

Fire Equipment Development Needs

Ratings for Federal Respondents - Presented in Questionnaire Order

Total FEDERAL Responses = 438

N = Number of Persons Responding to Each Question

	N	Overall Average	Males	Females
1 What government agency do you work with:				
2 Which agency do you work with:				
3 What state is your office in:				
4 What wildland fire organization are you attached to:				
5 What is your job title:				
6 Top 3 red card qualifications you fill during fire season:				
7 Years of experience in wildland fire protection:	438	16.3		
8 Gender:	434		51	383
9 Weight in pounds:	438	180.4		
10 Height in inches:	438	68.2		

See PowerPoint pie charts for statistical details on these first 10 variables.

N = Number of Persons Responding to Each Question

Rating Categories	N	Total Number Each Category			Valid % Each Category			Overall Average
		No Need	Low Priority	High Priority	No Need	Low Priority	High Priority	

Please rate the degree of need for development of new products or technology:

AERIAL OPERATIONS									
11a	Greater Consistency of drop height for airtankers.	344	42	258	44	12.2%	75.0%	12.8%	2.11
11b	Produce more consistent, accurate drop patterns.	346	32	259	55	9.2%	74.9%	15.9%	2.31
11c	Produce more consistent fixed wing drop patterns.	344	39	251	54	11.3%	73.0%	15.7%	2.25
11d	Deliver/retrieve fire supplies without landing.	352	50	207	95	14.2%	58.8%	27.0%	2.46
11e	Increase capacity Type 1 helicopter water drops.	350	79	206	65	22.6%	58.9%	18.6%	1.97
11f	Increase capacity Type 1 helicopter bucket drops.	347	80	202	65	23.1%	58.2%	18.7%	1.97
11g	Improve Type 1 helicopter/helibucket performance.	349	50	206	93	14.3%	59.0%	26.6%	2.39
11h	Increase accuracy Type 2 & 3 helicopter drops.	351	44	227	80	12.5%	64.7%	22.8%	2.35
11i	Increase capacity Type 2 & 3 helicopter bucket drops.	351	52	230	69	14.8%	65.5%	19.7%	2.26
11j	More accurate Type 2 & 3 helicopter bucket drops.	353	45	223	85	12.7%	63.2%	24.1%	2.40
11k	Increase capacity Type 2 & 3 helicopter bucket drops.	347	50	230	67	14.4%	66.3%	19.3%	2.22
11l	Improve reliability/quality of helicopter water bucket.	345	38	230	77	11.0%	66.7%	22.3%	2.38
11m	Improve quality flight helmet microphones/pigtails.	343	45	195	103	13.1%	56.9%	30.0%	2.49
11n	Develop cold weather flame-resistant flight suits.	337	53	189	95	15.7%	56.1%	28.2%	2.39
11o	Develop cold weather personal protective accessories.	346	31	169	146	9.0%	48.8%	42.2%	2.93
11p	More comfortable flame-resistant flight flight suits.	335	74	211	50	22.1%	63.0%	14.9%	1.90
11q	Develop contaminant-free helicopter fuel storage.	319	40	205	74	12.5%	64.3%	23.2%	2.40
11r	Improved helicopter seats to reduce spine injuries.	335	23	166	146	6.9%	49.6%	43.6%	3.08

11s	Develop multipurpose collapsible litter f/helicopters.	331	30	192	109	9.1%	58.0%	32.9%	2.78
11t	Improve mixing, handling, transport of retardants.	312	52	213	47	16.7%	68.3%	15.1%	2.03
11u	Improve quality of the flight helmet.	330	54	201	75	16.4%	60.9%	22.7%	2.25
11v	Improve environmental management of chemicals.	318	48	206	64	15.1%	64.8%	20.1%	2.16
11w	Improve snorkel systems for helitankers.	298	61	199	38	20.5%	66.8%	12.8%	1.88
11x	Improve aerial ignition systems for prescribed burns.	338	25	174	139	7.4%	51.5%	41.1%	3.05
11y	Improve rappel hardware for available helicopters.	303	51	182	70	16.8%	60.1%	23.1%	2.29
11z	Develop equipment for helibase management facilities.	305	54	177	74	17.7%	58.0%	24.3%	2.33

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ENGINES AND WATER TENDERS		N	Total Number Each Category			Valid % Each Category			Overall Average
			No Need	Low Priority	High Priority	No Need	Low Priority	High Priority	
13a	Improve compressed air foam systems.	377	36	231	110	9.5%	61.3%	29.2%	2.68
13b	Reduce noise levels for apparatus operations.	392	21	168	203	5.4%	42.9%	51.8%	3.34
13c	Improve engine mobility in rough and steep terrain.	399	10	175	214	2.5%	43.9%	53.6%	3.45
13d	Develop standardized engines across agencies.	398	44	135	219	11.1%	33.9%	55.0%	3.34
13e	Improve engines to meet HAZMAT exposure.	385	23	192	170	6.0%	49.9%	44.2%	3.10
13f	Improve storage capacity for equipment on engines.	394	14	151	229	3.6%	38.3%	58.1%	3.51
13g	Improve long-term chemical suppressants/equipment.	383	22	222	139	5.7%	58.0%	36.3%	2.93
13h	Improve electronic identifiers/locators for engines.	388	50	201	137	12.9%	51.8%	35.3%	2.68
13i	Develop a standardized family of engines.	394	27	134	233	6.9%	34.0%	59.1%	3.49
13j	Improve aspirated air proportioner foam system.	379	30	207	142	7.9%	54.6%	37.5%	2.89
13k	More clearly define role of water tenders in engines.	386	44	216	126	11.4%	56.0%	32.6%	2.66
13l	Include more safety features in engine design.	386	26	210	150	6.7%	54.4%	38.9%	3.01
13m	Improve foam application equipment for engines.	383	21	194	168	5.5%	50.7%	43.9%	3.11

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FOAM APPLICATION EQUIPMENT		N	Total Number Each Category			Valid % Each Category			Overall Average
			No Need	Low Priority	High Priority	No Need	Low Priority	High Priority	
15a	Improve application rate info for foam applicators.	357	36	229	92	10.1%	64.1%	25.8%	2.57
15b	Develop a towable foam application unit.	360	124	192	44	34.4%	53.3%	12.2%	1.60
15c	Improve specs and selection guide for foam systems.	359	41	236	82	11.4%	65.7%	22.8%	2.48
15d	Improve chemical suppressants f/engines & equipment.	363	36	202	125	9.9%	55.6%	34.4%	2.79

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WATER HANDLING EQUIPMENT		N	Total Number Each Category			Valid % Each Category			Overall Average
			No Need	Low Priority	High Priority	No Need	Low Priority	High Priority	
17a	Modify an All Terrain Vehicle to carry water.	391	32	188	171	8.2%	48.1%	43.7%	1.54
17b	Develop high-capacity hose maintenance equipment.	374	40	240	94	10.7%	64.2%	25.1%	1.46
17c	Develop identification system for marking fire hose.	362	48	243	71	13.3%	67.1%	19.6%	1.46
17d	Modify sprinkler technology to contain a fire.	383	29	225	129	7.6%	58.7%	33.7%	1.43

17e	Improve chemical suppressants used w/water equip.	378	32	222	124	8.5%	58.7%	32.8%	2.75
17f	Develop delivery systems f/ground chemical suppressants	372	34	247	91	9.1%	66.4%	24.5%	2.50
17g	Improve information on ground application rates.	365	36	260	69	9.9%	71.2%	18.9%	2.34
17h	Expand line of water handling accessories.	366	30	207	129	8.2%	56.6%	35.2%	2.85
17i	Improve lightweight hose with rugged characteristics.	390	10	125	255	2.6%	32.1%	65.4%	3.76
17j	Improve quick coupling fittings.	388	82	137	169	21.1%	35.3%	43.6%	2.77

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DOZER AND TRACTOR PLOWS		N	Total Number Each Category			Valid % Each Category			Overall Average
			No Need	Low Priority	High Priority	No Need	Low Priority	High Priority	
19a	Systems to correct environmental damage by dozers.	334	31	163	140	9.3%	48.8%	41.9%	3.04
19b	Improve communications with the dozer operator.	341	4	63	274	1.2%	18.5%	80.4%	4.16
19c	Protection of dozer operator from smoke and dust.	333	6	116	211	1.8%	34.8%	63.4%	3.71
19d	Improve towable cargo and water hauling capacity.	326	25	181	120	7.7%	55.5%	36.8%	2.92
19e	Develop a dozer blade to cut a narrower fireline.	330	53	163	114	16.1%	49.4%	34.5%	2.66
19f	Develop alternative construction techniques f/dozers.	325	38	179	108	11.7%	55.1%	33.2%	2.78
19g	Develop foam capacity for dozers.	324	67	187	70	20.7%	57.7%	21.6%	2.11
19h	Develop dozer brush rakes to construct control lines.	321	28	176	117	8.7%	54.8%	36.4%	2.88
19i	Improve dozer safety equipment.	319	11	140	168	3.4%	43.9%	52.7%	3.42
19j	Improve dozer identifier and locators.	321	20	146	155	6.2%	45.5%	48.3%	3.17
19k	Develop a fireline burnout system for dozer plows.	311	40	172	99	12.9%	55.3%	31.8%	2.63

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LINE CONSTRUCTION AND MOP-UP		N	Total Number Each Category			Valid % Each Category			Overall Average
			No Need	Low Priority	High Priority	No Need	Low Priority	High Priority	
21a	System to mark fireline on ridges & canyons from the air.	388	53	196	139	13.7%	50.5%	35.8%	2.69
21b	Develop standardized color-coded flagging for trees.	409	48	130	231	11.7%	31.8%	56.5%	3.41
21c	Develop means of cutting through heavy down fuels.	386	38	200	148	9.8%	51.8%	38.3%	2.88
21d	Transportable lightweight mechanical line digger.	391	92	177	122	23.5%	45.3%	31.2%	2.36
21e	Hand tools that are more effective and less fatiguing.	400	40	161	199	10.0%	40.3%	49.8%	3.16
21f	Power tools that are more effective and less fatiguing.	399	38	172	189	9.5%	43.1%	47.4%	3.12
21g	Develop lighter, more powerful chain saws.	401	36	143	222	9.0%	35.7%	55.4%	3.34
21h	Improve safety design of tools.	394	54	206	134	13.7%	52.3%	34.0%	2.64
21i	Improve equipment to build fireline w/minimal damage.	394	65	205	124	16.5%	52.0%	31.5%	2.50
21j	Improve the variety of fireline explosives.	377	47	210	120	12.5%	55.7%	31.8%	2.70
21k	Improve selection and capacity of firing devices.	392	22	179	191	5.6%	45.7%	48.7%	3.28
21l	Develop a mechanical line digger.	390	70	198	122	17.9%	50.8%	31.3%	2.52
21m	Develop portable lightweight sprinkler mopup system.	388	48	214	126	12.4%	55.2%	32.5%	2.63
21n	Improve foam technology for mopup.	389	46	212	131	11.8%	54.5%	33.7%	2.73
21o	Improve labor-saving technologies for mopup.	387	39	182	166	10.1%	47.0%	42.9%	3.02
21p	Update catalog on hand-held infrared sensing devices.	387	25	195	167	6.5%	50.4%	43.2%	3.11

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INFO COLLECTION & EVALUATION		N	Total Number Each Category			Valid % Each Category			Overall Average
			No Need	Low Priority	High Priority	No Need	Low Priority	High Priority	
23a	Develop fast, accurate resource location and allocation.	395	19	139	237	4.8%	35.2%	60.0%	3.59
23b	Develop lightweight, portable night vision device.	385	40	203	142	10.4%	52.7%	36.9%	2.84
23c	Improve Global Positioning System to locate persons.	398	13	149	236	3.3%	37.4%	59.3%	3.57
23d	FLIR system to collect fireline imagery at night.	377	16	168	193	4.2%	44.6%	51.2%	3.35
23e	Improve effective use of information dissemination.	384	23	163	198	6.0%	42.4%	51.6%	3.28
23f	Improve fire weather information dissemination.	394	9	138	247	2.3%	35.0%	62.7%	3.73
23g	Improve remote site 24-hour weather monitoring.	382	15	153	214	3.9%	40.1%	56.0%	3.52
23h	Improve use of fire weather data.	384	15	148	221	3.9%	38.5%	57.6%	3.57
23i	Fire detection system for unstaffed lookout towers.	377	60	196	121	15.9%	52.0%	32.1%	2.48
23j	Develop a real-time satellite fire detection system.	382	37	151	194	9.7%	39.5%	50.8%	3.18
23k	Develop maps with latitude and longitude grids.	392	21	119	252	5.4%	30.4%	64.3%	3.69
23l	Develop technology for locating fires from towers.	368	53	203	112	14.4%	55.2%	30.4%	2.54
23m	Develop lightning detection system to predict ignition.	380	29	187	164	7.6%	49.2%	43.2%	3.05
23n	Handheld infrared imager for ground fire location.	375	30	181	164	8.0%	48.3%	43.7%	2.99

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LOGISTICS		N	Total Number Each Category			Valid % Each Category			Overall Average
			No Need	Low Priority	High Priority	No Need	Low Priority	High Priority	
25a	Develop an integrated fire camp electrical system.	390	21	124	245	5.4%	31.8%	62.8%	3.64
25b	Improve methods of insect control around fire camps.	383	41	193	149	10.7%	50.4%	38.9%	2.80
25c	Improve sleeping bags and pads.	394	34	141	219	8.6%	35.8%	55.6%	3.32
25d	Develop one-person sleeping tents.	392	99	185	108	25.3%	47.2%	27.6%	2.21
25e	Fire camp modules for uniformity of equipment.	374	55	214	105	14.7%	57.2%	28.1%	2.55
25f	Improve hot and cold food containers.	372	45	181	146	12.1%	48.7%	39.2%	2.86
25g	Means of getting people/supplies to remote camps.	379	40	164	175	10.6%	43.3%	46.2%	3.03
25h	Improve safety for transporting liquid fuels.	374	34	176	164	9.1%	47.1%	43.9%	3.04
25i	System for tracking and displaying resource allocation.	374	21	173	180	5.6%	46.3%	48.1%	3.26
25j	Design items so they can be easily recycled.	391	24	161	206	6.1%	41.2%	52.7%	3.43

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PERSONNEL		N	Total Number Each Category			Valid % Each Category			Overall Average
			No Need	Low Priority	High Priority	No Need	Low Priority	High Priority	
27a	Improve fire shelters.	403	30	123	250	7.4%	30.5%	62.0%	3.69
27b	Improve single-unit headlamps.	410	19	122	269	4.6%	29.8%	65.6%	3.77
27c	Improve low heat-stress protective clothing.	409	15	133	261	3.7%	32.5%	63.8%	3.75
27d	Improve devices to protect face from radiant heat.	409	24	175	210	5.9%	42.8%	51.3%	3.31
27e	Non-fog goggles with scratch-resistant lenses.	415	17	108	290	4.1%	26.0%	69.9%	3.87

27f	Info on significance of carbon monoxide hazards.	403	24	194	185	6.0%	48.1%	45.9%	3.19
27g	Info on fine particulate hazards during firefighting.	403	22	180	201	5.5%	44.7%	49.9%	3.31
27h	Reduce exposure to smoke with breathing devices.	403	42	200	161	10.4%	49.6%	40.0%	2.88
27i	Improve reflective material for fire safety clothing.	405	43	187	175	10.6%	46.2%	43.2%	2.95
27j	Improve hardhats to meet impact, penetration, heat.	402	43	175	184	10.7%	43.5%	45.8%	3.06
27k	Equipment carrying vest of a tough fishnet fabric.	402	82	210	110	20.4%	52.2%	27.4%	2.35
27l	Improve the fireline pack for hand crews.	409	38	119	252	9.3%	29.1%	61.6%	3.54
27m	Fire-resistant clothing and gear for cold weather.	407	20	104	283	4.9%	25.6%	69.5%	3.86

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TRANSPORTATION		N	Total Number Each Category			Valid % Each Category			Overall Average
			No Need	Low Priority	High Priority	No Need	Low Priority	High Priority	
29a	More use of All Terrain Vehicles (ATVs).	402	41	188	173	10.2%	46.8%	43.0%	2.99
29b	Specifications for vehicles for crew transport.	395	25	175	195	6.3%	44.3%	49.4%	3.27
29c	Evaluate suitability of the color of F.S. vehicles.	391	103	131	157	26.3%	33.5%	40.2%	2.56
29d	Establish standard markings and lighting for vehicles.	402	43	129	230	10.7%	32.1%	57.2%	3.39
29e	Improve existing systems to transport liquid fuels.	385	25	192	168	6.5%	49.9%	43.6%	3.12
29f	Develop Off Highway Vehicle (OHV) personnel carrier.	394	62	193	139	15.7%	49.0%	35.3%	2.67

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DISPATCHING		N	Total Number Each Category			Valid % Each Category			Overall Average
			No Need	Low Priority	High Priority	No Need	Low Priority	High Priority	
31a	System for tracking and displaying resources.	382	16	138	228	4.2%	36.1%	59.7%	3.68
31b	Improve accountability for cache inventory.	372	20	177	175	5.4%	47.6%	47.0%	3.25
31c	Improve interface between dispatch and vehicles.	377	17	154	206	4.5%	40.8%	54.6%	3.46
31d	Improve means of locating people while off-duty.	381	59	146	176	15.5%	38.3%	46.2%	2.96

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COMMUNICATIONS		N	Total Number Each Category			Valid % Each Category			Overall Average
			No Need	Low Priority	High Priority	No Need	Low Priority	High Priority	
33a	Improve communications systems in vehicles.	400	14	120	266	3.5%	30.0%	66.5%	3.79
33b	Improve the hand-held communication system.	404	11	86	307	2.7%	21.3%	76.0%	4.12
33c	Satellite or microwave links to reduce isolation.	398	12	90	296	3.0%	22.6%	74.4%	4.00
33d	VHF repeater for communication with helicopters.	374	22	128	224	5.9%	34.2%	59.9%	3.58
33e	Improve incident repeater systems.	386	14	108	264	3.6%	28.0%	68.4%	3.88
33f	Reduce dead spots in radio communications.	406	7	64	335	1.7%	15.8%	82.5%	4.34
33g	Establish common command channels among agencies.	399	11	107	281	2.8%	26.8%	70.4%	3.97
33h	Improve compatibility of communication equipment.	402	8	69	325	2.0%	17.2%	80.8%	4.29
33i	Improve radio mounts for vehicles.	389	31	193	165	8.0%	49.6%	42.4%	3.09
33j	Establish recycle power source for hand-held radios.	395	25	125	245	6.3%	31.6%	62.0%	3.60

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PREVENTION - GENERAL		N	Total Number Each Category			Valid % Each Category			Overall Average
			No Need	Low Priority	High Priority	No Need	Low Priority	High Priority	
35a	Improve spark arrester systems.	349	74	228	47	21.2%	65.3%	13.5%	1.94
35b	Develop a spark arrester guide.	351	82	211	58	23.4%	60.1%	16.5%	1.95
35c	Inspection process for residences/power lines/equip.	359	40	171	148	11.1%	47.6%	41.2%	2.92
35d	Improve the Smokey Bear suit.	351	125	143	83	35.6%	40.7%	23.6%	1.89
35e	Improve poster material to withstand weather.	357	62	176	119	17.4%	49.3%	33.3%	2.59
35f	Improve visibility of poster material.	349	66	186	97	18.9%	53.3%	27.8%	2.46
35g	Improve content of posters.	352	43	179	130	12.2%	50.9%	36.9%	2.73
35h	Improve resistance of posters to vandalism.	351	59	181	111	16.8%	51.6%	31.6%	2.57
35i	Improve bilingual posters and fire prevention materials.	350	69	181	100	19.7%	51.7%	28.6%	2.41
35j	Improve investigation tools and equipment.	344	25	170	149	7.3%	49.4%	43.3%	3.09
35k	Improve fire prevention audiovisual support equipment.	344	37	182	125	10.8%	52.9%	36.3%	2.81

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FUELS MANAGEMENT		N	Total Number Each Category			Valid % Each Category			Overall Average
			No Need	Low Priority	High Priority	No Need	Low Priority	High Priority	
37a	Info on cost/production of fuel management techniques.	371	18	174	179	4.9%	46.9%	48.2%	3.30
37b	Develop a system to gather and cut firewood/fuelwood.	366	44	175	147	12.0%	47.8%	40.2%	2.85
37c	Efficient method of reducing fuel in young plantations.	364	30	174	160	8.2%	47.8%	44.0%	3.09
37d	Improve ground ignition systems for prescribed burning.	370	26	187	160	7.0%	49.7%	43.2%	3.08
37e	Improve sprinkler technology f/retardant effect of water.	366	28	191	147	7.7%	52.2%	40.2%	2.98
37f	Improve aerial ignition systems.	363	23	174	166	6.3%	47.9%	45.7%	3.25
37g	Improve mixing/application guidelines for fuel gelling.	347	28	176	143	8.1%	50.7%	41.2%	2.99
37h	Develop a king-size (approx. 200 gallons) helitorch.	344	67	189	88	19.5%	54.9%	25.6%	2.26
37i	Develop minimal environmental impact fireline.	361	69	187	105	19.1%	51.8%	29.1%	2.38
37j	Improve material to cover machine and hand piles.	360	40	180	140	11.1%	50.0%	38.9%	2.82
37k	Chemical systems to replace hand line broadcast burning	364	42	178	144	11.5%	48.9%	39.6%	2.82
37l	System to pre-treat leave trees in underburning ops.	357	41	197	119	11.5%	55.2%	33.3%	2.68

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OTHER		N	Total Number Each Category			Valid % Each Category			Overall Average
			No Need	Low Priority	High Priority	No Need	Low Priority	High Priority	
39a	Improve the standard trauma kit.	254	21	176	157	5.9%	49.7%	44.4%	3.29
39b	Improve individual first aid kits.	377	20	137	220	5.3%	36.3%	58.4%	3.53
39c	Improve crew (belt) first aid kits.	370	19	138	213	5.1%	37.3%	57.6%	3.56
39d	Improve mass casualty equipment.	341	30	183	128	8.8%	53.7%	37.5%	2.97
39e	Improve Blood Borne Pathogens (BBP) equipment.	358	26	163	169	7.3%	45.5%	47.2%	3.15
39f	Improve injured employee transport system.	353	25	144	184	7.1%	40.8%	52.1%	3.37
39g	Improve equipment to mitigate HAZMAT exposures.	354	24	168	162	6.8%	47.5%	45.8%	3.16