A Profile of Development and the Wildland-Urban Interface (WUI)

Selected Geographies:

Flathead County, MT

Benchmark Geographies:

West

Produced by
Economic Profile System
EPS
May 21, 2015

About the Economic Profile System (EPS)

EPS is a free, easy-to-use software application that produces detailed socioeconomic reports of counties, states, and regions, including custom aggregations.

EPS uses published statistics from federal data sources, including Bureau of Economic Analysis and Bureau of the Census, U.S. Department of Commerce; and Bureau of Labor Statistics, U.S. Department of Labor.

The Bureau of Land Management and Forest Service have made significant financial and intellectual contributions to the operation and content of EPS.

See headwaterseconomics.org/EPS for more information about the other tools and capabilities of EPS.

For technical questions, contact Patty Gude at eps@headwaterseconomics.org, or 406-599-7425.

HEADWATERS ECONOMICS

headwaterseconomics.org

Headwaters Economics is an independent, nonprofit research group. Our mission is to improve community development and land management decisions in the West.

NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

www.blm.gov

The Bureau of Land Management, an agency within the U.S. Department of the Interior, administers 249.8 million acres of America's public lands, located primarily in 12 Western States. It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE

www.fs.fed.us

The Forest Service, an agency of the U.S. Department of Agriculture, administers national forests and grasslands encompassing 193 million acres. The Forest Service's mission is to achieve quality land management under the "sustainable multiple-use management concept" to meet the diverse needs of people while protecting the resource. Significant intellectual, conceptual, and content contributions were provided by the following individuals: Dr. Pat Reed, Dr. Jessica Montag, Doug Smith, M.S., Fred Clark, M.S., Dr. Susan A. Winter, and Dr. Ashley Goldhor-Wilcock.

Table of Contents

Note to Users:

This is one of fourteen reports that can be created and downloaded from EPS Web. You may want to run another EPS report for either a different geography or topic. Topics include land use, demographics, specific industry sectors, the role of non-labor income, the wildland-urban interface, the role of amenities in economic development, and payments to county governments from federal lands. Throughout the reports, references to online resources are indicated in parentheses. These resources are provided as hyperlinks on each report's final page. The EPS reports are downloadable as Excel, PDF, and Word documents. For further information and to download reports, go to:

headwaterseconomics.org/eps

Flathead County, MT

Development in the WUI

How much of the WUI has been developed, and how much has not yet been developed?

This page evaluates the wildland-urban interface (WUI) for the eleven western continental states, showing both square miles and the proportion of the WUI that has been developed and how much remains to be developed.

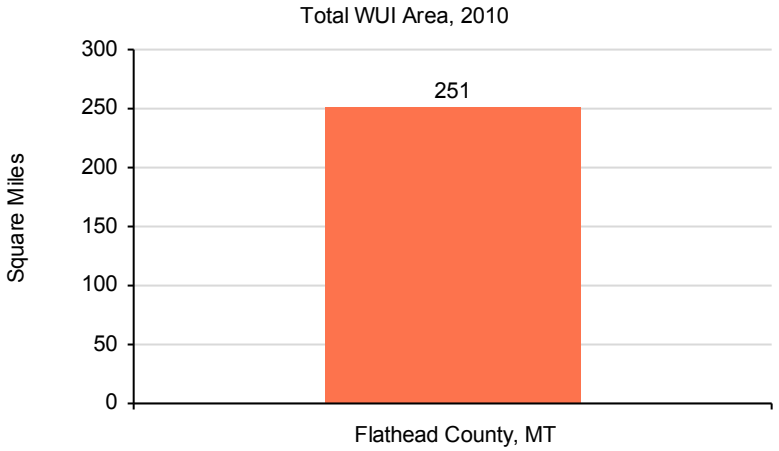
Wildland-Urban Interface (Square Miles), 2010

	Flathead County, MT	West
Total WUI Area	251	23,596
WUI Area with Homes	68	3,837
WUI Area without Homes	183	19,759

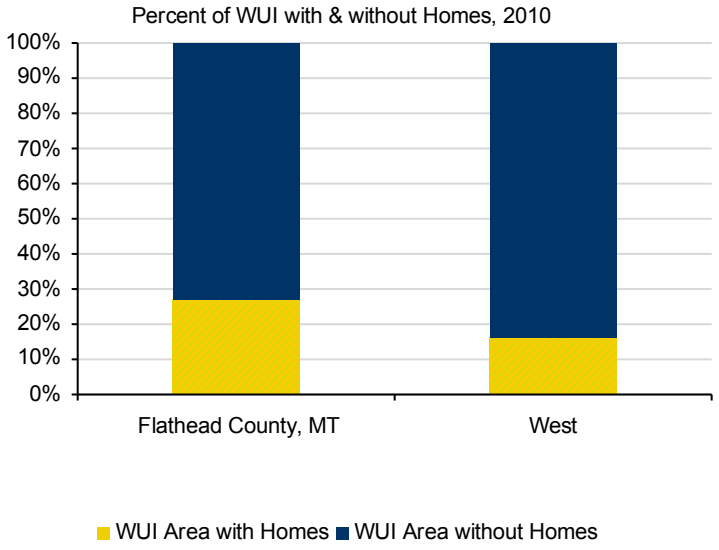
Percent of Total

WUI Area with Homes	27.1%	16.3%
WUI Area without Homes	72.9%	83.7%

- In 2010, Flathead County, MT had the largest total WUI area (251 square miles), and Flathead County, MT had the smallest (County Region square miles).



- In 2010, Flathead County, MT had the largest percent of the WUI with homes (27.1%), and the West had the smallest (16.3%).



Data Sources: Gude, P.H., Rasker, R., and van den Noort, J. 2008. Potential for Future Development on Fire-Prone Lands. Journal of Forestry 106(4):198-205; U.S. Department of Commerce. 2011. TIGER/Line 2010 Census Blocks and 2010 Summary File 1, Washington, D.C.

Study Guide and Supplemental Information

How much of the WUI has been developed, and how much has not yet been developed?

What do we measure on this page?

This page evaluates the wildland-urban interface (WUI) for the 11 western continental states, showing both square miles and the proportion of the WUI that has been developed and how much remains to be developed.

Wildland-Urban Interface (WUI): This report defines WUI as private forestlands that are within 500 meters of public forestlands. (See Methods section on final page for discussion of this threshold.) We focus on adjacency to public forests since roughly 70% of western forests are publicly-owned and since wildfire is a natural disturbance in these forests, creating a potential risk to adjacent private lands. In this report, the term "wildland-urban interface" (WUI) is sometimes used interchangeably with "fire-prone lands."
WUI Area with Homes: the square miles of private forest lands within 500 meters of public forestlands that are occupied by homes.
WUI Area without Homes: the square miles of private forest lands within 500 meters of public forestlands without homes. These lands have the potential to be developed.

Why is it important?

Wildfire directly impacts safety, private and public costs, and landscape health. Today, the rising expense of wildland firefighting that takes place both on public and private lands costs the federal government more than $3 billion per year. A principal reason for the escalating cost of wildland firefighting is the growing number of homes built in the WUI. Many studies have delineated the rising costs of forest and other wildland fires, and all point to the expanding pattern of residential development adjacent to public lands as a significant contributing factor. The costs of fire suppression will continue to grow if residential development trends continue.

Fire plays an important part in most wildland ecosystems. However, many years of fire suppression, much of it undertaken to protect private property, has resulted in fuel buildup, which in turn increases the probability of a large, expensive fire. Warmer temperatures, less snowpack, and drier forests also result in longer and more intense fire seasons across the West. Other factors, such as bug infestations, can exacerbate fire intensities.

Data on this page can be used to quanify whether the selected geographies have significant acreage in the WUI, whether this acreage is currently developed. If there is extensive WUI acreage that is currently undeveloped, it is important to ask whether public land managers and local and state officials are planning for potential development in the WUI and its associated costs.

Methods

The information in this report is based on a study conducted by Headwaters Economics (see Data Sources and Additional Resources) on the 11 contiguous western states. The original study utilized data from the 2000 Census. The study has since been replicated using 2010 Census data. Additional, detailed descriptions of methods are found on the last page of this report. For references on defensible space, see Gude et al, (2008), Data Sources, page 199.

As defined in the National Fire Plan, the WUI includes areas "where structures and other human development meet or intermingle with undeveloped wildland." Other federal documents define the WUI as areas "where humans and their development meet or intermix with wildland fuel" or "the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuel." In general, the WUI is an area rich in natural amenities, where both population and new housing are on the rise.

Additional Resources

A number of alternative definitions exist for the WUI. For example, the University of Wisconsin's SILVIS lab's definition is not focused on public forests. For more information, see: silvis.forest.wisc.edu/library/WUIDefinitions2.asp *(1)*.
For more discussion of fire policy in general, see: headwaterseconomics.org/wildfire.php *(2)*. This page has a variety of useful links including studies on controlling wildfire costs, the cost of protecting residences from wildland fire, and development in the WUI.
For a White Paper on methods to control future fire suppression costs in the WUI, a literature review of recent reports, and public policy options, see: headwaterseconomics.org/wildfire/HeadwatersFireCosts.pdf *(3)*.
The following report has a useful overview of costs, WUI, and related issues: U.S. Department of Agriculture, Office of Inspector General, Nov. 2006. Audit Report: Forest Service Large Fire Suppression Costs. Report No. 08601-44-SF.
Berry, Alison H., Geoffrey Donovan, and Hayley Hesseln. 2006. The Economic Effects of the Wildland-Urban Interface on Forest Service and BLM Prescribed Burning Costs in the Pacific Northwest. Western Journal of Applied Forestry, 21(2):72-78.
Healthy Forests Restoration Act of 2003, fs.fed.us/biology/wildecology/HFRA.pdf *(4)*.

Data Sources

Gude, P.H., Rasker, R., and van den Noort, J. 2008. Potential for Future Development on Fire-Prone Lands. Journal of Forestry 106(4):198-205; U.S. Department of Commerce. 2011. TIGER/Line 2010 Census Blocks and 2010 Summary File 1, Washington, D.C.

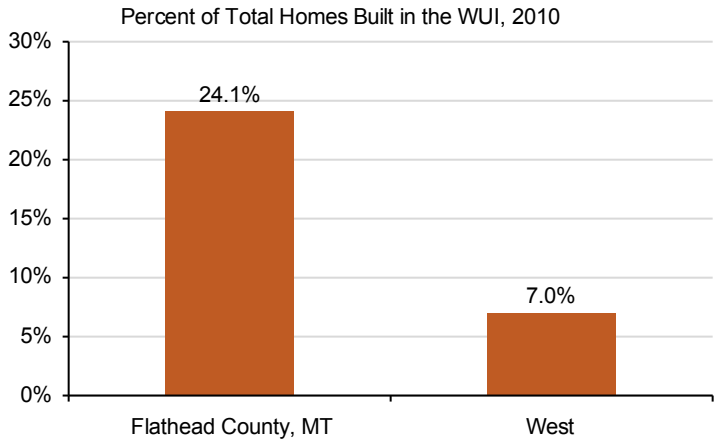
How many homes are in the WUI, and what proportion are permanently versus seasonally occupied?

This page measures the total number of homes compared to the subset of homes in the WUI and how many of those homes are permanent or second homes.

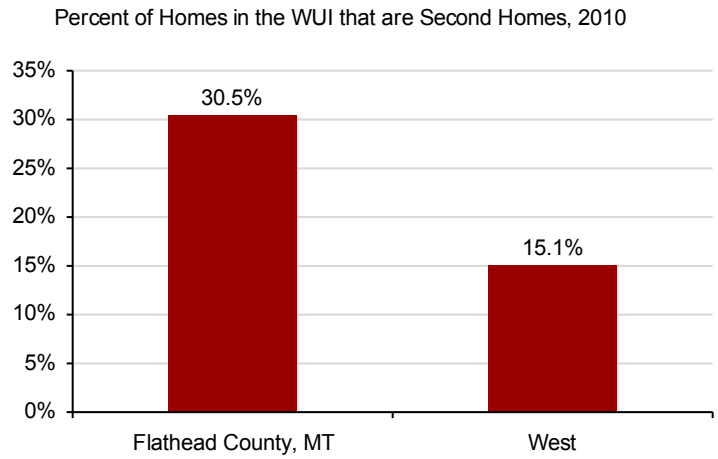
Total Homes and Wildland-Urban Interface Homes, 2010

	Flathead County, MT	West
Total Number of Homes	46,963	27,766,144
WUI Homes	11,327	1,947,927
Second Homes in WUI	3,451	293,196
Percent of Total		
WUI Homes as % of Total Homes	24.1%	7.0%
Second Homes as % of WUI Homes	30.5%	15.1%

- In 2010, Flathead County, MT had the largest percent of total homes (24.1%) built inside the WUI, and the West had the smallest (7%).



- In 2010, Flathead County, MT has the largest share of second homes in the WUI (30.5%), and the West has the smallest (15.1%).



Data Sources: Gude, P.H., Rasker, R., and van den Noort, J. 2008. Potential for Future Development on Fire-Prone Lands. Journal of Forestry 106(4):198-205; U.S. Department of Commerce. 2011. TIGER/Line 2010 Census Blocks and 2010 Summary File 1, Washington, D.C.

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How many homes are in the WUI, and what proportion are permanently versus seasonally occupied?

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This page measures the total number of homes compared to the subset of homes in the WUI and how many of those homes are permanent or second homes.

Second Homes: These are residences used only in certain seasons, for weekends, or other occasional uses throughout the year.

Why is it important?

This page focuses on housing that borders federally managed public forestlands in the West. Roughly 70 percent of western forests are publicly owned. Because wildfire is a natural disturbance in many of these forests, this creates a potential risk to adjacent private lands.

Homes built near forested public lands are much more likely to be second homes compared to homes built on other private western lands. One in five homes near public forests in the West is a second home, compared to one in twenty-five homes on other western private lands. Understanding how many of the homes are second homes is important because it puts the cost and danger of protecting homes into a context: are lives being risked, and billions of dollars being spent, to protect people's vacation homes?

Across the West, only 14 percent of private land adjacent to forests has homes on it. But this relatively small percentage is tremendously expensive. When combining local, state, and federal efforts, the cost to protect homes from forest fires exceeds $1 billion per year. If 50 percent of the forested private lands were developed, firefighting costs could exceed $4 billion.

Methods

The data were calculated using Geographic Information System (GIS) tools. A buffer of 500 meters surrounding forested public lands, including federal, state, and locally managed forests, was mapped, and residential areas that fell within this buffer were identified. The Protected Areas Database was used to map public lands in California, Colorado, Idaho, New Mexico, Nevada, Oregon, Utah, Washington, and Wyoming, and state data sources were used to map public land boundaries in Montana and Arizona.

To identify where housing has occurred adjacent to forested wildlands in the West, maps of housing density were created at the scale of 2010 Census blocks. The threshold of 40-acre lot sizes was used to identify residential development because at this home density, areas are generally considered to be more populated than working agricultural lands, although some high-value agricultural operations, including orchards, can be profitable at this lot size.

Detailed descriptions of methods are provided on the last page of this report and in the references cited under Additional resources.

Additional Resources

For an overview and statistical analysis of WUI development for the eleven western states and their counties, see: headwaterseconomics.org/wildfire *(2)*.

For a peer-reviewed journal article, see: Gude, P.H., R. Rasker, J. van den Noort. 2008. Potential for Future Development on Fire-Prone Lands. Journal of Forestry 106(4): 198-205. Available at headwaterseconomics.org/wildfire/PGude_2008_Forestry.pdf *(5)*.

For a discussion of improving firefighter and homeowner safety, see:
Cohen, J.D. 2000. Preventing Disaster: Home Ignitability in the Wildland-Urban Interface. J. Forestry. 98(3):15-21.

Butler, B.W., and J.D. Cohen. 1998. Firefighter Safety Zones: A Theoretical Model Based on Radiative Heating. Int. J. Wildland Fire. 8(2):73-77.

Nowicki, B. 2002. The Community Protection Zone: Defending Houses and Communities from the Threat of Forest Fire. Available at: biologicaldiversity.org/swcbd/programs/fire/wui1.pdf *(6)*.

Data Sources

Gude, P.H., Rasker, R., and van den Noort, J. 2008. Potential for Future Development on Fire-Prone Lands. Journal of Forestry 106(4):198-205; U.S. Department of Commerce. 2011. TIGER/Line 2010 Census Blocks and 2010 Summary File 1, Washington, D.C.

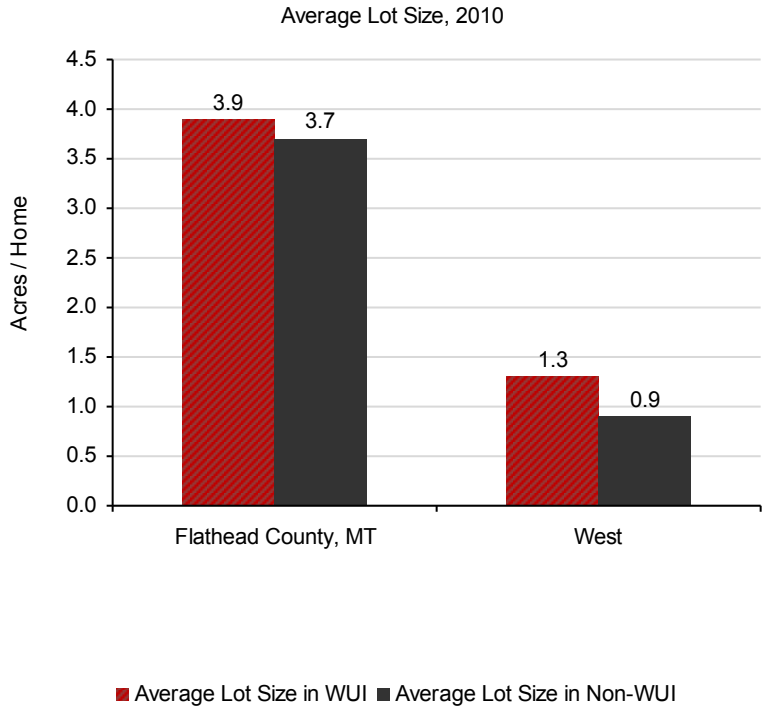
How much land is used inside and outside of the WUI?

This page provides both the total number of residences (homes) as well as the subsets of homes in and outside the WUI. It also shows the average lot size (in acres) of homes within the WUI compared to homes outside of the WUI.

Average Lot Sizes (Acres/Home), 2010

	Flathead County, MT	West
Average Lot Size	3.7	0.9
Total Number of Homes	46,963	27,766,144
Total Residential Acres	175,361	24,584,252
Average Lot Size in WUI	3.9	1.3
WUI Homes	11,327	1,947,927
WUI Residential Acres	43,787	2,455,779
Average Lot Size in Non-WUI	3.7	0.9
Non-WUI Homes	35,636	25,818,217
Non-WUI Residential Acres	131,574	22,128,473

- In 2010, the largest difference in lot sizes in and outside the WUI occurred in the West. In the WUI, the average lot size was 1.3 acres and outside the WUI the average lot size was 0.9 acres.



Data Sources: Gude, P.H., Rasker, R., and van den Noort, J. 2008. Potential for Future Development on Fire-Prone Lands. Journal of Forestry 106(4):198-205; U.S. Department of Commerce. 2011. TIGER/Line 2010 Census Blocks and 2010 Summary File 1, Washington, D.C.

How much land is used inside and outside of the WUI?

What do we measure on this page?

This page provides both the total number of residences (homes) as well as the subsets of homes in and outside the WUI. It also shows the average lot size (in acres) of homes within the WUI compared to homes outside of the WUI.

Why is it important?

Residential lots built in the WUI are much more likely to take up more space than homes built in the non-WUI. This is an important characteristic of the WUI because low-density housing is more costly to protect. In other words, what matters when calculating the costs of protecting homes from wildfires is not just the number of homes, but the per acre use of land per home.

Residential lots near wildlands also take up more than twice the space of homes built in other places. On average across the West, housing near forested land covers 2.3 acres per residence compared to 1.1 acres per residence on other western private lands. This is important because sprawled housing costs more to protect from wildfire.

On behalf of the Montana State Legislature, Headwaters Economics conducted a more detailed analysis of the costs of protecting homes from wildfire in the state of Montana. Headwaters Economics analyzed daily fire suppression costs across 30 large fires that burned in Montana during 2006 and 2007, extracting the portion of total fire suppression costs directly associated with housing. The study discovered that in Montana firefighting costs are highly correlated with the number of homes threatened by a fire.

More importantly, the pattern of development is a significant factor, with dispersed development (i.e. larger lot sizes) contributing more to the cost of fighting fires. For example, one dense subdivision is less costly to protect than the same number of homes spread across a large area of land. This discrepancy in cost between dense vs. sprawled development is important since, in the western U.S., residential lots in the WUI usually take up more space than homes built in other places. Headwaters Economics is replicating the study for California and New Mexico.

Methods

The data were calculated using Geographic Information System (GIS) tools. A buffer of 500 meters surrounding forested public lands, including federal, state, and locally managed forests, was mapped, and residential areas that fell within this buffer were identified. The Protected Areas Database was used to map public lands in California, Colorado, Idaho, New Mexico, Nevada, Oregon, Utah, Washington, and Wyoming, and state data sources were used to map public land boundaries in Montana and Arizona.

To identify where housing has occurred adjacent to forested wildlands in the West, maps of housing density were created at the scale of 2010 Census blocks. The threshold of 40-acre lot sizes was used to identify residential development because at this home density, areas are generally considered to be more populated than working agricultural lands, although some high-value agricultural operations, including orchards, can be profitable at this lot size.

Detailed descriptions of methods are provided on the last page of this report, and in the references cited under Additional Resources.

Additional Resources

Headwaters Economics. August 2008. Montana Wildfire Cost Study, available at: headwaterseconomics.org/wildfire/HeadwatersEconomics_FireCostStudy_TechnicalReport.pdf *(7)*.

For a peer reviewed report, see: Gude, P.H., R. Rasker, J. van den Noort. 2008. Potential for Future Development on Fire-Prone Lands. Journal of Forestry 106(4): 198-205. Available at: headwaterseconomics.org/wildfire/PGude_2008_Forestry.pdf *(5)*.

Two National Academy of Public Administration reports that may be helpful are:

Wildland Fire Costs: Enhancing Hazard Mitigation Capacity. January 2004. See: napawash.org/Pubs/WildfireJan04.htm *(8)*.

Wildfire Suppression: Strategies for Containing Costs. September 2002. See: napawash.org/Pubs/Wildfire9_30_02.pdf *(9)*.

Data Sources

Gude, P.H., Rasker, R., and van den Noort, J. 2008. Potential for Future Development on Fire-Prone Lands. Journal of Forestry 106(4):198-205; U.S. Department of Commerce. 2011. TIGER/Line 2010 Census Blocks and 2010 Summary File 1, Washington, D.C.

Existing and Potential Risk

What is the wildfire risk to development?

This page measures the risk of wildfire for lands already developed in the WUI and the potential risk of wildfire should homes be build on undeveloped land in the WUI. The geographies are ordered within the eleven western states in both absolute and percentile rankings.

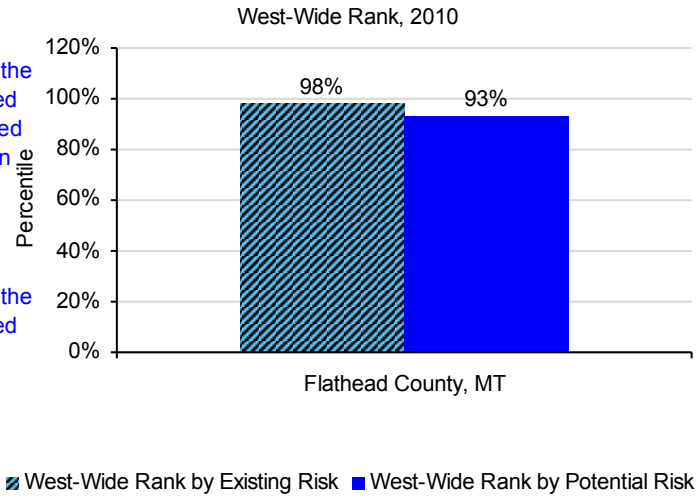
West-Wide and State-Wide County Rankings, 2010

	Flathead County, MT	West
West-Wide Rank by Existing Risk	10 of 414	na
West-Wide Rank by Potential Risk	27 of 414	na
State-Wide Rank by Existing Risk	1 of 56	na
State-Wide Rank by Potential Risk	4 of 56	na

Percentile

West-Wide Rank by Existing Risk	98%	na
West-Wide Rank by Potential Risk	93%	na
State-Wide Rank by Existing Risk	98%	na
State-Wide Rank by Potential Risk	93%	na

- In 2010, Flathead County, MT was in the 98 percentile in the West when ranked by existing risk (the amount of forested land where homes have already been built next to public lands).
- In 2010, Flathead County, MT was in the 93 percentile in the West when ranked by future potential risk (the area of undeveloped, forested private land bordering fire-prone public lands).



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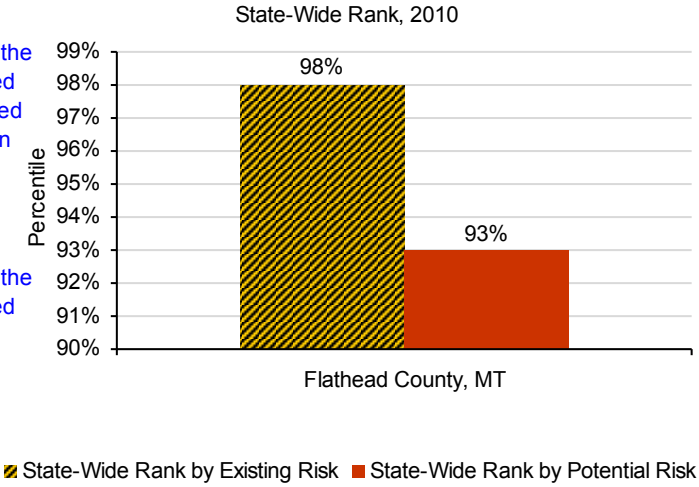
- In 2010, Flathead County, MT was in the 93 percentile in the state when ranked by future potential risk (the area of undeveloped, forested private land bordering fire-prone public lands).



Data Sources: Gude, P.H., Rasker, R., and van den Noort, J. 2008. Potential for Future Development on Fire-Prone Lands. Journal of Forestry 106(4):198-205; U.S. Department of Commerce. 2011. TIGER/Line 2010 Census Blocks and 2010 Summary File 1, Washington, D.C.

Study Guide and Supplemental Information

What is the wildfire risk to development?

What do we measure on this page?

This page measures the risk of wildfire for lands already developed in the WUI and the potential risk of wildfire should homes be built on undeveloped land in the WUI. The geographies are ordered within the eleven western states in both absolute and percentile rankings.

Existing Risk: Counties are ranked by the number of acres of forested land where homes have already been built next to public lands. For example, the west-wide rank may show that a county ranks 1st among the 413 western counties. This would indicate that the county has the highest "existing risk" (i.e., the 100th percentile). The state-wide rank for another county may show that it ranks 45th among the 50 counties within its state. This would indicate that the county has a low "potential risk" (i.e., the 10th percentile) relative to other counties in the same state.
Potential Risk: Counties are ranked by the number of acres of undeveloped, forested private land bordering fire-prone public lands.

Why is it important?

Defending homes from the risk of wildland fire is a major cost for public land agencies. The National Academy of Public Administration estimates that in the United States 2.2 million homes are expected to exist in the WUI by the year 2030 -- a 40 percent increase over 2001 levels.

While home construction is not the only contributor to the rising cost of fighting fires, it is an important factor and one that is expected to rise with continued development, particularly in the absence of well thought-out land use planning. A warming climate will exacerbate the costs even further.

Data on this page raise important questions about whether the selected geographies have significant acreage in the WUI that is not yet developed, and whether public land managers and local and state officials are planning for this potential development and its associated costs and risks.

Methods

See the last page of this report as well the article by Gude et al. (2008) cited in the data sources for definitions and methods.

Additional Resources

For a study of how an increase in temperatures could impact fire suppression costs, see: Gude, P.H., J.A. Cookson, M.C. Greenwood, M. Haggerty. 2009. Homes in Wildfire-Prone Areas: An Empirical Analysis of Wildfire Suppression Costs and Climate Change. In preparation for submission to journal. Available at headwaterseconomics.org/wildfire/Gude_Manuscript_4-24-09_Color.pdf [10].

Schoennagel T., C.R. Nelson, D.M. Theobald, G.C. Carnwald, and T.B. Chapman. 2009. Implementation of National Fire Plan Treatments Near the Wildland-Urban Interface in the Western United States. Proceedings of the National Academy of Sciences. 106 (23): 10706-10711. This article can be found at: pnas.org/content/early/2009/06/05/0900991106.abstract [11].

Menakis, J.P., J. Cohen, and L. Bradshaw. 2003. Mapping wildland fire risk to flammable structures for the conterminous United States. Pages 41-49 in K.E.M. Galeey, R.C. Klinger, and N.G. Sugihara (eds.).

Theobald. T.D. and W.H. Romme. 2007. Expansion of the U.S. Wildland-Urban Interface. Landscape and Urban Planning. 83: 340-354.

Data Sources

Gude, P.H., Rasker, R., and van den Noort, J. 2008. Potential for Future Development on Fire-Prone Lands. Journal of Forestry 106(4):198-205; U.S. Department of Commerce. 2011. TIGER/Line 2010 Census Blocks and 2010 Summary File 1, Washington, D.C.

Data Sources

The EPS-HDT Development and the Wildland-Urban Interface (WUI) report uses a set of specific West-wide data sources to quantify measures of fire risk related to residential development. In an effort to report more accurate statistics for land ownership, a compilation of state level data was used. All of the spatial data in this report were the result of calculations made in Geographic Information Systems (GIS). The contact information for these databases is:

- **Protected Areas Database 1.3 2012**
  US Geological Survey, Gap Analysis Program (GAP)
  http://gapanalysis.usgs.gov/padus/

- **2010 Decennial Census**
  Census Bureau, U.S. Department of Commerce
  http://wwwcensus.gov
  Tel 303-969-7750

- **MODIS Land Cover Type 2006**
  National Aeronautics and Space Administration
  http://modis-land.gsfc.nasa.gov/landcover.htm

Methods

In this report, we focus on housing that borders federal public forestlands in the West. Roughly 70 percent of western forests are publicly owned. Since wildfire is a natural disturbance in many of these forests, this creates a potential risk to adjacent private lands. Fire risk is extremely difficult to quantify. Since most western forests burn at some point and residential areas are rarely abandoned, for the purpose of this report, all forested public lands were considered susceptible to wildfire.

A buffer of 500 meters surrounding forested public lands, including federal, state, and locally managed forests, was mapped, and residential areas that fell within this buffer were identified. The forested public lands were identified based on the following classes from satellite classified land cover maps: evergreen needleleaf forest, evergreen broadleaf forest, deciduous needleleaf forest, deciduous broadleaf forest, mixed forests, closed shrublands. Although open shrublands and grasslands are also prone to wildfire, defending homes in these habitats tends to be less dangerous and less expensive. Since guidelines for the amount of defensible space necessary to protect homes range from 40 to 500 meters, the threshold of 500 meters was used to identify where residential development occurs adjacent to fire-prone public lands. This is a conservative estimate of the WUI and the associated risk of fire, since it is unknown how many home owners within this zone have followed defensible space guidelines.

In order to identify where housing has occurred adjacent to forested wildlands in the West, maps of housing density were created at the scale of 2000 Census blocks. Forested areas where residential development (census blocks with mean lot sizes less than 40 acre) occurred within 500 meters (0.31 miles) of public lands were identified. The threshold of 40 acre lot sizes was used to identify residential development because at this home density, areas are generally considered to be more populated than working agricultural lands. The mean lot size per Census block was calculated by dividing the number of housing units by the area of private land (public lands and any water bodies were excluded).

For each western state and for the West as a whole, the area of forested wildland interface containing homes, i.e., the WUI, was compared to the area of undeveloped forested wildland interface. Per state, the number of homes in the wildland interface was calculated, as well as the percent of these homes that are second homes. The number of second homes within the WUI was calculated by adding the number of “seasonally occupied” homes, as specified in by the Census SF1 H005005 field, to the number of “other vacant” homes, as specified in the Census SF1 H005007 field. These counts do not include homes that are vacant because they are for rent or sale.

Two measures were used to identify counties with high existing and high potential risk of wildland fire to homes. Existing risk was measured in terms of the total area of WUI per county, and potential risk was represented by the area of undeveloped forested wildland interface, where home construction could occur in the future.

For additional information about methods used to generate metrics in this report, see: Gude, P.H., Rasker, R., and van den Noort, J. 2008. Potential for Future Development on Fire-Prone Lands. Journal of Forestry 106(4):198-205.

Links to Additional Resources

For more information about EPS see:

headwaterseconomics.org/EPS

Web pages listed under Additional Resources include:

Throughout this report, references to on-line resources are indicated with italicized numbers in parentheses. These resources are provided as hyperlinks here.

1 www.silvis.forest.wisc.edu/library/WUIDefinitions2.asp
2 headwaterseconomics.org/wildfire.php
3 headwaterseconomics.org/wildfire/HeadwatersFireCosts.pdf
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