

# **IDENTIFYING AND ASSESSMENT OF COMMUNITIES AT RISK IN OREGON**

## **Draft Version 4.0**

**October 18, 2004**

**Scope:** This assessment methodology provides for a “seamless” process for identification and wildfire risk assessment of Oregon’s communities that is appropriate at all levels resolution – from statewide to community to parcel.

**Background:** Assessment of wildfire’s threat to communities in Oregon is occurring at several levels.

- The state will be using the National Association of State Forester’s (NASF) *Field Guide* during the next 12 months with the desired outcome to identify and assess Oregon’s communities to meet the needs of the “Collaborative Fuels Treatment MOU” and Task e, Goal 4 of the *Implementation Plan for the 10-Year Comprehensive Strategy*.
- The state is also beginning implementation of Oregon’s Forestland-Urban Fire Protection Act of 1997 (SB360), which will use procedures contained in Oregon Administrative Rules to identify and classify forestlands in nearly every county in the state over the next 10 years.
- Many counties and communities are beginning a wildfire assessment with the desired outcome to:
  - Meet federal FEMA requirements for a wildfire mitigation plan (Title 44 CFR Part 201 of The Disaster Mitigation Act of 2000) and
  - Prioritize Title III and National Fire Plan projects.
- Additionally, individual communities and watershed councils are completing neighborhood level assessments as part of their neighborhood/community fire plans.
- The Healthy Forests Restoration Act of 2003 (HFRA) and a new federal fire management planning process addresses community fire plans and identification of WUI lands within and adjacent to “at-risk” communities.

**Purpose:** Provide a tiered collaborative process that best serves the various needs at the appropriate resolutions of assessment. – from statewide to an individual neighborhood. The assessment includes all lands and ownerships and collaboratively considers the complexity of ownership patterns, resource management issues and stakeholder interests. The higher quality local assessments will be used to further refine the statewide assessment.

### **Process Overview**

ODF, with cooperators through a statewide steering committee will:

- Design and conduct a coarse scale statewide risk assessment to initially prioritize fire mitigation needs.
- Set standards and provide certain data for counties and communities to conduct a fire risk assessment.
- Initiate and maintain a risk assessment map and database for the state.

Counties and communities will:

- Using statewide standards, collaboratively further identify unique communities within their jurisdiction.
- Using statewide standards, collaboratively further refine the risk assessment
- Submit results to ODF for approval to be up-dated in statewide risk assessment.

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### **Identifying/Naming Communities to be Assessed**

**Background:** Under agreement of the NAFS and federal agencies, states are responsible for identification of communities at risk. For management of nearby federal lands, communities, through an approved *Community Wildfire Protection Plan (CWPP)*, will identify areas (Wildland-Urban Interface) within and adjacent to these state-identified communities using criteria contained in the HFRA. In areas not covered by a CWPP, federal agencies will determine the WUI boundary.

NASF Guidance defines *community* as “ a group of people living in the same locality and under the same government.”

The HFRA defines an “at-risk community” as:

- 1) An area comprised of:
  - Where humans and their development meet or intermix with wildland fuel (federal register definition, January 4, 2001, which uses a structure density of 1 per 40 acres or population of 28 person per square mile), or
  - Or a group of homes and other structures with basic infrastructure and services within or adjacent to federal land;
- 2) in which conditions are conducive to a large scale wildland fire event; and
- 3) for which a significant threat to human life or property exists as a result of a wildland fire disturbance event.

For its list of communities at risk in Oregon, ODF defines *community at risk* as ***a geographic area within and surrounding permanent dwellings with basic infrastructure and services, under a common fire protection jurisdiction or government, for which there is a significant threat due to wildfire.***

#### **Identifying communities for initial statewide assessment:**

- Geographic areas where at least 1 structure per 40 acres meet or intermix with wildland fuel are identified (federal register criteria).
- Adjacent landscapes that contain vegetation creating a risk to the community, generally a sixth field watershed, and municipal watersheds.
- These geographic areas are subdivided by the boundary of the jurisdictional with primary constitutional authority for protection of life from wildfire (Cities, fire districts, and county board of commissioners for “unprotected” areas).

#### **Identifying communities for county and community assessments:**

- For the purpose of providing a better community risk assessment and fire plan (and development of community wildfire protection plans under the HFRA), the jurisdictional areas identified at the statewide level should be divided into logical community boundaries collaboratively with fire districts, cities and counties. An unincorporated *rural community* without a common government or fire district providing structural fire protection is defined as consisting primarily of permanent residential dwellings but also at least two other land uses that provide commercial, industrial, or public uses (e.g. schools, churches, grange halls, post offices) to the community, surrounding rural area or persons traveling through the area (Oregon Department of Land Conservation and Development 1994).

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### **Assessment of Risk Factors**

Related to wildfire assessment, it is clear that one-size-does-not-fit-all. However, nearly all assessment models consider **risk, hazard, protection capabilities and values protected**. In addition, an assessment of the **vulnerability of values at risk** is needed for community down to parcel level assessments. Complex assessment worksheets available through Firewise, NFPA, RAMS, Western Fire Chiefs Association, International Fire Code Institute, and various states can be boiled into these groupings. FEMA requires risk assessments to profile hazards, vulnerabilities, and impacts in terms of location, extent, previous occurrence, and potential dollar loss to vulnerable assets.

Consistent with the NASF Guidance, an adjective rating of *Low, Moderate, or High* will be used to describe each factor (an additional *Very High* rating is allowed for Hazard) for the statewide assessment. However, field-testing has shown that there is a need for finer resolution of the data to accommodate local assessments. For example, it's possible that nearly every community in a county could receive a statewide rating of High for a factor. This would do little to help a local government or community prioritize areas of concern. To maintain the integrity of the statewide rating, yet provide of local needs, a point system that provides for a wide range of points for each factor is used. However, when this assessment is rolled up to the state, the statewide score system will be used

This paper provides a process for consistently assigning these adjective values. It uses *best available data* (BAD) for various resolutions of assessment.

### **Weighting of Factors**

Risk: 40 Points

Hazard: 80 Points

Protection Capability: 40 points

Values at Risk: 50 Points

Structural Vulnerability: 90 Points

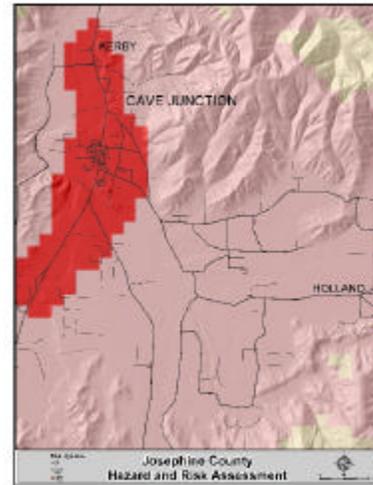
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**Risk: What is the likelihood of a fire occurring?**

Statewide: Use historic wildfire occurrence provided by ODF, OSFM, and federal land management agencies and tribes.

<b>Historic fire occurrence</b>	<b>Points</b>
<u>Fire occurrence - per 1000 acres per 10 years</u>	
(Low) 0-1	5
(Moderate) .1-1.1	20
(High) 1.1+	40

Local: Use of historic fire occurrence alone would be adequate (see Josephine County Example). However, in addition, an assessment of **ignition risk potential** may help local communities better assess potential fire starts and design appropriate fire prevention strategies into a fire plan. The list of ignition sources in the RAMS model is a good source: *Transmission power lines, above ground distribution lines, power substations, active logging, construction, debris burning, slash burning, mining, dispersed camping, developed camping, off-road vehicle use, flammables present, fireworks, mowing dry grass, woodcutting, equipment use, target shooting, military training, arson, cultural activities, railroad, federal/state highway, county road, public access roads, camps/resorts/stables, schools, business, ranch/farm, lightning prone, dump*



**Historic fire occurrence**

<u>Fire occurrence - per 1000 acres per 10 years</u>	
0-0.1	5
0.1 –1.1	10
1.1+	20

**Ignition Risk**

<u>Home density (homes per 10 acres)</u>	
0-.9 (rural)	0
1-5.0 (suburban)	5
5.1+ (urban)	10
<u>Other risk factors present in vicinity</u>	
< 1/3 present	0
1/3-2/3 present	5
> 2/3 present	10

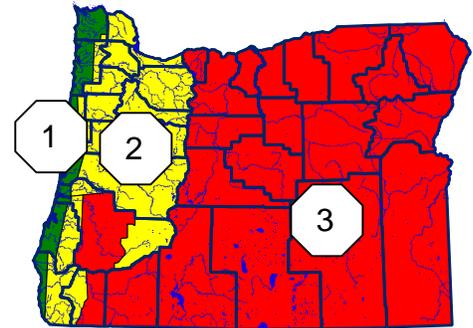
<b>Category</b>	<b>Rating</b>	<b>From</b>	<b>To</b>
Low		0	13
Moderate		13	27
High		27	40

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**Hazard:** What is the resistance to control once a wildfire starts, being the weather, topography and fuel that adversely affects suppression efforts

Hazard is closely associated with fire weather, topography, and fuels (the fire behavior triangle).

**Weather Hazard Factor Value:** All levels: The number of days per season that forest fuels are capable of producing a significant fire event is important to consider. The reference for establishing the wildfire weather hazard factor is data provided by the Oregon Department of Forestry, which was developed following an analysis of daily wildfire danger rating indices in each regulated use area of the state and which is described in Table 1 of OAR 629-044-0230.



State/Community/Parcel	
OAR Table 1	Points
Non-forest in any zone (mask out)	0
1	0
2	20
3	40

**Topographic Hazard Factor Value:**

All levels: Slope and aspect affect both the intensity and rate of spread of a wildfire. Elevation affects the type of vegetation and the length of the season. The topography hazard factor is determined by considering slope, aspect, and elevation using DEM's. Each factor is added together to determine the topographic value:

Topography	Points
<u>Slope</u>	
0-25%	0
26-40%	2
>40%	3
<u>Aspect</u>	
N, NW, NE	0
W, E	3
S, SW, SE	5
<u>Elevation feet above sea level</u>	
5001+ feet	0
3501-5000 feet	1
0-3500 feet	2

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**Natural Vegetative Fuel Hazard Factor Value:**

Given high-to-extreme fire danger for a geographic area, vegetation is the primary factor affecting the intensity of the fire, thus the resistance to control and the potential threat to protected resources (lives, property, and resources). It also affects the amount and travel distance of burning embers that again, significantly impact the resistance to control and the potential threat to protected resources

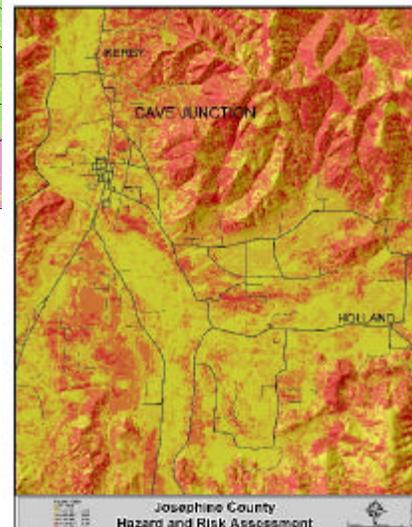
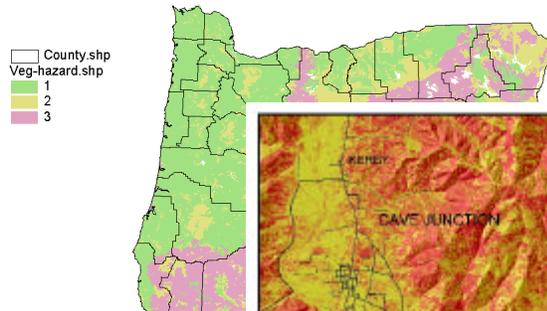
Determine by using fire behavior fuel models and/or potential flame length.

State/Community/Parcel*		
Fuel Hazard Factor	Fuel Model	Fire Characteristics
1	Grass (1) Low/less flammable brush (5) and short-needle timber litter (8)	Typically produces a flame length of up to 5 feet, a wildfire that exhibits very little spotting, torching, or crowning, and which results in a burned area that can normally be entered within 15 minutes.
2	Grass/Timber (2) Moderate brush, conifer reproduction, open sage and juniper (6)	Typically produces a flame length of 5 to 8 feet, a wildfire that exhibits sporadic spotting, torching, or crowning, and which results in a burned area that can normally be entered within one hour. Mixed severity.
3	Tall flammable grasses (3) Heavy/flammable brush (4), and mature timber with slash (10)	Typically produces a flame length of over 8 feet, a wildfire that exhibits frequent spotting, torching, or crowning, and which results in a burned area that normally cannot be entered for over one hour. Stand replacement severity.

Statewide: Best available data statewide will likely be a combination of grid vegetation and the GAP vegetation types with a cross-walk to hazard value (determined by an expert panel representing all areas – similar to Colorado assessment). Below is a sample of vegetation hazard value statewide using GAP data as a test (no collaboration or statewide input).

**Vegetation (fuel model)**  
**SB360 - Natural Vegetative**  
**Fuel Hazard**

	Points
Non-forest	0
1	5
2	15
3	30



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Local: The quality of fuels data varies significantly statewide. The best available data should be used to determine the expected fire behavior. Where data exists to determine crown fire potential, use the point system that follows:

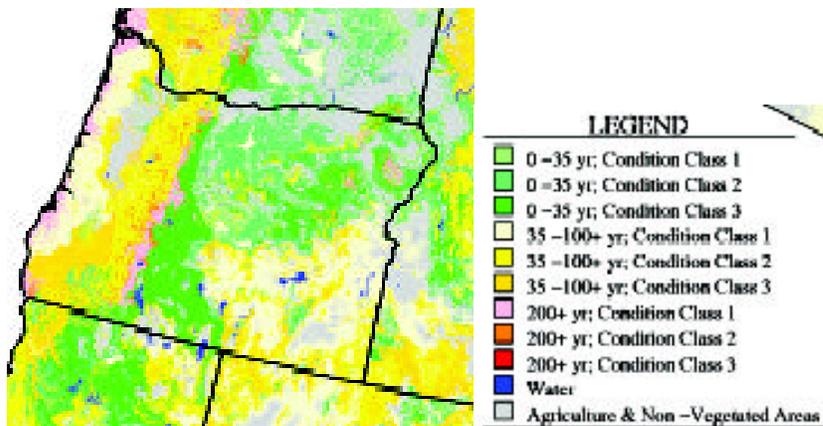
<b>Vegetation (fuel model)</b>	<b>Points</b>
<u>SB360 - Natural Vegetative Fuel Hazard</u>	
Non-forest	0
1	5
2	15
3	20

Areas exposed to crown potential (including areas of insect and disease infestation, wind throw, and slash)

Passive - Low	0
Active - Moderate	5
Independent - High	10

Note: Federal land management agencies are moving toward *condition class* rather than fuel model to assess hazard and prioritize projects. Discussions have begun with Region 6 staff as to how best coordinate this potential conflict. The good news is that condition class will likely be a close fit to the cross walk from vegetation to natural vegetation hazard. The clip below from a national condition class map (<http://www.fs.fed.us/fire/fuelman/curcond2000/maps/frcc2000.pdf>) shows similar results, except for the west slope of the Cascades (which could be resolved in development of the cross-walk).

<u>Category Rating</u>	<u>To</u>
Low	9
Moderate	40
High	60
Extreme	80

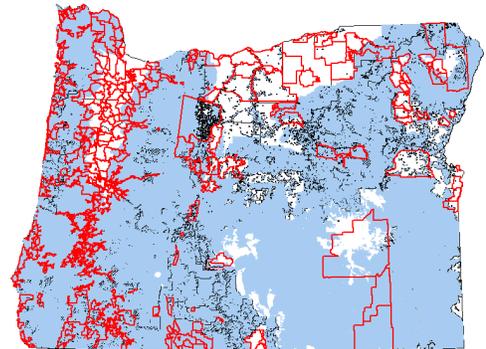


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**Protection Capabilities: What are the risks associated with wildfire protection capabilities, including capacity and resources to undertake fire prevention measures?**

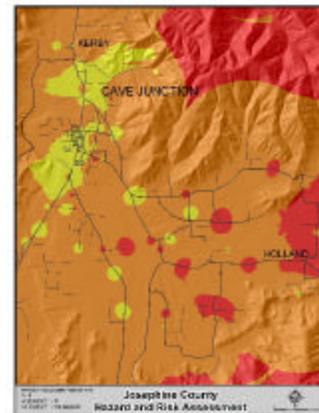
Protection capability is a combination of the capacities of the fire protection agencies, local government and community organizations. A high score represents high risk/low protection capability.

Statewide: Best available data to evaluation protection capability on a statewide basic is the absence or presence of structural and wildland protection agencies, using structural fire district boundaries and wildland protection boundaries.



Fire response	Points
Organized response	
Both structural and wildland	5
Wildland response only	15
No organized response	40

County and local: This system starts by assessing the fire response and then is increased based upon proven mitigation efforts of the community that will make the fire response effective. To assist with local assessments and planning, these factors should be identified and mapped as factors that will either increase or decrease the effectiveness of the protection system (i.e., areas with limited fire access that would lead to planning escape routes, safety zones, and/or road brushing projects). Generally, areas more than 300 feet for a road or driveway should be considered a limited response.



Fire response	Points
Organized structural response < 10 minutes	0
Inside fire district, but structural response > 10 minutes	8
No structural protection, wildland response < 20 min	15
No structural response & wildland protection > 20 minutes	36

Community preparedness	Points
Organized stakeholder group, community fire plan, phone tree, mitigation efforts	0
Primarily agency efforts (mailings, fire free, etc)	2
No effort	4

Category Rating	From	To
Low Risk	0	9
Moderate Risk	10	16
High Risk	17	40

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**Values Protected: What are the human and economic values associated with communities or landscapes (NASF definition)?**

Statewide: Assessment of values is best accomplished at the local level. However, although protection priorities vary between agencies, protection of life is number one for all. In addition to number of lives at risk, identification of population or structure density accomplishes an assessment of associated values of community infrastructure and property.

<b>Life/Property</b>	<b>Points</b>
<u>Population density (per square mile)</u>	
28-111(rural)	10
112-559(suburban)	30
560+(urban)	50

County and local: Values at risk and setting protection priorities is best accomplished locally. For a general assessment of life, either population density (above) or home density (below) is appropriate. However, identification and evaluation of additional human and economic values is needed for FEMA and community fire planning. It's important to identify **community** values at risk from wildfire

<b>Life/Property</b>	<b>Points</b>
<u>Homes - density (homes per 10 acres)</u>	
.1 -.9 (rural)	10
1-5.0 (suburban)	30
5.1+ (urban)	50

**OR**

<b>Life/Property</b>	<b>Points</b>
<u>Homes - density (homes per 10 acres)</u>	
.1 -.9 (rural)	2
1-5.0 (suburban)	15
5.1+ (urban)	30
<u>Community Infrastructure</u>	
Presence of an identified community infrastructure (examples below)	
None	0
One present	10
More than one present	20

Power substations & corridors, communication sites and facilities, transportation corridors, major manufacturing and utilities facilities, municipal watersheds, water storage and distribution, fuel storage facilities, hospitals and health care facilities, landfills and waste treatment facilities, schools, churches, community centers, and stores.

<b>Category Rating</b>	<b>From</b>	<b>To</b>
<b>Low</b>	<b>0</b>	<b>15</b>
<b>Moderate</b>	<b>16</b>	<b>30</b>
<b>High</b>	<b>31</b>	<b>50</b>

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**Structural Vulnerability: What is the likelihood that structures will be destroyed by wildfire?**

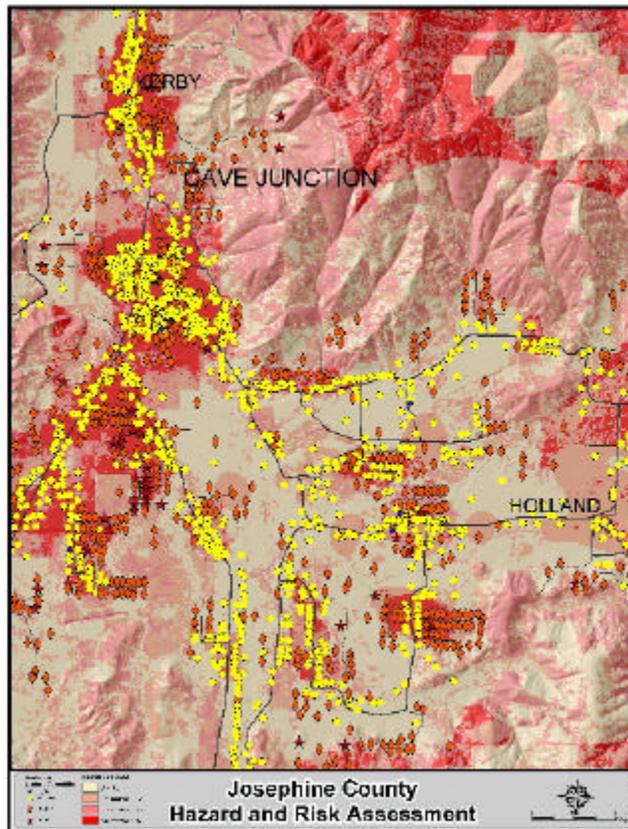
Risk, hazard, and protection capabilities account for 90% of the likelihood of a wildfire event threatening life and property. However, factors controlled by landowners within what is now being called the home ignition zone account for 90% of the likelihood of a wildfire threatening the structures. The three primary factors are roofing assembly, defensible space, and presence of suppression action (access).

Statewide: It's not practical to evaluate structural vulnerability at the statewide level.

Local: An assessment of structural vulnerability is best accomplished by on-site visits. The results are best displayed as points over the completed risk assessment (see example to left). Areas of "red-on-red" are at highest risk of loss of structures.

Viewing factors individually will assist in determining what is causing the problem. Mapping of what is causing access issues (dead-end roads, poor bridges, heavy roadside fuel) etc) will be helpful in planning mitigation.

The table below displays two options of scoring. You can use local ordinances or the NFPA's 1144 (the portion dealing with structural vulnerability).



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<b>Structure</b>	Local	NFPA
<u>Flammable roofing</u>		
Non-wood roofing	0	
Wood roofing	30	
<u>Roofing assembly</u>		
Class A roofing		0
Class B roof		5
Class C roof		10
Non-rated roof		20
<u>Building materials</u>		
Fire-resistant siding, eves and deck		0
Fire-resistant siding, eves and combustible deck		5
Combustible siding and deck		10
<u>Building setback to slopes &gt; 30%</u>		
0 - 30 feet to slope		1
> 30 feet from slope		5
<b>Defensible space</b>		
<u>Defensible space</u>		
Meets local requirements	0	
Non-compliant with local standards	30	
> 100 feet		1
71-100 feet		3
30-70 feet		10
< 30 feet		25
<u>Separation of adjacent homes contribute to fire spread</u>		
> 100 feet apart		0
60-100 feet apart		3
< 60 feet apart		5
<b>Fire access</b>		
<u>Roads and driveways</u>		
Within 300 feet of access that meets local requirements	0	
Non-compliant with local standards	30	
<u>Ingress/egress</u>		
TWO or more roads in/out		0
ONE road in/out		7
<u>Road width</u>		
> 24 feet		0
24-20 feet		2
<20 feet		4
<u>All-season road condition</u>		
Surfaced, grade < 5%		0
Surfaced, grade > 5%		1
Non-surfaced, grade < 5%		1
Non-surfaced, grade > 5%		3
Other than all-season		4

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<u>Fire service access</u>		
< 300 feet with turnaround		0
> 300 feet with turnaround		2
< 300 feet without turnaround		4
> 300 feet without turnaround		5
<u>Street signs</u>		
Present - 4 inch and reflective		0
Absent		5

<u>Category</u>	<u>Rating</u>	<u>From</u>	<u>To</u>
	Low	0	30
	Moderate	31	60
	High	61	90