The National Predictive Services User Needs Assessment: Final Report, Abbreviated Version[1]

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[1] This report has been shortened for the reader interested in a bit more beyond the executive summary, but without the interest in the extent of details in the full report.

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Executive Summary

This report presents findings from a user needs assessment commissioned by the National Predictive Services Group (NPSG). Following a needs assessment approach to program evaluation, we relied on the users and potential users of Predictive Services (PS) as our experts. Through use of an online survey, we had these experts tell us their opinions on current and potential products and services. Users and potential users were defined as employees in the federal and non-federal sectors with a defined membership in the fire management community. The report is organized so that the findings for the federal and non-federal sectors are presented, and then a number of appendices follow. Of particular interest to some readers will be Appendix F, which presents findings by job functions within the federal sector, and Appendix G, which presents findings for the non-federal sector by job function. This format allows readers to navigate to topics of key interest within the main body, and then to specific groups in which they have greater interest.

Federal sector respondents (*n*=1,078) were employed primarily in the Forest Service (FS), NOAA and National Weather Service (NWS), the Bureau of Land Management (BLM), and the National Park Service (NPS). Non-federal sector respondents (*n*=305) worked mostly in state and county agencies. The two sectors are reported on separately because we used different surveys for each.

Here are some key findings from the **federal respondents**:

Level of Expertise with PS

- A majority access Predictive Services (PS) information either daily or weekly during fire season. Outside of fire season access is more likely to be weekly or monthly. The two groups reporting the most frequent access were the multi-agency coordinators and non-NWS meteorologists. They were also the most familiar with products on the web, briefings and emails.

- A majority of PAO/information officers and support services respondents were not familiar with Predictive Services.

Opinions on Products and Services

- A majority or near-majority agreed that Predictive Services information was easy to understand, complete, accurate, timely, relevant, and accessible. Strongest agreement with these attributes was found among the multi-agency coordinators, FMOs[2]/assistants, FBANs/LTANs/analysts, and fuels specialists.

- The one-fifth who had contacted Predictive Services to report a problem with a product or service, and the one-tenth who had made contact to suggest a new product or service, tended to rate Predictive Services as responsive to their concerns and suggestions.

[2] Fire management officers/assistants (FMOs/assistants); Fire behavior analysts/long term analysts/fire danger analysts

- Products and services provided by Predictive Services on a national scale that were used by a majority and also rated as useful by a majority included Incident Management Situation Reports, weekly fire weather/danger outlook, 10-day fire weather/danger outlook, live fuel moisture, dead fuel moisture, 7-day large fire potential, ERC and fuels charts, links to other services/websites, and the Interagency RAWS program.

- Some products were not used by a majority, although groups who did use them often assigned high usefulness ratings.

- The vast majority expressed some, to a great deal of trust and confidence in PS information. Respondents who were most familiar with Predictive Services, and within some job groups, were most likely to indicate high levels of trust and confidence.

Reliance on and Taking Action Based on PS Information

- About one-fourth of all respondents rely on PS in making important decisions related to their job duties and functions; about one-third were likely to take action based on the information. Reliance and taking action based on PS was more likely among those who had trust and confidence in the information, and those most familiar with the products and services.

Barriers and Implications of Gathering, Reporting, and Use of Information

- More than half felt there was at least some overlap in the type of information that can be obtained from Predictive Services and other sources; this was not always viewed negatively.

- Among the subset of respondents with data gathering and reporting duties that are linked to PS, about one-third indicated they were likely to gather and report the data.
    - A majority or near majority agreed that failure to gather and report data could affect their unit's ability to make sound decisions, as well as having adverse impacts on firefighter safety.
    - About one-third felt they had the resources to gather field data necessary for reporting.
    - Almost half felt that their consistent upward reporting helped improved the quality of Predictive Services products and services, as well as the quality of products and services generated by others that use the data.

- Respondents were somewhat in agreement that they could access and apply PS information as part of their job duties. They were somewhat less in agreement with PS helping them to perform their jobs with greater precision.

- Potential inaccuracy of PS information was believed to decrease the ability to predict fire behavior by one-third of respondents. The same proportion felt inaccurate information would adversely impact firefighter safety.

- Primary barriers to not using the products and services included current management practices not requiring the types of information provided, not knowing how to use the products, needing information that is site specific, and not having thought about it. Not knowing how to use the products was mentioned more often by dispatchers and incident

management team members. Those most likely to choose the need for site specific information as a barrier were FMOs/assistants and incident management team members.

- Technology related issues were mentioned more often as barriers to use of the products by fire use team members, crew supervisors/other suppression personnel, and dispatchers.

- When asked to choose between Type I and Type II errors respondents tended to lean towards 'better safe than sorry' over 'don't cry wolf'. This indicated that an early response was preferred, even if it meant that it proved later to be a 'false alarm'.

New and Improved Products

- When asked preferred formats for information, respondents indicated a pattern of preference for maps over other format types. However, interest in specific formats varied greatly by job function.

- Only about one-tenth indicated that additional products or services should be added to what PS provides; a number of suggestions were offered and are provided verbatim in *Appendix F*.

Here are some key findings from the **non-federal respondents**:

Level of Expertise with PS

- More than half of the respondents access PS information during fire season and during a fire incident. FBANs/LTANs and dispatchers reported the most frequent access overall.

- Groups most familiar with the web products, briefings and emails were the FMOs/chiefs[3], fire environment analysts, dispatchers and FBANs/LTANs.

Opinions on Products and Services

- A majority agreed that PS information was easy to understand, complete, accurate, timely, relevant, and accessible.

- Some differences in ratings of PS attributes were found by job function and by familiarity. As with the federal sample, those most familiar with the products and services were more likely to rate the information positively.

- More than one-tenth who had contacted PS to report a problem with a product or service, and tended to rate PS as responsive to their concerns and suggestions.

- Average ratings suggest that PS had met most expectations, and respondents were somewhat satisfied. Administrators and supervisors, suppression personnel, and

[3] Fire management officers/fire chiefs (FMOs/chiefs); Fire behavior analysts/long term analysts (FBANs/LTANs)

incident management team members were more likely than other groups to report being very satisfied with the products and services.

- The vast majority expressed some, to a great deal of trust and confidence in PS information. Respondents who were most familiar with PS, and in particular job groups, were most likely to indicate high levels of trust and confidence.

Reliance on and Taking Action Based on PS Information

- About one-third of all respondents rely on PS in making important decisions related to their job duties and functions; the same proportion were likely to take action based on the information. Reliance and taking action based on PS was more likely among who had trust and confidence in the information, and those most familiar with the products and services.

Barriers to Use of Information

- More than half felt there was at least some overlap in the type of information that can be obtained from PS and other sources. Those who indicated there was overlap mentioned the National Weather Service most often when asked to state other sources.

- Primary barriers to not using the products and services included not having thought about it, needing information that is site specific, not being mandated to use the products, and current management practices not requiring the types of information provided.

- About half of the FBANs/LTANs/analysts need information that is site specific. FBANs/LTANs/analysts were almost twice as likely as any other group to cite a shortage of time among barriers preventing them from using PS.

- Technology-related issues were mentioned by about a tenth of FMOs/chiefs and incident management team members.

Key Implications

- Communication is needed to increase awareness of products and services. Some of this needs to be tailored to specific user groups.

- Training is needed to increase the understanding of how products can be applied to various fire management roles and responsibilities.

- A majority of respondents rated PS information positively, however strongly disagreed with timeliness as an attribute. Open ended comments suggest specific concerns about this and add insight into the perceptions that led to lower ratings. An improvement to timeliness of postings and updates of data is suggested from this finding.

- A majority rated PS information as accurate, although some strongly disagreed with this as an attribute. Again, open ended comments suggest specific concerns contributed to these lower ratings.

- Most respondents rated Predictive Services as accessible, however some did not. In particular, accessibility in the field seemed to be problematic. Solutions to the lack of access or difficulty in access may be particularly helpful to those on the ground.

- Overall the preferred format for data appears to be in maps. However, variation by job function suggests consideration. Some user groups were quite interested in particular types of data. A similar finding was revealed for the products and services offered. For both of these issues, it is important to identify the core audience/market for Predictive Services and then refine the products to meet needs indicated.

- A majority of respondents did not support adding new products and services. However others suggested innovativeness is a core responsibility of the program. Careful attention to suggestions for products and services offered in the appendices is warranted. Additional sensing with particular user groups, through listening sessions, may be needed.

- A number of respondents thanked us for doing this survey and for listening to users. In order to complete the loop however, actions derived from these survey results should be reported back to current and potential users.

- Trust and confidence showed some to a great deal of importance among the majority of respondents in both samples. In addition, trust issues were not revealed as significant barriers to use of products and services. Specific actions to build trust and confidence might include:
    - increase communication efforts so that people increase their awareness and familiarity with PS products and services;
    - target communication efforts so that messages address reflect the needs and interest of the products and services to particular user groups;
    - practice transparency in presentation of data including assumptions behind products, levels of accuracy and reliability, confidence, sources of error, and other salient data-related concerns;
    - report back to current users and prospective users how findings from this survey were applied.

Introduction

This report presents findings from a study initiated in 2005 through a request from the National Predictive Services Group (NPSG), a group chartered under the National Fire and Aviation Executive Board (NFAEB) that provides oversight, leadership, and strategic direction to the Predictive Services program. The NPSG has played a central role through the execution of the user needs assessment. The assessment examines the Predictive Services program, which offers products and services through websites, briefings, and emails administered through the National Interagency Fire Center (NIFC) and the Geographic Area Coordination Centers (GACCs). The main purpose of Predictive Services is to integrate climate, weather, situation, resources status and fuels information into products that will enhance the ability of managers to make sound decisions for both short and long range strategic planning and resource allocation, and ensure the safety of firefighting and emergency personnel. This user needs assessment relies upon the perceptions of users and potential users of Predictive Services to assess current products and services as well as to identify areas where new products and services might be needed.

Methods

Respondents

Federal respondents—The federal respondents included 1,078 individuals (with 63 volunteers representing 5.8% of the sample. These folks were not originally selected, but participated in our survey). The federal sample had a final response rate of 36.4 percent.

- The majority was employed with the USDA Forest Service (53.4%, *Figure 1*).
- Respondents had been in their current position of employment for an average of six years (median response, *n*=702).

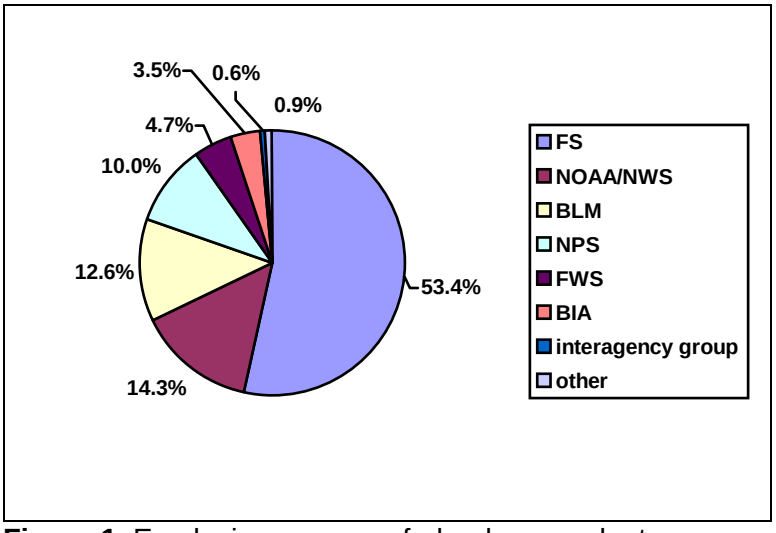


Figure 1. Employing agency—federal respondents.

Results of a non-response bias check appear in *Appendix A and B* of the full report.

Non-federal respondents—The non-federal respondents included 305 individuals (28 volunteers, or 9.2% of the sample). The non-federal sample had a response rate of 37 percent.

- Most worked for state agencies (*Figure 2*).

- The respondents had been in their current position of employment for 5.7 years (median response was less than one year).

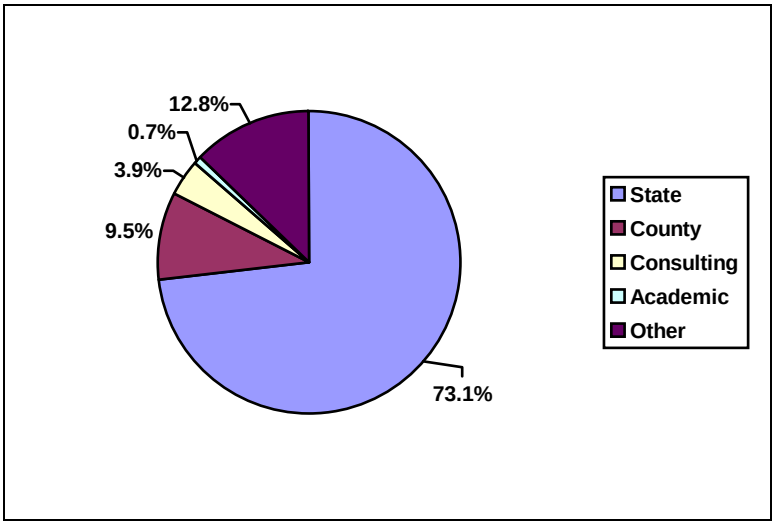


Figure 2. Employing agency—non-federal respondents.

A non-response bias check was conducted for the non-federal responses and results appear in *Appendix C* of the full report.

The Survey

Two survey instruments were constructed, one for the Federal sample *(Appendix D)* and one for the non-federal sample *(Appendix E)*. Findings from the federal sample are reported separately from the non-federal sample.

Results: Federal Survey

Who Were the Respondents?

- The majority (69.1%) was male.
- Respondents were primarily between 45 and 64 years of age *(Figure 3)*.

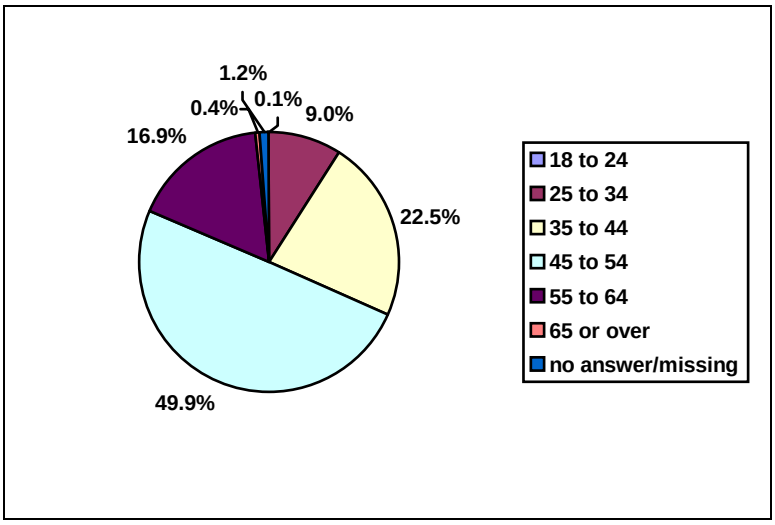


Figure 3. Age—federal respondents.

Educational background / degree or equivalent—Educational attainment was fairly high among the majority of respondents (*Figure 4*).

- More than half had obtained a Bachelor's level of education; another fifth had a master's degree or equivalent.
- Areas of study were varied among respondents; however, the vast majority of mentions were either related to forestry/resource management/range management, or the natural sciences.

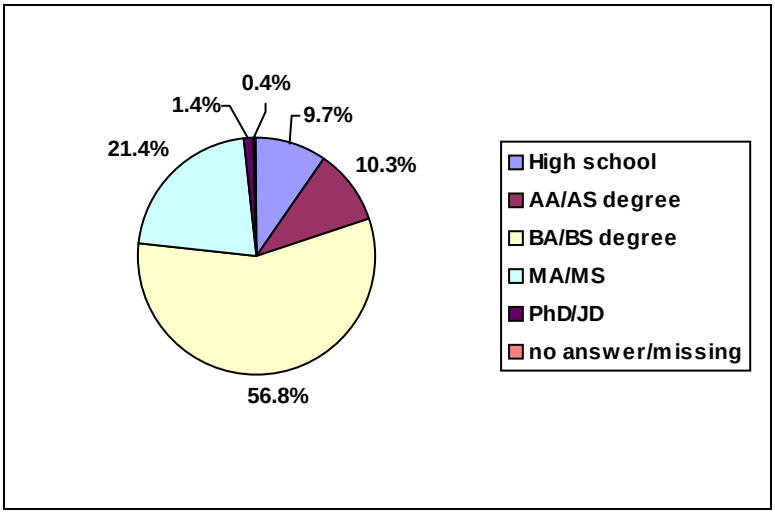


Figure 4. Educational attainment—federal respondents.

Geographic Area location—Respondents came from across the United States, with their home offices falling within the various established Geographic Areas (GAs, commonly referred to GACCs) shown below *(Figure 5)*.

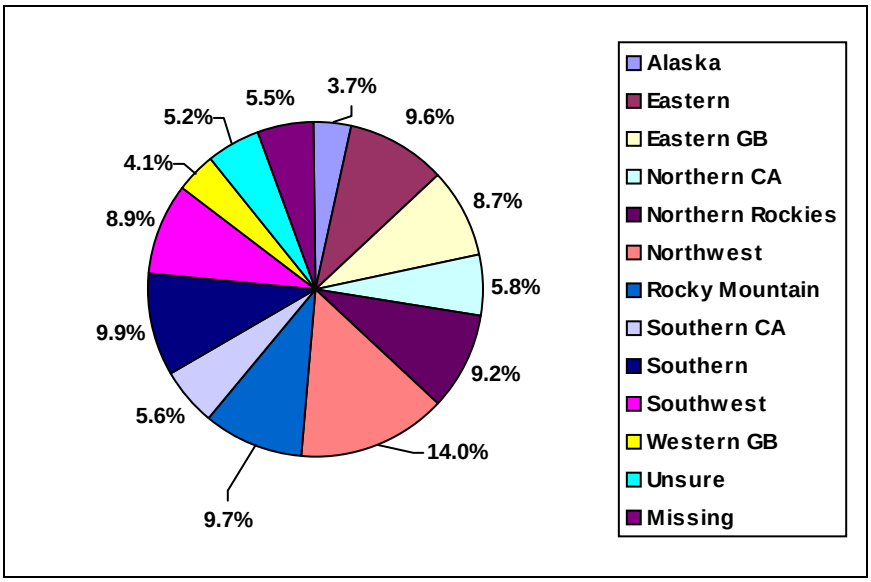


Figure 5. GAs—federal respondents.

Primary role or responsibility—Federal respondents were asked to 'choose their hat' for the remainder of the survey, by selecting their primary role or responsibility within their agency. About one-fourth of the sample served as PAO/information officers, with the balance reporting a variety of roles (*table 1).*

Table 1. Primary role or responsibility—federal respondents.

Role/Responsibility	n	%
Public affairs/information officers (PAO/information officers)	266	24.7
National Weather Service meteorologist (NWS meteorologist)	145	13.5
Forest/BLM District Fire Management Officer or Assistant (FMO/assistant)	123	11.4
Incident management team member	77	7.1
Crew supervisor/other suppression personnel in incident support	72	6.7
Fuels specialist	56	5.2
Fire Behavior/Long-Term Analyst for Incident Support (FBANs/LTANs)	37	3.4
Dispatcher in the Interagency Coordination System	34	3.2
Fire use team member in incident support	17	1.6
Fire research	15	1.4
Aviation	12	1.1
GACC manager/coordinator	11	1.0
Fire weather meteorologist in the interagency coordination system	10	.9
Multi-agency coordinator (NMAC/GMAC)	9	.8
Fire Behavior/Fire Danger Analyst within the interagency coordination system	8	.7
Intelligence within the interagency coordination system	3	.3
Other	181	16.8
	1,076	99.8

These responses required some grouping and re-categorization in order to allow a presentation of differences by job function. We blended the previous question along with job title to create the new groupings (*Figure 6*).

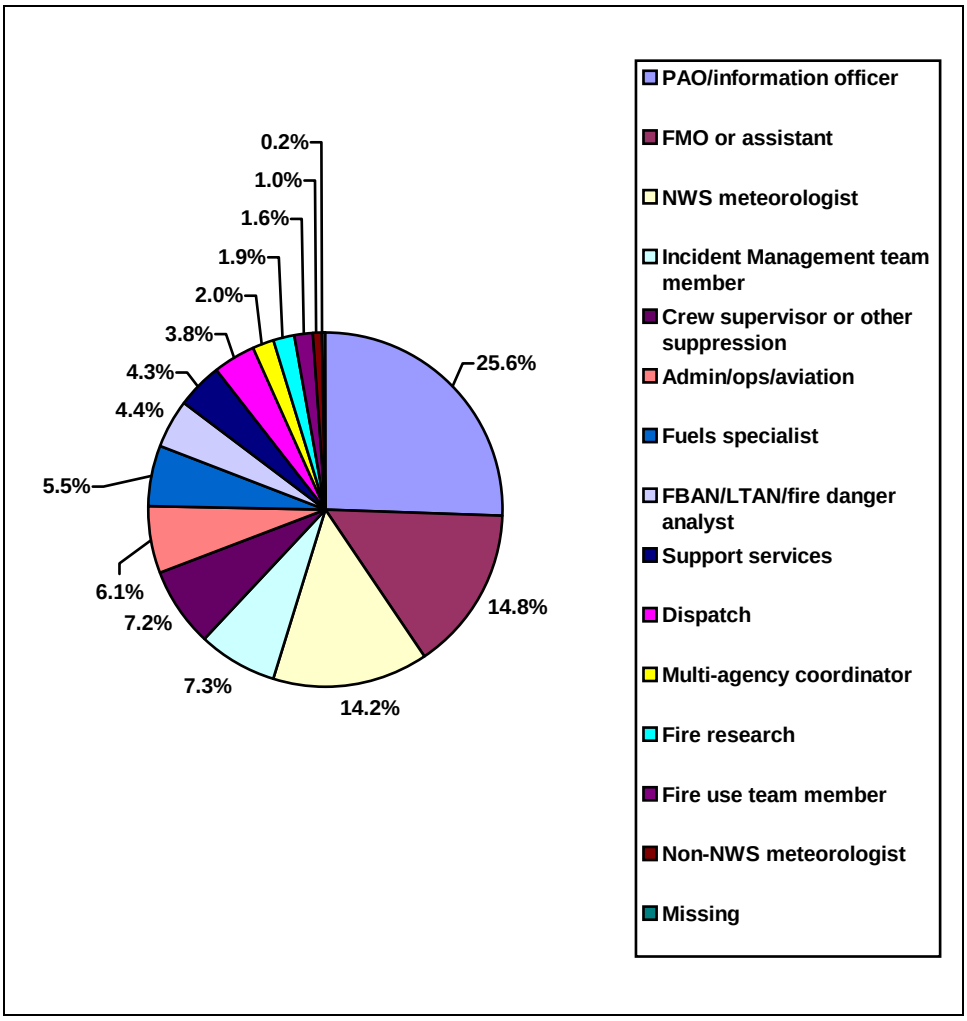


Figure 6. Job function groupings—federal respondents.

Level of geographic responsibility and scope of duties—Respondents' level of geographic responsibility varied. About one-tenth reported their duties were incident specific (10.2%), more than one third linked to their local unit (including forest, district, reserve, etc. at 40.9%). A few had duties that focused on county or state levels (2.5 and 8.3% respectively), and almost one-fifth (18.4%) had regional-level responsibilities. Responsibilities for the remainder were at the national (15.6%), or national and international (3.9%) level.

Some variation in level of responsibility by job function was evident. Four groups were more likely to report responsibility at the local level, including fire management officers or assistants (FMOs/assistants), support services, dispatchers, and fuels specialists. Regional responsibilities were most characteristic of non-NWS meteorologists and multi-agency coordinators.

The majority of respondents (56.8%) indicated that their work was specific to multiple agencies. Number of people supervised on a routine basis was one (45.2% had no supervisory responsibilities on a routine basis); fewer had supervisory responsibilities on an incident or seasonal basis.

Almost half of the respondents (43.6%) had job responsibilities that included gathering and reporting data that is utilized by Predictive Services (e.g., situation reports, ICS-209s, NFDRS/WIMS). Among the respondents in this group (*n*=470), in most cases the duties were assigned as one of their primary responsibilities, or assigned as part of a group that fulfills that responsibility. Groups with the greatest proportion of data gathering and reporting duties included the FMOs/assistants, FBANs/LTANs/analysts, and the dispatchers.

What are their Levels of Experience with Predictive Services?

Federal respondents varied in their use and resulting familiarity with the products and services being evaluated.

Frequency of access and information acquisition—The frequency of accessing and obtaining information from Predictive Services was examined under two conditions, during fire season and outside of fire season. Frequency of access was greatest during fire season (*table 2*).

Table 2. Frequency of accessing and obtaining information from Predictive Services—federal respondents.

Frequency	During Fire Season %	Outside Fire Season %
Daily	37.5	5.0
Weekly	22.9	17.3
Monthly	4.4	19.9
Quarterly	1.2	8.0
Rarely	10.8	21.5
Not at all	22.9	27.6
Missing	.4	.6

While frequency of access was greatest during fire season for the full sample, a majority of six function groups accessed Predictive Services daily during this season, including multi-agency coordinators, non-NWS meteorologists, dispatchers, FMOs/assistants, and fuels specialists. Least likely to access the information during fire season were the PAO/information officers and support services. Outside of fire season, daily or weekly access was highest among the non-NWS meteorologists and the multi-agency coordinators.

Specific circumstances for access/acquisition—In addition to frequency, respondents provided information regarding specific situations when they access or obtain information from Predictive Services. More than half reported accessing Predictive Services during fire season (61.1%), and during a fire incident (51.2%).

Between one-fourth and approximately one-third listed other situations including when a prescribed burn is being planned (30.0%) and when a prescribed burn is taking place (27.0%). About one-fourth indicated none of the above situations applied to them (26.4%).

While several of the job function groups access Predictive Services across a variety of situations, three groups stand out as those reporting the greatest access across a variety of situations. These included FMOs/assistants, fuels specialists, and fire use team members.

Several respondents offered up additional circumstances or situations when they would access/obtain information from Predictive Services. These responses provide a glimpse into the

diverse applications that survey respondents are finding for the information. The majority of uses mentioned were focused on planning throughout the year and during extreme events or incidents (*table 3*).

Table 3. Situations when information was accessed/obtained from Predictive Services—federal respondents.

General…
All year long/always; for all reasons
Specific types of incidents/situations…
Incidents involving risk
Pre-season for planning/projections
Red flag warnings
Multiple incidents in different areas
End of season
Times of high activity
Times of off-season activity
When making travel plans/heading to different area
When lightening is forecasted/occurring
When cyclones/floods/other severe events are forecasted/occurring
When hurricanes are forecasted/in season
During drought
Before leaving for an incident
During political situations
Tasks, general and specific…
To prepare for briefings
For all types of fire work
When detailed to a different job or assignment
Fire investigation
Research, to gather data, to examine trends, historical data
To prepare for MAC meetings
Pre-season preparation
To prepare situation reports
To prepare reports/projects
For general fire planning, including staffing/resources; long-term, short-term
To evaluate severity needs
For teaching/training purposes
For wildland fire use/prescribed burns/rehabilitation treatment events/planning
To prepare for media events/inquiries/contacts

Use of specific websites and services—Respondents were asked to indicate which Predictive Services websites they had visited, or which GACC services they had used (such as briefings), revealing that a majority had been to/used the National Interagency Coordination Center (NICC–59.1%). The Geographic Area Coordination Center sites from most to least mentioned were the Southwest (30.0%), Northern Rockies (26.3%), Northwest (25.2%), Rocky Mountain (25.0%), Eastern Great Basin (21.5%), Western Great Basin (21.2%), Southern (20.2%), Northern California (16.0%), Southern California (16.0%), Alaska (13.8%), and the Eastern site (12.2%; responses do not sum to 100% because respondents could select multiple sites). A few

(7.1%) were not sure which if any sites they had visited/ GACCs they had used, while about one-tenth (11.7%) indicated they had not visited any of the listed sites.

Familiarity with the products and services—Federal respondents were asked to indicate how true or untrue the following statement was "I am unfamiliar with Predictive Services products and services." About one-third indicated this statement was true (30.1% selected a rating of 4, or 5, where 5=very true), and another tenth (14.7%) selected 'somewhat true'. Over half felt familiar with the products and services (54.1% selected a 2 or 1, where 1=not at all true.) Those groups most likely to mark very true on this question, indicating the least familiarity, were support services, PAO/information officers, and fire researchers.

The majority of respondents was interested in Predictive Services products and services (*Figure 7*). Groups least interested in Predictive Services (selected not at all true or '2') included support services, fire researchers, and PAO/information officers.

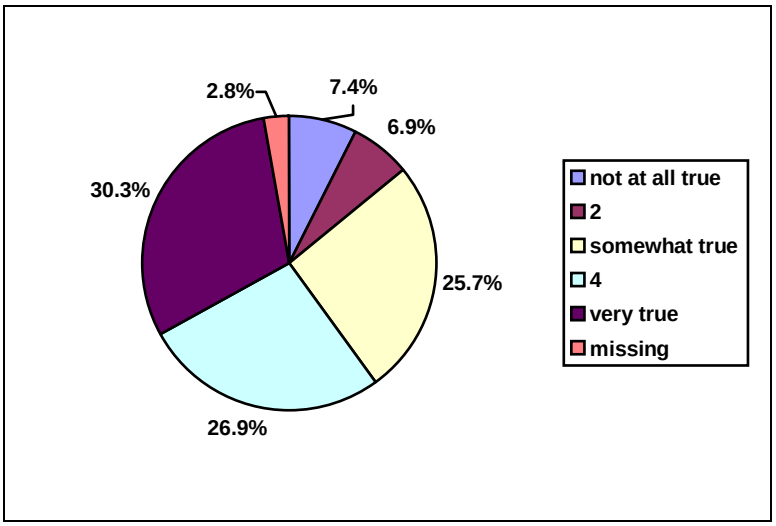


Figure 7. Interest in Predictive Services products and services—federal respondents.

Respondents were asked their familiarity with Predictive Services' products on the web, the briefings, and the emails**.** Federal respondents were more familiar with the web products (*Figure 8*), and the briefings (i.e., national, geographic, situational, or meteorological), than with the emails (these contain current projections and/or information about Predictive Services). It should be noted that the emails are sent to a specific fire audience and would, by their nature, be less familiar to the broad audience of respondents we surveyed.

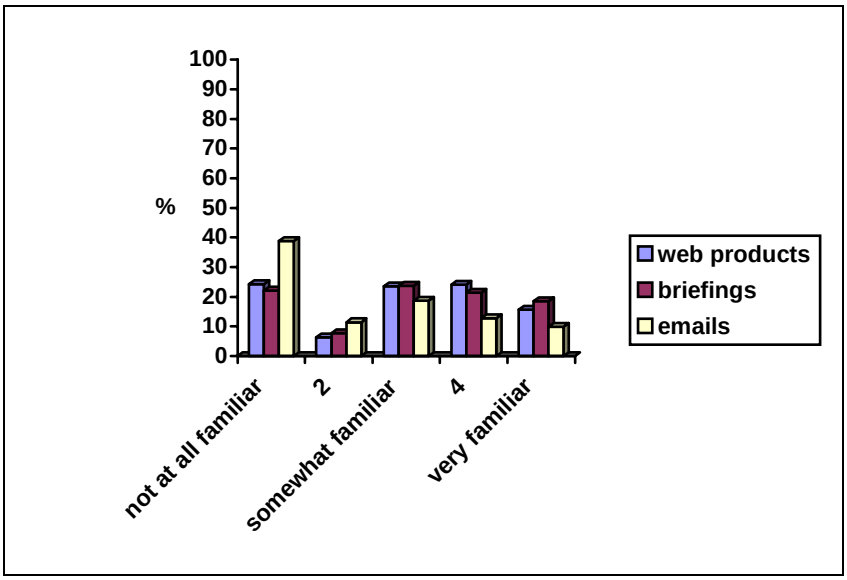


Figure 8. Familiarity with Predictive Services products on the web, briefings, and emails—federal respondents.

Familiarity with each of the types of products varied significantly by job function. Groups most familiar with the products and services included non-NWS meteorologists, multi-agency coordinators, and FBANs/LTANs/analysts. Least familiar with all three forms of products were the PAO/information officers and the support services respondents.

What are their Opinions of the Products and Services?

Ratings of Predictive Services information—Federal respondents were asked to rate six attributes of Predictive Services information on the 1 to 5 scale, where 1 was equal to strongly disagree, and 5 was equal to strongly agree. A ‘3’ is a neutral position on the scale, and should be viewed as neither agreement nor disagreement with each attribute as characteristic of Predictive Services. Overall variation by job function was significant for all six attributes. Two familiarity groups were created: those least familiar and those most familiar, using the median split of average familiarity with web products, briefings, and emails. All six attributes were rated higher (meaning that respondents were more likely to agree with these as positive characteristics of Predictive Services) by those most familiar with the Products and Services.

Respondents tended to agree that Predictive Services information was accessible (*Figure 9*, 27.7% marked ‘don’t know’ and 1.0% did not respond).

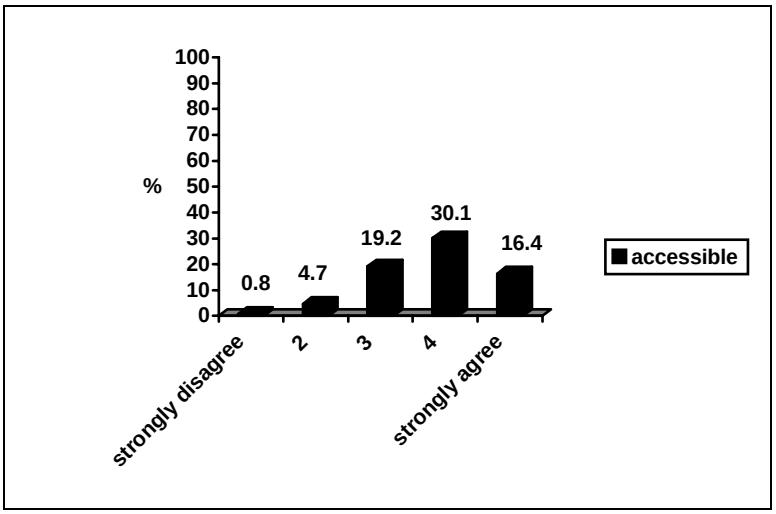


Figure 9. Ratings of accessibility of Predictive Services information—federal respondents.

Perceived accessibility varied significantly by job function. Between group differences were not significant. The functional groups with a majority who agreed Predictive Services information was accessible included non-NWS meteorologists, multi-agency coordinators, FMOs/assistants, FBANs/LTANs/analysts, fire use team members, fuels specialists, and incident management team members.

A near-majority agreed that Predictive Services information was timely (*Figure 10*, 11.5% marked ‘don’t know’ and 1.3% did not respond).

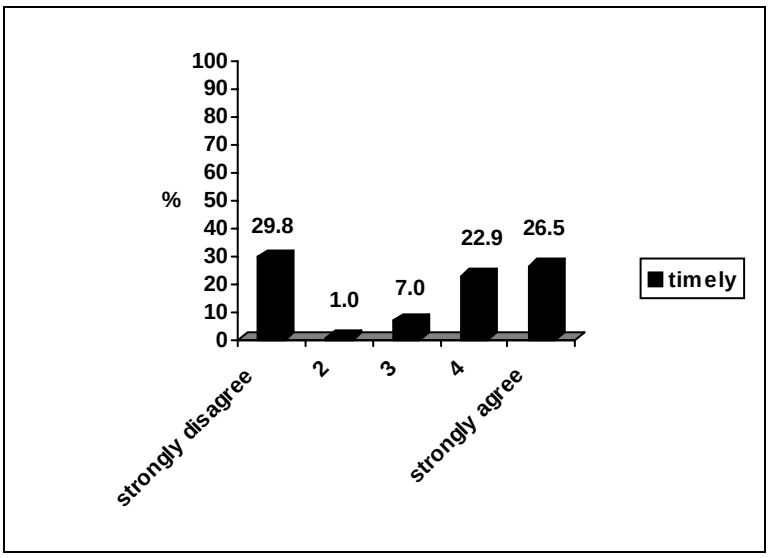


Figure 10. Ratings of timeliness of Predictive Services information—federal respondents.

Timeliness ratings varied significantly by job function and six groups stood out with greater agreement that the information was timely including: the multi-agency coordinators, FMOs/assistants, FBANs/LTANs/analysts, fuels specialists, incident management team members, and dispatchers.

A near-majority agreed that Predictive Services information was relevant (*Figure 11*, 17.6% marked ‘don’t know’ and 1.2% did not respond).

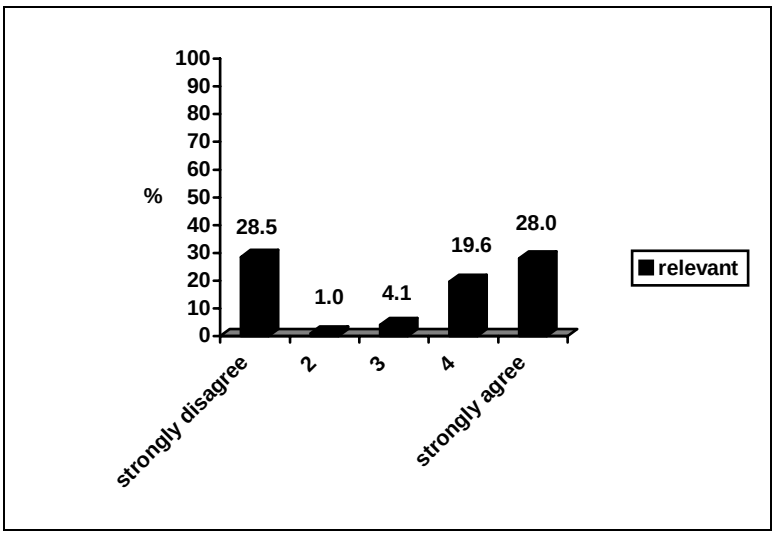


Figure 11. Ratings of relevance of Predictive Services information—federal respondents.

Perceived relevance varied significantly by job function and four groups stood out with greater agreement that the information was relevant including: the multi-agency coordinators, FMOs/assistants, FBANs/LTANs/analysts, and incident management team members.

A majority agreed that Predictive Services information was accurate (*Figure 12*, 7.1% marked ‘don’t know’ and 1.6% did not respond).

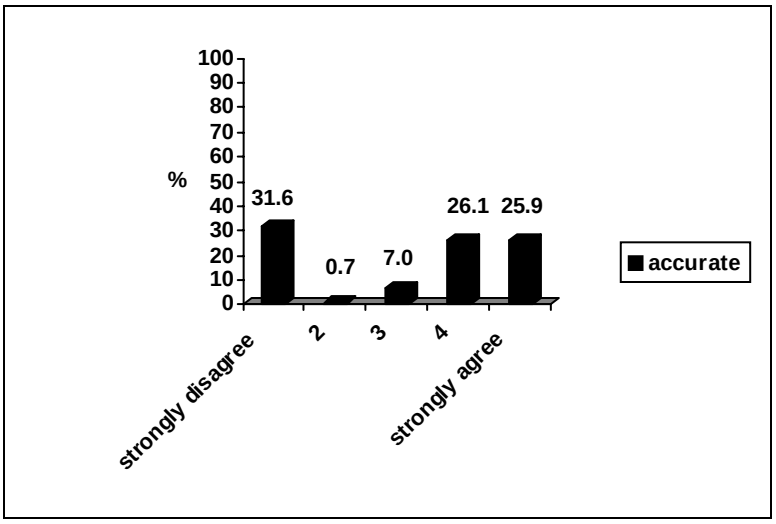


Figure 12. Ratings of accuracy of Predictive Services information—federal respondents.

Ratings of accuracy varied significantly by job function and five groups stood out with greater agreement that the information was accurate including: the multi-agency coordinators,

FMOs/assistants, FBANs/LTANs/analysts, non-NWS meteorologists, and incident management team members.

A majority also agreed that Predictive Services information was complete (*Figure 13*, 8.4% marked ‘don’t know’ and 1.5% did not respond).

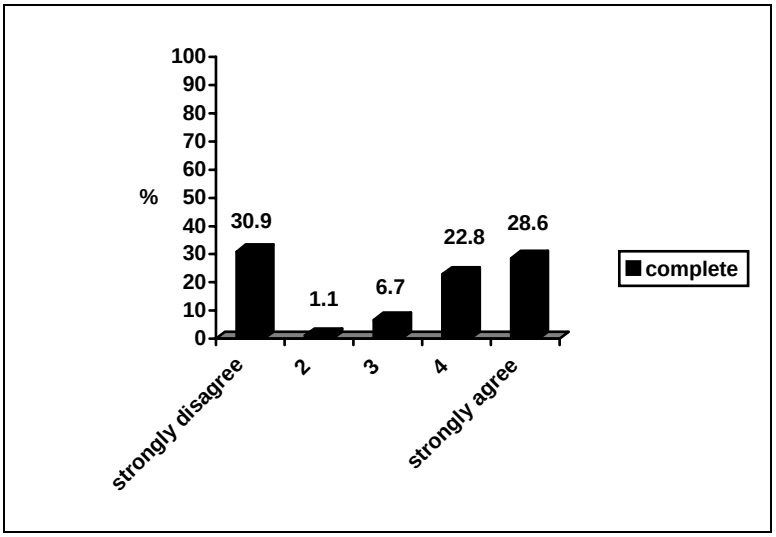


Figure 13. Ratings of completeness of Predictive Services information—federal respondents.

Perceived completeness of information varied significantly by job function and five groups stood out with greater agreement including: the multi-agency coordinators, FMOs/assistants, FBANs/LTANs/analysts, non-NWS meteorologists, and incident management team members.

A majority agreed that Predictive Services information was easy to understand (*Figure 14*, 11.1% marked ‘don’t know’ and 1.3% did not respond).

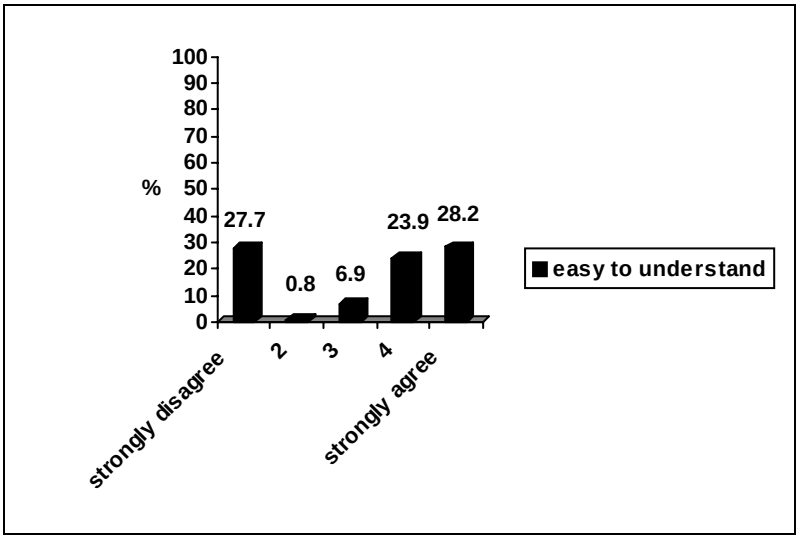


Figure 14. Ratings of ease of understanding of Predictive Services information—federal respondents.

Similar to the ratings on the other five attributes, ratings on ease of understanding varied by job function and for this attribute several groups stood out with greater agreement including: the multi-agency coordinators, FMOs/assistants, FBANs/LTANs/analysts, non-NWS meteorologists, fuels specialists, fire use team members, and dispatchers.

Similarity and importance of similarity of GACC sites—Respondents were asked a series of questions to examine their perceptions regarding current similarity of format and quality across GACCs, as well as the importance of that similarity. This was asked in light of nationwide efforts to provide comparable products and formatting on the GACC websites.

Federal respondents rated how true the following statement was “The Predictive Services products and services available through the GACCs you selected (based on which GACCs they had been to) are similar in format, quality, and the range of products and services offered. About one-third rated the statement as somewhat true (35.0% answered ‘3’), and about one-fifth rated the statement as true (20.9% answered either 4, or 5=very true.)

The final item addressing the similarity in format and quality theme asked respondents to rate importance. The majority indicated that similarity was important (*Figure 15*; 11.4% did not answer this item). Groups with a majority indicating similarity across GACCs was very important included multi-agency coordinators, non-NWS meteorologists, and FBANs/LTANs/analysts.

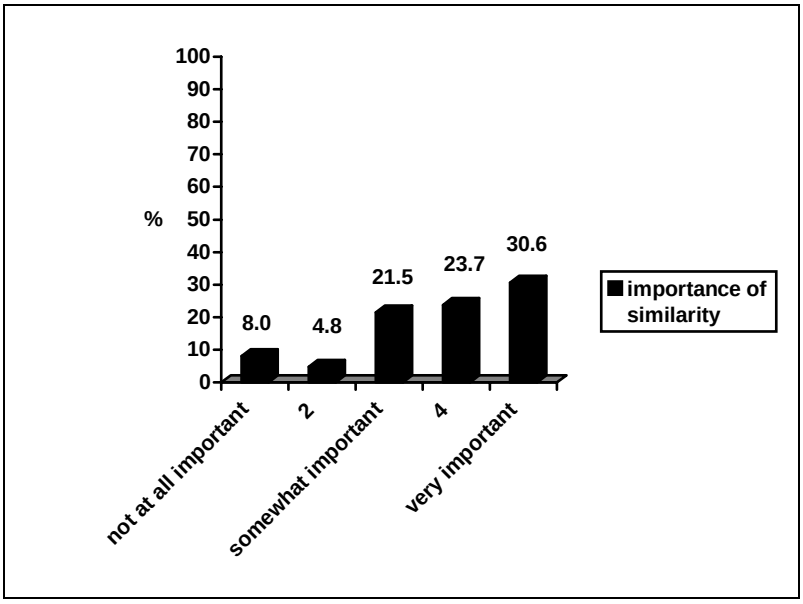


Figure 15. Importance of similarity of format and quality of GACC sites—federal respondents.

Satisfaction with Predictive Services contacts—About one-fifth of respondents (19.5%) had contacted Predictive Services to report a problem with a product or service. Those who had reported a problem indicated they were responsive. About one-tenth (11.9%) had contacted Predictive Services to suggest a new product or service. These respondents also tended to rate Predictive Services as responsive.

Use and utility of products and services—Products and services available through Predictive Services were examined. The 39 specific listings included some products and services that are generated elsewhere, or that are available only on some sites, but not all. Respondents were

asked first to indicate if they had not used each product, and then for those that they had used, to rate each according to its usefulness to them on a scale from 1 to 5, where 1=not at all useful and 5=very useful.

The first set of product ratings (*table 4*) are those that are shown on Predictive Services sites, but are produced through other agencies and provided as a courtesy to fire managers who might want a central location to find information.

In the first column of the table the service or product being rated is listed. The second column shows the percent of respondents who do not use the product or service (these are in order from least to greatest percentage not used). Then, only for those who use the product, an average usefulness rating is presented. Ratings are on a scale from 1 to 5 (1=not at all useful, 5=very useful). The last column shows the standard deviation around the mean on each usefulness rating. Larger numbers indicate more variability in the sample of users of that product. 'N' denotes the number of users who rated that particular product or service.

Table 4. Use and utility of Predictive Services products and services provided by other agencies/groups—federal respondents.

Product or Service	**% Not Used**[1]	**Usefulness *M***	**SD, N**
National fire weather outlook	18.6	3.68	1.0; 814
Red flag warnings	20.8	4.35	.9; 797
Drought information	22.2	3.95	.9; 772
Haines index	27.5	3.82	1.1; 722
7-day precipitation maps	32.5	3.54	1.0; 660
7 and 14-day precipitation percent of normal	33.3	3.42	1.0; 653
12-hour forecast maps	33.9	3.79	1.0; 643
MODIS active fire maps	34.3	3.64	1.0; 639
7 and 14-day average maximum temperature departure from normal	34.5	3.37	1.0; 641
7-day average maximum temperature maps	34.8	3.39	1.0; 629
Wind maps	38.6	3.76	1.0; 594
Observed fire danger images	42.7	3.66	.9; 553
ROMAN real time fire weather and information report	43.6	4.14	1.0; 540
Upper air soundings	60.1	3.46	1.2; 371

[1] This column reports the percentage of respondents who indicated that they had not used the product. Products are ordered from least to greatest % not used. The reader should not assume that the remaining respondents do use the product however, since some might not have provided an answer about the product. Those who use the products and provided ratings are reflected in the remaining columns in the table.

A set of products and services is produced by Predictive Services and is available on a limited scale (*table 5,* less than national, typically on a local and regional level). These products and services are offered on a limited scale to meet specific regional needs and interests.

Table 5. Use and utility of Predictive Services products and services provided by Predictive Services on a limited scale—federal respondents.

Product or Service	% Not Used	Usefulness *M*	SD, N
Interagency situation reports	19.4	4.14	.9; 804
Daily fire weather/danger outlook	21.7	4.13	.9; 795
Prescribed fire reports	44.0	3.46	1.0; 543
Smoke program reports	46.6	3.28	1.1; 505
Online briefings	49.4	3.57	1.0; 483

This final set of products and services is produced by Predictive Services (whether solely or in collaboration with others) and is available to the national audience (*table 6*). In addition, considering the percentage of respondents who rated each product or service, we provide the proportion of those who assigned ratings of 4 or 5 (indicating assessments of useful or very useful).

Table 6. Use and utility of Predictive Services products and services provided by Predictive Services on a national scale—federal respondents.

Product or Service	% Not Used	% With 4 or 5 Rating[1]	Usefulness *M*	SD, N
Incident Management Situation Reports	17.9	80.9	4.27	.9; 826
Weekly fire weather/danger outlook	22.5	68.8	3.93	.9; 777
Seasonal fire weather/danger outlook	22.6	46.1	3.37	1.1; 769
Monthly fire weather/danger outlook	25.7	45.5	3.39	1.1; 734
10-day fire weather/danger outlook	26.4	54.9	3.63	1.0; 730
Live fuel moisture	26.6	70.6	3.97	.9; 733
Dead fuel moisture	26.8	70.7	3.98	1.0; 720
7-day large fire potential	27.1	60.3	3.74	1.0; 720
Fire news and notes	32.6	47.5	3.51	1.0; 666
ERC and fuels charts	32.8	70.3	3.92	1.0; 661
Links to other services/websites	34.7	51.4	3.60	.9; 642
Multi-season fire weather maps	36.3	37.2	3.13	1.1; 615
Interagency RAWS program	38.3	67.1	3.97	1.0; 602
Reference links	42.0	48.0	3.49	1.0; 558
Training	53.7	45.3	3.42	1.1; 439
State of the fuels program	58.5	40.3	3.27	1.1; 380
Technological guidance and transfer	59.2	44.5	3.35	1.0; 375
Predictive service forms	59.3	33.1	3.14	1.0; 374
Regional monsoon update	62.2	42.3	3.26	1.2; 348

[1] This column considers only those who rated the product and is not based on all federal respondents.

Several of the usefulness ratings for the products in *table 6* varied significantly by job function.

Overall satisfaction—A series of items designed to measure aspects of user satisfaction were included in the survey.

Responses indicate that Predictive Services had neither met nor failed to meet most expectations (*Figure 16*), and respondents were neither satisfied nor dissatisfied (*Figure 17*).

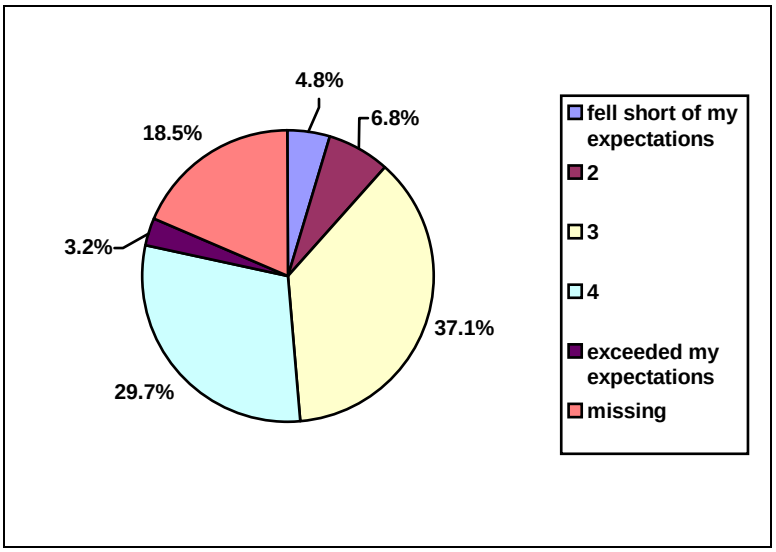


Figure 16. Ratings of degree to which Predictive Services met expectations—federal respondents.

Support services were most likely to indicated that PS has fallen short, while non-NWS meteorologist were most likely to indicate their expectations had been met.

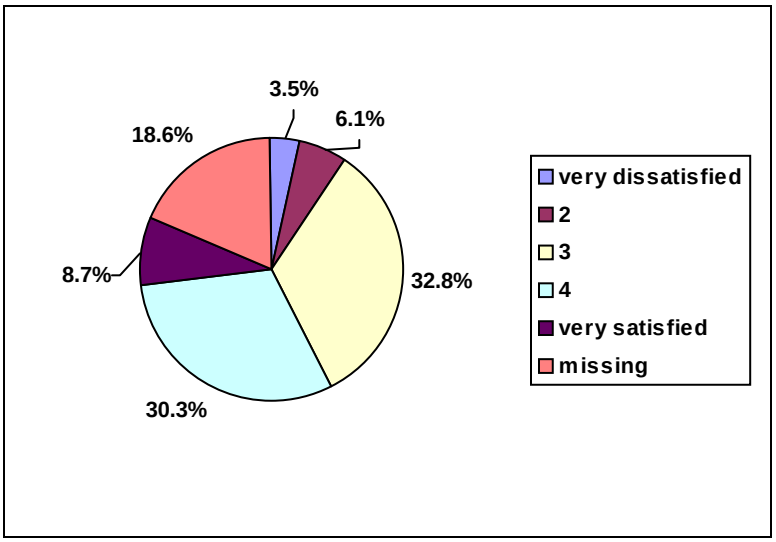


Figure 17. Ratings of satisfaction with Predictive Services products and services—federal respondents.

Ratings of satisfaction varied significantly by job function however, between group differences were not significant. Support services respondents had the lowest satisfaction ratings, while fire use team members had the highest.

Trust and confidence in the information—Federal respondents were asked to indicate the degree of trust and confidence they have in the information provided by Predictive Services. A majority expressed some to a great deal of trust and confidence (*Figure 18*, 12.0% did not answer this item.) Support services respondents and the PAO/information officers indicated the lowest trust

and confidence. The groups with the highest trust and confidence were the non-NWS meteorologists and multi-agency coordinators.

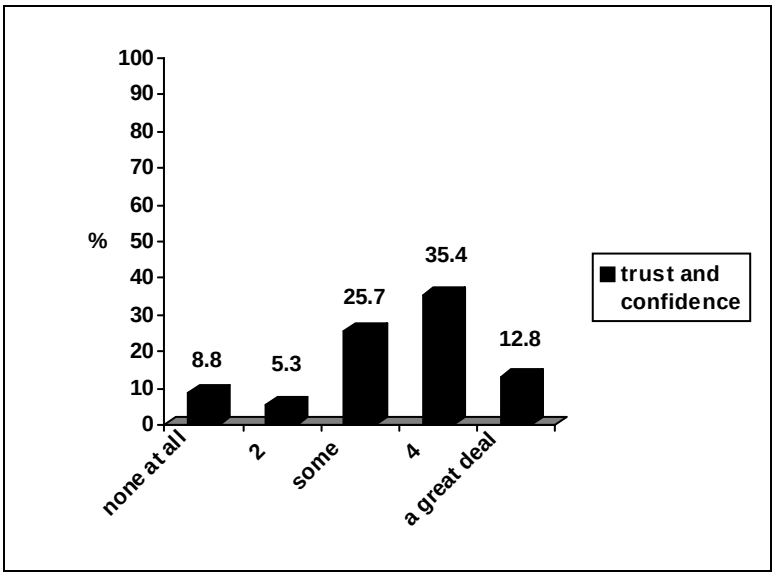


Figure 18. Ratings of trust and confidence in Predictive Services information—federal respondents.

Using each of the variables with a significant relationship with trust and confidence, we ran a multiple regression analysis, 44 percent of the variation in trust and confidence was accounted for by job function, level of geographic responsibility, frequency of use, gender, and familiarity.

Are Respondents Relying on and Taking Action Based on Predictive Services?

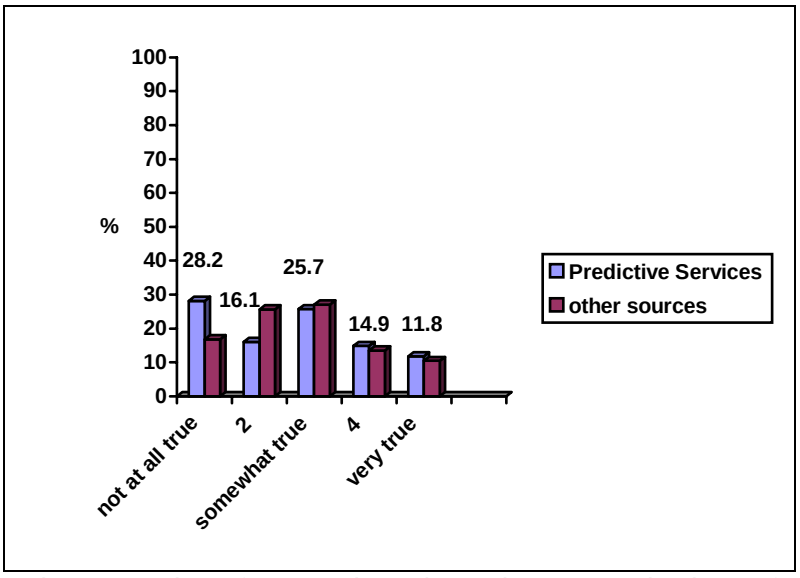
Reliance on products and services—A number of questions were asked to examine the degree to which respondents relied upon, and were likely to take action based upon Predictive Services information. The first of these measured reliance on products and services in making important decisions related to job duties and functions. While almost half (*Figure 19*) indicated that they did not rely on Predictive Services in making important decision related to job duties/functions.

Degree of reliance on Predictive Services was also queried; almost one-third indicated reliance (30.8%).

Least likely to rely on Predictive Services were the support services respondents, while multi-agency coordinators and meteorologists outside NWS were most likely to rely on the information.

Sixty percent of the variance in reliance was predicted by trust and confidence in the information, frequency of accessing Predictive Services during fire season, and familiarity.

About one-fourth (*Figure 19*) indicated that they relied on other sources more heavily than the products and services provided by Predictive Services. For those who chose a ‘4’ or ‘5’ rating, respondents were asked to specify the other sources relied on. The most frequently mentioned source was the National Weather Service, followed by a variety of local sources.



* The proportion of respondents in each category is shown for reliance on Predictive Services.

Figure 19. Reliance on Predictive Services and reliance on other sources—federal respondents.

The likelihood of taking action based on Predictive Services information was examined. About one-third were likely to take action based on Predictive Services information (*Figure 20*; 9.2% did not provide a response). The group least likely to take action based on the information was support services, most likely was the non-NWS meteorologists.

Fifty-nine percent of the variance in likelihood of taking action was predicted by trust and confidence in the information, frequency of accessing Predictive Services during fire season, and familiarity.

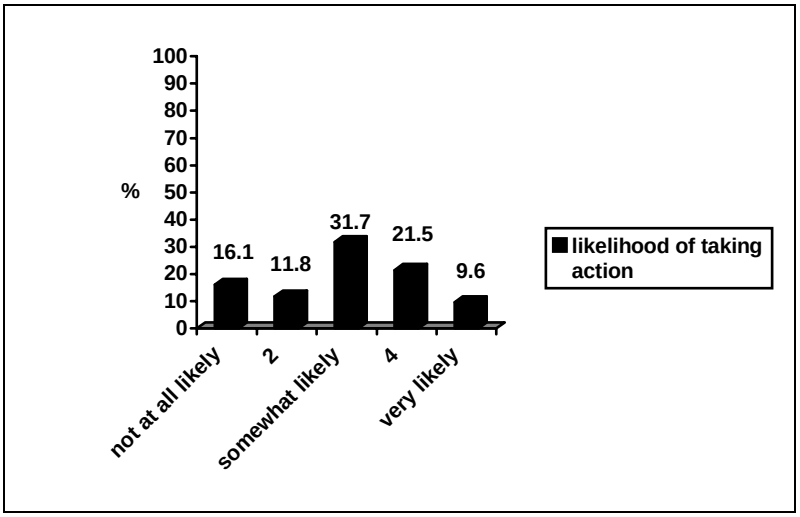


Figure 20. Likelihood of taking action based on Predictive Services information received, or gathered from a website—federal respondents.

Did Respondents offer Insights into Reliance and Barriers?

A series of items might offer insight beyond general satisfaction and trust into why respondents have, or have not relied on Predictive Services.

Perceived overlap—Respondents were asked how true or untrue it was that there is overlap in the type of information that can be obtained from Predictive Services and other sources. More than half felt there was overlap (*Figure 21*).

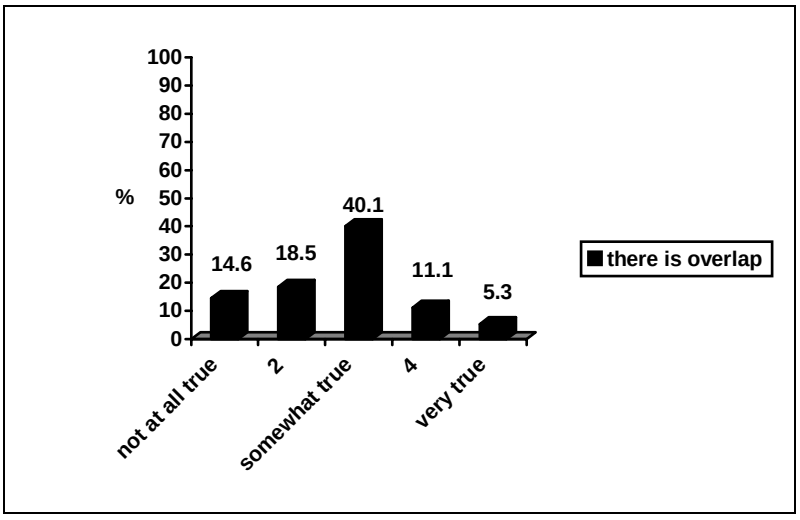


Figure 21. Perceived overlap of information from Predictive Services and other sources—federal respondents.

Beliefs about Predictive Services among those who had data gathering and reporting duties— This subgroup of individuals was asked "How likely is it that you will gather and report data to Predictive Services?" About one-third indicated that they were likely to gather and report data (*Figure 22*).

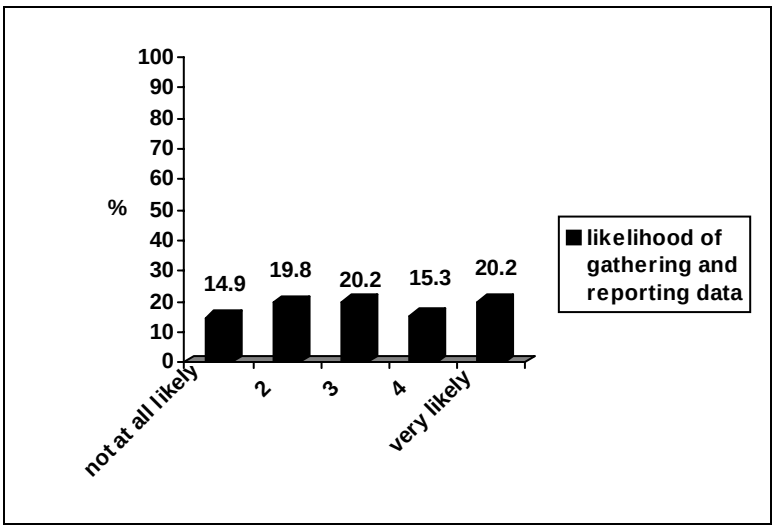


Figure 22. Likelihood of gathering and reporting data to Predictive Services—federal respondents with data gathering and reporting duties.

Respondents were somewhat mixed when rating agreement that they had the resources to gather field data for reporting (*n*=425, *Figure 23*).

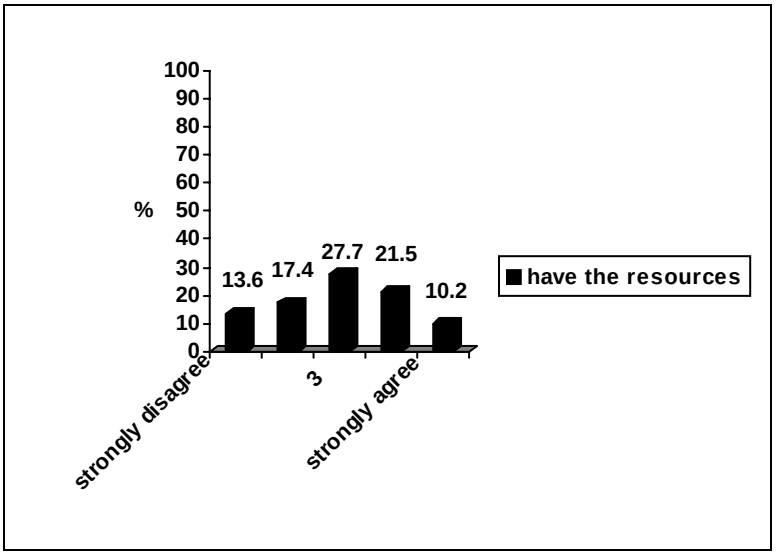


Figure 23. Degree of agreement or disagreement with "I have the resources (e.g., time/skills/personnel) to gather field data for Predictive Services reporting"—federal respondents with data gathering and reporting duties only.

This subgroup was also asked to rate five items focused on positive impact of reporting, and negative effects of not reporting. Each of these items was rated on a 1 to 5 scale, where 1=strongly disagree and 5=strongly agree.

The first positive impact assessed was "My consistent upward reporting of data (e.g., 1300 obs. for RAWS) increases the reliability and quality of Predictive Services products and services". Almost half selected a 4 or 5 on the scale (*n*=414; *Figure 24*).

The second positive impact assessed was "My consistent upward reporting of data (e.g., 1300 obs. for RAWS) increases the reliability and quality of products and services provided by groups and agencies that use the data from Predictive Services to generate their own products." Again, almost half selected a 4 or 5 rating on the scale (*n*=407; *Figure 24*).

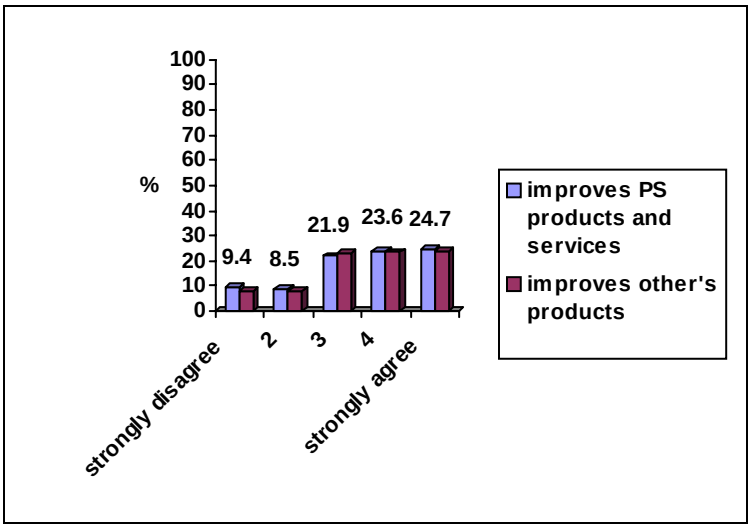


Figure 24. Degree of agreement or disagreement with positive outcomes of reporting data—federal respondents with data gathering and reporting duties only.

Responses indicate that the majority agrees there are adverse outcomes when/if data is not gathered and reported. This was assessed through two items including: "If I don't collect and report Predictive Services data, it could affect my unit's ability to make sound decisions to manage fire" (*n*=414; *Figure 25*). A majority indicated agreement with "If I don't collect and report Predictive Services data it could adversely impact firefighter or public safety" (*n*=414; *Figure 25*).

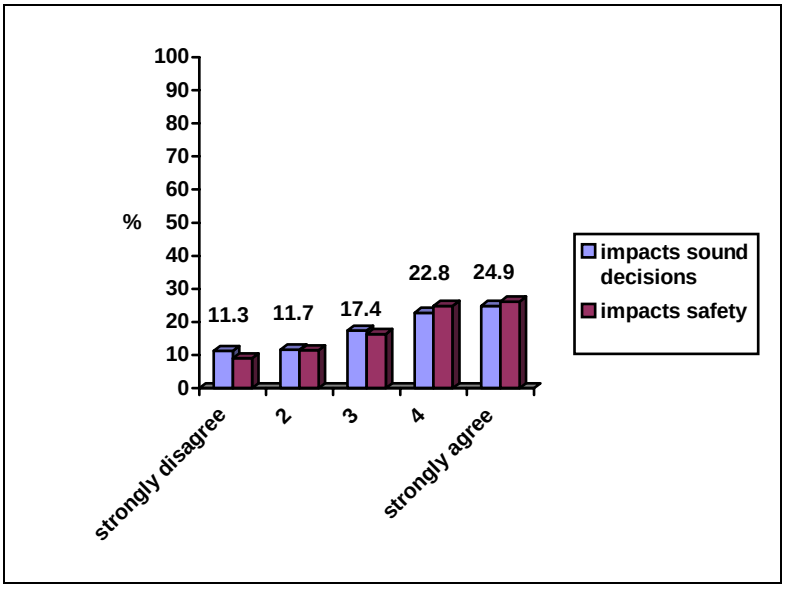


Figure 25. Degree of agreement or disagreement with adverse impacts of not collecting and reporting data—federal respondents with data gathering and reporting duties only.

Ratings of ability and impact of applying Predictive Services information—General ability to access and apply the information from Predictive Services, as well as its utility in job performance, was queried. For both items, respondents were asked to rate their agreement or

disagreement with a statement, using a 5-point Likert scale where 1 was equal to strongly disagree and 5 was equal to strongly agree. Federal respondents were somewhat in agreement with “I can access and apply Predictive Services information as part of my job duties” (*M*=3.8, sd=1.0, *n*=779). However, they were in less agreement with “Predictive Services information helps me perform my job with greater precision” (*M*=2.6, sd=1.0, *n*=728).

Two general items examined perceived impacts of inaccuracies of Predictive Services information. The first was “Inaccurate Predictive Services information would decrease my ability to predict fire behavior” (*Figure 26*; 24.8% selected ‘don’t know’ and 9.2% did not select any answer). The second was “Inaccurate Predictive Services information used in my decision making may adversely impact firefighter or public safety” (*Figure 23;* 21.7% marked ‘don’t know’ and 9.3% did not select any answer).

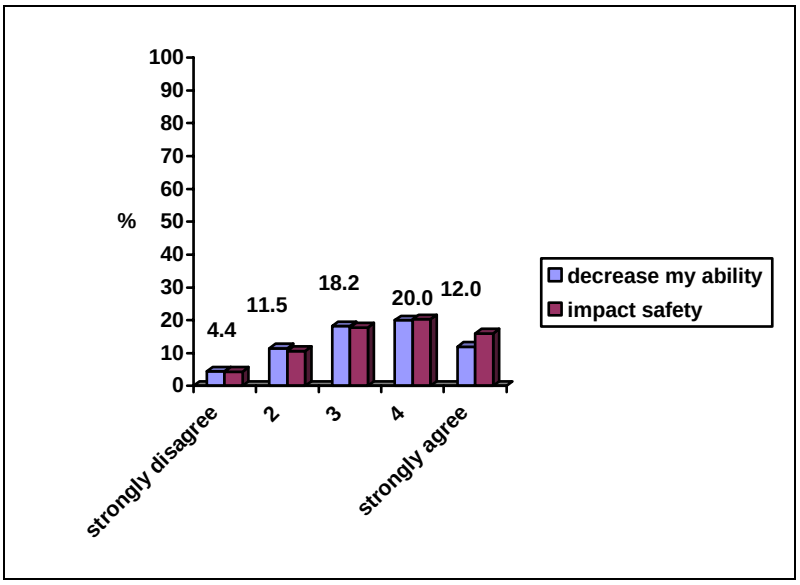


Figure 26. Impacts of inaccurate reporting of Predictive Services information—federal respondents with data gathering and reporting duties only.

Barriers to use of products and services—There were numerous reasons why respondents did NOT use the products and services offered by Predictive Services, although no one overwhelming reason or set of reasons emerged among the 16 offered as potential barriers (*table 7*). The most frequent reason provided was not having thought about using the products and services.

Table 7. Reasons why they had not used the products and services offered by Predictive Services—federal respondents.

Reason	Percent
I never thought about it.	26.9
My current management practices don't require the types of information provided by Predictive Services	14.7
I don't know how to use these products	14.1
I need information that is site specific	13.5
I am not mandated to use these products	9.6
I don't have the time to use these products	9.3
I don't know where to get advice about using these products	9.1
I don't know where to get the technology to use these products	5.5
I don't have the technology I need to use these products	4.0
I don't trust the products and services	3.5
I don't want to use these products	3.2
I don't think these products support my agency's current practices	1.7
Agency directives/guidelines instruct me to use other information	1.5
I don't have the money to use these products	1.4
I don't trust the advice I get about using these products	1.4
I don't trust information that is generated by multiple agencies	.9

Only those who marked "I don't want to use these products" (*n*=34) were asked to explain their response. Themes emerged surrounding issues of quality (e.g., experimental rather than tested approaches; products not verified; conflicts about accuracy; not ground-truthed with user groups), scale (need incident specific; don't need long term outlooks; generic rather than locally based), format (need maps of daily/weekly outlooks rather than text), lack of applicability (not applicable to current position), reliance on other sources (specifically National Weather Service), and lack of familiarity with Predictive Services.

Variations by job function regarding barriers to use of products and services were examined. None of the multi-agency coordinators selected "I had never thought about it" as a barrier. Fire researchers and support services were more likely than other groups to indicate "My current management practices don't require…". FMOs/assistants and incident management team members were more likely than other groups to indicate "I need information that is site specific." Function groups most likely to indicate lack of time as a barrier included fuel specialists, FMOs/assistants, and crew supervisors/other suppression personnel.

Technology-related issues were mentioned more often in a few cases. Fire use team members stood out as the group most likely to indicate they did not have the technology needed to use the products. Two other groups selected "I don't know where to get the technology I need…" as a barrier to use of the products (crew supervisors/other suppression personnel and dispatchers).

Lack of fit with the respondent's agency context was mentioned most by one group. NWS meteorologists were the most likely among all of the function groups to select "I don't think these products support my agency's current practices", and not being mandated to use the products.

Knowledge-related issues were cited. Not knowing how to use the products was mentioned by one-fifth or greater of the dispatchers and incident management team members. Dispatchers and fire use team members mentioned not knowing where to get advice about using the products.

The other barriers were mentioned by less than 10% within any functional group and are therefore too minimal to present.

How can Existing as well as New Products and Services be Improved or Designed?

The following sets of items examine insights into how respondents use information, how they approach risk, who they feel the Predictive Services audience should be, how existing products and services could be modified, new services and products of interest, and preferred formats for information. Findings can facilitate an understanding of how best to modify existing products and services as well as to design and provide new products and services

How fire danger/fire information is used to support decision-making—Respondents were asked to indicate how they use fire danger/fire information to support decisions made regarding fire management. More than one-third of respondents used fire danger and fire information to make decisions about resource staffing (42.0%), in decision support about public use restrictions (40.2%), for severity requests (34.4%), and for resource allocation (34.1%).

Uses of the fire danger/fire information varied significantly by job function. Differences found included decisions about resource staffing, public use restrictions, severity requests, and resource allocation. Those groups most likely to use fire danger and fire information for all purposes except public use restrictions were the FMOs/assistants and the multi-agency coordinators. Regarding public use restrictions, PAO/ information officers and the FMOs/assistants used this type of information the most.

They were also asked to indicate if they used the fire danger/information to support decisions other than those listed above. A variety of answers were provided, reflective of a broad range of uses for the services and products. The range of uses includes: preparing for the issuance of red flag warnings and fire weather watches/warnings; making decisions regarding prescribed burns—including go/no go decisions and fire staffing levels; for public contact purposes—including education, information, news releases, and public safety; for incident management; and crew management including briefings, readiness, and training.

Tolerance for errors and inaccuracies—Respondents were asked to rate their tolerance for false alarms and inaccurate reporting (rated on a scale from 1 to 5, where 1=low tolerance and 5=high tolerance). While respondents did not indicate a high tolerance for either type of error, they were somewhat more tolerant of false alarms pertaining to fire danger (*n*=999; *Figure 27*), than they were of inaccurate reporting of high fire potential (*n*=1,001; *Figure 27*). However, ratings should not be taken as indicative of a pattern of tolerance for either type of error.

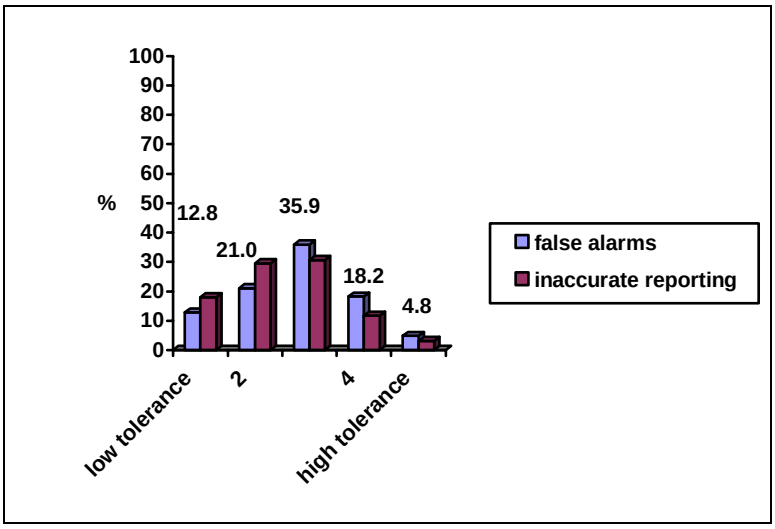


Figure 27. Tolerance for false alarms and inaccurate reporting—federal respondents.

In order to capture overall preferences for approaches to errors ("Although it is understood that accurate and reliable reporting of fire danger and high fire potential are desirable, margins of error are involved in predictions. In these cases, do you prefer that…"), respondents chose between two statements:

"Statements of danger or risk be issued with a greater margin of error allowing for an early response, knowing that this may lead to unnecessary alarms and response (Better safe than sorry)" —67.3 percent chose this statement as their preference.

"Statements of danger or risk should only be given with certainty, knowing that this may allow a few dangerous events to emerge that were not anticipated (Don't cry wolf)." —23.9 percent chose this statement as their preference.

A few (8.7%) did not choose either statement as their preferred approach.

Audience identification—According to Federal respondents, the primary audiences for Predictive Services' products should include: local and district fire managers (75.8%), regional and state fire managers (75.3%), national fire managers (65.5%), and to a lesser extent non-fire land managers (33.5%), and the public (27.0%; note that respondents could select multiple audience types, so responses do not sum to 100%).

Preferred information formats—Respondents were asked to indicate their preferences for the style and format of presenting information. For each of 11 formats presented, a rating from 1 to 5 was requested (1=not at all useful, 5=very useful). Based upon the proportion of respondents assigning ratings of 4 or 5 to each format, the formats most to least useful were: information presented in regional or national maps (57.9%), satellite maps (52.0%), brief executive summaries of data (50.2%), radar maps (43.6%), brief annotations that accompany data presentations (43.6%), data in table form (43.2%), bar charts or figures that summarize data (38.1%), web-based ArcIMS maps with user-defined layers and scales (35.2%), data in text form (34.7%), data in spreadsheet form (30.8%), and non-web-based Geo database files (14.4%).

These formats were examined for significant variation by job function. All of the map formats listed showed differences by functional group. A significant difference was found for ratings of regional or national maps and all of the non-NWS meteorologists rated this format as very useful. Satellite map ratings also varied significantly by function (with 'very useful' selected by a majority of non-NWS meteorologists, and fire use team members). Variations were also significant for radar maps, (with non-NWS meteorologists again selecting this format as very useful more often than any other group).

Both formats involving additions of text varied significantly by functional group, including brief annotations that accompany data presentations (with fire researchers most likely to mark 'very useful'), and brief executive summaries of data.

Web-based ArcIMS maps with user-defined layers and scales were of greatest interest to non-NWS meteorologists, and of least interest to crew supervisors/other suppression personnel. This format varied significantly by functional group. The non web-based Geo database files were of lesser interest as a whole, however variation by functional group was significant. More than one-tenth of fire researchers, fire use team members, and fuels specialists indicated this format was very useful.

Bar charts or figures that summarize data as well as data in table format did not vary significantly by functional group. However, data in spreadsheet form and data in text form both varied by group. Dispatchers and fire researchers indicated that data in text form was very useful. About one-fourth of fire researchers, FBANs/LTANs/analysts, and fuels specialists said data in spreadsheet form was very useful.

They were also asked if there was another style or format for presenting information (not listed) that would be useful to respondents. Very few (3.5%) marked 'yes'. Several suggestions focused on visual and graphic displays including graphs, google earth, interactive maps, photos, videos, and Powerpoints. A few suggested limiting jargon. Others expressed interest in direct briefings, emails with updates, pager notification of weather events, and access to toll free numbers.

In addition, respondents were asked what information, if any, they would like to see in summary or synthesis form. A few respondents suggested that what they wanted was already available. Others requested results of the user needs assessment. Other items desired included: what resources are assigned and where, what resources are available; seasonal and historical trends; fire events by region and how weather and forecasts impacted operations; intended uses and limitations of data; weather trends – including lightening, drought, wind, and snow pack; total number of fires and areas; fire summaries when ended; fire danger; fuels; and danger ratings. Some of this might be specific enough to allow relocation of resources.

Product and service improvement—Federal respondents were asked to complete the sentence "The information provided by Predictive Services would be more useful to me if…" Some respondents suggested the information would be more useful if they needed it for their jobs, or if they were more involved in the fire program. Others mentioned timeliness and accuracy. Others addressed specific issues related to accuracy, such as the need to state data sources, limitations of those sources, assumptions going into analyses, and confidence levels.

A number of respondents indicated that they have difficulty accessing Predictive Services information in the field. Suggestions were made to accommodate people working on slower computer systems and developing a protocol for providing email and phone updates. General

ease of access in terms of being able to locate the information, as well as a more user-friendly format to the sites, was mentioned. Overall, respondents expressed a need to contact potential customers and highlight available products. Some suggested they needed more time to understand and apply the products. Training on how to use these products was also suggested.

Along similar lines to the question above, respondents were asked how the existing products and services could be modified to better meet their needs. A wide variety of modifications were mentioned. Some focused on establishing consistency between GACCs, including the type of information, its presentation format, and its quality. Others mentioned an interest in more timely updates of information, and keeping information current. Some focused on access and making the websites more user-friendly. Others expressed interest in interactive web based maps. Some wanted improved accuracy and inclusion of confidence intervals with the data. Improved fuels information was of interest. Still others wanted more site specific information. Interest in data to assist with prescribed burns was mentioned. Several respondents expressed the opinion that the products were fine as is and met their needs. (These responses are listed verbatim by job function in *Appendix F* to more effectively target specific user group needs.)

Products or services that should be added to what Predictive Services provides—Federal respondents were most likely to indicate that there are not products and services that should be added (59.5%). However, about one tenth (13.3%) felt there were additions that could be made.

Respondents specified a number of products and services that should be added to what Predictive Services provides in order to better meet their needs. Some suggested integrating with the NWS and other services, others focused on serving a unique niche, distinct from what is already provided elsewhere. Some mentioned an interest in increasing the information about what Predictive Services provides to lead to increased use—so an education and outreach component was of interest. Others mentioned the need to update as technology improves. A number listed specific types of information or products of interest to them including live fuel moistures, easy access to archived data for research, improved fuels information and maps, smoke modeling predictions and other smoke related products, and open access to BLM lightning data. Others wanted increased access to personnel and a point person to answer questions that arise. (Similar to the responses on existing product improvements, verbatim responses by job function can be found in *Appendix F*.)

Were There Additional Comments?

Verbatim comments added at the end of the survey appear in *Appendix F* of the full report.

Results: Non-Federal Survey

Who Were the Respondents?

Non-federal respondents were asked a series of questions about personal characteristics and agency roles and responsibilities to better understand who responded.

- The vast majority was male (83.3%), another 6.2 percent did not indicate gender.

Educational background / degree or equivalent—Educational attainment was fairly high among the majority of non-federal respondents (*Figure 28*).

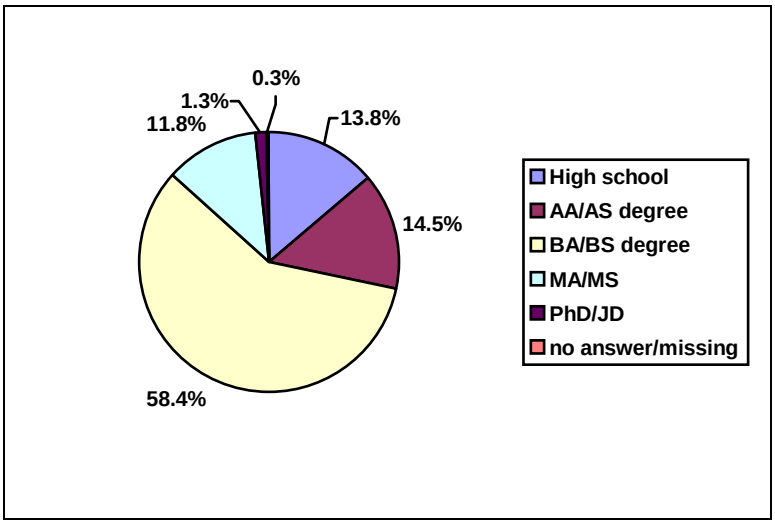


Figure 28. Educational attainment—non-federal respondents.

Respondents were asked to list what area their degree or an equivalent was in. The majority of responses fell into forestry/resource management/range management, although 13.1% mentioned fire science-related degrees.

Home office Geographic Area location—Respondents came from across the United States, with their home offices falling within the various Geographic Areas (GAs) shown below (*Figure 29*).

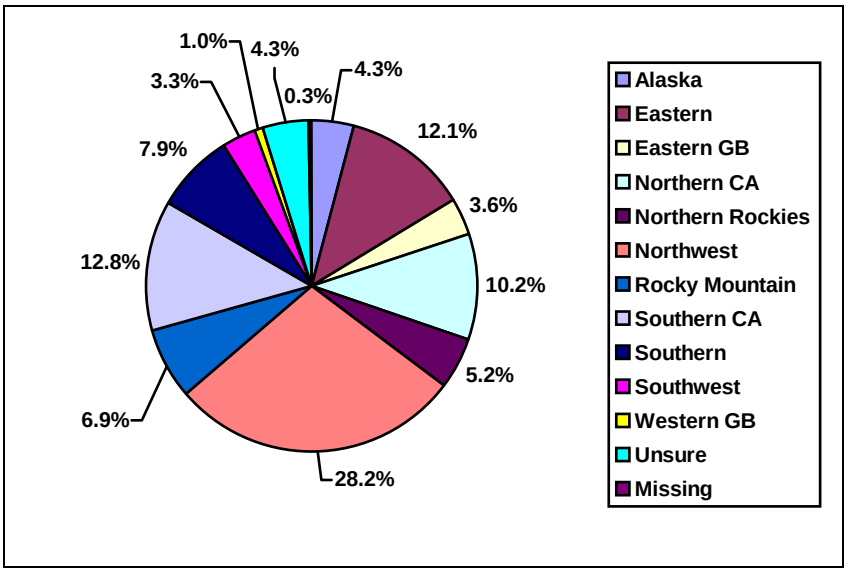


Figure 29. GAs—non-federal respondents.

Primary role or responsibility—Respondents were primarily incident management team members, crew supervisors or other suppression personnel, public affairs/information officers, or fire behavior/long term analysts (*table 8*).

Table 8. Primary role or responsibility—non-federal respondents.

Role/Responsibility	N	%
Incident management team member	60	19.7
Crew supervisor/other suppression personnel in incident support	46	15.1
Public affairs/information officers	31	10.2
Fire Behavior/Long-Term Analyst for Incident Support	31	10.2
Dispatcher in the Interagency Coordination System	25	8.2
Intelligence within the interagency coordination system	9	3.0
Fuels specialist	4	1.3
Fire use team member in incident support	4	1.3
Fire weather meteorologist in the interagency coordination system	4	1.3
Fire research	1	.3
Other	90	29.5
	305	100.0

Similar to the federal respondents, these job categories were somewhat diffuse and a number of individuals chose 'other'. In order to address this we examined job title and primary role to create job function categories (*Figure 30*).

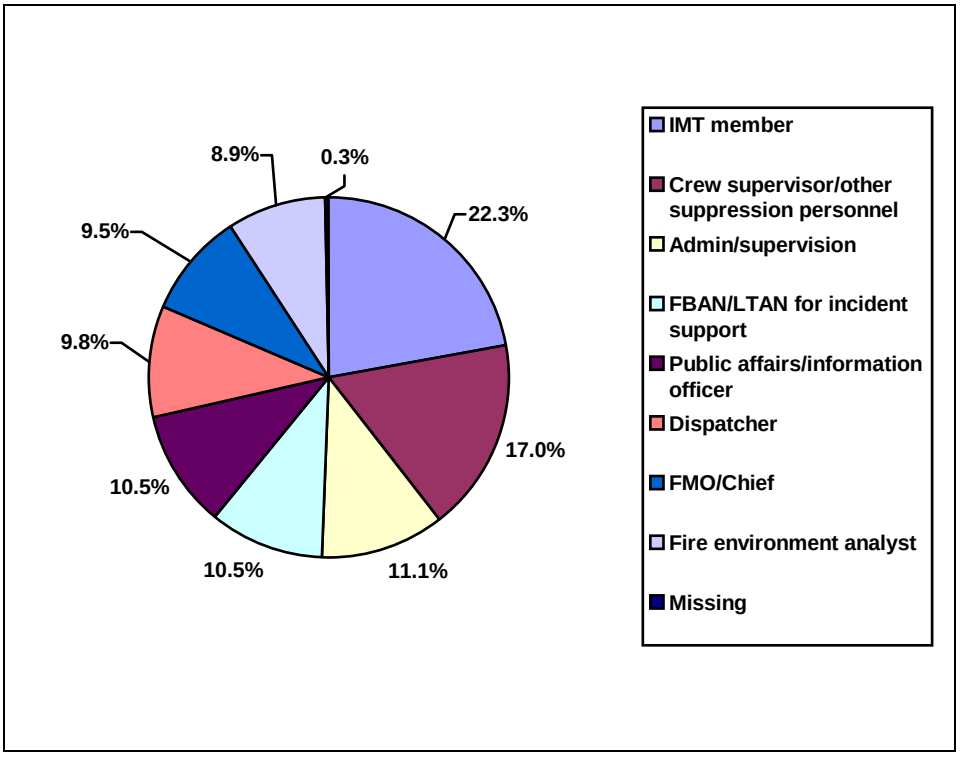


Figure 30. Job function groupings—non-federal respondents.

What are their Levels of Experience with Predictive Services?

Specific circumstances for access/acquisition—Non-federal respondents provided information regarding specific situations when they access or obtain information from Predictive Services. More than half reported accessing Predictive Services during fire season (73.1%), and during a fire incident (52.5%). About one-fourth of non-federal respondents access Predictive Services

when a prescribed burn is taking place (23.6%); about one-fifth indicated none of the above situations applied to them (19.7%).

Other situations were varied and numerous, but several respondents suggested they access Predictive Services information prior to fire season.

FBANs/LTANs and dispatchers were more likely to access Predictive Services information during fire season than the non-federal respondents were overall, while PAO/information officers were least likely. FBANs/LTANs and dispatchers also reported access during a fire incident that was higher than the overall access for the non-federal respondents. The non-federal suppression personnel and fire environment analysts were least likely to access Predictive Services information during a fire incident. Prescribed burns were an occasion where fire environment analysts and FBANs/LTANs were more likely to access Predictive Services than the group as a whole; whereas PAO/information officers and incident management team members were least likely to access the information on this occasion. PAO/information officers had the greatest percentage indicating that did not access Predictive Services information under any of the former situations.

Use of specific websites and services—Of the 305 non-federal respondents, a near majority had been to the National Interagency Coordination Center website or was audience to one of their briefings (NICC—45.2%). The Geographic Area Coordination Center sites from most to least visited or used were the Northwest (26.2%), Northern Rockies (16.7%), Northern California (16.7%), Southern (16.7), Southern California (16.4%), Southwest (16.4%), Rocky Mountain (14.8%), Eastern (13.4%), Alaska (8.5%), Eastern Great Basin (7.9%), and Western Great Basin (7.9). A few (6.6%) were not sure which if any sites they had visited, while about one-tenth (9.8%) indicated they had not visited any of the listed sites.

Familiarity with the products and services—Respondents were asked their familiarity with Predictive Services' products on the web, the briefings, and the emails**.** Non-federal respondents were more familiar with the briefings (i.e., national, geographic, situational, or meteorological, *Figure 31*), and the web products, than with the emails (these contain current projections and/or information about Predictive Services).

The group most familiar with Predictive Services products was the FBANs/LTANs. Least familiar were the PAO/information officers.

These three familiarity items were combined (averaged) to create a scale. This scale was useful as an indicator of combined familiarity with products and services. Scores on this scale varied significantly by job function. Least familiar were the PAO/information officers and most familiar with the products were FMOs/chiefs), fire environment analysts, dispatchers, and FBANs/LTANs. Examining each separately (web, briefings and emails) showed significant variation by job function as well.

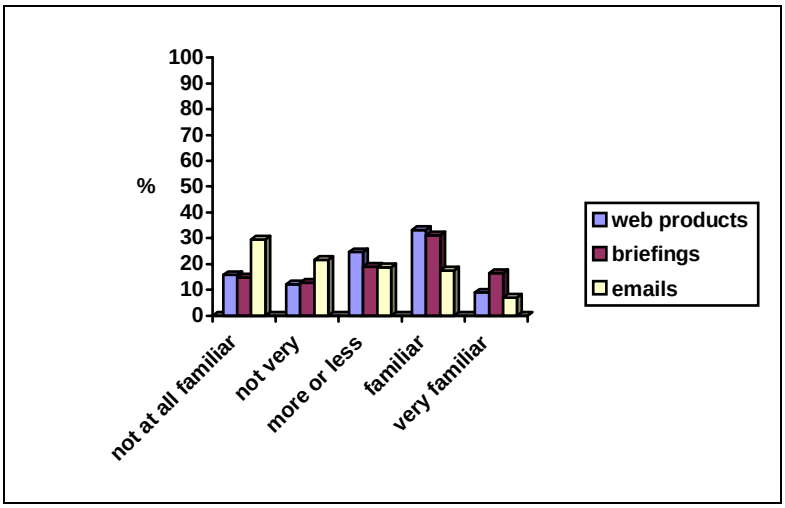


Figure 31. Familiarity with Predictive Services products on the web, briefings, and emails—non-federal respondents.

What are their Opinions of the Products and Services?

Ratings of Predictive Services information—Non-federal respondents rated six attributes of Predictive Services information including accessibility, timeliness, relevance, accuracy, completeness, and ease of understanding. Ratings varied by job function and these patterns are reported. However, variations by job function were not statistically significant. However, familiarity *was* a significant influence in ratings for the majority of attributes.

Respondents tended to agree that Predictive Services information was accessible (*Figure 32*, 18.4% marked 'don't know' and 4.9% did not respond). Fire environment analysts and dispatchers were the groups most likely to strongly agree that the information was accessible. Respondents less familiar with Predictive Services were less likely to view it as accessible.

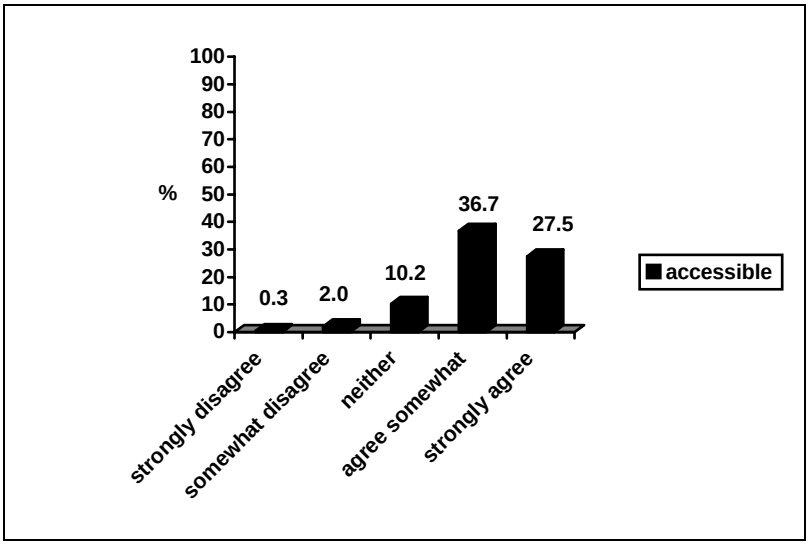


Figure 32. Ratings of accessibility of Predictive Services information—non-federal respondents.

A majority also agreed that Predictive Services information was timely (*Figure 33*, 18.0% marked ‘don’t know’ and 5.6% did not respond). Three groups were most likely to agree that the information was timely, including dispatchers, fire environment analysts, and administrators and supervisors. Respondents less familiar with Predictive Services were less likely to view it as timely.

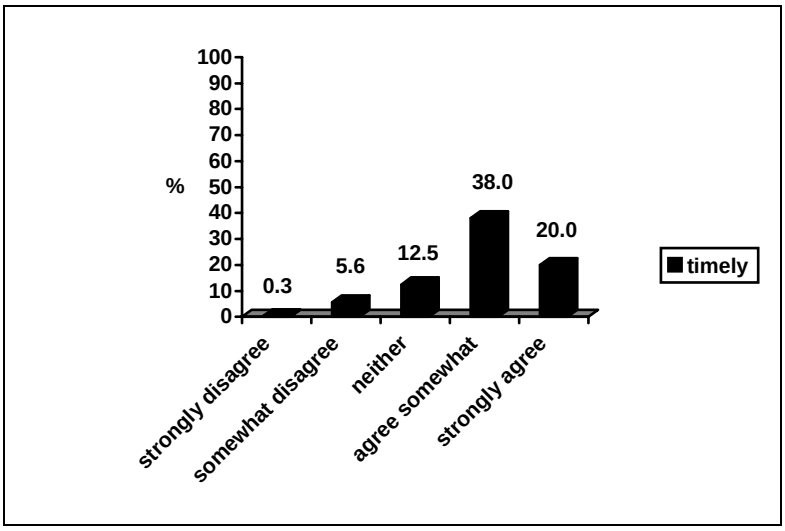


Figure 33. Ratings of timeliness of Predictive Services information—non-federal respondents.

A majority agreed that Predictive Services information was relevant (*Figure 34*, 18.4% marked ‘don’t know’ and 5.9% did not respond). Fire environment analysts were most likely to strongly agree. Respondents less familiar with Predictive Services were less likely to view it as relevant.

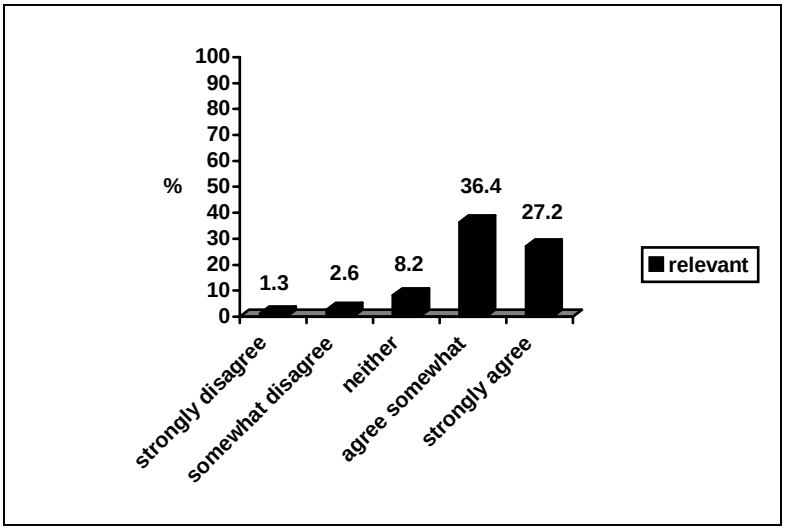


Figure 34. Ratings of relevance of Predictive Services information—non-federal respondents.

A majority agreed that Predictive Services information was accurate (*Figure 35*, 19.3% marked ‘don’t know’ and 5.2% did not respond). Considering the proportions of strong agreement among all the attributes rated, accuracy received the lowest percentage in ‘strongly agree’. Administrators and supervisors were almost twice as likely to strongly agree that the information

was accurate when compared to FMOs/chiefs. The PAO/information officers were most likely to mark ‘don’t know’. No differences were found when comparing those less and more familiar with Predictive Services on ratings of accuracy.

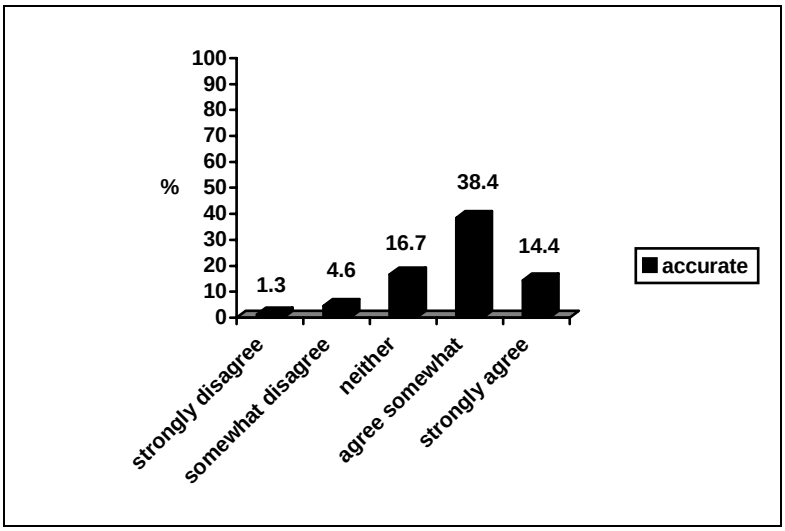


Figure 35. Ratings of accuracy of Predictive Services information—non-federal respondents.

A majority also agreed that Predictive Services information was complete (*Figure 36*, 18.4% marked ‘don’t know’ and 5.6% did not respond). The administrators and supervisors and dispatchers were most likely to strongly agree that the information was complete. Respondents less familiar with Predictive Services were less likely to view it as complete.

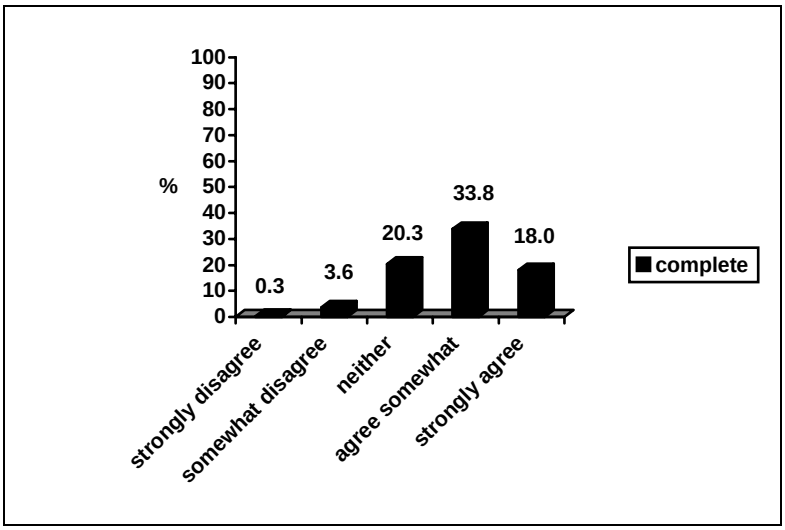


Figure 36. Ratings of completeness of Predictive Services information—non-federal respondents.

A majority agreed that Predictive Services information was easy to understand (*Figure 37,* 18.4% marked ‘don’t know’ and 5.6% did not respond). Dispatchers and administrators/supervisors were most likely to strongly agree that the information was easy to

understand. Respondents less familiar with Predictive Services were less likely to view it as easy to understand.

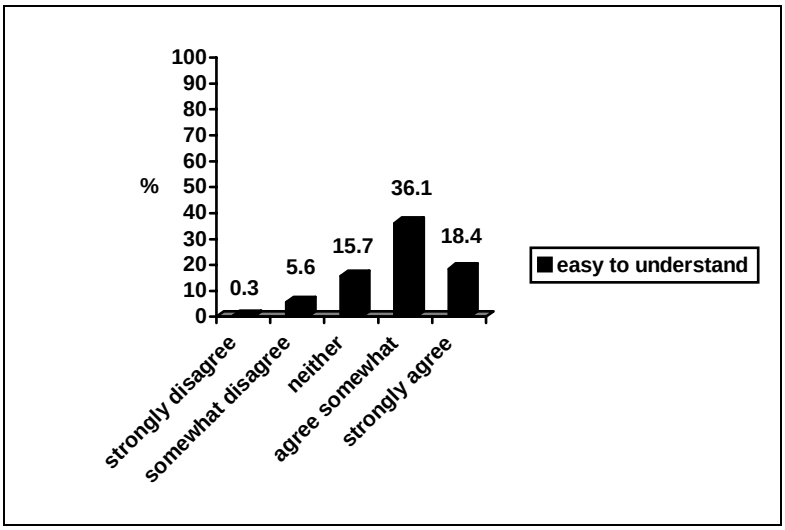


Figure 37. Ratings of ease of understanding of Predictive Services information—non-federal respondents.

Satisfaction with Predictive Services contacts—More than one-tenth (14.8%) of the non-federal respondents had contacted Predictive Services to report a problem with a product or service. The majority felt Predictive Services was responsive.

Overall satisfaction—Responses indicate that Predictive Services had met most non-federal respondents' expectations (*Figure 38*). A near majority reported that the products and services had met most to all of their expectations.

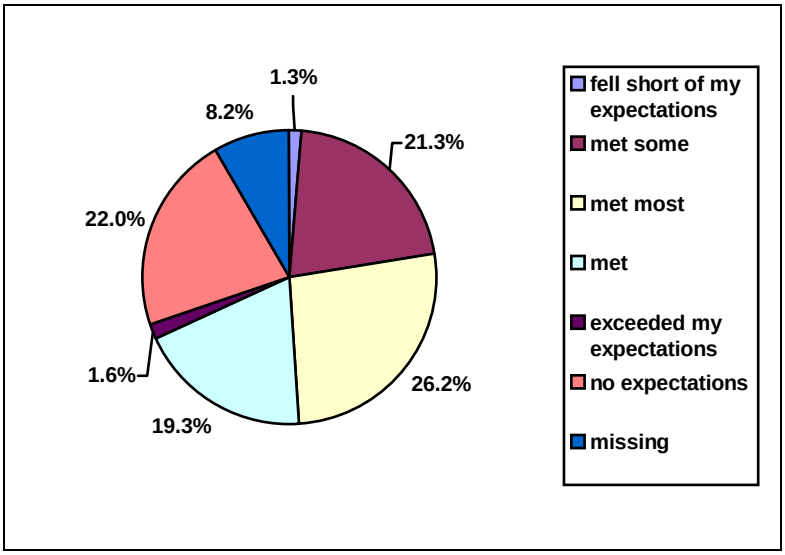


Figure 38. Ratings of degree to which Predictive Services met expectations—non-federal respondents.

About half of the non-federal respondents were somewhat or very satisfied with Predictive Services products and services (*Figure 39*). Administrators and supervisors, suppression personnel, and incident management team members were more likely than the other groups to report being very satisfied with the products and services.

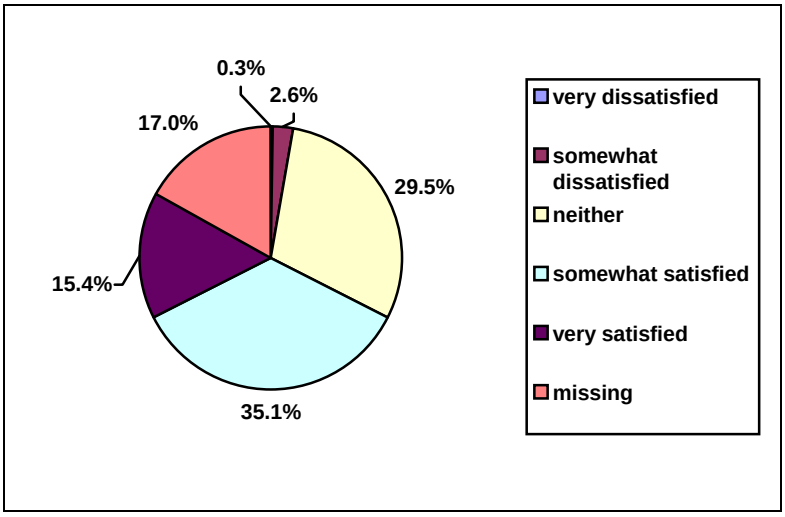


Figure 39. Ratings of satisfaction with Predictive Services products and services—non-federal respondents.

Trust and confidence in the information—Non-federal respondents were asked to indicate the degree of trust and confidence they have in the information provided by Predictive Services. A majority expressed some, to a great deal of trust and confidence (*Figure 40*, 8.2%, did not answer this item.) Those groups who had the greatest trust and confidence were FMOs/chiefs, FBANs/LTANs, and administrators and supervisors. Lowest were suppression personnel and PAO/information officers. Differences were not significant.

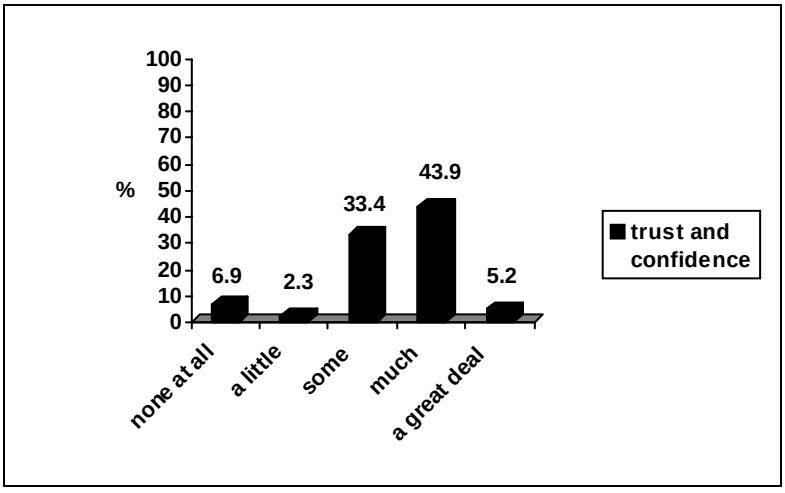


Figure 40. Ratings of trust and confidence in Predictive Services information—non-federal respondents.

Males had greater trust and confidence in the information than females.

A difference was also found based on original sample vs. volunteers and those added upon request; the original sample had somewhat less trust and confidence.

Respondents who accessed the information across more situations, and were more familiar with the products and services, had greater trust and confidence in the information. In addition, total situations for which Predictive Services was accessed was correlated with trust and confidence. Finally, familiars had more trust and confidence than unfamiliars.

Range of situations where Predictive Services information is used/accessed, gender, original sample/added later and familiarity accounted for 31 percent of the variation in trust and confidence.

Are Respondents Relying on and Taking Action Based on Predictive Services?

Reliance on products and services—A majority indicated some to a great deal of reliance on Predictive Services information to assist in decision making. The groups most likely to rely on Predictive Services were the dispatchers and administrators/supervisors. The PAO/information officers were least likely to indicate reliance. Reliance did not vary significantly by job function.

Trust and confidence, familiarity, and number of situations where Predictive Services is used accounted for 60 percent of the variation in reliance on PS to assist in decision making.

However, other sources were not necessarily relied on more heavily than the products and services provided. Specifically, almost half indicated that the statement “I rely on other sources more heavily than the products and services provided by Predictive Services” was not at all true, or not very true. Fire environment analysts were the group most likely to report reliance on other sources. Other sources relied on were varied and included the National Weather Service, other websources, state, regional, and local sources.

The likelihood of taking action based on Predictive Services information was examined. About one-third were likely to take action based on Predictive Services information (*Figure 41*), and another third considered it a possibility. Four groups were the most likely to take action based on Predictive Services information including administrators/supervisors, FMOs/chiefs, fire environment analysts, and dispatchers. PAO/information officers were least likely.

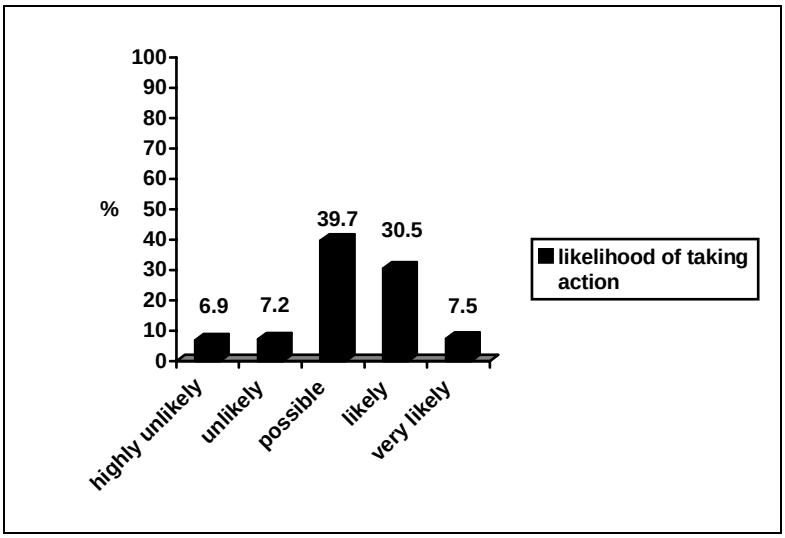


Figure 41. Likelihood of taking action based on Predictive Services information received, or gathered from a website—non-federal respondents.

We accounted for 50 percent of the variation in taking action. The most influential contributor was trust and confidence. In addition, familiarity and total situations where the information was accessed were significant predictors.

Did Respondents offer Insights into Reliance and Barriers?

Perceived overlap—Respondents were asked to indicate how true or untrue the statement "I think there is overlap in the type of information that I can obtain from Predictive Services and other sources" was. More than one third (39.7%) felt it was more or less true; about one-tenth indicated that it was true (9.5%) or very true (2.0%; 10.2%, did not answer this item.) The group most likely to indicate there was overlap was the FBANs/LTANs. Those who indicated there was overlap tended to mention the National Weather Service and state sources. Some commented that the overlap was good.

Barriers to use of products and services—Respondents reported various reasons why they had not used the products and services offered by Predictive Services, with about one-third or more reporting that they had not thought about it, or needed information that is site specific (*table 9*).

Table 9. Reasons why they had not used the products and services offered by Predictive Services—non-federal respondents.

Reason	Percent
I never thought about it.	40.0
I need information that is site specific	31.5
I am not mandated to use these products	22.3
My current management practices don't require the types of information provided by Predictive Services	10.8
I don't have the time to use these products	9.5
I don't know where to get advice about using these products	9.5
Agency directives/guidelines instruct me to use other information	5.9
I don't know where to get the technology to use these products	5.2
I don't have the technology I would need to use these products	4.6
I don't have the money to use these products	4.6
I don't think these products support my agency's current practices	4.3
I don't want to use these products	1.6
I don't trust information that is generated by multiple agencies	1.3
I don't trust the products and services	1.0
I don't trust the advice I get about using these products	.7

These barriers to use of products and services varied by job function. Specifically about half of PAO/information officers and incident management team members had never thought about using Predictive Services. About half of fire environment analysts and FBANs/LTANs need information that is site specific.

Mention of this barrier varied significantly by job function. Fire environment analysts and suppression personnel were among those most likely to report they were not mandated to use the products. FBANs/LTANs were almost twice as likely as any other group to report that they did not have the time to use the products. More than one-tenth of PAO/information officers and FBANs/LTANs indicated their current management practices did not require the types of information provided. Not knowing where to get advice about using the products was reported as a barrier by more than one-tenth of fire environment analysts, suppression personnel, and PAO/information officers. More than one-tenth of fire environment analysts and FMOs/chiefs felt the products did not support their agency's current practices. Agency directives and guidelines instructing them to use other products were mentioned by a tenth or more of the PAO/information officers, fire environment analysts, and dispatchers. About one-tenth of FMOs/chiefs did not have the technology to use the products. Not having the money to use the products was mentioned by nearly one-tenth of the FBANs/LTANs and the PAO/information officers. Nearly one-tenth of incident management team members indicated that they did not know where to get the technology to use the products. The other barriers were rarely mentioned among all eight job function groups.

Product and service improvement—Improvements in products and services were mentioned by several of the non-federal respondents. Common themes within these suggestions were focused on accuracy of information, recency of information, site and area specificity, and more information on what was available and how to use it. Verbatim responses to the question "The information and services provided by Predictive Services would be more useful to me if…" are presented in *Appendix G*. This Appendix supplies a unique view of product and service interests by the various job functions.

Were There Additional Comments?

Verbatim comments in *Appendix G* of the full report provide an opportunity to see specific suggestions on products and services that may be helpful in improving services and products.

Discussion

A considerable number of federal and non-federal employees, including those directly and only peripherally engaged in fire management, participated in this survey. Responses are not considered to be representative of the users and prospective users of Predictive Services as a whole because we were not able to construct either a census or random sample of employees within these sectors. However, responses offer valuable insights into the perspectives of those who participated and are of interest in examining the current opinions of Predictive Services products, services, and service delivery. In addition, while somewhat more a focus among our federal respondents by virtue of question items that were included, we can glean insights into additional products and services that might be offered.

The largest proportion of our federal sample was made up of PAO/information officers. This came about through sources available to us that might be involved in fire management. In compiling our sample we found that potential respondents might have multiple job identifications, so we asked respondents to ‘choose a hat’ for the purposes of the survey. We then grouped these respondents to facilitate meaningful comparisons by job function types.

PAO/information officers and support services were the two groups least familiar, least likely to use and rely on the products and services, and least likely to provide favorable ratings about products and services. In spite of this lack of familiarity, the tendency to indicate they were not interested in the products and services, and the tendency to rate the information unfavorably, open ended comments made by many of these respondents suggested some interest and intent to look into the products and services further. Needs and interests in products seemed distinctly different for the PAO/information officers, leaning towards information that would facilitate contacts with media and the public. For these groups an informational/educational program to feature products available and how they might meet their needs could be helpful in increasing familiarity as well as improving impressions about the products.

The two groups that came across as the most familiar and most satisfied overall with the products and services were the multi-agency coordinators and the non-NWS meteorologists. It is interesting to note however, that while the multi-agency coordinators repeatedly showed up as a group rating information favorably (considering the six attributes selected), non-NWS meteorologists did not always appear in the majority providing favorable ratings. The ratings and remarks provided should lend valuable insights into understanding why this might be so.

The remaining groups varied in their ratings and perspectives and each may be of interest depending on who the key constituents for Predictive Services are determined to be.

Among the non-federal respondents we adopted a similar approach, grouping some common job functions to facilitate analysis. As a whole, these respondents were more familiar with, and more positive towards the products and services. It is important to note however that representation of a particular group as much less familiar and much less satisfied with the products and services was not as strong a factor in the non-federal sector.

This sector of respondents was more likely to cite the need for site-specific information as a barrier to use of the products and services. Consideration will need to be given to the service delivery requirements in this particular case. Comments suggest that the products and services seem federal-centric. Program leaders will need to determine how to address this service gap, if appropriate.

Trust and confidence in the information provided by Predictive Services, and familiarity with the products and services, were highly significant in predicting who would rely upon, and take action based upon the information. While trust and confidence did not seem to be lacking among a majority, comments focused on issues of accuracy and consistency with other sources, as well as timeliness in updating the information should be considered. Job groups expressing less agreement with desirable attributes may be of particular help in understanding whether or not the core markets are viewing the products favorably. A number of suggestions are offered by respondents that may be helpful towards that end.

Overall the findings and evaluations tend to be positive among those most central to fire management and decision making. A number of suggestions for improvements of current products and services, as well as some ideas for additional products and services, are offered by respondents. It was made very clear, however, that additional communication and training efforts are a pressing need, to improve awareness of what is available and how it can be used. This is an important investment to make in the near future of the Predictive Services program.

Whether or not additional products and services should be added in the immediate future needs to be carefully considered. The expectation that this cutting edge innovation is to be a characteristic of Predictive Services was noted. Additional sensing may be necessary to effectively tailor the products and services to meet the needs of key markets.