin, and J. D. Cohen. 2008. Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States. Forest Ecology and Management 256:1997-2006.	This paper (1) summarizes objectives, methods, and expected outcomes of fuel treatments in forests of the Interior West, (2) highlights common misunderstandings and areas of disagreement, and (3) synthesizes relevant literature to establish a common ground for future discussion and planning.

Appendix C4 – Monitoring of Restoration Activities – (e)(25)

To obtain information related to implementation and monitoring of the projects listed in Appendix C1, USFS personnel on national forests across the U.S., who were familiar with the projects, responded to a questionnaire intended to verify whether the observed effects of these implemented projects were consistent with the NEPA analysis, and if not, examine how they differed. Twenty-three of the 68 projects were subject to additional review through the questionnaire. The questionnaire asked if the project had been implemented, if the project effects were more intense or substantial than predicted, how the effects were observed, where the monitoring results can be found, and how the effects differed from what was predicted. Two forests stated their projects had not been implemented and

two forests did not respond. For the 19 projects identified in Appendix C1 that provided survey responses, respondents indicated that the effects were not more intense or substantial than predicted in the EA, DN, and FONSI. The respondents also described how effects were observed or documented following project implementation. None of the environmental analyses for the projects reviewed for this proposed CE predicted significant environmental effects on the human environment.

Appendix C4 was updated to add information on 23 Collaborative Forest Landscape Restoration Program (CFLRP) projects located across the United States. The projects vary in size and have unique collaborative histories, infrastructure, and ecological conditions; all are in fire-adapted landscapes, with the goal of reintroducing natural fire and reducing the risk of fire to valued resources. The purpose of the CFLRP is to encourage the collaborative, science-based ecosystem restoration of priority forest landscapes. The projects are required to use a multiparty monitoring, evaluation, and accountability process to assess the positive or negative ecological, social, and economic effects. In addition, the projects are required to complete annual reporting on their progress including (1) a description of all acres treated and restored through projects implementing the strategy; (2) an evaluation of progress; (3) a description of community benefits achieved; (4) the results of the multiparty monitoring, evaluation, and accountability process; and (5) a summary of the costs of treatments and relevant fire management activities. The national indicators and sub indicators for monitoring are:

Indicators	Fire risk and costs	Leveraged funds	Economic impacts	Collaboration	Ecological condition
Sub indicators	Fire regime	Watershed condition	Invasive species	Fish and wildlife habitat	

The desired conditions and monitoring questions for the ecological sub indicators are set by each individual collaborative group based on local stakeholder interests and site specific needs. Each project scores their progress for each ecological sub indicator as either good, fair, or poor based on their judgement about project scale progress and landscape scale progress. The ecological report does not capture all of the monitoring work completed within a CFLRP project. The report is intended to provide an understanding of the extent to which the CFLRP project is progressing towards the desired ecological conditions outlined in its proposal. The 2014 ecological indicator reports for the 23 Collaborative Forest Landscape Restoration Program projects are included in Appendix C4. Additional information on the monitoring plans and other monitoring results can be found at the following link: https://usfs.maps.arcgis.com/apps/MapSeries/index.html?appid=c8af09c0176b477d90ef9c704b7e15a1

Other information on CLFRP projects can be found at https://www.fs.fed.us/restoration/CFLRP/results.shtml.

While the size of CFLRP projects tend to be much larger than the acreage included in the restoration CE, many of the treatment activities, such as thinning, reforestation, prescribed fire, etc. are similar to those covered by the CE at a smaller scale. The monitoring results available for some of these projects helps demonstrate the effectiveness of these activities at accomplishing restoration and resilience objectives on National Forest System lands.

Monitoring Document	Preparers	Summary
Colorado Front Range Collaborative Forest Landscape Restoration Project: Ecological Monitoring of Treatment Effects on Stand Structure and Fuels through 2013 Colorado Front Range Collaborative Forest Landscape Restoration Project: 2014 Ecological Indicator Report	Rob Addington, Kristen Pelz, and Tony Cheng	The 2013 report highlights accomplishments and ecological monitoring results for Front Range forest restoration treatments carried out under the Collaborative Forest Landscape Restoration Program through 2013. The Front Range CFLRP aims to restore lower montane forest structure and function by reducing forest density, creating diverse patterns of forest structure at stand and landscape-scales and reducing the potential for uncharacteristically severe wildfire. This monitoring document found that treatments have been effective in reducing forest densities, improving the balance of tree size class distributions and increasing stand quadratic mean diameters. Treatments have successfully reduced canopy fuels. Surface fuels increased following thinning activities and the document concludes that prescribed fire following mechanical treatments is extremely important. The 2014 report includes discussion of some monitoring results. Treatments generally caused forest conditions to move in desired directions. Canopy cover was reduced by treatments from 44% to 26% at the stand scale, on average. Despite the drop in cover, the number of patches increased, due to their smaller size. Size of the largest canopy patches also decreased, from covering 22% to 7% of the treatment units. Patches were more heterogeneously dispersed following treatment than before treatment, with a greater average distance, and greater range of distances, between patches of forest cover. All of these changes indicate that forest cover is less continuous, more spatially variable, and less likely to burn as part of a contiguous stand replacing fire. Some changes, however, indicate decreases in complexity of cover patterns. The range of patch areas decreased, and the amount of forest edge per area of canopy cover decreased. At the landscape scale, we did not expect large changes in forest cover due to the small portion of each watershed treated. But, although changes caused by treatments were small, they were noticeable.
Monitoring Fish and Wildlife Habitat in the Collaborative Forest Landscape Restoration	USDA Forest Service, Eileen Kitayama	An interactive "Story Map" providing background and results (through 2018) on monitoring across the CFLRPs.
Accelerating Longleaf Pine Restoration, Collaborative Forest Landscape Restoration Program: 5 year report 2010-2014 Accelerating Longleaf Restoration Osceola National Forest Collaborative Forest Landscape Restoration Program (CFLRP) Monitoring Report 2011-2015	Accelerating Longleaf Pine Restoration Collaborative and US Forest Service Osceola National Forest and National Forests in Florida	This 5-year report highlights progress to reduce fuels, improve watersheds and restore forest health on the National Forests in Florida, Osceola NF. The report evaluates the progress level of achieving desired conditions for the project based on monitoring. The Osceola NF project focuses on accelerating longleaf restoration to reduce the risk of severe wildfire and enhance wildlife habitat. The monitoring report found that CFLRP management actions improved ecological conditions and resulted in an increase in focal species populations. Treatment activities included thinning, roller chopping, and prescribed fire.

Monitoring Document	Preparers	Summary
Amador Calaveras Consensus Group, Cornerstone Collaborative Forest Landscape Restoration Program: 3 year report 2012-2014	Amador Calaveras Consensus Group, Cornerstone Collaborative and US Forest Service	This report highlights progress to reduce fuels, improve watersheds and restore forest health on the Eldorado and Stanislaus NFs.
Burney-Hat Creek Basins Collaborative Forest Landscape Restoration Program: 5 year report 2012-2014	Burney-Hat Creek Basins Collaborative and US Forest Service	This report highlights progress to reduce fuels, improve watersheds and restore forest health on the Lassen.
Colorado Front Range Collaborative Forest Landscape Restoration Program: 5 year report 2012-2014	Front Range Roundtable and US Forest Service	This report highlights progress to reduce fuels, improve watersheds and restore forest health on the Arapaho and Roosevelt and Pike and San Isabel NFs.
Deschutes Collaborative Forest Landscape Restoration Program: 5 year report 2012-2014	Deschutes Collaborative and US Forest Service	This report highlights progress to reduce fuels, improve watersheds and restore forest health on the Deschutes NF.
Dinkey Landscape Restoration Project Collaborative Forest Landscape Restoration Program: 5 year report 2012-2014 2018 Dinkey Collaborative Ecological Monitoring Report	Dinkey Collaborative and US Forest Service	This report highlights progress to reduce fuels, improve watersheds and restore forest health on the Sierra NF. The 91-page ecological monitoring report covers monitoring that took place on the landscape in 2018 for forest stand structure and composition, fire and fuel dynamics, mammalian and avian wildlife, aquatic organisms, hydrology, geology, and livestock grazing. Some highlights include that treatments are effective at mitigating drought impacts, particularly for ponderosa pines. Forest management that maintains a diversity of tree species will buffer forests against future droughts and other large disturbances. BMP effectiveness monitoring indicated that forest treatments are largely meeting the recommendations for BMPs (80-88%). Over the previous year forest restoration treatments did not increase sedimentation or decrease water quality.
Four Forest Restoration Initiative Collaborative Forest Landscape Restoration Program: 5 year report 2012-2014	Four Forest Restoration Initiative Collaborative and US Forest Service	This report highlights progress to reduce fuels, improve watersheds and restore forest health on the Apache-Sitgreaves, Coconino, Kaibab and Tonto NFs.

Monitoring Document	Preparers	Summary
Grandfather Restoration Collaborative Forest Landscape Restoration Program: 5 year report 2012-2014	Grandfather Restoration Collaborative and US Forest Service	This report highlights progress to reduce fuels, improve watersheds and restore forest health on the National Forests in North Carolina, Pisgah NF.
Kootenai Valley Resource Initiative Collaborative Forest Landscape Restoration Program: 5 year report 2012-2014	Kootenai Valley Resource Initiative Collaborative and US Forest Service	This report highlights progress to reduce fuels, improve watersheds and restore forest health on the Idaho Panhandle NFs.
Lakeview Stewardship Project Collaborative Forest Landscape Restoration Program: 5 year report 2012-2014	Lakeview Stewardship Project Collaborative and US Forest Service	This report highlights progress to reduce fuels, improve watersheds and restore forest health on the Fremont-Winema NF.
Longleaf Pine Ecosystem Restoration and Hazardous Fuels Reduction Collaborative Forest Landscape Restoration Program: 5 year report 2012-2014	Longleaf Pine Ecosystem Restoration and Hazardous Fuels Reduction Collaborative and US Forest Service	This report highlights progress to reduce fuels, improve watersheds and restore forest health on the National Forests in Mississippi, De Soto NF.

Monitoring Document	Preparers	Summary
Missouri Pine-Oak Woodland Restoration Collaborative Forest Landscape Restoration Program: 5 year report 2012-2014 Missouri Pine-Oak Woodland Restoration CFLRP 2019 Annual Report Soil and Vegetation Monitoring to Evaluate Hydrological Effects of Prescribed Burning in Big Barren Creek Watershed, Mark Twain National Forest, SE Missouri	Missouri Pine-Oak Woodland Restoration Collaborative and US Forest Service US Forest Service Ozark Environmental and Water Resources Institute Missouri State University	This report highlights progress to reduce fuels, improve watersheds and restore forest health on the Mark Twain NF. Monitoring results in the 2019 report indicate that pine-savanna and woodland restoration is benefiting nesting success of multiple species and guilds and is providing additional, possibly critical, habitat for declining early-successional species and species of concern. The positive relationship with focal species' nest success and densities provides even stronger inference that pine-savanna and woodland restoration is benefitting some bird species of concern. Management activities are effectively creating the necessary vegetation characteristics to attract focal species and these species are successfully nesting in these areas. The report also walks through modeling scenarios to analyze expected outcomes for a century of management under alternative scenarios with and without harvesting and burning. This included recreating a woodland overstory of 40 to 80% canopy cover required scenarios with timber harvesting on a roughly 20-year reentry cycle to reduce tree cover and increases in the fire frequency (every four years) increased the proportion of pines at the end of the century. All scenarios without timber harvesting resulted in a landscape dominated by closed-canopy oak forest. With neither burning nor harvesting the proportion of white oaks increased. Repeated burning without harvesting increased the proportion of pines in the overstory, but the closed-canopy overstory will remain dominated by an oak overstory. The Soil and Vegetation monitoring document highlighted the following conclusions: 1) Sites managed with prescribed burns had significantly less leaf litter but can recover to pre-burn conditions within one growing season. 2) Basal area and duff thickness were significantly different among stand types regardless of burn history. 3)Prescribed fires can improve soil physical properties such as increasing soil organic matter and lowering bulk density in the upper 5 cm of the soil profile. 4) The 2015 to 2016 monitoring and the 2018 monitoring show no clear negative effects of prescribed burning.
North East Washington Forest Vision Collaborative Forest Landscape Restoration Program: 5 year report 2012-2014	North East Washington Forest Vision Collaborative and US Forest Service	This report highlights progress to reduce fuels, improve watersheds and restore forest health on the Colville NF.

Monitoring Document	Preparers	Summary
Ozark Highlands Ecosystem Restoration Collaborative Forest Landscape Restoration Program: 5-year report 2012-2014 Ozark Highlands Ecosystem Restoration CFLRP 2019 Annual Report Big Piney and Pleasant Hill Ranger Districts Plant Community Monitoring Report for 2011-12 and 2014-15	Ozark Ouachita Highlands Collaborative and US Forest Service US Forest Service The Nature Conservancy, Arkansas	This report highlights progress to reduce fuels, improve watersheds and restore forest health on the Ozark-St. Francis NFs. The 2019 report highlights vegetation monitoring data. Vegetation monitoring has indicated that combined treatments for the CFLR project have been effective at shifting the vegetation communities and increase species diversity. Specifically, in areas where timber harvest or midstory removal is combined with multiple entries of prescribed fire, the treated vegetation community is meeting the project-scale objectives. Prescribed fire alone is slowly moving the vegetation conditions toward the desired condition, but it is not clear at this stage if multiple prescribed fire entries alone will completely return the stands to the desired condition or how long that may take. Data from bird surveys is clear that different species of migratory birds prefer different habitats throughout the year, thus, landscape scale treatments are important to support and create these mosaic habitat types. Site preparation activities within the CFLR project area are having a positive effect on the overall forest health of the area, by re-establishing new growth in forest stands in place of aging and overstocked stands. Plant Community Monitoring Report: Restoration activities (prescribed burning, commercial thinning and non-commercial midstory thinning) and natural disturbances (ice storms, tornados, insect outbreaks, etc.) have jointly driven the restoration area towards the desired ecological condition. Overall, overstory tree (>8" dbh) basal area/acre (BA) and midstory tree density (stems/acre) decreased significantly between baseline and the current condition (2014-15). The one exception to this was in unmanaged, riparian areas, where increases in overstory BA were observed over the same time period. Ground layer diversity (species richness) increased significantly since baseline. As expected, forest types or plant communities with more open vegetation structures (lower overstory basal area/acre, lower midstory stems/acre) had the higher, desired levels of herbaceous species richness present in the ground layer. Fire intolerant species, such as poison ivy, decreased significantly in importance in the ground layer since baseline. Continuation of prescribed fire and other restoration activities is recommended, as these have, up until now, produced many of the desired ecological effects.
Selway-Middle Fork, Collaborative Forest Landscape Restoration Program: 5 year report 2010-2014	Clearwater Basin Collaborative and US Forest Service	This 5-year report highlights progress to reduce fuels, improve watersheds and restore forest health on the Nez Perce-Clearwater NFs. The desired outcome of this project is a measurable shift toward terrestrial and aquatic restoration that achieves the desired future conditions on a landscape-scale while generating forest products and other opportunities that benefit local economies.

Monitoring Document	Preparers	Summary
Shortleaf Bluestem Community, Collaborative Forest Landscape Restoration Program: 5 year report 2010-2014 Shortleaf Bluestem Community CFLRP 2018 Annual Report	Shortleaf Bluestem Community Collaborative and US Forest Service	This 5-year report highlights progress to reduce fuels, improve watersheds and restore forest health on the Ouachita NF. From the 2018 Annual Report: The analysis of 2015-2016 plant community monitoring data found that while the forest structure (tree density and basal area) had not changed on a landscape scale since baseline, it had changed for some covertypes and topographic positions. Overstory basal area remained higher than desired but was significantly lower on ridgetops and pine plantations compared to baseline, which moved those habitats closer to the desired ecological condition. Midstory stem density and basal area also declined in the ridgetop community and were near the desired conditions, but overall the midstory remained more dense than desired. Five percent of the landscape remained in early seral stage, which met the forest objective. Ground layer diversity and cover had increased on a landscape scale. Total species richness and average ground layer and herbaceous layer species richness per macroplot increased in all topographic positions and covertypes. Macroplots that had been burned or were burned and thinned over the previous eight years met many of the desired ecological conditions, while untreated or thinned-only macroplots did not. Overall, these results clearly demonstrate that fire, either alone or in conjunction with thinning can help managers reach the desired ecological conditions in the pine-bluestem community, if non-native species are controlled. While the desired conditions have been met in areas managed with fire, the larger, landscape-scale desired conditions have not yet resulted, presumably because prescribed fire has not been implemented at effective frequencies and spatial scales.
Southwest Jemez Mountains, Collaborative Forest Landscape Restoration Program: 5 year report 2010-2014 Summary Report for 2010-2014 Southwest Jemez Mountains Collaborative Forest Landscape Restoration Project (CFLRP) Monitoring Program: Natural and Cultural Resources Sections	Southwest Jemez Mountains Collaborative and US Forest Service R.R. Parmenter, Director, Scientific Services Division, Valles Caldera National Preserve	This 5-year report highlights progress to reduce fuels, improve watersheds and restore forest health on the Santa Fe NF. The summary report represents the cumulative results of the Southwest Jemez Mountains CFLRP monitoring program. The report focuses on five objectives, summarizing monitoring efforts around each objective. Some highlights include that sites with open canopies had significantly more forage than closed canopy sites, indicating that thinning and burning treatments have the desired effect of producing more forage for ungulated species. Monitoring after thinning activities (both prior to and during the CFLRP) showed an increase in plan species diversity following thinning for four years in forest stands; but only a slight increase in open meadows. The report includes multiple before and after photos.

Monitoring Document	Preparers	Summary
Southwestern Crown, Collaborative Forest Landscape Restoration Program: 5 year report 2010-2014 Southwestern Crown of the Continent Collaborative Five-Year Monitoring Summary	Southwestern Crown Collaborative and US Forest Service	This 5-year report highlights progress to reduce fuels, improve watersheds and restore forest health on the Flathead, Lol, Helena-Lewis and Clark NFs.
Tapash, Collaborative Forest Landscape Restoration Program: 5 year report 2010-2014	Tapash Collaborative and US Forest Service	This 5-year report highlights progress to reduce fuels, improve watersheds and restore forest health on the Okanogan-Wenatchee NFs.
Uncompahgre Plateau, Collaborative Forest Landscape Restoration Program: 5 year report 2010-2014 Uncompahgre Mesas Project Area 2015 Monitoring Report	Uncompahgre Plateau Collaborative and US Forest Service	This 5-year report highlights progress to reduce fuels, improve watersheds and restore forest health on the Grand Mesa, Uncompahgre, and Gunnison NFs. The 2015 monitoring report documents results of treatments on the Uncompahgre Mesas project area. Treatments reduced the basal area and trees/acre and increased the quadratic mean diameter. Stands also met the objectives of retaining ponderosa pine and aspen while removing non-pine conifer basal area. This leads to more open stand conditions, which will provide more light for understory plants and shade tolerant tree regeneration. Canopy fire hazard has been reduced in treated stands; woody surface fuels have increased, however, prescribed fires are planned o reduce surface fuel loads.
Weiser-Little Salmon Headwaters, Collaborative Forest Landscape Restoration Program: 5 year report 2010-2014	Payette Forest Coalition and US Forest Service	This 5-year report highlights progress to reduce fuels, improve watersheds and restore forest health on the Payette NF.

Monitoring Document	Preparers	Summary
Zuni Mountains, Collaborative Forest Landscape Restoration Program: 5 year report 2010-2014 Restoration Objectives in the Zuni Mountains CFLR Landscape: Monitoring Update, 2020	Mt. Taylor-Zuni Mountain Collaborative and US Forest Service US Forest Service, Three Pines Forest Research, Zuni Mountains Collaborative, Forest Stewards Guild	This 5-year report highlights progress to reduce fuels, improve watersheds and restore forest health on the Cibola NF. Findings from the monitoring update: Forest restoration treatments in the Zuni Mountains enhanced forest resilience to fire, bark beetle attacks, and drought across the monitoring area by reducing stand densities, decreasing the connectivity of canopy fuels, and preserving large and old trees. Where thinning took place, treatments reduced the number of trees per acre (TPA) while increasing the average size of the trees on the landscape (QMD). These two metrics also correlated with a reduction in the canopy bulk density (CBD). Taken as a whole, these changes to stand structure are associated with a reduction in the hazard of crown fire. With fewer small trees, larger trees protected, and with less continuous canopy on the landscape, the risk of uncharacteristic crown fire is substantially decreased. Average tree diameters increased across much of the area, indicative of thinning small trees to reduce ladder fuels. Stands with QMD <4 inches or >10 inches are outside of the range for most beetle-induced mortality events in the Southwest (Bryant et al. 2019). Furthermore, ponderosa pine with a larger diameter demonstrate a higher resistance to fire-induced mortality, increasing their ability to re-colonize post-fire stands, and increasing the overall resilience of the forest to wildfire.
National Best Management Practices for Water Quality Management on National Forest Service Lands: Volume 1, National Core BMP Technical Guide	USDA Forest Service	This technical guide provides information for implementing the National Core BMP portion of the Forest Service National BMP Program. The National Core BMPs were compiled from Forest Service manuals, handbooks, contract and permit provisions, and policy statements, as well as State or other organizations' BMP documents.

Appendix D – Summary of Extraordinary Circumstances by Agency

Agency	Extraordinary Circumstances	Description (from rule/regulation)	Citation
FS	T&E species/FS Sensitive Species	Federally listed threatened or endangered species or designated critical habitat, species proposed for Federal listing or proposed critical habitat, or a designated Forest Service sensitive species where the applicable land management plan expressly contains a mandatory standard directing a species-specific, project-level analysis for that sensitive species	36 CFR 220.6(b)
	Flood plains, wetlands, or municipal watersheds	Flood plains, wetlands, or municipal watersheds	
	Congressionally designated areas	Congressionally designated areas, such as wilderness, wilderness study areas, potential wilderness areas, wild and scenic rivers, or national recreation areas	
	Roadless areas	Roadless areas designated under 36 CFR part 294	
	National Wilderness Preservation System	Lands recommended as part of the decision to approve or revise a land management plan for the establishment or study of a new unit, or addition to an existing unit, of the National Wilderness Preservation System	
	Research natural areas	Research natural areas	
	American Indian and Alaska Native religious or cultural sites	American Indian and Alaska Native religious or cultural sites	
	Archaeological sites, or historic properties or areas	Archaeological sites, or historic properties or areas	
FSA	Scientific controversy	Scientific controversy about environmental effects of the proposed action	7 CFR 799.33

Agency	Extraordinary Circumstances	Description (from rule/regulation)	Citation
	Archaeological or historic sites; T&E species; wetlands; important or prime lands; special designation; special sources of water	Impacts that are potentially adverse, significant, uncertain, or involve unique or unknown risks, including, but not limited to, impacts to protected resources. Protected resources include, but are not limited to: (i) Property (for example, sites, buildings, structures, and objects) of historic, archeological, or architectural significance, as designated by Federal, Tribal, State, or local governments, or property eligible for listing on the National Register of Historic Places; (ii) Federally-listed threatened or endangered species or their habitat (including critical habitat), or Federally-proposed or candidate species or their habitat; (iii) Important or prime agricultural, forest, or range lands, as specified in part 657 of this chapter and in USDA Departmental Regulation 9500-3; (iv) Wetlands, waters of the United States, as regulated under the Clean Water Act (33 U.S.C. 1344), highly erodible land, or floodplains; (v) Areas having a special designation, such as Federally- and State-designated wilderness areas, national parks, national natural landmarks, wild and scenic rivers, State and Federal wildlife refuges, and marine sanctuaries; and (vi) Special sources of water, such as sole-source aquifers, wellhead protection areas, or other water sources that are vital in a region	
	Connected to other actions with potential impacts	A proposed action that is also "connected" (as specified in 40 CFR 1508.25(a)(1)) to other actions with potential impacts	
	Proposed action related to cumulative impacts	A proposed action that is related to other proposed actions with cumulative impacts (40 CFR 1508.25(a)(2))	
	Non-compliance with 40 CFR 1506.1	A proposed action that does not comply with 40 CFR 1506.1, "Limitations on actions during NEPA process"	
	Violation of law or policy	A proposed action that violates any existing Federal, State, or local government law, policy, or requirements (for example, wetland laws, Clean Water Act-related requirements, water rights)	
NRCS	Public health or safety	The proposed action cannot cause significant effects on public health or safety.	7 CFR 650.6

Agency	Extraordinary Circumstances	Description (from rule/regulation)	Citation
	Significantly affect unique characteristics	The proposed action cannot significantly affect unique characteristics of the geographic area, such as proximity to historic properties or cultural resources, park lands, prime farmlands, floodplains, wetlands, wild and scenic rivers, or ecologically critical areas.	
	Highly controversial	The effects of the proposed action on the quality of the human environment cannot be highly controversial.	
	Highly uncertain effects	The proposed action cannot have highly uncertain effects, including potential unique or unknown risks on the human environment.	
	Establish a new precedent	The proposed action cannot include activities or conservation practices that establish a potential precedent for future actions with significant impacts.	
	Potentially significant environmental impacts to quality of human environment	The proposed action is known to have or reasonably cannot be expected to have potentially significant environmental impacts to the quality of the human environment either individually or cumulatively over time.	
	Invasive species, T&E species, environmental justice, wetlands, wild and scenic rivers, air quality, migratory birds, bald and golden eagles	The proposed action cannot cause or promote the introduction of invasive species or have a significant adverse effect on any of the following special environmental concerns not previously identified in this section, such as: endangered and threatened species, environmental justice communities as defined in Executive Order 12898, wetlands, other waters of the United States, wild and scenic rivers, air quality, migratory birds, and bald and golden eagles.	
	Violates environmental protection laws	The proposed action will not violate Federal or other applicable law and requirements for the protection of the environment.	
DOI – BLM, BIA, BOR, NPS, FWS	Public health or safety	Extraordinary circumstances exist when the proposed action may have significant impacts on public health or safety.	43 CFR 46.215

Agency	Extraordinary Circumstances	Description (from rule/regulation)	Citation
	Significant impacts on natural resources and unique geographic characteristics	May have significant impacts on such natural resources and unique geographic characteristics as historic or cultural resources; park, recreation or refuge lands; wilderness areas; wild or scenic rivers; national natural landmarks; sole or principal drinking water aquifers; prime farmlands; wetlands (Executive Order 11990); floodplains (Executive Order 11988); national monuments; migratory birds; and other ecologically significant or critical areas.	
	Highly controversial environmental effects	May have highly controversial environmental effects or involve unresolved conflicts concerning alternative uses of available resources [NEPA section 102(2)(E)].	
	Highly uncertain and potentially significant environmental effects	May have highly uncertain and potentially significant environmental effects or involve unique or unknown environmental risks.	
	Establish a precedent for future actions	May establish a precedent for future action or represent a decision in principle about future actions with potentially significant environmental effects.	
	Cumulatively significant effects	May have a direct relationship to other actions with individually insignificant but cumulatively significant environmental effects	
	National Register of Historic Places	May have significant impacts on properties listed, or eligible for listing, on the National Register of Historic Places as determined by either the bureau or office.	
	T&E species and habitat	May have significant impacts on species listed, or proposed to be listed, on the List of Endangered or Threatened Species, or have significant impacts on designated Critical Habitat for these species.	
	Violates environmental protection law	May violate a Federal law, or a State, local, or tribal law or requirement imposed for the protection of the environment.	
	High/adverse effect on low income or minority populations	May have a disproportionately high and adverse effect on low income or minority populations (Executive Order 12898)	

Agency	Extraordinary Circumstances	Description (from rule/regulation)	Citation
	Limit access to and ceremonial use of Indian sacred sites	May limit access to and ceremonial use of Indian sacred sites on Federal lands by Indian religious practitioners or significantly adversely affect the physical integrity of such sacred sites (Executive Order 13007).	
	Invasive species	May contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area or actions that may promote the introduction, growth, or expansion of the range of such species (Federal Noxious Weed Control Act and Executive Order 13112).	
DOT - FHWA and FTA	Significant impacts	Significant environmental impacts.	23 CFR 771.117 (FHWA) and 771.118 (FTA)
	Substantial controversy	Substantial controversy on environmental grounds.	
	Historic properties	Significant impacts on properties protected by Section (4(f) of the DOT Act or Section 106 of the National Historic Preservation Act.	
	Inconsistencies with applicable laws	Inconsistencies with any Federal, State, or local law, requirement or administrative determination relating to the environmental aspects of the action.	
DOT – Maritime Administration	Public health or safety	This action would have significant adverse effects on public health or safety	MAO 600-1
	Wildlife resources/ unique geographic features	This action would have significant effect on wildlife resources or would affect unique geographical features such as: wetlands, wild or scenic rivers, refuges, floodplains, etc. or lands protected by section 4(f) of the DOT act	
	Highly controversial	This action will have highly controversial environmental effects	
	Highly uncertain environmental effects	This action will have highly uncertain environmental effects or involve unique or unknown environmental risks	
	Establish a precedent	This action will establish a precedent for future actions	
	Cumulatively significant	This action is related to other actions with individually insignificant buy cumulatively significant effects	
	National Register of Historic Places	This action will affect properties listed or eligible for listing in the National Register of Historic Places, or otherwise protected by section 106 of the national Historic Preservation Act	

Agency	Extraordinary Circumstances	Description (from rule/regulation)	Citation
	T&E species	This section will affect a species listed or proposed to be listed as Endangered or Threatened.	
	Violation of law	This action is inconsistent with Federal, State, local or tribal law or requirements imposed for protection of the environment	
	Unreasonable conflicts of alternative uses of available resources	This action or group of actions would involve unresolved conflicts concerning alternative uses of available resources.	
DOT – FAA	Cultural Resources	An adverse effect on cultural resources protected under the National Historic Preservation Act of 1966, as amended.	FAA Order 1050.1E
	Section 4(f)	An impact on properties protected under section 4(f) of the Department of Transportation Act.	
	Federal, Tribal, State, local significance; protected resouces; wetlands, coastal zones, important farmlands	An impact on natural, ecological (e.g., invasive species), or scenic resources of Federal, Tribal, State, or local significance (for example: Federally listed or proposed endangered, threatened, or candidate species or designated or proposed critical habitat under the Endangered Species Act), resources protected by the Fish and Wildlife Coordination Act; wetlands; floodplains; coastal zones; prime, unique, State or locally important farmlands; energy supply and natural resources; and wild and scenic rivers, including study or eligible river segments and solid waste management.	
	Community disruption	Cause a division or disruption of an established community, or a disruption of orderly, planned development, or an inconsistency with plans or goals that have been adopted by the community in which the project is located.	
	Increase in congestion	Cause an increase in congestion from surface transportation (by causing decrease in Level of Service below acceptable level determined by appropriate transportation agency, such as a highway agency).	
	Noise-sensitive areas	An impact on noise levels of noise-sensitive areas.	
	Air quality	An impact on air quality or violate local, State, Tribal, or Federal air quality standards under the Clean Air Act Amendments of 1990.	
	Water quality	An impact on water quality, sole source aquifers, a public water supply system, or State or Tribal water quality standards established under the Clean Water Act and the Safe Drinking Water Act.	

Agency	Extraordinary Circumstances	Description (from rule/regulation)	Citation
	Highly controversial effects	Effects on the quality of the human environment that are likely to be highly controversial on environmental grounds. The term "controversial" means a substantial dispute exists as to the size, nature, or effect of a proposed Federal action. The effects of an action are considered highly controversial when reasonable disagreement exists over the project's risks of causing environmental harm. Opposition on environmental grounds by a Federal, State, or local government agency or by a Tribe or by a substantial number of the persons affected by the action should be considered in determining whether or not reasonable disagreement regarding the effects of a proposed action exists. If in doubt about whether a proposed action is highly controversial, consult the program office's headquarters environmental division, AEE (Environment and Energy Team, AEE-200), regional counsel, or AGC (AGC-600) for assistance.	
	Inconsistent with applicable laws	Likelihood to be inconsistent with any Federal, State, Tribal, or local law relating to the environmental aspects of the proposed action	
	Direct, indirect, cumulative impacts	Likely to directly, indirectly, or cumulatively create a significant impact on the human environment, including, but not limited to, actions likely to cause a significant lighting impact on residential areas or commercial use of business properties, likely to cause a significant impact on the visual nature of surrounding land uses (see sections 11 and 12, Appendix A for additional information), likely to be contaminated with hazardous materials based on Phase I or Phase II Environmental Due Diligence Audit (EDDA's) , or likely to cause such contamination (see section 10, Appendix A for additional references and discussion).	

Agency	Extraordinary Circumstances	Description (from rule/regulation)	Citation
DOE	Scientific controversy about environmental effects of the proposal	There are no extraordinary circumstances related to the proposal that may affect the significance of the environmental effects of the proposal. Extraordinary circumstances are unique situations presented by specific proposals, including, but not limited to, scientific controversy about the environmental effects of the proposal; uncertain effects or effects involving unique or unknown risks; and unresolved conflicts concerning alternative uses of available resources; and (3) The proposal has not been segmented to meet the definition of a categorical exclusion. Segmentation can occur when a proposal is broken down into small parts in order to avoid the appearance of significance of the total action. The scope of a proposal must include the consideration of connected and cumulative actions, that is, the proposal is not connected to other actions with potentially significant impacts (40 CFR 1508.25(a)(1)), is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27(b)(7)), and is not precluded by 40 CFR 1506.1 or §1021.211 of this part concerning limitations on actions during EIS preparation.	10 CFR 1021.410
	uncertain effects or effects involving unique or unknown risks	See above	
	unresolved conflicts concerning alternative uses of available resources	See above	
	Not segmented	See above	
	Does not violate other environmental laws	See above	

Agency	Extraordinary Circumstances	Description (from rule/regulation)	Citation
DHS		No Extraordinary Circumstances Exist. It is not appropriate to categorically exclude an action when there are extraordinary circumstances present that would create the potential for a normally excluded action to have a significant environmental effect. In those cases where a specific action that might otherwise be categorically excluded is associated with one or more extraordinary circumstances, a Record of Environmental Consideration (REC), as described in Section 3C(2), will be prepared to document the determination that the proposed action is appropriately categorically excluded or requires further analysis through an EA or EIS process. A determination of whether an action that is normally excluded requires additional analysis because of extraordinary circumstances must focus on the action's potential effects and consider the environmental significance of those effects in terms of both context (whether local, state, regional, tribal, national, or international) and intensity. This determination is made by considering whether the specific action is likely to involve one or more of the following circumstances:	Directive Number: 023-01
	Public health and safety	A potentially significant effect on public health or safety.	
	Significant effect on species/habitat protected under a variety of environmental laws	A potentially significant effect on species or habitats protected by the Endangered Species Act, Marine Mammal Protection Act, the Migratory Bird Treaty Act, or Magnuson-Stevens Fishery Conservation and Management Act.	
	Effect on site listed or eligible for listing on the National Register of Historic Places	A potentially significant effect on a district, site, highway, structure, or object that is listed in or eligible for listing in the National Register of Historic Places, affects a historic or cultural resource or traditional and sacred sites, or the loss or destruction of a significant scientific, cultural, or historical resource.	
	Significant effect on an environmental sensitive area	A potentially significant effect on an environmentally sensitive area	

Agency	Extraordinary Circumstances	Description (from rule/regulation)	Citation
	Violation of law	A potential or threatened violation of a federal, state, or local law or administrative determination imposed for the protection of the environment. Some examples of administrative determinations to consider are a local noise control ordinance; the requirement to conform to an applicable State Implementation Plan (SIP); and federal, state, or local requirements for the control of hazardous or toxic substances.	
	Highly controversial	An effect on the quality of the human environment that is likely to be highly controversial in terms of scientific validity, likely to be highly uncertain, or likely to involve unique or unknown environmental risks. This also includes effects that may result from the use of new technology or unproven technology. Controversy over, including public opposition to, a proposed action absent any demonstrable potential for significant environmental impacts does not itself constitute an extraordinary circumstance.	
	Establishes a precedent	Extent to which a precedent is established for future actions with significant effects	
	Significantly greater scope/size than normal	Significantly greater scope or size than normally experienced for a particular category of action	
	Significant degradation of already poor conditions	Potential for significant degradation of already existing poor environmental conditions. Also, initiation of a potentially significant environmental degrading influence, activity, or effect in areas not already significantly modified from their natural condition	
	Cumulative impacts	Whether the action is related to other actions with individually insignificant, but cumulatively significant impacts	
DoD – ACE		Actions listed below when considered individually and cumulatively do not have significant effects on the quality of the human environment and are categorically excluded from NEPA documentation. However, district commanders should be alert for extraordinary circumstances which may dictate the need to prepare an EA or an EIS. Even though an EA or EIS is not indicated for a Federal action because of a "categorical exclusion", that fact does not exempt the action from compliance with any other Federal law. For example, compliance with the Endangered Species Act, the Fish and Wildlife Coordination Act, the National Historic Preservation Act, the Clean Water Act, etc., is always mandatory, even for actions not requiring an EA or EIS.	33 CFR 230.9

Agency	Extraordinary Circumstances	Description (from rule/regulation)	Citation
U.S. Navy	Public health and safety	Would adversely affect public health or safety.	32 CFR 775.6
	Uncertain, unique, or controversial effects	Involves effects on the human environment that are highly uncertain, involve unique or unknown risks, or which are scientifically controversial.	
	Establishes precedent	Establishes precedents or makes decisions in principle for future actions that have the potential for significant impacts.	
	Violation of applicable laws	Threatens a violation of Federal, state, or local environmental laws applicable to the Department of the Navy.	
	T&E species; reefs; designated areas; wetlands; archeological or historic places; hazardous substances; Clean Air Act General Conformity Rule	Involves an action that, as determined in coordination with the appropriate resource agency, may: **(i)** Have an adverse effect on Federally listed endangered/threatened species or marine mammals; **(ii)** Have an adverse effect on coral reefs or on Federally designated wilderness areas, wildlife refuges, marine sanctuaries, or parklands; **(iii)** Adversely affect the size, function or biological value of wetlands and is not covered by a nation-wide or regional permit; **(iv)** Have an adverse effect on archaeological resources or resources (including but not limited to ships, aircraft, vessels and equipment) listed or determined eligible for listing on the National Register of Historic Places; or **(v)** Result in an uncontrolled or unpermitted release of hazardous substances or require a conformity determination under standards of the Clean Air Act General Conformity Rule.	
Department of the Treasury	Scope or size	The proposed action has the potential for a significant environmental impact because it is greater in scope or size than is typical for a particular category of actions.	Treasury Directive 75-02
	Controversial environmental effects	The proposed action has the potential for a significant environmental impact because it involves highly controversial environmental effects, where controversy is defined as: voiced environmentally based concerns or opposition from state/local agencies/tribes or the public.	

Agency	Extraordinary Circumstances	Description (from rule/regulation)	Citation
	Unproven technology/ uncertain effects	The proposed action will use unproven technology with uncertain environmental effects that have the potential to be significant.	
	Areas of critical environmental concern	The proposed action has the potential for a significant environmental impact to areas of critical environmental concern, including, but not limited to, prime or unique agricultural lands, wetlands or floodplains, coastal zones, wilderness areas, aquifers, or wild and scenic rivers.	
	Archaeological or historic resources	The proposed action has the potential for a significant environmental impact to properties or archaeological resources that are either listed or eligible for listing on the National Register of Historic Places (note: this extraordinary circumstance is not applicable if a separate Section 106 process under the National Historic Preservation Act has been completed resulting in the concurrence of the State Historic Preservation Officer (SHPO) or the Tribal Historic Preservation Officer (THPO) or the signing of a Memorandum of Agreement with the SHPO or THPO and/or the Advisory Council on Historic Preservation).	
	T&E species	The proposed action has the potential for a significant environmental impact on species endangered, threatened, or proposed to be listed on the List of Endangered or Threatened Species or located in an area designated as Critical Habitat for an endangered or threatened species or other protected resources.	
	Violation of applicable environmental laws	The proposed action has the potential to violate federal, state, local, or tribal laws for the protection of the environment.	
	Inconsistency with laws, requirements, plans, administrative determinations	The proposed action has the potential for a significant environmental impact and is subject to inconsistency with federal, state, local or tribal laws, requirements, plans, or administrative determinations.	
	Degradation of existing poor conditions	The proposed action has the potential to cause degradation of already poor environmental conditions, resulting in a significant impact on the environment.	

Agency	Extraordinary Circumstances	Description (from rule/regulation)	Citation
	Hazardous or toxic substances	The proposed action has the potential to add to or disturb hazardous or toxic substances existing at the project site at levels which exceed federal, state, local or tribal laws or regulations or standards requiring action or attention.	
	Health or safety	The proposed action has the potential to cause significant impacts on health or safety.	
	Cumulative impacts	The proposed action has the potential to cause significant cumulative impacts when the proposed action is combined with other past, present, and reasonably foreseeable future actions, even though the impacts of the proposed action may not be significant by themselves.	
	Uncertain effects or unique or unknown risks	The potential environmental effects of the proposed action are highly uncertain or involve unique or unknown risks.	
	Establish precedent	The proposed action may establish a precedent or principle for future actions that have the potential for a significant impact on the environment.	
TVA	T&E Species	Species listed or proposed to be listed under the Endangered Species Act, or the proposed or designated Critical Habitat for these species.	
	Wetlands/floodplains	Wetlands or floodplains.	
	Cultural resources	Cultural or historic resources.	
	Special designations	Areas having special designation or recognition such as wild and scenic rivers, parklands, or wilderness areas.	
	Farmland	Important farmland.	
	Controversy	The significance of the environmental impacts associated with the proposed action is or may be highly controversial.	