

A map of the Lake Tahoe region showing land parcels and wildland fire impact zones. The map features several color-coded areas: a large red area in the center and left, a yellow area to the right, and a blue area at the bottom. Numerous red circles are scattered across the red and yellow areas, likely representing individual parcels or specific fire incidents. The map includes labels for various locations such as Tallac Village, Fallen Leaf, and Lake Tahoe Blvd. Major roads like Airport Rd and US Hwy 50 are also shown.

Parcels and Wildland Fire

2007 Report

FGDC Cadastral Subcommittee

January 2008

Preface

The FGDC Cadastral Subcommittee is charged through OMB Circular A-16 with providing national coordination of the standards for and use of cadastral information to support decision making. The Subcommittee completed the FGDC Cadastral Data Content Standard and has been working with agencies to incorporate standardized cadastral (parcel) data in their business needs. Working with the Western Governors' Association, hurricane response agencies, the energy community and the wildland fire community a core data standard has been developed. Working with the wildland fire community the Subcommittee has supported efforts in developing sustainable, updated parcel data sets that can applied to decision support applications.

All federal wildland fire management teams must justify fire management costs based upon the values protected. Structures located within the wildland-urban interface comprise a very substantial portion of values commonly threatened by wildland fires. GIS parcel data from county and state government provide effective and accurate means to identify and map general structure locations with associated values. These data are incorporated into a state-of-the-art decision support system which helps agency administrators, incident managers, and fire planners develop wildland fire suppression strategies by rapidly mapping and quantifying the significant resource values most likely to be threatened by an ongoing fire event. With this technology and information, incident command teams can rapidly identify strategic protection needs and help assure that firefighters are most safely deployed to the right locations for the right reasons. This innovative application of parcel data in wildland fire emergency response may provide a useful example for efforts to build all-hazards decision support systems.

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1. Summary

This undertaking came out of the FGDC Cadastral Subcommittee’s investigation and workshop on the uses and needs cadastral data to support wildland fire¹ and ongoing research and development in Wildland Fire Community. The goal was to identify contacts for parcel data in priority counties across the west and to acquire and have as much available parcel data pre-deployed as possible to support the analysis of and response to Wildland Fire events by the U.S. Forest Service’s (USFS) RAVAR system. No parcel data was purchased. Data sharing agreements were signed by USFS if they did not require a fee. This project was funded by the Bureau of Land Management Cadastral Survey, Department of Interior and U.S. Forest Service.

2. Project Results

Figure 1 shows the status of the pre-deployed parcel data at the beginning of the project in March 2007. The green shaded counties are those for which parcel data was available and the yellow counties are where parcel data was available in emergencies.

Figure 2 shows the status of the pre-deployed parcels in August of 2007 after the inventory, parcel data request and pre-deployment of the data. The color scheme is similar with the following additional colors for the counties: orange have on attributes; red have neither geometry nor automated attributes; blue or pink have parcel data but can not share it freely; and yellow indicates that they will share their data in the event of a fire.

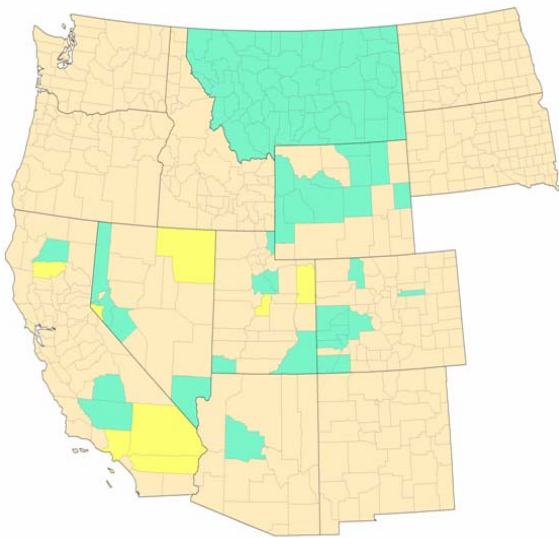


Figure 1 – March 2007 Parcel Availability

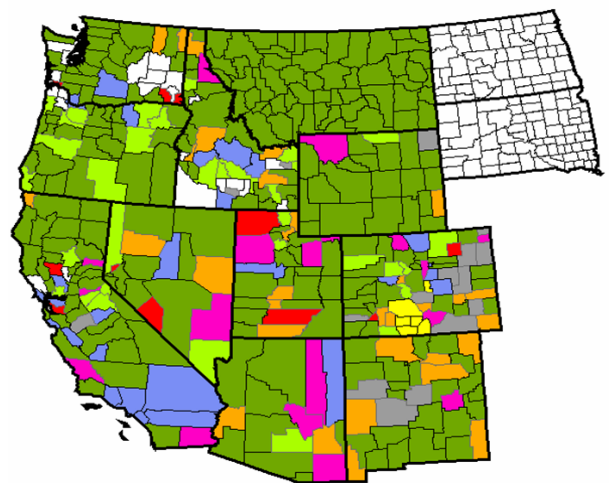


Figure 2 – August 2007 Parcel Availability

¹ <http://www.nationalcad.org/showdocs.asp?docid=149&navsrc=Project> (last access 1-7-08)

This effort demonstrated significant success in its first year; the US Forest service was able to include parcel data as a part of their RAVAR analysis in 78% of the fires.

Table 1 – 2007 Wildland Fire Season Summary Statistics

Total Large Fires with WFDSS Analysis	164
Total Fires - WFDSS/RAVAR Analysis	70
Large Fires requiring RAVAR *	43%
Counties with Structures assessed using County Parcel Data	78%
Counties where USGS assistance was required (no usable parcel data)	22%
Total Structures Identified	14,389,460
Estimated Structure Value (in trillions) **	\$ 2.12
<i>* Total count of fires where RAVAR analysis was completed includes fires in three non-western states FL, GA, MI</i>	
<i>** Based on median home value from US Census of 11 western states @ \$147,500 - NOTE: Value not discounted by loss probability - actual risk value is lower</i>	

The Subcommittee contacted 357 counties in ten of the eleven western states over a five-month period. In addition to the western states, four counties in Georgia were contacted and parcel data was obtained. Montana’s 56 counties have already been coordinated and are available from a centrally managed openly available portal therefore Montana’s counties are not included in the Subcommittee’s count. Counties in South and North Dakota are being contacted for as a part of the 2007 season wrap up activities and are not included in the count.

Table 2 – Parcel Data Readiness

Total Counties - 11 Western States *	414
County parcel data reported as available - includes counties without USFS lands	305
Western Counties w/ Data (305 of 414)	74%
Number of Counties from which parcel data was received	251
Available Data Received (251 of 305)	82%
Pre-deployed and ready for use (not all received data was pre-deployed because some not useable and in others no fires occurred)	196
% Available Data ready for use (196 of 305)	64%
<i>* Eleven Western States: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming.</i>	

Two-hundred and fifty-one (251) counties were able to deliver parcel data in some form for pre-deployment. This represents nearly two-thirds of the counties contacted. In the majority of cases if the correct contact person could be found and if the county had digital parcel maps and parcel value attributes the information was provided, processed and pre-deployed. There were some notable exceptions but they were a small minority. No data acquisition fees were paid. Some counties required a written agreement to “not distribute” data beyond the wildland fire community.

Some of the data that was provided could be not used in the pre-deployment. Section 4 of this report discusses some of the problems and issues. The two most common problems for this category of data were: 1) that the county could only provide either attributes or geometry but not both and 2) the lack of standardization and/or documentation for the data that was provided.

In nearly all cases, except for Montana, county geometry formats and attributes were not standardized. There are some exceptions that occur most often where a state agency has a standard format requirement such as Wyoming with statewide-standardized assessment data and Utah, which has standardized geometry reporting.

The Subcommittee and the Wildland Fire staff both felt the effort for 2007 was very successful. There are some important changes that are recommended for 2008 and beyond to increase the efficiency and sustainability of this effort.

- Increase state level participation and involvement to help build a single state contact for parcel information.²
- Merge the cadastral point of contact information with the fifty states initiative GIS Inventory (<http://www.gisinventory.net>) into a single data and point of contact resource.
- Expand the use of the pre-deployed parcel data to support other aspects of emergency response and recovery efforts to expand the base of support for the project, to reduce duplicative parcel inventory activities and to provide a common information base to multiple agencies.
- Federal assistance is needed to work with states that assist counties to complete and standardize parcel data systems.

² The Subcommittee Report “State Stewardship for Cadastral Data” further describes the roles and actions to achieve this result.

3. The 2007 Wildland Fire Season

The 2007 Wildland fire season was intense in that nearly all fires became severe very quickly. The availability of parcel information for most of the fire affected areas supported rapid response and analysis.

National Interagency Fire Center predictions for the 2007 season in May:

Significant fire potential is expected to be higher than normal across much of the Southwest and California, portions of the Great Basin, Northern Rockies, Northwest, Alaska and the Southeast. Below normal fire potential is predicted for a small portion of the Southwest Area.³

These predictions are illustrated in Figure 3 from that report



*Significant fire potential is defined as the likelihood that a wildland fire event will require mobilization of additional resources from outside the area in which the fire situation originates.

Figure 3 – NIFC 2007 Season Predictions

The forecast were very accurate and can be relied upon in the future to help define priority parcel collection areas.

³ http://www.nifc.gov/nicc/predictive/outlooks/season_outlook.pdf, May 1, 2007

The geographic information systems more detailed analysis and maps for each state were also found to be accurate and they provide further specific location details. Figure 3 indicates that the possibility of wildland fires in the southeastern U.S. were above normal and significant fires in South Georgia and North Florida broke out in August 2007.

The New West Environment⁴ assessment of the Lolo and Bitterroot National Forest Fires 2007 are typical of the 2007 Wildland Fires Season.

For the Lolo and Bitterroot National Forests, while the number of fires caused by humans and lightning did not increase dramatically, the number of acres that burned did.

In Lolo National Forest, 200 fires burned over 139,000 acres this past summer. Over the previous 10 years, the forest had experienced an average of 179 fires and 16,139 total acres burned. This summer 74 fires were caused by humans, as compared to an average of 63 over the previous 10 years.

Bitterroot National Forest officials reported 109 fires this season, down from an average of 146. However the 41,744 acres burned in the Bitterroot this season is higher than the annual average of 27,714, according to Rick Floch, timber coordinator for the forest. Floch said that officials blame 11 of this year’s fires on human activity, down from an average of 22.

The National Interagency Fire Center (NIFC) provides ongoing statistics on wildland fires from year to year.⁵ As of November 8, 2007 the following are the statistics with the acres per fire added. These tables include the late season California fires.

2007 (1/1/07 - 11/9/07)	Fires: 78,378	Acres: 9,330,260	119 acres/fire average
2006 (1/1/06 - 11/9/06)	Fires: 89,036	Acres: 9,468,959	106 acres/fire average
2005 (1/1/05 - 11/9/05)	Fires: 57,933	Acres: 8,318,527	143 acres/fire average
2004 (1/1/04 - 11/9/04)	Fires: 63,412	Acres: 8,057,053	127 acres/fire average
2003 (1/1/03 - 11/9/03)	Fires: 57,617	Acres: 3,815,923	66 acres/fire average

5-year average			
2003 - 2007	Fires: 72,766	Acres: 7,040,004	96 acres/fire

The statistics bear out the observation that there may have been fewer overall fires during the 2007 wildland fire season but the fires that did occur were severe and put a large number of properties at risk. This amplifies the need for the wildland fire community to have access to pre-deployed parcel level information that can be available to support analysis and response in a timely manner.

⁴ http://www.newwest.net/topic/article/tallying_up_the_2007_fire_season/C329/L38/, “Tallying Up the 2007 Fire Season”, Dave Loos, October 10, 2007

⁵ http://www.nifc.gov/fire_info/nfn.htm

4. Lessons Learned

The Cadastral Subcommittee shared the information they had with the Wildland Fire Community in 2006. The U.S. Forest Service asked the Subcommittee to assist them in their outreach effort for the 2007 wildland fire season. A Wildland Fire Team was established and worked closely with the Wildland Fire Community in reaching out to counties, identifying contacts for parcel data, assisting in gathering the data and in a few cases processing it.

The Wildland Fire Team conducted a post-project assessment to identify lessons learned and experiences gained that form the basis for suggested changes for 2008 and beyond. These are discussed in the following sections.

- 4.1 Reaching Out and Contacting Counties
- 4.2 Data Transmission
- 4.3 Processing Parcel Data
- 4.4 Project Management and Coordination
- 4.5 Overall Observations

4.1 Reaching Out and Contacting Counties

4.1.1 Sending letters through the US Mail

Sending an official letter by U.S. Mail on letterhead about the project to the counties before we contacted them was an important part of the initial communication. In most cases the Wildland Fire Project Team members worked with the States to identify a person at the upper management level who was associated with state fire or emergency response offices to send the letter. In California and Idaho where there was not a state GIS coordinating body the Subcommittee sent the letters.

4.1.2 Finding the Right Contact

It is important to find the right contact in the county. On average it took three phone calls to find the right person to get the parcel data. In many cases it was necessary to request data from two different offices, one for the geometry and another for the attributes. In many cases the right contact was not the person who received the original letter. Once the contacts were identified they were entered into the on-line tracking database to be used in the following years.

4.1.3 Small County Resources

Data requests impact some counties more than others. Many rural counties with a high percentage of federal land ownership have a small real estate tax base, fewer employees and therefore limited automation skills. They have to perform the day-to-day tasks to meet their business needs and local customers with a small staff base. Our requests get a low priority. If they have hired a GIS person it may be a part-time position or may have a variety of duties beyond GIS. We did not find counties that

shared GIS staff but we did find a few cases where a regional government entity supports the less populated counties with GIS services.

4.1.4 Identify Benefits for the County

We are often asked what we can do for the county, what products will the county get from the Wildland Fire office or how will sharing benefit the county. We know how fire planning and analysis helps the county and can relate that to them but it would be valuable to have a process in place where data sets or maps produced for a wildland fire event can be provided back to the counties. A map product they can hang on the wall helps demonstrate the reason to share their data in the following years..

In order to reach sustainability the counties have to be aware of the benefits that their participation has gained them. This means that we must give them examples, physical if possible, maps out of RAVAR, or value added products that USFS is able to give back to a county. There were many instances where Commissioners and other elected officials had to be persuaded to let us have even a minimum amount of assessment data or waive a fee. If they never see a tangible piece of evidence that utilized the data they provided it becomes that much harder to get them to commit to supplying their data on a sustained schedule. Even if they were forthcoming it doesn't hurt to let them know how they benefited rather than assume they realize it.

4.1.5 Timing is Critical

The tax cycle needs to be identified for each state to determine the best time of year to make data requests. For example the New Mexico counties have asked that we not request data before April 1 since their board of review data are due on April 1st. Colorado and Idaho were conducting an intensive revaluation and appeal process that had the local Assessors office tied up when we began calling them.

4.1.6 Prioritization of counties needed earlier

Prioritizing the states and counties was helpful, but as the project went on, it became rushed and disjointed. This should have been done sooner in the project. The annual Wildland Fire forecast was very accurate and should be used as a basis for setting the update and collection priorities. We need to publish the priorities so the counties and states realize how they were established and that if a fire breaks out in a county that is not in the priority area we will need to try to get the data on short notice. There was a reluctance to set a geographic priority this year until we had a better understanding of what we could and could not accomplish.

4.2 Data Transmission

4.2.1 FTP Site

The Wildland Fire ftp site was very valuable for the data sharing process. This site was hosted through a private outside web service. It was very stable and easy to use once the initial set up was completed. Only a few user issues were encountered with the site and most were related to a county firewall. The site structure had the state and counties as subfolders so that the user would login to their state, they would only see the counties for that state. The ftp site greatly facilitated the data sharing timeliness and means of transfer.

4.2.1 License Agreements

The overall speed at which the license agreements were signed by the USFS, after they actually got the document to sign was impressive. There is probably some way to improve or track getting the documents to USFS to sign. We may want to begin tracking the status of the agreement document itself since the absence of a signed agreement is a barrier to sharing the data for those counties that require them. There should be an automatic reminder or routinely call counties back after a period of time has elapsed if the USFS has not received the document to sign.

4.2.3 Standardized Data

Ideally the state as a parcel data steward will be able to process the individual county data sets into a publication format standard that has consistent attribute names, update cycles and have the attributes integrated with the geometry. Because very few states had standards for publication of parcels for the 2007 season it meant a lot of data had to be analyzed and formatted. Knowing how to process parcel data and what to look for in the data sets is a specialized skill. The Wildland Fire staff gained this expertise as the season advanced. For future seasons consideration should be given to pre-processing data sets that are not standardized and providing wildland fire with standardized data.

There was some concern that the USFS Wildland Fire staff needed raw data but if we can pre-process the county data into standard formats it will reduce the workload in pre-deploying parcel data. This effort was estimated at about 700 hours for the 2007 season. For the 2008 season and beyond we need to have a better understanding of the processing that could be automated and how it would reduce the workload on the USFS Wildland Fire staff.

The USFS needs more pre-processing steps to identify any data issues sooner and prep data for processing. Due to the lack of standardized data, the data documentation becomes even more important. For 2008 it is

proposed that the county formats be more specifically documented and stored with the county profile.

Data was received in various formats; ArcGIS (pre-v9.2), ArcGIS (v9.2), Geodatabase, dbf, mdb, Excel and text file. We were prepared to handle most formats although there were some very old technologies that were not supported (one case was a 9 track tape). It was necessary to acquire ArcGIS v9.2 to convert some county data down to ArcGIS v9.1. Some counties were in the middle of a conversion to a new system and therefore, couldn't provide data this year, but possibly next season.

4.2.4 Counties with split data sources

It is fairly common for counties to have two sources of the parcel data, one source for the geometry and one source for the attributes. When this occurs it is a bigger challenge to get both sets and to have them synchronized. In some cases we could only get one of the data sets or the timing in getting the two sets was different. Understanding parcel data and how it is used and created is an important skill set to support processing the parcel data in these cases.

When attribute fields were in a separate database file, it slowed down processing, required additional processing, and necessitate identical key fields to permit a join. In some cases link fields were not available.

4.2.5 Transfer Timing

There was a big effort to give attention to each county as they were handed over to the USFS to keep the process moving, but the volume of county data coming through was overwhelming at times. When it was in full motion, a full day could easily be spent downloading, tracking and communicating. It was beneficial when the data transfer happened soon after contact with the counties was made.

Having a single main point of contact for the data transfer aided in keeping the process and it was less confusing as a whole, especially for the counties. When we strayed and a second person contacted the county, it appeared to cause confusion and frustration and even duplicated efforts. One of the principle objectives of this effort was to minimize the impact on the counties to provide them with positive impression of the project.

4.3 Processing Parcel Data

4.3.1 Data Standardization

The "get what you can" approach did tell us what condition the county data was in however it caused some lower quality data to be transmitted and this increased administrative and processing time and at times the data

wasn't useful. Some counties will send everything they have on file, causing inefficiency as all data received must be documented and analyzed for usefulness.

4.3.2 Centralized statewide datasets are essential

Having state centralized data, like with Montana, made the processing seamless and extremely fast. Having New Mexico handle the entire state was helpful in organizing the data. The FGDC Subcommittee's role in helping the states establish a single point of contact and the various approaches the states can take to providing the parcel data is essential.

4.3.3 Metadata

The data documentation (metadata) was seldom included with the data transfers. If it was, it was rarely complete or accurate. When the data documentation was there, it was very valuable with the processing. When a county does not fill out the FGDC Data Request form, time must be spent delineating the appropriate attribute fields (if present) to utilize the data.

4.3.4 Value Attribute for RAVAR

The essential attribute field to RAVAR is *Value of Improvements*; this value can be derived when provided with *total value* and *land value*. When values are unavailable and structure locations can be determined through other means, such as a binary *Improvements* attribute field or via *Owner Type* or *Parcel/Land Use* information, the county data can still be manipulated in a way that is useful to RAVAR; albeit at an expense to efficiency.

4.3.5 Projection Information

The counties seldom included a projection file. When the county failed to include or sent incorrect spatial reference system, projections were defined via best fit by systematically trying each relevant spatial reference system until the data appeared in the expected location.

4.3.6 Data Set Size

The size of some data sets caused dramatic increases in processing time. In some cases it was inhibiting unless the data set was reduced to the minimum required fields. Possible non-indexing of data was also a factor (e.g. Maricopa, AZ & Los Angeles, CA),

4.3.7 Data Standardization

The easiest dataset was Montana due to it being a state-standardized data set located in one location and combined into one shapefile (possible in a rural state without overloading the number of records). Also, the clarity and relevancy of attribute fields beyond the basic *Value of Improvements* within this dataset allowed further manipulation providing

the capability for greater data reporting depth without the need of a cryptographer (e.g. categorization of building clusters into Residential, Commercial, & Exempt status, in addition to the creation of a state-wide jurisdiction layer assumed to be more accurate than the default national level jurisdiction layer employed outside Montana).

Even though data cleansing was not an assigned task, it was often required to permit processing. Converting text to numbers, removing special characters and spaces, creating attribute tables and other type processes were not uncommon.

There were cases of missing required GIS files. This delayed the processing as it was necessary to contact the county for the required files.

Naming conventions were typically not followed. For example there should not be spaces, but rather underscores (e.g. convert '*County Name.dbf*' to '*County_Name.dbf*').

4.4 Project Management and Coordination

4.4.1 Roles and Responsibilities

The Project coordination needs to focus more on who has responsibility for which components of the data sharing process.

The “handshake” email between FGDC contact, County contact(s) and USFS Data Administrator to initiate the data sharing process worked well. It introduced the County to the USFS and also alerted the USFS that data was going to be shared. This process included an instruction document on the FTP use and documentation on the wildland fire project.

There were some delays and confusion created when the County did not transfer the data when expected and the FGDC contact had to get re-engaged with the county to follow up on data transfer. There were a few cases where we tried to convey technical information through three different contacts (the FGDC Contact, the Wildland Fire data coordinator and the county). Other than a few frustrating moments and a few confused communications this was straightened out in weekly conference calls. An improved method of tracking and communication of the status of the transfer from the county would help prevent transfers from “falling through the cracks”.

4.4.2 Technology

Google Docs was used as one approach to interactive documentation. These documents allowed multiple users to access, update and view the inventory and contact process. However editing the documents was

cumbersome and they did not work as effortlessly as we had thought they would. They were abandoned when we could not easily integrate the Google document results into the national inventory database. Microsoft share point might be an option to try in the future if the web based inventory tools do not work.

The parcel tracking database and maps and the online FGDC survey site were excellent tools. The parcel tracking needs to be online to give access to the most current information to everyone. With the volume of counties being contacted, these tools were important in maintaining history and giving everyone access to the current status of any county at any given time. Over the course of the project the site was revised to facilitate tracking coordination. A spreadsheet download capability was added at the end of the season and this will be an important tool for next season and going forward. Being able to extract contacts and parcel status to incorporate in other applications improves the usability of the status information.

4.4.3 Status Map

The colors for the status maps took a while to resolve. The symbology should be revisited before the 2008 season and to determine what will work best and what conveys the message with greatest clarity.

4.4.4 Weekly Conference Calls

The weekly conference calls were essential to communication and coordination. Meeting notes from each call and goals were set for the week.

4.5 General Observations

4.5.1 Plan needed to consistently update data on annual basis

There is a challenge of updating the data we have received over the past two seasons. The data inventory needs to be complete and easily queried. This inventory needs to be passed to a state contact if possible to assist with identifying when updates will be available. The Wildland Fire community will need to prioritize the update needs from the inventory. This plan for annual updates should be coordinated with the Subcommittee's efforts to build sustainable state stewardship approaches to parcel data.

4.5.2 Continued Outreach

We should attend as many statewide GIS or Assessment/cartography meetings where we can explain the goals and objectives of the effort and how organizations can participate, Encouraging the counties and states is essentially as well as showing the results and importance of the use of parcel data.

4.5.3 State Stewardship

We must reinforce the chain of stewardship and use. Counties are (generally) the primary data steward. The state role is to coordinate, facilitate the resolution of conflicts between counties, and to route federal support to the counties. The federal role is facilitation and support and to reinforce the notion that stewardship resides at the county level. It is also important that the federal agencies be perceived as a good partner in disaster response in common service to the citizens.

Given high variability of county parcel data (i.e. format, metadata, attributes, storage systems, completeness, etc.) state-level standardization and coordination is essential to smooth, sustainable, consistent data acquisition, processing and analysis. Statewide coordination may help address variable county fee requirements where they exist.

4.5.4 2007 Success

Overall the effort was highly successful in our efforts as demonstrated by generally enthusiasm for the project at the State and County level of cooperation.

4.5.5 Non Emergency Management Use of Parcel Data

Caution is required not to let uncertainties over commercial firms or for profit use compromise the agencies needs for parcel data for emergency response.

4.5.6 Federal Assistance is Needed

Federal assistance is needed to work with states the help counties complete and standardize parcel data systems. Federal agencies must coordinate through a single voice to support state efforts. Working with the FGDC Cadastral Data Subcommittee would be effective way of leveraging existing resources and having a consistent voice for standards and process.

5. State Summaries

The following summaries describe the experiences and recommendations for each of the western states. These state-by-state descriptions illustrate the differences in the states and the similarities across state boundaries when dealing with the parcel data.

Arizona Data Sharing Summary

Number of Counties: 15

Institutional Structure: The Arizona Geographic Information Council is a well established GIS coordinating body. During 2007 they actively supported the county parcel data inventory and in the fall of 2007 they began working with the Cadastral Subcommittee to develop a Parcel Data Business Plan. Their intentions are to take on the responsibility for acquiring and publishing parcel data.

Special Conditions:

- Arizona is working to achieve Level 2 Stewardship in 2008 (Data producers provide data sets to a central location or contact at the state on a yearly basis).
- They do not have dedicated staff to this objective so they will still require support.
- AGIC has a State GIS portal which provides a site for storing the parcel data that is received from the county.
- The Parcel Data Business Plan is a work in progress and it is not anticipated to be complete until early 2008. The Subcommittee is providing assistance with the creation of this document.
- The AZ Forest Service has volunteered to assume responsibility for acquiring parcel data from the counties, compiling it on an AZ ftp site and transferring it to the US Forest Service.

Sharing Status:

- Ten counties have GIS data and are willing to share it.
- Three counties are works in progress and are willing to share what they have.
- Only one county had no GIS data (La Paz – pop 20,000)

Sharing Status	No. Counties
Will Share data	10
Will share with agreement	1
No GIS data	1
Other conditions	3

Recommendations for 2008:

Arizona is well on its way to assuming responsibility for the annual collection and publication of parcel data fro Wildland fire. Because they do not have dedicated staff they will need support for the next year to ensure that they do make it Level 2.

California Data Sharing Summary

Number of Counties: 58

Institutional Structure: California does not have a state GIS coordinator which required the Subcommittee to contact the counties directly without an introduction from a state agency. The Subcommittee did receive a great deal of assistance from the Department of Natural Resources, the State Forestry agency and the Department of Revenue which served as a working group to identify the county contacts.

Special Conditions:

- At the county level there is a legal battle between some of the counties and the state regarding their ability to sell their data. The Attorney General ruled in 2007 that parcel data was a public record and should be provided for the cost of reproduction. This decision is currently being contested and it has hampered data acquisition in some counties
- The private sector has a prominent role in some counties particularly where they license agreements for parcel geometry and or attributes limiting access to the data.

Sharing Status:

- Fifty-three of the fifty-eight counties have GIS data and of the remaining five counties three are in the process of developing a parcel GIS layer.
- Data was received from 30 counties.
- Six of the counties that did not provide data were low priority counties meaning that they were unlikely to experience wildland fires.
- Seven counties that had GIS data were unable to share their GIS or assessment data. .
- Nine counties that were willing to share their GIS data at no cost required fees for their assessment data.
- Five counties were unable to share assessment data.
- Fees varied from \$200 to \$2000.

Data Sharing Status	GIS Data	Assessment Data
Will share	40	34
Emergency only	0	0
Agreement	5	7
Fee	1	9
Unable to share	7	7
No Data	5	1
	58	58

Recommendations for 2008: Efforts should be made to work with the state to address the absence of a state coordinating body and a strategy to approach the counties that were unwilling to share their data and those that required fees. Data acquisition should focus on the priority counties.

Colorado Data Sharing Summary

Number of Counties: 63

Institutional Structure: Colorado does not have strong state level GIS coordination. The state coordinator sent letter to the counties and we did the follow up.

Special Conditions:

- The eastern half of the state is a low priority for wildland fire so our county statistics are based on the 47 counties in the high priority area which is western Colorado.
- Colorado does not have dedicated staff to this objective so they will still require support.

Sharing Status:

- Twenty-nine counties provided data and of those, twenty-two counties were processed and pre-deployed.
- Six counties have data but will only share in emergency.
- Ten counties that were contacted had no GIS data.
- Nine counties had data that was available for distribution from their web sites

Sharing Status (47 counties)	No. Counties
Will Share data	29
Will share in an emergency	6
No GIS data	10
Other conditions	2

Recommendations for 2008:

Colorado has 47 counties that data was requested. Of these 47 35 counties provided data or had data that they would provide in an emergency. It is recommended we focus on the remaining 12 counties, follow up on the 29 that have data to share to update the data sets and we don't work on a state plan in 2008.

Idaho Data Sharing Summary

Number of Counties: 44

Institutional Structure: Idaho has new State GIS coordinator as of December 2007, it is Gail Ewart. An introductory letter from the Idaho Bureau of Homeland Security was delivered to all the Counties and the Subcommittee contacted the Counties directly. The Idaho Department of Revenue provided a County contact list for this effort.

Special Conditions: Several Counties contract out their GIS collection to private firms. Many of these counties do not know how to provide the data to us themselves and the private firm needs permission to release and charges a fee.

Sharing Status:

- GIS parcel data exists for 28 Counties.
- Data was received from 22 counties, 11 of which were staged
- Ten Counties were low priority counties meaning that they were unlikely to experience wild land fires.
- Six Counties only had assessment data.

Data Sharing Status (44 counties)	No. Counties
Will GIS and attributes share	28
Attribute data only	6
Low priority counties	10

Recommendations for 2008: Contact remaining 22 Counties to obtain data and complete the parcel data inventory. Provide information and assistance to the new GIS Coordinator. Seek funding for Counties that do not have GIS capabilities.

North Dakota Data Sharing Summary

Number of Counties 53 – 11 inventoried

Institutional Structure: The North Dakota has a GIS Coordinator, Bob Nutsch, who is responsible for the ND Data Hub, a portal for the distribution of GIS data. This is the only staff that is available to support GIS management.

Special Conditions:

- Not all properties are included in the Tax Director’s assessment database. Individuals whose principle income is form farming are exempt from property taxation. These properties, including residences, are not included in the assessment database. This is significant because 60% of the parcels may not be in the assessment database.
- The Department of Transportation inventories the cultural structures in the rural areas on a six year cycle. A “structures” database is created that identifies structures and categorizes them as farms, abandoned, and other facilities. Although this database is not associates with the assessment data and the structure locations are approximate to a parcel it does fill in the gaps made by the farm exemptions.

Sharing Status:

- Eleven counties in the western portion of North Dakota were inventoried.
- 5 counties have GIS data
- 3 counties were willing to share and 2 counties required agreements or letters requesting an exchange of services.
- 1 county (Dunn) is expected to complete its parcel coverage in 2008.

Share Status	GIS Code	GIS Count	Attrib Count	Attrib Code
Share	1	3	5	A
Agreement	3	1	3	C
No Data	7	5	0	G
Other	8	2	3	H
		11	11	

Recommendations for 2008:

1. Assess the DOT cultural features database to determine its ability to fill in the gaps for the Agriculture Exemptions.
2. Check with Dunn County on its status in late spring before the beginning of the fire season.

Nevada Data Sharing Summary

Number of Counties: 17

Institutional Structure: Nevada does not have a state GIS coordinator at this time but we have a principle cadastral contact at the Department of State Lands. The State Cadastral Coordinator did provide an introductory letter and the Subcommittee contacted the Counties directly.

Sharing Status:

- GIS parcel data is available for 9 Counties in Nevada.
- Data was received from 8 counties.
- Two Counties were low priority counties meaning that they were unlikely to experience wild land fires or there is no federal surface agency ownership in these counties.
- Four counties had no GIS, and in one county the maps were hand drawn.
- Five counties that had GIS data were unable to share their GIS or assessment data. These five counties contract with ADS for Assessment database maintenance, charge is \$150 per county.

Data Sharing Status	GIS Data	Assessment Data
Will share	8	8
Agreement	4	4
Fee	0	5
Unable to share	5	5
No Data	4	4
	17	17

Recommendations for 2008: Complete parcel inventory in two remaining counties. Obtain parcel data for the remaining counties we did not acquire in 2007.

Oregon Data Sharing Summary

Number of Counties: 36

Institutional Structure: Oregon has a state GIS coordinator that is trying to set up a data sharing agreement between the State and the Counties which will allow State agencies to utilize County parcel information. They are negotiating on the content as well. Federal agencies are deliberately being excluded from this initial data sharing agreement due to Freedom of Information Act (FOIA) concerns, namely that if the federal sector has county data in their systems they might be forced to release it under a FOIA request. The State GIS Coordinator did provide an introductory letter and the Subcommittee contacted the Counties directly. The Oregon Department of Revenue provided a County contact list for this effort.

Special Conditions: The Department of Revenue maintains the parcel geometry for 14 Counties and was able to provide this information with permission from those counties.

Sharing Status:

- GIS parcel data is available for all 36 Counties in Oregon when the parcel geometry from DOR is included.
- Data was received from 29 counties.
- Three Counties were low priority counties meaning that they were unlikely to experience wild land fires.
- One County gave permission for the State to provide the data to us but it was never received.
- Four counties that had GIS data were unable to share their GIS or assessment data.

Data Sharing Status	GIS Data	Assessment Data
Will share	22	22
Agreement	10	10
Fee	0	0
Unable to share	4	4
No Data	0	0
	36	36

Recommendations for 2008: Include an *emergency response only* clause in the County data sharing agreement for the Federal Agencies to assure the Counties that non disclosure or license agreements signed by a federal agency will be honored even when faced with a FOIA request. Data acquisition should include all 36 Oregon Counties.

Utah Data Sharing Summary

Number of Counties: 29

Institutional Structure: The Utah Geographic Information Council is a well established organization with excellent staff, a very good data portal and a data development program.

Special Conditions:

- The UGIC has been able to get the counties to provide parcel geometry and a limited set of attribute data but it is less than the core and only includes owner name and address with no value information or other attribute that allows the determination of presence or absence of structures.
- The UGIC does not feel that they can take on the responsibility of requesting value information for political reasons.
- It is necessary that an outside entity contact and request the parcel data from the counties that is needed for wildland fire.
- 16 of 29 counties were willing to share their GIS data including value information with the US Forest Service.
- The UGIC is actively supporting the development of parcel data for some counties.
- UGIS is working on a Parcel Data Business Plan.

Sharing Status:

- 16 counties were willing to share their GIS data with value information.
- 10 counties had no usable GIS data
- 3 counties were unable to share their data

Share Status	GIS Data	Attribute Data
Will Share	15	20
Share/Agreement	1	2
Share/Fee	1	2
Unable to Share	2	3
No Data	9	2
Other Conditions	1	0
	29	29

Recommendations for 2008:

Work with the UGIC to develop an emergency response strategy for acquiring parcel data that includes the core data including value information.

Review the Parcel Development Business Plan to include a strategy for acquiring core data. Work with the UGIC to support their efforts in compiling parcel data that can be used for wildland fire. Acquire parcel data from counties we missed in 2007 and updates for the counties we did get data from.

Washington Data Sharing Summary

Number of Counties: 39

Institutional Structure: The Subcommittee approached Washington State government to issue an introductory letter supporting our parcel data request. There was no response. It was then decided that the Subcommittee would contact the Counties directly. The Washington Department of Ecology provided a contact list that they use and individual County websites to supplement their list.

Special Conditions: During the calendar year of 2007 a Parcel Framework Group in Washington was created. The Group is attempting to acquire GIS parcel data from the Counties and create a data set for the State that participating members of the Group will have access to. The Attorney Generals Office is drafting an agreement that will limit the distribution of the data only to members of the Framework Group. Integration of the County data into a seamless dataset and core data content are to be developed. Publication of the statewide dataset will be discussed in the future.

Sharing Status:

- 30 Counties have GIS parcel data.
- Data was received from 8 counties.
- Spokane County has their data on line but it was not obtained
- Yakima County shared the parcel geometry but there was a fee for the Assessment information.
- 4 Counties have tabular assessment data only
- 5 Counties are unknown

Recommendations for 2008: Contact 30 Counties to acquire GIS parcel data for wild land fire purposes. Try to identify funding for those counties who do not yet have GIS capability. Participate in the Parcel Framework Group activities.

Wyoming Data Sharing Summary

Number of Counties: 23

Institutional Structure: Wyoming has a strong Department of Revenue with data standards and data sharing arrangements for attribute information. Wyoming also has a strong data clearinghouse presence and a long history of cooperative working relationship with BLM.

Special Conditions:

- Park County Wyoming will not share their GIS data without a fee. Even in the presence of fires in 2007 they were unwilling to share data.
- The state has strong CAMA standards that are enforced through the Department of Revenue.

Sharing Status:

- In 2007 nine counties provided data that was staged for the 2007 season.
- Another nine counties had data to share but the geometry was not linked to the value attributes and eight of those were able to be staged.
- Four counties had no GIS data

Sharing Status	No. Counties
Will Share data	18
Will not share	1
No GIS data	4

Recommendations for 2008:

Wyoming is the pilot state for using the data integration tools that could be managed at the state and provides wildland fire with a standard shape file with the standardized attributes. These programs are being developed and tested as part of the 2007 updates. The state may need some support to use this software the first year.

Appendix A – Wildland Fire and Parcel Data in the News

The following are a sampling of articles about the 2007 wildland fire season that appeared in the news during 2007. These articles emphasize the level of damage and risk the 2007 wildland fires created and the importance of providing parcel level data to support the planning, response, recovery and mitigation of wildland fire risk and damage in the future.

<http://www.oregonlive.com/ap/stories/index.ssf?/base/news-35/1199556843208900.xml&storylist=topstories>

2007 wildfire season one of worst on record

1/5/2008, 10:07 a.m. PST

By KEITH RIDLER

The Associated Press

BOISE, Idaho (AP) — Wildfires scorched an area four times the size of Yellowstone National Park and destroyed more than 5,200 buildings in 2007, one of the nation's worst fire seasons despite a record amount of retardant dropped by aircraft.

The Boise-based National Interagency Fire Center reported nearly 14,000 square miles burned and the federal government spent more than \$1.8 billion fighting wildfires, making it the second costliest season on record.

Even though fire managers used 22.4 million gallons of fire retardant — nearly triple the 10-year average — the area burned in 2007 trails only 2006 when fire consumed 15,500 square miles.

The number of buildings burned in 2007 ranks second since current counting methods began in 1999, trailing the 5,700 buildings destroyed in 2003, the fire center reported.

It was also the fourth consecutive year that flames torched more than 12,500 square miles, an amount not previously recorded until 2004, with records going back to 1960.

"The world we're dealing with in fire suppression is changing," said Lyle Carlile, chair of the fire center's National Multiagency Coordinating Group and one of seven people who decide where to position U.S. wildfire fighting resources during the fire season. "We just can't continue to do business the same way. We don't have enough firefighters to draw from to handle the situations we're faced with."

Fire managers said a lengthening drought, hotter temperatures across much of the U.S., and an increased number of homes built in fire-prone wildland areas contributed to the severity of the wildfire season.

Rose Davis, a spokeswoman for the center, said the last two years represent back-to-back fire seasons so fierce managers have been forced to change strategy.

"Our fire managers knew they couldn't do things the old way — the frontal or flank attacks were just too dangerous," she said. "In some places they had to steer the fire to natural breaks where they could fight it efficiently and not get anybody hurt or killed."

Seven wildland firefighters died in 2007 as a result of activities related to wildfires, one on a fireline, said Davis. In 2006, 24 firefighters died, 12 on firelines.

About 15,000 wildland firefighters deployed during the season, and the U.S. asked for and received help from Canada with five hand crews of 20 firefighters each. The fire center in Boise remained on its highest alert level from mid-July to the end of August.

In December, the National Oceanic and Atmosphere Administration's National Climatic Data Center released preliminary data that predicted the annual average temperature for 2007 across the contiguous

United States at near 54.3 degrees Fahrenheit — which would make the year the eighth warmest since records were first kept in 1895.

Davis said extended drought also contributed to the 2007 wildfire season.

"The fire season started very early with the large, unusual fires in the East, in Georgia," said Davis. "As it moved to the Western U.S., almost every section of the country issued fire behavior alerts." Alerts warn firefighters about elevated danger based on weather and potential fuel, including how susceptible trees, brush and grasslands are to fire based on how dry conditions have become. Carlile said years of fire suppression in some areas have made those areas more difficult to protect. "We cannot keep fires out of these fire-dependent ecosystems," he said. "That is just not sustainable. Fuels are going to build up and it's just going to escalate."

Nearly 80,000 wildfires started in 2007, the fire center reported, about 85 percent the result of human activity and the rest lightning strikes. Initial attacks by a web of firefighters who react quickly put out all but about 2 percent of those wildfires, but some that got away became memorable:

In Georgia and Florida, the season started in April with wildfires that lasted several months and burned more than 900 square miles, the Southeast's biggest wildfire since 1898, according to the fire center.

At about 550 square miles, the Milford Flat fire in western Utah was the largest wildfire in that state's history. Five people died, including a California couple riding a motorcycle when smoke swept Interstate 15 on July 7.

Idaho had the most area burned in the U.S. in 2007 with 3,100 square miles. That included the 78-square mile Castle Rock fire in August that forced the evacuation of more than 2,000 homes in the resort area of Ketchum in central Idaho and caused Sun Valley Resort to run its snowmaking equipment in a successful bid to protect a \$12 million ski lodge atop Bald Mountain.

The Murphy complex of fires, started by lightning in late July, burned an area on the Idaho-Nevada border larger than Rhode Island. The fire blackened grassland used by cattle, and wildlife habitat that supports sensitive species such as sage grouse.

The Angora fire in June burned 3,100 acres and destroyed 254 homes on the west side of Lake Tahoe in California.

The Zaca fire that started on July 4 in southern California burned some four months and 375 square miles to become the second-largest wildfire in that state's history, threatening ranches and vineyards in the Santa Ynez Valley.

The Nov. 24 Malibu fire in southern California, fanned by Santa Ana winds, put the bookend to the season, destroying more than 50 homes, 35 other structures and burning about 5,000 acres. The total cost of the human-caused fire is estimated at \$100 million, and six firefighters were injured.

Carlile said wildfires that threaten homes get top priority because lives and buildings are at risk. But he also said homes built in areas prone to wildfire use fire fighting resources that might otherwise be sent elsewhere. "The expansion of the wildland-urban interface continues to challenge us," he said. "Everybody wants to live out next to the forest. That expansion becomes high value areas we have to protect." Smokejumpers, who parachute out of airplanes, have seen their roles change in recent years from jumping into remote areas to jumping into more easily accessible areas where initial attack is considered a key to stopping fires before they get big, said Eric Reynolds, chief of the Bureau of Land Management smokejumpers in Boise.

"Because of the experience, our crews are in demand more than ever on those emerging fires," he said. The Boise base is one nine smoke jumping bases in the U.S., and Reynolds said the 83 smokejumpers in Boise combined to go on 926 fire jumps in 2007. "There were a couple real barn burners," he said.

<http://www.oregonlive.com/news/oregonian/index.ssf?/base/news/1184298914303930.xml&coll=7>

Fires destroy valuable rangeland

As the Egley complex burns, Eastern Oregon ranchers fear the loss of grazing lands

Friday, July 13, 2007

MATTHEW PREUSCH

The Oregonian Staff

RILEY -- Rancher Wayne Evans stood beside his pickup Thursday, eyes on the towers of gray and brown smoke rising from the juniper-covered hills to the north.

The night before, as the expanding Egley fire bore down on the tiny outpost of Riley, Evans moved most of his 350 cows out of harm's way with the help of neighbors, but the fire charred much of the rangeland they depend on for forage.

"Basically, this could put me out of business," Evans said.

The Egley complex of fires -- now at 72,000 acres -- has torched a fraction of more than 3 million acres of public range in the Burns District of the U.S. Bureau of Land Management, yet the experience has proved traumatic for a handful of ranchers such as Evans.

Each summer, public lands ranchers rely on relatively cheap leased land from the BLM and Forest Service to graze their cattle, sheep and horses. Now they'll have to either buy hay or find more expensive private land for their animals.

Hay, normally \$100 a ton, is expected to cost twice that much by the end of the summer as demand rises and supplies fall.

"Hay is already real short here in the Northwest, so I'm sure some of these guys are going to have to sell some cows" to pay for it, said Bill Andersen, the BLM's district range specialist.

And the agencies usually retire grazing allotments for at least two seasons after a fire to allow the bunchgrasses and soil to recover, meaning longtime leaseholders could be out of luck for years.

"It's probably going to cost us a lot of money, and it's going to hurt for a long time," said Kim Perlot, owner of Silver Creek Ranch.

The ranch runs about 450 mother cows on a 70-square-mile allotment of federal land in the hills north of Riley, but the wildfires burned more than half of it.

"I'm working in the daytime and fighting fire at night," said Perlot, a municipal judge in Burns. The Egley complex, now made of up of three large fires that began with a lightning storm a week ago, moved east toward Burns and Hines

earlier this week. Fire managers focused their efforts on protecting the twin communities, pulling resources from the remote areas north of Riley, population 3.

But now the eastern front is quiet, and attention is on the damage to the range north of Riley that feeds what is Harney County's largest industry: ranching.

Harney County economy

Harney County rates ninth among counties in the United States in beef cattle production. About half of county taxes come from the ranching community, according to the Harney County Chamber of Commerce.

"It's absolutely huge for the big pictures in Harney County," said Judge Steve Grasty, whose position is similar to a county executive.

Last year, fires burned about 400,000 acres of private and public rangeland in Oregon, and this year the tally already is up to 150,000, said Gordon Foster, rangeland fire protection coordinator for the Oregon Department of Forestry. As the Egley complex expanded to the west, ranchers have had to scramble to move their animals to safety.

Brett Starbuck, a rail-thin buckaroo in a white snap button shirt, worked into the wee hours Thursday rounding up cows after firefighters lit a backburn that threatened a neighbor's herd.

"I wore out a good horse in a short time last night," he said while buying two cans of Grizzly chewing tobacco at the Riley Store & Archery. "A lot of guys did."

Tom Davis, who raises bucking horses north of Riley, recounted a 5-mile-wide front of 40-foot flames moving toward his pastures. "You ever been to hell? That's what it felt like, hell on Earth," he said.

Resources and decisions

Davis, Starbuck and many of their neighbors are critical of the way fire managers have fought the western edge of the fire, both for pulling all the resources over to the eastern side and for sparking burnouts, which are meant to rob an advancing fire of fuel. The burnouts blackened productive rangeland, they said.

It's not an easy situation, said Tim Johnson, spokesman for the interagency team fighting the fire.

"We don't like to not have the resources to do both sides, either, but if you have to decide, human life comes first, property comes second," he said. Most of the "heavy artillery" will now focus on the Riley side of the fire because that's where most of the growth is, he said. The complex is about 30 percent contained. But ranchers, a generally resilient crowd, are accustomed to looking for silver linings in what can be a hard life in harsh terrain. One of those linings is tottering around with Davis' bucking horses: a leggy brown and white colt born early Thursday. "We named him Smoke and Fire," Davis said.

http://www.nytimes.com/2007/01/03/us/03fire.html?_r=2&n=Top%2fReference%2fTimes%20Topics%2fPeople%2fJ%2fJohnson%2c%20Kirk&oref=slogin&oref=slogin

As Costs of Wildfires Grow, So Does a Question: Who Should Pay?



David McNew/Getty Images

A blaze in the San Jacinto Mountains of California in October took the lives of five federal firefighters who were trying to protect a home.

- By [KIRK JOHNSON](#)
Published: January 3, 2007, New York Times

DENVER, Jan. 2 — The steeply rising cost of preventing and suppressing wildfires, which burned more of the American landscape in 2006 than in any other year since at least 1960, is creating a rift between Washington and state and local governments over how the burden ought to be shouldered.



Eric Parsons/Ventura County Star, via Associated Press

The scorched landscape adjoining a residential development near Los Angeles bears witness to a fire last month that gutted five houses.

A study issued in November by the inspector general's office of the [United States Department of Agriculture](#), the parent agency of the Forest Service, said the nature of the wildfire threat was changing as private homes and communities pushed ever closer to the boundaries of once-remote public lands. Those communities and landowners, rather than federal taxpayers, should have to pay for more of their own fire protection, the report concluded.

States and local governments are gearing up to fight back in Congress, arguing that decades of federal mismanagement of national forests and open spaces, not development, created the threat and that little communities with few resources are neither responsible for it nor equipped to make a difference.

The pattern of wildfire distribution during the recently ended fire season, which charred more than 9.8 million acres, supports either side. According to federal statistics, more state, county and private lands burned than in any other year since 1997 — about half the total 2006 losses — primarily because of monstrous blazes in Oklahoma, in Texas and across the Upper Plains, regions where most property is privately owned.

That finding, though also driven by broader factors like drought and heat that have little to do with residential development in fire-prone areas, supports the federal contention that the government has had to shift an increasingly large share of its resources from the task of protecting its own forests to firefighting elsewhere.

In some places, though, the issue is more complex. In Stillwater County, Mont., north of Yellowstone National Park, for example, the small, long-established towns of Nye and Fishtail are bordered on two sides by national forest. In early July, the first of two huge fires erupted in the forest and roared into those communities, where 100,000 acres of mostly private land and 32 homes were burned. The blaze was the worst in the county's history, local officials say.

"The forest is very dry and primed for fires started by lightning, and when that occurs in a forest not managed as well as it could have been, it soon gets out of control and meets the community," said Ken Mesch, the Stillwater County disaster and emergency services coordinator. "If the federal government started pulling back money for fire suppression, they would be hanging us out to dry."

Federal land managers say protection of private land at the boundaries of public space — called the wildland-urban interface — is the fastest-growing component of the nation's firefighting budget. In 2003 and 2004, the inspector general's report estimated, the Forest Service spent at least half a billion dollars, and perhaps as much as a billion, protecting private property in such areas.

The trend is similar at the [Interior Department](#), which oversees hundreds of millions of acres of public lands in the West through the [Bureau of Land Management](#), the [Fish and Wildlife Service](#), and the [National Park Service](#). Fire prevention activities — controlled fires or thinning of burnable vegetation — have shifted there toward the interface lands, said Lynn Scarlett, deputy interior secretary.

Ms. Scarlett said that almost half the 1.1 million acres treated by the Interior Department for fire-risk reduction in 2006 were in interface zones, about double the proportion as recently as 2002. She said her department, too, was considering that it demand increased cost-sharing by state and local governments, though she emphasized that any outcome would have to be collaborative.

“One of the last things you want in an emergency is people squabbling over who’s going to pay,” she said.

The report from the Agriculture Department’s inspector general said a major problem was simply the weight of accumulated assumptions: fire response in the West has long meant federal authorities’ riding to the rescue, with no questions asked and no cost too great to bear.

“Public expectations and uncertainties about protection responsibilities,” the report said, “compel the Forest Service to suppress fires aggressively and at great expense when private property is at risk, even when fires pose little threat to National Forest system land.”

About 8.5 million homes were built at the wildland-urban interface within the interior West in the 1990s alone, according to the Forest Service. But state and local officials say they already pay their share to protect those communities and homeowners, partly because the residential growth has coincided with years of federal budget cuts. Arizona, for instance, now has 12 to 14 air tanker firefighting aircraft under contract, up from 2 to 4 in 2005, as a result of reduced federal spending on tankers, said Lori Faeth, a policy adviser to Gov. Janet Napolitano.

“Our forests are in the condition they are because of poor federal management,” Ms. Faeth said. “They’ve put us in this position, and they have the responsibility to pay for it.” The Forest Service’s director of fire and aviation management, Tom Harbour, said the agency would follow up on the inspector general’s recommendations. “We’re not going to walk away,” Mr. Harbour said, “but we will engage in a vigorous debate with our partners about the right way to split the pie.”

Still, money is only part of the issue, he said. Communities and developers in the West should be thinking in new ways as well, he said, including the use of fire-wise

construction techniques and preparedness plans that involve residents in their own defense even before fires start.

Many land experts say hardly anyone is addressing the most tangled and emotional question raised by the debate: how much or how little voice federal land managers should have in land-use decisions.

“Thinking through in advance the fire implications of a new subdivision next to a national forest boundary — that doesn’t happen,” said James L. Caswell, administrator of the Idaho Office of Species Conservation.

Given the property rights issue and the tension between local governments and Washington that has shaped the West’s culture for the last century, a system of planning that allows federal officials veto power would seem unlikely.

Mr. Caswell said better planning must be part of the solution. “A thousand houses next to a boundary could overwhelm all the other cost-control issues,” he said.

“But,” he added, “that’s a very emotional topic, so it’s really hard to deal with.”